When Cracks Appear: Resilience for Gympie

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Century-old, failing infrastructure, and the resilience behind regional water supply

Abstract

The Jones Hill Water Treatment Plant in Gympie, with origins tracing back to 1898, has continuously delivered drinking water to the community for over a century. The current treatment plant configuration, including the sedimentation tank poured in the early 1960s, remains in daily use — but aging infrastructure presents mounting operational challenges.

This paper shares how operators managing deteriorating structures, including extensive cracking, outdated systems, and limited redundancy, became central to driving strategic investment and long-term planning. It highlights the interplay between on-the-ground experience and executive action, telling the story of how a legacy asset's decline catalysed a system-wide response through Gympie's Water Security Strategy (WSS).

Introduction

The Jones Hill Water Treatment Plant (Gympie WTP) is part of the region's identity, supplying water to the town for over 100 years (Figure 1).

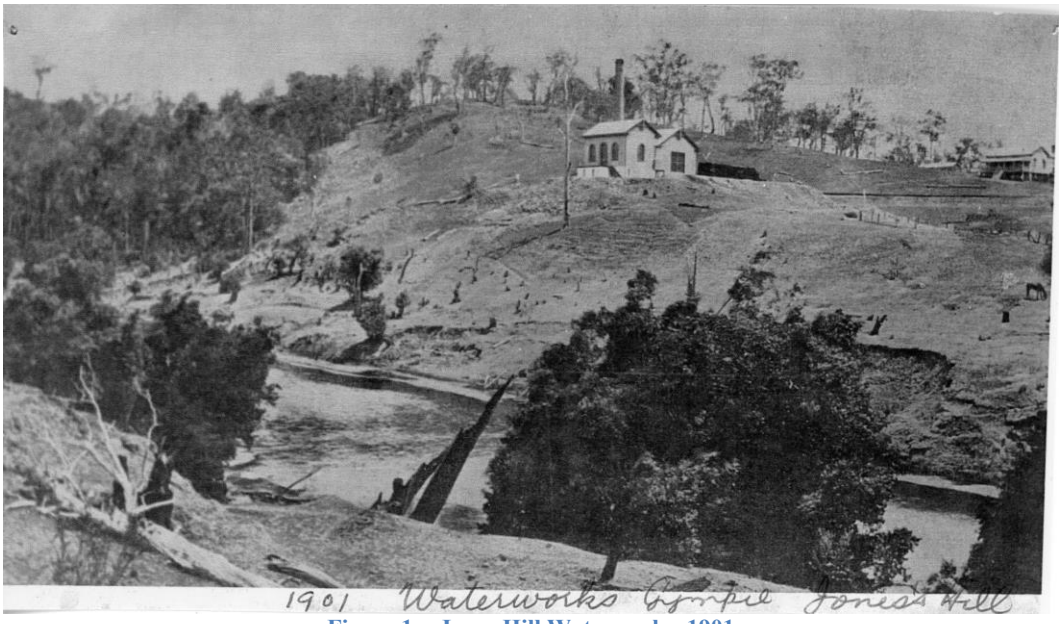

Figure 1 - Jones Hill Waterworks, 1901

Through decades of floods, droughts, and regulatory changes, operators kept the plant compliant. They adapted to its quirks, worked within its limits, and found ways to keep water flowing to the community. But like all aging assets, the signs of wear became harder to ignore.

In the early 1960s, the sedimentation tank was poured (Figure 2). It was rectangular, robust, and built to last — or so it seemed. At the time, it was a proud example of engineering for the needs of the era. What it didn't have were features we now consider essential: no redundancy, no bypass, no isolation valves, no drainage. The treatment process relies on this single tank. If it fails, the town's drinking water supply stops.

Figure 2 - Construction of sedimentation tank, early 1960s

Discussion

Operator Observations and Daily Challenges

Every operator has a mental checklist of the plant's "personality" — the quirks, the old equipment that needs coaxing, the things you work around without thinking. At Gympie WTP, that list is long:

- Sedimentation tank scraper failures — can't retrofit due to rectangular design.
- PAC dosing system offline — badly designed, prone to blockages.
- Belt press aging and unreliable.
- Clear water and backwash tanks undersized, limiting flexibility during peaks.
- No drainage or isolation for the sedimentation tank, meaning solids must be released to land during cleaning.

And on that list, for years, cracks in the tank wall. Operators kept an eye on it. There was no sign of tank movement. It was another job on the list. They didn't think it was the worst thing on site, they knew it was there, but it didn't stop them doing their job.

The Turning Point: From Repair to Replace

While Council had long recognised the need for a new water treatment plant in its future capital plans, the severity of the sedimentation tank's condition — and the fact it was a single point of failure — was not fully understood. The cracks had been known about for years. There was no obvious signs of tank movement, and it was assumed repairable.

