

Water Reuse Strategy - Construction Phase

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Signature:						



Details of Revision Amendments

Document Control

The Project Director is responsible for ensuring that this Strategy is reviewed and approved. The Support Services Director is responsible for updating this Strategy to reflect changes to the Project, legal and other requirements, as required.

Amendments

Any revisions or amendments must be approved by the Project Director before being distributed or implemented.

Revision Details

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00	08/09/16	Prepared for internal review
01	14/10/16	Updated to address DP&E comments. For DP&E approval
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1. Introduction

1.1 Project Description

WestConnex is one of the NSW Government's key infrastructure projects which aims to ease congestion, create jobs and connect communities. It is the largest integrated transport and urban revitalisation project in Australia.

The 33 kilometre project was a key recommendation of the State Infrastructure Strategy released in October 2012. It brings together a number of important road projects which together form a vital link in Sydney's Orbital Network. They include a widening of the M4 east of Parramatta, a duplication of the M5 East and new sections of motorway to provide a connection between the two key corridors.



Figure 1 WestConnex project map

WestConnex will support Sydney's long term growth and boost the city's economic productivity. It will:

- Provide quicker, more reliable trips between Western Sydney and the Port Botany/Sydney Airport precinct to support Sydney's urban freight task
- Help distribute traffic across the wider road network, removing bottlenecks and relieving congestion for local trips
- Provide better connections along the M4 and M5 corridors to cater for the forecast growth in employment and population along these routes
- Allow urban revitalisation and increase opportunities for active and public transport along and across Parramatta Road.

The WestConnex project includes a number of stages:

- Stage 1a – M4 Widening
- Stage 1b – M4 East
- Stage 2 – New M5

- Stage 3 – M4-M5 Link

In November 2015, the Sydney Motorway Corporation (SMC) awarded the CPB Contractors Dragados Samsung Joint Venture (CDS JV) the contract for the design and construction of Stage 2 – New M5. The New M5 will run from the existing M5 East corridor at Beverly Hills via a tunnel to St Peters, providing improved access to the airport, south Sydney and Port Botany precincts.

Key features of the New M5 include:

- New twin tunnels which are higher, wider and flatter. These will more than double capacity along the M5 East corridor and provide motorway access to north of Sydney Airport
- A new interchange at an industrial site at St Peters, which reduces the impact on nearby residential areas
- Connections from the interchange to key roads in the area, including Campbell Road/Street, Euston Road and across the canal to Bourke Road
- Widening of Campbell Road/Street and Euston Road through existing road widening reservations
- Western tunnel entry and exit points at Kingsgrove.

1.2 Purpose of this Strategy

CDS-JV has prepared this Water Reuse Strategy in accordance with Condition of Approval (CoA) B30 of the infrastructure Approval for the New M5 Project.

The purpose of the Strategy is to:

- Detail the use of water on the project through the construction phase;
- Investigate and evaluate all feasible reuse options for stormwater and groundwater; and
- Address the requirements of the CoA.

1.3 Scope of this Strategy

This strategy addresses the water use requirements and reuse options for the construction phase of the New M5 tunnel. Water reuse is limited to groundwater and stormwater collected within the project boundaries.

This Strategy addresses and details the following issues:

- Water use requirements for surface works;
- Water use requirements for tunnelling works;
- Stormwater collection, management and discharge during surface works construction activities; and
- Groundwater management throughout the tunnelling works, including treatment, storage and discharge.

This Strategy does not consider the:

- Treatment and reuse of sewerage;
- Treatment and reuse of leachate 'contaminated groundwater' from the Alexandria Landfill Treatment Plant; and
- Operational water reuse - an operational phase Water Reuse Strategy will be prepared separately prior to commencement of operation of the project.

1.3.1 Compliance with CoA B30

A Water Reuse Strategy is required by CoA B30. A description of compliance with the requirements of this CoA is provided in

Table 1 below.

