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Let's Solve Water

Handhelds and Lab Instrumentation for Wastewater Treatment

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Presenters & Agenda

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Water Quality Sampling
(WQS) Instrumentation

- Wastewater treatment process
- Portable handhelds
- Photometry/Colorimetry
- Laboratory instrumentation
- Questions & Answers

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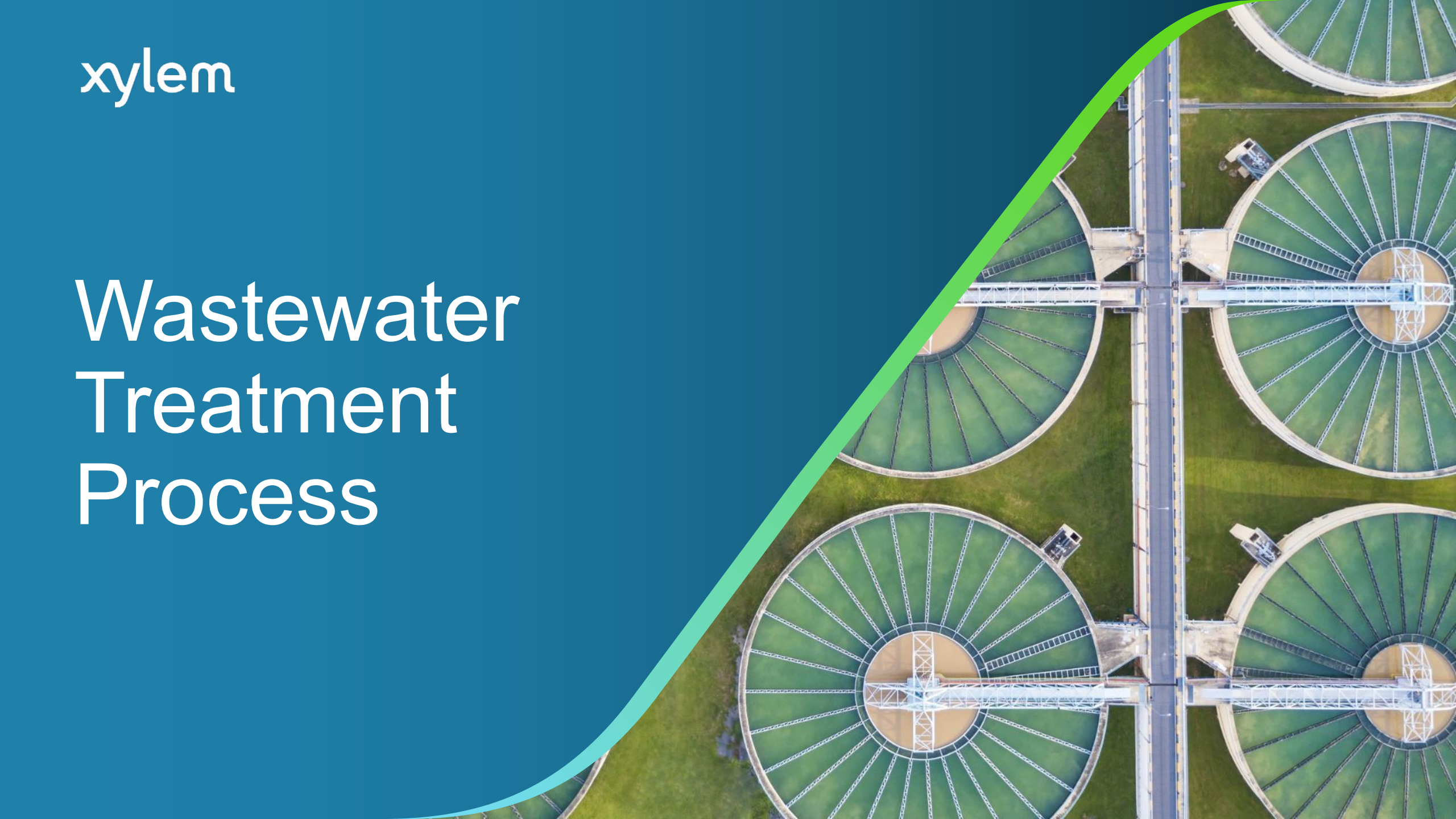
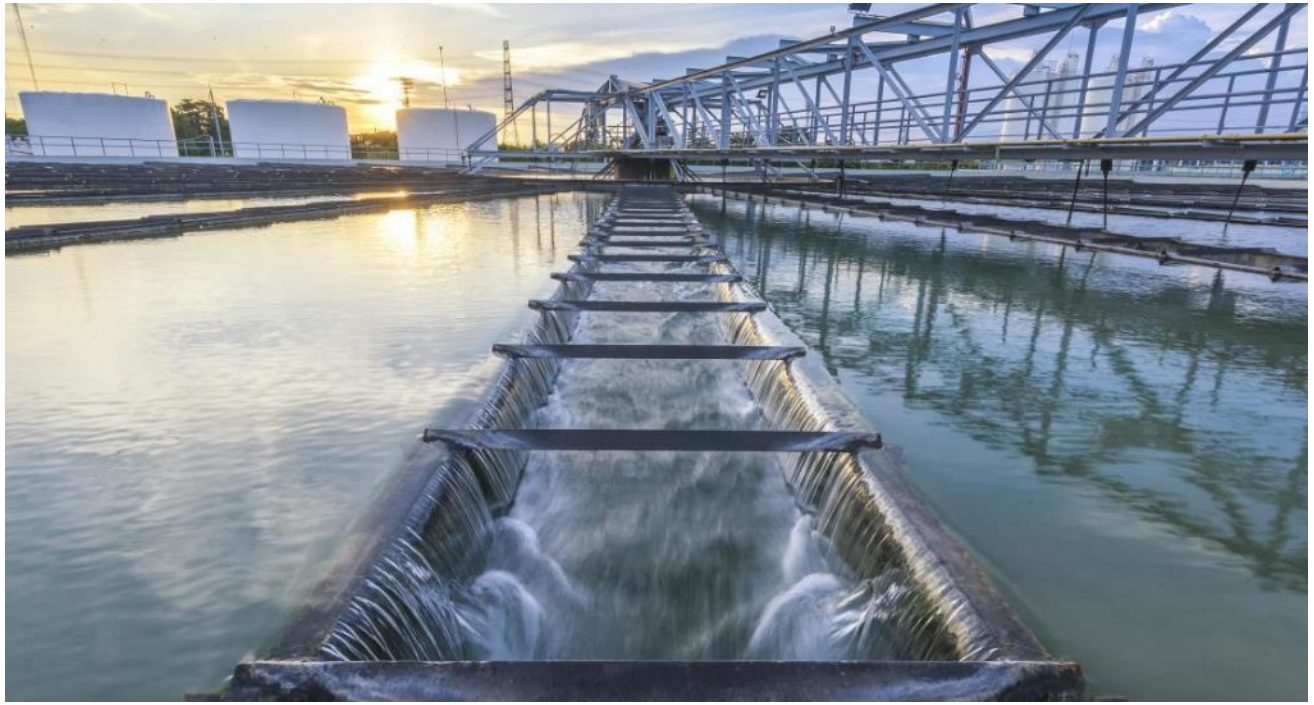
Wastewater Treatment Process



