



GILLENBAH TRUCKSTOP
Proposed Development at
16330 Newell Highway Gillenbah

Flood Impact and Risk Assessment

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Report

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Cover Photo: Development site at 16330 Newell Highway Gillenbah

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APPENDICES

Appendix A: Development Plans

1 Introduction

A truck stop is proposed at 16330 Newell Highway in Gillenbah. The site is flood affected and the consent authority (Narrandera Shire Council) requires a Flood Impact and Risk Assessment (FIRA) for the proposed development.

This report provides details of the FIRA, including flood modelling undertaken for impact assessment of the proposed development.

Figure 1 shows the site location.

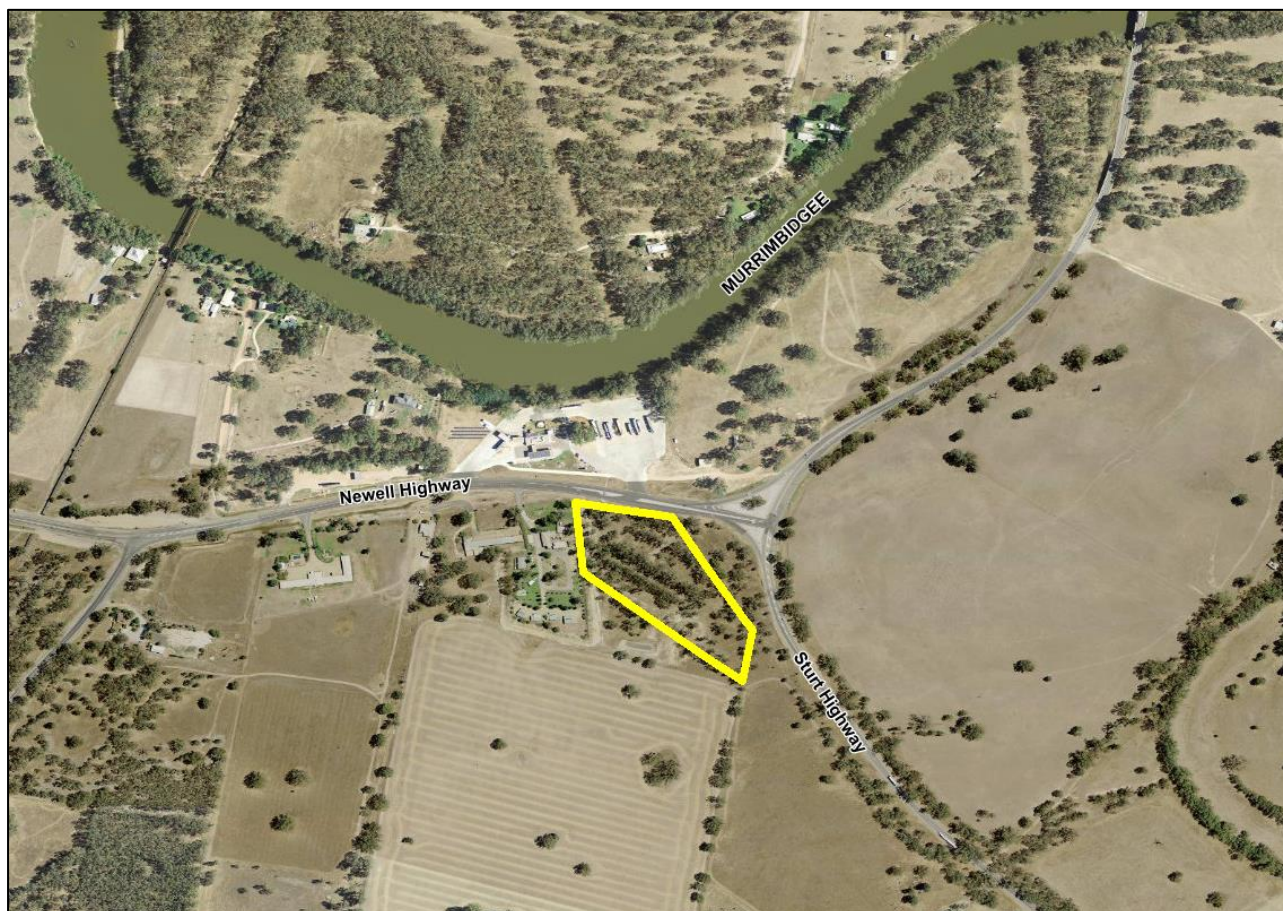


Figure 1. Site Location

2 Study Data

The following data was available for the FIRA:

- Development Plans prepared by Richmond+Ross (dated August 2024)
- Surface TINs for existing and proposed development by Richmond+Ross
- TUFLOW flood model, provided by Narrandera Shire Council
- Review of the Narrandera Floodplain Risk Management Study and Plan (March 2019)

3 Site Description

The site is located at the intersection of Newell and Sturt Highways. The land has a gentle slope from the north to the south. A low level embankment is present along the western boundary of the site.

A large trench has been excavated within the site to provide storage for a local runoff generated from the east of Sturt Highway. A culvert under the highway facilitated this flow towards the trench.

Figure 2 shows the terrain model for the existing site conditions.

