

TRANSFORMING WATER AND SEWER MAINTENANCE

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ABSTRACT

Gympie Regional Council is moving from a reactive to a proactive maintenance approach using risk identification, advanced analytics, and a structured IPSECA model to prevent failures before they happen.

Key Points

- Pioneering a shift in how water infrastructure is managed by not waiting for emergencies but staying ahead of them
- Leveraging data and real-time monitoring to make precise, risk-adjusted decisions
- Embedding a disciplined, repeatable maintenance process that ensures long-term reliability and efficiency

Gympie Regional Council's primary maintenance trigger has historically been reactive, responding to failures across the network such as hydrant bursts, sewer blockages, and pipeline leaks. This approach is now being fundamentally redefined. Rather than reactively responding to failures, we are shifting towards **early risk identification**, treating emerging defects as actionable signals before service is impacted.

Using historical failure data and real-time monitoring, we proactively identify high-risk assets across hydrants, sewer networks, and critical pipelines. This data-driven approach enables targeted, risk-based prioritisation, ensuring resources are directed where they deliver the greatest impact. The result is a measurable reduction in emergency callouts, improved service reliability, and a stronger, more proactive maintenance culture.

From identification to consistent delivery, we apply a structured end-to-end process through the IPSECA model. Risks are first identified and assessed for criticality, then planned with all required resources and parts. Work is scheduled based on priority and operational impact, before being executed safely by dedicated teams. Upon completion, outcomes are analysed to refine future identification and planning.

By integrating early risk identification with a disciplined IPSECA framework, Gympie Regional Council will establish a repeatable and scalable maintenance model. This approach ensures risks are identified early, systematically planned and executed, and continuously improved, transforming maintenance from a reactive function into a proactive, reliability-driven strategy.

1.0 INTRODUCTION

Local government utilities continue to face increasing demands on infrastructure, rising customer expectations, aging assets, and constrained financial resources. Like many councils, our organisation has experienced growing pressure on both the network and workforce while funding has struggled to keep pace with inflation and increasing service demands.

To address these challenges, a comprehensive review of operational practices, expenditure, workforce utilisation, maintenance delivery, and data management was undertaken. The review identified significant opportunities to improve efficiency, reduce reliance on reactive maintenance, strengthen internal capability, and maximise the value delivered from existing resources.

Through a combination of strategic investment, proactive maintenance programs, digitisation, automation, and improved data management, significant progress has been made in transitioning from a reactive maintenance model to a planned and preventative approach. This paper outlines the challenges identified, the initiatives implemented, and the outcomes achieved to date.

Understanding the Challenge

The primary challenge facing the organisation was simple: how can more be achieved with limited resources?

To answer this question, a detailed review of operational expenditure was undertaken. Maintenance and operational spending was analysed over a three-year period to establish baseline expenditure patterns, identify inefficiencies, and determine opportunities for improvement.

The review highlighted several key findings:

- Significant expenditure was being directed towards hired plant and equipment that could be more cost-effectively leased or acquired through fleet replacement programs.
- Maintenance expenditure was comparatively low when benchmarked against similar local government authorities despite managing a substantial asset portfolio.
- The operational workforce was smaller than comparable organisations.
- There was a heavy reliance on external contractors, particularly for electrical and mechanical works associated with water and wastewater treatment facilities.
- Maintenance activities were predominantly reactive, with limited preventative maintenance programs in place.
- Asset and maintenance data contained gaps, inconsistencies, and inaccuracies that reduced confidence in decision-making.
- There was a disconnect between operational data collection requirements and field-based activities, limiting the quality and completeness of information captured.

Collectively, these issues contributed to increased costs, reduced operational efficiency, and limited visibility of asset condition and performance.

Transitioning from Reactive to Proactive Maintenance

One of the most significant findings from the review was the cost differential between reactive and planned maintenance activities.

Analysis demonstrated that reactive maintenance can cost between two and five times more than planned preventative maintenance. Reactive works frequently result in:

- Emergency procurement and rushed purchasing decisions.
- Increased material and delivery costs.
- Overtime, call-out fees, and after-hours labour costs.
- Staff fatigue and reduced workforce availability.
- Temporary or short-term repairs rather than sustainable solutions.

In contrast, planned maintenance allows for improved resource allocation, better procurement outcomes, enhanced work quality, and opportunities to address root causes rather than symptoms.

Recognising these benefits, a deliberate shift towards proactive maintenance became a key organisational objective.

Building Internal Capability

The expenditure review also identified opportunities to redirect existing operational expenditure into long-term capability improvements.

