SUNRAYSIA WATER EFFICIENCY PROJECT

COMPLETION REPORT
DECEMBER 2024

Australian Government

VICTORIA State Government Australia

LOWER MURRAY WATER

SWEP SUNRAYSIA WATER EFFICIENCY PROJECT

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Lower Murray Water (LMW) acknowledges the Traditional Owners of the land on which we work and reside. We recognise their continuing connection to land, waterways and community. We pay our respects to Elders past, present and future.

The Traditional Owners groups within LMW's service region lie within the traditional lands of First Nations Peoples, from upstream at Koondrook moving downstream along the Murray River through to the western edge of our region at the South Australian border. They are the Barapa Barapa Peoples, Wemba Wemba Peoples, Wadi Wadi Peoples, Tatti Tatti Peoples, Latji Latji Peoples, Nyeri Nyeri Peoples, Ngintait Peoples and the Wegaia Peoples.

The First Nation People's connection to land and water is the living cultural knowledge that is passed down from generation to generation. The stories that connected the ancestors to their culture still live through the First Nations Peoples of today.

- Acknowledgement of Country written by Stephanie Sloane

Executive Summary

The Sunraysia Water Efficiency Project (SWEP) was a $37.9 million channel efficiency project undertaken by Lower Murray Water (LMW) spanning the Merbein, Mildura and Red Cliffs Irrigation Districts. The project was supported and funded by the Australian Government via the Off-Farm Efficiency Program.

The project was delivered over two years, with most works taking place in winter 2023 and 2024.

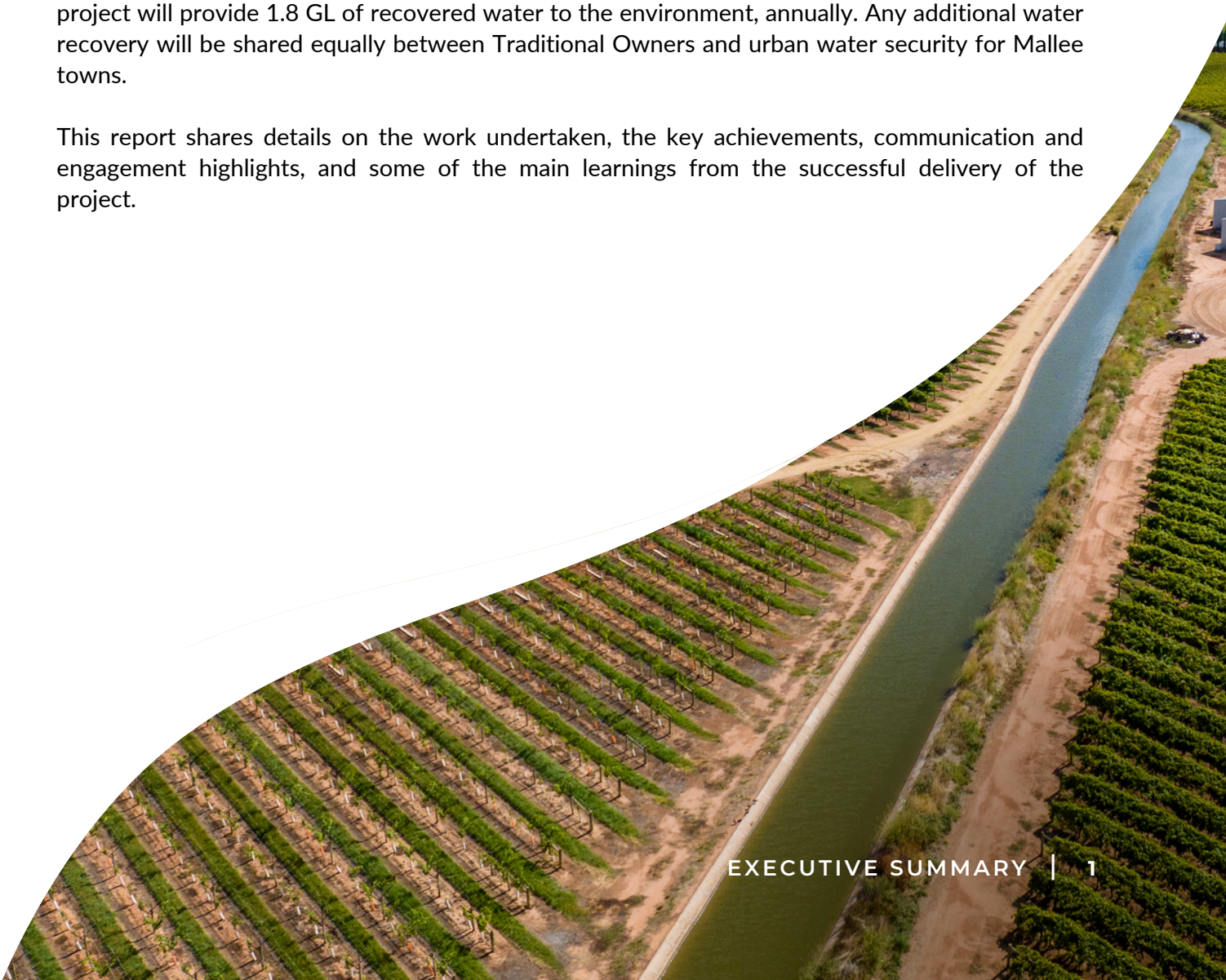
The project was a resounding success, with all works delivered on time and within budget. This was no mean feat in this era of rising costs, weather variables, labour shortages, and the logistical challenges associated with temporarily disrupting irrigation supply to undertake the works.

