

Billabong Creek Environmental Water Regulators

State Significant Infrastructure Assessment Report (SSI 50831979)

February 2026





Acknowledgement of Country

The Department of Planning, Housing and Infrastructure acknowledges that it stands on Aboriginal land. We acknowledge the Traditional Custodians of the land and show our respect for Elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

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Preface

This assessment report provides a record of the Department of Planning, Housing and Infrastructure's (the Department) assessment and evaluation of the State significant infrastructure (SSI) application for the Billabong Creek Environmental Water Regulators located in the Murray Darling Basin in south-west NSW, lodged by New South Wales Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW). The report includes:

- an explanation of why the project is considered SSI and who the approval authority is
- an assessment of the project against government policy and statutory requirements, including mandatory considerations
- a demonstration of how matters raised by the community and other stakeholders have been considered
- an explanation of any changes made to the project during the assessment process
- an assessment of the likely environmental, social and economic impacts of the project
- an evaluation which weighs up the likely impacts and benefits of the project, having regard to the proposed mitigations, offsets, community views and expert advice; and provides a view on whether the impacts are on balance, acceptable, and
- a recommendation to the decision-maker, along with the reasons for the recommendation, to assist them in making an informed decision about whether development approval for the project should be granted and any conditions that should be imposed.

Executive Summary

This report details the Department's assessment of the State significant infrastructure application SSI 50831979 for the Billabong Creek Environmental Water Regulators.

This report will be provided to the delegate of the Minister for Planning and Public Spaces (the Minister) for their consideration when deciding whether to approve the carrying out of the SSI.

Project

NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) (the Proponent) proposes to replace two existing weirs on Billabong Creek - Hartwood Weir and Wanganella Weir - with new regulators. The weirs are in the Edward River local government area (LGA) and would be owned and operated by WaterNSW.

The proposed regulators would be remotely operated and incorporate automated layflat gates to allow the operator greater control of water delivery for irrigation, town water supply and the environment. Other project elements include a fishway at each regulator to allow for fish passage, replacing and raising the existing Forest Creek block bank near the proposed Hartwood Regulator, and constructing a Wanganella flood bypass channel near the proposed Wanganella Regulator.

The proposal has a capital investment value of \$83.5 million and is expected to generate 26 construction jobs and one operational job. If approved, construction of the project is proposed to commence in 2026 and take up to 18 months to construct.

Strategic context

The Department considers the development is consistent with the principal aims of key relevant strategies including the Murray-Darling Basin Plan 2012, the draft Murrumbidgee Regional Water Strategy 2022 and the draft Murray Regional Water Strategy 2022.

Statutory context

The project is classified as State significant infrastructure (SSI) under section 5.12 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as it satisfies the criteria under section 2.13(1) of *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP). The proposed development is, by the operation of a State environmental planning policy, permissible without development consent under Part 4 of the Act, and the proposed development is specified

under Schedule 3 of the Planning Systems SEPP. Consequently, the Minister is the approval authority for the project under section 5.19 of the EP&A Act.

Engagement

The Department exhibited the environmental impact statement (EIS) from 1 November 2024 until 28 November 2024. During the exhibition period, the Department received:

- two submissions from the public (both from individuals)
- a submission from the local council, Edward River Council, commenting on the project, and

advice from the following government agencies

- Fisheries within Department of Primary Industries and Regional Development (DPIRD Fisheries)
- Crown Lands within the Department of Planning, Housing and Infrastructure
- State Emergency Services (SES)
- National Parks and Wildlife Services (NPWS) within the NSW Department of Climate Change, Energy, Environment and Water (NSW DCCEEW)
- Water Group (assessments) in NSW DCCEEW
- Heritage NSW in NSW DCCEEW
- (former) Biodiversity, Conservation and Science Group (BCS) in NSW DCCEEW (now Conservation Programs, Heritage and Regulation (CPHR) in NSW DCCEEW)
- NSW Environment Protection Authority (NSW EPA)
- Dams Safety NSW
- Murray-Darling Basin Authority (MDBA)
- Transport for NSW (TfNSW)
- WaterNSW.

Of the two public submissions, one supported the project and one was a comment.

Key concerns raised related to hydrology and the Draft Yanco Creek System Operations Plan, aquatic ecology, terrestrial biodiversity and Aboriginal heritage.

The Proponent submitted a Submissions Report (response to submission) on 10 June 2025 to address the issues raised in submissions and agency advice.

Subsequent to reviewing the submissions report, the Department requested further information from the Proponent on 16 July 2025 to address issues raised by the Department, DCCEE Water Group (assessments), Heritage NSW, DPIRD Fisheries and WaterNSW. The Proponent provided a response to additional information report (RFI report) on 17 September 2025.

Assessment

Hydrology and Water Management

The proposal is located in the Billabong Creek system which has undergone considerable alteration of key hydrological components and processes since European settlement, including the construction of numerous weirs and regulating structures. In the study area for the assessment there is widely variable hydrology due to the influence of rainfall, inflows, evaporation and bulk water demand for irrigation, industry, communities and the environment. The Proponent provided a hydrological assessment which considered the mid and lower reaches of Billabong Creek to the extent of project influence. The Proponent assessed hydrological impacts in relation to:

- weir pools upstream of the regulators
- flow volumes
- seasonality of flow
- flow sizes
- attainment of Environmental Water Requirements (EWRs)
- effective general security allocations
- water availability to meet Water Access Licences
- NSW River Flow Objectives

Generally, the proposal was found to result in a low degree of impact for the hydrological categories listed above and would provide benefits through the increased frequency of EWR attainment.

The Department notes that the EIS was submitted with a draft Yanco Creek Systems Operations Plan (YCSOP). The Department has recommended conditions requiring that the regulators are operated in a manner that is generally consistent with the existing hydrological conditions until YCSOP is approved by the Planning Secretary, or a waiver to this requirement is granted.

Hydrological impacts can be managed through the operation of the regulator gates, and the Department has recommended conditions to ensure that the environmental performance of the regulators is consistent with the EIS.

Aquatic Ecology

The proposal would impact on the aquatic ecology of Billabong Creek during both construction and operation, including positive impacts. Billabong Creek is located within the 'Lower Murray River aquatic ecological community' which is listed as Endangered under the FM Act. The Murray Cod (Vulnerable under the EPBC Act) and Silver Perch (Critically Endangered under the EPBC Act and Vulnerable under the FM Act) are widespread in the middle and lower reaches of Billabong Creek, and subsequently the proposal area is classified 'Type 1 – Highly Sensitive KFH' by DPIRD Fisheries. The Freshwater Catfish is also present in the proposal area and is listed as an Endangered Population in the Murray Darling Basin under the FM Act.

The proposal would have some unavoidable impacts to aquatic ecology; however, these would be offset in consultation with DPIRD Fisheries through a KFH offset strategy and fish passage offsets. The construction of the regulators has the potential to result in adverse impacts to water quality and aquatic ecology; however, these potential impacts would be avoided and mitigated through proponent commitments such that the residual risks are considered low.

The Department has recommended conditions relating to a KFH offset strategy, and erosion and sediment controls to protect aquatic ecology. Modelled results for the attainment of Environmental Water Requirements indicated minimal negative impacts and overall benefits in the environmental health of the system as a result of the project. Through the fishways at the new regulators, the project would also provide for improved fish passage in Billabong Creek.

Terrestrial biodiversity

A Biodiversity Development Assessment Report (BDAR) was prepared to address direct and indirect impacts on biodiversity under the BC Act. The proposal is not a controlled action under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

The Proponent has avoided and minimised impacts where possible; however, the proposal will remove up to 16.29 hectares of native vegetation during construction. Whilst no threatened ecological communities will be impacted, threatened species would be directly impacted and these impacts will be offset using the BAM-C method.

The proposal would impact mapped important habitat for a species at risk of serious and irreversible impacts (SAIL), the Plains Wanderer; however, the Department considers that the proposal would not result in a SAIL.

Aboriginal cultural heritage

The proposal is located on the traditional lands of the Yorta Yorta, Barapa Barapa and Jeithi peoples and the relevant Local Aboriginal Land Council (LALC) is Deniliquin LALC. The Proponent undertook

an Aboriginal Cultural Heritage Assessment (ACHA) of the study area in consultation with Registered Aboriginal Parties (RAPs).

The Proponent has sought to avoid and minimise impacts to Aboriginal Heritage. The proposal would impact 5 sites during construction. These impacts are considered acceptable subject to recommended conditions, including the implementation of an Aboriginal Cultural Heritage Management Plan and ongoing consultation with RAPs.

Conclusion

The Department considers that the Proponent has sought to avoid, mitigate and offset impacts and that the residual impacts of the project are acceptable subject to Proponent commitments and recommended conditions of approval.

The Department's assessment concludes the project would:

- improve the efficiency of water management in Billabong Creek
- provide for the delivery of improved environmental outcomes
- improve fish passage
- provide service for water users
- modernise ageing infrastructure.

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1 Introduction

1.1 The proposal

NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) (the Proponent) proposes to replace Hartwood Weir and Wanganella Weir on Billabong Creek with new water regulator structures. The existing weirs were built in the early 20th century, are in poor condition and prevent the movement of fish through the creek. The proposed regulators would be remotely operated and incorporate automated layflat gates to allow the operator greater and more efficient control of water delivery for irrigation, town water supply and the environment.

Other project elements include a fishway at each regulator to allow for fish passage, replacing and raising the existing Forest Creek block bank near the proposed Hartwood Regulator, and constructing a flood bypass channel near the proposed Wanganella Regulator.

The proposed regulators would be owned and operated by WaterNSW.

1.2 Project location

The Yanco Creek System links the Murrumbidgee and Murray Rivers through a complex of interconnected waterways, including Yanco, Colombo, Billabong, Forest, and Picaninny Creeks. It primarily receives regulated floods from the Murrumbidgee River at Narrandera and unregulated floods from Billabong Creek. The System consists of approximately 800 kilometres of waterways stretching 250 kilometres from the Murrumbidgee River at the Yanco Weir to its confluence with the Edward River at Moulamein. The Yanco Creek System's flow is highly modified and there are several significant wetlands within the system, including Wanganella Swamp and Rhyola Swamp.

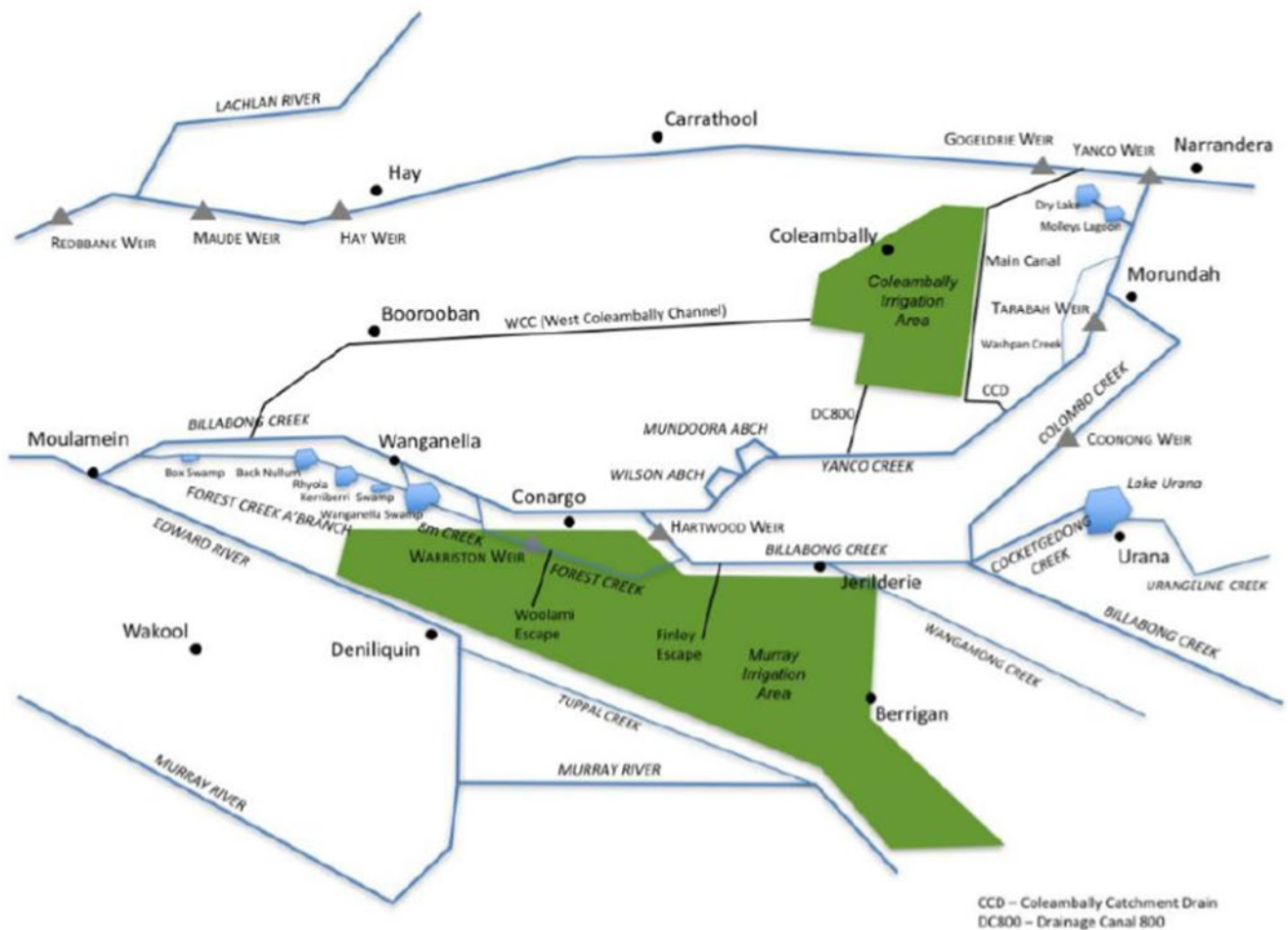


Figure 1 | Schematic of the Yanco Creek System (Source: EIS)

Billabong Creek can be broadly divided into three reaches on the basis of hydrology, ecology and geomorphology. The proposed regulators are located within the mid (Hartwood) and lower (Wanganella) sections of Billabong Creek near the existing Hartwood and Wanganella Weirs. The sites are in the Edward Rivers local government area (LGA) and within the Riverina Murray region of NSW (see **Figure 2**, **Figure 3** and **Figure 4**). The closest regional centre is Deniliquin. Nearby local villages include Wanganella (one kilometre north of the proposed Wanganella Regulator) and Conargo (10 kilometres west of the proposed Hartwood Regulator).

Land uses in the vicinity of the proposed Wanganella Regulator include dryland and irrigated cropping and grazing, recreation (Wanganella Recreation Reserve), the Wanganella landfill and Wanganella Cemetery.

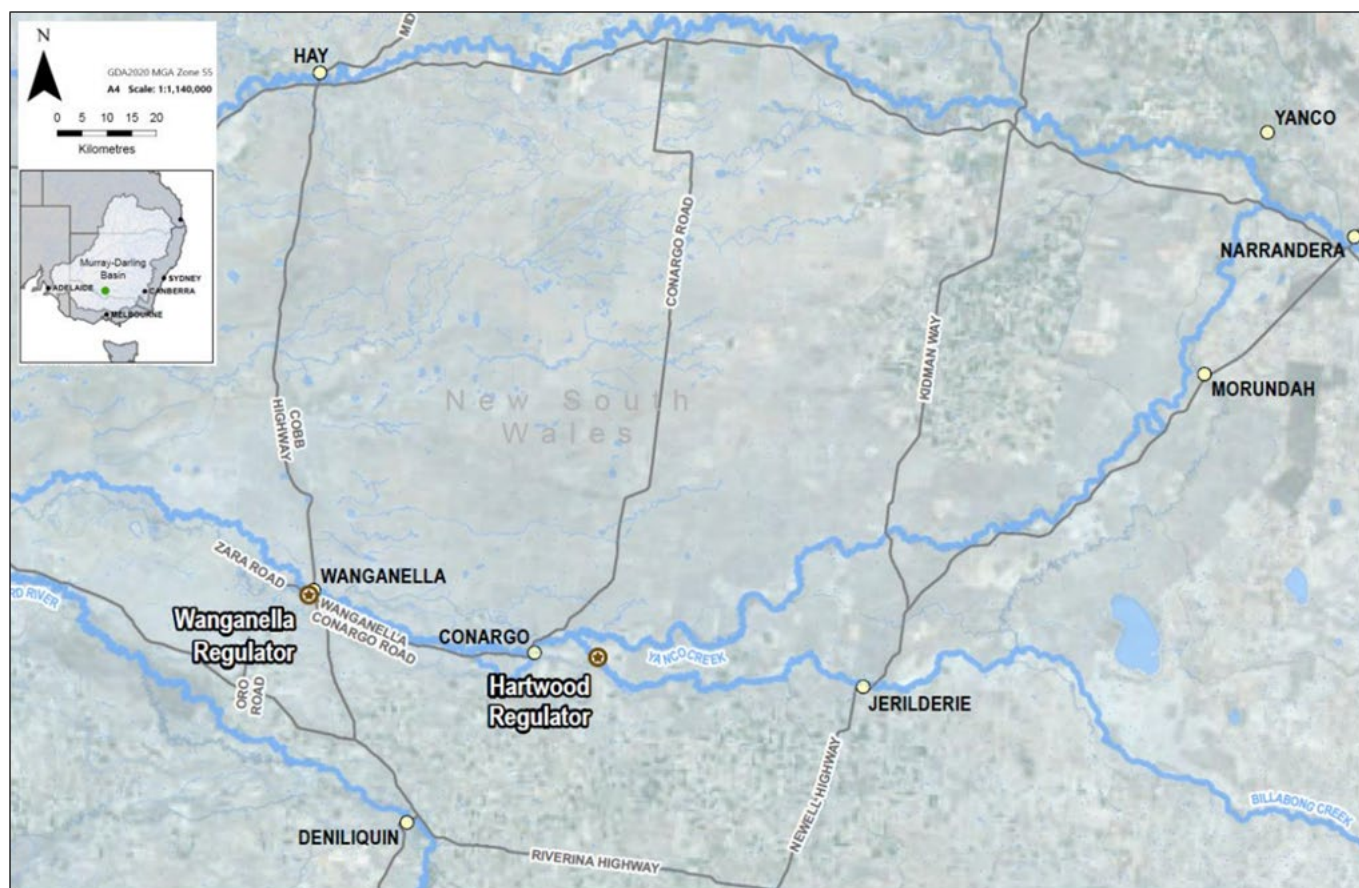


Figure 2 | Regional context map (Source: EIS)

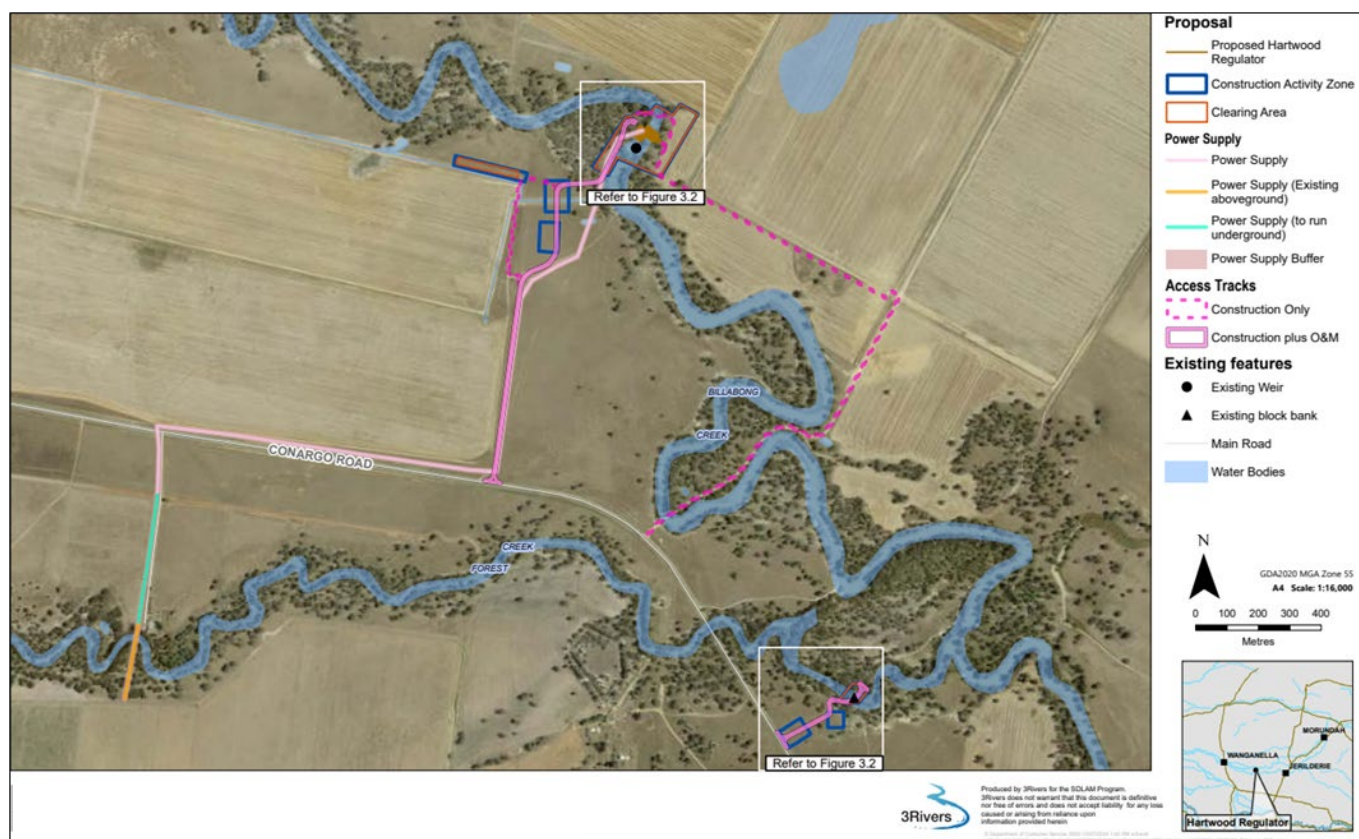


Figure 3 | Local context map – Hartwood Regulator (Source: EIS)

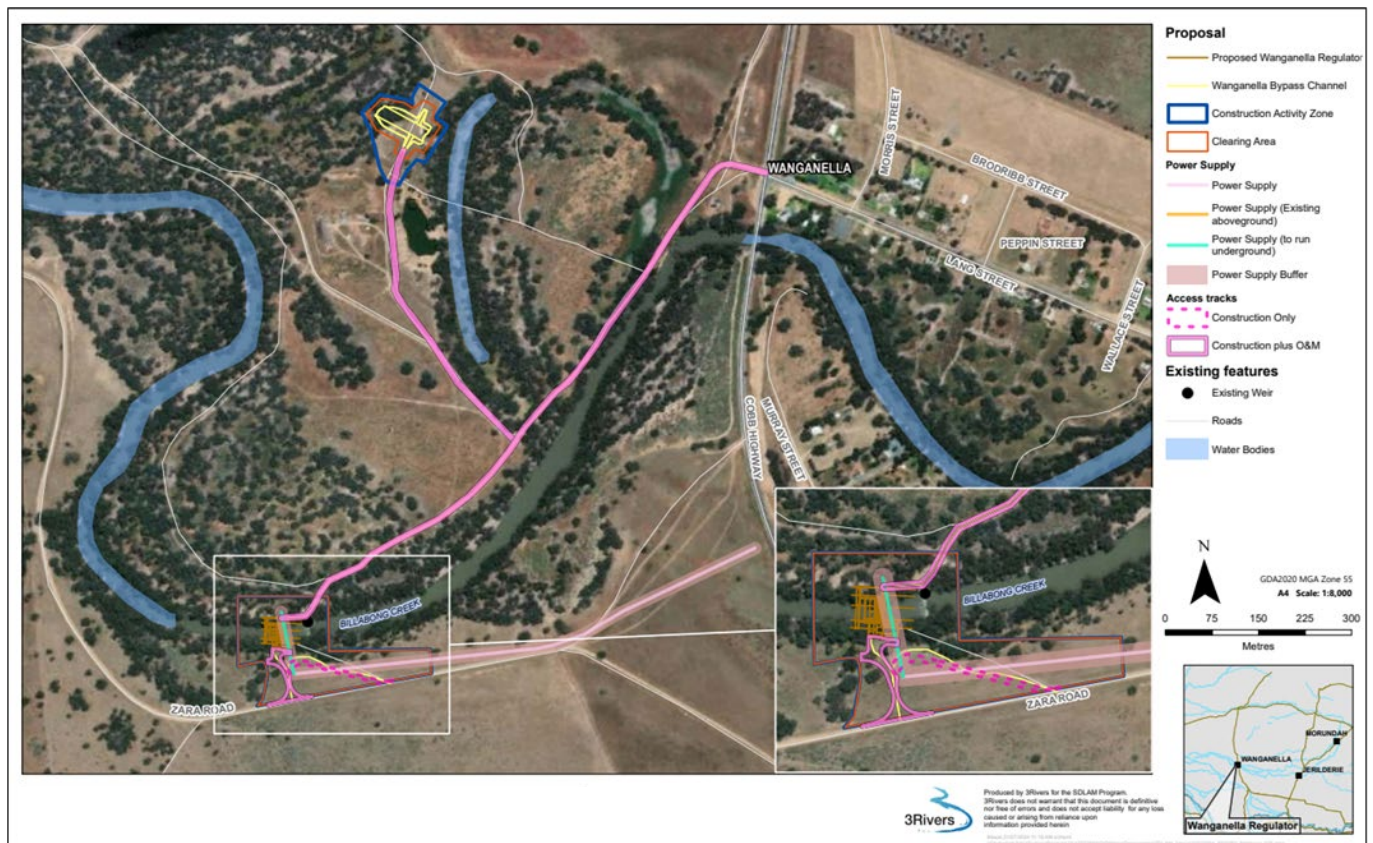


Figure 4 | Local context map – Wanganella Regulator (Source: EIS)

1.3 Project background

The existing Hartwood and Wanganella Weirs were built along Billabong Creek in the early 20th century to regulate water flow diverted from the Murrumbidgee River at Yanco Weir (see **Figure 5** and **Figure 6**).



Figure 5 | Existing Hartwood Weir (Source: EIS)



Figure 6 | Existing Wanganella Weir (Source: EIS)

The Murray-Darling Basin Authority (MDBA) has developed the Murray-Darling Basin Plan (the Basin Plan) to improve management of the Basin's water resources. The Basin Plan sets limits on the amount of water that can be taken from the Basin, known as sustainable diversion limits (SDLs), to ensure adequate water in the Basin for environmental flows. In 2017, it was estimated that only 77% of the target amount of surface water to be secured for environmental flows was being achieved. To offset this gap, the MDBA proposed adjustments to SDLs on the basis that Sustainable Diversion Limit Adjustment Mechanism (SDLAM) supply measures are implemented.

In 2017, the Australian, New South Wales, Victorian and South Australian governments agreed to a package of 36 SDLAM projects in the southern Basin, of which 21 are in NSW. The NSW Government identified SDLAM projects are intended to be completed for December 2026. The Yanco Creek Modernisation Project, which this proposal is part of, is among them.

