Upper South Creek Advanced Water Recycling Centre

Sydney WATER

Environmental Impact Statement

Volume 1 Executive Summary

September 2021

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	Chapter 3	**Project options –** provides an overview of the options assessment process, and the alternatives that were considered
	Chapter 4	**Project description –** provides a detailed description of all project components, including design, construction, operation and commissioning activities
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1 Introduction

The economic development of Western Sydney is reliant on efficient wastewater treatment to support population growth and current systems are unlikely to meet the future demands of this rapidly growing region. To meet this demand, Sydney Water is proposing to build and operate an Advanced Water Recycling Centre at Kemps Creek, a strategically-critical location adjacent to the Western Sydney International Airport and burgeoning Aerotropolis. As part of the process, the project will produce high-quality treated water for non-drinking reuse and for release to local waterways, which will support the environmental health of those waterways.

1.1 Overview

Sydney Water is planning the Upper South Creek Advanced Water Recycling Centre (AWRC) project to support population and economic growth in Western Sydney. Population forecasts show four million people living west of Parramatta over the next 40 years, with much of that growth occurring in the Western Parkland City. The Western Parkland City covers a large area from Liverpool and Campbelltown in the east to Penrith and the Blue Mountains in the west. It includes the new Western Sydney International Airport and designated growth areas including the South West Growth Area (SWGA) and Western Sydney Aerotropolis Growth Area (WSAGA).

Every city requires an efficient and safe system for managing the wastewater generated by its residents and businesses. This project will directly address that requirement, collecting wastewater from new urban communities in the WSAGA and SWGA. Sydney Water's wastewater servicing area for these areas is known as the Upper South Creek Servicing Area and is expected to be home to about 400,000 people by 2056.

As part of the process of treating wastewater, the AWRC will produce high-quality water, close in quality to drinking water. This recycled water is suitable for a wide range of non-drinking uses in homes, for various industrial uses, in businesses, in agriculture and for watering of public open spaces. Given its high quality, it can be released to local waterways such as the Nepean and Warragamba Rivers. This can help to sustain our important river ecosystems that continue to come under significant pressure from climatic changes and developments within their catchments. Although the project does not include recycled water for drinking, using the recycled water in industry, business, agriculture and irrigation can replace the drinking water that is often currently used for these non-drinking purposes. This saves valuable drinking water and provides increased resilience to Sydney's water supplies. The AWRC also provides a foundation for developing a future circular economy hub in the Western Parkland City for waste collection, reuse, resource recovery and renewable energy generation. This aligns with the principles of a multi-utility

approach to servicing Western Sydney and supports Commonwealth and NSW Government policies to promote a circular economy.

Sydney Water's investigations show that the project assessed in the Environmental Impact Statement (EIS) is the best approach for providing a wastewater service for the Upper South Creek Servicing Area. Sydney Water has assessed various options for providing the wastewater service against current and future needs in the region and completed a preliminary design (known as a reference design) for the preferred option. This EIS describes Sydney Water's assessment of the potential impacts of this option on a broad range of environmental and community factors. In addition, the EIS sets out how those impacts are avoided, reduced or effectively managed.

This EIS is one step in a broader approvals process and provides the information that will allow the NSW Department of Planning, Industry and Environment (DPIE) along with other NSW and local bodies, the Commonwealth Government and the community, to assess the merits of the project. The EIS will be placed on public exhibition, which gives all stakeholders and the community an opportunity to review the findings and provide formal commentary. If approved, DPIE will provide conditions by which the project must be constructed and operated.

Figure ES1 shows the key steps in this approvals process. It is during the public exhibition of the EIS that DPIE and other government agencies review the documents and make submissions. This is also the main point at which the community can make submissions to DPIE.

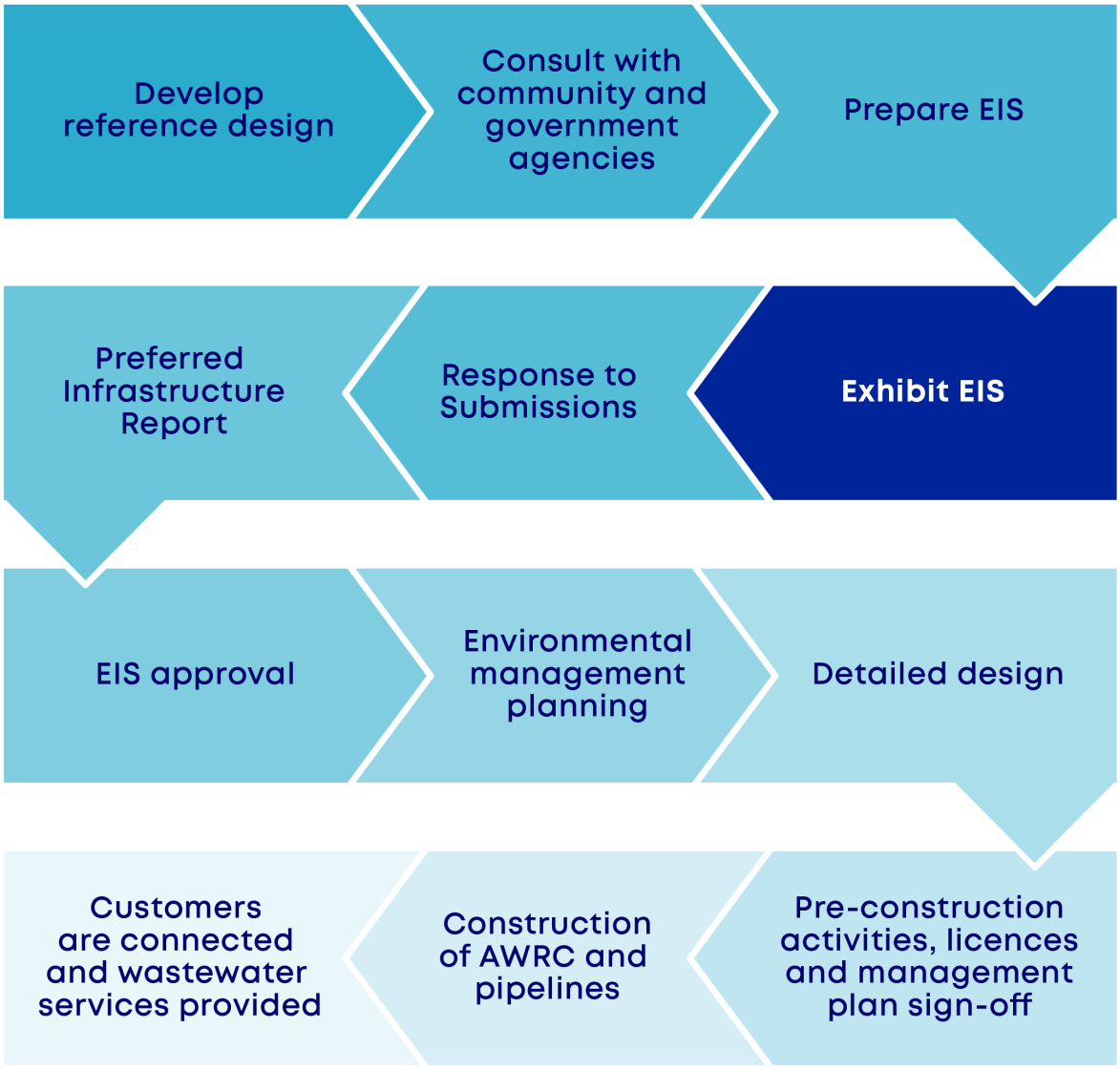

Figure ES1 Overview of approvals process

1.2 The need for the project and its benefits

1.2.1 The primary project need

Significant residential and economic growth is expected in the Upper South Creek Servicing Area over the next 35 years, and wastewater treatment is crucial to enable and support that growth.

The growth is driven by:

- the opening of the Western Sydney International Airport by 2026, a key catalyst for development in the region
- government and private sector investment in the WSAGA and SWGA
- NSW, Commonwealth and Local Government investment in infrastructure, including new major road and rail assets, social infrastructure and utilities
- release of new land areas, particularly for additional housing
- support for the establishment of industrial, manufacturing, agribusiness, commercial and other businesses that will create a large number of high value jobs.

Being mostly rural, a large proportion of the Upper South Creek Servicing Area is currently serviced by on-site systems such as septic tanks. While these systems are suitable for rural properties with only small numbers of people, they are not suitable in urban environments to treat large wastewater volumes. They are limited by the range of materials they can treat, their high maintenance costs, the poor quality of the treated water produced and subsequent risk to human health in the event of a failure. As a result, reliance on septic tanks in the Upper South Creek Servicing Area is not an acceptable long-term option.

Some parts of the Upper South Creek Servicing Area are temporarily connected to Sydney Water's existing Liverpool and West Camden Water Recycling Plants. However, these plants are experiencing rapid growth in their own catchments and are therefore close to capacity themselves. The rapid growth in the area, the resultant increasing demand and the poor existing levels of service, support the clear need to provide an expanded wastewater servicing solution in the Upper South Creek Servicing Area.

1.2.2 Benefits and future opportunities

The primary benefit of the project is that the new wastewater service will provide a critical service to Western Sydney International Airport, WSAGA and SWGA, supporting development of industry and jobs.

In addition, constructing the project has potential to create local employment opportunities including about 400 direct construction jobs (forecast to be up to 200 at the AWRC site and up to 200 along the pipelines), as well as indirect jobs in local businesses that support those construction activities.

In addition to providing efficient and cost-effective wastewater services to households and businesses, Sydney Water is also committed to doing so in a way that supports liveability, sustainability and the environment. This includes maximising the use and value of resources through contributing to a 'circular economy'. In the wastewater process, there is potential to treat and reuse water, but the opportunity also exists to capture nutrients such as nitrogen and phosphorus (which can be used as fertilisers), to produce gas and generate energy. As part of the project's scope, Sydney Water proposes to recover:

- high-quality treated water to be used as environmental flows in waterways, which will help protect aquatic ecosystems, reduce weeds and the frequency of algal blooms
- organic material recovered during wastewater treatment processes, known as biosolids, for use as an alternative to chemical fertilisers in farming and gardening
- renewable energy from co-generation within the AWRC and solar energy generation.

By establishing a green space area on the AWRC site, the project will also support the environmental health and amenity of South Creek, the waterway directly bordering the AWRC site. This will enhance biodiversity on the site and use best practice water-sensitive urban design to effectively manage site stormwater. As a result, the AWRC site will be an important link in the green spine along South Creek as envisaged in the NSW Government's vision for the WSAGA.

Key opportunities outside of the project scope above include:

- The recycled water produced can be used by industry, agriculture and to complement stormwater in irrigating open spaces.
- The AWRC represents Sydney Water's largest investment in infrastructure for Western Sydney and provides a foundation for a circular economy hub in the Parkland City. Sydney Water is investigating the opportunity to develop a future bioenergy hub at the AWRC for waste collection, reuse, resource recovery and renewable energy generation. This aligns with the principles of a multi-utility approach to servicing Western Sydney and supports Commonwealth and NSW Government policies to promote a circular economy in the Western Parkland City.

1.3 How have stakeholder views been considered

Sydney Water has consulted with key government agencies, local councils, directly-affected landowners, the broader community and special interest groups during development of the project and in the preparation of this EIS. Over 140 stakeholder meetings have been held, nearly 1,700 notifications have been sent to directly-impacted landowners and nearby properties, and over 44,000 letterbox drops and newsletters have been issued to other potentially-affected people, business and government entities.

This process raised a range of issues that have been used to change how the project has been planned and designed as well as how it will be constructed and operated. Some of those issues included:

- finding a suitable construction approach for the pipeline at Lansdowne Reserve, to avoid a neighbouring Biodiversity Stewardship site
- optimising the pipeline alignment through the Western Sydney Parklands to suit the Greater Sydney Parklands' future development plans
- avoiding impacts on Wollondilly Shire Council's upgrade of Silverdale Road
- tunnelling the pipelines beneath the M7 Motorway and the rail line at Cabramatta, to avoid construction-related impacts on users
- tunnelling the pipelines beneath several sensitive waterways to reduce impacts on riparian ecosystems.

Sydney Water will continue to engage with the community, businesses and government stakeholders as the project progresses, to provide stakeholders with the ongoing opportunity to provide input into refining the project.

The next formal step is an opportunity to review the EIS via public exhibition, and provide a formal submission to DPIE with any concerns, supporting statements or objections. During the public exhibition process, Sydney Water will continue community engagement activities to allow stakeholders to obtain additional clarification about the project. Following the public exhibition, Sydney Water will respond to submissions in a public document called a *Response to Submissions*, which will provide clarifications, additional information and may include changes to the project.

Sydney Water and its construction contractors will continue consulting with the community and stakeholders as the project progresses to detailed design and construction. Sydney Water will also maintain consultation and engagement processes during operation.

