



**OUR VISION & VALUES** ONE TEAM DELIVERING WITH  
**PRIDE**  
Passion | Respect | Innovation | Dedication | Excellence  
**OUR MISSION** TO BE EASY TO DO BUSINESS WITH

# **BUSINESS PAPER**

## **Ordinary Council Meeting**

**20 June 2023**

**Aaron Johansson**  
**Chief Executive Officer**

**16.2 DRAFT MARULAN FLOOD STUDY - POST EXHIBITION REPORT**

**Author:** Business Manager Strategic Planning  
Director Planning & Environment

**Authoriser:** Aaron Johansson, Chief Executive Officer

**Attachments:** 1. Council Report dated 20 February, 2023    
2. Marulan Flood Study (Final Draft) (separately enclosed) 

<b>Reference to LSPS:</b>	Planning Priority 8: Natural Hazards – Vision 2040 – Natural hazards are identified, planned for and mitigated where possible throughout the planning process.
<b>Submissions:</b>	Five (5)
<b>Key Issues:</b>	Flooding/Natural Hazard Identification for Planning, Asset Management, Risk to Population and Property

**RECOMMENDATION**

That:

1. The post exhibition assessment report for the *Draft Marulan Flood Study* be received.
2. The *Marulan Flood Study* as amended in Attachment 2 be adopted.
3. The *Marulan Flood Study* to take effect from 1 August 2023.

Section 375A of the *Local Government Act 1993* requires General Managers to record which Councillors vote for and against each planning decision of the Council, and to make this information publicly available.

**BACKGROUND**

Staff presented the *Draft Marulan Flood Study* (the Draft Study) to a briefing session on 14 February 2023, following this Council at its meeting of 21 February 2023 considered a report on the Draft Study and resolved:

*That:*

1. *The Business Manager Strategic Planning's report on the Draft Marulan Flood Study be received.*
2. *The Draft Marulan Flood Study be placed on exhibition for a minimum of 28 days.*

Attached (**Attachment 1**) is a copy of the previous report to Council relating to the proposed exhibition of the Draft Marulan Flood Study.

This report follows the public exhibition and consultation period for the Draft Study and provides an updated version of the Study (final draft) following consideration of submissions (**Attachment 2**) which is recommended for adoption.

**REPORT****Public Exhibition**

The Draft Marulan Flood Study was publicly exhibited from Friday 3 March, 2023 – Monday 3 April, 2023. The exhibition was notified via the following:

- Council's web site

- Goulburn Post
- Notification letters sent to all property owners affected by the 1% Annual Exceedance Probability (AEP – formerly referred to as a 1 in 100-year event level but is actually a 1% chance of such an event occurring in any given year).
- Notification email sent to State agencies, Marulan Chamber of Commerce and Council's Development Industry Stakeholders list (approximately 500 businesses).

The exhibition material (Draft Flood Study, Exhibition Notice, Council Report and Council Minutes) was provided online, with hard copies also available to view at the Council library and Civic Centre during office hours.

The exhibition notice recommended that if people had further questions that they contact the Strategic Planning Business Unit to book an appointment for a meeting (whether in person, online or over the phone). Council kept a log of all phone calls seeking further information or a meeting with only eight direct enquiries logged. Only five submissions have been received.

### State Agency/Service Submissions

Submissions have been received from the following State agencies/services (**Attachment 2 – Appendix G**):

- NSW SES – raises no objections and states that the document contains the necessary information for this stage of the process.
- Water NSW – no objections **but includes a table of recommendations** with some suggestions for interpretation/editing, identification of potential anomalies/corrections, and seeking clarification on the way the future urban release areas are integrated into the Flood Study or later Floodplain Risk Management Study and Plan.
- Transport for NSW – no objections but identifies itself as a key stakeholder for the next phase in the process with the development of the Floodplain Risk Management Study and Plan.

The above submissions have been noted and addressed/incorporated into the revised Study as applicable.