1.4 Related projects and works

1.4.1 Yanco Creek Modernisation Project

The Yanco Creek Modernisation Project involves the modernisation of infrastructure to deliver water more efficiently and minimise water losses within the Yanco Creek system – including Yanco, Billabong, Colombo and Forest Creeks. The project includes:

- new regulators and access culverts to allow more efficient delivery of environmental water into the Forest Creek system including Wanganella Swamp
- two new Billabong Creek regulators to replace ageing fixed crest weirs (this proposal)
- a new Wilsons Anabranche Offtake regulator
- a new regulator to return unplanned flows in Forest Creek downstream of Warriston Weir back to Billabong Creek via Piccaninny Creek
- four new hydrometric measurement stations to improve flow measurement at strategic locations across the Yanco Creek system
- new environmental flow provisions for the Yanco Creek system
- new operating rules for the delivery of water from irrigation escapes into the Yanco Creek system, and
- improved use of technology to allow new infrastructure to be managed efficiently.

2 Project

2.1 Project overview

The key aspects of the project are provided in detail in the Project Description chapter of the EIS and are outlined in **Table 1**.

Table 1 | Key aspects of the project

Aspect	Description
Project area	An approximate 21 hectares (ha) construction footprint, of which 6 ha is for Wanganella regulator (including the Wanganella bypass channel), and 15 ha is for Hartwood regulator (including the Forest Creek block bank).
Physical layout and design	Key structural and physical features include: • a regulator on Billabong Creek near Wanganella – Wanganella Regulator • a regulator on Billabong Creek east of Conargo – Hartwood Regulator • rock beaching approximately three metres upstream and downstream of the regulators to mitigate erosion • flood bypass channel north of the Wanganella Regulator • borrow pit to provide material for the construction of Hartwood Regulator and Forest Creek block bank • replacement of block bank on Forest Creek • on-site control house containing monitoring and recording equipment, and • maintenance pads, access and turnaround areas adjacent to the structures.
Uses and activities	• The two new regulators would be fully automated and remotely operated. • Hartwood Regulator would primarily be used to maintain a weir pool height sufficient to deliver normal regulated flow requirements (including managed environmental flows) at the Forest Creek offtake. • Wanganella Regulator would primarily be used to create a pumping pool for Wanganella's town water supply, one irrigation pump and to provide re-regulation capacity for flows in Billabong Creek. • The Wanganella Flood Bypass would be used to ensure works do not result in increased flooding of Wanganella village.

Aspect	Description
	- The Forest Creek block bank would continue to be used to control flows into Forest Creek from Billabong Creek. - The general operating principles for the Regulators are listed in Table 2.

2.2 Physical layout and design

2.2.1 Regulator Structures

The two regulators would be similarly designed and comprise a concrete base and piers and abutments. The piers would be fitted with bulkhead slots containing automated layflat gates. The Hartwood Regulator would have a height of 2.74m between the concrete crest and the upstream creek bed. The Wanganella Regulator would have a height of 1.85m between the concrete crest and the upstream creek bed. An indicative illustration of the proposed regulator design is shown in **Figure 7**. The proposed layout of the regulator structures is shown in **Figure 8** and **Figure 9**.



Figure 7 | Indicative regulator design (Source: EIS)



Figure 8 | Indicative Hartwood Regulator layout (Source: EIS)



Figure 9 | Indicative Wanganella Regulator layout (Source: EIS)

2.2.2 Layflat gates

Automated layflat gates would be placed across the crest of the regulator structures. The gates would be remotely controllable to measure and regulate the water flow rate and weir pool level at each regulator. Downstream fish passage would be made possible through the provision of a fish plunge pool and stilling basin downstream of the layflat gates.

Hartwood Regulator would have five gates, each two metres wide, and approximately 2.4 metres in height. Wanganella Regulator would have four, two-metre-wide gates, each approximately 3.34 metres in height. An indicative cross section of the layflat gates is shown in **Figure 10**.

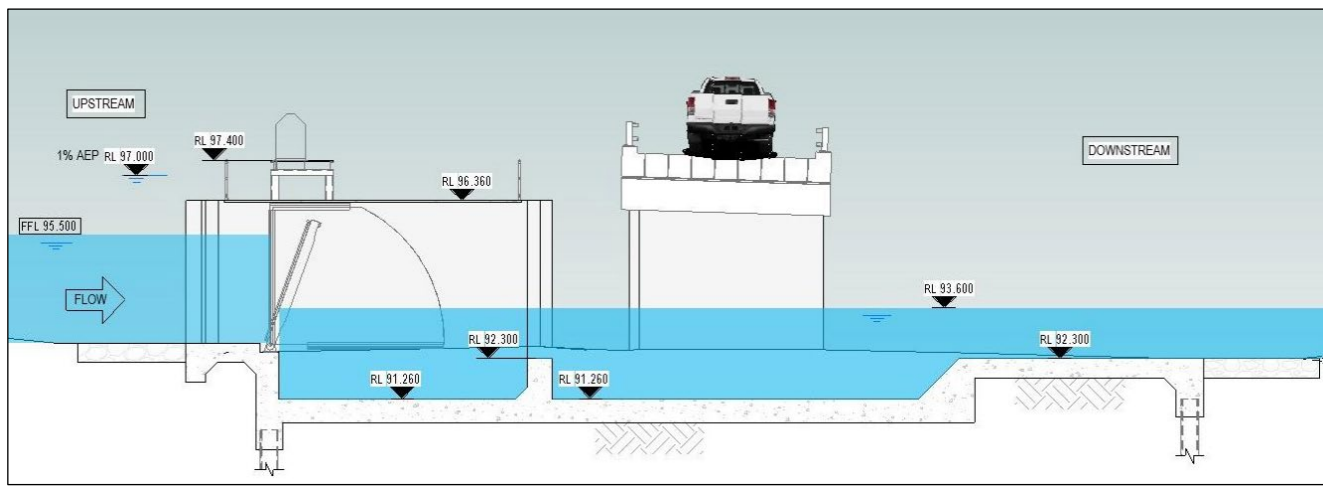


Figure 10 | Indicative horizontal cross section of a regulator showing the action of a regulator gate (Source: EIS)

2.2.3 Fishways

Each regulator would have a fishway installed adjacent to the layflat gates of the regulator to enable upstream fish movement for fish sized between three and 100 cm long. The fishways would be low turbulence keyhole type vertical slot fishways and would contain automated sidewinder gates to enable upstream fish passage in variable headwater conditions.

2.2.4 Control House

A control house containing monitoring and recording equipment would be constructed near each regulator. Data collected at the control house would be relayed to a remotely operated Supervisory Control and Data Acquisition (SCADA) control system. A 1.8-metre high fence would be erected around the control house.

2.2.5 Wanganella flood bypass channel

A flood bypass channel would be constructed approximately 900 metres north of the Wanganella Regulator to mitigate upstream flooding impacts (see **Figure 4**). The channel would enable flood waters for certain flood events to drain between nearby billabongs located in Wanganella Reserve and bypass the Regulator. The channel would be 85 metres long, approximately 40 metres wide and 1.7 metres deep.

2.2.6 Forest Creek block bank

The existing Forest Creek block bank, approximately 1,900 m south-east of the Hartwood regulator, is in poor condition (see **Figure 11**) and would be replaced and raised approximately 0.6 metres.



Figure 11 | Existing Forest Creek block bank (Source: EIS)

2.2.7 Ancillary infrastructure

The proposal would involve several ancillary elements, including:

- installation of overhead and underground electricity cables to connect the regulators to the power grid via the control houses (see **Figure 3** and **Figure 4**)
- upgrades to a number of existing unsealed roads and tracks, and construction of new vehicular access tracks to provide access for construction and operation/maintenance
- extraction of soil from an existing privately owned borrow pit near the Hartwood Regulator on Conargo Road.
- installation of temporary waterway safety features around the construction areas and permanent features upstream of the new regulators to warn and restrict public users.

2.3 Uses and activities

A draft Yanco Creek Systems Operations Plan (YCSOP) was developed and submitted as part of the EIS. The YCSOP provides details about how the creek system will be operated following completion of the Yanco Creek Modernisation Project, operational principles and rules for the regulators. During the assessment of the proposal it was raised by public authorities that an alternative means of implementing operational rules for the proposal would also be through the making of the relevant Water Sharing Plan (WSP) under the *Water Management Act* (2000) (WM Act). The infrastructure would be operated in accordance with either a finalised YCSOP, or that rules which achieve the same outcomes are incorporated into the relevant WSP.

The general operating principles for the Hartwood and Wanganella Regulators are outlined in **Table 2**.

Table 2 | General operating principles of the regulators (Source: EIS)

Regulator	General operating principles
Hartwood Regulator	• primarily used to maintain a weir pool height sufficiently high enough to deliver normal regulated flow requirements (including managed environmental flows) at the Forest Creek offtake • used to create a pumping pool for seven irrigation pumps within the influence of the weir pool and to provide re-regulation capacity for flows in Billabong Creek • some stock and/or domestic pumps also extract water from within the influence of the weir pool • regulator gates to be fully open during moderate to large unregulated flow events at every possible opportunity to enable unrestricted fish passage opportunities • equitable sharing of adverse outcomes across water access licence holders during unexpected supply shortfalls (i.e. when WaterNSW cannot deliver water order requests) • optimisation of weir pool operations to minimise the risk of adverse environmental outcomes • distribution of flows downstream across the regulator gates to maximise the effectiveness of the vertical slot fishway
Wanganella Regulator	• primarily used to create a pumping pool for Wanganella's town water supply, one irrigation pump and to provide re-regulation capacity for flows in Billabong Creek: – some stock and/or domestic pumps also extract water from within the influence of the weir pool – another irrigation pump benefits from the weir pool when operated within upper parts of the yellow zone (i.e. at or near the full supply level) • regulator gates to be fully open during moderate to large uncontrolled flow events at every possible opportunity to enable unrestricted fish passage opportunities • equitable sharing of adverse outcomes across water access licence holders during unexpected supply shortfalls (i.e. when WaterNSW cannot deliver water order requests) • optimisation of weir pool operations to minimise the risk of adverse environmental outcomes • distribution of flows downstream across the regulator gates to maximise the effectiveness of the vertical slot fishway

Figure 12 and **Figure 13** show the proposed operating levels for the Hartwood and Wanganella Regulators, respectively. Both would typically be operated within the green zone. The yellow zone would be primarily used during the irrigation season and is for the capture of the end of the recession of a peak flow in an unregulated flow event, allowing the rise and peak of the flow event to continue downstream. The water stored in the yellow zone would be held until used and this would depend on water demands downstream. In the event of a second unregulated event in the upstream catchment, the operations plan proposes to temporarily draw down the storage to the green zone and refilling the yellow zone on the recession of the second event.

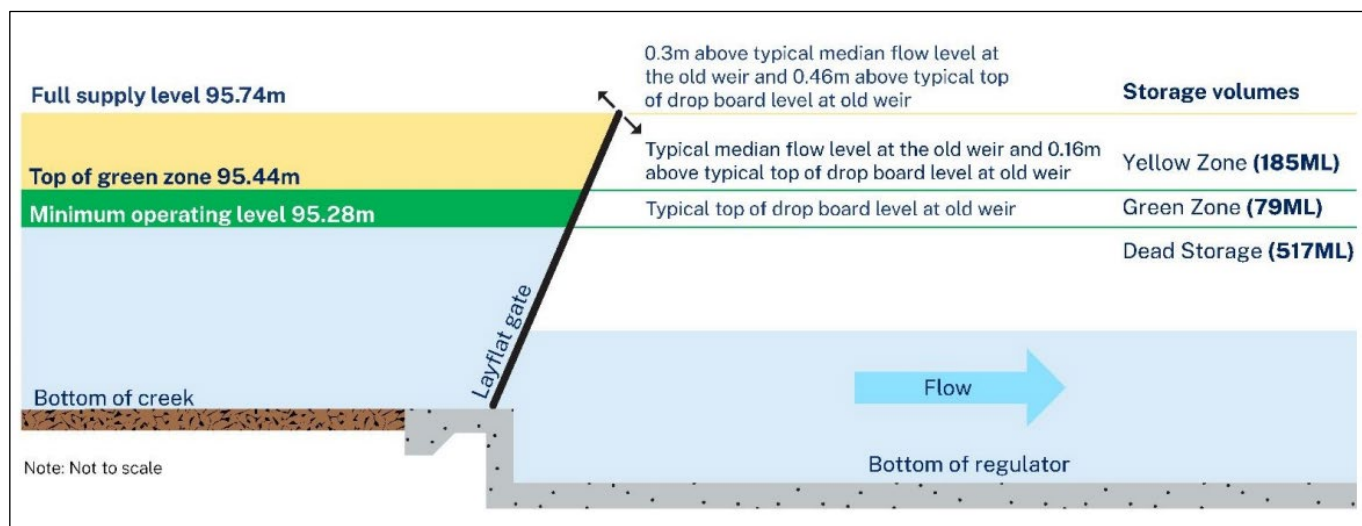


Figure 12 | Hartwood Regulator proposed operating levels (Source: EIS)

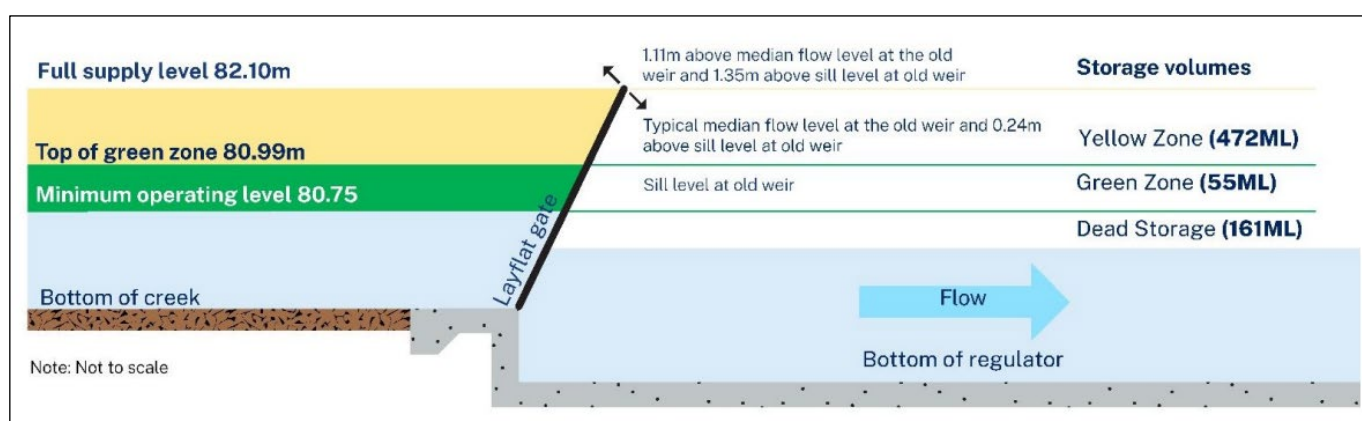


Figure 13 | Wanganella Regulator proposed operating levels (Source: EIS)

2.4 Timing and sequencing

The Proponent anticipates construction would take up to 18 months and would commence in 2026. Water flow would continue throughout construction, with the regulators being constructed on one half of the creek at a time. In-creek construction activities would be separated from water flow by a temporary sheet pile cofferdam. Construction would pause during periods of high water flow. The existing weirs would be demolished once the new regulators are operational.

The key phases of the construction works for each site include:

- site establishment
 - vegetation removal
 - establishing exclusion areas
 - install site compounds and laydown areas

- upgrading access tracks where required
- construct hardstand areas within a cleared and grubbed area overlaid with a layer of crushed rock road base
- in-stream pre-construction works such as installation of sediment curtains
- construction of the regulators and fishways
- utility services construction
 - overhead electricity lines installed within a 20-metre vegetation clearance corridor
 - underground electricity cables installed using open trench methods with conventional earthworks machinery
- demolition of existing weirs, and
- site rehabilitation and demobilisation.

3 Strategic context

3.1 Key strategic issues

The project is largely consistent with the strategies, plans and policies outlined in **Table 3** below, and therefore the Department considers it appropriate for the site.

Table 3 | Summary of government strategies, plans and policies

Strategy, plan or policy	Consistency	Comments
Sustainable Diversion Limit Adjustment Mechanism (SDLAM)	Consistent	The purpose of the SDLAM is to achieve equivalent environmental outcomes through water infrastructure projects rather than additional environmental water recovery. This proposal forms part of the Yanco Creek Modernisation Project, which is one of five accelerated projects in the SDLAM Acceleration Program.
Murray-Darling Basin Plan 2012	Consistent	The purpose of the Basin Plan is to bring the basin back to a healthier and sustainable level, while continuing to support farming and other industries for the benefit of the Australian community. The Basin Plan sets out sustainable diversion limits for each catchment within the basin. This proposal is an initiative under the SDLAM program, which was developed by the MDBA to achieve Basin Plan environmental outcomes.
Draft Murrumbidgee Regional Water Strategy 2022	Consistent	The purpose of the Draft Murrumbidgee Regional Water Strategy is to provide long-term strategic planning for the delivery of healthy, reliable and resilient water resources in the Murrumbidgee region. The strategy mentions the Yanco Creek Modernisation Project as contributing to the SDLAM locally under the Basin Plan 2012.
Murrumbidgee Regional Water Strategy 2025	Consistent	The Murrumbidgee Regional Water Strategy provides a long-term strategic plan to enable communities, the environment and industries to be better prepared for a future changing climate. The strategy mentions the Yanco Creek Modernisation Project as contributing to the SDLAM locally under the Basin Plan 2012 and enabling more efficient and flexible water delivery.

Strategy, plan or policy	Consistency	Comments
Draft Murray Regional Water Strategy 2022	Consistent	The purpose of the Draft Murray Regional Water Strategy is to provide a long-term strategic plan to prepare towns, communities, industries and the environment for future water resource challenges and opportunities. The strategy evaluates the Yanco Creek Modernisation Project as enabling smarter use of water in the Yanco Creek system, including restoring fish passage.
Flood Risk Management Manual 2023	Consistent	The purpose of the Flood Risk Management Manual is to guide the development and implementation of sustainable strategies for managing human occupation and use of floodplains in NSW. It sets out governing principles, roles and responsibilities and a supporting toolkit to be considered by stakeholders involved in flood risk management in NSW. In accordance with the Manual, the Proponent is expected to demonstrate certain considerations, including the objective, policy and principles of the manual, relevant EPIs and local flood information and FRM plans. The Flood Impact Assessment (Appendix H of the EIS) considered the relevant provisions of the Manual.
State Infrastructure Strategy 2018 – 2038: Building the Momentum 2018	Consistent	The purpose of the Strategy is to provide the NSW Government with advice about infrastructure policy and investment priorities designed to boost the State's economic prosperity and global competitiveness while meeting the challenges of population growth and ensuring that cities, towns, suburbs and communities across NSW continue to be great places to live and work. The proposal is consistent with two of the strategy's overarching strategic directives: • “optimise the management, performance and use of the State's assets” and • “ensure NSW's existing and future infrastructure is resilient to natural hazards and human-related threats”.

Strategy, plan or policy	Consistency	Comments
NSW Aquifer Interference Policy 2012	Consistent	The purpose of this Policy is to explain the role and requirements of the Minister administering the <i>Water Management Act 2000</i> in the water licensing and assessment processes for aquifer interference activities under the <i>Water Management Act 2000</i> and other relevant legislative frameworks. To comply with extraction limits set by water sharing plans it is important that the volumetric take of water by aquifer interference activities is appropriately licensed and accounted for. The Proponent has appropriately considered aquifer interference and groundwater impacts in the proposal design. The groundwater assessment (Appendix I of the EIS) assessed the proposal against the relevant provisions of the Policy.
NSW Weirs Policy 1995	Consistent	The purpose of this policy is to improve environmental outcomes associated with weirs in NSW. Principle 1 of the policy is to discourage the construction of new weirs. However, where weirs are retained, the owners are encouraged to reduce their environmental impact, such as by constructing a fishway. Additionally, the provision of fish passage, addressing population growth or industrial expansion are not adequate justification for constructing new weirs. The proposal is consistent with the Policy by replacing the existing weirs with regulators providing fishways, automated layflat gates and associated environmental outcomes.
Policy and Guidelines for Fish Habitat Conservation and Management 2013	Consistent	This document outlines policies and guidelines aimed at maintaining and enhancing fish habitat for the benefit of native fish species. Its purpose is to inform developers, their consultants and government and non-government organisations to ensure compliance with legislation, policies and guidelines as they relate to fish habitat conservation and management. The Proponent consulted with the Fisheries Office of the Department of Primary Industries and Regional Development (DPIRD Fisheries) to develop a Key Fish Habitat Offset Strategy to offset impacts in accordance with the <i>Policy and Guidelines for Fish Habitat Conservation and Management 2013</i>.

Strategy, plan or policy	Consistency	Comments
Riverina Murray Regional Plan 2041 2023	Consistent	The purpose of the Plan is to set the State's 20-year vision for land use planning within the Riverina Murray region. The Plan states that water management and sharing are subject to the provisions of the Murray Darling Basin Plan. The proposal is consistent with the Plan's objectives to: • protect, connect and enhance biodiversity throughout the region • manage development impacts within riverine environments, and • increase natural hazard resilience.

4 Statutory context

4.1 Permissibility and assessment pathway

Details of the legal pathway under which consent is sought and the permissibility of the project are provided in **Table 4** below.

Table 4 | Permissibility and assessment pathway

Consideration	Description
Assessment pathway	State significant infrastructure The project is declared SSI under section 5.12(2) of the EP&A Act as it satisfies the criteria under section 2.13(1) of the Planning Systems SEPP. The proposed development on the land concerned is, by the operation of a State environmental planning policy, permissible without development consent under Part 4 of the Act, and the proposed development is specified under Schedule 3 of the Planning Systems SEPP, being a “water storage facility”.
Approval authority	Minister for Planning and Public Spaces The Minister is the approval authority under section 5.19 of the EP&A Act.
Decision-maker	Director, Transport and Water Assessments - In accordance with the Minister’s delegation dated 9 March 2022, the Director, Transport and Water Assessments, may determine the application as: - the application has not been made by a person who has disclosed a reportable political donation - there are less than 50 public submissions in the nature of objection, and - the council has not made a submission by way of objection.
Permissibility	Permissible without consent The proposal is considered to be State significant infrastructure as it is declared state significant infrastructure by operation of Division 5.2 of the EP&A Act, State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP), and State Environment Planning Policy (Transport and Infrastructure) 2021 (Transport and Infrastructure SEPP).

Consideration	Description
	Under section 2.159(2A) of <i>State Environmental Planning Policy (Transport and Infrastructure) 2021</i> (Transport and Infrastructure SEPP), development for the purposes of the replacement of existing water storage facilities may be carried out by a public authority without consent on any land. All of the proposed works are being undertaken by a public authority – DCCEEW. Section 2.158 of the Transport and Infrastructure SEPP states that a water storage facility has the same meaning as in the Standard Instrument. The Standard Instrument definition of a water storage facility includes a weir and associated monitoring and gauging equipment on any land. A ‘weir’ includes structures such as regulators and block banks. Under section 2.56 of the Transport and Infrastructure SEPP, development for the purpose of flood mitigation work may be carried out by or on behalf of a public authority without consent on any land. A flood bypass channel is within the definition of flood mitigation work. As such, all of the proposed works are permissible without consent.

4.2 Other approvals and authorisations

The project will not require an environment protection licence issued by the NSW Environment Protection Authority under section 42 of the *Protection of the Environment Operations Act 1997* as the proposal does not constitute a Scheduled Activity under Schedule 1 of the POEO Act.

Section 6(2)(c) of the POEO Act states: “A local authority is the appropriate regulatory authority (ARA) for non-scheduled activities in its area, except in relation to ... (c) activities carried on by the State or a public authority, whether at premises occupied by the State or a public authority or otherwise ...” As the Proponent is DCCEEW, a public authority, the EPA would be the ARA during construction and operation of the proposal.

The Proponent has indicated that some areas of land would need to be acquired at Hartwood and Wanganella. All acquisitions would be subject to the requirements of the *Land Acquisition (Just Terms) Compensation Act 1991*.

Under section 5.23 of the EP&A Act, a number of other authorisations required under other Acts are not required for SSI. This is because all relevant issues are considered during the assessment of the SSI application.

Under section 5.24 of the EP&A Act, certain approvals cannot be refused if they are necessary to carry out the SSI (e.g. a consent under section 138 of the *Roads Act 1993*). These authorisations must be substantially consistent with any SSI approval for the project.

The Department has consulted with and considered the advice of the relevant government agencies responsible for these other authorisations in its assessment of the project (see **Section 5** and **Section 6**). Suitable conditions have been included in the recommended conditions of approval (see **Appendix F**).

4.3 Planning Secretary’s environmental assessment requirements

The Department’s review determined that the EIS addresses each matter set out in the Planning Secretary’s environmental assessment requirements (SEARs) issued on 17 October 2024 and is sufficient to enable an adequate consideration and assessment of the project for determination purposes.

4.4 Mandatory matters for consideration

4.4.1 Matters of consideration required by the EP&A Act

Section 5.19 of the EP&A Act sets out the matters to be considered by the Minister when deciding whether or not to approve the carrying out of SSI. The Department’s consideration of these matters is shown in **Table 5** below:

Table 5 | Matters for consideration

Matter for consideration	Location
Planning Secretary’s report	This report
Advice provided by the responsible portfolio Minister	Section 5 - Engagement and Section 6 - Assessment

4.4.2 Objects of the EP&A Act

In determining the application, the consent authority should consider whether the project is consistent with the relevant objects of the EP&A Act (s 1.3) including the principles of ecologically sustainable development. Consideration of those factors is described in **Appendix E**.

As a result of the analyses in **Appendix E**, the Department is satisfied that the development is consistent with the objectives of the EP&A Act and the principles of ecologically sustainable development (ESD).

4.4.3 Biodiversity development assessment report

Section 7.9(2) of the *Biodiversity Conservation Act 2016* (BC Act) requires all SSI applications to be accompanied by a Biodiversity Development Assessment Report (BDAR) unless the Planning Agency Head and the Environment Agency Head determine that the project is not likely to have any significant impact on biodiversity values (as identified in the BC Act and in the *Biodiversity Conservation Regulation 2017*).

The EIS included a BDAR (see **Appendix B**). The BDAR and the overall impact of the project on biodiversity values is assessed in **Section 6**.

5 Engagement

5.1 Preparation of SEARs

During the preparation of the Planning Secretary’s environmental assessment requirements, the Department consulted with relevant state government agencies and local council(s).

5.2 Exhibition of the EIS

5.2.1 Public exhibition of the EIS

After accepting the development application and EIS, the Department:

- publicly exhibited the project from 01 November 2024 until 28 November 2024 on the NSW Planning Portal
- advertised the exhibition in the Sydney Morning Herald, and
- notified and invited comment from relevant government agencies, Edward River Council and Murrumbidgee Council.

During the public exhibition period, the Department:

- undertook a site visit on 20 November 2024, and
- met with Edward River Council’s planning staff to discuss the project on 21 November 2024.

5.2.2 Summary of advice received from government agencies

The Department received advice from eleven government agencies during the assessment process.

A summary of the agency advice in response to assessment documents (i.e. EIS, Submissions Report, RFI report) is provided in **Table 6**. A link to the full copy of the advice is provided in **Appendix C**.

