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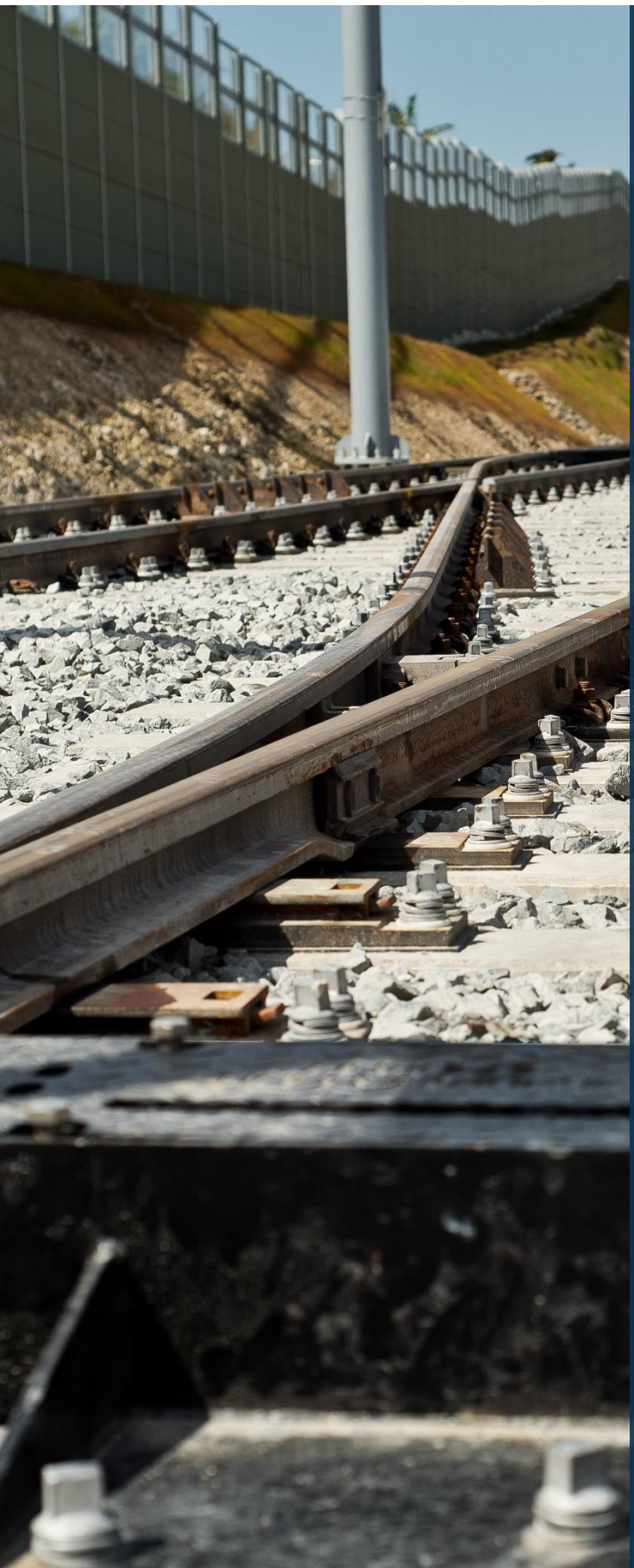

FLOOD DESIGN REPORT

A2I | Albury to Illabo

Package: A2I –Yerong Creek Yard

CONTRACT NUMBER: 0052

PROJECT DOCUMENT NUMBER:

5-0052-210-IHY-G3-RP-0001

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GLOSSARY

Specific terms and acronyms used throughout this plan and sub-plans are listed and described in Table 0-1 below.

Table 0-1: Definitions

Term	Definition
A2I	Albury to Illabo
A2P	Albury to Parkes Enhancement Project
AEP	Annual Exceedance Probability
ADC	Assumptions, Dependencies and Constraints
AHD	Australian Height Datum
ALCAM	Australian Level Crossing Assessment Model
ARF	Areal Reduction Factor
ARI	Average Recurrence Interval
ARR	Australian Rainfall and Runoff
ARTC	Australian Railway Track Corporation
BoD	Basis of Design
BoM	Bureau of Meteorology
CIZ	Construction Impact Zone
CO	Construct Only
CRS	Coordination Reference System
CSSI	Critical State Significant Infrastructure
D&C	Design and Construct
DCN	Design Change Notice
DDR	Detailed Design Review
EMC	Electromagnetic compatibility
EDPM	Engineering, Design and Project Management
ECMP	Electromagnetic compatibility management plan
EIS	Environmental Impact Statement
FDR	Feasibility Design Review
FFA	Flood Frequency Analysis
FS	Finish-Start constraint type
FSL	Finished Surface Level
GDA	Geocentric Datum of Australia
GIR	Geotechnical Interpretative Report
HF	Human Factors
I2S	Illabo to Stockinbingal
IFC	Issued for Construction
IR	Inland Rail
ITC	Incentivised Target Cost
IV	Independent Verifier

Term	Definition
Km	Kilometres
LPA	Licensed Project Area
LiDAR	Light Detection and Ranging
MGA	Map Grid of Australia
MIRDA	Master Inland Rail Development Agreement
NCR	Non-Conformance Report
NLPA	Non-Licensed Project Area
NtP	Notice to Proceed
PDR	Preliminary Design Review
PMF	Probable Maximum Flood
PSR	Project Scope and Requirements
QDL	Quantitative Design Limits
RCP	Representative Concentration Pathways
REF	Review of Environmental Factors
RFI	Request for Information
S2P	Stockinbingal to Parkes
SAQP	Sampling, Analysis and Quality Plan
SDR	Systems Definition Review
SEMP	System Engineering Management Plan
TfNSW	Transport for New South Wales
TWL	Tail Water Level
UMM	Updated Mitigation Measures
V & V	Verification and Validation
WAD	Works Authorisation Deed
WAE	Work-as-Executed

1 A2P PROJECT INTRODUCTION

1.1 Albury to Parkes (A2P)

As part of the Inland Rail program of projects, the Australian Rail Track Corporation (ARTC) has appointed Martinus as the delivery contractor for the Albury to Parkes (A2P) project, which comprises the brownfield sections between Albury and Illabo (A2I) and Stockinbingal to Parkes (S2P). The greenfield portion between Illabo to Stockinbingal (I2S) is not a part of the A2P project scope.

1.2 Project Scope

The S2P section will be delivered under an REF and as such construction works associated with the two (2) Construct Only packages can commence at Contract Award. The Design and Construct for the other seven (7) projects sites will also commence at Contract Award.

The A2I section will be delivered under an EIS and requires a Notice to Proceed from ARTC before works can commence on site. Design for A2I will however commence at Contract Award. The project received State Planning approval on 8th Oct 2024, and Martinus received the Notice to Proceed from IRPL on 18 Oct 2024.

Within the A2I section there are twenty (20) locations with twenty-nine (29) Design and Construct (D&C) projects of varying degrees of design gate development:

- Murray River bridge (Structure modifications)
- Albury Station Yard (Track slews, track reconfigurations)
- Albury Station Yard Track Slews (retained 3-track alignment)
- Albury Station Yard Footbridge (footbridge replacement), both pre- and post- SDRP-response
- Riverina Highway bridge (Track lowering)
- Billy Hughes bridge (Track lowering)
- Tabletop Yard (Structure modification)
- Culcairn Station Yard (Track slews and bridge removal)
- Henty Yard (Track slews)
- Yerong Creek Yard (Track slews)
- The Rock Yard (Structure modification)
- Uranquinty Yard (Track slews)
- Pearson Street bridge (Track lowering)
- Cassidy Parade footbridge (Bridge replacement), both pre- and post- SDRP-response
- Edmondson Street Bridge (stand-alone road bridge)
- Edmondson Street Footbridge (stand-alone road bridge)
- Edmondson Street bridge and footbridge (combined Bridge replacement), post- SDRP-response
- Wagga Wagga Station Yard (Track slews)
- Wagga Wagga Footbridge (footbridge replacement), both pre- and post- SDRP-response
- Bomen Yard (Track slews)
- Harefield Yard (Track slews)
- Kemp Street Bridge (stand-alone road bridge)
- Kemp Street Footbridge (stand-along footbridge)
- Kemp Street bridge and footbridge (combined Bridge replacement)
- Junee Station Yard (Track slews and bridge removal)
- Olympic Highway Underbridge (Track reconfiguration and Structure modification)
- Junee to I2S dual track section (Track slews)
- LX605 & LX1472 Activations
- LX605 relocation and LX1472 closure, both 16m and 4m slew options

Within the S2P section, there are two (2) Construct only projects:

- Daroobalgie New Loop
- Wyndham Avenue (Track lowering)

and seven (7) Design and Construct (D&C) projects:

- Milvale Yard (Structure modification)

- Bribbaree Yard (Track slews)
- Quandialla Yard (Structure modification)
- Caragabal Yard (Track slews)
- Wirrinya Yard (Track slews)
- Lachlan River bridge (Structure modifications)
- Forbes Station (Track slews and awning modifications)

The D&C scope typically includes works associated with route clearance to accommodate the new F2M clearance envelope, necessary to accommodate the double-stacked freight container trains and this includes.

- Structure modifications
- Track reconfigurations
- Bridge replacements
- Track lowering
- Track slews and level crossing upgrades
- Bridge removal

1.3 Site Description

This study involves a flood assessment for the Yerong Creek yard located in the middle of the town of Yerong Creek as shown in Figure 1-1. Yerong Creek yard is located approximately 50km southwest of Wagga Wagga City. The background and previous studies related to the site are listed in the following sections.

Figure 1-1: Site Location

1.3.1 Background

The Yerong Creek Yard forms part of the Albury to Illabo Section works. The project extent is located between Olympic Highway/Cox Street and Finlayson Street in Yerong Creek Town. The proposed solution involves track slews in conjunction with associated site drainage and civil design.

1.4 Objectives

This report has been prepared to support the delivery of the Yerong Creek Yard package by providing a flood impact assessment for the Issued for Construction (IFC) stage. However, it should be noted that inputs from all other design disciplines that have been used in this assessment are noted in the IFC Rev01 stage. The flood assessment aims to estimate the flood behaviour within the study area and assess the potential flood impacts as a result of the design.

The need for the flood assessment arose based on the approved EIS requirements, after the original IFC engineering design had already been developed and issued as IFC Rev 0 during November 2024.

1.5 Scope

The scope of this study includes:

- Carrying out the flood assessment for the design in the IFC stage for the design events of 5%, 2%, 1%, 1% + Climate Change and the Probable Maximum Flood (PMF).
- Checking flood assessment results against the criteria specified in Section 2, including flood impact and flood immunity.
- Proposing any mitigation measures if required.

1.6 Previous Study

1.6.1 Flood Studies

There are no previous flood studies associated with the Yerong Creek Yard area available.

1.6.2 Reference Design

The Albury to Illabo (A2I) and Stockinbingal to Parkes (S2P) Projects Reference Design Report – Lockhart & Greater Hume (June 2022) outlines details of the Reference Design.

No flood impact modelling was undertaken for the Yerong Creek Yard under the Reference Design. However, a desktop flooding assessment was carried out. Based on this, it was determined that the site will likely be affected by regional flooding from both Yerong Creek to the north and Sandy Creek to the south. However, due to the relative distance of the site from these creeks and the small magnitude of the proposed track changes, it was considered that this will have no impact on the primary flow paths, flood volumes and flood levels and hence, a negligible risk.

1.6.3 Environmental Impact Statement

The Albury to Illabo Environmental Impact Statement (EIS) Technical Paper 11 – Hydrology, flooding and water quality (July 2022) details the Yerong Creek Yard Clearances, that were investigated as part of the – EIS as part of a qualitative desktop assessment. It stated that “the town of Yerong Creek also lies between the two watercourses and therefore the higher ground and away from the floodplains of both creeks”. The report further states that the flow from both Yerong Creek and Sandy Creek will flow west, under Olympic Highway and the railway through bridges and culverts. As there was no available flood modelling, the EIS was an entirely qualitative assessment.

1.7 Purpose and Requirements

The primary purpose of this IFC flood assessment report is to describe how the design development and the associated review process will be managed., along with investigating the flood behaviour and its potential flood impact, at this location.

A series of tasks and activities that the design development and design reporting process need to address and include is described in the set of requirements within the Conditions of Approval (CoA), PSR Annexure F, and Inland Rail’s Design Management Specification.

1.8 Information Documents

The following documents have been provided ‘For Information’ and have been referenced/reviewed as part of the design development:

- Albury to Illabo (A2I) and Stockinbingal to Parkes (S2P) Projects Reference Design Report – Lockhart & Greater Hume (WSP, June 2022), 2-0008-210-PEN-03-RP-0002
- Albury to Illabo Environmental Impact Statement (EIS) Technical Paper 11 – Hydrology, flooding and water quality (WSP, July 2022), 2-0008-210-EAP-00-RP-0010

1.9 Inputs

The inputs to this flood assessment report include:

- Australian Standards and Guidelines: AS 7637 Railway Infrastructure – Hydrology and Hydraulics

- Australian Rainfall and Runoff: A Guide to Flood Estimation 2019, v4.1
- Austroads Guide to Bridge Technology – Part 8: Hydraulic Design of Waterway Structures
- Inland Rail Climate Change Risk Assessment Framework

1.9.1 Input Data

Table 1-1 outlines the available information relevant to the site and used for flood modelling.

Table 1-1: Available Information

Item	Information	Type	Description / Comments
1	1m 2015 LiDAR. The data derived points have an accuracy of 0.15m (68% confidence interval) ARTC LiDAR	TIF format in 1m resolution in GDA94 projection	The existing 1m LiDAR (flown by ARTC in 2015) was received from Martinus on 12/11/2024.
2	A2P YRG EXT GDA20Z55 COMBINED.12da	12da Existing Survey	Existing topographic survey. Received from the DJV Rail team 24/10/24
3	A2P YRG EXT GDA20Z55 COMBINED_RailLines.12da	12da Existing Top of Rail Survey	Existing survey to the top of rail levels. Received from the DJV Rail team 24/10/24
4	A2P YRG EXT GDA20Z55 FLOOD MODELLING_241219.12da	12da Existing Drainage Survey	Existing survey of road culvert at Sandy Creek, Road and Rail Bridge at Yerong Creek and drainage elements within the project boundary. Received on 19/12/24
5	5-0052-210-CDR-G3-MD-0005-YERONG_CREEK_YARD_3D_DRAINAGE_DESIGN_STRINGS_12DA.12da	12da IFC Design Drainage Strings	Design drainage strings. Received from the DJV Drainage team 18/10/24
6	YERONG 21 G3 SUPER TIN.dem	DEM IFC Design Surface	DEM surface of civil design surface, including ballast and capping. Received from the DJV Rail team 24/10/24
7	5-0052-210-CAL-G3-MD-0001-YERONG_CREEK_YARD_3D_RAIL_DESIGN_STRINGS_DWG	DWG IFC Design Top of Rail Strings	Design top of rail strings. Received from the DJV Rail team 22/11/2024
8	YERONG DRAINAGE OUTPUT 040625.12daz	12da IFC Design Drainage Strings	Design drainage strings. Received from the DJV Drainage team on 4/6/25
9	250604 NEW CESS MD21G3001 0.2m	DEM of IFC rev01 Cess Drain	DEM surface of design cess drain. Received from the DJV Civil team on 4/6/25
10	BUND 21 G3 MD21G3001.dem	DEM of IFC rev01 Bund	DEM surface of design bund. Received from the DJV Civil team on 27/5/25

1.10 Outputs

The list of flood maps and the flood maps are included in Appendix A.

1.11 Limitations and Assumptions

The following limitations and assumptions are applied to the Yerong Creek site:

- An assessment of temporary works and staging has not been undertaken.
- According to Clause 5.4.2 and Clause 5.4.3 in Annexure B of PSR (Table 2-1), the highest flood event shall be the one stipulated by the ARTC Safety Management System (SMS). As per Section 10.1.3 of Track and Civil Code of Practice Section 10 Flooding, the 1% AEP shall be used. The flood impact would be assessed up to the 1% AEP event for the project.
- Blockage assessment is carried out for the 1% AEP design scenario as per the guidance set out in ARR2019 for the culverts within the project boundary, while 20% blockage was adopted for all the other culverts, pits and pipes outside the site boundary.

2 COMPLIANCE WITH REQUIREMENTS

2.1 Project Scope and Requirements

Assessment of the Engineering IFC stage detailed design to see if it meets the Project Scope and Requirements (PSRs) has been undertaken. This is demonstrated throughout the flood assessment, with Table 2-1 below summarising the compliance of Yerong Creek Yard with the PSR.

Table 2-1: Flooding Criteria Within PSR Annexure B Technical Requirements

Requirement	Identifier	A2P Technical Requirements Description	Compliance Evidence Reference
Project Wide	5.4.10	Without limiting the environmental management requirements in Annexure F, section 6.1.1, all D&C Works in watercourses shall comply with the NSW Department of Primary Industries Standards: Policy and Guidelines for Fish Friendly Waterway Crossings; Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings; and Policy and Guidelines for Fish Habitat Conservation and Management Update.	N/A (structure modifications do not affect any watercourses)
Project Wide	5.4.2	Where existing flood immunity is lower than ARTC SMS minimum requirements, the functional requirements for flood immunity take precedence over the ARTC SMS.	Compliant. The existing immunity of 2% AEP is improved in design conditions which have 1% AEP immunity. Refer to Section 5.3
Project Wide	5.4.3	Where existing flood immunity is higher than ARTC SMS minimum requirements, the ARTC SMS requirements for flood immunity take precedence over the functional requirements.	Compliant. The existing immunity of 2% AEP is improved in design conditions which have 1% AEP immunity Refer to Section 5.3
Project Wide	5.4.5	Bridge and culvert hydraulics shall comply with Austroads Guide to Bridge Technology Part 8: Hydraulic Design of Waterway Structures.	N/A. No bridge or culvert designs are relevant.
A2I Technical Requirements	IR-SR-A2I-116	The System shall comply with 0-0000-900-ESS-00-ST-0001 Inland Rail Climate Change Risk Assessment Framework.	Climate Change assessment was carried out by using RCP 8.5 Year 2090, see Section 5.5.2 for more details.
A2I Technical Requirements	IR-SR-A2I-349	The Corridor System for Enhancement Corridors shall have a flood immunity of no worse than existing.	Compliant Refer to Section 5.3
A2I Technical Requirements	IR-SR-A2I-350	The Corridor System, where the existing track is lowered, shall maintain the existing flood immunity.	Compliant Refer to Section 5.3
A2I Technical Requirements	IR-SR-A2I-352	The Corridor System shall prevent damage of the formation due to ponding of water.	Compliant. No damage to the formation due to ponding of water. Existing condition is maintained. Refer to Section 5.4
A2I Technical Requirements	IR-SR-A2I-458	The Corridor System shall prevent ponding in longitudinal open channels.	Compliant. Existing condition is maintained. Refer to Section 5.4
A2I Technical Requirements	IR-SR-A2I-459	The Corridor System for Enhancement Corridors shall provide mitigation for flood impacts no worse than existing condition.	Compliant. No non-compliant flood impacts Refer to Section 5.4
A2I Technical Requirements	IR-SR-A2I-464	The Corridor System shall cause no adverse impacts either inside or outside the rail corridor when diverting water away from the track.	Compliant. No non-compliant flood impacts Refer to Section 5.4
A2I Technical Requirements	IR-SR-A2I-465	The Corridor System shall minimise changes to the existing or natural flow patterns.	Compliant. No non-compliant flood impacts Refer to Section 5.4

Requirement	Identifier	A2P Technical Requirements Description	Compliance Evidence Reference
A2I Technical Requirements	IR-SR-A2I-541	The Structures System new underbridges shall withstand the 0.05% annual exceedance probability design flood event.	N/A. There is no new underbridge structure for this package.
A2I Technical Requirements*	IR-SR-A2I-735	The Third-Party System private roads shall have flood immunity no worse than existing.	Compliant. No non-compliant flood impacts Refer to Section 5.4
A2I (Annexure F)	6.1.1	Without limiting clauses 8 and 14 of the Deed, the Contractor shall ensure that the Contractor's Activities and the Works comply with the following for A2I, the Conditions of Approval and the environmental assessment reports available on: https://www.planningportal.nsw.gov.au/major-projects/projects/inland-rail-albury-illabo"	Refer to Table 2-2

*A2I Technical requirements are used in A2P as A2P is a part of A2I.

2.2 Conditions of Approval – Flooding

The Conditions of Approval (CoA) have been provided as part of the CSSI approval and the Inland Rail Deed of Variation. The detailed design has been assessed to check if it meets the CoA and the compliance is presented in Table 2-2 below.

Table 2-2: Conditions of Approval Compliance Table – Flooding

Condition	Condition or Criteria	Compliance Evidence Reference
E38	All practicable measures must be implemented to ensure the design, construction and operation of the CSSI will not adversely affect flood behaviour, or adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of riverbanks or watercourses.	Compliant, see rows below.
E39	The CSSI must be designed with the objective to meet or improve upon the flood performance identified in the documents listed in **Condition A1**. Variation consistent with the requirements of this approval at the rail corridor is permitted to effect minor changes to the design with the intent of improving the flood performance of the CSSI.	Compliant Refer to Section 5.4
E40	Updated flood modelling of the project's detailed design must be undertaken for the full range of flood events, including blockage of culverts and flowpaths, considered in the documents listed in **Condition A1**. This modelling must include:	Compliant Refer to Sections 4 and 5
E40	a) Hydrologic and hydraulic assessments consistent with Australian Rainfall and Runoff – A Guide to Flood Estimation (GeoScience Australia, 2019);	Compliant. Section 4 methodology shows that ARR2019 guidelines were used for this assessment.
E40	b) Use of modelling software appropriate to the relevant modelling task;	Compliant. Section 4 shows that the appropriate software (TUFLOW) was used
E40	c) Field survey of the existing rail formation and rail levels, should be included within the models; and	Compliant. Section 1.7 shows that existing field survey and rail levels were used in the models.
E40	d) Confirmation of predicted afflux at industrial properties adjacent to Railway Street, Wagga Wagga based on field survey.	N/A – Railway Street in Wagga Wagga is not relevant to this site.
E40	Updated flood modelling must be made publicly available in accordance with **Condition B18**.	Flood design report and an independent review of the flood design report shall be provided to IR, through this submission, for IR to upload on the IR website, as per CoA B18 responsibility allocation.

Condition	Condition or Criteria	Compliance Evidence Reference
E41	The Proponent's response to the requirements of **Conditions E38** and **E40** must be reviewed and endorsed by a suitably qualified flood consultant, who is independent of the project's design and construction and approved in accordance with **Condition A16**, in consultation with directly affected landowners, DCCEEW Water Group, TfNSW, DPI Fisheries, BCS, NSW State Emergency Service (SES) and relevant Councils.	Independent review of the flood modelling, model and Flood Design Report will be undertaken by the Proof Engineer's specialist contractor, who satisfies and complies with the requirements of A16. Consultation with Council and other Stakeholders has been undertaken through a formal review of this Flood Design Report. Please see Appendix C,D and E.
E42	The CSSI must be designed and constructed to limit impacts on flooding characteristics in areas outside the project boundary during any flood event up to and including the 1% AEP flood event, to the following:	See E42 items below
E42	(a) a maximum increase in inundation time of one hour, or 10%, whichever is greater;	Compliant. Refer to Section 5.4.4
E42	(b) a maximum increase of 10 mm in above-floor inundation to habitable rooms where floor levels are currently exceeded;	Compliant. No flood level increase on any properties. Refer Section 5.4.1
E42	(c) no above-floor inundation of habitable rooms which are currently not inundated;	Compliant. No flood level increase on any properties. Refer Section 5.4.1
E42	(d) a maximum increase of 50 mm in inundation of land zoned as residential, industrial or commercial;	Compliant. No flood level increase in residential, industrial and commercial areas. Refer Section 5.4.1
E42	(e) a maximum increase of 100 mm in inundation of land zoned as environment zone or public recreation;	Compliant. No increases of more than 100mm on land zoned as environment or public recreation. Refer Section 5.4.1
E42	(f) a maximum increase of 200 mm in inundation of land zoned as rural or primary production, environment zone or public recreation;	Compliant. No increases of more than 200mm on land zoned as rural or primary production. Refer Section 5.4.1
E42	(g) no increase in the flood hazard category or risk to life; and	Compliant, no reasonable flood hazard increase or increase in Velocity x Depth to cause risk to life. Refer Section 5.4.3
E42	(h) maximum relative increase in velocity of 10%, or to 0.5m/s, whichever is greater, unless adequate scour protection measures are implemented and/or the velocity increases do not exacerbate erosion as demonstrated through site-specific risk of scour or geomorphological assessments	Compliant, no increase in velocity of more than 0.5m/s. Refer Section 5.4.2.
E42	Where the requirements set out in clauses (d) to (f) inclusive cannot be met, alternative flood levels or mitigation measures must be agreed to with the affected landowner.	N/A – clause (d) to (f) are compliant
E43	A **Flood Design Report** confirming the:	
E43	a) final design of the CSSI meets the requirements of **Condition E42;** and	Compliant. Refer to Section 5
E43	b) the results of consultation with the relevant council in accordance with **Condition E46**	Refer to E46
E43	must be submitted to and approved by the Planning Secretary prior to the commencement of permanent works that would impact on flooding.	This report will be submitted to the Planning Secretary for approval prior to the commencement of

Condition	Condition or Criteria	Compliance Evidence Reference
		permanent works that would impact on flooding
E44	The **Flood Design Report** required by **Condition E43** must be approved by the Planning Secretary prior to works that may impact on flooding or the relevant council's stormwater network.	This report will be submitted to the Planning Secretary for approval prior to the commencement of permanent works that would impact on flooding
E45	Flood information including flood reports, models and geographic information system outputs, and work as executed information from a registered surveyor certifying finished ground levels and the dimensions and finished levels of all structures within the flood prone land, must be provided to the relevant Council, BCS and the SES in order to assist in preparing relevant documents and to reflect changes in flood behaviour as a result of the CSSI. The Council, BCS and the SES must be notified in writing that the information is available no later than one (1) month following the completion of construction. Information requested by the relevant Council, BCS or the SES must be provided no later than six (6) months following the completion of construction or within another timeframe agreed with the relevant Council, BCS or the SES.	Flood information has been provided to the relevant Council, BCS and the SES in order to assist in preparing relevant documents and to reflect changes in flood behaviour as a result of the CSSI in accordance with the requirements of CoA E45.
E46	The design, operation and maintenance of pumping stations and storage tanks and discharges to council's stormwater network must be developed in consultation with the relevant council. The results of the consultation are to be included in the report required in **Condition E43.**	Local drainage flow regime, catchment area and imperviousness remain the same as per existing condition, there is no additional flow towards the existing Council's stormwater network. The design has not worsened the existing condition. Discharges to Council's stormwater network have been consulted with Lockhart Shire Council through staged design submissions, and receipt of review comments, details are documented in 5-0052-210-PEN-G3-RP-0001.

2.3 Updated Mitigation Measures - Flooding

The Updated Mitigation Measures (UMM) have been provided and the detailed design has been assessed to meet the UMM and the compliance is presented in Table 2-3 below.

Table 2-3: Updated Mitigation Measures Compliance Table - Flooding

Condition	Condition or Criteria	Compliance Evidence Reference
HFWQ3	Further consultation will be undertaken with local councils and other relevant authorities to identify opportunities to coordinate the proposal with flood mitigation works committed to as part of the council's flood management plans, or other strategies.	Consultation with Council and other relevant authorities has been undertaken through a formal review of this Flood Design Report.
HFWQ4	At Wagga Wagga Yard enhancement site, flood modelling would be carried out during detailed design to confirm predicted afflux at industrial properties located at Railway Street and compliance with the Quantitative Design Limits for Inland Rail. This would be informed by topographic and building floor surveys and a review of localised drainage structures (as required). Quantitative assessment of the sites of low and moderate hydraulic complexity will be carried out during detailed design, and will consider the impact of the Possible Maximum Flood event at built-up areas (where information is available) and the tenure of the upstream areas that are impacted by drainage and/or flooding. The outcomes of the assessment are to be provided to DCCEW– BCS	This report relates to the Yerong Creek Yard site, and so it is not relevant to Wagga Wagga Yard. Compliant. Quantitative assessment has been undertaken. Refer to Section 5

Condition	Condition or Criteria	Compliance Evidence Reference
HFWQ5	At Riverina Highway bridge enhancement site, flood and drainage network modelling (including capacity and operation of the stormwater storage and pump system) will be carried out during detailed design to confirm predicted compliance with the Quantitative Design Limits (QDLs)* for Inland Rail. The modelling would be undertaken in consultation with Albury City Council.	This report relates to the Yerong Creek Yard site, and so is not relevant to the Riverina Highway track lowering site.

* QDL is superseded by CoA E42.

3 CHANGE MANAGEMENT

This section summarises the changes made to this flood design package due to changes in the project scope and/or evolution of the design.

3.1 Concept Design to SDR

Flood modelling is not applicable to this stage.

3.2 SDR to PDR

Flood modelling is not applicable to this stage

3.3 PDR to DDR

The table below outlines the differences arising between a PDR assessment and DDR assessment

Table 3-1: Design Differences Between PDR to DDR

Item	Difference	Reason for Change
1	DJV created a new TUFLOW hydraulic model and RORB Hydrologic model to model the area of interest and proposed design (IFC Rev 01 engineering design)	No TUFLOW hydraulic model or RORB Hydrologic model was available for the DDR stage or earlier.

3.4 DDR to IFC

The table below outlines the differences arising between a DDR assessment and IFC assessment

Table 3-2: Design Differences Between DDR to IFC

Item	Difference	Reason for Change
1	Update representation of culvert and bridge structures at road/rail crossings at Sandy Creek and Yerong Creek	To address Proof Engineering, ARTC, TfNSW, Council and other external party's comments.

4 MODELLING METHODOLOGY

The overall approach to the flood modelling and impact assessment is detailed below:

- Based on ARR2019 v4.1, develop a RORB hydrological model and generate flow hydrographs for input to the hydraulic model for all events (5% AEP, 2% AEP, 1% AEP, 1% with climate change and PMF) to perform critical duration analysis.
- Compare the hydrologic results against information from the Regional Flood Frequency Estimation model
- Develop a TUFLOW hydraulic model with all available information to form an existing conditions flood model.
- Complete a flood impact assessment for the site.
- Conduct a Climate Change sensitivity assessment for the 1% AEP to inform the potential impact on the railway track flood immunity.
- Conduct a blockage sensitivity assessment for the 1% AEP event to inform the potential impact of blockage of hydraulic structures according to ARR2019 guidance.

4.1 Hydrologic Modelling

Flood behaviour at Yerong Creek town comprises three main mechanisms. These are flows from Yerong Creek to the north, Sandy Creek to the south and the local catchment flow from the east of the site. Therefore, two separate RORB hydrologic models were created to represent these flows: one representing the flow from Yerong Creek and the other representing the flow from Sandy Creek and the local catchment. The catchment areas for both Creeks and local catchments were delineated as per Figure which presents the hydrology sub-catchment extents, and described below in Table 4-1.

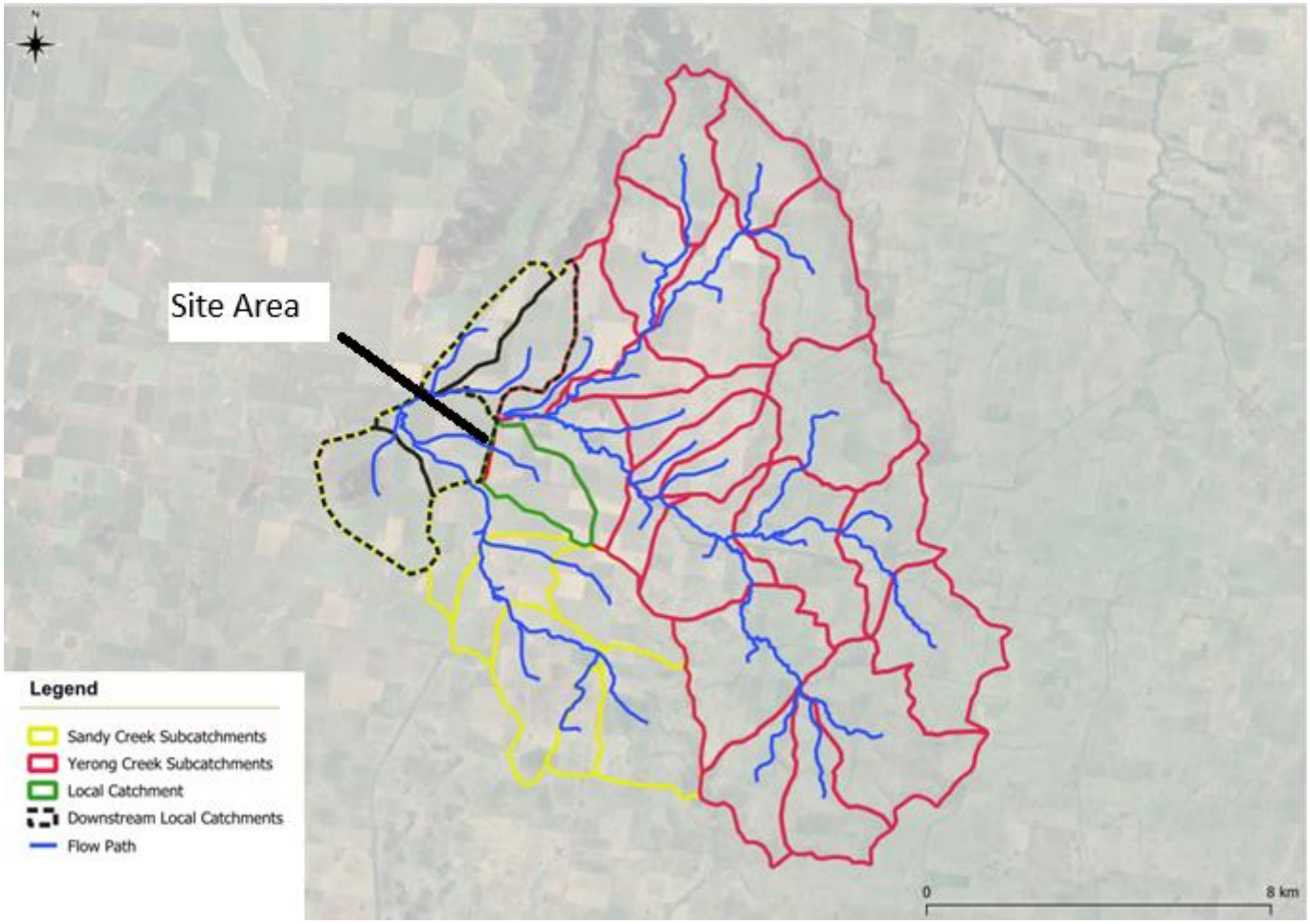

Figure 4-1: Hydrology Subcatchment Extents

Table 4-1: Model Parameters of Hydrology Model

Parameters	Developed Hydrology Model	Notes
Hydrology model and version	RORBwin model (Version 6.45) using Storm injector HL(V 1.3.7.0).	
Total catchment area	Yerong Creek 114 km^2 Sandy Creek 33 km^2	
Initial Loss	Probability Neutral Burst Loss for all events except PMF (refer Appendix B) PMF event (0mm)	ARR Data Hub (Downloaded 20/8/24) Refer Appendix B
Continuing Loss	1.84 mm/hr (PMF 1 mm/hr)	ARR Data Hub (Downloaded 20/8/24) Refer Appendix B
Kc Routing Parameter	Yerong Creek - 23.52 Sandy Creek - 12.56	See Section 4.1.1 for discussion
M value	0.8	As per ARR2019 guidelines
Catchment Slope	Based on LiDAR	
Impervious Area	Based on Aerial imagery	
Events	PMF, 1% AEP + Climate Change, 1%AEP, 2% AEP, 5% AEP	
Duration Temporal pattern received/ generated	Ensemble temporal pattern for each duration ranging from 35 minutes to 1440 minutes Ensemble 11 temporal patterns for GSDM PMF from 15 minutes to 180 minutes 1 Temporal pattern for GSAM PMF for durations greater than 180 minutes up to 96 hours	As per ARR2019 guidelines

4.1.1 Hydrology Model Comparison

The RORB hydrology models that were developed were compared against available data from the Regional Flood Frequency Estimation tool. Specifically, a comparison was undertaken by changing the Kc routing parameter using two separate equations to derive this parameter. Each of these Kc values was then run through RORB and Storm Injector to derive the peak flows for the 5%, 2% and 1% AEP events. These values were then compared against the flows from the RFFE for the site.

Table 4-2: Kc Parameters

Kc Value (Yerong Creek)	Kc Value (Sandy Creek)	Equation
10.43	5.86	ARR2019 Equation 7.6.13
23.52	12.56	RORB manual, equation 2.5

Table 4-3: RFFE Comparison – Yerong Creek

AEP (%)	RFFE Expected Value	ARR2019 Equation 7.6.13	RORB manual, equation 2.5
5%	71	158	77
2%	122	224	104
1%	168	276	130

Table 4-4: RFFE Comparison – Sandy Creek

AEP (%)	RFFE Expected Value	ARR2019 Equation 7.6.13	RORB manual, equation 2.5
5%	29	53	29
2%	48	74	39

AEP (%)	RFFE Expected Value	ARR2019 Equation 7.6.13	RORB manual, equation 2.5
1%	64	91	48

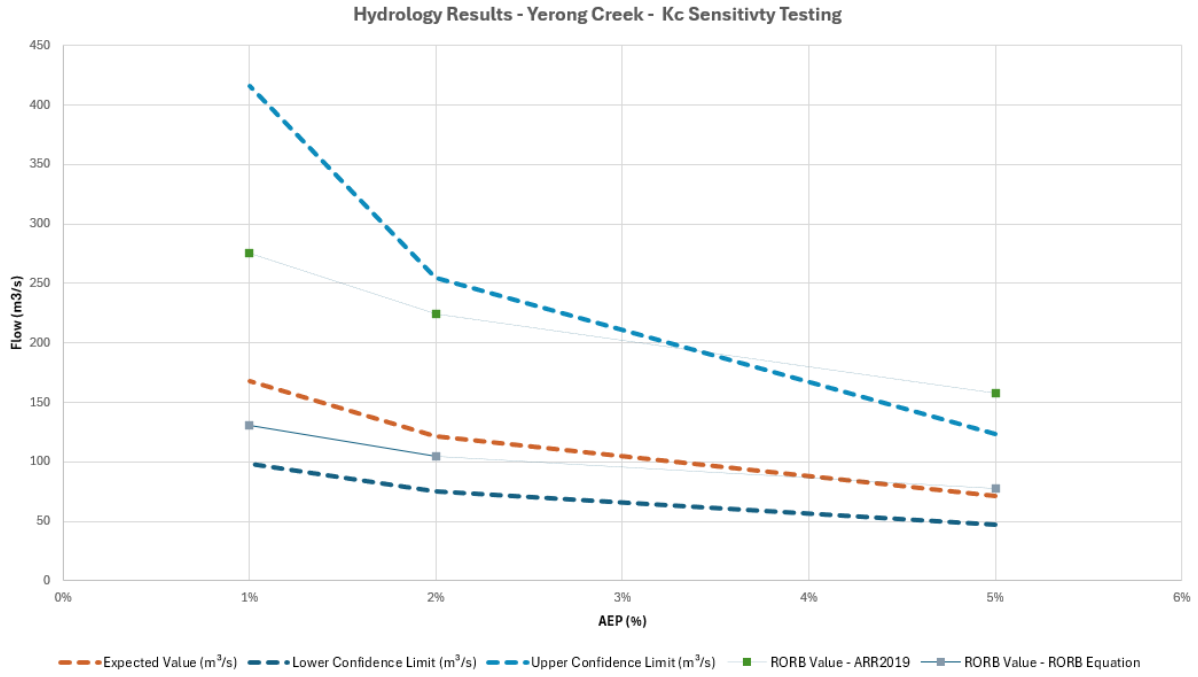

Figure 4-2: Peak Flow Comparison RFFE – Yerong Creek

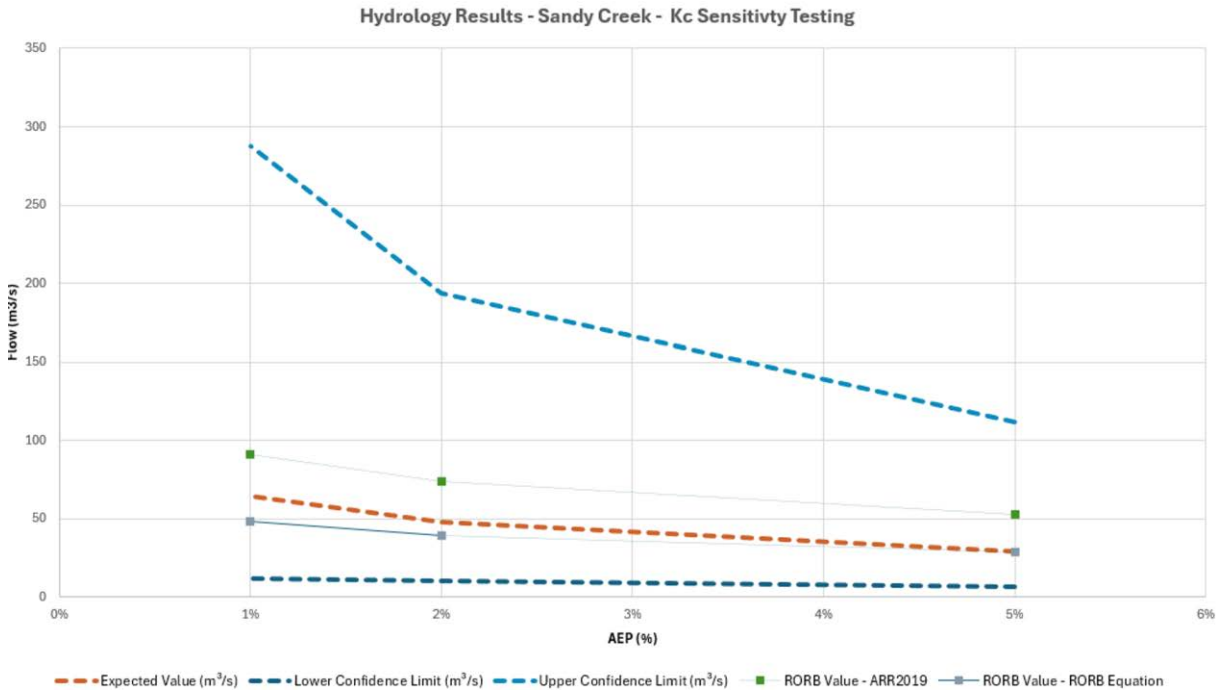

Figure 4-3: Peak Flow Comparison RFFE – Sandy Creek

As seen in the figures and tables above, the RORB equation yields the most similar flows compared to the RFFE flows, and therefore, it was adopted. While these flows may be slightly smaller compared to the RFFE flows, they are a better fit when compared to the ARR2019 equation flows which are considerably higher especially in the Yerong Creek Catchment.

4.2 Hydraulic Modelling

4.2.1 Existing Model

A TUFLOW model was developed to model the flood behaviour at the Yerong Creek Yard site. The hydraulic model extent encompasses the town of Yerong Creek and surrounding areas, both upstream and downstream.

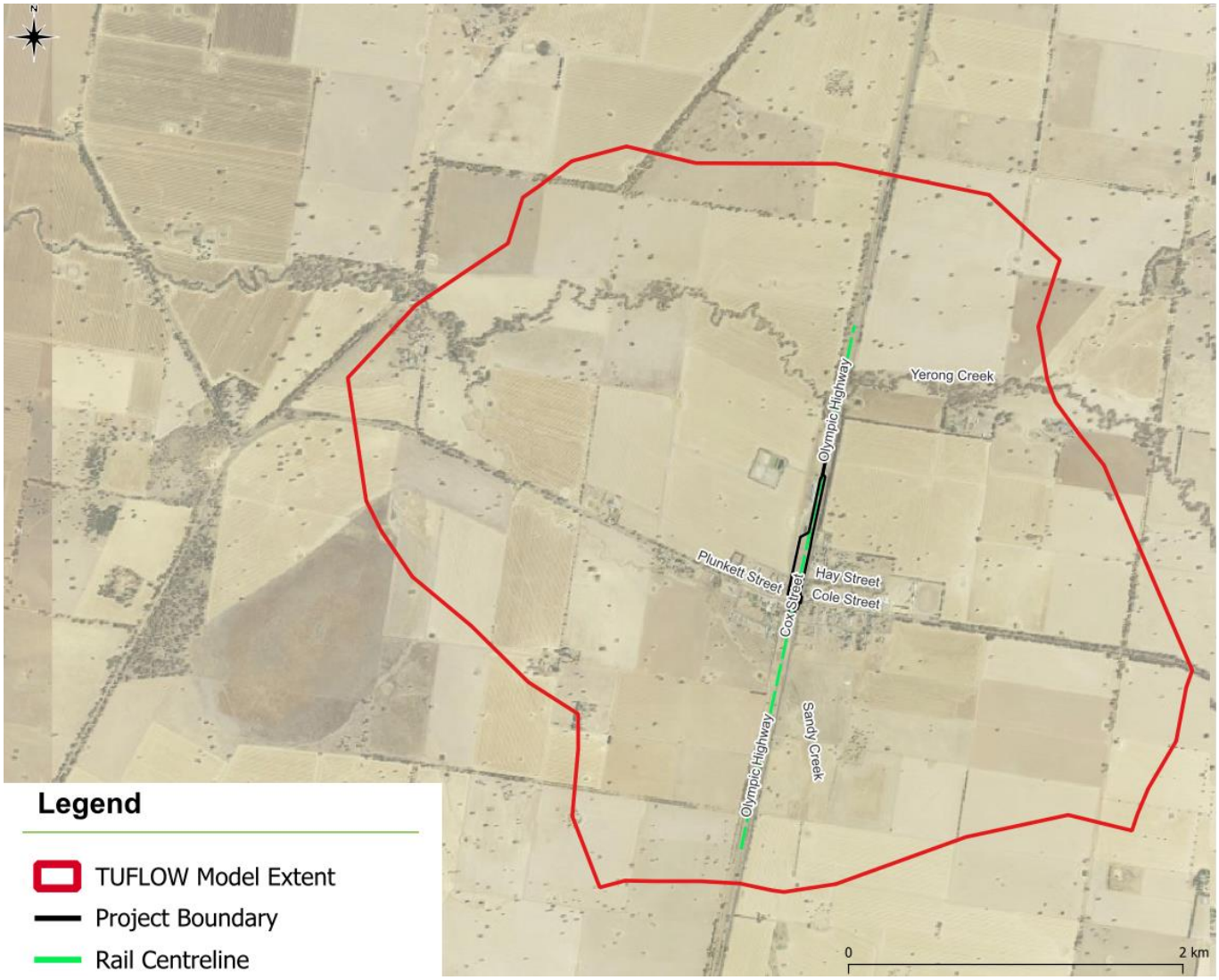

Figure 4-4: TUFLOW Model Extent - Yerong Creek Yard Model

Table 4-5: TUFLOW Model Parameters

Parameters	DDR TUFLOW Model
Build	TUFLOW 2023-03-AF
Coordination Reference System (CRS)	GDA2020 MGA 55
Grid Size	1m within the Quadtree Area (Site area) and 4m outside of the quadtree area (Refer to Figure). (Refer to “TUFLOW Model Version and Grid Size” for more details)
Inflow type	SA Polygon (using Flow vs Time inflows) BC Lines (using Flow vs Time inflows)
Extent	Yerong Creek township and areas immediately upstream and downstream
Downstream Boundary	Downstream water boundary (HQ)
Timestep	Dynamic
Building Representation	Null polygon

Parameters	DDR TUFLOW Model
Topography	1 m resolution LiDAR collected in 2015 Site survey
Roughness	Roads: 0.020 Railway: 0.030 Open Areas – 0.045 Channel roughness Yerong Creek – 0.065 Channel roughness Sandy Creek – 0.045
Design Events	5% AEP, 2% AEP, 1% AEP, 1% AEP + Climate Change and PMF events

4.2.1.1 TUFLOW Model Version and Grid Size

The latest TUFLOW version 2023-03-AF was utilised for this model with an overall grid size of 4m, which reduces to 1m within the Quadtree extent. Refer to Figure for the adopted quadtree extent.

Figure 4-5: Quadtree Extent - Yerong Creek Yard

4.2.1.2 Topography

The model topography was updated by incorporating the 2015 1m LiDAR, existing conditions Site Survey, existing top of rail lines as well as enforcing break lines for other features such as roads within the model domain. Further, building footprints were nulled out of the model domain.

4.2.2 Design Model Update

The design model was updated from the existing condition by incorporating the latest Inland Rail Project Works, including:

- Proposed alignment of the rail (top of the rail) and corresponding capping and ballast levels.
- Proposed cess drains
- Proposed drainage
- Proposed bund
- Proposed road design of the level crossing

Figure 4-6: Design Model Setup

The inclusion of the proposed Project Works did not result in any alterations to the sub-catchment topography. Therefore, the hydraulic model inflow locations remained consistent with the existing hydraulic model.

4.2.3 Design Events

The model was run for the design events of 5%, 2%, 1%, 1% + Climate Change AEP and PMF events.

An ensemble of 10 temporal patterns was run for each duration as recommended in ARR2019. The medium for the 10 temporal patterns will represent each duration. For PMF, storms from 15 minutes to 96 hours were modelled, and 11 temporal patterns were run for durations from 15 minutes up to 3 hours and 1 temporal pattern for storms greater, which is in line with ARR2019 guidance. Multiple critical durations were run to represent the critical events for Yerong Creek, Sandy Creek and the local catchment flows.

The critical duration and temporal patterns determined and elaborated below in Table 4-6 the information of the design events.

Table 4-6: Critical Duration and Temporal Patterns

Design Event	Critical Durations	Temporal Patterns
5% AEP	9 hours/2 hours	All 10 Temporal Patterns
2% AEP	9 hours/3 hours/12 hours	All 10 Temporal Patterns
1% AEP	9 hours/1.5 hours/12 hours	All 10 Temporal Patterns
1% AEP + Climate Change	9 hours/1.5 hours/12 hours	All 10 Temporal Patterns
PMF	3 hours/2 hours	All 11 Temporal Patterns

5 FLOOD ASSESSMENT

5.1 Existing Conditions

Existing condition flood maps, including peak flood depth and levels, peak flood velocities, and peak flood hazard for the modelled events are provided in Appendix A.

In the existing condition, the area of the project site is inundated with water flowing west from the local catchment as well as water from Sandy Creek. This water from Sandy Creek backs up against the rail line and road, and travels north towards the site area. During the 1% AEP event, the Main rail line is overtopped between chainage CH565+250km and CH565+275km in the area immediately south of the level crossing and also CH565+400km. The overtopped water then travels west through the township and rejoins Sandy Creek. Figure 5-1 shows points of interest used in the following tables.

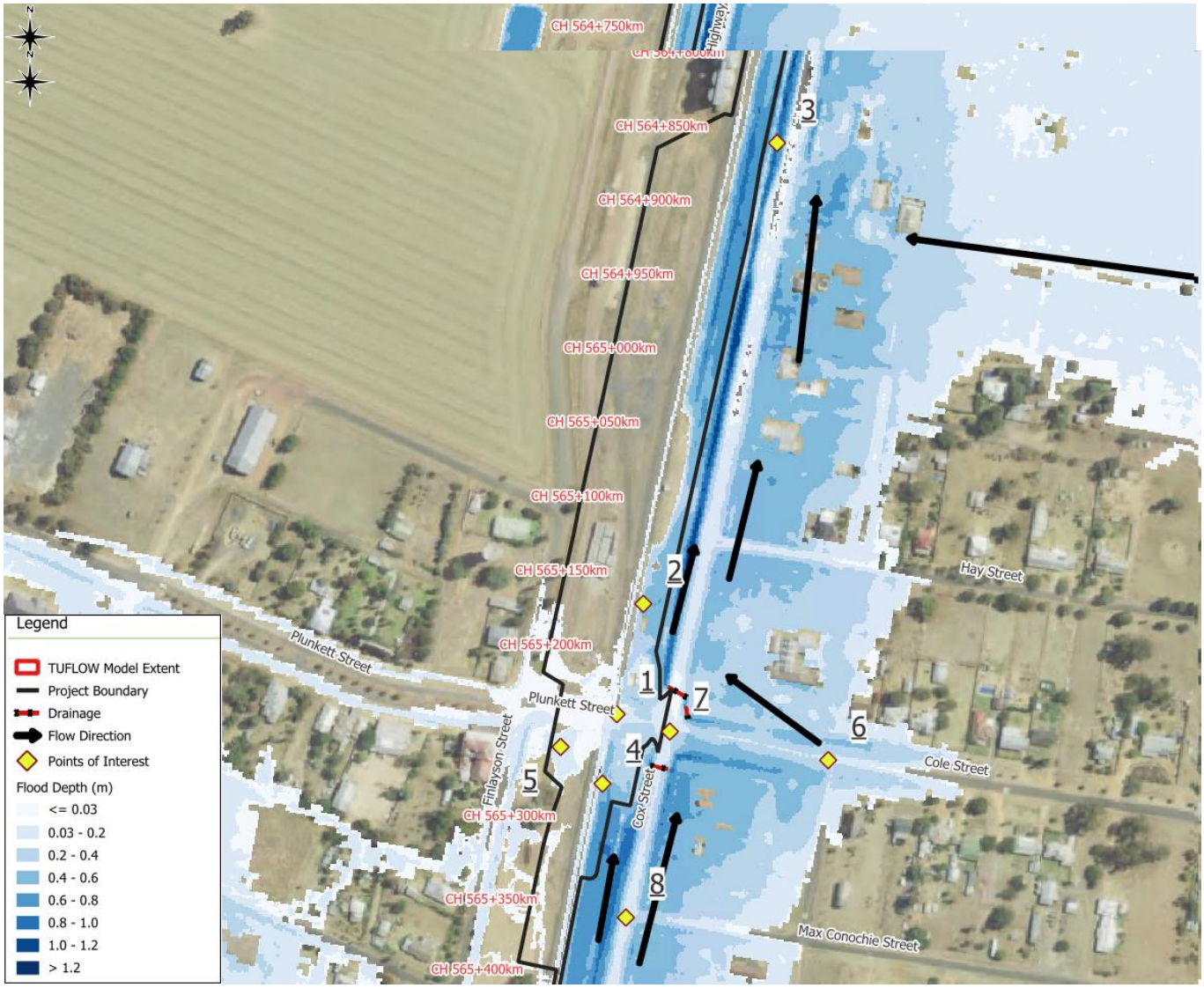

Figure 5-1: Existing Conditions 1% AEP Peak Flood Depth with Points of Interest

Table 5-1 summarises the notes on the locations of points of interest.

Table 5-1: Points of Interest

Point of Interest	Notes
1	Location at Plunket Street Level Crossing at CH565+250 km
2	Location in the existing channel at CH565+200 km
3	Location in the existing channel at CH564+850 km

Point of Interest	Notes
4	Location in the existing channel at CH565+275 km
5	Location in the existing basin at CH565+275 km
6	Upstream of the level crossing at CH565+250 km on Cole Street
7	Upstream of the level crossing at CH565+250 km at the intersection of Cole Street and Cox Street
8	Upstream of the site at CH565+350 km at the intersection of Cox Street and Max Conochie Street

Table 5-2 and Table 5-3 summarise the peak flood level results for the existing conditions at the Yerong Creek Yard.

Table 5-2: Peak Flood Levels - Existing Conditions

Design Events	Flood Levels
5% AEP	▪ No overtopping along the railway corridor. ▪ Refer to Table 5-3 for flood level comparison based on points of interest.
2% AEP	▪ The flood waters overtop the existing railway track level within the site, however only at the area of the Plunkett Street level crossing. ▪ Refer to Table 5-3 for flood level comparison based on points of interest.
1% AEP	▪ The flood waters overtop the existing railway track level within the site, however, only at the area of the Plunkett Street level crossing and immediately south and also at Chainage 565+400km. ▪ Refer to Table 5-3 for flood level comparison based on points of interest.
1% AEP + Climate Change	
PMF	▪ The flood waters overtop the existing railway track level along the entire length of the rail in the site area. ▪ Refer to Table 5-3 for flood level comparison based on points of interest.

Table 5-3: Peak Flood Levels (mAHD) at Points of Interest - Existing Conditions

Point of Interest	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	PMF
1	Dry	Dry	214.20	214.22	214.44
2	213.38	213.59	213.69	213.76	214.26
3	212.73	212.93	213.06	213.16	213.70
4	214.18	214.27	214.33	214.38	214.78
5	Dry	Dry	213.26	213.29	213.71
6	214.09	214.14	214.19	214.24	214.68
7	214.13	214.18	214.22	214.25	214.59
8	214.33	214.35	214.38	214.46	214.93

Table 5-4 summarises the peak flood velocity results for existing conditions at the Yerong Creek Yard.

Table 5-4: Peak Flood Velocity - Existing Conditions

Design Events	Flood Velocity
5% AEP	▪ Refer to Table 5-5 for flood velocity comparison based on points of interest. ▪ The peak velocity within the site area is 1.2m/s
2% AEP	▪ Refer to Table 5-5 for flood velocity comparison based on points of interest. ▪ The peak velocity within the site area is 1.3m/s

Design Events	Flood Velocity
1% AEP	▪ Refer to Table 5-5 for flood velocity comparison based on points of interest. ▪ The peak velocity within the site area is 1.5 m/s
1% AEP + Climate Change	▪ Refer to Table 5-5 for flood velocity comparison based on points of interest. ▪ The peak velocity within the site area is 1.5 m/s
PMF	▪ Refer to Table 5-5 for flood velocity comparison based on points of interest. ▪ The peak velocity within the site area is 2.2 m/s

Table 5-5: Peak Flood Velocity (m/s) at Points of Interest - Existing Conditions

Point of Interest	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	PMF
1	Dry	Dry	0.2	0.4	1.7
2	0.1	0.1	0.2	0.2	0.5
3	0.4	0.5	0.6	0.6	0.9
4	0.2	0.4	0.5	0.5	1.2
5	Dry	Dry	<0.1	0.1	0.7
6	0.5	0.6	0.7	0.7	1.1
7	0.1	0.6	0.8	0.9	1.9
8	0.5	0.8	0.7	0.8	1.4

The flood hazard assessment is based on the general flood hazard classification set by the Australian Institute for Disaster Resilience in the Australian Disaster Resilience Handbook Collection - Flood Hazard, 2017. Figure and Table 5-6 describe the hazards.

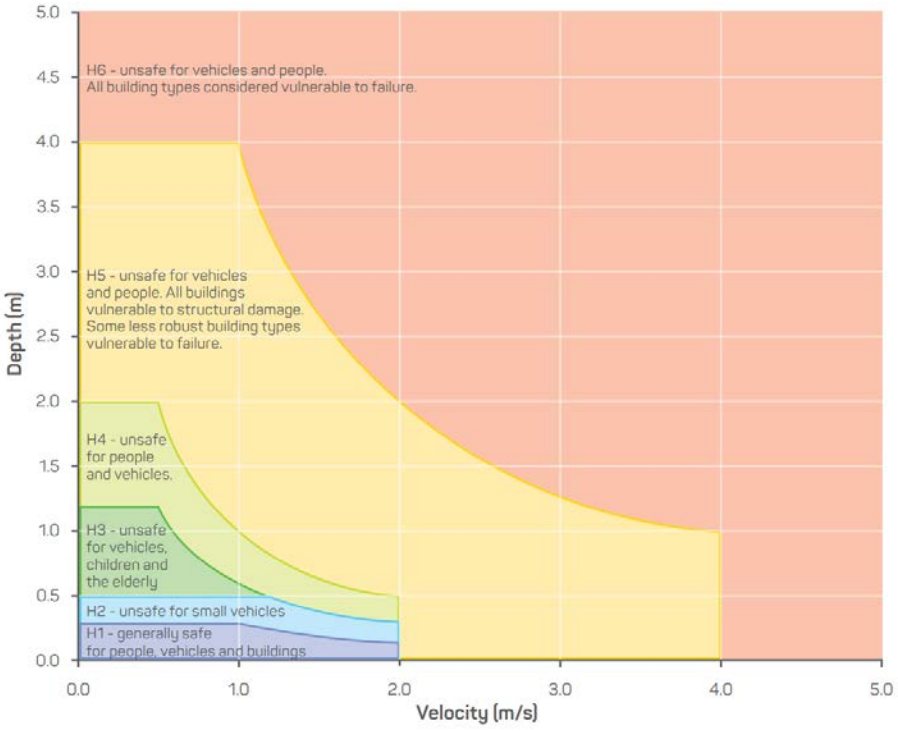

Figure 5-2: General Flood Hazard Vulnerability Curves - (Image Source: Australian Disaster Resilience Handbook Collection - Flood Hazard)

Table 5-6: Combined Hazard Curves - Vulnerability Thresholds

Hazard Vulnerability Classification	Description
H1	Generally safe for vehicles, people and buildings.
H2	Unsafe for small vehicles
H3	Unsafe for vehicles, children and the elderly
H4	Unsafe for vehicles and people.
H5	Unsafe for vehicles and people. All building types are vulnerable to structural damage. Some less robust building types are vulnerable to failure.
H6	Unsafe for vehicles and people. All building types are considered vulnerable to failure

Table 5-7 describes the general risk for all the events, while Table 5-8 summarises the hazard for the reporting locations.

Table 5-7: Flood Hazard - Existing Conditions

Design Events	Flood Hazard
5% AEP 2% AEP	▪ Refer to Table 5-8 for flood hazard comparison based on points of interest. ▪ The peak hazard along the rail corridor is up to H3
1% AEP 1% AEP + Climate Change	▪ Refer to Table 5-8 for flood hazard comparison based on points of interest. ▪ The peak hazard along the rail corridor is up to H4
PMF	▪ Refer to Table 5-8 for flood hazard comparison based on points of interest. ▪ The peak hazard along the rail corridor is generally H5.

Table 5-8: Peak Flood Hazard at Points of Interest - Existing Conditions

Point of Interest	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	PMF
1	Dry	H1	H1	H1	H2
2	H1	H2	H3	H3	H3
3	H3	H3	H3	H4	H5
4	H2	H2	H3	H3	H5
5	Dry	Dry	H1	H1	H3
6	H1	H1	H1	H1	H4
7	H1	H1	H1	H1	H4
8	H1	H1	H1	H1	H4

5.2 Design Condition

Design conditions flood maps, including peak flood depth and levels, peak flood velocity, and peak flood hazard for the events modelled, are provided in Appendix A.

The design conditions incorporate the track design, drainage design, and the proposed bund upstream of the rail line. The incorporation of these causes a reduction in the overtopping of the rail.

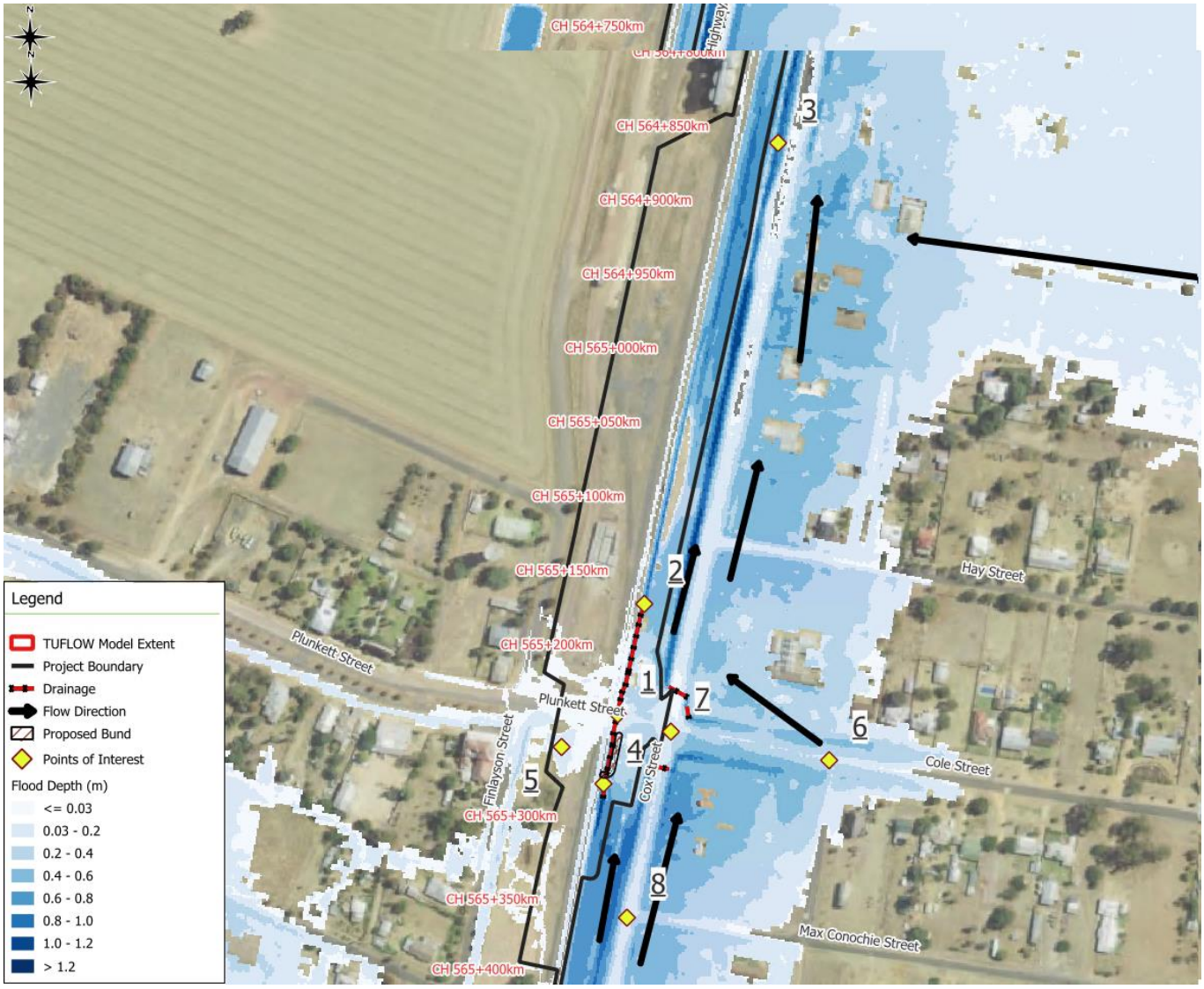

Figure 5-3: 1% AEP Peak Flood Depth at Points of Interest - Design Condition

Table 5-9 and Table 5-10 summarise the peak flood level results for design conditions at the Yerong Creek Yard.

Table 5-9: Peak Flood Levels - Design Conditions

Design Events	Flood Levels
5% AEP	▪ Same as the existing condition, no overtopping happens for the 5% AEP event. ▪ Refer to Table 5-10 for flood level comparison based on points of interest.
2% AEP	▪ The rail is no longer overtopped in the 2% AEP event. ▪ Refer to Table 5-10 for flood level comparison based on points of interest.
1% AEP	▪ Same as the existing condition, the rail is still overtopped in the 1% AEP event but the depth of overtopping is reduced. ▪ Refer to Table 5-10 for flood level comparison based on points of interest.
1% AEP + Climate Change	▪ Same as the existing condition, the rail is still overtopped in the 1% AEP event + Climate Change ▪ Refer to Table 5-10 for flood level comparison based on points of interest.
PMF	▪ Same as the existing condition, the rail is still overtopped in the PMF event ▪ Refer to Table 5-10 for flood level comparison based on points of interest.

Table 5-10: Peak Flood Levels (mAHD) at Points of Interest - Design Conditions

Point of Interest	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	PMF
1	Dry	Dry	214.15	214.19	214.46
2	213.33	213.54	213.66	213.74	214.23
3	212.71	212.93	213.07	213.16	213.69
4	214.20	214.29	214.36	214.41	214.84
5	Dry	Dry	213.23	213.25	213.70
6	214.08	214.14	214.19	214.24	214.69
7	214.13	214.18	214.22	214.26	214.60
8	214.31	214.33	214.39	214.46	214.94

In the design condition, the flow velocity is generally low along the railway corridor. Table 5-11 and Table 5-12 summarises the peak flood velocity results for design conditions at the Yerong Creek Yard.

Table 5-11: Peak Flood Velocity - Design Conditions

Design Events	Flood Velocity
5% AEP	▪ Refer to Table 5-12 for flood velocity comparison based on points of interest. ▪ The peak velocity along the rail corridor is 1.2m/s
2% AEP	▪ Refer to Table 5-12 for flood velocity comparison based on points of interest. ▪ The peak velocity along the rail corridor is 1.4m/s
1% AEP	▪ Refer to Table 5-12 for flood velocity comparison based on points of interest. ▪ The peak velocity along the rail corridor is 1.5 m/s
1% AEP + Climate Change	▪ Refer to Table 5-12 for flood velocity comparison based on points of interest. ▪ The peak velocity along the rail corridor is 1.6 m/s
PMF	▪ Refer to Table 5-12 for flood velocity comparison based on points of interest. ▪ The peak velocity along the rail corridor is 2.1 m/s

Table 5-12: Peak Flood Velocity (m/s) at Points of Interest - Design Condition

Point of Interest	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	PMF
1	Dry	Dry	0.2	0.3	1.5
2	0.3	0.4	0.4	0.4	0.9
3	0.4	0.5	0.6	0.6	0.9
4	0.2	0.4	0.3	0.4	1.2
5	Dry	Dry	<0.1	<0.1	0.7
6	0.5	0.6	0.7	0.7	1.1
7	0.2	0.7	0.9	1.0	1.9
8	0.5	0.7	0.7	0.8	1.3

The flood hazard for the design conditions is presented in Table 5-13 with the maps presented in Appendix A.

Table 5-13: Flood Hazard - Design Conditions

Design Events	Flood Hazard
5% AEP	Refer to Table 5-14 for a comparison of flood hazard based on points of interest. The peak hazard along the rail corridor is up to H3.
2% AEP	
1% AEP	Refer to Table 5-14 for a comparison of flood hazard based on points of interest.

Design Events	Flood Hazard
1% AEP + Climate Change	The peak hazard along the rail corridor is up to H4.
PMF	Refer to Table 5-14 for a comparison of flood hazard based on points of interest. The peak hazard along the rail corridor is up to H5.

Table 5-14: Peak Flood Hazard at Points of Interest - Design Condition

Point of Interest	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	PMF
1	Dry	Dry	H1	H1	H2
2	H2	H3	H3	H3	H4
3	H3	H3	H3	H4	H5
4	H3	H3	H3	H3	H5
5	Dry	Dry	H1	H1	H3
6	H1	H1	H1	H1	H4
7	H1	H1	H1	H1	H4
8	H1	H1	H1	H1	H4

5.3 Flood Immunity and Scour Protection

The railway corridor improves its flood immunity with the rail having a flood immunity in the 2% AEP event in the design conditions, whereas in the existing conditions, the flood immunity of the rail is the 5% AEP event. As this is an improvement in the rail immunity, this complies with the criteria in PSRs. As discussed further in Section 5.4.2 the only area where there are velocity increases of 0.5m/s is within the proposed design channel between Chainage 562+250km and 562+150km, however, these velocities are still below 1m/s and will not cause issues with regard to scour.

Table 5-15: Overtopping Details at CH565+250km

Chainage	Top of the Rail Level (mAHD) *		Top of the Formation Level (mAHD)		5% AEP Flood Level (mAHD)		2% AEP Flood Level (mAHD)		1% AEP Flood Level (mAHD)	
	Existing	Design	Existing	Design	Existing	Design	Existing	Design	Existing	Design
CH 565 + 250km	214.19	214.15	214.19	214.15	Not Overtopped	Not Overtopped	214.20	Not Overtopped	214.23	214.18

*Note as this is at the Plunkett Street level crossing, the top of the formation is the same as the top of rail level.

5.4 Flood Impact Assessment

Due to the addition of the cess drains and bund between CH565+250km and CH565+275km there is a general reduction in flood levels downstream as the depth of overtopping of rail is reduced. As a result, there is an increase in flood levels upstream of the bund.

5.4.1 Changes in Peak Flood Level

The table below provides the peak flood level changes associated with the proposed design conditions.

Table 5-16: Flood Level Impact Assessment

Design Events	Changes in Peak Flood Levels
5% AEP	▪ Increases in flood levels are localised to Chainage 565+275km where there are increases up to 11mm that extend slightly outside the project boundary. However, this is within the CoA afflux limits and hence compliant. ▪ There are increases in flood levels of less than 10mm upstream of the site in the Yerong Township area, however these are all within CoA afflux limits and hence compliant. ▪ There are some isolated newly wet areas at the upstream fringes of the flood extent, however these are all within CoA afflux limits and hence compliant.

