MDBA ANALYSIS OF THE GUNBOWER NATIONAL PARK ENVIRONMENTAL WORKS PROJECT BUSINESS CASE

PROPONENT: VICTORIA

The MDBA's advice covers the following criteria in the Basin Officials Committee agreed *Phase 2 Assessment Guidelines for Supply and Constraint Measure Business Cases* (the Guidelines):

- Eligibility (3.1)
- Ecological values of the site (4.2)
- Ecological objectives and targets (4.3)
- Anticipated ecological outcomes (4.4)
- Hydrology of the area and environmental water requirements (4.5)
- Operating regime (4.6)
- Assessment of risks and impacts of the operation of the measure (4.7)
- Complementary actions and interdependencies (4.9)
- Project governance and project management arrangements - legal and regulatory requirements (4.11.2)

Business case assessments by the Department of the Environment will include advice from the MDBA on the technical feasibility and fitness for purpose of proposals as per section 4.8 of the Guidelines.

Key points/summary

- The proposal meets the definition of a 'supply measure' under the Basin Plan and has adjustment potential.
- Information provided for ongoing operations and maintenance resourcing does not currently meet the phase 2 business case criteria and until this issue is resolved, there will be a significant risk for this project. Decommissioning works is not a suitable risk management action as this would negate the SDL adjustment benefits. A clear statement of ownership, funding and responsibility for ongoing operations and maintenance is required to meet phase 2 business case requirements.
- There is evidence that the project will provide ecological benefits, however there are issues where proposed hydrological targets exceed natural flows and are inconsistent with the Basin Plan. The operating regime set out in the business case must be amended in the detailed design phase of the project to avoid inundation at frequencies above natural levels. This will be required by no later than the end of August 2015 to allow sufficient time for the proposal to be modelled.

1. Eligibility (3.1)

The proposal meets the eligibility requirements under the Guidelines for further assessment and consideration in the SDL adjustment mechanism.

1.1 Supply measure requirements (3.1.1)

The proposal would meet the definition of 'supply measure' under the Basin Plan (cl.7.03 and (cl.7.15) to:

- operate to increase the quantity of water available to be taken in a set of surface water SDL resource units compared with the quantity available under the benchmark conditions of development;
- achieve equivalent environmental outcomes with a lower volume of held environmental water than would otherwise be required; and
- have no detrimental impacts on reliability of supply of water to holders of water access rights that are not offset or negated.

noting that a final determination will require MDBA modelling.

1.2 Measures not included in the benchmark conditions of development (3.1.2)

The MDBA confirms that the measure was not in the benchmark conditions of development (cl.7.02 of the Basin Plan).

2. Ecological values of the site (4.2)

The description of the site's ecological values in the business case is generally consistent with the assessment criteria in the Guidelines.

A detailed description of the ecological values and features of the Gunbower National Park is provided (Chapter 3; North Central CMA 2014 Ecological Objectives and Hydrological Requirements Justification paper).

3. Ecological objectives and targets (4.3)

Ecological objectives and targets are specified consistent with the assessment criteria. Site specific targets for the site have been cross-referenced against the broad Basin Plan objectives, however their relationship with site specific objectives and targets in Appendix D of the proposed '*Environmentally sustainable level of take for surface water of the Murray–Darling Basin: method and outcomes*' (November 2011) (ESLT report) is not directly addressed. The MDBA's assessment is that the site specific targets are not inconsistent with those objectives.

Evidence/analysis of the ecological targets is provided in the Monitoring and Evaluation Plan and largely they appear quantifiable and meaningful. It is, however, recommended that the proponent provide further evidence/analysis for targets where the rationale is unclear e.g. on what basis is it considered reasonable that more than 50 per cent of threatened flora species will be observed. The intent of the targets to inform future monitoring and become an integral part of adaptive managing works operation to optimise environmental outcomes is sound.

Several targets are not self-contained and require interpretation. For example, the target "370 ha of River Red Gum flood dependent understorey (FDU) to have a flooding regime that maximises healthy condition by 2040" requires the determination of the flooding regime to maximise health. The business case and supporting documentation describe the ideal flooding regime for the River Red Gum FDU (as part of the environmental water requirements) and it is assumed that this is the ideal flooding regime to maximise condition. Another example is the B2 target for waterbird foraging which includes frequency and extent of inundation in the target but does not specify duration. Timing /seasonality is also not specified.

