D & M Consulting
CONSULTING ENGINEERS

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I CIVIL & STRUCTURAL DESIGN I BUILDING REPORTS & CERTIFICATION I
I ROAD & DRAINAGE DESIGN I RESIDENTIAL, COMMERCIAL AND INDUSTRIAL DESIGNS
I FLOOD REPORTS

Flood Report
For
Proposed Rezoning Application
at

Lot 10 & 11 DP1012641

120 - 140 Bridge Street, Picton

My reference – 210599

-

Date 20 December 2021

D & M Consulting

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Contents

1. Introduction

1.1. General

This flood report has been prepared by Andrew Bailey of D & M Consulting as part of the proposed plan to rezone the property. This report investigates the extent of flooding and the impacts of flooding on the proposed properties at 120 - 140 Bridge Street Picton and the rezoning application.

1.2. Site Description

The subject property is Lot 10 & 11 DP1012641, 120 - 140 Bridge Street Picton is located on the Northwestern side of Bridge Street adjoining the Main Southern Railway. See Below for Locality Plan. Figure 1.

The existing site 120 Bridge Street has an existing industrial building and storage yard with a steep gully to the western boundary forming a water course from upstream and the adjoin site 140 Bridge Street which is vacant with grasslands and some trees. The steep gully is vegetated with some native and exotic trees.

Lot 10, 120 Bridge Street is currently zoned IN2 Light Industrial & RU2 Rural Landscape with Lot 11, 140 Bridge Street RU2 Rural Landscape.

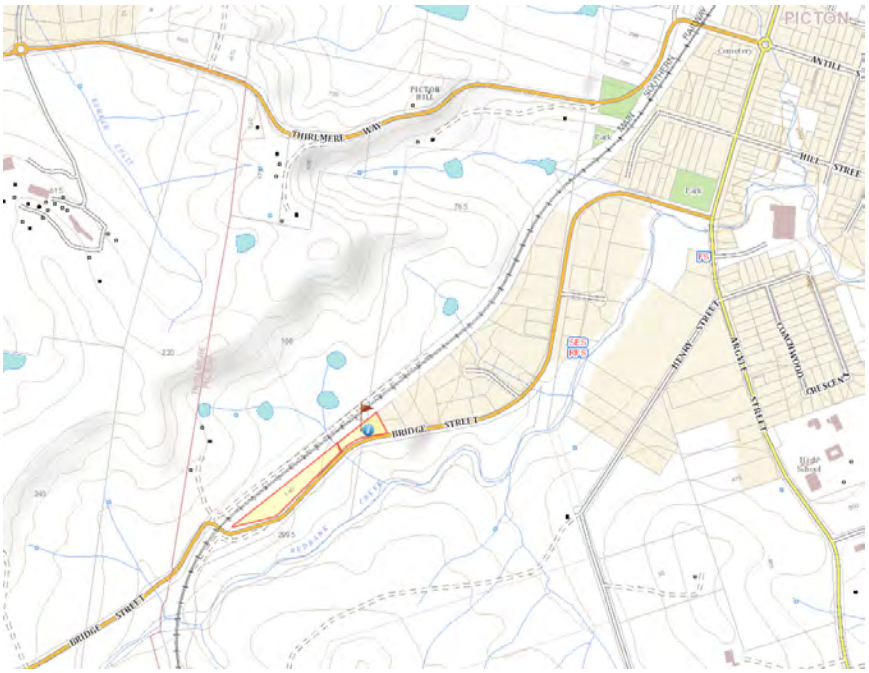


Figure 1 - Site Locality

1.3. Proposal

The proposed planning proposal is to rezone both Lot 10, 120 Bridge Street and Lot 11, 140 Bridge Street to IN2 Light Industrial. This will allow for future expansions of the current landholding industry.

2. Flooding

A second order stream runs through the gully between the two sites. The existing watercourse drains an upstream catchment to the west of the railway line. During larger storm events the watercourse would experience flooding.

To analyse the flooding from the upstream catchment a Drains model has been used to model the volume of stomwater through the upstream catchment. A HEC RAS Model has be used to model the 1% AEP flood event and the possible maximum flood (PMF) through the railway culvert, the site and through the road culvert.

3. Drainage Analysis

3.1. Catchment

The upstream catchment is a large rural catchment (approximate 21.5hectares) which drains through two small watercourses which converge into one watercourse before draining through a culvert under the railway. A surveyor has surveyed the existing culvert, the railway culvert is a 1200 diameter pipe and the culvert under Bridge Street is a 1350mm pipe. A catchment plans is detailed overleaf in Figure 2. An Enlarged Catchment Plan is also available to review in Appendix A.

