Agenda and Business Paper

Floodplain Risk Management Advisory Committee

To be held on
Thursday 17 April 2025
at 8:30 AM

Civic Centre cnr Baylis and Morrow Streets,
Wagga Wagga NSW 2650 (PO Box 20)
P 1300 292 442
P council@wagga.nsw.gov.au

wagga.nsw.gov.au

City of
Wagga Wagga

FLOODPLAIN RISK MANAGEMENT ADVISORY COMMITTEE AGENDA AND BUSINESS PAPER

THURSDAY 17 APRIL 2025

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ACKNOWLEDGEMENT OF COUNTRY

APOLOGIES

CONFIRMATION OF MINUTES

CM-1 FLOODPLAIN RISK MANAGEMENT ADVISORY COMMITTEE MINUTES - 7 NOVEMBER 2024

Rcommendation

That the Minutes of the proceedings of the Floodplain Risk Management Advisory Committee Meeting held on 8 August 2024 be confirmed as a true and accurate record, noting Council's adoption of these minutes at its meeting 7 November 2024.

Attachments

1⇩. Floodplain Risk Management Advisory Committee Meeting Minutes - 7 November 2024 47

DECLARATIONS OF INTEREST

REPORTS FROM STAFF

RP-1 ELECT A CHAIRPERSON AND DEPUTY CHAIRPERSON

Author: Warren Faulkner

Analysis:	As this is the first meeting of the newly formed Floodplain Risk Management Advisory Committee, a Chairperson and Deputy Chairperson for the Committee must be elected.

Recommendation

That the Committee elect a Chairperson and Deputy Chairperson for the Term of the Committee.

Report

In accordance with the Floodplain Risk Management Advisory Committee Terms of Reference, the Committee shall elect a Chairperson and Deputy Chairperson.

9. Chairperson and Deputy Chairperson

(1) The Committee shall, at its first meeting following appointment, elect one of its voting members appointed under Clause 5 to be Chairperson of the Committee and one of its voting members appointed under the same clause to be Deputy Chairperson.

A staff member may be appointed as Chair with no voting powers.

(2) The Deputy Chairperson shall act in the absence of the Chairperson.

The Committee's voting members are as follows:

Mayor, Councillor Dallas Tout	Council Elected Member
Councillor Jenny McKinnon	Council Elected Member
Councillor Lindsay Tanner	Council Elected Member
Austin Morris	Community Member
Michael Friend	Community Member
Patricia Murray	Community Member
Roslyn Pragnell	Community Member

There are no legislative requirements as to the process for electing a Chairperson or Deputy Chairperson of a Committee of Council. Accordingly, the election may take the form of a show of hands or secret ballot.

Committee members are requested to decide which form the election will take and proceed with the election of a Chairperson and Deputy Chairperson.

Financial Implications

N/A

Policy

Floodplain Risk Management Advisory Committee Meeting – Terms of Reference.

Link to Strategic Plan

Community Leadership and Collaboration

Objective: We have strong leadership

Outcome: We are accountable and transparent

Risk Management Issues for Council

No specific issues identified.

Internal / External Consultation

N/A

RP-2 2025 MEETING SCHEDULE

Author: Warren Faulkner

Analysis:	The Floodplain Risk Management Advisory Committee Terms of Reference require the Committee is to meet quarterly, as determined by the Committee.

Recommendation

That the Committee endorse the schedule of meeting dates for the next 12 months as outlined in the Report.

Report

A forward plan of meeting dates is agreed by the Committee each year. The following schedule of meeting dates is proposed for the remainder of the 2025 calendar year for the Committee's consideration and endorsement:

- Thursday 17 April 2025
- Thursday 3 July 2025
- Thursday 18 September 2025
- Thursday 4 December 2025

Meetings are proposed to commence at 8:30am in the Council Meeting Room.

Extraordinary meetings and additional workshops may be held from time to time to discuss specific projects and items as required.

Financial Implications

N/A

Policy

N/A

Link to Strategic Plan

Community Leadership and Collaboration

Objective: We have strong leadership

Outcome: We are accountable and transparent

Risk Management Issues for Council

No specific issues identified.

Internal / External Consultation

N/A

RP-3 2021-22-FM-0032 - URANQUINTY LEVEE UPGRADE - INVESTIGATION AND DESIGN

Author: Andrew Mason
Director: Warren Faulkner

Summary: The project is progressing as per the required program. The 50% design has been completed and a design report provided to Council for review.

Recommendation

That the Floodplain Risk Management Advisory Committee receive and note the update provided in relation to the Uranquinty Levee Upgrade Project.

Report

Royal Haskoning DHV (RHDHV) have completed the 50% design and provided it to Council for Review. Council provided the design and design report to DCCEEW and PWD for further review and passed the feedback onto RHDHV.

Council is progressing an alternative alignment of the eastern levee adjacent to Connorton Street so that it protects land that is zoned RU5 to allow for village expansion. The revised levee alignment has the potential to produce approximately an extra 50 1/4 acre blocks.

RHDHV has provided an estimate to complete the analysis as extra work and if the cost to protect the land proves viable and appropriate mitigation can be put in place, Council will need to finance this variation to the design from internal sources.

RHDHV have provided the attached update.

Andrew Morris from RHDHV will provide a presentation on the status of the current design and overall project.

Financial Implications

Policy and Legislation

N/A

Link to Strategic Plan

Safe and Healthy Community

Objective: Our community feel safe

Be responsive to emergencies

Risk Management Issues for Council

N/A

Internal / External Consultation

N/A

Attachments

1⇩. Uranquinty Levee Upgrade - Progress Report No. 5

Royal HaskoningDHV
Enhancing Society Together

Note / Memo

Haskoning Australia PTY Ltd.
Water & Maritime

To:	Mr Andrew Mason
From:	Andrew Morris
Date:	07 April 2025
Copy:	Click to enter "CopyTo"
Our reference:	PA3159-RHD-ME-WR-0001
Classification:	Project Related
Checked by	Tom Wright

Subject: *Uranquinty Levee Upgrade - Progress Report No. 5*
Attachment

Dear Andrew,

Please find a memorandum summarising progress on the Uranquinty Levee Upgrade Project. Recent progress has focussed on updating the drawings and report in response to comments received as well as progressing the Connorton Street Levee alternative alignment options.

1. Update to the concept design report and drawings

   The draft drawings were submitted for review in December 2024, and the associated draft report was submitted in February 2025. The drawings and report are being updated to reflect comments received from Council and the Department of Climate Change, Energy, the Environment and Water (DCCEEW). The updated documents will address a range of comments including the cost effectiveness of the current design, finalisation of an appropriate levee freeboard for each section of levee, confirming the 3rd party impacts associated with the levee upgrade and queries around the geotechnical integrity of the proposed levee structure. The updated report and drawings are expected to be available in mid to late April.

2. Investigation of Connorton Street Levee alternative

   We have commenced investigations into the Connorton Street Levee alternative alignment. So far this has included:
   - Making a number of updates and refinements to the existing TUFLOW model to facilitate an investigation of the alternative alignment. This included changes to the model mesh to allow testing of the proposed diversion channel that is aligned along the front of the levee and refinement of the grid size in this area.
   - Re-running the preliminary alignment of the proposed levee to test the impacts of the proposed works and undertake preliminary sizing of the drain required to facilitate diversion of flows.
   - Refinement of the alignment to optimise the alignment for a number of factors including simplicity of construction, impacts to private property and sizing of the existing drainage line.
   - Reviewing the potential sizing of the existing culvert beneath Key Street to accommodate any changes to the hydraulic regime associated with the upgrade.

I trust this provides an adequate summary of the current progress associated with the Uranquinty levee upgrade project.

RP-4 2021-22-FM-0039 - LAKE ALBERT FLOOD MITIGATION OPTIONS - FEASIBILITY STUDY

Author: Andrew Mason
Director: Warren Faulkner

Summary: Work on this project has commenced and Stantec are working on the project in line with the program.

Recommendation

That the Floodplain Risk Management Advisory Committee receive and note the update provided in relation to the Lake Albert Flood Mitigation Project.

Report

Update provided from Stantec:

LAKE ALBERT ENHANCED FLOW SCHEME - FEASIBILITY STUDY

Part 3 - Mitigation Options Assessment - Summary

Stantec has been engaged by Wagga Wagga City Council to assess in further detail the feasibility of diverting additional flooding flows from Stringybark Creek and Crooked Creek and using Lake Albert to provide additional flood mitigation to the broader area, referred to as the 'Lake Albert Enhanced Flow Scheme'.

This was first proposed as a flood mitigation option in the Wagga Wagga Major Overland Flow Floodplain Risk Management Study and Plan (MOFFRMS&P, WMA Water, 2021). The project has been divided into the following three stage sites:

- Stage 1 (LA01) Lake Albert Outlet Modification
- Stage 2 (LA02) Crooked Creek Modification
- Stage 3 (LA03 Stringybark Creek Modification

This report summarises the outcomes of findings of Part 1 Data Collection and Validation and Part 2 Investigative Works & Environmental Assessment. This report also summarises the outcomes of Phase 1 of Part 3 of the study, relating to identification and qualitative assessment of mitigation options.