### Public Submissions

Submissions have also been received from the following members of the public (**Attachment 2 – Appendix G**):

- *JPP Property Holdings – objects to No. 71 Old Tallong Road, Marulan (Lot 1 DP 855762) being identified in the 1% AEP. This is on the basis that the property is not significantly flood affected and has existing natural drainage opportunities.*

#### Council Comment

This submission is noted but is essentially pointing out the need for the study by identifying that there are drainage corridors through the property that need to be considered with any future development. Given the Ministerial Direction 4.1 relating to the assessment of planning proposals for flooding (when planning proposals are considered) and the need to address the existing Clause 5.21 in the GM Local Environmental Plan (LEP) 2009 relating to flooding, it is considered that any further development of this property given the current zoning or consideration of a future zoning will require a consideration of flooding.

- *M Melkonian – objects to No. 38 – 40 Goulburn Street being identified in the 1% AEP given the implication of this on future development (costs) and insurance. The submission*

*acknowledges current flooding but suggests that the flooding could be mitigated which may mean the property could be flood free in future subject to certain mitigation measures occurring. It is suggesting that Council not apply the Development Control Plan (DCP) controls (such as the interim 0.5m freeboard requirement) until the Floodplain Risk Management Study and Plan is completed and that the model is “re- run” with mitigation measures in place and only those properties still affected after mitigation should be identified as flood liable.*

### Council Comment

This submission is noted but is also pointing out the need for the Study and associated controls to be put in place acknowledging the present situation. Regardless of the Study or DCP, Council's LEP provisions in Clause 5.21 relating to flooding still apply. The existence of an adopted and endorsed flood study will make it possible to identify works for mitigation. In future years should mitigation occur this should be picked up in a flood study review. In the interim, Council is required to plan and mitigate flooding as it is now.

The revised Draft Flood Study following the public exhibition is provided in **Attachment 2**. Full copies of submissions (as redacted with personal details), submission summaries (by the consultant) and assessment are provided in Appendix G to the Study.

## **GM Local Environmental Plan (LEP) 2009**

The following standard clause for flooding is included in the *Goulburn Mulwaree Local Environmental Plan 2009*:

### **5.21 Flood planning**

(1) The objectives of this clause are as follows—

- (a) to minimise the flood risk to life and property associated with the use of land,
- (b) to allow development on land that is compatible with the flood function and behaviour on the land, taking into account projected changes as a result of climate change,
- (c) to avoid adverse or cumulative impacts on flood behaviour and the environment,
- (d) to enable the safe occupation and efficient evacuation of people in the event of a flood.

(2) Development consent must not be granted to development on land the consent authority considers to be within the flood planning area unless the consent authority is satisfied the development—

- (a) is compatible with the flood function and behaviour on the land, and
- (b) will not adversely affect flood behaviour in a way that results in detrimental increases in the potential flood affectation of other development or properties, and
- (c) will not adversely affect the safe occupation and efficient evacuation of people or exceed the capacity of existing evacuation routes for the surrounding area in the event of a flood, and
- (d) incorporates appropriate measures to manage risk to life in the event of a flood, and
- (e) will not adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of riverbanks or watercourses.

(3) In deciding whether to grant development consent on land to which this clause applies, the consent authority must consider the following matters—

- (a) the impact of the development on projected changes to flood behaviour as a result of climate change,
- (b) the intended design and scale of buildings resulting from the development,
- (c) whether the development incorporates measures to minimise the risk to life and ensure the safe evacuation of people in the event of a flood,

- (d) the potential to modify, relocate or remove buildings resulting from development if the surrounding area is impacted by flooding or coastal erosion.
- (4) A word or expression used in this clause has the same meaning as it has in the Considering Flooding in Land Use Planning Guideline unless it is otherwise defined in this clause.
- (5) In this clause—

*Considering Flooding in Land Use Planning Guideline* means the *Considering Flooding in Land Use Planning Guideline* published on the Department's website on 14 July 2021.

*flood planning area* has the same meaning as it has in the Floodplain Development Manual.

*Floodplain Development Manual* means the *Floodplain Development Manual* (ISBN 0 7347 5476 0) published by the NSW Government in April 2005.

The Draft Marulan Flood Study sets a temporary freeboard of 0.5m (which is the same as the freeboard generally applied in the GM DCP for areas outside the *Goulburn Floodplain Risk Management Study and Plan 2022* area. The 1%AEP level combined with the 0.5m freeboard will be the interim **flood planning area** (for the purposes of LEP Clause 5.21) until the Marulan Floodplain Risk Management Study and Plan is finalised and adopted.