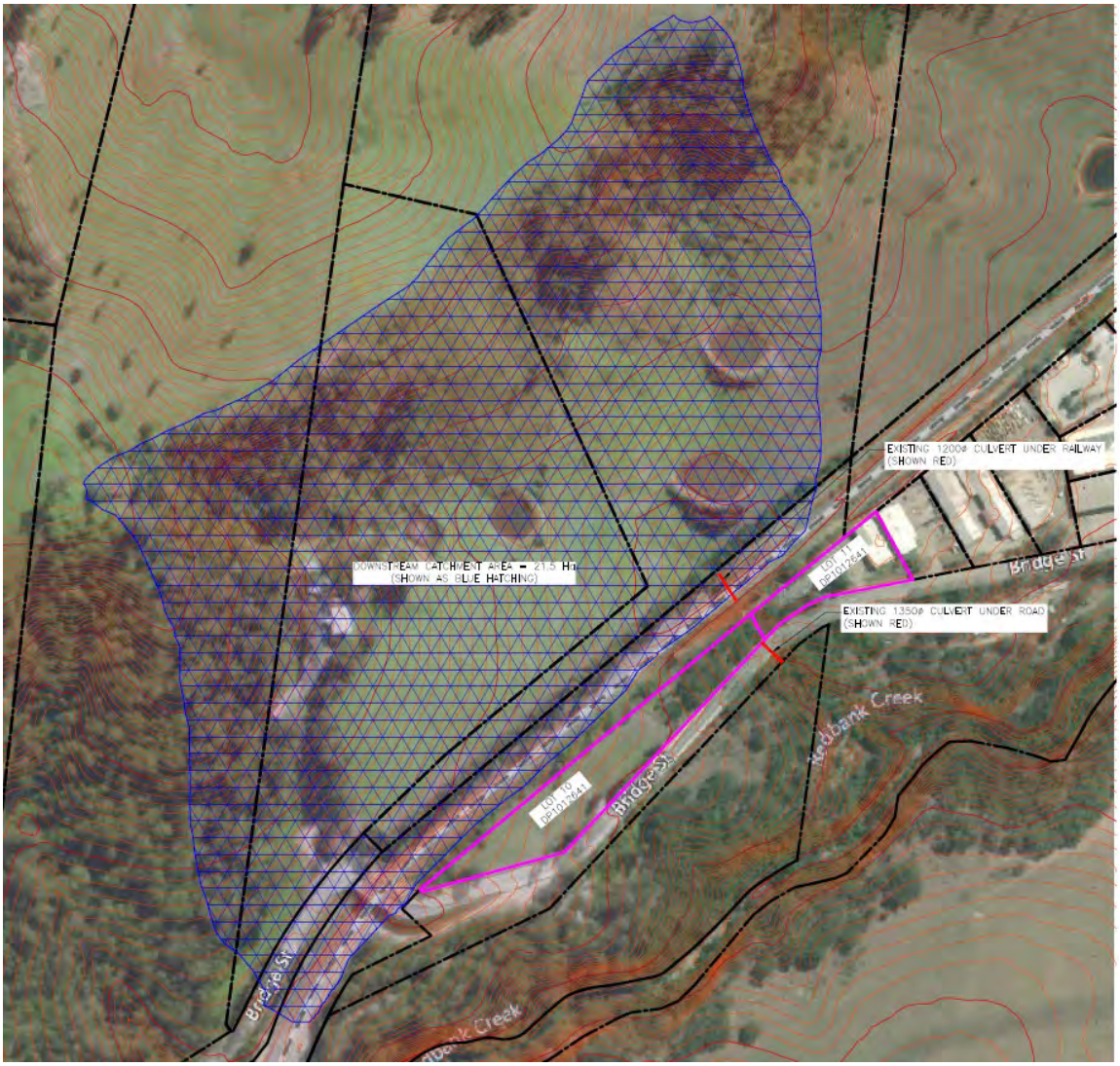


Figure 2: Catchment Plan

3.2. Drains modelling

To analyse the runoff from the upstream rural catchment a drainage model has been set up using Drains computer software to determine the volume runoff for the 1% AEP stormevent.

A 1 in 2000 year storm event has been utilised to simulate a PMF storm event and to provide an approximate runoff volume for the PMF storm event.

4. Flood Modelling

4.1. HEC – RAS Modelling

A 2D flood model for the subject site has been performed using HEC-RAS Version 6.0. and LiDAR survey for the site and upstream catchments. The existing culverts have been modeled into the surface. The upstream boundary conditions have been applied to the HEC-RAS Model, for the upstream rural catchment. The downstream boundary condition has been set as nominal depth with a grade of 1.0% Grade. The Manning's value of 0.075 has been adopted for the existing site surface condition due the overgrown vegetation within the existing creek area.

4.2. Reach Boundary Conditions

The upstream boundary conditions for the overland flow entering the existing railway culvert are set as a hydrograph with a maximum peak flow rate of 4.87m^3/s for the 1% AEP and 7.2m^3/s for the PMF. The upstream flow will be controlled through the 1200diameter pipe under the railway. The height of the railway embankment to the invert of the 1200diameter pipe is approximately 20m.

4.3. Results

The site is subject to flooding from the upstream catchment. As demonstrated by the results from the HEC-RAS model. The model was run for the 1% AEP and the PMF storm event, the results have been documented below. All detailed model result plans can be viewed in Appendix B.

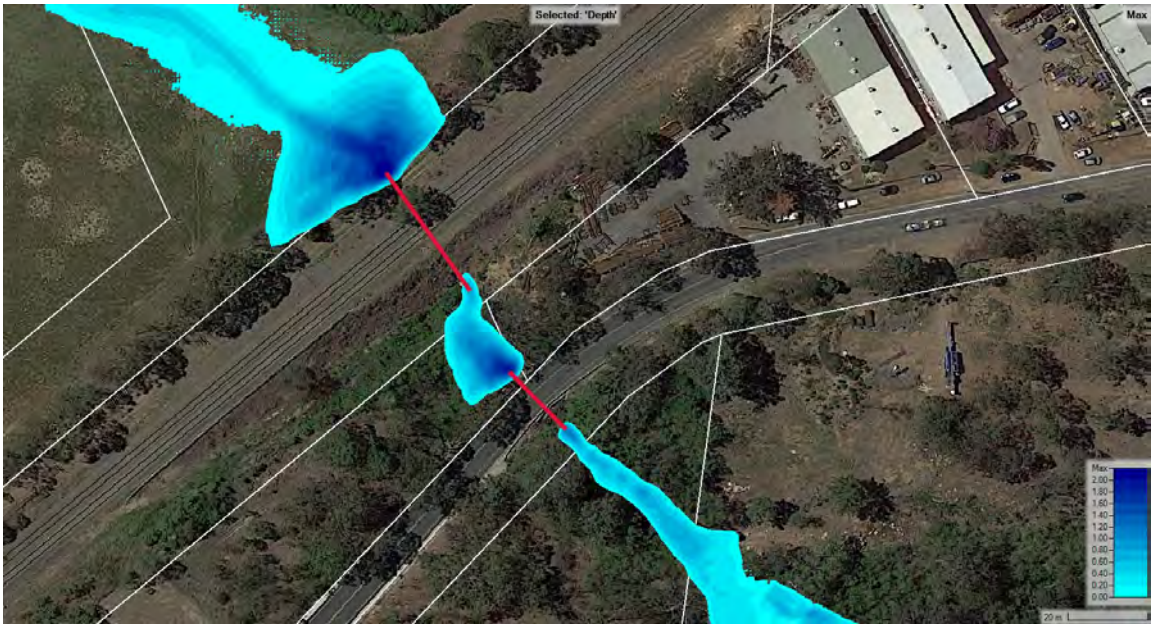


Figure 3: 1% AEP Flood Depths (Max. Upstream Depth 2.5m)

