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MARTINUS INLAND RAIL

FLOOD DESIGN REPORT

A2I | Albury to Illabo

Package: A2I – Table Top Yard

CONTRACT NUMBER: 0052

PROJECT DOCUMENT NUMBER:

5-0052-210-IHY-B6-RP-0001

Document Control

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Revision History

REVISION	REVISION DATE	AMENDMENT	DATE TO CLIENT
A	26/02/2025	DDR Issue for review	26/02/2025
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GLOSSARY

Specific terms and acronyms used throughout this plan and sub-plans are listed and described in the table below.

Table 0-1: Definitions

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

Term	Definition
NtP	Notice to Proceed
PDR	Preliminary Design Review
PMF	Probable Maximum Flood
PSR	Project Scope and Requirements
QDL	Quantitative Design Limits
RCP	Representative Concentration Pathways
REF	Review of Environmental Factors
RFI	Request for Information
RORB	Runoff Routing Burroughs
S2P	Stockinbingal to Parkes
SAQP	Sampling, Analysis and Quality Plan
SDR	Systems Definition Review
SEMP	System Engineering Management Plan
TfNSW	Transport for New South Wales
TWL	Tail Water Level
UMM	Updated Mitigation Measures
V & V	Verification and Validation
WAD	Works Authorisation Deed
WAE	Work-as-Executed

1 A2P PROJECT INTRODUCTION

1.1 Albury to Parkes (A2P)

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

1.2 Project Scope

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

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

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

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

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

- Daroobalgie New Loop
- Wyndham Avenue (track lowering)

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

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

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

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

1.3 Site Description

This study conducts a flood assessment for Table Top Yard (refer to Figure 1-1 for site location, the red polygon is the current project boundary. The background for the site is listed below.

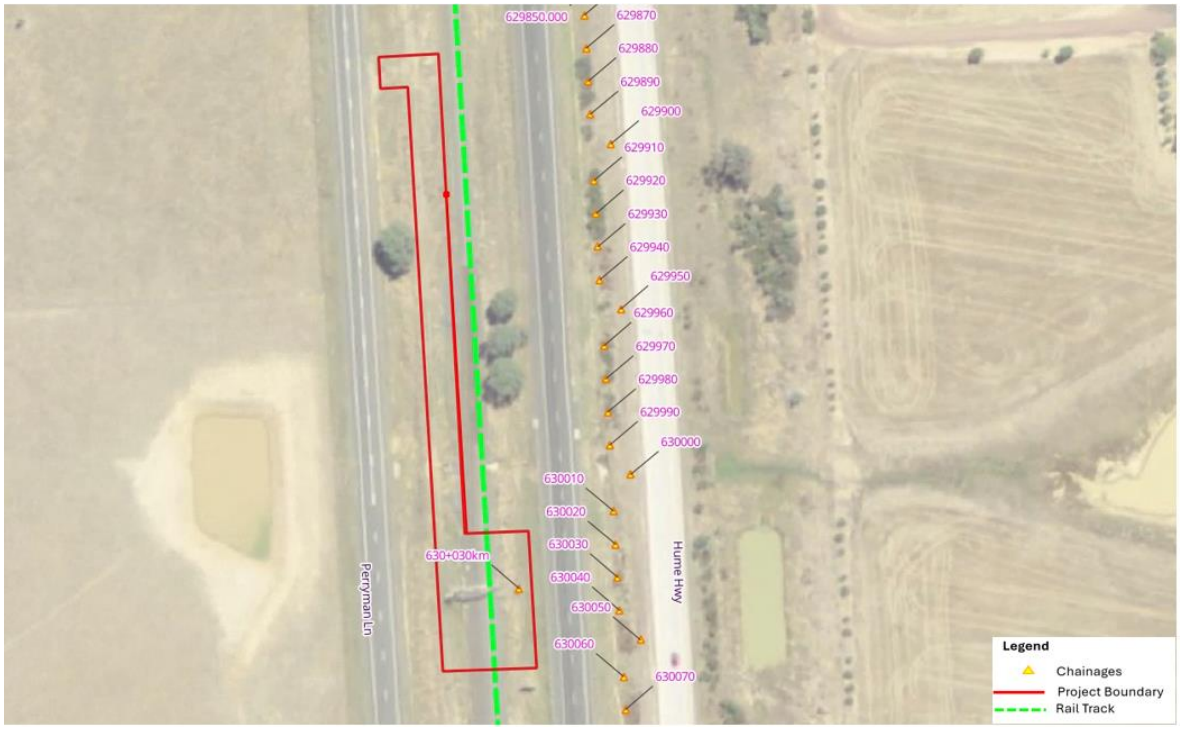


Figure 1-1: Site Location

1.3.1. Background

Table Top Yard forms part of the Albury to Illabo Section works. Table Top Yard is located in Table Top, a suburb of the City of Albury, located 16 kilometres north of Albury and 19 kilometres west of Bowna. The project scope at this site comprises the structure removal of an existing gantry only (CH630.030km).

1.4 Objectives

This report has been prepared to support the delivery of the structure removal at Table Top Yard and comply with the CSSI Condition of Approval and updated mitigation measures 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). The flood assessment aims to estimate the flood behaviour within the study area and assess the potential flood impacts due to the proposed works.

1.5 Scopes

The scope of this study includes:

- Carrying out the flood assessment for the design in the IFC stage for the design events of 5%, 2%, 1% AEPs, 1% AEP with climate change, and PMF.
- 1% AEP with blockage sensitivity analysis.
- 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

There is no existing flood studies related to Table Top Yard.

1.6.2. Reference Design

The Reference Design provided are:

- Albury to Illabo (A2I) and Stockinbingal to Parkes (S2P) Projects Reference Design Report – Lockhart & Greater Hume (June 2022)

There was no flooding assessment as per this Reference design.

1.6.3. Environmental Impact Statement

- Albury to Illabo Environmental Impact Statement (EIS) Technical Paper 11 – Hydrology, Flooding and Water Quality (July 2022)

The EIS report states that there are no watercourses intersecting the enhancement site, only local catchment flooding from the western side of Hume Highway to the eastern of the town, which runs down to a 2.5 km north-east merge at Murray River.

The EIS report also indicates that the enhancement site is not located within flood-prone land. Sandy Creek, located approximately 1.5 kilometres west of the site, is the nearest watercourse. Flooding from Sandy Creek is not expected to affect the proposal site as topography slopes in a north-west direction; therefore, there is no flood risk at this site.

1.7 Purpose and Requirements

The primary purpose of this IFC flood assessment report is to investigate the flood behaviour and its potential flood impact.

The secondary purpose of this report is to provide evidentiary documentation on consultation with external stakeholders, and review conducted by 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:

- Albury to Illabo (A2I) and Stockinbingal to Parkes (S2P) Projects Reference Design Report – Lockhart & Greater Hume (WSP, June 2022), 2-0008-210-PEN-02-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
- Austroads Guide to Bridge Technology – Part 8: Hydraulic Design of Waterway Structures
- Inland Rail Climate Change Risk Assessment Framework

Input Data

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

Table 1-1: Available Information

Item	Information	Type	Description / Comments
1	LiDAR 2020 (Spatial Accuracy Horizontal: +/-0.80, Spatial Accuracy Vertical: +/-0.30	TIF format in 1m resolution in GDA2020 projection	Downloaded from https://elevation.fsdf.org.au/ on 06/02/2025
2	1m 2015 LiDAR and High-Resolution Aerial Imagery. The data derived points have an accuracy of 0.15m (68% confidence interval) ARTC LiDAR	Tif format in GDA94	The existing 1m LiDAR (flown by ARTC in 2015) was received from Martinus on 12/11/2024. However, the LiDAR2020 (item 1) is newer and in GDA2020. Therefore, only LiDAR 2020 (item 1) is used.
3	3D LiDAR.dwg	DWG format in GDA2020	Existing top of the rail centreline lines for the main rail track. Received from DJV rail team on 10/02/2025.
4	SEC GANTRY.dwg	DWG format in GDA2020	Existing gantry dimensions (including gantry rough height and footing, as per Figure 4-3). Received from DJV Structure Team on 10/02/2025.
5	A2P TTP EXT GDA20Z55 KM POSTS RAIL.12da	12da file in GDA2020	Existing culvert survey around the project area. Received from Martinus on 19/12/2024.

1.10 Outputs

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

1.11 Limitations and Assumptions

The following limitations and assumptions are applied to the Table Top Yard site.

- There is no existing hydrologic model and flood result of flood study.
- The gantry structure in Table Top Yard at Hume Highway was modelled as a layered flow constriction with blockage parameters.
- An assessment of temporary works and staging has not been undertaken.
- According to Clause 5.4.2 and Clause 5.4.3 in Annexure B of PSR (Table 2-1), the highest flood event shall be the one stipulated by the ARTC Safety Management System (SMS). As per Section 10.1.3 of Track and Civil Code of Practise Section 10 Flooding, the 1% AEP shall be used.
- 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. Refer also to the Technical Memo provided on blockage analysis: 5-0052-210-IHY-99-ME-0001.

2 COMPLIANCE WITH REQUIREMENTS

2.1 Project Scope and Requirements

Assessment of the IFC stage 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 Table Top Yard 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 (No watercourse associated with this site.)
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 5% AEP in the existing scenario. Thus, the existing immunity will be less than 5% 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.	N/A (Clause 5.4.2 will apply)
Project Wide	5.4.5	Bridge and culvert hydraulics shall comply with Austroads Guide to Bridge Technology Part 8: Hydraulic Design of Waterway Structures.	No bridge and culvert design within the site.
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 + Year 2090 Representative Concentration Pathways (RCP) 8.5. Refer to 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.	No change to flood immunity. 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.	No track lowering in this site and existing flood immunity is maintained. Refer to Section 6.4
A2I Technical Requirements*	IR-SR-A2I-352	The Corridor System shall prevent damage of the formation due to ponding of water.	No material flood impact and the existing condition is maintained. Refer to Section 6.4
A2I Technical Requirements*	IR-SR-A2I-458	The Corridor System shall prevent ponding in longitudinal open channels.	There is no change to open channels as part of the design, existing conditions are maintained. Refer to Section 6.4
A2I Technical Requirements*	IR-SR-A2I-459	The Corridor System for Enhancement Corridors shall provide mitigation for flood impacts no worse than existing condition.	N/A (no underbridges assessed in this scope of work)

Requirement	Identifier	A2P Technical Requirements Description	Compliance Evidence Reference
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. flood impacts no worse than existing condition. 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. Flow patterns is maintained as existing condition. Refer to Section 6.4
A2I Technical Requirements*	IR-SR-A2I-541	The Structures System new underbridges shall withstand the 0.05% annual exceedance probability design flood event.	N/A (no underbridges assessed in this scope of work)
A2I Technical Requirements*	IR-SR-A2I-735	The Third-Party System private roads shall have flood immunity no worse than existing.	No material flood impacts, Refer to Section 6.3
A2I (Annexure F)	6.1.1	Without limiting clauses 8 and 14 of the Deed, the Contractor shall ensure that the Contractor's Activities and the Works comply with the following for A2I, the Conditions of Approval and the environmental assessment reports available on https://www.planningportal.nsw.gov.au/major-projects/projects/inland-rail-albury-illabo"	Refer to Table 2-2

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

2.2 Conditions of Approval - Flooding

The Conditions of Approval (CoA) have been provided as part of the CSSI approval and 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.

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

Condition #	Condition or Criteria	Compliance Evidence Reference
E38	All practicable measures must be implemented to ensure the design, construction and operation of the CSSI will not adversely affect flood behaviour, or adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.	Compliant with regards to flood impact. Section 6.4. Flood Impact assessment demonstrates this.
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 0 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 methodology shows that ARR2019 guidelines were used for this assessment.

Condition #	Condition or Criteria	Compliance Evidence Reference
E40	b) Use of modelling software appropriate to the relevant modelling task;	Compliant. Section 4 shows that 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 Sections 4.2.
E40	d) Confirmation of predicted afflux at industrial properties adjacent to Railway Street, Wagga Wagga based on field survey.	N/A – Railway Street in Wagga Wagga is not relevant to this site.
E40	Updated flood modelling must be made publicly available in accordance with **Condition B18**.	Flood design report and 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 E42** and **E44** must be reviewed and endorsed by a suitably qualified flood consultant, who is independent of the project's design and construction and approved in accordance with **Condition A16,** in consultation with directly affected landowners, DCCEEW Water Group, TfNSW, DPI Fisheries, BCS, NSW State Emergency Service (SES) and relevant Councils.	Independent review of the flood modelling, model and Flood Design Report is undertaken by the Proof Engineer's specialist contractor, who satisfies and complies with the requirements of CoA A16. Consultation with the Council will be undertaken through a formal review of this Flood Design Report. Consultation with other stakeholders will occur prior to finalisation of the 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 below
E42	(a) a maximum increase in inundation time of one hour, or 10%, whichever is greater;	Compliant. Refer to Section 6.4
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 to Section 6.4
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 to Section 6.4
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 to Section 6.4
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
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
E42	(g) No increase in the flood hazard category or risk to life; and	Compliant. Refer to Section 6.4

Condition #	Condition or Criteria	Compliance Evidence Reference
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
E42	Where the requirements set out in clauses (d) to (f) inclusive cannot be met, alternative flood levels or mitigation measures must be agreed to with the affected landowner.	N/A – clause (d) to (f) are compliant
E43	A **Flood Design Report** confirming the:	
E43	a) final design of the CSSI meets the requirements of **Condition E42;** and	Compliant. Refer to Section 6.4
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 works that may impact on flooding or the relevant council's stormwater network
E45	Flood information including flood reports, models and geographic information system outputs, and work as executed information from a registered surveyor certifying finished ground levels and the dimensions and finished levels of all structures within the flood prone land, must be provided to the relevant Council, BCS and the SES in order to assist in preparing relevant documents and to reflect changes in flood behaviour as a result of the CSSI. The Council, BCS and the SES must be notified in writing that the information is available no later than one (1) month following the completion of construction. Information requested by the relevant Council, BCS or the SES must be provided no later than six (6) months following the completion of construction or within another timeframe agreed with the relevant Council, BCS or the SES.	Flood information 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.
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 as there is no drainage design is included within the scope of works at this site.

2.3 Updated Mitigation Measures - Flooding

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

Table 2-3 Updated Mitigation Measures Compliance Table - Flooding

Condition	Condition or Criteria	Compliance Evidence Reference
HFWQ3	Further consultation will be undertaken with local councils and other relevant authorities to identify opportunities to coordinate the proposal with flood mitigation works committed to as part of the council's flood management plans, or other strategies.	Consultation with Council and other relevant authorities will be undertaken through 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 Table Top Yard site and so is not relevant to the Wagga Wagga Yard enhancement site, to which this condition refers. Compliant. A 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 Table Top Yard site, and so is not relevant to the Riverina Highway bridge enhancement site, to which this condition refers.

* 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

No SDR was submitted as this package is a Simple Package.

3.2 Concept to PDR

Flood modelling is not applicable to this stage.

3.3 PDR to DDR

The table below outlines the changes occurring between PDR and DDR submissions.

Table 3-1: Design Differences Between PDR and DDR

Item	Difference	Reason for Difference
1	DJV created a new TUFLOW hydraulic model to model the area of interest and proposed design.	A quantitative assessment is required as per UMM HFWQ4 (refer to Table 2-3). No TUFLOW hydraulic model was available for the PDR stage or earlier.

3.4 DDR to IFC

The table below outlines the changes occurring between DDR and IFC submissions.

Table 3-2: Design Differences Between DDR and IFC

Item	Difference	Reason for Difference
1	Updates to the report as per the comments from ARTC (5-0052-210-IHY-B6-CS-0001_B)	Addressing the comments

4 MODELLING METHODOLOGY

The overall approaches for flood modelling are listed below:

- Based on ARR2019, develop a Rainfall-on-Grid model and generate rainfall for input to the hydraulic model for all events (5% AEP, 2% AEP, 1% AEP, 1% with climate change, blockages and PMF) to perform critical duration analysis.
- Comparing the hydraulic results against information from the Regional Flood Frequency Estimation model.
- Develop a TUFLOW hydraulic model with all available information for existing and design conditions flood model.
- Determine whether a design conditions flood model is required based on the results of the existing conditions flood model.
- To complete a flood impact assessment for the site.
- Conduct a climate change sensitivity assessment for the 1% AEP event to inform the potential impact on the railway track flood immunity.
- Conduct a blockage sensitivity assessment for the 1% AEP event based on ARR2019 procedures.

4.1 Hydrology Input

The enhancement site is located in Table Top Yard, 19km north of Albury. The works are around CH630+030km and runs parallel to the Hume Highway and Perryman Lane (Chainage refers to Figure 1-1). The flood behaviour at the enhancement site is dominated by local catchment flooding from the western side of Hume Highway and Perryman Lane at Totable Top Yard, the total catchment area is approximately 1.42 km^2. There is no riverine flooding impact from the local rivers or creeks at Table Top Yard.

A Rainfall-on-Grid model was set up to generate rainfall for various AEP events to be used as input to the hydraulic model. The local catchment is shown as per the Figure 4-1.

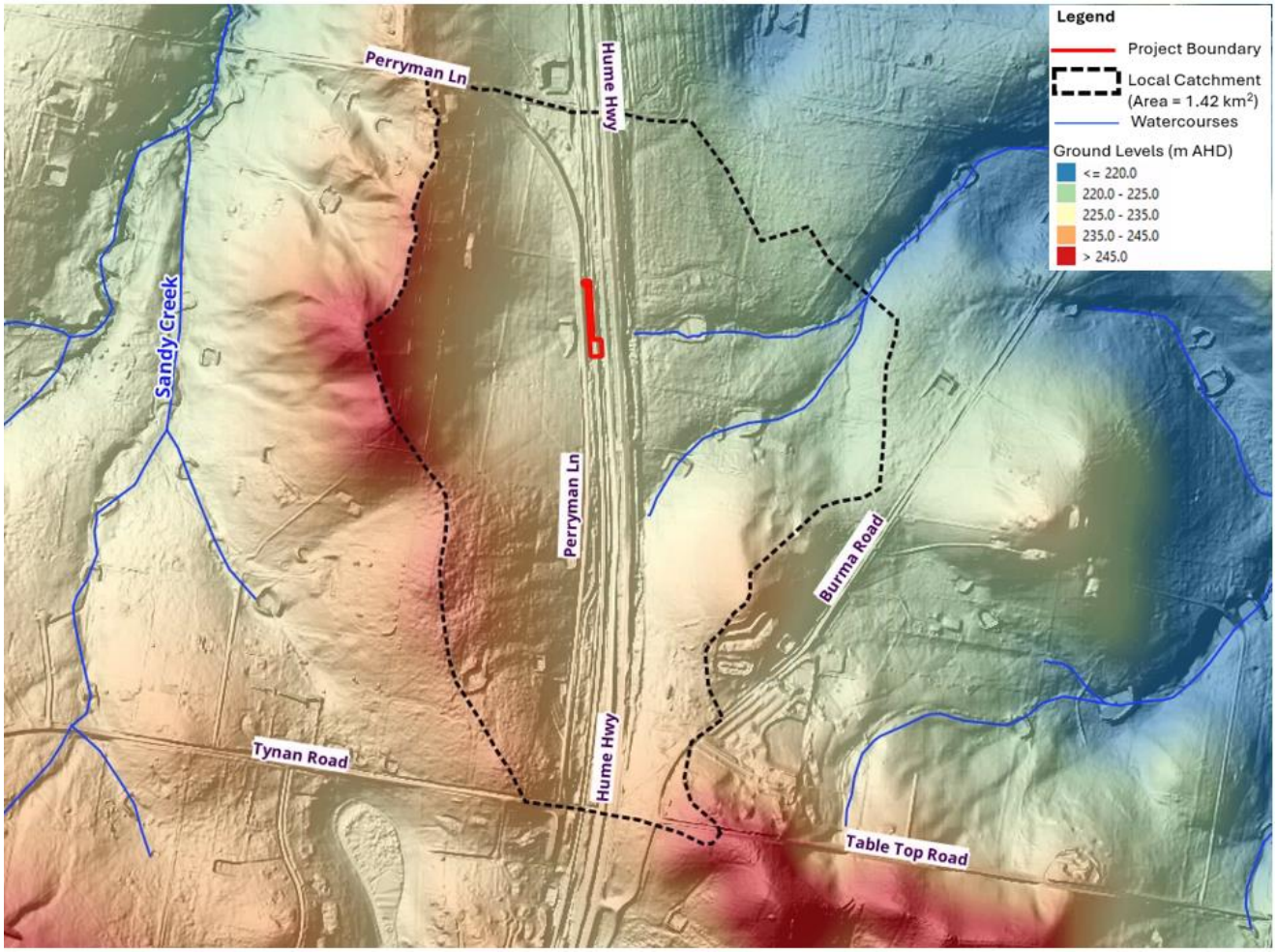


Figure 4-1: Hydrology Catchment Exten

Table 4-1: Model Parameters

Parameters	Developed Hydrology Model	Notes
Hydrology Method	Rainfall-on-Grid (RoG)	-
Total catchment area	1.42 km^2	-
Initial Loss	Probability Neutral Burst Loss for all events except PMF (refer Appendix B) PMF event (1 mm)	ARR Data Hub (Downloaded 06/02/2025) Refer to Appendix B
Continuing Loss	1.8 mm/hr (PMF event is 0 mm/hr)	ARR Data Hub (Downloaded 06/02/2025) Refer to Appendix B
Catchment Slope	Based off LiDAR	-
Areal Reduction Factors	Not Applied.	The catchment size is very small (1.42Km^2)
Impervious Area	Based on Aerial imagery (Imagery@2025)	-
Events	PMF, 1% AEP + Climate Change, 1% AEP, 2% AEP, 5% AEP	-
Duration and Temporal pattern	Ensemble temporal pattern for each duration ranging from 15 minutes to 360 minutes for the events apart from PMF. Ensemble 11 temporal patterns for GSDM PMF from 15 minutes to 180minutes	As per ARR2019 guidelines

4.2 Hydraulic Modelling

A TUFLOW model was developed to investigate the flood behaviour at the Table Top Yard site. The model extent encompasses the north-east of Table Top Yard town, covering the 0.5 km uphills to the western side of the Hume Highway and flowing downhills to the eastern sides of Hume Highway, the model extent ends at the intersection of Hume Highway and Landale Ln to the north-east of the town, ending up at the intersection of Tynan Road and Table Top Road at the south of the town (Refer to Figure 4-2).

Figure 4-2: TUFLOW Model Extent – Table Top Yard Model

Table 4-2: Model Parameters in the TUFLOW Model

Parameters	TUFLOW Model
TUFLOW version	TUFLOW 2023-03-AE HPC
Coordination Reference System (CRS)	GDA2020 MGA 55
Grid Size	2m
Hydrology	Rainfall-on-Grid (RoG)
Inflows	Area Rainfall Polygon
Downstream Boundary	Set as HQ (slope boundary) based on the general slope of the downstream areas
Building Representation	Null polygon
Model Topography	1m resolution LiDAR collected in 2020 downloaded from ELVIS. Supplemented by terrain modifications for the top of rail lines, roads, and channels.
Dams Initial Water Levels	All farm dams were assumed to be full as a conservative approach.
Drainage	Existing culverts were modelled as 1d network elements with connections to the 2d domain via 2d_bc lines.
Mannings Roughness Values	Floodplain – 0.05 Basins/Channels/Water – 0.025 Streets/Roads – 0.020 Rail – 0.030 Medium to Dense Bush – 0.07
Cut-Off Depth	30 mm
Design Events	PMF, 1% AEP Climate Change, 1% AEP, 2% AEP, 5% AEP

4.2.1. Existing Model

4.2.1.1 Topography

The model topography was modelled by incorporating the 1 metre LiDAR for the entirety of the model extent. This was then supplemented by incorporating the top of the rail information as well as 3D drawing lines for the top of the rail track.

4.2.1.2 Drainage Network

The drainage/culvert elements used in the model were based on the survey data which provided details and invert levels for some of the culvert elements. Where they were not available, these were assumed based on the Street View imagery and LiDAR information. These were modelled as 1D elements with links to the 2D model domain. The existing culverts are summarised in Table 4-3 as below:

Table 4-3: Summary of Existing Culverts in the Catchment

Culverts ID	Culvert Type, Size and numbers
Culvert 01 (CH629.990km) (close to Perryman Ln)	Pipe Culvert - 3 units (diameter of the culvert is 750mm)
Culvert 02 (CH629.990km) (Underneath railway)	Box Culvert - 1 unit (height is 1200mm and width is 1000mm, the culvert height is estimated based on street views)
Culvert 03 (CH629.990km) (West of Hume Hwy - Upstream)	Pipe Culvert - 1 unit (diameter of the culvert is 750mm)
Culvert 04 (CH629.990km) (East of Hume Hwy - Downstream)	Pipe Culvert - 4 units (diameter of the culvert is 750mm)

4.2.1.3 Existing Gantry Structure

The location of the existing gantry to be removed shown as Figure 1-1 (refers to CH630.030km and CH630.040km) within the south end of the project boundary. As stated in the Detailed Design Report (refer to document 5-0052-210-PEN-G4-RP-0001), the modifications to the gantry structure involve minor terrain modifications (including to the footing). Gantry details can be found in the document provided as per 5-0052-210-PEN-B6-RP-0001_0 Design Report (Table 4-5 and Figure 4-1), and the information is summarised below Table 4-4.

Table 4-4: Gantry Measures

	Details	
Details	Location	Table Top Yard
	Structure Owned By	ARTC
	ARTC Track Chainage	630+030KM
	Rail Configuration	Single Track
Dimensions (m) (based on gantry 3D drawings received on 10th Feb 2025)	Height (Top of the gantry to the bottom face of footings)	7.2m
	Length (Inside face of footings)	9.3m
	Downstream footings to Rail Centreline	2.8m
	Upstream footings to Rail Centreline	6.5m
	Grout Thickness	0.7m

The detail of gantry dimensions as per Figure 4-3 and Figure 4-4 below.

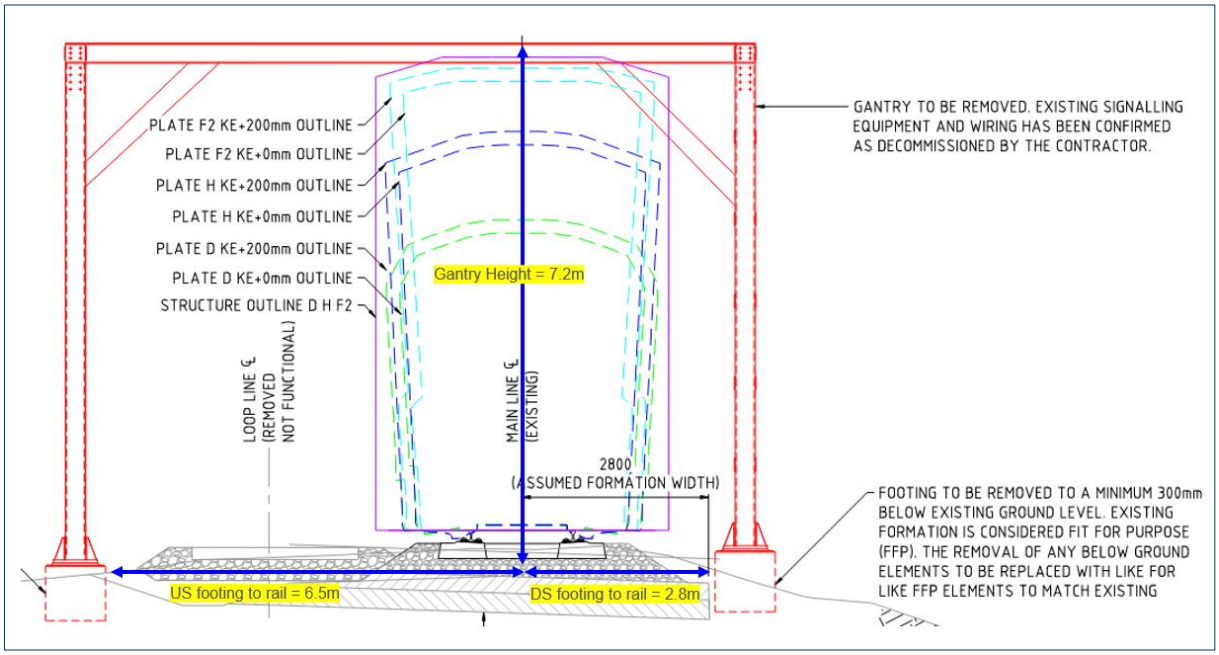


Figure 4-3: Gantry at CH 630+030km (Knee Brace and F2M Plate)

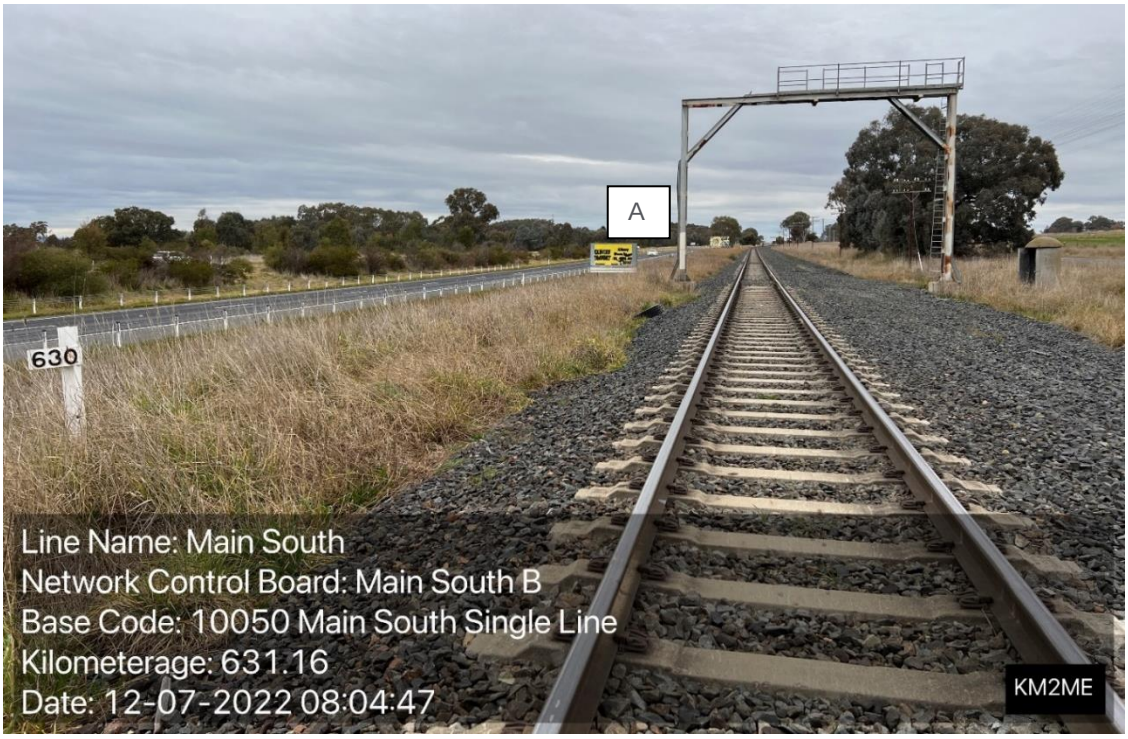


Figure 4-4: Disused Gantry at CH 630+030km to be removed

4.2.2. Design Model

The design model was updated by removing the existing gantry at the site as part of the IFC stage (including the footing, gantry location refers to Figure 4-4 as above).

4.2.3. Design Events

The critical duration analysis was conducted by utilising inflows generated from rainfall-on-grid with a 2d_rf layer across the entire model extent. The storm durations of 15min up to 360min were modelled for the events of 5%, 2%, 1% AEP, 1% AEP with climate change, and PMF events.

An ensemble of 10 temporal patterns was run for each duration as recommended in ARR2019. The medium for the 10 temporal patterns will represent each duration. For PMF, storms from 15 minutes to 3 hours were modelled, and 11 temporal patterns were run for durations from 15 minutes up to 3 hours, which is in line with ARR2019 guidance.

The critical duration and temporal patterns are determined and elaborated below in Table 4-5 summarise the information of the design events.

