TRANSFORMING WATER. ENRICHING LIFE.

How to Participate Today

- **Audio Modes**
  - Listen using Mic & Speakers
  - Or, select “Use Telephone” and dial the conference (please remember long distance phone charges apply).
- Submit your questions using the Questions pane.
- A recording will be available for replay shortly after this webcast.
Why Magnetite?

High specific gravity: 5.2
Readily available iron ore
Inexpensive commodity
Inert (NSF 61 certification)
Conveyable
Magnetically recoverable

Ballast Recovery

>99% recovery
Magnetically recovered
Sustainable
Flow Diagram

Optimize chemical use
Promote solids-contact

Sludge Recycle
Flow Diagram

Coagulant

Polymer

Magnetite

Waste Solids

Waste Sludge

Sludge Recycle

Clarifier
- 80%–90% smaller
- Capacity increase up to 10×
- Superior solids removal

Sludge Recycle
- Optimize Chemicals
- Promote Solids Contact

Waste Solids
CoMag® System Settling

What can CoMag® Systems Remove?

If it's particulate, CoMag® systems can remove it!
Magnetite Recovery Equipment

Inline Shear Mixer

CoMag® system
Waste Sludge

Magnetic Recovery Drum

Waste sludge
Recovered Magnetite

Magnetic Recovery Drum – Flow Path

Influent waste sludge
Recovered magnetite
Effluent waste
Magnetite Feed Options

Manual → Auto

Equipment

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<th>Rotating</th>
<th>Instruments</th>
<th>Controls</th>
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<td>Mixers</td>
<td>Level</td>
<td>Control panel</td>
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<tr>
<td>Pumps</td>
<td>pH</td>
<td>HMI</td>
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<td>Shear mixer</td>
<td>Flow meters</td>
<td>PLC</td>
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<td>Mag drum</td>
<td>Turbidimeter</td>
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<td>Clarifier drive</td>
<td>Flow control valves</td>
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<tr>
<td>Chemical feed</td>
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<tr>
<td>Magnetite feed</td>
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</tbody>
</table>
### Sizing Guidelines – Tertiary Treatment

**Coagulation** ➔ **Ballast** ➔ **Polymer** ➔ **Clarifier**

- **Reaction Tank HRT**
  - Average: 12 minutes
  - Peak: 4 minutes

- **Clarifier SOR**
  - Average: 6 gpm/ft²
  - Peak: 15 gpm/ft²

**Types:**
- Conventional
- Inclined tube

### Other Design Considerations

- **Clarifier**
  - Tubes ➔ Conv.
  - Scraper ➔ C&F

- **Coagulant**
  - Dispersion
  - Anionic
  - Dry ➔ Emulsion

- **Polymer**
  - Type
  - Gravity ➔ Pump

- **Hydraulics**
  - Manual ➔ Auto

- **Magnetite**
  - Indoor ➔ Outdoor

**Location**

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Installations

30+ Installations
50+ Pilots

CoMag® System Performance
CoMag® System Performance

Effluent Total Phosphorus

<table>
<thead>
<tr>
<th>Location</th>
<th>Total Phosphorus (mg/L)</th>
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<tr>
<td>Sturbridge</td>
<td>0.039</td>
</tr>
<tr>
<td>Maynard</td>
<td>0.026</td>
</tr>
<tr>
<td>Charlton</td>
<td>0.025</td>
</tr>
<tr>
<td>Billerica</td>
<td>0.026</td>
</tr>
<tr>
<td>Concord</td>
<td>0.045</td>
</tr>
</tbody>
</table>

TP Conc. (mg/L) vs. Year

- Median
- MD AVG
- ROLL AVG

Data source: USEPA, [epa.gov](http://epa.gov)
UV Transmittance

Effluent UV transmittance values. Each bin represents 2 percentage points.

Data source: Evoqua pilot test data.