TECHNICAL REVIEW

Harvey Water's Recycled Water Management Project

ABSTRACT

This report delves into the Harvey Water Recycled Water Management Project, and its impact on responsible environmental practices and water quality safety. It fosters community confidence and emphasises its crucial role in bolstering water quality amid climate challenges, prioritising transparency.

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TESSELE

HARVEY WATER

Assessment of Harvey Water's Recycled Water Management Proposal for Sustainable Water Resources

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Contents

1 Executive Summary

This comprehensive report presents an independent review and assessment of Harvey Water's pivotal proposal to effectively manage recycled water sourced from the Harvey Fresh processing plant. Harvey Water, a licensed provider of non-potable water for agricultural and industrial purposes, has embarked on this collaborative effort to secure resilient water resources capable of withstanding the region's evolving and increasingly arid climate conditions.

At the core of this proposal is a strategic modification of the existing process, featuring the integration of UV treatment and chlorination measures. These innovations are strategically employed to optimise the removal of various contaminants, including nutrients, coliforms, phosphate, and E. coli, from the recycled water. The ultimate objective is to achieve water quality standards closely mirroring those observed in the Harvey Dam, which will serve as the primary repository for the treated water.

It is important to note that the proposed treatment process does not address salinity concerns. However, Harvey Water is confident in its capacity to manage this aspect, believing that the relatively elevated salinity levels in the recycled water will be naturally diluted to levels that will not compromise water quality for irrigation purposes or negatively impact the local environment.

This comprehensive report encompasses the following components:

Background	A contextual overview emphasises the significance of Harvey Water's project in the face of a regional climate that necessitates innovative solutions for sustainable water supply.
Tessele's Credentials	Tessele, the independent assessor enlisted for this review, brings a wealth of experience and a proven track record in water quality assessments, safety evaluations, and environmental impact analyses. Their credentials underscore the impartiality and professionalism of this assessment.
Methodology Assessment	Tessele's thorough evaluation of Harvey Water's methodology and modelling affirms the viability and robustness of the proposed modifications. These measures, particularly UV treatment and chlorination, are well-founded in their potential to achieve the targeted water quality improvements.
Water Quality Safety	From a water quality (WQ) perspective, Tessele provides a positive assessment of the treated water's safety when introduced into the Harvey Dam. This opinion underscores the adherence to stringent quality standards and the assurance of safe and reliable water resources.

Harvey Water's initiative to manage recycled water from the Harvey Fresh processing plant represents a commendable and forward-thinking approach to securing climate-independent water resources. Tessele's independent review and assessment have lent credence to the feasibility and safety of this project, reinforcing its potential to not only enhance water quality but also promote responsible environmental stewardship.

This report is intended to serve as a valuable resource for the local community and stakeholders. It aims to provide transparency, foster confidence in the project's safety, and underscore its pivotal role in ensuring a sustainable water supply for the region.

2 Introduction

The imperative to secure and enhance water resources in response to the ever-evolving and increasingly arid climate of the region underscores the proactive approach adopted by Harvey Water, a privately-owned farmers' cooperative. This strategic initiative aligns with Harvey Water's mission to address the region's changing climatic conditions and to provide sustainable water solutions for the community and agricultural stakeholders.

In the middle of 2022, Harvey Water was presented with a critical task, one that would have profound implications for the sustainable management of water resources in the area. Harvey Fresh (Lactalis), a prominent player in the region's dairy industry, sought the expertise of Harvey Water to develop a comprehensive proposal aimed at effectively managing the substantial volume of recycled water generated daily – approximately 1 million litres. The existing practice of piping this significant volume of water to farm paddocks, while functional, was rendered unsustainable and, subsequently, subject to cessation due to evolving environmental considerations and regulatory directives.

This pivotal juncture presented Harvey Water with a unique opportunity to pioneer an environmentally sound and technologically advanced solution to address this challenge. As an organisation committed to the principles of sustainability and responsible water management, Harvey Water recognised the need to evolve beyond traditional practices to secure a climate-independent water supply, a critical step towards ensuring the long-term viability of water resources in the region.