Table 6 | Summary of agency advice

DPIRD Fisheries	
EIS	- Confirm the final construction footprint area before calculations of offset requirements. - The proposed new weir pool area and increases in water surface level will result in the loss TYPE 1 Key Fish Habitat (KFH) changing to TYPE 2 habitat. This will need to be calculated and offsets provided .

	• Overlaying aquatic habitat mapping of KFH features with the detailed spatial hydraulic mapping is required to obtain a clearer spatial view of the potential implications of this project on KFH at various flow scenarios. The implications of inundation duration at FSL needs to be assessed in more detail. • In addition to any KFH offsets, incorporate an offset strategy that considers a fish passage trade off ensuring equal or more cost beneficial fish passage outcomes, through transferring fish passage works, in relation to the raising of the Forest Creek block bank. The offset strategy should link with the other components of the Yanco Creek Modernisation Project that also trigger section 218 of the <i>Fisheries Management Act 1994</i> (FM Act) and require fish passage offsets. • An Offsets Strategy that evaluates the full implications of the proposal should be developed, with special considerations for threatened fish species. DPIRD Fisheries requests to see the detailed works underpinning offset calculations and notes that it is not confirmed that no offset is required for downstream areas. • Prepare an aquatic biodiversity strategy which is linked to the offsets strategy and includes adequate post implementation monitoring, evaluation and reporting of operations and the efficacy of the mitigation measures in eliminating any impacts. • Due to the long-term uncertainties associated with potential impacts and effectiveness of mitigations of the proposal, DPIRD Fisheries recommend that a bank guarantee be provided to DPIRD Fisheries to offset KFH impacts in accordance with the <i>DPIRD Fisheries Policy and Guidelines for Fish Conservation and Management</i> (Updated 2013), and the <i>NSW Biodiversity Offsets Policy for Major Projects</i> (2014).
Submissions Report	DPIRD Fisheries acknowledged continuing consultation around mitigating impacts of constructing and operating the regulators regarding the following matters: • the final weir and fishway detailed design including suitability for approval under s218 of the FM Act • the development of a Fish Passage Offset strategy, including review by DPIRD Fisheries • the development of the operations plan • the Key Fish Habitat Offset strategy • an aquatic biodiversity strategy for post-implementation management and mitigation • the Construction Environmental Management Plans including Fish management and relocation plans.
Murray-Darling Basin Authority (MDBA)	
EIS	• Considers that the proposal is unlikely to significantly impact the flow, use, control and quality of water of the River Murray.

	- Notes that construction under this proposal may impact the ability to convey water from Hume Dam to Lake Victoria due to reduced channel capacity, given that Billabong Creek can be used for bypassing the Barmah Choke via the Finley Escape channel. MBDA suggests this be further assessed by NSW agencies in collaboration with MDBA River Operations. - Limited consultation with MDBA around the current iteration of the project.
Transport for NSW (TfNSW)	
EIS	- Prepare a Construction Traffic Management Plan for the Wanganella Regulator, including measures to prevent loose material and dust tracking onto the Cobb Highway. - Prepare a dilapidation report for intersections between the Cobb Highway and Wanganella Regulator access roads. - Submit an application to Council under Section 138 of the Roads Act 1993 for any works proposed within the road reserve of the Cobb Highway where required.
Submissions Report	Notes the requested conditions have been incorporated into the updated mitigation measures.
WaterNSW	
EIS	- The Proponent is to confirm the result of its legal assessment on Native Title status for the land where the regulators are located. - The regulators meet the criteria for referral to Dams Safety NSW for a Declaration determination. As the intended owner and operator of the two regulators post-construction, WaterNSW will submit the consequence category assessments to Dams Safety NSW for a Declaration determination. - There will be a range of assurance checks and activities throughout the project delivery phase that the Proponent (DCCEEWS) must meet prior to WaterNSW's formal acceptance of ownership. - WaterNSW requests to review any changes to the mitigation measures made in response to agency advice or public submissions. - Given that releases from the regulators would impact on downstream catchments, WaterNSW requests the Proponent confirm/demonstrate if these processes are modelled appropriately in the Murrumbidgee Source model. Clarify how the floodplain impacts are explicitly modelled in Source to provide confidence in flood estimates and concurrent flood impacts on stakeholders in the area for EIS considerations. Document how uncertainty in flow estimations/flow distribution/local runoff contributions from long-term climate variability and change has been considered in this study.

	• Provide further justification of how the proposal would enhance operational flexibility. • Refer the groundwater assessment report to the DCCEE hydrogeology team for review.
Submissions Report	• Provide further information to confirm that inundation would be minor as WaterNSW is not empowered to operate the system to cause deliberate inundation on private property. • Noted that as the intended operator, WaterNSW must be satisfied that the Proposal can be operated as approved to avoid future non-compliance. • Suggested an alternative approach to the operational management of the Proposal, involving amending the Murrumbidgee Water Sharing Plan to include agreed environmental provisions, rather than the draft YCSOP. • Requested certainty regarding the proposal's requirement for water, and that the Proponent secure additional water through the WSP if required. • Other matters relating to impacts on grazing leases, potential delivery of cultural water and easement agreements.
RFI Report	• Resolve key provisions of the draft YCSOP to mitigate against the risk of WaterNSW becoming non-compliant with the plan. • Amend the Water Sharing Plan to include the publishing of an Annual Compliance Report. • Remove or reword the flow split requirements during unregulated flows, noting that the practical achievement of the flow splits is dependent on multiple factors. The flow split requirements could also be used as a guide rather than an enforceable requirement. • Continue to consult with DCCEE Water Allocation and involve WaterNSW regarding the trigger for the commencement of environmental flow provisions, which is outlined in the draft YCSOP as being when general security allocations on March 1 exceed 15%. • Set aside the issue of environmental base flow provisions and continue to consult with WaterNSW regarding the resolution of this issue across the Yanco Creek system. • Remove flow rate targets (rates of rise and fall) as WaterNSW lacks the tools, forecasting systems and real-time control to meet these targets. Continue to consult with WaterNSW during a commissioning period rather than codifying the targets. • Continue to consult with WaterNSW regarding resolving the matter of additional environmental provisions. • Consult and collaborate with WaterNSW regarding rates of water level rise and fall, proposing a trial period that refines target rates of rise and fall in real world conditions before finalising the targets. • Engage further with WaterNSW regarding any legal risk associated with additional property inundation in relation to the Wanganella regulator.

	Clarify any requirement for water and operating rules in parallel with the assessment process.
DPHI – Crown Lands	
EIS	- As many of the Crown Land parcels are currently under Aboriginal Land Claim, the Proponent will need discuss the proposal with the respective claimant Aboriginal Land Council(s) prior to any development occurring. - Native Title will need to be a consideration with all development impacting any Crown Land. - Concurrence should be sought from Local Land Services with regards to works over Travelling Stock Routes prior to any works commencing. - Liaise with Edward River Council, the Crown Land Manager of the Wanganella Regulator location, in the first instance with regards to the works proposed. - The proposal will require land to be acquired under the <i>Land Acquisition (Just Terms Compensation) Act 1991</i>. This is particularly the case where the new structures are to be developed. - Where linear infrastructure is expected to traverse Crown land, roads and/or waterways, an easement will be required for the protection of the infrastructure.
Submissions Report	The Submissions Report addressed Crown Lands' submission and relevant matters must be addressed prior to commencing construction.
NSW State Emergency Services (SES)	
EIS	- Ensure workers and people on site are aware of the flood risk and that a flood emergency plan is prepared for construction and operation/maintenance. - Notify NSW SES in advance of any local road disruptions during construction which may cause significant delays.
Submissions Report	Supports the preparation of a CEMP which will detail measures to manage hazards, incidents and emergency situations during construction.
NSW National Parks and Wildlife Services (NPWS)	
EIS	NSW NPWS recommended more detailed assessment of cumulative impacts in accordance with the <i>Cumulative Impact Assessment Guidelines for State Significant Projects (2022)</i>. Cumulative impact considerations to include: regional environmental water supply and delivery

	• ecological impacts • loss of water regulation infrastructure of local heritage significance across the SDLAM project area, and • establishing a monitoring framework across the SDLAM program which collects suitable baseline data on ecological systems to consider effects of the program, and variations to environmental water delivery as both a positive, and potential negative context.
Submissions Report	NPWS recommended that conditions of approval require: • management of historical heritage, hydrology and biodiversity to be consistent and compatible with broader SDLAM Program. • repatriation of Aboriginal objects in accordance with the NPW Act.
Water Group in NSW DCCEW	
EIS	• Quantify maximum potential water take per water year for all impacted sources during construction and operation of the project. • Identify site water demands and their proposed sources. • Demonstrate the ability to obtain sufficient entitlement to account for maximum potential take unless an exemption applies. • Provide an impact statement of the proposed borrow pit expansion during construction and operation. • Ensure a water access licence is obtained to account for the maximum predicted water take for construction and operation activities, unless an exemption applies. • Utilise rock armouring of the banks together with vegetation in addition to the proposed energy dissipation measures. • Large in-channel wood features should be used where historic river regulation has resulted in their removal. • Ongoing monitoring of site conditions and any sediment build up behind the structures or associated with fishways should occur following half bank height to bankfull flow events. • Prepare a construction environmental management plan that includes monitoring of geomorphic, channel form and erosion conditions. • Prepare an Operations Management Plan and detail how the operation of the project meets the requirements of the relevant Water Sharing Plan(s). • Provide further information on the design of the Forest Creek Block Bank. • Ensure works within waterfront land are in accordance with the <i>Guidelines for Controlled Activities on Waterfront Land (2025)</i>.

Submissions report	• Identify proposed water extraction points on Billabong Creek and provide an impact assessment on water users and the water source. • Demonstrate the viability and reliability of sourcing water from Council and nearby dams. • Ensure sufficient entitlement is held in a water access licence (WAL) to account for water take unless an exemption applies under the <i>Water Management (General) Regulation 2018</i>. • Provide a water related impact assessment of the proposed borrow pit expansion during construction and operation. • The Proponent should prepare a CEMP that includes energy dissipation and stabilisation measures and geomorphic monitoring of channel form and erosion including response measures.
RFI Report	• Water Group considered that all matters raised had been adequately addressed.

Heritage NSW in NSW DCCEW – Aboriginal Cultural Heritage Assessment

EIS	• Noted gaps in consultation with Registered Aboriginal Parties (RAPs) which do not constitute continuous consultation. • Recommended updating the Aboriginal Cultural Heritage Assessment Report (ACHA) to adequately reflect consultation with the RAPs. • Recommended additional targeted consultation regarding scarred trees within the project area. • Sought additional mapping including all survey track logs and the existing disturbance footprint within each of the project areas. • Further explication required on the assessment that Hartwood Weir, Forest Creek Block Bank, and Wanganella Weir were considered to have moderate archaeological potential and establishing the scientific and cultural significance of these areas. • Further description on how Potential Archaeological Deposit (PAD) boundaries were defined. • Additional information on the determination that hearth sites were of non-Aboriginal origin.
Submissions Report	• Confirm the extent of the proposal footprint. • Document how concerns raised by the RAPs were resolved. • Additional information regarding survey of the access track east of the proposed Hartwood Weir Regulator and sites in the vicinity of this track. • Additional mapping showing existing disturbed areas within the study areas.

	• Update the ACHA to include a clear assessment of the subsurface archaeological potential for the entirety of the study area. • Ensure that areas of PAD are reflected in the impact assessment and proposed mitigation measures, noting that areas of archaeological sensitivity for some sites do not match proposed exclusion zones and study areas, and that PAD associated with some sites recorded outside of the study area may extend into the study area. • Defining the archaeological potential of some sites. • Additional information on the assessment of two hearth sites. • Updating the assessment and site cards where sites have been recorded in duplicate. • Noting inconsistencies in the updated ACHA, recommended updating the assessment to provide a clear and consistent approach to identified sites in close proximity to the study area. • Updating mapping to differentiate between exclusion zones and salvage areas. • Consistency in mitigation measures between the ACHA and Appendix A of the Submissions Report.
RFI Report	• Heritage NSW considered that in the RFI report the Proponent had adequately addressed all matters previously raised.
Conservation Programs, Heritage and Regulation Group in NSW DCCEEW (CPHR)	
EIS	• The EIS does not include elements of flooding impact assessment that were specifically required in the SEARs, including mapping of hydraulic categorisation (i.e. floodways and flood storage areas) and assessment of the compatibility of the proposal with these hydraulic functions. • Further information is required to determine Serious and Irreversible Impacts (SAIL) to the Plains-wanderer. • Review the candidate lists of threatened species, survey effort, suitable habitat and species polygons as some have not been prepared in accordance with the Biodiversity Assessment Method (BAM) and contain omissions that may affect the credit obligation. • Revise plant community types (PCTs), threatened ecological communities (TECs) and vegetation zone identification and mapping to address inaccuracies that can affect the biodiversity credit calculation. • Mitigation measures lack specific detail and to be effective in managing impacts and need to include explicit terms. • More detail is required to determine the indirect impacts associated with the proposal.

	Additional survey and details are required to determine prescribed impacts to native vegetation, threatened entities and their habitat within and beyond the subject land.
Submissions Report	- Most issues relating to biodiversity have been resolved - satisfied with the responses provided in the Submissions Report, together with the amended BDAR. - When preparing the biodiversity management plan (BMP), the Proponent must use binding language to ensure the management actions are implemented. - The BMP should also include commitments to avoid construction works during breeding periods for relevant threatened species, and to undertake supplementary surveys to confirm the extent of threatened species within the proposal footprint.
NSW Environment Protection Authority (EPA)	
EIS	- The proposal does not appear to require an environment protection licence under the <i>Protection of the Environment Operations Act 1997</i>. - Prepare a detailed site investigation (DSI) for works associated with the Wanganella Regulator. The results of this DSI will determine whether the preparation of a remedial action plan is necessary. - Prepare site-specific construction environmental management plans (CEMP) for contamination at the sites. - The NSW EPA must be notified under section 60 of the <i>Contaminated Land Management Act 1997</i> where any contamination identified meets the triggers in the <i>Guidelines for the Duty to Report Contamination</i>.
Submissions Report	- The Submissions Report generally addresses the EPA's advice on the EIS - Recommends that conditions of approval require site-specific CEMPs for each regulator site.
Dam Safety NSW	
EIS	Submit consequence category assessments to Dam Safety NSW, noting that if the structures are not declarable then Dam Safety NSW will have no further input.

The following agencies raised no concerns or provided no comment:

- Heritage Council NSW in NSW DCCEEW – Historic Heritage, and
- DPIRD Agricultural Land Use Planning.

5.2.3 Summary of council submissions

Edward River Council provided comments on the project.

A summary of the issues raised by council is provided in **Table 7** below and a link to all submissions in full is provided in **Appendix C**.

Table 7 | Summary of issues raised by council

Edward River Council	
EIS	Council indicated support subject to the proposal having negligible impacts to Billabong Creek for licenced users, the environment and dependent local communities. Council raised concerns about the limited availability of nearby accommodation for workers and encouraged prioritising employment of local tradespeople during construction. Council requested the Proponent consult with Local Aboriginal Land Councils and Traditional Owners with regard to potential Aboriginal cultural heritage impacts.
Submissions Report	Council will work with DCCEEW where necessary and/or required to ensure impacts on transport and roads are mitigated and managed during the project.

5.2.4 Summary of public submissions

The Department received two submissions during the public exhibition period of the EIS, both from individuals. One submission supported the proposal and one provided comment. A link to the submissions in full is provided in **Appendix C**.

The key issues raised by the public relate to construction traffic safety and road dilapidation, the length of the exhibition period, biodiversity and operating rules.

5.3 Response to submissions

Following the public exhibition period, the Department asked the Proponent to respond to the issues raised in submissions, advice received from government agencies and issues raised by the Department including those raised by the independent hydrology review. The Proponent provided a Submissions Report to the Department on 10 June 2025 (see **Appendix B**).

The Department published the Submissions Report on the NSW Planning Portal and forwarded it to relevant government agencies and local council(s) for comment.

5.4 Request for further information

On 16 July 2025, the Department asked the Proponent to:

- provide further information as to why the Proponent considered certain elements as out of the scope of the proposal
- clarify the proposed rates of rise and fall for the Regulators, including the use of flow volumes as a surrogate for the rates of rise and fall measured in millimetres (as presented in the EIS), and the associated environmental impacts
- provide a cumulative social impact analysis in accordance with the Social Impact Assessment Guideline and the Cumulative Impact Assessment Guidelines for State Significant Projects
- provide detail on how bushfire risk will be considered during detailed design in accordance with relevant guidelines and standards, and
- respond to all agency comments on the Submissions Report (see **Table 6**)

6 Assessment

The Department has considered the application, the issues raised in the submissions, the Applicant's Submissions Report and supplementary information in its assessment of the development.

The Department considers the key assessment issues are:

- Hydrology and Water Management
- Aquatic Ecology
- Biodiversity
- Aboriginal Cultural Heritage

A number of other issues have also been considered. These issues are considered to be minor and are addressed in **Table 24** under **Section 6.5**.

6.1 Hydrology and Water Management

The Study Area and broader Yanco Creek system has undergone considerable alteration of key hydrological flow components and processes since European settlement. Currently the flows within the Yanco Creek System are highly variable at all locations with an absence of near no-flow years, which is a more consistently flowing system compared to the state of the system prior to European development. Over 30 private licenced fixed crest weirs exist in the system that intercept flows, act as barriers to fish passage, and modify flowing aquatic habitat (lentic) into more slowly flowing habitat (lotic). Flows through the system are maintained at artificially high levels during high demand periods and the total annual flow volume is much higher than pre-development. The changes proposed by the project may be broadly described as aiming to move the system towards a hydrological state that is closer to a pre-development environmental state than with current hydrological processes and flow regimes.

The proposed infrastructure (Change Case) scenario results indicate minor alterations in mean annual flows within the Yanco Creek System. The typical temperate seasonal pattern of flows is maintained, with minimal impact on mean monthly flow volumes throughout the Yanco Creek System, including the proposal study area (Billabong Creek from Jerilderie to Darlot). The Change Case scenario results indicate the proposal does not substantially impact annual or daily flow volume variability, and there are minimal impacts on annual or daily flow sizes.

Overall, the hydrological analysis suggests that while operation of the proposal will have some localised (within reach) effects on hydrology (i.e. water balance, seasonality, flow variability, and flow sizes) the impacts are generally minor and consistent with those expected as a result of implementing the proposal and broader system changes, and do not substantially alter the overall

hydrological characteristics of Billabong Creek within the proposal study area or the broader Yanco Billabong System.

After implementing the mitigation measures and operational rules proposed in the EIS the residual risks of impacts from the project are low as the hydrological changes from the new regulators are characterised as minor and have localised within reach effects. This justification for proceeding with the project is strong on the basis that it would improve the likelihood of attainment for ecologically important Environmental Water Requirement (EWR) categories, affords improved fish passage and nesting support within Billabong Creek, and there is not predicted to be a reduction in water availability or impacts to effective general security allocations. The predicted EWR improvements due to new environmental flow provisions and the improved water delivery under the project also mean there are not expected to be adverse impacts to Planned Environmental Water (PEW) or Held Environmental Water (HEW). The Department concludes that the hydrological impacts of the project are acceptable after considering the detailed hydrological assessment.

The Department considers that the environmental performance of the project during Standard Operations is secured by the operational rules outlined in the EIS and associated documents that would be finalised in a Yanco Creek Systems Operations Plan (YCSOP), or through the incorporation of operational rules into the relevant Water Sharing Plan (WSP). If a WSP is in effect that does not contain rules consistent with the environmental performance of the proposal set out in the EIS, and the performance of the project is not under an approved YCSOP, the proposal is required to be operated under Default Operations mode. Default Operations mode is generally consistent with the hydrological conditions within Billabong Creek to the extent of the project's influence prior to the existing fixed crested weir infrastructure.

The hydrological impact assessment has demonstrated that the operation of the proposal will have some minor and localised (within reach) effects on hydrology within each planning units for the key metrics (i.e. water balance, seasonality, flow variability, flow sizes, EWR attainment, NSW River Flow Objectives). These minor impacts are justified when considering the project achieves:

- Better predicted attainment of EWRs, and particularly the EWRs that support native fish nesting
- Through the predicted delivery of an additional small fresh flow event annually
- Better fish passage when flow regimes trigger fish movement

Through the infrastructure design and operational rules proposed the proponent has avoided and minimised secondary impacts to erosion, bank stability and fish nesting by proposing rules to target downstream flows, flood operations, limits to rates of rise and fall to accommodate fish breeding requirements, and limits to storage levels to protect riparian zones. The operation of the infrastructure in the yellow and green zones responds to seasonal demand for water and rainfall

events to allow for a reduction in the quantity of regulated water required by the Yanco Creek system, and to allow more responsive delivery of irrigation and environmental water, in a manner that also minimises the environmental impacts associated with dynamic river operation.

The generally low degree of hydrological changes are consistent with those expected from the implementation of the proposal alongside broader Yanco system changes, and do not substantially alter the overall hydrological characteristics of Billabong Creek within the study area or the broader Yanco Billabong System. The hydrological changes under the operation of the proposal have been considered in the aquatic ecology impact assessment, and the residual hydrological impacts incorporated into key fish habitat offsetting as discussed in the aquatic ecology assessment.

6.1.1 Issue

The project results in changes to complex hydrological processes within Billabong Creek that need to be well understood to ensure that environmental risks associated with the changes can be appropriately managed during operation of the infrastructure, and that unacceptable impacts to water security would not occur due to the project.

Detailed hydrological assessment using robust methods to predict changes to the hydrological regime and environment in Billabong Creek was required. Detailed information regarding long term, annual, seasonal, and daily timescales for key locations in Billabong Creek about the predicted performance of the infrastructure for a range of hydrological metrics was needed and provided through the assessment.

The nature of changes to the hydrology of the system are considered below. Summarily, the Department considers that hydrological changes anticipated to result from the project can be appropriately managed over the range of hydrological conditions Billabong Creek is expected to experience.

6.1.2 Consideration

Hydrological assessment methods used are appropriate for scale and complexity of the proposal

The hydrological assessment for the project has adequately addressed the characteristic variability of the Study Area and provided information to understand the predicted impacts of the proposal in the context of this variability. The Study Area for the EIS was from Mid Billabong Creek at Jerilderie to downstream to Billabong Creek at Darlot (see **Figure 14**). This includes Hartwood Weir (to where Lower Yanco Creek joins Billabong Creek) and Lower Billabong Creek and intersecting streams from downstream of Hartwood Weir to Moulamein (inclusive of Wanganella and Darlot). This was considered to represent the area of hydrological influence from the project. The impacts of the regulators are constrained by other structures both upstream and downstream. In the study area

there is widely variable hydrology due to the influence of rainfall, inflows, evaporation and bulk water demand for irrigation, industry, communities and the environment. The hydrological assessment for the project has adequately addressed the characteristic variability of the Study Area and provided information to understand the predicted impacts of the proposal in the context of this variability.

The Study Area for the hydrology assessment of impacts from the regulators is from Billabong Creek at Jerilderie downstream to Billabong Creek at Darlot (Study Area). The hydrological impacts of the regulators in Billabong Creek are constrained by existing weir structures upstream and downstream. The investigation area from the Yanco Creek at Yanco Offtake to Billabong Creek at Darlot was used for hydrological cumulative impact assessment including a range of changes proposed to occur under the Yanco Creek Modernisation program (Area of Investigation).

Multiple sources of information were used to address likely hydrological changes, water management requirements and policy objectives, with changes modelled using the Murrumbidgee Source Model

The Hydrological Assessment (Appendix G to the EIS) reported results across the water Planning Units of the *Murrumbidgee Long Term Water Plan Part A: Murrumbidgee catchment (NSW DPIE 2020)*, and data produced by streamflow gauges in those planning units as the key locations for hydrology assessment. The Planning Units (PU) correspond to a particular river reach and its associated floodplain:

- PU10: Upper Yanco Creek
- PU11: Colombo & Billabong Creeks
- PU12: Lower Yanco Creek to Lower Billabong Creek
- PU13: Lower Billabong and Intersecting Streams



Figure 14 | Study area for the hydrology assessment (Source: EIS)

A detailed assessment of multiple hydrology and water management issues for the construction and operation of the proposal was undertaken. The EIS used multiple sources of information to address likely hydrological changes, water management requirements and policy objectives to address the scale and complexity of the proposal.

The proponent modelled likely changes arising from the proposed infrastructure and changed operation of the Billabong Creek and broader Yanco Creek system using the Murrumbidgee Source Model (Source Model). The modelling performed provided results for the modelling period between 1 July 1895 to 30 June 2022, which is a suitably lengthy period to cover the full range of climatic conditions that the infrastructure would be operated under. This period includes the worst floods and droughts on record. The Source Model is calibrated to perform well with a high degree of confidence that modelled results are a good representation of reality in the regulated flows range. An independent review of the Source Model was completed in 2022 (Submissions Report, Appendix H).

The Department's assessment team also engaged an independent hydrology expert to review the EIS and associated documents. The Department's reviewer found the Source Model addressed the SEARs requirements and provided the necessary information to support completion of the Department's assessment. Therefore, the modelling approach and detailed hydrology assessment provided an adequate level of information for the assessment of the project.

Key operational rules for Yanco Creek secure the environmental performance of the project and would be implemented through the Yanco Creek Systems Operations Plan (YCSOP), or a new Murrumbidgee Water Sharing Plan

The operating rules that apply to management of water flowing through the system and targets for operating the layflat gates of the infrastructure are in large part the basis of the predicted impacts resulting from operation of the regulators. The operating rules are to be implemented by either the finalisation of a YCSOP, or through the making of a new Murrumbidgee Water Sharing Plan under the *Water Management Act 2000* (NSW) that would contain the operating rules and ensures the infrastructure will achieve the level of environmental performance committed to in the EIS.

Under the Operational Rules and other proposed changes to system operation, when comparing the Cumulative Change Case and Base Case results across impact metrics there are generally not significant differences in the hydrology (i.e. water balance, seasonality, flow variability, and flow sizes) and EWR frequency analyses, except at Forest Creek at Warriston Weir. Impacts attributed to hydrological changes from the Forest Creek Return Flows Project (FCRFP), including diversion of unplanned flows down Piccaninny Creek, are subject to a separate approval pathway (Hydrology Assessment Appendix G). The FCRFP impacts have been considered in this assessment for the purpose of cumulative impact assessment only.

The Department's decision that the infrastructure has acceptable environmental impacts is based upon the requirement that operational rules for the Yanco Creek System and operation of the infrastructure (Operational Rules) would be used to ensure satisfactory environmental performance. The key operational rules set out in the EIS include:

- Environmental baseflow provision for Yanco Creek at Offtake of 250 ML/day when General Security allocations exceed 15 per cent
- Environmental baseflow of 25 ML/d in Billabong Creek downstream of Hartwood Regulator at all times.
- Environmental baseflow of 50 ML/d in Billabong Creek downstream of the Darlot gauging station at all times.
- Environmental baseflow of 10 ML/d in Forest Creek downstream of the offtake from Billabong Creek when the annual available water determination for general security water entitlements are set at 15 per cent or more.
- Minimum environmental flow provision for Yanco Creek at Morundah of 100 ML/day
- A maximum daily rate of fall of nine per cent per day of volume at Darlot gauging station when flows are between 250-1,000 ML/d in the period 14 September to 16 November to

protect fish breeding (Native Fish Flow). This applies when the available water determination is set at 15 per cent or more and the creek has not been subject of a small fresh flow.

