ENGINEERS
AUSTRALIA

National Water Strategy
Department of Climate Change, Energy, the Environment and Water
GPO Box 3090, Canberra ACT 2601, Australia
nwi@dcceew.gov.au

Via online submission form

12 September 2024

Re: National Water Agreement – Principles Consultation

Dear National Water Strategy Team,

As Australia's national body for engineering, Engineers Australia is the voice and champion of our 127,000-plus members. We provide them with the resources, connections, and growth they need to do ethical, competent and high-value work in our communities. A mission-based, not-for-profit professional association, Engineers Australia is constituted by Royal Charter to advance the science and practice of engineering for the benefit of the community.

Engineers Australia is formally accredited as an observer to the business of the United Nations Framework Convention on Climate Change (UNFCCC), United Nations Environment Assembly (UNEA) and United Nations Environment Programme (UNEP). We are gold supporters of Infrastructure Net Zero and members of the Australian Sustainable Built Environment Council.

Engineers are essential providers of integrated delivery of water, wastewater, and stormwater infrastructure and services, contributing to the full suite of water security, public health, and environmental and urban amenities. Their involvement encompasses all aspects of water policy, governance, management, and compliance ensuring the efficient and sustainable use of water resources and optimal management of the total water cycle.

Engineers Australia supports renewing the National Water Agreement. This submission builds on our previous submissions to the National Water Agreement – Outcomes and Objectives and the National Water Reform 2024 Inquiry. Our response to this consultation paper can be found in the attached appendices (Appendix 1: General comments and Appendix 2: Principle-specific comments).

Engineers Australia is available to participate in future opportunities to discuss the issues raised in this submission. Please contact Caitlyn Baljak – Senior Policy Advisor, Climate Change (cbaljak@engineersaustralia.org.au) to continue the discussion.

Sincerely,

Jenny Mitchell

General Manager, Policy and Advocacy

Appendix 1: General comments

Engineers Australia is pleased to see the thorough consultation process and progress on the renewal of the National Water Agreement (NWA). We appreciate the supplementary information provided by the Department, which outlines the processes for developing the NWA and how the consultation has been adapted based on previous feedback. This reflects the Department's commitment to ensuring that the updated NWA is well-suited for the next 20 years.

Engineers Australia has consistently advocated[1] for integrated water governance—encompassing water allocation, trading, creation, moderation, and attenuation of access, along with the audit and evaluation of performance—and management, which includes monitoring, operation, and reporting. While we recognise that the NWA is moving in a more holistic direction compared with the original agreement, the new NWA still appears to lean towards incremental change. However, a step change is needed to address tipping points in ecological limits as well as supply and demand. Thus, a systems approach to water decision-making is necessary to achieve the seven interconnected objectives outlined in the agreement.

We understand that the principles are intended to provide best-practice, detailed guidance for jurisdictions as they develop their action plans. However, Engineers Australia is concerned that the large number of principles outlined in the draft agreement may hinder a holistic, systems approach to decision-making. The principles require prioritisation and adaptation, or they may prove either so rigid that a true systems approach cannot be fully implemented, or jurisdictions will be forced to prioritise themselves, leading to the same disparities between jurisdictions that the NWA is attempting to resolve.

Below are some high-level recommendations and general comments regarding the focus areas highlighted for consultation by the Department—namely climate change, urban water, and science, knowledge and partnerships. Principle-specific comments related to these three thematic areas can be found in Appendix 2.