2.1 The Strategic Approach: Climate-Independent Water Security

Harvey Water's strategic approach to addressing the water management challenge presented by Harvey Fresh is emblematic of the organisation's forward-thinking ethos. The proposal represents more than just a pragmatic response to an immediate issue; it embodies a visionary commitment to enhancing water resources for the region and serves as a prototype for climate-independent water security.

The project commenced with a comprehensive exploration of viable alternatives for the responsible management of the recycled water from the Harvey Fresh processing plant. Multiple avenues were considered, each rigorously evaluated for feasibility, environmental impact, and sustainability. These options included:

Disposal to an Ocean Outfall: This approach would involve the release of treated water into the ocean, providing a seemingly straightforward solution. However, environmental concerns and regulatory complexities posed significant challenges.

Disposal to the Diversion Drain: Diverting the treated water to a local drainage system offered some logistical advantages. Nevertheless, potential downstream impacts and compliance issues required careful consideration.

Trucking: Transporting the recycled water to designated locations appeared as a plausible choice, but this method presented logistical challenges, including cost-effectiveness and traffic-related issues.

Injection into the Piped Network: Incorporating the treated water into the existing piped network was explored as a means of efficiently distributing the resource. However, infrastructure adaptations and water quality considerations require thorough evaluation.

Disposal to the Harvey River: This option involved releasing the treated water into the nearby Harvey River, which warranted meticulous examination due to its potential influence on the river ecosystem and downstream users.

In light of these considerations, Harvey Water, guided by its commitment to responsible stewardship of water resources and its dedication to innovative solutions, formulated a proposal that integrates slight process modifications, UV treatment, and chlorination. These enhancements are meticulously designed to maximise the removal of nutrients, coliforms, phosphate, and E-Coli from the recycled water, while concurrently striving to achieve water quality that closely mirrors that of the Harvey Dam. It is important to emphasise that while this advanced treatment process is highly effective in addressing contaminants, it does not address salinity. Nevertheless, Harvey Water is resolutely confident that salinity levels in the recycled water will be naturally diluted to a degree that will not compromise water quality for irrigation or negatively impact the local environment.

The Harvey Dam, a crucial non-potable water storage facility, is set to play a pivotal role in the project's success. Treated water meeting stringent quality standards will be introduced into the dam, bolstering its capacity to store approximately 35,000 million litres of non-potable water over the course of an average year. The dam's water storage levels fluctuate from around 30,000 million litres at the end of the irrigation season (typically observed on the 30th of April each year) to approximately 50,000 million litres by mid-October. These fluctuations primarily result from surface inflow, driven by the Harvey and Wokalup catchments, with additional water imports from the Wellington Dam during the winter months, amounting to approximately 2,500-3,000 million litres.

Given the critical importance of maintaining water quality within the Harvey Dam, Harvey Water emphasises the implementation of ongoing water quality monitoring protocols. This meticulous oversight ensures that water quality remains consistent with established standards and safeguards against any unforeseen deviations.

2.2 Information and Consultation Process

Recognising the unique and sensitive nature of this project, Harvey Water is firmly committed to a comprehensive information and consultation process. This initiative seeks to empower the local community and engage with various stakeholders to ensure that all parties are well-informed and have the opportunity to seek clarifications and voice concerns. This proactive engagement underscores Harvey Water's commitment to transparency, responsible environmental stewardship, and community involvement.

2.3 Independent Review and Assessment

In pursuit of an objective and credible evaluation of the proposed project, Harvey Water has sought the expertise of Tessele, an independent and renowned authority in the field of water quality assessments, safety evaluations, and environmental impact analyses. Tessele's involvement bolsters the impartiality and professionalism of this assessment, providing an additional layer of rigor to the project's scrutiny.

