



# Standards Alert

## Publication of High Rate Clarification Guidelines

Sydney Water has developed the High Rate Clarification Guidelines to promote efficient and consistent design for high-rate clarification processes, offering best practices to enhance project delivery, asset performance, and safety outcomes. The document incorporates best practice designs, informed by insights and experience from previous Sydney Water projects and operations.

### Why has the guideline been developed?

Sydney Water is in process of upgrading water treatment plants (at approx. Capital investment of \$1 billion) and it is moving towards adopting high-rate clarification technologies due to its efficiency and smaller footprint compared to conventional clarification technologies. This new guideline addresses the need for consistent design and operational practices, incorporates lessons from pilot projects (e.g., Orchard Hills WFP trial), and supports efficient and consistent design of high rate clarification processes.

### What are the key requirements?

Key requirements are summarised below:

- Technology Review: Overview of Lamella, Ballasted, and Dense Sludge clarification technologies.
- Technical Design Guideline: Covers design principles, performance standards, and safety considerations.
- Technology Selection Guideline: Provides criteria for technology selection and vendor evaluation.
- Testing, Commissioning, and Handover: Outlines testing protocols, commissioning checklists, and handover procedures.
- Case Study: Summarizes key outcomes from the Orchard Hills WFP pilot trial.

### How do these changes impact users and what are the key benefits?

A user impact assessment has been conducted to evaluate the implications of the High-Rate Clarification

guideline's requirements across various criteria, ensuring they are appropriate, deliver value, and balance cost, risk, performance, and sustainability.

With the overall aim of offering best practices in designing high-rate clarification processes to enhance project delivery, asset performance, and safety outcomes, the guideline will impact various aspects of design and project delivery in the following ways.

#### 1. Costs:

##### Capital Costs:

- The guideline provides standardized design requirements, reducing design iteration time and associated costs.
- Early consideration of proprietary technology integration ensures accurate cost estimates upfront, minimizing unexpected variations.
- Modular design recommendations allow for efficient use of space, reducing civil works costs in space-constrained projects.

##### Operational Costs:

The guideline promotes consistent process control strategies, leading to reduced chemical dosing variability and lower energy consumption over time.

##### Cost Vs Benefits:

- The guideline supports informed decision-making on higher initial investments by weighing them against lifecycle benefits, including reduced sludge production, improved downstream process performance, and enhanced energy efficiency, ultimately contributing to long-term cost savings

## 2. Time to Design and Construct:

- **Faster Design & Approval:**
  - Clear design requirements mean fewer design revisions and quicker approval processes, reducing project delays.
  - The guideline removes ambiguity in technology selection, streamlining procurement.
- **Construction Time Considerations:**
  - Modular configurations enable faster installation and commissioning, reducing on-site construction time.
  - Standardized testing and commissioning checklists provide a structured handover process, avoiding delays caused by rework or misaligned expectations.

## 3. Functional Reliability / Risk

- The guideline identifies the risk of sludge washout during high hydraulic loading and mitigates it by defining hydraulic loading limits, optimizing flow distribution through baffles, recommending automated sludge withdrawal systems, and integrating real-time sludge blanket monitoring to maintain process stability
- The guideline documents challenges in sludge and ballast handling (e.g., wear in pumps and hydrocyclones) based on past experiences at Sydney Water plants. It informs designers of these risks and provides mitigation strategies, including the specification of abrasion-resistant materials. This improves system reliability by reducing wear-related failures and extending equipment lifespan

## 4. Safety

Following safety enhancements are recommended:

- **Automation:** Implementing automated air scour cleaning reduces the need for manual intervention in lamella plate maintenance, minimizing operator exposure to confined spaces, hazardous environments, and repetitive physical tasks, thereby enhancing overall safety. Automated air scour cleaning should be considered if the frequency of lamella plate cleaning justifies the cost.
- **Protective designs,** such as covered polymer tanks and accessible maintenance areas, will ensure the safety of operational and maintenance staff, providing net positive benefits for the cost incurred.

## 5. Sustainability

- **Carbon Footprint:** the guideline provides energy consumption information of high rate clarifier technologies to make informed decisions on selection of the technology.

## 5. Innovation

- The guideline's flexibility encourages incorporating emerging technologies, ensuring alignment with future advancements

## 6. Other Notable Benefits or Risks

- **Training / educational resource:** This guideline can be used as an educational resource for graduate engineers and water treatment professionals
- **Limitations:** High rate clarification guideline focuses on most used high rate clarification technologies like Ballasted clarification, Dense sludge clarification and Lamella clarification.

## When do this Guideline become effective?

- This guideline becomes available for all projects commencing planning or design after 1 April 2025. Project teams may choose to apply the guideline at other stages of asset delivery where there is a benefit to the project.
- This guideline supports designers in developing high-rate clarification processes by providing recommended requirements and best practice technical guidelines, which are not mandatory but are encouraged to enhance design outcomes

## Where can I find the new version?

- [iconnect](#)
- [SWDelivery Portal](#)

## How can I provide feedback?

If you have any feedback on the High Rate Clarification Guidelines, please email [kirtan.kelaiya@sydneywater.com.au](mailto:kirtan.kelaiya@sydneywater.com.au)