

Submission to Natural Resources Commission: Review of Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016

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To: Natural Resources Commission

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REVIEW OF *WATER SHARING PLAN FOR THE MURRUMBIDGEE REGULATED RIVER WATER SOURCE 2016* – SUBMISSION

Thank you for the opportunity to make this Submission to the Natural Resources Commission (“**the NRC**”). This Submission is made in response the NRC’s public call made on 11 May 2023 on its website for submissions on the *Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016* (“**the WSP for the M**”) “from members of the community and stakeholders.” The NRC advised that submissions close on 30 June 2023.

The structure of this Submission is as set out in the “**Contents**” page which follows.

Dictionary. Near the end of this Submission is my 23-page “Dictionary” of both the many terms that I use in this Submission, and the many other terms that I do not use in this Submission but which may serve as a useful record of their meanings in various water management contexts. Many of these terms are jargon and are used in documents and websites in relation to water management in NSW. I also record a “Note” at the start of the “Dictionary” as to the problems with jargon and their inconsistent meanings in the water management industry in NSW.

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PART 1 – EXECUTIVE SUMMARY

1.1 LIST OF MATTERS THE NRC SHOULD ADVISE AND RECOMMEND

1. In various places in this Submission, I use the phrase “**the NRC should advise and recommend**” to introduce each of my statements of those specific matters about which I ask the NRC to advise and recommend in the NRC undertaking a review and making a report under s 43A of the Water Management Act. To properly understand each of my statements of those specific matters:

(a) Each of my statements introduced by the phrase “**the NRC should advise and recommend**” must be read in the context in which my statement is made. The context will be not only the paras that lead up to my statement but also other parts of this Submission.

(b) In some cases, my statement in the list below of a specific matter is only a summary of a fuller expression of my statement of the specific matter which is to be found in the relevant para which is referenced.

(c) In some instances, my statements of those specific matters about which I ask the NRC to advise and recommend overlap in the sense that they deal with the same topic, one in general way and another in a more specific way. In all such instances, the NRC should advise and recommend the specific in priority to the general, and desirably should advise and recommend both the specific and the general.

2. Subject to paras (a) and (b) above, the following is the list of my statements of such specific matters and where in this Submission the details of the specific matter are primarily to be found:

1. The NRC should advise and recommend that the WSP for the M not be extended for a further 10 years after its due expiry date in 2026 but, instead, that the WSP for the M be replaced with a new management plan in order to address:

(a) the need to more clearly spell out the obligation on Water NSW to “undertake flood mitigation and management”; and

(b) the need to provide more balance in the WSP for the M by requiring Water NSW to have regard to the interests of the community. See **para 3**.

2. The NRC should advise and recommend that the WSP for the M must be amended to make it clear that Water NSW must operate the Burrinjuck Dam in such a way that avoiding *all* flood damage in the Area of Concern should be prioritised above non-essential irrigation and environmental water supplies. This should be subject only to dam safety. See **para 26(b)**.

3. The NRC should advise and recommend that the WSP for the M must be amended to make it clear that Water NSW must operate the Burrinjuck Dam in such a way that contributes no extra water to a forecast flood. See **para 26(c)**.

4. The NRC should advise and recommend that both the WSP for the M, and CARM (the decision support tool called “Computer Aided River Management”), must be altered to meet the following newly recognised circumstances, namely, that the risk of material damage from flooding arises within shorter time frames than ever before, and the intensity of the flooding and consequent level of damage caused is greater than before, which the CSIRO and BoM jointly advise arise from climate change. See **paras 31 and 30(c)**.

5. The NRC should advise and recommend that the function and duty of “flood mitigation” has to be raised to a statutory and clear obligation on Water NSW and within the WSP for the M, and given a higher priority. In addition to that overarching matter which the NRC should advise and recommend, the ways in which that overarching matter should be done, and in some cases the specific measures that might be taken, are set out in various places in this Submission. See **para 33**.

6. The NRC should advise and recommend that there should be a change to the “NSW Water Strategy” (released in August 2021) to make clear that Water NSW has a role and responsibility in relation to “flood management and response” with “flood mitigation” specially identified as a subset of “flood management”. See **para 69**.

7. The NRC should advise and recommend that, within the “NSW Water Strategy: Implementation Plan 2022 to 2024”, which involves the DPE, Water NSW, and some other NSW Government agencies, the role and responsibility of Water NSW in relation to flood should be elevated. See **para 71**.

8. The NRC should advise and recommend that the WSP for the M be remade with clauses that address, in a manner which binds Water NSW in a clear terms, each of the DPE’s Options, existing problems, and benefits of introducing the option, to which emphasis has been given by me in paras 74 (c), (e), (f), and (h) below. As to this:

(a) The DPE’s Options, existing problems, and benefits of introducing the option, are taken from the DPE document “Draft Regional Water Strategy: Murrumbidgee Long List of Options” (released in April 2022).

(b) In some cases, I have offered in various places in this Submission, the precise wording of clauses of the remade WSP for the M to give effect to those matters in paras 74 (c), (e), (f), and (h) below which would be appropriate for the NRC to advise and recommend.

(c) Only to the extent that I have not offered precise wording of clauses of the remade WSP for the M to give effect to those matters in paras 74 (c), (e), (f), and (h) below, the

NRC should advise and recommend that the wording be as formulated by Water NSW. See **para 75(a)**.

9. The NRC should advise and recommend the use of new climate datasets, to better inform future climate risks for extreme wet conditions and potential risk of increased flood probability in the future, and that the parameters of the CARM decision tools be modified accordingly. See **para 75(b)**.

10. The NRC should advise and recommend that a definition of “flood mitigation” be added to the *Water NSW Act 2014* (NSW). One possible wording might be:

“**flood mitigation** means reducing river levels downstream of the dam, which are or may become at flood level, by using planned and modelled airspace in the storage to temporarily store floodwater and only releasing that floodwater later when the downstream river levels have subsided to a safe level.” See **para 88**.

11. The NRC should advise and recommend that Water NSW modify its published set of 6 values to include the need to consider in every decision safety and possible damage to each community in which Water NSW operates. One possibility is to restate Water NSW’s first value as:

“**Think community and customer** – In every decision we make, consider safety first, and then consider both the effects on each community in which we operate and the benefit to our customers.” See **para 93(a)**.

12. The NRC should advise and recommend that Water NSW comply with its statutory obligation (and values) as referred to in para 93(c) below by setting out in each of its Annual Reports the specific provisions, or lack of them, in the WSP for the M, and relevant legislation, that Water NSW considers are factors that have affected the achievement of its objective of flood mitigation, and the nature of the changes that would cause Water NSW to be no longer affected in achieving its operational objective of flood mitigation. See **para 94**.

13. The NRC should advise and recommend changes to the WSP for the M, CARM and, if applicable, IQQM, arising from the relevant information about the matters in paras 102(a) to (f) below. In summary, this involves the NRC first asking Water NSW to provide to the NRC all relevant information sufficient to explain, in relation to the period from the start of September 2022 to the end of December 2022 and relevant to the lead up to the floods in the Area of Concern:

(a) how Water NSW perceived its function of flood mitigation under the WSP for the M; and

(b) how Water NSW interpreted relevant clauses of the WSO for the M, or the lack of them, and what were the constraints within the WSP for the M that Water NSW felt

limited its capacity to do more, in a time-critical manner, in relation to flood mitigation; and

(c) what are the changes to the wording of the WSP that Water NSW believes would have resulted in there being no flooding in the Area of Concern in the period October 2022 to December 2022; and

(d) what are the changes to the CARM modelling tools and the IQQM modelling tool that Water NSW believes would have assisted in avoiding the flooding events altogether. See **para 102**.

14. The NRC should advise and recommend that the Minister seek amendments of both the *Water NSW Act 2014* (NSW), and the Operating Licence of Water NSW, to the effect set out in paras 103(a) to (g) below. In the case of the amendment to the Water NSW Act, one version of what might appear in the Bill to implement those amendments is set out in para 104 below. In summary, the proposed amendments involve:

(a) A new “flood protection and control duty” is imposed on Water NSW in carrying out its other listed functions under the Act. In general terms, one form of the new duty is that it must take all steps reasonably necessary to avoid a threat to life or property arising from floods. In general terms, the other form of the new duty is that Water NSW must minimise the existing and future risk to human life and property, from the effects of flooding.

(b) The new “flood protection and control duty” only applies in those parts of the area of operations of Water NSW as are prescribed. The Murrumbidgee Area of Concern, which is defined, must be one of those parts which are prescribed.

(c) As part of its new “flood protection and control duty”, Water NSW is made solely responsible for: determining what the storage release from each of the Burrinjuck Dam and the Blowering Dam will be over what period; predicting the quantum of spillage for each such dam in that same period; predicting what the river levels and other flooding consequences downstream of the confluence of the Murrumbidgee and Tumut Rivers will be at specified points in the Murrumbidgee Area of Concern in that period; and Water NSW must publicly announce its determinations and predictions in a timely manner with a view to its flood protection and control duties being carried out as soon as possible.

(d) Water NSW must make such determinations, predictions, and announcements, as and when Water NSW considers it appropriate, in the light of its “flood protection and control duties”, its other listed functions, and all other circumstances. See **paras 103 and 104**.

15. The NRC should advise and recommend that an amendment of the “water management principles” in s 5 of the *Water Management Act 2000* (NSW) should be made to insert repeated references to “flood mitigation”. See **para 110**.

16. The NRC should advise and recommend that the definition of “extreme event” in the *Water Management Act 2000* (NSW) be amended to include: “(ab) an extreme wet period,”. See **para 111(b)**.

17. The NRC should advise and recommend that the WSP for the M be amended so that it complies with s 16(1)(e) of the *Water Management Act 2000* (NSW), and in particular with the “State government policy” with respect to flood mitigation as set out in numerous places in **Parts 9, 10 and 11** of this Submission. See **para 118(a)**.

18. The NRC should advise and recommend that ss 20 and 21 of the *Water Management Act 2000* (NSW) should be amended to make it clear that every management plan, and thereby every Minister’s plan, must incorporate provisions dealing with “flood mitigation”. Such amendments may go so far as requiring that there be rules for the establishment of a specified amount of airspace for each storage within the water management area, and the circumstances in which that amount of airspace may be increased and decreased. Such circumstances might, for example, depend on the BoM’s fortnightly update on the ENSO Outlook. See **para 119**.

19. The NRC should advise and recommend that the AWD methodology, whether published or not, be revised to take into account floods, airspace requirements, and flood mitigation. See **para 121**.

20. The NRC should advise and recommend that the “Water NSW Reporting Manual 2022-2024” be amended to include requirements with respect reporting with respect to flood mitigation. See **para 123**.

21. The NRC should advise and recommend that changes be made to the Operating Licence to require that Water NSW establish and maintain “Community Advisory Groups”, in parallel to the existing “Customer Advisory Groups”, in different regions. In summary, the Community Advisory Group must be consulted in those circumstances where, based on BoM forecasts, and all the other relevant circumstances, it was likely that issues concerned with flood mitigation may arise. See **para 128**.

22. The NRC should advise and recommend that changes should be made to the Operating Licence to make it more effective in relation to “flood mitigation”. See **para 129**.

23. The NRC should advise and recommend that “flood mitigation”, where used in clause 1.2.1 k of the Operating Licence, be defined in the Operating Licence. One possible wording might be the:

“**Flood Mitigation** means reducing river levels downstream of the dam, which are or may become at flood level, by using planned and modelled airspace in the storage to temporarily store floodwater and only releasing that floodwater later when the downstream river levels have subsided to a safe level.” See **para 130**.

24. The NRC should advise and recommend that Water NSW consider what are the changes to the IQQM modelling tool that Water NSW believes would have assisted in avoiding altogether the flooding events that occurred in 2022 in the Area of Concern, and then implement those changes to IQQM. See **para 133(b)**.

25. The NRC should advise and recommend that recent clause 4(1) (application of Plan) be remade, and that this be done in a manner which both gives legally correct effect, and operates in a consistent manner throughout the WSP for the M. See **para 149**.

26. The NRC should advise and recommend that recent clauses 5 and 6 (interpretation) be remade and in doing so that they be rationalised and rewritten as one coherent clause. See **para 150**.

27. The NRC should advise and recommend a procedure under which the community, beyond water users whose commercial interests are catered for at length in the WSP for the M, has effective input to the drafting of the WSP for the M. See **para 158**.

28. The NRC should advise and recommend that “Part 2 Vision, objectives, strategies and performance indicators” in the recent WSP for the M requires a total rewrite, with a more balanced approach to be taken. See **para 159**.

29. The NRC should advise and recommend that part of that rewrite of Part 2 of the WSP for the M include:

(a) a new clauses 7A which, in summary, would require Water NSW as the operator to consider safety first, then community and customer, and would specify that this obligation overrides and governs all other provisions in the WSP for the M;

(b) a new clause 7B which, in summary, would identify the components of Water NSW’s “flood protection and control duty” in carrying out its functions under the WSP for the M. See **para 159**.

30. The NRC should advise and recommend that the following definitions, whose wording is provided in this Submission, be added to the Dictionary of the remade WSP for the M: “flood mitigation”; “flood protection and control duty”; and “Murrumbidgee Area of Concern” See **para 160**.

31. The NRC should advise and recommend that consideration should be given to adding to the Dictionary of the recent WSP for the M definitions appropriately adapted

from the definition of “transparent flows” and “translucent flows” found in the Dictionary of the prior WSP for the M. See **para 162**.

32. The NRC should advise and recommend that recent clause 68, and the provisions related to it, be rewritten so that the provisional storage volumes must change, and the purpose of increasing the size and frequency of spill events must cease, in any circumstance where it is possible that the spill event, or combination of spill events, may give rise to a flood event affecting the Area of Concern. See **para 164**.

33. The NRC should advise and recommend that a new clause 71A be added, at the start of Part 10 Division 5 of the recent WSP for the M, in terms which correspond to the new “flood control and protection duties” which would be in clauses 7(2D), (2E), and (2F) of the Bill amending the *Water NSW Act 2014* (NSW). See **para 169**.

34. The NRC should advise and recommend that urban Wagga Wagga be assessed and added to the 4 “choke points” in recent clause 73(1) (water delivery and channel capacity constraints). See **para 170**.

35. The NRC should advise and recommend that recent clause 75 (rates of change to storage releases) be amended to, in summary, require the operator to consider damage to downstream communities, and in particular:

(a) the need to take all steps reasonably necessary to avoid a threat to life or property arising from floods, and

(b) the need to minimise the existing and future risk to human life and property, from the effects of flooding. See **para 172**.

36. The NRC should advise and recommend that recent clause 76 (dam operation during floods and spills) be rewritten so that, in the way discussed in this Submission. As suggested in para 174 below, such rewrite must address the de facto obligation in recent clause 76 on Water NSW to operate each of the Burrinjuck Dam and Blowering Dam to “leave the storages as full as possible after the flood or spilling event”. Thus, if the BoM has issued a La Niña WATCH or the higher La Niña ALERT, or worse still a La Niña event is continuing, it just reckless for Water NSW, in compliance with the constraint imposed by recent clause 76, to be leaving the 2 dams “as full as possible” and, in most circumstances, even more reckless to, “after the flood or spilling of water” to leave the 2 dams “as full as possible”. In the example given, if a La Niña event is continuing, but no flooding or spilling of water has yet occurred or the flooding or spilling event has ceased, the most dangerous thing, in terms of leading to flooding events and spilling of water in the Area of Concern, is to keep operating the 2 dams so as to leave them as full as possible. See **paras 174 and 175**.

37. The NRC should advise and recommend that, at a minimum, recent clause 77(2) be rewritten to reflect the real obligations and discretions that Water NSW has with

respect to maintaining airspace in the Blowering Dam, with a clear separation of the “emergency power generation” airspace from other airspace. See **para 184**.

38. The NRC should advise and recommend that the relevant parties reassess and determine what is truly ‘commercial-in-confidence’ with respect to Water NSW maintaining airspace in the Blowering Dam alone, with a view to the relevant information being both published and factored into, not just the Note to recent clause 77(2), but instead the operative part of recent clause 77(2). See **para 184**.

39. The NRC should advise and recommend that, to extent that the relevant parties fail to reassess and determine with an outcome sought in the preceding para, limited amendments be made, to the identified legislation and instruments, which will require publication of the details of the obligations and discretions applicable to Water NSW with respect to Water NSW maintaining airspace in the Blowering Dam alone. See **para 185**.

40. The NRC should advise and recommend that there is an immediate need for a tighter interconnection to be made between the cumulative and interacting effects of flows into, and releases from, the Burrinjuck Dam and the Blowering Dam. To that end, the airspace for each dam must, by amendment to both the Operating Licence and the Snowy Water Licence, be dealt with on an aggregate basis. See **para 186**.

41. The NRC should advise and recommend that, at the very least, recent clauses 76 and 77 of the WSP for the M be amended to provide that Water NSW must immediately be given both greater flexibility in relation to its operation of both the Burrinjuck Dam and the Blowering Dam and clearer responsibility for maintaining an increased airspace in each dam in circumstances where the BoM has issued a La Niña WATCH, a La Niña ALERT, or there is a La Niña event. See **para 187**.

42. The NRC should advise and recommend that the alternative and preferable approach to the minimal change to recent clause 76 and 77 set out above is to rewrite recent clauses 76 and 77 so as to impose a new and specific flood mitigation duty upon Water NSW with that new duty containing the following elements:

(a) an increase in the mandatory airspace for the Blowering Dam, such increase to be devoted solely to flood mitigation; and

(b) the imposition of a mandatory airspace (in lieu of a the present discretionary one) for the Burrinjuck Dam, such mandatory airspace solely devoted to flood mitigation; and

(c) a requirement that Water NSW coordinate releases from both dams, so that flood mitigation is best achieved;

(d) the calculation of the mandatory airspace in each of paras (a) and (b) above must be made every 3 months by Water NSW (and announced);

(e) such 3-monthly calculation must be made by Water NSW on the basis of advice from the BoM and the new specific flood mitigation duty imposed on Water NSW by para (f);

(f) the new specific flood mitigation duty imposed on Water NSW would be to the effect that, both in its forward planning for and the day-to-day operations of the 2 dams, Water NSW must avoid both:

(i) the height of the Murrumbidgee River at Wagga Wagga exceeding 7.10 metres, which is lower than minor flood level of 7.30 metres, on any day.

(ii) the height of the Murrumbidgee River at Gundagai exceeding 5.90 metres, which is lower than minor flood level of 6.10 metres, on any day. See **para 190**.

43. The NRC should advise and recommend that the legal uncertainties with respect to publication of the Minister’s Order, which may mean the whole of the recent WSP for the M is inoperative or that at the very least its Schedule 2 is inoperative, be resolved by publishing the correct form of the Minister’s Order and that the WSP for the M be remade with its new consequential commencement date. See **para 195**.

44. The NRC should advise and recommend that the legal uncertainties with respect to publication of the Minister’s Order, which may mean the whole of the recent WSP for the M is inoperative or that at the very least its Schedule 4 is inoperative, be resolved by publishing the correct form of the Minister’s Order and that the WSP for the M be remade with its new consequential commencement date. See **para 197**.

45. The NRC should advise and recommend that problems with terminology in policy and related documents be improved so that the word “floodplain” is restricted to land declared as such under the *Water Management Act 2000* (NSW), and that all other land that is susceptible to flooding is termed “flood prone land”, and the 2 terms are to be mutually exclusive. See **para 199**.

46. The NRC should advise and recommend that further improvement on the issue of jargon, inconsistency of terms, different terms meaning the same thing, which continues to be a problem for people from policy makers down to end users and consumers, be undertaken, with the WSP for the M a starting point. See **para 220**.

1.2 OVERVIEW OF THIS SUBMISSION

3. I submit that the NRC:

(a) Must not simply recommend to the Minister that the WSP for the M be extended for a further 10 years after its due expiry date of 30/06/2026.

(b) **Should advise and recommend** to the Minister that the WSP for the M be replaced as soon as possible with a new management plan in order to address:

(i) the need to more clearly spell out the obligation on Water NSW to “undertake flood mitigation and management”; and

(ii) the need to provide more balance in the WSP for the M by requiring Water NSW to have regard to the interests of the community.

(c) Should advise and recommend to the Minister, and thereby the DPE and Water NSW, to make specific changes, or undertake specific reviews, consistent with para (b) above.

1.3 THE TIME TO ADDRESS FLOOD MITIGATION IS NOW

4. The Area of Concern was severely damaged by a number of flooding events in 2022, including in the years 2010, 2012 and 2016. The Millennium Drought continues to dominate policy with respect to water management in NSW. That dominating influence is evident in the way in which Water NSW is required to operate under the WSP for the M.

5. Because of that, Water NSW has not been provided with the flexibility within the WSP for the M to respond to extreme events of flooding in the Area of Concern. For some years now, the CSIRO and BoM have been jointly advising that, arising from climate change, flooding events will occur more quickly and more often. The WSP for the M, and the modelling tools used by the DPE and Water NSW (such as CARM and IQQM) apparently have not sufficiently taken these matters into account.

6. As at 23/05/2023, the BoM advises that:

(a) “The El Niño-Southern Oscillation is currently neutral, however there are some signs El Niño may form later in the year. If the atmosphere responds to this warming, an El Niño would be expected to develop. El Niño typically reduces winter and spring rainfall across eastern Australia.”

(b) “The Indian Ocean Dipole is neutral. The latest model outlooks for the IOD indicate positive IOD development during the southern hemisphere winter. A positive IOD event can reduce winter and spring rainfall across much of central and southern Australia. Model accuracy for IOD forecasts at this time of year is low, and thus some caution should be taken with outlooks beyond June.”

7. It is in these very circumstances that time and attention can and must be paid to identifying the limitations imposed on Water NSW by the WSP for the M, and any inadequacy of the modelling tool used by Water NSW, which materially reduced its ability to mitigate the flooding events that occurred in the Area of Concern in 2022 and recent prior years. These things must be attended to when things are quiet – neither flood nor drought – so that Water NSW is fully armed able to effectively carry out flood mitigation when the heavy rainfall events return with a vengeance. For when La Niña returns, Water NSW needs to be forearmed, both the WSP for the M and its modelling tools. Because the lead times are short, it will too late to attend to these important matters as La Niña returns

PART 2 – LIVING IN AND REPRESENTING THE SEAT OF WAGGA WAGGA

8. **Living in Wagga Wagga since 1991.** I have been living and working in Wagga Wagga for 32 years. I first came to know Wagga Wagga when I was a junior doctor. I settled in Wagga Wagga in 1991 and I have lived and worked here ever since. My first position was as Director of the Emergency Department at the Wagga Wagga Base Hospital where, among other duties, I undertook ambulance retrieval work, bringing patients from Tumut, Batlow, Lockhart and other towns. That was the start of me gaining a deeper understanding of, and sharing experiences with, the wonderful people in all parts of the Seat of Wagga Wagga. In doing so I gained a deeper understanding of the needs of and issues that concerned our community.
9. **Member for the Seat of Wagga Wagga since 2018.** The matters in the preceding paragraph led me to stand as an Independent in the Seat of Wagga Wagga in 2011. Though I was unsuccessful, in the general election held in 2011 I did receive 30.6% of the first preference vote. In a 2018 by-election, I was successful in being elected as the Member for Wagga Wagga. I have been honoured and humbled to serve the people of the Seat of Wagga Wagga since 2018, having been re-elected in 2019 and 2023.
10. **Flooding a recurring concern in my electorate.** In my 32 years of living and working in Wagga Wagga (in all 3 senses of that term), one of the recurring issues of concern to large sections of the community has been the flooding of both the Murrumbidgee River below the Blowering and Burrinjuck Dams and the Tumut River below the Blowering Dam.
11. **My 09/08/2022 call for the levels of the 2 dams to be set at 80% for the rest of 2022.** On 09/08/2022, I spoke in the Legislative Assembly on the matter of flooding in the Seat of Wagga Wagga, which Hansard records in the following terms:

“WAGGA WAGGA ELECTORATE FLOODING

Dr JOE McGIRR (Wagga Wagga) (21:54): Once again the people of North Wagga, as well as many other landowners in my electorate, have to face the crisis of flooding. Last Friday afternoon there were flood and evacuation warnings seemingly from nowhere. Many outside the levee banks in Wagga Wagga had to leave their properties. Many other residents, especially at North Wagga within the limited levee banks now there, are still anxiously watching the river levels and waiting to see if and when they will have to evacuate. For many farmers and landowners it has meant long and frustrating hours of work moving stock and preparing their properties.

I say "once again" because this has become a distressing pattern of events. Dam levels are managed to ensure a supply of water for irrigators and the environment. Repeatedly we are told that this supply is the priority, yet there is a price to be paid for this. Dam levels are kept high, which means that at any time a sudden weather event can fill catchments and cause the dams to spill. I understand the need for water for farmers and the environment further down the river, but there is a question of balance and another of priority.

With the rain this year we have been closely watching the levels of Burrinjuck and Blowering dams, which feed the Tumut and Murrumbidgee rivers. This year we have had the added problem of Snowy Hydro discharging water into Blowering to provide extra power because of issues with the electricity supply. In a year of rain and more rain, many people in my electorate are asking: Did we have to have this flooding event? And what is going to happen for the rest of the year? One resident who is facing the loss of hundreds of thousands of dollars wrote to me, "This flooding effect ... was completely avoidable." Another resident said, "WaterNSW dam management plans defy logic and lack care." This resident goes on to ask why the dam levels have not been set at 80 per cent; where is the accountability for the impact of floods on people and their property; and what is the plan for the rest of the year? Further, he warns:

Dams, rivers, lagoons and billabongs are all now full, as we enter the major rainfall and run off season of the year, escalating the risk of further and more devastating flooding to severe levels.

To add insult to injury, overnight in Wagga Wagga—when the river was predicted to peak and residents were anxiously waiting for news—the river level measures were not available. This morning another resident wrote to me:

It beggars belief that NSW Water cannot reliably maintain the Wagga gauge ... the last available measurement was at 11.10 p.m. last night.

It has been happening with almost all high rivers since 2016.

Just when we need the data the most, NSW Water fails us.

I have followed this up and was told it was an issue with this particular measure and it has been fixed. But the Government needs to make sure this does not happen again. I commend the work of the SES, which responded very quickly to the surprising news last Friday and has worked hard to prepare the community and keep it informed. I acknowledge the challenges facing the many homeless who have been moved from Wilks Park and thank the support agencies for their work. I acknowledge the work of Wagga Wagga City Council in the flood response. Above all, I thank the affected residents for the positive attitude they have taken to dealing with this crisis. However, they are fed up, and this continues to be an issue.

I have raised this issue with the Government. I have participated in the airspace reference panels, whose members I thank for their work. But clearly this week's events show that what has happened has not been enough. **I am calling on the Government to make sure that the relevant dam levels are set at 80 per cent for the rest of this year, when it is likely that we will face significant rainfall. The predictions are that with the Indian Ocean dipole, La Niña and so on, we are in for a wet few months. Let us set the dam levels so that flooding is avoided.** [emphasis added]. I have already contacted the Minister on this issue and will be following this up with him and the Premier. As it stands the residents of my electorate, especially those in North Wagga, will be spending the rest of the year in a state of constant anxiety, terrified of a repeat of the devastating floods they endured in 2012. Surely we can learn from the past and do better in managing our dam levels.”

12. **Airspace Reference Panel, the 2 dams.** I have attended meetings of the Murrumbidgee & Tumut Airspace Reference Panel (“**the Panel**”) when invited. At such meetings I have raised questions about the operations of the Burrinjuck Dam and Blowering Dam (“**the 2 dams**”). Relevant to this Submission:

(a) I attended the meeting of the Panel held on 23/06/2022. Water NSW had 11 representatives present. At the meeting, I pressed my concerns about the clear wet conditions forecast by the BoM, as presented to the Panel, and I made clear my considerable concern, particularly in relation to flooding around North Wagga Wagga, and that there was an urgent need to create more airspace in the 2 dams.

(b) I attended the meeting of the Panel held on 24/08/2022. Water NSW had 9 representatives present. Again, I pressed the need to increase the airspace as flood mitigation was of concern to my constituents. Consistent with what I had told the Legislative Assembly on 09/08/2022 (see above), I sought an increase in airspace to 80%. In response to my suggestion, there was pushback from those Water NSW representatives who spoke. In addition to referring to the constraints imposed on Water NSW by the WSP for the M, their pushback was accompanied by references to modelling and messages from Water NSW which I now summarise as “we know what we are doing, we are keeping watch and we will adjust matters as and when necessary.” In **Part 4** below, I return to the issue of the CARM modelling tools used by Water

NSW, the constraints imposed on Water NSW by the terms of the WSP for the M, and the need to change both.

13. **My 18/10/2022 statement to the Legislative Assembly.** On 09/08/2022, I spoke again in the Legislative Assembly on the matter of flooding in the Seat of Wagga Wagga and how to better manage flood control and prevention, which Hansard records in the following terms:

“WAGGA WAGGA ELECTORATE FLOOD CONTROL

Dr JOE McGIRR (Wagga Wagga) (01:32): This year we have seen almost relentless rainfall across much of the State, and the Wagga Wagga region, downstream of the Blowering and Burrinjuck dams, has not been spared. The floods impact landowners with properties on or near the Murrumbidgee and threaten small communities and villages, the largest of which is North Wagga. For landowners, the recent flooding has meant not only anxiety but also real losses—hundreds and thousands of dollars of damage to farm infrastructure. A resident told me, "As for the flood this past week, it was about 400 millimetres higher for us, which took damage to another level. Our loss, damage and cost estimate this year is well over \$100,000 so far." For the residents of communities such as North Wagga, the recent floods have left them stressed and resentful. One resident said, "Surely there are protections in place for flood-affected communities in dam management planning and surely the technology is available to predict water rises in light of the weather."

I acknowledge that WaterNSW has acted to mitigate the effect of high rainfall by making dam releases, and I do not want to criticise the officers who diligently undertake their duties within the legislation and directives they have. However, those officers work within a policy and legal framework and it seems to me that the current water legislation and policy framework in New South Wales is primarily focused on providing water for times of drought and on meeting the need for water for communities, irrigators and farmers as well as the environment. That is important. Drought is a disaster with damaging long-term effects. Yet flooding is also a problem, which we can clearly see across New South Wales right now, and it is an issue for the communities of my electorate.