Climate Change

Recommendations:

- Include reference to recycled water systems in the principles to enhance risk-based, adaptive planning and include education on public acceptance of these systems
- Explicitly mention the climate change mitigation opportunities for water systems
- Consider the water-energy-land nexus as a critical aspect of climate resilience
- Include management of extreme excess water (i.e. flood management) principles in addition to extreme deficiency management

Risk-based, adaptive planning is essential to respond to climate variability and longer-term impacts and is well addressed by the draft principles. To further strengthen this, recycled water systems could be included in the principles. The public acceptance of fit-for-purpose, including recycled water systems, is a key challenge to their use, so education within the science, knowledge and partnerships-relevant principles (primarily under Objective 6) could be included. Setting specific, actionable targets for recycled water systems should be added as a principle to support jurisdictional planning. Further, the use of decentralised and/or modular water systems, such as household reticulated water systems, could be mentioned, recognising the imminent tipping points for traditional large water networks.

Although the contributions of water to climate mitigation is briefly mentioned in the preamble of Objective 1, this should be made explicit in the principles. Not only does water have a significant role to play in decarbonisation, low-carbon industries, and the energy transition, but the operation of water systems

[1] Engineers Australia (2024), *Submission to National Water Agreement*, accessed 27 August 2024, see also; Engineers Australia (2024), *National Water Reform 2024 Inquiry*, accessed 27 August 2024, see also; Engineers Australia (2023), *Queensland Water Policy: Water governance for a resilient future*, accessed 27 August 2024

produces greenhouse gas emissions (e.g. the methane and nitrous oxide emissions associated with wastewater and dams) and water infrastructure itself has embodied carbon (e.g. via construction materials such as concrete and steel). The imperative of mitigation in water systems should be included in addition to the existing adaptation focus. Additionally, the water-energy-land nexus should be considered, because enhancing climate resilience often requires increased energy (kW) per megalitre (ML) of water.

Finally, while extreme low-water availability scenarios are directly mentioned (e.g. "fire and drought" in principle 7.14), Engineers Australia recommends the management of flood be made explicit in the principles, considering the intense rainfall events projected under future climate change and the challenges this also poses to water sources, treatment and receiving waters.

Urban Water

Recommendations:

- Explicitly define "urban water" to clarify its relevance to both urban and rural water management
- Reference urban water in the principles under Objectives 2-5
- Support the promotion of non-linear, decentralised water service models
- Enable the NWA to explore future scenarios for technological disruptions in water services, like household potable water systems, efficient rainwater storage, and on-site wastewater treatment
- Support utilities in adapting to system disruptions by providing market certainty and developing option pathways
- Promote economic and financial innovations, such as bundling utility services, to streamline service delivery and reduce financial risks

Safe, secure, and resilient urban water services are crucial for meeting the needs of growing urban populations and the regional catchments from which water is drawn. We note that "urban water" is a term that is only relevant to the *use of* water, and that water is part of a complex hydrological system that is often drawn from and returned to regional catchments. A definition of urban water should be included in the draft definitions to clarify this, as many of the urban water-related principles are also relevant to rural water. In addition, the virtual water consumed by urban areas includes irrigation water used in producing food for urban communities. While several principles mention urban water, Engineers Australia notes that references to urban water are absent from principles under Objectives 2 – 5. We suggest these Objectives incorporate urban water.

The dominant urban water service model is linear, where the abstraction of water from nature increases and transfers to growing conurbations, and treated wastewater is discharged in areas that face increasing ecological stress. This outdated model ignores significant environmental externalities and tipping points of water sources and receiving water sinks. There are parallel lessons in non-linear, decentralised models from the energy sector (such as renewable rooftop solar displacing centralised fossil power) that the water sector will face in the next decade. The emergence of technologies that cost-effectively generate potable water (such as household reticulated systems), efficient rainwater storage, point-of-use ultra-violet (UV) treatment, and on-site treatment of wastewater, may disrupt services, and the incumbent utilities are generally slow to adapt. The NWA needs to enable exploration of these future scenarios to develop option pathways to provide market certainty for utilities to accelerate their adaptation to system disruptions.

