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MARTINUS INLAND RAIL

FLOOD DESIGN REPORT

A2I | Albury to Illabo

Package: A2I – Edmondson Street Bridge and Footbridge

CONTRACT NUMBER: 0052

PROJECT DOCUMENT NUMBER:

5-0052-210-IHY-W5-RP-0001

Document Control

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Revision History

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0	03/10/2025	IFC Issue for review	03/10/2025

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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
CoA	Conditions of Approval
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
FS	Finish-Start constraint type
FSL	Finished Surface Level
GDA	Geocentric Datum of Australia
GIR	Geotechnical Interpretative Report
GSDM	Generalised Short-Duration Method.
HF	Human Factors
I2S	Illabo to Stockinbingal
ICA	Indirectly Connected Area
IFC	Issued for Construction
IR	Inland Rail

Term	Definition
ITC	Incentivised Target Cost
IV	Independent Verifier
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 Pathway
REF	Review of Environmental Factors
RFI	Request for Information
S2P	Stockinbingal to Parkes
SA	Source Area
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
WBNM	Watershed-Based Network Model is a hydrology software tool used for simulating flood hydrographs from storm rainfall hyetographs.
UMM	Updated Mitigation Measures

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 thirty (30) 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)
- Junee Driver Platforms – JE11 and JE70
- 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
- Junee Drivers Platforms

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 Sites Description

This study conducts a flood assessment for the Edmondson Street Overbridge and Footbridge (referred to in this report as Edmondson bridge and footbridge). Refer to Figure 1-1 for site location. The background and previous studies for the Wagga Wagga sites are listed below.

Figure 1-1: Site Location

1.3.1 Background

The Edmondson Street Bridge and Footbridge forms part of the Albury to Illabo Section works at Chainage (CH)521.385km. The Edmondson Street bridge and footbridge (Site) is located within the City of Wagga Wagga and between Sturt Highway and Coleman Street. As part of the project scope, the existing Edmondson Street bridge will be replaced with a roadbridge and footbridge. The proposed bridge and footbridge solution will provide vehicle crossing and pedestrian crossing over the railway tracks and will have a vertical clearance of 7.1m over the Main line to allow the passage of double-stacked container rail traffic underneath the bridge.

1.4 Objectives

This report has been prepared to support the delivery of the bridge replacement at the Edmondson Street bridge and footbridge (Package W5) and comply with the CSSI Condition of Approval (CoA) and updated mitigation measures (UMM) for quantitative flood modelling, demonstrating compliance with pre- and post-development criteria. This report provides a flood impact assessment for the Issued for Construction (IFC) 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 outside of the project boundary.

1.5 Scopes

The scope of this study includes:

- Carrying out the flood assessment for the design in the DDR stage (DDR stage design was adopted in IFC stage assessment, refer to section 1.10) for design events of 10%, 5%, 2%, 1%, 0.05% AEPs, 1% AEP with climate change and PMF.
- Checking flood assessment results against the criteria, including flood impact and flood immunity.
- Proposing any mitigation measures (if required).

1.6 Previous Studies

1.6.1 Flood Studies

Table 1-1 summarises all the flood studies associated with the Wagga Wagga area.

Table 1-1: Summary of the Previous Flood Studies

Item No.	Flood Study	Description	Comments
1	Wagga Wagga Major Overland Flow Flood Study (WMAwater, 2011)	This flood study provided detailed local design flooding information for an area of 167 km2 on a 5m grid resolution. The hydrologic and hydraulic (WBNM/TUFLOW) modelling system was utilised, calibrated and validated for historical events. ARR1987 was adopted.	-
2	Wagga Wagga Major Overland Flow Floodplain Risk Management Scoping Study – Final Report (WMAwater, 2012)	This study was conducted to contextualise findings from item 1 before a Floodplain Risk Management Study commenced and recommendations were made.	-
3	Wagga Wagga Major Overland Flow Model Update Report (WMAwater, 2015)	This flood study updated the flood models originally established in item 1 by adopting the recommendations from item 2.	-
4	Wagga Wagga Revised Murrumbidgee River Floodplain Risk Management Study and Plan (WMAwater, 2018)	This study and plan assessed and ultimately recommended a broad range of mitigation options to manage flood risk in Wagga Wagga due to Murrumbidgee River flooding.	-
5	Wagga Wagga Major Overland Flow Floodplain Risk Management Study and Plan (MOFFS) (WMAwater, 2021)	This study and plan updated the hydrology and hydraulic models used in Items 1 and 3 above. ARR2019 has been used. The ARR2019 flood level results have been compared against the ARR1987 ones and it showed that flood levels in ARR2019 is 0.05 m - 0.3m higher than the ones from ARR1987. Therefore, ARR2019 is adopted as ARR1987 methodologies are likely to underestimate the flood risk throughout overland catchment areas. It is noted that ARR2019 flood extents remain largely unchanged compared with ARR1987 results.	TUFLOW and WBNM models in MOFFS were adopted and updated in this flood assessment. The TUFLOW model parameters can be found in Table 4-2.

1.6.2 Reference Design

The prior Reference Design report prepared by WSP is:

- Albury to Illabo (A2I) and Stockinbingal to Parkes (S2P) Projects Reference Design Report – Wagga Wagga (June 2022)

The Edmondson Street footbridge enhancement works were not investigated as part of the Reference Design (as not part of the design scope at the time). However, the Edmondson Street footbridge will be constructed next to Edmondson Street bridge, thus the Edmondson Street Bridge Reference Design investigation was utilised for the review.

There is no detailed flood modelling within the Reference Design report. The Reference Design report stated that the site is not impacted by major regional flooding (1% AEP) from the Murrumbidgee River. Wagga Wagga Council flood mapping however indicates local overland flooding in the rail corridor, in close proximity to the proposed bridge replacement. There are no watercourses within the project site. The nearest surface water receptors include the council stormwater network and the Murrumbidgee River. The construction layout will require consideration and management of local drainage through Erosion and Sediment Control plans.

1.6.3 Environmental Impact Statement

An EIS which has been approved, supports the application for approval of the Proposal under Division 5.2 of the Environmental Planning and Assessment Act 1979 (EP&A Act). It addresses the environmental assessment requirements set by the Secretary of the NSW Department of Planning, Industry and Environment, which is commonly referred to as the SEARs. The A2I CSSI Environmental Impact Statement contains the following relevant prior assessment documents:

- Albury to Illabo Environmental Impact Statement (EIS) Technical Paper 11 – Hydrology, flooding and water quality (July 2022)

The Edmondson Street footbridge enhancement works were not investigated as part of the Reference Design. However, the Edmondson Street footbridge will be constructed next (east) to the Edmondson Street bridge, thus the Edmondson Street Bridge Enhancement Works Reference Design investigation was utilised for the review.

There is no detailed flood modelling within this Technical Paper. A qualitative assessment was undertaken to assess the flood condition of the site based on two previous flood studies covering the City of Wagga Wagga: Wagga Wagga Revised Murrumbidgee River Floodplain Risk Management Study and Plan (2018) and MOFFS (WMAwater, 2021). It was found that the site is not affected by flooding from Murrumbidgee River up to the 1% AEP (refer to Figure 1-2) but is affected by local flooding during the 5% and 1% AEP events (refer to Figure 1-3).

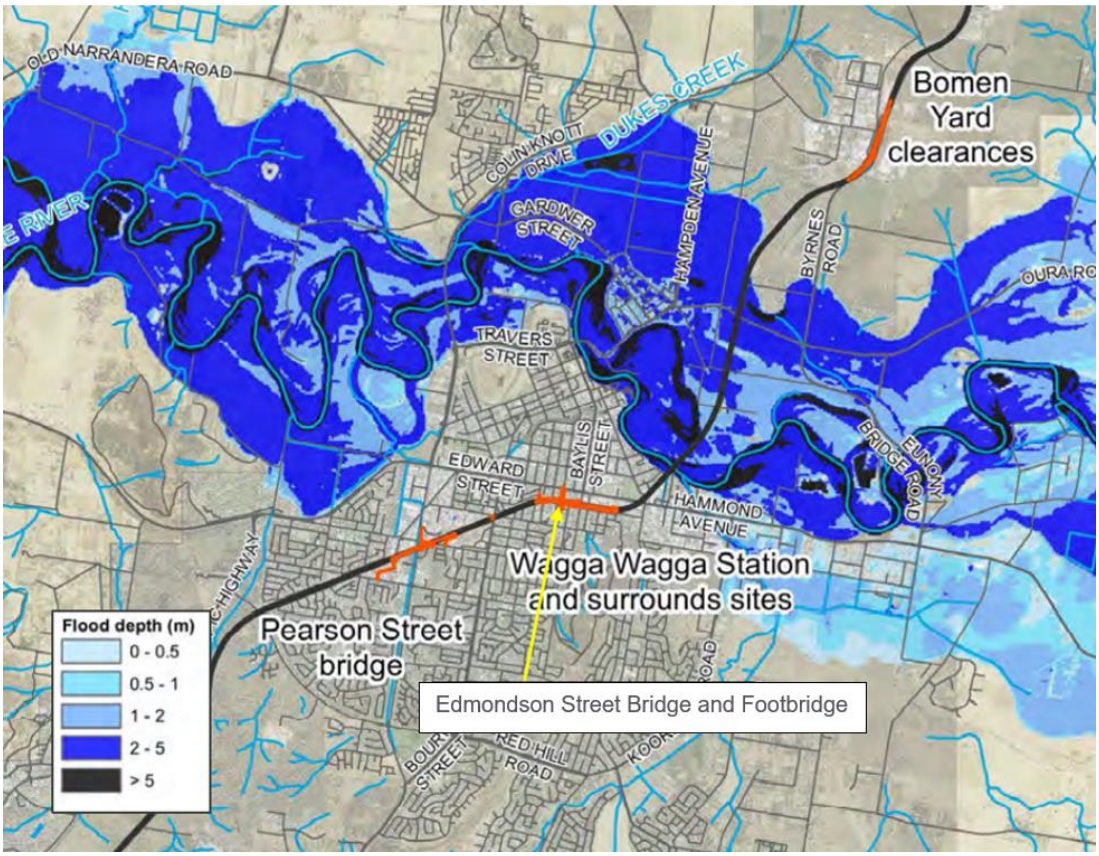


Figure 1-2: 1% AEP Regional Flooding (Image source: Albury to Illabo EIS Technical Paper 11 (July 2022))

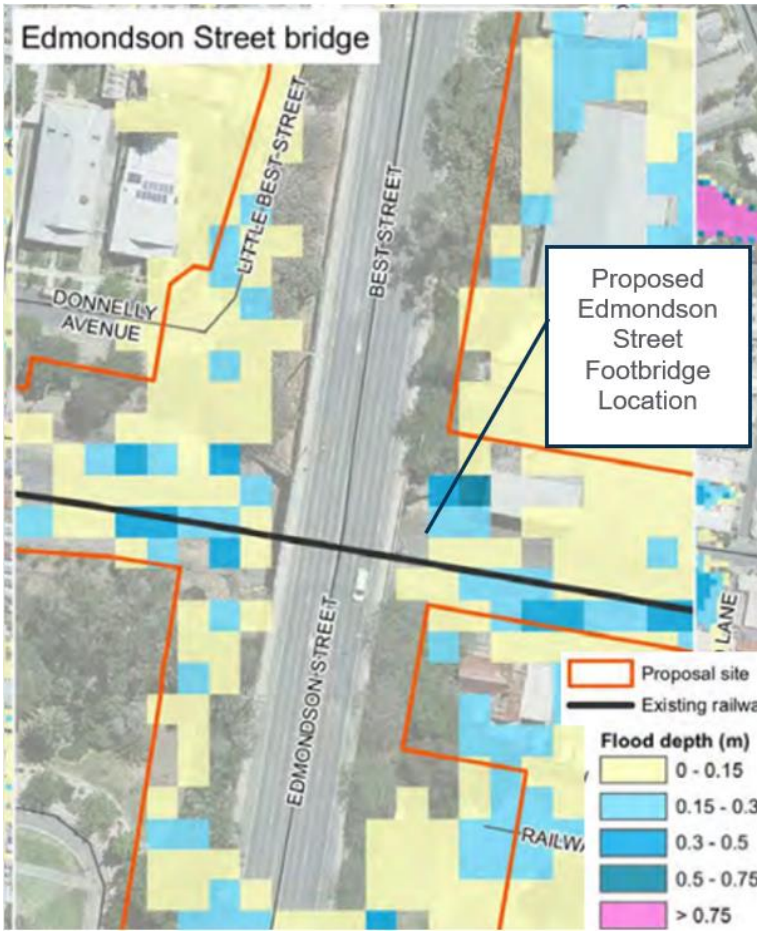


Figure 1-3: 1% AEP Local Flooding (Image source: Albury to Illabo EIS Technical Paper 11 (July 2022))

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 and is being managed.

The secondary purpose of this report is to provide evidentiary documentation of consultation and review by external stakeholders, and the independent suitably-qualified flood consultant, in demonstrating compliance with the CSSI conditions of approval. Refer to Appendix C for the ARTC review, Appendix D for the external consultation review, and Appendix E for the independent flood consultant review comments.

1.8 Information Documents

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

- Wagga Wagga Major Overland Flow Floodplain Risk Management Study and Plan (WMA Water, 2021). This flood study supersedes the other flood study listed in Table 1-1 as it's the most recent flood study.
- Albury to Illabo (A2I) and Stockinbingal to Parkes (S2P) Projects Reference Design Report – Wagga Wagga (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 1-2 outlines the available information relevant to the site and used for flood modelling.

Table 1-2: Available Information

Item	Information	Type	Description / Comments
General			
1	Flood model used in Wagga Wagga Major Overland Flow Floodplain Risk Management Study and Plan (WMAwater, 2021)	TUFLOW model in GDA94 projection	Received from ARTC on 29/08/2023
2	Hydrology model used in the Wagga Wagga Major Overland Flow Floodplain Risk Management Study and Plan (WMAwater, 2021)	WBN** (PMF for GSDM* only, 0.2% AEP, 0.5% AEP, 1% AEP, 2% AEP, 5% AEP, 10% AEP, 20% AEP)	Received on 29/08/2023 (refer to DJV RFI-007). WBN files (generated by Storm injector) include a single temporal pattern for durations 120 minutes, 360 minutes and 720 minutes for events 0.2% AEP, 0.5% AEP, 1% AEP, 2% AEP, 5% AEP, 10% AEP, 20% AEP and 90 minutes & 180 minutes for PMF.
3	Additional GIS files with Indirectly Connected Area (ICA) and catchment data related to Hydrology.	GIS files	Received from Wagga Wagga City Council on 22/11/2023 as part of the response to RFI 020
4	LiDAR 2020 (The data used to create this DEM has an accuracy of 0.3m (95% Confidence Interval) vertical and 0.8m (95% Confidence Interval) horizontal)	TIF format in 1m resolution in GDA2020 projection	Downloaded from https://elevation.fsdf.org.au/ on 26/09/2023
5	LiDAR 2015 and High-Resolution Aerial Imagery. The data derived points have an accuracy of 0.15m (68% confidence interval) ARTC LiDAR	TIF format in 1m resolution in GDA94	The existing 1m LiDAR (provided by ARTC) was received from Martinus on 12/11/2024. However, the LiDAR2020 (item 4) is newer and in GDA2020. Therefore, only LiDAR 2020 (item 4 above) is used.
Site Specific			
6	5-0052-210-ISV-W0-MD-0001-WAGGA_FEATURE_SURVEY.dwg	DWG CAD file	Site Survey in the GDA94 projection received from ARTC on 06/09/2023
7	SURVEY W7 MGA20 SURVEY DTM 21 W7 ISV.flt SURVEY W5 W6 MGA20 RAIL SURVEY DTM 21 W5 W6 ISV 000.flt	FLT grid file (1m grid)	Verified Point cloud data – Site survey in the GDA2020 projection – Wagga Wagga Yard and Edmondson Street bridge. Please note that the Edmondson point cloud data is superseded by item 9. Received from Civil Team on 12/04/2024
8	A2P CAS EXT GDA20Z55.12da	12Da file	Verified Point cloud data – Site survey in GDA2020 projection – Cassidy Parade Received from Martinus on 11/04/2024.
9	6-0052-210-ISV-W5-SV-0001_A.12da	12Da file	Survey TIN for Edmondson. Received from Martinus on 17/03/2025.
10	010425 EDMONDSON ST EXISTING DRAINAGE.12daz	12Da file	Existing drainage data. Received from DJV Drainage team on 1/04/2025.

Item	Information	Type	Description / Comments
11	5-0052-210-DDR-W5-MD-2004-EDMONDSON_STREET_BRIDGE_3D_DRAINAGE_DESIGN_STRINGS_12DA.12da 100425 EDMONDSON ST DRAINAGE SCHEDULE.xlsx 110425 Proposed Inlet pit curves.xlsx	12Da file and Excel file	Proposed drainage data. Received from DJV Drainage team on 11/04/2025.
12	20250410 EDMONDSON ST BRIDGE FLOOD TIN.dem	DEM	Edmondson Street bridge and footbridge Design Civil Design TIN in the GDA2020 projection. Received from DJV Civil team on 10/04/2025
13	5-0052-210-SBD-W5-MD-2001-EDMONDSON_STREET_BRIDGE_3D_STRUCTURAL_DESIGN_BRIDGE_MODEL_DWG.dwg	DWG CAD file	Edmondson Street bridge and footbridge Design Bridge Layout in the GDA2020 projection. Received from DJV Structure team on 02/04/2025

*: GSDM stands for Generalised Short-Duration Method.
** "WBN" is the extension of the WBNM file.

1.10 IFC Design Sensitivity

1.10.1 Model Update

A sensitivity analysis was made to assess the flooding condition for Edmondson Street, Wagga Yard and Wagga footbridge based on the updated survey and IFC design. The updates include:

- Addition of the latest survey topography for Edmondson (Survey received on 12/05/2025)
- Updated existing pipe data as per survey (Data received from the Drainage Team on 14/07/2025)
- Inclusion of the IFC designs for the design scenario
  - Edmondson Street Bridge and the footbridge (Civil and drainage)
  - Wagga Mothers Bridge (Civil)
  - Wagga Yard (Civil and drainage)

1.10.2 Assessment

Storm events of the 1% AEP and 2% AEP (based on the DDR results, the afflux value from the 2%AEP is higher than the 5% AEP and 10% AEP) have been run for the IFC Design Sensitivity analysis. The details of illustrations for the 1% AEP events is provided in Appendix F for the Edmondson Street and Footbridge and the 2% AEP results are attached after 1% AEP.

- In both events (1% and 2% AEPs), the changes in flood level, changes in flood velocity and changes in flood hazard comply with PSR and CoA.
- Generally, the value of changes in flood levels, changes in flood velocity and changes in flood hazard between DDR and IFC are similar (please refer to Appendix F). The difference between the DDR and IFC assessment findings is the change in flood water flow direction due to an update to the railway corridor culvert sizing and surveyed topography downstream of culvert. In the DDR scenario, the culvert size was 0.9m wide x 0.6m high and the flow was towards Little Best Street. In the IFC scenario, the culvert size was amended (decreased aperture) to 0.77m wide x 0.47m high and the flow is away from Little Best Street. Additionally, the updated surveyed topography shows higher levels downstream of the culvert, forming a barrier that prevents floodwater from entering Little Best Street. However, this does not change any flood immunity, and all the changes are within the project boundary.

1.10.3 Findings

- For the assessment of the 1% AEP and 2% AEP based on the new survey and design, it showed minor differences in terms of changes in flood level, changes in flood velocity and changes in flood hazard when

comparing with DDR. Therefore, it is not expected to identify any non-compliance in the 5% AEP and 10% AEP.

- Therefore, it is not necessary to re-run the whole flood events (PMF, 0.05% AEP, 1%AEP CC, 1%AEP, 2% AEP, 5% AEP and 10% AEP) for Edmondson Street Bridge and Footbridge due to such minor changes.

Given that the changes in the IFC are minimal compared to the DDR, the flood assessment will not result in any non-compliance. Therefore, the flood assessment results and maps from the DDR stage will be utilised to inform the IFC flood assessment from Section 2 onwards.

1.11 Outputs

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

1.12 Limitations and Assumptions

The following limitations and assumptions are applied to the Edmondson Street bridge and footbridge site.

- The site was not subject to regional flooding as per the EIS (Technical Paper 11, Hydrology, Flooding and Water Quality, Albury to Illabo Environmental Impact Statement).
- An assessment of temporary works and staging has not been undertaken as it is out of the flooding scope.
- 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 is adopted for all the other culverts, pits and pipes outside the project boundary.

2 COMPLIANCE WITH REQUIREMENTS

2.1 Project Scope and Requirements

Assessment of the DDR 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 Edmondson Street Bridge and Footbridge design's compliance with the PSRs.

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 waterway flow)
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.	The ARTC minimum requirement is 1% AEP. However, the top of the track is overtopped in the 10% AEP in the existing scenario. Thus, the existing immunity will be less than 10% AEP. The existing immunity is maintained under design conditions. Refer to Section 6.3.
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.	The ARTC minimum requirement is 1% AEP. However, the top of the track is overtopped in the 10% AEP in the existing scenario. Thus, the existing immunity will be less than 10% AEP. The existing immunity is maintained under design conditions. Refer to Section 6.3.
Project Wide	5.4.5	Bridge and culvert hydraulics shall comply with Austroads Guide to Bridge Technology Part 8: Hydraulic Design of Waterway Structures.	There are no other waterway structures within the Edmondson Street bridge and footbridge scope.
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 running the 1% AEP + 2090 RCP 8.5 and identifying that the bridge has low hazards. Refer to Section 6.5.2.
A2I Technical Requirements	IR-SR-A2I-349	The Corridor System for Enhancement Corridors shall have a flood immunity of no worse than existing.	The existing immunity is maintained under design conditions. Refer to Section 6.3.
A2I Technical Requirements	IR-SR-A2I-350	The Corridor System, where the existing track is lowered, shall maintain the existing flood immunity.	N/A (No track lowering included in the Edmondson Street bridge and footbridge scope).

Requirement	Identifier	A2P Technical Requirements Description	Compliance Evidence Reference
A2I Technical Requirements	IR-SR-A2I-352	The Corridor System shall prevent damage of the formation due to ponding of water.	No ponding of water. Existing Immunity is maintained. Proposed condition accommodates channels and additional drainage pipe to drain the site. Refer to Sections 6.2 & 6.3.
A2I Technical Requirements	IR-SR-A2I-458	The Corridor System shall prevent ponding in longitudinal open channels.	The proposed channels have culvert outlets which prevent ponding. Refer to Drainage Design (5-0052-210-PEN-W5-RP-0001)
A2I Technical Requirements	IR-SR-A2I-459	The Corridor System for Enhancement Corridors shall provide mitigation for flood impacts no worse than existing condition.	Existing condition is maintained. Refer to Section 6.3.
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.	Existing condition is maintained. Refer to Section 6.4.
A2I Technical Requirements	IR-SR-A2I-465	The Corridor System shall minimise changes to the existing or natural flow patterns.	Existing condition is maintained. Refer to Section 6.2 & Section 6.3.
A2I Technical Requirements	IR-SR-A2I-541	The Structures System new underbridges shall withstand the 0.05% annual exceedance probability design flood event.	The 0.05% AEP event simulation was carried out and identified that the flood velocity is generally less than 1m/s and the hazard is generally low. The flood level will not touch the bridge deck. Refer to Section 6.2. In addition, this is not a waterway bridge. So, it is low risk to the structural integrity. Refer to Section 4.6 Structure in 5-0052-210-PEN-W5-RP-0001 for details.
A2I Technical Requirements	IR-SR-A2I-735	The Third-Party System private roads shall have flood immunity no worse than existing.	No third-party private roads are impacted.
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.

2.2 Conditions of Approval - Flooding

The Conditions of Approval (CoA) have been provided as part of the CSSI approval and 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	Compliant. Refer to Section 6.

Condition	Condition or Criteria	Compliance Evidence Reference
	environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of riverbanks or watercourses.	
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 6.
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 6.
E40	a) Hydrologic and hydraulic assessments consistent with *Australian Rainfall and Runoff – A Guide to Flood Estimation* (GeoScience Australia, 2019);	Compliant. Section 4.
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. The existing rail level was used to inform the flood immunity. Refer to Section 6.
E40	d) Confirmation of predicted afflux at industrial properties adjacent to Railway Street, Wagga Wagga based on field survey.	N/A. This report relates to the Edmondson Street bridge and footbridge site. Refer to the Wagga Yard Flood design report (5-0052-210-IHY-W7-RP-0001) for confirmation of predicted afflux at industrial properties.
E40	Updated flood modelling must be made publicly available in accordance with **Condition B18**.	Flood design report and 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.
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.	Compliant Independent review of the flood modelling, model and Flood Design Report is undertaken by the Proof Engineer's specialist contractor, who satisfies and complies with the requirements of A16. Consultation with the council and other stakeholders is being undertaken through a formal review of this Flood Design Report.
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 items below
E42	(a) a maximum increase in inundation time of one hour, or 10%, whichever is greater;	Compliant. Refer to Section 6.4.4
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 of 10mm in above-floor inundation on any properties. Refer Section 6.4.1

Condition	Condition or Criteria	Compliance Evidence Reference
E42	(c) no above-floor inundation of habitable rooms which are currently not inundated;	Compliant. No increase for above floor inundation of habitable rooms on any properties. Refer Section 6.4.1
E42	(d) a maximum increase of 50 mm in inundation of land zoned as residential, industrial or commercial;	Compliant. No flood level increase of more than 50mm in residential, industrial and commercial areas. Refer Section 6.4.1
E42	(e) a maximum increase of 100 mm in inundation of land zoned as environment zone or public recreation;	Compliant. No flood level increase of more than 100mm in the environment zone or public recreation Refer to Section 6.4.1
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 flood level increase of more than 200mm in rural or primary production, environment zone or public recreation Refer to Section 6.4.1
E42	(g) no increase in the flood hazard category or risk to life; and	Compliant Refer to Section 6.4.3
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 Refer to Section 6.4.2
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.	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 6
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 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	Flood information will 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 in accordance with the requirements of CoA E45

Condition	Condition or Criteria	Compliance Evidence Reference
	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.	
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 E47.**	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 the council's stormwater networks have been consulted with Wagga Wagga City Council during the briefing workshops, various stages of design submissions with the Council's comments closed out, details are documented in 5-0052-210-PEN-W5-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	Comment if non-compliant
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 the 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 Edmondson Street bridge and footbridge site, and so is not relevant to the Wagga Wagga Yard enhancement site, Refer to Wagga Yard Flood design report (5-0052-210-IHY-W7-RP-0001) for predicted afflux at industrial properties. Compliant. Quantitative assessment has been undertaken. Refer to Section 6.	-
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 Edmondson Street bridge and footbridge 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 design package due to changes in the project scope and/or evolution of the design.

3.1 Concept Design to SDR

Key design changes between the Concept Design and the SDR Design are listed in Table 3-1.

Table 3-1: Design Differences Between Concept and SDR

Item	Difference	Reason for Change
1	Incorporation of existing condition survey	An existing condition survey was provided
2	Incorporation of Design Drainage	New drainage design
3	Incorporation of Civil Design	New civil design

3.2 SDR to Initial PDR

Key design changes between the PDR and the SDR Design are listed in Table 3-2.

Table 3-2: Design Differences Between SDR and PDR

Item	Difference	Reason for Change
1	Updated hydrology, which resulted in changes in critical durations for each AEP event.	Additional information (Item 3 of Table 1-2) was provided regarding the hydrology.
2	Incorporation of the latest existing condition survey (Point cloud data)	An updated existing conditions survey was undertaken
3	Incorporation of Design Drainage	New Drainage Design for Edmondson Street bridge and Edmondson footbridge
4	Incorporation of Civil Design	New Civil Design for Edmondson Street bridge
5	Incorporation of Bridge Design	New Bridge design for Edmondson Street bridge and Edmondson footbridge
6	Incorporation of Wagga yard and Cassidy Parade footbridge Design elements	To form a master design condition to assess cumulative impacts

3.3 Initial PDR to 2nd (Revised) PDR

There was a need for design revision due to the State Design Review Panel (SDRP) advice on the Edmondson Street footbridge package. IThe required changes to the design are documented in a re-submission of PDR (70%). A re-submission of PDR was deemed warranted to enable stakeholder consultation (TfNSW, Wagga Wagga Council and ARTC) to be undertaken based on the updated design.

Key design changes between the initial PDR and the 2nd (revised) PDR Design are listed in Table 3-2.

Table 3-3: Design Differences Between Initial PDR and 2nd PDR

Item	Difference	Reason for Change
1	Incorporation of the latest existing condition survey and drainage data	A new existing condition survey and existing drainage data were provided
2	Incorporation of Design Drainage	New Drainage Design for Edmondson Street bridge and Edmondson footbridge
3	Incorporation of Civil Design	New Civil Design for Edmondson Street bridge
4	Incorporation of Bridge Design	New Bridge design for Edmondson Street bridge and Edmondson footbridge
5	Incorporation of DDR Wagga yard and 2nd PDR Cassidy Parade footbridge Design elements	To form a master design condition to assess cumulative impacts

3.4 PDR2 to DDR

Key design changes between the PDR2 and the DDR Design are listed in Table 3-4.

Table 3-4: Design Differences Between 2nd PDR and DDR

Item	Difference	Reason for Change
1	Incorporation of the latest existing condition survey and drainage data	A new existing condition survey and existing drainage data were provided
2	Incorporation of Design Drainage	New Drainage Design for Edmondson Street bridge and Edmondson footbridge
3	Incorporation of Civil Design	New Civil Design for Edmondson Street bridge
4	Incorporation of Bridge Design	New Bridge design for Edmondson Street bridge and Edmondson footbridge
5	Incorporation of the DDR Wagga Wagga Yard, Cassidy Parade Footbridge and Wagga Mothers Footbridge design elements	To form a master design condition to assess cumulative impacts

3.5 DDR to IFC

Key design changes between the DDR and the IFC Design are listed in Table 3-5.

Table 3-5: Design Differences Between DDR and IFC

Item	Difference	Reason for Change
1	Updating sections and text throughout the report	To address ARTC / PE / TfNSW review comments
2	Conducted sensitivity analysis based on IFC design and survey (Refer to section 1.10)	- New IFC topography survey and existing drainage for Edmondson Street bridge and Edmondson footbridge - New IFC Drainage Design for Edmondson Street bridge and Edmondson footbridge - New IFC Civil Design for Edmondson Street bridge and Edmondson footbridge

4 MODELLING METHODOLOGY

The overall approaches for flood modelling are listed below:

- Utilise the hydrological model and generate flow hydrographs for input to the hydraulic model for all events to perform critical duration analysis.
- Update the received TUFLOW model by incorporating the latest LiDAR (Section 4.2) and survey. Use the updated TUFLOW model to predict hydraulic behaviour, which will be formed as the existing model for this study.
- The updated existing condition TUFLOW model results compared against the received model results (refer to Section 5).
- Update the TUFLOW model from the existing condition to the master design condition model by incorporating the Edmondson footbridge and Edmondson Street bridge design into the existing model.
- Incorporate the Wagga Wagga Yard design (5-0052-210-IHY-W7-RP-0001), Cassidy Parade Footbridge (5-0052-210-IHY-W4-RP-0001), and Wagga Mothers Footbridge design (5-0052-210-IHY-W8-RP-0001) into the Master Design condition to understand the cumulative impact on the site (refer to Section 6.4.5).
- Conduct a Climate Change Sensitivity Assessment for the 1% AEP to inform the potential impact on the railway track flood immunity.
- The flood impact was assessed up to the 1% AEP climate change and the flood results were shown including 1% AEP + Climate Change, 0.05% AEP and PMF to allow understanding regarding the bridge's flood risk.
- Conduct a blockage assessment as per ARR 2019 procedures.

4.1 Hydrologic modelling

The WBNM (City Catchment) model was utilised to generate flow hydrographs for input to the hydraulic model. The hydrology model covers Glenfield Drain (at CH523.560km) as well as the Wagga Wagga CBD and outer areas lying on the southern Murrumbidgee River floodplain. Refer to Figure 4-1 for the sub-catchment extents of the hydrology model.

As stated in Item 2, Table 1-2, only WBN running files generated by the Storm Injector were received, and those files could not be run directly through the WBNM software due to the lack of ICA and geometry. To produce the inflow hydrographs for critical duration analysis, Storm Injector HL (V 1.3.9.0) was used alongside the provided ICA and geometry data (Item 3, Table 1-2). However, generating identical hydrograph inflow values proved challenging. As a conservative approach, slightly higher inflow values (generally 0.0035 m3/s) than the received ones were created, which were then utilised in the hydraulic assessment. Table 4-1 presents a comparison between the received and adopted WBN files.

Flow hydrographs were generated for input to the hydraulic model for the 10% AEP, 5% AEP, 2% AEP, 1% AEP, and 1% AEP + Climate Change events to perform critical duration analysis (refer to Table 4-1 in the Hydraulic modelling).

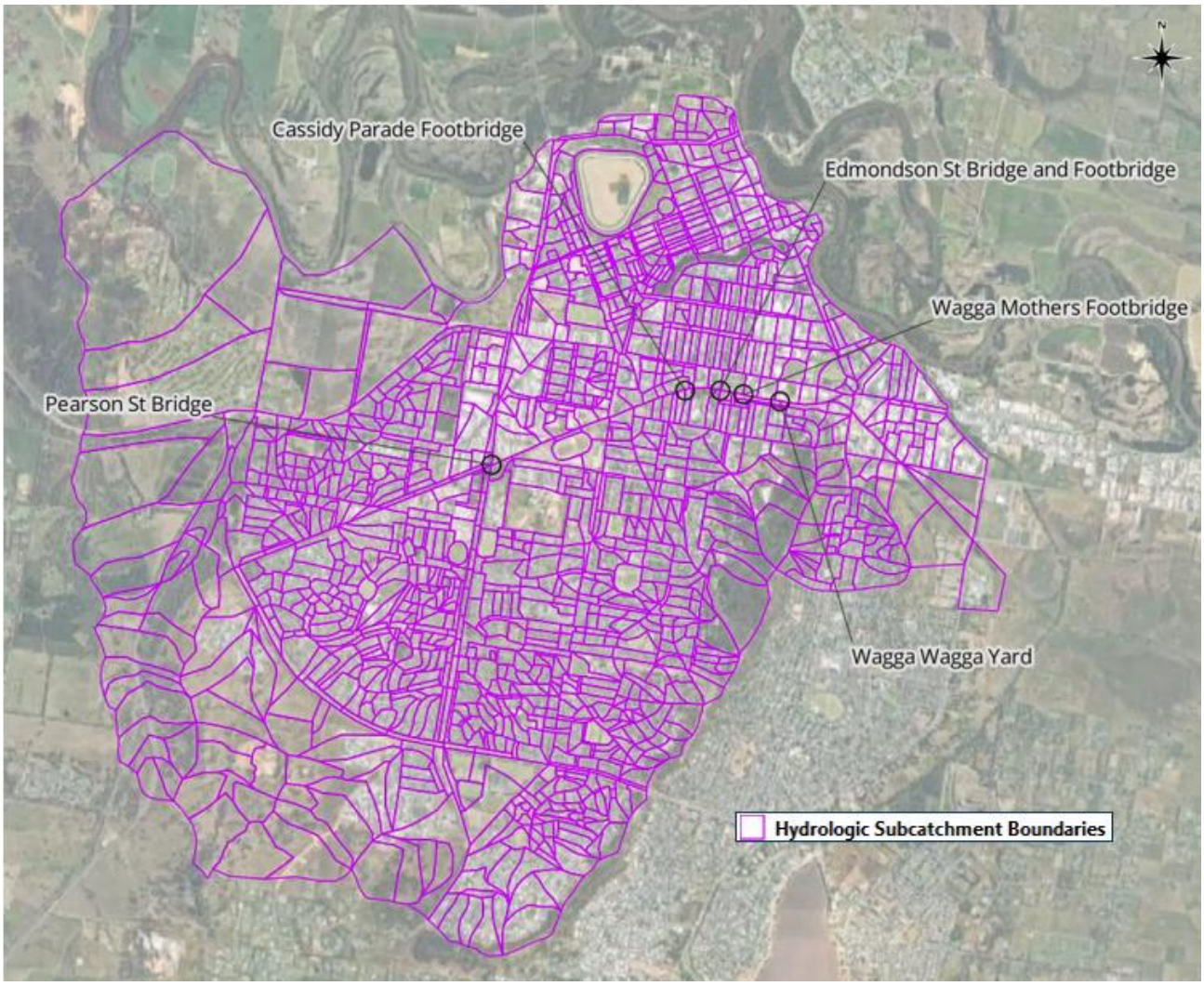


Figure 4-1: Hydrologic Subcatchment Extents

Table 4-1: Model Parameters of Hydrology Model

Parameters	Received Hydrology Model	Adopted Hydrology Model
Hydrology model and version	WBNM model (V2017) with WBN files	WBNM model (V2017) using Storm injector HL (V 1.3.9.0).
Total catchment area	3835 ha (38.35 km^2).	3835 ha (38.35 km^2).
Events	PMF, 0.2% AEP, 0.5% AEP, 1% AEP, 2% AEP, 5% AEP, 10% AEP, 20% AEP	0.05% AEP, 1% AEP + Climate Change, 1% AEP, 2% AEP, 5% AEP, 10% AEP, PMF
Duration Temporal pattern received/generated	Single temporal pattern for durations 120 minutes, 360 minutes and 720 minutes for all events 90 minutes and 180 minutes for PMF	Ensemble temporal pattern for duration ranging from 10 minutes to 720 minutes
Indirectly Connected Area (ICA)	Utilised received inflow hydrographs for events 1% AEP, 2% AEP, 5% AEP and 10% AEP, which had ICA included.	The hydrology model was updated with relevant ICA values from the data received from the Wagga City Council (item 3 in Table 1-2) and relevant inflow hydrographs for the hydraulic models were generated. These inflow hydrographs were then used in the model for the flood assessment.

4.2 Hydraulic Modelling

4.2.1 Existing Model Update

The existing model was updated based on the received TUFLOW from MOFFS (WMAwater, 2021) mentioned in Section 1.6.1. A summary of the received model and updated model parameters can be found in Table 4-2. The model extent encompasses Wagga Wagga's central business district (CBD) and surrounding regions situated along the southern floodplain of the Murrumbidgee River, spanning an area of approximately 42 km^2 (refer to Figure 4-2).