Design Events	Changes in Peak Flood Levels
2% AEP	▪ Increases in flood levels are localised to Chainage 565+275km where there are increases up to 11mm that extend slightly outside the project boundary. However, this is within the CoA afflux limits and hence compliant. ▪ There are increases in flood levels of less than 10mm upstream of the site in the Yerong Township area, however these are all within CoA afflux limits and hence compliant. ▪ There are some isolated newly wet areas at the upstream fringes of the flood extent, however these are all within CoA afflux limits and hence compliant.
1% AEP	▪ Increases in flood levels are localised to Chainage 565+275km where there are increases up to 13mm that extend slightly outside the project boundary. However, this is within the CoA afflux limits and hence compliant. ▪ There are increases in flood levels of less than 10mm upstream of the site in the Yerong Township area, however these are all within CoA afflux limits and hence compliant. ▪ There are some isolated newly wet areas at the upstream fringes of the flood extent, however these are all within CoA afflux limits and hence compliant.

Table 5-17: Changes in Flood Level (mAHD) at Points of Interest

Point of Interest	5% AEP	2% AEP	1% AEP
1	Dry	Was Wet Now Dry	-0.03
2	-0.05	-0.05	-0.03
3	-0.01	No Change	0.01
4	0.02	0.02	0.03
5	Dry	Dry	-0.03
6	No Change	No Change	0.01
7	No Change	No Change	No Change
8	No Change	0.01	0.01

5.4.2 Changes in Peak Flood Velocity

The table below details changes in peak flood velocity associated with the proposed design conditions.

Table 5-18: Flood Velocity Impact Assessment

Design Events	Changes in Peak Flood Velocity
5% AEP	▪ Changes in velocity are all below 0.5m/s other than small patches within the newly proposed drainage channels, however the velocity is below 1 m/s, so it is unlikely to cause any issue with regards to scour. These increases are all within the project boundary. As such, these are all within CoA afflux limits and hence compliant.
2% AEP	▪ Changes in velocity are all below 0.5m/s other than small patches within the newly proposed drainage channels, however the velocity is below 1 m/s so it is unlikely to cause any issue with regards to scour. These increases are all within the project boundary As such, these are all within CoA afflux limits and hence compliant.
1% AEP	▪ Changes in velocity are all below 0.5m/s other than small patches within the newly proposed drainage channels, however the velocity is below 1 m/s so it is unlikely to cause any issue with regards to scour. These increases are all within the project boundary As such, these are all within CoA afflux limits and hence compliant.

5.4.3 Changes in Peak Flood Hazard

The table below details the flood hazard changes associated with the proposed design conditions.

Table 5-19: Flood Hazard Impact Assessment

Design Events	Changes in Peak Flood Hazard
All AEP Events	There are increases of up to 2 Flood Hazard Categories within the proposed design channels however, this is unlikely to cause any material risk to life. As such, these are all within CoA afflux limits and hence compliant. There are small patches of increases of 1 Flood Hazard Category upstream of the bund and the rail line that extend outside the project boundary into the Yerong township area. However, when comparing the Z0 value (depth x velocity) which is also an indication of Flood Hazard, these are all negligible increases and unlikely to cause a risk to life. As such, these are all within CoA afflux limits and hence compliant.

5.4.4 Changes in Duration of Inundation

The analysis of the change in duration of inundation was undertaken by comparing water level vs. time hydrographs downstream of the site on Finlayson Street and upstream of the site at Cole Street(shown in Figure 5-4) and comparing them between the existing and design conditions.

Figure 5-4: Duration of Inundation Downstream Reporting Location

As shown in the below figures, for all AEP events, there are negligible changes in the graphs between the existing and design conditions. Therefore, it can be seen that there is no increase in duration of inundation as a result of the project works.

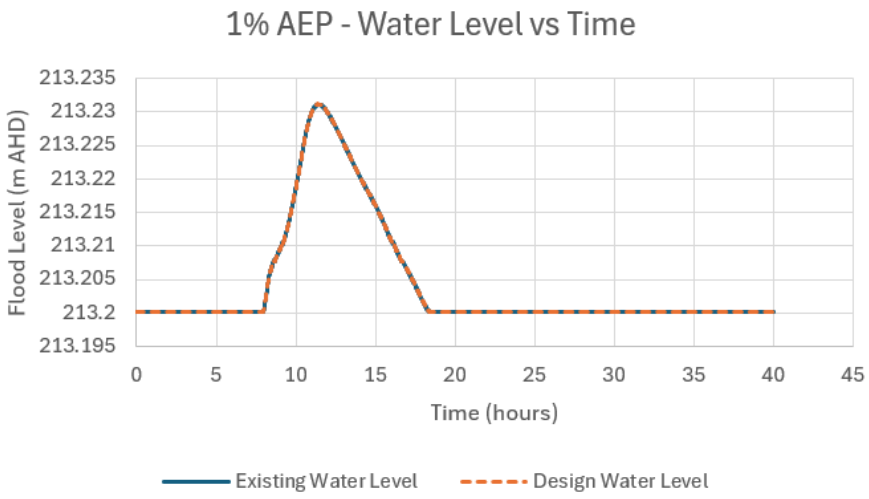

Figure 5-5: 1% AEP - Water Level vs Time - Downstream of the Site

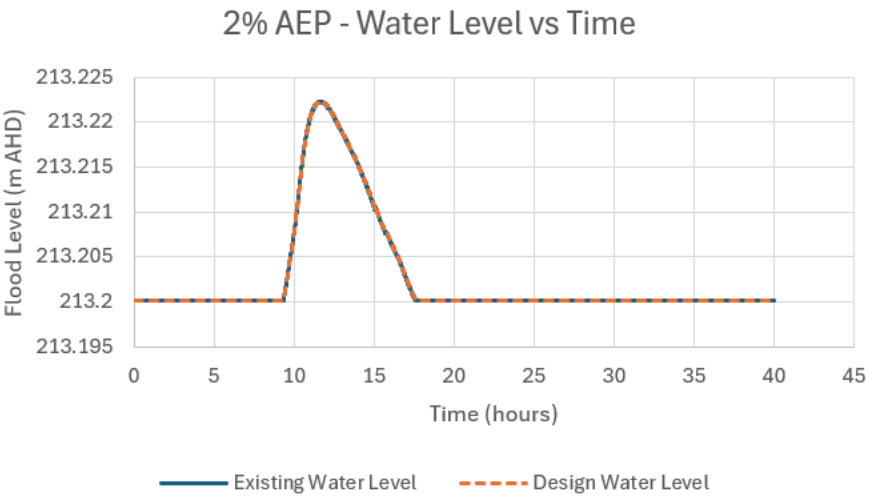

Figure 5-6: 2% AEP - Water Level vs Time - Downstream of the Site

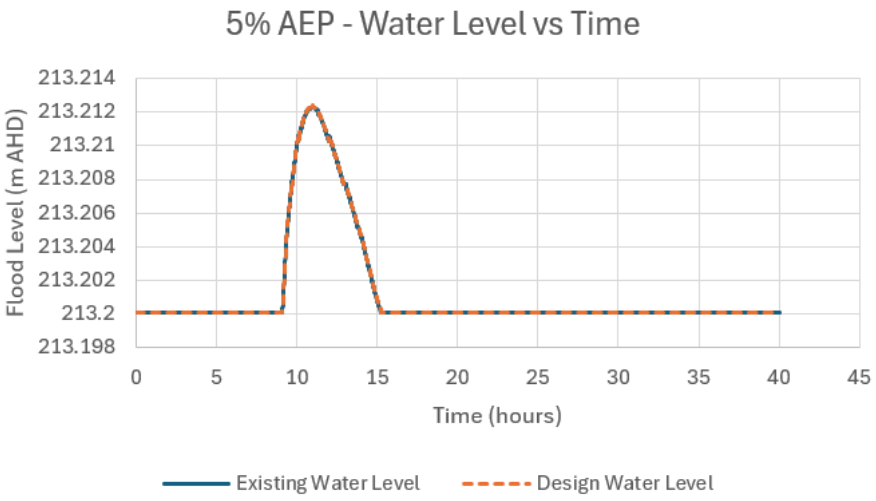

Figure 5-7: 5% AEP – Water Level vs Time - Downstream of the Site

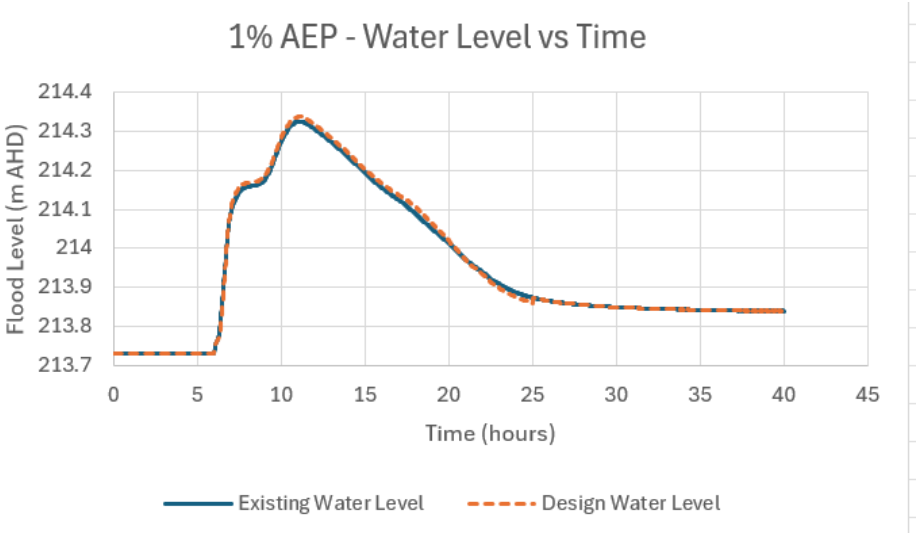

Figure 5-8: 1% AEP – Water Level vs Time – Upstream of the Site

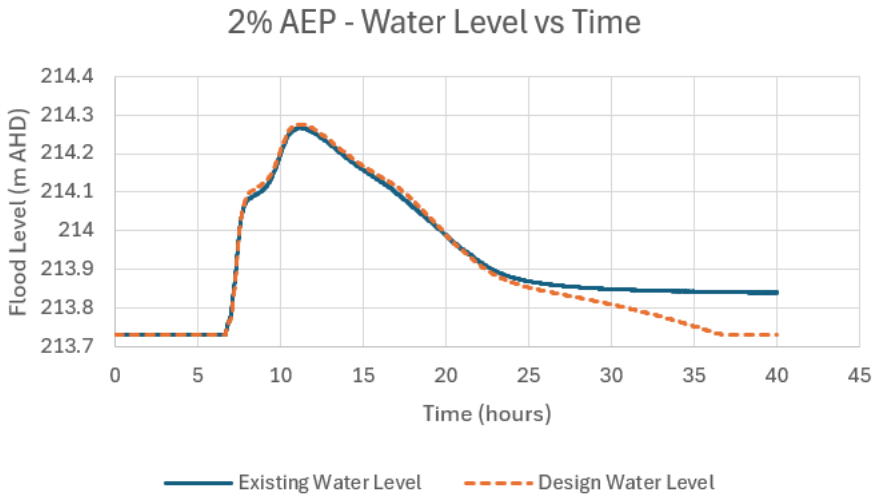

Figure 5-9: 2% AEP – Water Level vs Time – Upstream of the Site

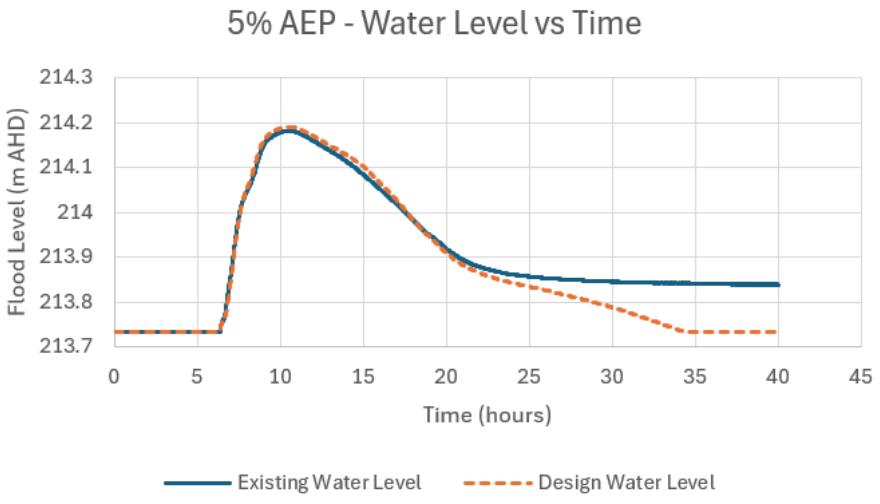

Figure 5-10: 5% AEP – Water Level vs Time – Upstream of the Site

5.5 Sensitivity Test

5.5.1 Blockage Assessment

A hydraulic blockage assessment was carried out for the 1% AEP event for design conditions as per Book 6 Chapter 6 of ARR2019. The assessment involved assessing the site area for debris availability, mobility and transportability and this, in conjunction with culvert size was used to determine the relevant blockage factors shown in Table 5-20 and Table 5-21. Culverts within the project boundary are shown in Figure 5-13. A 20% blockage was adopted for all the other culverts, pits pipes and bridges outside the project boundary.

A flood level comparison between the design blockage scenario and design conditions is presented in Figure . Specifically, the blockage of the road and rail culvert structures at the Sandy Creek crossing to the south of the site cause an increase of flows to travel north towards the site area. There are increases of up to 40mm on the site area and up to 30mm upstream in the Yerong Creek township as a result of the blockage. Further, there is an increase in slight overtopping of the level crossing at Plunket Street which then causes increases in flood levels of up to 20mm and newly wet areas downstream along Plunkett Street.

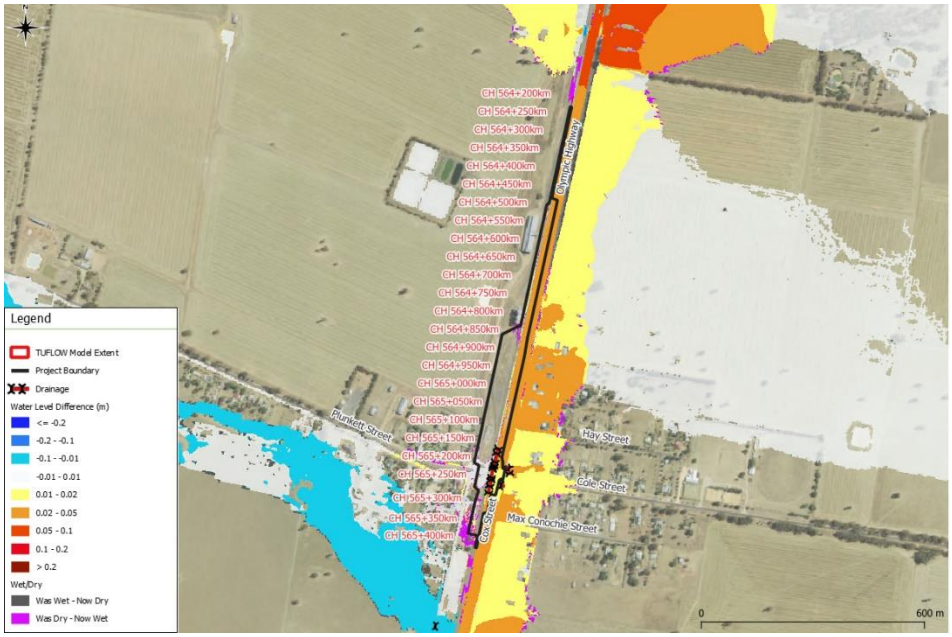

Figure 5-11: Design Blockage vs Non-Blockage Overview – 1% AEP

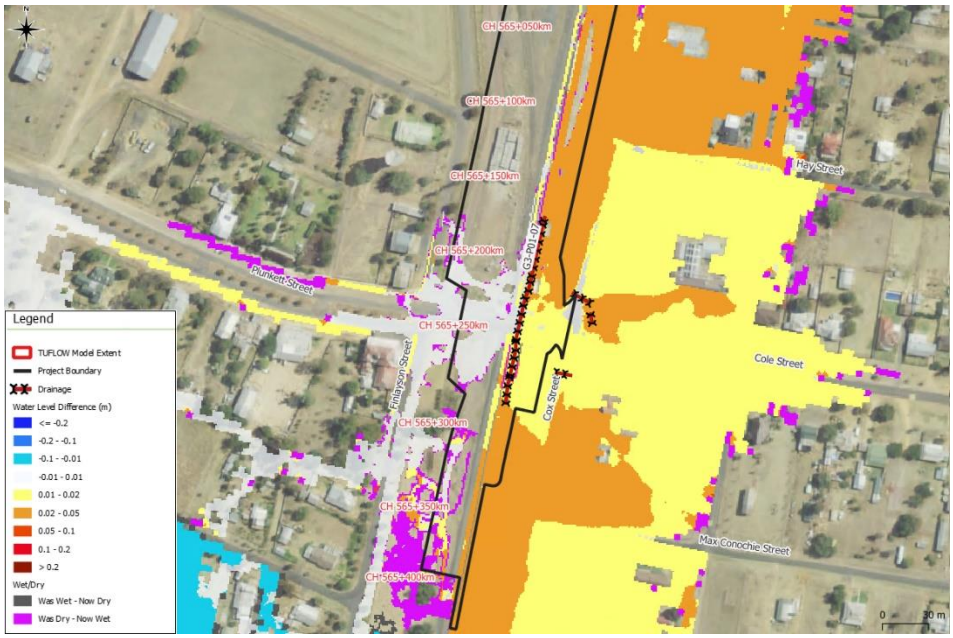

Figure 5-12: Design Blockage vs Non-Blockage Level Crossing – 1% AEP

Figure 5-13: Culverts Location

Table 5-20: Culvert Blockage Percentage

Drainage Component	Blockage Percentage (1% AEP)	Comments
G3-P01-01	50%	Inside the project boundary
G3-P01-02	50%	Inside the project boundary
G3-P01-03	50%	Inside the project boundary
G3-P01-04	50%	Inside the project boundary
G3-P01-05	50%	Inside the project boundary
G3-P01-06	50%	Inside the project boundary
G3-P01-07	50%	Inside the project boundary
G3-P01-08	50%	Inside the project boundary
All others (culverts, bridges and pipes)	20%	Outside of the project boundary

Table 5-21: Culvert Blockage Parameters

Culvert	Debris Availability	Debris Mobility	Debris Transportability	AEP Adjusted Debris Potential	L10
Culverts (Inside project boundary)	Medium	Medium	Medium	Medium	1.8m

5.5.2 Climate Change Risk Assessment

A Climate Change risk assessment was conducted by running the 1% Annual Exceedance Probability (AEP) with the Year 2090 RCP8.5 interim climate change factor (refer to Section 4.2.3.1 for details of the approach). The corresponding flood maps can be found in Appendix A. The assessment is summarised below:

- The rail is overtopped in both the existing and design conditions when considering climate change (1% AEP + climate change). As there are no issues with regards to scour in the existing conditions, the design works will not cause an issue with regards to scour or erosion.

6 MITIGATION MEASURES

Since the project site has no instances of non-compliance in terms of flood impact, no mitigation measures are necessary.

7 RECOMMENDATIONS AND NEXT STAGE

This is the final IFC stage of the report, and the followings are finalised:

- No instances of non-compliance have been identified through the assessment.
- All comments raised by relevant parties have been resolved (refer to Appendices C, D, and E)

Consequently, there are no further recommendations.

APPENDICES

APPENDIX A

Flood Maps

Table A- 1: List of Maps in Appendix A

Map ID	Map description
Figure 1	Figure Set Up
Figure 2	5% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions
Figure 2a	5% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions
Figure 2b	5% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions
Figure 2c	5% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions
Figure 3	2% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions
Figure 3a	2% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions
Figure 3b	2% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions
Figure 3c	2% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions
Figure 4	1% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions
Figure 4a	1% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions
Figure 4b	1% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions
Figure 4c	1% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions
Figure 5	1% AEP Climate Change Flood Depth (m) and Levels (m AHD) - Existing Conditions
Figure 5a	1% AEP Climate Change Flood Depth (m) and Levels (m AHD) - Existing Conditions
Figure 5b	1% AEP Climate Change Flood Depth (m) and Levels (m AHD) - Existing Conditions
Figure 5c	1% AEP Climate Change Flood Depth (m) and Levels (m AHD) - Existing Conditions
Figure 6	PMF Flood Depth (m) and Levels (m AHD) - Existing Conditions
Figure 6a	PMF Flood Depth (m) and Levels (m AHD) - Existing Conditions
Figure 6b	PMF Flood Depth (m) and Levels (m AHD) - Existing Conditions
Figure 6c	PMF Flood Depth (m) and Levels (m AHD) - Existing Conditions
Figure 7	5% AEP Flood Velocity (m/s) - Existing Conditions
Figure 7a	5% AEP Flood Velocity (m/s) - Existing Conditions
Figure 7b	5% AEP Flood Velocity (m/s) - Existing Conditions
Figure 7c	5% AEP Flood Velocity (m/s) - Existing Conditions
Figure 8	2% AEP Flood Velocity (m/s) - Existing Conditions
Figure 8a	2% AEP Flood Velocity (m/s) - Existing Conditions
Figure 8b	2% AEP Flood Velocity (m/s) - Existing Conditions
Figure 8c	2% AEP Flood Velocity (m/s) - Existing Conditions
Figure 9	1% AEP Flood Velocity (m/s) - Existing Conditions
Figure 9a	1% AEP Flood Velocity (m/s) - Existing Conditions
Figure 9b	1% AEP Flood Velocity (m/s) - Existing Conditions

Map ID	Map description
Figure 9c	1% AEP Flood Velocity (m/s) - Existing Conditions
Figure 10	1% AEP Climate Change Flood Velocity (m/s) - Existing Conditions
Figure 10a	1% AEP Climate Change Flood Velocity (m/s) - Existing Conditions
Figure 10b	1% AEP Climate Change Flood Velocity (m/s) - Existing Conditions
Figure 10c	1% AEP Climate Change Flood Velocity (m/s) - Existing Conditions
Figure 11	PMF Flood Velocity (m/s) - Existing Conditions
Figure 11a	PMF Flood Velocity (m/s) - Existing Conditions
Figure 11b	PMF Flood Velocity (m/s) - Existing Conditions
Figure 11c	PMF Flood Velocity (m/s) - Existing Conditions
Figure 12	5% AEP Flood Hazard (ARR2019) - Existing Conditions
Figure 12a	5% AEP Flood Hazard (ARR2019) - Existing Conditions
Figure 12b	5% AEP Flood Hazard (ARR2019) - Existing Conditions
Figure 12c	5% AEP Flood Hazard (ARR2019) - Existing Conditions
Figure 13	2% AEP Flood Hazard (ARR2019) - Existing Conditions
Figure 13a	2% AEP Flood Hazard (ARR2019) - Existing Conditions
Figure 13b	2% AEP Flood Hazard (ARR2019) - Existing Conditions
Figure 13c	2% AEP Flood Hazard (ARR2019) - Existing Conditions
Figure 14	1% AEP Flood Hazard (ARR2019) - Existing Conditions
Figure 14a	1% AEP Flood Hazard (ARR2019) - Existing Conditions
Figure 14b	1% AEP Flood Hazard (ARR2019) - Existing Conditions
Figure 14c	1% AEP Flood Hazard (ARR2019) - Existing Conditions
Figure 15	1% AEP Climate Change Flood Hazard (ARR2019) - Existing Conditions
Figure 15a	1% AEP Climate Change Flood Hazard (ARR2019) - Existing Conditions
Figure 15b	1% AEP Climate Change Flood Hazard (ARR2019) - Existing Conditions
Figure 15c	1% AEP Climate Change Flood Hazard (ARR2019) - Existing Conditions
Figure 16	PMF Flood Hazard (ARR2019) - Existing Conditions
Figure 16a	PMF Flood Hazard (ARR2019) - Existing Conditions
Figure 16b	PMF Flood Hazard (ARR2019) - Existing Conditions
Figure 16c	PMF Flood Hazard (ARR2019) - Existing Conditions
Figure 17	5% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions
Figure 17a	5% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions
Figure 17b	5% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions
Figure 17c	5% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions

Map ID	Map description
Figure 18	2% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions
Figure 18a	2% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions
Figure 18b	2% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions
Figure 18c	2% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions
Figure 19	1% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions
Figure 19a	1% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions
Figure 19b	1% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions
Figure 19c	1% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions
Figure 20	1% AEP Climate Change Flood Depth (m) and Levels (m AHD) - Developed Conditions
Figure 20a	1% AEP Climate Change Flood Depth (m) and Levels (m AHD) - Developed Conditions
Figure 20b	1% AEP Climate Change Flood Depth (m) and Levels (m AHD) - Developed Conditions
Figure 20c	1% AEP Climate Change Flood Depth (m) and Levels (m AHD) - Developed Conditions
Figure 21	PMF Flood Depth (m) and Levels (m AHD) - Developed Conditions
Figure 21a	PMF Flood Depth (m) and Levels (m AHD) - Developed Conditions
Figure 21b	PMF Flood Depth (m) and Levels (m AHD) - Developed Conditions
Figure 21c	PMF Flood Depth (m) and Levels (m AHD) - Developed Conditions
Figure 22	5% AEP Flood Velocity (m/s) - Developed Conditions
Figure 22a	5% AEP Flood Velocity (m/s) - Developed Conditions
Figure 22b	5% AEP Flood Velocity (m/s) - Developed Conditions
Figure 22c	5% AEP Flood Velocity (m/s) - Developed Conditions
Figure 23	2% AEP Flood Velocity (m/s) - Developed Conditions
Figure 23a	2% AEP Flood Velocity (m/s) - Developed Conditions
Figure 23b	2% AEP Flood Velocity (m/s) - Developed Conditions
Figure 23c	2% AEP Flood Velocity (m/s) - Developed Conditions
Figure 24	1% AEP Flood Velocity (m/s) - Developed Conditions
Figure 24a	1% AEP Flood Velocity (m/s) - Developed Conditions
Figure 24b	1% AEP Flood Velocity (m/s) - Developed Conditions
Figure 24c	1% AEP Flood Velocity (m/s) - Developed Conditions
Figure 25	1% AEP Climate Change Flood Velocity (m/s) - Developed Conditions
Figure 25a	1% AEP Climate Change Flood Velocity (m/s) - Developed Conditions
Figure 25b	1% AEP Climate Change Flood Velocity (m/s) - Developed Conditions
Figure 25c	1% AEP Climate Change Flood Velocity (m/s) - Developed Conditions
Figure 26	PMF Flood Velocity (m/s) - Developed Conditions

Map ID	Map description
Figure 26a	PMF Flood Velocity (m/s) - Developed Conditions
Figure 26b	PMF Flood Velocity (m/s) - Developed Conditions
Figure 26c	PMF Flood Velocity (m/s) - Developed Conditions
Figure 27	5% AEP Flood Hazard (ARR2019) - Developed Conditions
Figure 27a	5% AEP Flood Hazard (ARR2019) - Developed Conditions
Figure 27b	5% AEP Flood Hazard (ARR2019) - Developed Conditions
Figure 27c	5% AEP Flood Hazard (ARR2019) - Developed Conditions
Figure 28	2% AEP Flood Hazard (ARR2019) - Developed Conditions
Figure 28a	2% AEP Flood Hazard (ARR2019) - Developed Conditions
Figure 28b	2% AEP Flood Hazard (ARR2019) - Developed Conditions
Figure 28c	2% AEP Flood Hazard (ARR2019) - Developed Conditions
Figure 29	1% AEP Flood Hazard (ARR2019) - Developed Conditions
Figure 29a	1% AEP Flood Hazard (ARR2019) - Developed Conditions
Figure 29b	1% AEP Flood Hazard (ARR2019) - Developed Conditions
Figure 29c	1% AEP Flood Hazard (ARR2019) - Developed Conditions
Figure 30	1% AEP Climate Change Flood Hazard (ARR2019) - Developed Conditions
Figure 30a	1% AEP Climate Change Flood Hazard (ARR2019) - Developed Conditions
Figure 30b	1% AEP Climate Change Flood Hazard (ARR2019) - Developed Conditions
Figure 30c	1% AEP Climate Change Flood Hazard (ARR2019) - Developed Conditions
Figure 31	PMF Flood Hazard (ARR2019) - Developed Conditions
Figure 31a	PMF Flood Hazard (ARR2019) - Developed Conditions
Figure 31b	PMF Flood Hazard (ARR2019) - Developed Conditions
Figure 31c	PMF Flood Hazard (ARR2019) - Developed Conditions
Figure 32	5% AEP Changes in Flood Levels (m) - Developed Less Existing
Figure 32a	5% AEP Changes in Flood Levels (m) - Developed Less Existing
Figure 32b	5% AEP Changes in Flood Levels (m) - Developed Less Existing
Figure 32c	5% AEP Changes in Flood Levels (m) - Developed Less Existing
Figure 33	2% AEP Changes in Flood Levels (m) - Developed Less Existing
Figure 33a	2% AEP Changes in Flood Levels (m) - Developed Less Existing
Figure 33b	2% AEP Changes in Flood Levels (m) - Developed Less Existing
Figure 33c	2% AEP Changes in Flood Levels (m) - Developed Less Existing
Figure 34	1% AEP Changes in Flood Levels (m) - Developed Less Existing
Figure 34a	1% AEP Changes in Flood Levels (m) - Developed Less Existing

Map ID	Map description
Figure 34b	1% AEP Changes in Flood Levels (m) - Developed Less Existing
Figure 34c	1% AEP Changes in Flood Levels (m) - Developed Less Existing
Figure 35	5% AEP Changes in Flood Velocity (m/s) - Developed Less Existing
Figure 35a	5% AEP Changes in Flood Velocity (m/s) - Developed Less Existing
Figure 35b	5% AEP Changes in Flood Velocity (m/s) - Developed Less Existing
Figure 35c	5% AEP Changes in Flood Velocity (m/s) - Developed Less Existing
Figure 36	2% AEP Changes in Flood Velocity (m/s) - Developed Less Existing
Figure 36a	2% AEP Changes in Flood Velocity (m/s) - Developed Less Existing
Figure 36b	2% AEP Changes in Flood Velocity (m/s) - Developed Less Existing
Figure 36c	2% AEP Changes in Flood Velocity (m/s) - Developed Less Existing
Figure 37	1% AEP Changes in Flood Velocity (m/s) - Developed Less Existing
Figure 37a	1% AEP Changes in Flood Velocity (m/s) - Developed Less Existing
Figure 37b	1% AEP Changes in Flood Velocity (m/s) - Developed Less Existing
Figure 37c	1% AEP Changes in Flood Velocity (m/s) - Developed Less Existing
Figure 38	5% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing
Figure 38a	5% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing
Figure 38b	5% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing
Figure 38c	5% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing
Figure 39	2% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing
Figure 39a	2% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing
Figure 39b	2% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing
Figure 39c	2% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing
Figure 40	1% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing
Figure 40a	1% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing
Figure 40b	1% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing
Figure 40c	1% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing
Figure 41	1% AEP Flood Depth (m) and Levels (m AHD) - Blockage Sensitivity
Figure 41a	1% AEP Flood Depth (m) and Levels (m AHD) - Blockage Sensitivity
Figure 41b	1% AEP Flood Depth (m) and Levels (m AHD) - Blockage Sensitivity
Figure 41c	1% AEP Flood Depth (m) and Levels (m AHD) - Blockage Sensitivity
Figure 42	1% AEP Flood Velocity (m/s) - Blockage Sensitivity
Figure 42a	1% AEP Flood Velocity (m/s) - Blockage Sensitivity
Figure 42b	1% AEP Flood Velocity (m/s) - Blockage Sensitivity

Map ID	Map description
Figure 42c	1% AEP Flood Velocity (m/s) - Blockage Sensitivity
Figure 43	1% AEP Flood Hazard (ARR2019) - Blockage Sensitivity
Figure 43a	1% AEP Flood Hazard (ARR2019) - Blockage Sensitivity
Figure 43b	1% AEP Flood Hazard (ARR2019) - Blockage Sensitivity
Figure 43c	1% AEP Flood Hazard (ARR2019) - Blockage Sensitivity

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0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Legend

Figure Set-up

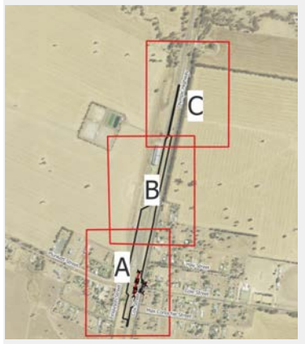

Figure 1 - Yerong Creek - IFC Stage

Figure Set Up

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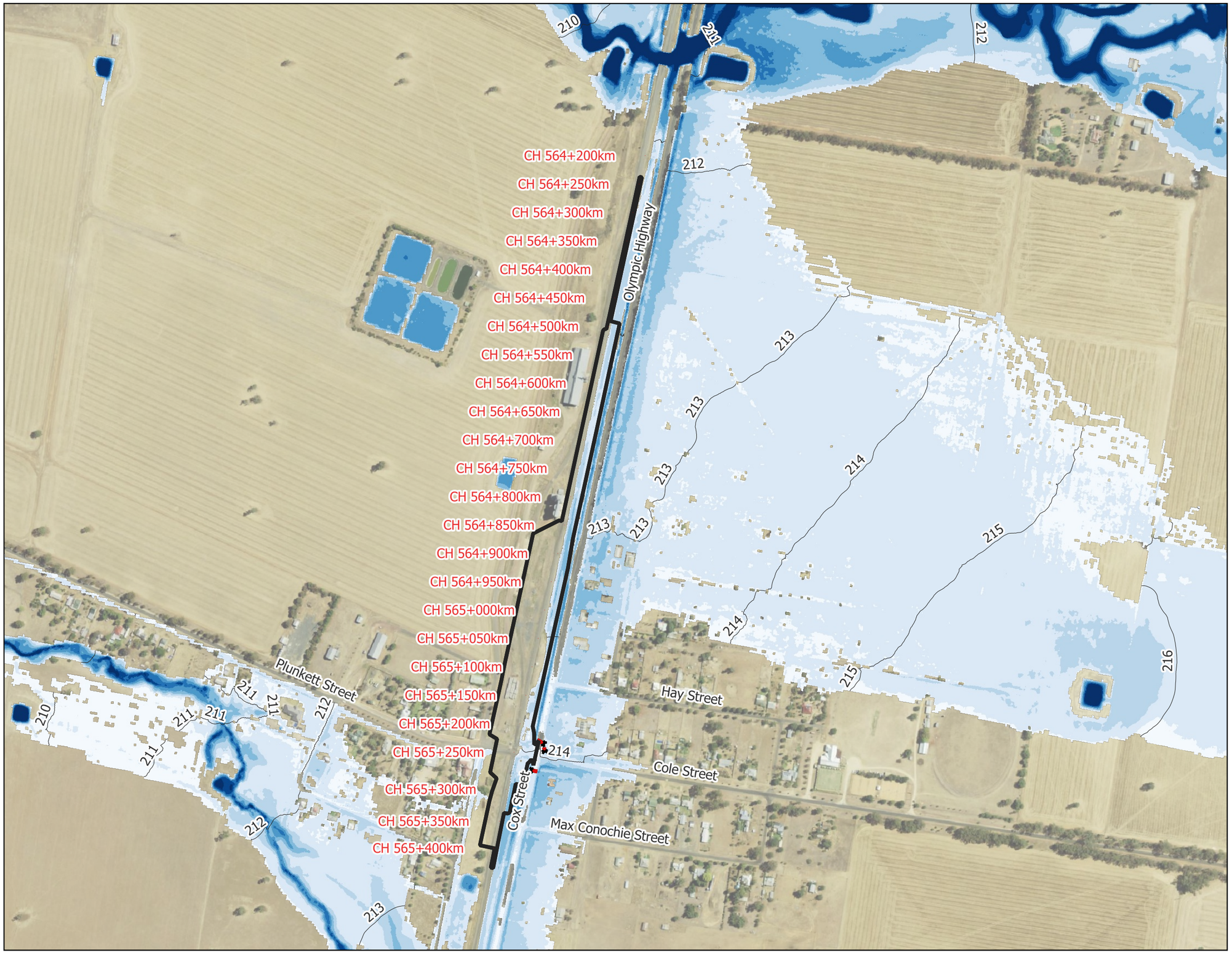

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Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up

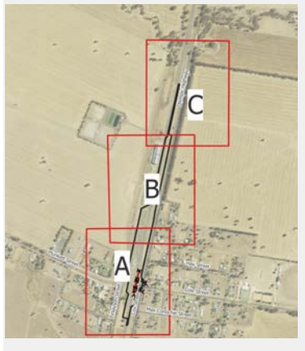

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Figure 2 - Yerong Creek - IFC Stage

5% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions

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Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up

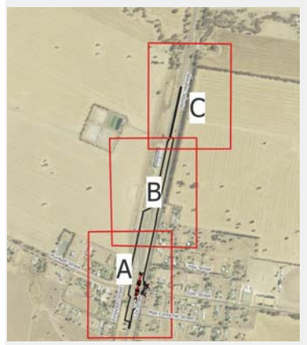

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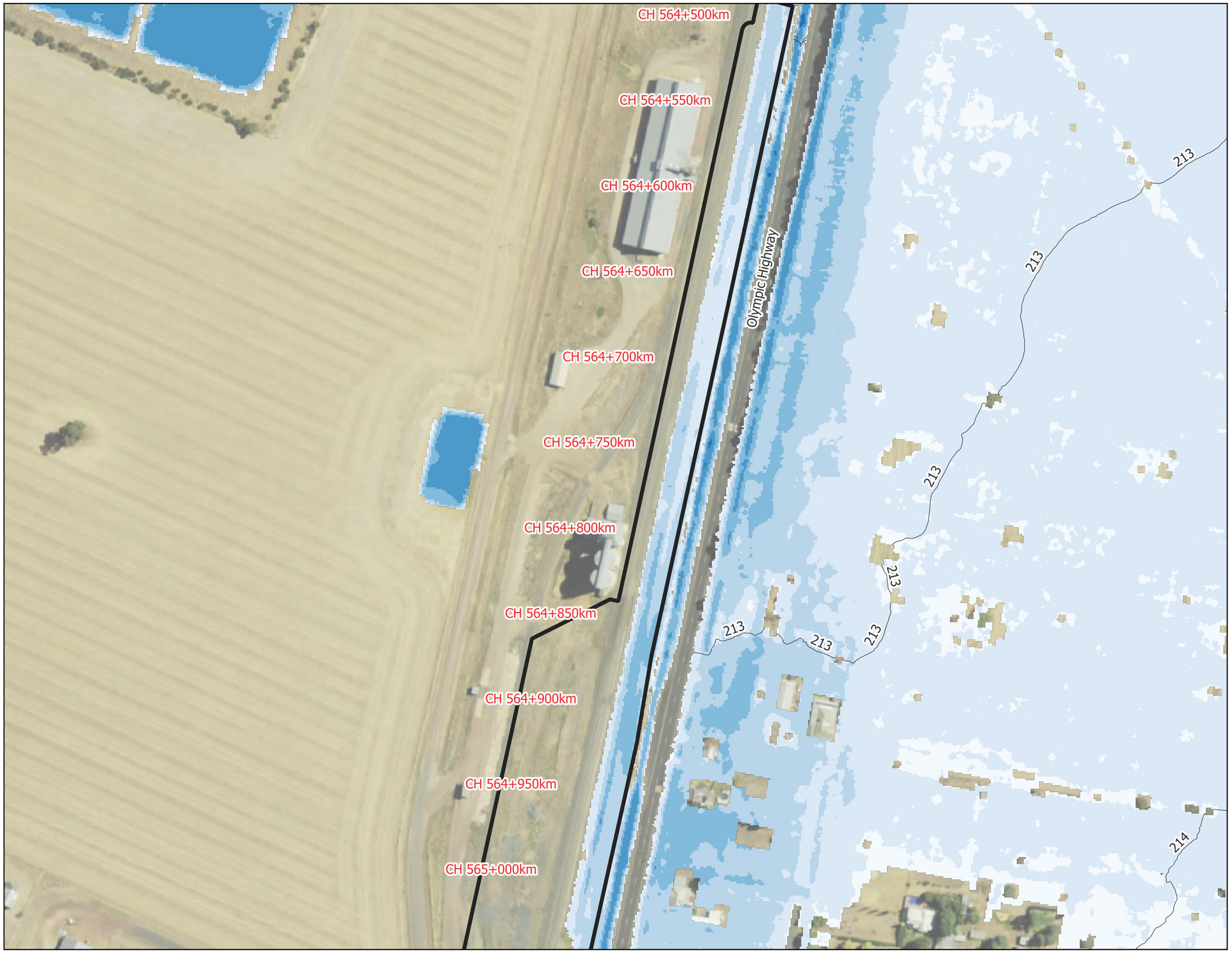
Figure 2a - Yerong Creek - IFC Stage

5% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions



MARTINUS

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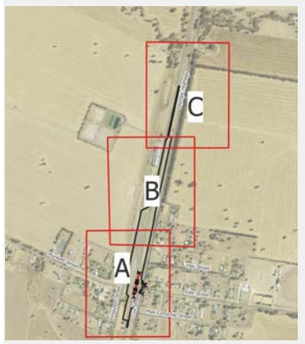
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



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0 80 160 m

21/8/2025 GDA2020 MGA Zone55

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Figure 2b - Yerong Creek - IFC Stage

5% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions

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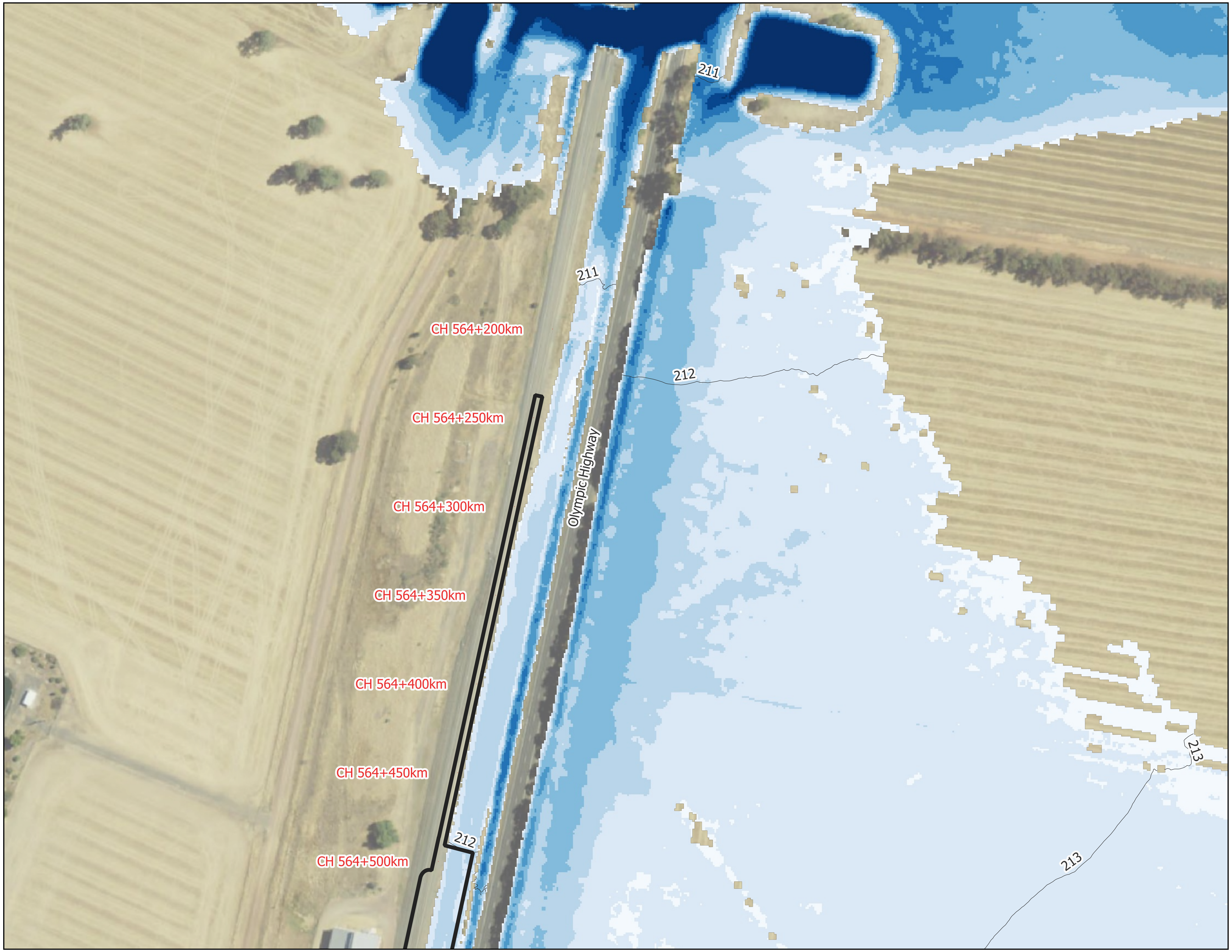


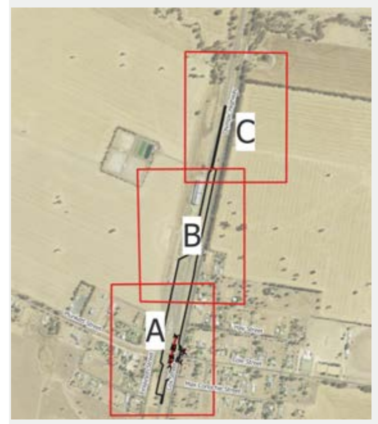
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



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21/8/2025 GDA2020 MGA Zone55

Figure 2c - Yerong Creek - IFC Stage

5% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions

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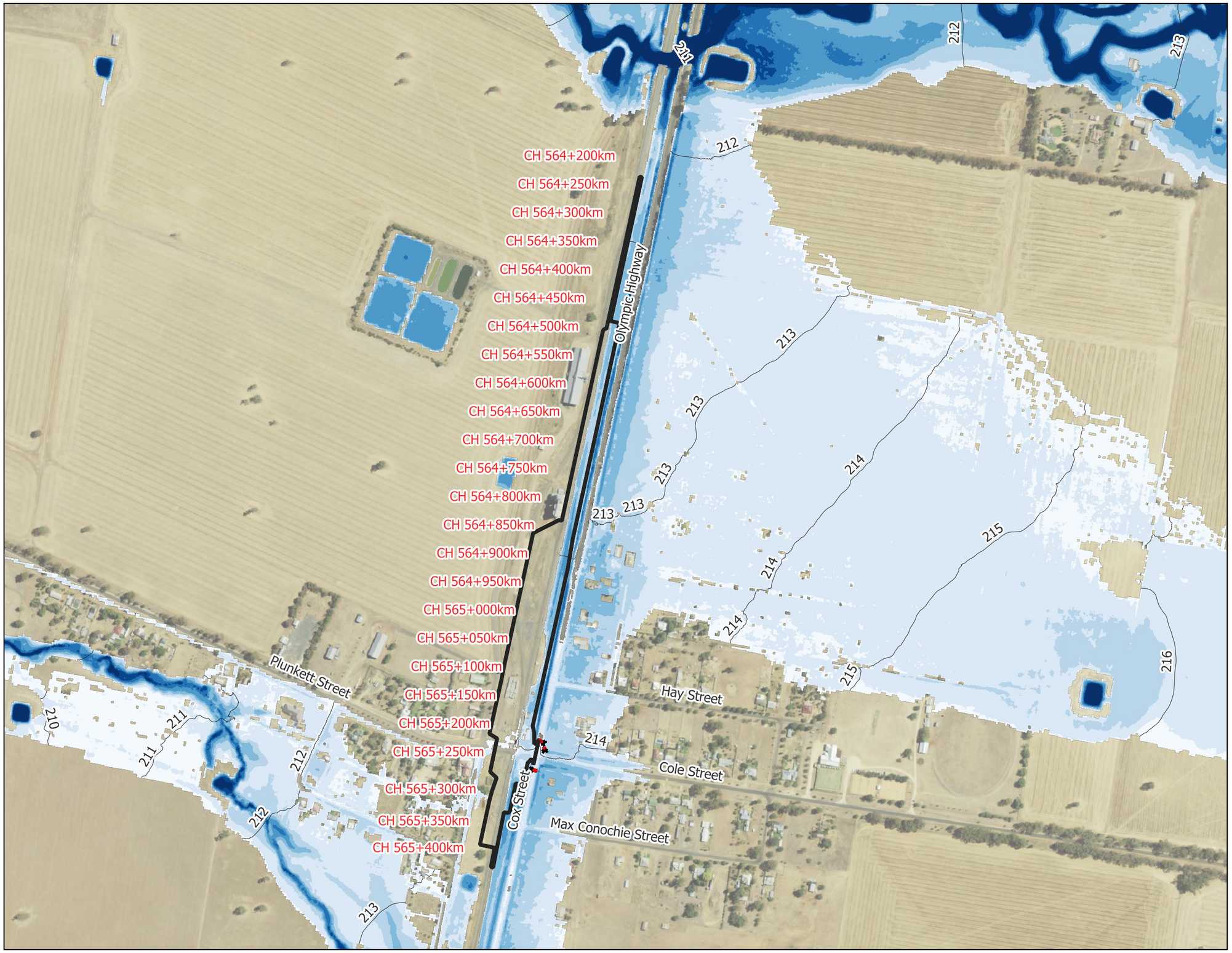

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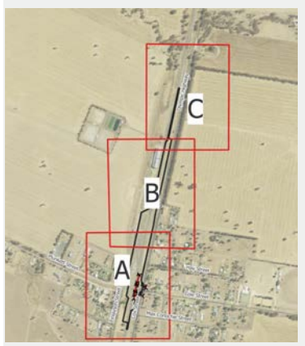
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 3 - Yerong Creek - IFC Stage

2% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

MARTINUS

aurecon BG&E

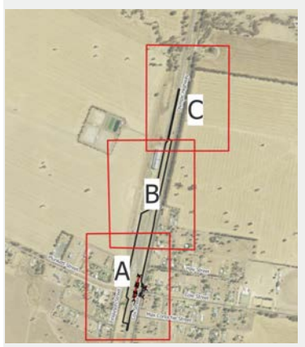
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



21/8/2025 GDA2020 MGA Zone55

Figure 3a - Yerong Creek - IFC Stage

2% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions

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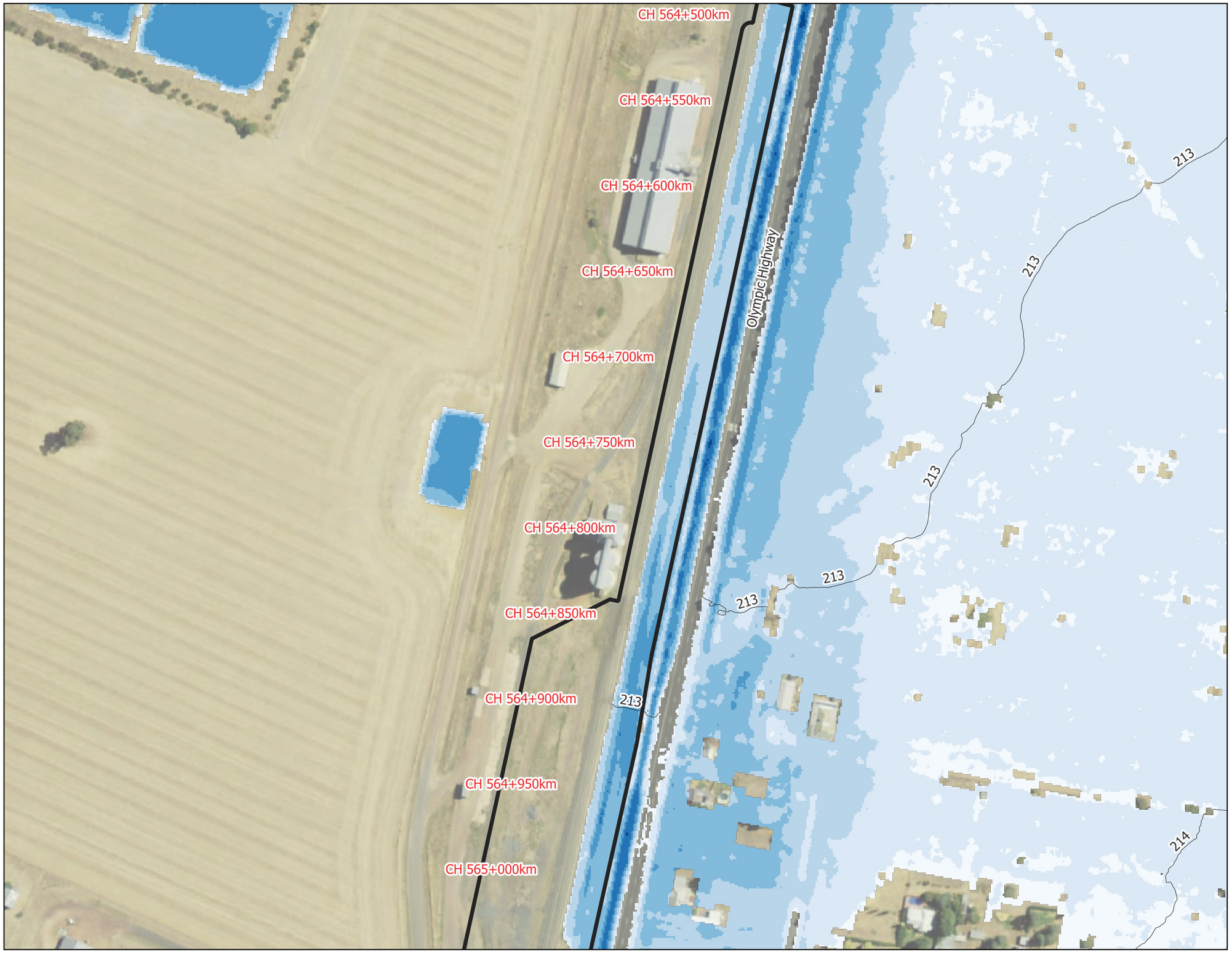


MARTINUS

aurecon BG&E

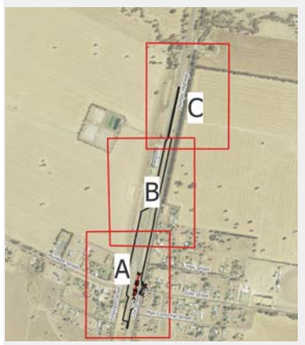
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



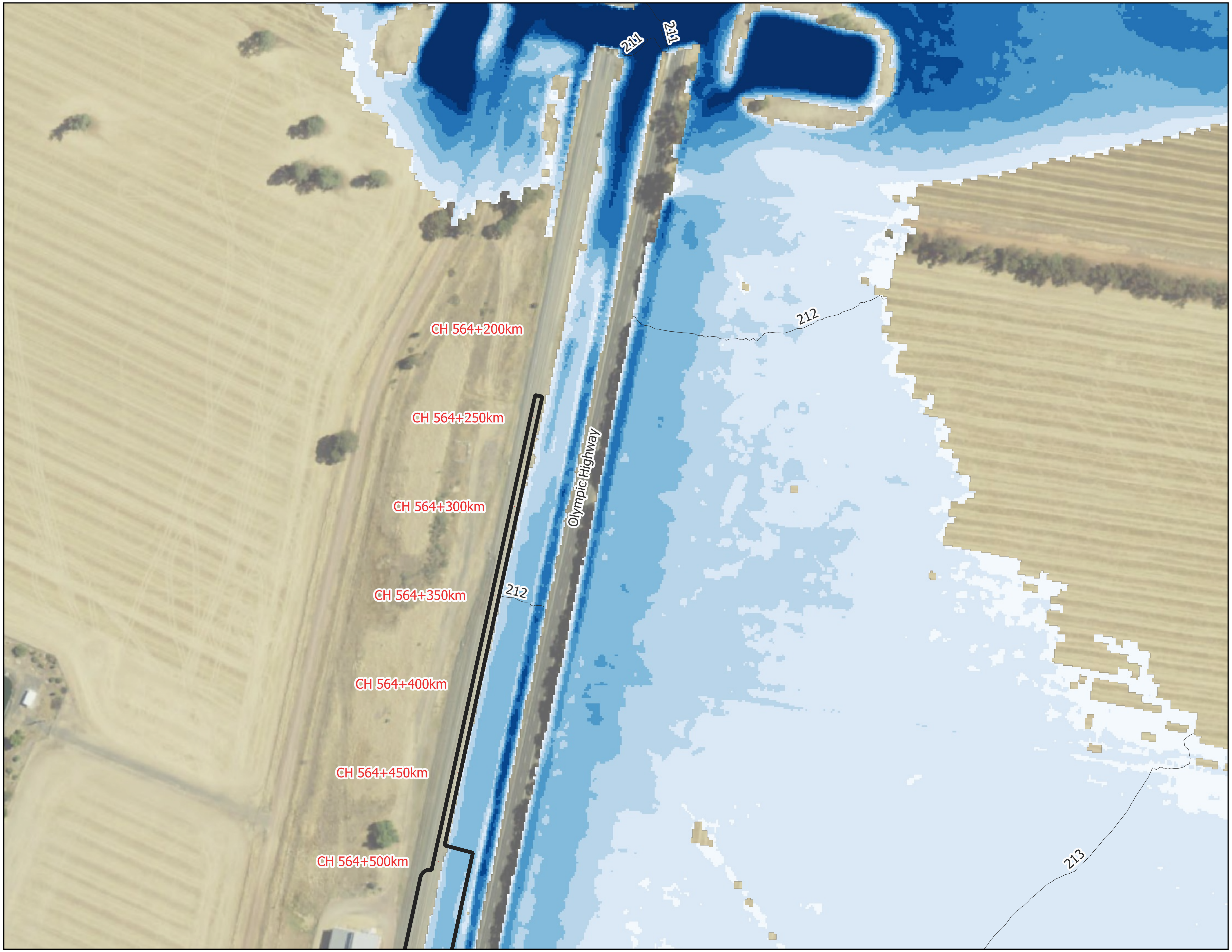
N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 3b - Yerong Creek - IFC Stage

2% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions



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MARTINUS aurecon BG&E

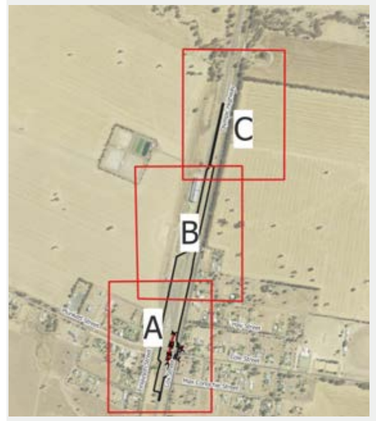
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



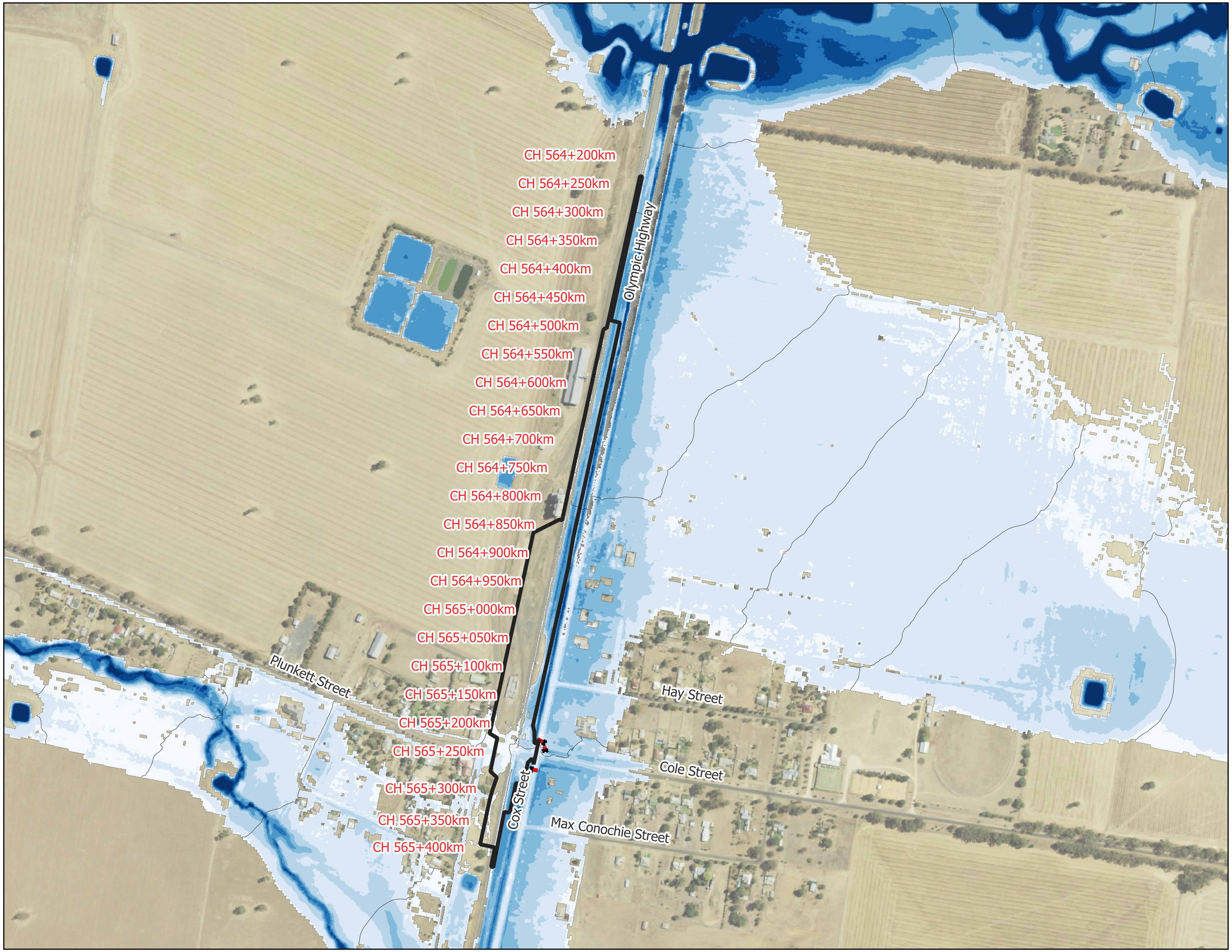
N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 3c - Yerong Creek - IFC Stage

2% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions



MARTINUS

aurecon

BG&E

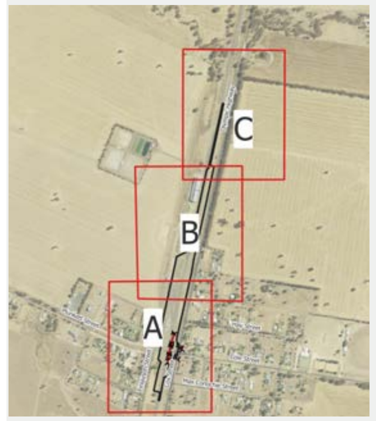
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 4 - Yerong Creek - IFC Stage

1% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions

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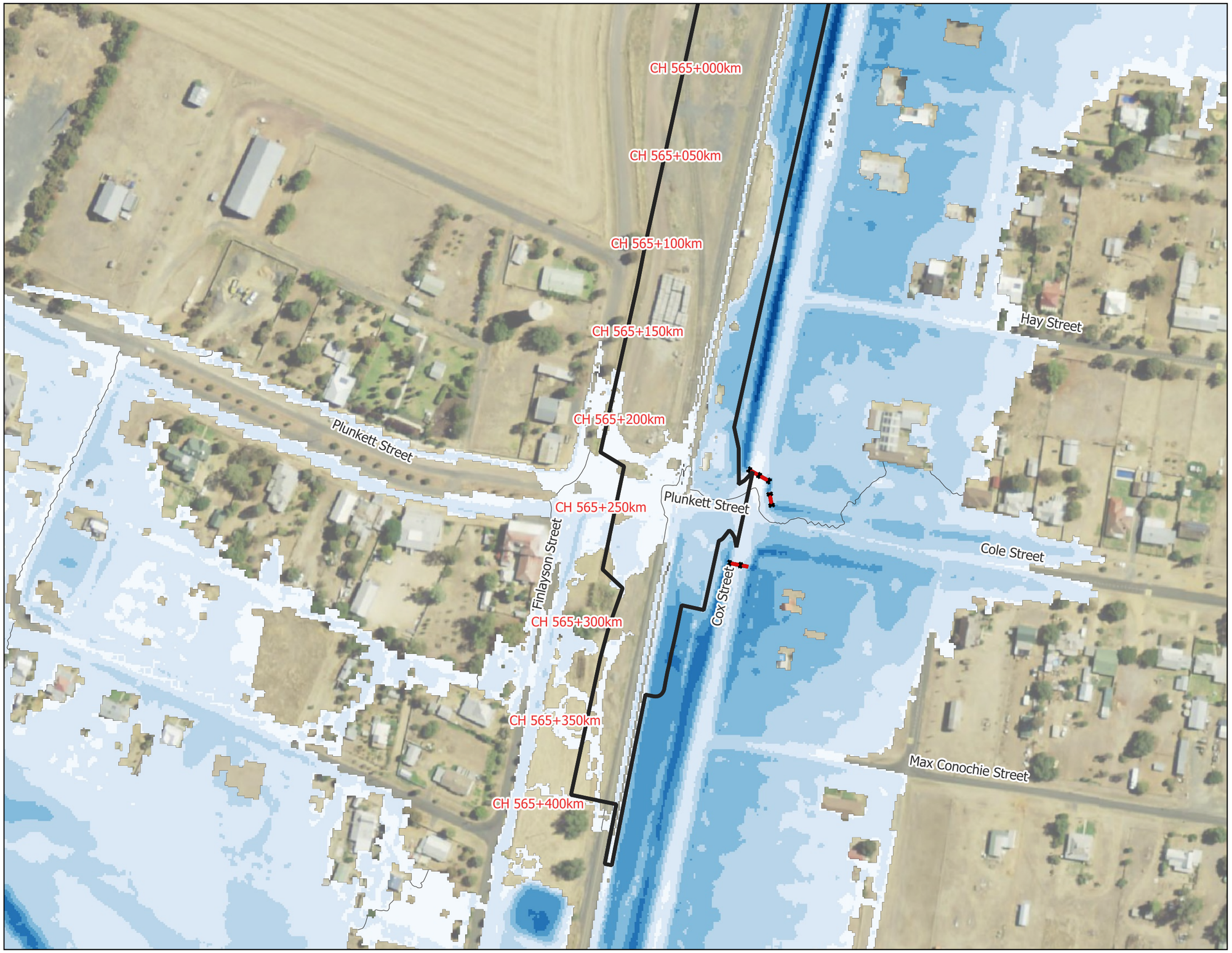


MARTINUS

aurecon BG&E

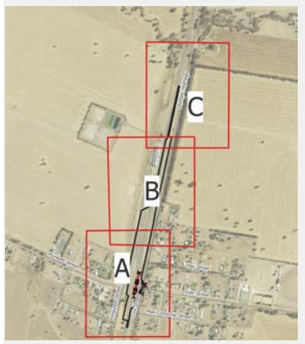
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

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Figure 4a - Yerong Creek - IFC Stage

1% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions

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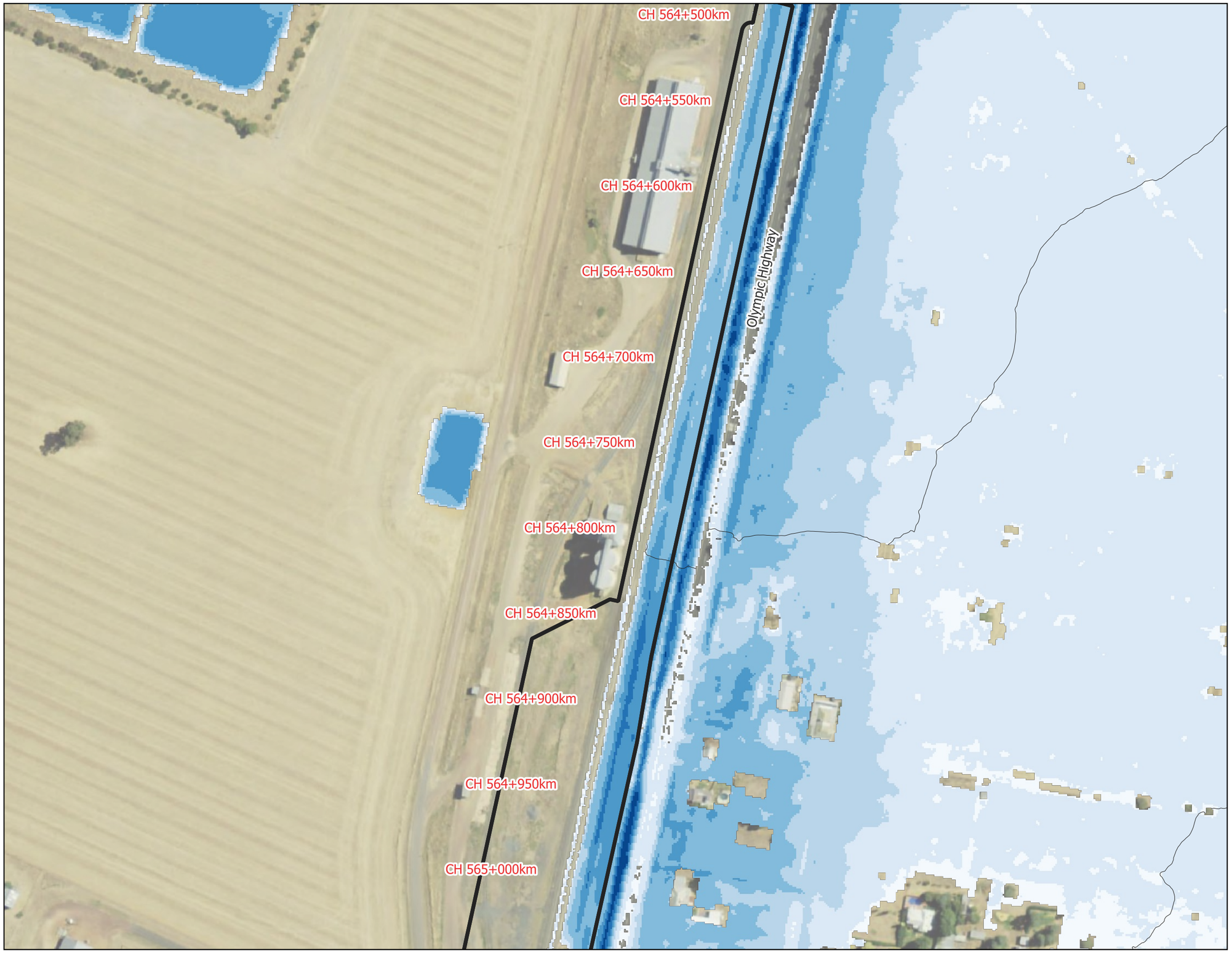


MARTINUS

aurecon BG&E

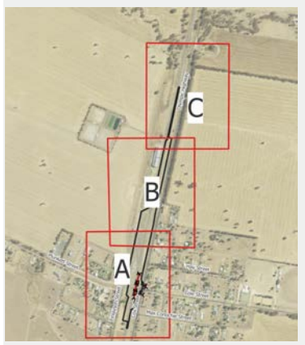
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



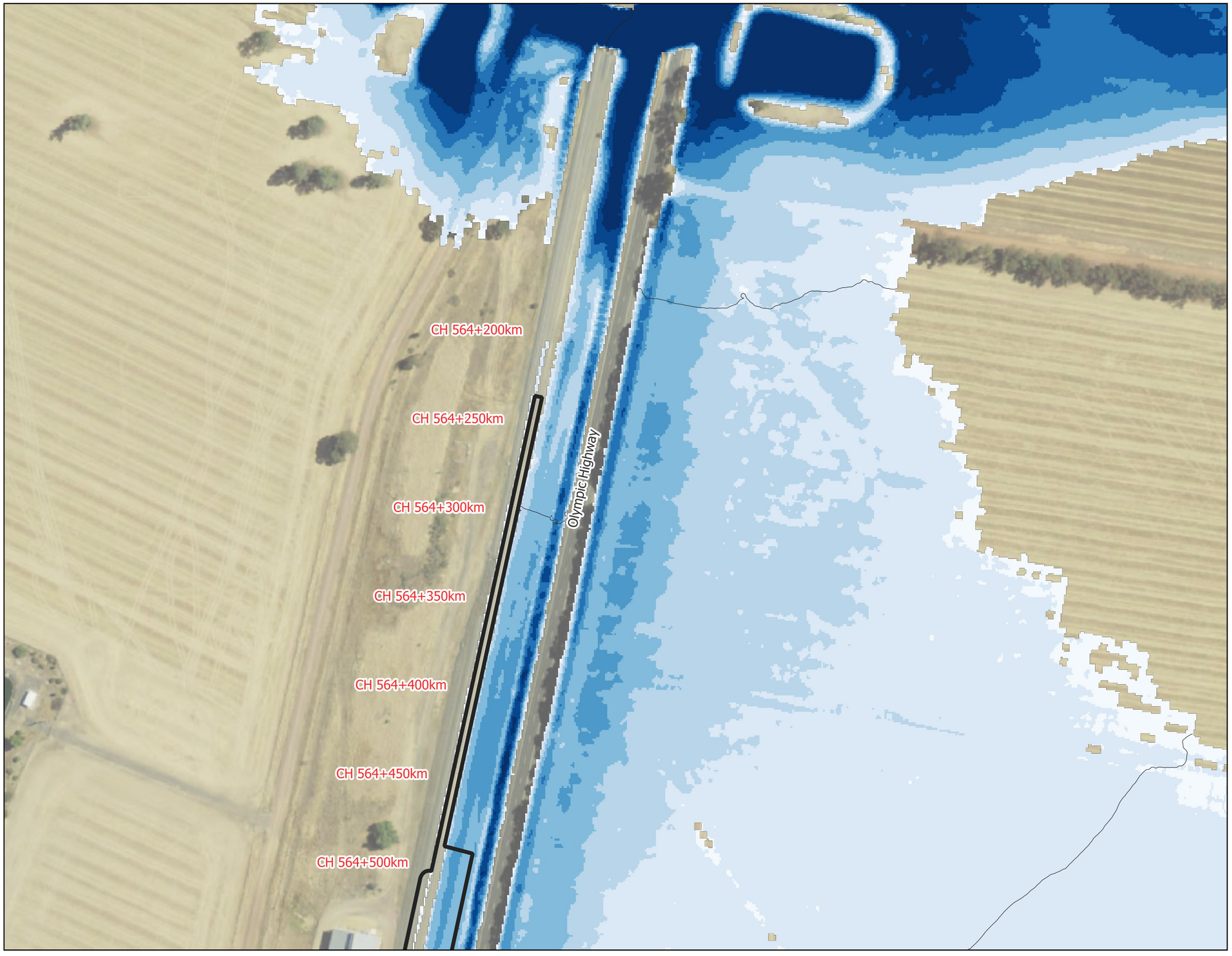
N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 4b - Yerong Creek - IFC Stage

1% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions



MARTINUS

aurecon BG&E

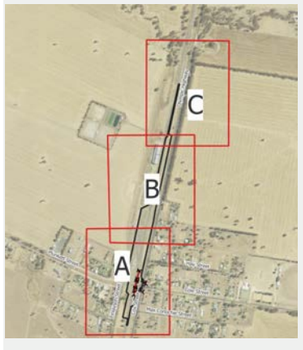
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

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Figure 4c - Yerong Creek - IFC Stage

1% AEP Flood Depth (m) and Levels (m AHD) - Existing Conditions

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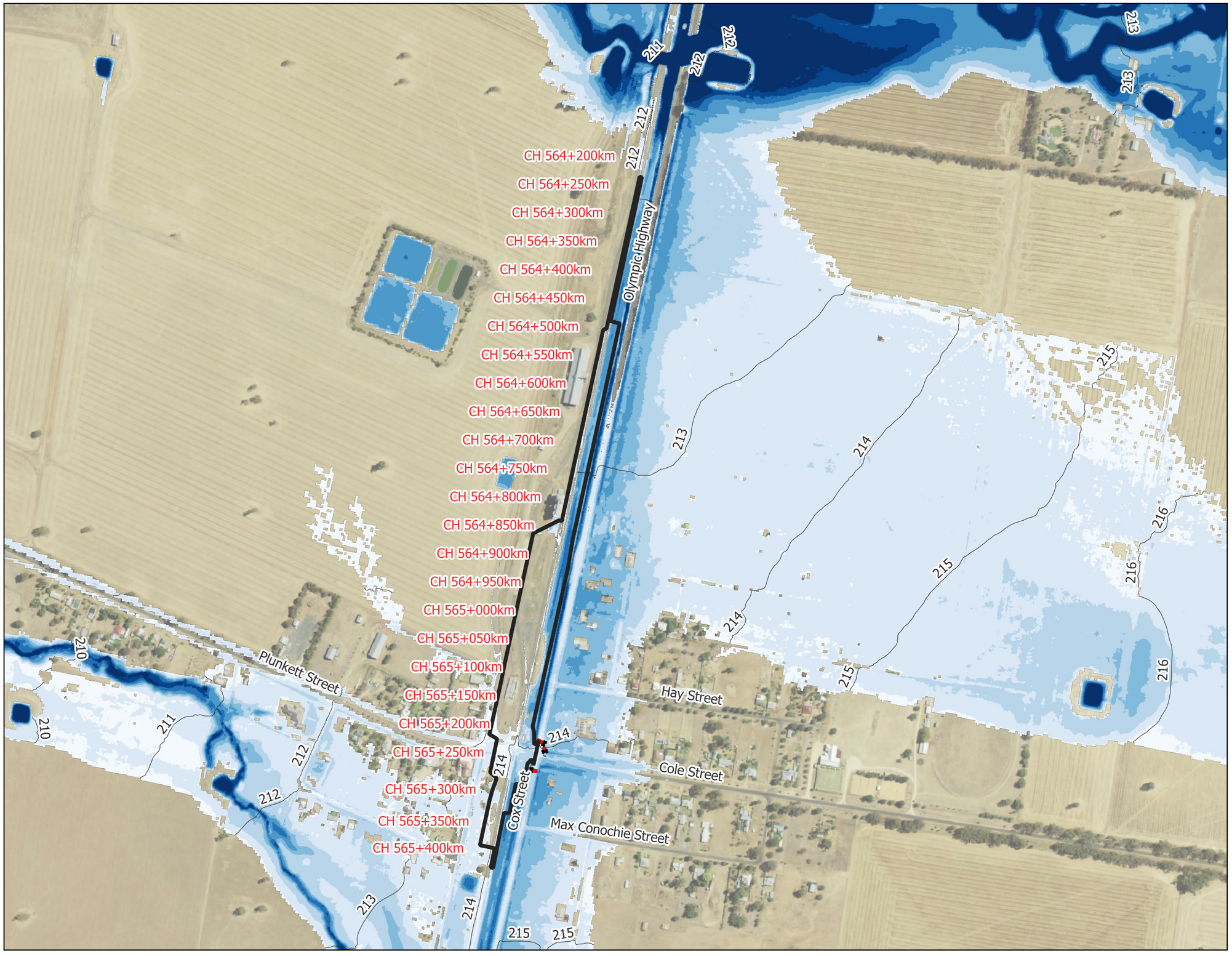


MARTINUS

aurecon BG&E

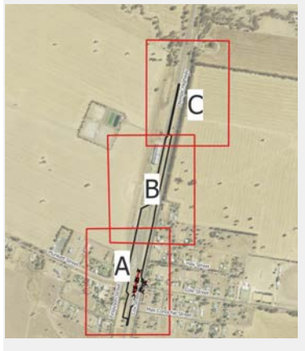
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 5 - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Depth (m) and Levels (m AHD) - Existing Conditions

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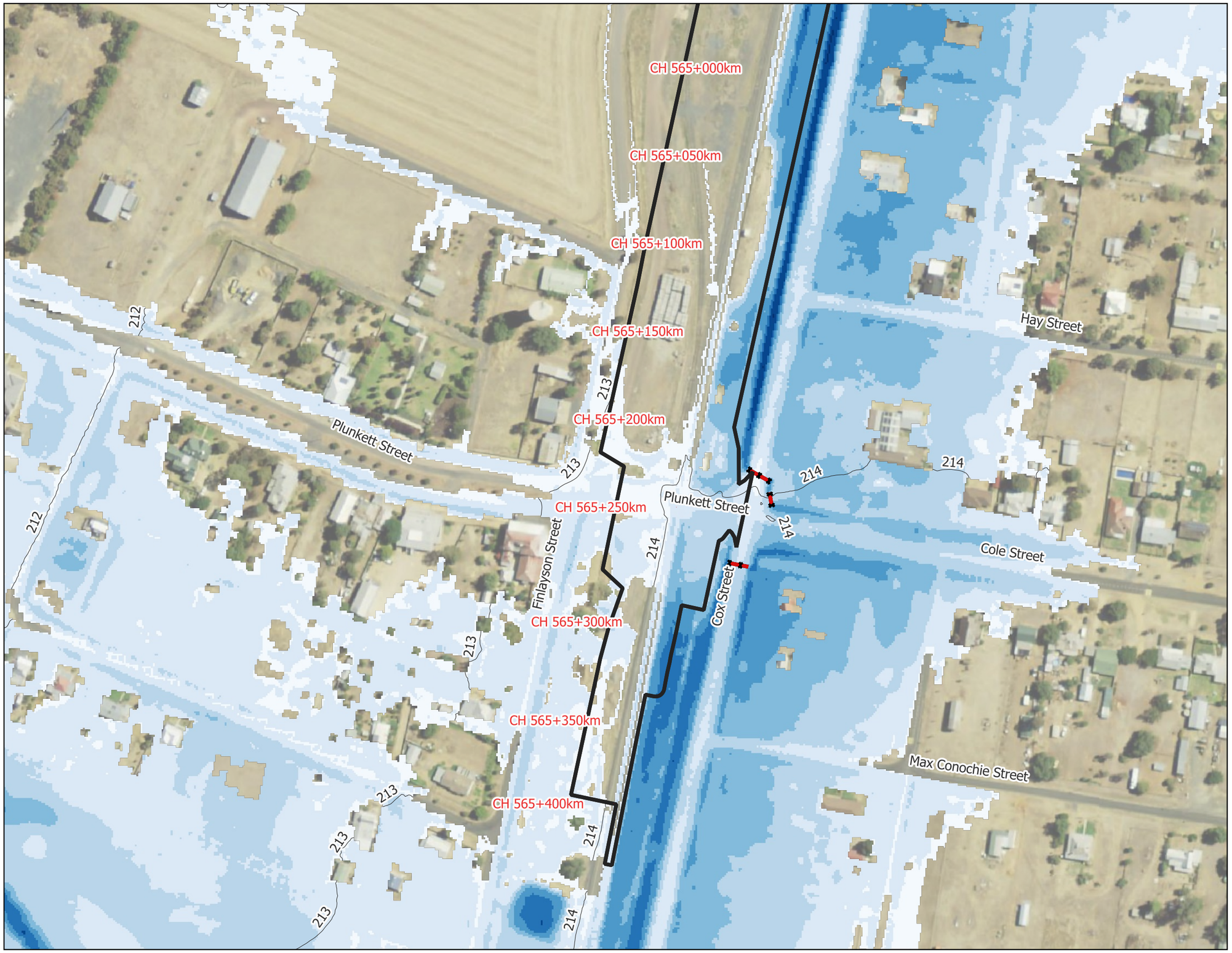


MARTINUS

aurecon BG&E

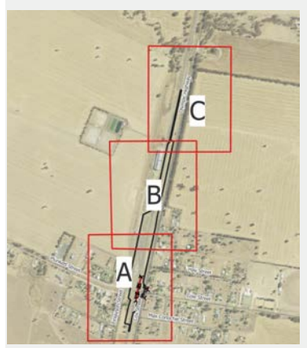
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 5a - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Depth (m) and Levels (m AHD) - Existing Conditions

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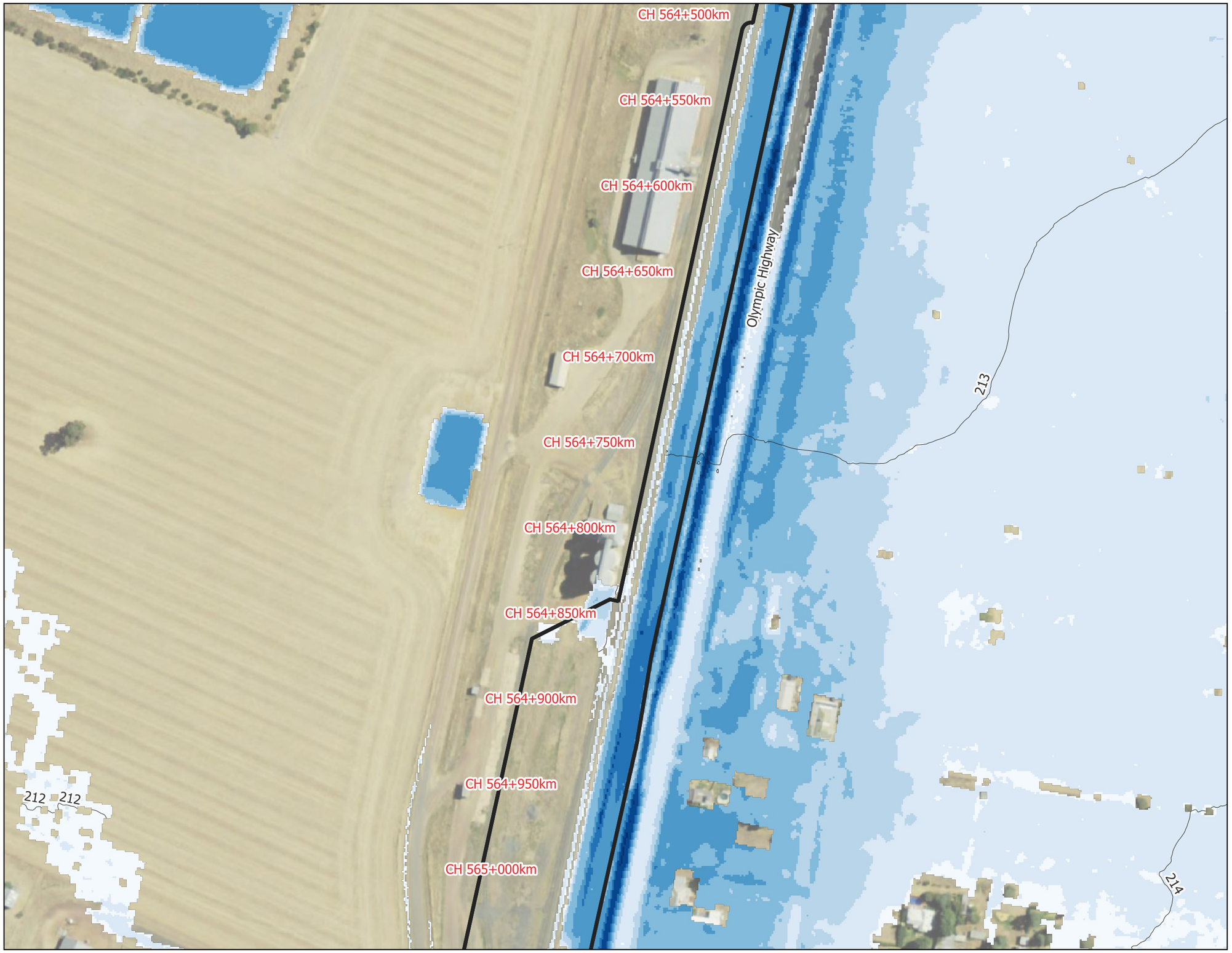


MARTINUS

aurecon BG&E

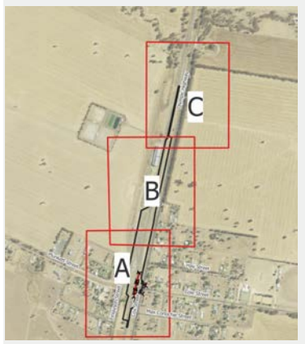
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



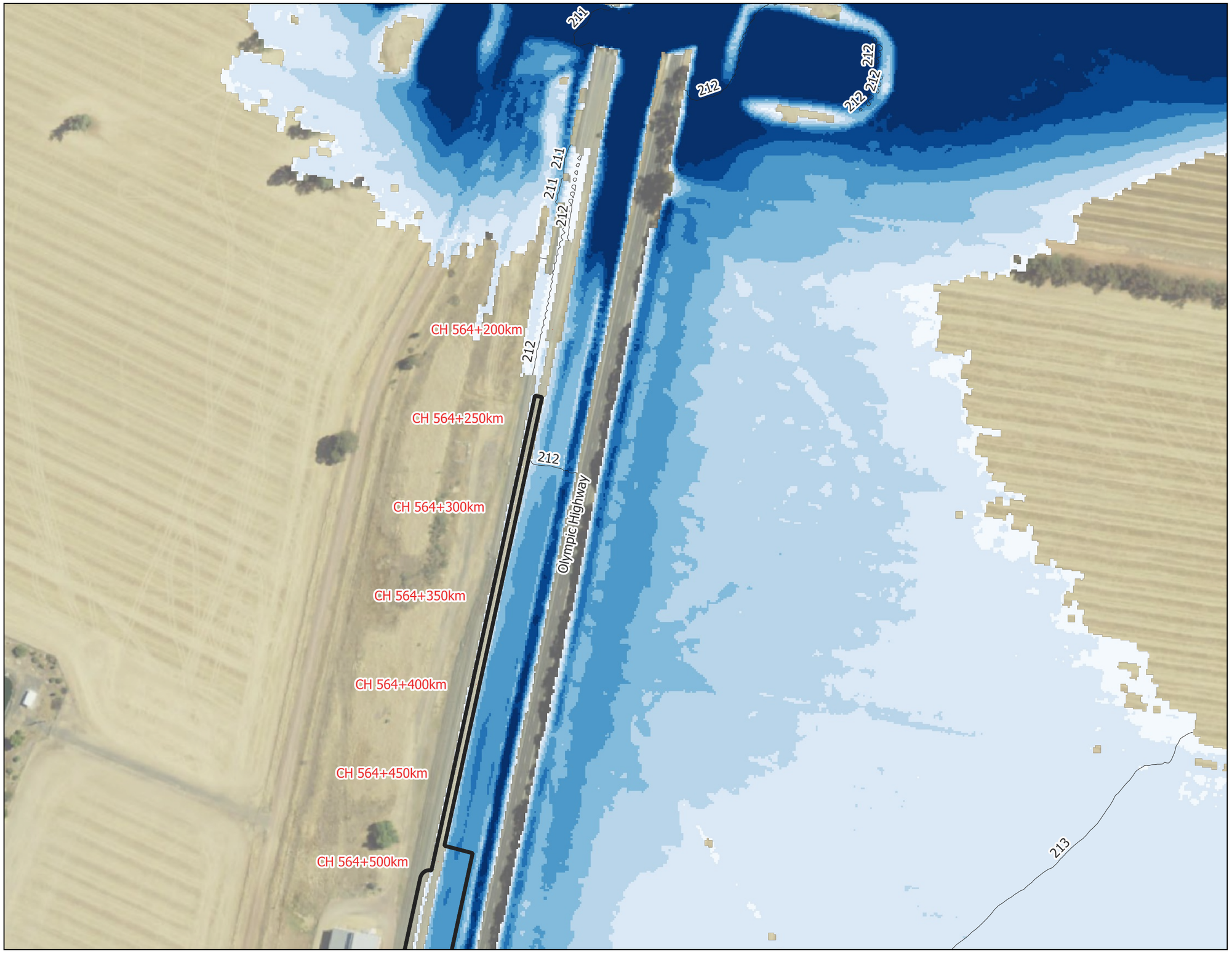
N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 5b - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Depth (m) and Levels (m AHD) - Existing Conditions



MARTINUS

aurecon BG&E

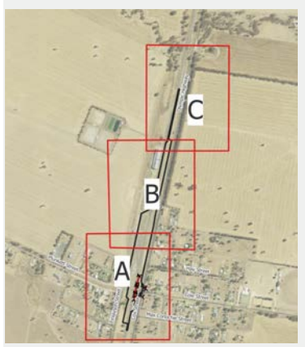
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

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Figure 5c - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Depth (m) and Levels (m AHD) - Existing Conditions

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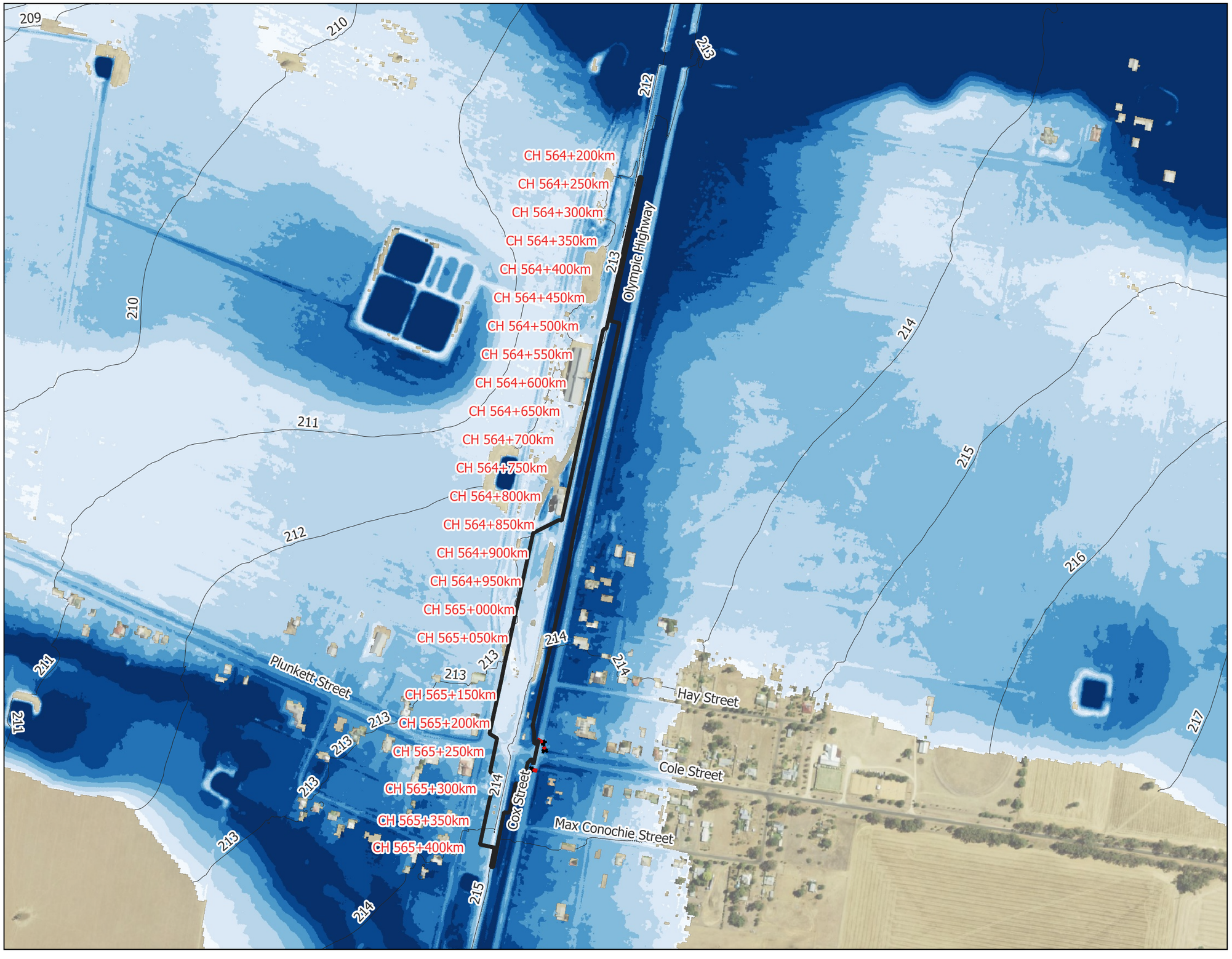


MARTINUS

aurecon BG&E

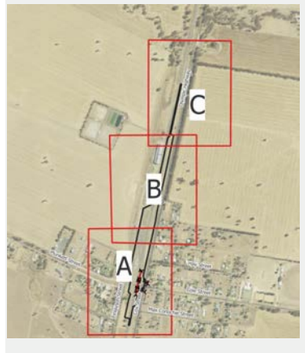
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 6 - Yerong Creek - IFC Stage

PMF Flood Depth (m) and Levels (m AHD) - Existing Conditions

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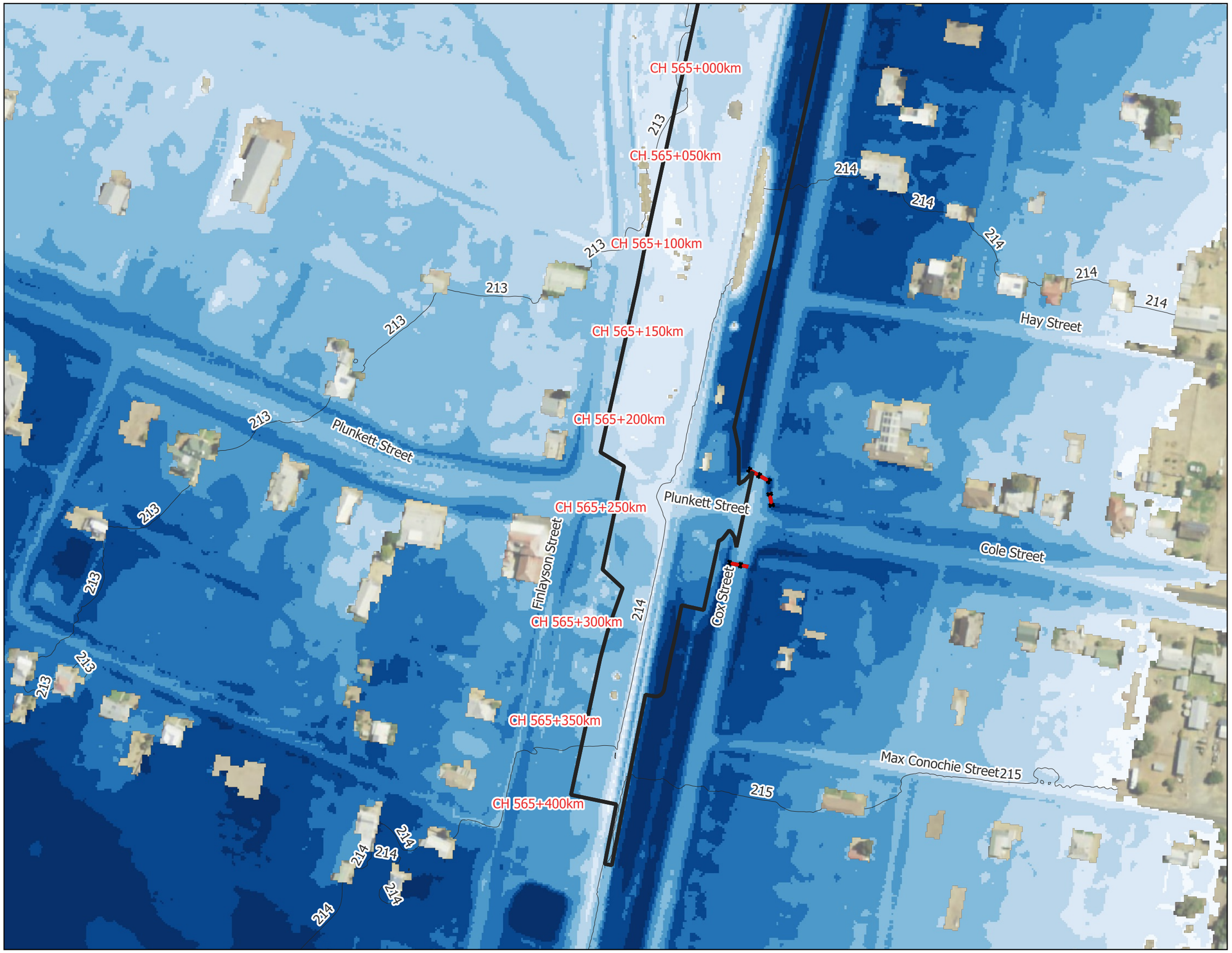


MARTINUS

aurecon BG&E

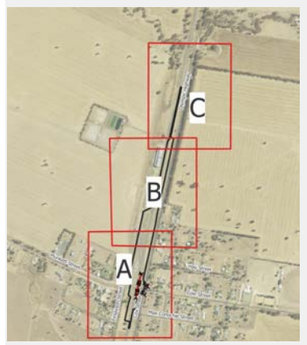
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

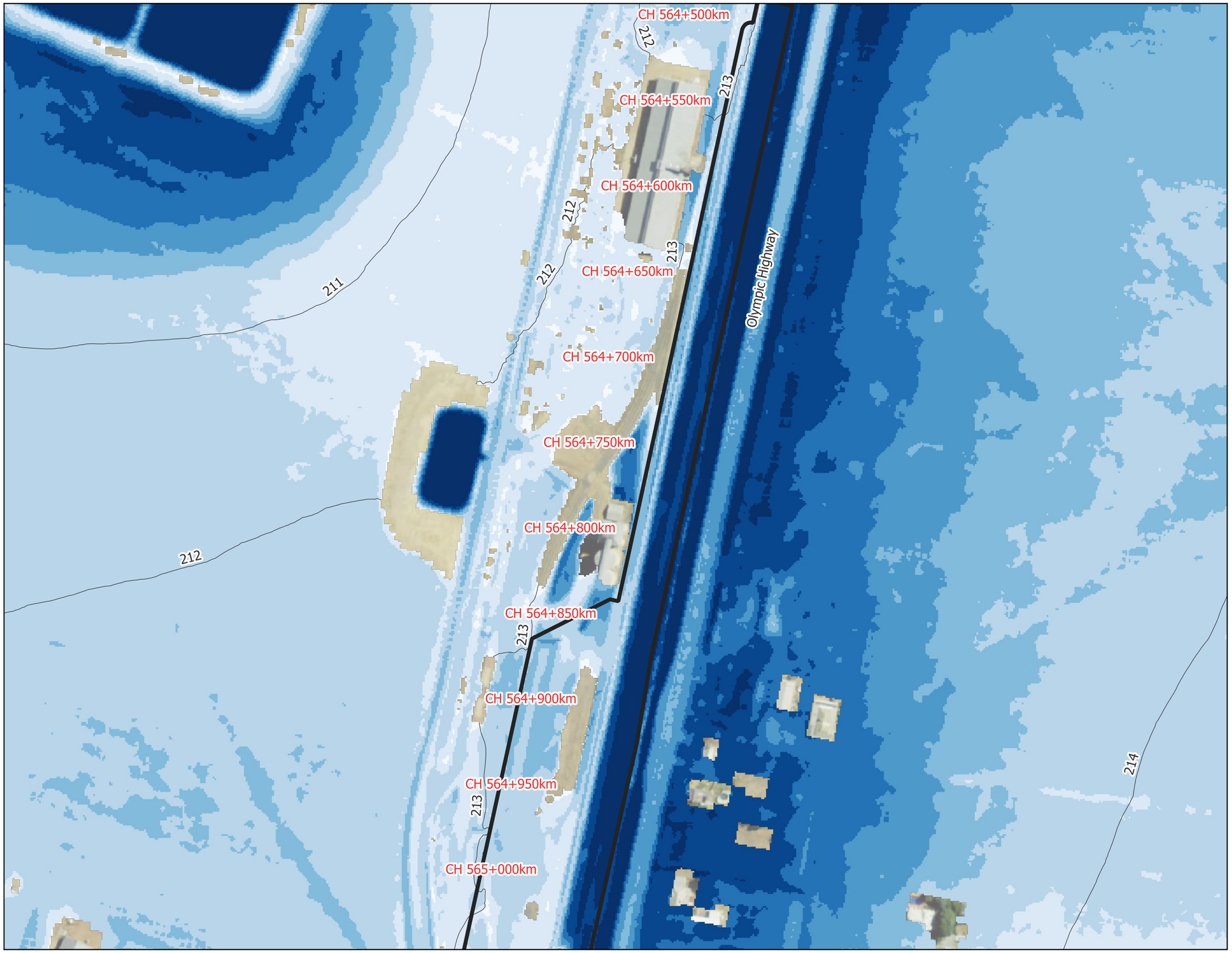
0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 6a - Yerong Creek - IFC Stage

PMF Flood Depth (m) and Levels (m AHD) - Existing Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

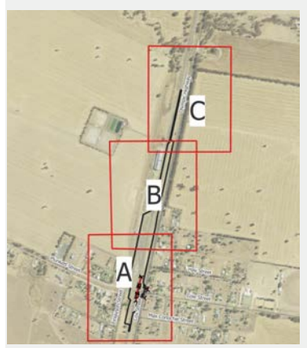
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



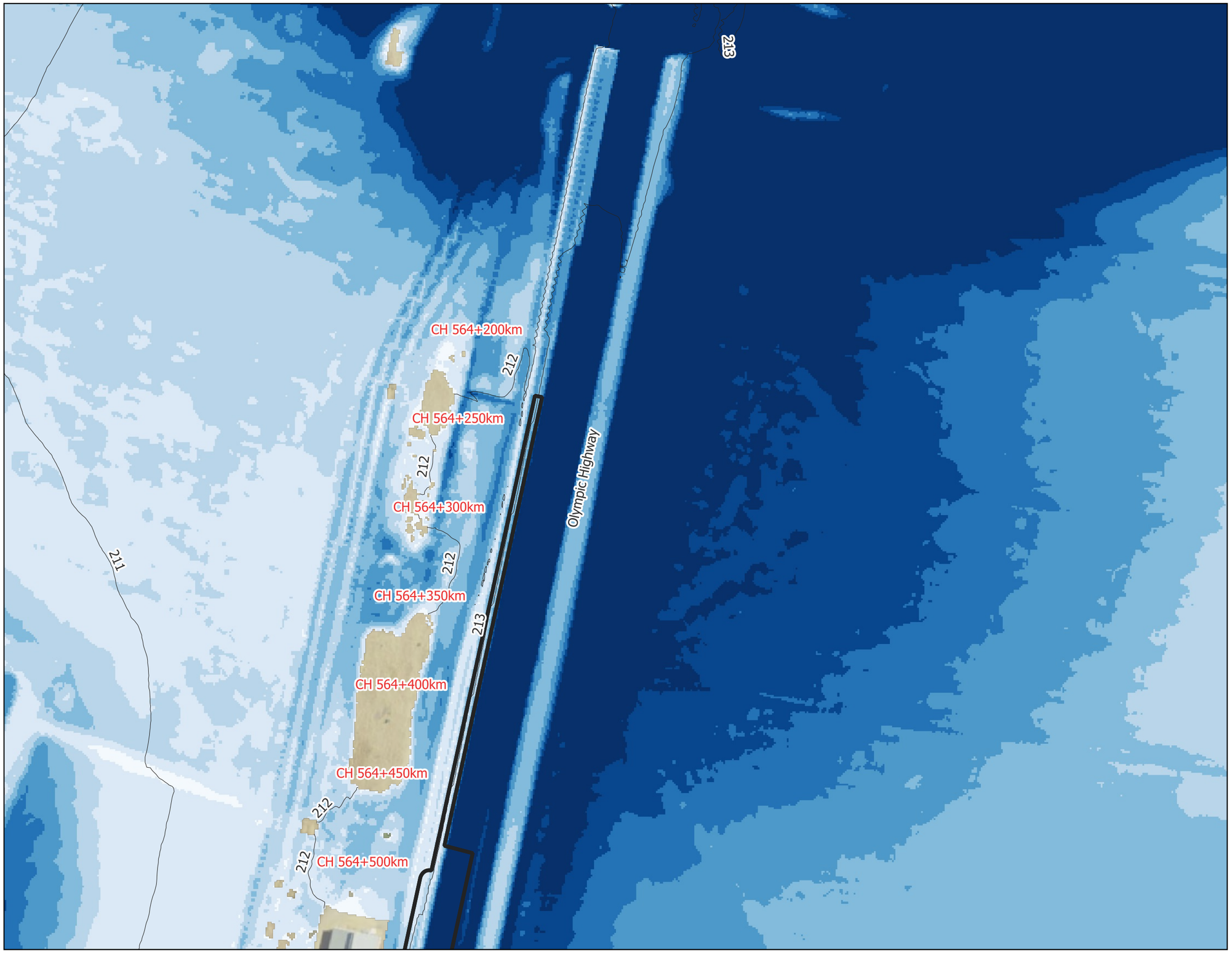
N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 6b - Yerong Creek - IFC Stage

PMF Flood Depth (m) and Levels (m AHD) - Existing Conditions



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MARTINUS

aurecon BG&E

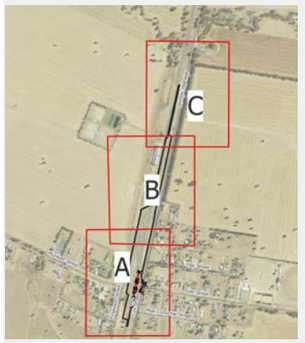
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 6c - Yerong Creek - IFC Stage

PMF Flood Depth (m) and Levels (m AHD) - Existing Conditions

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MARTINUS

aurecon BG&E

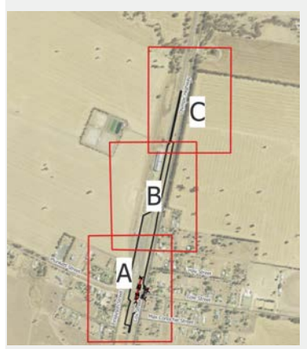
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

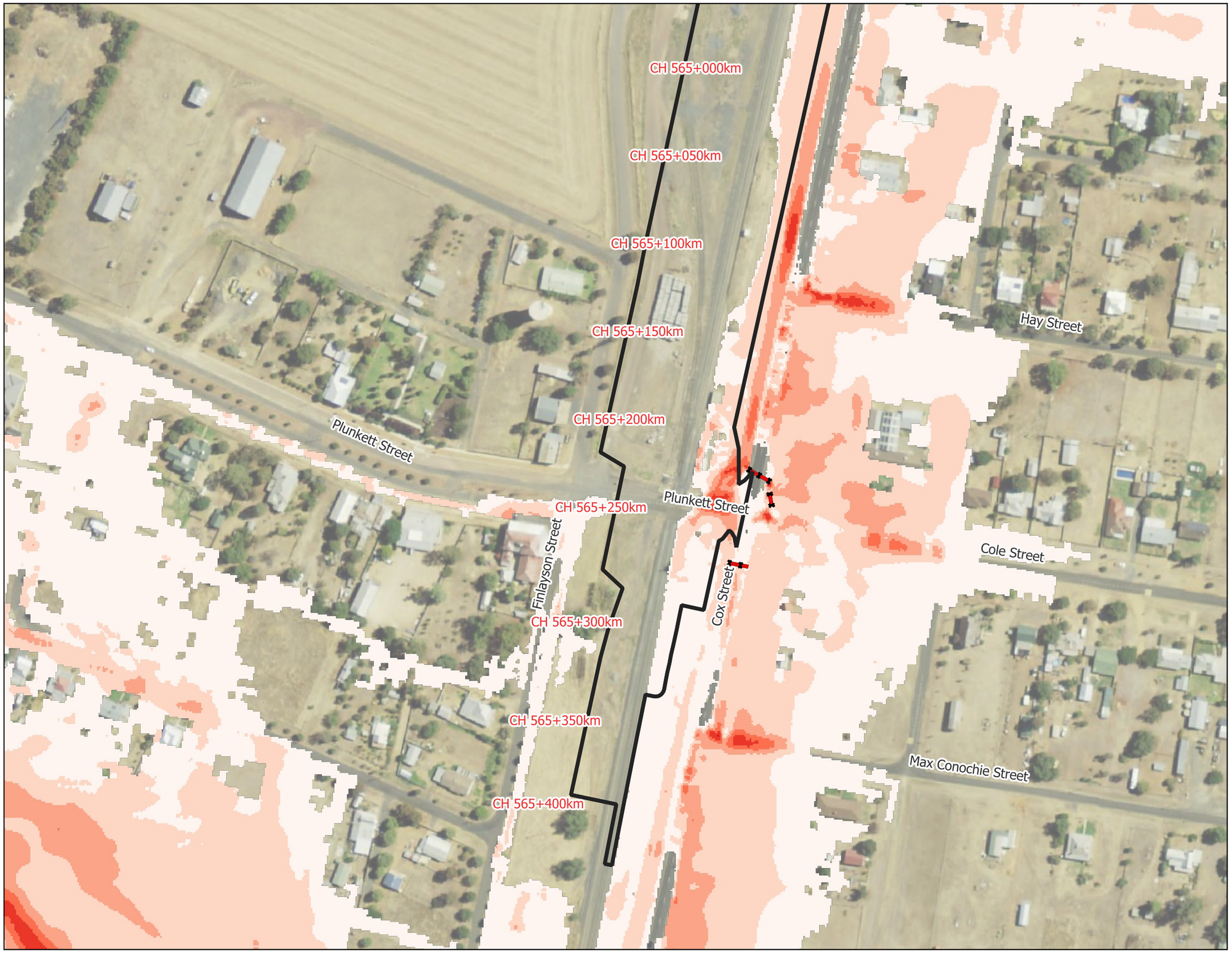
0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 7 - Yerong Creek - IFC Stage

5% AEP Flood Velocity (m/s) - Existing Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

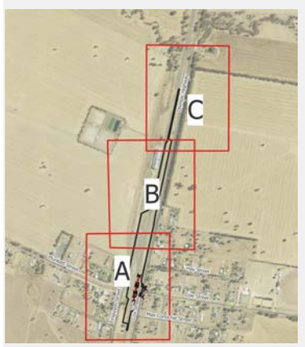
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 7a - Yerong Creek - IFC Stage

5% AEP Flood Velocity (m/s) - Existing Conditions

MARTINUS

aurecon BG&E

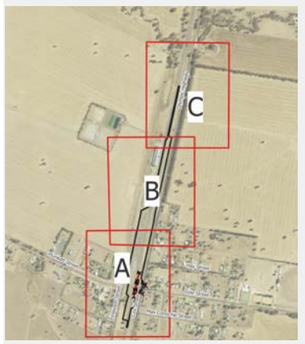
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

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Figure 7b - Yerong Creek - IFC Stage

5% AEP Flood Velocity (m/s) - Existing Conditions

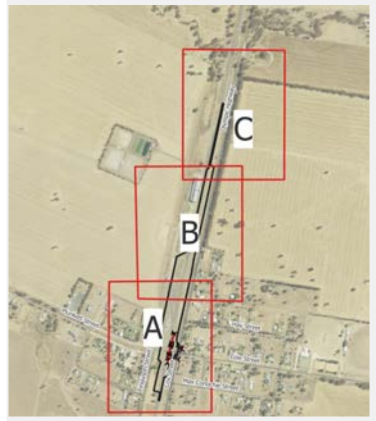
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 7c - Yerong Creek - IFC Stage

5% AEP Flood Velocity (m/s) - Existing Conditions

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MARTINUS

aurecon BG&E

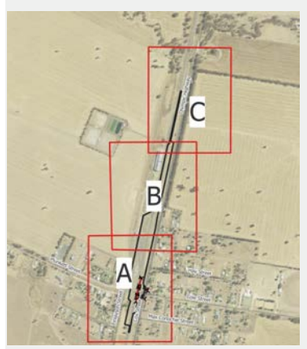
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 8 - Yerong Creek - IFC Stage

2% AEP Flood Velocity (m/s) - Existing Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 D&C\100 DRAW\100.8 Flooding\Workspace

CH 565+000km
CH 565+050km
CH 565+100km
CH 565+150km
CH 565+200km
CH 565+250km
CH 565+300km
CH 565+350km
CH 565+400km
Plunkett Street
Plunkett Street
Hay Street
Cole Street
Finlayson Street
Cox Street
Max Conochie Street

N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

MARTINUS
aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up

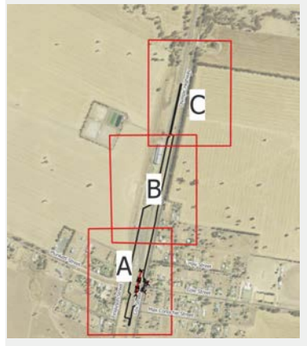


Figure 8a - Yerong Creek - IFC Stage
2% AEP Flood Velocity (m/s) - Existing Conditions

MARTINUS

aurecon BG&E

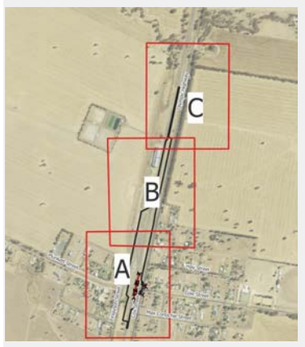
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

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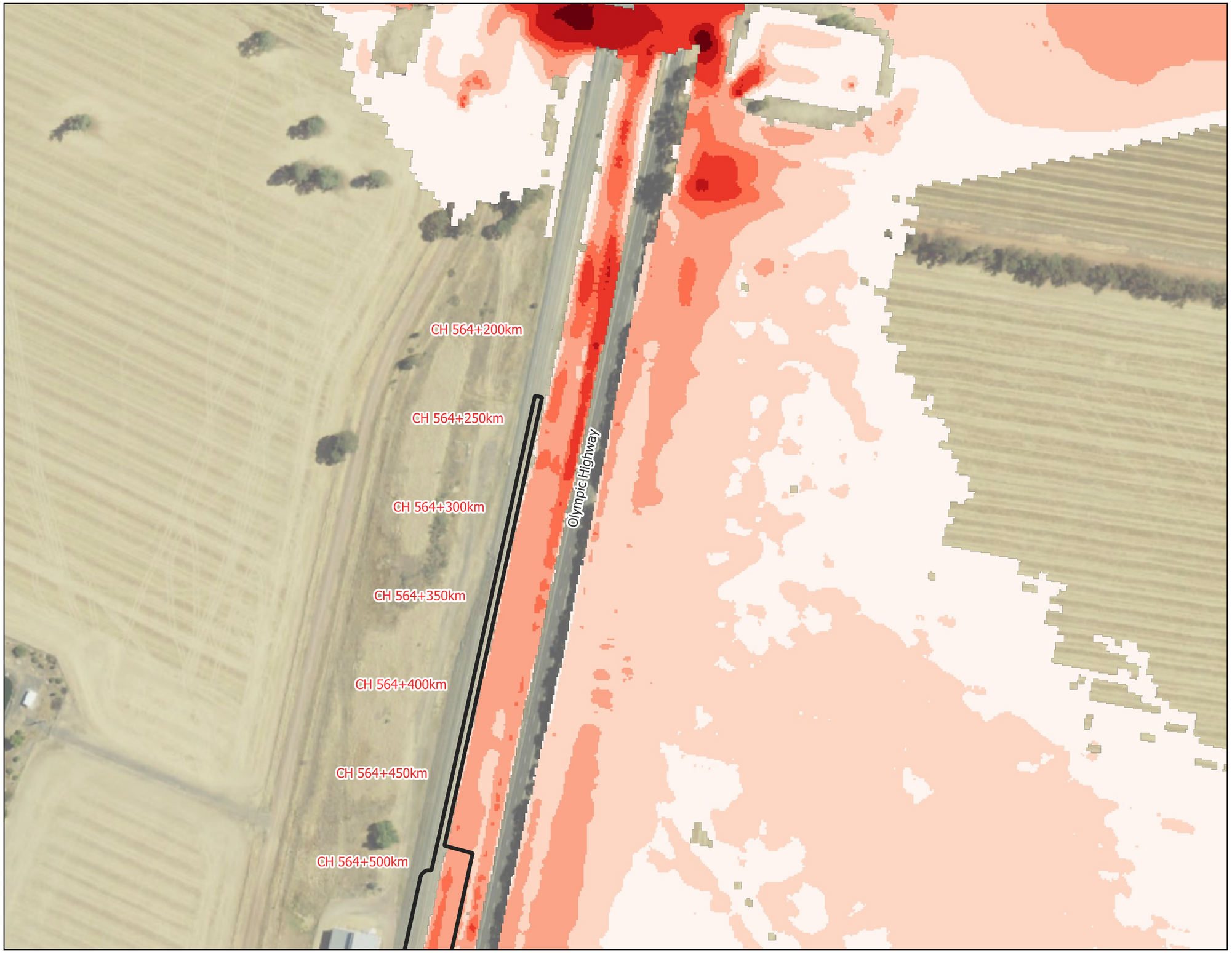
Figure 8b - Yerong Creek - IFC Stage

2% AEP Flood Velocity (m/s) - Existing Conditions



MARTINUS

aurecon BG&E

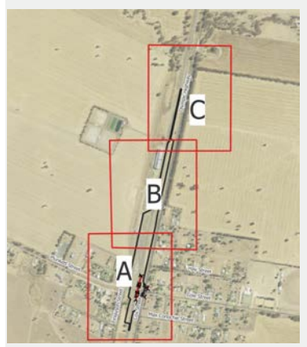
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

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Figure 8c - Yerong Creek - IFC Stage

2% AEP Flood Velocity (m/s) - Existing Conditions

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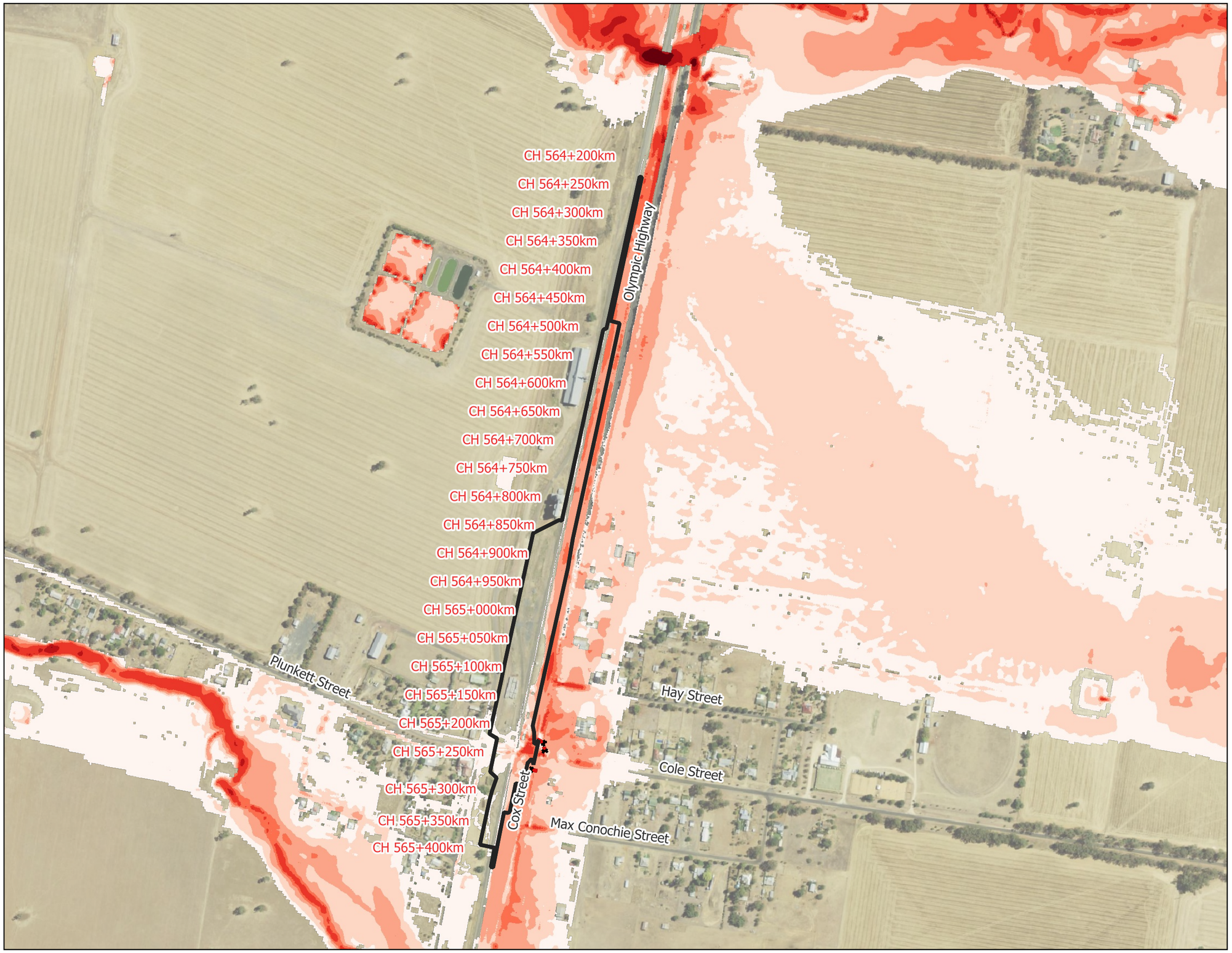


MARTINUS

aurecon BG&E

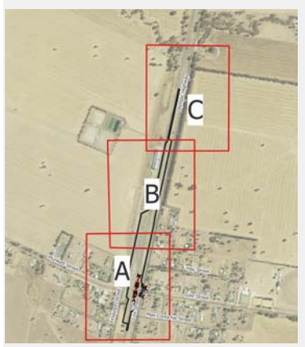
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 9 - Yerong Creek - IFC Stage

1% AEP Flood Velocity (m/s) - Existing Conditions

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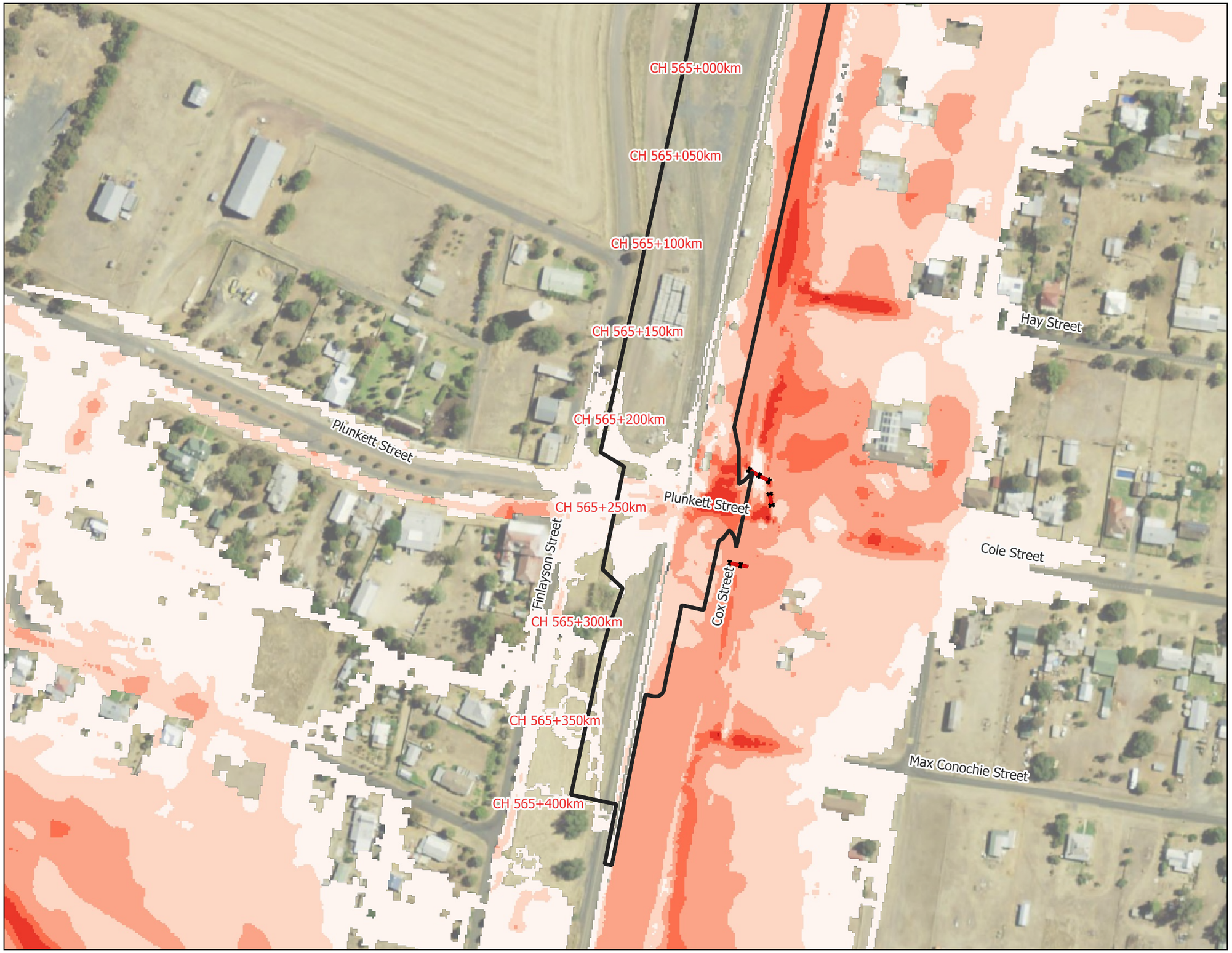


MARTINUS

aurecon BG&E

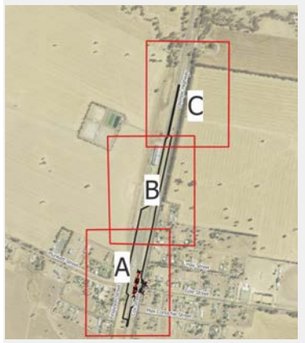
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



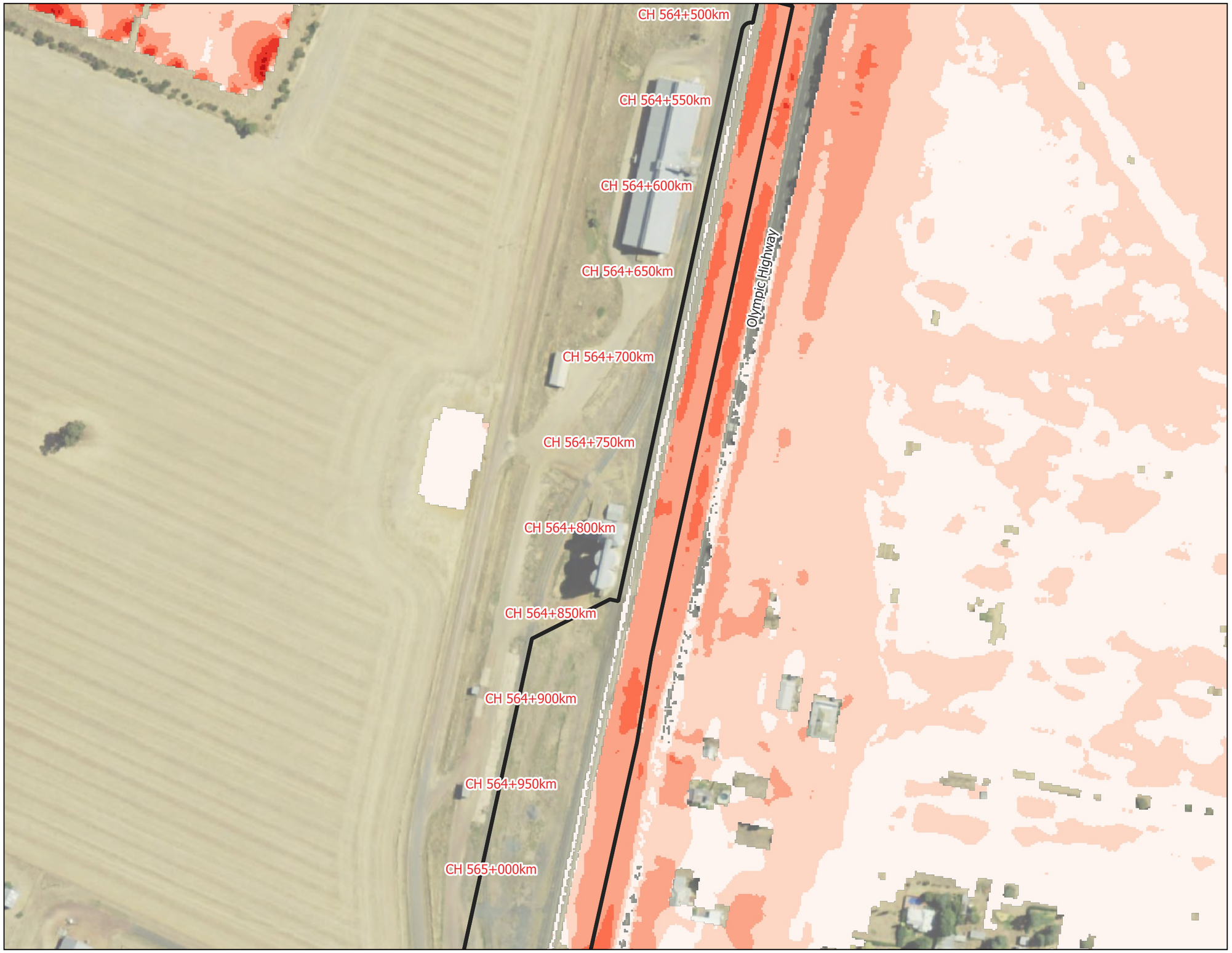
N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 9a - Yerong Creek - IFC Stage

1% AEP Flood Velocity (m/s) - Existing Conditions



MARTINUS

aurecon BG&E

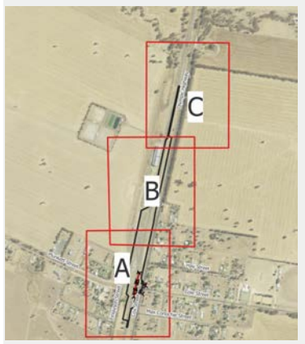
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

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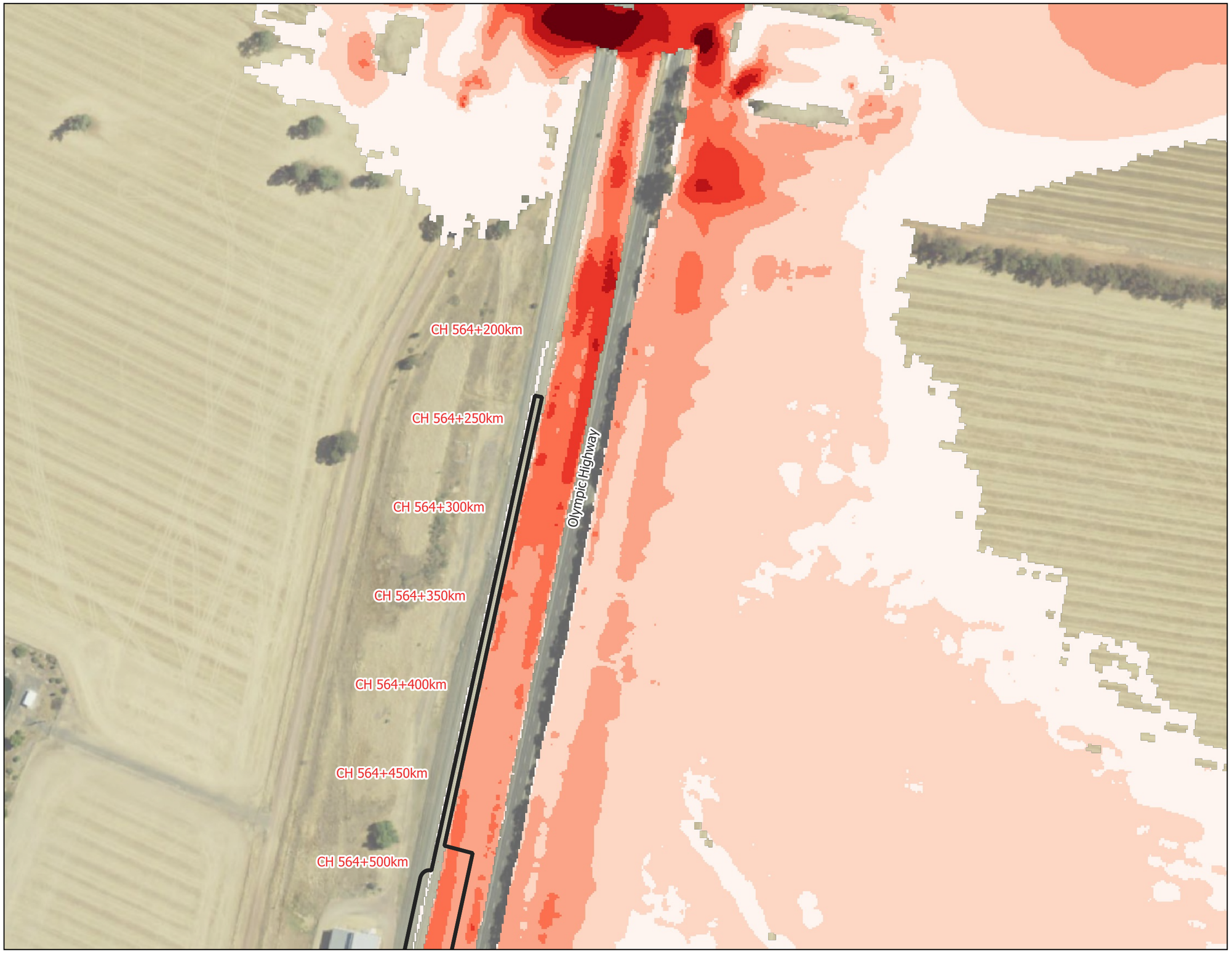
Figure 9b - Yerong Creek - IFC Stage

1% AEP Flood Velocity (m/s) - Existing Conditions



MARTINUS

aurecon BG&E

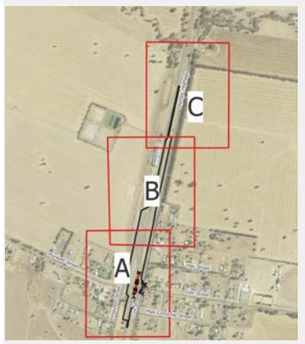
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



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N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 9c - Yerong Creek - IFC Stage

1% AEP Flood Velocity (m/s) - Existing Conditions

MARTINUS

aurecon BG&E

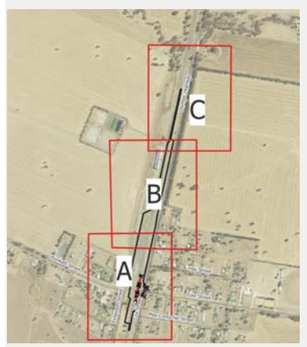
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



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N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 10 - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Velocity (m/s) - Existing Conditions

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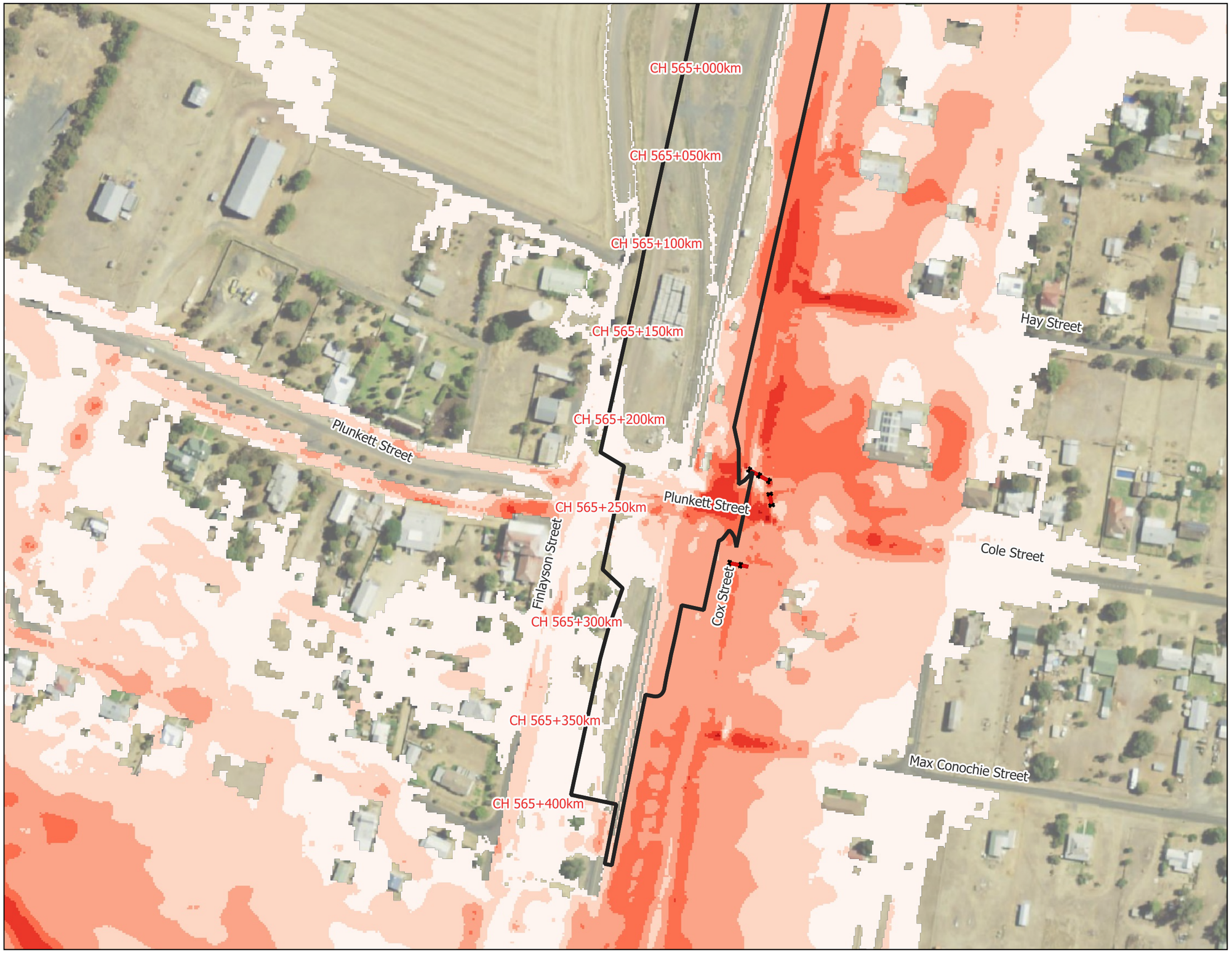


MARTINUS

aurecon BG&E

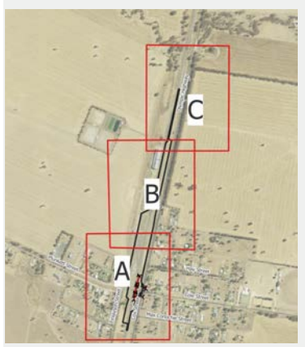
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



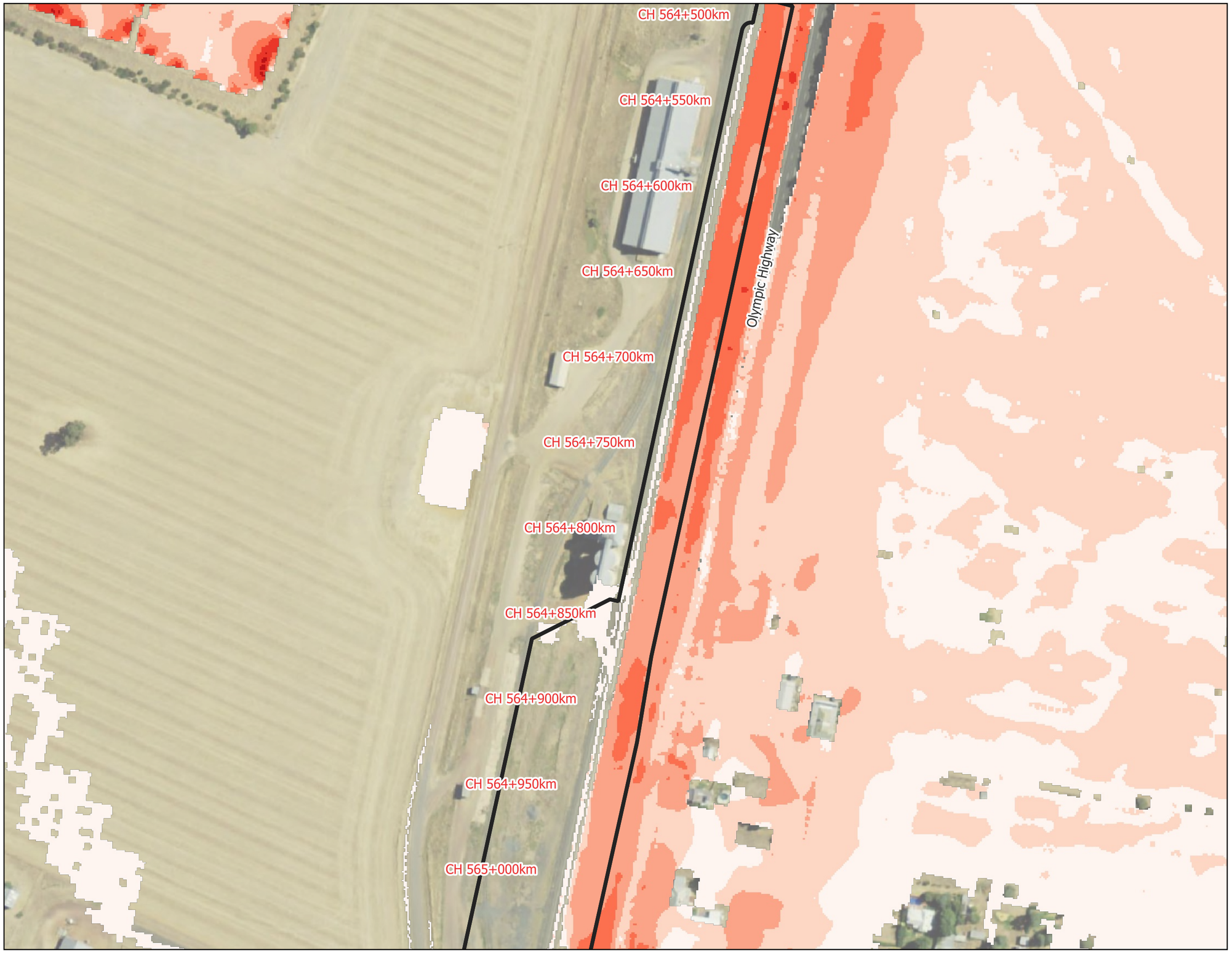
N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 10a - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Velocity (m/s) - Existing Conditions