The option assessment process involved:

- Identification of twelve key issues relating to the feasibility of any flood mitigation works as part of the Lake Albert Enhanced Flow Scheme. The identified key issues are:

  a) Flood mitigation downstream
  b) Limiting any adverse flood impacts
  c) Limiting cultural heritage / environmental / ecological impacts
  d) No significant increases to geotechnical risk
  e) Achieving cost-effectiveness for capital costs and maintenance costs
  f) Compatibility with other nearby Council projects
  g) Minimising utility impacts
  h) Containing works within Council-owned land

i) Limiting social disruptions to the community
j) Aesthetics and visual amenity
k) Community support
l) Providing improved amenity and addressing any maintenance issues.

- Identification of opportunities and constraints for each individual site of the Scheme. The opportunities and constraints have been identified through review of available data and site investigations, site visit observations, discussions with Council stakeholders, consultation discussions with representatives of affected recreation clubs.

- A review of the FRMS&P option for the three stages of the project concluded that based on key issues, opportunities and constraints, the options as proposed in the MOFFRMS&P were not seen as the most feasible solutions. Therefore, other preliminary options were considered using a qualitative assessment. Options have been grouped based not only on the stage of the project, but also the specific component. The components are as follows:

  a) Stage 1 – Levee / Berm Around Lake
  b) Stage 1 – Lake Outlets
  c) Stage 2 – Channel Modification and Raised Footpath Berm
  d) Stage 3 – Channel Modification
  e) Stage 3 – Flood Mitigation for Recreation Clubs

- For those options seen as potentially feasible from the above qualitative assessment, preliminary modelling of these options (for the 1% AEP event and Lake Albert model only) has been conducted to confirm flood mitigation outcomes of each option.

Following the preliminary option identification and assessment process, Stantec in consultation with Wagga Wagga City Council has selected the following option to proceed to preliminary design, costing, modelling, and damage benefits assessment:

- Stage 1 – Lake Albert Outlet Modification:
  a) Levee / berm around the lake is proposed to be both a sheet pile levee for sections and an earth embankment for other sections. The levee is proposed to be contained within the open space reserve between the lake and Lakeshore Drive and Lake Albert Road (where the original FRMS&P option was proposed to be road raising).

     Due to the space limitations for the east side of the lake, sheet piles are the only feasible option at this location. For all other areas where open space with no existing trees is sufficiently wide, an earth embankment should be applied due to the greater cost effectiveness and enhanced visual amenity.

     To be confirmed during preliminary design, however based on Council recommendations no freeboard will be applied above the 1% AEP level for the sheet pile sections of levee, and a 0.3m freeboard will be applied above the 1% AEP level for the earth embankment sections.

  b) The revised lake outlet is proposed to be a two-stage weir for both the north and east outlets, with a low flow weir at both locations to allow the lake to

drain to normal operating levels post-flood, and a high flow weir to convey additional flows during rarer flood events.

- Stage 2 – Crooked Creek Diversion Modification: After extensive consideration of key issues and opportunities and (critically) constraints of the Crooked Creek site, including preliminary modelling of several selected options, it was concluded that there were no feasible options for the Crooked Creek diversion modification.

  Central to this outcome was the key issue of ecological and environmental impacts channel widening would have on the threatened ecological community (TEC) located along the creek, with any widening requiring the removal of large numbers of native trees. Furthermore, due to the Main St bridge invert being fixed downstream there was no opportunity for channel lowering or re-grading as there was insufficient fall across the channel length to facilitate channel invert lowering.

  Finally, modelling showed that any footpath raising to the north to act as an additional berm was not feasible without resulting in adverse impacts for residential properties to the south of the diversion channel. Therefore, for the preferred option, it is proposed that no modification be made to the Crooked Creek diversion, and that it remains as per existing conditions.

- Stage 3 – Stringybark Creek Diversion Modification:

  a) The channel modification is proposed to involve lowering of the channel invert to increase capacity, rather than channel widening as was proposed in the FRMS&P option. The extent of channel lowering will be from the outlet of the existing pond near Springvale Drive through Plumpton Road and further downstream, transitioning back to existing grade before the drop structure on the downstream end.

     This channel modification provides additional capacity to limit the amount of local flooding for residential areas (the channel modification extends further upstream than the FRMS&P option which started at Plumpton Road). The maximum depth of channel lowering is proposed to be 2 metres.

     The existing Plumpton Road twin culverts (2 x 1.8m) are proposed to be upsized to twin 2.4m W x 2.4m H culverts to reduce flooding over the road. This upgrade will align with the objectives of the Plumpton Road widening project.

     No road raising is required for Plumpton Road and the Boat Club access driveway (unlike the FRMS&P option), as these works were not considered feasible and the increased channel capacity upstream of Plumpton Road negates the need for this road raising work.

  b) At the downstream end of Stringybark Creek, the existing large culverts are proposed for replacement and lowering to increase the capacity of the channel, and to reduce the velocity of flows to reduce scour risk for the culvert headwall. In addition, a raising of the footpath on the north side of the culvert inlet is proposed to ensure that there is no overtopping of the channel in all events up to and including the 1% AEP.

This will improve the flooding risk for the sheds of the recreation clubs in the south-west side of Lake Albert. Current modelling (and observations from the 2012 floods) confirm these sheds are affected by high velocity, high hazard flows from the channel overtopping in rare flood events, with this flooding removed as part of the preferred option.

However, flooding of the sheds and the Boat Club building is proposed to worsen from lake flooding due to increased flood levels in the lake. To address this, flood risk consideration is to be given to permanent flood barriers around the sheds / buildings, combined with actuated flood barriers (self-raising barriers) for openings of the sheds / building.

Following this report, Council and the Flood Risk Management Advisory Committee (FRMAC) will confirm the selection of the preferred design to progress to preliminary design. Stantec will then conduct the following assessment of the final preferred option to be summarised in the Draft Feasibility Study report for the Lake Albert Enhanced Flow Scheme:

- Preliminary design of the preferred option.
- Flood Modelling: The updated TUFLOW models will be run for up to five design flood events; the 20%, 10%, 5%, 1% AEP and PMF events and results will be analysed to assess the impacts of the option on flooding. The post-mitigation flows from the Lake Albert will be modelled in the East model as well to simulate impacts of the preferred option. Only the critical duration for each of the five events will be modelled.
- High-level cost estimation will be prepared for the preferred option.
- Flood damage benefits assessment will be conducted using TUFLOW model results for the five design flood events to calculate Average Annual Damage (AAD) and Net Present Value (NPV) of flood damage benefits over the design life of the preferred option.

The draft Feasibility Study report will be placed on public exhibition, with workshops planned for directly affected stakeholders, with a post-exhibition final report to be issued incorporating comments from the FRMAC, Council and the community.

Stantec have provided the attached reports and will be providing a presentation to the committee.

Financial Implications

N/A

Policy and Legislation

N/A

Link to Strategic Plan

Safe and Healthy Community

Objective: Our community feel safe

Be responsive to emergencies

Risk Management Issues for Council

N/A

Internal / External Consultation

N/A

Attachments

1. Lake Albert Feasibility Study - Part 3 Report - Provided under separate cover

RP-5 2023 FMP 0073 EARLY WARNING SYSTEM MODEL DEVELOPMENT

Author: Andrew Mason
Director: Warren Faulkner

Summary: This Report provides an outline of the Early Warning System Model Development 2023 FMP 0073.

Recommendation

That the Floodplain Risk Management Advisory Committee receive and note the report regarding the Early Warning and Flood Prediction Project.

Report

This project is a development of a recommendation from the 2018 FRMSP.

An initial project was completed by Stantec and this has been developed into a specific and targeted approach to improve accessibility to flood and river data for the Council, the State Emergency Service and the public. The approach is to enhance and improve existing Council systems and work collaboratively with the SES and Bureau of Meteorology to improve access to data across the Local Government Area and the wider catchment.

Cameron Druery from Worley will be providing a presentation about the status of the project.

Financial Implications

N/A

Policy and Legislation

N/A

Link to Strategic Plan

Safe and Healthy Community

Objective: Our community feel safe

Monitor and enforce public safety

Risk Management Issues for Council

N/A

Internal / External Consultation

N/A

RP-6 2021-22-FM-0024 - GLENFIELD DRAIN AND FLOWERDALE STORAGE FLOOD MITIGATION WORKS

Author: Andrew Mason
Director: Warren Faulkner

Summary: Lyall and Associates have been engaged to undertake further investigation into suggested mitigation options to reduce impacts in the Glenfield Drain catchment as identified in the Wagga Wagga Major Overland Flow Floodplain Risk Management Study and Plan (MOFFS).

Recommendation

That the Floodplain Risk Management Advisory Committee receive and note the update provided in relation to the Glenfield Drain and Flowerdale Storage Area Flood Mitigation Works Project.

Report

A comprehensive progress report on the work undertaken to date to make the MOFFS model for the Glenfield Road drain catchment fit-for-purpose to undertake a detailed assessment of the performance of the existing detention basins within the catchment is attached.

A copy of the model outputs for the Glenfield Road Catchment is provide as a separate attachment to the report.