2 Strategic context

The project makes an important contribution to the delivery of a range of Commonwealth, NSW, local government and Sydney Water strategies relating to economic development, growth, water resilience and environmental protection.

2.1 Economic development

The Western Sydney City Deal captures the support of the Commonwealth and NSW Governments and eight Western Sydney local councils, for the development of urban communities in Western Sydney. The Western Sydney City Deal is a planning, investment and delivery partnership which defines a series of development priorities and the projects which underpin them. It recognises how critical Western Sydney's development is for the economic development of the region, city, state and country. The delivery of wastewater services from the project will directly support the City Deal's commitments to build 184,500 new houses and create 200,000 new jobs over the next 20 years.

Focusing broadly on infrastructure priorities, the NSW State Infrastructure Strategy (SIS) sets out the NSW Government's infrastructure priorities for the next 20 years. Its vision for the Western Parkland City is focused on creating jobs, a highly-skilled workforce and an innovation economy. Of particular note to this project, is that the SIS recognises the need to ensure flexible and adaptable wastewater systems, that are resilient to climate change and leverage developments in contemporary wastewater treatment for energy generation, nutrient removal and resource recovery.

The Greater Sydney Region Plan and Western Sydney District Plan outline a vision for the Western Parkland City, which focuses on delivering outcomes by adopting a landscape-led approach. This vision seeks to create quality places for the community, keeping water resources in the catchment to support greening and reduce heat island effects and values Aboriginal and non-Aboriginal heritage. The Region and District Plans also recognise the imperative for the Western Parkland City to maximise productivity, liveability and sustainability for the region. In addition, the spine of South Creek is critical in providing new cool and green neighbourhoods and centres in a parkland setting, and the green space in non-operational areas of the AWRC site will contribute to this blue-green infrastructure along South Creek. There are also opportunities to use recycled water produced by the AWRC to contribute to cooling and greening in the Parkland City.

2.2 Supporting growth areas

The AWRC will be located in the WSAGA and will support proposed developments there and in the SWGA. Both the WSAGA and SWGA will be built around the new global gateway of Western Sydney International Airport and contribute to diverse housing types and a significant increase in jobs for Western Sydney. The project aligns with the key planning documents that support the development of the WSAGA, including the Western Sydney Aerotropolis Plan, Draft Precinct Plan and Phase 1 Development Control Plan.

The SWGA has been established longer than the WSAGA, and includes established suburbs such as Oran Park, Turner Road, Austral and Leppington North. DPIE is now leading strategic planning for the remainder of the SWGA, before developing plans for rezoning. Sydney Water provides wastewater services to those established suburbs through connections to the existing water recycling plants in Liverpool and West Camden. The project is designed to redirect some of these connections to the AWRC and then service the future precincts.

2.3 Water resilience and environment protection

In 2001, the Hawkesbury-Nepean Statement of Joint Intent recorded the commitment of NSW Government, local councils and Sydney Water to protect the health of the Hawkesbury-Nepean river system, including Nepean and Warragamba Rivers and South Creek. Amongst other areas, the commitment encouraged using treated wastewater to contribute to environmental flows, as this project proposes. In support of the commitment, the NSW Environment Protection Authority (EPA) developed a regulatory framework to reduce nutrient loads from wastewater treatment in the system, which is a key driver for inclusion of advanced wastewater treatment at the AWRC.

In 2017, the NSW Government developed the most recent Metropolitan Water Plan for Sydney to ensure that Sydney's long-term water needs will be met. The NSW Government is now developing the Greater Sydney Water Strategy (GSWS), which is closely focused on how to augment and increase Sydney's water supplies in the face of climate change and growing populations. Treated water produced by the AWRC can be used for a range of purposes to support these strategies for water resilience in Greater Sydney. This includes environmental flows, use in residences, business, industry, agriculture and irrigation of open space.

There are also a series of other plans, more specific to the protection of water resources and biodiversity, against which the project has been assessed as part of the EIS.

2.4 Sydney Water plans and policies

In support of these government policies and aspirations, Sydney Water developed the Western Sydney Regional Master Plan, with significant consultation across government. The Plan identified the opportunity to manage water and wastewater in Western Sydney in a more integrated way to deliver on the vision of a green and blue Western Parkland City. It also identified that increasing water recycling would deliver more economic value and enable opportunities for water reuse and for the circular economy. The project forms a part of delivering the Master Plan's flexible, adaptive, and high-value pathways for whole-of-community benefits.

In addition, Sydney Water's Environmental Policy outlines the commitment to protect, restore and enhance the natural environment, with commitments to:

- having no net impact from discharges to the air, water, or land
- maximising resource value and supporting a circular economy by responsibly managing energy, water and materials, and minimising waste creation
- managing the entire integrated water cycle in the catchment, including capturing, treating, distributing drinking water and collecting, treating and releasing wastewater
- protecting, restoring and enhancing natural and cultural heritage assets
- social responsibility by having at the forefront the wellbeing of the community to improve overall environmental performance.

This policy has informed design decisions for the project and Sydney Water's approach to managing impacts.

3 What were the options?

Sydney Water completed a comprehensive options analysis to identify the best strategic option to achieve the project objectives. Sydney Water also considered options relating to project location, pipeline alignments, release locations and more. Avoiding or minimising social and environmental impacts, while maximising project benefits, were key considerations in the options analyses.

3.1 The 'do nothing' option

If Sydney Water does not act, wastewater from the new precincts in the Upper South Creek Servicing Area would either continue to be serviced by on-site septic tank systems or would be transferred to existing, already near-capacity, water recycling plants at Liverpool and West Camden. This would severely limit development potential, and have a range of other negative consequences including:

- inability to provide wastewater servicing to the Western Sydney International Airport, which would potentially impact its opening and operations, resulting in significant negative consequences for the economic development of the Western Parkland City
- flows to West Camden and Liverpool WRPs would exceed capacity, resulting in operational pressure and non-compliances, including overflows to South Creek and other waterways
- either an inability to provide wastewater servicing in the WSAGA, or proliferation of decentralised solutions, which have been shown to be less cost-effective
- delaying the ability to provide a reliable supply of recycled water to support liveability, sustainability, environmental flows, businesses and industry, leading to a less resilient water supply system and a less-resilient Sydney
- on-site (septic tank) systems would continue to be implemented on a large scale in the Upper South Creek Servicing Area, increasing the risk to public and waterway health due to the progressive increase in wastewater overflows
- lost opportunity to implement circular economy solutions such as resource recovery through renewable energy generation and biosolids recovery
- risk of Sydney Water not complying with its obligations under the *Sydney Water Act 1994*.

For this project, the 'do nothing' option was therefore not considered a realistic option.

3.2 Wastewater servicing options

Sydney Water assessed five wastewater servicing options to determine which best delivered against the objectives of servicing the population growth in the new development areas and meeting sustainability and liveability goals. These include different levels of wastewater treatment, ranging from secondary treatment (lower level of treatment) through to tertiary treatment (higher level of treatment) and advanced treatment (highest level of treatment).

- **Extension of current servicing (the 'do nothing' option).** Parts of the Upper South Creek Servicing Area currently connected to an existing wastewater system would continue to be serviced by those treatment plants. The remaining parts of the Upper South Creek Servicing Area would continue with on-site treatment, which would severely limit development.
- **Transfer of untreated wastewater to the Malabar wastewater treatment plant.** A new transfer network would carry raw wastewater from the Upper South Creek Servicing Area to the Malabar Wastewater Treatment Plant (WWTP) via the Malabar collection network. This would require an upgrade to the Malabar WWTP and no recycled water would be produced.
- **Transfer of treated wastewater to the Malabar wastewater treatment plant.** Wastewater would be treated in the Upper South Creek Servicing Area at a new secondary WWTP located in the region, with treated water being transferred to the Malabar deep ocean outfall. Recycled water may be produced but there is limited opportunity to offset Sydney's bulk drinking water demands.
- **Decentralised water recycling plants (WRPs).** Decentralised WRPs would be installed across the Upper South Creek Servicing Area to minimise pumping distances in the network. Up to 15 new treatment plants would be built and upgraded progressively. Each plant would produce tertiary treated water available for reuse in irrigation, agriculture and industry. Energy generation would not be a feature of this option due to small plant size.
- **Advanced wastewater treatment option.** All wastewater generated in the Upper South Creek Servicing Area would be treated at a centralised Advanced Water Recycling Centre. Advanced treated water would be released to Nepean River with brine by-product transferred to Malabar WWTP for release to the ocean.

The assessment of the options clearly demonstrated the advanced wastewater treatment option was the best solution to address the project need and achieve superior benefits for Sydney Water's customers, the businesses and residents of Western Sydney and the people of Greater Sydney and NSW. The key benefits over other options included improved liveability and support for economic growth in Western Sydney, greater alignment with key NSW Government strategies and the ability to provide environmental flows and recycled water.

3.3 Site, pipeline alignment and release point options

Within the advanced wastewater treatment option, several more specific options were considered. These included where to locate the AWRC, the alignment of the pipelines carrying the treated water and brine, and the locations of the treated water release points on the Nepean and Warragamba Rivers. These are described below:

- **AWRC location options.** Three locations at Oran Park, Cecil Park and Kemps Creek were considered for the AWRC site. The Oran Park option was eliminated because the area is largely zoned for future residential development, which would result in increased impact to the community. The Cecil Park option was eliminated because land acquisition costs would likely be excessive. Kemps Creek was preferred as it would minimise community and local business exposure to construction impacts while providing greatest flexibility for future development. Around Kemps Creek, eight sites were assessed as potential locations for the AWRC, with the preferred site chosen because it minimised conflicts with other land uses and had lower community impacts.
- **Pipeline alignment options.** Three pipelines form part of the project, a treated water pipeline carrying treated water from the AWRC west to Nepean River, an environmental flows pipeline which is an extension of the treated water pipeline and carries water to Warragamba River and the brine pipeline which carries brine east from the AWRC to the Malabar system.
    - Two main route options were assessed for the treated water pipeline, one sharing the easement of the existing pipeline carrying drinking water from Warragamba Dam to the Prospect Reservoir and another running along Elizabeth Drive, Park Road and Silverdale Road to Wallacia. The first was eliminated because of the potential conflicts with future plans for additional critical pipeline infrastructure planned to be built in that easement.
    - Four alignment options were assessed for the environmental flows pipeline. Three were eliminated because of challenging construction requirements or potential impacts on existing infrastructure around Warragamba Dam. The preferred option was selected to take advantage of already disturbed land, significantly reducing the potential for environmental and heritage impacts.
    - For the brine pipeline alignment, five options were assessed. Two were shortlisted as they represented the shortest distance, the least impact on existing roads and could utilise some areas disturbed by other Sydney Water pipeline infrastructure (particularly Sydney Water's Prospect to Macarthur water supply project). The option ultimately selected was chosen since it represented the least community disruption.

- **Release point options.** As described above, the treated water pipeline will release into Nepean River and the environmental flows pipeline will release into Warragamba River. Several options were considered for the location of these release points, taking into consideration the potential of each option to minimise heritage, water quality, biodiversity, downstream flooding impacts and impacts on community recreational use and other values. The selected release point from the treated water pipeline is at Wallacia Weir and from the environmental flows pipeline downstream of Warragamba Dam. In addition, infrastructure will be built at the AWRC site allowing release of treated water to South Creek, when required (only during certain wet weather events).

Sydney Water is also exploring with DPIE if the project can contribute to waterway health benefits of the new environmental flows regime by releasing treated water to Nepean River at Wallacia Weir and avoiding the significant cost of building the environmental flows pipeline.

4 Project description

4.1 The overall project

Sydney Water is proposing to build and operate a new facility and associated pipelines to provide wastewater services for the WSAGA and SWGA. The project includes:

- a new Advanced Water Recycling Centre (AWRC) to collect wastewater from businesses and homes and treat it, producing high-quality treated water, renewable energy and biosolids for beneficial reuse
- a new green space area around the AWRC, adjacent to South Creek and Kemps Creek, to support the ongoing development of a green spine through Western Sydney
- new infrastructure from the AWRC to South Creek, to release excess treated water during significant wet weather events, estimated to occur about 3 – 14 days each year
- a new treated water pipeline from the AWRC to Nepean River at Wallacia Weir, to release high-quality treated water to the river during normal weather conditions
- a new environmental flows pipeline, from Wallacia to Warragamba River, to release high-quality treated water to the river just below Warragamba Dam
- a new brine pipeline from the AWRC connecting into Sydney Water's existing wastewater system to transport brine to the Malabar Wastewater Treatment Plant
- a range of ancillary infrastructure.

The EIS includes a detailed project description outlining the component infrastructure for the project, including the ancillary infrastructure and temporary works required to enable the efficient delivery of the project. Figure ES2 shows the key project components.