2.4 Report Overview

This report, commissioned by Harvey Water and prepared by Tessele, encompasses a comprehensive examination of the proposed project's background, methodology and the critical aspects of water quality and safety. The report unfolds as follows:

Background to the Project: This section provides an overview of the project's significance and contextualises its relevance within the changing climate conditions of the region.

Tessele's Credentials: A comprehensive profile of Tessele's credentials and expertise in water quality assessment, safety evaluation, and environmental impact analysis.

Assessment of Harvey Water's Methodology: An in-depth analysis of the methodologies and water quality predictions employed by Harvey Water, evaluating their feasibility, accuracy, and appropriateness in achieving project objectives.

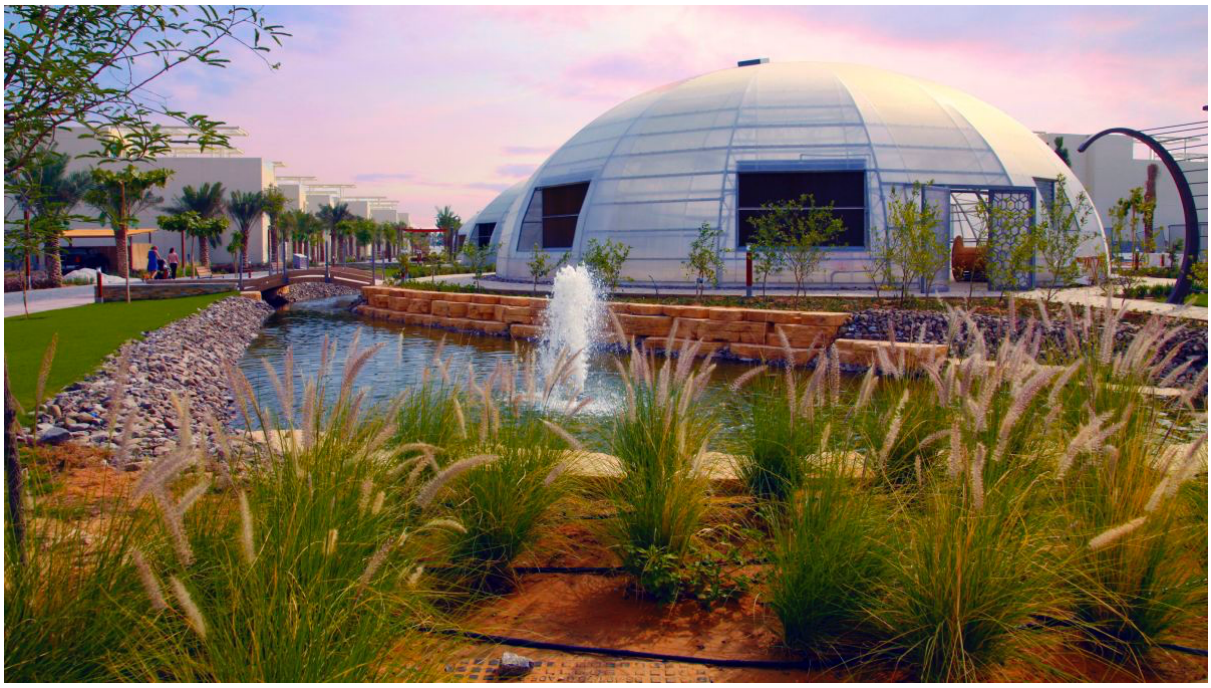
Utilising Recycled Water for Environmental Enhancement is a Vital Component of Climate Resilience in the Southwest, Supported by Expertise and Regulatory Endorsement

Opinion on Water Quality (WQ) Safety: Tessele's professional assessment and opinion regarding the safety and quality of the treated water to be introduced into the Harvey Dam.

This report encapsulates a multifaceted examination of a project that represents a ground-breaking approach in the realm of water resource management. It underscores Harvey Water's commitment to securing climate-independent water resources and serves as an invaluable resource for informed decision-making, transparent community engagement, and responsible stewardship of the environment.