How can we better manage flood control and prevention? I have three areas to consider for action. Firstly, I believe we should have an agency with overall responsibility for flood control and prevention. Currently, WaterNSW has flood mitigation and management as one of its 11 listed functions, and it appears that the responsibility for flood control and prevention is spread across three agencies: WaterNSW, the SES and the Bureau of Meteorology. There is no single point of accountability for flood protection. I understand the real issues with predictions and how difficult that can be. But can we not do better? Surely a single point of accountability with a flood control and prevention agency would be worth exploring.

Secondly, I believe that WaterNSW needs the agility and flexibility to manage storage better to reduce the impact of flooding in seasons of high rainfall. As I have said, the legislation is complex. However, a key element is in the Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016. The relevant sections are clauses 47 and 48. Clause 47 states:

(1) The operation of Burrinjuck Dam and Blowering Dam during times of flood and spilling of water is to be undertaken in a manner that maintains the safety of dam infrastructure and limits damage to downstream communities.

(2) Provided it is consistent with subclause (1), operation should leave the storage as full as possible at the completion of the flood event, subject to airspace requirements.

Clause 48 (1) states:

(1) Airspace operation of Burrinjuck Dam must be undertaken in accordance with the following principles:

(a) to assist in mitigating the impact of floods, a volume of airspace may be maintained which is no greater than that which will be refilled by storage inflows prior to a need to release from the storage to supply downstream requirements,

Note—

Paragraph (a) means that Burrinjuck Dam can be reduced to a level that is sufficient for the dam to refill based on the minimum forecast recession inflows.

Those directions do not appear to give WaterNSW the flexibility or agility it needs to best manage floods, especially when we are in the midst of a period of acknowledged high rainfall. Third, given the likely occurrence of further extreme weather events in the coming years because of the reality of climate change, we must examine closely what infrastructure we need to manage water storage as well as floods. I note that WaterNSW in 2018 issued 20 Year Infrastructure Options Study Rural Valleys, a discussion paper that highlights a number of options for infrastructure in the Murrumbidgee Valley, including raising the wall of Burrinjuck Dam.

Given the current difficulties with getting right the balance between having enough water for drought and better preventing and controlling floods, it seems to me that we should seriously consider those options, including raising the wall of Burrinjuck Dam. If that is done, it must have strict guidelines for the use of additional space for airspace and be required to maintain it for airspace. With our current situation and the wet season we are facing, which, we are told, will go on for months, the time has come for us to consider the options. I have put forward three today to consider.”

PART 3 – THE NRC HAS AN IMPORTANT ADVISORY FUNCTION

14. The NRC’s call for submissions has been made in the context of the NRC undertaking a review and making a report under s 43A of the Water Management Act. That section requires the NRC to:
 - (a) review the extent to which the water sharing provisions have materially contributed to the achievement of, or the failure to achieve, environmental, social and economic outcomes; and
 - (b) review whether changes to those provisions are warranted; and
 - (c) make a report to the Minister that, at a minimum, deals with the reviews in paras (a) and (b) above; and
 - (d) in making its report, the NRC must have regard to submissions duly received and “have regard to any other relevant State-wide and regional government policies or agreements that apply to the catchment management area.” [s 43A(3), (4)]
15. The NRC is established under the NRC Act. That Act is relatively short in length, but significantly states:
 - (a) “The object of this Act is to establish an independent body with broad investigating and reporting functions for the purposes of establishing a sound evidence basis for the properly informed management of natural resources in the social, economic and environmental interests of the State.” [s 3]
 - (b) “The Commission has the general function of providing the Government with independent advice on natural resource management.” [s 12(1)]
 - (c) In exercising its functions, the NRC must have regard to 6 guiding principles, 2 of which, relevant to the current review of the WSP for the M, are:
 - (i) “an integrated approach to natural resource management issues”; and
 - (ii) “State and national legislation and policies that are relevant to natural resource management.” [s 14(c), (f)]
 - (d) For the purposes of exercising its functions, the NRC may direct a government agency to provide the NRC with any relevant information held by the agency [s 16(3)].
16. In the light of the important independent advisory role that the NRC has imposed on it, and the guiding principles referred to in the preceding para, the NRC has within its prior public reports under s 43A of the Water Management Act advised and recommended to the Minister, and made recommendations to the DPE (and its predecessors), Water NSW, and others, on:

- (a) not only those matters specifically in relation to remaking the WSP in question;
- (b) but also on many matters that can improve and clarify water resource management arising from the review of the WSP in question.
17. In parallel with the NRC’s specific review of the water sharing provisions of the WSP for the M under s 43A(3), the Minister is also under a statutory obligation under s 43(2) to review all other provisions of the WSP for the M “for the purpose of ascertaining whether its provisions remain adequate and appropriate for ensuring the effective implementation of water management principles” [s 43(2)]. Thus all provisions of the WSP for the M are now under review. The distinction between what are water sharing provisions, and are what are not, in the WSP for the M is blurred by the fact that water sharing provisions are statutorily extended to also capture “measures to give effect to the water management principles and objects under the Act” [s 21(e)].
18. It is quite evident that, at the very least, the whole of Part 10 “System operation rules”, comprising clause 58 to 79, of the recent WSP for the M are water sharing provisions and, therefore, to be reviewed and reported upon by the NRC under s 43A. In any event, clause 2(2) of the recent WSP for the M also asserts that the whole WSP for the M is a plan for water sharing and generally deals with the matters set out in ss 20 and 21 of the Act.
19. Given the 4 preceding paras, the NRC should advise and recommend both under s 43A of the Water Management Act and its functions (read duties) under the NRC Act of providing independent advice on natural resource management. In any event, providing a wider advice in a report under s 43A is the common practice of the NRC. There are many good reasons, as set out in this Submission, for the NRC in doing so on this occasion.
20. In this Submission:
- (a) I am asking the NRC to advise and recommend with respect to flood mitigation under the WSP for the M, which falls directly under para (a) above. **There is both evident inconsistency in policy of the DPE with respect to flood mitigation, and evident uncertainty on the part of Water NSW with respect to the application of flood mitigation under the WSP for the M.**
- (b) In relation to flood mitigation, **I also seek at certain points in this Submission that the NRC advise and recommend changes to bring greater consistency between the Water Management Act, the Water NSW Act, the Operating Licence, and the WSP for the M.** All those changes also fall under para (a) above because those changes either feed directly into the WSP for the M or provide clarity as to what the clauses in the WSP for the M mean.
- (c) At the end of **Part 11**, I submit that there are particular things that the NRC should do in carrying out its review which will prove to be instructive for the NRC as to what changes it should advise and recommend should be made to the WSP for the M. Those things relate to obtaining relevant information from Water NSW as to what it did, or

failed to do, and the reasons for such actions and inactions, in the months and days leading up to and on the days during the flood events in the Area of Concern in each of October 2022 and December 2022.

21. **The WSP for the M is required to be consistent with government policy.** The Water Management Act mandates that every management plan, of which the WSP for the M is an example, must be “consistent with”, among other things, “State government policy” [s 16(1)(e)]. It states that for this purpose, “State government policy includes such matters as are declared by the regulations to be State government policy.” [s 16(2)]. The use of “includes” in s 16(2) means that there will usually be a lot of documents not referred to in the regulations but which nevertheless qualify as “State government policy” with which every management plan, and the WSP for the M in particular, must be consistent. The DPE, whose function is clearly concerned with setting policy in relation to water management, has published many documents which clearly qualify as “State government policy”. Some of those policy documents which are most relevant to the matter of flood mitigation are addressed in this Submission.
22. Water NSW and other stakeholders have over the years been seeking consistency in terminology across different WSPs. With the NRC’s impetus, this has been progressed. Consistency of policy, and understanding how that policy must be applied in a particular WSP, is even more important.

PART 4 – EFFICIENT AIRSPACE PAPER, USE OF “CARM”

23. **Efficient Airspace Paper.** The messaging from Water NSW to the Airspace Reference Panel referred to in **Part 2** above was occurring in the context of a paper by 4 authors, 3 of whom are from Water NSW. Aspects of this Paper include:
 - (a) The Paper is entitled “Efficient Airspace Operations at Burrinjuck Dam, Murrumbidgee Valley to lessen the flood impact at downstream townships” (“**the Efficient Airspace Paper**”).
 - (b) This 11-page Paper was presented at the Hydrology and Water Resources Symposium held 30/11 to 01/12/2022), and is freely accessible at <https://search.informit.org/doi/pdf/10.3316/informit.913065822536231>. The Efficient Airspace Paper deals with the actions taken by Water NSW in the period between July 2021 and April 2022. I believe that the authors of this paper have played a significant role in advising on decision-making in regard to important aspects of flood mitigation.
24. In the Efficient Airspace Paper, the authors state:

“Creating and managing airspace at Burrinjuck Dam is therefore challenging as the rate of release need to be varied continually to complement the runoff events from the downstream catchments that do not exceed the channel capacity constraints in the Murrumbidgee River.

Further, **the WSP does not provide any guidelines on the inflow sequence (probability) to be considered for airspace management.** [emphasis added]. WaterNSW has successfully developed an effective procedure **within legislative and physical constraints** to manage the Burrinjuck Dam airspace under an exceptional and prolonged wet season. [emphasis added]. The methodology has been successfully applied in 2021-22 water year, which saw the inflows wetter than 10th percentile inflow conditions. This paper provides the details of the procedure adopted for efficient management of Burrinjuck Dam airspace.” [p4].

25. **CARM.** A feature of the Efficient Airspace Paper is the use by Water NSW of the “decision support tool” called “Computer Aided River Management” (“**CARM**”). The authors state that CARM is a system of modelling tools. According to the Paper, CARM was used in the period in relation to events of high inflows into the Burrinjuck Dam:

“to estimate the potential short-term inflows (upstream and downstream tributaries) based on BOM’s forecast probabilistic rainfalls (50% and 25% exceedance conditions) and to make improved release decisions based on different risk profiles. The dam release schedules before and during the events were subject to channel capacity constraints at flood gauges. The strategy was successfully applied for scheduling Burrinjuck Dam releases with reduced impacts to downstream communities at Gundagai and Wagga Wagga.” [p1].

26. **Variable airspace policy.** The authors of the Efficient Airspace Paper make clear that Water NSW has “operated the Burrinjuck Dam on “variable airspace policy” that allows for the release of water to create some airspace especially in winter and early spring, provided it can safely be assumed that subsequent inflows will fill the storage to full conservation level by the time the system demand starts ... If the storage was at a reasonably high level before the onset of winter, the Dam would be drawn down as airspace releases subject to the following:

(a) “Target date to have storage full, which in turn is determined by **risk appetite** by the water user community.” The 3 categories of water users are then listed. My view is that it is very telling that there is no mention of the risk appetite for those in the Area of Concern to be flooded and have their stock, houses, property and infrastructure damaged and destroyed, and for so many to suffer direct and indirect economic damage and to suffer trauma. Where are they in the determination of risk appetite? What is the risk appetite of the community in general, as opposed to the narrow “water user community”?

(b) “Storage level at the time of commencement of airspace release and forecast inflows based on catchment conditions. As a State-Owned Corporation, WaterNSW operates the river in accordance with the Water Supply Work Approval issued by the Department of Planning and Environment. (DPE) and seeks to improve availability of water that is essential for water users and the communities. **WaterNSW cannot**

propose a higher airspace target than that can be refilled with forecast inflows by the target date. Unless it can be demonstrated that economically a higher risk of not re-filling the storage is acceptable (i.e. flood damage savings equal or greater than the losses due to reduced irrigation supplies/environmental benefits) and the water users agree. The least risk is provided by assuming zero effective rainfall and considering only the recession inflows.” My view on the emphasised material is that it is unacceptable that there could be the stated trade-off between “flood damage savings” and other consequences. Even worse, the stated assessment of risk being made by Water NSW is not about whether there will be *any* flood damage, but instead whether the flood damage reaches such a point that it is *greater than* losses due to reduced irrigation supplies/environmental benefits. **The NRC should advise and recommend** that the WSP for the M must be amended to make it clear that Water NSW must operate the Burrinjuck Dam in such a way that avoiding *all* flood damage in the Area of Concern should be prioritised above non-essential irrigation and environmental water supplies. This should be subject only to dam safety.

(c) “Channel capacity constraints: Pre-releases for airspace before an actual flood at downstream locations, should consider downstream channel capacity constraints. The current legislated channel capacities are 9,300 ML/day in the Tumut River at Tumut and 32,000 ML/day in the Murrumbidgee River at Gundagai. The airspace release **should not create a downstream flood greater than the forecast flood.**” [p4] [emphasis added]. My view on the emphasised material is that it is unacceptable that the Water NSW decision on releases could ever be framed in terms of making “the forecast flood” even “greater”. **The NRC should advise and recommend** that the WSP for the M must be amended to make it clear that Water NSW must operate the Burrinjuck Dam in such a way that contributes no extra water to a forecast flood.

27. The authors of the Efficient Airspace Paper do not claim, for the period July 2021 to April 2022, complete success in avoiding all flooding impact downstream of the Burrinjuck Dam. They only claim that the damage caused was “lessened” or “reduced”. Why the damage was not avoided altogether? Answer, the prime culprit is that the variable airspace policy referred to above exists, which is the greatest weakness of the WSP for the M.
28. I have no criticism of the authors of the Efficient Airspace Paper. I have no doubt that each of them has great expertise, great experience, and has applied himself to his duties very well. My perception is that the problem is that each of the authors, and each of the other officers of Water NSW carrying out duties in relation to the operations of the Burrinjuck Dam, must carry out their duties:

(a) Within the constraints applicable to the WSP for the M. These constraints should now be clarified or changed in the way, as set out in this Submission.

(b) Using the parameters within the CARM system of modelling tools. While I do not have access to the CARM system, it is evident from not only the Efficient Airspace Paper, but also the serious situation that occurred in the Area of Concern (see **Part 8**

below) just months later in the closing months of 2022, that the parameters within CARM need to be adjusted. Those changes to CARM must not only reflect clarifications and changes under para (a) above but also the fact that heavy rainfall events are becoming more intense.

29. It must have been concerning for the authors of the Efficient Airspace Paper, and for Water NSW, to find that flooding in the Murrumbidgee Valley was so devastating in the period from October to December 2022.
30. **The CSIRO and BoM's joint "Climate Change in Australia" report.** This webpage <https://www.climatechangeinaustralia.gov.au/en/changing-climate/climate-trends/australian-trends/> includes the 2020 "State of the Climate" report (24pp). That report is part of a series produced every 2 years (since 2010) jointly by the CSIRO and the Bureau of Meteorology. The 2020 "State of the Climate" report states:

(a) "Australian rainfall is highly variable and is strongly influenced by drivers such as El Niño, La Niña, the Indian Ocean Dipole and the Southern Annular Mode. Despite this natural variability, long-term trends are evident in Australia's rainfall record. There has been a shift towards drier conditions across the southwest and southeast, with more frequent years of below average rainfall, especially for the cool season months of April to October. In 17 of the last 20 years, rainfall in southern Australia in these months has been below average. This is due to a combination of natural variability on decadal timescales and changes in large-scale circulation caused by increased anthropogenic greenhouse gas emissions." [p6].

(b) "There has been a decline of around 16 per cent in April to October rainfall in the south-west of Australia since 1970. Across the same region May to July rainfall has seen the largest decrease, by around 20 per cent since 1970.

In the southeast of Australia there has been a decline of around 12 per cent in April to October rainfall since the late 1990s." [p6].

(c) **"Heavy rainfall events are becoming more intense.**

Observations show that **there has been an increase in the intensity of heavy rainfall events in Australia. The intensity of short-duration (hourly) extreme rainfall events has increased by around 10 per cent or more in some regions and in recent decades**, with larger increases typically observed in the north of the country. **Short-duration extreme rainfall events are often associated with flash flooding, and so these changes in intensity bring increased risk to communities.** This is particularly so in urban environments where the large amount of impervious ground cover (e.g. concrete) leads to increased flooding during heavy downpours.

Heavy rainfall events are typically caused by weather systems such as thunderstorms, cyclones and east coast lows. Daily rainfall totals associated with thunderstorms have increased since 1979, particularly in northern Australia. This is due to **an increase in**

the intensity of rainfall per storm, rather than an increase in the number of storms in general.” [p8]. [emphasis added]

31. The excerpts from the CSIRO and BoM’s 2020 “State of the Climate Report” are set out above because this was well publicised and must have been known by Water NSW during 2022. I am concerned that the CARM modelling systems are too reliant upon 90-year, or 108-year, historical statistics and have not sufficiently taken account of the new circumstances of which the CSIRO and BoM jointly warn. More extreme events, with rainfall events more intense, is what both the CSIRO and BoM have been consistently advising in recent years. The risk of material damage from flooding in the Area of Concern (see **Part 8** below) arises within shorter time frames than ever before, and the intensity of the flooding and consequent level of damage caused is greater than before. **The NRC should advise and recommend** that both the WSP for the M, and CARM, must be altered to meet the newly recognised circumstances emphasised in para (c) above which the CSIRO and BoM jointly advise arise from climate change.
32. For the sake of completeness, the 2022 “State of the Climate Report” from the CSIRO and BoM is in the same terms as I have quoted above from the 2020 Report, except that the closing sentence in the preceding para reads: “This is primarily due to an increase in the intensity of rainfall per storm.” [p8]

PART 5 – FLOOD DAMAGE VERSUS IRRIGATION SUPPLIES

33. **Flood mitigation must be raised in priority.** I submit that the function and duty of “flood mitigation” has to be raised to a statutory and clear obligation on Water NSW and within the WSP for the M, and given a higher priority. This Submission sets out the ways in which this should be done and in some cases the specific measures that might be taken, and **the NRC should advise and recommend** accordingly.
34. **Direct and indirect costs of floods.** The direct and indirect economic costs of the flooding of the Murrumbidgee River and Tumut River are very large and extensive: stock is lost; arable land and crops of many varieties are lost; equipment is damaged irreparably; buildings are either severely damaged or made unliveable; roads and other infrastructure are damaged; land and property is caked with mud and other debris is strewn everywhere; and commercial and community activities are severely disrupted for long periods. All 3 levels of government, and the private sector, in response to the effects of flooding, change their funding priorities, and alter their services and operations. Sometimes, human lives are lost.
35. **Governmental support never covers the extent of the damage and stress.** The Commonwealth Government and the NSW Government do provide some help each time such floods occur. However, such financial help is never sufficient and it is the large numbers of individuals and businesses that have been affected, directly or indirectly, that carry the burden. Many cannot carry that burden and they are broken by it. The knock-on effect of such financial losses is significant. Just as important, the trauma and stress the flooding of the Murrumbidgee River and the Tumut River causes, both during and in the drawn-out aftermath, are significant.

PART 6 – THE 3 MEANINGS OF WAGGA WAGGA

36. Because the term “Wagga Wagga” has different meanings in different contexts, in this Submission I identify the 3 separate meanings:

(a) It might refer to “**Wagga Wagga City**” which, if I need to differentiate it, I call in this Submission “the LGA of Wagga Wagga”. It is an area of 4,886 km² and has the proclaimed name “Wagga Wagga City”. That local government area (“**LGA**”) comprises both rural and urban areas. The current estimated resident population of the LGA of Wagga Wagga is 70,339, and it is forecast to grow by 15.13% to 80,984 by 2036 [see <https://forecast.id.com.au/wagga-wagga>]. About 85% of the estimated resident population of the LGA of Wagga Wagga is in the urban areas comprising, first, the biggest urban area in para (b) below and, second, 10 villages. The other 15% is in rural areas. Wagga Wagga City Council and others consistently claim: “It is the largest inland city in NSW”. While the use of the word “city” in this context may be misleading – compare this para (a) and para (b) below – even under para (b) below alone it would be correct.

(b) It might refer to what I call in this Submission “**urban Wagga Wagga**”. It comprises just the biggest urban area, comprising a CBD and suburbs south of the Murrumbidgee River (with its outer suburbs being perhaps Springvale to the south, Moorong to the west, and Gumly Gumly to the east), and suburbs north of the River (which include North Wagga Wagga, and some suburbs around Charles Sturt University). Urban Wagga Wagga is located near the geographical centre of the LGA of Wagga Wagga in para (a) above. That urban area, commonly called “Wagga Wagga”, contains about 80% of the estimated resident population of the LGA of Wagga Wagga.

(c) It might refer to the NSW State “**Seat of Wagga Wagga**”, of which I am the sitting Member. The area of that Seat is 12,108 km². While the area of the Seat overlaps the area of the LGA of Wagga Wagga in para (a) above, and includes all urban Wagga Wagga in para (b) above, it also includes parts of 2 other LGAs. The NSW Electoral Commission states on its website that as at 25/03/2023 there were 57,413 individuals enrolled to vote in the Seat. The NSW Parliament website states that the population of the Seat is 73,439 and the enrolment is 55,698 (though the latter number is actually the enrolment as at 23/03/2019).

PART 7 – THE MINISTER’S 17/12/2022 AMENDMENTS TO THE WSP FOR THE M

37. Between 06/07/2018 and 16/12/2022, the 63-page WSP for the M was unaltered. Some may be surprised to find that on 17/12/2022 the Minister made an Order, which ostensibly took effect on 23/12/2022, under s 45(1) of the Water Management Act amending the WSP for the M, and that the amendment was 64 pages in length (“**the Minister’s Order**”). I query whether the NRC should immediately, first, publicise that

there are 2 versions of the WSP for the M – “the prior” and “the recent” as suggested below – and that the NRC will accept and consider submissions in relation to either or both versions and, second, extend the time for making submissions.

38. According to the Minister’s Order, the 64 pages of amendments were made under the following 2 of the 4 available powers to amend:
- (a) If the Minister was satisfied “that it is in the public interest to do so” (s 45(1)(a)).
 - (b) If the Minister was satisfied “that it is necessary to do so because of requirements arising under the *Water Act 2007* of the Commonwealth” (s 45(1)(d)).
39. It is quite evident that many of the amendments have nothing to do with para (b) above, and that they could only fall under para (a) above.
40. On 11/05/2023, the NRC invited members of the community and stakeholders to make submissions to it on the matter of the future extension or remaking of the WSP for the M. The NRC stated that it would help if submissions addressed 6 key questions. Five of those 6 questions are framed as if the WSP for the M had remained unaltered for the past 5 years, and ask how “the plan has contributed” to this outcome or that. The NRC has not stated that the WSP for the M, with such a major amendment made to it, has only been in operation for 5 months. This compares with the prior version of the WSP for the M which had been in operation, in unaltered form, for the 4½ years prior to 23/12/2022.
41. **The “prior” and “recent” versions of the WSP for the M.** On a practical level, in making this Submission, there are really 2 quite different versions of the WSP for the M to consider:
- (a) the version which was in operation between 06/07/2018 and 16/12/2022 (“**the prior WSP for the M**”); and
 - (b) the version now in operation, which commenced on 23/12/2022 (“**the recent WSP for the M**”).

While there are some instances in this Submission where there is a need to identify, in the way set out above, which of the 2 versions is being referred to, in most instances it is sufficient to simply refer to “the WSP for the M”.

42. For the sake of clarity, I will sometimes use the term “**prior clause #**” and “**recent clause #**” to help identify the clause of which version of the WSP for the M, the prior version or the recent version, is being addressed. This will, first, assist in identifying where a recent clause corresponds with, or is now an altered version of, a prior clause and, second, enable some questions to be raised as to why the wording in the prior version has been changed.

PART 8 – AREA OF CONCERN, DEFINITION AND KEY COMPONENTS OF IT

8.1 AREA OF CONCERN

43. **“Area of Concern” definition.** In relation to the course of the Murrumbidgee River and the Tumut River, for the purpose of this Submission which is concerned with flood mitigation, I choose to define **“the Area of Concern”** to mean:

(a) The general area encompassing the farming properties and communities near the Murrumbidgee River as it flows east to west from the Burrinjuck Dam (on the Murrumbidgee River near Yass) to and through urban Wagga Wagga, and especially in the Wagga Wagga suburbs of Gumly Gumly and North Wagga Wagga, and then to a point some 15 km west of urban Wagga Wagga; and

(b) The general area encompassing the farming properties and communities near the Tumut River as it flows from the Blowering Dam down to the confluence of the Tumut River and the Murrumbidgee River.

44. In relation to the “Area of Concern” in the preceding para:

(a) Parts of the “Area of Concern” are outside of my electorate. A good example is the area near the Murrumbidgee River as it flows through Gundagai. As the very same deficiencies in the WSP for the M referred to in this Submission contribute to flooding affecting the areas around Gundagai, I feel quite justified in making this Submission in relation to such areas too.

(b) All areas near the Murrumbidgee River west of my electorate, starting about 36 kilometres east of Narrandera, have been deliberately omitted from the “Area of Concern”. While the flooding of the Murrumbidgee River occurs in those omitted areas, I feel that the circumstances of those areas are very different. In any event, despite such difference, I do not believe that the correction of the deficiencies in the WSP for the M referred to in this Submission will have any detrimental effect on the environmental, social and economic outcomes for such areas.

(c) All parts of the NSW State Seat of Wagga Wagga are of concern to me. My use of the term “Area of Concern”, and the way in which I have defined it, is just a means of providing focus for the issue of flood mitigation, which is the focus of this Submission.

8.2 MURRUMBIDGEE RIVER, BURRINJUCK DAM AND BLOWERING DAM

45. **Murrumbidgee River.** Aspects of this include:

(a) At 1,485 km, this river is the third-longest river in Australia. Its source is high in the Australian Alps, and after reaching the south-west slopes of NSW, it heads west across

the riverine plains, and it meets the Murray River on the semi-arid riverine plains near Balranald.

(b) It is a “**regulated river**”. With effect on 01/07/2004, the then Minister for Natural Resources, Craig Knowles, made an Order under the term “regulated river” in the Dictionary of the Water Management Act “that the rivers in the Murrumbidgee Water Management Area that are downstream of the upper limit of Burrinjuck Dam water storage or Blowering Dam and listed in the Schedule below are ‘regulated rivers’” [NSW Government Gazette 01/07/2004 p 5490]. Among the 43 rivers so listed as a “regulated river” were:

- (i) The Murrumbidgee River, from Burrinjuck Dam wall downstream to the Murray River.
- (ii) Burrinjuck Dam water storage.
- (iii) The Tumut River, which is the largest tributary of the Murrumbidgee River, in terms of volume of water, from Blowering Dam wall, downstream to the Murrumbidgee River.
- (iv) Blowering Dam water storage.

(c) The main unregulated water sources or “unregulated rivers” providing inflow to the Murrumbidgee River within the Area of Concern are, in order as the Murrumbidgee River flows east to west:

- (i) Jugiong Creek
- (ii) Muttama Creek
- (iii) Adelong Creek
- (iv) Hillas Creek
- (v) Tarcutta Creek
- (vi) Kyeamba Creek (all of (i) to (vi) flowing into the River above urban Wagga Wagga)
- (vii) Houlaghans Creek (which flows into the River below urban Wagga Wagga).

(d) The **major irrigation areas** and districts primarily fed by the Murrumbidgee River, all of which are well downstream of urban Wagga Wagga and outside the Area of Concern, are:

- (i) The Murrumbidgee Irrigation Area. It occupies an area of approximately 3,624 km² on the northern side of the Murrumbidgee River downstream of Narrandera. Established in 1912 as a government irrigation scheme it is now privately owned and operated by Murrumbidgee Irrigation Ltd.

(ii) The Coleambally Irrigation Area. Coleambally covers an area of over 790 km² on the southern side of the Murrumbidgee River. Originally established as a government scheme in 1960, it is now privately owned and managed by Coleambally Irrigation Co-operative Ltd which supplies water to irrigators in the Kerarbury region and the western Outfall Drain.

(iii) The Lowbidgee. The lower reaches of the Murrumbidgee River, between Maude and Balranald, are known as “**the Lowbidgee**” where the river degrades into a complex area of effluent channels and swamps known as the Lowbidgee Floodplain which covers an area of some 2,000 km².

46. **Burrinjuck Dam.** Aspects of this include:

(a) This dam, operated by Water NSW, is on the Murrumbidgee River, about 50 km south-west of Yass and about 55 km north-east of Gundagai.

(b) This is a mass gravity dam which holds back water by using its own weight. To meet modern dam safety standards and increase dam safety in the event of extreme flooding, between 1986 and 1994 the wall was strengthened by post-tensioned anchors, the dam’s spillways were upgraded, and the wall was raised by 13.4 metres to its current height of 92.4 metres.

(c) The “total storage capacity” of the Burrinjuck Dam is 1,026,327 ML (1,026 GL), being an “accessible storage capacity” of 1,023,036 ML (1,023 GL) plus a “dead storage capacity” of 3,291 ML (3 GL). The 28-megawatt Burrinjuck Power Station is located at the base of the Burrinjuck Dam and operates as water is released from the Burrinjuck Dam into the Murrumbidgee River.

(d) In April 2018, Water NSW stated: “**Burrinjuck Dam is subject to frequent short periods of low storage levels, which recover rapidly to medium and high storage levels** (Figure 23). The “Millennium drought” beginning in 2001 is evident in Figure 23, with storage levels often below 40 per cent of full storage capacity. Although storage levels recovered following the drought, levels in recent years have remained well below full storage capacity.” [Murrumbidgee Water Resource Plan: Surface Water Resource Description (Department of Primary Industries, April 2018, 64pp) at p35]. [emphasis added].

(e) According to the MDBA, the average time it takes for water to flow from Burrinjuck Dam down the Murrumbidgee River to the River Murray confluence is approximately 26 days.

47. **Blowering Dam.** Aspects of this include:

(a) This dam is owned by the Ministerial Corporation and is operated by Water NSW. The dam is on the Tumut River, about 13 km south of and upstream of Tumut.

(b) The Tumut River below the Blowering Dam feeds into the Murrumbidgee River with the confluence being about 18 km north-east of Gundagai.

(c) Water released upstream for electricity generation in the Snowy Mountains Hydro-Electric Scheme flows via the 22.2 km-long Eucumbene-Tumut tunnel from Lake Eucumbene, to the Tumut River and then through 3 power stations (2 of which are underground) owned by Snow Hydro, and then into the Blowering Dam. A 4th power station, the 80-megawatt Blowering Power Station, is located at the base of the Blowering Dam. The Blowering Power Station is a “run of river” plant that operates as water is released by Water NSW from the Blowering Dam into the Tumut River. Water NSW leases the Blowering Power Station to Snowy Hydro.