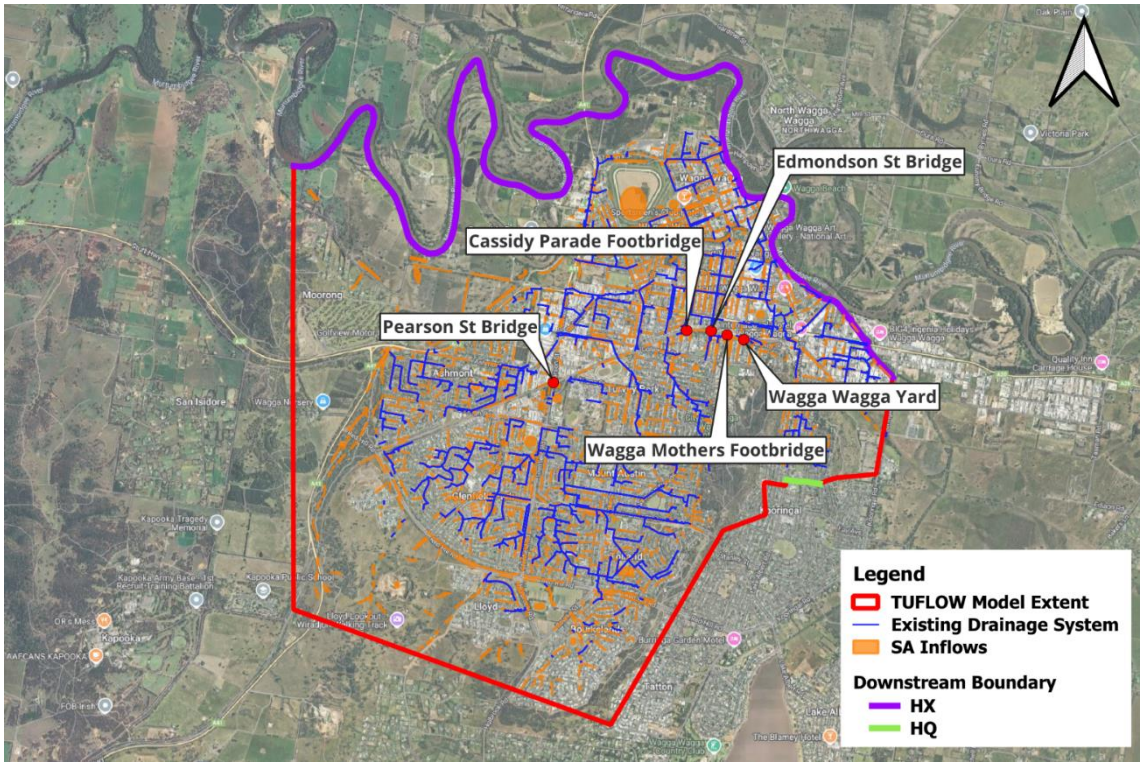


Figure 4-2: TUFLOW Model Extent

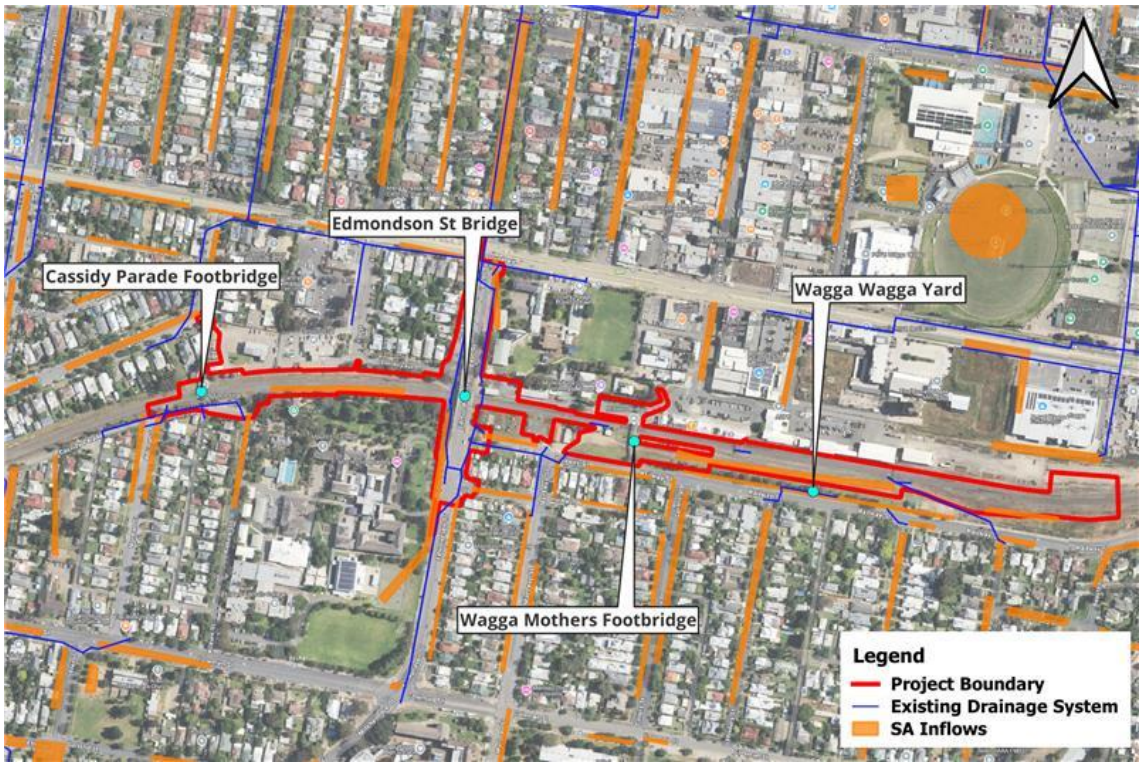


Figure 4-3: Edmonson Street Bridge and Footbridge (Zoomed in)

Table 4-2: Model Parameters in the Updated Existing Model and MOFFS 2021 TUFLOW Model

Parameters	MOFFS 2021 Model	Updated TUFLOW Model
Build	TUFLOW 2018-03-AC HPC	TUFLOW.2020-10-AF HPC (Refer to Section 4.2.1.2 – "TUFLOW model version and grid size" for more details)
Coordination Reference System (CRS)	GDA94 MGA 55	GDA2020 MGA 55
Grid Size	5m	1.25m within the quadtree area (Site area) and 5m outside of the quadtree area (Refer to Figure 4-5). (Refer to the following Section of "TUFLOW model version and grid size" for more details)
Hydrology	WBNM ARR2019	WBNM ARR2019
Inflow type	SA Polygon	SA Polygon (Figure 4-2)
Key Structures	No bridge was included.	The existing Edmondson Street Bridge and Wagga Wagga footbridge abutment were represented in the model.
Extent	Wagga Wagga's central business district (CBD) and surrounding regions are situated along the southern floodplain of the Murrumbidgee River	Wagga Wagga's central business district (CBD) and surrounding regions are situated along the southern floodplain of the Murrumbidgee River
Downstream Boundary	Dynamic downstream water boundary (HX) and slope boundary (HQ)	Dynamic downstream water boundary (HX) and slope boundary (HQ)
Timestep	Dynamic	Dynamic
Building Representation	Null polygon	Null polygon
Topography	1 m resolution LiDAR collected in 2008 5 m x 5 m resolution photogrammetry was obtained from Geoscience Australia – Elevation Information System (ELVIS) 2014 LiDAR was used for two basins upstream of Jubilee Park on Bourkelands Drive	1 m resolution LiDAR collected in 2008 5 m x 5 m resolution photogrammetry was obtained from Geoscience Australia – Elevation Information System (ELVIS) 2014 LiDAR was used for two basins upstream of Jubilee Park on Bourkelands Drive 2020 LiDAR for sites Site survey and verified cloud point data (Refer to Item 6, 7 and 8 in Table 1-2)
Roughness	Pasture: 0.045 1D cross section elements: 0.040 Lots: 0.060 Ponds and other water bodies: 0.030 Newly built/resurfaced road: 0.018 Industrial: 0.070 Roads: 0.022 Creek permanent water: 0.040 Vegetation: 0.100 Vegetated creek: 0.080 Railway: 0.060 1D cross section (crooked creek): 0.060	Pasture: 0.045 1D cross section elements: 0.040 Lots: 0.060 Ponds and other water bodies: 0.030 Newly built/resurfaced road: 0.018 Industrial: 0.070 Roads: 0.022 Creek permanent water: 0.040 Vegetation: 0.100 Vegetated creek: 0.080 Railway: 0.060 Design Channel: 0.035 1d cross section (Crooked Creek): 0.060 Design Channel: 0.035 Note: Some roughness areas in the site (the rail line) were refined
Design Events	PMF, 0.2% AEP, 0.5% AEP, 1% AEP, 2% AEP, 5% AEP, 10% AEP, 0.2 EY	PMF, 0.05% AEP, 1% AEP + Climate Change, 1% AEP, 2% AEP, 5% AEP, 10% AEP

4.2.1.1 GDA 2020 conversion

The conversion to the Geocentric Datum of Australia 2020 (GDA2020) represents a crucial update to modernise and align the model with the latest geodetic standards and reference systems and to meet project requirements on the CRS. The model layers and the rasters were converted into GDA2020 Map Grid of Australia (MGA) 55 from GDA94 MGA 55.

4.2.1.2 TUFLOW model version and grid size

The initial 5-meter grid size and TUFLOW 2018-03-AC HPC was adopted in the MOFFS 2021 TUFLOW model. However, a 5m grid was found to be insufficient to model the detailed specific requirements of the study area. Consequently, a more refined grid size is required. The application of a finer grid to the whole model extent is not cost-effective in terms of the computation time as the site areas are limited compared with the model extent. As such, the approach of applying quadtree (only available in versions from 2020 onwards) with 1.25m to the site area is favoured.

2023-03-AC is the most up-to-date TUFLOW version at the time when the modelling was carried out. However, when running the model using the 2023-03-AC HPC, inconsistencies were noted near the site area, particularly at area 1 and area 2 (refer to Figure 4-4), in comparison to the results obtained from the 2018-03-AC HPC. Area 1, which is located near the Pearson Street Bridge, experienced an increase of around 0.1 m in flood level, while area 2 (upstream of Wagga Yard) experienced an increase of around 0.5 m in flood level.

Following a series of tests, it was found that version 2020-10-AF HPC (the latest release prior to 2023) yielded results most similar to the results produced by the MOFFS 2021 model (2018-03-AC HPC), which is accepted by Wagga City Council (refer to Section 5 for more details). In Area 1 and 2, the flood levels were increased by around 0.02m and 0.15m.

Therefore, TUFLOW 2020-10-AF HPC with a quadtree of 1.25m was adopted for this study (refer to Figure 4-5 for the adopted quadtree extent).

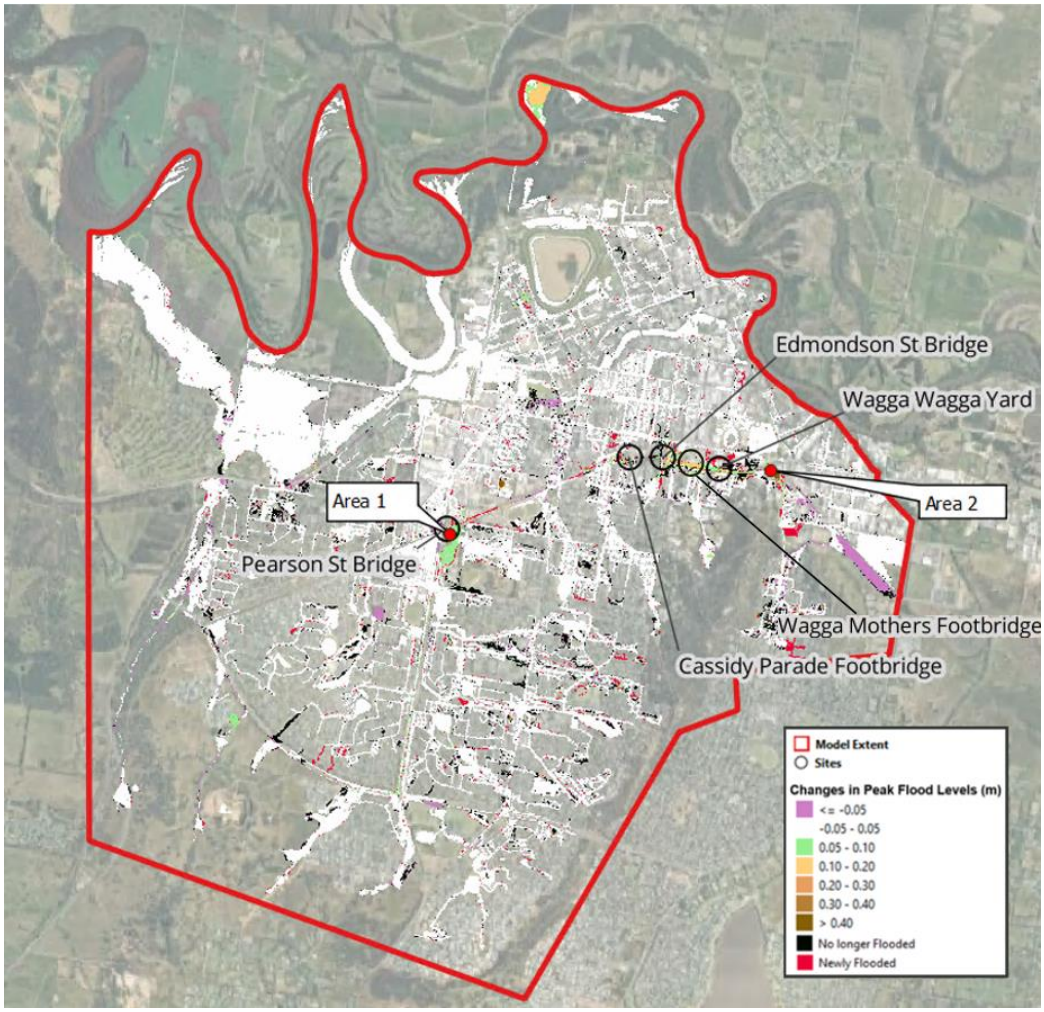


Figure 4-4: Discrepancies Between 2023-03-AC and 2018-03-AC TUFLOW Version Flood Levels

Figure 4-5: Quadtree Extent – Edmondson Street Bridge and Footbridge

4.2.1.3 Topography

The model topography was updated by incorporating the 2020 LiDAR into site areas. The adopted 2020 LiDAR extents are shown in Figure 4-6. The model topography was updated by incorporating the site survey (Item 6 & 9 in Table 1-2), the verified point cloud data (Item 7 & 8 in Table 1-2). This update was performed to enhance the accuracy of the model, ensuring a proper representation of the most recent topography within the study area.

Figure 4-6: LiDAR Extent

4.2.1.4 Key Structures

The MOFFS TUFLOW Model (2021) did not model any bridges within the study area, including the existing Edmondson Street bridge. The model topography levels (before adding the 2020 LiDAR and site survey) under the Edmondson Street bridge were higher than the actual levels. This restricted the flooding under the Edmondson Street bridge, acting like a barrier, and did not show the rail corridor as flooded in the council maps. However, after updating the model with the 2020 Lidar and site survey, the flow conveyance occurred under the bridge. As the Edmondson Street bridge is a key hydraulic structure within the site, ignoring the bridge will result in an inaccurate outcome.

The survey and point cloud data were incorporated into the model to represent the topography section under the bridge accurately, and the bridge was incorporated as a Layered Flow Constrictions (2d_lfcsh) layer based on the available survey data. After the model update, flood water conveyance was shown at the rail corridor under the Edmondson Street bridge.

4.2.1.5 Drainage Network

Existing drainage networks (shown in Figure 4-7) were updated around the Edmondson Street bridge and footbridge site area (based on item 10 in Table 1-2).

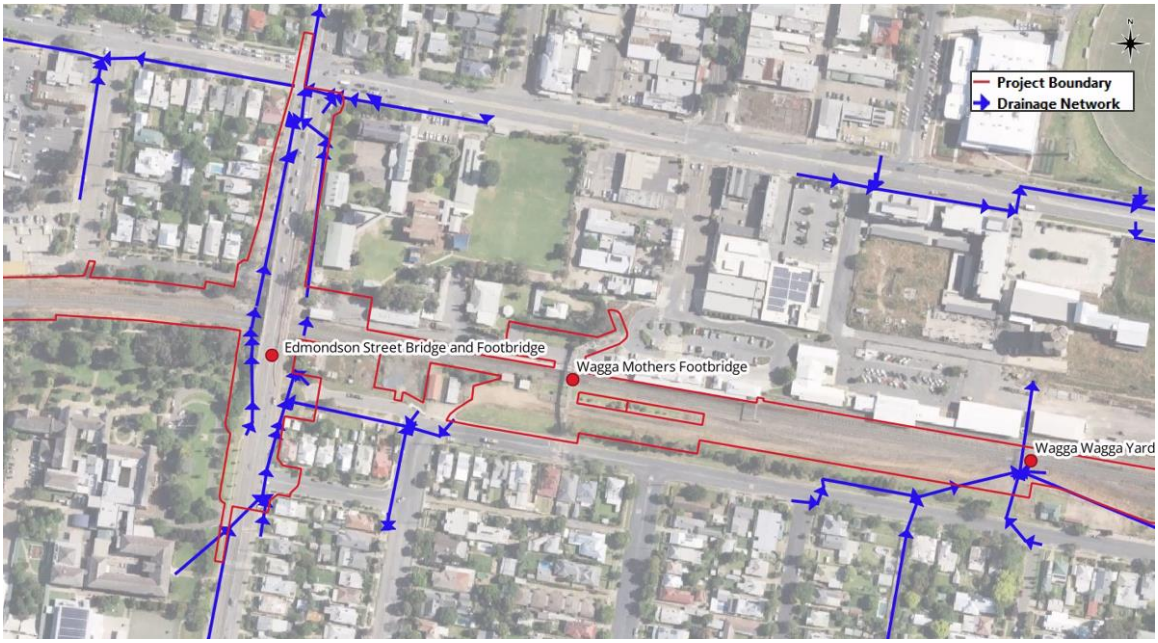


Figure 4-7: Drainage Network surrounding Edmondson Bridge and Footbridge

4.2.2 Design Model Update

The design model was updated from the existing condition by incorporating the Inland Rail Project Works as part of the DDR stage, including:

- Road design – The road design for the Edmondson Street bridge, encompassing design levels up to the Street abutments, was incorporated into the model (item 12 in Table 1-2). Refer to Figure 4-8 for changes in topography between the existing and design conditions.
- Design Street bridge and footbridge span representation. The street bridge was modelled as a Layered Flow Constrictions (2d_lfcsh) layer. The bridge data was adopted from the Edmondson Street bridge plan (item 13 in Table 1-2)
- Soffit level – 190.729 mAHD
    - Deck thickness – 1.8m
    - Safety guard rail height and blockage – 3.6m with 40% Blockage
- Design footbridge bridge ramp representation. Footbridge ramp was incorporated as a part of the road design (item 13 in Table 1-2).
- Design footbridge pier (access ramp) representation. The piers were modelled as a Layered Flow Constrictions (2d_lfcsh). The bridge data was adopted from the Edmondson Street footbridge plan (item 13 in Table 1-2), and the detail is summarised below:
    - Soffit level
- Pier 1 – 189.3 mAHD
    - Pier diameter – 1.2m
    - No debris blockage was adopted as this bridge is not a waterway bridge.
- Proposed drainage networks were incorporated into the model. The layout and pipe sizes of the design drainage system were adopted from the drainage plan (item 11 in Table 1-2).

This inclusion did not result in any alterations to the sub-catchment topography (Figure 12 of Wagga Wagga Major Overland Flow Flood Study, WMAwater, 2011). Thus, the inflow locations remain consistent with the existing model.

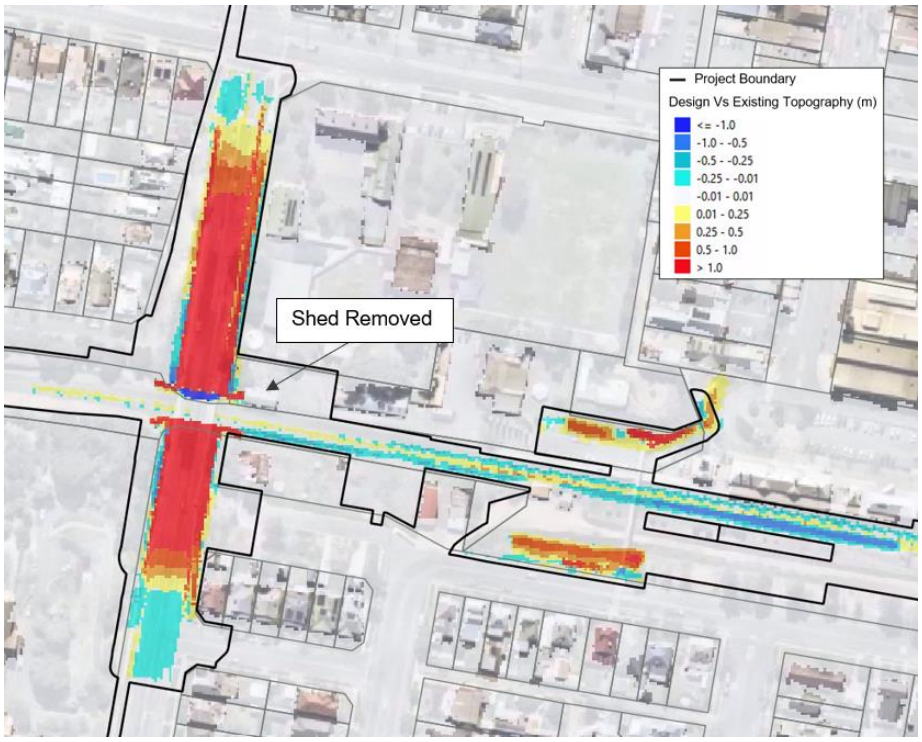


Figure 4-8: Changes in Topography (Design vs Existing)

4.2.3 Design Events

The storm durations of 10min, 15min, 20min, 25min, 30min, 45min, 60min, 90min, 120min, 180min, 270min, 360min, 540min and 720min were modelled. An ensemble of 10 temporal patterns was run for each duration as recommended in ARR2019. The critical durations were determined based on the maximum envelope method across the selected durations.

The model was run for the design events of 10%, 5%, 2%, 1%, 0.05% AEPs, 1% AEP with climate change and PMF. The critical duration and temporal patterns determined and elaborated below in Table 4-3 summarise the information of the design events.

Table 4-3: Summary of Events and Critical Durations Run in TUFLOW – Edmondson Street Bridge and Footbridge Master Design

Design Events	Master Design Critical Duration	Temporal Pattern
10% AEP	30 minutes, 60 minutes, 120 minutes	All 10 temporal patterns for each duration
5% AEP	30 minutes, 90 minutes, 120 minutes	
2% AEP	30 minutes, 45 minutes, 60 minutes, 90 minutes	
1% AEP & 1% AEP + Climate Change	30 minutes, 45 minutes, 60 minutes	
0.05% AEP	20 minutes, 30 minutes, 45 minutes, 60 minutes	
PMF	30 minutes, 45 minutes, 60 minutes	All 11 temporal patterns for each duration

4.2.3.1 Climate Change

There is no design criterion for flood impact on climate change. Therefore, a sensitivity assessment was conducted to evaluate the influence of climate change on flooding to anticipate future climate change flood risk. The existing WBNM model was employed to generate hydrographs for the TUFLOW model for the 1% AEP with climate change.

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 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 rainfall was adopted.

5 HYDRAULIC MODEL COMPARISION

The comparison in this section involved the results from the updated DDR model existing condition against the results from the MOFFS TUFLOW model for the 1% AEP design event storm duration of 120 minutes and Temporal pattern ID 3935.

Generally, this comparison revealed a high degree of consistency in flood levels between the two sets of results, with variations typically falling within the range of +/- 50 mm (refer to Figure 5-1). In some localised areas, larger differences were found ranging around from 0.05 to 0.3 meters. The possible reasons are listed below:

- It was initially expected that transitioning to a newer version of TUFLOW, which incorporates the quadtree method, might lead to minor changes in flood levels. The quadtree method could alter the model running timestep compared to the original model, potentially contributing to an increase in flood levels of up to 0.2m at the northern downstream boundary. However, since this area is distant from the sites, any such changes in flood levels would not impact the site.
- The changes in flood levels around the sites primarily stem from the integration of the 2020 LiDAR data and the comprehensive site survey.
- The existing drainage networks were updated based on the data provided by the DJV Drainage team which involved modification in terms of pipe location, pipe size inverts etc.
- Modifications were done based on the Independent Flood Consultant Specialist's review comments regarding the SA (Source Area) inflow polygons which additional flows were directed to the open channel at Colemans Street, creating more flows to the site

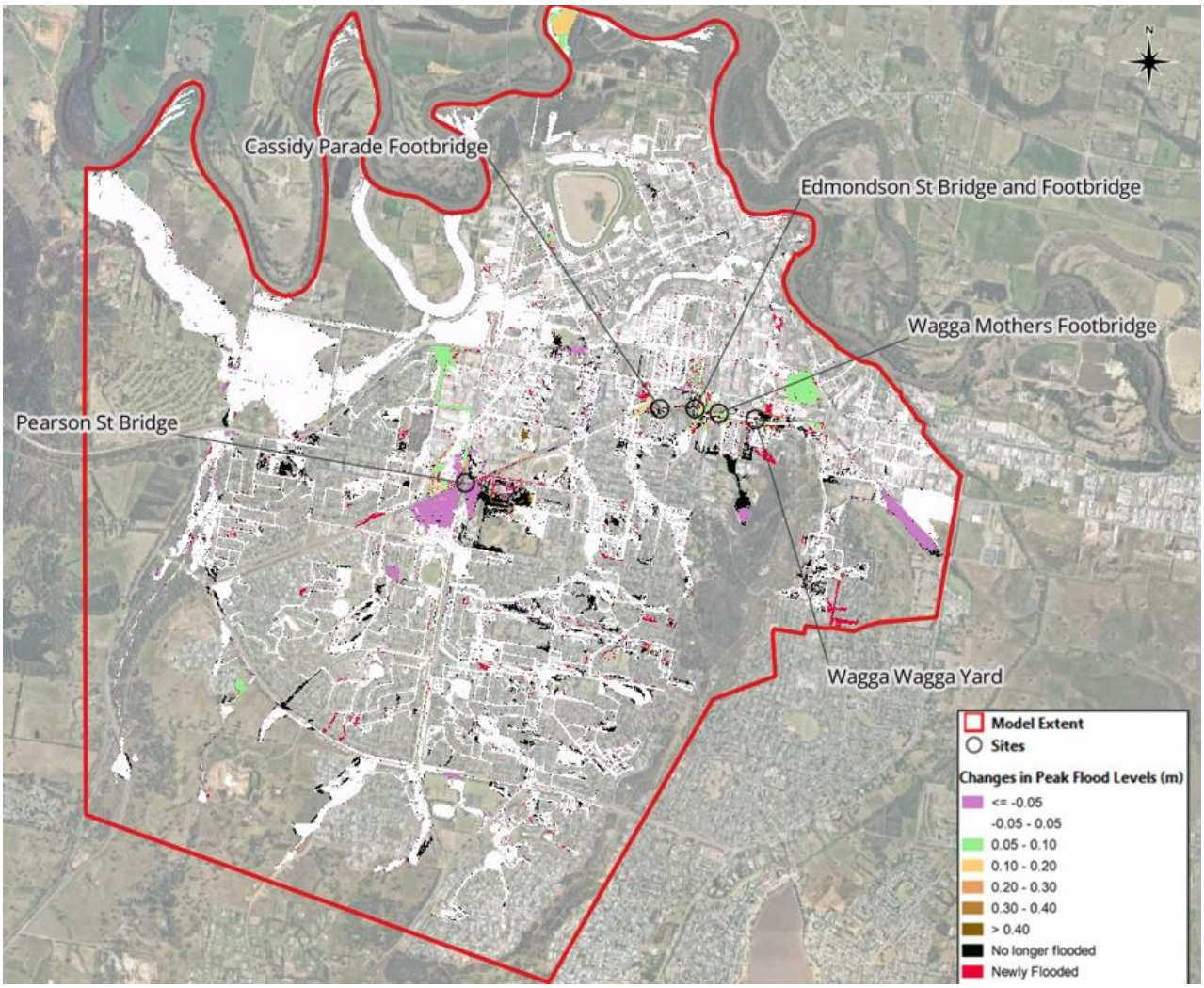


Figure 5-1: Comparison - Changes in Peak Flood Levels (updated TUFLOW model VS MOFFS 2021 TUFLOW model)

6 FLOOD ASSESSMENT

6.1 Existing Condition

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

The southern region of the site encounters localised flooding, as a result of, floodwater overtopping the existing Edmondson Street. Subsequently, the water flows in a northerly direction towards the established railway corridor, which is channelled to the railway corridor culvert east of Edmondson Street (refer to Figure 6-1 for flow path and Figure 4-7: Drainage Network Figure 4-7 for existing drainage network and culverts). Following this path, the water proceeds north along Edmondson Street until it converges at Sturt Highway. The water then flows west along Sturt Highway. The railway corridor underneath the existing Edmondson bridge overtops the ballast levels in the 10% AEP design event.

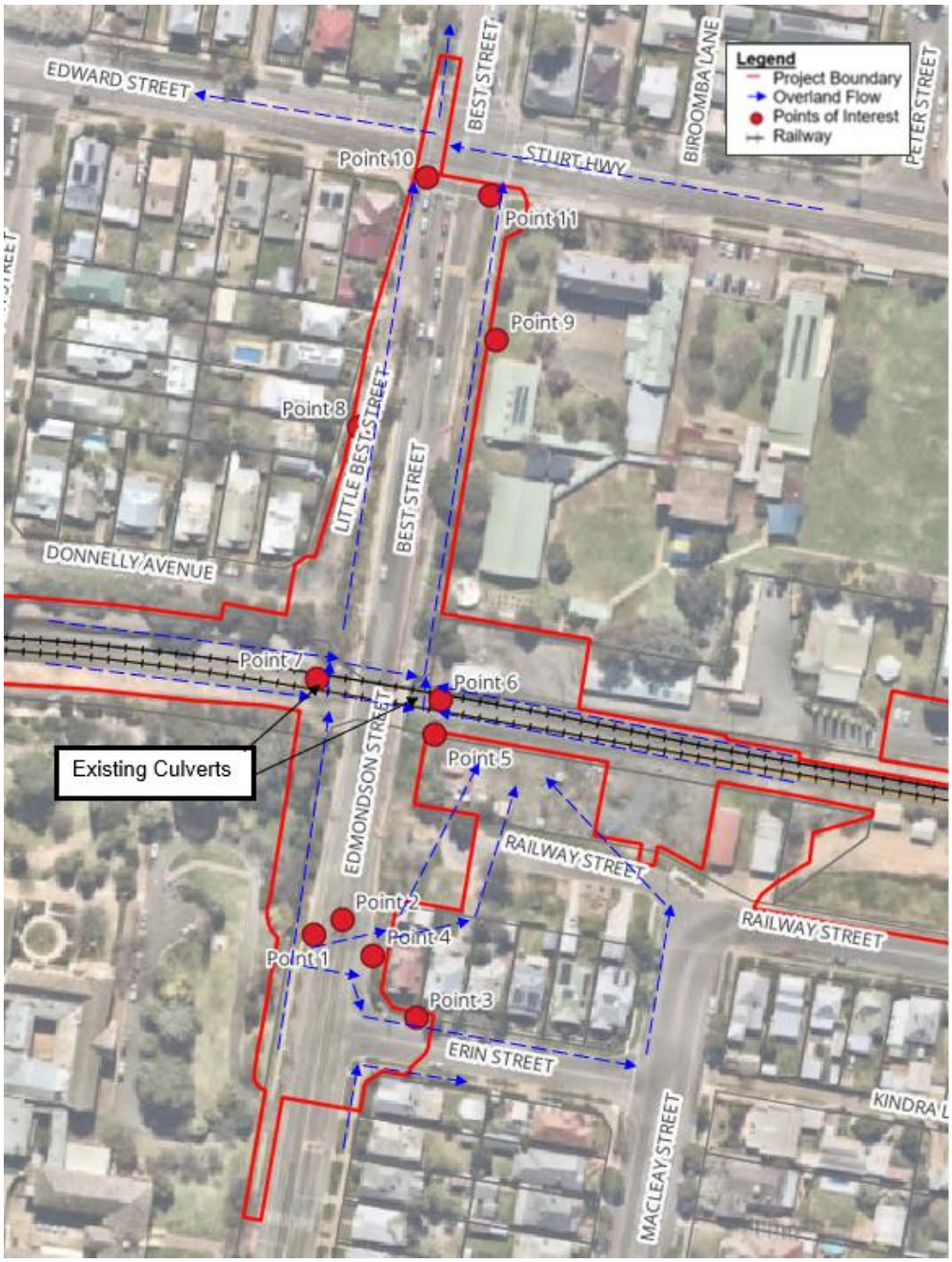


Figure 6-1: Edmondson Street Bridge Site Flow Paths

Table 6-1: Points of Interests

Points of Interest	Notes
1	Location at Edmondson Street western side
2	Location middle of Edmondson Street
3	Location at Erin Street
4	Location at Edmondson Street eastern side
5	Location at downstream of the culvert outlet from Edmondson Street
6	Location near eastern railway corridor culvert
7	Location near western railway corridor culvert
8	Location at Little Best Street
9	Location near the public school
10	Location at western intersection of Best Street
11	Location at eastern intersection of Best Street

Figure 6-1 summarises the peak flood level results for the existing condition at the Edmondson Street bridge and footbridge site.

Table 6-2: Peak Flood Levels – Existing Condition

Design Events	Flood Levels
10% AEP	▪ The flood waters overtop the top of the rail within a 50m vicinity from the site for all events in the Existing condition. The flood immunity is less than 10% AEP. ▪ The overtopping flood depth is generally less than 0.1m up to 0.05% AEP and less than 0.5m in the PMF event. ▪ Refer to Table 6-3 for flood level comparison based on points of interest.
5% AEP	
2% AEP	
1% AEP	
1% AEP + Climate Change	
0.05% AEP	
PMF	

The table below shows the reduced levels (RLs) at the points of interest (refer to Table 6-3) in the existing condition.

Table 6-3: Points of Interest Data – Peak Flood Levels (mAHD) – Existing Condition

Locations	10% AEP	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	0.05% AEP	PMF
Point 1	188.08	188.10	188.11	188.12	188.14	188.15	188.24
Point 2	188.07	188.08	188.09	188.10	188.11	188.12	188.19
Point 3	186.41	186.41	186.42	186.43	186.44	186.47	186.85
Point 4	Not flooded	Not flooded	187.75	187.75	187.76	187.76	187.78
Point 5	184.13	184.16	184.20	184.22	184.25	184.27	184.65
Point 6	184.11	184.14	184.17	184.19	184.20	184.22	184.62
Point 7	Not flooded	184.17	184.27	184.28	184.28	184.29	184.69
Point 8	Not flooded	182.08	182.10	182.14	182.20	182.25	182.51
Point 9	182.45	182.46	182.47	182.48	182.50	182.54	182.99
Point 10	181.77	181.82	181.86	181.89	181.93	181.96	182.22
Point 11	181.83	181.89	181.94	181.99	182.04	182.07	182.29

The flow velocity is generally low along the railway corridor open channel. Table 6-4 summarises the peak flood velocity results for the existing conditions at the Edmondson Street bridge and footbridge.

Table 6-4: Peak Flood Velocity – Existing Condition

Design Events	Flood Velocity
10% AEP	▪ Refer to Table 6-5 for flood velocity comparison based on points of interest. ▪ The peak velocity along the rail corridor open channel is generally less than 0.6m/s
5% AEP	▪ Refer to Table 6-5 for flood velocity comparison based on points of interest. ▪ The peak velocity along the rail corridor open channel is generally less than 0.7m/s
2% AEP	▪ Refer to Table 6-5 for flood velocity comparison based on points of interest. ▪ The peak velocity along the rail corridor open channel is generally less than 0.8m/s
1% AEP	▪ Refer to Table 6-5 for flood velocity comparison based on points of interest. ▪ The peak velocity along the rail corridor open channel is generally less than 0.9m/s
1% AEP + Climate Change	▪ Refer to Table 6-5 for flood velocity comparison based on points of interest. ▪ The peak velocity along the rail corridor open channel is generally less than 1.0m/s
0.05% AEP	▪ Refer to Table 6-5 for flood velocity comparison based on points of interest. ▪ The peak velocity along the rail corridor open channel is generally less than 1.1m/s
PMF	▪ Refer to Table 6-5 for flood velocity comparison based on points of interest. ▪ The peak velocity along the rail corridor open channel is generally less than 1.5m/s

The table below shows the peak flood velocities at the points of interest (refer Table 6-5) in the existing condition.

Table 6-5: Points of Interest Data – Peak Flood Velocity (m/s) – Existing Condition

Locations	10% AEP	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	0.05% AEP	PMF
Point 1	0.5	0.6	0.8	0.9	1.0	1.2	1.8
Point 2	0.5	0.5	0.6	0.7	0.8	0.8	1.3
Point 3	0.2	0.2	0.3	0.4	0.4	0.6	2.4
Point 4	Not flooded	Not flooded	0.4	0.6	0.7	0.8	1.0
Point 5	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Point 6	<0.1	0.1	0.3	0.3	0.3	0.3	0.6
Point 7	Not flooded	0.1	0.2	0.2	0.2	0.3	0.8
Point 8	Not flooded	0.4	0.6	0.7	0.9	1.1	2.2
Point 9	0.3	0.3	0.4	0.4	0.5	0.5	0.8
Point 10	0.4	0.6	0.6	0.7	0.8	0.8	1.5
Point 11	0.2	0.3	0.3	0.4	0.5	0.5	1.0

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. The Figure 6-2 and the tables below describe the hazards.

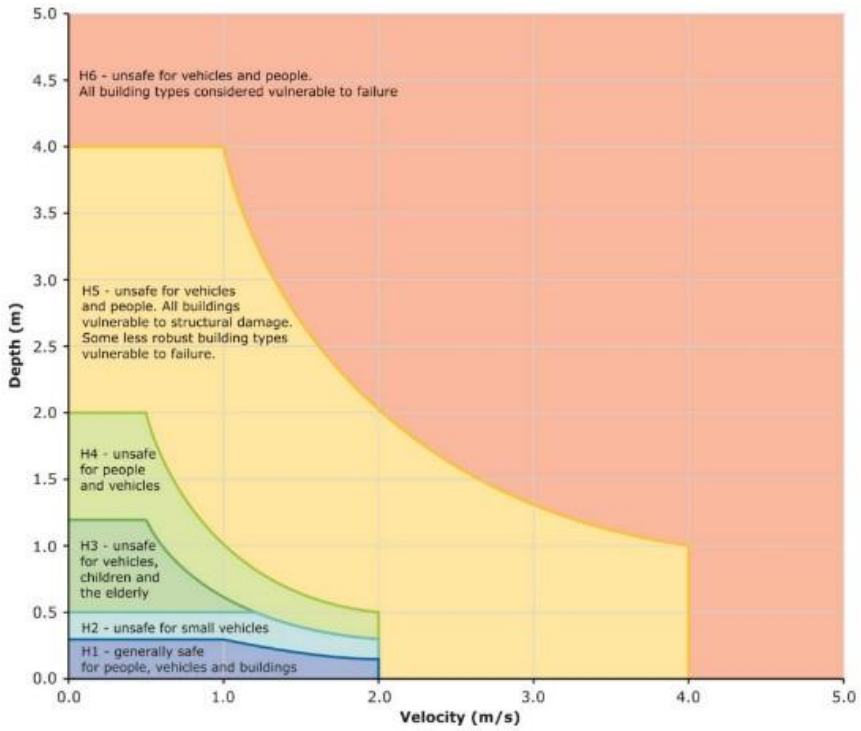


Figure 6-2: Hazard Category Classification

The flood hazard is generally low (H1 to H2) around the site area. The flood hazards for the existing case at the site area are presented in Table 6-6 and the maps are shown in Appendix A.

Table 6-6: Flood Hazard – Existing Condition

Design Events	Flood Hazard
10% AEP	▪ Refer to Table 6-7 for flood hazard comparison based on points of interest. ▪ The peak hazard along the rail corridor open channel is generally less than H3.
5% AEP	
2% AEP	
1% AEP	
1% AEP + Climate Change	
0.05% AEP	
PMF	▪ Refer to Table 6-7 for flood hazard comparison based on points of interest. ▪ The peak hazard at the rail corridor open channel experiences up to H5.

The table below shows the hazard category at the points of interest (refer Table 6-7) in the existing condition.

Table 6-7: Points of Interest Data – Peak Flood Hazard – Existing Condition

Locations	10% AEP	5% AEP	2% AEP	1% AEP	1% AEP + Climate change	0.05% AEP	PMF
Point 1	H2	H2	H2	H2	H2	H2	H3
Point 2	H1	H1	H1	H1	H1	H1	H1
Point 3	H1	H1	H1	H1	H1	H1	H5
Point 4	Not flooded	Not flooded	H1	H1	H1	H1	H1
Point 5	H3	H3	H3	H3	H3	H3	H4
Point 6	H1	H1	H1	H1	H1	H1	H3

Locations	10% AEP	5% AEP	2% AEP	1% AEP	1% AEP + Climate change	0.05% AEP	PMF
Point 7	Not flooded	H1	H1	H1	H1	H1	H3
Point 8	Not flooded	H1	H1	H1	H1	H1	H5
Point 9	H1	H1	H1	H1	H1	H1	H3
Point 10	H2	H2	H2	H2	H2	H2	H5
Point 11	H1	H1	H2	H2	H2	H2	H4

6.2 Design Condition

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

During design conditions, the elevated road levels in the southern civil design redirect the existing flow, which is captured by the proposed drainage pits, thereby channelling a reduced flow southward along Erin Street. (Refer to Figure 6-3). The flow behaviour near northern civil design is not affected significantly.