3 Tessele's Credentials

Expertise in Sustainable Water Management: thinking global, acting local.



The greenhouses at the Sustainable City (Dubai): one of Tessele Consultant's projects.

The pivotal role of Tessele as the independent assessor for this comprehensive review cannot be overstated. Tessele is an esteemed authority in the field of water quality assessments, safety evaluations, and environmental impact analyses. Their credentials reflect a wealth of experience and a remarkable track record, underlining their impartiality, professionalism, and unwavering commitment to ensuring the highest standards in project assessment.

Extensive Experience in Water Quality Assessments: Tessele's extensive experience in conducting water quality assessments spans a wide spectrum of projects, ranging from urban water systems to large-scale environmental initiatives. Their expertise includes the evaluation of various water sources, treatment processes, and distribution networks. They are recognised for their meticulous approach to data collection and analysis, which yields precise insights into water quality and its implications.

Proven Track Record in Water Safety Evaluations: Safety evaluations form an integral part of Tessele's portfolio. They have a proven track record of assessing the safety and reliability of water treatment and distribution systems, ensuring that projects adhere to the highest safety standards. Their evaluations encompass risk assessments, hazard analyses, and safety protocol reviews, providing valuable insights into potential safety concerns and mitigation strategies.

Environmental Impact Analysis Expertise: Tessele's proficiency in environmental impact analysis is a cornerstone of their credentials. They have played a pivotal role in assessing the ecological implications of various projects, ensuring that environmental sustainability remains a top priority. Their assessments encompass ecosystem evaluations, habitat assessments, and water resource impact analyses, contributing to responsible environmental stewardship.

Impartiality and Professionalism: Tessele's reputation for impartiality and professionalism in their assessments is highly regarded in the industry. They approach each project with an unwavering commitment to objectivity, ensuring that their findings are based on rigorous scientific methodologies and free from bias. Their ethical standards and dedication to excellence underscore the credibility of their assessments.

Commitment to Industry Best Practices: Tessele's commitment to industry best practices is evident in its adherence to the latest standards, regulations, and guidelines governing water quality, safety, and environmental impact assessments. Their assessments are not only robust but also align with the evolving landscape of best practices in the field.

Tessele's credentials as an independent assessor for this project reflect their profound expertise, unwavering commitment to excellence, and track record that exemplifies their dedication to ensuring the highest standards of water quality, safety, and environmental sustainability. Their involvement in this assessment reaffirms the integrity and credibility of the project's evaluation process.

3.1 Recent projects developed by Tessele in Australia

Bio-Resource Recovery Centres of Excellence Project – Australian Meat Processor Corporation | 2022 – present | Australia | Project Director. Fabiana led a feasibility study and engineering design of the Bio-Resource Recovery Centres of Excellence project incorporating water recycling, biofertiliser, and anaerobic digestion.

Anaerobic Digestate into Biofertiliser | Yelverton Bio Industries | 2020 | WA | Project Director. Fabiana conducted feasibility studies and a business case for biomass anaerobic digestion into fertiliser, including ARENA application.

Meat Industry Biogas | Harvey Beef | 2016 - 2019 | WA | Project Director. Fabiana evaluated meat industry biogas technology, visiting 10 AD plants across 7 European countries. She conducted a feasibility study, concept design and business case for co-digestion biogas, wastewater and solid wastes.

Water Recycling | Prime Meat Co | 2020 | WA | Project Director. Fabiana designed the wastewater treatment plant and the Anaerobic Digestion system for the solid waste streams.

Pre-Feasibility | Craig Mostyn Group | Australia | Project Director. Fabiana carried out a pre-feasibility study for a combined biogas production facility, including wastewater and solid wastes.

Biosolids Upgrade Stage 1 – Australian Meat Processor Corporation | 2022 – 2023 | Australia | Project Director. Fabiana was the Project Director for the pre-feasibility study of biofertiliser production from the red meat industry anaerobic digestate.