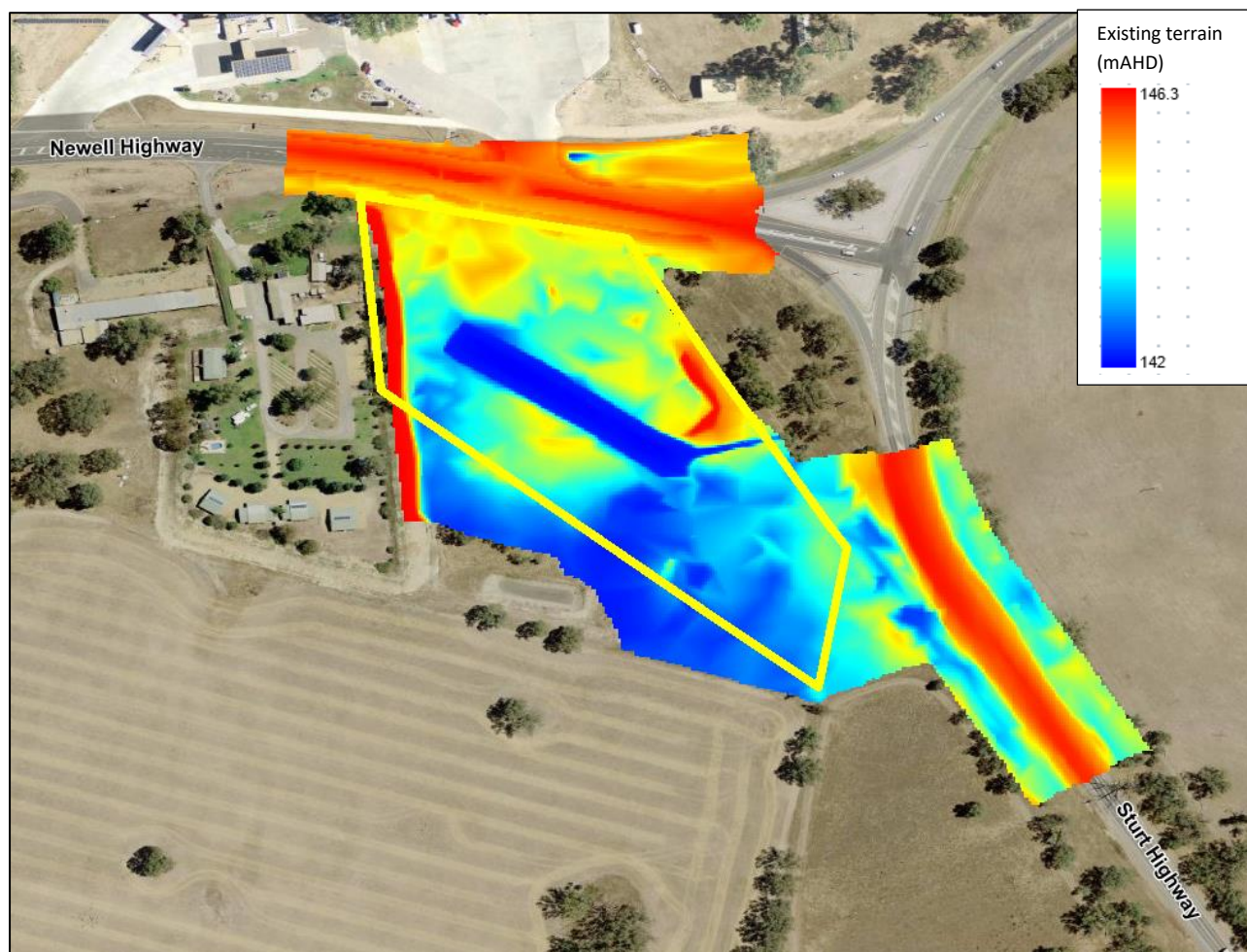


Figure 2. Existing Surface Levels (colour coded ground levels shown in mAHD)

4 Proposed Development

The proposed development includes

- a lounge
- an above ground and a below ground fuel tanks
- a car and a truck canopy for fuel dispensers
- sheltered outdoor seating
- parking for cars, trucks and caravans
- entry and exit driveways
- signage at the entrance.

The development plans for the proposed development are provided in Appendix A.

The ground levels would be modified with the proposed development. Figure 3 shows the proposed development terrain model and Figure 4 shows the difference between the proposed and existing terrains.

