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Our Ref: E322102_Flood Risk

30-32 MILLER STREET, GILGANDRA

FLOOD RISK MANAGEMENT REPORT

Dated 7th June 2021

REVISION A

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INTRODUCTION

Donovan Associates has been engaged to prepare a Flood Risk Management Report for the proposed development at 30-32 Miller Street, Gilgandra in accordance with the requirements of Gilgandra Shire Council Development Control Plans (DCP). This report documents the findings of the hydraulic modelling of the site in existing and design conditions.

DEVELOPMENT SITE

Figure 1 shows the location of the subject site and represents the nature of the surrounding area. The development lies in B2 – Local Centre, with R1 – General Residential to the northwest, and W1 – Natural Waterways to the southeast. Castlereagh River runs in a north-easterly direction to the west of the site.

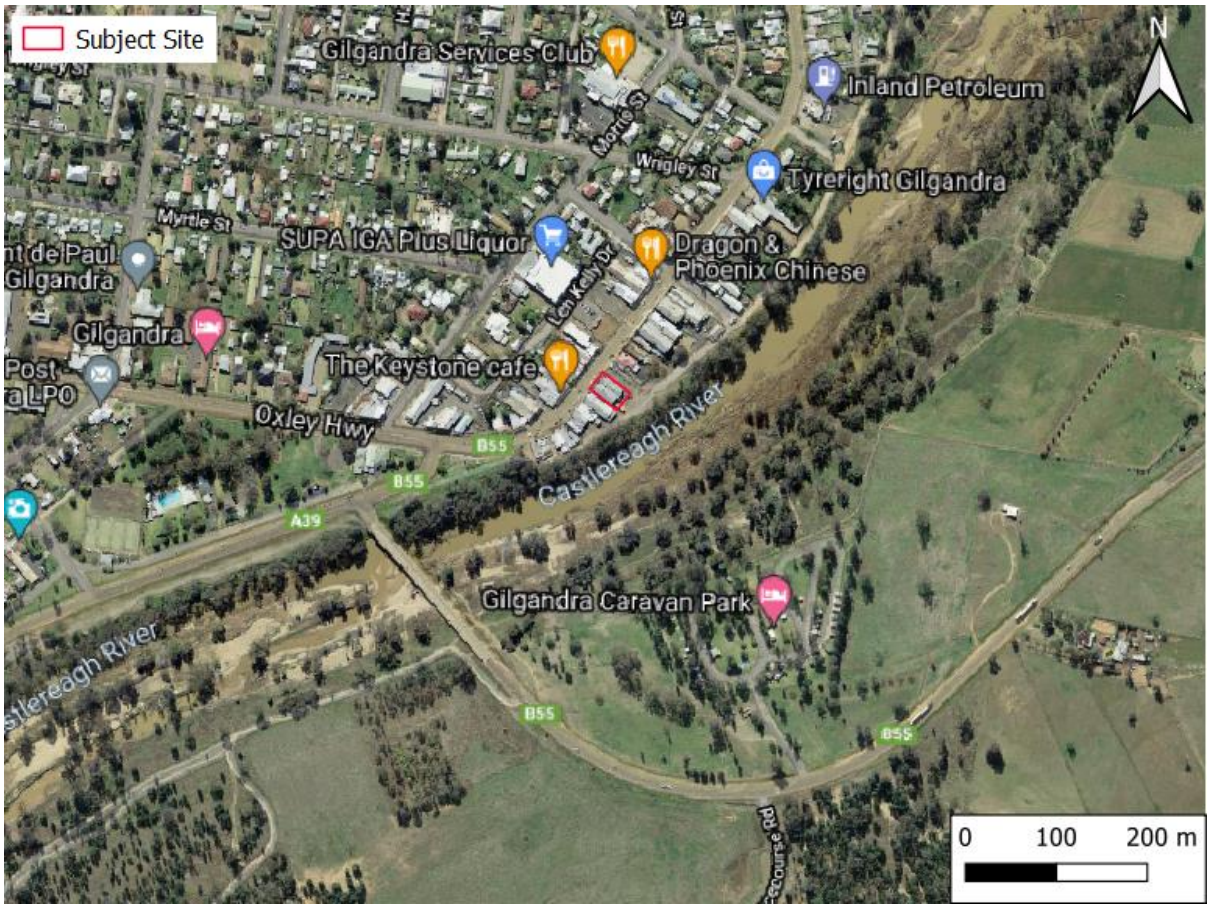

Figure 1. Site Location Map

Survey Information from Western Survey surveyors shows the site elevations vary from 282.4 – 281.5 mAHD. The site slopes towards the southeast on an average slope of 2.3%, draining to Castlereagh River (refer to Figure 2). The existing floor level lies at 282.4 mAHD.

