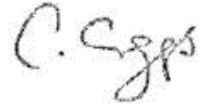


Water Reuse Strategy

Sydney Metro – Western Sydney Airport SSTOM
SMWSASSM-PLD-1NL-SB-PLN-000001

Version Control

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Reference documents

Ref	Document Name	Description
1	SMWSAASSM-PLD-1NL-PC-PLN-000064 – Sustainability Plan – Delivery Phase	Sustainability Management Plan and sub-plans for the Delivery of SSTOM Project.
2	General Specification	Outlines the specific targets the SSTOM Works project is required to achieve.
3	Particular Specification 01 (General)	Additional details around the targets that the project is required to achieve.
4	Particular Specification 02 – Built Environment	Additional details around the specific built environment requirements of the project.
5	Particular Specification 03 - Civil Engineering	Additional details around the specific civil engineering specific requirements of the project.
6	Green Building Council of Australia Green Star Building v1 Rating Tool	Outlines the requirements and evidence required to achieve the contracted 5 Star rating and 42 points minimum per building.
7	SMWSASSM-PLD-1NL-SB-SPC-000001 - Sydney Metro WSA - SSTOM Sustainability Specification	Articulates the projects sustainability requirements.
8	SMWSASSM-PLD-1NL-PC-PLN-000019 – Construction Environmental Management Plan	Outlines the Construction Environmental Management plan for all SSTOM construction sites.
9	SMWSASSM-PLD-1NL-PC-PLN-000020 – Soil and Water Management Sub-plan	Outlines the Soil and Water Management plan for all SSTOM construction sites.
10	Infrastructure Sustainability Council Infrastructure Sustainability Rating Tool v1.2. 'Design' and 'As built'	The Infrastructure Sustainability Design and As Built v1.2 Technical Manual outlines the requirements and evidence required to achieve credits under the IS Rating Scheme.

Abbreviations and Acronyms

Acronyms/ Abbreviations	Meaning
CEMF	Construction Environmental Management Framework
GBCA	Green Building Council of Australia
Green Star	means GBCA's Green Star Buildings rating tool version 1.0 (project registration prior to 2023) unless noted otherwise
GS	Sydney Metro SSTOM General Specification
GSAP	Green Star Accredited Professional
GSB	means the Green Building Council of Australia's Green Star Buildings v1 rating tool
ISC	Infrastructure Sustainability Council
IS v1.2	ISC's Infrastructure Sustainability rating scheme version 1.2 Design and As-Built
PS	Sydney Metro SSTOM Particular Specification
SM	Sydney Metro (the Principal)
SQP	Suitably Qualified Professional
WSUD	Water Sensitive Urban Design

1 Introduction

1.1 Acknowledgement of country

Parklife Metro D&C acknowledge the Dharug People, Traditional Owners and First Nations people of the lands on which we will work and on which we will manage water resources. We pay our respects to Elders past and those present that will walk with us on this project journey and support recognised emerging Elders.

We acknowledge their continuing connection to land, waters and culture and thank them for enriching us with their cultural practices.

1.2 Purpose of document & scope

This document outlines the *Water Reuse Strategy* which will be employed by Parklife Metro to meet and if feasible, exceed the relevant contractual (*SSTOM Specification* and *Infrastructure Planning Conditions of Consent*) and ratings framework (*Green Star* and *ISC IS rating*) obligations. The strategy covers both construction and operation and will be reviewed and updated as design and construction progress.

1.3 Project overview

SSTOM is the final of three packages of works which will deliver a 23km rail link connecting the future Western Sydney Airport with the Sydney Metropolitan Rail Network. The new metro rail line extends from the existing Sydney Trains suburban T1 western line at St. Mary in the north up to the Aerotropolis at Bringelly in the south. The proposed extent is shown in Figure 1.

SSTOM comprises six Stations, Signalling, Track and rolling stock, and Operation and Maintenance facilities including the first 15 years of operation.