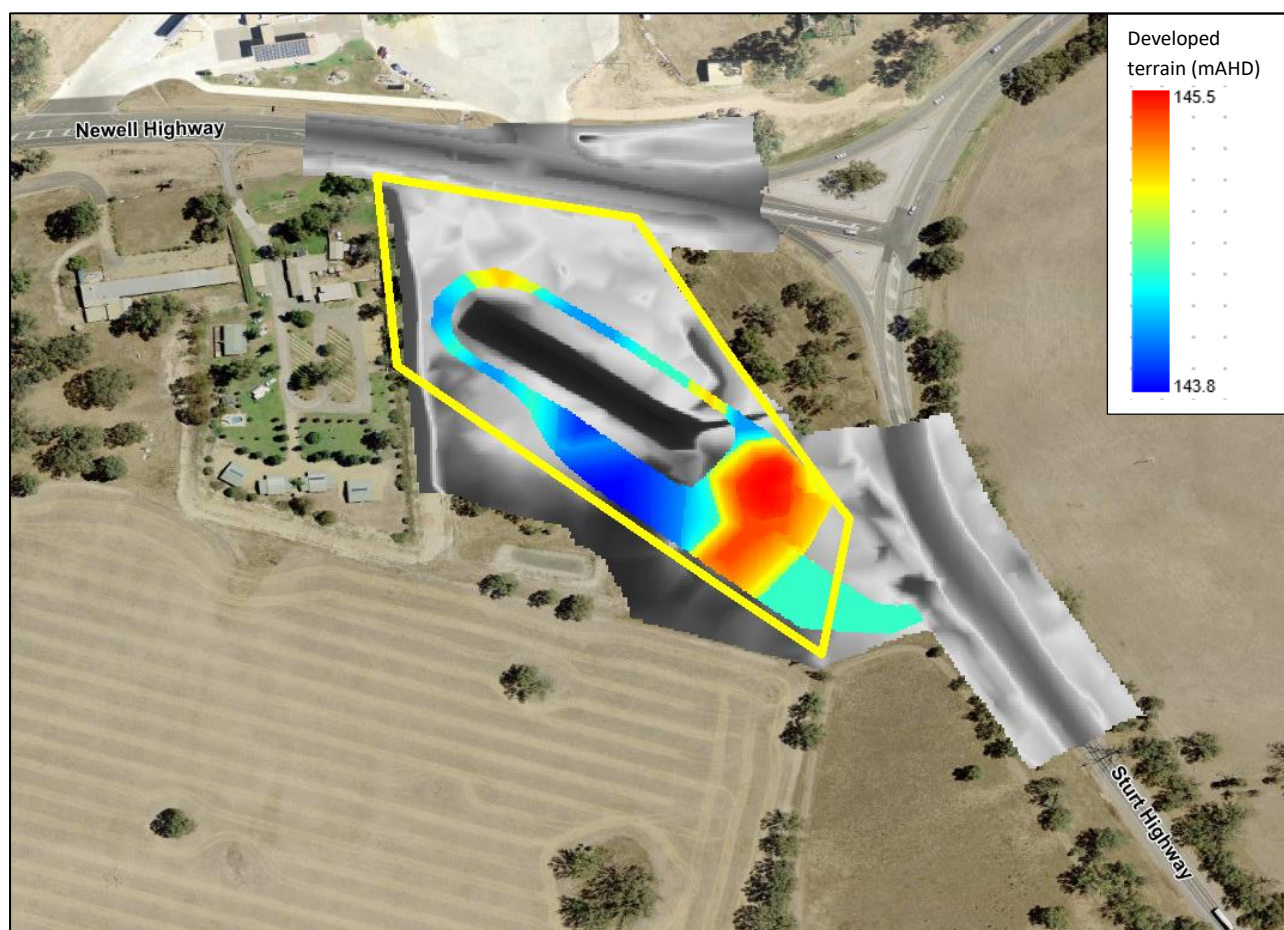


Figure 3. Proposed Surface Levels (colour coded ground levels shown in mAHD)



Figure 4. Difference in Proposed and Existing Ground Levels

4.1 Site Access

The site access for both cars and trucks is from Sturt Highway as shown in the development plans (Appendix A). Whereas the cars would be able to exit by driving around the proposed lounge, the trucks would drive around the trench and exit onto Sturt Highway.

The Sturt Highway rises to the south from the site.

5 Existing Flood Behaviour

The site is located in the floodplain of Murrumbidgee River and is frequently flooded. Figure 5 shows the depth of flooding in a 20% AEP event. The depth of flooding in this event is up to 0.2m except for the trench where the depth of flooding is greater than 1m.

However in a 5% AEP and rare events, the depth of flooding is greater than 1m, as shown in Figure 6.