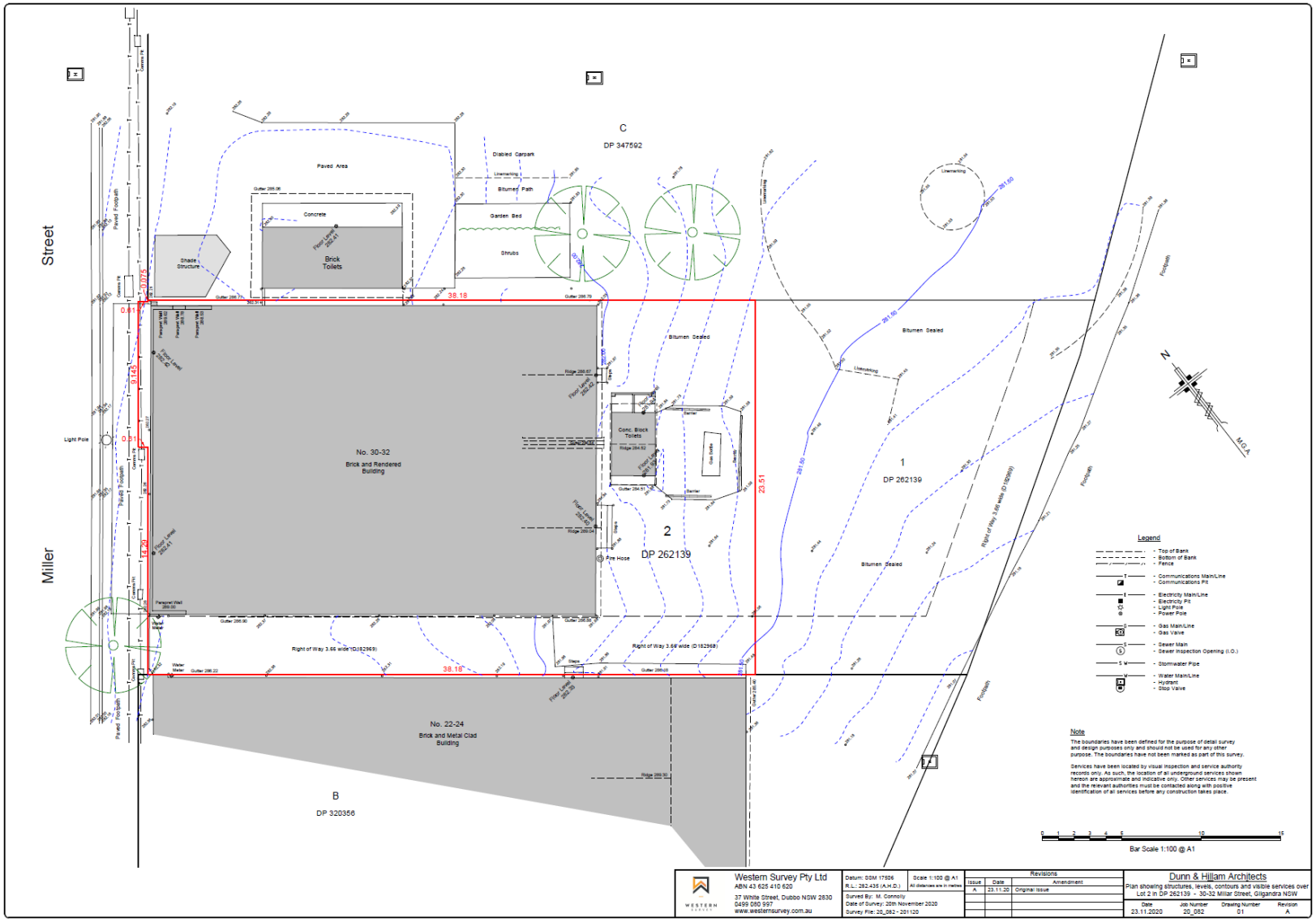

Figure 2: Detailed Survey Information

PROPOSED DEVELOPMENT

Architectural drawings provided by Dunn and Hillam Architects (Figure 3) indicate that the proposed development involves construction of a library and community hub. The development involves the retention of the building footprint, extension of the roof to the rear of the development over the proposed walkway, demolition of brick walls to allow for additional openings, as well as the construction of site parking to the rear of the property.