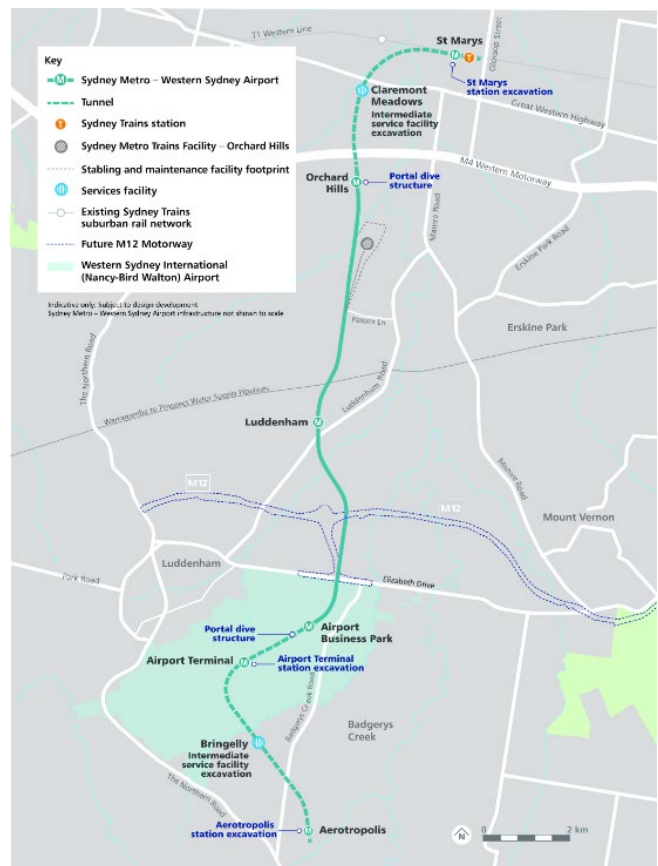


FIGURE 1: GEOGRAPHIC SCOPE OF SSTOM

2 Project objectives and strategy

This water reuse strategy has been developed in accordance with the principles and policies of Sydney Metro (SM) and Parklife Metro’s (PLM) sustainability charter and strategy. These are summarised below:

SM Principle: Manage resources efficiently

PLM Policy: Nature and Water

Objective: *Reduce water consumption and maximise use of recycled water*

This strategy has been developed in accordance with the water management hierarchy shown in Figure 2 as detailing in the Sustainability Management Plan.

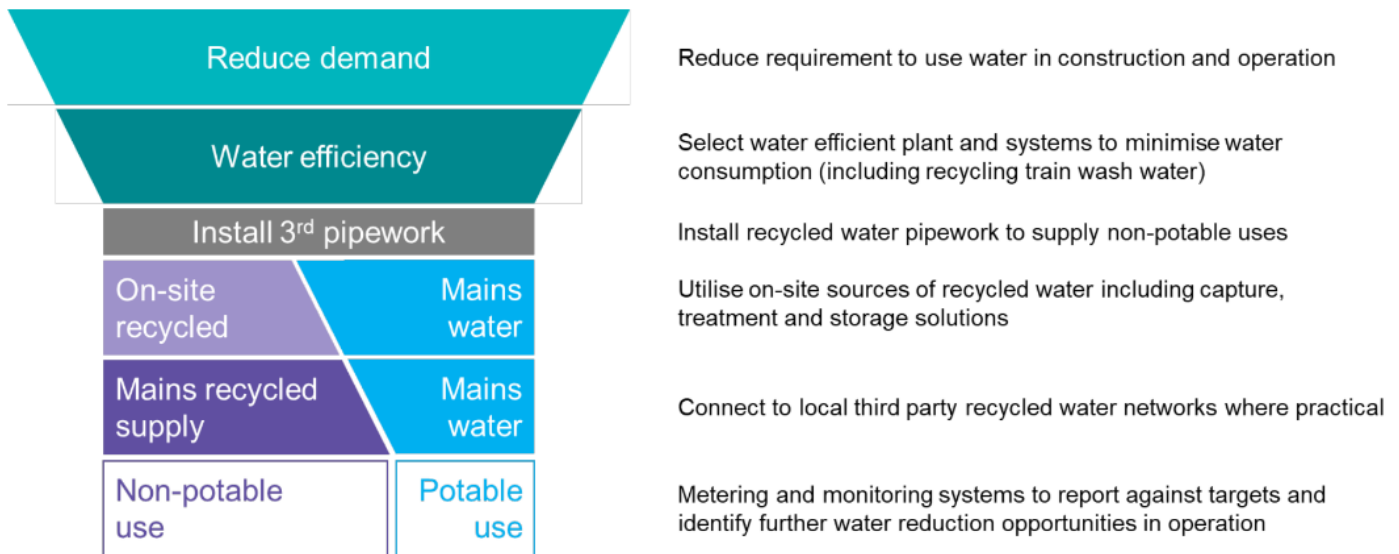


FIGURE 2: WATER-MANAGEMENT HIERARCHY

2.1 Project requirements

2.1.1 Specification requirements

Table 1 summarises contractual requirements present in the General and Particular Specifications.

