

Victorian Murray Floodplain Restoration Project

Standing Inquiry and Advisory Committee Report No. 1

EES Central – Belsar-Yungera and Hattah Lakes North Floodplain Restoration Projects

Environment Effects Act 1978

Planning and Environment Act 1987

Planning and Environment Act 1987

24 April 2023

Planning Panels Victoria acknowledges the Wurundjeri Woi Wurrung People as the traditional custodians of the land on which our office is located. We pay our respects to their Elders past and present.

We acknowledge the Traditional Owners of the lands and waters that are the subject of this report. We pay our respects to their Elders, past and present, and acknowledge their continuing connection to country and the responsibilities they carry.

Environment Effects Act 1978

Inquiry report under section 9(1)

Planning and Environment Act 1987

Advisory Committee report under section 151(1)

EES Central – Belsar-Yungera and Hattah Lakes North Floodplain Restoration Projects - Standing Inquiry and Advisory Committee Report No. 1

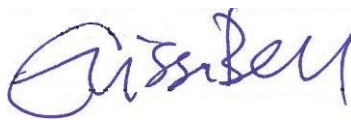
24 April 2023



Lisa Kendal, Chair



Michael Kirsch, Deputy Chair



Elissa Bell, Member



Sandra Brizga, Member



Geoffrey Carruthers, Member



Ian Hamm, Member

Contents

	Page
PART A: INTRODUCTION AND BACKGROUND.....	18
1 The Inquiry process	19
1.1 The Victorian Murray Floodplain Restoration Project.....	19
1.2 The Standing Inquiry and Advisory Committee	19
1.3 The SIAC's role.....	20
1.4 Exhibition and submissions	22
1.5 Hearings.....	22
1.6 Procedural issues	23
1.7 Report structure and Project documentation.....	25
1.8 Acknowledgements.....	25
2 The Project	27
2.1 Background	27
2.2 Belsar-Yungera	29
2.3 Hattah Lakes North.....	32
2.4 Project approvals	35
3 Environment Effects Statement	37
3.1 The decision to require an EES.....	37
3.2 The EES documentation.....	37
4 Preliminary matters	39
PART B: ENVIRONMENTAL EFFECTS AND BENEFITS – Terms of Reference Clause 47(a)	43
5 Surface water.....	44
5.1 Introduction	44
5.2 Source Murray Model.....	45
5.3 Floodplain hydraulics	47
5.4 Blackwater.....	51
5.5 Waterway salinity	54
5.6 Shear stress and erosion	56
5.7 Hydrologic benefits of the Project	60
5.8 Ramsar sites	61
5.9 Overall conclusions on surface water effects.....	63
6 Groundwater	64
6.1 Introduction	64
6.2 Groundwater effects.....	64
6.3 Overall conclusions on groundwater effects.....	68
7 Terrestrial ecology	69
7.1 Introduction	69
7.2 Floodplain ecology benefits (operation).....	70

7.3	Native vegetation effects (construction)	77
7.4	Native vegetation offsets.....	81
7.5	Trees and habitat (construction)	86
7.6	Terrestrialisation (operations).....	88
7.7	Groundwater salinity effects on trees (operations)	91
7.8	Threatened flora species and communities	93
7.9	Threatened fauna species and communities.....	97
7.10	Mildura Ogyris Butterfly (Hattah Lakes North)	100
7.11	Pest plants and animals	104
7.12	Overall conclusions on terrestrial ecology.....	106
8	Aquatic ecology	107
8.1	Introduction	107
8.2	Aquatic ecology (construction)	108
8.3	Stranding of aquatic species during drawdown (operations)	109
8.4	Carp (operations).....	111
8.5	Aquatic fauna connectivity (operations).....	115
8.6	Degradation of aquatic habitat (operations).....	119
8.7	Aquatic weeds (operations)	121
8.8	Cumulative effects on aquatic ecology	122
8.9	Effects on threatened aquatic species	124
8.10	Benefits for aquatic ecology	125
8.11	Overall conclusions on aquatic ecology	127
9	Soil	128
9.1	Introduction	128
9.2	Soil effects	128
9.3	Overall conclusions on soil.....	132
10	Aboriginal cultural heritage.....	133
10.1	Introduction	133
10.2	Consultation with Traditional Owner groups and interested parties.....	133
10.3	Cultural Heritage Management Plans	137
10.4	Aboriginal cultural heritage effects	138
10.5	Overall conclusions on Aboriginal cultural heritage	140
11	Historical heritage.....	141
11.1	Introduction	141
11.2	Historical heritage effects	141
11.3	Overall conclusions on historical heritage	143
12	Land use	144
12.1	Introduction	144
12.2	Land use effects	144
12.3	Overall conclusions on land use.....	146
13	Agriculture.....	147
13.1	Introduction	147
13.2	Agriculture effects	147
13.3	Overall conclusions on agriculture.....	149

14	Bushfire	150
14.1	Introduction	150
14.2	Bushfire effects	150
14.3	Overall conclusions on bushfire effects	154
15	Landscape and visual	155
15.1	Introduction	155
15.2	Landscape and visual effects	155
15.3	Overall conclusions on landscape and visual	157
16	Noise and vibration	158
16.1	Introduction	158
16.2	Noise and vibration effects	158
16.3	Overall conclusions on noise and vibration	160
17	Social and business	161
17.1	Introduction	161
17.2	Social and business effects	161
17.3	Overall conclusions on social and business effects	163
18	Traffic and transport	164
18.1	Introduction	164
18.2	Traffic and transport effects	164
18.3	Overall conclusions on traffic and transport effects	166
19	Air quality	167
19.1	Introduction	167
19.2	Air quality effects	167
19.3	Overall conclusions on air quality effects	168
PART C:	IMPLEMENTATION AND ASSESSMENT	169
20	Implementation	170
20.1	Draft Planning Scheme Amendment GC202	170
20.2	Matters of National Environmental Significance	175
20.3	Other approvals	178
21	Assessment	182
21.1	Integrated assessment	182
21.2	Response to Terms of Reference	184
PART D:	APPENDICES	190
Appendix A	Terms of Reference	191
Appendix B	List of Submitters	199
Appendix C	List of Parties	200
Appendix D	Document list	202
Appendix E	Process relating to views of Traditional Owners	214
Appendix F	Committee recommended incorporated document	216
Appendix G	Committee recommended Environmental Delivery Standards and Monitoring Requirements	226

List of Tables

	Page
Table 1	Surface water evidence 45
Table 2	Groundwater evidence 64
Table 3	Terrestrial ecology evidence 70
Table 4	Summary of impacts associated with proposed construction works..... 77
Table 5	Summary of offsets and benefits..... 82
Table 6	Threatened flora species and communities in the construction footprint 93
Table 7	Threatened flora species and communities in the MIA and expected effects of operations 93
Table 8	Summary of potentially significant negative effects of operations on FFG-listed terrestrial species 94
Table 9	Aquatic ecology evidence 108
Table 10	Threatened aquatic species present or possibly present in the Project areas..... 124
Table 11	Bushfire evidence 150
Table 12	Expected significant adverse impacts on MNES 176
Table 13	Summary of Committee’s assessment against evaluation objectives 183
Table 14	Committee’s responses to Terms of Reference Clause 47 184
Table 15	Committee’s responses to Terms of Reference Clause 48 187
Table 16	Cross references between recommendations and discussions 187

List of Figures

	Page
Figure 1	VMFRP overview 27
Figure 2	VMFRP project objectives..... 28
Figure 3	Belsar-Yungera Project area 29
Figure 4	Belsar-Yungera Project components..... 30
Figure 5	Hattah Lakes North Project area..... 32
Figure 6	Hattah Lakes North Project components 33
Figure 7	EES Central process and key approvals..... 36
Figure 8	Structure of the EES..... 37
Figure 9	Box plot for Belsar-Yungera medium flood scenario..... 47
Figure 10	Key Locations (and names) for medium flood bed shear stress at Belsar-Yungera 50

Figure 11	Operating scenarios and achievement of preferred EVC inundation depths for Belsar-Yungera.....	72
Figure 12	Operating scenarios and achievement of preferred EVC inundation depths for Hattah Lakes North.....	73

Glossary and abbreviations

AOIB	Assessment of overall improvement to biodiversity
Basin Plan	Murray Darling Basin Plan
the Butterfly	Mildura Ogyris butterfly (<i>Ogyris subterrestis subterrestis</i>)
CEMP	Construction Environment Management Plan
CHMP	Cultural Heritage Management Plan
Committee	Standing Inquiry and Advisory Committee for Environment Effects Statement Central package
CWE	Conservation Work Exemption
D#	Document number
DEECA	Department of Energy, Environment and Climate Action
DELWP	Department of Environment, Land, Water and Planning
EDS	Environmental Delivery Standard
EE Act	<i>Environment Effects Act 1978</i>
EES	Environment Effects Statement
EES Central	The EES for works in the Belsar-Yungera and Hattah Lakes North Floodplain Restoration Projects
EMF	Environmental Management Framework
EP Act	<i>Environment Protection Act 2017</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EVC	Ecological Vegetation Class
expert elicitation report	<i>Expert elicitation of tolerable and optimal watering regimes for Murray River floodplain vegetation</i> , Arthur Rylah Institute of Environmental Research, December 2022 (D73)
Fenner School	Fenner School of Environment and Society
Final Day Project Documents	Environmental Delivery Standards and Monitoring Requirements (D177) and Incorporated Document (D78)
FoNVP	Friends of Nyah Vinifera Park

Hydrological Analysis of EVCs for Belsar-Yungera incorporated document	<i>Hydrological Analysis of Ecological Vegetation Classes in relation to Expert Opinion – Belsar-Yungera Floodplain, Ecological Associates, January 2022 (D108)</i> <i>Victorian Murray Floodplain Restoration Project, Belsar-Yungera Floodplain Restoration Project & Hattah Lakes North Floodplain Restoration Project, Incorporated Document</i>
LCA	Landscape Character Areas
Mallee CMA	Mallee Catchment Management Authority
MDBA	Murray Darling Basin Authority
MIA	Maximum Inundation Area
MLDRIN	Murray Lower Darling Rivers Indigenous Nations
MNES	Matters of National Environmental Significance
OEMP	Operation Environmental Management Plan
PE Act	<i>Planning and Environment Act 1987</i>
PSA	Planning Scheme Amendment
RAP	Registered Aboriginal Party
RFI	Request for Information
S#	Submission number
SCO	Specific Controls Overlay
Scoping Requirements	<i>Scoping Requirements Belsar-Yungera and Hattah Lakes North Floodplain Restoration Projects Environment Effects Statement, June 2021</i>
SDLAM	Sustainable Diversion Limit Adjustment Mechanism
SIAC	Standing Inquiry and Advisory Committee
SMM	Source Murray Model
Strategic Assessment Report	<i>Victorian Murray Floodplain Restoration Project, Planning Scheme Amendment GC202 Strategic Assessment Report, August 2022</i>
the Minister	Minister for Planning
the Project	the Environment Effects Statement Central package; Belsar-Yungera and Hattah Lakes North Floodplain Restoration Projects
the Proponent	Lower Murray Urban and Rural Water Corporation
TLM	The Living Murray
ToR	Terms of Reference
TRG	Technical Reference Group

VHI	Victorian Heritage Inventory
VMFRP	Victorian Murray Floodplain Restoration Project (includes works in nine high-value floodplains along the Murray River)
VNPA	Victorian National Parks Association
WMA	Water Management Area

Overview

Project summary

The Projects	Environment Effects Statement Central Package – Belsar-Yungera and Hattah Lakes North (EES Central)
Brief description	The Victorian Murray Floodplain Restoration Project (VMFRP) consists of nine discrete projects which aim to return a more natural inundation regime to land adjacent to the Murray River in Victoria to achieve specific ecological objectives. EES Central includes a single EES covering both Belsar-Yungera Floodplain Restoration Project and Hattah Lakes North Floodplain Restoration Project
Project locations	<p>The Belsar-Yungera Floodplain Restoration Project proposes to return a more natural inundation regime to 2,374 hectares of the Belsar-Yungera Floodplain Complex within the Narcooyia Creek, Bonyaricall Creek and Yungera Creek anabranches of the Murray River (Figure 3)</p> <p>The Hattah Lakes North Floodplain Restoration Project propose to return a more natural inundation regime to 1,130 hectares of the Hattah Lakes Floodplains Complex, within Hattah-Kulkyne National Park and Murray-Kulkyne Park (Figure 5)</p>
The Proponent	Lower Murray Urban and Rural Water Corporation
EES	On 6 December 2020, the Minister for Planning determined an EES was required for the EES Central projects. The purpose of the EES is to provide a sufficiently detailed description of both projects, articulate their benefits and assess their potential effects on the environment
The draft Planning Scheme Amendment	Draft Planning Scheme Amendment GC202 to the Mildura and Swan Hill Planning Schemes

Standing Inquiry and Advisory Committee process

EES Central Committee	<p>Lisa Kendal, Chair</p> <p>Michael Kirsch, Deputy Chair</p> <p>Elissa Bell, Member</p> <p>Dr Sandra Brizga, Member</p> <p>Geoffrey Carruthers, Member</p> <p>Ian Hamm, Member</p>
Supported by	<p>Amy Selvaraj, Senior Project Officer, Planning Panels Victoria</p> <p>Gabrielle Trowse, Project Support Officer, Planning Panels Victoria</p>
Directions Hearing	Video conference, 28 November 2022
Hearing	Video conference, 17, 18, 19, 23, 24, 25 and 31 January, 2, 3 and 8 February 2023
Parties to the Hearing	See Appendix C
Citation	VMFRP EES Central SIAC Report No. 1 [2023] PPV

Executive summary

(i) Victorian Murray Floodplain Restoration Project

The Murray River is part of an important Australian river system that provides and supports abundant and diverse ecology, culturally significant places and values, and economic activity. The Victorian Murray Floodplain Restoration Project (VMFRP) is being delivered as part of the Murray Darling Basin Plan. The Murray Darling Basin Plan aims to increase water available for the environment and improve health of the Murray River and its floodplains.

(ii) VMFRP Standing Inquiry and Advisory Committee and EES Central package

The VMFRP is a Victorian Government project that will be delivered by Lower Murray Urban and Rural Water Corporation as the Proponent, in collaboration with other stakeholder organisations. It consists of nine discrete projects to be assessed under the *Environment Effects Act 1978*.

The Minister for Planning appointed the VMFRP Standing Inquiry and Advisory Committee (the Committee) on 27 September 2022. The Environment Effects Statement Central (EES Central) package was referred to the Committee on 28 September 2022.

The EES Central package (the Project) relates to two projects; Belsar-Yungera and Hattah Lakes North.

The Project involves construction of infrastructure to enable managed inundation, including pump hardstands, regulators, culverts, containment banks, pipes and tracks. The proposed infrastructure will provide operational flexibility to enable implementation of adaptive management principles and Project operations to respond to varying seasonal conditions and knowledge gained from previous operation events.

(iii) Context for assessment and this Report

The Minister for Planning gave the following reasons (amongst others) for requiring an EES for the EES Central projects:

- there are potentially significant complex effects and uncertainties associated with biodiversity, Aboriginal cultural heritage, surface water and groundwater and private land use values that require integrated assessment
- the projects have potential to have significant effects on floodplain ecosystems, threatened species and ecological communities and Aboriginal cultural values
- to ensure community and stakeholders are engaged and consulted in the assessment of the Project's potential environmental effects.

A delegate of the Commonwealth Minister for the Environment determined the EES Central projects are controlled actions for the purposes of the *Environment Protection and Biodiversity Conservation Act 1999*, and the EES process would be utilised as an accredited process for assessment.

The EES was placed on exhibition, together with draft Planning Scheme Amendment GC202 to the Mildura and Swan Hill Planning Schemes, for six weeks in October and November 2022. A total of 21 submissions were received. A public Hearing was held by video conference in January and February 2023.

The VMFRP Standing Inquiry and Advisory Committee's Terms of Reference require it to:

- inquire into and provide an integrated assessments of the potential environmental effects and benefits of the Project
- produce a report providing its findings and recommendations for each of the assessment packages.

The Committee has considered the exhibited material, all written submissions received in response to the exhibited material, and evidence, submissions and other material provided to it during the Hearing. The Committee's Report has four parts:

- Part A: Introduction and background
- Part B: Environmental effects and benefits
- Part C: Implementation and assessment
- Part D: Appendices.

EES Central is the first package to be considered by the VMFRP Standing Inquiry and Advisory Committee, and this is the first report of the Committee.

(iv) Preliminary matters

The Committee based its assessment on the requirements and guidance in its Terms of Reference and reached findings on several overarching issues raised in submissions. These are addressed as preliminary matters in this Report. Key conclusions were:

- it is not open to the Committee to review or assess the merits of the policies under which the Project was developed
- the Committee is confined to assessing the exhibited Project and possible modifications, not project alternatives
- sufficient water will be available for the Project
- the Project is expected to increase resilience to climate change
- adequate funding will be provided to resource required monitoring and adaptive management.

(v) Aboriginal cultural heritage

The Committee's Terms of Reference require it to review and consider any known views of the Registered Aboriginal Parties/Traditional Owner groups, or to seek their views if they are not already known.

The Project is in an area where Traditional Owners and Aboriginal parties and organisations have not been formally recognised under relevant legislation, either as a Registered Aboriginal Party or through a Recognition Settlement Agreement. The Committee extended an invitation to Traditional Owners to participate in the Hearing process, with the assistance of the Proponent. One Traditional Owner group participated in the Hearing, and the Proponent provided the Committee with correspondence from four other Traditional Owner groups during the Hearing. Otherwise the Committee had to rely on submissions of the Proponent on issues relating Aboriginal cultural heritage.

The Committee is satisfied that Traditional Owners have had opportunities to be involved in the development of the Project and the preparation of the EES, Cultural Heritage Management Plans and associated processes.

Ongoing engagement is critical to achieving the VMFRP objective to facilitate Traditional Owner aspirations for restoration of the floodplain. The Environmental Management Framework

appropriately includes a number of requirements for Traditional Owner consultation across various management, operating, monitoring, evaluation and reporting plans. It further requires the Project Control Group (Operation) to include an Independent Advisor in relation to Traditional Owner engagement and project management.

(vi) Overall assessment

Overall there are no impacts that preclude the Project being approved or the EES Scoping Requirements evaluation objectives being achieved, subject to the Committee's recommendations.

The expected benefits of the Project are significant, however they will take some time to realise due to ecological timeframes and a range of factors outside of the control of the Proponent and project partners, such as weather conditions and climate change. The Project is likely to result in net community benefit, however achieving this and specific project benefits will rely on successful mitigation of risks through implementation of the Committee's recommendations in relation to the Environmental Management Framework and effective adaptive management.

The Project is likely to result in an overall improvement to biodiversity values of the Belsar-Yungera and Hattah Lakes North floodplains, based on benefits to:

- floodplain hydrology in the Maximum Inundation Areas
- aquatic ecosystems and biota
- terrestrial fauna.

In broad terms, the Project is expected to deliver benefits to floodplain vegetation, including:

- increased availability of water for water-dependent vegetation
- reversal of territorialisation.

The EES, however, did not unequivocally demonstrate benefits for floodplain vegetation communities. Further analysis is required relating to floodplain hydraulics and implications for floodplain vegetation, to satisfactorily demonstrate and provide greater certainty that expected benefits will be achieved.

The Committee recommends:

- further analysis of hydraulic effects of the Project and implications for floodplain vegetation
- outcomes of this further analysis be used to inform necessary detailed design or operational changes.

The alternative arrangement proposed to compensate for the removal, destruction or lopping of native vegetation and associated impact on biodiversity is generally acceptable, subject to the recommended further analysis and update to the assessment of overall improvement to biodiversity. The further work should be completed before seeking agreement from the Secretary of the Department of Energy, Environment and Climate Action for the removal of native vegetation, and any further requirements should be incorporated into the Environmental Management Framework.

As the further work is proposed to refine and address some uncertainties in the EES, to ensure the operation of the Project is 'fine-tuned' and impacts are avoided, mitigated and managed acceptably, it is proposed through Environmental Delivery Standards in the Environmental Management Framework (rather than requiring it to be done before the Minister for Planning's assessment of the EES).

Other benefits are expected for:

- soil, by increasing vegetation cover and stabilising soil and landforms
- Aboriginal cultural heritage, by increasing vegetation cover, enhancing tree lifespans and reducing erosion
- land use, by providing opportunities for environmental land practices, recreation, agriculture, improved visual amenity and access
- agriculture, by replenishing ground and surface water and upgrading tracks
- bushfire, by reducing the likelihood of fire ignition, reducing the rate and extent of bushfires, and improving bushfire resilience of vegetation
- landscape character, by improving vegetation health and growth and improving quality of views
- community and business, by enhancing the natural environment, delivering employment and associated economic benefits tourism and recreational benefits
- traffic and transport, by improving tracks and access
- air quality, by reducing dust emissions.

In relation to Matters of National Environmental Significance, the Committee finds:

- impacts can be acceptably managed through recommended mitigation measures
- the Project will not have significant residual impacts.

(vii) Specific environmental effects and mitigation measures

Surface water

Surface water effects were assessed relating to floodplain hydraulics, blackwater, waterway salinity, shear stress and erosion, and Ramsar sites.

There are no surface water impacts that preclude the Project being approved or the evaluation objectives being achieved, subject to:

- further analysis of hydraulic parameters confirming the assessment of hydraulic effects and informing a refined assessment of effects on floodplain vegetation prior to detailed design
- clarification of mitigation measures relating to project operations to avoid and minimise blackwater events
- a protocol for how community expectations regarding potential adverse effects, in particular adverse anoxic (blackwater) events, will be managed during operations
- consideration of hydraulic effects during Project design to minimise erosion potential
- monitoring of bank and bed erosion in watercourses to inform adaptive management
- a requirement for operating rules for regulator ER1 to have regard to water levels in the Euston Weir pool.

Groundwater

Groundwater effects were assessed relating to modelling, salinity, cumulative effects and monitoring.

There are no groundwater impacts that preclude the Project being approved or the evaluation objectives being achieved, subject to:

- new groundwater monitoring sites to monitor changes to groundwater depth and salinity

- monitoring of groundwater levels and salinity in the same area as the tree monitoring, but at a greater frequency than tree monitoring, to provide a leading indicator of increased risk to the trees from rising saline groundwater.

Terrestrial ecology

Terrestrial ecology effects were assessed relating to native vegetation, terrestrialisation, trees and habitat, effects of groundwater salinity on trees, threatened flora and fauna species and communities, the Mildura Ogyris butterfly, pest plants and animals.

There are no terrestrial ecology impacts that preclude the Project being approved or the evaluation objectives being achieved, subject to:

- further investigation of identified alternatives where there may be opportunity to further avoid and minimise native vegetation removal through detailed design and construction methods
- ensuring appropriate reuse of felled timber and logs
- monitoring for hypersaline effects on trees
- preparation of Sub-Plans of the Operation and Environmental Management Plan for winged peppercress and Mildura Ogyris butterfly
- a requirement for the Pest Plan and Animal Management Plan to include measures to assist private landowners
- a refined assessment of implications for floodplain vegetation, based on additional hydraulic analysis prior to detailed design.

Aquatic ecology

Aquatic ecology effects were assessed relating to construction impacts, carp, aquatic fauna, connectivity, stranding of aquatic species, degradation of habitat, weeds, cumulative effects and effects on threatened species.

There are no aquatic ecology impacts that preclude the Project being approved or the evaluation objectives being achieved, subject to:

- amending the Environmental Management Framework to require refinement of the Operating Plan if there are significant advances in science or technology
- requiring construction of regulator ER1 and fishway to occur during a period of no flow or outside of fish migration periods
- timing inundation to reduce carp breeding and the risk of blackwater events
- the Pest Plant and Animal Monitoring and Management Plan addressing terrestrial and aquatic pests including carp
- including monitoring requirements relating to native fish strandings and terrestrial and aquatic weeds
- a new mitigation measure relating to the design of regulators, containment banks and spillways in relation to aquatic fauna passage.

Other effects

The following Project effects can be effectively managed to meet the evaluation objectives. In some cases the Committee has recommended changes to the exhibited mitigation measures to ensure that impacts are minimised in relation to:

- soil
- Aboriginal cultural heritage

- historical heritage
- land use
- agriculture
- bushfire
- landscape and visual
- noise and vibration
- social and business
- traffic and transport
- air quality.

Many of these changes were initiated by the Proponent following its review of submissions and evidence.

(viii) Consolidated recommendations

The Committee recommends various changes to the incorporated document and the Environmental Management Framework to better address the environmental effects of the Project. The Committee's recommended versions of Project documents at Appendix F and G are based on the Proponent's Final Day versions presented at the Hearing.

The Committee's detailed recommendations have been consolidated and reordered into:

- a recommendation relating to the draft Planning Scheme Amendment
- recommended changes to the Environmental Management Framework.

Draft Planning Scheme Amendment

The Committee recommends:

- 1. Approve draft Planning Scheme Amendment GC202, subject to the Committee's recommendations including the incorporated document shown in Appendix F of this Report.**

Environmental Management Framework

Part B of this Report recommends several changes to the mitigation measures in the Environmental Management Framework, specifically changes to the Environmental Delivery Standards and monitoring requirements.

The Committee recommends:

- 2. Approve the Environmental Management Framework, subject to the Committee's recommendations, including:**
 - a) Amend Section 18.8.3.5 Operating Plan of the Environmental Management Framework (page 18.34) to state:**

The Operating Plans are not intended to prescribe particular watering events. They are a 'living document' that would be further refined and updated over time if legislation changes or operations in the major river systems require it or outcomes of monitoring identify an issue that requires rectification or there are significant advances in science or technology.
 - b) Amend the Environmental Delivery Standards and monitoring register as shown in Appendix G of this Report.**

- c) Review and update the Environmental Management Framework to include any consequential changes associated with the recommended changes to the Environmental Delivery Standards and monitoring register, and to reflect changes to State government departments following Victorian machinery of Government changes.**

PART A: INTRODUCTION AND BACKGROUND

1 The Inquiry process

1.1 The Victorian Murray Floodplain Restoration Project

The Victorian Murray Floodplain Restoration Project (VMFRP) consists of nine discrete projects that are to be assessed under the *Environment Effects Act 1978* (EE Act). The floodplain restoration projects have been grouped under four assessment packages, including:

- a single Environment Effects Statement (EES) covering the Belsar-Yungera and Hattah Lakes North projects (EES Central)
- a single EES covering the Lindsay Island and Wallpolla Island projects
- a single environment report covering the Vinifera, Nyah and Burra Creek projects
- a single environmental report covering Gunbower National Park and Guttrum-Benwell Forests projects.

1.2 The Standing Inquiry and Advisory Committee

The Minister for Planning (the Minister) appointed the VMFRP Standing Inquiry and Advisory Committee (SIAC) on 27 September 2022. The SIAC consists of 19 members, including a Lead Chair, four Co-Chairs and 14 members. Specific SIAC members are to be appointed to each of the four VMFRP assessment packages.

The SIAC is appointed as an:

- inquiry pursuant to section 9(1) of the EE Act
- advisory committee pursuant to part 7, section 151(1) of the *Planning and Environment Act 1987* (PE Act).

(i) EES Central Committee

The EES Central package (the Project) was referred to the SIAC on 28 September 2022.

The EES Central SIAC members (Committee) include:

- Lisa Kendal, Chair
- Michael Kirsch, Deputy Chair
- Elissa Bell, Member
- Dr Sandra Brizga, Member
- Geoffrey Carruthers, Member
- Ian Hamm, Member.

The Committee was assisted by staff at Planning Panels Victoria including:

- Amy Selvaraj, Senior Project Officer
- Gabrielle Trowse, Project Support Officer.

The proponent for the Project is Lower Murray Urban and Rural Water Corporation (the Proponent).¹

¹ The Proponent advised it is supported by its partner agencies including Goulburn Murray Water, Mallee Catchment Management Authority, North Central Catchment Management Authority, Parks Victoria, the Water and Catchments division of the Department of Environment, Land, Water and Planning and the Commonwealth Department of Climate Change, Energy, the Environment and Water. (D14)

1.3 The SIAC's role

(i) Terms of Reference

Clause 5 of the Terms of Reference (ToR) requires the SIAC to inquire into and provide an integrated assessments of the environmental effects of the VMFRP projects. A copy of the ToR is included at Appendix A of this Report.

For each of the four assessment packages, the SIAC is to:

- review and consider the relevant EES or environment report and associated documents, and submissions received in relation to the package
- consider and report on potential environmental effects and benefits of each project, their significance and acceptability having regard to evaluation objectives and relevant policy and legislation
- consider and report on potential environmental effects for each project on relevant Matters of National Environmental Significance (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- identify any measures necessary and effective to sufficiently avoid, mitigate or manage the environmental effects, within acceptable limits
- advise on how any identified measures relate to relevant conditions, controls and requirements that could form part of the necessary approvals and consents
- consider the merits of the draft Planning Scheme Amendment (PSA) exhibited with the EES
- undertake a strategic assessment of the draft PSA against the strategic considerations identified in Planning Practice Note 46 Strategic Assessment Guidelines and other relevant considerations
- consider any relevant issues raised in submissions about the draft PSA, review the content of the draft PSA including the incorporated document and recommend any changes it considers necessary.

Clause 6 requires the SIAC to produce a report of its findings and recommendations for each of the assessment packages. The reports are to be provided to the Minister to inform the assessment under the EE Act and to assist the Minister in making decisions about the PSAs for the projects relevant to the assessment package.

Clause 47 requires the reports contain:

- analysis and conclusions regarding the predicted environmental effects and benefits of each project, and their respective significance and acceptability
- in the context of predicted effects, advise on whether each project is expected to result in overall improvement to the biodiversity values of relevant floodplain ecosystems (including listed threatened species and communities), including for each relevant MNES
- recommendations on whether the proposed alternative arrangement to compensate for the removal, destruction or lopping of native vegetation and associated impact on biodiversity is acceptable, and if not, whether any biodiversity offsets are necessary
- recommendations for any feasible modifications to the projects necessary to achieve appropriate environmental outcomes, including in relation to design and monitoring and management measures
- findings on whether acceptable environmental outcomes can be achieved

- recommendations on specific measures appropriate to prevent or mitigate adverse environmental effects to achieve acceptable environmental outcomes
- a short summary and assessment of the issues raised in submissions about the draft PSA
- advice on whether the consultation on the draft PSAs and proposed planning approval process is considered adequate or whether additional consultation should occur
- recommendations for any appropriate conditions that may be lawfully imposed on any approval for the projects, or changes that should be made to the draft PSA (for each assessment package) in order to ensure that the environmental effects of the projects are acceptable
- recommendations about the structure and content of draft management plans provided with the EES
- specific findings and recommendations about the predicted impacts on MNES and their acceptability.

Clauses 32 requires that the SIAC hold public hearings for the two EES assessment packages.

Clause 35 requires that the SIAC hold a roundtable forum for the two environment report assessment packages.

Clause 38(d) provides for the Committee to inform itself in any way it sees fit, and that it must review and consider for each assessment package:

any known views of the Registered Aboriginal Parties (RAPs) / Traditional Owner groups or seek the views of the RAPs / Traditional Owner groups if they are not already known.

The process undertaken by the Committee to satisfy this requirement is explained in Appendix E.

The Committee provides its consolidated response to the ToR in Chapter 21.2.

(ii) Scoping Requirements

The matters to be investigated and documented in the EES are described in the *Scoping Requirements for Hattah Lakes North and Belsar-Yungera Floodplain Restoration Projects Environment Effects Statement*, June 2021 (Scoping Requirements). The Scoping Requirements state:

The investigations and assessments are to include feasible project alternatives and design refinements (e.g. alternative project layouts, siting of infrastructure, management measures, project staging and timing and/or extent of inundation events) to avoid, minimise, and manage effects, particularly for:

- adverse effects on biodiversity and ecological values within and near the project area, including effects of exacerbated threatening processes, on native vegetation listed threatened ecological communities and species;
- intended ecological benefits and how they relate to the predicted adverse effects on specific biodiversity values;
- effects on Aboriginal and historic cultural heritage values;
- effects on land uses and socioeconomic values;
- potential effects on water environments and related beneficial uses;
- effects on groundwater that may result in adverse changes to salinity or groundwater depending ecosystems; and
- potential cumulative effects on threatened species, surface water and groundwater, with particular consideration of the currently operating, approved or proposed environmental watering projects in the region.

The Scoping Requirements include the following evaluation objectives:

- **Floodplain restoration**

Implement environmental watering of floodplains to enhance ecosystem function, biodiversity (particularly listed threatened species and communities), water quality, and cultural values.

- **Biodiversity and habitats**

Avoid, and where avoidance is not possible, minimise potential adverse effects on native vegetation, species of flora and fauna (particularly listed threatened species and their habitat and listed ecological communities), as well as address offset requirements (if required) consistent with state and Commonwealth policies.

- **Water, catchment values and hydrology**

Avoid and, where avoidance is not possible, minimise adverse effects on water quality, hydrology, hydrogeology and beneficial water uses (including for the Ramsar listed wetlands).

- **Cultural heritage**

Avoid, or minimise where avoidance is not possible, adverse effects on Aboriginal and historic cultural heritage values.

- **Social, economic, amenity, land/waterway use and infrastructure**

Minimise potential adverse social, economic, amenity and land/waterway use effects, including impacts on existing infrastructure and open space.

The evaluation objectives are discussed in the relevant chapters of this Report.

1.4 Exhibition and submissions

Clause 23 of the ToR provides for submissions to be lodged through the Engage Victoria website and collected by Planning Panels Victoria.

The EES was exhibited from 3 October to 14 November 2022. A total of 21 submissions were received (see Appendix B), including:

- four government agencies:
 - Environment Protection Authority Victoria (EPA) (S7)
 - Victorian Environmental Water Holder (S11)
 - Parks Victoria (S16)
 - Department of Environment, Land, Water and Planning – Environment (DELWP) (S18).
- seven environment and specific interest groups or organisations
- one local community group
- nine individuals and members of the community.

DELWP was replaced by the new Department of Energy, Environment and Climate Action (DECCA) through a machinery of government change effective of 1 January 2023. Throughout this Report, the Committee refers to S18 as DEECA, and to DELWP where relevant, for example to information and documents provided.

1.5 Hearings

A Directions Hearing was held by video conference on 28 November 2022. At the Directions Hearing the Committee explained its role, made various declarations, explained the submissions and information received, discussed various procedural issues and proposed directions relating to the main Hearing and site inspections. An audio recording was made available on the Engage Victoria website.

The main Hearing was held by video conference over 10 days between 17 January and 8 February 2023. Appendices C and D of this Report include a list of parties to the Hearing and tabled documents. Audio recordings of the Hearing and tabled documents were made available on the Engage Victoria website.

Members of the Committee attended the main Hearing on days relevant to their expertise, with the Chair, Deputy Chair and Member Bell attending on all days.

1.6 Procedural issues

(i) Hearing

The Hearing was conducted by video conference to ensure interested participants and attendees across the wide geographic region could conveniently participate in or view the Hearing, and in the context of flooding across the region in late 2022 (see discussion relating to the site inspection below).

Parties were invited to advise if they needed assistance to appear at the videoconference Hearing. No parties requested assistance. The Proponent offered technical support throughout the Hearing.

(ii) Request for Information

The Committee prepared a Request for Information (RFI) (D13) that was provided to the Proponent and tabled at the Directions Hearing. The RFI directed the Proponent to provide further information about various matters based on the Committee's preliminary review of the EES and submissions.

The Proponent responded to the RFI through a detailed written response (D99, D100, D126 and D142) and through submissions, evidence, Technical Notes, and various other information. The Committee appreciates the Proponent's responsiveness in providing this information.

(iii) Project approval documentation

The Project approval documentation includes:

- *Victorian Murray Floodplain Restoration Project, Belsar-Yungera Floodplain Restoration Project & Hattah Lakes North Floodplain Restoration Project, Incorporated Document* (incorporated document)
- *Environmental Management Framework (EMF)*, including Environmental Delivery Standards (EDS).

The Committee directed the Proponent provide Day 1 versions of this documentation before the Hearing started and Final Day versions with its closing submissions. The Proponent circulated:

- Day 1 version of the incorporated document (D94)
- Day 1 version of the EDS (D95)
- Final Day version of the incorporated document (D178)
- Final Day version of the EDS and Monitoring Requirements (D177).

Parties were given the opportunity to provide written comments on the Final Day Project Documents following the close of the Hearing. Two parties chose to provide comments:

- Dr Murdoch (S8 and S9) (D185)
- DEECA (D190).

(iv) Site inspection

Major flooding occurred along the Murray River and through the Project areas in late 2022. This created issues with access to the Project areas.

Reserve days for a site visit were scheduled in the timetable and the situation was monitored by the Proponent with updates provided to the Committee and parties in the lead up to and during the Hearing (D104). It advised the Committee on Day 7 of the Hearing that a site inspection would not be possible due to issues with site access and safety.

In anticipation that a site visit might not be possible, the Committee directed the Proponent to:

... provide visual material (photographs, video and/or drone footage) of key parts of the Projects' areas and key locations on the first day of the Hearing and as relevant during submissions.

Several submitters, particularly Friends of Nyah Vinifera Park (FoNVP) (S21), expressed disappointment the Committee would not be able to undertake a site inspection and were concerned it may not have a full appreciation of the Project areas and issues. The Committee noted that these were exceptional circumstances but was satisfied it could assess the Project on the basis that:

- the Proponent provided extensive visual material as directed by the Committee
- some Committee members are familiar with the areas
- the Committee members are engaged as experts in relevant Project areas and are familiar with the type of works and projects proposed
- not all issues require knowledge of the specific areas.

(v) Submitters requesting to appear as a witness

Dr Murdoch and Mr Frood (S4) advised that they wished to participate in the Hearing process as experts rather than submitters. The implications of this were discussed at the Directions Hearing and there were no objections. Dr Murdoch and Mr Frood considered their options and confirmed their intention to present evidence following the Directions Hearing (D15 and D19).

Dr Murdoch appeared at the Hearing as a witness for her submission on behalf of Mallee Conservation (S9), and appeared as a submitter on behalf of her submission from Fiona and Phil Murdoch (S8).

(vi) Hearing disruption

On Day 2 of the Hearing there were a number of disruptions to the online videoconference Zoom 'meeting' by unknown participant/s. The disruptions included audio interruptions and screen sharing. The Chair stood the matter down for approximately 2 hours while the situation was resolved.

The Proponent, as the online videoconference host, worked with the project team at Planning Panels Victoria to change the video conference settings to ensure appropriate and secure settings were in place for the rest of the Hearing.

(vii) DEECA submissions

At the Direction Hearing DEECA advised it did not wish to present to the Committee during the Hearing, however it would make itself available to answer questions from the Committee if required.

The Committee issued a letter with questions of DEECA on 27 January 2023 (D134) seeking its views on various issues raised in evidence and submissions in relation to the Conservation Work Exemption (CWE), biodiversity improvement and bushfire.

As documented in D155, following the receipt of correspondence from the Proponent (D136) and discussion during preliminary matters on Day 7 of the Hearing, the Committee withdrew its letter to DEECA and requested the Proponent address the relevant issues raised in the letter in its Part C submission. The Committee reserved the option to ask questions of clarification of DEECA if required.

1.7 Report structure and Project documentation

The material before the Committee is significant and includes:

- the EES main report, attachments and Specialist Assessments
- 21 submissions
- 191 tabled documents including:
 - eight evidence reports
 - 16 Technical Notes
 - extensive background material.

The Committee has considered all issues put to it, but has not explicitly responded to every written submission or further submission in this Report. The Report focuses on high-level key issues and what the Committee considers to be the determinative issues in its review, considerations, findings and recommendations. The Report addresses the requirements of the ToR and has regard to the Scoping Requirements evaluation objectives.

The Committee's Report has four parts:

- Part A: Introduction and background
- Part B: Environmental effects and benefits
- Part C: Implementation and assessment
- Part D: Appendices.

The Report Appendices include:

- Terms of Reference
- List of Submitters
- List of Parties
- Document list
- Process relating to views of Traditional Owners
- Committee recommended incorporated document
- Committee recommended Environmental Delivery Standards and Monitoring Requirements.

The Committee's recommended versions of Project documents are based on the Proponent's Final Day versions (D177 and D178).

1.8 Acknowledgements

The Committee thanks all who participated in its process. It appreciates the time and effort put into participating in the Committee process, including through written submissions, evidence and/or speaking at the Hearing.

The Committee thanks the Proponent for its administrative support, including hosting the online Hearing, hosting and managing the document sharing platform, and providing technical support throughout the Hearing process.

The Committee particularly thanks staff at the Planning Panels Victoria office for their support and assistance throughout the process, with special acknowledgement to Amy Selvaraj, Senior Project Officer and Gabrielle Trowse, Project Support Officer.

2 The Project

This chapter provides a high-level overview of the key elements of the Project drawn from the EES and provides context for the discussion of specific issues (refer to Parts B and C of this Report). Readers should refer to the relevant sections of the EES documentation for more specific or detailed information about the Project.

2.1 Background

The Project forms part of the VMFRP which is a Sustainability Diversion Limit Adjustment Mechanism (SDLAM) project under the Murray Darling Basin Plan (Basin Plan). The policy context for the VMFRP is explained in the EES.

The VMFRP seeks to return a more natural flood regime to approximately 14,000 hectares of high-ecological-value floodplain, distributed across nine sites along the River Murray between Echuca and the South Australian border (see Figure 1).

The Belsar-Yungera and Hattah Lakes North sites are the subject of this Report.

Figure 1 VMFRP overview



Source: EES Chapter 1

The VMFRP is a Victorian Government project that will be delivered by the Proponent in collaboration with other stakeholder organisations. The intent is for capital costs to be funded by the Commonwealth government, while operational funding will be provided by the State government.

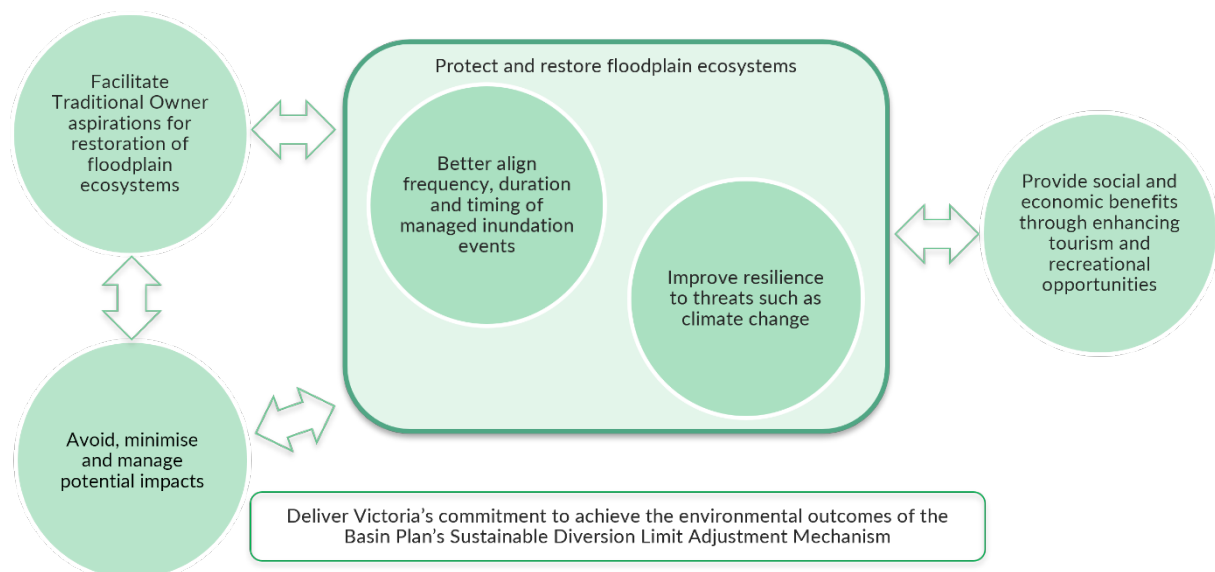
The nine VMFRP projects include the modification of existing infrastructure and the construction of new infrastructure. The works will remove blockages that stop floodwater flows and include new infrastructure such as pump hardstands, flow regulators, channels and banks to deliver environmental water onto the floodplains, and hold it there for longer. This infrastructure will allow environmental watering events to occur at lower river levels, using less water than otherwise required. The infrastructure will also be used to support the ecological needs of terrestrial and aquatic species by allowing wetting and drying regimes to be implemented.

The VMFRP objectives are to:

1. Protect and restore floodplain ecosystem biodiversity values, function and habitat components including for key species and communities by:
 - a. Better aligning the frequency, duration and timing of managed inundation events with the ecological needs of the floodplain
 - b. Improving resilience to threats such as climate change
2. Facilitate Traditional Owner aspirations for restoration of floodplain ecosystems by:
 - a. Engaging and collaborating with Traditional Owners to integrate their knowledge into the planning, delivery and evaluation of VMFRP
 - b. Creating opportunities for enhancing and sharing cultural connections to Country
3. Provide social and economic benefits through enhancing tourism and recreational opportunities associated with healthy riverine landscapes.
4. Avoid, minimise or otherwise appropriately manage potential environmental, cultural, and socioeconomic impacts during the construction, commissioning, operation and maintenance of VMFRP
5. Deliver Victoria's commitment to achieving the environmental outcomes of the Basin Plan's Sustainable Diversion Limit Adjustment Mechanism by:
 - a. Avoiding further buy-back of water from consumptive users
 - b. Being capable of full operation by 30 June 2024.²

Figure 2 shows the relationship between the project objectives.

Figure 2 VMFRP project objectives



Source: EES Chapter 1

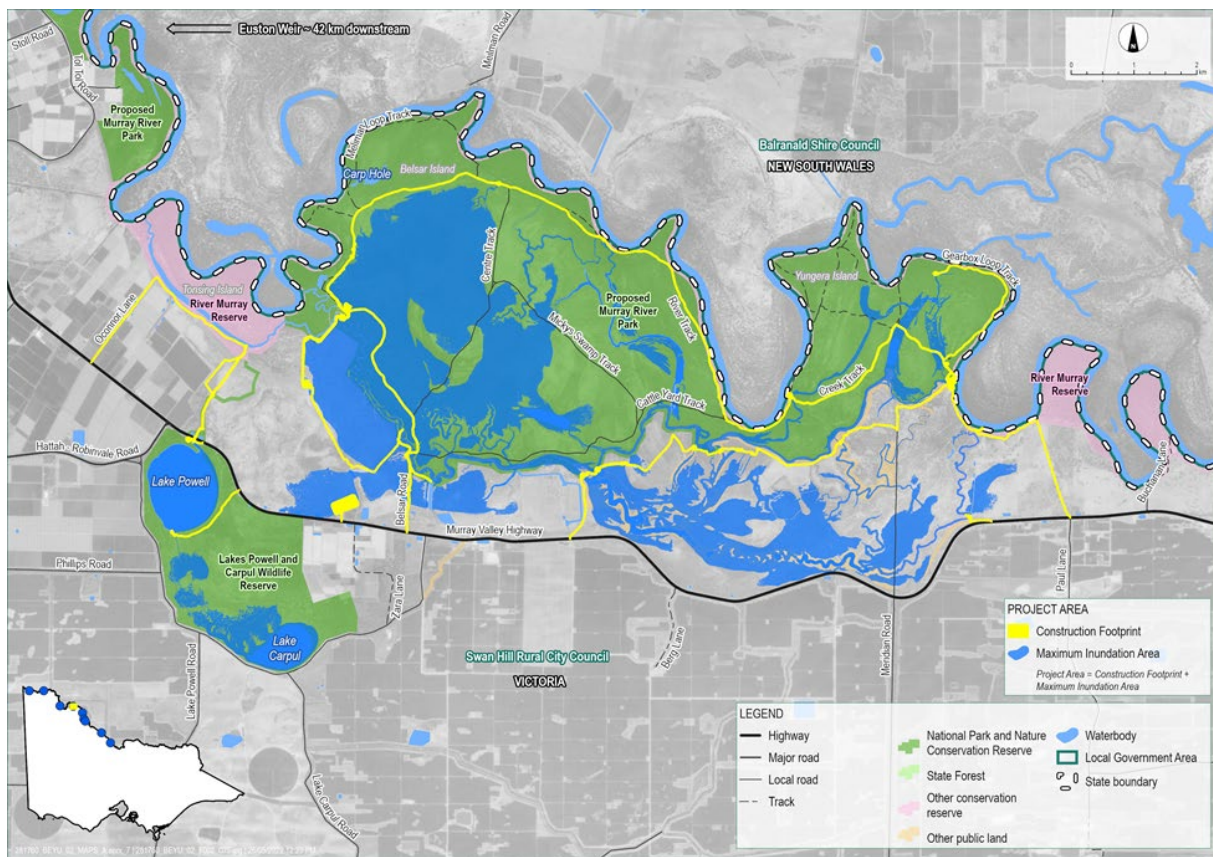
² EES Chapter 1

2.2 Belsar-Yungera

(i) Project site

The Belsar-Yungera Project is located in north-west Victoria near Robinvale, approximately 30 kilometres upstream of the Euston Weir. The Belsar-Yungera floodplain is nationally recognised for its high environmental and cultural values and is managed for environmental conservation. The Project aims to restore a more ecologically appropriate inundation regime and improve ecological conditions across approximately 2,374 hectares of high ecological value Victorian Murray River floodplain. The Project area is shown in Figure 3 and comprises the construction footprint (containing the proposed infrastructure) and the Maximum Inundation Area (MIA).

Figure 3 Belsar-Yungera Project area



Source: EES Chapter 1

The Project is located almost entirely in the Swan Hill Rural City Council area and the Mallee Catchment Management Authority (Mallee CMA) region, with the exception of the temporary suction line which, during pumping events, will be located on the bank of the Murray River within the Balranald Shire in New South Wales.

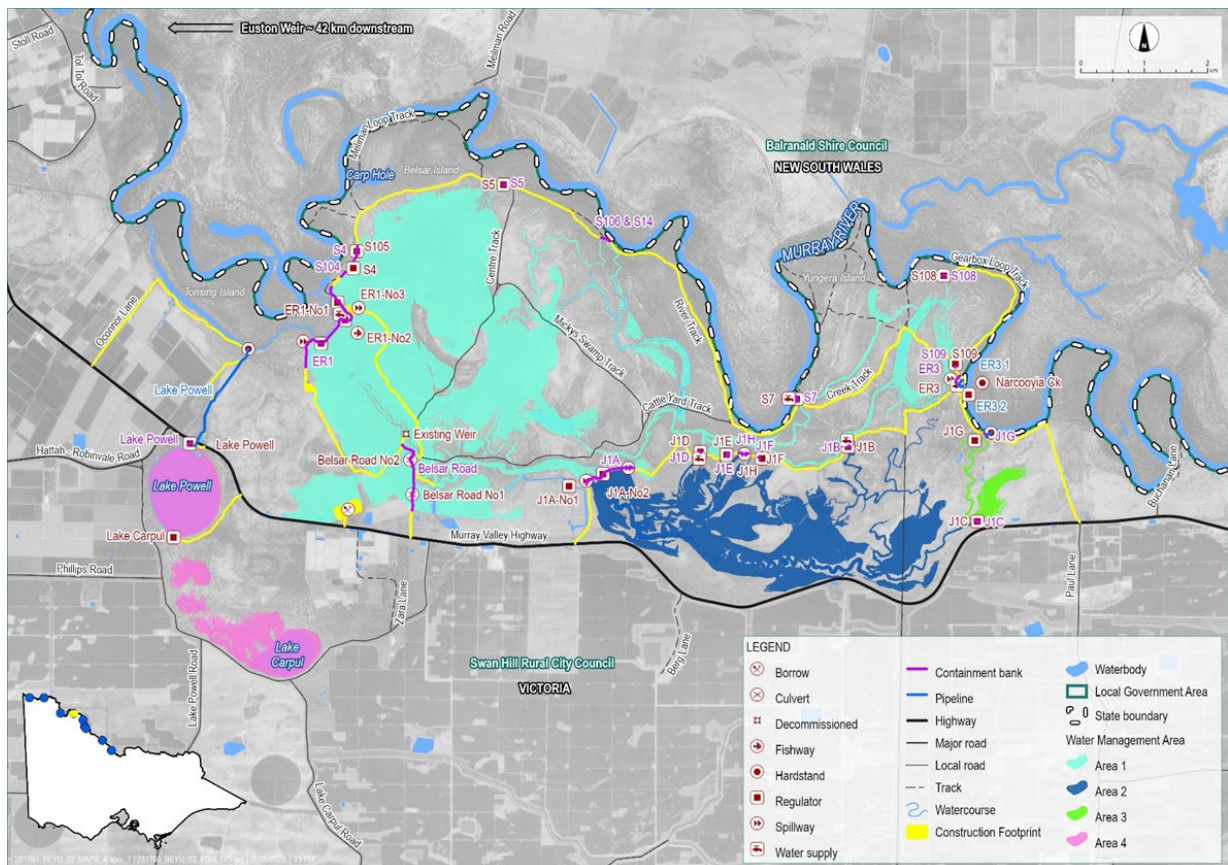
The Project is in an area where Traditional Owners and Aboriginal parties and organisations have not been formally recognised under relevant legislation, either as a Registered Aboriginal Party (RAP) or through a Recognition Settlement Agreement.

The 2,374 hectare MIA includes floodplain areas (including wetlands), anabranches of the Murray River and two large ephemeral lakes.³ A large portion of the proposed MIA is on Crown land managed by Parks Victoria and includes the River Murray Reserve, Lake Powell and Lake Carpul Nature Conservation Reserves.

Approximately 736 hectares in the southern part of the MIA is private land. A proportion of the private land proposed for inundation is protected under conservation covenants or as an offset site for land clearing associated with nearby irrigation developments.

The Project area is divided into four Water Management Areas (WMA) (see Figure 4).

Figure 4 Belsar-Yungera Project components



Source: EES Chapter 6

(ii) Project works

The key Project components are shown on Figure 4 and include:

- one very large regulator incorporating a vertical slot fishway (ER1)
- two large regulators (ER3 and S7)
- 14 small regulators
- two culverts
- 1.6 kilometres of containment banks with access tracks on top
- a two kilometre low-pressure underground pipeline

³ An anabranch is a diverging branch of a river that diverts from the main river and re-joins downstream. An ephemeral lake is a seasonal lake that fills with water for brief periods during and after rainfall

- four permanent hardstands (for temporary pumps to transfer environmental water from the Murray River into the Narcooyia Creek system as required)
- upgrades to existing access tracks (approximately 11.1 kilometres)
- creation of new access tracks (approximately 12.8 kilometres)
- use of existing access tracks, including for maintenance activities during operation (approximately 24.4 kilometres)
- decommissioning and removal of the existing block bank weir on the Narcooyia Creek.

There are no permanent pumps proposed as part of the Project.

(iii) Project construction

The total construction footprint for the Project is 52 hectares – this includes the area to be taken up by the proposed infrastructure and associated construction activities, and a suitable buffer distance to allow for construction activity.

The Project would involve three construction laydown areas:

- two laydown areas proposed for regulator ER1, the first approximately 75 by 90 metres and the second approximately 100 by 100 metres (located on private property)
- a third laydown area located south-west of regulator ER3, approximately 75 by 50 metres.

The laydown areas would be reinstated following the completion of works, however, this would be dependent on landowner requirements and onsite environmental considerations.

Construction of the Project would require the importation of material (clay/rock) from a nearby quarry site, known as borrow site. The borrow site would be located outside Belsar and Yungera Islands at Lake Powell, north of the Murray Valley Highway. The site is located on private land and is approximately 330 by 110 metres in size, with a construction footprint of approximately 410 by 190 metres.

Access to the Project components would be by the Murray Valley Highway and connecting public and private roads, including Belsar Road. Construction site access would use existing roads, tracks and passing bays. Existing access tracks may require minor upgrade works, such as grading and applying additional road base where required to maintain access.

Project construction is planned to commence in the first half of 2023, with construction taking approximately 18 months to complete. Standard construction work hours would apply, except in exceptional circumstances. The Project would generate between 50 and 100 local jobs during the construction phase.

(iv) Project operation

The Project aims to enable floodplain inundation using natural flow paths to better align the frequency, duration and timing of managed inundation events with the ecological needs of the floodplains using either river flows during flood events or pumped water under low flood conditions.

Operation of the environmental watering would be managed by the Mallee CMA. The proposed works are intended to provide a high degree of operational flexibility, enabling the implementation of 'adaptive management'. Adaptive management would allow the Project to respond to varying seasonal conditions and respond to knowledge gained from previous operational events. The

adaptive management process would be incorporated into the operational management documentation, including the Project-specific Environmental Water Management Plan.

The decision to initiate environmental watering would be based on:

- water availability (based on seasonal water allocations determined by storage operators)
- floodplain water requirements, to ensure consistency with the watering regime, ecological objectives and targets
- operational risks (such as risks associated with blackwater, algae and salinity)
- the regional context (such as the need for survival watering, recruitment watering and maintenance watering) and other river operations that may occur within the river reach.

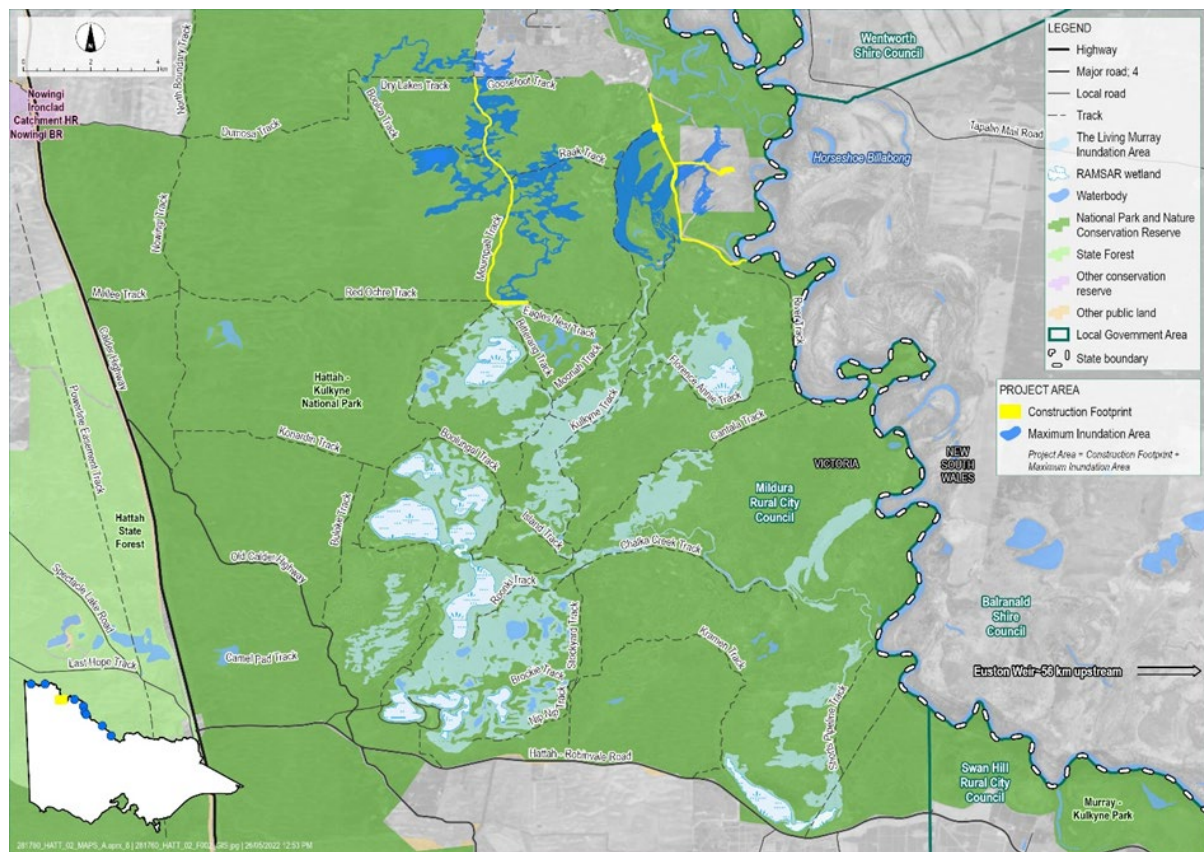
The EES describes six operational scenarios developed to deliver environmental water at different frequencies and durations to meet the hydrological requirements of the relevant ecosystem. These operating scenarios aim to replicate inundation conditions within the WMAs that would have occurred at various pre-regulation flow thresholds of the Murray River.

2.3 Hattah Lakes North

(i) Project site

The Hattah Lakes North Project is located on the western side of the Murray River in north-west Victoria, between Robinvale and Red Cliffs, approximately 75 kilometres south of Mildura. The Project area is shown in Figure 5 and comprises the construction footprint (containing the proposed infrastructure) and the MIA.

Figure 5 Hattah Lakes North Project area



Source: EES Chapter 1

The Project is situated in the northern most part of the Hattah Lakes floodplain complex, within the Hattah-Kulkyne National Park. It comprises approximately 20 lakes and surrounding woodlands that receive water from the Murray River via Chalka Creek. The Project aims to restore a more ecologically appropriate inundation regime across approximately 1,130 hectares of high ecological value Murray River floodplain, in the Chalka North and Lake Boolca WMAs.

The Project is located downstream of the existing environmental watering infrastructure installed as part of The Living Murray (TLM) initiative. The existing TLM infrastructure would be used in the operation of the Hattah Lakes North VMFRP project as described in Chapter 6 of the EES:

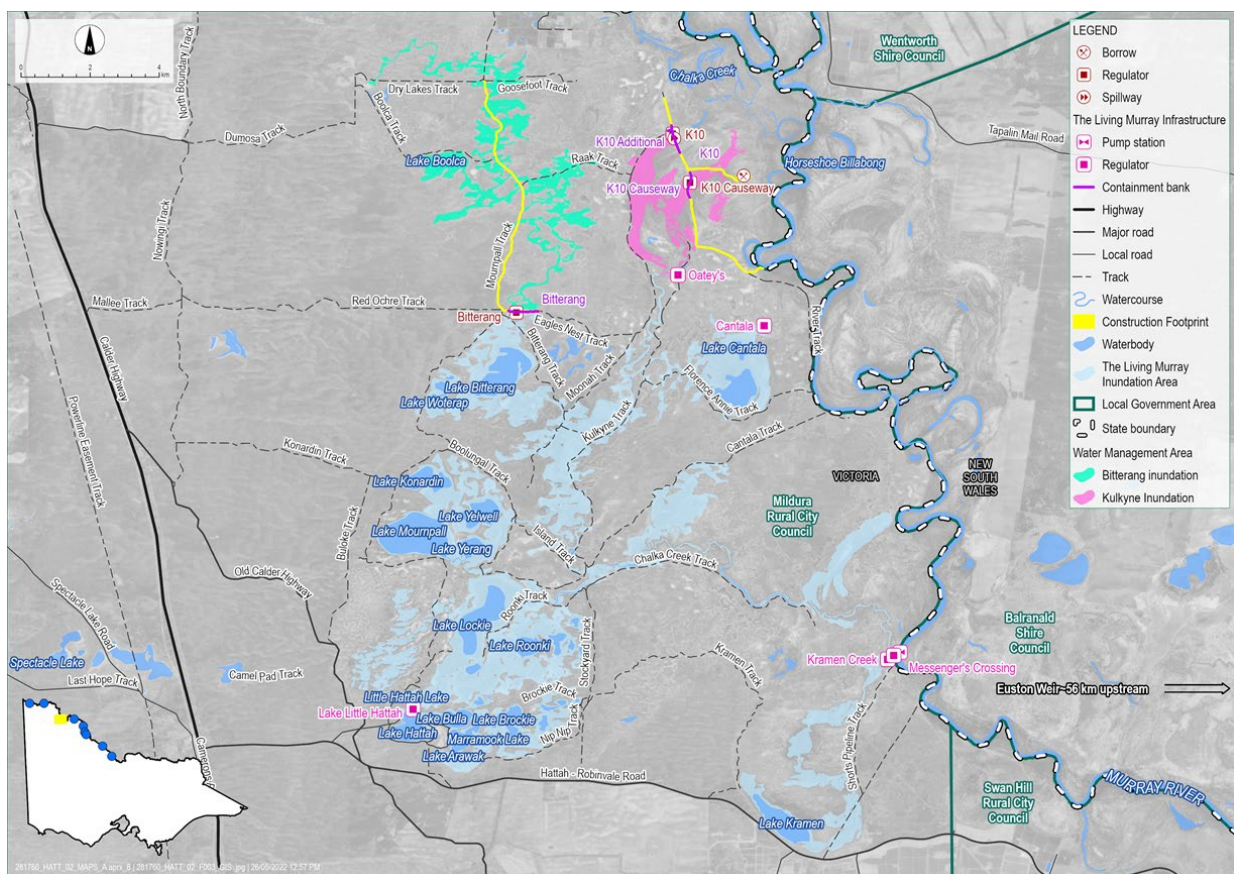
The Hattah Lakes North project is designed to build on the benefits of the TLM initiative, ... The project would use natural flood events and releases from the TLM works to facilitate environmental watering of flood-dependent vegetation communities on the northern Hattah Lakes floodplain. Existing TLM infrastructure would be used, including Oatey's Regulator and Bitterang Regulator.

The Project is located close to the Hattah-Kulkyne Lakes Ramsar site, however, no works are proposed within this area and it would not involve any discharges of managed floodwaters to the site.

The Project is located entirely in the Rural City Council of Mildura area and the Mallee CMA region.

The Project is an area where Traditional Owners and Aboriginal parties and organisations have not been formally recognised under relevant legislation, either as a RAP or through a Recognition Settlement Agreement.

Figure 6 **Hattah Lakes North Project components**



Source: EES Chapter 6

The proposed MIA includes mostly Crown land within the Hattah-Kulkyne National Park, some private land including Kulkyne Station to the east, and a parcel of private land adjoining the northern boundary of the Hattah-Kulkyne National Park, known as Raakajlim.

The project area covers two WMAs (see Figure 6).

(ii) Project works

The Project would use existing TLM infrastructure (Messenger pump station, regulators and containment banks), along with proposed new infrastructure to deliver water to the Chalka North and Lake Boolca WMAs.

The key Project components are shown in Figure 6 and include:

- one large regulator (K10)
- one small regulator (Bitterang Regulator)
- one containment bank (K10 River Track Containment Bank)
- 1.8 kilometres of containment banks with access tracks on top
- use of existing access tracks, including for maintenance activities during construction (approximately 16.9 kilometres).

The EES notes that opportunities for further alternative design options are being considered for the Project infrastructure as part of detailed design, including opportunities to reduce construction footprints.

(iii) Project construction

The total construction footprint for the Project is 31 hectares - this includes the area to be taken up by the proposed infrastructure and associated construction activities, and a suitable buffer distance to allow for construction activity.

The laydown area is for the construction of the K10 Regulator and would be approximately 75 by 50 metres.

The laydown area would be reinstated following the completion of works, however this would be dependent on landowner requirements and onsite environmental considerations.

The borrow site would be located immediately north of the previous borrow site used as part of the TLM initiative in 2012-2013. This site is located on private land at Kulkyne Station and is approximately 320 by 80 metres, with a construction footprint of approximately 400 by 100 metres.

Access to the Project components would be from Boonoonar Road (north), by either Reed Road (west) or Kulkyne Way (east), to the northern National Park boundary. Construction site access would use existing tracks and passing bays.

Project construction is planned to commence in the first half of 2023, with construction taking approximately 18 months to complete. Standard construction work hours would apply, except in exceptional circumstances. The Project would generate between 50 and 100 local jobs during the construction phase.

(iv) Project operation

The Project aims to enable floodplain inundation to additional areas on the Murray River floodplain, replicating as far as possible the natural hydrology of the system to these areas.

The proposed works are designed to be operated in several possible flow regimes to provide varying watering events. It would use natural flood events and releases from the TLM works to provide environmental watering on the northern Hattah Lakes floodplain.

Inundation of private land can be avoided through the operation of the proposed works and would only be undertaken subject to agreement with the relevant private landowners.

Operation of the environmental watering would be managed by the Mallee CMA. The proposed works are intended to provide a high degree of operational flexibility, enabling the implementation of adaptive management principles. These would allow the Project to respond to varying seasonal conditions and respond to knowledge gained from previous operation events. The adaptive management process would be incorporated into the operational management documentation, including the Project-specific Environmental Water Management Plan.

The decision to initiate environmental watering would be based on the same considerations as for the Belsar-Yungera Project, including water availability, floodplain water requirements, operational risks and the regional context.

The EES describes three operational scenarios for the Chalka North WMA and four for the Lake Boolca WMA.

2.4 Project approvals

Figure 7 outlines the EES process and approvals as described by the Proponent.

(i) Legislative and policy context

Key legislation and approvals required for the Project are outlined in Chapter 5 of the EES. A full list of applicable legislation, policy and guidelines is contained in Appendix III (Legislation and policy) of the EES.

(ii) Project approvals

Chapter 18 of the EES sets out the statutory approvals and consents that will be required for the Project to proceed.

Project approvals are discussed in Chapter 20 of this Report.

