Agenda and Business Paper

Floodplain Risk Management Advisory Committee

To be held on
Thursday 16 April 2026
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

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City of
Wagga Wagga

FLOODPLAIN RISK MANAGEMENT ADVISORY COMMITTEE AGENDA AND BUSINESS PAPER

THURSDAY 16 APRIL 2026

ORDER OF BUSINESS:

ACKNOWLEDGEMENT OF COUNTRY

APOLOGIES

DECLARATIONS OF INTEREST

REPORTS FROM STAFF

RP-1 WWCC MOFFS FFL AMENDMENT REVIEW

Author: Sam Robins
General Manager: Peter Thompson

Summary: Council has engaged GLN Planning and WMS Engineering to review the Flood Planning Area and the Finish Floor Level (FFL) in the MOFFs Study and Plan.

Recommendation

That the Floodplain Risk Management Advisory Committee receive and note that a detailed report is being prepared with the intent that it will be available for consideration at July's meeting.

Report

Background:
Councils 'Wagga Wagga Major Overland Flow Floodplain Risk Management Study and Plan 2021' (MOFFs) makes a recommendation that the minimum appropriate freeboard for flood planning levels for properties is 0.3m above the 1% AEP.

This height came from discussions with the consultant and Council's town planning staff and was based on the position that at the time this was generally consistent with what other Councils were applying.

Whilst no update to the Development Control Plan has occurred since the adoption of the study, Council's practice has been to implement this recommendation. What we have found is that this decision raises the following issues:

- Impact on built form, overlooking, overshadowing
- Impact on accessibility of the building
- Impact on streetscape
- Impact on construction cost.

These factors have led to a view that the Finished Floor Level (FFL) is a restrictive factor in the development of brownfield sites and infill development within areas where other policy position supports and encourages intensification.

Council planning staff are of the view that there is a substantial difference between the impact of a riverine flood event and a MOFFs event and the marginal difference in freeboard does not reflect this.

Next Steps
Council is therefore requesting a review of this recommendation and of how the Flood Planning Area (FPA) was determined.

Details of the review and desired outcomes are as follows:

MOFFs modelling

- Review with the intent of removing isolated areas of the FPA created by the level of accuracy within the modelling. Provide a report that justifies the areas to be removed and ensures the recommended changes to the defined FPA remain consistent with the NSW Flood Risk Management Manual.
- Provide Council with advice on whether the edges of the current modelling can be 'smoothed', and if so, what would be the cost and time frames involved in this process.
- Provide Council with any other options (excluding remodelling) for improving the accuracy of the modelling in terms of defining the FPA.

MOFFs Study and Plan

- Review recommended FFL with the intent of reducing the requirement for a freeboard in certain circumstances.
- Provide a report that either:
    - Supports the proposed amendment to the FFL recommendation and outlines the steps required to implement the amendment correctly, or
    - Disagrees with the position to amend the FFL and provides explanation as to why.
- Ensure any recommendation remains consistent with the NSW Flood Risk Management Manual and therefore provide Council the protection it requires under section 733 of the Local Government Act 1993.

Council staff will present on the issue to the meeting.

Financial Implications

Council funding from internal budget.

Policy and Legislation

Environmental Planning and Assessment Act 1979
Local Government Act 1993

Link to Strategic Plan

Regional Leadership

Ethical Leadership

Provide strategic direction and leadership for our region to deliver key community priorities.

Risk Management Issues for Council

Ensure any recommendation remains consistent with the NSW Flood Risk Management Manual and therefore provide Council the protection it requires under section 733 of the Local Government Act 1993.

Internal / External Consultation

N/A

Attachments

1⇩. MOFFS Amendment Presentation

Review of the 'Wagga Wagga Major Overland Flow Floodplain Risk Management Plan and Study 2021' (MOFFS)

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Focus of the review

Council has engaged GLN Planning and WMS Engineering to undertake a review of the MOFFs that focuses on the following two key points:

1. Improving the accuracy of the MOFFs Modelling to better reflect water movement and likely impacts:
2. Reviewing whether the recommended MOFFs freeboard is appropriate and takes into consideration Councils desired outcomes:

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MOFFS Modelling

- Review with the intent of removing isolated areas of the FPA created by the level of accuracy within the modelling. Provide a report that justifies the areas recommended to be removed and ensures the recommended changes to the defined FPA remain consistent with the NSW Flood Risk Management Manual.

- Provide Council with advice on whether the edges of the current modelling can be ‘smoothed’, and if so, what would be the cost and time frames involved in this process.

- Provide Council with any other options (excluding remodelling) for improving the accuracy of the modelling in terms of defining the FPA.

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Isolated spots identified as within the FPA

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Is there the ability to ‘smooth’ the edging?

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Outcomes

- A more accurate representation of what the water actually does.
- Reduction in the number of properties identified as being within the FPA because of isolated spots and inaccuracies.
- Reduction of properties indicated as being impacted by ‘flood controls’ under 10.7 certificates.
- Potential to increase the ability to undertake CDCs.
- Assistance to both applicants/consultants and Development Assessment and Engineering staff when assessing potential flooding impacts of Development Applications.

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MOFFS recommended freeboard

- Review the recommended FFL to consider if it remains an appropriate recommendation given the more knowledge we have on the impact of MOFFS and the risks associated with these impacts.

- Provide a report that either:
  - Supports an amendment to the FFL recommendation and outlines the steps required to implement the amendment correctly, or
  - Agrees with the current position and provides explanation as to why this remains appropriate.

- Ensure any recommendation remains consistent with the NSW Flood Risk Management Manual and therefore provide Council the protection it requires under section 733 of the Local Government Act 1993.

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MOFFS recommended freeboard

The MOFFS recommends that the minimum appropriate freeboard for the flood planning levels for properties in 0.3m above the 1% AEP.

This height came from discussions with the consultant and Council's town planning staff and was based on the position that at the time this was generally consistent with what other Councils were applying.

Whilst no update to the Development Control Plan has occurred since the adoption of the study, Council's practice has been to implement this recommendation. What we have found is that this decision raises the following issues:

- Impact on built form, overlooking, overshadowing
- Impact on accessibility of the building
- Impact on streetscape
- Impact on construction cost.

These factors have led to a view that the Finished Floor Level (FFL) is a restrictive factor in the development of brownfield sites and infill development within areas where other policy position supports and encourages intensification.

Council planning staff are of the view that there is a substantial difference between the impact of a riverine flood event and a MOFFS event and the marginal difference in freeboard does not reflect this.

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Outcomes

Current position supported:

- Controls will be updated in the revised DCP.
- Council has a clear position and is fully aware of the conflict between policies encouraging infill development, and impacts (MOFFS) restricting infill development.
- Level of protection remains high.

Current position recommended to be altered:

- Controls will be updated in the revised DCP.
- A restriction on development is reduced.
- Level of protection reduced
- Recommendation remains consistent with the NSW Flood Risk Manual and therefore provides Council the protection it requires under section 733 of the LG Act.

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Next Steps

The finalised report will be presented back to FRMAC with the outcomes/findings and staff recommendations from the report.

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RP-2 2021-22-FM-0032 - URANQUINTY LEVEE UPGRADE - INVESTIGATION AND DESIGN

Author: Andrew Mason
General Manager: Peter Thompson

Summary: The project is progressing as per the required program. The 80% design is in progress an, the extension of the Connorton St section of the levee 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

The 80% design is complete, Council and DCCEEW have reviewed the design and provided feedback to RHDHV .

RHDHV and Council staff presented the 80% design to the community of Uranquinty on the12th March, any appropriate feedback has been incorporated into the design as presented today.

Public Exhibition

A levee design does not normally require going to public exhibition, once Council and FRAMC accept the design then the project is complete and can move onto implementation. There is no budget allocation for RHDHV to put the design on Public Exhibition.

Once the 80% design is accepted by FRMAC and Council, RHDHV will progress the design and associated reports to conclusion and the final design will be will provided to Council in line with the current project timeline.