The project is planned to be built in stages, with this EIS assessing Stage 1, consisting of:

- building and operating the AWRC to treat a daily wastewater flow, known as the average dry weather flow (ADWF), of up to 50 megalitres per day (ML/day)
- building all pipelines to cater for up to 100 ML/day flow coming through the AWRC (but only operating them to transport and release volumes produced by Stage 1).

The EIS also seeks a staged approval for the overall concept of the AWRC operating at up to 100 ML/day. Future stages will involve expansion of the AWRC capacity, but will not require new pipelines. This avoids disruption and impacts from laying more pipelines in the future.

Current growth projections suggest the ultimate capacity of the AWRC could be up to 100 ML/day. The timing and size of future stages will be established over time to align with growth in demand in the servicing area.

Sydney Water expects to start building Stage 1 in mid-2022 and to start operating it in mid-2025.

Advanced Water Recycling Centre
Treated water pipeline
Brine pipeline
Environmental flows pipeline
Local Government Area
Watercourse
Waterbody
Railway

1:135,000
0 1 2km

Figure ES2: Overview of the project site and pipelines

Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI
Projection: GDA2020 MGA Zone 56

4.2 AWRC site

The AWRC site is about 78 ha in size and is located in Kemps Creek, bounded by South Creek to the west, Kemps Creek to the northeast and the proposed M12 Motorway to the south. The site, accessed from Elizabeth Drive via Clifton Avenue, will include an operational area laid out to the south and east of the site, as shown indicatively in Figure ES3. The site will also have a green space area, along the north and west of the site, adjacent to the waterways.

The key project components in the operational area include:

- the AWRC which includes buildings, infrastructure and equipment for wastewater treatment
- ancillary infrastructure including pumping stations, administration building, carparking, internal roads, renewable energy generation, onsite detention basins, chemical storage and switchrooms.

The key project components in the green space area include:

- landscaping to develop a green space that enhances biodiversity, uses best practice water sensitive urban design and provides visual screening of the AWRC
- infrastructure to release treated water and stormwater to South Creek.

The AWRC will use advanced wastewater treatment and processing approaches, meeting world's best practice. In addition to treating wastewater to high levels, the AWRC will include a range of design measures to minimise odour impacts, generate renewable energy and provide treated biosolids for use as agricultural fertilisers. The AWRC will operate 24 hours per day, seven days per week.

Figure ES3 Indicative visualisation of AWRC site

4.3 Water treatment and volumes

The sizing of wastewater treatment plants is based on the forecast volume of incoming wastewater likely to be received by the plant. During normal operating conditions, the wastewater flows, known as dry weather flows, are relatively consistent. However, stormwater and groundwater can enter the wastewater collection network from several sources, including infiltration through damaged pipes or other infrastructure or illegal stormwater connections. This typically occurs in wet weather and occurs in all wastewater systems. This additional water ultimately ends up at wastewater treatment plants or can contribute to overflows from the wastewater collection network if the pipeline volume is exceeded.

Although these increased flows, known as wet weather flows, are relatively infrequent, the volumes can be large, and the wastewater system needs to be designed to accommodate these larger flows.

The design of the AWRC is based on the requirement to treat the average dry weather flow (ADWF), representing the volume of wastewater Sydney Water expects the plant to receive, on average, each day under normal or dry weather conditions. It also needs to accommodate the larger wet weather flows.

All the wastewater received at the AWRC under normal conditions (up to 1.3 times ADWF) receives advanced treatment. This means that a very high-quality treated water will be produced and released to Nepean or Warragamba Rivers.

The larger wastewater volumes during wet weather are infrequent and highly diluted so they receive lower levels of treatment:

- Under partial wet weather conditions (between 1.3 times and 1.7 times ADWF), some of the water still receives advanced treatment while some receives tertiary treatment. The treated water produced will be released to Nepean River.
- In wet weather conditions (once flows exceed 1.7 times ADWF and up to three times ADWF), advanced and tertiary treated water will continue to be released to Nepean River with flows released to South Creek in some cases.
- In severe wet weather conditions (exceeding three times ADWF), disinfected primary treated water will also be released to South Creek.

The releases in wet weather and severe wet weather conditions are infrequent, with flows exceeding 1.7 times ADWF expected between 3-14 days each year.

Figure ES4 shows the way Sydney Water proposes to treat and manage releases to waterways, which is typical for wastewater treatment plant design.

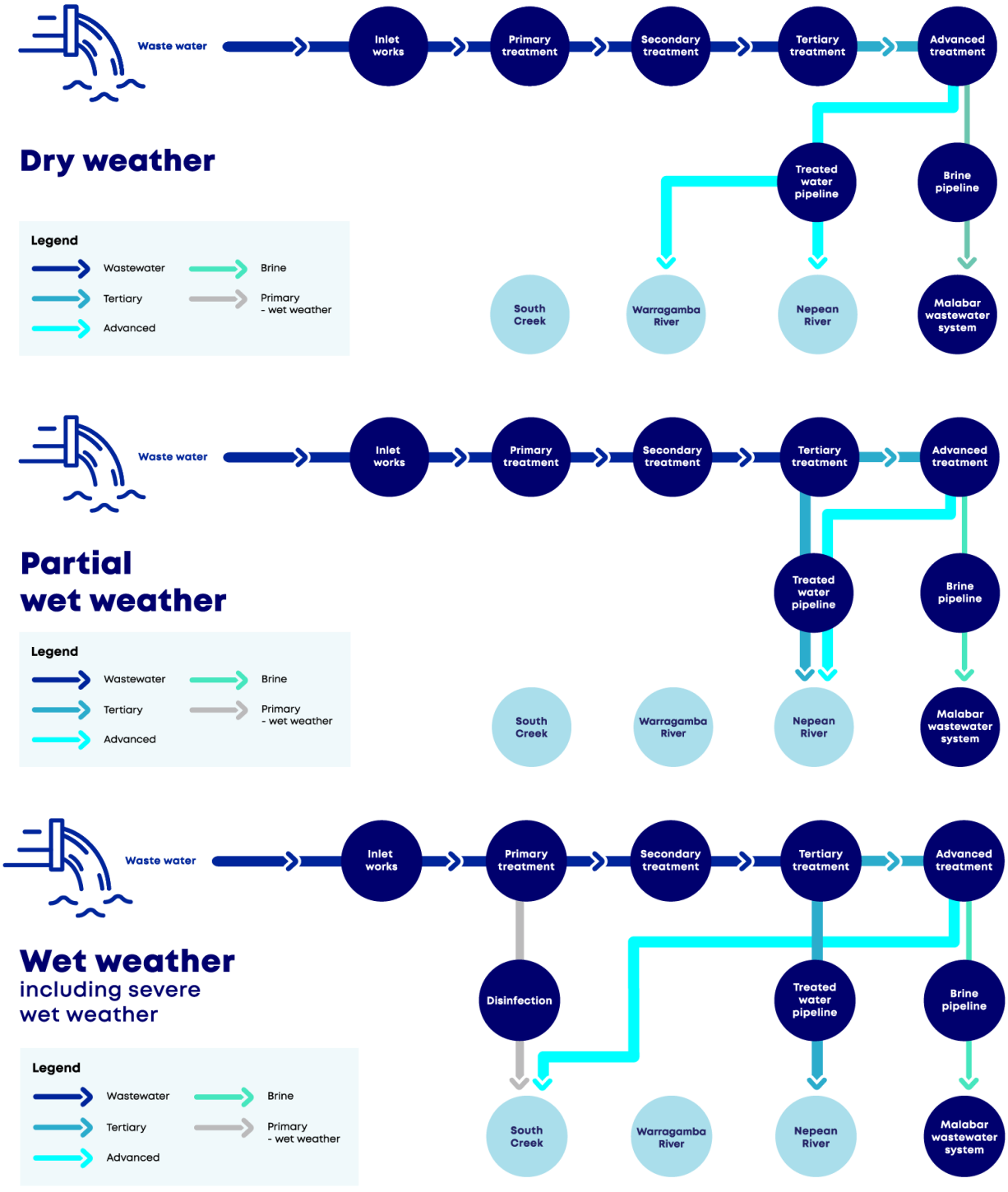

Figure ES4 Flow of wastewater through the AWRC in various weather conditions

Table ES1 shows the different treatment levels for these incoming wastewater volume scenarios and the proposed release locations.

Table ES1 Flow scenarios for the AWRC and the respective release locations.

Flow Scenario	Releases to Nepean River and Warragamba River		Releases to South Creek	
	Treatment level	Indicative volume (ML/day)	Treatment level	Indicative volume (ML/day)
Dry weather Flows up to 1.0 x ADWF	Advanced (≤1.0 x ADWF) to Warragamba River *or to Nepean River if the environmental flows pipeline is not built.*	0 – 45	-	-
Partial wet weather Flows from >1.0 x to 1.7x ADWF	Advanced (1.0 - 1.3 x ADWF) to Nepean River	45 – 59	-	-
	Tertiary (≤0.4 x ADWF) to Nepean River	0 - 20		
Wet weather Flows from 1.7 x to 3x ADWF	Advanced (≤1.3 x ADWF) to Nepean River	59 - 0		
	Tertiary (0.4 - 1.7 x ADWF) to Nepean River	20 - 85	Advanced (≤1.3 x ADWF)	0 – 59
Severe wet weather Flows ≥3 x ADWF	Tertiary (≤1.7 x ADWF) to Nepean River	85	Advanced (1.3 x ADWF)	45 – 59
			Wet weather (>3 x ADWF)	See notes in Chapter 4 of EIS

4.4 Pipelines

The treated water pipeline will transfer treated water from a pumping station at the AWRC to a release structure at Nepean River, upstream of Wallacia Weir. The treated water pipeline is about 16.7 km long and 1.2 m in diameter. There are no additional pumping stations along the route.

The environmental flows pipeline will transfer high-quality treated water to Warragamba River via a release structure to be constructed downstream of Warragamba Dam. It diverges from the treated water pipeline at a flow splitter located in Wallacia. From that point, the environmental flows pipeline is about 4.5 km in length and up to one metre in diameter.

The brine pipeline transfers brine, a waste product from the advanced process at the AWRC, to connect into the existing Malabar wastewater system at Lansdowne. The brine pipeline will be about 24 km in length and about 0.6 m in diameter and will cross under the M7 Motorway and the rail line at Cabramatta.

These pipelines are shown in Figures ES5 and ES6 over the page.