(iii) EPBC Act

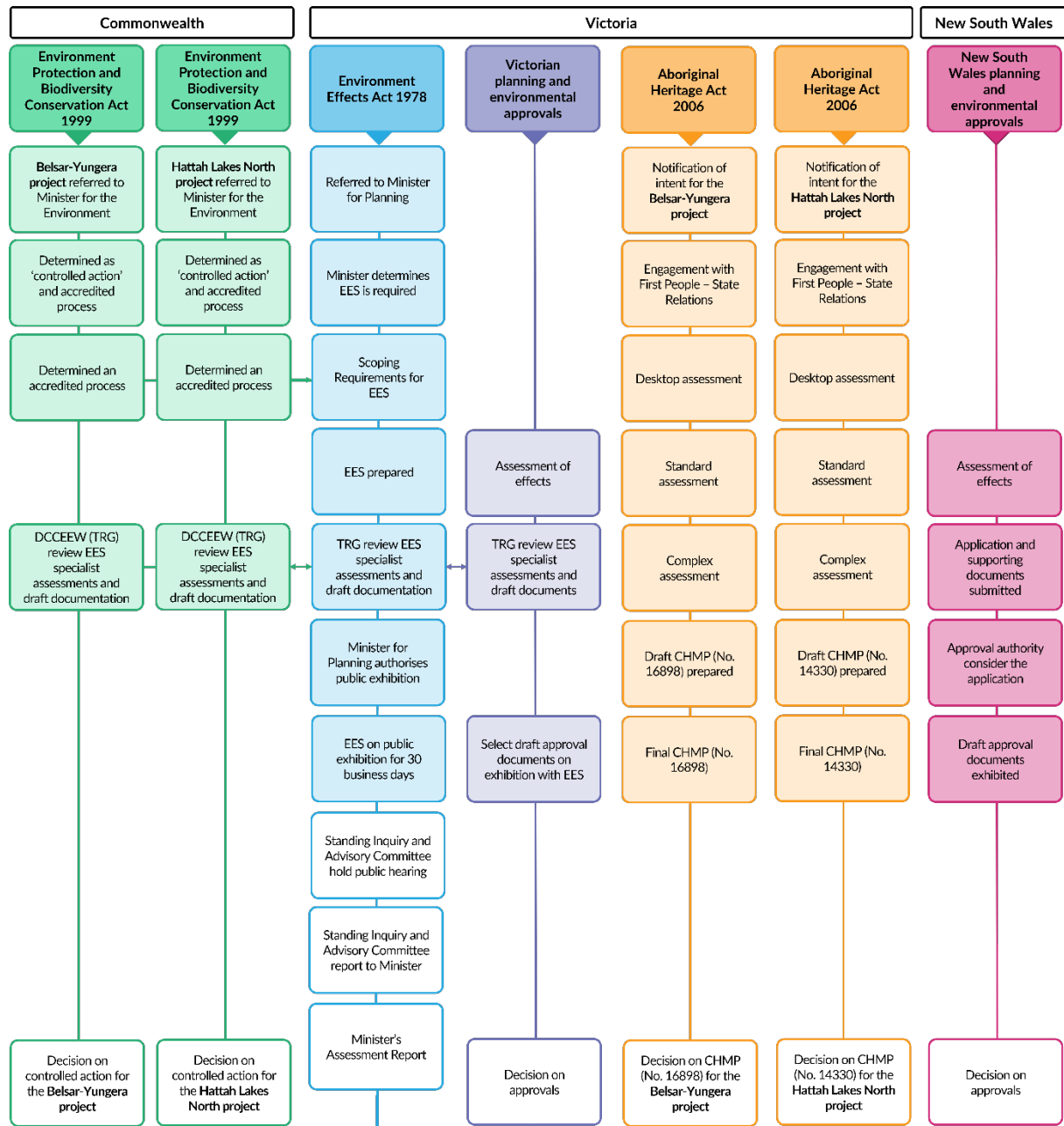
The EES is an accredited process to assess the impacts on MNES under the EPBC Act. In 2020, a delegate of the Commonwealth Minister for the Environment determined that the projects were a controlled action for the purposes of the EPBC Act, and the EES process would be utilised as an accredited process for assessment consistent with the Bilateral (Assessment) Agreement between the Commonwealth and State of Victoria.

The EPBC Act and MNES are discussed in Chapter 20 of this Report.

(iv) Terminology

The EE Act refers to significant effects on the environment. The EPBC Act refers to significant impacts on MNES. The Committee refers to impacts and effects interchangeably.

Figure 7 EES Central process and key approvals



Source: EES Chapter 1

3 Environment Effects Statement

3.1 The decision to require an EES

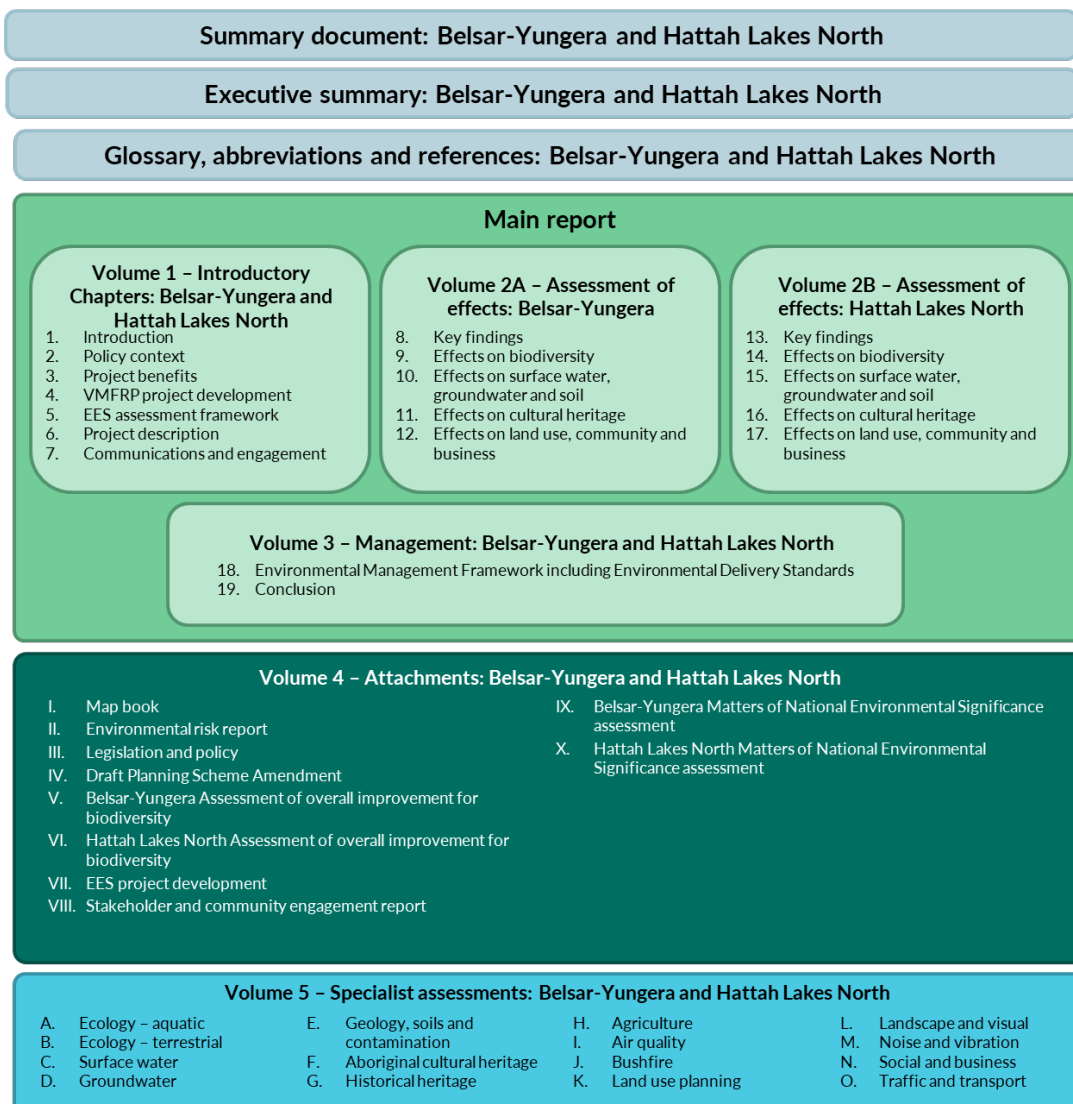
The Minister for Planning gave the following reasons (amongst others) for requiring an EES for the EES Central projects:

- there are potentially significant complex effects and uncertainties associated with biodiversity, Aboriginal cultural heritage, surface water and groundwater and private land use values that require integrated assessment
- the projects have potential to have significant effects on floodplain ecosystems, threatened species and ecological communities and Aboriginal cultural values
- to ensure community and stakeholders are engaged and consulted in the assessment of the projects' potential environmental effects.

3.2 The EES documentation

Figure 8 outlines the structure of the EES.

Figure 8 Structure of the EES



(i) Environmental Management Framework

Delivery of the Project would be facilitated by an incorporated document proposed for inclusion in the Mildura and Swan Hill Planning Schemes. The proposed incorporated document requires preparation of an EMF for the Project to the satisfaction of the Minister of Planning prior to the commencement of development (excluding preparatory buildings and works).

Chapter 18 of the EES includes the proposed EMF. The EMF aims to provide a framework to deliver the Project in accordance with regulations and approvals. It outlines existing management systems and procedures and specific documentation required to guide and manage implementation of the Project.

The EMF contains EDS which set out environmental management measures and standards to achieve the project benefits while managing environmental risk and avoiding, minimising and appropriately managing potential impacts. The EDS are also referred to as mitigation measures.

The EMF also contains a Monitoring Program which includes monitoring, auditing, inspection and investigation requirements. The EDS and Monitoring Program are based on the exhibited specialist assessments.

4 Preliminary matters

(i) Introduction

Submissions and evidence raised various ‘higher order’ issues that relate to the EES process, the scope of the Committee’s role and the matters it should consider. The Committee’s responses to these issues are provided below, and have informed the discussion of relevant matters in Part B of this Report. These issues include:

- the need for an EES
- the relevance and application of the broader policy context, including the Basin Plan, SDLAM and Victorian Environmental Water Framework
- the extent to which project alternatives have been investigated
- the adequacy of the EES, including the extent to which it addressed the Scoping Requirements and the cumulative effects of the Project
- the availability of environmental water
- project delivery
- the need to adequately resource the Project during their operation.

The Proponent discussed the Committee’s reporting tasks and submitted:

- 8.1 The Committee is not asked to report on water policy or its implementation. Similarly, the Committee is not asked to consider or report on the environmental or other effects of any particular policy decision. In addition to the absence of these matters from any relevant term and from the Department’s referral letter issued under term 29 having regard to the provisions of term 30, their exclusion from the Committee’s scope of reporting and advice follow as an express consequence of term 8.
- 8.2 Further, the Committee has not been asked to consider or report on alternatives to the Projects, and the Scoping Requirements did not require the EES to consider, alternatives to the Projects, other than by way of comparison of their effects with the “no project” or “do nothing” scenario.
- 8.3 Finally, and while the EES was prepared to appropriately respond to the Scoping Requirements, the Committee is not asked to report on the extent to which it has done so.⁴

The Proponent submitted that many issues raised in submissions were outside the scope of the ToR and would not assist the Committee in addressing its purpose and reporting requirements.

(ii) The need for an EES

Two submitters believed an EES was unnecessary for the Project and wasted money and resources that should have been used on implementation. It was noted TLM did not require an EES. They submitted the Project should proceed on the basis it will not have any significant negative impacts, will have substantial positive benefits, is consistent with policy and has extensive community and stakeholder support.

While the Committee notes these submissions, the decision to require an EES was made by the then Minister and is outside the scope of the Committee’s considerations.

⁴ D174, paragraph 8

(iii) Policy context

Many submitters believed that the scope of the Committee's considerations should be interpreted more broadly than suggested by the Proponent, particularly the compliance of the Project with higher order 'water' policies, consideration of the findings of the South Australian Murray Darling Basin Royal Commission, and the assessment of broader environmental effects. FoNVP, Environment Victoria (S19), Fenner School of Environment and Society, Australian National University (Fenner School) (S17), Murray Lower Darling Rivers Indigenous Nations (MLDRIN) and others made extensive submissions about these matters.

Clause 7 and 8 of the ToR describe the background to the Project and note:

7. VMFRP is being implemented as part of Victoria's obligations under the Murray-Darling Basin Plan. The Basin Plan sets out Sustainable Diversion Limits, which are the amount of water that can be taken from the Murray-Darling Basin each year, and the projects form part of the greater Sustainable Diversion Limit Adjustment Mechanism (SDLAM) under the Murray Darling Basin Plan.
8. The structure and implementation of the Murray Darling Basin Plan, SDLAM and the Victorian Environmental Water Framework are outside the scope of the matters to be examined by the SIAC. They are only context for these projects.

The Committee acknowledges submissions about the policy context for the Project but agrees with the Proponent that Clause 8 limits its considerations to the potential environmental effects and benefits of the exhibited Project. It is not open to the Committee to review or assess the merits of the policies under which the Project were developed.

(iv) Project alternatives

Some submitters believed the Committee should consider alternative projects to achieve the environmental outcomes sought under the VMFRP, including water buybacks and constraints relaxation. The EES did not propose any project 'alternatives', although it discusses the implications of the 'do nothing' scenario and explains how the development of 'options and alternatives' had informed the exhibited Project. This approach is consistent with the *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978* (Ministerial Guidelines).

In light of its ToR and in the absence of any exhibited alternatives, the Committee is confined to assessing the exhibited Project and possible modifications to the Project to better 'avoid, mitigate or manage' environmental effects. It is not able to form any views about alternative projects or approaches.

(v) EES investigations and consistency with the Scoping Requirements

Several submitters raised concerns about the adequacy of the EES investigations and the extent to which they adequately addressed the Scoping Requirements. They submitted that perceived shortcomings compromised the EES and would impact the anticipated Project benefits.

The Committee has identified elements of the EES where further information or analysis would have been beneficial and has included recommendations to address those matters in the relevant chapters of this Report. None of these matters are fatal to the Committee's assessment of the Project or its overarching finding that they should proceed.

In terms of the Scoping Requirements, the Committee notes the EES was developed through an extensive review process, after which it was authorised for exhibition. It agrees with the

Proponent that its ToR do not require it to review EES compliance with the Scoping Requirements, although it is required to have regard to the evaluation objectives under ToR 5(b). The Committee's assessment against the evaluation objectives is included in Parts B and C of this Report.

(vi) Water availability

Several submitters queried the likelihood of environmental water being available to support the Project's operation. The Victorian Environmental Water Holder supported the Project and outlined the prioritisation process for environmental water in the Victorian Environmental Water Holder Seasonal Watering Plan. It was satisfied sufficient water would be available *"to maintain or improve the condition of VMFRP sites, as well as existing priority sites"*.

The Committee has proceeded on the basis that sufficient water will be available to the Project.

(vii) Climate change impacts

Several submitters raised concerns about the extent to which potential climate change impacts had been considered under the Basin Plan, SDLAM and EES, particularly in relation to water availability. As noted earlier, the broader policy context, including the Basin Plan and SDLAM, is outside the scope of the Committee's considerations and the Committee has proceeded on the basis that sufficient water will be available to the Project.

In relation to the EES, the Proponent noted that part of the rationale for the VMFRP was to address potential climate change impacts and submitted that they were adequately dealt with in the EES and evidence of Dr Treadwell. The Committee has proceeded on the basis that the Project is expected to increase resilience to climate change by enabling and enhancing floodplain inundation if there are further reductions in river flows.

(viii) Project timing

Some submitters queried whether the Project would be delivered within the intended mid 2024 Basin Plan reconciliation timeframe and what might be the implications of not meeting that timeframe.

The EES notes there is a commitment under the Basin Plan that the SDLAM projects (including the VMFRP) will be delivered and fully operational by 30 June 2024.

The Proponent submitted *"The Projects are not proposed on the basis that they will only proceed if they can be delivered by June 2024, and this timeline has not influenced the processes undertaken in the preparation of the EES or this Inquiry"* (D174). Further, the Proponent advised delivery of the Project by June 2024 was considered unlikely, noting delays of up to 6 months resulting from the recent flood event and associated wet weather.

The Committee is not able to comment on when the Project might be delivered other than to note the Proponent's advice.

(ix) Project funding

Finally, some submitters raised concerns about the availability of appropriate funding and resources during the Project's operation, particularly in relation to successful monitoring and adaptive management. The Committee agrees that achieving the anticipated environmental benefits and managing any adverse outcomes will be contingent on suitable resources being

available. However, it has assessed the Project on the basis that the EMF and other management processes will be adequately resourced, consistent with their approval.

PART B: ENVIRONMENTAL EFFECTS AND BENEFITS – Terms of Reference Clause 47(a)

5 Surface water

5.1 Introduction

The primary Scoping Requirements evaluation objective is:

Avoid and, where avoidance is not possible, minimise adverse effects on water quality, hydrology, hydrogeology and beneficial water uses (including for the Ramsar listed wetlands).

There are several secondary relevant evaluation objectives:

Implement environmental watering of floodplains to enhance ecosystem function, biodiversity (particularly listed threatened species and communities), water quality, and cultural values.

Avoid, and where avoidance is not possible, minimise potential adverse effects on native vegetation, species of flora and fauna (particularly listed threatened species and their habitat and listed ecological communities), as well as address offset requirements (if required) consistent with state and Commonwealth policies.

Avoid, or minimise where avoidance is not possible, adverse effects on Aboriginal and historic cultural heritage values.

Minimise potential adverse social, economic, amenity and land/waterway use effects, including impacts on existing infrastructure and open space.

Surface water is discussed in:

- EES report chapters 10.1 and 15.1
- Specialist Assessment C Surface Water.

Surface water analysis was a key input to the assessment of overall improvement to biodiversity (AOIB) (Attachments V and VI).

The exhibited EMF includes the following EDS:

- SW1 Surface water management – Construction
- SW2 Surface water management – Operation
- SW3 Surface water – Monitoring.

In response to the Committee’s RFI and other issues raised at the Hearing, the Proponent provided the following Technical Notes:

- TN06 Cumulative assessment for MNES (D113)
- TN09 Dispersive and reactive soils (D139)
- TN11 Questions taken on notice – surface water (D164)
- TN12 Questions taken on notice – aquatic ecology (D165).

Additionally, the Committee had regard to:

- relevant submissions and evidence
- the Proponent’s RFI response dated 23 December 2022 (D99)
- the Proponent’s Final Day EDS (D177).

Table 1 lists the surface water and relevant groundwater evidence.

Table 1 Surface water evidence

Party	Expert	Firm	Area of expertise
Proponent	Simon Treadwell	Jacobs	Surface water
Proponent	Greg Hoxley	Jacobs	Groundwater

5.2 Source Murray Model

(i) What did the EES say?

Specialist Assessment C explained it used the Murray Darling Basin Authority’s (MDBA) Source Murray Model (SMM) flow data as an input to hydrological assessments, including comparisons of flow scenarios in relation to floodplain inundation thresholds. Flow scenarios included natural (without demand), baseline (current) and Basin Plan benchmark models.

The SMM, amongst other inputs, informed the blackwater event models. The blackwater models were developed specifically for assessment of floodplain inundation projects and have been peer reviewed. While there are limitations underpinning the models, uncertainty of outcomes had been addressed in the analysis and findings. Specialist Assessment C stated:

For the purposes of the assessment the models are considered the best available and suitable for the current assessment.

The assessment of climate change effects used the SMM and *Guidelines for Assessing the Impacts of Climate Change on Water Availability in Victoria* (DELWP, 2020). It explained the MDBA considered the modelling suitable for assessing the various operating strategies for each project, however:

... the availability and deliverability of environmental water under climate change remains uncertain. The MDBA further note that the SMM is being updated to include explicate representation of all [Sustainable Diversion Limit] projects, and that this will provide further insights into climate change effects, but that this modelling will not be completed until the end of 2022.

(ii) The issue

The issue is whether the hydrologic modelling of flows underpinning the assessment of effects, specifically the SMM, is fit for purpose.

(iii) Evidence and submissions

Several submitters were critical of the EES for its reliance on the SMM in respect of modelled Murray River flows.

Both Environment Victoria and the Fenner School referred to a study conducted by the Wentworth Group of Concerned Scientists which reported observed flows were 23 per cent less than the MDBA model projected at Hattah from 2012-19.⁵

Fenner School submitted the SMM was not fit for purpose as the “*model is over a decade old and has not been updated or refined*”.

Environment Victoria considered the modelling of current flows using the SMM was outdated and did not provide a proper baseline to assess the impacts of the Project. It explained the SMM draws

⁵ D156 and D160

on data collected from 1895 to 2009, which pre-dates critical river regulation and infrastructure projects that have changed the surrounding landscape and river flows. Environment Victoria sought a recommendation from the Committee that further information is required, including explicit representation of the VMFRP projects in the SMM, to enable appropriate assessment of the impacts of climate change and availability of environmental water.

Dr Treadwell gave evidence that the surface water assessment relied on data provided by the MDBA as the best available data at the time. He advised the MDBA intended to update flow modelling to explicitly incorporate Sustainable Diversion Limit projects and climate change, however this data was not available at the time of the assessment.

In its Part C submission, the Proponent explained:

- under section 172(1)(ea) of the *Water Act 2007* (Commonwealth) the MDBA has a legislated function to develop an integrated water model in consultation with Basin States
- the SMM is fit for purpose in its current form, as has been confirmed by the Inspector-General of Water Compliance following a review of data analysis processes and modelling used by the MDBA and as concluded by the Fenner School's independent review of the SMM
- modelled flows may differ from future flows and this was not a concern as the true benefit of the Project *"is the ability to respond flexibly, and to provide resilience, in the face of an unpredictable future"*.

(iv) Discussion

The Committee notes the Commonwealth Water Act requires the MDBA to develop an integrated water model for the Murray-Darling Basin in consultation with the Basin States.

The SMM is the hydrological model established by the MDBA (in conjunction with the State governments and E-water CRC⁶) for scenario testing, policy development and to assist in river management and river operations. No alternative model was presented to the Committee by the Proponent or submitters.

As a preliminary issue, the Committee has accepted the Project is likely to increase resilience to climate change (see Chapter 4(vii)), and has not discussed the matter further as it relates to the SMM.

The Committee:

- accepts the SMM as fit for purpose and an appropriate model to underpin the assessment of effects of the Project
- notes that the SMM is proposed to be updated, but does not accept the suggestion that approvals for the Project should be delayed until the SMM is updated or replaced.

While there are limitations with the SMM with regard to the Project, the modelling is adequate in the context of proposed adaptive management enabling responsiveness to future conditions.

⁶ The e-Water CRC is a not-for-profit enterprise jointly owned by the Commonwealth and State governments, which is the custodian of Australia's water modelling tools

(v) Findings

The Committee finds the SMM is fit for the purpose of modelling flows underpinning the environmental assessment of effects.

5.3 Floodplain hydraulics

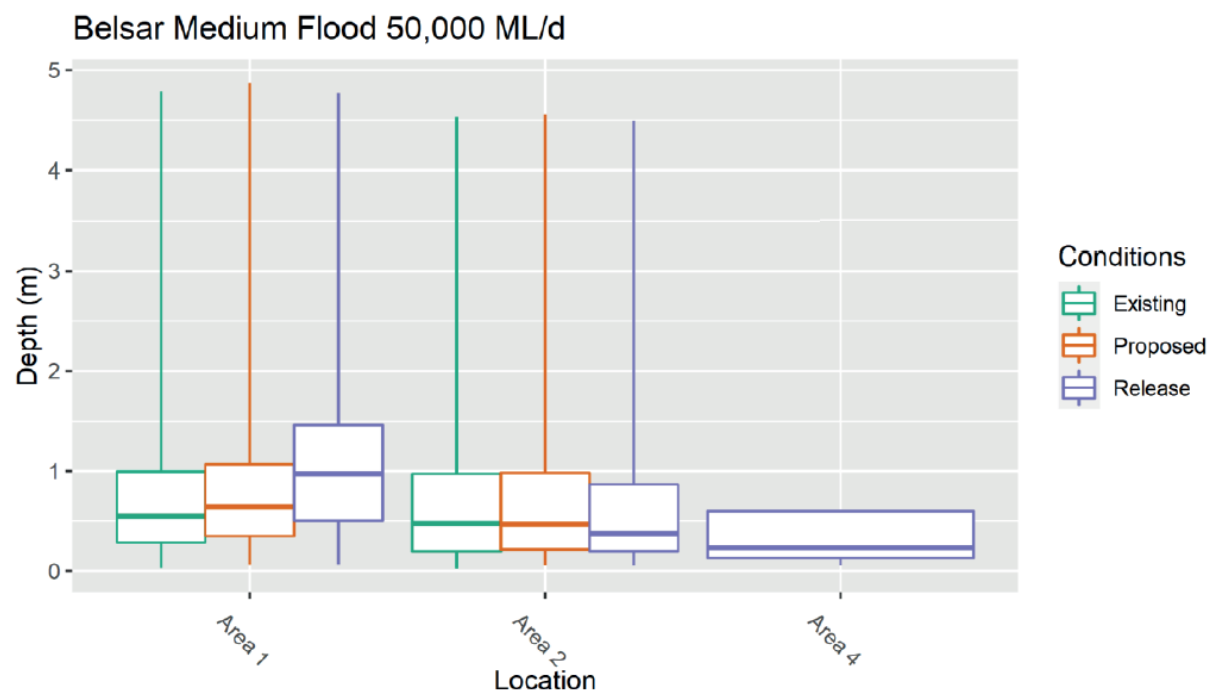
(i) What did the EES say?

Specialist Assessment C assessed the effects of the Project on floodplain hydraulics. It stated managed inundation “can result in changes in hydraulic characteristics compared to an unregulated flood event” because it “results in water being held on the floodplain at a particular level and duration through the use of infrastructure”. Potential effects include “ponding resulting in differences in inundation depth relative to an unregulated event, which exceeds vegetation tolerances”.⁷

Other effects include potential increase in velocity and shear stress within and downstream of the inundation area leading to excessive erosion. The issue of shear stress and erosion is discussed in Chapter 5.6 of this Report.

Pre-existing hydraulic models were used to compare hydraulic characteristics under current and proposed conditions. The results were presented graphically in ‘box plots’ which showed velocity, depth and bed shear stress (see example at Figure 9).⁸

Figure 9 Box plot for Belsar-Yungera medium flood scenario



Source: Specialist Assessment C, Figure B-11

⁷ Specialist Assessment C, Chapter 3.4.4.2

⁸ Box plots were presented based on summary statistics (median and 1st, 25th, 75th and 99th percentiles) for grid cells in broad reporting areas (including WMAs and ‘key locations’ based on flood size and gate operations) and were used to make comparisons between existing and proposed conditions. The hydraulic models used for the EES assessment of the Project were both combined 1-dimensional and 2-dimensional models using ‘MIKE FLOOD’ software from DHI

The modelling was peer reviewed by Dr Chris Gippel, who considered the models fit for purpose for business case development but advised a higher level of certainty might be required for the detailed design phase. Dr Gippel's recommendations for improvements to the models were not carried out prior to the completion of the EES. The EES stated the results from finer scale HEC-RAS models⁹ used in detailed design of the structures do not match the results from the floodplain models. Despite these uncertainties, the hydraulic models were considered fit for the EES assessment because maximum inundation extents were unlikely to be significantly affected and uncertainties in velocity and shear stress were likely to be similar in various scenarios. More detailed modelling of critical areas where localised issues have been identified was proposed for the detailed design stage.

(ii) The issue

The issue is whether the effects of the Project on floodplain hydraulics have been adequately quantified.

(iii) Evidence and submissions

The Victorian National Parks Association (VNPA) (S15) and Environment Victoria both submitted that the Project would cause water to pool in areas, which is different to natural flooding that recedes and disperses across the landscape, and will result in ecological changes. VNPA submitted it *"will impact the natural function of the ecosystems which the National Park protects, as well as impacting the composition of the existing native vegetation and potentially the composition of fauna that use the area"*.

Mr Frood gave evidence that artificial impoundment of water and changes to inundation depth regimes on the floodplain resulting from the Project presented a significant risk to floodplain vegetation. He submitted that *"turning floodplains into a series of irrigation bays is a risky experiment, and is likely to lead to significant changes to the vegetation, which may include ecological simplification and loss of species"* (D88). Mr Frood cited a number of examples of where *"apparently small changes to the bathymetry of wetlands"* had unexpected adverse effects including widespread tree deaths, loss of endangered plant species or Ecological Vegetation Class (EVC) displacement. He argued that *"this demonstrates the need for a highly cautious approach to these types of interventions"*.

Ms Thornton (S20) submitted:

Much of the perceived benefits being claimed are ones that are already achieved through natural and overbank inundation. Without full modelling on inundation scenario's with and without the projects implemented, it is impossible to determine the opportunity costs and risks of the projects as well as the risks of doing nothing.

Other submitters, including FoNVP and MLDRIN (D133), expressed concern about the impacts that changes in patterns of inundation could have for the natural functioning of ecosystems in the Project areas.

The Proponent (D174, para 116) submitted that *"concerns raised by (non-expert) submitters in response of "alteration of the bathymetry" of the floodplain are unfounded"*.

Dr Treadwell (D124) noted submitters' concerns that:

⁹ HEC-RAS is hydraulic modelling software from the United States Army Corps of Engineers Hydrologic Engineering Center (HEC)

- managed inundation changes how water moves across the floodplain during a flood event
- holding or ponding water on the floodplain does not replicate a natural flood event and could result in unintended ecological outcomes.

Dr Treadwell advised that the Project has potential to affect the hydraulic characteristics of inundation events, including *“ponding [that] results in differences in inundation depth relative to an unregulated event”*. He was of the view that *“residual water may be retained in depressions and wetlands and eventually would dry out”*.

Dr Treadwell’s evidence was that in the case of an unregulated event when all regulators are open, inundation extent and depth would be similar to the existing situation. Based on the EES modelling, he was of the view that during the ‘holding phase’ of a managed inundation event, depth, velocity and shear stress at Belsar-Yungera would be similar to or lower than existing, whereas at Hattah Lakes North, these hydraulic parameters would be similar to existing.

In response to questions from the Committee, Dr Treadwell advised that the assessment of hydraulic effects of the Project was based on the box plots and mapping of individual scenarios. Not all of the mapping was included in the EES. Difference maps (maps showing differences in hydraulic parameters between scenarios) were not prepared. In response to a request from the Committee the Proponent tabled *“The full suite of depth maps for natural, existing and proposed conditions”* (D164), comprising 15 maps for Belsar-Yungera showing peak flood depth for natural conditions, existing conditions, and with the proposed structures for 5 peak flow rates, but no maps for Hattah Lakes North. The Proponent also tabled some additional maps relating to velocity and shear stress at Belsar-Yungera (D164), but not for Hattah Lakes North.

In relation to the hydraulic modelling, Dr Treadwell gave evidence (D124) that flood modelling has advanced significantly since the modelling used in the EES was completed.¹⁰ More modern models would shorten run times and enable smaller grid cell sizes to be used. This would enable the hydraulic effects of the Project to be modelled in finer detail.

(iv) Discussion

The EES examined potential changes in floodplain hydraulics using box plots that aggregate data across broad areas of floodplain.

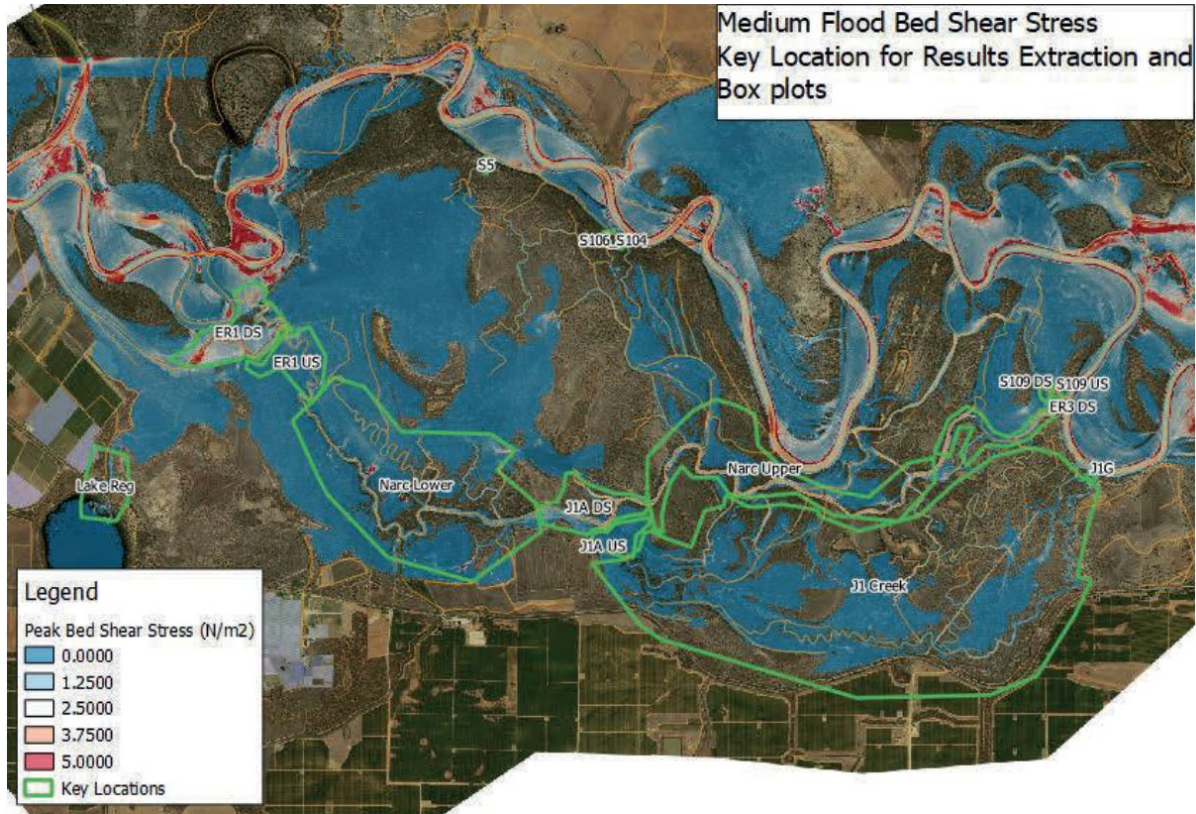
The box plots provide spatially averaged information about hydraulic effects, based on aggregated data across WMAs or ‘key locations’ which are broad areas that do not necessarily collectively cover the whole of the Project areas (for example see Figure 10). It is unclear how the box plots account for areas that are dry, specifically whether the dry areas are counted as zero depth or excluded from the data set used for the box plots. For example, the single box plot for WMA 4 in the Belsar-Yungera medium flood scenario (see Figure 9) suggests it was excluded from the data set. The box plots presented in Specialist Assessment C show varying effects depending on location and flood size.

The effects indicated by the box plots are difficult to interpret without additional information. They do not show the hydraulic effects of the Project with sufficient spatial detail to adequately inform the assessment of the Project’s ecological effects, especially in relation to floodplain

¹⁰ The EES stated the Hattah Lakes North model was originally developed in 2006 for TLM project at Hattah Lakes and updated in 2014, while the Belsar-Yungera model was developed in 2014. The scenario modelling for both Project areas was done in 2016.

vegetation. Including determining whether ponding in specific parts of the Project areas could lead to death of native vegetation by drowning as claimed by Mr Flood. This issue is discussed further in Chapter 7.2.

Figure 10 Key Locations (and names) for medium flood bed shear stress at Belsar-Yungera



Source: Specialist Assessment C, Figure B-5

The Committee recommends more detailed analysis be undertaken of the effects of the Project on floodplain hydraulics in the MIAs. The Committee recommends a new EDS SW4 which requires assessment of floodplain hydraulics and implications for floodplain vegetation prior to detailed design. The hydraulic analysis would include comparisons of maps of depth, velocity and shear stress for managed inundation events and comparable natural flood events. ‘Difference maps’, specifically maps showing the difference between managed inundation events and comparable natural flood events for each model grid cell, should be used to highlight any locations where the hydraulic parameters are changed by the Project and the magnitude of the change.

The hydraulic analysis should be undertaken prior detailed design, to provide the opportunity for any issues identified by the modelling to be addressed through design modifications if necessary. As discussed in Chapter 7.2, issues that may be identified include risks of unintended drowning of native vegetation or large trees due to excessively deep inundation. The hydraulic analysis should also be used to inform Project operations.

The EES and Dr Treadwell’s evidence drew attention to limitations of the existing MIKE FLOOD hydraulic models of the Project areas. The models should be reviewed by a suitably qualified expert to determine whether they are suitable for undertaking the analysis required by EDS SW4 and revised or updated as necessary.

Terrestrial ecology and floodplain vegetation benefits are discussed in Chapter 7.2, including additions to the recommended EDS SW4.

(v) Findings

The Committee finds:

- The EES does not adequately define the effects of the Project on floodplain hydraulics within the Project areas.
- A new EDS SW4 (Surface water – assessment of floodplain hydraulics and implications for floodplain ecology prior to detailed design) is required to determine the hydraulic effects in more detail, particularly as a basis for confirming the effects of the Project on floodplain vegetation.
- The additional assessments undertaken in relation to EDS SW4 should be used to inform the detailed design and operations.

(vi) Recommendation

The Committee recommends:

Environmental Management Framework

Include the following change:

- a) **New EDS SW4 that requires more detailed assessment of the Project's effects on floodplain hydraulics prior to detailed design, including:**
 - **mapping of key hydraulic parameters for each operating scenario, existing conditions and a natural baseline scenario**
 - **using 'difference maps' in conjunction with mapping of the key hydraulic parameters to determine the locations and magnitude of any changes.**

These changes are included at Appendix G.

5.4 Blackwater

(i) What did the EES say?

Dr Treadwell explained:

Blackwater is the term used to describe water that takes on a black appearance during flood events due to the leaching of tannins from organic material (leaves, bark, twigs etc) into the water.

...

When there is a large accumulation of organic material, low re-aeration potential and higher temperature, dissolved oxygen consumption can exceed re-aeration with a resulting decline in dissolved oxygen in the water column. Under severe cases the dissolved oxygen can decline to low levels (hypoxic) or be consumed entirely (anoxic). Hypoxic and anoxic conditions pose threats to aquatic fauna (fish, invertebrates, which includes crustaceans and molluscs) dependent on the availability of sufficient dissolved oxygen in the water column. Blackwater conditions and low dissolved oxygen conditions can occur in response to natural and managed inundation.¹¹

The EES explained there had been two recent widespread blackwater events along the Murray River in response to natural flooding that followed long dry periods (2010-2011 and 2016). There were no available water quality data for Belsar-Yungera, and there was no information about specific effects of Murray River blackwater events in this area. Within the Hattah Lakes, blackwater events had been reported during some inundation events and high nutrient conditions

¹¹ D80, pages 13 - 14

had been observed in the lakes system following inundation of the floodplain. These blackwater events had resulted in closure of some lakes to recreational activities.

While inundation and drying associated with individual events (natural and managed) may result in short-term degradation of water quality, this is a natural process and essential for floodplain function. The EES explained managed inundation provided the benefit of ‘filling the gaps’ between natural events and therefore helping mitigate more detrimental and widespread blackwater events which occur when flooding is infrequent.

Specialist Assessment C included modelling of dissolved oxygen concentration on the floodplain under a range of operating scenarios, and to evaluate potential adverse effects on the Murray River from managed drawdown. This modelling showed that:

- At Belsar-Yungera, if managed inundation is achieved by pumping with no throughflow, there is potential for prolonged and extensive declines in dissolved oxygen. However, maintaining throughflows significantly mitigates effects on dissolved oxygen for both pumped and flood capture events.
- At Hattah Lakes North, the effects of managed inundation would be similar to existing floodplain inundation, although natural inundation is likely to include throughflow, which would reduce impacts on dissolved oxygen compared to managed events that are retained on the floodplain without throughflow.
- The return flows from the Project areas generally present a low risk to water quality in the Murray River due to mixing and dilution. However, for Hattah Lakes North, in a ‘worst case’ scenario where anoxic water from TLM is returned together with anoxic water from the Project, combined with very low passing flows in the Murray River (2,000 megalitres per day rather than the usual flows of at least 5,000 megalitres per day), Chalka Creek return flows could result in a fall in the dissolved oxygen in the Murray River.¹²

Risks associated with blackwater events and low dissolved oxygen are addressed by mitigation measures outlined in EDS SW2 and monitoring in relation to blackwater events is proposed in M SW2.

While the MDBA climate change stress test for both Project areas predicts a decline in base flows under dry climate conditions, analysis shows the base flows should remain high enough for sufficient mixing and dilution of return flows on most occasions.

(ii) The issue

The issue is whether managed inundation will increase blackwater events.

(iii) Evidence and submissions

Four submitters raised concerns relating to blackwater effects. FoNVP was concerned the Project would result in increased blackwater events.

Dr Treadwell gave evidence the process of organic material decomposition is a natural ecosystem process and does not always lead to low dissolved oxygen conditions. He explained Specialist Assessment C showed the potential for low dissolved oxygen conditions to occur during managed inundations for both Project areas. Further work had been undertaken since the Specialist

¹² Specialist Assessment C, page 256

Assessment was finalised which resulted in some change to the nutrient load used in the cumulative assessment, however this had not changed the outcomes.

In summary, Dr Treadwell considered:

- more frequent inundation would enable greater decomposition and removal of organic matter which would help mitigate potential for hypoxic or anoxic blackwater during low level inundation
- in higher elevation areas with less frequent inundation organic matter may accumulate, and when these areas are inundated, blackwater is more likely to occur
- cumulative adverse effect from low dissolved oxygen would be low.

In response to the EPA's submission relating to community and stakeholder engagement activities, Dr Treadwell and the Proponent agreed to include an additional requirement in EDS SB3 for a protocol to manage community expectation regarding potential adverse effects including blackwater.

In response to issues raised by submitters relating to water quality, Dr Treadwell advised there was no modelling undertaken for areas where there was no return flow to downstream waterways. For example, in the Lake Boolca WMA, water on the floodplain will undergo natural drawdown and evaporation which may result in degradation of water quality as the area dries out, however this is considered a natural process and is not a specific risk.

(iv) Discussion

The Committee accepts Dr Treadwell's evidence relating to hypoxic blackwater effects. More frequent inundation can be expected to reduce the build-up of organic matter on the floodplain. Effects of managed inundation events on dissolved oxygen can be mitigated by maintaining throughflow whenever possible, as required by EDS SW2. Even if blackwater were to be discharged to the Murray River, its effects would generally be rapidly mitigated by mixing and dilution. Cumulative adverse effects from low dissolved oxygen should be low and within the range experienced under existing conditions.

The EDS addresses the specific effects through appropriate planning and operation, for example using through flow to maintain suitable dissolved oxygen conditions, such that residual effects would be low. The Committee recommends EDS SW2 expand on and clarify a number of the measures relating to project operations to avoid and minimise blackwater events.

The EMF requirements to monitor water quality values during operations are adequate to manage impacts from blackwater events.

The Committee supports the proposed additional point in EDS SB3 recommended by the EPA and supported by the Proponent to ensure adequate and appropriate communication with stakeholders. This included in the recommended EDS at Appendix G.

The effects of blackwater on aquatic ecology are discussed in Chapter 8.6.

(v) Findings

The Committee finds:

- The effects of managed inundation on blackwater have been adequately assessed.
- It is appropriate to require a protocol to manage community expectation regarding blackwater events.

- The adverse effects relating to blackwater effects can be acceptably managed with application of the Committee recommended EDS.

(vi) Recommendation

The Committee recommends:

Environmental Management Framework

Include the following change:

- a) **Revised EDS SW2 in relation to the timing of inundation events to reduce the risk of hypoxic or anoxic blackwater events.**

This change is included at Appendix G.

5.5 Waterway salinity

(i) What did the EES say?

The EES described the salinity modelling undertaken as part of the water quality assessment. Data to inform the assessment was from Specialist Assessment D Groundwater and from routine water quality and flow monitoring. The EES stated:

The salinity concentration in the receiving waterways was calculated from the predicted salt load discharged to waterways relative to the passing salt load and converted to a concentration. Depending on the project area, salinity load and concentration were determined for floodplain waterways and the Murray River, or just the Murray River.

The EES explained that increased waterway salinity may result from:

- rising groundwater levels
- discharge of water to the Murray River and at Belsar-Yungera to Narcooyia Creek and at Hattah Lakes North to Chalka Creek
- salt wash off from the floodplain.

In areas where groundwater is saline there is potential for increase in salinity concentration of receiving waters as groundwater discharges back to the waterway following inundation.

The salt load of the Murray River is expected to increase as a result of the Project. Increases of 64 tonnes per day from Belsar-Yungera and 14 tonnes per day from Hattah Lakes North were estimated for a 'seasonal fresh and large events' scenario.¹³

The residual risk rating of potential changes to water quality (such as water salinity) was assessed as low, with application of the following EDS:

- SW2 – Surface water management - operation
- SW3 – Surface water - monitoring
- E4a/E4b – Overall biodiversity improvement
- CM3 – Contaminated land duties
- GW2 – Operational groundwater management.

Specialist Assessment C explained that potential adverse effects associated with saline soils had been considered through Specialist Assessment E. It stated:

¹³ EES Chapter 10, Table 10.13, and Specialist Assessment D, Table 11.1

Although soils in the inundation area are typically saline, adverse effects from soils during operational managed events were considered unlikely.

However, Specialist Assessment E focused on saline soils primarily from the viewpoint of erosion and land stability, rather than in relation to possible salinisation of surface water. It concluded that potential adverse effects of saline soils in relation to erosion and land stability would be mitigated by implementing EDS GS1 and GS2 in relation to Project design and construction.

Regarding cumulative effects, if all of the VMFRP sites were inundated to the maximum extent and with drawdown occurring at the same time, the salt load for all sites could increase salinity in the Murray River by up to 10 per cent at the South Australian border. However:

- this scenario is unlikely and actual salt load increase in any one year would be much less than 10 per cent
- even if a 10 per cent salt load did occur, the concentration would be well below critical thresholds for protecting environmental values
- any increase in salinity is accountable under the Basin Salinity Management 2030 (BSM2030) framework.

(ii) The issue

The issue is whether the effects of waterway salinity in the Project areas and the Murray River downstream of the Project areas are acceptable.

(iii) Evidence and submissions

FoNVP submitted it was concerned about the potential for increased salinity.

Dr Treadwell explained how the process of inundation can result in increased salinity in waterways. He gave evidence:

- Inundation has the potential to increase groundwater levels which, on drawdown, may result in the discharge of groundwater to receiving waterways.
- Specialist Assessment C used the results of Specialist Assessment D to determine the change in salinity of surface waters resulting from managed inundation.
- The predicted salinity increase following an inundation event is less than 10 milligrams per litre at Belsar-Yungera and less than 3 milligrams per litre at Hattah Lakes North relative to background salinity in the Murray River of 100 – 200 milligrams per litre.
- This is modelled at conservative river flow of 7,500 mega litres per day and higher flows would result in proportionally lower salinity.
- The further work undertaken since Specialist Assessment D was finalised resulted in some change to the salt load, but did not alter the cumulative assessment outcome (D78 para 41 and D80, Table 2).

During cross examination Dr Treadwell advised the theoretical impacts of salinity were minor relative to benefits, and salinity credits had not been relied on. He concluded salinity would not exceed critical thresholds and:

... even under maximum inundation extent and low river flows the increase would not exceed water quality objectives for the protection of environmental values at a single site or cumulatively across all sites and would result in low level of effect.

In response to the RFI, Mr Hoxley gave groundwater evidence that the forecast average salt load from all VMFRP projects is considered to have negligible risk to river health, riparian vegetation and downstream values. Further:

- it is unlikely that the maximum managed inundation area will be used in all areas at the same time
- the maximum cumulative effect of all projects discharging salt load into the Murray River at one time has a very low likelihood of occurring.

During cross examination, Mr Hoxley confirmed DEECA had advised salinity credits were available if required.

(iv) Discussion

Water flows during managed inundations would be ‘fresh water’ from the Murray River that would introduce a relatively low level salt load to the Project areas. The concentration of salt would vary depending on actual flows and would be managed to minimise the salinity of the water.

The Committee accepts the evidence of Mr Hoxley and Dr Treadwell that the average salt load from all VMFRP projects is predicted to result in a small increase, compared to the mass of salt that is currently flowing in the Murray River during average flows, and is likely to have a negligible risk to river health, riparian vegetation, and downstream values.

It is appropriate to closely monitor salinity in accordance with the Operation Environmental Management Plan (OEMP) and as required by EDS SW3. The requirements of EDS SW3 are considered adequate on the basis the proposed monitoring regime M SW2 requirements and parameters are implemented.

The BSM2030 establishes a framework for trading of salinity credits as part of a salinity register. Specialist Assessment C states:

Discharge of saline groundwater may marginally increase the salinity of the water in the Murray River and may require acceptance under the Murray-Darling Basin Salinity Management Strategy.

The Committee accepts the evidence of Mr Hoxley that salinity credits exist if they are required.

Salinity as it relates to groundwater, trees and soil is discussed in Chapters 6, 7 and 9 of this Report.

(v) Findings

The Committee finds the effects of waterway salinity have been appropriately assessed and are acceptable with application of the recommended EDS.

5.6 Shear stress and erosion

(i) What did the EES say?

Specialist Assessment C presented an assessment of potential geomorphic effects of the Project based on inundation hydraulics including shear stress (based on the MIKE FLOOD hydraulic models discussed in Section 5.3, which operate on a daily timestep). The potential for erosion under managed flow events is expected to be similar to existing conditions in most parts of the Project areas.

The main erosion risks are expected to occur during the opening and releasing phases of managed inundation events, particularly downstream of regulators. The geomorphic assessment for Belsar-Yungera showed medium erosion risk at regulators ER1 and S109 and in Narcooyia Creek

downstream of regulator ER1. The geomorphic assessment for Hattah Lakes North showed medium to high potential erosion risk in Chalka Creek in the vicinity of the regulator and extending downstream from the regulator to the Murray River.

The EES outlined a number of limitations to the assessment of shear stress and erosion risk, which it proposed would be addressed through EDS GS1, GS3 and SW2 and the detailed design process.

(ii) The issue

The issue is whether the effects of the Project on shear stress and erosion risk are acceptable.

(iii) Evidence and submissions

Dr Treadwell gave evidence the modelling of the inundation patterns was used to identify locations for proposed infrastructure to “*enable a natural flood event to pass across the floodplain in a way that is hydrologically similar to current conditions*”.¹⁴ The Project is designed to allow natural water flow to be maintained outside the MIA during an unregulated event.

Dr Treadwell explained that during releases from the MIAs:

- for Belsar-Yungera, there is elevated shear stress potential downstream of proposed regulator ER1, along Narcooyia Creek and Bonyaricall Creek
- for Hattah Lakes North, areas of elevated shear stress are modelled to occur downstream of regulator K10, along Chalka Creek.

Dr Treadwell was of the view impacts can be managed by controlling regulator release rates and ensuring appropriate design and downstream scour protection. He concluded for both Project areas the mitigation measures in EDS GS1, SW2 and GS3 were appropriate to avoid or minimise high shear stresses.

In response to questions from the Committee, Dr Treadwell (D164) clarified that regulator ER1 discharges into the backwater of the Euston Weir pool, which would mitigate effects on shear stress, providing the weir pool is at the normal operating level. However, if the weir pool level is below normal operating level, releases from regulator ER1 may need to be adjusted on the basis of operating rules included in the Operating Plan.

Dr Treadwell (D164) provided further information about erosion risks in Chalka Creek downstream of the K10 regulator. He reported that:

Observations by the Mallee CMA staff from existing TLM watering at Hattah Lakes shows that release rates from the Oateys Regulator can be manipulated to avoid high velocity and shear stress downstream of the regulator...

Advice from the Project hydraulic modeller, geomorphologist and regulator designer is that flow conditions downstream of K10 regulator would be similar to those that are experienced during releases from the existing Oateys Regulator during unregulated flood flows and managed releases during Hattah Lakes TLM watering events.

... It is expected that release conditions from the K10 regulator would be the same as releases from Oateys Regulator and that there would be no additional erosion risks relative to existing conditions during Hattah TLM managed releases.

In response to the Committee’s RFI (D99), the Proponent explained that erosion control works, such as rock protection, will be installed to prevent scour and undercutting at structures, consistent with the approach generally adopted for similar infrastructure.

¹⁴ Dr Treadwell Expert Witness Statement, page 10

In its Part C submission, the Proponent submitted:

- erosion risks are accounted for in the context of project design and in future management
- erosion is appropriately addressed in the EDS.

(iv) Discussion

The Committee understands the Project will lead to increased risks of erosion resulting from increases in flow velocity and shear stress in the vicinity of regulators and in Narcooyia Creek, Bonyaricall Creek and Chalka Creek downstream of the Project areas.

Dr Treadwell gave evidence that erosion risks associated with elevated velocity and shear stress would be addressed in detailed design. EDS GS1 should be amended to confirm this by requiring the design have regard to hydraulic effects of the Project, and to minimise the potential for erosion.

EDS SW2 requires operational releases be managed to address a range of issues in addition to channel stability, including carp reduction, minimisation of native fish strandings and mitigation of blackwater event risks. Consideration of hydraulic effects of the Projects in relation to EDS GS1 should take into account the effects of the operational objectives specified in EDS SW2 on water releases. The operational releases required to address the other objectives may result in shear stresses exceeding thresholds for downstream channel stability. The Committee recommended EDS includes this requirement.

The EES showed that elevated shear stress in Chalka Creek downstream of the K10 regulator is not confined to the immediate vicinity of the K10 regulator, but extends from the K10 regulator to the Murray River.¹⁵ The EES states that this impact will be mitigated by controlling the flow rate of operational releases but does not include any modelling to demonstrate that the expected reduction in shear stress can be achieved given likely differences in tailwater¹⁶ support between natural floods and managed inundation events.

The Committee notes Dr Treadwell's advice (D164) that, based on anecdotal information from Mallee CMA, erosion risks at Oateys regulator have been successfully managed by manipulation of releases. Based on the limited information presented, the Committee is not convinced that this can necessarily be extrapolated to the K10 regulator, as suggested by Dr Treadwell. Further assessment needs to be undertaken to determine whether erosion risks in Chalka Creek at and downstream of the K10 regulator can be resolved through operating strategies, or whether design modifications are required.

Given that the elevated risk of erosion due to hydraulic changes is not confined to the structures but extends along the downstream waterways, monitoring of erosion risk should also be extended to these areas, to enable timely implementation of adaptive management and other remedial measures as necessary. The Committee recommends that EDS GS3 and M GSC1 be amended to require this.

The hydraulic assessment of erosion risks in the EES was constrained by limitations in the hydraulic modelling, including general limitations and likely understatement of shear stress. The model uses a daily timestep but the highest shear stress during the release phase is likely to occur within the

¹⁵ Specialist Assessment C, Figure 10.8

¹⁶ Tailwater is the water located downstream of a structure

first 24 hours, prior to the first recorded timestep.¹⁷ As discussed in see Chapter 5.3, the EES assessment for Belsar-Yungera relied on box plots that aggregated hydraulic data over broad areas. The EES assessment for Hattah Lakes North used box plots but also presented shear stress mapping along Chalka Creek, which provides more detailed information about the effects of the Project on shear stress.

In view of the coarse spatial resolution of the box plots, the results of the EES assessment of erosion potential should be confirmed using the velocity and shear stress mapping required by EDS SW4. The Committee recommends EDS GS1 be amended to require this be done as part of the Project design.

The Committee notes Dr Treadwell's advice that elevated shear stress associated with releases from the ER1 regulator into Narcooyia Creek are mitigated by tailwater support from the Euston Weir pool. It accepts Dr Treadwell's advice that the operating rules for the ER1 regulator should include provision for releases from the ER1 regulator to be adjusted based on the water level in the Euston Weir Pool. The Committee recommends EDS SW2 be modified to reflect this.

EDS SW2 relies on management of operational releases to mitigate elevated shear stress and thereby reduce erosion risks. Operational release strategies are also relied on to address other issues and risks, including blackwater, carp and fish stranding.

The EES has not assessed the feasibility of developing an operational release strategy that satisfactorily addresses all these objectives. The implications of all the requirements in EDS SW2 in relation to operational releases should be considered when undertaking the hydraulic assessments for the Project design, to ensure that opportunities for addressing risks associated with shear stress and erosion through the design process are maximised. This should be noted in EDS GS1.

The Committee also recommends that 'waterways' should be added to the requirement in EDS E1 relating to require footprint and soil disturbance be considered during detailed design and construction planning.

(v) Findings

The Committee finds:

- The Projects will increase erosion risks in Narcooyia Creek, Bonyaricall Creek and Chalka Creek downstream of the Project areas.
- These risks can be acceptably managed with application of the Committee recommended EDS.

(vi) Recommendations

The Committee recommends:

Environmental Management Framework

Include the following changes:

a) Revised EDS GS1 that requires:

- **project design to have regard to hydraulic effects to minimise erosion potential, and with consideration of the operational objectives in EDS SW2**

¹⁷ Specialist Assessment C, pages 422 and 445

- **confirmation of erosion potential based on the velocity and shear stress mapping required by EDS SW4.**
- b) **Revised EDS GS3 that requires monitoring of bank and bed erosion to inform adaptive management.**
- c) **Revised monitoring requirement M GSC1 that includes specific areas for monitoring along waterways.**
- d) **Revised EDS SW2 that includes a requirement for operating rules for regulator ER1 to have regard to water levels in Euston Weir pool.**
- e) **Revised EDS E1 to require footprint and soil disturbance also be considered near waterways.**

This change is included at Appendix G.

5.7 Hydrologic benefits of the Project

(i) What did the EES say?

Regulation of the Murray River has substantially reduced the frequency and duration of overbank floodings in the Project areas.

The Project would enable greater control over the timing, frequency and duration of inundation events within the MIAs. Hydrological modelling was used to demonstrate that the Project could increase the frequency and duration of inundation, bringing it closer to the pre-development inundation regime within the MIAs.

Datasets for hydrological modelling of climate change scenarios are expected to be developed by the CSIRO¹⁸ but were not available for the preparation of the EES. However, stress testing by the MDBA identified that more frequent managed inundation events are likely to be required to meet ecological objectives. The Project is expected to increase resilience to climate change by enabling and enhancing floodplain inundation if there are further reductions in river flows.

(ii) The issue

The issue is whether the Project will have beneficial effects on floodplain hydrology.

(iii) Evidence and submissions

The Proponent submitted the natural flow regime of the Murray River was characterised by almost annual flooding, and the frequency and duration of flooding has been greatly reduced since the mid 1930's (D116). It submitted the Project was designed to provide a high degree of operational flexibility in regard to environmental watering of the floodplains in the MIAs (D92).

A number of different operating scenarios had been modelled to assess the effects of the Project on floodplain inundation frequency and duration for different sizes of managed inundation events. These assessments showed the Project could be used to provide inundation frequencies and durations that were in most instances similar to pre-regulation.

Dr Treadwell gave evidence that prior to river regulation, the floodplains in the Project areas would have been inundated in most years while higher areas would have been inundated less frequently. Water resource development and river regulation have led to reductions in the frequency and

¹⁸ Commonwealth Scientific and Industrial Research Organisation

duration of flows in the Murray River that exceed inundation thresholds for the Project areas. He explained how the Project would use flood capture to extend the duration of natural inundation events as well as pumped events to increase inundation frequency and duration.

Dr Treadwell advised that stress testing by the MDBA showed that climate change is likely to further reduce the frequency and duration of overbank flows, resulting in managed events being required more often.

Peter Kelly (S12) submitted the Project is *“essential to be able to provide adequate frequency of flow for a landscape dehydrated through historical management”*.

Several submitters were concerned the EES failed to properly account for climate change, and therefore may not achieve the expected benefits.

(iv) Discussion

The Committee accepts the frequency and duration of floodplain inundation in the Project areas has been greatly reduced as a result of water resource development and river regulation. The Project has been designed to provide operational flexibility but is capable of increasing the frequency and duration of a range of inundation events similar to the pre-regulation inundation regime.

As a preliminary issue, the Committee has accepted the Project is likely to increase resilience to climate change (see Chapter 4(vii)). Notwithstanding the lack of hydrological modelling of climate change scenarios, is expected that the operational flexibility provided by the Project would be beneficial for floodplain resilience, particularly in a drying climate.

(v) Findings

The Committee finds the Project is expected to have benefits for floodplain hydrology in the MIAs in terms of inundation frequency and duration.

5.8 Ramsar sites

(i) What did the EES say?

The EES noted there are no Ramsar wetlands within or adjacent to the Belsar-Yungera project area, however, there are several Ramsar sites downstream, including Hattah Lakes (approximately 100 kilometres downstream), Riverland (over 500 kilometres downstream) and Banrock Station (over 700 kilometres downstream). The EES concluded the Project would not impact these sites.

The EES noted there are no Ramsar wetlands within the Hattah Lakes North project area, however twelve of the lakes within the broader Hattah Lakes complex are part of the Hattah-Kulkyne Lakes Ramsar site. The EES concluded there would be no change in water quality of the Hattah-Kulkyne Lakes Ramsar site as surface water flows would not be significantly changed and the Hattah Lakes North project would not involve any discharge of water from managed events to the Ramsar site.

(ii) The issue

The issue is whether surface water impacts on Ramsar sites have been appropriately assessed.

(iii) Evidence and submissions

Several submitters raised concerns about the potential impact on Ramsar sites.

Dr Treadwell gave evidence:

- the Hattah-Kulkyne Lakes Ramsar site is the closest Ramsar site to the Project
- the Hattah-Kulkyne Lakes Ramsar site is located within the Hattah-Kulkyne National Park, and is upstream of the Hattah Lakes North project area
- none of the Ramsar site lakes are located within the construction footprint or the proposed MIA of the Hattah Lakes North Project
- the lakes of the Hattah-Kulkyne Lakes Ramsar site currently receive managed inundation as part of TLM.

Dr Treadwell explained there would be no effect on the water regime or water quality of the Ramsar site:

- the Project would not alter the way water is delivered to the Ramsar site
- there are no changes to existing infrastructure that delivers water to the Ramsar site
- planning and delivery of the Project and TLM would be coordinated, with the needs of the Ramsar site prioritised in accordance with current environmental water planning and delivery procedures
- delivery of water to the Project would not alter the preferred timing, frequency and duration of inundation of the Ramsar site.

Dr Treadwell explained that Specialist Assessment C considered the potential for effects on Ramsar sites downstream of the Project areas. These sites are greater than 400 kilometres downstream of the Hattah Lakes North Project area. He stated:

The environmental water planning and delivery processes will consider the environmental water requirements for all sites and prioritise sites based on conservation significance. In that context, Ramsar sites would be considered a priority for environmental watering and river operations would need to be undertaken in a way to avoid detrimental impact to those sites. Decisions about future river operations would be made by environmental water managers, environmental water holders and the MDBA.

The Proponent's TN06 provided a cumulative assessment of MNES, including Ramsar sites. The cumulative adverse effects relating to the Hattah-Kulkyne Lakes Ramsar site is pest species, specifically carp. This issue of carp is discussed in Chapter 8.4 of this Report.

(iv) Discussion

The Committee accepts Dr Treadwell's evidence there would be no effect on the water regime or water quality of the Hattah-Kulkyne Lakes Ramsar site. Further, future decisions about the planning and delivery of environmental water will consider and prioritise water allocation to Ramsar sites. The Project has avoided Ramsar sites, and the Committee considers potential surface water adverse effects on Ramsar sites are acceptable.

(v) Findings

The Committee finds impacts of surface water effects on Ramsar sites have been adequately assessed.

5.9 Overall conclusions on surface water effects

There are no surface water impacts that preclude the Project being approved or the evaluation objectives being achieved. The EDS should, however, be amended to ensure surface water impacts are appropriately managed and minimised

6 Groundwater

6.1 Introduction

The relevant Scoping Requirements evaluation objective is:

Avoid and, where avoidance is not possible, minimise adverse effects on water quality, hydrology, hydrogeology and beneficial water uses (including for the Ramsar listed wetlands).

Groundwater is discussed in:

- EES report chapters 10.2 and 15.2
- Specialist Assessment D Groundwater.

The exhibited EMF includes the following EDS:

- GW1 Construction groundwater management
- GW2 Operational groundwater management.

In response to the Committee's RFI and other issues raised at the Hearing, the Proponent provided the following Technical Notes:

- TN10 Questions taken on notice – groundwater (D140).

Additionally, the Committee had regard to:

- relevant submissions and evidence
- BSM2030 (D62)
- the Proponent's RFI response dated 23 December 2022 (D99)
- the Proponent's Final Day EDS (D177).

Table 2 lists the groundwater evidence.

Table 2 Groundwater evidence

Party	Expert	Firm	Area of expertise
Proponent	Greg Hoxley	Jacobs	Groundwater

6.2 Groundwater effects

(i) What did the EES say

The methodology for groundwater was explained in the EES and included consideration of:

- groundwater values
- quantification of construction effects
- quantification of changes in groundwater levels
- climate change impacts
- an assessment of alternatives.

The Project is expected to result in increased groundwater recharge, initially raising groundwater around the MIA before being used by deep rooted vegetation or discharged back to the Murray River. The process is the same for natural and managed inundation events.

Based on the maximum inundation scenario, the groundwater level is predicted to increase by up to one metre across the MIA and adjacent to the floodplain for both Project areas.

A beneficial effect for both Project areas is increased water availability for water-dependent deep-rooted vegetation (by adding fresher water to groundwater and raising groundwater levels).

EDS GW1 requires the Construction Environment Management Plan (CEMP) to include measures to manage groundwater impacts in accordance with the *Environment Protection Act 2017* (EP Act) requirements. EDS GW2 requires the OEMP to provide for monitoring and minimisation of the risk of salinity in accordance with the Mallee CMA's salinity management program that complies with the BSM2030 or successor.

The potential residual effects for both Project areas during operation are of low significance and include:

- Effects on surface water values resulting from an increase in saline groundwater return flow accompanied by an increase in salt load to the Murray River and:
 - Narcooyia Creek for Belsar-Yungera
 - Chalka Creek north for Hattah Lakes North.

The salinity effects will need to be accounted for under the Murray Darling Basin Salinity Management 2030 Strategy (BSM2030).

Effects on land and soils in localised areas due to intermittent shallow groundwater levels.

For Belsar-Yungera, there is potential for a low significance residual adverse effect on water dependent vegetation during construction due to localised groundwater drawdown in the vicinity of the ER1 regulator and fishway structure.

For Hattah Lakes North there are no residual adverse effects during construction as no construction dewatering is anticipated and groundwater would not be affected.

(ii) The issues

The issues are whether:

- the EES has appropriately assessed groundwater effects and satisfies the relevant evaluation objective
- groundwater monitoring requirements are appropriate.

(iii) Evidence and submissions

The Proponent relied on the evidence of Mr Hoxley. His evidence was that effects for operations include:

- a small change in groundwater level, with a rise across the alluvial aquifer underlying the floodplain (this effect is restricted to the floodplain because of the nature of the aquifers in the area)
- a beneficial effect of increased evapotranspiration resulting from more water use by trees correlating with tree growth and improved health
- a minor detrimental effect of increased groundwater, with higher salt load, flowing to the waterways
- some areas within the floodplain developing shallow groundwater level, predominantly in the months following an inundation
- groundwater quality is not expected to be affected as no groundwater process that could affect water quality has been identified.

Regarding groundwater effects during construction, Mr Hoxley explained:

- for Belsar-Yungera, the effects are temporary and of limited extent
- for Hattah Lakes North, effects are insignificant as no structures are expected to intersect groundwater and there is negligible risk to groundwater values.

Mr Hoxley advised he had undertaken further work to analyse cumulative effects of all nine VMFRP projects, which had not changed his opinion expressed in Specialist Assessment D.

Mr Hoxley was of the view the exhibited EDS GW1 and GW2 were appropriate and would ensure environmental effects of the Project would be suitably managed to achieve acceptable outcomes with regard to groundwater effects. He noted the monitoring and review requirements recommended in Specialist Assessment D are included in the monitoring register in the EMF, specifically MGW1, MGW2 and MGW3.

In response to the Committee's RFI, Mr Hoxley explained:

- potential contingency measures available to minimise increased salinity risk from elevated groundwater levels
- how contingency measures may be applied if groundwater is found to be adversely affected by managed inundation (noting groundwater has a low risk of being affected by operations)
- the cumulative assessment of salt load for all VMFRP projects indicates the increase is considered to present a negligible risk to river health, riparian vegetation and downstream values.

Fiona and Phil Murdoch raised various groundwater related issues in relation to their property Raakajlim. In response, Mr Hoxley explained:

- with reference to Figure 10-23 of Specialist Assessment D, groundwater in the indicated low elevation land that will be subject to inundation is likely to rise and fall as a result of inundation events
- the closest observation bore is just to the south-west of the property and on the edge of the MIA
- increased soil salinity risk may occur if groundwater levels become shallow for extended periods of time
- the length of time that a water table must be shallow for adverse effects to appear is variable and depends on a complex relationship between soil texture, groundwater salinity and weather
- slight rises in groundwater over time are likely to be the effect of recharge from surrounding irrigation
- ongoing monitoring including from the existing closest and nearby bores should provide a suitable baseline for ongoing assessment of groundwater response to managed inundation.

At the Hearing, Fiona and Phil Murdoch indicated they were comfortable with Mr Hoxley's support for EDS GW2 and his evidence that *"the area adjoining Raakajlim would be monitored for the development of elevated groundwater table impacting native vegetation"*.

In closing, the Proponent submitted:

- groundwater evidence concluded the risk of groundwater salinity is a negligible risk
- the proposed EDS and monitoring requirements establish a suitable framework for identification and mitigation of such impacts, in the unlikely event that they arise.

(iv) Discussion

The Committee is satisfied the modelling of groundwater is appropriate and potential effects have been adequately considered, including the cumulative effects of all VMFRP projects.

The Committee accepts the evidence of Mr Hoxley that effects of the Project on groundwater salinity effects are negligible and the EMF as exhibited is suitable for managing any impacts.