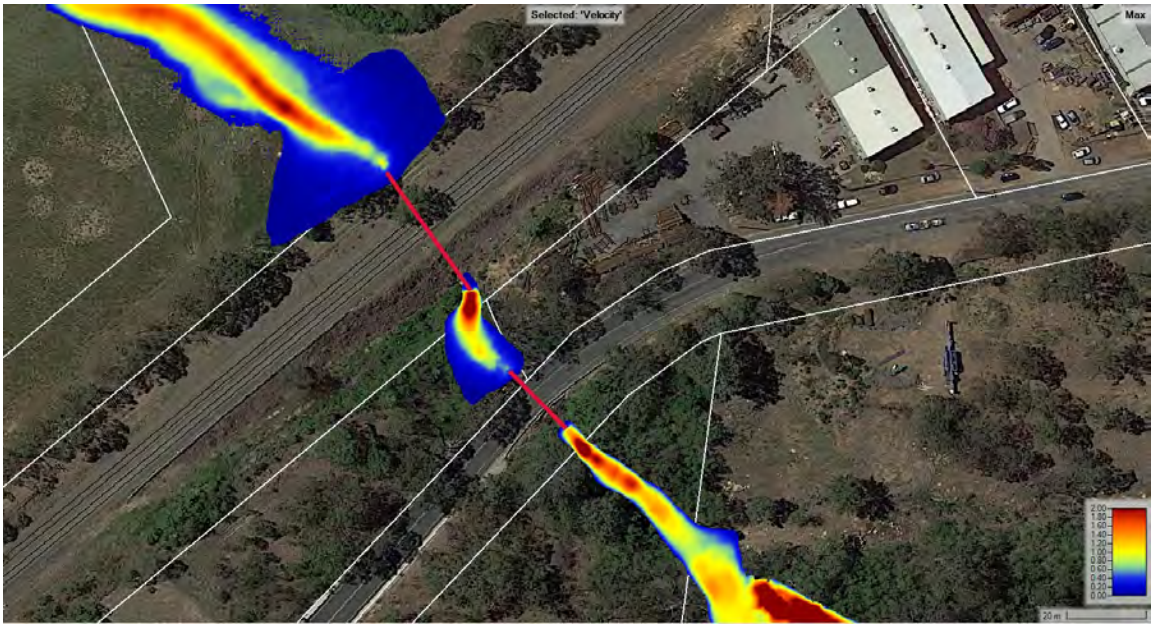


Figure 4: 1% AEP Flood Velocity

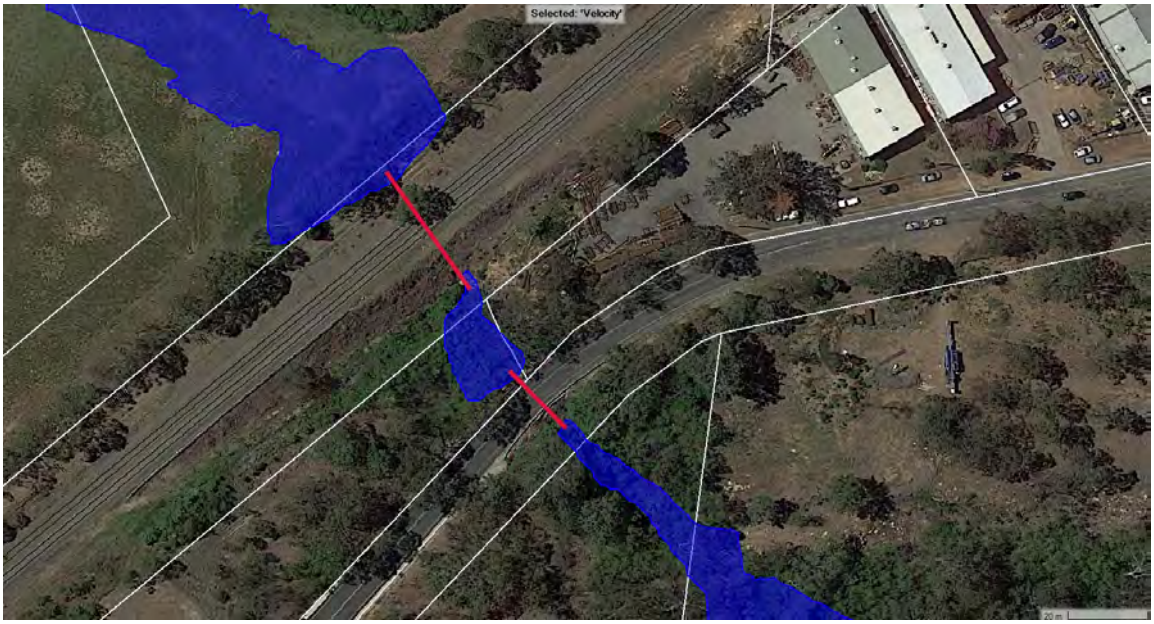


Figure 5: 1% AEP Flood Inundation Boundary

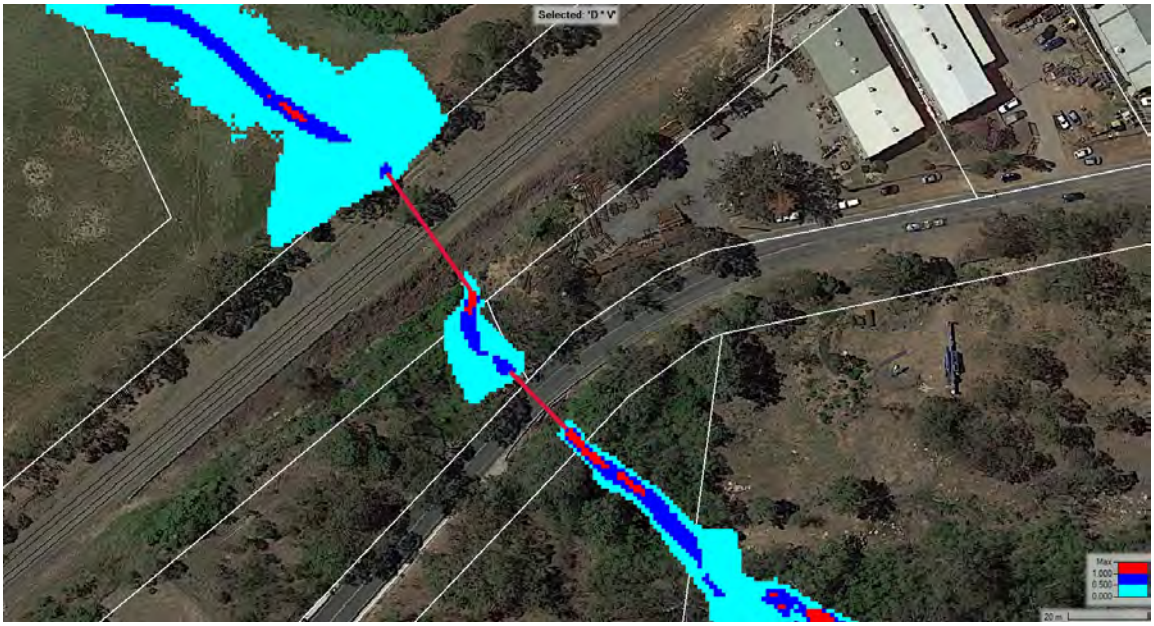


Figure 6: 1% AEP Flood Hazard (Depth Velocity Product)