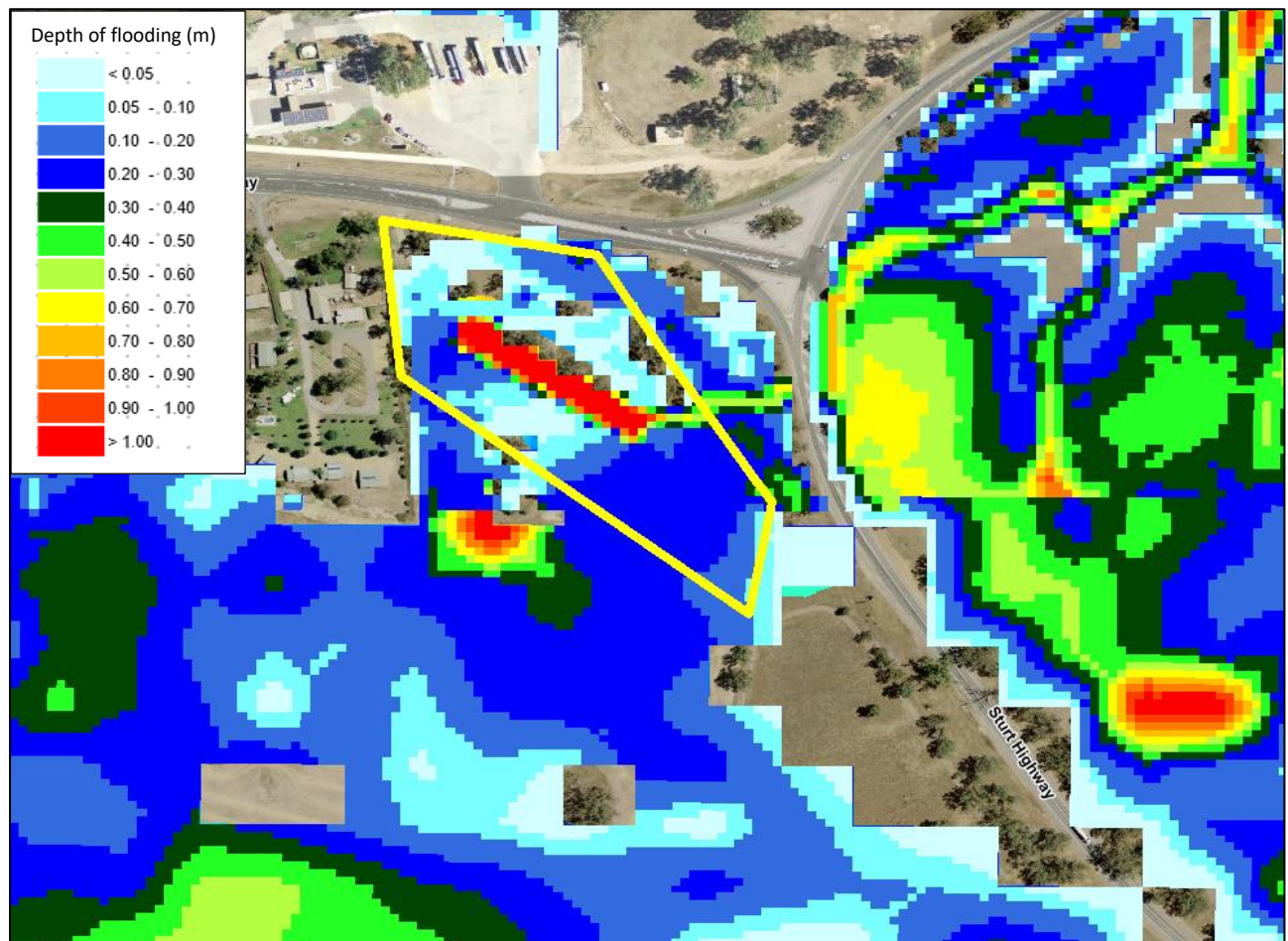


Figure 5. Peak Flood Depth – 20% AEP Event – Existing Conditions

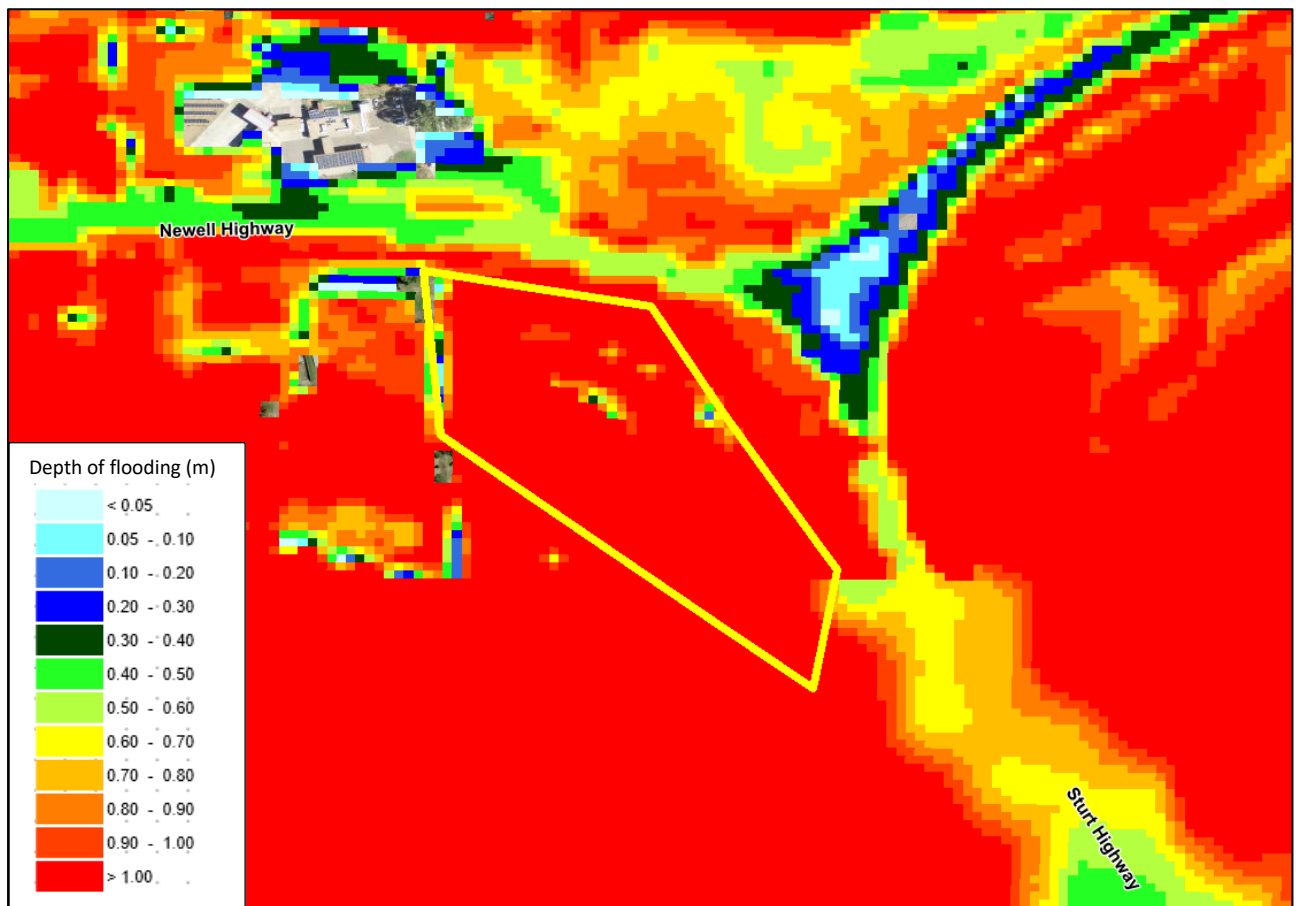


Figure 6. Peak Flood Depth – 5% AEP Event – Existing Conditions

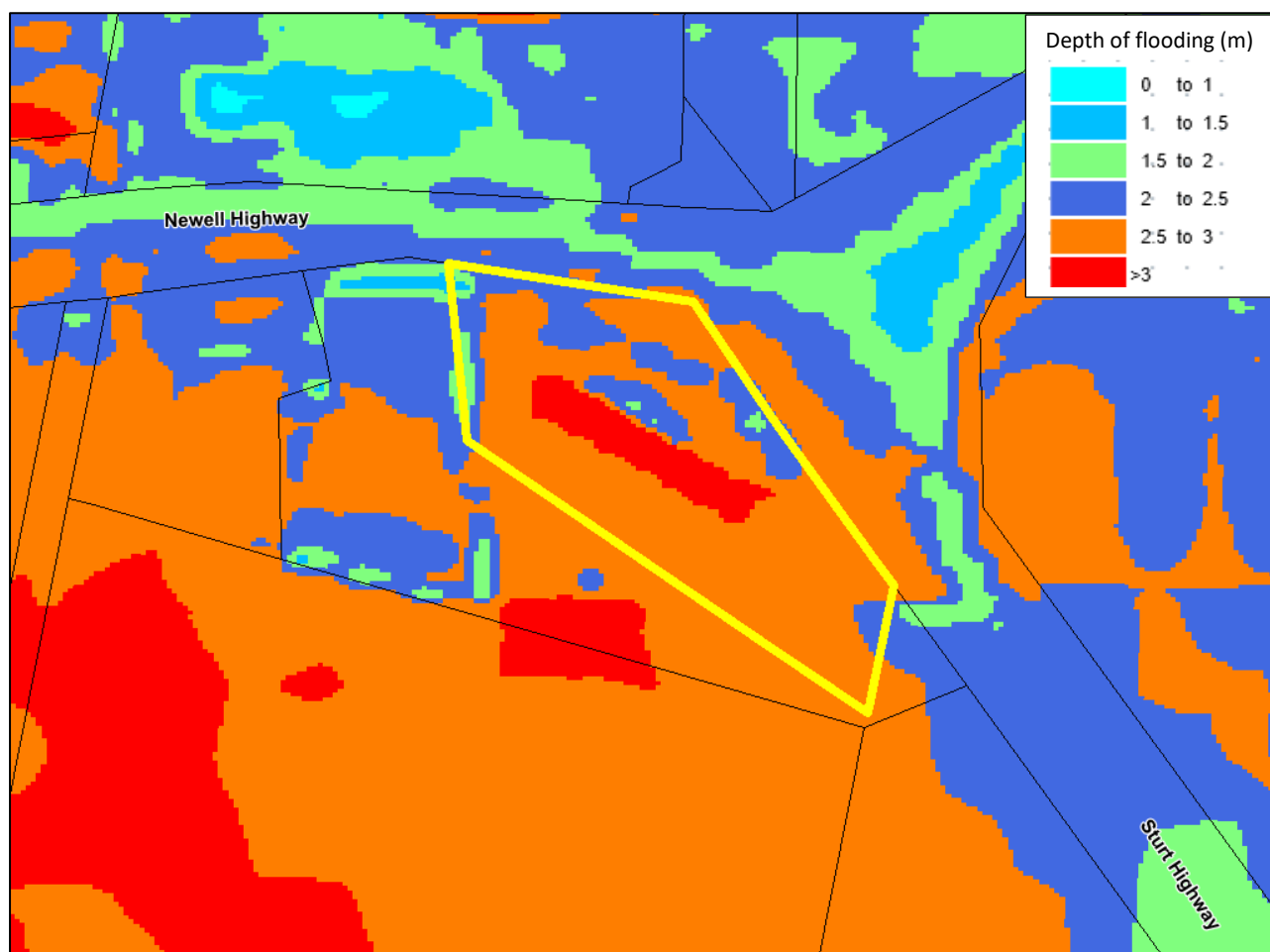


Figure 7. Peak Flood Depth – 1% AEP Event – Existing Conditions

6 Flood Modelling

Flood modelling was undertaken utilising the Council's TUFLOW flood model. Appropriate modifications were made to model the updated existing conditions and the post development conditions as discussed in the following sections.