MARTINUS

aurecon BG&E

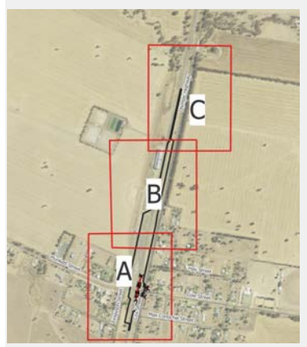
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

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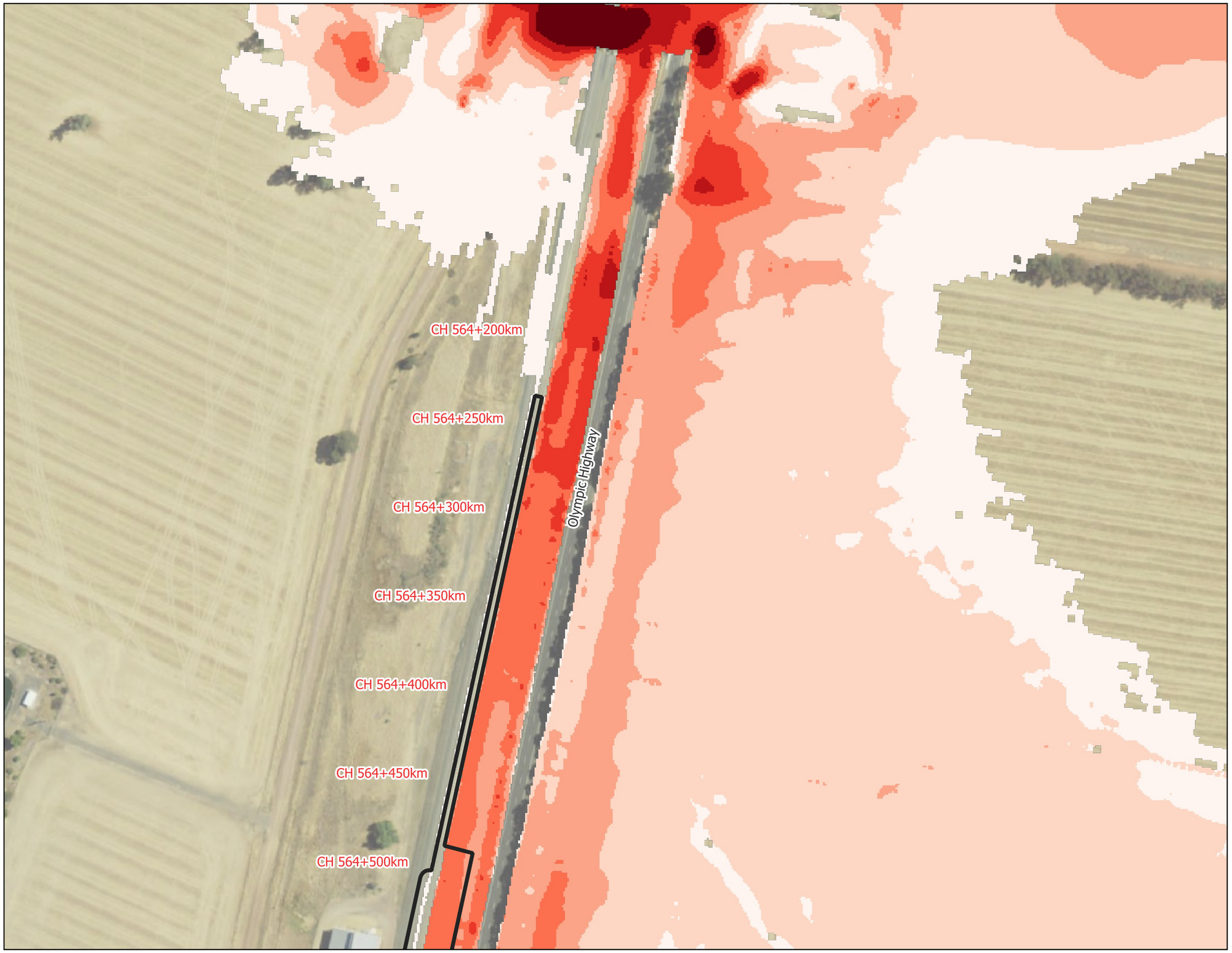
Figure 10b - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Velocity (m/s) - Existing Conditions



MARTINUS

aurecon BG&E

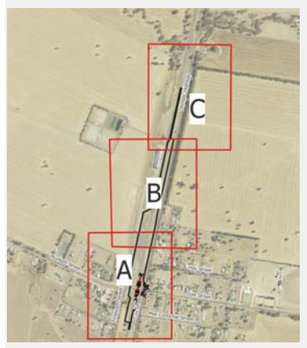
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

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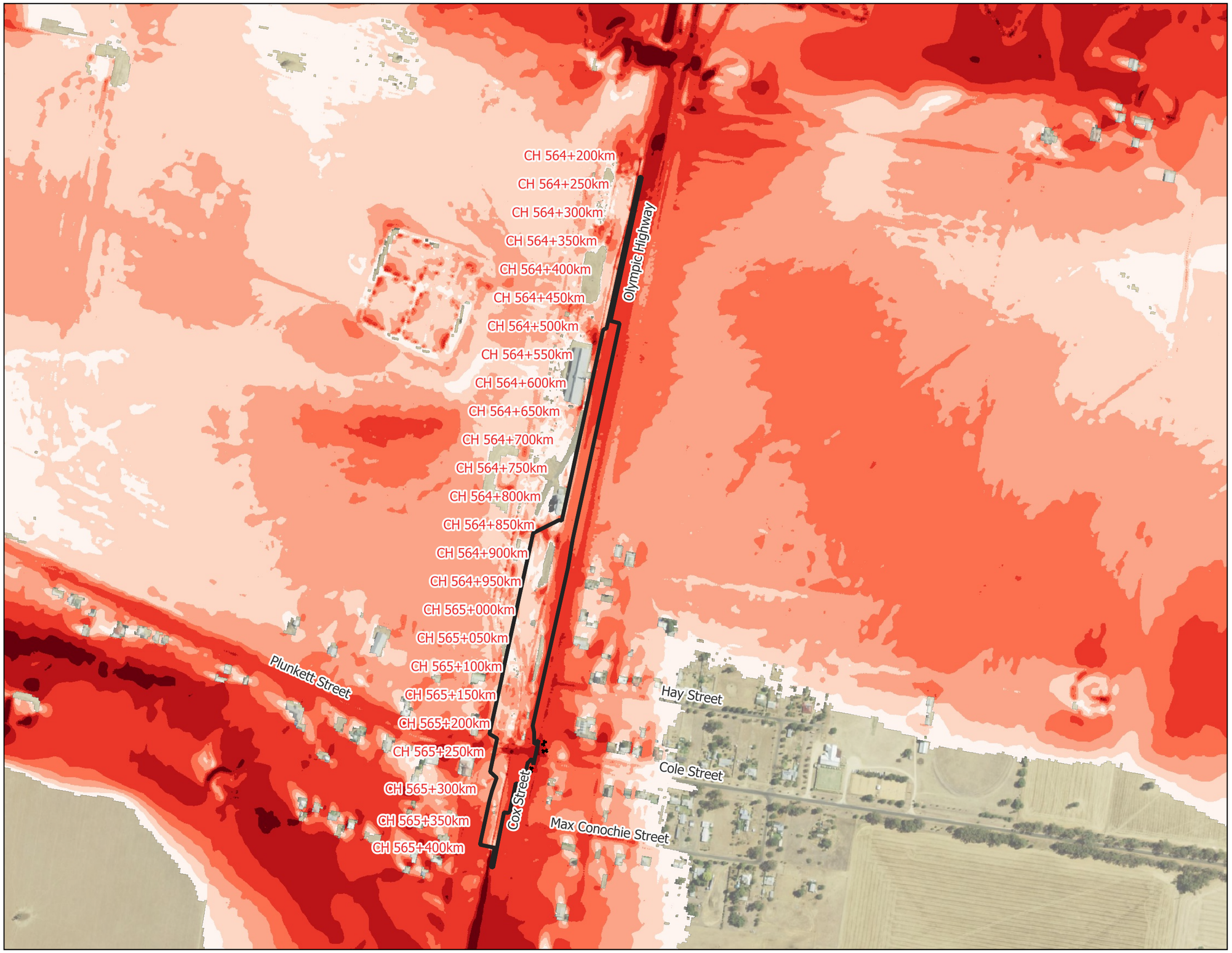
Figure 10c - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Velocity (m/s) - Existing Conditions



MARTINUS

aurecon BG&E

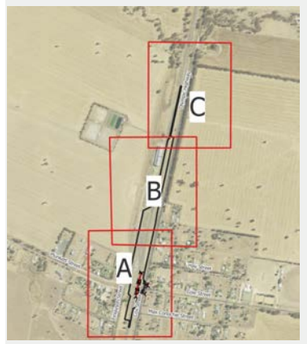
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 11 - Yerong Creek - IFC Stage

PMF Flood Velocity (m/s) - Existing Conditions

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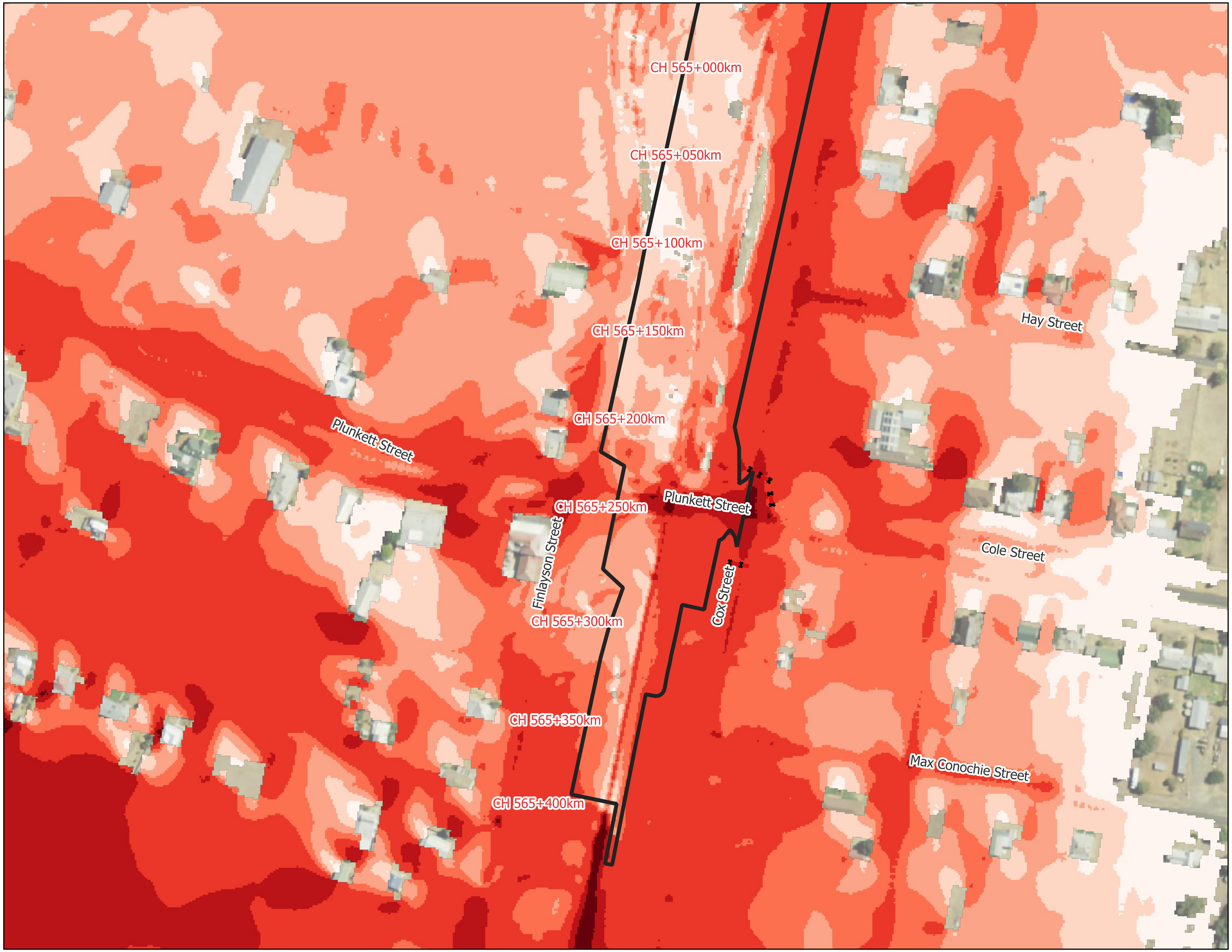

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MARTINUS

aurecon BG&E

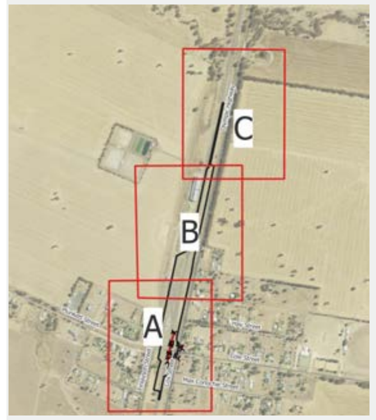
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



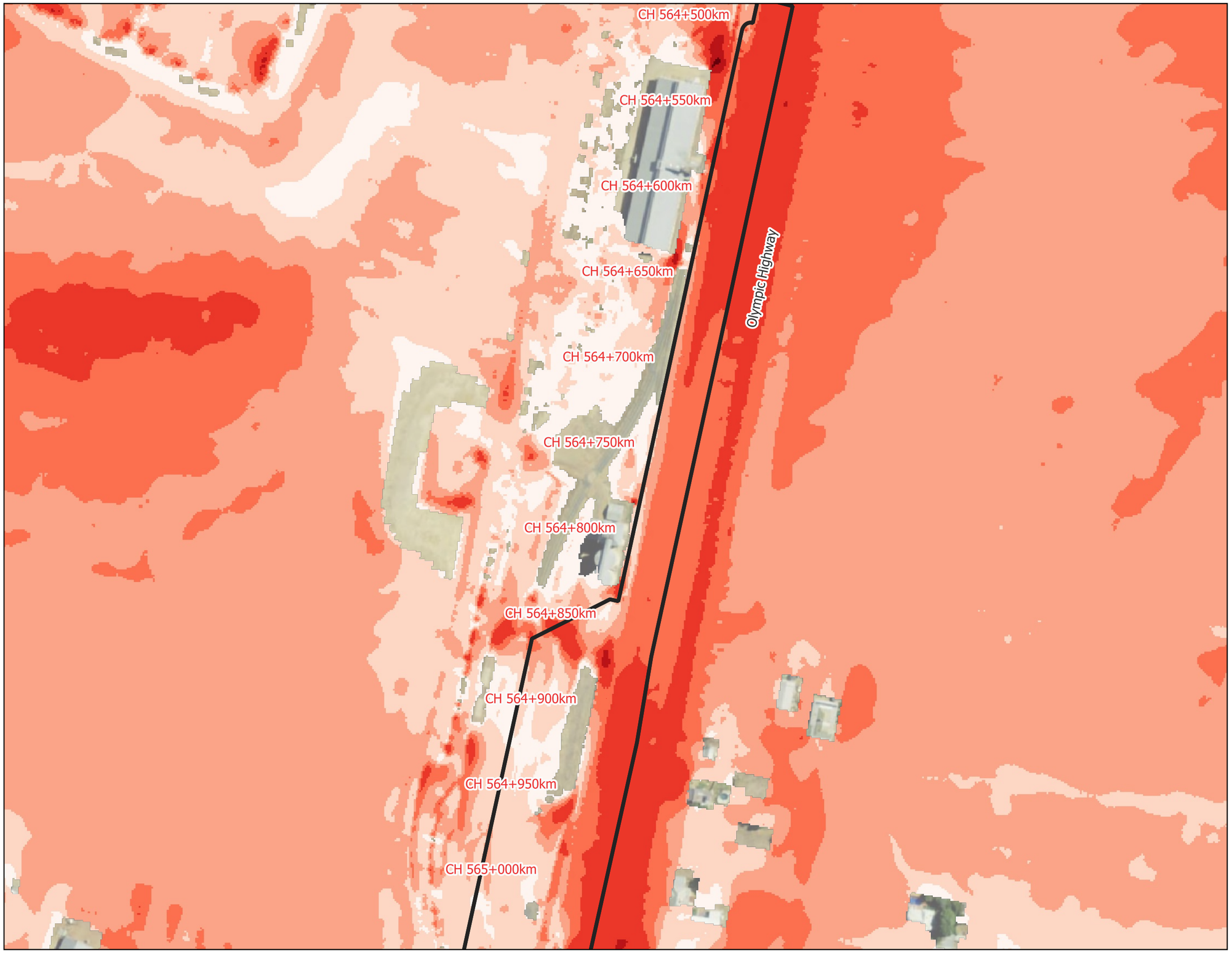
N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 11a - Yerong Creek - IFC Stage

PMF Flood Velocity (m/s) - Existing Conditions



MARTINUS

aurecon BG&E

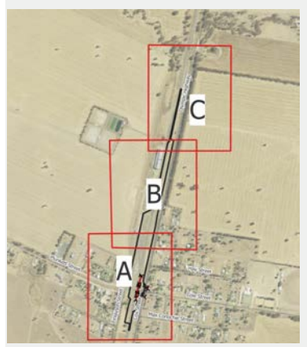
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

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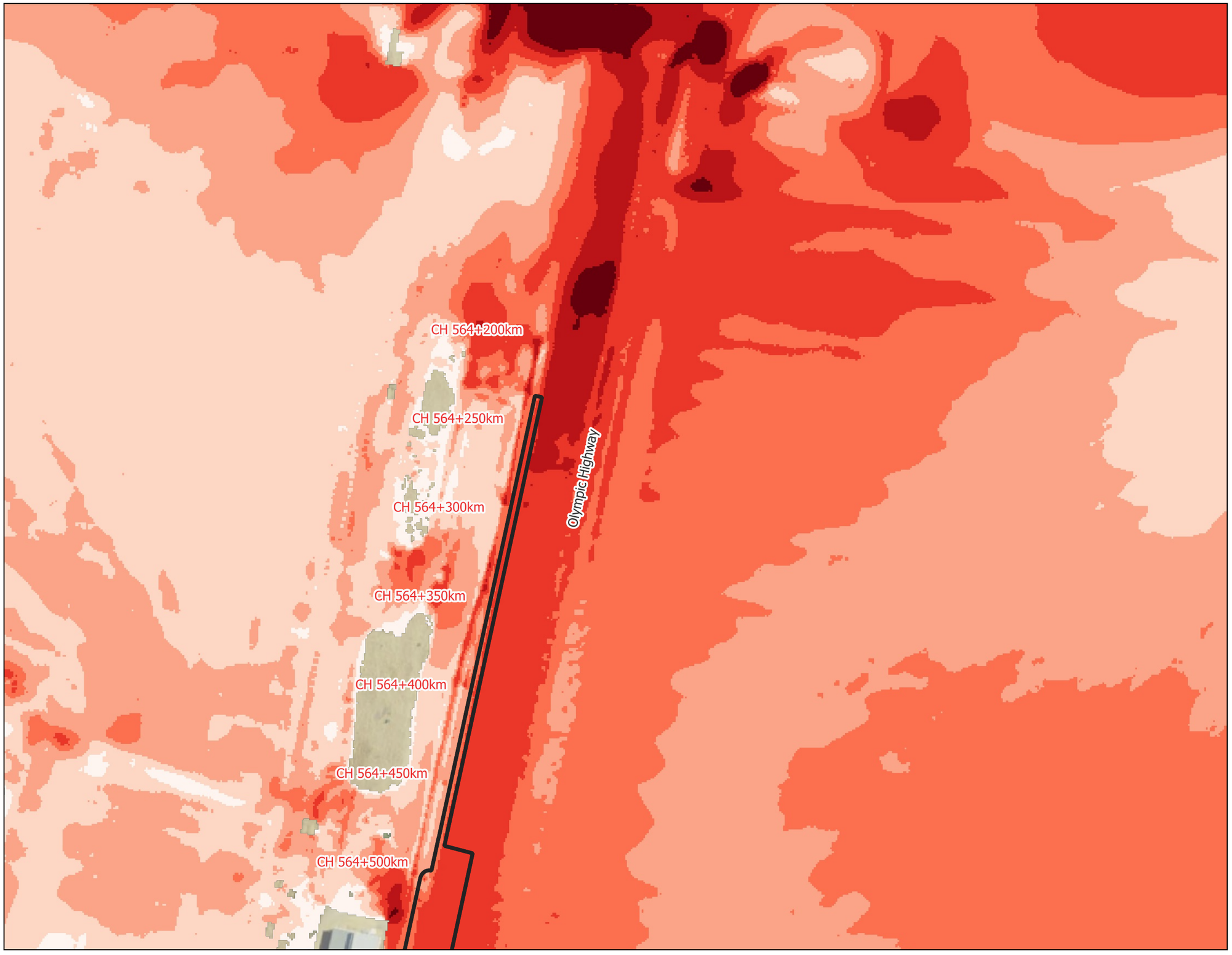
Figure 11b - Yerong Creek - IFC Stage

PMF Flood Velocity (m/s) - Existing Conditions



MARTINUS

aurecon BG&E

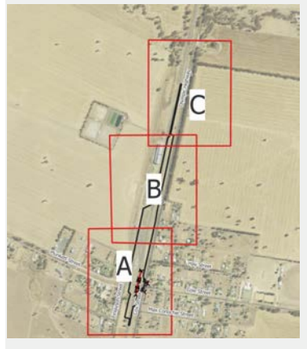
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

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Figure 11c - Yerong Creek - IFC Stage

PMF Flood Velocity (m/s) - Existing Conditions

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MARTINUS

aurecon BG&E

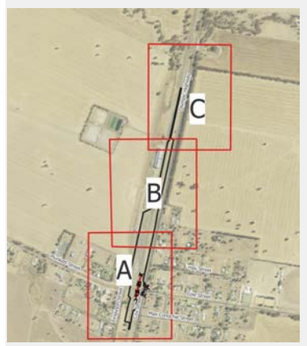
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 12 - Yerong Creek - IFC Stage

5% AEP Flood Hazard (ARR2019) - Existing Conditions

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MARTINUS

aurecon BG&E

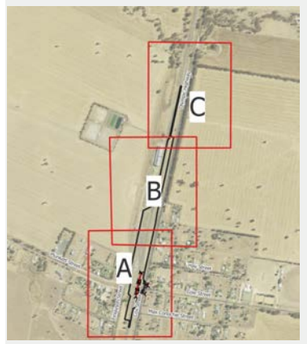
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 12a - Yerong Creek - IFC Stage

5% AEP Flood Hazard (ARR2019) - Existing Conditions

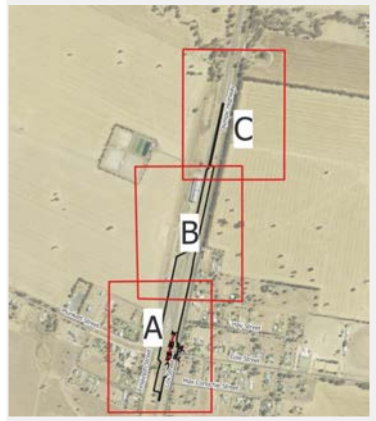
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 12b - Yerong Creek - IFC Stage

5% AEP Flood Hazard (ARR2019) - Existing Conditions

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R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

MARTINUS

aurecon BG&E

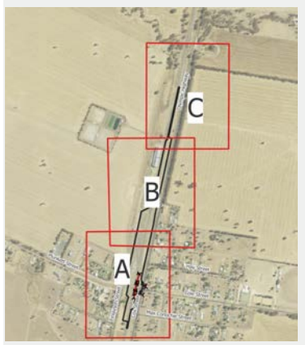
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 12c - Yerong Creek - IFC Stage

5% AEP Flood Hazard (ARR2019) - Existing Conditions

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MARTINUS

aurecon BG&E

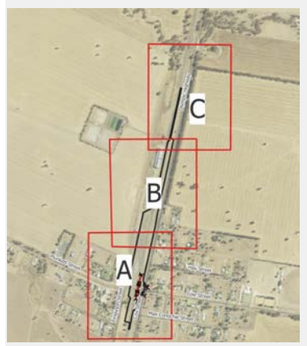
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 13 - Yerong Creek - IFC Stage

2% AEP Flood Hazard (ARR2019) - Existing Conditions

MARTINUS

aurecon BG&E

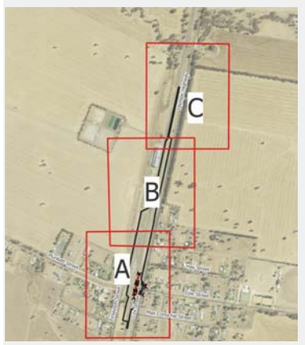
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



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N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 13a - Yerong Creek - IFC Stage

2% AEP Flood Hazard (ARR2019) - Existing Conditions

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MARTINUS

aurecon BG&E

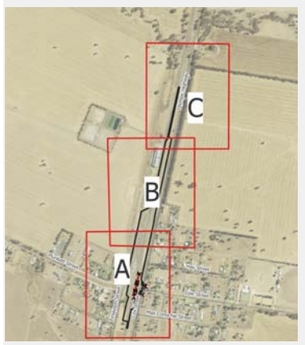
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 13b - Yerong Creek - IFC Stage

2% AEP Flood Hazard (ARR2019) - Existing Conditions

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MARTINUS

aurecon BG&E

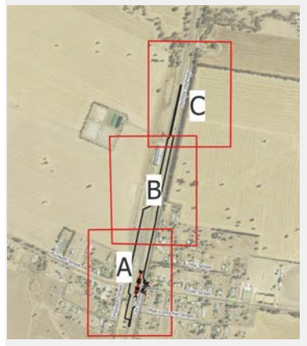
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 13c - Yerong Creek - IFC Stage

2% AEP Flood Hazard (ARR2019) - Existing Conditions

MARTINUS

aurecon BG&E

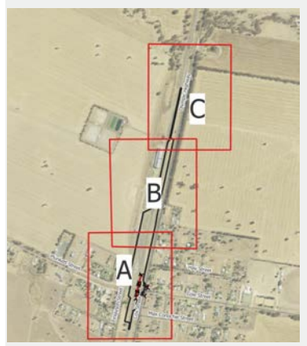
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

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Figure 14 - Yerong Creek - IFC Stage

1% AEP Flood Hazard (ARR2019) - Existing Conditions

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MARTINUS

aurecon BG&E

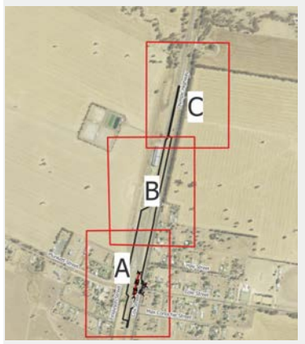
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 14a - Yerong Creek - IFC Stage

1% AEP Flood Hazard (ARR2019) - Existing Conditions

MARTINUS

aurecon BG&E

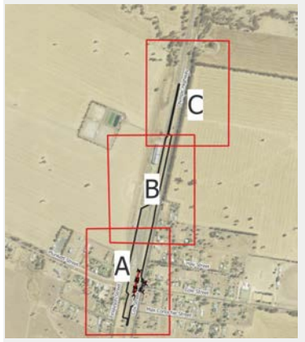
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



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N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 14b - Yerong Creek - IFC Stage

1% AEP Flood Hazard (ARR2019) - Existing Conditions

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MARTINUS

aurecon BG&E

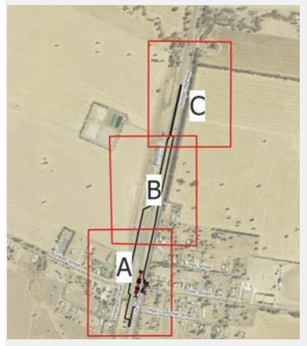
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 14c - Yerong Creek - IFC Stage

1% AEP Flood Hazard (ARR2019) - Existing Conditions

MARTINUS

aurecon BG&E

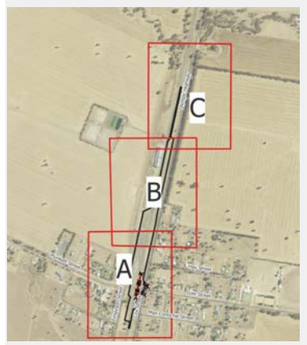
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

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Figure 15 - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Hazard (ARR2019) - Existing Conditions

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MARTINUS

aurecon BG&E

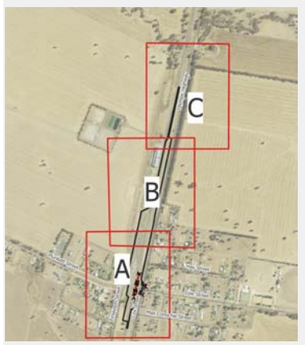
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



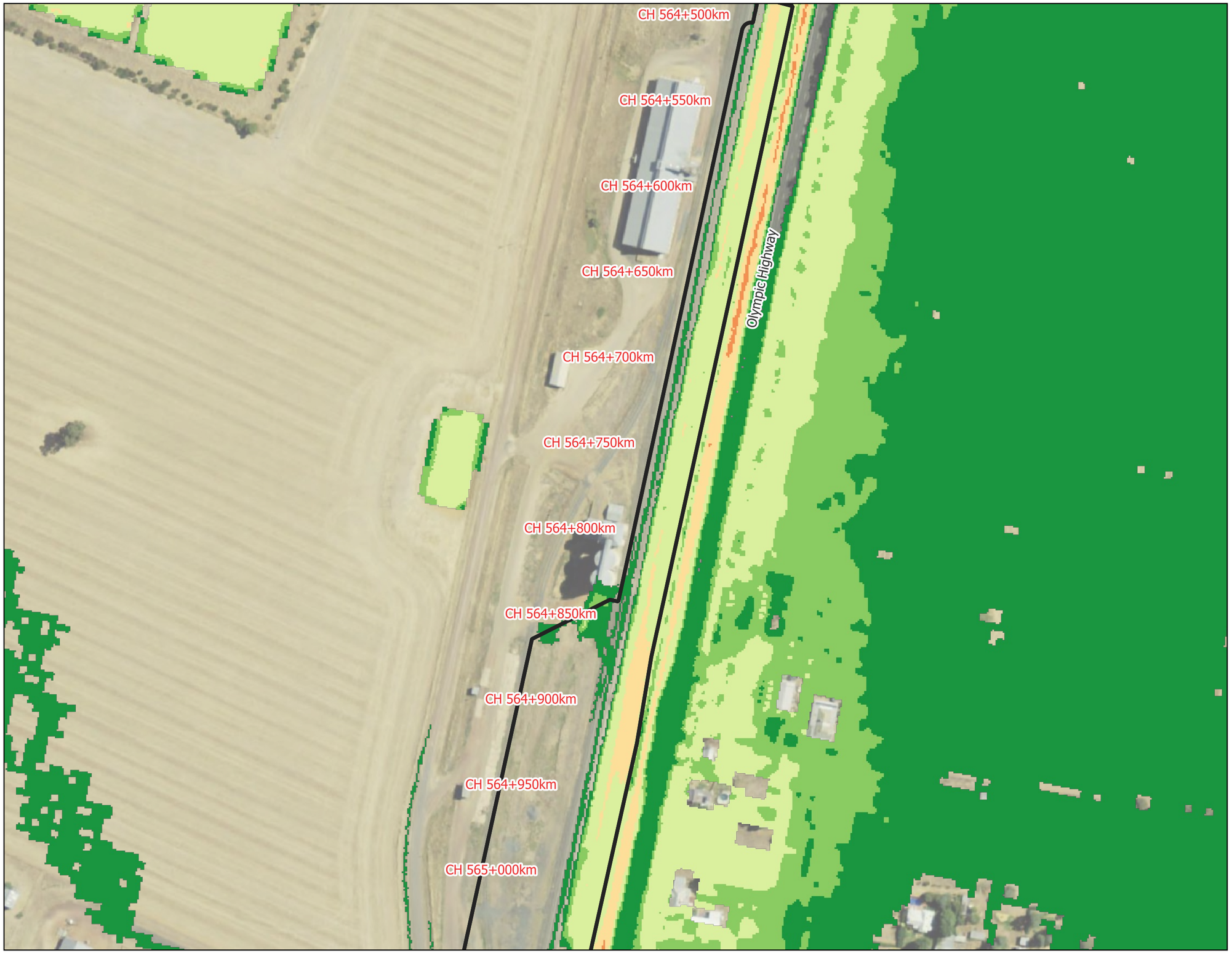
N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 15a - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Hazard (ARR2019) - Existing Conditions



MARTINUS

aurecon BG&E

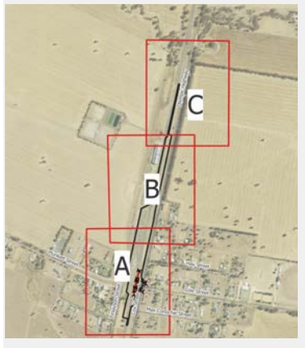
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



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N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 15b - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Hazard (ARR2019) - Existing Conditions

MARTINUS

aurecon BG&E

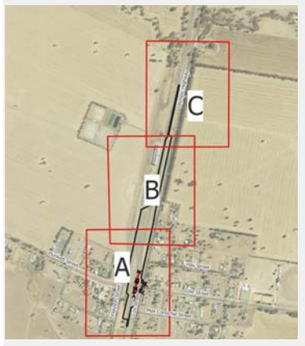
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



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N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 15c - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Hazard (ARR2019) - Existing Conditions

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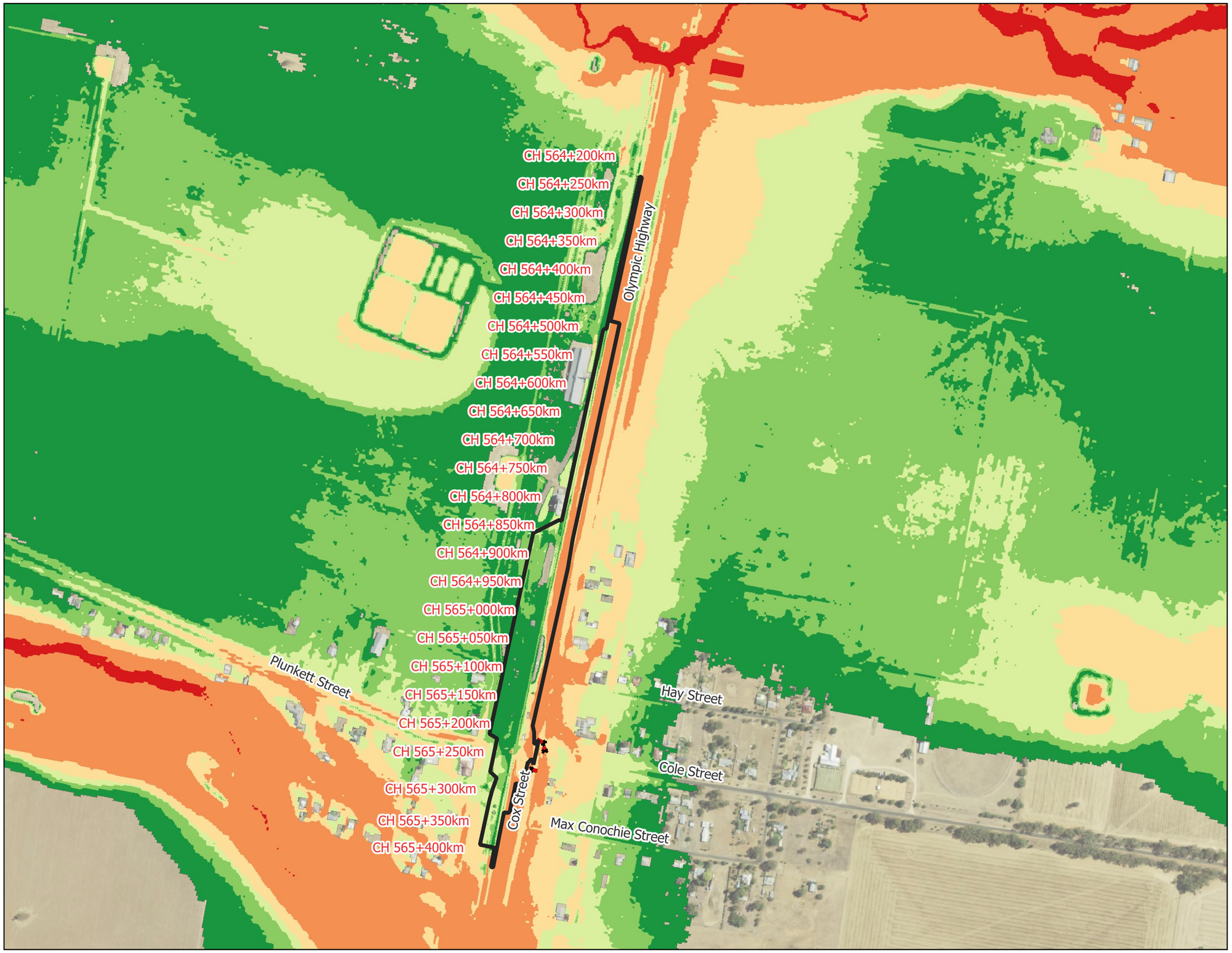


MARTINUS

aurecon BG&E

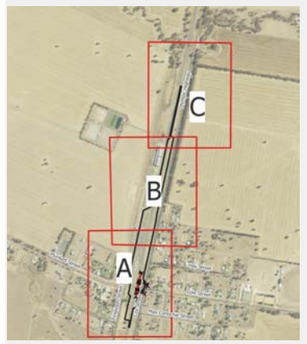
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 16 - Yerong Creek - IFC Stage

PMF Flood Hazard (ARR2019) - Existing Conditions

MARTINUS

aurecon BG&E

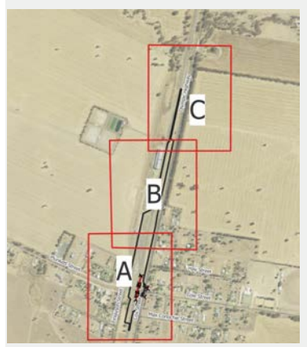
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



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N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 16a - Yerong Creek - IFC Stage

PMF Flood Hazard (ARR2019) - Existing Conditions

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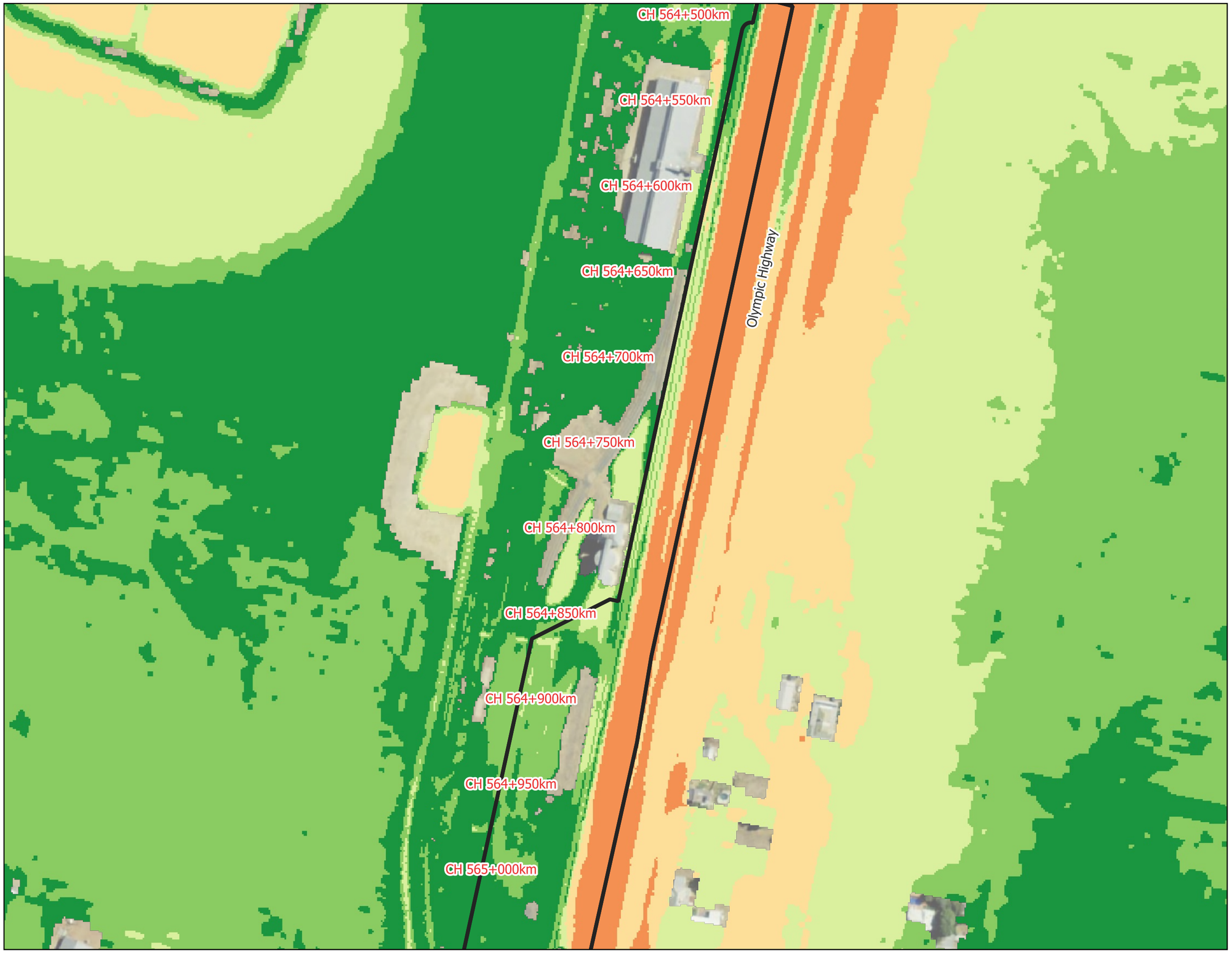


MARTINUS

aurecon BG&E

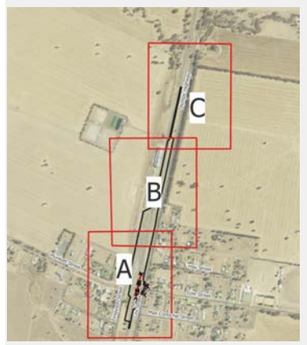
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 16b - Yerong Creek - IFC Stage

PMF Flood Hazard (ARR2019) - Existing Conditions

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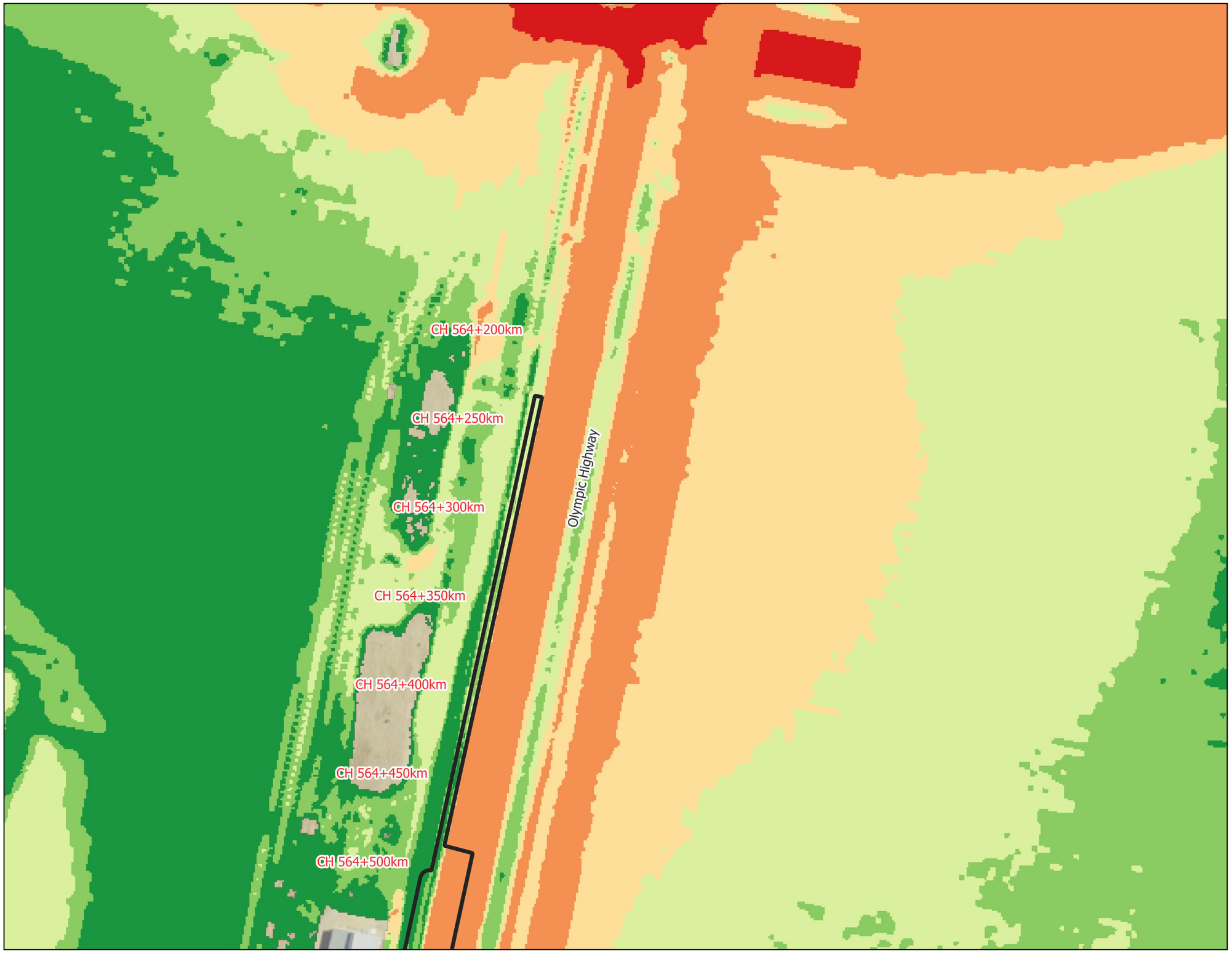


MARTINUS

aurecon BG&E

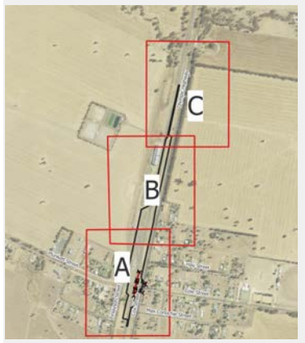
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 16c - Yerong Creek - IFC Stage

PMF Flood Hazard (ARR2019) - Existing Conditions

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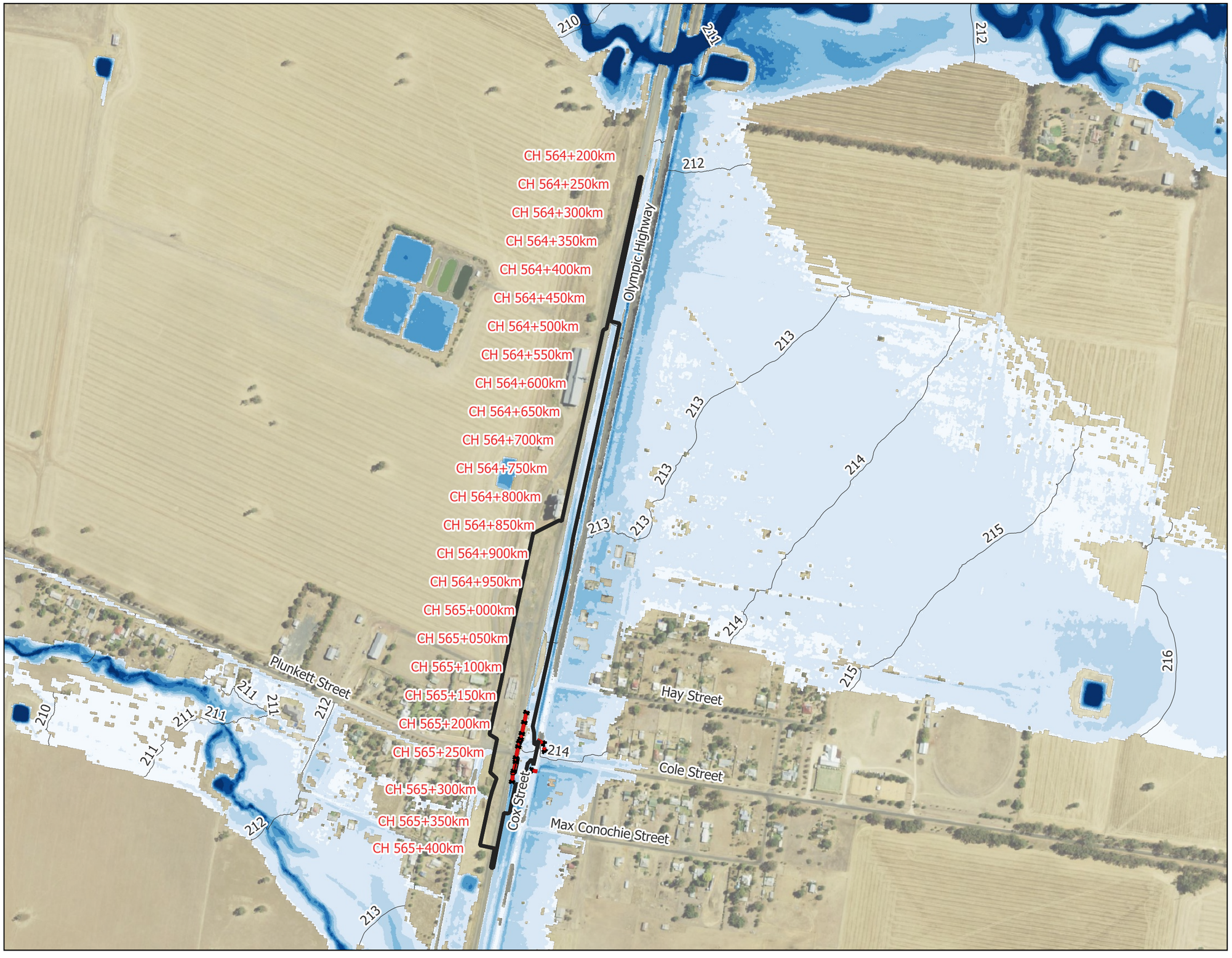


MARTINUS

aurecon BG&E

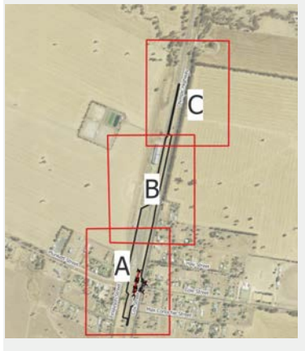
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 17 - Yerong Creek - IFC Stage

5% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions

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MARTINUS

aurecon BG&E

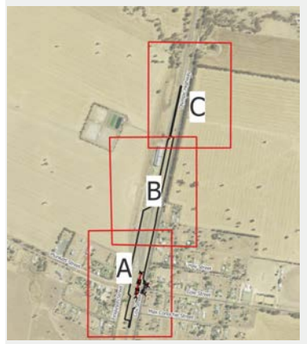
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

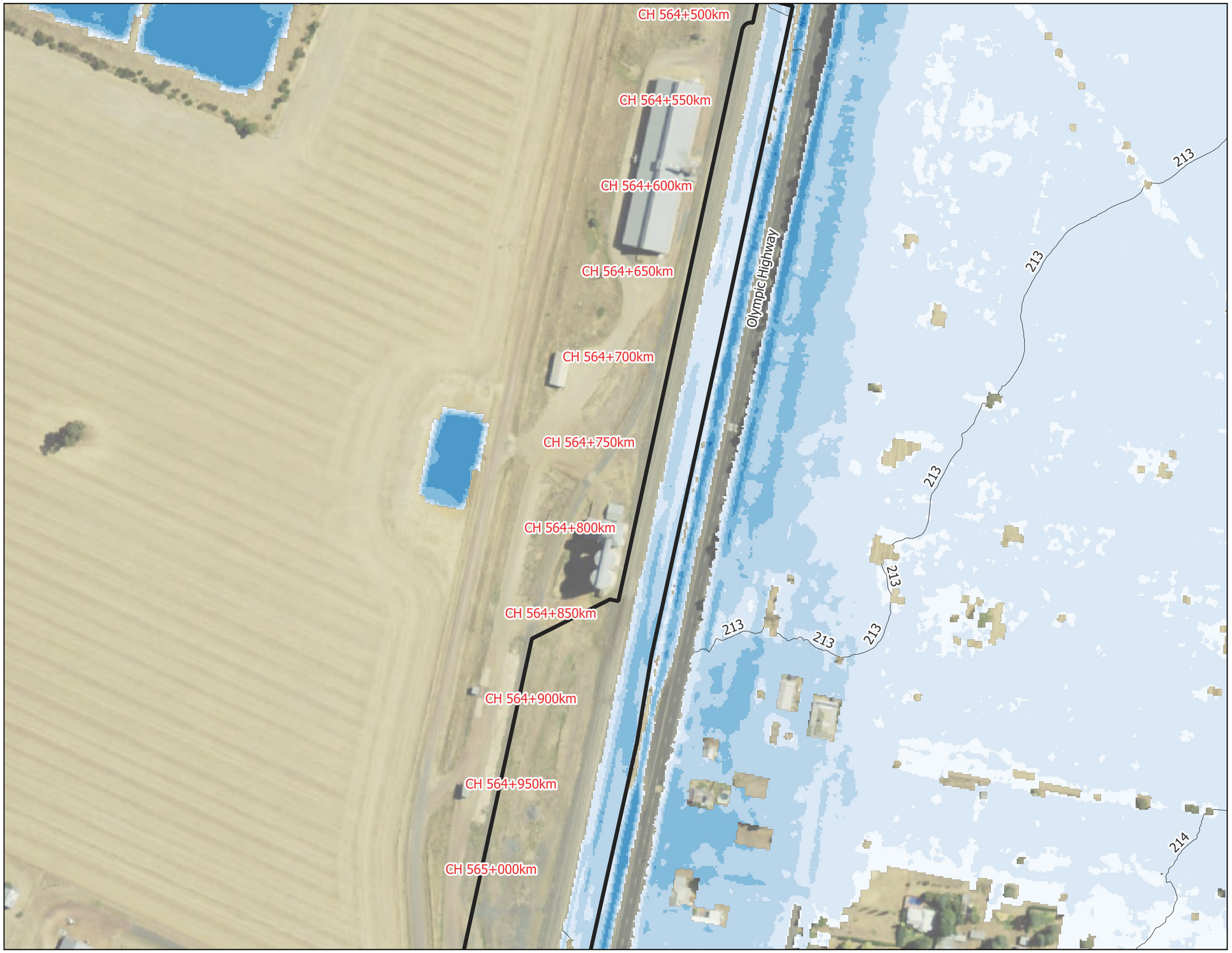
0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 17a - Yerong Creek - IFC Stage

5% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

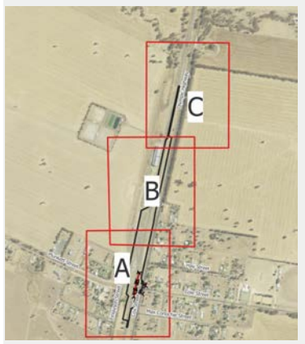
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



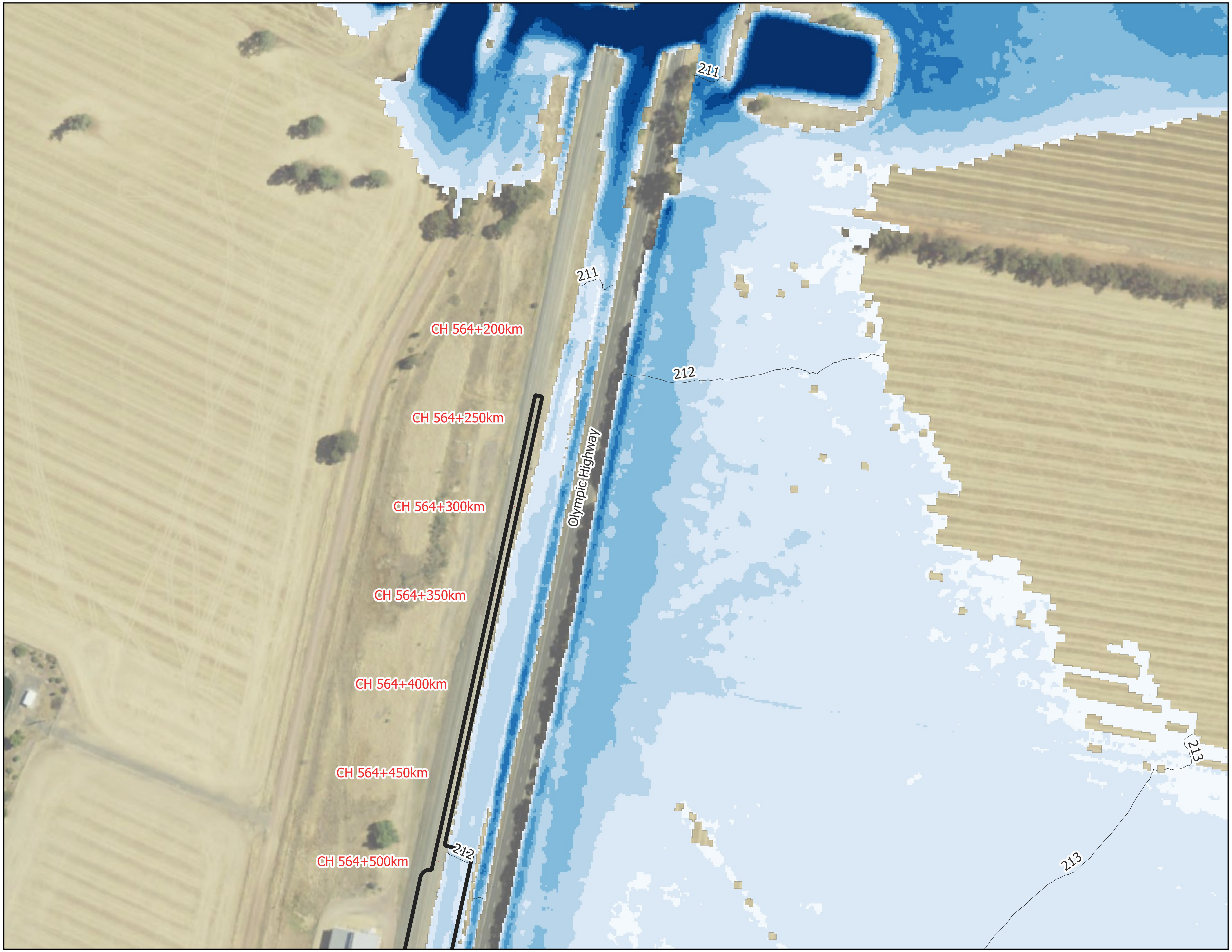
N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 17b - Yerong Creek - IFC Stage

5% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions



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MARTINUS aurecon BG&E

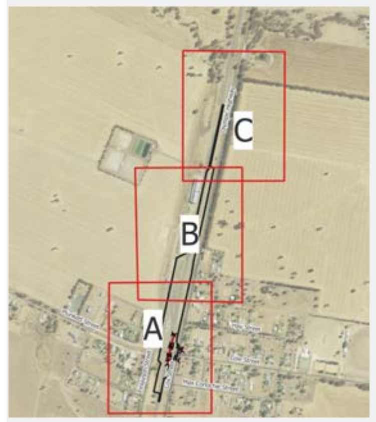
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 17c - Yerong Creek - IFC Stage

5% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions

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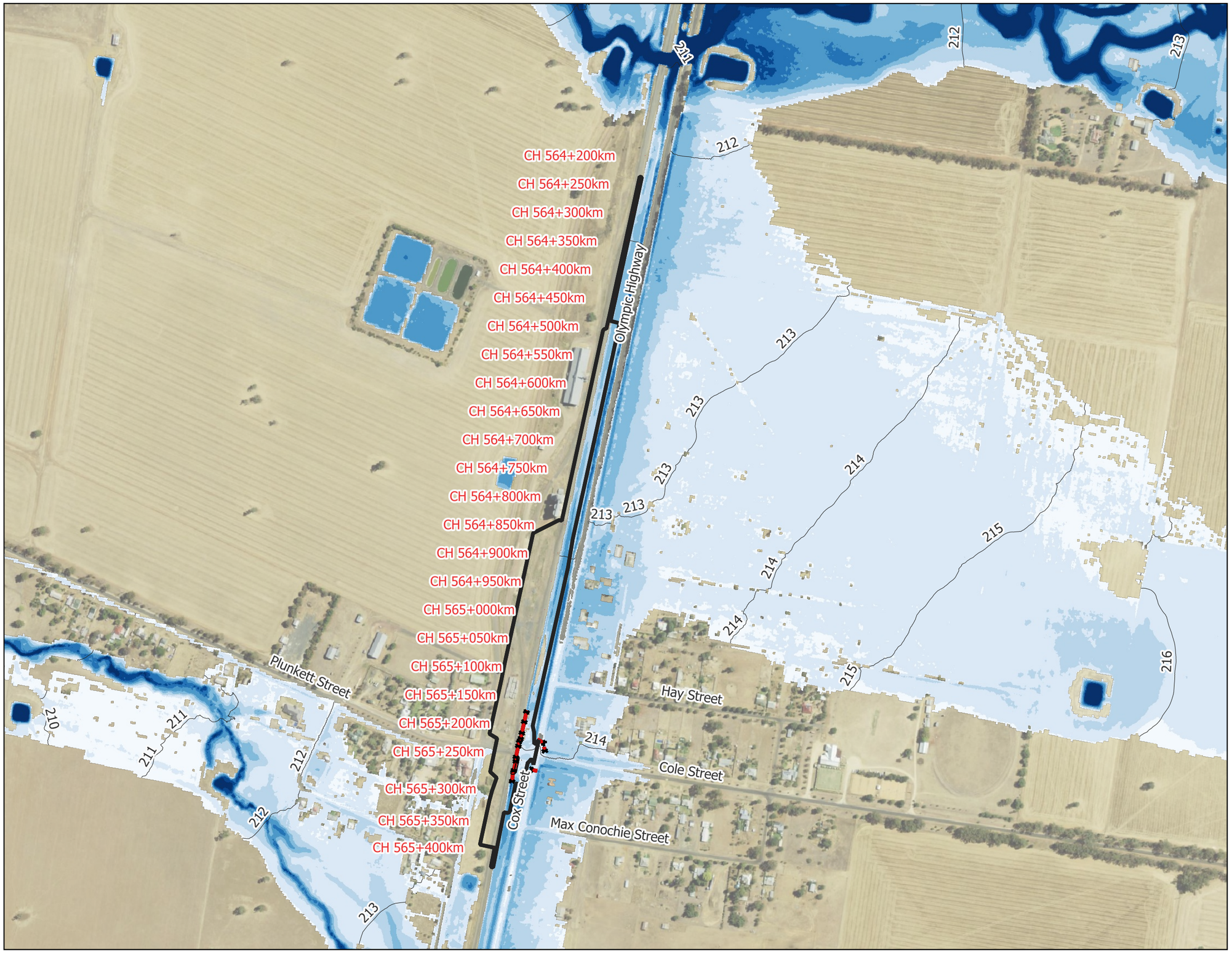


MARTINUS

aurecon BG&E

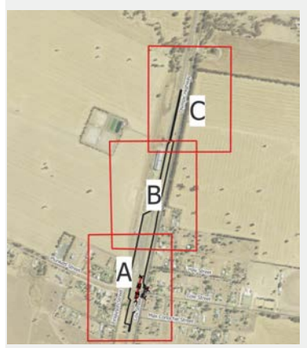
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 18 - Yerong Creek - IFC Stage

2% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

MARTINUS

aurecon BG&E

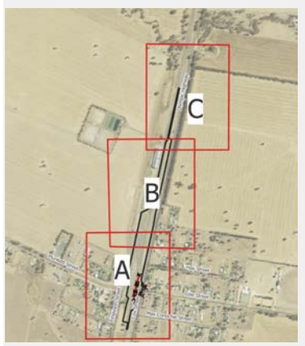
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



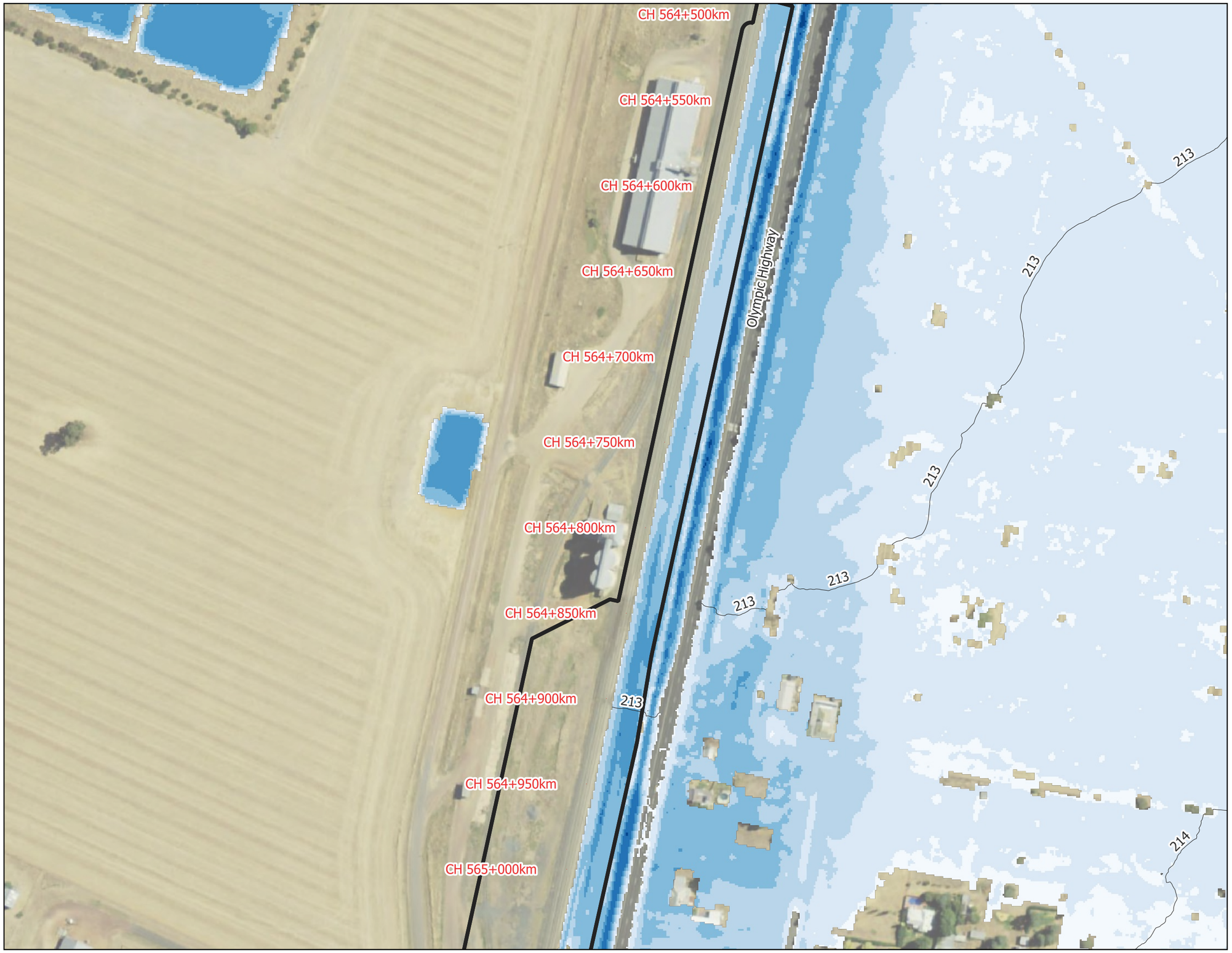
N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 18a - Yerong Creek - IFC Stage

2% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions



MARTINUS

aurecon BG&E

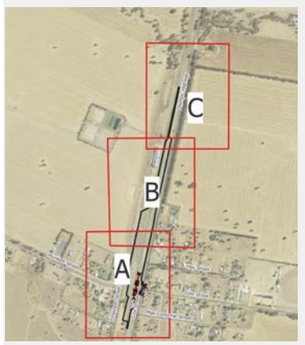
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

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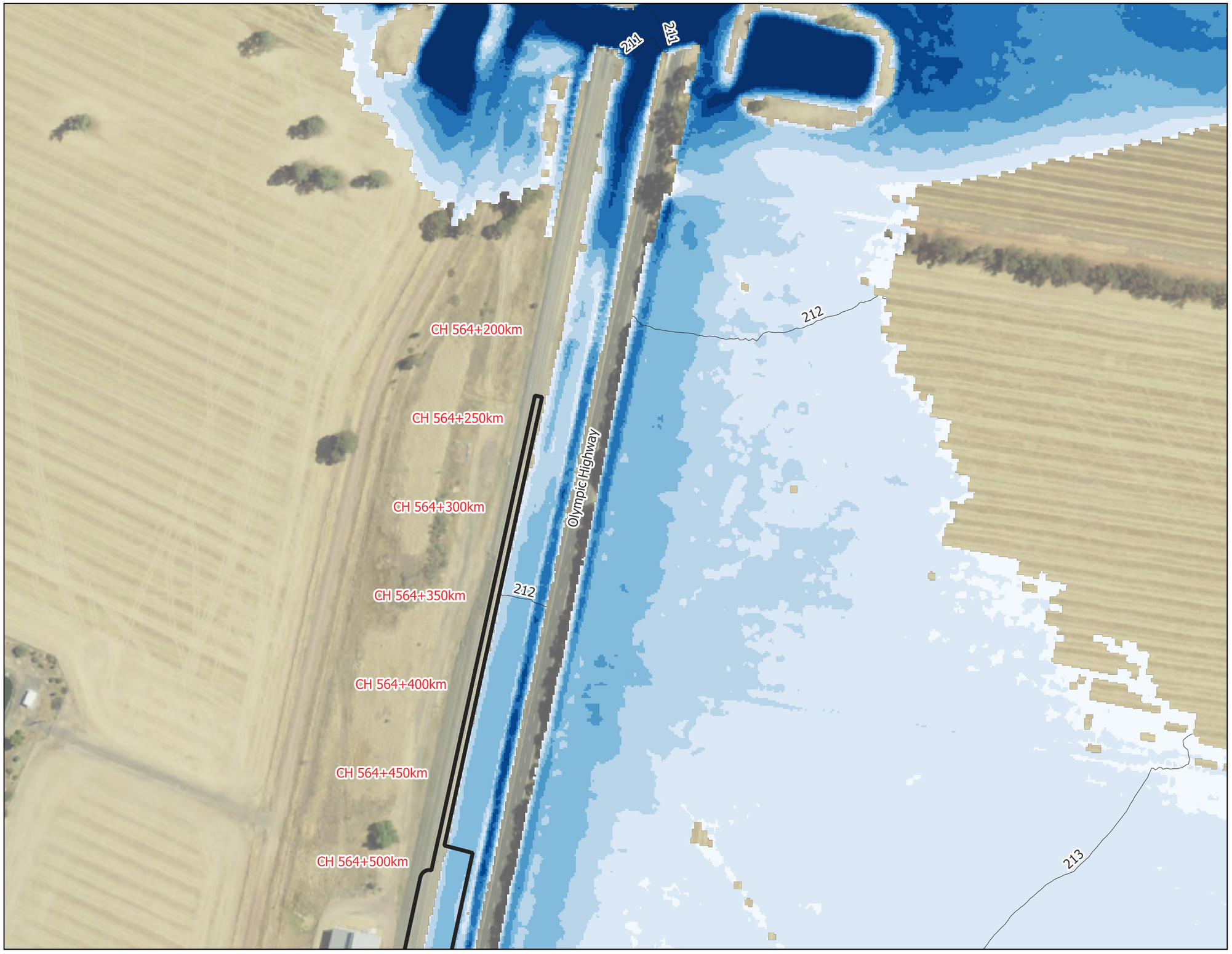
Figure 18b - Yerong Creek - IFC Stage

2% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions



MARTINUS

aurecon BG&E

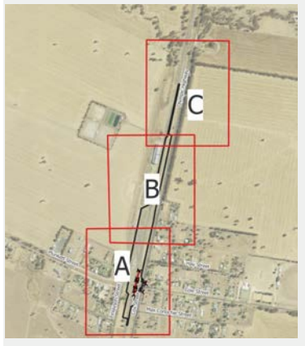
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

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Figure 18c - Yerong Creek - IFC Stage

2% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions

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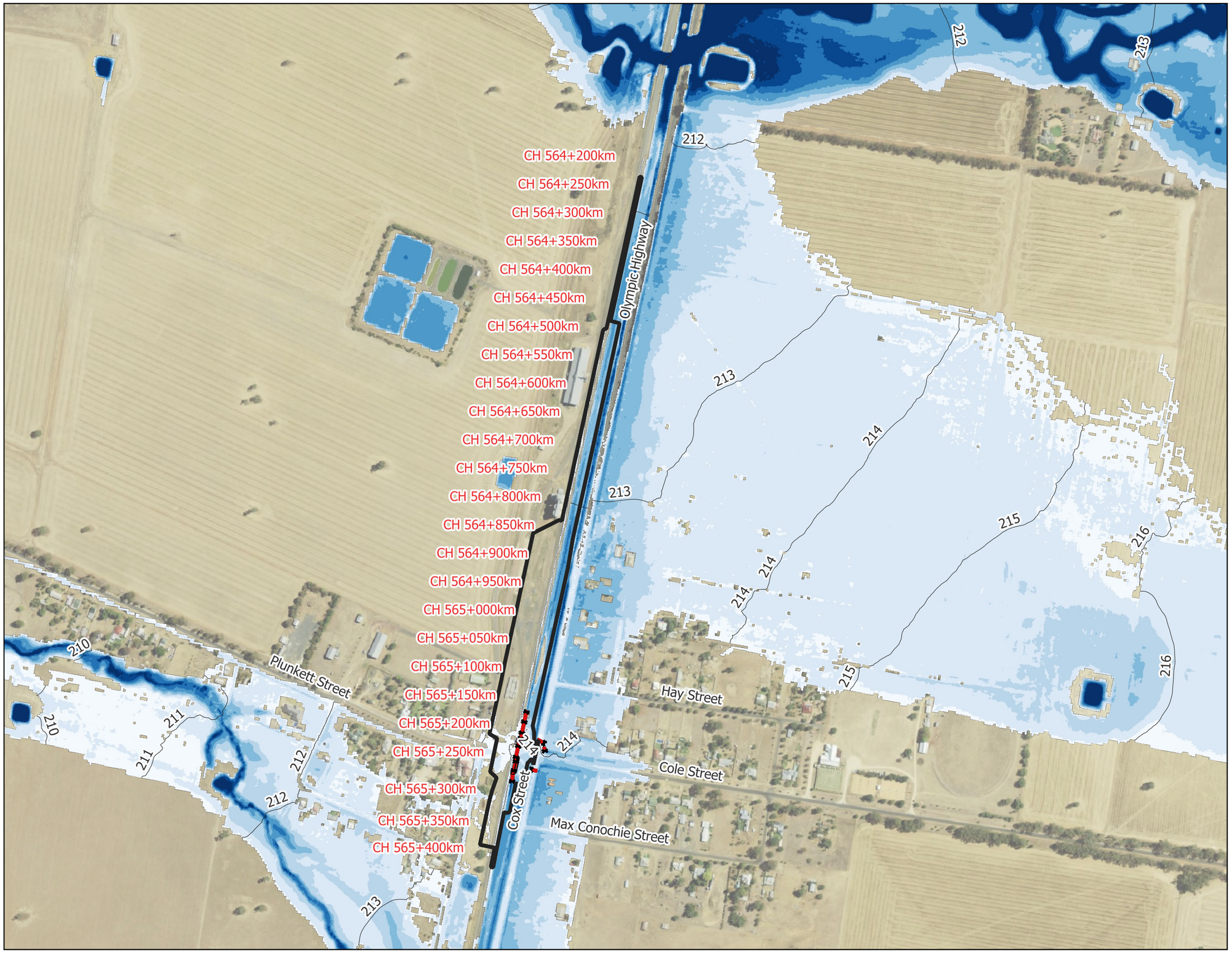


MARTINUS

aurecon BG&E

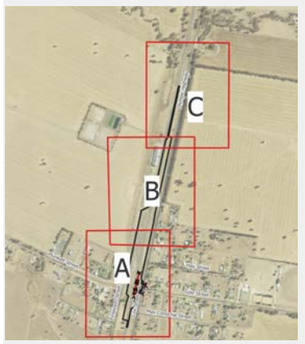
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 19 - Yerong Creek - IFC Stage

1% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions

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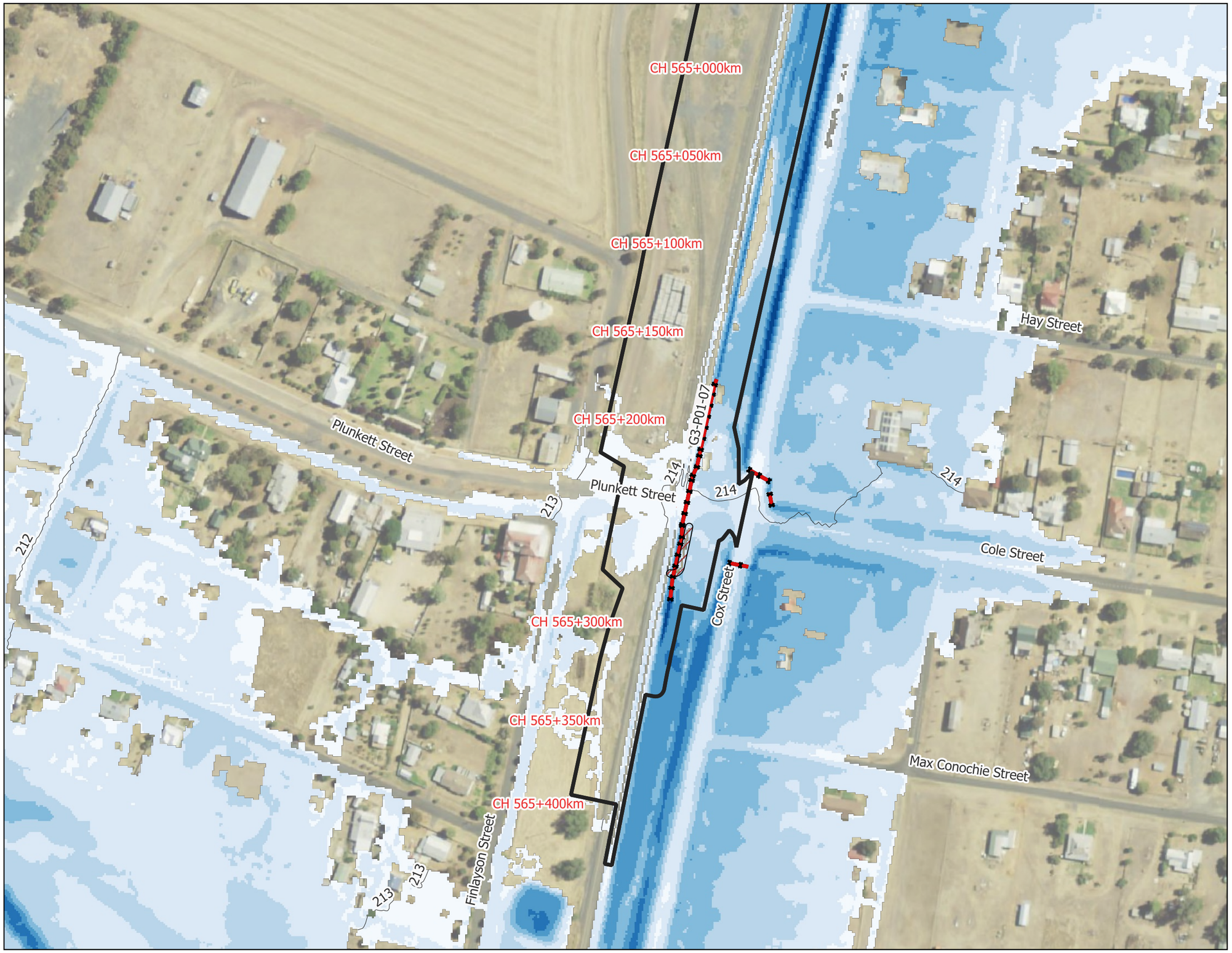


MARTINUS

aurecon BG&E

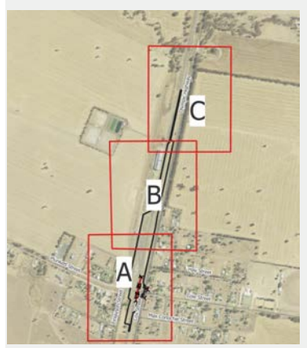
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 19a - Yerong Creek - IFC Stage

1% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions

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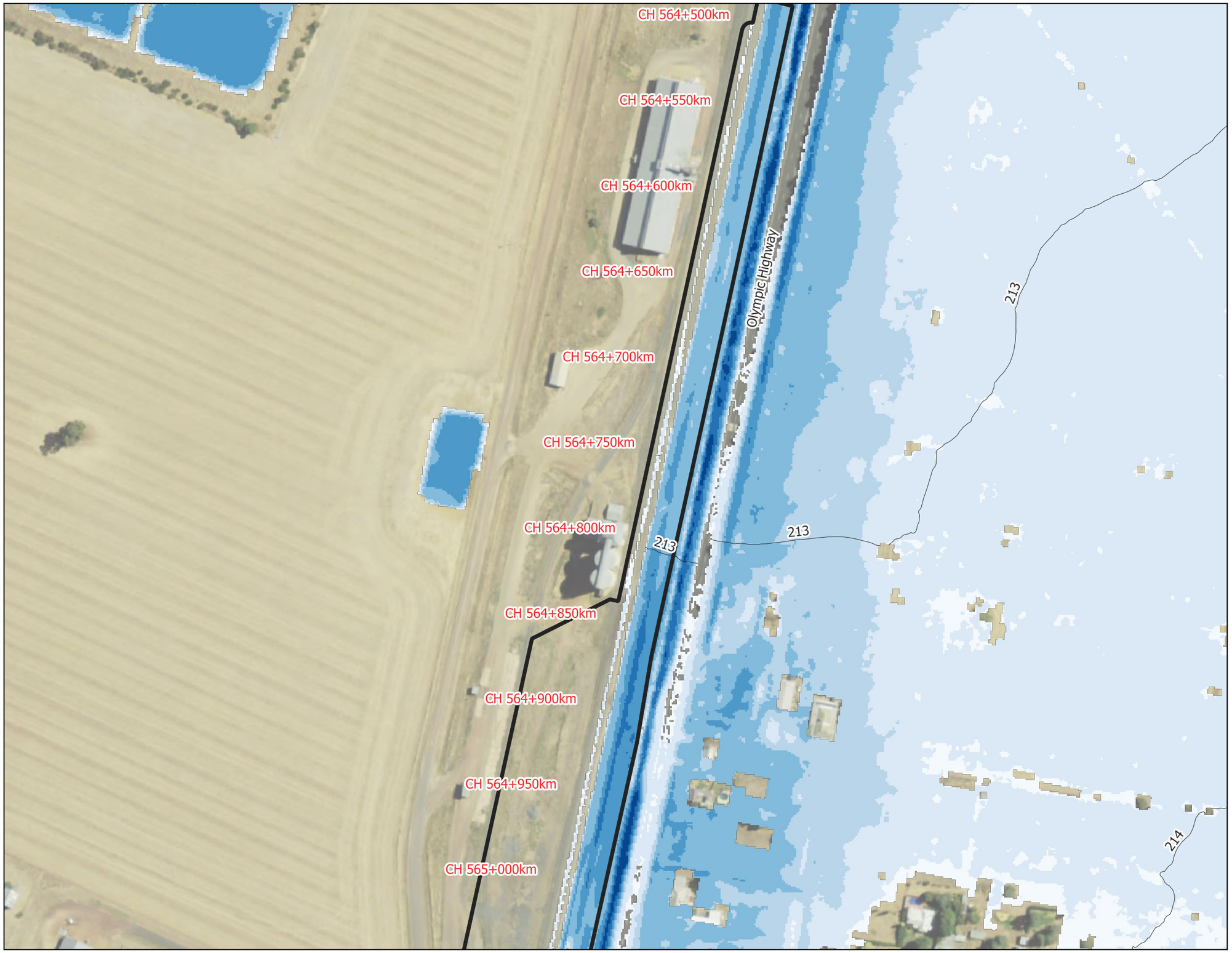


MARTINUS

aurecon BG&E

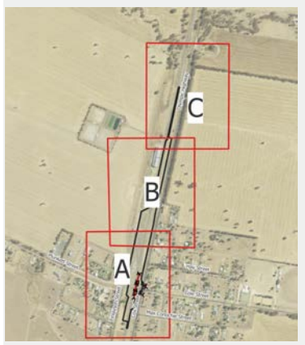
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 19b - Yerong Creek - IFC Stage

1% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions

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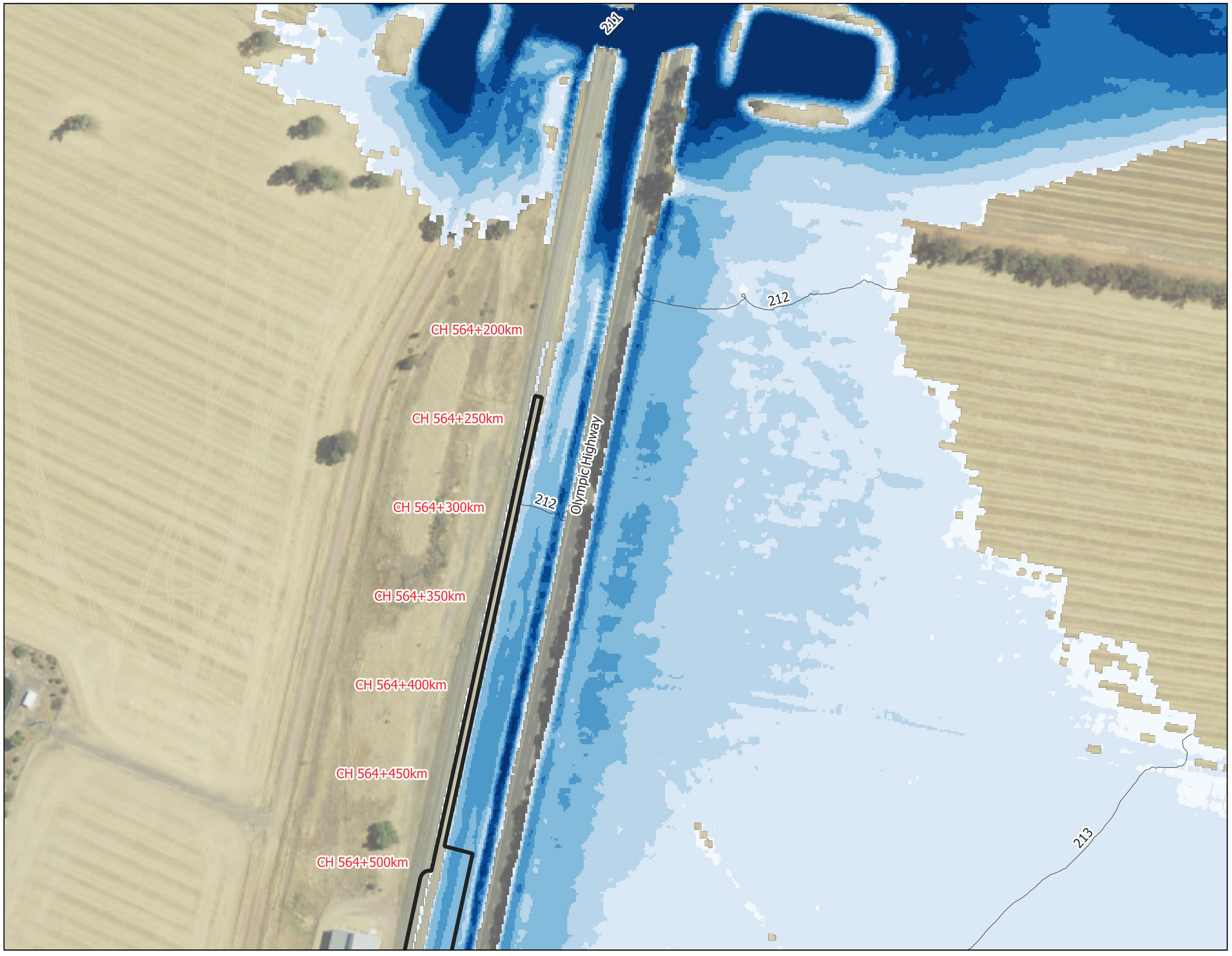


MARTINUS

aurecon BG&E

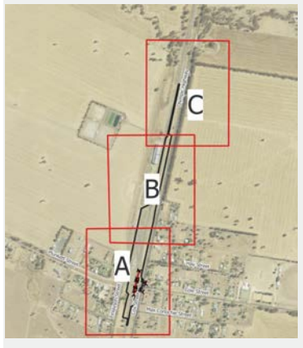
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 80 160 m

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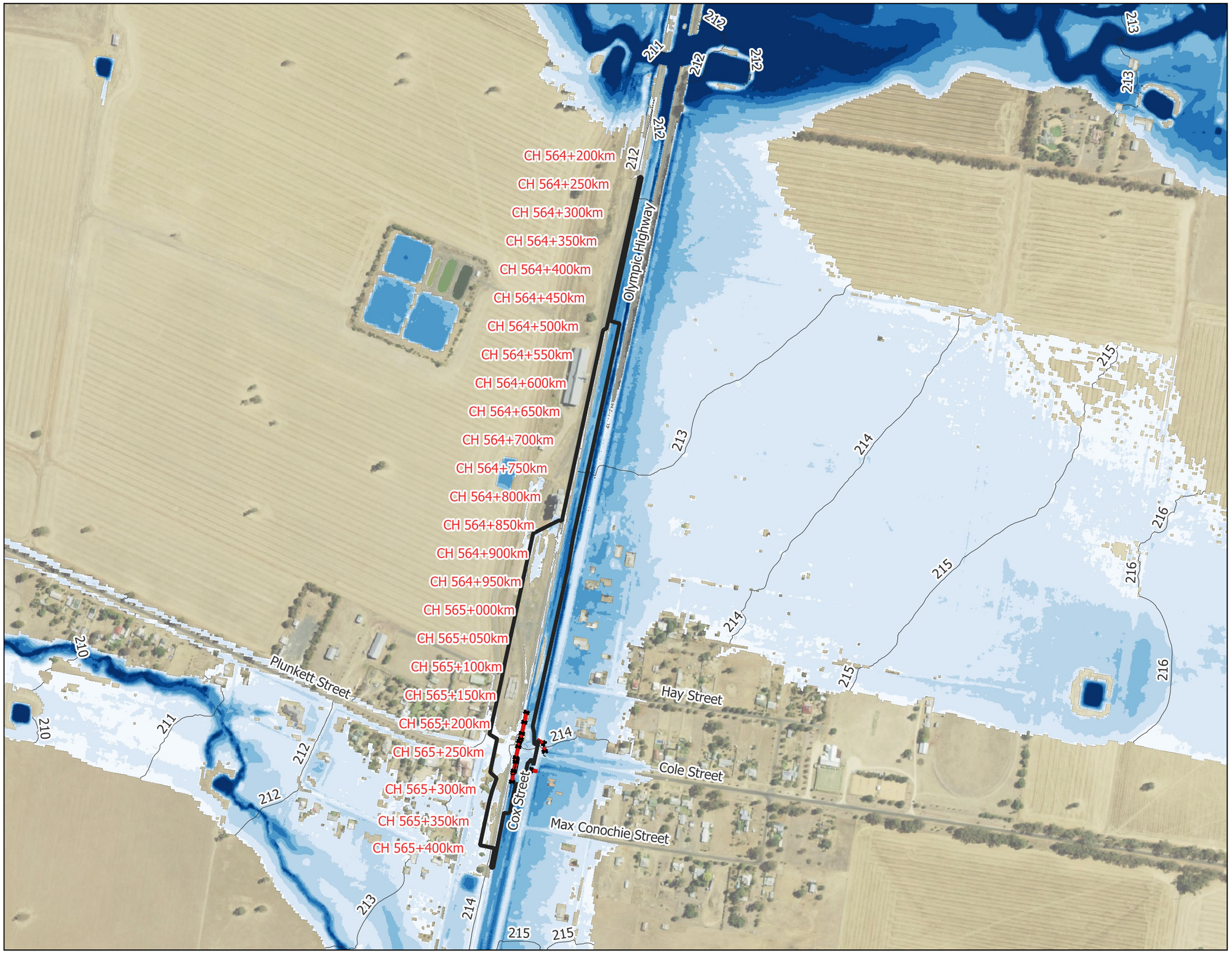
Figure 19c - Yerong Creek - IFC Stage

1% AEP Flood Depth (m) and Levels (m AHD) - Developed Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

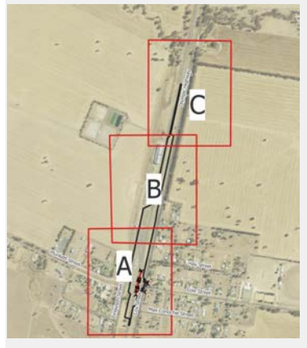
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 200 400 m

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Figure 20 - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Depth (m) and Levels (m AHD) - Developed Conditions

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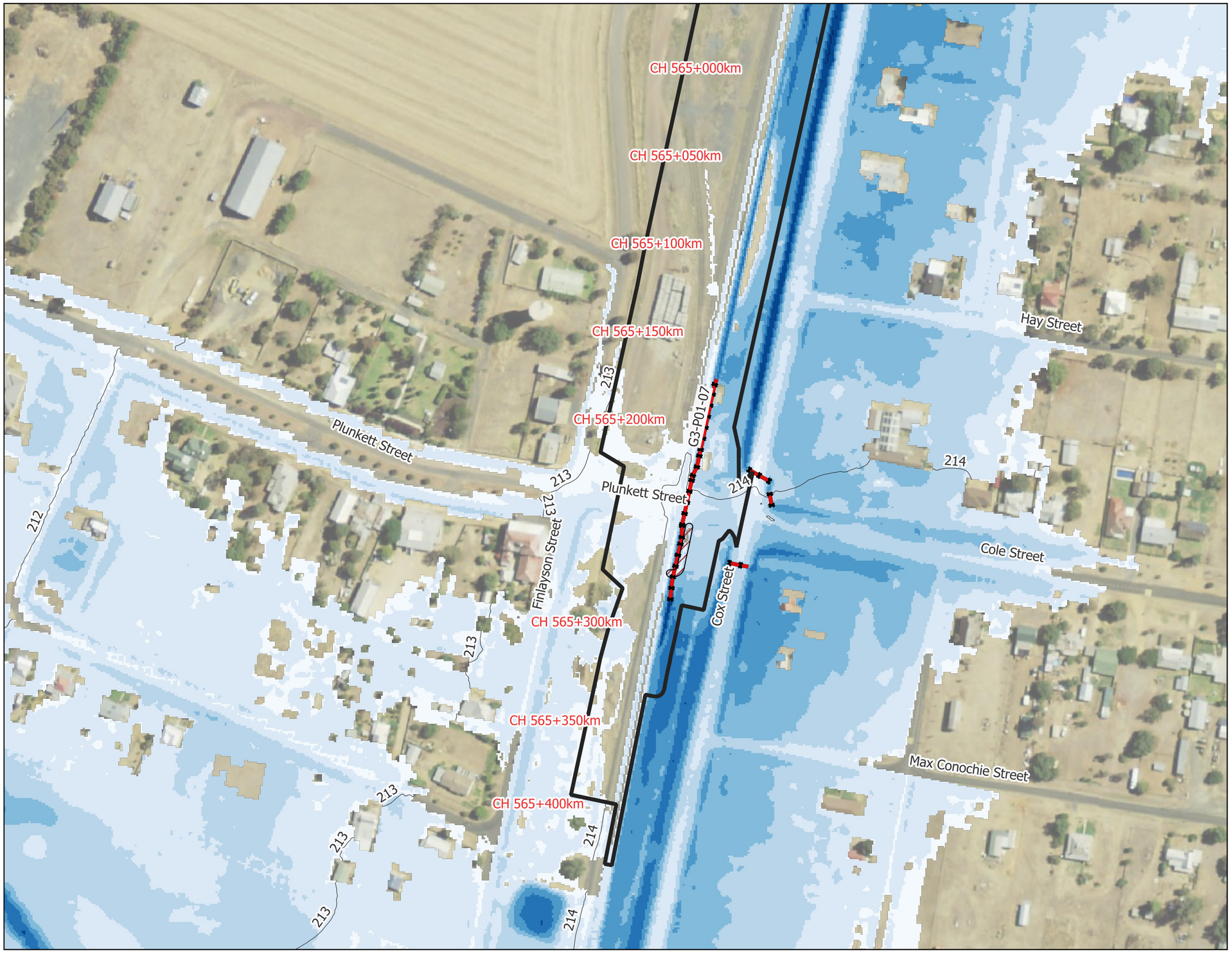


MARTINUS

aurecon BG&E

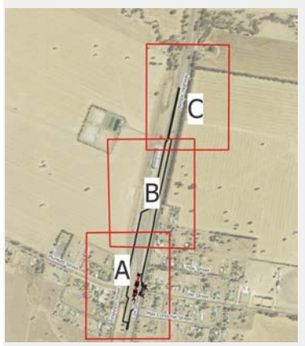
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

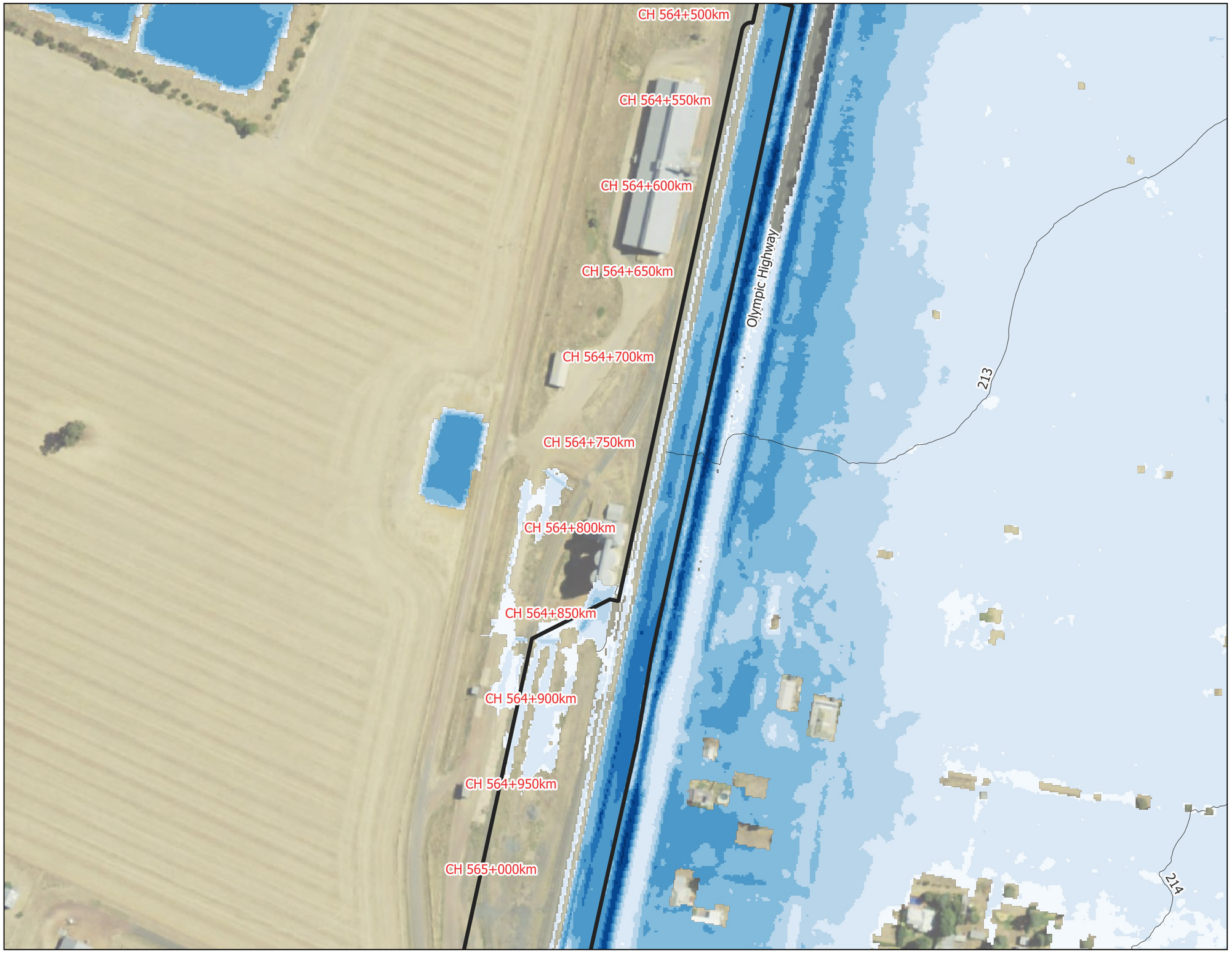
0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 20a - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Depth (m) and Levels (m AHD) - Developed Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

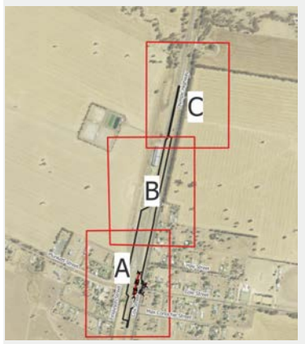
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

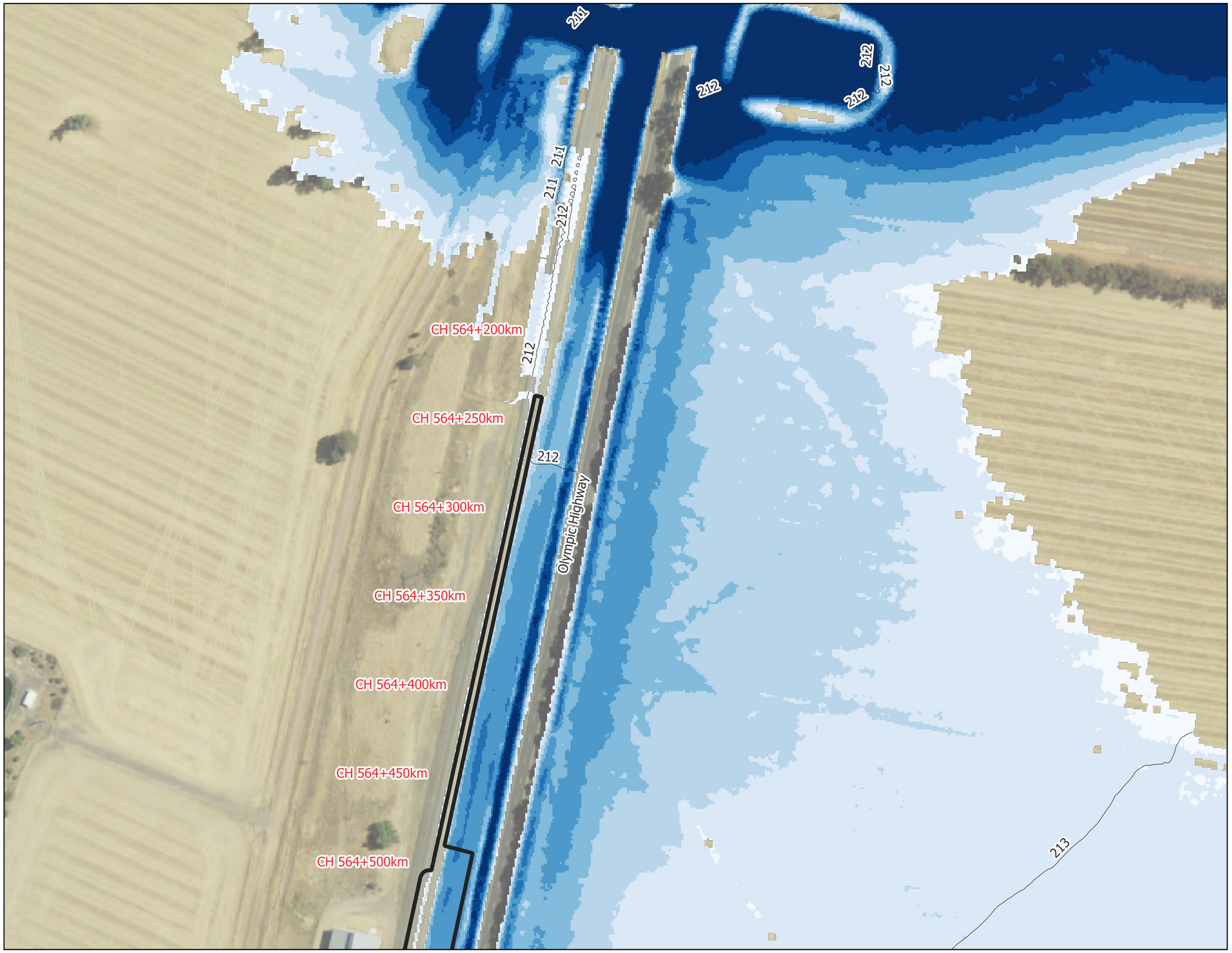
0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 20b - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Depth (m) and Levels (m AHD) - Developed Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

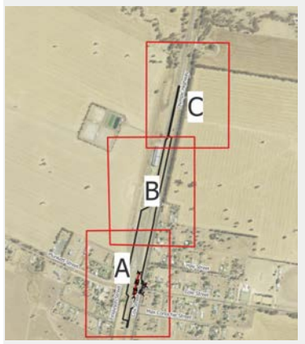
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 20c - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Depth (m) and Levels (m AHD) - Developed Conditions

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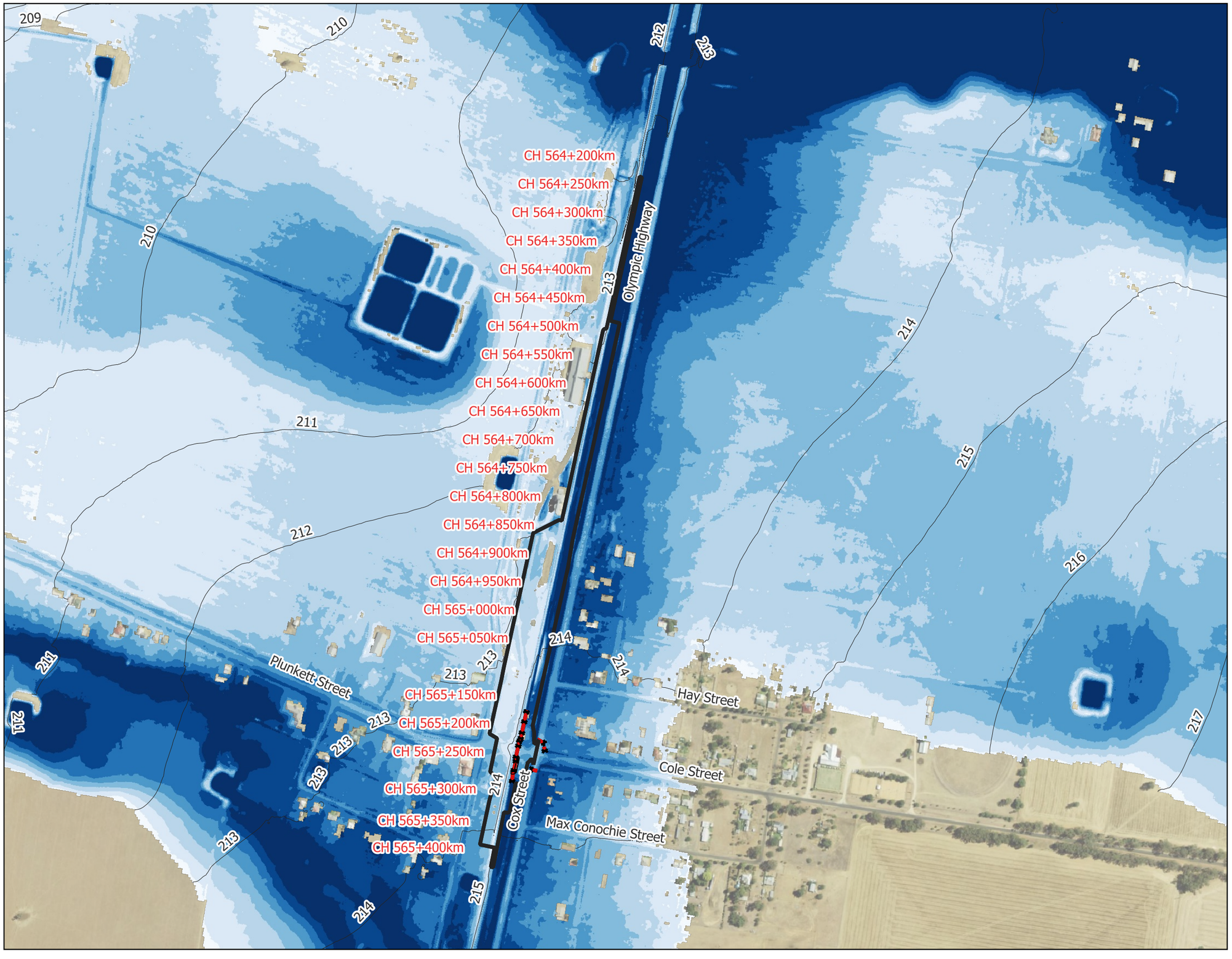


MARTINUS

aurecon BG&E

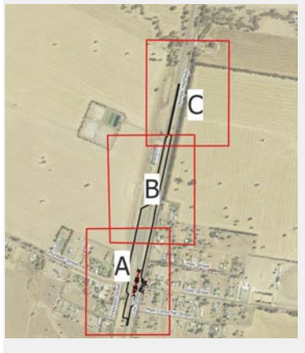
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

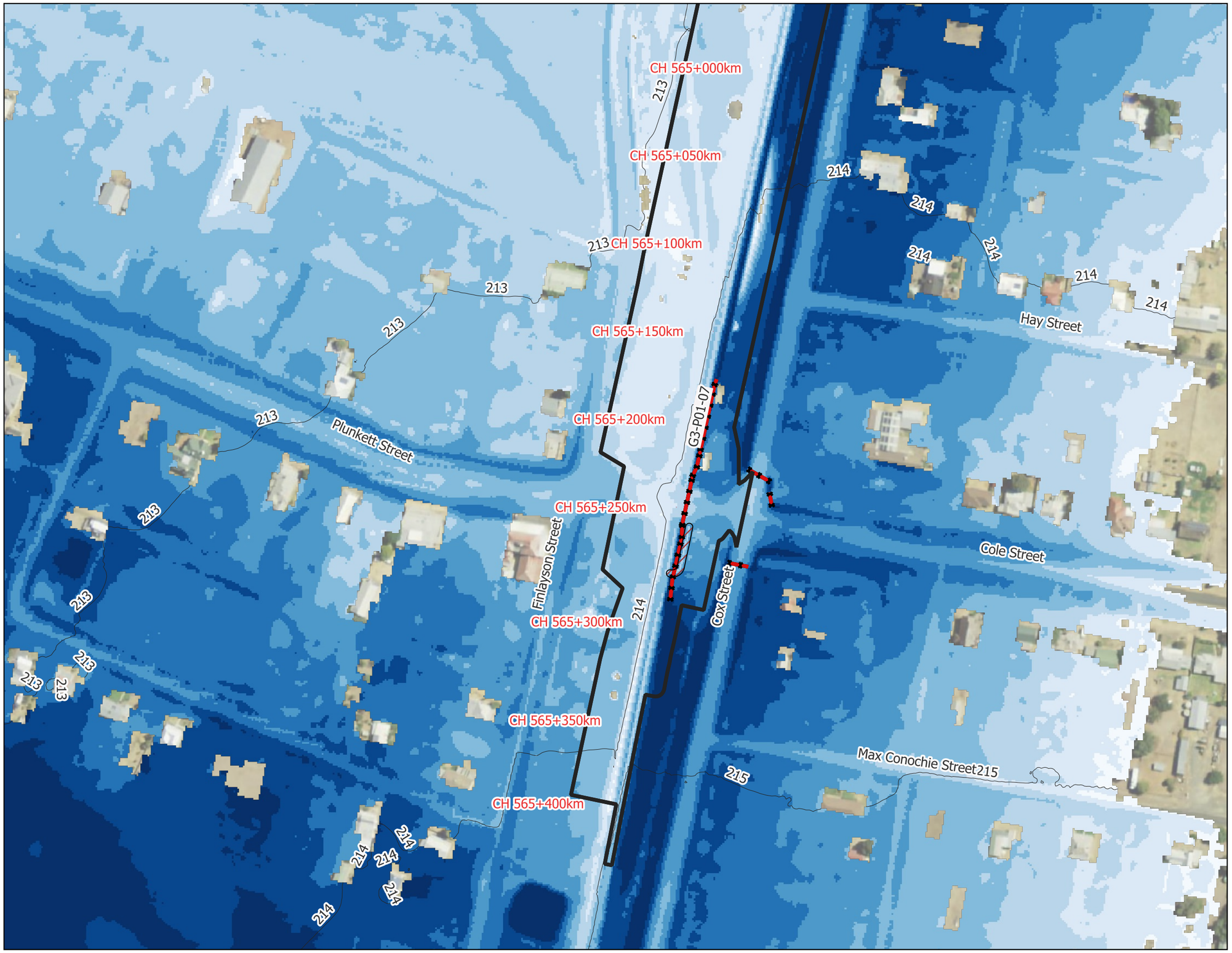
0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 21 - Yerong Creek - IFC Stage

PMF Flood Depth (m) and Levels (m AHD) - Developed Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

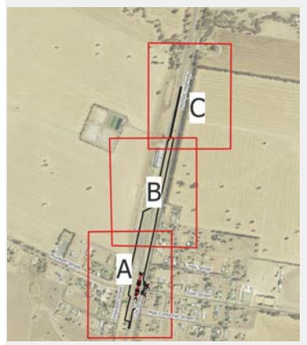
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

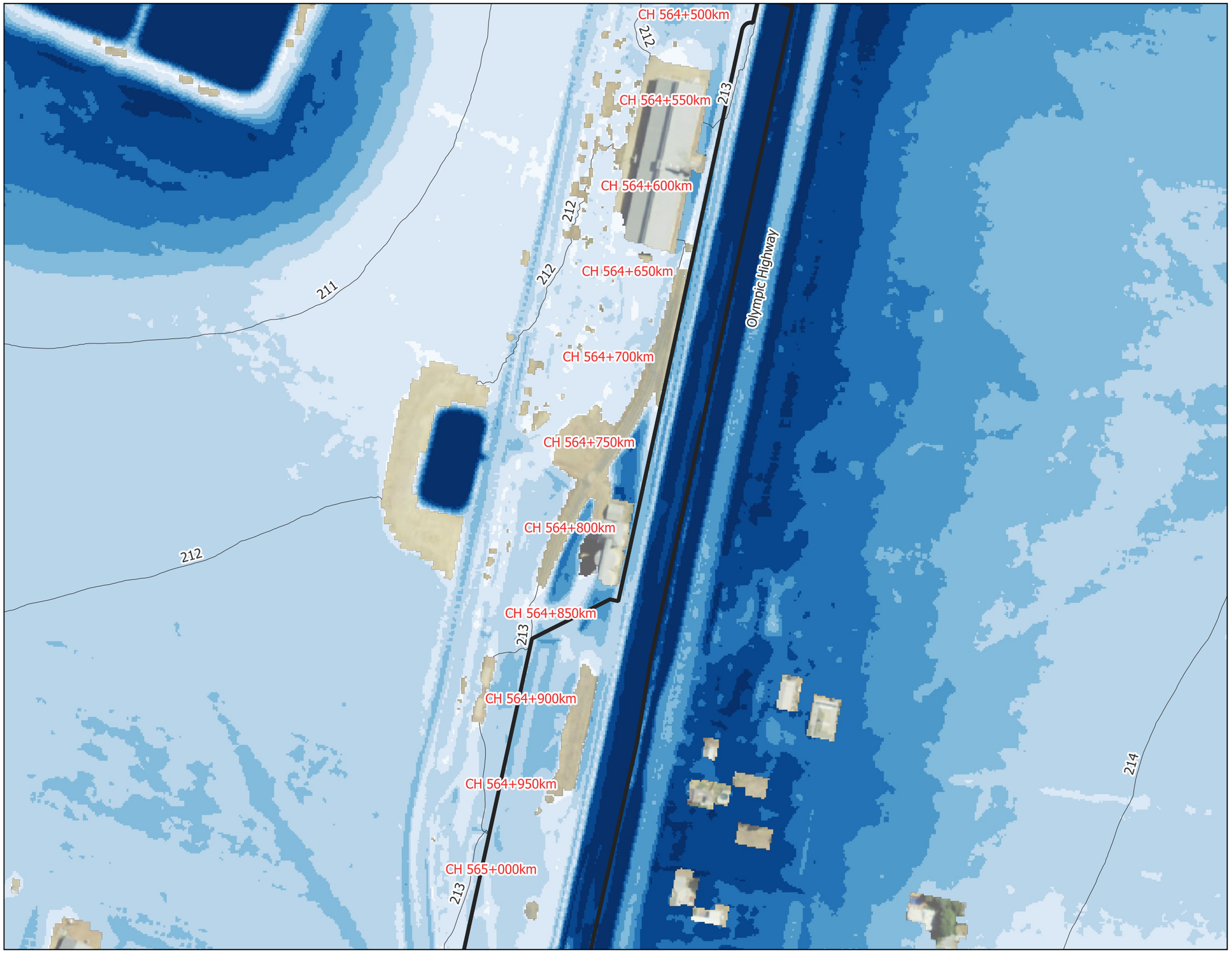
0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 21a - Yerong Creek - IFC Stage

PMF Flood Depth (m) and Levels (m AHD) - Developed Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

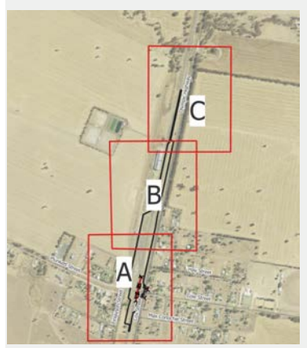
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



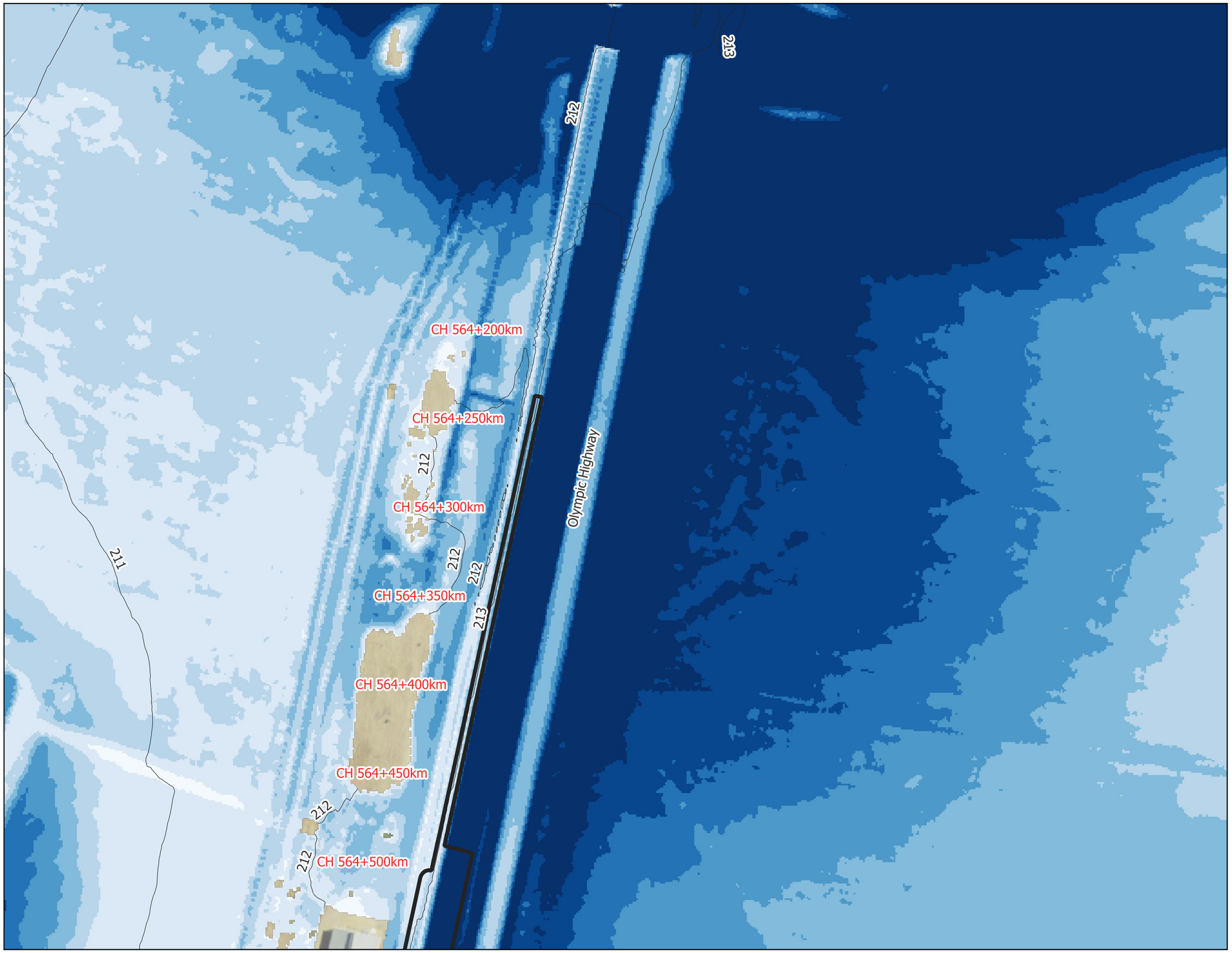
N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 21b - Yerong Creek - IFC Stage

PMF Flood Depth (m) and Levels (m AHD) - Developed Conditions



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MARTINUS

aurecon BG&E

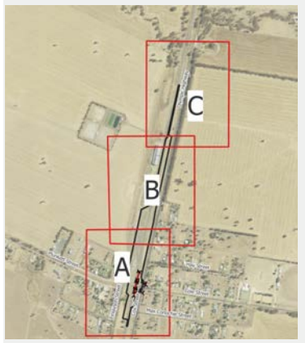
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 21c - Yerong Creek - IFC Stage

PMF Flood Depth (m) and Levels (m AHD) - Developed Conditions

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MARTINUS

aurecon BG&E

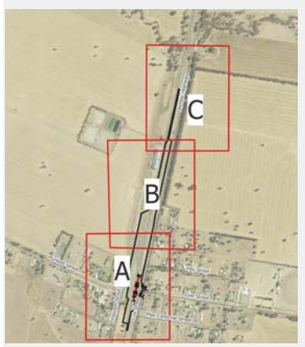
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

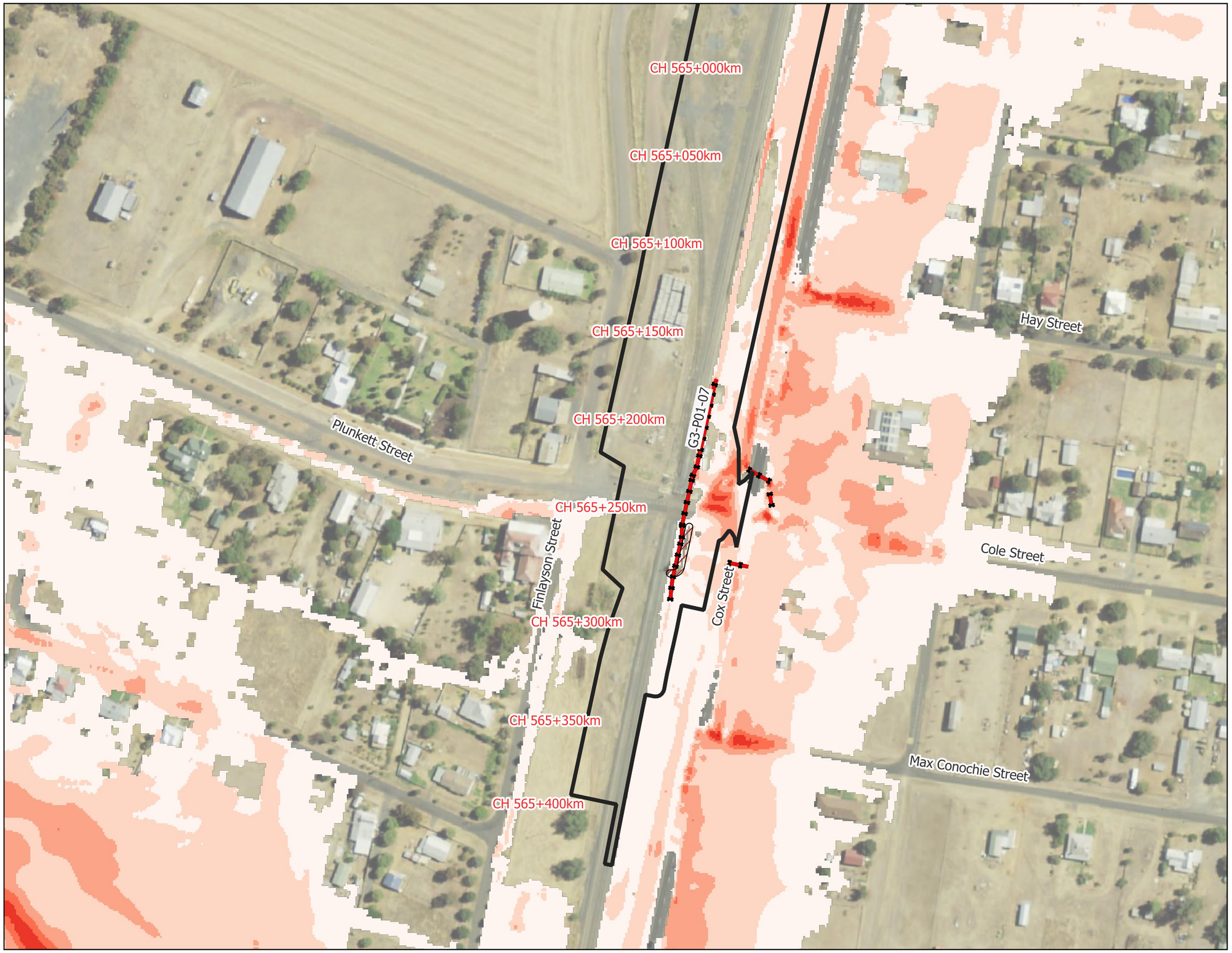
0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 22 - Yerong Creek - IFC Stage

5% AEP Flood Velocity (m/s) - Developed Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

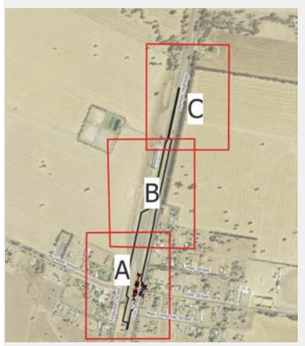
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 22a - Yerong Creek - IFC Stage

5% AEP Flood Velocity (m/s) - Developed Conditions

MARTINUS

aurecon BG&E

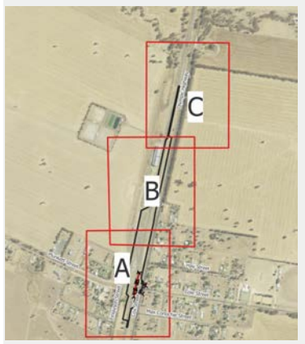
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



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N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 22b - Yerong Creek - IFC Stage

5% AEP Flood Velocity (m/s) - Developed Conditions

MARTINUS

aurecon BG&E

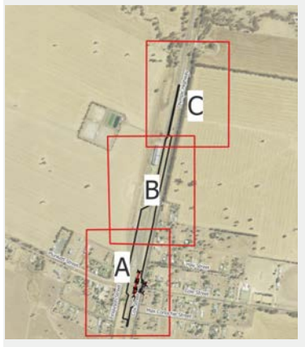
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

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Figure 22c - Yerong Creek - IFC Stage

5% AEP Flood Velocity (m/s) - Developed Conditions

MARTINUS

aurecon BG&E

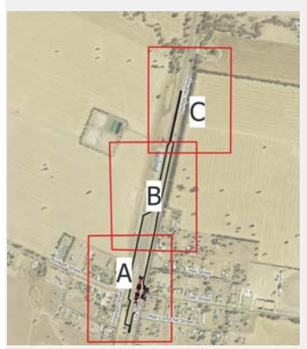
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 23 - Yerong Creek - IFC Stage

2% AEP Flood Velocity (m/s) - Developed Conditions

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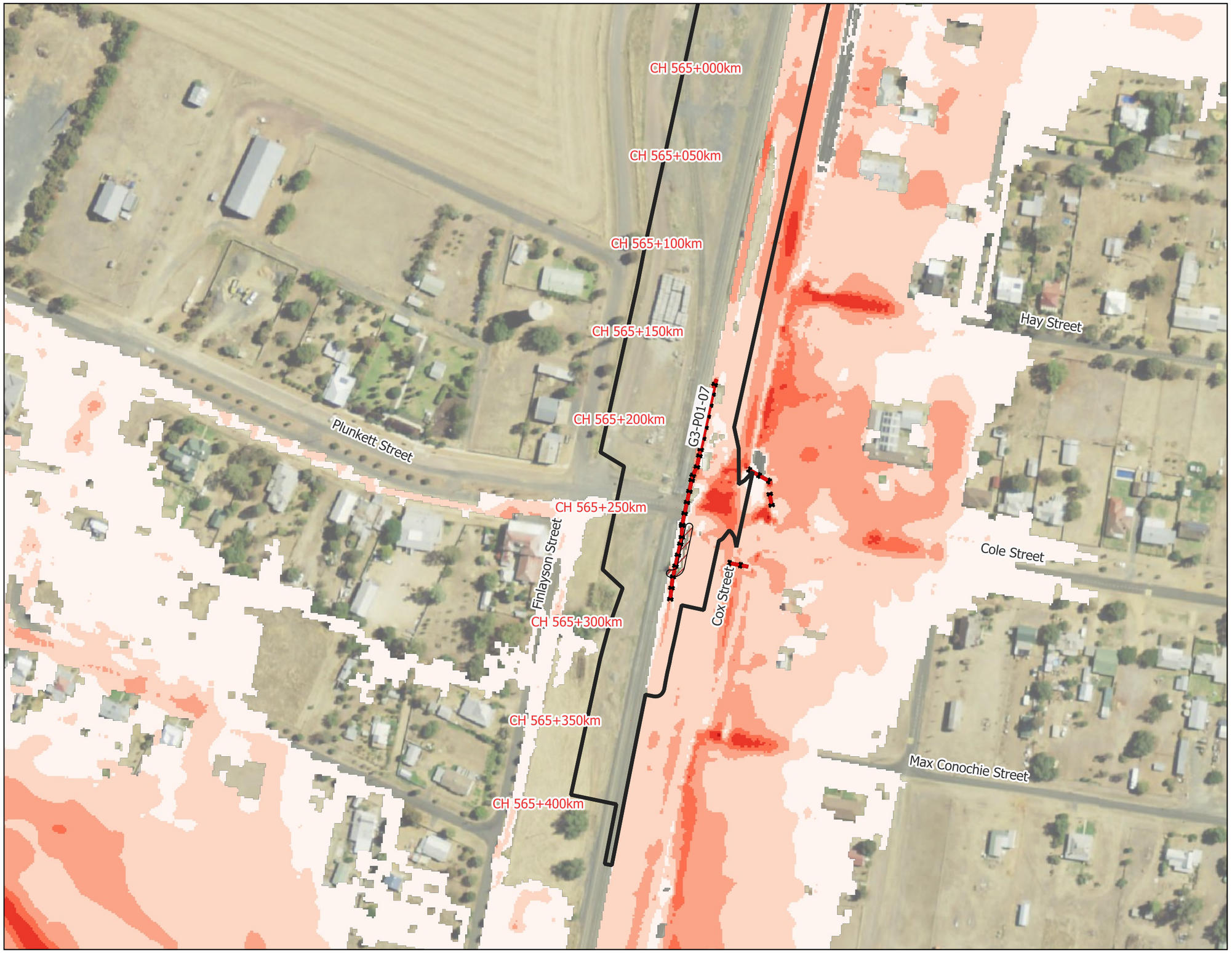
R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

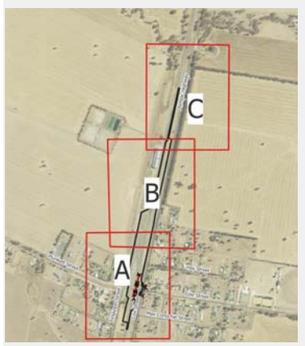
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

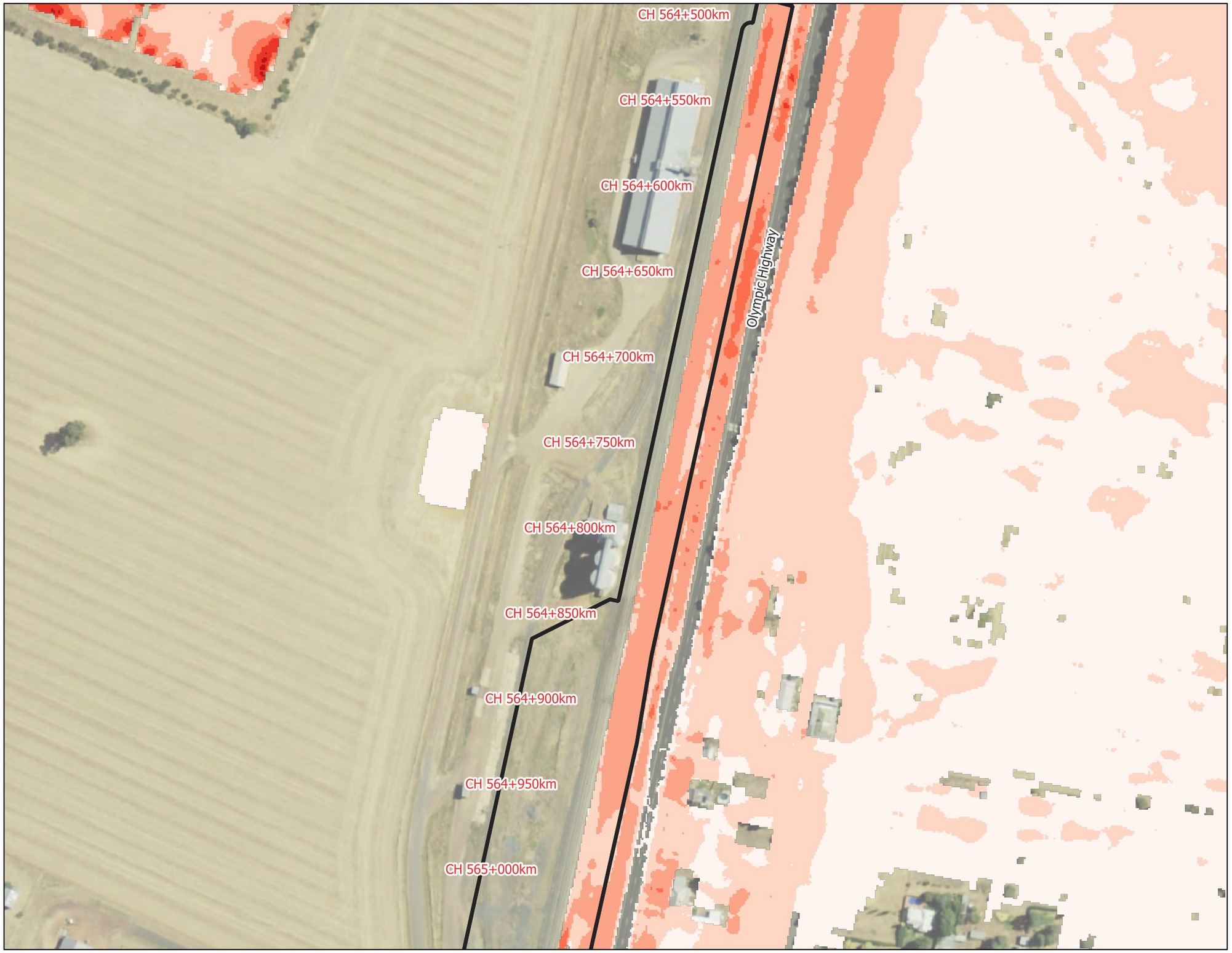
0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 23a - Yerong Creek - IFC Stage

2% AEP Flood Velocity (m/s) - Developed Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

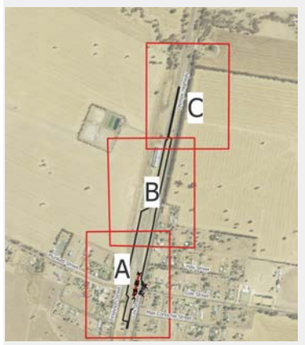
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

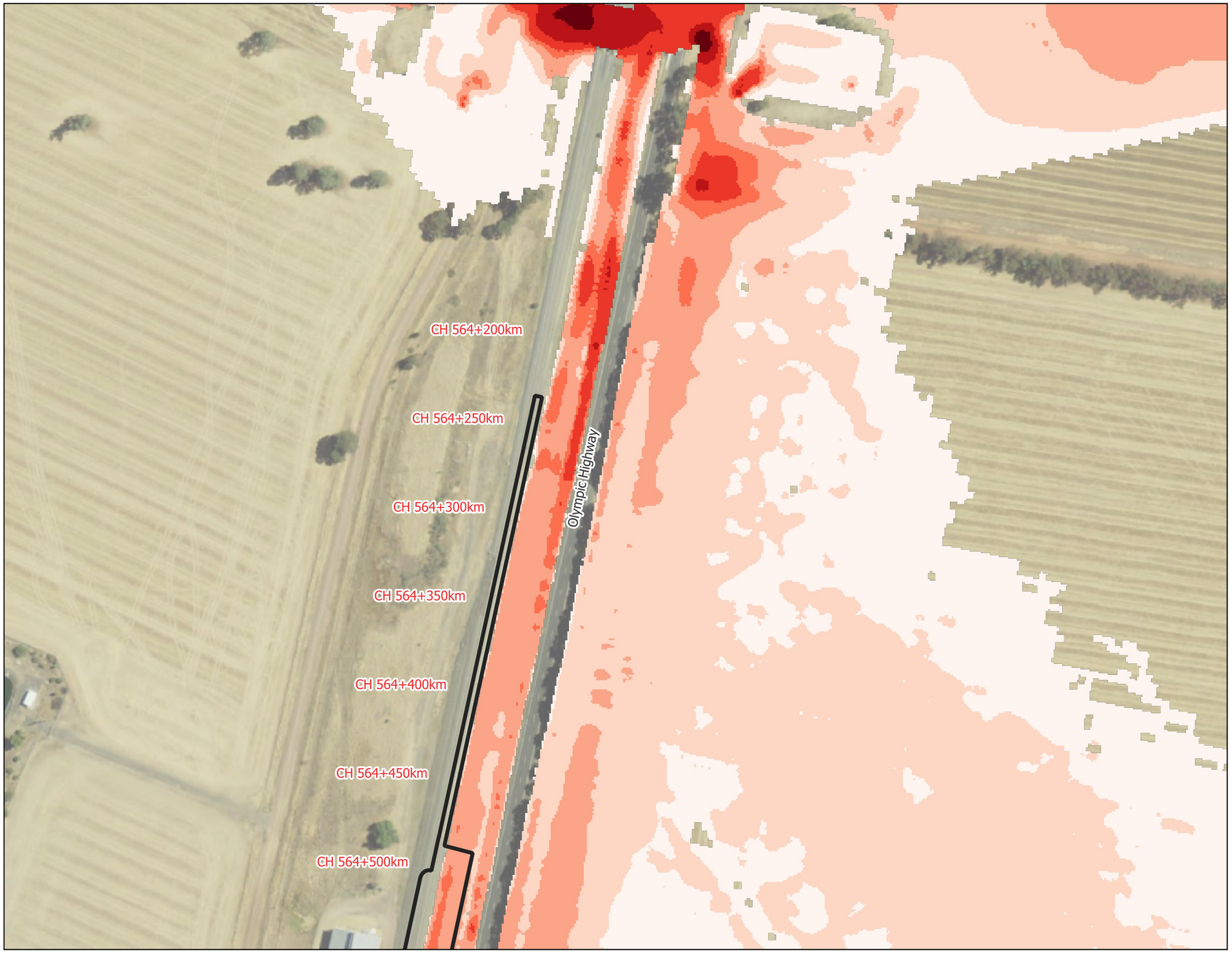
0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 23b - Yerong Creek - IFC Stage

2% AEP Flood Velocity (m/s) - Developed Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

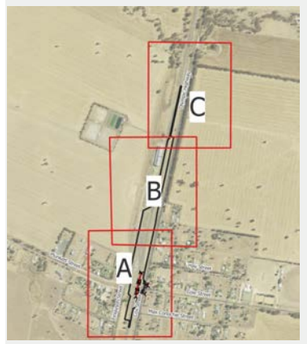
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 23c - Yerong Creek - IFC Stage

2% AEP Flood Velocity (m/s) - Developed Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

MARTINUS

aurecon BG&E

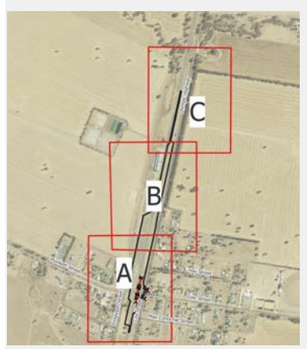
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



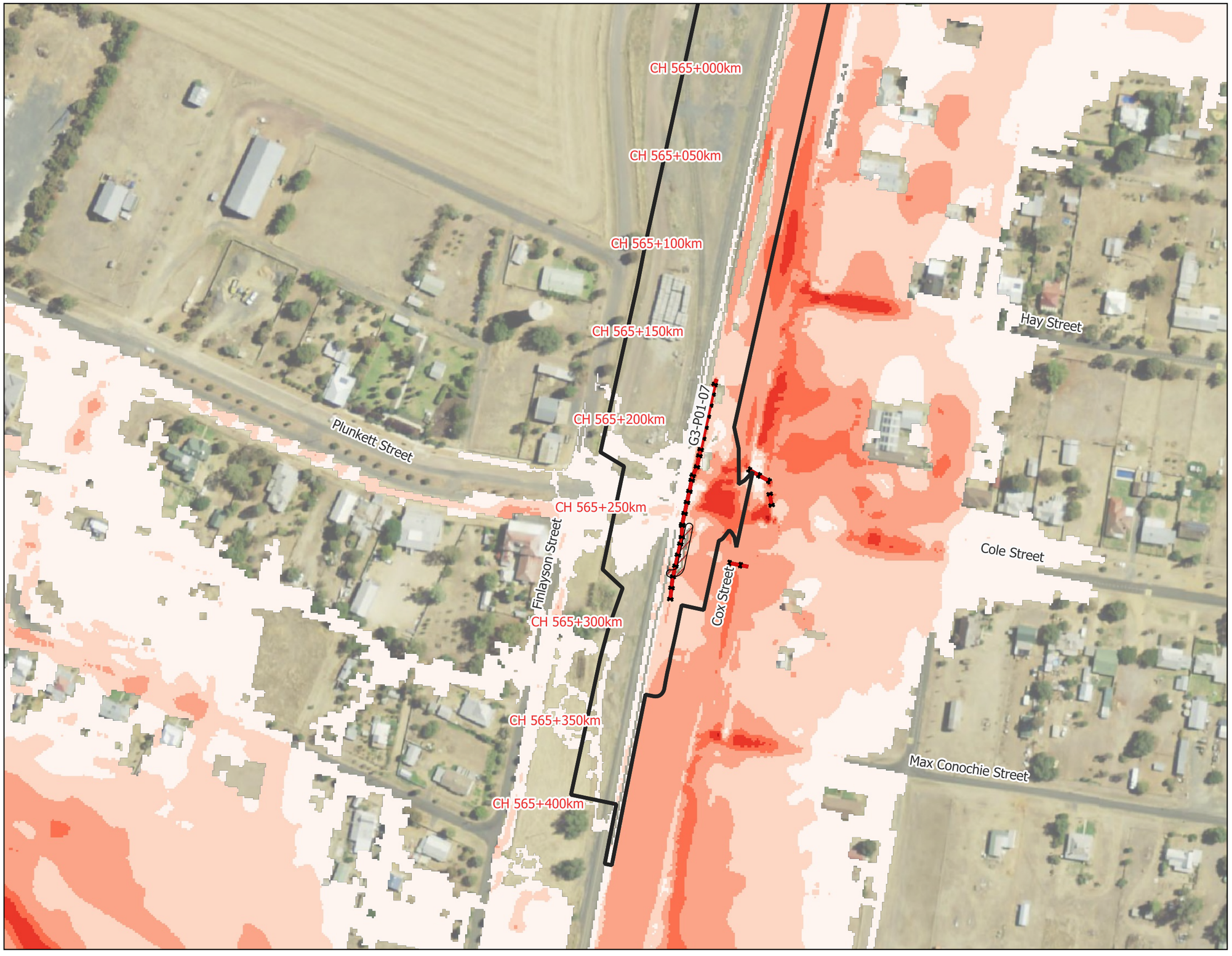
N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 24 - Yerong Creek - IFC Stage

1% AEP Flood Velocity (m/s) - Developed Conditions



MARTINUS

aurecon BG&E

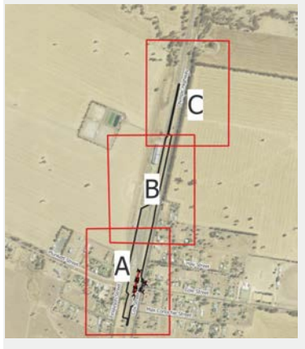
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

