

# BENDIGO CWS LINER REPLACEMENT PROJECT

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## ABSTRACT

Veolia operates the water treatment plant that supplies water to Bendigo, Sandhurst WTP. This water treatment plant has a 42MLD floating cover Clear Water Storage (CWS). In February 2023, tears in the bottom liner were observed during a routine diver inspection of the CWS. The conditions observed led to the need to accelerate planned works to replace the liner and undertake temporary by-pass works to ensure continuity of water supply to Bendigo.

Emergency By-pass works were completed within a couple of weeks with the support of local Bendigo contractors. By June 2023 a temporary by-pass was built and commissioned to allow the CWS to be taken offline for the replacement. Collaboration between the Veolia operations team and Coliban Water, meant that all contingency plans were documented and tested prior to the storage being taken offline.

Once the system was online the temporary bypass was operated until completion of liner replacement in September 2023. Operators worked a 24/7 shift, and additional Veolia resources from interstate came to Bendigo to support the local operations team. Replacement of the liner was managed by the Veolia project delivery team working alongside the local operations team. Regular updates were provided to Coliban Water throughout the works and the storage was brought back online on Friday 1st of September. During October and November 2023 the local operations team project managed the decommissioning of the temporary works.

## 1.0 INTRODUCTION

Veolia Australia-New Zealand (Veolia) operates three water treatment plants (WTPs) in Central Victoria, all of which which feature pretreatment (coagulant and pH/alkalinity adjustment), membrane filtration, ozone-BAC and disinfection, under the AQUA 2000; a 25-year BOOT contract with Coliban Water. The AQUA 2000 plants supply safe drinking water to the towns of Bendigo, Castlemaine and Kyneton, with a combined capacity of around 150 ML/d.

The largest of these plants is the Sandhurst WTP located in Bendigo. It can supply 126ML/day at peak flow. Water is supplied to Bendigo from Sandhurst through a single clear water storage with a liner and floating cover with no by-pass. The liner and floating cover were due for renewal and Veolia and Coliban Water were working through the planning for the construction of a new 15 ML storage and by-pass pipeline through 2022. Divers were regularly inspecting and cleaning the liner, to manage the integrity of the liner until the additional storage could be completed.

On the 8th of February 2023 during a quarterly diver inspection, a small hole was identified in the liner and a patch repair was applied. After the patch was applied it was noted by the divers that a tear was continuing up a weak point in the liner. As the liner was at risk of

further damage immediate action was taken to provide an emergency by-pass while a more robust by-pass was constructed to allow the liner to be replaced.



**Figure 1:**     *Sandhurst Reservoir and Water Treatment Plant*

## **2.0 DISCUSSION**

The team (Veolia, Coliban Water and number of local contractors) worked through a number of stages of a project to protect the water supply into Bendigo and replace the liner.

### **2.1 Emergency By-pass and Network Configuration**

The Veolia team worked closely with Coliban Water to make changes to the network configuration to reduce the number of customers being supplied directly from the clearwater storage at the Bendigo WTP. At the same time an emergency by-pass was set up around the CWS, which included installation of a number of lay-flat hoses and temporary pumps to connect into what had previously been a raw water by-pass. The whole system was installed, disinfected and commissioned within a week to allow water to still be supplied to Bendigo if the liner failed further. The CWS level was also lowered to reduce pressure on the liner and minimise the risk of further tearing.

### **2.2 Temporary By-pass and Operations**

While the emergency by-pass was being installed, the team was also working on a temporary by-pass to allow the CWS to be taken offline for the liner replacement. An existing unused concrete oxidation tank, and reclaimed water tank were retrofitted as temporary storage. Three 1.4ML temporary tanks were also constructed to provide enough storage to supply Bendigo over low demand periods. An existing standby pump was repurposed and used to fill the temporary storages. Local contractors supported installation of pipework to connect up all of the new tanks, and worked with the operations team to develop the control philosophies for the new temporary by-pass system.