Wastewater Monitoring

Parameters

Water quality within a wastewater plant is monitored by chemical, biological, and physical parameters that are important to the process.



Sensors and Analyzers

Used to monitor these parameters, which ensure the wastewater treatment plant is meeting standards while running the plant as efficiently as possible (cutting costs)

Main Stages of Wastewater Treatment

Inlet/Pretreatment

- Untreated wastewater is received into the plant from the collection system

Primary Treatment

- Removal of as much organic/inorganic material as possible

Secondary Treatment

- Focuses on the growth of nitrifying bacteria

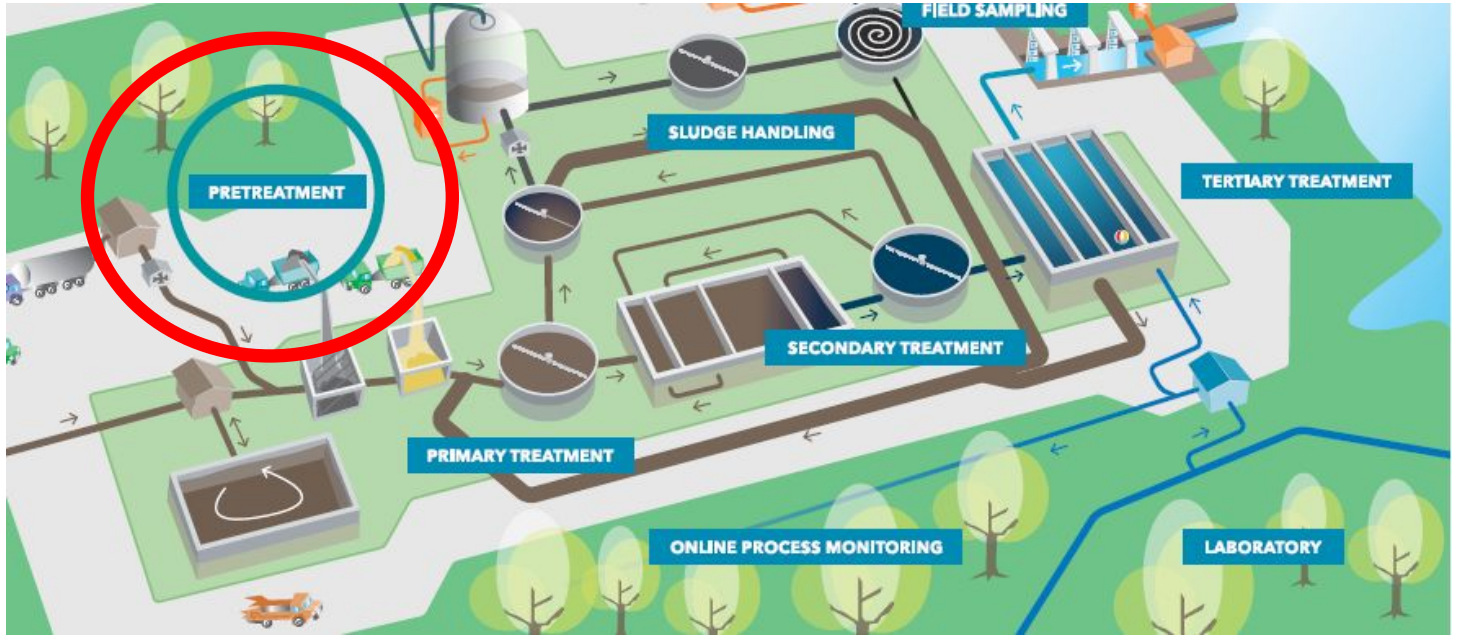
Nutrient Removal

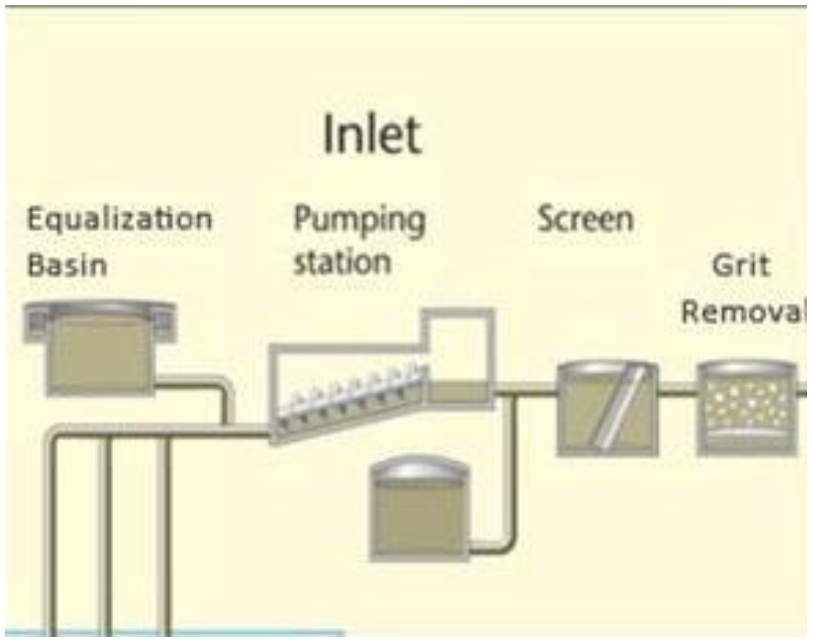
- Bacteria and microorganisms removed from wastewater through biological and chemical processes

Effluent Monitoring

- Collection and analysis of samples to make sure plant in compliance with environmental regulations

Inlet/Pretreatment





Problem	Parameter
Compliance	pH, TDS (not reportable)
Early Warning/ Upset Detection	pH, TDS, TSS, BOD
Efficiency / Process Control	BOD

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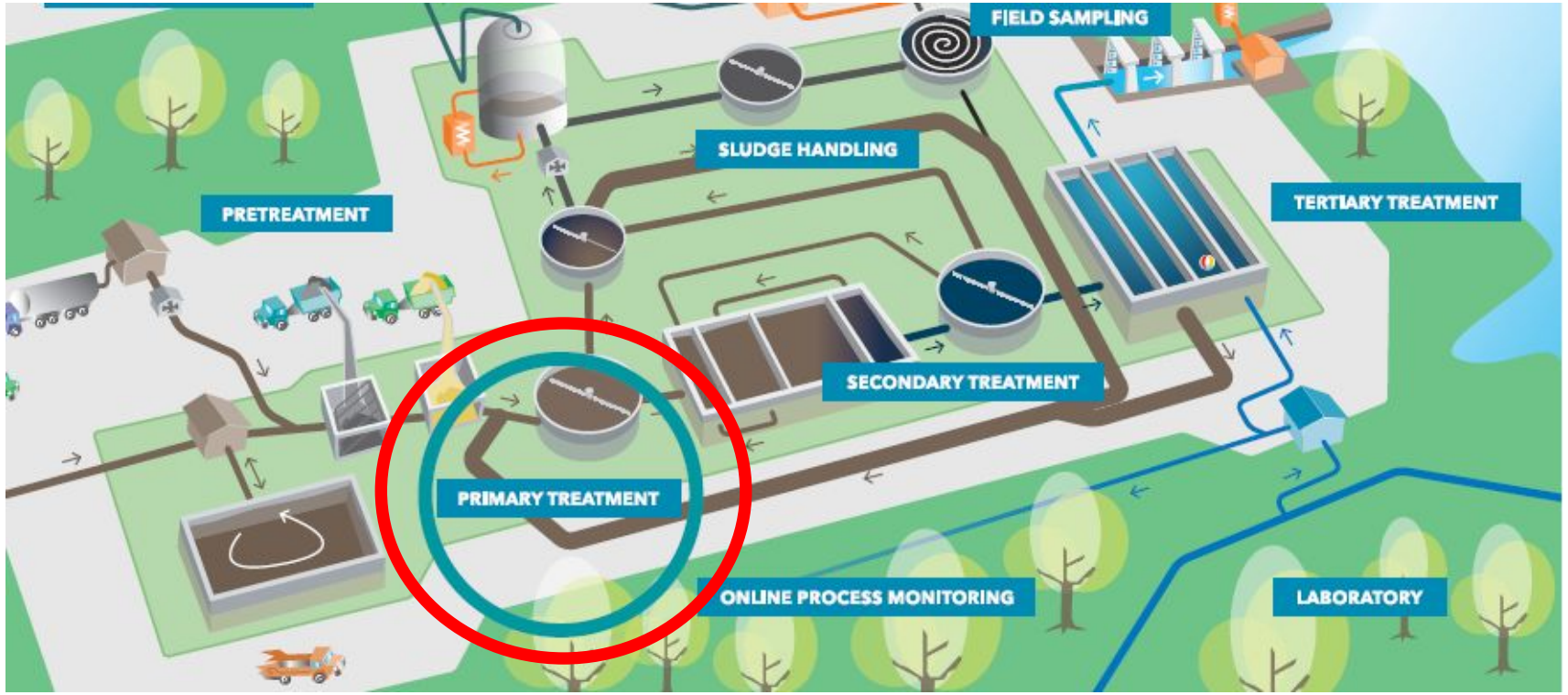
Primary Treatment