6.1 Existing Conditions

The survey provided for the site was processed and the terrain developed from this survey was included in the model. A model run was undertaken for the 1% AEP event.

6.2 Developed Conditions

The existing condition model was modified to include the proposed development. This included incorporating the proposed development terrain and the lounge building. A model run was undertaken for the 1% AEP event.

6.2.1 Flood Hazard

The flood hazard categories for the site are shown in Figure 8.

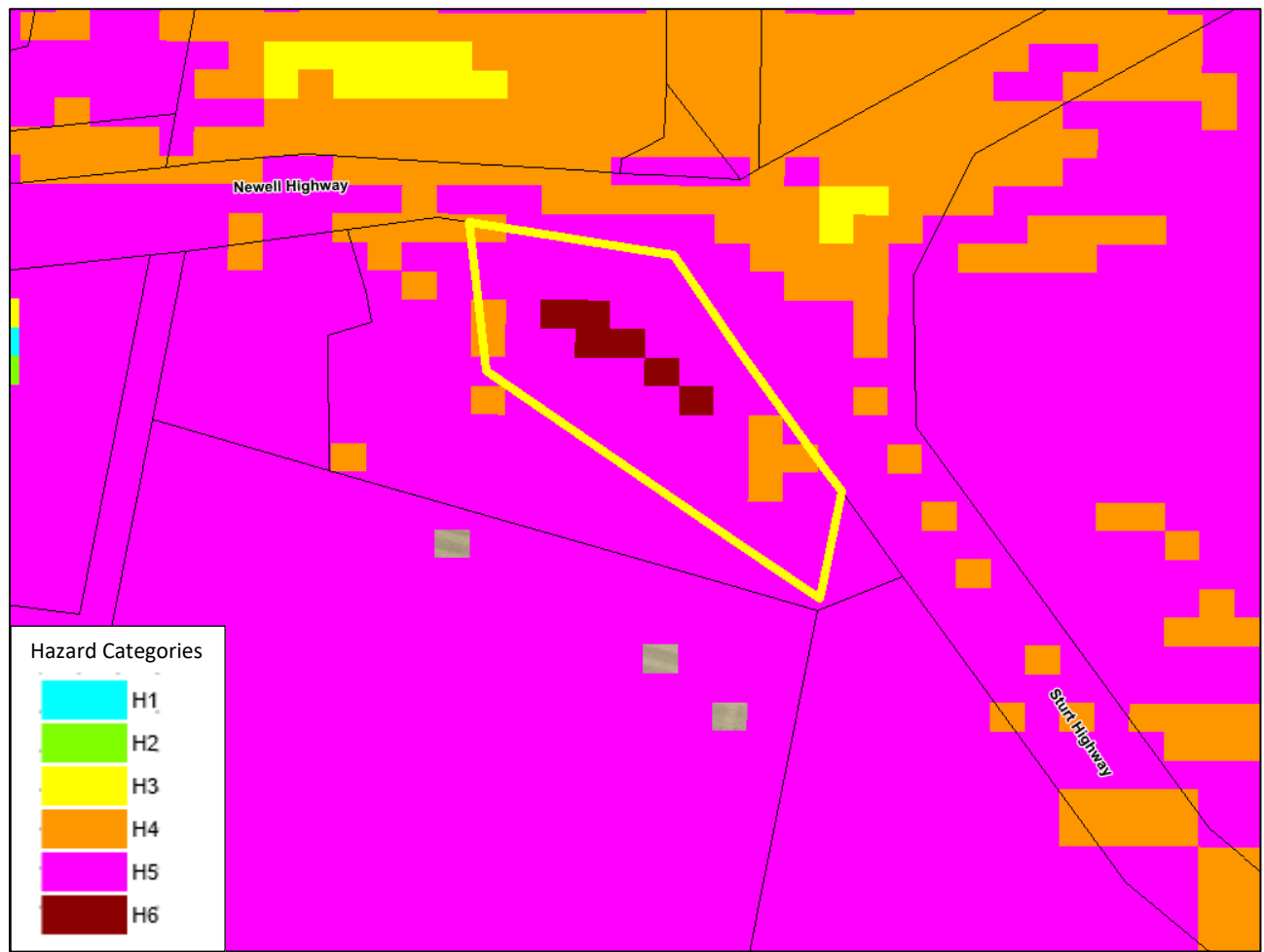


Figure 8. 1% AEP Flood Hazard Categories – Developed Conditions

7 Impact of the Development

The impact of the development was assessed by comparing the design flood levels for the developed conditions with those of existing conditions. Figure 9 shows the difference in design flood levels (developed minus existing) for the 1% AEP event.

The flood impact assessment shows that there is no significant increase in the flood levels due to the proposed development. The majority of the increase is up to 0.004m, which is within the error bounds of flood modelling.