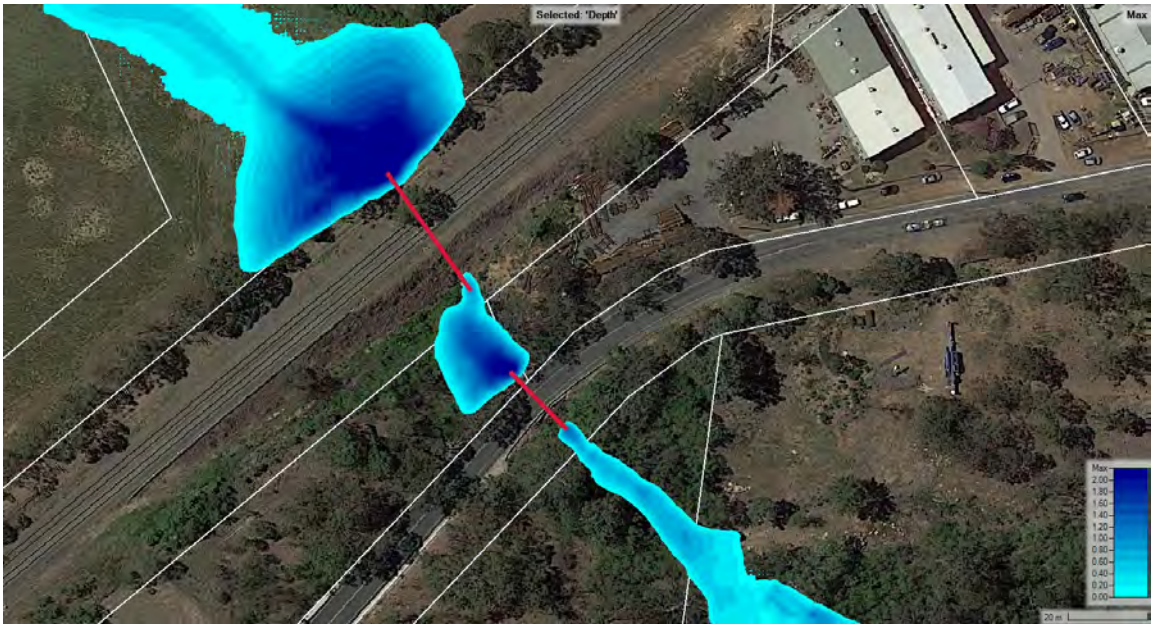


Figure 7: PMF Flood Depths (Max. Upstream Depth 3.5m)

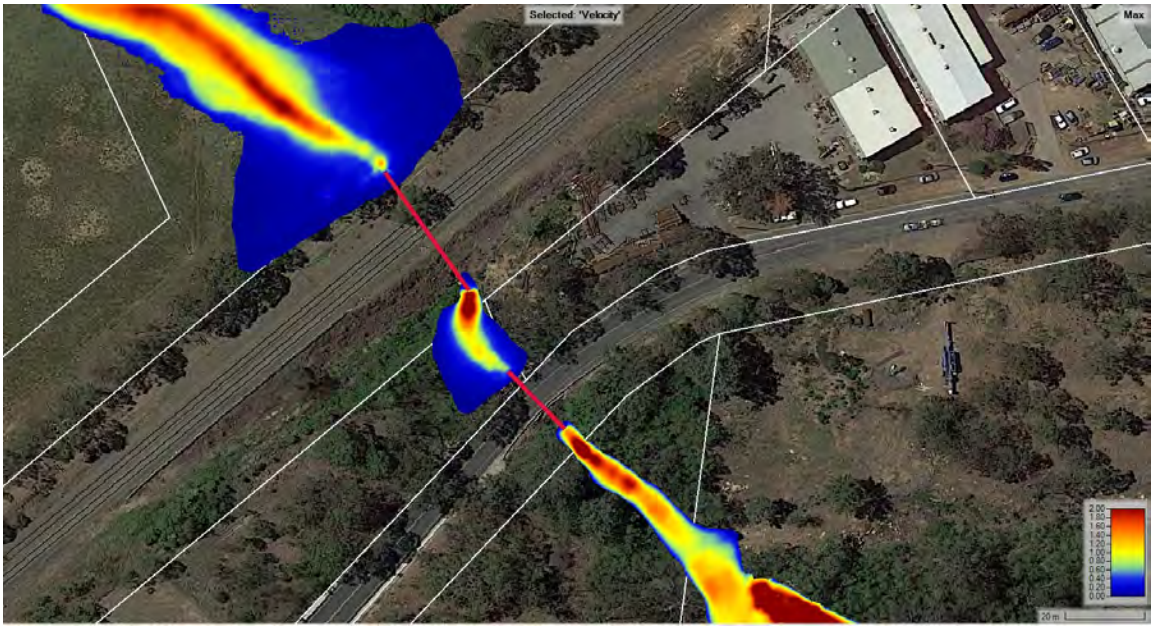


Figure 8: PMF Flood Velocity

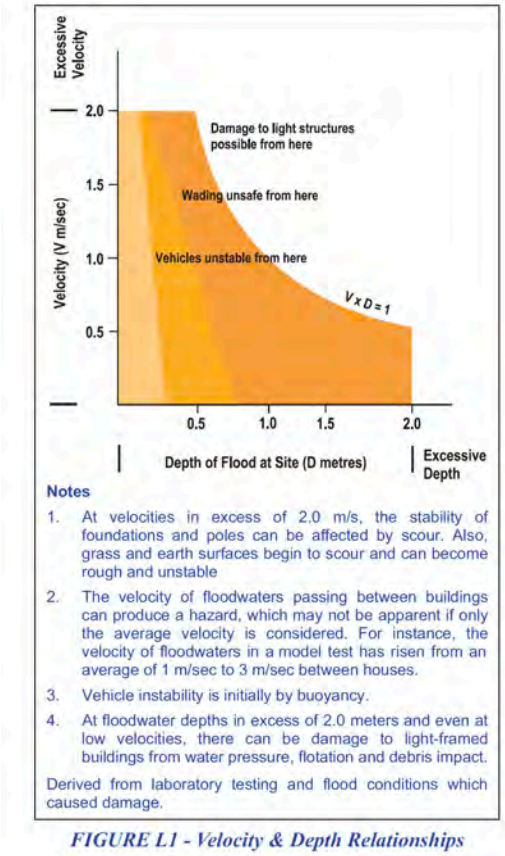
Figure 9: PMF Flood Inundation Boundary

Figure 10: PMF Flood Hazard (Depth Velocity Product)