Problem	Parameter
Compliance	NA
Early Warning / Upset Detection	TSS
Efficiency / Process Control	Sludge Blanket Level, TSS, Ammonia, BOD

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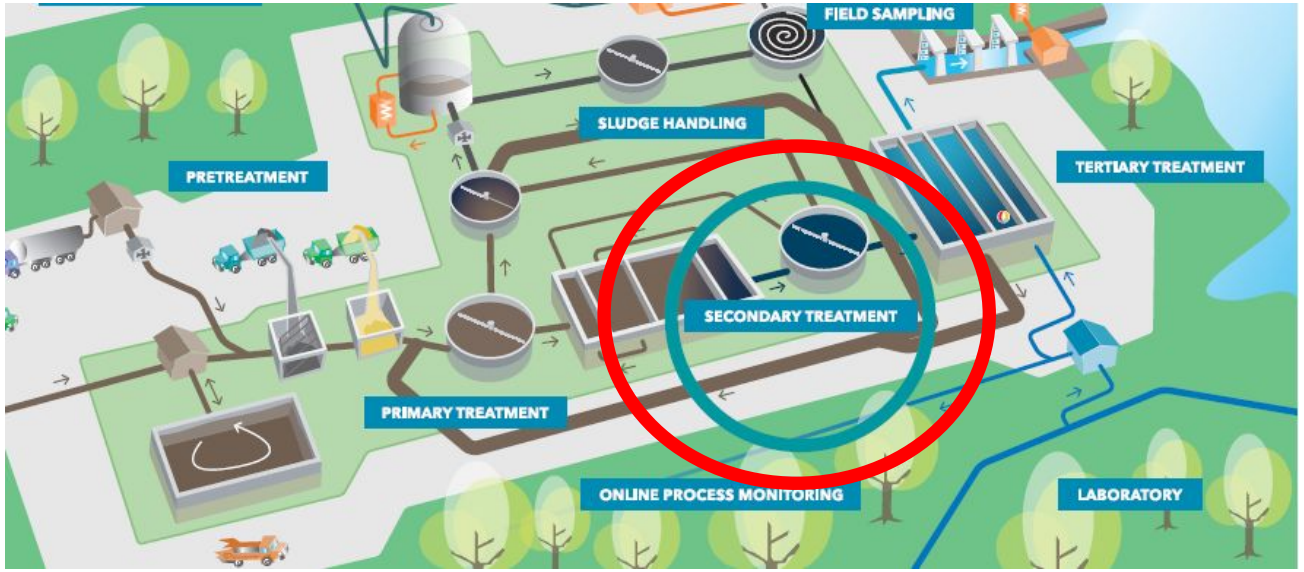
Secondary Treatment



Problem	Parameter
Compliance	NA
Early Warning / Upset Detection	Ammonia, Sludge Blanket Level, TSS, pH
Efficiency / Process Control	DO, Ammonia, Nitrate, TSS, ORP

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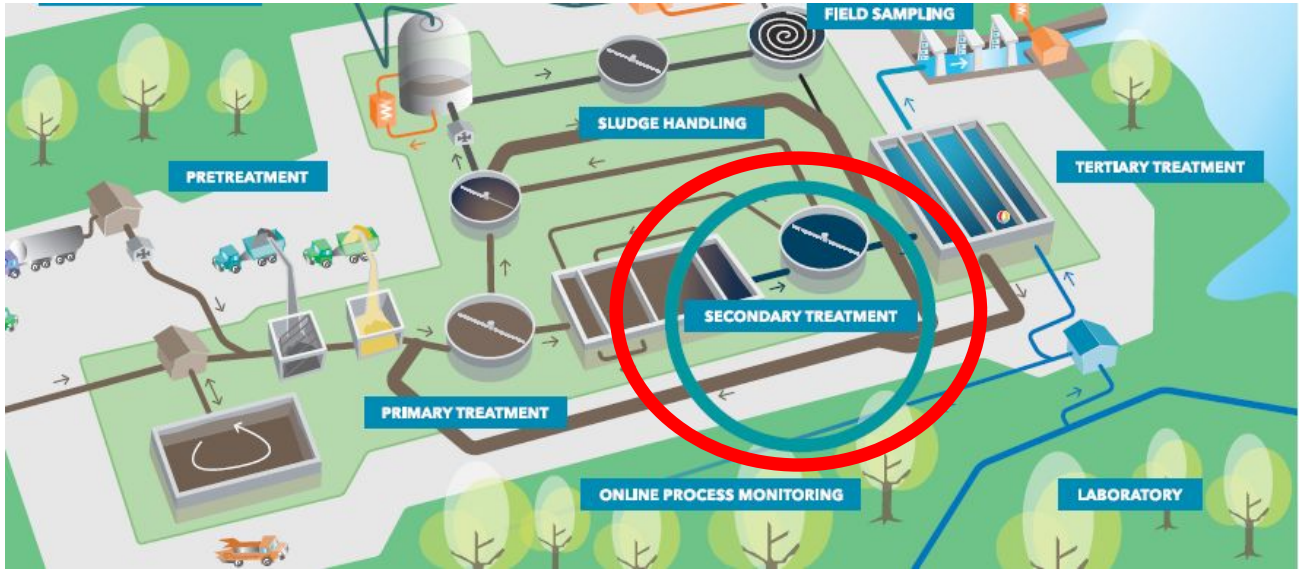
Nutrient Removal



Problem	Parameter
Compliance	--
Early Warning / Upset Detection	Ammonia
Efficiency / Process Control	ORP, Ammonia, Nitrate, Phosphate, TSS