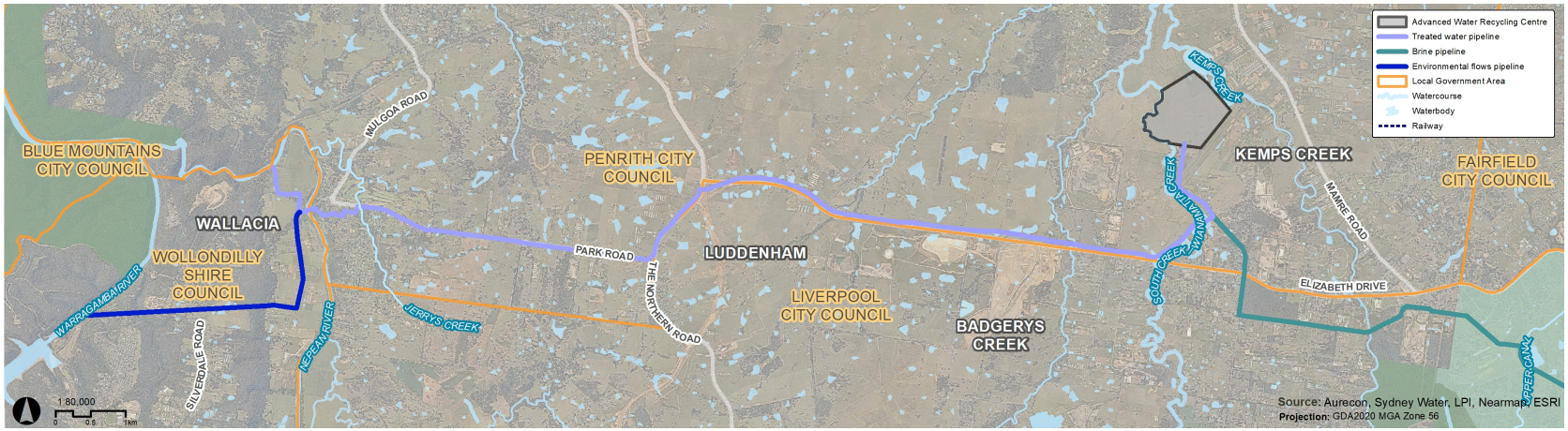

Figure ES5 Treated water and environmental flows pipeline alignment

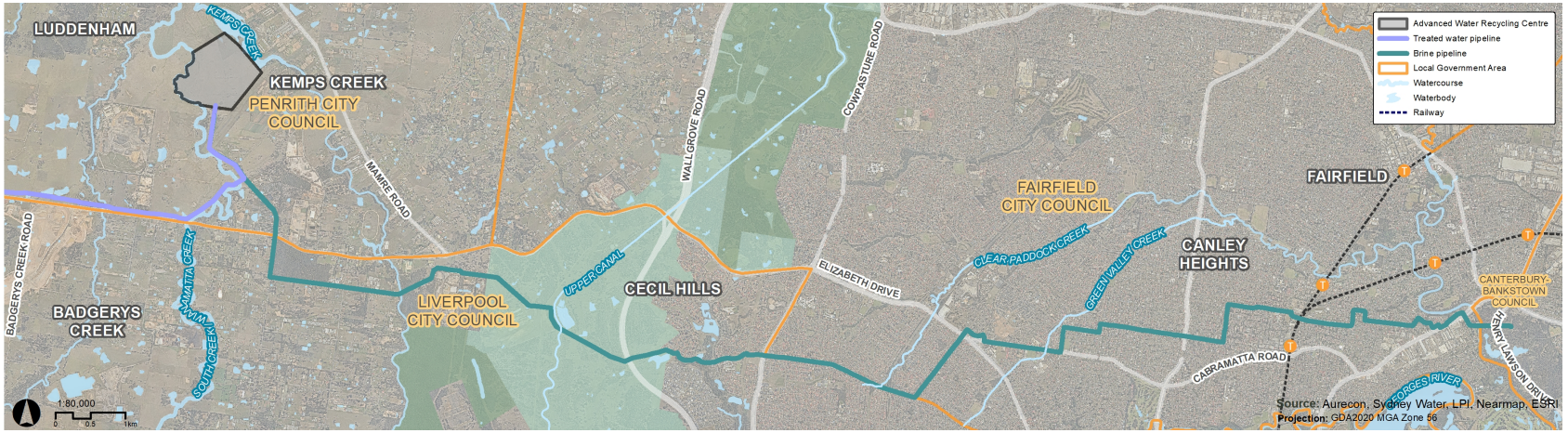

Figure ES6 Brine pipeline alignment

All pipelines will be underground and, in most cases, will be built using open trenching, as shown in Figure ES7. The typical construction corridor width for open trench construction is 15 – 30 m, although a narrower corridor can be adopted when constrained by potential Aboriginal heritage sites, areas of endangered vegetation or other sensitive items, as shown in Figure ES8.

Figure ES7 Trenched pipeline construction with benching

Figure ES8 Trenched pipeline construction with shoring in constrained contexts

The open trenching method of construction will also occur at some creek crossings as shown on Figure ES9. Determining the construction methodology across waterways includes balancing considerations such as environmental constraints, waterway size and flow, geotechnical conditions and cost.

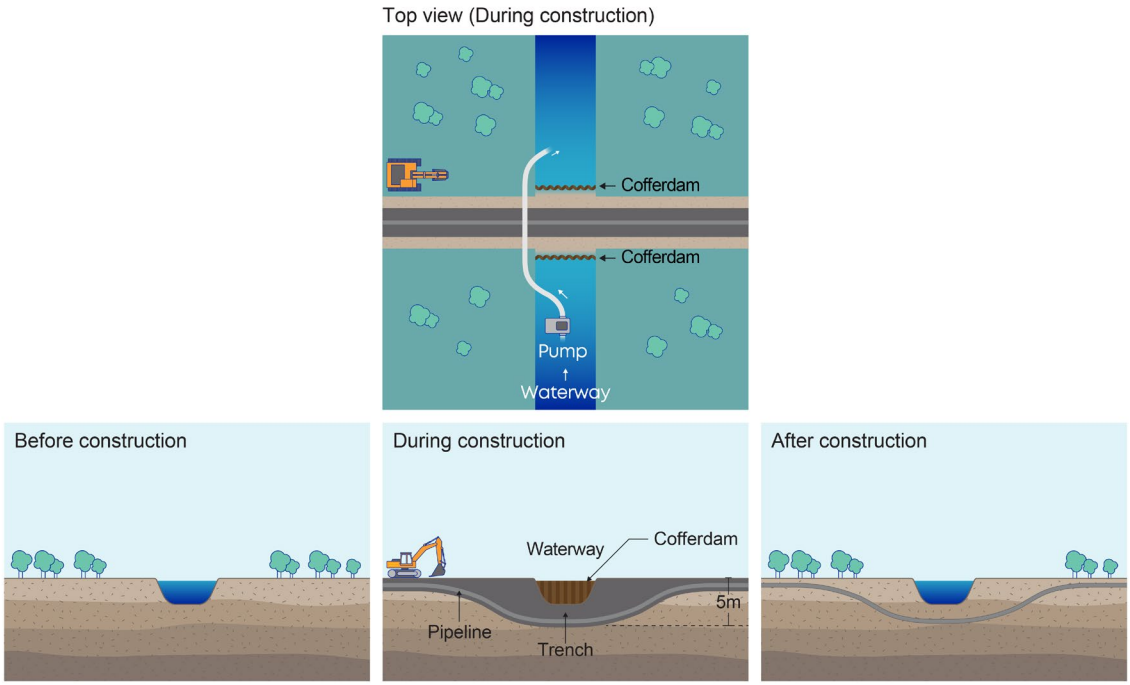

Figure ES9 Illustration of trenched pipeline construction through a waterway

Some pipelines will be built with tunnelling methods, including a technique known as Horizontal Directional Drilling (HDD). This method, shown in Figure ES10, needs a launch or entry trench from which the pipe is drilled. At the other end of the crossing, there is an exit trench into which the pipe arrives and from which the open trench construction can continue safely.

These types of crossings include Nepean River, Prospect Creek, Upper Canal, the railway line at Cabramatta, M7 Motorway and other key roads and creeks.

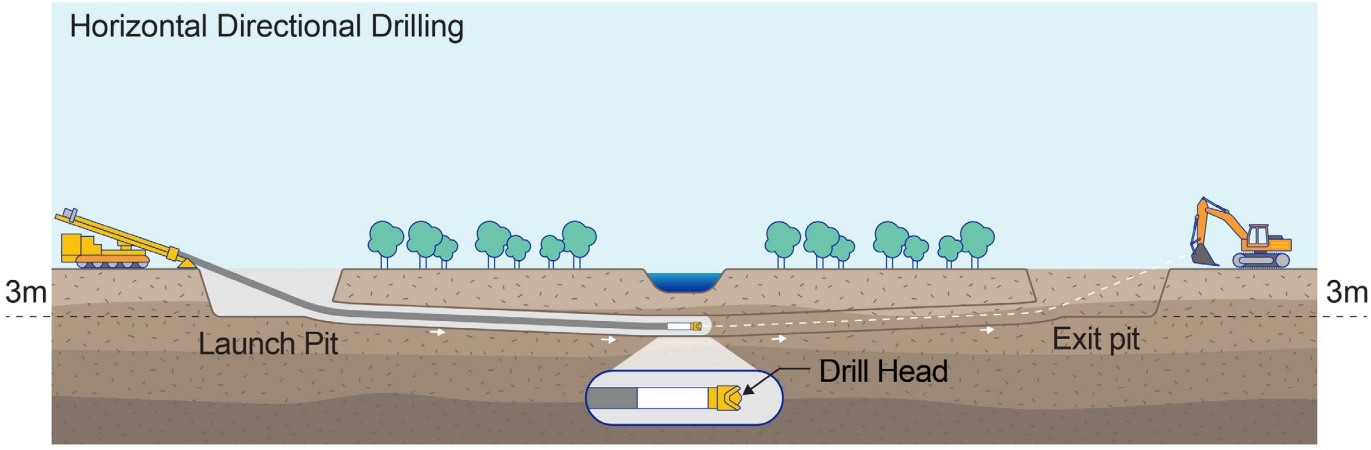

Figure ES10 Illustration of HDD tunnelling construction

4.5 Release structures

The release infrastructure to South Creek is proposed at two points, in the northwest and south of the AWRC site. This infrastructure could include a combination of grass swale, pipeline and headwall, and other measures. Release points are also proposed at Nepean and Warragamba Rivers. Figures ES11 and ES12 provide artist impressions of the release structures at Nepean and Warragamba Rivers.

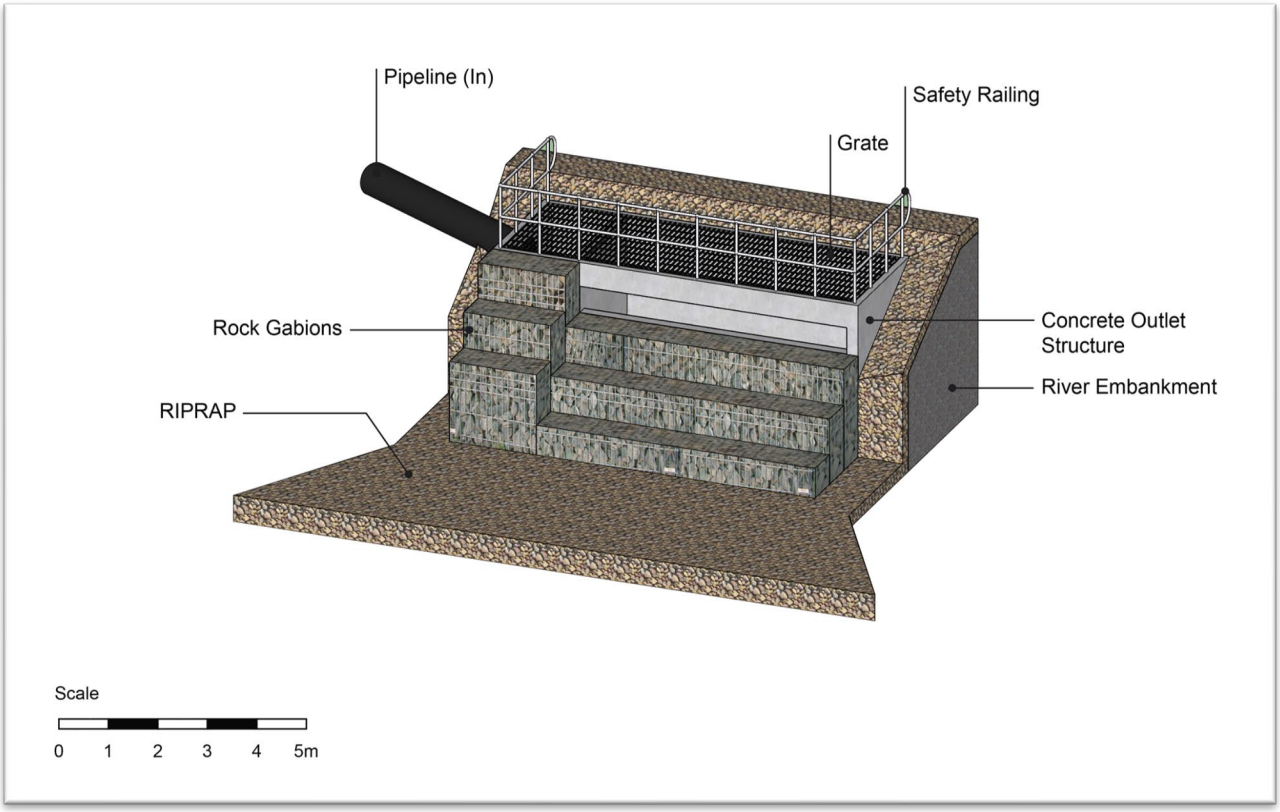

Figure ES11 Indicative design of the treated water release structure at Nepean River