- A small fresh flow event being required that has a minimum flow of 200 ML/d for 14 consecutive days between 1 February and 31 March as measured at the Darlot gauging station, to be delivered when the available water determination is set at 15 per cent or more (*Additional Small Fresh*).

New limits to when water can be ordered from Finley Escape, Coleambally Catchment Drain (CCD) and Drainage Channel 800 (DC800) Irrigation Escapes:

- The first 50ML/day of water orders to assist in meeting water orders downstream of Billabong Creek at Puckawidgee (410017) will be met from Finley Escape prior to ordering any water from Coleambally Catchment Drain (CCD) and/or Drainage Channel 800 (DC800).
- No restriction applies to Coleambally Catchment Drain (CCD) and/or Drainage Channel 800 (DC800) water orders after Finley Escape orders are more than or equal to 50ML/day.
- New limits of no orders from Finley Escape until Colombo Creek at Morundah reaches 130 ML/day and no orders during the winter period (15 May to 15 August).

The approach of including Operational Rules in the relevant WSP made under the WM Act instead of, or in addition to finalising a YCSOP to ensure acceptable performance of the infrastructure arose during consultation between NSW DCCEEW Water Group and WaterNSW about the proposal. The Department considers that either approach would be satisfactory if appropriate operational rules to ensure acceptable performance of the infrastructure are implemented. The flexibility to potentially implement the rules via the relevant WSP is reflected in the recommended conditions of approval, which allow the Planning Secretary to grant a waiver to the requirement of finalising the YCSOP should a WSP be made that contains rules that would secure the environmental performance of the infrastructure.

As the YCSOP is to be finalised or WSP made as a post-approval matter, the Department has recommended conditions so that the infrastructure must be operated to approximately replicate the operation of the existing fixed crested weir structures until operational rules are in place. This would produce impacts approximately equivalent to the base case that has been modelled and the level of environmental performance of the previous Hartwood and Wanganella weirs until Operational Rules are in effect (Default Operations). The operation of the regulators as set out in the EIS and associated documents to achieve the objectives of the project is permitted after the Planning Secretary is satisfied that an appropriate mechanism would manage the impacts of the proposal by implementing operational rules (Standard Operations).

The Department has recommended conditions of approval requiring the proponent demonstrates to the Planning Secretary prior to commencement of operation that the regulators that key operational rules are being formally implemented through a finalised YSCOP. If a waiver has been granted and the WSP containing Operational Rules to secure the performance of this project would no longer apply due to a WSP being repealed, ceasing to have effect, or being amended the waiver granting by the Planning Secretary in connection with that WSP would be automatically revoked and the project would revert to Default Operations. Default Operations would then occur until either a new waiver is sought and approved or a YCSOP is finalised and submitted to the Planning Secretary for approval.

The conditions ensure the infrastructure would be operated in accordance with rules that are fundamental to the predicted environmental impacts of the project. The Department considers that the operation of the regulators as set out in the EIS is acceptable with conditions placed on the project to manage the environmental performance of the infrastructure.

To facilitate optimal operational rules the project is required to operate in default operations prior to the approval or implementation of the YCSOP or new WSP

Until a YCSOP has been approved by the Planning Secretary, or a waiver granted to that requirement, the regulators at Hartwood and Wanganella are to be generally operated in a manner consistent with the existing hydrological regime in Billabong Creek produced by the fixed crested weirs that are to be replaced (i.e. Default Operations). The Department has also recommended conditions that allow for setting the height of regulator gates differently to Default Operation requirements, and subject to Planning Secretary approval. The purpose of including this flexibility under Default Operations is to:

- allow the regulators to support improved environmental outcomes for fish passage, fish breeding or migration events on request of the infrastructure operator, including:
- Lowering the infrastructure gates temporarily to allow for unimpeded fish passage through the regulator during higher flows (supplementary flow events), and returning the gates to the Default Operations fixed height after the flow event has ended.
- Changing the height of the regulator level to facilitate fishway operation for any duration
- Stabilising water levels for a certain duration to support fish nesting and then returning to the Default Operations fixed height.
- Allow for WaterNSW river operations to lower the weir height at Hartwood regulator to meet operational shortfalls in the system in the delivery of bulk water, consistent with the environmental performance of the operation of the current weir infrastructure.

Unregulated flow operations are optimised to minimise impacts

Unregulated flow operations occur when rainfall events result in higher than planned flows that cannot be controlled by river operators using water regulation infrastructure. During unregulated flow operations the infrastructure will be operated to maximise beneficial fish passage by fully opening the gates of the infrastructure, and also regulate the end of these larger flow events to improve the efficiency of the Yanco system.

For Hartwood unregulated flow operation principles are:

- Water resource availability will be optimised consistent with the yellow zone operations as described in the EIS.
- When flows downstream of Hartwood Regulator exceed normal regulated river flow requirements Hartwood Regulator will initially be placed in upstream control at any level within the green zone.
- When flows in the Billabong Creek at downstream Hartwood Regulator (410168) are equal to or more than 1,200ML/day, the gates at Forest Creek Offtake are to be fully opened (i.e. lifted clear of the water);
- During this period, Hartwood Regulator will be placed on upstream control at 95.44m (top of the green zone) until such time as downstream water levels increase to 95.44m.
- When water levels downstream of Hartwood Regulator increase to 95.44m the regulator gates will be fully opened until downstream water levels fall again to 95.44m.
- When water levels downstream of Hartwood Regulator fall below 95.44m, Hartwood Regulator will be placed in upstream control at 95.44m until flows are about to recede to normal regulated operating conditions.

When flows in the Billabong Creek at downstream Hartwood Regulator (410168) fall below 1,200ML/day the gates at Forest Creek Offtake will be placed back in the water to meet regulated water delivery requirements and Hartwood Regulator will be operated in upstream control at any level within the green zone:

- Delay filling Hartwood Regulator to full supply level until near the end of an unregulated or unplanned flow event without compromising total water resource availability.
- Return to normal regulated flow conditions including adoption of regulator pool target levels.
- Regulator pool full supply levels do not apply when regulation gates are fully open during high flow events.

For Wanganella unregulated flow operation principles are:

- Water resource availability will be optimised consistent with the yellow zone operations as described in the EIS.
- When flows downstream of Wanganella Regulator exceed normal regulated river flow requirements, Wanganella Regulator will initially be placed in upstream control at any level within the green zone.
- When water levels downstream of Wanganella Regulator increase to 80.82m, the regulator gates will be fully opened until downstream water levels fall again to 80.82m
- When water levels downstream of Wanganella Regulator fall below 80.82m, Wanganella Regulator will be placed in upstream control at 80.82m until flows are about to recede back to normal regulated operating conditions.
- Delay filling Wanganella Regulator to full supply level until near the end of an unregulated or unplanned flow event without compromising total resource availability.
- Return to normal regulated flow conditions including adoption of regulator pool target levels.
- Regulator pool full supply levels do not apply when regulation gates are fully open during high flow events.

Operational principles and targets for the regulator gates minimise impacts from the weir pools created behind the new regulators

The operation of the proposal would result in changes to the upstream extent of the hydraulic influence of from the infrastructure, and increased storage volumes compared to the current infrastructure. This impact is minimised by adopting target levels to optimise regulator operations to only target full storage volumes when needed for the purpose of capturing the tail end of large flows. This minimises the impact of larger weir pools in a satisfactory manner.

The optimisation of key operating principles that apply to the regulators, include:

- regulator gates are to be fully open during moderate to large uncontrolled flow events at every possible opportunity to enable unrestricted fish passage opportunities
- equitable sharing of adverse outcomes across water access licence holders during unexpected supply shortfalls
- optimisation of weir pool operations to minimise the risk of adverse environmental outcomes

- distribution of flows downstream across the regulator gates to maximise the effectiveness of the vertical slot fishway
- target to limit the maximum rate of fall to 100 millimetres per day, and the maximum rate of rise to 300 millimetres per day at both Hartwood Regulator and Wanganella Regulator.

The weir pool related impacts and predicted changes for flow categories have been considered in the aquatic ecology assessment, and key fish habitat (KFH) offsets provided in consultation with DPIRD (see Section 6.2 Aquatic Ecology).

The operation of each regulator is proposed to be targeted at different heights so that the that the yellow zone should be primarily used during the irrigation season when water demand is higher, and catchment rainfall provides stream flows for regulation by the new infrastructure. The new regulators will target higher minimum weir pool heights in the yellow zone during higher demand (November to April) and lower demand (May to October), as the lowest in -creek water levels during in dry conditions, in wetter conditions the target heights will often be exceeded due to rainfall in the catchment. The weir pool height targets are presented in **Table 8**.

At Hartwood Regulator the weir pool median level is predicted to be marginally higher by 22 mm during the irrigation season but 3 mm lower in the non-irrigation season. The infrastructure at FSL and maximum operating flow scenario results in an approximate 51,590 m² or 7.7% increase in overall weir pool area compared to existing conditions. This is due to the downstream extent of the weir pool increasing, as the new regulator is located 70 metres downstream of the existing structure.

At Wanganella Regulator the weir pool median level is predicted to be marginally higher by 65 mm higher in the irrigation season and median 43 mm lower in the non-irrigation season. The infrastructure at FSL and maximum operating flow scenario results in an approximate 110,350 m² or 30% increase in overall weir pool area compared to existing conditions. This is due to the downstream extent of the weir pool increasing, as the new regulator is located approximately 55 metres downstream of the existing structure. Comparison of the inundation area for existing the existing weirs and full supply level of the new regulators, and the inundation area under normal and minimum operation levels is provided in **Table 9**.

Table 8 | Weir pool height targets (Source: EIS)

Time period	Hartwood	Wanganella
1 November to 30 April	95.44 m AHD 0.30 m below full supply level	80.99 m AHD 1.11 m below full supply level
1 May to 31 October	95.32 m AHD 0.42 m below full supply level	80.82 m AHD 1.28 m below full supply level

Table 9 | Comparison of estimated weir pool inundation areas for the project (Source: EIS)

Estimated weir pool inundation area (hectares)	Hartwood	Wanganella
Existing weir	107	40
Full supply level (regulator)	112	51
Normal operating level (regulator)	103	40
Minimum operating level (regulator)	96	40

The expanded weir pools also change the volume of water storage at each location. **Table 10** below identifies the changes to water storage volumes under the project. The Department notes that flows move through the infrastructure as an in-channel water storage, and that the volume changes may appropriately be described as maximum nominal volumes.

Table 10 | Comparison of estimated water storage volumes for the project (Source: EIS)

Volume of water storage (ML)	Hartwood	Wanganella
Existing water storage volume (weir)	517	161
Additional volume for general operations (regulator)	79	55
Additional volume for periodic operations (regulator)	185	472
Total additional storage volume provided by regulator	264	527
Proposed total storage volume	781	688

Changes to annual flow volumes (water balance) in the Yanco and Billabong Creek systems are considered to be low and acceptable

Comparison of the Base Case scenario and Change case on the basis of modelled total annual flows (GL/year) are for flows to remain highly variable at all locations under the Change Case. Under the Change Case there remains an absence of near no-flow years. The Change Case would result in a low degree of change to mean annual flows within the entire Yanco Creek System ranging from an 11.1 per cent reduction to 2.1 per cent increase. The EIS predicts an acceptable level of change for mean annual flows in mid and lower Billabong Creek from Jerilderie to Darlot (end of system in the Source model) which are produced by the differences between the Change and Base Case scenarios, including:

- new environmental baseflow provision for Yanco Creek at Offtake of 250 ML/day when General Security allocations exceed 15 per cent

- increase in minimum environmental flow provision for Yanco Creek at Morundah from 50 ML/day to 100 ML/day
- the ability of the new regulators to regulate flows within Billabong Creek itself to meet environmental and water supply demands
- new limits of no orders from Coleambally Catchment Drain and Drainage Channel 800 Irrigation Escapes
- new limits of no orders from Finley Escape until Colombo Creek at Morundah reaches 130 ML/day and no orders during the winter period (15 May to 15 August).

Table 11 provides comparison of mean annual water balance for the Base Case, Change Case and the water balance change metric of volume, percentage and change rating predicted under the operation of proposal. The low degree of hydrological change predicted is consistent with the use of the regulators to provide water delivery within the reaches of mid and lower Billabong Creek by re-regulating flows from upper Billabong Creek, and reduced reliance on flows from the Coleambally and Finley irrigation infrastructure to deliver flows into Billabong Creek. Comparison of the predicted impacts between the Cumulative Change Case and the Change Case are generally consistent and changes to mean annual flows along Billabong Creek remaining acceptable should the FCRFP also be implemented.

Table 11 | Mean annual water balance at key locations within the Yanco Creek System under the Change Case scenario compared to Base Case scenario.

Planning Unit	Location	Mean annual flows (GL/year) under Base Case scenario	Mean annual flows (GL/year) under Change Case scenario	Change from Base Case (GL/year)	% Change from Base Case	Change Case from Base Case rating (as per Table 2-2)
PU10: Upper Yanco Creek	Yanco Offtake	294.1	295.2	1.1	0.4	Low
PU11: Colombo & Billabong Creeks	Colombo Creek at Morundah	129.1	127.4	-1.7	-1.3	Low
	Billabong Creek Inflows at Walbundrie	140.7	140.7	0.0	0.0	Low
	Billabong Creek at US Innes Bridge	205.5	203.9	-1.6	-0.8	Low
	Billabong Creek at Jerilderie	207.6	206.1	-1.5	-0.7	Low
	Finley Escape inflows	9.5	8.6	-0.9	-9.5	Low
	Billabong Creek at DS Hartwood Weir	149.4	147.0	-2.4	-1.6	Low
PU12: Lower Yanco Creek to Lower Billabong Creek	Yanco Creek at Morundah	135.1	137.9	2.8	2.1	Low
	CCD + DC800 irrigation escape inflows	22.5	21.8	-0.7	-3.1	Low
	CICL escape transmission losses	0.3	0.3	0.0	0.0	Low
	Coly Outfall Drain inflows	0.5	0.5	0.0	0.0	Low
	Yanco Creek at Yanco Bridge	136.4	138.2	1.8	1.3	Low
	Billabong Creek at Conargo	245.9	245.2	-0.7	-0.3	Low
	Billabong Creek at Wanganella	224.0	223.4	-0.6	-0.3	Low
PU13: Lower Billabong and Intersecting Streams	Billabong Creek at Darlot	211.5	210.9	-0.6	-0.3	Low
	Forest Creek at Warriston Weir	32.9	33.0	0.1	0.3	Low

The decreases in mean annual flows at Billabong Creek at Hartwood, Conargo and Jerilderie under the Change Case scenario are considered the result of the inclusion of the new environmental flow provision for Forest Creek at Offtake of 10 ML/day under the Cumulative Change case model. This is

due to flows down Billabong Creek at Jerilderie increasing flows at Forest Creek Offtake, resulting in less flows down Billabong Creek downstream of Hartwood Weir and Conargo. The proposal is not anticipated to have any significant additional cumulative impacts within mid and lower Billabong beyond those impacts predicted by the Change Case. The Department considers impacts to flow volumes are acceptable when taking into consideration potential cumulative impacts due to other proposed changes in the operation of the Yanco system. The key operational rules and targets from the project fundamental to the low degree of changes in mean annual flows in the Study Area are the:

- environmental baseflow, native fish environmental flow and additional environmental provisions, including the new environmental flow provision for Forest Creek at Offtake of 10 ML/day
- the ability of the new regulators to regulate flows within Billabong Creek to meet environmental and water supply demands
- operational limits on the use of irrigation escapes

Seasonality of flow is maintained

The modelling results predict that the typical temperate seasonal pattern of flows throughout Billabong Creek would be maintained during the operation of the infrastructure. For the Change Case and Cumulative Change Case a low degree of hydrological change is predicted for mean monthly flow volumes in Billabong Creek from Jerilderie to Darlot. The Change Case scenario flow frequency modelling predicts that there would be no material change in the proportion of flow categories for mid and lower Billabong Creek with operation of the proposal. The mean monthly flows in ML/month at key locations along Billabong Creek under the Change Case are presented in **Figure 15**.

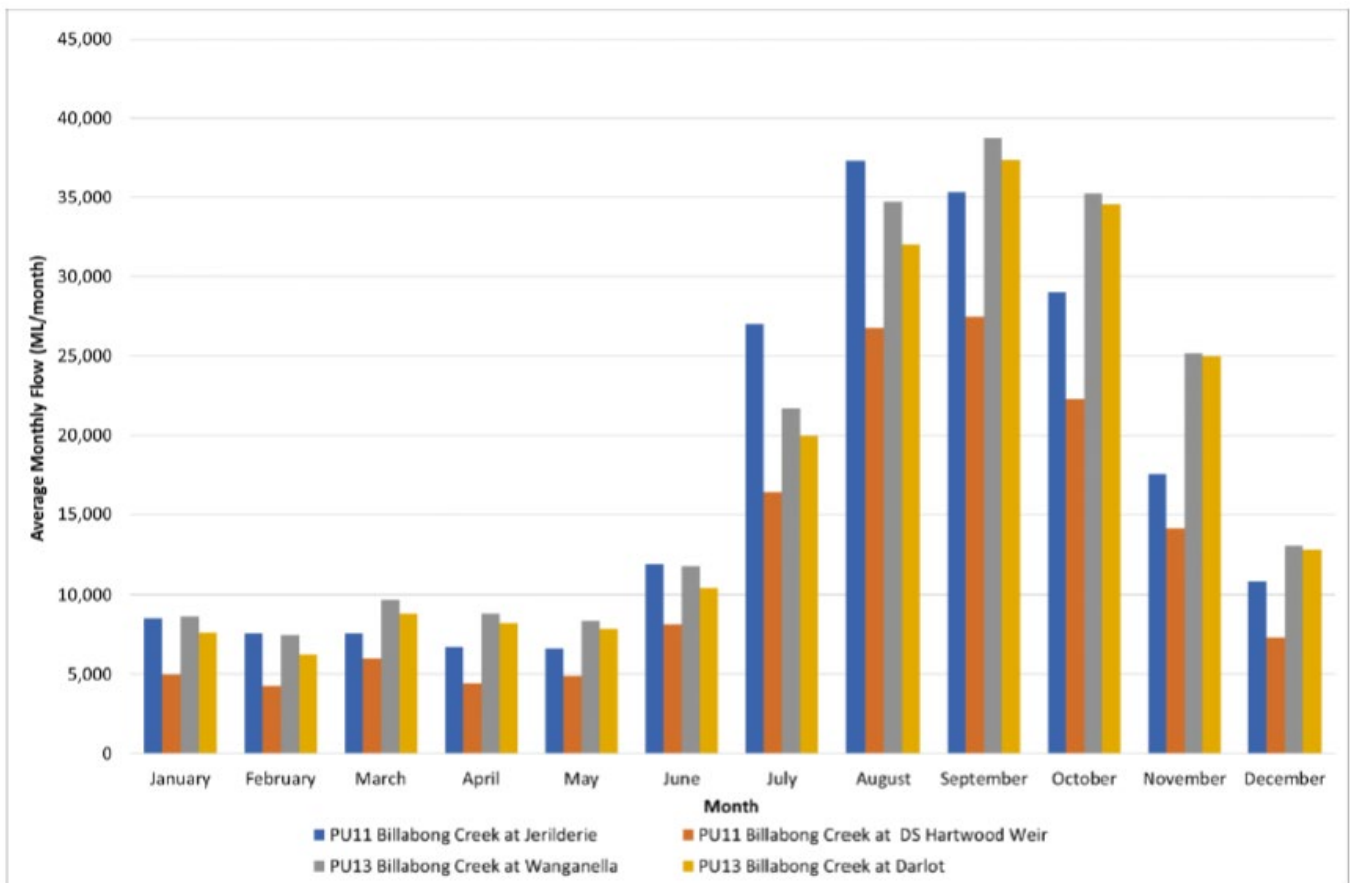


Figure 15 | Mean monthly flows at key locations for PU reaches in mid and lower Billabong Creek under the Change Case scenario (Source: EIS)

Figure 16 provides the changes in seasonal flows for percentage of difference in mean monthly flows under the Change Case. For middle and lower Billabong Creek the modelling results predict the differences in modelled mean monthly flows between Change and Base Case scenarios are characterised as low, with the mean monthly flow differences ranging from -17.6% to +5.3%. The changes to seasonal flows are proportionally larger in summer months compared to the rest of the year. Downstream of Hartwood regulator would see the most change in mean monthly flows with a range in reduction from -734 to -1,064 ML/month during the summer months, but comparatively less reduction across the rest of the year with a range from -14 to -276 ML/month under the Change Case. This is consistent with the project aiming to reduce unplanned flows downstream of Hartwood regulator.

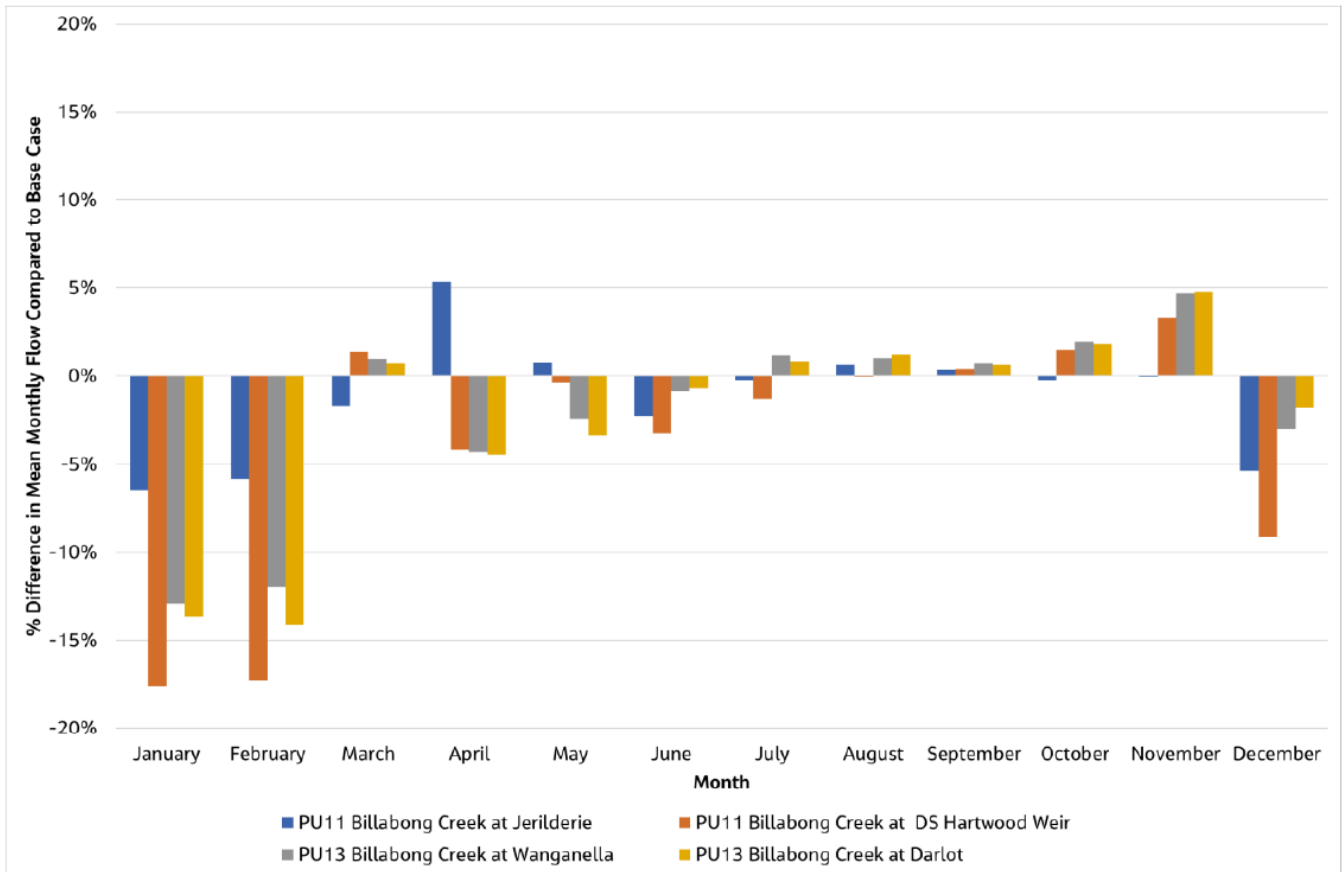


Figure 16 | Percentage difference in mean monthly flows at key locations for PU reaches in mid and lower Billabong Creek under the Change Case scenario compared to the Base Case scenario (Source: EIS)

The Change Case and Cumulative Change Case results in the EIS were consistent for seasonality of flow. As such, the proposal is not anticipated to have major additional cumulative effects within Yanco and Colombo Creeks beyond those observed under the Change Case, when taking into consideration potential cumulative effects associated with the Forest Creek Return Flows Project. The typical temperate seasonal pattern of higher flows during winter spring and lower flows during summer-autumn periods which was observed under the Base Case scenario is predicted to be retained for the Cumulative Change scenario.

Flow variability results predict a low degree of hydrological change due to the project

The Department notes that highly variable flows characterise the Yanco Creek system, and an absence of near no-flow years. The Change Case predicts a continuation of highly variable flow within the system and that the absence of near no-flow years is maintained. The total annual flows modelled for key locations in mid and lower Billabong Creek are presented in **Figure 17**. For the Study Area the changes predicted to the total annual flow volumes and flow variability within mid and lower Billabong Creek due to the project are acceptable.