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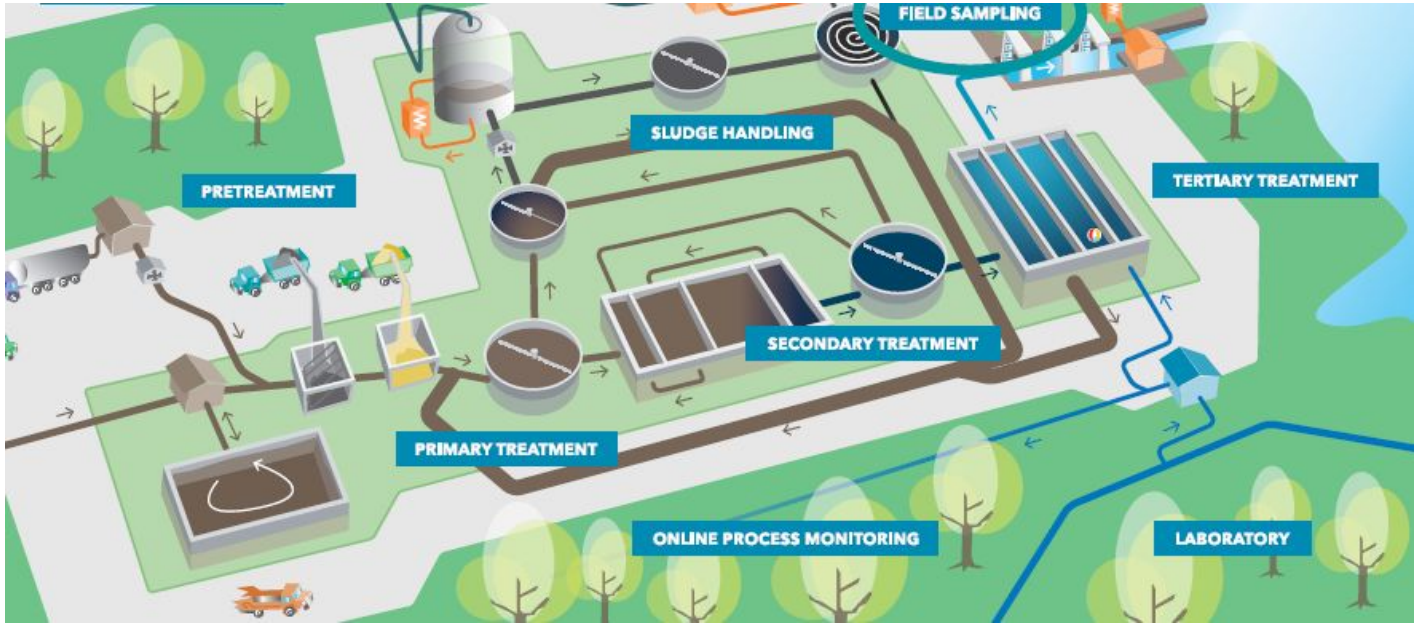
Effluent Treatment and Monitoring



Problem	Parameter
Compliance	pH, DO, Ammonia, Turbidity, BOD, Ortho-P, Chlorine
Efficiency / Process Control	ORP, UVT