Engagement with customers and key stakeholders was at the heart of the project, focusing on minimising impacts during construction and amplifying the long-term benefits of the works.

SWEP significantly contributed to LMW's vision of continuing to provide an economically sustainable means of supplying irrigation water to support agribusiness throughout Sunraysia. This was achieved by installing new pipelines, lining channels, removing redundant assets and replacing flowmeters.

By minimising water leakage and seepage across Sunraysia's irrigation network, once audited, the project will provide 1.8 GL of recovered water to the environment, annually. Any additional water recovery will be shared equally between Traditional Owners and urban water security for Mallee towns.

This report shares details on the work undertaken, the key achievements, communication and engagement highlights, and some of the main learnings from the successful delivery of the project.



Project Background

The Sunraysia region has a $2.7 billion annual economy, driven primarily by water-intensive agricultural and horticultural industries.

Sunraysia's agrifood sector is one of Australia's most valuable horticultural regions, producing over 80% of the nation's citrus exports, and an estimated 90% of its summer fruit and table grape exports.
At the centre of this high agricultural output is a reliable irrigation system, making the region's water infrastructure crucial.

The region's water is delivered via a complex network of concrete and earthen channels, many of which were built over a century ago. While some infrastructure has been updated over the years, much of it has degraded over time, and no longer reflects best practices.

LMW had several challenges in maintaining this outdated infrastructure, including:

- **The threat of reduced agricultural productivity**
- **Inefficient water delivery systems due to ageing assets**
- **An increased risk of supply failure**
- **Difficulty in accessing the channels to respond to incidents, slowing recovery times**

Objectives

The SWEP aimed to create a more efficient water delivery network across the Mildura, Red Cliffs, and Merbein Irrigation Districts. The project sought to:

- **Boost water delivery efficiency for LMW customers**
- **Remove infrastructure causing water loss**
- **Extend the lifespan of irrigation systems**
- **Enhance the region's agricultural productivity**
- **Recover 1.8 GL of water annually and return it to the environment**

Project Delivery

The project had two main scope components - channels and meters.

Channels

Works to 27 km of channels across the irrigation networks, broken into channel lining and pipeline replacements:

Channel lining
Relining 25 km of channels

Pipeline installation
Installing 2.5 km of new pipeline

Meters

Treating 682 meters, comprising of SMO removals, D&S flowmeter upgrades, and investigations only:

357 small meter outlets (SMOs) removed

101 domestic and stock outlets (D&S) upgraded

224 flowmeters investigated with no works necessary

Channel Lining

	Description of issue (Pre SWEP)	Rehabilitation process	Outcomes
Mildura K&L Channels	Mildura's K and L Channels faced severe issues, including seepage that impacted nearby farmland crops. Reactive responses to frequent leaks by LMW compromised service levels, and annual maintenance could only patch small sections. The K Channel in particular presented unique challenges, winding through dense vegetation and crossing roadways, which made repairs even more complex.	The team navigated limited access, as much of the land lacked formal easements or ownership, requiring over 100 private landowners' cooperation. Coordinating water shutdowns added another layer of challenge: with crops as diverse as vegetables, grapes, and avocados, each landowner had specific irrigation needs.	The team crafted detailed shutdown schedules and adaptable bypass pumping plans to ensure growers' water needs were met. In a notable improvement for the community, a section of the L Channel running past a local primary school was replaced with underground piping, delivering both safety and social benefits (see section on pipelines).

Red Cliffs	The Red Cliffs main channel, a 6.7 km concrete-lined channel, had significant issues before SWEP. Regular leaks were identified with several hundred megalitres of water lost annually. Additionally, an unlined section of channel supplying a private irrigator contributed to system losses. Dense vegetation along some parts of the channel posed a safety hazard to neighbouring communities.	The most significant issue was the channel's severely degraded concrete. Much of the channel was around 100 years old and showing its age, with many sections of the concrete failed and breaking apart. The concrete required extensive repairs and patching before a liner could be installed.	Construction was completed over three months in winter 2023, with all channel shutdowns completed in the intended timeframe, allowing customers to plan their irrigation and minimise impacts.

Merbein Main Channel	The downstream end of the Merbein Main Channel, known as the Wargan Channel, supplies irrigators growing table grapes, citrus, and fodder. This earthen channel suffered significant water seepage problems. Rehabilitating this section was challenging due to dense vegetation, reed growth, eroding embankments and difficult access.	LMW had been unable to access large sections of this channel for decades due to dense overgrown vegetation and deteriorating channel banks. As a result, maintenance was minimal, and water seepage issues only worsened over time.	During construction, the channel's deteriorated condition became clear: large sections of the channel banks had eroded. To restore its structural integrity, over 40,000 cubic metres of clay was brought in to rebuild the channel. A durable liner was installed to prevent seepage and leakage, helping to recover significant water losses.

Pipeline Installation

	Description of issue (Pre SWEP)	Rehabilitation process	Outcomes
Mildura L Pipeline ('Nichols Point Pipeline')	The Mildura L Channel, which ran alongside the Nichols Point Primary School, posed a safety hazard due to its proximity to the community and the difficulty of climbing out if someone fell in. As part of the WW2024 program, the project replaced the open channel with an underground pipeline. This pipeline solution not only improved community safety, but also reconnected the open space between the school and the oval.	The construction presented challenges: a confined work zone between the school and public oval, and damp, unstable ground from years of leakage made the terrain difficult to navigate. To maintain irrigation for hundreds of downstream customers, bypass pumping was used throughout the demolition of the old channel and installation of the new pipeline.	A close working relationship was established with the school to communicate to their students and parents about the project, including when the works would be undertaken and why they were necessary.

Knife Edge Pipeline, Merbein	The upper section of the channel in Merbein (known as 'Knife Edge') was in severe disrepair and ran close to a private residence.	The project team saw an opportunity to improve both functionality and safety by replacing this section of channel with a more direct, buried pipeline.	Previously, the open channel had divided a private landowner's two properties. Although the backfilled land remains council property, the new buried pipeline now allows the landowner easy access between both properties.

The Ditch	The Ditch was a small spur channel that served a single customer, with LMW bearing responsibility for water losses as the customer was metered at the channel's outlet to their dam.	Originally an earthen channel prone to high seepage, this section was upgraded with a buried pipeline from LMW's main channel to the dam.	This significantly reduces water loss and provides a more robust asset solution in the long-term.

Small Meter Outlets (SMOs) outlets

357 small meter outlets (SMOs) removed

Prior to the project, LMW had 397 Dethridge meters (or Small Meter Outlets, 'SMOs') remaining across its rural irrigation network.

These meters, once used to measure water flow to farms, are highly inaccurate compared to modern devices.

Most of the wheels were disused following modernisation works undertaken as part of the Sunraysia Modernisation Project (SMP). Active or not, these outdated meters are still connected to the irrigation supply network and cause water loss. In some instances, these leaks can be substantial, causing localised flooding of the surrounding property.

