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## APPENDIX M. RESPONSE TO PUBLIC EXHIBITION SUBMISSIONS

### M.1. Submissions of a General Nature

#### M.1.1. Floodplain Risk Management Process

##### Overview:

Several submissions raised the point that there has already been much consultation regarding floodplain risk management in Wagga Wagga, and as a result some residents believe they are not being listened to by Council.

##### Submission excerpts:

*“How many more of these revised plans and studies do we have to have every time there is a new Mayor or General Manager?” – ID71*

*“No more plans or money wasted on consultants – there will be another flood before something is done.” – ID 103*

*“As a resident of North Wagga we are not going anywhere. This has been going on for 7 years. Instead of wasting money on study after study, just fix our Levee so we are protected.” – ID19*

*“Following the 2012 flood, North Wagga Residents were promised all sorts of flood prevention ideas. If the money spent on “Draft Plans, Studies Etc.” was injected into material Flood Mitigation Structures we would all be headed in the right direction.” – ID33*

##### Response:

- In order to be eligible for NSW state government funding under the Floodplain Management Program (FMP), flood mitigation options must be investigated and recommended via the Floodplain Management Process – i.e., in a Floodplain Risk Management Study & Plan.
- The Floodplain Development Manual 2005 recommends that management plans be reviewed every 5 -10 years and after significant flood events which provide additional data on flood behaviour (Section 2.7, Reference 1).
- Raising the North Wagga levee had been previously assessed as part of the Floodplain Management Process in 2009 and found to not be viable: “As North Wagga would become isolated in a flood around a 10y ARI flood, due to the low lying areas outside the levee, measures to provide higher levels of protection could encourage people to resist evacuation and significantly increase liability and risk. Raising the levee would also discourage residents from redeveloping their homes in ‘flood aware’ ways, such as house raising and flood proofing. Overall, the raising of the levee would discourage better long term and more sustainable solutions for an area under such a significant flood risk.” (Wagga Wagga FRMS 2009, pg 63).

- The plan made the following recommendation:

***“F1: INVESTIGATE THE FEASIBILITY OF RAISING MAIN CITY LEVEE***

*Within the cost constraints and technical issues associated with raising a levee, a best practical compromise should be reached for a level of protection between the 100y ARI plus 0.5m freeboard and 100y ARI plus 1.0 m freeboard for concrete wall and earth embankment, respectively. Consideration should also be given to maintaining a 20y ARI level of protection for the North Wagga Wagga levee. (Wagga Wagga FRMP 2009, pg ii)”*

- Consultation undertaken in 2013 and 2015 (following flood events in 2010 and 2012) found that some residents were in favour of a levee for North Wagga with a level of protection of the 1% AEP despite the previous 2009 assessment outcome.
- Investigation was undertaken outside the Floodplain Risk Management process which considered a range of flood mitigation options for North Wagga, including the 1% AEP levee. These options have been considered via this current Wagga Wagga Revised Murrumbidgee River FRMS&P and assessed against the full range of criteria.
- In regard to ‘wasting money on consultants’, it is more cost effective for Council to engage specialists in flood modelling on an as-needs basis than to employ a full-time flood modelling expert in-house.
- The consultant works with the Floodplain Risk Management Advisory Committee to identify potential flood risk mitigation options, and determine the options that require in depth investigation, and those for which a high-level assessment would suffice, noting that detailed investigations are costly and time consuming and may not be the best use of the available funding.
- It is acknowledged that this can be perceived as a long process and that there may be floods in the interim, but this is the process stipulated by the NSW State Government via the Floodplain Development Manual and Floodplain Management Process for accessing funding streams.

### **M.1.2. Feedback on the Public Exhibition Process**

#### **Overview:**

Some submissions identified that the drop-in sessions were poorly advertised and that the public exhibition period was too short, especially given the complexity of the report.

#### **Submission excerpts:**

*“One of the problems with this report is that it is so complex that most people cannot understand what it all means” – ID62*

*“I attended your community consultation session at the Gumly Hall which I will add was poorly advertised – the first I knew of it was when reading Saturday’s paper a few days before. You need to give at least a weeks’ notice of such events.” – ID12*

*“The public was initially allocated four weeks to prepare and submit FRMS submissions. WWCC subsequently offered a short term extension to the submission deadline. [We are grateful for the extension.”- ID136*

**Response:**

- While the report is indeed long and quite technical, it has been written with the intent that it be understood by a range of readers, including committee members, council staff, technical representatives and the general public. There are a number of important technical issues that are required to be covered in the report, and it is hard to simplify the document without losing the required depth of information.
- The report authors and council representatives were available for nine sessions at multiple locations to clarify any queries and questions readers may have had, and to provide summaries to those without time to read the report. The FRMAC appreciates the number of community members who took advantage of this opportunity.
- The NSW Local Government Act (Section 402) requires that Council exhibits the Draft Plan for public comment 'for a period of at least 28 days'. WWCC acknowledged that given the complexity of the report this was insufficient time and granted an extension of a further 2 weeks.
- The short notice of drop-in sessions is noted. Commencement of the public exhibition period and advertisement of the sessions was contingent on the Wagga Wagga Revised Murrumbidgee River FRMS&P Public Exhibition Draft Report being endorsed by the Councillors.
- WWCC hosted some drop-in sessions early in the period to allow residents a chance to obtain information about the report and receive advice about which sections of the report might be of most interest to them (acknowledging it is a long document). Council also provided a number of sessions throughout the duration of the period to give more residents an opportunity to review the report, and raise any queries at a later session, whilst still having time to prepare a submission.
- While some drop-in sessions were targeted at specific communities, all residents were welcome to attend all sessions.
- It is noted that part of the role of FRMAC community representatives involves acting as a two-way medium between their community and the Committee, and to disseminate information about the drop-in sessions to the communities they represent. The importance of this role will be emphasised during subsequent studies.
- Further to this, Council will take advertising lead time into account when it next puts a report on public exhibition.

### **M.1.3. Feedback on Modelling and Reporting Practices**

**Overview:**

Some submissions identified inconsistencies in the report and questioned the report's review process, especially given that WMAwater have been engaged to undertake these types of studies since before 2009. Confirmation was also sought in regard to the

'robustness' of the modelling, specifically relating to the inclusion of recent developments on the floodplain, such as the harness racing track on the northern floodplain, and the new Eunony Bridge access ramps.

**Submission excerpts:**

*"The lack of rigorous examination of cumulative development makes this report invalid. The report does not consider all of the elements already approved or existing within the floodplain collectively. Without this information council will be liable for litigation" – Petition, point 2 of 2.*

*"WMA water have been the tender winner and preferred Consultants since at least 2009. As such an independent review of associated reports should also be conducted to ensure the information contained within them is correct."- ID104*

*"Council has allowed the development of a trotting track on the floodplain, which will impact on floodwaters at North Wagga." – ID03*

*"At your session I made a comment regarding the new Eunony Bridge and its proposed approaches, plus the proposed truck by-pass (where ever it is to go). Without these proposed road works included in this current draft I can see little reason to take any notice of it. Any earth works, and I mean any earth works on the flood plain no matter how minimal, has an impact on the flood levels, velocity and direction." – ID12*

**Response:**

- The modelling has been undertaken in accordance with industry best practice utilising the best available information. The various stages of model establishment have been subject to review by Council and state government departments. Modelling represents the best methods we have available to predict what will occur in flood events and if changes are made to the floodplain. To build confidence in the modelling, calibration and validation to known flood events is undertaken. The current model has been calibrated and validated to 1974, 2010 and 2012 events.
- WMAwater was appointed as the consultant for this study (and previous studies) via a competitive tender process.
- The modelling process is quite a time-consuming exercise and for practical reasons there needs to be a decision on the point in time which it represents. There have been updates made to the model since 2014 (See Section 4.4 in the Public Exhibition Draft FRMS&P), but specifically, the Harness Racing Track and new Eunony Bridge approaches and proposed truck by-pass are not included in the model as they were not approved at the decision point in time.
- Typically, development that is proposed after this point is managed via impact assessments. This way, Council is aware of the extent of the potential impact, can make informed decisions if inclusion is warranted, and if the opportunity arises, that development can be included in future model revisions. An impact assessment for the Harness Racing Track at North Wagga was undertaken as a separate

investigation, and is discussed in Section 3.14 of the Wagga Wagga Revised Murrumbidgee River FRMS Final Report.

- Noted and identified errors have been amended in the Wagga Wagga Revised Murrumbidgee River FRMS&P Final Report, as detailed in the accompanying table.

## **M.2. Submissions relating to Recommendations in Draft Plan**

### **M.2.1. Changes to the Local Environmental Plan (LEP) and Development Control Plan (DCP)**

#### **Overview:**

Greater clarification is required to better communicate the proposed changes to the Wagga Wagga LEP 2010 and Wagga Wagga DCP 2010, and describe how these changes will affect residents.