5. Flood Classification and Considerations for Rezoning

From reviewing the flood results impacting 120 to 140 Bridge Street the flooding would be classified as mainstream flooding with a Medium to low flood risk. The area of flooding is localised to a very small area on 120 Bridge Street and most of the flooding is within 140 Bridge Street. The overall flood inundation is approximate 20m wide. The medium to low flood risk will not impacted on the proposed rezoning from RU2 Rural Landscape to IN2 Light Industrial as it is permissible within Wollondilly Shire Council to development Light Industrial within medium flood risk precinct. The proposed redevelopment will not impact on the flooding or increase flooding within the floodplain. An easement may need to be placed on the lots to ensure overland flow from upstream properties is not impeded with future development of the site.

Below Figure 11 from NSW Floodplain Development Manual to determine flood hazard and flood risk precinct.



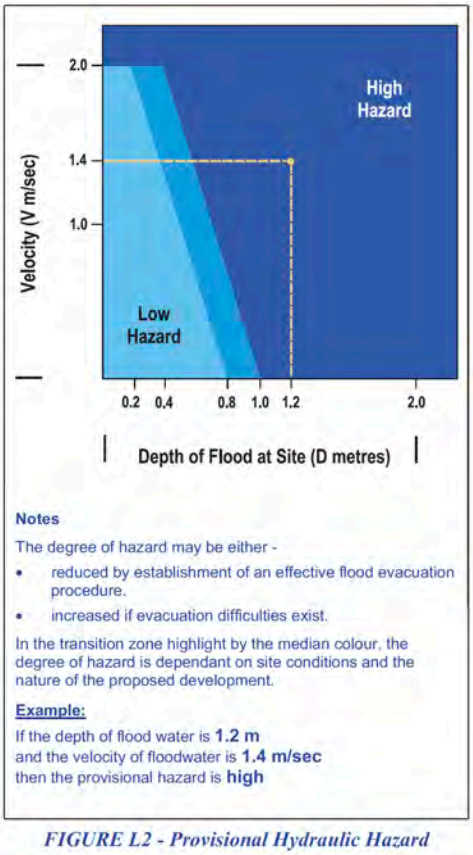


Figure 11: Figures L1 & L2 form NSW Floodplain Development Manual

6. Conclusion

The site is subject to flooding in the form of mainstream flooding during a 1% AEP.

The flood hazard has been classified as Medium to Low flood Risk.

Majority of the flooding is on Lot 11, 140 Bridge Street.

Overall width of the flood inundation is 20m.

It is permissible Rezone from RU2 Rural Landscape to IN2 Light Industrial.

The proposed redevelopment will not impact on the flooding or increase flooding within the floodplain.

An easement may need to be placed on the lots to ensure overland flow from upstream properties is not impeded with future development of the site.

Should anything in this report be unclear please contact the author for clarification. Do not assume.