TABLE 1: SPECIFICATION REQUIREMENTS RELEVANT TO WATER REUSE

Water Targets	Project Phase	SSTOM Specification Requirement
IS D&AB v1.2: Level 2 for credit Wat-1 'Water use monitoring and reduction', demonstrating a reduction in water use of 10% compared to a base case.	Delivery	GS Table 2.1 – item 5 GS 2.8.3(c)(vii) GS 2.8.3(e)(ix)
IS D&AB v1.2: Level 1.5 for credit Wat-2 'Replace potable water', demonstrating that at least 50% of water used is from non-potable sources.	Delivery	GS Table 2.1 – item 6 GS 2.8.3(c)(viii)

		GS 2.8.3(e)(x)
OpCo must undertake and submit a water balance study to the Principal 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 OpCo's Activities: (i) at Design Stage 1; and (ii) prior to the commencement of construction of the SSTOM Works and Temporary.	Delivery	PS01 1.5.6.4.1(a)
OpCo must minimise water demand including total water consumption and potable water consumption during the design and construction phases by:	Delivery	PS01 1.5.6.4.1(g)
using water efficient controls, fixtures, and fittings;	Delivery	PS01 1.5.6.4.1(g) (i)
harvesting rainwater wherever available;	Delivery	PS01 1.5.6.4.1(g) (ii)
using water from recycled water networks where available;	Delivery	PS01 1.5.6.4.1(g) (iii)
collecting, treating, and reusing stormwater and wastewater; and	Delivery	PS01 1.5.6.4.1(g) (iv)
metering and sub-metering water use.	Delivery	PS01 1.5.6.4.1(g) (v)
OpCo 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 OpCo's Activities and are available.	Delivery	PS01 1.5.6.4.1(h)
OpCo must use best endeavours to ensure that 80% of offsite and onsite batching plant concrete production operation water is recycled and incorporated into concrete production, provided it meets the relevant requirements in applicable Legislation, codes and standards and the concrete water requirements in accordance with section 3.7 of Particular Specification 03.	Delivery	PS01 1.5.6.4.1(i)
OpCo must ensure that all construction equipment requiring water is selected taking into account the water efficiency of the equipment and associated construction methodology.	Delivery	PS01 1.5.6.4.1(j)
OpCo must ensure that water efficient construction methods are described in all construction method statements.	Delivery	PS01 1.5.6.4.1(k)
OpCo must meter the water supplied for OpCo's Activities from both recycled water networks and potable sources in order to report against the targets set out in the SSTOM Specification.	Delivery	PS01 1.5.6.4.1(l)
OpCo must ensure that, where reasonable and feasible, any temporary site facilities provided by OpCo incorporate:	Delivery	PS01 1.5.6.11
rainwater harvesting;	Delivery	PS01 1.5.6.11(vi)
water efficient fixtures, fittings and controls;	Delivery	PS01 1.5.6.11(vii)

2.1.2 Ministers Conditions of Approval

Table 2 summarises contractual requirements present in the Ministers Conditions of Approval.