#### **Submission Excerpts:**

*“The change of planning law from the LEP to the DCP is dangerous to all who live in the floodplain as it allows council to make decisions with less restriction about what can be developed. It is uncertain whether council has been making best decisions to date about development in the floodplain and whether they can be trusted to make good decisions in the future if they have no restrictions” – Petition, Point 1 of 2.*

*“We object to any change from the LEP to the DCP for future developments in the city as this could cause an unfair disadvantage to our suburb by denying us the right for improvements to our properties without any right of reply to the DCP.” – ID26*

*“We would also like to voice our objection regarding the removal of Clause 7.2 from the Wagga Wagga Local Environment Plan 2010. The removal of this clause would result in Council no longer having to satisfy a state agency (i.e. NSW Department of Planning) when making changes to flood affected areas. Thus the level of scrutiny required by a state agency would be lost and this is not supported” – ID104*

#### **Response:**

- Local Environmental Plans (LEPs) guide planning decisions for local government areas. They do this through zoning and development controls, which provide a framework for the way land can be used. LEPs are the main planning tool to shape the future of communities and also ensure local development is done appropriately (See <http://www.planning.nsw.gov.au/Plans-for-your-area/Local-Planning-and-Zoning>).
- LEPs are generally based on the Standard Instrument which provides a common format and content for the plans.
- Clause 7.2 of the Wagga Wagga LEP 2010 relates to Flood Planning, and sets out broad objectives for development on flood prone areas. The clause applies to land that is shown as ‘Flood Planning Area’. The Flood Planning Area (FPA) is an extent of land defined by the Flood Planning Level (FPL). The FPL is based on the 1% AEP event extent, plus a freeboard. For riverine flooding, the freeboard is 0.5 m.

- The Development Control Plan (DCP) 2010 is a document that sets out specific controls that are applied to developments in order to fulfil the objectives set out in the LEP.
- The above excerpts from submissions tend to indicate that the proposed changes may have been misinterpreted by a number of readers, and greater clarification in the report is necessary to rectify this issue.
- The recommendation is not proposing to ‘Remove Clause 7.2 from the Wagga Wagga Local Environmental Plan 2010’, but rather to move the Flood Planning Area *mapping* into the DCP where it can be updated easily by Council. The definition of the FPA and FPL would remain in the LEP. FPA maps are produced through Floodplain Risk Management Studies which are reviewed by State Government Agencies.
- From the Wagga Wagga Revised Murrumbidgee River FRMS Report, transposed from Table 2, pg v (Public Exhibition Draft), the following is proposed:

Option	PL1: Remove Flood Planning Area (FPA) mapping from LEP.
<b>Description</b>	A general definition of both Flood Planning Level (FPL) and the FPA is to remain in the LEP, with details and FPA mapping provided in the DCP for ease of updating following the completion of future studies.
<b>Benefits</b>	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).
<b>Concerns</b>	This amendment to the LEP would require Council to submit a planning proposal
<b>Priority</b>	High

- For clarity, the wording of PL1 will be amended to the following in the Wagga Wagga Revised Murrumbidgee River FRMS Final Report:  
*“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 Wagga Wagga LEP.”*

### **M.2.2. Support for reformatting the DCP in as a matrix-style document**

#### **Overview:**

Option PL2 recommends reformatting the DCP as a matrix style document rather than the lengthy, complicated document it currently is. The proposed matrix would assign relevant flood related development controls based on the flood risk (using outputs from the study including hazard, hydraulic categories), rather than using precinct-based language. Submissions were supportive of this recommendation.

#### **Submission Excerpts:**

*“I am supportive of Recommendation PL2 in the draft Plan, which is a proposal to reformat the Development Control Plan into a Matrix-style document.” – ID131*



*“To date, the advice I have received from Council has been conflicting and discouraging. I hope that when the DCP is reformatted in a clear matrix (as per the recommendation in the FRMS&P) that both myself and the Council Planners will be able to come to the same understanding regarding the flood risk at the site, and the building controls that should apply.” – ID01*

*“It seems to me that this straightforward change [to a matrix style document] will be beneficial for both Council and the public. Council's planners also find it very difficult to offer advice to residents using the current DCP, and this lack of clarity only makes it difficult for residents to make changes that will improve the safety and livability of the area.” – ID25*

*“As the DCP is wordy and difficult to interpret, we ended up spending around \$7000 having architectural drawings, engineering plans and a Development Application prepared in order to answer some simple questions we had about what we could and could not do with our house.” – ID25*

**Response:**

- Support for reformatting the Wagga Wagga DCP as a matrix-style document is noted. The intent of this recommendation is to improve the clarity and useability of the current DCP as it is currently a lengthy, cumbersome document.
- Furthermore, the intent is to use the most up to date flood modelling results (including, hydraulic categorisation and hazard classification) to determine the flood risk at a given site, then use the matrix to determine which controls should apply in a transparent manner.

### **M.2.3. Responses to other proposed planning recommendations**

**Overview:**

The Draft Plan made eight other recommendations (PL3 – PL10) to amend existing planning controls to reduce flood risk to life, risk to proposed developments, and risk to the wider floodplain (and its existing properties). Relatively few submissions were received in relation to these recommendations.

**Submission Excerpts:**

*“Where recommendations to change planning controls have been made, it has been difficult to fully grasp what such recommendations mean in practical terms. Providing written examples of how property owners and/or developers may be impacted by FRMS recommendations relating to planning controls would be beneficial to the reader.” – ID136*

*“[We] recommend that the FRMS recommend that WWCC assist developers and property owners to prepare and maintain practical flood emergency plans, where flood emergency*

*plans are required, by providing all of the necessary tools, such as emergency plan templates.” – ID136*

**Response:**

- The FRMS has provided recommendations to amend or supplement the existing planning policies with clauses that achieve a particular outcome in relation to flood risk in the Study Area.
- The scope of the FRMS is limited to describing the intent of these outcomes (i.e. reducing flood risk in various ways), however it is up to Council to determine the exact wording of particular clauses, and the resulting implications for developers.
- The report does not include example clause phrasing as readers tended to focus on the specific wording rather the overarching intent of the clause.
- Once it has drafted the clauses with its preferred phrasing, Council will exhibit the proposed DCP for public exhibition (to be confirmed with WWCC).
- In regard to recommendation PL4: Requirement of Site Specific Flood Emergency Plans. It is noted that developers may appreciate assistance from WWCC to achieve this objective, possibly by WWCC providing emergency plan templates.

#### **M.2.4. Responses to Proposed Flood Response Modification Recommendations**

**Overview:**

Very few submissions commented on the proposed response modification options (Options RE1 – RE3), and these submissions were in favour of the proposed recommendations.

**Submission Excerpts:**

*“[We] support the ongoing improvements to flood warning systems, flood management planning and community flood education.” – ID136*

**Response:**

- As the proposed response modification options are largely to ‘continue and improve’, they were not expected to generate many submissions;
- Recommendation RE1: Improve Flood Warning System, recommends investigating a ‘DipStik’ to be installed at Oura. ‘DipStik’ is an independent flood level monitoring and alert device that can transmit water level information (and flood alerts) to key stakeholders, such as Council and the SES. A number of attendees to drop in sessions commented that they were in support of this recommendation.

#### **M.2.5. Responses to Recommendation L4B**

**Overview:**

Option L4B: Undertake a Feasibility Study to investigate North Wagga Levee Upgrade to a 5% AEP level of protection including upgrade to Hampden Avenue to the equivalent level

(as embankment) and conveyance improvements through Wilks Park. A range of responses both for and against this option were received.

**Submission Excerpts in Support of Option L4B:**

*“From Table 1 I support Ref L4B. - A feasibility study to further investigate of raising the Nth Wagga Levy to 5% AEP.” – ID18*

*“It [Option L4B]] would have no negative impact on the city levee, and it actually reduces the upstream impacts of flooding (see p128 and Figure E17). There are no losers if this proposal is implemented.” – ID131*

*“As a resident and on behalf of all the residents I have spoken to about this issue we value our community and way of life and we want our levee bank maintained at a 1 in 20 year level or above as it provides a level of protection to our property.” – ID48*

*“Even where this report is lacking in rigour and accuracy and biased toward not upgrading levees, it offers an appropriate and affordable levee upgrade option to 5% protection which should be the very least that council considers for North Wagga.” – ID51*

**Submission Excerpts in Opposition to Option L4B:**

*“[Acknowledging the costs not included in the current cost estimate for Option L4B, including bridging the dip between the two North Wagga ring levees, using concrete retaining walls where there is insufficient easement for earthen levee walls, and the true cost of upgrading the bridge across Wilks Park], it could end up being cheaper for government to fund the raising of the remaining houses within North Wagga to 1 in 100 year flood levels and leave the existing levee as it is, instead of implementing option L4B which only gives 1 in 20 year protection.” – ID109*

*“[in 2012] North Wagga became an isolated swamp, contaminated with sewerage from Gundagai and Canberra while houses outside of the levee were relieved from flood water as soon as the river height receded. This problem will only get worse if council raises the levee bank.” – ID109*

*“With regard to option L4B, we appreciate the fact that the plan looks to reduce flooding pressure on the upstream area by increasing the flow of floodwater through the Wilks Park area. At the same time though, we question the likelihood of appropriate excavation works being carried out due to cost and environmental factors. In summary we object to any proposal which would involve raising the North Wagga levees and in turn contribute to increasing flood levels in the upstream flood plain.” - ID60*

*“I do not support the thinning of native vegetation or any works that would involve disturbing native vegetation on the Wilks parkland as it provides an important habitat area for our native fauna and slows floodwaters.” – ID48*

*“There is no mention of compensation if works carried out cause flooding and/or have financial implications for those affected eg. Increased insurance costs. This is something which we believe is essential in order to make the process equitable for all parties.” – ID60*

*“It is difficult to see how any excavation of any practical depth is going to change this [upstream impacts of North Wagga Levee].” – ID11*

*“34 houses outside the [North Wagga] levy would be affected as well - protect them also!!”  
– ID71*

**Response:**

- It is important to note that the neutral (or even beneficial) upstream impacts of Option L4B are contingent on the proposed excavation and conveyance improvements through Wilks Park. Without this excavation, flood waters obstructed by the higher levee adversely impact on properties in the floodplain outside the North Wagga levees.
- Several submissions identified that excavation to a meaningful extent is not likely to be environmentally appropriate, and were outright opposed to removal of any native vegetation through the Wilks Park area.
- This feedback indicates that due to the environmental impacts of this necessary excavation, L4B may not be the preferred method of achieving flood protection for North Wagga.
- It is also noted that increasing the levee height is likely to lead to extended periods of inundation as drainage of North Wagga is slowed by the levee system. Associated negative impacts include delays to residents being able to access their homes and health concerns caused by the prolonged impoundment of floodwaters that contain sewage, debris, mosquitoes and snakes (for example).
- There were relatively few submissions that were supportive of raising the levee to the 5% AEP level, however many responses indicated that residents of North Wagga would rather see the recommendation of a 1% AEP level of protection, or were in favour of the recommended Voluntary House Raising and Voluntary Purchase scheme in preference to a levee option. Feedback on these two options is presented below.