That changed when GHD, who were developing the Water Security Strategy, were engaged to carry out a detailed inspection in May and July 2024. They assessed the significant diagonal shear cracking on the northern wall, damaged joints, and other structural defects. The findings raised serious concerns about potential localised or global failure. Following the inspection, GHD prepared the *Gympie WTP Sedimentation Tank Options Report*. Four possible pathways were outlined: do nothing, remediate, install a new process, or construct a new WTP. At that point, remediation still seemed possible — but the tone had shifted from "fix it when we can" to "this could fail."

To confirm the findings, ADG Engineers undertook an independent inspection in October 2024. Their structural assessment, supported by crack mapping and analysis, concluded the extent and nature of the cracking indicated serious and progressive structural distress (Figure 3). ADG's view was unequivocal: repair would not provide a reliable long-term solution, and full replacement of the sedimentation tank — the plant's single point of failure — was the only prudent course of action.

These independent reports converged on the same point: the tank's structural integrity was compromised, rehabilitation was impractical, and replacement was essential.

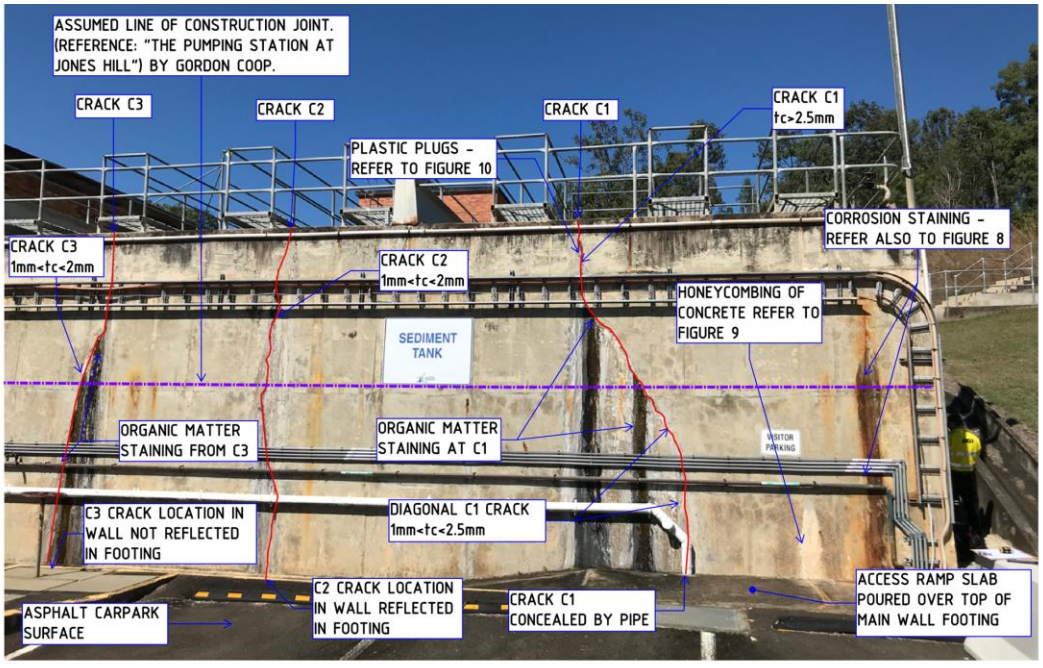

Figure 3 - Overview of cracking on northern wall

Risk Mitigation and Emergency Planning

The move from “repair” to “replace” didn’t mean operators could stop using the tank. It still had to function safely until a replacement was built. This meant urgent mitigation:

- Crack monitoring and survey regime.
- Exclusion zone for staff safety.
- External buttresses installed along the most vulnerable walls (Figure 4)
- Emergency bypass design from flocculation to filtration — once considered unworkable.

Figure 4 - Sedimentation tank buttressing

Operators were central to these measures — guiding engineers to safe access points, helping plan bypass routing that worked with existing plant layout, and keeping a close watch on daily operations. They weren’t just keeping it running, they were actively shaping the response.

These measures were never going to remove the single point of failure risk — we still needed a permanent solution.

From Risk to Strategy

While the cracks had the spotlight, the bigger story was resilience. At the same time as these urgent works, Council was still developing the Water Security Strategy (WSS) — a long-term plan to ensure sustainable growth, system resilience, and fit-for-purpose infrastructure for the Gympie region (Figure 5).