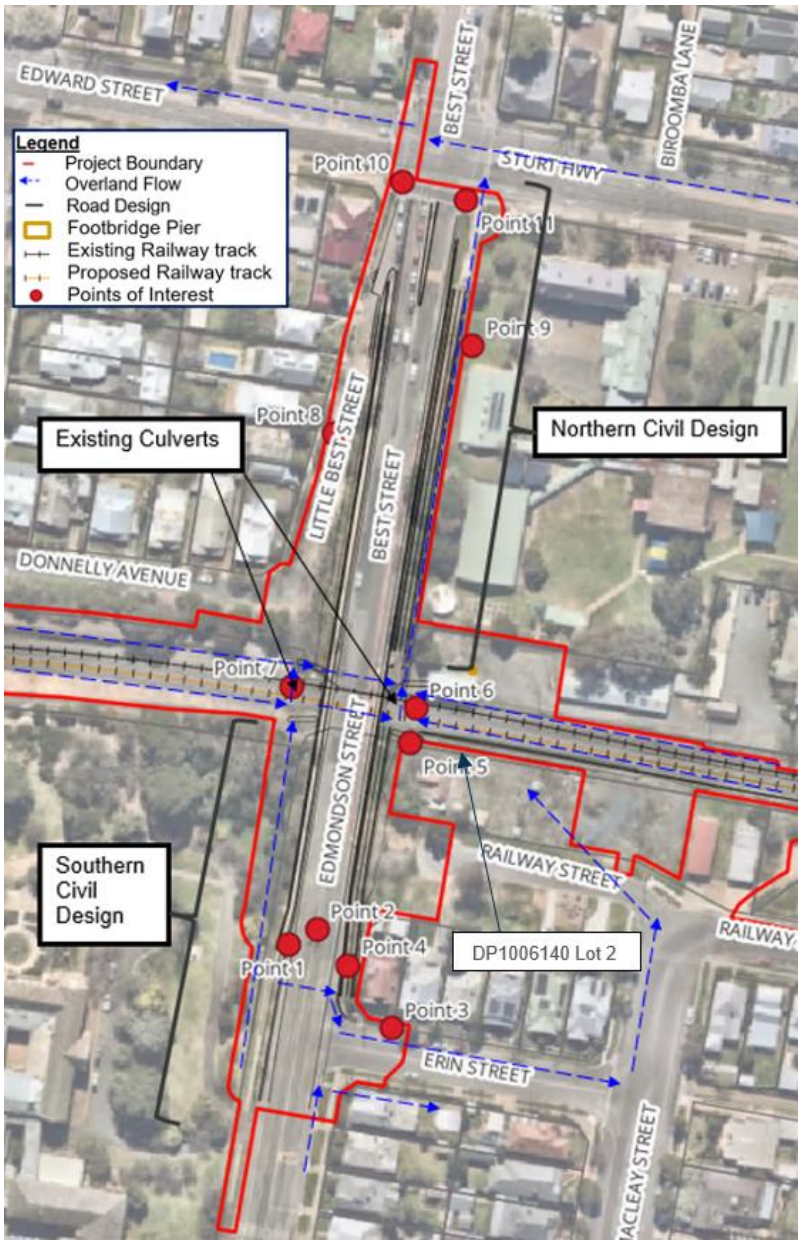


Figure 6-3: Design Condition Flow Characteristics

Table 6-8 summarises the peak flood level results for design conditions at the Edmondson Street bridge and footbridge.

Table 6-8: Peak Flood Levels – Design Condition

Design Events	Flood Levels
10% AEP	▪ The flood waters do not overtop the top of rail within 50m vicinity from the site. ▪ Refer to Table 6-9 for flood level comparison based on points of interest.
5% AEP	▪ The flood waters overtop the top of rail within 50m vicinity from the site. ▪ The overtopping flood depth is generally less than 0.1m up to 0.05% AEP and less than 0.5m in PMF event. ▪ Refer to Table 6-9 for flood level comparison based on points of interest.
2% AEP	
1% AEP	
1% AEP + Climate Change	
0.05% AEP	
PMF	

The table below shows the reduced levels (RLs) at the points of interest (refer to Table 6-9) in the design condition.

Table 6-9: Points of Interest Data – Peak Flood Levels (mAHD) – Design Condition

Locations	10% AEP	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	0.05% AEP	PMF
Point 1	Not flooded	Not flooded	Not flooded	188.21	188.24	188.26	188.41
Point 2	Not flooded	Not flooded	Not flooded	Not flooded	Not flooded	Not flooded	Not flooded
Point 3	186.39	186.40	186.42	186.43	186.45	186.47	186.88
Point 4	Not flooded	Not flooded	Not flooded	Not flooded	Not flooded	Not flooded	Not flooded
Point 5	184.16	184.21	184.25	184.28	184.31	184.34	184.68
Point 6	Not flooded	184.12	184.16	184.17	184.19	184.21	184.59
Point 7	Not flooded	184.16	184.26	184.28	184.28	184.29	184.72
Point 8	182.18	182.19	182.19	182.19	182.21	182.24	182.49
Point 9	182.45	182.45	182.47	182.48	182.50	182.54	183.09
Point 10	181.78	181.80	181.85	181.88	181.94	181.97	182.17
Point 11	181.83	181.86	181.92	181.97	182.03	182.07	182.31

In the design condition, the flow velocity is generally low along the railway corridor open channel. Table 6-10 summarises the peak flood velocity results for design conditions at the Edmondson Street bridge and footbridge.

Table 6-10: Peak Flood Velocity – Design Condition

Design Events	Flood Velocity
10% AEP	▪ The peak velocity along the rail corridor open channel is generally less than 0.8m/s. ▪ Refer to Table 6-11 for flood velocity comparison based on points of interest.
5% AEP	▪ The peak velocity along the rail corridor open channel is generally less than 0.8m/s. ▪ Refer to Table 6-11 for flood velocity comparison based on points of interest.
2% AEP	▪ The peak velocity along the rail corridor open channel is generally less than 0.8m/s. ▪ Refer to Table 6-11 for flood velocity comparison based on points of interest.
1% AEP	▪ The peak velocity along the rail corridor open channel is generally less than 0.9m/s. ▪ Refer to Table 6-11 for flood velocity comparison based on points of interest.

Design Events	Flood Velocity
1% AEP + Climate Change	▪ The peak velocity along the rail corridor open channel is generally less than 0.9m/s. ▪ Refer to Table 6-11 for flood velocity comparison based on points of interest.
0.05% AEP	▪ The peak velocity along the rail corridor open channel is generally less than 0.9m/s. ▪ Refer to Table 6-11 for flood velocity comparison based on points of interest.
PMF	▪ The peak velocity along the rail corridor open channel is generally less than 1.3m/s. ▪ Refer to Table 6-11 for flood velocity comparison based on points of interest.

The table below shows the peak flood velocities at the points of interest (refer Table 6-11) in the design condition.

Table 6-11: Points of Interest Data – Peak Flood Velocity (m/s) – Design Condition

Location	10% AEP	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	0.05% AEP	PMF
Point 1	Not flooded	Not flooded	Not flooded	<0.1	<0.1	0.1	0.3
Point 2	Not flooded	Not flooded	Not flooded	Not flooded	Not flooded	Not flooded	Not flooded
Point 3	0.1	0.2	0.3	0.3	0.5	0.7	2.6
Point 4	Not flooded	Not flooded	Not flooded	Not flooded	Not flooded	Not flooded	Not flooded
Point 5	0.7	0.7	0.8	0.8	0.8	0.8	0.8
Point 6	Not flooded	0.1	0.3	0.3	0.3	0.3	0.7
Point 7	Not flooded	0.1	0.2	0.2	0.2	0.3	0.8
Point 8	0.7	0.8	0.8	0.8	0.9	1.0	2.2
Point 9	0.3	0.3	0.4	0.4	0.5	0.5	0.9
Point 10	0.4	0.5	0.6	0.6	0.7	0.7	1.2
Point 11	0.2	0.2	0.3	0.4	0.5	0.5	1.3

The flood hazard is generally low at the site area in design condition. The flood hazard for the design conditions at the Edmondson Street bridge and footbridge study area, are presented in Table 6-12, and the maps are presented in Appendix A.

Table 6-12: Flood Hazard – Design Condition

Design Events	Flood Hazard
10% AEP	▪ The peak hazard near the access ramps and piers is generally H1 – H3. ▪ Refer to Table 6-13 for a comparison of flood hazard based on points of interest.
5% AEP	
2% AEP	
1% AEP	
1% AEP + Climate Change	
0.05% AEP	
PMF	▪ The peak hazard at the rail corridor open channel experiences up to H5. ▪ Refer to Table 6-13 for a comparison of flood hazards based on points of interest.

The table below shows the hazard category at the points of interest (refer Table 6-13) in the design condition.

Table 6-13: Points of Interest Data – Peak Flood Hazard – Design Condition

Location	10% AEP	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	0.05% AEP	PMF
Point 1	Not flooded	Not flooded	Not flooded	H1	H1	H1	H1
Point 2	Not flooded	Not flooded	Not flooded	Not flooded	Not flooded	Not flooded	Not flooded
Point 3	H1	H1	H1	H1	H1	H1	H5
Point 4	Not flooded	Not flooded	Not flooded	Not flooded	Not flooded	Not flooded	Not flooded
Point 5	H3	H3	H3	H3	H3	H3	H4
Point 6	Not flooded	H1	H1	H1	H1	H1	H3
Point 7	Not flooded	H1	H1	H1	H1	H1	H3
Point 8	H1	H1	H1	H1	H1	H1	H5
Point 9	H1	H1	H1	H1	H1	H1	H3
Point 10	H2	H2	H2	H2	H2	H2	H4
Point 11	H1	H1	H1	H2	H2	H2	H4

6.3 Flood Immunity and Scour Protection

Within 50m vicinity of the site, the flood water overtops the top rail in the 5% AEP in proposed condition, while the flood water overtops the top rail in the 10% AEP in existing conditions. This is mainly due to the introduction of the proposed channel south of the Main Line in Wagga Wagga Yard design (refer to Section 6.4.5). The proposed channels are grass lined with jute-mesh which provides local scour protection to the channel (refer to Drainage Design in Section 4.5 of the Wagga Yard Design report (5-0052-210-PEN-W7-RP-0001)). The proposed design results in an improvement to the immunity of the rail in terms of overtopping (refer to Table 6-14 and Table 6-15), which complies with the criteria in PSRs and CoA to provide a no-worse outcome.

Table 6-14: Comparison of Flood Immunity at Overtopping Locations

Overtopping Location	Existing Condition Overtopping AEP	Design Condition Overtopping AEP
CH521.300	10% AEP event	5% AEP event

An assessment of the flood immunity at the noted locations of overtopping along the rail is seen in Table 6-15 for CH521.360 where overtopping of the rail occurs.

Table 6-15: Overtopping Details at CH521.300

Chainage	Top of the Rail Level (mAHD)		Top of the Formation Level (mAHD)		10% AEP Flood Level (mAHD)		5% AEP Flood Level (mAHD)	
	Existing	Design	Existing	Design	Existing	Design	Existing	Design
CH521.300	184.108	184.137	183.441 *	183.470 *	184.136	184.094	184.157	184.168

*Note that the existing top of the formation level has been assumed to be 667mm below the existing top of the rail level

Furthermore, in the design condition, the flood velocity outside the project boundary complied with the PSRs and CoA. Hence, there is no need for scour protection measures.

The flooding depths are generally less than 1m in the 0.05% AEP event at the railway corridor and will be well below the bridge deck in all events up to the PMF. At around the bridge abutments and footbridge access ramps and piles, flood hazard is generally lower (H1 and H2) in the 0.05% AEP, with the flooding not expected to cause any surface damage to the bridge including piers and abutment, due to abrasion/ erosion.

6.4 Flood Impact Assessment

Due to elevated road levels of the southern road design and southern footbridge access ramp, the existing northeast flow path is obstructed, causing floodwater to divert south. This redirection results in a new dry area east of the bridge with a reduction in flood levels. The redirected water is captured by the drainage network, preventing additional afflux

on Erin Street. The northwestern part of the site experience improvements in flood level due to the western wing wall of the Edmondson Street bridge. The Existing flow pattern is generally maintained in the Design condition. However, due to the reduction in proposed pipe size from 0.6m to 0.45m causing water surcharging, which results in flood level increase at Little Best Street inside the project boundary. The discussion about the peak level, velocity and hazard effect due to the design is illustrated in the following sections.

6.4.1 Changes in Peak Flood Level

Table 6-16 provides details regarding the peak flood level changes during the Design scenario.

Table 6-16: Flood Level Impact Assessment

Design Events	Changes in Peak Flood Levels
10% AEP	• The changes in flood level outside the project boundary are less than 0.05m and no residential, commercial or industrial properties are impacted (Refer to Figure A43 in Appendix A). • The corner lot (DP1006140 Lot 2 - see Figure 6-3) upstream of the railway corridor between Edmondson Street and Railway Street experiences afflux up to 35 mm due to the Eastern wing wall of the Edmondson Street bridge design. Although the lot is outside the boundary, it is classified as ARTC land. Therefore, this afflux is deemed compliant. • Newly wet areas created outside the project boundary at Little Best Street due to pit surcharging is less than 0.05m which is within the COA impact limit and project requirements. No other private roads are Impacted. • Newly wet areas created outside the project boundary are less than 0.01m.
5% AEP 2% AEP 1% AEP	• The changes in flood level outside the project boundary are less than 0.05m and no residential, commercial or industrial properties are impacted (Refer to Figure A44 to A46 in Appendix A). • The corner lot (DP1006140 Lot 2 - refer to Figure 6-3) upstream of the railway corridor between Edmondson Street and Railway Street experiences afflux up to 70 mm due to the Eastern wing wall of the Edmondson Street bridge design. Although the lot is outside the boundary, it is classified as ARTC land. Therefore, this afflux is deemed compliant. • Newly wet areas created outside the project boundary at the Little Best Street due to pit surcharging is less than 0.05m which is within the COA impact limit and project requirements. No other private roads are Impacted. • Newly wet areas created outside the project boundary are less than 0.01m.

Table 6-17: Changes in Flood Level (m) at Points of Interest

Location	10% AEP	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change
Point 1	No more inundated	No more inundated	No more inundated	0.09	0.10
Point 2	No more inundated	No more inundated	No more inundated	No more inundated	No more inundated
Point 3	-0.02	Negligible impacts*	Negligible impacts*	Negligible impacts*	Negligible impacts*
Point 4	Not flooded	Not flooded	No more inundated	No more inundated	No more inundated
Point 5	0.03	0.06	0.06	0.06	0.06
Point 6	No more inundated	-0.02	-0.01	-0.01	-0.01
Point 7	Not flooded	-0.02	-0.01	Negligible impacts*	Negligible impacts*
Point 8	No more inundated	0.11	0.09	0.05	0.01
Point 9	Negligible impacts*	Negligible impacts*	Negligible impacts*	Negligible impacts*	Negligible impacts*
Point 10	0.01	-0.02	-0.01	Negligible impacts*	0.01
Point 11	Negligible impacts*	-0.04	-0.02	-0.01	Negligible impacts*

*Impact less than 0.01m is considered as negligible impacts

The changes in flood level outside the project boundary are less than 0.05m and no residential, commercial or industrial properties are impacted. The changes in flood levels outside the project boundary comply with PSR and CoA project requirements.

6.4.2 Changes in Peak Flood Velocity

Table 6-18 details changes in peak flood velocity during the Design scenario.

Table 6-18: Flood Velocity Impact Assessment

Design Events	Changes in Peak Flood Velocity
10% AEP	▪ The changes in velocity outside the site is less than 0.5m/s within the COA impact limit and project requirements. (Refer to Figure A48 to A51 in Appendix A). ▪ Newly wet area created outside the project boundary has a velocity of less than 0.5m/s within the COA impact limit and project requirements.
5% AEP	
2% AEP	
1% AEP	

Points 1 to 11 experience less than 1 m/s of velocity increase for events 10% AEP, 5% AEP, 2% AEP and 1% AEP. The changes in flood velocity outside the project boundary comply with the PSR and CoA project requirements.

6.4.3 Changes in Flood Hazard

Table 6-19 details the peak flood velocity changes during the Design scenario.

Table 6-19: Flood Hazard Impact Assessment

Design Events	Changes in Peak Flood Hazard
10% AEP	▪ There is no increase in flood hazard outside the project boundary. (Refer to Figure A53 to A56 in Appendix A). ▪ The Corner lot (DP1006140 Lot 2) upstream of the railway corridor between Edmondson Street and Railway Street experiences an general increase in Hazard by one category due to additional flow from the culvert from the Edmondson Street bridge transverse pipe. Although the lot is outside the boundary, it is classified as ARTC land. Therefore, this afflux is deemed compliant ▪ Newly created wet area outside the project boundary experiences H1 Hazard which is generally safe for people vehicles and buildings.
5% AEP	
2% AEP	
1% AEP	

Points 1 to 11 do not experience any increase in hazard for events 10% AEP, 5% AEP, 2% AEP and 1% AEP. The changes in flood hazard outside the project boundary comply with the PSR and CoA project requirements.

6.4.4 Changes in Duration of Inundation

The analysis around the changes in the duration of inundation was undertaken by comparing the existing and design flood level vs time in selected locations. The locations adopted for the comparison are shown in Figure 6-4. Figure 6-5 & Figure 6-6 show the comparison of flood level vs time for Reporting Locations 1 and 2, respectively. Both the existing and design flood level vs time, is mostly similar for Locations 1 and 2. These demonstrate that the design will not create an extra duration of inundation upstream and downstream outside the project boundary. Consequently, the changes in the duration of inundation comply with the CoA E42(a).

Figure 6-4: Reporting Locations for the Changes in Duration of Inundation

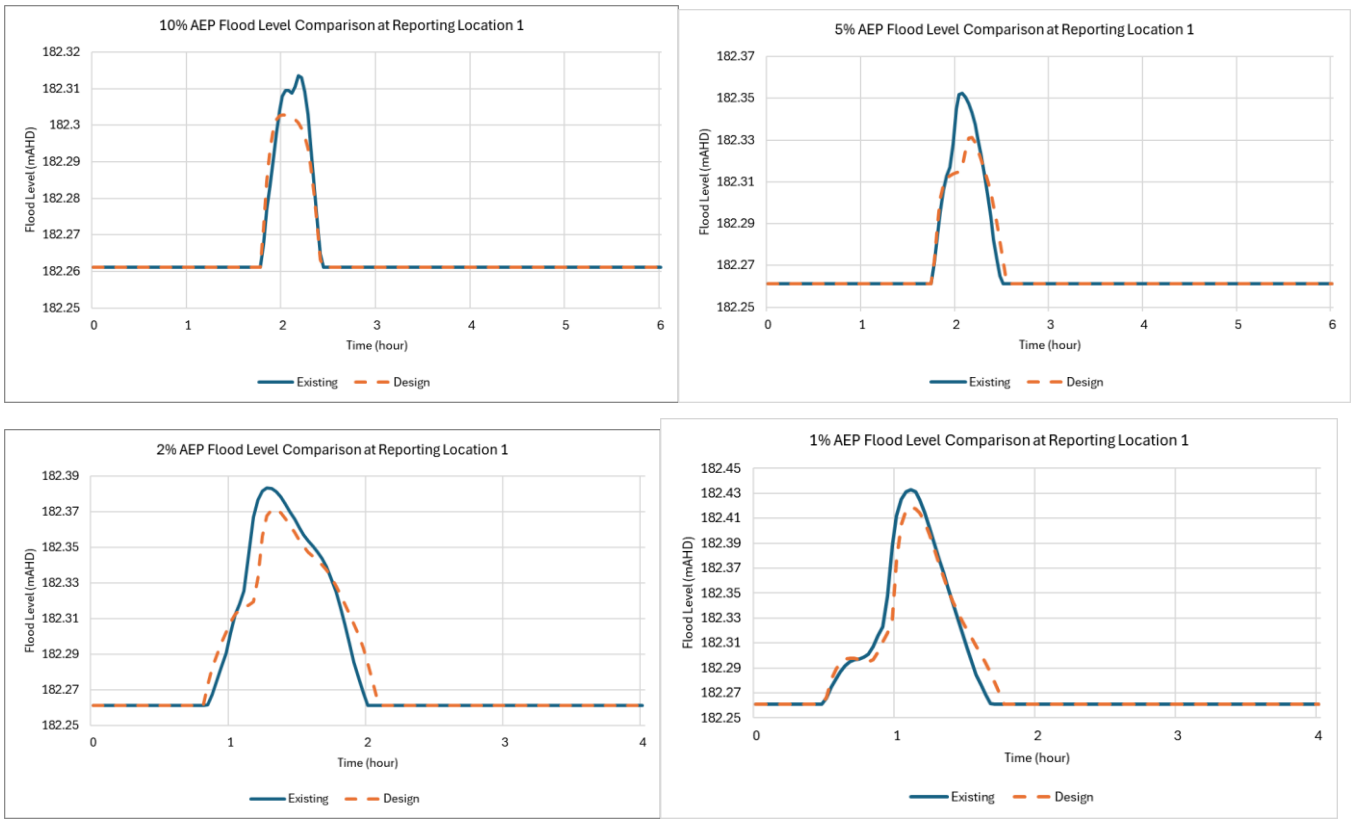


Figure 6-5: Comparison of Flood Level vs. Time at Reporting Location 1

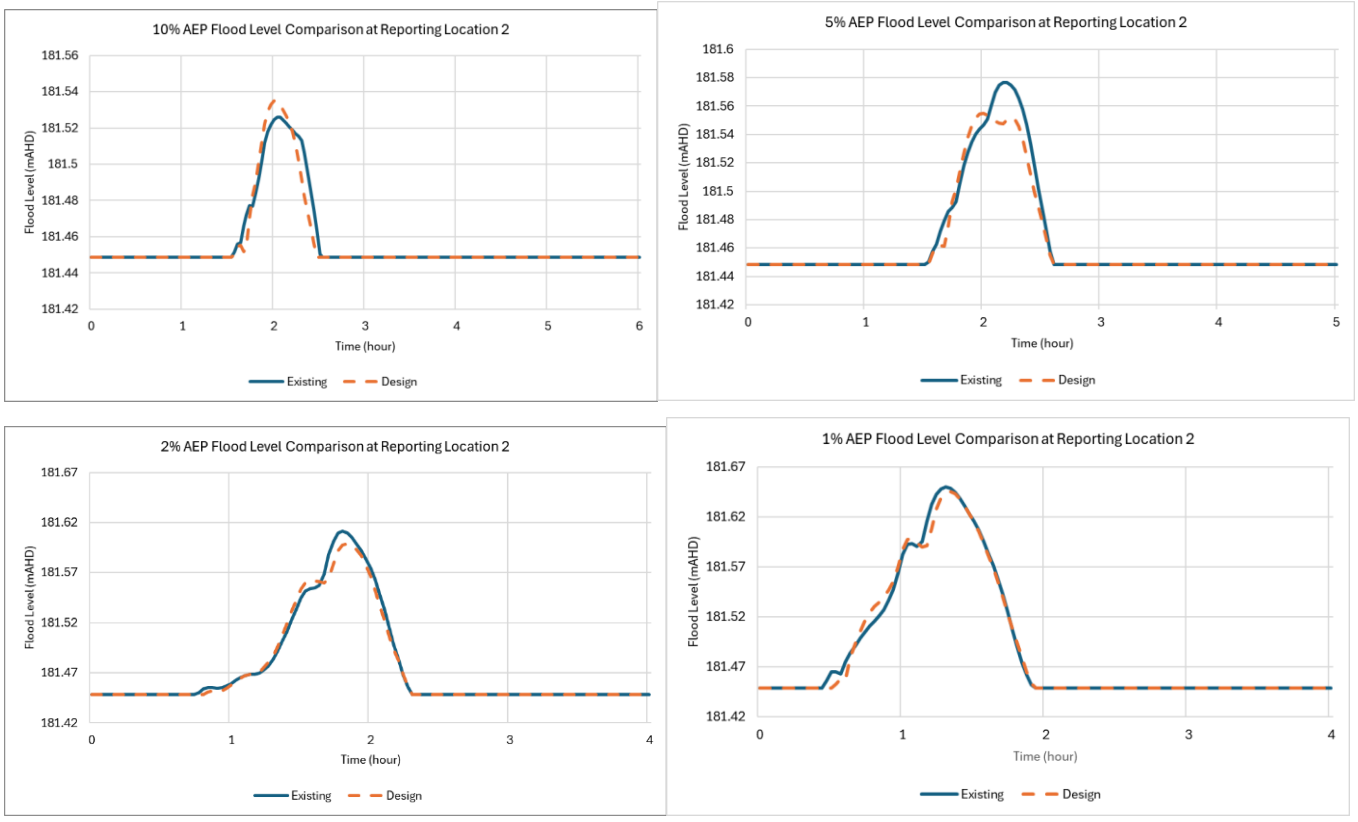


Figure 6-6: Comparison of Flood Level vs. Time at Reporting Location 2

6.4.5 Cumulative impact

As stated in Section 4 under “Modelling Methodology”, the master design condition incorporated the Wagga Wagga Yard design (5-0052-210-IHY-W7-RP-0001), Wagga Mothers Footbridge design (5-0052-210-IHY-W8-RP-0001), Cassidy Parade footbridge (5-0052-210-IHY-W4-RP-0001) Edmondson Street bridge and footbridge design to understand an overall cumulative impact on the site. The changes in flood level maps indicate that there are no impacts on Edmondson Street bridge and footbridge caused by Cassidy Parade footbridge and Wagga Yard design for all events up to 1% AEP.

6.5 Sensitivity Test

6.5.1 Blockage Assessment

A hydraulic blockage assessment was carried out for the 1% AEP design scenario as per the guidance set out in ARR2019. The assessment involved assessing the site area for debris availability, mobility and transportability. This, in conjunction with the culvert sizes were used to determine the relevant blockage factors shown (refer to Table 6-20 and Table 6-21) below 20% blockage was adopted for all the other culverts, pits and pipes outside the project boundary (refer to Table 6-20, Figure 6-7 and Figure 6-8).

A flood level comparison between the blockage scenario and design is shown in Figure 6-9. Although the Culvert NP1049 and the Edmondson Street wing wall penetration within the project boundary do not have any blockage (due to large width and height, and lower debris potential), the overall flood behaviour is subject to the blockage of the downstream drainage system. A general water level increase of up to 0.030m is mainly found within the site. As a consequence of implementing the 20% blockage in the drainage networks located outside the site, Stuart Highway (north to the site) experiences a rise in water levels of up to 0.030m. Due to blockage application for the culvert located at Little Best street, surcharges with a reduced flow which results in water level improvement up to 0.035m north of the site (refer to Figure 6-9).

Table 6-20: Culvert Blockage Percentage

Culvert	Blockage Percentage (1% AEP)	Comments
W7_P04_01t02 (1 cell 0.200m in diameter)	25%	Inside the project boundary
W5_E02_01t02 (1 cell 0.600m in diameter)	25%	Inside the project boundary
NP1064 (1 cell 0.9m Width x 0.6m Height)	25%	Inside the project boundary
NP1049 (1 cell 1.8m Width x 0.6m Height)	0%	Inside the project boundary
Eastern bridge wing walls penetration (1 cell 2.0m Width x 0.65m Height)	0%	Inside the project boundary
Western bridge wing walls penetration (1 cell 1.2m Width x 1.0m Height)	0%	Inside the project boundary
W5_E04_01t02 (1 cell 0.6m in diameter)	25%	Inside the project boundary
P06-2toP06-3 (1 cell 0.900m in diameter)	25%	Inside the project boundary
Stormwater network	20% (on grade pit), 50% (sag pits)	Inside the project boundary
All others (culvert, pit and pipe)	20%	Outside of the project boundary

Table 6-21: Culvert Blockage Parameters

Culvert	Debris Availability	Debris Mobility	Debris Transportability	AEP Adjusted Debris Potential
W7_P4_01t02	Low	Medium	Low	Low
W5_E02_01t02	Low	Medium	Low	Low
NP1064	Low	Medium	Low	Low
NP1049	Low	Medium	Low	Low
Eastern bridge wing walls penetration	Low	Medium	Low	Low

Culvert	Debris Availability	Debris Mobility	Debris Transportability	AEP Adjusted Debris Potential
Western bridge wing walls penetration	Low	Medium	Low	Low
W5_E04_01t02	Low	Medium	Low	Low
P06_01_02	Low	Medium	Low	Low

Note: L10 value of 1.0m was adopted for the site culverts blockage calculation.

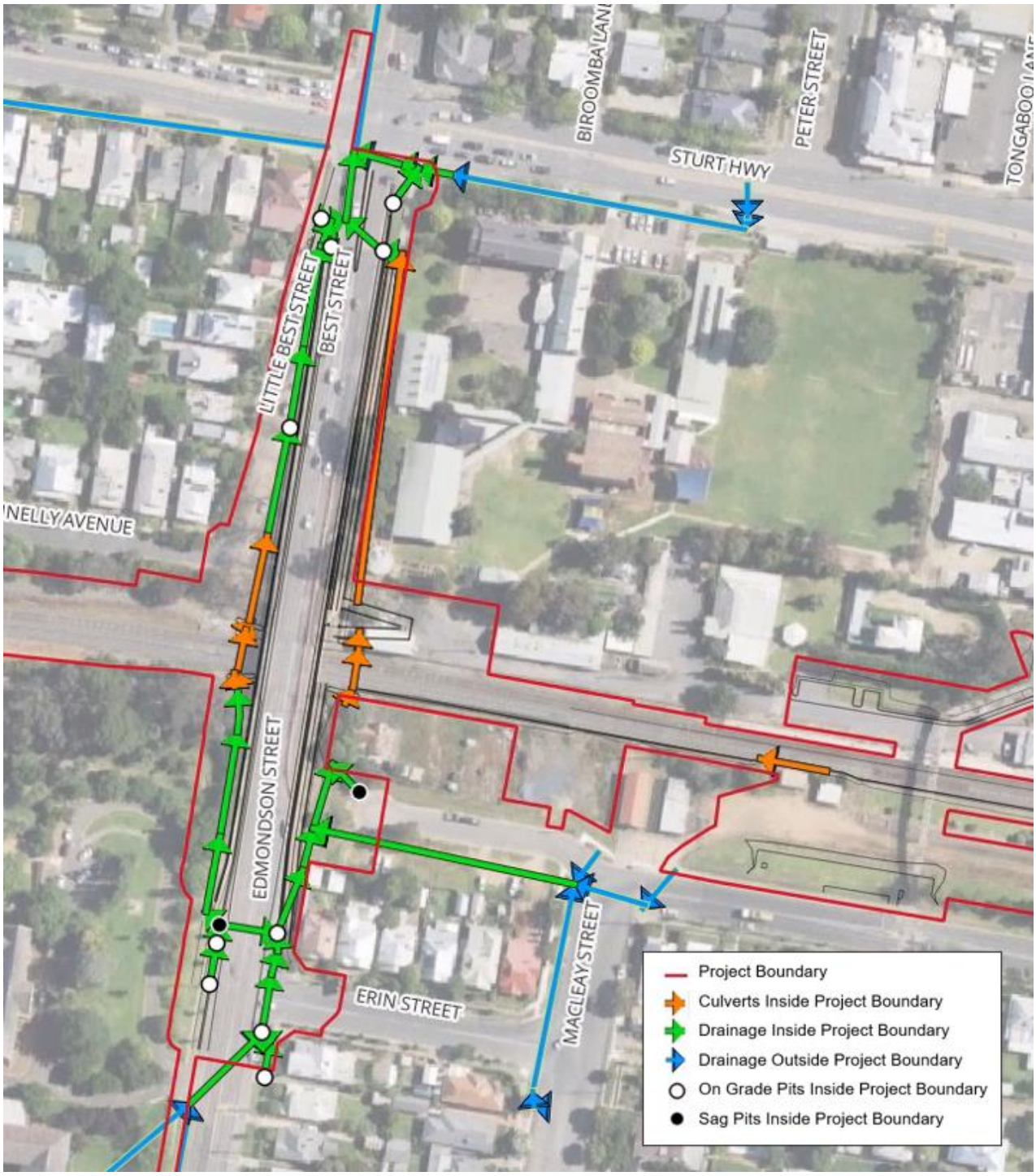


Figure 6-7: Culverts at Edmondson Street Bridge and Footbridge Site

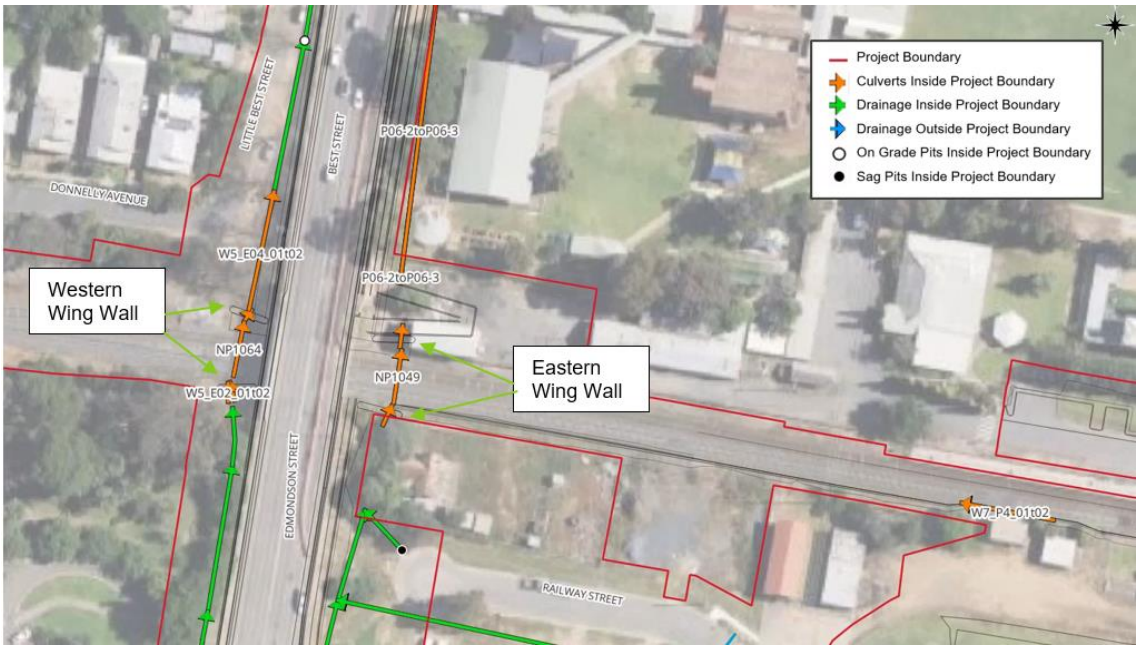


Figure 6-8: Culverts at Edmondson Street Bridge and Footbridge Site (Zoomed in)

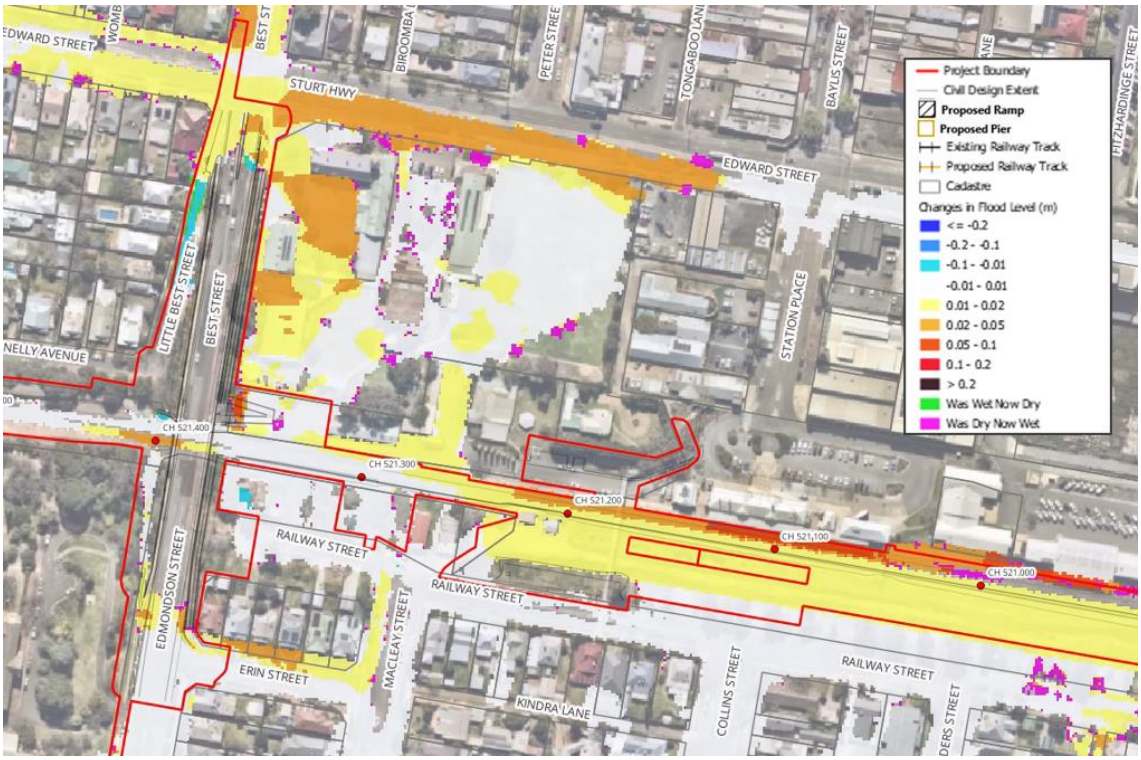


Figure 6-9: Flood Level Comparison for 1% AEP Design Condition – Blockage vs Design

6.5.2 Climate Change Risk Assessment

A Climate Change risk assessment was carried out by running the 1% AEP with the Year 2090 RCP8.5 interim climate change factor (refer to Section 4.2.3.1 for details of the approach) and the results of flood depth, flood velocity and flood hazard can be found in Section 6.1 and Section 6.2. The corresponding flood maps can be found in Appendix A. The assessment is summarised below:

- The floodwater accumulates at Edmondson Street southwest of the site, reaching a depth of up to 0.35m, which then overtops Edmondson Street.
- The flood depth along Edmondson Street north of the site is generally less than 0.5m.
- The flood depth along the railway corridor ranges from 0.1-1.1m.
- The site generally experiences H2 and lower hazard.

7 MITIGATION MEASURES

No instances of non-compliance in terms of flood impact were documented. Therefore, no additional mitigation measures are necessary at this stage.

8 RECOMMENDATIONS AND NEXT STAGE

This is the IFC stage of the report, and the following 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.