Lyall & Associates met with Council officers on Wednesday 2 April 2025 to discuss the current performance of each detention basin in the catchment and identify which ones should be pursued to optimise their performance, thus ensuring that downstream impacts in major storm events are minimised.

Lyall and Associates are on track to complete this engagement in August 2025.

An employee of Lyall & Associates will present on a selection of model outputs to the Committee.

Financial Implications

N/A

Policy and Legislation

N/A

Link to Strategic Plan

Safe and Healthy Community

Objective: Our community feel safe

Be responsive to emergencies

Risk Management Issues for Council

N/A

Internal / External Consultation

N/A

Attachments

1. Glenfield Road Drain Progress Report No. 1 - Provided under separate cover
2. Model outputs for the Glenfield Road Catchment - Provided under separate cover

RP-7 2022-FMP-0103 HUMULA AND MANGOPLAH FLOOD STUDIES

Author: Andrew Mason
Director: Warren Faulkner

Summary: WMAWater have commenced the study for Humula and Mangoplah and have conducted initial community consultation in the villages.

Recommendation

That the Floodplain Risk Management Advisory Committee receive and note the update provided in relation to the Humula and Mangoplah Flood Studies Project.

Report

Council engaged WMAWater in late September 2023, to undertake the Humula and Mangoplah Flood Study.

The relevant LiDAR data has been provided to WMAWater for development of the flood models.

WMAWater have built hydrologic models for both towns and have a hydraulic model for Mangoplah. Calibration for Mangoplah has commenced. The hydraulic build for Humula is ongoing.

Community Consultation was conducted at Humula on the 4 September 2024 and Mangoplah on the 5 September 2024.

WMAWater will be presenting to the committee regarding the status of this project.

Financial Implications

N/A

Policy and Legislation

N/A

Link to Strategic Plan

Safe and Healthy Community

Objective: Our community feel safe

Be responsive to emergencies

Risk Management Issues for Council

N/A

Internal / External Consultation

N/A

RP-8 17866- LEVEE SYSTEM UPGRADE - NORTH WAGGA

Author: Andrew Mason
Director: Warren Faulkner

Summary: This project to upgrade the levee has commenced with preliminary tasks completed and further funding sources being investigated.

Recommendation

That the Floodplain Risk Management Advisory Committee receive and note the update to the Levee System Upgrade – North Wagga.

Report

A new project specifically about the implementation of the levee raising and third-party mitigation options has commenced.

The Project Sponsor is the Director Infrastructure Services.

An updated indicative timeline for the implementation of the raised levee and third-party mitigation options is provided below.

Stage	Duration	Commencement
Topographic Survey	6 months	August 2024
Environmental Assessment	4 months	November 2024
Floodgate Pipe Relining	4 months	April 2025
Civil Design including mitigation options for residents adversely affected by the levee raising	6-12 months	July 2025
Levee contractor procurement	4 months	July 2026
Levee construction	24 months	November 2027

For the North Wagga levee, Council currently has a funding pool of:

- $6.3M in SRV funding
- $1.1M in the original Commonwealth Development Grant to be expended by December 2025.

The CDG will be utilised to fund the floodgate pipe relining and the detailed design of the levee.

There is a shortfall of approximately $5M for the construction of the levee and with the need to provide mitigation to the 25 buildings adversely affected by the levee raising, there is potentially the need to raise a further $3.75M on top of the $5M.

Council has applied for funding through Round 3 of the Disaster Ready Fund to finance the shortfall for this project. Council should be notified later this year if it has been successful.

The status of the project is:

- The detailed survey for the levee design has been completed.
- The Review of Environmental Factors is well underway, a draft has been received and final comments have been provided back to the consultant. The final REF should be received shortly.
- Procurement is underway for the detailed design of the levee, this closed yesterday 16th April, Council is aiming to have a design consultant appointed to the project by the middle of June.
- Procurement is underway for the relining of the existing 14 floodgates in the levee, preliminary access and environmental work has already been completed for this component of the project.
- A project steering committee will be engaged shortly to oversee this complex project.

Financial Implications

N/A

Policy and Legislation

Local Government Act

Development Control Plan 2010

Flood Risk Management Manual

Link to Strategic Plan

Safe and Healthy Community

Objective: Our community feel safe

Be responsive to emergencies

Risk Management Issues for Council

N/A

Internal / External Consultation

N/A

RP-9 FLOOD PROJECT IMPLEMENTATION STATUS

Author: Andrew Mason
Director: Warren Faulkner

Summary: This Report outlines the status of the flood projects across the various studies that Council currently has underway.

Recommendation

That the Floodplain Risk Management Advisory Committee receive and note the report in relation to Flood Project Implementation Status.

Report

Council has over 60 recommendations from the three recently completed studies and is working its way through the studies.

The spreadsheet tracking these projects is an attachment to this report.

Financial Implications

N/A

Policy and Legislation

N/A

Link to Strategic Plan

Safe and Healthy Community

Objective: Our community feel safe

Be responsive to emergencies

Risk Management Issues for Council

As outlined in the Report.

Internal / External Consultation

N/A

Attachments

1⇩. 2023 Flood Studies Project Status

2018 FRMSP Actions

REF	Option	Description	Benefits	Concerns	Priority		Responsibility	Status
PR1	Feasibility study to investigate a Voluntary House Raising & Voluntary Purchase Scheme in Wagga Wagga Study Area. The feasibility study is to be investigated in conjunction with Option L4B (see below)*.	Residential properties located outside leveed areas may be eligible for voluntary house raising which aims to reduce property damages to residential dwellings, or voluntary purchase, which aims to remove residents from high hazard areas and prevent future development of the purchased lot.Feasibility study is to include economic appraisal of both options, eligibility criteria for participation, identification of construction constraints and extensive community consultation to determine likely participation rates.	The frequency of overfloor inundation (and hence property damage) is significantly reduced by raising the dwelling above the Flood Planning Level. This option can provide benefits to many dwellings across the floodplain without impacting others. Voluntary purchase reduces the number of residents in high hazard areas and can improve conveyance by removing dwellings and rezoning lots to prevent future development.	Suitability for house raising depends on building footings (slab on ground not appropriate), which may limit participation.Some residents may not want stairs due to health and mobility issues.Economic viability of this scheme would be directly linked with participation rates.Raised houses could encourage residents to 'shelter in place' during floods, however isolation and long durations of floods put them at high risk. Significant ongoing education efforts will be required to ensure any evacuation orders are heeded.	**High***		Strategy and Projects	This project has been closed . Work has begun on the implementaion of the recommendations. Counil has resolved to build a 5% AEP levee for North Wagga
L4B	Feasibility Study to investigate North Wagga Levee Upgrade to 5% AEP level of protection including upgrade to Hampden Avenue to equivalent level (as embankment and conveyance improvements through Wilks Park. Feasibility study is to be conducted in conjunction with Option PR1 (see above)*.	Undertake a study to further investigate and determine the feasibility of raising the North Wagga Levee to a 5% AEP level of protection, and raising Hampden Avenue to an equivalent level with some excavation of Wilks Park to improve conveyance and offset upstream flood impacts. The feasibility study is to include EIS for the park excavation, geotechnical assessment of existing levee, site-by-site assessment of third party impacts and extensive community consultation.	Moderate reduction in frequency of inundation and property damages in North Wagga and minor benefits upstream due to increased flow conveyance beneath the newly excavated Wilks Bridge.	Significant concerns regarding risk to life of residents inside levee: ongoing education required to ensure residents fully understand the level of protection the levee would offer. Raising the levee has external adverse flood impacts on a number of properties which require further investigation. The upgrade involves additional excavation beneath Wilks Park Bridge which is likely to have associated environmental impacts. Other concerns include the high capital cost and	**High***		Strategy and Projects	This project has been closed . Work has begun on the implementaion of the recommendations. Counil has resolved to build a 5% AEP levee for North Wagga
VMP	Update the recently completed Vegetation Management Plan to consider new state biodiversity legislation instruments, then draft Standard Operation Procedures for selected recommended activities.	The recently completed VMP was written in accordance with new biodiversity legislation, however implementation guides and instruments were not available at the time of writing. Following completion, Council is to select recommended activities to progress, and draft Standard Operating Procedures for these items.	Controlled vegetation management ensures that in the long term, vegetation does not roughen the riparian zone excessively, and to protect areas of ecological value (especially habitat for native fauna).	There is a perception that broadscale clearing may occur, however vegetation management activities will be targeted and controlled. Vegetation management will not explicitly reduce flood affectation, however will ensure that over time flood behaviour is not worsened by increased riparian roughness due to increased vegetation density.	**High**		Environment and Regulatory Services	Councl is looking to a grant opportunity and the placement of an undergraduate intern to undertake a review of the current document and to develop an action plan .