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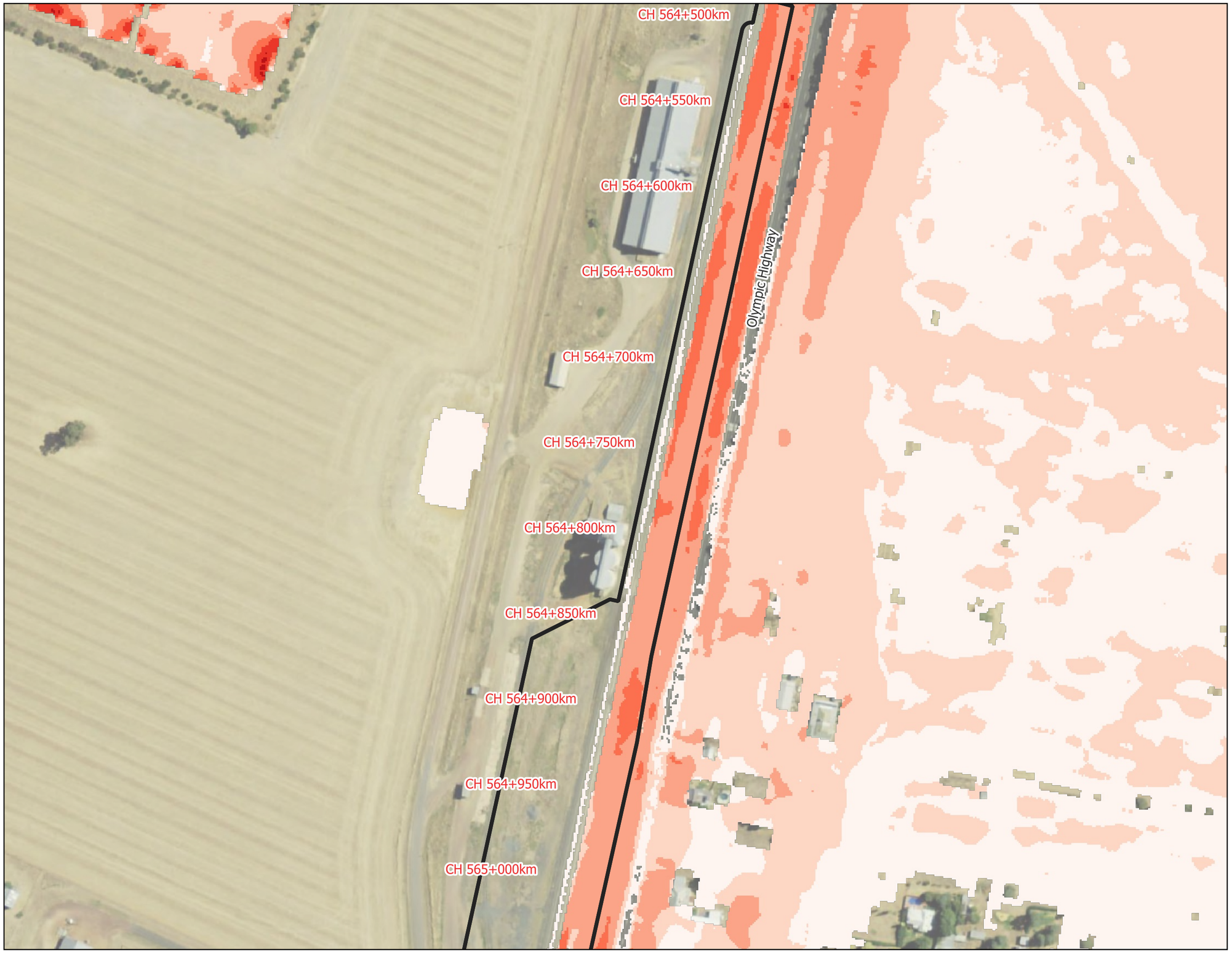
Figure 24a - Yerong Creek - IFC Stage

1% AEP Flood Velocity (m/s) - Developed Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

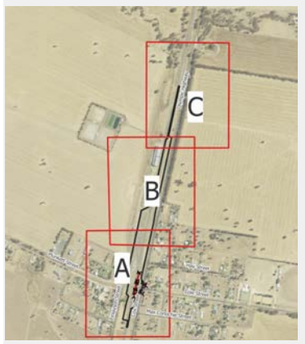
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

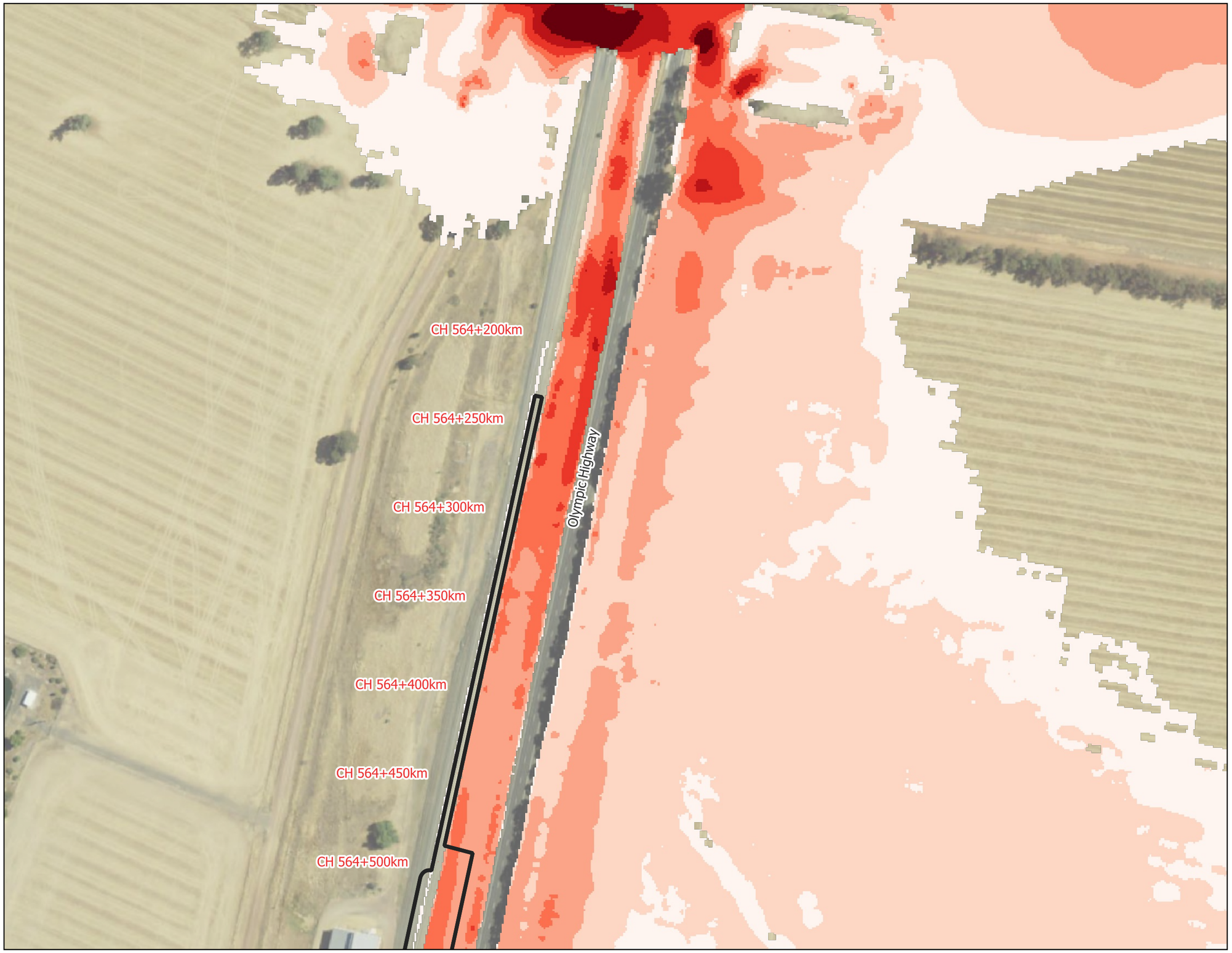
0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 24b - Yerong Creek - IFC Stage

1% AEP Flood Velocity (m/s) - Developed Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

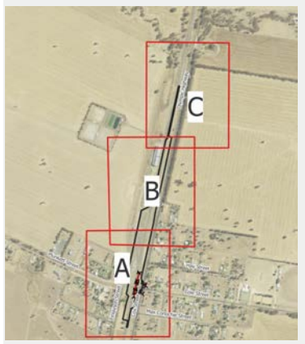
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 24c - Yerong Creek - IFC Stage

1% AEP Flood Velocity (m/s) - Developed Conditions

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MARTINUS

aurecon BG&E

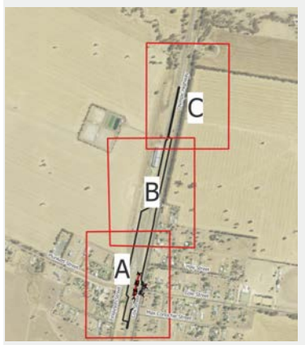
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

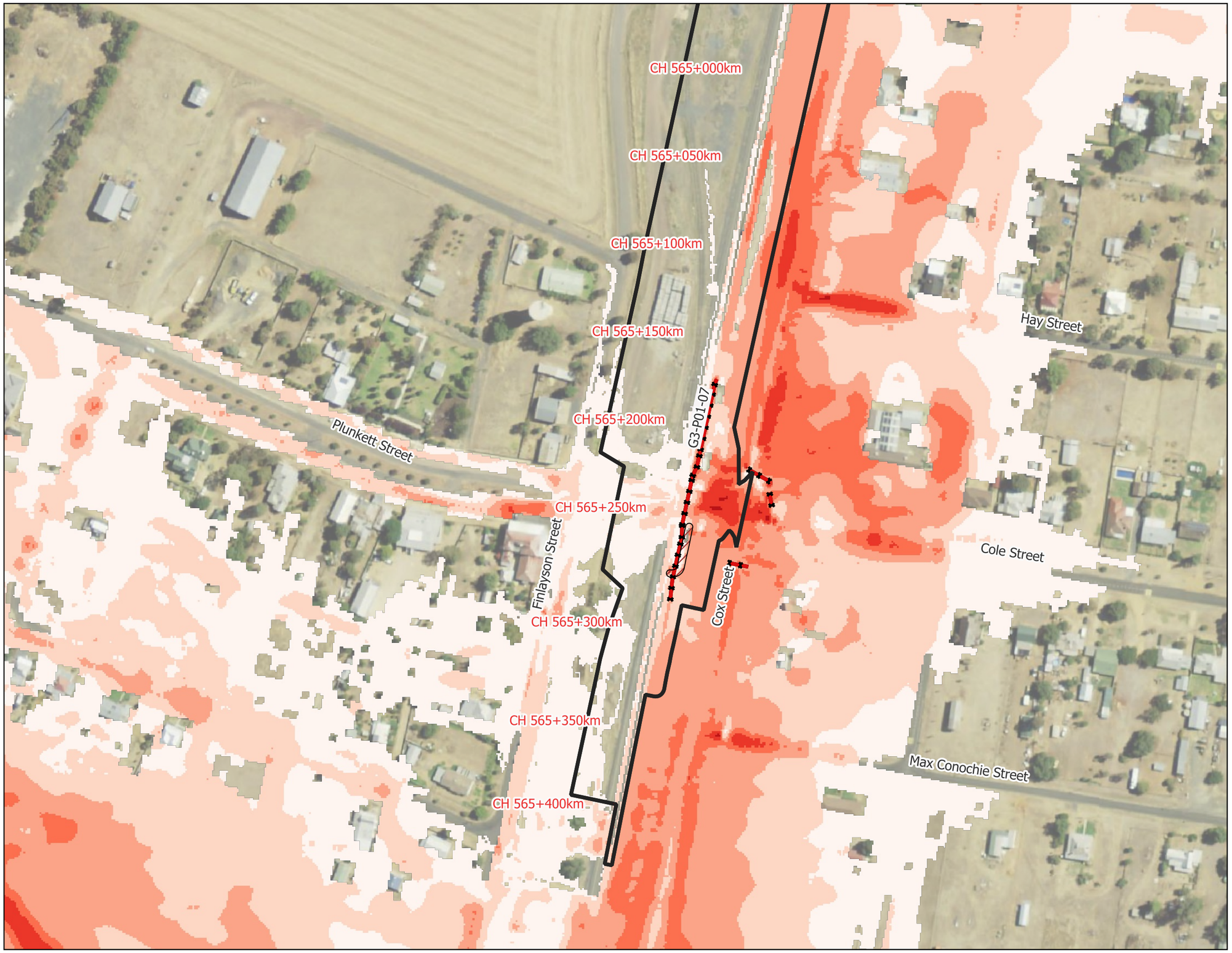
0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 25 - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Velocity (m/s) - Developed Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

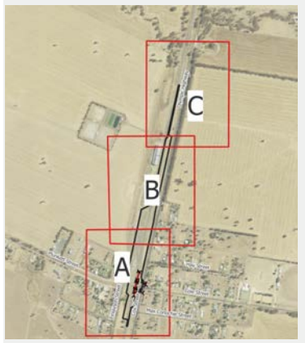
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

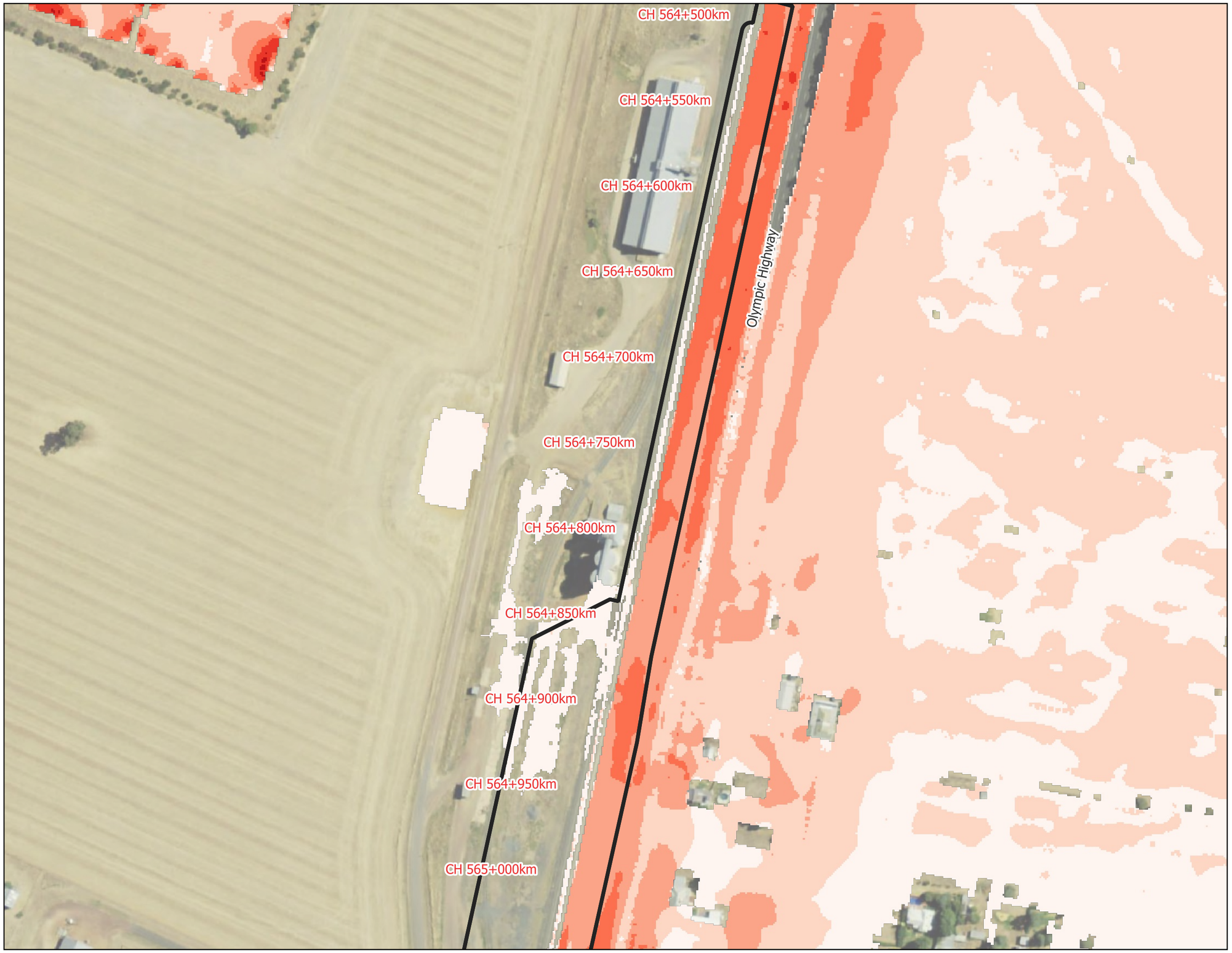
0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 25a - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Velocity (m/s) - Developed Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

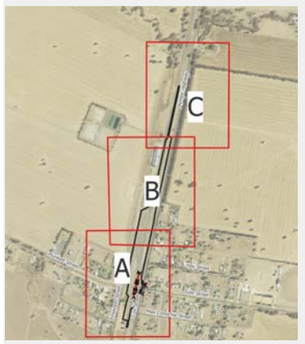
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

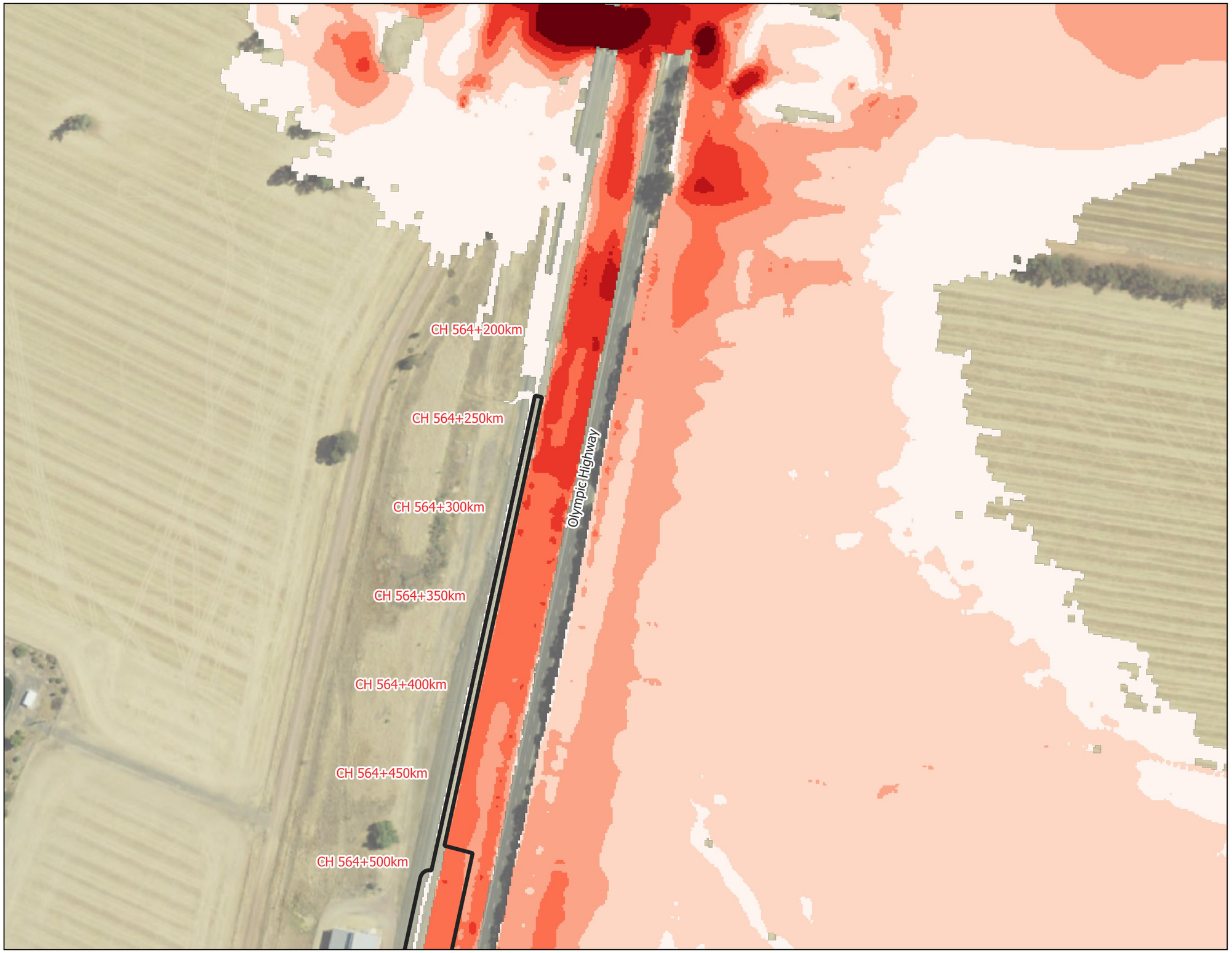
0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 25b - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Velocity (m/s) - Developed Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

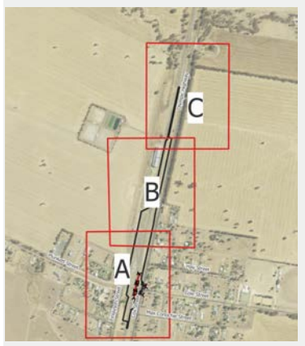
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



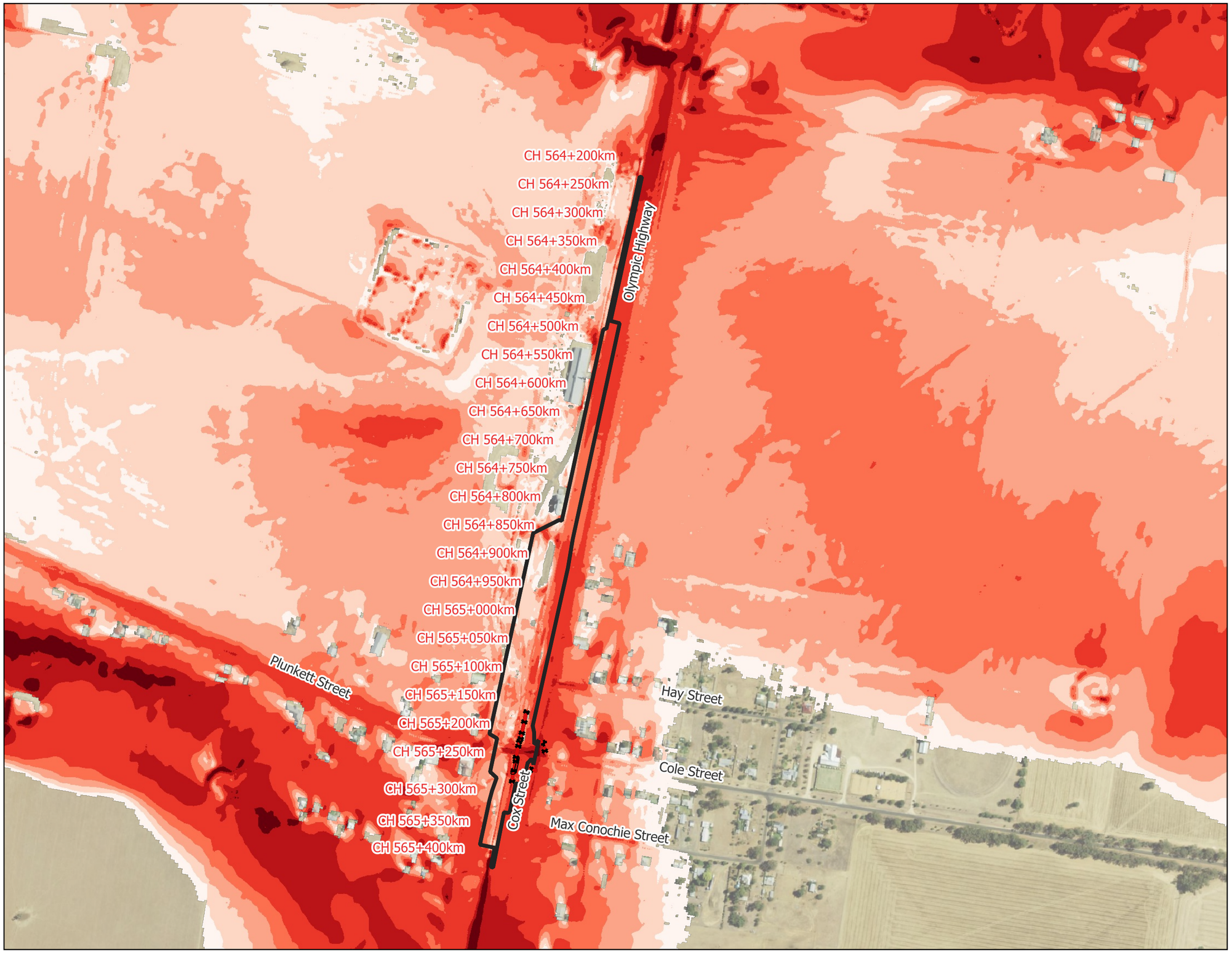
N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 25c - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Velocity (m/s) - Developed Conditions



MARTINUS

aurecon BG&E

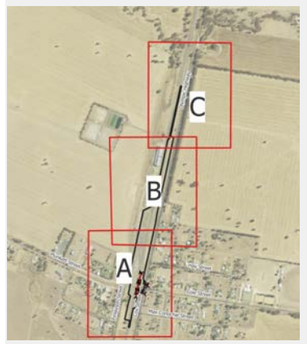
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

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Figure 26 - Yerong Creek - IFC Stage

PMF Flood Velocity (m/s) - Developed Conditions

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CH 565+000km
CH 565+050km
CH 565+100km
CH 565+150km
CH 565+200km
CH 565+250km
CH 565+300km
CH 565+350km
CH 565+400km
Plunkett Street
Finlayson Street
G3-P01-07
Cox Street
Hay Street
Cole Street
Max Conochie Street

MARTINUS
aurecon BG&E

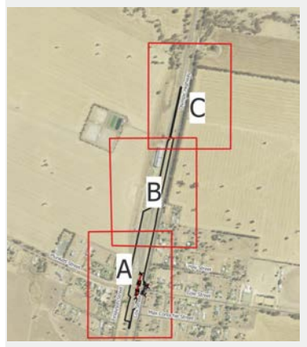
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



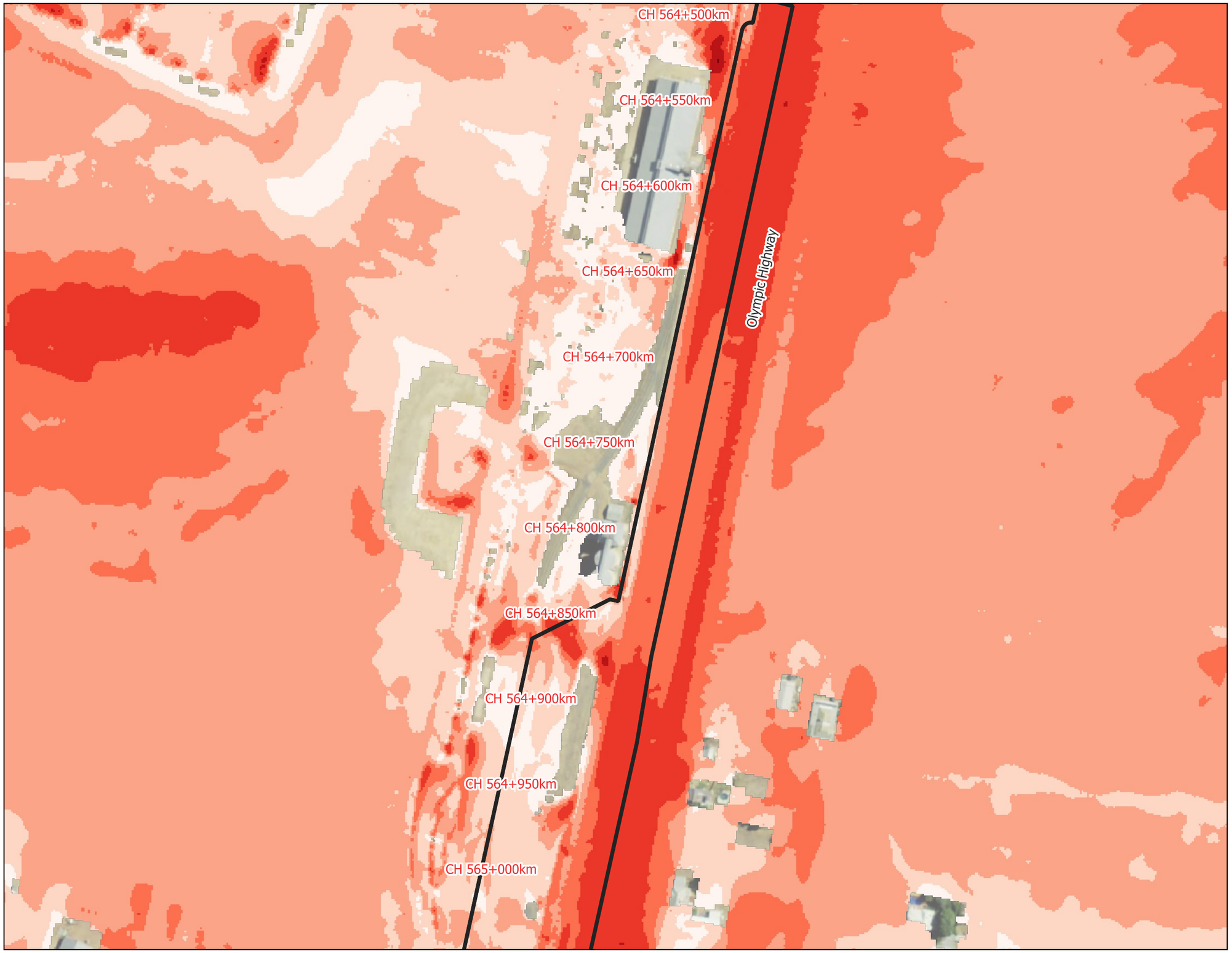
N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 26a - Yerong Creek - IFC Stage

PMF Flood Velocity (m/s) - Developed Conditions



MARTINUS

aurecon BG&E

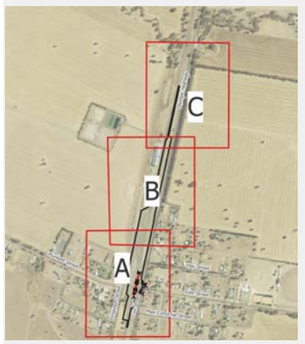
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

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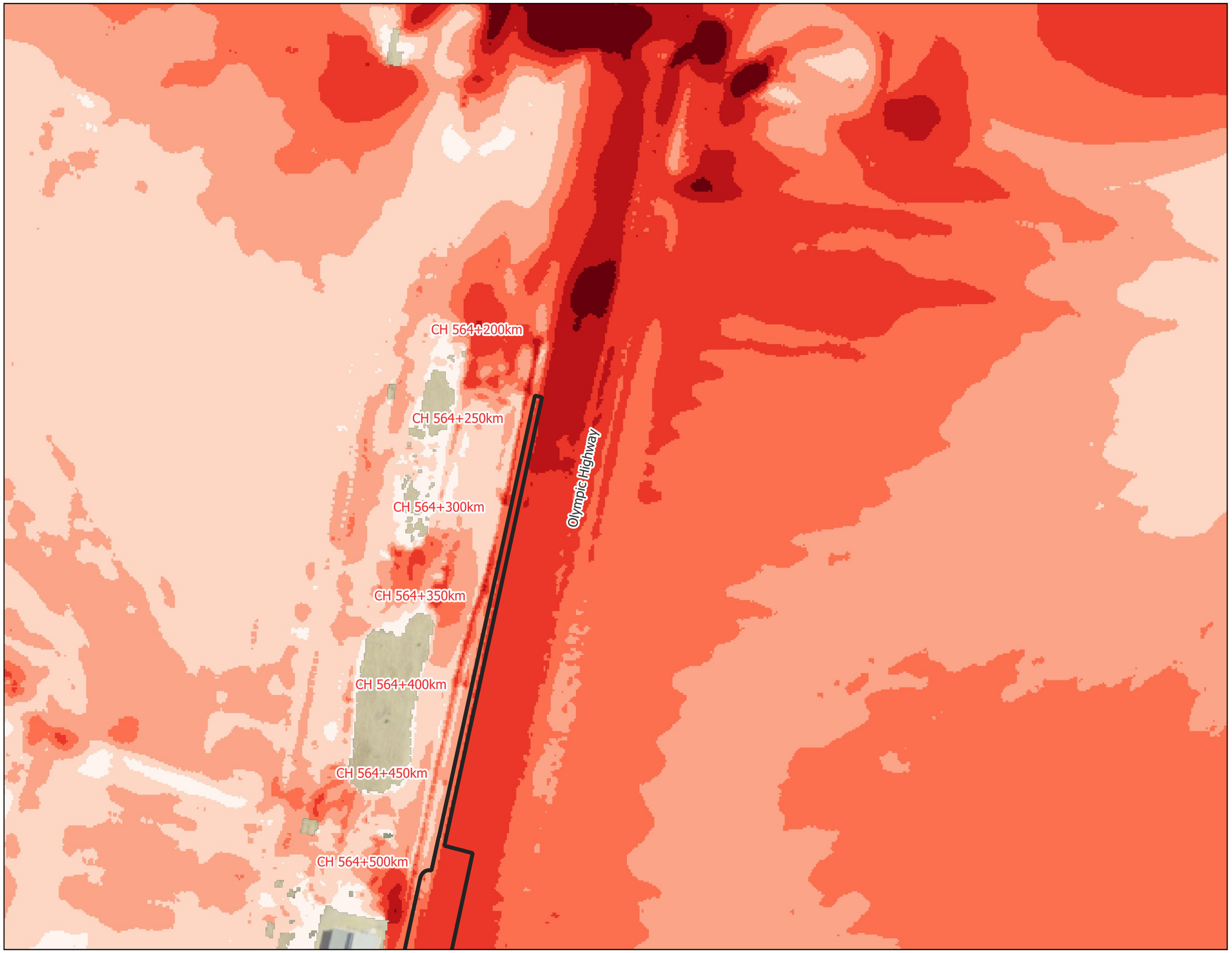
Figure 26b - Yerong Creek - IFC Stage

PMF Flood Velocity (m/s) - Developed Conditions



MARTINUS

aurecon BG&E

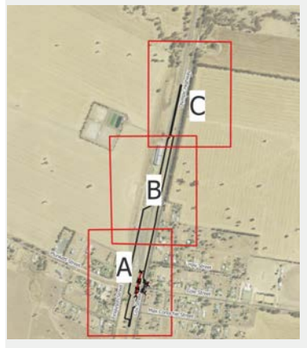
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

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Figure 26c - Yerong Creek - IFC Stage

PMF Flood Velocity (m/s) - Developed Conditions

MARTINUS

aurecon BG&E

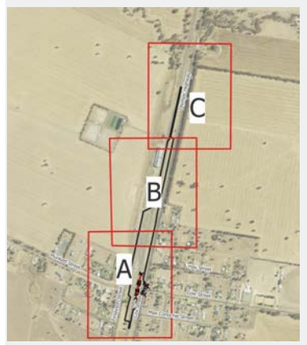
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

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Figure 27 - Yerong Creek - IFC Stage

5% AEP Flood Hazard (ARR2019) - Developed Conditions

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CH 565+000km
CH 565+050km
CH 565+100km
CH 565+150km
CH 565+200km
CH 565+250km
CH 565+300km
CH 565+350km
CH 565+400km
Plunkett Street
Finlayson Street
G3-P01-07
Cox Street
Hay Street
Cole Street
Max Conochie Street

MARTINUS
aurecon BG&E

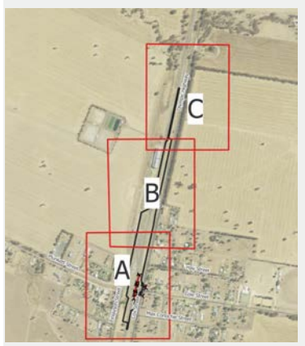
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 27a - Yerong Creek - IFC Stage

5% AEP Flood Hazard (ARR2019) - Developed Conditions

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MARTINUS

aurecon BG&E

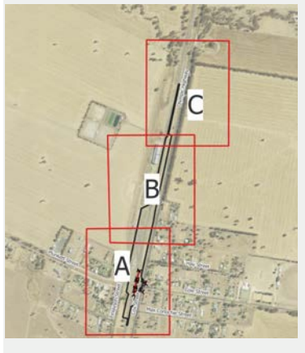
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 27b - Yerong Creek - IFC Stage

5% AEP Flood Hazard (ARR2019) - Developed Conditions

MARTINUS

aurecon BG&E

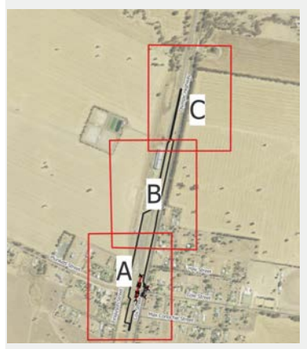
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



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N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 27c - Yerong Creek - IFC Stage

5% AEP Flood Hazard (ARR2019) - Developed Conditions

MARTINUS

aurecon BG&E

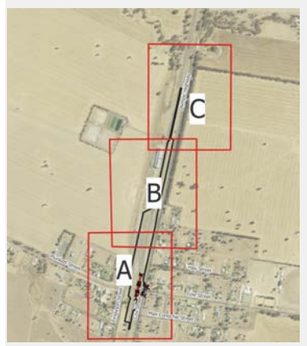
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

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Figure 28 - Yerong Creek - IFC Stage

2% AEP Flood Hazard (ARR2019) - Developed Conditions

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MARTINUS

aurecon BG&E

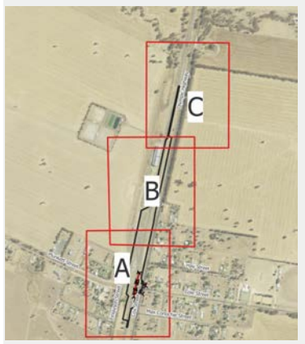
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 28a - Yerong Creek - IFC Stage

2% AEP Flood Hazard (ARR2019) - Developed Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

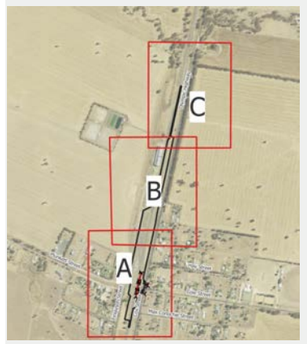
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 28b - Yerong Creek - IFC Stage

2% AEP Flood Hazard (ARR2019) - Developed Conditions

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MARTINUS

aurecon BG&E

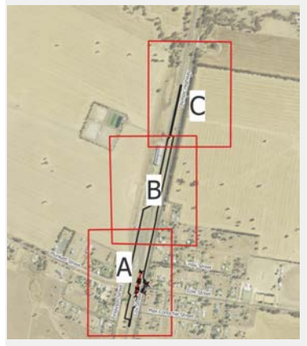
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 28c - Yerong Creek - IFC Stage

2% AEP Flood Hazard (ARR2019) - Developed Conditions

MARTINUS

aurecon BG&E

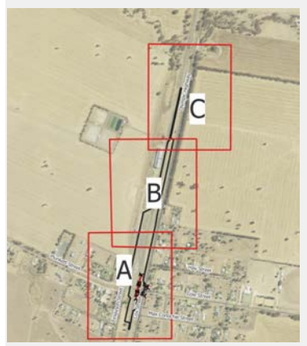
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

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Figure 29 - Yerong Creek - IFC Stage

1% AEP Flood Hazard (ARR2019) - Developed Conditions

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MARTINUS

aurecon BG&E

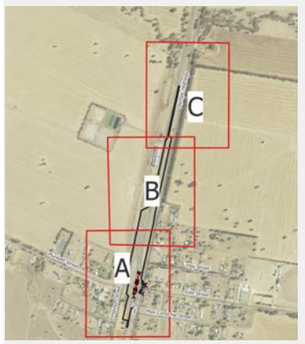
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 29a - Yerong Creek - IFC Stage

1% AEP Flood Hazard (ARR2019) - Developed Conditions

MARTINUS

aurecon BG&E

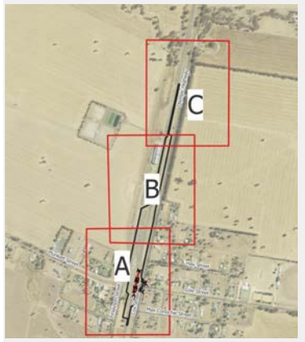
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 29b - Yerong Creek - IFC Stage

1% AEP Flood Hazard (ARR2019) - Developed Conditions

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

MARTINUS

aurecon BG&E

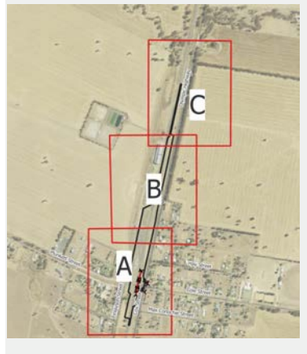
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 29c - Yerong Creek - IFC Stage

1% AEP Flood Hazard (ARR2019) - Developed Conditions

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MARTINUS

aurecon BG&E

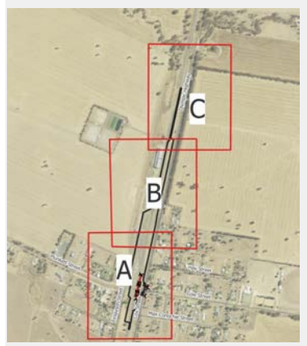
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 30 - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Hazard (ARR2019) - Developed Conditions

MARTINUS

aurecon BG&E

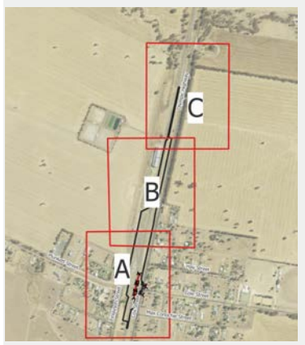
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

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Figure 30a - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Hazard (ARR2019) - Developed Conditions

MARTINUS

aurecon BG&E

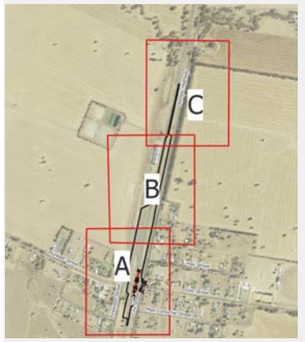
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



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N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 30b - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Hazard (ARR2019) - Developed Conditions

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MARTINUS

aurecon BG&E

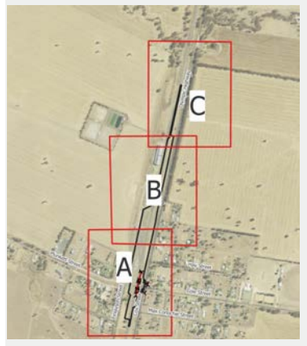
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 30c - Yerong Creek - IFC Stage

1% AEP Climate Change Flood Hazard (ARR2019) - Developed Conditions

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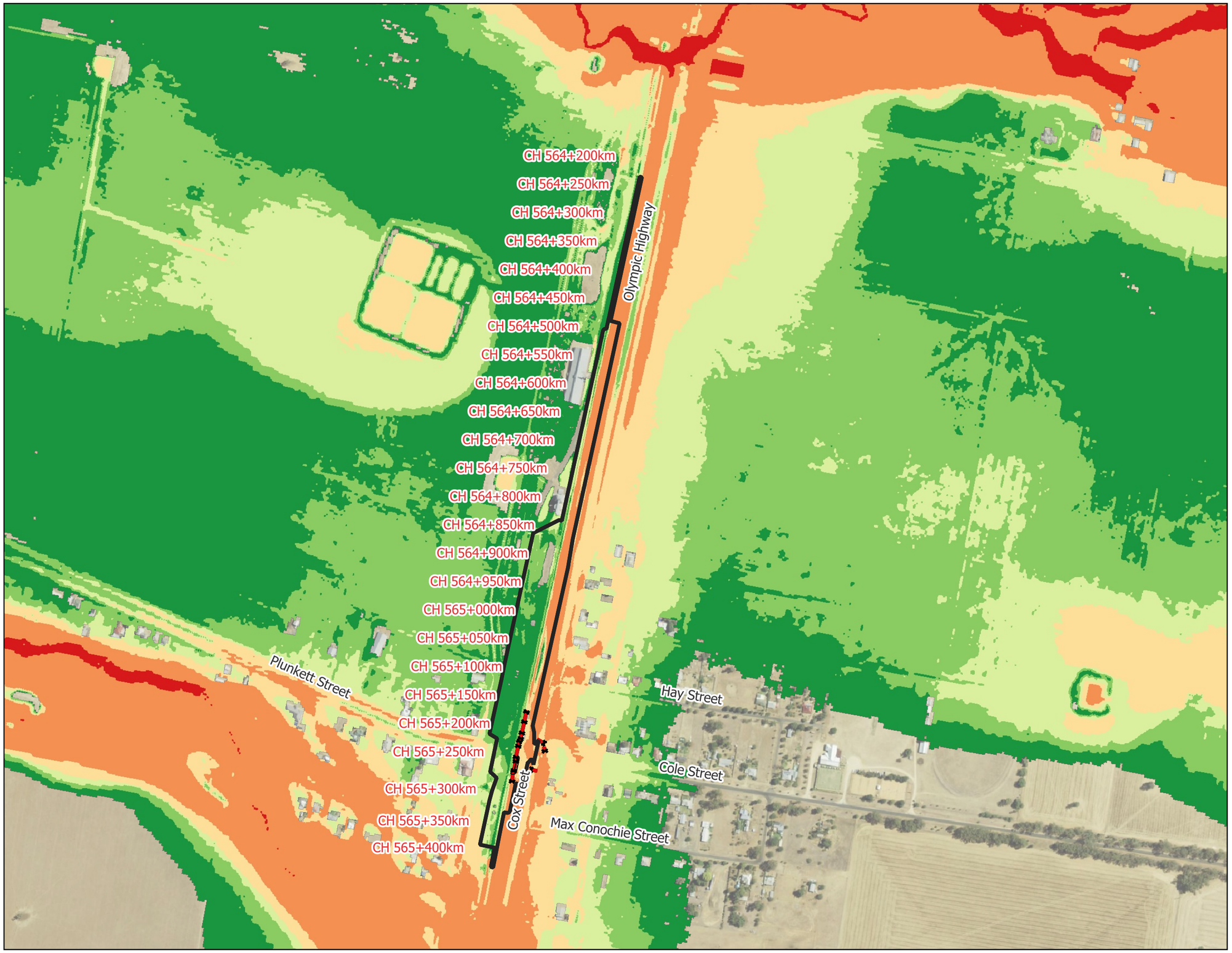


MARTINUS

aurecon BG&E

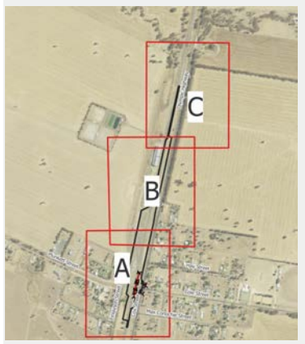
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 31 - Yerong Creek - IFC Stage

PMF Flood Hazard (ARR2019) - Developed Conditions

MARTINUS

aurecon BG&E

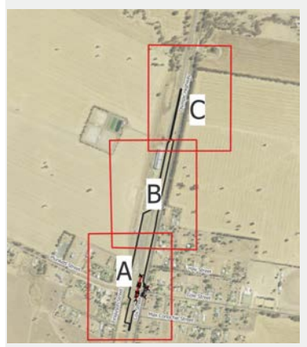
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



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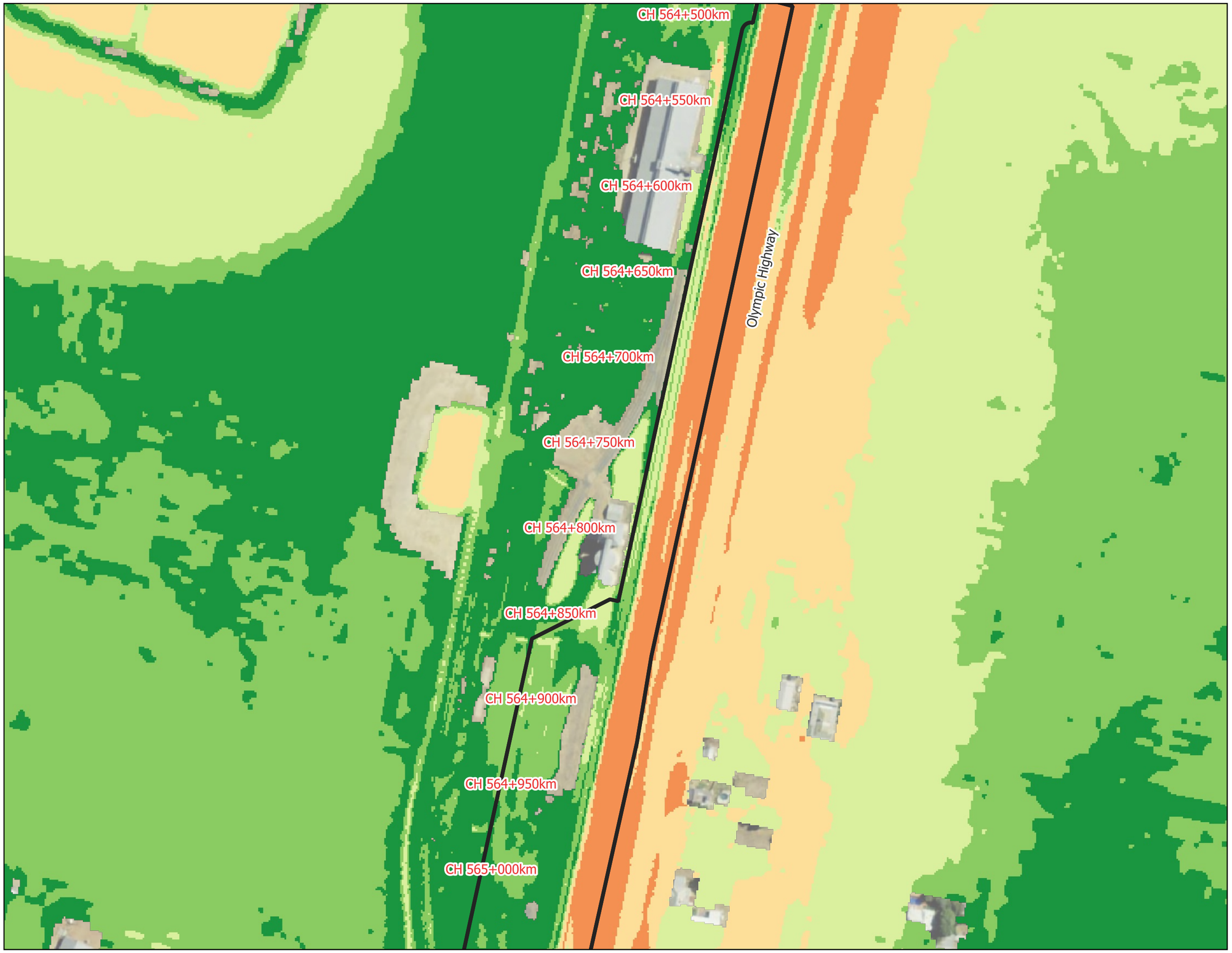
N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 31a - Yerong Creek - IFC Stage

PMF Flood Hazard (ARR2019) - Developed Conditions



MARTINUS

aurecon BG&E

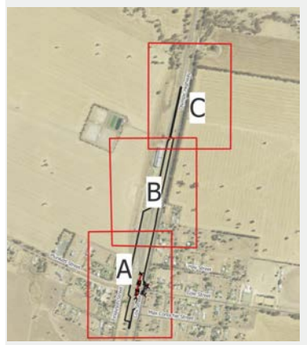
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

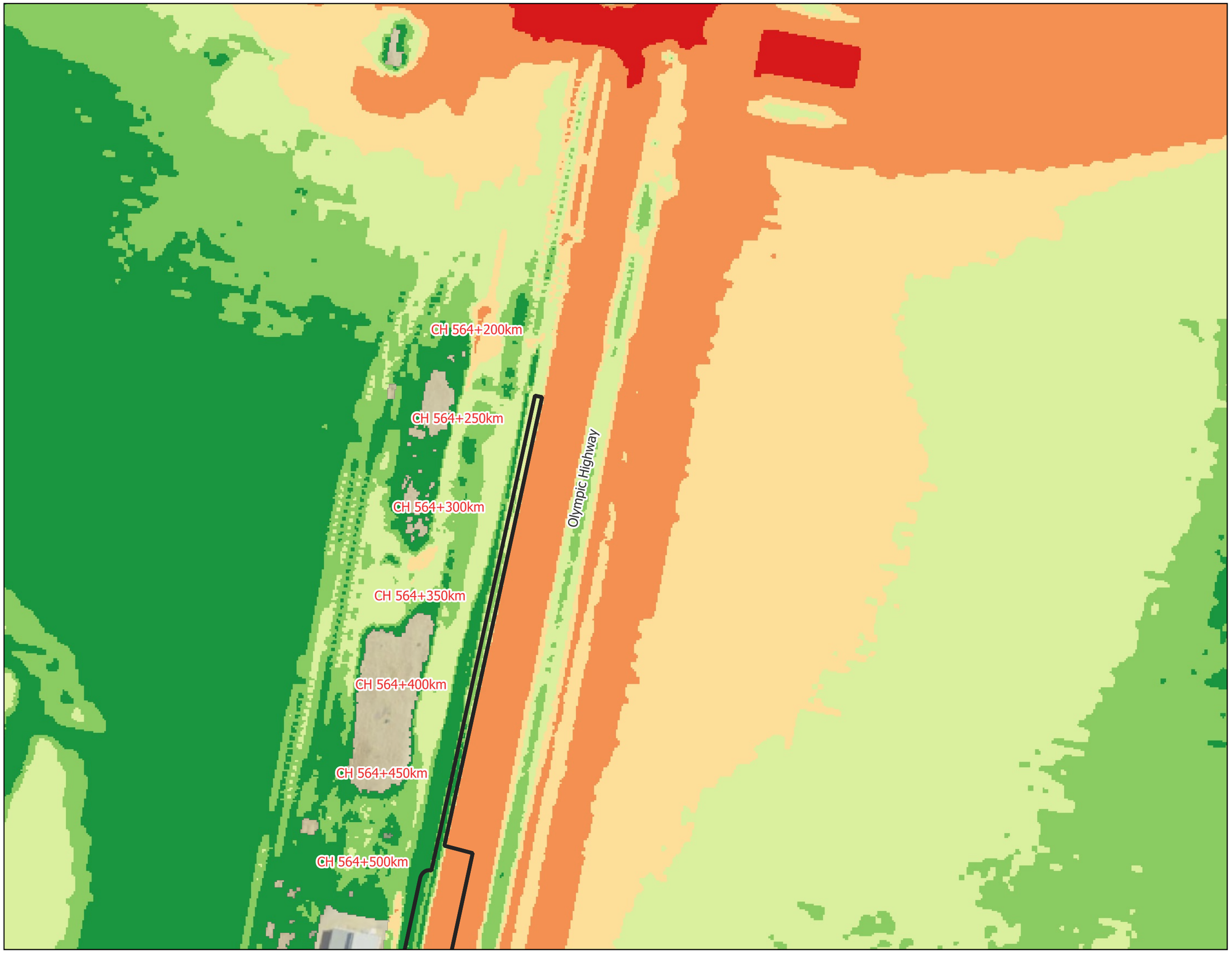
0 80 160 m

21/8/2025 GDA2020 MGA Zone55

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

Figure 31b - Yerong Creek - IFC Stage

PMF Flood Hazard (ARR2019) - Developed Conditions



MARTINUS

aurecon BG&E

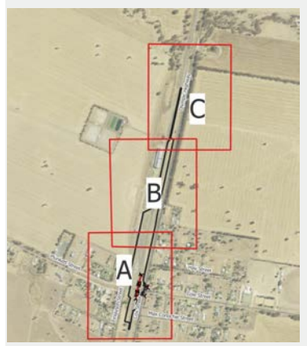
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 31c - Yerong Creek - IFC Stage

PMF Flood Hazard (ARR2019) - Developed Conditions

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MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

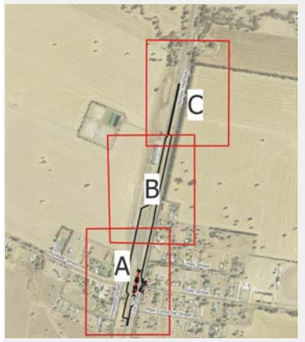
Water Level Difference (m)

- <= -0.2
- -0.2 - -0.1
- -0.1 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- > 0.2

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



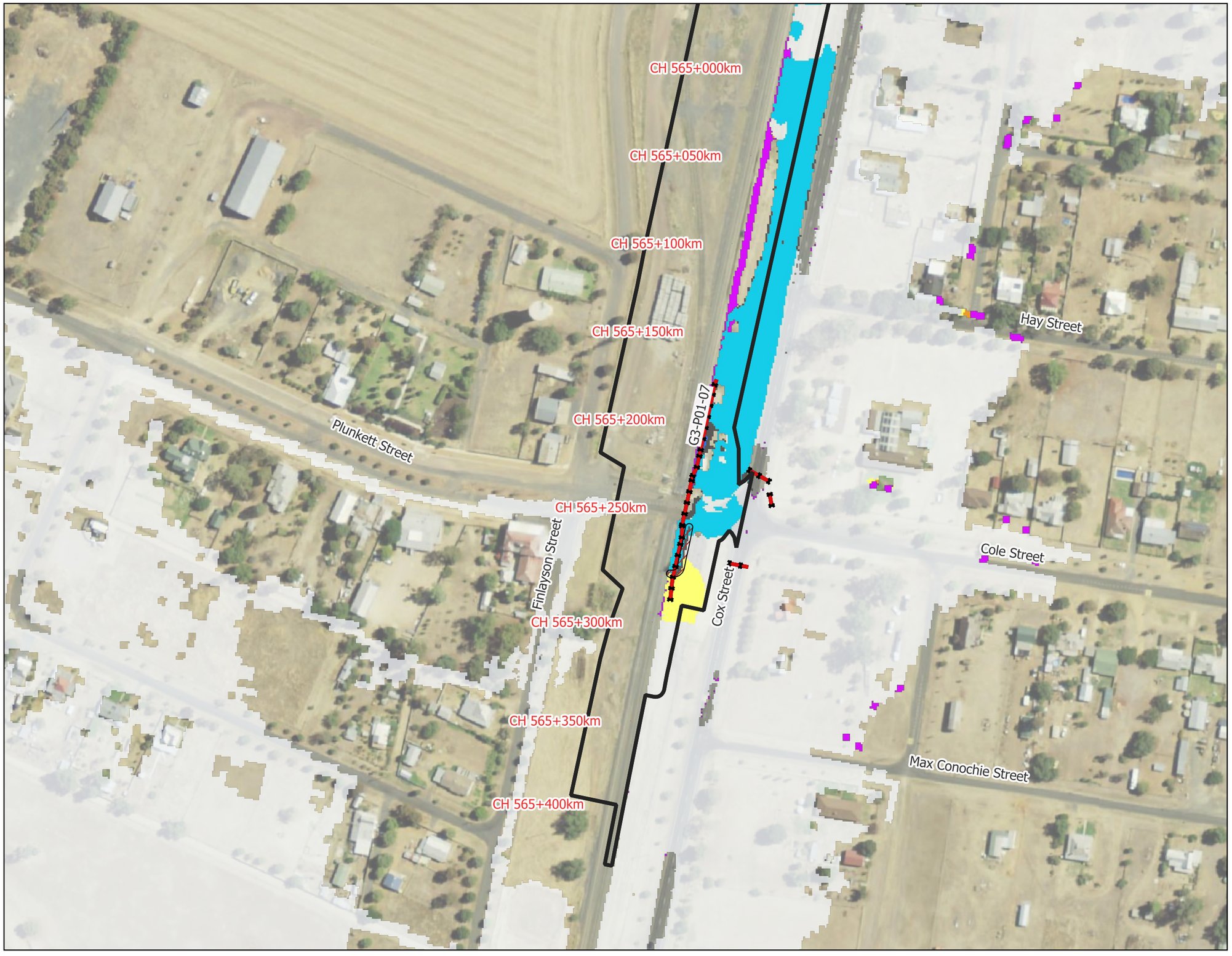
N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 32 - Yerong Creek - IFC Stage

5% AEP Changes in Flood Levels (m) - Developed Less Existing



MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

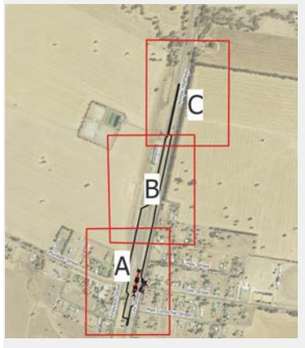
Water Level Difference (m)

- <= -0.2
- -0.2 - -0.1
- -0.1 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- > 0.2

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 32a - Yerong Creek - IFC Stage

5% AEP Changes in Flood Levels (m) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

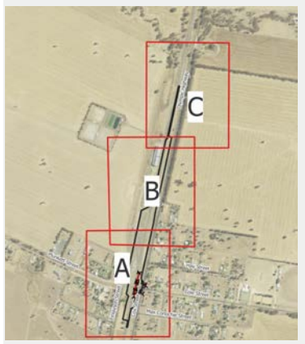
Water Level Difference (m)

- <= -0.2
- -0.2 - -0.1
- -0.1 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- > 0.2

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

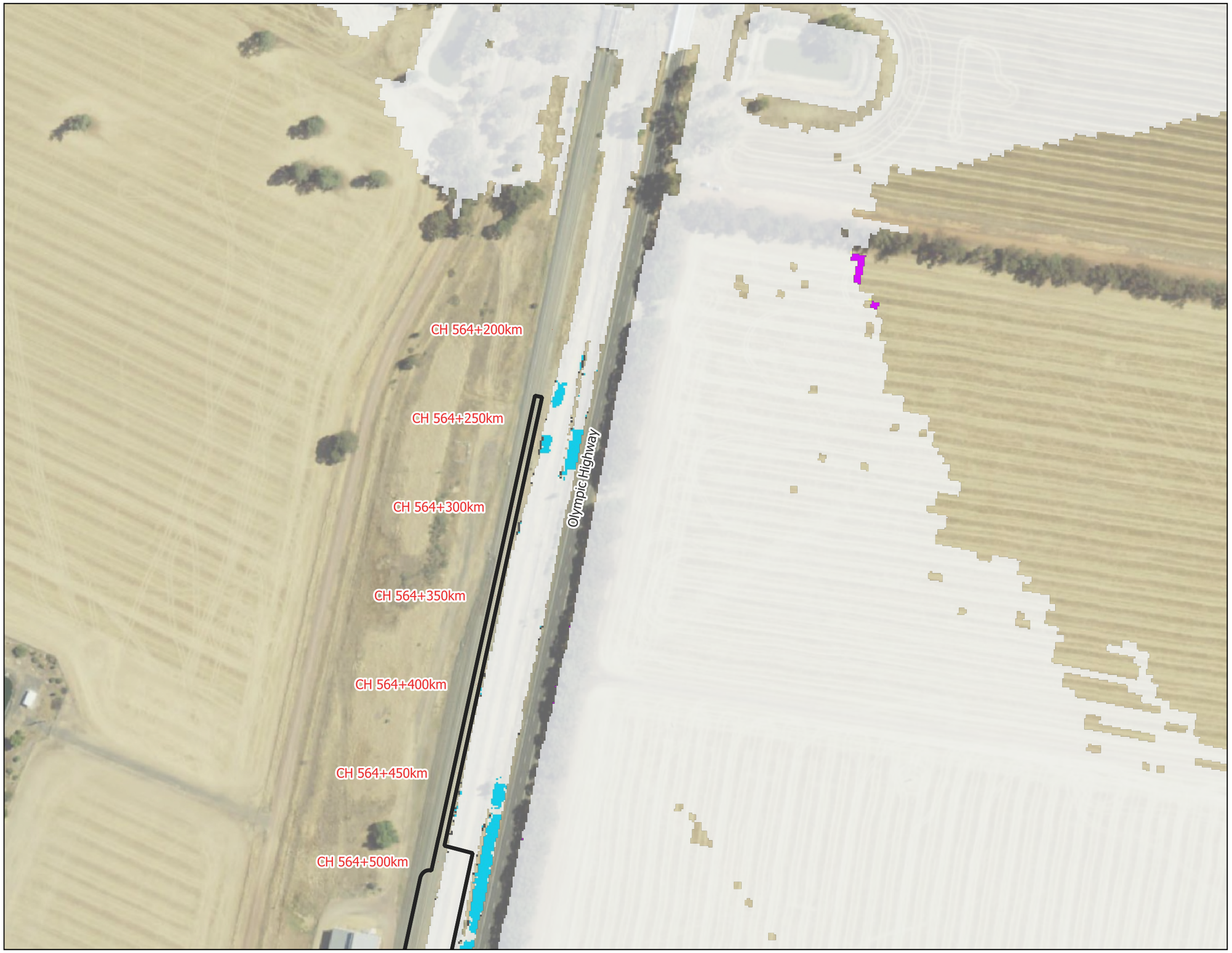
0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 32b - Yerong Creek - IFC Stage

5% AEP Changes in Flood Levels (m) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

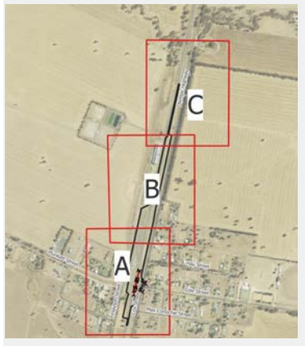
Water Level Difference (m)

- <= -0.2
- -0.2 - -0.1
- -0.1 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- > 0.2

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 32c - Yerong Creek - IFC Stage

5% AEP Changes in Flood Levels (m) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

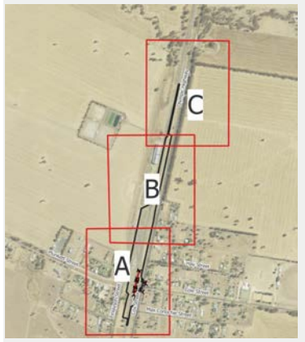
Water Level Difference (m)

- <= -0.2
- -0.2 - -0.1
- -0.1 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- > 0.2

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

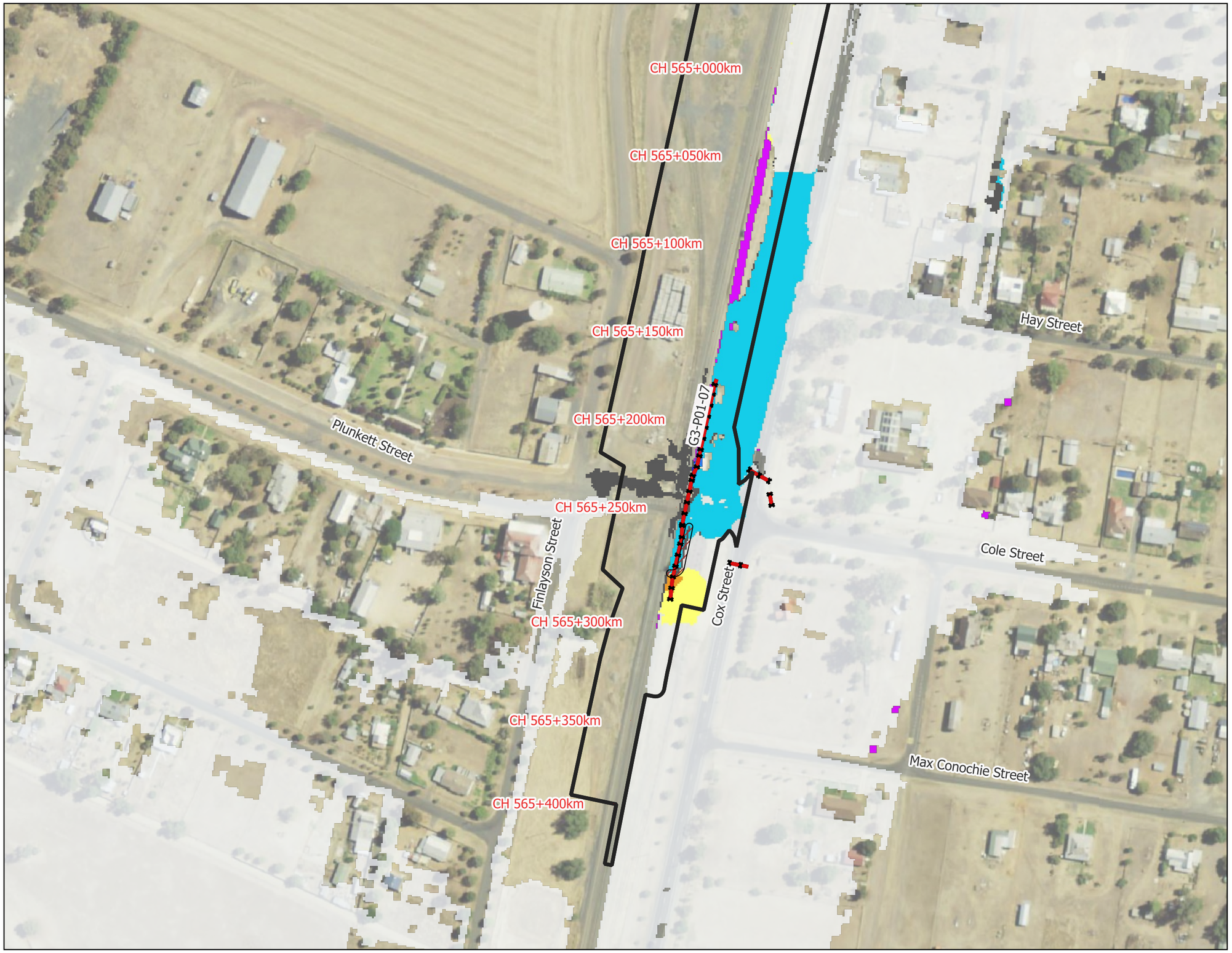
0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 33 - Yerong Creek - IFC Stage

2% AEP Changes in Flood Levels (m) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

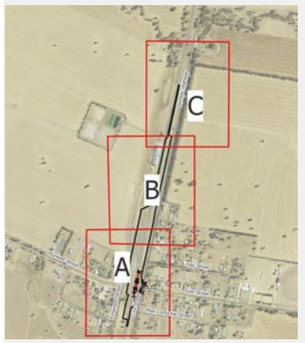
Water Level Difference (m)

- <= -0.2
- -0.2 - -0.1
- -0.1 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- > 0.2

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 33a - Yerong Creek - IFC Stage

2% AEP Changes in Flood Levels (m) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

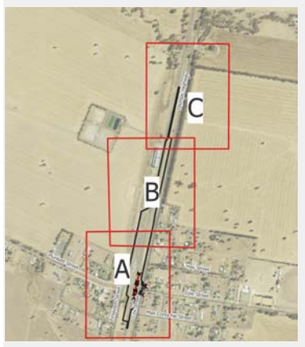
Water Level Difference (m)

- <= -0.2
- -0.2 - -0.1
- -0.1 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- > 0.2