(d) The Blowering Dam is a rock-fill embankment with a clay core. A concrete chute spillway is located at the eastern end of the dam wall. To meet modern day safety standards and increase dam safety in the event of extreme flooding, an upgrade was completed in 2010. It involved construction of a parapet wall on top of the dam wall, raising the dam wall to its current height of 114 metres, and raising the training walls on the sides of the spillway. The spillway capacity is 230 GL per day.

(e) The “total storage capacity” of the Blowering Dam is 1,633,852 ML (1,633 GL) being an “accessible storage capacity” of 1,609,859 ML (1,609 GL) plus a “dead storage capacity” of 23,982 ML (24 GL). It is one of the biggest dams in NSW.

(f) In April 2018, Water NSW stated: “Storage volumes in Blowering Dam fluctuate dramatically from year to year and were well below 60 per cent of total storage capacity during the Millennium drought (Figure 24).” [Murrumbidgee Water Resource Plan: Surface Water Resource Description (Department of Primary Industries, April 2018, 64pp) at p35].

(g) According to the MDBA, the average time it takes for water to flow from the Blowering Dam to reach the confluence of the Tumut River and the Murrumbidgee River is one day.

48. **Snowy Hydro impact on water level in Blowering Dam.** Snowy Hydro is the largest supplier, by capacity, of on-demand energy generation in NSW. The Tumut 3 Power Station, with a generation capacity of 1,800 megawatts is a significant contributor. The impact of this is discussed in **Parts 7.3 and 7.4** below.

49. **Murrumbidgee “water management area” and “catchment area”.** Aspects of this include:

(a) Under s 11 of the Water Management Act, the Minister constituted the “Murrumbidgee Water Management Area” on 23/11/2001 [NSW Gazette 23/11/2001 p 9389]. The Water Management Act, with some minor irrelevant exceptions, does not use the term “catchment area”.

(b) Under s 40(1) of the Water NSW Act, the Governor declared the same area to be a “declared catchment area of Water NSW”. The Water NSW Act does not use the term “water management area”.

(c) The Murrumbidgee Water Management Area is bordered by the Great Dividing Range to the east, the Lachlan catchment to the north, and the Murray catchment to the south. It is an area of 84,000 square kilometres (about 8% of the Basin), with elevations ranging from 2,200 metres to the east, to less than 55 metres on the western plains.

8.3 MURRUMBIDGEE RIVER LONGITUDINAL PROFILE

50. **Murrumbidgee Valley.** In some of their documents and webpages, Water NSW and the DPE use the phrase “**Murrumbidgee Valley**”, “Lachlan Valley”, and so on. It seems that the use of “Valley” is a non-technical and refers to the regulated river water supply area in which regulated rivers are located, and such phrases are best understood as being interchangeable with the entire “catchment area” or “water management area” through which the named regulated river, the principal river, flows. This use ties in with one of the “designated river valleys” in NSW being “Murrumbidgee catchment excluding that part of the Murrumbidgee River that flows through the Australian Capital Territory, its sub-catchments in that Territory and the Canberra Water Supply System.” [Schedule E – Appendices 1 and 2, Basin Agreement].
51. **Murrumbidgee River longitudinal profile.** The Murrumbidgee River starts in the Kosciuszko National Park at an elevation of 1,560 metres. It drops around 1,500 metres as it flows through these places: it is at 1,230 metres at the Tantangara Reservoir (which has a “total storage capacity” of 254 GL, and which is operated by Snowy Hydro); it is at 305 metres immediately after the wall of the Burrinjuck Dam; it is at 214 metres as it runs through Gundagai; as it runs through Wagga Wagga the bank of the river is at 174 metres (noting that the Council Chambers in Wagga Wagga are at a height of 180 metres); it is at 145 metres as it runs south of Narrandera; it is at 89 metres as it runs through Hay; and it ends at a height of less than 55 metres at the confluence with the Murray River.

8.4 “CHOKE POINTS” AT TUMUT, GUNDAGAI, URBAN WAGGA WAGGA

52. **“Choke points” in the Murrumbidgee Valley.** In the light of the 2 preceding paras, it is not surprising to find that the main choke points in the Murrumbidgee Valley are at its upper end – at what may be generally described as Tumut, Gundagai, and urban Wagga Wagga. It is at these choke points that serious damage is most often caused. Under the heading “What delivery constraints exist in the Murrumbidgee?” the DPE stated in October 2015:

“Constraints are physical or operational “blockages” that limit the volumes of water that can be delivered.

Channel capacity constraints are outlined in the water sharing plan as follows:

- 9,000 ML/day in Tumut River at Oddys Bridge
- 9,300 ML/day in Tumut River at Tumut
- 32,000 ML/day in Murrumbidgee River at Gundagai
- 1,400 ML/day in Yanco Creek at the off-take.

If flow rates exceed the limits above, water will begin to break out of the main channels. This can impact public and private property and may significantly increase operational losses. The Tumut River constraint is perhaps the most significant because it limits the rate at which water can be released from Blowering Dam.

Peak summer irrigation demand can be in excess of 20,000 ML/day, meaning that Burrinjuck Dam must supply more than half this daily requirement.” [How Water is Shared in the Regulated Murrumbidgee Valley, October 2015, 6pp].

53. **WSP for the M channel capacity constraints.** Clause 43(2) of the prior WSP for the M stated that “the water supply system must be managed taking into account any **channel capacity constraints** specified by the Minister”. The Note to prior clause 43(2) listed the same 4 flow rates and places as are bullet-pointed in the preceding para, and that was the position as at 01/07/2016.
54. **Urban Wagga Wagga not yet a “channel capacity constraint” on the DPE list and not yet in the WSP for the M.** From the history of flooding in urban Wagga Wagga and the damage repeatedly caused, it is self-evident that urban Wagga Wagga is also what I call a “choke point” as water flows down the Murrumbidgee River. In that respect I find it surprising that the DPE did not include urban Wagga Wagga as one of the “physical or operational blockages” it lists above and that the Minister has failed to specify urban Wagga Wagga as one for the purposes of clause 43(2) of the prior WSP for the M.
55. The fact that the DPE did not include urban Wagga Wagga in that list, and that the Minister has failed to specify urban Wagga Wagga in either prior clause 43(2) or recent clause 73(1), suggests to me that the flooding of urban Wagga Wagga that has been occurring is to be, if not disregarded, then considered quite acceptable in terms of maintaining water supply to its users. I submit that this is totally unacceptable, and indeed reckless. Further, I submit that these omissions by the DPE and the Minister have “materially contributed to ... the failure to achieve environmental, social and economic outcomes” as referred to in the NRC’s statutory task under 43A of the Water Management Act.
56. **Constraints Management Strategy in 2016.** In October 2016, the equivalent of today’s DPE published its 96-page document “Constraints Management Strategy – Murrumbidgee River Constraints Measure: Concept Proposal Business Case”. It is freely accessible at

https://www.industry.nsw.gov.au/data/assets/pdf_file/0020/165134/Murrumbidgee-River-Constraints-Measure-Business-case.pdf. Aspects of this document include:

(a) It states in the “Executive Summary”: “This concept proposal proposes to increase the regulated flow limit of environmental water releases in the Murrumbidgee River up to **40,000 ML/day at Wagga Wagga. This is 6.3 metres depth at the Wagga Wagga gauge** (footnote 1). A flow of this size would not be unusual to people who have been living next to the river for some time. On average flows of this size already occur about five times every 10 years.” [p i].

(b) The footnote 1 in para (a) above is stated as: “1 The maximum target flow is below the minor flood level at Wagga Wagga of 7.3 metres, which is 50,000 ML/day. It is not comparable to recent floods – the March 2012 flood peaked at 313,000 ML/day, which is 10.6 metres at the Wagga gauge. The December 2011 flood peaked at 145,000 ML/day, which is 9.7 metres.” [p i].

(c) At page 5 it states the numbers in paras (a) and (b) above a little differently: “The maximum target flow proposed of 40,000 ML/day equates to a river height of is **6.4 metres** at the Wagga Wagga gauge. This is below the minor flood level at Wagga Wagga (7.3 metres) which is **48,300 ML/day** and is not comparable to recent flood river heights.” Figure 2 on page 6 of the document provides a graphical representation of the targeted flow rate level versus flood levels at the Wagga Wagga gauge. [p5].

(d) The rest of the document is interesting as to the scenarios and modelling undertaken. This includes adding to the target of 40,000 ML/day a “buffer” which would take it to 45,000 ML/day the result then becoming a river height at Wagga Wagga of 6.96 metres. [pp6–7].

(e) “It is important to note that the flow levels being investigated are the total flows — that is, the level achieved from dam deliveries and the tributary inflows combined. For example, **if a flow of 40,000 ML/day is sought and tributary flows are providing 15,000 ML/day, then dam deliveries would be 25,000 ML/day.**” [p11].

(f) The impacts, mitigation and costs, are discussed at length [pp 14 and following].

(g) The DPE’s 2016 “Constraints Management Strategy” document was follow-on from the Basin Plan and earlier work by the MDBA as referred to in the next para.

57. **Priority Constraints Analysis in 2014.** In December 2014, the MDBA published its 46-page document “Priority Constraints Analysis: Methods and Results”. Aspects of this include:

(a) The MDBA, under the heading “Background”, states:

“The Constraints Management Strategy is a key part of the implementation of the Murray–Darling Basin Plan and was published in November 2013 following 12 months of technical work and consultation with local communities and industries.

The aim of the Strategy is to improve the environmental outcomes achievable beyond current operating conditions by allowing better use of environmental water while avoiding, managing or mitigating impacts to local communities and industries. The changes being investigated are modest and aim to increase the frequency of some of the small to medium flow events that have been reduced through river regulation.

The Commonwealth Government has allocated \$200 million to ease or remove priority constraints in the context of the SDL adjustment mechanism.” [p4].

(b) One of the 7 key focus areas analysed by the MDBA was the Murrumbidgee with flows as measured at Wagga Wagga of up to 48,500 ML/day [p7].

(c) The MDBA discusses the Murrumbidgee issues with different flow rates at pages 13 and 14.

58. The impression I have from the 2 “Constraints” documents in the 2 preceding paras is that there is clearly a desire on the part of both the MDBA and the DPE that the flow rate of the Murrumbidgee River at Wagga Wagga (station gauge 57300) be maximised to the point where the river height is near to but below the minor flood level of 7.30 metres.

59. **Balancing of interests of those far downstream of the Area of Concern with those within the Area of Concern.** Aspects of this include:

(a) Those far downstream from the Area of Concern depend on particular volumes of water passing the choke points at Tumut, Gundagai, and urban Wagga Wagga, so that the required quantity of water reaches them far downstream in areas around such places as Leeton, Hay, and Balranald. Further, the quality of the water (including blue-green algae blooms) in Tombullen Storage, an off-river storage south-west of Leeton, becomes problematic during periods of drought and low water flows.

(b) However, with a sudden downpour anywhere upstream of the choke points in the Area of Concern, the Murrumbidgee River cannot cope with the extra quantity of water and major damage is caused, including flooding, at those choke points – the very things about which so many in the community are concerned.

(c) In essence, I want the volume passing the choke points in the Area of Concern being lowered on very short notice by means of much increased mandated airspace in the 2 dams being able to absorb inflows and Water NSW immediately reducing outflows to offset the effects of the sudden downpours.

(d) I believe that a “best of both worlds” result can be achieved – with the help of the changes that I seek in this Submission – in which the interests of those far downstream from the Area of Concern as referred to in para (a) above are protected, and in which the interests of those in the Area of Concern as referred to in paras (b) and (c) above are also protected.

PART 9 – NSW MINISTER, MINISTERIAL CORPORATION, THE DPE

60. **NSW Minister.** The administration of Acts and other portfolio responsibilities relevant to this Submission has been allocated, under s 50B of the *Constitution Act 1902* (NSW) and the relevant statutory instrument *Allocation of the Administration of Acts*, as follows:
- (a) The “Minister for Lands and Water” (until 05/04/2023), or the “Minister for Water” (since 05/04/2023) as named in the Dictionary: *Dams Safety Act 2015; Natural Resources Access Regulator Act 2017; Water Act 1912; Water (Commonwealth Powers) Act 2006; Water Management Act 2000; Water NSW Act 2014*.
 - (b) The Minister for Planning: *Natural Resources Commission Act 2003*.
61. **Ministerial Corporation.** The “Water Administration Ministerial Corporation” (“**the Ministerial Corporation**”) is constituted under s 371(1) of the Water Management Act. Aspects of this include:
- (a) It is a statutory body representing the Crown [s 371(4)].
 - (b) “The affairs of the Ministerial Corporation are to be managed by the Minister” [s 371(2)].
 - (c) The functions of the Ministerial Corporation include to “operate water management works” [s 372(1)(a)].
 - (d) It “may exercise any of its functions, and may otherwise act, in the name of the” DPE [s 372(3)].
 - (e) It “may delegate to any person the exercise of any of its functions” [s 377].
62. **The Ministerial Corporation delegates its functions** under the Water Administration Act to:
- (a) The DPE, which sets policy. This includes policy in relation to: water allocations; water sharing plans; regional water strategies; analytics, modelling and science; and delivery of the Basin Agreement and Basin Plan.
 - (b) Water NSW, which implements policy. This includes: most licensing and approvals; rules-based environmental and bulk water supply; water infrastructure operation; customer water transactions and information services; and water monitoring to meet the needs of the DPE.
 - (c) The NRAR, which enforces policy. This includes: monitoring and auditing the use of surface and ground water; investigation and enforcement to prevent, detect and stop illegal activities; and some licensing and approvals. [2020 Water Administration

Ministerial Corporation Pricing Submission (July 2020, 13pp) at pp 3, 4 – freely accessible at the IPART website].

63. **NSW Department of Planning and Environment (“the DPE”).** “Planning and Environment” is one of the 10 “clusters” of the NSW Government. Within that cluster is the NSW Department of Planning and Environment (“**the DPE**”) which is home to agencies, offices, entities, and business units, concerned with the following relevant to your questions:

(a) “environment and heritage”.

(b) The Natural Resources Access Regulator. The NRAR was established by a namesake Act in 2017 as the independent water law compliance arm of the NSW Government. It is a body corporate, is a NSW Government agency, but the relevant Minister may only give it written directions of a general nature. Some of the staff of Water NSW were transferred to the NRAR.

(c) The Natural Resources Commission. As already referred to in Part 3 above, the NRC is a NSW Government statutory authority established by a namesake Act in 2003. The NRC is an agency which provides evidence-based advice into managing natural resources in NSW, including “oversight of water planning and implementation”. The NRC has 3 part-time commissioners and 25 other employees.

(d) “**water**”. This is a wide term. It would seem to encompass, at least as at mid-December 2021:

(i) the DPE “**Water Group**”, a specialist group within the DPE.

(ii) the DPE “Environment, Energy and Sciences Group”;

(iii) the DPE “Planning and Assessment Group”.

Of the 3 Groups above within the DPE, it is **the DPE “Water Group”** which will be the most relevant in relation to any legislative or policy changes the NRC pursues, or changes it advises and recommends be made.

(e) Water Infrastructure NSW. This is an agency which was established within the DPE in 2021. On 25/08/2021, the portfolio Minister (Melinda Pavey) both gave a direction under s 20P of the SOC Act to Water NSW, and made a related Transfer Order, which had the effect that from 01/09/2021 the new agency, Water Infrastructure NSW, was made responsible, in place of Water NSW, for leading the development and delivery of key government water infrastructure projects, such as raising the wall of the Wyangala Dam and construction of 2 new dams, and a number of other programs across the state. Such programs include NSW grant funded drought and emergency relief for Regional Town Water Supplies along the length of the Murrumbidgee River from the Burrinjuck Dam to Balranald. See <https://water.dpie.nsw.gov.au/water-infrastructure-nsw>.

(f) Water NSW. This is a statutory State owned corporation (see **Part 11** below).

64. **Roles and Responsibilities Agreement.** On 30/06/2021 a “Roles and Responsibilities Agreement” became binding on the DPE, the NRAR, the Ministerial Corporation, and Water NSW. The Agreement is freely accessible at <https://www.industry.nsw.gov.au/water/what-we-do/roles-responsibilities-agreement>. That webpage states: “It sets out in detail each agency’s role in relation to key water management functions and provides frameworks for resolving any interagency issues and monitoring the performance of agencies against their responsibilities.”
65. In essence, and simplistically:
- (a) The DPE makes the rules (sets policy and plans for legislation, rule-making, and inter and intra-governmental collaboration).
 - (b) Water NSW implements the rules (systems operations, licensing, and customer services including information services).
 - (c) The NRAR enforces the rules (education, monitoring and audits, and compliance hotline).
66. For present purposes, it is important to note that under the Agreement’s 57-page Schedule 1 it is the DPE that takes the role of setting the longer-term rules for sharing, use and management of water resources.

[REDACTED]

PART 10 – NSW WATER STRATEGY, DRAFT WATER STRATEGY FOR MURRUMBIDGEE

68. **NSW Water Strategy.** Under the general heading of “water”, for which the DPE is responsible, are many areas. Included is the “NSW Water Strategy”, which the DPE’s website describes as “a 20-year state-wide strategy to improve the security of our water resources. The “NSW Water Strategy” sets the overarching vision for 12 regional and 2 metropolitan water strategies, tailored to the individual needs of each region in NSW. Together, the strategies will improve the resilience of NSW’s water services and resources.” The 152-page “NSW Water Strategy” was released in August 2021. The “NSW Water Strategy”, at p33 in Figure 14 “Roles and responsibilities for water management in NSW”, attributes those of the 7 roles and responsibilities relevant to your questions, as follows:

- (a) “Water policy planning and resource allocation”: the DPE, and 4 others.
 - (b) “Administration of water rights: Water NSW, and the NRAR.
 - (c) “Distribution of water and management of wastewater”: Water NSW, the MDBA, Snowy Hydro, and some others.
 - (d) “Water pricing”: IPART, local water utilities, and the DPE.
 - (e) “Monitoring compliance and review”: the NRAR, the DPE, the NRC, Water NSW, Dams Safety NSW, and some others.
 - (f) “Flood management and response”: “Local Government”, the SES, the DPE, and 2 others.
 - (g) “Drought management and response”: “Local Government”, the DPE, Water NSW, and 3 others.
69. It is notable that while the “NSW Water Strategy” views Water NSW as having a role and responsibility under paras (c) and (g) above, it does not view Water NSW as having a role and responsibility under para (f) above. **The NRC should advise and recommend** that there should be a change to the “NSW Water Strategy” to make clear that Water NSW has a role and responsibility in relation to “flood management and response” with “flood mitigation” specially identified as a subset of “flood management”.
70. **Implementation Plan.** With respect to the “NSW Water Strategy”, in September 2022 the “NSW Water Strategy: Implementation Plan 2022 to 2024” (DPE, 2022, 28pp) was published. The “Implementation Plan” deals with the period from 01/07/2022 to 30/06/2024. It involves the DPE, Water NSW, and some other NSW Government agencies. The “Implementation Plan” is freely accessible at <https://www.dpie.nsw.gov.au/water/plans-and-programs/nsw-water-strategy/implementation-planning>.
71. It is notable that the “Implementation Plan” does not give Water NSW many actions to undertake. Indeed, in the 28-page document Water NSW is mentioned only 15 times and while it has a role in relation to drought, it is given no role in relation to flood. **The NRC should advise and recommend** that, within the “Implementation Plan”, the role and responsibility of Water NSW in relation to flood should be elevated. As it is the DPE which drives policy and any recommendations as to changes to operational rules, priority should be given to the DPE over Water NSW, the latter having less impact in those areas.
72. **Draft Regional Water Strategy for Murrumbidgee of April 2022.** In April 2022, the DPE released the 100-page document “Draft Regional Water Strategy: Murrumbidgee Long List of Options” (“**Draft Water Strategy for the M**”). The document is freely accessible at https://www.dpie.nsw.gov.au/data/assets/pdf_file/0006/506661/options.pdf. While there are a number of things that are of interest in the Draft Strategy for the M, pages 66

and 67 are of particular interest as they discuss the DPE's **Option 33** (sourced from Water NSW) which is given the summary description of:

“This option would investigate alternative infrastructure projects to increase the storage capacity in the Murrumbidgee region downstream of Blowering and Burrinjuck dams.

Possible new water storage sites could include a:

- new dam on the Murrumbidgee River, near Mingay/Darbalara
- new dam on the Murrumbidgee River, near Gundagai
- new dam on the Murrumbidgee River, near Oura
- new weir near Gundagai on the lower Tumut River.”

73. The 3 new dams and one new weir in the DPE's Option 33 above, and the discussion of them in the Draft Water Strategy for the M, reflect the following matters I raise in **Part 18** below:

(a) The Legislative Council Committee Report of 14/05/2018, and the NSW Government Response of 28/11/2018.

(b) The Water NSW Option Study of June 2018.

74. Other DPE Options in the Draft Water Strategy for the M that are of interest in relation to airspace and flood mitigation include:

(a) Option 9: Review drought rules for the Murrumbidgee region (pages 21 to 22).

(b) Option 16: Develop climate risk evidence base to inform the next Snowy Water Licence Review (pages 33 to 35). This DPE Option was sourced from the Snowy River Licence Review, Water NSW, Riverina Joint Organisation, and the DPE. Option 16 ties in with issues on which I comment in **Part 15.4** below which include the need to enable Water NSW to operate the Burrinjuck Dam and Blowering Dam in conjunction with each other and that the airspace for each is aggregated so that Water NSW can better mitigate floods. See also the DPE's Option 42 below.

(c) Options 33 to 43, some of which are mentioned below, are in a group which the DPE introduces in this way:

“Limitations of existing water infrastructure, delivery and operations

Surface water resources in the Murrumbidgee region are highly regulated with several major dams, weirs and regulators along the entire length of the system.

Storage capacity, physical constraints and operational limitations can hinder efficient water delivery, limit the ability to make pre-releases to create airspace

during flood operations and reduce the reliability of supply. [emphasis added].

In addition, the length of the system can result in high transmission losses during dry periods and over-ordering and rainfall rejections that contribute to operational surplus. Options listed under this category focus on existing and new water-related infrastructure opportunities, improved system efficiencies (infrastructure and delivery) and enhanced river operations.”

(d) Option 35: Install gravity pipeline along Tumut River (pages 68 to 70). This DPE Option was sourced from Water NSW. This option would investigate the feasibility of installing a gravity pipeline along the Tumut River from Blowering Dam to the Murrumbidgee River. This option would address the channel capacity constraint in the Tumut River by enabling release of higher flows downstream of Blowering Dam. One of the existing problems this Option would address is stated by the DPE as: “There is a risk of flooding at Tumut from uncontrolled spills and pre-releases from Blowering Dam.”

(e) Option 36: Raising Blowering Dam (pages 71 to 72). This DPE Option was sourced from Water NSW. The DPE states that the existing problems are: “System storage capacity and operational limitations” and “**current airspace rules limit the ability to manage Snowy Scheme releases and prevent uncontrolled spills.**” [emphasis added]. The DPE then states that the benefit of introducing Option 36 as: “If the option is progressed in the Murrumbidgee region, it would – “increase active storage in Blowering Dam, to potentially better manage Snowy Scheme releases and **reduce uncontrolled spills**” and – “**provide potential for more airspace for flood mitigation**”. [emphasis added].

(f) Option 37: Enlarge Burrinjuck Storage Reservoir (pages 73 to 74). This DPE Option was sourced from Water NSW, Wagga Wagga City Council, Griffith Business Chamber, and Murray Darling Association. The DPE states that this Option is to address 4 problems, one of which is: “**Current airspace rules allow pre-release that is sufficient for the dam to refill based on minimum forecast recession inflows. This variable airspace and reliance on forecasts of inflows can limit the ability to provide flood mitigation and prevent uncontrolled spills.**” [emphasis added]. The DPE states that 2 of the 4 benefits of its Option 37 are that it would: “**increase the active storage in Burrinjuck Dam, potentially reducing dam imbalances and uncontrolled spills**” and “**potentially allow for more airspace for improved flood mitigation.**” [emphasis added].

(g) Option 41: Change environmental releases from Murrumbidgee storages (page 78).

(h) Option 42: Review flood management and airspace operation (pages 79 to 80). This DPE Option was sourced from Water NSW, the DPE, Riverina Water, and Queanbeyan Palerang Regional Council. Aspects of this include:

(i) The DPE describes its Option 42 in this way:

“This option would review existing operations and rules governing flood operation of Blowering and Burrinjuck dams and the interaction with airspace rules and relevant Snowy Water Licence rules. **It would also investigate potential operational or rule changes to improve flood mitigation functions.** This would involve the following components:

- **review current WaterNSW operations for Blowering and Burrinjuck dams in the lead up to, and during, floods and spills and identify any potential improvements**
- **investigate the effectiveness of current Blowering and Burrinjuck dams’ airspace rules for flood mitigation, and identify any limitations**
- **use the new climate datasets to better inform future climate risks for extreme wet conditions and potential risk of increased flood probability in the future**
- review the interaction between the Snowy Water Licence and the Blowering Airspace Deed and its appropriateness in the context of a changing climate
- investigate the benefits and impacts of increasing the airspace in Blowering Dam
- review the flood operation and data sharing arrangements for the ACT’s storages and investigate potential operational improvements.” [emphasis added].

(ii) The DPE states the existing problem in this way:

“• Current dam operations during floods and spills are required to balance dam safety and flood mitigation for downstream communities with regional water security (i.e. ensuring the storage is as full as possible at the end of the flood event). Uncertainty associated with weather forecasts and the balancing of the two storages present challenges for decision making on the timing and magnitude of pre-releases to provide adequate airspace.

- Some current rules can contribute to physical spills from Blowering Dam or the need for releases to prevent it from exceeding full storage level, under a return to expected minimum inflow conditions prior to an onset of water supply demands. These uncontrolled spills can impact on downstream flooding and affect subsequent water availability.
- The water sharing plan does not explicitly require the Tumut River channel capacity constraints to be complied with.
- Flooding is a vital, natural process that supports the region’s environment and facilitates longitudinal and lateral connectivity across the Murrumbidgee system. Flood mitigation needs to be balanced with the water needs of the environment.” [emphasis added].

(iii) The DPE states the benefit of introducing Option 42 in this way:

“If the option is progressed in the Murrumbidgee region, it would:

- support the implementation plan of the Ten-Year Review of the Snowy Water Licence
- **improve integrated flood management by coordinating Snowy Scheme releases and flood operation of Murrumbidgee region’s major storages and airspace**
- **potentially reduce unused spills from Blowering Dam**
- **potentially reduce the potential future flood risk in the Murrumbidgee catchment.**” [emphasis added].

75. In the light of the Draft Water Strategy for the M, and in particular the emphasised material in the preceding para, **the NRC should advise and recommend** that:

(a) The WSP for the M be remade with clauses that address, in a manner which binds Water NSW in a clear terms, each of the DPE’s Options, existing problems, and benefits of introducing the option, to which emphasis has been given by me in paras (c), (e), (f), and (h) of the preceding para. As to this:

(i) In some cases, I have offered, in other Parts of this Submission, the precise wording of clauses of the remade WSP for the M to give effect to those matters in paras (c), (e), (f), and (h) of the preceding para which would be appropriate for the NRC to advise and recommend.

(ii) Only to the extent that I have not offered precise wording of clauses of the remade WSP for the M to give effect to those matters in paras (c), (e), (f), and (h) of the preceding para, the NRC should advise and recommend that the wording be as formulated by Water NSW.

(b) The use of new climate datasets, to better inform future climate risks for extreme wet conditions and potential risk of increased flood probability in the future, and that the parameters of the CARM decision tools be modified accordingly.

76. I believe it will greatly assist the NRC in relation to all the matters in the preceding para, and how the NRC should advise and recommend, that the NRC should inform itself in a particular way on the as set out in the last para of **Part 11** below. I expect the NRC will find it instructive – in a real and practical situation – as to what changes the NRC should advise and recommend be made to the WSP for the M and to CARM.

PART 11 – WATER NSW, THE WATER NSW ACT

77. **Status of Water NSW.** Water NSW is a “statutory State owned corporation” or “statutory SOC” [s 3 and Schedule 5 State Owned Corporations Act 1989]. In passing, I note that the correct name of the corporation is “Water NSW”, not “WaterNSW”.
78. **Overview of significance of Water NSW.** Water NSW is Australia’s largest water supplier. Two-thirds of water used in NSW is supplied by Water NSW.
79. **Water NSW’s summary of its legislative framework.** The Water NSW website at <https://www.waternsw.com.au/about/legislation> describes, under the heading “What Guides Our Business”, the legislative framework applicable to it in the following way:
- “Water NSW’s activities are guided and regulated by:
- *Water NSW Act 2014*
 - *Water NSW Regulation 2020*
 - *Water Management Act 2000* and *Water Act 1912*
 - Operating licence
 - Water sharing plans
 - Memoranda of understanding
 - Water supply agreements
 - Catchment audits
 - NSW rural water pricing
 - *Dams Safety Act 2015*
 - Roles and Responsibilities Agreement (DPIE – Water, NRAR and Water NSW)
 - NSW Water Strategy
 - Water NSW Reconciliation Action Plan
 - Statement of Expectations for Water NSW 2022”.
80. Of the 14 descriptors listed in the above para, only those which are directly relevant to the WSP for the M, whether it is meeting various outcomes, and the changes that are needed to improve outcomes, are discussed below.
81. **Objectives of Water NSW.** On 01/01/2015, the 81-page Water NSW Act effected the change of name above and it:
- (a) States that one of the 4 “principal objectives” of Water NSW is to “capture, store and **release water in an** efficient, effective, **safe** and financially responsible **manner**” [s 6(1)(a)].

(b) States that another of the 4 “principal objectives” of Water NSW is “**to ensure**” that catchment areas and **water management works “are managed** and protected **so as to promote** water quality, the **protection of** public health and **public safety**, and the protection of the environment” [s 6(1)(c)].

(c) States that one of its 4 “other objectives”, each of which is “not as important as the principal objectives”, is “**to exhibit a sense of social responsibility by having regard to the interests of the community in which it operates**” [s 6(2)(b)].

(d) States that another of its 4 “other objectives” is, “where its activities affect the environment, to conduct its operations in compliance with the principles of ecologically sustainable development contained in section 6(2) of the Protection of the Environment Administration Act 1991” [s 6(2)(d)].

