Water Reuse Strategy

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Acronyms/ Definitions

Term	Description
BAU	Business as Usual
BOM	Bureau of Meteorology
CEMP	Construction Environmental Management Plan
CoA	Condition of approval
CPB	CPB Contractors Pty Ltd
CSSI	Critical State Significant Infrastructure
EMS	Environmental Management System
ER	Environmental Representative
EP&A Act	Environmental Planning and Assessment Act 1979
EPL	Environment Protection License
ETP	Eastern Tunnelling Package
IC	Independent Certifier
ISCA	Infrastructure Sustainability Council of Australia
IS Rating	Infrastructure Sustainability Rating
ISP	Independent Sustainability Professional
JCG	John Holland CPB Ghella Joint Venture
MCA	Multi Criteria Analysis
SDG	United Nations Sustainable Development Goals
SMS	JCG Sustainability Management System
LGA	Local Government Area
Project	Eastern Tunnelling Project
REMM	Revised Environmental Mitigation Measure
TBM	Tunnel Boring Machine
WTP	Water Treatment Plants

Compliance

Table 1: Compliance matrix

ID	Requirement	Reference
SSI 19238057 Infrastructure Approval		
D66	A **Water Reuse Strategy** must be prepared, which sets out options for the reuse of collected stormwater during the CSSI. The Water Reuse Strategy must include, but not be limited to:	This document
	(a) evaluation of reuse options;	Section 4
	(b) details of the preferred reuse option(s), including volumes of water to be reused, proposed reuse locations and/or activities, proposed treatment (if required), and any additional licences or approvals that may be required;	Section 4
	(c) measures to avoid misuse of recycled water as potable water;	Section 3
	(d) consideration of the public health risks from water recycling; and	Section 3
	(e) time frame for the implementation of the preferred reuse option(s).	Section 4
	The Water Reuse Strategy must be prepared based on best practice and advice sought from relevant agencies, as required. The Strategy must be applied during construction. Justification must be provided to the Planning Secretary if it is concluded that no reuse options prevail. A copy of the Water Reuse Strategy must be made publicly available. Nothing in this condition prevents the Proponent from preparing separate Water Reuse Strategies for the construction phases of the CSSI.	Section 1.5
ETP General Specification		
	2.8.1 General (a) The Contractor must ensure that sustainability is addressed throughout the performance of the ETP Contractor's Activities and that sustainability is embedded into the design and construction of the Project Works.	This document
	2.8.2 (d) In achieving the “design” rating, the Contractor must, as a minimum, achieve the following levels using the ISCA IS rating tool version 1.2 (iv) Level 2 for credit Wat-2 'Replace potable water', demonstrating that at least 33% of water used is from non-potable sources;	Section 1.5 Water Balance to be completed separately
	2.8.2 (f) In achieving the “as built” rating, the ETP Contractor must, as a minimum, achieve the following levels using the ISCA IS Rating Scheme version 1.2: (iii) Level 2 for credit Wat-1 'Water use monitoring and reduction', demonstrating a reduction in water use of 10% compared to a base case footprint	Section 1.5 Water Balance to be completed separately
	(iv) Level 1.5 for credit Wat-2 'Replace potable water', demonstrating that at least 33% of water used is from non-potable sources;	Section 1.5 Water Balance to be completed separately