Salinity, as it relates to risks for large trees and native vegetation, is discussed in Chapter 7 of this Report.

The Committee notes that the locations of existing monitoring bores, and the proposed additional infrastructure monitoring sites, are generally external to the proposed MIAs (save for Bore 7853). The existing bores are predominantly nearer the Murray River (where salinity levels are expected to be lower than sites to the south of the MIAs).

EMF monitoring requirement M TE9 requires the condition of river red-gum and black box trees be monitored every three years in areas susceptible to rising saline groundwater associated with environmental watering. The Committee considers the three-yearly monitoring of tree condition should be accompanied by more frequent monitoring of groundwater levels and salinity in the same area as the tree monitoring, to provide a leading indicator of increased risk to the trees from rising saline groundwater. If large trees were to succumb to increased salinity in a higher water table, the damage may be irreparable in the longer term.

The Committee recommends additional groundwater monitoring sites across the floodplain including within and possibly also to the north and west of the Project area (that is, downgradient of the MIAs), based on the following criteria:

- sites at the locations where threatened flora and large trees have been identified as being at risk from rising groundwater and increasing salinity, and where tree health will be monitored
- sites in areas where there is relatively shallow groundwater with high salinity.

Data obtained would provide early indications of the risk, applying the guidelines as described by Mr Hoxley.¹⁹ The implementation of the adaptive management actions should be regarded as preventative, rather than as mitigation after the event.

The groundwater monitoring sites at the locations where tree health will be monitored will also assist in the interpretation of tree health monitoring data, to determine whether trends in tree health reflect changes in groundwater levels and salinity, or other pressures.

EDS GW2, which requires the OEMP provide for monitoring of groundwater and salinity, is appropriate subject to new requirements for:

- groundwater monitoring including wells or bores within the Project areas, including parts of each Project area that are expected to be the most sensitive to groundwater rise or salinity increase, with sufficient monitoring wells or bores within each WMA to adequately detect and interpret any changes in water levels and salinity
- reviewing operations if increasing salinity is identified.

The recommendations regarding new monitoring sites are included in the Committee recommended monitoring requirements at Appendix G.

¹⁹ D78, paragraph 5.3(i)

(v) Findings

The Committee finds:

- The EES has appropriately assessed groundwater effects and satisfies the relevant evaluation objective.
- More frequent monitoring of groundwater levels and salinity should occur in the same area as the tree monitoring, to provide a leading indicator of increased risk to the trees from rising saline groundwater.
- The proposed EDS are appropriate and monitoring requirements M GW1 and M GW2 are satisfactory, subject to the additional requirements recommended by the Committee.

(vi) Recommendations

The Committee recommends:

Environmental Management Framework

Include the following changes:

- a) Revised EDS GW2 to require groundwater monitoring including wells or bores within the Project areas, with a sufficient number to detect and interpret changes to water levels and salinity, and review of operations if increasing salinity is identified.**
- b) Revised monitoring requirement M GW1 that requires new groundwater monitoring sites to monitor changes to groundwater depth and elevation.**
- c) Revised monitoring requirement M GW2 that requires new groundwater monitoring sites to monitor changes to groundwater quality (specifically salinity).**

These changes are included at Appendix G.

6.3 Overall conclusions on groundwater effects

There are no groundwater impacts that preclude the Project being approved or the evaluation objectives being achieved. The EDS should, however, be amended to ensure groundwater impacts are appropriately managed and minimised.

7 Terrestrial ecology

7.1 Introduction

The relevant Scoping Requirements primary evaluation objectives are:

Implement environmental watering of floodplains to enhance ecosystem function, biodiversity (particularly listed threatened species and communities), water quality, and cultural values.

Avoid, and where avoidance is not possible, minimise potential adverse effects on native vegetation, species of flora and fauna (particularly listed threatened species and their habitat and listed ecological communities), as well as address offset requirements (if required) consistent with state and Commonwealth policies.

Relevant secondary evaluation objectives are:

Avoid, or minimise where avoidance is not possible, adverse effects on Aboriginal and historic cultural heritage values.

Minimise potential adverse social, economic, amenity and land/waterway use effects, including impacts on existing infrastructure and open space.

Terrestrial ecology is discussed in:

- EES report chapters 9.1 and 14.1
- EES Attachment VII EES Project Development
- EES Attachment V Belsar-Yungera AOIB
- EES Attachment VI Hattah Lakes North AOIB
- Specialist Assessment B Ecology - Terrestrial.

The exhibited EMF included the following EDS:

- E1 Native vegetation and habitat design minimisation
- E2a Construction biodiversity administrative processes
- E2b Construction vegetation management
- E2c Construction fauna management
- E2d Construction weed and pest management
- E2e Construction rehabilitation management
- E2g Site specific additional measures
- E3 Pest Plant and Animal Monitoring and Management Plan
- E4a Overall biodiversity improvement – Belsar-Yungera
- E4b Overall biodiversity improvement – Hattah Lakes North.

In response to the Committee's RFI and other issues raised at the Hearing, the Proponent provided the following Technical Notes and reports:

- *Expert elicitation of tolerable and optimal watering regimes for Murray River floodplain vegetation*, Arthur Rylah Institute of Environmental Research, December 2022 (D73) (expert elicitation)
- TN01 Expert Elicitation Report (D74)
- TN02 *Ogyris subterrestris* surveys (D101)
- TN03 Implications of the Expert Elicitation Report on the EES Central Package, with attachment report *Hydrological Analysis of Ecological Vegetation Classes in relation to Expert Opinion – Belsar-Yungera Floodplain*, Ecological Associates, January 2022 (D108) (Hydrological Analysis of EVCs for Belsar-Yungera)

- TN04 Corrected Table 6 to Attachment V to the EES (D111)
- TN08 Terrestrialisation (D138)
- TN13 Questions taken on notice – terrestrial ecology and bushfire (D171)
- TN16 Table 6.8 of Chapter 6 of the EES (D189).

Additionally, the Committee had regard to:

- the Proponent’s RFI response dated 23 December 2022 (D99)
- the Proponent’s Part C submission (D174)
- Attachment to the Proponent’s Part C submission – Victorian native vegetation policy (D172)
- Presentation of the Assessment of overall improvements for Biodiversity (D179).

Table 3 lists the terrestrial ecology evidence.

Table 3 Terrestrial ecology evidence

Party	Expert	Firm	Area of expertise
Proponent	Zoe Jellie	GHD	Flora
Proponent	Alex Homes	GHD	Fauna
Mallee Conservation	Fiona Murdoch	n/a	Arid bronzed azure butterfly (also known as the Mildura Ogyris butterfly)
Douglas Frood	Douglas Frood	Pathways Bushland and Environment	Flora

7.2 Floodplain ecology benefits (operation)

(i) Background and context – the expert elicitation report

The Committee’s ToR require it to report and make recommendations on whether the Project is expected to result in an overall improvement to the biodiversity values of floodplain ecosystems.

A Guide to water regime, salinity ranges and bioregional conservation status of Victorian wetland Ecological Vegetation Classes (Frood and Papas, Arthur Rylah Institute for Environmental Research, 2016) (D29) was a key technical guidance document used to inform the likely responses of EVCs to environmental watering in Specialist Assessment B and Attachments V and VI of the EES. It presents water regime and salinity ranges for wetland EVCs in Victoria. The water regime information includes frequency of inundation, maximum range of duration of waterlogging and inundation and maximum depth.

EES Attachments V and VI state the AOIB is based on conservative assumptions, such as excluding benefits on private land. Further:

While conservative, as with any ecological assessment there is uncertainty, and further expert elicitation is being undertaken on tolerable and optimal ranges for water regimes for selected Ecological Vegetation Classes relevant to VMFRP. The results will inform the assessment of overall biodiversity improvement for consideration as part of the conservation

work exemption through the Planning Scheme Amendment process, and be provided to the VMFRP Standing Inquiry and Advisory Committee.²⁰

The purpose of the expert elicitation report was to “*elicit expert judgements regarding appropriate water regimes, specifically tolerable and optimal ranges for inundation frequency (events per 10 years) and duration (days in a year) for selected flood dependent EVCs that occur within the nine floodplains relevant to the VMFRP*”.²¹

The Committee directed the Proponent to:

- provide the expert elicitation report to the Committee and all parties to the Hearing
- prepare and provide a response on the implications of the expert elicitation report on EES Central.²²

The Proponent tabled the expert elicitation report (D73) and TN01 (D74), which explained the key findings of the expert elicitation and how the Proponent intended to provide a response on its implications for the Project. TN01 noted:

- a) The outcomes of the expert elicitation process are generalised in nature, and it will be necessary to contextualise the results with site-specific information for the Projects.
- b) The expert elicitation process was limited to consideration of frequency and duration of inundation, and other factors such as hydrology, topography, watering intervals and the requirements of specific species will need to be considered.²³

The Proponent commissioned further analysis for Belsar-Yungera in response to the expert elicitation report. It tabled TN03 with the Hydrological Analysis of EVCs for Belsar-Yungera (D108).

TN03 explained that the Hydrological Analysis of EVCs for Belsar-Yungera contextualises the results of the expert elicitation with regard to site specific hydrology, specifically frequency and duration of inundation for specific EVCs. It does not however consider the full range of factors which will be relevant to the achievement of the intended benefits of the Belsar-Yungera project through future environmental water decision-making processes.

Further, the hydrological analysis of EVCs for Hattah Lakes North had not been undertaken as the hydraulic modelling of the entirety of the Hattah Lakes floodplain (beyond the MIA) was not yet available.

(ii) What did the EES say

A key objective of the EES is to demonstrate the Project would provide benefits for floodplain ecosystems, including flora and fauna, through managed inundation which brings the floodplain inundation regime in the MIAs closer to the pre-regulation frequency and duration.

The EES used multiple lines of evidence (qualitative and quantitative) to determine the benefits to native vegetation, including EVCs and listed threatened species, from Project operation. EES Attachments V and VI described the modified native vegetation gain approach used to demonstrate Project benefits and also used qualitative assessment of benefits including literature review and consideration of monitoring results of similar projects.

²⁰ EES Attachment V, page V.4

²¹ D73, page 1

²² Direction 17

²³ D74, paragraph 7

Specialist Assessment B concluded that environmental watering is strongly expected to benefit the floodplain environment, including improvements in native vegetation condition and fauna habitat in the MIAs, noting that ongoing monitoring is required. It stated:²⁴

Environmental water delivery would generate a range of environmental benefits in line with the ecological objectives of the project, ranging from improving the health, structure and regeneration of canopy species, and increasing the diversity and abundance of floodplain-dependent understorey species.

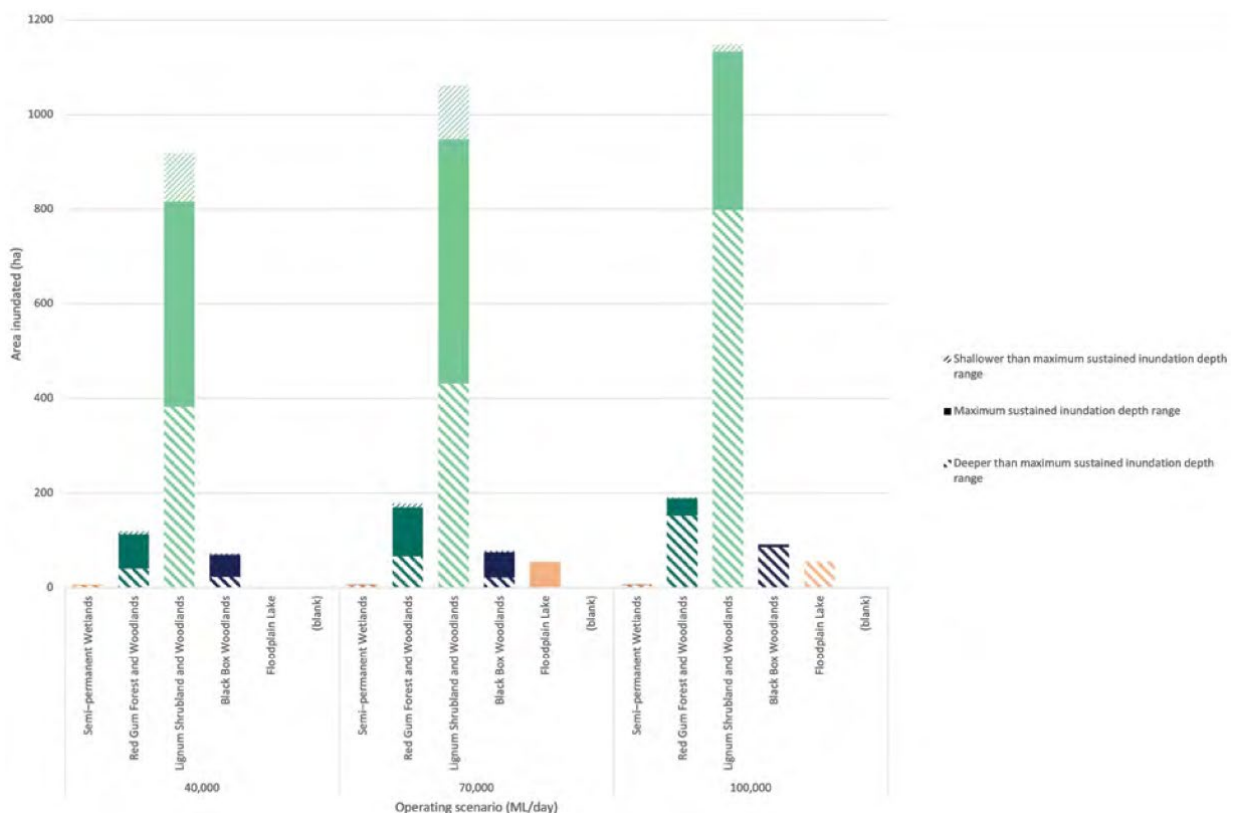
EES Attachments V and VI presented an AOIB for each Project area. Modelled operating scenarios were analysed to determine the extent to which preferred EVC inundation depths were achieved. For both Project areas the preferred inundation depths were exceeded for a portion of most EVC types under all scenarios (see Figure 11 and 12 below).

Key mitigation measures relating to overall biodiversity improvement are EDS E4a (Belsar-Yungera) and E4b (Hattah Lakes) which requires operation of the Project to:

...better align the frequency, duration and timing of managed inundation events with the ecological needs of the floodplain, including to improve ecosystem function, threatened species habitat and native vegetation.

EDS E4a and E4b also require operation of the Project be undertaken in accordance with principles of adaptive management and various operating plans.

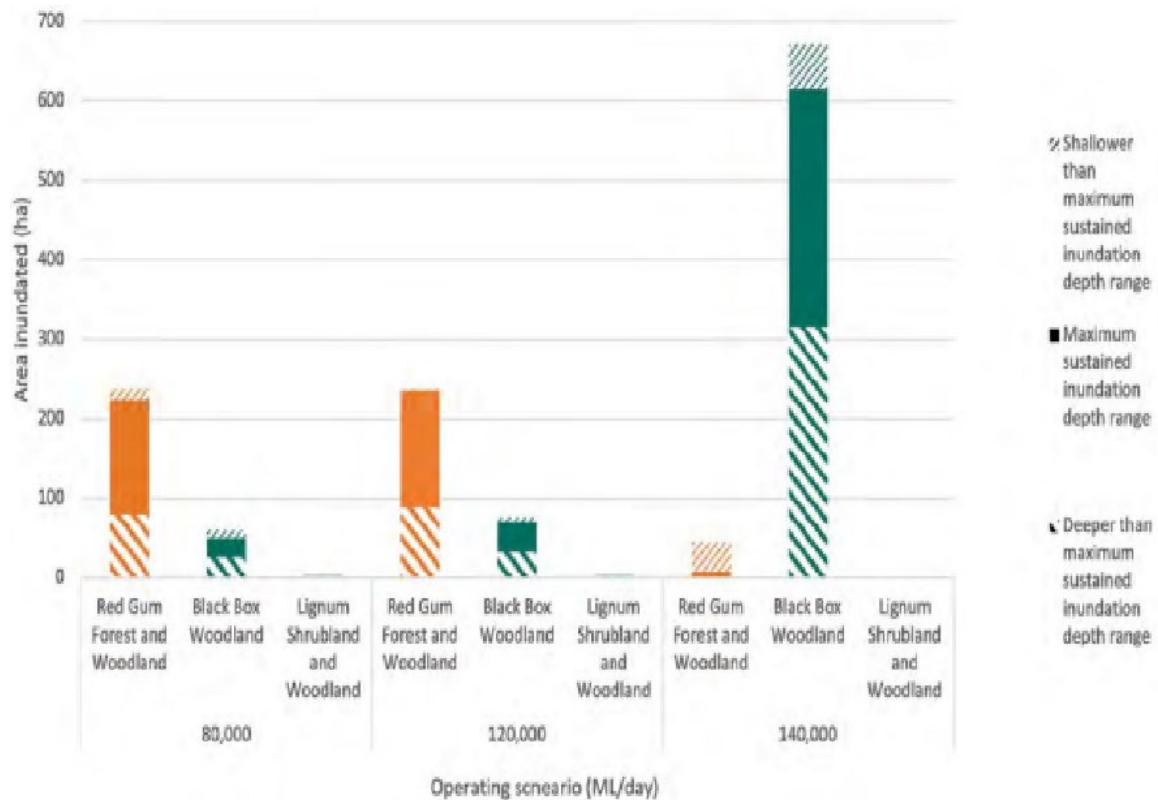
Figure 11 Operating scenarios and achievement of preferred EVC inundation depths for Belsar-Yungera



Source: EES Attachment V, Figure 16

²⁴ Specialist Assessment B, page 545

Figure 12 Operating scenarios and achievement of preferred EVC inundation depths for Hattah Lakes North



Source: EES Attachment VI, Figure 16

(iii) The issues

The issues are whether there is an appropriate level of certainty regarding:

- floodplain hydraulics and impacts on native vegetation
- tolerable and optimal water regimes for vegetation.

(iv) Evidence and submissions

Hydraulic effects on floodplain vegetation

Ms Jellie gave evidence her assessment of the Project's benefits was based on the assumption that water would flow in the same way as natural inundation and there would be no change in depth as a result of the Project. Ms Jellie advised the main instance of potential plant drownings would be terrestrial species or communities which had opportunistically inhabited the floodplain. As there was no change to bathymetry (depth of water) or ponding proposed (except for at the lakes, such as Lake Boolca where ponding is a natural occurrence), there was no potential for catastrophic changes to vegetation as a result of managed inundation (such as tree deaths experienced at Avoca Marshes).

Mr Frood, co-author of D29, gave evidence that the water regimes guidance in D29 characterised the hydrological requirements of EVCs in terms of frequency, duration and depth of inundation. Frequency and duration of inundation were not intended to be used in circumstances where bathymetry would be changed, such as where water may pond behind new structures, without also considering the implications of changes in depth.

Mr Frood cautioned that *“any changes to the topography influencing water movement and persistence can have unintended effects”*. He provided examples of bathymetry changes resulting in tree deaths (for example Avoca Marshes) or massive changes to the EVC.

VNPA submitted many ecological communities and species rely upon natural flood events *“that move through the landscape, rather than water sitting in ponds which is what could occur as part of the Project”*.

Water regimes

DEECA submitted the expert elicitation report was expected to assist the Committee with inquiry into:

- inundation characteristics of the Project’s modelled scenarios with regard to EVCs
- optimum and tolerable ecological water regimes for EVCs
- impacts of changes to water regimes for EVCs and conservation benefit for rare and threatened species.

Ms Jellie gave evidence the delivery of water to the Project areas was expected to benefit the floodplain at a local and regional level. She explained:

- the ecological health of the areas has been in steady decline due to altered flow regimes
- the main difference between a natural flood and managed inundation is the speed, intensity, extent, timing and duration of inflows
- managed inundation has potential to provide a more controlled approach reducing the severity of negative effects
- the Project is designed to restore broad ecological function on the floodplain, not targeting a small suite of species.

Ms Jellie explained that based on the observed response to previous smaller scale watering projects, it was expected the ecological condition of the floodplains would improve when the water regime better matches their ecological requirements. For example, the benefits of changing the water regime had previously been demonstrated for Belsar-Yungera when emergency environmental watering was undertaken in 2005-2006, and environmental watering of Lakes Powell and Carpul in 2011-2012. Benefits of changing the water regime had been demonstrated for the Hattah Lakes floodplain complex through TLM project. Lessons learned from other projects, specifically monitoring and adaptive management, had been incorporated into the Project design to ensure appropriate watering is applied.

Ms Jellie gave evidence that for previous, smaller scale projects, DEECA had accepted a similar level of field work and assessment of benefits (based on the DELWP native vegetation gains calculator) and without the need for further expert elicitation. For these projects, realising benefits relied on monitoring and adaptive management to ensure appropriate watering is applied.

Mr Frood gave evidence the Project represented a *“risky experiment”*²⁵ by artificially impounding water which could lead to ecological simplification. Risks associated with managed inundation included:

- triggering seed germination at the wrong time
- drowning seedlings or even mature trees

²⁵ Expert Witness Statement, Mr Frood, D88, page 6

- providing water in climatic conditions unsuitable to plant health.

The Proponent explained the implications of the expert elicitation report (D74) and subsequent Hydrological Analysis of EVCs for Belsar-Yungera (D108), stating:

- The expert elicitation report may be used as an input to future environmental water decision-making (noting it presents generalised estimates of tolerable and optimal watering).
- Given the complex and dynamic nature of hydrological and ecological systems, it is expected that different approaches to analysing the floodplains will result in different guidance in how benefits may be achieved. Consequently the AOIB employed multiple lines of evidence and adaptive management is a key pillar of the Project's operations.
- Site-specific considerations must guide environmental watering decisions across all VMFRP sites. Further work such as the Hydrological Analysis of EVCs for Belsar-Yungera will be undertaken as appropriate to ensure generalised ranges in the expert elicitation are interpreted and applied in site-specific contexts.

The Proponent submitted *"The extent to which submitters sought to query the benefits associated with environmental watering of the floodplains, as recognised in the evaluation objective itself, was very limited"*.²⁶ Regarding Mr Frood's evidence, the Proponent regarded his stated philosophical opposition to the Project did not make him a credible expert witness in the context of the Hearing.

(v) Discussion

Hydraulic effects on floodplain vegetation

While Mr Frood opposes the Project and was involved in the expert elicitation process, he has extensive experience in floodplain ecology and is co-author of D29. The Committee has therefore given weight to his evidence that there is a credible risk native vegetation could be drowned, potentially reducing the achievement of Project benefits.

Realising benefits may not be simple as 'just add water'. Both Ms Jellie and Mr Frood gave evidence that changes in depth or floodwater behaviour could negatively affect outcomes for vegetation. While Ms Jellie assumed there would be no changes in floodplain hydraulics as a result of the Project, Mr Frood raised the risk of drowning vegetation which could jeopardise the success of the Project.

The extent and nature of any hydraulic changes due to the Project was not adequately described in the EES or subsequent responses from the Proponent (see Chapter 5.3). As a result, it is not possible to determine whether and to what extent the Project may cause drowning of any floodplain vegetation, including large trees.

As recommended by the Committee in Chapter 5.3, further work is required to determine the extent of change to floodplain hydraulics. This work should inform further assessment of hydraulic effects on floodplain vegetation with regard to EVC and vegetation depth preferences and tolerances. Outcomes of this further work should be used to inform any necessary design or operational changes.

This further work has been captured in the new EDS SW4 recommended by the Committee and shown in Appendix G.

²⁶ Document 174, paragraph 91

Water regimes

The expert elicitation report (D73) did not resolve uncertainty in relation to the tolerable and optimal inundation requirements for the EVCs as anticipated by DEECA's submission. While it defined tolerable and optimal inundation regimes in terms of frequency and duration of inundation, it did not use depth as a key factor to do so (unlike D29). Site-specific information such as hydrology, topography, watering intervals, site inter-connectedness and watering trade-offs is also required.

The Hydrological Analysis of EVCs for Belsar-Yungera (D108) provides more site-specific information as to preferred and tolerated watering regimes for specific EVCs which will be useful to inform preferred water regimes. However, it did not find that optimum conditions defined in the expert elicitation report were closely aligned with pre-regulation water regimes, instead reporting that the expert elicitation report recommended much lower optimal inundation frequencies for EVCs than those experienced in the pre-regulation scenario. Possible reasons for this finding include the general (rather than site-specific) scope of the expert elicitation report, uncertainties in the assessment of ecological threats resulting from hydrological change, and limitations to expert experience.

Further assessment of tolerable and optimal watering regimes should be undertaken to inform initial operating scenarios and adaptive management to be tested through environmental monitoring of response of vegetation to watering events. This assessment should consider the *Guide to water regime, salinity ranges and bioregional conservation status of Victorian wetland Ecological Vegetation Classes* (D29), the expert elicitation report (D73), and hydrological analyses of EVCs for both Project areas. The Committee recommends a new EDS E7 which requires this assessment. It also requires a hydrological analysis of EVCs be prepared for Hattah Lakes, similar to that done for Belsar-Yungera (D108), to inform this assessment.

The Committee accepts Ms Jellie's evidence that previous smaller-scale watering projects have addressed uncertainty with respect to watering regimes through adaptive management. The Committee accepts parameters of inundation frequency and duration can be managed adaptively. It would however be appropriate to gather further site-specific information to inform working hypotheses to be tested through monitoring and adaptive management. Depth, on the other hand, should be considered in the Project's design to ensure the design of infrastructure does not result in ponding of water beyond tolerated depths. This has been captured in the Committee's recommended new EDS SW4 included in Appendix G.

(vi) Findings

The Committee finds:

- Further assessment is required to provide an appropriate level of certainty regarding implications for floodplain vegetation. This is addressed in the Committee's recommended EDS SW4.
- Further assessment is required to provide an appropriate level of certainty regarding preferred and tolerable water regimes to inform initial operating scenarios and adaptive management. This is addressed in the Committee's recommended EDS E7.

(vii) Recommendations

The Committee recommends:

Environmental Management Framework

Include the following changes:

- a) New EDS SW4 that requires:
 - further assessment to determine implications of hydraulic effects on floodplain vegetation to inform any necessary design or operational changes.
- b) New EDS E7 that requires:
 - a hydrological analysis of Ecological Vegetation Classes be undertaken for Hattah Lakes North
 - site-specific hydrological analysis of Ecological Vegetation Classes, expert elicitation and relevant documents to inform initial operating scenarios and adaptive management to be tested during operations.

These changes are included at Appendix G.

7.3 Native vegetation effects (construction)

(i) What did the EES say

Extent of native vegetation loss

The EES described the desktop assessments, field surveys, risk assessment, and assessment of alternatives that informed the impact assessment for terrestrial ecology for the two Project areas.

Residual effects of construction on native vegetation and large trees is summarised in Table 4 below.

Table 4 Summary of impacts associated with proposed construction works

	Belsar-Yungera		Hattah Lakes North	
	Native vegetation (ha)	Trees	Native vegetation (ha)	Trees
Infrastructure	17.365	274	15.373	147
Access tracks	25.523	413	None	None
Borrow area	7.417	5	3.527	3
Total	50.304	692	18.9	150

Source: Specialist Assessment B Tables 7-4 and 10-4

For native vegetation an extreme consequence was considered greater than 30 hectares and major consequence between 10 and 30 hectares. For trees, a major consequence was greater than 500 trees with a moderate consequence greater than 100 trees.²⁷

For Belsar-Yungera, the residual risk ratings for potential effects of construction on large trees and native vegetation were rated as extreme. For Hattah Lakes North, the residual risk ratings for potential effects of construction on large trees and native vegetation were rated as high. As the likelihood of removal was considered almost certain, consequence ratings were determinative of risk.

²⁷ EES Attachment II Table 3 and Appendix B

These residual risk ratings reflect the extent of vegetation clearance required.

Avoid and minimise

EES Attachment VII describes the potential site-specific modifications to the preliminary design to avoid and minimise potential impacts of project infrastructure within the 'area of investigation'. Design alternatives were informed by the specialist assessments and stakeholder engagement, including with specialists, project partners and Traditional Owners. An iterative multi-disciplinary approach was undertaken to considering design alternatives that would deliver better ecology and cultural heritage outcomes. Water and social impacts were considered but ended up being the same for all design options, and therefore not determinative.

For Belsar-Yungera, the alternatives assessment resulted in:

- 30 alternatives that deliver better outcomes being adopted, avoiding the removal of 57 large and 23 very large trees. Together with the rationalisation of access tracks, this resulted in a 19 hectare reduction in native vegetation removal
- 21 alternatives where there may be opportunity to further avoid and minimise adverse effects to native vegetation through detailed design and construction methods, subject to further investigation post-approval
- two alternatives that were not feasible.

For Hattah Lakes North, the alternatives assessment resulted in:

- three alternatives that deliver better outcomes being adopted, avoiding the removal of eight large and 14 very large trees resulting in a 0.51 hectare reduction in native vegetation removal
- three alternatives where there may be opportunity to further avoid and minimise adverse effects to native vegetation through detailed design and construction methods, subject to further investigation post-approval.

EDS E1 applies to the construction phase of the Project. It requires further measures to avoid and minimise native vegetation removal during the detailed design and construction phases to ensure it does not exceed the worst case assessed in the EES.

(ii) The issues

The issues are whether:

- assessment of native vegetation effects is satisfactory
- the Project will appropriately avoid and minimise impacts on native vegetation, including large trees.

(iii) Evidence and submissions

Extent of native vegetation loss

Several submitters were concerned with the large amount of vegetation loss associated with the Project's construction.

Ms Jellie gave evidence the assessment included:

- direct impacts of removal in the construction footprint
- indirect impacts in the buffer area either side of the construction footprint.

Indirect impacts were where the tree protection zone was encroached by the construction footprint (by more than 10 per cent in accordance with the threshold in the *Guidelines for the*

removal, destruction or lopping of native vegetation (DELWP, 2017). Trees potentially impacted by indirect impacts would not be directly removed, but may decline in health (possibly resulting in death).

Indirect impacts accounted for:

- 57 per cent of tree loss and 29 per cent of native vegetation loss for Belsar-Yungera
- 21 per cent of tree loss and seven per cent of native vegetation loss for Hattah Lakes North.

Ms Jellie gave evidence:

- native vegetation to be removed is generally surrounded by more native vegetation beyond the construction footprint
- due to this context, impacts are not significant on a local or regional scale
- while the numbers may seem high compared to other projects where the impacts were considered significant, those other projects are likely in more urban or disturbed environments and not surrounded by thousands of hectares of contiguous vegetation.

Avoid and minimise

Several submitters questioned whether sufficient effort had been made to avoid and minimise effects on native vegetation.

Ms Jellie gave evidence that efforts to avoid and minimise impacts were through an iterative and integrated approach to design modifications. While EVC and tree mapping was limited to the area of investigation, native vegetation extends almost entirely across the Project areas.

The Committee asked questions of Ms Jellie about further refinement of the Project infrastructure to avoid native vegetation removal. In each instance, in balancing effects on significant values (cultural, native vegetation and private landowner interests), Ms Jellie gave evidence there were no better outcomes to be found.

For Belsar-Yungera, in response to questions from the Committee regarding the need for two access tracks in WMA1 from Belsar Road to ER1 (as shown in Figure 4 of this report), Ms Jellie (D171) and the Proponent (D189) clarified there were no new access tracks proposed in WMA1 and the EES contained errors to this effect.

(iv) Discussion

Extent of native vegetation loss

The extent of native vegetation loss is significant, particularly at Belsar-Yungera, and the Committee notes the concerns of submitters regarding this effect. In the absence of specific advice or submissions on opportunities to further avoid or minimise native vegetation removal, the Committee does not have any recommendations for feasible modifications to the Project design which may further avoid removal of native vegetation.

The Committee accepts Ms Jellie's evidence that the context reduces the significance of the native vegetation loss, although the residual effects remain high at Hattah Lakes North and extreme at Belsar-Yungera due to the certainty of the loss. The Committee notes there is one EVC proposed for removal during construction that is not found in the MIA and is not expected to benefit from

the Project. Specifically, the removal of 0.191 hectares (or 19 per cent) of remaining Plains Grassland which is endangered in the Robinvale bioregion at Hattah Lakes North.²⁸

The Committee notes, the Project avoids nearly 70 per cent of this EVC located in the area of investigation and EDS E1 includes the objective to minimise the construction footprint as far as reasonably practicable, particularly near endangered EVCs, which is appropriate to further reduce impact on this EVC.

There may be further minor vegetation loss required for additional groundwater monitoring bores recommended by the Committee (see Chapter 6). Ideally, these could be sited in the existing construction footprint and accommodated in the current worst case figures. If not, the Committee anticipates these losses to be insignificant compared with the overall impacts of the Project.

Avoid and minimise

The specified Project design refinements (EES Attachment VII) sufficiently explored efforts to avoid and minimise effects from native vegetation loss. The EES identifies 21 alternatives for Belsar-Yungera and three alternatives for Hattah Lakes North with potential to further avoid and minimise impacts for further investigation during detailed design post-approval. This was not captured in the EMF and should be to ensure further opportunities to avoid and minimise native vegetation loss are realised. The Committee recommends EDS E1 be amended to specifically require these identified alternatives be further investigated.

For Belsar-Yungera, as a result of the corrected error (D171 and D189) the extent of new access tracks is reduced from 12.8 kilometres to 0.8 kilometres. No submissions were made that this correction would result in a reduction of native vegetation impacts, however it has created some uncertainty about the actual native vegetation proposed for removal.

EDS E1 currently states that removal of native vegetation will not exceed 50.30 hectares for the Belsar-Yungera Project. These native vegetation removal calculations should be reviewed in light of the reduction of new access tracks. If the reduction at Belsar-Yungera results in less native vegetation removal, EDS E1 should be updated to represent the new maximum to ensure the EDS accurately reflects Project requirements and the objective to avoid and minimise native vegetation loss is achieved. If the reduction at Belsar-Yungera does not result in less native vegetation removal, the Proponent should review the need for two access tracks in WMA1.

(v) Findings

The Committee finds:

- The EES has satisfactorily assessed impacts on native vegetation from construction.
- There is potential to further reduce impacts during detailed design, however it is unlikely the assessed high and extreme residual impacts would change as a result.
- Subject to the Committee recommended changes to EDS E1, the Project will appropriately avoid and minimise impacts on native vegetation from construction.

(vi) Recommendation

The Committee recommends:

²⁸ EES Chapter 14, Table 14.28

Environmental Management Framework

Include the following change:

a) **Revised EDS E1 that requires:**

- **native vegetation removal calculations be reviewed for Belsar-Yungera, in light of errors identified in the Environment Effects Statement**
- **if necessary amend EDS E1 to reflect the revised calculations**
- **if the revised calculations do not result in less native vegetation removal, review the need for two access tracks in WMA1**
- **further assessment of identified alternatives through the detailed design process and selection of construction methods with potential to further avoid and minimise impacts to native vegetation removal.**

This change is included at Appendix G.

7.4 Native vegetation offsets

(i) Background and context

The Committee's ToR require it to consider consistency of the Project with native vegetation policy (section 39(b)).

State planning policy includes the objectives to:

- protect and enhance Victoria's biodiversity (clause 12.01-1S)
- ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation (clause 12.01-2S).

The CWE is a provision of Clause 52.17 (Native vegetation) of the Planning Scheme which provides a permit exemption relating to conservation work, stating:

Native vegetation that is to be removed, destroyed or lopped to the minimum extent necessary to enable the carrying out of conservation work:

- which provides an overall improvement for biodiversity; and
- with written agreement of the Secretary to the Department of Environment, Land, Water and Planning (as constituted under Part 2 of the *Conservation, Forests and Lands Act 1987*).

The DELWP guidance *Exemptions from requiring a planning permit to remove, destroy or lop native vegetation* (December 2017) explains the purpose of the exemption and outlines criteria for assessment and agreement with the Secretary.

The exhibited incorporated document (condition 4.5) provides for:

- information about the native vegetation to be removed to be submitted to and approved by the Secretary prior to native vegetation removal
- offsets to be provided prior to native vegetation removal, unless written agreement is obtained from the Secretary stating it has been demonstrated the removal of native vegetation necessary to enable the use and development provides for an overall improvement to biodiversity
- any secured offsets to be reconciled within six months of the completion of construction, and evidence provided that offsets have been secured.

(ii) What did the EES say

The Project seeks to generate an overall improvement to biodiversity, thereby eliminating the need to obtain offsets for the removal of native vegetation required for construction.

The EES noted that as the Project proposes a PSA rather than a planning permit the CWE is not directly available. A quantitative assessment to support an application for a CWE or equivalent was provided in the AOIB (EES Attachments V and VI).

Comparisons of impacts and potential benefits showed the Project would “be overwhelmingly positive for Victorian rare and threatened species”.²⁹ A gain in habitat was expected for all threatened species, with the exception of grey goshawk, samphire skink and Murray River turtle for Belsar Yungera and grey-fronted honeyeater for Hattah Lakes North. Except for Murray River turtle, these species were considered unlikely to occur in the Project areas.

Table 5 shows a summary of expected gains compared with offset requirements for unavoidable impacts.

Table 5 Summary of offsets and benefits

Summary of offsets	Belsar-Yungera	Hattah Lakes North
General offsets	None	None
Species offsets	4,157 specific habitat units	489 species habitat units
Large trees	692	150
Summary of benefits	Belsar-Yungera	Hattah Lakes North
General gains	151 general habitat units	90 general habitat units
Specific habitat gains	With the exception of Murray Hardhead, for each species requiring specific habitat units of offsets the gain would be 1.9 to 4.0 times the impact. An additional 137 rare or threatened species would generate gains that would not be impacted by construction.	For each species requiring specific habitat units of offsets the gain would be 1.5 to 4.0 times the impact. An additional 171 rare or threatened species would generate gains that would not be impacted by construction.
Large trees	11,862	8,759

Source: For offsets - Specialist Assessment B, Tables 7-6 and 10-6. For benefits - Attachment V Table 35 and Attachment V1 Table 35

(iii) The issue

The issue is whether the Project will ensure no net loss of native vegetation and (if not) whether offsets should be required.

²⁹ EES Attachments V and VI page 4

Comparisons using the EnSym NVR tool and habitat importance mapping layer.

EnSym Native Vegetation Regulations tool can be used to test clearing and offset scenarios

(<https://www.environment.vic.gov.au/native-vegetation/native-vegetation-removal-regulations/ensym-native-vegetation-regulations-tool>)

(iv) Evidence and submissions

The Proponent submitted (D172):

The Projects are effectively State projects, predominantly proposed on public land, designed to achieve ecological benefit against a backdrop of documented decline. The Projects are wholly concerned with the protection and enhancement of biodiversity values. It is in this context that a bespoke assessment and approval process has been set up for the Projects.

Native vegetation offsets are not proposed as part of the Projects. This is not because of the operation of any statutory exemption in clause 52.17, but because operation of the Projects will achieve overall improvements to biodiversity which achieve, and exceed, “no net loss” as a result of native vegetation removal.

It submitted the Project was not dependent on statutory exemption mechanisms, but rather they propose an alternative arrangement to compensate through *“implementation of the proposed EMF and integration into and enhancement of the environmental watering framework”*.³⁰ It considered the Project consistent with Victorian State biodiversity strategy *Biodiversity 2037* and that, consistent with policy objectives to enhance biodiversity and achieve net gain, it counter-balanced impact against gains.

Most submitters agreed managed inundation of the Project areas would be beneficial to native vegetation. Parks Victoria submitted the overall biodiversity improvements would be considerable. Environment Victoria was concerned the Project would be exempt from offset requirements. Mr Frood was concerned a CWE would be applied to permit the Proponent to do whatever it wanted.

DEECA submitted the *“expected gains and levels of certainty”* were relevant in considering the application for exemption from native vegetation offsets.

Ms Jellie was of the opinion that as the purpose of the Project was to provide ecological benefits, offsets were not warranted. In response to questions, Ms Jellie advised preliminary inquiries had indicated required offsets would not be readily available, and for Hattah Lakes North a handful of species offsets would be difficult to obtain.

Ms Jellie and Mr Frood agreed the existing tools to assess native vegetation condition (habitat hectare assessment) and threatened species benefits (Ensym) had limitations in assessing potential native vegetation gains. Ms Jellie gave evidence these were used as they were required by DELWP.

Ms Jellie provided examples for smaller environmental watering projects that had been approved:

- Catfish Lagoon Project – with a CWE and environmental water management plan
- Mulcra Island Project – approved prior to the CWE pathway being available, using a portion of the inundation area as an offset site with an offset management plan.

The Proponent advised (D171):

The Part B (Offset Implementation) component of the Mulcra Island Vegetation Offset Plan contains management and monitoring recommendations that are broadly equivalent to the requirements of existing [Environmental Water Management Plans] for sites managed by the Mallee CMA.

The Proponent explained the TLM project at Hattah Lakes South had been approved by a planning permit with an approved net gain and offset management plan, and only a portion of the

³⁰ D172, paragraph 10

inundation area (approximately 5 per cent) was used for the purpose of calculating whether net gain would be achieved (D184).

The Proponent submitted the Project would provide an overall improvement to biodiversity as demonstrated in the EES. Ms Chapman, on behalf of the Proponent, provided a presentation summarising the AOIB reports (D179).

The Proponent submitted offsets were inappropriate as a matter of policy and practice. Consistent with this, the Proponent's Final Day version of the incorporated document (D178) removed all of condition 4.5 relating to native vegetation.

DEECA supported condition 4.5 as exhibited. If the Committee were of a mind to remove condition 4.5 it considered information about native vegetation removal should still be required for other purposes, such as providing data for regional and State-wide monitoring and reporting on the 'no net loss' objective.

DEECA submitted that regardless of whether the Committee accepted there is an overall biodiversity benefit, and consequently no offsets were required as a matter of policy, the native vegetation condition should remain. Reasons included:

- the substantial role given to the Secretary by the Victorian planning system in assessing biodiversity impact and benefit
- it is appropriate to have some safeguard mechanism in the incorporated document
- conditions around operations and management for the purposes of achieving 'no net loss' are to be administered by the Secretary
- a secondary consent directly administered by the Secretary is more appropriate than leaving it to requirements of the EMF and development plans.

DEECA submitted relevant safeguards exist to prevent the risk of re-litigation of the issues as any agreement needs to be consistent with the Minister for Planning's assessment of the environmental effects.

(v) Discussion

The Project is required to satisfy biodiversity and native vegetation policy. Given the context of this Project, an alternative arrangement to compensate for native vegetation loss, which demonstrate these policy objectives are achieved, is appropriate.

Establishing no net loss relies on achieving the expected benefits to native vegetation through managed inundation. At its simplest, the area of native vegetation expected to benefit (the MIA) is significantly greater than the area to be impacted (the construction footprint). Benefits should significantly outweigh the impacts, in the context of existing and potential future decline in ecological health from the projected absence of more frequent flooding.

The EES used multiple methods to describe and quantify the Project's benefits. Each method had limitations, but together they provided an understanding of the Project benefits (see Chapter 7.2).

However, as discussed in Chapter 7.2, the assessments of benefits for native vegetation did not unequivocally demonstrate that native floodplain vegetation in the MIAs would benefit from the Projects. Provided vegetation in the MIAs benefits from the Project, the Project benefits are likely to outweigh the impacts.

The Proponent relied on the AOIB to justify its exemption from native vegetation offsets.

The Proponent provided a number of corrections to the EES during the Hearing, which may also have implications for an updated AOIB, including:

- D171 with significant corrections to the way EVC responses for Belsar-Yungera were depicted in the EES
- D189 relating to new tracks (see Chapter 7.3).

Based on the Committee's review of the EES and other recommendations in this Report, to ensure figures remain conservative, an updated AOIB should account for:

- trees at risk of potentially being subject to hypersaline groundwater during Project operations should be included in losses (see Chapters 6.2 and 7.7 of this Report)
- any native vegetation or trees identified through further assessment by EDS SW4 to be at risk of potentially drowning as a result of impoundment during Project operation and which cannot otherwise be avoided by design or operation measures should be included in losses (see Chapter 7.2 of this Report)
- any native vegetation to be removed for the recommended additional groundwater bores should be included in losses (see Chapters 6.2 and 7.3 of this Report)
- any reduction to native vegetation removal figures as a result of the reduction in new access tracks at Belsar-Yungera (see Chapter 7.3 of this Report)
- if inundation on private land to the west of K10 containment bank is controlled by the regulator, then the small strip of public land to the west of this structure should be discounted from benefits (see Figure 2 of Attachment VI to the EES).

The Committee has recommended further work to address uncertainties relating to floodplain hydraulics and floodplain ecology (see Chapters 5.3 and 7.2 of this Report). Confirmation of the extent of benefits will need to occur following this further work, including updating the AOIB.

The AOIB should be updated and assessment of whether offsets might be required, before seeking agreement from the Secretary of DELWP for the removal of native vegetation. The Committee has captured the requirement to update the AOIB in new EDS SW4.

The Committee notes standard statutory pathways to achieve no net loss have broadly equivalent requirements³¹ with the option:

- to use the MIA (or a subset of the area) to achieve the benefit
- for additional requirements to be added to the management and monitoring plan to ensure outcomes.

Following update of the AOIB, any further requirements should be incorporated into the EMF.

In this context, the Committee recommends condition 4.5 in the exhibited incorporated document be retained (noting this is shown as condition 4.6 in the Committee recommended incorporated document in Appendix F of this Report due to other changes accepted in the Proponent's Final Day version).

(vi) Findings

The Committee finds:

³¹ Native vegetation removal to be the minimum necessary (avoid and minimise); demonstration of a benefit of gain that outweighs the impacts with a reasonable level of certainty and a management plan.

- While it is likely the Project will achieve no net loss to biodiversity, uncertainty remains regarding floodplain hydraulics and benefits to floodplain vegetation resulting from inundation.
- The alternative arrangement proposed to compensate for the removal, destruction or lopping of native vegetation and associated impact on biodiversity is generally acceptable, subject to the recommended further analysis and update to the AOIB.
- Condition 4.5 in the exhibited incorporated document should therefore be retained in the event that offsets are required.

(vii) Recommendation

The Committee recommends:

Incorporated Document

Include the following change:

- a) **Reinstate exhibited condition 4.5 Native vegetation (shown as condition 4.6 in the Committee recommended version).**

Environmental Management Framework

Include the following changes:

- a) **New EDS SW4 that requires:**
 - **an updated assessment of overall improvements to biodiversity.**

These changes are included at Appendices F and G.

7.5 Trees and habitat (construction)

(i) What did the EES say

The key effect to trees during construction is from direct removal or indirect impacts such as construction within the tree protection zone. Of the large trees to be impacted by construction, 277 were recorded as hollow-bearing at Belsar-Yungera and 77 at Hattah Lakes North. Loss of hollow-bearing trees is recognised as a threatening process for fauna under the *Flora and Fauna Guarantee Act 1988* (FFG Act).

Potential direct or indirect impacts on large trees as a result of construction (including native vegetation removal) had a residual risk rating of extreme for Belsar-Yungera and high for Hattah Lakes North based on the number of large trees to be removed.

(ii) The issues

The issues are whether:

- a hollow replacement plan should be considered to mitigate impacts from removal of hollow-bearing trees
- a timber reuse and repurpose plan should be developed and implemented.

(iii) Evidence and submissions

DEECA submitted a hollow replacement plan should be considered to mitigate immediate and short-term impacts to hollow dependent species from the significant loss of hollow bearing tree losses. VNPA agreed, submitting compensation was required to make up for the lag effect in

hollow creation which could take up to 150 years. Mr Frood, VNPA, Environment Victoria and FoNVP were concerned about the loss of habitat for hollow-dependent species.

Mr Holmes gave evidence that while removal of hollow-bearing trees would likely displace individuals of common and threatened species (and may even cause individual deaths), it was not considered *“likely to cause measurable impacts on populations of those species”*.

Although not opposed to a hollow replacement plan, Mr Holmes submitted it was not warranted or a worthy mitigation due to the surrounding context, specifically there is no shortage of hollows. Further, the hollow replacement as part of the TLM was unsuccessful, where poorly insulated nest boxes possibly caused regent parrot nestlings to overheat and perish. If a hollow replacement plan were to be mandated, careful consideration of an appropriate compensation (noting one for one replacement is almost certainly not achievable, particularly for the full range of hollow dependent fauna) and suitable design (avoiding poorly insulated nest boxes) would be required.

No relevant changes were proposed by the Proponent in its Final Day Project Documents. While DEECA’s original submission was that a hollow replacement plan should be required, it did not suggest this in comments on the Final Day Project Documents.

In response to questions from the Committee about the need for a timber repurposing plan, the Proponent responded this was unnecessary due to the works being undertaken on public land managed by Parks Victoria and existing requirements in EDS E2e that the Native Flora and Fauna Management Plan must require:

- replacement of large woody debris, such as logs, as close as practicable to where it was initially location
- rehabilitation to including reinstatement of logs (D171).

(iv) Discussion

The Committee accepts Mr Holmes evidence that any hollow replacement plan would need to be carefully considered to ensure it would be beneficial and did not cause negative impacts such as providing unappealing or unsuitable nesting boxes. While the Committee understands this has been overcome in other projects by attaching natural or carved hollows to standing trees or stags in the landscape, it agrees a hollow replacement plan is not warranted. In the context of the trees to be removed, the remaining landscape provides ample tree hollows.

The Committee interprets EDS E2e as referring to replacing natural logs already on the ground that are moved during construction. Considering EDS E2e will be implemented by a contractor, it should be clarified that felled trees and logs should also be reused on site as appropriate with habitat improvement the priority.

(v) Findings

The Committee finds:

- A hollow replacement plan is not warranted.
- Minor amendment to EDS E2e is warranted to ensure appropriate reuse of felled timber and logs.

(vi) Recommendation

The Committee recommends:

Environmental Management Framework

Include the following change:

- a) Revised EDS E2e to, where possible, ensure appropriate reuse of felled timber and logs.

This change is included at Appendix G.

7.6 Terrestrialisation (operations)

(i) What did the EES say

Terrestrialisation is where terrestrial species had inhabited the dry floodplain. A return to a more natural flooding regime can result in a reversal of this process.

The EES noted operation of the Project would result in the reversal of existing terrestrialisation of ecosystems in some areas. The EES stated for Belsar-Yungera:

... no EVCs are likely to be substantially negatively impacted by the increase in flooding. Instead minor transitions in floristic composition are anticipated where terrestrialisation has occurred as a result of reduced flooding frequency.

This was also the case for most EVCs at Hattah Lakes North (with one exception discussed below).

Examples of species this could affect included:

- river red-gum which have established in drying treeless wetlands
- black box seedlings which would be susceptible to water stress from prolonged, deep flooding
- some chenopods that have colonised drying riverine and/or previously swampy EVCs.³²

Likely effects on these species included decline in health, death or inability to recruit. This outcome was considered a benefit of the Project in the context of an overall objective to restore the floodplain.

The residual risk rating for removal or destruction of native vegetation during operations was considered low for Belsar-Yungera and high for Hattah Lakes North. For Hattah Lakes North the risk rating was due to a novel form of the terrestrial EVC 102 low chenopod shrubland established at Lake Boolca, as a result of the lack of flooding over 50 years. DELWP modelling suggests pre-1750 this site would have supported EVC 107 lake bed herbland – a completely different EVC. In this case, as the transition will be to an entirely new inundation tolerant community (as opposed to the reduction of a single-species which has expanded into the floodplain). The consequence to the existing EVC is considered moderate, resulting a high residual effect.

³² Specialist Assessment B, Sections 7.2.2.1 and 10.2.2.1

(ii) The issues

The issues are whether:

- reversal of terrestrialisation is an impact or benefit
- reversal of terrestrialisation should be accounted for in native vegetation impacts
- the biodiversity value of terrestrial species to be affected by inundation is a relevant consideration when considering measures to avoid, minimise and mitigate effects.

(iii) Evidence and submissions

VNPA submitted the Project has the potential to cause the conversion of EVCs due to unnatural inundation as the vegetation communities and plant species *“have evolved and adapted to the existing water flows, soil types, hydrology and inundation periods”*. It submitted conversion of existing vegetation types to new EVCs in the MIA should be considered removal of native vegetation as it is not fully understood what EVC would replace the existing vegetation.

Ms Jellie’s view was reversal of terrestrialisation should be regarded as a Project benefit. Terrestrialisation reversal was likely to be seen as a gradual transitioning of some aspects of the floristic community to more flood-tolerant or dependent species. Such transitions are not expected to result in the loss of native vegetation as it is expected to still be dominated by native species. Instead, the transitions are expected to be a minor component of the existing floristic complex. For example, chenopods that have colonised more flood-prone areas may reduce in cover and be replaced by more flood-dependent species. The loss of trees is *“not expected as monitoring and adaptive management will be used to mitigate the risk of such a dramatic unintended ecological shift”*.

Ms Jellie considered the reversal of terrestrialisation would have already commenced as a result of the recent floods and suggested the previously high risk rating for Hattah Lakes North could be downgraded to low as there would now be no initial loss in terrestrial vegetation as a result of the Project’s operations.

In response to the Committee’s RFI, the Proponent submitted existing *“terrestrialisation represents the loss of significant, valued Murray River floodplain environments and their ecosystem processes”* and has the same meaning as floodplain decline (D138). A key intention and core objective of the Project is to reverse this threat. Environmental watering is expected and intended to lead to a change in the floristic characteristics to decrease terrestrial species which do not naturally occur in floodplains, and increase species diversity and abundance of desirable floodplain species.

The Proponent submitted it was important that questions regarding terrestrialisation do not attach ecological value to terrestrial species within the MIA or presuppose there are any risks associated with its reversal that are not capable of being appropriately managed. Similarly, the Proponent relied on the evidence of Mr Holmes that, to the extent any terrestrial fauna had come to habituate the floodplain, its intolerance to inundation was *“an illustration of how such fauna belongs to habitat outside the MIA”*.

In response to questions from the Proponent, Dr Murdoch gave evidence it is difficult to balance single species conservation with environmental watering for the greater good. While the Mildura Ogyris butterfly (*Ogyris subterrestis subterrestis*) (the Butterfly) is likely to be present in the landscape in the Hattah Lakes North MIA as a result of terrestrialisation, her primary concern was the Butterfly given its precarious state.

(iv) Discussion

The Committee accepts the reversal of terrestrialisation for the EVCs in the MIA should generally be considered a benefit of the Project and not accounted for in native vegetation impacts. In coming to this conclusion, the Committee was persuaded by the following:

- evidence and submissions that floodplain vegetation would benefit from more frequent environmental watering
- for the most part, increased watering is likely to drown terrestrial species that have opportunistically expanded their range into new EVCs to the detriment of the natural EVC (for example, river red gums that have expanded into drying treeless wetlands may be drowned)
- there are no threatened terrestrial flora communities recorded or anticipated to occur in the MIA
- the likely effect of recent floods on terrestrial vegetation in the floodplain is such that this process is likely to have already commenced minimising the effects of the Project.

The *Biodiversity 2037* adopts an ecosystems approach to conservation. In the context of securing the greatest overall benefit, it states:

Conservation management is shifting away from planning for threatened species one at a time. While it will always be necessary to understand each species' specific circumstances and needs, species are embedded in ecosystems and are collectively subject to threats and management responses. Biodiversity management is more effective and efficient if synergies and potential negative outcomes are considered.

That said, the Committee does not agree that consideration of terrestrialisation cannot attach *any* biodiversity value to terrestrial species which have opportunistically inhabited the floodplain. Where a terrestrial species is threatened or at risk of becoming threatened, this should be considered in the context of the objectives of the FFG Act, in particular the objective to “*prevent species and communities from becoming threatened and to recover threatened species and communities*”.

If the Project was to result in a significant negative outcome to a vulnerable or endangered terrestrial species, then measures to avoid, minimise and mitigate that outcome warrant consideration in the context of predicted ecosystem benefits. This is discussed further in Chapters 7.8 and 7.9.

(v) Findings

The Committee finds:

- The reversal of terrestrialisation is a legitimate and beneficial objective and outcome of the Project.
- Gradual floristic changes which result in a terrestrial EVC converting to a floodplain EVC do not need to be accounted for in native vegetation impacts.
- The Committee does not agree that consideration of terrestrialisation cannot attach *any* biodiversity value to terrestrial species which have opportunistically inhabited the floodplain.

7.7 Groundwater salinity effects on trees (operations)

(i) What did the EES say

During operations, trees may be affected by changes in groundwater level, which is expected in general to rise (see Chapter 6). Where the groundwater is relatively fresh, the rise in groundwater is expected to improve tree health and result in increased evapotranspiration. This benefit is expected to be experienced by vegetation within and adjacent to the MIA, predominately towards the Murray River.

There would be very few, small areas that may be at risk of soil salinisation due to operations. This relates to areas where the groundwater level may increase to within two metres of the surface for greater than 20 per cent of time. The development of any salinity is a function of a range of factors including the climate and inundation pattern.

Specialist Assessment B explains that despite the negligible to low risk, an assessment of native vegetation in ‘zones of interest’ was undertaken to identify the presence of deep-rooted vegetation that could be potentially at risk of hyper-saline groundwater mounding during operations. Relevant species that could be at risk were predominantly river red gum and black box at Belsar-Yungera and black box at Hattah Lakes North. The assessments indicated small ‘zones of interest’ where there is a moderate risk of impacts to trees from hyper-saline groundwater. The assessment stated:

The baseline ecological data collected is intended to be used in combination with follow up monitoring undertaken between 2021 and 2024, when the project is planned to have been installed / prior to any environmental watering events. Having 2-3 years of ‘pre-watering’ baseline data would assist the analysis of any changes that may occur in tree condition in zones of interest as a result of the environmental watering.

The proposed EMF monitoring includes:

- monitoring of trees at these locations every three years for at least 15 years (M TE9)
- monthly and annual groundwater monitoring to identify changes in groundwater levels and quality (M GW1 and M GW2)
- daily monitoring of surface water level, salinity and flow (M GW3).

The EES compares the low risk of trees being affected by hypersaline groundwater in discrete ‘zones of interest’ with the expected benefits of increased rates of evapotranspiration for vegetation over a much greater area.

(ii) The issue

The issue is whether the proposed monitoring of potential salinity impacts on trees is adequate.

(iii) Evidence and submissions

In response to questions from Environment Victoria, Ms Jellie gave evidence adaptive management could be applied if trees started to show salt stress, but the specifics of what that would entail would need to be determined at the time. At this stage, no negative effects were considered likely, but proposed monitoring was sufficient to identify any negative effects should they occur.

Mr Hoxley gave evidence that adaptive management, such as reducing the frequency and or depth of inundation, could be used to reduce increased salinity in groundwater, including at the ‘zones of interest’.

In response to questions from the Committee, Mr Hoxley clarified the assessment of evapotranspiration effects was undertaken to understand groundwater effects and was not intended to demonstrate the benefits of the Project.

(iv) Discussion

The Committee is satisfied the EES investigations, surveys and methodologies are appropriate to understand the risks and benefits to vegetation during operations due to potential changes to groundwater levels.

Potential issues with groundwater salinity are likely to be identified through regular groundwater monitoring before visual effects on trees are noticed. Once visual effects are obvious on trees, it may be too late to remediate and affected trees may die. Early detection will allow for mitigation measures to be applied to avoid and minimise impacts. In applying a precautionary approach and to improve the likelihood for early identification of potential risk for hypersaline effects to trees, the Committee has recommended additional monitoring of groundwater in Chapter 6.

If adverse effects on trees in defined zones of interest are observed, changes to inundation patterns will need to be balanced with effects across the MIA.

Spatially, areas likely to benefit from increased evapotranspiration are far greater than the ‘zones of interest’ for hypersaline effects on trees. However the risk of losing trees in ‘zones of interest’ remains and should be assessed in considering the overall benefits of the Project.

Monitoring requirement M TE9 refers to the incorrect appendix of Specialist Appendix B for monitoring locations. This has been corrected in Appendix G.

(v) Findings

The Committee finds:

- Proposed monitoring for hypersaline effects on trees is appropriate in light of the Committee recommended groundwater monitoring requirements.

(vi) Recommendation

The Committee recommends:

Environmental Management Framework

Include the following change:

- a) Revised monitoring requirement M TE9 to correct a cross-reference for survey locations for trees at risk of hypersaline groundwater.**

This change is included at Appendix G.

7.8 Threatened flora species and communities

(i) What did the EES say

The EES assessed the likelihood of listed species existing in the area of investigation, including the construction footprint and a buffer to allow for modifications to avoid impacts (see Table 6).

Numerous listed flora species are proposed to be removed during construction and a Native Flora and Fauna Sub-Plan to the satisfaction of DELWP is proposed (EDS E2a to E2e) as part of the CEMP (EMF Table 18.2). Some species will be able to be avoided.

Table 6 Threatened flora species and communities in the construction footprint

	Area of Investigation which includes the construction footprint	
	Belsar-Yungera	Hattah Lakes
EPBC Act listed flora	Winged peppercress – new important population identified, and will be avoided	Winged peppercress – not recorded, unlikely to be critical habitat
EPBC Act listed flora community	None recorded	None recorded
FFG Act listed flora	72 species recorded or potentially occurring	80 species recorded or potentially occurring
FFG Act listed flora community	None recorded	Semi-arid shrubby pine-buloke woodland recorded adjacent to an existing track and not within construction footprint

Source: compiled from Chapter 9, Table 9.23 and Chapter 14, Table 14.24

The EES assessed the likelihood of listed species being present in the MIA and included an assessment as to whether they were likely to respond positively or negatively to inundation (see Table 7).

Table 7 Threatened flora species and communities in the MIA and expected effects of operations

	Belsar-Yungera MIA	Hattah Lakes MIA
EPBC Act listed flora	None recorded Winged peppercress – possibly occurs; if present, likely to benefit	None recorded Winged peppercress – possibly occurs; if present, likely to benefit
EPBC Act listed flora community	None recorded or assessed to have potential to occur	None recorded
FFG Act listed flora	68 species recorded or potentially occurring	62 species recorded or potentially occurring
FFG Act listed flora – expected effect of operations	39 beneficial effect 20 beneficial to neutral effect 5 neutral effect 4 neutral to negative effect	36 beneficial effect 19 beneficial to neutral effect 3 neutral effect 4 neutral to negative effect
FFG Act listed flora community	None recorded or assessed to have potential to occur	None recorded

Source: compiled from Chapter 9, Tables 9.4 and 9.15, and Chapter 14, Table 14.4

A summary of potentially significant negative effects on listed terrestrial flora species is provided in Table 7. Of the four FFG listed species likely to have a neutral to negative effect from inundation, three of these (umbrella wattle, club-hair new holland daisy and frosted goosefoot) expect “a significant ecological impact based on estimates of the number of individuals present within the MIA”.

Table 8 Summary of potentially significant negative effects of operations on FFG-listed terrestrial species

Listed species	Belsar-Yungera	Hattah Lakes North
Umbrella wattle (critically endangered)	4,317 individuals or an estimated 29% of the State population	2392 individuals or an estimated 16% of the State population
Club-hair new holland daisy (endangered)	6,457 individuals The State population estimate of 500 to 2000 is expected to be an underestimate.	28,510 individuals The State population estimate of 500 to 2000 is expected to be an underestimate
Frosted goosefoot (endangered)	8,405 individuals or an estimated 0.18% of the State population	306 individuals or between 0.3 and 1.5% of the State population

Source: Appendix Z to Specialist Appendix B

For Belsar-Yungera, impacts on umbrella wattle (critically endangered) and club-hair new holland daisy (endangered) are considered almost certain to occur and the consequence is considered severe, resulting in a residual impact of extreme. For frosted goosefoot (endangered), impacts are considered almost certain with a consequence of minor, resulting in a residual impact of medium.³³ For Hattah Lakes North, residual impacts for these three species are extreme.

Overall, the residual effect is medium, as the majority of threatened flora known or predicted to occur are expected to benefit.

No mitigation measures are proposed for operations.

(ii) The issues

The issues are whether:

- residual effects of construction and operation on threatened flora species and communities are acceptable
- potential benefits for winged peppergrass are overstated.

(iii) Evidence and submissions

Construction and operation

Separate from previously discussed submissions that clearance of native vegetation and listed species generally was a significant impact, there were no submissions specifically concerned with any listed flora species being impacted from construction.

DEECA submitted it did not consider the Project would pose an unacceptable risk or consequence to any State-wide population of any FFG Act listed flora or communities.

³³ Specialist Appendix B, Section 7.2.4.1, and Appendix J of Specialist Appendix B

Ms Jellie gave evidence that while the Project is likely to have significant local effects on three threatened flora species it is not likely to impact their overall conservation status on the following basis:

.. umbrella wattle is widespread in northwestern Victoria, frosted goosefoot has scattered occurrence in northwest Victoria where it can be locally common and club-hair new holland daisy is nonetheless sufficiently present outside the Project area to preclude the threat of (local) extinction.³⁴

Consequently there were no plans for mitigation of effects to these species from inundation in the MIA. Further, these species would have been under water during the 2022 floods.

Winged peppercress

Dr Murdoch gave evidence winged peppercress was also present on Raakajlim in the MIA and had not been considered in the impact assessment. Dr Murdoch recommended a Native Flora and Fauna Sub-Plan for operations, and that for Raakajlim it should consider winged peppercress.

Mr Frood gave evidence the winged peppercress, if present, was not guaranteed to benefit from the Project. Although winged peppercress occurs where ponding from seasonal rainfall exists it did not in his opinion occupy habitat subject to riverine flooding. There was a risk that inappropriately timed inundation could drown seedlings.

In response to Dr Murdoch, Ms Jellie explained that information about the Raakajlim population was not available on public databases and the location was unable to be verified by the consultant team. In any case, Ms Jellie reasoned if it were present, it would likely respond favourably to the Project.

In response to Mr Frood, Ms Jellie referred to the *National Recovery Plan for Winged Peppercress* to support her evidence the species occurs on sites that are “*seasonally flooded or prone to waterlogging*”. Ms Jellie acknowledged there is limited knowledge of the essential habitat requirements for this species, however as altered flood regimes and site drying are identified as serious threats, returning more water to the floodplains should increase potentially suitable habitat for this species.

(iv) Discussion

Construction and operation

The Committee is satisfied the assessment has appropriately characterised potential effects to threatened flora from construction. The development of a Native Flora and Fauna Sub-Plan to be approved by DELWP/DEECA (EMF Table 18.2) is an appropriate mechanism to address potential mitigation for effected species.

The Committee accepts evidence the three terrestrial species initially predicted to experience a significant ecological impact as a result of the Project would have been inundated by the 2022 floods. Consequently the context of predicted impacts from the Project’s operations has changed and assessed consequences are no longer relevant.

The Committee places significant weight on views of DEECA as to the acceptability of the consequences for FFG listed flora. It accepts Ms Jellie’s evidence the Project is unlikely to affect the conservation status of these species.

³⁴ The Committee has used common names whereas, Ms Jellie used scientific names

Winged peppercress

The Committee accepts altered hydrology, including drainage and prolonged inundation, are serious threats to winged peppercress. The *National Recovery Plan for Winged Peppercress* identifies that “little is known of the biology and ecology” of this species. Mr Frood raises a credible risk that with the limited knowledge of the species, the Project could inadvertently negatively impact on the species, if it is present within the MIA.

Based on this, and that no individuals were identified in the MIA for Belsar-Yungera, the Committee considers the potential response is likely more neutral rather than a definite benefit.

For Hattah Lakes, if individuals or a viable seed bank persists on private land in the MIA following the 2022 floods, the Committee considers it possible for inappropriate inundation regimes to result in a negative response from this species. In both Project areas, other threats identified in the *National Recovery Plan for Winged Peppercress* may be exacerbated by the Project, including weeds, grazing from pest and overabundant native fauna, erosion and salinity.

Winged peppercress is listed as endangered under the EPBC Act. Any action with the chance or possibility of it leading to a long-term decrease in a population size or reducing the area of occupancy is considered a significant impact.³⁵ Consequently, the Committee recommends further consideration of the population on Raakajlim including:

- Prior to inundation, the Proponent should identify habitat for winged peppercress on the Raakajlim property.
- Further advice should be sought regarding appropriate timing and duration of potential inundation of this species and the need for any mitigation measures such as specific inundation requirements or seed collection.
- Potential risks and mitigations should be balanced with overall benefits for other vegetation in the area.

The Committee agrees with submissions that details are best finalised in a Sub-Plan of the OEMP to identify, assess and mitigate potential effects of inundation on winged peppercress (to be approved by DEECA). The Committee has recommended a new EDS E5 at Appendix G to require this.

(v) Findings

The Committee finds:

- The EES assessment of construction effects to listed flora species and proposed EDS is appropriate.
- Three terrestrial dry species considered likely to be significantly impacted during operations have likely already been significantly impacted by the 2022 floods and actions to mitigate effects of the Project are not warranted.
- Expected benefits of the Project on winged peppercress are potentially overstated.
- Further consideration of the winged peppercress population on Raakajlim is required.
- The EDS is satisfactory with inclusion of the Committee recommended new EDS E5.

(vi) Recommendation

The Committee recommends:

³⁵ EPBC Act, Significant impact guidelines 1.1

Environmental Management Framework

Include the following change:

- a) **New EDS E5 that requires a new winged peppercress (Hattah Lakes North) Sub-Plan of the Operation Environmental Management Plan to identify, assess and mitigate any potential effects of inundation on winged peppercress on the Raakajlim property.**

This change is included at Appendix G.

7.9 Threatened fauna species and communities

(i) What did the EES say

Threatened species

The EES assessed the likelihood of listed fauna species being present in the construction footprint and MIA.³⁶ For Belsar-Yungera, listed fauna species present or possibly present included one mammal, twenty birds, two reptiles and one amphibian (growling grass frog). For Hattah Lakes North, listed fauna species present or possibly present included two mammals, twenty seven birds, three reptiles and one invertebrate (the Butterfly).

