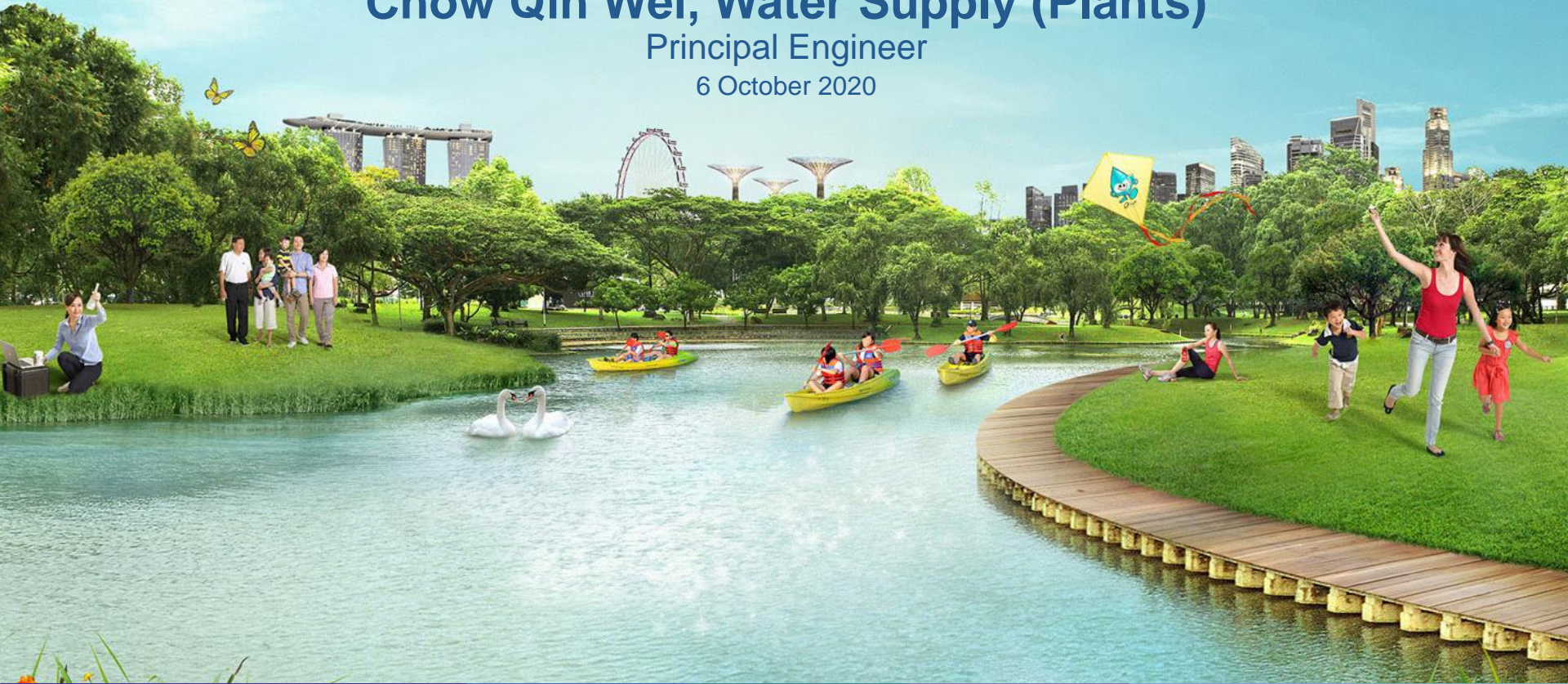# Seamless Coagulation Control

Chow Qin Wei, Water Supply (Plants)
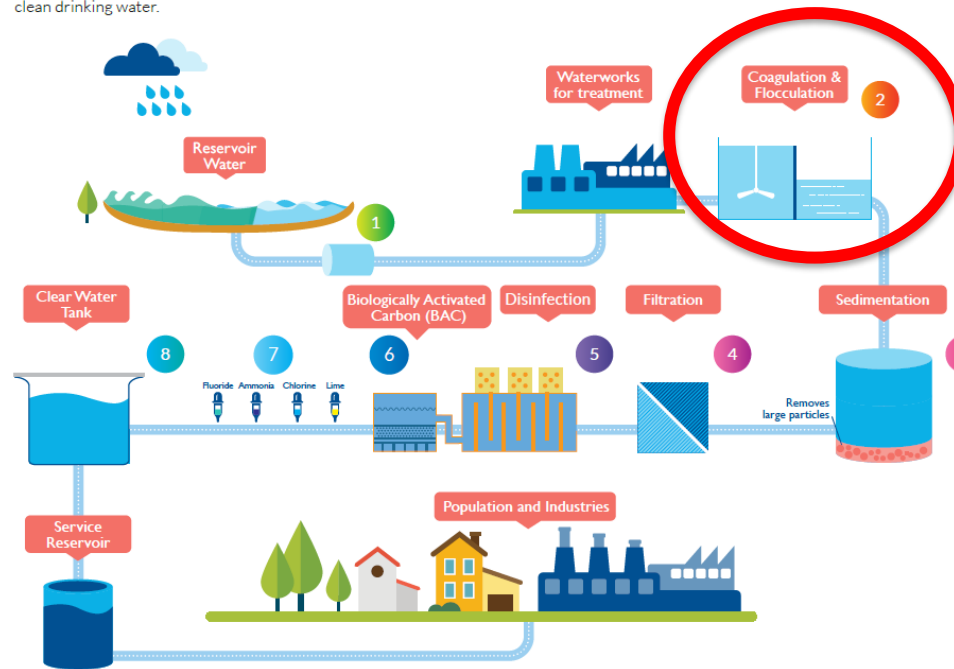Principal Engineer
6 October 2020

Challenge Statement

How might we determine the required coagulant dosage in water treatment processes using new means that are faster, connected, and automatic?

Figure: PUB's Water Treatment Process and Water Quality Process, reference from www.pub.gov.sg

Background

Due to fluctuating quality in the source water, the **required coagulant dosage** for removing suspended, colloidal and dissolved matter in the water treatment process needs to be adjusted accordingly.

Kallang River at Bishan-Ang Mo Kio Park

Current Practice

- Jar Test is a laboratory procedure in which varying dosages of coagulants are mixed with the water to be treated under identical conditions in order to determine the optimum dose.

- Jar test –

    - conducted manually

    - each test takes about one to two hours

    - time delay between testing and actual coagulant dosing adjustment

- Jar test is only representative of a particular batch of water and need to be repeated whenever there are changes in the source water quality.

OPUB

Opportunities Areas & Key Considerations

- We are looking for solutions that can determine the optimum coagulant dosage in view of potential fluctuating source water quality in **near real-time**.

- This would allow **automatic coagulation control** and prevent underdosing of coagulant which will affect water quality, and overdosing which will result in wastage of chemicals and additional sludge handling.

- We are open to alternative solutions, including those that make use of the **zeta potential principle**.

⟲PUB

Key Challenges

- Scoring the jar test result requires a fair degree of skill and experience on the part of the operator and may be difficult to replicate using sensors or machines.

- Time lag involved in the jar test method, the proposed solution would need to significantly reduce the time taken to determine the appropriate coagulant dose and provide **near real-time information** of required coagulant dosage to the operator.

Key Challenges

-   The proposed solution should also be able to correlate the information with data from jar test to validate the system.

-   The proposed solution should be integrated into the treatment system to allow for **real-time adjustment** of coagulant dosages.

-   The proposed solution must support PUB's practice of **enhanced coagulation** for the removal of dissolved organics in addition to colloidal particles.

Thank you