Economic and financial innovations like bundling utility services have the potential to streamline service delivery and reduce financial risk. The NWA can enable utilities to shape the industry through judicious co-investment (for example, via public-private partnerships). There are resources and learnings from the United Nations' ONE Water Stewardship Initiative that can inform this.[2]

[2] United Nations (2024), *The ONE Water Stewardship Initiative*, accessed 28 August 2024

Science, Knowledge and Partnerships

Recommendations:

- Ensure sustained engagement and continued education post-development of jurisdictional action plans to support successful implementation
- Provide more explicit guidelines on governance frameworks to enhance transparency and accountability in decision-making and knowledge sharing
- Implement independent auditing and public reporting on the use of science in water management decisions
- Address capacity and capability challenges in delivering the NWA, particularly in the engineering profession

Science, knowledge and partnerships will be key to implementing jurisdictional action plans. The principles support incorporating knowledge beyond traditional Western science, including that of the first engineers, Aboriginal and Torres Strait Islander peoples. The long-term, values-based perspectives of First Nations peoples can help to re-think economic-rationalist approaches to water management.

With science, knowledge and partnership also comes education – for example to support behaviour change (such as via real-time feedback on water use and weather changes, incentives for reduced consumption, water-saving behaviour campaigns etc.). While capacity building and engagement are mentioned in the draft principles (see Objective 5), sustained engagement and continued education after the jurisdictional action plans have been developed could be incorporated to support successful implementation.

In addition to the value-add of science and knowledge inputs, more explicit guidelines on governance frameworks should be considered to ensure transparency and accountability in decision-making and knowledge sharing. Independent auditing and public reporting on the application of science in water management decisions would support greater transparency and accountability. While transparency is referenced in Objective 2, it could also be reinforced in principles under Objective 4.

Engineers Australia recommends that the capacity and capability challenges of delivering the NWA be addressed in subsequent consultations. Within the engineering profession, there are significant skills challenges, including shortages, impacting the ability to deliver the NWA, some of which could be addressed through strategic partnerships with education and training providers and industry.

Appendix 2: Principle-specific comments

Engineers Australia's principle-specific comments have been grouped thematically (climate change, urban water, and science, knowledge and partnerships) for ease of interpretation by the Department. We have only commented on theme-relevant principles where we have additional, constructive feedback, as it is not practical to provide comments against all principles and their subsidiaries.

Climate Change

#	Principle	Engineers Australia - Comment
Objective 1 – The safe and secure supply of sufficient water quality and quantity to sustain our natural environments, Culture, economic prosperity and communities.		
1.2	Drinking water supply, including in regional and remote communities, is secure and maintained at a quality that meets the Australian Drinking Water Guidelines.	The Australian Drinking Water Guidelines (ADWG) outline health-based water quality characteristics and aesthetic characteristics (which have more latitude for variation). Suggest that "and aesthetic" be included after "quality" in this principle.
1.3	A risk-based, adaptive approach to planning is undertaken to ensure the maintenance of urban water security across Australia in response to climate change and variability, population change and other pressures.	It is essential to consider the carrying capacity of local water resources. If reliable water yields decrease due to climate change, it is important to assess the financial viability of water efficiency improvements and consider both transformational adaptation (e.g. moving to new or diversified sources) and incremental adaptation (e.g. demand management or transitioning to crop species, both in agriculture and urban forestry, with lower irrigation needs).
1.6	Options for planning and managing water include consideration of all water supply and demand options, including climate resilient sources, based on a transparent assessment of all costs and benefits, including identifying and addressing any barriers to use.	The viability of Managed Aquifer Recharge and Recovery (MARR) schemes using shallow aquifers—which may also benefit groundwater-dependent ecosystems—depends on the ratio of groundwater abstraction volume credit to aquifer recharge volume. Low ratios can lead to a lose-lose situation, where the MARR scheme is not viable, and no co-benefits are achieved. Focusing solely on the current financial cost-benefit analysis might support outdated systems and create barriers to adopting more sustainable water sources. Therefore, it may be necessary to pair such assessments with incentives for sustainable technologies, environmental restoration, and other related initiatives.