TABLE 2: MINISTERS CONDITIONS OF APPROVAL RELEVANT TO WATER REUSE

#	Condition	Response
E102	<p>A Water Reuse Strategy must be prepared, which sets out options for the reuse of collected stormwater and groundwater during construction and operation. The Water Reuse Strategy must include, but not be limited to:</p> <ul style="list-style-type: none"> (a) evaluation of reuse options; (b) details of the preferred reuse option(s), including volumes of water (c) measures to avoid misuse of recycled water as potable water; (d) consideration of the public health risks from water recycling; and (e) time frame for the implementation of the preferred reuse option(s). <p>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.</p> <p>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.</p> <p>Note: Nothing in this condition prevents the Proponent from preparing separate Water Reuse Strategies for the construction and operational stages of the CSSI.</p>	<p>The SSTOM specifications include requirements for water reuse including:</p> <p>Particular Specification PS01 clause 1.5.6.4.1 - Water Efficiency:</p> <ul style="list-style-type: none"> • Water Balance Study • Train wash water Reuse • Rainwater tanks at stations and SMF • Use of recycled water mains water when available to site • Water efficiency strategies • Engagement with Sydney Water was undertaken as part of site establishment process to determine availability of non-potable water mains. Further engagement as part of development of the Water Reuse Strategy was not deemed necessary as available information was sufficient. No other relevant agencies were identified

2.1.3 Construction Environmental Management Framework requirements

Table 3 summarises the requirements of the CEMF relevant to water reuse.

TABLE 3: REQUIREMENTS OF THE CEMF RELEVANT TO WATER REUSE

Target	Phase	Reference
The following soil and water management objectives will apply to construction:	Delivery	12.1 (a)
Minimise leaks and spills from construction activities;	Delivery	12.1 (a)(ii)
Source construction water from non-potable sources, where feasible and reasonable; and	Delivery	12.1 (a)(iv)

For on-airport works, the Sydney Metro Western Sydney Airport Soil and Water CEMP will detail all the soil and water management objectives and will be consistent with the WSA Soil and Water CEMP, including all appendices to the CEMP

Delivery 12.1 (a)(v)

2.1.4 ISC IS Rating requirements

Table 4: relevant requirements from IS Rating credits show the IS Rating credits relevant to construction water use and requirements as referred to in the general specification and Table 1.

TABLE 4: RELEVANT REQUIREMENTS FROM IS RATING CREDITIS

Credit	Level	Benchmark
Wat-1	Level 1	Monitoring and modelling of water use is undertaken.
	Level 1 to 3 (on a sliding scale)	The requirements for Level 1 are achieved. AND Monitoring and modelling demonstrates a reduction in water use compared to a base case footprint. For every reduction up to 20% for Level 3, fractions of Levels may be achieved on a sliding scale.
Wat-2	Level 0 to 3 (on a sliding scale)	Monitoring and modelling demonstrates that some proportion of total water use is from non-potable sources (substituting for potable). Fractions of Levels may be achieved on a sliding scale up to 100% for Level 3.

2.2 Scope and structure of this Water Reuse Strategy

In accordance with contractual obligations outlined in Section 2.1 and, the water management hierarchy, principles and objectives outlined in Section 2, this document identifies:

- Sources of water demand.
- Opportunities to reduce demand and/or suitability for fulfillment with non-potable water.
- Sources of potable water.
- Sources of non-potable water, including opportunities for water reuse.
- Implementation timeline for preferred reuse options.
- A discussion of measures to prevent misuse of recycled water.
- Public health risks of recycling water.
- Metering and monitoring strategy.
- Evaluation and improvement strategy.

This document also provides a summary of the current strategy for water reuse during operations, in accordance with the above structure.

This Strategy does not consider the:

- Treatment and reuse of sewerage, and
- Treatment and reuse of any contaminated water.

3 Construction

3.1 Water demand sources

3.1.1 Site water use

Based on the indicative construction methodology shown in Figure 3, the following table has been developed identifying the likely major site water uses and their suitability for fulfillment using recycled water.

TABLE 5: CONSTRUCTION WATER USES AND SUITABILITY FOR RECYCLING

Use	Non-potable water can be used	Water can be captured for reuse	Method of capture
Site facilities			
Dish washer			
Potable water			
Shower			
Sinks			
Toilets	✓		RWH
Wash basins	✓		RWH
Washdown	✓	✓	Runoff, sediment basin and RWH
Logistics			
Water cart	✓	✓	Runoff and sediment basin
Wheel wash	✓	✓	Captured through wheel wash and recycled
Street sweeper	✓		
Construction			
Piling	✓		
Trenching	✓	✓	Runoff and sediment basin
Dust suppression	✓	✓	Runoff and sediment basin
Establishment of landscaping	✓		
Excavation	✓	✓	Runoff and sediment basin
Masonry works	✓		
Concrete works	✓		
Concrete curing	✓		
Concrete truck washout	✓	✓	Captured through washout system and recycled
Compaction of fill material	✓		
Cleaning/washdown	✓	✓	Runoff, sediment basin and RWH
Fitout water use			
Testing and Commissioning			