Removing them helps conserve water by eliminating system 'weak points' and reducing leaks from pits and valve plates. The project team successfully removed 357 SMO's from the irrigation network, substantially exceeding the Funding Agreement target.

Domestic and Stock (D&S) outlets

101 domestic and stock outlets (D&S) upgraded

LMW uses a mix of Magflow and mechanical meters to measure domestic and stock water in its Red Cliffs, Mildura and Merbein districts.

Testing of these flowmeters showed that a small number were inaccurately recording flows, with some meter errors being in the range of 96-100%.

This would result in domestic and stock usage being unreported and being accounted for in LMW's rural loss entitlement.

The project sought to identify the faulty flowmeters and replace them to reduce under-measurement.

Project Achievements

More than
1.8 GL
of water saved annually

100+
local construction jobs created

85
landowner agreements signed

400+
primary students engaged in works

$20 million
estimated regional GDP increase

Reduced operational costs for irrigators

3 ministerial visits

130,000+
hours worked

850+
site inductions

1,000+
photos taken

30+
removed wheels turned into public art

400+
day sheets completed

500+
quality inspection records

10
site tours hosted

Improved water management outcomes in the region

2 educational site tours

Key Activity Timeline

2023

February
1

- First major contracts awarded for: design and supply of channel lining materials to support the WW2023.
- Industry briefings for construction are hosted in Mildura and Echuca.

April
2

First delivery of channel liner arrives.

May
3

First major construction contracts are awarded for construction of the WW2023 channel lining program & SMO's.

June
4

Channels are drained and fish salvage takes place in Red Cliffs & Mildura. Mildura Channel Works commence & first water shutdown takes place in Red Cliffs.

July
5

- Channel lining works progress.
- 60 Melbourne University engineering students tour the SWEP construction site.

August
6

- In-channel lining works across Red Cliffs and Mildura are completed on-time.
- The Ditch pipeline installation takes place.
- SMO and D&S works commence.

Site inductions at Red Cliffs Channel.

September
7

- The Hon. Tanya Plibersek (Federal Minister for Water) and the CEO of the MDBA visited the SWEP.

October
8

- Construction Industry Briefing sessions held in Mildura and Echuca to promote the WW2024 and upcoming tenders.
- Design and approval works commence for WW2024.

November
9

SMO in-season works commence.

December
10

- Major contracts awarded for supply of channel liner and pipe for WW2024.
- WW2024 Construction tender released to market.

2024

January
1

Community Art Initiative launches to turn removed Dethridge wheels into community sculptures, celebrating the history of irrigation in the region.

February
2

Consultation with impacted community commences, requesting input into the WW2024 shutdown period. Schedule is adapted based on irrigator feedback.

March
3

Major construction contracts are awarded for construction of the WW2024 channel lining program and SMO's.

April
4

WW2024 commences with first works focusing on dewatering, fish salvage, desilting and concrete repair works at Mildura.

May
5

Meet the Team Day, incursion and BBQ event at Nichols Point.

June
6

Community Art Initiative closes, with 30 applications received to own and decorate a wheel.

July
7

- Completion of in-channel works for Mildura L & K Channels and Knife Edge.
- The project team hosted visits from project funders and hosted a bus tour for LMW staff to inspect the works.

August
8

- Nichols Point pipeline and Merbein Wargan in-channel works are complete and operational.
- Filming and photography for completion communications commences.

October
9

All works complete!

November
10

Minister Hon Harriet Shing attends ribbon cutting event at Nichols Point.