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Other Treatment Stages

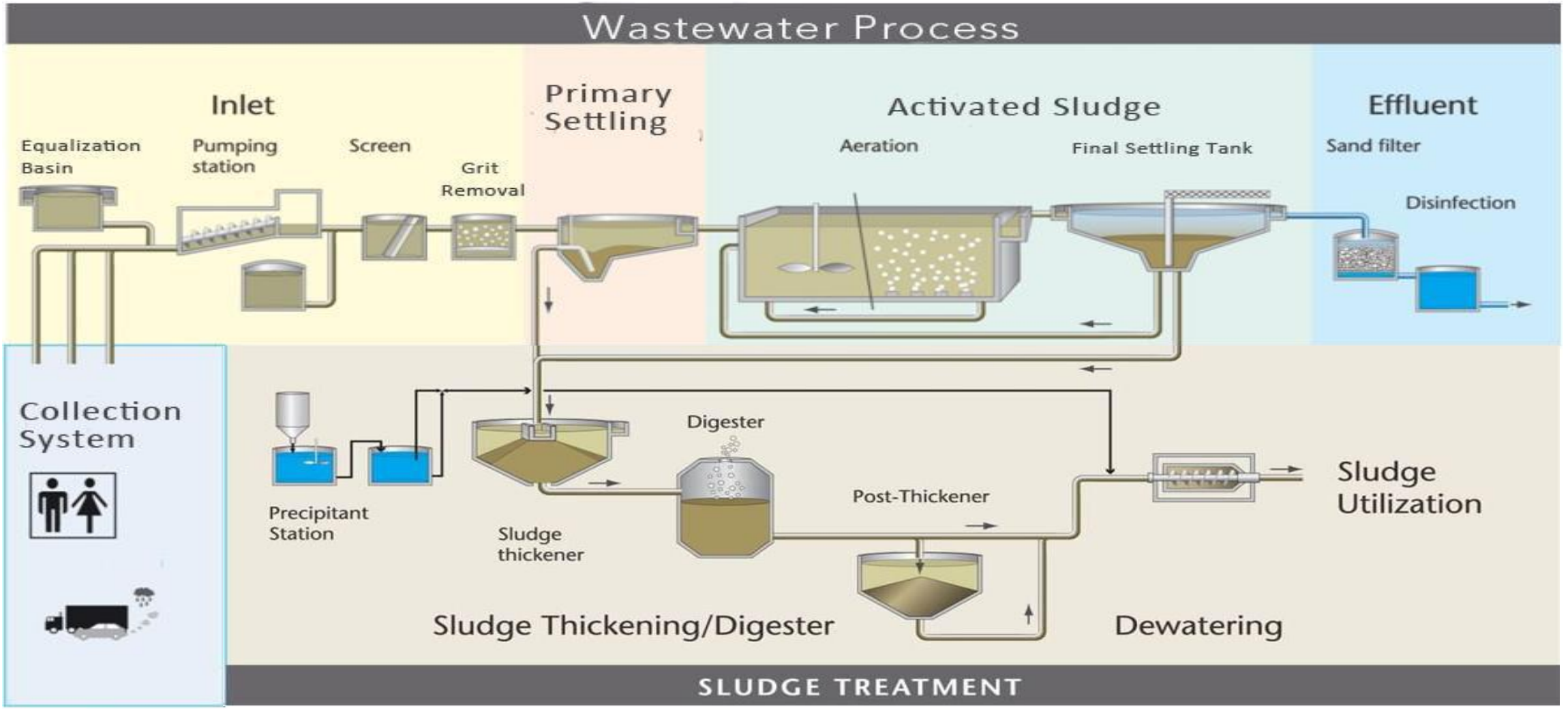
Tertiary Treatment

Problem	Parameter
Compliance	DO, pH, ortho-P, TOC (not reportable)
Early Warning	Turbidity
Efficiency / Process Control	Nitrate, TOC

Sludge Treatment

Problem	Parameter
Compliance	--
Early Warning	pH, TSS
Efficiency	DO, pH, ORP

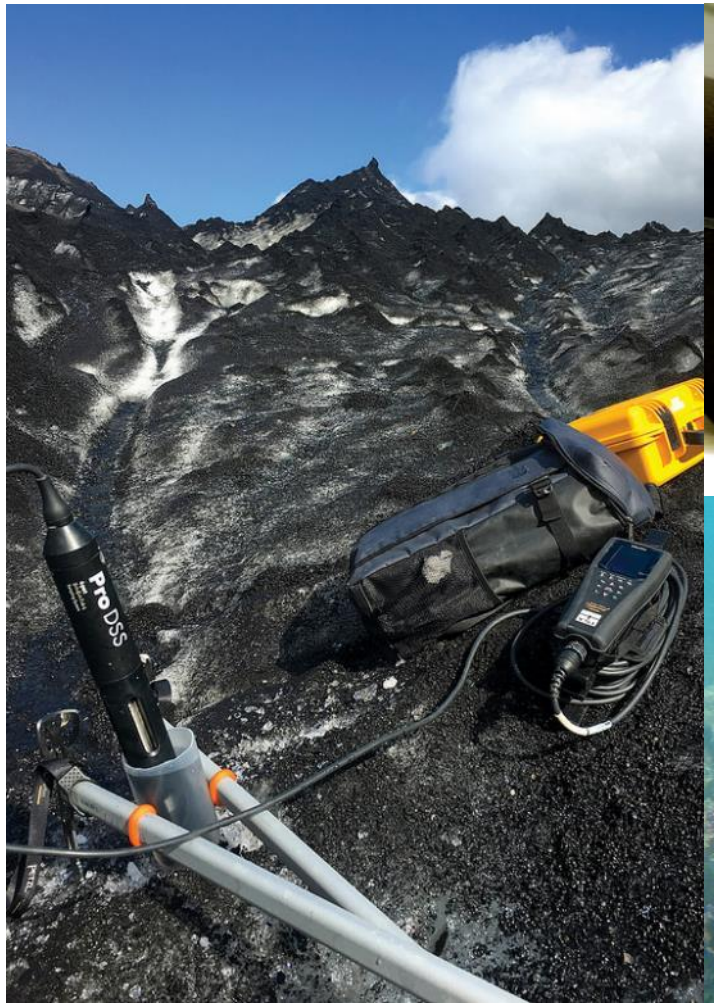
Typical Wastewater Treatment Plant Process



Portable Handhelds

Pro Series Handhelds Key Features

- IP-67 waterproof
- Military-spec cable connectors
- User-replaceable cables and sensors
- Rubber over-molded casing
- Drop rated to 1-meter



YSI Professional Series

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Dissolved Oxygen in Wastewater Treatment Plants

- Critical parameter for wastewater treatment plants
  - Aeration Basins in Secondary Treatment
  - DO Aeration Control
  - Effluent Monitoring
- Portable dissolved oxygen handhelds are used to verify online dissolved oxygen sensors
- Pro20/Pro20i and ProSolo handhelds

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YSI Oxygen Sensing Technology

Primary Dissolved Oxygen Sensor Types

- Electrochemical (membrane covered DO)
  - Polarographic
  - Galvanic
  - Available on ProBasics and ProQuatro

- Optical/Luminescent
  - Available on ProDIGITAL handhelds

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Pro20 and Pro20i Portable Handhelds

- Use membrane-covered dissolved oxygen sensor technology
- Offered in 4-meter and 10-meter kits
- Pro20 handheld can use the Pro Series BOD probe for lab measurements
- Pro20i- integrated cable assembly

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Optical Dissolved Oxygen Sensor Technology

Optical DO Advantages

- Hold calibration for longer periods of time
- No sample stirring requirement for accurate measurements
- Less susceptible to interference from other gases
- Accuracy +/- 0.1 mg/L of DO
- YSI optical DO sensor cap warrantied for 2 years

