



Protecting Your Drinking Water

Water Treatment Process



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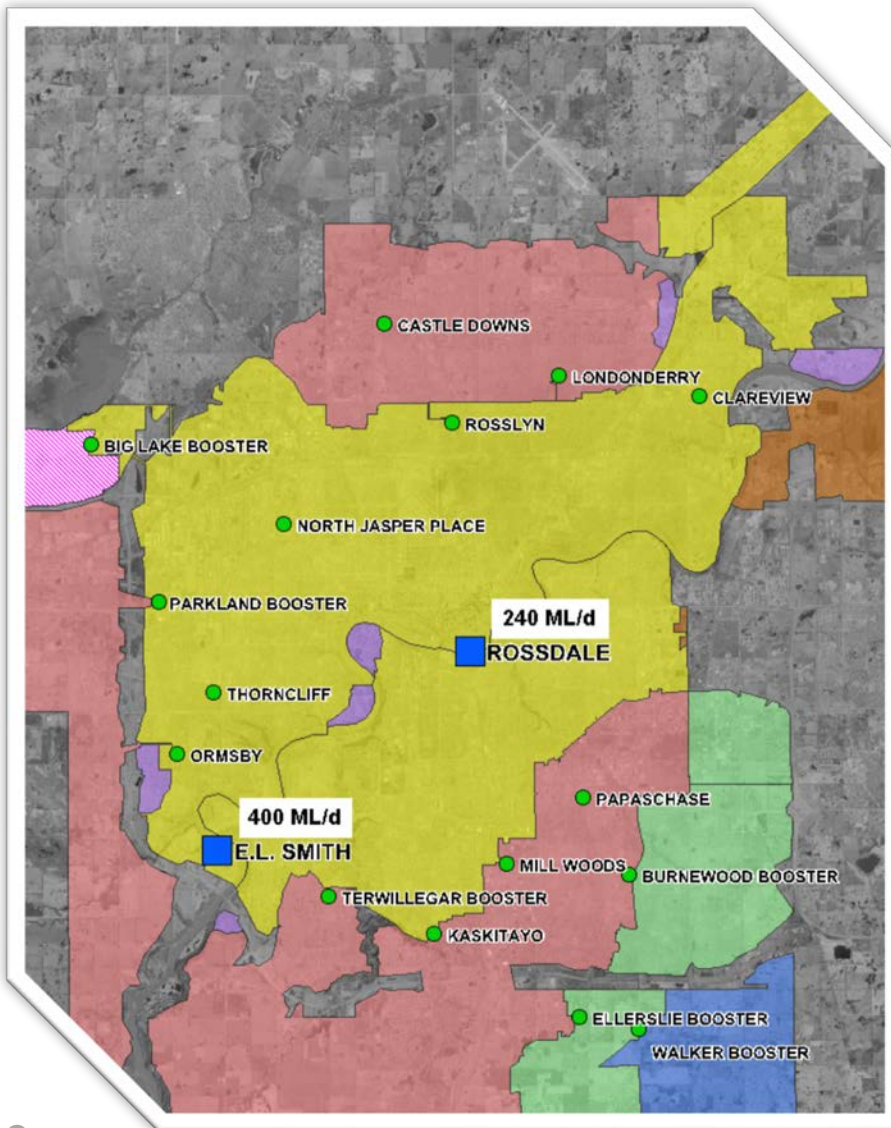
October 24th, 2019