1.16.2	Full cost recovery for water services to ensure business viability and avoid monopoly rents, including recovery of environmental externalities, where feasible and practical	This principle needs clarification, especially given governments currently subsidise water utilities to ensure water prices in isolated towns are comparable to those in larger towns, where the cost of water production is lower due to economies of scale and access to more affordable water sources.
Objective 2 – Investment in major water infrastructure that is effective, strategic and transparent.		
2.1.10	Use best available science, information and modelling to assess the proposed infrastructure's resilience to climate change or other stressors	Explicitly include other stressors in this principle, such as "energy dependency", as climate-resilient infrastructure is increasingly becoming energy-dependent infrastructure. Further, the principles under this objective could reference nature-based solutions as an example of "infrastructure".
2.4	State and territory governments have primary responsibility for proposing and managing government involvement in major water infrastructure in their jurisdictions.	Make the role of local government explicit so that there is vertical integration and consistency. Example text: "Planning, stormwater, sewerage and decentralised solutions are typically local government accountability/functions. Regional councils also manage their water services and drought supplies."
2.7	Where additional access to water is created through infrastructure, consideration is given to making this unallocated water available for Aboriginal and Torres Strait Islander Peoples as new water rights, which contributes to their access to, management and/or ownership of water for Cultural, spiritual, social, economic and environmental values in line with the National Agreement on Closing the Gap.	Rather than a consequential outcome, this principle could consider proactively identifying investments to create new entitlements specifically geared to Close the Gap.
Objective 3 – A water management framework, underpinned by national and international human rights principles, which recognises and protects Aboriginal and Torres Strait Islander Peoples' Cultural, spiritual, social, environmental and economic water interests and values.		
We are grateful for the acknowledgement of the deep climate change expertise of Aboriginal and Torres Strait Islander Peoples.		
Objective 4 – The robust and coordinated use of science, data and Cultural knowledge underpins evidence-based decision making in water management		
4.2	A common language is used to communicate projections, uncertainty and risks associated with changes in water availability to enable jurisdictions to share relevant hydrological and climate change knowledge and expertise.	Suggest include, "…and to seek free, prior and informed consent" in this principle
Objective 5 – Sustained community trust and confidence in government, water agencies, water managers and users		
Climate change could be mentioned in the principles under this objective (and is not currently).		

Objective 6 – Environmentally sustainable water planning and management that is interconnected, adaptive and responsive to climate change and other circumstances		
6.1.1	Manage the risk of lower water availability and the need to balance or rebalance between environmental and consumptive uses	Lower water availability is just one aspect of water management risk – suggest that this principle be adjusted to reflect changes in "extremes" (both low and high) and not only availability but other non-quantity related characteristics also such as catchment health, yield, timing, quality and demand etc. This requires regular reassessment of these characteristics in their local contexts to adapt to changes over time.
6.5	A precautionary approach is taken to the allocation of resources with high uncertainty. Adaptive planning cycles will incorporate revision of water plans and planning instruments, and flexible water allocations that are informed by seasonal and inter-annual water availability as future climate conditions occur.	While the precautionary principle can support decision-making when uncertainty is high, probabilistic and/or stochastic approaches can support better decision-making in many cases by allowing for the consideration of decision options (i.e. quantity, quality, timing) that would be ignored in the low-risk appetite environment created by precautionary approaches.
6.8	Where an action creates water as a by-product	Consider re-wording this principle because "creates water" can be interpreted narrowly as only applying to the use of hydrogen (producing water), whereas it is probably meant to encompass water as a resource output (e.g. treated wastewater; de-watering for mines and construction).
6.10.1	Where aquifer recharge and storage are practiced the quality of recovered water must be fit for its intended use	Consider wording that addresses recharge quality rather than just recovered water quality (e.g. the quality of recharged water must not degrade the ecological integrity of the aquifer and not clog the aquifer).
6.19	Water plans provide options that can be triggered in response to specific events or climate conditions, enabling a flexible management response.	Consider including that the plans also be based on water efficiency measures and decline in available water resource yield (whether due to climate change altering the sustainable yield as in principle 6.19 or simply due to observation that existing use exceeds sustainable yield).
6.28	The role of water quality is recognised as a key contributor to climate resilience and adaptation of environmental systems.	This principle could contribute to improving current environmental impact conditions, and dependent systems where ecosystem services are compromised (e.g., restoration, rehabilitation, monitoring etc.). To achieve this, further detail as to "the role of water quality" and how that is defined is required.
Objective 7 – Water management frameworks that facilitate the judicious and efficient use of water		
7.5.3	Water access entitlements or licences will also… be able to be varied, for example, to change extraction conditions, where mutually agreed between the government and the entitlement holder	We suggest a variation in the wording of this principle to make clear (e.g. reference principle 7.14) that water access entitlements do not require the agreement of the entitlement holder where the allocated volume is not sustainable (e.g. due to declining water table or risk of environmental harm) and/or in response to climate change reducing the sustainable yield of the resource.