## **M.2.6. Responses to the proposed Voluntary House Raising Scheme**

**Overview:**

The Wagga Wagga Revised Murrumbidgee River Draft Floodplain Risk Management Plan proposes to investigate the feasibility of undertaking a Voluntary House Raising and Voluntary Purchase Scheme. This section describes the feedback received in regards to the Voluntary House Raising part of the scheme. It should be read in conjunction with Section M.2.7 which addresses the feedback to the Voluntary Purchase Scheme.

**Submission Excerpts in favour of Option PR1: Voluntary House Raising (VHR) Scheme:**

*"I support this proposal [VHR & VP] which would benefit residents inside and outside the North Wagga Levee. It would increase the safety and value of properties and considerably reduce the impact of future flooding on the community." – ID124*

*"Firstly raising houses is a good thing and selling up could interest some however cost and financial losses on both those options is grossly unfair without some financial assistance which is unlikely" – ID130*

*"I am broadly supportive of the proposal to investigate the feasibility of a Voluntary House Raising or Voluntary Purchase Scheme for residents on the floodplain...While house-raising comes with its own challenges, such as accessibility issues that may face frail residents and those with disabilities, I suspect that the availability of affordable technologies such as stairway lifts and elevators could allay some of these concerns." – ID131*

*"I strongly urge council to focus on raising the remaining houses in North Wagga instead of further impeding flood flows by raising roads or levee banks on the already reduced floodplain." – ID109*

*"Voluntary House Raising would be more effective in giving houses in North Wagga the same level of protection, as those in Central Wagga, for a 1 in 100 year flood, than a 5% AEP levee bank ever would. Additionally houses outside the levee bank would have the same benefit too, as opposed to raising the levee bank further and pushing flood levels even higher." – ID109*

*"If every house within North Wagga was raised instead, and the levee remained the same, people can return and get back on with their lives sooner than if the levee was raised, only to trap in more water and take even longer to drain out." – ID109*

*"We fully support Option PR1 with regard to the raising and purchase of properties within the floodplain" – ID60*

*"We [speaking on behalf of residents of North Wagga] do not welcome a VP scheme because we do not want to leave our community, although several community members are interested in the house raising option." – ID48*

**Submissions in opposition to Option PR1: VP/VHR Scheme:**

*"We are both in our 50s and cannot afford to raise or relocate our house" – ID43*

*"No.2: Raising houses above the flood level, not practical for some of the houses, not practical for older residents – No stairs." – ID83*

*“I would contend if council pursues down the path of a feasibility study on this (VHR) the outcome will be similar to previous analyses of this option – that is it is technically very difficult and it will be VERY, VERY expensive. The result will be more money wasted on consultants for an outcome that is already known.” – ID135*

**Response:**

- The VHR Scheme seeks to raise dwellings above the 1% AEP event to significantly reduce flood damages. This option provides a much greater level of protection and broader benefit than Option L4B, which offers a 5% AEP level of protection to residents of North Wagga only.
- Opposition to the VHR scheme typically relates to the perception of cost for residents, the idea that the scheme would be ‘forced’ upon residents, and the fact that not all houses are suited to being raised.
- The proposed feasibility study to investigate the VHR Scheme further will seek to determine the following:
  - appropriate government funding streams to minimise the contribution required of residents (if any);
  - technical feasibility of raising houses, or adding a second story to houses that cannot be raised;
  - availability of technologies to assist less mobile members of the community to live comfortably in a raised house, e.g. lifts, stair lifts etc.
- Greater clarification may be required to ensure residents are aware the scheme would be voluntary, and that no one will be forced to raise their home against their will.
- It is encouraging that a large number of responses were open to the idea of Voluntary House Raising, as community participation is a vital to the success of such a scheme.

### **M.2.7. Responses to the Proposed Voluntary Purchase Scheme**

**Overview:**

Further to offering Voluntary House Raising as a way for residents to reduce their property’s flood risk, the Wagga Wagga Revised Murrumbidgee River FRMS&P also recommends investigating the feasibility of a Voluntary Purchase Scheme. This option is intended to be made available to residents who cannot (or do not want to) raise their house, or who would prefer to move out of the area.

**Submissions in favour of the Voluntary Purchase Scheme**

*“I was heavily involved in the welfare team after the 1974 flood and saw at close hand the damage that that flood caused; not just to buildings but to the residents who had to recover from the damage both physical and emotional. I wonder if all of the costs to every level of government and the financial and emotional costs to residents, over, say, the last ten flood events could have been saved if the radical solution of offering grants of land and financial help to residents to relocate to a safe and flood free area had been proposed.” – ID02*

*“I support this proposal [VHR & VP] which would benefit residents inside and outside the North Wagga Levee. It would increase the safety and value of properties and considerably reduce the impact of future flooding on the community.” – ID124*

*“Firstly raising houses is a good thing and selling up could interest some however cost and financial losses on both those options is grossly unfair without some financial assistance which is unlikely” – ID130*

*“We fully support Option PR1 with regard to the raising and purchase of properties within the floodplain” – ID60*

### **Submissions in opposition to the Voluntary Purchase Scheme**

*“The voluntary buy back offer – absolute no. Remember, We shall not be moved.”- ID83*

*“I believe myself and my family who live with me would suffer a great hardship of grief and deprivation if we were forced by the Wagga Wagga City Council to relocate elsewhere. It is so unfair.” – ID87*

*“We [North Wagga] are a low-crime, low-maintenance neighbourhood that has been a part of Wagga's history from the start and it would be more than a shame, it would be a disaster for all of Wagga, if it was wiped off the map because of a lack of vision by council” -ID03*

*“As a rate payer I think it is disgusting for a Council to decide that my house will be worthless. You added an extra fee on the Rates to help with the building of the Levees. Now you decide that North Wagga is not worth protection from a flood.” – ID19*

### **Response:**

- Voluntary Purchase schemes aim to reduce the number of people living in high hazard flood areas. This intention was supported by a number of submissions, especially from elderly residents who had participated in recovery following the 1974 flood event. The primary purpose of VP is to reduce flood risk to life and eliminate property damage. A secondary benefit is that obstructions (houses) are removed from the floodway, as houses are purchased and demolished. The lot is then rezoned to prevent future residential development.
- A number of submissions and attendees at the drop in sessions indicated that Voluntary Purchase is not desired, as they did not want to see more houses removed from North Wagga.
- Some submissions referred to the mentality of ‘We shall not be moved’, and indicated a strong desire to remain living in North Wagga.
- Both these points have been taken into consideration particularly with Voluntary House Raising offered as an alternative. In addition, the feasibility study will investigate innovative ways in which the Voluntary House Raising and Voluntary Purchase Scheme could be implemented.
- A number of submissions and drop in session attendees were concerned about the method by which houses would be valued: the following information will be provided

in the Wagga Wagga Revised Murrumbidgee River FRMS (Final Report) for greater clarity.

The OEH Guideline for voluntary purchase sets out how a VP scheme should be undertaken and how properties should be valued. Valuations are to assume there are no flood related development constraints applied to the property. The aim of this is to allow those who take up voluntary purchase to buy a similar property in a location not subject to flood risk, acknowledging that flood risk and subsequent flood related constraints may have an impact on property value.

Excerpt from OEH guideline:

*“The council should obtain a valuation in accordance with the Valuer General requirements to provide a range that is considered fair and equitable in relation to market value. This provides a basis for determining the maximum value that is eligible for subsidy. The valuation should assume no VP scheme is in place, consider the requirements for minimum floor levels due to flooding, but disregard any flood-related development constraints that may apply on that land due to its flood hazard. The valuation should be undertaken by a registered land and house valuer.”* – NSW OEH Guideline for Voluntary Purchase

## **M.2.8. Submissions proposing alternative flood risk mitigation options**

### **M.2.8.1. Flood relief excavation works**

#### **Overview:**

A small number of submissions proposed alternate mitigation options to allow floodwaters to be diverted away from town or to drain more quickly.

#### **Submission Excerpts:**

*“One solution is open up Pomingalarna and let the water flow - if it affects other towns - protect them as well”* – ID71

*“Consider constructing a flood relief channel from Eunony Bridge to Malebo, including a weir at the borrow pit on the flats. Such a channel will reduce the pressure on levees by diverting flood waters before they reach Wagga.”* - ID103

#### **Response:**

- Option CM1 (9.3.5.1), CM2 (9.3.5.2) and BF1 (Section 9.3.4.2) assessed opening up Malebo Gap, the area around Gobbagombalin Bridge, and excavating a bypass floodway channel around the north of North Wagga, similar to the above suggestions.
- Each of these options involved significant excavation, which would involve substantial costs and adverse environmental impacts, and only had minor impacts on flood levels.