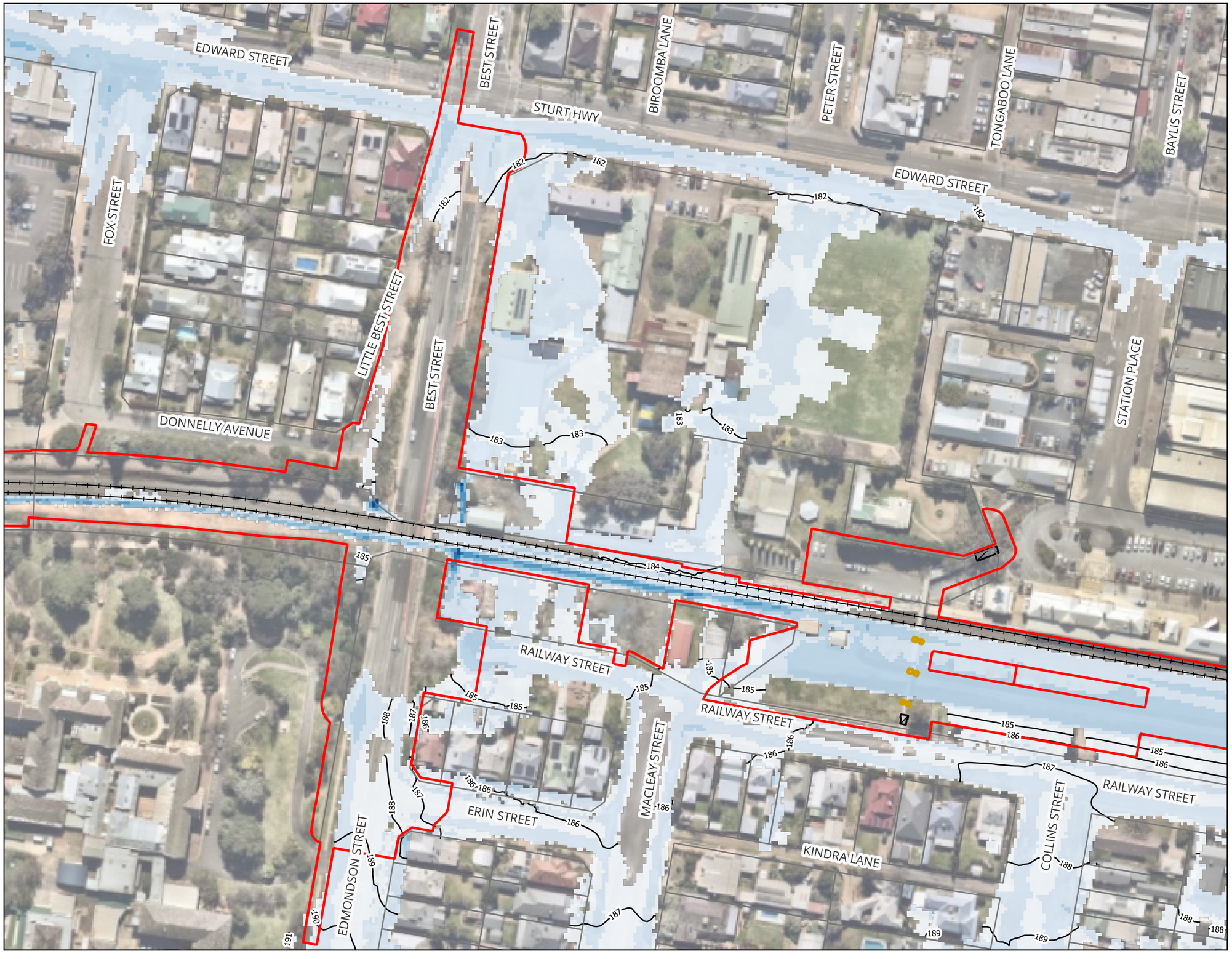
APPENDIX A

Flood Maps

Table A- 1: List of Maps in Appendix A

Map ID	Map description
Figure A01	10% AEP Peak Flood Depth and Levels - Existing Condition
Figure A02	5% AEP Peak Flood Depth and Levels - Existing Condition
Figure A03	2% AEP Peak Flood Depth and Levels - Existing Condition
Figure A04	1% AEP Peak Flood Depth and Levels - Existing Condition
Figure A05	1% AEP Climate Changes Peak Flood Depth and Levels - Existing Condition
Figure A06	0.05% AEP Peak Flood Depth and Levels - Existing Condition
Figure A07	PMF Peak Flood Depth and Levels - Existing Condition
Figure A08	10% AEP Peak Flood Velocity - Existing Condition
Figure A09	5% AEP Peak Flood Velocity - Existing Condition
Figure A10	2% AEP Peak Flood Velocity - Existing Condition
Figure A11	1% AEP Peak Flood Velocity - Existing Condition
Figure A12	1% AEP Climate Changes Peak Flood Velocity - Existing Condition
Figure A13	0.05% AEP Peak Flood Velocity - Existing Condition
Figure A14	PMF AEP Peak Flood Velocity - Existing Condition
Figure A15	10% AEP Peak Flood Hazard - Existing Condition
Figure A16	5% AEP Peak Flood Hazard - Existing Condition
Figure A17	2% AEP Peak Flood Hazard - Existing Condition
Figure A18	1% AEP Peak Flood Hazard - Existing Condition
Figure A19	1% AEP Climate Changes Peak Flood Hazard - Existing Condition
Figure A20	0.05% AEP Peak Flood Hazard - Existing Condition
Figure A21	PMF AEP Peak Flood Hazard - Existing Condition
Figure A22	10% AEP Peak Flood Depth and Levels - Master Design Condition
Figure A23	5% AEP Peak Flood Depth and Levels - Master Design Condition
Figure A24	2% AEP Peak Flood Depth and Levels - Master Design Condition
Figure A25	1% AEP Peak Flood Depth and Levels - Master Design Condition
Figure A26	1% AEP Climate Changes Peak Flood Depth and Levels - Master Design Condition
Figure A27	0.05% AEP Peak Flood Depth and Levels - Master Design Condition
Figure A28	PMF Peak Flood Depth and Levels - Master Design Condition
Figure A29	10% AEP Peak Flood Velocity - Master Design Condition
Figure A30	5% AEP Peak Flood Velocity - Master Design Condition
Figure A31	2% AEP Peak Flood Velocity - Master Design Condition
Figure A32	1% AEP Peak Flood Velocity - Master Design Condition
Figure A33	1% AEP Climate Changes Peak Flood Velocity - Master Design Condition
Figure A34	0.05% AEP Peak Flood Velocity - Master Design Condition
Figure A35	PMF Peak Flood Velocity - Master Design Condition
Figure A36	10% AEP Peak Flood Hazard - Master Design Condition
Figure A37	5% AEP Peak Flood Hazard - Master Design Condition
Figure A38	2% AEP Peak Flood Hazard - Master Design Condition
Figure A39	1% AEP Peak Flood Hazard - Master Design Condition
Figure A40	1% AEP Climate Changes Peak Flood Hazard - Master Design Condition

Map ID	Map description
Figure A41	0.05% AEP Peak Flood Hazard - Master Design Condition
Figure A42	PMF Peak Flood Hazard - Master Design Condition
Figure A43	Changes in Peak Flood Levels for 10% AEP - Master Design Condition vs Existing Condition
Figure A44	Changes in Peak Flood Levels for 5% AEP - Master Design Condition vs Existing Condition
Figure A45	Changes in Peak Flood Levels for 2% AEP - Master Design Condition vs Existing Condition
Figure A46	Changes in Peak Flood Levels for 1% AEP - Master Design Condition vs Existing Condition
Figure A47	Changes in Peak Flood Levels for 1% AEP Climate Changes - Master Design Condition vs Existing Condition
Figure A48	Changes in Peak Flood Velocity for 10% AEP - Master Design Condition vs Existing Condition
Figure A49	Changes in Peak Flood Velocity for 5% AEP - Master Design Condition vs Existing Condition
Figure A50	Changes in Peak Flood Velocity for 2% AEP - Master Design Condition vs Existing Condition
Figure A51	Changes in Peak Flood Velocity for 1% AEP - Master Design Condition vs Existing Condition
Figure A52	Changes in Peak Flood Velocity for 1% AEP Climate Changes - Master Design Condition vs Existing Condition
Figure A53	Changes in Peak Flood Hazard for 10% AEP - Master Design Condition vs Existing Condition
Figure A54	Changes in Peak Flood Hazard for 5% AEP - Master Design Condition vs Existing Condition
Figure A55	Changes in Peak Flood Hazard for 2% AEP - Master Design Condition vs Existing Condition
Figure A56	Changes in Peak Flood Hazard for 1% AEP - Master Design Condition vs Existing Condition
Figure A57	Changes in Peak Flood Hazard for 1% AEP Climate Changes - Master Design Condition vs Existing Condition
Figure A58	1% AEP Peak Flood Depth and Levels - Master Design Blockage Condition
Figure A59	1% AEP Peak Flood Hazard - Master Design Blockage Condition
Figure A60	1% AEP Peak Flood Hazard - Master Design Blockage Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Existing Railway Track
- Modelled Existing Bridge Pier
- Modelled Existing Bridge Access Ramp
- Cadastre
- Flood Level Contours (mAHD)

Peak 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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A01 : 10% AEP Peak Flood Depth and Levels - Existing Condition

MARTINUS

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Legend

- Project Boundary
- Existing Railway Track
- Modelled Existing Bridge Pier
- Modelled Existing Bridge Access Ramp
- Cadastre
- Flood Level Contours (mAHD)

Peak 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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

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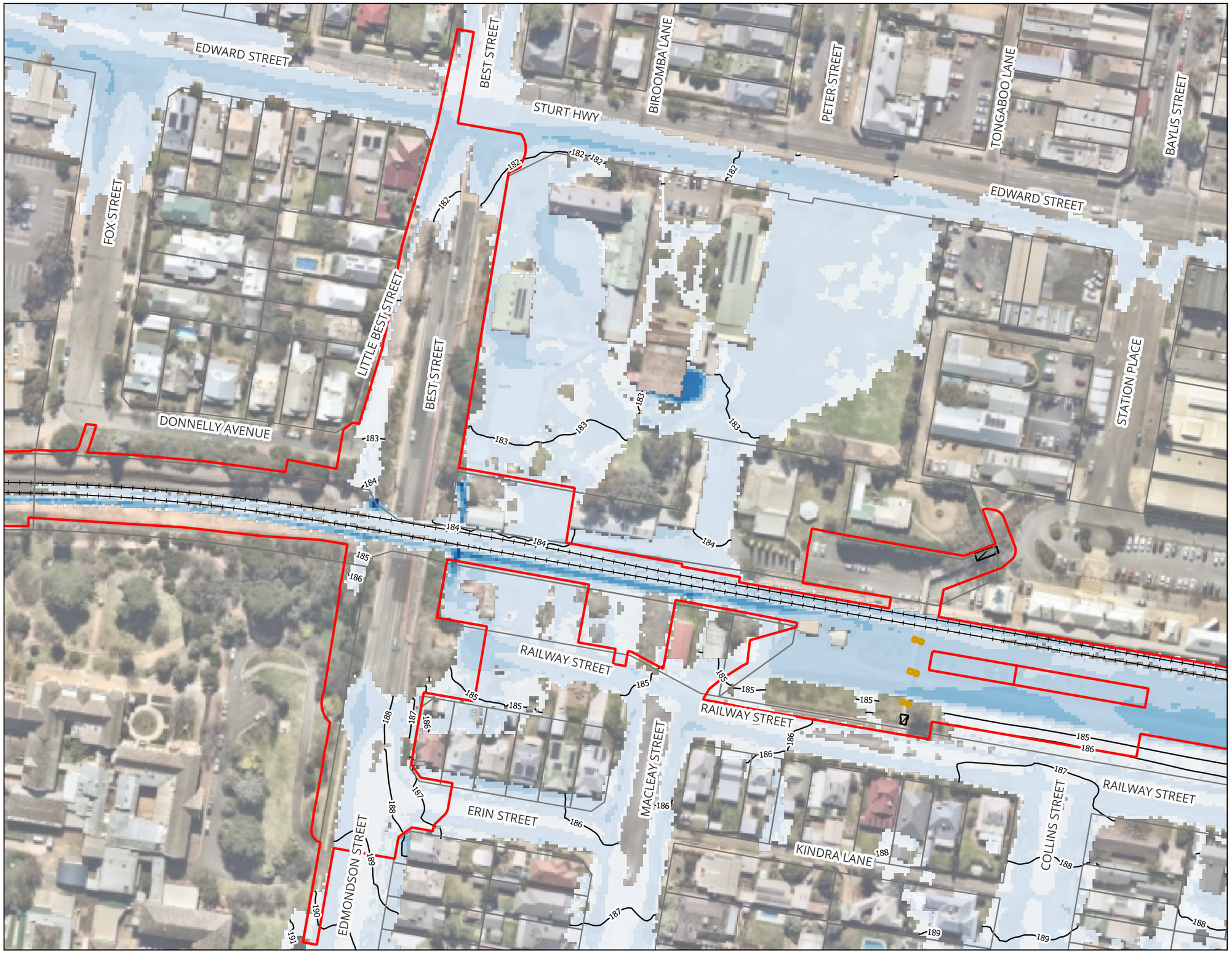
Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A02 : 5% AEP Peak Flood Depth and Levels - Existing Condition



C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Existing Railway Track
- Modelled Existing Bridge Pier
- Modelled Existing Bridge Access Ramp
- Cadastre
- Flood Level Contours (mAHD)

Peak 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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

0 60 120 m

A3 Scale: 1:1,500

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Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A03 : 2% AEP Peak Flood Depth and Levels - Existing Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Existing Railway Track
- Modelled Existing Bridge Pier
- Modelled Existing Bridge Access Ramp
- Cadastre
- Flood Level Contours (mAHD)

Peak 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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

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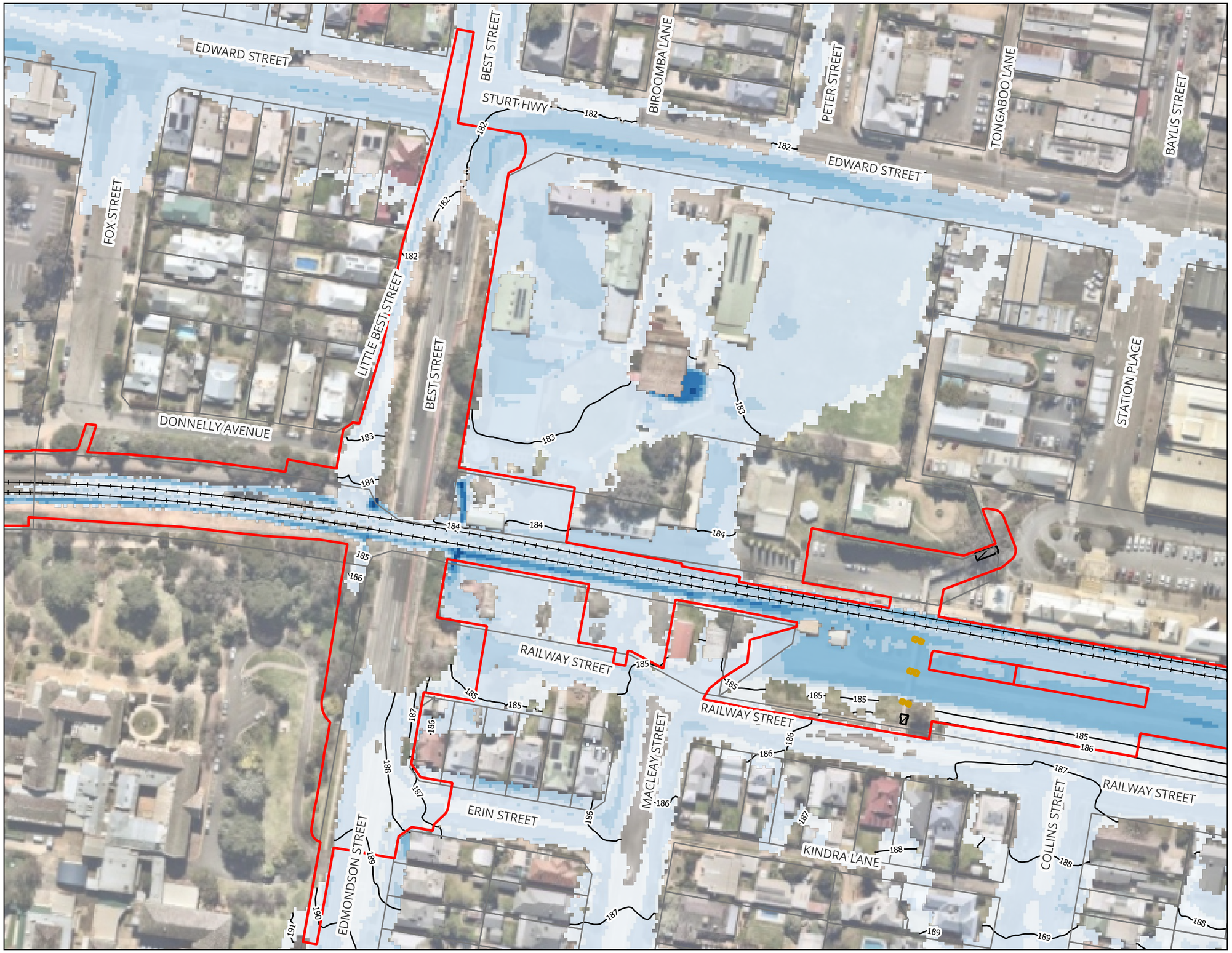
Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A04 : 1% AEP Peak Flood Depth and Levels - Existing Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Existing Railway Track
- Modelled Existing Bridge Pier
- Modelled Existing Bridge Access Ramp
- Cadastre
- Flood Level Contours (mAHD)

Peak 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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

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Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A05 : 1% AEP Climate Changes Peak Flood Depth and Levels - Existing Condition

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Legend

- Project Boundary
- Existing Railway Track
- Modelled Existing Bridge Pier
- Modelled Existing Bridge Access Ramp
- Cadastre
- Flood Level Contours (mAHD)

Peak 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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

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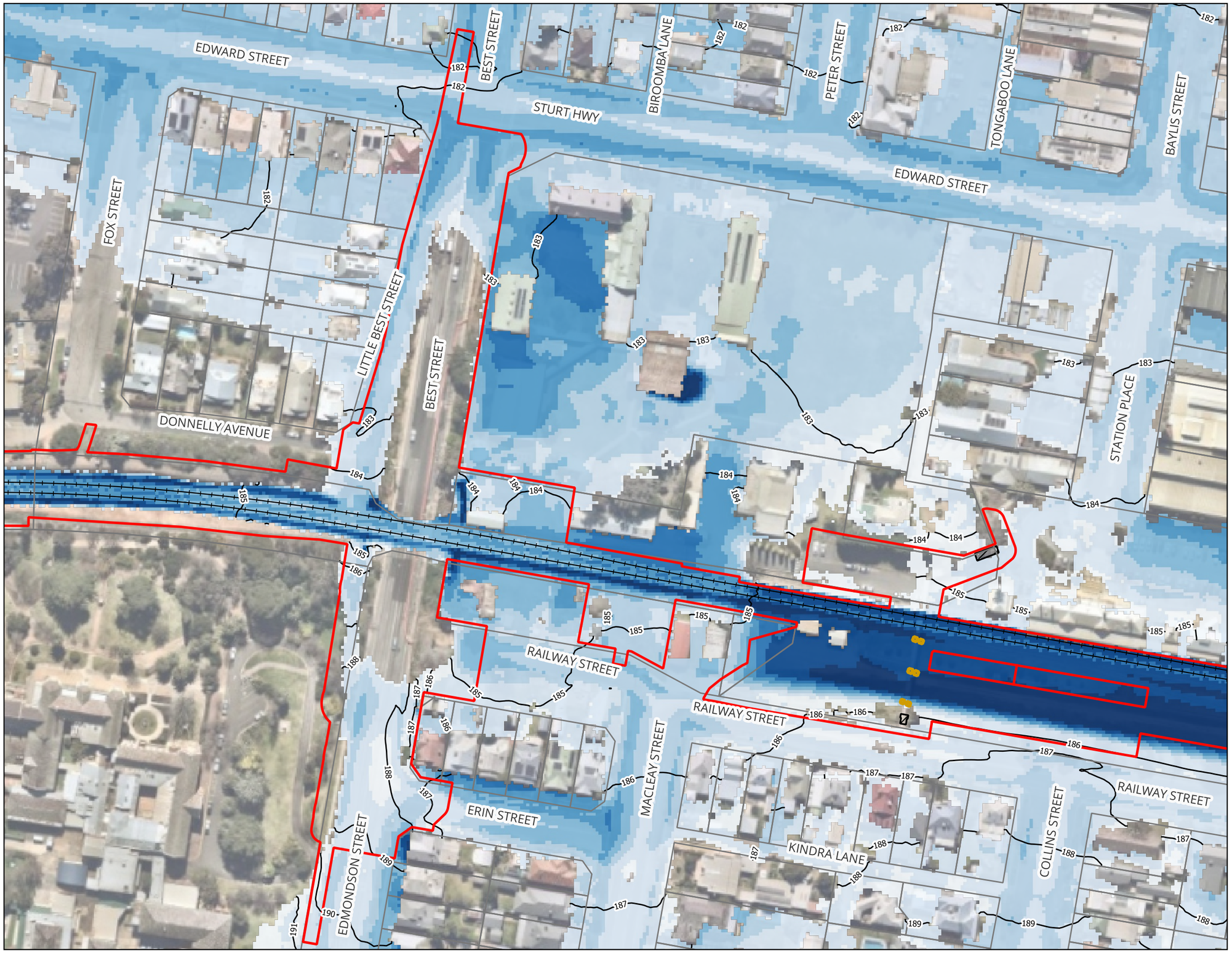
Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A06 : 0.05% AEP Peak Flood Depth and Levels - Existing Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Existing Railway Track
- Modelled Existing Bridge Pier
- Modelled Existing Bridge Access Ramp
- Cadastre
- Flood Level Contours (mAHD)

Peak 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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

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Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A07 : PMF Peak Flood Depth and Levels - Existing Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Existing Railway Track
- Modelled Existing Bridge Pier
- Modelled Existing Bridge Access Ramp
- Cadastre

Peak Flood Velocity (m/s)

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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

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Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A08 : 10% AEP Peak Flood Velocity - Existing Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Existing Railway Track
- Modelled Existing Bridge Pier
- Modelled Existing Bridge Access Ramp
- Cadastre

Peak Flood Velocity (m/s)

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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A09 : 5% AEP Peak Flood Velocity - Existing Condition

EDWARD STREET
BEST STREET
STURT HWY
BIROOMBA LANE
PETER STREET
TONGABOO LANE
BAYLIS STREET
EDWARD STREET
FOX STREET
LITTLE BEST STREET
BEST STREET
DONNELLY AVENUE
STATION PLACE
RAILWAY STREET
RAILWAY STREET
RAILWAY STREET
MACLEAY STREET
ERIN STREET
KINDRA LANE
COLLINS STREET
EDMONDSON STREET

MARTINUS
aurecon BG&E

Legend

- Project Boundary
- Existing Railway Track
- Modelled Existing Bridge Pier
- Modelled Existing Bridge Access Ramp
- Cadastre

Peak Flood Velocity (m/s)

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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A10 : 2% AEP Peak Flood Velocity - Existing Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Existing Railway Track
- Modelled Existing Bridge Pier
- Modelled Existing Bridge Access Ramp
- Cadastre

Peak Flood Velocity (m/s)

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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A11 : 1% AEP Peak Flood Velocity - Existing Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Existing Railway Track
- Modelled Existing Bridge Pier
- Modelled Existing Bridge Access Ramp
- Cadastre

Peak Flood Velocity (m/s)

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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumuruganl\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A12 : 1% AEP Climate Changes Peak Flood Velocity - Existing Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Existing Railway Track
- Modelled Existing Bridge Pier
- Modelled Existing Bridge Access Ramp
- Cadastre

Peak Flood Velocity (m/s)

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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

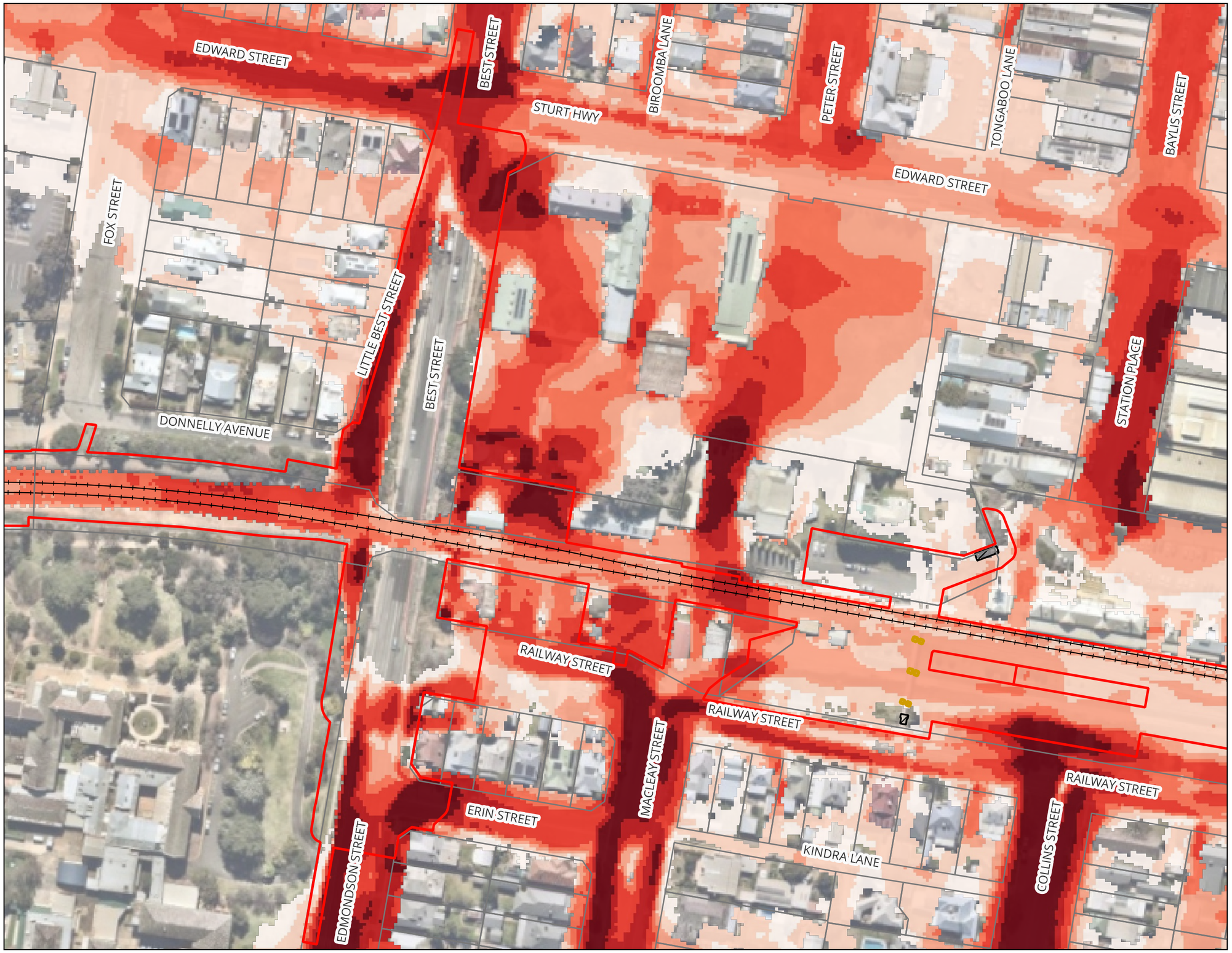
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A13 : 0.05% AEP Peak Flood Velocity - Existing Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Existing Railway Track
- Modelled Existing Bridge Pier
- Modelled Existing Bridge Access Ramp
- Cadastre

Peak Flood Velocity (m/s)

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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

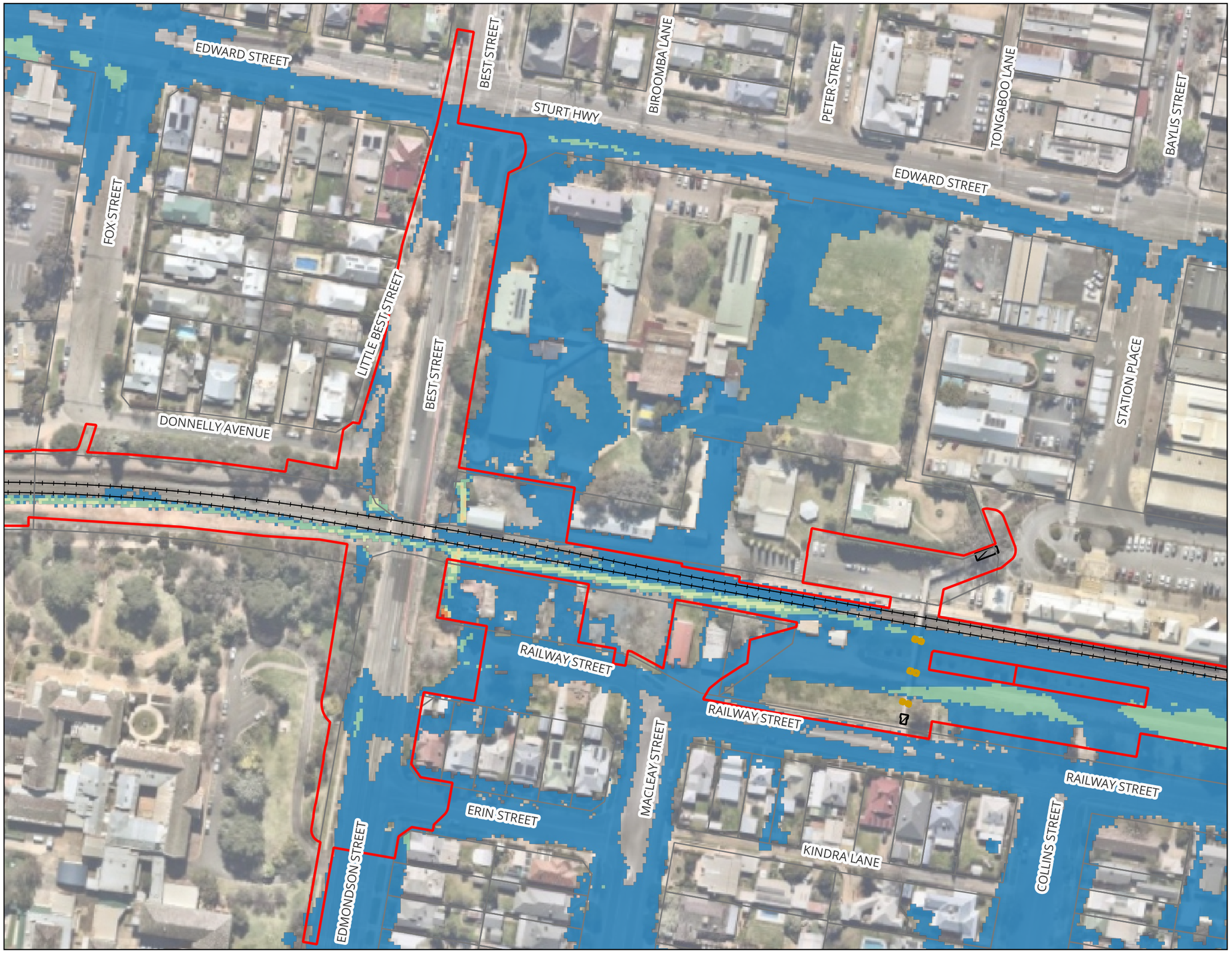
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A14 : PMF AEP Peak Flood Velocity - Existing Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Existing Railway Track
- Modelled Existing Bridge Pier
- Modelled Existing Bridge Access Ramp
- Cadastre

Peak Flood Hazard

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

Notes:

The maps are based on DDR results (Refer to Flood Design Report)

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 buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6 : Unsafe for vehicles and people. All building types considered vulnerable to failure.

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

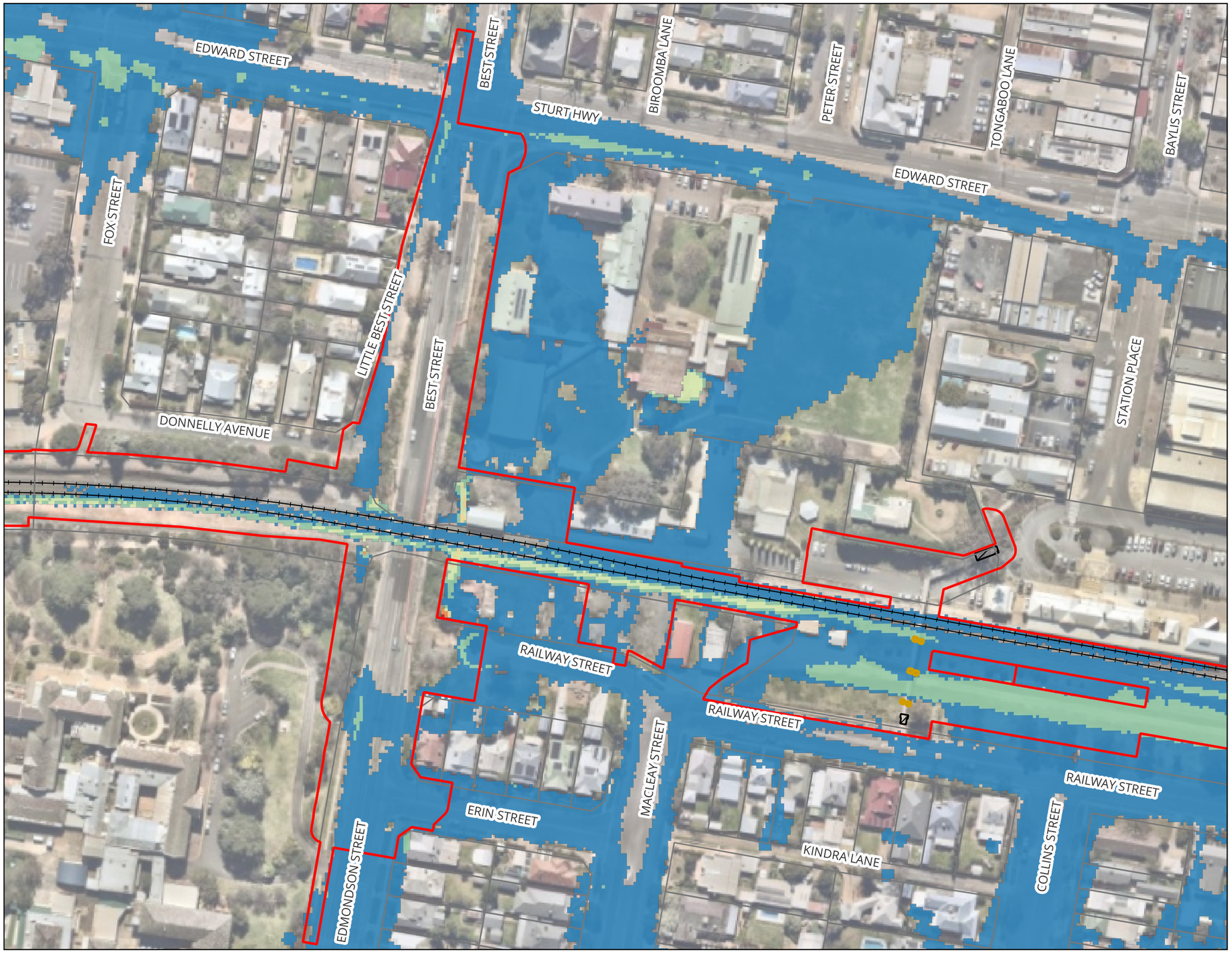
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A15 : 10% AEP Peak Flood Hazard - Existing Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Existing Railway Track
- Modelled Existing Bridge Pier
- Modelled Existing Bridge Access Ramp
- Cadastre

Peak Flood Hazard

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

Notes:

The maps are based on DDR results (Refer to Flood Design Report)

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 buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6 : Unsafe for vehicles and people. All building types considered vulnerable to failure.

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

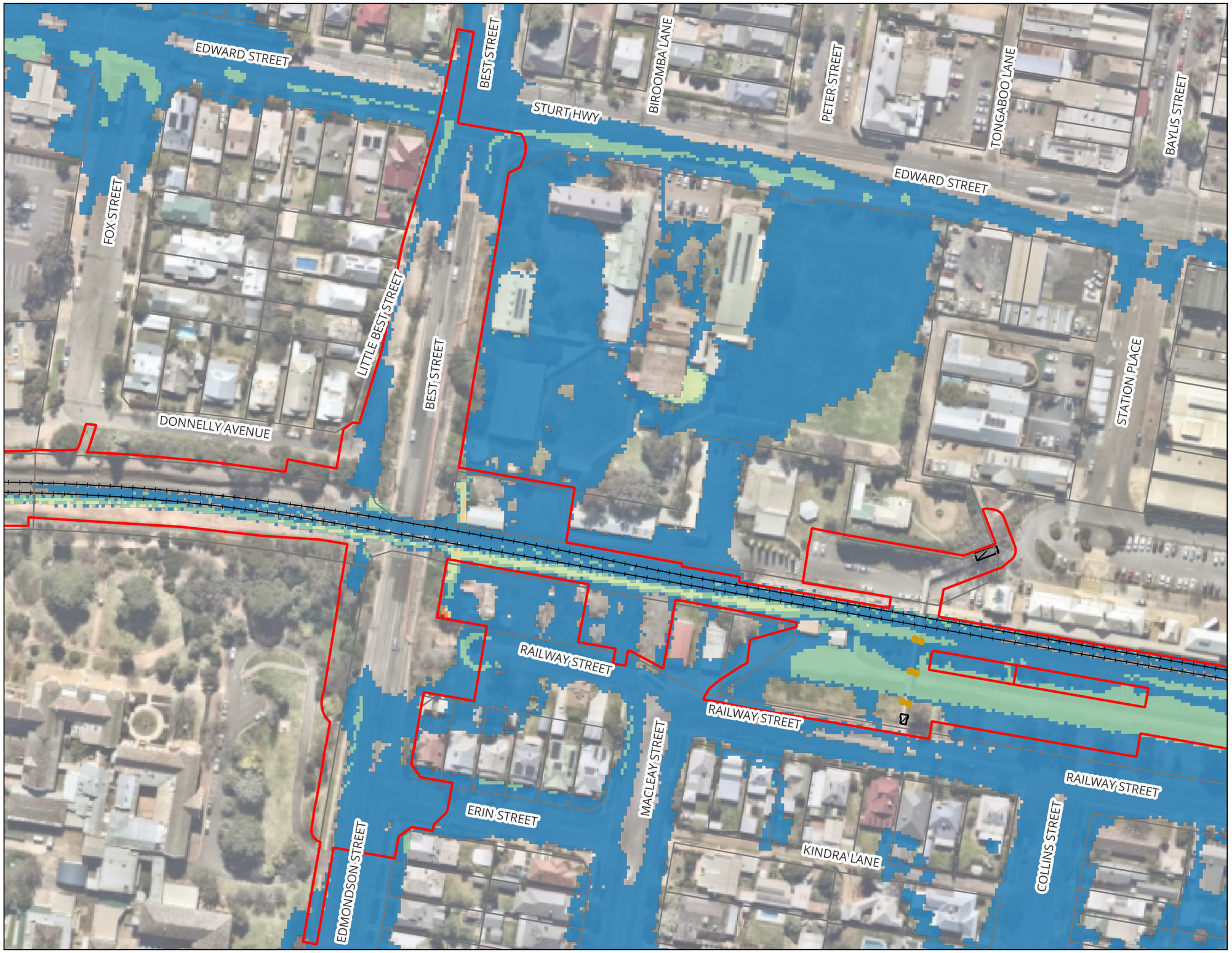
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A16 : 5% AEP Peak Flood Hazard - Existing Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Existing Railway Track
- Modelled Existing Bridge Pier
- Modelled Existing Bridge Access Ramp
- Cadastre

Peak Flood Hazard

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

Notes:

The maps are based on DDR results (Refer to Flood Design Report)

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 buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6 : Unsafe for vehicles and people. All building types considered vulnerable to failure.