Table 4-5: Summary of Events and Critical Durations Run in TUFLOW

Design Events	Critical Duration	Temporal Patterns
5% AEP	60min	10 TPs
2% AEP	45min/60min	10 TPs
1% AEP	45min	10 TPs
1% AEP + Climate Change	45min	10 TPs
PMF	15min/90min	11 TPs

4.2.3.1 Climate change

An assessment was conducted to evaluate the influence of climate change on flooding to anticipate future climate change flood risk. The TUFLOW Plugin has been used to generate rainfall for the TUFLOW model for the 1% AEP with climate change (Refer to Section 1.11 for assumptions). As per the EIS report (Section 3.3.5 of Albury to Illabo Environmental Impact Statement Technical Paper 11), the Year 2090 RCP8.5 interim climate change factor sourced from the ARR Data Hub (https://data.arr-software.org/) was adopted. And the associated 18.7% increase in rainfall was adopted and incorporated into the rainfall.

5 HYDRAULIC MODELLING RESULTS COMPARISONS

The comparison presented in this section involves the results from the developed TUFLOW model's existing condition results against the results from RFFE for the 1% AEP event at the downstream of the local catchment as Figure 5-1. A Rainfall-on-Grid model was set up to generate rainfall for the various AEP events. The peak flows for the 5%, 2% and 1% AEP events were generated from TUFLOW. These values were then compared against the flows from the RFFE for the site.

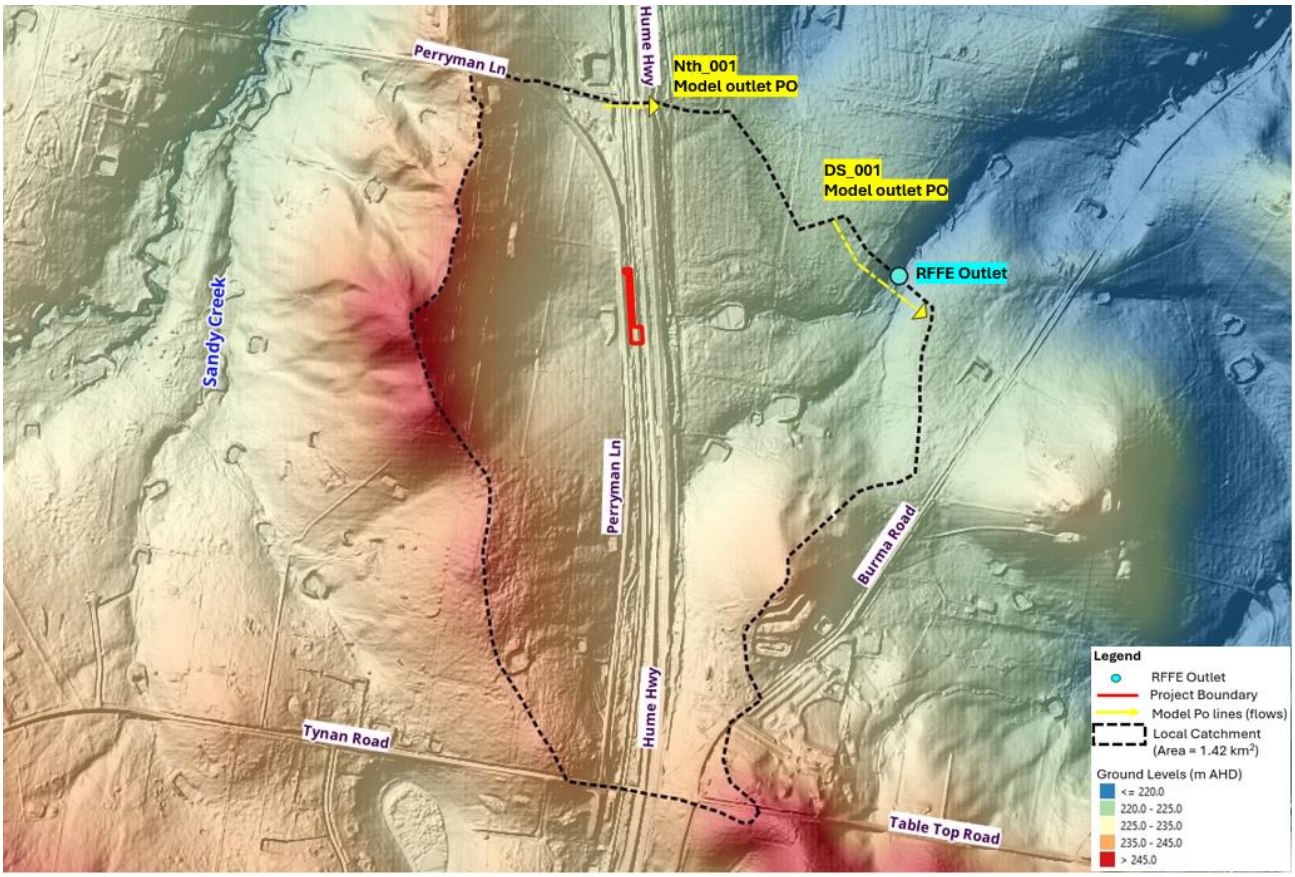


Figure 5-1: RFFE Outlet Location and TUFLOW Downstream Locations

Table 5-1: Peak Flows Comparison

AEP (%)	TUFLOW Peak Flows (DS_001) (m3 /s)	TUFLOW Flows (Nth_001) (m3 /s)	RFFE Expected Flow (m^3 /s)	Lower Confidence Limit (5%) (m^3 /s)	Upper Confidence Limit (95%) (m^3 /s)
5%	4.16	1.20	4.61	1.80	11.8
2%	5.52	1.33	6.36	2.46	16.6
1%	5.98	1.39	7.90	2.99	21.1

The outflows from TUFLOW were extracted at two locations (DS_001 and Nth_001 in Figure 5-1, the flow directions are perpendicular (anticlockwise) to the direction of those two PO lines) and DS_001 is the main outlet. The comparison between the RFFE results and TUFLOW Peak Flows (DS_001) shows a reasonable agreement with minor discrepancies for 5% AEP, 2% AEP and 1% AEP events. The slight discrepancies are due to two reasons. Firstly, the presence of water depressions on-site and reduced flow towards the downstream boundary at the north and south-east of the model boundary. In addition, some water will flow outside from the location at Nth_001. Overall, the results remain reasonable and within the range of the RFFE lower and upper confidence limits.

6 FLOOD ASSESSMENT

As required, the flood impacts have been assessed up to the 1% AEP event. 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 general flow behaviour is shown below in Figure 6-1.

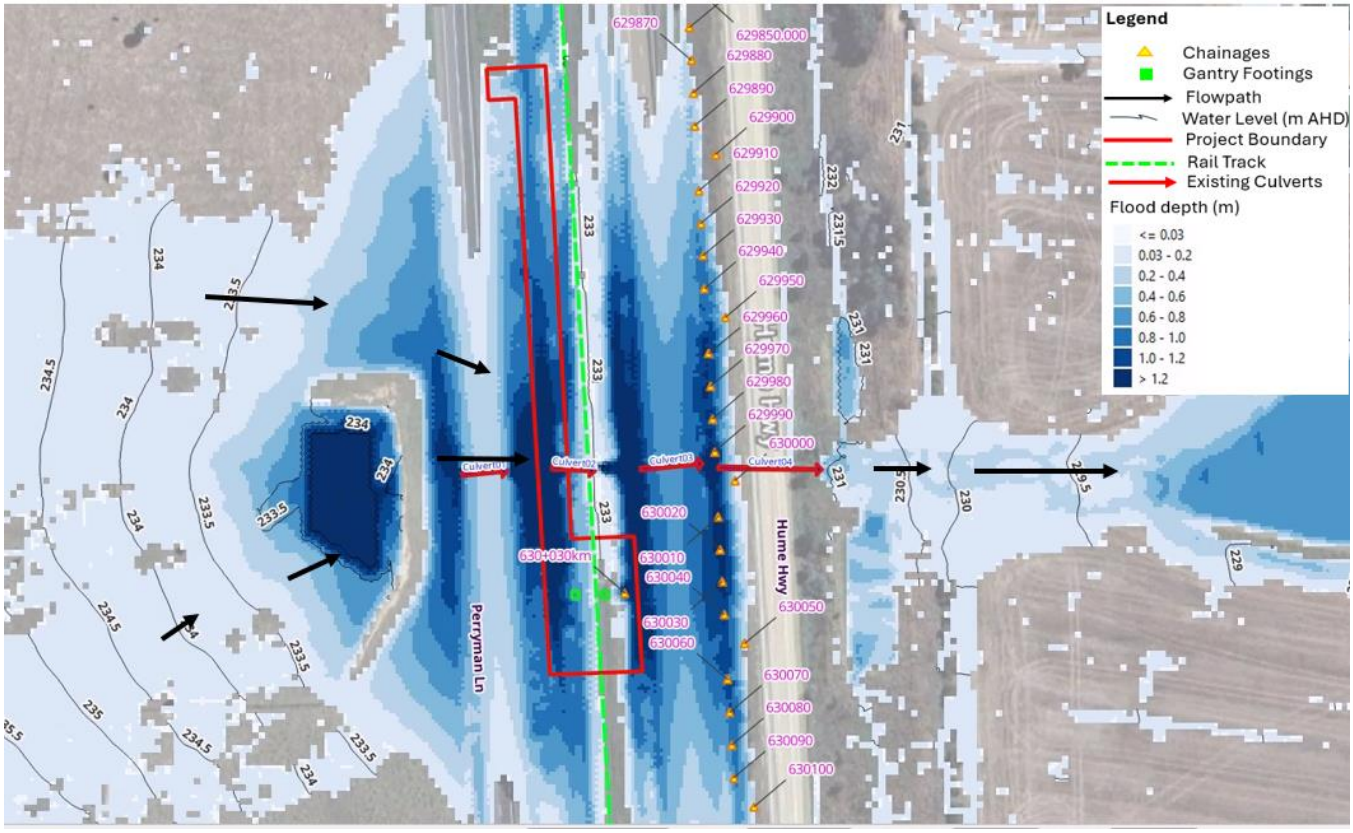


Figure 6-1: Table Top Yard Site Flow Paths (1% AEP Event)

6.1 Existing Condition

The EIS report (Technical Paper 9, Hydrology, Flooding and Water Quality, Albury to Illabo Environmental Impact Statement) indicates that the site is unaffected by regional flooding. There is no major waterway located near the site. In the existing conditions, for the local catchment as above in Figure 6-1 shows major flow paths to the culverts at CH629.990km from the western of the railway to the downstream of the railway.

The points of interest that have been used for the flood impact assessment are presented in the following sections and Table 6-1 below describes the location at each point of interest.

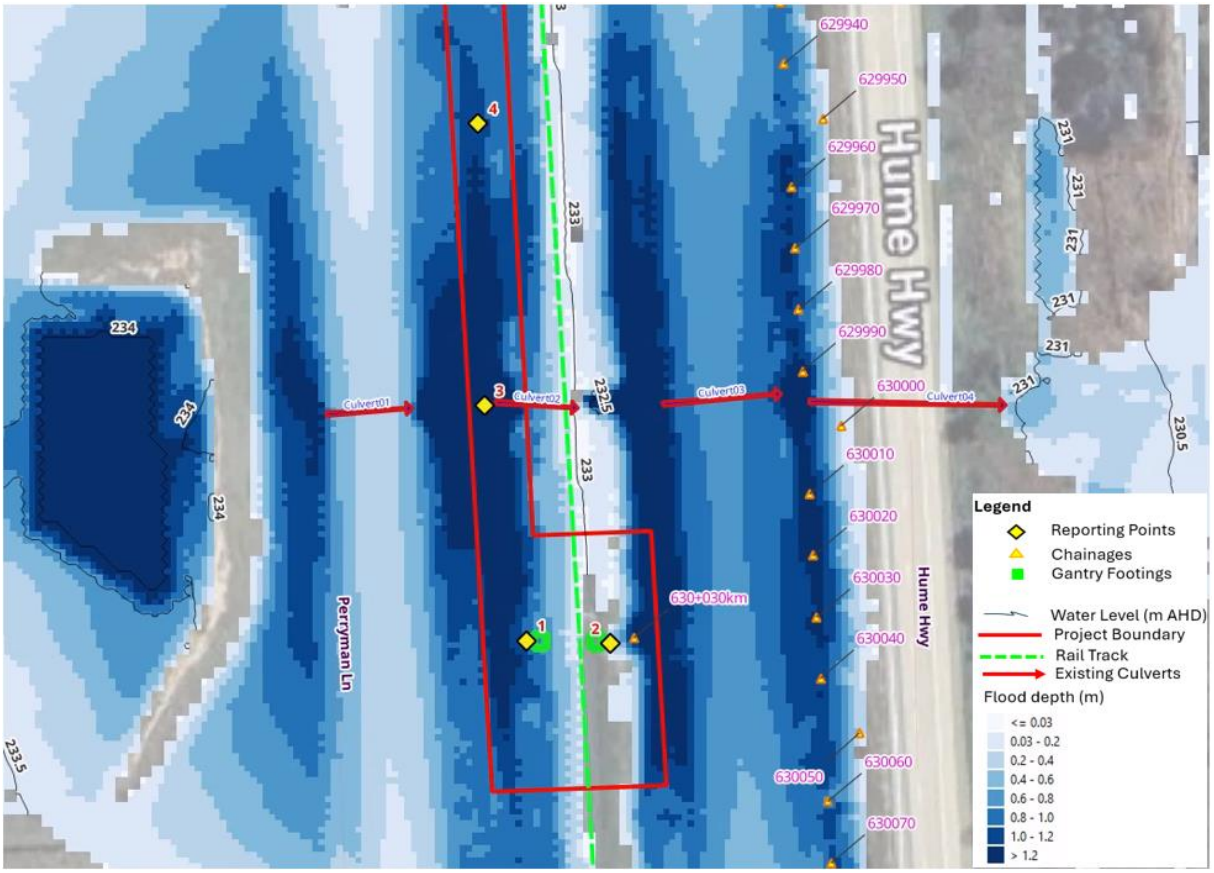


Figure 6-2: Reporting Points of Interest 1 to 4

The description of the location at each point of interest is summarised as below Table 6-1.

Table 6-1: Points of Interest

Point of Interest	Chainage (m)	Description
1	CH630.030km	West side of Gantry
2	CH630.030km	East side of Gantry
3	CH629.990km	Upstream of Culvert 02 (underneath the railway)
4	CH629.950km	North end of Project area

The existing condition flood behaviour for each point of interest is discussed in

Table 6-2 to Table 6-5.

Table 6-2: Peak Flood Depths – Existing Conditions

Design Events	Flood Levels
5% AEP	Floodwaters overtop the rail at the site location (CH630.020km) Floodwaters overtopping the existing railway track level is up to 0.25m within the site.
2% AEP	Floodwaters overtop the rail at the site location (CH630.020km) Floodwaters overtopping the existing railway track level is up to 0.26m within the site.
1% AEP	Floodwaters overtop the rail at the gantry location (CH630.020km) Floodwaters overtopping the existing railway track level is up to 0.27m within the site.
1% AEP Climate change	Floodwaters overtop the rail at the gantry location (CH630.020km) Floodwaters overtopping the existing railway track level is up to 0.27m within the site.
PMF	Floodwaters overtop the rail at the gantry location (CH630.020km) Floodwaters overtopping the existing railway track level is up to 0.56m within the site.

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

Locations	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	PMF
Point 1	233.22	233.23	233.24	233.25	233.55
Point 2	232.46	232.54	232.58	232.58	233.17
Point 3	233.23	233.23	233.24	233.25	233.57
Point 4	233.22	233.23	233.24	233.24	233.55

Table 6-4: Points of Interest Data – Peak Flood Velocity (m/s) – Existing Conditions

Locations	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	PMF
Point 1	0.3	0.4	0.5	0.5	1.3
Point 2	0.1	0.3	0.4	0.4	2.1
Point 3	0.3	0.3	0.3	0.3	0.8
Point 4	0.4	0.5	0.5	0.5	0.9

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 6-3 and the tables below describe the hazard.

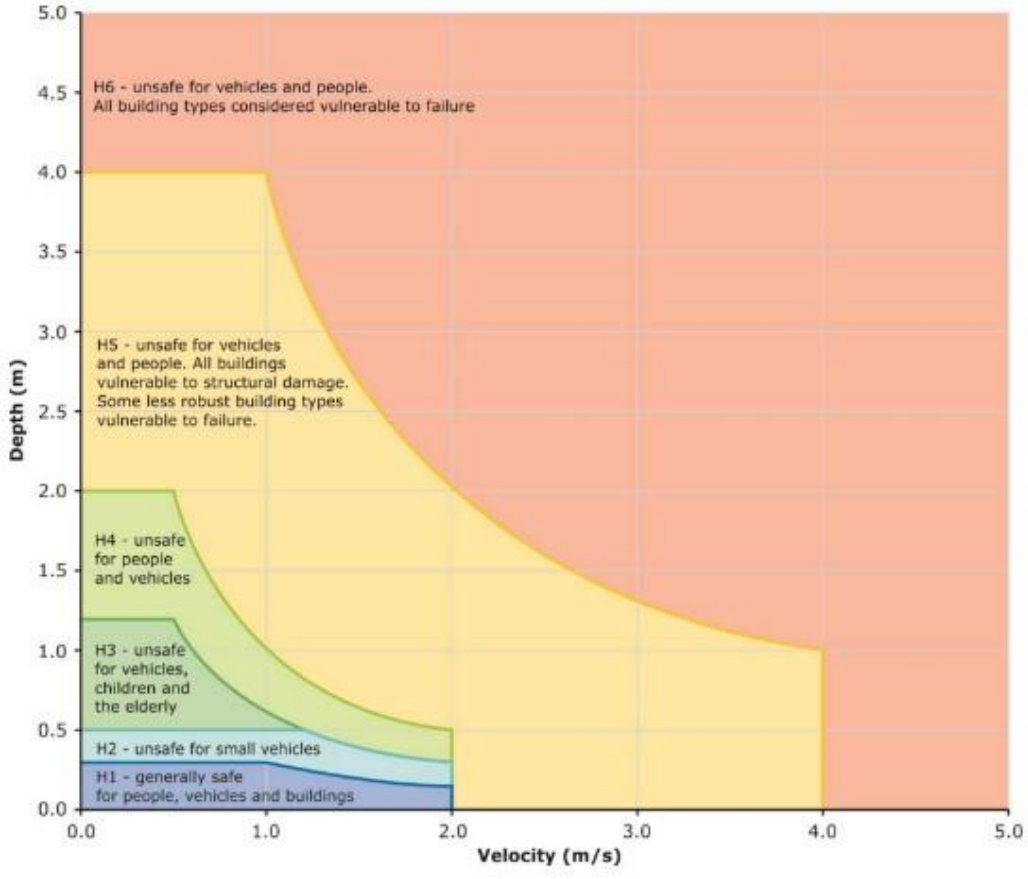


Figure 6-3: Hazard Category Classification

Table 6-5: Points of Interest Data – Peak Flood Hazard Category – Existing Conditions

Locations	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	PMF
Point 1	H3	H3	H3	H3	H4
Point 2	H1	H1	H1	H1	H3
Point 3	H5	H5	H5	H5	H5
Point 4	H3	H3	H3	H3	H4

6.2 Design Condition

Design conditions flood modelling was undertaken by removing the gantry at the site (including the footing, the gantry location refers to Figure 4-4). The 1% AEP flood extent in relation to Gantry is shown as below Figure 6-4.

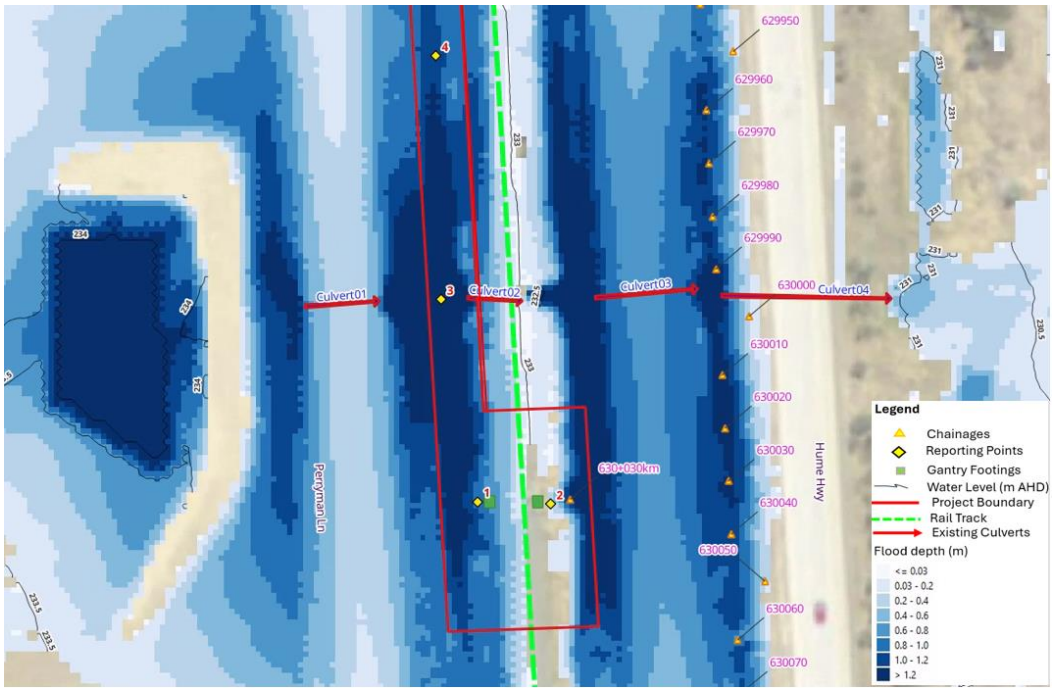


Figure 6-4: 1% AEP Flood Extent in relation to Gantry (Design Condition)

The design condition flood behaviour is discussed in

Table 6-6 to

Table 6-9 as below.

Table 6-6: Peak Flood Depths – Design Conditions

Design Events	Flood Levels
5% AEP	▪ Floodwaters overtop the rail at the site location (CH630.020km) ▪ Floodwaters overtopping the existing railway track level is up to 0.25m within the site.
2% AEP	▪ Floodwaters overtop the rail at the site location (CH630.020km) ▪ Floodwaters overtopping the existing railway track level is up to 0.26m within the site.
1% AEP	▪ Floodwaters overtop the rail at the gantry location (CH630.020km) ▪ Floodwaters overtopping the existing railway track level is up to 0.27m within the site.
1% AEP with Climate Change	▪ Floodwaters overtop the rail at the gantry location (CH630.020km) ▪ Floodwaters overtopping the existing railway track level is up to 0.27m within the site.
PMF	▪ Floodwaters overtop the rail at the gantry location (CH630.020km) ▪ Floodwaters overtopping the existing railway track level is up to 0.56m within the site.

Table 6-7: Points of Interest Data – Peak Flood Levels (mAHD) – Design Conditions

Locations	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	PMF
Point 1	233.22	233.23	233.24	233.25	233.55
Point 2	232.46	232.54	232.58	232.58	233.17
Point 3	233.22	233.23	233.24	233.25	233.57
Point 4	233.22	233.23	233.24	233.24	233.55

Table 6-8: Points of Interest Data – Peak Flood Velocity (m/s) – Design Conditions

Locations	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	PMF
Point 1	0.3	0.4	0.5	0.5	1.3
Point 2	0.1	0.3	0.4	0.4	2.1
Point 3	0.3	0.3	0.3	0.3	0.8
Point 4	0.4	0.5	0.5	0.5	0.9

Table 6-9: Points of Interest Data – Peak Flood Hazard Category – Design Conditions

Locations	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	PMF
Point 1	H3	H3	H3	H3	H5
Point 2	H1	H1	H1	H1	H3
Point 3	H5	H5	H5	H5	H5
Point 4	H3	H3	H3	H3	H4

6.3 Flood Immunity and Scour Protection

The railway is overtopped in both the existing and design conditions from 5% AEP (at around CH630.020km). Since there is no design in track, civil and drainage systems, the flood behaviours are maintained in existing and design conditions (refer to Section 6.4). Therefore, there is no change in flood immunity, which complies with the criteria in PSRs. The flood velocities in the 1% AEP in both existing and design are up to 1.5m/s, and there are very minimal changes in velocity between existing and design. Hence, scour protection is not necessary.

Table 6-10: Comparison of Flood Levels at CH630.020km

Chainage	Top of the Rail Level (mAHD)		Top of the Formation Level (mAHD) *		5% AEP Flood Level (mAHD)		2% AEP Flood Level (mAHD)		1% AEP Flood Level (mAHD)	
630.020	Existing	Design	Existing	Design	Existing	Design	Existing	Design	Existing	Design
	233.15	233.15	232.48	232.48	233.22	233.22	233.23	233.23	233.24	233.24

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

6.4 Flood Impact Assessment

The removal of the gantry structures (CH630.030km) within the project boundary has no impact on the flow paths upstream and downstream of the rail. The flood impacts are elaborated below in Table 6-11 to Table 6-13.

6.4.1. Changes in Peak Flood Level

Table 6-11 details changes in peak flood levels associated with the proposed design conditions.

Table 6-11: Flood Level Impact Assessment

Design Events	Changes in Peak Flood Levels
5% AEP	No changes in flood levels within the project boundary (Refer to Figure31 in Appendix A).
2% AEP	No changes in flood levels within the project boundary (Refer to Figure32 in Appendix A).
1% AEP	No changes in flood levels within the project boundary (Refer to Figure33 in Appendix A).
1% AEP Climate Change	No changes in flood levels within the project boundary (Refer to Figure34 in Appendix A).

6.4.2. Changes in Peak Flood Velocity

Table 6-12 details changes in peak flood velocity associated with the proposed design conditions.

Table 6-12: Flood Velocity Impact Assessment

Design Events	Changes in Peak Flood Velocity
5% AEP	No changes in flood velocity within the project boundary (Refer to Figure35 in Appendix A).
2% AEP	No changes in flood velocity within the project boundary (Refer to Figure36 in Appendix A).
1% AEP	No changes in flood velocity within the project boundary (Refer to Figure37 in Appendix A).
1% AEP Climate Change	No changes in flood velocity within the project boundary (Refer to Figure38 in Appendix A).

6.4.3. Changes in Peak Flood Hazard

Table 6-13: Flood Hazard Impact Assessment

Design Events	Changes in Peak Flood Hazard
5% AEP	No changes in flood hazard within the project boundary (Refer to Figure39 in Appendix A).
2% AEP	No changes in flood hazard within the project boundary (Refer to Figure40 in Appendix A).
1% AEP	No changes in flood hazard within the project boundary (Refer to Figure41 in Appendix A).
1% AEP Climate Change	No changes in flood hazard within the project boundary (Refer to Figure42 in Appendix A).

6.4.4. Changes in Duration of Inundation

There are no changes in the duration of inundations as there are no changes in flood levels, flood velocities and flood hazard. The flood levels comparison between existing and design at the reporting locations is shown below.