Bio-Resource Recovery Centre Pre-FID Engineering Services– V&V Walsh | 2023 – present | WA | Project Director. Fabiana is the Project Director for Engineering Services to assist V&V Walsh with the

Financial Investment Decision for a Bio-Resource Recovery Centre, involving anaerobic digestion, wastewater treatment for recycling and biofertiliser.

Digital Tool - Bio-Resource Recovery | Australian Meat Processor Corporation | 2020– 2022| Australia | Project Director. Fabiana developed a digital model for the red meat industry to improve waste management sustainability.

Bio-Resource Recovery Centre FEED – Bindaree Food Group | 2023 - present | NSW | Project Director. Fabiana led the Bio-Resource Recovery Centre FEED for Bindaree Food Group, incorporating water recycling, biofertiliser, anaerobic digestion and CO2 recovery.

Circular Economy CSBP Project | Wesfarmers Chemicals and Fertilisers | 2020 - 2022 | WA | Technical Advisor. Fabiana developed a circular framework, that addressed regulatory barriers and a circular approach (water recycling, energy recovery, solids management).

Circular Economy Approach Renewable Energy Assessment - Goulburn Valley Water | 2023 | VIC | Project Director. Fabiana assisted GVW in the Circular Economy Strategy Stage 1 project, by assessing the current biogas contract, identifying renewable energy goals, evaluating local industries for co-digestion feedstock, conducting a water and energy balance, and outlining the Stage 2 scope.

4 Assessment of Harvey Water's Methodology

In the intricate landscape of water resource management, the efficacy of any proposed methodology is paramount. Tessele's rigorous evaluation of Harvey Water's methodology has shed light on the merits of the project, endorsing its viability and robustness. The examination not only underscores the soundness of the approach but also elucidates the inherent potential of key interventions, such as UV treatment and chlorination, in achieving the coveted water quality enhancements.

Methodology's Sound Foundation: Harvey Water's methodology serves as the cornerstone of the project's success. Tessele's in-depth analysis has reaffirmed the foundation's soundness, confirming that it is grounded in a thorough understanding of water treatment principles and best practices. The methodology reflects meticulous attention to detail, encompassing every facet of water quality enhancement, from contaminant removal to the preservation of aquatic ecosystems. Its comprehensive nature aligns seamlessly with the project's overarching objectives.

UV Treatment and Chlorination's Integral Role: Among the pivotal measures within the proposed methodology, UV treatment and chlorination occupy a central role. Tessele's assessment acknowledges the well-founded nature of these interventions. UV treatment, with its ability to target microorganisms and contaminants at the molecular level, stands as a testament to modern water treatment technology's effectiveness. Likewise, chlorination, a tried-and-tested method for disinfection, serves as a robust line of defence against harmful pathogens.

Achieving Targeted Water Quality Improvements: The core of Harvey Water's project revolves around achieving targeted water quality improvements. Tessele's evaluation affirms that the chosen methodology and water quality modelling possess the inherent potential to realise these improvements. The strategic integration of UV treatment and chlorination is anticipated to yield water quality that closely aligns with the standards set for the Harvey Dam. This alignment is a testament to the foresight embedded in the project, ensuring that the treated water meets stringent quality criteria.

Tessele's assessment of Harvey Water's methodology is a resounding validation of their viability and robustness. The methodology's solid foundation and the central role played by UV treatment and chlorination collectively contribute to the project's credibility. Tessele's findings serve not only as an endorsement of the project's approach but also as a testament to the responsible and informed decision-making that underpins it.

5 Water Quality Safety

In the realm of water resource management, the assurance of water quality safety is an uncompromising priority. In this context, Tessele's assessment is unequivocal: the treated water, upon its introduction into the Harvey Dam, is regarded as inherently safe and consistent with stringent quality standards. This assessment is not a mere formality; it is a culmination of meticulous analysis, rigorous evaluation, and a commitment to ensuring that the community receives water resources that are dependable, secure, and free from compromise.