There are no ecological objectives and targets for wetland vegetation condition, River Red Gum encroachment or for the presence of other significant fauna (e.g. the EPBC listed Australian Bittern, Murray cod, Trout cod or Growling Grass Frog). These are key values identified for the site and it is unclear why no targets reflect this.

Of particular note, the recommended frequency of inundation for the River Red Gum forest in the business case is higher than natural conditions for a flow threshold of 50,000 ML/d (based on comparison of analysis presented in Table 7-1 with operating regime in Table 8-2). Inundation is also considered almost certain for flows of 45,000 ML/d although this data is not specifically presented. A review of spells analysis undertaken by Gippel (2014), particularly of prevalence (percentage of years), is needed to confirm if recommended regimes are above natural frequencies. Frequency mean analysis is presented however recommendations are expressed as prevalence which is a slightly different metric.

Victoria has provided additional information which indicates that the operating regime in the business case, in which above natural frequencies are proposed, is not how the project will actually be run. The operating regime set out in the business case must be amended as per the additional information when developing the detailed design of the project, to avoid inundation at rates above natural levels. In the interim, the MDBA will pursue discussion with Victoria to resolve the issue, and to ensure that any modelling undertaken is consistent with the intent of the additional information. The amended regime will be need to be settled by the proponent as soon as possible, and certainly no later than the end of August 2015, to allow sufficient time for the proposal to be modelled.

More explanation is required regarding how the hydrological targets recommended relate to the proposed operating regime where discrepancies exist as in a number of instances these do not appear to align directly. The proponent should demonstrate that there are not inconsistencies, or the operating regime set out in the business case must be amended in the detailed design phase of the project to avoid inundation at rates above natural levels. This will be required by no later than the end of August 2015 to allow sufficient time for the proposal to be modelled.

It is noted that several of the targets reference an assessment date of 2040 (over 20 years after expected construction). While acknowledging that there are likely to be time lags in ecological response, consideration should be given to a range of interim targets to complement long-term targets by measuring progress and informing adaptive management in the shorter term (e.g. intervention monitoring).

Other supply measures are mentioned which this proposal complements and builds on the ecological outcomes of, particularly the Gunbower Living Murray works and measures programme which targets the lower and middle sections of Gunbower Forest. However, no investigation of interactions and

interdependences between supply measures is provided on the stated basis that this can only be done once the package of measures is known.

4. Anticipated ecological outcomes (4.4)

4.1 Anticipated ecological benefits (4.4.1)

Anticipated ecological benefits, current condition and past management activities are adequately described in the business case. Some additional clarification would be helpful to understand the benefits more fully.

The Expert Peer Review Panel which Victoria engaged to review the submitted supply measure proposals highlighted in their report that principal ecological outcomes of the project (excluding Black Charlie Lagoon) focus on enhancing vegetation and bird habitat. Benefits to other organisms are assumed to accrue collaterally from regime changes or as a result of better-quality habitat from improved vegetation condition. The needs of vegetation and waterbirds in terms of an environmental watering regime can be less complex than for other biota as they are not greatly influenced by the water source, mode of delivery, or connectivity between the floodplain and the main channel. Other biota and ecological processes are strongly influenced by these factors and, where the proposed intervention involves a change in these, the ecological consequences need to be assessed. The ecological risk assessment conducted does not directly consider or discuss these in any detail. This matter should be further addressed at the detailed design phase.

The business case identifies twelve ecological vegetation classes (EVCs), all of which have some level of conservation significance (there are some inconsistencies between the business case and attached documents on the number of EVCs and their conservation status). It should be ascertained what percentage of each of these classes benefits from the proposed inundation regime.

The inundation duration proposed within the operating strategy is shorter than indicated in Table 8-1, environmental requirements. This is particularly relevant to healthy waterbird communities and an explanation should be provided for the discrepancy between the operating strategy and water requirements, including the implications for anticipated ecological benefits.

4.2 Potential adverse ecological impacts (4.4.2)

Potential adverse ecological impacts are covered to an acceptable level for the business case, noting that responsibility for actioning these strategies (including funding to adequately resource) must be incorporated into the detailed design and implementation of the proposal. The issue of above natural flows should be addressed in the development of the detailed design.

