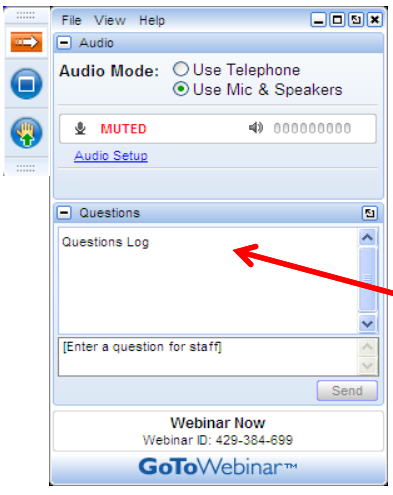
Nutrient Removal and Wet Weather Flow Management

How to Optimize Both in Sequencing Batch Reactors

TRANSFORMING WATER. ENRICHING LIFE.

1

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.**

2

Presenters

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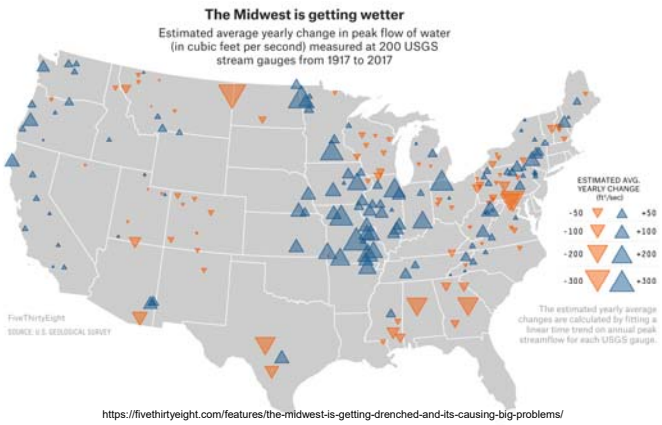
3

Issue: Wet Weather Flows are Increasing, Nutrient Limits Decreasing

- Combined stormwater sewers and systems with I&I both see higher flows during storm events
- Coupled with stricter nutrient limits, this is a serious issue
- Thousands of SBR installations nation wide



https://fivethirtyeight.com/features/the-midwest-is-getting-drenched-and-its-causing-big-problems/

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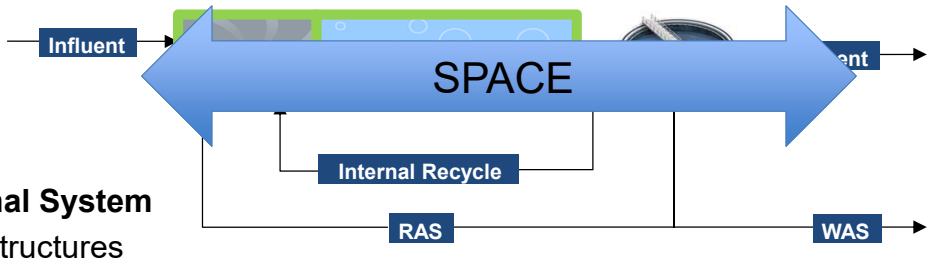
4

What is an SBR?



Conventional System

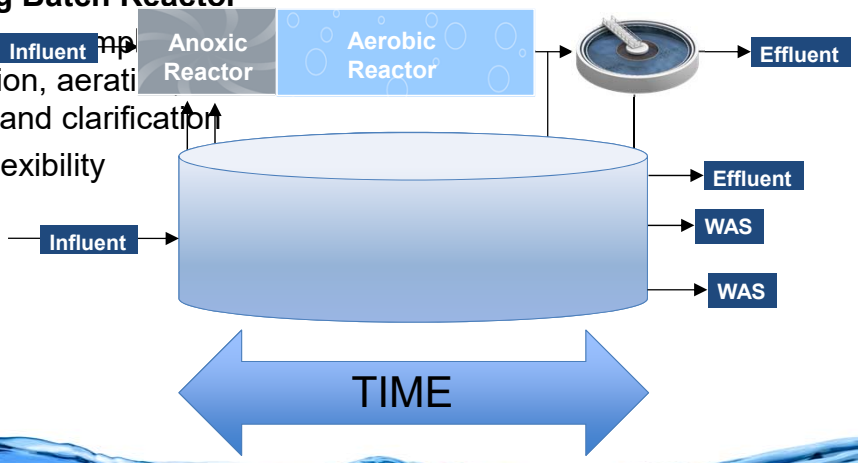
- Multiple structures
- Fixed tank volume

5

What is an SBR?