ID	Requirement	Reference
	2.8.8 Construction Water (a) The Tunnelling Contractor must use a maximum of 335,000 kilolitres of water from the potable water main in the Tunnelling Contractor's Activities (b) The Tunnelling Contractor must use a minimum of 188,300 kilolitres of water from sources other than the potable water main in the Tunnelling Contractor's Activities. (c) The Tunnelling Contractor must ensure 80% of onsite and offsite batching plant concrete production operation water is recycled and incorporated into concrete production provided it meets the relevant codes and standards.	Section 1.5
ETP Particular Specification		
	3.4.4 Resources 3.4.4.1 Water Efficiency (a) The Tunnelling Contractor must undertake a water balance study and submit it to the Principal's Representative (prior to the commencement of Project Works and Temporary Works) that identifies the sources, uses and estimated quantities of potable and non-potable water which will be either created or used in the performance of the Tunnelling Contractor's Activities. (b) The Tunnelling Contractor must ensure that the water balance study in Item (a) above identifies initiatives to reduce water demand and use non-potable water, which must be adopted in order to achieve the targets set out in Section 2.8.2 of the General Specification. (c) The Tunnelling Contractor must undertake a water balance study and submit it to the Principal's Representative, prior to the commencement of Design Stage 2 and again prior to the commencement of Project Works and Temporary Works, that identifies the sources, uses and estimated quantities of potable and non-potable water which will be either created or used in the operation of the Project Works and Temporary Works. (d) The Tunnelling Contractor must ensure that the water balance study in Item (c) above identifies initiatives to reduce water demand and use non-potable water, which must be adopted in order to achieve both the design-stage sustainability rating and the performance targets set out in Section 2.8 (Sustainability) of the General Specification. (e) The Tunnelling Contractor must minimise water demand including total water consumption and potable water consumption during the design and construction phase by: i) using water efficient controls, fixtures and fittings; (ii) harvesting rainwater wherever available; (iii) using water from recycled water networks where available; (iv) collecting, treating and reusing stormwater and wastewater; and (v) metering and sub-metering water use.	Section 4 Water Balance to be completed separately

ID	Requirement	Reference
	(f) The Tunnelling Contractor must not use potable water as a substitute for non-potable water where on-site or local sources of non-potable water are suitable for the Tunnelling Contractor's Activities and are available. (g) The Tunnelling Contractor must ensure that all construction equipment requiring water are selected taking into account the water efficiency of the equipment and associated construction methodology. (h) The Tunnelling Contractor must ensure that water efficient construction methods are described in all construction method statements to be applied by the Tunnelling Contractor. (i) The Tunnelling Contractor must meter the water supplied for the Tunnelling Contractor's Activities from both recycled water networks and potable sources in order to report against the targets set out in the General Specification and show the effectiveness of the water sustainability practises required in this Particular Specification. (j) For water used in onsite and offsite concrete batching plants which supply the Tunnelling Contractor's Activities: (i) the Tunnelling Contractor must endeavour to ensure that a portion of offsite and onsite batching plant concrete production operation water is recycled and incorporated into concrete production, provided it complies with AS 1379; and (ii) the Tunnelling Contractor must pass requirements relating to concrete production operation water down through its supply chain.	

1. Introduction

1.1. Purpose and Application

The purpose of this Water Reuse Strategy is to describe how the John Holland CPB Ghella Joint Venture (JCG JV) will consider and apply the sustainable water use practices during the delivery of the Eastern Tunnelling Package (ETP) of the Sydney Metro West Project within NSW.

In doing so, this Strategy addresses the relevant requirements of the Project Planning Approval, applicable legislation, and contractual requirements, including the Project Deed and Specifications.

1.2. Project Description

Sydney Metro West is a new 24-kilometre metro line that will connect Greater Parramatta with the Sydney CBD via stations at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays, Pyrmont, and Hunter Street (Sydney CBD).

The planning process for Sydney Metro West was assessed as a staged infrastructure application under section 5.20 of the Environment Planning and Assessment Act 1979 (EP&A Act).

Stage 1 of the development, the Sydney Metro West Concept and major civil construction work for Sydney Metro West between Westmead and The Bays (SSI-10038 Schedule 2), was approved on 11 March 2021 and includes:

- Construction and operation of new passenger rail infrastructure between Westmead and the central business district of Sydney, including:
  - Tunnels, stations (including surrounding areas) and associated rail facilities
  - Stabling and maintenance facilities (including associated underground and overground connections to tunnels)
- Modification of existing rail infrastructure, including stations and surrounding areas
- Ancillary development.

Stage 2 of the planning approval process, the ETP Works, includes all major civil construction work including station excavation (Pyrmont Station and Hunter Street Station (Sydney CBD) and tunnelling between The Bays and Sydney CBD (Figure 1).