3.1.2 Water demand reduction opportunities

To minimise demand for potable and non-potable water on site, the following water use reduction measures have been identified:

Reduction measure	Method of implementation
Reducing use of water consuming materials, primarily concrete.	Engagement with designers through design development to reduce materiality.
Pre-start meetings and toolbox talks to cover water efficiency protocols including minimisation and timely reporting of leaks and spills.	Inclusion in training and workforce development materials.
Signage to reinforce point-of-use actions.	Inclusion as part of site establishment.
High efficiency fittings and fixtures for site accommodations and amenities including: <ul style="list-style-type: none"> – Taps with 5- or 6-star WELS rating – Urinals with 5- or 6-star WELS rating – Toilets with minimum 4-star WELS rating – Showers with 3- or 4-star WELS rating – Dishwashers with 5- or 6-star WELS rating 	Inclusion as part of Sustainability Specification for procurement of site accommodations.
Use of a curing compound to reduce wet curing time of concrete.	Engagement with concrete supplier.
High efficiency wheel washes which utilise recycled water.	Inclusion in site establishment plans.
Schedule water-consuming activities during cooler periods of the day where possible.	Inclusion in training and workforce development plan and training materials.
Reduction in required dust suppression through reduced vehicle speeds and application of temporary ground covers	Inclusion in Soil and Water Management Plan.

3.2 Water supply sources

The project will utilise water from a variety of sources depending on the requirements of use and site location. Water sourcing will consider the water management hierarchy in Section 2 and preference the use of non-potable water over potable water.

3.2.1 Potable water supply

Potable water will be sourced from Sydney Water network via a metered connection where possible. Potable water will be supplied to site offices for drinking and domestic cleaning, and in some construction activities where recycled water is not satisfactory.

Where a mains connection is not available, potable water will be transported to site via road.

3.2.2 Non-potable water and onsite reuse

Non-potable water will come from a variety of sources detailed in this section. Site-won sources will be preference.

Given the project timeline extends over three years, seasonal variation in the availability of site-won water sources is expected. This is expected to result in suboptimal use of site-won water through either:

- Lack of rainfall replenishing site reserves; or
- Substantial rainfall reducing the need for site use and exceeding the capacity of site storage.

Site water storage will be designed to limit the effect of these factors. When there is a lack of available site-won water, offsite sources of recycled water will be utilised.

3.2.2.1 Rainwater harvesting

Rainwater will be harvested at all sites where spatial limitations allow. Harvesting tanks will be either:

- retained from SCAW works where site infrastructure is to be handed over; and
- installed at all sites where new site structures are planned (spatial limitations permitting).

Rainwater collection will occur at all practical roof-covered facilities and be stored in the Rainwater Harvesting Tank for use as non-potable water primarily in site facilities.

Table 6 below shows the expected volumes of rainwater available for collection at each site based on the historical rainfall patterns and catchment area. Seasonality of the rainfall events will also be considered when planning for availability of rainwater. Current estimates are based on preliminary site plans and will be updated as these plans are progressed. It has been assumed that all roof space on site will be used to capture water and that capacity will be sufficient such that no overflow of rainwater tanks occurs.

TABLE 6: ESTIMATED RAINWATER VOLUME AVAILABLE FOR CAPTURE

Area	Annual rainfall (mm)	Roof Catchment Area (m ²)	Volume available over site life (m ³)
St. Mary's Station	1213.4	1620	5500
Orchard Hills Station	1213.4	6650	21600
Luddenham Station	1213.4	3540	10700
SMF & OCC	1213.4	1630	4100
Airport Business Park Station	1213.4	2990	8800
Airport Terminal Station	1213.4	2140	6100
Aerotropolis Station	1213.4	2190	7200
Tunnel North (Claremont)	1213.4	590	1700
Tunnel South (Bringelly)	1213.4	739	1600
Orchard Hills Batching Plant	1213.4	50	160
Airport Business Park Batching Plant	1213.4	957	3100

3.2.2.2 Off-site recycled water supply

PLM will seek to secure a recycled water connection through Sydney Water for each site. However, this is unlikely to occur in the preliminary stages of construction and will be site dependant.