Sequencing Batch Reactor

- One basin ~~mp~~ equalization, aerati removal, and clarificat~~n~~
- Time = Flexibility



6

Experience: Over 35 years and 700 SBR Installations

Jet Tech
an EVOQUA technology

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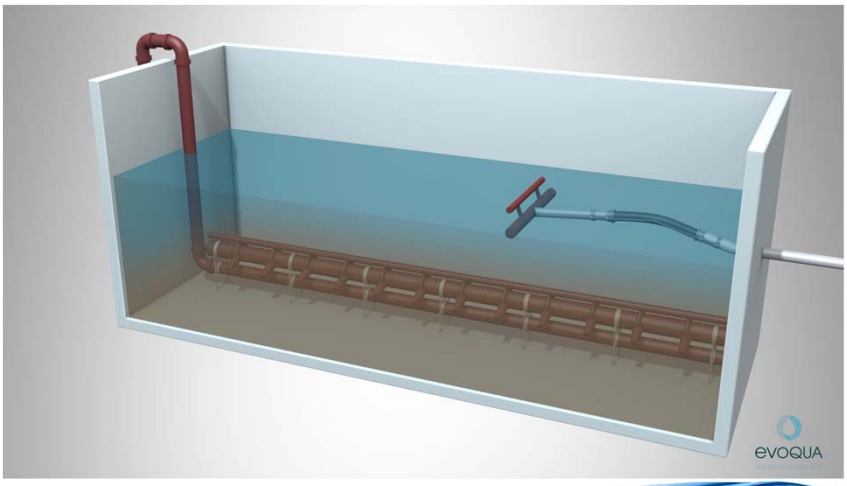
7

OMNIFLO® SBR Process

A single cycle for each reactor consists of five discrete periods:

- Fill
- React
- Settle
- Decant
- Idle



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8

True-Batch Process: Only one basin fills at any time

Benefits include:

- Complete Biological Nutrient Removal (BNR)
  - TN < 5 mg/l
  - TP < 1 mg/l
- No short circuiting for optimal effluent quality
- Improved settling

9

Problem: True-Batch SBRs Suffer Under Wet Weather Flows

- All flow goes to only one basin at a time
- True-Batch SBRs have the highest influent hydraulic loading rates per surface area
- Sending >300% of design flow to one tank can disrupt the sludge blanket, resulting in poor effluent quality

10

SBR Wet Weather Flow Management: Traditional Approach

- Additional tank volume
  - influent equalization tanks
  - additional freeboard in SBR tank
- Compress cycles to accommodate higher flow rates
- Decant while filling in the same SBR tank

11

Solution: Evoqua's OMNIFLO® SBR MAX Control Strategy

- Maximize buffering capacity of the plant by using all SBR volume
- Maintain effluent quality with proper hydraulic design

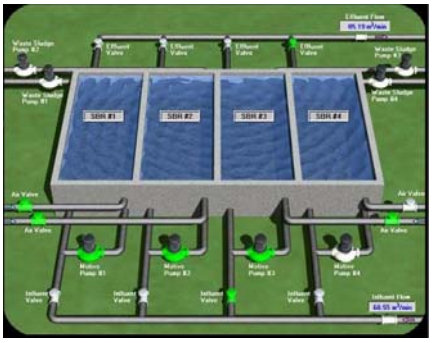
	Omniflo <300%	Omniflo MAX 300% - 500%
Influent EQ Tank	✗	✗
Additional Freeboard	✗	✗
Compress Cycles	✓	✓
Open all Influent Valves	✗	✓

12

Solution: Evoqua's OMNIFLO® SBR MAX Control Strategy

OMNIFLO® SBR MAX:

- Below ~300% design flow rate the system operates in True-Batch mode
- Above 300%, the system automatically opens all influent valves
- When wet weather flows subside, True-Batch SBR operation resumes



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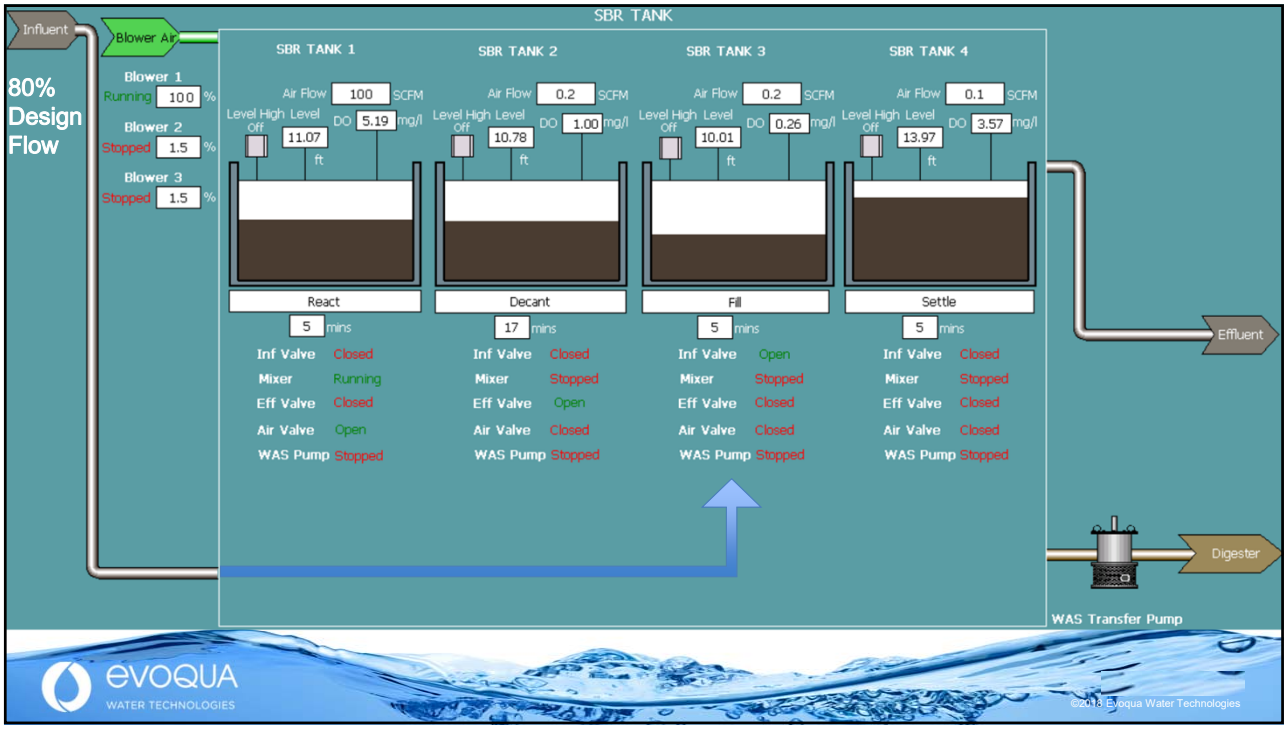
13