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

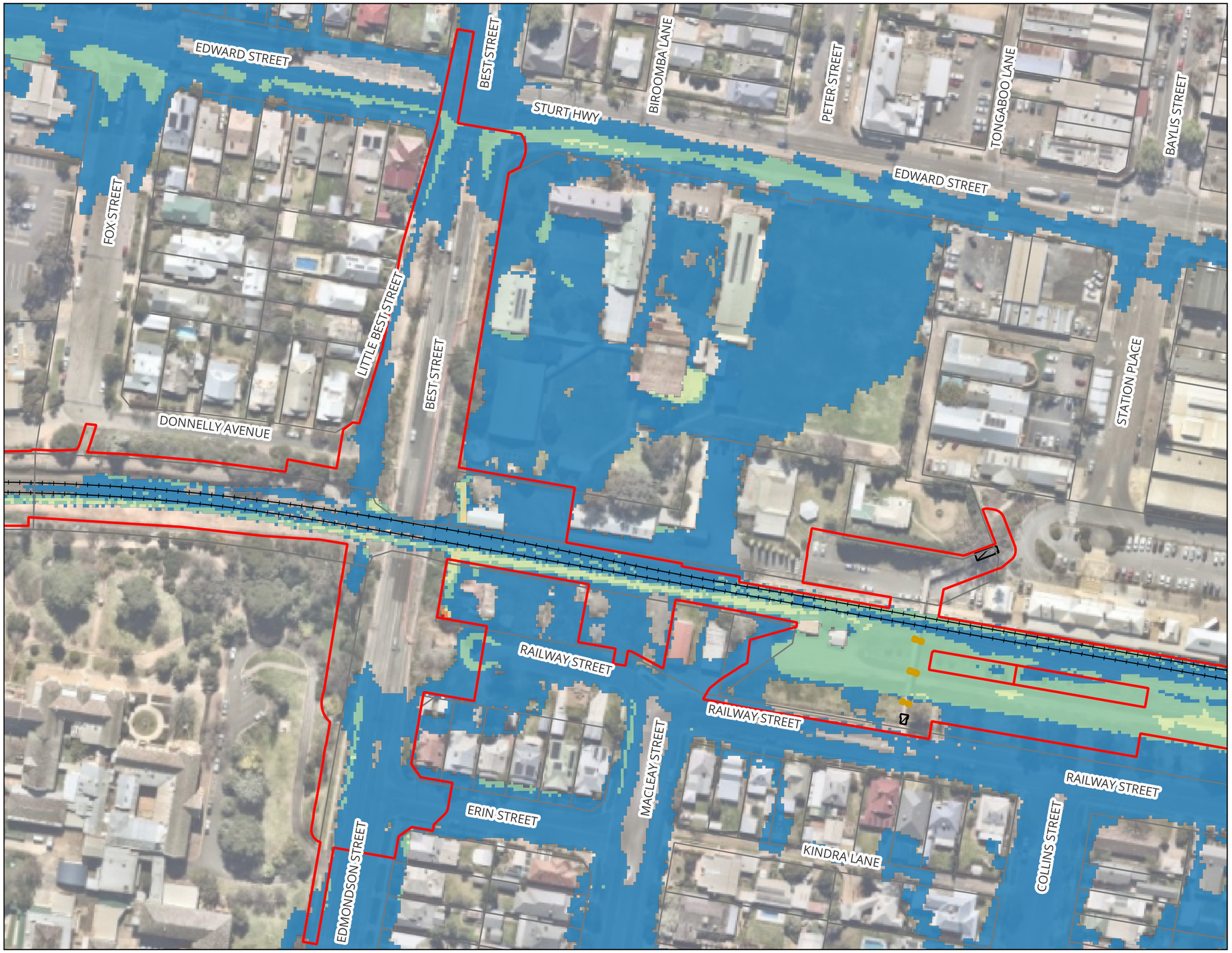
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A17 : 2% AEP Peak Flood Hazard - Existing Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Existing Railway Track
- Modelled Existing Bridge Pier
- Modelled Existing Bridge Access Ramp
- Cadastre

Peak Flood Hazard

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

Notes:

The maps are based on DDR results (Refer to Flood Design Report)

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 buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6 : Unsafe for vehicles and people. All building types considered vulnerable to failure.

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

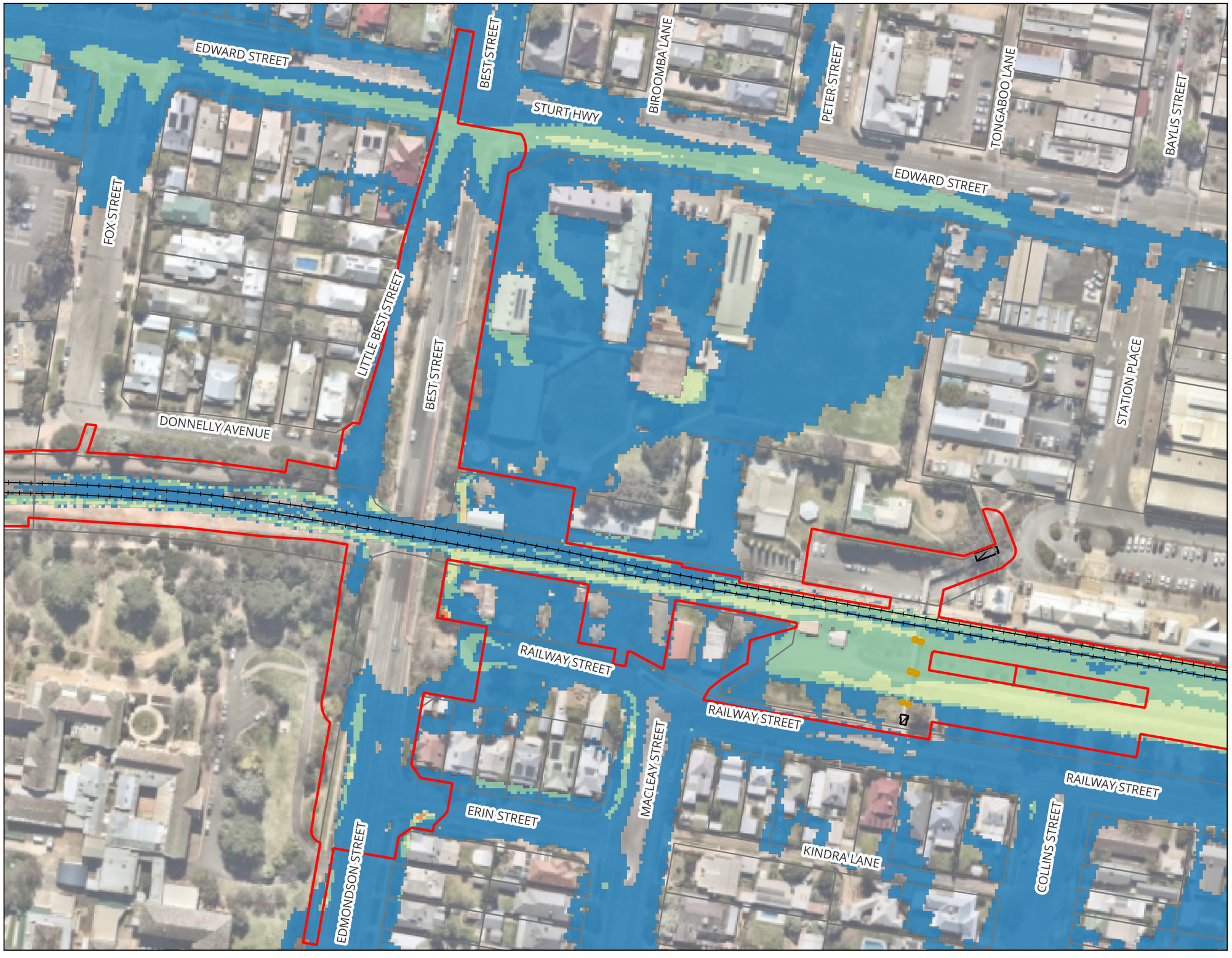
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A18 : 1% AEP Peak Flood Hazard - Existing Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Existing Railway Track
- Modelled Existing Bridge Pier
- Modelled Existing Bridge Access Ramp
- Cadastre

Peak Flood Hazard

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

Notes:

The maps are based on DDR results (Refer to Flood Design Report)

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 buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6 : Unsafe for vehicles and people. All building types considered vulnerable to failure.

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

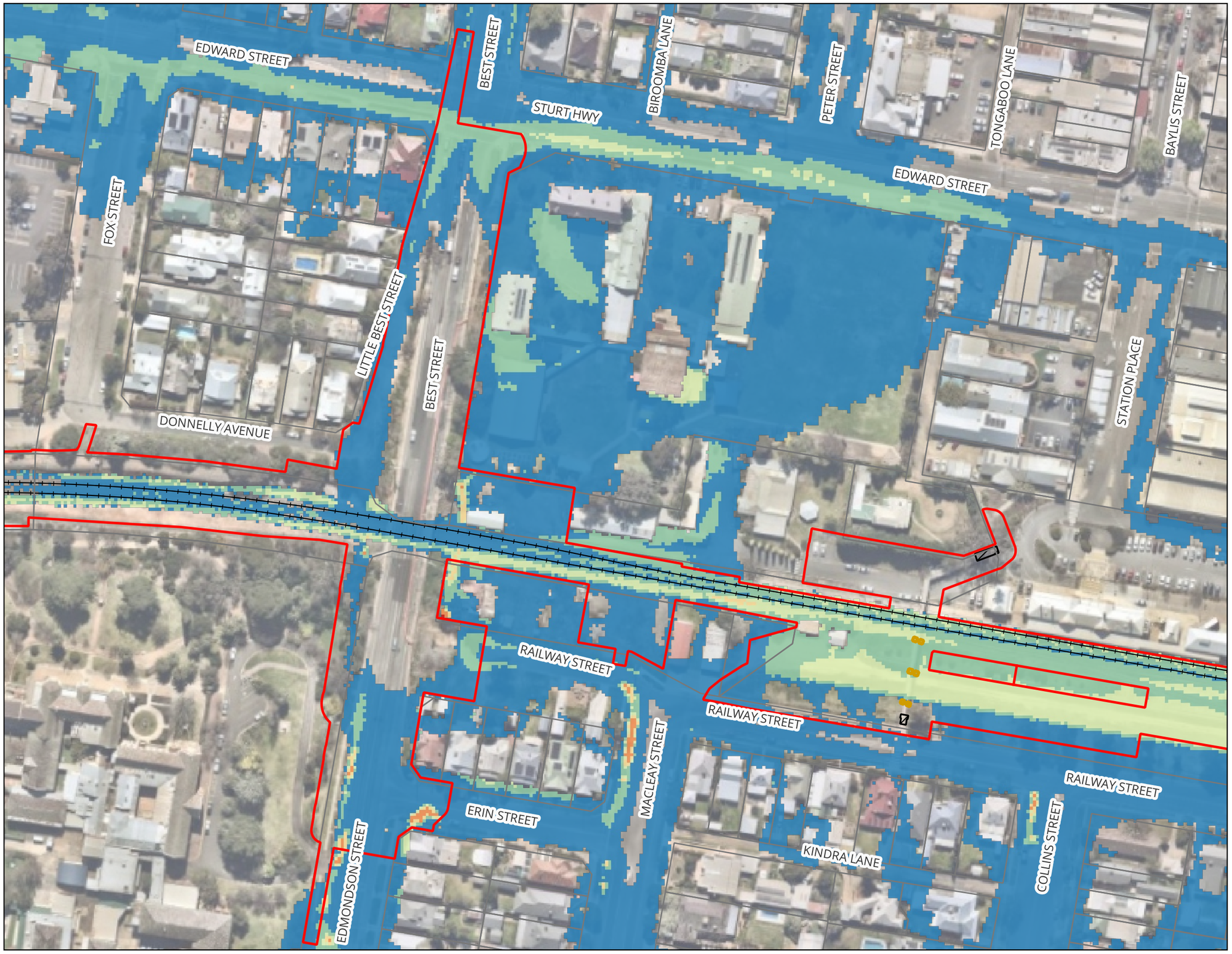
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A19 : 1% AEP Climate Changes Peak Flood Hazard - Existing Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Existing Railway Track
- Modelled Existing Bridge Pier
- Modelled Existing Bridge Access Ramp
- Cadastre

Peak Flood Hazard

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

Notes:

The maps are based on DDR results (Refer to Flood Design Report)

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 buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6 : Unsafe for vehicles and people. All building types considered vulnerable to failure.

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A20 : 0.05% AEP Peak Flood Hazard - Existing Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Existing Railway Track
- Modelled Existing Bridge Pier
- Modelled Existing Bridge Access Ramp
- Cadastre

Peak Flood Hazard

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

Notes:

The maps are based on DDR results (Refer to Flood Design Report)

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 buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6 : Unsafe for vehicles and people. All building types considered vulnerable to failure.

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A21 : PMF AEP Peak Flood Hazard - Existing Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre
- Flood Level Contours (mAHD)

Peak 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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

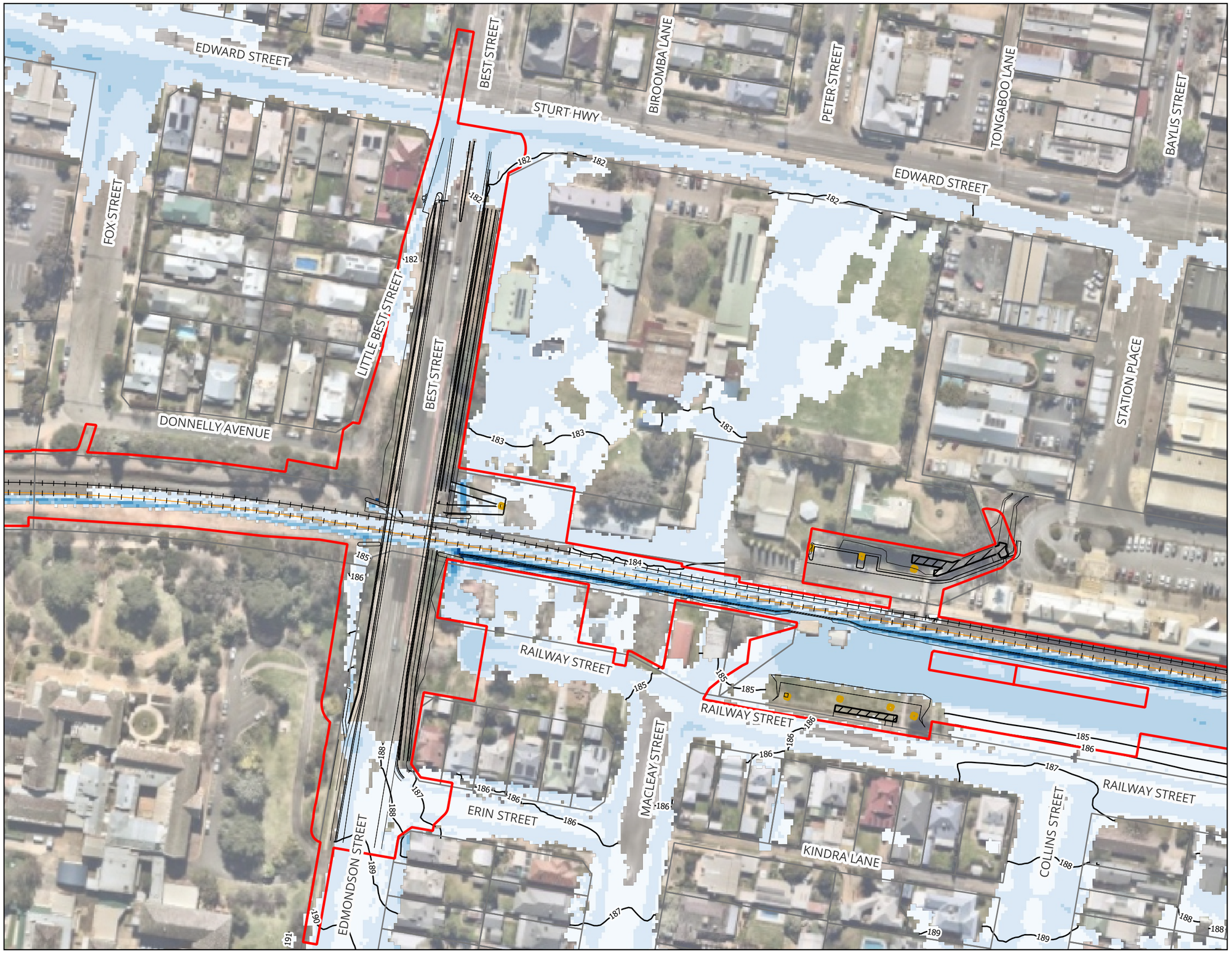
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A22 : 10% AEP Peak Flood Depth and Levels - Master Design Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre
- Flood Level Contours (mAHD)

Peak 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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A23 : 5% AEP Peak Flood Depth and Levels - Master Design Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre
- Flood Level Contours (mAHD)

Peak 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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A24 : 2% AEP Peak Flood Depth and Levels - Master Design Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre
- Flood Level Contours (mAHD)

Peak 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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A25 : 1% AEP Peak Flood Depth and Levels - Master Design Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre
- Flood Level Contours (mAHD)

Peak 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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A26 : 1% AEP Climate Changes Peak Flood Depth and Levels - Master Design Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre
- Flood Level Contours (mAHD)

Peak 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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A27 : 0.05% AEP Peak Flood Depth and Levels - Master Design Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre
- Flood Level Contours (mAHD)

Peak 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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A28 : PMF Peak Flood Depth and Levels - Master Design Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Peak Flood Velocity (m/s)

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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

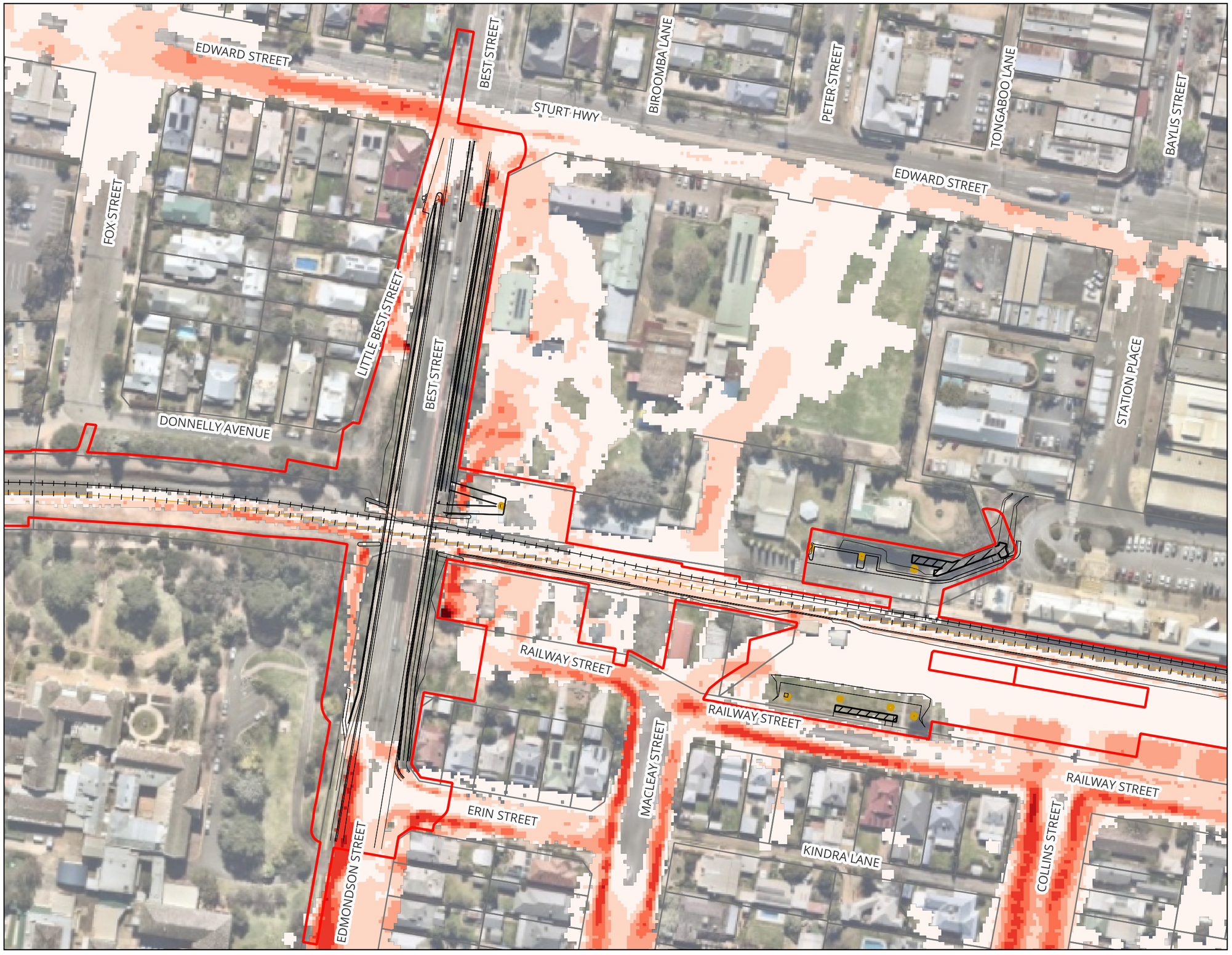
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A29 : 10% AEP Peak Flood Velocity - Master Design Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Peak Flood Velocity (m/s)

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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

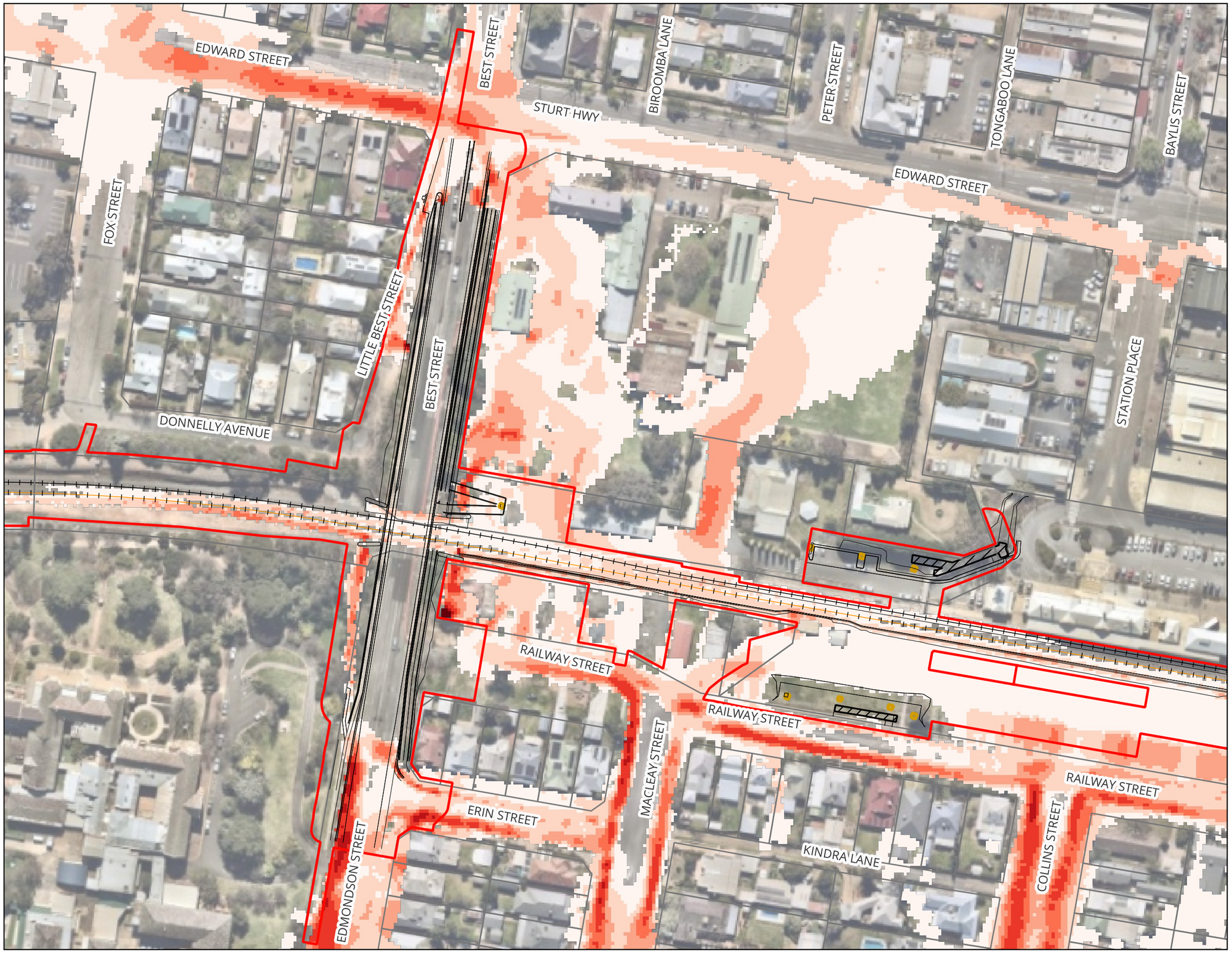
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A30 : 5% AEP Peak Flood Velocity - Master Design Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Peak Flood Velocity (m/s)

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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A31 : 2% AEP Peak Flood Velocity - Master Design Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Peak Flood Velocity (m/s)

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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

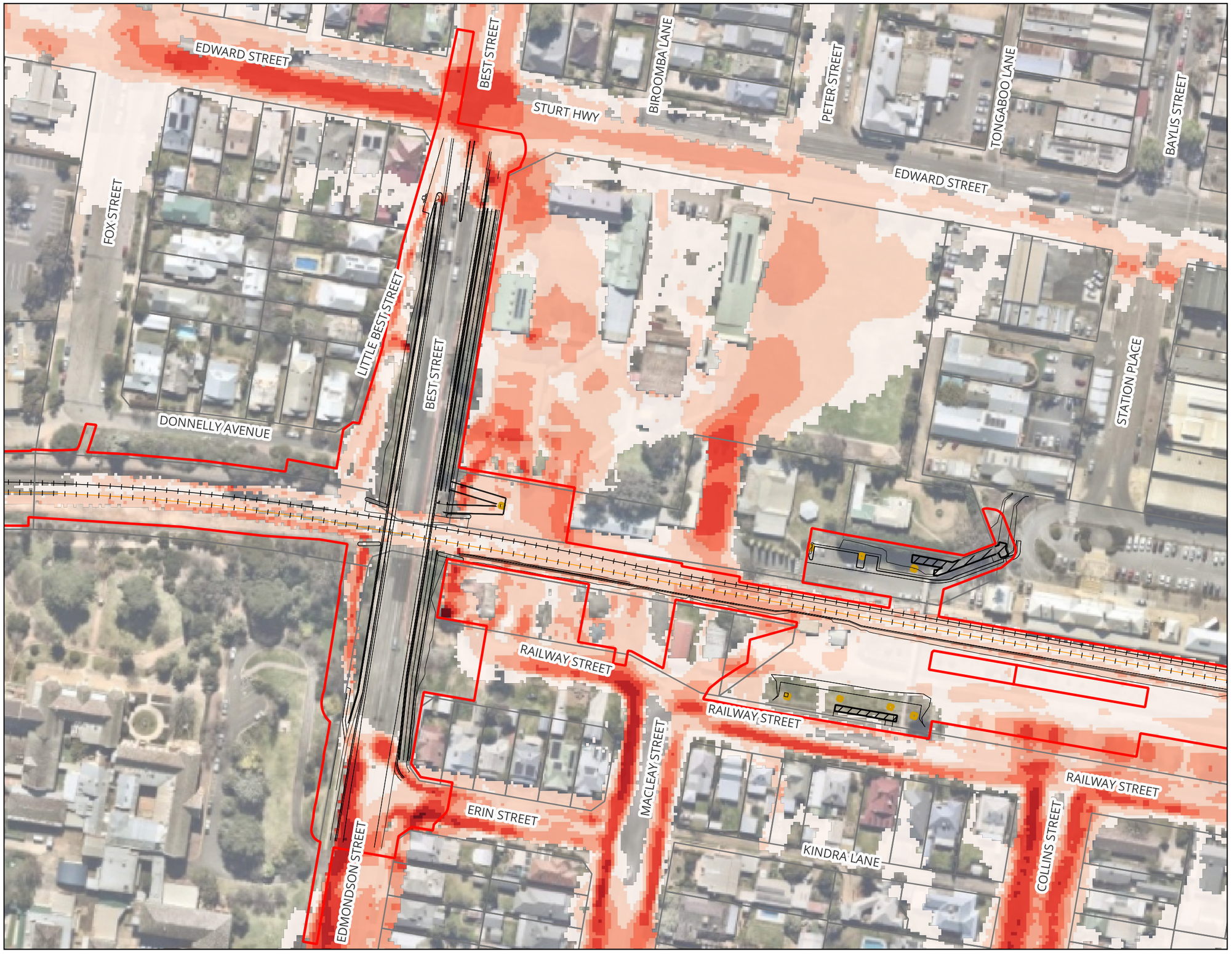
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A32 : 1% AEP Peak Flood Velocity - Master Design Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Peak Flood Velocity (m/s)

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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A33 : 1% AEP Climate Changes Peak Flood Velocity - Master Design Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Peak Flood Velocity (m/s)

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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A34 : 0.05% AEP Peak Flood Velocity - Master Design Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Peak Flood Velocity (m/s)

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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

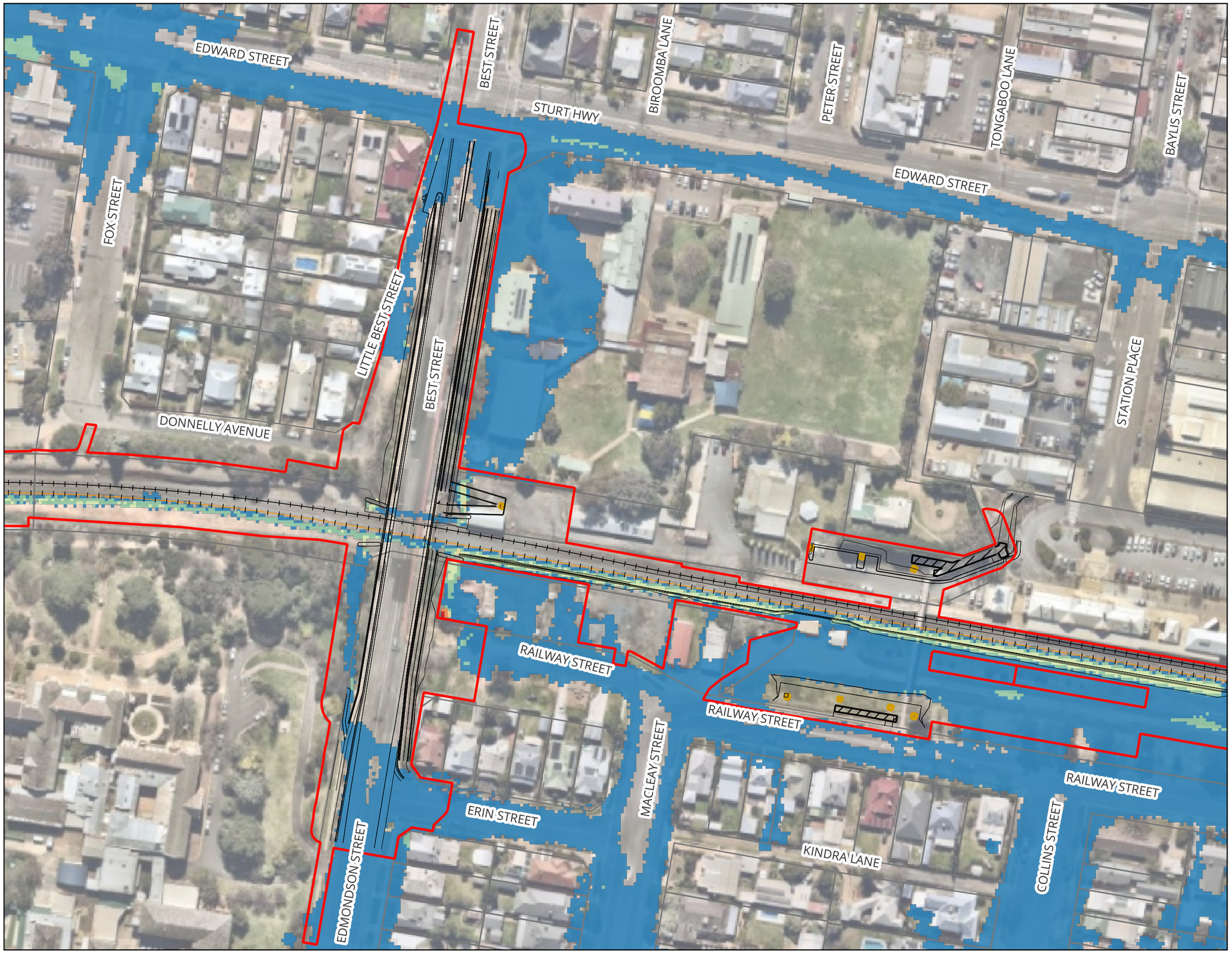
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A35 : PMF Peak Flood Velocity - Master Design Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Peak Flood Hazard

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

Notes:

The maps are based on DDR results (Refer to Flood Design Report)

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 buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6 : Unsafe for vehicles and people. All building types considered vulnerable to failure.

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

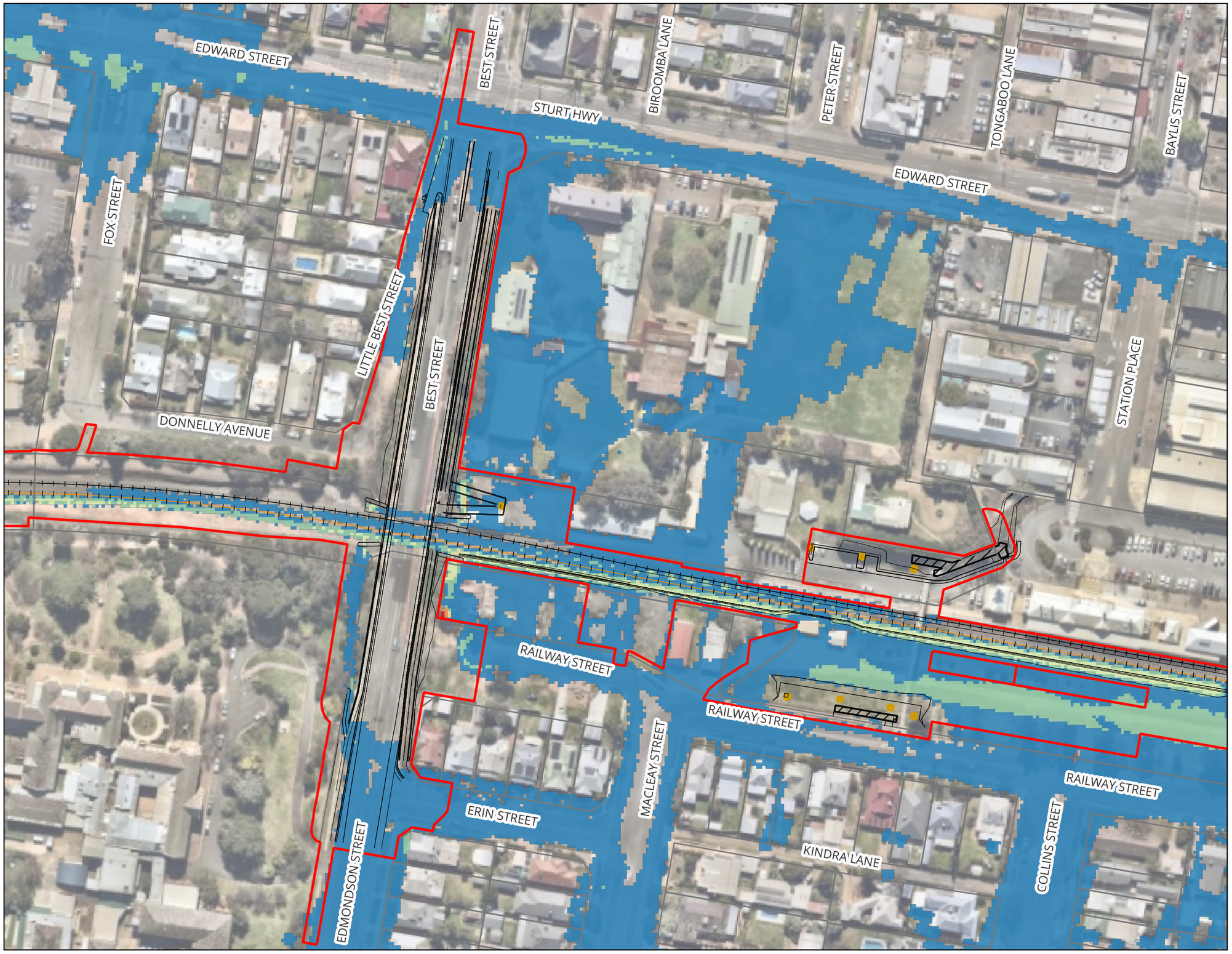
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A36 : 10% AEP Peak Flood Hazard - Master Design Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Peak Flood Hazard

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

Notes:

The maps are based on DDR results (Refer to Flood Design Report)

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 buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6 : Unsafe for vehicles and people. All building types considered vulnerable to failure.

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

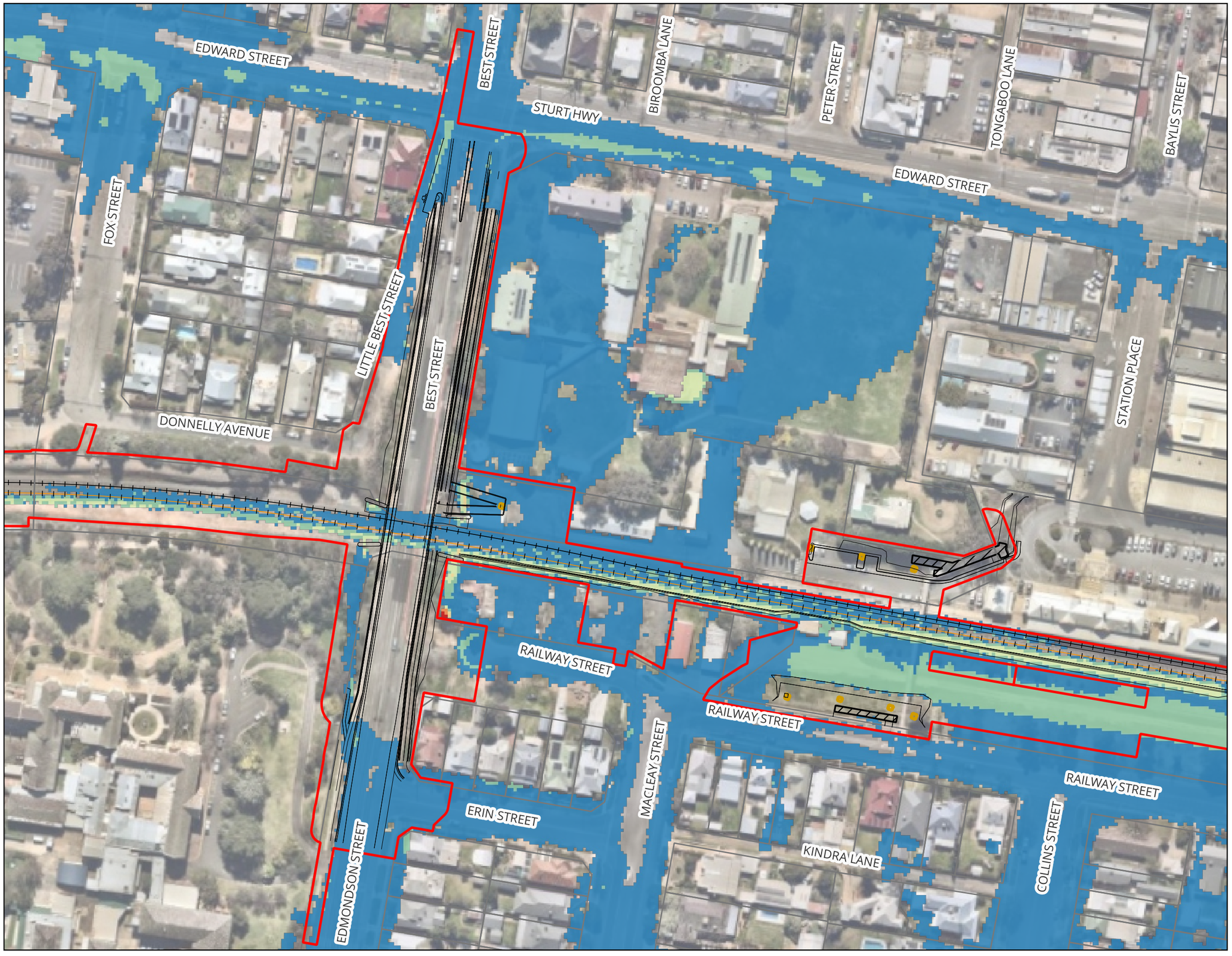
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A37 : 5% AEP Peak Flood Hazard - Master Design Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Peak Flood Hazard

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

Notes:

The maps are based on DDR results (Refer to Flood Design Report)

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 buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6 : Unsafe for vehicles and people. All building types considered vulnerable to failure.