Stringent Quality Standards Adherence: The foundation of Tessele's assessment lies in the unwavering commitment to adhere to stringent quality standards. Water quality, a non-negotiable aspect of any responsible water management project, has been at the forefront of Harvey Water's approach. Every facet of the water quality framework has been meticulously examined, from chemical composition to microbial content, ensuring alignment with recognised standards and guidelines. Tessele's assessment is, in essence, a seal of approval that attests to the project's adherence to these exacting benchmarks.

Safety as the Cornerstone: Safety is not a mere aspiration but the cornerstone of Tessele's assessment. The assurance of safe water resources is fundamental to the well-being of the community and the preservation of the environment. Tessele's endorsement of the treated water's safety is founded on the principle that public health and environmental sustainability must always remain at the forefront of water management practices. The implementation of UV treatment and chlorination, endorsed by Tessele, is a testament to the project's commitment to safety.

Community Confidence and Responsible Environmental Stewardship: The implications of Tessele's positive assessment extend beyond the technical realm. It resonates with the broader community as a vote of confidence in the project's safety and environmental conscientiousness. It serves as a

testament to the responsibility and ethical considerations that underpin Harvey Water's initiative. The project not only enhances water quality but also elevates the cause of responsible environmental stewardship, reinforcing the critical interplay between sustainable water supply and the preservation of our natural surroundings.

A Valuable Resource for the Community: Tessele's affirmative opinion on water quality safety is not merely a professional judgment; it is a validation of a project that stands as a beacon of innovation and responsibility in water resource management. This assessment lends credence to the project's feasibility and safety, reinforcing its potential to not only elevate water quality but also to champion responsible environmental stewardship. The report's slated publication on the Harvey Water website underscores the commitment to transparency, community engagement, and the pivotal role this initiative plays in securing a sustainable water supply for the region.

This report is more than just words on paper; it is a testament to the unwavering commitment to the community's well-being and the responsible management of our precious water resources.

5.1 Effective Salinity Management for Water Quality Assurance

Harvey Water has implemented a robust and proven strategy to manage salinity levels effectively between Wellington Dam and Harvey Dam, ensuring the quality and suitability of the water for various purposes. This strategy involves careful control of the water intake from Wellington Dam, the primary source of water supply for the region. The 13-kilometre stretch between Wellington Dam and Burekup Weir, which provides water for the channel system, benefits from a natural influx of fresh rainwater during the winter months, naturally diluting the salinity of the water.

The continuous monitoring of salinity levels is a key aspect of this strategy and is facilitated by automated devices. One of these devices is strategically positioned near the Sandalwood Rd pump station in Benger, referred to as Benger Dam, ensuring round-the-clock surveillance of salinity levels. Additionally, three monitoring devices are strategically situated within Harvey Dam, enabling the collection of salinity measurements on a weekly basis.

This meticulous approach to water quality management extends to the treated water from Harvey Fresh. Just as the salinity of water from Wellington Dam is carefully regulated, the treated water from Harvey Fresh will be managed in the same diligent manner. This consistency in approach ensures that the treated water, despite its source, meets the established quality standards.

To maintain the desired water quality, a predetermined limit for acceptable salinity levels within the dam is set at 450 mg/L Should salinity levels approach the cautionary threshold of 350 mg/L, Harvey

Water takes precautionary measures, which may include reducing the volume of water drawn from Wellington Dam to prevent any adverse impacts on water quality.

Currently, the salinity level in Harvey Dam stands at a comfortable 270 mg/L, well within the acceptable range. This serves as a testament to the efficacy of the ongoing strategy, which not only safeguards the quality of water but also underscores Harvey Water's commitment to responsible water management practices.