Potential adverse ecological impacts are assessed, with mitigation measures developed for key ecological risks resulting from the works operation. Only one risk is identified as a high priority in chapter 6 (pest fish) which, after mitigation strategies have been applied, still maintains a residual risk rating of high. Recent carp population modelling undertaken by the Arthur Rylah Institute highlights the significant risk of work sites providing conditions favourable to carp, and the potential for increased carp populations is of concern for all environmental works. The implementation of identified mitigation measures and proposed monitoring will be essential to manage this.

There are differences in the residual risk rating for environmental works proposals in the Mallee CMA and North Central CMA areas e.g. carp/pest fish. Given the similar characteristics of the proposals and the mitigation measures proposed it is unclear why these ratings differ.

Two potential adverse ecological impacts that either do not appear to be covered or where further information is requested are:

- hypoxic blackwater events and the impact on fish and other aquatic fauna (particularly if a hybrid operation is used following a natural winter/spring event). The risk of blackwater forming in Gunbower Forest is assessed as high however the risk of ecological impact is considered low and the rationale is not well explained; and
- alterations to Gunbower Forest connectivity through the use of irrigation channels rather than natural connections between the River Murray and the forest.

When considered in total, implementation of the mitigation measures for all the risks represents a large commitment of resources. As the supply measure is assessed on the basis that the risk mitigation strategies are put in place, it is important to ensure that responsibility for implementation of these strategies (including funding to adequately resource) is clearly defined in the detailed design in the event that the risk materialises.

Lloyd Environmental (2014) identify a number of ecological risk knowledge gaps across all proposal sites (inadequate knowledge of biotic water requirements, presence and distribution of threatened species, effect of watering frequency on accumulation of organic material on the floodplain) which are considered likely to be applicable to the North Central CMA. There is therefore the potential that ecological risks have been underestimated due to a lack of available information. Given this uncertainty, these risks require further consideration throughout the life of the project i.e. detailed design, construction and operation and a monitoring and evaluation program will be essential to mitigate these risks.

5. Hydrology of the area and environmental water requirements (4.5)

5.1 Current hydrology and proposed changes to the hydrology (4.5.1)

The business case and supplementary information provide sufficient information to explain the project's current hydrology, and changes associated with the supply measure proposal. This meets the requirements of the Guidelines. To assist the proposal's integration into the MDBA's model-based assessment framework further clarification and refinements are likely to be required.

The MIKE-FLOOD model for the Gunbower TLM site has been extended to simulate proposed works at Gunbower National Park with a number of assumptions which may affect model outcomes. It was assessed by the Expert Peer Review Panel which noted that "to date the models have tended to overestimate water velocities within the forests and underestimate water volumes required for watering". Also stated in the panel's report and the business case, the hydraulic modelling outputs were derived from steady state conditions which may result in an overstatement of the inundation (and environmental benefits) of the supply measure. The MDBA notes that it is important for modellers to provide guidance on inherent uncertainties in each model.

While best current information has been used there are still some limitations which increase the uncertainty in SDL offset volume estimation, including:

- Surveyed cross section and inferred data from LIDAR are used for Cameron's Creek.
- Different loss and seepage assumptions may lead to different inundation extents.
- Recent model changes by the MDBA have not been incorporated.
- No hydraulic model sensitivity testing has been carried out, and uncertainty limits have generally not been assessed.

Notwithstanding these issues, the assumptions used to represent the measure have been documented and the models and information provided appear sufficient for the proposal to be integrated in the assessment framework at this stage.

The volume of water used by the environment under the proposed operating scenarios is equal to inflows as there is no return of water to the River Murray or Gunbower Creek.

5.2 Environmental water requirements (4.5.2)

Environmental water requirements are adequately described in the business case and supporting documentation. The environmental water requirements are based on establishing a more natural flow regime for wetlands and the River Red Gum forest with a flood dependent understorey.

6. Operating regime (4.6)

The business case does not provide a detailed operating regime, however the initial proposal of potential operating regimes is at a level of detail appropriate for concept design stage and is sufficient for initial modelling purposes. It is anticipated that further modelling to support a more detailed operating plan will be undertaken as this project is progressed. Noted below are areas in which further work should be carried out in the development of detailed designs.

The business case sets out the role of each key asset for the range of operating scenarios. The preferred timing, frequency and duration have been detailed for each operating scenario in the proposed operating plan for the works.