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

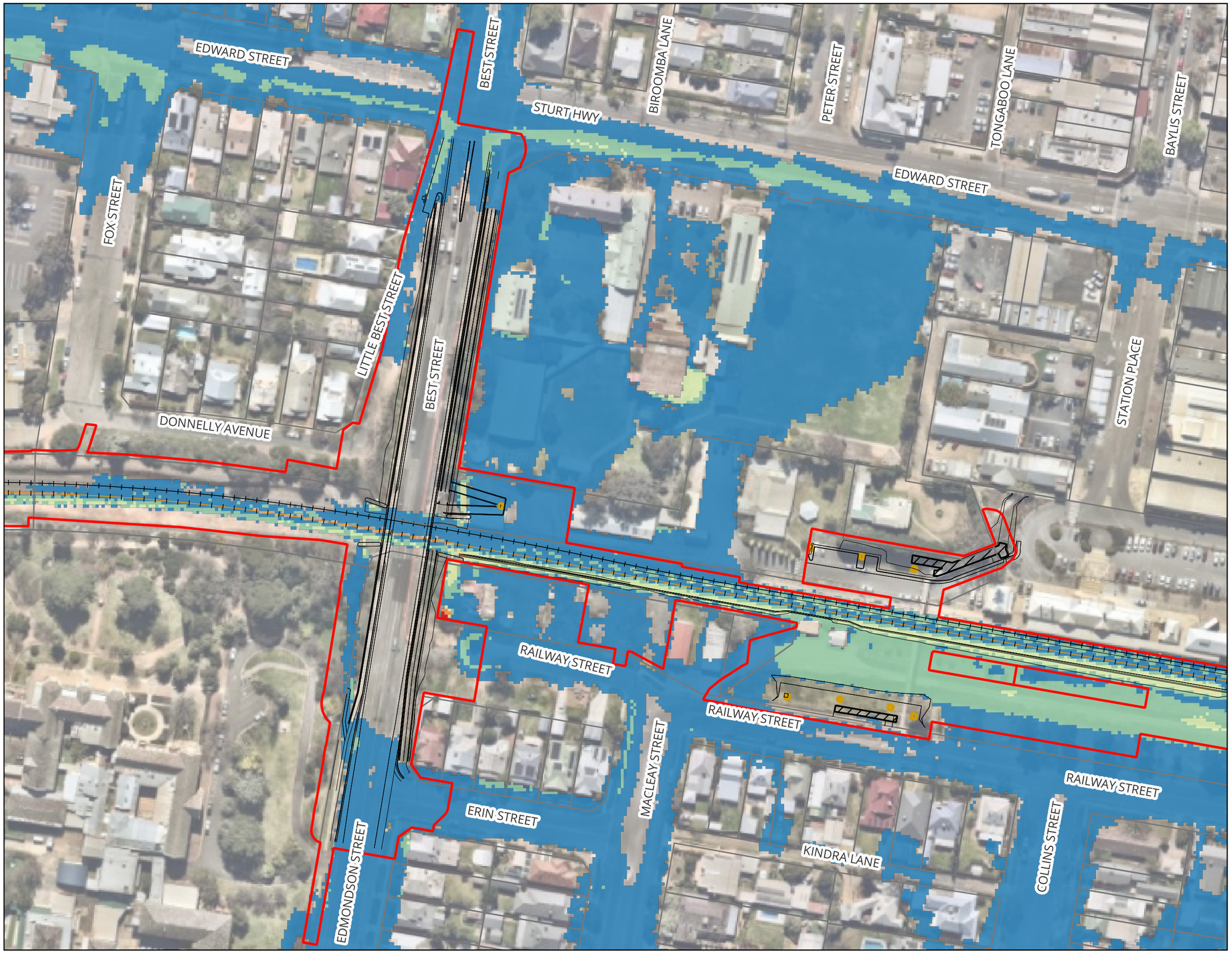
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A38 : 2% AEP Peak Flood Hazard - Master Design Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Peak Flood Hazard

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

Notes:

The maps are based on DDR results (Refer to Flood Design Report)

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 buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6 : Unsafe for vehicles and people. All building types considered vulnerable to failure.

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

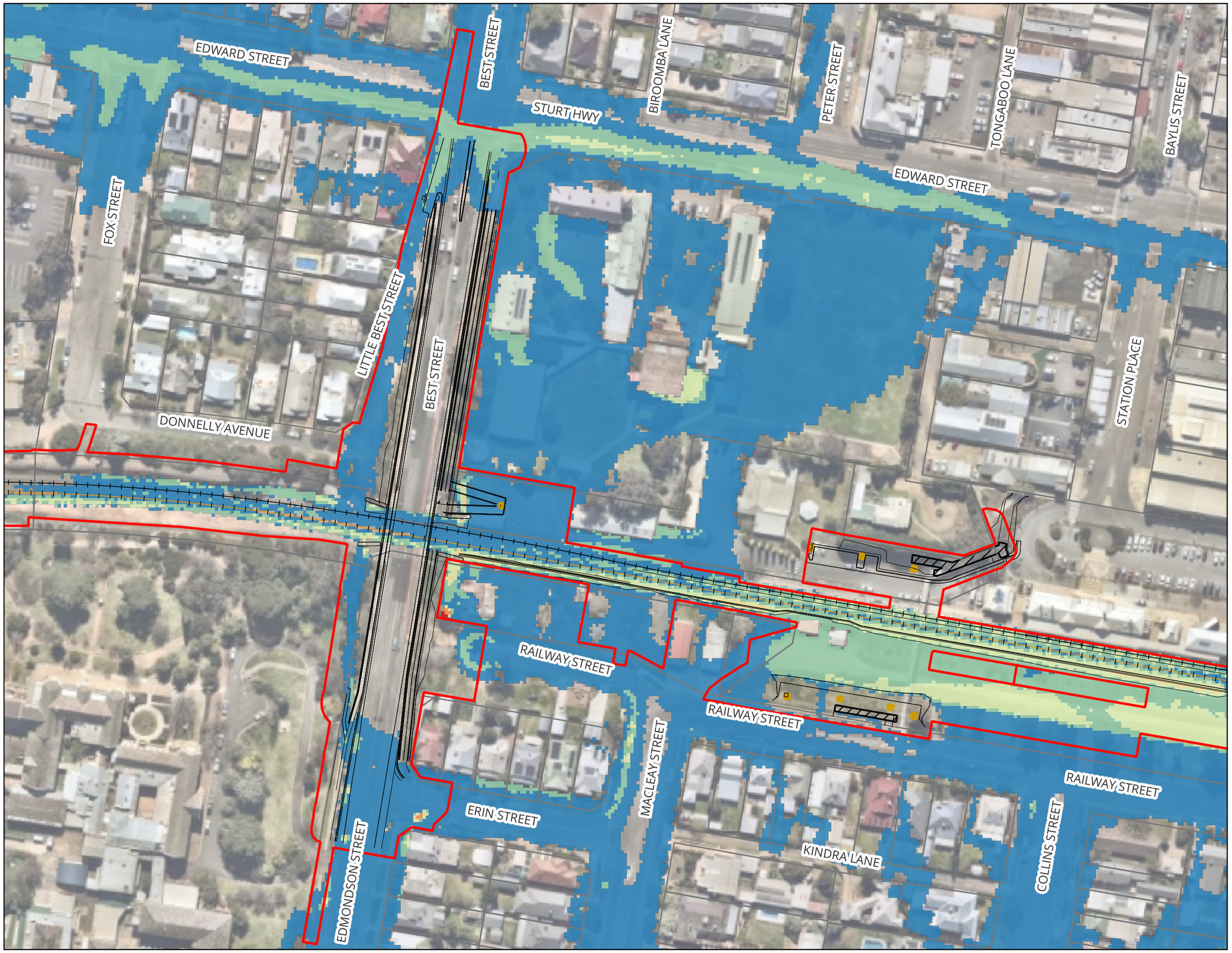
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A39 : 1% AEP Peak Flood Hazard - Master Design Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Peak Flood Hazard

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

Notes:

The maps are based on DDR results (Refer to Flood Design Report)

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 buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6 : Unsafe for vehicles and people. All building types considered vulnerable to failure.

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

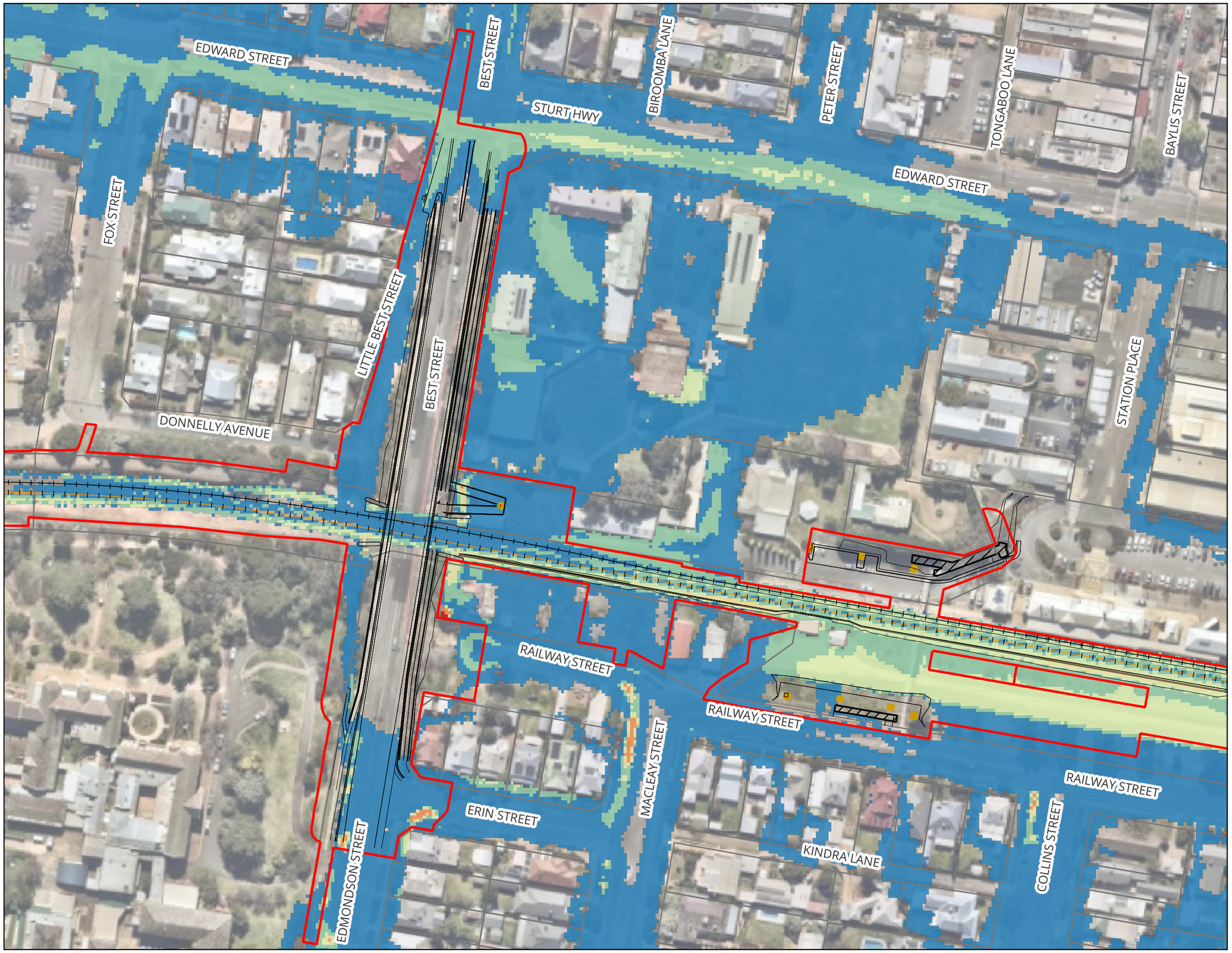
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A40 : 1% AEP Climate Changes Peak Flood Hazard - Master Design Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Peak Flood Hazard

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

Notes:

The maps are based on DDR results (Refer to Flood Design Report)

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 buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6 : Unsafe for vehicles and people. All building types considered vulnerable to failure.

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

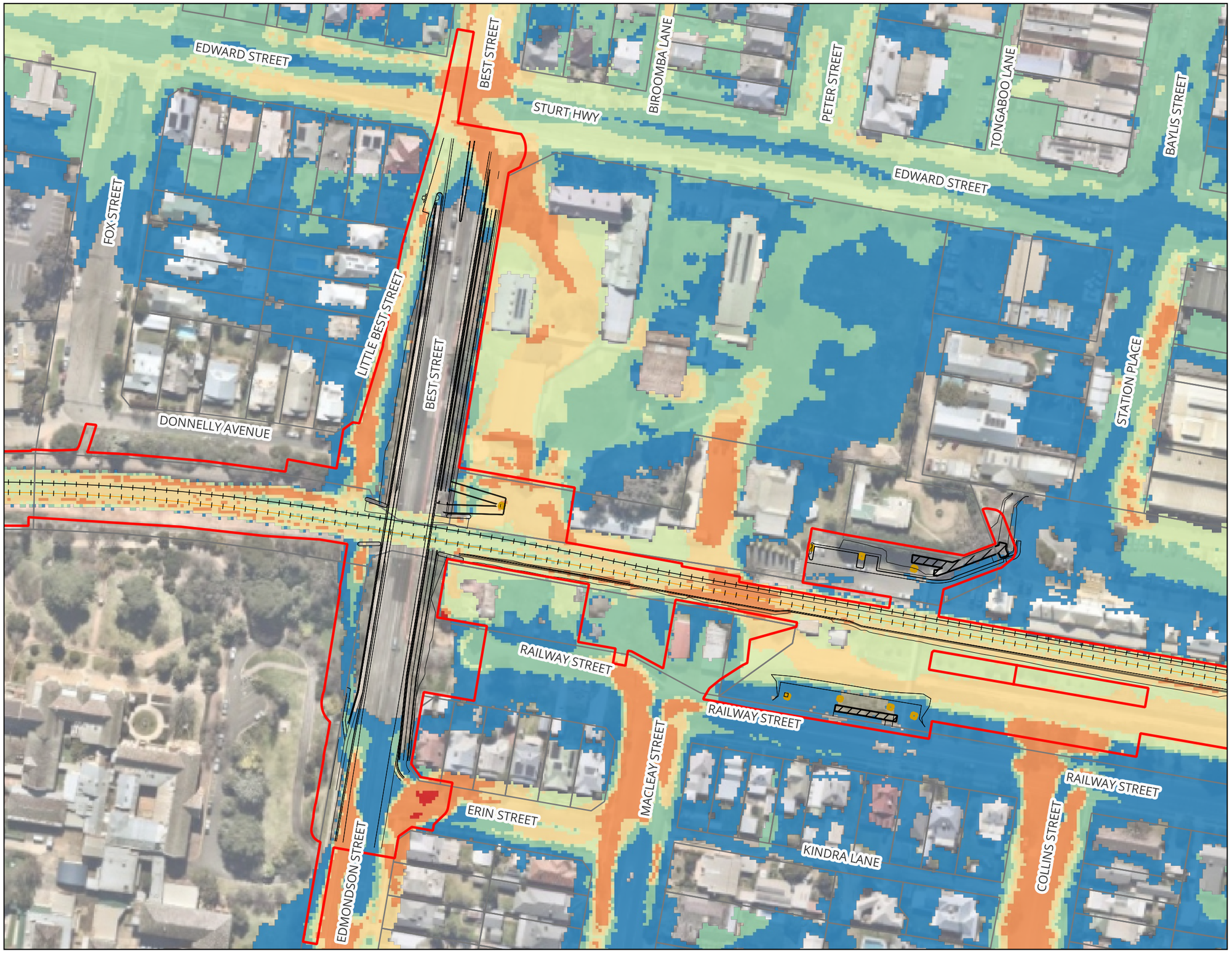
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A41 : 0.05% AEP Peak Flood Hazard - Master Design Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Peak Flood Hazard

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

Notes:

The maps are based on DDR results (Refer to Flood Design Report)

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 buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6 : Unsafe for vehicles and people. All building types considered vulnerable to failure.

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A42 : PMF Peak Flood Hazard - Master Design Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Changes in Flood Level (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
- Was Wet Now Dry
- Was Dry Now Wet

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

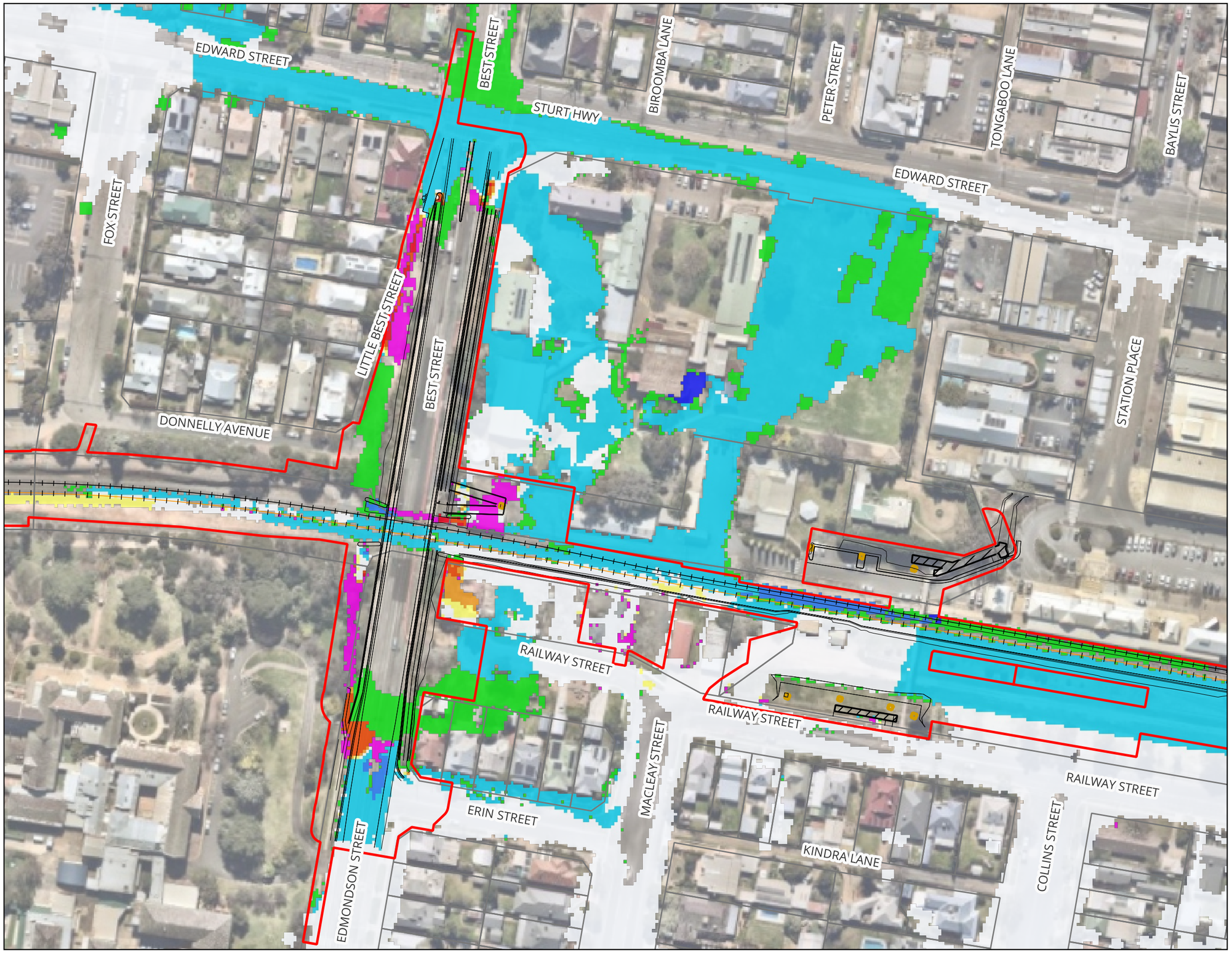
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A43 : Changes in Peak Flood Levels for 10% AEP - Master Design Condition vs Existing Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Changes in Flood Level (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
- Was Wet Now Dry
- Was Dry Now Wet

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A44 : Changes in Peak Flood Levels for 5% AEP - Master Design Condition vs Existing Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Changes in Flood Level (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
- Was Wet Now Dry
- Was Dry Now Wet

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

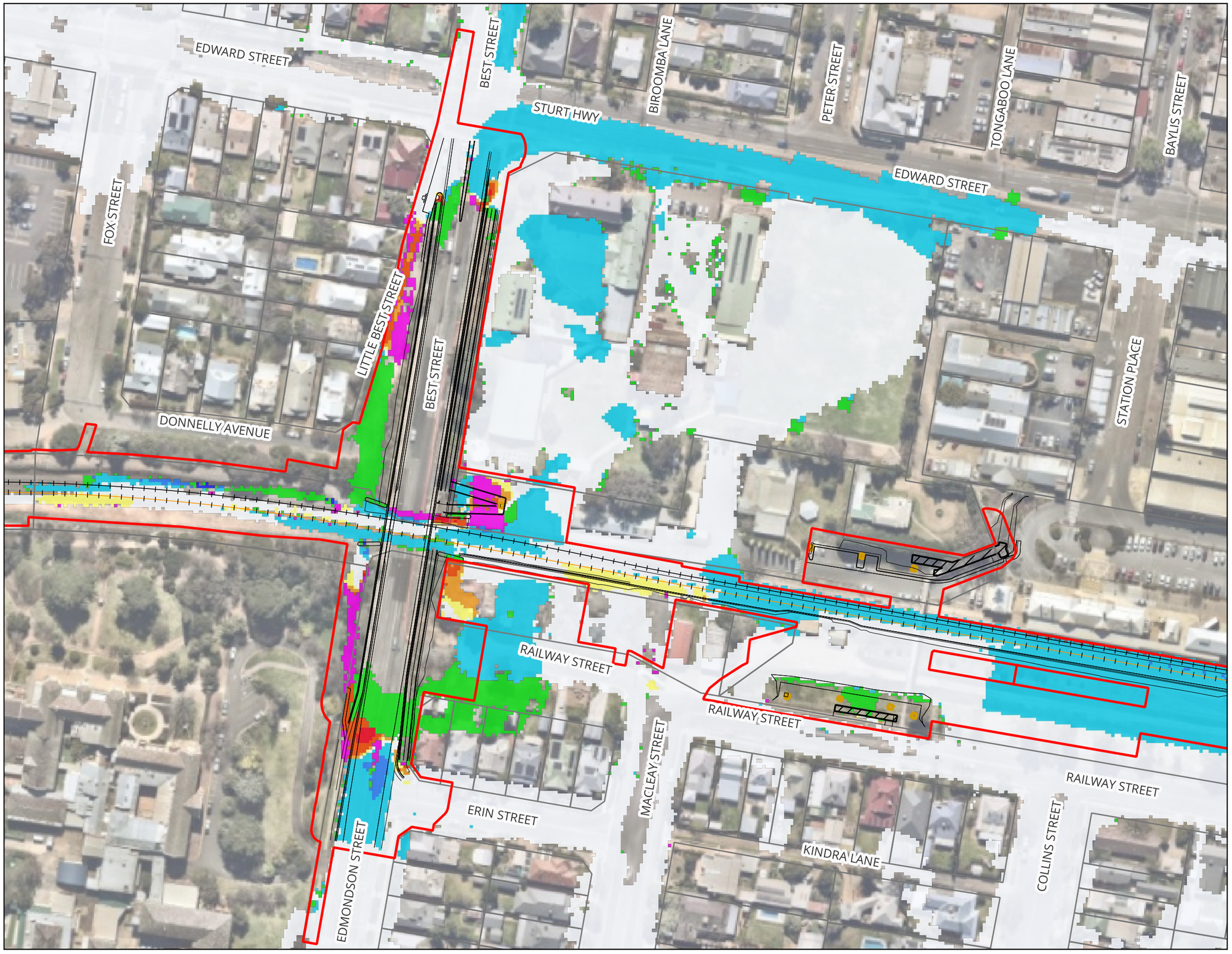
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A45 : Changes in Peak Flood Levels for 2% AEP - Master Design Condition vs Existing Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Changes in Flood Level (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
- Was Wet Now Dry
- Was Dry Now Wet

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A46 : Changes in Peak Flood Levels for 1% AEP - Master Design Condition vs Existing Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Changes in Flood Level (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
- Was Wet Now Dry
- Was Dry Now Wet

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A47 : Changes in Peak Flood Levels for 1% AEP Climate Changes - Master Design Condition vs Existing Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Changes in Velocity (m/s)

- <= 0.50

Changes in Velocity (%)

- <= 10%
- 10% - 20%
- > 20%
- Was Wet Now Dry
- Was Dry Now Wet

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A48 : Changes in Peak Flood Velocity for 10% AEP - Master Design Condition vs Existing Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Changes in Velocity (m/s)

<= 0.50

Changes in Velocity (%)

- <= 10%
- 10% - 20%
- > 20%
- Was Wet Now Dry
- Was Dry Now Wet

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A49 : Changes in Peak Flood Velocity for 5% AEP - Master Design Condition vs Existing Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Changes in Velocity (m/s)

- <= 0.50

Changes in Velocity (%)

- <= 10%
- 10% - 20%
- > 20%
- Was Wet Now Dry
- Was Dry Now Wet

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

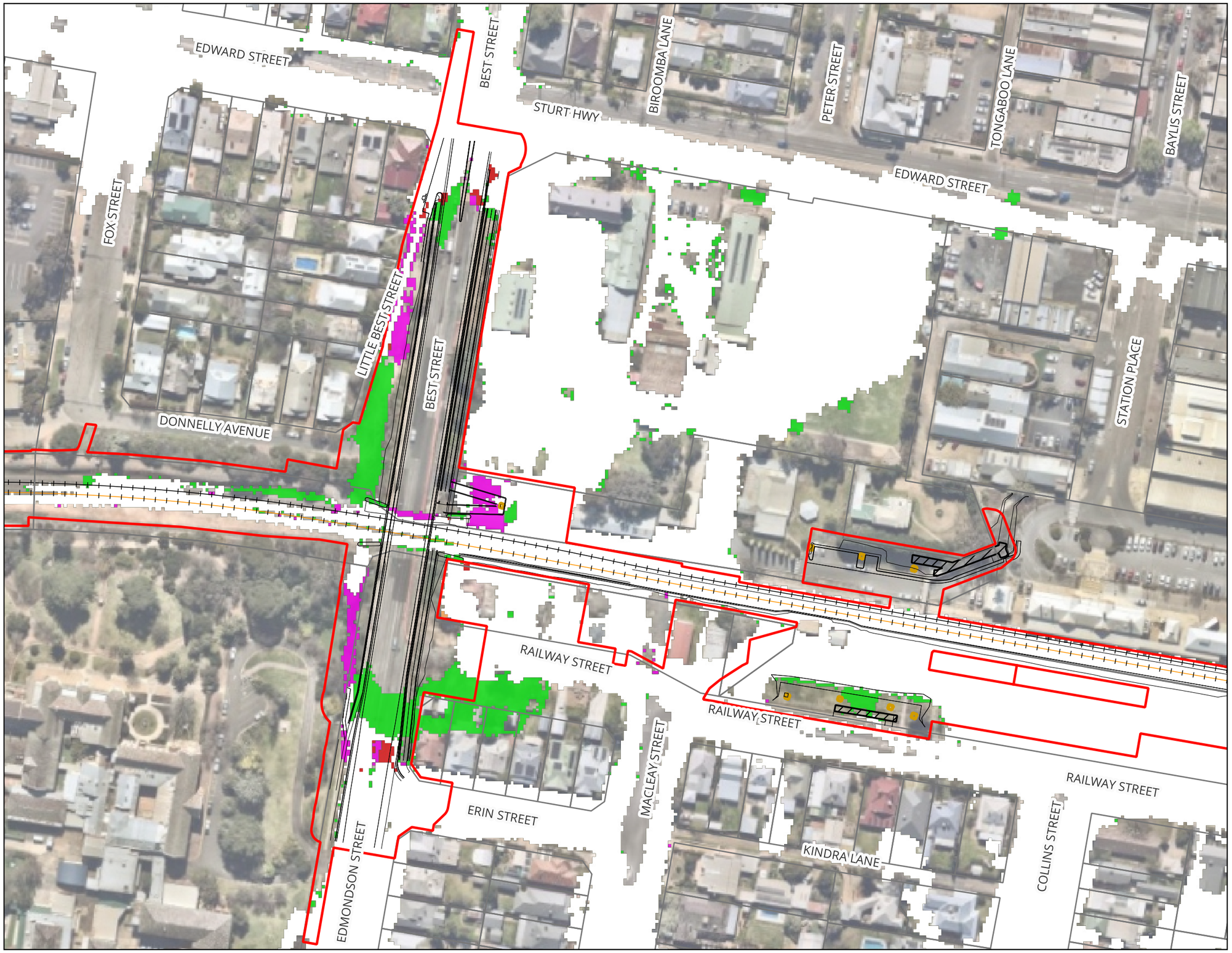
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A50 : Changes in Peak Flood Velocity for 2% AEP - Master Design Condition vs Existing Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Changes in Velocity (m/s)

<= 0.50

Changes in Velocity (%)

- <= 10%
- 10% - 20%
- > 20%
- Was Wet Now Dry
- Was Dry Now Wet

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

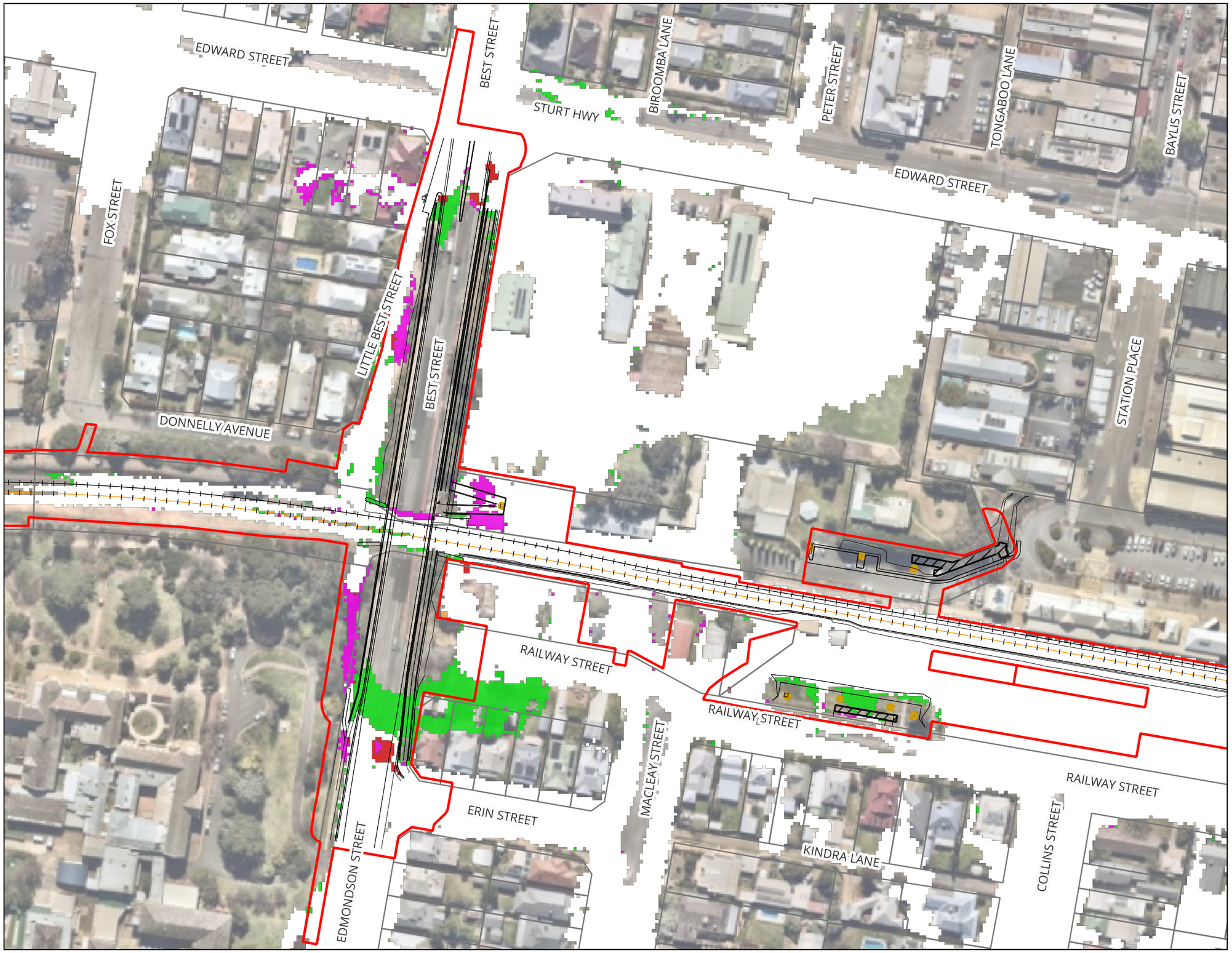
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A51 : Changes in Peak Flood Velocity for 1% AEP - Master Design Condition vs Existing Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Changes in Velocity (m/s)

<= 0.50

Changes in Velocity (%)

- <= 10%
- 10% - 20%
- > 20%
- Was Wet Now Dry
- Was Dry Now Wet

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A52 : Changes in Peak Flood Velocity for 1% AEP Climate Changes - Master Design Condition vs Existing Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Changes in Hazard

- Reduced 5 Classes
- Reduced 4 Classes
- Reduced 3 Classes
- Reduced 2 Classes
- Reduced 1 Class
- No Change
- Increased 1 Class
- Increased 2 Classes
- Increased 3 Classes
- Increased 4 Classes
- Increased 5 Classes
- Was Wet Now Dry
- Was Dry Now Wet

Notes:

The maps are based on DDR results (Refer to Flood Design Report)

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 buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6 : Unsafe for vehicles and people. All building types considered vulnerable to failure.

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A53 : Changes in Peak Flood Hazard for 10% AEP - Master Design Condition vs Existing Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Changes in Hazard

- Reduced 5 Classes
- Reduced 4 Classes
- Reduced 3 Classes
- Reduced 2 Classes
- Reduced 1 Class
- No Change
- Increased 1 Class
- Increased 2 Classes
- Increased 3 Classes
- Increased 4 Classes
- Increased 5 Classes
- Was Wet Now Dry
- Was Dry Now Wet

Notes:

The maps are based on DDR results (Refer to Flood Design Report)

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 buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6 : Unsafe for vehicles and people. All building types considered vulnerable to failure.

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A54 : Changes in Peak Flood Hazard for 5% AEP - Master Design Condition vs Existing Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Changes in Hazard

- Reduced 5 Classes
- Reduced 4 Classes
- Reduced 3 Classes
- Reduced 2 Classes
- Reduced 1 Class
- No Change
- Increased 1 Class
- Increased 2 Classes
- Increased 3 Classes
- Increased 4 Classes
- Increased 5 Classes
- Was Wet Now Dry
- Was Dry Now Wet

Notes:

The maps are based on DDR results (Refer to Flood Design Report)

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 buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6 : Unsafe for vehicles and people. All building types considered vulnerable to failure.

C:\Users\Thinesh.Thirumuruganl\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A55 : Changes in Peak Flood Hazard for 2% AEP - Master Design Condition vs Existing Condition

MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Changes in Hazard

- Reduced 5 Classes
- Reduced 4 Classes
- Reduced 3 Classes
- Reduced 2 Classes
- Reduced 1 Class
- No Change
- Increased 1 Class
- Increased 2 Classes
- Increased 3 Classes
- Increased 4 Classes
- Increased 5 Classes
- Was Wet Now Dry
- Was Dry Now Wet

Notes:

The maps are based on DDR results (Refer to Flood Design Report)

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 buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6 : Unsafe for vehicles and people. All building types considered vulnerable to failure.

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

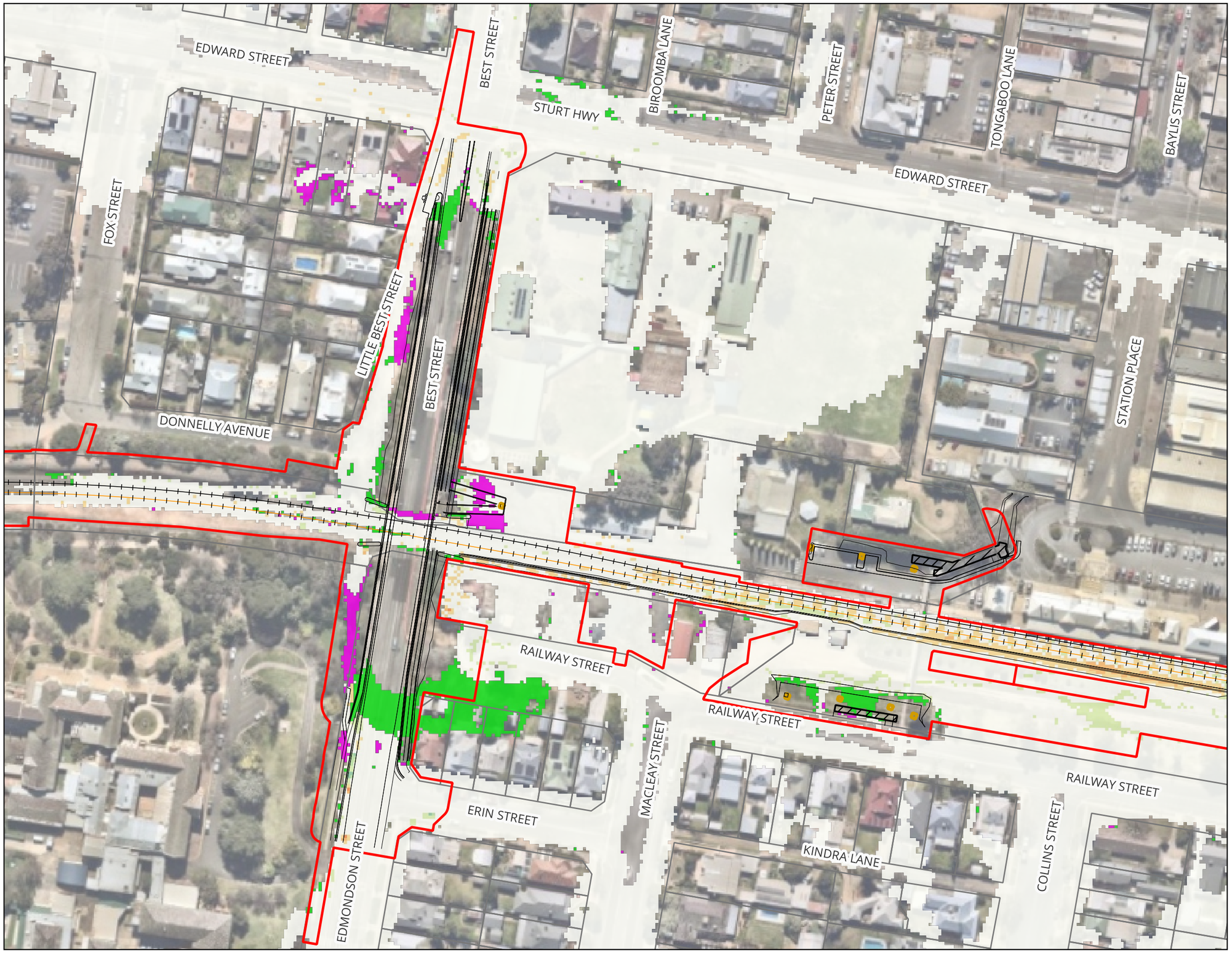
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A56 : Changes in Peak Flood Hazard for 1% AEP - Master Design Condition vs Existing Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Changes in Hazard

- Reduced 5 Classes
- Reduced 4 Classes
- Reduced 3 Classes
- Reduced 2 Classes
- Reduced 1 Class
- No Change
- Increased 1 Class
- Increased 2 Classes
- Increased 3 Classes
- Increased 4 Classes
- Increased 5 Classes
- Was Wet Now Dry
- Was Dry Now Wet

Notes:

The maps are based on DDR results (Refer to Flood Design Report)

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 buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6 : Unsafe for vehicles and people. All building types considered vulnerable to failure.

