Explanatory note on the Lake Eppalock Technical Assessment

Following the 2022 floods, the Department of Energy, Environment and Climate Action (DEECA) engaged Hydrology and Risk Consulting (HARC) to undertake a technical assessment of Lake Eppalock to determine if changing the operating and infrastructure arrangements could improve protection for downstream communities from future flooding and the associated financial and non-financial implications of such changes.

A working group was established to support the delivery of the assessment. The working group consists of DEECA, Goulburn-Murray Water, Coliban Water, Central Highlands Water, the Victorian Environmental Water Holder, the North Central Catchment Management Authority, Bendigo City Council and Campaspe Shire Council.

What options have been looked at?

The technical assessment investigated five options as selected and agreed by the working group:

- The first three options involve lowering the target storage or Full Supply Level (FSL) at Lake Eppalock. These options would therefore reduce the volume of water stored in the Campaspe system for entitlement holders.
- The other two options would maintain the existing FSL at Lake Eppalock but hold more water behind the dam wall during floods. These options would therefore increase the number of recreational and commercial tourism sites around Lake Eppalock that are inundated during floods.

Option	Description
1	Reduction of target storage levels (e.g., where possible holding the lake at a maximum volume of 50%, 70%, 90% of FSL all year round), using existing infrastructure
2	Reduction of target storage levels (e.g., where possible holding the lake at a maximum volume of 50%, 70%, 90% of FSL all year round), and increasing the outlet capacity (from 1,600 to 5,000 ML/day)
3	Reduction of Full Supply Level (to 70% of current FSL) using a passive spillway slot
4	Maintenance of Full Supply Level, and the addition of spillway gates
5	Maintenance of Full Supply Level, combined with the changes to the spillways (installation of a piano keys) and the reconfiguration of embankments to enable more water to be stored during floods

Table 1 – Five options selected for detailed technical assessment

Other options were considered during the workshop, or at other times during the project, however, were not selected for a more detailed assessment.

For example, transferring water from Lake Eppalock to Greens Lake and/or Lake Cooper would not have made a significant difference to the peak outflows during 2011 and 2022.

Greens Lake and Lake Cooper were near or above capacity in January / February 2011 *without* any transfers from Lake Eppalock, and in 2022 there was approximately 5,700 ML of capacity at Greens Lake. 5,700 ML is a fraction of the inflows experienced at Lake Eppalock during the 2022 flood. Therefore, the volume of water that could have been stored in these lakes was small when compared to the airspace required at Lake Eppalock.

The intent of the assessment

The technical assessment provides important information on how the five options compare and rank against each other and an initial assessment of the flood mitigation benefits and capital cost of each option. The capital costs for the works were estimated to a AACE Class 5 level, which are typically within -50% to +100% of the true cost.

It also provides a preliminary assessment on how these options could impact other users within the system such as existing entitlement holders, the environment, Traditional Owners, recreational users, and upstream land holders.

The assessment **does not** consider the ongoing operational and maintenance cost, the ongoing economic and social consequences of reducing the volume of entitlement in the Campaspe system, or social and economic impacts of holding the Lake Eppalock water level below FSL.

The assessment considers the increase in approximate flood damages upstream and the approximate reduction in flood damages downstream, however, does not consider the ongoing social impact and/or benefit of these changes to those communities.

What the technical assessment tells us

The assessment was informed by applying existing water resource and flood hydrology models and using historical datasets. Results from the technical analyses completed are suitable for high-level comparisons between current conditions and what is anticipated if the options were implemented.

The relative differences between options are not expected to change significantly as models are updated or more work is completed, but specific values will become superseded.

Option	Ranking (approximate avoided damages: Initial capital cost (50 years, 6% discount ratio)
Slot spillway at 70% FSL (option 3)	Highest ratio of avoided damages to initial capital cost
70% target storage + 5,000 ML/d outlet (option 2)	
90% target storage + 5,000 ML/d outlet (option 2)	Medium ratio of avoided damages to initial capital cost
50% target storage + 5,000 ML/d outlet (option 2)	
Piano key spillways (option 5)	Lowest ratio of avoided damages to initial capital cost
Spillway gates (option 4)	

Table 2 – Ranking of the five options using approximate avoided damages: initial capital cost (50 years, 6% discount) ratio

Adopting a target storage of 70% or 90% below FSL using the existing infrastructure (option1) at Lake Eppalock is not included within the rankings as it would not have significantly changed the outcomes observed in January 2011 and October 2022. This is because in 2011 and 2022 inflows in the months prior to the floods were such that the storage could not have been held at a defined target before either event due to current outlet having a maximum capacity of 1,600 ML/d.

Likewise, releasing water from storage in response to rainfall forecasts will not be a feasible way of significantly reducing flood frequencies downstream of Lake Eppalock for the foreseeable future due to forecast uncertainty.