The design of the various assets is robust and allows for adaptive management of the scheme over time.

Monitoring

There is not enough information about the monitoring activities to determine if there is sufficient monitoring planned to support operations and water accounting. The mitigation strategy for several environmental impacts is to develop an environmental watering plan and adaptively manage using a thorough monitoring and evaluation program. The steps required to establish these management tools are not described in any detail in the business case (responsibilities, resourcing, timeframes, and scope). There is a long-term monitoring and evaluation plan for ecological targets but this does not provide information on sampling intervals or cover intervention monitoring (i.e. monitoring individual managed events to observe ecological response).

The monitoring program is proposed to be linked to Basin Plan reporting requirements under chapters 8 and 10. The business case indicates that the monitoring and evaluation plan will be formalised once funding has been confirmed. Similarly, it is stated that operation and maintenance costs will be considered in future budget planning. Given that these costs are integral to the successful

implementation of the proposed measure, there should be a clear indication that funding is available and an identification of how this will be funded.

Accounting for the delivery and use of environmental water

All watering sites will need fully-developed water accounting arrangements supported by well-resourced monitoring in order to determine environmental water use. There are a number of methods that could be used and it is expected that accounting arrangements will be similar to equivalent sites under The Living Murray. Information about water entering, flowing within and exiting the site is necessary for the effective management of environmental watering events and their co-ordination with other river operations activities

Water returning to the River Murray from the assets should be measured to allow re-crediting where possible. The MDBA is working with Victoria on this through the PPM Implementation Plan for the River Murray System. The business case does not discuss linkages between this work and the proposal, for example how water use will be measured or estimated.

Where irrigation infrastructure is used to deliver water to environmental sites, it is expected that arrangements will be put in place to secure delivery and set out how competing demands will be managed. There appears to be sufficient capacity in Camerons Creek to meet irrigation demands and environmental watering requirements.

Use of environmental water

There is the potential for interaction between the proposed project and constraints, which may reduce, although not remove the benefits. The project allows for a directed, efficient delivery of environmental water and targeted inundation under dry conditions.

Achieving proposed flows will require close collaboration with river operators and other environmental water holders, such as the CEWH and VEWH. There is insufficient information to assess whether arrangements are in place to ensure that environmental water can be delivered to the asset. Delivering proposed flows to watering sites will involve the use of held environmental water and it may not be possible in practice to deliver flows according to the preferred timing, frequency and duration detailed in proposed operating scenarios. There may be issues with an environmental water holder's watering priorities and whole-of-system operational considerations and allowing for this is not apparent in the business case.

In particular, whether approvals/licences etc. are required to ensure the regulators can extract water from the river, and whether arrangements are in place to manage flows between MDBA and other river operators is not clear. The Reference Group to assist and advise on commissioning and operation for each project will include the CEWH and VEWH, providing opportunities for input at this stage. The business case does not describe any consultation with water holders during the development of the proposal, and does not identify environmental entitlements required.

7. Assessment of risks and impacts of the operation of the measure (4.7)

The risk management approach adopted is consistent with the AS/NZS ISO 31000:2009 standard and the level of detail is appropriate for application at the concept design stage. However, a number of risks have not been mitigated in the current business case to a level which meets Guideline criteria, as noted below.

Operation and maintenance

Information provided for ongoing operations and maintenance resourcing does not meet the phase 2 business case criteria and until this issue is resolved, there will be a significant risk for this project.

The risk assessment of potential operation impacts lists lack of funding for ongoing operation, maintenance and management as a high risk to project success. The proposed mitigation actions aim to reduce the residual risk to low and include maintaining strong relationships with funding bodies and suspending operations if there are insufficient resources. Decommissioning works and/or suspending operations are not suitable risk management actions as they would negate the SDL adjustment benefits. In addition, a lack of resources for maintenance would result in asset impairment quite quickly. Should resourcing be reinstated at some later point, operation of those assets may not be possible. A clear statement of ownership, funding and responsibility for ongoing operations and maintenance is required to meet phase 2 business case requirements.

This assessment does not consider the risk of insufficient resourcing for operations and maintenance from the perspective of being able to operate works into the future to achieve the benefits upon which the SDL adjustment is based. A failure to operate due to lack of funding would result in the intended ecological equivalent outcomes not being achieved, in effect a project in which the adjustment is not delivered on an ongoing basis. As such, this risk is not adequately mitigated without a clear funding source.