Where a connection to the Sydney Water recycled water network is not available recycled water can be sourced from nearby wastewater treatment plants and transported to site via road. Quantities will be subject to the quantity of available site-won non-potable water, and that available from off-site sources.

3.2.2.3 Surface and groundwater water capture

Site temporary stormwater management systems as described in the Soil and Water Management Sub-plan will include the construction or utilisation of existing sediment basins and on-site water treatment plants which will facilitate the capture and reuse of surface and ground water. This will primarily accumulate runoff from rainfall but also from water uses contributing to runoff like dust suppression and washdown and from groundwater inflow within tunnels and station boxes. The captured water will be used as non-potable water supply for uses identified in Table 5. Estimated quantities of water available for capture through site drainage are shown below in Table 7.

Current estimates are based on preliminary site plans and will be updated as these plans are progressed. Catchment size has been estimated based on available site drainage information. An average volumetric runoff coefficient of 0.95 and 0.8 has been assumed for sealed and unsealed surfaces respectively. Volumes shown are indicative of the total available volume of runoff and groundwater over the life of the project. Stormwater management and control measures will mean this is not all utilised. It is expected that the seasonal factors listed in 3.2.2 will also limit the volume of water captured and therefore available for reuse.

TABLE 7: ESTIMATED RUNOFF AND GROUNDWATER QUANTITIES AVAILABLE FOR CAPTURE

Area	Annual rainfall (mm)	Catchment Area (m ²)	Volume available over site life (m ³)	Volume of groundwater expected over site life (m ³)
St. Mary's Station	1213.4	28400	62000	6650
Orchard Hills Station	1213.4	222000	243000	12670
SMF & OCC	1213.4	43600	323000	0
Luddenham Station	1213.4	138000	140000	0
Airport Business Park Station	1213.4	163000	127000	11100
Airport Terminal Station	1213.4	130000	180000	12872
Aerotropolis Station	1213.4	83000	143000	5650
Tunnel North (Claremont)	1213.4	41400	71000	4100
Tunnel South (Bringelly)	1213.4	14800	29000	6130
Orchard Hills Batching Plant	1213.4	10700	22000	0
Airport Business Park Batching Plant	1213.4	17500	24000	0

3.2.2.4 Mobile concrete truck washout system

The project is expected to use 250,000 m³ to 300,000 m³ of concrete in the permanent works alone, accounting for a significant proportion of site water use in construction and logistics. PLM D&C will use specialist concrete truck washout equipment which captures and reuses water specifically for this task. Water captured in washout equipment is reused for washout or as an input for concrete batching.

TABLE 8: ESTIMATED QUANTITIES OF NON-POTABLE WATER COLLECTED WITH MOBILE TRUCK WASHOUT SYSTEM

Area	Concrete (m ³)	No. truck washes	Volume (m ³)
St. Mary's Station	39500	1410	1270
Orchard Hills Station	39600	1380	1240
SMF & OCC	16400	590	530
Luddenham Station	2800	100	90
Airport Business Park Station	20000	710	640
Airport Terminal Station	25000	900	810
Aerotropolis Station	57100	2040	1840
Tunnel North (Claremont)	-	-	-
Tunnel South (Bringelly)	-	-	-
Orchard Hills Batching Plant	-	-	-
Airport Business Park Batching Plant	-	-	-
Linewide	66800	2390	2150

3.2.3 Implementation of the preferred reuse options

Implementation of water reuse measures will occur at different times over the mobilisation and construction phases at each site. Figure 3 shows an indicative timing of implementation of each option.