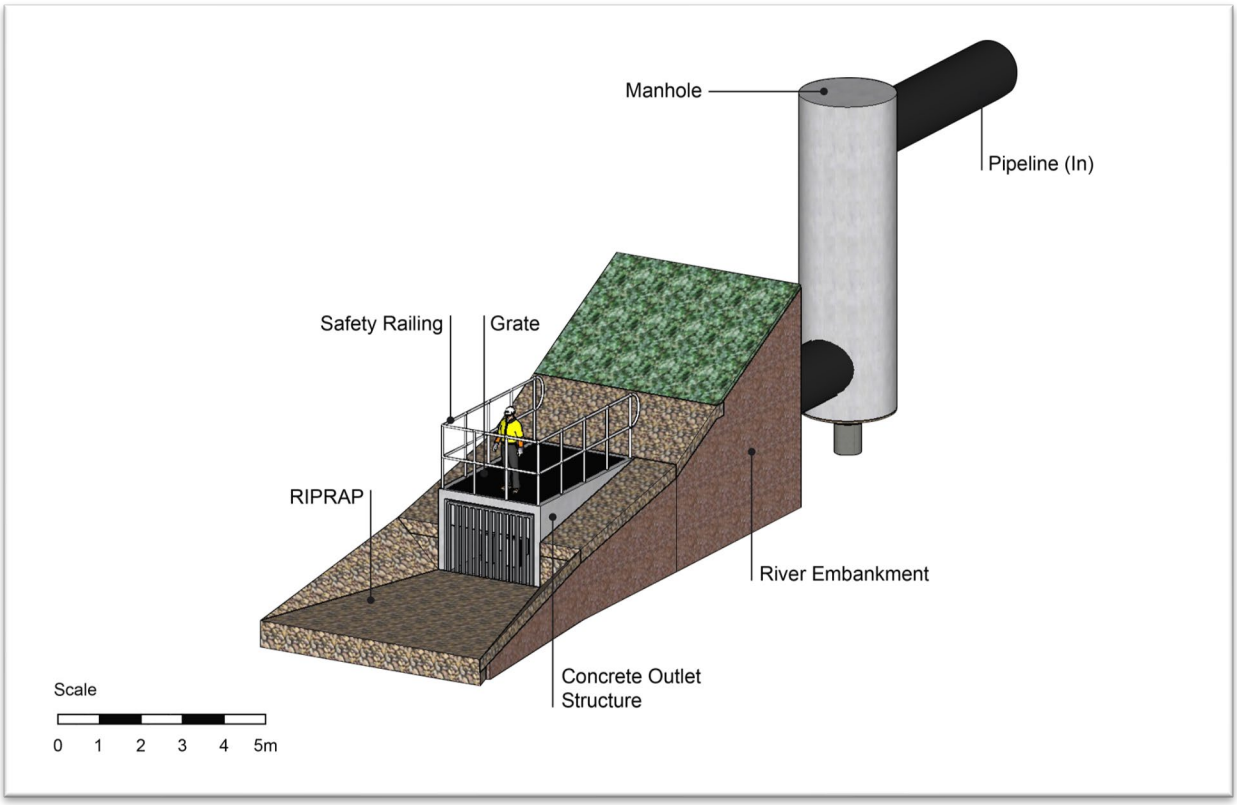

Figure ES12 Indicative design of the environmental flows release structure at Warragamba River

4.6 Construction timing

The project will take about three years to build, with some locations such as the AWRC site requiring construction activity over this whole period. Construction of other components such as pipelines will occur in several locations at one time, with works moving progressively along the alignment. Once each element of the project is built it will undergo commissioning tests to make sure it is ready to operate, and works to restore disturbed areas will be completed.

4.7 Project uncertainties

Sydney Water is seeking flexibility in the approval to manage project elements that are uncertain for the following reasons:

- The project assessed in the EIS is based on a reference design and will be refined and changed during a more detailed design process by Sydney Water's construction contractors.
- Project sizing and staging is influenced by external factors such as whether population projections occur as expected. These factors often evolve over time.

- Some aspects of the project are influenced by key cross-government decisions for which planning is still underway at the time of writing the EIS. These include WSAGA and metropolitan water planning.

Chapter 4 of the EIS provides more detail about the key areas where this flexibility is needed and how Sydney Water will resolve the uncertainties. Chapter 3 also describes some pipeline alignment changes that are under consideration.

5 Statutory context

Under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act), the project is State significant infrastructure. Sydney Water must prepare an Environmental Impact Statement (EIS) and seek approval for the project from the Minister for Planning and Public Spaces. The Department of Planning, Industry and Environment (DPIE) issued Sydney Water with environmental assessment requirements in January 2021, which Sydney Water must follow in preparing the EIS.

The project will also need approvals under a range of other NSW environmental legislation, which Sydney Water will apply for separately.

Sydney Water referred the project to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) for a decision about whether the project was likely to have a significant impact on any matters of national environmental significance under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. As a result, Sydney Water needs to assess the project's impact on:

- Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest, which is a threatened community
- Regent Honeyeater, Swift Parrot and Macquarie Perch, which are threatened species
- Greater Blue Mountains Area, a World Heritage property and National Heritage place.

The Commonwealth Government has an agreement with the NSW Government that although the project needs approval from the Commonwealth Minister for the Environment, the assessment of the matters of national environmental significance can be incorporated into the NSW EIS process.

6 Engagement

6.1 How has Sydney Water consulted?

Sydney Water has undertaken a range of consultation activities since December 2019. These are summarised in Figure ES13 below and fully detailed in Chapter 6 of the EIS.

Figure ES13 Overview of community and stakeholder activities

6.2 Key issues that were raised

Sydney Water consulted with NSW and Commonwealth Government agencies, local councils, interest groups, local communities and directly-affected landowners. The main issues raised included:

- traffic and transport and its management during the construction period to minimise disruption on local communities, particularly in areas that are densely populated
- construction disruption to highly-populated areas where there are social hubs of activity
- the potential availability of water for businesses
- impacts to waterways (including their quality, health and safety and aquatic flora and fauna) from construction of pipelines and from water releases during operation
- the ability to be involved in and influence the final design alignments and how portions of the project will be constructed
- potential flooding around South Creek and Wallacia and whether the project will increase the frequency of flooding, make flooding worse, or result in more localised flooding as smaller creeks get backed up
- cumulative impacts (traffic, noise and dust) with multiple other major projects being constructed in Western Sydney at the same time
- potential impacts to terrestrial biodiversity and heritage.

This input has already informed and influenced the project and consultation will continue to inform the project as it progresses to more detailed stages of design. Input from stakeholders and the community is also key in developing the design and construction methodology and construction management documentation. It allows Sydney Water to ensure detailed construction methodologies and management are designed with input from those directly affected.

7 Impact assessment

7.1 Impact assessment approach

The EIS assesses the project's impacts on a broad range of environmental aspects. For each environmental aspect, Sydney Water and a series of expert specialist consultants completed a level of assessment commensurate with the project's potential impacts. The assessment is also in line with existing guidelines and the Secretary's Environmental Assessment Requirements (SEARs) issued by DPIE and the Commonwealth DAWE.

Each assessment includes identification of the impacts, an assessment of their significance and a description of the actions that were taken to either avoid or minimise the impacts. Where impacts could not be avoided, additional specific environmental management measures have been identified to manage residual impacts to acceptable levels. Specialist consultants have developed these measures based on best practice, guidelines and industry standards. The proposed measures therefore represent Sydney Water's best understanding of the most effective way to manage residual impacts.

As described previously, the impact assessment for this project focuses on the impacts of Stage 1, the 50 ML/day plant and associated pipelines. Although future project stages will require separate approvals to address construction and operational impacts, Sydney Water has included in the EIS a brief assessment of operational impacts of the larger plant operating at 100 ML/day to demonstrate the acceptability of the long-term impacts of the project. In this case, only operational impacts are assessed for future stages, given construction impacts will be short-term and focused within and close to the AWRC site.

Western Sydney is a rapidly developing area, and the host of other major projects and urban developments in the vicinity of the AWRC project means there is potential for cumulative impacts. Capturing these cumulative impacts is an important component of impact assessment. Therefore, where there is adequate information available about environmental impacts and timing for these projects, and there is likely to be an overlap in construction or operational activities, Sydney Water has explicitly addressed those cumulative impacts in the respective impact assessment chapters.

As described in Chapter 15, the management measures will be consolidated into the Construction Environmental Management Plan (CEMP) and the operational Environmental Management Systems (EMS). Apart from identifying management measures, these plans and systems also provide a framework to verify the effectiveness of management measures, during construction and operation, through inspections, auditing, monitoring and continual improvement activities.

7.2 Summary of results

Most potential impacts from the project are related to its construction, including reduced amenity around the various construction locations. Most impacts are predicted to be temporary and short term and Sydney Water will apply mitigation and management measures to either avoid the impacts, reduce them, or minimise their effects. During project operation, there are few impacts predicted, mostly relating to the visibility of the AWRC site and releases of treated water to local waterways.

The following sections summarise the technical studies presented in the EIS and their impact assessment results.

7.3 Waterway impacts

Potential impacts to the waterways could occur during construction and operation, for different reasons and with different management responses. During construction, direct impacts include building pipelines across waterways and indirect impacts can occur if erosion is not appropriately managed. During operation, treated water will be released to South Creek and Nepean and Warragamba Rivers.

The project is located in the Hawkesbury Nepean River catchment (including the South Creek sub-catchment) and the Georges River catchment. The waterways in these catchments have all been subject to historical impacts associated with urban and agricultural land use, including elevated nutrient levels and altered hydrology due to in-stream weirs and dams.

The main project impacts during construction are direct impacts on waterways (where construction activities are required for pipeline crossings and release structures) and indirect impacts from potential erosion and sedimentation. The activities can potentially affect water quality, geomorphology and aquatic ecology. These construction impacts are not expected to be significant and can be effectively mitigated through standard management measures for erosion and sediment control and other measures such as careful management and timing of waterway crossings in accordance with DPI Fisheries guidelines. Some waterways will be crossed using tunnelling methods which will minimise impacts.

During operation, the main potential for impacts to waterways is from treated water releases to South Creek and Nepean and Warragamba rivers. These releases have the potential to impact on water quality, geomorphology and aquatic ecology as a result of altered water quality and flow regimes.

For all waterways, the assessments indicate that the main future changes to waterways result from increased surface flows and pollutant loads from urban development and that treated water releases from the project represent a marginal additional impact. This is partly a result of the high-quality advanced treated water produced by the AWRC and, for South Creek in particular, that the treated water releases represent a small proportion of total flows.

Sydney Water has developed waterway objectives for the project, with management goals relating to aquatic ecology, recreation and aesthetics, primary industries (irrigation and livestock drinking) and drinking water. Overall, the project is predicted to achieve the management goals and, in some cases, potentially lead to improvements in the condition of the waterway. The project is not expected to have any negative impacts on Sydney's drinking water catchment.

The only threatened species potentially impacted by the project is the Macquarie Perch, which is protected under the Fisheries Management Act 1994 (FM Act) and Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). A Seven-part Test of Significance has been undertaken in accordance with the FM Act and an Assessment of Significant Impact has also been undertaken in accordance with the EPBC Act. The results of these assessments indicated that the project's impacts on this species are not considered significant, given impacts on its habitat and food sources in Nepean and Warragamba rivers will be minor.

7.3.1 South Creek

In South Creek, treated water (either advanced treated water or a blend of advanced treated water and primary treated water) will be released infrequently and only during wet weather, with no releases during dry weather. Water quality impacts are predicted to be infrequent and short-lived with concentrations returning to background levels within a day of the releases ceasing, with impacts generally minor and/or not identifiable downstream of Kemps Creek.

As a result of the proposed release strategy, the treatment of releases from the AWRC also has the potential to dilute and improve some aspects of water quality within the creek during smaller events.

The potential for toxicity impacts is low given the infrequent nature and short duration of the releases. The treated water releases will result in a minor increase (less than 3%) in mean annual flows in South Creek resulting in limited additional geomorphological change to the creek. Treated water releases align with the NSW Government's flow objectives for South Creek. The exception is the cease to flow metrics, where modelling shows they are unlikely to be achieved both with and without AWRC releases given the urbanisation of the catchment.

The aquatic ecology of South Creek is currently in a degraded state. The water quality and hydrological changes induced by the AWRC are not expected to further impact the system given that the releases will be infrequent, short-term and treated to minimise the risk of environmental harm.

7.3.2 Nepean River

In Nepean River, treated water releases (either advanced treated water or a blend of advanced and tertiary treated water) are expected to typically improve water quality for some indicators (such as total nitrogen, total phosphorus, salinity, dissolved oxygen and enterococci) with slight increases in bioavailable forms of nitrogen. During infrequent wet weather events, elevated nutrient concentrations are predicted downstream of the releases due to the higher proportion of tertiary treated water in the releases. These 'spikes' result in localised and short-lived downstream impacts

on water quality. Nutrient concentrations are predicted to drop quickly to levels lower than the background scenario within a few days as a result of dilution.

Hydraulic and geomorphic impacts are expected to be minor. Moderate increases in water surface elevation (averaging about 18 cm) are expected upstream of the Wallacia Weir, however increases are well within the channel extents and will not result in flooding or engagement of floodplain areas. Downstream of the weir, increases to water surface elevation are minor. Changes to velocity and shear stress are generally minor, with one area showing a localised increase through a steep riffled section.

The impacts on aquatic ecology are expected to be minor given the generally beneficial impacts or minor impacts associated with water quality and geomorphology. The potential for toxicity impacts is also assessed to be low given the infrequency and short duration of the tertiary treated water releases. There is potential for the small increases in bioavailable nitrogen to contribute to enhanced algal growth, but this is considered a low risk given the overall positive impacts on water quality. The increases in wetted perimeter may provide a small benefit to in-stream aquatic ecology by increasing habitat and an equivalent minor reduction in riparian habitat.