Benefits Realisation

	Description of issue (Pre SWEP)	SWEP outcome	Project benefit
Water supply interruptions and risk of supply failure	Aging assets in the network were causing bursts, leaks, seepage, and evaporation, leading to supply interruptions and increased risks for growers.	The relined channels and new pipelines will reduce water loss through seepage and reduce bursts and leaks across the network.	Growers now have greater confidence that water will be available when they require it - with fewer losses, bursts and interruptions to supply.
High operating costs	The maintenance costs of bursts and leaks were significant. Lack of easements across the network, dense vegetation and hard-to-access locations meant repairs were often time consuming and costly.	With the delivery system's enhanced reliability from repaired and modernised assets, bursts and leaks will occur less frequently. Access to the channels has been enhanced through vegetation clearing and channel bank repairs.	Ongoing annual operational costs have been reduced with these works.
Water loss from channels	Water loss from channels due to leakage and seepage, was a significant issue across the LMW pumped districts. Over a three-year period, the average water loss was 8.8 GL.	The relined channels and new pipelines will significantly reduce water loss through seepage and reduce bursts and leaks across the network.	The channel network is now more efficient, reducing the amount of 'wasted water' in delivery from the river to the farmgate, so that it can be used to benefit the environment.
Redundant and inaccurate flowmeters	Redundant and inaccurate Dethridge flowmeters contributed to water losses, due to leakage through or around the meters, as well as unauthorised use.	The SWEP project successfully treated more than 450+ problematic flowmeters, comprised of 357 SMOs and 101 D&S.	The removal of redundant SMOs and replacement of high-error flowmeters contributed to water savings gained by the project. The removal of old Dethridge wheels removed 'weak points' in the system, reducing the likelihood of pipe bursts and localised flooding.
OH&S risks	The legacy open channels posed a safety risk to the community due to their proximity to houses, roads, and schools. Overgrown reeds, weeds, and eroding embankments make it difficult to climb out of the channels, while the lack of fencing and signage further increases the risk of falls and other safety hazards.	The open channel near a primary school was replaced with an underground pipeline. The Project installed more than 30km of fencing around the channels and 700+ escape ladders.	Safety risks from the open channels have been minimised through fencing, safety ladders and signage. The risk of the open channel near a primary school has also been removed, with an underground pipeline replacing the channel section neighbouring the school.
Slow incident recovery	Slower incident recovery and revenue loss resulted from suboptimal water delivery. To manage risks and minimise customer impacts, LMW had to maintain extra reserve capacity, limiting its availability to customers.	With upgraded delivery systems, water is now delivered more efficiently.	LMW has a deeper understanding of the network and greater confidence that the infrastructure can handle higher flow rates. Reserve capacity can be better utilised for customers.
Climate change	Climate change is reducing total inflows into the broader southern Murray-Darling Basin, while hotter, drier summers are driving up water demand due to increased evapotranspiration rates. This imbalance between reduced supply and rising demand has led to water shortages and a significant price surge in the allocation market. The rising cost and limited availability of water are creating barriers for new entrants and threatening the viability of existing growers.	Though the project did not increase water availability for growth, it will improve system efficiency, ensuring more consistent and reliable water delivery to existing customers.	The region gains improved resilience to the impacts of climate change and fluctuations in water allocations.

Communications and Engagement

From day one, the project was about more than just hitting technical targets and deadlines – it was about strengthening LMW's lasting relationships with customers and the community. The project team recognised that they were custodians of these relationships, and the goal was to return them in the same or even better condition at the project's completion.

With two consecutive winters of project related water supply interruption for growers, the priority was a customer-first approach, ensuring their needs remained at the heart of the project.

Engaging with Growers and Landowners

SWEP engaged with over 3,000 impacted growers more than five months before the project's most significant works package (WW2024) began, providing them with a proposed channel shutdown schedule.

This early communication gave growers vital information about changes to their water access, allowing them to make informed decisions for their properties and reduce the risk of crop failure and financial losses.

Based on customer feedback, the project made changes to the shutdown schedule across nearly all channels to minimise disruptions.

Constructive input from landowners, offering suggestions for program adjustments, was a significant win for the project. It allowed for smooth delivery within a condensed timeframe, avoiding the complaints and escalations that often occur with projects of this scale.

40,000+
customer & landowner interactions

85
landowner access agreements signed

13
shutdown schedule adjustments made

Engaging with Community

The SWEP team held a community 'Meet the Team' event on the Nichols Point Oval in May 2024, coinciding with the start of the Winter Works 2024 program. The community interacted with our team, explored machinery, enjoyed a free sausage sizzle and park games – including a large 'construction' sand pit.

Prior to the event, the team took Nichols Point Primary School (NPPS) students on a school incursion. NPPS was located next to one of the channels being replaced by a pipeline, and as such, a key stakeholder in the project.

