UrbanUtilities

Gatton Sewage Treatment Plant Compliance Project

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ABSTRACT

The Gatton Sewage Treatment Plant (STP), operated by Urban Utilities in the Lockyer Valley, treats domestic and industrial wastewater through a conventional process including trickling filters, cold digesters, and polishing lagoons. Its Environmental Authority licence imposes strict conditions on discharge to Lockyer Creek: ammonia below 0.9 mg/L and a minimum creek flow of 5 ML/day at the time of release.

When Urban Utilities lost a major recycled water customer in May 2024, surplus effluent accumulated and non-compliant releases followed. In response, a cross-functional tiger team designed and implemented targeted operational improvements — including surface aerator installation, optimised waste activated sludge (WAS) wasting, dechlorination dosing, and a real-time creek flow monitoring model. Over an 18-month period, these measures returned the plant to consistent compliance. This paper documents those interventions and the broader lessons for managing ageing trickling filter plants under tightening regulatory conditions.

INTRODUCTION

Urban Utilities serves more than 1.5 million customers across South East Queensland, treating over 136,000 ML of wastewater annually across a network of plants of varying age, technology, and scale. The Gatton STP is a legacy facility whose trickling filter-based process, while reliable for standard wastewater treatment, offers limited control over the degree of ammonia oxidation under variable load or temperature conditions. For facilities like Gatton, regulatory compliance demands create operational responses rather than straightforward process control.

The plant's compliance strategy had historically relied on diverting all treated effluent to local recycled water customers — principally agricultural users — thereby eliminating the need for creek discharge altogether. This approach worked until the loss of the plant's primary customer in May 2024. Remaining customers could not absorb the effluent output; lagoons filled; and non-compliant releases to Lockyer Creek became unavoidable. An Incident Management Team (IMT) was activated on 14 May 2024, and an operational tiger team was formed to address the compliance gap without waiting for a capital solution.

THE COMPLIANCE CHALLENGE

The Environmental Authority (EA) licence governing the Gatton STP imposes two critical conditions on any release to Lockyer Creek: ammonia below 0.9 mg/L at the point of discharge in creek, and a minimum creek flow of 5 ML/day providing adequate dilution.

Trickling filters offer limited control over nitrification under variable load or temperature conditions. During cooler months and following rainfall events, ammonia concentrations pushed above the licence threshold. When that demand collapsed, the plant had no compliant discharge pathway. Repeated wet weather events across the Lockyer Valley in early 2024 had filled the water storages of all remaining recycled water customers simultaneously. The plant was producing 1.2 ML of effluent per day with nowhere for it to go.

THE TIGER TEAM RESPONSE

Urban Utilities responded by forming a cross-functional tiger team comprising operations specialists, process engineers, environmental advisors, and field technicians. The team's mandate was specific: implement operational measures capable of reducing effluent ammonia and enabling compliant creek releases, without major capital expenditure.

Aerator Installation

The single most impactful intervention was the installation of two surface aerators in the plant's polishing lagoons. Prior to installation, the polishing lagoons operated as quiescent ponds with limited dissolved oxygen — constraining active nitrification despite bacteria being present. A 3-phase aerator was already on site but required a generator of sufficient capacity; a second single-phase unit was sourced from Laidley. With RPEQ sign-off secured, both aerators were commissioned, dramatically increasing dissolved oxygen throughout the lagoon water column and enabling active nitrification to supplement the trickling filters. The result was consistent, measurable ammonia reduction — the highest-impact, lowest-cost intervention of the project.

Figure 1 — Effluent Release Calculator

Figure 2 — Close-up of aerator in lagoon

Optimised WAS Wasting

With reduced effluent volumes being diverted to customers, the hydraulic retention time through the system had changed — increasing nitrogen recycling from the cold digesters back through the lagoons. By increasing WAS wasting frequency and volume, the team reduced that internal load. The compounding benefit: lower nitrogen input to the trickling filters improved their performance, while reduced lagoon loading meant the aerators operated more efficiently. Higher transport costs were accepted as a necessary operational expense.