Table 1: Compliance with CoA B30

CoA B30 Requirement	Where addressed
The Proponent must prepare a Water Reuse Strategy which sets out feasible and reasonable options for the reuse of collected stormwater and groundwater during construction and operation of the SSI. The Water Reuse Strategy must include, but not be limited to:	This Strategy addresses the construction phase of the project. A separate strategy will be prepared for the operational phase of the project.
(a) evaluation of all feasible and reasonable reuse options;	Section 4
(b) details on the preferred reuse option(s), including volumes of water to be reuse, proposed reuse locations and/or activities, proposed treatment (if required), and any additional licences or approvals that may be required; and	Section 4
(c) a time frame for the implementation of the preferred reuse option(s).	Section 4
Justification must be provided in the event that it is concluded that no feasible or reasonable reuse options prevail.	Section 4
A copy of the Water Reuse Strategy must be submitted to the Secretary for approval prior to commencement of tunnelling works. Nothing in this condition prevents the Proponent from preparing separate Water Reuse Strategies for the construction and operational phases of the SSI. Where a separate Strategy is prepared for the operation of the SSI, this must be submitted to the Secretary for approval at least six months prior to the commencement of operation of the SSI.	This Strategy addresses the construction phase of the project. The operational phase Water Reuse Strategy will be submitted for approval at least 6 months prior to the commencement of operation.

1.3.2 Revised environmental management measures

In addition to the requirements of CoA B30, this Strategy has also been prepared with consideration of the revised environmental management measures (REMMs) listed in the New M5 Submissions and Preferred Infrastructure Report (SPIR). REMMS that relate to this Strategy are provided in Table 2.

Table 2: Revised environmental management measures identified in the New M5 SPIR that relate to water reuse

Reference	Requirement	Where addressed
REMM GW07	Treated waste water would be stored and re-used for project purposes wherever possible. Groundwater reuse would be in accordance with the policies of sustainable water use of the NSW Office of Water, such as dust suppression and earthworks.	Section 4
REMM WM16	Feasible and reasonable opportunities for wastewater reuse on-site or for construction purposes would be pursued (such as dust suppression both in the tunnels and for surface works).	Section 4

1.4 Objectives and Targets

The water reuse targets in Table 3 relate to the overall targets identified in the New M5 Sustainability Plan (M5N-ES-PLN-PWD-0020). The targets for water reuse were developed with consideration to the particular constraints for each surface site. Constraints for the project include: water quality

requirements for plant and equipment, potential for surface water contamination at the St Peters Interchange site and the hygiene requirements for the Green & Golden Bell Frog at the Arncliffe site.

Table 3: Project sustainability targets for water reuse

Metric / measure	Target	Timeframe	Accountability	Documentation / reporting
Percentage of potable water demand which is sourced from non-potable water sources during construction	15%	Average over construction period	Project Manager	Monthly Sustainability Report
Percentage of water (rainwater, stormwater, wastewater, groundwater, tunnel inflow water) generated/collected during construction which is reused, recycled or reclaimed.	15%	Average over construction period	Project Manager	Monthly Sustainability Report

Examples of non-potable replacement of potable demand may include the use of treated groundwater in tunneling operations, such as dust suppression or rock cutting. Non-potable water may also, in some cases, replace potable water for the flushing of construction ablution facilities or plant and equipment wash down.

1.5 Environment Protection Licence

The water reuse options identified within this document have been assessed against the current environment protection licences for the project - EPLs No. 20772 and No. 4627.

A variation to the project EPLs No. 20772 and No. 4627 will be sought from the EPA to permit discharge of groundwater from the construction tunnelling water treatment plants. The on-site reuse of water proposed within this strategy does not require an EPL variation, but it will allow for the operation of the construction water treatment plants and subsequently for the utilisation of treated water.

1.6 Alexandria Landfill Leachate Water Treatment Plant

At the St Peters Interchange (SPI) worksite, landfill leachate and/or contaminated stormwater is directed to the Alexandria Landfill Leachate Treatment Plant (LTP). Discharge from the LTP is in accordance with the Trade Waste Agreement with Sydney Water to sewer (Ref: 32539, dated 25 July 2016).

A new Leachate Management System will be installed for the Alexandria Landfill in accordance with the Alexandria Landfill Closure Management Plan, as part of the project. Management of the upgraded Alexandria Landfill LTP during the operational phase will be addressed in the Water Reuse Strategy – Operational Phase.