The following update has been provided by Royal Haskoning (RHDHV) who are the consultant engaged to deliver this project.

- The drawings and report are currently being updated to address comments received from Council. Expecting to have these addressed by the end of April.
- As part of the finalisation and an outcome from the community consult, we are including a section recommending prioritisation of the levee upgrade sections, based on maximising the benefit cost.
- We are finalising a draft version of the levee operation manual and Review of Environmental Factors that will be ready in the next week.
- Look to have the project wrapped up by the end of May 2026

RHDHV will be presenting the 80% design to this meeting.

Aboriginal Land Claim

The NSW Aboriginal Land Council has recently issued a claim over Crown land across many areas of the LGA. These claims include blocks of land that contain both the existing and potential future levee alignment. As per our current practice in this situation, Council will approach the Land Council to negotiate a solution for these parcels of land which will involve the removal of the relevant parcels from the claim or Council acquire an easement over the parcel for drainage, flood and maintenance purposes.

Financial Implications

N/A

Policy and Legislation

N/A

Link to Strategic Plan

Regional Leadership

Ethical Leadership

Provide strategic direction and leadership for our region to deliver key community priorities.

Risk Management Issues for Council

N/A

Internal / External Consultation

N/A

Attachments

1⇩. Uranqunity Levee Upgrade presentation

Haskoning
Enhancing Society Together

Wagga Wagga City Council

Uranquinty Village Levee Upgrade

Community Consultation for Detail Design

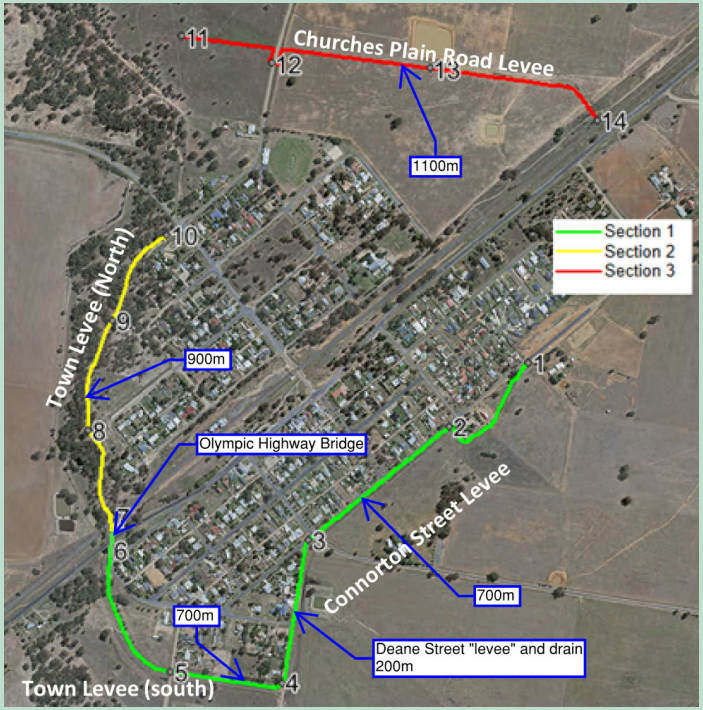
PA3159-RHD-PP-WR-0006

Andrew Morris
12 March 2026

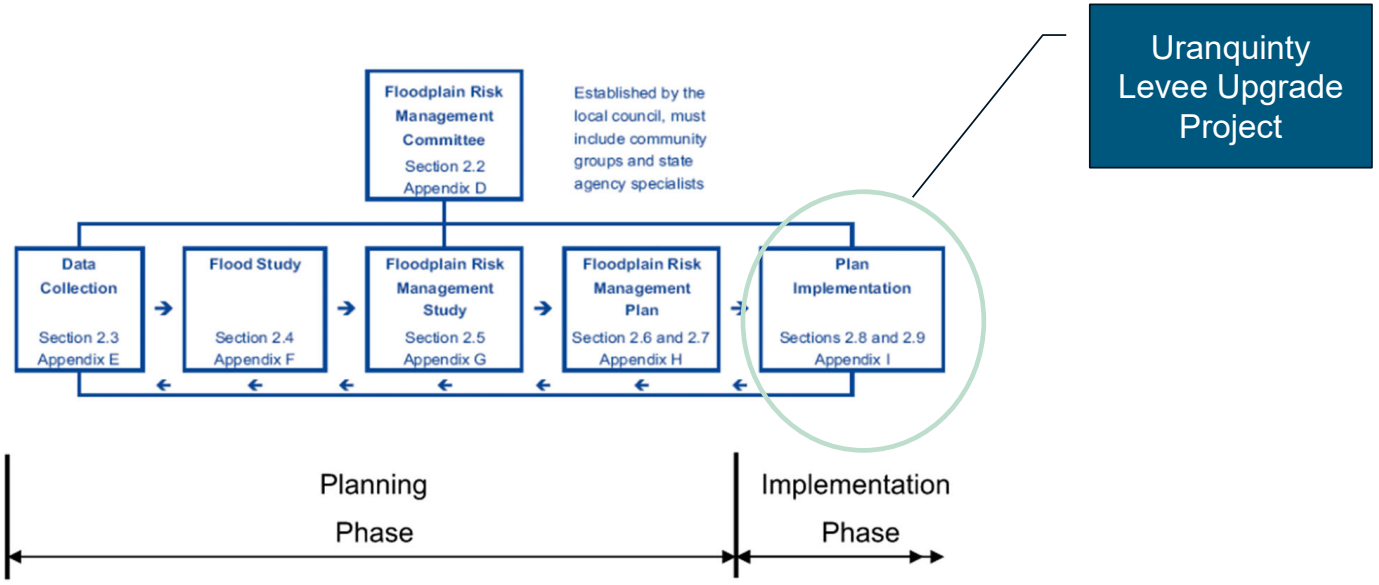
Overview

Development of Detail Design Documentation

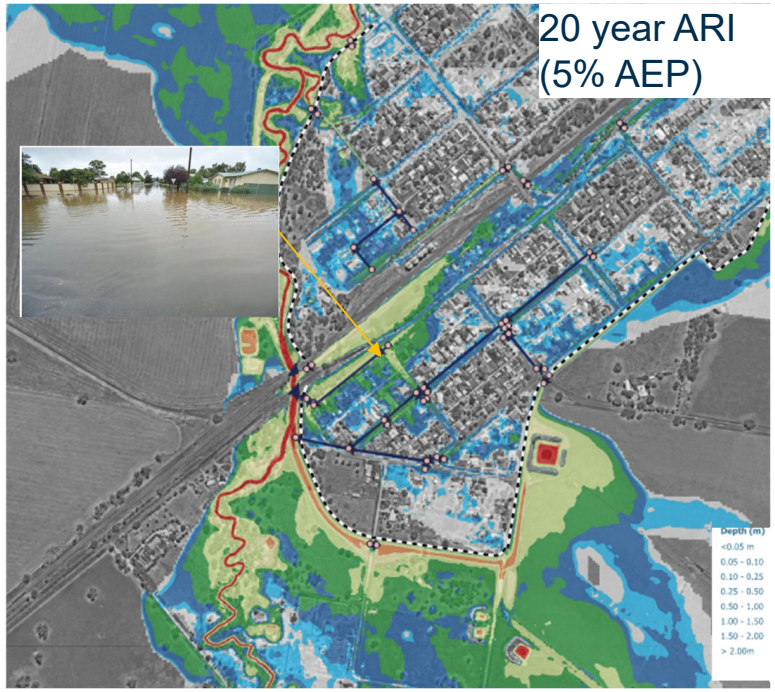
- Project Context
- Site Investigations (recap)
- Design Development
- Detail Design Documentation
- Flood and 3rd Party Impacts
- Steps to Finalise Design
- Feedback/ Questions