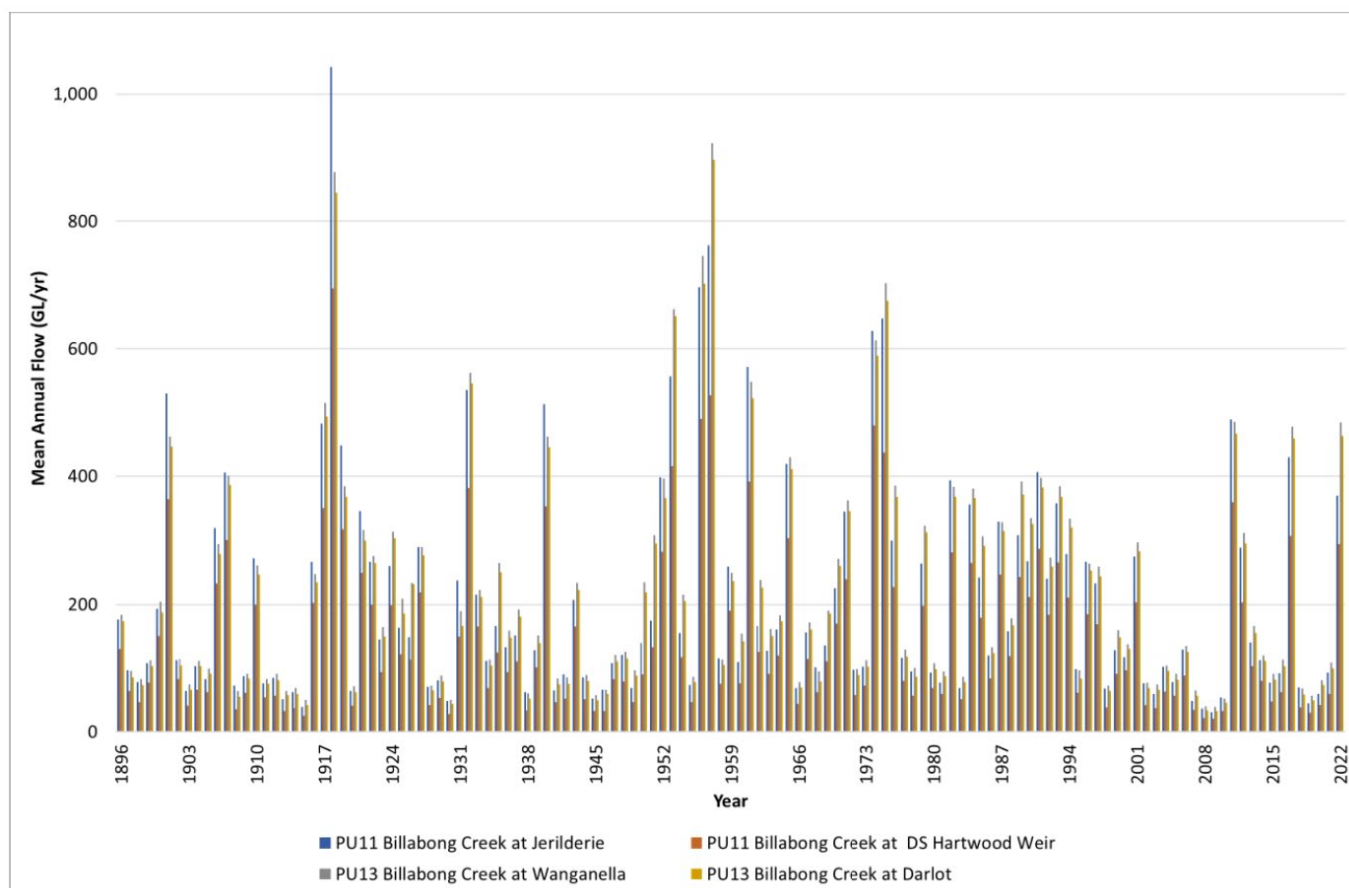


Figure 17 | Percentage difference in total annual flows at key locations for PU reaches in mid and lower Billabong Creek under the Change Case scenario compared to the Base Case scenario (Source: EIS)

The modelled percentage difference in mean annual flow volumes for the Change Case compared to the Base Case for mid and lower Billabong Creek is presented in **Figure 18** for key planning unit locations in the Study Area. The majority of predicted percentage differences to annual flow volumes across the modelling period represent a low degree of hydrological change of less than 20% difference. The Department also notes that the Base Case scenario incorporates higher flows due to increased use of irrigation escapes to deliver water in the system, and that minor negative differences in annual flow compared to the Base Case would be consistent with the proposed changes in rules for the operation of irrigation escapes.

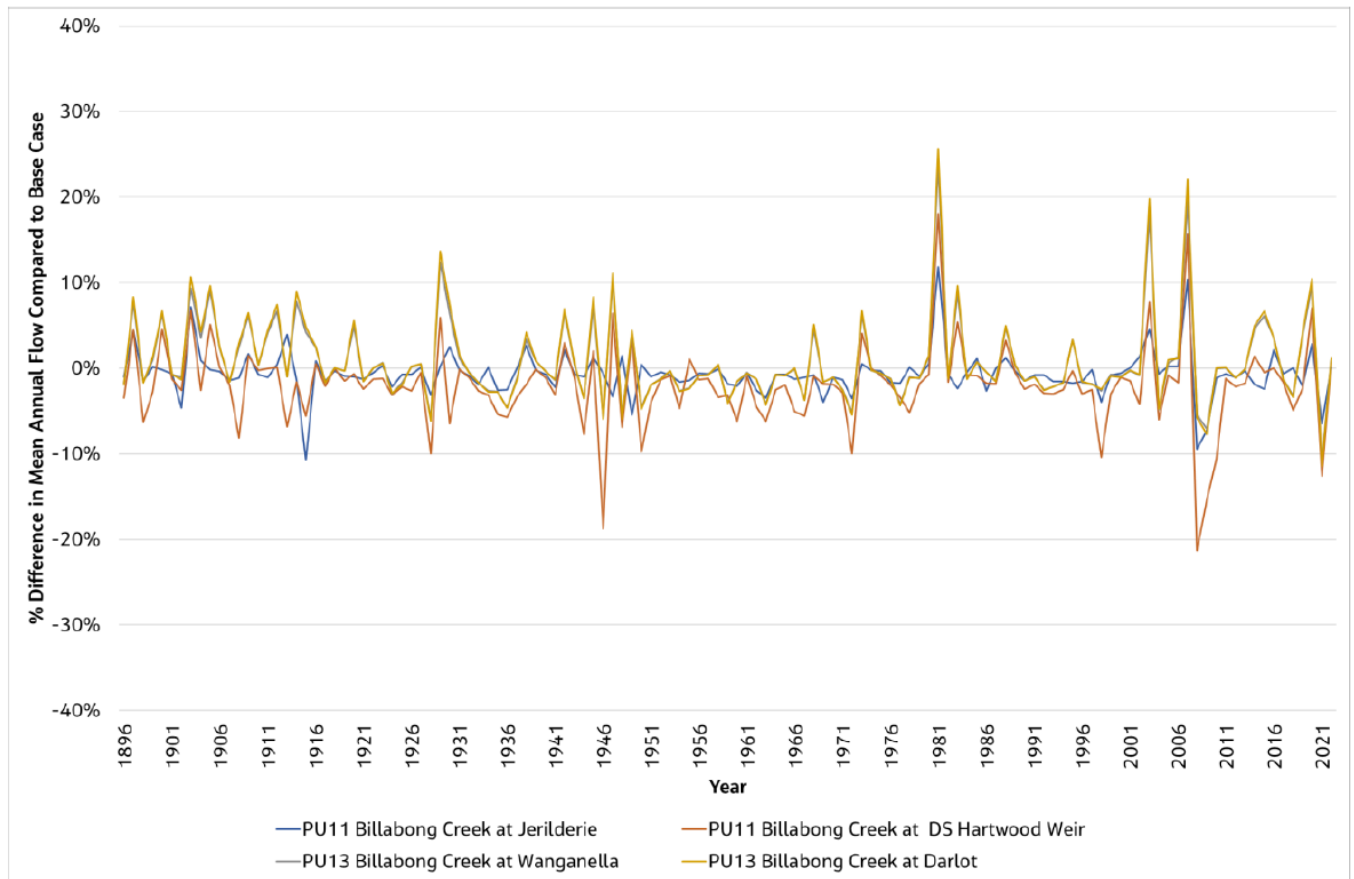


Figure 18 | Percentage difference in total annual flows at key locations for PU reaches in mid and lower Billabong Creek under the Change Case compared to the Base Case (Source: EIS)

The modelled Change Case and Cumulative Change Case for the Study Area predict flow variability that is generally consistent with the Base Case on an annual basis for both the Change Case and Cumulative Change Case. For mid and lower Billabong Creek, the majority of change in annual flow volumes are low with average annual flow volume change ranging from -2.6% to +2.6% along Billabong Creek, but for Forest Creek the change in modelled annual flow volumes ranges from low to high, with an average change of -14.8% as shown in **Figure 19**. The Department notes changes predicted for Forest Creek at Warriston Weir range from a low to high degree of hydrological change due to the FCRFP. The FCRFP has been considered in respect of the cumulative impacts; however, is subject to a separate assessment and approval process outside of this approval. The Department considers that the predicted outcomes for change in annual flow variability in Billabong Creek when operating the infrastructure, when also considering cumulative impacts, are acceptable.

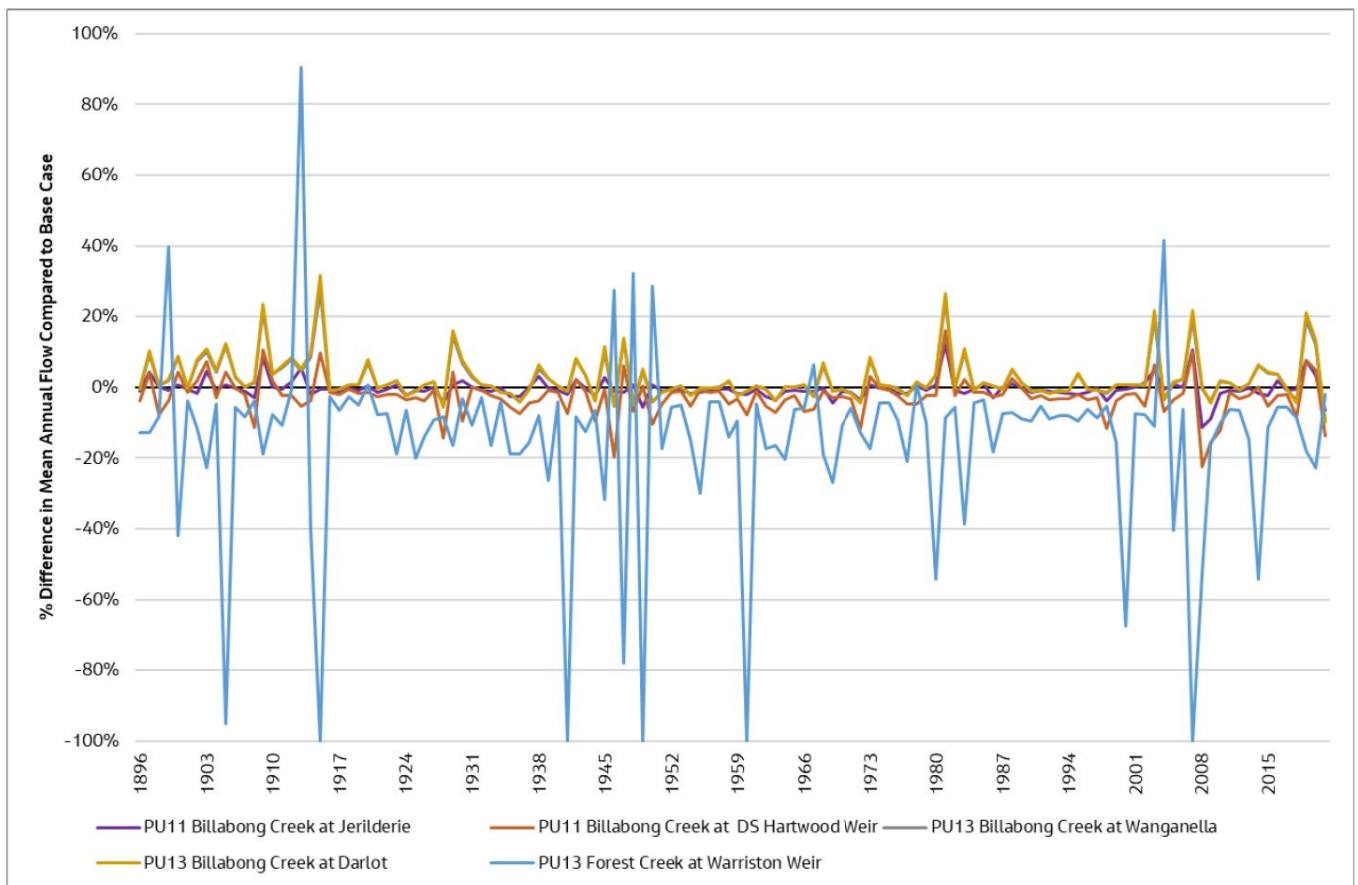


Figure 19 | Percentage difference in total annual flows at key locations along Billabong and Forest Creeks under the Cumulative Change compared to the Base Case (Source: EIS)

Modelling of the percentage of differences in mean daily flows has demonstrated a low degree of hydrological alteration under the proposal for the Change Case and Cumulative Change Case in Billabong Creek. Modelled differences in mean daily flows generally represent a low degree of hydrological change on average for mid and lower Billabong Creek (-4.6% to -0.8%), which is presented in **Figure 20**. The Department notes for Forest Creek at Warriston Weir the modelled differences from that project range from low to high (ranging from -2.1 to -98%) due to the flow target downstream of Forest Creek at Warriston Weir of 0 ML/day. This project is subject to separate assessment but has been considered to determine that the impacts of changes in flows are acceptable within Billabong Creek.

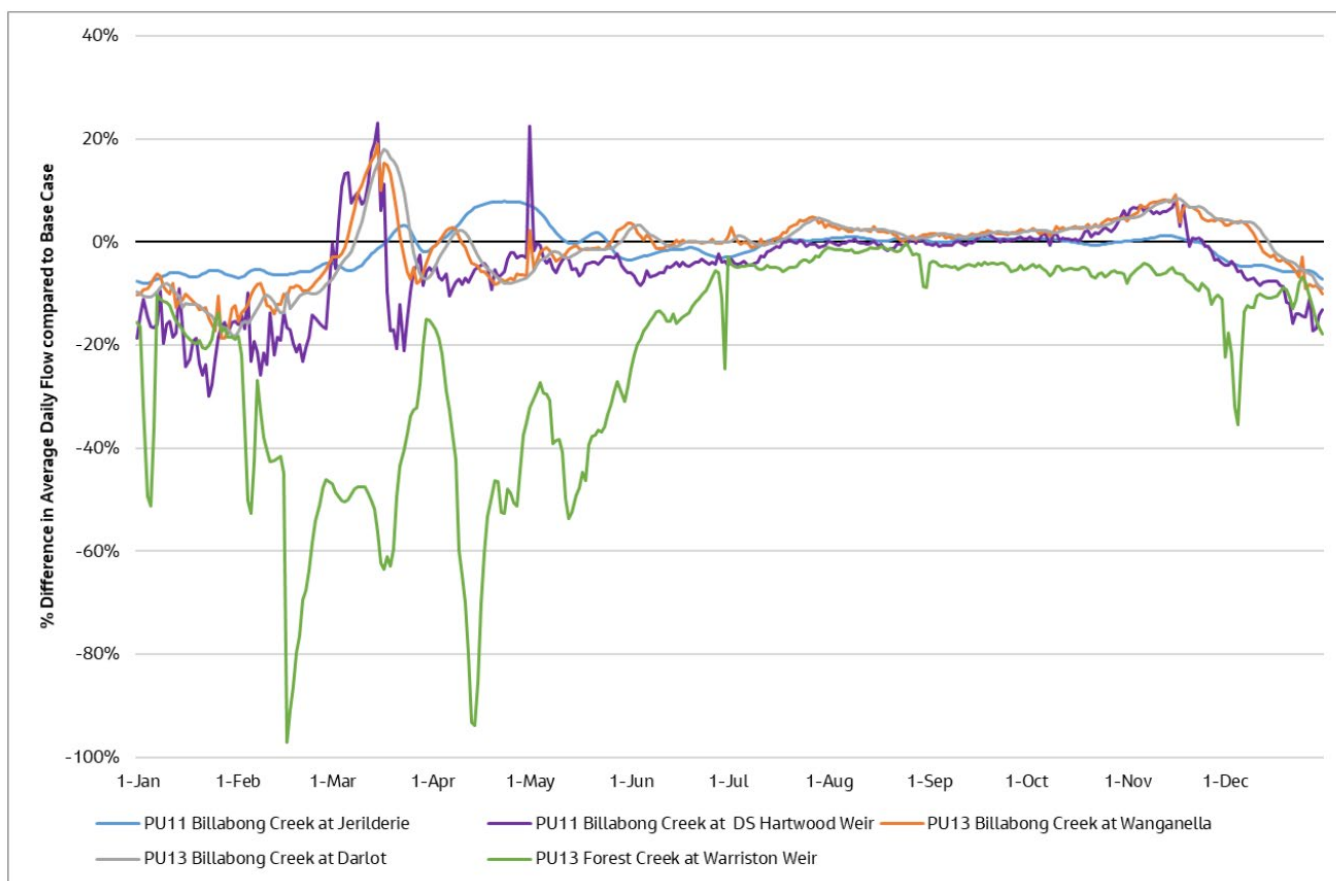


Figure 20 | Percentage difference in mean daily flows at key locations along Billabong and Forest Creeks under the Cumulative Change scenario compared to the Base Case scenario (Source: EIS)

Changes to Flow Size are Minimal

Flow size analysis for the project predicts that almost all changes in daily flow sizes for the Change and Base Case scenarios represent a low degree of hydrological change. Cease-to-flow no longer occurs throughout Billabong Creek under the modelled scenarios compared to pre-development conditions. Compared to the Base Case, a 3 per cent reduction of flow sizes for mid and lower Billabong is predicted during the operation of the proposal, but no material change in the proportion of flow categories is indicated. The daily flow duration curves under the cumulative change case are shown in **Figure 21**.

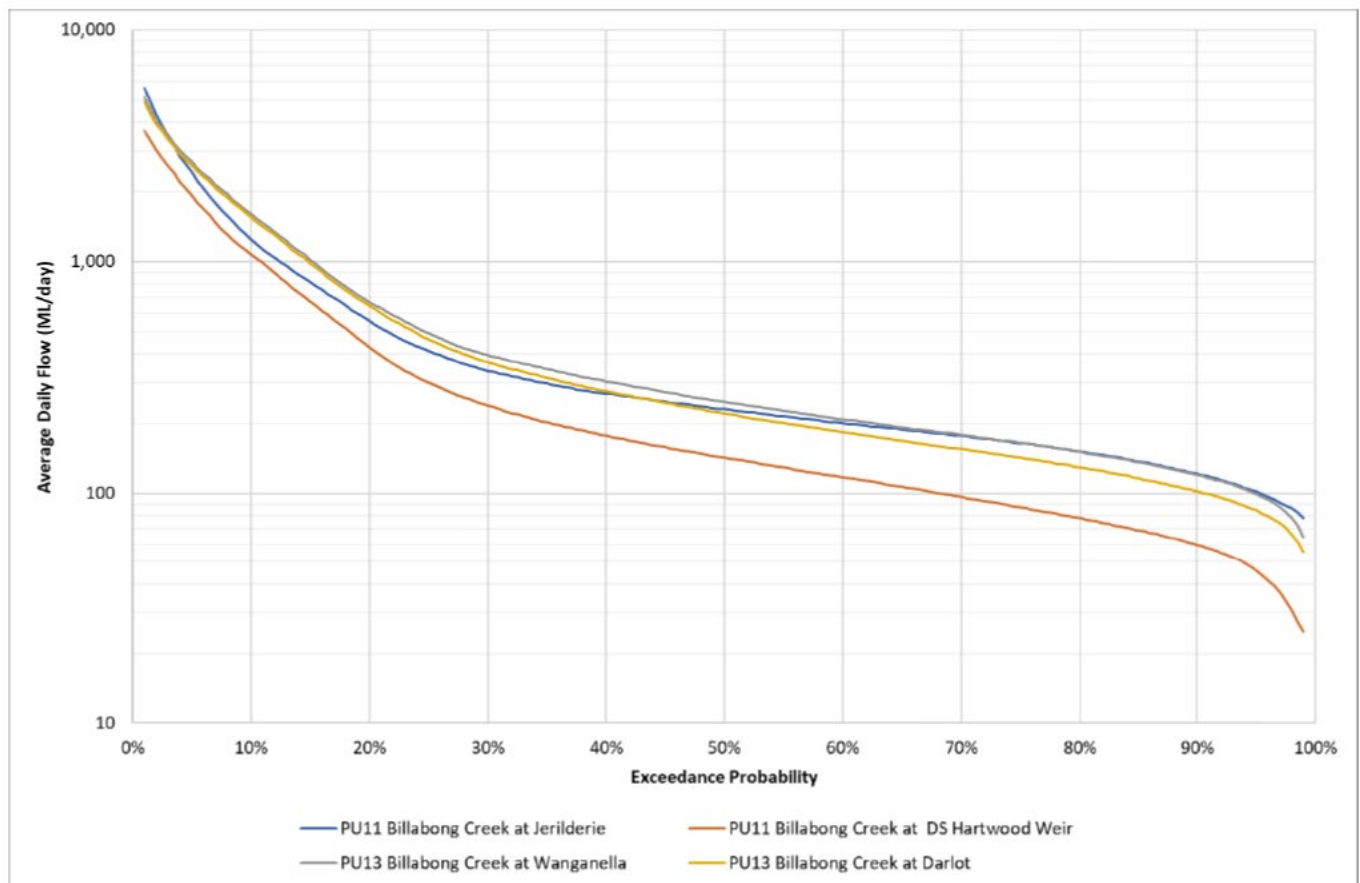


Figure 21 | Daily flow duration curves at key locations along Billabong and Forest Creeks under the Cumulative Change scenario (Source: EIS)

Changes in the predicted percentile of daily flow duration for mid and lower Billabong Creek are presented in **Table 12**. These changes are an expected result of carrying out the proposal as the regulators are intended to be operated to hold back unplanned water. The decrease in flows when the proposal is operated would mean the flow regime would change towards being more consistent with the hydrology of Billabong Creek pre-development than the flow regime prior to carrying out the project.

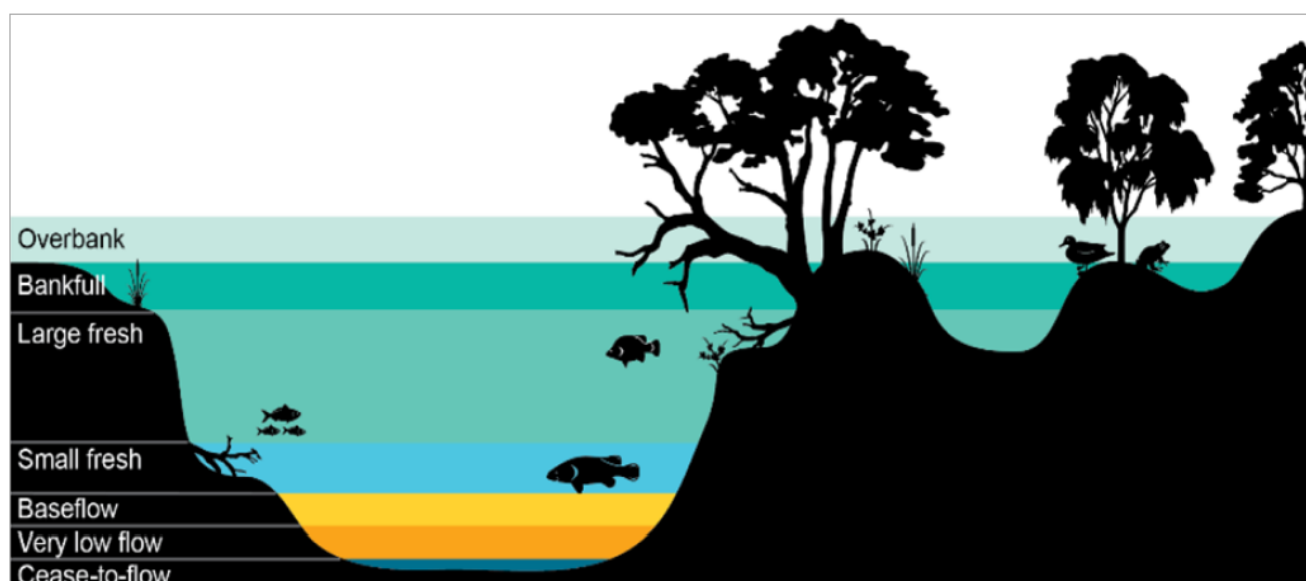
Table 12 | Percentile table for daily flow durations at key locations for PU reaches in mid and lower Billabong Creek under the Change Case scenario, with comparison to Base Case (Source: EIS)

Percentile	PU11 Billabong Creek at Jerilderie	PU11 Billabong Creek at DS Hartwood Weir**	PU13 Billabong Creek at Wanganella**	PU13 Billabong Creek at Darlot
0%*				
5%	2431 (+9, +0.4%)	1916 (+12, +1%)	2695 (+17, +1%)	2602 (+15, +1%)
10%	1249 (+10, +1%)	1074 (-8, -1%)	1607 (+17, +1%)	1553 (+10, +1%)
15%	815 (+8, +1%)	674 (+4, +1%)	1018 (+21, +2%)	987 (+22, +2%)
20%	553 (-1, -0.1%)	428 (+1, +0.2%)	669 (+16, +2%)	643 (+18, +3%)
25%	411 (-10, -2%)	299 (+4, +1%)	490 (+14, +3%)	461 (+11, +2%)
30%	338 (-17, -5%)	239 (0, 0%)	394 (+5, +1%)	367 (+7, +2%)
35%	297 (-17, -5%)	202 (-7, -3%)	343 (+3, +1%)	315 (+2, +1%)
40%	269 (-15, -5%)	177 (-10, -5%)	304 (-1, -0.3%)	275 (-2, -1%)
45%	247 (-11, -4%)	157 (-12, -7%)	272 (-7, -3%)	245 (-7, -3%)
50%	230 (-9, -4%)	143 (-11, -7%)	247 (-10, -4%)	221 (-9, -4%)
55%	214 (-9, -4%)	129 (-12, -9%)	226 (-13, -5%)	200 (-11, -5%)
60%	200 (-6, -3%)	117 (-13, -10%)	208 (-14, -6%)	183 (-13, -7%)
65%	188 (-4, -2%)	106 (-13, -11%)	192 (-14, -7%)	168 (-13, -7%)
70%	177 (-1, -1%)	96 (-13, -12%)	178 (-11, -6%)	155 (-12, -7%)
75%	164 (-1, -1%)	87 (-13, -13%)	165 (-10, -6%)	142 (-11, -7%)
80%	152 (0, 0%)	78 (-12, -13%)	151 (-9, -6%)	129 (-10, -7%)
85%	137 (-1, -1%)	69 (-12, -15%)	136 (-7, -5%)	116 (-9, -7%)
90%	121 (-2, -2%)	60 (-12, -17%)	120 (-6, -5%)	102 (-6, -6%)
95%	102 (0, 0%)	46 (-15, -25%)	99 (-8, -7%)	84 (-6, -7%)
100%*				

Smaller than very low flows	Very low flows	Baseflows	Small freshes		Large freshes	Large freshes: wetland connection	Small overbank	Large overbank
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Changes to EWR attainment throughout the system are acceptable and will likely provide a beneficial environmental outcome

The NSW long-term water plans (DPIE 2020b and 2020c) provide for environmental water requirements (EWRs) which describe a set of recommended flow characteristics (flow threshold or volume, duration, timing, frequency, maximum inter-event period) at particular locations (river gauges) in order to meet the environmental objectives for a PU. EWRs cover a range of flows including but not limited to, cease-to-flows, baseflows, small and large freshes and overbank flows, as presented in **Figure 22**, which is a conceptual diagram that illustrates the flow categories. The hydrological modelling performed for the EIS in Source was used in conjunction with Version 0.0.5 of the EWR Tool, which is a tool originally developed by the Murray–Darling Basin Authority, to predict and compare the likely EWR attainment between the Base Case, Change and Cumulative Change Case for key locations in PUs for the Study Area, and Area of Investigation.



Source: Murrumbidgee Long Term Water Plan Part A: Murrumbidgee catchment (NSW DPIE 2020b)

Figure 22 | Conceptual diagram of different flow categories (Source: EIS)

Table 13 presents the EWR adjusted frequency score results at key locations under the Cumulative Change Case during the operation of the proposal. The results presented in the EIS predict that there would generally be an improvement in the attainment of EWRs under the Change Case and Cumulative Change Case for the proposal in the Study Area. This indicates that the project would likely result in improved environmental performance compared to the Base Case. Therefore, the Department considers the impacts of project are acceptable with respect to ongoing attainment of EWRs and the delivery of flows to Billabong Creek, and that the project does not result in unacceptable risks to the attainment of EWRs across the range of EWR categories.