During construction, the permanent and temporary loss of small areas of habitat for Victorian Temperate Woodland Bird Community and woodland fauna and the potential for injury or death is considered to have a medium residual effect.

Residual adverse effects of operations were considered low for threatened fauna communities. Each listed fauna species was assessed for expected residual effects of operations, with residual adverse effects ranging from insignificant to low.³⁷ In some cases, only benefits could be anticipated. The one exception was the Butterfly (see Chapter 7.10).

Regent parrot

The regent parrot is regularly observed in the Project areas.

For Belsar-Yungera, two construction footprint areas are known to, or could support nesting sites (S108 and ER1). No trees known to contain nesting hollows are proposed to be removed or impacted. The nearest known tree is more than 100 metres away at S108. Other construction footprint areas have large trees that could potentially be used as nesting sites, but there are no known records. Whilst large river red gum trees in the construction footprint will be impacted, not all will be felled and a significant portion will only be impacted within the tree protection zones. Overall, minor disturbance during construction is expected but not considered ecologically significant.

For Hattah Lakes North, targeted surveys for nest trees found the proposed construction areas were not directly used for breeding or foraging and with no potential nesting habitat proposed for removal. The nearest likely active nesting sites were found a minimum 350 metres from the construction footprint along Chalka Creek. Overall, minor impacts are considered possible, but expected to be localised, minor and not ecologically significant.

³⁶ EES Chapters 9 and 14, Tables 9.6 and 14.6

³⁷ EES Chapters 9 and 14, Tables 9.16 and 14.17

EDS E2g includes a contingency measure for monitoring if construction occurs during the breeding season in the vicinity of active nesting sites, in accordance with the Native Flora and Fauna Management Sub-Plan. Monitoring requirement M TE1 provides a process for monitoring regent parrot nests during construction, including pre-clearance surveys, assessment of known nesting trees and monitoring of nest trees. Routine monitoring is required on a weekly basis during construction. M TE1 provides:

Refer to hatched areas on map in EES Central terrestrial report showing potential nesting locations.

These measures repeat measures outlined in Table 13-5 of Specialist Appendix B to the EES.

(ii) The issues

The issues are whether:

- the residual construction and operation effects on threatened terrestrial fauna are acceptable
- potential effects on the regent parrot will be appropriately managed.

(iii) Evidence and submissions

Construction and operation effects on threatened fauna

DEECA submitted it did not consider the Project posed an unacceptable risk or consequence to any state-wide population of any FFG Act listed terrestrial fauna.

Mr Holmes gave evidence that while there would be winners and losers from operations, overwhelmingly terrestrial species would experience benefits. Recent floods had demonstrated survival techniques of terrestrial fauna such as retreating into tree canopies to survive inundation. Benefits on floodplain ecology are discussed further in Chapter 7.2 of this Report.

Regent parrot

DEECA noted the regent parrot had been a species of interest during the EES development, however it did not consider the Project posed an unacceptable risk or consequence.

Mr Holmes advised impacts to regent parrot had been avoided by removing the gear box loop track from the Project area at Belsar-Yungera. In addition, EDS E2g will manage risks to any other nesting pairs during construction. Operations were not an issue for the regent parrot.

The Proponent provided a cumulative assessment of MNES including the regent parrot (D113). The nine projects together would result in approximately 273.7 hectares of foraging habitat loss (being 0.03168 per cent of the estimated total) and 45.14 hectares of breeding habitat loss (0.12010 per cent of the estimated total) for this species. The Proponent concluded:

Given the relatively small scale of the localised (i.e., project specific) habitat loss and the likelihood that different project areas support different populations of the regent parrot, cumulative effects on this species, or any population of this species, as a result of the VMFRP construction are considered unlikely.

(iv) Discussion

Construction and operation

The Committee is satisfied the EES assessment has appropriately characterised potential effects to threatened fauna from construction. The development of a Native Flora and Fauna Sub-Plan to be

approved by DELWP/DEECA is an appropriate mechanism to address potential mitigation for effected species.

The Committee accepts evidence that the Project operations are unlikely to significantly impact any terrestrial fauna species (with the exception of the Butterfly discussed in Chapter 7.10).

Regent parrot

The Committee accepts the outcomes of the cumulative impact assessment for the regent parrot is consistent with significant impact guidelines. It agrees with Mr Holmes that EDS E2g is suitable to manage residual risks to the regent parrot during construction.

The Committee notes there is no cross-referencing from EDS E2g to monitoring requirement M TE1.

The monitoring requirements outlined in M TE1 and as specified in Specialist Appendix B are appropriate contingency measures, however, would only be required in the event construction occurs within the breeding season and within 350 metres of an active nesting tree. Currently there is only one tree within 100 metres from the construction footprint and no known nesting trees are proposed to be removed for construction. The preferred measure is to avoid construction in the vicinity of such trees during breeding season.

To clarify and simplify requirements, the Committee recommends EDS E2g is amended as follows:

Where construction occurs within 350 metres of an active nesting tree during the Regent Parrot breeding season (August to December inclusive) undertake monitoring, consistent with that outlined in Table 13-5 of Specialist Assessment B to the EES, in accordance with the Native Flora and Fauna Sub-Plan.

M TE1 can then be deleted and monitoring requirements can be finalised in the Native Flora and Fauna Sub-Plan.

It is useful to record where potential nesting trees may be. The current reference in Table 13-5 of Specialist Assessment B (repeated in monitoring requirement M TE1) is vague and unhelpful. The Committee recommends EDS E2g make explicit reference to the regent parrot habitat maps in Appendix I to Specialist Assessment B which shows potentially suitable nesting habitat within 120 metres of water.

The Committee also recommends:

- changing the heading of EDS E2g to 'Site specific additional measures - Regent Parrot'
- including reference in EDS E2a (Construction biodiversity administrative processes) to EDS E2g.

(v) Findings

The Committee finds:

- The EES assessment of construction effects to listed fauna species and proposed EDS is appropriate.
- Project operations are unlikely to significantly impact any terrestrial fauna species.
- Potential effects on regent parrot will be appropriately managed with implementation of the Committee recommended EDS.

(vi) Recommendations

The Committee recommends:

Environmental Management Framework

Include the following changes:

- a) Revised EDS E2g that clarifies and simplifies requirements for monitoring of regent parrot nests.
- b) Delete monitoring requirement M TE1 as fully captured in revised EDS E2g.
- c) Revised EDS E2a to refer to EDS E2g.

These changes are included at Appendix G.

7.10 Mildura Ogyris Butterfly (Hattah Lakes North)

(i) FFG Act Action Statement No. 158

The FFG Act Action Statement No. 158 – Mildura Ogyris (*Ogyris subterrestis subterrestis*) notes there were previously three known populations of this extremely rare, restricted species. One population at the Mildura Cemetery died out likely as a result of habitat disturbance and flooding in 1974. The Hattah population sighted in and adjacent to Hattah-Kulkyne National Park is recognised as the healthiest persisting population.

Threats include flooding, soil compaction, pesticide use and physical disturbance (for example from stock or pest animals).

Management of the Hattah-Kulkyne National Park areas should be appropriate for the conservation of the Butterfly and associated ant. Any management actions to protect the Butterfly should take into consideration possible impacts on other threatened species present in the National Park.

(ii) What did the EES say

The Butterfly is listed as endangered under the FFG Act. It belongs to a small, unique species complex that appears to be totally dependent on sugar ants for food supply during the larvae stage.

The Butterfly has been documented both within and adjacent to the MIA, including on the privately owned conservation property Raakajlim. The Butterfly is found in mallee woodland and shrubland, and hop-bush shrubland on sandy soil near floodplains where colonies of sugar ant establish at the base of trees and shrubs.

Potential effects during construction were considered possible due to its possible presence in the construction footprint, although this was considered to be unsuitable habitat.

It was considered likely the Butterfly would be unable to survive flooding. Therefore if the population was limited to the MIA, the potential impacts from inundation during operation would be direct and significant.

Targeted surveys located numerous oviposition (egg laying) sites outside the MIA and the potential impact from flooding on the species was therefore considered moderate. Eggs were only observed on living trees, not dead ones. The most common vegetation for oviposition sites were black box, moonah and narrow-leafed hopbush. Existing threats included intense grazing, including from rabbits and kangaroos.

The Butterfly survey report (Appendix J to Specialist Assessment B) recommended monitoring of oviposition sites in and around the MIA pre and post inundation to determine the response of the

sugar ants and hence, the Butterfly, to flooding. Comparative modelling with dry sites was recommended to determine if the Butterfly is able to persist in habitat that is very occasionally inundated. Managed inundation to improve floodplain vegetation may support the sugar ant, and by association the Butterfly, however *“this would need to be very carefully managed to ensure that important subpopulations of Mildura Ogyris are not lost in other parts of the MIA and its periphery”*.

The EES reported Project operations would have a neutral impact on the Butterfly.

The EMF did not adopt the monitoring recommended in Specialise Assessment B and did not include any measures for the Butterfly.

(iii) The issues

The issues are whether the:

- requirements of the Butterfly are adequately understood
- mitigation and monitoring measures are appropriate

(iv) Evidence and submissions

Mr Douglas (S5) was author of the FFG Act Action Statement No. 158 and reviewer of the EES Butterfly survey report. Mr Douglas and Moths and Butterflies Australasia Inc (S6) were concerned the proposed flooding of the MIA would have negative impacts on this important population of extremely rare Butterfly, with the post flooding recolonisation time unknown.

Butterfly Conservation South Australia (S13), Nature Glenelg Trust (S10) and Mr Glatz (S14) submitted the EES underrated the risks and likely outcome for the Butterfly, particularly as habitat would be lost and no mitigation measures were proposed. Nature Glenelg Trust gave an example of another environmental watering project in South Australia which inadvertently flooded the entire larval food plant area for two butterfly species which no longer occur in the park as a result.

The above submitters recommended further investigations, monitoring and mitigation.

Dr Murdoch gave evidence there had been no records of the Butterfly in these locations prior to the 1975 floods and it was therefore most likely the species had opportunistically colonised the floodplain whilst dry. The 2022 floods changed the risk profile for the species as it had inundated most of the known oviposition sites.³⁸ The proposed frequency of flooding of one in 10 years could impact the ability for the sugar ant to recolonise the MIA to achieve a population size suitable to support the Butterfly.

Despite the 2022 flood, Dr Murdoch considered the Hattah population to be nationally important because the Pink Lakes population may already be extinct and the South Australian population was limited to a roadside.

In addition to impacts from inundation, Dr Murdoch was concerned construction traffic on the northern end of Mournpall Track, where lekking (breeding) sites are present, could impact the species by roadkill during peak active flight time. Peak flight activity occurs twice a year generally around October and January but could be confirmed by the use of reference sites. Impacts could be avoided by avoiding heavy vehicle use of Mournpall Track during this time.

³⁸ D137, slide 21

In response to the Proponent's submissions, Dr Murdoch noted suitable habitat was not restricted to private property and considered it should not be up to private land holders to protect remaining habitat for a species.

Dr Murdoch gave evidence there are several species of sugar ants, not all of which can host the Butterfly. Without genetic testing, there was a risk in assuming all sugar ants were suitable Butterfly hosts as appeared to have been done in recent surveys.

Mr Holmes considered the lack of information about the Butterfly's ecology had resulted in submitters assuming worst case scenarios would eventuate. His assessment acknowledged the uncertainty, but was based on the contention "*that colonies of this species at Hattah North have always experienced periodic inundation and maintain resilience ... to recolonise*" once water recedes. Alternatively if the Butterfly lacked resilience to flooding it was a 'natural loser' of the Project, having inhabited a floodplain.

Mr Holmes gave evidence the Butterfly was not observed on dead vegetation therefore environmental watering was essential to supporting its habitat.

Mr Holmes provided a summary of all surveys undertaken with respect to the Butterfly, including recording sightings of the sugar ant without the Butterfly (D101). This culminated in a habitat model being mapped which, assuming 'fit for purpose', indicated the MIA represented 11 per cent of the area of suitable habitat within the modelled extent.

Mr Holmes supported further monitoring for research purposes to determine:

- recolonisation of the sugar ant in floodplain areas currently inundated by the 2022 floods
- presence of the Butterfly before and after managed inundation events as delivered under the VMFRP
- potential broader distribution of the Butterfly in accordance with the FFG Act Action Statement No. 158.

The Proponent submitted inundation on private land was subject to private landowner permission, therefore, Dr Murdoch would have the ability to control inundation on Raakajlim to avoid any effects she was concerned about.

The Proponent reiterated its view that the Project was for the overall benefit of the floodplain and cautioned against creating a 'hero' species by requiring certain monitoring or actions to be pre-conditions for approval or at the cost of overall floodplain health.

In its Final Day versions of the Project Documents, the Proponent proposed two new monitoring requirements (M TE10 and M TE11):

- To assess the impacts of the 2022 flood event on the Butterfly – survey recorded locations of oviposition sites on public land within the MIA, once prior to operations.
- To assess the response of the Butterfly over time to environmental watering – survey recorded locations of oviposition sites on public land within the MIA every 5 years for at least 15 years with review thereafter.

Dr Murdoch commented on the Final Day versions, stating it was important for monitoring to inform project modification or mitigation measures to manage this one location and allow the Butterfly to persist "*whilst also maximising benefits for other species*" (D185). She advised:

- M TE10 surveys should:

- not be limited to previously recorded oviposition sites as there was no likelihood sugar ants or butterflies would persist post flooding at these sites, nor re-establish at those exact locations
- not be limited to public land
- include the sugar ant and determine the recolonisation rate by host ants
- be undertaken annually
- M TE 11 surveys should:
 - be undertaken *“to ensure the butterfly population does not decline in response to environmental watering”*
 - include locations inside and outside the MIA as recommended in the EES³⁹
 - address issues raised for M TE 10 above.

(v) Discussion

The Hattah Lakes North population of the Butterfly is the most significant and one of only two populations in the State.

The Committee acknowledges the evidence of Mr Holmes, however it also gives significant weight to the evidence of Dr Murdoch due to her expertise and local knowledge of the Butterfly. It considers that the EES underrated the risk and has not fully investigated the impact to the Butterfly. It considers:

- there is no evidence the Butterfly is flood tolerant or that it maintains resilience to recolonise the floodplain
- if the Butterfly is able to recolonise the floodplain post-flooding, it is unclear how long this process will take as a suitably large colony of sugar ants would need to establish first
- the potential exists to significantly impact the extent of this population by inundating habitat more frequently than it can tolerate
- reversal of terrestriation should not be at the expense of the extent of the most significant population of this State endangered species
- measures to mitigate impacts are warranted during construction and operations.

During construction, the greatest risk identified is road kill. The EES identifies construction access would be via Mournpall Track to Bitterang Regulator and River Track to K10 Regulator, Causeway regulator and Kulkyne Station Claypit. To avoid and minimise impacts, construction traffic should avoid Mournpall Track during active flight seasons. The Committee recommends a new EDS E2h to include this mitigation measure, and for this to be referred to in EDS E2a as it relates to the Native Flora and Fauna Management Sub-Plan.

It is possible the sugar ant and Butterfly will recolonise the MIA following the 2022 floods, however it is not known if this will occur or how long it would take. More frequent inundation may impact the ability of sugar ants to establish suitably large colonies for the Butterfly.

All parties agreed monitoring was warranted prior to and during operations. The Committee accepts Dr Murdoch’s evidence regarding the limitations of the monitoring proposed by the Proponent and that monitoring needs to be linked to mitigation and management outcomes if the area is recolonised. The Committee recommends details of monitoring and any management measures be developed in a Butterfly Sub-Plan of the OEMP and to be approved by DEECA in a new EDS E6.

³⁹ Appendix J to Specialist Assessment B, page J-19

The Butterfly Sub-Plan should address appropriate monitoring requirements to determine recovery and recolonisation of the MIA by the sugar ant and Butterfly following the 2022 floods. It should inform management decisions regarding the extent of inundation events over potential habitat, and implementation of any mitigation or management measures should inundation occur.

The Sub-Plan should take a pragmatic approach and balance the need to prevent further decline of the Butterfly from environmental watering with the overall ecosystem health and the needs of any other relevant threatened species.

(vi) Findings

The Committee finds:

- The requirements of the Butterfly are not well understood.
- Subject to implementing the Committee recommended changes, mitigation and monitoring measures are likely to ensure impacts are acceptable.

(vii) Recommendations

The Committee recommends:

Environmental Management Framework

Include the following changes:

- a) New EDS E2h to schedule construction traffic to avoid the use of Mournpall Track during active Mildura Ogyris Butterfly flying times.**
- b) Revised EDS E2a to refer to EDS 2h.**
- c) New EDS E6 that requires a new Mildura Ogyris Butterfly Sub-Plan of the Operation Environmental Management Plan to be approved by the Department of Energy, Environment and Climate Action.**

These changes are included at Appendix G.

7.11 Pest plants and animals

(i) What did the EES say

Pest and overabundant native species were recognised as an existing threatening process in the Project areas which could, in some circumstances, be exacerbated by construction and environmental watering.

The EMF included the following measures to manage risks from pest plants and animals:

- EDS E2d – Construction weed and pest management – prescribed requirements to be included in the Native Flora and Fauna Management Sub-Plan of the CEMP.
- EDS E2e – Construction rehabilitation management – prescribed requirements to be included in the Native Flora and Fauna Management Sub-Plan of the CEMP.
- EDS E3 – proposed a Pest Plant and Animal Monitoring and Management Plan to be prepared and implemented by Parks Victoria during operations.

The EMF stated:

Parks Victoria, Mallee CMA and Traditional Owners and Interested Parties, as partners in land and waterway management, are closely involved in the planning and delivery of environmental water and these associated management and enhancement activities on

public land. This is achieved through collaborative development of key planning and strategic documents such as the Pest Plant and Animal Monitoring Management Plan.

For both Project areas, the EES considered the residual risk from the potential introduction of weeds, pest species or pathogens was high for construction and medium for operations.

(ii) The issues

The issues are whether:

- the proposed EDS are appropriate to mitigate risks of pest plants and animals
- mitigation measures should apply equally to private and public land.

(iii) Evidence and submissions

Ms Jellie recommended the following changes to the exhibited EDS:

- additional text be added to EDS E2d to ensure biosecurity checks of vehicles entering the construction footprint
- amend EDS E2e to require rehabilitation to specifically include “*weed monitoring and management*”.

Ms Jellie explained the residual risk of weeds from construction was high, and from operations it was medium. She recommended amendments to mitigation measures for construction including:

- biosecurity checks of vehicles (EDS E2d)
- rehabilitation to include weed monitoring and management (EDS E2e).

Mr Marsden recommended EDS E2d be amended to clarify that weed management should include both terrestrial and aquatic weeds (see Chapter 8.7 of this Report).

Noting the benefits of the Project to native flora and fauna, Parks Victoria submitted “*there will be a proportionate increase in pest plants and animals that will need to be addressed to ensure the benefits of the investment are realised*”. Parks Victoria supported the approach in EDS E3 and the need for investment in this mitigation strategy.

Dr Murdoch identified existing issues on the Raakajlim property included overgrazing from kangaroos, increased abundance of noisy minors, feral pigs, and weeds. She understood there was no mitigation or monitoring proposed on private land and was concerned about the additional burden on private landowners for pest plant and animal management from the recent floods and future managed inundations. Dr Murdoch advised Raakajlim had always been managed collaboratively with adjoining parks and the Mallee CMA and would propose a similar approach going forward with support for pest plant and animal control.

The Proponent submitted private landowners would be responsible for weed and pest management consistent with existing obligations under the *Catchment and Land Protection Act 1994*. In addition, Parks Victoria’s Good Neighbour Program may be implemented to assist pest control actions that reduce threats to neighbouring landowners and improve condition of the Parks Victoria estate. Involvement in such programs is out of scope of the Project and subject to discussions with landowners and relevant agencies (D99).

The Proponent adopted the changes proposed by its experts to the EDS E2d and E2e.

(iv) Discussion

The Committee agrees with the Proponent's proposed changes to EDS E2d and E2e. These changes are captured in the Committee's recommended EDS at Appendix G.

The Committee accepts the greater risk that weeds may be introduced during construction than operations, and this will generally be on public land. On private land the greater risk will be during operations, although the overall risk of the introduction of weeds or pest plants is lower during operations. The burden to manage and control pest plants and animals will therefore likely increase as a result of the Project.

The Committee considers it appropriate that the Proponent work with landowners to mitigate this risk on private land. Details of suitable approaches and measures (including for example, communications, education, working bees and grants) should be detailed in the Pest Plant and Animal Management Plan required by EDS E3. Measures must be implemented in consultation with and subject to discussions with landowners.

(v) Findings

The Committee finds:

- The EDS to manage pest plants and animals will be appropriate, subject to changes recommended by the Committee.
- The Project should support private landowners in managing the spread of pest plants and animals resulting from managed inundation.

(vi) Recommendation

The Committee recommends:

Environmental Management Framework

Include the following change:

- a) Revised EDS E3 to include measures to assist private landowners with the increased risk of pest plant and animal presence and activity due to operations.**

This change is included at Appendix G.

7.12 Overall conclusions on terrestrial ecology

There are no terrestrial ecology impacts that preclude the Project being approved or the evaluation objectives being achieved. The EDS should, however, be amended to ensure impacts on terrestrial ecology are appropriately managed and minimised.

8 Aquatic ecology

8.1 Introduction

The relevant Scoping Requirements evaluation objectives are:

Implement environmental watering of floodplains to enhance ecosystem function, biodiversity (particularly listed threatened species and communities), water quality, and cultural values.

Avoid, and where avoidance is not possible, minimise potential adverse effects on native vegetation, species of flora and fauna (particularly listed threatened species and their habitat and listed ecological communities), as well as address offset requirements (if required) consistent with state and Commonwealth policies.

Avoid and, where avoidance is not possible, minimise adverse effects on water quality, hydrology, hydrogeology and beneficial water uses (including for the Ramsar listed wetlands).

Aquatic ecology is discussed in:

- EES report chapters 9.2 and 14.2
- Specialist Assessment A Ecology - Aquatic.

The exhibited EMF includes the following EDS:

- E2a Construction biodiversity administrative processes
- E2c Construction fauna management
- E2d Construction weed and pest management
- E2e Construction rehabilitation management
- E2f Aquatic fauna management
- E3 Pest Plant and Animal Monitoring and Management Plan
- E4a Overall biodiversity improvement – Belsar-Yungera
- E4b Overall biodiversity improvement – Hattah Lakes North
- SW2 Surface water management – operation.

Other EDS are also relevant, particularly those relating to surface water (SW1, SW3), groundwater (GW1, GW2), lighting (LV3), contamination (CM1a, CM1b, CM1c, CM3), acid sulfate soils (CM2), erosion, sediment control and land stability (GS1, GS2, GS3), noise (NV1) and waste management (RU1).

In response to the Committee's RFI and other issues raised at the Hearing, the Proponent provided the following Technical Notes:

- TN06 Cumulative assessment for MNES (D113)
- TN07 Aquatic ecology RFI responses (D128)
- TN11 Questions taken on notice – surface water (D164)
- TN12 Questions taken on notice – aquatic ecology (D165)
- TN15 Previous environmental watering projects (D184).

Additionally, the Committee had regard to:

- the Proponent's RFI response dated 23 December 2022 (D99)
- the Ecological Monitoring, Evaluation and Reporting Plan (D44).

Table 9 lists the aquatic ecology evidence.

Table 9 Aquatic ecology evidence

Party	Expert	Firm	Area of expertise
Proponent	Tim Marsden	Australasian Fish Passage Services	Aquatic ecology
Proponent	Simon Treadwell	Jacobs	Surface water

8.2 Aquatic ecology (construction)

(i) What did the EES say

Construction poses risks to aquatic ecosystems through a range of risk pathways including direct impacts, loss of connectivity, degradation of aquatic habitat, spread of weeds, pest species and pathogens, noise and vibration, and light. Mitigation measures to address these risks are set out in the EMF and residual risks and effects are generally low or insignificant.

The exception is the effects of construction of the ER1 regulator and fishway at Belsar-Yungera, on connectivity and impeded passage for native species, which has medium initial and residual risk ratings. This risk is addressed by two EDS, specifically E2c Construction Fauna Management and E2f Aquatic Fauna Management.

(ii) The issue

The issue is whether the effects of construction of the Project on aquatic ecology are acceptable.

(iii) Evidence and submissions

Mr Marsden gave evidence that construction of the ER1 regulator would require a coffer dam, which would need to remain in place during construction for a period of approximately 6 months. The coffer dam would temporarily impede fish passage during this period.

In response to a question from Environment Victoria, Mr Marsden explained the impacts on fish passage resulting from construction could be minimised by undertaking construction during a period of no flow or outside the fish migration periods, such as in the middle of winter.

(iv) Discussion

Project construction poses a range of potential risks to aquatic ecosystems, which can be satisfactorily managed by the EDS.

EDS E2f should be amended to include a requirement for the timing of works for the ER1 regulator and fishway to avoid construction at times when fish migrate. A reference to E2f should also be included in EDS E2a to ensure aquatic fauna management is taken into consideration in the Native Flora and Fauna Management Sub-Plan.

(v) Findings

The Committee finds the construction effects of the Project on aquatic ecosystems can be acceptably managed, subject to the recommendations of the Committee.

(vi) Recommendations

The Committee recommends:

Environmental Management Framework

Include the following changes:

- a) Revised EDS E2f that requires construction of the ER1 regulator and fishway occur during a period of no flow in Narcooyia Creek or outside the periods of time when fish migrate.
- b) Revised EDS E2a to refer to EDS E2f.

These changes are included at Appendix G.

8.3 Stranding of aquatic species during drawdown (operations)

(i) What did the EES say

Floodplain inundation is expected to benefit small-bodied fish species. Medium to large fish may use the floodplain for short-term foraging. Fish may be stranded following managed inundations if the drawdown is too rapid. The residual effect of stranding aquatic species on the floodplain is expected to be medium at Belsar-Yungera and low at Hattah Lakes North.

To mitigate the risk of fish stranding, EDS SW2 provides for the development and testing of a native fish exit strategy to allow native fish to migrate from the floodplains in the Project areas. The EES states that the fish exit strategy proposed in EDS SW2 is ‘experimental’.⁴⁰

At Belsar-Yungera, the fishway at regulator ER1 is intended to be the main exit point from the managed floodplain. Flow velocities through the other structures may be higher than the swimming capability of fish, which may result in fish strandings. Fishways are not proposed at major regulators ER3 and SW7, which may result in the stranding of fish that move upstream towards the Murray River rather than downstream towards regulator ER1, and if the flow velocities through the regulators exceed the swimming abilities of the fish. There is also an existing barrier (block bank) at the inlet to Narcooyia Creek upstream of the MIA.

At Hattah Lakes North, the native fish exit strategy will be tested in the Chalka Creek North WMA, based on fish exiting at Regulator K10. There is a risk that fish will be stranded if they attempt to leave the receding floodwaters by moving upstream rather than downstream. The native fish exit strategy is not proposed to be applied to the Lake Boolca WMA, which will be left to dry through evaporation, with no downstream exit point.

The EES noted that even if native fish are stranded, this would still provide ecological benefits, as the stranded fish would provide a food source for birds, turtles and other terrestrial fauna.

It is possible that freshwater turtles may also be stranded as a result of drawdown following managed inundations. However, Murray River turtles and Broad-shelled turtles are mostly associated with permanent or near-permanent water rather than temporary inundation as is proposed. Eastern Snake-necked turtles are more likely to use temporary freshwater habitats but are known to travel considerable distances over land. The EES does not make any provisions in relation to managing the risk of freshwater turtle stranding.

⁴⁰ Specialist Assessment A, page 126

(ii) The issue

The issue is whether the Project adequately minimise risks of stranding of aquatic species (including fish and turtles) on the floodplains.

(iii) Evidence and submissions

Ms Thornton was concerned about the risk of fish stranding on the floodplain as a result of the Project.

In TN07 the Proponent explained the native fish exit strategy is likely to be based on a strategy previously trialled at Gunbower Forest (D128):

- The strategy will be *“developed over the course of multiple watering events, in accordance with the principle of adaptive management”*.
- The *“development, implementation and refinement of the native fish exit strategy will be supported by fish movement monitoring undertaken in accordance with the [Monitoring, Evaluation and Reporting Plan] (refer to M AE2 in Table 18.13 of the Environmental Management Framework) and adaptive management”*.
- *“In the event that large numbers of high value large-bodied fish species are found to be regularly stranded on the floodplain (which is considered unlikely) consideration would be given to capture and relocation of native fish, as appropriate”*.

Mr Marsden gave evidence that stranding of fish in drying lakes, billabongs and depressions is a natural process in most Australian rivers and provides significant food resources for other animals such as birds. The Proponent reported that in TLM projects *“Fish that are stranded by retreating floodwater contribute to the nutrient supply of wetlands and those that are returned to the main river channel contribute to the riverine food web, including for fish-eating birds and predatory fish”* (D184).

Mr Marsden noted that the EES identified the operational arrangements to encourage fish to leave the inundated floodplains include ramping of flows to cue fish that water levels are dropping (D127). He advised that these operational arrangements would minimise fish strandings.

(iv) Discussion

Fish using the floodplains may be stranded if the drawdown following managed inundations is too rapid. The EES proposes an experimental native fish exit strategy based on ramping of flows to cue fish that water levels are dropping, based on a strategy previously trialled at Gunbower Forest. It is unclear whether the native fish exit strategy will be compatible with other strategies and management measures also reliant on operational release regimes.

The Committee agrees that stranding of fish on floodplains after inundation events is a natural process that provides food resources for other animals. It notes Mr Marsden’s advice that the inundated floodplains are expected to mainly benefit small-bodied fish species, while large, high-value fish species such as Murray cod and silver perch are expected to only use the floodplains opportunistically and are therefore less likely to be stranded.

The proposal to capture and relocate native fish if large numbers of high value large-bodied fish species are found to be regularly stranded on the floodplain is not reflected in the EDS. The Committee has concerns about potential logistic constraints and difficulties with this approach. If high-value fish are found to be regularly stranded on the floodplain, a review of the causes of the

strandings should be undertaken, with a view to addressing any underlying design or operational issues associated with the Project.

The EMF should be amended to:

- require monitoring and reporting on native fish strandings resulting from managed inundation events, so that recurrent strandings can be identified and investigated to enable management measures to be implemented to address the strandings as required (EDS SW2)
- include a new monitoring requirement related to fish stranding events (M AE7).

The Committee notes that fish passage through the regulators and the ER1 fishway are critical in relation to fish strandings and has made recommendations regarding connectivity (see Chapter 8.5 of this Report).

(v) Findings

The Committee finds:

- The EMF should include revisions to require monitoring and reporting on fish strandings to support adaptive management.
- Fish stranding effects of the Project can be acceptably managed through the Committee recommended EMF.

(vi) Recommendations

The Committee recommends:

Environmental Management Framework

Include the following changes:

- a) Revised EDS SW2 in relation to monitoring and reporting on fish strandings associated with the Project.**
- b) New monitoring requirement M AE7 in relation to monitoring and reporting on native fish stranding.**

These changes are included at Appendix G.

8.4 Carp (operations)

(i) What did the EES say

Operation of the Project is expected to lead to increased carp populations, with a high residual effect at Belsar-Yungera and medium residual effect at Hattah Lakes North. Carp are already present in the Project areas, including the Murray River, Narcooyia Creek and Chalka Creek. Managed floodplain inundation would greatly increase the extent and quality of potential carp breeding habitat at Belsar-Yungera and create potential additional carp breeding habitat at Hattah Lakes North.

The risk of increased carp populations is proposed to be addressed by two mitigation measures in EDS SW2:

- Factor seasonal implications in the timing of filling and drawdown
- Develop and test a strategy to retain carp on the floodplain for the Hattah Lakes North project.

The suitability of the inundated areas for carp breeding is affected by water temperature, with inundation in spring or summer providing more favourable conditions for carp breeding than winter inundation. June and July are considered to provide the lowest risk conditions for inundation. However, operational constraints may require the managed floodplain inundation to coincide with the carp breeding window (late winter to summer).

The strategy to retain carp on the floodplain at Hattah Lakes North is based on managing drawdown rates to result in stranding of carp. It is not proposed for Belsar-Yungera because Narcooyia Creek is a permanent waterway that also supports native fish species, and drawdown would be likely to concentrate carp in Narcooyia Creek.

The EMF does not include any requirements for carp monitoring.

(ii) The issues

The issues are whether:

- the Project will lead to increased carp populations
- the effects of the Project in relation to carp can be acceptably managed.

(iii) Evidence and submissions

Several submitters raised concerns about the effects of the Project in terms of carp populations. Environment Victoria submitted that if water is delivered to the floodplain at inappropriate times, there is potential for environmental damage associated with carp.

Mr Marsden gave evidence that carp is the most significant aquatic pest species relevant to the Project, and confirmed the Project was expected to lead to increased carp populations. Carp spawn on floodplains and reproduce quickly, producing massive numbers of fish that can affect river populations for years after a spawning event (D127). Mr Marsden gave evidence that the late 2022 floods would have led to increased carp populations, which are likely to persist for some years and then decline. He considered this effect to be part of cyclical population dynamics rather than a shift in baseline for carp populations.

Mr Marsden considered the mitigation measures in EDS SW2, which focus on the timing of watering, would be the best way to manage the risk of carp proliferation associated with floodplain watering. He advised if watering could not be undertaken in the cooler months, consideration should be given as to whether watering occurs at all in a given season. He explained that if watering is done in the warmer months, other carp mitigation measures would be required, such as trapping or stranding.

Mr Marsden gave evidence there are no ‘natural’ measures to control carp. Carp harvesting has minimal effects, and carp cages on fishways can be locally effective but only have small-scale effects.

In response to a question from FoNVP, Mr Marsden explained it would take something like a virus to bring carp numbers down to a reasonable level.

In relation EDS SW2, Dr Treadwell gave evidence that the strategy to retain carp on the floodplain for the Hattah Lakes North is *“experimental and subject to adaptive management ... carp are still likely to breed in response to managed and unregulated inundation events”* (D80).

The Proponent clarified the strategy to retain carp on the floodplain for the Hattah Lakes North would be applied to the Chalka North WMA but not the Lake Boolca WMA where environmental

water will be left on the floodplain to gradually dry out (D128). The carp stranding strategy is based on the premise that carp will not respond to the same exit cues as native fish to leave the floodplain and return to the Murray River. This approach is proposed to be explored and refined through adaptive management.

The Proponent acknowledged that carp remain a residual risk that will need to be managed as part of the Project, informed by operational monitoring, adaptive management, and the watering event lessons record (D165). It explained that multiple factors would need to be considered in determining regulator drawdown rates, including downstream erosion risks, seasonal implications, the native fish exit strategy and maintaining mixing and dilution in the Murray River. It submitted these factors would be considered in preparing Operating Plans, which would be refined by adaptive management.

The Proponent submitted that *“although risks associated with Carp populations are acknowledged and need to be managed, these risks do not outweigh the benefits of floodplain inundation to native fish and other flood-dependent plants and animals”* (D128, para 42).

The Proponent provided TN06 which confirmed there is potential for cumulative adverse effects from increased carp populations across the VMFRP projects (D113).

(iv) Discussion

Project operations are expected to lead to increases in carp populations in the Project areas and the Murray River. The key mitigation measure proposed is timing of managed inundation events so that they occur in the winter months when low water temperatures are not conducive for carp breeding. However, this may not necessarily be achievable due to operational constraints including the availability of water and the timing of natural flow events that would be enhanced by the Project.

The Committee notes Mr Marsden’s advice that if watering cannot be undertaken in the cooler months, consideration should be given to whether watering occurs at all in a given season. EDS SW2 should be amended to explain the requirement to factor in seasonal implications of the timing of inundation to reduce the likelihood of creating suitable breeding conditions for carp. It should also state that inundation events should not occur in the warmer months (when conditions are conducive to carp breeding) unless other benefits outweigh the risks associated with carp population increase.

The Committee notes the advice of Dr Treadwell that the carp stranding strategy proposed at the Chalka North WMA is experimental, with risks including stranding of native fish at the time the carp are stranded. The Committee was not provided with any material that demonstrated whether the releases necessary for carp stranding are compatible with release requirements to address other management objectives, including minimisation of shear stress to maintain channel stability, and creating conditions suitable for the exit of native fish.

The Proponent acknowledged that multiple factors need to be considered in determining regulator drawdown rates, and this would be addressed through the development and refinement of operating plans. At this stage it not known whether all of the EDS that rely on release management can be simultaneously applied and, if not, how the various EDS will be prioritised.

The extent to which manipulation of drawdown rates can be used to control carp populations by stranding is unclear. This is acceptable given the carp stranding strategy is only proposed for one

of the six WMAs in the two Project areas and the timing of managed inundation events is the main measure to address the implications for carp.

The monitoring requirements in the EMF do not make any specific reference to carp and the VMFRP *Ecological Monitoring, Evaluation and Reporting Plan* (D44) does not propose any monitoring of carp. Information on the effects of the proposed EDS on carp is required to determine whether they are effective and to enable adaptive management. Monitoring requirement M AE3, which requires fish surveys of wetlands and floodplain lakes in the Project areas to assess the effects on small-bodied native fish, should be amended to include a requirement to also assess the effects on the abundance of carp.

Further, EDS E3 (Pest Plant and Animal Monitoring and Management Plan) does not make any specific reference to carp and the discussion of carp in Specialist Assessment A does not refer to EDS E3. EDS E3 should be amended to clarify that both aquatic and terrestrial pest species should be covered by the Pest Plant and Animal Monitoring and Management Plan, including carp.

The Committee notes that carp are already present in the Project areas, and there is expected to be a boom in carp populations as a result of recent floods. In this context, the Committee considers the effects of the Project on carp to be acceptable, provided they are effectively managed in accordance with the Committee recommended EDS.

The Committee notes the advice of Mr Marsden that operational mitigation measures proposed in the EES are currently the best way to manage carp within floodplain watering activities. It also notes that there is ongoing research into carp control, including consideration of the release of a carp virus as an option.

Until an effective general carp control measure is established, carp are expected to pose an ongoing threat to the achievement of Project's benefits for aquatic ecosystems and will require ongoing active management. General developments in carp control measures should be monitored and the Operating Plan should be periodically reviewed in relation to any new developments.

The EMF states the Operating Plan will be reviewed every 5 years or as needed (including in response to changes in legislation, river operations or identification of issues that require rectification based on outcomes of monitoring). Significant developments in carp control should also be considered in determining the need for review. The Committee recommends additional wording in Section 18.8.3.5 Operating Plan of the EMF to reflect this requirement.

Cumulative effects of carp are considered in Chapter 8.4 of this Report.

(v) Findings

The Committee finds:

- The Project will have moderate (Hattah Lakes North) or major (Belsar-Yungera) residual effects in terms of increases in carp populations.
- The significance of the effects of the Project on carp is reduced by the existing presence of carp in the Project areas and Murray River, and likely current boom in carp populations following the 2022 floods.
- The carp effects of the Project can be acceptably managed through the EMF, including EDS and monitoring requirements, subject to the recommendations of the Committee.

(vi) Recommendations

The Committee recommends:

Environmental Management Framework

Include the following changes:

- a) Revised EDS SW2 in relation to the timing of inundation events to reduce carp breeding.
- b) Revised EDS E3 that requires the Pest Plant and Animal Monitoring and Management Plan to address both ‘terrestrial and aquatic’ pests, including carp.
- c) Revised monitoring requirement M AE3 that includes a performance objective and indicator in relation to carp populations.
- d) Amend Section 18.8.3.5 Operating Plan of the Environmental Management Framework (page 18.34) to state:

The Operating Plans are not intended to prescribe particular watering events. They are a ‘living document’ that would be further refined and updated over time if legislation changes or operations in the major river systems require it or outcomes of monitoring identify an issue that requires rectification or there are significant advances in science or technology.

These changes are included at Appendix G.

8.5 Aquatic fauna connectivity (operations)

(i) What did the EES say

The Project involves the construction of structures, including regulators and containment banks, that may result in loss of connectivity and impede passage of aquatic fauna including fish and turtles. The residual effect on connectivity and passage for native aquatic species from the operation of the fishway and regulators is expected to be medium at Belsar-Yungera and low at Hattah Lakes North. The Project would have low residual effect in terms of fragmentation of habitat for turtle species.

A vertical slot fish way is proposed for the ER1 regulator on Narcooyia Creek, which has permanent aquatic habitat. The ER1 fishway is intended to provide the main connection for fish between the Belsar-Yungera floodplain and the Murray River. It will replace an existing weir situated 3 kilometres further upstream on Narcooyia Creek, which is currently a barrier to fish passage (except in larger floods when it is overtopped).

The ER1 fishway is intended to provide upstream and downstream passage for small, medium and large fish, as well as eggs and larvae. The regulator and fishway designs are similar to those used elsewhere in the Murray Darling Basin, and therefore there is a high degree of confidence that the ER1 structure would enable the passage of target species. Adaptive management of the ER1 fishway operation would rely on the implementation of monitoring set out in the EMF, including ecological and hydraulic assessments.

The ER1 fishway has not been designed for freshwater turtles and it is expected that the ER1 regulator would act as an in-water barrier for turtles, especially migrating Broad-shelled turtles, which are an obligate aquatic species (that is, depending on waterbodies of its lifecycle). The ER1

regulator would be a more significant barrier to Broad-shelled turtles than the existing weir on Narcooyia Creek.

To pass the ER1 regulator, turtles would need to leave the water, exposing them to predation by foxes. Changes to bank conditions may also make overland passage difficult. Monitoring of the status of the turtle population and response to the barrier of the ER1 regulator is proposed in the EMF. Providing passage around the structure that is safe from fox predation could be a suitable approach, such as construction of a turtle ramp, reducing bank slopes, construction of fencing to direct turtles around the structure and targeted fox control. The EES reported the efficacy of turtle ramps is unknown.

The EMF includes the following monitoring requirements and associated performance objectives in relation to the ER1 fishway (relating to Belsar-Yungera only):

- M AE2 – To assess movement of large and medium native fish between the River Murray and Narcooyia Creek.
- M AE5 – Turtle presence in the fishway – to minimise potential adverse effects on turtle passage due to operation of the ER1 regulator – with provision for more detailed contingency monitoring and potential improvements to turtle passage if this is found to be an issue.
- M AE6 – Confirmation that the ER1 fishway is operating in accordance with design criteria.

The other regulators will not have fishways but will be designed to provide ‘passive fish passage’ using design features such as overshot gates and plunge pools. However, the design flow velocities for the small regulators (less than 1 metre per second) may be higher than the swimming capability of fish that require upstream passage (less than 0.03 metres per second for small fish to less than 0.30 metres per second for large fish), which could restrict fish movement, potentially resulting in fish strandings.

The designs of regulators are similar to those used elsewhere in the Murray Darling Basin and there is a high degree of confidence that fish passage would be maintained. No monitoring of connectivity is proposed for the regulators other than ER1.

The regulators have not been designed to facilitate turtle passage. Containment banks and track raising may increase the fragmentation of turtle habitat, but given the extent of floodplain habitat available, the significance of habitat fragmentation is considered to be low.

(ii) The issue

The issue is whether the Project infrastructure will provide adequate connectivity for aquatic fauna (fish and turtles).

(iii) Evidence and submissions

Several submitters expressed concerns about the effects of the Project on connectivity for aquatic fauna. VNPA submitted that *“Built infrastructure will also likely stop the free movement of fish and turtles across the rivers and flood plain,”...“impede the movement of animals trying to adapt to the changing climate, and also slowing the movement of much needed genetic diversity through the species using the river”*.

In TN07, the Proponent explained that apart from the ER1 fishway, no other fishways are proposed *“as all other infrastructure will be constructed in areas that are generally dry under*

existing conditions (and therefore do not require maintenance of fish passage), or at locations at which in-water barriers to connectivity already exist” (D128).

The Proponent submitted that the effects of the Project on lateral connectivity between the Murray River and floodplain habitat could be understood as follows:

- normal river flow – the Project will have a neutral effect on lateral connectivity as there is no connectivity between the Murray River and floodplains
- operational events – the Project will have a net positive effect by increasing the frequency of lateral connectivity for both Project areas and the extent of managed inundation at Hattah Lakes, the ER1 fishway on Narcooyia Creek will increase connectivity for fish compared to existing conditions (existing weir with no fishway) and small regulators will allow for passive fish passage
- natural flood events – the Project will have a neutral effect on lateral connectivity as *“all regulating structures would be opened, allowing flows to pass”*.

Mr Marsden gave evidence that following the completion of Specialist Assessment A (which he peer reviewed as a member of the Biodiversity Expert Review Group), he had *“undertaken further work in relation to the detailed design of fish passage structures associated with infrastructure required for the Projects”* (D81). He found that *“broadly the fish passage infrastructure that has been incorporated into the Projects is suitable for the species that occur in the Project areas and that the level of fish passage that is expected to be provided by the structures is suitable to maintain fish species lifecycles within the Project areas”*. At the Hearing, Mr Marsden explained that the regulators were designed to be ‘fish friendly’ by sizing the gates to ensure that velocities would be sufficiently low to be suitable for the movement of target fish species.

Mr Marsden explained the Project would maintain free movement of aquatic animals past structures, ensuring adequate genetic exchange occurs.

In response to a question from Environment Victoria, Mr Marsden gave evidence that the Project infrastructure generally improved the access of aquatic fauna across the floodplains. He explained that the best fish passage is available if there are no structures. As soon as there are structures, fish passage is restricted in some way. However, this is counterbalanced by the increase in extent/duration of aquatic habitat on the floodplain, which would otherwise be dry (with no aquatic habitat or fish passage). As a result, the net effect is more fish passage onto the floodplains than existing conditions, rather than less.

In response to a question from FoNVP, Mr Marsden gave evidence that flood runners (also known as anabranches) provide very temporary connections and fish tend to move back to the main channels, so he did not consider that blockage of any flood runners by containment banks would lead to a significant reduction in fish passage.

In response to a question from Environment Victoria regarding the risk of turtle entrapment in the ER1 fishway, Mr Marsden explained that turtles occasionally use fishways but prefer overland pathways past barriers such as regulators. Turtle passage requirements are not well understood but are the subject of research. Turtle ramps are expected to assist turtles to get up and over structures.

(iv) Discussion

The Project will alter connectivity between the Murray River and the floodplains in the MIAs. The Northern Region Sustainable Water Strategy, quoted in the Proponent's Part A submission (D92) states that:

There is no doubt that with increasing water scarcity, structural works will be an important solution for flooding high-value floodplains and wetlands. However, ... while structures provide a means to water isolated sites, they often result in a disconnection between the river and the floodplain and may act as a barrier to fish movement and migration. This reduces the ability of plant and animal populations to disperse and recolonise, and often requires the costly construction of fishways to minimise their impact and enable fish passage.

A vertical slot fishway is proposed for the ER1 regulator on Narcooyia Creek, which it intended to be the main exit point from the Belsar-Yungera Project to the Murray River. The EES assessment and evidence from Mr Marsden indicate this fishway is likely to be effective in allowing fish to move between the Belsar-Yungera Project area and the Murray River, but it may have adverse effects on the movement of turtles.

The EMF includes appropriate monitoring requirements to check that the ER1 fishway is operating in accordance with design criteria as well as to determine effects on turtle movements, including contingency measures to address potential impacts on turtles if impacts are identified.

The other regulators in the Project areas will not have fishways. While Mr Marsden advised the regulators would permit fish passage, with measures including sizing of gates to ensure that velocities would be low enough to be suitable for the movement of target fish species, the EES stated that the design flow velocities for at least some of the regulators may exceed the swimming capabilities of the target fish species. If the regulators impede fish passage in this way, the risk of fish strandings would be increased and the effects of the Project during natural flood events on lateral connectivity will not be neutral as claimed by the Proponent (D128). The Committee notes the prevention of passage of aquatic biota as a result of instream structures is a threatening process under the FFG Act.

For avoidance of doubt, the EMF should include a requirement to ensure that the design of the regulators provides suitable velocities for the passage of all target species of native fish to the extent reasonably practicable. The Committee proposes a new EDS SW5 to reflect this.

The regulators have not been designed to facilitate turtle passage. The Committee accepts Mr Marsden's evidence that turtles are likely to be able to bypass the regulators and move overland across the containment banks and spillways. The design of the containment banks and spillways should have regard to the facilitation of turtle passage, as included in the Committee recommended EDS SW5.

(v) Findings

The Committee finds the effects of the Project on aquatic fauna connectivity can be acceptably managed through the EDS and monitoring requirements, subject to the recommendations of the Committee.

(vi) Recommendation

The Committee recommends:

Environmental Management Framework

Include the following change:

a) New EDS SW5 in relation to:

- **the design of regulators and the passage of native fish**
- **the design of containment banks and spillways and the passage of turtles.**

This change is included at Appendix G.

8.6 Degradation of aquatic habitat (operations)

(i) What did the EES say

Project operations may cause degradation of aquatic habitat through water quality changes, including anoxic blackwater events and increased salinity, and increased erosion and sedimentation. There is a medium initial risk that operation of the Project will result aquatic habitat degradation through water quality or water regime changes, but this is reduced to a low residual risk and low residual effect through the application of relevant EDS.⁴¹

Blackwater events (see Chapter 5.3 of this Report) potentially result in death of aquatic organisms, typically referred to as a ‘fish kills’ but can also include other aquatic organisms reliant on sufficient dissolved oxygen in the water to survive.

The blackwater modelling in Specialist Assessment C showed that:⁴²

- At Belsar-Yungera, if there is throughflow, dissolved oxygen does not decline to levels that represent a risk to aquatic species. However, if inundation is achieved by pumping with no throughflow, there is potential for prolonged and extensive declines in dissolved oxygen that pose a threat to aquatic species.
- At Hattah Lakes North, there is a medium risk of anoxic blackwater events, but the residual effects on aquatic biodiversity values are low. The effects of non-pumped inundation on aquatic fauna would be similar to existing floodplain inundation. It is assumed that the use of pumps to inundate a dry floodplain would mean there would be few aquatic fauna present (due to screens on the pumps), leading to low likelihood of impacts on aquatic fauna.
- There is low risk to water quality and aquatic life in the Murray River due to rapid mixing and dilution.

As discussed above, the cumulative assessment in D113 reported that the VMFRP projects are not expected to have cumulative effects on dissolved oxygen in the Murray River due to mixing and dilution even during low river flow conditions.

The residual effect of the Project on aquatic biodiversity values resulting from increased salinity was assessed as low based on the results of the surface water and groundwater assessments. Surface water and groundwater monitoring in relation to salinity is proposed to assess conditions during operation.

⁴¹ EDS SW2, SW3, GS1 GS3 and GW2

⁴² Specialist Assessment C, page 256

The residual effect of the Project on aquatic biodiversity values resulting from increased sedimentation and turbidity was assessed as low based on the results of the surface water and soils assessments. There is a low risk that floodplain soil erosion or bed or bank erosion in the vicinity of regulators will affect sediment and turbidity levels to the extent that it would significantly affect the aquatic ecology. Erosion risks will be managed through the regulator design process (EDS GS1) and operation of the Project to reduce drawdown rates (EDS SW2). Soil and landform stability will be monitored (EDS GS3).

(ii) The issue

The issue is whether the Project will cause unacceptable degradation of aquatic habitat through water quality changes, including blackwater events, increased salinity or increased suspended sediments and turbidity.

(iii) Evidence and submissions

A number of submitters were concerned about risks to aquatic ecosystems and biota associated with poor water quality, especially increased frequency of blackwater events. FoNVP expressed concerns regarding other potential impacts relating to poor water quality, including salinity, suspended solids and organic matter.

As described in Chapter 5 of this Report, the Proponent submitted the effects of the Project on surface water in terms of blackwater and salinity will be limited and largely consistent with, or an improvement on, the effects of a natural flood.

In considering conditions for aquatic fauna, Mr Marsden gave evidence that blackwater events can occur naturally within the Murray Darling Basin, but have been exacerbated by reduced overbank flows which allow excess nutrients to accumulate on the floodplain for longer than natural. The proposed mitigation measures in EDS SW2 are sufficient to minimise blackwater events during operations. More frequent return of organic matter from the floodplain to the Murray River would reduce the risk of blackwater events in the longer term and increase ecological productivity in the river (D81).

As described in Chapter 5, Dr Treadwell (D80) gave evidence:

- it was not expected that salinity in the Murray River would exceed critical thresholds for the protection of environmental values
- erosion risks associated with releases from the Project can be acceptably managed through measures proposed in the EDS.

Dr Treadwell gave evidence that modelling showed the severity of hypoxic or anoxic blackwater was influenced by seasonal factors (severity is likely to be greater if inundation occurs during warmer periods) and also the time interval between inundation events (a longer time interval allows accumulation of large organic loads). Any potential effects of outflows from the Project areas on the Murray River would be mitigated by dilution, with an expectation of adequate dilution by passing flows in the Murray River even under low flow conditions. He was of the view these factors were addressed in the mitigation measures in EDS SW2, while noting that some measures could be considered experimental.

Dr Treadwell also advised that return flows high in dissolved organic carbon contribute beneficially to riverine food webs.

(iv) Discussion

The Committee notes Dr Treadwell’s advice that it is preferable to avoid inundation in late spring and summer when water temperatures are high, and hypoxia or anoxia are more likely to occur.

The Committee recommends EDS SW2 be amended to clarify the purpose of the requirement to “*Factor seasonal implications in the timing of filling and drawdown*”. In the context of aquatic ecology, the purpose is to reduce the risk of hypoxic or anoxic blackwater events. The preferred timing of inundation in the cooler months to manage blackwater events is consistent with the preferred timing of inundation to mitigate the risk of carp breeding (see Chapter 8.3 of this Report).

Risks to aquatic ecosystems resulting from increased salinity in the Project areas or Murray River resulting from the Project can be acceptably managed through the recommended EMF, including surface and groundwater salinity monitoring requirements. Salinity risks to surface water and groundwater are discussed in more detail in Chapters 5.5 and 6 of this Report.

Risk to aquatic habitat associated with erosion and sedimentation can be acceptably managed through the recommended EDS, as discussed in Chapter 5.6 of this Report.

(v) Findings

The Committee finds the risks of aquatic habitat degradation through water quality changes can be acceptably managed with the recommended EDS.

(vi) Recommendation

The Committee recommends:

Environmental Management Framework

Include the following change:

- a) Revised EDS SW2 which clarifies the purpose of the requirement to factor seasonal implications in the timing of filling and drawdown.**

This change is included at Appendix G.

8.7 Aquatic weeds (operations)

(i) What did the EES say

There is the potential for aquatic weeds to be transferred into wetland habitats by environmental watering. Risks include overabundant growth of native aquatic plants as well as the spread of aquatic weeds. Three aquatic weed species on the Advisory List of Environmental Weeds in Victoria were assessed as being relevant to the Project areas, namely water hyacinth, clove-strip and lesser reed-mace. A fourth species, Canadian pondweed, is relevant to Hattah Lakes North.

With the implementation of EDS E3, the residual effects of pest aquatic plants were assessed as minor.

(ii) The issue

The issue is whether the Project will lead to the proliferation or spread of aquatic weeds.

(iii) Evidence and submissions

Mr Marsden gave evidence confirming there is potential for aquatic weeds to enter the wetlands in the Project areas or be dispersed during flooding and drawdown events. He noted that the Project would include the following measures in relation to aquatic weeds, which he considered are the only viable way to control aquatic weeds within the wetlands:

- management, monitoring, reporting and auditing requirements for aquatic weeds
- implementation of watering regimes that do not favour the establishment of aquatic weeds – for example, by having no permanent standing water.

Mr Marsden noted the EMF did not include specific monitoring requirements for aquatic weeds, and recommended this be included using the same methodology to be implemented for terrestrial weeds (D81). The Proponent responded to this recommendation by amending EDS E2d (Construction weed and pest management) to clarify that the Native Flora and Fauna Management Sub-Plan should address both terrestrial and aquatic weeds.

(iv) Discussion

The Committee accepts the Proponent's change to EDS E2d to include reference to aquatic weeds and to require risks associated with aquatic weeds to be addressed during construction.

In addition, EDS E3 should be modified to require inclusion of 'terrestrial and aquatic' species in the Pest Plant and Animal Monitoring and Management Plan to ensure aquatic weeds are addressed during operation and M TE3 should be modified to require aquatic as well as terrestrial weeds be monitored during operation.

(v) Findings

The Committee finds:

- Aquatic weed growth effects can be acceptably managed with the Committee recommended EMF.

(vi) Recommendation

The Committee recommends:

Environmental Management Framework

Include the following change:

- a) Revised EDS E3 that requires consideration of 'terrestrial and aquatic' species in the Pest Plant and Animal Monitoring and Management Plan.**

This change is included at Appendix G.

8.8 Cumulative effects on aquatic ecology

(i) What did the EES say

Specialist Assessment A considered the cumulative effects of the Project on aquatic ecology. The assessment was in the context of all VMFRP projects, Third Reedy Lake Bypass Project (2016), Swan Hill Modernisation Project (2013) and Echuca Moama Bridge Project (2013).

The EES concluded the Project may have cumulative effects in terms of increased carp abundance, but the significance of this impact is reduced by carp already being established in the Murray

Darling Basin and proliferating after natural flood events. Otherwise, it is unlikely the Project will have cumulative adverse effects on aquatic ecology.

(ii) The issue

The issue is whether the cumulative effects of the Project on aquatic ecology are acceptable.

(iii) Submissions

FoNVP submitted:

The Hattah North and Belsar-Yungera Floodplain Restoration Projects cannot be assessed on their own and must be seen in relation to all the other projects ... We believe all the 9 projects should have been referred together as they collectively are going to contribute to threats to matters of national environmental significance (MNES) under Part 3 of the EPBC Act.

The Proponent tabled an assessment of the cumulative effects of the nine VMFRP projects on MNES (D113). Unlike the cumulative effects assessment in Specialist Report A, D113 considered cumulative effects in relation to the New South Wales SDLAM projects, Gunbower Forest TLM, Hattah Lakes TLM and Chowilla TLM projects.

D113 identified a “*potential cumulative adverse effect on the Gunbower Forest Ramsar site, [New South Wales] Central Murray Forests Ramsar site, Hattah-Kulkyne Lakes Ramsar site and Riverland Ramsar sites as a result of an increase in pest species, specifically Carp*”. However, it determined that the impact of carp on MNES would not be ‘significant’ in terms of the EPBC Act guidelines, because it does not involve the establishment of a new invasive aquatic fauna species or the geographic spread of aquatic fauna already present. Other construction and operation impact pathways associated with the Project were assessed as unlikely to lead to potential cumulative adverse effects.

(iv) Discussion

Both cumulative assessments relevant to aquatic ecology (Specialist Assessment A and D113) identified potential cumulative effects in terms of increased carp abundance. The Committee agrees with the Proponent this will not have significant impacts on MNES in terms of the EPBC Act guidelines, as carp are already established in the Murray Darling Basin including the Project areas.

The cumulative effects assessment reinforces the significance of potential effects of the Project in terms of increased carp populations, and the importance of ensuring that effects on carp are mitigated and monitored to the full extent practicable. This is discussed further in Chapter 8.4 of this Report.

(v) Findings

The Committee finds:

- The Project is likely to contribute to cumulative effects in terms of increased carp populations.
- The Project is not expected to have significant cumulative effects in terms of any other potential effect pathways for aquatic ecosystems.

8.9 Effects on threatened aquatic species

(i) What did the EES say

Aquatic fauna of the Project areas include a number of fish species that comprise the FFG Act listed ‘Lowland Riverine Fish Community of the Southern Murray- Darling Basin’. The Belsar-Yungera area includes four threatened fish species listed under the EPBC Act and/or FFG Act, and the Hattah Lakes North Project area includes five threatened fish species (Table 10). Both Project areas provide habitat for two threatened turtle species listed under the FFG Act.

Table 10 Threatened aquatic species present or possibly present in the Project areas

Species	EPBC Act Status	FFG Act Status	Belsar-Yungera	Hattah Lakes North
Freshwater catfish	-	EN	x	x
Murray cod	VU	EN	x	x
Murray-Darling rainbowfish	-	EN	x	x
Silver perch	CR	EN	x	x
Southern pygmy perch – Murray-Darling lineage	VU	EN		x
Murray River turtle		CR	x	x
Broad shelled turtle		EN	x	x
Conservation status: Critically endangered (CR), Endangered (EN), Vulnerable (VU)				

Source: Specialist Assessment A, Sections 5.4. and 8.4

The operation of Belsar-Yungera is expected to lead to slight improvements in populations of Murray cod and silver perch, while the operation of Hattah Lakes North is expected to have no significant effects on these species.

The operation of the Belsar-Yungera is expected to lead to substantial improvements in populations of freshwater catfish and Murray Darling rainbowfish, while the operation of Hattah Lakes North is expected to have no significant effects on freshwater catfish but lead to slight improvement in populations of Murray Darling rainbowfish.

The EES is silent on implications of the Hattah Lakes North for southern pygmy perch.

Both Project areas are expected to lead to slight improvements in populations of Murray River turtle and broad-shelled turtle, although the residual effects of the ER1 regulator and fishway on turtle species are uncertain.

In both Project areas carp may have adverse effects on threatened fish species.

The EMF includes specific monitoring requirements for threatened aquatic species, although other monitoring requirements relating to fish and turtles are relevant.

(ii) The issue

The issue is whether the effects of the Project on threatened fish and turtle species are acceptable.

(iii) Evidence and submissions

Ms Thornton was concerned about implications of the Project for threatened species and communities.

DEECA submitted:

DELWP Environment Portfolio does not consider the Project to pose an unacceptable risk or consequence to the State-wide population of any aquatic FFG listed fauna species.

Mr Marsden gave evidence that Murray cod and silver perch would be present in the Murray River and larger waterbodies. They generally spawn in riverine habitat but may use the inundated floodplains for short-term foraging. The ER1 fishway is expected to enable Murray cod and silver perch to safely enter and exit the Belsar-Yungera project area.

The Proponent provided further information about southern pygmy perch in TN12 (D165). It submitted that southern pygmy perch were discovered to be present in the vicinity of the Hattah Lakes North Project area in November 2021. It submitted:

Benefits to the species may include a temporarily expanded range during inundation events due to increased habitat availability and hydraulic connectivity with the Project Areas.

(iv) Discussion

The Committee accepts the evidence and submissions that the effects of the Project on threatened aquatic fauna would be acceptable. Indeed, some of the threatened species are expected to benefit from the Project.

The risk of increased carp populations as a result of Project operations is a potentially significant threat to threatened fish species, through processes including predation, competition and habitat degradation. This emphasises the importance of adequate measures to address and monitor the effects of Project operation on carp. Specific measures have been discussed and addressed in other chapters of this Report.

(v) Findings

The Committee finds the effects of the Project on threatened aquatic fauna are acceptable, subject to compliance with the recommended EDS.

8.10 Benefits for aquatic ecology

(i) What did the EES say

The EES stated the Project will provide benefits for aquatic ecology as a result of:

- increased temporary aquatic habitat and increased hydraulic connectivity between the Murray River and adjacent floodplains, creating breeding habitat in inundated floodplains for small-bodied fish and nursery habitat for large-bodied fish, increased habitat for turtles and increased movement opportunities for Murray River and broad-shelled turtles
- improvements to floodplain, aquatic and riparian vegetation, which are expected to be beneficial to aquatic ecosystem functioning, through effects on habitat, food webs, water quality and ecological processes

- improvements to ecosystem function.

Attachments V and VI of the EES reported that environmental watering associated with the Project would lead to increased abundance and diversity of aquatic vegetation in the Project areas. It is also expected to lead to overall improvements in native fish communities, which, in turn, is expected to contribute benefits to the larger ecosystem beyond the Project areas.

Specialist Assessment A indicated that existing populations of native fish (except carp gudgeon) and turtle species in the Project areas are generally stable or declining.⁴³ At Belsar-Yungera, all native fish and turtle species showed slight or strong improvement under all four Project operating scenarios. At Hattah Lakes North, Murray cod and silver perch will remain stable, and freshwater catfish will benefit by a shift from the current trajectory of decline to stable, while other fish and turtle species will show slight improvement under the two operating scenarios considered in the assessment.

(ii) The issue

The issue is whether the Project will provide benefits for aquatic ecology.

(iii) Evidence and submissions

Mr Marsden gave evidence the Project would lead to acceptable outcomes for aquatic ecology, in the context of being part of a managed system. He noted natural floods provide greater benefits to aquatic ecosystems than managed floods, but managed floods are preferable to having no inundation events (D81).

Mr Marsden gave evidence that *“while managed inundations have not been demonstrated to improve resilience they are also unlikely to decrease resilience and as such are relatively neutral in this regard”*. During the Hearing he explained that the *“Projects are likely to have many positive benefits for aquatic ecology”*. A key benefit of the Project would be increased resilience of fish and turtle populations by increasing habitat availability and hydraulic connectivity. Without the Project, and if the current reduced inundation regimes are maintained, there will be continued decline of native fish species.

Mr Marsden drew attention to monitoring proposed in the EMF, which will assess the benefits of floodplain watering for a range of fish species.

The Proponent submitted that TLM projects demonstrate the benefits of managed inundation events for small-bodied floodplain fish (D184). It reported:

Australian Smelt and Carp Gudgeon are two of these species that respond to environmental watering events at Gunbower, Lindsay Island, Chowilla and Hattah with rapid breeding in very large abundances during spring environmental watering events. These fish are short-lived but contribute to the value of the floodplain habitats to fish-eating birds.

(iv) Discussion

The Committee accepts that the Project is likely to provide benefits for aquatic ecosystems and fauna, including native fish and turtles.

⁴³ EES Chapter 7 and 10, Tables 7-4a and 10-5

It is important to note, however, that the realisation of benefits is dependent on successful mitigation of the risks and impacts to aquatic ecosystems arising from the Project. These risks and impacts include:

- the effects of Project infrastructure on connectivity
- the risk of carp proliferation
- risks of aquatic habitat decline including from potential water quality impacts such as anoxic blackwater.

Some of the mitigation measures proposed in the EES are experimental, including measures relating to carp, native fish stranding and blackwater events.

Ongoing monitoring and adaptive management are therefore critical to ensure that Project benefits for aquatic biota are achieved and maintained.

(v) Findings

The Committee finds the Project is expected to have overall benefits for aquatic ecology, subject to compliance with the recommended EMF and effective adaptive management.

8.11 Overall conclusions on aquatic ecology

There are no aquatic ecology impacts that preclude the Project being approved or the evaluation objectives being achieved. The EDS should, however, be amended to ensure impacts on aquatic ecology are appropriately managed and minimised.

9 Soil

9.1 Introduction

The relevant Scoping Requirements evaluation objective is:

Avoid and, where avoidance is not possible, minimise adverse effects on water quality, hydrology, hydrogeology and beneficial water uses (including for the Ramsar listed wetlands).

Minimise potential adverse social, economic, amenity and land/waterway use effects, including impacts on existing infrastructure and open space.

Soil is discussed in:

- EES report chapters 10.3 and 15.3
- Specialist Assessment E Geology, Soils and Contamination.

The exhibited EMF includes the following EDS:

- CM1a Contaminated land duties
- CM1b Water, Soils and Waste Management Sub-Plan
- CM1c Soil characterisation
- CM2 Acid sulfate soils
- CM3 Contaminated land duties
- GS1 Minimising erosion and sedimentation through design
- GS2 Erosion and Sediment Control Plan
- GS3 Soils and landform stability.

In response to the Committee's RFI and other issues raised at the Hearing, the Proponent provided the following Technical Notes:

- TN09 Dispersive and reactive soils (D139)
- TN06 Cumulative assessment for MNES (D113).

Additionally, the Committee had regard to:

- the Proponent's RFI response dated 23 December 2022 (D99)
- the Proponent's RFI response to public submission (D93)
- EPA Publications referenced by the EPA (S7).

No soil evidence was called.

9.2 Soil effects

(i) What did the EES say

The EES described the soil assessment methodology, including consideration of relevant legislation and policy, establishment of study areas, characterisation of existing conditions, assessment of potential geological effects, description of positive effects, development of EDS, assessment of potential residual effects, cumulative assessment and development of monitoring and contingency measures.

The approach to managing soil effects during construction include Project design to reduce the potential for erosion and sedimentation (EDS GS1) and various plans and subplans (EDS CM1a, EDS CM1b, EDS CM2, EDS GS2).

The OEMP is required to contain measures to avoid and minimise adverse effects to soils and landform stability during operation (EDS CM3 and GS3).

While the Project is expected to generate benefits including soil and landform stability, there is potential for adverse effects during operation and construction. The potential adverse effects would be localised and there is a high degree of certainty of successful mitigation and management measures.

The potential residual effects for both Project areas during operation are of low significance and include:

- localised contamination of soil or surface water associated with a spill or leak of fuel or wastes
- potential formation and oxidation of potential or actual acid sulfate soils as a result of groundwater level changes
- effects on soils and landform stability, due to:
 - increased dispersion and soil reactivity due to chemical and structural changes of sodic soils from freshwater managed inundation events
 - poor trafficability of soil imported from the borrow site
 - variable soil conditions and differential settlement
 - seepage erosion resulting from infrastructure built on permeable soils.

For Belsar-Yungera, residual adverse effects during construction are insignificant to low, and include:

- release of contaminants through surface water runoff or dust associated with use of imported contaminated soil or potentially contaminating substances (insignificant)
- potential oxidation of acid sulfate soils and formation of sulfuric acid from excavation (insignificant)
- corrosion resulting from disturbance of saline soils (low significance)
- erosion (low significance).