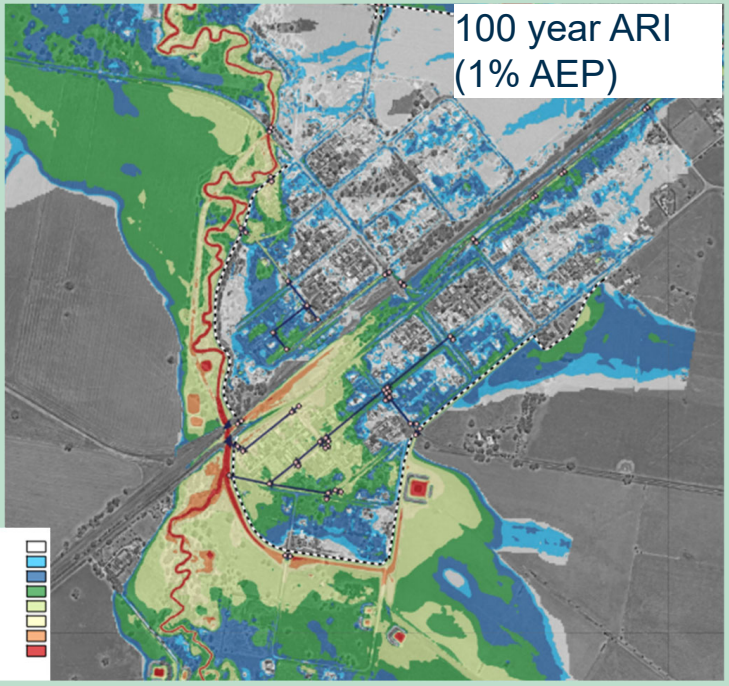


Project Context



Overview


20 year ARI
(5% AEP)
Depth (m)
<0.05 m
0.05 - 0.10
0.10 - 0.25
0.25 - 0.50
0.50 - 1.00
1.00 - 1.50
1.50 - 2.00
> 2.00m

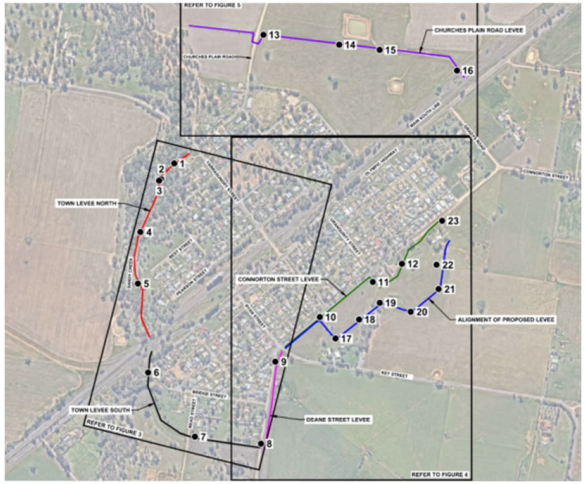

100 year ARI
(1% AEP)

Site Investigations - Recap

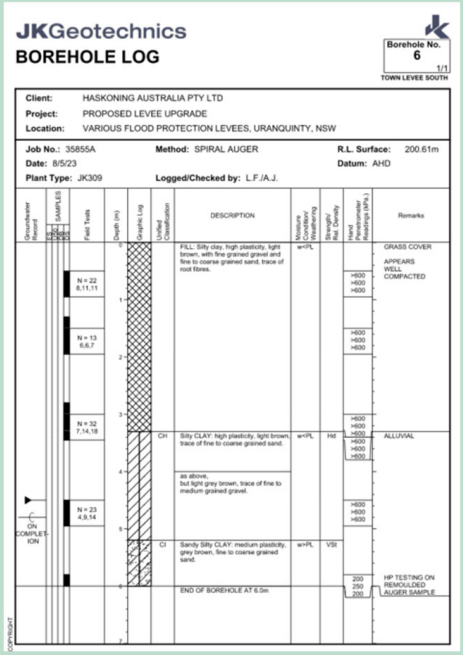
Development of Detail Design Documentation

- Geotechnical
- Survey
- Services

Geotechnical Investigations



- 23 boreholes in total
- Soil testing.
- Recommendations for levee design



JKGeotechnics

BOREHOLE LOG

Borehole No. 6 1/1

TOWN LEVEE SOUTH

Client: HASKONING AUSTRALIA PTY LTD
Project: PROPOSED LEVEE UPGRADE
Location: VARIOUS FLOOD PROTECTION LEVEES, URANQUINTY, NSW

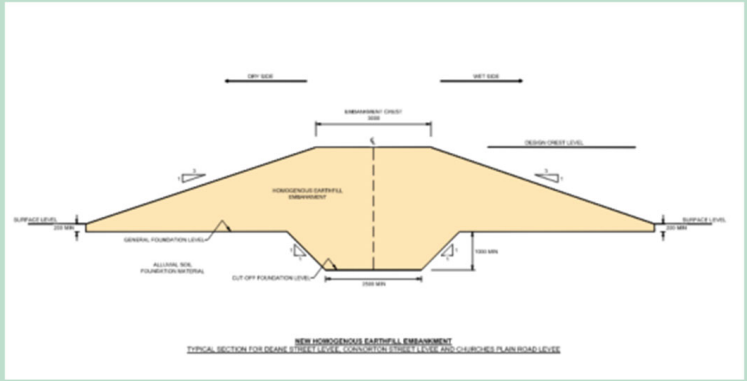
Job No.: 35855A Method: SPIRAL AUGER R.L. Surface: 200.61m
Date: 8/5/23 Datum: AHD
Plant Type: JK309 Logged/Checked by: L.F./A.J.

Groundwater Record	SAMPLES	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Consistency	Shear Strength/ Rel. Density	Hand Penetrometer Readings (kPa)	Remarks
		N = 22 6,11,11	1			FILL: Silty clay, high plasticity, light brown, with fine grained gravel and fine to coarse grained sand, trace of root fibres.	w<PL		>600 >600 >600	GRASS COVER APPEARS WELL COMPACTED
		N = 13 6,6,7	2						>600 >600 >600	
		N = 32 7,14,18	3		CH	Silty CLAY: high plasticity, light brown, trace of fine to coarse grained sand.	w<PL	Hd	>600 >600 >600 >600 >600	ALLUVIAL
			4			as above, but light grey brown, trace of fine to medium grained gravel.				
ON COMPLETION		N = 23 4,9,14	5						>600 >600 >600	
			6		CI	Sandy Silty CLAY: medium plasticity, grey brown, fine to coarse grained sand.	w<PL	VSt	200 250 200	HP TESTING ON REMOULDED AUGER SAMPLE
			7			END OF BOREHOLE AT 6.0m				