Table 13 | EWR adjusted frequency score results at key locations for PU reaches in the Yanco Creek System under the Cumulative Change scenario, with comparison to Base Case (Source: EIS)

Note that the green, yellow and red shading represents high, medium and low degree of EWR attainment as per Table 2-2. In addition, +/- indicates an increase/decrease in EWR adjusted frequency score compared to the Base Case scenario.

Category	EWR	PU10 (Upper Yanco Creek)	PU12 (Lower Yanco Creek to Lower Billabong Creek)	PU11 (Colombo Creek at Morundah to Billabong Creek upstream of Jerilderie)	PU11 (Billabong Creek at Jerilderie to downstream of Hartwood Weir)	PU13 (Lower Billabong and Intersecting Streams)
Cease-to-flow (CtF)	CF1	100 (0)	100 (0)	100 (0)	100 (0)	99 (-1)
Very low flow (VLF)	VF1_a	100 (0)	100 (0)	100 (0)	100 (0)	100 (0)
	VF1_b	100 (0)	100 (0)	99 (-1)	99 (-1)	100 (0)
Baseflow (BF)	BF1_a	100 (+32)	42 (+10)	100 (0)	100 (0)	100 (0)
	BF1_b	100 (0)	97 (+1)	99 (-1)	99 (0)	100 (0)
Native Fish Nesting Support	NestS1_mc	52 (+5)	37 (+5)	65 (+4)		76 (+7)
	NestS1_tmcc	40 (+4)	29 (+3)	60 (+7)		65 (+8)
Small fresh (pulse) (SF)	SF1_P	79 (+7)	82 (+6)	86 (+9)		94 (+4)
	SF1_S	87 (+3)	90 (+5)	93 (+3)		96 (+4)
	SF2	100 (0)	59 (+4)	97 (+8)		100 (0)
Large fresh (pulse) (LF)	LF1_P	81 (+5)	81 (+4)	87 (+7)		85 (0)
	LF1_S	100 (+3)	100 (0)	100 (0)		100 (0)
	LF2	100 (+2)	100 (0)	100 (0)		100 (0)
Wetland connection flow (Wetland-LF)	W-LF4_P					68 (+1)
	W-LF4_S					72 (+2)
	W-LF5					98 (+2)
	W-LF6_P	100 (0)	100 (0)	100 (0)		100 (0)
	W-LF6_S	100 (0)	100 (0)	100 (0)		100 (0)
	W-LF7	89 (-1)	70 (-1)	73 (0)		87 (+1)
	W-LF8	100 (0)	100 (0)	100 (0)		100 (0)
Floodplain connection flow (OB)	OB-L1					96 (8)
	OB-L1_P	88 (0)	92 (0)	88 (-4)		
	OB-L1_S	100 (0)	100 (0)	100 (0)		
	OB-S1					70 (-2)
	OB-S2		90 (0)			98 (0)
	OB-S2_P	70 (0)		86 (0)		
	OB-S2_S	88 (0)		100 (0)		

The Department notes that large fresh flows that connect wetlands, and overbank flows that connect the floodplain are not presently targeted for delivery, due to potential impacts on third

parties. When the flows currently occur, they are due to tributary rainfall events or dam spills and are not from infrastructure operation.

The key EWR results for Lower Billabong and Intersecting Streams downstream to Moulamein indicate predicted reduction in the attainment frequency with which Cease-to-flow (CF1) and the specific flow or inundation regimes for Small Overbank Floodplain Connection Flow EWRs are achieved. However, the EWR results for Lower Billabong and Intersecting Streams downstream to Moulamein indicate there are increases in the frequency with which the specific flow or inundation regime for Floodplain Connection Flow and Large Overbank, Small Freshes and Native Fish Nesting Support EWRs are achieved compared to Base Case results.

The EWR analysis predicts under the Change Case and the Cumulative Change Case that there is expected to be limited change to lower flow associated EWRs and improvements to the attainment of EWRs associated with baseflow and larger flows in the Billabong Creek Study Area. This minor change in attainment of lower flow associated EWRs is acceptable as the project would result in improvement in the frequency with which base flows, native fish nesting support, small fresh and large fresh events are achieved to support the environmental outcomes within Billabong Creek.

EWR attainment analysis for the reaches of the Yanco system upstream of the Study Area predict that there would generally be no reduction to the attainment of EWRs or there would be an increase in the frequency of attainment of EWRs compared to Base Case scenario results. In particular, the EWR categories which are larger flows than baseflow and associated with beneficial environmental outcomes are predicted to be attained more frequently.

Base flows in lower Yanco Creek to Lower Billabong Creek are predicted to increase +10%. Native Fish Nesting Support flows increase across all locations with a range from +3% to +8%.

Improvements in small fresh flow pulse attainment are predicted to increase by 3% to 9% as a beneficial environmental outcome of the operation of the project, in combination with the cumulative effect of changes modelled. These predicted changes to flows relate to the broader environmental outcomes of the project, and justify the acceptability of the project's other impacts, including the predicted minor reductions in other flow categories. The Department considers that the changes to predicted attainment of EWRs from the project are acceptable.

For Colombo Creek at Morundah to Billabong Creek upstream of Jerilderie (PU11) a minor reduction in the frequency with which very low flow (VF1_b), baseflow (BF1_b) is modelled for the Cumulative Change Case compared to Base Case. For this reach there is also a -4% reduction of modelled for the Large Floodplain Connection Flows OB-L1_P ('preferred seasonal timing') EWR achievement compared to Base Case. These modelled changes are noted by the Department to be at flow sizes where the predicted changes may be artifacts of the modelling process. The predictions for reduced attainment of these EWR categories are acceptable and consistent with the operation of the project to capture a portion of higher flow events in improving the efficiency of water delivery in Billabong

Creek. This is also acceptable as the attainment of Small fresh (SF1_P, SF1_S and SF2) and Large fresh (LF1_P) EWRs are predicted to be improved. Particularly, there is improvement to the frequency with which the fish breeding Nest 'S1_tcmc' (Trout Cod/Murray Cod) EWR is attained, and the associated beneficial environmental outcomes for key fish species under that flow category. This justifies the acceptability of the upstream and cumulative impacts of the proposal.

The EWR results for Billabong Creek at Jerilderie to downstream of Hartwood Weir indicates only a minor (-1%) reduction in cease-to-flow. The results are similar for Lower Billabong and Intersecting Streams downstream to Moulamein which indicate a minor (-1%) reduction in the frequency of attainment for Cease-to-flow, and the specific flow or inundation regimes for small overbank floodplain connection flow (-2%) compared to Base Case scenario results. The minimum flow targets as specified for Billabong Creek at Jerilderie is 70 ML/day when General Security allocations are equal to or greater than 15%, and this flow is larger than the EWR categories below very low flow (VF1_b). The predicted minor decreases in reductions for cease to flow and very low flows attainment are potentially artifacts of the modelling process.

Effective General Security allocations are not predicted to decrease

Effective General Security Allocations are predicted to increase marginally under the Change Case scenario, compared to Base Case, for opening allocation and summer planning decision dates. The results for Effective General Security Allocations are presented in **Table 14**. The Source model results predict a minor decrease for the Change Case at the end of the year, but the Cumulative Change Case does not predict a decrease. The Department notes that the quantum of decrease predicted under the Change Case is within the limit of model accuracy and is likely an artifact of the limitations of the Source model. As the decrease is not predicted under the Cumulative Change Case with the concurrent changes proposed for the Yanco Creek system, the Department is satisfied that the risk of reduction to water availability to meet Water Access Licenses is acceptable under the proposal.

Table 14 | Effective General Security Effective Allocations (AWDs + Carryover) (Source: EIS)

Key date	Description	Base Case	Change Case	Cumulative Change Case
1-Jun	Opening allocation	48.2	48.4	48.4
15-Sep	Summer planning decision dates	57.5	57.7	57.8
1-Oct		58.8	58.9	59.0
30-Jun	End the Year	84.9	84.8	84.9

Water extraction changes predicted are acceptable

The EIS modelling results for consumptive extraction indicates that consumptive take is able to increase by up to 0.2 GL/year based on the water availability in the Yanco Creek under the Change Case scenario, and that there would be no reduction in water availability to meet Water Access Licenses requirements during the operation of the proposal **Table 15**. The Department considers the potential water extraction impacts of the proposal to be acceptable.

Table 15 | Predicted change in water extraction (Source: EIS)

Water Balance Component	Base Case	Change Case
Extractions (GL/year)	66.9	67.1
Difference from Base Case (GL/year)	0	Increase of 0.2

NSW River Flow Objectives would be met during construction and operation

The assessment has demonstrated that the risk of adverse NSW River Flow Objectives outcomes during construction and operation of the proposal is low, and acceptable considering the environmental benefits of the proposal generally support the achievement of NSW River Flow Objectives. Due to the construction methodology staging bypassing flows around the construction zone inside cofferdams, and demolition of the existing weirs only after the completion of the new regulators, no adverse impacts to the NSW River Flows are expected during the construction of the project.

The assessment of potential impacts to the NSW River Flow Objectives during the operation of the proposal to the extent of proposal influence up and down stream are shown in **Table 16** and **Table 17**.

Table 16 | Potential impacts to River Flow Objectives with operation of the proposal (Source: EIS)

NSW river flow objective	Description	River Flow Objectives impacts during operation
Protect natural low flows	Protect natural low flows	The flow variability and frequency and size analysis results for the Change Case scenario (see Section 4.2) indicate operation of the proposal is not expected to result in adverse impacts to low flows (i.e. unnatural prolonged drying) within the proposal study area and the broader Yanco Creek System. Very minor reductions are modelled in some instances, but these are likely modelling artifacts due to the limitations of the Source model. Environmental baseflow provisions specified in the Yanco Creek System Operations Plan (NSW DCCEEW 2023b) include at (among other locations) Billabong Creek @ Jerilderie of 70 ML/day (when general security allocations are equal to or greater than 15%), Billabong Creek @ downstream Hartwood Regulator of 25 ML/day (at all times) and Billabong Creek @ Darlot (410134) – 50 ML/day plus downstream orders (at all times).
Protect important rises in water levels	Protect or restore a proportion of moderate flows ('freshes') and high flows	The flow frequency and size analysis for the Change Case scenario (see Section 4.2) indicate no material change in the proportion of moderate flows ('freshes') and high flows will occur within the study area with operation of the proposal.
Maintain wetland and floodplain inundation	Maintain or restore the natural inundation patterns and distribution of floodwaters supporting natural wetland and floodplain ecosystems	The analysis of EWR (Environmental Water Requirements) attainments for the Change Case scenario (see Section 4.2) indicate, with some exceptions, mostly no change or some minor improvements in the frequency in the expected frequency of over bank wetland connection or floodplain connection flows within the study area (i.e. lower Billabong Creek) with operation of the proposal. Very minor reduction in the frequency of small overbank floodplain connection flows (EWRs OB-S1 and OB-S2) predicted for lower Billabong Creek, but this is likely a modelling artifact due to the limitations of the Source model.
Mimic natural drying in temporary waterways	Mimic the natural frequency, duration and seasonal nature of drying periods in naturally temporary waterways	The annual water balance results (see Section 4.2.1) indicate no material change in the overall water balance of the Yanco Creek System with operation of the proposal that is considered likely to result in changes to the current frequency, duration and seasonal nature of drying periods in naturally temporary waterways within the Yanco Creek System.

Table 17 | Potential impacts to River Flow Objectives with operation of the proposal (Source: EIS)

NSW river flow objective	Description	River Flow Objectives impacts during operation
Maintain natural flow variability	Maintain or mimic natural flow variability in all streams	The flow variability analysis results (see Section 4.2) indicate no material change in the overall annual flow variability within the Yanco Creek System with operation of the proposal. Operation of the proposal is also not expected to seriously impact mean daily flow volumes within lower Billabong Creek, including the proposal study area.
Maintain natural rates of change in water levels	Maintain rates of rise and fall of river heights within natural bounds	Operation of the proposal is expected to result in an improvement in the rates of change in water levels within the proposal study area and the broader Yanco Creek System. The Yanco Creek System operations plan includes normal regulated flow operational limits for 'Pool Maximum Daily Rate of Rise' of 0.30m for Hartwood and Wanganella regulators. The Yanco Creek System operations plan also includes 'Native fish environmental flow provisions' of a maximum rate of fall of 9% (by volume) between the 14th September and 16th November inclusive for Yanco Creek at Yanco Offtake and Billabong Creek at Darlot, to better align with the EWR for fish nesting in the long-term watering plan.
Manage groundwater for ecosystems	Maintain groundwater within natural levels and variability, critical to surface flows and ecosystems	During operation, minor watertable change is expected at Hartwood and Wanganella. The operation of the proposal is not expected to result in adverse impacts to water dependent ecosystems as the change in groundwater level expected from the proposal is minor. Billabong Creek is partially disconnected and losing to groundwater hence, the proposal is not expected to result in reduced surface flows during operation.
Minimise effect of weirs and other structures	Minimise the impact of instream structures	Operation of the proposal will not have a significant adverse impact on the occurrence of high-quality flowing habitat or water quality within the proposal study area. The design of the Hartwood and Wanganella regulators includes fishways that will allow an increase in river extent with unimpeded fish passage.

During operation, under both the Change Case and Cumulative Change Case scenarios, no significant adverse impacts are expected to any of the River Flow Objectives. Serious impacts to the mean daily low volumes within lower Billabong Creek, including the proposal study area, are not expected (*'Maintain natural flow Variability'*). Objectives. Adverse impacts are not expected to occur to the protection of low flows (i.e. unnatural prolonged drying), moderate flows (*'freshes'*), high flows (*'Protect natural low flows'*) and wetland and floodplain inundation flows (*'Maintain wetland and floodplain inundation'*). In addition, operational targets for the maximum rates of rise and fall at each regulator are expected to improve the rates of change in water levels (*'Maintain natural rates of change in water levels'*) within the study area, which would better align with the EWR for native fish

nesting. Groundwater impacts are expected to be minimal with minor watertable changes expected at Hartwood and Wanganella, that are not expected to result in adverse impacts to water dependent ecosystems as the change in groundwater level (*'Manage groundwater for ecosystems'*). As Billabong Creek is partially disconnected and losing to groundwater the proposal is not expected to result in reduced surface flows during operation. In addition, through the provision of fishways, the proposal would increase the extent of river with unimpeded fish passage (*'Minimise the effects of weirs and other structures'*).

The Cumulative Change Case assessment was broadly consistent with the Change Case, but noted some minor improvements were predicted to the expected frequency of over bank wetland connection or floodplain connection flows within the study area (i.e. mid and lower Billabong Creek) after taking into account the operation of the proposal and the Forest Creek Return Flows Project.

6.2 Aquatic Ecology

The proposal would impact on the aquatic ecology of Billabong Creek during both construction and operation, including positive impacts. Billabong Creek is located within the *Lower Murray River aquatic ecological community* which is listed as Endangered under the FM Act. The Proponent assessed the proposal study area – Billabong Creek from Jeriliderie to Darlot for impacts to aquatic ecology (see **Figure 14**) considered to be the extent of hydrological influence for the regulators. This Department considers that this extent was adequate for assessment of impacts to aquatic ecology, and notes that the operation of the Forest Creek Return Flows Project has been included in this assessment for the purpose of cumulative impact assessment but is subject to a separate assessment. Aquatic habitat mapping within the proposal study area identified a moderate to high abundance of in-stream structural habitat (large woody habitat and rootballs), wetland entry and exit points, drought refuges (particularly within weir pools), benches and 10 macrophyte species.

The Murray Cod (Vulnerable under the EPBC Act) and Silver Perch (Critically Endangered under the EPBC Act and Vulnerable under the FM Act) are widespread in the middle and lower reaches of Billabong Creek and therefore the proposal area is classified as 'Type 1 – Highly Sensitive KFH' by DPIRD Fisheries. The Freshwater Catfish is also present in the proposal area and is listed as an Endangered Population in the Murray Darling Basin under the FM Act. Other ecologically, commercially, and culturally important aquatic and semi-aquatic species that have been recorded in the Yanco-Billabong System in the vicinity of the study area include native fish (Golden Perch), turtles (Eastern Long-necked Turtle, Broad-shelled Turtle and Murray River Turtle), Platypus, and Rakali (Water Rat).

The proposal would have some unavoidable impacts to aquatic ecology, however these would be offset in consultation with DPIRD Fisheries through a KFH offset strategy and fish passage offsets. The construction of the regulators has the potential to result in adverse impacts to water quality and

aquatic ecology, however, these potential impacts can be avoided and mitigated such that the residual risks are considered low. Modelled results for the predicted attainment of EWRs generally showed very minor changes or improvements in the frequency of attainment of flow categories that are important for the movement and reproduction of key species in the system, indicating low risk of adverse impacts and likely benefits to the environment due to the project. Through the fishways at the new regulators, and fully opening regulators in supplementary flow operations, the project would provide for significantly improved fish passage within Billabong Creek.

6.2.1 Issue

The proposal would have impacts on Key Fish Habitat and habitat connectivity and subsequently would require offsets

The proposal causes unavoidable impacts due to the installation and operation of instream structures. The proposal will result in the permanent loss of up to 4,635 square metres of type 1 Key Fish Habitat (KFH) through the construction of the regulators, including approximately 3225 square metres at Wanganella and 1400 square metres at Hartwood. These figures account for the footprints of the regulators, noting that the fishways were excluded from the offset calculation in accordance with the *Policy and Guidelines for Fish Habitat Conservation and Management (2013)*. During operation, the proposal would generally not result in changes to downstream attainment of EWRs.

The new operating regime will result in more frequent high upstream water levels coinciding with low flow conditions through the weir pool, changing habitat that was previously lotic (flowing) to lentic (slow or no flow). In addition, as the new regulators are downstream of the existing weirs – 55 metres downstream for Wanganella and 70 metres for Hartwood – the area between the existing weirs and the new regulators would become weir pool.

In its review of the EIS, DPIRD Fisheries noted the need for offsets to account for both the regulator footprint and the change in upstream habitat. Subsequently, the Proponent consulted with DPIRD Fisheries to develop a KFH offset strategy. Under high and moderate flows, there was found to be minimal differences between the current weirs and the proposed regulators. However, under existing conditions, water levels in the yellow zone (see **Figure 11** and **Figure 12**) occur only during high flows. With the new regulators, the yellow zone conditions would also occur during periods of low flows (i.e. when a large flow occurs and is captured and held in the weir pool). It was also noted by DPIRD Fisheries in its review of the EIS that the raising of the Forest Creek block bank by 0.6 metres would represent a barrier to fish passage, triggering section 218 of the FM Act (Fishways to be provided in construction of dams and weirs).

Construction of the project would have impacts on aquatic ecology; however, the overall risks are low

Billabong Creek is classified as waterfront land under the *Water Management Act 2000*. The Proponent has considered the need to protect water quality and aquatic ecology during construction. Aside from the direct impacts to KFH identified above, the Proponent identified a number of potential impact pathways related to the construction of the infrastructure, including:

- Direct harm or mortality of aquatic fauna from contact with equipment and machinery, noise and vibration or disturbance of bank habitat.
- Direct degradation of instream habitat through changes to water quality and water regime such as sedimentation (i.e. smothering aquatic vegetation), removal of vegetation resulting in increased light levels and temperature, and accidental spills and leaks.
- Loss of connectivity and impeded fish and other aquatic fauna passage from temporary barriers associated with instream work areas, which could result in behavioural changes or increased predation. Dewatering the coffer dams could also have impacts (i.e. fish stranding).
- Reduced water quality, through increased turbidity which may lead to direct harm to aquatic species from clogging fish gills, reduced visibility for aquatic biota, or reduced light penetration through the water column which may limit growth of macrophytes.
- Reduced water quality through increased nutrient loading released from mobilised sediments leading to risk of algal blooms. Algal blooms could lead to direct harm to aquatic species.
- Reduced water quality, through increased pH from mobilisation of extremely alkaline concrete waste products (i.e., concrete slurries, concrete dust or washout water) may directly harm or kill aquatic species.
- Proliferation of weeds, pest species or pathogens.

The Proponent has proposed mitigations such as water quality control measures, weed and biosecurity control, and a dewatering plan to reduce the risk of the impacts outlined above. The construction methodology which would leave one half of the creek unobstructed would also minimise impacts related to the passage of fish and other aquatic fauna.

With the implementation of mitigation and management measures the Proponent considered that the risk ratings were low to very low for all but one of the impact pathways identified. Erosion and sedimentation was considered to have a medium risk rating - the disturbance of soil during construction has the potential to result in erosion and subsequent impacts to water quality and aquatic ecology. The Proponent has committed to preparing an Erosion Sediment and Control Plan in line with best practice guidelines, which would include measures such as instream silt curtains,

sediment controls around stockpiles which would be placed away from the watercourse, jute matting and silt fences.

6.2.2 Consideration

Where impacts to KFH and fish passage cannot be avoided offsets would be provided to the satisfaction of DPIRD Fisheries

The Proponent has sought to avoid impacts to hydrology and KFH through the location of the regulators immediately downstream of the existing weirs. However, the Department acknowledges that some impacts to KFH are unavoidable and offsets would need to be provided for both the direct impacts of the instream structures and the operational impacts upstream of the regulators. The Department considers that impacts to aquatic ecology downstream of the regulators are acceptable due to low degree of hydrological change and changes to attainment of EWRs.

Considering KFH offsets, the Proponent calculated the difference in time (as a percentage) that the regulators would be operated in the yellow zone upstream of the regulators compared to the existing weirs (see **Table 18**).

Table 18 | Difference in time in yellow zone (Source: Billabong Creek KFH Offset Strategy - Wanganella and Hartwood Regulators - Yanco Modernisation, SDLAM)

Structure	% Time in Yellow Zone (Existing)	% Time in Yellow Zone (Proposed)	% Difference between existing and proposed
Wanganella	27	41	14
Hartwood	19	30	11

Table 19 shows how the proposed offsets were calculated. The area of lentic habitat at Full Supply Level (FSL) was modified to reflect the percentage change in frequency of time in the yellow zone. The modified area would be paid at \$114.40 per square metre of affected area. **Table 19** shows the offset cost proposed by the Proponent for both regulators for upstream impacts. The offsets relating to the construction footprints of the regulators were calculated at \$530,244, bringing the total offset cost to an estimated \$5,112,462.

Table 19 | Proposed operational offset costs (Source: Billabong Creek KFH Offset Strategy - Wanganella and Hartwood Regulators - Yanco Modernisation, SDLAM)

Structure	Lentic Habitat Created at FSL m ²	Change in frequency in yellow zone (%)	Modified area for offset calculation (m ²)	\$ per m ²	Offset cost
Hartwood	258,125	11	28,393.75	114.40	\$3,248,285
Wanganella	83,290	14	11,660.60	114.40	\$1,333,973
Total					\$4,582,218

The Department has recommended a condition requiring the Proponent to prepare a KFH Offset Strategy in consultation with DPIRD Fisheries. The Department understands that this process is underway and a KFH offsets strategy is being developed by the Proponent (including the cost methodology in **Table 19**) for review by DPIRD Fisheries. The KFH offset strategy would incorporate the Aquatic Biodiversity Strategy that was requested by DPIRD Fisheries at the EIS and RtS stages. The Department has also recommended conditions requiring that the KFH offset strategy include a governance group made up of representatives from DCCEEW Water Group and DPIRD Fisheries and that the finalised offset strategy is published on the Major Projects portal.

The Department understands that the fish passage offset strategy is being developed to the satisfaction of DPIRD Fisheries regarding the Forest Creek block bank through providing fish passage in other areas of the system as part of the broader Yanco Creek Modernisation Project. Section 4.8 (Fish Passage Trade-offs) of the *NSW Policy and guidelines for fish habitat conservation and management (2013)* provides provisions for transferring section 218 fish passage requirements to alternative priority sites. Overall, the Department considers that these impacts are acceptable subject to offsetting measures and noting the other project benefits to aquatic ecology.

Potential impacts to water quality and aquatic ecology during construction are generally low risk and can be effectively managed

The Department considers that the Proponent has adequately assessed impacts during construction. Where feasible, the Proponent has avoided impacts, such as through the construction methodology, which does not obstruct fish passage. Potential impacts related to erosion and sedimentation were considered to be a medium level of risk to aquatic ecology and water quality.

The Department has recommended a condition requiring the Proponent to prepare a Soil and Water sub-plan that would include energy dissipation and stabilisation measures in areas of increased flow, and monitoring of channel form and erosion. Recommended conditions also require that the NSW Water Quality Objectives are maintained and that construction is carried out in accordance with the *Guidelines for Controlled Activities on Waterfront land (DCCEEW, 2025)*. Further, the Department considers that the proposed measures contained in the Erosion Sediment and Control Plan would effectively manage the impacts. The implementation of these measures minimise the risk of exceeding NSW Water Quality Guideline values and minimise the risk of indirect water quality impacts, such as algal blooms.

The Department considers that other impacts during construction are adequately managed by proponent commitments. In conjunction with recommended conditions, it is expected that the water quality objectives and aquatic ecosystem values in the study area (including threatened species and key fish habitat) would be protected during construction.

The proposal would provide for environmental benefits in the Billabong Creek system including improved fish passage and attainment of EWRs

The findings of the EWR analysis indicated that there was either generally no change or improvement in achieving EWRs during the operational of the proposal (see Section 6.1). The analysis predicted improvements in the frequency of achieving baseflows, native fish nesting support, small freshes and large fresh EWRs throughout the Yanco Creek System, including the proposal study area. Improvements to the fish nesting support EWR is expected to have broad system benefits for Billabong Creek ecology.

In addition, the proposal would provide for improvements in the efficiency of water management in Billabong Creek by assisting the delivery of environmental water through greater operational control. Each regulator would include a low turbulence 'keyhole' type vertical slot fishway to enable fish sized between 3 and 100 centimetres long to move upstream of the structures. The inclusion of the fishways represents a significant fish passage improvement over the current structures. Further, the layflat gates can be lowered during high flow events to allow additional opportunities for fish movement. The Department has considered these benefits in recommending that the overall impacts of the proposal to aquatic ecology are acceptable.

Operational impacts would be managed through recommended conditions of approval

As noted in Section 6.1 the operational rules for the project would be implemented through a YCSOP or WSP. Accordingly, the Department has recommended conditions that require the regulators to be operated in a manner that is generally consistent with the existing hydrological regime under

Default Operations until the operating rules are in place to attain a level of environmental performance commensurate with the environmental impacts outlined in the EIS.

During the assessment process, the Proponent raised the issue that when the new regulators are operated under Default Operations, the water level may not enable the functioning of the fishways. To address this potential issue, the Department has recommended a condition that allows for the regulators to be operated in a manner not consistent with Default Operations for the purposes of improved environmental outcomes in relation to fish passage, fish breeding and migration events. Such operation would be to the satisfaction of DPIRD Fisheries and approved by the Planning Secretary. Recommended conditions also require that when the operational rules are finalised, either through the YCSOP or amendments to the Murrumbidgee Water Sharing Plan, the regulators must generally be operated in a manner consistent with the environmental impacts outlined in the EIS.