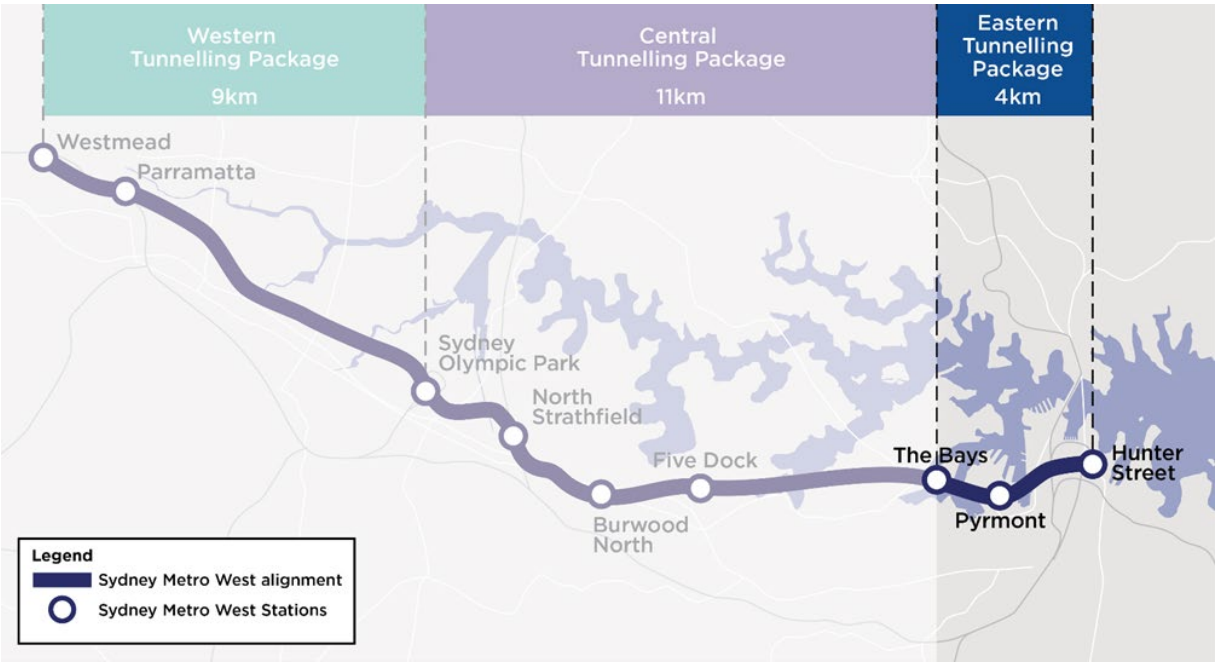

Figure 1: Overview of the Project

1.3. Scope

This Strategy addresses the water use requirements and re-use options for the construction and operation phases of the Eastern Tunnelling Package.

This Strategy addresses and details the following issues:

- Water use requirements for surface and tunnelling works;
- Water minimisation strategies to reduce water consumption; and
- Non-Potable water use, including:
    - Rainwater collection, management and discharge during surface works construction and operation activities,
    - Groundwater management throughout the tunnelling works.

This Strategy does not consider the following:

- Treatment and re-use of sewerage
- Treatment and re-use of leachate 'contaminated groundwater.'

1.4. Project Requirements

A Water Reuse Strategy is required by the CSSI 19238057CoA D66. The Sydney Metro West General Specification Section 2.8 and Particular Specification Section 3.4 contain the project-specific requirements related to sustainable water consumption.

1.4.1. Project Environment Protection Licence

JCG has obtained an Environment Protection Licence (EPL 21784) in March 2023, which prescribes water discharge requirements. In addition, a Sydney Water Trade Waste Agreement may be required to enable discharge of water that does not satisfy the EPL criteria. Discharge will be carried out in accordance with approvals under the EPL or the Sydney Water Trade Waste Agreement.

1.4.2. Project Planning Approvals

During Construction, refer to the Water Reuse and Discharge Management Procedure (SMWSTETP-JCG-SWD-SW000-EN-PRO-065014) for further information regarding water discharge measures. Following endorsement of the Soil and Water Management Sub-plan, water discharge will be managed in accordance with the sub-plan.

This Strategy will be updated to include any relevant details associated with the EPL or any Trade Waste Agreement.