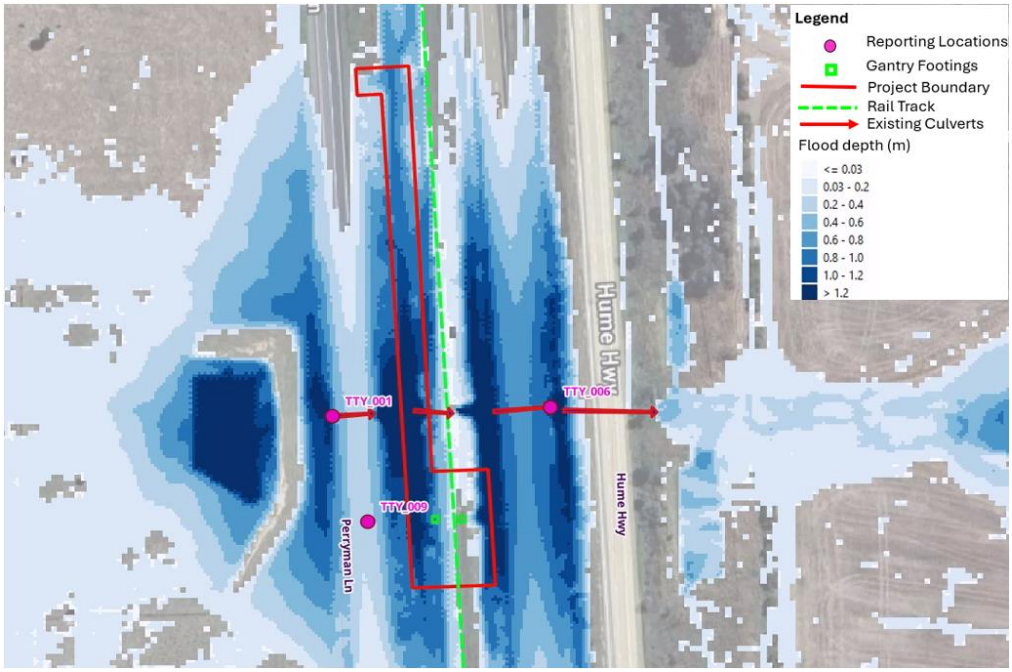


Figure 6-5: 1% AEP Flood Depth Extent – Reporting Locations

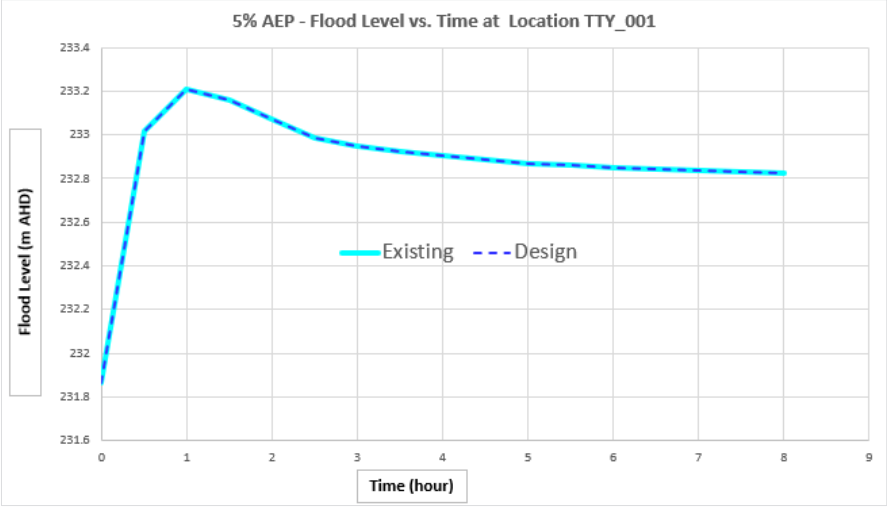


Figure 6-6: 5% AEP - Flood Level vs. Time at Location TTY_001

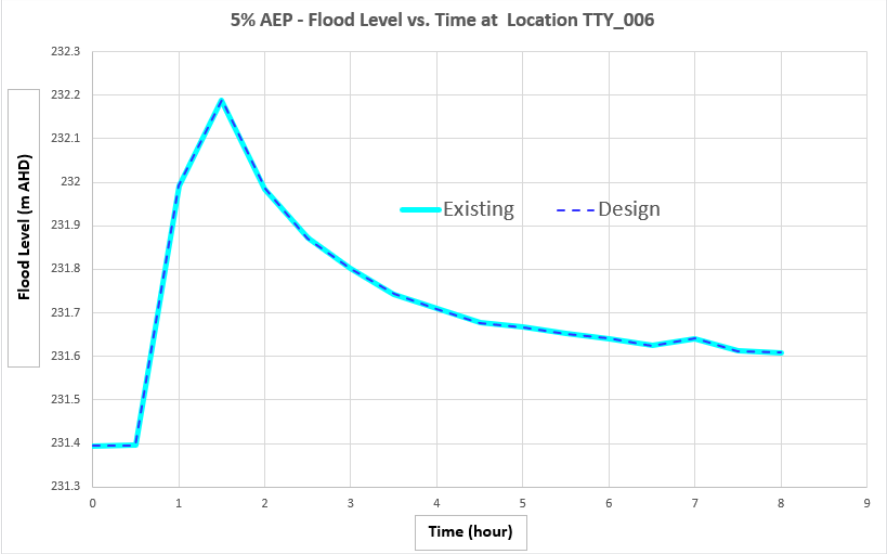


Figure 6-7: 5% AEP - Flood Level vs. Time at Location TTY_006

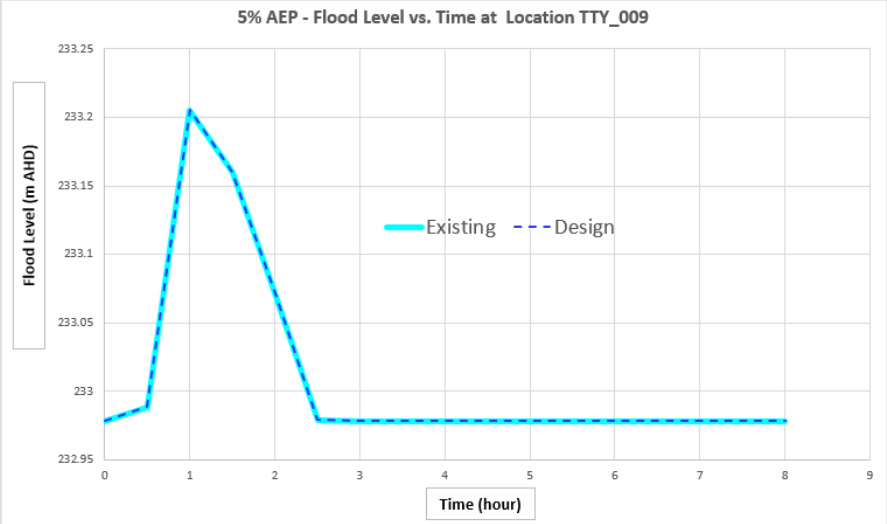


Figure 6-8: 5% AEP - Flood Level vs. Time at Location TTY_009

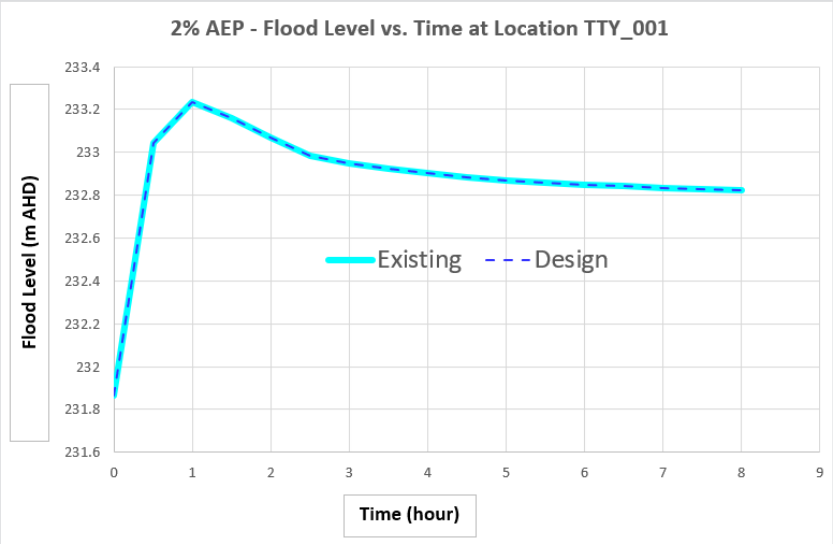


Figure 6-9: 2% AEP - Flood Level vs. Time at Location TTY_001

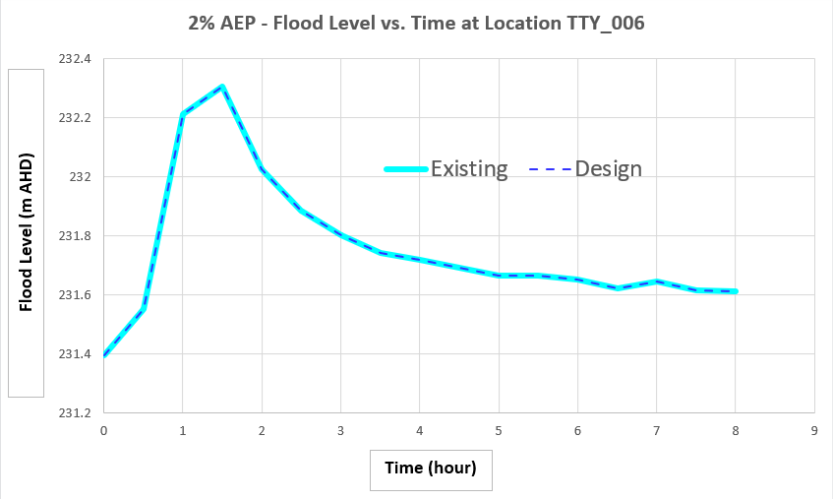


Figure 6-10: 2% AEP - Flood Level vs. Time at Location TTY_006

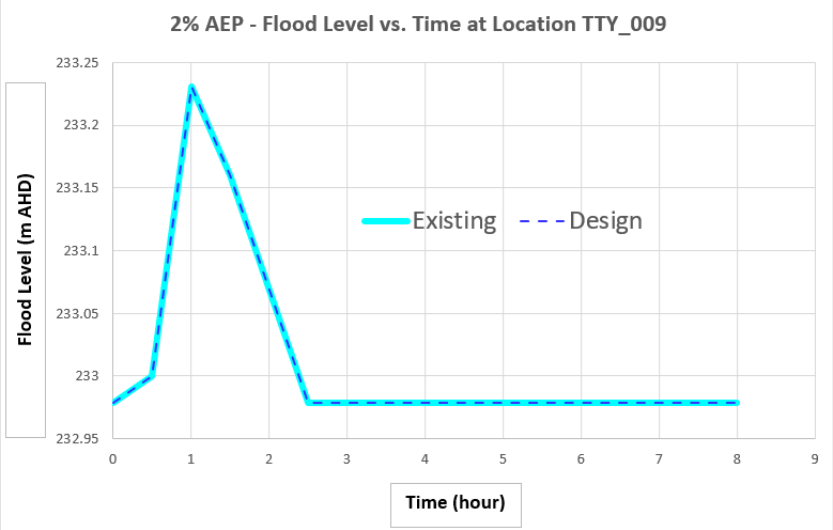


Figure 6-11: 2% AEP - Flood Level vs. Time at Location TTY_009

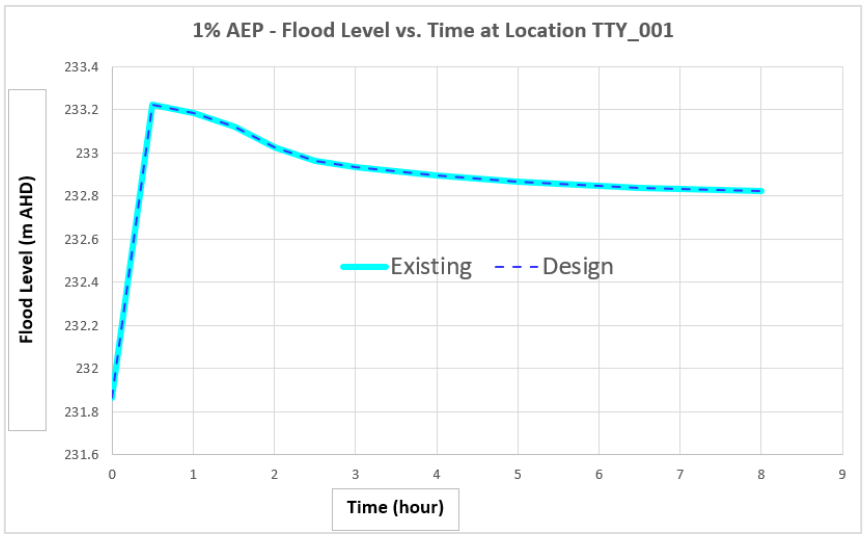


Figure 6-12: 1% AEP - Flood Level vs. Time at Location TTY_001

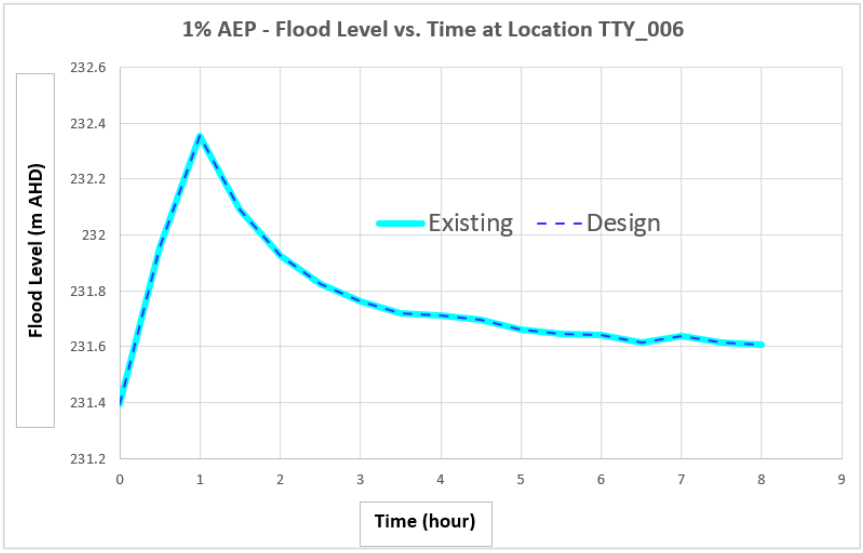


Figure 6-13: 1% AEP - Flood Level vs. Time at Location TTY_006

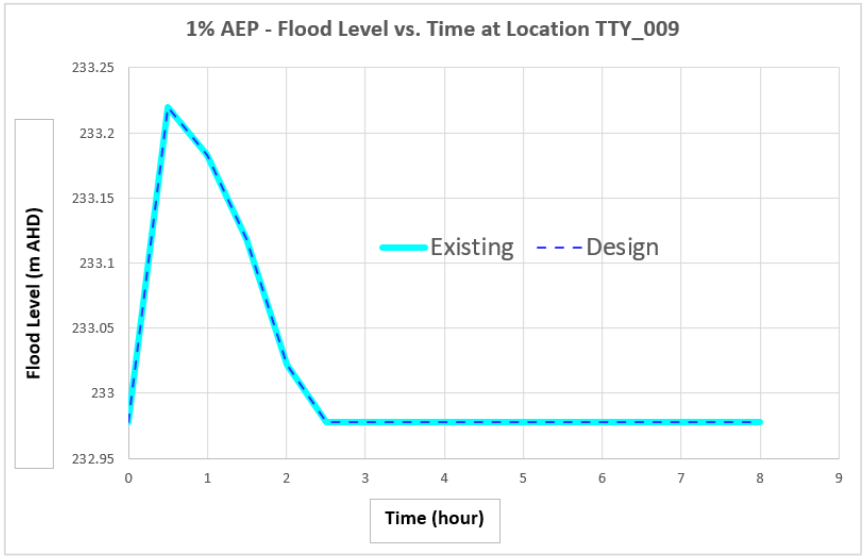


Figure 6-14: 1% AEP - Flood Level vs. Time at Location TTY_009

The results show that there is no increase in duration of inundation as a result of the project works in the 5% AEP, 2% AEP and 1% AEP design events and this complies with CoA E42(a).

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 and this, in conjunction with culvert size was used to determine the relevant blockage factors shown in Table 6-14 below. For culverts within the project boundary, the methodology within ARR2019 was to be followed.

As shown in the survey provided (as per Figure 6-2), there were four existing culvert structures within the model boundary and one set of culvert sets within the project boundary. For all three other culverts outside the project boundary, a 20% blockage was applied.

Table 6-14: Culvert Blockage Percentage

Culvert	Blockage Percentage (1% AEP)	Comments
Culvert 01	20%	Outside of the project boundary
Culvert 02	15%	Within the project boundary
Culvert 03	20%	Outside of the project boundary
Culvert 04	20%	Outside of the project boundary

Table 6-15: Culverts Blockage Parameters

Structure	Debris Availability	Debris Mobility	Debris Transportability	AEP Adjusted Debris Potential
Culvert 02 (CH629.990km) (Underneath railway)	Medium	Medium	High	Low

The above methodology was adopted by considering the following:

- ARR2019 does not require blockage assessments in all design runs. ARR Book 6 Sections 6.4.3 and 6.4.5 allow for an "All Clear" condition when there is no long-term history of blockage at a particular structure. There is no reporting of long-term historical blockage around the site to cause major flooding risk. Therefore, only 1% AEP design was run as a sensitivity test.
- The approach matches the Environmental Impact Statement (EIS) report as per CoA Condition E40, ensuring consistency and reliability.
- For detailed information, please refer to the memo 5-0052-210-IHY-99-ME-0001

A flood level comparison between the blockage scenario and design conditions is presented in Figure 6-15. The water level increased by up to 20 ~ 50mm around the downstream area of the project boundary. The flood incorporation of blockage makes a minimal impact on the flood immunity on the rail line as the rail line is still overtopped in the 1% AEP event with a similar overtopping length to the non-blockage scenario.

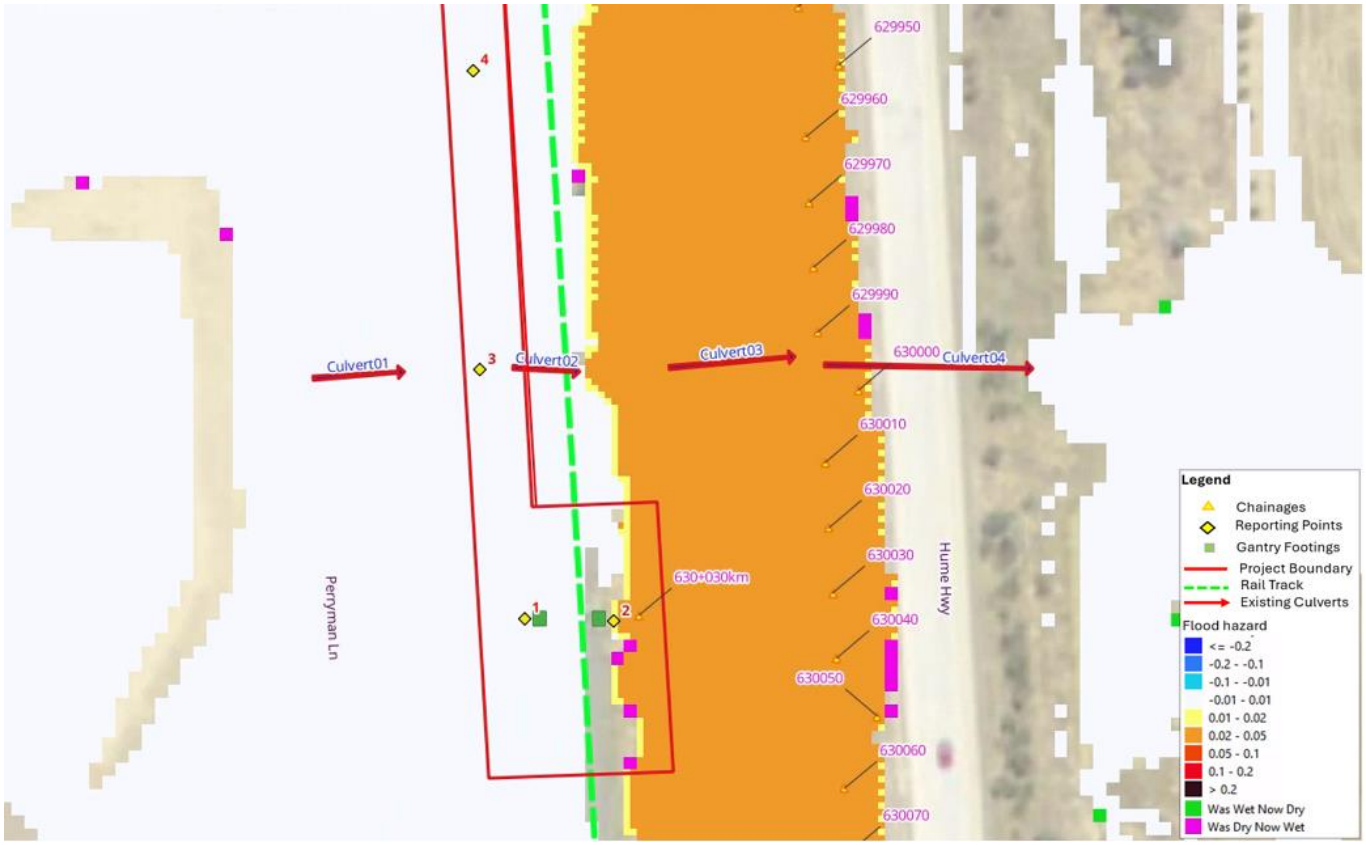


Figure 6-15: Flood Level Comparison for 1% AEP Design Condition - Blockage vs Design Conditions

6.5.2. Climate Change Risk Assessment

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 0 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 floodwaters overtop the rail line at the site location with a depth of 0.82m.

7 MITIGATION MEASURES

No mitigation measures are required as there are no non-compliances.

8 RECOMMENDATIONS

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

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

Consequently, there are no further recommendations.

APPENDICES

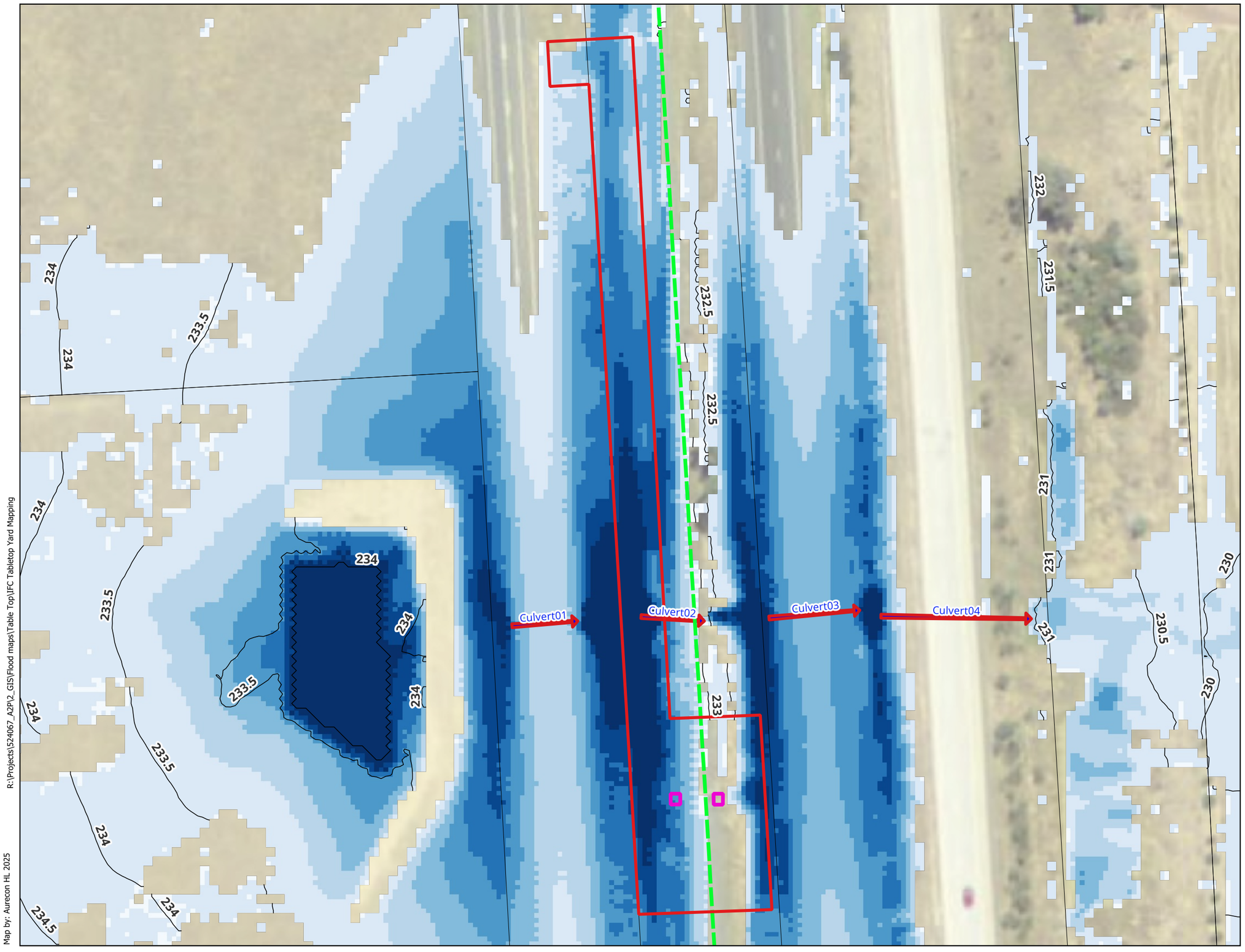
APPENDIX A

Flood Maps

Table 8-1: List of Maps in Appendix A

Map ID	Map description
Figure01	5% AEP Peak Flood Depth and Levels (Existing Condition)
Figure02	2% AEP Peak Flood Depth and Levels (Existing Condition)
Figure03	1% AEP Peak Flood Depth and Levels (Existing Condition)
Figure04	1% AEP with Climate Change Peak Flood Depth and Levels (Existing Condition)
Figure05	PMF Peak Flood Depth and Levels (Existing Condition)
Figure06	5% AEP Peak Flood Velocity (Existing Condition)
Figure07	2% AEP Peak Flood Velocity (Existing Condition)
Figure08	1% AEP Peak Flood Velocity (Existing Condition)
Figure09	1% AEP with Climate Change Peak Flood Velocity (Existing Condition)
Figure10	PMF Peak Flood Velocity (Existing Condition)
Figure11	5% AEP Peak Flood Hazard (Existing Condition)
Figure12	2% AEP Peak Flood Hazard (Existing Condition)
Figure13	1% AEP Peak Flood Hazard (Existing Condition)
Figure14	1% AEP with Climate Change Peak Flood Hazard (Existing Condition)
Figure15	PMF Peak Flood Hazard (Existing Condition)
Figure16	5% AEP Peak Flood Depth and Levels (Design Condition)
Figure17	2% AEP Peak Flood Depth and Levels (Design Condition)
Figure18	1% AEP Peak Flood Depth and Levels (Design Condition)
Figure19	1% AEP with Climate Change Peak Flood Depth and Levels (Design Condition)
Figure20	PMF Peak Flood Depth and Levels (Design Condition)
Figure21	5% AEP Peak Flood Velocity (Design Condition)
Figure22	2% AEP Peak Flood Velocity (Design Condition)
Figure23	1% AEP Peak Flood Velocity (Design Condition)
Figure24	1% AEP with Climate Change Peak Flood Velocity (Design Condition)
Figure25	PMF Peak Flood Velocity (Design Condition)
Figure26	5% AEP Peak Flood Hazard (Design Condition)
Figure27	2% AEP Peak Flood Hazard (Design Condition)
Figure28	1% AEP Peak Flood Hazard (Design Condition)
Figure29	1% AEP with Climate Change Peak Flood Hazard (Design Condition)
Figure30	PMF Peak Flood Hazard (Design Condition)
Figure31	5% AEP Changes in Peak Flood Levels (Design Condition vs. Existing Condition)
Figure32	2% AEP Changes in Peak Flood Levels (Design Condition vs. Existing Condition)
Figure33	1% AEP Changes in Peak Flood Levels (Design Condition vs. Existing Condition)
Figure34	1% AEP with Climate Change in Peak Flood Levels (Design Condition vs. Existing Condition)
Figure35	5% AEP Changes in Peak Flood Velocity (Design Condition vs. Existing Condition)
Figure36	2% AEP Changes in Peak Flood Velocity (Design Condition vs. Existing Condition)
Figure37	1% AEP Changes in Peak Flood Velocity (Design Condition vs. Existing Condition)
Figure38	1% AEP with Climate Change in Peak Flood Velocity (Design Condition vs. Existing Condition)
Figure39	5% AEP Changes in Peak Flood Hazard (Design Condition vs. Existing Condition)

Map ID	Map description
Figure40	2% AEP Changes in Peak Flood Hazard (Design Condition vs. Existing Condition)
Figure41	1% AEP Changes in Peak Flood Hazard (Design Condition vs. Existing Condition)
Figure42	1% AEP with Climate Change in Peak Flood Hazard (Design Condition vs. Existing Condition)
Figure43	1% AEP Peak Flood Depth and Levels (Blockage Assessment)
Figure44	1% AEP Peak Flood Velocity (Blockage Assessment)
Figure45	1% AEP Peak Flood Hazard (Blockage Assessment)



aurecon

Legend

- Existing Culverts
- Gantry Footings
- Railway
- Project Boundary
- Lot
- Flood Level Contours (1m Interval)

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:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure01: 5% AEP Peak Flood Depth and Levels (Existing Condition)

aurecon

Legend

- Existing Culverts
- Gantry Footings
- Railway
- Project Boundary
- Lot
- Flood Level Contours (1m Interval)

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

Culvert01
Culvert02
Culvert03
Culvert04

Notes:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

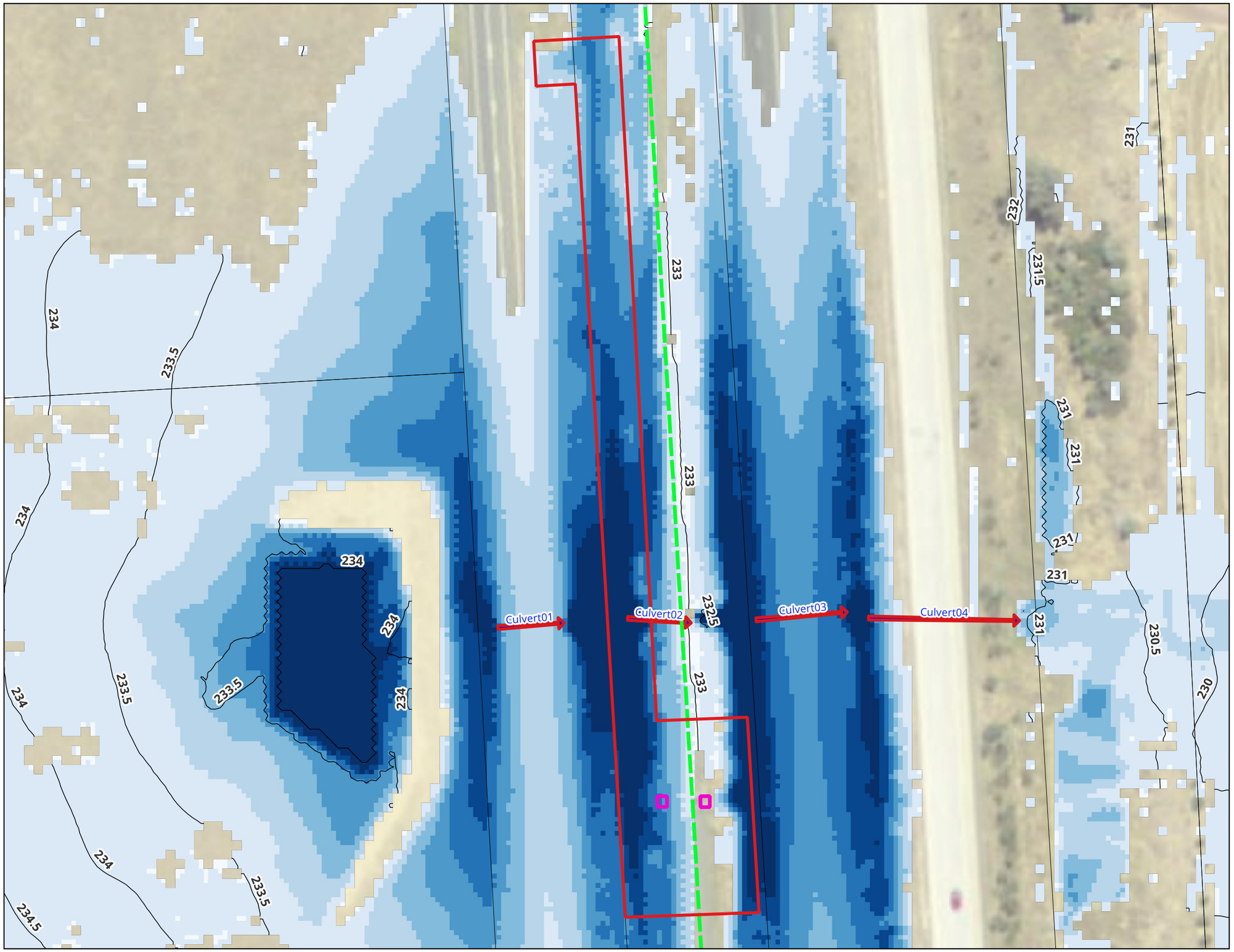
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure02: 2% AEP Peak Flood Depth and Levels (Existing Condition)



aurecon

Legend

- Existing Culverts
- Gantry Footings
- Railway
- Project Boundary
- Lot
- Flood Level Contours (1m Interval)

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:

R:\Projects\S24067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

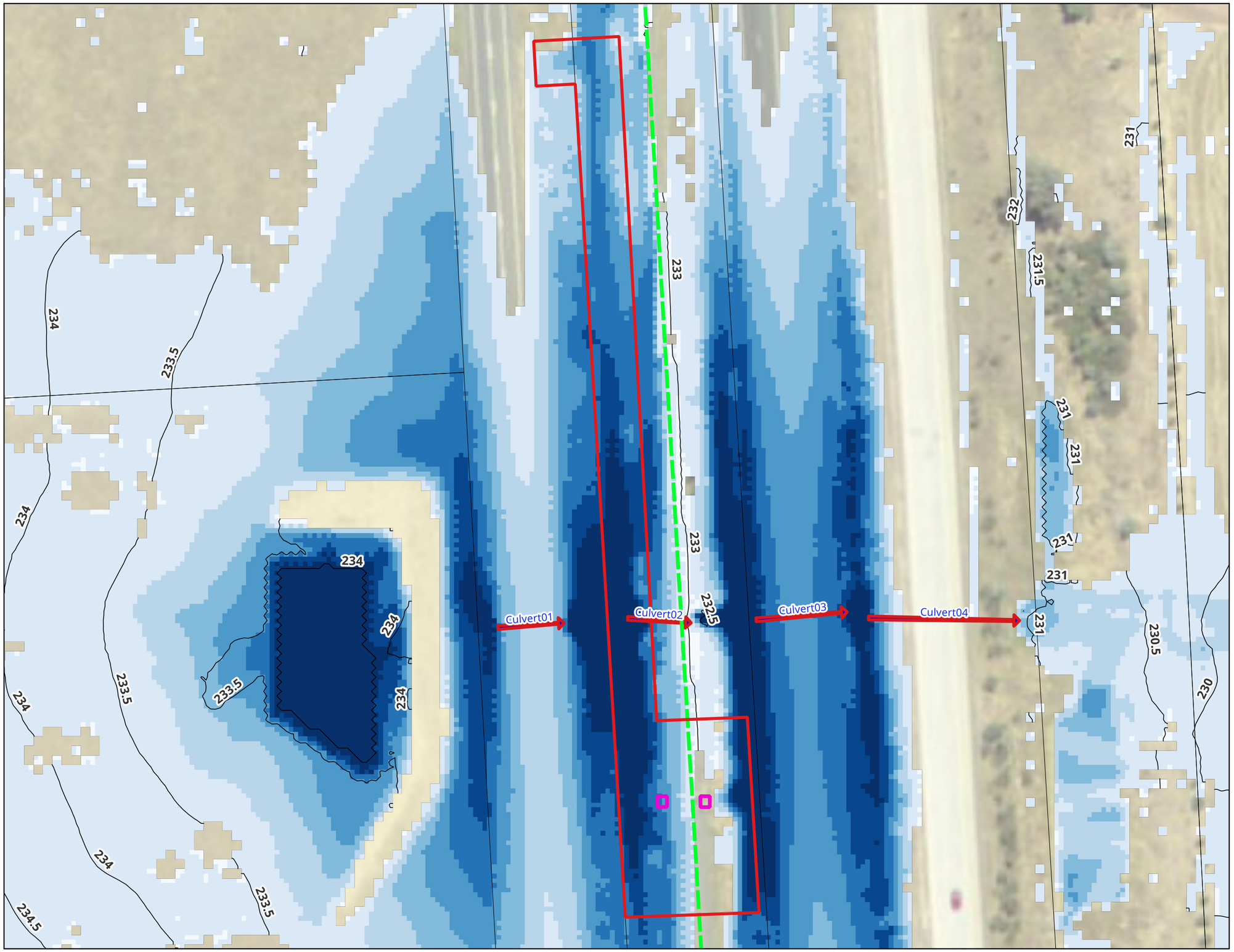
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure03: 1% AEP Peak Flood Depth and Levels (Existing Condition)



aurecon

Legend

- Existing Culverts
- Gantry Footings
- Railway
- Project Boundary
- Lot
- Flood Level Contours (1m Interval)

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:

R:\Projects\S24067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

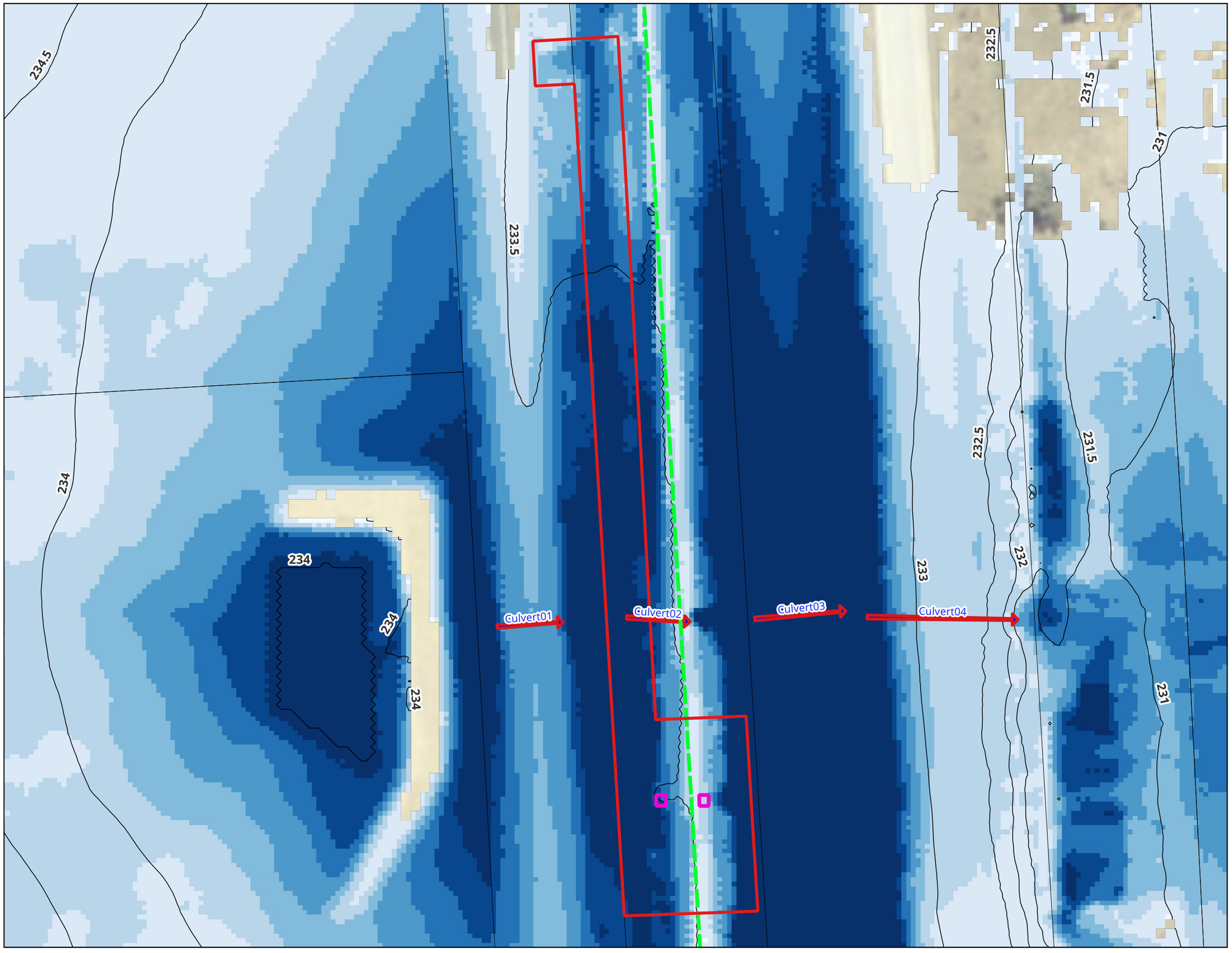
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure04: 1% AEP with Climate Change Peak Flood Depth and Levels (Existing Condition)



aurecon

Legend

- Existing Culverts
- Gantry Footings
- Railway
- Project Boundary
- Lot
- Flood Level Contours (1m Interval)

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:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

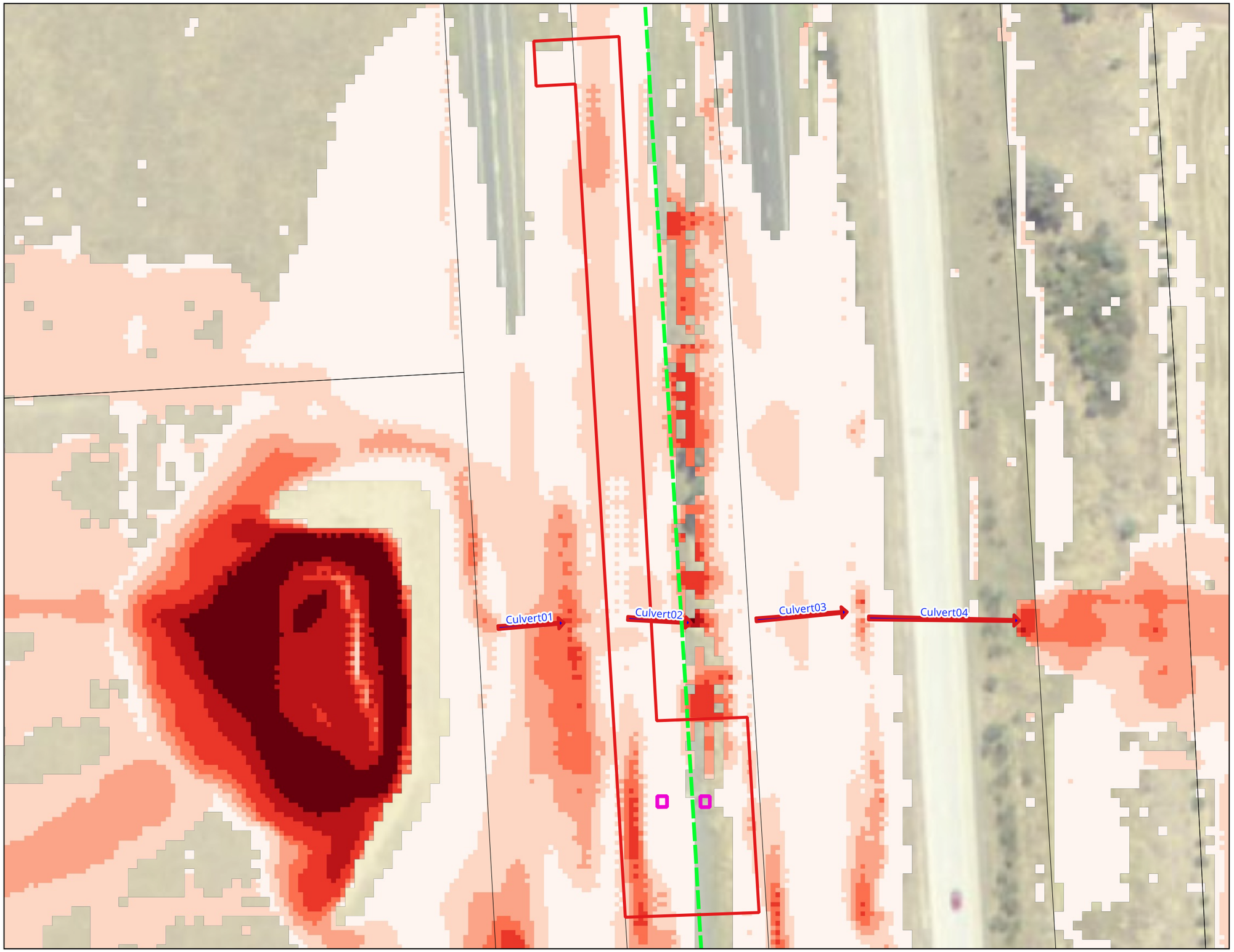
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure05: PMF Peak Flood Depth and Levels (Existing Condition)



aurecon

Legend

- Existing Culverts
- Gantry Footings
- Railway
- Project Boundary
- Lot

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:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

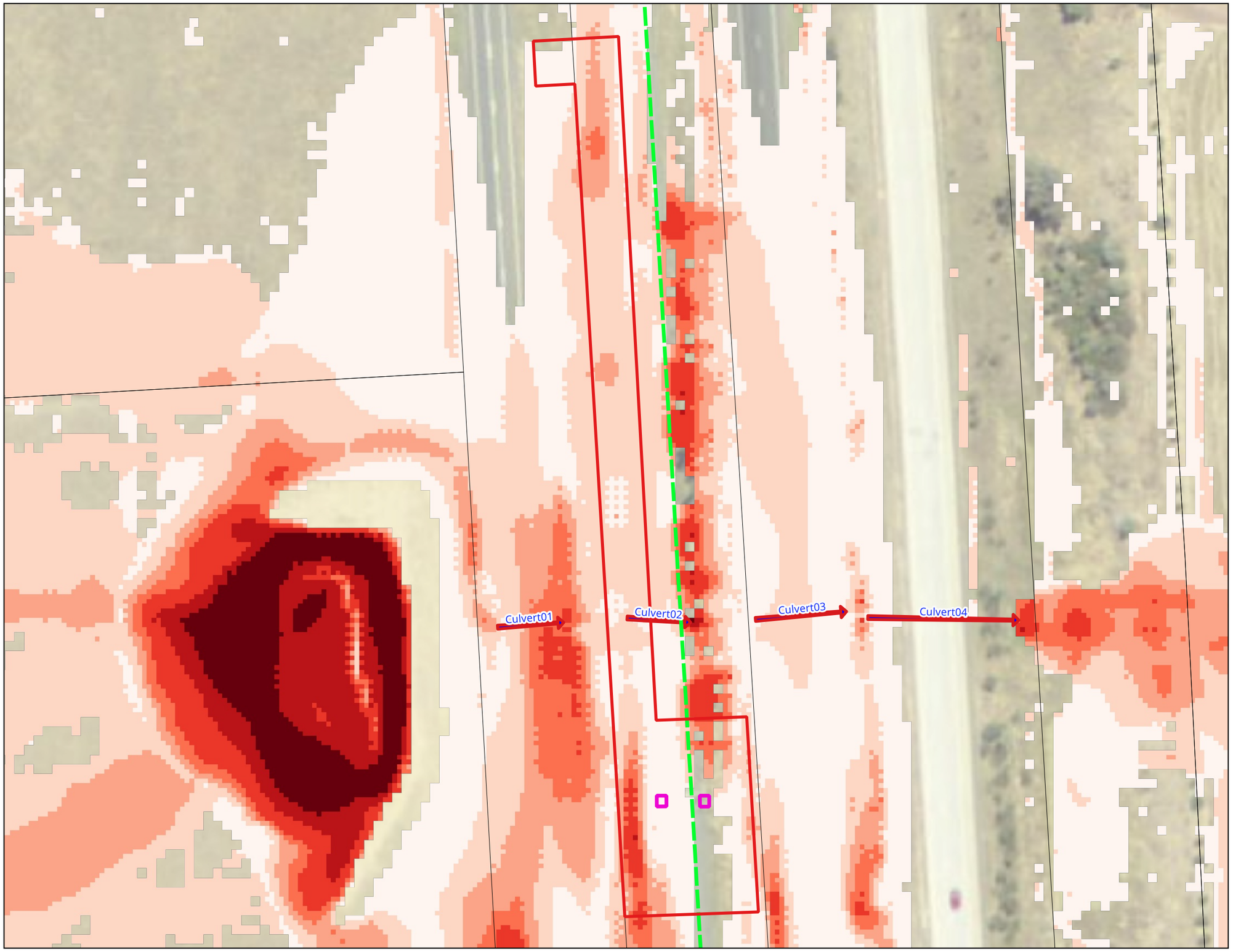
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure06: 5% AEP Peak Flood Velocity (Existing Condition)



aurecon

Legend

- Existing Culverts
- Gantry Footings
- Railway
- Project Boundary
- Lot

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:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

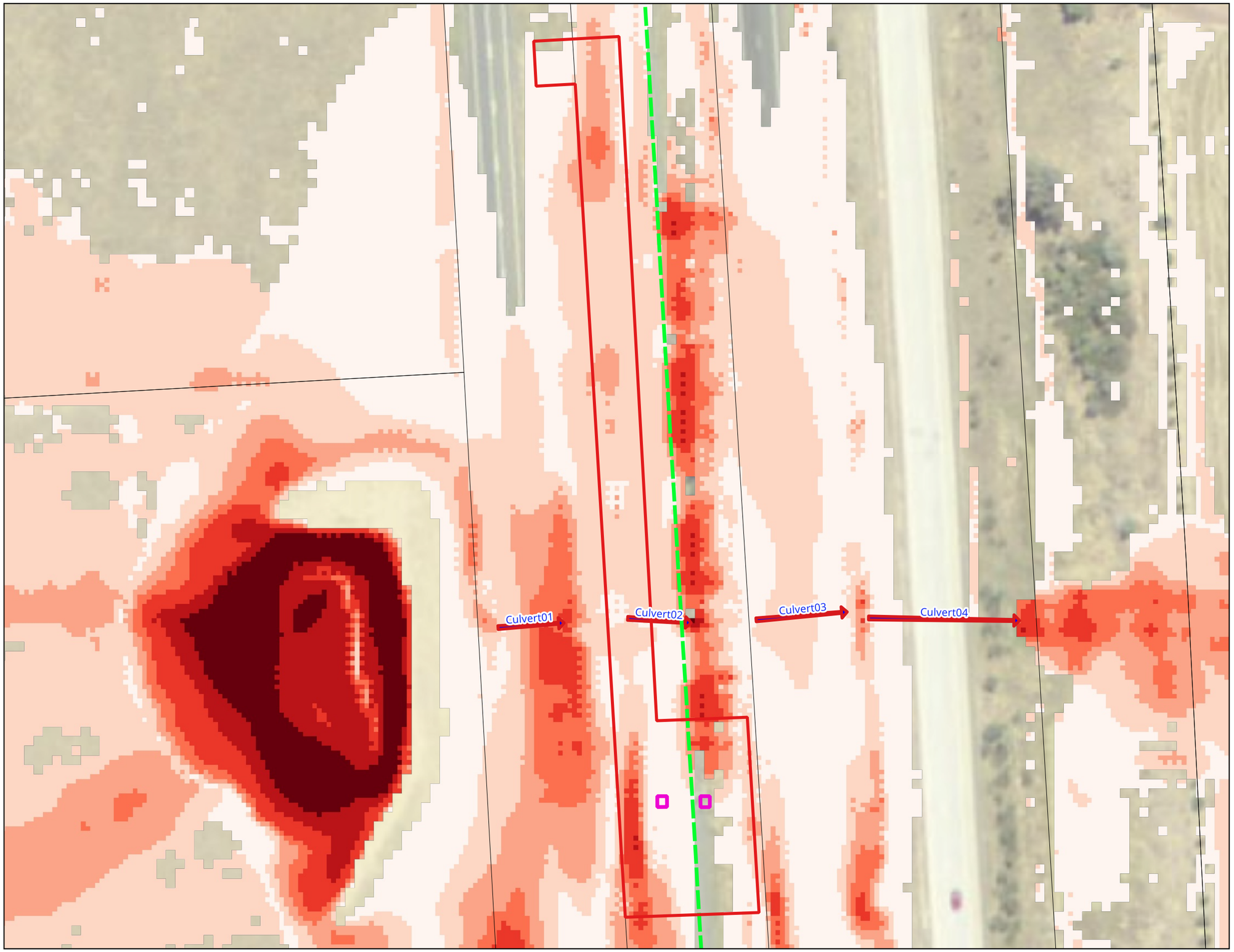
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure07: 2% AEP Peak Flood Velocity (Existing Condition)



aurecon

Legend

- Existing Culverts
- Gantry Footings
- Railway
- Project Boundary
- Lot

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:

R:\Projects\S24067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

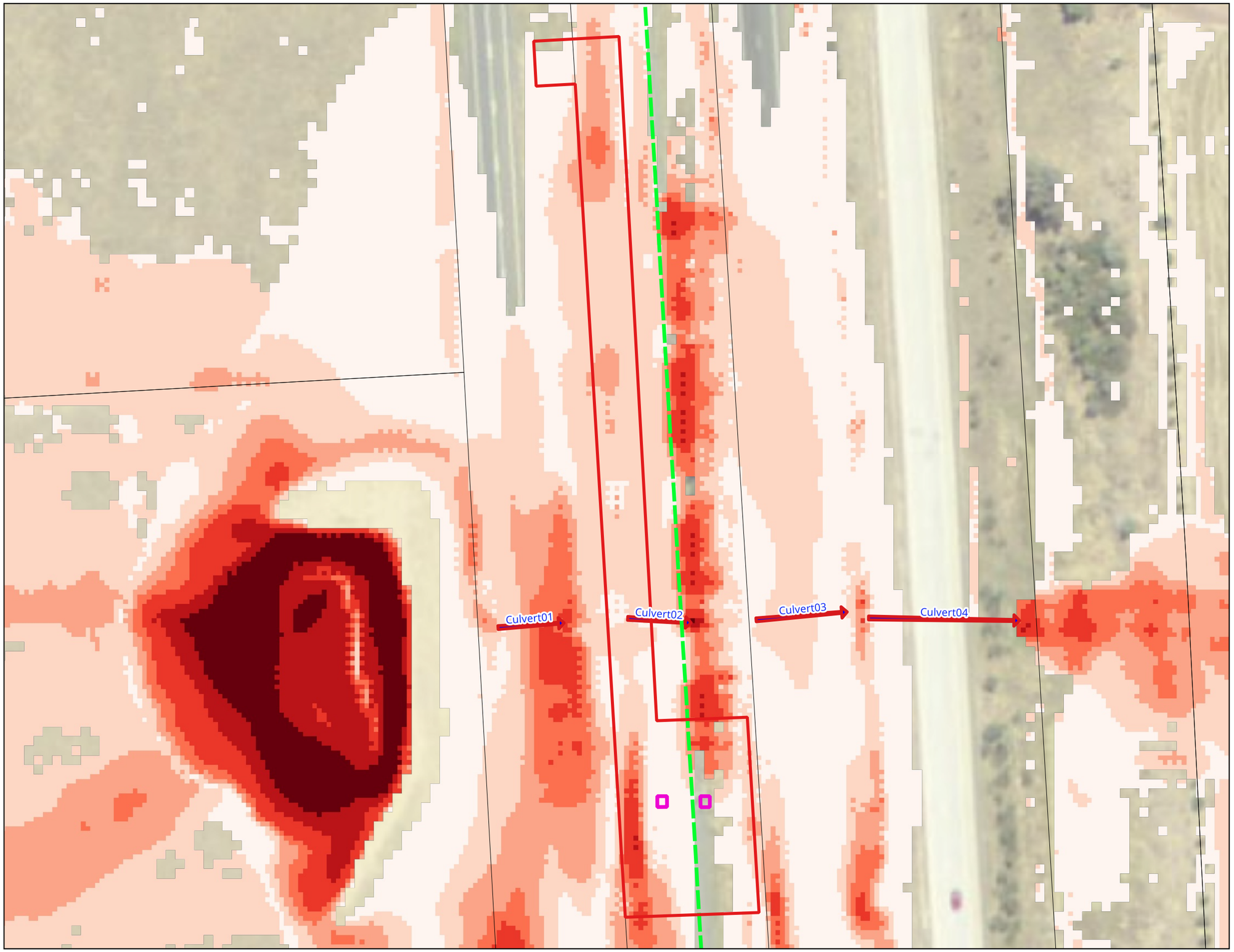
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure08: 1% AEP Peak Flood Velocity (Existing Condition)



aurecon

Legend

- Existing Culverts
- Gantry Footings
- Railway
- Project Boundary
- Lot

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:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure09: 1% AEP with Climate Change Peak Flood Velocity (Existing Condition)

aurecon

Legend

- Existing Culverts
- Gantry Footings
- Railway
- Project Boundary
- Lot

Flood Velocity (m/s)

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

Culvert01
Culvert02
Culvert03
Culvert04

Notes:

R:\Projects\S24067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

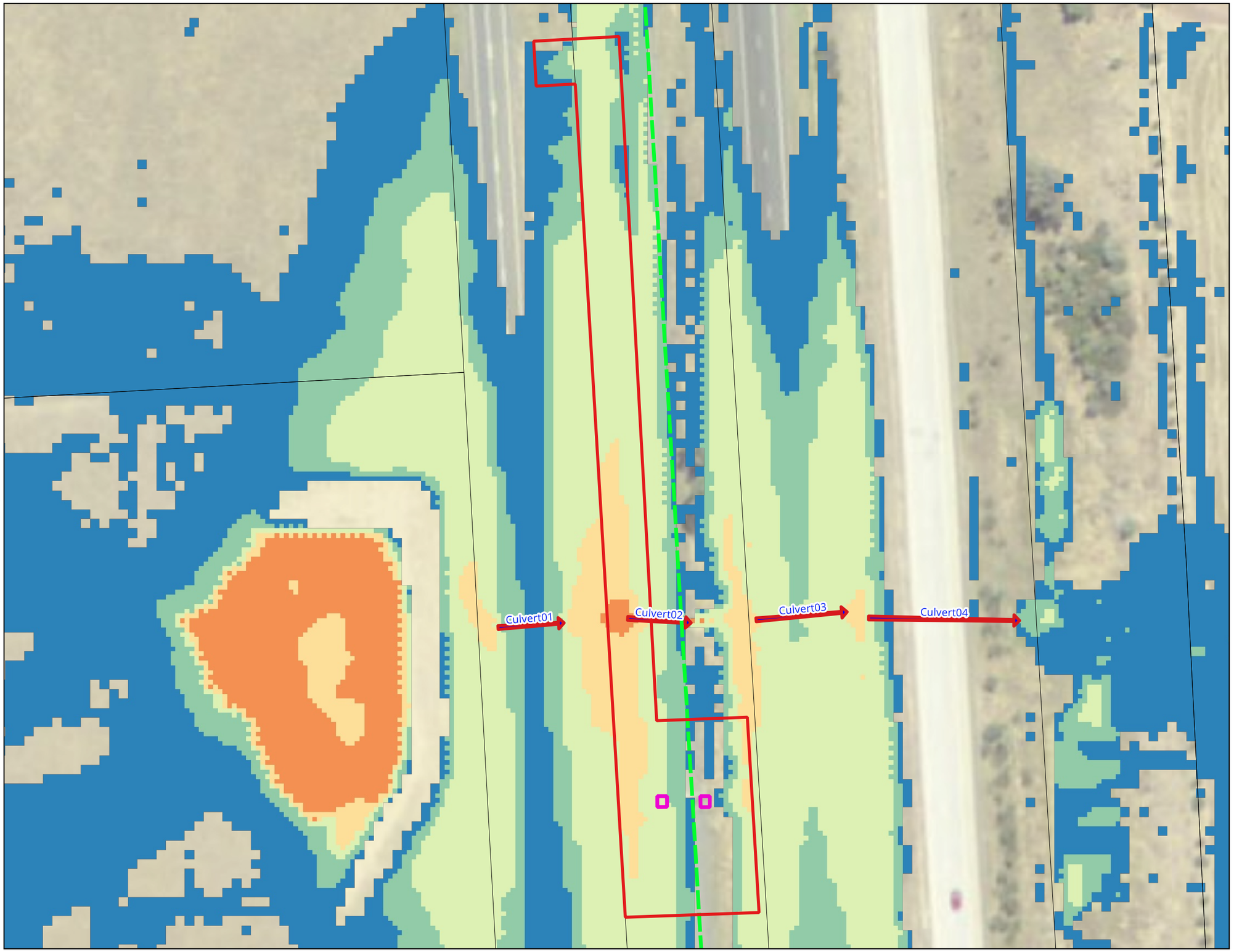
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure10: PMF Peak Flood Velocity (Existing Condition)



aurecon

Legend

- Existing Culverts
- Gantry Footings
- Railway
- Project Boundary
- Lot

Flood Hazard

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

Notes:

R:\Projects\S24067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

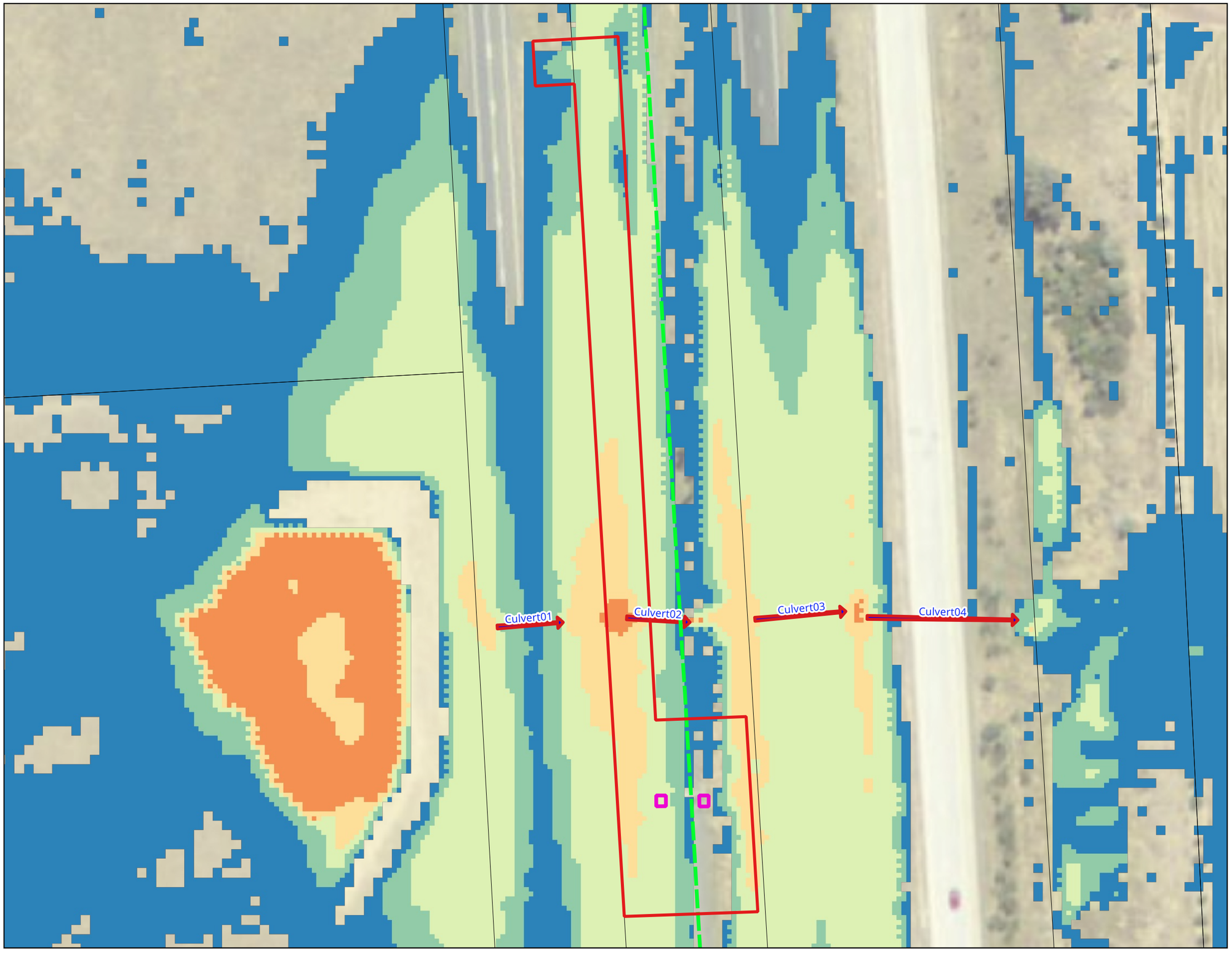
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure11: 5% AEP Peak Flood Hazard (Existing Condition)



aurecon

Legend

- Existing Culverts
- Gantry Footings
- Railway
- Project Boundary
- Lot

Flood Hazard

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

Notes:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

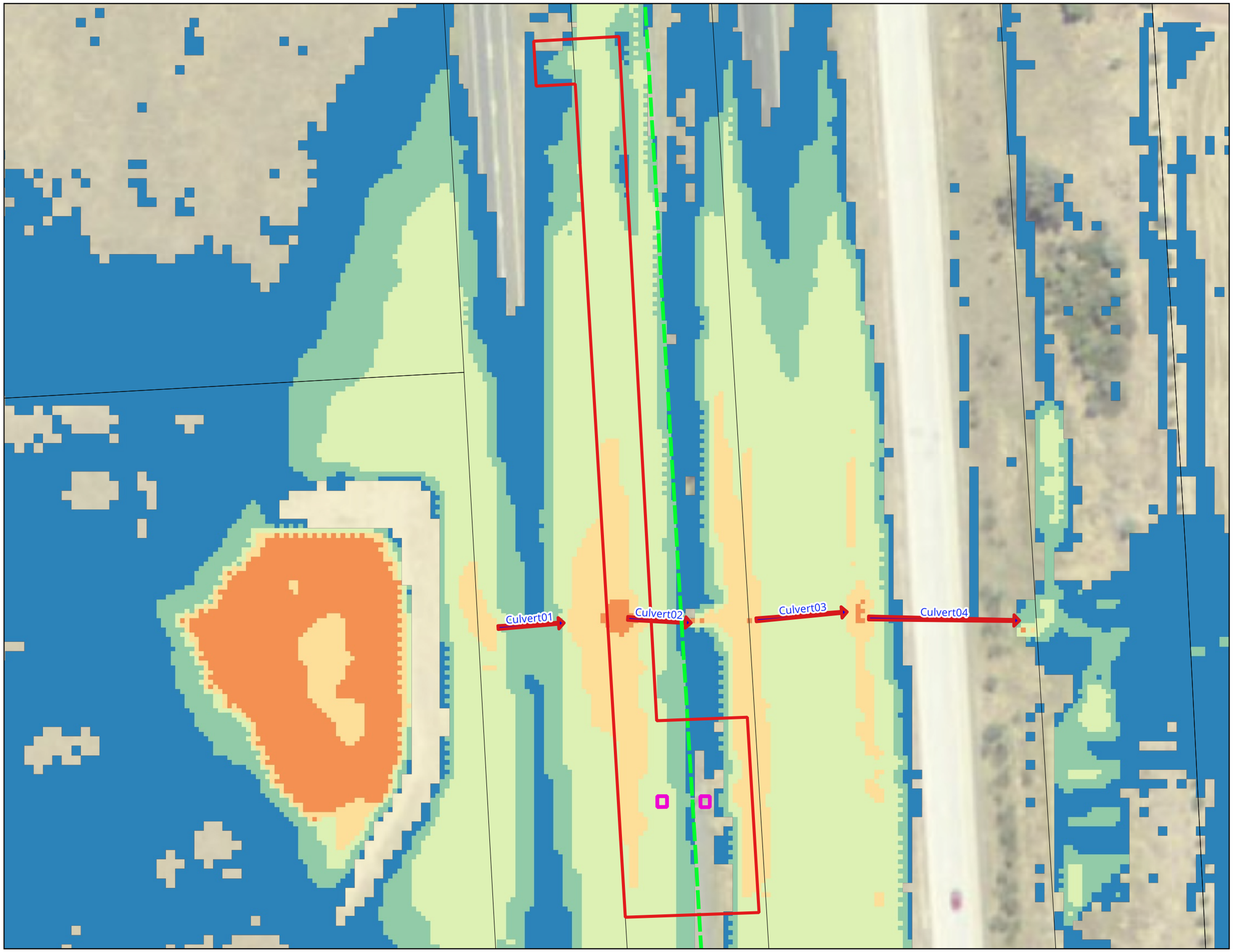
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure12: 2% AEP Peak Flood Hazard (Existing Condition)