7.3.3 Warragamba River

Similar to Nepean River, treated water releases (of advanced treated water only) are expected to result in water quality improvements in relation to total nitrogen, salinity, total suspended solids, enterococci and dissolved oxygen, with an increase in bioavailable forms of nitrogen and phosphorus. Higher levels of chlorophyll a are predicted which increases the risk of localised algal growth in Warragamba River. This change is not observed downstream of the confluence with Nepean River.

The project can contribute to potential geomorphic benefits identified for variable environmental flows including mobilisation of in-channel sediment, an increase in wetted perimeter and a better defined, active low flow channel.

Aquatic ecology impacts are considered similar to those related to water quality in Nepean River. The increased risk of algal growth is not expected to alter the trophic state of the river, meaning any potential impacts would be minor.

Sydney Water will implement a baseline and post-commissioning monitoring program to help understand impacts of the project once it is operational. This will have water quality, aquatic ecology and geomorphic components.

7.4 Terrestrial biodiversity

Most impacts to terrestrial biodiversity will occur during construction, when vegetation and fauna habitat is removed to establish project infrastructure. These impacts are considered moderate. Operational impacts are predicted to be minor.

The project has been designed and located to avoid and minimise impacts on native vegetation where possible. An example of this is the Lansdowne biodiversity stewardship site, where the design was amended in consultation with Canterbury-Bankstown City Council.

During construction, the project will remove up to 13.77 ha of native vegetation. Although most of this vegetation is classified as threatened ecological communities, about 86% is thinned or scattered trees, rather than intact vegetation communities. Within this area, seven individual threatened plants will be removed as result of the project. Most of the impact area represents marginal and disturbed habitat for threatened animal species, but some habitat for threatened birds, bats and snails will be removed.

In addition to the direct impacts from removal of vegetation and fauna habitat to establish the project's infrastructure, the EIS also assesses indirect impacts including the project's potential to create ecological edge effects. Edge effects occur when the perimeter of a patch of vegetation increases and can change vegetation community composition and environmental conditions for plants and animals. Although the project will create some edge effects, these are not expected to be significant.

Operation of the project is expected to have minor or negligible impacts on terrestrial biodiversity. Treated water releases to Nepean River may result in some minor changes to the area or duration of vegetation inundation along riverbanks. The impact assessment has shown that these changes will be minor relative to natural inundation fluctuations.

No significant impacts are predicted on threatened plants, animals or ecological communities, protected under NSW or Commonwealth legislation.

Sydney Water will implement a range of management measures to minimise biodiversity impacts including pre-clearance surveys, delineating no-go zones to protect vegetation and restoring areas where native vegetation is removed. Sydney Water will also implement a Biodiversity Offset Strategy to further offset residual impacts, in accordance with NSW Government guidelines including the Biodiversity Offset Scheme.

7.5 Flooding

Most project infrastructure will be built outside areas of flood risk. Although some project activities will occur on flood-prone land, both construction and operational activities will have little to no impact on other developments, on surrounding land or on the flood behaviour or downstream flooding in any of the surrounding rivers or creeks (including contributing to flood flows in Nepean or Warragamba Rivers).

During construction, there is potential for a small impact on flooding where construction activities encroach on flood-prone land on South Creek, Nepean River and other waterways. This includes activities at the AWRC site, the treated water and environmental flow release locations and some site compounds and waterway crossings along the pipeline alignment. In particular, construction activities on flood-prone land may change local flooding characteristics in the short term, causing

flood levels to increase to a small degree. Flooding could also create hazardous working conditions, or displace temporary buildings, equipment, or materials.

However, construction impacts are small scale, temporary and the chance of a large flood event (a 1% Annual Exceedance Probability (AEP), representing a flood with a 1 in 100 chance of occurring each year) during the three-year construction period, is low. In addition, the project's potential flooding impacts during construction can be effectively managed through a range of standard construction management measures, such as appropriate layout of construction compounds to avoid flood-prone land and overland flow paths.

Sydney Water has consulted with the State Emergency Service (SES), Wollondilly Shire Council and Penrith City Council about flood evacuation for project staff and contractors during construction and operation, and this can be effectively managed through flood preparedness procedures and evacuation plans.

The main consideration for operational flooding impacts is at the AWRC site and the treated water and environmental flows release locations. Once built, pipelines will be below ground so these structures are not expected to impact on flooding during operation.

At the AWRC site, the operational area of the site is outside and above the 1% Annual Exceedance Probability (AEP) flood planning level, which includes an allowance for flood level increases resulting from climate change. As a result, there is a very low probability of any impacts on downstream flood levels and of the operational area getting flooded.

Even in the largest flood (the Probable Maximum Flood - PMF), the AWRC operational area will not be flooded. However, there will be some minor encroachment into the PMF flood extent, resulting in minor increases (100 mm) in upstream flood levels on Kemps Creek. These flood level increases will be localised and will not impact on any other assets, development or land. During operation, the impact of flooding from the AWRC and associated infrastructure is therefore considered negligible.

For Warragamba River and Nepean River, the release structures are expected to have little to no impacts on flow conveyance or upstream flooding. The contribution of treated water releases to downstream flood flows in these waterways is also negligible, with flows contributing to 0.04% of the 1% AEP flood event for the environmental flows pipeline release point at Warragamba River and 0.02% of the 1% AEP flood event for the treated water pipeline release point at Nepean River. This represents an increase of only up to five millimetres in flood levels.

7.6 Groundwater

The project's construction and operation impacts on groundwater condition will be low. In addition, neither construction nor operation are expected to affect the long-term viability of groundwater dependent ecosystems.

Groundwater near the project is moderately to highly saline and may be affected by other contaminants generated by neighbouring activities (for example, widespread agricultural land use, areas of disturbed terrain and landfilling). For this reason, groundwater near the project has low potential for beneficial use for agricultural and drinking purposes.

During construction, and particularly during excavation, dewatering and drawdown of groundwater could occur. Dewatering will require a Water Access Licence given that drawdown volumes are likely to be about 9 ML for pipeline construction, and 57 ML for the AWRC three-year construction period. Groundwater drawdown for pipeline construction is likely to be minor and return to normal levels within several days. Groundwater drawdown from AWRC construction will also be temporary and may decrease baseflows to South Creek by about 6% during the first 18 months of construction before returning to normal.

Extracted water will be carefully managed to ensure that any contaminated groundwater encountered is appropriately treated and disposed of to prevent impacts to surrounding land or waterways.

Operational impacts are limited to the AWRC site and relate to reduced groundwater infiltration as a result of increased impervious surfaces and dewatering during periodic bioreactor maintenance (about every five years). These impacts are minor and further minimised by management measures including stormwater recharge and irrigation, which will partially offset the reduced recharge from the increase in impervious surfaces.

7.7 Surface water

The project has the potential to impact surface water during construction and operation, including through construction-related erosion and increased stormwater runoff during operation. However, the significance of these impacts is expected to be low.

Excavation and earthworks during construction at the AWRC site and along the pipeline alignments have the potential to cause localised erosion and increased sediment loads to local waterways. In addition, any accidental chemical spills or inappropriate management of waste and stockpiles during construction have the potential to result in other contaminants entering waterways. These construction impacts can be effectively managed through standard erosion and sediment control and spill management measures.

Pipelines will be designed and maintained to avoid leaks during operation, and release structures will result in only a small increase in runoff from their impervious surfaces. The operation of the pipelines and release structures will therefore have limited potential to cause surface water impacts. For this reason, the assessment focuses on impacts related to the operation of the AWRC .

Once built, the AWRC will increase the extent of impervious surfaces on the site, which could increase runoff and pollutant loads to South Creek. However, Sydney Water has modelled the water balance at the AWRC site and the effectiveness of water sensitive urban design (WSUD) measures in managing additional runoff and pollutant loads. WSUD measures can include features

such as tree planting, wetlands, gross pollutant traps, stormwater harvesting and detention basins. By implementing a range of WSUD measures at the AWRC site, modelling shows the project can:

- meet draft NSW Government water quality and flow objectives for South Creek and Penrith Council pollution reduction targets
- maintain peak flows from the AWRC site at pre-development levels
- reduce runoff by about 45% and slowly release stormwater to support baseline flows in South Creek
- reduce pollutant loads to acceptable levels.

Irrigation of the green space area on the AWRC site also has the potential to increase saline groundwater levels and result in saline runoff. Runoff will be managed by measures including controlling the irrigation rate.

7.8 Soils and contamination

The greatest potential for contamination-related impacts is during construction when soils are disturbed. Operational impacts are expected to be low given limited soil disturbance is likely, apart from during infrequent maintenance activities.

Sydney Water has not identified any widespread contamination near the project but has identified 16 areas of environmental concern (AEC) based on desktop investigations and soil sampling. The main contaminant of concern is asbestos, which has been found in localised areas on the AWRC site, around current and former structures at the Warragamba viewing platform, at Eighteenth Street near Warragamba River and in several other locations near the pipeline alignments. The greatest potential for impacts is through the disturbance of these contaminated soils during project-related construction.

Other sources of potential contaminants, near project infrastructure, include landfills and service stations. However, the interaction between these and the project is limited or non-existent. It is also possible that other unexpected contamination could be found during construction.

Saline (high salt) and sodic (high sodium) soils are also expected across the project area, with the potential for acid sulfate soils (ASS) localised around Georges River and Prospect Creek. Sydney Water has developed management measures to minimise the potential risk of saline runoff, sodic soil erosion and of disturbance of any ASS.

Sydney Water will also further investigate AECs as design progresses, develop plans to appropriately manage any contamination found (including asbestos) and implement standard soil and erosion management measures.

7.9 Aboriginal heritage

Some Aboriginal archaeological items will be impacted by project construction. Project design has avoided all items with high significance and impacts on items with low or moderate significance have been minimised. No further impacts to Aboriginal heritage items and sites are expected during project operation.

In preparing the Aboriginal heritage impact assessment, Sydney Water undertook an extensive literature review and consulted with the 26 Registered Aboriginal Parties who registered interest in the project. Some of these parties accompanied the archaeologists during site surveys.

The project has been designed to avoid impacts on several Aboriginal sites, including avoiding some entirely, and avoiding areas of high significance in others.

There are some impacts that could not be avoided, and the project will partially impact 15 Aboriginal sites during construction. These sites are either artefacts or potential archaeological deposits (PADs) of low or moderate significance, located at the AWRC site and along the pipelines. Three of the sites are in areas for which existing Aboriginal Heritage Impact Permits (AHIPs) apply or have been submitted. During detailed design, Sydney Water will consider further opportunities to refine the project to reduce impacts to sites and PADs where practical. Where impacts cannot be avoided a program of test excavations and artefact salvage will be undertaken. Sydney Water will also implement other measures to manage Aboriginal heritage impacts during construction, including procedures for managing any unexpected heritage finds.

Sydney Water is also completing an Aboriginal Cultural Values Study in consultation with local Aboriginal communities to better understand intangible Aboriginal cultural values of water in the South Creek catchment and parts of Nepean River. This study is separate to the project but its outcomes may help inform ongoing management and design of the project, including design of the green space area on the AWRC site and heritage interpretation.

7.10 Non-Aboriginal heritage

The project has the potential to create moderate impacts on non-Aboriginal heritage items during construction, particularly the Fleurs Radio Telescope site, the South, Kemps and Badgerys Creek Confluence Weirs Scenic Landscape and the Blaxland Farm. There is minimal potential for impacts during operation.

Extensive heritage surveys have identified 17 items with archaeological or built heritage value, potentially impacted by the project. Seven of these are not listed on any heritage registers. One item (the Upper Canal) is on the State Heritage Register and the remainder are on State authority or local council heritage registers.

The greatest potential for impacts during construction includes damage to items through ground disturbance during excavation activities, and damage to structures, through vibration from activities such as tunneling. The impact on scenic landscapes, from building structures in those landscapes, was also assessed.

During construction, the significance of the impacts on most listed heritage items are considered negligible. However, moderate to major impacts are expected to:

- built heritage at Fleurs Radio Telescope site at the AWRC site
- South, Kemps and Badgerys Creek Confluence Weirs Scenic Landscape near the AWRC
- archaeological heritage at Blaxlands Farm, at the treated water release location to Nepean River.

During operation, once the AWRC is built, it will change the visual landscape of the Fleurs Radio Telescope site, which is considered a moderate impact. No impacts to non-Aboriginal heritage are expected during pipeline operation.

Sydney Water will implement a range of measures to manage the project's heritage impacts. These include archival recording and further archaeological testing in several locations, measures to avoid accidental damage to heritage items and stop work provisions if unexpected heritage items are found. In addition, Sydney Water will prepare a heritage interpretation framework for the AWRC site to celebrate the site's heritage

7.11 World and National heritage

The project is not located within the boundary of any World or National heritage-listed items so will not have any direct impacts on any listed items. The release of treated water and potential for indirect impacts during operation has been assessed and potential impacts are slight or negligible. Management measures proposed under the biodiversity, waterways, heritage and visual assessments are sufficient to address any potential impacts.