82. **Listed functions of Water NSW.** The Water NSW Act states that Water NSW has 11 “listed functions”, which:

(a) “may only be exercised under the authority of, and in accordance with, one or more operating licences” (which are granted under the Water NSW Act); and

(b) “are subject to any applicable requirements under the *Water Management Act 2000* or the *Water Act 1912*” [s 7(3)].

83. Among the 11 “listed functions” of Water NSW are:

(a) “to capture and store water and to **release water**”:

(i) to persons entitled to take the water and

(ii) “**for any other lawful purpose**, including the release of environmental water” [s 7(1)(a)].

(b) to construct, maintain and operate water management works [s 7(1)(f)].

(c) “**to undertake flood mitigation and management**” [s 7(1)(i)].

84. Water NSW also has such other functions as may be conferred or imposed on it by another provision of the Water NSW Act, or by any other Act or law, or by an operating licence [s 7(4)].

85. “**Function**” includes a duty. Under the Water NSW Act, the word “function” is defined as follows: “**function** includes a power, authority or duty, and **exercise** a function includes perform a duty.” [s 3].

86. The word “flood” appears 4 times in the Water NSW Act:

(a) First, as one of the 11 “listed functions” of Water NSW in para (c) above.

(b) Second, in s 64A in the context of the “Warragamba Dam project” it is used in the phrase “for the purpose of facilitating flood mitigation downstream of the dam.”

(c) Third, in s 64F in the context of the Warragamba Dam it is used in the phrase “flood event”.

(d) Fourth, in Schedule 2 (transitional provisions) it is used in a similar manner to para (a) above.

87. The word “drought” does not appear in the Water NSW Act.

88. **Flood mitigation.** The phrase “flood mitigation”, which is used in one of the 11 “listed functions” of Water NSW and repeated in the Operating Licence (see **Part 14** below), is not defined. **The NRC should advise and recommend** that a definition of “flood mitigation” be added to the Water NSW Act. One possible wording might be:

“**flood mitigation** means reducing river levels downstream of the dam, which are or may become at flood level, by using planned and modelled airspace in the storage to temporarily store floodwater and only releasing that floodwater later when the downstream river levels have subsided to a safe level.”

89. Apparently, in the case of Water NSW, flood mitigation would normally be achieved through the water sharing rules found in in the WSP for the M – but as will be dealt with later, they are sadly lacking. In Neal Hughes et al, “Storage Rights and Water Allocation Arrangements in the Murray–Darling Basin” (ABARES Technical Report 13.07, December 2013, 72pp) it states:

“The spill and flooding events of 2010–11 and 2011–12 highlighted the role water storages play in flood mitigation. Flood mitigation is normally achieved though centrally determined water sharing rules. In practice these rules require difficult trade-offs between the risk of flooding and the effects on consumptive users.” [p53].

In the Dictionary at the end of this Submission, I have suggested a definition for “flood mitigation” as it might apply to Water NSW (and Snowy Hydro).

90. **The “Water NSW Annual Report 2020–21”** (176 pages) includes:

(a) The “Message from the Board” includes the statement:

“We have managed major inflow events and sought to maximise water resources. Through prudent management we aim to achieve a balance between water security **whilst working closely with communities in flood prone valleys to manage airspace and mitigate the impact of dam releases.**” [p5].

(b) The “Message from the Chief Executive Officer” opens with:

“The significant and ongoing recovery in water storages from increased rainfall and inflows following one of the worst droughts on record in many valleys has been the theme for 2021. With a significant shift in weather patterns and replenished storages across the State, this has led to increased community confidence addressing the very

real concerns about water security for towns and communities following years of intense drought.

The challenges of managing these major inflow events are significant for our teams across NSW. **We want to ensure we capture as much water as possible** for our customers, but we also **want to work closely with local communities** and environmental water holders **in understanding how best to manage large inflow events, storage airspace and local flooding impacts**. We do this in collaboration with a range of stakeholders, and notably the Bureau of Meteorology, State Emergency Service, NSW Health and local councils.

The ability of our teams and people right across NSW to adjust to changing priorities, major weather events, floods, and working closely with local communities has been and continues to be extraordinary. Managing such events in real time requires the highest levels of operational and technical expertise, catchment knowledge and working closely with other agencies. Our customers and stakeholders across our operations have seen first-hand the dedication of our people to do the best and right thing by local communities.” [p8].

(c) Under the subheading “Who we are” Water NSW states that it is an SOC and operates under its Operating Licence, and then states:

“• We operate the state’s rivers and water supply systems in accordance with the rules set out by regulators

• With **more than 40 dams** across the state, **we supply two-thirds of water used in NSW** to regional towns, irrigators, Sydney Water Corporation and local water utilities

• We also own and operate the largest surface and groundwater monitoring network in the southern hemisphere and build, maintain and operate essential infrastructure.” [p10].

(d) At 30/06/2021, Water NSW had 958 employees, and their total employee remuneration for the year was \$154.9 million [pp 21, 63].

(e) For the year to 30/06/2021, Water NSW paid a total of \$2,596,000 to consultants, including: \$670,000 to Ernst & Young for “strategic advice in relation to water reform and corporate strategy development”; \$510,000 to KPMG for “corporate strategy”; and \$53,000 to Marsdon Jacob Associates Pty Ltd for “Warragamba short term flood mitigation” [p79].

91. The phrases which I have emphasised in the preceding para, of which I am critical, which appeared in the “Water NSW Annual Report 2020–21” (176 pages), should be seriously questioned when viewed in the light of the clear warnings by the BoM of La Niña and the foreshadowing of flooding events and then the actual flooding events that all occurred through to 31/12/2022.

92. **The next annual report, “Water NSW Annual Report 2021–22”** (152 pages), is even more telling:

(a) The annual report mentions the word “flood” no less than 57 times and, as a whole, it reads as though it were written, not by paid professionals responsible for water management, but by public relations people.

(b) Nowhere in the annual report is there an acceptance that the wrong policy settings with respect to flood mitigation need to be corrected, regardless of whether those policies emanate from the DPE, legislation, WSPs, or from other sources. In the light of not only what happened in the year ended 30/06/2022 but also what happened in the ensuing 6 months, it is particularly embarrassing, in the context of the damaging floods of the Area of Concern, to read page 28 dealing with “Managing floods” and the top of page 29 dealing with “Murrumbidgee dams”.

(c) There is an evident lack of focus by Water NSW on the fact that one of its 11 listed functions – and I remind the NRC, the DPE, and Water NSW, that “function” includes “duty” – is “to undertake flood mitigation and management”.

(d) For the year to 30/06/2022, Water NSW paid a total of \$2,305,000 to consultants, including: \$1,312,000 to Partners in Performance International Pty Ltd for “design and development of revised Operating model and cost transformation program”; and \$286,000 to Ernst & Young for another year of “strategic advice in relation to water reform and corporate strategy development” [p52].

93. **Values and reporting obligations of Water NSW.** At page 9 of the “Water NSW Annual Report 2021-22” it sets out the 6 values – “the principles and behaviours that drive us” – of Water NSW. As to these:

(a) The first value stated by Water NSW is: “**Think customer** – In every decision we make, consider the benefit to our customers.” [emphasis in original]. For me, the word “customer” in this context has its ordinary meaning, namely, “a person who buys goods or a service”. This is consistent with the way “customer” is defined in the Operating Licence of Water NSW, to the effect that the “customers” of Water NSW are those authorised to take and use bulk water. The way in which this first value is stated, coupled with the fact that the other 5 values have nothing to say about other people or other considerations to consider in every decision, strongly implies that Water NSW’s number one, and only, value in making decisions is considering the benefit of those who have rights to take and use water. In that I include environmental flows on the basis that the environment is anthropomorphised and thereby is also a customer. **What is completely missing from Water NSW’s values is the need to consider in every decision safety and possible damage to each community in which Water NSW operates.** While it will be a matter for Water NSW to come up with the wording that is appropriate, one possibility is to restate Water NSW’s first value as:

“Think community and customer – In every decision we make, consider safety first, and then consider both the effects on each community in which we operate and the benefit to our customers.”

It is not just my view that Water NSW must change its principal value from just considering the benefit of customers to considering safety, each community in which Water NSW operates, and customers: the Water NSW Act specifies that one of the principal objectives of Water NSW is to have “regard to the interests of the community in which it operates” [s 6(2)(b)]. **The NRC should advise and recommend** that Water NSW modify its values to reflect the preceding comments.

(b) The third value stated by Water NSW is: **“Own it** – We do what we say we will do and take ownership of our actions”. [emphasis in original].

(c) The fourth value stated by Water NSW is: **“Drive change** – We are open to change and always improving the way we do things”. [emphasis in original]. Aspects of this include:

(i) This “Drive change” value, and perhaps also the “Own it” value in para (b) above, must be viewed in the context of a particular mandatory reporting requirement applicable to Water NSW. **It is mandatory on Water NSW to include in its “report of operations”: “Economic or other factors: Factors that have affected the achievement of the operational objectives of the statutory body during the reporting year.”** [s 9(2) Annual Reports (Statutory Bodies) Act 1984 (NSW); and clause 13, Schedule 1 Report of operations, Annual Reports (Statutory Bodies) Regulation 2015 (NSW)].

(ii) For the purpose of Water NSW’s statutory reporting obligation under para (i) above, the “operational objectives” of Water NSW clearly include “flood mitigation”. The term “operational objectives” is understandably not defined and must be understood by reference to the particulate statutory body’s circumstances. In the case of Water NSW, it is abundantly clear that its “operational objectives” include “flood mitigation”. This is made clear by: first, the Water NSW Act states that its “principal objectives” include to release water in a safe manner, and to manage water management works so as to promote “public safety”, as to which see the emphasised material near the start of this **Part 11**; second, the Water NSW Act states that “flood mitigation” is one of the 11 “listed functions” (read “duties”) of Water NSW, as to which see near the start of this **Part 11**; and third, the “Operating Licence” under which Water NSW operates treats flood mitigation in this way, as to which see **Part 14** below.

(iii) Water NSW is both failing to “drive change” with respect to flood mitigation and has thus far failed to include in its annual reports those factors which have affected the achievement of the operational objectives of Water NSW. Those failures are with respect to its operational objective of “flood mitigation and management”.

Water NSW is on the public record – as recorded in various places in this Submission – to the effect that the variable airspace operation of the Burrinjuck Dam is causing Water NSW to have to refill the dam as soon as possible – with disastrous consequential flooding events when the BoM has advised that La Niña is operational and the risk of heavy downpours high. Further, Water NSW is on the public record – also recorded in various places in this Submission – to the effect that the wording of the WSP for the M is overly complex and difficult to understand. For example, Water NSW stated in 2017: “From both the system operator and customer perspective, **the existing water sharing rules are overly complex, difficult to understand and do not allow operators the flexibility they need** to achieve the best possible outcome for customers and the environment.”

94. **The NRC should advise and recommend** that Water NSW comply with its statutory obligation (and values) as referred to in the preceding para by setting out in each of its Annual Reports the specific provisions, or lack of them, in the WSP for the M, and relevant legislation, that Water NSW considers are factors that have affected the achievement of its objective of flood mitigation, and the nature of the changes that would cause Water NSW to be no longer affected in achieving its operational objective of flood mitigation.
95. **The Water NSW website** at <https://www.watarnsw.com.au/supply/flood> states under the heading “Flood Information”:

“As Australia commonly experiences a range of natural events such as fire, **flood** and drought we **closely plan for, monitor and manage such events. High rainfall events that extend over our catchment areas can lead to increases in our dam and storage levels, resulting in them spilling. Water NSW closely monitors these events and works together with other key agencies to manage the dams during these incidents.**

The Bureau of Meteorology (BoM) is the agency responsible for issuing information about rainfall, river levels and flood. For the most up to date information on flood watches and warnings visit the BoM website.”

96. I feel that **the above statements by Water NSW are unsatisfactory**. In the context of the NRC’s review of the WSP for the M, and in particular the Area of Concern, it would appear that **there is no clear responsibility on either Water NSW or the BoM, or the unnamed “other key agencies”, as to what steps will be taken when and by which entity**. In **Part 12** below, and in other various places in this Submission, I suggest possible ways of addressing that unsatisfactory situation.
97. **Early Warning Network (EWN)**. Water NSW has an automated notification system, the “Early Warning Network” or “EWN”, to improve notification of dam and supply activities to the public. For information on this see <https://www.watarnsw.com.au/supply/ewn>. Following the December 2010 floods in the Tumut and Murrumbidgee Rivers, the trial of the EWN was announced by the Minister on 11/01/2012, and the EWN commenced in October 2012.

98. **EWN notifications re the 2 dams.** The following are examples of EWN notifications:
- (a) On 05/10/2022 at 8.05 am the “Burrinjuck dam pre-release and airspace notification” stated: “Flows are decreasing from 23,000 Megalitres per day to 12,000 Megalitres per day.”
 - (b) On 05/10/2022 at 5.33 pm the “Burrinjuck dam pre-release and airspace notification” stated: “Flows are decreasing from 12,000 Megalitres per day to 5,600 Megalitres per day.”
 - (c) On 06/10/2022 at 4.02 pm the “Burrinjuck dam pre-release and airspace notification” stated: “Flows are decreasing from 5,600 Megalitres per day to 450 Megalitres per day.”
 - (d) On 06/10/2022 at 4.20 pm the “Blowering dam flow decrease notification” stated: “Releases are planned to decrease from 5,000 ML/day to 600 ML/day by 6 PM on Thursday, 6 October 2022.”
99. **SES warnings re Murrumbidgee.** At the same time as the above EWN notifications were being made, the SES:
- (a) On 06/10/2022 at 10.52 pm, issued a “Flood Advice” of “Stay Informed” which, in essence, warned that the Tumut River at Tumut may reach the minor flood level of 2.0 metres late that afternoon.
 - (b) On 07/10/2022 at 6.31 am, issued a “Flood Advice” of “Stay Informed” which, in essence, warned with the heading “Oura flooding” but was more general in the text, advising “predicted likely minor flooding on the Murrumbidgee River: Low lying areas; Oura camping area”. It also added: A Flood Watch is current for the Murrumbidgee and Tumut Rivers”.
100. The webpage for the SES does not enable me to access earlier Flood “Advices” and Flood “Watch and Acts”. Even so, it is clear that the 06 and 07/10/2022 “Flood Advices” listed above were not preceded by anything in the 3 days prior to 06/10/2022.
101. From just the above small snapshots, I feel the role of both Water NSW and the SES to be most unsatisfactory with respect to flood mitigation arising from the operations of the Burrinjuck Dam and the Blowering Dam. On 13/09/2022, the BoM issued its fortnightly update on the ENSO Outlook, with its leading point being: “The ENSO Outlook dial has been raised to LA NINA.” The BoM stated “**Models indicate this La Niña event may peak during the spring and return to neutral conditions early in 2023.** La Niña events increase the chances of above-average rainfall for northern and eastern Australia during spring and summer.” In other words, **22 days before** flood warnings were issued, Water NSW had been advised that between 13/09/2022 and “early 2023” the heavy downpours that are a feature of a La Niña event were being

predicted by the BoM. Yet Water NSW arguably did not do enough by way of increasing outflows to prepare for the expected 4 months of heavy downpours.

102. **I submit that the NRC should look into the circumstances** in the preceding 4 paras, and the similar circumstances in the lead up to each of the October 2022 and December 2022 floods in the Area of Concern. I expect the NRC will find it instructive – in a real and practical situation – as to what changes the NRC should advise and recommend be made to the WSP for the M. In particular, I submit that the NRC should ask Water NSW to provide to the NRC all relevant information sufficient to explain:

(a) how Water NSW perceived its function of flood mitigation under the WSP for the M; and

(b) how Water NSW carried out that function, first during particular months and then weeks and days in the lead up to the flooding events, and second on each day and within days during the flooding events; and

(c) how Water NSW has interpreted relevant clauses of the WSP for the M, or the lack of clauses that helped or clarified matters, and particularly what are the constraints within the WSP for the M that Water NSW felt limited its capacity to do more, and to do it in a more time-critical manner, in relation to flood mitigation; and

(d) what are the changes to the wording of the WSP for the M that Water NSW believes would have resulted in Water NSW being able to make decisions and take actions in the months, weeks, and days in the lead up to October 2022 and December 2022, and then on each day during October 2022 and December 2022, so that the flooding events would have been avoided altogether; and

(e) what are the changes to the CARM modelling tools (see **Part 4** above) that Water NSW believes would have assisted in avoiding the flooding events altogether; and

(f) if relevant, what are the changes to the IQQM modelling tool (see **Part 15** below) that Water NSW believes would have assisted in avoiding the flooding events altogether.

The NRC should advise and recommend changes to the WSP for the M, CARM and, if applicable, IQQM, arising from the relevant information about the matters in paras (a) to (f) above.

PART 12 – POSSIBLE WORDING OF A WATER NSW AMENDMENT BILL

103. **The NRC should advise and recommend** that the Minister seek amendments of both the Water NSW Act, and the Operating Licence of Water NSW, to the following effect:

(a) Make Water NSW solely responsible for making and announcing, in the light of all available information, and regardless of whether that information is issued or not and

whether that information is from the BoM or otherwise, the determinations and predictions in para (b) below.

(b) Water NSW must:

- (i) determine what the storage release from each of the Burrinjuck Dam and the Blowering Dam will be over what period; and
- (ii) predict the quantum of spillage for each such dam in that same period; and
- (iii) predict what the river levels and other flooding consequences downstream of the confluence of the Murrumbidgee and Tumut Rivers will be at specified points in the Area of Concern in that period; and
- (iv) publicly announce its determinations and predictions under paras (i) to (iii) above in a timely manner with a view to its Flood Protection and Control Duty being carried out as soon as practicable.

(c) Water NSW must make such determinations, predictions, and announcements, as and when Water NSW considers it appropriate, in the light of:

- (i) Water NSW has a Flood Protection and Control Duty, in carrying out its other “listed functions”, to minimise the existing and future risk to human life and property, from the effects of flooding; and
- (ii) Water NSW has a Flood Protection and Control Duty, in carrying out its other “listed functions”, to take all steps reasonably necessary to avoid a threat to life or property arising from floods; and
- (iii) all other circumstances.

(d) Each Flood Protection and Control Duty in para (c) above must be carried out by Water NSW in those parts of the Area of Operations of Water NSW, whose meaning is given in s 15 of the Water NSW Act, as are prescribed by the regulations. The Area of Concern must be one of those parts so prescribed.

(e) Each Flood Protection and Control Duty in para (c) above is added to the “listed functions” of Water NSW in s 7 of the Water NSW Act. They might become s 7(1)(ha) and (hb) of the Water NSW Act.

(f) Paras (a) to (e) above:

- (i) are subject to any direction of the Commissioner or “senior emergency officer” under Part 5 of the *State Emergency Service Act 1989* (NSW) where that direction is in writing to Water NSW and bears the signature of the Commissioner or the “senior emergency officer” giving the direction; and
- (ii) do not authorise Water NSW to take measures directed at bringing an industrial dispute to an end; and

(iii) do not authorise Water NSW to take measures directed at controlling a riot or other civil disturbance.

(g) The terms of paras (a) to (f) above are added to s 12 of the Water NSW Act, which deals with the terms and conditions of an operating licence, as either s 12(2)(c) or s 12(8).

104. **Water NSW Amendment Bill.** If the effect of what I have stated in the whole of the preceding para were converted into a series of sequential amendments to the Water NSW Act, one version of what might appear in the Bill, which **the NRC should advise and recommend** that Minister introduce as a Bill, would be as follows:

“Schedule 1 Amendment of Water NSW Act 2014

[1] Section 7 (1) Additional provisions

Insert after section 7 (1) (h):

(ha) in carrying out its other listed functions, to take all steps reasonably necessary to avoid a threat to life or property arising from floods, including complying with subsections (2A) to (2F),

(hb) in carrying out its other listed functions, to minimise the existing and future risk to human life and property, from the effects of flooding, including complying with subsections (2A) to (2F),

[2] Section 7 (2A) Flood protection and control duties

Insert after section 7 (2):

(2A) For the purposes of this Act, each of the listed functions in sections 7 (1) (ha) and (hb) is a **“flood protection and control duty”**.

(2B) Each flood protection and control duty must be carried out by Water NSW in those parts of the area of operations of Water NSW as are prescribed by the regulations.

(2C) The Murrumbidgee Area of Concern must be one of those parts which are prescribed under subsection (2B). The **“Murrumbidgee Area of Concern”** means:

(a) the area which is 4 kilometres either side of what Water NSW has most recently recorded is the median point of the Murrumbidgee River when the river level at Wagga Wagga (gauging station 573000/410001) is between 4.5 and 5.5 metres, such median point and area being recorded as a continuous line for the length of that part of the Murrumbidgee River which is:

(i) from the confluence of the Tumut River and the Murrumbidgee River,

(ii) to the point on the Murrumbidgee River which is 8 kilometres, as the crow flies, north-west of the Munday Lane Bridge (which bridge is about 15 km west of the CBD of Wagga Wagga); and

(b) the area which is 2 kilometres either side of what Water NSW has most recently recorded is the median point of the Tumut River, such median point and area being recorded as a continuous line for the length of that part of the Tumut River which is from immediately below the wall of the Blowering Dam to the confluence of the Tumut River and the Murrumbidgee River.

(2D) As part of carrying out its flood protection and control duties, Water NSW is solely responsible for making, in the light of all available information, and regardless of whether that information is issued or not and whether that information is from the Bureau of Meteorology or otherwise, those determinations and predictions as are prescribed by the regulations. In relation to the Murrumbidgee Area of Concern, those determinations and predictions must be as follows:

(a) Water NSW must determine what the storage release from each of the Burrinjuck Dam and the Blowering Dam will be over what period; and

(b) Water NSW must predict the quantum of spillage for each such dam in that same period; and

(c) Water NSW must predict what the river levels and other flooding consequences downstream of the confluence of the Murrumbidgee River and Tumut River will be at Wagga Wagga and not less than 2 other specified points in the Area of Concern in that period.

(2E) Water NSW must publicly announce its determinations and predictions under subsection (2D) in a timely manner with a view to its flood protection and control duties being carried out as soon as practicable.

(2F) Water NSW must make such determinations, predictions, and announcements, as and when Water NSW considers it appropriate, in the light of its flood protection and control duties, its other listed functions, and all other circumstances.

(2G) Subsections (2A) to (2F):

(a) are subject to any direction of the Commissioner or “senior emergency officer” under Part 5 of the *State Emergency Service Act 1989* (NSW) where that direction is in writing to Water NSW and bears the signature of

the Commissioner or the “senior emergency officer” giving the direction;
and

(b) do not authorise Water NSW to the take measures directed at bringing
an industrial dispute to an end; and

(c) do not authorise Water NSW to the take measures directed at controlling a riot or
other civil disturbance.”

105. The reasons I press for the ‘Murrumbidgee Area of Concern’ clauses to be in the Bill, as set out in the preceding para, are that they should be enacted as part of the Water NSW Act, rather than form part of a regulation under that Act. Provisions in regulations are more readily amended and repealed, and effected with less oversight and opportunity to debate, than provisions in an Act.

PART 13 – WATER MANAGEMENT ACT

106. **Overview.** In summary, the 362-page Water Management Act:

(a) Controls the extraction of water, the use of water, the construction of works, and the carrying out of activities on or near water sources in NSW.

(b) Sets out “water management principles”.

(c) Empowers the Minister to make management plans, which deal with the matters in para (a) above. Under such power the WSP for the M was made.

(d) The Water Management Act repealed the *Water Act 1912* (NSW) [s 401, Schedule 7]. However, there were transitional and savings provisions. The Water Management Act will eventually replace the *Water Act 1912* (NSW), which remains in force in some areas of NSW but it seems that it is not relevant to this Submission.

107. As noted in **Part 11** above, the 11 “listed functions” of Water NSW are subject to any applicable requirements under the Water Management Act.

108. **Flood mitigation irrelevant.** It is fair to say that the Water Management Act, surprisingly, has very little to say about “flood mitigation” in relation a WSP. Aspects of this include:

(a) The word “flood” appears 211 times in the Water Management Act. However, nearly all of these mentions are irrelevant to a WSP.

(b) The phrase “floodplain management” appears 15 times in the Act and in sections that might, at first, appear to be important. However, as noted below in relation to “Floodplain”, there is no legally declared “floodplain” relevant to the Area of Concern.

(c) The phrase “flood mitigation” appears a number of times, but principally in relation to, first, the Hunter Valley and, second, empowering an authority to levy “flood mitigation service charges” on land within a floodplain.

109. **Water management principles.** In the Water Management Act the “water management principles”, around which water management planning in Chapter 2 (sections 5 to 51) and many other provisions revolve, fall into 6 categories: general; water use; drainage management; floodplain management; controlled activities; and aquifer interference activities [s 5]. It is the statutory duty of all persons exercising functions under the Act “to take all reasonable steps to do so in accordance with, and so as to promote, the water management principles...” [s 9(1)].
110. Even though the statement of the “water management principles” in s 5 runs to over 1½ pages, there is no reference in there to either “drought” or “flood mitigation”. **The NRC should advise and recommend** that an amendment of the “water management principles” in s 5 of the Water Management Act should be made to insert repeated references to “flood mitigation”.
111. **Extreme event.** In the Water Management Act, the term “extreme event” is defined as any of: “an extreme dry period”; a water quality event rendering water acutely toxic or unusable; or any other type of event that has resulted in the suspension of a WSP [Dictionary]. It is bizarre that “an extreme wet period”, or some like phrase to reflect flooding events, is not listed as an additional “extreme event”. Aspects of this include:
- (a) The floods in particular regions in particular years in the history of NSW should have made it obvious that flooding in that region in that year is, in anyone’s terms, an “extreme event”, just as drought is. The floods across so many parts of NSW during 2022 highlight the absurdity of flooding not being part of the definition of “extreme event”.
- (b) Thus the DPE in October 2022 had to come to grips with the reality of what the community thinks when it issued its 26-page “Draft Regional Water Strategy Lachlan: Shortlisted Actions – Executive Summary”. In it, the DPE uses the phrase “extreme event” 16 times, both in relation to flooding and drought. With some irony, the DPE then announced that “due to the extensive flooding situation impacting communities across the Lachlan region at the time,” the DPE decided to re-exhibit the draft Strategy in 2023. I believe that both the community and the DPE views flooding as an extreme event, and yet the Water Management Act – unaltered in this respect since 2000 – did not reflect that view in 2000, and even more strongly does not reflect that view today.
- (c) The addition of “an extreme wet period” to the definition of “extreme event” in the Water Management Act is not just cosmetic. It has real consequences. An example of this is to be found in the fact that the 30-page document “NSW Extreme Events Policy: Policy Framework for the Management of NSW Murray–Darling Basin Water Resources during Extreme Events” explicitly does not deal with flooding events. This omission is a matter to which I return in **Part 15** below.

- (d) **The NRC should advise and recommend** that the definition of “extreme event” in the Water Management Act be amended to include: “(ab) an extreme wet period.”
112. **Floodplain.** In the Water Management Act the phrase “floodplain management” is not defined. However, in the Dictionary at the end of the Act the word “floodplain” is defined to mean “land declared by the regulations to be a floodplain”. This strongly suggests that the phrase “floodplain management” in the Act only applies in relation to land which has been declared by the regulations to be “a floodplain”, and that within the Water Management Act the phrase “floodplain management” has no application to any other land.
113. So far as I can tell, the only land in NSW declared under legislation to be a “floodplain” are:
- (a) 6 separate areas in northern NSW specified in regulation 252, and depicted on 6 maps in Schedule 6, of the *Water Management (General) Regulation 2018* (NSW).
- (b) 10 areas the subject of localised floodplain management plans under Part 8 of the *Water Act 1912* (NSW). Of those 10, only one such plan relates to the Murrumbidgee River: It is within the LGA of Hay Shire, extends from 11 km upstream of Hay to just downstream of Maude, and covers an area of about 1,700 km². Given it is so far downstream of urban Wagga Wagga and outside the LGA of Wagga Wagga, I consider it beyond the scope of the matters discussed in this Submission.
114. No part of the Area of Concern is declared to be “a floodplain” for the purpose of either the Water Management Act or the *Water Act 1912*. It follows that the provisions of the Water Management Act concerned with “floodplain management” do not apply to any part of the Area of Concern. **Part 16** below deals with the role of local councils in floodplain risk management.
115. **Management plan or Minister’s plan.** Under the Water Management Act there are 2 ways in which a plan for water sharing can be made:
- (a) One option is that the Minister goes down the route of Parts 2 and 3 of the Act. This, in essence, involves the Minister establishing a management committee for the water management area. It must consist of 12 to 20 people who represent specified community and other interests [ss 12, 13]. A major task of the committee is to prepare a draft management plan for the management area [s 14]. Part 3 (ss 15 to 49B) spells out: what the draft management plan must include; how the draft is submitted to the Minister for approval; how the “**management plan**” is ultimately made by the Minister under s 41; and how the plan may be subsequently varied.
- (b) The other option is that the Minister circumvents the involvement of a committee altogether and the Minister, instead, makes a “**Minister’s plan**” [s 50].
116. The 80-page *Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016* (NSW) (“**the WSP for the M**”) was made by the Minister under s 50 of the Water Management Act – option (b) above. The WSP for the M and other WSPs have been

made by the relevant Minister under s 50, thereby circumventing community involvement in the preparation of the plan under option (a) above.

117. **What a Minister’s plan must contain.** Given that the WSP for the M is in respect of only one water management area, the Water Management Act mandates that Part 3 (ss 15 to 49B), with a few exceptions, applies to the WSP for the M [50(2A)]. The exceptions are ss 15 and 36-41 which deal with a committee preparing the plan [s 50(2A)]. So for present purposes, it is sufficient to outline below what the Water Management Act expects to be put into a “management plan” as this also informs as to what was expected to be put into the WSP for the M.
118. **What the WSP for the M must contain.** A “management plan” prepared by the committee under Part 3 of the Act, which is option (a) above, must meet certain requirements. A Minister’s plan, of which the WSP for the M is an example, must meet at least the following requirements:

(a) **State government policy.** The Minister’s plan must be “consistent with”, among other things, “State government policy” [s 16(1)(e)]. Unhelpfully, it states that for this purpose, “State government policy includes such matters as are declared by the regulations to be State government policy.” [s 16(2)]. The use of “includes” means that there will usually be a lot of documents not referred to in the regulations but which nevertheless qualify as “State government policy” with which a management plan must be consistent. **The NRC should advise and recommend** that the WSP for the M be amended so that it complies with s 16(1)(e) of the Water Management Act, and in particular with the “State government policy” with respect to flood mitigation as set out in numerous places in **Parts 9, 10 and 11** above.