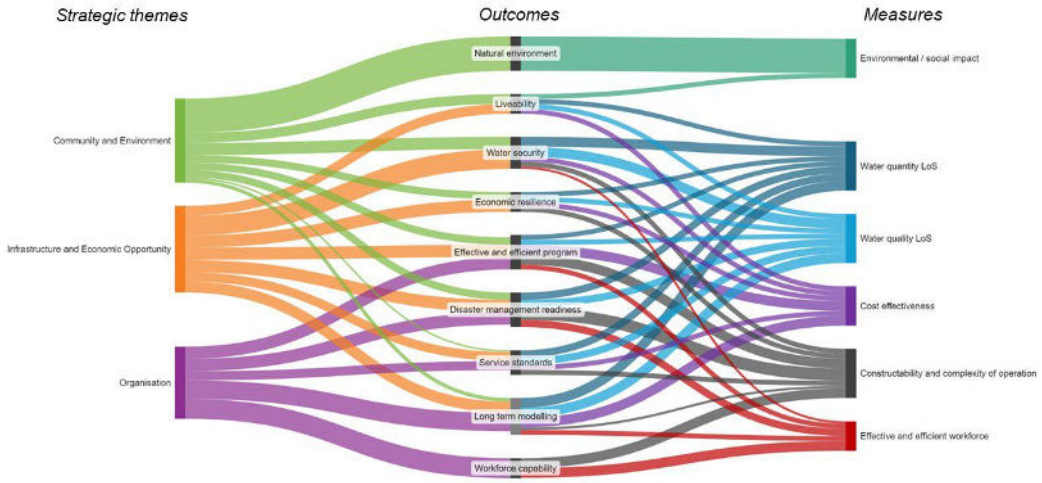

Figure 5 - Strategic themes and outcomes from Water Security Strategy

The findings from the sedimentation tank inspections were incorporated into the WSS, elevating the tank from an operational hazard to a priority strategic project. The WSS provided the framework to progress from reactive maintenance to planned, staged capital investment.

The WSS set the long-term investment priorities, then Gympie Water Resilience Augmentation Project (GWRAP) was then created to deliver them. Within GWRAP, the sedimentation tank replacement was designated Separable Portion 1 (SP1).

Design considerations for SP1 include:

- Redundancy, isolation and drainage for safe maintenance.
- Enhanced sludge management.
- Integration with emergency bypass and automation.

Operators have stayed part of the process — reviewing designs, providing site insights, and ensuring that what gets built will work in practice, not just on paper.

Funding and the Future

In July 2025, the Queensland Government committed $42 million to deliver SP1 and other priorities.

This funding secures a replacement for the 1960s tank — modern, redundant, and resilient. The crack will finally disappear, but the lessons will remain: that early observation, decisive escalation, and genuine collaboration can turn a local risk into a fully funded solution.

Conclusion

The Gympie WTP story is familiar across the industry: aging infrastructure, limited redundancy, and operator workarounds that sustain supply for decades.

For years, the sedimentation tank cracks were monitored and managed. Independent inspections revealed the true extent of structural failure risk, shifting the mindset from "patch and repair" to "replace and secure."

Operators, managers, engineers, and government all played vital roles, but it was frontline vigilance that first kept the plant safe — and ultimately helped secure a resilient future.

The cracks were more than a defect: they became the turning point from reactive maintenance to proactive resilience, ensuring safe, secure water for the Gympie community for decades to come.

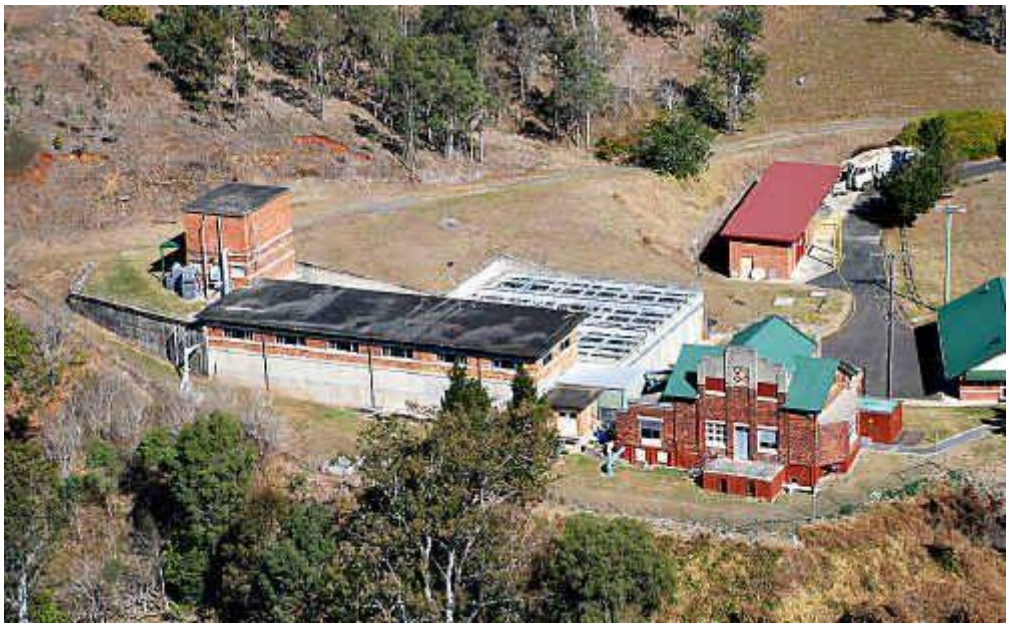

Figure 6 - Jones Hill Water Treatment Plant

Acknowledgements

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References

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