The team (Coliban Water and Veolia) worked together to look at all of the potential risks with the new by-pass and Veolia developed an extensive project management plan. This included reference graphs for the operators to quickly identify how much capacity they might have in the network if the by-pass failed and the response required. The by-pass system also needed to pass a number of performance tests before the CWS was taken off-line to make sure it could keep operating throughout the replacement. Bendigo operators also moved to a 24 hour shift rotation once the temporary by-pass was operational to allow for quick response to any shutdowns or failures.

Temporary Bypass Hours Remaining % of 5.5 ML Full Volume - Reference Chart

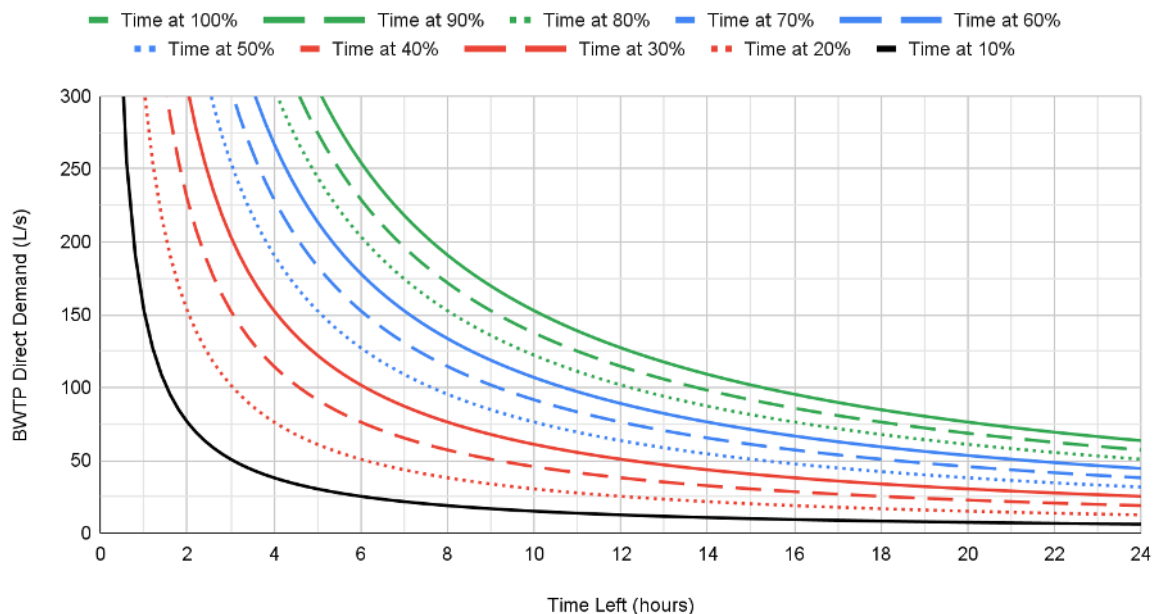


Figure 2. Example of temporary by-pass draw down quick reference chart

### 2.3 Liner Replacement

A new liner order was fast-tracked from the manufacturer. During the shipping process the liner material was delayed but the team replacing the liner were able to source some material from a delayed project somewhere else in Australia. Once this was confirmed on the 6th of July 2023 the CWS was drained and taken offline for the liner replacement. The team was supervised by a combination of Veolia project managers and on-site operational staff and worked 6 days a week replacing the liner. Dry cool conditions meant that the liner replacement progressed ahead of schedule. Throughout the replacement, the Veolia operations team provided daily updates to the Coliban Water operations team about progress of the replacement and performance of the temporary by-pass.

By the end of August 2023 the liner replacement was complete and the team worked to commission the new storage, filling and disinfecting before taking bacto samples as required in the project management plan. On September the 8th 2023 after completing a taste and odour panel the CWS was brought back online into Bendigo.

### **3.0 CONCLUSION**

This project showed that teamwork, good planning and collaboration are essential in delivering good project outcomes. It also highlights what can be achieved when different people with different skills come together with a common goal.

### **4.0 ACKNOWLEDGEMENTS**

Bendigo Operations Teams (AQUA, GSP, CFA)  
Coliban Water Operations Teams  
Suzanne Nuroo

### **5.0 REFERENCES**

*Bendigo CWS Liner Replacement - Project Management Plan - Veolia 2023*