1.5. Objectives and Targets

JCG has a sustainability objective to maximise efficiencies to reduce our footprint in relation to water. The Strategy we will adopt to support sustainable consumption of water during delivery and operations of the Project is based on the following four principles:

1. Understand the project water demand, including identification aspects with high demand;
2. Reduce the volume of water required during project delivery and operations, to the greatest extent practicable;
3. Replace potable water with sustainable non-potable sources, where feasible; and
4. Monitor and measure water consumption during project delivery.

This approach will ensure a holistic approach to water management and best practice environment and sustainability outcomes.

JCG water targets based on the General and Particular Specifications and are outlined in Table 2.

Table 2: General and Particular specification objectives and targets

Reference	Objective	Target
General Specification		
2.8.2 (d) (iii)	Level 2 for credit Wat-1 'Water use monitoring and reduction', demonstrating a reduction in water use of 10% compared to a base case footprint.	10% reduction in water use during design
2.8.2 (d) (iv)	Level 2 for credit Wat-2 'Replace potable water', demonstrating that at least 33% of water used is from non-potable sources.	33% non-potable water source during design
2.8.2 (f) (iii)	Level 2 for credit Wat-1 'Water use monitoring and reduction', demonstrating a reduction in water use of 10% compared to a base case footprint.	10% reduction in water use during As-Built phase
2.8.2 (f) (iv)	Level 1.5 for credit Wat-2 'Replace potable water', demonstrating that at least 33% of water used is from non-potable sources.	33% non-potable water source during As-Built phase
2.8.8 (a)	The Tunnelling Contractor must use a maximum of 335,000 kilolitres of water from the potable water main in the Tunnelling Contractor's Activities.	Max of 335,000 kL of total water use
2.8.8 (b)	The Tunnelling Contractor must use a minimum of 188,300 kilolitres of water from sources other than the potable water main in the Tunnelling Contractor's Activities.	Min of 188,300 kL of non-potable water use
2.8.8 (c)	The Tunnelling Contractor must ensure 80% of onsite and offsite batching plant concrete production operation water is recycled and incorporated into concrete production provided it meets the relevant codes and standards.	80% water used on batching plant operation is recycled
Particular Specification		
3.4.4.1 (i)	The Tunnelling Contractor must meter the water supplied for the Tunnelling Contractor's Activities from both recycled water networks and potable sources in order to report against the targets set out in the General Specification and show the effectiveness of the water sustainability practises required in this Particular Specification.	100% of water sources must be metered

1.6. Interactions with other Project Plans

This Strategy is part of an integrated set of Project documents. Table 3 below outlines key sustainability items/content addressed within other relevant Plans.

Table 3: Project Plan Interfacing

Management Plan	Sustainability items/content addressed
Construction Environmental Management Plan (SMWSTETP-JCG-SWD-SW000-EN-PLN-002017)	Sets out governance, monitoring, reporting, auditing, and corrective action processes applicable to sustainability and environment management practices in relation to water management
Sustainability Management Plan (SMWSTETP-JCG-SWD-SW000-EN-PLN-002045)	Sets of governance, monitoring, reporting, auditing, and corrective action processes applicable to sustainability Identities water minimisation measures

Management Plan	Sustainability items/content addressed
Soil and Water Management Sub-plan (SMWSTETP-JCG-SWD-SW000-EM-PLN-002014)	Details strategies to be applied to minimise water usage and manage groundwater resources during the ETP Project
Construction Waste and Recycling Management Plan (SMWSTETP-JCG-SWD-SW000-EM-PLN-002022)	Details strategies to be applied to minimise and manage waste during the ETP Project

1.7 Previous project's best practice and guidelines

This Strategy has been prepared in consideration of previous best practices undertaken by other projects, such as Sydney Metro City & Southwest Tunnel and Station Excavation (TSE) and Sydney Metro Western Sydney Airport, Station Boxes and Tunnelling.