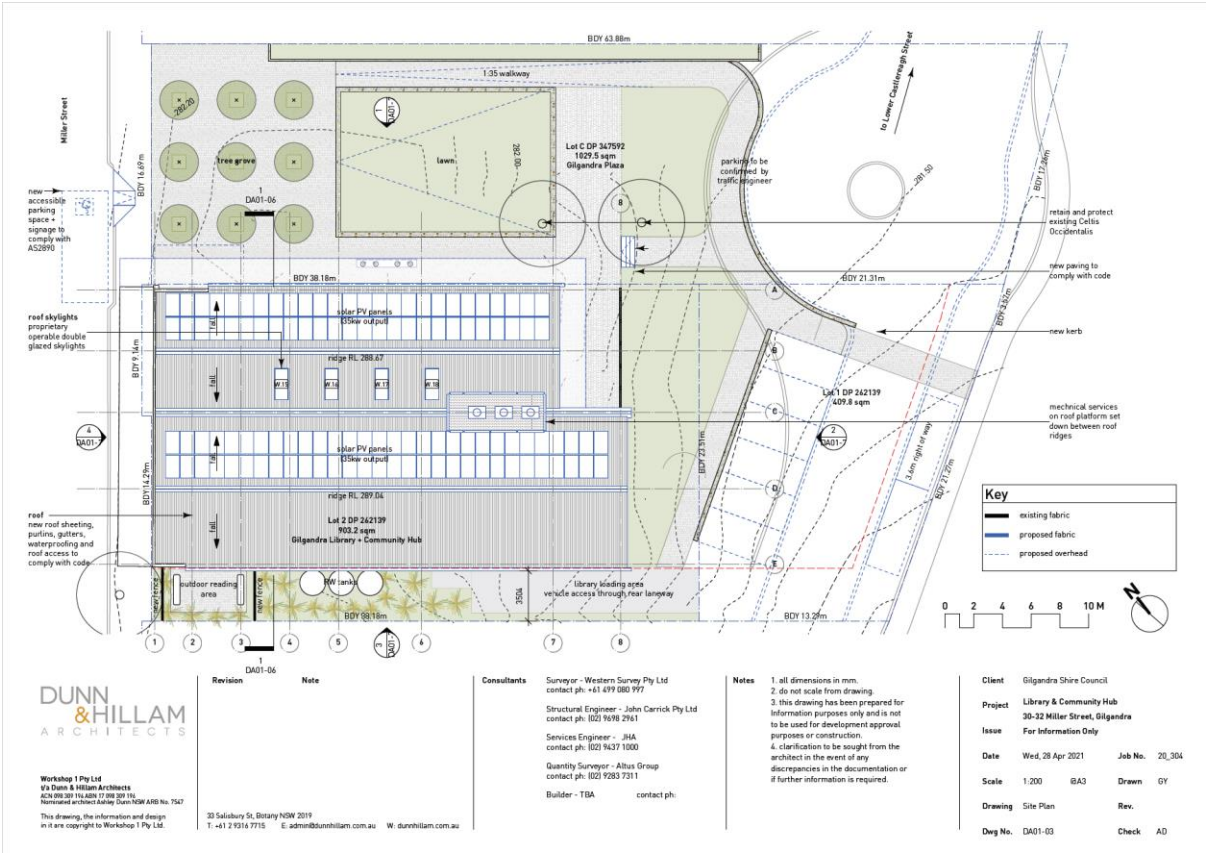

Figure 3. Proposed Site Plan (Purple Outline Represent Existing House Footprint)

REFERENCE DOCUMENTS

The following reports, guidelines and policies have been used to prepare this Report:

- Gilgandra Shire Council (2011), *Gilgandra Development Control Plan (DCP).*
- Gilgandra Shire Council (2011), *Gilgandra Local Environment Plan (LEP).*
- Gilgandra Shire Council (2008), *Gilgandra Shire Local Flood Plan.*
- Lyall & Macoun (1996) *Gilgandra Floodplain Management Study*.
- NSW Department of Infrastructure, Planning and Natural Resources (2005) *Floodplain Development Manual*

The following plans have been used to prepare this Report:

- Architectural Plans by Dunn and Hilam Architects dated 28th April 2021.
- Site Survey Plan by Western Survey dated 21st November 2020.

SITE FLOOD CONDITIONS

Model Setup

The Castlereagh River has an approximate upstream catchment of 6,350 km^2 at the Gilgandra gauge. Lyall & Macoun assessed the hydrology of the Castlereagh River to the gauge, which was calibrated to the 1955 inflow hydrographs, which were used to estimate the 1% AEP design flows. These design flows were adopted and used in the hydraulic model.