1.7 Other Approvals

Aquifer Interference approvals have not yet commenced under the *Water Management Act 2000* but may be required to be obtained for the operational phase of the project. Consultation is ongoing with DPI (Water) in regards to ongoing licensing requirements under this Act.

1.8 Associated plans and reference documents

The Water Reuse Strategy has been developed in accordance with the project documents and approvals listed below. This strategy supports, but does not replace or supersede the following documents:



- New M5 Environmental Impact Statement;
- New M5 Submissions Report
- New M5 Construction Environmental Management Plan (M5N-ES-PLN-PWD-0001);
- New M5 Sustainability Plan (M5N-ES-PLN-PWD-0020);
- Water Quality Plan and Monitoring Program (M5N-ES-PLN-PWD-0027);
- Environment Protection Licences No. 20772 and No. 4627;
- Technical Report – Groundwater & Soil Salinity Report (M5N-GOL-TER-100-200-GT-1520)
- Technical Report – Hydrogeological Design Report (M5N-GOL-TER-100-200-GT-1525).

2. Water Requirements

2.1 Construction phase water requirements

The balance of water quality and availability is an essential component of construction. Water, both potable and non-potable, is a vital requirement for the construction of the New M5 project and is required to sustain the health and well-being of the project workforce. All surface water reuse and discharge will be managed in accordance with the Construction Soil and Water Quality Sub-Plan Section 7.5 (M5N-ES-PLN-PWD-0005). Testing and, where necessary, treatment of any construction water or Water Treatment Plant (WTP) water will be undertaken in accordance with Section 5 of the Water Quality Plan and Monitoring Program (M5N-ES-PLN-PWD-0027).

The EIS identifies a series of construction activities that will require water and estimates the total quantity of potable and non-potable water used in the construction of the project at 2,500 megalitres. As detailed design has progressed and construction planning has advanced, the water requirements for both surface and tunnelling works have been refined as outlined in Table 6. CDS-JV has used the detailed design process to assess the potential water saving activities and reuse options available throughout construction.

Water will be utilised for:

- Surface works including western surface works and M5 East Motorway integration works
- St Peters Interchange works and local road upgrade works
- Tunnelling activities
- Alexandria Landfill Closure works
- General construction activities e.g. earthworks, soil compaction, spoil handling, stockpile management, dust suppression.

2.1.1 Surface Works

Fourteen ancillary facility sites are required to support construction of the project, eight are required to support construction of the tunnel with two sites also supporting the western surface works. Six sites are required to support the local road upgrade surface works at the eastern end of the project.

Surface works will include activities such as widening and realignment of the existing M5 Motorway, dives into the tunnel, construction of interchanges, surface road improvements, pedestrian and cycling facilities and installation of noise walls.

Table 4: Surface works sites and construction activities

Construction Site	Construction Activity
Kingsgrove North tunnel and civil (C1)	Civil site: cut and cover, spoil management and removal, and surface works support. Tunnel site: shaft excavation and tunnel support site. (Including 484m ³ sediment basin at the western surface works site)
Kingsgrove South civil (C2)	Civil site: spoil management and removal, and surface works support.
Commercial Road tunnel (C3)	Tunnel site: shaft excavation and tunnel support site. (Including construction Water Treatment Plant)
Bexley Road North tunnel and civil (C4)	Civil site: declines, spoil management and removal. Tunnel site: shaft excavation and tunnel support site. (Including construction Water Treatment Plant)

Construction Site	Construction Activity
Bexley Road South tunnel and civil (C5)	Civil site: declines, spoil management and removal. Tunnel site: shaft excavation and tunnel support site.
Bexley Road East support (C6)	Support site to Bexley Road North (C4) and Bexley Road South (C5) construction compounds.
Arncliffe tunnel and civil (C7)	Civil site: declines, spoil management and removal, Green and Golden Bell Frog habitat and surface works support. Tunnel site: ventilation shaft excavation and tunnel support site. (Including construction Water Treatment Plant)
Canal Road tunnel and civil (C8)	Civil site: decline, dive structures, cut and cover, spoil management and removal, and surface works support Tunnel site: ventilation shaft excavation and tunnel support site (Including construction Water Treatment Plant)
Campbell Road civil (C9)	Civil site: on and off ramps, bridge structures, tie-ins, carriageways, and surface works support
Landfill Closure civil (C10)	Civil site: enabling and support for landfill closure works, landfill closure works (Including two temporary sediment basins of 900m ³ and 1080m ³ volumes respectively, to be replaced by a single larger sediment basin of approximately 4000m ³ to be built for the construction period at the St Peters Interchange site)
Burrows Road civil (C11)	Civil site: surface works support site
Campbell Road bridge civil (C12)	Civil site: bridge structures, tie-ins, and surface works support
Gardeners Road bridge civil (C13)	Civil site: bridge structures, tie-ins, and surface works support
Sydney Park civil (C14)	Civil site: bridge structures and surface works support
Alexandria Landfill	Alexandria Landfill Closure works (Including new Alexandria Landfill Leachate Water Treatment Plant)
Local road upgrade works	Surface works and spoil management