The sheer scale of the Murrumbidgee floodplain in Wagga Wagga means that options that seek to contain or redirect flows are largely ineffective.

- The options mentioned in the above quoted submissions will not be assessed in the Wagga Wagga Revised Murrumbidgee River FRMS&P Final Report, as the impact on flood levels and other issues are considered to be comparable to the three options already assessed.

### M.2.8.2. Alternate Road Upgrade Options

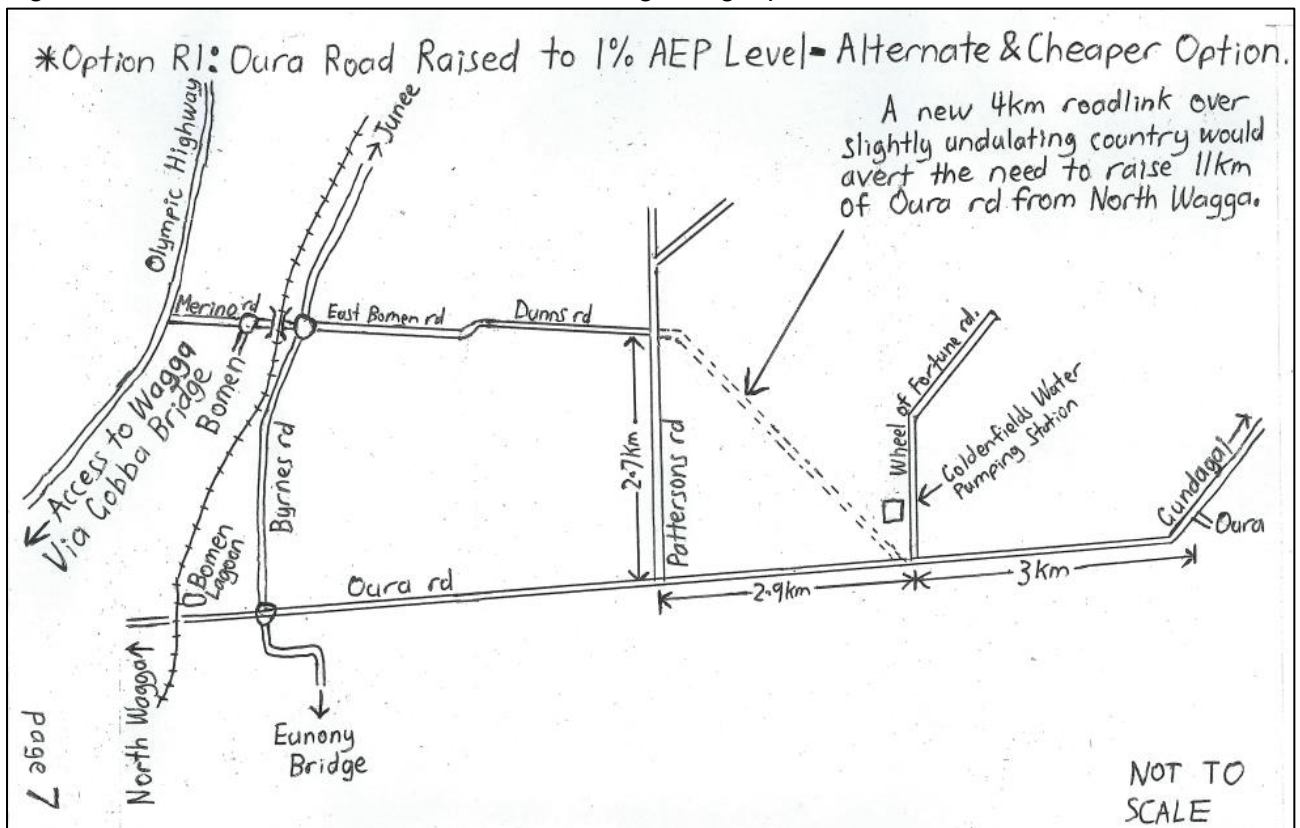
#### Overview:

A small number submissions (as well as two drop-in session attendees) suggested an alternate route to provide flood free access between Wagga Wagga CBD and Oura (Recommendation R1), and identified a potential opportunity for the implementation of Recommendation R2 (Upgrading the Sturt Highway).

#### Submission Excerpt:

*“A new 4km roadlink over slightly undulating country would avert the need to raise 11 km of Oura Road from North Wagga” – ID109 [See accompanying sketch in Figure 1]*

Figure 1 Sketch included in Submission ID109 regarding Option R1



*“FRMS recommendation R2 is to assist those in and around Gumly during a flood event but it indirectly supports the benefits of an east-west access through the region such the alternate southern route proposed by Committee 4 Wagga and adopted in the WWCC Integrated Transport Strategy. [We are] of the view that a recommendation such as R2 could be linked to the C4W Southern Alternate Route strategic priority.” – ID136*

**Response:**

- The intent of Option R1 is to provide flood free access between the CBD and Oura in the 1% AEP event, with the initial proposed option being to raise Oura Road.
- The report acknowledges the difficulty and cost associated with raising a road through a floodplain, especially because of the flood impacts it would cause and the significant use of culverts or bridge sections required to ameliorate these impacts.
- Alternate routes for Option R1 will be considered and included in the Wagga Wagga Revised Murrumbidgee River FRMS&P Final Report. A route outside of the floodplain would be preferable as it would not cause flood impacts. The above sketch is noted, and another alternate route suggested at the Oura Drop In session will also be noted in the Wagga Wagga Revised Murrumbidgee River FRMS&P Final Report. It is noted that the route provided in the above sketch would be flood affected along Oura Road between Wheel of Fortune Road and Barney Street in events greater than a 5 year ARI.
- There may be difficulties in acquiring the roads (if not already Council roads), and costs involved in construction/ upgrade for trafficability, however the option may still be preferable to raising the entirety of Oura Road between Hampden Avenue and Oura.
- With regard to Option R2 – The FRMS expresses the intent of Option R2 to provide improved access to residents in and around Gumly Gumly. Assessment of linking this route to other transport objectives is beyond the scope of the report, however the recommendation will be updated to reflect that analysis of such opportunities in the future would be prudent.

### **M.2.8.3. Alternate Levee Option**

#### **Overview:**

One submission suggested a levee alignment that had not been examined in the Wagga Wagga Revised Murrumbidgee River FRMS&P Public Exhibition Draft Report.

#### **Submission Excerpt:**

*“Last year I submitted a proposal to council regarding building a levee starting at Forest Hill and following the river where best to Eunony Bridge. Another levee would commence on the other side of Eunony Bridge and skirt around behind North Wagga. The purpose of these levees is in a 5% AEP flood event to redirect all water except in the main river channel downstream of the bridge, thus causing only low level flooding.” – ID93*

#### **Response:**

WMAwater have mapped this proposed levee alignment from the above description. It works out to be approximately 20 km in length, and would act to channelise the Murrumbidgee River. A levee in this alignment would have significant, unacceptable flood impacts and adverse environmental impacts as a result of restricting flows in small events that feed key ecosystems. In some areas the levee would need to be several metres high to contain even the 5% AEP event. Compared to the Main City Levee upgrade, with a length of just under 10 km, this levee alignment would attract significant costs related to planning and construction, and difficulties acquiring the appropriate easements and approvals. For these reasons this suggested levee option will not be considered within the Wagga Wagga Revised Murrumbidgee River FRMS&P Final Report.

## M.3. Other Issues

### M.3.1. Clarification of basis of Risk to Life scores

#### Overview:

The “risk to life” scores given to various options is based on a range of criteria, however it appeared many submissions interpreted the “risk to life” score as being based solely on “non-compliance to evacuate”, especially in relation to the North Wagga Levee Options.

#### Submission Excerpts:

*“The ratings given are emotional ones not based on scientific facts, or even financial equations but on a perceived attitude of residents of North Wagga. For example; If the levee was increased to maintain it’s 1 in 20 year flood status it is said that North Wagga residents would not evacuate. However, in 2012, just 2 years after a false alarm and 40 years of not having been inundated when we all thought we had a 1 in 20 levee bank, 97% of us evacuated. The idea that we wouldn’t evacuate is assumed and not taken from interviews or even reflection of past events.” – ID14*

*“There is consistent reference to increased resident complacency. I do not see this consistent statement evidenced and yet it is repeated often. It is an assertion. Would the plan not benefit from placing more emphasis on the benefits of education and community engagement.” – ID18*

*“I think this plan would do well to place more emphasis on the importance of timely flood information and evacuation orders and less emphasis on the subjective assessment of how Nth Wagga residents may behave. NO where in the plan is there a consideration of how increased technology may contribute to improved evacuation procedures.” – ID18*

*“There were actually no people within that levee system during the flood that the SES weren’t aware of. If the SES were to determine that in future they wish to enforce 100% compliance with their evacuation orders in North Wagga, they would be able to do so with assistance from the police. Legal advice provided by the ‘Emergency Law’ website notes that the State Emergency and Rescue Management Act 1981 (NSW) empowers police to enforce an evacuation order using reasonable force.” – ID25*

#### Response:

- Risk to life is a factor against which flood risk mitigation options are assessed, and relates generally to safety of people. Aspects that may impact the risk to life score include:
  - Proximity to highly hazardous flooding (great depths or significant velocity);
  - Evacuation time and constraints;
  - Ability to self-evacuate over the full range of flood events (i.e. road access);
  - Community behaviour;