Geotechnical Recommendations

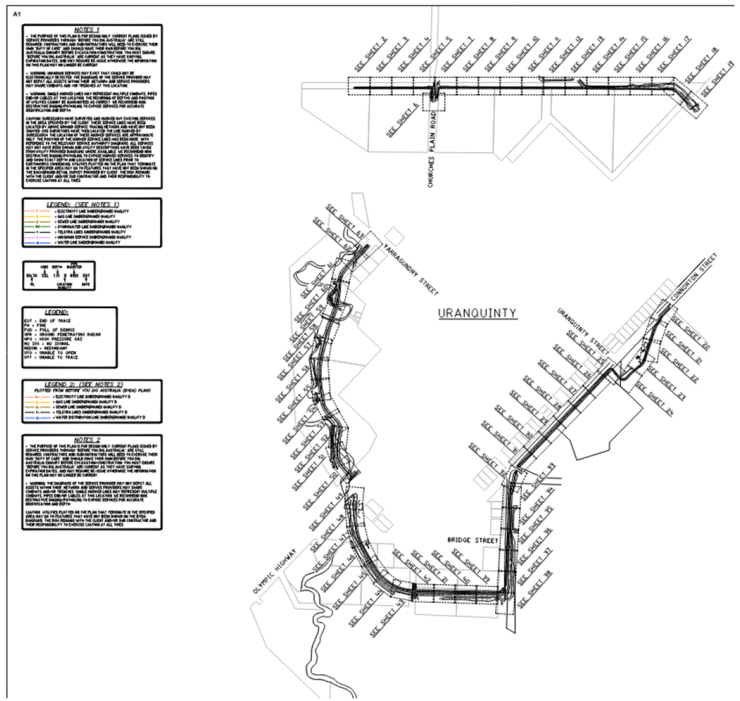
Overall Levee Upgrade and Raising

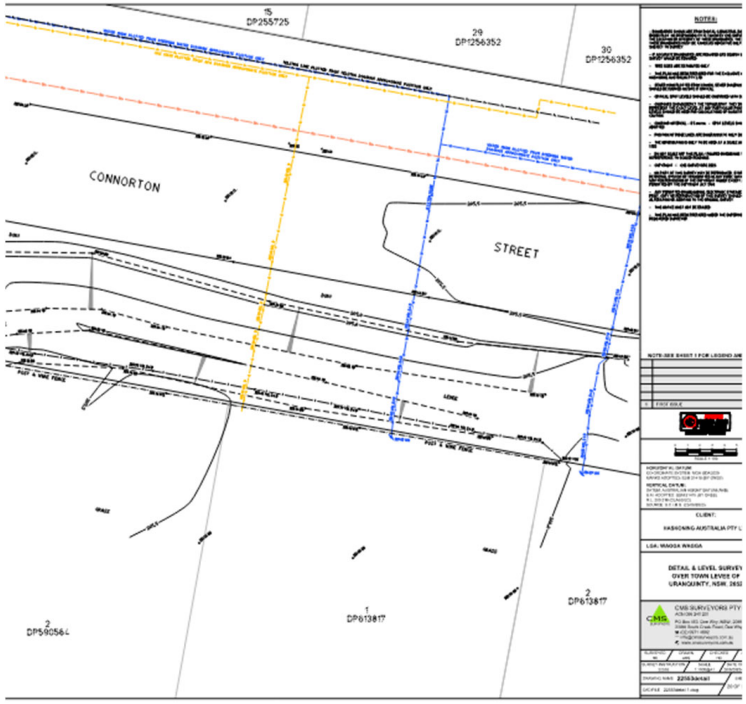
- The geotechnical report makes the following recommendations in relation to upgrade of the levees:
  - Churches Plain Road, Connorton Street, and Deane Street levees should be excavated and fully reconstructed to new design specifications.
  - Town Levee North and South require shoulder or crest raises, except for a section of Town Levee South between CH405–CH550, which requires complete reconstruction.



7 Uranquinty Village Levee Upgrade | 12 March 2026 Haskoning

Topographical/Services Survey





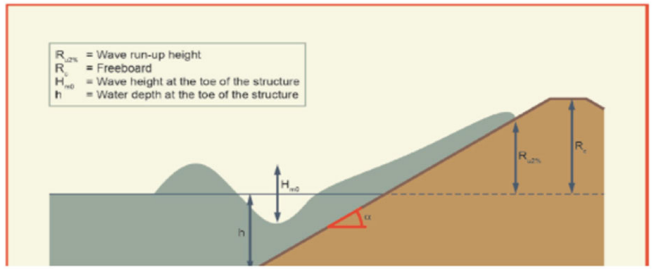
Design Development

- Levee Design Development has progressed in consideration of a number of factors:
  - Adoption of 1% AEP event as the basis for protection of the village.
  - Selection of an appropriate freeboard.
  - Land ownership – e.g. existing easements
  - Construction processes
  - Geometrically stable design
  - Maintenance and access requirements

Design Development – Levee Freeboard

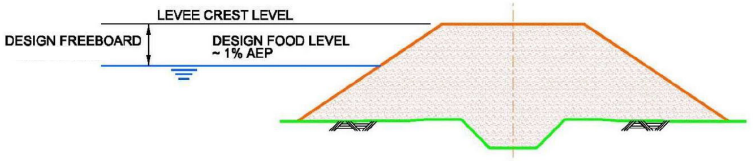
- Evaluated a range of parameters that will affect the freeboard of the levee including:
  - Wave run-up & Set up
  - Local water surge
  - Uncertainty in flood levels
  - Potential for levee settlement
  - Defects in Levee
  - Climate Change

  These were used to consider the joint probability and assign a freeboard to the levee



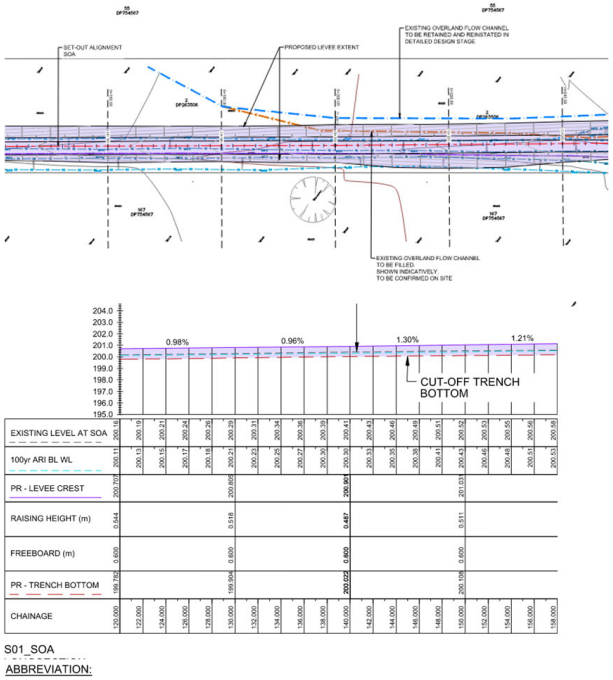
Adopted Freeboard

Good practice to have some uniformity in levee freeboard. This facilitates practical decision making during events.

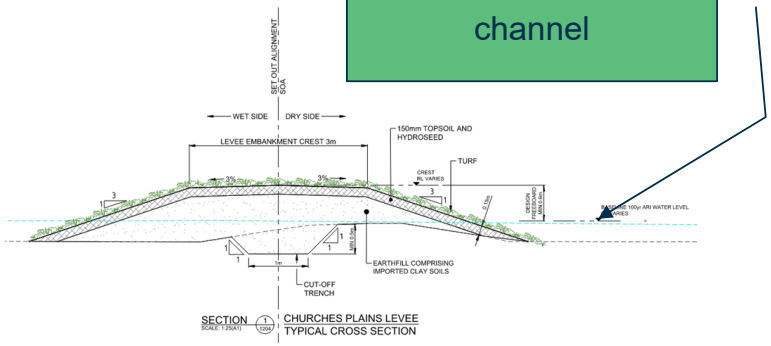


Levee	Freeboard (m)
Churches Plain	0.6
Connorton Street	0.6
Deane Street	0.6
Town Street Levee South	0.9
Town Street Levee North	0.9

Levee Design – Churches Plains



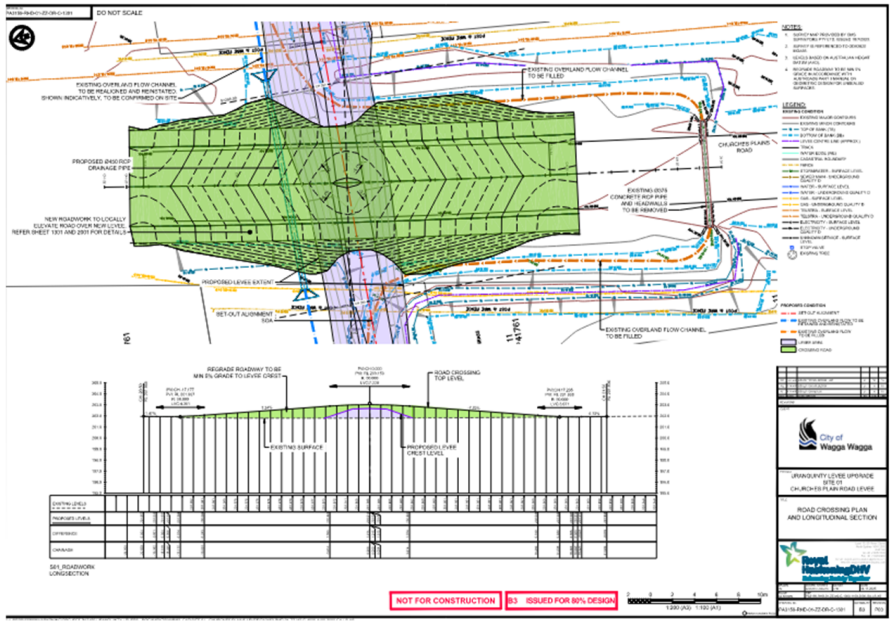
Potential inclusion of channel



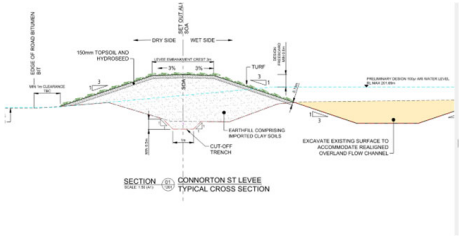
- Raising existing structure by approximately 0.6m.
- Incorporation of cut-off trench in the structure. Locks in levee and lengthens flow path for seepage
- Looking at channel on wet side to optimise cost.