Surface works will use both potable and non-potable water for the following purposes:

- Dust suppression on exposed surfaces and roads;
- General wash down and wheel wash;
- Compaction;
- Concreting;
- General earthworks;
- Interchange works;
- Conditioning of fill material;

- Site amenities including toilets, showers, cleaning and drinking; and
- Establishment of landscaping.

Surface works generally require a significant volume of water for dust suppression and compaction activities. Water carts will distribute the water across the surface sites as required. Water demand from site offices and amenities will depend on the number of personnel based at a particular site and the hours of operation. The amenities at the surface of the tunnelling sites will be operational 24 hours a day, 7 days a week for the duration of the project construction. The civil sites are operational week days between 7am and 6pm, and Saturdays between 8am and 1pm.

2.1.2 Tunnelling Works

Tunnelling works will operate out of six construction compound sites and an additional two office and laydown sites will support the tunnel works. Tunnelling works will utilise both potable and non-potable water from the above ground sites.

Due to the operation of the roadheaders, associated drilling machinery, and benching and shotcreting activities, there is significant demand for water within tunnel operations. Roadheader machines in tunnelling operations on the new M5 are using a closed loop system for cooling which significantly reduces water demand. Water used in tunnelling operations, such as spraying the cutterhead during excavation and dust suppression, have strict water quality requirements due to the potential for system blockages.

The specific activities within the tunnel construction that require water are:

- Operation of road header machines;
- Operation of bolter machines;
- Surface preparation prior to shotcrete;
- Operation of the shotcrete rig;
- Dust suppression during tunnelling and fit out;
- Rock and concrete cutting during fit out; and
- Drinking water, wash and safety facilities.

Where water is used directly for the operation of the tunnelling machinery it is required to meet strict manufacturer's water quality parameters and pressure requirements. As a result, all roadheader works will be supplied with water from water mains on the surface. Investigation is currently underway to ascertain whether the treated groundwater from the WTP meets this requirement and can replace the potable demand.

The volume of water required at each site is dependent upon tunnelling conditions and the number of equipment and machinery operating at any given time. Temporary water supply for tunnelling has been modelled on the maximum anticipated flow rates to ensure the water supply will be sufficient, but construction practices will be implemented to minimise water consumption and wastage.

3. Water Sources

Over the course of construction, a number of water sources will be utilised for the purposes described in Section 2. The Sustainability Plan (SP) describes the following strategy which CDS-JV will utilise throughout construction.