The following guidelines, reports and policies have been consulted:

- Australian Guidelines for water recycling (July 2009)[1]: provides a risk-based framework for the management of recycled water schemes and supports sustainable recycling of waters. The document also includes guidelines for stormwater harvesting and reuse, while managing public health and environmental risks associated with the reuse of roof water collected from residential or industrial buildings, and urban stormwater from sewered areas
- City of Sydney Environmental Strategy 2021-2025 (July 2021)[2]: states actions that have been adopted by the Council to reuse recycled water for non-potable use, such as stormwater harvesting for parks irrigation
- City of Sydney Environmental Sustainability Policy (August 2021)[3]: lists out actions to support and increase the use of recycled water
- City of Sydney Green Report (Annual Environmental Report 2021-22)[4]: includes water saving actions that have been adopted by the City of Sydney Council, improvements to the existing water recycling network, stormwater harvesting and buildings fixtures and fittings
- Inner West City Council Community Strategic Plan (June 2022)[5]: includes actions to save and harvest water for future reuse, in particular for parks and sports fields irrigation.

[1] Australian Guidelines for water recycling (July, 2009). Accessed in 23/06/2023 and available at: https://www.waterquality.gov.au/guidelines/recycled-water.

[2] Environmental Strategy 2021-2025 (City of Sydney, July 2021). Accessed in 23/06/2023 and available at https://www.cityofsydney.nsw.gov.au/environmental-action.

[3] Environmental Sustainability Policy (City of Sydney, August 2021). Accessed in 23/06/2023 and available at: https://www.cityofsydney.nsw.gov.au/environmental-action.

[4] City of Sydney Green Report - Annual Environmental Report 2021-22. Accessed in 23/06/2023 and available at: https://www.cityofsydney.nsw.gov.au/environmental-action.

[5] Inner West Community Strategic Plan (June 2022). Accessed in 23/06/2023 and available at: file:///C:/Users/jsaldanha/Downloads/Community%20Strategic%20Plan%20-%20Our%20Inner%20West%202036%20-%20adopted%20June%202022.pdf

1.8 Water Efficient Design

The Project will implement water efficient design at all sites to minimise the use of potable water. Measures to be implemented will include:

- Water efficient fixtures and fittings in crib rooms and amenities including spring loaded taps and dual flush toilets, and
- Trigger activated nozzle attachments for hoses.

2. Project Water Sources

Over the course of the project, a number of water sources will be utilised. JCG will adopt the water use and sourcing hierarchy illustrated in Figure 2 during the construction and operation of the project.

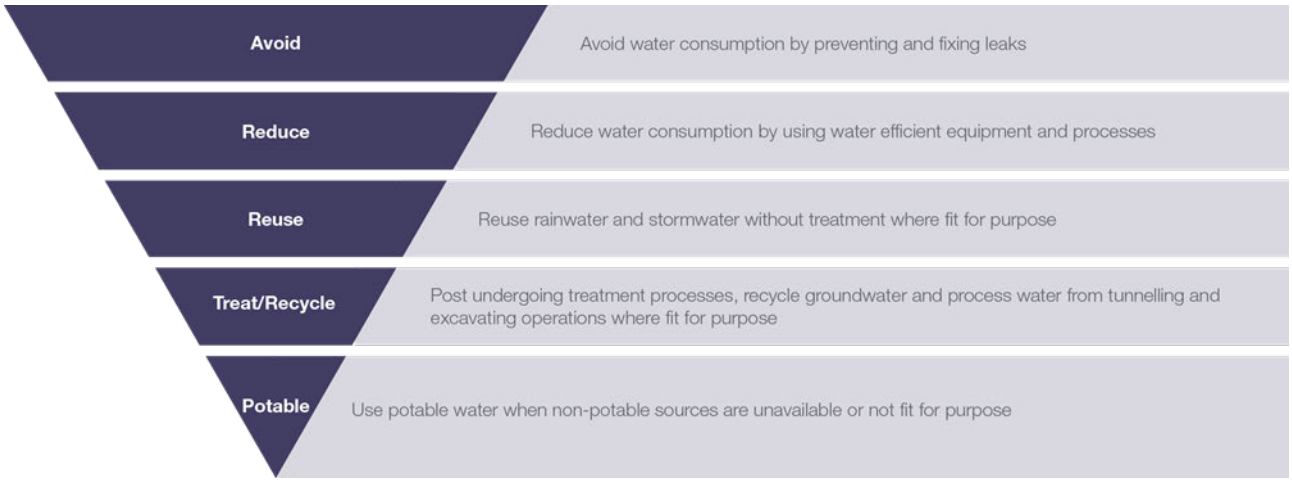

Figure 2: Water Use and Sourcing Hierarchy

There is a range of water sources available during the construction phases, including:

- Connection to mains supply (potable water);
- Captured surface water;
- Rainwater harvest;
- Onsite construction water treatment and re-use;
- Treated groundwater.