The TUFLOW hydraulic model was used to determine site flood conditions, including flood extents, depths, and water levels for existing and proposed conditions. Survey from Western Survey was combined with LPI (2011) LIDAR data to form a 10m topographic grid for the purposes of modelling. The existing building extents were modelled with an increased roughness coefficient to represent the obstruction to flood waters. These results were then compared to the proposed building extents, which included the extended roof structure to the south of the site.

Existing 1% AEP Peak Flood Depth and Water Level

The 1% AEP (i.e., 100-year) flood depth and water level map at the subject site has been provided below. The flooding behaviour shows that the site is affected by mainstream flooding from the Castlereagh River, resulting in a relatively uniform water level over the site. Results indicate that the peak 1% AEP water level is 284.5 mAHD. Flood depths at the subject site vary from 2.3 – 3.0m.

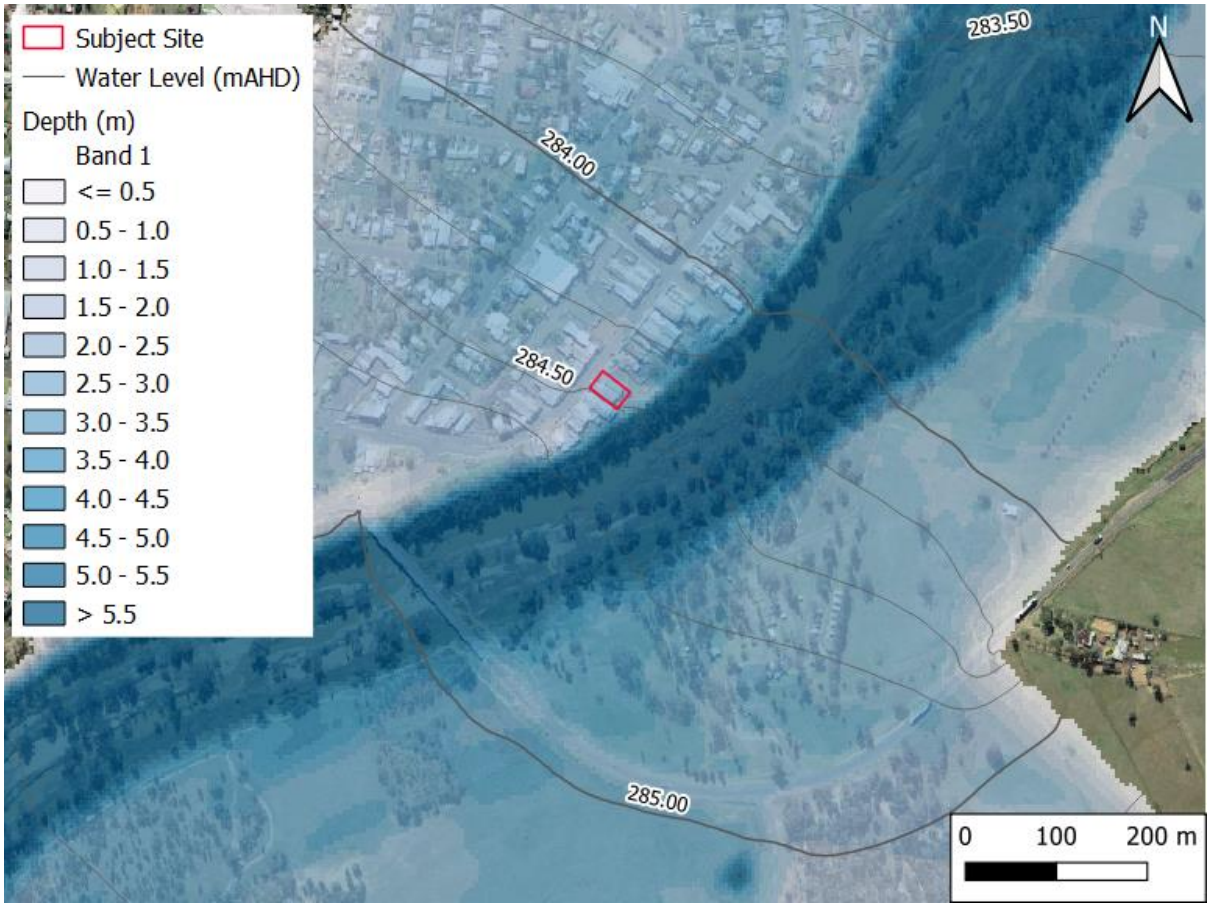

Figure 4. Existing 1% AEP Peak Flood Depth and Water Level

Existing 1% AEP Peak Flood Velocity

The 1% AEP (i.e., 100-year) flood velocity map at the subject site has been provided below. The velocity plot shows high velocities in the Castlereagh River (>2.5 m/s), whereas velocities onsite are typically medium-low. Results indicate that the peak 1% AEP velocity 1 m/s along Miller Street, and 0.5 m/s over building footprint.