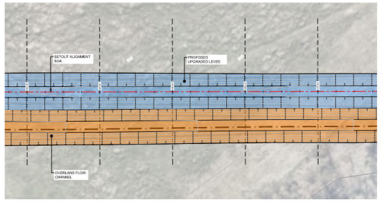
Levee Design – Churches Plains

- Raise Churches Plains Roads
- In order to provide an acceptable change in grade, need to raise both approaches.
- Re-direct local drainage underneath road raising

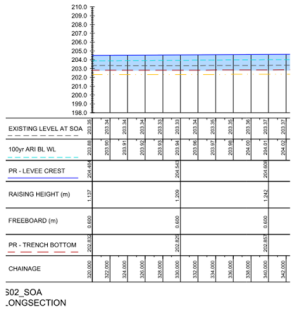


Levee Design – Connorton Street

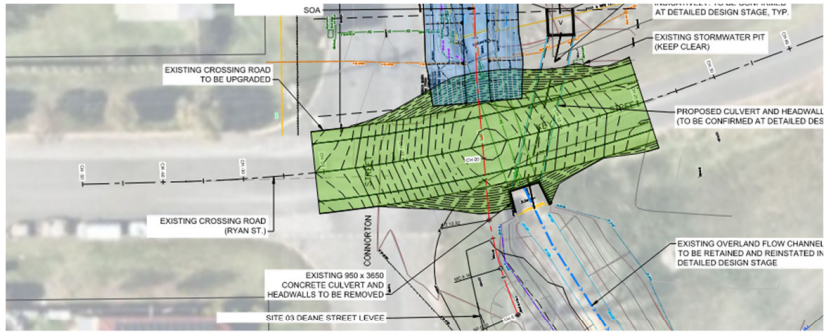


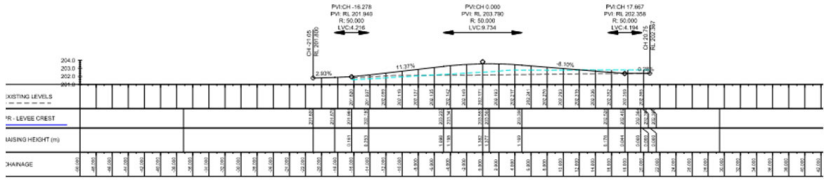


- Revised levee alignment being pursued.
- Will avoid having to construct in close proximity to preschool, men's shed.
- Can realise additional land for development.
- Provide channel to manage run-off
- Internal stormwater to be managed as part of future sub-division design



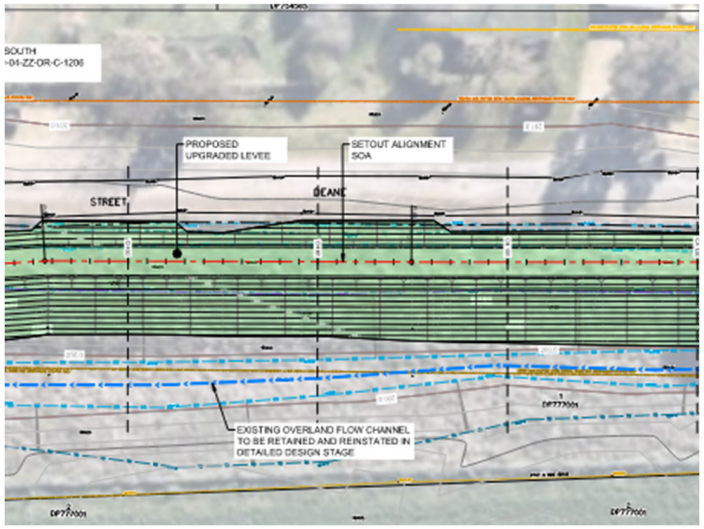
Levee Design – Connorton Street

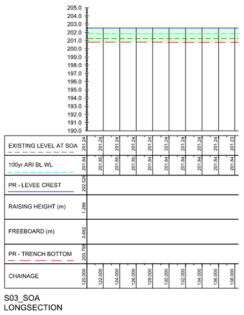




- Key Street needs to be raised to facilitate protection in the 1% event
- Need to raise both approaches to provide safe road design.
- Culvert beneath Key Street to be lengthened/replaced as part of the proposed works.