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A57 : Changes in Peak Flood Hazard for 1% AEP Climate Changes - Master Design Condition vs Existing Condition

EDWARD STREET
BEST STREET
BIROOMBA LANE
PETER STREET
TONGABOO LANE
BAYLIS STREET
STURT HWY
FOX STREET
LITTLE BEST STREET
DONNELLY AVENUE
EDWARD STREET
STATION PLACE
RAILWAY STREET
ERIN STREET
MACLEAY STREET
KINDRA LANE
COLLINS STREET
EDMONDSON STREET

182 183 184 185 186 187 188 189 190 191

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

MARTINUS
aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre
- Flood Level Contours (mAHD)

Peak 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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

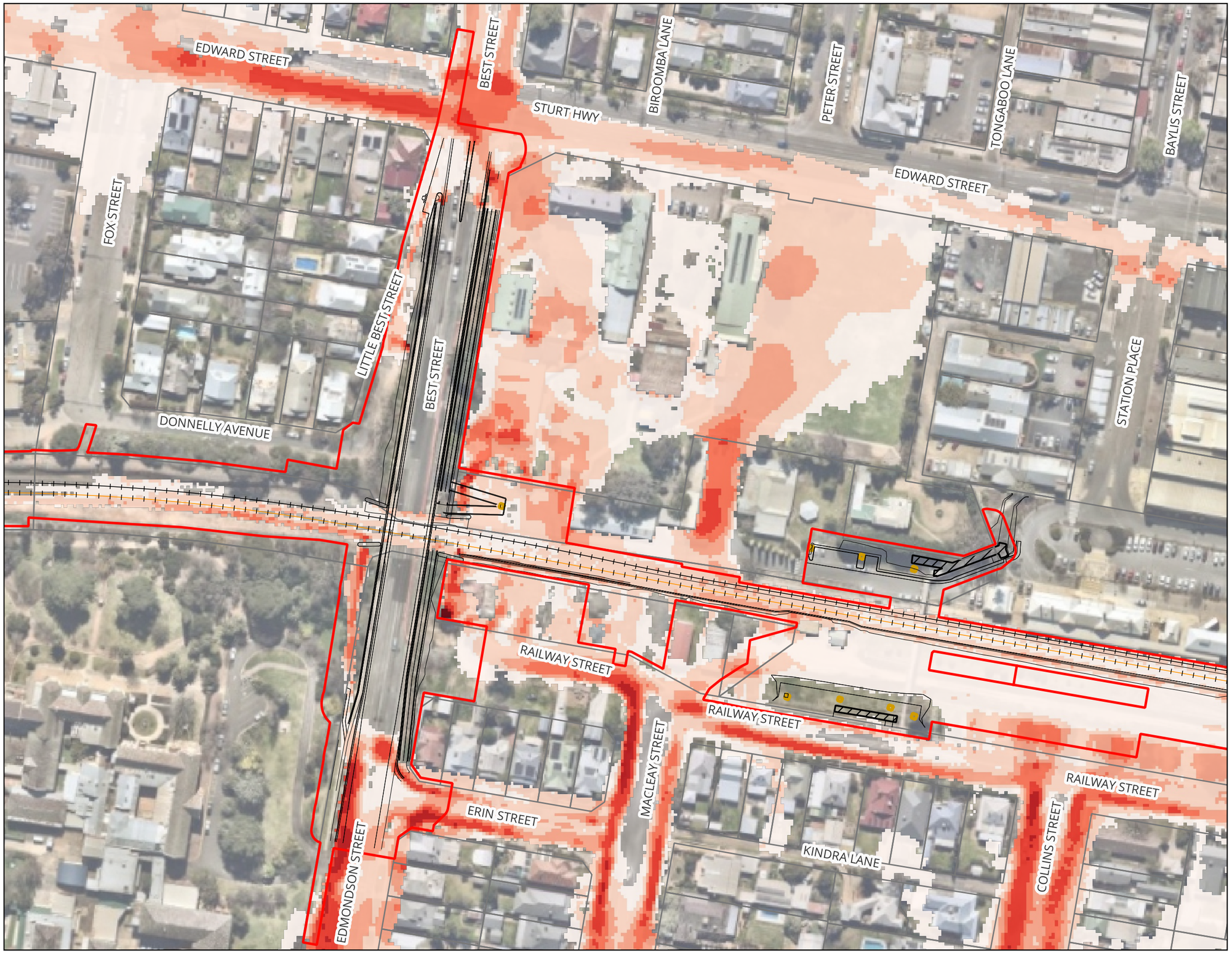
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A58 : 1% AEP Peak Flood Depth and Levels - Master Design Blockage Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Peak Flood Velocity (m/s)

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

Notes:
The maps are based on DDR results (Refer to Flood Design Report)

C:\Users\Thinesh.Thirumuruganl\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

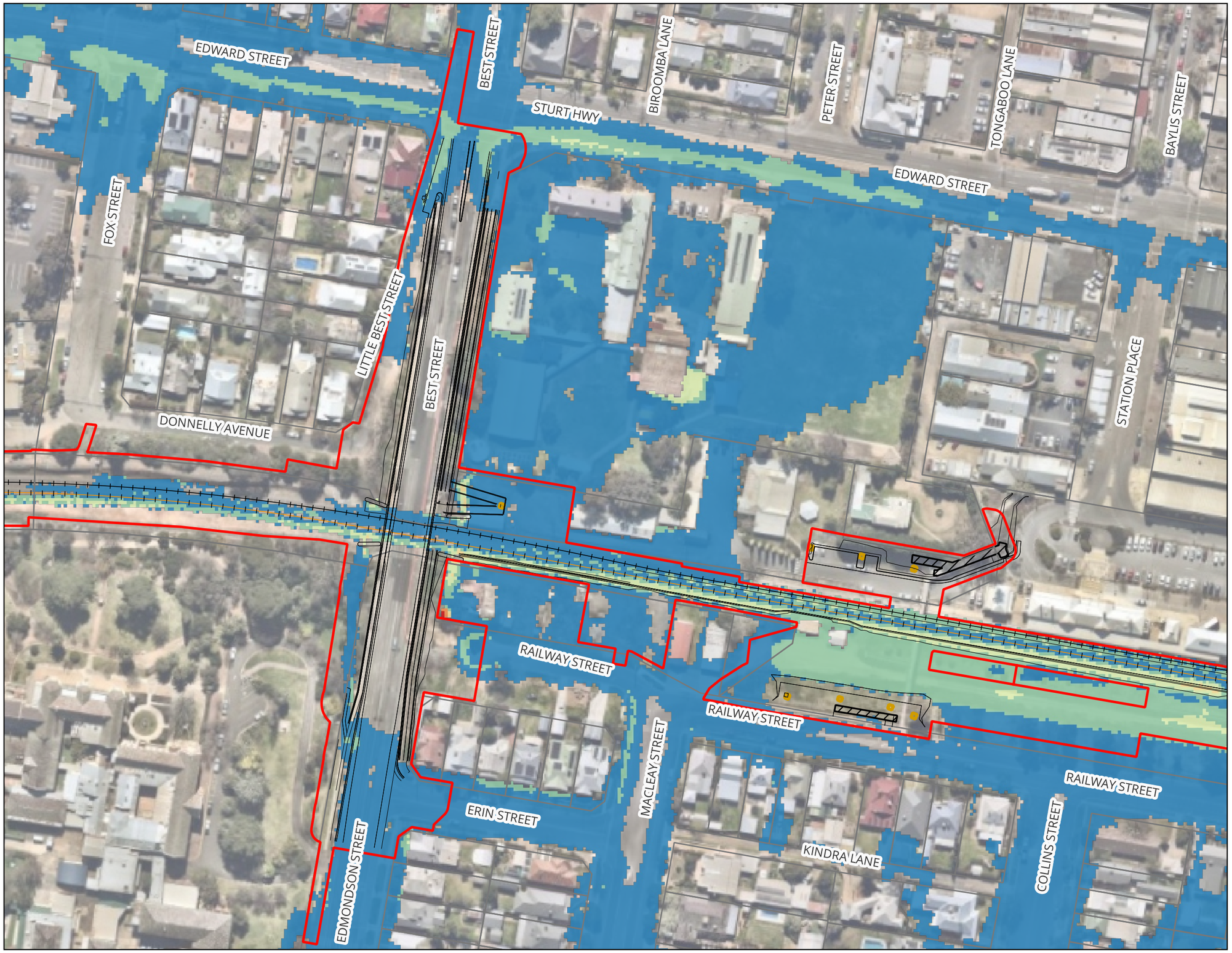
0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A59 : 1% AEP Peak Flood Velocity - Master Design Blockage Condition



MARTINUS

aurecon BG&E

Legend

- Project Boundary
- Design Strings Extent
- Modelled Proposed Bridge Access Ramp
- Modelled Proposed Bridge Pier
- Existing Railway Track
- Proposed Wagga Yard Railway Track
- Cadastre

Peak Flood Hazard

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

Notes:

The maps are based on DDR results (Refer to Flood Design Report)

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 buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6 : Unsafe for vehicles and people. All building types considered vulnerable to failure.

C:\Users\Thinesh.Thirumurugan\Desktop\IFC Edmondson st bge and Wagga footbridge (Same as DDR)\DDR Edmondson st bge and Wagga footbridge

Map by: TT

0 60 120 m

A3 Scale: 1:1,500

17/9/2025 GDA2020 / MGA zone 55

Edmonson Street Bridge - Inland Rail (A2P) - IFC Stage

Figure A60 : 1% AEP Flood Hazard - Master Design Blockage Condition

APPENDIX B

ARR Data hub Data

Results - ARR Data Hub

[STARTTXT]

Input Data Information

[INPUTDATA]

Latitude,-35.122268

Longitude,147.367080

[END_INPUTDATA]

River Region

[RIVREG]

Division,Murray-Darling Basin

River Number,12

River Name,Murrumbidgee River

[RIVREG_META]

Time Accessed,18 June 2024 01:04PM

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,18 June 2024 01:04PM

Version,2016_v1

[END_LONGARF]

Storm Losses

[LOSSES]

ID,30818.0

Storm Initial Losses (mm),26.0

Storm Continuing Losses (mm/h),4.7

[LOSSES_META]

Time Accessed,18 June 2024 01:04PM

Version,2016_v1

[END_LOSSES]

Temporal Patterns

[TP]

code,MB

Label,Murray Basin

[TP_META]

Time Accessed,18 June 2024 01:04PM

Version,2016_v2

[END_TP]

Areal Temporal Patterns

[ATP]

code,MB

arealabel,Murray Basin

[ATP_META]

Time Accessed,18 June 2024 01:04PM

Version,2016_v2

[END_ATP]

Median Preburst Depths and Ratios

[PREBURST]

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

60 (1.0),1.8 (0.089),1.6 (0.057),1.5 (0.044),1.4 (0.034),0.9 (0.019),0.5 (0.010)

90 (1.5),2.8 (0.123),1.9 (0.059),1.3 (0.033),0.7 (0.016),0.6 (0.011),0.5 (0.009)

120 (2.0),4.4 (0.178),3.2 (0.093),2.5 (0.059),1.7 (0.035),0.8 (0.013),0.1 (0.001)

180 (3.0),3.0 (0.108),2.9 (0.075),2.8 (0.062),2.8 (0.052),1.6 (0.025),0.7 (0.010)

360 (6.0),2.2 (0.065),1.3 (0.027),0.7 (0.012),0.1 (0.001),1.2 (0.016),2.1 (0.025)

720 (12.0),0.1 (0.002),1.0 (0.018),1.5 (0.024),2.1 (0.028),4.0 (0.045),5.4 (0.055)

1080 (18.0),0.0 (0.000),0.3 (0.005),0.5 (0.006),0.6 (0.008),2.5 (0.025),3.8 (0.035)

1440 (24.0),0.0 (0.000),0.2 (0.002),0.3 (0.003),0.4 (0.004),0.6 (0.006),0.8 (0.007)

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,18 June 2024 01:04PM

Version,2018_v1

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

[END_PREBURST]From preburst class

10% Preburst Depths

[PREBURST10]

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

60 (1.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

90 (1.5),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

120 (2.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

180 (3.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

360 (6.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

720 (12.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

1080 (18.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

1440 (24.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

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)

[PREBURST10_META]

Time Accessed,18 June 2024 01:04PM

Version,2018_v1

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

[END_PREBURST10]From preburst class

25% Preburst Depths

[PREBURST25]

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

60 (1.0),0.1 (0.005),0.1 (0.002),0.0 (0.001),0.0 (0.000),0.0 (0.000),0.0 (0.000)

90 (1.5),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

120 (2.0),0.1 (0.004),0.1 (0.001),0.0 (0.001),0.0 (0.000),0.0 (0.000),0.0 (0.000)

180 (3.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

360 (6.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

720 (12.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

1080 (18.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

1440 (24.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

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)

[PREBURST25_META]

Time Accessed,18 June 2024 01:04PM

Version,2018_v1

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

[END_PREBURST25]From preburst class

75% Preburst Depths

[PREBURST75]

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

60 (1.0),15.3 (0.750),13.8 (0.480),12.7 (0.369),11.7 (0.291),11.8 (0.246),11.9 (0.220)

90 (1.5),15.3 (0.666),13.0 (0.404),11.5 (0.297),10.0 (0.222),10.5 (0.196),10.9 (0.180)

120 (2.0),16.6 (0.664),16.4 (0.471),16.3 (0.391),16.2 (0.334),12.4 (0.215),9.6 (0.147)

180 (3.0),11.8 (0.423),15.8 (0.410),18.5 (0.401),21.0 (0.393),20.3 (0.320),19.8 (0.278)

360 (6.0),12.7 (0.380),12.2 (0.265),11.8 (0.216),11.4 (0.181),17.4 (0.233),21.9 (0.261)

720 (12.0),5.5 (0.136),9.1 (0.167),11.5 (0.178),13.8 (0.185),18.3 (0.207),21.6 (0.219)

1080 (18.0),2.9 (0.064),6.1 (0.102),8.3 (0.117),10.4 (0.126),13.2 (0.136),15.4 (0.141)

1440 (24.0),0.2 (0.004),3.5 (0.054),5.7 (0.074),7.8 (0.088),9.1 (0.088),10.1 (0.087)

2160 (36.0),0.0 (0.000),0.9 (0.012),1.4 (0.017),2.0 (0.020),3.1 (0.027),4.0 (0.031)

2880 (48.0),0.0 (0.000),0.4 (0.006),0.7 (0.008),1.0 (0.010),1.1 (0.009),1.2 (0.009)

4320 (72.0),0.0 (0.000),0.0 (0.000),0.1 (0.001),0.1 (0.001),0.0 (0.000),0.0 (0.000)

[PREBURST75_META]

Time Accessed,18 June 2024 01:04PM

Version,2018_v1

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

[END_PREBURST75]From preburst class

90% Preburst Depths

[PREBURST90]

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

60 (1.0),36.2 (1.772),29.9 (1.042),25.7 (0.746),21.7 (0.539),29.0 (0.603),34.4 (0.636)

90 (1.5),38.3 (1.665),34.2 (1.061),31.4 (0.814),28.8 (0.640),30.3 (0.566),31.5 (0.522)

120 (2.0),39.0 (1.565),36.1 (1.038),34.1 (0.821),32.3 (0.667),32.3 (0.561),32.3 (0.499)

180 (3.0),26.5 (0.953),31.5 (0.816),34.7 (0.755),37.9 (0.709),41.0 (0.647),43.4 (0.609)

360 (6.0),26.9 (0.804),28.0 (0.611),28.8 (0.528),29.5 (0.467),41.5 (0.555),50.5 (0.601)

720 (12.0),16.1 (0.400),24.9 (0.457),30.8 (0.477),36.4 (0.488),39.8 (0.451),42.3 (0.428)

1080 (18.0),16.2 (0.362),19.2 (0.318),21.1 (0.297),23.0 (0.280),30.3 (0.312),35.7 (0.328)

1440 (24.0),6.7 (0.138),13.4 (0.207),17.9 (0.234),22.2 (0.252),23.2 (0.223),23.9 (0.206)

2160 (36.0),1.1 (0.021),9.3 (0.131),14.8 (0.176),20.0 (0.208),17.3 (0.152),15.2 (0.119)

2880 (48.0),0.4 (0.007),6.8 (0.089),11.0 (0.123),15.1 (0.147),17.3 (0.143),18.9 (0.140)

4320 (72.0),0.0 (0.000),3.1 (0.037),5.1 (0.052),7.0 (0.063),13.9 (0.106),19.0 (0.130)

[PREBURST90_META]

Time Accessed,18 June 2024 01:04PM

Version,2018_v1

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

[END_PREBURST90]From preburst class

Interim Climate Change Factors

[CCF]

,RCP 4.5,RCP6,RCP 8.5

2030,0.816 (4.1%),0.726 (3.6%),0.934 (4.7%)

2040,1.046 (5.2%),1.015 (5.1%),1.305 (6.6%)

2050,1.260 (6.3%),1.277 (6.4%),1.737 (8.8%)

2060,1.450 (7.3%),1.520 (7.7%),2.214 (11.4%)

2070,1.609 (8.2%),1.753 (8.9%),2.722 (14.2%)

2080,1.728 (8.8%),1.985 (10.2%),3.246 (17.2%)

2090,1.798 (9.2%),2.226 (11.5%),3.772 (20.2%)

[CCF_META]

Time Accessed,18 June 2024 01:04PM

Version,2019_v1

Note,ARR recommends the use of RCP4.5 and RCP 8.5 values. These have been updated to the values that can be found on the climate change in Australia website.

[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),17.6,10.7,10.6,11.3,10.9,9.0

90 (1.5),17.1,11.2,10.9,11.8,11.9,9.3

120 (2.0),16.3,10.8,10.5,11.4,11.1,9.4

180 (3.0),17.7,12.1,10.9,11.3,9.7,7.3

360 (6.0),18.1,13.6,13.3,14.1,12.4,8.1

720 (12.0),21.1,15.8,14.6,14.6,12.5,8.5

1080 (18.0),22.0,17.3,16.6,17.1,14.3,9.0

1440 (24.0),24.3,19.2,18.7,19.1,17.1,11.5

2160 (36.0),25.6,21.0,20.4,21.2,19.3,15.9

2880 (48.0),26.2,21.5,21.4,22.4,20.6,15.4

4320 (72.0),26.6,22.1,23.3,24.0,21.9,15.7

[BURSTIL_META]

Time Accessed,18 June 2024 01:04PM

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),8.4,15.3,15.4,14.7,15.1,17.0

90 (1.5),8.9,14.8,15.1,14.2,14.1,16.7

120 (2.0),9.7,15.2,15.5,14.6,14.9,16.6

180 (3.0),8.3,13.9,15.1,14.7,16.3,18.7

360 (6.0),7.9,12.4,12.7,11.9,13.6,17.9

720 (12.0),4.9,10.2,11.4,11.4,13.5,17.5

1080 (18.0),4.0,8.7,9.4,8.9,11.7,17.0

1440 (24.0),1.7,6.8,7.3,6.9,8.9,14.5

2160 (36.0),0.4,5.0,5.6,4.8,6.7,10.1

2880 (48.0),0.0,4.5,4.6,3.6,5.4,10.6

4320 (72.0),0.0,3.9,2.7,2.0,4.1,10.3

[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]

[ENDTXT]

APPENDIX C

ARTC Review

Document Control Information			
	Contractor DC to update for re-submission	**Submitted Document No. or Transmittal No.:**	Martinus-PTRAN-001291
Project:	2100 - A2I	**Date Submission Received:**	9/05/2025
Comment Sheet Number_Revision:	5-0052-210-IHY-W5-CS-0001_E	**Comment Sheet Title:**	***External Comment Sheet - A2I | Flood Design Report - Edmondson Street Bridge and Footbridge***
Revision Date:	2/10/2025	**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*	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	Annexure F, Appendix F, Design Development Deliverables, clarification.	5-0052-210-IHY-W5-RP-0001_A.pdf	Page 12, 5-0052-210-IHY-W5-RP-0001_A, Section 1.7 (page 11)	SDR	No track lowering is proposed at this location. Rather, the proposal is the replacement of Edmondson Street bridge with 7.1m clearance above the existing railway. Confirm and revise accordingly	Major	Ayub Ali	8/02/2024	Jasmine Lee	Martinus Rail	8/03/2024	Please note: PSR Annexure F Appendix F is not a listing of mandatory requirements. It is a listing of typical minimum requirements. Typical requirements are not mandatory requirements. As such, please specify the actual clause/technical/functional requirement non-compliance. Noted. The words will be updated in the next design stage report.	PDR submission design deliverables	Ayub Ali	16/07/2024	CLOSED	
2	Annexure F, Appendix F, Design Development Deliverables, clarification.	5-0052-210-IHY-W5-RP-0001_A.pdf	Page 13, Table 2-1 pg 12 of 42	SDR	References to other sections of the report to be updated - all hyperlinked cross references are appearing as Section 0. This comment applies to all cross references in this table.	Minor	Andrew Aitken	5/02/2024	Jasmine Lee	Martinus Rail	8/03/2024	Please note: PSR Annexure F Appendix F is not a listing of mandatory requirements. It is a listing of typical minimum requirements. Typical requirements are not mandatory requirements. As such, please specify the actual clause/technical/functional requirement non-compliance. Noted. The references will be updated in the next design stage report.	PDR submission design deliverables	Ben Casey	16/07/2024	CLOSED	Originally 'Next Phase' by Andrew Aitken on 25/03/2024. Closed by Ben Casey on 16/07/2024.
3	Annexure F, Appendix F, Design Development Deliverables, clarification.	5-0052-210-IHY-W5-RP-0001_A.pdf	Page 22, 5-0052-210-IHY-W5-RP-0001_A, Section 4.1.1.2 (page 21)	SDR	It's understood that the TUFLOW version 2020-10-AF produced better calibration result compared to the latest version 2023-03-AC. However, the latest version introduced a significant change to the model features including the break-line representations, structure losses method and momentum flux for 1d-2d connection. As mentioned earlier, the latest version would generally produce more accurate result due to improved structure representation and better computation. Therefore, we are interested to know how flooding impacts were observed when using the latest version of TUFLOW (whether it improved or deteriorated). Moreover, it could be worthwhile trying to improve calibration results through fine tuning relevant calibration parameters while using the latest version of TUFLOW software.	Major	Ayub Ali	8/02/2024	Jasmine Lee	Martinus Rail	8/03/2024	Please note: PSR Annexure F Appendix F is not a listing of mandatory requirements. It is a listing of typical minimum requirements. Typical requirements are not mandatory requirements. As such, please specify the actual clause/technical/functional requirement non-compliance. A sensitivity test between 2023-03-AC results and 2018-03-AC results could be provided in the next design stage report. The updates (including any available topographic survey and structure survey) made to the TUFLOW model are constrained within the project boundary. However, when using the 2023-03-AC to run the model, some significant differences (between 2023-03-AC and original 2018-03-AC) were identified far away from the project boundary, which is purely resulted from TUFLOW software version changes. Fine tuning the parameter across whole TUFLOW model extent which is irrelevant to this project is not deemed as necessary. Given that the 2020-10-AF version could produce closer results as per 2018-03-AC, it is appropriate to use 2020-10-AF.	PDR submission design deliverables	Ayub Ali	16/07/2024	CLOSED	
4	Annexure F, Appendix F, Design Development Deliverables, clarification.	5-0052-210-IHY-W5-RP-0001_A.pdf	Page 24, Section 4.1.3.1 Climate Change Pg23 of 42	SDR	Please clarify the impact of this change (for example as a % increase in extreme rainfall event). This information is used by other parties assessing the extent to which climate change is addressed and having the interpretative impact of this 'factor' improves transparency.	Minor	Andrew Aitken	5/02/2024	Jasmine Lee	Martinus Rail	8/03/2024	Please note: PSR Annexure F Appendix F is not a listing of mandatory requirements. It is a listing of typical minimum requirements. Typical requirements are not mandatory requirements. As such, please specify the actual clause/technical/functional requirement non-compliance. The rainfall increase is around 20% compared with the 1% AEP rainfall. The information of the factor will be included in the next design phase report.	PDR submission design deliverables	Ben Casey	16/07/2024	CLOSED	Originally 'Next Phase' by Andrew Aitken on 25/03/2024. Closed by Ben Casey on 16/07/2024.
5	Annexure F, Appendix F, Design Development Deliverables, clarification.	5-0052-210-IHY-W5-RP-0001_A.pdf	Page 35, 5-0052-210-IHY-W5-RP-0001_A, Section 6.4.1 (Page 34)	SDR	Any mitigation measure suggested and tested? A discussion regarding probable mitigation measures is required. Recommend MR to include line at the end of the sentence to advise that, proposed mitigations is outlined in Section 7.	Major	Ayub Ali	9/02/2024	Jasmine Lee	Martinus Rail	8/03/2024	Please note: PSR Annexure F Appendix F is not a listing of mandatory requirements. It is a listing of typical minimum requirements. Typical requirements are not mandatory requirements. As such, please specify the actual clause/technical/functional requirement non-compliance. To address the adverse flood level impact, two mitigations have been proposed in Section 7. A new channel could be provided on the western side of Edmondson Street to provide extra storage and increase the pipe size on the northern side of the site to mitigate the pit surcharging. These mitigation measures will be implemented and outlined in Section 7 in the next design stage.	PDR submission design deliverables	Ayub Ali	16/07/2024	CLOSED	
6	Annexure F, Appendix F, Design Development Deliverables, clarification.	5-0052-210-IHY-W5-RP-0001_A.pdf	Page 35, 5-0052-210-IHY-W5-RP-0001_A, Section 6.4.2 (Page 34)	SDR	Any mitigation measure suggested and tested? A discussion regarding probable mitigation measures is required. Recommend MR to include line at the end of the sentence to advise that, proposed mitigations is outlined in Section 7.	Major	Ayub Ali	9/02/2024	Jasmine Lee	Martinus Rail	8/03/2024	Please note: PSR Annexure F Appendix F is not a listing of mandatory requirements. It is a listing of typical minimum requirements. Typical requirements are not mandatory requirements. As such, please specify the actual clause/technical/functional requirement non-compliance. To reduce the changes in flood velocity, two mitigations have been proposed in Section 7. A new channel could be provided on the western side of Edmondson Street to provide extra storage and increase the pipe size on the northern side of the site to mitigate the pit surcharging. These mitigation measures will be implemented and outlined in Section 7 in the next design stage.	PDR submission design deliverables	Ayub Ali	16/07/2024	CLOSED	
7	Annexure F, Appendix F, Design Development Deliverables, clarification.	5-0052-210-IHY-W5-RP-0001_A.pdf	Page 36, 5-0052-210-IHY-W5-RP-0001_A, Section 6.4.3 (Page 35)	SDR	Any mitigation measure suggested and tested? A discussion regarding probable mitigation measures is required. Recommend MR to include line at the end of the sentence to advise that, proposed mitigations is outlined in Section 7.	Major	Ayub Ali	9/02/2024	Jasmine Lee	Martinus Rail	8/03/2024	Please note: PSR Annexure F Appendix F is not a listing of mandatory requirements. It is a listing of typical minimum requirements. Typical requirements are not mandatory requirements. As such, please specify the actual clause/technical/functional requirement non-compliance. Two mitigations have been proposed in Section 7 to reduce the changes in flood hazard. A new channel could be provided on the western side of Edmondson Street to provide extra storage and increase the pipe size on the northern side of the site to mitigate the pit surcharging. These mitigation measures will be implemented and outlined in Section 7 in the next design stage.	PDR submission design deliverables	Ayub Ali	16/07/2024	CLOSED	
8	Annexure F, Appendix F, Design Development Deliverables, clarification.	5-0052-210-IHY-W5-RP-0001_A.pdf	Page 37, 5-0052-210-IHY-W5-RP-0001_A, Section 7 (Page 36)	SDR	These mitigation measures could have been tested at this stage for understanding its effectiveness.	Major	Ayub Ali	9/02/2024	Jasmine Lee	Martinus Rail	8/03/2024	Please note: PSR Annexure F Appendix F is not a listing of mandatory requirements. It is a listing of typical minimum requirements. Typical requirements are not mandatory requirements. As such, please specify the actual clause/technical/functional requirement non-compliance. SDR (30% of design level) was based on the design information available at the tender phase. As such, the full risk assessment and implementation of mitigation measures cannot have occurred prior to or during the feasibility or systems definition stage. Testing of identified mitigation measures will be performed during the preliminary phase, and refined and finalised during the detailed phase.	PDR submission design deliverables	Ayub Ali	16/07/2024	CLOSED	
9	Opportunity	5-0052-210-IHY-W5-RP-0001_B.pdf	Page 8, 5-0052-210-IHY-W5-RP-0001_B, Section 1.3.1	PDR	Please check whether it is Definition or Design	Opportunity	Ayub Ali	10/06/2024	Michal Plesko	DJV Desing Coordination	31/07/2024	PDR - Preliminary Design Review. Typo to be amended at the next submission.	5-0052-210-IHY-W5-RP-0001_B	Ayub Ali	13/01/2025	CLOSED	
10	Opportunity	5-0052-210-IHY-W5-RP-0001_B.pdf	Page 19, 5-0052-210-IHY-W5-RP-0001_B, Section 4.1 (Page 18)	PDR	Appears to be typo. Please check and correct it.	Opportunity	Ayub Ali	17/06/2024	Jasmine Lee	DJV Flooding Lead	1/08/2024	It will be amended at the next submission.	DDR submission design deliverables	Ayub Ali	13/01/2025	CLOSED	
11	NA	5-0052-210-IHY-W5-RP-0001_B.pdf	Page 29, Table 6-2	PDR	Please include the elevation of the rail embankment at each of these locations. The flood levels mean very little without a reference to how much the embankment is overtopped.	Opportunity	Hartley Bulcock	18/06/2024	Jasmine Lee	DJV Flooding Lead	1/08/2024	The elevation of the rail embankment will be included in the next phase. (in order to provide calrity as to the 'freeboard')	DDR submission design deliverables	Hartley Bulcock	26/09/2024	CLOSED	
12	Opportunity	5-0052-210-IHY-W5-RP-0001_B.pdf	Page 33, 5-0052-210-IHY-W5-RP-0001_B, Table 6-9	PDR	Space missing between 6-10 and Table. Please check Table numbers also.	Opportunity	Ayub Ali	10/06/2024	Michal Plesko	DJV Desing Coordination	31/07/2024	To be reiviewed and amended as required.	5-0052-210-IHY-W5-RP-0001_B	Ayub Ali	13/01/2025	CLOSED	
13	Opportunity	5-0052-210-IHY-W5-RP-0001_B.pdf	Page 34, 5-0052-210-IHY-W5-RP-0001_B, Table 6-13	PDR	Space missing between 6-14 and Table. Please check Table numbers also.	Opportunity	Ayub Ali	10/06/2024	Michal Plesko	DJV Desing Coordination	31/07/2024	To be reiviewed and amended as required.	5-0052-210-IHY-W5-RP-0001_B	Ayub Ali	13/01/2025	CLOSED	
14	NA	5-0052-210-IHY-W5-RP-0001_B.pdf	Page 35, 6.3 Flood immunity and Scour Protection	PDR	While I agree that it is important that the design complies with the QDL in terms of scour/erosion potential, but consideration for the need for scour/erosion protection should also be based on site observations. IR do not want scour and erosion, even if the design meets the QDL's. We have instances along the alignment where the design technically meets the QDL, but there is erosion occurring. If there is no evidence of erosion occurring currently, then the explanation given is probably valid.	Opportunity	Hartley Bulcock	19/06/2024	Jasmine Lee / Zoe Cruice	DJV Flooding Lead	1/08/2024	The design will be assessed against the latest draft CoA instead of QDL in the next design phase to comply with the velocity criteria. If site inspection identifies extent erosion, additional consideration will be provided as to what scour protection can reasonably be provided. 16/8 ZC note: Hartley notes that there is program-wide concern that the QDLs and velocity - although compliant - do not reflect the site conditions, or the actual erodability of the site soil. Make a positive statement as to the erodibility classification of the proposed drainage type (e.g. grass-lined swale can withstand 1.2m/s etc)	DDR submission design deliverables	Hartley Bulcock	26/09/2024	CLOSED	
15	Opportunity	5-0052-210-IHY-W5-RP-0001_C.pdf	Page 11, 5-0052-210-IHY-W5-RP-0001_C, Section 1.9	PDR	There appears to be a typo in this section number. Hence, correction is recommended.	Opportunity	Ayub Ali	13/01/2025	Thinesh Thirumurugan	DJV	10/03/2025	The formatting issue will be corrected in the DDR stage	DDR submission design deliverables 5-0052-210-IHY-W5-RP-0001_D, Section 1.9	Ayub Ali	19/09/2025	CLOSED	
16	Opportunity	5-0052-210-IHY-W5-RP-0001_C.pdf	Page 23, 5-0052-210-IHY-W5-RP-0001_C, Section 4.2	PDR	There appears to be typos in numbering of this section and its subsections. Hence, correction is recommended.	Opportunity	Ayub Ali	13/01/2025	Thinesh Thirumurugan	DJV	10/03/2025	The formatting issue will be corrected in the DDR stage	DDR submission design deliverables 5-0052-210-IHY-W5-RP-0001_D, Section 4.2	Ayub Ali	19/09/2025	CLOSED	

Comment Sheet Number_Revision:	5-0052-210-IHY-W5-CS-0001_E	**Comment Sheet Title:**	***External Comment Sheet - A2I | Flood Design Report - Edmondson Street Bridge and Footbridge***
Revision Date:	2/10/2025	**Documents related in Aconex** (by IR DC)	*Yes*

Review Comments (Reviewer)									Responses (Document Owner)					Close-Out			
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17	Opportunity	5-0052-210-IHY-W5-RP-0001_C.pdf	Page 26, 5-0052-210-IHY-W5-RP-0001_C, Section 4.2	PDR	There appears to be a typo in this section number. Hence, correction is recommended.	Opportunity	Ayub Ali	13/01/2025	Thinesh Thirumurugan	DJV	10/03/2025	The formatting issue will be corrected in the DDR stage	DDR submission design deliverables 5-0052-210-IHY-W5-RP-0001_D, Section 4.2	Ayub Ali	19/09/2025	CLOSED	
18	Opportunity	5-0052-210-IHY-W5-RP-0001_C.pdf	Page 27, 5-0052-210-IHY-W5-RP-0001_C, Section 4.2	PDR	There appears to be typos in numbering of this section and its subsections. Hence, correction is recommended.	Opportunity	Ayub Ali	13/01/2025	Thinesh Thirumurugan	DJV	10/03/2025	The formatting issue will be corrected in the DDR stage	DDR submission design deliverables 5-0052-210-IHY-W5-RP-0001_D, Section 4.2	Ayub Ali	19/09/2025	CLOSED	
19	Clarification	5-0052-210-IHY-W5-RP-0001_C.pdf	Page 31, Table 6-1	PDR	should this not be 5% AEP, noy 0.05% AEP. Please state what the flood immunity is, rather than what it is not.	Opportunity	Hartley Bulcock	21/01/2025	Thinesh Thirumurugan	DJV	10/03/2025	The highlighted section generally discusses the overtopping depth up to 0.05% and not about the immunity. Figure 6-1 summarises the peak flood level results for the existing condition at the Edmondson Street bridge and footbridge site. **Table 6-2: Peak Flood Levels – Existing Condition** Design Events: 10% AEP; 5% AEP; 2% AEP; 1% AEP; 1% AEP + Climate Change; 0.05% AEP; PMF Flood Levels: • The flood waters overtop the top of the rail within a 50m vicinity from the site for all events in the Existing condition. The flood immunity is less than 10% AEP. • The overtopping flood depth is generally less than 0.1m up to 0.05% AEP and less than 0.5m in the PMF event. • Refer to Table 6-3 for flood level comparison based on points of interest.	"DDR submission design deliverables 5-0052-210-IHY-W5-RP-0001_D, Section 6.1, Table 6-1"	Hartley Bulcock	18/03/2025	CLOSED	Updated at DDR
20	Clarification	5-0052-210-IHY-W5-RP-0001_C.pdf	Page 35	PDR	Format issue. In completed sentence.	Opportunity	Robert Hu	22/01/2025	Thinesh Thirumurugan	DJV	10/03/2025	In the design condition, the flow velocity is generally low along the railway corridor open channel. Table 6-10 summarises the peak flood velocity results for design conditions at the Edmondson Street bridge and footbridge. **Table 6-10: Peak Flood Velocity – Design Condition** Design Events: 10% AEP; 5% AEP; 2% AEP; 1% AEP; 1% AEP + Climate Change Flood Velocity: • The peak velocity along the rail corridor open channel is generally less than 0.8m/s. • Refer to Table 6-11 for flood velocity comparison based on points of interest.	DDR submission design deliverables 5-0052-210-IHY-W5-RP-0001_D, Section 6.2	Stephen Brierley	14/03/2025	CLOSED	Corrected
21	Clarification	5-0052-210-IHY-W5-RP-0001_C.pdf	Page 37, 6.3 Flood Immunity and Scour Protection	PDR	Flood immunity is expressed as water level at the shoulder of the capping lay, not when it spills over the rail, unless that has been stated in the PSR for that project (there are projects where that is not the case based on an MCA outcome)	Opportunity	Hartley Bulcock	21/01/2025	Thinesh Thirumurugan	DJV	10/03/2025	**6.3 Flood Immunity and Scour Protection** Within 50m vicinity of the site, the flood water overtops the top rail in the 5% AEP in proposed condition, while the flood water overtops the top rail in the 10% AEP in existing conditions. This is mainly due to the introduction of the proposed channel south of the Main Line in Wagga Wagga Yard design (refer to Section 6.4.5). The proposed channels are grass lined with jute-mesh which provides local scour protection to the channel (refer to Drainage Design in Section 4.5 of the Wagga Yard Design report (5-0052-210-PEN-W7-RP-0001)). The proposed design results in an improvement to the immunity of the rail in terms of overtopping (refer to Table 6-14 and Table 6-15), which complies with the criteria in PSRs and CoA to provide a no-worse outcome. **Table 6-14: Comparison of Flood Immunity at Overtopping Locations** Overtopping Location: CH521.300; Existing Condition AEP: 10% AEP event; Overtopping Design Condition Overtopping AEP: 5% AEP event An assessment of the flood immunity at the noted locations of overtopping along the rail is seen in Table 6-15 for CH521.360, where overtopping of the rail occurs. **Table 6-15: Overtopping Details at CH521.300** Chainage: CH521.300 Top of the Rail Level (mAHD): Existing 184.108; Design 184.137 Top of the Formation Level (mAHD): Existing 183.441 *; Design 183.470 * 10% AEP Flood Level (mAHD): Existing 184.136; Design 184.094 5% AEP Flood Level (mAHD): Existing 184.157; Design 184.168 *Note that the existing top of the formation level has been assumed to be 667mm below the existing top of the rail level Furthermore, in the design condition, the flood velocity outside the project boundary complied with the PSRs and CoA. Hence, there is no need for scour protection measures. The flooding depths are generally less than 1m in the 0.05% AEP event at the railway corridor and will be well below the bridge deck in all events up to the PMF. At around the bridge abutments and footbridge access ramps and piles, flood hazard is generally lower (H1 and H2) in the 0.05% AEP, with the flooding not expected to cause any surface damage to the bridge, due to abrasion/ erosion.	DDR submission design deliverables 5-0052-210-IHY-W5-RP-0001_D, Section 6.3	Hartley Bulcock	18/03/2025	CLOSED	Updated at DDR
22	Opportunity	5-0052-210-IHY-W5-RP-0001_C.pdf	Page 37, 5-0052-210-IHY-W5-RP-0001_C, Section 6.4	PDR	There appears to be a typo in this section number. Hence, correction is recommended.	Opportunity	Ayub Ali	13/01/2025	Thinesh Thirumurugan	DJV	10/03/2025	The formatting issue will be corrected in the DDR stage	DDR submission design deliverables 5-0052-210-IHY-W5-RP-0001_D, Section 6.4	Ayub Ali	19/09/2025	CLOSED	
23	Opportunity	5-0052-210-IHY-W5-RP-0001_C.pdf	Page 38, 5-0052-210-IHY-W5-RP-0001_C, Section 6.4	PDR	There appears to be a typo in this section number. Hence, correction is recommended.	Opportunity	Ayub Ali	13/01/2025	Thinesh Thirumurugan	DJV	10/03/2025	The formatting issue will be corrected in the DDR stage	DDR submission design deliverables 5-0052-210-IHY-W5-RP-0001_D, Section 6.4	Ayub Ali	19/09/2025	CLOSED	
24	Opportunity	5-0052-210-IHY-W5-RP-0001_C.pdf	Page 38, 5-0052-210-IHY-W5-RP-0001_C, Section 6.4	PDR	There appears to be a typo in this section number. Hence, correction is recommended.	Opportunity	Ayub Ali	13/01/2025	Thinesh Thirumurugan	DJV	10/03/2025	The formatting issue will be corrected in the DDR stage	DDR submission design deliverables 5-0052-210-IHY-W5-RP-0001_D, Section 6.4	Ayub Ali	19/09/2025	CLOSED	
25	Opportunity	5-0052-210-IHY-W5-RP-0001_C.pdf	Page 39, 5-0052-210-IHY-W5-RP-0001_C, Section 6.4	PDR	There appears to be a typo in this section number. Hence, correction is recommended.	Opportunity	Ayub Ali	13/01/2025	Thinesh Thirumurugan	DJV	10/03/2025	The formatting issue will be corrected in the DDR stage	DDR submission design deliverables 5-0052-210-IHY-W5-RP-0001_D, Section 6.4	Ayub Ali	19/09/2025	CLOSED	