aurecon

Legend

- Existing Culverts
- Gantry Footings
- Railway
- Project Boundary
- Lot

Flood Hazard

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

Notes:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

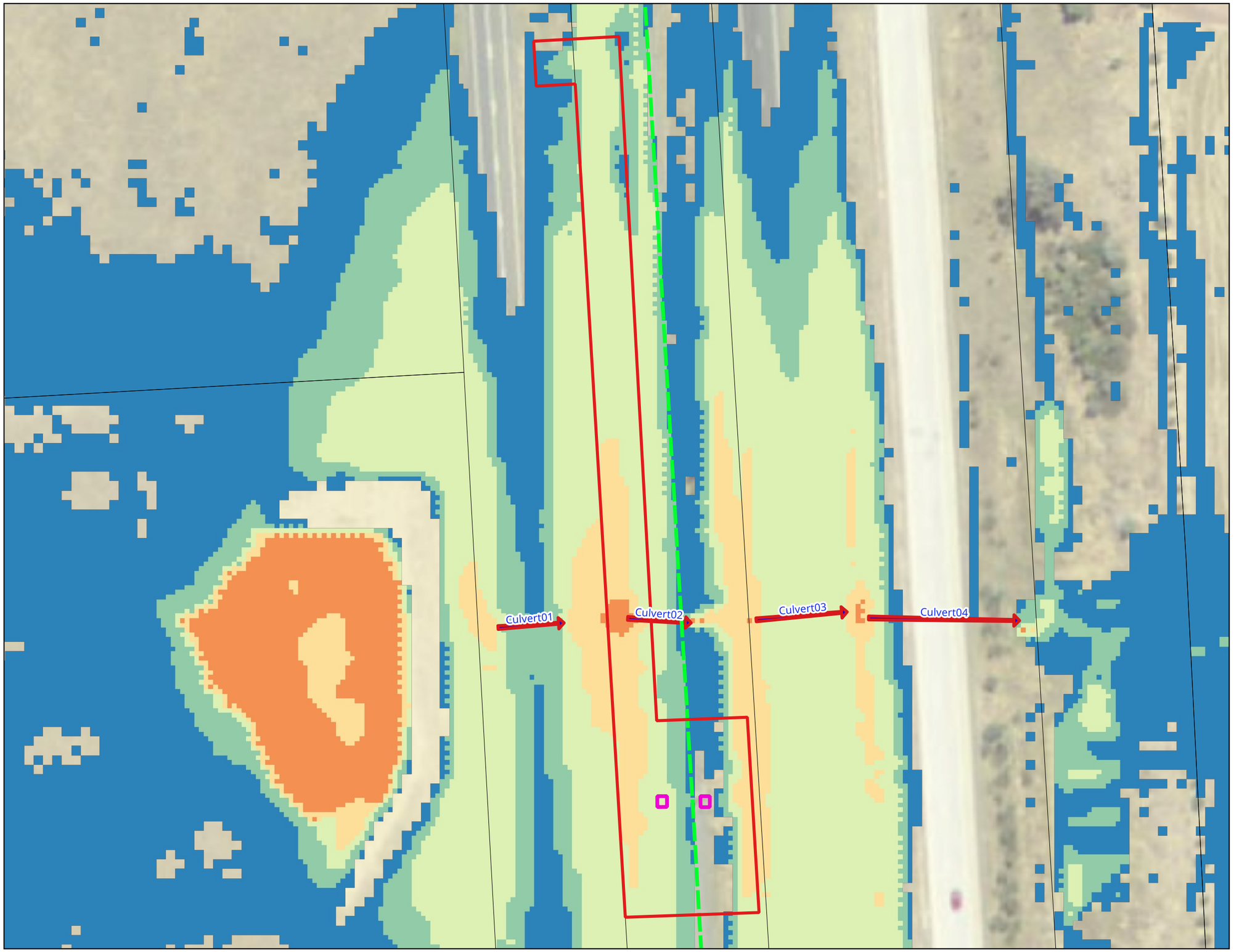
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure13: 1% AEP Peak Flood Hazard (Existing Condition)



aurecon

Legend

- Existing Culverts
- Gantry Footings
- Railway
- Project Boundary
- Lot

Flood Hazard

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

Notes:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

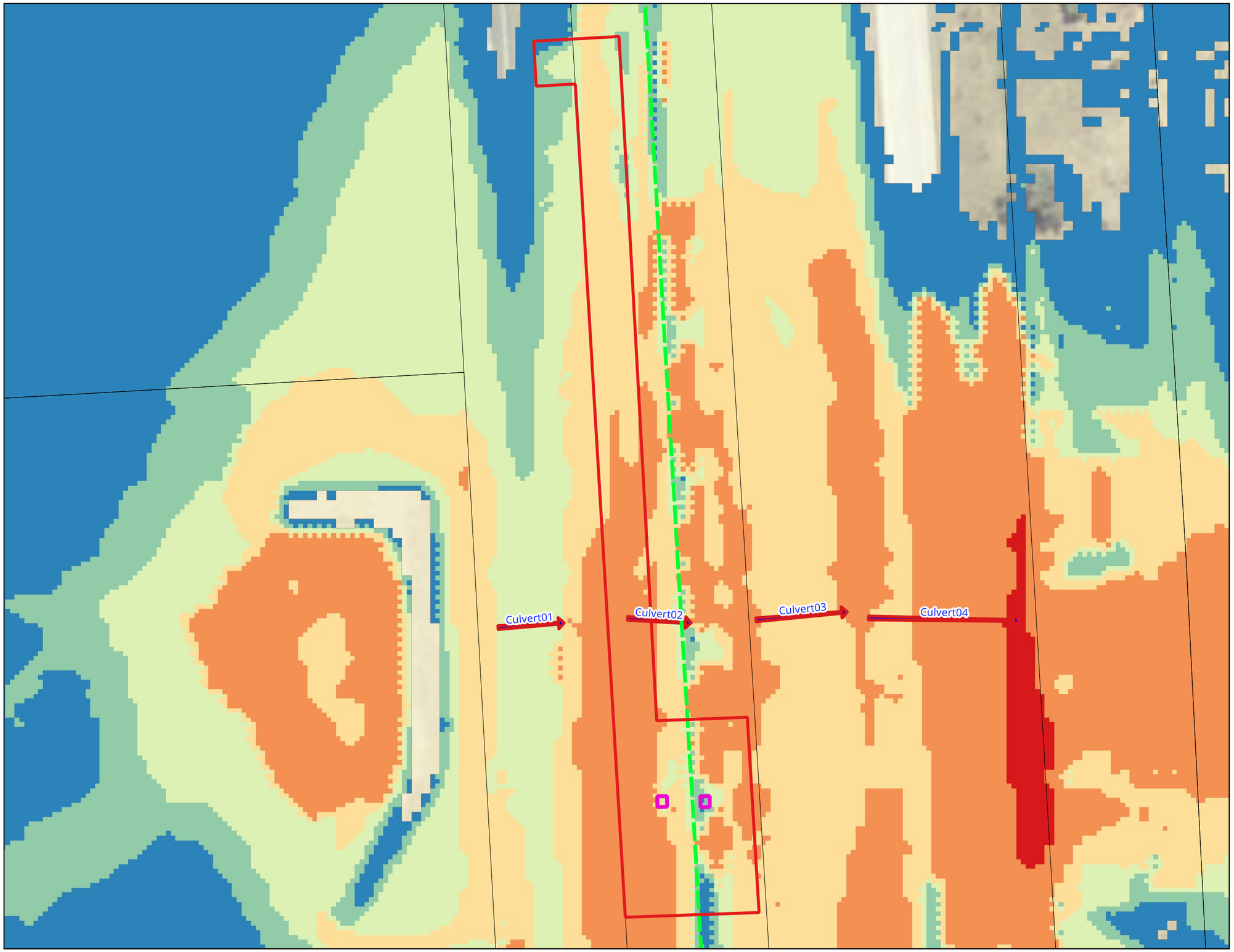
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure14: 1% AEP with Climate Change Peak Flood Hazard (Existing Condition)



aurecon

Legend

- Existing Culverts
- Gantry Footings
- Railway
- Project Boundary
- Lot

Flood Hazard

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

Notes:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

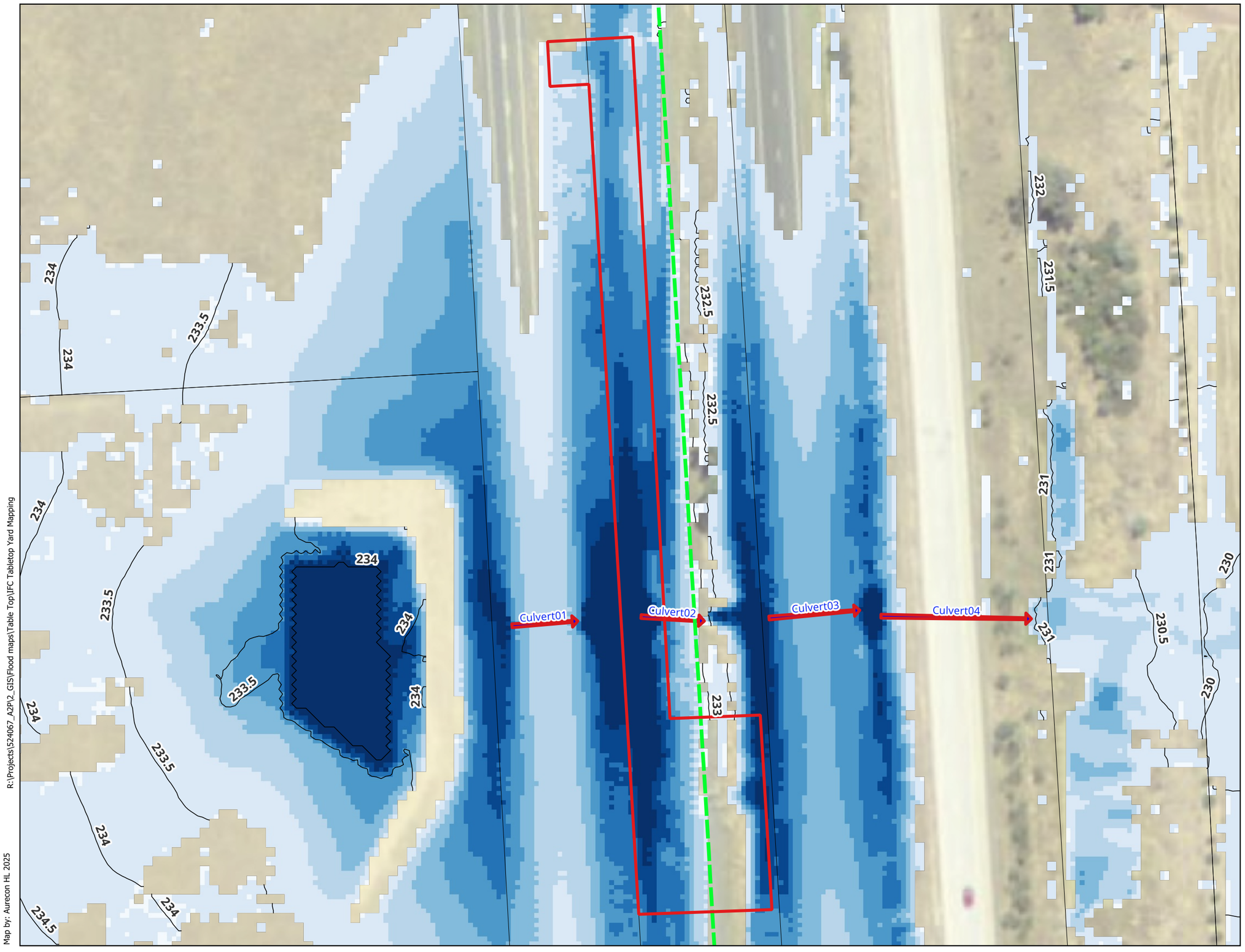
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure15: PMF Peak Flood Hazard (Existing Condition)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot
- Flood Level Contours (1m Interval)

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:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure16: 5% AEP Peak Flood Depth and Levels (Design Condition)

aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot
- Flood Level Contours (1m Interval)

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

Culvert01
Culvert02
Culvert03
Culvert04

Notes:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

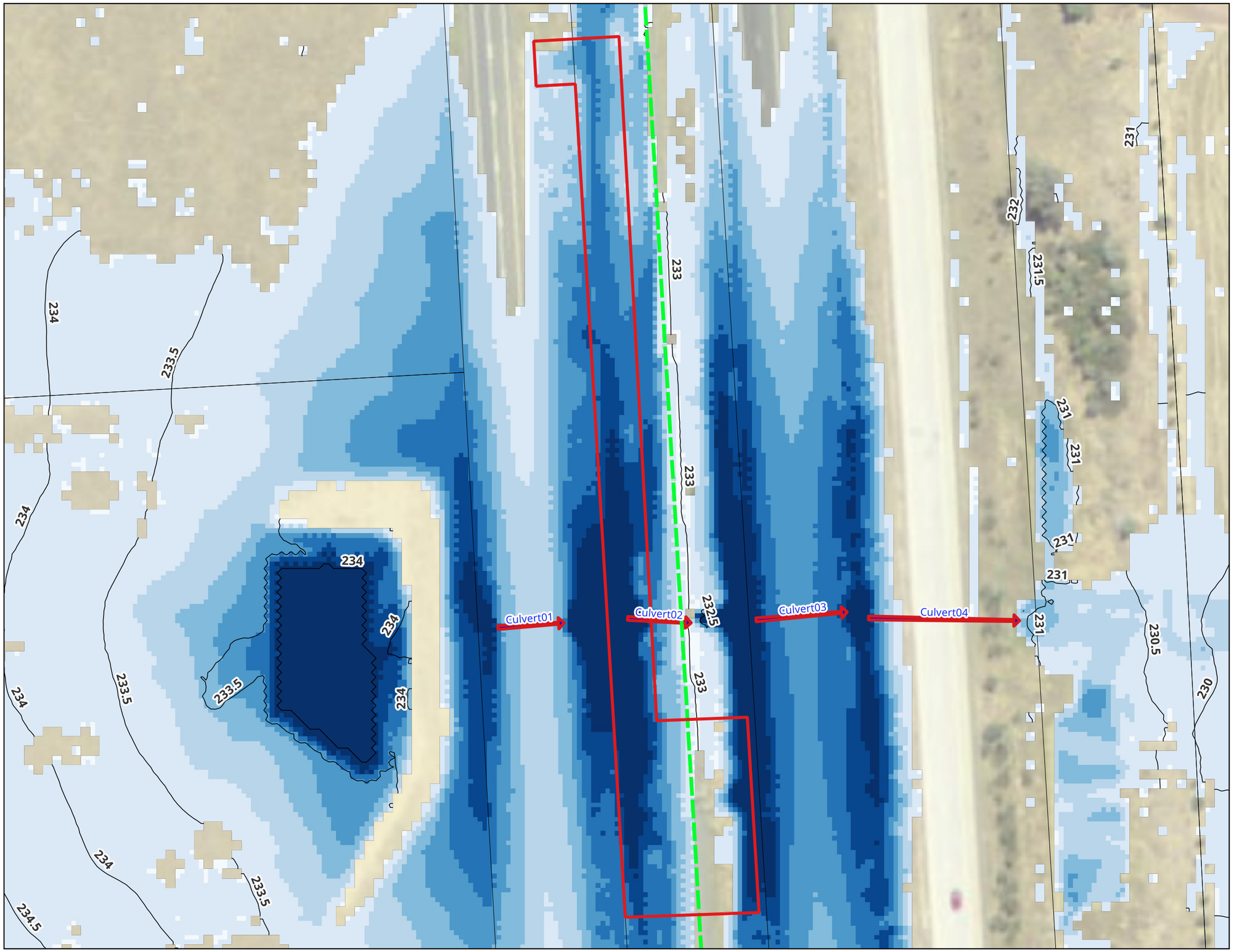
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure17: 2% AEP Peak Flood Depth and Levels (Design Condition)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot
- Flood Level Contours (1m Interval)

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:

R:\Projects\S24067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

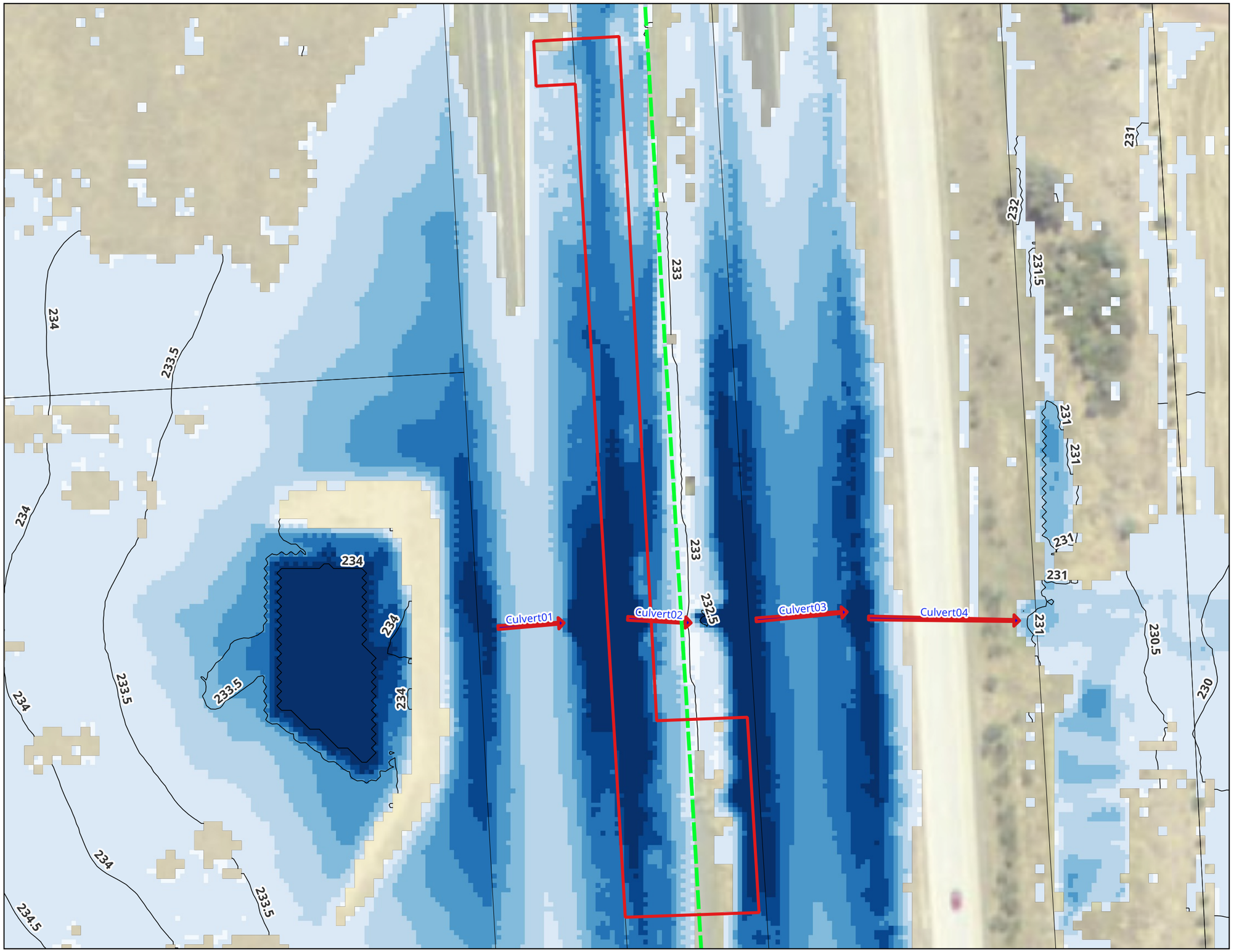
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure18: 1% AEP Peak Flood Depth and Levels (Design Condition)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot
- Flood Level Contours (1m Interval)

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:

R:\Projects\S24067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

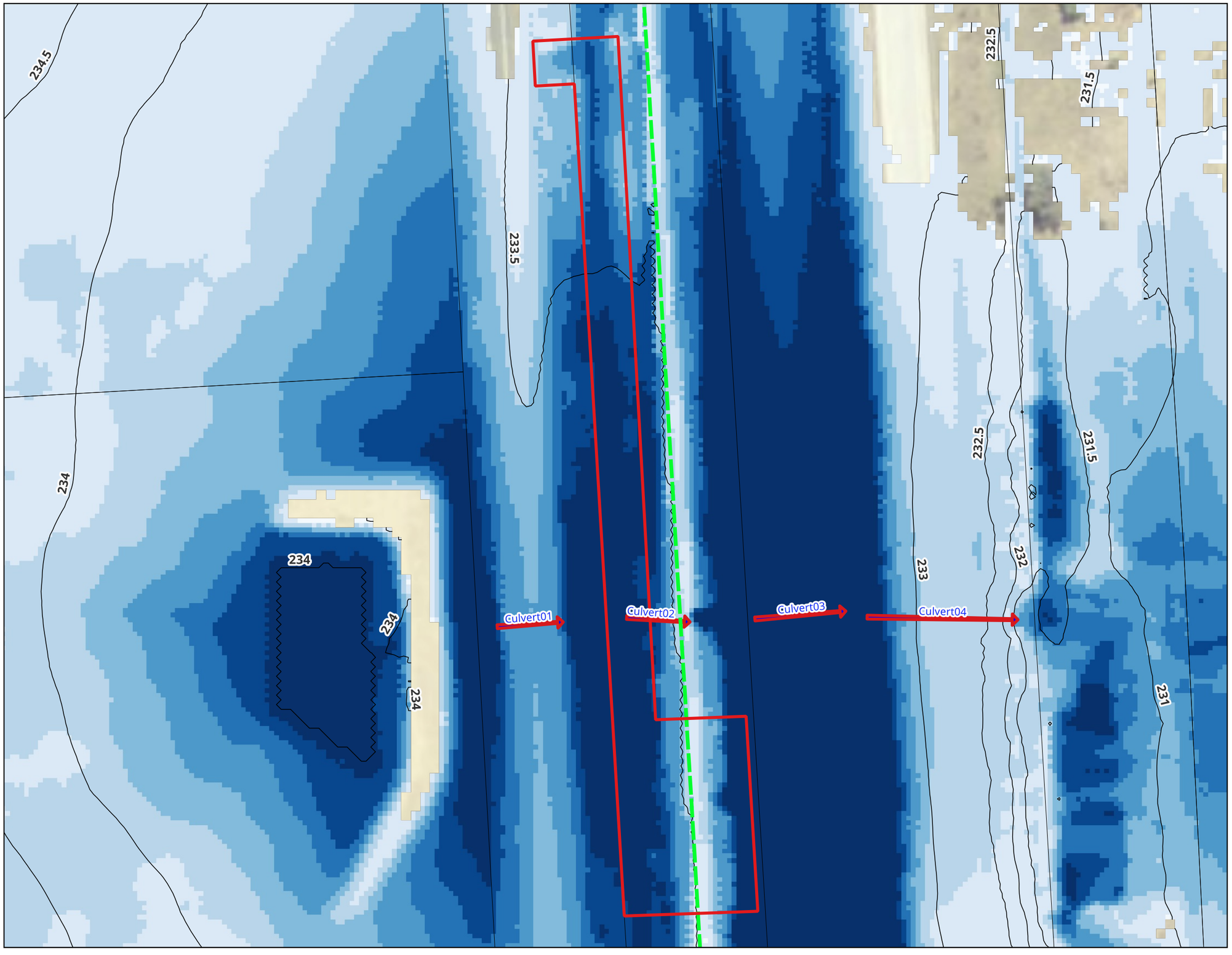
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure19: 1% AEP with Climate Change Peak Flood Depth and Levels (Design Condition)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot
- Flood Level Contours (1m Interval)

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:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

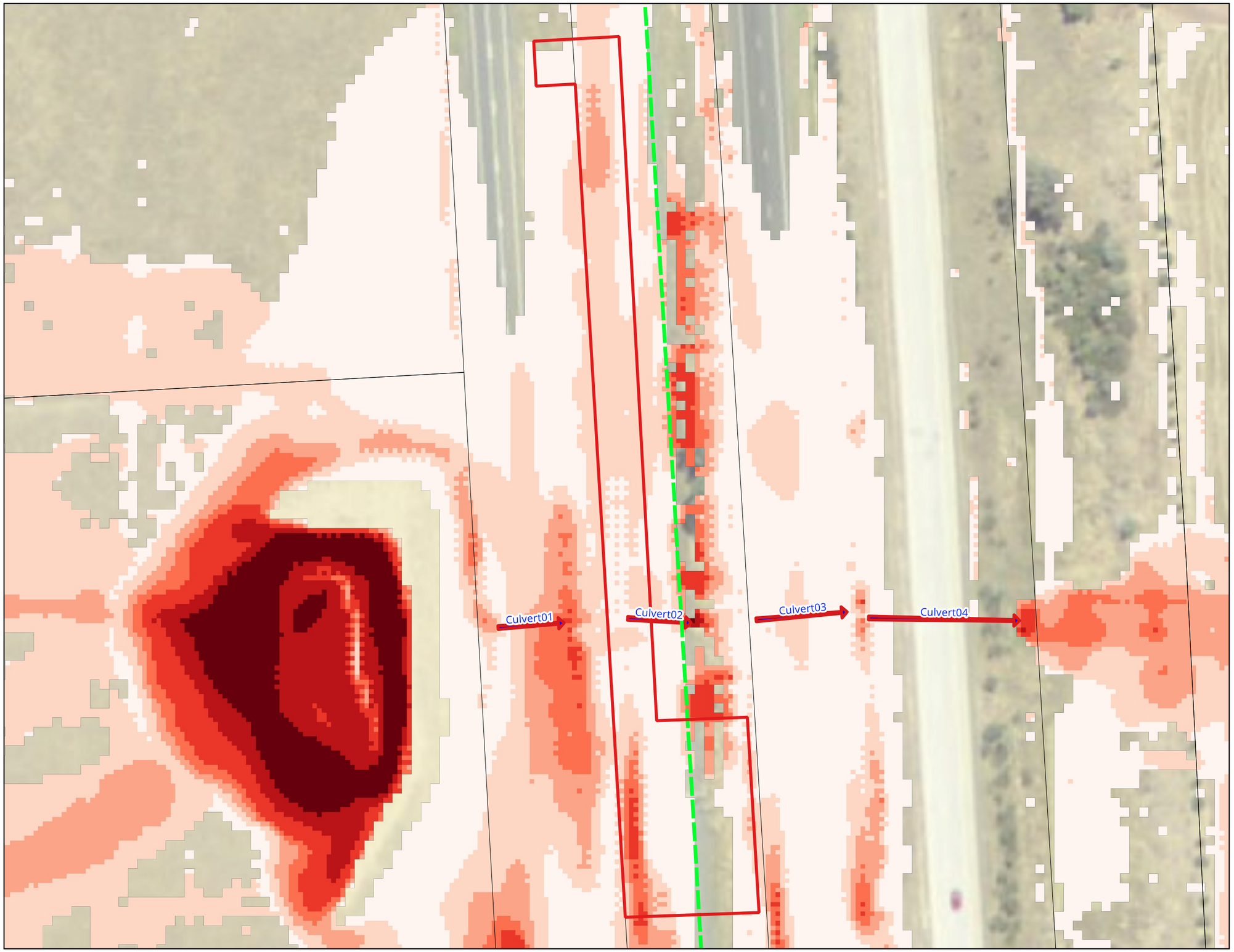
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure20: PMF Peak Flood Depth and Levels (Design Condition)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

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:

R:\Projects\S24067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

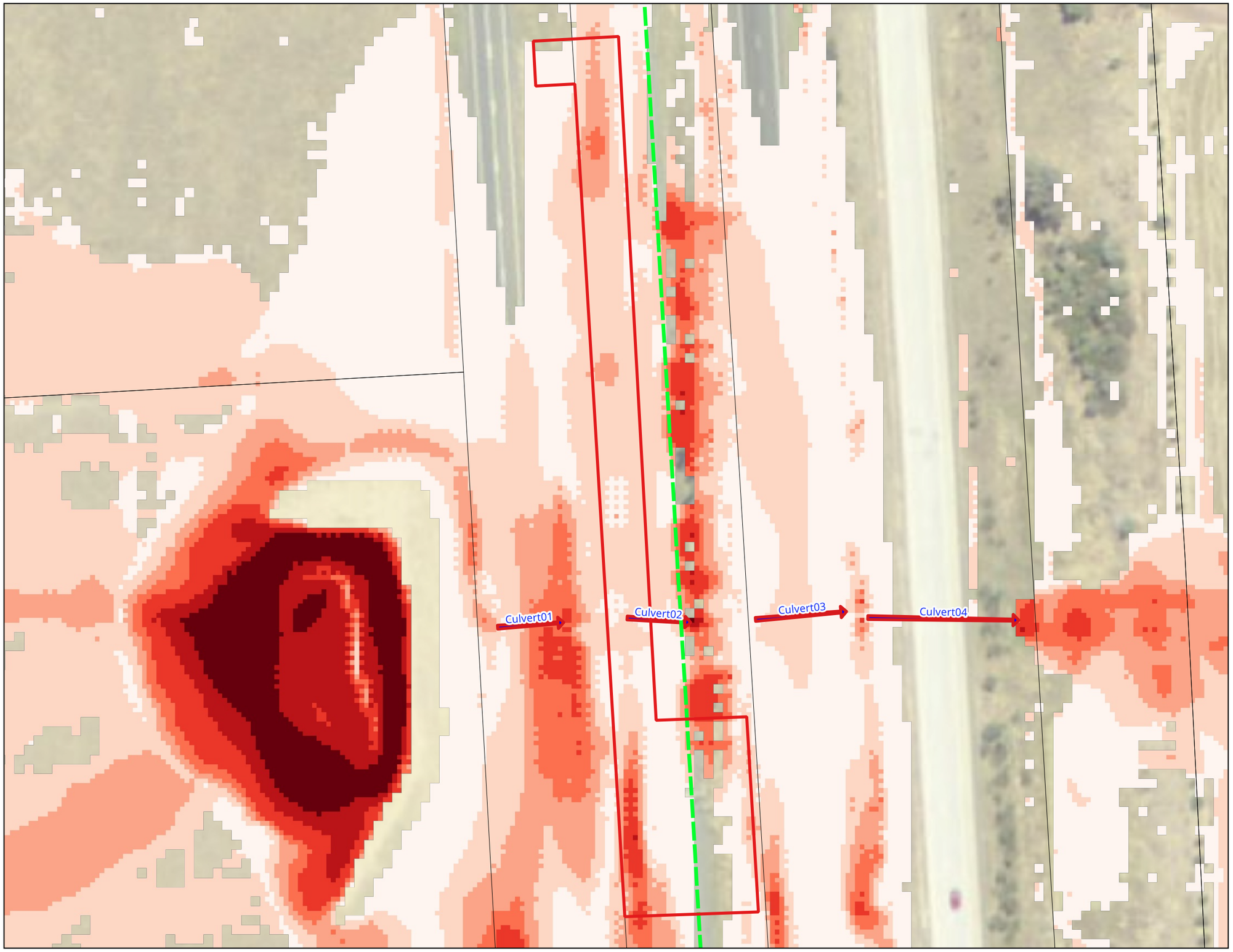
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure21: 5% AEP Peak Flood Velocity (Design Condition)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

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:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

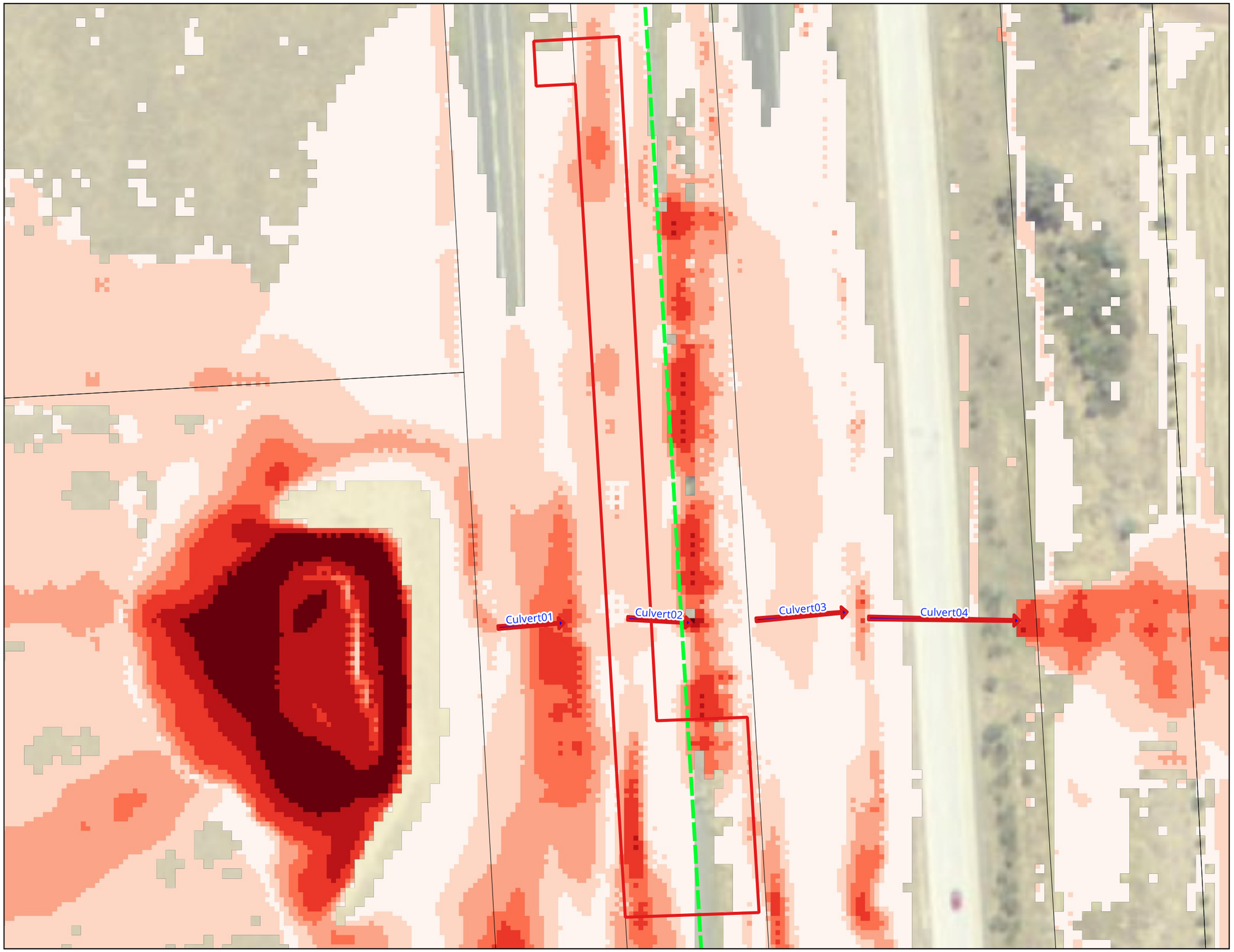
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure22: 2% AEP Peak Flood Velocity (Design Condition)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