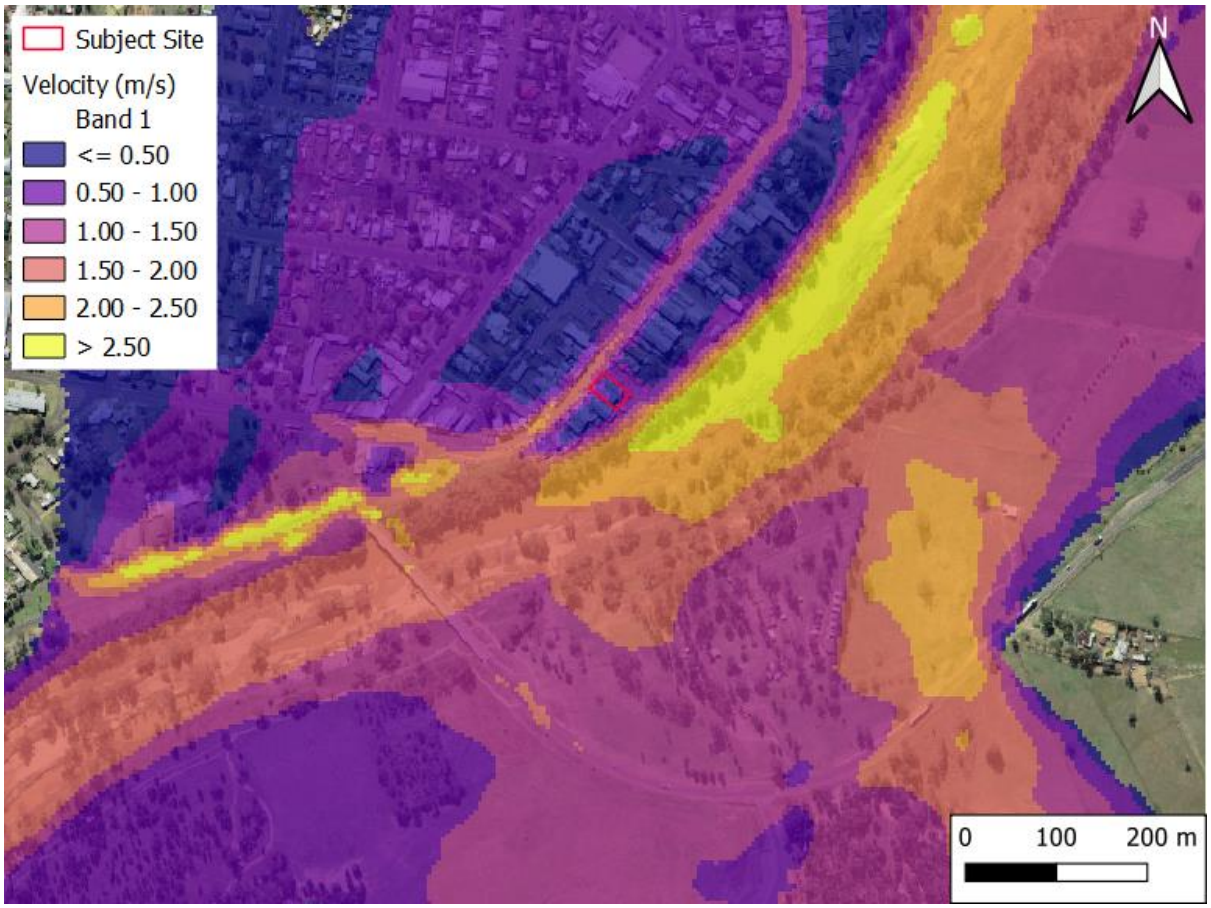

Figure 5. Existing 1% AEP Peak Flood Velocity

Design 1% AEP Peak Flood Depth and Water Level

The 1% AEP (i.e., 100-year) flood depth and water level map at the subject site has been provided below. There are immaterial changes to flood water levels and depths as a result of the development as the change to building footprint is relatively minor with the only change being an increase in awning coverage.