The team gave 400 students project-branded high-vis vests and an exclusive tour of the construction site – including educational talks about water use and Sunraysia's irrigation history. The school incursion and community event showcased the project's genuine commitment to making SWEP more than just a capital works program – it was a shared community improvement project to be celebrated.

Community Co-design Art Initiative with Removed Water Wheels

As the project removed old water wheels from Sunraysia's network, the SWEP landowner team noticed a growing sentiment of nostalgia within the community. Rather than recycling all the removed wheels, the project team used this opportunity to strengthen goodwill within the community.

A community co-designed art initiative was launched, where community took the retired water wheels and installed them as art pieces across Sunraysia. Participants were left to decide whether they would turn the wheels into a decorated sculpture or install them in their natural state – as a teachable opportunity about the region's irrigation history.

Dethridge wheel before removal from the network.

Dethridge wheels repurposed by a local school into an art piece that also functions as a frog habit.

Work Health and Safety

Safety of all people involved on the project was the highest priority throughout.

Works were conducted in open channels at multiple sites simultaneously, often near environmentally sensitive areas and public spaces such as schools, sports ovals, and private residences. The project team had dedicated resources on the ground every day, ensuring that the contractors were implementing the works in accordance with their management plans.

To ensure safety, the project team maintained regular site visits and daily communication. This allowed close collaboration with contractors, ensuring they effectively managed health, safety, environmental concerns, and quality across all sites. Utilising electronic recording of site observations for safety, the project team was able to remotely access drawings, databases, project plans and safety resources. The project team used technology such as ArcGIS to enable real time monitoring and reporting.

These tools enabled effective compliance management and assisted in achieving successful project outcomes.

50+ drug & alcohol tests

130,000+ hours worked

850+ site inductions

80+ safety inspection

400 day sheets completed

1,250+ quality checklists

Toolboxes

To ensure consistency in standards and safety across all contractors, the project team issued a fortnightly 'Project Works Toolbox'. This update addressed evolving safety risks throughout the project's duration.

Quality

The project team developed an Integrated Management System (IMS) with requirements and project processes. The project gained accreditation to ISO 9001 (quality), ISO 14001 (environment) and ISO 45001 (safety) standards. This was the first time that LMW had achieved all three certifications. The project was audited in 2024, which confirmed that all processes were in place and suitable, with no non-conformances or opportunities for improvement identified.

Conclusion

The Sunraysia Water Efficiency Project undertaken by Lower Murray Water has been unprecedented in its successful delivery. Not only achieved within budget and on time, but additionally, the project has resulted in significantly more benefits for the Sunraysia community.

SWEP has been successful in all forms:

- An estimated $20 million regional GDP increase;
- All channels brought back online on-time, or earlier than promised to stakeholders – allowing community and growers to confidently plan their water usage and irrigation needs;
- Employment across Sunraysia increased, with 100+ local jobs created;
- The number of Dethridge wheels removed from across the network was 25% more than the project committed to decommissioning, allowing greater water savings by removing these network 'weak points';
- The use of considered pipeline installation instead of channel relining has reduced safety hazards and opened up spaces and community and landowner access across the region;
- A community co-design project that has used removed Dethridge wheels and transformed them into sculptures across Sunraysia – giving the project a lasting presence in the region;
- Establishment of a highly skilled Project Delivery Team within Lower Murray Water; and
- Successful utilisation of digital media such as YouTube clips and technological advancements such as drones utilised for media purposes and electronic site auditing.

SWEP will support Sunraysia remaining competitive within Australia's agribusiness sector. Given the region's importance in produce supply to both the State and Australia, the project has also helped assure Australia's ability to provide its people with high quality Australia-grown produce.

With the project aiming to annually recover 1.8GL in water savings to be used for environmental purposes, the project has also made a significant contribution to preventing water scarcity and protecting the ecologically significant Murray-Darling Basin.

The SWEP Project Control Group and Delivery Team look forward to seeing the benefits of these works overtime as they positively impact the Sunraysia Region and Murray-Darling Basin.

Lower Murray Water wishes to sincerely thank the Australian and Victorian Governments for funding, supporting and believing in the Sunraysia Water Efficiency Project. Together, great things have been achieved.

Australian Government

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