2018 FRMSP Actions

REF	Option	Description	Benefits	Concerns	Priority		Responsibility	Status
RE1	Improve Flood Warning System	Various measures to continue and improve on Wagga Wagga's existing flood warning systems, both to enhance flood forecasting and dissemination of information to the public, including investigation of "DipStik" to be installed at Oura to provide water level alerts.	Improved warning systems will better increase the accuracy and timeliness of flood predictions and improve the communication methods to deliver accurate and persuasive messages during flooding.	BOM is responsible for issuing Flood Watch and Flood Warnings.	**High**		Strategy and Projects	Council have received a grant from DCCEEW to continue the next stage of this project. Worley have been engaged to develop the existing WaterRide system for this project.
RE2	Flood Emergency Management Planning	Review and update current Council and SES emergency flood response documents, drawing from latest modelling and recent floods.	Improved flood planning reduces flood risk to life and property, assisting residents of flood prone areas better prepare themselves and their property for flooding.	There are a number of documents to be updated and coordinated.	**High**		Strategy and Projects. SES	SES have finalised work on updating their floodplans. Council staff are periodically updating the Levee Owners Manual and Flood Emergency Response Operations Plan .
RE3	Community Flood Education	Ongoing community engagement is key to maintaining flood awareness, which can wane as time between flood events increases.	A flood aware community is generally better prepared for flooding, more responsive to evacuation orders and more resilient in recovery.	Levee upgrades can cause increased complacency in residents, which needs to be gently targeted with ongoing flood education campaigns.	**High**		SES	The NSW government have released a set of information that will assist Council with the ongoing education of the community with regard to flooding. Council have an ongoing program to improve the information on Council's website to provide a current source of reliable informaiton for the community
A1	Future consideration of increasing conveyance beneath Wiradjuri Bridge by extending span and/or excavating beneath the bridge.	Future Option: use planned upgrades to Wiradjuri Bridge (maintenance/ traffic capacity upgrade etc.) as an opportunity to improve flood conveyance between North and South Wagga.	Increasing flow conveyance reduces flood levels across the floodplain upstream of Wiradjuri Bridge and reduces flood damages in the CBD, Wagga Floodplain and parts of North Wagga.	There may be adverse impacts downstream of the bridge, high capital costs and ongoing maintenance costs. Would have to be undertaken in conjunction with other bridge works.	**Low**		Strategy and Projects	Initial investigations have highlighted significant issues with this proposal. This does not look to be a feasible option in the short-term

2018 FRMSP Actions

REF	Option	Description	Benefits	Concerns	Priority		Responsibility	Status
R1	Improved Access to Oura	Long term, staged upgrades to raise Oura Road (or other route) above the 1% AEP flood level.	Flood free access east-west across Wagga Wagga to Oura is beneficial not only to residents of Oura but to communities across the Riverina.	This road intersects several major flow paths and would require significant culverts/ bridge sections. Costs would be significant.	**Low**		Strategy and Projects	Initial investigations have highlighted significant issues with this proposal. This does not look to be a feasible option in the short-term
R2	Improved Access to Gumly Gumly	Long term, staged upgrades to raise or divert the Sturt Highway (or other route) above the 1% AEP flood level between East Wagga and Gumly Gumly.	Flood free access east-west across Wagga Wagga to Oura is beneficial not only to residents of Gumly Gumly but to communities across the Riverina.	This road intersects several major flow paths and would require significant culverts/ bridge sections. Costs would be significant. Sturt Highway is owned by RMS.	**Low**		Strategy and Projects TfNSW	This was raised with TfNSW and they will investigate options for flood proofing the Sturt Highway as the road is rehabilitated as part of the future roadworks programs
PL1	Move Flood Planning Area mapping into the Wagga Wagga DCP, whilst retaining the definition of the Flood Planning Area and Flood Planning Level in the LEP.	A general definition of both FPL and FPA is to remain in LEP, with details and FPA mapping provided in the DCP for ease of updating following the completion of future studies.	By keeping the FPA mapping in the DCP, Council would not be required to prepare a Planning Proposal each time the FPA map is updated (e.g. with completion of future flood studies).	This amendment to the LEP would require Council to submit a planning proposal.	**High**	General Changes		Awaiting finalisation of the update to the LEP to allow reference to the FPA map in DCP.
PL2	Reformat DCP to Matrix style document	The Development Control Plan (DCP) is currently a long, wordy and cumbersome document. Reverting to a matrix style format will make it easier for Council and the public to apply and understand.	Matrix style with controls dependent on hydraulic categorisation and hydraulic hazard will be clearer and simpler to interpret. Controls specific to each precinct are not necessary.	There may be resistance to moving away from precinct-centric controls, however the proposed format would be more equitable and clearer about which controls apply to a proposed development.	**High**		Regional Activation	Engaged consultants in August 2018 to update flooding controls in DCP - process identified issues with completion prior to completion of VOFFs and MOFFs. These issues are yet to be resolved.

2018 FRMSP Actions

REF	Option	Description	Benefits	Concerns	Priority		Responsibility	Status
PL3	Add clause to LEP to control critical facilities and vulnerable land uses between the FPA and PMF extent.	This clause empowers Council to apply appropriate flood related controls to critical facilities within the PMF extent that fall outside the FPA (which are not subject to the DCP).	Critical facilities including schools, aged care facilities, childcare facilities outside of the FPA are not currently subject to development controls, however are vulnerable to flood risk in events greater than the 1% AEP. This clause will require development of critical facilities to consider and prepare for flooding during the development application stage	This amendment to the LEP would require Council to submit a planning proposal, which could be lodged in conjunction with Option PL1.	**High**	Controls to reduce risk to life	Regional Activation	NSW Planning are currently in the process of reviewing standard flood clause. Council has been involved in this process. It is anticipated this will be updated automatically in the LEP without the need for Council to prepare an amendment. Expected completion 2021.
PL4	Requirement of Site Specific Flood Emergency Plans	Certain types of developments will be required to provide site specific emergency flood plans to demonstrate how occupants and stock will be kept safe during and after flood events.	Preparation of a plan increases the flood awareness of the business owner and reduces risk to life of staff or occupants by improving evacuation efficiency and preparedness. Increased awareness can also reduce property damages by preparing the site for flooding.	There may be resistance from developers, as preparation of a site-specific flood plan may be considered onerous to prospective developers.	**High**			Similar controls currently exist in the DCP. Any review and update of these controls will retain this provision.
PL5	Flood Risk Info on s149 Planning Certificates	Increase depth of flood information to be provided on s149(2) and (5) certificates to identify the property's flood hazard, hydraulic category and whether or not flood related development controls apply.	The more informed a home owner is, the greater the understanding of their flood risk. During a flood event this information can help prepare residents to evacuate and reduces the number of residents that elect to take shelter in high hazard areas.	None -s149 certificates already contain basic information, Council to provide further detail from current FRMS results.	**High**		Planning	Flood related development controls are provided on certificates. Further investigation is required to determine whether flood hazard and hydraulic category can be provided under liability requirements.
PL6	Controls to set Minimum Floor Levels	The Flood Planning Level (FPL) for a variety of types of development is set at a design flood event level plus a freeboard.	Incidences of overfloor inundation can be reduced for new developments by ensuring their floor levels are set at the FPL (as a minimum).	FPL and FPA to be updated based on results from this FRMS and applied appropriately to various types of development.	**High**		Planning	Completed. Controls currently exist in DCP. New data from FRMP&S is currently being used when assessing development applications.

2018 FRMSP Actions

REF	Option	Description	Benefits	Concerns	Priority		Responsibility	Status
PL7	Controls to set Minimum Flood Proofing Levels	Flood proofing to the FPL is to be required for certain types of development to reduce flood damages.	Implementation of a minimum flood proofing level can lead to reduced flood damages. Wet or dry flood proofing could be allowed at the developer's discretion.	FPL and FPA to be updated based on results from this FRMS and applied appropriately to various types of development.	**High**	Controls to reduce proposed development	Planning	Completed. Controls currently exist in the DCP. Updates to the DCP controls resulting from adoption of final FRMP&S, VOFF & MOFF will retain provisions for flood proofing levels.
PL8	Controls to ensure appropriate building design and materials	Certain developments are to be certified by an engineer to ensure they can withstand flooding forces, buoyancy and debris.	Developments in higher hazard areas or the floodway may be subject to fast flowing or deep floodwaters, and buoyant debris. This control will ensure such buildings are constructed suitably to withstand such forces and reduce damages and hazard.	There may be resistance from developers, as engineering certification may be considered onerous to prospective developers.	**High**		Planning	Completed. Controls currently exist in the DCP. Updates to the DCP controls resulting from adoption of final FRMP&S, VOFF & MOFF will retain provisions for building design and materials.
PL9	Controls to Manage Offsite Impacts: Flood Impact Assessment	A flood impact assessment can be used to demonstrate that a proposed development will not have any adverse flood impacts elsewhere in the floodplain (e.g. on a neighbouring property).	Developments in higher hazard areas or the floodway may cause adverse flood impacts to other properties and contribute to impacts of cumulative development. This control requires developments of a certain size to submit an impact assessment to demonstrate no offsite flood impacts occur	There may be resistance from developers, as a flood impact assessment may be considered onerous to prospective developers.	**High**	Controls to reduce risk to the wider floodplain		Completed. Controls currently exist in the DCP. Updates to the DCP controls resulting from adoption of final FRMP&S, VOFF & MOFF will retain provisions for flood impact assessment.
PL10	Appropriate Dwelling Design	Redevelopment of existing dwellings should be undertaken so as to improve flood risk where possible, and development controls can be used to achieve improvement over time.	The proposed controls seek to reduce the flood impacts of a replaced dwelling by, for example, locating it on the part of the lot with the lowest hazard, orienting the dwelling to cause least obstruction of flow, requiring minimum floor levels above the FPL, and using open piers to allow flow beneath the property.	There may be limited scope to change the siting of the dwelling or resistance to having open space beneath houses.	**High**			Completed. Controls currently exist in the DCP. Updates to the DCP controls resulting from adoption of final FRMP&S, VOFF & MOFF will retain provisions for appropriate dwelling design.