Dechlorination

Sodium metabisulphite (SMBS) dosing was introduced for dechlorination ahead of any creek release, ensuring residual chlorine — toxic to aquatic organisms — was neutralised before discharge. This reflected the IMT’s stated objective of minimising environmental harm, not simply meeting the letter of the licence.

Real-Time Creek Flow Monitoring

The tiger team developed a more sophisticated daily assessment model integrating upstream gauge stations on Lockyer Creek, recent rainfall data, and calibrated flow routing estimates. This gave operators greater confidence in release decisions, reduced overly conservative assessments, and improved identification of compliant release windows. The model incorporated a feedback loop comparing predictions to actual gauge readings to progressively improve accuracy.

Figure 3 — Gatton STP at dawn, showing primary clarifiers. Operators monitored lagoon levels and assessed release conditions before sunrise throughout the incident period daily.

SUMMARY OF INTERVENTIONS

The following table summarises the compliance issues identified, their root causes, and the operational responses implemented by the tiger team.

Issue	Root Cause	Operational Response
Surplus effluent / full lagoons	Loss of major recycled water customer	Tiger team established; storage audit and diversions actioned
Non-compliant ammonia levels	Trickling filter technology limits	2 surface aerators installed; WAS wasting frequency increased
Inconsistent creek releases	Creek flow < 5 ML/day threshold	Real-time creek flow model; daily go/no-go release decisions
Lagoon conditions	Low hydraulic turnover in polishing lagoons	Supplementary aeration; lagoon cleaning completed
Residual chlorine in creek releases	Residual chlorine toxic to aquatic organisms	SMBS dechlorination introduced ahead of creek release

RESULTS AND OUTCOMES

The combined effect of the four interventions was substantial. Over the 18-month period following tiger team activation, the Gatton STP returned to consistent compliance. The aerator installation delivered the most immediate and measurable improvement; the combination of WAS wasting optimisation, dechlorination dosing, and creek flow monitoring provided operational resilience against normal process variability.

KEY OUTCOMES

- 18 consecutive months of compliant operations — zero licence exceedances
- Ammonia consistently below the 0.9 mg/L licence threshold post-aerator installation
- All creek releases occurred only when creek flow exceeded 5 ML/day
- Aerator installation identified as the highest-impact, lowest-cost single intervention
- Continuous communication with stakeholders is invaluable
- Operational framework shared across Urban Utilities' Resource Recovery network

LESSONS LEARNT

- Single-pathway compliance strategies carry inherent risk. Treatment plants should be capable of meeting licence conditions through the treatment process — not solely through recycled water diversion or other demand-dependent mechanisms.
- Supplementary polishing lagoon aeration is a cost-effective and operationally straightforward means of improving ammonia removal at trickling filter plants.
- WAS wasting rates are often set and left unchanged. Regular review relative to current loading conditions yields compounding benefits throughout the treatment system.
- Real-time creek flow models improve compliance confidence and recover release opportunities lost to overly conservative assessments.
- Chemical treatment decisions should reflect holistic receiving water quality expectations — not only the specific licence thresholds. SMBS dechlorination reflects best practice regardless of whether it is explicitly required.
- Cross-functional tiger teams — empowered and tightly scoped — are highly effective for complex, time-sensitive operational compliance challenges.

CONCLUSION

The Gatton STP compliance project demonstrates what good operational management can achieve under constraint. Faced with a compliance crisis triggered by the loss of recycled water demand, Urban Utilities formed a tiger team, diagnosed the problem systematically, and implemented a targeted package of interventions that returned the plant to consistent licence compliance within 18 months — without capital works or major procurement.

The Gatton STP is not unique. Its challenges — ageing trickling filter technology, single-pathway compliance strategies, and tightening regulatory conditions — are shared by treatment plants across Queensland and nationally. This project offers a practical, replicable framework for addressing those challenges, and a reminder that compliance and operational excellence are not the exclusive province of new infrastructure.

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