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ProSolo Handheld

- Uses optical dissolved oxygen sensors
- Extended probe options
  - Optical DO/Temperature (ODO/T)
  - Optical DO/Conductivity/Temperature (ODO/CT)
    - for real-time salinity compensation of DO measurement
  - ProOBOD- optical BOD probe for the lab
- Replaced the YSI ProODO handheld

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Total Suspended Solids (TSS) and Sludge Level

- TSS and sludge level are important parameters primary and secondary treatment
- Primary and secondary clarifiers allow for settling of sludge through gravity
- Portable handhelds wastewater operators monitor sludge level blanket depth and sludge level concentration for optimal clarifier efficiency

YSI Pro711 Handheld

- *Upcoming YSI product launch!*
- Direct replacement to the Royce 711 handheld (discontinued in 2021)
- Leverages the ProDSS platform (similar to ProSolo, only for TSS and sludge level)
- Main use in secondary treatment stage in wastewater treatment plants

** Expected launch March 2025

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YSI Pro711 Handheld

Secondary Clarifier in Wastewater Plant

Features of the Pro711

- TSS range expanded up to 30,000 mg/L
- Improved battery life
- Depth sensor and cable depth markings
- Sludge profile graphing
- Data logging capabilities
- Multiple calibration storage for different parts of the plant

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ProQuatro Multiparameter Handheld

ProQuatro Features

- Cost-effective solution for multiparameter sampling
- Offered in kits
- ProQuatro 4-port cable- combine four analog sensors on a single cable assembly
- 5,000 data set memory
- Data and user calibration records accessed through USB
- Ion Selective Electrode (ISE) options
  - Nitrate
  - Ammonium
  - Chloride

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ProQuatro Parameters

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ProDSS Multiparameter Handheld

ProDSS Features

- Most advanced YSI handheld for spot sampling and profiling
- DSS 4-port cable on a single cable assembly
- Digital, titanium sensors hold calibration and are warrantied for two years
- Sensors automatically recognized in any of the 4 ports
- Turbidity sensor option

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ProDSS Parameters

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KOR Software

- Data management software for digital handhelds (ProDSS and ProSolo)
- View live or recorded data
- Change handheld settings
- Manage sampling sites and photos
- Look out for future release of KorLink-DSS with iOS KOR mobile app

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Photometry/Colorimetry

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YSI 9800 Photometer

- 5-wavelength multiparameter photometer for the field or laboratory
- Lightweight (0.90 kg) and compact
- Large touchscreen
- 10,000+ data record storage capability

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YSI 9800 Photometer

- Used to spot check samples throughout the wastewater treatment process
- Nutrient parameters such as nitrate and ammonium
- Upset conditions visibility

Parameters

Alkalinity, Total
Aluminum
Ammonia
Bromine
Calcium Hardness
Chlorine, Combined
Chlorine, Free
Chlorine, Total
Copper
Cyanuric Acid
Fluoride
Hardness (Total)
Iron MR
Iron HR
Magnesium
Manganese
Nickel
Nitrate
Nitrite
Ozone
Phenol-Red
Phosphate LR
Potassium
Sulfate
Turbidity

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Model 910 COD Colorimeter

- Waterproof and rugged for the measurement of Chemical Oxygen Demand (COD)
- 3 different COD ranges (0-15,000 mg/L)
- Useful to monitor changing conditions in waste stream
- Quicker than 5-day BOD test
- User-calibration to any government or organizational standard (N.I.S.T. or ISO)

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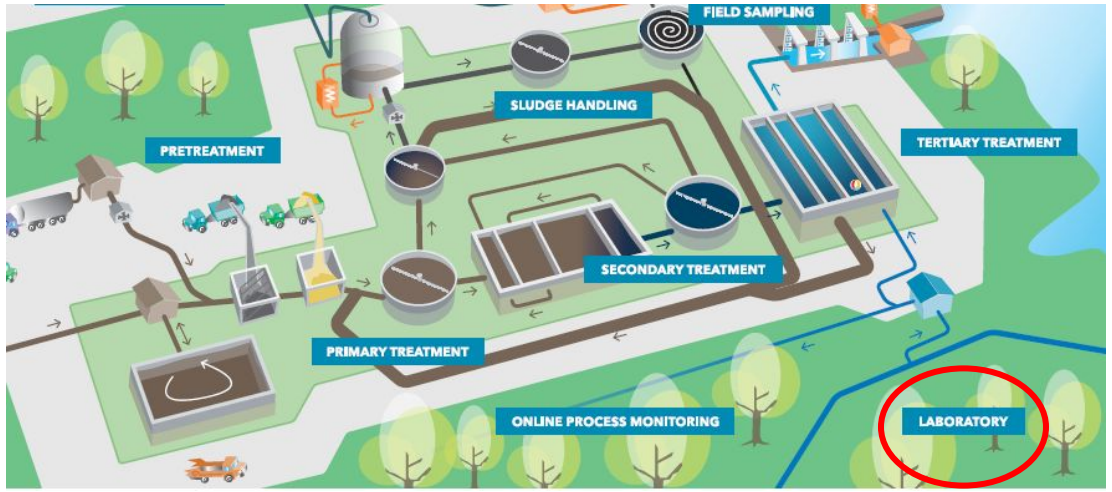
Laboratory

Why Laboratory Measurements?