2021 MOFFS Actions

Option ID	Option	Description	Benefits	Concerns	Priority	Responsibilty	Status
RM01	Amend Flood Plans to include Overland Flow Flood Information	Amend local flood plans and operational plans to include information on flood risk due to overland flow, drawing on modelling and information provided in this FRMS&P	Detailed information will allow for better management of overland flow flood risk and will increase understanding of the different levels and types of risk present in Wagga Wagga.	Modelled results should be used as a guide only, as real flood behaviour may vary from modelled design results.	High	WWCC and SES	Currently underway with information added into the Flood Emergency Operational Response Plan
RM04	Community Flood Awareness	Establish and implement ongoing and collaborative education to improve flood awareness.	Flood awareness significantly improves preparedness for and recovery from flood events, building a more flood resilient community.	Ongoing efforts to ensure information is not forgotten. Potential for residents to become bored or complacent with messaging.	High	WWCC and SES	The NSW government have released a set of information that will assist Council with the ongoing education of the community with regard to flooding. Council have an ongoing program to improve the information on Council's website to provide a current source of reliable informaiton for the community
RM05	Improvements to Driver Safety	Undertake an investigation using the outputs from the FRMS&P to identify locations for the installation of road flood signage.	The installation of appropriate road signage pointing to routes likely to be cut and alternate routes, reduces the risk to drivers during floods, reducing the number of incidences of motorists driving through floodwater. Could potentially reduce demand on SES with a reduced number of incidents.	Community attitudes, awareness of, and behaviour during overland flood events will need to be considered. Signage needs to be as automated as possible to reduce additional demand on Council resources.	High	WWCC and SES	Council currently has 72 Water Over Road signs installed across the LGA
P01	Adoption of Overland Flow Flood Planning Area	Adopt the Overland Flow Flood Planning Area developed in the FRMS&P.	FPLs are effective tools to limit property damage to new development and redevelopment. FPLs may pertain to minimum floor levels or flood proofing levels depending on the type of development.	A planning proposal is required to amend the LEP and implement the new FPL. May be considered more onerous for developers.	High	WWCC Development Assessment and Building certification	The existing DCP controls cover Riverine Flooding only. Changes to the existing flooding controls have commenced and include MOFFS and VOFFS and relevant FPLs. Recent updates to Council's LEP by NSW Department of Planning includes a definition of FPA by directly referencing it to have the same meaning as the Floodplain Development Manual.

2021 MOFFS Actions

Option ID	Option	Description	Benefits	Concerns	Priority	Responsibilty	Status
P02	Adoption of Overland Flow Flood Planning Level	Adopt the Overland Flow (Residential) Flood Planning Level developed in the FRMS&P defined as the 1% AEP level plus 0.3 m freeboard. Modify the Wagga Wagga LEP to contain the definition consistent with Reference 7.	The FPA will provide clear guidance on the properties subject to flood related development controls.	A planning proposal is required to amend the LEP and implement the new FPA definition. Consultation would be required.	High	WWCC Development Assessment and Building certification	The existing DCP controls cover Riverine Flooding only. Changes to the existing flooding controls have commenced and include MOFFS and VOFFS and relevant FPLs. Recent updates to Council's LEP by NSW Department of Planning includes a definition of FPA by directly referencing it to have the same meaning as the Floodplain Development Manual. Recent updates to Council's LEP by NSW Department of Planning includes a definition of FPA by directly referencing it to have the same meaning as the Floodplain Development Manual.
P05	Appropriate Land Use Zoning in Future Development Areas	For areas not covered by existing flood mapping, undertake a flood investigation to develop flood mapping and allow for an appropriate assessment of flood risk. Ensure Planning Proposals for the rezoning of future growth areas are undertaken with due consideration of flood risk using information available to Council through its various Floodplain Risk Management Studies and Plans. If no flood information is available, consideration should be given to undertaking further analysis prior to determining land use zoning for future development areas. Ensure Development Planning Controls are implemented to manage development in areas of new growth in relation to flooding. This may include, for example, guidelines relating to the permissible proportion of impervious surfaces in areas of new development.	Considering flood risk in future development areas will allow early decisions to be made to reduce flood risk and minimise the impacts of flooding.	There may be resistance from developers who consider new controls to be onerous or likely to reduce the development yield.	High	WWCC Regional Activation	This is currently being undertaken with all Planning Proposals and will continue to be done.

2021 MOFFS Actions

Option ID	Option	Description	Benefits	Concerns	Priority	Responsibilty	Status
P07	Appropriate Management of areas subject to both riverine and overland flow flood risk.	Proposed development is to be assessed (and designed) with due consideration of the full range of flood risk present at the site, i.e., riverine, overland flow, or both mechanisms. For residential development both Riverine and Overland Flow FPAs are to be considered, while critical utilities or vulnerable facilities may warrant consideration of the PMF for either or both flood mechanisms, particularly when considering Flood Planning Levels, evacuation constraints and other methods to manage the full range of flood risk.	Considering flood risk from all mechanisms will ensure development is appropriate given the prevailing risk, minimising flood risk and the impacts of flooding.	There may be resistance from developers who consider new controls to be onerous.	High	WWCC Regional Activation	The existing DCP controls cover Riverine Flooding only. Changes to the existing flooding controls have commenced and include MOFFS and VOFFS and relevant FPLs. Recent updates to Council's LEP by NSW Department of Planning includes a definition of FPA by directly referencing it to have the same meaning as the Floodplain Development Manual. Recent updates to Council's LEP by NSW Department of Planning includes a definition of FPA by directly referencing it to have the same meaning as the Floodplain Development Manual.
P08	Confirm suitability of riverine flood related development controls within the overland flow PMF extent.	Controls to reduce riverine flood risk (e.g. by filling above a particular level) may inadvertently exacerbate the flood risk due to overland flow. It is recommended that Council's flood related development controls are assessed for their suitability in relation to overland flow flood information provided in this Study.	Considering flood risk from all mechanisms will ensure development is appropriate given the prevailing risk, and ensuring impacts are not worsened by controls to protect against one mechanism.	Individual consideration may be required.	High	WWCC Regional Activation	Recent updates to Council's LEP by NSW Department of Planning includes a definition of FPA by directly referencing it to have the same meaning as the Floodplain Development Manual.
P09	Inclusion of Overland Flow flood information on Section 10.7 Planning Certificates	In Section 10.7 Planning Certificates, notations regarding flooding should provide information on all mechanisms of flood risk at the site, including riverine, overland flow, or if appropriate, both. A greater level of detail can be provided via Section 10.7(5) certificates using high-resolution outputs from this Study and Council's other Floodplain Risk Management Studies.	The more informed a home owner is, the greater the understanding of their flood risk. During a flood event this information can help prepare residents to evacuate and reduces the number of residents that elect to take shelter in high hazard areas.	Limited -s10.7(2) certificates already contain basic information, Council to provide further detail from current FRMS&P results. May increase demand on Council staff, however GIS systems can be established to provide this information efficiently.	High	Development Assessment and Building Certification	Planning certificates identify whether the land is below the 1% Average Recurrence Interval and therefore flood related development controls may apply. No further details is provided on whether this is Riverina or overland flow.

2021 MOFFS Actions

Option ID	Option	Description	Benefits	Concerns	Priority	Responsibilty	Status
GD01 (Glenfield Drain)	Red Hill Road and Glenfield Road Basin (further investigation)	Aim: To reduce peak flows entering Glenfield Drain by temporarily storing runoff and releasing it at a lower flow rate; • Involves augmentation of the existing retarding basin south of Red Hill Road by excavating approximately 5,000 m3, and building up the existing Red Hill Road/ Glenfield Road intersection to raise the basin embankment, resulting in a total capacity of approximately 5.1 ML; Low spots in the existing embankment north east of the roundabout were filled	Reduced flood levels on and adjacent to Glenfield Road up to the railway in the 1% AEP event, including properties no longer flooded on the eastern side of Glenfield Road.	Increased flood depths upstream of the embankments, both in the designated basin southwest of the intersection, as well as the downstream parts of Jubilee Park. Public safety considerations due to prolonged ponding in roadside basin.	High	WWCC Projects	Contract awarded to Lyalls , project underway, due for completion in August 2025
GD02 (Glenfield Drain)	Adjin Street & Maher Street Intersection Civil Works (further investigation)	Suite of civil works intended to reduce inundation of properties and roads between Maher Street and Glenfield Road.	Removes external flood affectation for 47 properties and over-floor flooding for 4 dwellings in the 1% AEP event. Significant reductions in flood levels east of Glenfield Road.	Minor increase in flood levels in the industrial properties and vacant land upstream of the railway.	High	WWCC Projects	Contract awarded to Lyalls , project underway, due for completion in August 2025
GD03 (Glenfield Drain)	Anderson Oval Basin and Swale Augmentation (further investigation)	Aim: Increase flood storage capacity at Anderson Oval to reduce flooding on Finch Place and to reduce (and delay) peak inflows from entering Glenfield Drain; • Increase existing embankment height around Anderson Oval from 1 m to 2.25 m; • A spillway is provided in the north western section of the basin, set 0.25 m lower than the remainder of the embankment; A swale was excavated to allow runoff from Finch Place to flow towards Fernleigh Road rather than back up behind the basin embankment.	The extent of reductions in flood levels is significant and can be observed up to the northern extent of the City model. Effective in reducing peak flood levels across a range of events.	Public safety concerns as a significant depth (> 1 m) would be ponded within the playing field in a 5% AEP event. Reduction in amenity and usability of the oval following rain events.	High	WWCC Projects	Contract awarded to Lyalls , project underway, due for completion in August 2025