The next step in the process upon the adoption of the flood study is the preparation of the Marulan Floodplain Risk Management Strategy and Plan. This document will consider the risks and a range of potential mitigations from planning policy for development through to physical works, warning systems etc, as applicable to Marulan.

### **GM Development Control Plan (DCP) 2009**

The Chapter 3.8 Flood Affected Lands provisions in the Goulburn Mulwaree Development Control Plan was recently updated to reflect the recommendations of the *Goulburn Floodplain Risk Management Study and Plan 2022*. These changes included the adoption of a flood policy which addresses flood provisions for land outside an adopted flood study. The DCP and LEP controls would still apply to Marulan as an interim measure with a 0.5m freeboard (as also specified as an interim measure in the Study if adopted) until the next phase being the Floodplain Risk Management Study and Plan finalises a specific freeboard and flood planning constraint categories for Marulan and or other changes which may be suggested for the DCP. Therefore, no changes to the DCP are recommended at this stage.

### **Planning Certificates & Flood Certificates**

Once the Flood Study is adopted, Council's information systems will require updating with the new data to inform 10.7 Certificates (Planning Certificates) and associated updates to Council's GIS and information systems. Therefore, should the Study be adopted there will need to be a delay before commencement to facilitate these updates.

Flood certificates will be able to be issued providing information as available from the Study if adopted.

### **SES Flood Data Portal**

The adopted study will be made publicly available on the NSW SES Flood Data Portal. The portal provides access to flood modelling which can be used by the State and the public to model the impacts of new development on flooding.

### **Conclusion and Recommendation**

In conclusion, the adoption of the flood study is recommended to inform planning, asset management, disaster/ risk management and to facilitate grant applications for mitigation works

etc. The application of evidence based flood controls will reduce risks to life and property the identification and mitigation of flooding through the existing planning controls.

The adopted Flood Study will inform the next phase of the process which is the Floodplain Risk Management Strategy and Plan. Council as a land use manager and asset owner/manager is required to make informed decisions around land use constraints and capabilities both for itself and for the public. The adoption of the Study will facilitate public access to the Study and associated modelling which will be cheaper and more coordinated than site specific flood studies as necessary. The adoption and application of the Flood Study will also be foundational to any future Planning Proposals for opportunity areas identified in the Urban and Fringe Housing Strategy or master planning for Marulan.

No changes to the Council LEP or DCP are identified at this phase of the process, but further recommendations may be identified in the subsequent Floodplain Risk Management Study and Plan.

### **FINANCIAL IMPLICATIONS**

The adoption of the Flood Study will facilitate the identification and mitigation of flooding in Marulan and potentially may open opportunities for grant applications for mitigations identified in the upcoming Floodplain Risk Management Study and Plan.

### **LEGAL IMPLICATIONS**

Council is responsible for land use management and planning and the Study will assist in providing information to facilitate decision making generally.

### 16.3 DRAFT MARULAN FLOOD STUDY

**Author:** Business Manager Strategic Planning

Director Planning & Environment

**Authoriser:** Aaron Johansson, Chief Executive Officer

**Attachments:** 1. Marulan Flood Study 1\_ AEP - Flood Depths    
2. Draft Marulan Flood Study (separately enclosed) 

<b>Reference to LSPS:</b>	Planning Priority 8: Natural Hazards – Vision 2040 – Natural hazards are identified, planned for and mitigated where possible throughout the planning process.
<b>Key Issues:</b>	Flood planning Urban and Fringe Housing Strategy

### RECOMMENDATION

That:

1. The Business Manager Strategic Planning's report on the Draft Marulan Flood Study be received.
2. The Draft Marulan Flood Study be placed on exhibition for a minimum of 28 days.

Section 375A of the *Local Government Act 1993* requires General Managers to record which Councillors vote for and against each planning decision of the Council, and to make this information publicly available.

### BACKGROUND

Council's Local Strategic Planning Statement sets a priority for planning for natural hazards being "*Natural Hazards are identified, planned for and mitigated where possible throughout the planning process*". In addition to this the *Urban and Fringe Housing Strategy* (Housing Strategy) has identified potential land for development in Marulan. During the preparation and consultation process for the Strategy it was noted that some areas identified for urban release were potentially affected by either creeks or overland flows. Therefore, a flood assessment for areas identified in the Housing Strategy is required to inform future planning and to facilitate the release of land by improving the understanding of land use constraints.