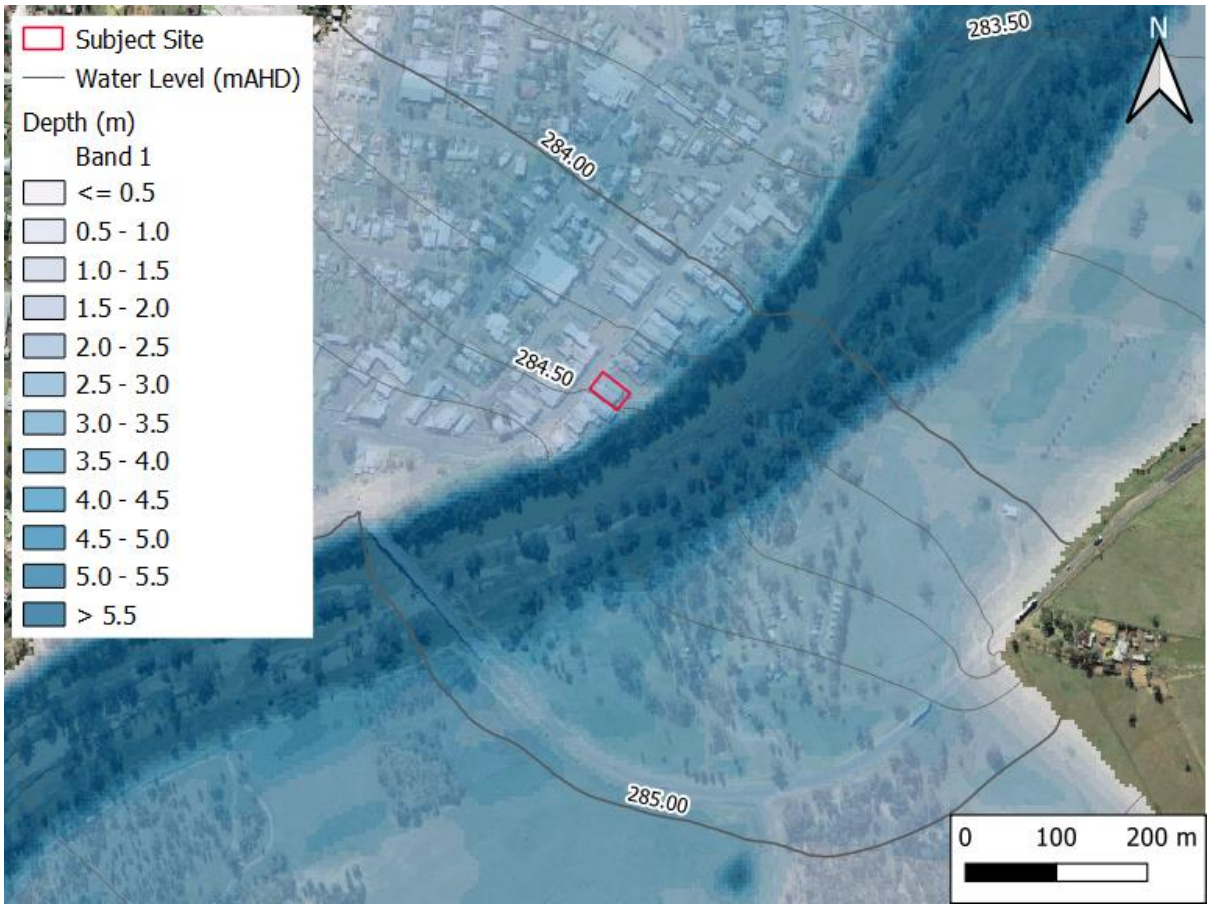

Figure 6. Design 1% AEP Peak Flood Depth and Water Level

Design 1% AEP Peak Flood Velocity

The 1% AEP (i.e., 100-year) flood velocity map at the subject site has been provided below. There are immaterial changes to flood velocities as the proposed awning does not materially deflect flood waters.