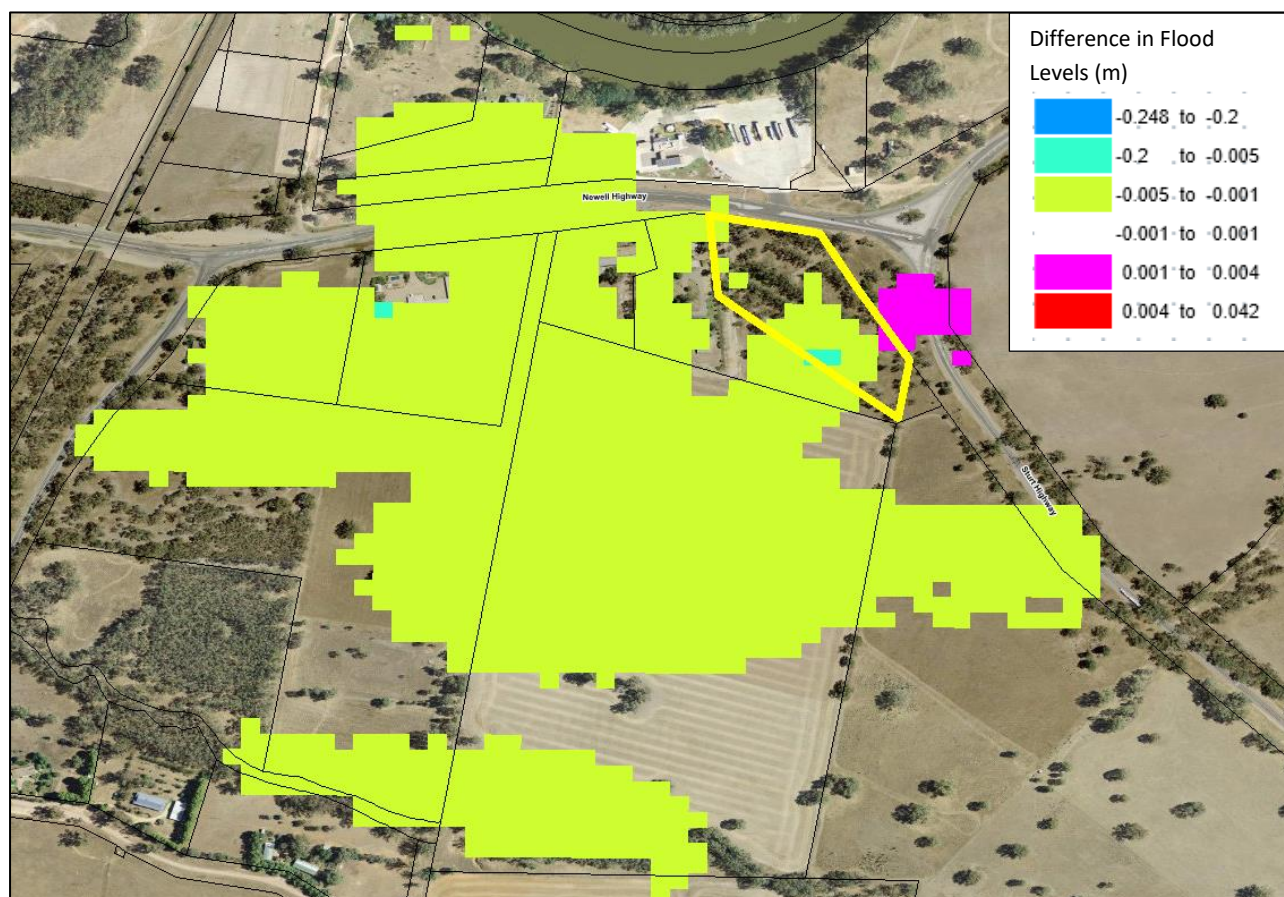


Figure 9. Impact of the Development – 1% AEP Event

8 Flood Risk Management

The proposed development is inundated by significant flood depths and lies in high flood risk. Therefore flood management measures are required for the proposed development as per the Council DCP.

The required measures as specified in the DCP and how the proposal can implement those measures are detailed in Table 1. The DCP controls for commercial development are applicable.

Table 1. DCP Measures and Proposed Development

DCP Measures/Requirements	Proposed Development Implementation
Floor level	
Habitable floor levels to be no lower than the 20 year ARI level unless justified by a site specific assessment.	The 20 year ARI (5% AEP) flood level for the site is 145.6m AHD. The floor level of the lounge should be set at this level
Building components	
All new structures to have flood compatible building components below the 100 year flood level	The 100 year (1%AEP) flood level for the site is 146.6m AHD. All building materials should be flood compatible