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

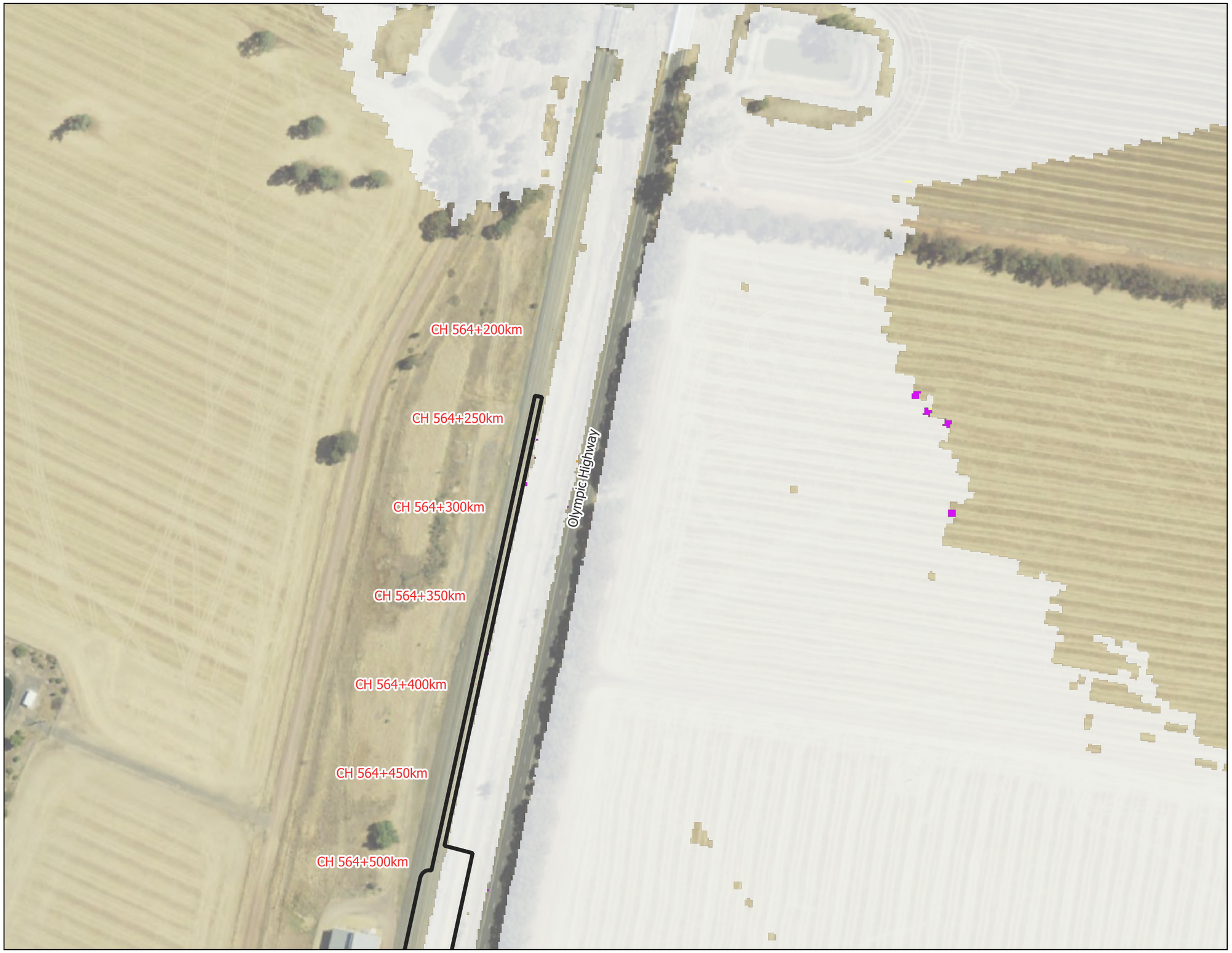
0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 33b - Yerong Creek - IFC Stage

2% AEP Changes in Flood Levels (m) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

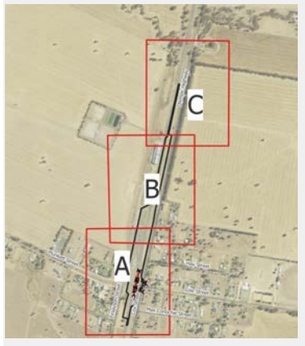
Water Level Difference (m)

- <= -0.2
- -0.2 - -0.1
- -0.1 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- > 0.2

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 33c - Yerong Creek - IFC Stage

2% AEP Changes in Flood Levels (m) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

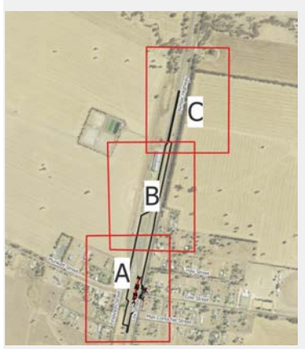
Water Level Difference (m)

- <= -0.2
- -0.2 - -0.1
- -0.1 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- > 0.2

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 34 - Yerong Creek - IFC Stage

1% AEP Changes in Flood Levels (m) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

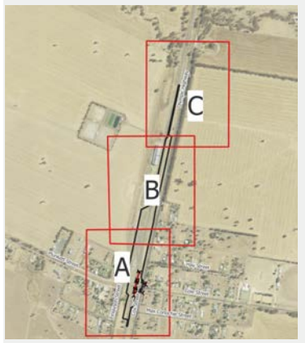
Water Level Difference (m)

- <= -0.2
- -0.2 - -0.1
- -0.1 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- > 0.2

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 34a - Yerong Creek - IFC Stage

1% AEP Changes in Flood Levels (m) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

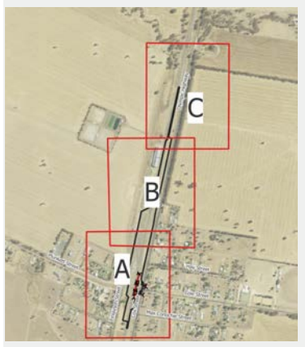
Water Level Difference (m)

- <= -0.2
- -0.2 - -0.1
- -0.1 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- > 0.2

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

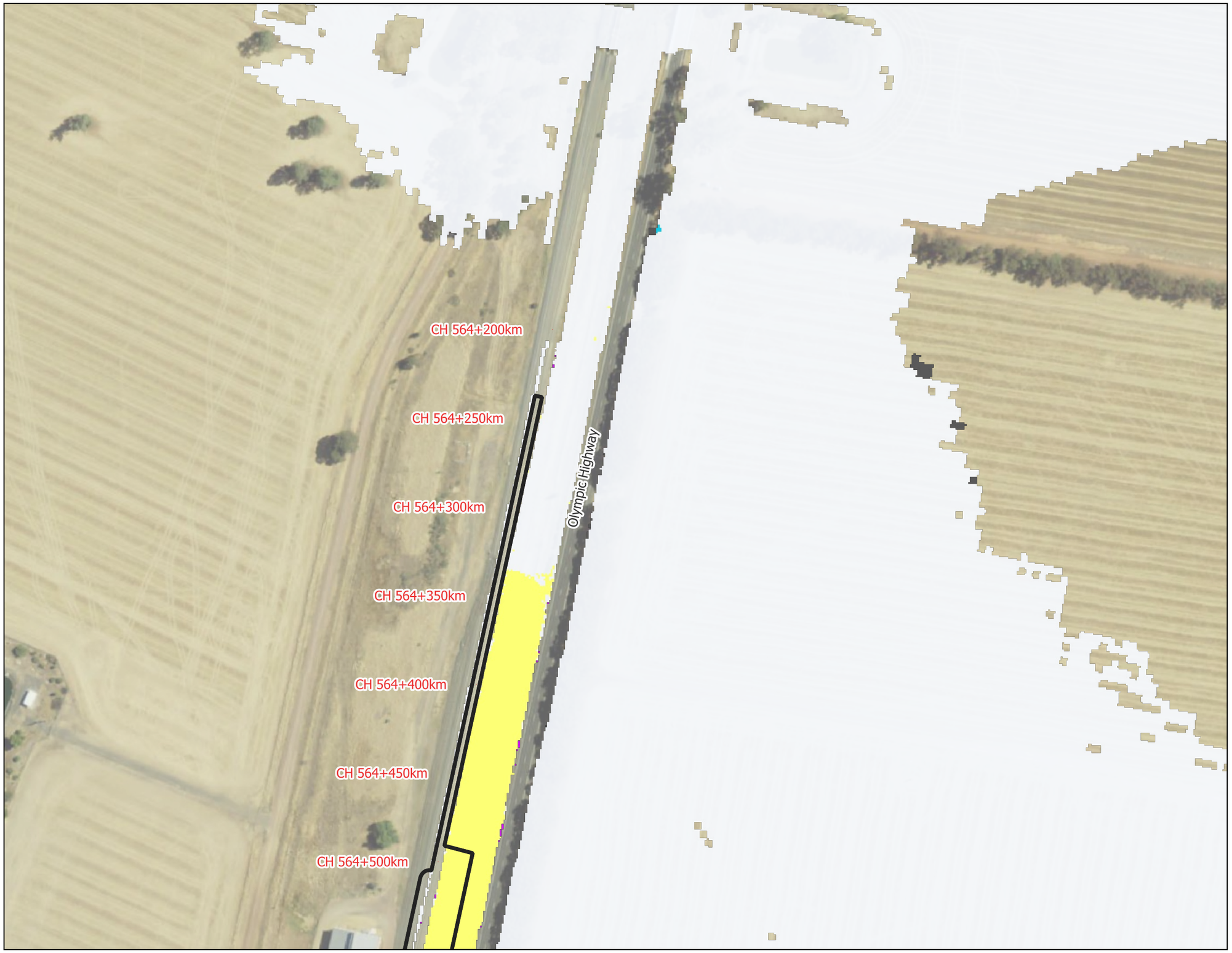
0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 34b - Yerong Creek - IFC Stage

1% AEP Changes in Flood Levels (m) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

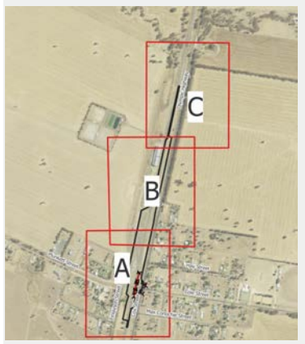
Water Level Difference (m)

- <= -0.2
- -0.2 - -0.1
- -0.1 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- > 0.2

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

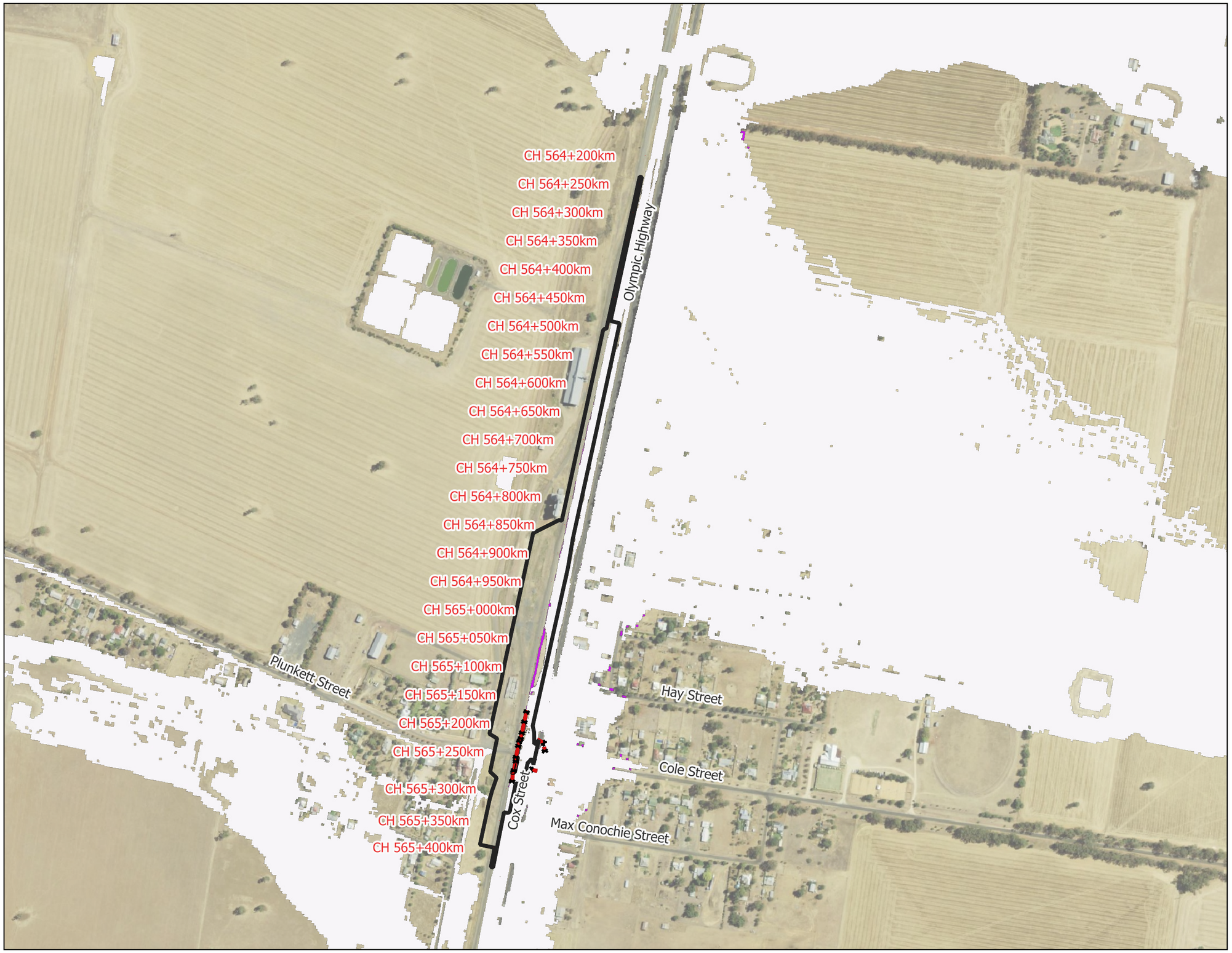
0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 34c - Yerong Creek - IFC Stage

1% AEP Changes in Flood Levels (m) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

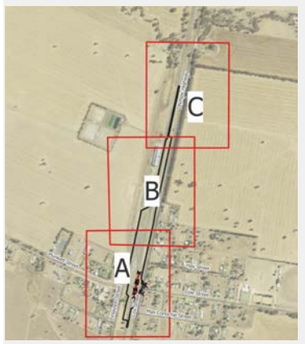
Change in Velocity (m/s)

- <= 0.5
- > 0.5

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 35 - Yerong Creek - IFC Stage

5% AEP Changes in Flood Velocity (m/s) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

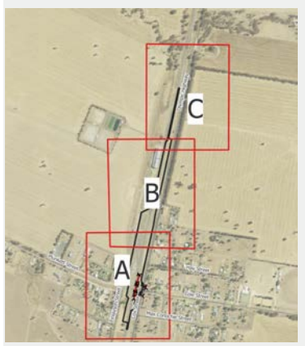
Change in Velocity (m/s)

- <= 0.5
- > 0.5

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 35a - Yerong Creek - IFC Stage

5% AEP Changes in Flood Velocity (m/s) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

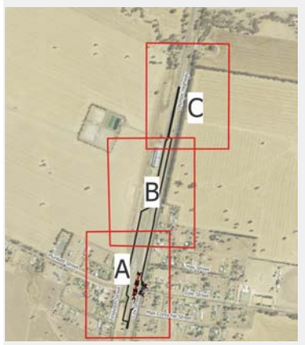
Change in Velocity (m/s)

- <= 0.5
- > 0.5

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

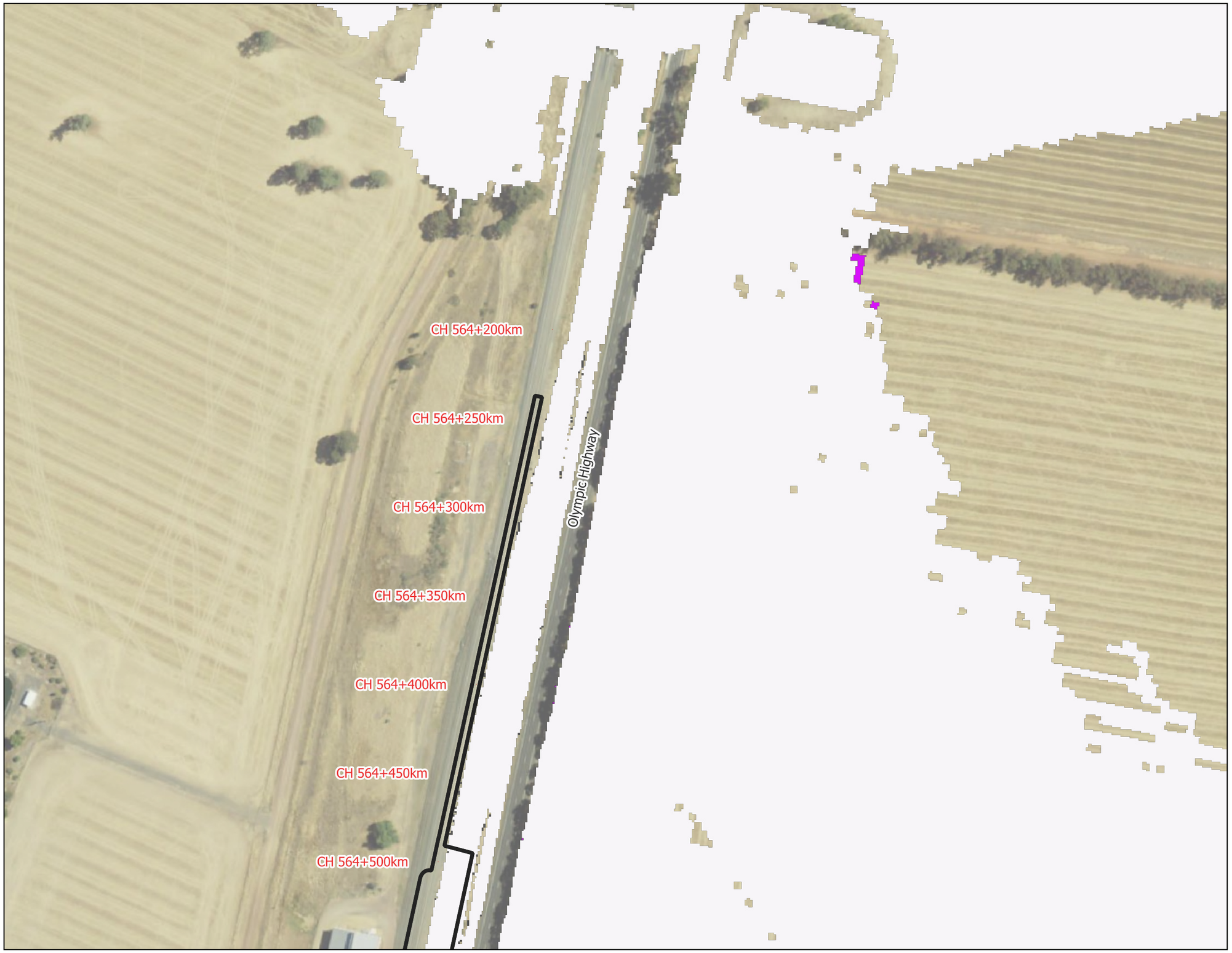
0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 35b - Yerong Creek - IFC Stage

5% AEP Changes in Flood Velocity (m/s) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

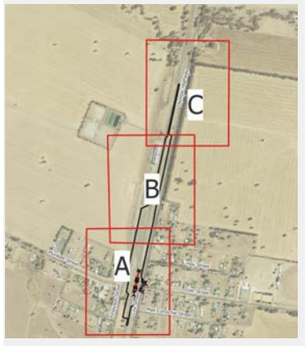
Change in Velocity (m/s)

- <= 0.5
- > 0.5

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



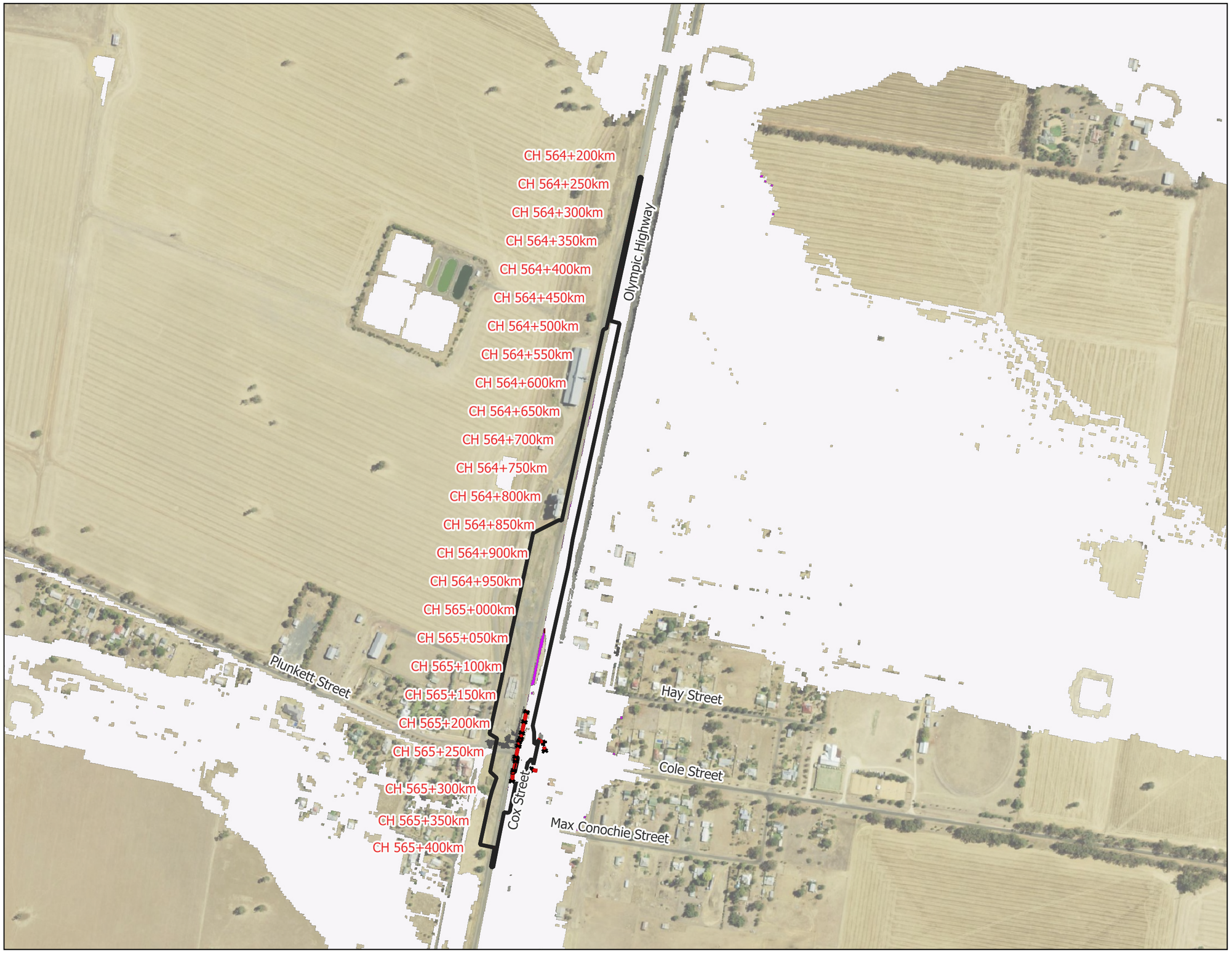
N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 35c - Yerong Creek - IFC Stage

5% AEP Changes in Flood Velocity (m/s) - Developed Less Existing



MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

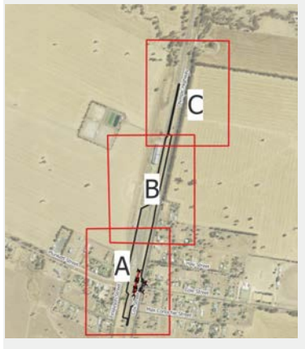
Change in Velocity (m/s)

- <= 0.5
- > 0.5

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



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N

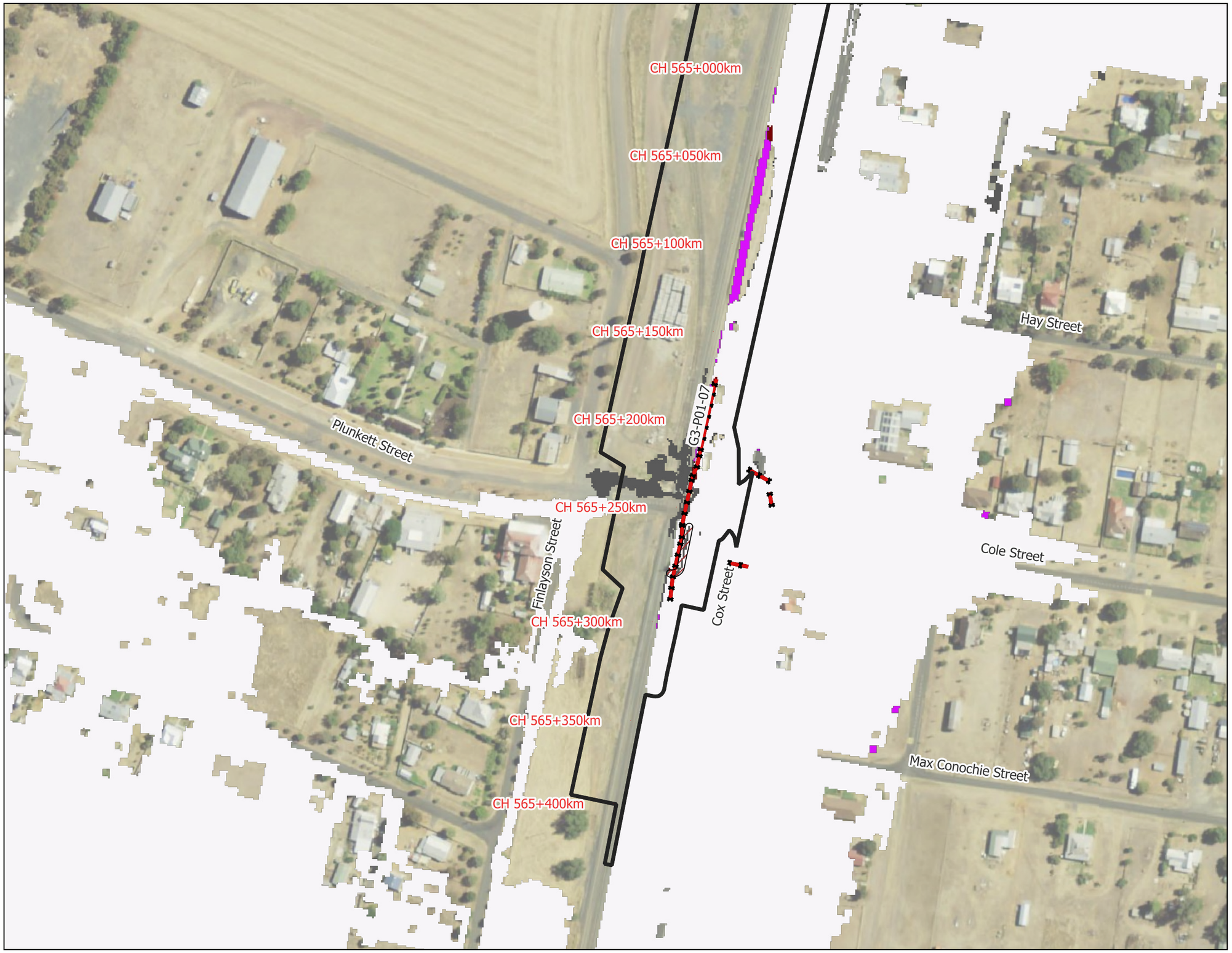
0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 36 - Yerong Creek - IFC Stage

2% AEP Changes in Flood Velocity (m/s) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

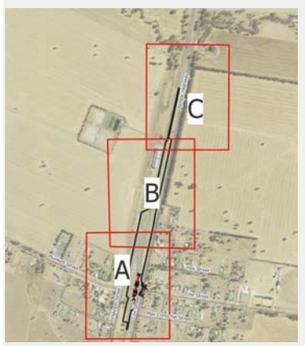
Change in Velocity (m/s)

- <= 0.5
- > 0.5

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 36a - Yerong Creek - IFC Stage

2% AEP Changes in Flood Velocity (m/s) - Developed Less Existing

MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

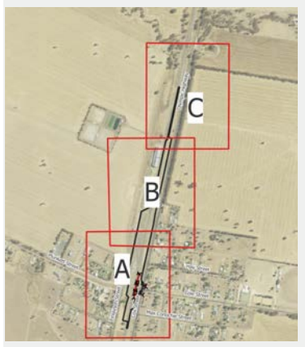
Change in Velocity (m/s)

- <= 0.5
- > 0.5

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

0 80 160 m

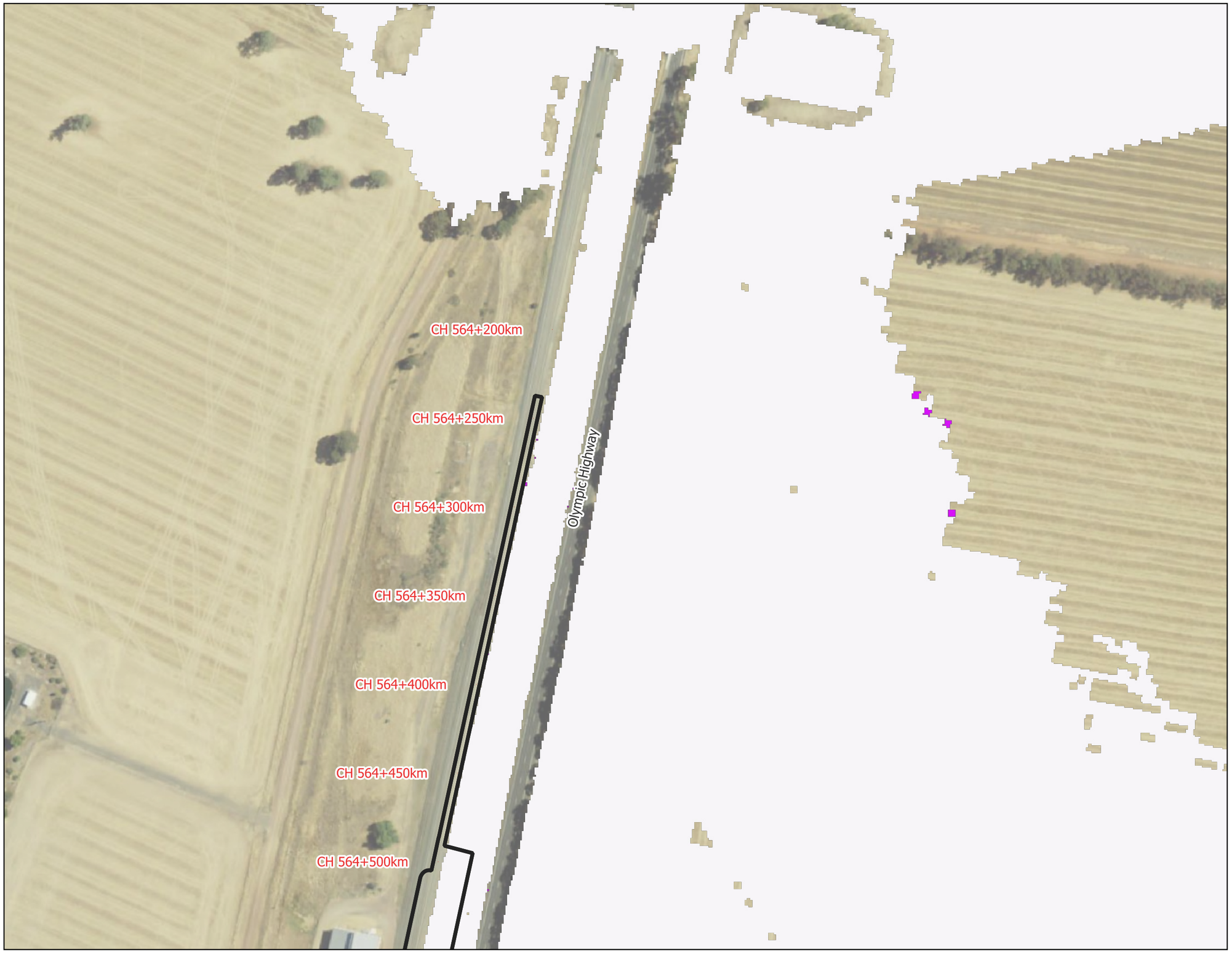
21/8/2025 GDA2020 MGA Zone55

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

Figure 36b - Yerong Creek - IFC Stage

2% AEP Changes in Flood Velocity (m/s) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

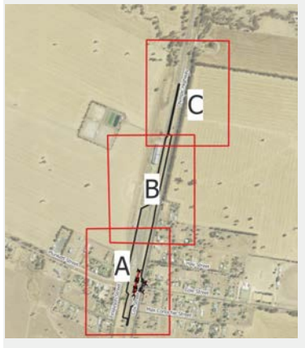
Change in Velocity (m/s)

- <= 0.5
- > 0.5

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

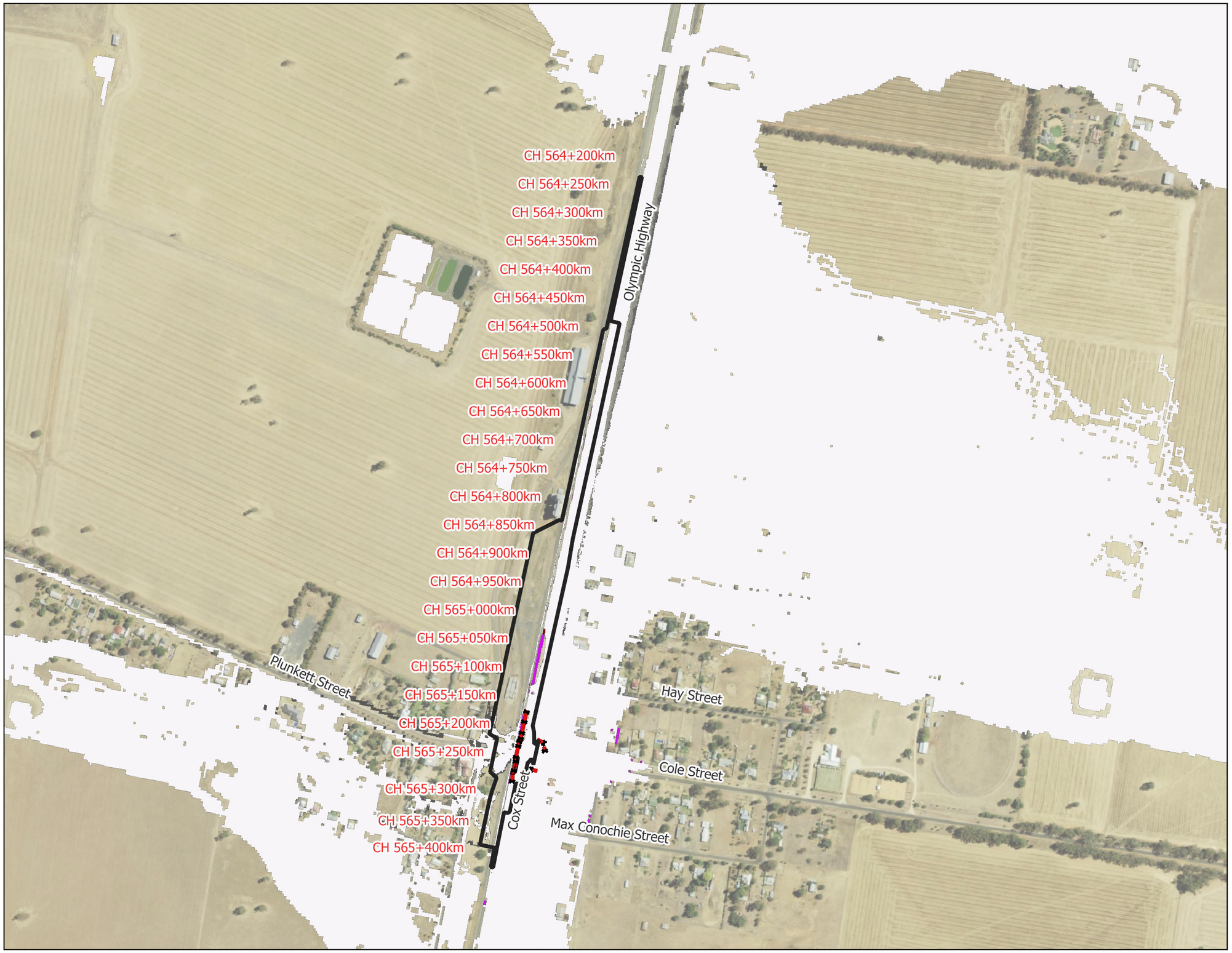
0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 36c - Yerong Creek - IFC Stage

2% AEP Changes in Flood Velocity (m/s) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

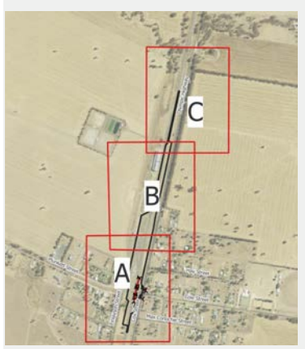
Change in Velocity (m/s)

- <= 0.5
- > 0.5

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

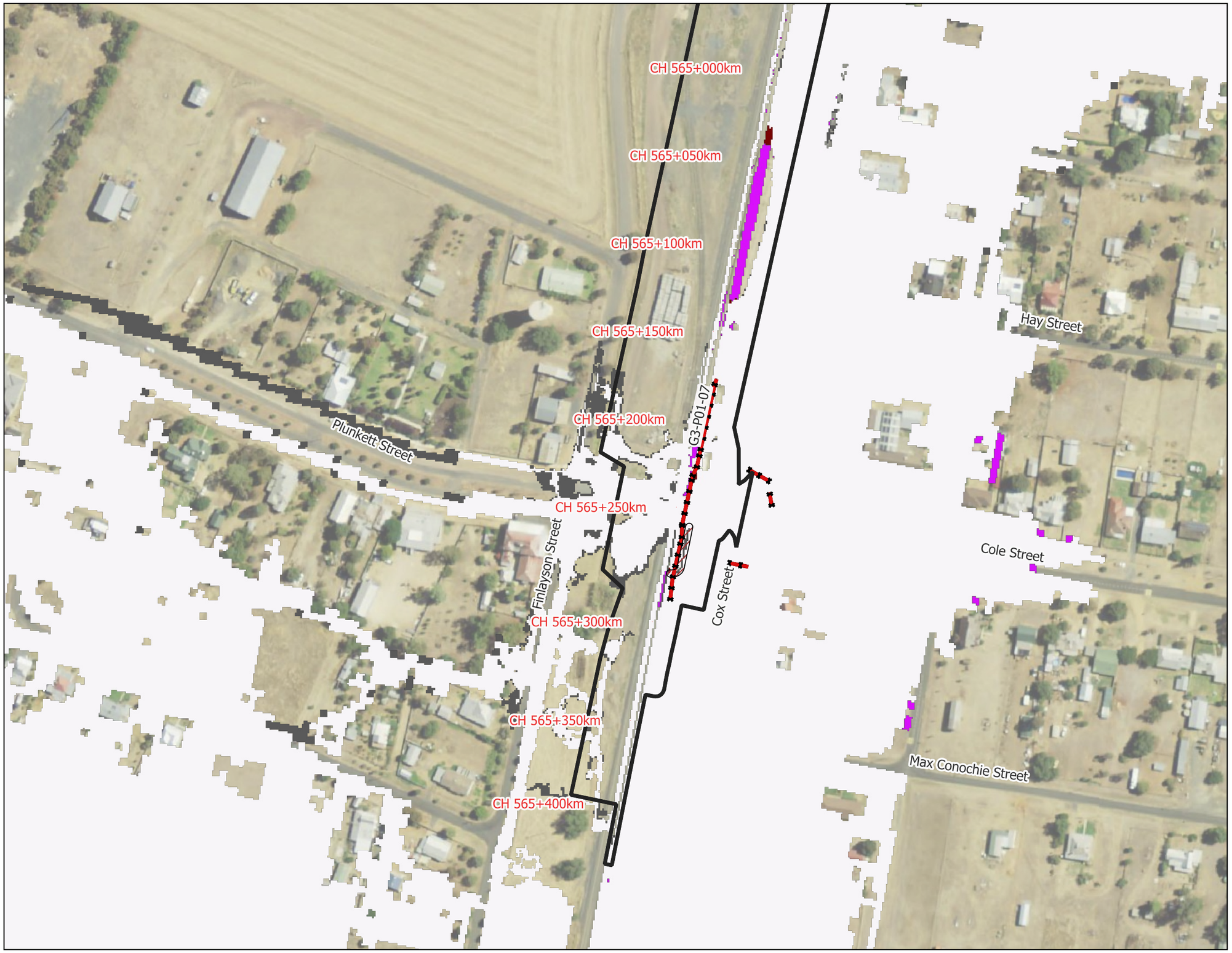
0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 37 - Yerong Creek - IFC Stage

1% AEP Changes in Flood Velocity (m/s) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

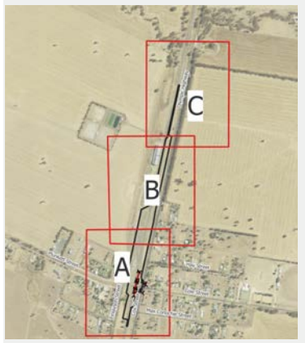
Change in Velocity (m/s)

- <= 0.5
- > 0.5

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 37a - Yerong Creek - IFC Stage

1% AEP Changes in Flood Velocity (m/s) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

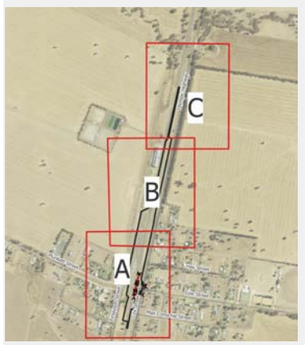
Change in Velocity (m/s)

- <= 0.5
- > 0.5

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

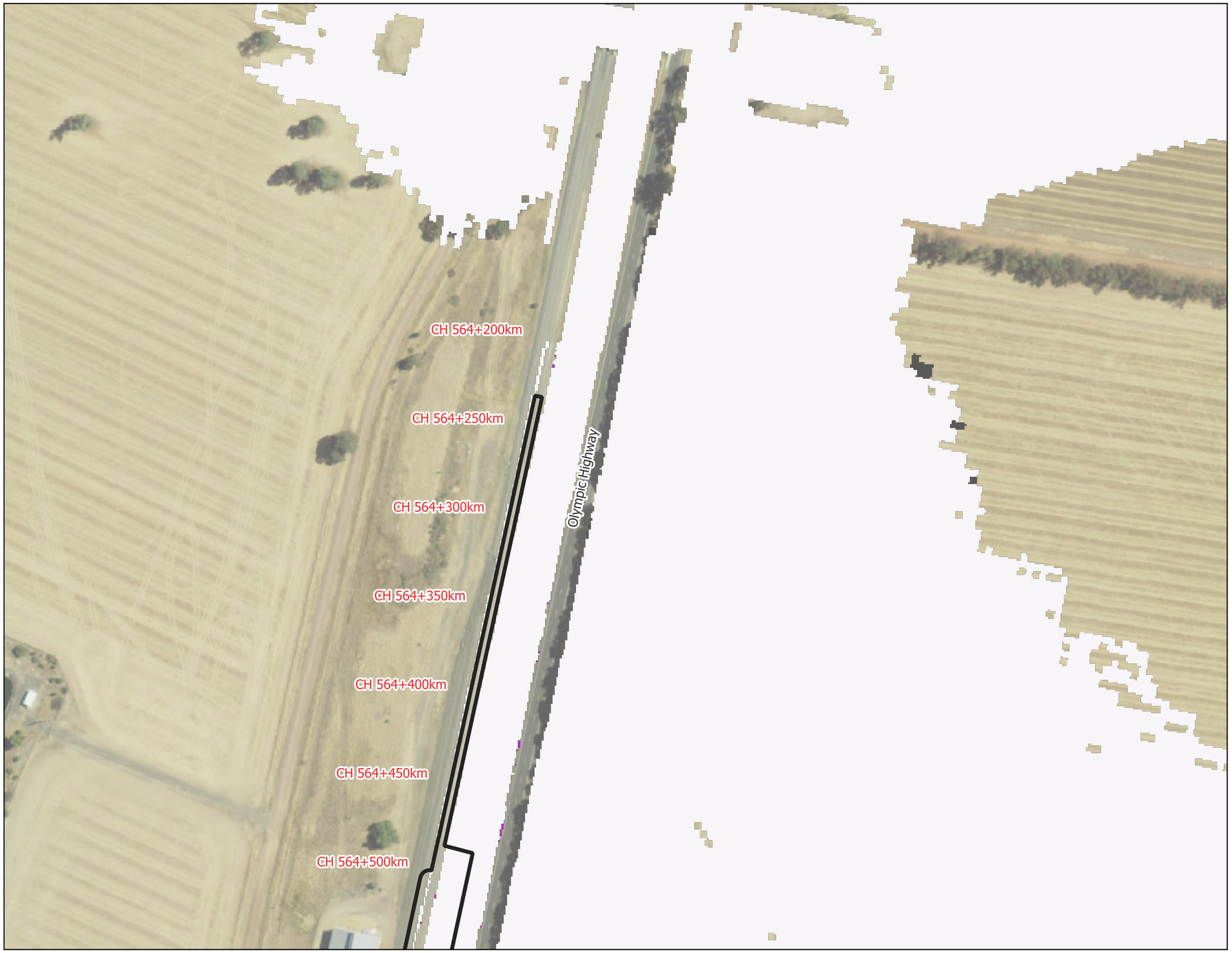
0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 37b - Yerong Creek - IFC Stage

1% AEP Changes in Flood Velocity (m/s) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

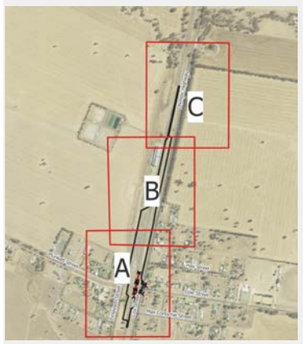
Change in Velocity (m/s)

- <= 0.5
- > 0.5

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 37c - Yerong Creek - IFC Stage

1% AEP Changes in Flood Velocity (m/s) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

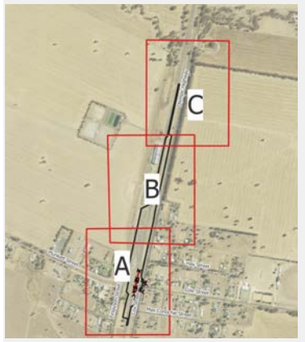
Change in Flood Hazard

- Decreased 6 Classes
- Decreased 5 Classes
- Decreased 4 Classes
- Decreased 3 Classes
- Decreased 2 Classes
- Decreased 1 Class
- No Change
- Increased 1 Class
- Increased 2 Classes
- Increased 3 Classes
- Increased 4 Classes
- Increased 5 Classes
- Increased 6 Classes

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

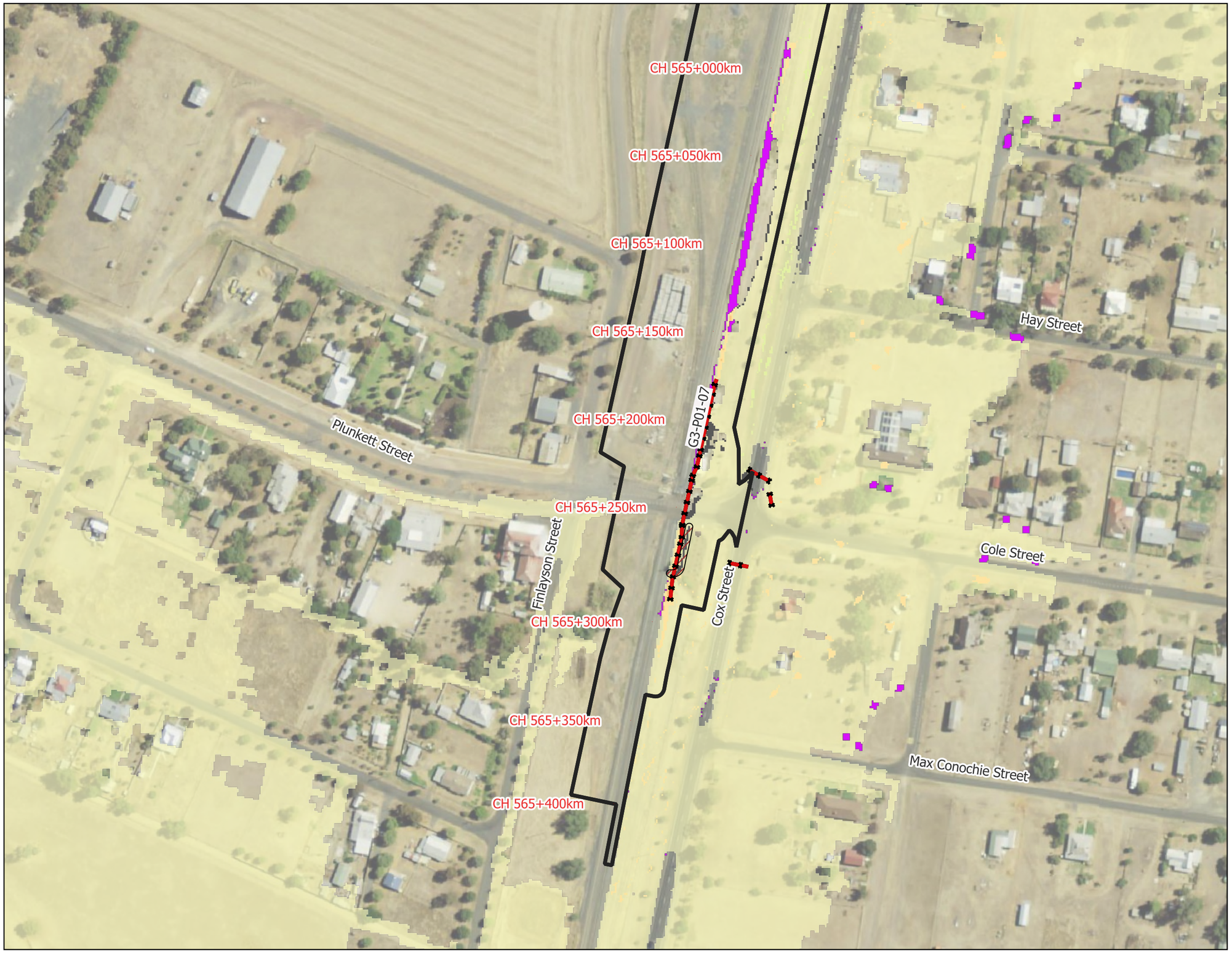
0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 38 - Yerong Creek - IFC Stage

5% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

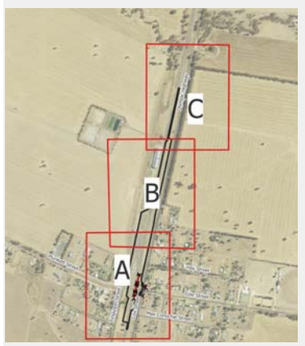
Change in Flood Hazard

- Decreased 6 Classes
- Decreased 5 Classes
- Decreased 4 Classes
- Decreased 3 Classes
- Decreased 2 Classes
- Decreased 1 Class
- No Change
- Increased 1 Class
- Increased 2 Classes
- Increased 3 Classes
- Increased 4 Classes
- Increased 5 Classes
- Increased 6 Classes

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 38a - Yerong Creek - IFC Stage

5% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing

MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

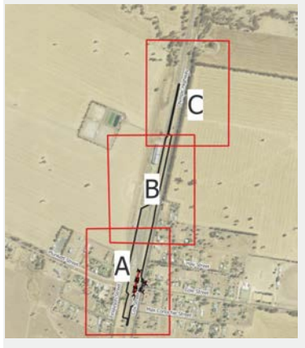
Change in Flood Hazard

- Decreased 6 Classes
- Decreased 5 Classes
- Decreased 4 Classes
- Decreased 3 Classes
- Decreased 2 Classes
- Decreased 1 Class
- No Change
- Increased 1 Class
- Increased 2 Classes
- Increased 3 Classes
- Increased 4 Classes
- Increased 5 Classes
- Increased 6 Classes

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



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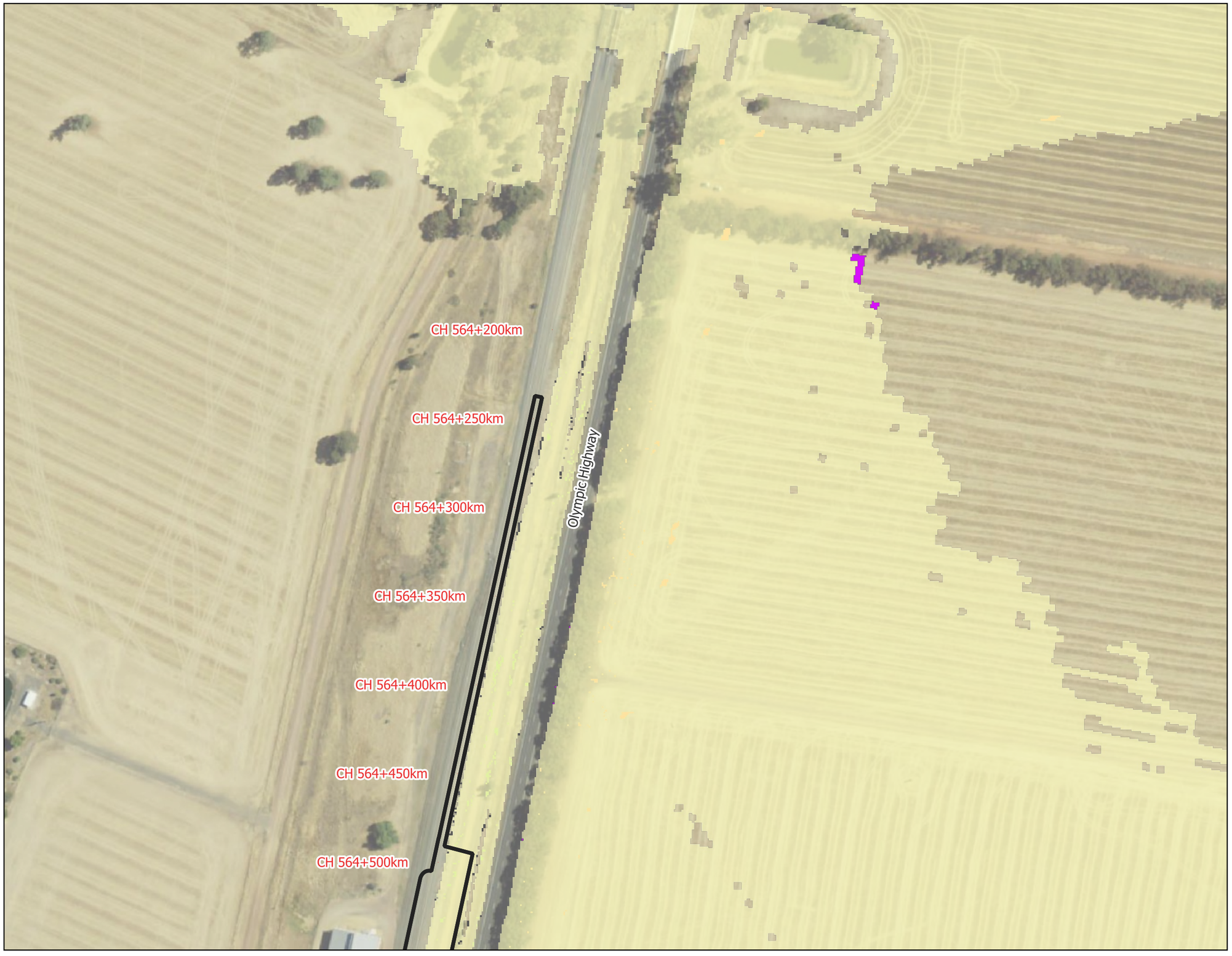
N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 38b - Yerong Creek - IFC Stage

5% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing



MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

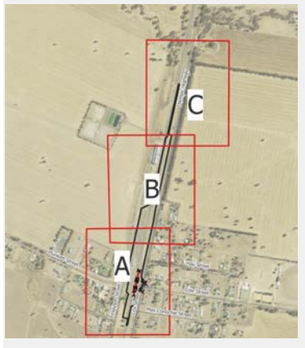
Change in Flood Hazard

- Decreased 6 Classes
- Decreased 5 Classes
- Decreased 4 Classes
- Decreased 3 Classes
- Decreased 2 Classes
- Decreased 1 Class
- No Change
- Increased 1 Class
- Increased 2 Classes
- Increased 3 Classes
- Increased 4 Classes
- Increased 5 Classes
- Increased 6 Classes

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



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N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 38c - Yerong Creek - IFC Stage

5% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing

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MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

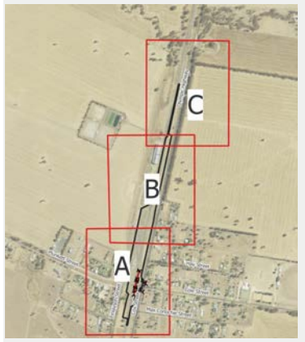
Change in Flood Hazard

- Decreased 6 Classes
- Decreased 5 Classes
- Decreased 4 Classes
- Decreased 3 Classes
- Decreased 2 Classes
- Decreased 1 Class
- No Change
- Increased 1 Class
- Increased 2 Classes
- Increased 3 Classes
- Increased 4 Classes
- Increased 5 Classes
- Increased 6 Classes

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

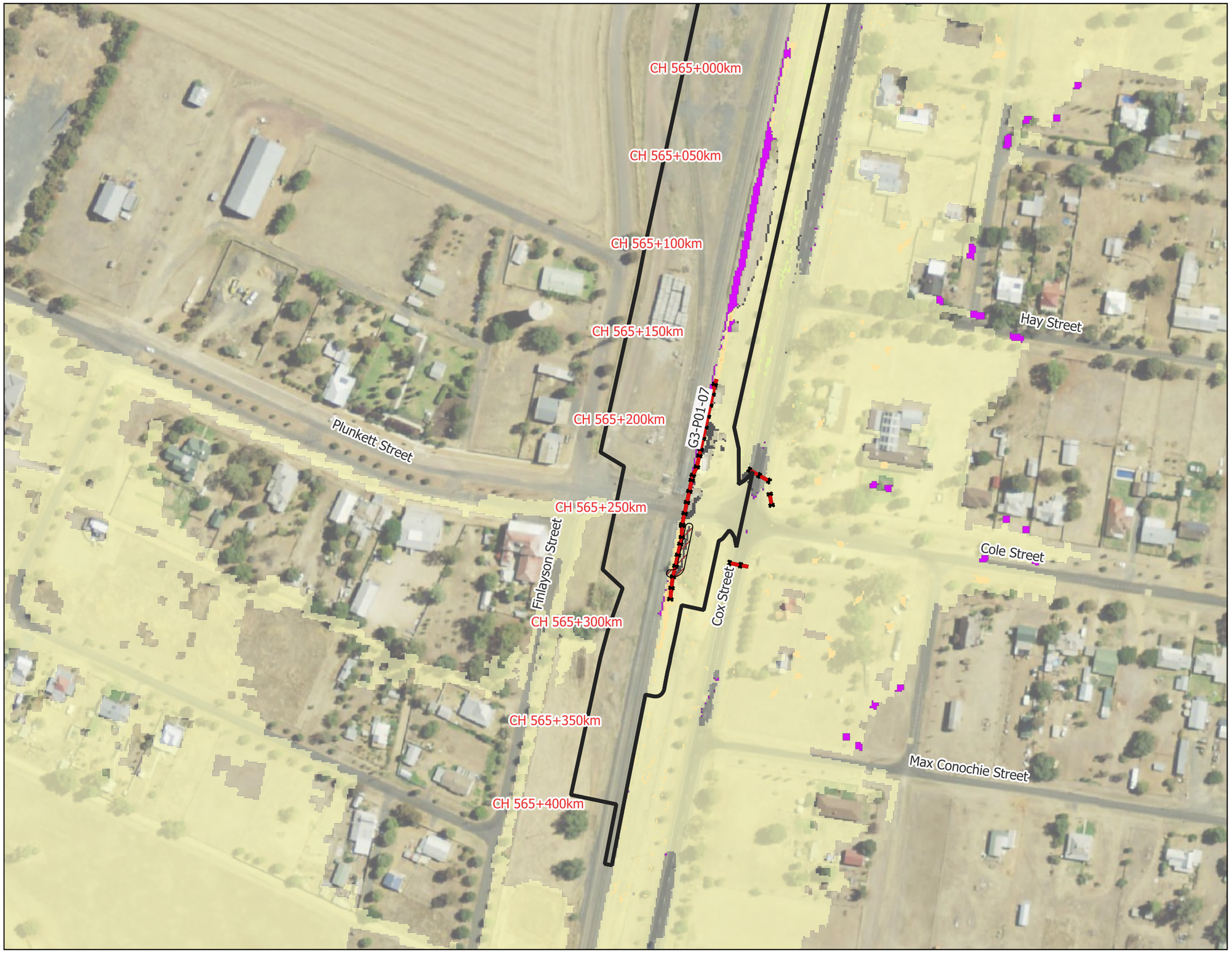
0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 39 - Yerong Creek - IFC Stage

2% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

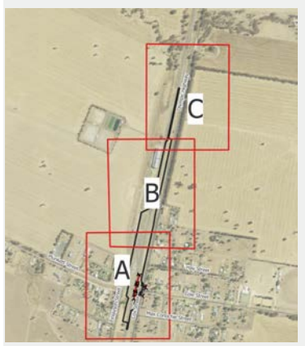
Change in Flood Hazard

- Decreased 6 Classes
- Decreased 5 Classes
- Decreased 4 Classes
- Decreased 3 Classes
- Decreased 2 Classes
- Decreased 1 Class
- No Change
- Increased 1 Class
- Increased 2 Classes
- Increased 3 Classes
- Increased 4 Classes
- Increased 5 Classes
- Increased 6 Classes

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 39a - Yerong Creek - IFC Stage

2% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing

MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

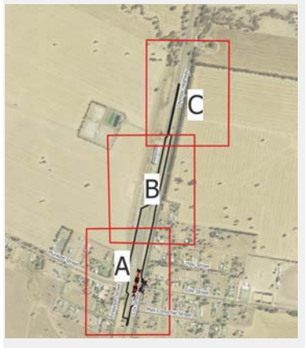
Change in Flood Hazard

- Decreased 6 Classes
- Decreased 5 Classes
- Decreased 4 Classes
- Decreased 3 Classes
- Decreased 2 Classes
- Decreased 1 Class
- No Change
- Increased 1 Class
- Increased 2 Classes
- Increased 3 Classes
- Increased 4 Classes
- Increased 5 Classes
- Increased 6 Classes

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



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N

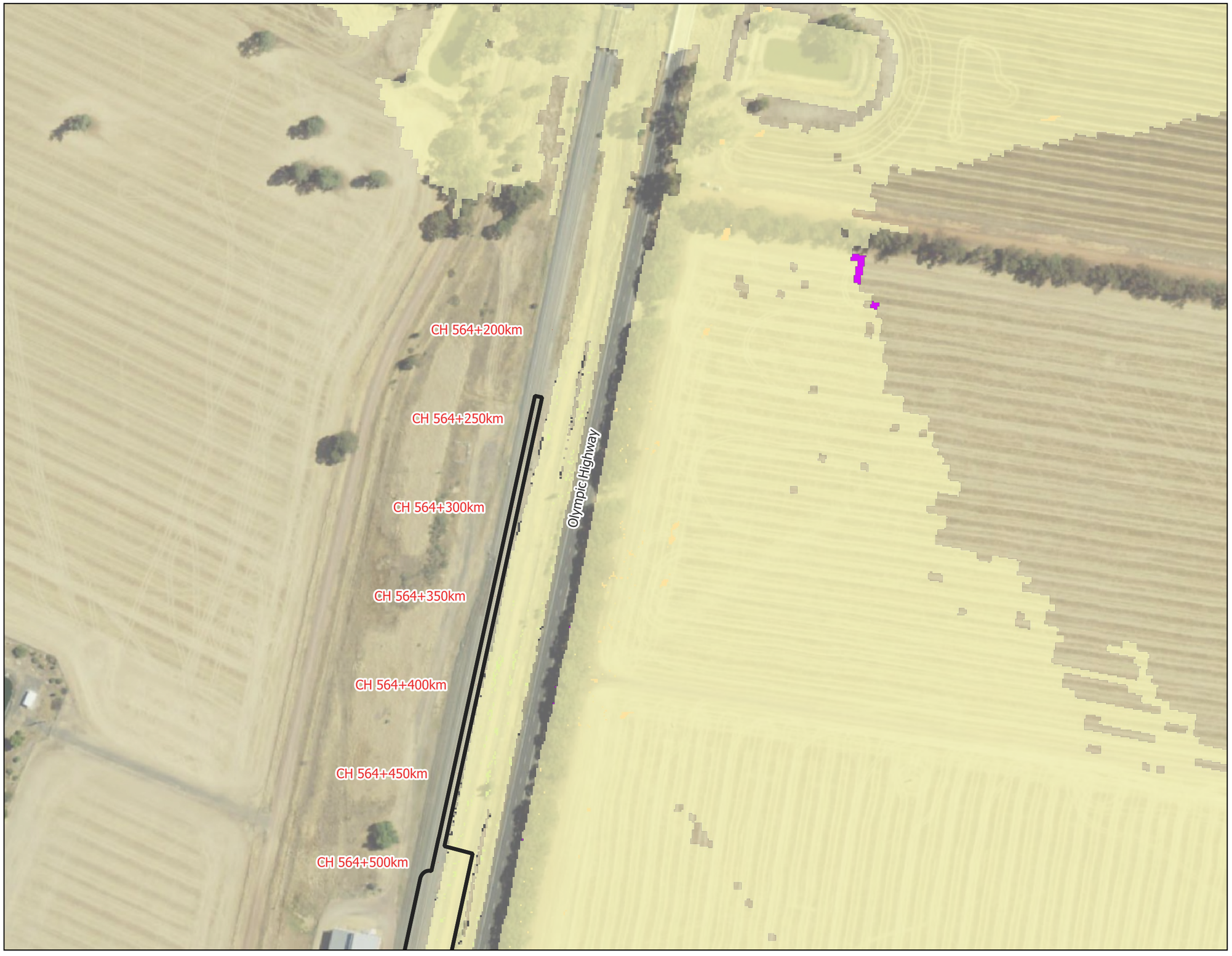
0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 39b - Yerong Creek - IFC Stage

2% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

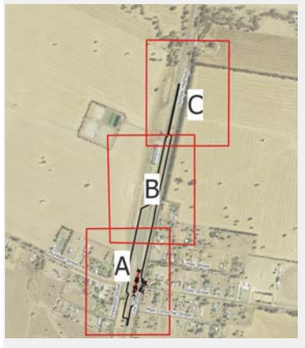
Change in Flood Hazard

- Decreased 6 Classes
- Decreased 5 Classes
- Decreased 4 Classes
- Decreased 3 Classes
- Decreased 2 Classes
- Decreased 1 Class
- No Change
- Increased 1 Class
- Increased 2 Classes
- Increased 3 Classes
- Increased 4 Classes
- Increased 5 Classes
- Increased 6 Classes

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 39c - Yerong Creek - IFC Stage

2% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing

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MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

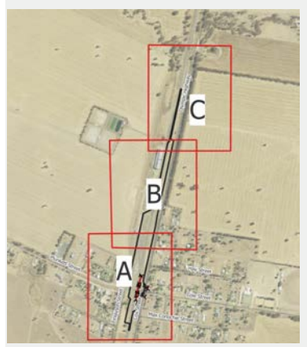
Change in Flood Hazard

- Decreased 6 Classes
- Decreased 5 Classes
- Decreased 4 Classes
- Decreased 3 Classes
- Decreased 2 Classes
- Decreased 1 Class
- No Change
- Increased 1 Class
- Increased 2 Classes
- Increased 3 Classes
- Increased 4 Classes
- Increased 5 Classes
- Increased 6 Classes

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 40 - Yerong Creek - IFC Stage

1% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing

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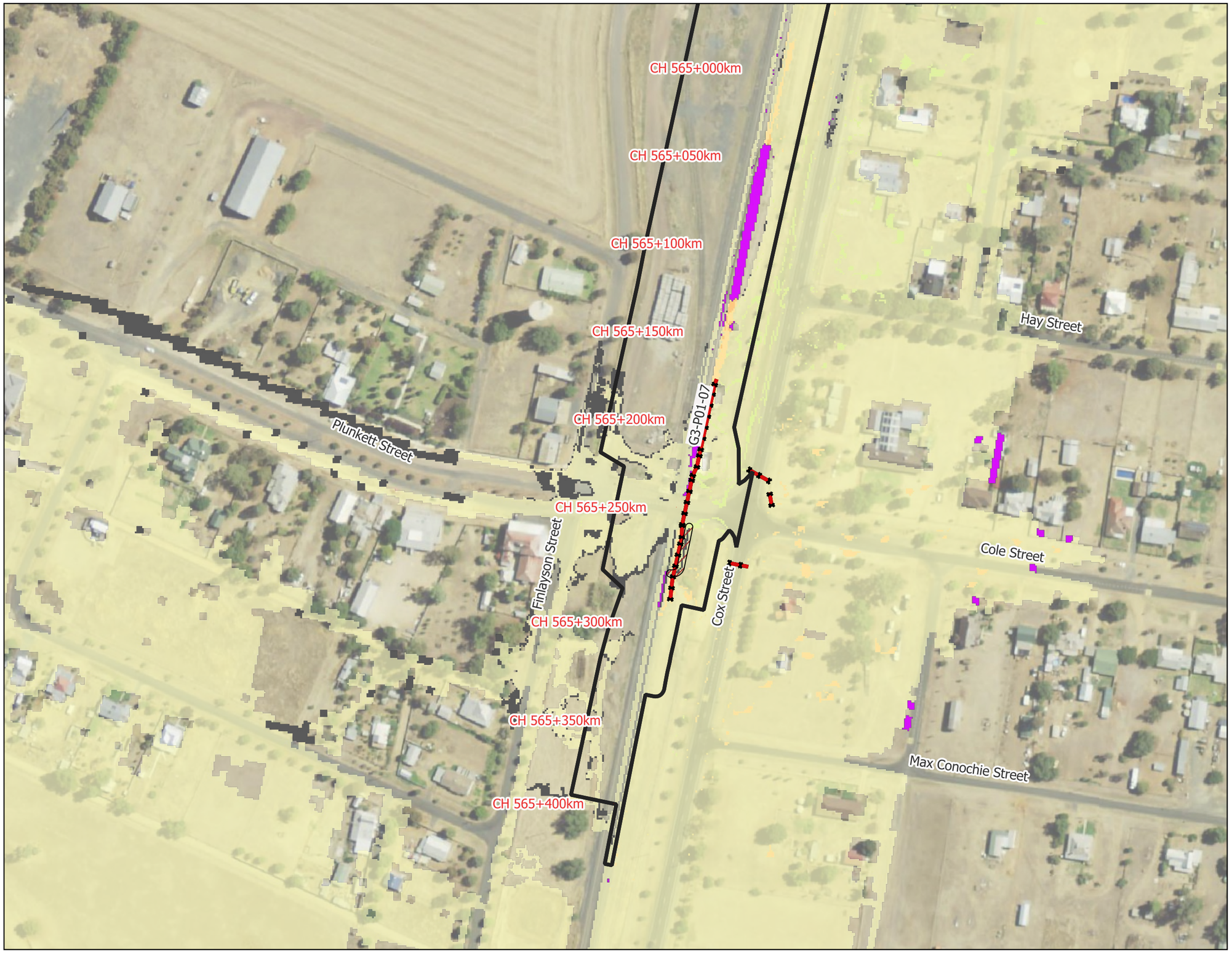


MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

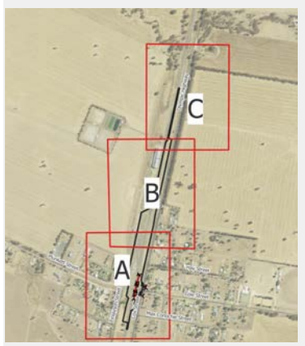
Change in Flood Hazard

- Decreased 6 Classes
- Decreased 5 Classes
- Decreased 4 Classes
- Decreased 3 Classes
- Decreased 2 Classes
- Decreased 1 Class
- No Change
- Increased 1 Class
- Increased 2 Classes
- Increased 3 Classes
- Increased 4 Classes
- Increased 5 Classes
- Increased 6 Classes

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 40a - Yerong Creek - IFC Stage

1% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing

MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

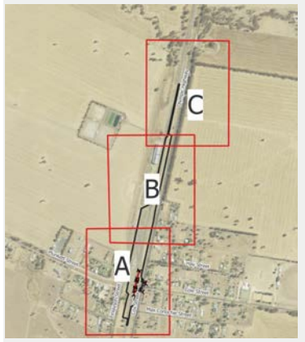
Change in Flood Hazard

- Decreased 6 Classes
- Decreased 5 Classes
- Decreased 4 Classes
- Decreased 3 Classes
- Decreased 2 Classes
- Decreased 1 Class
- No Change
- Increased 1 Class
- Increased 2 Classes
- Increased 3 Classes
- Increased 4 Classes
- Increased 5 Classes
- Increased 6 Classes