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Revision Date:	2/10/2025	**Documents related in Aconex** (by IR DC)	*Yes*

Review Comments (Reviewer)									Responses (Document Owner)					Close-Out			
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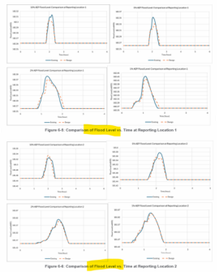
26	Opportunity	5-0052-210-IHY-W5-RP-0001_C.pdf	Page 39, 5-0052-210-IHY-W5-RP-0001_C	PDR	Flow rate vs time hydrograph should not be used for estimating time of inundation. Flood level vs time hydrograph is appropriate and sufficient. Hence, it is recommended to remove all flow rate vs time hydrograph figures from this section and to utilise flood level vs time hydrographs for all locations.	Opportunity	Ayub Ali	13/01/2025	Thinesh Thirumurugan	DJV	10/03/2025	T w  nd flood level vs time hydrographs	DDR submission design deliverables 5-0052-210-IHY-W5-RP-0001_D, Section 6.4	Ayub Ali	19/09/2025	CLOSED	
27	Opportunity	5-0052-210-IHY-W5-RP-0001_C.pdf	Page 39, 5-0052-210-IHY-W5-RP-0001_C	PDR	I believe, it will be flood level instead of flow level.	Opportunity	Ayub Ali	13/01/2025	Thinesh Thirumurugan	DJV	10/03/2025	**6.4.4 Changes in Duration of Inundation** The analysis around the changes in the duration of inundation was undertaken by comparing the existing and design flood level vs time in selected locations. The locations adopted for the comparison are shown in Figure 6-4. Figure 6-5 & Figure 6-6 show the comparison of flood level vs time for Reporting Locations 1 and 2, respectively. Both the existing and design flood level vs time, is mostly similar for Locations 1 and 2. These demonstrate that the design will not create an extra duration of inundation upstream and downstream outside the project boundary. Consequently, the changes in the duration of inundation comply with the CoA E42(a). 	DDR submission design deliverables 5-0052-210-IHY-W5-RP-0001_D, Section 6.4	Ayub Ali	19/09/2025	CLOSED	
28	Opportunity	5-0052-210-IHY-W5-RP-0001_C.pdf	Page 40, 5-0052-210-IHY-W5-RP-0001_C	PDR	I believe, vertical axis label should be flow rate instead of flood rate in Figures 6-5 and 6-7. Therefore, checking and correction is recommended.	Opportunity	Ayub Ali	13/01/2025	Thinesh Thirumurugan	DJV	10/03/2025	Wording will be updated to "Flood Level" in the DDR stage	DDR submission design deliverables 5-0052-210-IHY-W5-RP-0001_D, Section 6.4	Ayub Ali	19/09/2025	CLOSED	
29	Opportunity	5-0052-210-IHY-W5-RP-0001_C.pdf	Page 40, 5-0052-210-IHY-W5-RP-0001_C	PDR	I believe, it will be flood level instead of flow level. Please check and correct it.	Opportunity	Ayub Ali	13/01/2025	Thinesh Thirumurugan	DJV	10/03/2025	Wording will be updated to "Flood Level" in the DDR stage	DDR submission design deliverables 5-0052-210-IHY-W5-RP-0001_D, Section 6.4	Ayub Ali	19/09/2025	CLOSED	
30	Opportunity	5-0052-210-IHY-W5-RP-0001_C.pdf	Page 41, 5-0052-210-IHY-W5-RP-0001_C	PDR	I believe, it will be flood level instead of flow level. Please check and correct it.	Opportunity	Ayub Ali	13/01/2025	Thinesh Thirumurugan	DJV	10/03/2025	Wording will be updated to "Flood Level" in the DDR stage	DDR submission design deliverables 5-0052-210-IHY-W5-RP-0001_D, Section 6.4	Ayub Ali	19/09/2025	CLOSED	
31	Opportunity	5-0052-210-IHY-W5-RP-0001_C.pdf	Page 41, 5-0052-210-IHY-W5-RP-0001_C, Section 6.4	PDR	There appears to be a typo in this section number. Hence, correction is recommended.	Opportunity	Ayub Ali	13/01/2025	Thinesh Thirumurugan	DJV	10/03/2025	The formatting issue will be corrected in the DDR stage	DDR submission design deliverables 5-0052-210-IHY-W5-RP-0001_D, Section 6.4	Ayub Ali	19/09/2025	CLOSED	
32	Opportunity	5-0052-210-IHY-W5-RP-0001_C.pdf	Page 42, 5-0052-210-IHY-W5-RP-0001_C, Section 6.5	PDR	There appears to be a typo in this section number. Hence, correction is recommended.	Opportunity	Ayub Ali	13/01/2025	Thinesh Thirumurugan	DJV	10/03/2025	The formatting issue will be corrected in the DDR stage	DDR submission design deliverables 5-0052-210-IHY-W5-RP-0001_D, Section 6.5	Ayub Ali	19/09/2025	CLOSED	
33	Opportunity	5-0052-210-IHY-W5-RP-0001_C.pdf	Page 44, 5-0052-210-IHY-W5-RP-0001_C, Section 6.5	PDR	There appears to be a typo in this section number. Hence, correction is recommended.	Opportunity	Ayub Ali	13/01/2025	Thinesh Thirumurugan	DJV	10/03/2025	The formatting issue will be corrected in the DDR stage	DDR submission design deliverables 5-0052-210-IHY-W5-RP-0001_D, Section 6.5	Ayub Ali	19/09/2025	CLOSED	
34	Opportunity	5-0052-210-IHY-W5-RP-0001_C.pdf	Page 44, 5-0052-210-IHY-W5-RP-0001_C, Section 6.5	PDR	Please remember update this reference when it is changed.	Opportunity	Ayub Ali	13/01/2025	Thinesh Thirumurugan	DJV	10/03/2025	Noted	DDR submission design deliverables 5-0052-210-IHY-W5-RP-0001_D, Section 6.5	Ayub Ali	19/09/2025	CLOSED	

Non-Compliant:	Non-compliance which requires correction before further design development occurs.
Opportunity:	Comment which identifies an opportunity to save capex, achieve increased quality or operational outcome. Not a non-compliance.

OPEN:	Comment has not been addressed.
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 – WWCC Review

APPENDIX D1

TfNSW review

A2I Flood Design Report CONSULTATION - COMMENTS REGISTER

Title: A2I | Transport for NSW - Flood Design Report - Edmondson Street Bridge and Footbridge - Comment Register
Doc No.: 5-0001-210-IHY-W5-RG-0001 **Revision:** 3 **Revision Date:** 2/07/2025

Stakeholder Category	Stakeholder Name	Flood Design Report name	Document reference	Date raised	Topic that comment relates to	Comments	Full Name	Company	Date	Response *(must be specific on how the comment has been addressed. Agreed approach for re-submission)*	Full Name	Date	Comment Status	Close-Out Comment
State Government	TfNSW	5-0052-210-IHY-W5-RP-0001_C Edmondson St bridge and footbridge - Flood Design Report- combined	Whole document	21/02/2025	Climate Change Assumptions	The climate change assumptions are not aligned with the latest guidance in ARR2019 (Version 4.2). Therefore, the reports do not fully comply with the Draft Conditions of Approval – Flooding. Specifically: *E40* *Hydrologic and hydraulic assessments consistent with Australian Rainfall and Runoff – A Guide to Flood Estimation (Geoscience Australia, 2019);* Any instances of non-compliance must be justified.	Yucen Lu	DJV Flood Modeller	18/03/2025	The Contractor queried the post-contract-award change to the ARR2019 Climate Change approach (changed in Sep 2024), and IR confirmed (post CSSI approval on 8 Oct) the continued use of the prior version of ARR2019 climate change method (refer to IR2140-RTRFI-000773). It was determined that the prior version should be used to ensure consistency (and thus parity) with the methods used through the EIS Technical assessments.	TfNSW	18/06/2025	Closed	Noted.
State Government	TfNSW			18/06/2025		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.	Thinesh Thirumurugan / Zoe Cruice	DJV Flood Modeller	26\06/2025	The COA reference for E41 has been corrected Refer to 5-0052-210-IHY-W5-RP-0001_F Table 2-2 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. | Compliant Independent review of the flood modelling, model and Flood Design Report is undertaken by the Flood Engineer's specialist contractor, who satisfies and complies with the requirements of A16. Consultation with the Council and other Stakeholders is being undertaken through a formal review of this Flood Design Report.				

APPENDIX D2

WWCC Review

A2I Flood Design Report CONSULTATION - COMMENTS REGISTER

Title: A2I | Wagga Wagga City Council - Flood Design Report - Edmondson Street Bridge and Footbridge

Doc No.: 5-0052-210-IHY-WE-RC **Revision:** 0.1 **Revision Date:** 18/09/2025

Stakeholder Category	Stakeholder Name	Flood Design Report name	Document reference (e.g. section, figure, table)	Date raised	Topic that comment relates to	Comments	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
Local Government	WWCC	Flood Design Report – Edmondson Street Bridge and Footbridge Rev C	Hydraulic Model	05.02.2025	TUFLOW Model	Please provide a copy of the TUFLOW model files for review.	Yucen Lu	DJV Flood Modeller	19/03/2025	TUFLOW model has been provided to Martinus.		Geordi Paxton	10.06.2025	Closed	
Local Government	WWCC	Flood Design Report – Edmondson Street Bridge and Footbridge Rev C	Hydraulic Model	05.02.2025	TUFLOW Model	The WWCC MOFFS model does not incorparate the subsuface 1d network. Can you please confirm the extent of the 1d network included in the updated model. The upstream network should extend all the way to Mitchemore St. Can you confirm the assumed boundary conditions for the downstream 1d network. This stormwater line extents all the way to the lagoon and is heavily influenced by downstream flooding. You cannot assume a free outfall in any significant rainfall event.	Yucen Lu	DJV Flood Modeller	19/03/2025	The 1d pit and pipe network is included in the TUFLOW model of Wagga Wagga Major Overland Flow Floodplain Risk Management Study and Plan (WMAwater, 2021) recevied from Wagga Wagga City Council, which was shown in Figure 4-2 in Section 4.2.1. The 1d networks around the Edmondson Street Bridge and footbridge were updated based on the available survey data. A zoomed-in figure around the site area including the 1d network will be added in Section 4.2.1 in the next design stage. The extent of 1d network covers up to the intersection between Mitchelmore Street and Coleman Street. The downstream boundary of the 1d network adopted Waterlevel (Murrumbidgee River) vs Time as per Wagga Wagga Major Overland Flow Floodplain Risk Management Study and Plan (WMAwater, 2021). The Wollundry Lagoon is represented in the 2D domain in TUFLOW, so the water level within it will be varied dynamically. The outlet of 1d network draining into the lagoon was not a free outfall and it is a 1d-2d connection. This connection takes lagoon water level into consideration for 1d network. 23/9/25: It has been discussed with DPHI that it is not appropriate to revise the project baseline models as this stage. The final models will be provided to the stakeholders and Councils for incorporation into their own asset management system and modelling.	5-0052-210-IHY-W4-RP-0001 Section 4.2.1	Geordi Paxton	10.06.2025	Open	Updated model provided with current pit and pipe network files to be included.
Local Government	WWCC	Flood Design Report – Edmondson Street Bridge and Footbridge Rev C	Hydraulic Model	05.02.2025	TUFLOW Model	There are several other subsuface inflows that enter the rail corridor to the east of the bridge upgrade. Have these been accounted for approriately. Do the SA inflow locations you have adopted appropriately direct water to the kerb inlet locations (noting the original hydrology was not completed to a pit and pipe level of detail).	Yucen Lu	DJV Flood Modeller	19/03/2025	The inflow entering the rail corridor east of the bridge has been directed to the kerb inlet location. The SA inflow locations related to the site area have been checked against the latest adopted LIDAR. The 1d network capacity related to the site area has been also checked and got almost 100% capacity in most of the pipes in a 10% AEP event. 23/9/25: It has been discussed with DPHI that it is not appropriate to revise the project baseline models as this stage. The final models will be provided to the stakeholders and Councils for incorporation into their own asset management system and modelling.		Geordi Paxton	10.06.2025	Open	Updated model provided with current pit and pipe network files to be included.
Local Government	WWCC	Flood Design Report – Edmondson Street Bridge and Footbridge Rev C	Hydraulic Model	05.02.2025	TUFLOW Model	No information given on SA inflow locations.	Yucen Lu	DJV Flood Modeller	19/03/2025	The SA inflow locations will be included in Figure 4-2 in the next design stage.	5-0052-210-IHY-W4-RP-0001 Section 4.2.1	Geordi Paxton	10.06.2025	Closed	
Local Government	WWCC	Flood Design Report – Edmondson Street Bridge and Footbridge Rev C	Hydraulic Model	05.02.2025	TUFLOW Model	Confirm topographic modifications to represent abutments and wingwalls (z-shapes within the rail corridor). A LFC is only affecting flows passing under the bridge, whereas we are more interested in constrictions to the flow travelling perpendicular to the bridge face. No change in DEM Z map provided in the report.	Yucen Lu	DJV Flood Modeller	19/03/2025	The details of the topographic modifications have been provided in Section 4.2.2. The embankment and wing wall for Edmondson Street Bridge were represented in TIN (received from DJV Civil Team) and z-shape in the model. The changes in DEM Z will be provided in the next design stage report.	5-0052-210-IHY-W4-RP-0001 Section 4.2.2	Geordi Paxton	10.06.2025	Closed	
Local Government	WWCC	Flood Design Report – Edmondson Street Bridge and Footbridge Rev D	Report and Model	10.06.2025	Conditions of Approval	Can you forward the latest comments/ report provided by the specialist independent reviewer? The comments in the appendices are from previous design phases.	Zoe Cruice	Eng Manager	20/06/2025	Please find attached the Independent Flood Consultant's current review at Appendix E					
Local Government	WWCC	Flood Design Report – Edmondson Street Bridge and Footbridge Rev D	Report and Model	10.06.2025	Edmonston St Bridge	The model is missing a connection to the 600*1500 RCBC running along Edward St (WS_E11_01t02)	Yucen Lu	DJV Flood Modeller	20/06/2025	Based on the input from CCTV and survey data, the pipes were not connected. However, the original council TUFLOW model showed them as connected. Therefore, the connection was removed, and the model was updated according to the CCTV and survey data to reflect the current conditions accurately.					
Local Government	WWCC	Flood Design Report – Edmondson Street Bridge and Footbridge Rev D	Report and Model	10.06.2025	Edmonston St Bridge	Pipe ID 805864 should be a 600 RCP?	Yucen Lu	DJV Flood Modeller	20/06/2025	A sensitivity analysis was conducted for the 1% AEP event for Pipe 805864 with a 600RCP. The results confirm no changes in flood impact. Thus, this does not affect the overall results. The Pipe details have been updated in the IFC sensitivity analysis					
Local Government	WWCC	Flood Design Report – Edmondson Street Bridge and Footbridge Rev D	Report and Model	10.06.2025	Edmonston St Bridge	WWCC requests comment from the independent reviewer be provided relating to the selection of the TUFLOW model version. WWCC does not agree that an older model version should be adopted to match results to the MOFFS model. The MOFFS model is no superceeded and is not accepted by Council as an approved baseline.	Dan Williams / Yucen		7/01/2025	At the time DJV started flood assessment, MOFFS model is the only approved source provided by ARTC to be relied on. Based on the Independent Flood Consultant review, the upstream hydrology/routing and local drainage were updated. In addition, using an older TUFLOW executable (but newer than MOFFS executable) to better match an existing and adopted model is valid and regularly done. Ultimately, the adoption of a more recent executable is unlikely to change the outcome of the assessment.					

APPENDIX E

Independent Flood Consultant Review

Project: 2100 **Deliverable:** Edmondson Street Overbridge and Footbridge

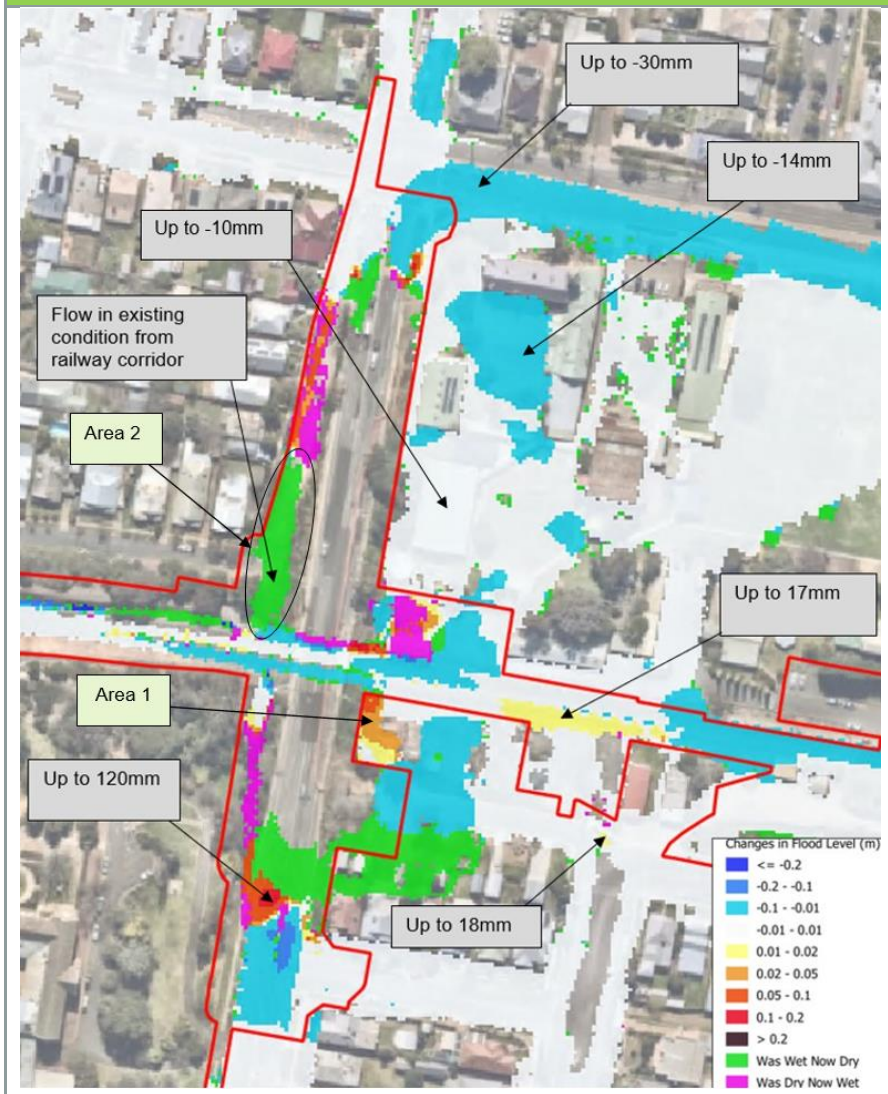
Comment Sheet Reference: 5-0052-210-IHY-W5-CS-0001-PE_H

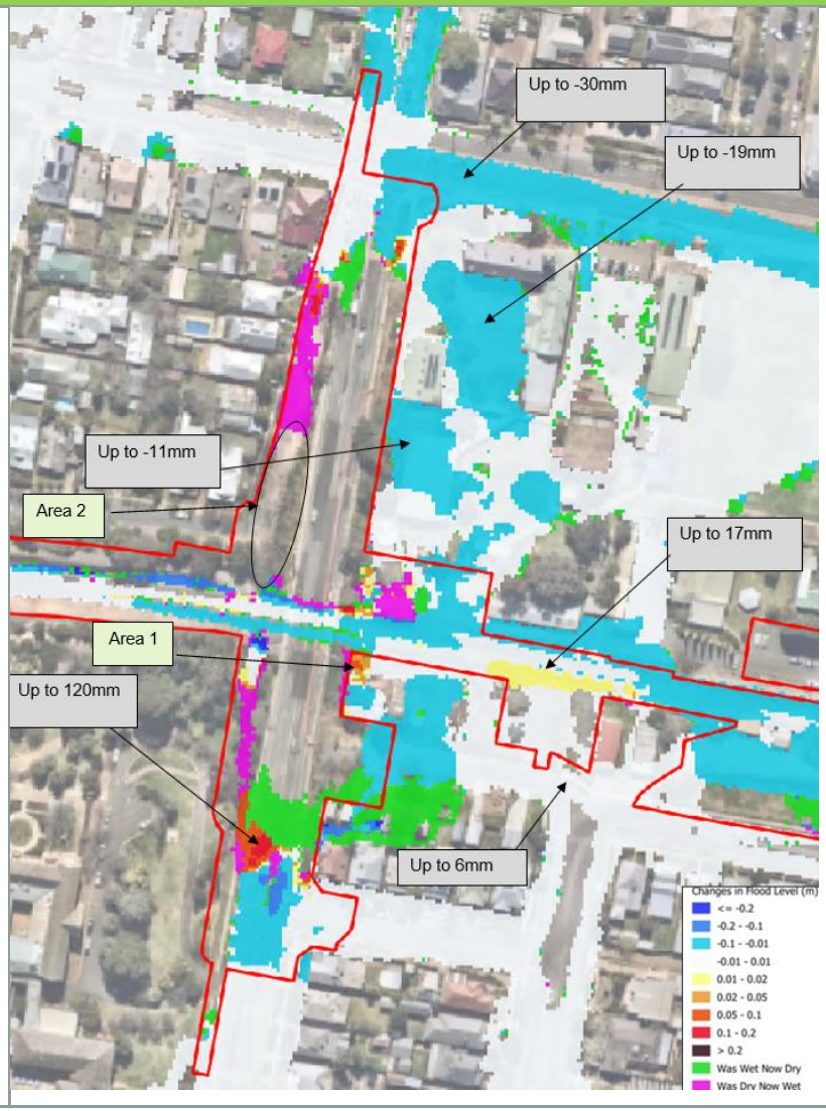
Review Comments (Reviewer)											Responses (Document Owner)					Close-Out				
#	Document number / drawing number - Revision Number	Section # / page #	Company	Full Name	Functional Area	Date	Design Gate	Comment (for example must be specific on non compliance. Reference mark-ups, if required)	Compliance 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-W5-RP-0001_B	TUFLOW files	Hatch	Sam Drysdale	Flood Assessment	16/10/2024	PDR	Inconsistency in representation of baseline conditions between work packages W4, W5 and W7.		Minor	Thinesh Thirumurugan	DJV Flood Modeller	28/01/2025	The flood design report 5-0052-210-IHY-W5-RP-0001_B (PDR No. 1) has been superseded by 5-0052-210-IHY-W5-RP-0001_C (PDR No. 2). 5-0052-210-IHY-W5-RP-0001_C is based on the master TULFLOW model, which includes W4, W5, and W7 work packages all together adopting a consistent baseline scenario. The new model has been submitted to PE to review in Dec 2024.		Darren Lyons	Hatch	29/01/2025	CLOSED	Comment relates to the initial PDR submission and has been resolved in the updated PDR submission of Dec 2024
2	5-0052-210-IHY-W5-RP-0001_B	TUFLOW files	Hatch	Sam Drysdale	Flood Assessment	16/10/2024	PDR	Given the sensitivity of the cumulative impacts from the W7 Wagga Wagga Yard works, all changes made as a part of the W7 package should be included within the modelling for W5.		Minor	Thinesh Thirumurugan	DJV Flood Modeller	28/01/2025	The flood design report 5-0052-210-IHY-W5-RP-0001_B (PDR No. 1) has been superseded by 5-0052-210-IHY-W5-RP-0001_C (PDR No. 2). 5-0052-210-IHY-W5-RP-0001_C is based on the master TULFLOW model, which includes W4, W5, and W7. This model includes all changes made as a part of the W7 package.		Darren Lyons	Hatch	29/01/2025	CLOSED	Comment relates to the initial PDR submission and has been resolved in the updated PDR submission of Dec 2024
3	5-0052-210-IHY-W5-RP-0001_B	TUFLOW files	Hatch	Sam Drysdale	Flood Assessment	16/10/2024	PDR	The representation of pits and inflow efficiency needs to undergo a review to ensure that representation in TUFLOW is appropriate.		Major	Thinesh Thirumurugan	DJV Flood Modeller	28/01/2025	The pit types and attributes will be reviewed and will be represented appropriately in the DDR stage.		Darren Lyons	Hatch	29/01/2025	CLOSED	Comment relates to the initial PDR submission and has been resolved in the updated PDR submission of Dec 2024
4	5-0052-210-IHY-W5-RP-0001_B	TUFLOW files	Hatch	Sam Drysdale	Flood Assessment	16/10/2024	PDR	Detail to be developed and provided in PDR for the tie-in of the W5 works to into the Edmondson Street and Erin Street intersection to be designed and verified to not result in non-compliances.		Major	Thinesh Thirumurugan	DJV Flood Modeller	28/01/2025	The flood design report 5-0052-210-IHY-W5-RP-0001_B (PDR No. 1) has been superseded by 5-0052-210-IHY-W5-RP-0001_C (PDR No. 2) and this report and model have been submitted to PE in Dec 2024. In PDR No.2, there is no non-compliance for the site including at the Edmondson Street and Erin Street intersection. The details of the tie-in of the W5 works to into the Edmondson Street and Erin Street intersection and flood impact results can be found in 5-0052-210-IHY-W5-RP-0001_C (PDR No. 2).		Darren Lyons	Hatch	29/01/2025	CLOSED	Comment relates to the initial PDR submission and has been resolved in the updated PDR submission of Dec 2024
				Daniel Williams	Flood Assessment	31/01/2025	rePDR	No further comments.			Zoe Cruice	Engineering Manager	15/02/2025	Noted. No further action at PDR2. Re-issue at DDR for PE review					CLOSED	
				Daniel Williams	Flood Assessment	20/06/2025	DDR	No further comments.			Zoe Cruice	Engineering Manager	20/06/2025	Noted. No further action at DDR. Re-issue at IFC for PE certification					CLOSED	
				Daniel Williams	Flood Assessment	19/09/2025	IFC	No further comments.												

APPENDIX F

IFC Sensitivity Analysis Results Comparison

DDR	IFC
Edmondson Street Bridge and Footbridge for 1% AEP storm event	
Changes in Flood Level(m)	





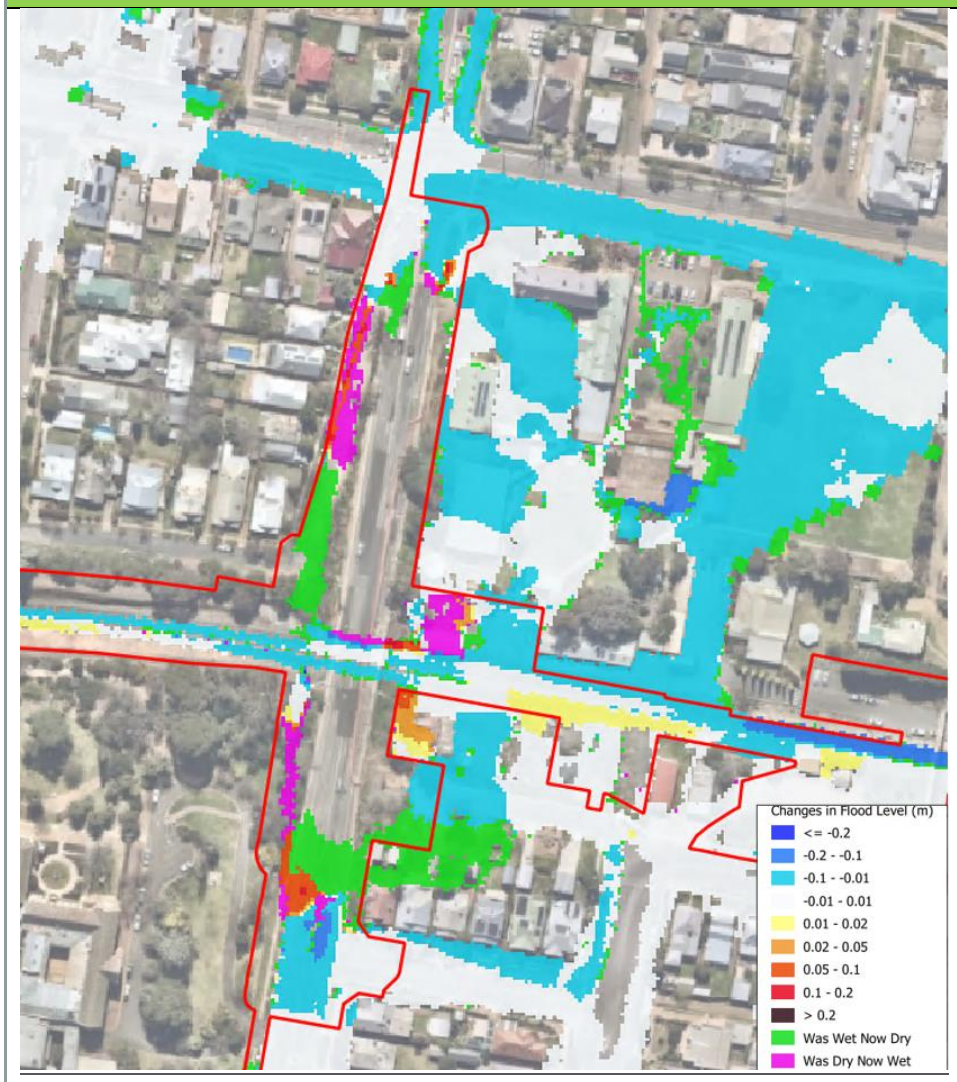
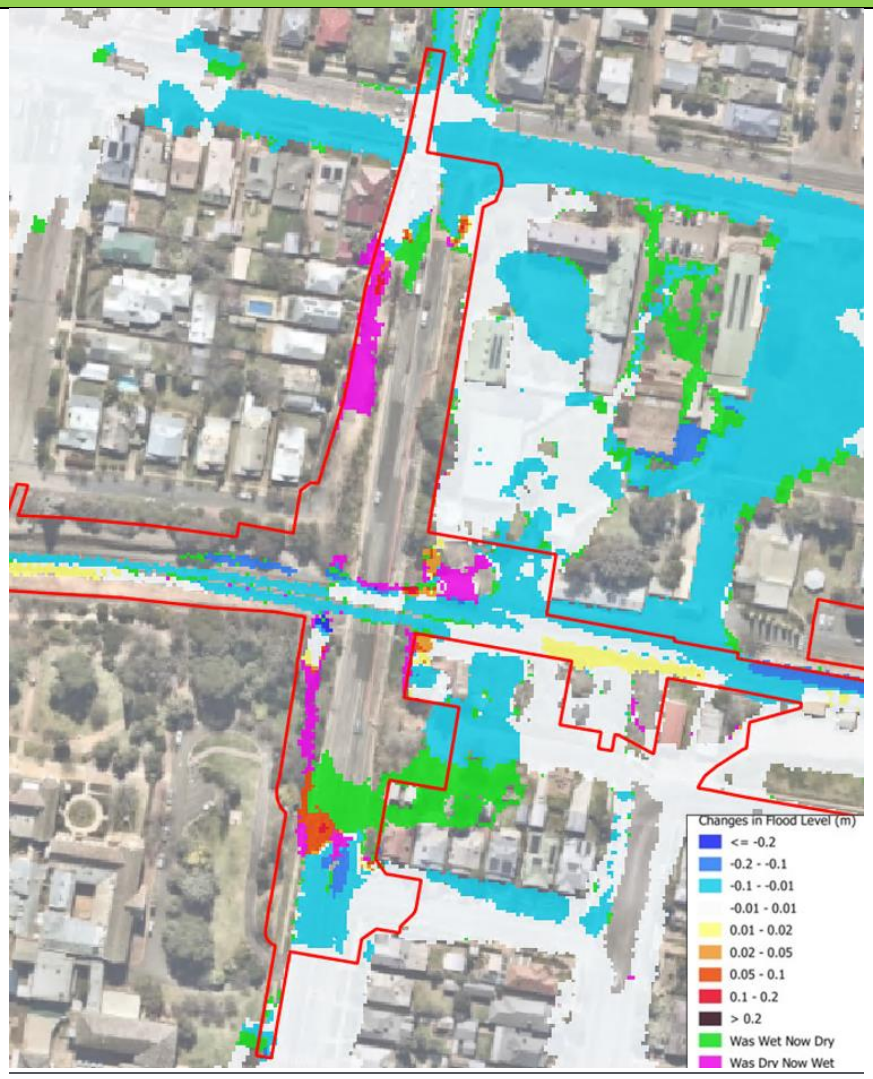
Changes in Flood Level 1. The changes in flood level outside the project boundary are less than 0.05m and no residential, commercial or industrial properties are impacted 2. Area 1 in figure (corner lot DP1006140 Lot 2) located upstream of the railway corridor between Edmondson Street and Railway Street experiences afflux up to 70 mm due to the Eastern wing wall of the Edmondson Street bridge Design. Although the lot is outside the boundary, it is classified as ARTC land. Therefore, this afflux is deemed compliant. 3. Newly wet areas created outside the project boundary at the Little Best Street due to pit surcharging is less 0.05m.	Changes in Flood Level 1. The changes in flood level outside the project boundary are less than 0.05m and no residential, commercial or industrial properties are impacted 2. Area 1 in figure (DP1006140 Lot 2) located upstream of the railway corridor between Edmondson Street and Railway Street experiences afflux up to 75 mm due to the Eastern wing wall of the Edmondson Street bridge Design. Although the lot is outside the boundary, it is classified as ARTC land. Therefore, this afflux is deemed compliant. 3. Newly wet areas created outside the project boundary at the Little Best Street due to pit surcharging is less 0.05m. 4. During the existing scenario, the flood water does not flow towards Little Best Street (Area 2 in the figure) on the west side of Edmondson Street bridge due to the update in Survey topography and railway corridor culvert sizes.

DDR	IFC
Changes in Flood Velocity (m/s)	

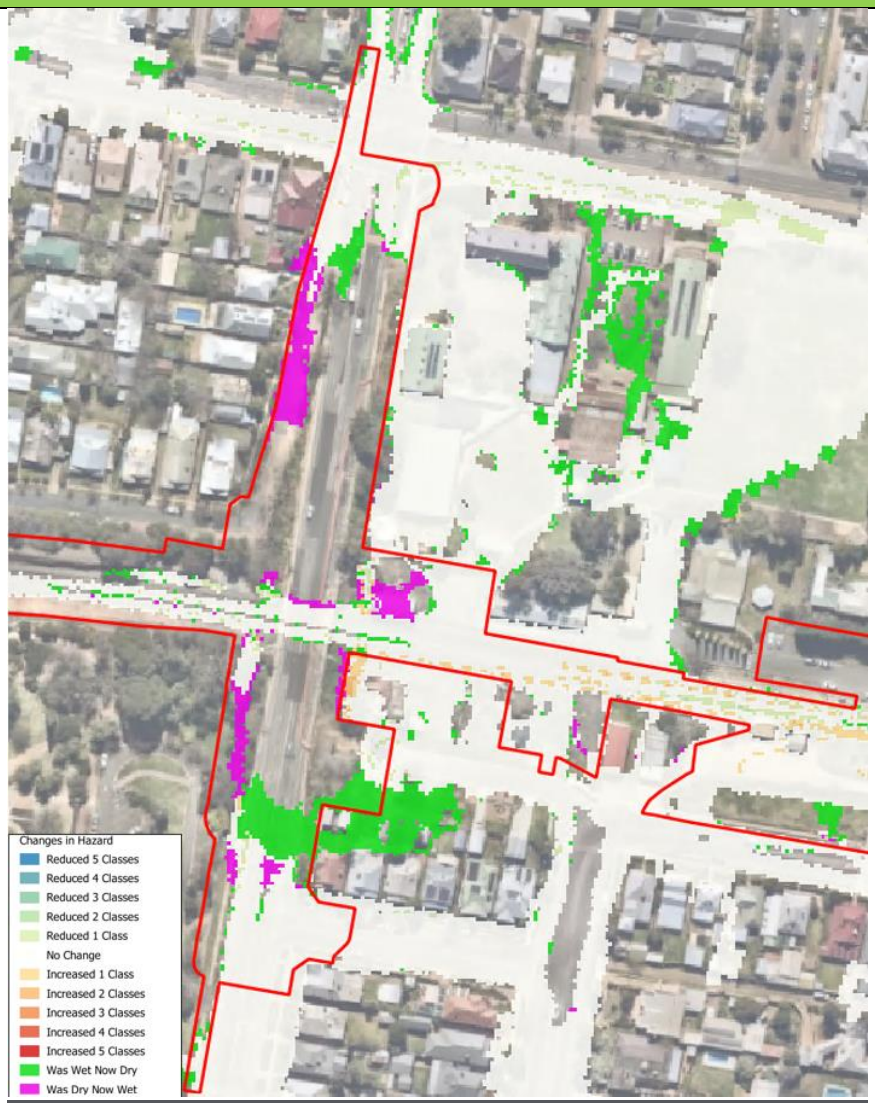
DDR	IFC
Changes in Flood Velocity 1. The changes in velocity outside the site is less than 0.5m/s. 2. Newly wet area created outside the project boundary has a velocity of less than 0.5m/s.	Changes in Flood Velocity 1. The changes in velocity outside the site is less than 0.5m/s. 2. Newly wet area created outside the project boundary has a velocity of less than 0.5m/s.

DDR	IFC
Changes in Flood Hazard	
	

DDR	IFC
Changes in Flood Hazard 1. There is no increase in flood hazard outside the project boundary. 2. The Corner lot (DP1006140 Lot 2) upstream of the railway corridor between Edmondson Street and Railway Street experiences a general increase in Hazard by one category due to additional flow from the culvert from the Edmondson Street bridge transverse pipe. Although the lot is outside the boundary, it is classified as ARTC land. Therefore, this afflux is deemed compliant 3. Newly created wet area outside the project boundary experiences H1 Hazard which is generally safe for people vehicles and buildings.	Changes in Flood Hazard 1. There is no increase in flood hazard outside the project boundary. 2. The Corner lot (DP1006140 Lot 2) upstream of the railway corridor between Edmondson Street and Railway Street experiences an general increase in Hazard by one category due to additional flow from the culvert from the Edmondson Street bridge transverse pipe. Although the lot is outside the boundary, it is classified as ARTC land. Therefore, this afflux is deemed compliant 3. Newly created wet area outside the project boundary experiences H1 Hazard which is generally safe for people vehicles and buildings.

DDR	IFC
Edmondson Street Bridge and Footbridge extent for 2% AEP	
Changes in Flood Level(m)	
	

DDR	IFC
Changes in Flood Velocity (m/s)	

DDR	IFC
Changes in Flood Hazard	
	

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