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:

R:\Projects\S24067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

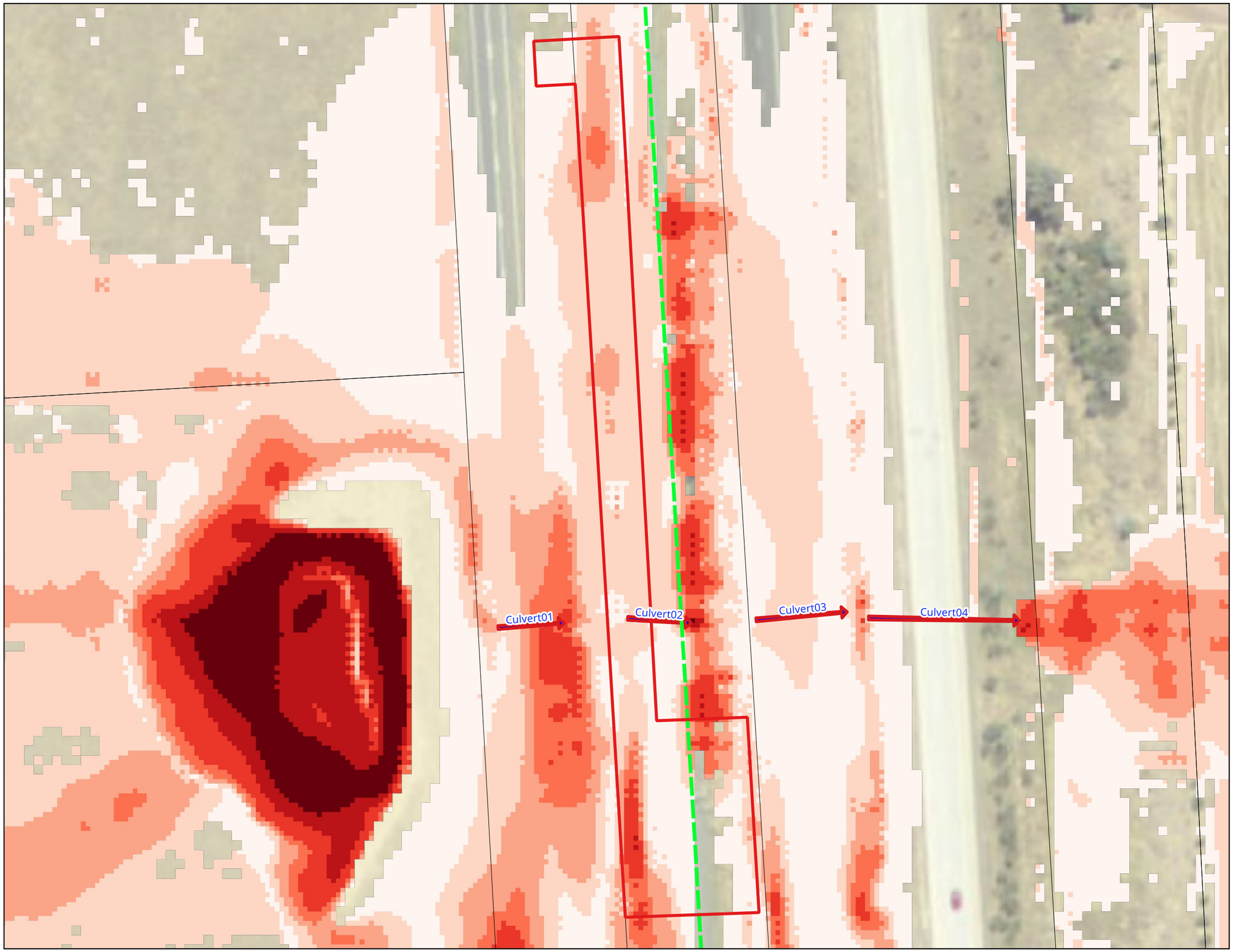
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure23: 1% AEP Peak Flood Velocity (Design Condition)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

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:

R:\Projects\S24067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

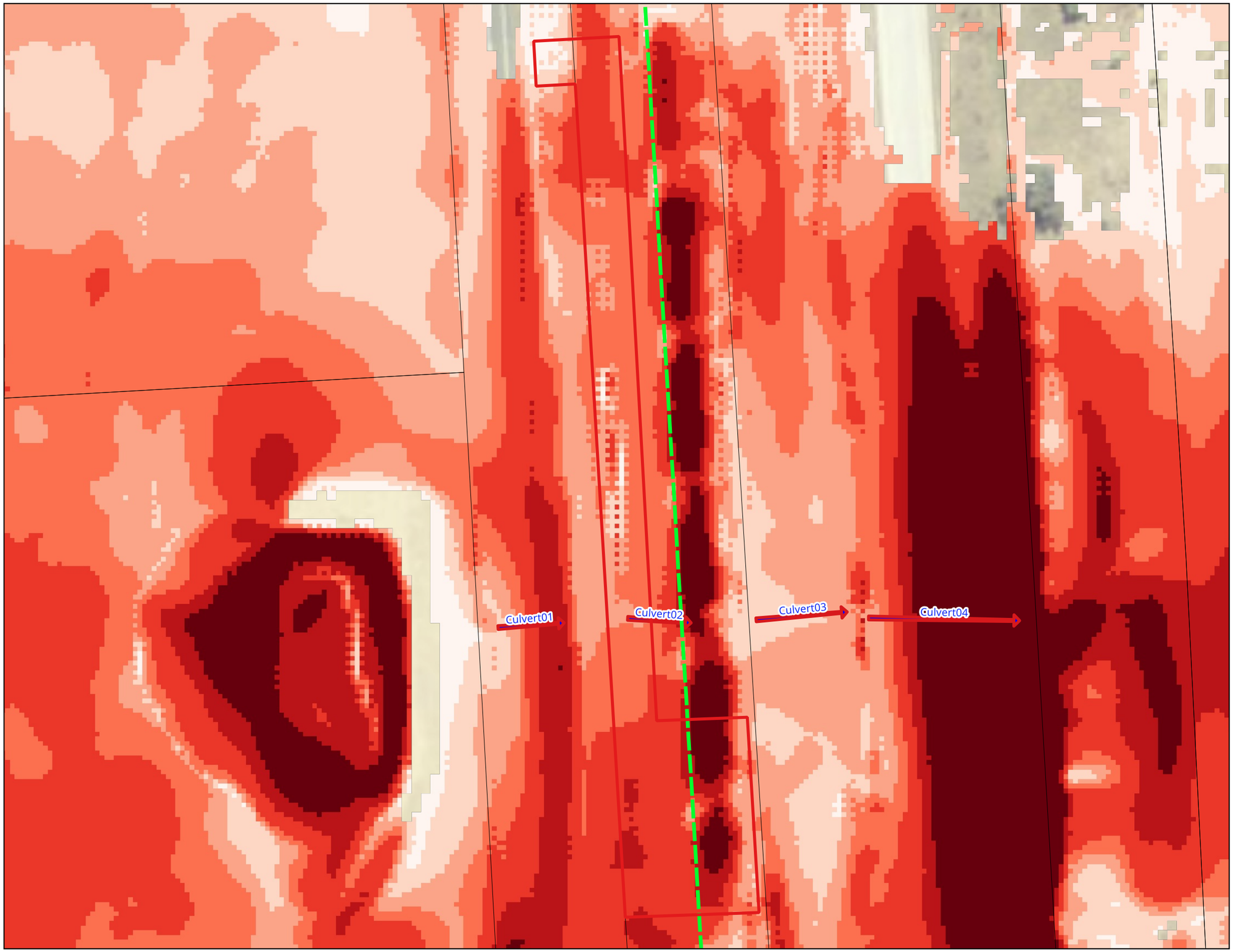
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure24: 1% AEP with Climate Change Peak Flood Velocity (Design Condition)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

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:

R:\Projects\S240167_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

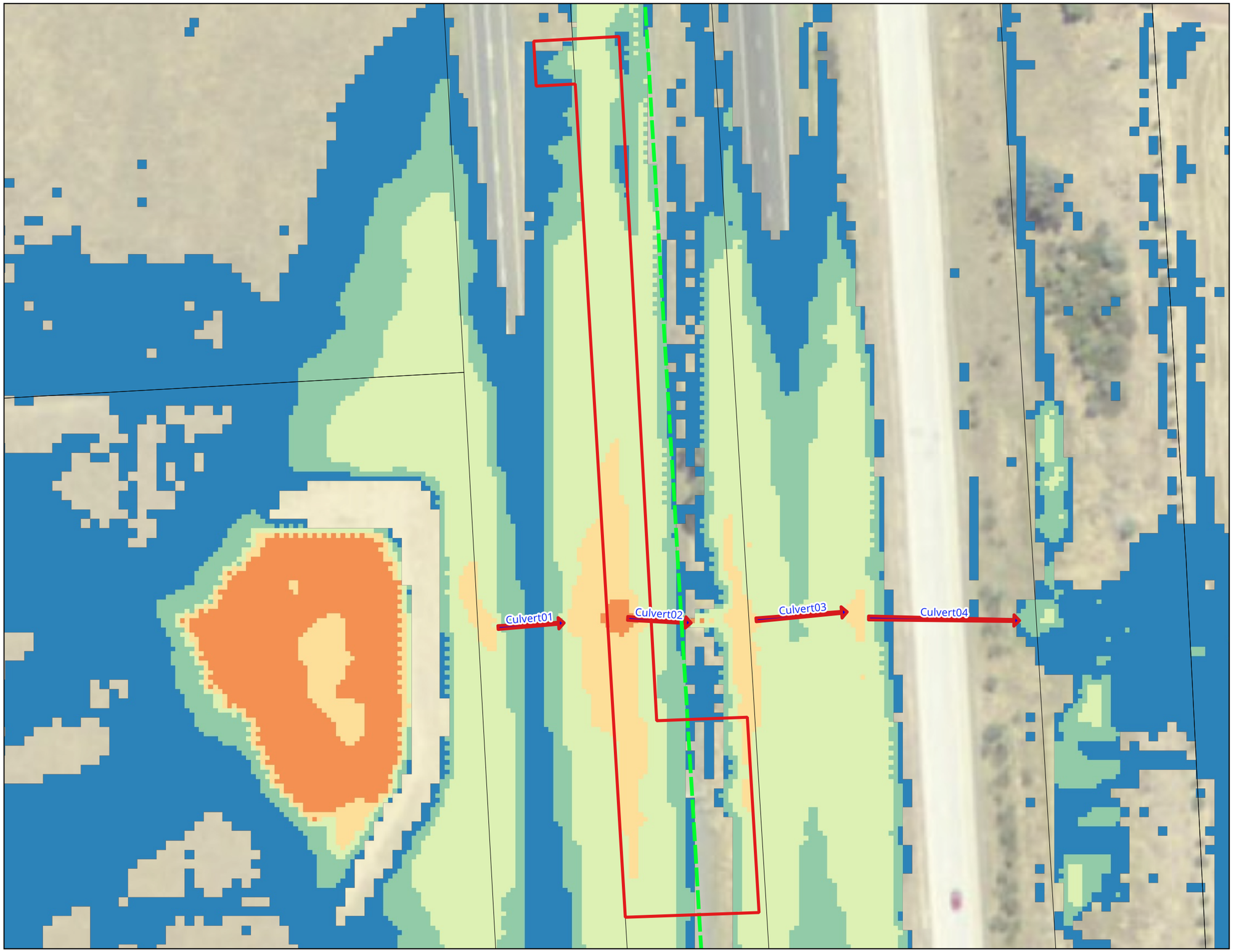
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure25: PMF Peak Flood Velocity (Design Condition)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

Flood Hazard

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

Notes:

R:\Projects\S24067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

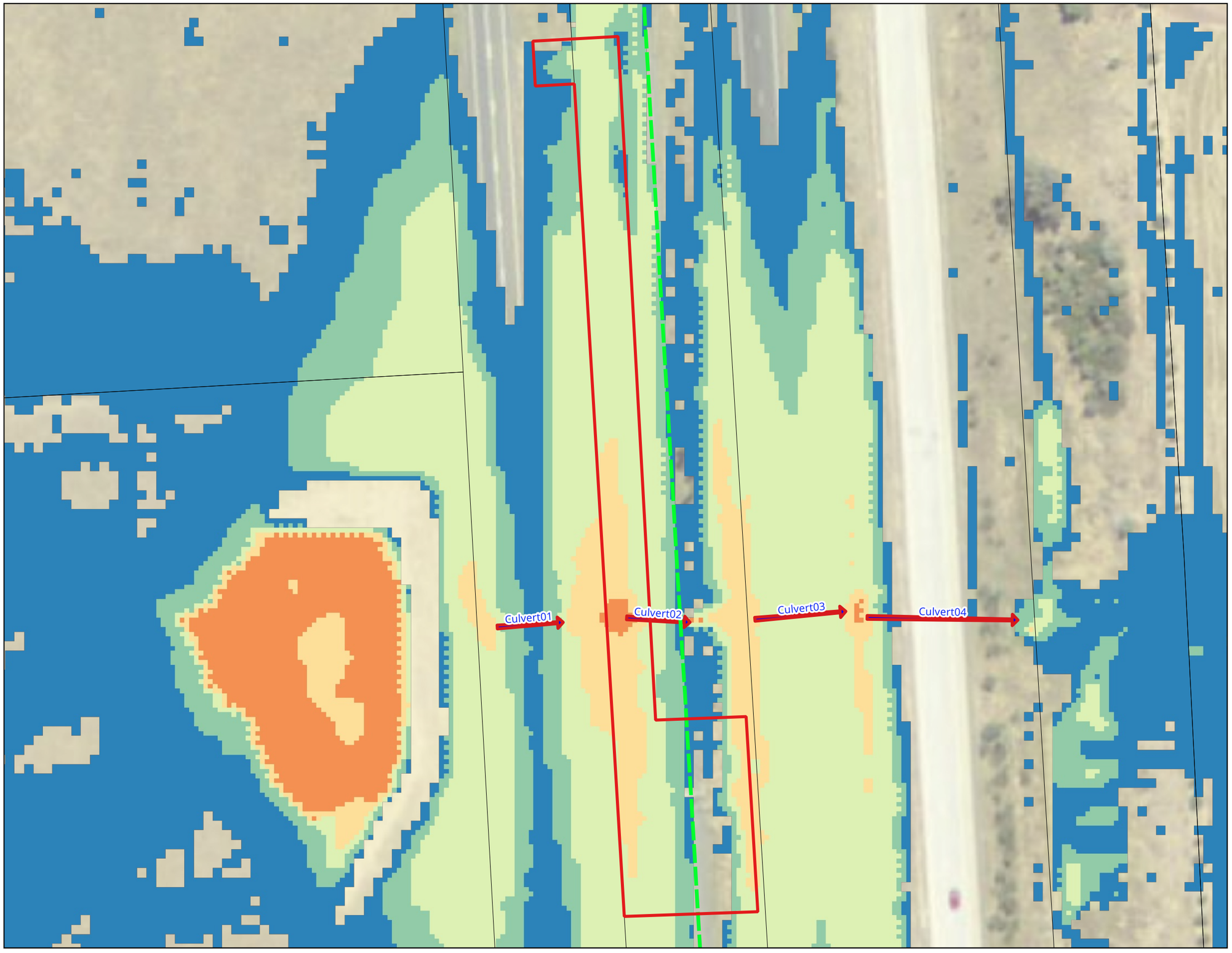
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure26: 5% AEP Peak Flood Hazard (Design Condition)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

Flood Hazard

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

Notes:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

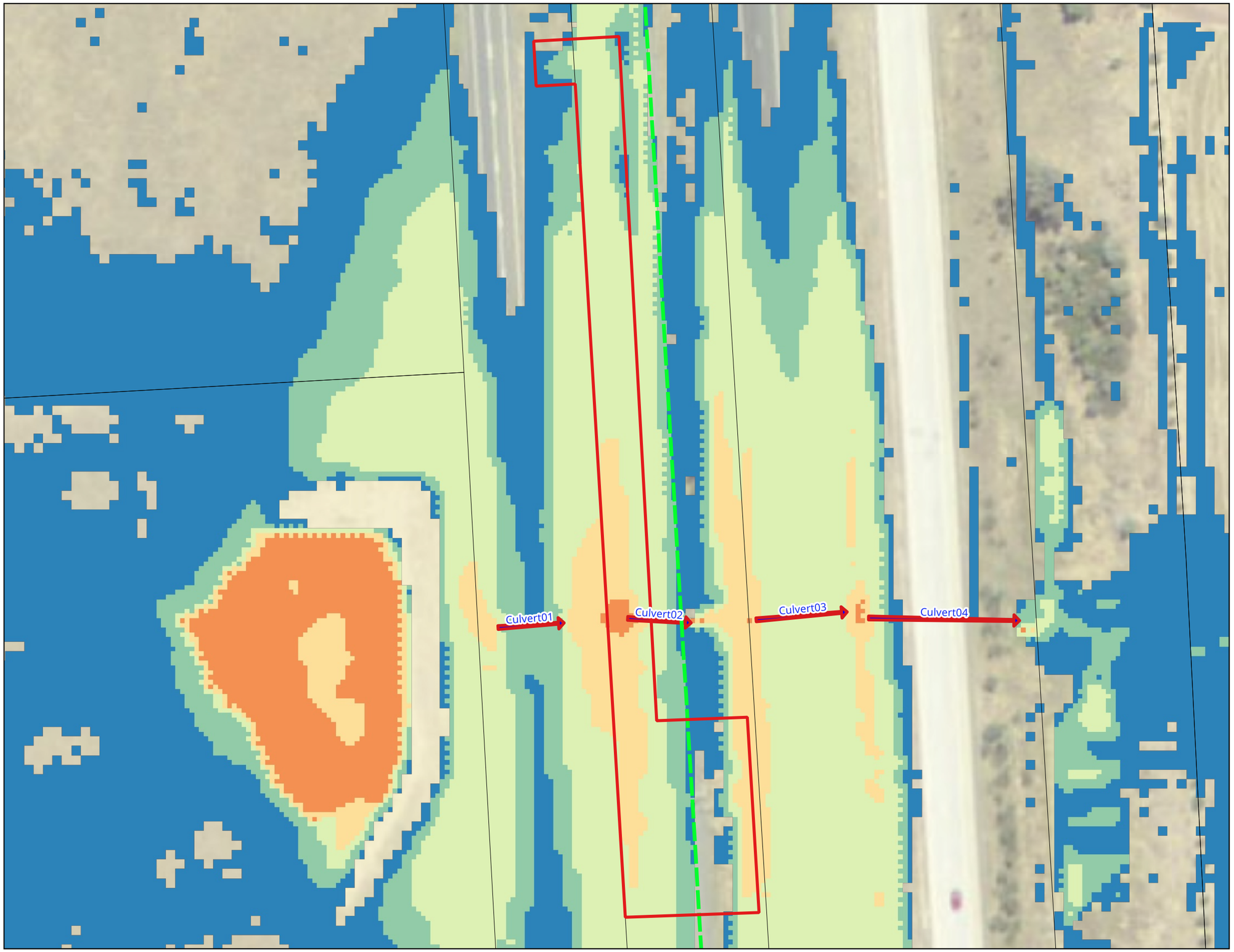
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure27: 2% AEP Peak Flood Hazard (Design Condition)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

Flood Hazard

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

Notes:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

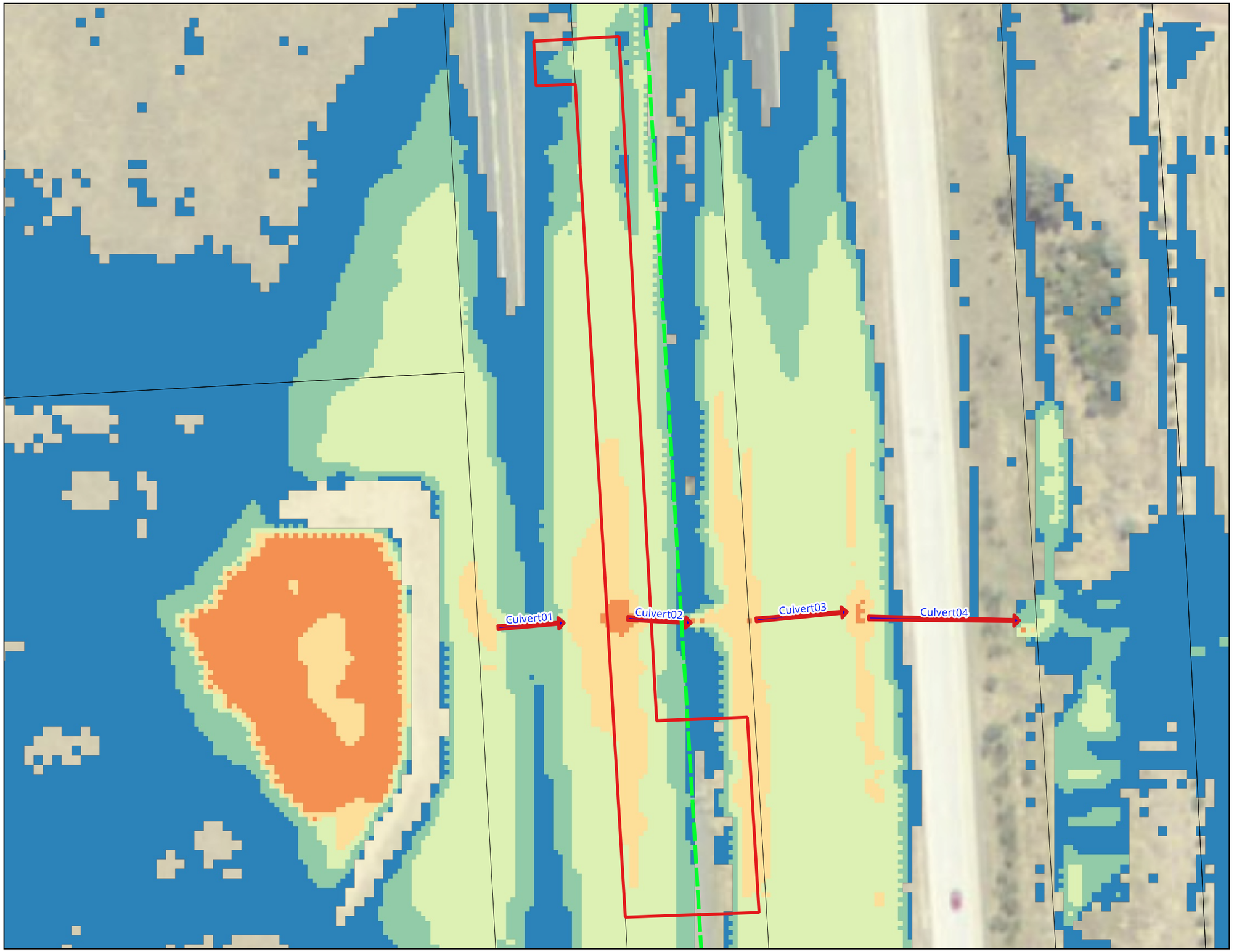
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure28: 1% AEP Peak Flood Hazard (Design Condition)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

Flood Hazard

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

Notes:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

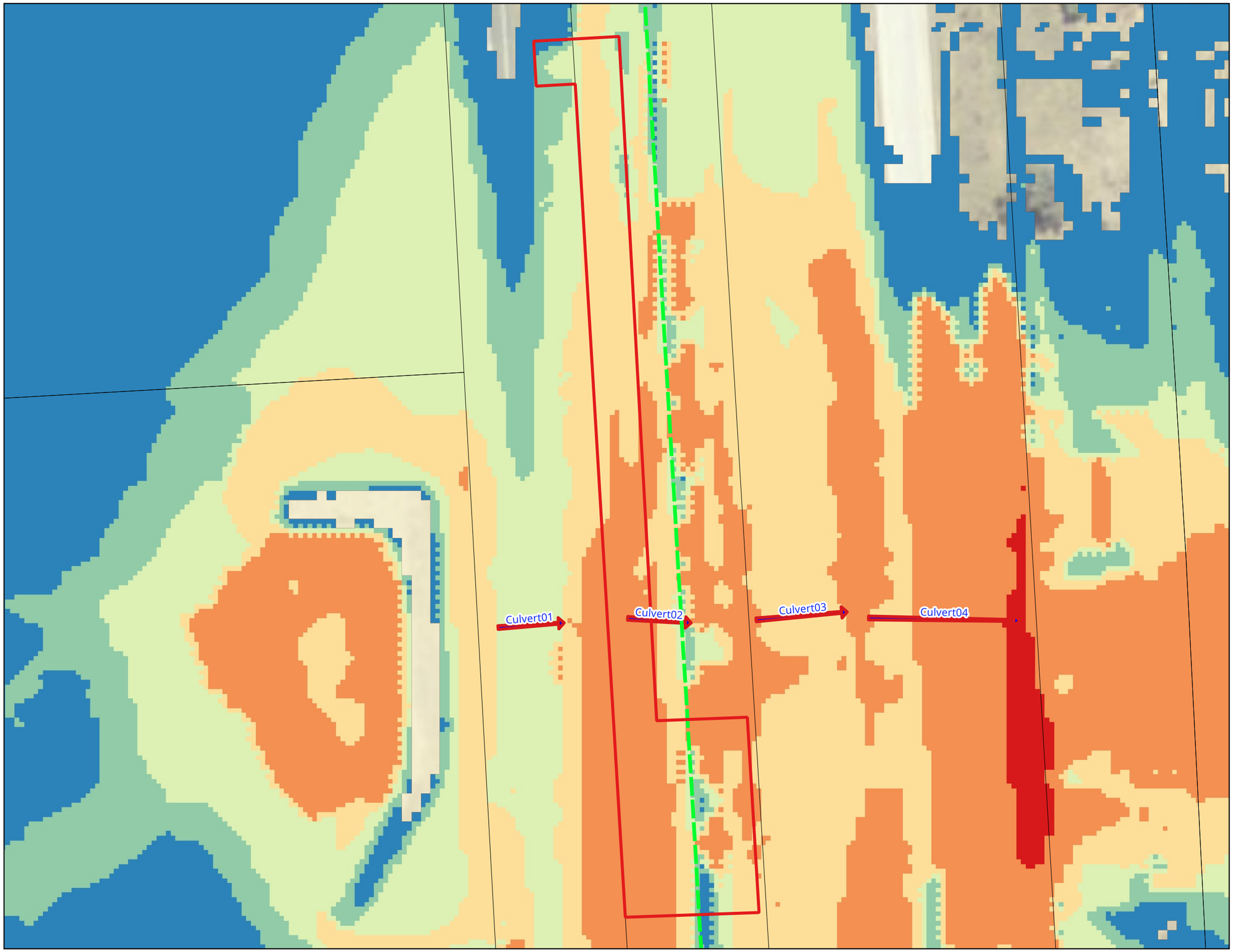
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure29: 1% AEP with Climate Change Peak Flood Hazard (Design Condition)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

Flood Hazard

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

Notes:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

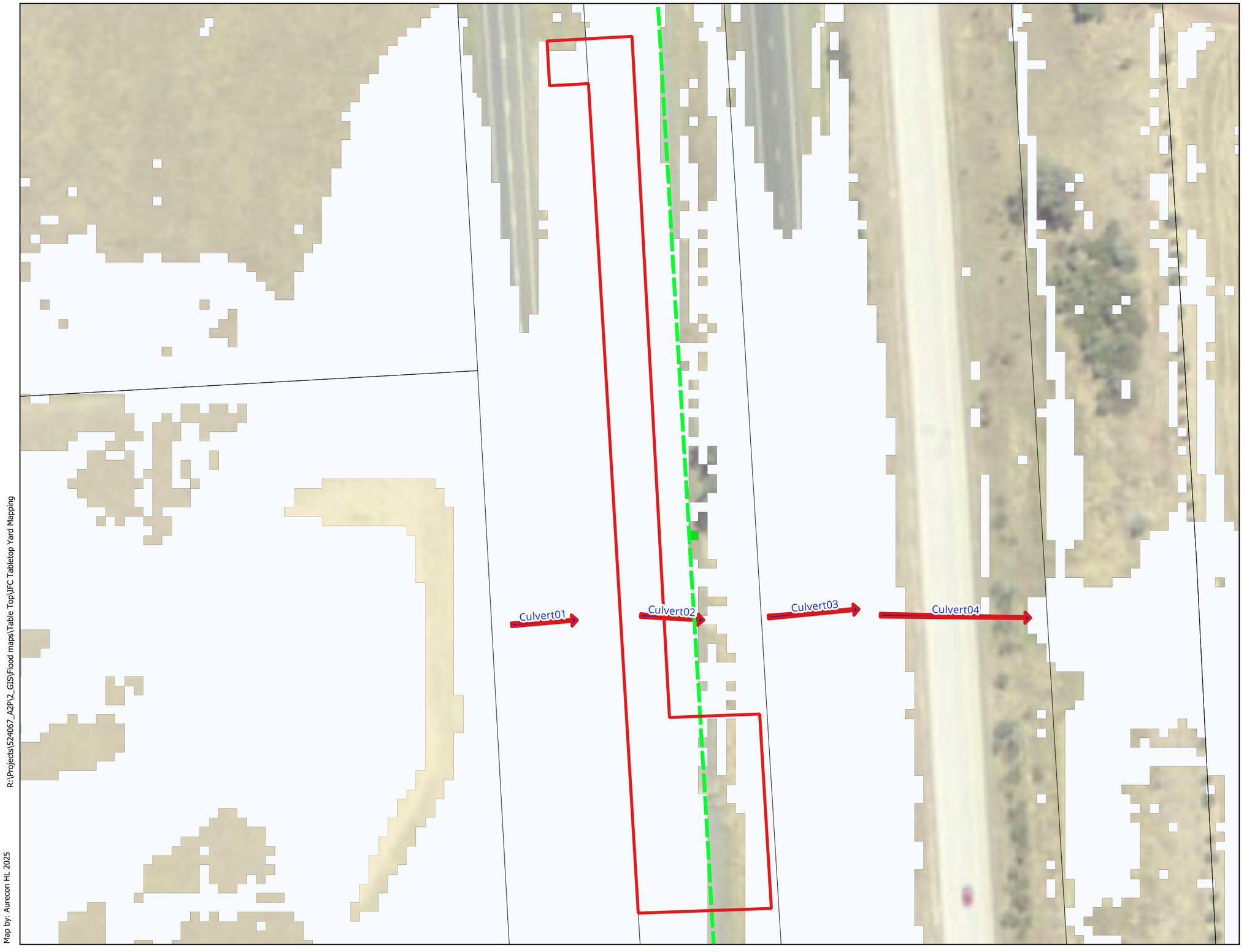
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure30: PMF Peak Flood Hazard (Design Condition)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

Changes in Peak Flood Levels

- <= -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:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