(b) **Water sharing provisions.** To the extent that a Minister’s plan deals with water sharing, the Minister’s plan must deal with:

- (i) the establishment of environmental water rules;
- (ii) requirements for water “to satisfy basic landholder rights”;
- (iii) requirements for water “for extraction under access licences”;
- (iv) the establishment of “access licence dealing rules”;
- (v) “the establishment of a **bulk access regime for the extraction of water under access licences**” having regard to paras (i) to (iv) above [s 20(1)].

(c) **Bulk access regime.** The “bulk access regime” in para (v) above:

- (i) must recognise and be consistent with any limits to the availability of water;
- (ii) must establish rules according to which WALs are to be granted and managed and “available water determinations” to be made;
- (iii) “must recognise the effect of climatic variability on the availability of water”;

(iv) may establish rules with respect to priorities and adjustments arising from any reduction in the availability of water;

(v) may contain conditions in relation to WALs; and

(vi) “must be consistent with the water management principles”. [s 20(2)].

(d) **Additional provisions.** The water sharing provisions may also deal with the following matters:

(i) the rate, times, and circumstances under which water may be taken;

(ii) the kinds of water supply works that may be constructed and used;

(iii) the operation of water accounts, carrying over of credits, and so on, and “the withdrawal of water from any account by reason of ... dam spill”;

(iv) measures for the protection of the quality of water;

(v) “**measures to give effect to the water management principles and the objects of this Act**”. [s 21]. [emphasis added].

119. Due to the complete absence of the phrase “flood mitigation” from any of the 16 matters listed across paras (b), (c), or (d) above, **the NRC should advise and recommend that** ss 20 and 21 of the Water Management Act should be amended to make it clear that every management plan, and thereby every Minister’s plan, must incorporate provisions dealing with “flood mitigation”. Such amendments may go so far as requiring that there be rules for the establishment of a specified amount of airspace for each storage within the water management area, and the circumstances in which that amount of airspace may be increased and decreased. Such circumstances might, for example, depend on the BoM’s fortnightly update on the ENSO Outlook.
120. **Available water determinations (AWDs).** From time to time, the Minister may make an “available water determination” as to the availability of water for one or more categories or subcategories of WALs in the water management area [s 59]. This has the effect of reducing the taking of water in specified ways across WALs with priority again being given under the preceding para [s 60].
121. **AWD methodology.** In March 2022, the DPE published its 18-page document “Water Allocation Methodology: Murrumbidgee Regulated River Water Source”. It is freely accessible at https://www.industry.nsw.gov.au/data/assets/pdf_file/0017/512504/wam-murrumbidgee-regulated-river.pdf. This document: explains the methodology; it indicates the underlying thinking, policy, and priorities (“drought” being mentioned 8 times, and no mention at all of “flood”); and in its pages 2 and 3 it brings together the volumes of a 100% allocation to the numerous categories of people and purposes in clauses 18 to 41 and 65(2) of the prior WSP for the M. **The NRC should advise and recommend** that the AWD methodology, whether published or not, be revised to take into account floods, airspace requirements, and flood mitigation.

122. **Compensation payable if WALs affected by alterations.** There are complex provisions in the Act (ss 86 to 87A) which run to nearly 4 pages, which provide for **the Crown to pay compensation to the holder of a WAL if there are reductions in water allocations arising from variations of a bulk access regime**, of which the recent WSP for the M is an example. There are many conditions to be satisfied before compensation becomes payable. This is a matter which the NRC must address in its report to the Minister under s 43A of the Water Management Act. Obviously, the NRC with legal advice will form its own view, but I believe that **none of the changes that I seek in this Submission be made to the recent WSP for the M give rise to any compensation payable under s 87AA of the Water Management Act.**

PART 14 – OPERATING LICENCE OF WATER NSW

123. **Operating licence.** As emphasised in **Part 11** above, Water NSW has 11 “listed functions” and they may only be exercised under the authority of, and in accordance with, one or more operating licences. Aspects of the Operating Licence granted to Water NSW include:
- (a) The Operating Licence commenced on 01/07/2022 and expires on 30/06/2024.
 - (b) The 61-page licence is entitled “Water NSW operating licence 2022–2024”. Though the licence is branded with the “IPART” acronym, the licence is granted by the Governor on the recommendation of the portfolio Minister [s 11(1) Water NSW Act]. That said, the statutory functions of IPART include the making of recommendations to the portfolio Minister for or with respect to the granting, amendment or cancellation of an operating licence [s 56(2) Water NSW Act].
 - (c) The Governor, on the recommendation of the portfolio Minister, determines the terms and conditions of an operating licence, and may amend an operating licence [ss 12, 13 Water NSW Act]. That said, the statutory functions of IPART include the making of recommendations to the portfolio Minister for or with respect to imposition, amendment or cancellation of conditions in relation to an operating licence [s 56(2) Water NSW Act].
 - (d) The functions of IPART in relation to an operating licence include monitoring and reporting to the portfolio Minister on compliance by Water NSW with its operating licence [s 56(3) Water NSW Act]. A 42-page “Water NSW Reporting Manual 2022-2024” (published July 2022) sets out what and when must be reported on by Water NSW. Such reports are to be made to IPART and to some other entities such as NSW Health. The word “flood” does not appear in this “Reporting Manual”, or the 2017-2022 manual which preceded it. **The NRC should advise and recommend** that the “Water NSW Reporting Manual 2022-2024” be amended to include requirements with respect reporting with respect to flood mitigation.
124. The Operating Licence of Water NSW:

(a) Repeats, in the same or similar wording, the 11 “listed functions” referred to in **Part 11** above [clause 1.2.1]. In the Operating Licence the last “listed function” is stated as: “**to undertake flood mitigation and management in all areas of New South Wales, except for the Sydney Catchment Area**” [clause 1.2.1 k].

(b) States: “Water NSW must maintain jointly with Sydney Water, and deliver on actions specified in, the Greater Sydney Drought Response Plan” [clause 2.8.4].

125. The word “flood” appears 4 times in the Operating Licence of Water NSW:

(a) First, as per para (a) above.

(b) Then 3 times in the context of one part of Table A.7 dealing with assessing an application for a flood work approval.

126. The word “drought” appears 6 times in the Operating Licence of Water NSW:

(a) First, in clause 2.5.1 in the context of requiring Water NSW to “recalculate the System Yield in respect of a Declared Catchment Area on the occurrence of any one or more of the following events: a. the conclusion of any drought event affecting the Declared Catchment Area”.

(b) Five times in the context of the Greater Sydney Drought Response Plan.

127. **Customer Advisory Groups.** Clause 6.5 of the Operating Licence requires Water NSW to establish and maintain advisory groups for “Customers” in different regions. For each such Group the membership must be representative of the 10 categories of water users, plus 2 categories of water utilities. In the Operating Licence, “Customer” is narrowly defined and captures only those to whom Water NSW makes direct supply of water. Water NSW is required to “regularly consult” with such Groups. It is notable that this again emphasises the rights of “water users”, with no inclusion of any representatives of the general community who may be very interested in “flood mitigation”.

128. **Community Advisory Groups.** In the light of the deficiency highlighted in the preceding para, **the NRC should advise and recommend** that changes be made to the Operating Licence to require that Water NSW establish and maintain “Community Advisory Groups”, in parallel to the existing “Customer Advisory Groups”, in different regions. To that end, the NRC should advise and recommend that a set of additional clause be added to the Operating Licence which would mirror with appropriate adaptations, or differ from, clauses 6.5.1 to 6.6.4 as follows:

(a) The equivalent of clause 6.5.2 would be to the effect that the Community Advisory Group must be consulted in those circumstances where, based on BoM forecasts, and all the other relevant circumstances, it was likely that issues concerned with flood mitigation may arise. In practice, this would mean that a meeting of a Community Advisory Group would not be convened for a particular region during long periods of

drought, but convened often in periods of predicted heavy inflows with consequential possibility of risk of flooding.

(b) The equivalent of clause 6.5.4 would be to the effect that, for each Community Advisory Group, the membership must meet the following requirements:

(i) Each individual should be representative of those in the community who have experienced one or more flooding events (whether in the region or elsewhere) or who work or reside in a place in the region which has been the subject of one or more flooding events within the preceding 30 years; and

(ii) Each individual must not have a conflict of interest between the membership and purpose of the Community Advisory Group, and any of the categories of “water user” listed in paras a to l of clause 6.5.4. Examples of such of a conflict of interest would be that the following categories of individuals would be ineligible to be a member of the Community Advisory Group: any individual who is, or has been in the preceding 15 years, a water user listed in paras a to l of clause 6.5.4; any individual who is, or has been in the preceding 15 years, a director of, employee of, consultant to, or contractor to any such water user.

(c) The equivalent of clause 6.5.5 would contain the additional requirement that Water NSW provide the Community Advisory Group with the same information that was most recently provided to the Customer Advisory Group, together with the minutes of the last 3 meetings of the Customer Advisory Group.

129. **End of term review.** It is anticipated that “in the first quarter of 2023” an “End of Term Review” will commence, presumably undertaken by IPART or its nominee, to investigate, first, “whether this Licence is fulfilling its objectives” and, second, “any issues which have arisen during the term of this Licence, which may reduce the effectiveness of this Licence” [clause 1.6.1]. **The NRC should advise and recommend** that changes should be made to the Operating Licence to make it more effective in relation to “flood mitigation”.
130. **Defining “flood mitigation” in the Operating Licence.** At the very least, **the NRC should advise and recommend** that “flood mitigation”, where used in clause 1.2.1 k of the Operating Licence, be defined in the Operating Licence. One possible wording might be the:

“**Flood Mitigation** means reducing river levels downstream of the dam, which are or may become at flood level, by using planned and modelled airspace in the storage to temporarily store floodwater and only releasing that floodwater later when the downstream river levels have subsided to a safe level.”

PART 15 – WATER SHARING PLAN FOR THE MURRUMBIDGEE

15.1 INTRODUCTION

131. **Current term.** The term of the WSP for the M:

(a) commenced on 01/07/2016 [clause 3].

(b) is due to expire on 30/06/2026;

(c) may, before such expiry, be extended for another 10-year term, such extension being made by the Minister on the recommendation of the NRC [s 43A Water Management Act].

The 10-year term is designed to support the commercial aspects of the WSP for the M (or any WSP). In this respect the DPE website states:

“The plans also define the rules for access to water by commercial users for 10 years. This supports greater business certainty and assists commercial licence holders in planning for the future.

The plans also strengthen water trading, which allows users to purchase water from licensed users who are not extracting their full entitlement or to sell the licensed water that is surplus to their needs.”

132. **Mid-term review.** The current review date scheduled, in accordance with s 43(1) of the Water Management Act, for the WSP for the M is 30/06/2026. However, it is noteworthy that the WSP for the M, under s 50(4) having the same effect as a “management plan”, the following applies to it:

“In the 5 years before its expiry, the Minister is to review each management plan (other than provisions dealing with water sharing) for the purpose of ascertaining whether its provisions remain adequate and appropriate for ensuring the effective implementation of the water management principles.” [s 43(2)]. “Such a review is to be conducted in consultation with the Minister for the Environment and the Natural Resources Commission.” [s 43(3)].

133. **IQQM.** The Integrated Quantity and Quality Model (“**the IQQM**”) is a hydrologic modelling tool developed by the NSW Government, with collaboration from the Queensland Government. Aspects of this include:

(a) The water sharing provisions of the 2003 WSP, which was the predecessor to the 2016 WSP for the M, were developed using a computer model known as IQQM (Integrated Quantity and Quality Model). The model simulates the behaviour of flows, extractions and private and public infrastructure throughout the water source to produce daily data on these parameters. The primary purpose of the model is to enable comparison of the outcomes of applying different extraction access management rules.

The model has been used to examine 108 years of daily data representing the years from 1892 to 2000. Its prime purpose is to simulate the impacts of water resource management strategies on flows, so the impacts of various water diversion scenarios can be assessed and incorporated in Water Resource Plans.

(b) I have a reasonably based suspicion that the IQQM has been too heavily influenced by datasets from a 108-year history to 2000, the **Millennium Drought in particular**, and that it does not take into account the more recent recognition of climate change and the clear joint advice from the CSIRO and the BoM that “heavy rainfall events are becoming more intense” and that “short-duration extreme rainfall events are often associated with flash flooding, and so these changes in intensity bring increased risk to communities”. See **Part 4** above. In 2022, the community in the Area of Concern saw this played out with repeated flooding and consequential damage. **The NRC should advise and recommend** that Water NSW consider what are the changes to the IQQM modelling tool that Water NSW believes would have assisted in avoiding altogether the flooding events that occurred in 2022 in the Area of Concern, and then implement those changes to IQQM.

134. **Amendment of any WSP.** The DPE website at <https://www.industry.nsw.gov.au/water/plans-programs/water-sharing-plans/review-process> states:

“Amendments to water sharing plans are made throughout their life to ensure they comply with changing legislation and to facilitate their implementation. However, near the end of the ten year term, a formal review is completed by the Natural Resource Commission to identify the necessary alterations to deliver better outcomes for all water users, including the environment.”

135. The Minister has the power to amend any WSP, which includes the WSP for the M, during its term, in 4 situations, the 2 most relevant to your questions being as follows:

(a) The Minister may amend any WSP under s 45(1)(a) of the Water Management Act “**if satisfied it is in the public interest to do so**”; or

(b) The Minister may amend the WSP for the M under s 45(1)(b) in such circumstances as provided for in the WSP for the M itself.

136. **Criticism of the WSPs by Water NSW itself in 2017.** Water NSW itself stated in March 2017:

“Currently, Water NSW must follow often **very detailed water sharing rules** contained within Water Sharing Plans when delivering water across NSW. From both the system operator and customer perspective, **the existing water sharing rules are overly complex, difficult to understand and do not allow operators the flexibility they need** to achieve the best possible outcome for customers and the

environment. These issues are further exacerbated by different terminology being used in different Water Sharing Plans for similar rules.

The complexities associated with the high level of prescription in existing water sharing rules are key sources of problems for Water NSW and frustrations for customers (e.g. access to uncontrolled flows). The development of Water Resource Plans (and associated Water Sharing Plans) for all surface water and groundwater systems over the next two years provides the opportunity to target better consistency between plans and at the same time, reduce the complexity in all plans and thereby improve market understanding of water sharing rules and ultimately market certainty. This will provide a framework that provides greater consistency, predictability and confidence in market outcomes.” [section 4.2 of the Water NSW Submission to the Status and Issues Paper for the Murrumbidgee Surface Water Resource Plan, freely accessible at the Water NSW website].

137. The Water NSW Submission in the preceding para was in response to the *Murrumbidgee Water Resource Plan Surface Water (SW 9): Status and Issue Paper* issued by the NSW Department of Primary Industries in February 2017. That was part of the process of implementing and aligning with the Basin Plan. At this stage of this Submission it is sufficient to note that Water NSW is itself complaining about both the complexity and rigidity of the rules imposed on it in its water sharing plans, which of course must be directly referring to the one for the Murrumbidgee River.
138. **My overall impression of priorities in the WSP for the M.** While there are a lot of complex rules within the WSP for the M, and while there is evidently both detailed calculations to be made all the time, and reliance made on weather forecasting and trends, my overall impression of the WSP for the M is as follows:
- (a) Its rules are structured to ensure that the maximum amount of water is made available to water users, subject only to a minimum requirement for environmental flows.
 - (b) To that end, water must be stored in the 2 dams as much as is safely possible so that it can be made available to such water users.
 - (c) Flood mitigation is a low priority, with inflows to the 2 dams to be viewed positively for the purposes of paras (a) and (b), if not in the near future, then for the feared drought to come.

15.2 NSW EXTREME EVENTS POLICY

139. **NSW Extreme Events Policy.** In October 2018, the NSW Department of Industry published the 30-page document “NSW Extreme Events Policy: Policy Framework for the Management of NSW Murray–Darling Basin Water Resources during Extreme Events”. The Policy is freely accessible at https://www.industry.nsw.gov.au/data/assets/pdf_file/0008/187703/Extreme-Events-

[policy.pdf](#). The Policy strongly reinforces my impression in paras (a), (b) and (c) in the preceding para. In that regard I note:

(a) The definition adopted for an “extreme event” under the Policy does not include flood events [p3]. Flood mitigation and management of flood events is not covered by the Policy.

(b) The Policy states:

“Under this policy, an extreme event may include:

- **an extreme dry period**, such as the conditions during the Millennium drought
- the actual or imminent **structural failure** of a state-owned water storage that may cause a severe water shortage
- **an extreme water quality event**, such as blackwater, salinity, water pollution and a blue-green algae outbreak. [emphasis in original].

The definition of an extreme event in this context does not include flood events. The management of flood events is not covered by the policy as it involves different considerations. **When NSW river systems experience severe flooding, water sharing plan rules continue to operate.** Flood emergency planning is done under a separate process consistent with the *State Emergency and Rescue Management Act 1989*. The State Emergency Services, Bureau of Meteorology **and WaterNSW** are the agencies responsible for managing the effects of flood and providing emergency response to affected communities.” [p3] [emphasis added]. I feel that, in all the circumstances as set out in this Submission, it is quite inaccurate for the Policy to suggest that Water NSW, let alone the BoM, are agencies “responsible for managing the effects of flood and providing emergency response to affected communities”. While “to undertake flood mitigation and management” is one of the 11 listed functions of Water NSW, when it comes to the clauses of the WSP for the M it is not demonstrated – the very point made in this Submission.

(c) The Policy sets out 9 “Principles” to be used to inform the development and implementation of the “incident response guides”. I feel that it is telling that the Principles include the following headings:

(i) Principle 1 – Every attempt will be made to maintain the operation of the statutory water sharing plans.

(ii) Principle 2 – The local requirements for critical human water needs will be recognised and prioritised.

(iii) Principle 3 – The market will continue to operate for as long as possible during extreme events.

(iv) Principle 4 – Licence holders within licence categories should be treated equally.

(v) Principle 5 – Certainty should be maximised. [pp 7–8].

15.3 SHARE COMPONENTS AND PRIORITIES

140. I do not seek to change the share components and priorities set out in this **Part 15.3**.

141. I only include the information in this **Part 15.3** to support my view that the share components and priorities impose a very substantial expectation, if not commercial pressure, on Water NSW. This becomes relevant to understanding the imbalance in the WSP for the M with its main focus on economic objectives (and improving them), with insufficient regard being paid to flood mitigation. The changes to particular clauses of the recent WSP for the M, as set out in **Part 15.4** below, redress that imbalance to some degree while preserving the other environmental, social, and economic benefits.

142. For convenience, the rest of this **Part 15.3** refers to the wording and situation in 2022 when the prior WSP for the M was in operation.

143. **Share components and priorities.** The following provides a flavour of the relative quantities of claims to water, and the priorities of claims to water, under the WSP for the M:

(a) “**share component**” means an entitlement to a given number of shares of the available water in a specified water source. The share component on an access licence certificate is expressed as a “**unit share**”. The share component of a specific-purpose access licence (for example, local water utility, major water utility, and domestic and stock) is expressed in megalitres.

(b) Planned environmental water. This is done by a combination of minimum daily flow requirements (clause 30), “transparent flow” releases from Blowering Dam (clause 31), “transparent flow” and “translucent flow” releases from the Burrinjuck Dam (clause 32), 3 types of “Environmental Water Allowance” (clauses 33–40), and 2 types of “Provisional Storage Volume” (clause 41).

(c) Domestic and stock rights, with no WAL involved (the main components of what are “basic landholder rights” under ss 52–55 Water Management Act), estimated at 1,690 ML/year (clause 18).

(d) Under s 58 of the Water Management Act and clause 6 of *Water Management (General) Regulation 2018* (NSW) the following priorities are to be observed in relation to access licences or “WALs”:

(i) The categories in paras (e) and (f) below share the top level of priority.

(ii) The category in para (g) below ranks next in priority.

(iii) The categories in paras (h), (i), (j), and (k) below are next in priority, and have equal priority with each other.

(iv) The categories in paras (l) and (m) below have the lowest priority.

(e) Domestic and stock WALs, very high security, estimated at 35,041 ML/year (clause 21). There are 513 WALs of this category.

(f) Local water utility WALs, very high security, estimated at 23,816 ML/year (clause 22). There are 14 WALs of this category.

(g) Regulated river (high security) WALs, high security, estimated at 417,631 unit shares (clause 23). There are 235 WALs of this category.

(h) Regulated river (general security) WALs, low security, estimated at 1,891,815 unit shares (clause 24). There are 873 WALs of this category.

(i) Regulated river (conveyance), low security, estimated at 2,968 unit shares (clause 25). There are 3 WALs of this category.

(j) Murrumbidgee Irrigation (conveyance) WALs, low security, estimated at 243,000 unit shares (clause 26). Murrumbidgee Irrigation Ltd (ABN 39 084 943 037), an unlisted public company, holds 3 WALs of this category with a total of 243,000 unit shares. The company also holds other types of WALs. It holds an operating licence under the Water Management Act to carry out the business and function of water delivery within its “area of operations”. Its constitution prohibits the payment of dividends to its shareholders. To be a shareholder a person must own “Water Entitlements” under a “Water Entitlements Contract” with the company.

(k) Coleambally Irrigation (conveyance) WAL, low security, estimated at 130,000 unit shares (clause 27). Coleambally Irrigation Co-operative Ltd (ABN 75 951 271 684), a not-for-profit entity, holds 3 WALs of this category with a total of 130,000 unit shares. The co-operative also holds other types of WALs. It manages the irrigation infrastructure and delivery of water and services to customers in its “area of operations”.

(l) Supplementary WALs, estimated at 198,780 unit shares (clause 28). There are 238 WALs of this category.

(m) Supplementary water (Lowidgee) WALs, estimated at 747,000 unit shares (clause 29). There are 26 WALs of this category.

144. It should be evident from the preceding para that there is very substantial expectation imposed on Water NSW, if not commercial pressure, under the WSP for the M created by:

(a) WALs with 417,631 unit shares in the “high security” category in para (g) above;

(b) followed by the even bigger number of the total 2,267,783 unit shares in the “low security” categories in paras (h), (i), (j), and (k) above.

Such expectation and pressure must lead to Water NSW focusing on keeping the 2 dams full.

145. The DPE in its 2021 document “Water Allocation Methodology: Murrumbidgee River Water Source” states:

“Supplementary WAL holders usually receive full (100%) allocation at the start of the water year, however; supplementary water users can only access water in periods of announced supplementary flow.

These unregulated or surplus flow conditions can occur from strong inflows from tributaries downstream of storages that cannot be re-regulated and/or spillage from upstream storages. Supplementary water is not supplied from storages (regulated water), therefore does not compete for allocations with regulated licence categories.” [p2].

While the DPE may be correct to say that there is no direct competition, I feel that the total of 945,780 unit shares in the supplementary categories in paras (l) and (m) above do **add to the expectation and pressure on Water NSW to permit higher than usual water levels. This is the opposite of flood mitigation.**

15.4 PARTICULAR CLAUSES OF THE RECENT WSP FOR THE M

146. As noted in **Part 7** above, the 64-page Minister’s Order made on 17/12/2022 ostensibly made substantial changes to the WSP for the M which had been operating in an unaltered form for the preceding 4½ years. While many of the clauses in the recent WSP for the M referred to below are in substance the same as differently numbered clause in the prior WSP for the M, some have changed in substance.
147. In this **Part 15.4**, I address particular clauses in the recent WSP for the M in the sequence in which they appear in the recent WSP for the M, as opposed to their importance to the matters in this Submission.
148. **Clause 4(1) (Application of Plan)**. Recent clause 4(1) is inconsistent with both the Minister’s Order and prior clause 4(1). This is significant. In essence, the differences are:

(a) In prior clause 4(1), the bolded definition phrase (“this water source”) appeared after “the Murrumbidgee Regulated Water Source”.

(b) In the Minister’s Order, the bolded definition phrase in para (a) above was deleted and the new bolded definition phrase (“the water source”) was inserted after “Murray Water Management Area”.

(c) Unaccountably, and without any authority of which I am aware, someone has ignored what the Minister's Order did in para (b) above and instead in the recent WSP for the M has inserted the new bolded definition phrase ("the water source") not after "Murray Water Management Area" but after "Murrumbidgee Water Management Area".

149. Given that many of the clauses in the recent WSP for the M revolve around what is defined as "the water source", the evident legal uncertainties which have been created as outlined in the preceding para, and the legal and commercial consequences of those uncertainties, the matter has to be dealt with. **The NRC should advise and recommend** that recent clause 4(1) be remade, and that this be done in a manner which both gives legally correct effect, and operates in a consistent manner throughout the WSP for the M.
150. **Clauses 5 and 6 (Interpretation)**. Both recent clauses 5 and 6 are headed "Interpretation" and, to a large extent, duplicate each other. It would appear that this has come about because in the Minister's Order it was mistakenly stated that "Clause 5 Interpretation" in the prior WSP for the M was being deleted and replaced with a new "clause 5 Interpretation". The problem was that, in the prior WSP for the M, clause 5 was headed "Understanding the rules in this Plan" and clause 6 was headed "Interpretation". Without any authority of which I am aware, someone has resolved the mistake in the Minister's Order by deleting prior clause 5, with result that there are now 2 clauses dealing, somewhat differently, with the same topic. **The NRC should advise and recommend** that recent clauses 5 and 6 be remade and in doing so that they be rationalised and rewritten as one coherent clause.
151. **Clauses 7 to 11 (Part 2 Vision, objectives, strategies and performance indicators)**. Recent clauses 7 to 11 run to 6½ pages. Their wording and thrust are materially different from, and from a community perspective worse than, prior clauses 7 to 11 which ran to 3½ pages. Aspects of this are as follows.
152. The word "safety", or any variant of it, does not appear at all in recent clauses 7 to 11. Indeed, in the whole 65-page recent WSP for the M, the word "safety" features only twice, in recent clauses 75 and 76, which I will address further below. Those involved in drafting recent clauses 7 to 11 have simply forgotten, or chosen to disregard, the fact that the Water NSW Act states that the principal objects of Water NSW include:
- (a) to release water in a safe manner [s 6(1)(a)].
- (b) to ensure that water management works are managed so as to promote the protection of public safety [s 6(1)(b)]. See **Part 11** above.
153. The word "community" does not appear at all in recent clauses 7 to 11. Indeed, in the whole recent WSP for the M, the word "community" appears only 4 times and then only in circumstances which have nothing to do with "having regard to the interests of the community in which it [Water NSW] operates". Those involved in drafting recent clauses 7 to 11 have simply forgotten, or chosen to disregard, the fact that the Water NSW Act states that the other objectives of Water NSW include "to exhibit a sense of

responsibility by having regard to the interests of the community in which it operates” [s 6(2)(b)]. See **Part 11** above.

154. In the prior WSP for the M, the very last strategy was “minimise the impact of water delivery on the community” [prior clause 11(2)(d)]. There is no equivalent in the recent WSP for the M. What possible justification could there be for removing even that minimal provision?
155. It beggars belief that, given that s 6 of the Water NSW Act is headed “Objectives of Water NSW” and that Part 2 of the recent WSP for the M also has “objectives” in its heading, yet what the NSW Parliament has stated about “safety” and “community”, as set out in the 2 preceding paras, has been so blatantly disregarded in clauses 7 to 11 of the recent WSP for the M.
156. As already discussed in **Part 11** above, this same disregard of the Water NSW Act as set out in the 3 preceding paras has occurred with respect to the “values” of Water NSW. Water NSW presumably conducted workshops with the aid of outside paid consultants, and yet came up with “values” so flawed that they flew in the face of the legislation governing Water NSW. Perhaps, Water NSW has carried through that same thinking into how it will operate under the WSP for the M – namely, we will apply a first value: “**Think customer** – In every decision we make, consider the benefit to our customers.” [emphasis in original]. That same mistaken value pervades the tenor and wording of, and highlights the glaring omissions from, recent clauses 7 to 11.
157. Worse still is that the “economic objectives” in recent clause 9 have been changed to be framed in terms of not just supporting and encouraging (in prior clause 10) but “maintain, **and where possible improve**, access to water to optimise economic benefits” (in recent clause 9) [emphasis added]. Not only is there a total disregard for safety and the interests of the community – they are not even mentioned – but the economic objectives have been pushed to an even greater height. It is reasonable to assume that the Minister and those who most closely advised the Minister in relation to such matters in the recent WSP for the M, have focused on increasing benefits for water users, and have paid so little regard to the matters of safety and community that they are not even mentioned.
158. How have we arrived at this sorry state of affairs with respect to the recent WSP for the M? Aspects of this include:
 - (a) The lack of concern with safety and community interest, particularly in relation to flooding events, is inconsistent with the evident policy of the DPE, and while not always consistent, is definitely found in the DPE’s own Options 33 to 43 – particularly Option 42 – in the Draft Water Strategy for the M which was only published as recently as April 2022 (see **Part 10** above).
 - (b) Both the prior WSP for the M and the recent WSP for the M have been made by the Minister under s 50 of the Water Management Act, thereby circumventing the requirement to establish under s 12 a “management committee” for the water management area (whose 12 to 20 members represented a cross-section of interests) with the task of the committee being to draft such plans in accordance with Part 3 of the

Act. The lack of community involvement in the drafting of both the prior WSP for the M and the recent WSP for the M is quite evident. Merely inviting the public to make submissions is paying lip service to community involvement.

(c) I am not suggesting that the WSP for the M be remade by a “management committee” established under s 12. The WSP for the M has to be drafted by experts, not a broadly representative committee which might include experts as envisaged by s 13(1) of the Water Management Act. **The NRC should advise and recommend** a procedure under which the community, beyond water users whose commercial interests are catered for at length in the WSP for the M, has effective input to the drafting of the WSP for the M. Inviting submissions from the community is clearly inadequate, for a number of reasons. They include: commercial irrigators and other water users have the time, money, resources, and incentive, to devote time and effort to making submissions; individuals within a community who are not water users may feel they do not have the knowledge of the complexity of the issues or the time to come to an understanding of them; individuals making submissions would generally do so without the benefit of seeing, until after the closing date for making submissions, what other people are saying; individuals making submissions do not get feedback from the DPE or like policy advisers as to what the issues and implications might be with respect to taking certain approaches or pursuing certain options in the WSP for the M.