2021 MOFFS Actions

Option ID	Option	Description	Benefits	Concerns	Priority	Responsibilty	Status
GD05 (Glenfield Drain)	Flowerdale Lagoon Drainage Improvements	Aim: Improve drainage of the Flowerdale Storage Area by installing an additional major levee pipe between Floodgates 01 and 02 (Flowerdale Lagoon and Wiradjuri Reserve); The installation of three 1.8 m diameter levee pipes has been tested near the Wiradjuri Walking Track, between Flood Gates 1 and 2.	Significant flood level reductions along Spring Street and the Olympic Highway up to Evans Street and Shaw Street (up to 0.42 m). Similar reductions can be seen along Pearson Street (up to 0.38 m). Major flood level reductions observed on the vacant land between the lagoon and the Olympic Highway (up to 0.66 m); Minimal works required.	Construction at this location would interfere with the Main City Levee Spillway. Potential for constraints relating to cultural and heritage values of Flowerdale Lagoon.	High	WWCC Projects	Contract awarded to Lyalls , project underway, due for completion in August 2025
SW01	Incarnie Crescent Stormwater Line	Aim: Reduce flood levels along Incarnie Crescent; Connect existing drainage line along Incarnie Crescent via a new 525 mm pipe to the trunk drainage line east towards the river.	Peak flood level reductions can be observed from Incarnie Cres all the way west to the Wiradjuri Walking Track. No increases in flood level can be seen. Scope of work is not extensive.	Incarnie Crescent will require closure while works are underway.	High	WWCC Projects	Complete, the project now requires the installation of a pump at both floodgates 7 & 8 , Council is determiningthe most appropriate way to fund and imlement this.
LA01 (Lake Albert)	Raising Lake Albert Road	Raise Lake Albert Road at the north east corner of Lake Albert by approximately 1 m-1.5 m over a length of 450 m, and Lakeside Drive by approximately 1 m for 200 m from its intersection with Lake Albert Road. Increase airspace in Lake Albert to provide storage capacity during flood events; Involves reducing the Lake Albert outlet capacity by approximately 50% to limit peak outflows.	Reduces peak flood levels downstream of Lake Albert in the 1% AEP by up to 0.47 m immediately downstream of the road, and to a lesser degree across the East Wagga commercial area. Minor increase in surface area of Lake Albert due to relatively gently sloping banks;	Increases flood levels by up to 0.45 m in the 1% AEP event in Lake Albert. Potential adverse impacts to properties at southern end of the Lake. Lake Albert Road will require closure while works are underway.	High	WWCC Projects	Contract awarded to Stantec, project underway,

2021 MOFFS Actions

Option ID	Option	Description	Benefits	Concerns	Priority	Responsibilty	Status
LA02 (Lake Albert)	Augmentation of Crooked Creek Diversion into Lake Albert	Increase capacity of the existing Crooked Creek diversion south of Craft Street, to reduce flood risk further north by diverting flows into Lake Albert; Construct a 1 m high diversion embankment along Craft Street to assist in function of the Crooked Creek diversion channel and provide protection to residences north of Craft Street. To be undertaken in conjunction with LA01 and LA03	The extent of reductions in flood levels is significant and can be observed from Craft Street through to East Wagga along the Crooked Creek system.	Environmental factors including retention of 'low flow' through the original creek channel. Erosion, scouring and sedimentation concerns will need to be considered in the design of widened channels. Potential loss of habitat. Acquisition of privately owned land adjacent to the creek may be necessary depending on preferred channel width.	High	WWCC Projects	Contract awarded to Stantec, project underway,
LA03 (Lake Al	Augmentation of Stringybark Creek Diversion into Lake Albert	Increase capacity of the Stringybark Creek diversion south of Nelson Drive and reduce flood risk along Plumpton Road and further downstream by diverting flows into Lake Albert; Construct a diversion embankment 1 m high, parallel to Nelson Drive;	Reductions in peak flood levels observed from Nelson Drive through to East Wagga. Reductions in over-road inundation, particularly Plumpton Road;	Environmental factors including retention of 'low flow' through the original creek channel. Erosion, scouring and sedimentation concerns will need to be considered in design of widened channels. Acquisition of privately owned land adjacent to the creek may be necessary depending on preferred channel width.	High	WWCC Projects	Contract awarded to Stantec, project underway,

2021 MOFFS Actions

Option ID	Option	Description	Benefits	Concerns	Priority	Responsibilty	Status
RM02	Flood Emergency Response Coordination	The ongoing improvement of the coordination within and between the response agencies to ensure: •Roles and responsibilities are well defined and understood by each agency (and the broader community); •Hazards can be responded to quickly, efficiently and safely; and Calls from the public can be directed to the appropriate agency and responded to effectively.	Ongoing improvements to the coordination between and within emergency service agencies. Improvements to volunteer coordination. Identify vulnerable occupants.	Challenges include change of personnel, difficulty in organising meetings and exercises between flood events.	Medium	WWCC and SES	
RM03	Flood Warning System	Utilise Severe Weather Warnings from the BOM to prepare for potential flash flooding events, couple with community awareness campaigns and utilise information from the FRMS&P to understand the consequences of the warning.	Improve current system using outputs from the FRMS&P. Potentially increase warning time available to the community.	May not be possible to increase warning time in overland catchments due to short catchment response time. Communication needs to be at the correct level to avoid false alarms and complacency.	Medium	WWCC and SES	Council have received a grant from DCCEEW to continue the next stage of this project
P03	Adoption of Flood Related Development Controls for development within the Overland Flow FPA	Incorporation of flood related development controls in the Wagga Wagga DCP to manage development in areas of Wagga Wagga prone to flood risk from overland flow. The intent and objectives of the development controls is to be consistent with those applied to the riverine FPA, however adjustment of the phrasing or implementation criteria may be necessary to better suit the context of overland flow flood risk.	Improve clarity of DCP (Flood for the benefit of both developers and Council assessors/approvers. Enable proponents to design, build and manage development using the best available flood information.	There may be resistance from developers who consider new controls to be onerous.	Medium	WWCC Regional Activation	The existing DCP controls cover Riverine Flooding only. An update to these controls commenced and was deferred until the completion of the 2021 MOFFS & VOFFS studies being completed. Changes to the existing flooding controls will recommence and include MOFFS and VOFFS and ensure all flood risks are considered.

2021 MOFFS Actions

Option ID	Option	Description	Benefits	Concerns	Priority	Responsibilty	Status
P04	Development Controls on Low Flood Risk Areas	Modify the Wagga Wagga LEP to enable Council to apply flood related development controls to critical facilities and vulnerable land uses between the FPA and PMF extent, as defined in this study and the Revised Murrumbidgee River at Wagga Wagga FRMS&P for overland flow and riverine flood risk, respectively.	Ensure critical utilities and vulnerable facilities are designed, constructed and managed in such a way as to minimise flood risk to the structure and (if relevant) its occupants.	This amendment to the LEP would require Council to submit a planning proposal, which could be lodged in conjunction with Option PM01.	Medium	WWCC Regional Activation	Recent changes to the LEP were undertaken by NSW Department of Planning & Environment. These changes resulted in two new clauses in the LEP dealing with flooding. These clauses provide controls on how Council must assess development applications that occur on land within the Flood Planning Area and provides flood risk considerations for certain types of developments that have a higher risk of life.
SW02	Bolton Park Drainage Gate Automation	Aim: To allow control of the outlet flow from the existing Bolton Park storage to alleviate pressure on the downstream system and reduce flooding in Morgan and Berry Streets; Install automated penstock operation	Minor flood reductions along Morgan Street and Berry Street for frequent events, potential reduction in duration of inundation.	Ineffective in rarer events. Public safety risks, and changes to amenity and usability of the field during and following storm events.	Medium	WWCC Projects	
FM01	Willans Hill Overland Flow Options Assessment	Aim: To ultimately develop mitigation strategies for properties impacted by rainfall runoff in the Willans Hill area. Establish an appropriate tool that can identify issues and assess mitigation options for the runoff and overland flow impacting the Willans Hill area. The assessment should also consider the impacts of development. Undertake a drainage investigation study of the area.	A more appropriate scaled hydraulic model will allow strategies to be developed that can minimize the impacts of runoff and overland flow in this area.	Very targeted area, there may be other areas which require a similar assessment. Suggested works will likely need to be funded by private landowners or in some cases Council (unlikely to be funded by the State).	Medium	WWCC Projects	
FM02	McNickle Roach Road and Intersection	Aim: To improve flood immunity at the Roach and McNickle Road intersection to improve access for residents in Riverview Drive. Install culvert with conveyance area of 5m2 and reinstate channel downstream of intersection.	Relatively minor upgrades to the culvert at the intersection and reinstatement of a channel downstream can significantly improve the flood immunity of the intersection. Overall a general reduction of flood levels in the area.	Very targeted area, there may be other areas which require a similar assessment. Intersection will require closure while works are undertaken and alternative access will be required. Suggested works would not be eligible for State funding.	Medium	WWCC Projects	