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



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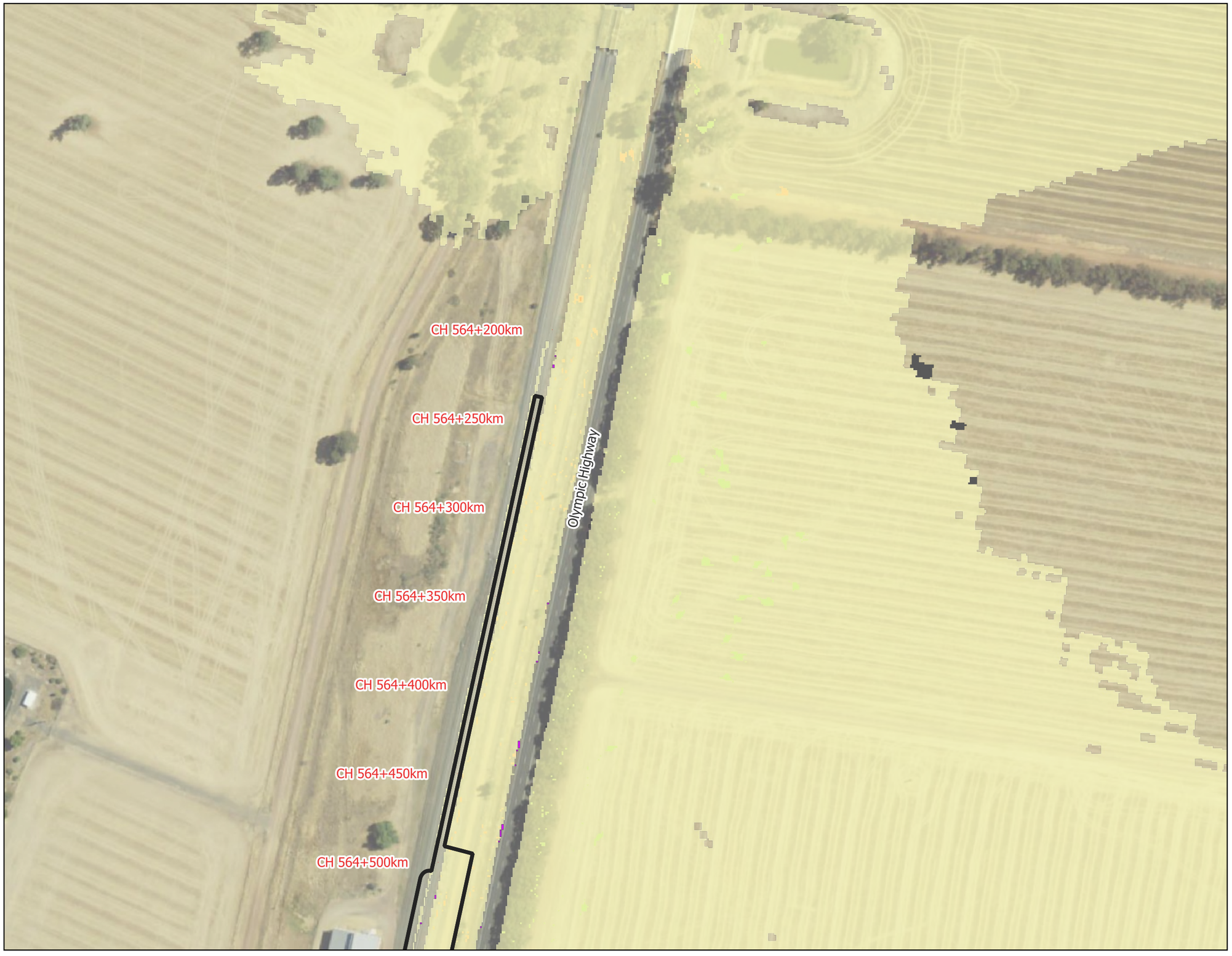
N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 40b - Yerong Creek - IFC Stage

1% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing



MARTINUS

aurecon BG&E

Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

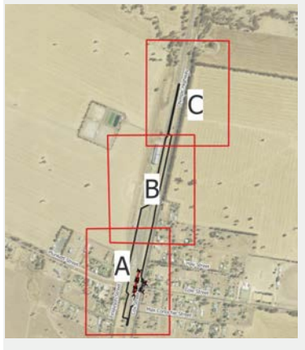
Change in Flood Hazard

- Decreased 6 Classes
- Decreased 5 Classes
- Decreased 4 Classes
- Decreased 3 Classes
- Decreased 2 Classes
- Decreased 1 Class
- No Change
- Increased 1 Class
- Increased 2 Classes
- Increased 3 Classes
- Increased 4 Classes
- Increased 5 Classes
- Increased 6 Classes

Wet/Dry

- Was Wet - Now Dry
- Was Dry - Now Wet

Figure Set-up



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N

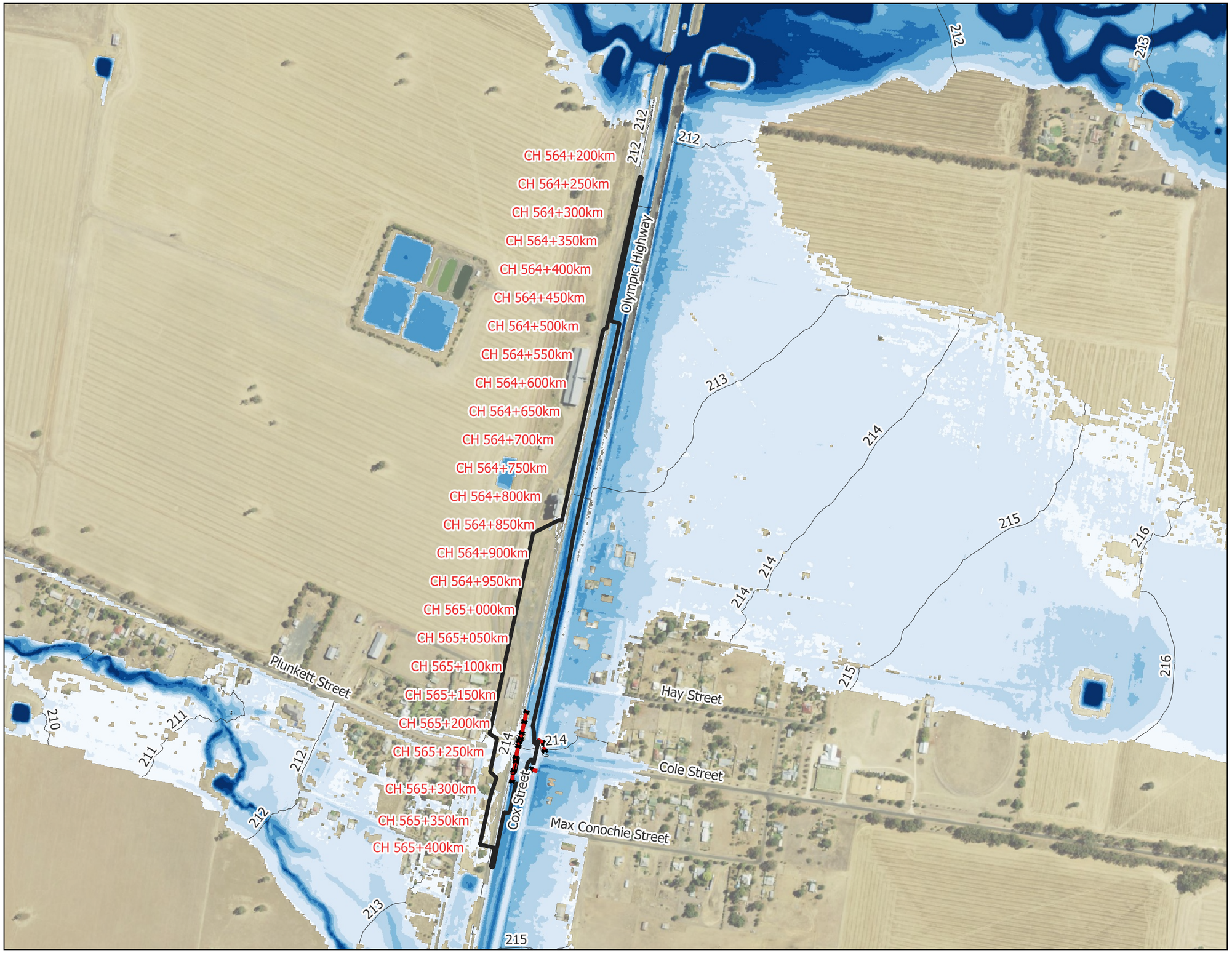
0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 40c - Yerong Creek - IFC Stage

1% AEP Changes in Flood Hazard (ARR2019) - Developed Less Existing

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

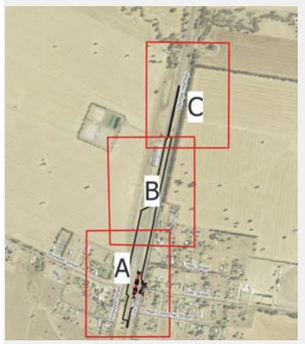
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 41 - Yerong Creek - IFC Stage

1% AEP Flood Depth (m) and Levels (m AHD) - Blockage Sensitivity

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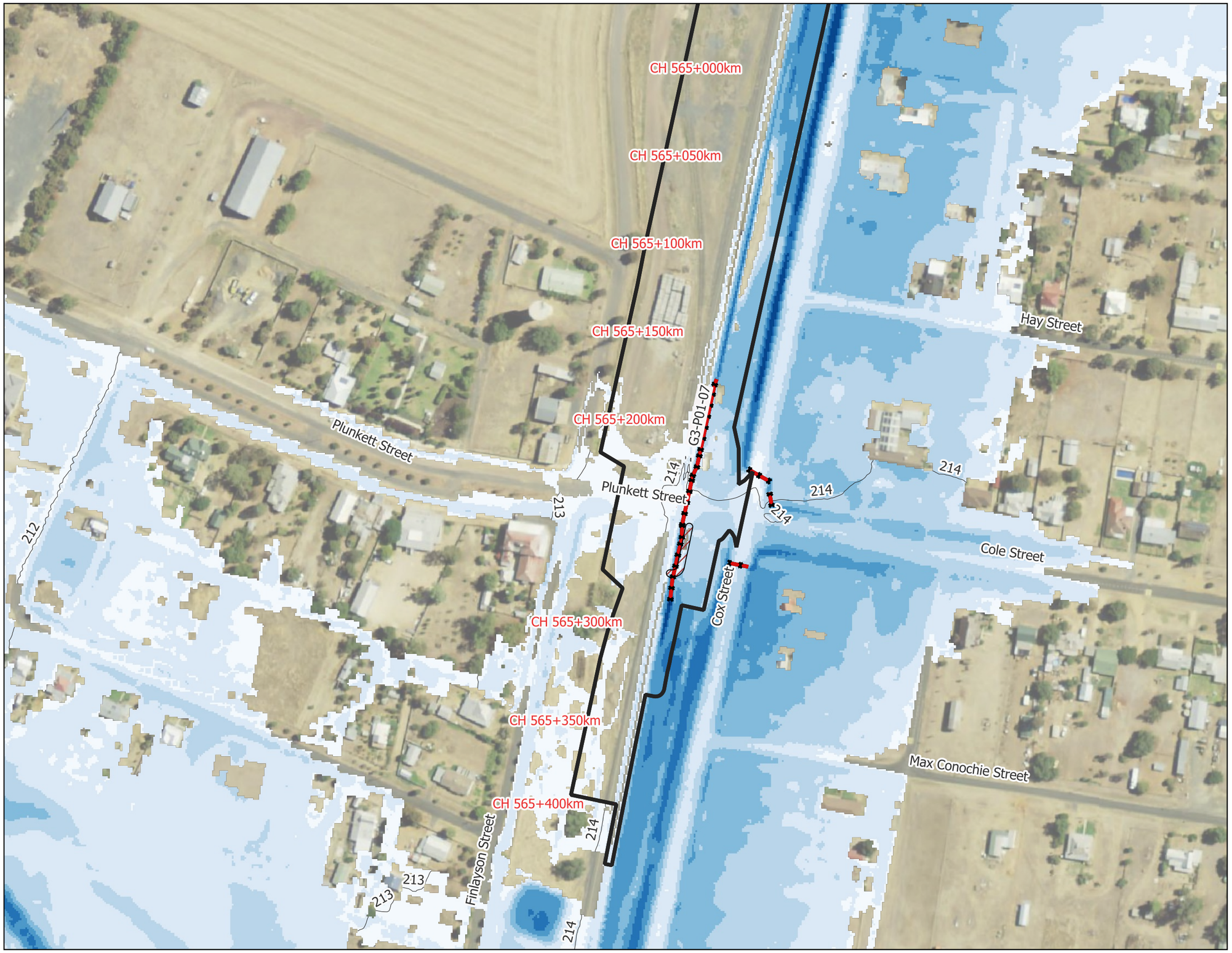


MARTINUS

aurecon BG&E

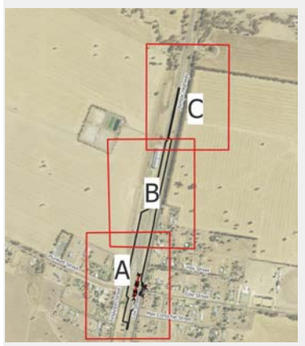
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



N

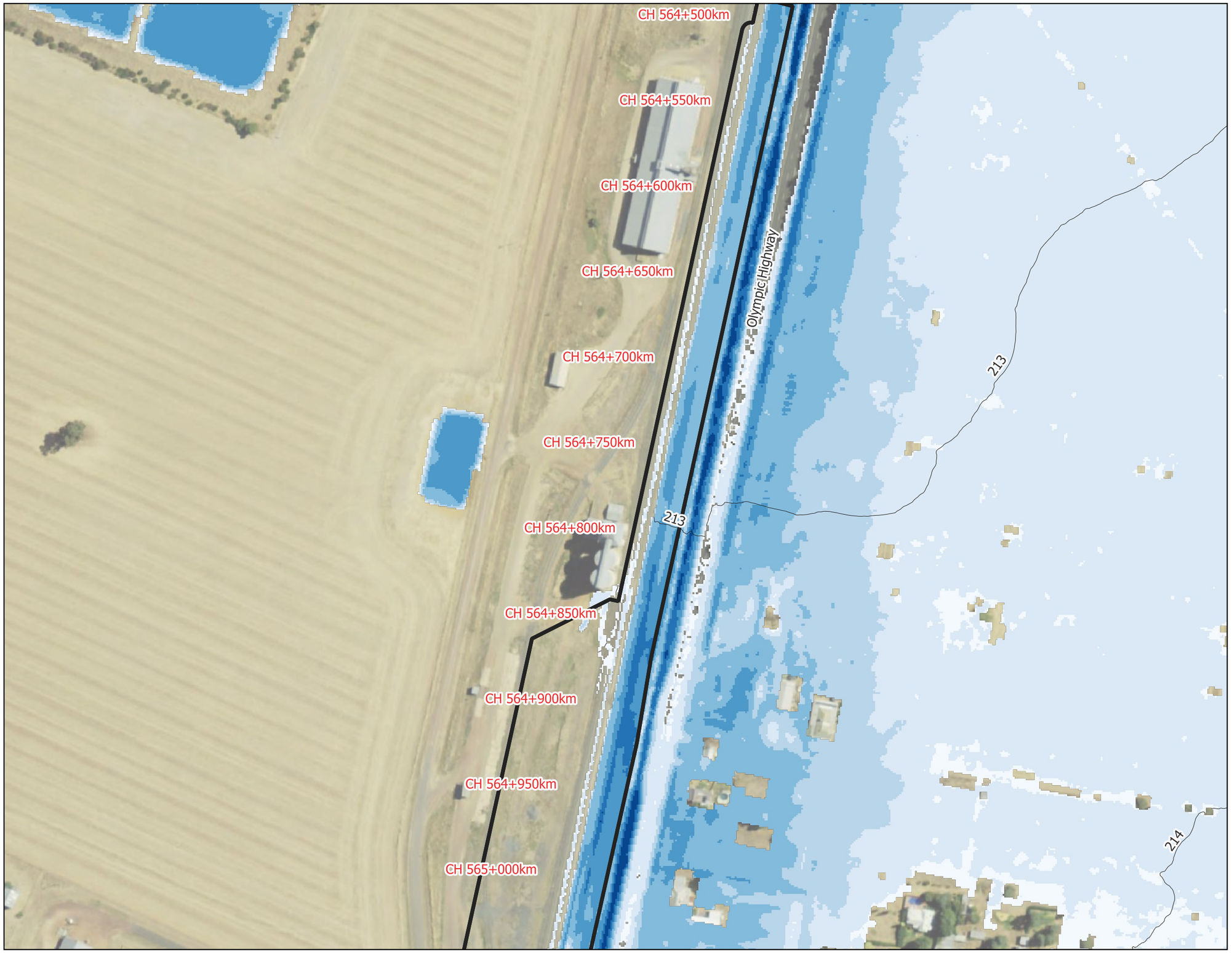
0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 41a - Yerong Creek - IFC Stage

1% AEP Flood Depth (m) and Levels (m AHD) - Blockage Sensitivity

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

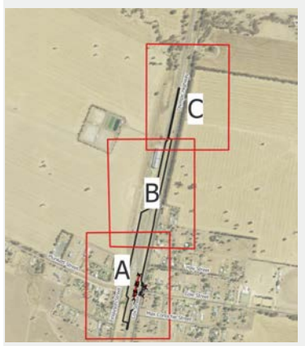
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



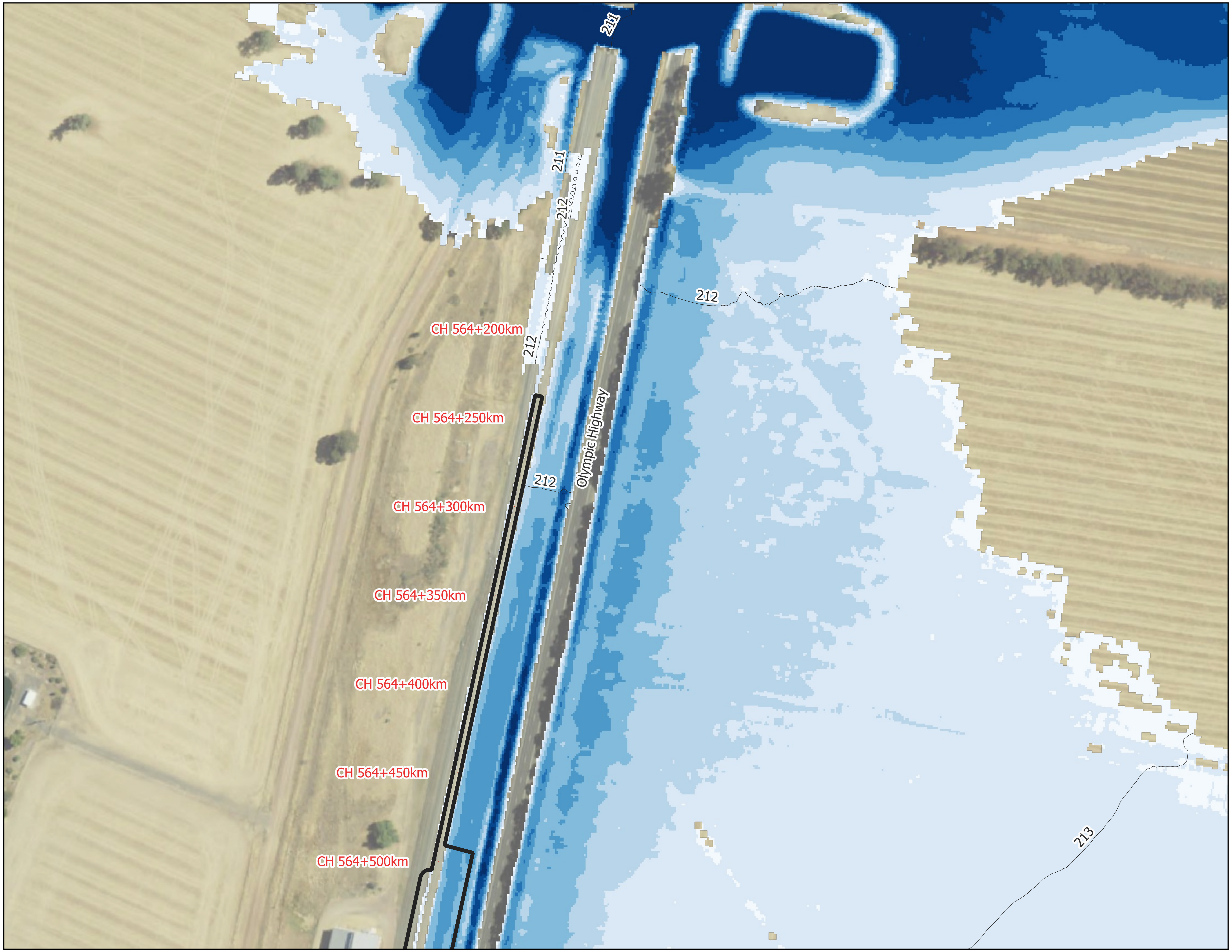
N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 41b - Yerong Creek - IFC Stage

1% AEP Flood Depth (m) and Levels (m AHD) - Blockage Sensitivity



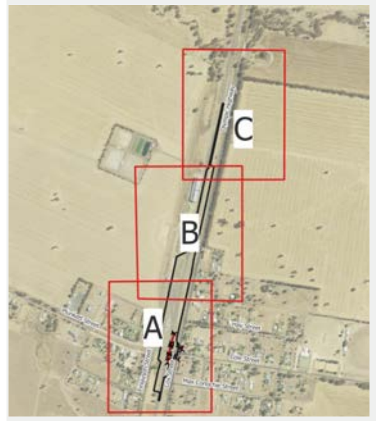
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- 1m Water Level Contours (m AHD)
- Proposed Bund

Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Figure Set-up



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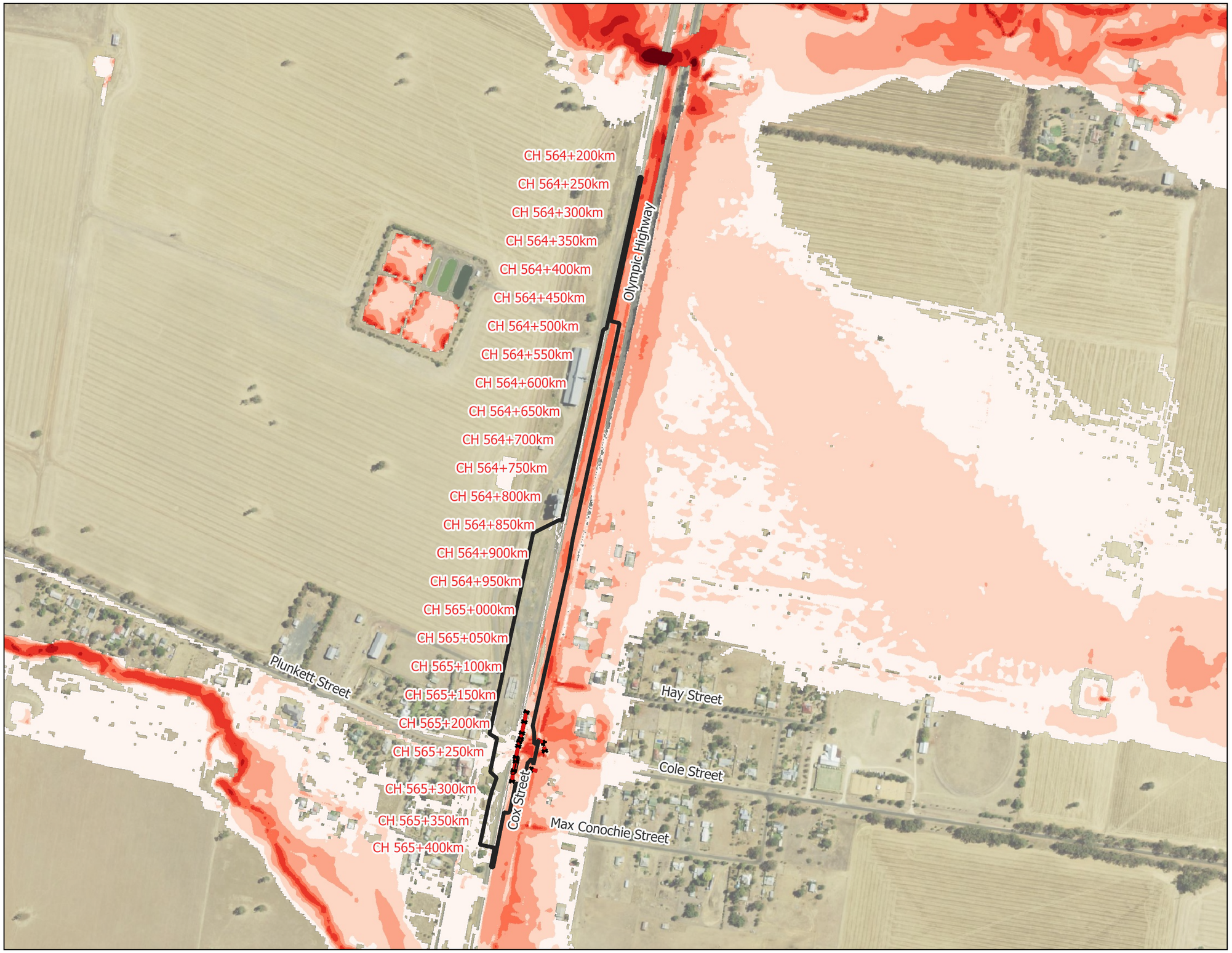
N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 41c - Yerong Creek - IFC Stage

1% AEP Flood Depth (m) and Levels (m AHD) - Blockage Sensitivity



MARTINUS

aurecon BG&E

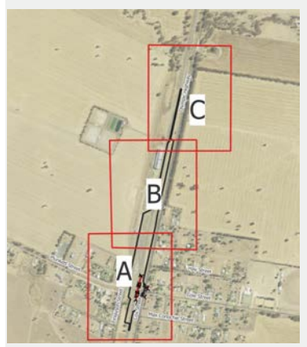
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

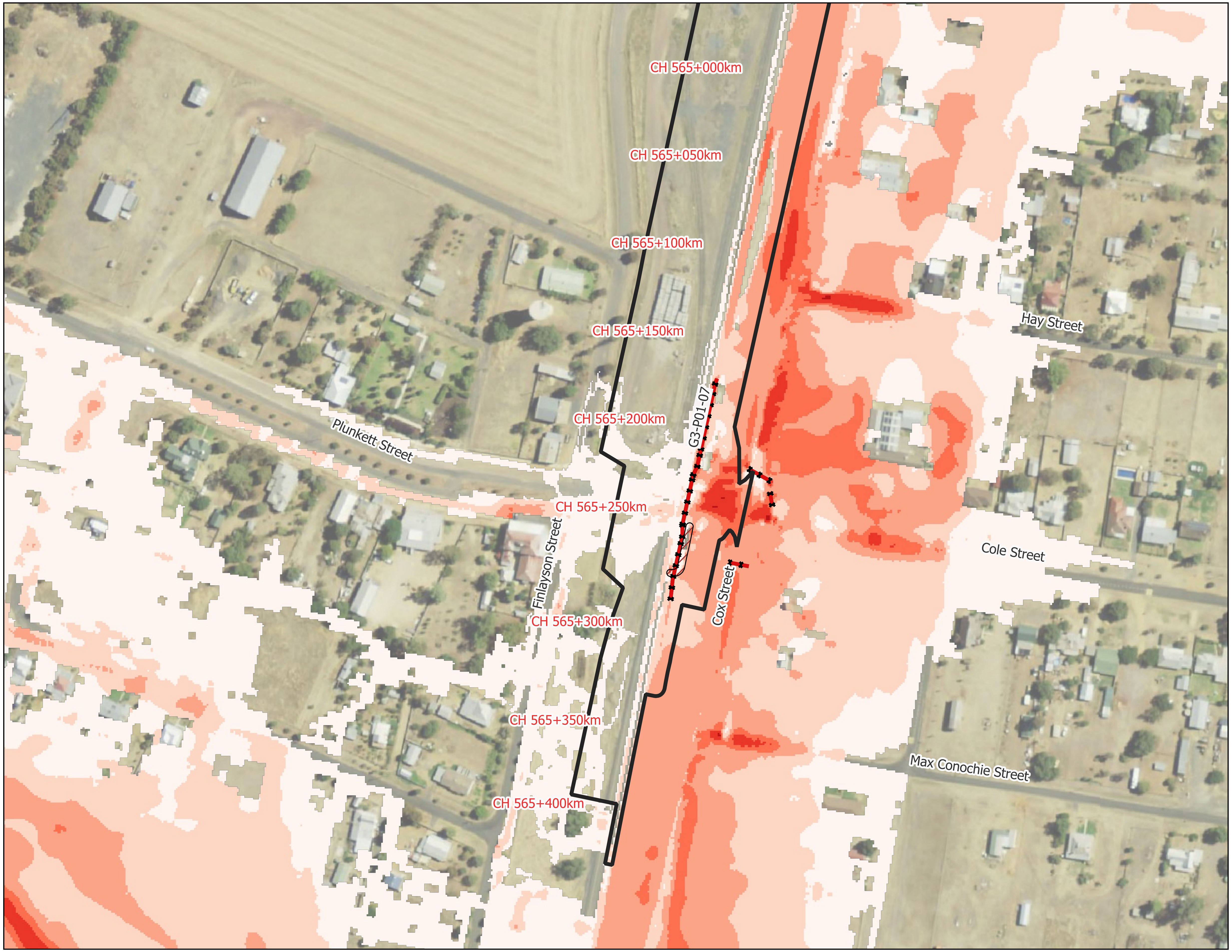
0 200 400 m

21/8/2025 GDA2020 MGA Zone55

Figure 42 - Yerong Creek - IFC Stage

1% AEP Flood Velocity (m/s) - Blockage Sensitivity

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS
aurecon
BG&E

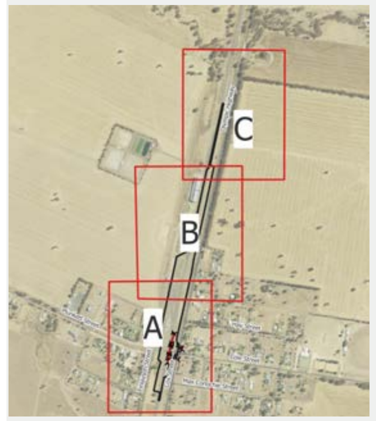
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

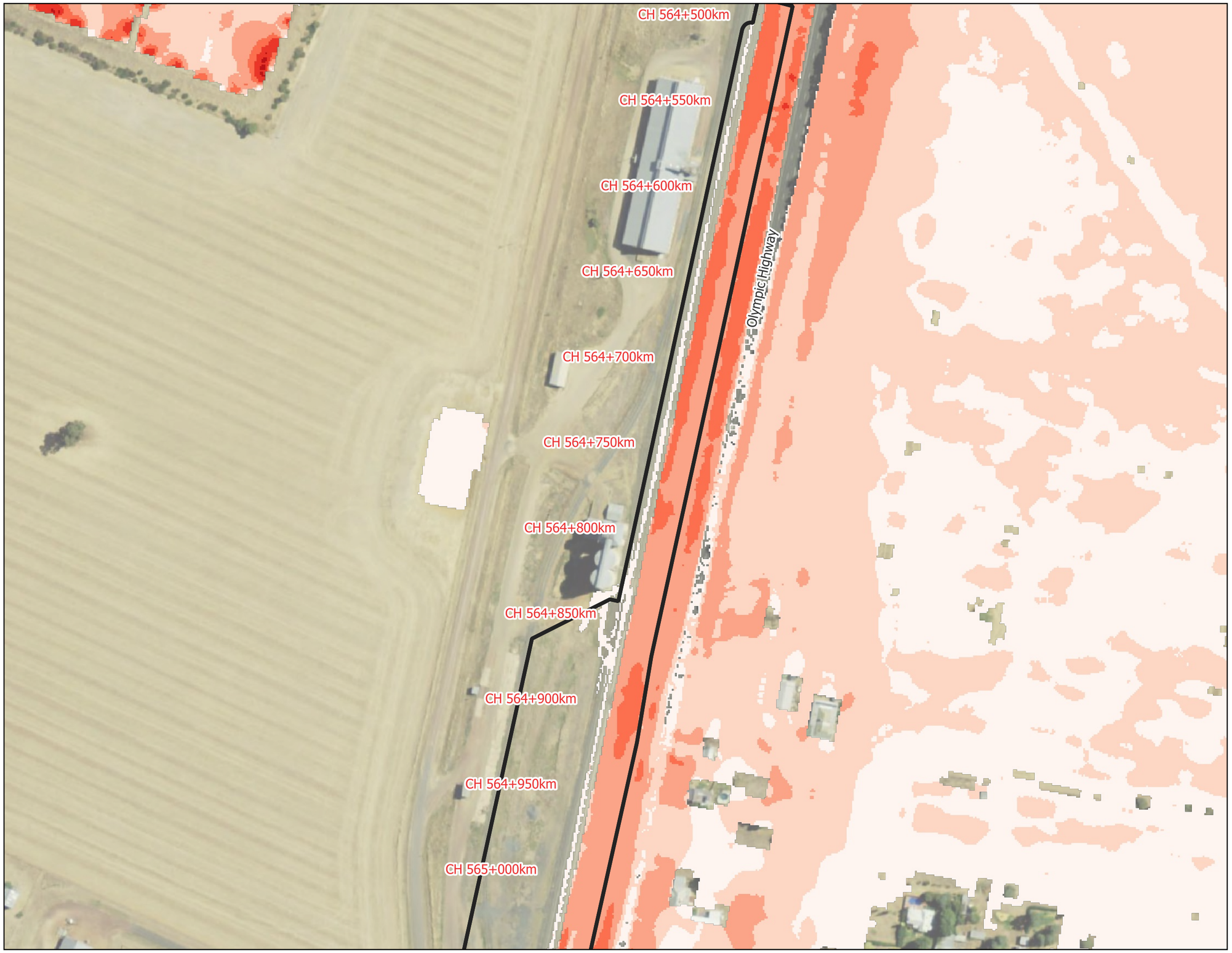
N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 42a - Yerong Creek - IFC Stage

1% AEP Flood Velocity (m/s) - Blockage Sensitivity



MARTINUS

aurecon BG&E

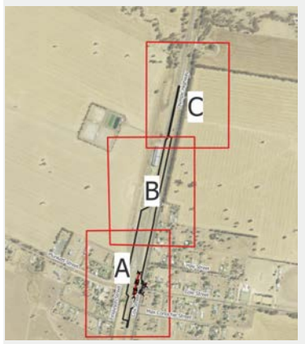
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 80 160 m

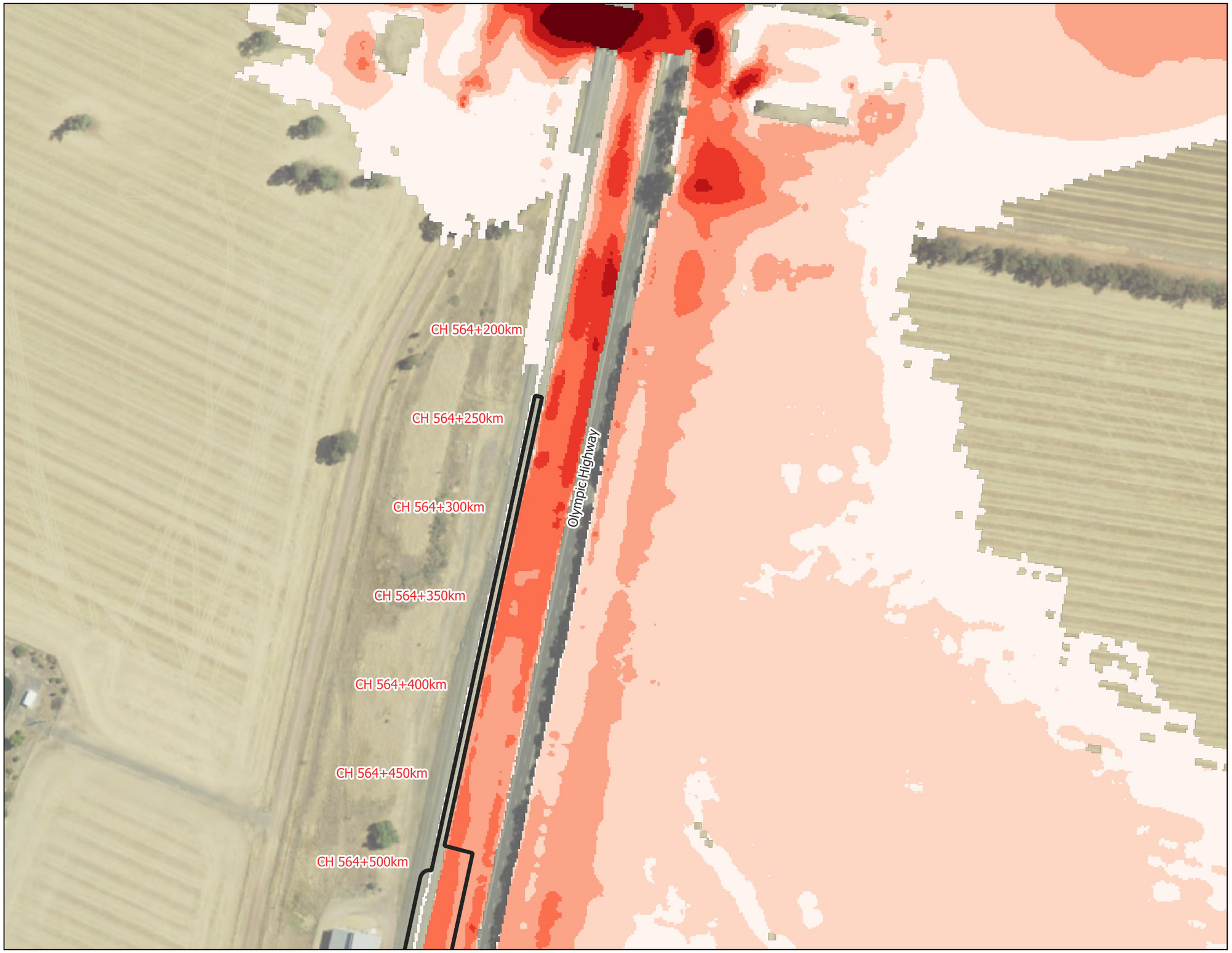
21/8/2025 GDA2020 MGA Zone55

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

Figure 42b - Yerong Creek - IFC Stage

1% AEP Flood Velocity (m/s) - Blockage Sensitivity

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace



MARTINUS

aurecon BG&E

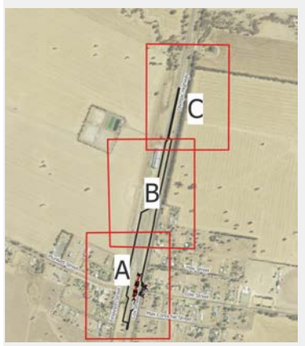
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 42c - Yerong Creek - IFC Stage

1% AEP Flood Velocity (m/s) - Blockage Sensitivity

MARTINUS

aurecon BG&E

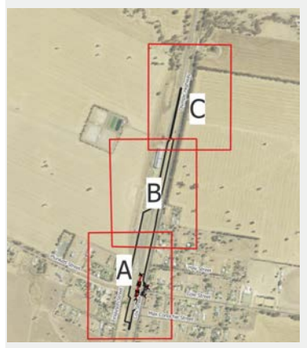
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 200 400 m

21/8/2025 GDA2020 MGA Zone55

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

Figure 43 - Yerong Creek - IFC Stage

1% AEP Flood Hazard (ARR2019) - Blockage Sensitivity

R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

MARTINUS

aurecon BG&E

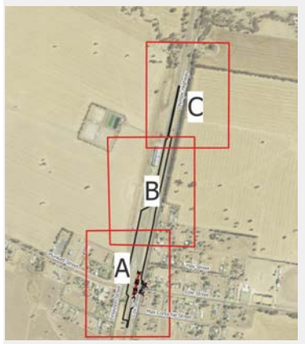
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 43a - Yerong Creek - IFC Stage

1% AEP Flood Hazard (ARR2019) - Blockage Sensitivity

MARTINUS

aurecon BG&E

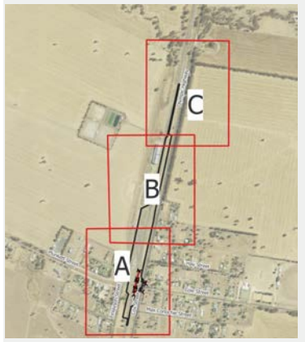
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 43b - Yerong Creek - IFC Stage

1% AEP Flood Hazard (ARR2019) - Blockage Sensitivity

MARTINUS

aurecon BG&E

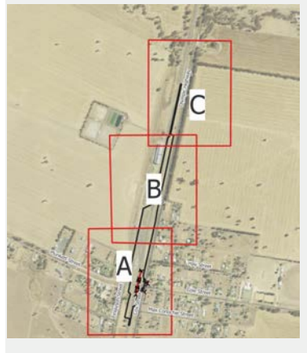
Legend

- TUFLOW Model Extent
- Project Boundary
- Drainage
- Proposed Bund

Flood Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

Figure Set-up



R:\BGE\BNE\BE22012.01 A2P ENHANCEMENT D&C\100 DRAW\100.8 Flooding\Workspace

N

0 80 160 m

21/8/2025 GDA2020 MGA Zone55

Figure 43c - Yerong Creek - IFC Stage

1% AEP Flood Hazard (ARR2019) - Blockage Sensitivity

APPENDIX B

ARR2019 Information

Sandy Creek:

Results - ARR Data Hub

[STARTTXT]

Input Data Information

[INPUTDATA]

Latitude,-35.414093

Longitude,147.07554

[END_INPUTDATA]

River Region

[RIVREG]

division,Murray-Darling Basin

rivregnum,12

River Region,Murrumbidgee River

[RIVREG_META]

Time Accessed,10 October 2024 09:00AM

Version,2016_v1

[END_RIVREG]

ARF Parameters

[LONGARF]

Zone,Southern Temperate

a,0.158

b,0.276

c,0.372

d,0.315

e,0.000141

f,0.41

g,0.15

h,0.01

i,-0.0027

[LONGARF_META]

Time Accessed,10 October 2024 09:00AM

Version,2016_v1

[END_LONGARF]

Storm Losses

[LOSSES]

id,28627.0

Storm Initial Losses (mm),26.0

Storm Continuing Losses (mm/h),4.5

[LOSSES_META]

Time Accessed,10 October 2024 09:00AM

Version,2016_v1

[END_LOSSES]

Temporal Patterns

[TP]

code,MB

Label,Murray Basin

[TP_META]

Time Accessed,10 October 2024 09:00AM

Version,2016_v2

[END_TP]

Areal Temporal Patterns

[ATP]

code,MB

arealabel,Murray Basin

[ATP_META]

Time Accessed,10 October 2024 09:00AM

Version,2016_v2

[END_ATP]

BOM IFD Depths

[BOMIFD]

No data,No data found at this location!

[BOMIFD_META]

Time Accessed,10 October 2024 09:00AM

[END_BOMIFD]

Median Preburst Depths and Ratios

[PREBURST]

min (h)\AEP(%),50,20,10,5,2,1,

60 (1.0),1.8 (0.091),1.7 (0.062),1.6 (0.049),1.5 (0.041),1.1 (0.024),0.7 (0.014),

90 (1.5),1.6 (0.074),1.4 (0.045),1.2 (0.032),1.0 (0.023),0.6 (0.012),0.3 (0.005),

120 (2.0),4.5 (0.186),4.2 (0.126),4.0 (0.101),3.8 (0.083),1.7 (0.031),0.1 (0.001),

180 (3.0),2.4 (0.088),3.2 (0.087),3.8 (0.087),4.4 (0.086),2.6 (0.042),1.2 (0.018),

360 (6.0),1.8 (0.054),1.1 (0.024),0.6 (0.011),0.1 (0.002),1.0 (0.014),1.7 (0.021),

720 (12.0),0.0 (0.001),0.8 (0.015),1.3 (0.021),1.8 (0.025),2.5 (0.029),3.0 (0.031),

1080 (18.0),0.0 (0.000),0.4 (0.006),0.7 (0.009),0.9 (0.011),2.2 (0.022),3.1 (0.028),

1440 (24.0),0.0 (0.000),0.1 (0.002),0.2 (0.003),0.3 (0.003),0.7 (0.007),1.1 (0.009),

2160 (36.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),

2880 (48.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),

4320 (72.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),

[PREBURST_META]

Time Accessed,10 October 2024 09:00AM

Version,2018_v1

Note,Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

[END_PREBURST]

Interim Climate Change Factors

[CCF]

2030,0.85 (4.3%),0.845 (4.2%),0.974 (4.9%),

2040,1.086 (5.4%),1.05 (5.3%),1.341 (6.7%),

2050,1.303 (6.5%),1.283 (6.4%),1.734 (8.7%),

2060,1.478 (7.4%),1.539 (7.7%),2.212 (11.1%),

2070,1.629 (8.1%),1.775 (8.9%),2.753 (13.8%),

2080,1.741 (8.7%),2.036 (10.2%),3.26 (16.3%),

2090,1.793 (9.0%),2.316 (11.6%),3.748 (18.7%),

[CCF_META]

Time Accessed,10 October 2024 09:00AM

Version,2016_v1

Note,ARR recommends the use of RCP4.5 and RCP 8.5 values

[END_CCF]

Probability Neutral Burst Initial Loss

[BURSTIL]

min (h)\AEP(%),50.0,20.0,10.0,5.0,2.0,1.0

60 (1.0),18.0,10.9,10.5,11.3,10.7,8.0

90 (1.5),17.6,11.2,10.4,10.9,10.5,9.1

120 (2.0),15.9,10.3,9.8,10.6,10.6,9.2

180 (3.0),17.9,12.2,10.8,11.2,9.8,7.1

360 (6.0),17.6,13.0,12.7,13.4,11.4,7.0

720 (12.0),21.0,15.9,15.0,14.8,12.3,9.2

1080 (18.0),21.7,17.1,16.5,16.9,14.2,9.1

1440 (24.0),23.1,18.6,18.3,18.5,16.6,11.3

2160 (36.0),25.1,20.9,20.3,21.4,19.2,14.0

2880 (48.0),25.7,21.3,21.1,22.3,20.5,13.2

4320 (72.0),26.2,22.5,23.5,24.5,21.8,14.2

[BURSTIL_META]

Time Accessed,10 October 2024 09:54AM

Version,2018_v1

Note,As this point is in NSW the advice provided on losses and pre-burst on the NSW Specific Tab of the ARR Data Hub is to be considered. In NSW losses are derived considering a hierarchy of approaches depending on the available loss information. Probability neutral burst initial loss values for NSW are to be used in place of the standard initial loss and pre-burst as per the losses hierarchy.

[END_BURSTIL]

Transformational Pre-burst Rainfall

[PREBURST_TRANS]

min (h)\AEP(%),50.0,20.0,10.0,5.0,2.0,1.0

60 (1.0),7.5,14.6,15.0,14.2,14.8,17.5

90 (1.5),7.9,14.3,15.1,14.6,15.0,16.4

120 (2.0),9.6,15.2,15.7,14.9,14.9,16.3

180 (3.0),7.6,13.3,14.7,14.3,15.7,18.4

360 (6.0),7.9,12.5,12.8,12.1,14.1,18.5

720 (12.0),4.5,9.6,10.5,10.7,13.2,16.3

1080 (18.0),3.8,8.4,9.0,8.6,11.3,16.4

1440 (24.0),2.4,6.9,7.2,7.0,8.9,14.2

2160 (36.0),0.4,4.6,5.2,4.1,6.3,11.5

2880 (48.0),0.0,4.2,4.4,3.2,5.0,12.3

4320 (72.0),0.0,3.0,2.0,1.0,3.7,11.3

[PREBURST_TRANS_META]

The tranformational pre-burst is intended for software suppliers in the NSW area and is simply the Initial Loss - Burst Initial Loss. It is not appropriate to use these values if considering a calibrated initial loss.

[END_PREBURST_TRANS]

Baseflow Factors

[BASEFLOW]

downstream,10746

area_sqkm,1016.777536

catch_no,10767

Volume Factor,0.207098

Peak Factor,0.039781

[BASEFLOW_META]

Time Accessed,10 October 2024 09:00AM

Version,2016_v1

[END_BASEFLOW]

[ENDTXT]

Yerong Creek:

Results - ARR Data Hub

[STARTTXT]

Input Data Information

[INPUTDATA]

Latitude,-35.389564

Longitude,147.130932

[END_INPUTDATA]

River Region

[RIVREG]

division,Murray-Darling Basin

rivregnum,12

River Region,Murrumbidgee River

[RIVREG_META]

Time Accessed,15 November 2024 03:09PM

Version,2016_v1

[END_RIVREG]

ARF Parameters

[LONGARF]

Zone,Southern Temperate

a,0.158

b,0.276

c,0.372

d,0.315

e,0.000141

f,0.41

g,0.15

h,0.01

i,-0.0027

[LONGARF_META]

Time Accessed,15 November 2024 03:09PM

Version,2016_v1

[END_LONGARF]

Storm Losses

[LOSSES]

id,16099.0

Storm Initial Losses (mm),25.0

Storm Continuing Losses (mm/h),4.5

[LOSSES_META]

Time Accessed,15 November 2024 03:09PM

Version,2016_v1

[END_LOSSES]

Temporal Patterns

[TP]

code,MB

Label,Murray Basin

[TP_META]

Time Accessed,15 November 2024 03:09PM

Version,2016_v2

[END_TP]

Areal Temporal Patterns

[ATP]

code,MB

arealabel,Murray Basin

[ATP_META]

Time Accessed,15 November 2024 03:09PM

Version,2016_v2

[END_ATP]

BOM IFD Depths

[BOMIFD]

No data,No data found at this location!

[BOMIFD_META]

Time Accessed,15 November 2024 03:09PM

[END_BOMIFD]

Median Preburst Depths and Ratios

[PREBURST]

min (h)\AEP(%),50,20,10,5,2,1,

60 (1.0),1.8 (0.090),1.7 (0.061),1.6 (0.049),1.5 (0.041),1.1 (0.024),0.7 (0.014),

90 (1.5),1.6 (0.074),1.4 (0.044),1.2 (0.032),1.0 (0.023),0.6 (0.012),0.3 (0.005),

120 (2.0),4.5 (0.186),4.2 (0.126),4.0 (0.101),3.8 (0.083),1.7 (0.031),0.1 (0.001),

180 (3.0),2.4 (0.087),3.2 (0.087),3.8 (0.087),4.4 (0.086),2.6 (0.042),1.2 (0.018),

360 (6.0),1.8 (0.054),1.1 (0.024),0.6 (0.011),0.1 (0.002),1.0 (0.014),1.7 (0.021),

720 (12.0),0.0 (0.001),0.8 (0.015),1.3 (0.021),1.8 (0.025),2.5 (0.029),3.0 (0.031),

1080 (18.0),0.0 (0.000),0.4 (0.006),0.7 (0.009),0.9 (0.011),2.2 (0.022),3.1 (0.028),

1440 (24.0),0.0 (0.000),0.1 (0.002),0.2 (0.003),0.3 (0.003),0.7 (0.007),1.1 (0.009),

2160 (36.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),

2880 (48.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),

4320 (72.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),

[PREBURST_META]

Time Accessed,15 November 2024 03:09PM

Version,2018_v1

Note,Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

[END_PREBURST]

Interim Climate Change Factors

[CCF]

2030,0.85 (4.3%),0.845 (4.2%),0.974 (4.9%),

2040,1.086 (5.4%),1.05 (5.3%),1.341 (6.7%),

2050,1.303 (6.5%),1.283 (6.4%),1.734 (8.7%),

2060,1.478 (7.4%),1.539 (7.7%),2.212 (11.1%),

2070,1.629 (8.1%),1.775 (8.9%),2.753 (13.8%),

2080,1.741 (8.7%),2.036 (10.2%),3.26 (16.3%),

2090,1.793 (9.0%),2.316 (11.6%),3.748 (18.7%),

[CCF_META]

Time Accessed,15 November 2024 03:09PM

Version,2016_v1

Note,ARR recommends the use of RCP4.5 and RCP 8.5 values

[END_CCF]

Baseflow Factors

[BASEFLOW]

downstream,10746

area_sqkm,1016.777536

catch_no,10767

Volume Factor,0.207098

Peak Factor,0.039781

[BASEFLOW_META]

Time Accessed,15 November 2024 03:09PM

Version,2016_v1

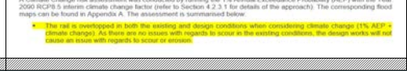
[END_BASEFLOW]

[ENDTXT]

APPENDIX C

ARTC Review

Document Control Information			
	Contractor DC to update for re-submission	**Submitted Document No. or Transmittal No.:**	Martinus-PTRAN-001678
Project:	2100 - A2I	**Date Submission Received:**	11/08/2025
Comment Sheet Number_Revision:	5-0052-210-IHY-G3-CS-0001_D	**Comment Sheet Title:**	***External Comment Sheet - A2I | Flood Design Report - Yerong Creek Yard***
Revision Date:	31/10/2025	**Documents related in Aconex** (by IR DC)	*Yes*

Review Comments (Reviewer)									Responses (Document Owner)					Close-Out			
#	PSR ID No. **or** Compliance Reference Document *(State the fully qualified reference the deliverable is non-compliant with)*	Document / drawing number - Revision Number	Section # / page #	Engineering Assurance Stage	Comment *(for example must be specific on non compliance. Reference mark-ups, if required)*	Comment Type	Full Name	Date	Full Name	Company	Date	Response *(must be specific on how the comment has been addressed. Agreed approach for re-submission)*	Documentation Section # / Figure #	Full Name	Date	Comment Status	Close-Out Comment
Example	*IR-SR-A2I-517 or 01-3500-PD-P00-DE-0008-A*	*0-0000-900-PEN-00-TE-0020_A*		*CRR*	*Is there sufficient space for a 10m maintenance vehicle to turn around at the end of the RMAR?*	*Non-Compliant*	*Joe Bloggs*	*15/02/2023*	*Fred Bloggs*	*Designer*	*15/03/2023*	*The area has been increased - now possible to turn 12.5m vehicle. The drawings are updated.*	*01-3500-PD-P00-DE-0008-A 01-3500-PD-P00-DE-0015-C*	*Jane Doe*	*27/09/2023*	CLOSED	
1	PSR, Ann F	5-0052-210-IHY-G3-RP-0001_A P11	Page 2, 5-0052-210-IHY-G3-RP-0001_A, Page 1, Doc Control	Draft	Malinda Gunasekera - Water Engineer, unable to verify EDPM Competency	Non-Compliant	Mick Parnell	16/07/2025	Michal Plesjo	DJV	25/07/2025	DJV in process with ARTC Competency application forms for Flooding team , to still be assessed by Assessor. We plan to have this in place by latest mid-Aug 25		Mick Parnell	14/10/2025	CLOSED	
2	PSR, Ann F	5-0052-210-IHY-G3-RP-0001_A P11	Page 2, 5-0052-210-IHY-G3-RP-0001_A, Page 1, Doc Control	Draft	Yucen Lu - Senior Water Resources Engineer 'Prepared by', unable to verify EDPM Competency	Non-Compliant	Mick Parnell	16/07/2025	Michal Plesjo	DJV	25/07/2025	DJV in process with ARTC Competency application forms for Flooding team , to still be assessed by Assessor. We plan to have this in place by latest mid-Aug 25		Mick Parnell	14/10/2025	CLOSED	
3	PSR, Ann F	5-0052-210-IHY-G3-RP-0001_A P11	Page 2, 5-0052-210-IHY-G3-RP-0001_A, Page 1, Doc Control	Draft	Jasmine Lee - Associate Water Resources Engineer 'Reviewed by', unable to verify EDPM Competency	Non-Compliant	Mick Parnell	16/07/2025	Michal Plesjo	DJV	25/07/2025	DJV in process with ARTC Competency application forms for Flooding team , to still be assessed by Assessor. We plan to have this in place by latest mid-Aug 25		Mick Parnell	14/10/2025	CLOSED	
4	*Opportunity*	5-0052-210-IHY-G3-RP-0001_A P11	Page 34, 5-0052-210-IHY-G3-RP-0001_A P1, Section 5.5	Draft	Is there a risk of erosion? if yes, any recommendations for improving its resilience?	Opportunity	Ayub Ali	7/07/2025	Malinda Gunasekera	DJV	25/07/2025	This statement should read "is overtopped in both the existing and design conditions when considering climate change". As there are no issues with regards to scour in the existing conditions, the design works will not cause an issue with regards to scour or erosion. This will be updated for the IFC report as shown in the screenshot below.  5.5.2 Climate Change Risk Assessment A Climate Change risk assessment was conducted by running the 1% Annual Exceedance Probability (AEP) with the Year 2090 RCP8.5 interim climate change factor (refer to Section 4.2.3.1 for details of the approach). The corresponding flood maps can be found in Appendix A. The assessment is summarised below: • The rail is overtopped in both the existing and design conditions when considering the 1% AEP + Climate Change event. 31/010/25: The wording has been updated:  5.5.2 Climate Change Risk Assessment A Climate Change risk assessment was conducted by running the 1% Annual Exceedance Probability (AEP) with the Year 2090 RCP8.5 interim climate change factor (refer to Section 4.2.3.1 for details of the approach). The corresponding flood maps can be found in Appendix A. The assessment is summarised below: • The rail is overtopped in both the existing and design conditions when considering climate change (1% AEP + Climate change). As there are no issues with regards to scour in the existing conditions, the design works will not cause an issue with regards to scour or erosion.	Draft IFC snipped at left 31/10/25: IFC wording updated	Ayub Ali	1/09/2025	OPEN	Instead of the single sentence "The rail is overtopped in both the existing and design conditions"; its recommended to include the full response in the flood design report such as "The rail is overtopped in both the existing and design conditions when considering climate change. As there are no issues with regards to scour in the existing conditions, the design works will not cause an issue with regards to scour or erosion."

Non-Compliant:	Non-compliance which requires correction before further design development occurs.	**OPEN:**	Comment has not been addressed.
Opportunity:	Comment which identifies an opportunity to save capex, achieve increased quality or operational outcome. Not a non-compliance.	**CLOSED:**	Comment is closed. No further action.
		NEXT PHASE:	Comment response has been accepted. Resulting actions have been deferred to the next Phase of the Project (for Doc Control purposes the comment is considered OPEN)
		TRANSFERRED:	Response is not acceptable or review has been split and the comment has been transferred to another comment sheet. (for Doc Control purposes comment is considered CLOSED)

APPENDIX D

External Consultation Review

D1 – TfNSW Review

D2 – CPHR Review

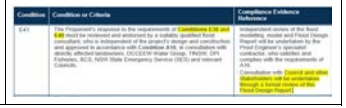
D3 – Council Review

APPENDIX D1

TfNSW Review

Attachment 1: A2I Flood Design Report CONSULTATION - COMMENTS REGISTER

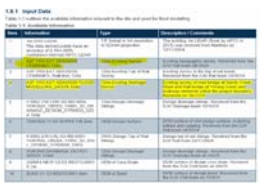
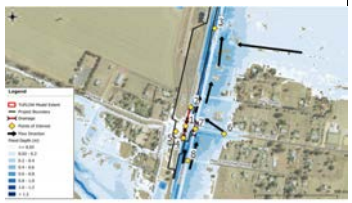
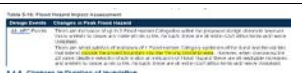
Doc No.: 5-0052-210-IHY-G3-CS-0001-TW_B

Stakeholder Category	Stakeholder Name	Flood Design Report name	Document reference (e.g. section, figure, table)	Date raised	Topic that comment relates to	Comments	Date	Name	Response	Evidence
State Government	TfNSW	Package: A2I –Yerong Creek Yard	Figures - Blockage Sensitivity	5/08/2025	Blockage Sensitivity	Blockage sensitivity maps do not show changes to flood levels as a result of blockage. Please include maps that illustrate where the model is sensitive to blockage by showing any areas where there is an increase in flood levels as a result of increases in blockage factor.	8/08/2025	Malinda Gunasekera / Zoe	Noted. Blockage figure is provided as an in-report figure nd not in Appendices as it is not required as an assessment scenario for CSSI CoA. However, to address the concern around clarity, more detailed map figures will be provided within the deisgn report where there are areas sensitive to blockage.	
State Government	TfNSW	Package: A2I –Yerong Creek Yard	Figures - Blockage Sensitivity	5/08/2025	Flood Impacts	There is an area on the Olympic Highway that is impacted by the project by an increase in flood level up to 20mm, between Cole and Macconochie Streets. This section also shows areas that were once dry-now wet in the 5% AEP event. Introducing further drainage works in this area may reduce these impacts e.g. minor lifting of the pavement along the Olympic Highway by 20mm.	8/08/2025	Malinda Gunasekera	Noted. However, these impacts are within the relevant afflux limit for the landuse type (50mm)	
State Government	TfNSW	Package: A2I –Yerong Creek Yard	2.2. Conditions of Approval - Flooding	5/08/2025	Editorial	In Table 2-2 for Condition of Approval E41 this should read "The Proponent's response to the requirements of Conditions E38 and E40 .." - please correct.	8/08/2025	Malinda Gunasekera	Noted. This has been corrected in the Draft-IFC version	

APPENDIX D2

CPHR Review

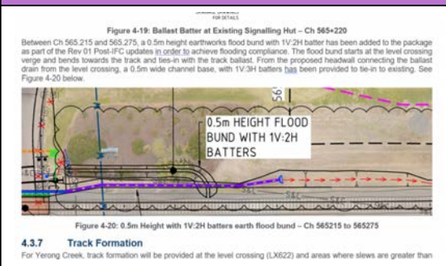
A2I Flood Design Report CONSULTATION - COMMENTS REGISTER

Stakeholder Category	Stakeholder Name	Flood Design Report name	Document reference (e.g. section, figure, table)	Date raised	Topic that comment relates to	Comments	Date responded	Name	Response	Evidence
	CPHR	A2I-Yerong Creek Yard-Flood Design Report (5-0052-210-IHY-G3-RP-0001)	Section 1.9	7/07/2025	Inputs	Inputs referenced ARR 2019 V4.1. Latest Version (Aug 2024) is V4.2. Confirm why the latest version was not referenced or used. Section 4 referenced v4.1 (pre Aug 2024) and given this report is dated 2025 then a comment should be provided regarding the updated V4.2 method of addressing climate change and potential impacts to the results of the updated method.	18/8/25	Malinda Gunasekera	As per the EIS report (Section 3.3.5 of Albury to Illabo Environmental Impact Statement Technical Paper 11) and the agreement between the Contractor and ARTC for the continued use of the prior version (v4.1) of ARR2019 climate change method (refer to IR2140-RTRFI-000773), the Year 2090 RCP8.5 interim climate change factor sourced from the ARR Data Hub (https://data-legacy.arr-software.org/) and the associated 20.2% increase in	
	CPHR	A2I-Yerong Creek Yard-Flood Design Report (5-0052-210-IHY-G3-RP-0001)	Section 1.11	7/07/2025	Limitations	Given there is limited survey outside the project boundary, confirm whether any additional studies or investigations are proposed.	18/8/25	Malinda Gunasekera	Survey was undertaken for the road bridge at Sandy Creek as well as both road and rail bridges at Yerong Creek. The IFC report will be updated to reflect this.	
	CPHR	A2I-Yerong Creek Yard-Flood Design Report (5-0052-210-IHY-G3-RP-0001)	Section 1.11 - last dot point	7/08/2025	Survey of culverts and bridges	This dot point states that the railway and highway bridges are not critical as they are outside the project boundary. Although they are physically located outside the site they have a large influence on the flows that reach and leave the site. When the flows through the culverts/bridges at Sandy Creek are at capacity the residual flows travel north along the road/rail alignments impacting the site. Conversely the flows in Yerong Creek can be choked by the bridges causing flows to backup to the south along the road/rail alignments. As such, accurate survey of these structures is needed to accurate represent the flood impacts I would suggest.	18/8/25	Malinda Gunasekera	Noted and updated. Survey was undertaken for the road bridge at Sandy Creek as well as both road and Rail Bridges at Yerong Creek. However, the IFC flood assessment demonstrated that the design was still compliant with the PSR and CoA.	
	CPHR	A2I-Yerong Creek Yard-Flood Design Report (5-0052-210-IHY-G3-RP-0001)	Table 1-1 - Item 1	7/08/2025	LiDAR data	Lockhart Shire Council has recently collected new (2025) LiDAR for Yerong Creek for the development of the new Yerong Creeek Flood Study. Council maybe willing to share this data if it is useful?	18/8/25	Malinda Gunasekera	This new 1m LiDAR was not available at the time that this assessment was undertaken. As shown in Section 1.9.1, this assessment used the 1m LiDAR that was provided by ARTC that was supplemented by topographic survey of the site area. Therefore, this is unlikely to make a major difference to flood behaviour.	
	CPHR	A2I-Yerong Creek Yard-Flood Design Report (5-0052-210-IHY-G3-RP-0001)	Table 2-2 - Condition E46	7/08/2025	Incorrect Council	Yerong Creek is within Lockhart Shire Council not Greater Hume Shire Council. Need to liaise with the correct local Council for stormwater related issues.	18/8/25	Malinda Gunasekera	Noted and corrected in the report.	
	CPHR	A2I-Yerong Creek Yard-Flood Design Report (5-0052-210-IHY-G3-RP-0001)	Section 4.1 - 1st Para - last sentence	7/08/2025	Figure # missing	Figure # missing from the sentence that refers to Figure 4-1.	18/8/25	Malinda Gunasekera	Noted and corrected in the report.	
	CPHR	A2I-Yerong Creek Yard-Flood Design Report (5-0052-210-IHY-G3-RP-0001)	Section 4.1.1	7/07/2025	Hydrology Model Comparison	The RORB equation appears to be consistently lower than the RFFE. Given the confidence limits for the RFFE is relatively large, this approach does not appear to be conservative and further discussion is required to justify the adoption of the less conservative flows.	18/8/25	Malinda Gunasekera	Noted and further discussed in the report. The flows derived from the ARR2019 equation are considerably higher especially in the Yerong Creek Catchment. The RORB equation flows however match better across the AEPs and hence, the RORB equation flows were adopted.	
	CPHR	A2I-Yerong Creek Yard-Flood Design Report (5-0052-210-IHY-G3-RP-0001)	Section 5.1	7/07/2025	Existing Conditions	All the points of interest appear to be within the project boundary. As flooding extends into the township, consideration should be given to additional points of interest in critical areas outside the project boundary.	18/8/25	Malinda Gunasekera	Noted. Points in the township area will be added to the reported points of interest.	
	CPHR	A2I-Yerong Creek Yard-Flood Design Report (5-0052-210-IHY-G3-RP-0001)	Section 5.4.2	7/07/2025	Changes to Peak Velocity	The CoA provides velocity limits which are separate to afflux limits. Reference should be made to velocity CoA. Peak velocities of 1.4m3/s are reported, confirm whether any scour protection is going to be recommended, and discuss any potential impact outside the project boundary.	18/8/25	Malinda Gunasekera	Noted and have updated the text to reference that all velocity increases are within the project boundary. Scour protection measures have been considered in the drainage design. Please refer to Section 4.5 of the IFC rev01 Design Report 5-0052-210-PEN-G3-RP-0001 for more information about the drainage design	
	CPHR	A2I-Yerong Creek Yard-Flood Design Report (5-0052-210-IHY-G3-RP-0001)	Section 5.4.3	7/07/2025	Changes to Peak Flood Hazard	The CoA provides hazard conditions which are separate to afflux limits. Additional details should be provided as to the location and impact of the increase in flood hazard.	18/8/25	Malinda Gunasekera	Noted and added more information regarding location of hazard increases. However, as stated previously, based on a comparison of 2D (depth x velocity) values, these are not material hazard increases and do not pose a risk to life.	
	CPHR	A2I-Yerong Creek Yard-Flood Design Report (5-0052-210-IHY-G3-RP-0001)	Section 5.5.1 - 2nd Para - 1st sentence	7/08/2025	Figure # missing	Figure # missing from the sentence that refers to Figure 5-11.	18/8/25	Malinda Gunasekera	Noted and corrected in the report.	
	CPHR	A2I-Yerong Creek Yard-Flood Design Report (5-0052-210-IHY-G3-RP-0001)	General	7/07/2025	Description	Additional information regarding the changes in design (e.g. drain construction) would be helpful in understanding the project.	18/8/25	Malinda Gunasekera	Details regarding construction methodology are not within the flooding scope. Please refer to Section 4.5 of the IFC rev01 Design Report 5-0052-210-PEN-G3-RP-	

APPENDIX D3

Council Review

A2I Flood Design Report CONSULTATION - COMMENTS REGISTER

Stakeholder Category	Stakeholder Name	Flood Design Report name	Document reference (e.g. section, figure, table)	Date raised	Topic that comment relates to	Comments	Date	Name	Response	Evidence
Council	Lockhart Shire	Yerong Creek Yard - Flood Design Report 2-0052-210-IHY-G3-RP-0001_A.pdf	Section 5.4, 5.2, 4.2.2, 1.9.1	7/07/2025	Bund	Report refers to proposed bund. I can't find any details regarding a bund in the design drawings.	18/8/25	Malinda Gunasekera	Appendix A (Flood maps) in the Flood Design report will be updated to include the bund in the IFC submission. Please refer to Section 4.3.6 (last para) of the IFC Rev 2 Design Report 5-0052-210-PEN-G3-RP-0001 for more information about the civil design that includes the bund.	 Figure 4-19: Ballast Batter at Existing Signalling Hut – Ch 565+220 Between Ch 565.215 and 565.275, a 0.5m height earthworks flood bund with 1V:2H batter has been added to the package as part of the Rev 01 Post-IFC updates in order to achieve flooding compliance. The flood bund starts at the level crossing verge and bends towards the track and ties-in with the track ballast. From the proposed headwall connecting the ballast drain from the level crossing, a 0.5m wide channel base, with 1V:3H batters has been provided to tie-in to existing. See Figure 4-20 below. Figure 4-20: 0.5m Height with 1V:2H batters earth flood bund – Ch 565215 to 565275 4.3.7 Track Formation For Yerong Creek, track formation will be provided at the level crossing (LX622) and areas where slews are greater than

APPENDIX E

Independent Flood Consultant Review

Project: 2300 **Deliverable:** Yerong Creek Yard

Comment Sheet Reference: 5-0052-210-IHY-G3-CS-0001-PE_E

Review Comments (Reviewer)											Responses (Document Owner)					Close-Out				
#	Document number / drawing number - Revision Number	Section # / page #	Company	Full Name	Functional Area	Date	Design Gate	Comment (for example must be specific on non compliance. Reference mark-ups, if required)	Compliance Reference Document (State the fully	Comment Type	Full Name	Role	Date	Response (must be specific on how the comment has been addressed)	Where addressed (Section # / Figure #)	Full Name	Company	Date	Comment Outcome	Close-Out Comment
1	5-0052-210-IHY-G3-RP-0001_A	TUFLOW files	Hatch	Sam Drysdale	Flood Assessment	30/07/2025	DDR	The Sandy Creek cross-drainage beneath the Olympic Highway and railway is duplicated in the 1D and 2D domains and needs to be removed from the 2D domain. Reduced cross-drainage results in increased flood impacts from the design works.		Major	Malinda Gunasekera	DJV Flood Modeller	8/08/2025	Noted and acknowledged. This has been rectified in the model by correcting the duplication and modelling the road bridge as a 2d_lfcsh and the rail bridge as a 1d culvert. We have undertaken a sensitivity test for the 1% AEP event critical duration and no non-compliances were identified with regards to flood immunity or flood impacts. The full flood impact assessment will be undertaken and check against with CoA and PSR. The FDR IFC report and model will be resubmitted for PE review.		Daniel Williams	Hatch	8/11/2025	CLOSED	Noted. To be confirmed at IFC
2	5-0052-210-IHY-G3-RP-0001_A	TUFLOW files	Hatch	Sam Drysdale	Flood Assessment	30/07/2025	DDR	No deck form loss was applied in Layer 2 of the Layered Flow Constriction Shapes for the Yerong Creek bridges. To accurately represent the effects of the bridge superstructure through the water column, both blockage and form loss should be applied (as undertaken for Layer 1)		Minor	Malinda Gunasekera	DJV Flood Modeller	8/08/2025	Noted. This has been updated in the IFC model to incorporate both FLC and blockage factor for the superstructure. However, for Layer 1 (for the piers), the representation has been updated so only a FLC factor is applied as per guidance from TUFLOW. According to the TUFLOW recommendations, the pier form loss coefficients in Hydraulics of Bridge Waterways are derived based on the cross-sectional averaged velocity through the bridge opening in the absence of piers. It's not necessary to specify a blockage value if a pier form loss coefficient estimated from this method is used.		Daniel Williams	Hatch	8/11/2025	CLOSED	Noted. To be confirmed at IFC
3	5-0052-210-IHY-G3-RP-0001_0	TUFLOW files	Hatch	Sam Drysdale	Flood Assessment	30/09/2025	IFC	An earthen bund is included in the TUFLOW modelling, which is integral to maintaining consistency with the existing local peak flood conditions. Whilst full detail of the design crest level of the bund (which is the key hydraulic control) is represented in the modelling, detail in the design drawings is limited to an approximate 0.5 m high reference in 5-0052-210-CXR-G3-DR-0101 and two cross-sections indicating closer to a 0.4 m height in 5-0052-210-CCW-G3-DR-0304. It is recommended that further detail is provided in the design drawings (e.g. a long section of crest heights) given the importance of the bund.		Minor	Malinda Gunasekera	DJV Flood Modeller	13/10/2025	The civil drawings (5-0052-210-CCW-D3-DR-0304) have been updated as per the comments . No changes required to the modelling and the flood report.	5-0052-210-CCW-D3-DR-0304	Daniel Williams	Hatch	31/10/2025	CLOSED	The drawings do not appear to have been updated. The IFC drawing set includes two cross-sections through the bund but they do not provide full detail of the crest level along the total length of bund. DJV has confirmed that the civil design model matches what is used in the TUFLOW model and that the construction works will utilise the civil design model rather than rely solely on the design drawings.
			Hatch	Darren Lyons	Flood Assessment	31/10/2025	IFC	No further comments						Noted. No further action						

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