Grab samples collected throughout the wastewater system

- Verification of online sensor readings
- Visibility into conditions of the water at different parts of the plant
- Grab samples from final effluent can be used for compliance reporting
- Essential in wastewater treatment due to controlled conditions



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YSI MultiLab Benchtop

Digital, multiparameter lab meter

- **MultiLab 4010-1W**
  - Single channel option
  - DO/BOD, pH, ORP, conductivity

- **MultiLab 4010-2W**
  - Dual channel option
  - DO/BOD, pH, ORP, conductivity, and Ion Selective Electrodes

- **MultiLab 4010-3W**
  - Three channel option
  - DO/BOD, pH, ORP, conductivity, and Ion Selective Electrodes

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YSI MultiLab Features

- Digital sensors
- GLP traceability
- Up to 25 different parameters
- Wireless sensors
  - pH, fluorescent dissolved oxygen (FDO), conductivity, ORP

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YSI MultiLab Intelligent Digital Sensors (IDS)

- Digital sensor recognition, processing and data transfer
- Plug-and-play connectivity; sensors auto-recognized
- Sensors store unique ID with serial number and calibration status
- Monitors sensor performance and calibration to notify when it is time to change sensor cap or refill/replace pH sensor
- Includes pH, ORP, conductivity and optical based self-stirring BOD

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YSI MultiLab for BOD

- Ideal BOD instrument
  - MultiLab powers OBOD probe’s stir motor
  - Optical and electrochemical sensors
  - Connect up to 3 BOD probes
  - OUR/SOUR function on -**2W** and -**3W**

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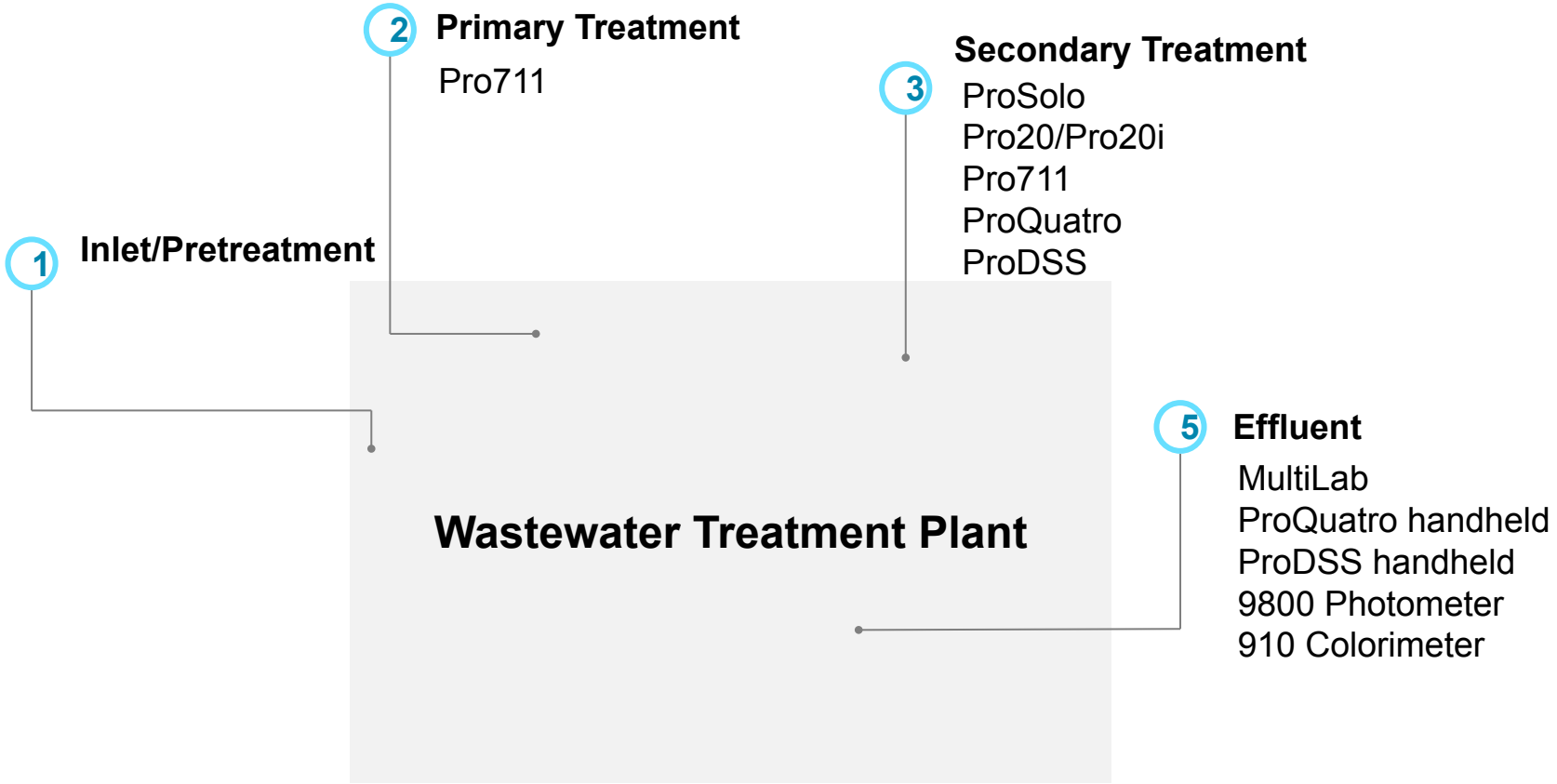
Portable and Lab Instrumentation in Wastewater

Used throughout the wastewater treatment process



YSI has a well-rounded offering of portable and lab instrumentation options for use in wastewater treatment

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Ask your questions!

Please click the Q&A icon and type your question directly into this window

If we don't get to your question, we will follow up directly via phone or email offline

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