2021 MOFFS Actions

Option ID	Option	Description	Benefits	Concerns	Priority	Responsibilty	Status
GD04 (Glenfield Drain)	Rabaul Place Trunk Drainage Line (further investigation)	Aim: Reduce inflows into Glenfield Drain to reduce demand on the existing open channel, by diverting flows to Ashmont Drain; Significant trunk drain installation, involving 3 x 1.8m diameter pipes from immediately downstream of the western railway culvert near Rabaul Place to the channel north of Ashmont Avenue.	Significant reductions in peak flood levels along Pearson Street and Dobney Avenue with some areas showing a 0.2 m reduction in flood level for the 1% AEP event. Effective in reducing peak flood levels in frequent events.	Increases peak flood levels at and around the northern end of the channel near the Sturt Highway. Staged construction would be required to allow affected roads to remain trafficable.	Low	WWCC Projects	Contract awarded to Lyalls , project underway, due for completion in August 2025

EWS Actions

Reference	Option and report Reference	Priority	DPE Funding available	Responsibility	Status
Improving Understanding and Knowledge of the Influence of tributaries on Flooding	Option 3 Monitoring and prediction	High	Probably	WWCC	Ongoing development of internal flood forecasting capability
Review the existing rating Curve	Option 6 Monitoring and prediction	High	Yes	WaterNSW	recently completed by WaterNSW
Review Flood Forecasting and warning services	Option 8 Interpretation	High	No	WWCC and BOM	
Revise Flood Intelligence Card and Local Flood Plan for Oura	Option 9 Interpretation	High	No	WWCC and SES	
Review the need for new targetted prediction and Warning Services for graziers and water licence holders	Option 10 Message Construction	High	No	WWCC and BOM	

EWS Actions

Reference	Option and report Reference	Priority	DPE Funding available	Responsibility	Status
Incorporate GIS mapping within warning services and products	Option 11 Message Construction	High	Yes	WWCC BOM SES	Council have received a grant from DCCEEW to continue the next stage of this project
Community Education materials	Option 13 Communication	High	No	SES WWCC	The NSW government have released a set of information that will assist Council with the ongoing education of the community with regard to flooding. Council have an ongoing program to improve the information on Council's website to provide a current source of reliable informaiton for the community
Expand the use of CATS	Option 14 Protective behaviour	High	No	SES WWCC	
Targetted Review and change to the Minor Flood Level for the Wagga Wagga gauge	Option 7 Interpretation	Low	No	WWCC and BOM	After preliminary investigaiton, this will not be occurring but the EWS project may contribute to alleviating some of the issues associated with this
Automatic gauge at Oura	Option 1 Monitoring and prediction	Medium	Yes	WWCC WaterNSW BOM	The gauge at Eringoarrah is programmmed for review by BOM under a federally funded program

EWS Actions

Reference	Option and report Reference	Priority	DPE Funding available	Responsibility	Status
Level Sensors and Flow Gauges at Key Culverts	Option 2 Monitoring and prediction	Medium	Possibly	WWCC	
Extend the model boundary	Option 4 Monitoring and prediction	Medium	Yes	WWCC	Council has a plan to extend the model boundary in 2028
Automate the floodgates	Option 5 Monitoring and prediction	Medium	No	WWCC	This option is very expensive and currently deemed not feasible
Communication of road closures	Option 12 Communication	Medium	No	WWCC TfNSW	TfNSW have fast-tracked a statewide program that allows Council to directly input road closures into Live Traffic

2021 VOFFS Actions

Reference	Option and report Reference	Description	Priority	Responsibility	Status
PM01	Flood Planning Area and Level for each town (PM01)	A designated area in each town where Council planning controls, including minimum floor levels, apply to development.	High	WWCC Regional Activation	Amendments proposed to the DCP will incorporate FPA's identified in the 2021 VOFFS.
RM01 RM04	Update the Wagga Wagga Local Flood Plan section for each town (RM01, RM04, RM06)	Incorporate the consequences of flooding observed in the 2010 and 2012 floods in the Local Flood Plan, as well as flood risk information from the FRMS.	High	SES	
RM02 RM05 RM08	Update Flood Intelligence Cards for each town (RM02, RM05, RM08)	Updated information will list consequences of flooding in each town in relation to particular creek depths.	High	SES	
RM03	Install an automatic water level recorder on Umbango Creek (RM03)	Improve the warning system for flooding at Tarcutta by including the Umbango Creek catchment, which currently has no gauge.	High	WWCC in consultation with SES and BOM	
RM10	Community Flood Education (RM10)	Undertake various activities aimed at raising and maintaining public awareness of flooding.	High	WWCC	

2021 VOFFS Actions

Reference	Option and report Reference	Description	Priority	Responsibility	Status
TD01	Maintenance for Levee Cross-drainage for Tarcutta (TD01)	Undertake regular maintenance of the cross-drainage structures including clearing vegetation and sediment. SES own and maintain mobile pumps for use during a flood.	High	WWCC Operations and SES	
UL01	Uranquinty Levee System Upgrade (UL01)	Upgrade the levee by raising it to protect against the 1% AEP flood.	High	WWCC Projects	DPIE grant received 2021-22-FM-0032. project awarded to RHDHV, 50% design is completed and the first two stages of community consultaion has been completed. Council is investigating modifying the alignnment of the levee to protect a section of Crown and Council land to the east of Uranquinty
S06	Sandy Creek Regular Clearing of Sedimentation (S06)	Regularly remove built-up sediment from the creek bed to prevent blockage of the channel.	High	WWCC Operations	
UD01	Maintenance for Levee Cross-Drainage for Uranquinty (UD01)	Undertake regular maintenance of the cross-drainage structures including clearing vegetation and sediment. SES own and maintain mobile pumps for use during a flood.	High	WWCC Operations	

2021 VOFFS Actions

Reference	Option and report Reference	Description	Priority	Responsibility	Status
PM02	Updated information in the Local Environment Plan (PM02)	Revision of the LEP text to improve functionality and separate overland and mainstream flood risk.	Medium	WWCC Regional Activation	Recent changes to the LEP were undertaken by NSW Department of Planning & Environment. These changes resulted in two new clauses in the LEP dealing with flooding. These clauses provide controls on how Council must assess development applications that occur on land within the Flood Planning Area and provides flood risk considerations for certain types of developments that have a higher risk of life.
PM03	Adoption of matrix style Development Control Plan and related DCP changes (PM03)	Revision of the current planning controls to improve their clarity and prescribe specific controls on development based on its type and the flood risk present.	Medium	WWCC Regional Activation	The existing DCP controls cover Riverine Flooding only. An update to these controls commenced and was deferred until the completion of the 2021 MOFFS & VOFFS studies being completed. Changes to the existing flooding controls will recommence and include MOFFS and VOFFS.
PM04	Inclusion of Flood Risk Information on Section 10.7 (2) & (5) Planning Certificates (PM04)	Provision of detailed information on a site's flood risk via the existing planning certificates.	Medium	WWCC Regional Activation	Planning certificates identify whether the land is below the 1% Average Recurrence Interval and therefore flood related development controls may apply.

2021 VOFFS Actions

Reference	Option and report Reference	Description	Priority	Responsibility	Status
RM07	Install a telemetered pluviometer in the Sandy Creek catchment (RM07)	Improve the warning system for flooding at Uranquinty by installing a new rain gauge in the Sandy Creek catchment (currently none exists).	Medium	WWCC in consultation with SES and BOM	
RM09	Requirement for Site Specific Flood Emergency Plans (RM09)	For development in areas of high flood risk, require a site specific plan be prepared that details flood risk and evacuation.	Medium	WWCC	
LK01	Improved drainage on Cunningdroo Street (LK01)	Construct a kerb-gutter system at the end of Cunningdroo St, Ladysmith, to reduce ponding on the road area.	Medium	WWCC Projects	
TL04	Upgrade Existing Tarcutta Levee (TL04)	Upgrade the levee by raising it to protect against the 1% AEP flood.	Low	WWCC Projects	

RP-10 RECONNECTING RIVER COUNTRY PROGRAM

Author: Andrew Mason
Director: Warren Faulkner

Summary: Reconnecting River Country Program

Recommendation

That the Floodplain Risk Management Advisory Committee receive and note the update provided in relation to the Reconnecting River Country Program being carried out by DCCEEW.