JCG notes there is no local recycled water networks available to the project.

3. Consideration to Suitability

All water sources will be evaluated for suitability and measures will be adopted to avoid misuse of recycled water as potable water. The use of non-potable water will be prioritised over the use of potable where suitable quality and supply is available and practical. Table 4 highlights the consideration and measures to deem a water source suitable for reuse within the evaluation process.

Table 4: Consideration to suitability of water reuse

Aspect	Risk	Mitigation	Suitability Measure
Health and safety (Project)	Personnel contact with bacteria during reuse of partially treated grey water. Personal contact with contaminants in recycled water from the Water Treatment Plant. Personnel consuming recycled water due to poor identification of recycled water lines.	Adequate treatment including disinfection/chlorination and carbon filtration of treated water. Clear labelling and colour coding of recycled water lines. Separate potable water and recycled water lines to work areas.	Regular sampling and analysis of recycled water to determine compliance with relevant guidelines for recycled water. Hazards and associated risks, including control measures to eliminate and minimise these risks are captured in the Risk Assessment.
Specification	Recycled water does not meet required quality standards to meet construction specifications e.g. concrete batching.	Initial and ongoing laboratory analysis of recycled water to determine suitability for reuse.	Limits detailed in relevant specification.
Demand and reliability	Water demand (quantities of water) and reliability (constant supply and quality of water) from source is not able to be met for the proposed water use e.g. recycled water blocking dust cannon nozzles.	Detailed water balance study to be developed prior to commencing reuse of non-potable water.	Project's Water Balance Study
Financial feasibility	The economics of the proposed water source is not viable due to initial capital costs or ongoing operating costs.	Detailed cost estimates during procurement to include capital costs including additional equipment used for treatment and reticulation of treated water. Ongoing operating costs including chemicals and laboratory analysis to be assessed. Cost benefit analysis to be completed.	Economic review to determine benefits.
Environmental	Use of recycled water containing elevated levels of salinity or other contaminants result in impact on soils, groundwater, vegetation, or surface waters.	Treatment of water prior to reuse. Completion of a risk assessment to determine maximum salinity levels for recycled water reuse. Ongoing analysis of recycled water to meet environment requirements.	To be confirmed following risk assessment.

4. Evaluation of Preferred Reuse Options

JCG completed an evaluation for water reuse opportunities during the tender phase of the Project. The use of non-potable water will be prioritised over the use of potable water on all sites where suitable quality and quantity is available.

The sub-sections below highlight the evaluation process in determining a preferred water source, including non-potable water. Water consumption estimates are calculated in the Project's Water Balance Study and will be updated as detailed design progresses. The supply of non-potable water will be dependent on rainfall, groundwater inflow, construction activities, water quality and availability of storage at each site.

The table below summarises the key components of water use and savings across the Eastern Tunnelling Package sites. This table compares a projected 'actual case' usage of the project to a base case and summarises the water reduction compared the base case.

Table 5: *Water use summary*

Total Water Use	Base Case	Actual Case	Reduction	Potable water replacement summary		
	Consumption (kL)	Consumption (kL)	(kL)	Suitable for Non-Potable water (kL)	Non-potable water use (kL)	% Replacement
1. Site Facilities	7,562	7,562	-	338	338	100%
2. Demolition	42,633	42,633	-	42,633	-	0%
3. Plant	245,875	245,875	-	245,875	-	0%
4. TBM	697,454	491,478	205,976	409,373	205,976	50%
5. Precast Yard	3,796	3,796	-	2,112	2,019	96%
7. Rockbolting	17	17	-	17	-	0%
8. Wheel wash	5,519	22	5,497	22	5,497	0%
9. The Bays Dust Suppression	13,889	13,889	-	13,889	11,916	86%
Total	**1,016,744**	**805,271**	**211,473**	**714,259**	**14,273**	**31.6%**

The water reduction above is a result of two initiatives to reduce potable water use across the project. These initiatives are summarised in table 6 below.