5.2 How is the water purified?

Chemistry plays a pivotal role within various wastewater treatment systems, ensuring the efficient removal of solid particles and contaminants. In a drum screen treatment system, wastewater undergoes chemical reactions where coagulants and flocculants are added to facilitate the aggregation of suspended solids. Coagulants neutralise particle charges, allowing them to cluster, while flocculants aid in forming larger, easily removable flocs. pH adjustments cis used to optimise these processes. The drum screen acts as a physical barrier, capturing larger particles, resulting in cleaner wastewater by removing suspended solids, grit, debris, fats, oils, grease, and inorganic solids.

The equalising tank treatment system focuses on balancing and stabilising incoming wastewater composition. Various wastewater sources are mixed to create a consistent influent. This process mitigates fluctuations in pH, temperature, and chemical composition. Achieving equilibrium readies the wastewater for downstream treatments like biological or chemical processes, where precise chemical reactions eliminate contaminants and ensure treatment efficiency. The equalising tank's chemistry is crucial in controlling flow equalisation, hydraulic load equalisation, pH, and temperature, reducing shock loads.

Dissolved Air Flotation (DAF) treatment relies on chemistry to remove suspended solids and contaminants. Air is dissolved into wastewater under high pressure, releasing microbubbles that attach to solids and hydrophobic contaminants, making them buoyant. Coagulants, flocculants, and pH adjustments enhance particle aggregation. Buoyant particles form a froth or sludge layer at the tank surface, which is skimmed off, effectively separating, and removing contaminants. DAF's chemistry is highly effective at clarifying wastewater with suspended solids, making it suitable for further treatment or safe discharge.

In Sequencing Batch Reactor (SBR) treatment, a series of controlled chemical reactions occur. Microbial activity breaks down organic matter, producing carbon dioxide, water, and biomass. Phases like filling, aeration, settling, and decanting trigger chemical reactions using coagulants, flocculants, and pH adjusters. These chemicals aid in removing suspended solids, nutrients, and other pollutants to meet environmental standards. SBR's intricate chemistry ensures effective wastewater purification, removing organic matter, nutrients, pathogens, heavy metals, and various compounds, contributing to a cleaner environment.

5.3 Regulatory Approvals and Alignment with DWER's Climate-Resilient Water

The Harvey Water recycled water project, a critical undertaking aimed at enhancing water quality and sustainability in the region, has achieved a significant milestone by securing the requisite approvals from the Department of Water and Environmental Regulation (DWER) and the Department of Health (DOH). These approvals underscore the project's rigorous adherence to environmental and health standards, demonstrating its unwavering commitment to responsible practices. Moreover, this

project seamlessly aligns with DWER's strategic vision to expand the sources of climate-independent water throughout Western Australia. This alignment reinforces the project's pivotal role in fortifying the region's resilience against the challenges posed by climate change, ensuring a sustainable and secure water supply for the community.

6 Examples of Recycled Water Schemes

Sustainability and resource optimisation have become paramount considerations worldwide. Much like the Harvey Water project's dedication to securing climate-independent water resources and responsible environmental stewardship, numerous initiatives across the globe have embraced the ethos of water recycling and reuse. These innovative projects, hailing from diverse corners of the world, share a common mission: to harness the power of recycling technology and conservation practices to enhance water quality, alleviate water scarcity, and foster a more sustainable future. In this global tapestry of water recycling initiatives, each project serves as a testament to the collective commitment to responsible water management, echoing the principles championed by Harvey Water in its quest for climate-resilient water resources.

NEWater Program (Singapore): Singapore's NEWater program is a flagship water recycling initiative that treats wastewater to produce high-quality reclaimed water, utilised for industrial and potable purposes, significantly reducing freshwater demand.

Groundwater Recharge (California, USA): California employs groundwater recharge projects that treat and recycle stormwater and treated wastewater to replenish aquifers, enhancing water resources and sustainability.

Water Recycling in Western Corridor (Australia): The Western Corridor Recycled Water (WCRW) Project (SE Queensland) is Australia’s largest recycled water project and is the third largest advanced water treatment project in the world. It will deliver more than 200 km of pipeline and three advanced water treatment plants. Australia's Western Corridor Recycled Water Scheme treats and recycles wastewater for various purposes, reducing strain on potable water sources and promoting responsible water management.