Business cases were developed to replace regularly hired plant and equipment with owned fleet assets. By redirecting funds previously spent on equipment hire, the organisation was able to acquire assets that provide ongoing operational value while reducing long-term costs.

A similar approach was applied to outsourced maintenance activities. Analysis of contractor expenditure revealed that annual spending on external electrical and mechanical services was sufficient to support the recruitment of permanent specialist positions.

As a result, business cases were developed to establish in-house electrical and mechanical capability. These positions will not only reduce contractor dependence but also provide additional capacity to undertake proactive maintenance activities across treatment facilities.

This approach demonstrates how existing expenditure can be repurposed to create sustainable operational improvements without requiring additional funding.

Implementing the IPSECA Maintenance Framework

A key component of the maintenance transformation has been the implementation of the IPSECA process.

The IPSECA framework provides a structured approach to managing maintenance activities from initiation through to completion, regardless of whether the work is reactive, proactive, or preventative in nature.

The framework establishes clear responsibilities, improves visibility of work progression, and provides greater control over maintenance delivery. By defining each stage of the process and the role of each participant, the organisation is better positioned to identify bottlenecks, address process failures, and continuously improve maintenance performance.

The framework has also provided the foundation for expanding preventative maintenance programs and supporting future in-house delivery of selected capital works activities.

Digitisation and Improved Data Management

Digitisation has played a significant role in improving operational efficiency.

Field crews were already equipped with tablet devices for work order management. Building upon this capability, existing paper-based forms were converted into digital formats that could be completed directly in the field.

This initiative has reduced administrative effort, improved accessibility of information, and increased consistency in data collection.

Data quality remains one of the most significant challenges facing the organisation. Historical records contained inaccuracies and missing information, limiting the ability to make informed asset management decisions.

Considerable effort has been invested in correcting historical records, improving asset information, and implementing processes to ensure future activities are captured consistently.

While significant progress has been made, ongoing improvement in data collection and reporting remains a critical focus area.

Automation and Process Efficiency

To maximise productivity without increasing staffing levels, extensive use of automation has been implemented.

Preventative maintenance programs have been configured to automatically generate work orders and assessment tasks through Power Automate. Service areas have been divided into sixteen operational zones, each linked to dedicated work packages covering activities such as:

- Sewer jetting.
- CCTV inspections.
- Hydrant inspection and testing.
- Manhole inspections.
- Valve exercising.
- Hydrant location and painting.

As work packages near completion, the system automatically generates the next package, ensuring a continuous workflow without manual intervention.

Completed inspections are automatically processed, with follow-up work orders generated for assets that fail condition assessments or performance tests. Notification workflows also ensure relevant stakeholders are alerted when water quality results require further investigation.

Additional automation has been developed to support wet weather response activities. Rainfall data is monitored automatically, and targeted inspections are generated when predefined rainfall thresholds are exceeded following designated dry periods.

These initiatives have significantly reduced administrative workload while ensuring preventative maintenance programs continue to operate efficiently.

Performance Monitoring Through Dashboards

Real-time dashboards have been developed to improve operational visibility and support decision-making.

The dashboards provide instant access to key operational metrics including:

- Workforce allocation and workload distribution.
- Daily work order creation and completion rates.
- Progress against preventative maintenance programs.
- Outstanding maintenance activities.
- Work package execution history.

By presenting information visually, dashboards allow managers and supervisors to quickly identify emerging issues and make informed decisions without extensive manual reporting.

Workforce Engagement and Change Management

Successful transformation requires more than systems and processes; it requires people.

Introducing new technologies, processes, and expectations inevitably creates challenges and can contribute to change fatigue if not managed effectively.

Throughout the transition, emphasis has been placed on engaging field crews, seeking feedback, and continually refining processes based on operational experience.

The organisation has benefited from a supportive workforce that has embraced many of the changes implemented. While improvements are still required, the positive response from staff has been instrumental in achieving progress.

Ongoing communication, consultation, and collaboration will remain essential as the organisation continues its journey towards a proactive maintenance culture.

Conclusion

The transition from reactive to proactive maintenance is a long-term journey rather than a single project.

By critically reviewing expenditure, building internal capability, improving data quality, implementing structured maintenance processes, embracing digitisation, and leveraging automation, the organisation has made significant progress despite limited financial resources.

Preventative maintenance activity has increased substantially, operational efficiency has improved, and the foundations have been established for sustainable long-term asset management.

While there is still work to be done, the results achieved to date demonstrate that meaningful improvement is possible through innovation, discipline, and a commitment to continuous improvement. The organisation is moving steadily towards a more proactive, efficient, and sustainable maintenance model capable of delivering improved outcomes for both the community and the workforce.