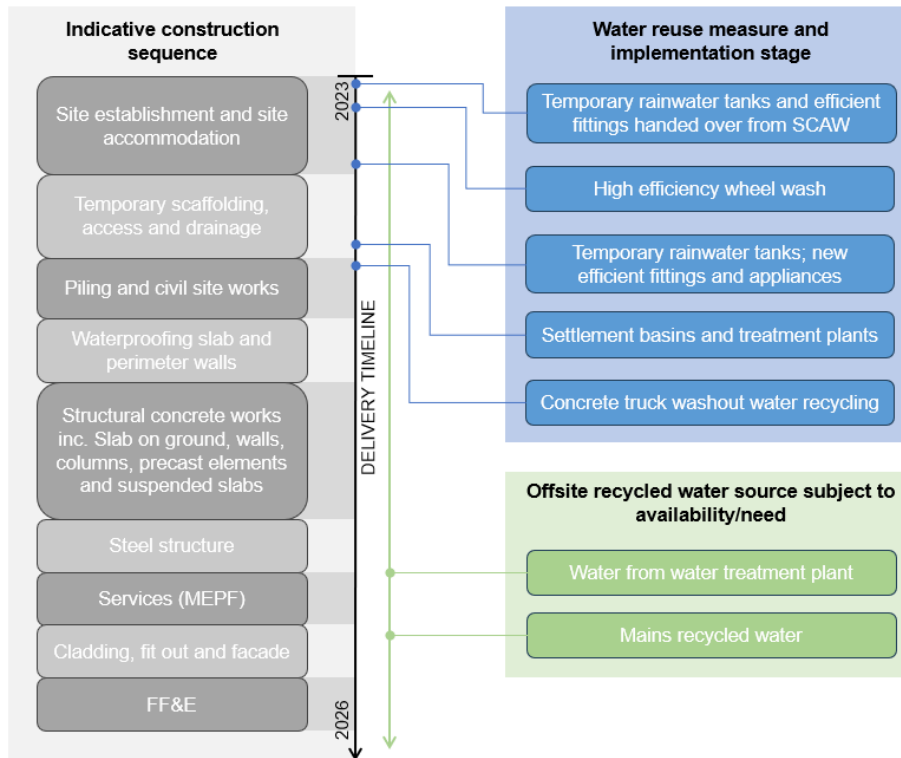


FIGURE 3: INDICATIVE IMPLEMENTATION TIMELINE FOR WATER REUSE OPTIONS

3.2.4 Public health risks from water recycling and mitigation measures

Usage of non-potable water on site carries a number of public health risks. Table 9 identifies the primary risks and proposed mitigation measures.

TABLE 9: PUBLIC HEALTH RISKS AND MITIGATION MEASURES

Risk	Mitigation Measures
Contamination of potable water with non-potable water.	<ul style="list-style-type: none"> • Separation of potable and non-potable water systems. • System design to ensure water flow is unidirectional.
Accidental consumption or misuse of non-potable water.	<ul style="list-style-type: none"> • Inclusion of water use training in pre-commencement materials and toolbox talks. • Point of use signage differentiating between potable or non-potable water sources and identifying appropriate uses. • Provision of sufficient potable water for consumption and cleaning.
Proliferation of insect-borne and waterborne pathogens in water storage	<ul style="list-style-type: none"> • Storage of rainwater in sealed tanks and regular inspection of rainwater tanks to ensure integrity of seals. • Sediment basins will be designed and managed to limit the growth of insects and to meet discharge quality requirements in accordance with the PLM D&C CEMP.

- Recycled water shall not be used in applications which atomise water.

3.3 Metering, monitoring and reporting

Metering, flow gauges or another form of direct monitoring of water will occur at the following locations:

- Mains water connection;
- recycled water network connection as applicable;
- rainwater harvesting tanks;
- all significant quantities of water entering site via road; and
- sediment basin and water treatment plant discharge in accordance with the SWMP.

Water usage rates may also be derived from invoicing, permits or other administrative paperwork where direct measurements are not recorded.

Water usage will be reported as part of monthly reporting requirements and will include:

- Volume of potable and non-potable water consumed and harvested;
- sources of potable and non-potable water; and
- performance against water consumption reduction and water consumption and harvesting targets.

3.4 Evaluation and improvement

PLM's Management Systems, including the Sustainability Management System and ISO 9001, are regularly reviewed to identify opportunities for improvement. The process is through audit results, analysis of data and management reviews.

The implementation of this Water Reuse Strategy will be reviewed as construction progresses and construction methodologies are advanced. This will be achieved by:

- Monthly internal review of water reuse metering and monitoring results data to assess efficacy of listed reuse methods.
- Review and incorporation of comments from Sydney Metro on Monthly and Quarterly Sustainability Reports as they relate to water reuse.
- Regular meetings with site representatives to discuss implementation of reuse methods, feedback from Sydney Metro and opportunities for improvement.