Council received a grant from the NSW Floodplain Management Program towards the development of a flood study and floodplain risk management plan for Marulan. Council engaged GRC Hydro to prepare the flood study and the flood plain risk management plan (following the adoption of the flood study).

A Draft Marulan Flood Study has now been prepared and this report recommends placing it on exhibition for public comment.

### REPORT

#### Marulan and Flooding

Unlike Goulburn, Marulan is sited at the top of two catchments and does not have any proximity to rivers and the impacts of riverine flooding. However, Marulan does have creeks and watercourses which are located within the town and surrounding rural catchment. Furthermore, some areas within the town are known to experience problems with overland flows and stormwater. The risks to life and property still apply to flooding whether due to overland flow or riverine flooding.

Ordinary Council Meeting Agenda

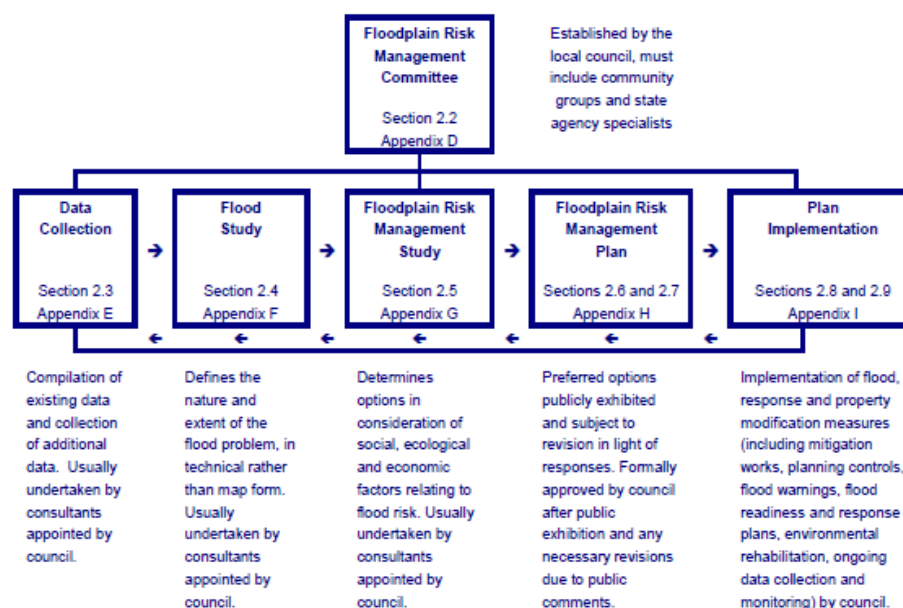
21 February 2023

Council as a land manager is required to understand these systems to mitigate the associated risks to the community, development and infrastructure.

A Draft Flood Study has been prepared following community consultation, data collation and the development of an appropriate model.

The following image details the floodplain risk management process in NSW

Image 1: The floodplain risk management process in New South Wales (FDM, 2005)



Source: NSW Government (2005)

## Data Collection

Data was collected from a variety of sources including Council, Transport for NSW, Australian Rail Track Corporation, topographic data and survey, meteorological data (daily read rainfall gauges, stream gauges) etc.

## Community Consultation

A newsletter and questionnaire were developed for the Marulan community which introduced the study and its objectives and requested information via a questionnaire. The newsletter and questionnaire were distributed to all property owners within the Marulan locality. Community members were able to participate in the questionnaire either via return of the paper questionnaire, email or submission on Council's website.

Twenty (28) responses were received from the community. Approximately 68% of respondents indicated that they were aware of flooding from overland flow in their area. Around 25% of replies indicated that they had experienced flooding in their yard or garage, with one respondent noting flooding above their floor level at their property.



GRC Hydro held or offered one on one follow up interviews with each of the respondents.

These results highlight that there is a general awareness of flooding in Marulan and the potential for flooding to impact on properties. The questionnaire asked the community about the management of flood related development controls within the floodplain and the varying degrees of restrictions that can be applied.

Approximately 71% of respondents selected that property owners should be informed of potential flood risks and flood related development controls on their property and allow for development provided these controls are adhered to. These results will inform the implementation of flood related development controls for properties within the final Flood Planning Area, undertaken during the Floodplain Risk Management Study and Plan.

With the development of the Flood Study, it is recommended that Council exhibit the study prior to developing the floodplain risk management plan.