159. It would be tedious to lay out all the problematic words and phrases used in recent clauses 7 to 11 across their 6½ pages. It would also be tedious to spell out the glaring omissions from recent clauses 7 to 11. **The NRC should advise and recommend** that “Part 2 Vision, objectives, strategies and performance indicators” in the recent WSP for the M requires a total rewrite, with a more balanced approach to be taken. When the WSP for the M is remade (consequent upon the NRC’s recommendation), **the NRC should advise and recommend** that part of that rewrite include the following, to be added to Part 2 of the recent WSP for the M after recent clause 7 “Vision statement”:

“7A Operator to consider safety first, then community and customer

In every decision the operator makes under this Plan, and in every interpretation the operator makes under this Plan, the operator must consider safety first, and then consider both the effects on each community in which it operates and the benefit to water users and other customers. This obligation on the operator overrides and governs all other provisions of this Plan.

7B Flood protection and control duties on operator in the Murrumbidgee Area of Concern

(1) In carrying out its functions under this Plan, the operator must take all steps reasonably necessary to avoid a threat to life or property arising from floods in the Murrumbidgee Area of Concern.

(2) In carrying out its functions under this Plan, the operator must minimise the existing and future risk to human life and property, from the effects of flooding in the Murrumbidgee Area of Concern.

(3) In carrying out its functions under this Plan, the operator must carry out flood mitigation with respect to the Murrumbidgee Area of Concern.

(4) Each of subclauses (1), (2), and (3) is a “**flood protection and control duty**”.

(5) Subclauses (1) to (3):

(a) are subject to any direction of the Commissioner or “senior emergency officer” under Part 5 of the *State Emergency Service Act 1989* (NSW) where that direction is in writing to Water NSW and bears the signature of the Commissioner or the “senior emergency officer” giving the direction; and

(b) do not authorise the operator to take measures directed at bringing an industrial dispute to an end; and

(c) do not authorise the operator to take measures directed at controlling a riot or other civil disturbance.”

160. Further to the preceding para, **the NRC should advise and recommend** that the following definitions be added to the Dictionary of the remade WSP for the M:

(a) “**flood mitigation** means reducing river levels downstream of either the Blowering Dam water storage or the Burrinjuck Dam water storage, which are or may become at flood level, by using planned and modelled airspace in the storages to temporarily store floodwater and only releasing that floodwater later when the downstream river levels have subsided to a safe level.”

(b) “**flood protection and control duty**” means each of the duties on the operator under clause 7B(1), (2), and (3).”

(c) “**Murrumbidgee Area of Concern**” means:

(a) The area 4 kilometres either side of what the operator has most recently recorded is the median point of the Murrumbidgee River when the river level at Wagga Wagga (gauging station 573000/410001) is between 4.5 and 5.5 metres, such median point and area being recorded as a continuous line for the length of that part of the Murrumbidgee River which is:

(i) from the confluence of the Tumut River and the Murrumbidgee River,

(ii) to the point on the Murrumbidgee River which is 8 kilometres, as the crow flies, north-west of the Mundowry Lane Bridge (which bridge is about 15 km west of the CBD of Wagga Wagga); and

(b) The area 2 kilometres either side of what the operator has most recently recorded is the median point of the Tumut River, such median point and area being recorded as a continuous line for the length of that part of the Tumut River which is from immediately below the wall of the Blowering Dam storage to the confluence of the Tumut River and the Murrumbidgee River.”

161. **Clause 60 (Transparent and translucent release rules for Burrinjuck Dam).** Recent clause 60 and related clauses use the term “transparent release” and “translucent release”. Prior clause 32 dealt with “transparent flows” and “translucent flows” and there was a definition for each of those terms in the Dictionary of the prior WSP for the M. There are no equivalent adapted definitions in the Dictionary of the recent WSP for the M which would provide the reader with some understanding, or at least a cross-reference to a relevant recent clause. While recent clause 59 deals with “transparent releases” in relation to the Blowering Dam it is not really that helpful either.
162. **The NRC should advise and recommend that** consideration should be given to adding to the Dictionary of the recent WSP for the M definitions appropriately adapted from the definition of “transparent flows” and “translucent flows” found in the Dictionary of the prior WSP for the M (and also reproduced in the Dictionary of this Submission).
163. **Clause 68 (Multiple provisional storage volumes).** Recent clause 68 requires Water NSW to maintain particular “provisional storage volumes **for the purpose of increasing the size and frequency of spill events** and to increase water availability in future water years”. [emphasis added]. That stated intention of increasing the size and frequency of spill events, and the calculations that achieve that purpose, are unacceptable in those circumstances where it is possible that the spills will lead to or enhance flood events in the Area of Concern.
164. **The NRC should advise and recommend** that recent clause 68, and the provisions related to it, be rewritten so that the provisional storage volumes must change, and the purpose of increasing the size and frequency of spill events must cease, in any circumstance where it is possible that the spill event, or combination of spill events, may give rise to a flood event affecting the Area of Concern.
165. **Clauses 72 to 79 (Division 5 General system operation rules).** Most of recent clauses 72 to 79 are based on most of prior clauses 42 to 48. Both the prior clauses and the recent clauses in question are unsatisfactory. Division 5 and its recent clauses need to be remade.
166. A significant issue that has been evident to me, based on feedback from constituents, is the matter of notifications made by both Water NSW under the EWN and the SES in the lead up to, and during flood events in the Area of Concern. See **Part 11** above for examples of such notifications and the differences between them. The unreliability of such notifications is also a matter which I have raised in Parliament on 09/08/2022 (see **Part 2** above).
167. I believe that this is an instance where Water NSW must meet its third value of “Own it” (see **Part 11** above) and take responsibility for contemporaneous and direct

reporting of the predicted effects of its decisions on the community in the Area of Concern in the context of flood protection and control.

168. The fact that there will be duplication by Water NSW with some notifications the SES may be making with respect to the Area of Concern is of no importance. What is important is that Water NSW takes responsibility for advising and warning the community, based on the advice Water NSW has received from the BoM and the modelling tools used by Water NSW, and very importantly based on the decisions Water NSW itself is taking with respect to the operation of the 2 dams. Those announcements by Water NSW must be made in a timely manner, which may range from say weekly in “quiet” times” of no La Niña, through to hourly in the lead up to possible flooding events that might affect the Area of Concern.
169. For the reasons outlined above, **the NRC should advise and recommend** that a new clause 71A be added, at the start of Part 10 Division 5 of the recent WSP for the M, in the following terms:

“71A Operator to make determinations and predictions with respect to its flood protection and control duties in the Murrumbidgee Area of Concern

(1) As part of carrying out its flood protection and control duties, the operator is solely responsible for making, in the light of all available information, and regardless of whether that information is issued or not and whether that information is from the Bureau of Meteorology or otherwise, the following determinations in relation to, or likely impact on, the Murrumbidgee Area of Concern:

- (a) The operator must determine what the storage release from each of the Burrinjuck Dam and the Blowering Dam will be over what period; and
- (b) The operator must predict the quantum of spillage for each such dam in that same period; and
- (c) The operator must predict what the river levels and other flooding consequences downstream of the confluence of the Murrumbidgee River and Tumut River will be at Wagga Wagga and not less than 2 other specified points in the Murrumbidgee Area of Concern in that period.

(2) The operator must publicly announce its determinations and predictions under subclause (1) in a timely manner with a view to its flood protection and control duties being carried out as soon as practicable.

(3) The operator must make such determinations, predictions, and announcements, as and when the operator considers it appropriate, in the light of its flood protection and control duties, its other functions, and all other circumstances.”

170. **Clause 73 (Water delivery and channel capacity constraints).** For the reasons set out in **Part 8.4** above, **the NRC should advise and recommend** that urban Wagga Wagga be assessed and added to the 4 “choke points” in recent clause 73(1).

171. **Clause 75 (Rates of change to storage releases).** So that the NRC may properly inform itself of important information relevant to its review and making its report, the NRC should:
- (a) Ask the Minister for a copy of each of the procedures established by each of the prior Ministers, and each of the rules established by each of the prior Ministers, as referred to in clause 46 of the prior WSP for the M, that were at any time operative between 01/07/2016, when the WSP for the M commenced, and 17/12/2022.
 - (b) Ask the Minister for a copy of each of the procedures established by the Minister each of the prior Ministers, and each of the rules established by the Minister and each of the prior Ministers, as referred to in clause 75 of the recent WSP for the M, that were at any time operative since 23/12/2022, when the recent WSP for the M ostensibly commenced.
172. If as I expect, the procedures and rules given to the NRC under the preceding para either are or and have been inadequate on the point, **the NRC should advise and recommend** that recent clause 75 be amended as follows:
- (a) After “consider” add “, first the matters in subclause (2), and then”.
 - (b) Add a subclause (2) to recent clause 75 as follows:
 - “(2) the operator must consider damage to downstream communities, and in particular:
 - (a) the need to take all steps reasonably necessary to avoid a threat to life or property arising from floods, and
 - (b) the need to minimise the existing and future risk to human life and property, from the effects of flooding.”
173. **Clause 76 (Dam operation during floods and spills).** Because prior clause 47 and recent clause 76 deal with the same issue, and that issue is central to the constraints imposed on Water NSW that contribute to significant damage to the communities in the Area of Concern, I will first set out their respective terms in full:
- A. Prior clause 47 (Dam operations during floods and spills) states:
 - “(1) **The operation of Burrinjuck Dam and Blowering Dam during times of flood and spilling of water is to be undertaken in a manner that maintains the safety of dam infrastructure and limits damage to downstream communities.**
 - (2) **Provided it is consistent with subclause (1), operation should leave the storage as full as possible at the completion of the flood event, subject to airspace requirements.**” [emphasis added]
 - B. Recent clause 76 (Dam operations during floods and spills) states:

“(1) The operation of Blowering Dam and Burrinjuck Dam during times of flood and spilling of water from the dam is to be undertaken in a manner that maintains the safety of dam infrastructure.

(2) Providing it is consistent with subclause (1), the operation must aim to—

(a) leave the storages as full as possible after the flood or spilling of water, subject to the airspace operation rules in clause 77, and

(b) minimise downstream flood damage where possible.

Note. Airspace is defined in the Dictionary.” [emphasis added]

174. Both prior clause 47 and recent clause 76 are problematic and, because Water NSW is bound by them, they give rise to additional spilling and flooding events which damage the community in the Area of Concern. The problems are as follows:

(a) Whether it is by use of “should” (prior clause 46(2)) or “must aim to” (recent clause 76(2)), it is to all intents and purposes an obligation on Water NSW to operate each of the Burrinjuck Dam and the Blowering Dam to **“leave the storage as full as possible at the completion of the flood event”** (prior clause) or **“leave the storages as full as possible after the flood or spilling event”** (recent clause), subject only to the limited qualifications stated.

(b) This requirement imposed on Water NSW is unsatisfactory, particularly in those circumstances where further heavy rains in the Murrumbidgee Water Management Area are predicted by the BoM in the coming days, weeks or months, thereby giving cause to believe that further flood events are coming relatively soon. Thus, if the BoM has issued a La Niña WATCH or the higher La Niña ALERT, or worse still a La Niña event is continuing, it just reckless for Water NSW to be leaving the 2 dams “as full as possible” and, in most circumstances, even more reckless to, “after the flood or spilling of water” to leave the 2 dams “as full as possible”. In the example given, if a La Niña event is continuing, but no flooding or spilling of water has yet occurred or the flooding or spilling event has ceased, the most dangerous thing, in terms of leading to flooding events and spilling of water in the Area of Concern, is to keep operating the 2 dams so as to leave them as full as possible.

175. **The NRC should advise and recommend** that recent clause 76 must be rewritten in a way that takes into account both the matters raised in the preceding para and the changes to recent clause 77 set out below.

176. **Clause 77 (Airspace operation rules).** Because prior clause 48 and recent clause 77 deal with the same issue, and that issue is central to the constraints imposed on Water NSW that contribute to significant damage to the communities in the Area of Concern, I will first set out their respective terms in full:

A. Prior Clause 48 (Airspace operation rules) states:

“(1) Airspace operation of Burrinjuck Dam must be undertaken in accordance with the following principles:

(a) to assist in mitigating the impact of floods, a volume of airspace may be maintained which is no greater than that which will be refilled by storage inflows prior to a need to release from the storage to supply downstream requirements,

Note. Paragraph (a) means that Burrinjuck Dam can be reduced to a level that is sufficient for the dam to refill based on the minimum forecast recession inflows.

(b) downstream impact must be considered before releases to obtain airspace are made.

Note. Channel capacity constraints will be one of the factors considered in relation to paragraph (b).

(2) Airspace operation of Blowering Dam water storage must be undertaken in accordance with the provisions of the Blowering Airspace Deed, to which the Water Administration Ministerial Corporation and the Snowy Hydro Limited are parties.

Note. The Blowering Airspace Deed requires an airspace volume of up to 190 gigitalitres, as advised by Snowy Hydro Limited, for the purpose of emergency power generation. The volume of any releases made specifically to provide the advised airspace, up to the advised airspace limit, will be reserved in Snowy Hydro storages, and is subsequently available to the Department.”

B. Recent clause 77 (Airspace operation rules) states:

“(1) The operator must manage Burrinjuck Dam in accordance with the following—

(a) any volume of airspace that is maintained is to be no greater than that which is likely to be refilled by storage inflows prior to making a release of water from the storage to supply downstream requirements,

Note. Subclause (1) (a) means that the volume of water in Burrinjuck Dam water storage can be reduced to a level that is sufficient for the water storage to refill based on the minimum forecast recession inflows, in order to assist in mitigating the impact of floods.

(b) downstream impacts must be considered before releases to maintain airspace are made.

Note. Channel capacity constraints will be one of the factors considered in relation to subclause (1) (b).

(2) The operator must manage Blowering Dam in accordance with the provisions of the Blowering Airspace Deed, to which the Water Administration Ministerial Corporation and Snowy Hydro Limited are parties.

Note. **The Blowering Airspace Deed requires the operator to maintain an airspace volume** of up to 190 gigalitres, as advised by Snowy Hydro Limited, **for the purpose of emergency power generation**. A volume equal to any releases made specifically to provide the advised airspace, up to the advised airspace limit, will be reserved in Snowy Hydro storages, and is subsequently available for allocation by the Minister.”

177. With respect to the operation of the **Burrinjuck** Dam, the provisions within prior clause 48(1) and recent clause 77(1), though expressed in different ways:
- (a) make it entirely discretionary as to whether Water NSW maintains any airspace or the volume of the airspace in the Burrinjuck Dam; and
 - (b) constrain that discretion by requiring that it be no greater than that which is likely to be refilled by storage inflows prior to making a release of water “from the storage to supply downstream requirements”.
178. If the BoM has issued a La Niña WATCH or the higher La Niña ALERT, or worse still a La Niña event is continuing, it just reckless for Water NSW to be constrained by prior clause 48(1) and recent clause 77(1). This is particularly the case given the other reckless obligation on Water NSW under prior clause 47 and recent clause 76 to leave the 2 dams “as full as possible” and, in most circumstances, even more reckless to, “after the flood or spilling of water” to leave the 2 dams “as full as possible”.
179. With respect to the operation of the **Blowering** Dam, the provisions within prior clause 48(2) and recent clause 77(2) are very unsatisfactory because;
- (a) The “Blowering Airspace Deed” which is referenced in prior clause 48(2) and recent clause 77(2) has remained ‘commercial-in-confidence’ ever since it was executed 21 years ago on 28/06/2002. Apart from the limited information in paras (b) and (c) below, we do not know what the “Blowering Airspace Deed” says about maintaining airspace for flood mitigation.
 - (b) The wording of the “Note” to each of prior clause 48(2) and recent clause 77(2) implies that the only airspace requirement on Water NSW in operating the Burrinjuck Dam is what Snowy Hydro Ltd dictates to Water NSW and that airspace is a volume up to 190 GL “for the purpose of emergency power generation”.
 - (c) It seems, from limited and very general statements made by Snowy Hydro, that “arrangements are in place to minimise the risk of a spill from Blowering Dam” in the following way:

(i) Under the “Snowy Water Licence”, Snowy Hydro must prepare a safety management plan and is subject to a range of performance and operating rules designed to mitigate floods. Maintenance of airspace in the Snowy Hydro facility and Blowering Dam is a key safety measure to mitigate the risk of floods and to provide capacity for emergency power generation.

(ii) Under the “Blowering Air Space Deed”, Water NSW maintains an airspace volume of up to 190 GL to accommodate water released by Snowy Hydro during emergency power generation. It also maintains airspace and manages water releases so as to mitigate the risk of floods downstream of the Blowering Dam.

(d) Assuming the general statements in the preceding para accurately describe the situation, then it would seem that the “Blowering Air Space Deed” is not silent on the matter of Water NSW maintaining airspace for purposes beyond “emergency power generation”, not the least of which would be for the purpose of flood mitigation. What the Deed actually says about Water NSW’s obligations and discretions is not disclosed to the public.

(e) Related to this issue are, first, the 109-page “Snowy Water Licence” issued by the Ministerial Corporation to Snowy Hydro and, second, the “Annual Watering Plan” which is initially approved by Snowy Hydro and finally approved by the Ministerial Corporation. It is unsatisfactory that only a summary of the “Annual Water Operating Plan”, such summary called the “Public AWOP”, is released to the public.

(f) One of the pertinent effects of the above, is that the community in the Area of Concern are prevented from knowing what obligations and discretions Water NSW has with respect to maintaining airspace in the Blowering Dam (beyond that dictated by Snowy Hydro for “emergency power generation”).

(g) Here we are in 2023, having endured repeated damaging floods in 2022 in the Area of Concern, and we still do not know the parameters of the obligations and discretions available to Water NSW with respect to airspace and flood mitigation in its operation of the Burrinjuck Dam.

180. **Snowy Hydro may or may not be able to release as it sees fit.** The general statements in para (c) above must be seen in the context of the following. Under clause 7.4 of the “Snowy Water Licence”, Snowy Hydro “may release water from the Works at the times and in the quantities that it sees fit provided that”:

(a) it “at all times complies with the Water Release Requirements and the Increased Flow Requirements”; and

(b) it complies with its obligations under clause 8.1(2), which are that Snowy Hydro “must do all things reasonably necessary to operate the Snowy Scheme in accordance with the provisions of each approved Annual Water Operating Plan”.

181. Even though the “Snowy Water Licence” speaks in terms of “Water Release Requirements”, under clause 5.2 of the “Snowy Water Licence” this is interpreted as only a requirement on Snowy Water “to use its best endeavours to release that volume or achieve that flow” by reference to average annual flows, operational characteristics, and simulations [clause 5.2(1)].
182. The practical effects of clause 8.1 to 8.16A of the “Snowy Water Licence” include:
- (a) Snowy Hydro drafts the “Annual Water Operating Plan”. The Water Consultation and Liaison Committee (“WCLC”) can give advice to Snowy Hydro about the draft Plan, but Snowy Hydro does not have to accept that advice. The Ministerial Corporation can force changes to the “Annual Water Operating Plan” to achieve better water outcomes, but otherwise has very limited rights to require Snowy Hydro to change its draft “Annual Water Operating Plan”.
 - (b) Snowy Hydro has complete control over the storage and timing of release of Above Target Water (ATW) – representing about 10% of all Snowy Scheme water – which could occur when either, or both, Blowering and Hume Dams are full.
183. Only a summary of the “Annual Water Operating Plan”, such summary called the “**Public AWOP**”, is released to the public [clauses 8.3(6), 8.13B, Snowy Water Licence]. In effect, the commercial-in-confidence information in the “Annual Water Operating Plan” is not made public. What justification could there be for claiming that the obligations and discretions that Water NSW has with respect to maintaining airspace in the Blowering Dam is ‘commercial-in confidence’? I find it hard to imagine there are any justifications. In contrast, there are strong reasons for making those obligations and discretions public.
184. **The NRC should advise and recommend** that, at a minimum, recent clause 77(2) be rewritten to reflect the real obligations and discretions that Water NSW has with respect to maintaining airspace in the Blowering Dam, with a clear separation of the “emergency power generation” airspace from other airspace. To that end, **the NRC should advise and recommend** that the relevant parties reassess and determine what is truly ‘commercial-in-confidence’ with respect to Water NSW maintaining airspace in the Blowering Dam alone, with a view to the relevant information being both published and factored into, not just the Note to recent clause 77(2), but instead the operative part of recent clause 77(2). It is too often the case that a broad ‘commercial-in-confidence’ claim or confidentiality provision is relied upon when it was not really justified in the first place or, with the passage of time and changed circumstances, it is no longer justified.
185. **The NRC should advise and recommend** that, to extent that the relevant parties fail to reassess and determine with an outcome sought in the preceding para, limited amendments be made, to the following legislation and instruments, which will require publication of the details of the obligations and discretions applicable to Water NSW with respect to Water NSW maintaining airspace in the Blowering Dam alone. The legislation and instruments to be subject to such minor amendments would be: the

Snowy Hydro Corporatisation Act 1997 (NSW), the “Snowy Water Licence” issued under that Act, and thereby also the “Blowering Airspace Deed”.

186. **The NRC should advise and recommend** that there is an immediate need for a tighter interconnection to be made between the cumulative and interacting effects of flows into, and releases from, the Burrinjuck Dam and the Blowering Dam. To that end, the airspace for each dam must, by amendment to both the Operating Licence and the Snowy Water Licence, be dealt with on an aggregate basis.
187. **The NRC should advise and recommend** that, at the very least, recent clauses 76 and 77 of the WSP for the M be amended to provide that Water NSW must immediately be given both greater flexibility in relation to its operation of both the Burrinjuck Dam and the Blowering Dam and clearer responsibility for maintaining an increased airspace in each dam in circumstances where the BoM has issued a La Niña WATCH, a La Niña ALERT, or there is a La Niña event.
188. There is a clear need for Water NSW to be given both the authority and the duty to exercise much greater agility, flexibility, and speed of response in relation to flooding risk for the Area of Concern. To that end, at the very least, this must start immediately with:
- (a) an increase in the mandatory airspace for the Blowering Dam, such increase to be devoted solely to flood mitigation; and
 - (b) the imposition of a mandatory airspace (in lieu of a the present discretionary one) for the Burrinjuck Dam, such mandatory airspace solely devoted to flood mitigation; and
 - (c) a requirement that Water NSW coordinate releases from both dams, so that flood mitigation is best achieved.
189. The calculation of the mandatory airspace in paras (a) and (b) above could be done on the basis of “worst case” scenarios derived from actual flood events at Gundagai and urban Wagga Wagga.
190. **The NRC should advise and recommend** that the alternative and preferable approach to the minimal change to recent clause 76 and 77 set out above is to rewrite recent clauses 76 and 77 so as to impose a new and specific flood mitigation duty upon Water NSW with that new duty containing the following elements:
- (a) an increase in the mandatory airspace for the Blowering Dam, such increase to be devoted solely to flood mitigation; and
 - (b) the imposition of a mandatory airspace (in lieu of a the present discretionary one) for the Burrinjuck Dam, such mandatory airspace solely devoted to flood mitigation; and
 - (c) a requirement that Water NSW coordinate releases from both dams, so that flood mitigation is best achieved;

(d) the calculation of the mandatory airspace in each of paras (a) and (b) above must be made **every 3 months** by Water NSW (and announced);

(e) such 3-monthly calculation must be made by Water NSW on the basis of advice from the BoM and the new specific flood mitigation duty imposed on Water NSW by para (f);

(f) the new specific flood mitigation duty imposed on Water NSW would be to the effect that, both in its forward planning for and the day-to-day operations of the 2 dams, **Water NSW must avoid both:**

(i) **the height of the Murrumbidgee River at Wagga Wagga (gauging station 573000/41004) exceeding 7.10 metres on any day.** In that regard, the BoM records that river heights for the Murrumbidgee River at Wagga Wagga gauging station are at differing flood levels as follows: minor 7.30 m; moderate 9.00 m; and major 9.60 m.

(ii) **the height of the Murrumbidgee River at Gundagai (gauging station 073132/410004) exceeding 5.90 metres on any day.** In that regard, the BoM records that river heights for the Murrumbidgee River at Gundagai gauging station are at differing flood levels as follows: minor 6.10 m; moderate 7.60 m; and major 8.50 m.

191. I note that the MDBA uses “active airspace management” in operating the Dartmouth Dam and the Hume Dam in a coordinated way to reduce the probability of downstream flooding. See <https://www.mdba.gov.au/water-management/infrastructure/dartmouth-dam/managing-floods>.

192. The serious deficiencies of the recent WSP for the M discussed above:

(a) Materially contribute to the failure to achieve social, economic, and environmental outcomes in the recurring periods of flooding events affecting the Area of Concern.

(b) Fail to comply with the “listed function” (read “duty”) of Water NSW “to undertake flood mitigation and management” and the repeated obligation in the Operating Licence [s 7(1)(i) Water NSW Act, clause 1.2.1 k Operating Licence].

193. **Recent Schedule 2 (Burrinjuck Dam translucency percentage table).** I feel that there are legal uncertainties concerning recent Schedule 2. If so, then these legal uncertainties also creates legal uncertainty as to how recent clause 60 operates. The legal uncertainties arise in the following way:

(a) The Minister’s Order states that it “commences on the day on which it is published on the NSW legislation website.” [clause 2].

(b) The version of the Minister's Order that was published on the NSW legislation website on 23/12/2022, and is still published there, is freely accessible at <https://legislation.nsw.gov.au/view/pdf/asmade/sl-2022-871>.

(c) Schedule 2 within the Minister's Order so published is 3½ pages long, but:

- (i) there are no dates in the first column;
- (ii) there are no numbers in any of the other 9 columns.

(d) Those missing dates and numbers render Schedule 2 in the Minister's Order meaningless, and create particular problems with how recent clause 60 can operate.

(e) It is very likely that there is a hard copy version of the Minister's Order which is dated 17/12/2022 and which contains in its Schedule 2 the missing dates and numbers. That then raises legal validity questions, which I can only raise and not answer, ranging from:

(i) None of the Minister's Order in the form of the hard copy dated 17/12/2022 has been "published on the NSW legislation website" because it was a materially different document that was published on the NSW legislation website on 23/12/2022. If this were the legal position, then it would follow that the whole of the recent WSP for the M is inoperative because the Minister's Order has not yet commenced.

(ii) With the exception of all dates and all numbers in its Schedule 2, the Minister's Order in the form of the hard copy dated 17/12/2022 has been "published on the NSW legislation website" and has commenced. The *Interpretation Act 1987* (NSW) deals with what "published on the NSW legislation website" means. For present purposes, it is sufficient to say that if the purpose is "to provide public access" to what is "published", then being unable to see the dates and the numbers in Schedule 2 must mean that those dates and numbers have not been "published". This would mean that only the empty table and headings of Schedule 2 has commenced. This would mean that Schedule 2 is an "empty shell" and meaningless for the purposes of recent clause 60.

194. Regrettably, the legal uncertainties with recent Schedule 2 do not end there, and include:

(a) Someone, perhaps understandably, has ignored the fact that all the dates and numbers are missing from what is "published on the NSW legislation website" and created the recent WSP for the M with its Schedule 2 full of dates and numbers. I do not know what the legal position is in that circumstance.

(b) All 3 headings in the table in Schedule 2 of the Minister's Order as published on the NSW legislation website" are identical and read: "Effective Volume of Water In

Burrinjuck Dam Water Storage”. Unaccountably, and without any authority of which I am aware, someone has added to what the published Minister’s Order stated, so as to create 3 headings with the same published words but now with the following 3 separate endings: “<30% Full Supply Volume”, “30-50% Full Supply Volume”, and “>50% Full Supply Volume”. Again, I do not know what the legal position is in that circumstance.

195. **The NRC should advise and recommend** that the legal uncertainties with respect to publication of the Minister’s Order, which may mean the whole of the recent WSP for the M is inoperative or that at the very least its Schedule 2 is inoperative, be resolved by publishing the correct form of the Minister’s Order and that the WSP for the M be remade with its new consequential commencement date.
196. **Recent Schedule 4 (Initial “unclipped” translucency percentage table).** I feel that there are legal uncertainties concerning recent Schedule 4. If so, then these legal uncertainties also create legal uncertainty as to how recent clause 65 operates. The legal uncertainties arise in the same way as set out above with respect to the Minister’s Order and its Schedule 2 as published. Just as occurred with Schedule 2, in the case of Schedule 4 as published:
- (a) there are no dates in the first column;
 - (b) there are no numbers in any of the other 9 columns;
 - (c) the missing dates and numbers somehow appear in the recent WSP for the M.
197. **The NRC should advise and recommend** that the legal uncertainties with respect to publication of the Minister’s Order, which may mean the whole of the recent WSP for the M is inoperative or that at the very least its Schedule 4 is inoperative, be resolved by publishing the correct form of the Minister’s Order and that the WSP for the M be remade with its new consequential commencement date.

PART 16 – FLOOD RISK MANAGEMENT MANUAL

198. The purposes of this **Part 16** are:
- (a) To outline how flood risk management has been successfully pushed down the line and away from the prime cause – namely Water NSW and the way it operates under the constraints of the WSP for the M – to local councils.
 - (b) To identify where more information about floods affecting the LGA of Wagga Wagga can be obtained.
 - (c) To outline how that shift in responsibility from Water NSW down the line causes significant time and effort to be expended by the community when, as set out elsewhere

in this Submission, flood risk management should have been undertaken by Water NSW in the first place.

(d) To identify the ongoing confusion created by the following terms which are sometimes used interchangeably in policies emanating from the DPE and other organisations and which terms sometimes have quite distinct meanings under the legislation and other instruments governing the operations of Water NSW. Those terms include “floodplain”, “flood liable land”, and “flood prone land”.