Yours Faithfully,

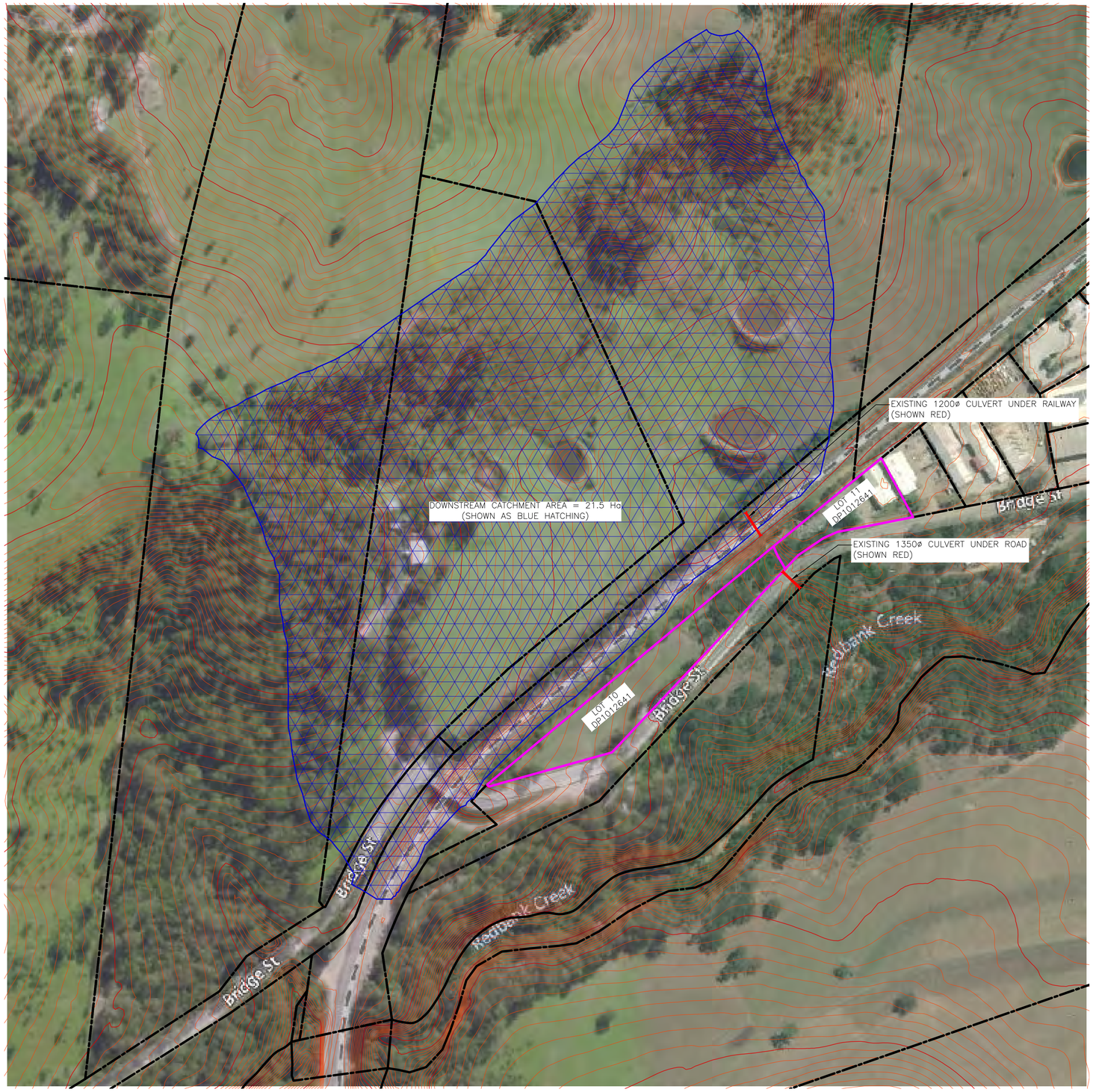
Andrew Bailey
Civil Designer

David Turner (Checked)
B.E. MIEA. CP.Eng 275717

7. References

Floodplain Management Manual (New South Wales Government April 2005)

Appendix A (Catchment Plan)



COUNTOURS KEY

NATURAL SURFACE MAJOR CONTOURS (CONTOUR INTERVAL = 10m)

NATURAL SURFACE MINOR CONTOURS (CONTOUR INTERVAL = 1m)

N

W E

S

FLOOD STUDY PLAN

SCALE

0 40m 80m 120m 160m 200m

20m 60m 100m 140m 180m

1:2000 @ A1

1:4000 @ A3

REV	AMENDMENTS	REV DATE	INITIALS
—	–	–	–
—	–	–	–
—	–	–	–
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A1 SCALE: AS SHOWN ON SHEET DATE: 17/12/21

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PROJECT: FLOOD STUDY – –

SHEET: 1/3

DWG NO: 210599

DESIGNED: AJB
DRAWN: KWH
CHECKED: AJB

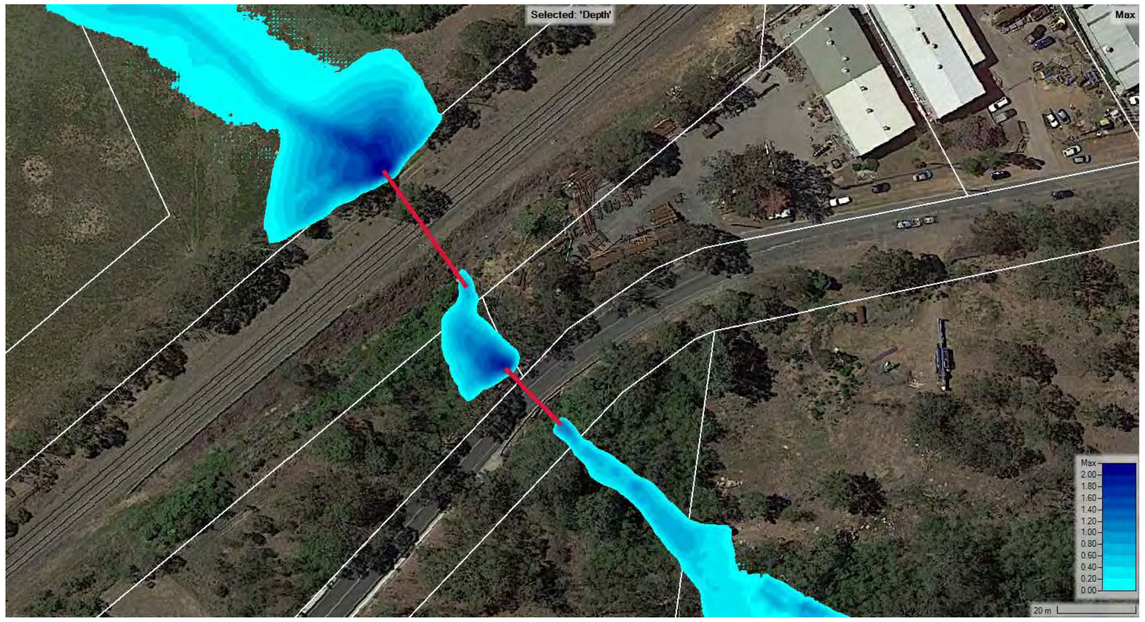
ADDRESS: 140 BRIDGE STREET, PICTON – –

CLIENT: PREMISE

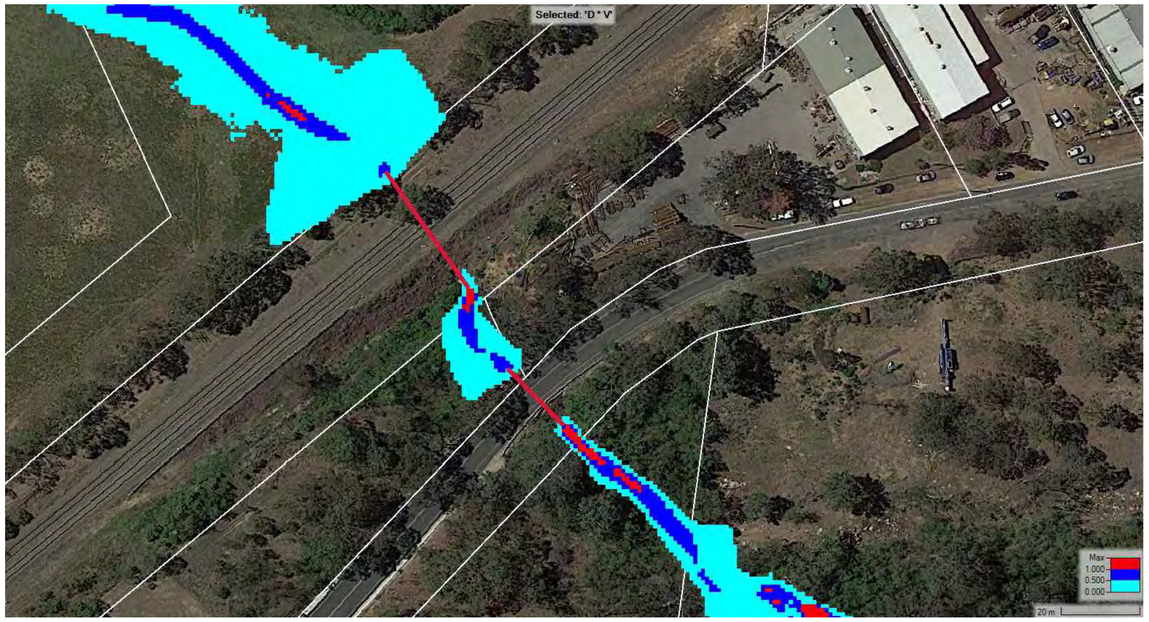
CERTIFIED DESIGNED IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS.