The treated water release locations at Nepean River and Warragamba River are located adjacent and upstream of the Greater Blue Mountains World Heritage Area (GBMWHA). Construction of this infrastructure is not expected to have any indirect impacts on the GMBWHA so this section only addresses potential operational impacts.

Release of treated water into Nepean River and Warragamba River during operation has the potential to indirectly impact values of the GBMWHA. Sydney Water has assessed impacts on attributes of the GBMWHA associated with geomorphology, water quality, biodiversity, Aboriginal heritage, visual and non-Aboriginal heritage.

Treated water releases from the project will result in an increase of water depth in Nepean River of about 50 mm for Stage 1 of the project (50 ML/day) and about 100 mm for the ultimate releases of up to 100 ML/day and changes to wetted perimeter are expected to remain within the river channel. These changes are not expected to have a significant impact on any World or National heritage values of the GBMWHA. For most values (including geomorphology, visual and heritage) the changes associated with the project are negligible resulting in an overall neutral impact from the project. For biodiversity, the impact is slight due to small additional wetted areas on lower riverbanks and slight increase in saturation frequency in flood events. The impacts on Platypus and Echidna are considered negligible.

The management measures proposed in other sections of the EIS in relation to biodiversity, waterways, heritage and visual are appropriate to also manage and monitor potential impacts on the GBMWHA and no additional management measures are considered necessary.

7.12 Air quality

The project has the potential to generate air quality impacts during construction, primarily dust. The incorporation of an odour control unit in the AWRC will ensure that operational odour emissions from the plant are maintained below EPA requirements at both the site boundary and at sensitive receivers.

During construction, dust may be generated for short periods of time from earthworks at the AWRC site and along the pipeline alignments. Standard construction management measures for dust control, such as regular watering of exposed areas, can effectively manage these impacts.

Pipeline operation is expected to cause negligible air quality impacts. During AWRC operation, air quality impacts could arise from odour generated by wastewater treatment and oxides of nitrogen generated by combustion within the co-generation unit. However, the AWRC includes an odour control unit to treat odorous air. Modelling of odour releases completed in accordance with NSW Environment Protection Authority (EPA) guidelines shows the project can meet EPA odour criteria at the AWRC site boundary and at the nearest sensitive receivers. Modelling of nitrogen dioxide also shows that EPA criteria can be met at the AWRC boundary and nearest sensitive receivers.

7.13 Noise and vibration

The project will generate moderate noise impacts during construction, but noise impacts will be minimal during operation. No vibration impacts are anticipated throughout construction or operation of the project.

Construction at the AWRC site is likely to exceed some noise management levels at six sensitive receivers, but only when worst-case noise generation and propagation scenarios are encountered. However, this will be substantially reduced with management measures.

Noise impacts from pipeline construction are typically short-term, for individual receivers, as the construction activities progress along the pipeline alignment. The significance of impacts during construction will be greatest where work is required outside of standard construction hours (such as the environmental flows pipeline and along the brine pipeline alignment), where sensitive receivers are located within 100 m of construction activities, and where construction activities are required for extended periods. Such extended and out of standard construction hours work will be required while tunnelling is undertaken at Bents Basin Road and Lansvale Park, and if night works are required on busy roads to minimise impacts on the traffic network. Some out of standard construction hours work may also be required at the AWRC.

For the environmental flows pipeline, which includes a long and deep tunnel section under Silverdale Road and parts of Silverdale, some residences may be impacted by ground-borne noise, during construction, although this will be for only short periods of time as the tunnel construction progresses.

Operational noise impacts from the AWRC will typically meet noise criteria. However, modelling showed that there will be a minor exceedance of 1 dBA at one residential receiver during certain meteorological conditions. Management measures will be implemented to address this. Operational noise from pipelines and release structures will be minimal.

Careful management of noisy activities (such as selection of types of equipment with lowest noise outputs and installing site noise barriers) and ongoing consultation with nearby sensitive receivers, to make them aware of any upcoming events, will be used in managing project noise impacts during construction. Sydney Water will prepare a Construction Noise and Vibration Management Plan (CNVMP) outlining detailed measures to minimise the project's construction noise impacts and ensure effective consultation with sensitive receivers.

7.14 Landscape character and visual impact

Both the pipeline and AWRC components of the project will have temporary landscape and visual impacts during construction, and the main operational impact is associated with the AWRC site. The AWRC will be a permanent new structure. Screening and landscaping will reduce the visual impacts over time as the plantings become established. The impact of the release structures is minor given their small size and restricted visibility.

Visual and landscape character impacts during construction are associated with visible construction activities and associated machinery, and the removal of vegetation, including mature trees. The duration of impacts will be longer in some locations such as the AWRC site and compounds and shorter in others such as pipeline construction areas, where construction moves progressively along the alignment. Depending on the location and its sensitivity, the significance of impacts ranges from negligible to high but these will only be temporary.

Once completed, the AWRC will introduce large buildings and infrastructure into what is currently a rural setting. The visual impact will be high from some nearby viewpoints but there will also be some nearby locations from which the AWRC will not be visible.

Sydney Water has located the AWRC in an area that is expected to change over time to industrial and employment land uses and close to other major infrastructure such as the M12 Motorway. This change in surrounding visual environment will likely reduce the significance of the impact of the AWRC over time. In addition, a landscape-led approach to urban design provides opportunities to positively enhance the visual impact of the AWRC by softening the buildings and providing visual interest through tree planting and architectural treatments. However, given the scale of the AWRC, this will minimise rather than entirely mitigate visual impacts.

The photomontages in Figures ES14 to ES17 give an indication of what the AWRC will look like in the current landscape.

Figure ES14 Looking north to the proposed AWRC from Clifton Avenue

Figure ES15 Looking north west to the proposed AWRC from Clifton Avenue

The point where the AWRC will be most visible will be from the new M12 Motorway as shown below.

Figure ES16 Current view from the future M12 Motorway

Figure ES17 View from the M12 Motorway once the AWRC is constructed

During operation, the main above-ground structures for the pipelines will be the treated water and environmental flows release structures on the Nepean and Warragamba Rivers. The visual impact of these structures is considered low because public access is limited and views are restricted by surrounding topography and vegetation.

Given most pipeline infrastructure will be underground, the other main operational impact results from vegetation removal to build the pipelines. Immediately after construction, impacts are likely to be moderate. However, once revegetation establishes, impacts across most of the pipeline alignment will reduce to negligible. In several localised areas, mature trees removed for pipeline construction cannot be replaced given the potential to damage the new pipeline. In these areas (including small areas around Wallacia, Luddenham, Cabramatta, Kemps Creek and Cecil Hills), ongoing impacts are likely to be moderate.

7.15 Traffic and transport

Most traffic impacts are likely to occur during the construction period with up to 400 light vehicle and 300 heavy vehicle movements per day on roads surrounding the AWRC. Much smaller numbers are anticipated in relation to the pipeline construction. Traffic impacts during operation are expected to be negligible as the plant will generate very few daily trips and the pipelines will generate infrequent maintenance traffic.

Project construction will generate movement of light worker vehicles and trucks to transport waste, equipment and materials to the AWRC and pipeline construction sites.

A large proportion of the project's construction vehicle movements will be to and from the AWRC site, with vehicle movements between the AWRC and The Northern Road at peak times (such as during heavy earthworks) estimated at about 400 light vehicle movements and 300 heavy vehicle movements each day.

Sydney Water expects these traffic movements to be greatest during the first 18 months of the three-year construction period. This is when extensive earthworks will be undertaken, requiring moving spoil to and from the site.

For most roads, additional construction traffic volumes from the project are within their capacity and will have limited impact on user experience. However, some roads in the project area are already under stress from existing traffic volumes, which in some cases will be exacerbated by construction traffic from several major projects in the area (such as the Western Sydney International Airport and the M12 Motorway). These roads include Elizabeth Drive at the Clifton Avenue intersection, the Northern Road and Hume Highway.

Pipeline construction will also generate construction traffic, particularly around construction compounds including those near Bents Basin Road, Wallacia and Cabravale Park, Cabramatta. Construction work for pipelines will temporarily disrupt footpaths and cycleways, public transport such as temporary displacement of bus stops and access to properties and parking in some areas. This is particularly relevant along the brine pipeline as it traverses more heavily populated urban areas. Disruptions are typically short-term in any one location as pipeline construction progresses along the alignment. Standard traffic management measures will be used to minimise those short-term impacts.

Project operation will generate an average of about 19 two-way vehicle movements each day at the AWRC, primarily light vehicle movements associated with staff trips but also a small number of heavy vehicles providing chemical deliveries and biosolids removal from the AWRC site. This is unlikely to significantly impact the road network. Similarly, routine and infrequent maintenance works conducted on the pipelines will have negligible impact on local roads.

Construction Traffic Management Plans will capture the management measures which will be used to manage the more significant construction traffic impacts. These will outline management measures to control and minimise impacts at each work location, including the use of best practice traffic control measures and coordination with other projects to minimise the amplification of any traffic impacts. Prior to any potential traffic disruption occurring, local residents and businesses will be consulted

7.16 Human health and hazards

Potential impacts on human health can occur from water quality, air quality, noise and vibration, soil contamination, hazardous chemicals, traffic and transport, waste, bushfire and subsidence. However, the results of a Health Impact Assessment show that potential impacts during construction are low or negligible. During operation, all risks are either unlikely or manageable through Sydney Water's standard management practices.

Potential health impacts during construction relate to noise and vibration, especially when work outside of standard construction hours is required. Contaminated soil (including soil containing asbestos) and contaminated groundwater may also be encountered during construction, both of which could impact the health of workers and the community. These potential impacts will be minor and temporary, therefore human health impacts during construction are considered low or negligible. Implementing the management measures in this EIS will further minimise the potential for impacts to human health.

The main potential operational impacts to human health relate to water quality, exposure to waste, and the transport, storage, handling and use of dangerous goods at the AWRC. Water quality modelling of the potential impact of treated water release to waterways informed human health considerations. This showed that exceedances of water quality related human health guidelines are not expected.

The assessment of dangerous goods required during operation identified that the handling and storage of methanol and biogas posed a potential risk to workers, but there will be no risk of offsite harm or fatality from the assessed hazardous scenarios. Exposure to waste was found to be of low risk to human health.

In general, offsite impacts to human health are unlikely to occur, and all construction and operational risks to human health can be adequately managed through the implementation of processes and procedures in the existing Sydney Water management systems.

7.17 Socio-economics and land use

The socio-economic impact assessment of the project determined that although the project will generate temporary negative impacts during construction, including impacts to amenity, the impacts will be minimal during operation. The project will generate substantial economic benefits in Western Sydney, through the provision of wastewater services and recycled water.

During construction, the project has the potential to impact the local community, both positively and negatively. Positive socio-economic construction impacts include the creation of about 400 construction jobs. In contrast, communities close to the construction activities may experience negative impacts mainly relating to temporary traffic impacts, restricted access and noise, and to some personal property and open space. These can cause amenity and nuisance issues and reduce social cohesion where they disrupt people's everyday activities. Construction impacts are unlikely to impact the economic or demographic profile of the suburbs directly affected, or the wider Western Sydney community. Construction impacts on land use will also be minor, with temporary impacts on landuse on portions of some properties while infrastructure is built. The exception is the impact on the AWRC site, which Sydney Water will acquire from the current landowner. With management measures, most of the negative socio-economic impacts reduce to moderate or low in significance.

The key positive socio-economic impact of the project, once it is operational, is the provision of essential wastewater services and of recycled water which will support long-term liveability and growth in the region. However, parts of the community may see this growth and the development of the region as negative. During operation, the project's negative socio-economic impacts will be minor, given the pipelines will be largely underground, the treated water release structures will have a small footprint and amenity impacts at the AWRC will be limited. The visual impacts at the AWRC will reduce over time as landscaping treatments are undertaken and plantings become established. Operational land use conflicts will also be minor.

Ongoing consultation with businesses, communities and local councils will be important to keep them informed about the project and discuss management of potential negative impacts.

Sydney Water also proposes a range of management measures to minimise the scale of effects on people's everyday activities, including redirection signage on roads and around businesses and coordinating with key community and school activities. Ongoing engagement with stakeholders will also be important to test the effectiveness of those measures.

7.18 Sustainability

The project will demonstrate a high level of sustainability by generating wastewater that can be reused for various purposes, by beneficially reusing process by-products and by generating renewable energy. The project will be designed to embed sustainability measures in construction and operation and is committed to achieving an Infrastructure Sustainability Council of Australia (ISCA) rating of at least Excellent (or Gold under ISCA version 2.1).