199. As to paras (a) and (c) above, many of the matters raised in this Submission are directed to seeking that the NRC should advise and recommend changes that would increase the responsibility of Water NSW in relation to flood mitigation affecting the Area of Concern. As to para (d) above, **the NRC should advise and recommend** that problems with terminology in policy and related documents be improved so that the word “floodplain” is restricted to land declared as such under the Water Management Act, and that all other land that is susceptible to flooding is termed “flood prone land”, and the 2 terms are to be mutually exclusive.
200. **Floodplain management plan.** Historically, the management of rural floodplains relied upon the preparation of localised floodplain management plans under Part 8 of the *Water Act 1912* (NSW). Such floodplain management plans are superseded upon the commencement of an equivalent plan under the Water Management Act. Of the 22 such plans originally prepared under the *Water Act 1912*, only 10 remain in-force today. Of those 10, only one such plan relates to the Murrumbidgee River: It is within the LGA of Hay Shire, extends from 11 km upstream of Hay to just downstream of Maude, and covers an area of about 1,700 km². Given that it is so far downstream of urban Wagga Wagga and outside the LGA of Wagga Wagga, I consider it beyond the scope of the matters discussed in this Submission.
201. **Exemption from liability for a local council.** Under s 733 of the LG Act a local council “does not incur any liability in respect of” a number of things, including:
 - (a) “anything done or omitted to be done in good faith by the council in so far as it relates to the likelihood of land being flooded or the nature or extent of any such flooding” [s 733(1)(b)];
 - (b) with para (a) applying, for example, to “the carrying out of flood mitigation works” [s 733(3)(e)];
 - (c) with para (a) applying, for example, to “the failure to upgrade flood mitigation works...in response to projected or actual impacts of climate change” [s 733(3)(f3)].
202. For the purposes of the preceding para, a local council is, unless the contrary is proved, taken to have acted “in good faith” if what was done or omitted to be done was substantially in accordance with the principles contained in the current version of a manual whose publication has been notified in the Gazette by the Minister for Planning [s 733(4)(a), s 733(5)(a)].

203. **Flood Risk Management Manual (“the FRM Manual”).** In February 2022, the DPE published its 66-page “Flood Risk Management Manual” (“**the FRM Manual**”). Aspects of this include:

(a) The FRM Manual is the current manual notified in the Gazette under s 733 of the LGA

(b) The FRM Manual replaced a similar manual, the “Floodplain Development Manual” of April 2005 (149pp) (“**the FD Manual 2005**”). Similar policy documents had been published, starting in 1986.

(b) Like its predecessor, the FRM Manual clearly allocates responsibility for flood risk management to local councils. In the Foreword to the FRM Manual it states: “The Policy highlights that primary responsibility for flood risk management (FRM) rests with councils, which are provided with financial and technical support by the NSW Government. The Commonwealth Government has also historically shown a willingness to be involved by providing financial assistance to local government in partnership with the NSW Government.” [p4]. This is reinforced by the 21-page document “Administrative Arrangements: Flood Risk Management Guide AG01” published by the DPE in February 2022 in which it starts with: “Flood risk management (FRM) in New South Wales is a partnership across all levels of government, with local councils being primarily responsible in their local government areas (LGAs).” [p1].

(c) This allocation of responsibility to local councils (both elected members and council staff) is reinforced by the fact that neither the 63-page FRM Manual of 2022 nor the 149-page FD Manual 2005 even mentions Water NSW.

204. **Merit-based approach.** The FRM Manual, like its predecessor, calls upon local councils to take a “merit-based approach”. Aspects of this include:

(a) The phrase “merit-based approach” is defined as: “Weighs social, economic, ecological and cultural impacts of land-use options for different flood prone areas together with flood damage, hazard and behaviour implications, and environmental protection and wellbeing of the state’s rivers and floodplains.” [p53].

(b) The FRM Manual, in respect of that definition, states that the context for use and additional information is:

“The merit approach operates at two levels.

At the strategic level it allows for the consideration of social, economic, ecological, cultural and flooding issues to determine strategies for the management of future flood risk, which are formulated into council plans, policy, and environmental planning instruments

At a site-specific level, it involves consideration of the merits of a development consistent with council LEPs, DCPs and local FRM policies, and consistent with FRM plans.” [p53].

(c) In the context of discussing the role of the FRM committee, the bureaucrats who drafted the FRM Manual allowed the plain English “**trade-offs**” to slip in:

“Important roles of the FRM committee include assisting in presentation and resolution of conflicting desires and requirements on the part of various community groups and individuals. By necessity, an FRM plan is a compromise aimed at having the community as a whole better off. It generally involves trade-offs as certain individuals may be disadvantaged and others advantaged.” [p32].

205. **When is a floodplain not a floodplain?** In NSW there continues to be a confusing use of the term “floodplain”. As set out in the Dictionary at the end of this Memorandum, it has 2 or 3 meanings. For the purposes of the Water Management Act, there is no “floodplain” declared as such by the regulations in the Area of Concern. On the other hand, under the FRM Manual, the FD Manual 2005 and its predecessors, there is “floodplain” in the Area of Concern and the LGA of Wagga Wagga has responsibility for managing the risk in respect of it. The bureaucrats are starting to see the problem of the incorrect usage of “floodplain”: the FD Manual 2005 contained “Floodplain” in its title, whereas the FRM Manual does not; the FRM Manual uses “floodplain” 152 times but within the FRM Manual there is an evident attempt to switch to “flood prone land” and “flood liable land”, with the total of those 2 phrases now outnumbering “floodplain”.
206. The FD Manual 2005 records that, in respect of the Murrumbidgee River system, the “key historic floods” or “years in which significant floods occurred” were: 1993, 1974, 1956, 1952, 1931, 1925, 1905, 1894, 1891, 1870, and 1852 [A-1, A-7 Manual]. The FRM Manual does not repeat such information.
207. **Wagga Wagga floodplain risk study and report.** The NSW State Emergency Service website at its “NSW Flood Data Portal” at <https://flooddata.ses.nsw.gov.au/flood-projects/wagga-wagga-revised-murrumbidgee-river-frmsp> contains the “Wagga Wagga Revised Murrumbidgee River Floodplain Risk Management Study and Plan: Final Report” of 13/04/2018 (“**the 2018 Final Report**”). The 240-page volume 1 of the 2018 Final Report records flood events that exceeded 9 metres on the Hampden Bridge gauge in 2012 (10.60 m) and 2010 (9.70 m), as well as in another 19 years from 1991 back to 1852 [p28]. The Wagga Wagga City Council website, under “History of Floods in Wagga”, lists 77 floods of over 8.23 metres between 1844 and the present: see <https://wagga.nsw.gov.au/services/emergencies/floods/history-of-floods-in-wagga-wagga>.
208. The Wagga Wagga City Council website discusses “Riverine Flooding” at <https://wagga.nsw.gov.au/services/emergencies/floods/flood-studies/riverine> and on that webpage a number of documents are freely accessible. Such documents include both the 2018 Final Report and the 2022 Review of it, being the 102-page “Review of

Wagga Wagga Floodplain Management Study & Plan” by BMT Commercial Australia Pty Ltd.

209. Volume 1 of the 2018 Final Report also recorded:

“Wagga Wagga has experienced riverine flooding on numerous occasions causing evacuation, considerable damage, loss of property, loss of revenue, disruption of services, disruption of lifestyle and significant inconvenience. These events have shaped the past and will continue to shape the future development of the city and the region.

After a 19-year period from 1991 without major or moderate Murrumbidgee River floods, and not even a minor flood between 1996 and 2010 (Diagram 1) the December 2010 event put flooding back on Wagga Wagga’s agenda.

The magnitude of the volume of floodwaters generated by the catchment means that it is impossible to significantly reduce the peak flood flows, even with the construction of major dams such as Burrinjuck, Blowering and Tantangara in the Snowy Mountains. The main means of protecting the city from inundation has been the construction of levee banks (see Section 5.9.1) together with Council controls imposed on new development.” [pp28–29, vol 1].

210. Volume 1 of the 2018 Final Report, at pages 29 and 30, went on to discuss the 2010 and 2012 flood events and the consequent necessary revision of the rating table for the Hampden Bridge gauge – with approximately 25% less flow required to achieve a similar level to past events. The one mention of Water NSW in the Final Report is only in the context of it being responsible “for performing gaugings and updating rating tables in NSW” [p30, vol 1].

211. **Floodplain Risk Management Advisory Committee.** The Wagga Wagga City Council’s website at <https://wagga.nsw.gov.au/the-council/council-committees> outlines the role of the “Floodplain Risk Management Advisory Committee” and identifies its members.

212. **BoM “flood watch areas”.** The BoM records that it has 2 Flood Watch Areas relevant to the Area of Concern:

(a) Area No 13 (Lower Murrumbidgee River), which is a very large area extending from just west of urban Wagga Wagga to Balranald; and

(b) Area No 23 (Central Murrumbidgee River).

PART 17 – ICAC OPINION A REMINDER

213. **ICAC Report.** In November 2020, the Independent Commission Against Corruption (ICAC) released its 168-page Report *Investigation into Complaints of Corruption in the Management of Water in NSW and Systemic Non-Compliance with the Water Management Act 2000*. Aspects of this include:

(a) Most of the matters investigated by ICAC occurred between 2010 and 2017. No public inquiry was held in aid of its investigation.

(b) ICAC opened its Results with: “The Commission was not satisfied in relation to any of the matters it investigated that the evidence established that any person had engaged in corrupt conduct for the purpose of the” ICAC Act. [Report p8].

(c) ICAC then went on to state: “In a number of the matters it investigated, the Commission could not be satisfied that the particular allegations could be established on the evidence. **The Commission formed the opinion, however, that in many of the matters it investigated, the evidence did establish that certain decisions and approaches taken by the department with responsibility for water management in NSW over the last decade were inconsistent with the object, principles and duties of the WMA and failed to give effect to the legislated priorities for water sharing.**” [Report p8]. [emphasis added].

(d) In the Report, while neither the Blowering Dam nor the Burrinjuck Dam was mentioned, “Murrumbidgee” was mentioned 22 times.

214. To be clear, I am not aware of anything, in relation to the matters raised by me in this Submission, that might constitute a person having engaged in corrupt conduct for the purpose of the ICAC Act. The only reason I have included all the material in the preceding para, and that I have highlighted para (c) above, is that it should act as a reminder about such matters.

PART 18 – LEGISLATIVE COUNCIL REPORT, WATER NSW STUDY, IN 2018

215. I have included the material in this **Part 18** because it reinforces either the existing State government policy and the DPE’s specific policy positions, or to the extent that such policies are deficient, the need for buttressing such policies.

18.1 LEGISLATIVE COUNCIL COMMITTEE REPORT, IN 2018

216. **Legislative Council Committee report in 2018.** On 22/03/2016, the NSW Legislative Council’s Portfolio Committee No 5 – Industry and Transport, started its inquiry which 2 years later on 14/05/2018 resulted in publication of its 324-page Report “Augmentation of Water Supply for Rural and Regional New South Wales”. The Committee’s Recommendation 35 was:

“That the NSW Government:

- (a) conduct a feasibility study into the augmentation of Burrinjuck Dam, and
- (b) subject to the findings of the feasibility study, construct a new dam wall or extend the existing dam wall for Burrinjuck Dam.”

217. **Government response in 2018.** On 28/11/2018, the NSW Government responded to the Committee’s 35 Recommendations. In respect of Recommendation 35 it stated:

“Supported in principle

The NSW Government is developing regional water strategies to identify opportunities to improve medium and long-term regional water security. Strategy development builds on the best available data, including long-term climate information and regional NSW population forecasts. **The NSW Government may consider a number of infrastructure options (including enlarging Burrinjuck Dam)** when developing a regional water strategy for this area.” [emphasis added].

18.2 WATER NSW OPTIONS STUDY IN 2018

218. **Water NSW Option: Raising the wall of the Burrinjuck Dam, or new dams.** In June 2018, Water NSW released its “20 Year Infrastructure Options Study Rural Valleys: Summary Report” (Water NSW, June 2018, 72pp). The Options Study is freely accessible at

https://www.waternsw.com.au/_data/assets/pdf_file/0019/132616/20-Year-Infrastructure-Options-Study-June-2018.pdf. The options in relation to the

Murrumbidgee Valley are stated at pages 40 to 43. The options in the Options Study, relevant to urban Wagga Wagga, include on p42:

- (a) Burrinjuck Dam raising (up to 1,700 GL potentially), preliminary capital cost \$873 million.
- (b) New dam on the Murrumbidgee near Mingay (potentially up to 1,000 GL), capital cost \$1,174 million.
- (c) New dam on the Murrumbidgee near Oura (potentially up to 1,000 GL), capital cost \$924 million.
- (d) New dam downstream of Blowering Dam on the Tumut River near Gundagai, capital cost \$1,542 million.

219. While each of paras (a), (b), and (c) above is stated to be an option “to improve water availability”, it is equally relevant to flood mitigation. Para (d) above is stated to be an option “to mitigate asset constraints” which is directly relevant to flood mitigation.

PART 19 – DICTIONARY

220. The following is my “Dictionary” of:

- (a) terms that I use in this Submission, which have the meanings set out, unless the contrary intention appears; and
- (b) terms that I do not use in this Submission, but which are a useful record of the meaning of the many terms which are jargon and are used in documents and websites in relation to water management.

Note on inconsistency of terms: A number of the terms, or terms that are similarly worded, have different meanings depending on whether used in Commonwealth-based or NSW-based regulatory environments. A number of different terms, and variations in terms, appear to mean the same thing. My impression is that both the jargon and inconsistency of some jargon continues to be a problem for people from policy-makers down to end users and consumers. **The NRC should advise and recommend** that further improvement on this issue be undertaken, with the WSP for the M a starting point.

“**accessible storage capacity**” is stated by the BoM on its website to mean: “The volume of water that a ‘water storage’ can hold between the ‘minimum supply level’ and ‘full supply level’; equal to the ‘total storage capacity’ excluding the ‘dead storage capacity’”. It is the sum of this capacity that is reported for a collection of water storages.” A synonym is “**capacity**”.

“**accessible storage volume**” is stated by the BoM on its website to mean: “The volume of ‘water stored’ at a particular time and date. It excludes the ‘dead storage’ volume and hence is the volume of water that can be accessed under normal circumstances without the installation of additional infrastructure.” A synonym is “**volume**”.

“**access licence**” means under the NSW Water Strategy:

“An access licence entitles its holder to take water from a water source in accordance with the licence conditions.

Key elements of an access licence are defined in section 56(1) of the NSW *Water Management Act 2000* as:

- (a) specified shares in the available water within a specified water management area or from a specified water source (the **share component**), and
- (b) authorisation to take water:
 - (i) at specified times, at specified rates or in specified circumstances, or in any combination of these, and

(ii) in specified areas or from specified locations (the **extraction component**).

An access licence may also be referred to as a **water access licence** or a **WAL**.”

“**airspace**” means, under the prior WSP for the M, “the volume in a dam which is normally kept empty for the purpose of mitigating potential floods.” In general terms, it may also be described as “the difference between maximum storage capacity and the current volume of water in storage.” The MDBA states on its website:

“Airspace is the difference between the actual volume of water in storage and the volume when full. Airspace is used to capture a proportion of the water flowing into storages during a flood, preserving airspace is a priority to help reduce the impact of future larger floods on communities and the environment.

Some dams also have additional, ‘designated’ airspace that is reserved for capturing water only during large floods. Dams without this capacity, such as Hume Dam provide very little flood mitigation when water approaches the full supply level. This is because most of the flood water entering the dam must be released downstream to prevent the dam level rising too high and risking dam safety.

The main priority for the MDBA during flooding is to protect the structural integrity and safety of the dams it operates.”

“**allocation**”:

(a) is stated by the BoM on its website to mean: “The specific volume of water allocated to ‘water access entitlements’ in a given ‘water year’ or allocated as specified within a ‘water resource plan’.”

(b) is stated by the MDBA on its website to mean: “The amount of water a water entitlement holder receives in a given year.

An allocation is different to an entitlement. An allocation is the proportion of the entitlement held that can be made available reflecting how much water is available in the system. The percentage depends on the amount of rainfall, inflows into storages, and how much water is already stored. Allocations can increase throughout the year in response to changes in the system. Allocations can be traded, meaning an entitlement holder can sell their water in one year, but still have an ongoing share of water for the following year.”

“**allocation announcement**” means, under the Water NSW “Glossary of Water Terms”, “the basis upon which Water Allocation is calculated from time to time. It may take the form of an Initial Announcement at the beginning of the Water Year or a Supplementary Announcement during the Water Year. It is expressed as a percentage of Entitlement. See also Groundwater Property Allocation.”

“**alluvium**” means unconsolidated sediments deposited by rivers or streams consisting of gravel, sand, silt and clay, and found in terraces, valleys, alluvial fans and floodplains.

“**annual exceedance probability**” or “**AEP**” means, under the FRM Manual, “the chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage.” [p46]. The FRM Manual states that, “for example, a 1% AEP flood has a 1% or 1 in 100 chance of being reached or exceeded in any given year.” [p46]. This approach was preceded by “average recurrence interval” or “**ARI**” which meant “the long-term average number of years between the occurrence of a flood equal to or larger in size than the selected event.” For example, a 100-year ARI flood had 1 in 100 chance of being reached or exceeded in any given year. It is equivalent to a 1% AEP flood.

“**the Area of Concern**” means

(a) The general area encompassing the farming properties and communities near the Murrumbidgee River as it flows east to west from the Burrinjuck Dam (on the Murrumbidgee River near Yass) to and through urban Wagga Wagga, and especially in the Wagga Wagga suburbs of Gumly Gumly and North Wagga Wagga, and then to a point some 15 km west of urban Wagga Wagga; and

(b) The general area encompassing the farming properties and communities near the Tumut River as it flows from the Blowering Dam down to the confluence of the Tumut River and the Murrumbidgee River. This is discussed in **Part 8** above. It is also dealt with in a specific manner in **Part 12** above and in **Part 15.4** above.

“**available water**” means, under the Water Management Act, in relation to a water management area or water source, means the water that is available in that area or water source in accordance with an available water determination that is in force in respect of that area or water source.” [Dictionary].

“**available water determination**” or “**AWD**” means a determination referred to in s 59 of the Water Management Act that defines a volume of water or the proportion of the share component (also known as an “allocation”) that will be credited to respective water accounts under specified categories of water access licence. Initial allocations are made on 1 July each year and, if not already fully allocated, may be incremented during the water year. In effect, AWDs are the mechanism by which water available for extraction is determined and credited into an individual access licence water allocation account.

“**basic landholder rights**” or “**BLR**” means, under the Water Management Act, “domestic and stock rights, harvestable rights or native title rights.” Water NSW in its “Glossary of Water Terms” states:

“Basic landholder rights cover three types of rights to take water without a water access licence.

The first allows landholders along the riverfront to extract water for domestic household and stock watering purposes, replacing riparian rights under the Water Act 1912.

Harvestable rights allow landholders to capture a portion of the rainfall runoff from their land in harvestable rights dams.

Native Title Rights allow Aboriginal native title holders (as determined under the Commonwealth's Native Titles Act 1993) to extract water for a range of personal, domestic and non-commercial communal purposes.”

“**the Basin**” means “the Murray-Darling Basin” which is an extensive area falling within a boundary, an indicative map of which is set out in Schedule 1A of the Cth Water Act. The Basin includes most of the area of NSW (except along the coast), most of northern Victoria, and parts of each of Queensland and South Australia. The Area of Concern is within the Basin.

“**the Basin Agreement**” means the “Murray-Darling Basin Agreement” set out in Schedule 1 of the Cth Water Act. The 260-page Basin Agreement is between the Cth, NSW, Victoria, Queensland, South Australia, and the ACT. It came into effect in 2008.

“**the Basin Authority**” or “**the MDBA**” means the Murray-Darling Basin Authority established by s 171 of the Cth Water Act.

“**the Basin Ministerial Council**” means the council established under clause 7 of the Basin Agreement. It consists of 6 ministers: one minister of each of the 6 contracting governments is appointed by that government.

“**the Basin Officials Committee**” means the committee established under clause 17 of the Basin Agreement.

“**the Basin Plan**” means the 263-page *Basin Plan 2012* (Cth) adopted by the Cth Minister under s 44(3)(b)(i) of the Cth Water Act. In effect, it sets the amount of water that users can take from the Murray–Darling Basin each year.

“**Basin State**” means, under the Cth Water Act, NSW, Victoria, Queensland, South Australia, and the ACT.

“**Basin water resources**” means, under the Cth Water Act, all water resources within, or beneath, the Basin. However, it does not include, first, water resources prescribed by the regulations and, second, ground water that forms part of the Great Artesian Basin.

“**Blowing Air Space Deed**” means the deed so entitled between the Ministerial Corporation and Snowy Hydro and dated 28/06/2002. Since that date it has been ‘commercial-in-confidence’.

“**the BoM**” means the Cth Bureau of Meteorology. It is a non-corporate Cth entity which was established under the *Meteorology Act 1955* (Cth) and it operates under that Act and the Cth Water Act.

“**bulk access regime**” is, as Water NSW states: “The bulk access regime is the water sharing rules that will determine how much water will be available for extraction by all licensed water users within a Water Sharing Plan.” A “**bulk access regime for the extraction of water under access licences**” is established under a management plan or Minister’s plan [s 20(1) Water Management Act]. In the case of the WSP for the M, the “bulk access regime” comprises most of recent clauses 12 to 83.

“**capacity**” is stated by the BoM on its website to mean: “The volume of water that a ‘water storage’ can hold between the ‘minimum supply level’ and ‘full supply level’; equal to the ‘total storage capacity’ excluding the ‘dead storage capacity’. It is the sum of this capacity that is reported for a collection of water storages.” A synonym is “**accessible storage capacity**”.

“**CARM**” means “Computer Aided River Management”, a decision support tool used by Water NSW. According to the website of DHI (whose name was Danish Hydraulic Institute between 1971 and 2000, and which is an international water software development and engineering consultancy firm with headquarters in Denmark), DHI used the MIKE suite of software to develop CARM, such development being with and for the then State Water Corporation of NSW. DHI states that CARM is a “real-time operational system”. DHI also states: “We developed the operational models for the project and integrated these tools with additional optimisation in an online Decision Support System. The operational models accurately described catchment and river processes including: catchment rainfall runoff; groundwater seepage and evaporation; river hydraulics.” According to the 2022 “Efficient Airspace Paper” in relation to the Murrumbidgee River referred to in **Part 4** above, CARM was “used to estimate the potential inflows based on BOM’s short term (7-day) forecast probabilistic rainfalls (50% and 25% exceedance conditions) using hydrological and hydraulic models. CARM models have been critical in estimating tangible forecast inflows to the dam and downstream tributaries and making improved release decisions based on different risk profiles.”

“**carryover**” is stated by the MDBA on its website to mean:

“An unused water allocation (or part of an allocation) that the water entitlement holder saves for the next water year.

Carryover gives a water entitlement holder a right to a share of space in storage dams and the right retain any unused water for use in a later year.”

“**catchment**” means, under the NSW Water Strategy (August 2021), “a natural drainage area, bounded by sloping ground, hills or mountains from which water flows

to a low point. Flows within the catchment contribute to surface water sources as well as to groundwater sources.”

“**clause**” means a provision of delegated legislation, or of an Agreement. Examples include a provision in: the WSP for the M; the Dams Safety Regulation 2019; the Operating Licence; and the Basin Agreement.

“**Cth**” means the Commonwealth of Australia.

“**the Cth Department**” means, as from mid-2022, the Department of Climate Change, Energy, the Environment and Water.

“**the Cth E Water Holder**” means the Cth Environmental Water Holder established under s 104 of the Cth Water Act. The Holder manages the Australian Government’s portfolio of water for the environment to protect and restore the environmental assets of the Basin, and outside the Basin where the Australian Government owns water.

“**the Cth Minister**” means, as from mid-2022, Tanya Plibersek, the Minister for the Environment and Water.

“**Cth Water Act**” means the *Water Act 2007* (Cth).

“**combat agency**” means, under s 3(1) of the *State Emergency and Rescue Management Act 1989* (NSW), “the agency identified in the State Emergency Management Plan as the agency primarily responsible for controlling the response to a particular emergency.”

“**consumptive use**” means, under s 4 of the Cth Water Act, “the use of water for private benefit consumptive purposes including irrigation, industry, urban and stock and domestic use.”

“**consumptive water**” is stated by Water NSW on its “Water Insights” portal to mean: “A general term for water that is extracted for consumption and not available for further use. This includes water for irrigation and business, for town water supply and “basic landholder rights”. Compare this with “Operational water” and “Environmental water”.”

“**dam**” is used to refer to either separately or together, as the context requires:

- (a) the wall or like structural barrier constructed across a river; and
- (b) the “reservoir” or “storage” which is the large body of water that accumulates behind the wall.

“**dead storage**”:

- (a) is stated by the BoM on its website to mean: “In a water storage, the volume of water stored below the level of the lowest outlet (the ‘minimum supply level’). This water cannot be accessed under normal operating conditions.”

(b) is stated by the DPE to mean the volume in storage that is generally considered unavailable for use (e.g. water level below release valves) due to access and often poor water quality.

“**dead storage capacity**” is stated by the BoM on its website to mean: “The portion of ‘total storage capacity’ that is equal to the volume of water below the level of the lowest outlet (the ‘minimum supply level’). This water cannot be accessed under normal operating conditions.”

“**dead storage water**” is stated by the BoM on its website to mean: “Water in a storage that is below the elevation of the lowest constructed outlet.”

“**domestic and stock rights**” means the rights conferred on a landholder by s 52 of the Water Management Act.

“**the DPE**” means the NSW Department of Planning and Environment.

“**DPE Water**” means, under the Operating Licence, “the division responsible for water within DPE.”

“**Draft Water Strategy for the M**” means “Draft Regional Water Strategy: Murrumbidgee Long List of Options” (Department of Planning and Environment, April 2022, 100pp), freely accessible at https://www.dpie.nsw.gov.au/_data/assets/pdf_file/0006/506661/options.pdf. For a discussion of the Draft Water Strategy for the M, see **Part 10 above**.

“**drought**” is stated by the BoM on its website to mean: “A long period of abnormally low rainfall, especially one that adversely affects agriculture and other human activities.”

“**the Efficient Airspace Paper**” means the 2022 Paper discussed in **Part 4** above.

“**effective available water**” means, under the prior WSP for the M, “is the sum of:

- (a) the available water determinations in the water year made under clause 62(2) and (3), plus
- (b) the maximum of zero or the water carried over in regulated river (general security) access licence water allocation accounts from the previous water year less 0.15 ML per unit share.”

“**effective storage**” means, according to the DPE, the total volume of storage minus the dead storage component – the volume generally considered as useable.

“**effective storage volume**” means, under the WSP for the M, “is equal to the active storage volume in Burrinjuck Dam minus half the volume in regulated river (general security) access licence accounts that was carried over from the previous water year.”

“**El Niño**” is stated by the BoM on its website to mean: “Refers to the extensive warming of the central and eastern Pacific Ocean that leads to a major shift in weather patterns across the Pacific. In Australia (particularly eastern Australia), El Niño events are associated with an increased probability of drier conditions.”

“**ENSO**” or “**El Niño Southern Oscillation**” is stated by the BoM on its website to mean: “The oscillation between the El Niño climate phase and the La Niña climate phase, or opposite phase, usually over several years.”

“**environmental water**” means, under s 8 of the Water Management Act, a combination of:

(a) “water that is committed by management plans for fundamental ecosystem health or other specified environmental purposes, either generally or at specified times or in specified circumstances, and that cannot to the extent committed be taken or used for any other purpose (**planned environmental water**)”; and

(b) “**licensed environmental water**” which is water committed by a particular type of condition of an access licence imposed by the Minister taken or permitted to be taken under specified licence conditions concerned with environmental water.

[Note: First, “planned environmental water” is water committed to the environment by rules in the WSP, and is often referred to as “rules-based”. Second, “licensed environmental water” is water held through a WAL that is dedicated exclusively for environmental purposes, and is often referred to as “held” environmental water.]

“**environmental water rules**” means, under the Water Management Act, those rules which a management plan is required to contain, such rules being “provisions for the identification, establishment and maintenance of planned environmental water” [s 8(2)].

“**EWN**” means “Early Warning Network”, which is Water NSW’s automated notification system designed to improve notification of dam and supply activities to the public. This is discussed in **Part 11** above.

“**extreme event**” means, under the Water Management Act, “any of the following events:

(a) an extreme dry period,

(b) a water quality event of an intensity, magnitude and duration that is sufficient to render water acutely toxic or unusable for established local uses and values,

(c) any other type of event that has resulted in the suspension of a water management plan under this Act or in the last 50 years of a plan that deals with water allocation and is made under any other Act.” [Dictionary]. This is discussed in **Part 15.2** above.

“**failure**” of a dam means, under the *Dams Safety Regulation 2019* (NSW), “the uncontrolled release of the contents of the dam or the dam ceasing to perform its functions”.

“**F D Manual 2005**” means the “Floodplain Development Manual: The Management of Flood Liable Land” (Department of Infrastructure, Planning and Natural Resources, April 2005, 149pp). For a discussion of this, and the FRM Manual, see **Part 16** above.

“**flash flooding**” is stated by the BoM on its website to mean: “Flooding occurring within about 6 hours of rain, usually the result of intense local rain and characterised by rapid rises in water-levels”. The phrase is usually used in water forecasts and in flood warning services messages.

“**flooding**” is categorised by the BoM on its website as follows:

(a) “**local flooding**”: “Describes situations where intense rainfall is expected to cause high run-off volumes in small catchments or localised areas with minimal impact on main streams.”

(b) “**minor flooding**”: “Causes inconvenience. Low-lying areas next to watercourses are inundated which may require the removal of stock and equipment. Minor roads may be closed and low-level bridges submerged.”

(c) “**moderate flooding**”: “In addition to the criteria for minor flooding, the evacuation of some houses may be required. Main traffic routes may be covered. The area of inundation is substantial in rural areas requiring the removal of stock.”

(d) “**major flooding**”: “In addition to the criteria for moderate flooding, extensive rural areas and/or urban areas are inundated. Properties and towns are likely to be isolated and major traffic routes likely to be closed. Evacuation of people from flood affected areas may be required.”

Note: The **SES** states on its website:

(i) “**Local warnings for your community**”

The NSW SES utilises a range of sources to build detailed flood intelligence within local communities – including information from flood studies and historical flood data. As part of the transition to the Australian Warning System, the NSW SES has increased flexibility to tailor warnings at the community level, based on the expected consequences of severe weather events.”