SIGNED & APPROVED: D.TURNER
B.E.(MIEAust) CPEng

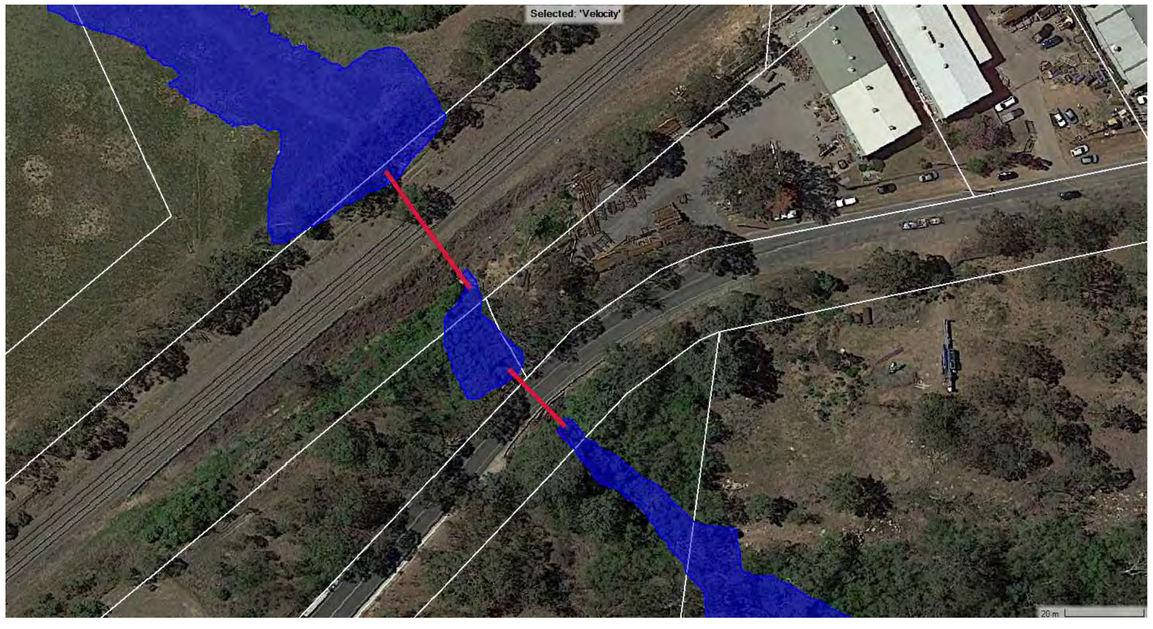
Appendix B (HEC RAS Model Results)



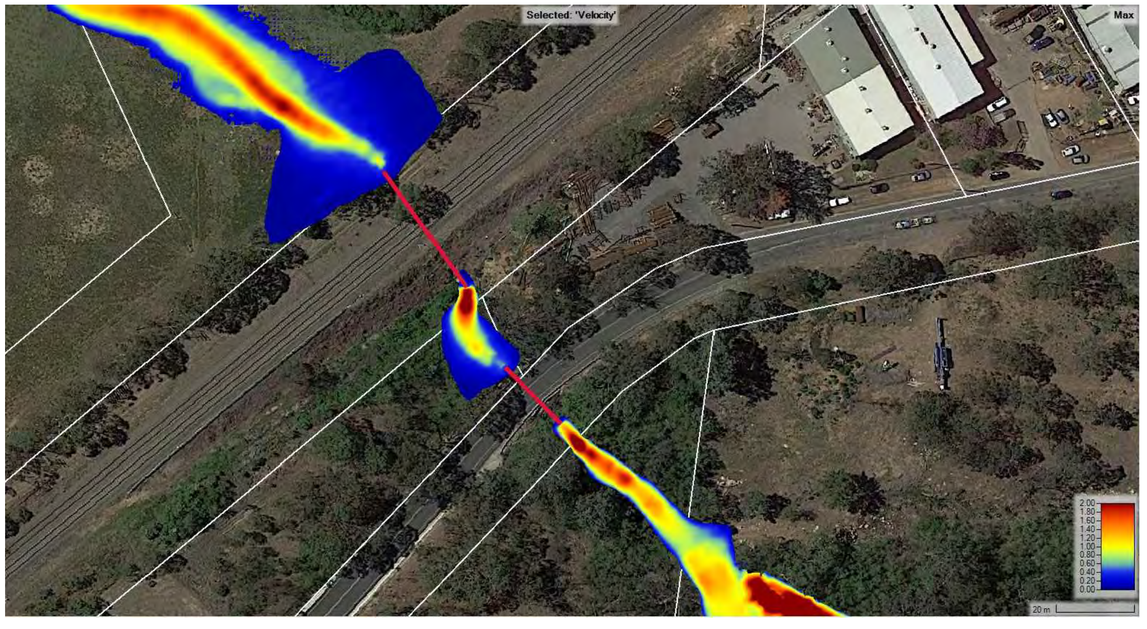
1% AEP DEPTHS



1% AEP HAZARDS



1% AEP INUNDATION BOUNDARIES



1% AEP VELOCITY

REV	AMENDMENTS	REV DATE	INITIALS
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A1 | SCALE: AS SHOWN ON SHEET | DATE: 17/12/21