For Hattah Lakes North, residual adverse effects during construction are of low significance, and include:

- localised contamination of soil or surface water associated with a spill or leak of fuel or wastes
- potential formation and oxidation of potential or actual acid sulfate soils as a result of groundwater level changes
- erosion.

No material cumulative effects were identified.

(ii) The issues

The issues are whether:

- the EES has appropriately assessed soil effects and satisfies the relevant evaluation objective
- soil monitoring requirements are appropriate
- EDS CM1a should be amended as recommended by the EPA.

(iii) Submissions

In response to the Committee's RFI regarding dispersive and reactive soils, the Proponent explained (D139):

- soil investigation had been undertaken at borrow site and Project structure locations
- additional geotechnical investigations will be undertaken to further characterise soils at these locations to assist with defining any treatments that may be required
- site-specific stabilisation measures will be determined based on outcomes of existing and additional investigations
- currently there are no proposals to use chemical ameliorants to stabilise dispersive soils.

While the EPA noted it is included in the EMF as a relevant stakeholder for the review of the CEMP and sub-plans when drafted, it sought a change to the EMF to require an *"allowance of sufficient review time in agreement with the relevant stakeholders is to be included in the development process timeline"*.

It recommended the following changes to EDS CM1a:

- change the reference to relevant regulatory publications
- reword to state:
Measures to minimise chemical and fuel storage (including hazardous materials and dangerous goods) **on site, and store** in accordance with EPA and Safe Work Australia requirements in the legislation and guidelines listed above ...

The Proponent supported the EPA's proposed changes to EDS CM1a.

FoNVP had concerns about the introduction of large amounts of foreign soil to the Project sites, and potential associated bio-security risks. In response, the Proponent submitted (D93):

- soil for construction is proposed to be locally sourced from the borrow site
- where possible, soil will be reused in construction
- soil will be characterised, transported and managed in accordance with the EMF, which includes EDS CM1c in respect of soil contamination and EDS CM2 in respect of acid sulfate soil.

(iv) Discussion

The Committee is generally satisfied with the approach to assessing residual effects and developing mitigation measures to avoid and minimise risks to soil. Overall the Committee accepts the findings of the EES that the residual effects for soil are insignificant to low, and no cumulative effect has been identified.

The approach to civil works in the CEMP, in particular environmental management requirements during construction, is appropriate. Measures include:

- the acid sulfate soil management plan required as part of the CEMP, prepared in accordance with relevant guidelines, legislation and regulations (EDS CM2)
- minimising erosion and sedimentation through design (EDS GS1)
- the erosion and sediment control plan required as part of the CEMP (EDS GS2).

During operations the main erosion risks are expected to occur during the opening of large regulators and releasing phases of the managed inundation events. During the water filling and holding phases, velocities within the managed inundation area are expected to be close to stationary, resulting in minimal erosion risks. Erosion risks associated in Chalka Creek, Narcooyia Creek and Bonyaricall Creek were examined in EES surface water assessment (Specialist

Assessment C) rather than the soils assessment (Specialist Assessment E) and are discussed in Chapter 5.6 of this report, where recommendations are made in relation to EDS GS1, EDS GS3, M GSC1 and EDS SW2.

The Committee is satisfied that, subject to the Committee's recommendations in relation to design and operations (EDS GS1 and SW2), any observed shear stress and erosion during operations can be addressed through the adaptive management approach, specifically monitoring to ensure structural integrity of infrastructure through the OEMP (EDS GS3 and M GSC1).

The Committee agrees with the changes to EDS CM1a proposed by the EPA and supported by the Proponent. The changes provide for more accurate reference to relevant regulatory documents and appropriate specification of measures to minimise potential land contamination effects. These are included at Appendix G.

Specialist Assessment E relied on EDS GS1 and GS2 to mitigate the potential adverse effects of saline soils. However, the final day versions of EDS GS1 and GS2 do not mention soil salinity. EDS GS1 should be amended to add a description of relevant soil characteristics, consistent with Specialist Assessment E, and to ensure consideration is given to saline soils, as this EDS is being relied on to manage issues arising from soil salinity.

The Committee recommends a correction to the reference to Specialist Assessment E in EDS CM1c.

The Committee does not consider EPA's suggested wording in the EMF relating to timeframes for stakeholder consultation is necessary. The incorporated document includes multiple conditions relating to stakeholder consultation including a requirement for the EMF to:

Contain a summary of the consultation that informed the preparation of the EMF and a summary of the proposed ongoing engagement activities with the councils, the community and other stakeholders during construction of the Projects and processes for enquiries and complaints management.

(v) Findings

The Committee finds:

- The EES has appropriately assessed soil effects and satisfies the relevant evaluation objective.
- The proposed EDS are appropriate, including the change proposed by the EPA relating to EDS CM1c, and the monitoring regime requirements are satisfactory.
- The residual and cumulative effects on soil are acceptable.

(vi) Recommendations

The Committee recommends:

Environmental Management Framework

Include the following change:

- a) Revised EDS GS1 which includes a description of relevant soil characteristics consistent with Specialist Assessment A and to ensure consideration is given to saline soils.**
- b) Revised EDS CM1c which corrects a reference to Specialist Assessment E.**

These changes are included at Appendix G.

9.3 Overall conclusions on soil

There are no soil impacts that preclude the Project being approved or the evaluation objective being achieved.

10 Aboriginal cultural heritage

10.1 Introduction

The relevant Scoping Requirements evaluation objectives are:

Implement environmental watering of floodplains to enhance ecosystem function, biodiversity (particularly listed threatened species and communities), water quality, and cultural values.

Avoid, or minimise where avoidance is not possible, adverse effects on Aboriginal and historic cultural heritage values.

Aboriginal cultural heritage is discussed in:

- EES report chapters 7, 11.2 and 16.2
- Specialist Assessment F Aboriginal Cultural Heritage
- Attachment VIII Stakeholder and Community Engagement.

The exhibited EMF includes the following EDS:

- ACH1 Cultural Heritage Management Plan
- ACH2 Connection to Country
- ACH3 Cultural Heritage Management – Operation.

Additionally, the Committee had regard to:

- relevant submissions
- Traditional Owner Consultation Update (D175)
- updates on the Cultural Heritage Management Plans (CHMPs) (D182 and D183).

No Aboriginal cultural heritage expert evidence was called.

10.2 Consultation with Traditional Owner groups and interested parties

(i) Background

One of the VMFRP project objectives is to:

Facilitate Traditional Owner aspirations for restoration of floodplain ecosystems by:

- Engaging and collaborating with Traditional Owners to integrate their knowledge into the planning, delivery and evaluation of VMFRP
- Creating opportunities for enhancing and sharing cultural connections to Country.

Clause 38 of the ToR states the Committee “*may inform itself in any way it sees fit, but must review and consider for each assessment package*” various matters, including:

38d. any known views of the Registered Aboriginal Parties (RAPs)/Traditional Owner groups or seek the views of the RAPs/Traditional Owner groups if they are not already known.

There is no approved RAP for either of the Project areas and there were no submissions from Traditional Owner groups during exhibition of the EES.

Prior to the Hearing and in the absence of Traditional Owner submissions, the Committee sought Traditional Owner contact information from the Proponent and others in order to invite Traditional Owners to participate in the Hearing. This raised various privacy, consultation and participation issues.

During the Hearing, MLDRIN sought to be heard and was provided the opportunity to make submissions to the Committee. Following this, the Proponent provided the Committee with copies of correspondence to the Mallee CMA from four Traditional Owner groups about the MLDRIN submission (D151, D152, D153 and D154).

This chapter discusses the consultation with Traditional Owners during the development of the Project and the Committee's response to ToR 38(d). A chronology of key actions and correspondence in relation to ToR 38(d) is included at Appendix E.

(ii) What did the EES say?

The EES described the consultation undertaken with Traditional Owners and interested parties in Chapter 8 of Attachment VIII – Stakeholder and Community Engagement Report. Consultation was led by Mallee CMA staff, including ongoing consultation outside the CHMP related meetings.

Chapter 8 noted that not all Traditional Owners and interested parties provided with information and updates on the Project had chosen to be involved.

Consultation involved face to face meetings and site visits to:

- explain the Project and address concerns prior to design
- better understand Traditional Owner aspirations
- determine appropriate engagement processes
- develop CHMPs
- explore how to incorporate Traditional Owner knowledge and science.

Chapter 8 described the consultation undertaken for each Project, including the dates of key meetings.

EES Specialist Assessment F explained the Traditional Owner consultation that informed the risk assessment, identification of intangible aboriginal cultural heritage values and preparation of the CHMPs.

Consultation was undertaken with the following Traditional Owner groups:

- Gilbie Aboriginal Corporation
- Dadi Dadi Weki Weki Aboriginal Corporation
- Munatunga Elders Aboriginal Corporation
- Tati Aboriginal Corporation
- Tati-Tati Land and Water Indigenous Corporation
- Wadi Wadi Land & Water Indigenous Corporation
- Wadi Wadi Wemba Wamba Barapa First Nations Aboriginal Corporation
- Latji Latji Mumthelang Aboriginal Corporation
- Wergaia
- Nyeri Nyeri / Wergaia Peoples
- Murray Valley Aboriginal Corporation.

(iii) The issue

The issue is whether consultation with Traditional Owner groups and interested parties has been adequate.

(iv) Submissions

The Proponent outlined the ongoing involvement Traditional Owners have had in the development of the Project and the preparation of the EES and CHMPs. The Proponent noted this involvement will continue during the construction and operation of the Project and referred to the role of the Aboriginal Water Program and Aboriginal Waterways Assessments, including the involvement of Aboriginal Water Officers.

The Proponent's closing submission included presentations about Traditional Owner consultation from Mr Kellerman (Manager - Community Engagement, Mallee CMA) and Mr Watson (Aboriginal Engagement Officer, Mallee CMA). Mr Kellerman provided a broad overview of Mallee CMA's longstanding relationship with the Traditional Owners in the region. Mr Watson, himself a Traditional Owner in the region, described meetings, phone calls and on-country field visits with Traditional Owner groups.

The Proponent addressed ToR Clause 38(d) in its Part C submission (D174) and noted:

... there are several, independent, Traditional Owner groups who continue to be engaged with the Projects, and have chosen not to make a direct submission to the EES or SIAC process.

... ongoing consultation occurs in a safe space, away from public airing, and where groups are afforded privacy on an individual basis, and removed from any potential media coverage.

... the Committee should reject advice or submissions from any submitter that is not expressly authorised to comment on the consultation process or the views of Traditional Owners, or other Traditional Owners ...

The Proponent submitted:

- (a) Traditional Owners were afforded an opportunity to present to the Committee if they wished to;
- (b) the majority of Traditional Owners have not sought to be heard;
- (c) the majority of Traditional owners have not lodged submissions against the Projects;
- (d) the Committee otherwise has an understanding of the process of consultation, its rigour, extent, and implications in the design of the projects, and ongoing; and
- (e) there is a sufficient basis to conclude that the views of Traditional Owners, are known, and form an important part of the ongoing implementation phases of the Projects.

The submission from MLDRIN discussed broader water policy issues, as well as the VMFRP and exhibited Project. It opposed the Project (and the VMFRP/SDLAM) (D133) and submitted First Nations people have been marginalised from consultation and decision making. The Proponent advised that MLDRIN had been invited to participate in the EES process and submitted that reviewing water policy is outside the scope of the Committee's ToR.

The Proponent provided copies of correspondence from four Traditional Owners groups to the Mallee CMA advising that MLDRIN did not represent them in relation to the Project. Three of the groups advised they supported the Project.

Environment Victoria made submissions about the adequacy of the EES response to Traditional Owner aspirations (objective 2 of the VMFRP), the *Advancing the Treaty Process with Aboriginal Victorians Act 2018* (the Treaty Act) and engagement with Traditional Owners. It referred to two individual Traditional Owners who, it submitted, opposed the Project.

Ms Thornton submitted that consultation with First Nations people should be "*deeper and more genuine*".

FoNVP raised various concerns about the extent and nature of consultation with Traditional Owners on broader water policy issues and various related projects, including the VMFRP. It submitted the VMFRP was not supported by Traditional Owners.

(v) Discussion

The policy context and scope of the Committee's considerations, including water policy, are discussed in Chapter 4 of this Report. The Committee notes the Proponent's views about the status and weight that should be given to submissions made on behalf of Traditional Owners, but without their specific authorisation.

The Committee acknowledges the complexity in consulting with Traditional Owners groups and interested parties in the absence of a RAP. The process is complex due to the need to engage multiple Traditional Owners who may have differing perspectives or views.

The Committee is satisfied that Traditional Owners have had opportunities to be involved in the development of the Project and the preparation of the EES, CHMPs and associated processes. It notes the Proponent's advice that Traditional Owner groups are aware of the Committee's role, the Hearing process and the invitation to participate.

Ongoing engagement is critical to achieving the VMFRP objective of facilitating Traditional Owner aspirations for restoration of the floodplain. Key to this are the EMF requirements for ongoing consultation with Traditional Owners in relation to the:

- Environmental Water Management Plan
- Seasonal Watering Proposal and Plan
- Delivery Plan and Seasonal Watering Statement
- Operating Plan
- Operations and Maintenance Plan
- Land and Waterway Management
- Bushfire management during operation
- Ecological Monitoring, Evaluation and Reporting Plan
- Socio-economic Monitoring, Evaluation and Reporting Plan
- EMF monitoring program (M ACH1, ACH2, ACH3, and ACH4)
- EDS (ACH1, ACH2 and ACH3).

The EMF also requires the Project Control Group (Operation) include an Independent Advisor in relation to Traditional Owner engagement and project management.

While the Committee acknowledges the submissions and differing views of MLDRIN and the four Traditional Owner groups whose correspondence was provided by Mallee CMA, it considers the Proponent has sufficiently demonstrated it is engaging with the Traditional Owners and will continue to do so.

The Committee does not believe the concerns about Traditional Owner engagement raised by Environment Victoria and others have been substantiated, including a perceived inconsistency with Objective 2 of the VMFRP. In relation to the Treaty Act, it is not clear how the Project or EES are inconsistent with the Act.

In relation to ToR 38(d), the Committee has taken into account the known views of Traditional Owner groups and interested parties, and provided them with the opportunity to make submissions and participate in the Hearing. It is satisfied it has addressed this ToR.

It would have been useful if more comprehensive information about Traditional Owner consultation had been provided earlier in the Hearing, including the material provided by the Proponent during its closing submissions on the final day. This might have allayed concerns about the adequacy of the consultation and better informed the Committee's consideration of Clause 38(d) earlier in the Hearing process.

While it would have been helpful to have expert evidence, as originally intended by the Proponent, the Committee is satisfied that consultation issues were able to be adequately addressed by submission, albeit late in the Hearing process.

Finally, the Mallee CMA raised privacy concerns (D12) about providing the Committee with contact information for Traditional Owner groups and declined to do so. The Committee had sought this information in order to invite Traditional Owner groups to participate in the Hearing process. Despite these privacy concerns, the Proponent subsequently provided copies of correspondence from four Traditional Owner groups in response to the MLDRIN submission. Although the contact information was redacted, the names of the groups were identified. It was not clear to the Committee how this was consistent with the privacy concerns raised by Mallee CMA.

(vi) Findings

The Committee finds:

- Traditional Owner groups have been involved in the development of the Project, and the preparation of the EES and CHMPs.
- Traditional Owner groups will have a continuing role in the operation of the Project.
- The known views of Traditional Owner groups have been considered in preparing this Report and where the views were not known, the groups were invited to make submissions and participate in the Hearing.

10.3 Cultural Heritage Management Plans

(i) What did the EES say?

Two CHMPs are being prepared for the Project under the *Aboriginal Heritage Act 2006*:

- Belsar-Yungera CHMP 16898
- Hattah Lakes North CHMP 14330.

There is no approved RAP for either of the Project areas, consequently the Secretary of the Department of Premier and Cabinet is required to approve the CHMPs.

The EES describes the legislative context and purposes of the CHMPs, together with the consultation and investigations undertaken up until its exhibition.

D182 and 183 included updates on CHMP related investigations and consultation since the EES exhibition, together with further work that will be required before the CHMPs are submitted for approval. Further work includes the finalisation of site card registrations and Traditional Owner consent to management conditions.

(ii) Submissions

Some submissions raised issues about impacts on Aboriginal cultural heritage, but there were no submissions specifically in relation to the CHMPs.

The Proponent submitted Aboriginal cultural heritage impacts will be appropriately managed through implementing the two CHMPs, together with the EMF. It provided an overview of the requirements of the Aboriginal Heritage Act and noted the CHMPs must be approved before various Project approvals can be granted. It outlined the consultation undertaken with Traditional Owner groups and interested parties, including discussions about management conditions and contingency measures held in February 2023 and further meetings scheduled for March to obtain Traditional Owner agreement on CHMP management conditions.

(iii) Discussion

The Committee accepts the CHMPs will be a key mechanism to address Aboriginal cultural heritage impacts and is satisfied Traditional Owners and interested parties have been, and continue to be, appropriately consulted in their preparation.

Although the CHMPs are yet to be approved, the Committee is not aware of any matters that would preclude the CHMPs being finalised.

(iv) Findings

The Committee finds that once approved, the CHMPs will be a key mechanism to address Aboriginal cultural heritage impacts.

10.4 Aboriginal cultural heritage effects

(i) What did the EES say?

The EES described the investigations, surveys and methodology that informed the Aboriginal cultural heritage assessments for the Project and underpin the development of the CHMPs. Elements of this material was updated in D182 and D183, including the further investigations and consultation that had occurred since the exhibition of the EES.

The EES identified potential Project benefits for Aboriginal cultural heritage, including increased vegetation cover, enhanced tree lifespans and reduced erosion that could protect archaeological sites.

It proposed three specific Aboriginal cultural heritage EDS and noted that other EDS would assist in mitigating effects:

- E3 Pest Plant and Animal Monitoring and Management Plan
- GS1 Minimising erosion and sedimentation through design
- GS2 Erosion and Sediment Control Plan
- GS3 Soils and landform stability
- SW1 Surface water management
- SW2 Surface water management – Operation
- SW3 Surface water – Monitoring.

The EES noted the Project's iterative design processes had considered Aboriginal cultural heritage and involved Traditional Owner groups.

It recorded:

- 117 Aboriginal cultural heritage places within the Belsar-Yungera construction footprint, including surface stone artefacts, scarred trees, hearths and shell middens

- 11 Aboriginal cultural heritage places within the Hattah Lakes North construction footprint, including an isolated artefact, scarred trees, earth features (artefact scatters and mounds) and a Low Density Artefact Distribution.⁴⁴

Potential adverse effects of the construction phase include:

- permanent damage or removal of heritage, such as stone artefacts, earth features (hearths and mounds), shell middens (both surface and subsurface deposits), scarred trees and Ancestral Remains
- impact to the root protection zone of scarred trees which could kill live trees or destabilise dead standing trees.

The EES assessed the significance of the construction residual effect on Aboriginal cultural heritage (following implementation of the CHMP) as low, and medium for ancestral remains.

The potential adverse effects during operation relate to:

- Erosion and sedimentation. The significance of the residual effect on Aboriginal cultural heritage and ancestral remains was assessed as low.
- Increased water availability and fluctuations in water content. The significance of the residual effect on Aboriginal cultural heritage and ancestral remains was assessed as low to medium.
- Altered pest animal activity. The significance of the residual effect on Aboriginal cultural heritage was assessed as low, and medium for ancestral remains.
- Changes in visitation and tourism activity. The significance of the residual effect on Aboriginal cultural heritage was assessed as low, and medium for ancestral remains.
- Loss of past, present and future cultural connection to Country. The significance of the residual effect was assessed as low as a result of EDS ACH2 and its requirements for consultation with Traditional Owners during design, operation and construction.

(ii) The issues

The issues are whether:

- Aboriginal cultural heritage impacts were appropriately assessed
- effects on Aboriginal cultural heritage can be satisfactorily managed through the EMF and CHMPs.

(iii) Submissions

The Proponent submitted Aboriginal cultural heritage impacts were appropriately assessed in the EES and will be managed through implementation of the EMF and two CHMPs.

Environment Victoria made submissions about the adequacy of the EES response to Traditional Owner aspirations (objective 2 of the VMFRP), the Treaty Act and engagement with Traditional Owners.

MLDRIN described direct impacts on Aboriginal culture and heritage resulting from construction and management of the Project, and submitted the broader benefits and outcomes of the Project are unclear.

Three Traditional Owner groups expressed written support for the Project.

⁴⁴ D182 and 183 provide more up-to-date advice on the number and status of sites

Concerns about impacts on Aboriginal cultural heritage were raised by Ms Thornton and FoNVP.

(iv) Discussion

The Committee is satisfied the investigations, surveys and methodologies described in Specialist Assessment F are appropriate for the purposes of the EES and notes most impacts are expected to be low. Some impacts in relation to ancestral remains have been assessed as medium and the Committee notes the Proponent's expectation the CHMPs will include protocols to address any associated unexpected finds. The EES also involved consultation with the Ancestral Remains Unit of the Victorian Aboriginal Heritage Council in relation to this issue.

The Committee acknowledges the concerns about impacts raised by MLDRIN, while noting that other Traditional Owner groups support the Project. On balance, the Committee is satisfied the EMF and CHMPs will provide appropriate mechanisms to manage impacts and achieve the Scoping Requirements evaluation objective.

As discussed earlier, the Committee is satisfied Traditional Owner groups and interested parties have had appropriate opportunities to participate in the Project's development, and the EMF and CHMPs provide for their ongoing involvement.

The Committee is satisfied Aboriginal cultural heritage impacts have been appropriately assessed in the EES and can be managed through the EMF and CHMPs.

(v) Findings

The Committee finds:

- The EES assessment of Aboriginal cultural heritage effects is appropriate.
- Effects on Aboriginal cultural heritage can be satisfactorily managed through the EMF and CHMPs.

10.5 Overall conclusions on Aboriginal cultural heritage

Subject to the Committee's recommendations, there are no Aboriginal cultural heritage impacts that preclude the Project being approved or the evaluation objectives being achieved.

11 Historical heritage

11.1 Introduction

The relevant Scoping Requirements evaluation objectives are:

Implement environmental watering of floodplains to enhance ecosystem function, biodiversity (particularly listed threatened species and communities), water quality, and cultural values.

Avoid, or minimise where avoidance is not possible, adverse effects on Aboriginal and historic cultural heritage values.

Historical heritage is discussed in:

- EES report chapters 11.1 and 16.1
- Specialist Assessment G Historical Heritage.

The exhibited EMF includes the following EDS:

- HH1 Management of Historical Heritage during construction
- HH2 Management of Historical Heritage during operation.

No historical heritage evidence was called.

11.2 Historical heritage effects

(i) What did the EES say

The EES described the investigations, surveys and methodology that informed the historical heritage assessments for the two Project areas.

In relation to Belsar-Yungera, the EES noted there are no known historical heritage places located within the study area, however there is ‘moderate’ potential for previously unidentified historical heritage items to be present. Any sites would most likely be associated with early agricultural or pastoral activities and water management practices, and could potentially be disturbed during construction or submerged by managed inundation during operation.

In relation to Hattah Lakes North, the EES noted four listed historical heritage places that intersect with the study area:

- Kulkyne Drop Log Stockyards (VHI H73280016) – the physical features are located approximately 200 metres south of the study area
- Moonah Track and Wattle Track Charcoal Pits (VHI H73280002) – incorrectly mapped but still within the MIA. The EES found that adverse erosion effects on the Charcoal Pits would be insignificant
- Brighton’s Block (Mildura HO117) – incorrectly mapped and outside the study area
- Brighton’s Bridge (Mildura HO118) – incorrectly mapped and outside the study area.

Heritage Victoria and Mildura Rural City Council have been advised of these mapping discrepancies.

The field survey identified a further historical archaeological site close to, but outside the Construction Footprint boundary – Crawford’s Home Station/Kulkyne Homestead (unlisted, proposed Victorian Heritage Inventory (VHI)). This site has been referred to Heritage Victoria for inclusion in the VHI.

There is ‘moderate’ potential for previously unidentified historical heritage items to be present within the study area. Any sites would most likely be associated with early agricultural or pastoral activities, logging, river shipping, and water management practices.

EDS HH1 applies to the construction phase of the Project. It requires the CEMP to include an unexpected finds protocol and establishes other requirements relating to physical protection works, training and approvals. EDS HH2 applies to the operational phase of the Project. It includes requirements relating to training, unexpected finds and approvals.

The EES concluded that with the application of these measures, the significance of the residual adverse effects on historical heritage are expected to be low.

(ii) The issue

The issue is whether historical heritage effects have been appropriately assessed and are acceptable.

(iii) Submissions

The Proponent submitted that the potential for impacts on historical heritage was modest, and appropriately addressed through Specialist Assessment G and the proposed EDS.

In a request to the Proponent, the Committee noted that the Specialist Assessment G discussion of the Moonah Track and Wattle Track Charcoal Pits had concluded that adverse impacts were not likely to be substantial given the low velocity water flow in the MIA and noted that the site would, in any event, be impacted by natural flood events. Nevertheless, it recommended:

To minimise and manage the adverse effects, an archaeological investigation, including removal of the surrounding leaf litter, detailed photographic recording, and potentially excavation of one of the pits to understand the construction and/or use of the pits should be undertaken prior to project operation.⁴⁵

This recommendation was not included in the exhibited EMF, but subsequently supported by the Proponent and included as a new EDS HH3.

(iv) Discussion

The Committee is satisfied the investigations, surveys and methodologies described in Specialist Assessment G are appropriate for the purposes of the EES. It agrees with the Proponent that any impacts are likely to be modest and that EDS HH1 and HH2 provide appropriate mechanisms to address unexpected finds.

The Committee supports the additional EDS HH3 recommended in Specialist Assessment G and agreed to by the Proponent and has included it in the recommended EDS at Appendix G.

(v) Findings

The Committee finds:

- The EES assessment of historical heritage and proposed EDS are appropriate.
- The additional EDS HH3 requiring further investigation of the Moonah Track and Wattle Track Charcoal Pits is warranted.

⁴⁵ Specialist Assessment G, page 111

11.3 Overall conclusions on historical heritage

There are no historical heritage impacts that preclude the Project being approved or the evaluation objectives being achieved.

12 Land use

12.1 Introduction

The relevant Scoping Requirements evaluation objective is:

Minimise potential adverse social, economic, amenity and land/waterway use effects, including impacts on existing infrastructure and open space.

Land use is discussed in:

- EES report chapters 12.1 and 17.1
- Specialist Assessment K Land Use Planning.

The exhibited EMF includes the following EDS:

- LU1 Land use effects – Construction
- LU2 Land use effects – Operation.

In response to the Committee's RFI, the Proponent provided the following Technical Note:

- TN05 Private landowner agreements (D112).

No land use planning evidence was called.

12.2 Land use effects

(i) What did the EES say

The EES described the land use assessment methodology, including policy and planning scheme review, consultation with stakeholders, risk and benefits assessment and developing management and monitoring processes.

It proposed two specific land use EDS and noted other EDS would assist in mitigating effects:

- Environmental Management Framework – EMF2
- Agriculture – AG1 and AG2
- Air Quality – AQ1, AQ2 and AQ3
- Bushfire – BF1 and BF2
- Geology, Soils and Contamination – CM1a-1b, CM2, CM3 and CM4
- Terrestrial Ecology – E1, E2a-g, E3, E4a and E4b
- Landscape and Visual – LV1, LV2 and LV3
- Noise and Vibration – NV1 and NV2
- Social and Business – SB1, SB2 and SB3
- Surface Water – SW1 and SW2
- Traffic and Transport – TT1, TT2, TT3, TT4 and TT5.

The EES concluded that with the application of the EDS, the Project would be beneficial for environmental land practices, recreation, agriculture, visual amenity and access.

In relation to Belsar-Yungera, the EES found watering events would result in the temporary inundation of approximately 2,374 hectares of public land within Belsar Island and the Lake Powell and Carpul Nature Conservation Reserves and 804 hectares of private land (used for agriculture, nature conservation and rural residential land uses). All public and private land that would be inundated is subject to the Land Subject to Inundation Overlay.

The potential residual adverse effects during operation are of low significance, and include:

- periodic occupation/inundation and changes to access to public and private land
- changes to the amenity of existing land uses.

The potential residual adverse effects during construction are insignificant, and include:

- acquisition and severance of land associated with construction
- temporary occupation of public and private land and changes to access
- changes to the amenity of existing land uses.

In relation to Hattah Lakes North, the EES found that watering events would result in the temporary inundation of approximately 1,019 hectares of the Hattah-Kulkyne National Park and Murray-Kulkyne Park and 111 hectares of private land zoned for farming purposes. Most public and private land to be inundated is subject to the Land Subject to Inundation Overlay.

The potential adverse effects during operation are insignificant, and include:

- periodic occupation/inundation and changes to access to public and private land
- changes to the amenity of existing land uses.

The potential adverse effects during construction are insignificant, and include:

- acquisition and severance of land associated with construction
- temporary occupation of public and private land and changes to access
- changes to the amenity of existing land uses.

(ii) Submissions

There were no submissions relating to land use impacts.

(iii) Discussion

The Committee is satisfied that the methodology used to assess land use effects was appropriate and the overarching conclusions in the EES are sound.

The Project is predominately located on public land and are consistent with the purposes of that land. Any land use effects can be appropriately mitigated through the EMF, including the need to consult with and obtain licences from public land managers.

The areas of the Project located on private land are already encumbered by a range of planning overlays and other controls, including the Land Subject to Inundation Overlay, that restrict development. Although operation of the Project will likely introduce further restrictions on this land, the Committee is satisfied they can be appropriately managed through the relevant EDS, including those that require landowner agreements and consultation before construction and operation.

The Proponent's Final Day EDS included a minor revision to clarify the operation of EDS LU2. The Committee supports the revision and has included it in the recommended EDS at Appendix G.

(iv) Findings

The Committee finds:

- The EES assessment of land use effects is satisfactory.
- Potential adverse effects will be limited and there is scope for beneficial effects.
- The EMF will provide a suitable basis for managing land use effects.

12.3 Overall conclusions on land use

There are no land use impacts that preclude the Project being approved or the evaluation objective being achieved.

13 Agriculture

13.1 Introduction

The relevant Scoping Requirements evaluation objective is:

Minimise potential adverse social, economic, amenity and land/waterway use effects, including impacts on existing infrastructure and open space.

Agriculture is discussed in:

- EES report chapters 12.2 and 17.2
- Specialist Assessment H Agriculture.

The exhibited EMF includes the following EDS:

- AG1 Avoid and minimise impacts on agricultural productivity
- AG2 Operational agricultural impacts.

In response to the Committee's RFI, the Proponent provided the following Technical Note:

- TN05 Private landowner agreements (D112).

No agriculture evidence was called.

13.2 Agriculture effects

(i) What did the EES say

The EES describes the agriculture assessment methodology, including the characterisation of existing conditions, consultation with stakeholders, identification of key risks, assessment of potential effects, and developing management and monitoring processes.

It proposed two specific Agriculture EDS and noted that other EDS would assist in mitigating effects:

- Air Quality – AQ1
- Bushfire – BF1
- Environmental Management Framework – EMF2 and EMF4
- Geology, Soils and Contamination – GS1 and GS2
- Groundwater – GW2
- Terrestrial Ecology – E2a-e
- Noise and Vibration – NV1
- Social and Business – SB1 and SB3
- Surface Water – SW1
- Traffic and Transport – TT2.

In relation to Belsar-Yungera, the EES found that during watering events there would be temporary inundation of approximately 479 hectares of agricultural land, including:

- 199 hectares of land used for general cropping
- 144 hectares of land used for mixed farming and grazing
- 136 hectares of land used for orchards, groves and plantation.

Construction would temporarily affect approximately 7.2 hectares of agricultural land.

In relation to Hattah Lakes North, the EES found that during watering events there would be temporary inundation of approximately 111 hectares of mixed farming and grazing land, including approximately 75 hectares within Kulkyne Station.

The construction footprint includes approximately 1.1 hectares of mixed farming and grazing land, in addition to approximately 3.5 hectares of agricultural land within Kulkyne Station required to establish a borrow site and associated access tracks.

The potential adverse effects of the Project in both Project areas during operation include:

- changes to access to and/or from and within agricultural properties (low)
- temporary changes to land capability and farming practices as a result of managed inundation events (insignificant to low)
- increased threats to biosecurity including spread of weeds, pests and diseases (low).

The potential adverse effects of the Project in both Project areas during construction include:

- changes to access within agricultural properties during construction (low)
- temporary changes to land capability, farm infrastructure and agricultural operations (low)
- increased threats to biosecurity including spread of weeds, pests and diseases (low)
- potential for project construction to compete with agricultural activities for labour resources (insignificant)
- the movement of water away from agriculture (insignificant).

The EES anticipated productivity benefits because of the replenishment of ground and surface water, and the upgrade of tracks.

(ii) Submissions

There were no submissions relating to specific agricultural effects.

(iii) Discussion

The Committee is satisfied that the methodology used to assess agriculture effects was appropriate and the overarching conclusions in the EES are sound. The Committee supports the extensive EDS designed to manage construction and operational impacts, and the requirements relating to landowner consultation. Landowner agreements and consultation will be particularly important given that the nature and extent of inundation impacts will be dependent upon timing, volume, duration and frequency of inundation events.

There will be some minor, localised impacts during construction, but these can be adequately managed through the EMF and landowner agreements. The broader operational effects, while covering large areas, can be appropriately mitigated and potentially bring productivity improvements through planned inundation and landowner agreements.

The Committee accepts there may be benefits to agricultural landholders through improved tracks and inundation may increase productivity due to replenished soil moisture.

Impacts are likely to be more prevalent in Belsar-Yungera than Hattah Lakes given the larger area of agricultural land that could be inundated, but would still be relatively minor in the broader regional context.

(iv) Findings

The Committee finds:

- The EES assessment of effects on agriculture is satisfactory.
- Potential adverse effects will be limited and there is scope for beneficial effects.
- The EMF will provide a suitable basis for managing agriculture effects.

13.3 Overall conclusions on agriculture

There are no agricultural impacts that preclude the Project being approved or the evaluation objective being achieved.

14 Bushfire

14.1 Introduction

The relevant Scoping Requirements evaluation objectives are:

- Minimise potential adverse social, economic, amenity and land/waterway use effects, including impacts on existing infrastructure and open space.
- Avoid, and where avoidance is not possible, minimise potential adverse effects on native vegetation, species of flora and fauna (particularly listed threatened species and their habitat and listed ecological communities), as well as address offset requirements (if required) consistent with state and Commonwealth policies.
- Avoid, or minimise where avoidance is not possible, adverse effects on Aboriginal and historic cultural heritage values.

Bushfire is discussed in:

- EES report chapters 12.4 and 17.4
- Specialist Assessment J Bushfire.

The exhibited incorporated document includes conditions relating to bushfire protection measures.

The exhibited EMF includes the following EDS:

- BF1 Bushfire management during construction
- BF2 Bushfire management during operation.

In response to issues raised at the Hearing, the Proponent provided the following Technical Note:

- TN13 Questions taken on notice - terrestrial ecology and bushfire (D171).

Additionally, the Committee has had regard to:

- relevant evidence and submissions
- the Proponent's RFI response dated 23 December 2022 (D99).

Table 11 lists the bushfire evidence.

Table 11 Bushfire evidence

Party	Expert	Firm	Area of expertise
Proponent	Mick George	GHD	Bushfire

14.2 Bushfire effects

(i) What did the EES say

The EES described the bushfire assessment methodology, including review of the regulatory framework, establishment of study areas, characterisation of existing conditions, consultation with stakeholders, assessment of risks and potential effects (including cumulative effects), development of EDS and management and monitoring processes.

The EDS apply the mitigation hierarchy by:

- avoiding, minimising and managing adverse bushfire effects through the preparation of a Bushfire and Emergency Response Plan

- minimising and managing the risk during construction and operation in accordance with existing public land management processes.

The EES found that with the application of the EDS the frequency and extent of water, wet soils, and green or hydrated vegetation would increase, which provides potential benefits by:

- reducing the likelihood of fire ignition
- reducing the rate and extent of bushfire spread
- improving the resilience of vegetation communities to bushfire.

The potential adverse effects of the Project during operation include:

- Onsite bushfire ignition as a result of project operational activities (the residual effect is assessed as insignificant).
- Increased visitation resulting in an increased likelihood of bushfire ignition (low).
- Bushfire entering the Project areas through offsite ignition (insignificant to medium).
- Changes to bushfire behaviour due to localised and short term increases in fine fuels from environmental watering (primarily areas with grassy understorey) medium).
- Loss or disturbance to ecological values due to management treatments and habitat impacts (low).
- Damage to, or death of hollow-bearing or culturally modified (scarred) trees, resulting in indirect impacts to fauna through loss of habitat or cultural heritage values (low).

An additional potentially adverse effect for Hattah Lakes North is:

- Bushfire originating in the project area and adversely affecting the Hattah Lakes TLM icon site (low).

The potential adverse effects of the Project during construction include:

- Onsite bushfire ignition as a result of construction activities low).
- Storage and handling of combustible materials and stockpiling of salvaged residues providing a fuel source for bushfires (insignificant).
- Bushfire entering the Project area through offsite ignition (insignificant to medium).
- Loss or disturbance to ecological or heritage values, including fauna habitat or changes to aquatic ecosystems due to bushfire (low).

(ii) The issues

The issues are whether the:

- bushfire effects are acceptable
- bushfire protection measures in the incorporated document and EMF are adequate.

(iii) Evidence and submissions

The Proponent proposed extensive changes to the bushfire protection measures in the Day 1 incorporated document (D94) as a result of legal review and to ensure consistency with other provisions. The redrafting introduced the following:

- condition under 'Bushfire risk management during construction':
Guidelines for Total Fire Ban days including prohibition of works for any specified day or time period except with written consent of the relevant fire authority.
- requirement relating to the OEMP (in response to comments from Forest Fire Management Victoria):

The OEMP must include guidelines for any appropriate notification of inundation events to the public and relevant agencies, including the relevant fire authorities.

The Proponent relied on the evidence of Mr George. He gave evidence the exhibited EDS relating to bushfire were appropriate and would ensure the effects will be suitably managed to achieve acceptable outcomes.

At the Hearing, Mr George supported the conditions in the Day 1 incorporated document. He was satisfied the flexible approach to track upgrades was appropriate rather than applying a mandated standard.

He suggested the guidelines for total fire ban days should apply for both the construction and operation phases. He recommended a change to EDS BF2 to add:

Prepare guidelines for operational or maintenance activities on Total Fire Ban days, and during the Fire Danger Period, including requirements to adhere with any relevant restrictions as applicable.

The Proponent supported this change and included it in the Final Day EDS.

In response to questions from the Committee, Mr George explained:

- climate change had been adequately considered in the modelling
- current fire management measures relied on for bushfire risk mitigation are adequately captured in the EDS
- EDS BF1 which requires a Bushfire Emergency Management Plan will ensure coordination of bushfire management measures across landowners
- mitigation measures adequately consider recreational activities and protection of life.

In response to a question from Environment Victoria about consideration of the values and views of Traditional Owners, Mr George explained that cultural burning will be considered through the Joint Fuel Management Program.

In response to a question from the Committee, the Proponent clarified its approach to the Fire Access Road Plan (D171). It considered that access track upgrades for fire access purposes are not required for the Project and the:

- Project has minimised the extent of track widening and pavement improvements to reduce potential adverse environmental impacts
- dimensions of access tracks in Belsar-Yungera would comply with Parks Victoria's guidelines
- Day 1 incorporated document includes a condition *"to enable the Secretary to consider a Fire Access Road Plan on the basis that it may be appropriate for some existing tracks that form part of the operational fire access roads to be upgraded as part of the Projects"*
- Project has potential for high compliance with the identified standards.

The Proponent explained the Joint Fuel Management Program was an existing process planned and managed by Forest Fire Management Victoria. EDS BF2 requires that bushfire management during operation must be undertaken in accordance with existing relevant arrangements, and this includes the Joint Fuel Management Program.

In its original submission, DEECA:

- supported condition 4.10 (Bushfire protection measures) of the exhibited incorporated document

- submitted the residual risks of the Project can be appropriately mitigated through the EDS and with all *“strategic and operational road networks within Crown land ... built and maintained to DELWP standards”*.

DEECA submitted comments on a number of proposed changes in the Final Day incorporated document:

- Condition 4.10.1 – the reference to the ‘relevant fire authority’ should be retained as it serves a distinct purpose with regard to the Victoria Planning Provisions, particularly with regard to Clause 44.06 (Bushfire management overlay). The Country Fire Authority is the ‘relevant fire authority’ under the Victoria Planning Provisions with respect to freehold land, not DEECA.
- Condition 4.10.2 – does not provide for adequate assurance that road works prior to the Project becoming operational will be to required standards. If a Fire Access Road Plan is recommended it should be submitted *“before the commencement of works on roads”* and *“approved by the relevant fire authority”*.
- Condition 4.10.2 (d) and (e) as they relate to *“Except with the approval of the Secretary”* – DEECA supports some flexibility however expects this will only be considered in *“highly localised locations and under exceptional circumstances”*.

(iv) Discussion

The Committee accepts the findings of the EES and Mr George’s evidence that the adverse effects are acceptable and there are likely to be benefits relating to bushfire. While there may be localised increases in fine fuels as a result of environmental watering, the overall fuel hazard in the Project areas is likely to be minor in consequence and should be able to be managed with appropriate measures.

The Committee is satisfied the Project design and operation are intended to minimise potential adverse effects. Specifically:

- the EMF must contain EDS that address bushfire management during construction and operation
- the Bushfire Emergency Response Plan required by EDS BF1 requires consultation with relevant land managers, emergency management and fire authorities
- the Proponent advised the access tracks have been designed to avoid environmental and cultural values where possible
- the incorporated document requires that any increase in bushfire risk from environmental watering must be mitigated.

The Committee agrees with Mr George that guidelines for total fire ban days should apply to both construction and operation phases. The EDS BF2 should be amended accordingly.

The Committee accepts the Proponent’s proposed requirement that the OEMP in the incorporated document include guidelines for appropriate notification of inundation events to relevant fire authorities.

The Committee does not agree with DEECA that the Bushfire Emergency Response Plan should be *“submitted to, and approved by, the relevant fire authority”* as originally exhibited. Having both the Secretary and relevant fire authority in approval roles may create inconsistencies and confusion in what has been agreed, and consequential risk. The incorporated document prevails over contrary or inconsistent provisions in the planning schemes. While construction works are

proposed on public and private land, it is appropriate that the Bushfire Emergency Response Plan be prepared in consultation with relevant fire authorities and submitted to the satisfaction of the Secretary, as suggested by the Proponent. As the relevant fire authority for freehold land, the Country Fire Authority would be consulted in preparation of the Bushfire Emergency Response Plan, and is required to give written consent for works as relevant to total fire ban days (condition 4.10.1 (i)).

The conditions relating to the Fire Access Road Plan in the Final Day incorporated document require standards to be met, except with approval of the Secretary to DEECA. The Committee acknowledges DEECA's submission that compliance with access road construction standards is necessary to manage risk and ensure safe access, and exemptions will only be considered under exceptional circumstances. The Committee is satisfied the conditions provide flexibility where required and discretion for the Secretary to approve an exemption if appropriate.

To ensure clarity and certainty, the Committee recommends EDS BF2 include reference to the Joint Fuel Management Program and cultural burning as existing relevant processes.

The Committee supports the Proponent's proposed changes which are included in the recommended Project documents at Appendices F and G.

(v) Findings

The Committee finds:

- The EES assessment of bushfire effects is satisfactory.
- There are likely to be beneficial effects, and potential adverse effects will be acceptable.
- The incorporated document and EMF will provide a suitable basis for managing bushfire effects.

(vi) Recommendation

The Committee recommends:

Environmental Management Framework

Include the following change:

- a) Revised EDS BF2 to include reference to the Joint Fuel Management Program including cultural burning as an 'existing relevant process'.**

This change is included at Appendix G.

14.3 Overall conclusions on bushfire effects

There are no bushfire impacts that preclude the Project being approved or the evaluation objective being achieved.

15 Landscape and visual

15.1 Introduction

The relevant Scoping Requirements evaluation objective is:

Minimise potential adverse social, economic, amenity and land/waterway use effects, including impacts on existing infrastructure and open space.

Landscape and visual are discussed in:

- EES report chapters 12.5 and 17.5
- Specialist Assessment L Landscape and Visual.

The exhibited EMF includes the following EDS:

- LV1 Avoid and minimise visual impacts through design
- LV2 Avoid and minimise visual impacts during construction
- LV3 Minimise construction and operation lighting impacts.

No landscape and visual evidence was called.

15.2 Landscape and visual effects

(i) What did the EES say

The EES described the landscape and visual assessment methodology, including the characterisation of existing conditions, identification of key risks, assessment of potential effects, and development of management and monitoring processes.

It proposed three specific landscape and visual EDS and noted that other EDS would assist in mitigating effects:

- EMF4 - Operation performance management
- E2a - Construction biodiversity administrative processes
- E2b - Construction vegetation management
- E2e - Construction rehabilitation management
- TT2 - Traffic management plan.

The EES identified three Landscape Character Areas (LCAs)⁴⁶ within the study area for the Belsar-Yungera project (Murray River riparian corridor, Belsar-Yungera Woodland and Rural living and farmland). The EES assessed potential effects on these LCAs based on 11 viewpoints and three sensitive receptor types (residential, park users and campers, and road users [people driving along the Murray Valley Highway]).

It concluded the Project has the potential to benefit landscape character by improving the health of existing vegetation, encouraging new growth and improving the visual quality of the views within and surrounding the Lake Powell and Lake Carpul Nature Conservation Reserve and the Murray River Reserve.

The potential operational effects include:

⁴⁶ Defined in the EES as ‘...an area with similar properties such as geology, vegetation, topography, drainage patterns or strongly defined special qualities, distinct from areas immediately nearby’.

- Beneficial residual effects in the Murray River riparian corridor and the Belsar-Yungera Woodland LCAs. A neutral residual effect for the Rural Living and Farmland LCA.
- Beneficial residual effects experienced by sensitive receptors, except for the Murray Valley Highway – Lake Powell viewpoint, where a neutral residual effect is anticipated.

The potential construction effects are expected to range from negligible to low and include:

- changes to landscape character resulting in:
 - low to moderate significance residual adverse effects on the Murray River riparian corridor and the Belsar-Yungera Woodland LCAs
 - negligible residual adverse effects on the Rural living and farmland LCA.
- changes in views experienced by sensitive receptors resulting in:
 - low significance residual adverse effects on three viewpoints
 - negligible residual adverse effects on two viewpoints
 - no change for the six remaining viewpoints that would not be accessible during construction.

The EES identified four LCAs within the study area for the Hattah Lakes North project (Murray River riparian corridor, Hattah Lakes, Rural living and farmland, and Mallee Dunes). The EES assessed potential effects on the LCAs based on four viewpoints and three sensitive receptor locations for park users.

It concluded the Project has the potential to benefit landscape character by improving the health of the existing vegetation and encouraging new growth, improving the visual quality of the views within and surrounding the Hattah-Kulkyne National Park.

The potential operational effects include:

- beneficial residual effects in some areas, including the Hattah Lakes and Mallee Dunes LCAs
- a neutral residual effect in the Murray River riparian corridor and Rural living and farmland LCAs
- changes to views experienced by sensitive receptors, however residual beneficial effects are expected for all assessed viewpoints.

The potential construction effects are:

- low to moderate significance residual adverse effects on the Hattah Lakes LCA
- low significance residual adverse effects on the Murray River riparian corridor and Rural living and farmland LCAs
- neutral residual adverse effect on the Mallee Dunes LCA.

Views experienced by sensitive receptors will not change as these areas would not be accessible during construction.

(ii) Submissions

There were no submissions relating to specific landscape and visual effects.

(iii) Discussion

The Committee is satisfied the methodology used to assess landscape and visual effects was appropriate and the overarching conclusions in the EES are sound.

While there will be some localised adverse impacts, particularly during construction, the Committee agrees with the general proposition that improved floodplain health and future regrowth will contribute to mitigating expected effects once the Project is established and operational. Other factors such as existing topography and vegetation density and coverage limit view lines within the Project areas and will lessen landscape and visual effects. In addition, the impact of some infrastructure will be reduced by proximity to existing irrigation infrastructure and associated disturbance.

Impacts are likely to be more prevalent in Belsar-Yungera than Hattah Lakes given the extent and nature of works, including the number of regulators and creation of new access tracks. These will require sensitive treatment, including rehabilitation and revegetation, as will be required by EDS E2e and addressed in the Native Flora and Fauna Management Plan.

The Committee has reviewed the relevant elements of the EMF, including the EDS, and is satisfied they provide a suitable basis for managing landscape and visual effects across both Project areas. The Committee recommends one change to EDS LV3 to ensure impacts for terrestrial and aquatic fauna species are considered.

(iv) Findings

The Committee finds:

- The EES assessment of landscape and visual effects is satisfactory.
- Potential adverse effects will be limited and there is scope for beneficial effects.
- The EMF will provide a suitable basis for managing landscape and visual effects.

(v) Recommendation

The Committee recommends:

Environmental Management Framework

Include the following change:

- a) Revised EDS LV3 to require mitigation measures to avoid and minimising lighting impacts on terrestrial and aquatic fauna.**

This change is included at Appendix G.

15.3 Overall conclusions on landscape and visual

There are no landscape or visual impacts that preclude the Project being approved or the evaluation objective being achieved.

16 Noise and vibration

16.1 Introduction

The relevant Scoping Requirements evaluation objective is:

Minimise potential adverse social, economic, amenity and land/waterway use effects, including impacts on existing infrastructure and open space.

Noise and vibration is discussed in:

- EES report chapters 12.6 and 17.6
- Specialist Assessment M Noise and Vibration.

The exhibited EMF includes the following EDS:

- NV1 Construction noise and vibration management
- NV2 Operational noise management.

Additionally, the Committee had regard to:

- EPA submission (S7)
- the Proponent's RFI response dated 23 December 2022 (D99).

No noise and vibration evidence was called.

16.2 Noise and vibration effects

(i) What did the EES say

The EES described the methodology that informed the noise and vibration assessments for the Project.

Within the study areas:

- at Belsar-Yungera there are 106 sensitive receivers (dwellings), 91 located in Victoria and 15 in New South Wales, and eight camping sites are located within and adjacent to the area
- at Hattah Lakes North there are 96 sensitive receivers (dwellings), all located in Victoria, and two camping sites within the area.

The EMF proposed two noise specific EDS and noted EDS SB3 would also mitigate the effects on noise and vibration. The CEMP would include measures to minimise and manage construction noise and vibration in accordance with the EP Act and its subordinate legislation, and other relevant statutory requirements and guidelines.

The residual effects during operation of the Project were assessed as insignificant to low, including:

- noise from pump infrastructure, adversely affecting nearby receivers (insignificant for park users and low significance for sensitive receivers at Belsar-Yungera and insignificant for all at Hattah Lakes North)
- vibration from pump infrastructure, adversely affecting nearby receivers (insignificant for all sensitive receivers).

No operational cumulative impacts were identified.

The residual effects during Project construction were assessed as insignificant to medium:

- noise generated by vehicle movements and on-site construction activities adversely affecting nearby receivers (low during normal working hours and medium when working outside normal working hours is unavoidable)
- noise generated by vehicle movements on main roads and local roads outside the Construction Footprint (insignificant)
- vibration generated by vehicle movements and on-site construction activities adversely affecting nearby receivers (insignificant).

(ii) The Issues

The issues are whether noise and vibration effects:

- are acceptable
- can be adequately mitigated.

(iii) Submissions

EPA submitted it was satisfied the potential adverse effects of noise and vibration for operations and construction had been identified in the EES. It recommended changes to:

- EDS NV1 to require *“a framework for justification and approval of out-of-hours works that is established in consultation with the relevant stakeholders”*
- the wording of the Explanatory Report to resolve an inconsistency regarding the number of sensitive receivers.

The Proponent accepted the EPA’s proposed changes to EDS NV1. It did not object to changes to wording of the Explanatory Report at the time the PSA is finalised, and proposed the following wording:

Where work is scheduled to occur outside of normal working hours, then the 35 dB(A) criterion adopted for the first 18 months of construction would be exceeded at 32 sensitive receiver within Victoria at Belsar-Yungera and at 34 sensitive receivers within Victoria at Hattah Lakes North.”

(iv) Discussion

The Committee is satisfied the EES has adequately assessed potential adverse noise and vibration effects. The EES has appropriately sought to avoid, minimise and manage adverse effects.

The Committee accepts:

- residual effects for operations and construction are insignificant to low, with the potential for medium impacts if work is required to be conducted out of business hours
- no cumulative effects will occur given the anticipated noise and vibration levels, location of sensitive receivers and separation distances.

Noise and vibration during operations is required to be minimised and established within the limits set by EPA Publication 1826. This is appropriate.

EDS NV1 requires a Construction Noise and Vibration Management Plan which complies with the EP Act and associated regulations and outlines a range of measures that must be included. EPA’s request to amend EDS NV1 to expand on requirements to justify and approve out of hours works in consultation with relevant stakeholders is appropriate. This change was supported by the Proponent.

(v) Findings

The Committee finds:

- The EES assessment of noise and vibration effects is satisfactory.
- Potential adverse effects will be limited and the recommended EDS will mitigate any effects.
- The EMF will provide a suitable basis for managing noise and vibration effects.

16.3 Overall conclusions on noise and vibration

There are no noise and vibration impacts that preclude the Project being approved or the evaluation objective being achieved.

17 Social and business

17.1 Introduction

The relevant Scoping Requirements evaluation objective is:

Minimise potential adverse social, economic, amenity and land/waterway use effects, including impacts on existing infrastructure and open space.

Social and business is discussed in:

- EES report chapters 12.7 and 17.7
- Specialist Assessment N Social and Business.

The exhibited EMF includes the following EDS:

- SB1 Community and Stakeholder Engagement Management Plan
- SB2 Minimise social and business impacts – Construction
- SB3 Community and Stakeholder Engagement activities – Operation.

Additionally, the Committee had regard to:

- submissions
- Socio-economic monitoring, evaluation and report implementation method report (D45)
- the Proponent's RFI response dated 23 December 2022 (D99)
- the Proponent's Final Day EDS (D177).

No social and business evidence was called.

17.2 Social and business effects

(i) What did the EES say

The EES described the social and business effects assessment methodology, including consideration of relevant legislation and policies, review of other relevant specialist assessments, establishment of study areas, stakeholder and community consultation, risk and effect assessment including cumulative effects, and developing management measures and monitoring requirements.

It proposed three social and business EDS and noted other EDS would assist in mitigating effects:

- Land use effects – LU2
- Air quality – AQ1, AQ2
- Terrestrial ecology – E1, E2a, E2b, E2e
- Noise and vibration – NV1
- Traffic and transport – TT2.

The EES concluded the Project has the potential to benefit community and businesses. It would contribute to an enhanced natural environment benefiting users, and construction would deliver direct and indirect employment and associated economic benefits for the region.

In relation to both Project areas, the potential adverse effects during operation include:

- Restrictions or changes to private property access (the residual effect is assessed as low).
- No expected impact on access to social infrastructure during operation.
- Temporary loss of some recreational areas during inundation events (low).

- Visual impacts, noise, vibration and air quality (low).
- Restrictions or disruptions to apiarists and businesses operating in or adjacent to the park and the broader region (low).

The potential adverse effects during construction include:

- Restrictions or changes to private property access (low for Belsar-Yungera and insignificant for Hattah Lakes North).
- Potential for increased competition for private dwellings for workers (low).
- Temporary loss or restriction of access to some recreational areas (low).
- Temporary and short-term visual impacts, noise, vibration and air quality effects (low).
- Temporary disruptions and delays for business operations, and amenity impacts affecting the experience of visitors to the area (insignificant to low for Belsar-Yungera and low for Hattah Lakes North).

(ii) The issue

The issue is whether the social and business effects are acceptable.

(iii) Submissions

Mr Kelly submitted the Project would help maintain or improve the floodplain he relied on for his tourism business.

One submitter (S3) raised concerns the:

- works at Belsar-Yungera would result in change to land tenure and restrict recreational activities
- new infrastructure would potentially limit boat access (the large regulator S7 and small regulator S108)
- camping may be restricted in the vicinity of S7.

The Proponent responded to issues raised in submissions (D93), stating:

- there is no proposed change to land tenure or additional restrictions on recreational activities at Belsar-Yungera
- under existing conditions access to the Murray River is not always possible
- the watercourse at S108 is frequently dry and at times boats need to be transported around structures and obstructions
- following construction, boats will need to be transported around new structures.

In response to questions from the Committee about how tourism activities and visitor numbers have informed Project design and operations, and the potential for residual effects on use and amenity of recreational areas, the Proponent explained (D99):

- as the Project has been designed to facilitate environmental watering, tourism activities have not directly influenced the design
- while potentially inconvenient, alternative camping areas and open spaces will be available within the region during inundation periods
- it is predicted that tourism activities will benefit from improved access tracks and ecological conditions following the construction phase.

In its Final Day EDS (D177) the Proponent proposed an amendment to the communication and engagement requirement in EDS SB3. The proposed change includes addition of a protocol for how community expectations will be managed in the context of potentially adverse effects.

(iv) Discussion

The Committee is satisfied that the methodology used to assess social and business effects was appropriate and the overarching conclusions in the EES are sound.

The Committee accepts that with application of the EDS there are potential social and business benefits that contribute to VMFRP project objective three, which states:

Provide social and economic benefits through enhancing tourism and recreational opportunities associated with healthy riverine landscapes.

The evaluation objective to minimise potential adverse effects can be achieved by the proposed EDS which require engagement and consultation with community and stakeholders, minimising impacts during construction and managing impacts during operation. Any changes to boat access arrangements resulting from S7 and S108 will not be significant given the current restrictions and need to transport boats around existing structures and obstructions.

The Committee agrees with the Proponent it is appropriate to amend EDS SB3 to include a protocol relating to how community expectations will be managed in the context of potentially adverse effects. This will assist with transparency in managing potentially adverse social and economic impacts. This is included in the recommended EDS at Appendix G.

(v) Findings

The Committee finds:

- The EES assessment of social and business effects is satisfactory.
- There are likely to be beneficial effects, and potential adverse effects will be acceptable with the Committee recommended EDS.
- The EMF will provide a suitable basis for managing social and economic effects.

17.3 Overall conclusions on social and business effects

There are no social and economic impacts that preclude the Project being approved or the evaluation objective being achieved.

18 Traffic and transport

18.1 Introduction

The relevant Scoping Requirements evaluation objective is:

Minimise potential adverse social, economic, amenity and land/waterway use effects, including impacts on existing infrastructure and open space.

Traffic and transport is discussed in:

- EES report chapters 12.8 and 17.8
- Specialist Assessment O Traffic and Transport.

The exhibited EMF includes the following EDS:

- TT1 Safety in road design
- TT2 Traffic Management Plan
- TT3 Safety during operation – recovery equipment
- TT4 Safety during operation – signage
- TT5 Track maintenance program.

No traffic and transport evidence was called.

18.2 Traffic and transport effects

(i) What did the EES say

The EES described the traffic and transport assessment methodology including desktop and field investigations and collection of traffic volume data.

Specialist Assessment O summarised existing conditions, including:

- roads and tracks within the study areas generally carry very low traffic volumes and are within capacity, with the busiest roads being B400 Murray Valley Highway (Belsar-Yungera) and A79 Calder Highway (Hattah Lakes North)
- the study areas include several tourist attractions and informal and formal campsites, as well as land used for farming and primary industry
- the crash history in the study areas shows low serious and fatal injury crash rates, indicating there are no elevated safety issues.

Both Project areas were assessed to meet the relevant evaluation objective with implementation of the EDS. The EES noted the five traffic and transport specific EDS and EDS LU1 would:

- during operations, require specific requirements to be detailed in the Operations and Maintenance Plan, signage implementation and a track maintenance program
- during construction, require independent road safety audits and preparation and implementation of a Traffic Management Plan.

There is potential for the Project to provide benefits as a result of track upgrades, and associated improved access to campgrounds and recreational facilities, and for maintenance and during emergencies.

Residual adverse effects during operations for Belsar-Yungera were assessed as insignificant to low and included access disruptions and effects on the safe and efficient movement of traffic on the transport network including:

- effect on the local road network and private property access (insignificant)
- road safety and emergency vehicle access (low)
- effect from maintenance vehicles (low).

At Belsar-Yungera there would be no effect on pedestrian and cyclist activity and freight and public transport operation.

Residual adverse effects during operations for Hattah Lakes North were assessed as insignificant to low, including:

- access disruptions and effects on the safe and efficient movement of traffic on the transport network including private property access (insignificant)
- road safety and emergency vehicle access (low)
- effect from maintenance vehicles (low)
- effect on freight transport (insignificant).

At Hattah Lakes North there would be no effect on pedestrian and cyclist activity and public transport operation.

Residual adverse effects during construction for both Project areas were assessed as insignificant to low and included impeding safe and efficient movement of traffic on local roads, active transport, restricting access to private land, or creating safety risks by the presence or operation of vehicles.

Regarding cumulative impacts, the EES stated:

- at Belsar-Yungera, five projects were identified in nearby areas with a similar construction timeframe which may influence the movement of traffic in the region
- at Hattah Lakes North, the Hattah-Robinvale Road reconstruction project is anticipated to have low cumulative impact due to the size and distance from the Project area.

Potential cumulative impacts would be considered and detailed as part of the construction Traffic Management Plans for the Project.

(ii) Submissions

There were no submissions relating to specific traffic and transport effects.

(iii) Discussion

The Committee is satisfied that the methodology used to assess traffic and transport effects was appropriate and the overarching conclusions in the EES are sound.

Any traffic and transport effects during construction and operation of the Project can be appropriately mitigated through the requirements of the EMF. The EDS require:

- design – to undertake independent road safety audits to ensure all tracks meet land manager and relevant authority requirements (EDS TT1)
- construction – to prepare a Traffic Management Plan to minimise disruption in consultation with land manager and relevant authority requirements (EDS TT2), with associated audit and survey requirements (AI TT1 and AI TT2)
- operations – the Operations and Maintenance Plan to include a recovery plan if vehicles are bogged or stuck and blocking access, advisory signage and a track maintenance program.

The EMF appropriately identifies the need to consider the Traffic Management Plan in reducing dust generated from construction vehicle movement (EDS AQ1) and to manage erosion (EDS TT2).

The Committee considers the Traffic Management Plan and track maintenance program should be consistent with the Fire Access Road Plan included as a condition in the incorporated document. Reference to this should be made in EDS TT2 and EDS TT5.

The Committee is satisfied any cumulative traffic and transport effects of nearby projects can be effectively managed through the Traffic Management Plans that are required to be prepared in consultation with relevant road management authorities and the land manager, and through notification of affected residents and landholders of changes to traffic conditions.

(iv) Findings

The Committee finds:

- The EES assessment of traffic and transport effects is satisfactory.
- Potential adverse effects will be limited and the recommended EDS will mitigate any effects.
- The EMF and incorporated document provide a suitable basis for managing traffic and transport effects.

(v) Recommendation

The Committee recommends:

Environmental Management Framework

Include the following change:

- a) Revised EDS TT2 and EDS TT5 to require consistency with the Fire Access Road Plan conditioned in the incorporated document.**

This change is included at Appendix G.

18.3 Overall conclusions on traffic and transport effects

There are no traffic and transport impacts that preclude the Project being approved or the evaluation objective being achieved.

19 Air quality

19.1 Introduction

The relevant Scoping Requirements evaluation objective is:

Minimise potential adverse social, economic, amenity and land/waterway use effects, including impacts on existing infrastructure and open space.

Air quality is discussed in:

- EES report chapters 12.3 and 17.3
- Specialist Assessment I Air Quality.

The exhibited EMF includes the following EDS:

- AQ1 Construction air quality management: dust
- AQ2 Dust nuisance and complaints
- AQ3 Pumping equipment.

Additionally, the Committee had regard to:

- EPA submission (S7)
- the Proponent's RFI response dated 23 December 2022 (D99).

No air quality expert evidence was called.

19.2 Air quality effects

(i) What did the EES say

The EES described the air quality assessment methodology, including review of policy, establishing a study area, characterising existing conditions, identification of key risks, assessment of potential effects including cumulative effects, and developing management and monitoring processes.

It proposed three specific air quality EDS and noted these would be completed:

- SB3 – Community and stakeholder engagement activities – operation
- SW2 – Surface water management – operation.

For both Project areas, an anticipated benefit is reduction of dust emissions resulting from increased frequency and extent of watering, which will improve the vegetative cover condition in the MIA.

Residual effects for operation are expected to be insignificant and include:

- diesel emissions from temporary pumping
- pollutants produced by maintenance vehicle exhaust
- dust from maintenance vehicle travel and wind erosion
- odour associated with blackwater events.

Residual effects during construction are expected to be insignificant and include:

- dust from construction activities and wind erosion
- gaseous air emissions from construction vehicles and activities.

(ii) Submissions

EPA explained the Proponent's obligations under the EP Act and General Environmental Duty, noting the EMF may not deal exhaustively with all risks contemplated by the General Environmental Duty. Specifically, compliance with the EMF may not amount to compliance with the General Environmental Duty which is a separate *"statutory requirement which exists independently from the approval process undertaken for the Projects"*.

EPA submitted that of particular concern to it was that the CEMP and OEMP address risks associated with air quality, among other environmental considerations. It noted the EMF had provided for EDS to be in accordance with relevant EPA publications and a requirement for consultation with relevant stakeholders including the EPA.

While the EPA suggested changes relating to timeframes for assessment and reference to publications, it did not recommend any specific changes to the Project documentation relating to air quality.

The Proponent proposed amended wording to AQ1 to require measures to include *"visual observations of nuisance dust"*.

(iii) Discussion

The Committee is satisfied the methodology used to assess air quality effects is appropriate and the overarching conclusions in the EES are sound.

The Committee has reviewed the relevant elements of the EMF, including the EDS, and is satisfied they provide a suitable basis for managing air quality effects. The EMF appropriately includes measures during construction to manage dust (EDS AQ1), processes for managing dust nuisance and complaints (EDS AQ2) and during operation, a requirement for appropriate servicing of diesel pumps (EDS AQ3). The Committee accepts the suggested change to AQ1 proposed by the Proponent.

The Committee notes that EDS AQ1 and monitoring requirement M AQ1 appropriately reference *EPA Publication 1961 Guideline for assessing and minimising air pollution in Victoria*. EDS AQ1 also requires contractors to consider other relevant EPA publications during construction.

The Committee is satisfied that residual effects for operation and construction are likely to be insignificant, and the expected increase in vegetative cover in the MIA will be a benefit.

(iv) Findings

The Committee finds:

- The EES assessment of air quality effects is satisfactory.
- Potential adverse effects will be insignificant and beneficial effects are expected.
- The EMF will provide a suitable basis for managing air quality effects.

19.3 Overall conclusions on air quality effects

There are no air quality impacts that preclude the Project being approved or the evaluation objective being achieved.

PART C: IMPLEMENTATION AND ASSESSMENT

20 Implementation

20.1 Draft Planning Scheme Amendment GC202

(i) Introduction

The draft PSA documentation is included at EES Attachment IV, including:

- the incorporated document
- the *Victorian Murray Floodplain Restoration Project, Planning Scheme Amendment GC202 Strategic Assessment Report* (Strategic Assessment Report).

Community and stakeholder consultation about the draft PSA is discussed in EES, Attachment VIII – Stakeholder and Community Engagement Report. Specialist Assessment K discusses the planning approval pathways.

The draft PSA proposes to introduce Specific Controls Overlays (SCOs) to apply the incorporated document:

- in the Swan Hill Planning Scheme to facilitate the Belsar-Yungera Project
- in the Mildura Planning Scheme to facilitate the Hattah Lakes North Project.

In response to the Committee’s RFI, the Proponent provided additional information about the boundaries of the SCOs, reporting and monitoring provisions, and consultation (D99).

The exhibited incorporated document exempts the Project from other planning scheme provisions and requires the preparation of:

- development plans to be approved by the Minister for Planning, prior to the commencement of development
- an EMF to be approved by the Minister for Planning, prior to the commencement of development
- a CEMP to be approved by the Secretary to DELWP, prior to the commencement of development
- an OEMP to be approved by the Secretary to DELWP, prior to the commencement of environmental watering.

It also includes provisions related to:

- native vegetation
- monitoring and evaluation of biodiversity improvement
- heritage management
- road access
- floodplain management
- bushfire protection measures
- other conditions
- preparatory and other works
- expiry of the control.

(ii) Review and assessment

Terms of Reference

Clause 5 of the ToR specifies the Committee must consider the following matters in relation to the draft PSA:

- 5f. consider the merits of the draft planning scheme amendments (PSAs) exhibited with the EES or environment report (as applicable), which have been prepared to apply a Specific Controls Overlay, incorporated document and establish planning approval for the projects;
- 5g. undertake a strategic assessment of draft PSAs, exhibited with the EES or environment report (as applicable) against the strategic considerations identified in Planning Practice Note 46 Strategic Assessment Guidelines and other relevant considerations;
- 5h. consider any relevant issues raised in submissions about the draft PSAs;
- 5i. review the contents of the draft PSAs including the incorporated documents; and
- 5j. recommend any changes to the draft PSAs that it considers necessary.