Further work

Further work is required prior to any preferred options being selected.

As a first step this includes benchmarking and comparing the results from the Lake Eppalock assessment with other flood mitigation options for Rochester as part of the review of the Rochester Flood Management Plan and an assessment – informed by consultation with entitlement holders – about the mechanisms available to change water sharing arrangements.

Further work is also needed to assess the socio-economic consequences of reducing the volume of entitlement available for use in the Campaspe River system, and the recreational impacts of holding the Lake Eppalock water level below FSL.

Post the Rochester Flood Management Plan review there may be a preferred flood mitigation option(s) for Rochester. Depending on the option(s) the next steps may include further modelling, investigation and assessment, full cost-benefit analysis, broad community engagement, business case development, environmental approvals, funding, design, construction.

Current policy & legislative requirements

An overview of current policy and legislative requirements that need to be considered in the prioritisation of options at Lake Eppalock is provided below.

This is not an exhaustive list; there may be other policy and legislative requirements not listed here that may need to be considered.

Victorian Floodplain Management Strategy

Changing the infrastructure at Lake Eppalock for the purpose of flood mitigation could have significant increased capital and maintenance costs.

The Victorian Floodplain Management Strategy provides policy and guidance for investment in flood mitigation infrastructure and maintenance.

Government capital investment criteria (e.g. locally agreed, cost effective, evidence based) will be shared equally between the Australian and Victorian Governments and the relevant LGAs (one third each).

Ongoing maintenance costs of flood mitigation infrastructure is the responsibility of the beneficiaries, who may be represented by Local Government Authorities (LGAs).

Victorian Waterway Management Strategy

Any change to how Lake Eppalock is operated could impact the Campaspe River, wetlands and floodplains – collectively called waterways. Waterways need to continue to support environmental, social, cultural and economic values for all Victorians.

Victorian Water Act 1989

Unless offset, any option which reduces the volume of water stored in Lake Eppalock would impact the reliability of water supplies for entitlement holders. To avoid or offset this impact, water sharing arrangements would need to be adjusted through some form of water recovery program that reduces the amount of entitlement held. When making changes to water sharing arrangements the Minister must have regard to (among other things) the impact the change would have on third parties (including holders of entitlements and water shares) and the environment.

Murray-Darling Basin Plan

The Murray-Darling Basin Plan establishes the Campaspe Sustainable Diversion Limit which identifies the volume of water that can be taken for consumption. Changes to water sharing rules will need to ensure that the Campaspe Sustainable Diversion Limit is still complied with.

In addition, the Victorian Government, after consultation with key Victorian stakeholders and communities, developed and published a position (October 2018) on socio-economic criteria, being that water recovery must only occur with neutral or positive socio-economic outcomes for communities. This was to ensure that projects for additional water recovery above the 2,750 GL target do not create adverse socio-economic impacts. This is in line with the requirements of the Basin Plan.

Environment Effects Act 1978

The proponent of works at Lake Eppalock may be required to prepare an Environmental Effects Statement. The Environment Effects Statement process can take several years to complete. The final step in the process determines whether the likely environmental effects of a project are acceptable.

Environment Protection and Biodiversity Conservation (EPBC) Act 1999

A referral may be required if works or changes to operations at Lake Eppalock would potentially impact any matters protected under the EPBC Act.

Next Steps

DEECA will undertake community consultation seeking feedback on other impacts and benefits that need to be considered across the five options.

Consultation is expected to begin in early 2024 and feedback is encouraged from all members of the community – irrigators, downstream residents, recreational users and upstream landholders.

Deliverable	Details	Timing
Lake Eppalock Technical Assessment Report	Report published on DEECA website and stakeholders and members of the community informed on the findings of the Lake Eppalock Technical Assessment	Now – January 2024
Technical assessment feedback opportunity	Consult and seek feedback from the community, focusing on other impacts and benefits that need to be considered across the five options. Likely via the Engage Victoria platform.	February – March 2024 (estimated)
Community Engagement Findings Report	Report published on DEECA website to inform and report back on 'what we heard' through the engagement	March - April 2024 (estimated)
Rochester Flood Management Plan	Rochester Flood Management Plan – benchmarking of flood mitigation options – including community consultation – led by Campaspe Council, with support from NCCMA. DEECA will work with Campaspe Council and NCCMA to determine if any other analysis is needed on the Lake Eppalock options to help inform the benchmarking of flood mitigation options.	End 2024/ Early 2025 (estimated)
Potential preferred flood mitigation option(s) for Rochester	Post the Rochester Flood Management Plan review there may be a preferred flood mitigation option(s) for Rochester. Depending on the option(s) the next steps may include; further investigation and assessment, full cost – benefit analysis, broad community engagement, business case development, environmental approvals, funding, design, construction.	2025/2026 – beyond

Table 3 – Overview and timeline of the next steps