Table 6: *Water saving initiatives*

Initiatives summary	Water saved (kL)	Percent reduction
TBM Slurry Treatment closed loop	205,976	97%
Wheel wash system closed loop	5,497	3%

Appendix A provides an overview of associated construction activity, water source, approximate volume available for reuse, feasibility and indicative timeframe for implementation.

4.1 Mains Supply Potable Water

All construction sites will have access to potable water supplies through metered connections to the Sydney Water network or other arrangements involving water tanks onsite. During construction, potable water will supply the site offices and amenities and be used to supplement non-potable water supplies as needed. Potable water will be used where manufacturers or technical specifications require, or concerns related to health and safety considerations.

4.2 Surface Water Capture

The ETP Project will not construct sediment basins onsite however some surface runoff will be captured in surface sumps. Water will be reused where appropriate for dust suppression, washdown water or for earthworks compaction.

4.3 Rainwater Harvesting

Rainwater has been identified as a potential source of non-potable water for reuse. Rainwater can be harvested from acoustic sheds via rainwater tanks.

Consistent water quality measures from rainwater are not possible to achieve, and therefore compliance with water quality parameters is difficult to achieve. Consequently, rainwater harvest is deemed unsuitable for activities requiring a technical specification, i.e. grout production. Rainwater would be preferably reused for dust suppression, washdown water and earthworks compaction.

Table 7 estimates quantities of rainwater capture. This was based on the estimated roof area and calculated using local BOM weather station data.

Table 7: Estimated rainwater harvesting quantities for construction

Site	Roof Area (m2)	Estimated Volume (kL/day)[6]	Indicative implementation duration (months)
Pre-Cast	3500m2	25	24

Rainwater uses assessed and implemented at the Pre-Cast site are:

- Toilet flushing
- Rainwater mixed with WTP recycled water for use on:
  - Aggregate and sand moisture control
  - Washdown of concrete batching and ancillary equipment

4.4 Treated Construction Water

Treated tunnel water describes all water that will enter the site from the water table, rainfall and construction activities during tunnel excavation and construction. Once tunnelling commences, the groundwater and any residual construction water will be combined, pumped to the surface as one stream and processed within the construction Water Treatment Plants (WTP).

[6] Calculated from daily average rainfall volume derived from BOM average annual rainfall. Maximum storage capacity at Pre-Cast is 40kL (2 x 20kL).

WTPs will allow for water recycling and re-use for suitable activities on a case-by-case assessment where site layouts permit installation of required water recycling tanks and disinfection systems. WTPs will be installed during site establishment and will require commissioning prior to operation.

Feedback and lessons learnt from previous projects suggest that treated water may not be suitable for wheel wash systems as water has higher hardness/mineral content in the water and can cause damage to plants and trucks. As noted above any opportunities for reuse will be incorporated into subsequent revisions of the strategy.

JCG has identified this water source as a potential non-potable water source. Potential activities which could utilise treated tunnel water are detailed in Table 6.

For public health and safety considerations, for water to be deemed suitable, water must have no potential to leave the premises. Additionally, disinfection of treated water will be required prior to reuse. Chlorination has been incorporated into all WTP designs.

Table 6 estimates quantities of water demand and estimated treated tunnel water.

Table 8: Estimated treated tunnel water quantities

Site	Estimated Volume Available (kL/day)	Indicative implementation duration (months)
The Bays	864[7]	12
Hunter St	150	18
Pyrmont St	125	18

4.5 TBM Slurry Closed Loop

JCG will recirculate treated water from the Slurry Treatment Plant to reuse water used in the TBM operation. A combination of bentonite and water is used in the slurry circuit to assist in the removal of spoil from the cutting face. As part of the tunnelling process a percentage of water is lost through absorption into spoil and is removed from site. The water lost will be replaced with non-potable water from the water treatment plant where feasible, however this is condition dependant and may require potable water. The volume of water required is dependent on a range of factors and will be refined during tunnelling operations.

JCG is investigating the opportunity to use non-potable water in the industrial water circuit on the TBM. The industrial water circuit is used for washdown and other tasks where water quality is not a limiting factor.