The project provides an essential wastewater service to Western Sydney and can also contribute to sustainable outcomes by:

- producing treated water suitable for a range of beneficial uses, contributing to Sydney's water resilience
- beneficially reusing biosolids and generating renewable energy with potential for this to expand in the future to create a centre for circular economy activity at the AWRC
- providing water that could be used for greening and cooling the landscape.

In addition, sustainability is also a key consideration in the more detailed aspects of how the project is designed, constructed and operated. Sydney Water is committed to implementing a range of initiatives, ranging from ensuring materials are responsibly sourced and disposed of, through to reducing greenhouse gas emissions. These are drawn together in a commitment to achieving an Infrastructure Sustainability Council of Australia (ISCA) rating of at least Excellent (or Gold under ISCA version 2.1).

Reducing greenhouse gas emissions is a key focus of the project's sustainability commitment. The main contributors to greenhouse gas emissions are materials, electricity consumption and nitrous oxide from the wastewater treatment process. At peak capacity, Stage 1 of the project will contribute just under 674,000 tonnes of carbon dioxide equivalent (tCO2-e) to the atmosphere, of which two thirds is from operation and one third from construction. This represents about 0.04% of the NSW carbon budget and 0.01% of the national carbon budget. To offset these emissions during operations, Sydney Water will generate renewable energy from co-generation facilities (through wastewater treatment) and solar photovoltaic panels. This will reduce electricity purchase from the grid and reduce the project's greenhouse gas emissions by just under 30%.

Sydney Water has also considered the project's climate change adaptability and resilience. A risk assessment has been completed for different climate change projections, with measures incorporated to address increases to temperature, extreme weather events and bushfire to ensure the infrastructure can adapt and respond to impacts from projected climate change.

The project's sustainability measures will be captured in a Sustainability Management Plan to outline how the project will implement and deliver the sustainability commitments and improve sustainability performance over time.

7.19 Waste management

During construction, the project will generate waste, which will be managed by Sydney Water through standard construction management measures, to ensure impacts are low. Similarly, operational waste impacts are also likely to be low, since the waste streams from wastewater operation are well understood and can often be reused, with existing approaches available for their effective management.

Construction waste will primarily include excavated spoil (some of which may contain small quantities of contaminated materials), green waste and surplus construction materials. Other wastes generated during construction include liquid wastes in the form of stormwater runoff and wastewater. About 181,000m^3 of excess spoil is estimated and Sydney Water plans to have commercial arrangements in place for disposal to other sites in Sydney. Any uncontaminated waste that cannot be immediately disposed of, including excavated spoil, will be temporarily stored at construction compounds.

Sydney Water will implement the approaches embedded in the 'avoid, minimise, reuse' waste management hierarchy to develop waste management strategies. These strategies will focus on reducing the waste generated, ensuring it is recycled wherever possible and carefully managing the segregation, storage and transport of any residual waste.

Waste generated during operation of the AWRC will include waste chemicals, screenings and grit from the treatment process, brine and small amounts of office waste. These are relatively small volume waste streams and typical of waste generated from operation of Sydney Water's other treatment plants. Well established and tested waste management processes and contractual arrangements are in place to manage these. Wastes from pipeline operation are unlikely.

7.20 Airport operations

The AWRC will be located close to Western Sydney International Airport, which is currently under construction. The AWRC will not create any windshear, lighting or noise impacts, and Sydney Water will manage open bodies of water and site vegetation to minimise the site's contribution to the risk of wildlife strikes on aircraft.

The AWRC is located about three kilometres from Western Sydney International Airport and under the future north-east flight path. The project will become operational at about the same time as Western Sydney International Airport. Sydney Water's assessment therefore focuses on impacts when both the AWRC and airport are operating.

The AWRC site has been assessed against the guidelines described in the National Airport Safeguarding Framework (NASF). This assessment has identified that the project is unlikely to have impacts related to intrusion in airspace, windshear, lighting or noise. However, the AWRC will include bodies of water and vegetation, with the potential to attract wildlife, in particular, birds. This has the potential to contribute to the risk of wildlife strikes on aircraft. Sydney Water will develop a Wildlife Management Plan for the AWRC site to minimise these risks.

The pipeline components of the project do not present a risk to airport operations because they are located underground.

7.21 Utilities

The project will require new utility connections, but its impacts on existing utilities are expected to be minor.

The project will require new utility connections such as power, gas, water, wastewater and communications and Sydney Water has consulted with relevant government agencies and utilities about these needs. The establishment of these new services will not impact on the existing services in the area.

The project is close to a range of existing and future utilities, including council, WaterNSW and Transport for NSW (TfNSW) assets. The project has been designed to avoid and minimise impacts on these utilities. The current assessment has demonstrated that no impacts will occur, however Sydney Water will continue to consult with relevant agencies during detailed design and construction and implement management measures to ensure that remains the case.

8 Environmental management

8.1 Construction

After the EIS has been submitted, and during detailed design, the construction contractor(s) who will build the project will prepare a Construction Environmental Management Plan (CEMP), which will contain a series of sub-plans as shown in Figure ES18. Many of these sub-plans may be reviewed and approved by DPIE as part of approval conditions. These plans will draw on the management measures defined in the impact assessments and will be in place before construction starts. These plans will include roles and responsibilities, how the plans will be implemented and how they are to be communicated to everyone working on the construction of the project.

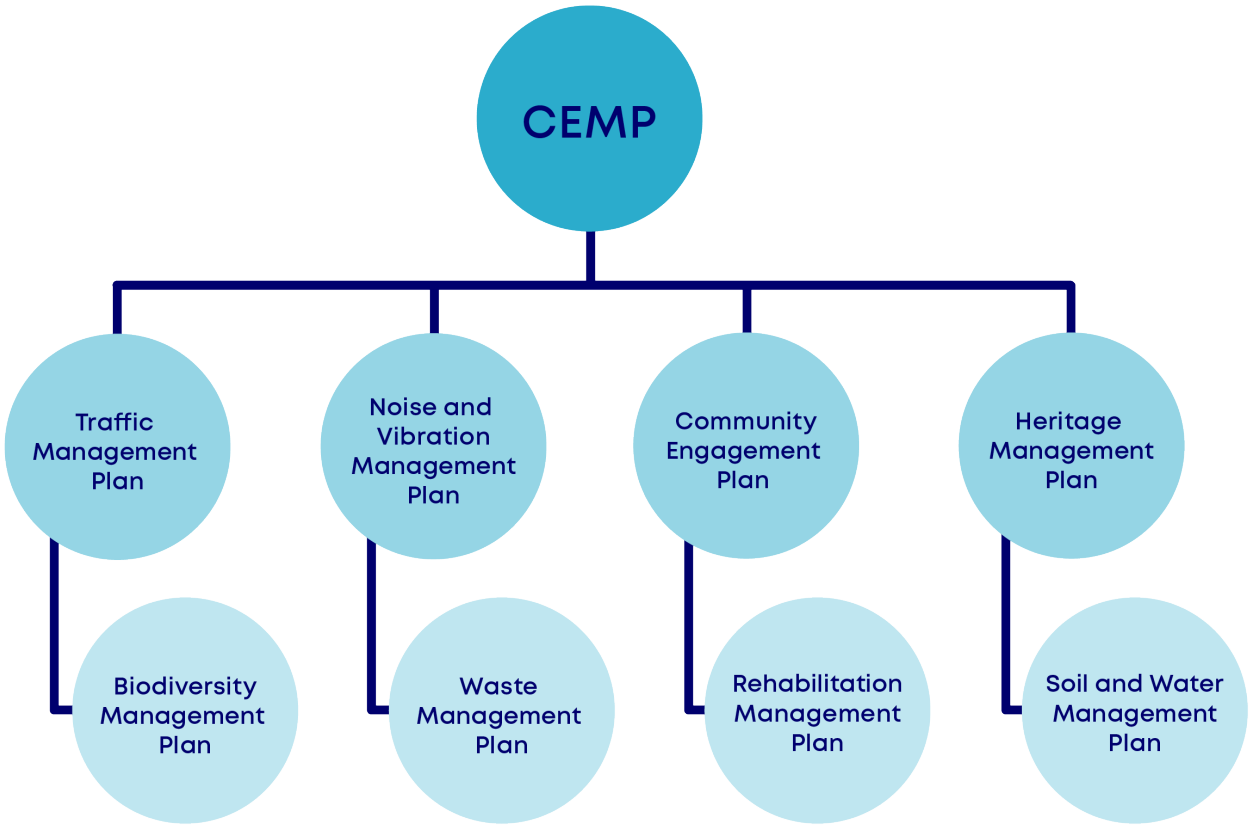

Figure ES18 Overview of construction management plans

8.2 Operation

Sydney Water has a range of existing management systems that will be applied during project operation. These are based on international standards and apply across Sydney Water. They capture accountabilities, processes, policies and procedures and manage quality, safety, environmental and asset-related risks. They also provide a platform for Sydney Water to continually improve its processes. These systems will evolve over time, for example Sydney Water is planning to integrate them into a single management system. If Sydney Water engages another party to operate the AWRC, they would also be required to have equivalent management systems.

In 2017, Sydney Water developed an operational environmental management roadmap which demonstrated to DPIE how its management systems fulfil the requirements of a project-specific Operational Environmental Management Plan (OEMP). DPIE approved modifications to existing conditions of approval for Sydney Water's State significant projects to reflect this. Sydney Water proposes to continue this established approach for the project. By managing operations in accordance with Sydney Water's existing management systems (or contractor management systems) there is no need for an OEMP. Sydney Water will incorporate operational management measures from Chapter 15 of the EIS and any operational phase conditions of approval into the relevant component of its existing management systems.

9 Evaluation

Sydney Water submitted a Scoping Report to DPIE in 2020 and received Secretary's Environmental Assessment Requirements (SEARs) in August 2020. These were updated in January 2021 with additional SEARs from the Commonwealth Department of Agriculture, Water and Environment (DAWE). The EIS prepared by Sydney Water meets all the SEARs provided by DPIE and DAWE. The project also meets the principles of Ecologically Sustainable Development which is one of the objects of the EP&A Act.

The project meets local and NSW planning objectives and legislative obligations. Through a process of rigorous options assessment, the project meets the need of servicing new development areas and a growing population in Western Sydney. In addition to providing this essential wastewater service, the project presents a range of opportunities to improve liveability, sustainability and the environment across Western Sydney. Table ES2 summarises the key project opportunities including those currently in project scope, and other opportunities enabled by the project.

Table ES2 Key project opportunities

Project opportunity	In project scope	Opportunities enabled by the project
Liveability, productivity and sustainability in Western Sydney	Treat wastewater and produce high-quality recycled water suitable for a range of uses supporting liveability, productivity and sustainability. Urban design of the AWRC and green space area to align with place-making principles and celebrate the site's Aboriginal and non-Aboriginal heritage.	Use recycled water to support some or all of the following uses: • complement stormwater (top-up of rainwater and stormwater tanks/basins), in the irrigation of open spaces and street trees to provide cooling and support recreational or sporting activities and active transport for residents and workers in Western Sydney. • industrial processes and cooling towers to support industries around Western Sydney International Airport • food production in the Agribusiness Precinct.

Project opportunity	In project scope	Opportunities enabled by the project
Supporting the health of South Creek and Nepean River	A green space area on the AWRC site along South Creek to enhance biodiversity on the site, use best practice water sensitive urban design and provide visual screening of the AWRC. The green space area is an important link in the green spine along South Creek envisaged in the NSW Government's vision for the WSAGA. Treated water releases to support flow and water quality objectives in South Creek through best-practice management of stormwater, transferring treated water to Nepean River in normal conditions and releasing advanced treated water to South Creek in wet weather conditions. High-quality treated water for environmental flows released to Nepean or Warragamba Rivers. The water is treated to a high level through an advanced treatment process that produces water so clean it could be used for drinking. This helps protect aquatic ecosystems, reduce weeds and the frequency of algal blooms. It also protects the values of the downstream Blue Mountains World Heritage Area.	Public access to the green space area to form part of the Wianamatta-South Creek parkland envisaged in the Western Sydney Aerotropolis Plan.
Enabling a circular economy	High-quality treated water to be used as environmental flows in waterways, which can also be made available for reuse locally. Organic material recovered during secondary wastewater treatment processes, known as biosolids, as an alternative to chemical fertilisers in farming and gardening. Renewable energy from co-generation within the AWRC and solar energy generation.	A circular economy hub in the Western Parkland City with opportunities for digestion of additional waste such as food waste (to generate energy and reduce waste to landfill) or co-location of suitable industries. Contributing to the NSW Government's environmental flows regime from Warragamba Dam to offset drinking water releases. Direct augmentation of Sydney's drinking water supplies, subject to future government decisions and community support.

Through the environmental assessments undertaken as part of this EIS, Sydney Water has avoided impacts through design, and have identified management measures that are appropriate to the impacts identified. This means Sydney Water will be able to construct and operate the project in a way that minimises impacts to the environment and the community.