- Vulnerability of the occupants;
  - Population; and
  - Period of isolation (and associated health and social risks).
- Positive scores indicate that the proposed option will improve these aspects, and vice versa for negative scores.
- The most significant factor for North Wagga is the isolation which is exacerbated by any levee upgrade, particularly as there would be greater depths surrounding the area;
- The report includes a discussion regarding the generally good response rate to evacuation orders in the past but highlights that a levee upgrade may increase complacency. These aspects among others contribute to the risk to life score.
- A number of submissions have connected the very negative risk to life score (for various North Wagga levee upgrade options) with this potential complacency, concluding that the score is not valid as there has been good response rates in the past. The previous good response rate has been taken into consideration, but other factors remain (as listed above).
- While improvements in flood warning technology may increase the available evacuation time, the highly hazardous flood conditions, and potential for isolation remain. It is noted that Recommendation RE1 includes various measures to continue and improve on Wagga Wagga's existing flood warning systems, including the investigation of installing a 'DipStik' or equivalent technology at Oura to provide water level alerts directly to WWCC and the SES.
- With regard to enforcing an evacuation, while it may be legally possible, the organisation and management of an enforced evacuation imposes further demand on SES and police, whose resources are likely to already be stretched during a flood event.
- The SES have been approached for comment regarding the multicriteria matrix assessment for all assessed options.
- Action: To provide greater detail on the quantification of 'Risk to Life' scores, a table will be added to the Section 10 of the Wagga Wagga Revised Murrumbidgee River FRMS&P Final Report, scoring each individual factor as listed above. Overall risk to life scores will also be adjusted in consideration of the submissions received and feedback from the SES.

### **M.3.2. Difference in approach: Main City vs North Wagga**

#### **Overview:**

Many submissions assert that North Wagga is entitled to the same protection as the CBD/ Central Wagga. The difference in approach to floodplain risk management in these two areas needs more clarification and justification in the Wagga Wagga Revised Murrumbidgee River FRMS&P Final Report.

**Submission Excerpts:**

*“Why are the Homes and Businesses in the CBD (floodplain) protected species and North Wagga Homes and Businesses (Rate payers as well) left stranded with less protection (infrastructure)?” – ID61*

*“I find the report to be lacking in respect for the people it is discussing protection for, as for a community on a flood plain we are as equal to any other part of Wagga Wagga and are rate payers just the same. We should and will be given the same human rights as any other people who are protected by the main city levee upgrade. You cannot put a price on human life so to give the most protection to that life by government is priority.” – ID92*

*“My submission is to see the North Wagga levee upgraded to a 1 in 100 year flood protection, as I cannot see why one side of the city is any different to the other, people, livelihoods, businesses and infrastructure.” – ID62*

*“There is a comment in the report that North Wagga should not be considered in regard to equity as the CBD is the business centre I would think it is pertinent to note that North Wagga is home to approximately 600 people and North Wagga is also home to a school, pre-school, numerous small businesses and home businesses.” – ID92*

*“Upgraded levee protection is the only means to equity for the North Wagga community...” – ID51*

**Response:**

There are a number of non-flood related aspects that differentiate North Wagga and other areas on the Wagga Wagga floodplain from the CBD, including the location of the financial centre and key facilities, different residential rate sub-categories (i.e. ‘City & Suburbs’ and ‘Villages’), population, property values. Specifically, from a flooding perspective, North Wagga is not the same as the CBD. North Wagga is located within a floodway which is a highly hazardous location, and where obstructions will impact on other area. Access to and from North Wagga becomes restricted during relatively frequent events, placing significant pressure on stretched resources during a flood event. In the CBD, access to high ground is never cut (acknowledging that there are capacity restrictions), and the CBD is not in a floodway.

Due to these factors, flood risk management must be approached differently. The proposed option PR1: Voluntary House Raising and Voluntary Purchase, seeks to provide residents of North Wagga (and the entire Wagga Wagga floodplain) with the same level of protection as the CBD, that is, to the 1% AEP level. However, offering the same level of protection via a levee upgrade was found to not be viable, as it impacts on residents in the floodplain, and increases the isolation of residents inside North Wagga, among other reasons discussed in Section 9.3.3.1 – 9.3.3.3 in the Wagga Wagga Revised Murrumbidgee River FRMS&P (Public Exhibition Draft).

### M.3.3. Level of Protection of the North Wagga Levee

#### Overview:

A number of submissions referred to apparent reduction in the level of protection of the North Wagga Levee. Further clarification is required regarding the evolution of the understanding of the level of protection offered by the current North Wagga Levee.

#### Submission Excerpts:

*“Between the years of 1990 (completion of levee) and 2012 (new flood modelling) council has promoted the North Wagga levee as offering 1 in 20 year protection ... This fact is noted on numerous websites, printed into documents and commemorated on plaques.” – ID92 and ID51*

*“The WWCC have clouded the true levee heights of North Wagga for years, my family moved here in 1990 with knowledge that the levee was 1-20 which is now revealed as lucky to be 1-8 if not even less.” – ID130*

#### Response:

Level of protection is the level to which the levee is “guaranteed” to protect, it is typically the crest level minus an appropriate amount of freeboard. That level is then equated to a flood level of a particular frequency.

The original design intent was to provide a level of protection to North Wagga which equated to approximately a 20 y ARI. Over time it has become apparent that the height of the levee does not meet this criteria. More recently a change to the understanding of what the 20 y ARI flood level is, as well as changes to appropriate freeboard requirements have meant that the actual “guaranteed” level of protection is below a 20 y ARI. The following discussion provides more detail on each of these factors.

There has been a temporary levee of some description around North Wagga since as early as the 1930's. In 1990 the levee was formalised to provide protection up to 9.9m with between 0.15 and 0.3m freeboard. At the time this was between 0.5m and 1m below the 1974 flood level and equated to approximately a 20 y ARI level of protection. It was acknowledged in the 2009 FRMS (pg 34) that some sections of the levee are lower than this and would require sandbagging during flood events. It is also worth noting that the 2009 FRMS (pg 34) suggests that the 0.3m freeboard is unlikely to be suitable for ensuring a 20 y ARI level of protection.

In 2010, a major upgrade of the modelling tool was undertaken with the conversion to a 2D hydraulic model. This allowed for detailed localised assessment and mapping of flood behaviour across the full model domain as opposed to point information, that had previously been available. This report identified that the North Wagga levee would be overtopped in a 5% AEP (20 y ARI) event, that is, its level of protection was below a 20 y ARI.

Following the events in 2010 and 2012, it was apparent that far less flow was required to achieve a similar peak level to previous events. For example, the peak flood levels of 1974 and 2012 are comparable but the 2012 event was gauged at approximately 3,600 m<sup>3</sup>/s (311 GL/day) at Wagga compared to the 5,200 m<sup>3</sup>/s (450 GL/day) estimated for the 1974 flood. A detailed investigation was undertaken as part of the 2014 report which concluded that a number of factors had contributed to a reduction in the conveyance of the channel. These factors include riparian vegetation, debris, and a change in channel shape. The outcome was a shift in the established relationship between height and flow. The 5% AEP flood level at Hampden Bridge shifted from 9.9m to 10.1m, with a larger increase on the floodplain near North Wagga of up to 0.3m. The diagram below from the 2014 report compares the 2010 5% AEP flood level and the 2014 5% AEP flood level with the North Wagga levee crest height.

Finally, current best practice for determining appropriate levee freeboard requires consideration of a range of factors including wave action, water surge, flood level uncertainties, settlement, defects and climate change. This assessment was undertaken by Public Works in November 2010, and determined the appropriate freeboard for the North Wagga levee to be 0.75m (as opposed to 0.3m which had been assumed previously).

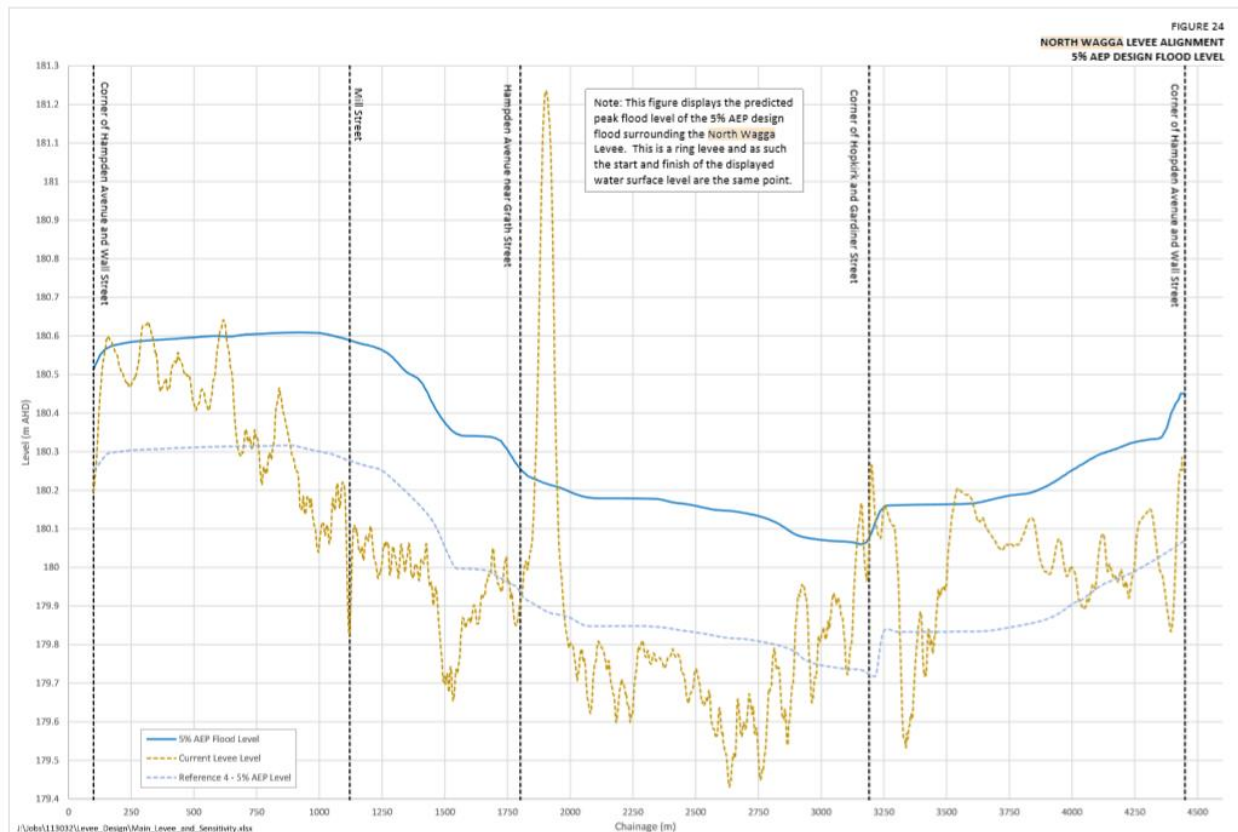
These factors place the current level of protection at approximately an 8 y ARI (12% AEP).