### Model Development

Computer models were established to simulate catchment rainfall/runoff response and flood behaviour for Marulan and surrounding areas. A rainfall/runoff model (DRAINS software) was used to convert design rainfall into runoff, which was then applied to the flood model (TUFLOW software) to define flood depths, extents and velocities.

The study area's flood model represents the urban area and surrounds as a 2 m resolution grid of cells. Physical features including the area's topography, creek and river bathymetry, roads, buildings, and drainage features (e.g. bridges, culverts and stormwater drainage) are all incorporated into the model. Applied model parameters have been obtained from applicable reference documents such as Australian Rainfall and Runoff (2019).

Limited hydrometric data was available for model calibration and instead, a model validation process was implemented. The rainfall/runoff model results were validated to ARR2019 Regional Flood Frequency Estimation (RFFE) flows and flood model results were compared to flood observations provided by the community.

### Model Results

Design flood behaviour was produced for the study area for the 20%, 10%, 5%, 2%, 1%, 0.5% and 0.2% Annual Exceedance Probability (AEP) events, as well as the Probable Maximum Flood (PMF). The primary model outputs are high-resolution raster outputs of peak flood depth, level and velocity across the study area. These results were then used to derive the hydraulic hazard, which describes the risk to pedestrians, vehicles and buildings based on a flood's depth and velocity. Flood function will be produced during the Floodplain Risk Management Study phase of the project.

Developed areas are noted to be typically subject to limited flood affectation and low hazard flow conditions. A notable exception is Morris Place which is reported by the community to be frequently flooded. Areas of high flood hazard affecting dwellings is noted upstream of the ARTC rail corridor for events rarer than 0.2% AEP.

Greenfield areas identified for urban development in the Urban and Fringe Housing Strategy are also subject to various levels of inundation. This Study will assist in informing and facilitating the planning proposal process to ensure that future development is appropriately planned.

**Attachment 1** is an extract of the flood mapping detailing the depth and extent of inundation from a 1% AEP event (formerly described as a 1 in 100-year event but is really a 1% chance of occurrence in any given year). The 1% AEP event is the most used for planning purposes. **Attachment 2** provides a full copy of the flood study which is provided under separate cover due to its size.

### Flood Damages Assessment

A flood damages assessment was undertaken to quantitatively assess the impacts of flooding on the community. The flood damages assessment described herein has been completed for 451 properties within the study area. Based on the flood liability of each development, a monetary value was applied to each property based on the level of property damage over a range of design flood events.

Property flood liability for residential and non-residential properties is presented in the tables below.

Design Event (AEP)	Number of Properties Affected	Number of Properties affected above Floor Level
20%	1	0
10%	2	0
5%	2	0
2%	7	0
1%	14	0
0.5%	15	0
0.2%	15	0
PMF	77	30

**Table 1 - Residential Property Flood Affection**

Design Event (AEP)	Number of Properties Affected	Number of Properties affected above Floor Level
20%	9	2
10%	10	2
5%	10	3
2%	10	3
1%	12	3
0.5%	12	3
0.2%	12	3
PMF	24	7

**Table 2 – Non- Residential Property Flood Affection**

The estimated average annual flood damages for both residential and non-residential flooding is \$426,400, which is comprised of \$22,900 of residential damages and \$403,500 of non-residential damages.

### Floodplain Risk Management Plan

The development of a floodplain risk management plan will follow Council's public exhibition and adoption of the flood study. The results of the flood study will inform a range of recommendations to mitigate the impacts of flooding. Measures may include defining a flood planning area, a freeboard height for development, mapped flood planning constraint categories, physical measures to mitigate flooding impacts, warning systems, public awareness etc.

Council's recently amended flood affected land provisions in the Goulburn Mulwaree Development Control Plan 2009 and the adopted flood policy specify a freeboard of 0.5m above the 1%AEP for development outside the area covered by the Goulburn Flood Study. Should Council adopt the Marulan Flood Study, these provisions would apply as an interim measure until the floodplain risk management plan is completed and adopted for Marulan.

**Conclusion and Recommendation**

In conclusion, a draft Marulan Flood Study has been prepared to inform the future planning and development. It is recommended that the Draft Marulan Flood Study be placed on public exhibition prior to the development of the Floodplain Risk Management Plan.