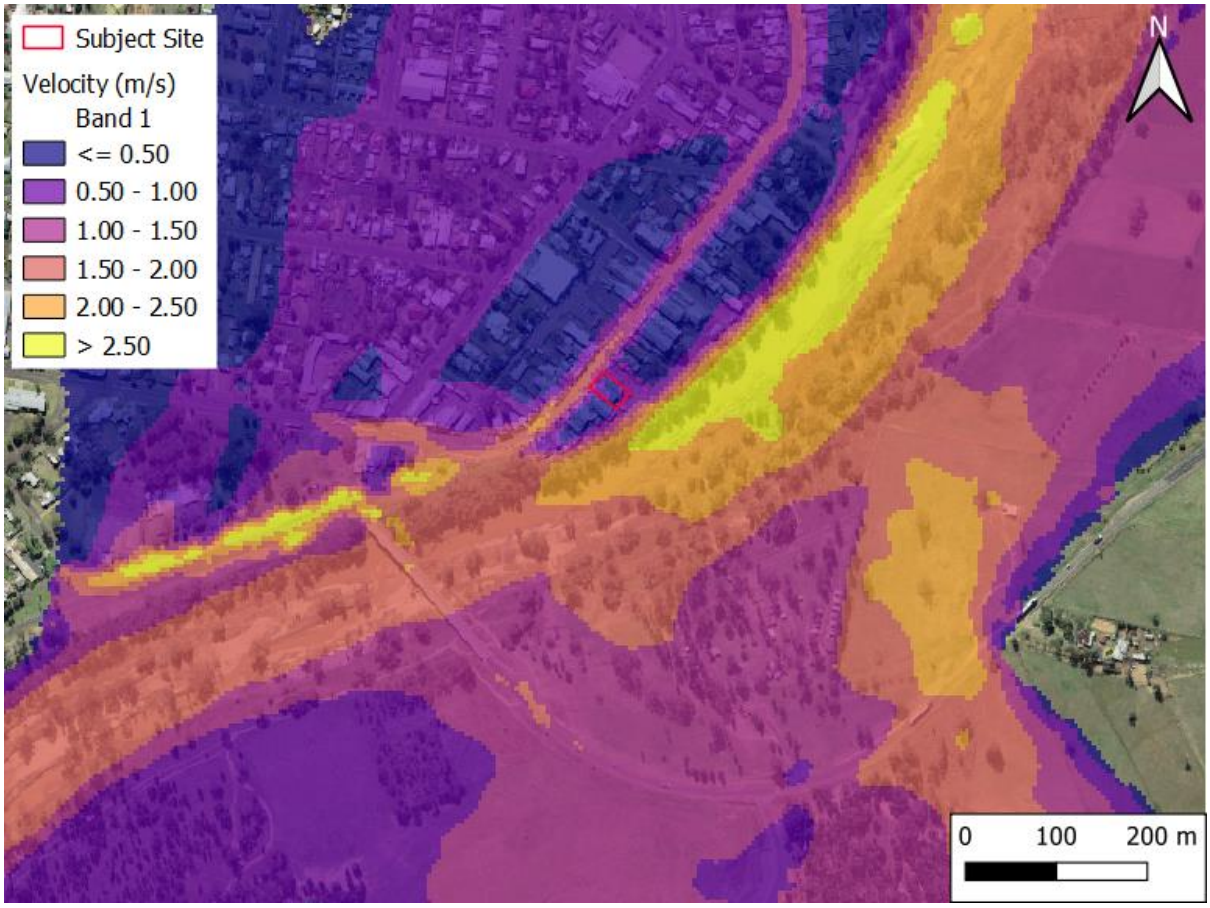

Figure 7. Design 1% AEP Peak Flood Velocity

FLOOD PLANNING CONTROLS

The proposed building Gilgandra Shire Council provides flood specific controls in DCP Section 21.1. These controls are listed as below:

21.1.2 General Development Controls

a) No building or work (including land filling, fencing, excavation) shall be permitted on flood affected land where in the opinion of Council, such building or work will obstruct the movement of floodwater or cause significant concentration or diversion of floodwaters.
b) The DA must demonstrate the building or structure can withstand the force of flowing floodwaters, including debris and buoyancy forces as appropriate. A report from a structural engineer demonstrating/certifying that the proposed structure can withstand the force of floodwaters is required. Class 10 Structures up to 50m^2 which includes Carports, Garages, Garden sheds and the likes will be assessed on merits and may not require supporting information from a structural engineer.
c) A survey plan prepared by a registered surveyor showing existing ground levels, finished ground levels, finished floor levels, flood levels and location of existing/proposed buildings is required.
d) Floor levels to be equal to or greater than the 1% AEP flood level plus 500mm freeboard. Where this is not practical due to compatibility with the height of adjacent buildings, or compatibility with the flood level of existing buildings, or the need for access for persons with disabilities, a lower floor level may be considered. In these circumstances, the floor level is to be as high as practical, and, when undertaking alterations or additions, no lower than the existing floor level.
e) All structures to have flood compatible building components below the 1% AEP flood level plus freeboard.