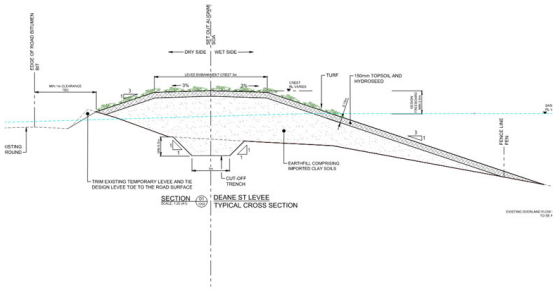
Levee Design – Deane Street



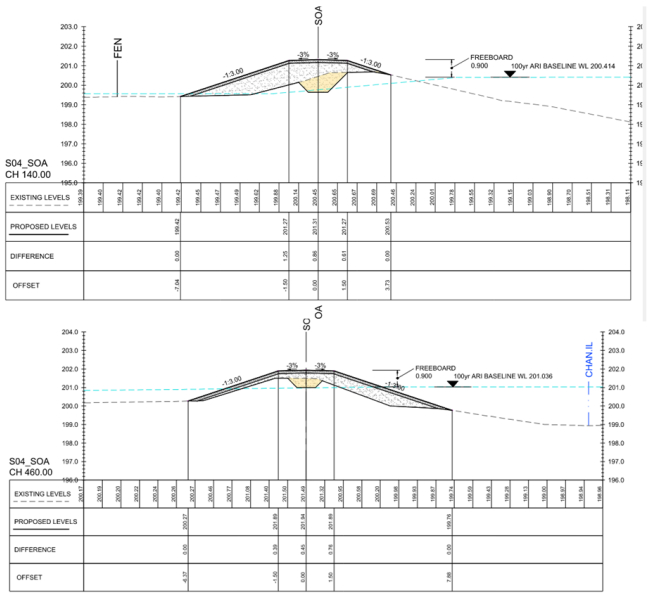


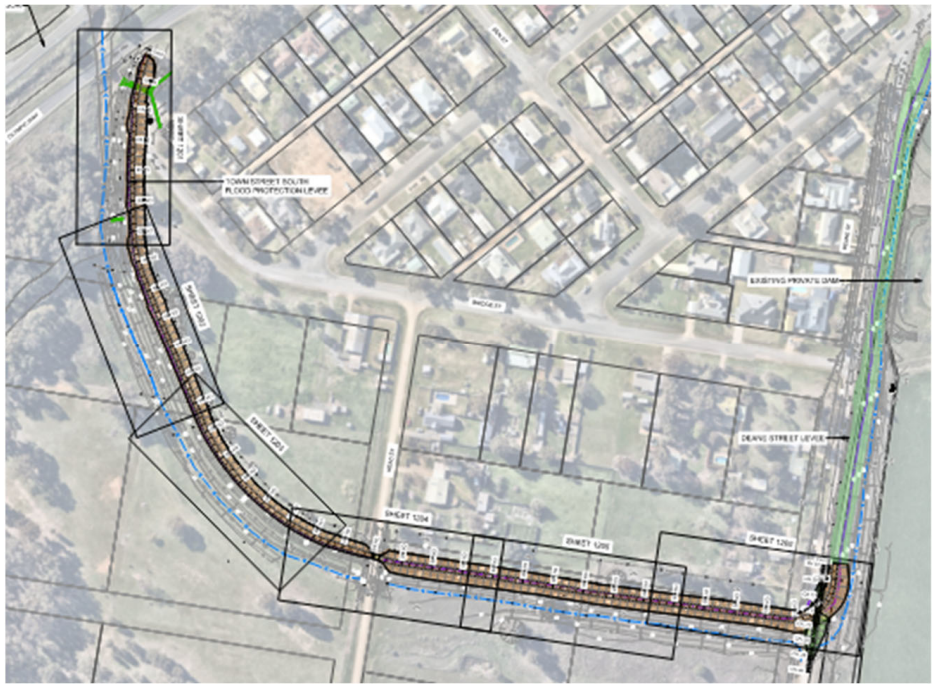
S03_SOA
LONGSECTION

- Deane Street needs to be constructed approximately 1.3 metres above the adjoining roadway to provide the protection required.
- Raising of Deane Street required to provide levee immunity.
- Starts 1 metre offset from edge of road

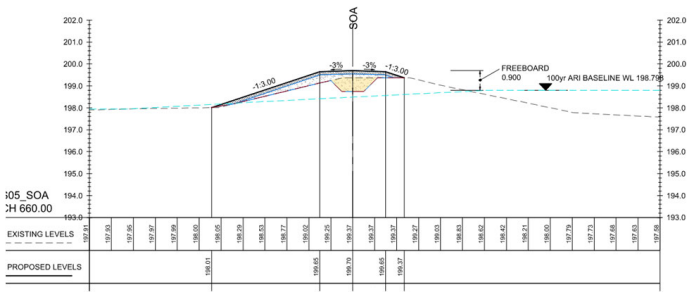


Levee Design – Town Street South

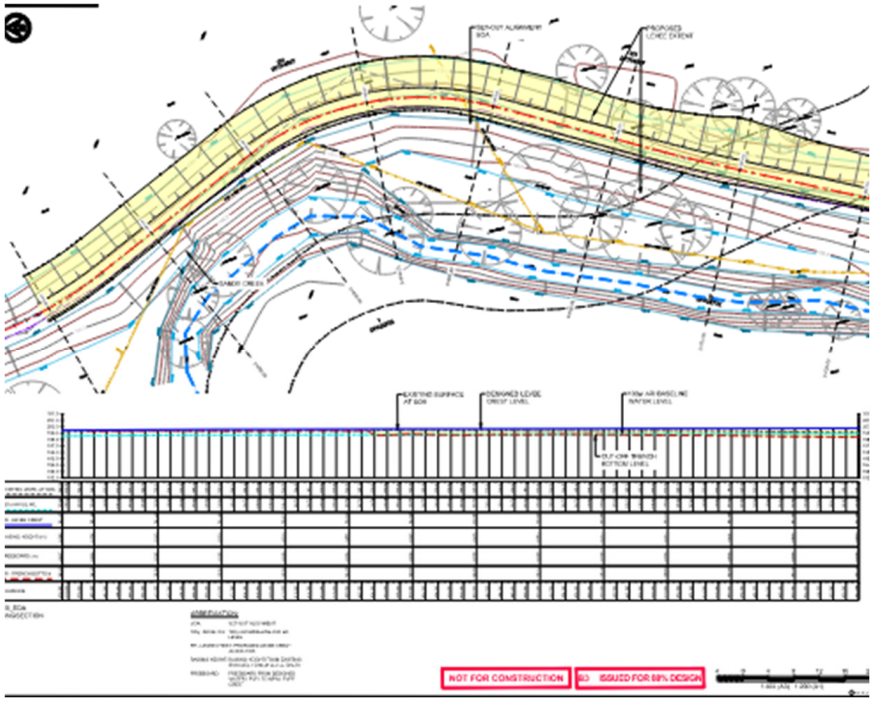




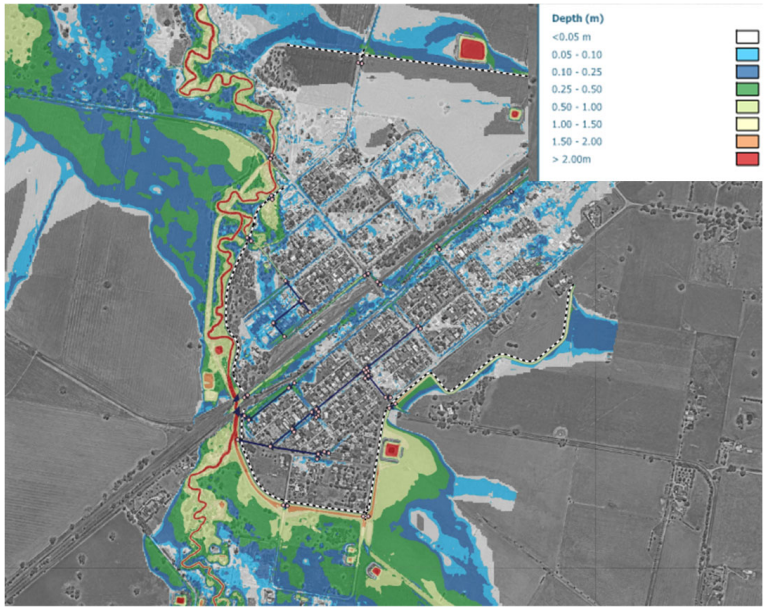
Levee Design – Town Street North



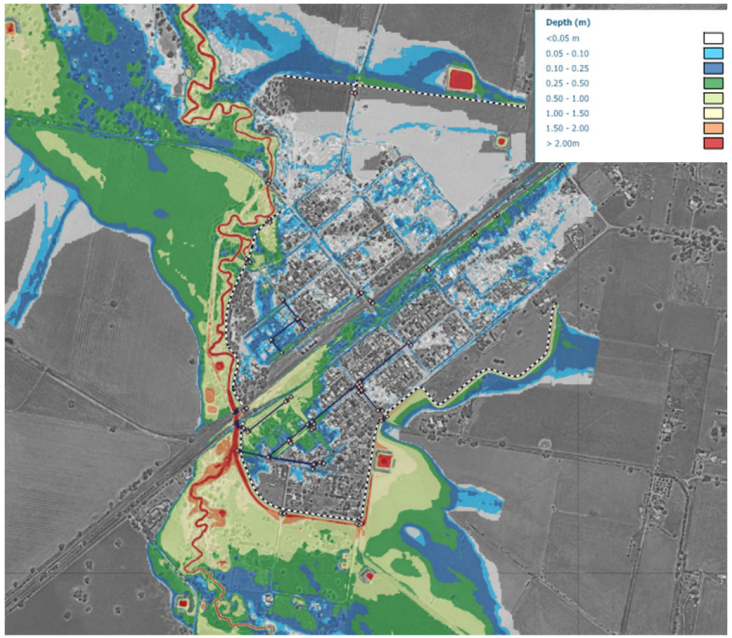
- Town Street levee north will just be small raising – typically 300 mm.
- Likely refine to only raise the crest.