6.3 Terrestrial Flora and Fauna

A Biodiversity Development Assessment Report (BDAR) was prepared to address direct and indirect impacts on biodiversity under the BC Act. The proposal is not a controlled action under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Proponent has avoided and minimised impacts where possible. During operation, impacts from the regulators would be restricted to in-stream, aquatic environments with no changes to overbank flows and so would not tangibly affect the terrestrial flora and fauna that is the subject of the BDAR. During construction however the proposal will remove up to 16.29 hectares of native vegetation. Whilst no threatened ecological communities will be impacted, threatened species would be directly impacted and residual impacts will be offset using the BAM-C method.

The proposal would impact mapped important habitat for a species at risk of serious and irreversible impacts (SAIL), the Plains Wanderer; however, the Department has concluded that the proposal would not result in SAIL.

6.3.1 Issue

The proposal would remove up to 16.29 hectares of native vegetation during construction however no threatened ecological communities would be impacted.

The proposal is located within the Murrumbidgee subregion of the Riverina Interim Biogeographic regionalisation of Australia (IBRA) region. The proposal footprint consists of 21.28 ha which included 16.29 ha of native vegetation, or approximately 76.55% of the proposal footprint. The proposal footprint includes areas located within and close to the riparian corridor of Billabong Creek.

The 16.29 hectares of native vegetation comprise 6 plant community types (PCTs) which require offsets under the Biodiversity Offset Scheme (BOS) (see **Table 20**). No threatened ecological communities (TECs) were recorded in the proposal footprint or surrounding study area.

The BDAR calculated the conservative upper limit of native vegetation removal required for construction of the proposal. These impacts would primarily result from construction of the regulators and block bank, power supply routes and new access tracks.

Table 20 | Impacted PCTs

Plant community type (PCT)	Extent in proposal footprint at Wanganella site (ha)	Extent in proposal footprint at Hartwood site (ha)	Total extent of PCT in proposal area (ha)
PCT 7: River Red Gum - Warrego Grass - herbaceous riparian tall open forest wetland	0.61	0.84	1.45
PCT 10: River Red Gum - Black Box woodland wetland	0.93	0.77	1.7
PCT 13: Black Box - Lignum woodland wetland	1.68	4.26	5.94
PCT 160: Nitre Goosefoot shrubland wetland	0.19	0	0.19
PCT 46: Curly Windmill Grass - speargrass - wallaby grass grassland	1.89	4.8	6.69
PCT 44: Forb-rich Speargrass - Windmill Grass - White Top grassland	0	0.32	0.32

Threatened species identified during surveys would be directly impacted by the clearing of native vegetation

The clearing of native vegetation directly impacts the habitat of locally-occurring threatened species.

36 threatened fauna species listed under the BC Act and/or the EPBC Act were identified as predicted or with ecosystem credit species within the study area. One threatened flora species, Slender Darling Pea, was recorded during targeted surveys. Five threatened fauna species were recorded during targeted surveys: Southern Bell Frog, Pink Cockatoo, Southern Myotis, Bush Stone-

Curlew and Little Eagle. In addition, one fauna species, Plains-wanderer was assumed present at Hartwood due to mapped important areas within the proposal footprint.

Identified habitat for threatened species listed under the BAM, include:

- removal of 1.25 ha of breeding habitat for the Little Eagle (*Hieraaetus morphnoides*) listed as a vulnerable species under the BC Act– confirmed present
- removal of 2.33 ha of occupied habitat for the Bush Stone-curlew (*Burhinus grallarius*) listed as an endangered species under the BC Act– confirmed present
- removal of 8.81 ha of occupied habitat for the Southern Bell Frog (*Litoria raniformis*) listed as a vulnerable species under the BC Act and endangered species under the EPBC Act – confirmed present
- removal of 5.52 ha of occupied habitat for the Southern Myotis (*Myotis macropus*) listed as a vulnerable species under the BC Act – confirmed present
- removal of 1.96 ha of mapped important habitat for the Plains-wanderer (*Pedionomus torquatus*) listed as an endangered species under the BC Act and critically endangered species under the EPBC Act – mapped important habitat present
- removal of 2.25 ha of occupied habitat for Slender Darling-pea (*Swainsona murrayana*) listed as a vulnerable species under the BC Act and EPBC Act – confirmed present
- removal of 2.33 ha of occupied habitat for Pink Cockatoo (*Lophochroa leadbeateri*) listed as a vulnerable species under the BC Act and endangered species under the EPBC Act. – assumed present

The Proponent intends to manage construction impacts to native vegetation and habitats of threatened species through mitigation measures including pre-construction fauna surveys, exclusion fencing and staging works to avoid animal breeding periods. Further measures include plant maintenance and the rehabilitation and landscaping of disturbed areas.

The proposal will require offsets in accordance with the BC Act

A total of 429 ecosystem credits under the Biodiversity offsets scheme (BOS) are required for the clearing of native vegetation, as outlined in **Table 21** below. A total of 794 species credits under the BOS are required, as outlined in **Table 22** below.

Table 21 | Ecosystem credits (Source: Amended BDAR)

PCT	Area (ha)	Ecosystem credits
7	1.45	37
10	1.7	37
13	5.94	127
44	0.32	12
46	6.69	209
160	0.19	7
		429

Table 22 | Species credits (Source: Amended BDAR)

Species	Scientific name	Habitat loss (ha)	Species credits
Southern bell frog	<i>Litoria raniformis</i>	8.8	242
Southern myotis	<i>Myotis macropus</i>	5.52	157
Plains wanderer	<i>Pedimomus torquatus</i>	1.96	123
Slender Darling-Pea	<i>Swainsona murrayana</i>	2.25	94
Bush Stone-curlew	<i>Burhinus grallarius</i>	2.33	74
Little Eagle	<i>Hieraeetus morphnoides</i>	1.25	30
Pink Cockatoo	<i>Lophochroa leadbeater</i>	2.33	74
			794

The proposal would impact mapped important habitat for a species at risk of serious and irreversible impacts (SAIL), the Plains Wanderer

The Proponent has undertaken an assessment for potential for Serious and Irreversible Impacts (SAIL) in accordance with the requirements of section 9 of the BAM and the principles outlined in Section 6.7 of the *Biodiversity Conservation Regulation 2017* (BC Reg).

The principles against which an SAIL determination are considered are:

1. The impact will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline.
2. The impact will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size.
3. The impact is made on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution.
4. The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity and therefore its members are not replaceable.

The Proponent identified that one species, the Plains Wanderer, needed assessment. The Plains-wanderer is a critically endangered fauna species at risk of Serious and Irreversible Impact. This species prefers sparse, treeless lowland native grassland. The proposal would impact 1.96 hectares of Riverine Plain Grasslands near the Hartwood regulator which is mapped important habitat for the Plains-wanderer under the BC Act (see **Figure 23**). The species was not detected during surveys.

The proposal would:

- Impact on mapped habitat which contains existing gravel access tracks and adjoins a sealed carriageway of Conargo Road and areas of cleared cropland in a highly modified and fragmented agricultural landscape. Therefore, this area of the proposal footprint is unlikely to contain any Plains-wanderer individuals in many seasons.
- Potentially impact up to one breeding pair, within a small portion of their home range (if present).
- Remove approximately 1% of mapped important habitat in the locality (estimated to be 191 ha within 20km from the proposal).

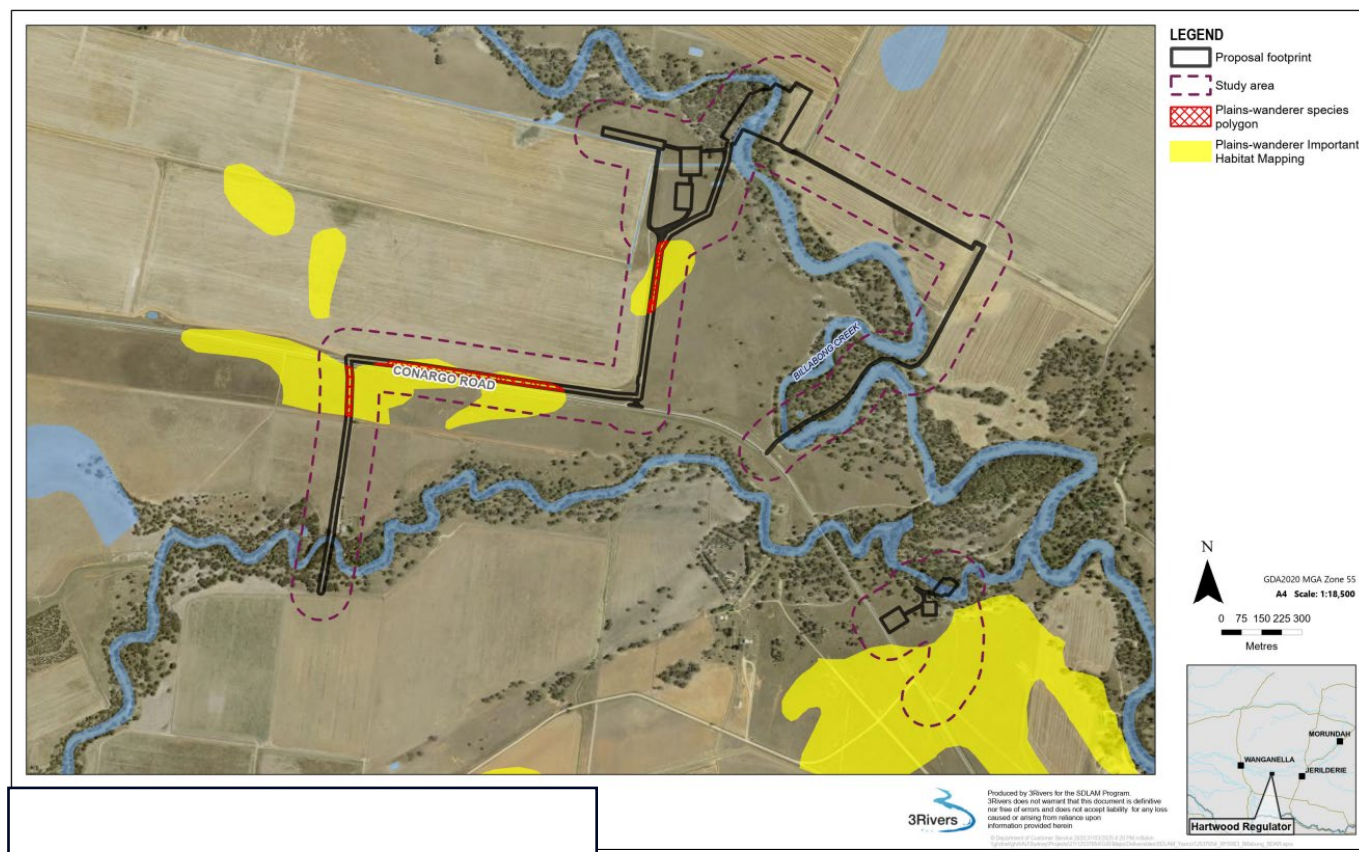


Figure 23 | Plains-wanderer species polygons (Source: Amended BDAR)

Avoidance and minimisation measures

The proponent has implemented avoidance and minimisation measures during the design phase to reduce impacts to terrestrial biodiversity, including:

- Reducing project scope by excluding proposed works at Piccaninny and Caroonboon Weirs, partially due to potential impacts on biodiversity values
- Reuse of existing access tracks where possible to minimise vegetation clearing
- Avoiding clearance of trees and riparian habitats in selecting compound site locations, where possible
- Refinement of power supply corridor at Hartwood to reduce clearing of native vegetation
- Selection of vertical slot fishway design, which is a more compact design, thus reducing impacts to the riparian zone

Residual indirect and prescribed impacts

The BDAR states that the proposal may result in residual indirect and prescribed impacts which are likely to be minor in intensity and consequence and therefore no offsets are proposed for these residual impacts.

Residual indirect impacts:

- light spill and noise and vibration generation causing displacement of threatened species and other native fauna from habitat adjoining the proposal footprint

Residual prescribed impacts:

- removal or modification of vegetation within habitat corridors
- minor changes to surface water flows
- moderate risk of vehicle strike causing harm to threatened fauna species, including Plains-wanderer, and other native fauna occupying habitat in the vicinity of the proposal.

6.3.2 Consideration

The Proponent has avoided and minimised impacts where possible. Residual impacts have been offset using the BAM-C method

The BDAR follows the hierarchy of avoidance and minimisation of impacts, mitigation of the effect of unavoidable impacts, and finally the provisions of offsets to compensate for residual impacts of the proposal. The proposal has been refined to reduce direct and indirect impacts, including during design development by reducing the scope of the project from 4 weirs to 2, by using existing access tracks where possible and changing the power supply corridor at Hartwood following ecological survey to reduce clearing of native vegetation.

The Department considers that impacts would be limited to the construction stage as operational impacts (hydrological changes) are contained within the existing channel. The Proposal would remove up to 16.29 ha of native vegetation (specific vegetation types detailed in **Table 10**). The native vegetation clearing would be offset through the BOS via a total of 429 ecosystem credits and 794 species credits. The proponent has committed to retiring the biodiversity credits or other measures in accordance with the BC Act and all biodiversity offsets would be finalised before the commencement of construction.

Combined with the proposed mitigation measures and compliance with the BOS offset strategy, the Department considers the impacts to be minor in nature.

The proposal would not result in serious and irreversible impacts (SAIL)

The proposal will result in an impact on a potential SAIL entity through the removal of 1.68 hectares of mapped important habitat for Plains Wanderer. The Department considers it unlikely that the proposal would result in a serious and irreversible impact to Plains Wanderer as the proposal would not:

1. cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline
2. further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size.

The areas of mapped habitat impacted by the proposal is a residual area of riverine plain grassland near highly modified agricultural land and Conargo Road. The mapped habitat includes an existing access track, adjacent to which would be constructed an overhead power supply to the Hartwood regulator. The potential habitat to be removed, is unlikely to be a critical part of the home range of the species, considering the poor quality of the habitat and noting that the species was not detected during surveys.

The proponent has proposed mitigation measures which would minimise residual impacts on the species, including:

- Pre-construction consideration of whether construction period coincides with Spring-Summer breeding periods for threatened bird species
- Pre-clearing surveys, and procedures should fauna or nests be found during surveys
- Avoiding night works during October to March to minimise disturbance
- Installing temporary fencing to delineate construction footprint from adjacent native vegetation
- Requiring operational vehicles to remain on designated tracks

The Department considers that the residual impacts on Plains-wanderer are negligible and, therefore, the proposal is unlikely to contribute to the risk of the species becoming extinct. This is consistent with the BDAR's finding that the proposal is unlikely to directly impact any individuals of the species nor reduce the species' geographic extent. In addition, CPHR advised that they consider the mitigation measures to be sufficient to minimise the risks to Plains-wanderer. The Department is satisfied that the proposed mitigation measures are adequate.

6.4 Aboriginal Cultural Heritage

The proposal is located on the traditional lands of the Yorta Yorta, Barapa Barapa and Jeithi peoples. The relevant Local Aboriginal Land Council (LALC) is Deniliquin LALC. The Proponent undertook an Aboriginal Cultural Heritage Assessment (ACHA) of the study area in consultation with Registered Aboriginal Parties (RAPs).

The Proponent has sought to avoid and minimise impacts to Aboriginal Heritage. Impacts would be limited to the construction stage, with impacts identified to 5 sites. These impacts are considered

acceptable subject to the implementation of an Aboriginal Cultural Heritage Management Plan and ongoing consultation with RAPs.

6.4.1 Issue

Five Aboriginal heritage sites would be impacted during the construction stage of the proposal

The study area consisted of construction zones associated with Hartwood Weir, Forest Creek block bank, Wanganella Weir, a borrow pit for Hartwood Weir, construction laydown zones for Hartwood Weir and Forest Creek block bank, and associated access tracks. The Proponent considered that impacts to Aboriginal heritage would be limited to the construction stage, as operational impacts are contained to within the existing banks of the creek which are already subject to water flow including unregulated flood events. Further, the proposal would be operated to minimise geomorphic impacts to the creek bank.

Background research conducted by as part of the ACHA identified 13 previously registered sites within 10 kilometres of the study area with two AHIMS sites located in close proximity to the study area. A subsequent archaeological survey of the study area identified 10 Aboriginal sites, including 6 scarred trees, 3 earth mounds, one hearth and an associated scarred tree and PAD. One previously recorded and registered site was unable to be located during the archaeological survey. Sites in the vicinity of the construction zones and proposed impacts are outlined in **Table 23**.

Table 23 | Sites in the vicinity of the construction zones and level of impact

Site name and AHIMS ID#	Assessment of significance	Impact
Forest Creek Block Bank Scarred Tree 2/#54-3-0031	Moderate scientific value at a local level	Partial impact - removal and trimming of branches
Forest Creek Block Bank Scarred Tree 3/#54-3-0034	Moderate scientific value at a local level	No impact - the site can be avoided
Forest Creek Block Bank Scarred Tree 4/#54-3-0057	Moderate scientific value at a local level	Partial impact – removal and trimming of branches
Forest Creek Block Bank Earth Mound/#54-3-0058	High scientific value at a local level	No impact - the site can be avoided

Site name and AHIMS ID#	Assessment of significance	Impact
Hartwood Weir Scarred Tree 4/#54-3-0059	Moderate scientific value at a local level	Total loss of the site – the site cannot be avoided
Hartwood Weir Scarred Tree and PAD/#54- 3-0055	High scientific value at a local level	No impact – the site can be avoided
Hartwood Weir Earth Mound 1/# 54-3- 0054	High scientific value at a local level	No impact – the site can be avoided
Hartwood Weir Earth Mound 21/# 54-3- 0056	High scientific value at a local level	No impact – the site can be avoided
Hartwood Weir Hearth/# 54-3- 0061	Moderate scientific value at a local level	Total loss of the site – the site cannot be avoided.
Wanganella Weir Scarred Tree 1/# 54-2- 0263	Moderate scientific value at a local level	No impact – the site can be avoided
Wanganella Weir Scarred Tree 3/# 54-2- 0264	Moderate scientific value at a local level	Total loss of the site – the site cannot be avoided.

The analysis undertaken by the Proponent found that all of the sites to be impacted were of moderate scientific value and were common in the region. The proponent also undertook an analysis of cumulative impacts to Aboriginal heritage, and found that in the local area, identified sites had not been subject to Aboriginal Heritage Impacts Permits. This analysis indicates that sites recorded on the Aboriginal Heritage Information Management System in the area are generally being conserved.

The Proponent has proposed measures as part of an Aboriginal Cultural Heritage Management Plan (ACHMP) to mitigate impacts to Aboriginal cultural heritage. For the sites that can be avoided (see Table 9) mitigation measures include:

- fencing off sites using temporary flagging – for scarred trees, this would ensure no ground-disturbing works within the canopy dripline, and no damage to tree trunks or limbs
- an exclusion line using bollards
- ensuring all vehicles keep to access tracks

- involving Traditional Owners in monitoring works.

The removal of branches and trimming of scarred trees (partial impacts) would be undertaken by a qualified arborist and under the supervision of RAPs. For the scarred trees that cannot be avoided, mitigation would involve digital recording of the tree using LIDAR scanning and casting of the scar, followed by careful removal of the tree avoiding damage to the cultural modification of the tree. For Hartwood Weir Hearth (AHIMS #54-3- 0061), archaeological salvage would be undertaken under the supervision of RAPs.

6.4.2 Consideration

The Proponent has sought to avoid and minimise impacts to Aboriginal Heritage and residual impacts considered acceptable subject to management measures and ongoing consultation with RAPs

The Department considers that the impacts of the proposal to Aboriginal heritage would be limited to the construction stage of the project. Further, it is considered that the Proponent has avoided impacts to Aboriginal heritage where possible through the location of construction zones with the input of heritage consultants and the use of existing access tracks. In the case of the Forest Creek block bank, a new access track is proposed as the existing access track currently impacts on a heritage feature.

These impacts will be managed through the implementation of an Aboriginal Cultural Heritage Management Plan (ACHMP), which has been recommended as a condition of approval. The ACHMP manages cultural heritage impacts in consultation with RAPs through digital recording, removal, salvage, trimming of branches and protection measures. The Department has also recommended a condition relating to the preparation of an Aboriginal Cultural Heritage Salvage Report, to manage archaeological items salvaged, including any permanent public interpretive display. The Aboriginal Cultural Heritage Salvage Report would also be provided to RAPs.

Noting the advice received from Heritage NSW, the Department considers the Proponent has adequately assessed impacts to Aboriginal heritage. The Department considers that Aboriginal sites in the region do not currently appear to be subject to cumulative impacts. The Department considers that the impacts to 5 sites are acceptable subject to the management, recording, salvage and consultation measures specified in the conditions of approval that minimise harm to Aboriginal heritage.

6.5 Other issues

The Department's consideration of other issues is summarised in **Table 24** below.

Table 24 | Assessment of other issues

Issue	Recommended conditions
Air Quality Air quality impacts from the project would be limited to the construction stage, mainly relating to dust generated during construction activities. The Department considers that these impacts are minor due to the distance to sensitive receivers and can be managed through mitigation measures.	The Department has recommended a condition requiring that measures are implemented to minimise and manage dust, odour and other air pollutants.
Contamination - Construction activities including excavation would expose and disturb soils and groundwater which have the potential to be contaminated. - EPA recommended undertaking further investigation of contaminants from the Wanganella Landfill site impacting the construction of the Wanganella Flood Bypass Channel. The Proponent undertook targeted soil sampling and landfill gas monitoring in six boreholes within the construction footprint. The targeted contamination investigation concluded that the site has limited soil and landfill gas contamination and therefore construction of the flood bypass channel is unlikely to risk harm to workers or the public. The EPA reviewed the Submissions Report and supplementary contamination investigation report and advised that these generally addressed the EPA's previous advice. The EPA recommended conditions to mitigate construction contamination risk at the regulator sites. - The Department considers the proposed mitigation measures adequate to minimise contamination risk during construction and operation.	The Department has recommended the following conditions: - preparation of a construction environmental management plan which addresses existing contamination at the regulator sites - preparation of an unexpected finds procedure for contamination.
Social The Proponent prepared a Social Impact Assessment (SIA) as part of the EIS, which identified a range of social impacts. Negative social impacts included access and disruptions for nearby landholders and residents during construction, temporary reduction in amenity for users of	The Department has recommended a condition requiring the preparation of a Local Accommodation and

Issue	Recommended conditions
Wanganella Reserve, loss of local heritage potentially impacting community values, and reduced availability of short-term accommodation due to an influx of non-resident workers to the area. • Council raised concerns around the influx of workers to the area and the low availability of accommodation in Deniliquin, noting also the cumulative impacts of nearby renewable energy projects. Subsequent to receiving the Submissions Report the Department requested further analysis of cumulative social impacts. • The Proponent provided an analysis of cumulative impacts relating to the influx of workers to the region and the availability of accommodation. The construction period for the majority of relevant projects was not predicted to coincide with the construction period for the Proposal; however, the Department notes that construction periods are subject to change. The Proponent has committed to early consultation through the construction contractor with local accommodation providers to mitigate impact. • The Department considers that negative social impacts would primarily be temporary and related to the construction stage of the project and can be managed through mitigation measures and the preparation of a Local Accommodation and Employment Plan. Further, the project would provide for overall socio-economic benefits to the region through improved water management.	Employment Plan that includes measures to ensure that sufficient accommodation is available and prioritises the employment of local workers where possible.
Public health and safety (including Dam Safety) • WaterNSW has submitted a consequence category assessment to Dams Safety NSW to determine whether the regulators are to be Declared under the <i>Dam Safety Act 2015</i>. • The existing weirs are located upstream of the proposed regulators and will not be demolished until the regulators are commissioned. This avoids the risk of the weir pool being released downstream in the event of the regulator structures failing during construction. • Health and safety risks during construction would be managed by the implementation of standard safety measures in accordance with regulatory requirements. A creek exclusion zone will be demarcated using buoys during construction and operation of the proposal.	The Department has recommended a condition stating that dangerous goods must be handled in accordance with relevant safety standards.

Issue	Recommended conditions
• The proposal's design addresses public health and safety considerations, including fencing along the trafficable deck and at the maintenance access, covering the fishways with grates, and warning signage. • The Department considers that public health and safety risks during construction and operation of the proposal are adequately managed by the proposed mitigation measures.	
Bushfire • The proposal footprint and surrounding area is categorised as medium and highly bush fire prone land by the Planning Portal Hazard – Bushfire Prone Vegetation Mapping Tool. • During construction, the Proponent has committed to implementing a bush fire emergency management plan in accordance with <i>Planning for Bush Fire Protection</i> (NSW Rural Fire Service, 2019) and in consultation with the NSW Rural Fire Service. • The Proponent has stated that the proposal's power supply would be designed, constructed and operated in accordance with the relevant fire safety standards and guidelines. Essential Energy would own the power infrastructure from the regulator control huts and be responsible for maintaining the power infrastructure and maintaining the powerline easements to manage bushfire risk. In addition, new and upgraded access tracks would be accessible to firefighters if required. • During operation, WaterNSW would manage bushfire risk for maintenance activities in accordance with its standard mitigation measures and emergency management plans. The regulators would be controlled remotely and only be accessed by the Proponent during operation for maintenance and monitoring activities. • The Department considers that bushfire risk is low during construction and operation and can be safely managed by implementing the proposed construction bushfire emergency management plan and WaterNSW's standard operational management and maintenance requirements.	No conditions are recommended as Proponent commitments are considered adequate.
Traffic and access • The Proponent provided a traffic and access impacts assessment with the EIS. The Proponent estimates the construction workforce at the Hartwood Site to peak at approximately 26 personnel over eighty days during construction of the fishway and regulator. The Proponent	The Department has recommended a condition requiring that a road dilapidation report must be

Issue	Recommended conditions
estimates the construction workforce at the Wanganella site to peak at approximately 34 personnel over eighty days, including eight personnel constructing the flood mitigation channel. • The existing access tracks to the construction sites would be upgraded to all-weather tracks to enable construction access during inclement weather. In addition, 1.1km of new tracks will be constructed at Hartwood, and 321 metres of new tracks will be constructed at Wanganella. • Traffic generated by construction and operation of the proposal is minimal and unlikely to impact the capacity of the road network. • The access points for the construction sites meet the minimum sight distance requirements, except for Cobb Highway (southbound) at Wanganella. This would be addressed by traffic management measures included in the Construction Traffic Management sub-plan. • The Proponent has committed to preparing a Road Dilapidation report for access roads between the proposal sites and the existing freight network, including any stock grids, and to rectify damage that occurs during construction. • TfNSW advised that the Proponent should prepare a Construction Traffic Management Plan, a dilapidation report of the intersections of the Cobb Highway with the access track and Zara Road, and an application submitted under Section 138 of the <i>Roads Act 1993</i> for works proposed within the Cobb Highway road reserve. The Proponent accepted these requirements.	provided to the relevant road authority. If damage to a road occurs, the Proponent must either compensate the relevant road authority or restore the road.
Earthworks, materials and waste • The proposal involves earthworks for the clearing the creek bed of debris and silt, installation of cofferdams, upgrades to access tracks. An estimated 3,250 cubic metres of material which would need disposal from Hartwood, and 1,490 cubic metres at Wanganella. • The proponent has committed to spoil being reused for backfilling where possible and if the material is suitable. • Surplus material that cannot be used on-site or on other projects would be classified in accordance with the NSW EPA Waste Classification Guidelines (NSW EPA, 2014a) and disposed of at an approved materials recycling or waste disposal facility	The Department has recommended conditions to reduce and manage any waste generated.