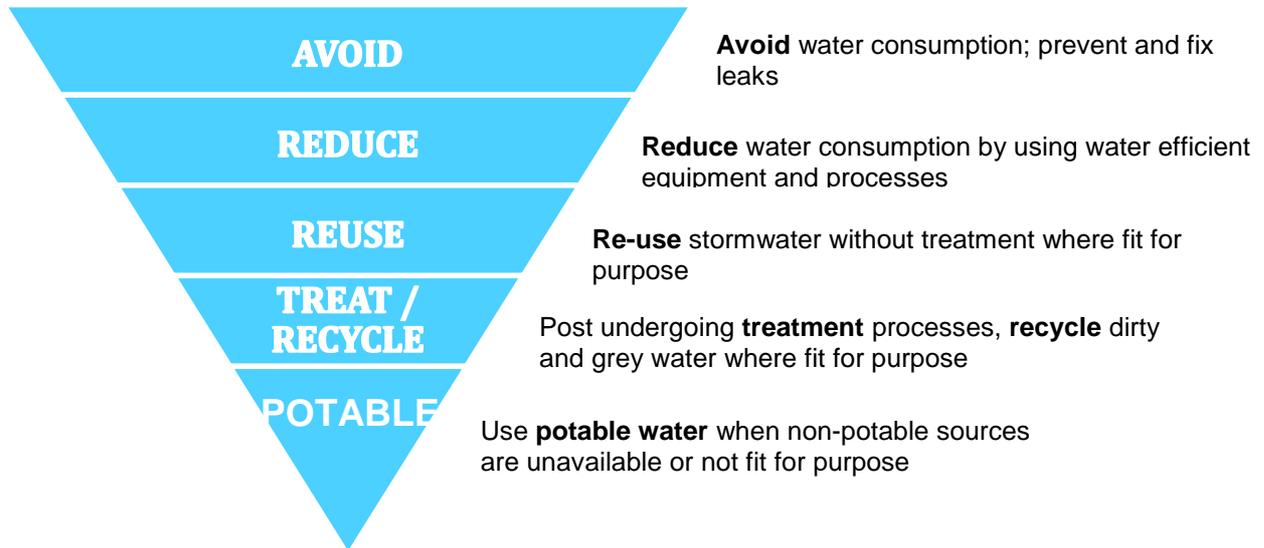


Figure 2 Water Use and Sourcing Hierarchy

Water will be sourced from the mains supply and a range of non-potable sources including:

- Stormwater harvesting;
- Onsite construction water treatment and reuse; and
- Groundwater.

The use of non-potable water will be preferred over potable water dependent upon workplace health and safety considerations, economic feasibility and any relevant manufacturer's or design specifications, for example.

Treatment and re-use of non-potable water falls into two main categories:

- **Surface water reuse**
 - rainwater harvested from tanks can be stored on site and used to flush toilets, irrigation, wash down, dust suppression and earthworks.
 - after primary treatment (settlement) stormwater can be stored on site and used for dust suppression and earthworks.
- **Groundwater reuse**
 - groundwater collected within the tunnel during construction will be pumped to the surface and treated to meet the discharge specifications of the EPL.
 - treated water will then be used for non-potable uses such as dust suppression.

3.1 Water sources for construction phase

Construction activities for both the surface works and tunnelling will make use of all available water sources in line with the necessary specifications.

3.1.1 Surface water

Stormwater harvesting using sediment basins and rainwater collection using tanks will be the preferred method of non-potable water capture on site.

3.1.1.1 Sediment Basins

Sediment basins are proposed at two of the construction compounds, at the western section of road widening works, and at St Peters Interchange works (refer [Table 4](#)). Sediment basins will be designed in accordance with the requirements identified in the CSWQSP. The exact location, size and management of each sediment basin will be in accordance with the applicable erosion and sediment (ERSED) control plan.

Due to the constraints listed in Section 1.4 and further detailed in [Table 6](#), captured surface water in sediment basins may only be re-used at the Kingsgrove site.

3.1.1.2 Rainwater harvesting tanks

The Bexley North (C4) has been assessed as a suitable site for rainwater harvesting through the installation of at least one harvesting tank. The harvested water will be reused for non-potable purposes such as toilet flushing, dust suppression, and wheel-washing.

Other sites, such as the St Peters Interchange and Arncliffe, will continue to be assessed for suitability of rainwater collection as construction commences and a more detailed design is finalized.

3.1.2 Groundwater and Construction Water

Groundwater is water found below the subsurface which will enter the tunnel from the water table. Once tunnelling commences the groundwater and any residual construction water (from rock bolting activities, for example) will be combined together and pumped to the surface as one stream.

There will be a total of four water treatment plants established to treat the groundwater in line with EPL No. 20772 and No. 4627. These water treatment plants will be used throughout construction of the project. These will be located at the Commercial Road construction compound (C3), the Bexley Road South construction compound (C5), the Arncliffe construction compound (C7) and the Canal Road construction compound (C8).

Water used in tunnelling operations, such as spraying the cutterhead during excavation and dust suppression, have strict water quality requirements. Investigation is currently underway to ascertain whether the treated groundwater from the WTP meets this requirement and can replace the potable demand.

