SDP Capital Works
Project Summary

SYDNEY DESALINATION PLANT

Project Title / Asset	Second Drinking Water Tank
Project Driver	Reliability / Availability

Purpose

The purpose of this document is to provide a high-level overview for major projects, further detailed information is available on request. Major projects have been defined as any capital expenditure that includes the addition of new assets to the plant.

Information/justification on other elements of the proposed capex program (e.g. refurbishments and replacements of existing assets) are available on request.

Project Background

Remineralised water is stored in a 40ML Drinking Water Tank (DWT) before being transferred via the pumping station and pipeline to Sydney Water's distribution network. The DWT is constructed from pre-cast concrete panels stressed together (post-tensioned) to form a water-tight structure. This project consists of the installation of an additional DWT to effectively provide 80ML of potable water storage capacity onsite.

There is an area set aside for an additional storage tank to incorporate any expanded production capacity from 250ML/day up to 500ML/day. SDP has been in consultation with Sydney Water regarding the benefits of installing the second DWT during the Regulatory Period (RP3) to provide additional site storage capacity and assist the overall Plant reliability and availability in response to the new operating environment.

Asset Details

Asset	40ML Drinking Water Tank – concrete panel with aluminium roof
Asset durability/ design intent/ asset management Strategy	Civil – Above ground storage tanks – 100 years Structural Steel – Roof supports – 50 years Mechanical/Electrical – 25 years Instrumentation/Control – 15 years
Asset Function/ Subsystem/ System	Remineralised water is stored in a 40ML Drinking Water Tank (DWT) before being transferred via the pumping station and pipeline to Sydney Water's distribution network.
Asset Failure and its consequence	Catastrophic failure of the existing DWT will result in complete loss of production for an extended period (> 3 months) and the potential inundation and localised flooding of the surrounding area. The installation of a secondary tank will provide redundancy for this system.

Justification

The primary operational benefits of installation a second DWT include:

- During a planned shutdown of the Plant for greater than 4 days the pipeline can be flushed using the available drinking water in both tanks (combined 80ML) without the need to produce additional desalinated water and disrupt shutdown activities. The pipeline volume is 50ML and therefore the existing storage volume is not sufficient without additional production to make-up the shortfall.
- In the event of a Plant outage there is double the supply available in the storage tanks, approximately 8 hours supply at full production and 15 hours at half production, allowing for SDP and Sydney Water to respond accordingly.
- A second DWT will also increase the amount of water immediately available in the event SDP are requested to respond to production requests from Sydney Water at short notice (e.g. due to water quality or other emergency response). Having additional storage available will allow faster Plant ramp-up to full capacity by approximately 4 hours, providing an improved response time.
- The arrangement would also allow one tank to be taken offline (e.g. for planned or unplanned maintenance) without disrupting water supply, providing redundancy for this process system.

The secondary benefits include the ability to schedule integration of the tank into the system at an opportune time. Having the infrastructure already in place for a future expansion of the Plant will reduce downtime and therefore increase available production during a future expansion at a time when water production from the Plant may be important.

Options Considered

Whilst there are clear operational benefits to providing additional storage it is difficult to quantify the financial benefits to Sydney Water and customers of any improvements to SDP reliability and response time. Likewise, there may be net present value (NPV) benefits to customers from deferred capital expenditure or reduced mitigation costs to Sydney Water as a result of additional functional storage. We will continue to work with our customer Sydney Water, to determine whether implementing this project now is a prudent investment. The following options have and will be considered:

<u>Option 1 – Do nothing</u>

The do nothing option will not have an effect on the current Plant operation, however will not improve reliability and response time.
A second tank will be required to expanded production capacity from 250ML/day up to 500ML/day and will need to be implemented at that time.

<u>Option 2 – Installation of second 40ML tank</u>

Installation of a second 40ML tank will provide redundancy, reliability, improved response, and less disruption during planned/unplanned outages. Furthermore, the infrastructure will be in place for the expansion of the Plant.
This arrangement was considered during the original design of the Plant and there is existing infrastructure and area to facilitate installation and it can easily be incorporated into the existing operation/process.

Option 3 – Installation of larger storage reservoir

Installation of a large storage reservoir would greatly increase resilience, reliability, response time and provides greater flexibility for SDP and Sydney Water.

This arrangement has never previously been considered. A substantially larger area would be required, which may encroach on the area available of the expansion (if located at rear of site) or alternatively would need to acquire additional land adjacent to the Plant (e.g. Ampol site). Additional infrastructure will be required to transfer the water between the Plant and reservoir and other modification to the existing Plant process.

This option will be a considerably larger cost than Options 1 & 2.

Proposed Scope

The proposed scope in based on Option 2 – second 40ML drinking water tank and includes:

- New 40ML drinking water tank adjacent to existing Drinking Water Tank.
- New inlet and outlet pipe arrangements, which are to be connected to the inlet and outlet pipework of the existing Drinking Water Tank (connection stubs have been provided).
- New overflow and drain pipework and connection into existing break tank (connection stubs have been provided).
- New Inlet and outlet isolation valves (including valve chambers).
- New chemical dosing pit (or potential relocation to post pumping station).