4.6 Recirculating wheel wash

JCG have begun the implementation of recirculating wheel washes for trucks leaving site. The wheel wash works by running water down a slope for the trucks to drive through prior to leaving site, this water is captured in a gutter at the base of the slope and recirculated through the system. This wheel wash system has been implemented at the Hunter St East construction site and further implementation at other sites is being assessed. The wheel wash to be constructed at the Bays site will recirculate water.

5. Measuring and Reporting

[7] Based on average WTP discharge rate of 10 l/s

Measuring and reporting will be undertaken as detailed in Section 7 of the Sustainability Management Plan (SMWSTETP-JCG-SWD-SW000-EN-PLN-002045).

Flow meters will be installed at key water reuse and disposal points on the water network to enable accurate measurement of volumes of water re-used. Flow meters will be read at regular intervals and data recorded in a database. In some cases smart meters will be installed to enable automated data readings to be taken.

6. Evaluation and Improvement

6.1. Availability Review and update of the Strategy

6.1.1. Strategy Availability

A copy of this strategy will be available on the Project website.

6.1.2. Review and Update of this strategy

As noted above the strategy has been developed to address regulatory and contract requirements.

At the time of publishing the initial Strategy JCG were consulting with stakeholders to identify any opportunities and potential limitations to water reuse. Future revisions of the Strategy will provide details of the outcome of ongoing consultation.

The strategy will be regularly reviewed and updated to address changes to water reuse identified during design of temporary works, site establishment and throughout construction. Detailed water balance assessments will be provided in the sustainability design reports. As also noted above each revision of the Strategy will be publicly available on the project website.

Appendix A

Construction Activity	Water source	Approximate volume to be reused	Feasibility	Feasible Locations (Reuse)	Indicative timeframe for implementation
Above ground construction support	Mains	N/A	Feasible		
	Rainwater Harvest	Refer to Table 5	Rainwater harvest tanks have been installed at the Pre-Cast Facility. Rainwater harvest was not deemed feasible at the other sites.	Eastern Creek Pre-Cast (Washdown, aggregate moisture retention, Amenities)	April 24 – July 25 April 24 – July 25
	Treated Tunnel Water	Refer to Table 6	Feasible	The Bays (Dust Suppression, Washdown)	January 24 – July 25
Below ground construction support, including plant operations	Mains	N/A	Feasible		
	Rainwater Harvest	Refer to Table 5	Available water does not meet demand. For rainwater to be used underground, additional piping would be required to be installed. Increased material usage (piping) would result in associated cost and embodied carbon, which is a worse environmental and economic outcome	Nil	N/A
	Treated Tunnel Water	Refer to Table 6	Feasible	The Bays (slurry circuit top up) Hunter St (Drilling, dust suppression) Pyrmont (Drilling, dust suppression)	January 24 – July 25 August 23 – December 24 January 24 – July 25
Grout Production	Mains	N/A	Feasible		

	Rainwater Harvest	Refer to Table 5	Consistent water quality measures from rainwater is not possible to achieve, and therefore compliance with water quality parameters is unknown. Consequently, rainwater harvest is deemed unsuitable for activities requiring a technical specification, i.e. grout production. Mix design not compliant with specification, resulting in project delays (economic and social impact)	Nil	N/A
	Treated Tunnel Water		Treated tunnel water exceeds the salinity limits for the grout specification. Saline water results in cement curing quicker, which is an undesirable characteristic of grout in TBM application Grout curing in the piping would result in blockages. This would delay TBM construction (economic impact). It would also result in increase in grout usage, increasing the project's embodied carbon footprint.	Nil	N/A
Precast Batching	Mains	N/A	Feasible	Eastern Creek PCF	August 23 – July 25
	Rainwater Harvest	Refer to Table 5	Consistent water quality measures from rainwater is not possible to achieve, and therefore compliance with water quality parameters is unknown. Consequently, rainwater harvest is	Nil	N/A

			deemed unsuitable for activities requiring a technical specification, i.e. segment production. Mix design not compliant with specification, resulting in project delays (economic and social impact)		
	Treated Tunnel Water	N/A	N/A	N/A	N/A