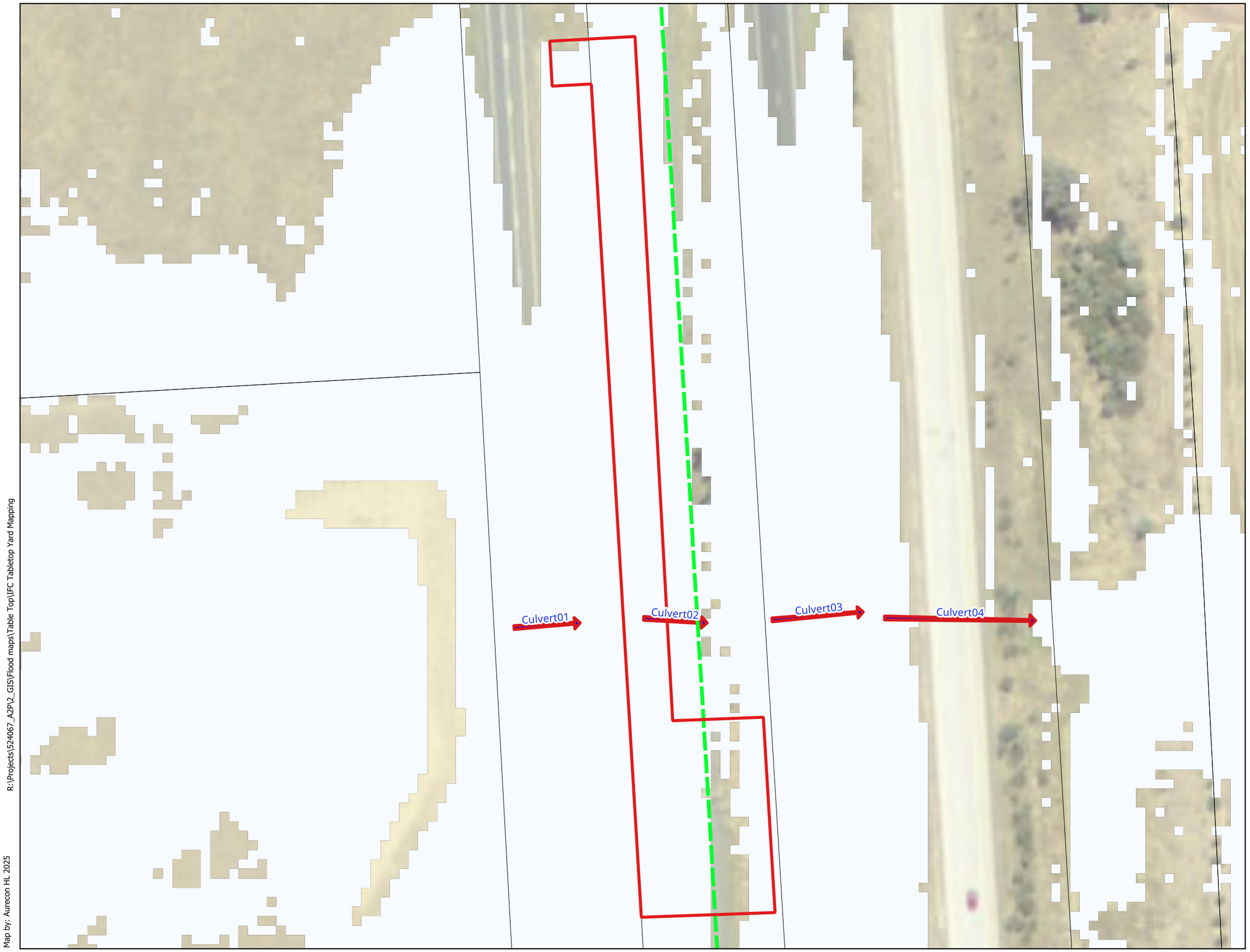
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure31: 5% AEP Changes in Peak Flood Levels (Design Condition vs. Existing Condition)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

Changes in Peak Flood Levels

- <= -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:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure32: 2% AEP Changes in Peak Flood Levels (Design Condition vs. Existing Condition)

aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

Changes in Peak Flood Levels

- <= -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

Culvert01
Culvert02
Culvert03
Culvert04

Notes:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure33: 1% AEP Changes in Peak Flood Levels (Design Condition vs. Existing Condition)

aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

Changes in Peak Flood Levels

- <= -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

Culvert01
Culvert02
Culvert03
Culvert04

Notes:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure34: 1% AEP with Climate Change in Peak Flood Levels (Design Condition vs. Existing Condition)

aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

Changes in Peak Flood Velocity

- <= 10%
- 10% - 20%
- > 20%
- <= 0.50
- Was Wet Now Dry
- Was Dry Now Wet

Notes:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure35: 5% AEP Changes in Peak Flood Velocity (Design Condition vs. Existing Condition)

aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

Changes in Peak Flood Velocity

- <= 10%
- 10% - 20%
- > 20%
- <= 0.50
- Was Wet Now Dry
- Was Dry Now Wet

Culvert01
Culvert02
Culvert03
Culvert04

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Notes:

Table Top Yard Clearances - A2P - IFC Stage

Figure36: 2% AEP Changes in Peak Flood Velocity (Design Condition vs. Existing Condition)

aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

Changes in Peak Flood Velocity

- <= 10%
- 10% - 20%
- > 20%
- <= 0.50
- Was Wet Now Dry
- Was Dry Now Wet

Culvert01
Culvert02
Culvert03
Culvert04

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Notes:

Table Top Yard Clearances - A2P - IFC Stage

Figure37: 1% AEP Changes in Peak Flood Velocity (Design Condition vs. Existing Condition)

aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

Changes in Peak Flood Velocity

- <= 10%
- 10% - 20%
- > 20%
- <= 0.50
- Was Wet Now Dry
- Was Dry Now Wet

Culvert01
Culvert02
Culvert03
Culvert04

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

0 4,000 8,000 m

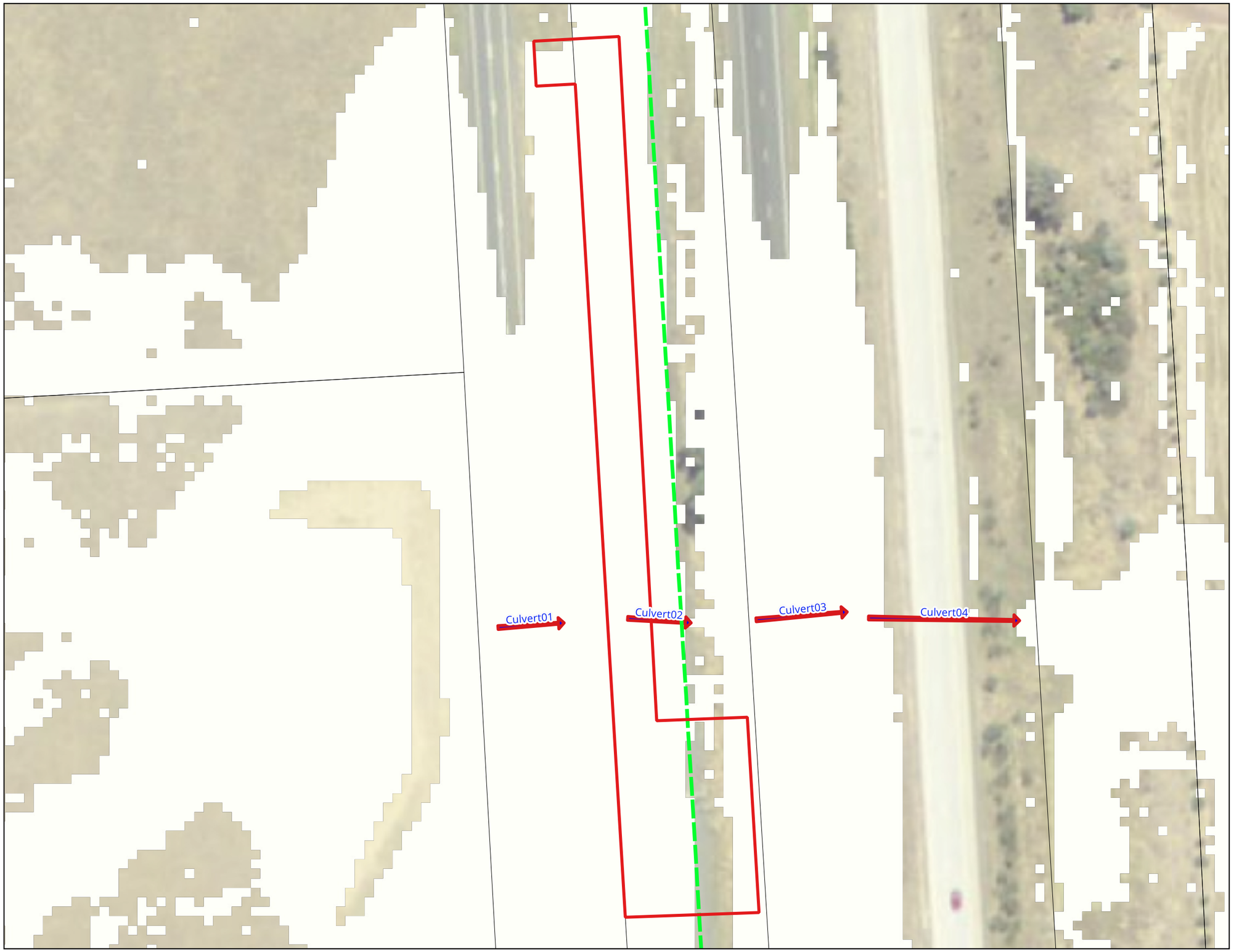
A3 Scale: 1:1

12/3/2025 MGA 55

Notes:

Table Top Yard Clearances - A2P - IFC Stage

Figure38: 1% AEP with Climate Change in Peak Flood Velocity (Design Condition vs. Existing Condition)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

Changes in Peak Flood 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:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

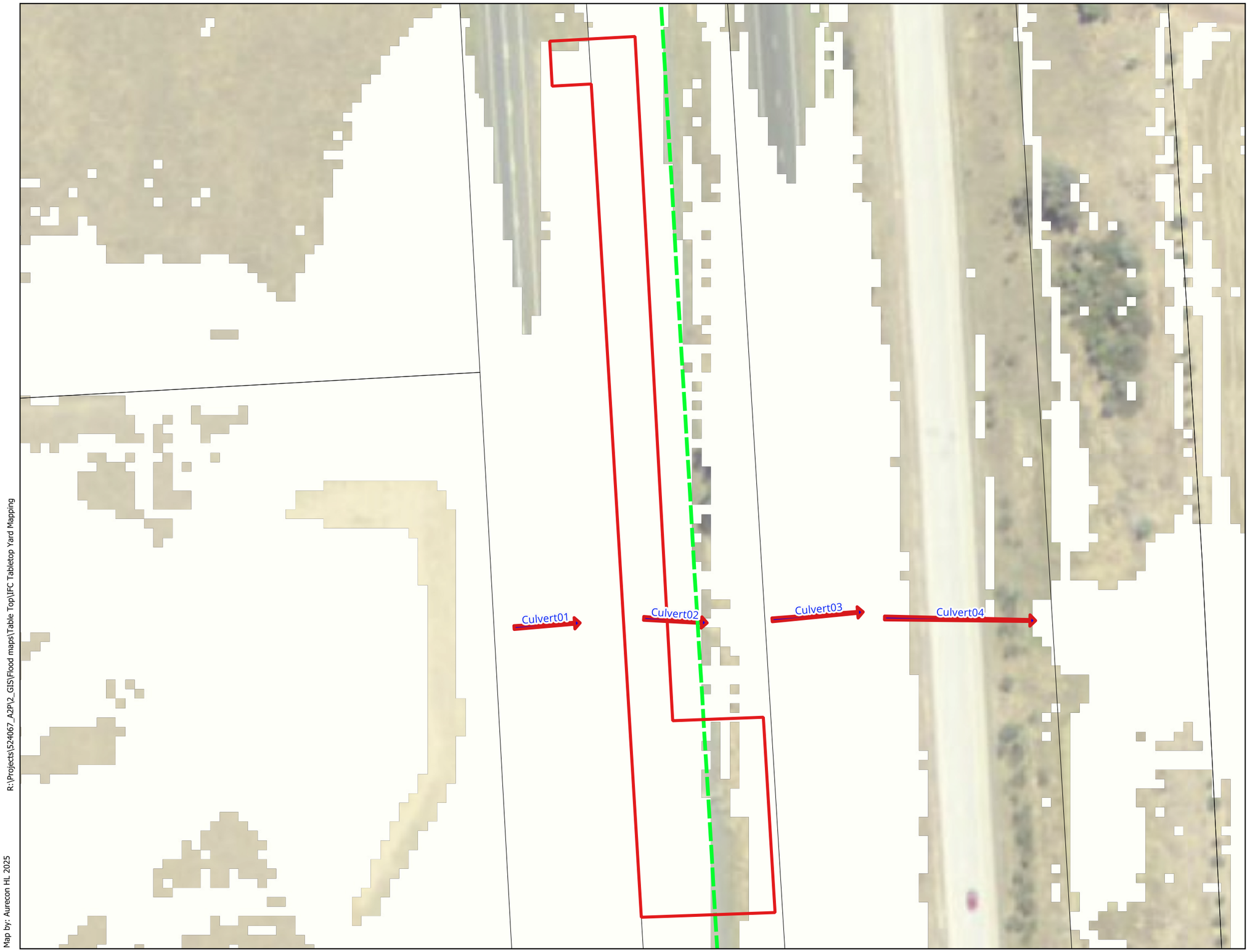
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure39: 5% AEP Changes in Peak Flood Hazard (Design Condition vs. Existing Condition)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

Changes in Peak Flood 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:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

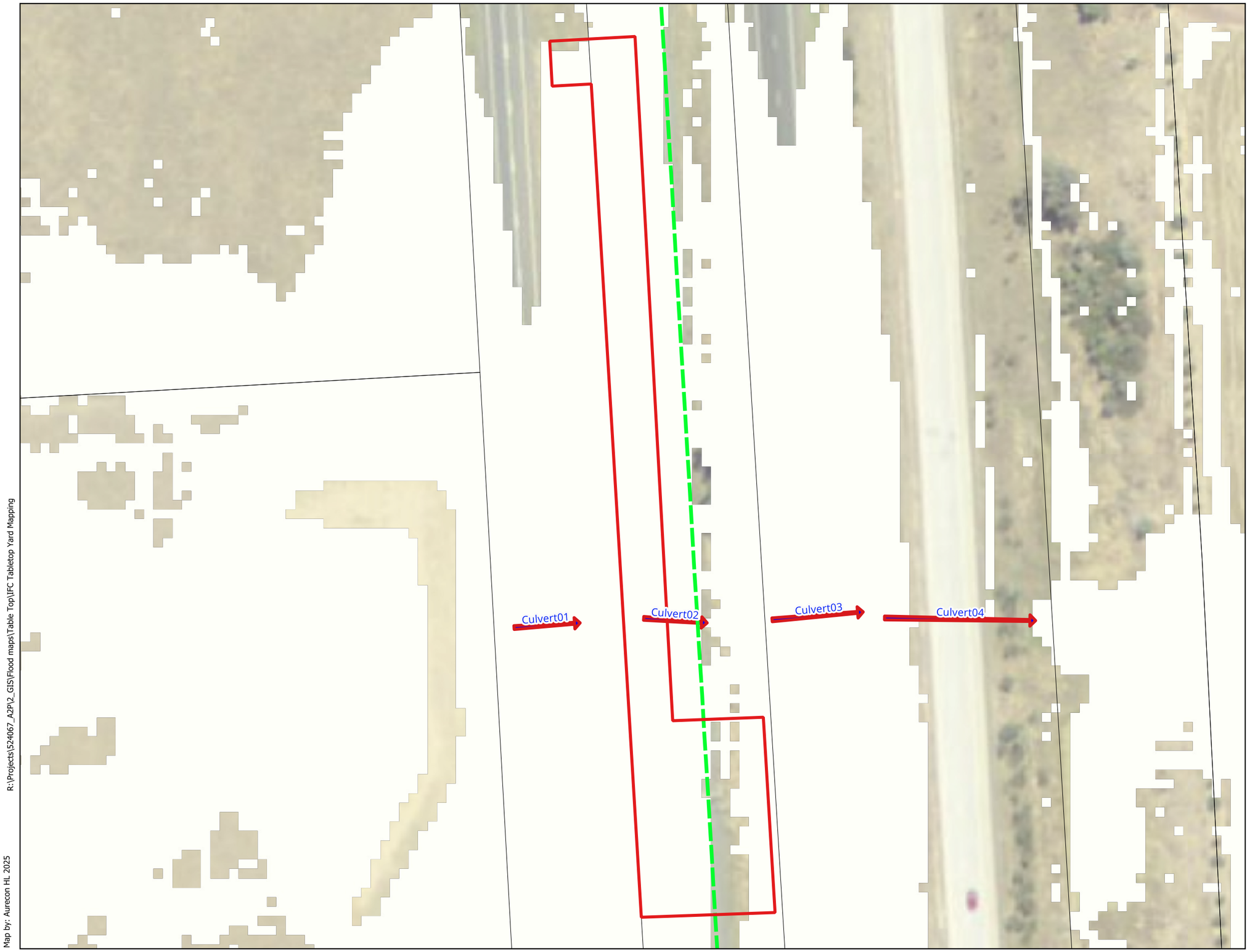
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure40: 2% AEP Changes in Peak Flood Hazard (Design Condition vs. Existing Condition)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

Changes in Peak Flood 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:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

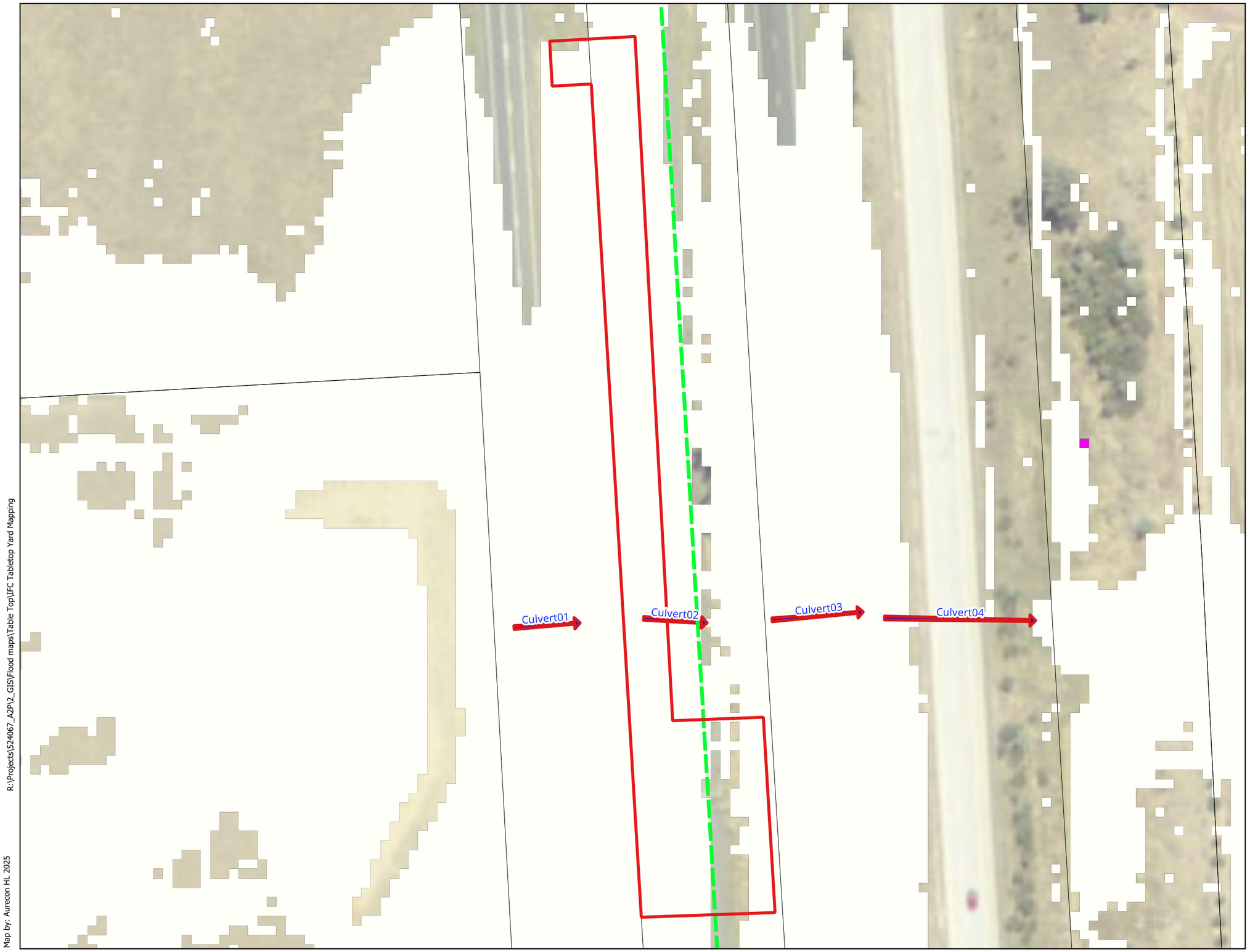
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure41: 1% AEP Changes in Peak Flood Hazard (Design Condition vs. Existing Condition)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

Changes in Peak Flood 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:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

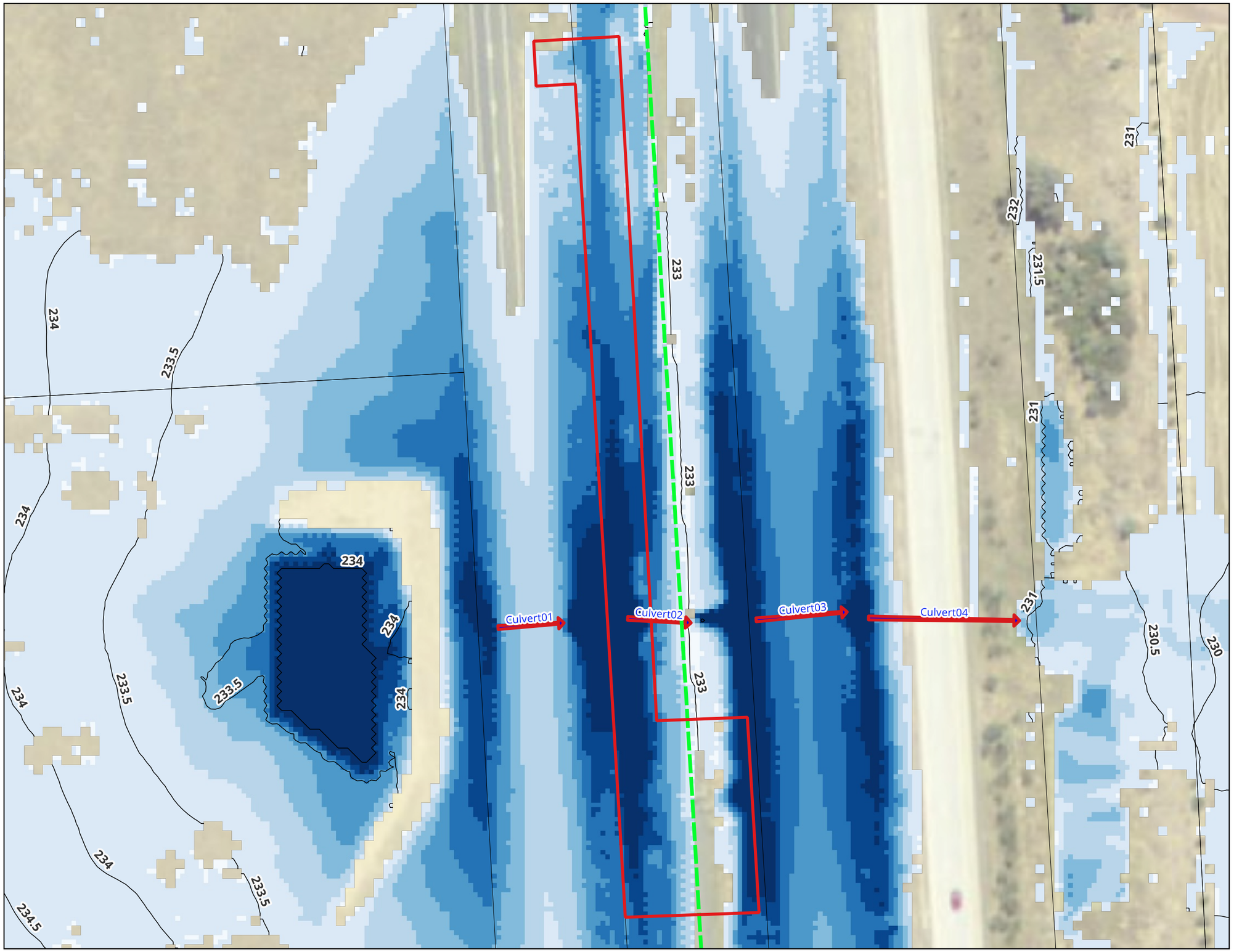
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure42: 1% AEP with Climate Change in Peak Flood Hazard (Design Condition vs. Existing Condition)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot
- Flood Level Contours (1m Interval)

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:

R:\Projects\S24067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

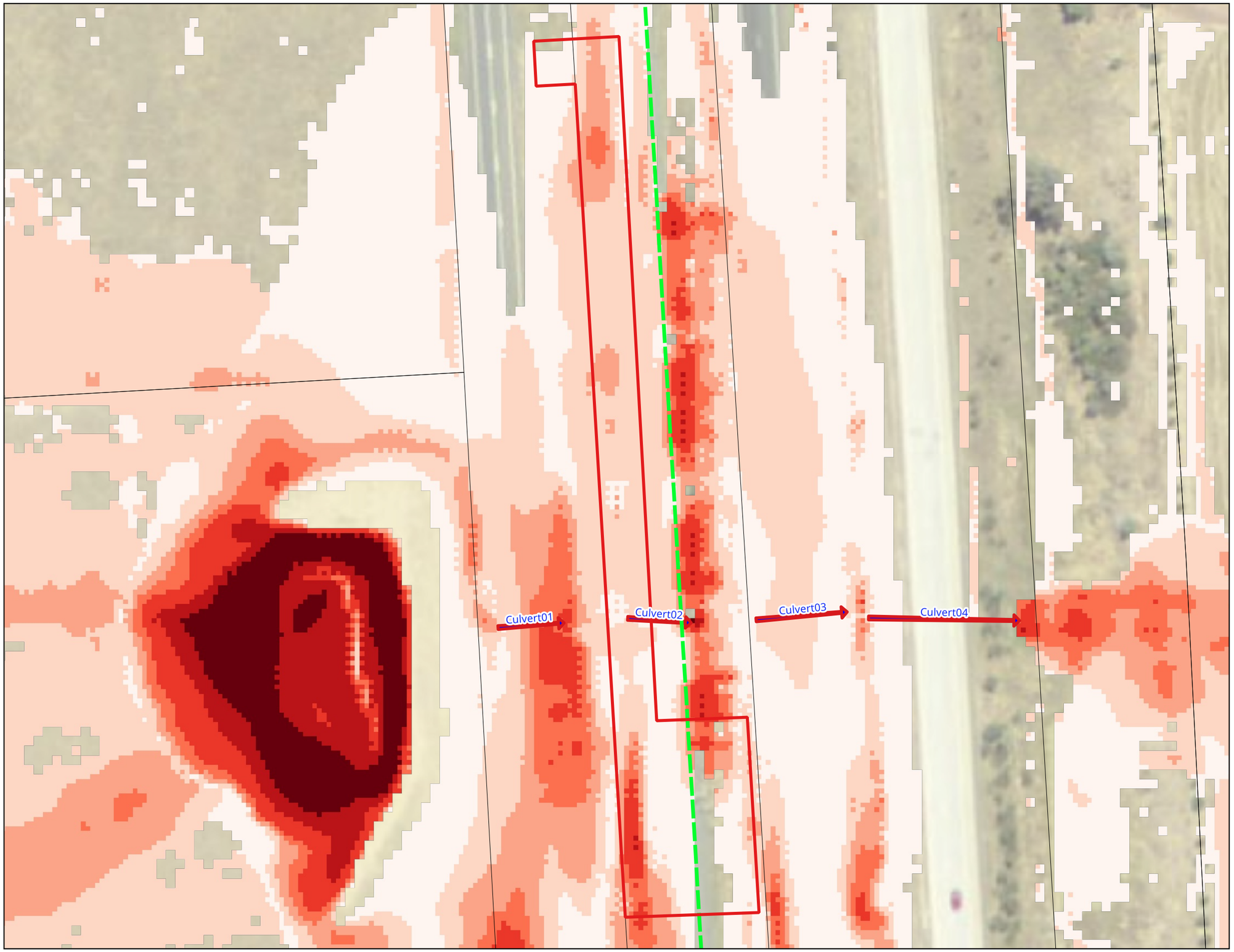
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure43: 1% AEP Peak Flood Depth and Levels (Blockage Assessment)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

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:

R:\Projects\S24067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

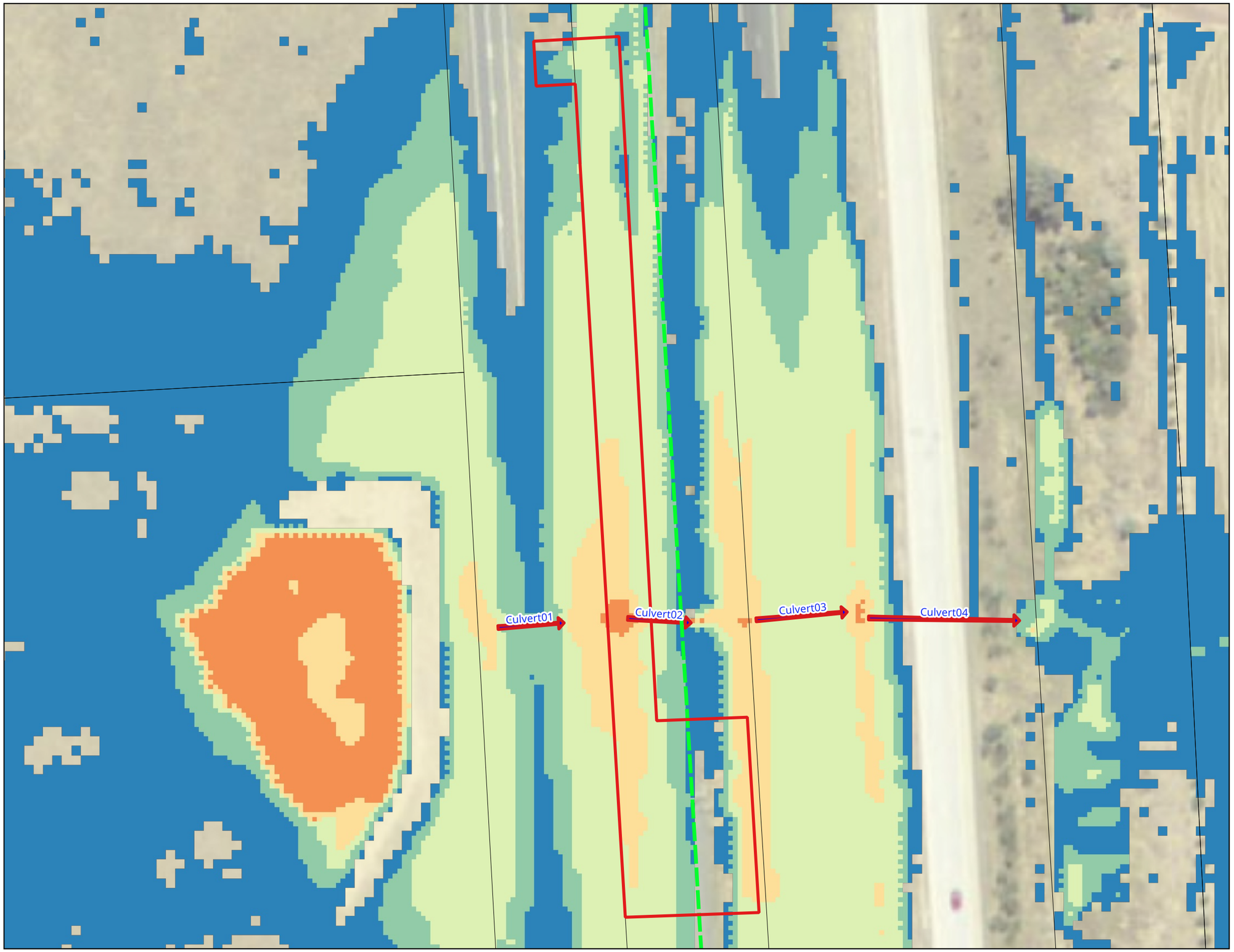
0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure44: 1% AEP Peak Flood Velocity (Blockage Assessment)



aurecon

Legend

- Existing Culverts
- Railway
- Project Boundary
- Lot

Flood Hazard

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

Notes:

R:\Projects\524067_A2P\2_GIS\Flood maps\Table Top\IFC Tabletop Yard Mapping

Map by: Aurecon HL 2025

0 4,000 8,000 m

A3 Scale: 1:1

12/3/2025 MGA 55

Table Top Yard Clearances - A2P - IFC Stage

Figure45: 1% AEP Peak Flood Hazard (Blockage Assessment)

APPENDIX B

Hydrologic Data (ARR Data Hub)

ARR2019 (https://data.arr-software.org/):

Results - ARR Data Hub

[STARTTXT]

Input Data Information

[INPUTDATA]

Latitude,-35.961600

Longitude,147.004650

[END_INPUTDATA]

River Region

[RIVREG]

Division,Murray-Darling Basin

River Number,1

River Name,Upper Murray River

[RIVREG_META]

Time Accessed,07 February 2025 06:45AM

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,07 February 2025 06:45AM

Version,2016_v1

[END_LONGARF]

Storm Losses

[LOSSES]

ID,9767.0

Storm Initial Losses (mm),26.0

Storm Continuing Losses (mm/h),4.6

[LOSSES_META]
Time Accessed,07 February 2025 06:45AM
Version,2016_v1
[END_LOSSES]

Temporal Patterns
[TP]
code,MB
Label,Murray Basin
[TP_META]
Time Accessed,07 February 2025 06:45AM
Version,2016_v2
[END_TP]

Areal Temporal Patterns
[ATP]
code,MB
arealabel,Murray Basin
[ATP_META]
Time Accessed,07 February 2025 06:45AM
Version,2016_v2
[END_ATP]

Median Preburst Depths and Ratios
[PREBURST]
min (h)\AEP(%),50,20,10,5,2,1
60 (1.0),2.5 (0.129),1.7 (0.065),1.2 (0.038),0.7 (0.019),0.9 (0.020),1.0 (0.021)
90 (1.5),1.9 (0.084),1.6 (0.053),1.4 (0.040),1.2 (0.030),0.7 (0.016),0.4 (0.007)
120 (2.0),5.1 (0.211),3.1 (0.099),1.9 (0.050),0.6 (0.015),0.4 (0.008),0.2 (0.004)
180 (3.0),2.0 (0.073),2.6 (0.072),2.9 (0.071),3.3 (0.071),1.5 (0.028),0.2 (0.003)
360 (6.0),3.2 (0.098),2.7 (0.062),2.3 (0.046),1.9 (0.035),3.8 (0.059),5.2 (0.073)
720 (12.0),0.1 (0.004),0.5 (0.009),0.7 (0.012),0.9 (0.014),2.1 (0.026),2.9 (0.033)
1080 (18.0),0.0 (0.000),0.3 (0.005),0.5 (0.008),0.7 (0.009),1.6 (0.017),2.2 (0.022)
1440 (24.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.8 (0.008),1.4 (0.013)
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,07 February 2025 06:45AM
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,07 February 2025 06:45AM
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 (0.004),0.0 (0.002),0.0 (0.001),0.0 (0.000),0.0 (0.000),0.0 (0.000)
90 (1.5),0.1 (0.003),0.0 (0.001),0.0 (0.001),0.0 (0.000),0.0 (0.000),0.0 (0.000)
120 (2.0),0.1 (0.004),0.1 (0.002),0.0 (0.001),0.0 (0.000),0.0 (0.000),0.0 (0.000)
180 (3.0),0.0 (0.001),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,07 February 2025 06:45AM
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),17.8 (0.907),16.9 (0.642),16.4 (0.527),15.8 (0.443),14.1 (0.337),12.8 (0.275)
90 (1.5),16.9 (0.766),17.1 (0.581),17.3 (0.499),17.4 (0.438),13.3 (0.286),10.2 (0.197)
120 (2.0),18.3 (0.765),17.9 (0.562),17.6 (0.473),17.4 (0.407),14.9 (0.301),13.1 (0.238)
180 (3.0),14.1 (0.525),15.6 (0.439),16.5 (0.400),17.4 (0.371),14.5 (0.266),12.3 (0.204)
360 (6.0),14.0 (0.427),14.6 (0.342),15.0 (0.303),15.3 (0.273),17.9 (0.276),19.9 (0.277)
720 (12.0),5.7 (0.139),7.9 (0.151),9.4 (0.156),10.9 (0.159),15.1 (0.190),18.2 (0.207)
1080 (18.0),2.3 (0.050),5.0 (0.084),6.8 (0.100),8.6 (0.110),10.7 (0.119),12.3 (0.123)
1440 (24.0),0.9 (0.018),4.2 (0.064),6.4 (0.085),8.4 (0.099),10.1 (0.101),11.3 (0.102)
2160 (36.0),0.0 (0.000),0.6 (0.008),1.0 (0.012),1.4 (0.014),3.1 (0.027),4.4 (0.034)
2880 (48.0),0.0 (0.000),0.2 (0.002),0.3 (0.003),0.4 (0.004),0.5 (0.004),0.6 (0.004)
4320 (72.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.1 (0.001)
[PREBURST75_META]
Time Accessed,07 February 2025 06:45AM
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),42.6 (2.173),35.9 (1.361),31.4 (1.012),27.2 (0.761),26.8 (0.641),26.6 (0.570)
90 (1.5),37.2 (1.687),37.5 (1.270),37.6 (1.086),37.8 (0.952),30.4 (0.656),24.9 (0.483)
120 (2.0),34.2 (1.427),35.8 (1.123),36.8 (0.987),37.8 (0.886),41.5 (0.836),44.3 (0.804)
180 (3.0),26.2 (0.975),33.7 (0.950),38.6 (0.935),43.3 (0.921),36.5 (0.668),31.4 (0.519)
360 (6.0),32.6 (0.991),30.3 (0.708),28.7 (0.581),27.3 (0.487),35.9 (0.552),42.3 (0.589)
720 (12.0),14.1 (0.348),20.1 (0.384),24.1 (0.399),27.9 (0.408),29.6 (0.373),30.9 (0.351)
1080 (18.0),14.6 (0.317),20.2 (0.340),23.9 (0.349),27.5 (0.355),27.3 (0.302),27.2 (0.270)
1440 (24.0),12.6 (0.251),20.4 (0.313),25.5 (0.339),30.4 (0.358),26.0 (0.261),22.7 (0.205)
2160 (36.0),3.0 (0.052),7.3 (0.098),10.1 (0.118),12.8 (0.133),12.8 (0.113),12.9 (0.101)
2880 (48.0),1.7 (0.027),5.0 (0.062),7.2 (0.077),9.3 (0.088),19.9 (0.160),27.9 (0.200)
4320 (72.0),0.0 (0.000),1.5 (0.017),2.5 (0.025),3.5 (0.030),10.8 (0.077),16.2 (0.104)
[PREBURST90_META]
Time Accessed,07 February 2025 06:45AM
Version,2018_v1
Note,Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.
[END_PREBURST90]From preburst class

Climate Change Factors
[CCF]
[SSP1-2.6]

,<1 hour,1.5 Hours,2 Hours,3 Hours,4.5 Hours,6 Hours,9 Hours,12 Hours,18 Hours,>24 Hours
2030,1.18,1.17,1.16,1.14,1.13,1.12,1.12,1.11,1.1,1.1
2040,1.21,1.19,1.17,1.16,1.15,1.14,1.13,1.12,1.11,1.11
2050,1.22,1.2,1.18,1.17,1.15,1.15,1.14,1.13,1.12,1.11
2060,1.23,1.21,1.2,1.18,1.17,1.16,1.15,1.14,1.13,1.12
2070,1.24,1.22,1.2,1.18,1.17,1.16,1.15,1.14,1.13,1.12
2080,1.23,1.21,1.2,1.18,1.17,1.16,1.15,1.14,1.13,1.12
2090,1.23,1.21,1.2,1.18,1.17,1.16,1.15,1.14,1.13,1.12
2100,1.22,1.2,1.19,1.17,1.16,1.15,1.14,1.13,1.12,1.12
[END_SSP1-2.6]
[SSP2-4.5]
,<1 hour,1.5 Hours,2 Hours,3 Hours,4.5 Hours,6 Hours,9 Hours,12 Hours,18 Hours,>24 Hours
2030,1.18,1.17,1.16,1.14,1.13,1.12,1.12,1.11,1.1,1.1
2040,1.22,1.2,1.19,1.17,1.16,1.15,1.14,1.13,1.12,1.12
2050,1.27,1.24,1.23,1.21,1.19,1.18,1.17,1.16,1.15,1.14
2060,1.3,1.27,1.25,1.23,1.21,1.2,1.19,1.18,1.16,1.16
2070,1.33,1.3,1.28,1.26,1.24,1.22,1.21,1.19,1.18,1.17
2080,1.37,1.33,1.31,1.28,1.26,1.24,1.22,1.21,1.2,1.19
2090,1.4,1.36,1.34,1.31,1.28,1.26,1.24,1.23,1.21,1.2
2100,1.41,1.37,1.35,1.32,1.29,1.27,1.25,1.24,1.22,1.21
[END_SSP2-4.5]
[SSP3-7.0]
,<1 hour,1.5 Hours,2 Hours,3 Hours,4.5 Hours,6 Hours,9 Hours,12 Hours,18 Hours,>24 Hours
2030,1.18,1.17,1.16,1.14,1.13,1.12,1.12,1.11,1.1,1.1
2040,1.23,1.21,1.2,1.18,1.17,1.16,1.15,1.14,1.13,1.12
2050,1.29,1.26,1.24,1.22,1.2,1.19,1.18,1.17,1.16,1.15
2060,1.35,1.32,1.3,1.27,1.25,1.23,1.22,1.2,1.19,1.18
2070,1.42,1.38,1.35,1.32,1.29,1.28,1.26,1.24,1.22,1.21
2080,1.5,1.45,1.42,1.38,1.35,1.33,1.3,1.28,1.26,1.25
2090,1.59,1.53,1.49,1.44,1.4,1.38,1.35,1.33,1.3,1.29
2100,1.66,1.59,1.55,1.5,1.45,1.42,1.39,1.37,1.34,1.32
[END_SSP3-7.0]
[SSP5-8.5]
,<1 hour,1.5 Hours,2 Hours,3 Hours,4.5 Hours,6 Hours,9 Hours,12 Hours,18 Hours,>24 Hours
2030,1.2,1.18,1.17,1.16,1.14,1.13,1.13,1.12,1.11,1.11
2040,1.26,1.24,1.22,1.2,1.18,1.17,1.16,1.15,1.14,1.14
2050,1.34,1.31,1.29,1.26,1.24,1.23,1.21,1.2,1.18,1.18
2060,1.42,1.38,1.35,1.32,1.29,1.28,1.26,1.24,1.22,1.21
2070,1.52,1.47,1.43,1.4,1.36,1.34,1.31,1.29,1.27,1.26
2080,1.63,1.57,1.52,1.48,1.43,1.4,1.37,1.35,1.33,1.31
2090,1.77,1.69,1.64,1.58,1.52,1.49,1.45,1.42,1.39,1.37
2100,1.86,1.77,1.71,1.64,1.58,1.54,1.5,1.47,1.43,1.41

[END_SSP5-8.5]

[Climate_Change_INITIAL_LOSS]

,Losses SSP1-2.6,Losses SSP2-4.5,Losses SSP3-7.0,Losses SSP5-8.5

2030,1.04,1.04,1.04,1.04

2040,1.04,1.04,1.05,1.05

2050,1.04,1.05,1.06,1.07

2060,1.05,1.06,1.07,1.08

2070,1.05,1.07,1.08,1.1

2080,1.05,1.07,1.09,1.11

2090,1.05,1.07,1.11,1.13

2100,1.04,1.08,1.12,1.15

[END_Climate_Change_INITIAL_LOSS]

[Climate_Change_CONTINUING_LOSS]

,Losses SSP1-2.6,Losses SSP2-4.5,Losses SSP3-7.0,Losses SSP5-8.5

2030,1.08,1.08,1.08,1.09

2040,1.09,1.1,1.1,1.11

2050,1.1,1.11,1.13,1.14

2060,1.1,1.13,1.15,1.18

2070,1.1,1.14,1.18,1.21

2080,1.1,1.16,1.21,1.25

2090,1.1,1.17,1.24,1.3

2100,1.1,1.17,1.27,1.33

[END_Climate_Change_CONTINUING_LOSS]

[TEMPERATURE_CHANGES]

,SSP1-2.6,SSP2-4.5,SSP3-7.0,SSP5-8.5

2030,1.2,1.2,1.2,1.3

2040,1.3,1.4,1.5,1.6

2050,1.4,1.7,1.8,2.1

2060,1.5,1.9,2.2,2.5

2070,1.5,2.1,2.5,3.0

2080,1.5,2.2,2.9,3.5

2090,1.5,2.4,3.3,4.1

2100,1.4,2.5,3.6,4.5

[END_TEMPERATURE_CHANGES]

[CCF_META]

Time Accessed,07 February 2025 06:45AM

Version,2024_v1

Note,Updated climate change factors for IFD Initial loss and continuing loss based on IPCC AR6 temperature increases from the updated Climate Change Considerations (Book 1: Chapter 6) in ARR (Version 4.2). ARR recomends the use of Current and near-term (2030 midpoint). Medium-term (2050 midpoint) and Long-term (2090 midpoint)

[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),17.0,9.0,8.4,9.2,9.5,8.5

90 (1.5),17.4,9.7,8.8,9.2,9.2,9.0

120 (2.0),16.4,9.7,9.0,9.4,9.0,7.7

180 (3.0),18.1,11.1,9.6,9.6,9.0,8.1

360 (6.0),17.5,11.6,10.6,11.4,9.7,6.2

720 (12.0),21.5,15.6,14.1,14.2,12.3,7.6

1080 (18.0),22.3,16.7,15.5,15.6,14.0,10.1

1440 (24.0),23.1,17.4,16.2,16.3,15.6,11.6

2160 (36.0),25.4,20.7,20.7,21.2,19.6,15.1

2880 (48.0),25.9,21.6,21.9,22.0,21.0,12.9

4320 (72.0),26.6,22.5,23.4,23.9,23.1,17.5

[BURSTIL_META]

Time Accessed,07 February 2025 06:45AM

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),8.6,16.6,17.2,16.4,16.1,17.1

90 (1.5),8.2,15.9,16.8,16.4,16.4,16.6

120 (2.0),9.2,15.9,16.6,16.2,16.6,17.9

180 (3.0),7.5,14.5,16.0,16.0,16.6,17.5

360 (6.0),8.1,14.0,15.0,14.2,15.9,19.4

720 (12.0),4.1,10.0,11.5,11.4,13.3,18.0

1080 (18.0),3.3,8.9,10.1,10.0,11.6,15.5

1440 (24.0),2.5,8.2,9.4,9.3,10.0,14.0

2160 (36.0),0.2,4.9,4.9,4.4,6.0,10.5

2880 (48.0),0.0,4.0,3.7,3.6,4.6,12.7

4320 (72.0),0.0,3.1,2.2,1.7,2.5,8.1

[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]

1. ARR 2019 legacy site (for climate change factors, https://data-legacy.arr-software.org/):

Results - ARR Data Hub

[STARTTXT]

Input Data Information
[INPUTDATA]
Latitude,-35.96159
Longitude,147.00532
[END_INPUTDATA]

River Region
[RIVREG]
division,Murray-Darling Basin
rivregnum,1
River Region,Upper Murray River
[RIVREG_META]
Time Accessed,09 February 2025 09:28PM
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,09 February 2025 09:28PM
Version,2016_v1
[END_LONGARF]

Storm Losses
[LOSSES]
id,9767.0
Storm Initial Losses (mm),26.0
Storm Continuing Losses (mm/h),4.6
[LOSSES_META]
Time Accessed,09 February 2025 09:28PM

Version,2016_v1
[END_LOSSES]

Temporal Patterns
[TP]
code,MB
Label,Murray Basin
[TP_META]
Time Accessed,09 February 2025 09:28PM
Version,2016_v2
[END_TP]

Areal Temporal Patterns
[ATP]
code,MB
arealabel,Murray Basin
[ATP_META]
Time Accessed,09 February 2025 09:28PM
Version,2016_v2
[END_ATP]

BOM IFD Depths
[BOMIFD]
No data,No data found at this location!
[BOMIFD_META]
Time Accessed,09 February 2025 09:28PM
[END_BOMIFD]

Median Preburst Depths and Ratios
[PREBURST]
min (h)\AEP(%),50,20,10,5,2,1,
60 (1.0),2.5 (0.129),1.7 (0.065),1.2 (0.038),0.7 (0.019),0.9 (0.020),1.0 (0.021),
90 (1.5),1.9 (0.084),1.6 (0.053),1.4 (0.040),1.2 (0.030),0.7 (0.016),0.4 (0.007),
120 (2.0),5.1 (0.211),3.1 (0.099),1.9 (0.050),0.6 (0.015),0.4 (0.008),0.2 (0.004),
180 (3.0),2.0 (0.073),2.6 (0.072),2.9 (0.071),3.3 (0.071),1.5 (0.028),0.2 (0.003),
360 (6.0),3.2 (0.098),2.7 (0.062),2.3 (0.046),1.9 (0.035),3.8 (0.059),5.2 (0.073),
720 (12.0),0.1 (0.004),0.5 (0.009),0.7 (0.012),0.9 (0.014),2.1 (0.026),2.9 (0.033),
1080 (18.0),0.0 (0.000),0.3 (0.005),0.5 (0.008),0.7 (0.009),1.6 (0.017),2.2 (0.022),
1440 (24.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.8 (0.008),1.4 (0.013),
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,09 February 2025 09:28PM
Version,2018_v1
Note,Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.
[END_PREBURST]

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,09 February 2025 09:28PM
Version,2018_v1
Note,Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.
[END_PREBURST10]

25% Preburst Depths
[PREBURST25]
min (h)\AEP(%),50,20,10,5,2,1,
60 (1.0),0.1 (0.004),0.0 (0.002),0.0 (0.001),0.0 (0.000),0.0 (0.000),0.0 (0.000),
90 (1.5),0.1 (0.003),0.0 (0.001),0.0 (0.001),0.0 (0.000),0.0 (0.000),0.0 (0.000),
120 (2.0),0.1 (0.004),0.1 (0.002),0.0 (0.001),0.0 (0.000),0.0 (0.000),0.0 (0.000),
180 (3.0),0.0 (0.001),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,09 February 2025 09:28PM

Version,2018_v1

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

[END_PREBURST25]

75% Preburst Depths

[PREBURST75]

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

60 (1.0),17.8 (0.907),16.9 (0.642),16.4 (0.527),15.8 (0.443),14.1 (0.337),12.8 (0.275),

90 (1.5),16.9 (0.766),17.1 (0.581),17.3 (0.499),17.4 (0.438),13.3 (0.286),10.2 (0.197),

120 (2.0),18.3 (0.765),17.9 (0.562),17.6 (0.473),17.4 (0.407),14.9 (0.301),13.1 (0.238),

180 (3.0),14.1 (0.525),15.6 (0.439),16.5 (0.400),17.4 (0.371),14.5 (0.266),12.3 (0.204),

360 (6.0),14.0 (0.427),14.6 (0.342),15.0 (0.303),15.3 (0.273),17.9 (0.276),19.9 (0.277),

720 (12.0),5.7 (0.139),7.9 (0.151),9.4 (0.156),10.9 (0.159),15.1 (0.190),18.2 (0.207),

1080 (18.0),2.3 (0.050),5.0 (0.084),6.8 (0.100),8.6 (0.110),10.7 (0.119),12.3 (0.123),

1440 (24.0),0.9 (0.018),4.2 (0.064),6.4 (0.085),8.4 (0.099),10.1 (0.101),11.3 (0.102),

2160 (36.0),0.0 (0.000),0.6 (0.008),1.0 (0.012),1.4 (0.014),3.1 (0.027),4.4 (0.034),

2880 (48.0),0.0 (0.000),0.2 (0.002),0.3 (0.003),0.4 (0.004),0.5 (0.004),0.6 (0.004),

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

[PREBURST75_META]

Time Accessed,09 February 2025 09:28PM

Version,2018_v1

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

[END_PREBURST75]

90% Preburst Depths

[PREBURST90]

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

60 (1.0),42.6 (2.173),35.9 (1.361),31.4 (1.012),27.2 (0.761),26.8 (0.641),26.6 (0.570),

90 (1.5),37.2 (1.687),37.5 (1.270),37.6 (1.086),37.8 (0.952),30.4 (0.656),24.9 (0.483),

120 (2.0),34.2 (1.427),35.8 (1.123),36.8 (0.987),37.8 (0.886),41.5 (0.836),44.3 (0.804),

180 (3.0),26.2 (0.975),33.7 (0.950),38.6 (0.935),43.3 (0.921),36.5 (0.668),31.4 (0.519),

360 (6.0),32.6 (0.991),30.3 (0.708),28.7 (0.581),27.3 (0.487),35.9 (0.552),42.3 (0.589),

720 (12.0),14.1 (0.348),20.1 (0.384),24.1 (0.399),27.9 (0.408),29.6 (0.373),30.9 (0.351),

1080 (18.0),14.6 (0.317),20.2 (0.340),23.9 (0.349),27.5 (0.355),27.3 (0.302),27.2 (0.270),

1440 (24.0),12.6 (0.251),20.4 (0.313),25.5 (0.339),30.4 (0.358),26.0 (0.261),22.7 (0.205),

2160 (36.0),3.0 (0.052),7.3 (0.098),10.1 (0.118),12.8 (0.133),12.8 (0.113),12.9 (0.101),

2880 (48.0),1.7 (0.027),5.0 (0.062),7.2 (0.077),9.3 (0.088),19.9 (0.160),27.9 (0.200),

4320 (72.0),0.0 (0.000),1.5 (0.017),2.5 (0.025),3.5 (0.030),10.8 (0.077),16.2 (0.104),

[PREBURST90_META]

Time Accessed,09 February 2025 09:28PM

Version,2018_v1

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

[END_PREBURST90]

Interim Climate Change Factors

[CCF]

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

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

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

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

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

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

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

[CCF_META]

Time Accessed,09 February 2025 09:28PM

Version,2016_v1

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

[END_CCF]

[ENDTXT]

APPENDIX C

ARTC Review

Document Control Information			
	Contractor DC to update for re-submission	**Submitted Document No. or Transmittal No.:**	Martinus-PTRAN-001071
Project:	2100 - A2I	**Date Submission Received:**	13/03/2025
Comment Sheet Number_Revision:	5-0052-210-IHY-B6-CS-0001_C	**Comment Sheet Title:**	***External Comment Sheet - A2I | Flood Design Report - Tabletop Yard***
Revision Date:	20/03/2025	**Documents related in Aconex** (by IR DC)	Yes

Review Comments (Reviewer)									Responses (Document Owner)					Close-Out			
#	PSR ID No. **or** Compliance Reference Document *(State the fully qualified reference the deliverable is non-compliant with)*	Document / drawing number - Revision Number	Section # / page #	Engineering Assurance Stage	Comment *(for example must be specific on non compliance. Reference mark-ups, if required)*	Comment Type	Full Name	Date	Full Name	Company	Date	Response *(must be specific on how the comment has been addressed. Agreed approach for re-submission)*	Documentation Section # / Figure #	Full Name	Date	Comment Status	Close-Out Comment
Example	*IR-SR-A2I-517 - or 01-3500-PD-P00-DE-0008-A*	*0-0000-900-PEN-00-TE-0020_A*		*CRR*	*Is there sufficient space for a 10m maintenance vehicle to turn around at the end of the RMAR?*	*Non-Compliant*	*Joe Bloggs*	*15/02/2023*	*Fred Bloggs*	*Designer*	*15/03/2023*	*The area has been increased - now possible to turn 12.5m vehicle. The drawings are updated.*	*01-3500-PD-P00-DE-0008-A 01-3500-PD-P00-DE-0015-C*	*Jane Doe*	*27/09/2023*	OPEN	
1	CoA E42	5-0052-210-IHY-B6-RP-0001_A.pdf	Page 28, 5-0052-210-IHY-B6-RP-0001_A, Section 6.4.4	DDR	Flow is not an appropriate parameter for comparing inundation time at a location. Please utilise water level instead of flow.	Non-Compliant	Ayub Ali	3/03/2025	Yucen Lu	DJV Flood Modeller	10/03/2025	The flood level comparison has been added to represent the changes in duration of inundation (yellow highlight in the screenshot below)	Section 6.4.4 of 5-0052-210-IHY-B6-RP-0001	Ayub Ali	18/03/2025	CLOSED	It's a time series, not peak level. Hence, replace the term "peak flood levels" with just "flood levels". This item can be closed once it is corrected. Ayub confirmed sighting evidence change 20//3/25
2																	
3																	
4																	

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)

6.4.4 Changes in Duration of Inundation

There are no changes in duration inundations as there is no change in peak flood levels, peak flood velocities and peak flood hazard. The flood levels comparison between existing and design at the reporting locations are shown as below.

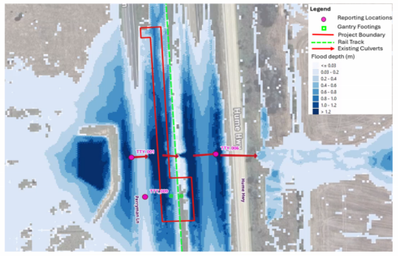


Figure 6-5: 1% AEP Flood Depth Extent – Reporting Locations

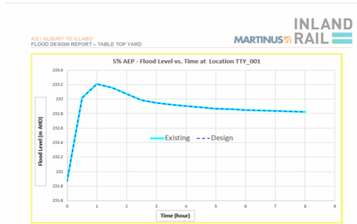


Figure 6-6: 5% AEP - Flood Level vs. Time at Location TTY_001

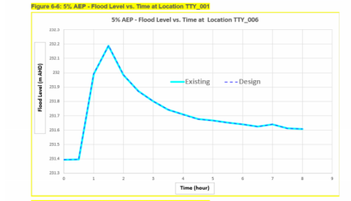


Figure 6-7: 5% AEP - Flood Level vs. Time at Location TTY_006

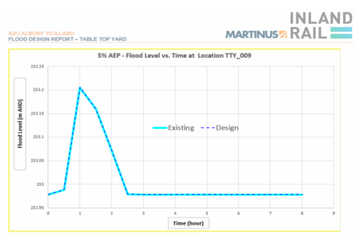


Figure 6-8: 5% AEP - Flood Level vs. Time at Location TTY_009

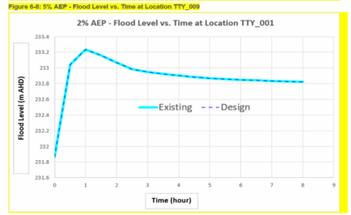


Figure 6-9: 2% AEP - Flood Level vs. Time at Location TTY_001

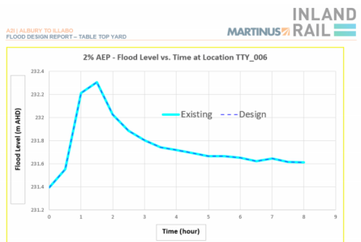


Figure 6-10: 2% AEP - Flood Level vs. Time at Location TTY_006

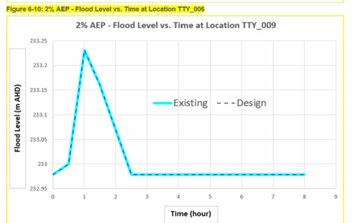


Figure 6-11: 2% AEP - Flood Level vs. Time at Location TTY_009

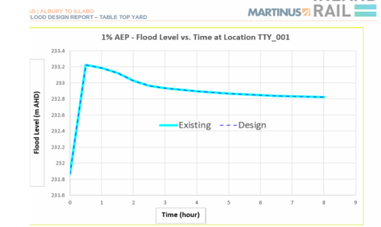


Figure 6-: 1% AEP - Flood Level vs. Time at Location TTY_001

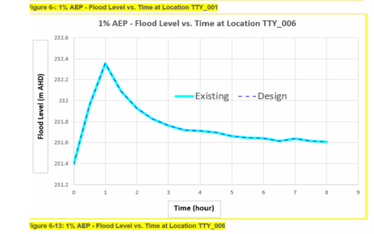


Figure 6-13: 1% AEP - Flood Level vs. Time at Location TTY_006

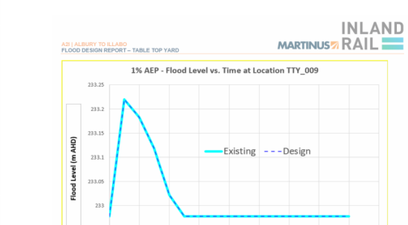


Figure 6-14: 1% AEP - Flood Level vs. Time at Location TTY_009

The results show that there is no increase in duration of inundation as a result of the project works in the 5% AEP, 2% AEP and 1% AEP design events and this complies with CoA E42(a).

APPENDIX D

External Consultation Review

A2I Flood Design Report CONSULTATION - COMMENTS REGISTER

Stakeholder Category	Stakeholder Name	Flood Design Report name	Document reference (e.g. section, figure, table)	Date raised	Topic that comment relates to	Comments	Full Name	Role	Date	Response (entire box required once how the comment has been addressed)	Where addressed (section # if report etc)	Full Name	Company	Date	Comment Outcome
	CPHR	A2I-Tabletop Yard-Flood Design Report (5-0052-210-IHY-B6-RP-0001)	Generally	10/04/2025	Generally	The flood impacts of the proposed works (removal of a gantry) is negligible. As such no major concerns from a flood impact perspective.	Zoe Cruice			Noted					OPEN
	CPHR	A2I-Tabletop Yard-Flood Design Report (5-0052-210-IHY-B6-RP-0001)	Flood modelling figures	10/04/2025	Flood immunity	The railway line seems to be overtopped in frequent events. The mapping seems to indicate inundation by approximately 250mm in the 5% AEP design flood. Was increasing the flood immunity of the rail considered?	Zoe Cruice			The project and CSSI CoA requirements are to make no-worse. So no improvement to existing immunity was considered or required.					OPEN

Close-Out Comment

APPENDIX E

Independent Flood Consultant

E1 - Review

E2 - Certificate

APPENDIX E1

Independent Flood Consultant Review

Project: 2300 **Deliverable:** Tabletop Yard

Comment Sheet Reference: 5-0052-210-IHY-B6-CS-0001-PE_C

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 qualified reference	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-B6-RP-0001_A	TUFLOW files	Hatch	Dan Williams	Flood Assessment	7/04/2025	DDR	A modelling based flood impact assessment is not required to conclude that the design works do not impact the existing flood conditions. Neverthless, this has been undertaken and has determined that the design works have negligible flood impacts, as expected.		Minor	Zoe Cruice	Engineering Manager	22/04/2025	It is the environmental approvals team view that quantitative assessments are required to demonstrate the Nil, positive or negative impacts from the works to the existing flooding, in accordance with condition E43.		Darren Lyons	Hatch	23/05/2025	CLOSED	No further comments

APPENDIX E2

Independent Flood Consultant Certificate

Schedule 12 Consultant Certificate

Part A – Consultant's Statement of Conformance for Services

(clause 5.3 (b))

Date:	23 May 2025
Project:	Albury to Parkes Enhancement Project (A2P) (the Project) B6 – Table Top Yard Flood (IFC)
Consultant:	Hatch Pty Ltd ABN 59 008 630 500
In relation to:	The contract between the Consultant and Martinus Rail Pty Ltd (MR) dated …18 March 2024…….with respect to the Project

1. This Statement of Conformance is given in relation to the Agreement.

2. The Consultant hereby certifies to MR that:

   a. the design calculations and drawings are agreed with the Designer; and

   b. it has provided a full and independent assessment of all factors influencing the final integrity of the specified components of the Works,

   c. it has reviewed the design calculations, models and drawings, and undertaken separate calculations for critical aspects of the Works,

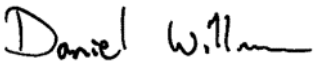
   d. it has undertaken an independent detailed check of the Design Documentation,

   e. it has provided all advice and comment, including calculations, in writing.

Statement 2 above applies to the extent clarified in Section 3 and 4 on the following page.

……..

Signature of Authorised Person



……..

Signature of Witness

Darren Lyons

……..

Name of Authorised Person

Daniel Williams

……..

Name of Witness

Schedule 12 Consultant Certificate

Part A – Consultant's Statement of Conformance for Services

(clause 5.3 (b))

3. This statement of conformance applies to the following work packages only:

    a. B6 – Table Top Yard Flood (IFC)

4. Statement 2 is limited to the degree at which the design and review has progressed at the relevant phase (SDR, PDR, DDR & IFC) and the information provided by Martinus.

    All proof engineering comments identified as part of our IFC review have been closed.

MARTINUS

Head Office | 1/23-27 Waratah Street | KIRRAWEE NSW 2232