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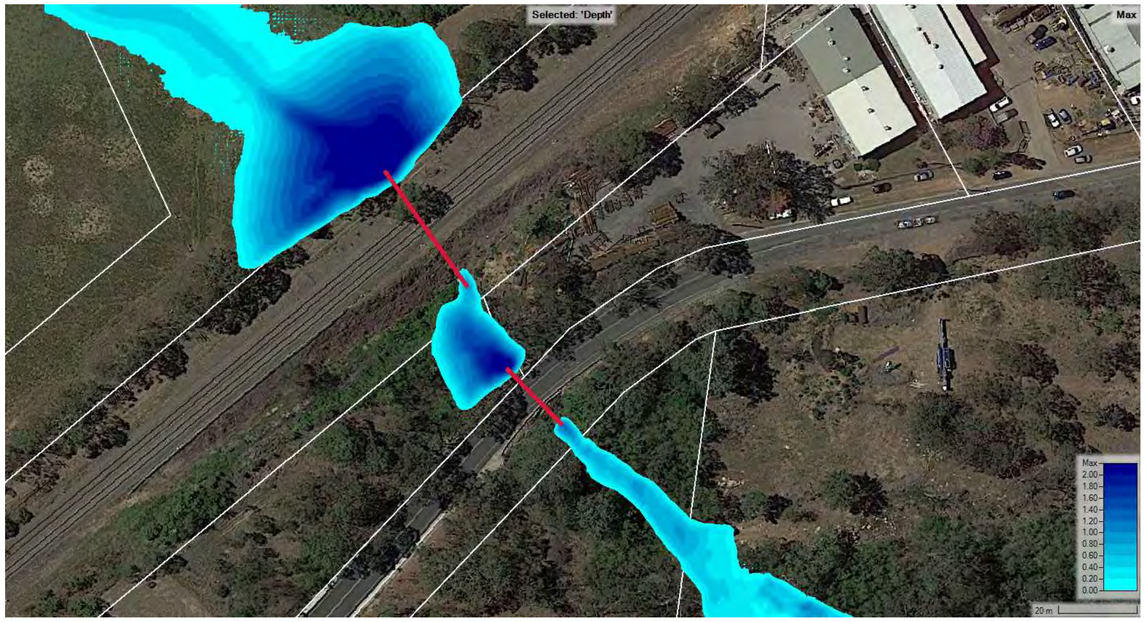
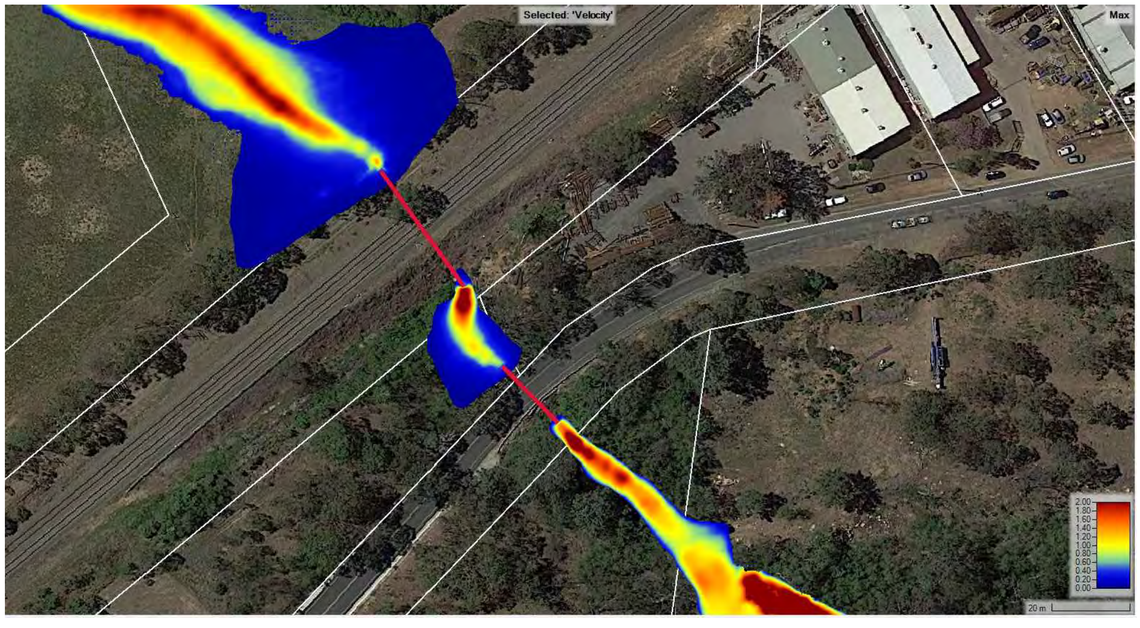
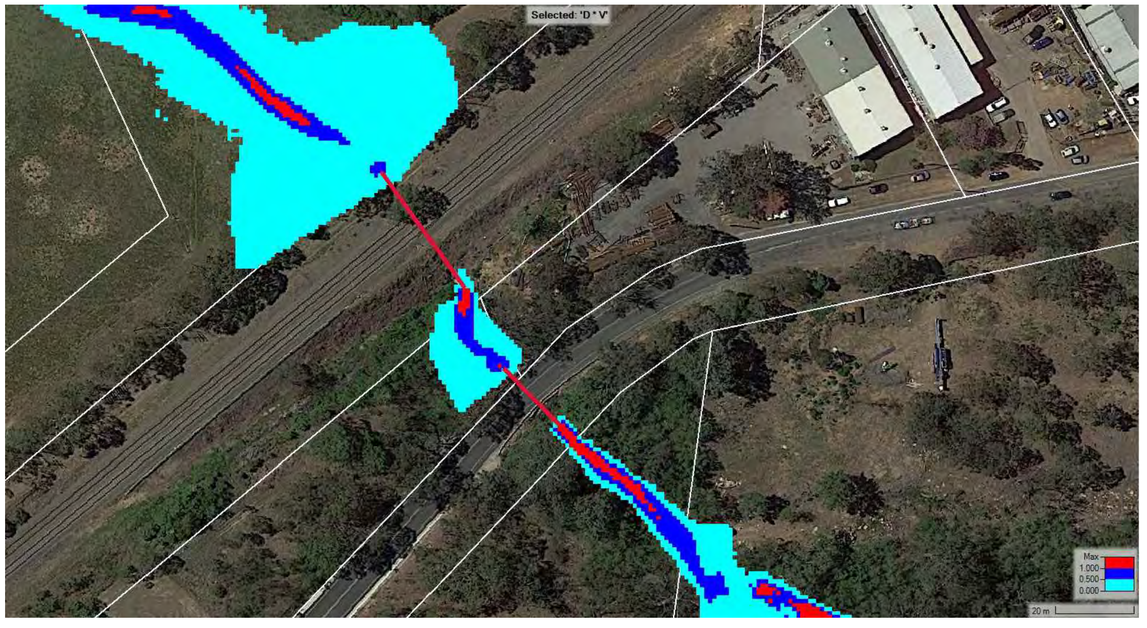
PMF INUNDATION BOUNDARY



PMF DEPTHS



PMF VELOCITY



PMF HAZARD

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