7.14, 7.14.1, 7.14.2	Water access entitlement or licence holders are to bear the risks of any reduction or less reliable water allocation, under their water access entitlements, arising from reductions to the consumptive pool as a result of: seasonal or long-term changes in climate, periodic natural events such as bushfires and drought.	Add a sub-clause (i.e. principle 7.14.3): "Existing use being identified as unsustainable" (e.g. where monitoring provides evidence of long-term decline (refer to principle 7.13.4) in quantity and/or quality of the water resource especially where that impacts on beneficial uses). We note that users will need due warning and support to respond. This is a big change for primary producers and those depending on and affecting environmental systems. They need information and access to solutions such as improved access to markets, performance of water trading and allocation hedging to enable investment to be sustained.
7.15	Risk sharing of per cent reduction in water allocation under a water access entitlement	It is not clear whether these percentages are arbitrary or based on evidence of the proportional change in water resources – they seem too small to reflect climate change. Note also that second-order changes can be disproportionate (e.g. a 20 per cent reduction in rainfall in south-west Western Australia resulted in an 80 per cent reduction in streamflow).[3] It is also unclear how a percentage risk allocation of only a few per cent can work in harmony with principle 7.11 where the environment has at least the same degree of security. A more practical system may be if the water allocation entitlement were based on a proportion share of a sustainable yield, rather than a guaranteed volume.
7.29.3	considering land use change, climate change and other externalities as elements of the water balance.	We agree that water balance must be dynamic and projecting scenarios into the future is essential. We suggest that this be supported by including externalities at a system level (e.g. inter-demographic, inter-generational and inter-geographical).

Urban Water

#	Principle	Engineers Australia - Comment
Objective 1 – The safe and secure supply of sufficient water quality and quantity to sustain our natural environments, Culture, economic prosperity and communities.		
1.1.5	Ensuring the safety, security and resilience of urban water services, including in regional and remote communities.	Principle 1.1 mentions "sustainable manner", so environmental externalities could be called out specifically. Consider circular options and point-of-use solutions.
1.3	A risk-based, adaptive approach to planning is undertaken to ensure maintenance of urban water	The NWA should recognise that long-linear networks that exploit and transfer water from one region (eco-bioregion) to another and transfer waste from one source to another are likely to

