

**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 implementation of the recommendations
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 implementation of the recommendations
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	Implementation of actions from the Vegetation Management Plan are being progressed including management of exotic plant species and weeds. Grant funding was received and willows in the floodplain were removed.
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 DCEEW to continue the next stage of this project

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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 have completed 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 information 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

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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.

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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 overflow 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.



## 2021 MOFFS Actions

Option ID	Option	Description	Benefits	Concerns	Priority	Responsibility	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 information 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 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 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.

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Option ID	Option	Description	Benefits	Concerns	Priority	Responsibility	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 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 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.
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**

<b>Option ID</b>	<b>Option</b>	<b>Description</b>	<b>Benefits</b>	<b>Concerns</b>	<b>Priority</b>	<b>Responsibility</b>	<b>Status</b>
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. 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.
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	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 review suitability of controls.
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	WWCC Regional Activation	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	Responsibility	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 m <sup>3</sup> , 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
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

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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	Grant received, design completed, currently with Council Operations for implementation
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,
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,

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LA03 (Lake A	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,
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

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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.
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	

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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 5m <sup>2</sup> 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	
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	
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

## EWS Actions

Reference	Option and report Reference	Priority	DPE Funding available	Responsibility	Status
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 information 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 investigation, 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 programmed for review by BOM under a federally funded program
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

## EWS Actions

<b>Reference</b>	<b>Option and report Reference</b>	<b>Priority</b>	<b>DPE Funding available</b>	<b>Responsibility</b>	<b>Status</b>
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 alignment 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.
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	

## 2021 VOFFS Actions

Reference	Option and report Reference	Description	Priority	Responsibility	Status
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	