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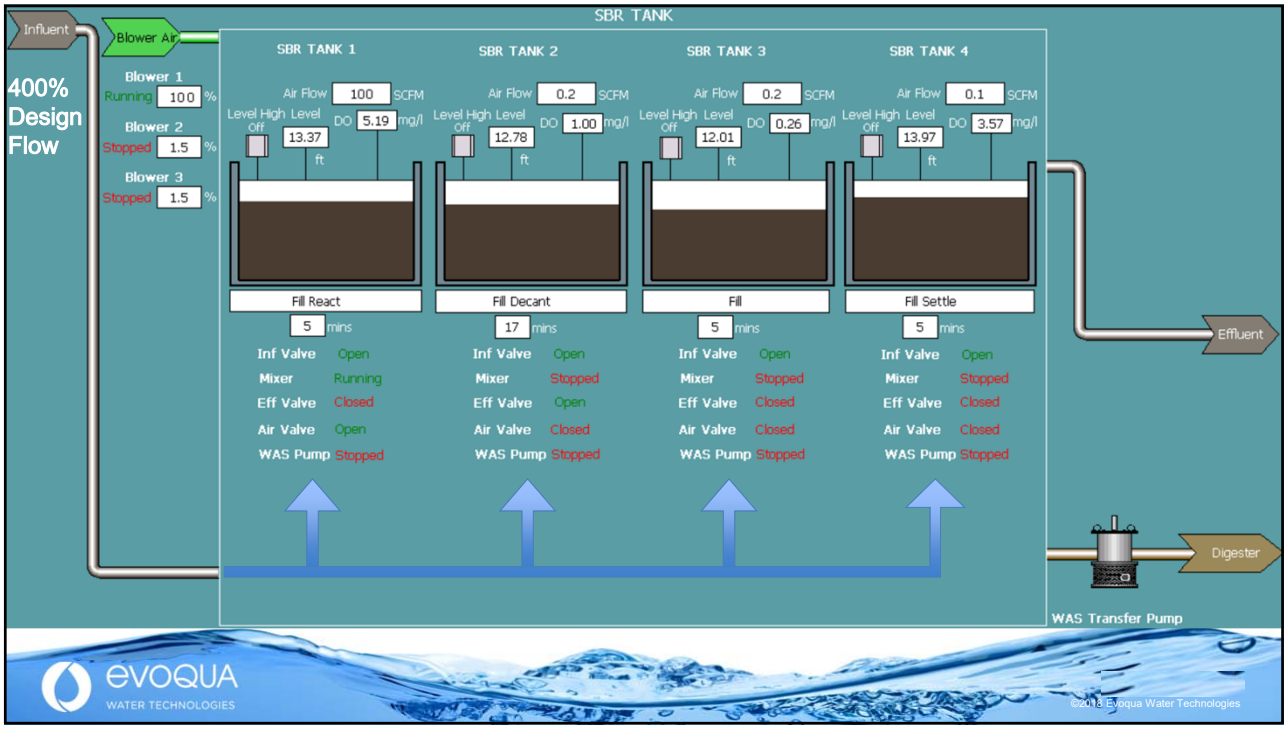
14



15

OMNIFLO® SBR MAX: Achieve BNR and Improve Wet Weather Flow Management

- Innovative control strategy monitors influent flow and automatically adjusts sequence of operations
- Improve process control of existing SBRs
- No additional infrastructure required for wet weather flow management for new plants
- Achieve high quality biological nutrient removal during average flows by using true batch process
- Optimize wet weather flows by distributing to all SBR basins

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16

Thank You

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17