(ii) “**Will minor/moderate/major terminology still be used?**”

The Bureau of Meteorology will continue to issue flood warnings with this terminology. The NSW SES will then analyse the expected impact and consequences of these flood warnings to communities in the warning area, and

determine the type of warning to issue (Advice, Watch & Act, or Emergency Warning).

Minor, moderate and major terminology will still be used within the flood products from NSW SES, however it will not be part of the headline warning.”

“**flood liable land**” means, under the FRM Manual, the same as “**flood prone land**”, as to which see further below.

“**flood mitigation**”:

(a) In general contexts. In general contexts, other than in para (b) or (c) below, I feel that the phrase “flood mitigation” might be described as “those proactive measures that are taken, both before and during flooding, to minimise or eliminate the impacts and risk of flooding.”

(b) Water NSW and Snowy Hydro. One of the “listed functions” of Water NSW under the Water NSW Act, and the Operating Licence, is “to undertake flood mitigation and management”. That phrase is not defined. Given that Water NSW operates and manages dams, and Snow Hydro has a similar function, I feel that for each of them the phrase “flood mitigation” might fairly be regarded as meaning: “reducing river levels downstream of the dam, which are or may become at flood level, by using planned and modelled airspace in the storage to temporarily store floodwater and only releasing that floodwater later when the downstream river levels have subsided to a safe level.”

(c) Local councils. In the context of local councils, which do not operate and manage dams, “flood mitigation” might fairly be regarded as a combination of structural and non-structural measures that might be taken by the local council within its legislative and financial power within its LGA. Structural measures might include the construction and maintenance of levees and other like structures to limit inundation of nearby areas up to a certain size flood event. Such other structures include: control banks, spillways, drainage channels, flood gates, and bank protection works. Non-structural measures might include such things as, first, land use planning controls, second, building and development controls, third, property modification projects and, fourth, flood warning systems.

“**floodplain**”:

(a) means, under the Water Management Act, “land declared by regulations to be a floodplain” [Dictionary]. This does not include any land in the Area of Concern.

(b) means, in other contexts including under the “NSW Water Strategy”, flat land bordering a river or stream that is naturally subject to flooding and is made up of alluvium (sand, silt and clay) deposited during floods.

(c) The FRM Manual states that “flood prone land”, which it defines as “land susceptible to flood by the PMF event”, “is also known as ‘the floodplain, ‘flood liable land’ and ‘flood affected land’”. [p50].

“floodplain harvesting”:

(a) means, under the prior WSP for the M, “is the collection, extraction or impoundment, of water flowing across the floodplain.”

(b) means, under the Basin Plan, “the taking of water from a floodplain, including after it leaves a watercourse during a flood.”

“flood prone land” means, under the FRM Manual, “land susceptible to flooding by the PMF event.” “PMF” means “probable maximum flood”. The FRM states: “Flood prone land is also known as ‘the floodplain’, ‘flood liable land’ and ‘flood affected land’”. [p50].

“flow rate (ML/day)” is stated by Water NSW on its “Water Insights” portal to mean: “This is the rate of water passing the river gauge. It is measured in megalitres per day, written ML/d. A megalitre is 1,000,000 litres. One megalitre per day is equivalent to about 12 litres per second. A daily value is the flow rate at 6 am.”

“FRM” means “flood risk management”, being under the FRM Manual, “the management of flood risk to communities”. [p50]

“FRM Manual” means the “**Flood Risk Management Manual**” (Department of Planning and Environment, February 2022, 66pp). For a discussion of the FRM Manual, and the FD Manual 2005, see **Part 16** above.

“full supply level” is stated by the BoM on its website to mean: “The normal maximum operating ‘water level’ of a ‘water storage’ when not affected by floods. This water level corresponds to 100% ‘capacity’.”

“full supply volume” means, under the prior WSP for the M, “the storage volume considered to be the limit for the purposes of storage of water, except in periods of flood operation. This excludes any water that cannot be accessed using existing outlet infrastructure.”

“GL” means gigalitre. One gigalitre is 1,000 ML (megalitres) or 1 billion litres.

“groundwater”:

(a) means, under the NSW Water Strategy, “water located beneath the surface of the ground in the spaces between sediments and in the fractures of rock formations.”

(b) means, under the Cth Water Act and the Basin Plan,

(i) water occurring naturally below ground level (whether in an aquifer or otherwise); or

(ii) water occurring at a place below ground that has been pumped, diverted or released to that place for the purpose of being stored there;

but does not include water held in underground tanks, pipes or other works.”

“**I**”, “**me**”, and “**my**” refers to Dr Joe McGirr, MP, Member for Wagga Wagga (Independent).

“**Indian Ocean Dipole**” is stated by the BOM on its website to mean: “A major contributor to rainfall variability over Australia. When the dipole is in a positive phase, the sea-surface temperature (SST) around Indonesia is cooler than average while those in the western Indian Ocean are warmer than average. The positive phase increases easterly winds across the Indian Ocean, while convection in areas near Australia reduces. This results in suppressed rainfall over the Australian region. During a negative phase, warmer than average SST near Indonesia and cooler than average SST in the western Indian Ocean, result in more westerly winds across the Indian Ocean, greater convection near Australia and enhanced rainfall in the Australian region.”

“**individual**” means a natural person.

“**inflows**” means, according to the DPE, surface water runoff and deep drainage to groundwater (groundwater recharge) and transfers into the water system (both surface and groundwater) for a defined area

“**IPART**” means the Independent Pricing and Regulatory Tribunal. It is an independent authority, albeit a NSW government agency, established in 1992 by an Act of the same name. IPART is the independent pricing regulator for water, energy, public transport, and local government. It is also the licence administrator of water, electricity, and gas.

“**La Niña**” is stated by the BoM on its website to mean: “The extensive cooling of the central and eastern Pacific Ocean. In Australia (particularly eastern Australia), La Niña events are associated with an increased probability of wetter conditions.”

“**LGA**” means a local government area, being an “area” as constituted under Part 1 of Chapter 9 of the LG Act.

“**LG Act**” means the *Local Government Act 1993* (NSW).

“**listed functions**” means the 11 “listed functions” of Water NSW set out in s 7 of the Water NSW Act. Each “function” includes a “duty” [s 3]. Relevant to this Submission, one of the 11 “listed Functions” is “to undertake flood mitigation and management” [s 7(1)(i)].

“**local council**” means the council of an LGA.

“**local water utilities**” means, under the NSW Water Strategy, “generally these are council owned and operated utilities that provide water supply and sewerage services to local communities.”

“**LTADEL**” means “long-term average annual extraction limit”. It is the long-term average annual volume of water (expressed in megalitres per year) in a water source available to be lawfully extracted or otherwise taken under access licences and BLR requirements. In the case of the WSP for the M, clauses 49 to 57 (Division 1 of Part 7) deal with such matters.

“**management plan**” means a plan prepared by a committee involving community representatives and finally made by the Minister under s 41 of the Water Management Act.

“**the MDBA**” means the Murray-Darling Basin Authority established by s 171 of the Cth Water Act.

“**Millennium Drought**” means, as the BoM describes it:

“From late 1996 to mid-2010, much of southern Australia (except parts of central Western Australia) experienced a prolonged period of dry conditions, known as the Millennium Drought (Figure 2). The drought conditions were particularly severe in the more densely populated southeast and southwest, and severely affected the Murray-Darling Basin and virtually all of the southern cropping zones.

While this episodic dry spell contributed to a long-term statistical decline in southern cool-season rainfall, it is also partially distinct from those drying trends – most particularly in the southwest, where winter drying has persisted for more than four decades.

During the Millennium Drought, Perth, Adelaide, Melbourne, Hobart, Canberra, Sydney and Brisbane were all affected by persistent or periodic drought episodes.”

“**minimum supply level**” or “**MSL**” is stated by the BoM on its website to mean: “The lowest ‘water level’ to which a ‘water storage’ can be drawn down (0% full) with existing outlet infrastructure; typically equal to the level of the lowest outlet, the lower limit of ‘accessible storage capacity’”.

“**the Minister**” means, as the context requires:

(a) from 02/04/2015 to 05/04/2023: the Minister for Lands and Water, Niall Blair (Nationals) (02/04/2015 to 30/01/2017); the Minister for Water, Property and Housing, Melinda Pavey (Nationals) (30/01/2017 to 21/12/2021); the Minister for Lands and Water, Kevin Anderson (Nationals) (21/12/2021 to 05/04/2023).

(b) from 05/04/2023, the Minister for Water, who at the date of this Submission is The Hon. Rose Jackson, MLC (Australian Labor Party). Under the *Administrative Arrangements (Minns Ministry – Administration of Acts) Order 2023* (NSW) the Minister for Water has been allocated the administration of various NSW Acts including: the *Dams Safety Act 2015*, the *Water Act 1912*, the *Water Management Act 2000*, and the *Water NSW Act 2014*.

“**the Ministerial Corporation**” means the Water Administration Ministerial Corporation (ABN 32 471 530 421) constituted under s 371(1) of the *Water Management Act 2000* (NSW). For a short discussion of the Ministerial Corporation, see **Part 7** above.

“**the Minister’s Order**” means the 64-page Order made on 17/12/2022 by the then Minister, Kevin Anderson, which made amendments to the wording of the WSP for the M which had been in operation in an unaltered form for the preceding 4½ years. For a discussion of the Minister’s Order, see **Parts 7 and 15.4** above.

“**Minister’s plan**” means a plan made by the Minister under s 50 of the Water Management Act. For a discussion of a Minister’s plan, see **Part 13** above.

“**ML**” means megalitre. One megalitre is one million litres.

“**Murrumbidgee Irrigation Ltd**” means the company of that name. It is an “irrigation corporation” under s 117 and Schedule 1 of the Water Management Act.

“**natural inflows**” means, under the prior WSP for the M, “flows entering Blowering Dam as compared to flows entering into Blowering Dam as a result of releases made from the Snowy Hydro scheme.”

“**NEM**” means the National Electricity Market. It commenced in 1998, and is the wholesale market for the supply of electricity to retailers and end-users in all States and Territories except Western Australia, Northern Territory, and Tasmania.

“**NRAR**” means the Natural Resources Access Regulator.

“**NRC**” means the Natural Resources Commission.

“**the NRC Act**” means the *Natural Resources Commission Act 2003* (NSW).

“**NSW Water Strategy**” means “NSW Water Strategy” (Department of Planning, Industry and Environment, August 2021, 152pp). This document is freely accessible at <https://water.dpie.nsw.gov.au/plans-and-programs/nsw-water-strategy/the-strategy>. For a discussion of the NSW Water Strategy, see **Part 10** above.

“**the Operating Licence**” means the 61-page operating licence entitled “Water NSW operating licence 2022–2024” granted by the Governor to Water NSW under s 11 of the Water NSW Act. For a discussion of the Operating Licence, see **Part 14** above.

“**operational rules**” means, under the NSW Water Strategy, “the procedures for managing releases and extractions of water (surface and groundwater) to meet the rules of relevant legislation and policy (e.g. water sharing plans, long-term water plans).”

“**operational water**” is stated by Water NSW on its “Water Insights” portal to mean: “A general term for water that is consumed as a natural consequence of operating the rivers, including through evaporation in storage or in rivers, seepage out of rivers to

aquifers, losses to floodplains (collectively called losses), water flowing out of the system through customers not taking water previously ordered, and water that is set aside in storage for future year's needs (see "Reserves")."

"overland flow water" means, under s 4A of the Water Management Act, "water (including floodwater, rainfall run-off and urban stormwater) that is flowing over or lying on the ground as a result of rain or any other kinds of precipitation, or rising to the surface from underground", subject to some qualifications in s 4A.

"penstocks" or **"slide gates"** or **"sluice gates"** means a water control gate or structure that controls flow.

"percentage full" or **"% full"**:

(a) is stated by Water NSW on its "Water Insights" portal to mean: "This is the accessible "storage volume" expressed as a percentage of accessible capacity. Some water in the lake is not accessible because it is below the outlets from the dam. So, the percentage full is calculated as the accessible volume divided by the accessible capacity (the maximum accessible volume).

(b) is stated by the BoM on its website to mean: "The volume of water in storage as a percentage of the 'accessible storage capacity'. Note that the percentage full may exceed 100% due to floods for example."

"person" includes an individual, a company, a corporation, or any other body corporate.

"PMF" or **"probable maximum flood"**:

(a) means, under the FRM Manual: "The largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation (PMP), and where applicable, snow melt, coupled with the worst flood producing catchment conditions."

(b) is stated by the BoM on its website to mean:

"The largest flood that could conceivably occur at a particular location.

Generally, it is not physically or financially possible to provide general protection against this event. This flood defines the maximum extent of land liable to flooding. The extent, nature and potential consequences of flooding associated with the PMF event should be assessed in a Flood Study. The PMF event may form the basis of evacuation planning and the identification of refuge areas. Considerations should be given to adopting the PMF event as the design flood event for emergency services planning and for determining the location and floor levels of facilities such as telephone exchanges, police stations and hospitals. The PMF event may also be used to develop land use development guidelines in the floodplain management plan."

“**PMP**” or “**probable maximum precipitation**” is stated by both the BoM and the FRM Manual to mean:

“Probable maximum precipitation

The greatest depth of precipitation for a given duration meteorologically possible for a given size storm area at a particular location at a particular time of the year, with no allowance made for long-term climatic trends.”

“**POAMA**” means “Predicted Ocean Atmosphere Model for Australia”. This is the climate model used by the BoM for multi-week to seasonal through to inter-annual climate outlooks. See <http://www.bom.gov.au/climate/poama2.4/about-POAMA-outlooks.shtml>.

“**predicted river height**” is stated by the BoM on its website to mean: “The height (in metres) to which the river is predicted to rise at the river gauge referred to in the warning. The actual depth of floodwater will vary across the floodplain. Knowledge of past flood events, as well as estimates of flood levels from flood studies, are used by local Councils, emergency services and landowners to determine which areas are likely to be flooded from the predicted river height. The accuracy of this prediction will depend on a number of factors, including the type of flood forecasting model and its input data. Predicted river heights are subject to forecasting error and are regularly updated as more information becomes available.”

“**pre-releases**” means, in general terms, releasing water prior to the ‘wet season’ or well before an expected flood event to create airspace within the dam to ‘absorb’ or capture the first of the floodwaters. Pre-releases are made to minimise the risk of a physical spill.

“**regulated river**”:

(a) means, according to the DPE, a river system where flow is controlled via one or more major man-made structures such as dams and weirs;

(b) means, under the Water Management Act, “a river that is declared by the Minister, by order published in the Gazette, to be a regulated river.” [Dictionary]. Within a regulated river system, downstream flows are regulated by a major state-owned storage, and licence holders can order water against a held entitlement.

“**regulated river water source**” is stated by Water NSW on its “Water Insights” portal to mean: “A regulated river is a “water source” where water can be stored in dams or inline storage weirs and consequently river flow rates and levels can be controlled or regulated. Only 15 such water sources exist (out of about 760 water sources). A licence holder must always order water before taking it from a regulated river. Compare with “groundwater” and “unregulated water source”.” The major regulated rivers in NSW are: the Border Rivers (jointly managed by NSW and Queensland, which rivers include parts of the Dumaresq and Macintyre), the Gwydir, Namoi, Macquarie, Lachlan,

Murrumbidgee, and the Hunter. Some of the major rivers in NSW which are “**unregulated**” include: the Barwon/Darling, Richmond, Clarence, Macleay, and Bemboka.

“**reserves**” means, under the WSP for the M, “are volumes of water put aside in a water storage to allow the supply of future water requirements.”

“**riparian**” is stated by the BoM on its website to mean: “An area or zone within or along the banks of a stream or adjacent to a watercourse or wetland; relating to a riverbank and its environment, particularly to the vegetation.”

“**river level (metres)**” is stated by Water NSW on its “Water Insights” portal to mean: “This is the level of water at the river gauge. The level is in metres above a zero point at the site, not an elevation above sea level. A daily value is the level at 6 am.”

“**s**” means a section of an Act. Examples include: the Water Management Act; the Water NSW Act.

“**SDL**” means, under the Cth Water Act, “long-term average sustainable diversion limit for the water resource plan area”. The requirement for the SDL is in s 55(2)(b) of the Cth Water Act and Part 3 of Chapter 10 of the Basin Plan (sections 10.08 to 10.15 of the Basin Plan). The MDBA states on its website: First, “For many years, state governments managed water use through their own Cap on water diversions. A new system, known as the **sustainable diversion limit**, came into effect from [1 July] 2019 and is binding on all states in the Basin.” Second: “The new system will focus on sustainable diversion limits, which limit how much water, on average, can be used in the Basin by towns and communities, farmers, and industries, while keeping the rivers and environment healthy.” The context and further explanation is freely accessible at <https://www.mdba.gov.au/basin-plan/sustainable-diversion-limits>.

“**serious rainfall deficiency**” is stated by the BoM on its website to mean: “Describes the situation of an area where the total rain received for three months or more is between the lowest five to ten per cent of recorded rainfall for that area.”

“**SES**” means the NSW State Emergency Service established under s 7 of the *State Emergency Service Act 1989* (NSW).

“**severe rainfall deficiency**” is stated by the BoM on its website to mean: “Describes the situation of an area where the total rain received for three months or more is within the lowest five per cent of recorded rainfall for that area.”

“**share component**” means an entitlement to a given number of shares of the available water in a specified water source. The share component on an access licence certificate is expressed as a unit share. The share component of a specific-purpose access licence (for example, local water utility, major water utility, and domestic and stock) is expressed in megalitres.

“**Snowy Hydro**” means Snowy Hydro Limited (ABN 17 090 574 431), a for-profit public company incorporated on 28/06/2002 under the *Corporations Act 2001* (Cth). Since 29/06/2018 it has been wholly owned by the Cth. It has paid total dividends of: in FY 2020, \$217.8 million; in FY 2021, \$122.7 million.

“**Snowy Hydro Act**” means the *Snowy Hydro Corporatisation Act 1997* (NSW).

“**Snowy-Tumut Development**”:

(a) means, under the Cth Water Act and the Snowy Water Licence, “the component of the Snowy Scheme comprising Works that regulate the waters of the Eucumbene River, the Tooma River, the Upper Murrumbidgee River and the Upper Tumut River.”

(b) is stated by the DPE, as a plainer language version of “Snowy-Tumut Development” in the Snowy Water Licence, to mean: “The area of the Scheme (mostly to the north) where inflows are accounted for eventual release through the Tumut 3 power station to the Murrumbidgee River via Blowering Dam.”

“**Snowy Water Licence**” means the 112-page “Snowy Water Licence” issued by the Ministerial Corporation under Part 5 of the Snowy Hydro Act.

“**SOC Act**” means the *State Owned Corporations Act 1989* (NSW).

“**Southern Oscillation Index**” or “**SOI**” is stated by the BoM on its website to mean: “An index calculated from the monthly or seasonal fluctuations in the air pressure difference between Tahiti and Darwin.” Sustained negative values of the SOI below -7 often indicate El Niño episodes. Sustained positive values of the SOI above $+7$ are typical of a La Niña episode.

“**spillway**” means one or 2 structures that either form part of a dam, or are found just beside one. They are used, when a reservoir is full, to pass floodwater safely, and in a controlled way, over a dam, or around it, or through it.

“**storage**” means, according to the DPE, a state-owned dam, weir or other structure that is used to regulate and manage river flows in the catchment and the water bodies impounded by these structures.

“**storage capacity**” is stated by Water NSW on its “Water Insights” portal to mean: “This is the maximum accessible volume of a dam’s reservoir or inline storage weir. Some water in a storage is not accessible because it is below the outlets and this inaccessible volume is called *dead storage*. Storage capacity does not include dead storage (except Menindee Lakes where the capacity is shown as Total Capacity).”

“**storage inflow (GL)**” is stated by Water NSW on its “Water Insights” portal to mean: “When it rains in the storage’s catchment, the run-off water eventually flows into the storage. The total that arrives each day in the 24 hours to 9 am is called the daily inflow to the storage. Inflow is measured in gegalitres (GL). One GL is 1000 ML or 1 billion

litres. A monthly value is the total inflow in the month to 9 am on the last day of the month (or today for the current month).”

“**storage release (GL)**” is stated by Water NSW on its “Water Insights” portal to mean: “The volume of water released from the dam in the 24 hours to 9am, measured in gigalitres. Releases are made for orders placed by customers and to maintain the river and its environment, to stop storages overflowing and to mitigate flooding. Releases are measured in gigalitres (GL). One GL is 1000 ML or 1 billion litres. A monthly value is the total volume released in the month to 9am on the last day of the month. (or today for the current month).”

“**storage reserve**” means proportion of water in a storage reserved in the resource assessment process for future essential or high-security requirements (e.g. town water).

“**storage volume**”:

(a) is stated by Water NSW on its “Water Insights” portal to mean: “This is the amount of accessible water in the reservoir behind a dam or weir at 9am on the last day of a month. Some water in the lake is not accessible because it is below the outlets from the dam and this inaccessible volume is called *dead storage*. Storage volume does not include dead storage (except the Menindee Lakes where volume is shown including dead storage). The Storage volume is also called the *active storage volume* and effective storage volume. The Murray Darling Basin Authority uses the term *active storage*, and the Bureau of Meteorology uses the term *accessible volume*.”

(b) is stated by the DPE to mean the total volume of water held in storage at a specified time.

(c) is stated by the BoM on its website to mean: “The volume of water stored at a particular time and date. It excludes the dead storage volume and is therefore the volume of water that can be accessed under normal circumstances without the installation of additional infrastructure.” Synonyms are “accessible storage volume” and “volume”.

“**supplementary announcement**” means, under the Water NSW “Glossary of Water Terms”: “See Allocation Announcement. This is the basis upon which the Initial Water Allocation Announcement at the beginning of the Water Year is supplemented by additional Announcements during the Water Year.”

“**supplementary WAL**” means a “supplementary water access licence” under the Water Management Act. Where a surplus flow from rain events cannot be captured in storages or weirs, and this water is not needed to meet current demands or commitments, then it is considered surplus to requirements and a period of Supplementary Access is announced. Supplementary Water Access Licence holders can only pump water against these licences during these announced periods. Other categories of licence holders may also pump water during these periods.

“**surcharge**” means, according to the DPE, the temporary storage level increase above the ‘full supply level’ during a flood.

“**surface water**”:

(a) means, under the Cth Water Act:

(i) water in a “watercourse” – which includes a river, creek, or a dam that collects water flowing in a watercourse – or lake or wetland; and

(ii) any water flowing over or lying on land after either having precipitated naturally or having risen to the surface naturally from underground.

(b) means, under the NSW Water Strategy, “all water that occurs naturally above ground including rivers, lakes, reservoirs, creeks, wetlands and estuaries.”

“**SWIOLD**” means the 63-page deed dated 03/06/2002 entitled “Snowy Water Inquiry Outcomes Implementation Deed” between the Cth, NSW, and Victoria.

“**total storage capacity**” is stated by the BoM on its website to mean: “The entire volume of water contained by the ‘water storage’ at ‘full supply level’; equal to the sum of the ‘accessible storage capacity’ plus the ‘dead storage capacity’.

“**translucent flows**” means, under the prior WSP for the M, “releases from water storages where some portion of the inflows to the water storage is released coincidentally with their occurrence.”

“**translucent release**” is stated by Water NSW on its “Water Insights” portal to mean: “Translucent releases from a dam are flows intended to mimic the flow patterns of a river by allowing to ‘pass through’ a portion of the inflows to a dam. This helps support ecological processes, increase nutrient availability, and support the reproduction and spread of native fish.”

“**transparent flows**” means, under the prior WSP for the M, “releases from water storages where all water storage inflows are released coincidentally with their occurrence.” Transparent releases are provided by rules that define thresholds whereby 100% of dam inflows are released to the river downstream as if there was no dam present. They mimic the range and timing of natural flows.

“**turbidity**” is stated by the BoM on its website to mean: “Means the measure of the light scattering properties of water, and is an indicator of the presence of suspended solids.”

“**the 2 dams**” means the Burrinjuck Dam and the Blowering Dam.

“**unregulated river**” means, under the NSW Water Strategy:

“These are rivers or streams that are not fully controlled by releases from a dam or through the use of weirs and gated structures. However, in some catchments there are town water supply dams that control flows downstream.

Water users on unregulated rivers are reliant on climatic conditions and rainfall.

For the purposes of the NSW *Water Management Act 2000*, an unregulated river is one that has not been declared by the Minister to be a regulated river.”

“**volume**” is stated by the BoM on its website to mean: “The volume of water stored at a particular time and date. It excludes the dead storage volume and hence is the volume of water that can be accessed under normal circumstances without the installation of additional infrastructure.” A synonym is “accessible storage volume”.

“**Wagga Wagga**” has the 3 meanings I give in **Part 6** above.

“**WAL**” means “**water access licence**”, which has the same meaning as “**access licence**”, as to which see above.

“**water allocation**” means, under the Water Management Act, “the water to which the holder of an access licence is entitled from time to time under the licence, as recorded in the water allocation account for the licence.” [Dictionary].

“**water allocation account**” exists, under s 85(1) of the Water Management Act, for each access licence in the water source. The account is managed in accordance with the rules specified in the WSP. The water allocation account tracks the water credited and extracted under each access licence. After each AWD, the DPE credits an access licence’s water allocation account with a water volume determined by the AWD, to the limit of the account. The DPE also adds to the account water exchanged by way of a dealing. Water extracted or moved to another account via a dealing is debited against the seller’s water allocation account by the DPE.

“**watercourse**” means, under the Cth Water Act:

- (a) a river, creek or other natural watercourse in which water is contained or flows (whether permanently or from time to time); and
- (b) includes: a dam or reservoir that collects water flowing in a watercourse; and a lake or wetland through which water flows.

“**Water Management Act**” means the *Water Management Act 2000* (NSW). For a discussion of the Water Management Act, see **Part 13** above.

“**Water NSW**” means Water NSW (ABN 21 147 934 787), a statutory State owned corporation. Since 05/03/2014 it has been the registered proprietor of the Business Name “Water NSW”. Its correct corporate name is “Water NSW”. The constant use of “WaterNSW”, on its own, both in documents and on websites, if referring to the corporation, is legally incorrect. The use of “WaterNSW”, on its own, appears to be

based on Trade Marks and even then it is also an incorrect use of just one part of Trade Marks 2032822 (in 4 colours) and 2034283 (black only) which comprise the word “WaterNSW” in conjunction with the image of 3 diverging stripes below a quadrilateral. When using a trade mark, the entire trade mark should be used.

“**Water NSW Act**” means the *Water NSW Act 2014* (NSW). For a discussion of the Water NSW Act, see **Part 11** above.

“**water resource plan**” or “**WRP**” means a plan, accredited under s 63 of the Cth Water Act, that outlines how a particular area of the Basin’s water resources will be managed to be consistent with the Basin Plan. These plans set out the water sharing rules and arrangements relating to issues such as annual limits on water take, environmental water, managing water during extreme events and strategies to achieve water quality standards and manage risks.

“**water rights**” means, under the NSW Water Strategy, “The legal right of a person to take water from a water source such as a river, stream or groundwater source.”

“**water security**” means, under the NSW Water Strategy:

“Water security refers to the acceptable chance of having town water supplies fail. This requires community and government to have a shared understanding of what is a ‘fail event’ (for example, no drinking water or unacceptable water quality) and the level of acceptability they will pay for.

The NSW Government’s guidance around an appropriate security of supply for sizing town water supply head-works is the 5/10/10 rule. Under this approach, the total time spent in drought restrictions should be no more than 5% of the time, restrictions should not need to be applied in more than 10% of years and when they are applied there should be an average reduction of 10% in water usage. This allows full demand to be met in most years and also allows for water restrictions to be implemented infrequently to conserve supplies.”

“**water sharing plan**” or “**WSP**” means a plan made under the Water Management Act which sets out the rules for sharing water between the environment and water users, and between different water users, within whole or part of a water management area or water source. Currently there are 56 WSPs in force. Water NSW states on its “Water Insights” portal: “A water sharing plan (WSP) is a NSW law that establishes a set of rules for how water is to be shared, used, managed, and traded in a water source. The objectives are to provide water users with a clear picture of when and how water will be available for extraction, protect the fundamental environmental health of the rivers or aquifers and their dependent eco-systems, and ensure the water source is sustainable in the long-term.”

“**the Water Sharing Plan for the Murrumbidgee**” or “**the WSP for the M**” means the *Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016* (NSW). For a discussion of the WSP for the M, see **Part 15** above.

“**water source**” is stated by Water NSW on its “Water Insights” portal to mean:

“A water source is a collection of rivers, lakes or estuaries that are managed together under a single set of rules in a water sharing plan. A water source can also be below the surface of the ground or coastal waters. Water sources can be called systems by the Murray Darling Basin Authority (MDBA) and the Bureau of Meteorology. See also “Regulated river water source”, “Groundwater source” and “Unregulated water source”.”

“**water storage**” means, under the WSP for the M, “the water body impounded by a dam, weir or other structure, which is used to regulate and manage river flows in this water source.”

“**water year**” means:

(a) under the Cth Water Act and the Snowy Water Licence, the period of 12 months from 1 May to 30 April.

(b) in other contexts such as WSPs, a 12-month period from 1 July to 30 June.

“**WCLC**” means the Water Consultation and Liaison Committee established under clause 28 of the SWIOD. For a discussion of the WCLC, see **Part 15.4** above.

“**WRP**” has the same meaning as “Water Resource Plan” above.

“**WSP**” has the same meaning as “Water Sharing Plan” above.

“**the WSP for the M**” has the same meaning as “**the Water Sharing Plan for the Murrumbidgee**” above.

“**you**” and “**your**” refers to each of:

(a) the NRC in providing advice and carrying out its other functions.

(b) the Minister in administering Acts and carrying out portfolio responsibilities, and in considering initiating legislative change.

CONSENT TO PUBLICATION

I consent to this Submission being published on the website of the NRC, and being published to Water NSW, the DPE, and to the Minister. I will also be sending a copy of this Submission to the Minister for Water, the Department of Planning and Environment, Water NSW and other interested parties.

CONCLUSION

Thank you again for considering this Submission. If there are matters in this Submission on which you want clarification, or if you want a supplementary submission from me, I am happy to do so. I acknowledge the assistance of Gregory Bateman in the preparation of this Submission.

Yours sincerely

Dr Joe McGirr, MP

Member for Wagga Wagga