Clause 39 of the ToR requires the Committee to consider the following in its review of the draft PSA:

- 39a. consider the P&E Act, ministerial directions, Victoria Planning Provisions and the Loddon Mallee North Regional Growth Plan.
- 39b. consider the relevant planning schemes, including state, regional and local planning policies, and any adopted plans, strategies and PSAs. In particular, attention should be given to the consistency of the projects/draft PSAs with state policy on native vegetation, biodiversity and bushfire planning.
- 39c. review all relevant material submitted on behalf of VMFRP or otherwise provided to the SIAC.
- 39d. review all relevant submissions and evidence received.

What did the EES say?

The Strategic Assessment Report addressed the relevant ‘strategic considerations’ described in Planning Practice Note 46 Strategic Assessment Guidelines (PPN46), including:

- Why is an amendment required?
- Does the amendment implement the objectives of planning and address any environmental, social and economic effects?
- Does the amendment address relevant bushfire risk?
- Does the amendment comply with the relevant Minister’s Directions?
- Does the amendment support or implement the Planning Policy Framework?
- How does the amendment support or implement the Municipal Planning Strategy?
- How does the amendment support or implement the Local Planning Policy Framework and, specifically the Municipal Strategic Statement?
- Does the amendment make proper use of the Victoria Planning Provisions?
- How does the amendment address the views of relevant agencies?
- Does the amendment address the requirements of the Transport Integration Act 2010?
- What impact will the new planning provisions have on the administrative costs of the responsible authority?

Regarding environmental, social and environmental effects the Strategic Assessment Report stated the Project:

- is designed to deliver positive ecological outcomes for the floodplains

- will benefit the use of public and private land for environmental land practices, recreational activities and farming
- will create jobs and economic value.

Submissions

The Proponent outlined the contents and purpose of the draft PSA in its Part A submission, but primarily relied on the exhibited EES material.

There was no town planning evidence or submissions about the strategic justification for the draft PSA or the use of the SCO. However, issues associated with elements of the incorporated document and the EMF were raised in evidence and submissions. These are discussed in the relevant chapters in Part B of this Report.

The EPA recommended the Explanatory Report be amended to better address contaminated land and resolve an inconsistency in relation to noise. The Proponent did not oppose these changes and advised they will be addressed when the PSA is finalised following the Minister's assessment.

Discussion

The Committee has reviewed the Strategic Assessment Report in the context of ToR 5(g) and PPN46 and is satisfied that:

- the draft PSA will facilitate the VMFRP's implementation
- the use of the SCO and incorporated document is an appropriate use of the Victoria Planning Provisions
- the draft PSA appropriately responds to the objectives of planning, as well as relevant State, regional and local policies, strategies and plans, including the Loddon Mallee North Regional Growth Plan referred to in ToR 39(a)
- the draft PSA appropriately responds to the relevant Ministerial Directions, Planning Practice Notes, bushfire risk and the *Transport Integration Act 2010* referred to in ToR 39(b)
- the preparation of the draft PSA included appropriate consultation with relevant agencies and stakeholders
- the administrative costs associated with implementing the incorporated document will potentially be significant, but are balanced by the broader Project benefits.

Overall, the Committee is satisfied the implementation of the Project through the draft PSA will result in a net community benefit, subject to adopting the Committee's recommendations in relation to the incorporated document and EMF. These are shown in Appendices F and G.

The Committee notes the EPA's submission about the Explanatory Report and supports the Proponent's intention to address these matters following the Minister's assessment. This process should also address any consequential changes to the PSA and associated documentation arising from the Committee's recommendations and Minister's assessment.

Findings

The Committee finds:

- The use of the SCO and incorporated document is an appropriate use of the Victoria Planning Provisions.
- Draft PSA GC202 is strategically justified.

(iii) Consultation

Terms of Reference

Clause 47 of the ToR requires the Committee's report to contain:

47h. advice on whether the consultation on the draft PSAs and proposed planning approval process is considered adequate or whether additional consultation should occur.

What did the EES say?

The Engagement Report describes the consultation that was undertaken on the draft PSA prior to its exhibition, including the nature of the consultation and the stakeholders that were engaged.

In addition, the draft PSA was formally exhibited with the EES between 3 October 2022 and 14 November 2022.

Submissions

In response to the Committee's RFI (Question 116) the Proponent provided the following overview of the draft PSA consultation:⁴⁷

Government agency consultation for the PSA was undertaken via the [Technical Reference Group] TRG, convened by DELWP's Impact Assessment Unit. The PSA was presented to the TRG and two rounds of comments were received and responded to. Dedicated briefings were also held with both Councils, and extended consultation outside of the TRG forum occurred with DELWP's planning division regarding the bushfire conditions.

The community and relevant landowners were provided with notification and briefings in respect of the purpose of the PSA, the implications of it for their properties, and that it would be exhibited as part of the EES, including an invitation to provide feedback by making a submission on the EES.

FoNVP raised various concerns about the adequacy of consultation during the development of the Project, but not specifically in relation to the draft PSA. In particular, it submitted that Traditional Owners had not been adequately consulted and found it 'odd' that Swan Hill and Mildura Rural City Councils had not made submissions on the draft PSA.

Discussion

The Committee has reviewed the pre-exhibition consultation arrangements described in the Engagement Report and supplementary material provided by the Proponent, and is satisfied appropriate consultation was undertaken. The Committee is also satisfied the formal exhibition of the draft PSA with the EES was appropriate and that additional consultation is not necessary.

The Committee notes that Swan Hill and Mildura Rural City Councils did not lodge submissions on the EES or draft PSA, but is satisfied they were aware of the Project and had opportunities to participate in the preparation of the EES and make submissions during its exhibition. The Councils, together with other stakeholders, were represented on the TRG and Community Reference Group that were aware of the Amendment.

Issues relating to consultation with Traditional Owners and interested parties are discussed in Chapter 10 of this Report.

Findings

The Committee finds that consultation on Draft PSA GC202 was adequate and no additional consultation need occur.

⁴⁷ D99, page 21

(iv) Environmental Management Framework

What did the EES say?

The incorporated document requires the preparation and approval of various documents and plans including an EMF (a draft was exhibited as part of the EES). The incorporated document describes the matters the EMF must include and address, including EDS that are applicable to Project design, construction and operation, and the performance monitoring and reporting processes.

The EMF must be approved by the Minister prior to the commencement of development.

Submissions

The Proponent outlined the role of the EMF as the overarching project management plan and the various requirements it would establish.

The Proponent provided a Day 1 version of the exhibited EDS (D95) and a Final Day version of the EDS and Monitoring Requirements (D177). The revisions followed a legal review of the EDS to ensure it was fit for purpose and in response to submissions and evidence.

The draft EMF was the subject of submissions and evidence that are discussed in Part B of this Report.

The EPA submitted the EDS should specify for the CEMP that allowance of sufficient review time is to be included, in agreement with relevant stakeholders. The Proponent accepted this recommendation and included changes to EDS EMF2 in its Final Day version.

Discussion

The Committee is satisfied the EMF will provide an appropriate framework for the design, construction and operation of the Project, subject to the recommended changes discussed in Part B of this Report and included in Appendix G.

The key recommendations relate to further analysis of floodplain hydraulics and monitoring of groundwater, as well as preparing management plans for winged peppercress (Hattah Lakes North) and Mildura Butterfly *Ogyris subterrestris subterrestris* (Hattah Lakes North).

The Committee is sympathetic to the EPA's submissions regarding review time of the CEMP, and agrees that adequate review time for stakeholders is important. It does not however agree the EDS is the correct place to specify this requirement, and the change to EMF2 proposed by the Proponent in response to the EPA's submission is not supported by the Committee.

The EMF will require further review prior to approval in order to identify any consequential changes resulting from the Committee's recommendations, including the changes to the EDS and monitoring provisions included at Appendices F and G. It will also be necessary to reflect recent Victorian machinery of Government changes to State government departments.

Findings

The Committee finds the Final Day versions of the Project documents are appropriate, subject to the Committee's recommended changes.

(v) Recommendations

Draft Planning Scheme Amendment GC202

Approve draft Planning Scheme Amendment GC202 subject to the Committee's recommendations.

Environmental Management Framework

Include the following change:

- a) Revised EDS EMF2 to revert to the exhibited version.**
- b) Review and update the Environmental Management Framework to include any consequential changes associated with the recommended changes to the Environmental Delivery Standards and Monitoring register, and to reflect changes to State government departments following Victorian machinery of Government changes.**
- c) Approve the Environmental Management Framework, subject to the Committee's recommended changes.**

These changes are included at Appendices F and G.

20.2 Matters of National Environmental Significance

(i) Introduction

Clause 5 of the ToR requires the SIAC to:

- c. consider and report on potential environmental effects for each project on relevant matters of national environmental significance protected under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) for that project;

Clause 47 requires SIAC reports to include:

- k. specific findings and recommendations about the predicted impacts on matters of national environmental significance and their acceptability, including appropriate controls and environmental management.

The Hattah Lakes North project was deemed a controlled action (EPBC 2020/8632) based on the potential for significant impacts on Ramsar wetlands and listed threatened species and communities. A variation to the proposed action to include maintenance of 16.9 kilometres of existing access tracks was accepted in September 2022.

The Belsar-Yungera project was deemed a controlled action (EPBC 2020/8744) based on the potential for significant impacts on listed threatened species and communities. A variation to the proposed action to include a borrow site and to undertake track maintenance was accepted in September 2022.

The Hattah Lakes North Project is being assessed through the EES process under the bilateral agreement, whereas Belsar-Yungera is being assessed through the EES as an accredited assessment. For both assessments, the Commonwealth Minister for the Environment or delegate will decide whether the Project is approved, approved with conditions or refused under the EPBC Act, after having considered the Minister for Planning's assessment for each project under the EE Act.

The *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (2013) under the EPBC Act provide overarching guidelines on determining whether an action is likely to have a significant impact on a matter protected under national environmental law.

Significant impact criteria are provided to assist in determining whether potential impacts of an activity on a MNES are likely to be significant. The criteria are different according to the conservation category of the MNES (for example, critically endangered or vulnerable).

(ii) What did the EES say?

The EES concluded there would be no significant impacts on these matters as summarised in Table 12. Detailed significant impact assessments are provided in Appendix K to Specialist Appendix B and Appendix G to Specialist Assessment A.

Table 12 Expected significant adverse impacts on MNES

Species	Construction	Operations
<i>Belsar-Yungera Project</i>		
Winged peppercross	No impact expected	Expected to be positively impacted (if present)
South-eastern long-eared bat	Unlikely to be significant	Unlikely to be significant
Australian painted snipe	No impacts expected	No impacts expected
Painted honeyeater	Unlikely to be significant	No impacts expected
Regent parrot	Unlikely to be significant	Minor impacts possible but highly unlikely to be significant
Growling grass frog	No impacts expected	No impacts expected
Murray cod	Unlikely to be significant	Unlikely to be significant
Silver perch	Unlikely to be significant	Unlikely to be significant
<i>Hattah Lakes North Project</i>		
Buloke Woodlands of the Riverine and Murray-Darling Depression Bioregions	No impacts expected	Although not present in MIA, increases to water table and soil saturation expected to have neutral to positive impact on this community
Winged peppercross	Minor impacts possible, significant impacts not likely	If present in MIA, species is expected to respond positively to watering and significant impacts are not considered likely
South-eastern long-eared bat	Unlikely to be significant	Unlikely to be significant
Australian painted snipe	No impacts expected	No impacts expected
Painted honeyeater	Unlikely to be significant	Unlikely to be significant
Regent parrot	Unlikely to be significant	Minor impacts possible but highly unlikely to be significant
Murray cod	Unlikely to be significant	Unlikely to be significant
Silver perch	Unlikely to be significant	Unlikely to be significant

Species	Construction	Operations
Southern pygmy perch (Murray-Darling lineage)	Unlikely to be significant	Unlikely to be significant
Hattah-Kulkyne Lakes Ramsar site	Highly unlikely to result in significant impacts and unlikely to trigger any of the limits of acceptable change	Unlikely to result in significant impacts or trigger any of the limits of acceptable change

Source: Summary of Tables 7.14, 10.14 and Sections 10.1.2.5 and 10.2.3.5 of Specialist Appendix B

In addition, five and seven migratory species listed under the EPBC Act were identified as present or potentially occurring in the Belsar-Yungera and Hattah Lakes North Project areas, respectively. All species were considered unlikely to be significantly impacted under the EPBC Act.

Commonwealth offsets are not required for the Project as no residual significant impacts are expected.

(iii) Evidence and submissions

Evidence and submissions relevant to these matters are detailed in Chapter 7 and 8 of this Report and are not repeated here.

Several submissions were made that the suite of VMFRP (including this Project) would result in significant cumulative impacts on Ramsar sites further downstream of the Project, as a result of the overall reduction in freshwater to be released down the Murray by avoiding buybacks.

The Proponent submitted a cumulative impact assessment for MNES (D113, TN06). This considered cumulative impacts for all MNES including those nominated in respective referral decisions and those that were found to be present or possibly present in the Project areas. Cumulative effects were only considered for MNES that were present at more than one site and determined to have more than a very low potential for cumulative effects.

Relevant MNES considered in the cumulative assessment were regent parrot which was present at six sites, silver perch and Murray cod which were both found at all nine sites. Potential cumulative impacts on the Hattah Kulkyne Ramsar site were also considered.

Cumulative effects have been considered in Chapters 5, 6, 7 and 8 of this Report.

(iv) Discussion

Discussion relevant to threatened species and communities are detailed in Chapters 7.6, 7.7 and 8.10 of this Report and is not repeated here.

The Committee accepts evidence and submissions the Project will not result in significant impacts on MNES nor require offsets under Commonwealth legislation.

However, the Committee has made various recommendations in relation to MNES, including new and revised EDS that:

- require a specific Sub-Plan of the OEMP to address potential effects of inundation on winged peppercreep on the Raakajlim property
- simplify the requirements for monitoring regent parrot nests, if construction occurs within 350 metres of an active nesting tree during breeding season.

In addition, the Committee has recommended new and revised EDS to address key threats including pest plants and animals, and carp and fish stranding that will assist in further reducing potential impacts to MNES.

In Chapter 5 the Committee concluded the impacts of surface water effects on Ramsar sites has been adequately assessed.

In Chapters 7 and 8 the Committee concluded impacts of the Project on threatened species and communities had been adequately assessed.

As noted in Chapter 4, the Committee did not explore the potential for the Project to result in significant cumulative impacts on the Coorong Ramsar site by avoiding buybacks as this was out of the scope of its ToR. The Coorong was not nominated as a controlling provision for any of the nine VMFRP sites.

(v) MNES conclusions

The Committee concludes:

- MNES impacts can be acceptably managed through recommended mitigation measures.
- The Project will not have significant residual impacts on any MNES.

20.3 Other approvals

The Project will require various approvals that are discussed in EES Attachment III (Legislation and Policy) and EES Chapter 18.5 (Statutory approvals and consents):

- 47i. recommendations for any appropriate conditions that may be lawfully imposed on any approval for the projects, or changes that should be made to the draft PSA (for each assessment package) in order to ensure that the environmental effects of the projects are acceptable having regard to legislation, policy, best practice, and the principles and objectives of ecologically sustainable development;

These approvals and consents are discussed below.

(i) Environment Protection and Biodiversity Conservation Act

The EPBC Act provides the legal framework to protect and manage designated MNES, including World Heritage Properties, National Heritage Places, Ramsar wetlands, nationally listed threatened species and ecological communities and listed migratory species.

MNES are discussed in Chapter 20.2 of this Report.

(ii) Water Act (Commonwealth)

The *Water Act 2007* (Commonwealth) integrates the management of water resources and provides limits on how much water can be taken from surface and groundwater systems across the Murray-Darling Basin. It provided for the establishment of the MDBA and the Basin Plan.

The VMFRP is being implemented as part of Victoria's obligations under the Basin Plan and will operate in accordance with the requirements for environmental watering under the *Water Act 2007* and the *Water Act 1989* (Vic).

As noted in Chapter 4 of this Report, the Policy basis for the Project and VMFRP is beyond the scope of the Committee's considerations. The Committee has also proceeded on the basis that adequate water will be available to the Project.

(iii) Aboriginal Heritage Act

The *Aboriginal Heritage Act 2006* requires the preparation and approval of CHMPs for the Project:

- Belsar-Yungera (CHMP No. 16898)
- Hattah Lakes North (CHMP No. 14330).

These are being prepared by the Proponent for approval by the Secretary to the Department of Premier and Cabinet in the absence of a RAP.

The CHMPs are discussed in Chapter 10 of this Report where the Committee described the status of the CHMPs and noted it was not aware of any matters that would preclude the CHMPs being finalised.

(iv) Fisheries Act

The *Fisheries Act 1995* provides for the regulation, management and conservation of Victorian fisheries, including aquatic habitats. The Project will require authorisation to create obstructions to fish passage under Section 119 and/or a permit to take fish under Section 49.

The Committee supports the relevant approvals, subject to compliance with the Committee recommended EMF.

(v) Flora and Fauna Guarantee Act

The FFG Act is the primary legislation dealing with conservation of flora and fauna and the management of potentially threatening processes in Victoria. The Project will require approval to take protected flora on Crown land under Section 48 and to handle fish under Section 53.

The Committee supports the relevant approvals, subject to compliance with the Committee recommended EMF.

(vi) Heritage Act

The *Heritage Act 2017* requires a consent to carry out works or activities to a VHI site, and a permit to carry out works or activities to a heritage place or heritage object listed on the Victorian Heritage Register. The EES found that permits were unlikely to be required for sites on the VHI and Victorian Heritage Register, but might be required for unlisted or newly discovered sites.

Historical heritage is discussed in Chapter 11 of this Report where the Committee found the EES assessment of historical heritage and proposed EDS are appropriate.

(vii) Mineral Resources (Sustainable Development) Act

The *Mineral Resources (Sustainable Development) Act 1990* is likely to require approvals for the Project borrow sites. The EES noted the Proponent was in discussion with Earth Resources Regulation and DELWP in relation to the approvals.

Borrow sites are discussed in Chapters 9 and 13 of this Report.

The Committee supports the relevant approvals, subject to compliance with the Committee recommended EMF.

(viii) National Parks Act

The *National Parks Act 1975* provides for the preservation, protection, enhancement and management of the natural environment and native flora and fauna within national and State parks in Victoria. The Act requires approval for certain works, including permanent construction works to be carried out within a park.

The Hattah Lakes North Project is located within the Hattah-Kulkyne National Park and will require approval for the construction, operation and maintenance of Project infrastructure.

The Committee supports the relevant approvals, subject to compliance with the Committee recommended EMF.

(ix) Planning and Environment Act

Draft PSA GC202 will provide the Project approvals required under the PE Act. The draft PSA is discussed in Chapter 20.1 of this Report, in which the Committee recommends it be approved, subject to its recommended changes.

(x) Road Management Act

The *Road Management Act 2004* provides a statutory framework for road management authorities to manage the road network in Victoria. The Project may require consent for the use or development of land within a declared road.

Traffic and transport issues are discussed in Chapter 18 of this Report, where the Committee concluded the incorporated document and EMF will provide a suitable basis for managing traffic and transport effects.

The Committee supports any relevant approvals, subject to compliance with the Committee recommended EMF.

(xi) Local Government Act

The *Local Government Act 2020* provides a statutory framework for governing the operation of councils, including the powers of a council in relation to roads within its municipal district. The Project may require consent for the use or development of land within Council owned or managed roads.

Traffic and transport issues are discussed in Chapter 18 of this Report, where the Committee concluded the incorporated document and EMF will provide a suitable basis for managing traffic and transport effects.

The Committee supports any relevant approvals, subject to compliance with the Committee recommended EMF.

(xii) Water Act (Victoria)

The *Water Act 1989* sets out the legal framework for the management of Victoria's water resources, including the Murray River. The EES sets out the likely approvals or processes that will be required to divert water and construct infrastructure.

As noted in Chapter 4 of this Report, water allocation issues are beyond the scope of the Committee's considerations.

The Committee supports the proposed Project infrastructure, subject to compliance with the recommended EMF.

(xiii) Wildlife Act

The *Wildlife Act 1975* provides for the protection and conservation of wildlife, and regulates the conduct of persons engaged in wildlife related activities. The Proponent will require authorisation under section 28A.

The Committee supports authorisation, subject to compliance with any relevant elements of the EMF.

(xiv) New South Wales approvals

The EES describes the approvals that will be required under the following New South Wales legislation:

- *Environmental Planning and Assessment Act 1979*
- *Fisheries Management Act 1994*
- *National Parks and Wildlife Act 1974*.

It is outside the scope of the Committee's considerations to assess these approvals, although it notes the Proponent's updated advice on the status of approvals in D99.

21 Assessment

21.1 Integrated assessment

(i) Legislation and policy

The legislative and policy context is described in Chapters 2.4 and 20 of this Report. The Committee addressed a number of preliminary matters in Chapter 4. These issues include the policy context of the Basin Plan, SDLAM and Victorian Environmental Water Framework.

The Committee accepts the basic premise that the Project is consistent with policies relating to the Basin Plan, in the context of the Committee's ToR which states these obligations are for context only and outside of the matters to be considered by the Committee.

The Committee has addressed specific impacts relating to approval requirements for elements of the Project in Part B of this Report. The Committee is satisfied the Project will be delivered consistent with legislative and policy requirements, subject to compliance with the Committee recommended incorporated document and EMF.

(ii) Benefits

Project benefits have been assessed as they relate to specific matters in Part B of this report. In summary, the Project is expected to have benefits for:

- floodplain hydrology in the MIAs in terms of inundation frequency and duration
- floodplain vegetation in broad terms, on the basis the Committee recommended further analysis provides appropriate certainty regarding floodplain hydraulic conditions and preferred and tolerable water regimes to inform detailed design, operations and adaptive management
- the majority of threatened flora known or predicted to occur in the Project areas
- water-dependent deep-rooted vegetation by increasing water availability
- aquatic ecosystems and biota
- terrestrial fauna.

Subject to the Committee's recommendations, the Project:

- is likely to achieve no net loss to biodiversity
- will not have significant residual impacts on any MNES, and any impacts can be acceptably managed through recommended mitigation measures.

Other likely benefits assessed in Part B related to:

- soil, by increasing vegetation cover and stabilising soil and landforms
- Aboriginal cultural heritage, by increasing vegetation cover, enhancing tree lifespans and reducing erosion
- land use, by providing opportunities for environmental land practices, recreation, agriculture, improved visual amenity and access
- agriculture, by replenishing ground and surface water and upgrading tracks
- bushfire, by reducing the likelihood of fire ignition, reducing the rate and extent of bushfires, improving bushfire resilience of vegetation
- landscape character, by improving vegetation health and growth and improving visual quality of views

- community and business, by enhancing the natural environment, delivering employment and associated economic benefits, tourism and recreational benefits
- traffic and transport, by improving tracks and access
- air quality, by reducing dust emissions.

Achieving the Project benefits and net community benefit is, of course, reliant on successful mitigation of risks. The Committee's recommended changes to the EMF and EDS are designed to ensure risks are further minimised and managed appropriately.

The Committee considers some elements of the EES require further work and refinement to address uncertainties and to ensure the operation of the Project is 'fine-tuned' and impacts are managed acceptably. The further work is therefore proposed through EDS in the EMF (rather than requiring to be done before the Minister's assessment of the EES).

The Committee noted in Chapter 4 of this Report, it has assessed the Project on the understanding that adequate project funding and resourcing will be allocated, particularly in relation to monitoring and adaptive management. It goes without saying that if adequate funding and resourcing is not available, achieving the benefits of the Project will be compromised.

On this basis, the Committee is satisfied the Project will achieve net community benefit, subject to the Committee's recommendations.

(iii) Assessment against evaluation objectives

Clause 5(b) of the ToR requires the Committee to have regard to the evaluation objectives in the Scoping Requirements Report. Table 13 summarises the Committee's findings in relation to the objectives and indicates where the relevant discussion can be found.

Table 13 Summary of Committee's assessment against evaluation objectives

Evaluation objective	Response and relevant report reference
Floodplain restoration Implement environmental watering of floodplains to enhance ecosystem function, biodiversity (particularly listed threatened species and communities), water quality, and cultural values.	The Project is consistent with the evaluation objective, subject to applying the Committee's recommendations. Refer to Chapters 5, 7, 8 and 10.
Biodiversity and habitats Avoid, and where avoidance is not possible, minimise potential adverse effects on native vegetation, species of flora and fauna (particularly listed threatened species and their habitat and listed ecological communities), as well as address offset requirements (if required) consistent with state and Commonwealth policies.	The Project is consistent with the evaluation objective, subject to applying the Committee's recommendations. Refer to Chapters 7, 8 and 20.
Water, catchment values and hydrology Avoid and, where avoidance is not possible, minimise adverse effects on water quality, hydrology, hydrogeology and beneficial water uses (including for the Ramsar listed wetlands).	The Project is consistent with the evaluation objective, subject to applying the Committee's recommendations. Refer to Chapters 5, 6, 8 and 9.
Cultural heritage	The Project is consistent with the evaluation objective, subject to

Avoid, or minimise where avoidance is not possible, adverse effects on Aboriginal and historic cultural heritage values.	applying the Committee's recommendations. Refer to Chapters 10, 11 and 14.
Social, economic, amenity, land/waterway use and infrastructure Minimise potential adverse social, economic, amenity and land/waterway use effects, including impacts on existing infrastructure and open space.	The Project is consistent with the evaluation objective, subject to applying the Committee's recommendations. Refer to Chapters 7, 8, 9, 12, 13, 14, 15, 16, 17, 18 and 19.

(iv) Findings

The Committee finds:

- The Project is consistent with legislation and policy, subject to recommendations of the Committee.
- The EES assessment is generally acceptable and responds adequately to the evaluation objectives.
- The Project is likely to achieve environmental, social and economic benefits, and overall net community benefit.
- The effects of the Project can be appropriately managed subject to changes to the Project documents recommended by the Committee.

21.2 Response to Terms of Reference

(i) Clause 47

Clause 47 lists the matters the Committee's report must contain. Table 14 identifies where the matters are addressed.

Table 14 Committee's responses to Terms of Reference Clause 47

Terms of Reference Clause 47	Committee's response	Relevant reference	report
47(a) analysis and conclusions with respect to the predicted environmental effects and benefits of each project in the package and their respective significance and acceptability	<p>The Committee is generally satisfied with the EES analysis and assessment of predicted environmental effects, their significance and acceptability, and the predicted benefits for each project.</p> <p>That said, it has recommended further analysis and monitoring in relation to:</p> <ul style="list-style-type: none"> - floodplain hydraulics and implications for floodplain ecology - groundwater - winged peppercress (Hattah Lakes North) - Mildura Butterfly <i>Ogyris subterrestris</i> (Hattah Lakes North). <p>The further analysis will provide additional certainty in relation to the</p>	The analysis and conclusions are provided in Part B.	

	impacts and benefits of the Project, and will be used to inform detailed design and operations.	
47(b) in the context of predicted effects, advice on whether each project is expected to result in overall improvement to the biodiversity values of relevant floodplain ecosystems, including for each relevant matter of national environmental significance	<p>The Committee is generally satisfied the Project is likely to result in an overall improvement to the biodiversity values of the Belsar-Yungera and Hattah Lakes North floodplains.</p> <p>In relation to MNES, the Committee finds:</p> <ul style="list-style-type: none"> - MNES impacts can be acceptably managed through recommended mitigation measures - the Project will not have significant residual impacts on any MNES. 	<p>The analysis and conclusions are provided in Part B.</p> <p>MNES impacts are discussed in Chapters 5, 7, 9 and 20.2.</p>
47(c) recommendations on whether the proposed alternative arrangement to compensate for the removal, destruction or lopping of native vegetation and associated impact on biodiversity is considered acceptable, and if not, whether any biodiversity offsets are necessary	<p>The Committee is satisfied the alternative arrangements proposed in the EES to compensate for the removal, destruction or lopping of native vegetation and associated impact on biodiversity are acceptable.</p> <p>The Committee does not believe any native vegetation offsets are necessary, subject to implementing the Committee's recommendations for further analysis of floodplain hydraulics and implications for floodplain ecology, and having regard to any consequential reassessment of impacts.</p> <p>The Committee has recommended the native vegetation offset provision be reinstated in the incorporated document.</p>	Native vegetation offsets are discussed in Chapter 7.
4(d) recommendations for any feasible modifications to the projects	<p>The Committee has not recommended any design modifications to the Project, but has recommended various changes to the incorporated document and EMF (including the EDS), including further analysis of various matters.</p> <p>These recommendations, together with the further analysis and review contemplated in the incorporated document and EMF and recommended by the Committee, may result in design changes.</p>	<p>Recommended changes to the incorporated document and EMF are discussed in Part B and Chapter 20.1.</p> <p>Recommended changes are marked up in the Project documents in Appendix F (incorporated document) and Appendix G (EDS and monitoring requirements), based on</p>

		the Proponent's Final Day versions.
47(e) findings on whether acceptable environmental outcomes can be achieved	The Committee is satisfied the Project is likely to achieve acceptable environmental outcomes, subject to the adopting its recommendations.	Environmental outcomes are discussed in Part B.
47(f) recommendations on specific measures appropriate to prevent or mitigate adverse environmental effects to achieve acceptable environmental outcomes	The Committee has recommended various refinements to the incorporated document and EMF to better prevent or mitigate adverse impacts. It has also recommended further analysis and monitoring of various matters.	The recommendations are discussed in Part B and listed in Table 16.
47(g) a short summary and assessment of the issues raised in submissions about the draft PSAs	<p>No issues were raised in submissions about the SCOs and associated planning scheme provisions.</p> <p>Various issues were raised in evidence and submissions about the incorporated document and EMF.</p> <p>The EPA raised minor issues relating to the draft Explanatory Report.</p>	<p>Issues about the incorporated document are discussed in Chapters 7, 14 and 20.1.</p> <p>Issues about the EMF are discussed in Part B.</p> <p>Issues about the Explanatory Report are discussed in Chapter 20.1.</p>
47(h) advice on whether the consultation on the draft PSAs and proposed planning approval process is considered adequate or whether additional consultation should occur	The Committee is satisfied the consultation was adequate and that no additional consultation need occur.	PSA consultation is discussed in Chapter 20.1.
47(i) recommendations for conditions on any approval for the projects, or changes that should be made to the draft PSA	<p>The Committee recommends various changes to the incorporated document and the EMF to better address the environmental effects of the Project.</p> <p>The Committee does not recommend any specific conditions on other approvals, but notes that all approvals will need to be consistent with the Committee's recommendations.</p>	<p>Recommended changes to the incorporated document and EMF are discussed in Part B and listed in Table 16.</p> <p>Recommended changes are marked up in the Project documents in Appendix F (incorporated document) and Appendix G (EDS and monitoring requirements).</p>
47(j) recommendations about the structure and content of the draft management plans provided with the EES	The incorporated document and EMF require the preparation of various management plans that were not exhibited as part of the EES. The Committee has reviewed the	Recommended changes to the incorporated document and EMF are discussed in Part B.

	<p>requirements for these plans in the incorporated document and EMF and recommends various changes to better address mitigation, monitoring and contingency measures.</p> <p>The Committee has recommended additional management plans be prepared in relation to:</p> <ul style="list-style-type: none"> - winged peppercreep (Hattah Lakes North) - Mildura Butterfly <i>Ogyris subterrestris subterrestris</i> (Hattah Lakes North). 	<p>Recommended changes are marked up in the Project documents in Appendix F (incorporated document) and Appendix G (EDS and monitoring requirements).</p>
47(k) specific findings and recommendations about the predicted impacts on MNES	<p>The Committee is satisfied:</p> <ul style="list-style-type: none"> - MNES impacts can be acceptably managed through the Committee's recommended EDS - the Project will not have significant residual impacts on any MNES. 	<p>MNES impacts are discussed in Chapter 20.2.</p>

(ii) Clause 48

Clause 48 lists additional matters the Committee's report must contain. Table 15 identifies where the matters are included. Table 16 provides a cross reference between recommendations and relevant discussions.

Table 15 Committee's responses to Terms of Reference Clause 48

Terms of Reference Clause 48	Relevant report reference
48(a) information and analysis in support of the SIAC's findings and recommendations	Parts B and C
48(b) a list of all recommendations, including cross-references to relevant discussions in the report	Table 16
48(c) a description of the public hearing/roundtable conducted by the SIAC, and a list of those persons consulted with or heard	Overview, Chapter 1.5 and Appendix C
48(d) a list of all submitters in response to the exhibited EES/environment report and the draft PSA	Appendix B
48(e) a list of the documents tabled during the proceedings	Appendix D

Table 16 Cross references between recommendations and discussions

Recommendation	Relevant reference	report
Draft PSA GC202		
Revised EDS E2a (Construction biodiversity administrative processes)	Chapter 7	
Adopt draft Planning Scheme Amendment GC202 subject to the following:	Chapter 20.1	
The incorporated document (Included at Appendix F)		

Reinstated condition 4.5 Native vegetation (as exhibited)	Chapter 7
Environmental Management Framework	
Amend Section 18.8.3.5 Operating Plan	Chapter 8
Make consequential changes or updates as necessary	Chapter 20
Environmental Delivery Standards and Monitoring Standards (Included at Appendix G)	
New EDS SW4 (Surface water – assessment of implications for floodplain vegetation prior to detailed design)	Chapters 5 and 7
Revised EDS GS1 (Minimising erosion and sedimentation through design)	Chapter 5 and 9
Revised EDS GS3 (Soils and landform stability)	Chapter 5
Revised EDS SW2 (Surface water management – Operation)	Chapters 5 and 8
Revised M GSC1 (Geology soils and contamination)	Chapter 5
Revised EDS GW2 (Operational groundwater management)	Chapter 6
Revised M GW1 (Groundwater)	Chapter 6
Revised M GW2 (Groundwater)	Chapter 6
Revised EDS E1 (Native vegetation and habitat design minimisation)	Chapter 7
Revised EDS E2e (Construction rehabilitation management)	Chapter 7
Revised M TE9 (Terrestrial ecology)	Chapter 7
New EDS E5 (Winged peppercreep - Hattah Lakes North)	Chapter 7
Revised EDS E2g (Site specific additional measures - regent parrot)	Chapter 7
Delete M TE1 (Terrestrial ecology)	Chapter 7
Revised M TE3 (Terrestrial ecology)	Chapter 7
Revised EDS E2a (Construction biodiversity administrative processes)	Chapter 7
New EDS E2h (Mildura Butterfly <i>Ogyris subterrestris subterrestris</i> Site specific additional measures – Hattah Lakes North)	Chapter 7
New EDS E6 (Mildura Butterfly <i>Ogyris subterrestris subterrestris</i> - Hattah Lakes North)	Chapter 7
Revised EDS E3 (Pest Plant and Animal Monitoring and Management Plan)	Chapters 7 and 8
New EDS E7 (Water regimes to inform initial operations)	Chapter 7
Revised EDS E2f (Aquatic fauna management)	Chapter 8
Revised M AE3 (Aquatic ecology)	Chapter 8
New EDS SW5 (Surface water design – regulators, containment banks and spillways)	Chapter 8
New M AE7 (Aquatic ecology)	Chapter 8
Revised EDS GS1 (Minimising erosion and sedimentation through design)	Chapter 9
Revised EDS CM1c (Soil characteristics)	Chapter 9
Revised EDS BF2 (Bushfire management during operation)	Chapter 14

Revised EDS TT2 (Traffic Management Plan)

Chapter 18

Revised EDS TT5 (Track maintenance program)

Chapter 18

PART D: APPENDICES

Appendix A Terms of Reference

Terms of Reference

Victorian Murray Floodplain Restoration Project Standing Inquiry and Advisory Committee

Version: August 2022

Standing Inquiry and Advisory Committee appointed to inquire into, and report on, the proposed nine Victorian Murray Floodplain Restoration Projects (VMFRP) and their potential environmental effects in accordance with this terms of reference.

VMFRP consists of nine discrete projects that are being assessed under the *Environment Effects Act 1978* (EE Act) via four 'assessment packages', as set out below:

- a. a single environment effects statement covering both Hattah Lakes North Floodplain Restoration Project and Belsar-Yungera Floodplain Restoration Project;
- b. a single environment effects statement covering both Lindsay Island Floodplain Restoration Project and Wallpolla Island Floodplain Restoration Project;
- c. a single environment report covering Nyah, Vinifera and Burra Creek Floodplain Restoration Projects; and
- d. a single environment report covering Gunbower National Park and Guttrum-Benwell Forests Floodplain Restoration Projects.

The Standing Inquiry and Advisory Committee is appointed pursuant to:

- section 9(1) of the EE Act as an inquiry; and
- part 7, section 151(1) of the *Planning and Environment Act 1987* (P&E Act) as an advisory committee.

Name

1. The Standing Inquiry and Advisory Committee is to be known as the 'Victorian Murray Floodplain Restoration Project Standing Inquiry and Advisory Committee' (SIAC).

Skills

2. The SIAC needs to have members that cover the following areas of knowledge and expertise:
 - a. floodplain ecology (terrestrial and aquatic);
 - b. environmental hydrology;
 - c. Aboriginal cultural heritage; and
 - d. land use and planning.
3. The SIAC may seek additional specialist expert advice to assist it in undertaking its role.
4. The SIAC will comprise of an appointed Lead Chair (SIAC Chair), co-Chairs and other appropriately qualified members.

Purpose

5. The SIAC is appointed by the Minister for Planning under section 9(1) of the EE Act and section 151(1) of the P&E Act to inquire into and provide an integrated assessment of the environmental effects of each of the projects within the VMFRP. For each of the assessment packages the SIAC is to:

VMFRP Standing Inquiry and Advisory Committee: Terms of Reference

- a. review and consider the relevant environment effects statement (EES) or environment report together with the associated technical appendices, other exhibited documents and submissions received in relation to the projects covered by the relevant EES or environment report package;
 - b. consider and report on potential environmental effects and benefits of each project presented in the relevant EES or environment report, their significance and acceptability, having regard to the evaluation objectives in scoping requirements and relevant policy and legislation;
 - c. consider and report on potential environmental effects for each project on relevant matters of national environmental significance protected under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) for that project;
 - d. identify any measures, including any necessary project modifications, it considers necessary and effective to sufficiently avoid, mitigate or manage the environmental effects, within acceptable limits, for the projects that are the subject of the relevant EES or environment report;
 - e. advise on how any identified measures relate to relevant conditions, controls and requirements that could form part of the necessary approvals and consents for the projects being assessed;
 - f. consider the merits of the draft planning scheme amendments (PSAs) exhibited with the EES or environment report (as applicable), which have been prepared to apply a Specific Controls Overlay, incorporated document and establish planning approval for the projects;
 - g. undertake a strategic assessment of draft PSAs, exhibited with the EES or environment report (as applicable) against the strategic considerations identified in the Planning Practice Note 46 Strategic Assessment Guidelines and other relevant considerations;
 - h. consider any relevant issues raised in submissions about the draft PSAs;
 - i. review the content of the draft PSAs including the incorporated documents; and
 - j. recommend any changes to the draft PSAs that it considers necessary.
6. For each of the four assessment packages, the SIAC is to produce a report of its findings and recommendations to the Minister for Planning to inform the assessment under the EE Act and, in turn to assist the Minister to make a decision about the PSAs for the projects relevant to the assessment package. One report shall be prepared for each assessment package however findings and recommendations need to be clearly identified for each individual project.

Background

Project outline

7. VMFRP is being implemented as part of Victoria's obligations under the Murray-Darling Basin Plan. The Basin Plan sets out Sustainable Diversion Limits, which are the amount of water that can be taken from the Murray-Darling Basin each year, and the projects form part of the greater Sustainable Diversion Limit Adjustment Mechanism (SDLAM) under the Murray Darling Basin Plan.
8. The structure and implementation of the Murray Darling Basin Plan, SDLAM and the Victorian Environmental Water Framework are outside the scope of matters to be examined by the SIAC. They are only context for these projects.
9. The projects aim to restore a more natural flooding regime to approximately 14,000 hectares of high ecological value floodplains along the Murray River through modification of existing and construction of new infrastructure.
10. The buildings and works proposed for these projects will include construction of infrastructure such as channels, regulators, containment banks, drop structures, spillways, temporary or permanent pumping stations, laydown areas, site compounds and workforce facilities. Construction and upgrade of access roads will be required, as well as the removal of native vegetation in construction areas. Sites will also need to be established to supply fill material to support construction.

VMFRP Standing Inquiry and Advisory Committee: Terms of Reference

11. The proponent for all nine projects is Lower Murray Urban and Rural Water Corporation (LMW).
12. LMW, as the proponent, is responsible for preparing technical studies, consulting with the public and stakeholders and preparing the EESs and environment reports.

Assessment processes

13. The proponent provided a referral for each of the nine VMFRP projects to the Minister for Planning under the EE Act.
14. In response to the referrals made under the EE Act from the proponent, the former Minister for Planning determined that assessment under the EE Act was required for all 9 projects, either through the preparation of an EES or environment report (as specified in the Introduction). The projects have the potential for significant effects, in particular on floodplain ecosystems, native vegetation, threatened species and ecological communities, as well as Aboriginal cultural heritage values.
15. The EESs are being prepared by the proponent in response to the Minister for Planning's respective EES decisions, procedures and requirements, as well as the scoping requirements issued by the Minister for Planning for each EES.
16. The environment reports (ER) are being prepared by the proponent in response to the Minister for Planning's decisions, specified conditions and scopes issued by the Department of Environment, Land, Water and Planning (DELWP) for each ER.

Commonwealth assessment process

17. Due to the potential significant impacts on matters of national environmental significance, each of the nine VMFRP projects were determined to be a controlled action for the purposes of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act), thus requiring approval under the EPBC Act.
18. The Victorian assessment processes (either via an EES or environment report) are serving as the accredited assessment processes under the EPBC Act.
19. At the conclusion of each accredited process, the Victorian Minister for Planning will provide an assessment of environmental effects to the Commonwealth Minister for the Environment, to inform the approvals decision on each of the nine projects under the EPBC Act.

Planning approval process

20. The SIAC is to consider and provide advice on the draft PSAs that propose planning controls and provisions for the nine projects. The PSAs, in conjunction with other required approvals, will regulate the use and development of land for the projects in accordance with incorporated documents that are proposed to be included in the relevant Council's Planning Schemes.

Other approvals

21. The VMFRP projects may require several other statutory approvals and/or consents including:
 - a. an approved Cultural Heritage Management Plan under the *Aboriginal Heritage Act 2006*;
 - b. a permit to remove listed flora under the *Flora and Fauna Guarantee Act 1988*;
 - c. permits for works potentially affecting historic heritage sites under the *Heritage Act 2017*;
 - d. approval to undertake works in a national park under the *National Parks Act 1975*;
 - e. consent for the use or development of land within a declared road under the *Road Management Act 2004*;
 - f. authorisation to create obstructions to fish passage and/or a permit to take fish under the *Fisheries Act 1995*; and
 - g. a licence to take and use water and a licence for works on a waterway under the *Water Act 1989*.

VMFRP Standing Inquiry and Advisory Committee: Terms of Reference

Method

Submissions

22. Each of the EESs and environment reports (together with corresponding draft PSAs) will be placed on public exhibition, each for at least thirty (30) business days.
23. Submissions on each of the EESs, environment reports and corresponding draft PSAs are to be provided in writing on or before the close of exhibition for each assessment package. Submissions will be collected by the office of Planning Panels Victoria (PPV) on behalf of the Minister for Planning through the Engage Victoria platform. All submissions must state the name and address of the person making the submission. Submissions will be collected and managed in accordance with the 'Guide to Privacy at PPV'.
24. Petition responses will be treated as a single submission and only the first name from a petition submission will be registered and contacted.
25. Pro-forma submitters will be registered and contacted individually if they provide their contact details. However, pro-forma submitters who want to be heard at the public hearing or roundtable forum may be encouraged to present as a group, given their submissions raise the same issues.
26. All written submissions and other supporting documentation or evidence received through the course of the SIAC process may be published online, unless the SIAC specifically directs that the submission or other material, or part of it, is to remain confidential.
27. Electronic copies of each submission on the EESs, environment reports and draft PSAs are to be provided to the proponent, DELWP Impact Assessment Unit, DELWP Regional Planning Services (Loddon Mallee), First Peoples – State Relations, relevant Registered Aboriginal Party (RAP), relevant Council and Parks Victoria.
28. PPV will retain any written submissions and other documentation provided to the SIAC for a period of five years after the time of its appointment.

Referrals to the SIAC

29. The DELWP Impact Assessment Unit will refer projects by letter to the SIAC, for advice on relevant aspects listed in clauses 5 and 6.
30. The referral letter will specify:
 - a. the locality/relevant municipality for each project being referred;
 - b. any specific matters, not already explicitly addressed in these terms of reference, the Minister for Planning seeks advice about;
31. The letter of referral will be a public document.

Public hearings for EES packages (including draft PSAs)

32. The SIAC must hold a public hearing for each of the two EES assessment packages and may make other such enquiries as are relevant to undertaking its role.
33. Prior to commencement of the public hearing for each EES, the SIAC must hold a directions hearing to make directions it considers necessary or appropriate as to the conduct, scope or scheduling of the public hearing.
34. When it conducts the public hearing, the SIAC has all the powers of an advisory committee that are specified in section 152(2) of the P&E Act.

VMFRP Standing Inquiry and Advisory Committee: Terms of Reference

Roundtable for environment report packages (including draft PSAs)

35. The SIAC must hold a roundtable forum for each of the two environment report assessment packages, unless given alternative direction in the referral letter, and may make other such enquiries as are relevant to undertaking its role.
36. Prior to commencement of the roundtable forum for each environment report, the SIAC may hold a directions hearing and make any directions it considers necessary or appropriate as to the conduct, scope or scheduling of the roundtable forum.
37. The SIAC may determine the scope of specific evidence and submissions to be presented by parties at the roundtable (such as by theme), based on key issues identified by the SIAC through its review of the exhibited environment report, draft PSA and submissions received on the exhibited documents. All relevant experts and parties with an interest in a particular issue or theme need to attend the roundtable for that theme, but not other sessions unless identified by the SIAC.

SIAC consultation processes

38. The SIAC may inform itself in any way it sees fit, but must review and consider for each assessment package:
 - a. the referral letter from the DELWP Impact Assessment Unit.
 - b. the exhibited EES or environment report (as applicable to the assessment package) and corresponding draft PSA;
 - c. all submissions and evidence provided to the SIAC by the proponent, state agencies, local councils and submitters;
 - d. any known views of the Registered Aboriginal Parties (RAPs) / Traditional Owner groups or seek the views of the RAPs / Traditional Owner groups if they are not already known;
 - e. any information provided by the proponent and parties that responds to submissions or directions of the SIAC; and
 - f. any other relevant information that is provided to, or obtained by, the SIAC.
39. In their review of the draft PSAs, the SIAC is to:
 - a. consider the P&E Act, ministerial directions, Victoria Planning Provisions and the Loddon Mallee North Regional Growth Plan.
 - b. consider the relevant planning schemes, including state, regional and local planning policies, and any adopted plans, strategies and PSAs. In particular, attention should be given to the consistency of the projects/draft PSAs with state policy on native vegetation, biodiversity and bushfire planning.
 - c. review all relevant material submitted on behalf of VMFRP or otherwise provided to the SIAC.
 - d. review all relevant submissions and evidence received.
40. The SIAC must conduct its processes in accordance with the following principles:
 - a. the public hearing/roundtable forum will be conducted in an open, orderly and equitable manner, in accordance with the principles of natural justice;
 - b. the public hearing/roundtable forum will be conducted with a minimum of formality and without legal representation being necessary for parties to be effective participants; and
 - c. the SIAC process is to be exploratory and constructive, with adversarial behaviour discouraged and with cross-examination/questioning regulated by the SIAC.
41. The SIAC may limit the time of parties appearing before it.

VMFRP Standing Inquiry and Advisory Committee: Terms of Reference

42. The SIAC may direct that a submission or evidence is confidential in nature and the hearing/roundtable forum be closed to the public for the purposes of receiving that submission or evidence.
43. The SIAC may conduct its processes when there is a quorum of at least two of its members present or participating through electronic means, one of whom must be the SIAC Chair or a co-Chair.
44. The SIAC should, as appropriate, use relevant understandings gained from SIAC's other public hearings or roundtable forums, including to assist with common matters and consistency.
45. Recording of the proceedings must be undertaken by the proponent, if directed by the SIAC. If recorded, the audio recording will be provided to PPV as a weblink and would be made publicly available on the project website as soon as practicable after the conclusion of each day of the proceedings, or otherwise as directed by the SIAC.
46. Any other audio or video recording of the conference by any other person or organisation may only occur with the prior consent of, and in accordance with, the directions of the SIAC.

Report

47. For each of the four assessment packages, the SIAC must produce a written report for the Minister for Planning containing its:
 - a. analysis and conclusions with respect to the predicted environmental effects and benefits of each project in the package and their respective significance and acceptability, based on the EES or environment report documents (as applicable) and public submissions, as well as documentation and evidence presented to the SIAC, and having regard to referral letter given to the SIAC under paragraph 28;
 - b. in the context of predicted effects, advise on whether each project within the EES or environment report (as applicable) is expected to result in overall improvement to the biodiversity values of relevant floodplain ecosystems (including listed threatened species and communities), including for each relevant matter of national environmental significance;
 - c. recommendations on whether the proposed alternative arrangement to compensate for the removal, destruction or lopping of native vegetation and associated impact on biodiversity is considered acceptable, and if not, whether any biodiversity offsets are necessary;
 - d. recommendations for any feasible modifications to the projects, necessary to achieve appropriate environmental outcomes, including in relation to variations to the proposed design and/or environmental monitoring and management measures;
 - e. findings on whether acceptable environmental outcomes can be achieved, having regard to legislation, policy, best practice, and the principles and objectives of ecologically sustainable development;
 - f. recommendations on specific measures appropriate to prevent or mitigate adverse environmental effects to achieve acceptable environmental outcomes, having regard to legislation, policy, best practice, and the principles and objectives of ecologically sustainable development;
 - g. a short summary and assessment of the issues raised in submissions about the draft PSAs;
 - h. advice on whether the consultation on the draft PSAs and proposed planning approval process is considered adequate or whether additional consultation should occur;
 - i. recommendations for any appropriate conditions that may be lawfully imposed on any approval for the projects, or changes that should be made to the draft PSA (for each assessment package) in order to ensure that the environmental effects of the projects are acceptable having regard to legislation, policy, best practice, and the principles and objectives of ecologically sustainable development;

VMFRP Standing Inquiry and Advisory Committee: Terms of Reference

- j. recommendations about the structure and content of the draft management plans provided with the EES, including with respect to mitigation and monitoring of environmental effects, as well as contingency measures; and
 - k. specific findings and recommendations about the predicted impacts on matters of national environmental significance and their acceptability, including appropriate controls and environmental management.
48. Each report should include:
- a. information and analysis in support of the SIAC's findings and recommendations;
 - b. a list of all recommendations, including cross-references to relevant discussions in the report;
 - c. a description of the public hearing/roundtable conducted by the SIAC, and a list of those persons consulted with or heard;
 - d. a list of all submitters in response to the exhibited EES/environment report and the draft PSA; and
 - e. a list of the documents tabled during the proceedings.
49. In preparing reports for each package, the SIAC should provide advice and recommendations cognisant of other packages as appropriate, including to address consistency across all VMFRP projects where appropriate.

Timing

50. For public hearings, the SIAC should commence proceedings no later than 30 business days from the final date of the exhibition period.
51. For roundtable forums, the SIAC should commence proceedings no later than 20 business days from the final date of the exhibition period, cognisant of timing and sequencing of public hearings/roundtable forums for other assessment packages.
52. The SIAC must submit its report in writing to the Minister for Planning within 40 business days from the last day of its proceedings for a public hearing and 30 business days from the last day of its proceedings for a roundtable forum.
53. The DELWP Impact Assessment Unit must liaise with the office of PPV and the proponent to agree on the proposed dates to be included on all public notices for the exhibition of the EESs and environment reports (including draft PSAs) for the directions hearing, hearing and/or roundtable forum.

Minister's assessment

54. The Minister for Planning will issue a Minister's assessment of the environmental effects of each of the projects that are the subject of an assessment package after considering the corresponding SIAC's report, as well as the EES or environment report (as applicable), submissions and any other relevant matters (as applicable).
55. PPV will notify all submitters for each assessment package of the release of the Minister for Planning's assessment and SIAC report.

Fee

56. The fees for the members of the SIAC will be set at the current rate for a panel appointed under part 8 of the P&E Act.
57. All costs of the SIAC, including the costs of obtaining any expert advice, technical administration and legal support, venue hire, accommodation, recording proceedings and other costs must be met by the proponent.

VMFRP Standing Inquiry and Advisory Committee: Terms of Reference

Miscellaneous

58. The SIAC may apply to the Minister for Planning to vary these terms of reference in writing, at any time prior to submission of its final report.
59. The SIAC may retain specialist expert advice and legal counsel to assist if necessary.
60. PPV is to provide any necessary administrative support to the SIAC. In addition, the proponent is to provide any necessary administrative or technical support to the SIAC in relation to the conduct of hearings and roundtables.



Hon Lizzie Blandthorn MP
Minister for Planning

Date: 16 / 8 / 22

The following information does not form part the terms of reference.

Project Management

1. For matters regarding the inquiry and advisory committee process, please contact Amy Selvaraj, Senior Project Officer, of Planning Panels Victoria, by phone (03) 8624 5714 or email Planning.Panels@delwp.vic.gov.au.
2. For matters regarding the EES and environment report processes please contact the Impact Assessment Unit in DELWP by email environment.assessment@delwp.vic.gov.au.

Appendix B List of Submitters

No	Submitter
1	Donald Macleod
2	Adrian Vlok
3	Brett Ainsworth
4	Doug Frood
5	Fabian Douglas
6	Moths and Butterflies Australasia Inc.
7	Environment Protection Authority Victoria
8	Fiona and Phil Murdoch
9	Fiona Murdoch (Mallee Conservation)
10	Nature Glenelg Trust
11	Victorian Environmental Water Holder
12	Peter Kelly
13	Butterfly Conservation SA Inc.
14	Richard Glatz
15	Victorian National Parks Association
16	Parks Victoria
17	Fenner School of Environment and Society, Australian National University
18	Department of Environment, Land, Water and Planning – Environment
19	Environment Victoria
20	Peta Thornton
21	Friends of Nyah Vinifera Park Inc.

Appendix C List of Parties

Submitter	Represented by
Lower Murray Urban and Rural Water Corporation (Proponent)	<p>Christopher Townshend KC and Robert Forrester of Counsel, instructed by Sallyanne Everett and William Bartley of Clayton Utz, who called expert evidence on:</p> <ul style="list-style-type: none"> - groundwater from Greg Hoxley of Jacobs - surface water from Simon Treadwell of Jacobs - aquatic ecology from Tim Marsden of Australasian Fish Passage Services - terrestrial ecology (flora) from Zoe Jellie of GHD - terrestrial ecology (fauna) from Alex Holmes of GHD - bushfire from Mick George of GHD <p>Proponent also provided descriptive and explanatory presentations on:</p> <ul style="list-style-type: none"> - context of the Project, Basin Plan and the river and floodplain management from Nicholas Sheahan of Murray Darling Basin Authority (MDBA) - overview of Victoria's environmental watering program from Beth Ashworth of Victorian Environmental Water Holder - overview of environmental watering in practice, proposed operations and adaptive management from James Kellerman of Mallee Catchment Management Authority - overview of the Project, existing conditions, physical context and description of proposed infrastructure and works from Josh White of Lower Murray Water - Overall Improvement for Biodiversity from Hilary Chapman - Traditional Owner engagement update from James Kellerman and Craig Watson of Mallee Catchment Management Authority
Department of Transport and Planning Impact Assessment Unit	Amy Young
Murray Lower Darling Rivers Indigenous Nations (MLDRIN)	Brendan Kennedy and Will Mooney
Dr Fiona Murdoch (Mallee Conservation)	Submitter who also presented expert evidence on the Arid Bronze Azure butterfly
Doug Frood	Submitter who also presented expert evidence on botanical ecology
Environment Victoria	Ellen Maybery and Natalie Hogan of Environmental Justice Australia
Fenner School of Environment and Society, Australian National University (Fenner School)	Dr Matthew Colloff and Prof Jamie Pittock
Fiona and Phil Murdoch	
Friends of Nyah Vinifera Park (Inc.) (FoNVP)	Dr Jacquie Kelly and Nicole McKay

Submitter	Represented by
Peta Thornton	
Peter Kelly	
Victorian National Parks Association (VNPA)	Jordan Crook

Appendix D Document list

No.	Date	Description	Presented by
1	28 Sep 22	Letter of Referral to SIAC - EES Central package	Department of Environment, Land, Water and Planning (DELWP)
2	4 Nov 22	VMFRP SIAC EES Central - Letter to Victorian Aboriginal Heritage Council (VAHC) - Assistance on relevant Traditional Owner groups	VMFRP EES Central Standing Inquiry and Advisory Committee (Committee)
3	"	VMFRP SIAC EES Central - Letter to First Peoples - State Relations - Assistance on relevant Traditional Owner groups	"
4	"	VMFRP SIAC EES Central - Letter to Department of Environment, Land, Water and Planning (DELWP) - Assistance on relevant Traditional Owner groups	"
5	"	VMFRP SIAC EES Central - Letter to the Proponent - Assistance on relevant Traditional Owner groups	"
6	10 Nov 22	Letter from Victorian Aboriginal Heritage Council to SIAC - Response on Traditional Owner groups	Victorian Aboriginal Heritage Council
7	11 Nov 22	Letter from Proponent to SIAC - Response on Traditional Owner groups	Proponent
8	14 Nov 22	Email from DELWP to SIAC - Response on Traditional Owner groups	DELWP - Land Services and First Peoples' Group
9	"	Letter from First Peoples - State Relations to SAIC - Response on Traditional Owner groups	First Peoples - State Relations
10	16 Nov 22	Directions Hearing Notification	Committee
11	18 Nov 22	VMFRP SIAC EES Central - Letter to Mallee Catchment Management Authority (CMA) - Invitation to participate and Traditional Owner engagement	Committee
12	24 Nov 22	Letter from Mallee CMA to SIAC - Response to invitation and Traditional Owner engagement (dated 25 November 22)	Mallee Catchment Management Authority (Mallee CMA)
13	28 Nov 22	VMFRP SIAC EES Central - Request for Information (RFI)	Committee
14	"	Letter from Proponent to SIAC - Order and timing of experts, Counsel, Site inspection, Hearing format dated 31 October 22	Proponent
15	30 Nov 22	Email from Doug Frood to SIAC – Confirmation on participation in the Hearing (Direction 2)	Mr Frood
16	1 Dec 22	Directions	Committee

No.	Date	Description	Presented by
17	“	Email from VNPA to SIAC - Confirmation no longer calling expert witnesses (Direction 1)	Victorian National Parks Association (VNPA)
18	“	Letter from Proponent to SIAC - Confirmation of expert witness details (Direction 1)	Proponent
19	2 Dec 22	Email from Fiona Murdoch to SIAC – Confirmation on participation in the Hearing (Direction 2)	Dr Murdoch for Mallee Conservation
20	5 Dec 22	Letter from Proponent to SIAC - Document Share Platform and instructions (Direction 4)	Proponent
21	“	Proponent - VMFRP - Instructions for using document sharing platform	“
22	8 Dec 22	Hearing Timetable (v1)	Committee
23	12 Dec 22	Letter from Proponent to SIAC - Draft site inspection itinerary (Direction 12)	Proponent
24	“	Proponent - Draft site inspection itinerary (Direction 12) - 12 Dec 22	“
25	“	Email from Friends of Nyah Vinifera Park Inc to SIAC - Expert witness details and additional locations (Directions 1 and 11)	Friends of Nyah Vinifera Park Inc (FoNVP)
26	13 Dec 22	Letter from Proponent to SIAC – Providing requested information and documents (Direction 16)	Proponent
27	“	Ecological Associates (2007) Feasibility Investigation of Options for the Hattah Lakes (Direction 16 1A)	“
28	“	MDBA (2012) Hattah Lakes Environmental Water Management Plan (Direction 16 1A)	“
29	“	Frood and Papas (2016) A Guide to water regime, salinity ranges and bioregional conservation status of Victorian wetland Ecological Vegetation Classes (Direction 16 1A)	“
30	“	DELWP (2014) The Victorian wetland classification framework (Direction 16 1A)	“
31	“	MCMA (2014a) Belsar-Yungera Business Case report (Direction 16 1A)	“
32	“	MCMA (2014b) Hattah Lakes Business Case report (Direction 16 1A)	“
33	“	Duncan et al (2018b) Mulcra Island Offsets 5 Year assessment (Direction 16 1B)	“
34	“	Cunningham et al. (2013) Mapping the Condition of River Red Gum (<i>Eucalyptus camaldulensis</i> Dehnh) and Black Box (<i>Eucalyptus largiflorens</i> F.Muell) Stands in The Living Murray Icon Sites (Direction 16 1B)	“

No.	Date	Description	Presented by
35	“	Bennetts (2014) Gunbower Forest Sentinel Wetland and Understorey Survey (Direction 16 1B)	“
36	“	Parks Victoria (2019) Conservation Action Plan for River Red Gum parks and reserves managed by Parks Victoria (Direction 16 1B)	“
37	“	Horner et al. (2015) Recruitment of a keystone tree species must concurrently manage flooding and browsing (Direction 16 1B)	“
38	“	Lunt et al. (2012) Effects of flood timing and livestock grazing on exotic annual plants in riverine floodplains (Direction 16 1B)	“
39	“	Horner et al. (2012) Forest structure, flooding and grazing predict understorey composition floodplain forests in southeastern Australia (Direction 16 1B)	“
40	“	Moxham et al. (2017) Tree health and regeneration response of Black Box (<i>Eucalyptus largiflorens</i>) to recent flooding (Direction 16 1B)	“
41	“	DELWP (2017a) Native vegetation gain scoring manual Version 2 (Direction 16 1B)	“
42	“	DELWP (2021d) Victorian Murray Long-term Watering Plan Minor Update (Direction 16 1B)	“
43	“	Belsar-Yungera Threatened Flora Transect Survey in MIA (Direction 16 1C)	“
44	“	Ecological Monitoring, Evaluation and Reporting Plan (Direction 16 1D)	“
45	“	Socio-economic Monitoring, Evaluation and Reporting Plan (Direction 16 1D)	“
46	“	The 2020 Basin Plan Evaluation – Vulnerabilities to climate change in the Murray-Darling Basin (Direction 16 1E)	“
47	“	The 2020 Basin Plan Evaluation (Direction 16 1E)	“
48	“	Guide to the proposed Basin Plan (Volume 1) (2010) (Direction 16 1E)	“
49	“	Guide to the proposed Basin Plan (Volume 2) (2010) (Direction 16 1E)	“
50	“	Guide to the Environmental Watering Plan (July 2022) (Direction 16 1E)	“
51	“	Basin-wide environmental watering strategy (November 2019) (Direction 16 1E)	“
52	“	Basin-wide environmental watering strategy (November 2014) (Direction 16 1E)	“

No.	Date	Description	Presented by
53	“	Constraints under a future climate (October 2022) (Direction 16 1E)	“
54	“	Basin-plan annual report 2020-21 (Direction 16 1E)	“
55	“	Sustainable diversion limit adjustment mechanism 2022 Assurance report (November 2022) (Direction 16 1E)	“
56	“	VMFRP Climate Change Stress Test (October 2022) (Direction 16 1E)	“
57	“	Review of the Environmental Watering Plan (March 2021) (Direction 16 1E)	“
58	“	July 2022 Report Card (Direction 16 1E)	“
59	“	Hattah Lakes Environmental Water Management Plan (February 2012) (Direction 16 1E)	“
60	“	Constraints Management Strategy 2013 to 2024 (2012) (Direction 16 1E)	“
61	“	Basin annual environmental watering priorities 2022-2023 (Direction 16 1E)	“
62	“	Basin Salinity Management Strategy 2030 (BSM2030) (Direction 16 1E)	“
63	“	Belsar-Yungera Operating Elevation Maps (12 December 2022) (Direction 16 2A and 2C): a. Overview and Maps 1 to 3 b. Maps 4 to 7 (Dir 16 2A, 2B and 2C) c. Maps 8 to 11 d. Maps 12 to 13	“
64	“	Hattah Lakes North Operating Elevation Maps (12 December 2022) (Direction 16 2A and 2C): a. Overview and Maps 1 to 3 b. Maps 4 to 7 (Dir 16 2A, 2B and 2C) c. Maps 8 to 9	“
65	“	Belsar-Yungera Water Movement Maps (6 December 2022) (Direction 16 2C and 2D): a. Overview and Maps 1 to 3 b. Maps 4 to 5	“
66	“	Hattah Lakes North Water Movement Maps (Overview and Maps 1 to 2) (6 December 2022) (Direction 16 2C and 2D)	“
67	“	Belsar-Yungera Contour and LiDAR Maps (8 December 2022) (Dir 16 2E): a. Overview and Maps 1 to 5 b. Maps 6 to 10 c. Maps 11 to 13	“

No.	Date	Description	Presented by
68	“	Hattah Lakes North Contour and LiDAR Maps (8 December 2022) (Direction 16 2E): a. Overview and Maps 1 to 4 b. Overview and Maps 5 to 9	“
69	“	Belsar-Yungera Aerial Imagery Map Book (Overview and Maps 1 to 13) (7 December 2022) (Direction 16 2F)	“
70	“	Hattah Lakes North Aerial Imagery Map Book (Overview and Maps 1 to 9) (7 Dec 22) (Direction 16 2F)	“
71	“	Freehold map (Direction 16 (3)): a. BEYU 001 b. BEYU 001A c. BEYU 002 d. BEYU 003 e. BEYU 004 f. BEYU 004A g. BEYU 005 h. BEYU 006 i. BEYU 006A j. BEYU 008 k. HATT 001 l. HATT 002	“
72	“	Letter from Proponent to SIAC – update from Mallee CMA on contacting traditional owners dated 12 Dec 22 (Direction 9)	“
73	“	Expert elicitation of tolerable and optimal watering regimes for Murray River floodplain vegetation (Direction 17a) (Expert Elicitation Report; Dec 22)	“
74	“	Proponent - Technical Note 1 (TN01) – Expert Elicitation Report (Direction 17a)	“
75	14 Dec 22	Nomination to attend site visit (Direction 13)	Mr Kelly
76	15 Dec 22	Letter from Proponent to SIAC - Expert evidence (Direction 21)	Proponent
77	“	Expert witness statement of Alex Holmes - terrestrial ecology (fauna)	“
78	“	Expert witness statement of Greg Hoxley - groundwater	“
79	“	Expert witness statement of Mick George - bushfire	“
80	“	Expert witness statement of Simon Treadwell - surface water	“
81	“	Expert witness statement of Tim Marsden - aquatic ecology	“

No.	Date	Description	Presented by
82	“	Expert witness statement of Zoe Jellie - terrestrial ecology (flora)	“
83	“	Nominations to attend site visit (Direction 13)	Environment Victoria
84	“	Nominations to attend site visit (Direction 13)	Dr Murdoch for Mallee Conservation
85	“	Nomination to attend site visit (Direction 13)	DELWP Regional Planning Services (Loddon Mallee)
86	“	Nominations to attend site visit (Direction 13)	FoNVP
87	18 Dec 22	Expert witness statement of Fiona Murdoch - Arid Bronze Azure butterfly	Dr Murdoch
88	“	Expert witness statement of Douglas Frood - botanical ecology - dated 8 Dec 22	Mr Frood
89	19 Dec 22	Nominations to attend site visit (Direction 13)	VNPA
90	“	VMFRP SIAC Letter to First Peoples - State Relations - Further assistance Traditional Owner Group engagement	SIAC lead Chair
91	21 Dec 22	Letter from Proponent to SIAC - Part A, schedule of witnesses, Day 1 versions, update on Aboriginal Cultural Heritage evidence (Directions 18, 19 and 23)	Proponent
92	“	Proponent - Part A Submission (Direction 18)	“
93	“	Proponent - Response to the public submissions (Direction 18c)	“
94	“	Proponent - Day 1 - Incorporated Document (Direction 23)	“
95	“	Proponent - Day 1 - Environmental Delivery Standards (Direction 23)	“
96	“	Email from First Peoples - State Relations to SIAC – Response to further assistance on engagement	First Peoples - State Relations
97	22 Dec 22	Hearing Timetable (v2)	Committee
98	23 Dec 22	Letter from Proponent to SIAC – Providing response to RFI, RFI tracker (v1) and Technical Note 2	Proponent
99	“	Proponent - Response to the Committee Request for Information (RFI)	“
100	“	Proponent - Request for Information (RFI) Tracker V1 (Direction 18e)	“
101	“	Proponent - Technical Note 2 (TN02) - Ogyris butterfly surveys	“
102	“	Email from Friends of Nyah Vinifera Park Inc to SIAC – Request for extension of time to provide expert witness report	FoNVP

No.	Date	Description	Presented by
103	“	Email from SIAC to Friends of Nyah Vinifera Park Inc – Response to request for extension to provide expert witness report	Committee
104	9 Jan 23	Letter from Proponent to SIAC - Response in regard to Site Visit (Direction 14)	Proponent
105	“	Email from Proponent requesting extension of time to respond to Direction 17	“
106	“	Committee response to Proponent's request for extension of time to respond to Direction 17	Committee
107	10 Jan 23	Email from Friends of Nyah Vinifera Park Inc to SIAC – No longer calling expert witness	FoNVP
108	“	Proponent - Technical Note 3 (TN03) - Implications of the Expert Elicitation Report on the EES Central package (Direction 17)	Proponent
109	12 Jan 23	Department of Transport and Planning Impact Assessment Unit – Submission - Overview of EES process EES Central	Department of Transport and Planning Impact Assessment Unit (DTP IAU)
110	16 Jan 23	Proponent - Part B Submission (Direction 30)	Proponent
111	“	Proponent - Technical Note 4 (TN04) - Corrected Table 6 to Attachment V to the EES	“
112	“	Proponent - Technical Note 5 (TN05) - Private landowner agreements	“
113	“	Proponent - Technical Note 6 (TN06) - Cumulative assessment for Matters of National Environmental Significance (MNES)	“
114	“	Proponent - presentation of Nicholas Sheahan - Murray Darling Basin Authority (MDBA) - Hattah Lakes North and Belsar Island VMFRP projects in the context of the Basin Plan	“
115	17 Jan 23	Proponent - presentation of Beth Ashworth - Victorian Environmental Water Holder - Victoria's Environmental Watering Program (updated)	“
116	16 Jan 23	Proponent - presentation of James Kellerman - Mallee CMA - Waterway management an adaptive management approach	“
117	“	Email from Proponent to SIAC – Providing Josh White presentations and interactive ArcGIS links on Project Context and Project Descriptions	“
118	“	Proponent - presentation of Josh White (LMW) - Project context	“

No.	Date	Description	Presented by
119	“	Proponent - presentation of Josh White (LMW) - Project descriptions	“
120	“	Proponent - presentation of Josh White (LMW) - Design and construction of proposed infrastructure	“
121	17 Jan 23	Cost of further water purchases irrigation industry impacts (RMCG 2021)	Proponent
122	“	Expert Witness presentation of Greg Hoxley - groundwater	“
123	“	Email from Murray Lower Darling Rivers Indigenous Nations to SIAC - Request to make a submission on EES Central	Murray Lower Darling Rivers Indigenous Nations (MLDRIN)
124	“	Expert Witness presentation of Simon Treadwell - surface water	Proponent
125	18 Jan 23	Email from Mallee Conservation to SIAC – Flooding of Raakajlim Creek - Hattah North – 17 Jan 23	Dr Murdoch
126	20 Jan 23	Response to the Committee Request for Information (RFI) Part II	Proponent
127	“	Expert Witness presentation of Tim Marsden - aquatic ecology	“
128	“	Proponent - Technical Note 7 (TN07) Aquatic Ecology RFI responses	“
129	“	Hearing Timetable (v3)	Committee
130	23 Jan 23	Expert Witness presentation of Zoe Jellie - terrestrial ecology (flora)	Proponent
131	“	Expert Witness presentation of Alex Holmes - terrestrial ecology (fauna): a. Part 1 b. Part 2 c. Part 3	“
132	24 Jan 23	Expert Witness presentation of Mick George -- bushfire	Proponent
133	25 Jan 23	Murray Lower Darling Rivers Indigenous Nations (MLDRIN) – EES Central - High level submission	MLDRIN
134	27 Jan 23	WITHDRAWN VMFRP SIAC EES Central - Letter to DEECA Forest, Fire and Regions (FFR) seeking input on issues Document withdrawn as outlined in Tabled Document 155	Committee
135	“	Murray Lower Darling Rivers Indigenous Nations (MLDRIN) - EES Central - First Nations statement on Victorian Sustainable Diversion Limit Adjustment Mechanism Supply Measure projects	MLDRIN

No.	Date	Description	Presented by
136	“	Email from Proponent to SIAC – Response to Committee seeking views of DEECA FFR	Proponent
137	30 Jan 23	Expert Witness presentation of Fiona Murdoch - Arid Bronze Azure butterfly	Dr Murdoch
138	“	Proponent - Technical Note 8 (TN08) - Terrestrialisation	Proponent
139	“	Proponent - Technical Note 9 (TN09) - Dispersive and reactive soils	“
140	“	Proponent - Technical Note 10 (TN10) - Question taken on notice (groundwater)	“
141	“	Email from Proponent to SIAC – Update on questions requests that have been taken on notice	“
142	“	Request for Information (RFI) tracker (Version 2)	“
143	“	Proponent - Summary of hearing requests and questions on notice	“
144	“	Email from MLDRIN to SIAC – Providing additional correspondence as referenced in submission	MLDRIN
145	“	Letter from MLDRIN to Minister for Water - Implementation of SDL Adjustment Mechanism - 10 Mar 2017	“
146	“	Letter from Minister for Water to MLDRIN – Response cultural implications of supply measures SDL adjustment – 18 Apr 17	“
147	“	Letter from MLDRIN to Murray Darling Basin Authority (MDBA) – cultural implications of supply measures and SDL Adjustment	“
148	“	Letter from MDBA to MLDRIN – Response cultural implications of supply measures SDL adjustment – 25 Jan 2016	“
149	“	Letter from MLDRIN to MDBA – Response to MDBA 25 Jan letter – 23 Aug 2016	“
150	“	MLDRIN – MLDRIN submission to the SDL adjustment mechanism draft determination	“
151	31 Jan 23	Correspondence from Waddi Traditional Owners to Mallee CMA – Regarding MLDRIN Submission – 30 Jan 2023	Proponent
152	“	Correspondence from Latji Latji Mumthelang Members to Mallee CMA - Regarding MLDRIN Submission – 30 Jan 2023	“
153	“	Correspondence from Murray Valley Aboriginal Cooperative (MVAC) to Mallee CMA - Regarding MLDRIN Submission – 30 Jan 23	“

No.	Date	Description	Presented by
154	“	Correspondence from First Peoples of the Millewa Mallee Aboriginal Corporation (FPMMAC) to Mallee CMA - Regarding MLDRIN Submission - 30 Jan 23	“
155	1 Feb 23	Email from SIAC to parties – Withdrawal of Tabled Document 134 and update on site visit	Committee
156	“	Environment Victoria - Hearing Submission	Environment Victoria
157	“	Annexure 1 - Murray Darling Basin Royal Commission Report - 29 Jan 2019	“
158	“	Annexure 2 - Advancing the Treaty Process with Aboriginal Victorians Act (Treaty Act)	“
159	“	Hearing Submission	Mr Kelly
160	2 Feb 23	Hearing Submission	Prof Pittock for Fenner School of Environment and Society, ANU
161	“	Hearing Submission	Fiona and Phil Murdoch
162	“	Hearing Submission (EES Central)	VNPA
163	3 Feb 23	Review of Proponent’s economic consultancy report	Prof Pittock for Fenner School of Environment & Society, ANU
164	“	Proponent - Technical Note 11 (TN11) - Questions taken on notice (surface water)	Proponent
165	“	Proponent - Technical Note 12 (TN12) - Questions taken on notice (aquatic ecology)	“
166	“	Email from SIAC to parties - Follow up questions to Proponent	Committee
167	“	Email from Donald Macleod to SIAC - Written submission	Mr Macleod
168	“	VMFRP SIAC EES Central - Letter from SIAC to Proponent regarding closed session	Committee
169	6 Feb 23	Letter from Proponent to SIAC - Response regarding closed session	Proponent
170	“	VMFRP SIAC EES Central - Letter to Proponent - Response to proposal to hold closed session	Committee
171	“	Proponent - Technical Note 13 (TN13) - Questions taken on notice (terrestrial ecology and bushfire)	Proponent
172	“	Proponent - Attachment to Part C Submission – Native Vegetation Policy	“

No.	Date	Description	Presented by
172a	7 Feb 23	Proponent - draft Conservation Work Exemption (CWE) further guidance	“
173	6 Feb 23	Email from Proponent to SIAC – Link to Ecology Mapping System [CONFIDENTIAL FOR USE OF COMMITTEE ONLY]	“
174	7 Feb 23	Proponent - Part C Submission (Direction 41)	Proponent
175	“	Proponent - Attachment to Part C Submission, Traditional Owner Consultation Update	“
176	“	Proponent - Cosier et al, Assessment of river flows in the Murray-Darling Basin (2019)	“
177	“	Proponent - Final Day - Environmental Delivery Standards (EDS) and Monitoring Requirements (Direction 42)	“
178	“	Proponent - Final Day - Incorporated Document (Direction 42)	“
179	“	Proponent - presentation of AOIB (Overall Improvement for Biodiversity)	“
180	“	Proponent - Technical Note 14 (TN14) - quarry material and spillway design	“
181	“	Proponent - VMFRP Independent Expert Review Panel Terms of Reference of Biodiversity Expert Review Group (TOR BERG)	“
182	“	Proponent - CHMP update memorandum - Belsar-Yungera	“
183	“	Proponent - CHMP update memorandum - Hattah Lakes North	“
184	8 Feb 23	Proponent - Technical Note 15 (TN15) - Previous environmental watering projects	Proponent
185	“	Email from Fiona Murdoch to SIAC – Comments on EDS and Monitoring Requirements (Document 177) (Direction 44)	Dr Murdoch
186	10 Feb 23	Email from Proponent to SIAC - Updated drone footage links	Proponent
187	“	Proponent - Hattah November 2022 Drone Footage Location Description	“
188	“	Proponent - Belsar November 2022 Drone Footage Location Description	“
189	“	Proponent - Technical Note 16 (TN16) - Table 6.8 of Chapter 6 of the EES	“
190	15 Feb 23	Letter from DEECA to SIAC – Comments on Incorporated Document (Document 178) dated 14 Feb 23 (Direction 44)	Department of Energy, Environment and Climate Action (DEECA)

No.	Date	Description	Presented by
191	22 Feb 23	Letter from Proponent to SIAC – Confirmation not providing further version of Final Day Project Documents	Proponent

Appendix E Process relating to views of Traditional Owners

This appendix provides a chronology of key actions and correspondence in relation to ToR 38(d) and the requirement the Committee *‘may inform itself in any way it sees fit, but must review and consider for each assessment package’* various matters, including:

38d. any known views of the Registered Aboriginal Parties (RAPs)/Traditional Owner groups or seek the views of the RAPs/Traditional Owner groups if they are not already known.