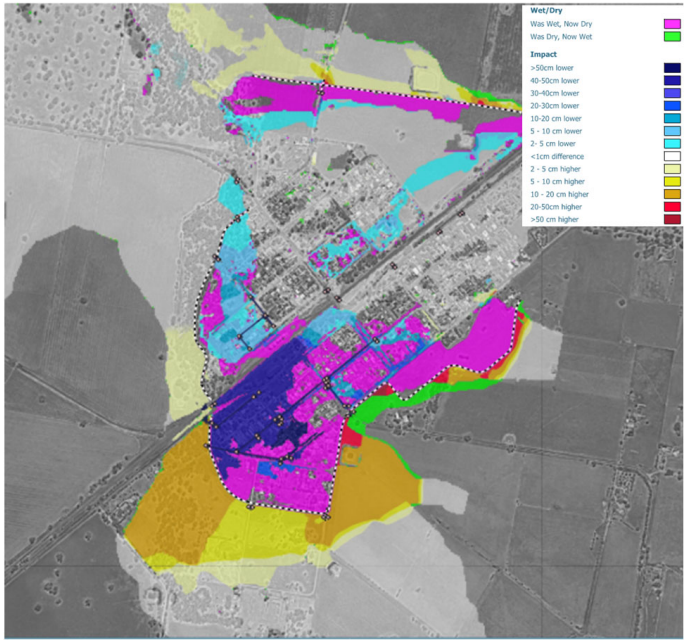


Flood Impacts – 5% AEP

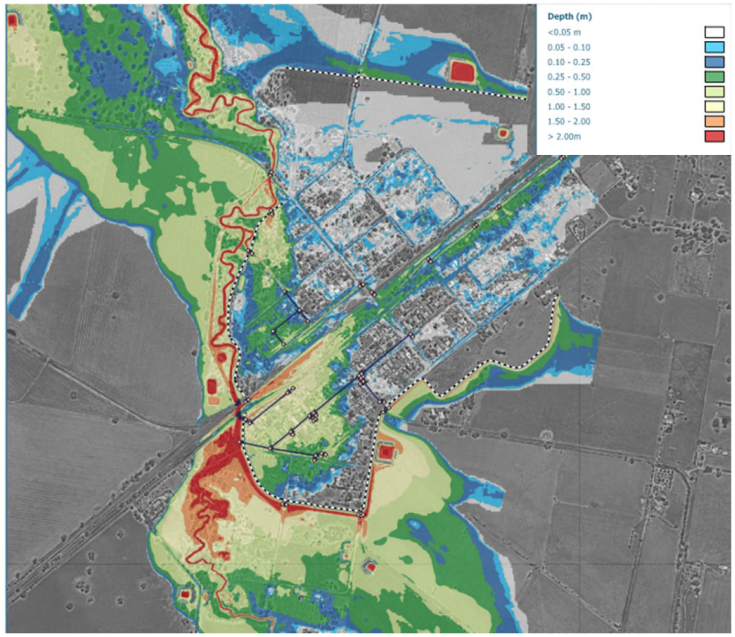


Flood Impacts – 1%AEP





Flood Impacts – 0.2% AEP



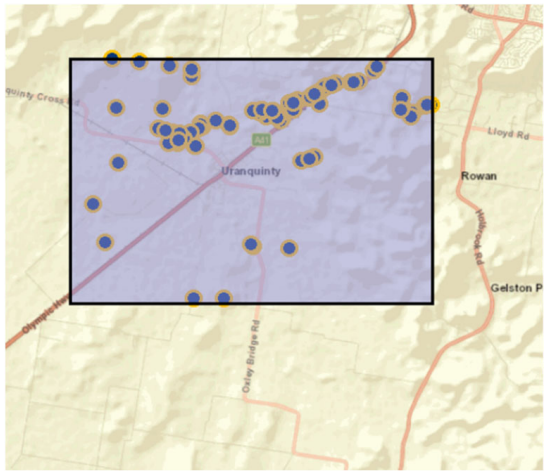
Works Staging

- Each of the 5 respective levee sections has relative perceived benefits.
- In terms of upgrading the levee to reduce impacts on the township, the order of priority is as follows:
  1. Connorton Street Levee and Deane Street Levee (equal first, need to upgraded simultaneously).
  2. Churches Plains Levee
  3. Town Levee South
  4. Town Levee North

  The final report will outline a sequence that will be recommended for staging of the levee upgrade, particularly in the context of likely funding constraints

Review of Environmental Factors

- The levee works are to be approved under Part 5 of the Environmental Protection and Planning Act.
- This assesses the impact of the proposed works in respect of a number of constraints including ecological, hydraulic and archaeological design.
- This is currently being prepared for the 80% design.



Levee Owners Handbook

- Levee Owner's Manual being updated to reflect changes associated with the design upgrade.
- Will reflect changes to the levee upgrade including revised freeboard arrangement, closure of stormwater gates.
- This will also update procedures for periodic inspection and maintenance of the upgraded levee structure.

URANQUINTY LEVEE

Levee Owner's Manual

Report number: ISR19207 *(Draft rev0)*

Date: December 2019

City of Wagga Wagga

Thank you

Questions/ comments

RP-3 2022-FMP-0103 HUMULA AND MANGOPLAH FLOOD STUDIES

Author: Andrew Mason
General Manager: Peter Thompson

Summary: WMAWater have completed the modelling and reporting for the flood model for the study for Humula and Mangoplah and are seeking endorsement to place the model and report on Public Exhibition .

Recommendation

That the Floodplain Risk Management Advisory Committee receive and note the update provided in relation to the Humula and Mangoplah Flood Studies Project and endorse the model and report to go on Public Exhibition

Report

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

WMAWater have been preparing the reporting for the Mangoplah and Humula Flood Study. In preparing the report, it was identified that some additional model simulations were required. These have been progressed, and the Draft Flood Study report has been provided to Council.

WMA Water is seeking endorsement from FRMAC to place the report on Public Exhibition. The outcomes of the Public Exhibition will then be presented to the July FRMAC meeting for consideration and recommendation to Council to finalise the Flood Studies and complete the project.

A time extension until September 2026 has been approved by DCCEEW for this project. This allows time for Public Exhibition, FRMAC meetings and Council meetings.

WMAWater will be presenting to this meeting.

Financial Implications

N/A

Policy and Legislation

N/A

Link to Strategic Plan

Regional Leadership

Ethical Leadership

Provide strategic direction and leadership for our region to deliver key community priorities.

Risk Management Issues for Council

N/A

Internal / External Consultation

N/A

RP-4 DCCEEW 2024 FLOODPLAIN GRANTS

Author: Andrew Mason
General Manager: Peter Thompson

Summary: This Report provides an outline of the DCCEEW Floodplain Grant Applications for 2026

Recommendation

That the Floodplain Risk Management Advisory Committee receive and note the report with regard to the 2026-27 Floodplain Management Program.

Report

As at the end of August 2026 Council will have completed either the implementation or feasibility studies for the high priority recommendations from both the 2018 Riverine FRMSP and the 2021 MOFFS studies.

The DCCEEW FMP grant for 2026-27 has opened and Council needs to decide which project or study to apply for in this round of funding which closes on the 15th April 2026. The choice of what to apply for is across the projects listed below:

- Utilise Reconnecting River Country program data, new LiDar and imagery to develop a new riverine flood model with a smaller grid size and a combination of 1D and 2D modelling

- Utilise data and information completed as a part of the Glenfield Drain flood mitigation project, the investigation into floodgate 25 and other more recent smaller studies, to develop a new, more comprehensive and detailed MOFFs flood model for the city including pipes and pits and stormwater infrastructure.

- Glenfield Drain Flood Mitigation projects, this capital intensive project has a total cost of $27M . Perhaps key individual projects such as PFMM1 (Flowerdale Storage Area supplementary pipes) can be delivered at a cost of approximately $1M

- Lake Albert Flood Mitigation Options. The detailed design for this project could be developed, this would require, an REF, topographic survey and civil, building and environmental design components. Funding for the construction of this project would then need to be another DCCEEW grant in future founds.

- Uranquinty Levee construction, the detailed design of the levee will not be finalised until the end of May 2026 so perhaps this funding should be sourced in future rounds of DCCEEW grants.

In 2025 DCCEEW received grant applications to the value of $46M and provided funding for $8M .