DCP Measures/Requirements	Proposed Development Implementation
	<p>below this level. This includes electric, gas and fuel connections.</p> <p>Other measures as specified in the Council DCP for flood compatible building component should also be followed.</p>
Structural soundness	
Engineers report to demonstrate that the structure can withstand the forces of floodwater, debris and buoyancy up to and including the 100 year ARI plus freeboard of 500mm.	<p>A structure engineer's report should be prepared to demonstrate that the structure can withstand the forces of floodwater, debris and buoyancy up to and including the 100 year ARI plus a freeboard of 500mm.</p> <p>Attention should also be paid to the impact on the ceiling of the proposed buildings due to excessive depths of flooding.</p>
Flood effect	
The flood impact to be considered to ensure that the development will not increase flood effects elsewhere, having regard to (i) loss of flood storage, (ii) changes in flood levels and velocities caused by alterations to the flood conveyance, and (iii) the cumulative impact of multiple developments in the floodplain. The development should be generally in accordance with the Floodplain Risk Management Study provisions for Gillenbah, otherwise an engineer's report should be provided.	<p>Flood modelling shows that the proposed development does not increase flood levels in a 1% AEP event. The proposed development is not likely to alter the flood conveyance of the river or major flow paths.</p> <p>Compensatory flood storage should be provided to make up for lost storage due to raised ground levels for the proposed development.</p>
Evacuation	
<p>Reliable access for pedestrians or vehicles is required from the building to an area of refuge above the PMF level: the access commencing and continuing at a level no lower than the lowest level of the building.</p> <p>The development is to be consistent with the evacuation plans specified in the SES Local Flood Plan adopted by the Council.</p>	<p>Refuge on site is not recommended during a flooding event. SES/Local Council directions to be followed for evacuation of the site to a safer place.</p> <p>A flood emergency response plan should be prepared for the site, addressing evacuation and other flood risk management issues.</p>
Management and design	
<p>The applicant is to demonstrate that area is available to store goods above the 100 year ARI level.</p> <p>No storage of materials below the 100 year ARI level which may cause pollution or be hazardous during a flood.</p> <p>Applicant to demonstrate that any proposed fencing is of an open nature and collapsible during floods.</p> <p>Applicant to demonstrate that the proposed development is aligned with the</p>	<p>The proposed development should have areas above the 100 year flood level to store goods. All hazardous material should be stored above this level. Alternatively, the hazardous material can be stored in an enclosure with protective walls up to the FPL. The storage areas should be such that the goods do not float away during a flood event.</p> <p>The fuel tanks are located at the ground level and therefore exposed to flood events more frequent than 100 year ARI. Appropriate measures need to be undertaken to prevent floodwaters mixing with the fuel and discharge of</p>

DCP Measures/Requirements	Proposed Development Implementation
direction of flood flow and where possible of an open nature (that is the building should be aligned/oriented in the direction of the flood flow and should be preferably broken up to avoid one long building mass which may redirect flows).	<p>fuel into floodwaters during a flooding event. Appropriate standards should be followed in the design of fuel tanks to prevent leakage of fuel during a flood event.</p> <p>The fences should be constructed such that it will not modify the flow of floodwaters or cause damage to surrounding land. The fence design should allow collapse of the structure during a flood event.</p> <p>There is only one walled building proposed on the site(the lounge). The other buildings are canopies, which are not likely to affect the flow of floodwaters.</p>

8.1 Additional Measures

The following additional measures should be undertaken to manage the flood risk for the proposed development

- Although the DCP does not specify the flood planning level for the car park, it should also be located at the 20 year ARI flood level where feasible, similar to the habitable floor level.
- Flood signage should be provided at suitable locations within the site, including the lounge and parking areas.
- A FloodSafe business plan should be developed to manage the flood risk on site

8.2 Evacuation Plan

The proposed site is affected by major flooding from Murrumbidgee River. Sufficient warning time is available to vacate the site. Evacuation orders issued by the local SES should be complied with at the time of flood emergency. Any recommended measures in the FloodSafe business plan should be followed before evacuating the site and at arrival back to the site after the flood emergency has ceased.

8.3 Flood Emergency Response Plan

A Flood Emergency Response Plan (FERP) should be prepared for the proposed development. The FERP provides guidance for preparing and executing a plan to manage risk during a flood emergency.

The FERP can be prepared at the Construction Certificate stage of development approval.

9 Summary and Conclusion

A flood study for the proposed development at 16300 Newell Highway Gillenbah has been undertaken to assess its impact on the existing flood behaviour. Flood modelling has been undertaken for the 1% AEP design flood event. Modelling was undertaken for both pre and post development conditions to assess the impact.

Modelling results show that the proposed development would have no adverse impact on the surrounding properties in the 1% AEP event.

The proposed floor levels would need to comply with the flood planning levels specified in this report. Additional measures such as appropriate fencing to allow floodwaters through, use of flood compatible materials and structural soundness of the buildings in a 1% AEP event with 0.5m freeboard would reduce the flood risk on the site.

Compensatory flood storage should be provided on site, which is equal to the loss of storage due to the proposed raised ground levels.

A Flood Emergency response plan should be prepared to manage the risk during a flood emergency.

10 Qualifications

This report has been prepared for Richmond+Ross for the assessment of the proposed commercial development at 16300 Newell Highway in Gillenbah. The report is subject to following qualifications:

- Th flood modelling is based on the data provided by the client. The accuracy of modelled results is dependent on the accuracy of the provided data.
- Flood assessment from local creeks has not been investigated since flooding from Murrumbidgee River is dominant for the site.
- This study and its outcomes should not be used for any other purpose than those specified in this report.

APPENDIX A