The treated groundwater can be reused as further detailed in Section 4.

3.1.3 Potable water

All construction sites will have access to potable water through metered connections to the Sydney Water network. During construction, potable water will supply the site offices and amenities and be used as feedwater to the tunnelling machinery in line with manufacturer's specifications.

4. Evaluation

The CDS-JV design and construction team have undertaken a water reuse assessment for the construction phase of the asset life. This assessment, including the considerations and justifications for site specific water re-use strategies, is detailed below.

Reused water is preferred over potable water on all sites where suitable quality surface water or treated groundwater is available. The supply of re-used water is entirely dependent on rainfall, construction activities, and on the storage capacity of available sediment basins and rainwater tanks.

For any external recycled water reuse options, Third-Party stakeholders such as Councils and Golf Course Operators will be responsible for meeting end-use requirements such as public health requirements and permits and approvals.

4.1 Considerations for Water Reuse

4.1.1 Concrete

All concrete will arrive on site pre-mixed and the use of non-potable water for batching plant production will be encouraged where possible.

4.1.2 Green and Golden Bell Frog Plan of Management - Arncliffe

Surface water must not be reused at the Arncliffe site. As detailed in the Green and Golden Bell Frog Plan of Management (GGBF PoM) the reuse of sediment pond water is prohibited to prevent the spread of chytrid fungus. The GGBF PoM specifies that only town water should be applied to construction zones for dust suppression.

4.2 Reuse Options and Activities

A constant supply of treated groundwater will be available for use at the tunnelling compound sites that can be used both within the tunnelling operations (where specifications permit) and also on the surface. This water will be available as soon as the water treatment plants have been commissioned and will supply the Commercial Road (C3), Bexley North (C4), Arncliffe (C7), Canal Road (C8) tunnel sites. Treated groundwater from water treatment plants will be available from fill points for water carts.

It is anticipated that the treatment plants will be treating water at between 12 and 36 L/s (peak flows) depending on location and the activities being undertaken in the tunnel.

Where possible, available surface water and treated groundwater will be used to provide reuse water for all non-potable water usage activities as detailed in [Table 5](#) below.

Table 5: New M5 Water reuse activities

Construction Phase		
Surface Works (including cut & cover)	Tunnelling & Fit Out	Potential External Third Party Uses
Dust suppression	Surface preparation	Irrigate and/or supplementary water for public open space
General wash-down	Dust suppression	Watering of retained or regenerated vegetation/landscaping
Wheel wash	Rock saw	
Concrete cutting	Rock breaking	
Fill conditioning	Surface trench excavation	
Compaction		
General earthworks		
Rock sawing		



Construction Phase		
Concrete batching		
Landscaping		
Non-potable water uses such as toilets		

Table 6 below details and evaluates each the reuse opportunities at each construction site/s, taking into account the specific considerations for this project. The estimated volumes represent the theoretical water consumption for each construction area assuming water quality meets the requirements for each activity and that re-used water is available.



Table 6: New M5 water reuse options – Construction Phase

Construction Site/s	NP Water Sources	Est. Potable Water Volume/Day	Est. Available Reused Water Volume/Day	Considerations/ Justification	Implementation Period
Western surface works Kingsgrove North tunnel and civil (C1) Kingsgrove South civil (C2) Commercial Road tunnel (C3)	Construction Water Treatment Plant/s Sediment Basin	93 kL (C1) 90 kL (C2)	Up to 25kL Surface Water Up to 240kL WTP	<p>WTP is located at Commercial Road tunnel site (C3) and will provide treated water for reuse at the site. Sediment basin will be located at the Kingsgrove North tunnel site (C1) and will capture surface water for potential re-use for dust suppression. Potential for reused water to supply the ablutions facilities on site and to be used for cleaning of belt pressers and back wash of filters is currently being investigated.</p> <p>Roadheader machines in tunnelling operations on the new M5 use a closed loop system for cooling which reduces water demand. Water used in tunnelling operations, such as spraying the cutterhead during excavation and dust suppression, have strict water quality requirements. Investigation is currently underway to ascertain whether the treated groundwater from the WTP meets this requirement and can replace the potable demand.</p> <p>Expected WTP rates of discharge are based on the average discharge flow rate at capacity of the WTP. Actual treated water availability and usage will depend on several factors including groundwater input flows, tunnelling activities and water storage capacity. Excess of water treatment discharge will drain to approved stormwater drainage systems outlined in the SEP.</p>	Sediment basins and groundwater treatment plants will be operational in accordance with the Site Environment Plans (and erosion and sediment control plans).
Bexley Road North tunnel and civil (C4) Bexley Road South tunnel and civil (C5)	Construction Water Treatment Plant Rainwater Tanks	214 kL (C4) 116 kL (C5) 17 kL (C6)	Up to 10kL rain water Up to 656kL WTP	Roadheader machines in tunnelling operations on the new M5 use a closed loop system for cooling which reduces water demand. Water used in tunnelling operations, such as spraying the cutterhead during excavation and dust suppression, have strict water quality	Rainwater tanks will be operational in accordance with the Site Environment Plans (and erosion