4 Operation

4.1 Water supply to stations and the SMF

4.1.1 Potable water

4.1.1.1 Cold water

Domestic cold water (DCW) to the station will be taken from the potable water utility stub. Utility potable water will be supplied to the stations and SMF from the Sydney water network. Water mains will be brought to the station boundary as part of the utility design scope of works. The hydraulic design will extend the potable water into the station as a metered domestic cold-water service to meet the requirements of the NCC Volume 3 – Plumbing Code of Australia and the PS.

4.1.1.2 Hot water

The station's domestic hot water requirements will be provided by local electric hot water units located adjacent to the point of use. Two types of hot water units (storage or instantaneous types) are provided depending on the demand and space availability. Kitchenettes in staff areas will be provided with 4 in 1 combined water chilled and boiling water units.

Domestic hot water will be provided to the following areas:

- Public Basins in disabled amenities;
- Staff bathrooms; and
- Sinks.

4.1.2 Non-potable water and reuse options

All stations and the SMF will be fitted with a reticulated, non-potable cold water (NPCW) system in accordance with NCC Volume 3 – Plumbing Code of Australia and the PS. This will serve all fixtures that are able to accept non-potable water. The NPCW supply for the station amenities, cooling towers and plant will be fed from the tank via packaged booster pump set reticulating through a treatment train and into a ring main.

Note that NCC vol. 3 includes compulsory measures to avoid accidental cross connection of potable and non-potable systems whilst mitigating public health risks.

4.1.2.1 Rainwater harvesting

NPCW to the station will be taken from the rainwater harvesting tank. Rainwater will be harvested from the roofs of each station and SMF and, will be directed to rainwater storage tanks with a total capacity of 80kL, which if full will overflow to the external stormwater system designed within this station's civil package. Harvested roof area will be maximised with the few areas not able to be harvested discharging directly to the civil network. Rainwater water drainage will meet the requirements of the NCC Volume 1 NCC. Water from the harvested rainwater tanks will be reticulated through the stations and SMF through the aforementioned NPCW system. Rainwater tanks and the NCPW will be operational from date of commission.

4.1.2.2 Recycled water utilities

In addition to rainwater harvesting, NPCW will also be sourced from the Sydney water recycled water network where available. This is dependant on both the date of completion of Sydney Water infrastructure and the availability of recycled water within the network. Both these factors may limit availability at the beginning of operation.

At this stage recycled water utilities will not be available at St Mary's, Orchard Hills East, SMF and Luddenham Station. The station hydraulic design will nonetheless provide a recycled main from the station outer wall to the non-potable (rainwater harvesting) tanks. When a utility recycled water network is made available, it would be feasibly connected to the station.

4.1.2.3 Groundwater harvesting

All subterranean structures of sufficient size to warrant collection and reuse of groundwater have been designed to permanently exclude water in accordance with Particular Specification Section 3.6.1 (a) and (b). As such, readily available groundwater is not present and the collection and use of groundwater is not considered feasible.

4.2 Demand reduction measures

Total water demand for the St Marys station (reference station) is, at this stage, determined from Sydney water's published values of 0.91L/m²/day. This value is considered conservative as it benchmarks against average consumption of Sydney's transport buildings, many of which do not incorporate best practice water saving designs.

The following measures are being considered in the hydraulic design for stations and the SMF:

- For stations with water cooled chilled water plant, the cooling tower treatment strategy will enable to increase cycle of concentration from 6 to 10. This will in turn reduce the heat rejection water demand.
- Water efficient fittings will also be selected and specified in accordance with Green Star Buildings Credit 25 Water Use requirements.
- Where there will be landscape, native vegetation and drought tolerant plants will be selected to reduce irrigation water demand.
- On the fire services, fire pump test water will be recollected back into fire system tanks instead of discharging into stormwater system.

4.3 Metering and monitoring

Domestic Cold-Water - DCW and Non-Potable Cold-Water - NPCW supplied to mechanical services equipment and other high water uses will be individually metered via water sub meters and monitored by the BMCS in accordance with the Green Star requirement and requirements of the PS and GS.