Issue	Recommended conditions
Noise and Vibration • The Proponent provided a noise and vibration impact assessment with the EIS. The Proponent predicted Noise Management Level (NML) exceedances for several sensitive receivers during construction, ranging 1 dB to 8 dB, with no exceedances of the highly noise affected level. These noise impacts would mostly occur from construction of ancillary infrastructure such as power supply routes and site access tracks. • The Proponent has identified two residences in Wanganella located within 100 metres of the site access roads. These receivers may experience temporary vibration impacts from use of construction equipment including vibratory rollers. • During operation, the regulators would generate noise when hydraulically adjusting the regulators. The nearest receivers to each regulator are 750-785 metres away and would experience negligible noise impacts during operation. • The Proponent has provided noise and vibration mitigation measures to address potential impacts during construction and operation.	The Department has recommended conditions requiring: • work hours must be between 7am and 6pm Monday-Friday, and 8am to 1pm Saturday, except for safety reasons, work that meets certain criteria, or by approval through negotiated agreement with affected receivers • mitigation measures must be implemented to address exceedances of NMLs and vibration criteria • work that results in exceedance of NMLs at certain institutions must not be timetabled during sensitive periods.
Non-Aboriginal heritage • Heritage NSW provided advice confirming that the subject sites do not impact on any items listed on the State Heritage Register, or contain any known archaeological relics. • The Proponent provided a non-Aboriginal heritage assessment with the EIS, which identified the Wanganella Weir and Hartwood Weirs as being of local significance. Both weirs were built in 1916 to regulate flows through Billabong Creek. Hartwood Weir (S170 4550110), is registered under Section 170 of the Heritage Act for NSW government state agencies (WaterNSW) and is considered a good representative example of an early 20th century weir. Both weirs would be largely demolished, except for sections of the base slabs and wingwalls.	The Department has recommended conditions requiring: • preparation of an annotated index and reference • preparation of an unexpected heritage finds and human remains procedure

Issue	Recommended conditions
Prior to demolition, the Proponent has committed to recording both weirs in accordance with the relevant guidelines and exploring options for interpretive display of an engraved section of Hartwood weir, in consultation with WaterNSW.	- no impacts to heritage items not previously identified - preparation of an archival recording report for impacted heritage items.
Flooding - During the estimated 18-month construction period, events up to the 20% AEP (1 in 5-year event) would generally be contained within the creek channel for both sites, and coffer dams would be constructed to meet this event and maintain normal flows. Construction works would cease during periods of high flow to ensure the safety of site staff and manage environmental risks. The CEMP would detail processes, responsibilities and measures to manage flood hazards during construction. - During the operation of both the Hartwood and Wanganella regulators, all operational flow scenarios would be contained within the Billabong Creek channel. The Hartwood regulator would effect minor changes and redistribution of flows in flood scenarios and minimal change in flood hazard category distribution. At Conargo, the populated area closest to the Hartwood regulator (10 kilometres distance), there is little to no change in flow and water surface levels across all operational and flood flow events. The originally proposed access track to the Hartwood regulator crossed a flood runner. Subsequently, the access track was modified to incorporate a floodway to prevent blocking the flood runner and increasing flood levels upstream. - Initial hydraulic modelling for the Wanganella regulator showed increased flood levels in the nearby Wanganella township. To mitigate this impact the Proponent has proposed a flood relief channel which would result in decreased water surface levels upstream of the regulator in the 1% AEP and larger flood events. However, for smaller, more frequent flood events increases in water surface levels were predicted upstream of the regulator, including areas of residential backyards in Wanganella township - approximately 68mm for the 20% AEP event and 16mm for the 5% AEP event. These increases do not impact on existing dwellings or evacuation routes and modelled results show minimal change in flood hazard category distribution. The Proponent has	The Department has recommended the following conditions: - measures outlined in by the Proponent must be incorporated into the design of the infrastructure - maximum increases in inundation depth of between 50mm and 100mm (depending on land zoning) for flood events up to and including the 1% AEP event - no increase in flood hazard or risk to life - a maximum relative increase in velocity where scour measures are not proposed.

Issue	Recommended conditions
committed to investigating additional options with the proposed operator (WaterNSW) to reduce the flooding of properties in smaller flood events. • Climate change will lead to increased rainfall intensity and larger flood events. The impacts of climate change on the flooding characteristics were assessed and found no significant impacts. During larger flood events the structures become fully submerged and the layflat gates can be placed in supplementary flow event operation with gates completely open to afford fish passage. During these larger flood events the regulating structures have minimal influence on flood behaviour. • The Department considers that overall flood impacts are minor and have been mitigated and minimised in the design of the project, and would be managed by recommended conditions.	
Soils and Geomorphology • Construction activities including excavation would expose and disturb soils which, if not mitigated adequately, could result in erosion, soil salinity and sedimentation. • The Proponent provided a geomorphology assessment with the EIS. Construction of the proposal would involve instream and adjacent works which could change fluvial processes and water quality. The assessment concluded that implementation of safeguards and mitigation measures would protect geomorphology values and reduce the risk of these impacts occurring from medium to low. • The assessment referenced the hydraulic modelling results and noted that there would be small changes in flow velocities and shear stress values during operation. Potential geomorphic changes would be minor and localised. In addition, the regulators are designed to manage erosion risk immediately downstream of the structures. The assessment recommended periodic condition checks of the structures during operation to assess erosion. • The Proponent has committed to preparing an Erosion and Sediment Control plan which will detail the specific erosion and sediment control measures during construction and maintained post construction until any disturbed areas are stabilised. The Proponent has also committed to post-construction visual assessments to address and identify any erosion.	The Department has recommended conditions requiring: • the CEMP must include a sub-plan for Soil and Water management that includes energy dissipation and stabilisation measures and geomorphic monitoring of channel form and erosion during construction. • erosion and sediment controls must be installed and implemented during construction in accordance with relevant guidelines.

Issue	Recommended conditions
Land use, property and agriculture • The Proponent provided a qualitative Land Use Assessment to support the EIS. The assessment identifies the most significant direct impact as the temporary use of agricultural land within the construction footprint. • Both regulator sites are subject to several Aboriginal Land Claims under the <i>Aboriginal Land Rights Act 1983 (NSW)</i>, which are yet to be determined. The Proponent has stated that it is actively consulting with the claimant at each location with the view of negotiating an agreement under which the claimant would provide its consent for the proposed works. • The Wanganella site is subject to an active, but not registered, Native Title Claim. The Proponent has stated that, if the Claim's status changes, consultation would be carried out with the Native Title claimant in accordance with <i>Native Title Act 1993 (Cth)</i>. • Concerns were raised during exhibition by community members and agencies regarding the impact of construction traffic at Wanganella on the Cobb Highway and Zara Road travelling stock reserves. The Proponent has committed to consulting with Local Land Services and stock managers to address impacts.	No conditions are recommended as Proponent commitments are considered adequate.
Temporary changes to hydrology due to cofferdams during construction • It is considered unlikely that construction of the proposal would adversely impact the relevant River Flow Objectives applicable to the proposal study area, as the existing weir structures remain in place during construction and flows are passed through the construction area due to cofferdam staging. The construction of cofferdams for the proposal is not likely to have a material adverse effect on the hydrology of Billabong Creek, either upstream or downstream.	The Department has recommended a condition requiring that all works in watercourses and on waterfront land are carried out in accordance with appropriate guidelines.
Public Utility Adjustment • Power lines would be constructed as part of the proposal to provide electricity to the regulators and connected to the public electricity grids. The impacts of the utility adjustment have been considered in relation to their impacts, relating to biodiversity, land use, and visual impact.	No specific conditions for public utility adjustments are recommended.

Issue	Recommended conditions
Water Quality • The Proponent undertook an assessment to determine whether Water Quality Objectives were being achieved in Billabong Creek. The construction stage of the project has a low to moderate risk of potential to impact water quality through turbidity, suspended solids and release of sediments and nutrients. These would be temporary, reversible and minor impacts within the range of water quality variability currently present in the system. • The Department considers that potential impacts during construction would be effectively mitigated by Proponent commitments such as erosion and sediment controls and silt curtains, so that the risk of water quality impacts is low. • The Department considers that during operation the proposal is not expected to have impacts on water quality. Considering the existing water quality and aquatic environments, design of the new regulators, and proposed safeguards and management practices, water quality objectives and aquatic ecosystem values within the study area and downstream would be adequately protected during operation of the proposal through regulator design to minimise erosion and dissipate energy, and the mitigation measures proposed. • The MDBA considered that the project was unlikely to have impacts to water quality in the Murray River.	The Department has recommended conditions requiring that: • the project must be designed, constructed and operated to maintain the NSW Water Quality Objectives • works on waterfront land must be carried out in accordance with the <i>Guidelines for Controlled Activities on Waterfront land</i> (DCCEEW, 2025).
Ground Water • During construction, dewatering is expected to be required at the Wanganella site only. During construction, only minor dewatering is expected at Wanganella. The limit of effect of the dewatering is expected to be no more than 50m from the creek in extent and a maximum of 0.5m drawdown. Due to ongoing recharge from Billabong Creek, the impact of dewatering would only occur during the period of dewatering, which is a temporary and reversible minor impact that is shorter than the full construction program. • Operational impacts were also assessed to be minor. At Hartwood, very minor water table drawdown/mounding (0.5 to 1 cm) would be limited to 1 km from the weir pool and for periods of a few weeks only. Similarly at Wanganella, water table drawdown/mounding of 1 to 2 cm would be limited to 2 km from the weir pool and for periods of a few weeks. The	No conditions are recommended as the Department considers that Proponent commitments are adequate.

Issue	Recommended conditions
groundwater assessment also showed minor to negligible increase to evapotranspiration, groundwater elevation, and leakage from weir pool to groundwater. Subsequently, impacts to irrigation or stock bores are considered negligible. Land salinisation is not expected to occur. • Under the NSW Aquifer Interference Assessment Policy the predicted impacts fall within the Level 1 category and the assessment is considered “Level 1 – Acceptable”.	

7 Evaluation

The Department's assessment has considered the relevant matters and objects of the EP&A Act, including the principles of ecologically sustainable development (**Sections 3 & 6**), advice from government agencies, an independent hydrology review, local councils and public submissions (**Section 5**), and strategic government policies and plans (**Section 4**).

This includes consideration of:

- Billabong Creek Regulators - Environmental Impact Statement. NSW DCCEEW, October 2024
- Billabong Creek Regulators - Response to Submissions Main Report. NSW DCCEEW, May 2025
- Billabong Creek Regulators - Request for additional Information (RFI) Report. NSW DCCEEW, September 2025

If approved, it is expected the project would:

- improve the efficiency of water management in Billabong Creek
- increase certain hydrological flow types, and the attainment of environmental flows in Billabong Creek under certain circumstances
- assist in the delivery of improved environmental outcomes
- improve fish passage through the provision of fishways
- provide service for water users
- modernise ageing infrastructure.

Other key benefits include:

- supporting the aim of the Murray-Darling Basin Plan adopted in November 2012
- supporting the Yanco Creek modernisation program which aims to enable smarter use of water in the Yanco Creek system
- provide regional economic benefit through the provision of up to 50 construction jobs and one operational job.

However, the project would also:

- change or reduce hydrological flows under certain circumstances
- remove up to 16.29 hectares of native vegetation during construction

- remove or alter approximately 44,688 square metres of Type 1 Key Fish Habitat
- result in impacts to 5 Aboriginal heritage sites, including the loss of 3 sites.

If not managed appropriately, there is a risk that the project may lead to:

- Changes to hydrology that affect water users, including environmental water users
- KFH impacts above those predicted in the EIS with optimised operation of the infrastructure
- decreased water quality and impacts to aquatic ecology
- erosion, sedimentation and geomorphic impacts to the environment
- contamination of land and water.

The Department, accordingly, has recommended a range of conditions to manage residual environmental impacts.

The Department has formed the opinion:

- the proponent has sought to avoid impacts
- where impacts cannot be avoided, the residual impacts are deemed acceptable, subject to the management, mitigation and offset measures specified in Proponent commitments and conditions of approval
- issues raised in submissions and by agencies have been appropriately considered and responded to by the Proponent
- the benefits of the project outweigh the residual impacts and the project is in the public interest
- the project should be approved subject to conditions.

8 Recommendation

It is recommended that the Director, Transport and Water Assessments, as delegate of the Minister for Planning and Public Spaces:

- **considers** the findings and recommendations of this report
- **accepts and adopts** the findings and recommendations in this report as the reasons for making the decision to grant approval to the application
- **agrees** with the key reasons for approval listed in the notice of decision
- **grants approval** for the application in respect of Billabong Creek Environmental Water Regulators (SSI 50831979) subject to the conditions in the attached infrastructure approval
- signs the attached infrastructure approval (Appendix F).

Recommended by:



Drew Anderson

Senior Planning Officer

Transport and Water Assessments

Recommended by:



Benjamin Cox

Principal Planning Officer

Transport and Water Assessments

9 Determination

The recommendation is **adopted** by:



Glenn Snow

Director

Transport and Water Assessments

Glossary

Abbreviation	Definition
AHD	Australian height datum
BCS of NSW DCCEEW	Biodiversity Conservation and Science group of the NSW Department of Climate Change, Energy, the Environment and Water
BDAR	Biodiversity Development Assessment Report
CEMP	Construction Environmental Management Plan
CIV	Capital investment value
Council	Edward River Council
Crown Lands	Crown Lands division of the Department of Planning, Housing and Infrastructure
AG DCCEEW	Australian Government Department of Climate Change, Energy, the Environment and Water
Department	Department of Planning, Housing and Infrastructure
DPI	Department of Primary Industries within the Department of Regional NSW
EIS	Environmental impact statement
EPA	NSW Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	Environmental Planning and Assessment Regulation 2021
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPI	Environmental planning instrument
EPL	Environment protection licence
ESD	Ecologically sustainable development

Abbreviation	Definition
EWR	Environmental Water Requirement
Heritage	Heritage NSW, within the NSW Department of Climate Change, Energy, the Environment and Water
KFH	Key Fish Habitat
Minister	Minister for Planning
MDBA	Murray Darling Basin Authority
NPWS	National Parks & Wildlife Service within the NSW Department of Climate Change, Energy, the Environment and Water
RAP	Registered Aboriginal Party
Planning Systems SEPP	State Environmental Planning Policy (Planning Systems) 2021
PCT	Plant Community Type
SAII	Serious and Irreversible Impact
SDLAM	Sustainable Diversion Limit Adjustment Mechanism
SEARs	Planning Secretary's Environmental Assessment Requirements
Secretary	Secretary of the Department of Planning, Housing and Infrastructure
SEPP	State environmental planning policy
SSI	State significant infrastructure
TEC	Threatened Ecological Community
TfNSW	Transport for NSW
YSCOP	Yanco Creek Systems Operations Plan

Appendices

Appendix A – Summary of key amendments to the project

In the initial scoping report for the project, the proposal was to replace four weirs rather than two. Hydrological modelling established that water delivery efficiency could be obtained through the replacement of two weirs only while reducing overall impacts.

Since lodgement, some aspects of the project have been amended by the applicant and notified in the Response to Submissions Report. These were:

Hartwood

- Installation of a communication mast within the existing footprint
- Construction vehicle reversing area at Forest Creek block back, resulting in 365 square metres of vegetation to be cleared
- Two construction vehicle passing bays, resulting in 150 square metres of vegetation to be cleared
- Additional utility poles within the existing footprint

Wanganella

- Changes to the access track to reduce road safety risks

Appendix B – List of referenced documents

Billabong Creek Regulators - Environmental Impact Statement. NSW DCCEEW, 2024

Billabong Creek Regulators - Response to Submissions – Main Report. NSW DCCEEW, 2025

Billabong Creek Regulators – Request for additional Information Report. NSW DCCEEW, 2025

Billabong Creek Key Fish Habitat Offset Strategy - Wanganella and Hartwood Regulators - Yanco Modernisation, SDLAM. NSW DCCEEW, 2025

Appendix C – Submissions and government agency advice

All submissions and government agency advice can be found here:

<https://www.planningportal.nsw.gov.au/major-projects/projects/billabong-creek-environmental-water-regulators>

Appendix D – Community views for draft Notice of Decision

Table 25 | Key issues and how they have been considered

Issue	Consideration
<i>Travelling Stock Reserves (TSRs)</i> • TSRs are used for moving sheep which will need to be considered during construction. • Stock grids could be impacted and may need to be replaced.	<i>Assessment</i> • The Proponent would seek agreements and permits for work that may impact TSR and has committed to carrying out consultation with local land services and stock managers during the construction period. • The Proponent would complete a dilapidation survey prior to commencing construction and make good any damage to stock grids <i>Conditions</i> • The Department considers that Proponent commitments are adequate and no conditions are recommended.
<i>Traffic and Transport</i> • The intersection of the road to Wanganella weir and the Cobb highway requires particular safety considerations. • School bus routes in the area require consideration. • Dilapidation of roads should be assessed prior to works commencing to ensure that impacted roads are not left in a damaged condition. • Should upgrades to intersections on major roads be required, Council requests notification.	<i>Assessment</i> • The Proponent has committed to preparing a construction traffic management plan that would include a Traffic Guidance Scheme and strategies to facilitate the safe movement of road users in the vicinity of the proposal. • The Proponent would consult with Council to manage potential impacts to roads. <i>Conditions</i> • The Department has recommended a condition requiring the Proponent to prepare a Road Dilapidation Report to be provided to the relevant road authority, and to restore the road if any damage occurs. No conditions are recommended in relation to construction traffic management as the Department considers that Proponent commitments are adequate.
<i>Biodiversity and Biosecurity</i>	<i>Assessment</i>

Issue	Consideration
• There is a risk of spreading weeds by vehicles during construction. • “Like for like” biodiversity offsets are more applicable than paying into the Biodiversity Conservation Fund. • Impacts to native flora and fauna, critical habitat and sensitive ecosystems should be negligible. • Measures should be taken to prevent water quality and erosion impacts.	• The Proponent has committed to preparing a CEMP that would detail weed and pathogen management measures including vehicle, personnel, material and equipment hygiene protocols. • Biodiversity offset requirements would be secured according to offset rules established by the Biodiversity Conservation Regulation 2017. • The Proponent has avoided impacts to biodiversity where possible and residual impacts can be mitigated and offset. • Aquatic ecology impacts have been minimised and managed where possible. The Proponent would offset impacts to Key Fish Habitat. • Water quality and erosion impacts can be managed through Proponent commitments and recommended conditions of approval. <i>Conditions</i> • The Department has recommended conditions requiring biodiversity offsets through the retirement of biodiversity credits. • The Department has recommended conditions requiring the Proponent to prepare a Key Fish Habitat offset strategy in consultation with DPIRD Fisheries. • The Department has recommended a condition requiring the Proponent to prepare a soil and water management plan for the construction period. • The Department has also required that the Proponent prepare a biodiversity management plan that includes management and mitigation measures including weed control.
<i>Operation</i> • Need for flexibility in the operating rules.	<i>Assessment</i> • The Department has considered the environmental, economic and social impacts of the project during construction and operation.

Issue	Consideration
Questions around the ability of the river operator to manage the flow regime.	- The Proponent advised that monitoring and review of operational rules would ensure the attainment of environmental performance. - The bulk delivery of irrigation and environmental water is core business for WaterNSW, the proposed operator of the project. <i>Conditions</i> - Operational rules would be formally implemented through the Yanco Creek Systems Operations Plan or amendments to the Murrumbidgee Water Sharing Plan. The Department has recommended conditions requiring that the Proponent demonstrate the formal implementation of these rules which secure the environmental performance of the infrastructure.
<i>Social</i> - Prioritisation of local contracts for construction. - Consideration of local accommodation availability for workers, noting an anticipated influx of workers in the area relating to other projects. - Support for employment of local tradespeople.	<i>Assessment</i> - The Proponent has indicated that part of the assessment criteria for the principal contractor will be the extent to which local contractors, suppliers, service providers and employees are engaged. <i>Conditions</i> - The Department has recommended a condition requiring the Proponent to prioritise the employment of local workers and to detail measures to ensure sufficient local accommodation as part of the Local Accommodation and Employment Plan.
<i>Cultural Heritage</i> - Work closely with Local Aboriginal Land Councils and Traditional Owners to manage impacts to Aboriginal Cultural Heritage. - Relocation and exhibition of any removed items is supported by Council.	<i>Assessment</i> - The Proponent has assessed impacts to Aboriginal heritage and avoided impacts where possible. The project would result in impacts to 5 sites, including the loss of 3 sites, <i>Conditions</i> - The Department has recommended conditions including an Aboriginal Cultural Heritage Management Plan and an

Issue	Consideration
	Aboriginal Cultural Heritage Salvage Report to manage impacts and minimise harm to Aboriginal heritage.
<i>Power supply</i> Consideration of solar power for the regulators should be given.	<i>Assessment</i> - The Proponent advised that the feasibility of solar power was considered during the design development phase; however, mains power was preferred including by WaterNSW as intended operator. <i>Conditions</i> - No conditions are recommended.
<i>Exhibition period</i> The exhibition period for the EIS was considered too short particularly as it coincided with other government papers.	<i>Assessment</i> - The exhibition period was in accordance with the requirements of the EP&A Act 1979. <i>Conditions</i> - No conditions are recommended.
<i>Water</i> Consistency and water availability should not be impacted as a result of the project and have minimal change to the existing hydrology including impacts to water users and the environment.	<i>Assessment</i> - The Proponent undertook an assessment of impacts to hydrology and water management and generally found that the project resulted in a low degree of impact and environmental benefits in some cases. <i>Conditions</i> - The Department has recommended conditions to ensure the environmental performance of the infrastructure in relation to hydrology and water management.

Objects of the EP&A Act

A summary of the Department's consideration of the relevant objects (found in section 1.3 of the EP&A Act) are provided in **Table 26** below.

Table 26 | Objects of the EP&A Act and how they have been considered

Object	Consideration
(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,	The proposal would provide for the improvement of water management and efficiency in Billabong Creek and contribute towards conservation of fish species in the creek through removing barriers to fish passage.
(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,	The Department has considered the potential environmental, social and economic impacts of the proposal. The proposal was considered to facilitate ecologically sustainable development and would not have significant negative economic, environmental or social impacts.
(c) to promote the orderly and economic use and development of land,	The proposal would replace existing outdated and dilapidated weirs to improve the efficiency of water management in Billabong Creek.
(d) to promote the delivery and maintenance of affordable housing,	Affordable housing does not form part of the project.
(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,	The project has been designed and would be operated to minimise impacts to the environment. Where impacts have not been avoided to terrestrial and aquatic flora and fauna, the Proponent would offset the impacts.
(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),	Design development of the project sought to minimise impacts to Aboriginal and non-Aboriginal heritage. The project would impact on 5 Aboriginal heritage sites; however, these impacts would be managed through an Aboriginal Cultural Heritage Management Plan that includes recording, salvage and ongoing consultation with RAPs. No state heritage items would be impacted by the project. Hartwood Weir (S170 4550110), is registered under Section 170 of the Heritage Act for NSW government state agencies. Both weirs would be demolished; however, they would be recorded and some sections salvaged prior to demolition.

Object	Consideration
(g) to promote good design and amenity of the built environment,	The proposal would not have unacceptable visual or amenity impacts. The Wanganella regulator is adjacent to Wanganella camping reserve and has been sited on the opposite bank to minimise visual and amenity impacts to the camping reserve. Once vegetation has reestablished at both weirs the visual impacts would be minimal.
(h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,	The Department considers that the infrastructure would be designed and constructed in accordance with applicable Australian and international safety standards.
(i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,	The Department consulted with several agencies and the Edward River Council during the assessment of the project and their advice has been take into consideration in the assessment of the project.
(j) to provide increased opportunity for community participation in environmental planning and assessment.	The project was exhibited on the Departments Major Projects portal. Submissions were received from community members and Edward River Council and advice was received from government agencies. Matters raised have been addressed by the Proponent in subsequent documents and have been considered by the Department as part of the assessment of the project.

Ecologically sustainable development

The EP&A Act adopts the definition of ecologically sustainable development (ESD) found in the *Protection of the Environment Administration Act 1991*. Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental considerations in decision-making processes and that ESD can be achieved through the implementation of:

- the precautionary principle.
- inter-generational equity.
- conservation of biological diversity and ecological integrity.
- improved valuation, pricing and incentive mechanisms.

The Department required the proponent to demonstrate how the principles of ESD have been incorporated into the project, including how it addresses:

- national best practice sustainable building principles to improve environmental performance and reduce ecological impact.
- projected climate change impacts.

The proposal has applied the principles of ESD throughout the EIS. The proposal has been designed to minimise impacts both aquatic and terrestrial biodiversity and the residual impacts would be offset. During construction, the Proponent has committed to waste management controls including reuse and recycling strategies. Risks related to climate change were identified in the EIS and considered to be managed with mitigation measures. The Department considers that overall the project would provide for improved fish passage and improved delivery of environmental water and efficiency of water use. Subsequently, the Department considers that the proposal is consistent with the principles of ESD.

EP&A Regulation

The EP&A Regulation requires the proponent to have regard to the *State Significant Infrastructure Guidelines* when preparing their application. In addition, the SEARs require the proponent to have regard to the following:

- Social Impact Assessment Guideline for State Significant Projects
- Undertaking Engagement Guidelines for State Significant Projects
- Cumulative Impact Assessment Guidelines for State Significant Projects.

The Department considers the project has been undertaken in accordance with the Guidelines and the project complies with the requirements of the Regulation for SSI.

Environmental Planning Instruments (EPIs)

State Environmental Planning Policy (Transport and Infrastructure) 2021

The proposal is permissible without consent as a result of the operation of the Transport and Infrastructure SEPP. Section 2.159(2A) of the Transport and Infrastructure SEPP states that “Development for the purposes of the maintenance or replacement of existing water storage facilities may be carried out by or on behalf of a public authority without consent on any land”.

State Environmental Planning Policy (Planning Systems) 2021

The proposal is SSI as a result of the operation of the Planning Systems SEPP. Schedule 3 (Section 4) of the Planning Systems SEPP identifies that development for the purpose of a water storage

facility carried out by a public authority and having a value of greater than \$30 million. The proposal would be undertaken by a public authority and have a value of greater than \$30 million and it meets the requirements of Section 4 of Schedule 3 of the Planning Systems SEPP.

State Environmental Planning Policy (Primary Production) 2021

The aims of this policy which relate to this proposal are: (a) to facilitate the orderly economic use and development of lands for primary production, (b) to reduce land use conflict and sterilisation of rural land by balancing primary production, residential development and the protection of native vegetation, biodiversity and water resources, (c) to identify State significant agricultural land for the purpose of ensuring the ongoing viability of agriculture on that land, having regard to social, economic and environmental considerations. The Proponent has addressed these matters in the EIS.

State Environmental Planning Policy (Biodiversity and Conservation 2021)

The aims of this policy which relate to this proposal are: Chapter 3 Koala habitat protection 2020, Chapter 4 Koala habitat protection 2021 and Chapter 5 River Murray Lands. The Proponent has addressed these matters in the EIS.

Appendix E – Recommended instrument of approval

<https://www.planningportal.nsw.gov.au/major-projects/projects/billabong-creek-environmental-water-regulators>