The main city levee upgrade does not alter the current level of protection of the North Wagga levee.

Figure 2 North Wagga Levee Alignment and 5% AEP Design Flood Level (from Wagga



## Wagga Detailed Flood Model Revision, 2014)



### M.3.4. Perception of Council's view towards North Wagga

#### Overview:

A number of submissions expressed the perception that Wagga Wagga City Council is not concerned with providing flood protection to the North Wagga community.

#### Submission Excerpts:

*"To me it looks like Council wish to be rid of North Wagga as a village and be left with a parcel of land that can be re zoned to suit their own needs." -ID33*

*"We feel that council in general displays very little if any enthusiasm in pursuing equal protection for North Wagga. It certainly appears that current council is satisfied that the residents of North Wagga be the sacrificial lamb on this matter" – ID4*

*"The report has only gone off what WWCC would like to see happen which is nothing." – ID92*

#### Response:

- The nature of these submissions is disheartening to Wagga Wagga City Council, as it has, through this FRMS process, assessed 8 different levee options specifically to reduce flood risk in North Wagga, as well as several options designed to reduce flood risk across the broader floodplain (including North Wagga).

- During the public exhibition period, the report authors and council representatives offered nine information sessions (including one at the North Wagga Hall) specifically to discuss the recommended options with North Wagga residents.
- It is considered likely that the above submissions refer to disappointment that a 1% AEP levee was not recommended for North Wagga (refer to Section M.3.2).
- A major outcome of this Floodplain Risk Management Study however is the recommendation that an upgrade of the North Wagga levee to the 5% AEP level of protection be investigated further. The other important recommendation for North Wagga residents is Option PR1, which aims to give residents the opportunity to raise their homes above the Flood Planning Level (1% AEP level + 0.5 m). While there are a number of complexities to be worked through, this option intends to see North Wagga residents and residents in the floodplain receive the same level of protection for their properties as residents inside the Main City Levee.

### **M.3.5. Development Inside Leveed Areas**

#### **Overview:**

Submissions expressed both support and opposition to intensification of development inside leveed areas, specifically North Wagga.

#### **Submission Excerpts:**

*“Retain North Wagga classification as a village. Do not allow any further light industry development within the village. East Wagga is the Industrial area.” – ID103*

*“I suggest council takes a long term view. Increase our levee, save a lot of money in the future (how much did repairing all those roads cost???) and allow raised houses to be built in the vacant lots of North Wagga. More rates for you, increased home value for us.” - ID14*

*“We could make North Wagga the greatest tourist attraction with all the heritage value [we] have here as North Wagga was built a long time before Wagga Wagga.” - ID102*

#### **Response:**

- There is a general principle that flood mitigation options are intended to protect the current community, not to allow the opportunity for intensified development, especially in high risk locations. In cases where increased development is a desired outcome, often developers are required to contribute financially to the infrastructure (e.g. levee) that would allow their land to be developable, for example via Section 94 contributions.
- Clause 7.1 in the Wagga Wagga LEP2010 contains a control that limits the number of dwellings that can be built in North Wagga. Building a levee around the remaining properties is not intended to allow removal of this control.
- It is also noted that a number of residents (including several who attended drop in sessions at the shopping centres) expressed a desire to see the ‘village feel’ of North Wagga be maintained.

### **M.3.6. Comparison of North Wagga to Lismore**

#### **Overview:**

A small number of submissions received from North Wagga residents objected to the flood risk in their community being likened to that of Lismore.

#### **Submission Excerpts:**

*“The situation of Wagga Wagga has been incorrectly likened to that of Lismore. The geographical position of Wagga Wagga and consequential capacity of the SES to forecast major flooding means that evacuations from North Wagga can be conducted well before a flood poses a real threat to life. This was demonstrated in both 2010 and 2012.” – ID104*

*“Irrelevant and offensive pictures of elderly and disabled people in Lismore being removed from floodwaters in Lismore I find these pictures misleading and request they be removed from the North Wagga section (p110) as the North Wagga flood situation and population demographics are not comparable to Lismore.” – ID48*

*“I would strongly recommend that the photos from Lismore be removed as they are in no way reflective of the unique people of North Wagga.” – ID51*

#### **Response**

In its discussion of the flood risk characteristics in North Wagga (Section 9.3.3) the Revised Wagga Wagga Murrumbidgee River Floodplain Risk Management Study (Public Exhibition Draft) stated that *‘any community with elderly residents is vulnerable to evacuation difficulties, as can be seen in Lismore during the flood in March 2017’* (p110). The report does not directly compare North Wagga to Lismore, but simply identifies that there may be elderly residents that are likely to require assistance during an evacuation. Inclusion of the two photographs of residents being given assistance was intended to help readers visualise the types of difficulties that can occur during evacuation.

While North Wagga and Lismore do share some common flood risk characteristics, the report does not go into a comparison of the two areas. The report also, in several sections, acknowledges the excellent rate of evacuation during 2010 and 2012 by the North Wagga community. No direct comparison, or indeed, offence was intended in this section of the report.

Having said that, it is important to acknowledge that lessons can be learnt from floods faced by other communities, such as Lismore in 2017 or Nyngan in 1990. Given the importance of protecting lives, we feel it is beneficial for readers to be aware of the evacuation difficulties that can occur during floods, as were seen in Lismore in 2017. Furthermore, other references to Lismore (Paragraph 3 pg 131, Paragraph 3 pg 199) that identify concerns relating to ring levees, are considered relevant and will remain in the Wagga Wagga Revised Murrumbidgee River FRMS&P Final report.

### **M.3.7. Flood Insurance**

#### **Overview:**

A number of submissions referred to the potential reduction in insurance premiums if a levee were to be constructed (especially for North Wagga).

#### **Submission Excerpts:**

*“If we (North Wagga) had a Levee that protects us from floods we had in 2012 then our house insurance might or will drop heaps.” – ID43*

#### **Response:**

The below is taken from *Local Government and Insurance: Flood Insurance Pricing*, published by the Floodplain Management Association with the Insurance Council of Australia (available from [http://www.floods.org.au/client\\_images/1787680.pdf](http://www.floods.org.au/client_images/1787680.pdf)):

*“Most local governments only apply planning controls in areas identified as 1 in 100 year flood zones (i.e. a 1% chance of flooding per year). Flood insurance covers ALL flood events, including much larger (or less-likely) floods than the 1 in 100 year event.”*

If North Wagga had a levee with a 1% AEP level of protection (1 in 100 year), the community would still be subject to flood risk in rarer events (and more frequent events in the case of levee failure). Given that insurers tend to base flood insurance premiums on events greater (rarer) than the 1% AEP event, construction of such a levee upgrade is not guaranteed to reduce the cost of flood insurance for residents.

Additionally, it should be noted that the 2012 event is approximately equivalent to a 1 in 35 year ARI event (2.8% AEP – larger than a 5% AEP event).

### **M.3.8. Dam Management**

#### **Overview:**

Two submissions referred to using major dams on the Murrumbidgee system for flood mitigation purposes.

#### **Submission Excerpts:**

*“Councils in the Murrumbidgee catchment area need to put much more pressure on NSW Water to better manage the level of water in the dams - especially when they are filled to capacity in the storm seasons. There needs to be more air-space left in the dams and more controlled releases to prevent flooding in towns and cities downstream.”- ID26*

*“Build more water storages - dams - weirs and lakes - which would help the [flooding] problem” – ID71*

**Response:**

As described in Section 9.5.3 of the Wagga Wagga Revised Murrumbidgee River FRMS&P Public Exhibition Draft Report, the primary purpose of dams upstream of Wagga, including Blowering, Burrinjuck and Tantangara in the Snowy Mountains, is to store water for water supply (to towns and irrigators), and flood mitigation is only sometimes possible. Flood mitigation dams require airspace to be maintained, and this is at odds with the operational procedures required to store water. If flood-producing rainfall occurs when one of the dams is full, it will pass the full flow to the downstream area, and not reduce the flood peak. The variability of possible flood-producing rainfall events and the very large catchment area mean there is little certainty about what effect the dams will have in future flood events, particularly with the primary purpose of water storage remaining.