The Committee intended to write to the relevant Traditional Owner groups prior to the Hearing to advise them of the Project and Hearing process, and invite them to make submissions and participate in the Hearing.

The Committee wrote to the following organisations on 4 November 2022 seeking contact details for relevant Traditional Owner groups:

- Victorian Aboriginal Heritage Council (D2)
- First Peoples-State Relation (D3)
- DELWP (Aboriginal Engagement and Policy) (D4)
- the Proponent (D5).

The Committee received the following responses:

- Victorian Aboriginal Heritage Council advised the Committee it should contact the Proponent (D6)
- DELWP (Aboriginal Engagement and Policy) (D8), directing the Committee to Department of Premier and Cabinet, First Peoples - State Relations
- Department of Premier and Cabinet, First Peoples - State Relation (D9), explaining it had provided advice to the Proponent about consulting with Aboriginal bodies and the VMFRP should be able to advise the Committee on appropriate contact points for who it has consulted throughout its assessments
- the Proponent advised:
 - Mallee CMA has had primary responsibility for engaging with Traditional Owners
 - Traditional Owners had been notified and provided with information and updates about the Project and EES
 - it would enquire through the Mallee CMA whether Traditional Owner groups consented to the Committee being provided with their contact details. (D7).

The Committee wrote to Mallee CMA seeking contact details for Traditional Owners, or if this was not possible for privacy reason, requesting it forward the Committee’s invitation to Traditional Owners to participate in the process (D11).

Mallee CMA responded it was not appropriate to provide Traditional Owner contact details, including for privacy reasons, and agreed to forward the Committee’s invitation (D12).

The Proponent provided advice from Mallee CMA confirming that 16 Traditional Owners, representing six groups, had been advised of the Committee’s invitation. The six groups were:

- Latji Latji Mumthelang Aboriginal Corporation
- Gilbie Aboriginal Corporation
- Murray Valley Aboriginal Corporation
- Tati Tati

- Wekki Wekki
- Waddi Waddi (D72).

The Committee did not receive any requests from these Traditional Owners to make submissions or participate in the Hearing.

The Proponent advised it would not be calling expert evidence on Aboriginal cultural heritage due to unexpected circumstances and relevant issues would be dealt with through submissions and responses to the Committee's RFI (D91).

First Peoples - State Relations responded to the Committee's second request for contact information and noted that Mallee CMA was primarily responsible for engaging with Traditional Owners. It could not provide any further assistance and suggested the Committee contact First Nations Legal and Research Services (D96).

MLDRIN requested the opportunity make a submission to the Committee about the EES. (D123) (17 January 2023) The Committee agreed to the request and MLDRIN presented its submission on 31 January 2023. MLDRIN provided various documents in support of its submission. (D133, 135, 144, 145, 146, 147, 148, 149 and 150).

Following the MLDRIN submission, the Proponent provided copies of correspondence that had been received by the Mallee CMA from the following Traditional Owner groups:

- Waddi Waddi (D151)
- Latji Latji Mumthelang members (D152)
- Murray Valley Aboriginal Cooperative (D153)
- First People of Millewa Mallee Aboriginal Corporation (D154).

This correspondence raised issues about the MLDRIN submission and advised these groups were not represented by MLDRIN. The Latji Latji Mumthelang, Murray Valley Aboriginal Cooperative and First People of Millewa Mallee Aboriginal Corporation advised they supported the Project.

At the Hearing on 3 February 2023, the Proponent proposed that a closed session be held later in the Hearing to discuss Traditional Owner participation in the EES process. It was not intended that Traditional Owners participate in the session. The session would be conducted in accordance with ToR 42:

The SIAC may direct that a submission or evidence is confidential in nature and the hearing/roundtable forum be closed to the public for the purposes of receiving that submission or evidence.

The Committee requested further information from the Proponent about the proposed session in relation to various procedural and natural justice matters (D168) (3 February 2023). The Proponent responded to the Committee's requests (D169) (6 February 2023) and the Committee subsequently decided the session would not be of assistance and declined the offer. (D170) (6 February 2023)

Appendix F Committee recommended incorporated document

The following incorporated document includes the Committee’s recommended changes based on the Proponent’s Final Day version (D178).

Tracked Added

~~Tracked Deleted~~

Victorian Murray Floodplain Restoration Project

Belsar-Yungera Floodplain Restoration Project & Hattah Lakes North Floodplain Restoration Project

Incorporated Document, April 2023

Committee recommended version - tracked against the Proponent's Final Day Version (D178)

1.0 INTRODUCTION

1.1 This document is an incorporated document in the Schedule to Clause 45.12 (Specific Controls Overlay) and Clause 72.04 (Documents incorporated in this Planning Scheme) of the Mildura and Swan Hill Planning Schemes (planning schemes) under Section 6(2)(j) of the *Planning and Environment Act 1987*.

1.2 This incorporated document facilitates the delivery of:

- The Belsar-Yungera Floodplain Restoration Project (Belsar-Yungera Project); and
- The Hattah Lakes North Floodplain Restoration Project (Hattah Lakes North Project)

(together, the **Projects**).

1.3 The control in Clause 4.0 prevails over any contrary or inconsistent provision in the planning schemes.

2.0 PURPOSE

2.1 The purpose of this incorporated document is to permit and facilitate the use and development of land described in Clause 3.0 for the Projects.

3.0 LAND

3.1 The control in Clause 4.0 applies to the land shown as SCO2 on the planning schemes maps forming part of the planning schemes (**Project Land**).

4.0 CONTROL

EXEMPTION FROM PLANNING SCHEME REQUIREMENTS

4.1 Despite any provision to the contrary, or any inconsistent provision in the planning schemes, no planning permit is required for, and no provision in the planning schemes operates to prohibit, restrict or regulate the use or development of the Project Land for the purposes of, or related to, constructing, maintaining or operating the Projects.

4.2 The use and development of the Project Land for the purposes of, or related to, constructing, maintaining or operating the Projects includes:

- a) Environmental watering including retarding, discharging, storing, releasing and the escape, percolation, seepage and passage of water, and includes both surface and underground flow and inundation of land, the commissioning of infrastructure and mitigation measures and works;
- b) Permanent and temporary infrastructure, utility installations and relocation of utility installations to collect, transmit, store or distribute water including pumps, regulators, culverts, pipelines, water quality facilities, flow devices and associated structures and services;
- c) Construction, alteration and maintenance of waterways, earthworks, channels, water and soil transfer and treatment facilities, embankments, containment banks, barriers, cuttings, batters, fill and associated works;
- d) Quarrying, excavation, extraction, treatment and removal of stone, clay, sand, earth or soil (or other similar materials) for building, construction and roadworks and site rehabilitation;
- e) Roadworks and construction, alteration, maintenance and use of roads, access ways, temporary access roads, diversion roads, vehicle parking

areas, tracks and creating or altering access to roads;

- f) Any buildings or works or associated infrastructure or activities for the Projects including:
- i. Developing and using laydown areas for construction purposes.
 - ii. Constructing and using temporary site workshops and storage, administration and amenities buildings.
 - iii. Stockpiling spoil and excavated material.
 - iv. Storage and assembly of materials and equipment.
 - v. Restoration and reinstatement works.
 - vi. Removing, destroying and lopping vegetation, including native vegetation and dead native vegetation.
 - vii. Relocating, modifying and upgrading services and utilities.
 - viii. Demolishing, removing and relocating buildings, fixtures, structures and infrastructure.
 - ix. Constructing fences, temporary site barriers and site security.
 - x. Erecting and displaying signage for construction, directional and identification purposes.

4.3 CONDITIONS

- 4.3.1 The use and development permitted by this incorporated document is subject to the following conditions and is to be implemented in accordance with the plans and documents approved pursuant to this Incorporated Document.

4.4 Development Plans

- 4.4.1 Prior to the commencement of development (excluding preparatory buildings and works), development plans must be submitted to and approved by the Minister for Planning. The development plans must include:
- a) details of buildings and works, the location and extent of the construction footprint, including any construction compound, extractive industry site and access tracks.
 - b) details of colours, materials and finishes of the Bitterang and K10 regulators and ER1 and ER3 structures which may be illustrated by photos of similar existing infrastructure.
 - c) details of any staging of the development.
- 4.4.2 The development plans may be amended from time to time, with the approval of the Minister for Planning.
- 4.4.3 Any request to amend the development plans must be accompanied by:
- a) Amended plans and a schedule explaining the proposed amendment/s.
 - b) Details of any proposed infrastructure and associated construction footprints.
 - c) A written statement explaining and supporting the proposed amendment, including:

-
- i. A description of the form and extent of any consultation undertaken with relevant councils, government agencies and other stakeholders concerning the proposed amendment;
 - ii. Any written comments from relevant councils, government agencies and other stakeholders; and
 - iii. A written response to comments from relevant councils, government agencies and other stakeholders.

4.4.4 For the avoidance of doubt, the development plans do not need to show areas of environmental watering or any mitigation measures or works under Clause 4.2(a).

4.5 **Environmental Management**

Environmental Management Framework

4.5.1 Prior to the commencement of development (excluding preparatory buildings and works), an Environmental Management Framework (**EMF**) must be prepared, and then submitted to and approved by the Minister for Planning. The EMF must be accompanied by a statement explaining any difference between it and the matters set out in the Minister's Assessment under the *Environment Effects Act 1978* [insert date].

4.5.2 The EMF must:

- a) Contain a description of the Project elements and key construction and operational activities covered by the EMF.
- b) Contain the Environmental Delivery Standards (**EDSs**) that are applicable to the design, construction and operation of the Projects and address the following areas and any other relevant matters:
 - i. Aboriginal cultural heritage
 - ii. Agriculture
 - iii. Air quality
 - iv. Bushfire
 - v. Contamination
 - vi. Environmental Management
 - vii. Geology and soils
 - viii. Groundwater
 - ix. Historical heritage
 - x. Land use planning
 - xi. Landscape and visual
 - xii. Native vegetation
 - xiii. Noise and vibration
 - xiv. Overall biodiversity improvement

-
- xv. Social and business
 - xvi. Surface water
 - xvii. Threatened species and communities and their habitat
 - xviii. Traffic and transport
- c) Set out the process, timing and approval requirements for the development of plans and procedures required by the EMF and EDSs as relevant to any stage of the Projects, including the process for review and amendment of the plans and procedures as relevant.
 - d) Contain a summary of the consultation that informed the preparation of the EMF and a summary of the proposed ongoing engagement activities with the councils, the community and other stakeholders during construction of the Projects and processes for enquiries and complaints management.
 - e) Contain the performance monitoring and reporting processes, including requirements for auditing, to evaluate compliance with and the effectiveness of the EMF and management plans in mitigating and managing environmental risks and impacts during construction of the Projects.
- 4.5.3 The use and development of the Projects must be carried out in accordance with the approved EMF.
- 4.5.4 The EMF may be amended from time to time, with the approval of the Minister for Planning.
- 4.5.5 Any request to amend the EMF must be accompanied by:
- a) A description of the form and extent of any consultation undertaken with relevant stakeholders concerning the proposed amendment/s;
 - b) Any written comments received from relevant stakeholders; and
 - c) A written response to comments made by relevant stakeholders.
- 4.5.6 The current version of the EMF must be available on a clearly identifiable Project or other relevant website from the date of approval and must remain available on such website for at least 10 years after completion of construction.

Construction Environmental Management Plan

- 4.5.7 Prior to the commencement of development (excluding preparatory buildings and works), a Construction Environmental Management Plan (**CEMP**) must be prepared in consultation with agencies specified in the EMF, and then submitted to and approved by the Secretary to the Department of Environment, Land, Water and Planning (as constituted under Part 2 of the *Conservation, Forests and Lands Act 1987*) (the **Secretary**). The CEMP must be prepared in accordance with the EMF and outline commitments, mitigation measures and monitoring to be implemented during construction, as well as roles and responsibilities for implementation.

Operational Environmental Management Plan

- 4.5.8 Prior to the commencement of environmental watering, an Operational Environmental Management Plan (**OEMP**) must be prepared in consultation with agencies specified in the EMF, and then submitted to and approved by the Secretary. The OEMP must be prepared in accordance with the EMF and must outline commitments, mitigation measures and monitoring to be implemented during operation, as well as roles and responsibilities for implementation. The OEMP must include the objectives, targets and indicators to be used for the monitoring and evaluation of biodiversity response in accordance with Clause 4.6, as well

as the process for preparation, approval and implementation of a Monitoring, Evaluation and Reporting Plan. The OEMP must include guidelines for any appropriate notification of inundation events to the public and relevant agencies, including the relevant fire authorities.

4.6 Native vegetation

- 4.6.1 Prior to the removal, destruction or lopping of any native vegetation, information about that native vegetation in accordance with Application Requirements 1, 5 and 9 of Table 4 and 10 and 11 of Table 5 (as applicable) of the *Guidelines for removal, destruction or lopping of native vegetation* (Department of Environment, Land, Water and Planning, 2017) must be submitted to and approved by the Secretary. Information submitted must include details regarding the timing of the removal of native vegetation. (NOTE – offset requirements are not applicable if offsets are not required under Clause 4.6.2)
- 4.6.2 Prior to the removal, destruction or lopping of any native vegetation (except for preparatory buildings and works in accordance with Clause 4.12), native vegetation offsets must be provided in respect of the native vegetation to be removed in accordance with the requirements of the *Guidelines for removal, destruction or lopping of native vegetation* (Department of Environment, Land, Water and Planning, 2017) unless written agreement is obtained from Secretary that it has been demonstrated that the removal of native vegetation necessary to enable the use and development of the Projects provides for an overall improvement for biodiversity. The agreement must address and be consistent with all relevant matters set out in the Minister's Assessment under the Environment Effects Act 1978 dated [insert date].
- 4.6.3 Any secured offsets for the Projects must be reconciled within six months of the completion of construction in accordance with the Assessor's handbook – *Applications to remove, destroy or lop native vegetation* (Department of Environment, Land, Water and Planning, 2018) or its successors. (NOTE – not applicable if offsets are not required as per condition 4.6.2)
- 4.6.4 Evidence that any required offsets have been secured for the projects must be provided in a report to the Secretary within six months of the last vegetation removal. (NOTE – not applicable if offsets are not required as per condition 4.6.2)
- 4.6.5 The Secretary may vary the timing of the requirement for offsets. (NOTE – not applicable if offsets are not required as per condition 4.6.2)

4.7 Monitoring and evaluation of biodiversity improvement

- 4.7.1 Monitoring activities to evaluate the extent to which an overall improvement for biodiversity has been achieved must be carried out during operation of the Projects, and a report of monitoring results must be submitted to the Secretary 5 years after the first environmental watering and thereafter every 10 years, unless otherwise agreed by the Secretary. The report must be prepared and submitted to the satisfaction of the Secretary and must identify any unintentional impacts on biodiversity values, and any adaptive management proposed to be undertaken to provide for an increase in overall biodiversity improvements.

4.8 Heritage management

- 4.8.1 Where, but for this incorporated document, a planning permit would be required to demolish or remove a building or construct a building or carry out works on land subject to a Heritage Overlay, site and elevation plans showing the extent of buildings and works must be prepared, submitted to and approved by the Minister for Planning.
- 4.8.2 Prior to the commencement of any work to demolish, alter or remove a building on land subject to a Heritage Overlay for which a planning permit would be required but for this incorporated document, a full archival photographic survey of the heritage place must be prepared, submitted to and approved by the Minister for Planning. The survey must show:
- a) Photographs of both the exterior and interiors of the listed heritage place.
 - b) Contextual images of the environs and setting of the heritage place.

Once approved by the Minister for Planning, a copy of the full archival photographic survey must be provided to the relevant Council.

4.9 Road access

- 4.9.1 Before the commencement of works to create, alter or modify an intersection to a Transport Zone Category 2, a plan showing the works and materials is to be submitted to and approved by the Head, Transport for Victoria.

4.10 Floodplain management

- 4.10.1 Development on land subject to the Land Subject to Inundation Overlay must be undertaken to the satisfaction of, and in accordance with, plans submitted to and approved by the relevant floodplain management authority.

4.11 Bushfire protection measures

Bushfire risk management during construction

- 4.11.1 Prior to the commencement of development (except for preparatory buildings and works), a Bushfire Emergency Response Plan must be prepared and submitted to the satisfaction of the Secretary. The Plan must be prepared in consultation with the relevant land manager, emergency management and fire authorities (including DELWP Forest Fire Management Victoria), and show:

- a) Procedures for the location of site offices and combustible liquids (associated with the construction of the Projects) in areas clear of vegetation and with a minimum ten (10) metre buffer from all retained vegetation. The buffer must be:
 - i. Either mineral earth or non-combustible mulch such as crushed rock.
 - ii. Kept free of vegetation and fine fuels at all times.
- b) Training and equipment requirements for on-ground personnel.
- c) Site access/equipment restrictions and permits that apply according to the fire danger rating.
- d) Pre work assessment to incorporate fire ignition risk assessment and controls (e.g. restrictions on use of machinery which must be adhered to during the fire danger period).
- e) A description of how bushfire danger (i.e. fire danger ratings and bushfire incidents) will be monitored.
- f) Emergency response actions (including evacuation routes or shelter in place locations) if bushfire is detected on or off site.
- g) Procedures for managing flammable material to prevent ignition, explosion or spread of fire from fuels or other hazardous materials.
- h) The locations of fire suppression equipment.
- i) Guidelines for Total Fire Ban days including prohibition of works for any specified day or time period except with written consent of the relevant fire authority.

Fire Access Road Plan

- 4.11.2 Prior to operation, a Fire Access Road Plan must be prepared showing the following to the

satisfaction of the Secretary:

- a) Identification of the operational fire access roads;
- b) Identification of the strategic fire access road network;
- c) Identification of other roads that are not part of the strategic fire access road network and not operational fire access roads;
- d) Except with approval of the Secretary, how operational fire access roads that are part of the land used for the Projects:
 - i) are designed to a standard to accommodate a vehicle configuration which is 4.5 metres high, 3.0 metres wide, and 19.0 metres in length with a 78.5 tonnes gross mass.
 - ii) have crossings designed to the SM1600 traffic loading model in the Australian Standard AS 5100.1:2017 Bridge design, Part 1: Scope and general principles (Standards Australia, 2017).
 - iii) can be maintained to road class 5D or higher, as outlined in the *DELWP - PV Road Management Plan October (Department of Environment, Land, Water and Planning, 2019)* and must meet the *Guide to Road Design* (Ausroads, 2021).
- e) Except with approval of the Secretary, how roads that form part of the strategic fire access road network and which are part of the land used for the Projects:
 - i) are designed to a standard to accommodate a vehicle configuration of 5.0 metres high, 4.0 metres wide, and 26 metres in length.
 - ii) can be maintained to road class 5C or above as outlined in the *DELWP - PV Road Management Plan October* (Department of Environment, Land, Water and Planning, 2019).
- f) Information addressing:
 - i) how the proposed roads meet the objectives and standards contained in the *Guide to Road Design* (Ausroads, 2021).
 - ii) how designs accommodate the operation of oversize over mass vehicles which are up to 78.5 tonnes gross mass, 5.0 metres high, 4.0 metres wide, and 26 metres in length.
 - iii) how crossing designs respond to the SM1600 traffic loading model in the Australian Standard AS 5100.1:2017 *Bridge design, Part 1: Scope and general principles* (Standards Australia, 2017).

Managing changes to bushfire risk arising from environmental watering operations

4.11.3 Increased bushfire risk to life and property resulting from the operation of the Projects must be mitigated in accordance with *Code of Practice for Fire Management on Public Land* (Department of Environment, Land, Water and Planning, amended 2022) or subsequent plans approved by the Minister of Environment and Climate Action (as the Minister administering *Conservation, Forests and Lands Act 1987*).

4.11.4 The plans and other documents listed in Clause 4.10.1 and Clause 4.10.2 may be amended from time to time to the satisfaction of the Secretary.

4.12 Other conditions

4.12.1 Unless otherwise stated, the plans and other documents listed in Clause 4.3 to Clause 4.10.2 must be approved before the start of the relevant component of development or operation. Plans and other documents may be prepared and approved separately for the Belsar-Yungera Project and Hattah Lakes North Project.

- 4.12.2 The plans and other documents listed in Clause 4.3 to Clause 4.10.2 may be amended from time to time to the satisfaction of the relevant authority specified in Clause 4.3 to Clause 4.10.2. In deciding whether a plan or other document is satisfactory or whether to approve an amendment to a plan or other document, the relevant authority may seek the views of any relevant council or other authority.

4.13 Preparatory and other works

- 4.13.1 Preparatory buildings and works may commence before the conditions and requirements set out in Clauses 4.0 to 4.10 are satisfied.
- 4.13.2 Preparatory buildings and works for the Projects includes:
- a) Works, including vegetation removal, where a planning permit would not be required under the provisions of the planning scheme.
 - b) Investigation, testing and preparatory works to determine the suitability of land, and property condition surveys.
 - c) Salvage and relocation of Aboriginal cultural heritage and other management actions required to be undertaken in compliance with the relevant cultural heritage management plan approved under the Aboriginal Heritage Act 2006 or other compliance with that Act.

5.0 EXPIRY

- 5.1 The control in Clause 4.0 of this incorporated document expires in respect to land identified in Clause 3.0 of this document if any of the following circumstances apply:
- a) The use and development of the land allowed by the control is not started by 31 December 2024.
 - b) The development of the land allowed by the control is not completed by 31 December 2028.
 - c) The use allowed by the control is not started by 31 December 2033.
- 5.2 The Minister for Planning may extend these periods if a request is made in writing before the expiry date or within six months afterwards.

Appendix G Committee recommended Environmental Delivery Standards and Monitoring Requirements

The following tables includes the Committee’s recommended changes to the Environmental Management Framework Environmental Delivery Standards for the Belsar-Yungera and Hattah Lakes North projects (table 18.12) and the Belsar-Yungera and Hattah Lakes North projects monitoring register (table 18.13).

These changes are based on the Proponent’s Final Day versions (D177).

Other recommended changes to the Environmental Management Framework are dealt with through individual recommendations.

[Tracked Added](#)

~~Tracked Deleted~~

VMFRP EES Central
Committee recommended version of Environmental Delivery Standards and Monitoring Requirements
Tracked against the Proponent's Final Day Version (D177)

Environmental Delivery Standard		Project phase	Responsibility
EMF1	Environmental Management System Develop, prepare and implement an Environmental Management System that is consistent with AS/NZS ISO 14001:2015 Environmental management systems – Requirements with guidance for use through the design and construction of the Projects.	Construction	Contractor
EMF2	Construction Environmental Management Plan Prepare and implement a project specific Construction Environmental Management Plan and other relevant sub-plans as required by the Environmental Delivery Standards and in accordance with the Environmental Management Framework. The development of the Construction Environmental Management Plan and sub-plans must include consultation with relevant stakeholders as listed in the Environmental Management Framework and as required under any statutory approvals. Allowance of sufficient review time in agreement with the relevant stakeholders is to be included in the development process timeline. The Construction Environmental Management Plan and all sub-plans shall be prepared or approved by Lower Murray Water before construction commences. The Plan and all sub-plans will be audited for compliance by the Independent Environmental Auditor.	Construction	Contractor
EMF3	Operational management Operate the Projects in accordance with the following documents (or equivalent) within the environmental watering framework in accordance with the Environmental Management Framework and as applicable to the relevant project: <ul style="list-style-type: none"> • Operation Environmental Management Plan • Environmental Water Management Plan • Seasonal Watering Plan • Operating Plan • Operations and Maintenance Plan. 	Operation	CMA (as preparer of the plans except the O&M Plan) LMW (as preparer of the O&M Plan)
EMF4	Operation performance management Operation of the projects will be monitored, evaluated and reported on in accordance with: <ul style="list-style-type: none"> • Operation Environmental Management Plan • Ecological Monitoring, Evaluation and Reporting Plan • Socio-economic Monitoring, Evaluation and Reporting Plan • Environmental Watering Management Plans Annual Operational Environmental Performance Reports will be prepared to report on performance against the EDSs and other operational obligations. As part of this process the Plans will address the management of, and access to, baseline and monitoring data. Implement a process to ensure that the outcomes of the monitoring, evaluation and reporting inform adaptive management of environmental watering events as per the Environmental Watering Management Plans.	Operation	CMA (as preparer of the plans)
ACH1	Cultural Heritage Management Plan Comply with the Cultural Heritage Management Plans (No. 16898 and No. 14330) approved by First Peoples – State Relations for the Belsar-Yungera and Hattah Lakes North projects under the <i>Aboriginal Heritage Act 2006</i> .	Design, operation and construction	LMW Contractor
ACH2	Connection to Country Integrate Aboriginal knowledge, values, and aspirations into the planning, delivery and evaluation of the Belsar-Yungera and Hattah Lakes North projects. Create opportunities for enhancing and sharing cultural connection to Country.	Design, operation and construction	CMA Parks Victoria

Environmental Delivery Standard		Project phase	Responsibility
ACH3	<p>Cultural Heritage Management - Operation</p> <p>Operate the projects in accordance with the existing Victorian environmental watering management framework, including via Environmental Watering Management Plans, Seasonal Watering Proposals and/or Delivery Plans (or equivalent), to:</p> <ol style="list-style-type: none"> Undertake a risk-based approach to identify, avoid and minimise risks (where practicable) to cultural heritage in (and immediately adjacent to) the Maximum Inundation Area in consultation with Registered Aboriginal Parties/Traditional Owners and interested parties (as applicable), and In accordance with that framework, before watering develop measures to avoid, mitigate, minimise or manage risks (e.g. protection measures). All measures are to be commensurate with the level of risk and must be developed in consultation with Registered Aboriginal Parties/Traditional Owners and interested parties (as applicable). <p>If culturally sensitive locations are observed or reported to be at risk from pest or overabundant native species or human activity (i.e. visitation), conduct monitoring at these locations to determine the potential for impact, and as a first priority, implement protective measures, and secondary to this, implement remedial measures, where necessary. These actions are to be commensurate with the level of risk and determined and agreed between the land manager and Registered Aboriginal Parties/Traditional Owners and interested parties (as applicable).</p>	Operation	CMA
AG1	<p>Avoid and minimise impacts on agricultural productivity</p> <p>The Construction Environmental Management Plan must include measures to manage:</p> <ul style="list-style-type: none"> biosecurity risks in accordance with the Catchment and Land Protection Act 1994 and Best practice viticulture biosecurity (Victoria Agriculture, 2021). Specific measures to be agreed with the landholder and/or land manager access disruptions to private land and infrastructure in accordance with EDS TT2. 	Construction	Contractor
AG2	<p>Operational agricultural impacts</p> <p>Any potential impacts on private land including agricultural land during operation will be managed in accordance with the easements or other agreements as detailed in EDS LU2. The Operations and Maintenance Plan will inform day-to-day operation and detail operating control limits, action triggers and associated response procedures for watering events.</p>	Operation	<p>LMW (as preparer of O&M Plan and Property Management Plan)</p> <p>CMA (as preparer of Operating Plan)</p>
AQ1	<p>Construction air quality management: dust</p> <p>The Construction Environmental Management Plan must include an Environmental Emission Management Sub-plan with processes and measures to avoid and, where avoidance is not practicable, minimise emissions to air in accordance with the requirements of the <i>Environment Protection Act 2017</i>, subordinate legislation and other relevant statutory requirements and guidelines. Measures to include:</p> <ul style="list-style-type: none"> A process for confirming all sensitive receptors within 350 metres of active construction sites Apply dust suppression on unsealed roads/tracks and areas to the extent practicable for reducing impacts within 350m of stationary human sensitive receptors Vehicle loads on public roads to be covered when carrying dust (or litter) generating material Setting speed limits for construction vehicles (in accordance with the Traffic Management Plan required by EDS TT2) to reduce dust as far as practicable Dust suppression activities must consider weather patterns, ground cover, ground conditions e.g. type and moisture content of soil present, and type of activities being conducted as well as proximity to sensitive receptor locations Manage stockpile areas to minimise dust (eg, through compaction, lining, covering, wetting or use of a binding agent) Environment inspections as detailed in the Construction Environmental Management Plan to include dust observations, record inspection results Contractors will be required to refer to and utilise the following three documents and implement measures where appropriate during the construction phase of the project in accordance with the following publications: <ul style="list-style-type: none"> Managing stockpiles (EPA Publication 1895) Managing soil disturbance (EPA Publication 1894) Managing truck and other vehicle movement (EPA Publication 1897) Undertake visual observations of nuisance dust and reactive continuous/realtime dust monitoring (as defined in Guideline for assessing and minimising air pollution in Victoria (EPA Publication 1961) where construction and/or haulage on unsealed roads occurs within 20m of occupied residences. <p>Reactive dust monitoring is required at these locations only while construction and/or haulage is being undertaken (i.e. not required outside of working hours). If fine dust particles are measured to exceed PM10 of 100 ug/m3 for a 15 minute average and/or the trigger level identified in Guideline for assessing and minimising air pollution in Victoria (EPA Publication 1961) and following an investigation which determines that the dust is attributed to the project construction, then the contractor must temporarily modify or suspend dust generating activities until controls are put in place to avoid and reduce dust.</p>	Construction	Contractor

Environmental Delivery Standard		Project phase	Responsibility
AQ2	Dust nuisance and complaints The Community and Stakeholder Engagement Management Plan required by EDS SB1 must detail a process to receive and respond to queries or complaints relating to dust. This must include a project specific hotline to receive queries or complaints and a process for investigating and responding as required. Measures to address the complaint must be implemented as soon as practicable.	Construction	Contractor
AQ3	Pumping equipment All pumping infrastructure involving diesel plant to be serviced within appropriate servicing frequencies and maintained to manufacturer specifications (where available).	Operation	LMW (as preparer of O&M plan) CMA (as preparer of Operating plan)
BF1	Bushfire management during construction Prepare and implement a Bushfire Emergency Response Plan for the construction of the projects in consultation with the relevant land manager, emergency management and fire authorities (including DELWP Forest Fire Management Victoria). The Bushfire Emergency Response Plan must include: <ul style="list-style-type: none"> • Training and equipment requirements for on-ground personnel • Site access/equipment restrictions and permits that apply according to the Fire Danger Rating • Pre work assessment (for example a Job Safety Analysis) to incorporate fire ignition risk assessment and controls • Monitoring of bushfire danger by using the Bureau of Meteorology and Victorian and NSW government recommended emergency information sources (e.g. VicEmergency app) • Emergency response actions (including evacuation routes or shelter in place locations) in the event that bushfire is detected on or off site. • Procedures for managing flammable material to prevent ignition, explosion or spread of fire from fuels such as: <ul style="list-style-type: none"> - Minimisation of storage quantities and use of mobile refuelling where feasible - Storage methods and locations for flammable materials such as fuels, with low radiant heat exposure • Setbacks and vegetation management procedures to provide suitable separation between fuels and combustible materials. 	Construction	Contractor
BF2	Bushfire management during operation Activities associated with the operation and maintenance of project infrastructure with relevance to bushfire ignition, preparedness and management must be undertaken in accordance with existing relevant processes (such as the Joint Fuel Management Program including cultural burning), procedures and requirements of the relevant land manager and relevant emergency management authorities. Prior to the commencement of operation: <ul style="list-style-type: none"> • Prepare a pre work assessment (for example a Job Safety Analysis) to incorporate fire ignition risk assessment and controls for any operation and maintenance activities. • Prepare Emergency Response Plans (or equivalent) in consultation and agreement with the relevant land manager and relevant emergency management authorities. The Emergency Response Plans must include maps with key access/egress roads, alternative routes and key visitation sites for each proposed watering scenario. • Prepare guidelines for operational or maintenance activities on Total Fire Ban days, and during the Fire Danger Period, including requirements to adhere with any relevant restrictions as applicable. Before a watering event notify land owners and managers, emergency management agencies and DELWP Forest Fire Management Victoria of the timing and type of event (confirm the watering scenario) regarding any changes to access/egress.	Operation	LMW (as preparer of the O&M Plan) CMAs (as preparer of OEMP and Operating Plan) Parks Vic (as land manager)

Environmental Delivery Standard	Project phase	Responsibility
<p>CM1a Contaminated land duties</p> <p>The Construction Environmental Management Plan must include processes and procedures to manage contaminated land, spoil and waste in accordance with land manager processes, procedures and requirements and the requirements of the <i>Environment Protection Act 2017</i>, the Environment Protection Regulations 2021, and the following publications as appropriate and as amended or replaced from time to time:</p> <ul style="list-style-type: none"> • EPA Victoria, 2020, Publication 2008 Notifiable contamination guideline – Duty to notify contaminated land • EPA Victoria, 2021, Publication 1827.2 Waste classification assessment protocol • EPA Victoria, 2021, Publication 1828.2 Waste disposal categories – characteristics and thresholds • EPA Victoria, 2021, Publication 1799.2 Permissions scheme policy • EPA Victoria, 2022, Publication 1977: Assessing and controlling contaminated land risks: A guide to meeting the duty to manage for those in management or control of land • WorkSafe Victoria, 2010, Asbestos Contaminated Soil Guidance Note • Australian Standard AS1940 Storage Handling of Flammable and Combustible Liquids • EPA Victoria, 2020, Publication 1834 Civil construction, building and demolition guide • EPA Victoria, 2018, Publication 1698: Liquid storage and handling guidelines • EPA Victoria, 2021, Publication 1756.2, Summary of waste framework • EPA Victoria, 2021, Publication 1915, Contaminated land policy • EPA Victoria, 2021, Publication 1940, Contaminated land: understanding section 35 of the Environment Protection Act 2017 • EPA Victoria, 2021, Publication 1820.1, Construction – Guide to preventing harm to people and the environment. <p>Specifically, the Construction Environmental Management Plan must include:</p> <ul style="list-style-type: none"> • A framework for managing contamination risks to achieve compliance with the contaminated land duties, including the General Environmental Duty, duty to manage contaminated land and duty to notify the EPA of contamination. • A framework for monitoring baseline and post-construction conditions to measure compliance with the duties and assess whether contamination has occurred as a result of the project • A framework for managing waste to achieve compliance with the Duties and regulatory requirements including classification, transportation and disposal at a lawful place. This will include minimisation of waste generation and implementation of the waste hierarchy • Management measures for storage, handling and transport of materials for the protection of human health and the environment, including controls for minimising dust generation, sediment and stormwater run-off and seepage from stockpiled materials • Management measures to minimise chemical and fuel storage (including hazardous materials and dangerous goods) onsite, and store in accordance with EPA and Safe Work Australia requirements in the legislation and guidelines listed above. This must include: <ul style="list-style-type: none"> - Creating and maintaining a dangerous goods register - Disposing of any hazardous materials, including asbestos, in accordance with the Environmental Protection Regulations 2021 and relevant guidelines - Implementing requirements for the installation of bunds and precautions to reduce the risk of spills - Contingency and emergency response procedures to handle fuel and chemical spills, including availability of on-site hydrocarbon spill kits. <p>An unexpected finds protocol including procedures if building rubble/asbestos in fly-tipped waste, buried waste or previously unidentified contamination is encountered. This must include measures to identify asbestos and (if present) manage this soil in accordance with the WHS Act and Regulations and Safe Work Australia.</p>	Construction	Contractor
<p>CM1b Water, Soils and Waste Management Sub-plan</p> <p>A Water, Soils and Waste Management plan must be prepared as a sub-plan to the Construction Environmental Management Plan to:</p> <ul style="list-style-type: none"> • Comply with the General Environmental Duty as per the Environment Protection Act 2017 • Identify spoil management options and / or off-site disposal in accordance with regulatory requirements including details of reuse options for all categories of spoil expected to be generated through construction • Identify procedures and requirements for characterisation, management and reuse of soil to be imported and/or re-used in construction. Classification and relevant permits will be sought and obtained in accordance with the Environment Protection Regulations 2021 and supporting EPA guidelines. Characterisation will also consider the National Environment Protection Measures (Assessment of Site Contamination) 2013 to confirm the material is suitable for the proposed end use (to be determined based on the identified re-use location). This will include: <ul style="list-style-type: none"> • Preparation of a sample analysis and quality plan and conceptual site models • Details of management measures to be implemented for sustainable handling and transport of spoil for the protection of human health and the environment • Details of design and specific environmental management plans for temporary stockpile areas and stockpile activities including but not limited to containment of stockpiled materials to prevent any impact to human health or the environment (if required) • Classify material for disposal and identification of a suitable receiving facility (dependant on the classification) in accordance with EPA Victoria requirements to classify spoil for disposal or re-use as required • Provide a framework for material and waste tracking • Apply the waste hierarchy, including avoidance as far as reasonably practicable, prioritise beneficial re-use of material as part of the project and avoid off-site disposal to landfill as far as reasonably practicable. 	Construction	Contractor

Environmental Delivery Standard	Project phase	Responsibility
<p>CM1c Soil characterisation</p> <p>Prior to construction activities commencing at a discrete location, the contractor must characterise the condition of the land by applying a risk based approach to understand the nature and extent of any potential (existing) contamination at the following locations:</p> <ul style="list-style-type: none"> • Lay down areas and compounds • Other areas where soil or materials will be handled, or chemicals will be stored / used <p>This characterisation will include:</p> <ul style="list-style-type: none"> • Review of desktop information (including the EES Central Geology, Soils and Contamination E2 Specialist Assessment and any further information provided from land managers, through the design process and other information that may have changed, for example publicly available information such as from EPA Victoria) • Site walkover across the locations identified above, with a particular focus on visual or olfactory signs of contamination such as staining, spills, dumped waste or stockpiles of soil • Depending on the outcomes of the tasks above, targeted soil sampling at locations identified as having potential to contain contaminated material. <p>The outcomes of this characterisation will inform construction control measures, inform the re-use of soil, and/or to classify material in accordance with EPA waste guidelines.</p> <p>Soil will be managed in accordance with the Water, Soils and Waste Management Sub-plan as per EDS CM1b.</p>	Construction	Contractor
<p>CM2 Acid sulfate soils</p> <p>The Construction Environmental Management Plan must include an Acid sulfate soil management plan (ASMP). The ASMP must be prepared in accordance with the following where relevant:</p> <ul style="list-style-type: none"> • National Guidance for the Management of Acid Sulfate Soils in Inland Aquatic Ecosystems • Guidance for the dewatering of acid sulfate soils in shallow groundwater environments • Environment Protection Act 2017 General environmental duty • Environment Protection Regulations 2021 • National Acid Sulphate Soils Guidance - A synthesis • National acid sulphate soils sampling and identification methods manual • Guidelines for the dredging of acid sulphate soil sediments and associated dredge spoil management • Land manager policies and requirements. <p>The ASMP must include measures to:</p> <ul style="list-style-type: none"> • Characterise and manage acid sulfate soils in accordance with: <ul style="list-style-type: none"> - EPA Victoria, 2009, Publication 655.1 Acid Sulfate Soil and Rock - Murray Darling Basin Authority, 2010, Detailed Assessment of Acid Sulfate Soils in the Murray-Darling Basin • Manage stockpile areas to prevent release of acid to the environment • Identify suitable sites for management, re-use or disposal of acid sulfate soil and rock in accordance with EPA Victoria requirements. <p>As far as reasonably practicable, prevent oxidation that could lead to acid formation through cover and/or scheduling practices or addition of neutralising compounds to avoid acid formation.</p>	Construction	Contractor

Environmental Delivery Standard		Project phase	Responsibility
CM3	<p>Contaminated land duties</p> <p>The Operation Environmental Management Plan must include processes and procedures to manage contaminated land, spoil and waste in accordance with land manager processes, procedures and requirements, and the requirements of the legislation and other relevant statutory regulations and guidelines as detailed in EDS CM1a. Specifically, the Operation Environmental Management Plan must include:</p> <ul style="list-style-type: none"> Reference to a framework(s) for managing contamination risks to achieve compliance with the contaminated land duties, including the General Environmental Duty, duty to manage contamination and duty to notify the EPA of contamination Management measures for storage, handling and transport of soil, water and/or waste materials for the protection of human health and the environment, including measures for minimising dust generation, sediment and stormwater run-off. Soil and/or water monitoring and reporting would be undertaken to ensure effective implementation of the management measures and ongoing environmental compliance of the project infrastructure/operational activities. Controls must include: <ul style="list-style-type: none"> Measures to minimise chemical and fuel storage on site and store hazardous materials and dangerous goods in accordance with EPA and Safe Work Australia requirements in the legislation and guidelines listed in EDS CM1a. This must include: <ul style="list-style-type: none"> Creating and maintaining a dangerous goods register Disposing of any hazardous materials, including asbestos, in accordance with the Environmental Protection Regulations 2021 and relevant guidelines Implementing requirements for the installation of bunds and precautions to reduce the risk of spills Contingency and emergency response procedures to handle fuel and chemical spills, including availability of on-site hydrocarbon spill kits 	Operation	<p>Mallee CMA</p> <p>LMW</p> <p>Parks Victoria</p>
E1	<p>Native vegetation and habitat design minimisation</p> <p>Avoid and, where avoidance is not practicable, minimise native vegetation removal and ensure that the removal of native vegetation will not exceed 50.30 ha for the Belsar-Yungera project and 18.90 ha for the Hattah Lakes North project. For Belsar-Yungera, review the native vegetation removal calculations in light of the reduction of new access tracks and update as necessary. If the amount remains 50.30 ha despite review of calculations, review the need for two access tracks in WMA1 for Belsar-Yungera.</p> <p>The following measures to avoid and minimise impacts to native vegetation (including habitat fragmentation) are to be implemented as part of detailed design and construction planning phases including:</p> <ul style="list-style-type: none"> Undertake further investigation of identified alternatives where there may be opportunity to further avoid and minimise adverse effects to native vegetation through detailed design and construction methods (as identified in Attachment VII to the EES). Minimise footprint and surface disturbance of temporary and permanent works within the Construction Footprint as far as reasonably practicable, particularly near waterways, wetlands, endangered EVCs and fauna habitats (eg native and exotic vegetation, hollows, logs, soil and water). This includes movement and storage of all vehicles, machinery, equipment and materials Avoid and/or minimise the removal of native vegetation including Large and/or hollow-bearing trees, threatened species and threatened communities as far as reasonably practicable, particularly in the design phase when finalising the Construction Footprint (e.g. looking at alternative locations for turning circles and laydown areas that avoid impacts to any large trees, refining track class and alignment to avoid and minimise impacts to threatened species and Large or Very Large Trees). <p>Design and implement no-go zones to protect ecological values, and provide detailed maps of their location in the Construction Environmental Management Plan. No-go zone fencing (bunting/barriers considerate of culturally sensitive areas) to be installed around significant ecological values to be retained, including populations of EPBC Act-listed flora within the Area of Investigation, FFG Act listed flora and Large or Very Large Trees on the edge of the Construction Footprint that are proposed to be retained during construction).</p>	Design and construction	Contractor

Environmental Delivery Standard		Project phase	Responsibility
E2a	<p>Construction biodiversity administrative processes</p> <p>Develop and implement a Native Flora and Fauna Management Sub-Plan as a sub-plan of the Construction Environmental Management Plan (EDS EMF2). The Native Flora and Fauna Management Sub-Plan must include auditable specific commitments, and identify requirements and methods for avoiding and minimising impacts on biodiversity values, particularly native vegetation and threatened species and communities, including:</p> <ul style="list-style-type: none"> the matters required by EDS E2b, E2c, E2d, and E2e, and E2f, E2g and E2h Contractor inductions to be undertaken so that all staff onsite are aware of the ecological values (and other values) to be protected during construction Monitoring and auditing requirements for implementation by the environmental supervisor to confirm works are proceeding in accordance with the Native Flora and Fauna Management Sub-plan (e.g. checking that works are occurring in approved areas, no-go zone delineation is accurately in place, pre-clearance surveys are proceeding appropriately) If EPBC Act or FFG Act listed threatened species (individuals or population) are encountered which were not assessed within the EES assessment: <ul style="list-style-type: none"> Stop works at that location and implement appropriate measures (e.g. temporary fencing will be installed), pending discussions with DAWE/DELWP as relevant Notify a suitably qualified ecologist to determine the significance of any potential impacts Seek any relevant approvals from the relevant authority if removal/impacts cannot be avoided. <p>Should works be required outside the approved Construction Footprint, follow the change process as detailed in the Construction Environmental Management Plan which includes consideration of biodiversity (e.g. native vegetation, threatened species) implications, including approval requirements, re-quantification of impacts.</p>	Construction	Contractor
E2b	<p>Construction vegetation management</p> <p>The Native Flora and Fauna Management Sub-Plan must include the following requirements for vegetation removal activities:</p> <ul style="list-style-type: none"> Clearly identify the trees to be removed. Trees that may be or are to be retained, must not be marked in any way Delineate no-go zones incorporating Tree Protection Zones of Large Trees and threatened flora species populations to be retained to prevent access during construction Tree protection measures to be implemented to respond to arborist recommendations (e.g. tree protection zone fencing, mats) where appropriate Minimise removal of vegetation approved for removal/impacts (for example, reducing the number of trees felled) Once the construction footprint and construction methods are finalised in areas not previously assessed by an arborist during the design phase, undertake a detailed arborist assessment for Large Trees that will be impacted by more than 10% of their Tree Protection Zone (TPZ) to document the tree condition and significance, tree protection zone, structural root zone, tree protection fencing or ground protection systems to be used, and determine if the tree can be retained. The arborist is required to have a minimum qualification of Diploma in Arboriculture (AQF level 5 or equivalent) and tree impacts are to be assessed in accordance with the Australian Standard 4970- 2009 Protection of Trees on Development Sites. For trees to be retained implement tree and vegetation protection measures outlined in this EDS Pruning of trees to be retained will be undertaken to the minimum extent necessary and must not exceed one third of total canopy area. Pruning to be undertaken in accordance with AS4373 Pruning of Amenity Trees Vegetation clearing, pruning and excavation controls and protection measures, including the following protocols: <ul style="list-style-type: none"> pre-clearing surveys by an authorised and experienced wildlife handler of all accessible fauna habitat up to 5 days prior to clearing, as well as identified obscured fauna habitat (e.g. hollows, nests, logs, inaccessible habitat) up to 24 hours prior to clearing. These can be conducted together as one pre-clearing survey provided it occurs no more than 24 hours prior to clearing fauna salvage by an authorised and experienced wildlife handler that is to be onsite during all vegetation removal/felling/lopping activities. two-stage clearing and phased/staged removal to retain trees for as long as possible wherever practicable minimised clearing during spring where practicable. 	Construction	Contractor

Environmental Delivery Standard		Project phase	Responsibility
E2c	<p>Construction fauna management</p> <p>The Native Flora and Fauna Management Sub-Plan must include the following requirements for terrestrial and aquatic fauna management during construction:</p> <ul style="list-style-type: none"> Development and implementation of handling and salvage protocols for terrestrial and aquatic fauna during construction, including legislative permit and authorisation requirements of wildlife handlers (e.g. a Management Authorisation under the Wildlife Act 1975). This will include guidance for appropriate methods to encourage wildlife to leave vegetation and the construction areas, and other procedures should fauna (including juveniles or eggs) be found within hollows or nests during the pre-clearance surveys. The protocols will include details of requirements, including wildlife handler/ecologist/Victorian Fisheries Authority permit and authorisation requirements and EPBC Act post-referral approvals processes All fencing must be fauna friendly to minimise risk of wildlife injury from collision and include provision of egress points, for example: <ul style="list-style-type: none"> Temporary to exclude construction: High visibility string of bunting or plastic mesh (not transparent) attached to star pickets with plastic caps (or weighted posts that avoid ground penetration in culturally sensitive areas) Temporary to exclude wildlife (e.g. from open trenches): Chain wire fencing >1.8m high with a top rail or tension wire. Fencing stays located inside the exclusion area, or with high visibility mesh to guide wildlife away from obstructions. Shade cloth or other suitable deterrent attached to the lower 50 cm of the outside of the exclusion zone and weighted to the ground to exclude smaller animals No barbed or razor wire will be used Trench management, including avoiding open trenches overnight where practicable. Where trenches cannot be closed, check trenches at the start and end of each day (i.e. dawn/dusk), and consider feasibility of measures (e.g. ramps) to aid animal escape Implement measures to minimise noise, vibration and lighting impacts on known threatened fauna species and habitat, including: <ul style="list-style-type: none"> Avoid unnecessary light spill across a broader area than required to avoid attracting insects and subsequently their predators (bats and birds)). EDS LV3 provides additional requirements in relation to lighting during construction Avoiding night works during periods of high insect/bird/bat activity (October to March) as far as reasonably practical, so as to minimise disturbance to fauna communication, foraging and other behaviours that depend on sound and darkness Avoiding pile driving in waterways at night as far as reasonably practical. If pile driving in waterways must occur over multiple nights, consecutive days are to be separated with a night of no works in between to minimise ongoing chronic disturbance to wildlife. 	Construction	Contractor
E2d	<p>Construction weed and pest management</p> <p>The Native Flora and Fauna Management Sub-Plan must include the following requirements and measures to mitigate weed (terrestrial and aquatic) and pathogen introduction and spread:</p> <ul style="list-style-type: none"> Vehicle, personnel, material and equipment hygiene protocols (including measures required to prevent the spread or transmission of Chytrid Fungus as per Hygiene protocols for the control of diseases in Australian frogs (Murray et al. (2011)) Weed, pest animal and pathogen management and monitoring and reporting requirements Biosecurity check/inspections of all vehicles entering the Construction Footprint for plant material, seeds and soils containing organic matter. Following this initial check upon entry, biosecurity checks are not required each time the vehicle comes into the Construction Footprint if the vehicle has only travelled on bitumen or well-established gravel or dirt roads (i.e. no vegetation growing within roads) outside the Construction Footprint. <p>These measures must be auditable and linked to management outcomes such as:</p> <ul style="list-style-type: none"> Identify CaLP Act listed weeds in the construction area and assess the risk of additional spread prior to relocating topsoil. Implement measures to manage this risk during clear and grade, and reinstatement To a reasonable extent practicable during the clear and grade phase, ensure that vehicles and plant are free of soil (dust/clods) and vegetation prior to entry and exit from the construction area Evaluate disturbed areas post-construction and implement rehabilitation in accordance with EDS E2e. <p>To avoid and minimise spread of pathogens, all vehicles and plant undertaking construction works directly in the watercourse must be cleaned and free of soil prior to entrance of each waterway and on exit if working between multiple waterways (excluding vehicles and plant using the constructed access route).</p>	Construction	Contractor

Environmental Delivery Standard		Project phase	Responsibility
E2e	<p>Construction rehabilitation management</p> <p>The Native Flora and Fauna Management Plan must include the following requirements for rehabilitation following construction:</p> <ul style="list-style-type: none"> • Where possible, reuse timber and logs from felled trees on site with habitat improvement uses prioritised • Replace large woody debris (existing logs and snags) removed during construction from waterbodies or the floodplain as close as practicable to where it was initially located, in consultation with land managers • The projects must include rehabilitation of all affected areas following construction within the timeframe specified by the land manager: <ul style="list-style-type: none"> - Rehabilitation for all areas except Borrow sites must be detailed in the CEMP and must be developed in consultation with the relevant land manager. Rehabilitation should include as appropriate topsoil, leaf litter, log reinstatement and targeted revegetation (using indigenous species in areas of native vegetation pre-construction or soil stabilising non-invasive species in other areas), as agreed with the land manager - Borrow sites rehabilitation works are to be addressed in Property Management Plans, developed in agreement with the relevant land owner. <p>Rehabilitation should include as appropriate topsoil, leaf litter, log reinstatement, weed monitoring and management and targeted revegetation as agreed with the land manager.</p>	Construction	Contractor
E2f	<p>Aquatic fauna management</p> <p>In addition to the handling and salvage protocols for aquatic fauna as detailed in EDS E2c implement the following:</p> <ul style="list-style-type: none"> • Where works in waterbodies require coffer-damming that completely blocks the waterway: <ul style="list-style-type: none"> - Where practical, undertake works under no-flow conditions or outside the periods of time when fish migration occurs - Clearance of coffer dams during the de-watering process and following flood events which over-top the coffer dam - If clearance is not possible (e.g. for safety reasons), screens/filters to be placed on temporary pumps to be used to dewater coffer dam to avoid entrainment - Implement flow-through via pumping from upstream to downstream to maintain water quality and levels on both sides of the coffer dam - Monitor water quality (specifically dissolved oxygen) and depths upstream and downstream of the coffer dam during construction period to maintain similar conditions on both sides of the construction site <p>Minimise the duration of fish passage restrictions during works undertaken in or within the vicinity of any waterbodies to reduce impacts on aquatic fauna movements and water quality.</p>	Construction	Contractor
E2g	<p>Site specific additional measures - regent parrot</p> <ul style="list-style-type: none"> • <u>Implement measures to avoid and minimise impacts on Regent Parrot including (unless otherwise agreed with DAWE and DELWP):</u> <ul style="list-style-type: none"> - Removal/lopping/felling of active nesting trees, if required, must be done outside the breeding season - Where possible, schedule construction activities to avoid active construction within 350m of active nesting trees during the breeding season (spring/early summer). Active construction includes construction activities associated with track upgrades and new track construction, but does not include construction vehicle transit, where vehicles are simply using tracks for access to construction sites or routine track maintenance • Where construction occurs within 350 metres of an active nesting tree during the Regent Parrot breeding season (August to December inclusive), undertake monitoring, consistent with that outlined in Table 13-5 of Specialist Assessment B to the EES, in accordance with the Native Flora and Fauna Management Sub-Plan. • Active nesting trees are to be determined with reference to potential nesting locations identified in regent parrot habitat maps in Appendix I to Specialist Appendix B of the EES. 	Construction	Contractor
E2h	<p>Mildura Butterfly Ogyris subterrestris Site specific additional measures – Hattah Lakes North</p> <ul style="list-style-type: none"> • Schedule construction traffic to avoid the use of Mournpall Track during active flying times. 	Construction	Contractor

Environmental Delivery Standard		Project phase	Responsibility
E3	<p>Pest Plant and Animal Monitoring and Management Plan</p> <p>Prepare (prior to the commencement of operation) and implement a Pest Plant and Animal Monitoring and Management Plan to detect and manage terrestrial and aquatic pest presence and activity due to managed environmental watering events, including carp. The Plan may be prepared for multiple VMFRP projects, and will include:</p> <ul style="list-style-type: none"> • A monitoring program to indicate pest presence and activity, which will inform adaptive management and treatment measures • Thresholds for implementation of contingency management measures • Contingency measures, which may refer to existing policies, practices and procedures. <p>The monitoring program must include monitoring objectives, indicators and requirements (e.g. parameters, locations, frequency) appropriate to identify the exceedance of thresholds for pest presence and activity. Locations must include culturally sensitive locations relevant to EDS ACH3.</p> <p>The Pest Plant and Animal Monitoring and Management Plan should include measures to assist private landowners with the increased risk of pest presence and activity due to managed environmental watering events. Measures should include raising awareness to inform landowner monitoring and reporting, appropriate measures to manage any pest presence or activity, providing support to implement measures by coordinating efforts.</p>	Operation	Parks Victoria
E4a	<p>Overall biodiversity improvement – Belsar- Yungera</p> <p>Operate the Belsar-Yungera project to better align the frequency, duration and timing of managed inundation events with the ecological needs of the floodplain, including to improve ecosystem function, threatened species' habitat, and native vegetation.</p> <p>Operation of the projects, including the monitoring and reporting of outcomes, is to be undertaken in accordance with the principles of adaptive management through the following documents (or successors, as applicable):</p> <ul style="list-style-type: none"> • Operation Environmental Management Plan • Environmental Water Management Plan • Seasonal Watering Proposal • Operating Plan • Operations and Maintenance Plan • Monitoring, Evaluation and Reporting Plan. 	Operation	CMA (as preparer of the MER)
E4b	<p>Overall biodiversity improvement – Hattah Lakes North</p> <p>Operate the Hattah Lakes North project to better align the frequency, duration and timing of managed inundation events with the ecological needs of the floodplain, including to improve ecosystem function, threatened species' habitat and native vegetation.</p> <p>Operation of the projects, including the monitoring and reporting of outcomes, is to be undertaken in accordance with the principles of adaptive management through the following documents (or successors, as applicable):</p> <ul style="list-style-type: none"> • Operation Environmental Management Plan • Environmental Water Management Plan • Seasonal Watering Proposal • Operating Plan • Operations and Maintenance Plan • Monitoring, Evaluation and Reporting Plan. 	Operation	CMA (as preparer of the MER)
E5	<p>Winged peppercress - Hattah Lakes North</p> <p>Develop and implement a sub-plan of the Operations Environmental Management Plan to identify, assess and mitigate any potential effects of inundation on winged peppercress on the Raakajlim property. The plan should include:</p> <ul style="list-style-type: none"> • Prior to inundation, identification and assessment of habitat for winged peppercress on the Raakajlim property • If found, definition and implementation of preferred inundation requirements for this species and reasonably feasible mitigation measures (such as altered inundation frequency, sandbagging to prevent inundation, seed collection and other appropriate measures). <p>Liaise directly with the landowner in development of the plan prior to submission to the Department of Energy, Environment and Climate Action for approval.</p>	Operation	LMW/CMA

Environmental Delivery Standard		Project phase	Responsibility
E6	<p><u>Mildura Butterfly <i>Ogyris subterrestris</i> - Hattah Lakes North</u></p> <p><u>Develop and implement a sub-plan of the Operations Environmental Management Plan to monitor/assess effects of the 2022 flood event and proposed environmental watering on the butterfly. Outcomes are to be used to inform the appropriate management approach which balances the need to prevent further decline of the butterfly from environmental watering with overall ecosystem health and the needs of any other relevant threatened species.</u></p> <p><u>Liaise directly with the relevant landowners in the development of the plan prior to submission to the Department of Energy, Environment and Climate Action for approval.</u></p>	Operation	LMW/CMA
E7	<p><u>Water regimes to inform initial operations</u></p> <p><u>For Hattah Lakes North, prior to operation, undertake a Hydrological Analysis of Ecological Vegetation Classes.</u></p> <p><u>For both Projects' areas, use the site-specific hydrological analyses of Ecological Vegetation Classes (including the analysis recommended for Hattah Lakes North above and <i>Hydrological analysis of ecological vegetation classes in relation to expert elicitation report – Belsar Yungera floodplain</i> (2023, Ecological Associates) together with <i>A Guide to water regime, salinity ranges and bioregional conservation status of Victorian wetland Ecological Vegetation Classes</i> (2016, Frood and Papas) and the expert elicitation report (<i>Expert elicitation of tolerable and optimal watering regimes for Murray River floodplain vegetation</i>, 2022 ARI), to inform initial operating scenarios and adaptive management to be tested through environmental monitoring of response of vegetation to watering events.</u></p>	Design	LMW/CMA
GS1	<p>Minimising erosion and sedimentation through design</p> <p>Design the projects having regard to soil characterisation, <u>for example dispersive, saline, reactive and/or soft soils</u>, with the objective of dispersing water flows and minimising water velocities to minimise the potential for erosion and sedimentation, to the extent practicable.</p> <p><u>The hydraulic assessment of floodplain and waterway erosion risks in Specialist Assessment C should be confirmed based on the velocity and shear stress mapping required by EDS SW4 to ensure that all areas with elevated erosion risks are identified.</u></p> <p><u>Design the Projects having regard to the hydraulic effects of the Projects on erosion risks, to minimise the potential for erosion including in the vicinity of structures and in watercourses between the Project areas and the Murray River (including Narcooyia Creek, Bonyaricall Creek and Chalka Creek). The hydraulic assessment and design should take into account the possible effects of the various operational objectives in EDS SW2 on water releases.</u></p>	Design	Contractor
GS2	<p>Erosion and Sediment Control Plan</p> <p>The Construction Environmental Management Plan must include an Erosion and Sediment Control Plan which details measures to:</p> <ul style="list-style-type: none"> • Minimise clearance of vegetation and retain existing vegetation wherever possible, particularly along drainage lines and waterways, steep slopes and areas with unstable soils • Stabilise exposed soil where applicable with the appropriate structural materials and media for the construction activities (e.g. stabilisation matting, rock armour or vegetation) • Manage vehicle movement to designated roads and access areas as detailed in the Traffic Management Plan (EDS TT2) • Erosion and sediment control measures to be maintained as appropriate following construction until the site is stabilised or vegetation is established, or as otherwise agreed with the land manager • Install sediment controls around stockpiles to contain coarse soil and sediment, as applicable to prevent sedimentation of watercourses • If required, treat dispersive or reactive soils prior to importation and use in construction. 	Construction	Contractor
GS3	<p>Soils and landform stability</p> <p>The Operation and Maintenance Plan must identify infrastructure locations (including but not limited to, regulators and containment banks) to be monitored for erosion risk. This monitoring is to inform adaptive management and/or any measures to ensure structural integrity of infrastructure.</p> <p><u>Monitoring of bank and bed erosion should be undertaken in watercourses between the Projects' areas and the Murray River (including Narcooyia Creek, Bonyaricall Creek and Chalka Creek), to inform adaptive management and any structural responses to address accelerated erosion, if required.</u></p>	Operation	LMW (as owners and operators of the infrastructure)