Bexley Road East support (C6)				<p>requirements. Investigation is currently underway to ascertain whether the treated groundwater from the WTP meets this requirement and can replace the potable demand.</p> <p>Potential for reused water to supply the ablutions facilities on site and to be used for cleaning of belt pressers and back wash of filters is currently being investigated.</p>	and sediment control plans).
Arncliffe tunnel and civil (C7)	Construction Water Treatment Plant	421 kL (C7)	Up to 1002kL WTP	<p>Surface water at Arncliffe must not be reused for dust suppression or surface activities. As detailed in the Green and Golden Bell Frog Plan of Management (GGBF PoM) the reuse of sediment pond water is prohibited to prevent the spread of chytrid fungus. The GGBF PoM specifies (Table 2) that only town water should be applied to construction zones.</p> <p>Potential for reused water to supply the ablutions facilities on site and to be used for cleaning of belt pressers and back wash of filters is currently being investigated.</p> <p>Expected WTP rates of discharge are based on the average discharge flow rate at capacity of the WTP. Actual treated water availability and usage will depend on several factors including groundwater input flows, tunnelling activities and water storage capacity. Excess of water treatment discharge will drain to approved stormwater drainage systems outlined in the SEP.</p>	Commencement of Construction
<p>St Peters Interchange works</p> <p>Canal Road tunnel and civil (C8)</p> <p>Campbell Road civil (C9)</p> <p>Landfill Closure civil (C10)</p> <p>Burrows Road civil (C11)</p>	<p>Construction Water Treatment Plant</p> <p>Sediment Basin/s</p> <p>Rainwater Tanks</p> <p>Leachate Water Treatment Plant</p>	504 kL	<p>Up to 50 kL Surface Water</p> <p>Up to 622 kL WTP</p> <p>Up to 10kL rain water</p>	<p>Roadheader machines in tunnelling operations on the new M5 use a closed loop system for cooling which reduces water demand. Water used in tunnelling operations, such as spraying the cutterhead during excavation and dust suppression, have strict water quality requirements. Investigation is currently underway to ascertain whether the treated groundwater from the WTP meets this requirement and can replace the potable demand.</p> <p>Construction team at SPI works currently investigating the opportunity to connect the tunnelling water treatment</p>	Sediment basins and groundwater treatment plants will be operational in accordance with the Site Environment Plans (and erosion and sediment control plans).



				<p>plant water discharge line to storage tanks for civil dust suppression.</p> <p>Expected WTP rates of discharge are based on the average discharge flow rate at capacity of the WTP. Actual treated water availability and usage will depend on several factors including groundwater input flows, tunnelling activities and water storage capacity. Excess of water treatment discharge will drain to approved stormwater drainage systems outlined in the SEP.</p> <p>SPI is a former landfill site. Due to the potential contamination on-site it will be unlikely to be able to re-use captured surface water for dust suppression and other construction activities. Town water may be required for these activities for H&S reasons.</p> <p>Leachate cannot be used for wash down facilities and/or used for dust control at the premises. During landfill closure activities, surface water management measures will be implemented to isolate and capture potentially contaminated water. Water will then be transferred to the leachate treatment plant for treatment prior to discharge to sewer under a trade waste agreement with Sydney Water.</p>	
<p>Campbell Road bridge civil (C12)</p> <p>Gardeners Road bridge civil (C13)</p> <p>Sydney Park civil (C14)</p> <p>Local Roads Upgrade Works</p>		TBC	TBC	<p>No sediment basins or water treatment plants are being installed at these sites given the land size constraints and construction activity requirements.</p> <p>Opportunities for water re-use are currently being investigated such as the installation of rainwater tanks for toilet flushing in office and crib facilities. These opportunities will be further evaluated as construction commences in each area.</p>	Commencement of Construction