It is also noted that rainfall that occurs downstream of the dams cannot be captured by dams, and that given the catchment size, this could contribute significant runoff to the Murrumbidgee River and flooding at Wagga Wagga.

**M.3.9. Sediment Control****Overview:**

One submission raised concern about Council's management of soil erosion and sediment control, and the impact that sediment transport in water courses may have on flood behaviour.

**Submission Excerpt:**

*"I do not believe Council have undertaken their responsibility in planning to be given the control of the floodplains, nor has WMA Water taken into account the sediments infilling the water courses which contribute to flooding" – ID137*

**Response:**

- The purpose of flood modelling in the Floodplain Risk Management process is to help understand 'the big picture' of flooding in the Wagga Wagga study area.
- The resolution of the model is therefore too coarse (based on an 20 m model cell size) to represent the finer detail of how sediment from construction sites or earthworks projects may affect flood behaviour.
- Large scale sedimentation was considered in the Wagga Wagga Detailed Flood Model Revision (2014).
- Furthermore, the 1% AEP flood (1 in 100 year ARI event) is of such a significant scale in the Murrumbidgee at Wagga Wagga, that the influence of localised sedimentation is negligible.
- Topographic survey and bathymetry is used to represent the terrain through which water flows, however as discussed in Section 2.3 above, a decision is made about the 'point in time' for which flood conditions are represented by the flood model.
- Wagga Wagga City Council do however acknowledge the importance of correct soil erosion management and will endeavour to uphold approved practices as set out in their Standard Operating Procedures (SOPs) for relevant projects.

### M.3.10. Vegetation Management

#### Overview:

A small number of submissions referenced Recommendation VMP: to update the recently completed Vegetation Management Plan (VMP) to consider new state biodiversity legislation instruments, then draft Standard Operation Procedures for selected recommended activities (arising from the updated VMP).

#### Submission Excerpts:

*“We also believe that better management of vegetation on the floodplain would allow floodwater to get away faster.” – ID03*

*“Clear the regrowth in Parken Pregan lagoon.” – ID103*

*“I do not support the thinning of native vegetation or any works that would involve disturbing native vegetation on the Wilks parkland as it provides an important habitat area for our native fauna and slows floodwaters.” – ID48*

#### Response:

- A number of vegetation management activities have been identified as suitable for the Murrumbidgee River riparian areas through Wagga Wagga, and are detailed in Appendix H and summarised in Section 9.4 of the Wagga Wagga Revised Murrumbidgee River FRMS&P.
- The activities include:
  - Targeted Willow Treatment
  - Treatment of Weeds in Riparian Areas
  - Reduction in Debris
  - Reduction in Shrub and Canopy Regeneration Layer Density
- The activities do not include broad-scale clearing of vegetated riparian areas.
- While the vegetation management activities do not significantly improve existing flood behaviour, if left unchecked it is expected that exotic species are likely to increase in density and thereby increase roughness and hence potentially worsen flood behaviour.
- Further to the prevention of increased roughness, the VMP notes the ecological value of reducing the density of exotics and removing weeds.
- To progress the Vegetation Management Plan, it is recommended that the VMP is updated as new legislative instruments become available, and to then draft Standard Operating Procedures to detail the methods by which the recommended activities are to be safely undertaken in accordance with the requirements of legislation.

### **M.3.11. Issues not related to this study**

**Overview:**

One submission raised concern about a particular location that will be looked at in the Major Overland Flow Floodplain Risk Management Study

**Submission Excerpt:**

*“STORMWATER INUNDATION: Cnr Hardy Avenue & Cullen Road. Is the Glenfield Drain being updated in the current plan?” (ID17)*

**Response:**

The current study relates only to mainstream flooding from the Murrumbidgee River, whereas the corner of Hardy Avenue and Cullen Road is located within the Major Overland Flow study area. Council is currently undertaking its Major Overland Flow Floodplain Risk Management Study and Plan. Within this study, the Glenfield Drain is the subject of a number of mitigation options to be investigated.

## M.4. Specific Responses to Submissions

Table 1 Editions to the Wagga Wagga Revised Murrumbidgee River FRMS&P (Final Report) based on feedback received during Public Exhibition

Item	Submission ID	Topic/Relevant Text from Submission	Response	Section in Final Report
1	NA	Overview of Public Exhibition period	Section 8.6 of the Final Report has been updated to include a summary of the public exhibition period, list of drop in sessions held and statistics on the submissions received. Submissions and Council responses are detailed in Appendix M.	8.6
2	NA	'Risk to Life' scores	A description of the factors that contribute to the 'Risk to Life' scores has been added in Note 4, Section 10.1. A table breaking down the contributing factors of the 'Risk to Life' scores has been added to Section 10 (Table 101). Any resulting changes to the overall score (based on feedback from submissions and the SES) have been updated in the relevant parts of Section 9.	10, 9 (Various)
3	Various	Clarification of the different approaches in flood risk management between various floodplain locations (including North Wagga and the Main City).	A number of characteristics differentiate the various floodplain communities in Wagga Wagga, and they necessarily require different approaches to floodplain risk management. Clarification regarding this matter, specifically the difference in approach between North Wagga and the CBD will be included in Section 9.3.3	9.3.3
4	NA	Clarification of purpose of PL1	For clarity, the wording of PL1 has been amended to the following in the Wagga Wagga Revised Murrumbidgee River FRMS Final Report: <i>"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 Wagga Wagga LEP."</i>	9.7.2.1, Various
5	Various	Clarification of Voluntary House Raising and Voluntary Purchase Scheme	Greater clarification has been added to Section 9.6.1 to ensure residents are aware the scheme would be voluntary, and that no one will be forced to raise their home against their will. Comprehensive community consultation would also be a required part of the recommended feasibility study.	9.6.1
6	NA	Clarification of house valuation for Voluntary Purchase	For clarity, the following description will be added to Section 9.6.1: <i>"The council should obtain a valuation in accordance with the Valuer General requirements to provide a range that is considered fair and equitable in relation to market value. This provides a basis for determining the maximum value that is eligible for subsidy. The valuation should assume no VP scheme is in place, consider the requirements for minimum floor levels due to flooding, but disregard any flood-related development constraints that may apply on that land due to its flood hazard. The valuation should be undertaken by a registered land and house valuer."</i> – NSW OEH Guideline for Voluntary Purchase	9.6.1



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7	Various	Clarification of the Level of Protection of the North Wagga Levee	The understanding of the level of protection afforded by the North Wagga levee has evolved since its construction. Substantial text (as per Appendix M Section M3.3) will be added to Section 5.9.1.2 to describe how this understanding has changed over time, and what the resulting level of protection is understood to be.	5.9.1.2
8	NA	Alternate Road Upgrade Routes	Option R1 and R2 will be amended to reference the potential for alternate routes to be utilised to achieve the intended outcomes.	9.3.1.2 9.3.2.2

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9		Changes to cost estimates: see specifics below	<p>The cost estimates for flood mitigation options have been amended based on feedback from the Public Exhibition period. The Cost/Benefit analysis has been updated accordingly, and it is noted that the resulting BC ratios do not change materially.</p> <p>The cost estimates are intended to be high level estimates only to produce a ball park figure that can be used in the preliminary cost/benefit assessment. It is noted that not all aspects have been considered in these estimates, but that the overall figure is in keeping with similar industry project values when compared on a per metre basis. Cost estimates for options recommended in the Floodplain Risk Management Plan require refinement in subsequent feasibility studies/detailed design stages.</p> <p>Key items to note:</p> <ul style="list-style-type: none"> <li>• Modelled levee options L1 (Oura), L2 (Gumly Gumly) and L3 (North Wagga) were designed to exclude floodwaters in the 1% AEP event, and hence have been designed with the length and height appropriate to achieve this outcome;</li> <li>• The 1% AEP event is approximately 0.7 m higher than the 2012 event (at the Hampden Bridge Gauge).</li> <li>• Note that in the 1% AEP event, flood depths in Oura (on Wagga St) vary between 1.3 m - 1.6 m, and 2.5 m - 3.5 m in the paddocks between the road and the river.</li> <li>• In Gumly Gumly, depths outside the proposed levee alignment reach up to 3.5 m in the 1% AEP event.</li> <li>• A 20% contingency has been added to the estimated totals to account for unlisted items, uncertainty in volumes and rates, and the potential changes to rates between the time of writing and construction date due to inflation or changes in the market.</li> <li>• Project management and construction management rates have been adjusted and consolidated into the 'Fixed Costs' line items for each option.</li> <li>• It is considered that project management of a North Wagga levee construction would incur greater costs than say, Gumly Gumly or Oura, due to the greater degree of difficulty in acquiring easements for footprint expansion, longer levee length and proximity to residents.</li> </ul>	Appendix F Section 9 (various)