Council is due to renew both the Riverine and MOFFs models. The availability of an extensive amount of cost effective and current data and the increase in computing power since the current models were developed results in this project being the next important step in Council's floodplain management program.

Council staff consider that, given the scale of these projects and the ongoing development pressures in both the northern and southern areas of the city, a staged approach is necessary. The approach will be to update and extend the existing MOFFS model for the 2026 grant funding and then the update of the riverine model will follow in 2027.

Financial Implications

A $600,000 grant application will result in Council needing to fund $200,000 of this project.

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-5 17866- LEVEE SYSTEM UPGRADE - NORTH WAGGA

Author: Andrew Mason
General Manager: Peter Thompson

Summary: The project to upgrade the North Wagga levee has commenced with preliminary tasks completed and with some grant funding closures becoming due.

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	Status
Topographic Survey	6 months	August 2024	Complete
Environmental Assessment	4 months	November 2024	Complete
Floodgate Pipe Relining	4 months	September 2025	Complete
Civil Design including mitigation options for residents adversely affected by the levee raising	6-12 months	December 2025	PWA NSW are the design consultant. Council will be negotiating with affected landholders
Levee contractor procurement	4 months	July 2026	Not due
Levee construction	24 months	November 2027	Not due

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

- $6.1M in SRV funding
- $1.1M in the original Commonwealth Development Grant (CDG) to be expended by 30 June 2026.
- $9.1M in DRF round three funding

The CDG has been allocated to fund the floodgate pipe relining, the detailed design of the levee, purchase of sheetpiles and the purchase of 5 floodgates.

The status of the project is:

- The detailed survey for the levee design has been completed.
- The Review of Environmental Factors has been completed and accepted by Council
- The detailed design of the levee has been awarded to PWA NSW after negotiations with GHD failed to reach a successful conclusion.
- Pipeline Watertech have completed the relining of the existing 11 floodgates in the levee, the remaining three floodgates require significant levee work as well as the relining and this will be undertaken as a component of the levee rebuild.
- A project team has been engaged 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

Regional Leadership

Ethical Leadership

Provide strategic direction and leadership for our region to deliver key community priorities.

Risk Management Issues for Council

N/A

Internal / External Consultation

RP-6 2023 FMP 0073 EARLY WARNING SYSTEM MODEL DEVELOPMENT

Author: Andrew Mason
General Manager: Peter Thompson

Summary: This Report provides an update 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.

Worley was engaged to deliver the Early Warning and Flood Prediction project as an enhancement to the existing WaterRide software currently utilised by Council.

Status of project:

- Base Murrumbidgee River system operational
- Upstream lookup approach developed and to be integrated into WaterRIDE 11
- MOFFS flash flood base configuration complete
- Build URBS hydrology model (variation complete)
- Configuration of operational forecasting WaterRIDE projects complete
- Configuration of WaterRIDE LITE project complete
- Present beta version
- Setup/Delivery/Training/Manual complete

This initial project is complete and the system is up and running for Council staff to utilise. The public facing version of the software will be released shortly.

Council and Worley will continue to improve and enhance the system, Council has provided Sewer Pump Station data to Worley as critical action points where intervention is required by Council staff during emergencies.

Worley will be presenting the system and project to the FMA conference in a couple of weeks and also to the LEMC at their meeting on the 4 May 2026.

Financial Implications

The project is currently within budget allocations.

Policy and Legislation

N/A

Link to Strategic Plan

Regional Leadership

Ethical Leadership

Provide strategic direction and leadership for our region to deliver key community priorities.

Risk Management Issues for Council

N/A

Internal / External Consultation

N/A

RP-7 2021-22-FM-0039 - LAKE ALBERT FLOOD MITIGATION OPTIONS - FEASIBILITY STUDY

Author: Andrew Mason
General Manager: Peter Thompson

Summary: Work on this project is complete.

Recommendation

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

Report

Lake Albert Enhanced Flow Scheme – Feasibility Study

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

Stantec have completed the project and only Stages 1 and 3 are viable and prioritisation and funding for this project will need to be developed and sought by Council to implement this project.

Stantec are completing the design of some components of LA03 as a part of the Plumpton Road upgrade and these will be installed as that project progresses.

The Acquittal Report has been provided to DCCEEW to close out the project.

Financial Implications

N/A

Policy and Legislation

N/A

Link to Strategic Plan

Regional Leadership

Ethical Leadership

Provide strategic direction and leadership for our region to deliver key community priorities.

Risk Management Issues for Council

N/A

Internal / External Consultation

N/A

RP-8 2021-22-FM-0024 - GLENFIELD DRAIN AND FLOWERDALE STORAGE FLOOD MITIGATION WORKS

Author: Andrew Mason
General Manager: Peter Thompson

Summary: Lyall and Associates have completed the 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 report.

Report

The project has been completed and closed out with DCCEEW. Council is analysing components of this project for design and implementation . The design for the reconstruction of Glenfield Drain is complete and funding and prioritisation of the various components of this project and the upstream works is being determined by Council staff.

Financial Implications

N/A

Policy and Legislation

N/A

Link to Strategic Plan

Regional Leadership

Ethical Leadership

Provide strategic direction and leadership for our region to deliver key community priorities.

Risk Management Issues for Council

N/A

Internal / External Consultation

N/A

RP-9 FLOOD PROJECT IMPLEMENTATION STATUS

Author: Andrew Mason
General Manager: Peter Thompson

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 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. Council 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. Council 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 .
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	This project is completed, a system has been developed and is currently running within Council's existing WaterRide program.

2018 FRMSP Actions

REF	Option	Description	Benefits	Concerns	Priority		Responsibility	Status
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
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

2018 FRMSP Actions

REF	Option	Description	Benefits	Concerns	Priority		Responsibility	Status
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.
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.

2018 FRMSP Actions

REF	Option	Description	Benefits	Concerns	Priority		Responsibility	Status
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**	Controls to reduce proposed development	Planning	Completed. Controls currently exist in DCP. New data from FRMP&S is currently being used when assessing development applications.
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**		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.

2018 FRMSP Actions

REF	Option	Description	Benefits	Concerns	Priority		Responsibility	Status
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 and mapped in the internaal GIS
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 Strategic Planning	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 Strategic Planning	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 Strategic Planning	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	Project is complete and components of this analysis are beginning to be implemented
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	Project is complete and components of this analysis are beginning to be implemented
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	Project is complete and components of this analysis are beginning to be implemented

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	Project is complete and components of this analysis are beginning to be implemented
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 determining the 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	Project is complete and prioritisation and funding will be required before detiled design and implentation can begin

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	Project is complete and prioritisation and funding will be required before detiled design and implentation can begin
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	Project is complete and prioritisation and funding will be required before detiled design and implentation can begin

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	Project is complete and a system has been developed and implemented using the existing Council WaterRide system.
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 Strategic Planning	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 Strategic Planning	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	The floodgate is in place but has not been automated at this pont in time.
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	Project is complete and components of this analysis are beginning to be implemented

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	A program has been developed to operate in the WaterRide system, it incorporates both Riverine and Overland flooding.
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	This is complete and will be launched with the release of WaterRide Lite to the public
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 the 2028 revision of the Riverine Flood model
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
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
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
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
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
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 Strategic Planning
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 Strategic Planning
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 Strategic Planning

2021 VOFFS Actions

Reference	Option and report Reference	Description	Priority	Responsibility
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

2021 VOFFS Actions

Status
Amendments proposed to the DCP will incorporate FPA's identified in the 2021 VOFFS.

2021 VOFFS Actions

Status
A project is underway to improve the stormwater flow through the levee in Tarcutta.
DPIE grant received 2021-22-FM-0032. project awarded to RHDHV, 80% design is completed and the first three stages of community consultation 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.

2021 VOFFS Actions

Status
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.
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.
Planning certificates identify whether the land is below the 1% Average Recurrence Interval and therefore flood related development controls may apply.

2021 VOFFS Actions

Status
This is not feasible and improvements to stormwater outflow will offset the need for this work.

QUESTIONS WITH NOTICE