Desalination in Israel: Israel utilises extensive seawater desalination projects along its coastline, recycling seawater into freshwater to address water scarcity challenges.

Water Reclamation in Windhoek (Namibia): The city of Windhoek in Namibia has a long-standing water reclamation project that treats wastewater to produce potable water, ensuring a sustainable water supply.

Toilet-to-Tap in Orange County (California, USA): Orange County's wastewater purification system purifies sewage water to near-drinking water quality, promoting water recycling for potable purposes.

Water Recycling in Cloud Forests (Costa Rica): In Costa Rica's cloud forests, fog-catching nets capture moisture from fog, recycling it as a vital water source for local ecosystems.

Agricultural Wastewater Reuse (India): In India, agricultural wastewater is treated and recycled for irrigation, reducing the burden on freshwater sources and promoting sustainable farming practices.

Cape Town's Direct Potable Reuse (South Africa): Cape Town implemented a direct potable water reuse project that treats wastewater to meet drinking water standards, mitigating water scarcity challenges.

The Sustainable City (Dubai, UAE): Dubai's Sustainable City is an innovative urban development designed with sustainability at its core. The project incorporates various water management strategies to reduce water consumption and promote sustainability in a desert environment. The Sustainable City employs advanced greywater recycling systems that treat and reuse wastewater from households and businesses for irrigation and non-potable uses, reducing freshwater demand.

These diverse water recycling projects demonstrate innovative approaches to conserving and reusing water resources, addressing water scarcity, and promoting sustainable water management practices globally.

7 Conclusions

Based on our comprehensive assessment of the Harvey Water Recycled Water Management Project, it is evident that this initiative exemplifies responsible environmental stewardship and a resolute commitment to enhancing water quality. The project's dedication to transparent practices fosters community confidence, emphasising its critical role in addressing the challenges posed by a changing climate.

Harvey Water's meticulously devised methodology and framework have proven their viability and robustness. With a solid foundation grounded in water treatment principles and best practices, the project exhibits a comprehensive and informed approach to water quality enhancement. The precision of its technical capabilities further enhances its credibility, empowering stakeholders with accurate insights for decision-making and resource allocation.

Central to the project's success is the strategic incorporation of UV treatment and chlorination, tried-and-tested interventions that are integral in safeguarding water quality. The potential for these measures to achieve targeted water quality improvements closely aligns with the project's overarching objectives.

Furthermore, the proactive consideration of environmental impact and the preservation of aquatic ecosystems underscores the project's commitment to holistic sustainability. By adhering to stringent quality standards, the initiative not only ensures safe and reliable water resources but also contributes to responsible resource management.

With the salinity management strategy, as well as the successful incorporation of treated water from Harvey Fresh into the project's framework, Harvey Water has demonstrated the adaptability and scalability of its approach. This adaptability opens the door for the project to expand its horizons beyond Harvey Fresh, benefiting the wider community. By increasing the availability of climate-independent water resources, the project can fortify the region's resilience in the face of climate challenges.

Moreover, the project has successfully obtained the necessary approvals from both the Department of Water and Environmental Regulation (DWER) and the Department of Health (DOH). These approvals signify the project's compliance with stringent regulatory standards and its commitment to adhering to responsible environmental practices. Furthermore, it aligns seamlessly with DWER's commendable drive to augment the sources of climate-independent water throughout Western Australia, reinforcing the project's significance in bolstering the region's resilience in the face of evolving climate dynamics.

Therefore, it is our strong recommendation that the Harvey Water Recycled Water Management Project be implemented. The benefits of securing climate-independent water resources and ensuring water quality enhancement are undeniably vital for the community's welfare. In doing so, Harvey Water will not only address immediate water resource needs but also contribute significantly to the sustainable future of the Southwest region.