Environmental Delivery Standard		Project phase	Responsibility
GW1	<p>Construction groundwater management</p> <p>The Construction Environmental Management Plan must include measures to manage groundwater impacts in accordance with the requirements under the <i>Environment Protection Act 2017</i>, subordinate legislation and other relevant statutory requirements and guidelines.</p> <p>Measures must include:</p> <ul style="list-style-type: none"> • Avoid extracting contaminated groundwater wherever possible • Seeking advice from a suitably qualified person on the most suitable way to manage contaminated groundwater • Disposal of groundwater from dewatering must minimise impacts to land and/or waterways. Disposal option(s) selected for each dewatering activity must consider the volume and or quality of the groundwater to be disposed (i.e. salinity) and be undertaken to avoid and minimise effects on groundwater values • Dewatering must be restricted to the minimum volume required • Spills of contaminants must be avoided and managed in accordance with EDS CM1. 	Construction	Contractor
GW2	<p>Operational groundwater management</p> <p>The Operation Environmental Management Plan must provide for the monitoring of groundwater and surface water levels, surface water flow and salinity to minimise the risk of salinity in accordance with the relevant Catchment Management Authority's salinity management program that complies with <i>Basin Salinity Management 2030</i> or its successor.</p> <p>The groundwater monitoring should include wells or bores within the Projects' areas, including parts of each Project's area that are expected to be the most sensitive to groundwater rise or salinity increase, with a sufficient number of monitoring wells or bores within each WMA to adequately detect and interpret any changes in water levels and salinity.</p> <p>The operation of the Projects should be reviewed and, if necessary, modified, if a significant trend of increasing salinity is identified at any of the monitoring sites.</p>	Operation	CMAs (as preparers of plans)
HH1	<p>Management of Historical Heritage during construction</p> <p>The Construction Environmental Management Plan must include:</p> <ul style="list-style-type: none"> • An unexpected finds protocol that specifies measures to avoid and minimise impacts on any previously unidentified historical archaeological sites and values discovered during construction. The management protocol must be consistent with the requirements of the Heritage Act 2017 and include procedures for ceasing work if human remains or archaeological sites, values or objects are discovered, notifying Heritage Victoria of the find, obtaining consent to deal with the find, and dealing with the find in accordance with the consent • Measures to manage historical heritage impacts including physical barrier protection and/or exclusion zones to manage unplanned effects • Details around training and awareness in relation to historic heritage places and obligations (e.g. Project induction toolbox talks and staff inductions) • Requirement to obtain any necessary consent under the Heritage Act 2017 prior to the disturbance of a known archaeological site. 	Construction	Contractor
HH2	<p>Management of Historical Heritage during operation</p> <p>In accordance with the <i>Heritage Act 2017</i>, manage historical heritage impacts including:</p> <ul style="list-style-type: none"> • Details around training and awareness in relation to historic heritage places and obligations (eg. Project induction toolbox talks and staff inductions) • An unexpected find protocol that specifies measures to avoid and minimise impacts on any previously unidentified historical archaeological sites and values discovered during operation. The management protocol must be consistent with the requirements of the Heritage Act 2017 and include procedures for ceasing work if human remains or archaeological sites, values or objects are discovered, notifying Heritage Victoria of the find, obtaining consent to deal with the find, and dealing with the find in accordance with the consent • Apply for and obtain any necessary consent under the Heritage Act 2017 where an archaeological site is to be disturbed, and comply with the conditions of that consent. 	Operation	<p>CMA (as preparer of the plans)</p> <p>Parks Victoria (joint, responsibilities as asset owner)</p>
HH3	Prior to operation, undertake an archaeological investigation and archival photographic survey of the Moonah Track and Wattle Track Charcoal Pits (VHI H7328-0002) to understand the construction and/or historic use of the pits.	Construction	LMW
LU1	<p>Land use effects – Construction</p> <p>Minimise or manage land use impacts by:</p> <ul style="list-style-type: none"> • Developing and implementing private landowner agreements in consultation with private landowners and in advance of construction activities occurring on their property which include measures to minimise site specific disruptions • Obtain required consents from public land managers for areas to be occupied during construction for the building of infrastructure and comply with the conditions of those consents. 	Construction	LMW

Environmental Delivery Standard		Project phase	Responsibility
LU2	<p>Land use effects – Operation</p> <p>Prior to operation:</p> <ul style="list-style-type: none"> Where operation will involve inundation of private land or operation of infrastructure located on private land, establish private landowner agreements for the operation and maintenance of infrastructure and areas to be inundated Obtain licences from the public land managers, as applicable, for the operation and maintenance of infrastructure on public land. <p>During operation:</p> <ul style="list-style-type: none"> Operate and maintain infrastructure in accordance with the private landowner agreements and licences over public land Undertake inundation in accordance with the private landowner agreements and licences over public land and in consultation with those landowners and public land managers. 	Operation	<p>CMAAs (as owners of Seasonal Watering Plans and Operating Plans)</p> <p>LMW (as preparers / owners of the O&M Plans)</p>
LV1	<p>Avoid and minimise visual impacts through design</p> <p>Design permanent and temporary works in consultation and agreement with relevant stakeholders (e.g. land and asset managers) to minimise any adverse landscape and visual impacts as far as reasonably practicable.</p>	Design and construction	Contractor
LV2	<p>Avoid and minimise visual impacts during construction</p> <p>As far as reasonably practicable, locate construction equipment, stockpiles, and other visible elements away from key sensitive receptor views (as identified in the Construction Environmental Management Plan) and otherwise incorporate screening measures such as hoarding where necessary. Remove construction equipment and temporary construction infrastructure when no longer required.</p>	Construction	Contractor
LV3	<p>Minimise construction and operation lighting impacts</p> <p>Temporary and permanent lighting used during construction and operation must avoid and minimise light spillage where safe to do so (considering AS/NZS 4282:2019 Control of the Obtrusive Effects of Outdoor Lighting), to protect the amenity of adjacent sensitive receptors (as identified in the Operations Environment Management Plan).</p> <p>Develop and implement measures to avoid and minimise lighting impacts to terrestrial and aquatic fauna species including considering the siting of temporary pumps and associated equipment to avoid impacts (such as downward angles or directional lights to avoid unnecessary light spill across a broader area than required, yellow/orange LED light wavelengths to avoid attracting insects and subsequently their predators (bats and birds)).</p>	Construction and operation	<p>Contractor</p> <p>CMAAs (as owners of Operating Plan)</p>

Environmental Delivery Standard		Project phase	Responsibility
NV1	<p>Construction noise and vibration management</p> <p>The Construction Environmental Management Plan must include measures to minimise as far as reasonably practicable and manage construction noise and vibration in accordance with the requirements of the Environment Protection Act 2017, subordinate legislation and other relevant statutory requirements and guidelines. The Construction Environmental Management Plan must include measures, such as:</p> <ul style="list-style-type: none"> • Fit and maintain appropriate mufflers on vehicles • Maximise shielding taking topography, existing structures and equipment location into consideration • Where an activity is likely to cause noise effects to nearby noise and vibration sensitive receivers, restrict operating hours to between 7 am and 6 pm weekdays and 7 am to 1 pm Saturday, except where, for practical reasons, the activity is unavoidable. All reasonable measures must be implemented to mitigate the effects of such unavoidable works • Inform the community on work scheduling and working hours in accordance with EDS SB1 and advise local residents when unavoidable out-of-hours work would occur • Provide the opportunity for the community to raise issues / concerns and respond to these in accordance with EDS SB1 • Setting speed limits for construction vehicles (in accordance with EDS TT2) to minimise vibration and noise effects • Prior to the commencement of vibration intensive works (such as compaction, sheet piling, rock breaking), prepare a risk assessment to inform the need to undertake dilapidation survey(s) • A framework for justification and approval of out-of-hours works that is established in consultation with the relevant stakeholders. Such a framework should: <ul style="list-style-type: none"> ○ include a clear rationale for the justification of both unavoidable works and managed impact works, and response strategies with EDSs to reduce noise and vibration and their impacts, so far as reasonably practicable, consistent with EPA publications 1834 and 1820.1 (as amended or replaced from time to time); ○ ensure that all assessments for out-of-hours works and their approval are conducted by a suitably qualified independent person, such as the Independent Environmental Auditor, who has no prior involvement in planning or delivery of the Projects and is able to make decisions free from influence or pressure related to the delivery of the Projects; and ○ ensure that, in respect of unavoidable works: <ul style="list-style-type: none"> ▪ the necessity for such works to be carried out outside of normal working hours is assessed and documented by a person with skills and expertise in risk/safety assessments; ▪ the EDSs to reduce noise and vibration are assessed and documented by a person with skills and expertise in noise and vibration control; and ▪ contingency measures will be taken to address the residual noise and vibration impacts from unavoidable works (for example respite periods or alternative accommodation) and the conditions in which they will apply. 	Construction	Contractor
NV2	<p>Operational noise management</p> <p>Noise and vibration from operation and commissioning (e.g. pumps) must be minimised as far as reasonably practicable and be within established limits as set by the Noise Limit and Assessment Protocol for the control of noise from commercial, industrial and trade premises and entertainment venues (EPA Publication 1826).</p>	Operation	CMAs (as owners of Operations Plans)
RU1	<p>Waste management</p> <p>Develop and implement management measures for resource use and waste (excluding soils) minimisation during construction and operation in accordance with the EPA waste management hierarchy and management options, to address:</p> <ul style="list-style-type: none"> • Litter management • Construction and demolition wastes • Organic wastes. 	Operation and construction	<p>LMW (as asset owner / operator)</p> <p>GMW (as State Constructing Authority)</p> <p>CMA (as preparer of Operating Plan)</p>

Environmental Delivery Standard		Project phase	Responsibility
SB1	<p>Community and Stakeholder Engagement Management Plan</p> <p>Prior to construction (other than preparatory buildings and works), develop and implement a Community and Stakeholder Engagement Management Plan to engage and consult the community and affected stakeholders and discuss progress and timing of construction activities. The Community and Stakeholder Engagement Management Plan must include measures to:</p> <ul style="list-style-type: none"> • Provide advanced notification to relevant Councils and land managers to allow communication of upcoming construction activities, their timing and duration to direct visitors away from the construction footprint where appropriate • Provide advanced notification to potentially affected stakeholders (i.e. local irrigators on Narcooyia Creek, private landowners and leaseholders) of the extent and timing of access disruptions associated with construction and commissioning activities • Establish communication protocols to provide adequate notification to the local community, stakeholders, businesses, registered recreational users of the park/forest and emergency response organisations prior to access disruptions and communicate alternate access arrangements • Notify relevant agencies (e.g. DELWP) to engage with license holders (e.g. apiary and other) to provide information on the timing of construction activities • Establish a project specific hotline to receive queries or complaints • Investigate and respond to community complaints or enquiries, as soon as practicable • Prepare incident notification and governance protocols for relevant Councils and land managers. <p>Timing and type of notification to potentially affected stakeholders will be determined in consultation with the relevant stakeholder prior to the commencement of construction (other than preparatory buildings and works), and may be amended from time to time, subject to agreement.</p>	Construction	Contractor
SB2	<p>Minimise social and business impacts – Construction</p> <p>Where recreation facilities are displaced or potentially affected by access restrictions or amenity impacts, work in collaboration with land managers, relevant Councils and other relevant authorities to identify relocation opportunities with the objective to maintain the continuity of affected facilities and activities, as far as reasonably practicable.</p>	Construction	Contractor
SB3	<p>Community and Stakeholder Engagement activities - Operation</p> <p>Catchment Management Authorities to continue to deliver communication and stakeholder engagement activities in accordance with Victoria's Catchment Management Authorities Community Engagement and Partnership Framework and Toolkit. Communication and engagement during the operation of the project must include:</p> <ul style="list-style-type: none"> • Advanced notification to relevant Councils and land managers to allow communication of upcoming operational activities, their timing and duration to direct visitors away from inundation areas where appropriate • Advanced notification to potentially affected local irrigators on Narcooyia Creek, private landowners and leaseholders of the extent and timing of access disruptions associated with commissioning and operational activities • Advanced notification to the local community, stakeholders, businesses and registered recreational users of the park/forest and emergency response organisations prior to access disruptions and communicate alternate access arrangements • Advanced notification to relevant agencies (e.g. DELWP) so that they can engage with license holders (i.e. apiary and other) to provide information on the timing of watering events • A process to receive queries or complaints and respond to these • A protocol for how community expectations regarding potential adverse effects, in particular adverse anoxic (blackwater) events, will be managed at identified stages of inundation events. <p>Timing and type of notification to potentially affected stakeholders will be agreed prior to the commencement of operation, and may be amended from time to time, subject to agreement</p>	Operation	CMAs, in consultation with land manager.
SW1	<p>Surface water management - Construction</p> <p>The Construction Environmental Management Plan must include processes and measures to manage surface water in accordance with the relevant requirements of the <i>Environment Protection Act 2017</i>, subordinate legislation and other relevant statutory requirements and guidelines. Mitigation and management measures will be informed by the EPA Publication 1834 and must include requirements to:</p> <ul style="list-style-type: none"> • Manage sediment and erosion during construction in accordance with EDS GS2 • Manage storage, handling and transport of materials in accordance with EDS CM1 for the protection of drains and waterway • Establish water quality criteria through baseline monitoring (as specified in the CEMP) to inform site specific objectives for the treatment of water prior to discharge to receiving waterways • Manage dewatering rates to prevent bank slumping • Monitor surface water quality (in accordance with the requirements set out in the CEMP) upstream and downstream from where works occur within a designated waterway* to confirm effectiveness of established controls and implement additional controls as required • Include contingency plans should flooding occur during construction to avoid spills, erosion and discharge of poor quality water to waterways. <p>* Designated waterways are named or unnamed, permanent or seasonal, and range in size from a river to a natural depression.</p>	Construction	Contractor

Environmental Delivery Standard	Project phase	Responsibility
<p>SW2 Surface water management – Operation</p> <p>In accordance with the <i>Water Act 1989</i>, operate the project within the Victorian annual environmental water management cycle and, at the local level, be guided by site specific Operating Plans developed to outline the operational arrangements including identification of overarching operating risks and mitigation measures associated with the delivery of environmental water.</p> <p>The Catchment Management Authority is to develop the Operating Plan in consultation with relevant stakeholders prior to the first watering event.</p> <p>Operation of the project to consider and seek to avoid, minimise and manage where practicable:</p> <ul style="list-style-type: none"> • Adverse anoxic (blackwater) events • Excessive algal growth • Increased Carp population • Native fish stranded on the floodplain during drawdown events • Excessive erosion during filling and drawdown. <p>This will include consideration of the following measures as appropriate:</p> <ul style="list-style-type: none"> • Factor seasonal implications in the timing of filling and drawdown to reduce the likelihood of creating suitable breeding conditions for Carp and to reduce the risk of hypoxic or anoxic blackwater events. Inundation events should only occur in the warmer months when conditions are conducive to carp breeding if benefits outweigh the risks associated with Carp proliferation • Maintain throughflow during managed inundation if appropriate and possible to mitigate anoxic conditions • Assess accumulated organic material load and adjust inundation timing and extent (if larger litter loads are present then consider small inundation with maintenance of throughflow) to minimise the risk of anoxic blackwater events • Provide throughflow to replicate first flush or consider staged inundation to minimise the risk of anoxic blackwater events • Manage drawdown rates to maintain mixing and dilution in the Murray River, especially during times of low Murray River flow to reduce the negative impacts of hypoxic or anoxic discharges from the Project areas on the Murray River • Develop and test the success of a native fish exit strategy to allow native fish to migrate from the floodplain • Monitor and report on native fish strandings associated with the Projects. In the event that large numbers of high value large-bodied fish species are found to be regularly stranded on the floodplain, review and investigate the cause of the strandings. Develop and implement mitigation measures to address the strandings, which may include modifications to Project infrastructure, changes to operating arrangements, and/or capture and relocation of stranded native fish • Develop and test the success of a strategy to retain carp on the floodplain for the Hattah Lakes North project • Manage drawdown rates to minimise increase in velocity and shear stress downstream of regulators. Operating rules for regulator ER1 should have regard to variability in Euston Weir pool levels, which provide tailwater support for releases from regulator ER1. 	Operation	CMAs (as preparers of Operating Plan)
<p>SW3 Surface water – Monitoring</p> <p>Monitor the volume, duration, frequency and surface water quality of managed environmental watering events in accordance with the Operation Environmental Management Plan to inform adaptive management (e.g. through the <i>Operating Arrangements for the Environmental Water Holdings of the Murray System</i> and the Ecological Monitoring, Evaluation and Reporting Plans).</p>	Operation	CMA (as preparer and owner of plans)
<p>SW4 Surface water – assessment of floodplain hydraulics and implications for floodplain vegetation prior to detailed design</p> <p>Undertake the following hydraulic analysis to inform the floodplain vegetation assessment and the minimisation of erosion and sedimentation through design (EDS GS1) and operation (EDS GS3 and EDS SW2):</p> <ul style="list-style-type: none"> • Mapping of key hydraulic parameters (depth, velocity and shear stress) for each operating scenario (including managed inundation events and comparable natural and existing flood events) at key stages of managed inundation events (including filling, holding and releasing with regulators closed and open) • ‘Difference maps’ should be used in conjunction with mapping of the key hydraulic parameters for each scenario to determine the locations where they key hydraulic parameters will be changed by the Projects, and the magnitude of the change. <p>Undertake further assessment to determine implications of hydraulic effects of the Project for floodplain vegetation having regard to EVCs and vegetation depth preferences and tolerances.</p> <p>Outcomes of this hydraulic analysis and further assessment should be used to inform any necessary design or operational changes and an updated assessment of the overall improvements to be provided to the Secretary of Department of Energy, Environment and Climate Action under Clause 4.5.1 of the incorporated document.</p>	Design	LMW

Environmental Delivery Standard		Project phase	Responsibility
SW5	<p>Surface water design – regulators, containment banks and spillways</p> <p>The design of the regulators should ensure that suitable flow velocities are provided to enable the passage of all target species of native fish to the extent reasonably practicable.</p> <p>The design of the containment banks and spillways should have regard to the facilitation of turtle passage.</p>	Design	LMW
TT1	<p>Safety in road design</p> <p>Undertake independent road safety audits during project development to ensure all new and upgraded access tracks meet relevant land manager or road management authority requirements with respect to transport network user safety. Implement relevant recommendations from the audit as appropriate.</p>	Design	Contractor
TT2	<p>Traffic Management Plan</p> <p>Prepare and implement a Traffic Management Plan to minimise disruption during construction in consultation with relevant road management authorities and the land manager. The Traffic Management Plan must clearly outline measures to:</p> <ul style="list-style-type: none"> Identify routes for construction haulage and construction vehicles travelling to and from the projects (including within the park(s) and outside) and identify any specific requirements for those routes Minimise road closures, access restrictions and disruption to all road users and active users Provide for safe construction practices in accordance with road authority requirements Specify vehicle speed limits considering safety, noise, vibration and dust. Provide alternative routes for affected road users and active users where practicable Maintain property accesses during construction where practicable or provide alternative access Maintain emergency service access (as developed in consultation with emergency services), consistent with the Fire Access Road Plan (see clause 4.10.2 of the incorporated document) Notify affected residents and landholders of changes to traffic conditions and access to property for duration of the works Provide a clear delineation between road and areas dedicated for construction and roads and areas available for public use (e.g through fencing, signage, etc) Monitor weather conditions to reduce the risk of a heavy vehicle travelling into the area during poor weather conditions Minimise the risk of vehicles getting bogged or stuck due to wet weather (including the requirement for recovery equipment to be on site) Provide adequate access to heavy vehicles (including adequate vegetation clearance from vehicles) Determine whether any pavement damage has occurred due to construction activity (including the requirement for pre and post construction road pavement reports. 	Construction	Contractor
TT3	<p>Safety during operation – recovery equipment</p> <p>The Operations and Maintenance Plan must detail the requirement for all maintenance vehicles associated with the operation of the projects to have recovery equipment on-board in order to recover any vehicles that are bogged or stuck and blocking access.</p>	Operation	LMW (as preparer of O&M Plan)
TT4	<p>Safety during operation – signage</p> <p>During operation, the land manager is to provide:</p> <ul style="list-style-type: none"> advisory signage on closed or inaccessible tracks public advice regarding changes in-park/forest conditions (eg. via websites). 	Operation	Parks Victoria (as Land manager)
TT5	<p>Track maintenance program</p> <p>Land managers to continue implementing a track maintenance program (according to regional priorities) to facilitate continued safe access for park users and emergency services, consistent with the Fire Access Road Plan (see clause 4.10.2 of the incorporated document).</p>	Operation	Parks Victoria (as Land manager)

This table is the Proponent's Final Day Version of the Projects Monitoring Register for the Belsar-Yungera and Hattah Lakes North Projects, which is Table 18.13 in the EMF. It reflects the proponent's position as at the date of the document.

Key: M= Monitoring, AI – Auditing / Inspection, I = Investigation, C= Construction, O = Operation, WC = Wet Commissioning. ^ monitoring of operational impacts, risks and uncertainties, * - monitoring of ecological benefits

ID & Discipline	Performance objective	Phase	Indicator	Monitoring requirement and parameters	Locations	Frequency	Responsibility
M AQ1 Air quality	Minimise dust within 20m of stationary human sensitive receptors	C	Dust plumes from construction activities at stationary human sensitive receptor(s) (i.e. occupied residences) located within 20m of the construction footprint.	As required by EDS AQ1, implement real-time monitoring where construction and/or haulage on unsealed roads occurs within 20m of occupied residences. If fine dust particles are measured to exceed PM10 of 100 ug/m3 for a 15 minute average and/or the trigger level identified in EPA Publication 1961 Guideline for assessing and minimising air pollution in Victoria and following an investigation which determines that the dust is attributed to the project construction, then the contractor must temporarily modify or suspend dust generating activities until controls are put in place to avoid and reduce dust.	Where construction and/or haulage on unsealed roads occurs within 20m of occupied residences	While construction and/or haulage is being undertaken at the specified locations (i.e. not required outside of working hours).	Construction contractor
M AE1 Aquatic ecology	To assess the maintenance of seasonal populations of large, medium and small-bodied native fish.	O^	Local populations of large, medium and small-bodied native fish do not decline below baseline (pre-intervention) levels in Narcooyia Creek.	Boat electrofishing, fyke netting	Narcooyia Creek – four sites specified in MER program	Annual: late summer/autumn	Mallee CMA
M AE2 Aquatic ecology (Belsar only)	To assess movement of large and medium native fish to maintain populations.	O^	Movement of large and medium native fish occurs between the River Murray and Narcooyia Creek within the Belsar-Yungera system every year.	Trapping, tagging and tracking	ER1	Annual (spring)	Mallee CMA
M AE3 Aquatic ecology	To assess the benefits of floodplain watering for small-bodied fish productivity. To assess the effects of floodplain watering and mitigation measures on carp populations.	O^*	Abundance of small-bodied native fish in wetlands and floodplain lakes increases due to environmental watering. Change in carp populations in relation to environmental watering and application of mitigation measures in EDS SW2.	Boat/backpack electrofishing, fyke netting	Wetlands and floodplain lakes (Powell and Carpul) within the inundation area. Effectiveness of watering to be determined through correlation with habitat quality and trends in fish abundance over time.	At least once during each inundation event. Trends evaluated after each watering event. Opportunity to reduce frequency and/or cease monitoring if a clear and reliable correlation with environmental watering is established.	Mallee CMA
M AE4 Aquatic ecology (Belsar only)	Minimise potential adverse effects of fox predation on adult turtles moving around regulator ER1	O^	Fox activity and obvious signs of turtle predation.	Install fauna cameras to assess fox activity and predation, as a part of the ongoing targeted fox management program at regulator ER1. If evidence of increased fox activity or predation of turtles found, the turtle species is to be identified if possible, location and time of observation recorded.	Focus effort at ER1 regulator	Install cameras from late spring to autumn during nesting seasons (for each turtle species). Install fauna cameras for one season only. If there is evidence of predation, then continue fauna cameras for additional seasons, until there is not evidence of fox predation.	Mallee CMA
M AE5	Minimise potential adverse effects on turtle passage due to operation of the ER1 regulator	O^	Turtle presence in the fishway	Observations of trapped turtles by LMW during fishway operation or maintenance visits If turtles found trapped in fishway, the	ER1 regulator fishway	Ongoing: During all operation or maintenance visits.	Mallee CMA (formal monitoring)

ID & Discipline	Performance objective	Phase	Indicator	Monitoring requirement and parameters	Locations	Frequency	Responsibility
Aquatic ecology (Belsar only)				species is to be identified if possible, location and time of observation recorded. Notification to be sent to Mallee CMA and logged on LMW Environmental management system. Note - the results from the fauna cameras in the fox control monitoring can also be used to supplement LMW observations. If turtles are consistently trapped within the fishway structure, undertake Contingency monitoring 1			LMW (opportunistically during operation and maintenance visits)
M AE5 Aquatic ecology (Belsar only)		O^	Contingency monitoring: Turtle community assessment (species diversity and abundance)	Contingency monitoring 1: Trapping (e.g., fyke and cathedral netting) or acoustic tagging	Upstream and downstream of regulator ER1	Annually during spring/summer prior to nesting when males looking for females to breed for up to 5 years. Review need to continue monitoring annually.	Mallee CMA
M AE5 Aquatic ecology (Belsar only)		O^		Subject to outcomes of contingency monitoring: Potential construction of a turtle ramp, reducing bank slopes, use of fencing to direct turtles around the structure	Regulator ER1	Post-management monitoring to determine efficacy of management actions if required	Mallee CMA
M AE6 Aquatic ecology (Belsar only)	Confirmation that the fishway is operating in accordance with design criteria.	O^ (WC)	Fishway design criteria.	Check water flow through the fishway (velocity). Record any fish activity.	ER1 Fishway (Belsar-Yungera)	Once off during wet commissioning	LMW (opportunistically during operation and maintenance visits)
M AE7 Aquatic ecology	Monitoring and reporting on native fish strandings resulting from managed inundation events, so that recurrent strandings can be identified and investigated to enable management measures to be undertaken to address the strandings as required	O^	Fish stranding events	Monitor and report on native fish strandings from managed inundation events	Areas inundated by managed inundation events	During drawdown of inundation events. Undertake a review of the monitoring after the first 5 inundation events to confirm and refine ongoing monitoring requirements (e.g. key risk factors and locations)	Mallee CMA
M GSC1 Geology soils and contamination	Assess water containment and conveyance infrastructure locations with potential for erosion /or sedimentation and reaches of Narcooyia Creek and reaches of Bonyaricall Creek downstream of the ER1 regulator to the Murray River and Chalka Creek downstream the K10 regulator to the Murray River to inform adaptive management and/or any measures to ensure	O^	Visual indicators (e.g., notching, bank slumping) of induced soil, water or wave erosion/sedimentation.	Visual inspections (including photo points) of constructed infrastructure and waterways	Infrastructure locations (including, but not limited to, regulators and containment banks) and waterways affected by releases from the Projects' areas	Before, during and after an environmental watering event	Asset owner (infrastructure) and Mallee CMA (waterways)

ID & Discipline	Performance objective	Phase	Indicator	Monitoring requirement and parameters	Locations	Frequency	Responsibility
	structural integrity of infrastructure.						
M GW1 Groundwater	Identify changes to groundwater levels as a result of environmental watering	O^	Groundwater depth and groundwater elevation trends over time compared with the forecast changes	Groundwater depth below surface and groundwater reduced level. The frequency and location of monitoring may be adjusted through adaptive management.	<p>Belsar-Yungera: 6969, 26219, 26231, 26274, 26810, 26811, 26812, 26813, 40057, 40058, 40059, 123757, 123758, WRK950452, WRK958592, WRK958593</p> <p>Hattah: 7016, 7017, 7019, 7022, 7024, 7683, 7852, 7853, 7859, 26266, 26289, WRK059899, WRK059901, WRK059902, WRK059903, WRK059904, WRK059905, WRK958603</p> <p>New groundwater monitoring sites:</p> <p>Establish new groundwater monitoring sites within the Maximum Inundation Areas of both Projects, including at the tree condition monitoring sites for M TE9 and in targeted areas that are predicted to be most sensitive to groundwater rise, particularly where there is high groundwater salinity.</p>	<p>Monthly</p> <p>Following the first maximum inundation event, undertake an interim review of monitoring outcomes and identify appropriate adjustments to the monitoring program.</p> <p>Following the second maximum inundation event, undertake a comprehensive review of monitoring outcomes and identify appropriate adjustments to the monitoring program.</p> <p>Due to the frequency of the maximum inundation event for the Lake Boolca Water Management Area, the monitoring requirements could be reviewed after the first watering event.</p>	Mallee CMA
M GW2 Groundwater	Identify changes to groundwater quality as a result of environmental watering	O^	Groundwater quality trends over time compared with the forecast	<ul style="list-style-type: none"> Alkalinity (Bicarbonate) Alkalinity (Hydroxide) as CaCO₃ Alkalinity (total) as CaCO₃ Ammonia as N Arsenic Bicarbonate Alkalinity as CaCO₃ Cadmium Calcium Chloride Chromium (III+VI) Copper Kjeldahl Nitrogen Total Lead Magnesium Mercury Nickel Nitrate & Nitrite (as N) Nitrate (as N) Nitrite (as N) Nitrogen (Total) pH Phosphorus Phosphorus reactive (as P) 	<p>Belsar-Yungera: 26231, 26274, 26810, 26813, 40058, 40059, 123757, 123758, WRK950452, WRK958592, WRK958593</p> <p>Hattah: 7683, 7852, 7853, 7859, WRK059899, WRK059902, WRK059903, WRK059904, WRK059905</p> <p>New groundwater monitoring sites:</p> <p>The new monitoring sites established to meet the requirements of M GW1</p>	<p>Annual.</p> <p>Following the first maximum inundation event, undertake an interim review of monitoring outcomes and identify appropriate adjustments to the monitoring program.</p> <p>Following the second maximum inundation event, undertake a comprehensive review of monitoring outcomes and identify appropriate adjustments to the monitoring program.</p> <p>Due to the frequency of the maximum inundation event for the Lake Boolca Water Management Area, the monitoring requirements could be reviewed after the first watering event.</p>	Mallee CMA

ID & Discipline	Performance objective	Phase	Indicator	Monitoring requirement and parameters	Locations	Frequency	Responsibility
				<ul style="list-style-type: none"> Potassium Redox Potential Sodium Soluble Carbonate as CaCO₃ Sulfate as SO₄ Zinc 			
M GW3 Groundwater	Identify changes to surface water levels that influence groundwater Identify changes in surface water salinity, including the effect of groundwater discharge	O ^A	Water level, salinity and flow	Measure surface water levels, flow and salinity at specific locations.	<p>Belsar-Yungera:</p> <p>New surface water monitoring sites to be established</p> <ul style="list-style-type: none"> ER1 Regulator, Upstream J2 A Regulator, Upstream ER3 Regulator, Downstream Lake Powell Box Culvert Downstream Lake Carpul Box Regulator Downstream <p>Hattah:</p> <p>Site ID and new surface watering monitoring sites to be established</p> <ul style="list-style-type: none"> K10 Regulator Upstream Bitterang Regulator Downstream 414231 Chalka Creek 	<p>Daily.</p> <p>Following the first maximum inundation event, undertake an interim review of monitoring outcomes and identify appropriate adjustments to the monitoring program.</p> <p>Following the second maximum inundation event, undertake a comprehensive review of monitoring outcomes and identify appropriate adjustments to the monitoring program.</p> <p>Due to the frequency of the maximum inundation event for the Lake Boolca Water Management Area, the monitoring requirements could be reviewed after the first watering event.</p>	Mallee CMA
M SW1 Surface water	Assess the effect of the project's construction on surface water quality.	C	<p><u>Routine field-based monitoring:</u></p> <ul style="list-style-type: none"> Electrical conductivity (salinity) Turbidity Dissolved oxygen pH Temperature Visual and olfactory inspection for oils and greases, litter and algal growth. If hydrocarbons are suspected to be present, a sample will be collected for laboratory analysis of oils and grease and total petroleum hydrocarbons. If algae are suspected to be present, a sample will be collected for laboratory analysis of nutrients (total nitrogen and total phosphorus), chlorophyll and identification of algal species. <p><u>Contingency monitoring:</u></p> <ul style="list-style-type: none"> Indicators identified during contaminated land assessment that could leach to surface waters due to construction activities at levels above objectives outlined in 	<p>Specific monitoring programs for each construction location to be developed and documented in the CEMP prior to project commencement. This will include:</p> <p><u>Routine monitoring:</u></p> <p>Assess whether the project's construction is adversely affecting surface water quality and if relevant EDS are being implemented and effective. Thresholds for acceptable levels of change in indicators are provided in Table 60 of the EES Central Surface Water Assessment. If monitoring downstream of a construction site shows water quality exceeds values in Table 60 and the exceedance is due to construction activities (i.e. a comparison between water quality upstream and downstream of the construction shows compliance upstream but non-compliance downstream) implement contingency actions.</p> <p><u>Contingency monitoring:</u></p> <p>Assess whether the project's construction is adversely effecting surface water.</p>	<p>Specific monitoring programs for each construction location to be developed and documented in the CEMP prior to project commencement. This will include:</p> <p><u>Routine monitoring:</u></p> <p>For floodplain creeks and the Murray River – Where there is potential for runoff from the active construction sites to a watercourse, monitor upstream and downstream of the active area of construction in both immediate receiving waters (floodplain creeks) and the Murray River. Where construction blocks a waterway (e.g. construction of regulator ER1), monitor within the watercourse both upstream and downstream of that blockage. For wetlands – wetlands that receive surface water inflows from the active area of construction and a reference site</p>	<p><u>Routine monitoring:</u></p> <p>Weekly for one month prior to construction to establish baseline (if water is present)</p> <p>At least weekly during construction whenever water is present, or more frequently during and after: hot weather/ rainfall event.</p> <p>If algae are suspected to be present, a sample will be collected for laboratory analysis.</p> <p><u>Contingency monitoring</u></p> <p>As required by the nature of the event being responded to (e.g. daily) to show duration of potential impact and effectiveness of rectification actions.</p>	Construction contractors

ID & Discipline	Performance objective	Phase	Indicator	Monitoring requirement and parameters	Locations	Frequency	Responsibility
			the NEPM 2013 or Environment Reference Standard as a result of the project (in accordance with EDS CM1). Contaminants accidentally spilled with potential to pollute watercourses.	The determination of effect should be based on water quality exceeding thresholds in Table 60 of the EES Central Surface Water Assessment that can be attributed to construction activities.	(if relevant to individual construction locations). <u>Contingency monitoring</u> Upstream and downstream of affected areas, including multiple downstream sites to detect extent of potential impact.		
M SW2 Surface water	Assess the effect of environmental watering on surface water quality on the floodplain and within the Murray River.	O^	Indicators are derived from the VMFRP Ecological MER plan (Sparrow et al. 2020) as covariates for enabling assessment of effects on floodplain biota such as fish during inundation events: Flow In-situ (field based) physico-chemical parameters <ul style="list-style-type: none"> Electrical conductivity (salinity) Turbidity Dissolved oxygen pH Temperature Visual observations for signs of severe blackwater or excessive algal growth. Parameters requiring laboratory analysis (as needs basis): <ul style="list-style-type: none"> Total nitrogen Total phosphorus Organic carbon (dissolved and particulate) Chlorophyll Algal species identification and quantification (if an algal bloom occurs). 	Specific monitoring programs for each project area and the process for evaluation and reporting against EDS to be developed and documented in the Operation Environmental Management Plan (EDS SW2, SW3) prior to project commencement. This will include: <ul style="list-style-type: none"> Monitor flow at outlet regulators Monitor changes in surface water quality across the floodplain during a managed inundation event to maximise beneficial effects and minimise adverse effects to environmental values supported by surface water in areas where sensitive environmental values exist (e.g. native fish and where throughflow to the Murray River occurs). Assess if relevant EDS are being implemented and are effective. Rates of through flow (discharge to the Murray River during the managed inundation event) should be adjusted based on the monitoring results to minimise effects of low dissolved oxygen on the Murray River. Results from managed inundation events should also be used to inform subsequent managed inundation events.	On the floodplain - site(s) to be identified at infrastructure locations and within the floodplain at locations that support sensitive receptors (for example, aquatic species or water users). Sites to be selected by CMA and may include sites already included in other monitoring programs. Within the Murray River - Upstream and downstream* of the floodplain return flow (and within the return flow prior to entering the Murray River). * immediately downstream of the floodplain return flow and further downstream if adverse effects are detected after floodplain outflows and the Murray River are mixed.	Baseline water quality will be established in the Murray River and across the floodplain (where possible i.e. for areas may be already wet) prior to the inundation event. For the Murray River, data from the MDBA RWQMP could be used. On the floodplain locations – minimum daily recording of out-flow weekly monitoring during a managed inundation event for in-situ parameters, spot monitoring for parameters requiring laboratory analysis if in-situ monitoring indicates degraded water quality that could affect sensitive values. The specific site locations will change as the event progresses and may depend on access limitations. Within the Murray River – immediately prior to drawdown from a managed inundation event then weekly during floodplain return flows for in-situ parameters in the Murray River. Spot monitoring for parameters requiring laboratory analysis if in-situ monitoring indicates degraded water quality that could affect sensitive values. Note: location, frequency of sampling and specific parameters may be adjusted by the relevant water manager in line with access and existing programs.	Mallee CMA
M TE1 Terrestrial ecology	To avoid and minimise adverse effects on Regent Parrot during construction	E	Active Regent Parrot nest/s within trees to be removed (during breeding season: August to December). Active Regent Parrot nest is disturbed as a result of construction activities (within 350 metres of active	1. Pre-clearance surveys, including nest surveys, will be undertaken as per EDS E2b prior to tree removal for construction. 2. Assessment of known nesting trees and identification of new nesting trees, if breeding is found to occur in trees not	1. Pre-clearance surveys: construction footprint. 2. Assessment of nesting trees: Potential nesting trees in potential nesting habitat (appropriate EVC and within 120 m of water, as determined in EES) within 350	Pre-clearance surveys: prior to clearing in accordance with EDS E2 Confirmation of known nesting trees and identification of new nesting trees: prior to commencement of construction	Suitably qualified or experienced ecologist or zoologist

ID & Discipline	Performance objective	Phase	Indicator	Monitoring requirement and parameters	Locations	Frequency	Responsibility
			construction sites during breeding season: August to December inclusive)	<p>previously known to support nesting. Refer to hatched areas on map in EES Central Terrestrial report showing potential nesting locations. The main locations where Regent Parrots are known to breed include the 'Gearbox Loop' area of Yungera Island. There is also the potential that they could breed in the vicinity of ER1 regulator and associated levee.</p> <p>Assessment of known and potential nesting trees within 350 metres of active construction sites (or scheduled construction site where works commence during the breeding season) at the start of the breeding season (August–September), prior to construction activities commencing at these locations.</p> <p>3. Monitoring of active nesting trees within 350 metres of active construction sites during breeding season: August to December inclusive.</p> <p>A 'scheduled construction site' is one where works occur during the Regent Parrot breeding season, but may or may not have commenced before the breeding season</p>	<p>metres of proposed construction sites (includes roads and access tracks if construction activities occur there—excludes vehicle transit).</p> <p>3. Monitoring of nest trees: Active nesting trees (as determined in EES) within 350 metres of active or scheduled construction sites (includes roads and access tracks if construction activities occur there): throughout breeding season: August to December inclusive.</p>	Routine monitoring of known nesting sites: weekly	
M TE2 Terrestrial ecology	To meet land manager and landowner post-construction requirements.	C & O^	Area within Construction Footprint left as per agreed with land manager and landowners.	<p>Monitoring of topsoil redistribution, native and exotic vegetation cover, and organic litter and log cover within the Construction Footprint.</p> <p>Monitoring of weed cover following construction to identify if additional management is required to prevent an increase in Weeds of National Environmental Significance, weeds listed under the CaLP 1994 and those listed as FFG Act threatening processes.</p>	Construction footprint with specific focus on waterways	First 12 months following construction unless specified otherwise in the Section 27 consent or agreed with the land manager. Subject to outcomes of monitoring, management and further monitoring may be required.	Land manager or as otherwise agreed with land manager (i.e through section 27 consent)
M TE3 Terrestrial ecology	To assess the change in terrestrial and aquatic weed occurrence and cover as a result of project environmental watering	O^	Occurrence or cover does not increase above threshold set in PPAMP for high threat weeds (i.e. Weeds of National Significance, designated high threat weeds, declared noxious weeds under the CaLP Act and/or weeds listed under DSE (2009) Advisory list of environmental weeds of aquatic habitats of Victoria) as a result of environmental watering.	<p>10x10 m vegetation quadrats to document species cover-abundance, including weeds.</p> <p>Monitor weeds within and adjoining the Maximum Inundation Area. This includes monitoring populations on ground and active management as required (e.g. infestations of high threat weeds using appropriate treatment techniques). This will include:</p> <ul style="list-style-type: none"> Vegetation quadrat monitoring to identify species presence. 	Sufficient quadrats must be sampled to evaluate the statistical significance of watering effects. Quadrats should represent all major EVCs with sampling effort weighted according to EVC extent. The effect of watering is to be determined through comparison with contrasting water regimes at other VMFRP.	Annual for at least 15 years, with continued need to be reviewed thereafter every 3 years	Mallee CMA

ID & Discipline	Performance objective	Phase	Indicator	Monitoring requirement and parameters	Locations	Frequency	Responsibility
		O^		Surveillance monitoring of weed infestation occurrence using a rapid search at specified search areas. Any other observed significant weed infestations should be added to the surveillance program search areas.	Rapid surveillance at high risk locations as specified in Pest Plant and Animal Management Plan. Report on effectiveness of pest plant control through surveillance program.	Annual for at least 15 years, with continued need to be reviewed thereafter every 3 years	Parks Victoria
M TE4 Terrestrial ecology	To assess the change in damage to habitat from rabbits, goats, pigs and kangaroos as a result of project environmental watering	O^	Pest animal damage and/or abundance not to exceed thresholds identified in PPAMP for rabbits, goats, pigs and kangaroo within and adjacent to the Maximum Inundation Area as result of environmental watering.	Monitor old/new rabbit and pig damage and abundance of rabbit, goat and kangaroo populations. Methods to be detailed in the Pest Plants and Animals Monitoring and Management Plan (EDS E3).	Pest animal damage and/or abundance will be measured within and adjacent to the MIA. Sampling locations will be defined in the Pest Plants and Animals Monitoring and Management Plan (EDS E3). Sufficient sampling will be undertaken to detect the significance of watering effects. The significance of watering effects will be determined by comparison to control areas outside the MIA.	Frequency to be determined for each pest species in PPAMP, for at least 15 years, with continued need to be reviewed after every 3 years	Parks Victoria
M TE5 Terrestrial ecology	To assess the change in the abundance of cats and foxes as a result of project environmental watering	O^	Fox and cat abundance not to exceed thresholds identified in PPAMP within and adjacent to the maximum area of inundation as a result of environmental watering.	Monitor fox and cat populations. Methods to be detailed in the Pest Plants and Animals Monitoring and Management Plan (EDS E3).	Cat and fox abundance will be measured within and adjacent to the MIA. Sampling locations will be defined in the Pest Plants and Animals Monitoring and Management Plan (EDS E3). Sufficient sampling will be undertaken to detect the significance of watering effects. The significance of watering effects will be determined by comparison to control areas outside the MIA.	Frequency to be determined in PPAMP, for at least 15 years, with continued need to be reviewed after every 3 years.	Parks Victoria
M TAE1 Terrestrial and aquatic	To determine the level, duration and extent of the inundation during each event	O*	Inundation of water management areas as described in the EES Project description. This includes: Belsar: WMA1 – 1540ha, WMA2 – 526ha, WMA3 – 36ha, WMA4 – 272ha Hattah: Chalka North – 420ha, Lake Boolca – 710ha	Monitor the: - level - duration; and - extent of managed environmental watering events.	Within Maximum Inundation Area	At an appropriate interval during the event. CMA/PV to advise on frequency, consistent with current practices.	Mallee CMA
M TAE2 Terrestrial and aquatic	To assess improvement in water-dependent vegetation in wetlands and floodplain lakes in response to environmental watering	O*	For wet wetlands: <ul style="list-style-type: none"> characteristic PFG species richness meets target* characteristic PFG cover meets target * For dry wetlands, <ul style="list-style-type: none"> characteristic PFG species richness meets target* characteristic PFG cover meets target* 	10x10 m wetland vegetation quadrats to document species occurrence (including PFG) and cover-abundance. Saplings also counted. Number of individuals of each threatened flora also counted/estimated.	Sufficient quadrats must be sampled to evaluate the significance of watering effects. The number of quadrats should be weighted according to the extent of EVCs. The effect of watering is to be determined through comparison with contrasting water regimes at other VMFRP sites.	Annual for at least 15 years, with continued need to be reviewed thereafter every 3 years.	Mallee CMA

ID & Discipline	Performance objective	Phase	Indicator	Monitoring requirement and parameters	Locations	Frequency	Responsibility
			<i>*Targets to be defined in the Environmental Water Management Plan</i>				
M TE6 Terrestrial ecology	To assess improvement in the understorey of River Red-gum woodland, Black Box woodland and Lignum shrubland in response to environmental watering	O*	<ul style="list-style-type: none"> For River Red Gum / Black Box / Lignum EWRC sites, characteristic PFG species richness meets target* For River Red Gum / Black Box / Lignum EWRC sites, characteristic PFG species cover meets target* <i>*Targets to be defined in the Environmental Water Management Plan</i>	10x10 m vegetation quadrats to document species occurrence (including PFGs) and cover-abundance. Saplings counted also.	Sufficient quadrats must be sampled to evaluate the significance of watering effects. The number of quadrats should be weighted according to the extent of EVCs. The effect of watering is to be determined through comparison with contrasting water regimes at other VMFRP sites.	Annual for at least 15 years, with continued need to be reviewed thereafter every 3 years	Mallee CMA
		O*	For River Red Gum / Black Box / Lignum EWRC sites stand condition score meets target defined in the Environmental Water Management Plan	Stand condition monitored via remote sensing technique and model verified / calibrated by MER stand condition method.	Entire site.	Modelled stand condition to be reported every five years at year 0, 5, 10 and 15. Ongoing field plot data to be collected to validate and verify model as required.	Mallee CMA
M TE7 Terrestrial ecology	To assess the response of native fauna species over time to environmental watering.	O*	<p>Species richness, relative abundance, recruitment, presence of threatened/notable species is meets targets* for:</p> <ul style="list-style-type: none"> Wetland birds Woodland birds <p>Species richness, relative abundance, recruitment, extent of distribution, presence of threatened/notable species meets targets* for frogs</p> <i>* Targets to be defined in the Environmental Water Management Plan</i>	<ul style="list-style-type: none"> Wetland birds – complete counts at wetlands, monitoring of breeding events (multiple counts required) Woodland birds – 20 min 2 ha counts (multiple counts required) Frogs – acoustic detectors with sufficient sampling to detect a significant effect of watering 	<p>Wetland birds, woodland birds and frogs at sites established through the MER within the MIA</p> <p>The effect of watering is to be determined through comparison with contrasting water regimes at other VMFRP sites.</p>	<ul style="list-style-type: none"> Wetland birds – during and after every managed inundation event (up to 6 trips). Woodland birds – twice annually (spring, autumn) Frogs – acoustic detectors during and after each watering event <p>Monitoring to occur for at least 15 years, with continued need to be reviewed thereafter every 3 years.</p>	Mallee CMA
M TE8 Terrestrial ecology (Belsar)	To assess the response of fauna species over time to environmental watering (Belsar)	O*	<p>Species richness, relative abundance, recruitment, presence of threatened/notable species meets targets* for ground dwelling fauna</p> <i>*Targets to be defined in the Environmental Water Management Plan</i>	Ground dwelling fauna – pitfall and funnel traps, cameras (5 days/nights minimum, cameras 2 weeks minimum).	Ground dwelling fauna – within the Maximum Inundation Area and adjacent woodland. Reference sites to be selected to identify ground dwelling fauna (which may overlap with the sites for other fauna species).	Spring/summer, every fifth year, of up to at least 15 years, to determine broader landscape-scale responses.	Mallee CMA
M TE9 Terrestrial ecology	River Red-gum and Black Box condition does not deteriorate over time in areas susceptible to rising saline groundwater in response to environmental watering	O^	<ul style="list-style-type: none"> For River Red Gum trees, crown extent and/or stand condition score is the same or greater than baseline.* For Black Box trees, crown extent and/or stand condition score is the same or greater than baseline.* 	<p>Tree condition assessment, including crown condition score either a) based on TLM method or b) crown condition index (Crome 2004).</p> <p><i>Note: location, frequency of sampling and specific parameters may be adjusted by the relevant water manager in response</i></p>	Mapped locations as 'high/medium risk' in EES Central Terrestrial Ecology Report: Appendix UV – Survey locations for risk of hypersaline groundwater impacting Blackbox and River Red Gum.	Every three years for at least 15 years, with continued need to be reviewed thereafter every 3 years.	Mallee CMA

ID & Discipline	Performance objective	Phase	Indicator	Monitoring requirement and parameters	Locations	Frequency	Responsibility
			<i>*Baseline quadrat data collected prior to commencement of environmental watering.</i>	<i>to adaptive management and existing programs.</i>			
M TE10 Terrestrial ecology (Hattah only)	To assess the impacts of the 2022 flood event on Mildura Butterfly (<i>Ogyris subterrestris subterrestris</i>)	C^	Presence of adults and oviposition sites	Survey of recorded locations of oviposition sites	Public land within the Maximum Inundation Area at Hattah Lakes North	Once prior to operation at Hattah Lakes North	Suitably qualified or experienced ecologist or zoologist
M TE11 Terrestrial ecology (Hattah only)	To assess the response of Mildura Butterfly (<i>Ogyris subterrestris subterrestris</i>) over time to environmental watering	O^	Presence of adults and oviposition sites	Survey of recorded locations of oviposition sites	Public land within the Maximum Inundation Area at Hattah Lakes North	Operation: every 5 years for at least 15 years, with continued need to be reviewed thereafter every 5 years.	Mallee CMA
M ACH1 Aboriginal Cultural Heritage	Identify potential for adverse effects to Ancestral Remains and earth mounds resulting from exceedance of population thresholds of pest and overabundant native species as a result of VMFRP environmental watering	O	N/A – determining baseline condition to inform contingency measures, if required.	Baseline assessment to be undertaken at Ancestral Remains and earth mound sites prior to environmental watering events.	The locations selected for baseline assessment will be determined in the EWMP (or similar mechanism) process using a risk-based approach that considers locations of registered Ancestral Remains and earth mound sites and Ancestral Remains predictive mapping results overlaid with areas of proposed inundation. In addition to these sites control sites will be selected in comparable locations where environmental watering is not likely to have an effect. Exact locations to be identified by the Land Manager in consultation with the Traditional Owners and interested parties (as applicable).	Baseline assessment prior to each environmental watering event at applicable locations. Subsequent monitoring events to be undertaken as per risk-based approach outlined in EDS ACH3.	Land manager Baseline assessment to be undertaken by a person appropriately qualified in archaeology or heritage management in collaboration with the Registered Aboriginal Parties/Traditional Owners and Interested Parties (as applicable).
M ACH2 Aboriginal Cultural Heritage	Identify potential adverse effects to specific Aboriginal cultural heritage values (Ancestral Remains) as a result of increased visitation as a result of VMFRP environmental watering	O	N/A – determining baseline condition to inform contingency measures, if required.	Baseline assessment to be undertaken at Ancestral Remains sites prior to environmental watering events.	The selection of locations for baseline assessment will be determined in the EWMP (or similar mechanism) process using a risk-based approach that considers locations of registered Ancestral Remains and predictive mapping results overlaid with areas of proposed inundation. In addition to these sites control sites will be selected in comparable locations where environmental watering is not likely to have an effect. Exact locations to be identified by the Land Manager in consultation	Baseline assessment prior to each environmental watering event at applicable locations. Subsequent monitoring events to be undertaken as per risk-based approach outlined in EDS ACH3.	Land manager The baseline assessment must be implemented by a person appropriately qualified in archaeology or heritage management in collaboration with the Registered Aboriginal Parties/Traditional Owners and

ID & Discipline	Performance objective	Phase	Indicator	Monitoring requirement and parameters	Locations	Frequency	Responsibility
					with the Registered Aboriginal Parties/Traditional Owners and interested parties (as applicable).		Interested Parties (as applicable).
M ACH3 Aboriginal Cultural Heritage	Identify potential for adverse effects to Ancestral Remains and earth mounds as a result of exceedance of population thresholds of pest and overabundant native species as a result of VMFRP environmental watering	O	If monitoring (under EDS E3) identifies an exceedance of population thresholds for pest or overabundant native species, inspections of Ancestral Remains and earth mound sites to be undertaken.	This will include inspection of locations to identify effectiveness of implemented management measures (if applicable) and any change in site condition as a result of pest or overabundant native species activity in response to VMFRP environmental watering. Reporting will include a review of the causes of any change and provide recommendations for management if justified.	As necessary at sites assessed under the baseline monitoring –	Monitoring would be required at for least one event, with the number of monitoring events to be agreed with Registered Aboriginal Parties/Traditional Owners and interested parties (as applicable) and documented in EWMP (or similar mechanism).	Land manager The monitoring program must be implemented by a person appropriately qualified in archaeology or heritage management in collaboration with the Registered Aboriginal Parties/Traditional Owners and Interested Parties (as applicable).
M ACH4 Aboriginal Cultural Heritage	Identify potential for adverse effects to specific Aboriginal cultural heritage values (Ancestral Remains) as a result of increased tourism as a result of environmental watering	O	If land managers identify locations that have been accessed and shouldn't have been (due to the restrictions), additional monitoring under this contingency measure will apply.	This monitoring will include inspection of areas potentially containing Ancestral Remains to determine if there has been unauthorised access to identify effectiveness of implemented management measures (if applicable) and report on changes in site condition directly related to the watering program. Reporting will include a review of the causes of any change and provide recommendations for management if justified.	Where necessary at sites assessed under the baseline monitoring,	Monitoring would be required at for least one event, with the number of monitoring events to be agreed with Registered Aboriginal Parties/Traditional Owners and interested parties (as applicable) and documented in EWMP (or similar mechanism).	Land manager The monitoring program must be implemented by a person appropriately qualified in archaeology or heritage management in collaboration with the Registered Aboriginal Parties/Traditional Owners and Interested Parties (as applicable).
AI ACH1 Aboriginal Cultural Heritage	Verify compliance with the CHMP	C	Compliance check with EDS requirements	Monitoring and compliance in accordance with the CHMP No. 16898 and No. 14330 as approved under the <i>Aboriginal Heritage Act 2006</i> .	As required in accordance with CHMP No. 16898 and No. 14330.	As required in accordance with CHMP No. 16898 and No. 14330. Compliance audits to be undertaken as per the program detailed in the EMF.	Construction contractor
AI ACH2 Aboriginal Cultural Heritage	Verify compliance with EDS GS2 and SW1	C	Compliance check with EDS requirements	Compliance with GS2 and SW1	Within the Construction Footprint	Compliance audits to be undertaken as per the program detailed in the EMF.	Construction contractor

ID & Discipline	Performance objective	Phase	Indicator	Monitoring requirement and parameters	Locations	Frequency	Responsibility
AI ACH3 Aboriginal Cultural Heritage	Verify compliance with EDS E3, GS3, SW2 and SW3	O	Compliance check with EDS requirements	Compliance with E3, GS3, SW2 and SW3	Within the Maximum Area of Inundation	Compliance audits to be undertaken as per the program detailed in the EMF.	Mallee CMA during operation
AI AQ1 Air quality	Minimise dust during construction	C	Dust plumes from construction activities in proximity to human sensitive receptors	Environmental inspections as detailed in the CEMP which include dust observations.	At all active construction sites	Weekly during environmental inspections	Construction contractor
AI AQ2 Air quality	Minimise diesel emissions from pumping infrastructure	O	Pumping infrastructure involving diesel plant have not been serviced prior to installation and/or are not maintained to manufacturer specifications	Audit to check compliance with EDS AQ3 which requires all pumping infrastructure station(s) involving diesel plant to be serviced prior to installation and maintained to manufacturer specifications	Pumping infrastructure locations	Compliance audits to be undertaken as per the program detailed in the EMF.	LMW/GMW
AI AG1 Agriculture	Confirm implementation and effectiveness of measures implemented in EDS AG1 and assess the need for additional measures to minimise the impact of Biosecurity issues on agricultural land and farming operations during construction	C	Weed and pest control would be managed in accordance with the requirements of the CALP Act. It will be the responsibility of the construction contractor to manage waste (e.g. food scraps) and ensure the cleaning of vehicles and equipment.	Construction contractor: Weed and pest control mitigation and management strategies would be documented in the CEMP and implemented. This will include (but not limited to): maintenance of visitor registers, cleaning of plant and equipment prior to entering site, registers for import/export of material from site and site signage.	Construction footprint	Construction contractor: weekly environmental inspections.	Construction contractor
AI GSC1 Geology soils and contamination	Confirm implementation and effectiveness of management of use of chemicals, fuels and materials during construction and assess need for additional measures	C	Visual indicators of spills or leaks Increase in concentrations of contaminants of concern between baseline and post-construction conditions. Contaminants of concern would be based on the materials used or stored in a specific location, to be determined in the CEMP.	During construction: Inspections of spill controls and bundings, plant and equipment	Lay down areas and compounds Other areas where soil or materials are handled, chemicals stored or used	Weekly inspections during construction	Construction contractor
AI GSC2 Geology soils and contamination	Confirm implementation and effectiveness of management of dispersive/sodic/unstable soils during construction as outlined in the CEMP and ESCP and assess the need for additional measures.	C	IECA Best Practice Erosion and Sediment Control 2008	Inspections of construction work areas for indications of erosion or sediment runoff and effective application of engineering controls	Areas of excavation and soil disturbance during construction as detailed in the Erosion and Sediment Control Plan.	Construction: weekly or after a rainfall event.	Construction contractor
AI GSC3 Geology soils and contamination	Confirm implementation and effectiveness of management of soil related wastes during construction and assess need for additional measures	C	Compliance with the waste management hierarchy and the General Environmental Duties under the <i>Environment Protection Act 2017</i> Compliance with EPA Publications 1827.2, 1828.2 and 1799.2 Classification of waste for off-site disposal or reuse against thresholds detailed in EPA Publication 1828.2	Construction: Check compliance with EDS CM1a. During construction, record and audit: i. type and volume of soil related wastes generated and compliance with waste management procedures and consider waste elimination/reduction and opportunities for the reuse and recycling of waste. ii. soil tracking system including trucking	All locations where waste generated (to be defined the CEMP)	Records kept during construction. Compliance audits to be undertaken as per the program detailed in the EMF.	Construction contractor

ID & Discipline	Performance objective	Phase	Indicator	Monitoring requirement and parameters	Locations	Frequency	Responsibility
				and destination tracking and sampling results.			
AI GSC4 Geology soils and contamination	Confirm implementation and effectiveness of management of use of chemicals, fuels and materials during operation and assess need for additional measures	O	Visual indicators of spills or leaks	Inspections of spill controls and bundings, plant and equipment where used. If spills observed, undertake appropriate soil sampling as detailed/required in the OEMP.	Operation: regulators and pumps where fuel or hazardous materials are stored or used	Operation: weekly during pump operation. Soil sampling as required to address spills.	LMW/GW and Mallee CMA
AI GSC5 Geology soils and contamination	Confirm implementation and effectiveness of management of soil related wastes during operation and assess need for additional measures	O	Compliance with the waste management hierarchy and the General Environmental Duty under the <i>Environment Protection Act 2017</i> Compliance with EPA Publications 1827.2, 1828.2 and 1799.2 Classification of waste of inorganics, anions, organics and pesticides against off-site disposal thresholds and other requirements detailed in EPA Publication 1828.2 Waste disposal categories – characteristics and thresholds (2021).	During operation, record and audit: i. type and volume of soil related wastes generated and compliance with waste management procedures and consider waste elimination/reduction and opportunities for the reuse and recycling of waste. ii. soil tracking system including trucking and destination tracking and sampling results.	All locations where waste generated (to be defined the Operational Environment Plan)	Records kept during construction and operation. Compliance audits to be undertaken as per the program detailed in the EMF.	LMW/GW and Mallee CMA
AI GSC5 Geology soils and contamination	Confirm implementation and effectiveness of management of soil related wastes during operation and assess need for additional measures	O	Compliance with the waste management hierarchy and the General Environmental Duty under the <i>Environment Protection Act 2017</i> Compliance with EPA Publications 1827.2, 1828.2 and 1799.2 Classification of waste of inorganics, anions, organics and pesticides against off-site disposal thresholds and other requirements detailed in EPA Publication 1828.2 Waste disposal categories – characteristics and thresholds (2021).	During operation, record and audit: i. type and volume of soil related wastes generated and compliance with waste management procedures and consider waste elimination/reduction and opportunities for the reuse and recycling of waste. ii. soil tracking system including trucking and destination tracking and sampling results.	All locations where waste generated (to be defined the Operational Environment Plan)	Records kept during construction and operation. Compliance audits to be undertaken as per the program detailed in the EMF.	LMW/GMW and Mallee CMA
AI HH1 Historic heritage (Hattah only)	Minimise risk of harm to historical heritage values at Crawford's Home Station historical site	C	Establishment of physical barrier protection and/or exclusion zones	Checks to confirm that appropriate barrier protection or exclusion zones (as detailed in the CEMP) have been established prior to construction commencing	Crawford's Home Station historical site (VHI tbc) and Kulkynne Drop Log Stockyards	Prior to construction commencing and during weekly environmental inspections while work is being undertaken in proximity to these sites.	Construction contractor
AI HH2 Historic heritage	Verify compliance with EDS HH1.	C	Compliance with <i>Heritage Act 2017</i> for discovery of archaeological sites	Check compliance with EDS HH1 and specifically requirements for implementation of an unexpected archaeological finds protocol during construction.	Construction Footprint.	Compliance audits to be undertaken as per the program detailed in the EMF.	Construction contractor during construction
AI HH3 Historic heritage	Verify compliance with EDS HH2.	O	Compliance with <i>Heritage Act 2017</i> for discovery of archaeological sites	Check compliance with EDS HH2 and specifically requirements for implementation of an unexpected archaeological finds protocol during operation.	Project area	Compliance audits to be undertaken as per the program detailed in the EMF.	Mallee CMA (in consultation with the land managers/owners) during operation

ID & Discipline	Performance objective	Phase	Indicator	Monitoring requirement and parameters	Locations	Frequency	Responsibility
AI NV1 Noise and vibration	Assess timeliness and actions taken in response to noise and vibration complaints.	C	Noise or vibration complaints from sensitive receivers (e.g. residents) located near the Construction Footprint are received.	Reviews and audits of the implementation of EDS SB1 and EDS NV1.	Project area	Response to complaints or feedback as these are received in accordance with the Communications and Stakeholder Engagement Plan. Compliance audits to be undertaken as per the program detailed in the EMF.	Construction contractor
AI NV2 Noise and vibration	All pumping infrastructure to be serviced prior to installation and maintained to manufacturer specifications	O	Pumping infrastructure has not been serviced prior to installation and/or are not maintained to manufacturer specifications	A register is kept outlining the details of maintenance associated service information. If this has not occurred then pump infrastructure to be serviced as soon as reasonably practicable to allow ongoing performance evaluation to be undertaken in line with the GED.	Pumping infrastructure locations	Compliance audits to be undertaken as per the program detailed in the EMF.	Mallee CMA or LMW/GMW
AI SB1 Social and business	Minimise the impact of the project on businesses and the community	C & O	Complaints, feedback and enquiries	Review of the implementation of EDS SB1 and SB3: <ul style="list-style-type: none">The nature of complaints, feedback and enquiries receivedTime taken to close out complaints and enquiriesWhether additional actions can be taken to address persistent complaint typesWhere there are opportunities identified to better communicate with or engage stakeholders.Communication processes to identify whether there are opportunities to improve.	All	Construction: as specified in the Community and Stakeholder Engagement Management Plan. Operation: in accordance with CMA and land managers processes and procedures and Victoria's Catchment Management Authorities Community Engagement and Partnership Framework and Toolkit	Construction: LMW Operation: Mallee CMA, Land managers (DELWP and Parks Victoria), LMW, GMW
AI TE1 Terrestrial ecology	To confirm that construction has been undertaken in accordance with EDS E1 and no unapproved vegetation is removed	C	Confirmation that no-go zones have been delineated and maintained around significant ecological values to be retained including populations of EPBC Act-listed flora (<i>Lepidium monoplacoides</i> Winged Peppergrass) at Belsar-Yungera), FFG Act listed flora and Large or Very Large Trees on the edge of the Construction Footprint that are proposed to be retained during construction.	The performance of EDSs would be evaluated by development and implementation of an auditing program (as detailed in the Native Flora and Fauna Construction Management Plan (EDS E2)) that would: <ul style="list-style-type: none">Verify that vegetation removal is consistent with the extent of vegetation approved for removal at each site.Verify that no-go zones have been delineated and maintained to protect significant ecological values as listed in the indicator column.	Construction footprint	Weekly during environmental inspections	Construction contractor
AI TE2 Terrestrial ecology	To avoid and minimise increased weed cover during construction	C	Weed species of management concern do not increase in abundance within the construction footprint. This includes Weeds of National Significance, weeds	Pre-construction inspections of construction sites and control of high	Construction footprint	Inspections of weeds undertaken weekly during environmental inspections	Construction contractor

ID & Discipline	Performance objective	Phase	Indicator	Monitoring requirement and parameters	Locations	Frequency	Responsibility
			listed under the CaLP 1994 and those listed as FFG Act threatening processes.	threat weeds undertaken a minimum four weeks prior to construction. Biosecurity check/inspections for plant material, seeds and soils containing organic matter in accordance with EDS E2d.			
AI TE3 Terrestrial ecology	To avoid and minimise increased presence of pests during construction	C	Presence of pests (i.e black rats, cats and foxes) does not increase in abundance within the construction footprint - evident through sightings (or motion sensing cameras near food disposal areas) or damage/ disturbance to construction laydown/office areas overnight).	All food to be disposed of in secured/locked bins and regularly cleared offsite. Sightings or damage observed.	Construction footprint, focused on laydown/office areas.	Food waste disposal locations checked during weekly during environmental inspections. Sightings observed.	Construction contractor
AI TT1 Traffic and transport	Verify compliance with EDS TT2 to avoid and minimise impacts on the road network	C	Compliance with the TMP (EDS TT2)	Audit of compliance with EDS TT2 (Traffic Management Plan).	Road networks within project areas including haulage routes as detailed in the Traffic Management Plan	Compliance audits to be undertaken as per the program detailed in the EMF.	Construction contractor
AI TT2 Traffic and transport	Assess impact on pavement condition of public roads.	C	Pavement condition survey	Construction site manager to undertake audits on pavement conditions as detailed in the TMP	Roads and tracks used by construction vehicles for the project including haulage routes (as defined in the Traffic Management Plan).	Prior to, during and at completion of construction as detailed in the Traffic Management Plan	Construction contractor
I GSC1 Geology soils and contamination	Confirm suitability of soil for use	C	EPA Publication 1828.2 Fill material upper limits NEPM 2013 screening criteria relevant for protection of human health (HIL and HSL C – public open space land use) and ecological receptors (EIL and ESL for Areas of Ecological Significance) EPA Publication 655.1 Table 3: Texture based action criteria for classification of acid sulfate soil. Specific parameters to be assessed include heavy metals, pesticides, herbicides, asbestos, hydrocarbons, acid sulfate soils and geotechnical properties.	As required in EDS CM1b, detailed characterisation (sampling) of material that will be imported for use in construction in accordance with the sampling densities identified in EPA Publication IWRG701: Sampling and analysis of waters, wastewaters, soils and wastes and EPA Publication 655.1 Acid sulfate soil and rock or equivalent as updated EPA publications are forthcoming.	Borrow sites and other material source sites (if any).	Characterisation: prior to commencing construction (once off if investigation sufficient)	Construction contractor
I GSC2 Geology soils and contamination	Confirm presence/absence of acid sulfate soils	C	Field screening and quantitative laboratory analysis, for example chromium reducible sulfur to determine levels in accordance with EPA Publication 655.1 Acid sulfate soil	As required by EDS CM2, undertake soil samples at selected locations as identified in the acid sulfate soil management plan (ASMP). The ASMP must outline processes and procedures for identifying, reducing and minimising disturbance and oxidation of acid sulfate soils during construction.	Locations to be identified in the ASMP	To be detailed in the ASMP. Collection of samples prior to construction.	Construction contractor