The new drinking water tank will be located adjacent to the existing. The tank will be the same size as the existing. That is it will have the same footprint, height and volume of 40ML. Space has been allocated for this tank in the existing Plant design.

The new tank will have the same construction methodology as the existing (unless a new method is found that provide suitable levels of robustness and cost efficiencies). That is, it will be a post-tensioned tilt-up panel construction, which is considered appropriate for a tank of this size and required design life (100 years as nominated in original technical specification TS-02). This construction methodology requires a temporary casting yard and laydown area. It also requires a crane to transport the panels from the yard to the future tank location.

The pre-cast panels will be manufactured off-site in conventional pre-cast facilities and delivered as required direct to the erection crane. This method of construction will maximise the off-site components allowing rapid construction.

Prior to construction of the tank several major outlet pipes will require installation. The area will then be backfilled and short continuous flight auger (CFA) piles installed. Reinforcing steel will be placed, and the tank base poured. A recess in the external ring beam will be provided for installation of the pre-cast panels.

A crane will be used to erect the panels with the base inside the ring beam recess. Props will be provided to temporarily support the panels and to allow vertical adjustment. The panels will be erected in segments with a special stressing blister panel at each end. Once all panels in a segment have been erected, the stressing ducts will be coupled and the gap between the panels infilled with in-situ concrete. As each segment is completed the tank will be initially stressed. Once all segments have been erected, final stressing will take place and the recess in the ring beam waterproofed and grouted.

In parallel with the wall construction, pre-cast columns will be erected inside the tank for support of the roof steelwork. Internal and external stairs will also be installed. The roof steel and cladding will be erected by conventional means after the tanks have been cleaned.

The new inlet pipe will be connected to the existing inlet via the existing crosstie installed in the original design with two isolation valves in pits. The isolation valves mean the potable water can be delivered to either drinking water tank, or both tanks simultaneously, allowing a tank to be taken offline for inspection and maintenance. To achieve this arrangement, the new inlet pipe must pass underneath the existing break tank overflow channel. To install the pipe, the contractor will trench through the existing channel, lay the pipe and then reinstate the channel afterwards.

The new tank overflow pipe will be connected to the existing break tank via an existing connection installed in the original design. The overflow pipe will have to pass underneath a DN250 drain line from the Drinking Water Pump Station (DWPS). Part of the drain line may have to be demolished to install the overflow and then reinstate afterwards. The overflow pipe also crosses underneath the crosstie between inlet pipes, therefore the installation of the overflow pipe will occur before the inlet crosstie to avoid construction interferences.

The new tank outlet will be connected to the existing outlet manifold from the existing tank, which feeds all the suction line running to the DWPS. This new pipe will have an isolating valve pit and chemical dosing pit as per the outlet pipe design for the existing drinking water tank.

Following completion of the works, the tank will be filled with potable water for leak testing before commissioning of the entire system.

Cost Estimate

A high-level cost analysis has been performed based on the preliminary expansion planning completed in 2019. The base costs used are the efficient costs from the original tender with escalation applied. The total estimated cost is around [redacted], as per below:

[redacted]

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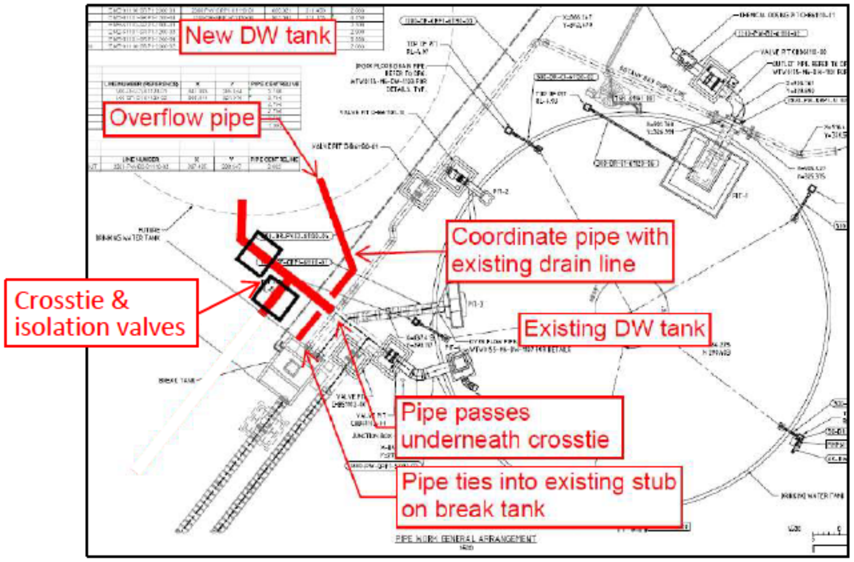
Proposed Layout

Tank Inlet



Tank Outlet