Report

A report was presented to the FRMAC at its 8 August 2024 meeting that provided an overview of the Reconnecting River Country Program.

The program is in development. No flows have been delivered under the program and no decision has been made to select a flow option. No higher environmental flows will be delivered before December 2026.

The program is funded to prepare a Murrumbidgee Final Business Case by February 2025. This will recommend a flow option for delivery. The Final Business Case must be considered before proceeding to delivery.

In July 2024, funding was announced to upgrade a 1.5km section of Mundowy Lane to be resilient to flows up to 45 GL/day.

Council staff have been meeting regularly with DCCEEW and the design consultant, Jacobs, to work through design issues and to satisfy the needs of all concerned parties.

Financial Implications

N/A

Policy and Legislation

N/A

Link to Strategic Plan

Safe and Healthy Community

Objective: Our community feel safe

Be responsive to emergencies

Risk Management Issues for Council

N/A

Internal / External Consultation

N/A

QUESTIONS WITH NOTICE

MINUTES of the **FLOODPLAIN RISK MANAGEMENT ADVISORY COMMITTEE** held on **Thursday 7 November 2024**.

PRESENT
Councillor Jenny McKinnon (Chair)
Jenny Rolfe
Ros Prangnell
Patricia Murray
Tim Kurylowicz

IN ATTENDANCE

Josh Stanbury	State Emergency Service (SES)
Steve Manwaring	Department Planning, Industry & Environment
Michael Friend	North Wagga Co-opted Community Member (8.32 – 8.40am)
Karen Murray	North Wagga Co-opted Community Member (8.32 – 8.40am)
Brian Mahoney	Uranquinty Co-opted Community Member (8.30 – 9.36am)
Andrew Morris	Royal HaskoningDHV (8.43 – 9.31am)
Cameron Druery	WaterRIDE (9.40 – 10.07am)
Warren Faulkner	Director City Engineering
Andrew Mason	Project Manager
Carly Hood	Manager Environment & Regulatory Services (Acting)
Geordi Paxton	Manager Engineering Design Services (8.30 – 9.36am)
Sam Robins	Senior Town Planner
Louise Wheaton	Executive Assistant
Kori West	Corporate Governance Officer (Minute Taker)

The meeting of the Floodplain Risk Management Advisory Committee commenced at 8.30am.

ACKNOWLEDGEMENT OF COUNTRY

Wagga Wagga City Council acknowledges the traditional custodians of the land, the Wiradjuri people, and pays respect to Elders past, present and future and extends our respect to all First Nations Peoples in Wagga Wagga.

We recognise and respect their cultural heritage, beliefs and continuing connection with the land and rivers. We also recognise the resilience, strength and pride of the Wiradjuri and First Nations communities.

APOLOGIES

Apologies for non-attendance were received and accepted for the General Manager, Peter Thompson, the Mayor, Councillor D Tout and Councillor L Tanner.

MINUTES of the **FLOODPLAIN RISK MANAGEMENT ADVISORY COMMITTEE** held on **Thursday 7 November 2024**.

CONFIRMATION OF MINUTES

CM-1 FLOODPLAIN RISK MANAGEMENT ADVISORY COMMITTEE MINUTES - 8 AUGUST 2024

Recommendation:
On the Motion of P Murray and R Prangnell

That the Minutes of the proceedings of the Floodplain Risk Management Advisory Committee Meeting held on 8 August 2024 be confirmed as a true and accurate record, noting Council's adoption of these minutes at its meeting 26 August 2024.

CARRIED

RECORD OF VOTING ON THE MOTION

For the Motion	Against the Motion
J McKinnon	
J Rolfe	
R Prangnell	
T Kurylowicz	
P Murray	

DECLARATIONS OF INTEREST

Mr T Kurylowicz declared a general interest that he is a resident of North Wagga, however as a community representative he is representing the whole community.

REPORTS FROM STAFF

Brian Mahoney - Uranquinty Co-opted member, entered meeting, the time being 8.30am.

Michael Friend and Karen Murray North Wagga Co-opted Community members entered the meeting remotely, the time being 8.32am.

RP-3 2018-19-FM-0071 - NORTH WAGGA FLOOD MITIGATION OPTIONS

Recommendation:
On the Motion of T Kurylowicz and R Prangnell

That the Floodplain Risk Management Advisory Committee receive and note the update to the North Wagga Flood Mitigation Options.

CARRIED

RECORD OF VOTING ON THE MOTION

For the Motion	Against the Motion
J McKinnon	

J Rolfe
R Prangnell
T Kurylowicz
P Murray

Michael Friend and Karen Murray, North Wagga Co-opted Community members vacated the meeting, the time being 8.40am.

Andrew Morris from Royal HaskoningDHV entered the meeting remotely to provide the committee a presentation, the time being 8.43am.

RP-1 2021-22-FM-0032 - URANQUINTY LEVEE UPGRADE - INVESTIGATION AND DESIGN

Recommendation:
On the Motion of J Rolfe and T Kurylowicz

That the Floodplain Risk Management Advisory Committee receive and note the update provided in relation to the Uranquinty Levee project.

CARRIED

RECORD OF VOTING ON THE MOTION

For the Motion	Against the Motion
J McKinnon	
J Rolfe	
R Prangnell	
T Kurylowicz	
P Murray	

Andrew Morris from Royal HaskoningDHV vacated the meeting, the time being 9.31am.

Brian Mahoney vacated the meeting, the time being 9.36am.

Cameron Druery from WaterRIDE entered the meeting remotely to provide the committee a presentation, the time being 9.40am.

RP-2 2023 FMP 0073 EARLY WARNING SYSTEM MODEL DEVELOPMENT

Recommendation:
On the Motion of T Kurylowicz and R Prangnell

That the Floodplain Risk Management Advisory Committee receive and note the report with regard to the Early Warning and flood Prediction Project.

CARRIED

RECORD OF VOTING ON THE MOTION

For the Motion	Against the Motion
J McKinnon	
J Rolfe	

R Prangnell
T Kurylowicz
P Murray

Cameron Druery from WaterRIDE vacated the meeting, the time being 10.07am.

RP-4 2021-22-FM-0024 - GLENFIELD DRAIN AND FLOWERDALE STORAGE FLOOD MITIGATION WORKS

Recommendation:
On the Motion of P Murray and T Kurylowicz

That the Floodplain Risk Management Advisory Committee receive and note the update provided in relation to the Glenfield Drain and Flowerdale Storage Area Flood Mitigation Works Project.

CARRIED

RECORD OF VOTING ON THE MOTION

For the Motion	Against the Motion
J McKinnon	
J Rolfe	
R Prangnell	
T Kurylowicz	
P Murray	

RP-5 2021-22-FM-0039 - LAKE ALBERT FLOOD MITIGATION OPTIONS - FEASIBILITY STUDY

Recommendation:
On the Motion of J Rolfe and T Kurylowicz

That the Floodplain Risk Management Advisory Committee receive and note the update provided in relation to the Lake Albert Flood Mitigation Project.

CARRIED

RECORD OF VOTING ON THE MOTION

For the Motion	Against the Motion
J McKinnon	
J Rolfe	
R Prangnell	
T Kurylowicz	
P Murray	

RP-6 2022-FMP-0103 HUMULA AND MANGOPLAH FLOOD STUDIES

Recommendation:
On the Motion of R Prangnell and P Murray

That the Floodplain Risk Management Advisory Committee receive and note the update provided in relation to the Humula and Mangoplah Flood Studies Project.

CARRIED

RECORD OF VOTING ON THE MOTION

For the Motion	Against the Motion
J McKinnon	
J Rolfe	
R Prangnell	
T Kurylowicz	
P Murray	

RP-7 RECONNECTING RIVER COUNTRY PROGRAM

Recommendation:
On the Motion of T Kurylowicz and R Prangnell

That the Floodplain Risk Management Advisory Committee receive and note the update provided in relation to the Reconnecting River Country Program being carried out by DCCEEW.

CARRIED

RECORD OF VOTING ON THE MOTION

For the Motion	Against the Motion
J McKinnon	
J Rolfe	
R Prangnell	
T Kurylowicz	
P Murray	

RP-8 LOCAL & REGIONAL RISK REDUCTION STREAM - LEVEE PUMP AUGMENTATION

Recommendation:
On the Motion of J Rolfe and R Prangnell

That the Floodplain Risk Management Advisory Committee receive and note the update provided in relation to the Levee Pump Augmentation Project.

CARRIED

RECORD OF VOTING ON THE MOTION

For the Motion	Against the Motion
J McKinnon	
J Rolfe	
R Prangnell	
T Kurylowicz	
P Murray	

RP-9 FLOOD PROJECT IMPLEMENTATION STATUS

Recommendation:
On the Motion of T Kurylowicz and J Rolfe

That the Floodplain Risk Management Advisory Committee receive and note the report in relation to Flood Project Implementation Status.

CARRIED

RECORD OF VOTING ON THE MOTION

For the Motion	Against the Motion
J McKinnon	
J Rolfe	
R Prangnell	
T Kurylowicz	
P Murray	

QUESTIONS WITH NOTICE

No Questions with Notice were received.

The Floodplain Risk Management Advisory Committee rose at 11.08am.