[3] Water Corporation (2024), *Climate and the South West*, accessed 4 September 2024

	security across Australia in response to climate change and variability, population change and other pressures.	be untenable in the long term. While this model has served historically, it is now the primary cause of ecological degradation.
1.10	Integrated approaches to water supply options for urban and rural water systems are encouraged through the conjunctive management of surface water, groundwater and other water sources where applicable.	While we agree with this principle, we note that explicit encouragement of fit-for-purpose stormwater and treated effluent for specific uses will be required. Suggest remove "where applicable" from this principle, as this could serve as a loophole to avoid attempting integration.
1.11	Urban water planning and management systems integrate water supply, wastewater and stormwater management, where appropriate, maximising opportunities to achieve public and environmental health outcomes.	Suggest removing, "where appropriate", as this could serve as a loophole to avoid attempting integration, where of course at the design stage appropriateness will be determined if it is mandatory to consider.
1.17	In large urban water systems, water pricing continues to move towards upper bound pricing.	Engineers Australia requests that further clarification be provided regarding the logic of this principle (either via the Objective 1 preamble or a clarifying sub-principle). Clarification is also required on the use of tiered pricing (e.g. first volume at a lower unit rate, which covers essential needs, but then tiered charges at higher rates for high volume water uses). Such an approach provides affordable water while the tiered approaches encourage high water users to be efficient.
Objective 2 – Investment in major water infrastructure that is effective, strategic and transparent.		
Urban water could be mentioned in the principles under this objective (and is not currently).		
Objective 3 – A water management framework, underpinned by national and international human rights principles, which recognises and protects Aboriginal and Torres Strait Islander Peoples' Cultural, spiritual, social, environmental and economic water interests and values.		
Urban water could be mentioned in the principles under this objective (and is not currently).		
Objective 4 – The robust and coordinated use of science, data and Cultural knowledge underpins evidence-based decision making in water management		
Urban water could be mentioned in the principles under this objective (and is not currently).		
Objective 5 – Sustained community trust and confidence in government, water agencies, water managers and users		
Urban water could be mentioned in the principles under this objective (and is not currently).		
Objective 7 – Water management frameworks that facilitate the judicious and efficient use of water		
7.34	Water regulation for non-urban water shall conform with Australian standards and agreed national approaches for non-urban water metering.	We agree with this principle, though it is built on the assumption that water metering and reporting is compulsory. We suggest that a principle regarding compliance and enforcement be introduced to strengthen the management of scarce non-urban water resources.

Science, Knowledge and Partnerships

#	Principle	Engineers Australia - Comment
Objective 4 – The robust and coordinated use of science, data and Cultural knowledge underpins evidence-based decision-making in water management		
4.1.2	Knowledge-building priorities identified and coordinated through processes that draw on input from the research community and research users and consultation with the broader community	Suggest adding at the end of this principle "including industry", noting the need to consult with industry stakeholders.
4.1.5	Knowledge-generation activities and align with identified priorities to serve the public good.	We note that "public good" is subject to demographics and temporal distribution – perhaps support this with clarification in the draft definitions.
4.2	A common language is used to communicate projections, uncertainty and risks associated with changes in water availability to enable jurisdictions to share relevant hydrological and climate change knowledge and expertise.	This aligns well with the update to the *Australian Rainfall and Runoff: A Guide to Flood Estimation – Book 1, Chapter 6: Climate Change Considerations* work supported by Engineers Australia to highlight risk-based approaches to including climate change in hydrological decision making.
4.3.1	The Australian Drinking Water Guidelines, the National Water Quality Management Strategy and the Australian and New Zealand Guidelines for Fresh and Marine Water Quality.	We agree and advocate for the use of familiar existing instruments where possible.
4.9	Water planning and management is underpinned by reliable modelling and data systems at a fit-for-purpose scale, using validated data and subject to ongoing review and refinement.	Agree, though note that data systems are reliant on dedicated resourcing (both funding and people) to be successful – this should not be taken for granted.
4.10	Aboriginal and Torres Strait Islander Peoples' Cultural water and Cultural values are included in modelling frameworks so they can be used to inform water planning and management decisions.	Strong agreement. As mentioned in Appendix 1, this requires more capacity building and education both at the planning and implementation stages of the jurisdictional water plans, as many First Nations organisations are hamstrung in participation due to resourcing constraints.