21.1.5 Commercial/Industrial Development

a) Development should incorporate measures to seal or flood proof buildings, to avoid the use of fittings susceptible to flood damage, or to store the contents of buildings above the 1% AEP flood level.
b) The floor level of all habitable areas of proposed development shall be at least 0.5m above the 1% AEP flood level except in the case of change of use of an existing building.
c) Provision shall be made for the safe storage and/or timely removal of goods, materials, plant and equipment in the event of a flood.

FLOOD EVACUATION STRATEGY

This section of the report identifies and discusses the strategies applicable to the subject site in accordance with Gilgandra LEP.

The hydraulic model shows that the site becomes inundated in the 1% AEP [refer to Figure 6]. Evacuation strategies shall be prepared and implemented to minimise the impact of flooding and liability on individual owners and occupiers of flood prone property and reduce private and public losses from floods.

As such, it concluded that early evacuation is necessary, and off-site evacuation must be executed before the extreme storm events.

Evacuation from the site should only be undertaken in a safe and organized manner, consistent with the SES (2008) Gilgandra Shire Local Flood Plan. For this purpose, a FEP has prepared and included in the Attachment B.

CONCLUSIONS & RECOMMENDATIONS

The hydraulic model developed for the site has been used to assess local flood characteristics utilising Council's existing hydrology model for Castlereagh River. The peak flood level of the 1% AEP flood event due to mainstream flooding at subject site is estimated to be 284.5mAHD.

The following recommendations are made:

- Habitable floor level must set at a minimum RL of 285.0mAHD (i.e., 1% AEP flood level + 0.5m freeboard).
- All structures located below the RL of 285.0mAHD (i.e., 1% AEP flood level + 0.5m freeboard) to be flood compatible building components.
- All structures located below the RL of 285.0mAHD (i.e., 1% AEP flood level + 0.5m freeboard) to be able to withstand the hydraulic forces of the extreme flood events at the Site.
- All flood Electrical equipment (including electric motors, switches and air conditioning unit) below the RL of 285.0mAHD (i.e., 1% AEP flood level + 0.5m freeboard) are to be waterproofed.
- All goods and materials that may cause pollution or are potentially hazardous must be stored above the FPL, or removed before the event of a flood.

According to the proposed levels on the latest architectural plans:

- Proposed habitable floor level remains at RL 282.42 m which does not comply with the council's flood planning requirements (i.e., less than 285.0 AHD).
- However, as this is retained from the existing structure, the proposal does not worsen the existing flood conditions at the site, and is therefore considered acceptable.

The proposed development has been designed to ensure compatibility with the floodplain and Council's requirements, and as such no further recommendations are necessary.

Prepared by

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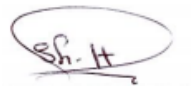

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APPENDIX A – FLOOD EVACUATION PLAN

Flood Evacuation Plan (FEP)	
PREPARE (Before a Flood Event)	• Check bureau of Meteorology periodically for severe weather warnings and broadcast to your family members. • Be aware of location of muster point • Check if your home and contents insurance covers flooding. • Keep list of emergency numbers • Prepare an emergency kit which include everything you need in one place such as radio, torch, spare batteries, First Aid Kit, Gloves, Important Document, canned food at least 3 days' supply, water, prescriptions and medications and copy of your emergency plan
Action (When You Hear A Flood Watch OR Weather Warning)	• Listen to the radio and check the SES website for more information and advice. • Go over your emergency plan Pack clothing and other extra items into your Emergency Kit and take this with you if you evacuate.
When Flooding May Happen Soon (A Flood Warning)	• Make sure your family members and neighbours are aware of what is happening. • Be ready to evacuate. Act early. Conditions change rapidly. Roads and escape routes can be covered or blocked. Do not forget to take pets and medicine with you. • Put household valuables and electrical items as high as possible. • Turn off water, gas, and electricity at the mains • Secure objects likely to float and cause damage. Raise chemicals and oils well above the forecast flood height.
Action (During A Flood Event)	• Remain calm • For emergency assistance, call 132 500 for SES. • Never drive, ride, or walk-through floodwater. This is the main cause of death during floods. • Never allow children to play in floodwater. This is the main cause of death during floods for children and young people. • Stay away from waterways. Water can flow quickly and have strong currents. • If you must leave the site, exercise caution to fewer mobile persons seek assistance. • Obey speed limit within the site and public roads. • If evacuated, do not return until it is safe to do so. • Follow the advice of authorities
RECOVERY (After A Flood Event)	• If your property has been flooded, check with Camden council for information and advice. • Have all electrical and gas equipment professionally tested before use.