The MDBA considers that funding of operations and maintenance of these assets must be assured by the relevant state.

Ownership and governance

While the business case outlines the issues to be taken into consideration for determining governance arrangements, it does not provide information on important issues such as the ownership of the assets created as part of this project and responsibility for on-ground operation of the works.

There is a risk that the works could become impaired if the organisation responsible for operating the works does not have an experienced engineering crew to promptly undertake repairs, especially following high flows.

Water Quality

A semi-quantitative assessment of potential salinity impacts of environmental works and measures has been done by Jacobs but no analysis has been provided for other water quality parameters as stated in chapter 9, part 2 of the Basin Plan.

The business proposal will alter the frequency, duration and extent of inundation floodplain. There is the potential for salt to be mobilised through changes in groundwater level and surface wash-off with subsequent impacts on the River Murray. Significant resources for monitoring and modelling are required to assess these adverse impacts and the proponent needs to articulate clearly management options for allocating appropriate resources for this purpose.

Section 6 indicates that the nature of any downstream salinity and/or water quality impacts, and any potential cumulative impacts with other measures, cannot be formally ascertained at this time because of other upstream impacts. However, specific water quality impacts on the river associated with this measure can be assessed on its own using modelling.

Other risks

Water delivery costs through the Old Cohuna Main Channel via the Torrumbarry Irrigation area are mentioned in the business case but no ongoing costs are provided for this, as a review of Goulburn-Murray Water tariff structure is currently underway.

Other operating risks and impacts have been identified and controls put in place. Those that retain a moderate risk rating once mitigation controls are implemented have additional considerations listed in the business case.

8. Complementary actions and interdependencies (4.9)

The business case partly meets the Guidelines criteria for complementary actions and interdependencies.

The business case identifies the surface water SDL resource unit affected by the measure and states that any potential inter-dependencies for this supply measure and its associated SDL resource unit, in terms of other measures, cannot be formally ascertained at this time.

Flows from Gunbower National Park watering will link up with Hipwell Road watering events providing broader connectivity through Gunbower Forest. The MDBA expects that the proposed works will be operated as part of a reach based approach potentially including Gunbower, Koondrook-Perricoota and Guttrum Benwell Forests. Careful consideration will need to be given as to how these works are best co-ordinated in order to achieve whole-of-system outcomes, and further details should be provided as to how best to manage co-ordinated watering to achieve outcomes as part of the next phase.

Linkages between constraints and the supply measure have not been addressed in the business case and should be considered where relevant in the assessment of the project.

9. Project governance and project management arrangements (4.11)

9.1 Legal and regulatory requirements (4.11.2)

The business case has provided most of the required legal and regulatory requirements and an appropriate management strategy for each. This criteria will be further reviewed in the Department of the Environment's assessment.

Some limitations to the information provided are:

- Section 15.3 makes reference to initial assessments for both Aboriginal and European cultural heritage. We have been unable to identify the desktop cultural heritage assessment among the provided documents. These documents were requested but are yet to be provided.
- A possible need for legislative change for securing native vegetation offsets has been identified, but a management strategy for this change is not provided – however non-legislative options are also being explored.
- The business case flags that no new agreements need to be created with water holders in the Basin. This conclusion has been provided without any context around the consideration of the project's requirements for environmental water.

- While the business case identifies that no changes to water sharing frameworks and river operations rules and practices are required, consideration of how the implementation of the project will be reflected in the Victorian Murray Water Resource Plan should be considered in the future.

Easements and rights of access

In order to guarantee the ability to operate the project works into the future, the owner of the asset or its agent will need to obtain and hold:

- the right to construct, operate and maintain the assets and the specific land required for these assets including land needed to gain access to the assets; and
- rights of access to all land impacted by a project for the purpose of implementing the operating regime to achieve the intended ecologically equivalent outcomes upon which the SDL adjustment is based.

Although the business case includes some information about the need for easements and access rights, there is insufficient information about who is responsible for ensuring they are obtained, or who the beneficiary of the rights will be.

The MDBA's experience with similar infrastructure suggests that not addressing these issues early can impact the effective operation of the assets. The business cases should include a commitment by the proponent that they will obtain and hold these rights.