Item	Submission ID	Topic/Relevant Text from Submission	Response	Section in Final Report
10	15	The estimated costs of providing a levee around North Wagga are, as I understand it, somewhere around \$14 million. There is talk among local residents that a Wagga based firm has suggested a cost of around \$3 million to complete a levee using materials reclaimed from other areas at little to no cost.	<p>The \$14M figure referred to the cost for Option L3B: to raise the North Wagga levee to provide protection in the 1% AEP event AND upgrade Hampden Avenue to the equivalent level between North Wagga and Wiradjuri Bridge.</p> <p>This involves a 5.3 km levee, which will be an extra 2 m high for much of its length, and 530 m of Hampden Avenue (also raised by 2 m, plus road surfacing and necessary works to the Parken Prgan lagoon bridge to raise it to the same level.</p> <p>Given the extent of works, a cost of \$3 M is not considered realistic. No change has been made to the report.</p>	NA
11	18	Table 29 preamble states that Nth Wagga is the largest contributor of AAD at 41%. This is contradicted in the table itself that states Nth Wagga at 40% and the CBD at 41%. A small difference but an error nonetheless.	These figures have been checked and amended, and figures presented to 1 decimal place for greater clarity than rounded figures.	7.1.3.1
12	48	Table 73 under Option L5 does not consider removing North Wagga levees as an increase risk to loss of life which it clearly is I find this extremely disrespectful of North Wagga residents as our lives need to be considered equally in all options I would like to think this is an accidental oversight but Table 77 Option L6 (Opening up the North Wagga ring levee) does not consider loss of our lifes as a risk factor either.	<p>Table 73 notes that the risk to life score for Option L5 is -2. Table 77 notes that the risk to life score for Option L6 is -2.</p> <p>These scores acknowledge that the removal of North Wagga levee (Option L5) or the opening of the North Wagga Levee (L6) would have worse outcomes in terms of risk to human life.</p> <p>The scores have been confirmed in the detailed risk to life assessment that has been added to Section 10.</p> <p>Note that 'Community Acceptance' scores were reported as zero across every option, as they were intended to be allocated following the Public Exhibition period. These scores have been updated based on the feedback received via submissions and in drop in sessions. Following minor negative responses, L5 scored -2 for community acceptance, and L6 was scored -1.</p>	NA

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13	48	<p>Under Option L4(A) when results of a 1 in 20 year levee (5%AEP) were being reported there were also results of a 1 in 100 year event (1%AEP) and results of a 1 in 200 year event (.5%AEP)</p> <p>Eg: "In the .5% AEP event 13 properties in the CBD would be flooded..." p124 firstly 13 out of 2418 is statistically insignificant and secondly it is incorrect as the CBD has a 1 in 100 year levee protection so a 1 in 200 year flood event would flood the whole CBD, most of Wagga including North Wagga and it will have nothing to do with North Wagga's 1 in 20 year levee.</p>	<p>The purpose of reporting on results like this is to highlight that a 5% AEP levee around North Wagga would have an impact on flood behaviour in larger (rarer) events.</p> <p>P124 of the report states: "In the 0.5% AEP event 13 properties in the CBD would be flooded above floor (previously only flooded above floor in events greater than or equal to the 0.2% AEP)."</p> <p>This statement is included to demonstrate that a 5% AEP levee around North Wagga changes flood behaviour in greater events, as it acts as an obstruction in the floodway. 13 houses in the CBD that would normally be flooded above floor level in a 500 year ARI event (0.2% AEP event), would, if Option L4A were built, now be flooded <u>above floor</u> in a smaller (more frequent) event.</p> <p>While 13 out of 2184 (looking at the Total Properties Affected over floor column in Table 57) is a small percentage, one of the principles of floodplain management is to reduce flood risk for the broader community without directly disadvantaging others. An increase in the frequency of over floor inundation is considered a direct adverse impact.</p>	NA
14	136	<p>FRMS Table 21 on page 56 states that the CBD levee upgrade is estimated to be completed by 2022. C4W has championed the timely CBD levee upgrade for many years. WWCC have committed to the entire CBD upgrade being complete by the end of 2018 (evidenced by Image 1).</p>	<p>The following work plan is noted:</p> <p><a href="http://www.wagga.nsw.gov.au/city-of-wagga-wagga/business/projects/current-projects/levee-upgrade">http://www.wagga.nsw.gov.au/city-of-wagga-wagga/business/projects/current-projects/levee-upgrade</a></p> <p>Stage 1 of the levee upgrade is due to be completed in April 2018. Stage 2 of the levee upgrade is due to be commenced in April 2018. Stage 2 is due to be completed by the end of 2018. This has been noted in the report.</p>	Table 21

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15	135	Even if they were given the same weighting, it is ridiculous that both L3A and L4A are both given +3 for economic merits (when clearly L3A is superior economically) yet both are given -6 for impact on SES. The score of -6 is the strongest score allocated to for any criteria, and no rational justification is provided, yet this has an overwhelming effect on the final number.	<p>Greater clarification of the economic merit scores has been added to Section 10.1. Economic Merit scores were based on the cost-benefit ratios. While L3A would have a greater “benefit”, i.e reduction in Annual Average Damages compared to Option L4A, its far greater cost means it has a comparable BC ratio to Option L4A. Due to the limitations of the -3 to +3 scoring scale, the two options are given +3 as both have BC ratios greater than 1.6.</p> <p>The “impact on SES” scores recognise that the SES is not an infinite resource, and is generally already stretched during flood events on the Murrumbidgee. Options that necessitate greater SES involvement are given negative scores in the matrix. Options L3A and L4A both increase the protection of North Wagga, but do not include any upgrade to Hampden Avenue. As this key access road is overtopped much earlier than an upgraded levee, any delay to evacuation means that residents would be isolated inside the levee (which may become overtopped later). Evacuation after this point imposes a significant strain on SES resources as rescue via boat would be necessitated. The “Impact on SES” scores have been reassigned between -3 and +3 following feedback from the Public Exhibition submissions.</p>	Section 10.1 Table 100
16	61	The report simply states there is a ‘significant number’ of properties outside the North Wagga Levee that would be affected by a 1% AEP North Wagga Levee, but this number is not given (as far as I can see) so it is impossible to make a judgment on how significant the effect is.	For option L3A-C, the report states a ‘significant number’ of properties <i>inside</i> North Wagga would be protected up to the 1% AEP level. This number is quantified in the property affectation tables in each option. The reduction in Annual Average Damages per community precinct is also provided for each option, in the ‘Property Damages by Community’. These tables, along with the “red and green” diagrams (e.g. Diagram 9) assist in explaining where in the floodplain benefits and adverse impacts of options occur.	NA

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17	48	Another issue is that under Option L6 Opening North Wagga levee Diagram 15 shows that only 100 properties would be flooded more frequently in North Wagga And Option 5 Removal of Levee Diagram 14 shows 90 properties would be flooded more frequently. These figures do not add up when I know from personal flood experience in the 2012 event that all properties inside the levee bank were affected and this report states on p30 that approximately 190 homes were inundated when the water breached the levee, without the levee all North Wagga residents properties currently within the levee will be affected in all flood events modelled from 10% AEP thru to PMF externally or over floor depending on the height of the flood waters.	Diagram 14 and 15 indicate properties that, if the option were implemented, would be flooded in a <i>more frequent (or smaller)</i> event. These are properties that, for example, would normally be flooded in a 5% AEP event, but with the option implemented (i.e. levee removed or opened), would now be flooded in a 10% AEP event or smaller (more frequent). A brief explanation of how to interpret these diagrams is provided in Section 9.3	NA
18	48	The tables also uses percentages incorrectly (percentages should be represented from 0 to -100% where there is a fixed number of items and losses are being reported eg Properties Affected Table 70 shows -222.0% and again in table 74 which shows -236.6% these figures are mathematically impossible.	<p>The property affectation results tables (e.g. Table 74) use percentages to describe the percentage difference in the number of properties affected over floor level if that option were to be implemented. This example is taken from Option L6 (remove North Wagga Levee) to clarify:</p> <p>In the existing case, 41 properties are affected over floor in the 10% AEP event. If the option were implemented, 138 properties would be affected.</p> <p>That is, 97 additional properties are affected.</p> <p>The % difference is expressed as the difference (97) divided by the original amount (41), which is 2.366, or 236.6%.</p> <p>Percentage differences are included to provide context and a sense of scale to the absolute figures in the tables.</p>	NA

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19	60	The draft document has provided us with a better understanding of the considerations being undertaken in the decision process, but feel that the East St component of any likely upgrade has not been addressed, and we require further information in that regard.	The assessment of each of the 'North Wagga Levee upgrade options (L3A-C and L4A-C) all include the East Street component of the levee raised to the same level as the main North Wagga levee. The impact figures in Appendix E reflect the change in peak flood levels that occur if both levee components are upgraded, and the preliminary cost estimates (and hence cost benefit analysis) include both levee components.	9.3.3
20	38	A number of your plans show my entire property under water [address not printed for privacy]. In 2012, my buildings were above the river's flood levels, in fact no flood water from the river entered any part of my property.	<p>The flood model used in this Floodplain Risk Management Study was developed in the 2014 Wagga Wagga Detailed Flood Model Revision, and was calibrated to the 2012 event (see Figure 15, <a href="http://www.wagga.nsw.gov.au/_data/assets/pdf_file/0003/65406/Part_2.pdf">http://www.wagga.nsw.gov.au/_data/assets/pdf_file/0003/65406/Part_2.pdf</a>). This figure does not show the property in question as inundated.</p> <p>The 2012 event is estimated to be approximately a 1 in 35 year ARI (or 2.85% AEP event). The peak flood depth figures for more frequent (smaller events) do not show the property as flood affected, however the depth figure for rarer (or larger) events, such as the 2% AEP, 1% AEP and greater, do show the property as flood affected.</p> <p>The peak flood level impact maps provided in Appendix E show the impacts of options in the 5% AEP event and the 1% AEP event. The 1% AEP is approximately 0.7 m higher than the 2012 event (at the Hampden Bridge Gauge).</p> <p>It is also important to note that the flood model is based on recently acquired LiDAR data and other survey, using current industry best practice. It is designed to represent the 'big picture' and it may not accurately show smaller scale flood inundation consistent with community experience.</p>	NA