5. Monitoring and Reporting

The water reuse targets detailed in Table 3 relate to the overall New M5 project targets identified in the Project Sustainability Plan. To track performance against these targets, a quarterly sustainability report will be produced and provided to SMC. This report will include the monthly volumes of potable water consumed and the volume of water reused on site.

A Permit to Dewater process ((M5N-ES-PER-PWD-0001) has been developed to record the volumes of surface and groundwater reused on, and discharged from, the project sites. This process reinforces the project preference to reuse water that has been captured onsite wherever possible (e.g. for dust control). Prior to any discharge offsite or reuse onsite the Environment Team will ensure the water treated, recorded and reported in accordance with the EPL. The completed permits will be the primary source of reused water data for the quarterly sustainability report.

6. Conclusion

This strategy outlines the water reuse opportunities in the New M5 project construction phase as detailed in Section 4.

The water treatment plants will supply treated water within the site for non-potable water uses in Table 5. At the peak of construction these water treatment plants are estimated to provide 2500kL of water per day to the construction works. Sites, such as Kingsgrove, which will have sediment basins on site, will also have the capacity to harvest storm water to supplement the demand for surface activities. This, along with potential opportunities for rainwater harvesting, will ease the pressure placed on potable water demand by making non-potable water available for the construction activities outlined in Table 5.

CDS-JV design and construction teams will continue to work collaboratively to investigate future potential water re-use options for the new M5 project. Such options may include the installation of additional rainwater tanks and the supply of treated groundwater to the local irrigation network at the Arncliffe Golf Course. As design, construction and programming progress, these options will be addressed in the Water Re-Use Strategy – Operational Phase.

Appendices

Appendix A: Glossary of Terms

Term / abbreviation	Definition
CAFMP	Construction Ancillary Facilities Management Plan
CCS	Community Communication Strategy
CEMP	Construction Environmental Management Plan
CoA	Condition of Approval
D&C	Design and Construction
Deed	As appropriate to the defined scope of the WestConnex New M5 Main Works D&C Deed.
DP&E	Department of Planning and Environment
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPA	Environment Protection Authority
EPL	Environment Protection Licence
ER	Environmental Representative
EWMS	Environmental Work Method Statements
CFFSP	Construction Flora and Fauna Sub-plan
IC	Independent Certifier
Infrastructure Approval	Approval under the Environmental Planning & Assessment Act 1979 for SSI 6788 signed by the Minister for Planning on 20 April 2016
ISCA IS Rating Tool	Rating tool developed by the Infrastructure Sustainability Council of Australia (ISCA) to evaluate sustainability across design, construction and operation of infrastructure. The Infrastructure Sustainability rating scheme evaluates the sustainability (including environmental, social, economic and governance aspects) of infrastructure Projects and assets.
CDS-JV	CPB Contractors Dragados Samsung Joint Venture (Contractor)
PMP	Project Management Plan
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
Project	WestConnex New M5 Project
Project Company	WCX M5 PT Pty Limited
Project requirements	The project requirements include all CoA (pursuant to Infrastructure Approval), REMMs, EMMs, SWTC and EPL.



Term / abbreviation	Definition
REMM	Revised Environmental Management Measure (from the SPIR)
RMS, Roads and Maritime	Roads and Maritime Services
SMC	Sydney Motorway Corporation
SPIR	Submission [and Preferred Infrastructure] Report
SWTC	As appropriate to the defined scope of the Scope of Works & Technical Criteria defined under the New M5 D&C Deed.
CSWQSP	Construction Soil and Water Quality Sub-plan
WCX	WestConnex
WDA	WestConnex Delivery Authority, now Sydney Motorway Corporation (SMC)
WTP	Water Treatment Plant