MIRANDA water technologies

Municipal Wastewater Capacity Planning

Phased approaches for growth-constrained communities

Purpose

This resource supports municipal leaders, planners, and infrastructure teams in evaluating phased wastewater capacity as part of growth planning and capital decision-making.

It is intended to inform internal evaluation, alignment, and governance discussions. It does not prescribe a specific project, site, technology selection, or implementation pathway.

Municipal Planning Context

Municipal wastewater planning increasingly requires decisions not only about how much capacity is needed, but how and when that capacity is delivered. **In many communities:**

Centralized expansion | Phased capacity

- Growth occurs in stages rather than as a single buildout
- Development is distributed across multiple service areas
- Capital investment must balance financial exposure, approvals, and infrastructure timing

Traditional centralized expansion often assumes long-term growth projections can be translated into large, upfront capital investments. Where growth timing or development patterns are uncertain, this approach can limit flexibility and increase capital and governance risk.

When Phased Wastewater Capacity Is Evaluated

Phased wastewater capacity is most often evaluated when municipalities require flexibility in aligning infrastructure investment with growth. **Common evaluation scenarios include:**

Phased or uncertain development
Growth proceeds in stages with variable timing or uptake.

Constrained or delayed trunk infrastructure
Centralized systems lack available capacity or face extended expansion timelines.

Growth beyond existing service areas
Development occurs outside centralized wastewater networks where extension is impractical or delayed.

Capital and approval risk
Large upfront investments introduce financial or political exposure if projected growth does not materialize.

Alignment of investment with real development activity
Infrastructure spending must track confirmed growth rather than long-term buildout assumptions.

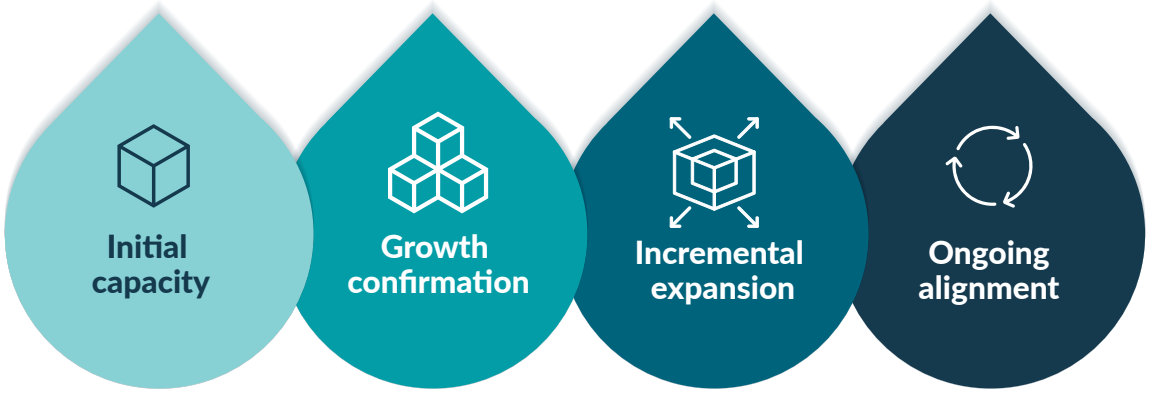
In these contexts, phased wastewater capacity enables municipalities to support growth without prematurely committing to oversized infrastructure.

How Phased Wastewater Capacity Is Delivered

Under a phased approach, wastewater treatment capacity is delivered incrementally rather than through a single, long-cycle capital expansion.

Initial capacity supports near-term development needs. Additional capacity is added as demand materializes, allowing infrastructure investment to scale alongside growth rather than precede it.

This delivery model supports sequencing of approvals, capital investment, and infrastructure delivery over time.



Implications for Municipal Planning and Capital Decisions

Applying phased wastewater capacity changes how municipalities plan and sequence infrastructure. Municipalities may:

- Time capital investment to confirmed development activity
- Align infrastructure approvals with growth phases
- Reduce reliance on long-cycle centralized expansion schedules

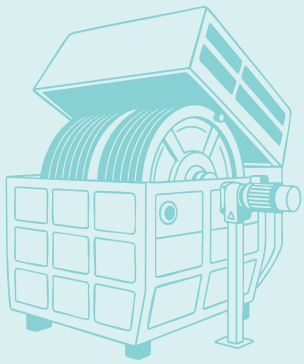
This approach supports improved capital risk management, servicing flexibility, and responsiveness to evolving growth conditions.

Role of Modular Decentralized Systems

Modular decentralized wastewater systems are commonly evaluated where phased capacity delivery is required, and centralized expansion is constrained, delayed, or impractical.

Miranda Water Technologies' Miracell® systems support incremental capacity delivery while maintaining consistent treatment performance across expansion stages.

Evaluation-relevant characteristics include:



Capacity expansion without full system replacement

Consistent performance as treatment capacity scales

Compatibility with long-term municipal servicing strategies

Predictable operational requirements across growth phases

These characteristics allow phased wastewater capacity to be evaluated as a long-term infrastructure strategy rather than a temporary measure.

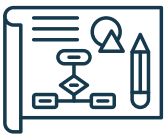
Miracell® Ultra in Municipal Evaluations

For municipal wastewater capacity planning, Miracell® Ultra is typically evaluated where phased growth, regulatory compliance, and scalability are required.

Miracell® Ultra supports municipal evaluation by:

- Accommodating variable flows and changing load conditions
- Enabling staged capacity expansion within a stable treatment framework
- Aligning with municipal asset management and capital planning processes
- Meeting typical municipal effluent requirements without complex process redesign

This allows municipalities to assess wastewater capacity delivery based on actual growth patterns rather than full buildout projections.



How Municipalities Use This Information

Municipalities use phased wastewater capacity evaluation to support:

- Growth and servicing strategy development
- Preliminary capacity planning and infrastructure phasing
- Capital planning alignment and scenario evaluation
- Internal coordination across planning, engineering, and finance
- Council and governance discussions
- Early-stage feasibility assessment

Miranda Water Technologies supports municipalities during this evaluation stage by contributing technical insight, planning context, and capacity modeling to inform internal decision-making.

Closing

Phased wastewater capacity is increasingly evaluated by municipalities as a planning strategy to manage growth, capital exposure, and infrastructure constraints.

Miranda Water Technologies welcomes conversations with municipalities assessing whether phased wastewater capacity aligns with their growth planning and capital objectives.