EPCOR

Edmonton Water Operations

Water Source and Quality

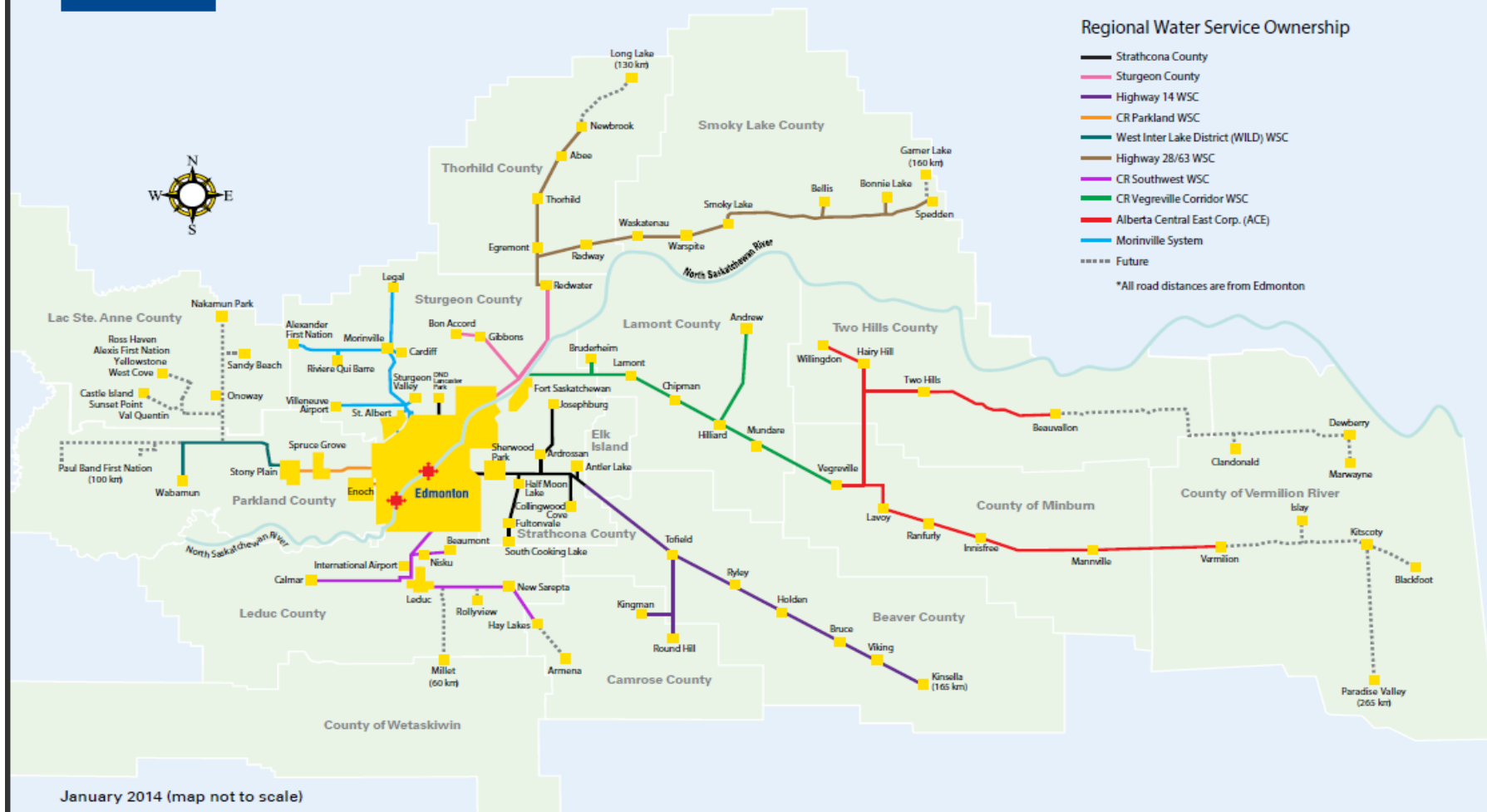
- North Saskatchewan River
- Turbidity:
 - Max ~ 7000 NTU
 - Avg ~ 130 NTU (Apr – Aug)
- Color:
 - Max ~ 200 TCU
 - Avg ~ 30 TCU (Apr – Aug)
- Contains contaminants such as clay, bacteria, viruses and organics



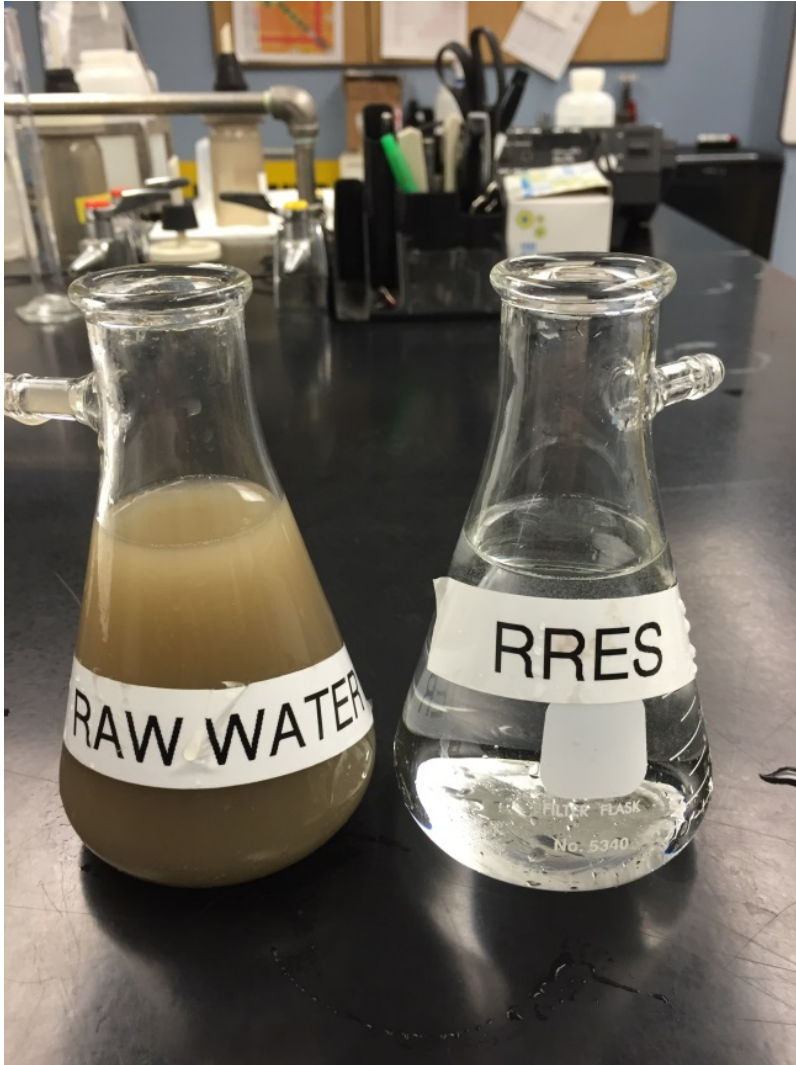
Edmonton Water Operations



EDMONTON REGION WATER SERVICE AREA



What is Turbidity?



- the cloudiness or haziness of a fluid
- this is a key test of measuring water quality



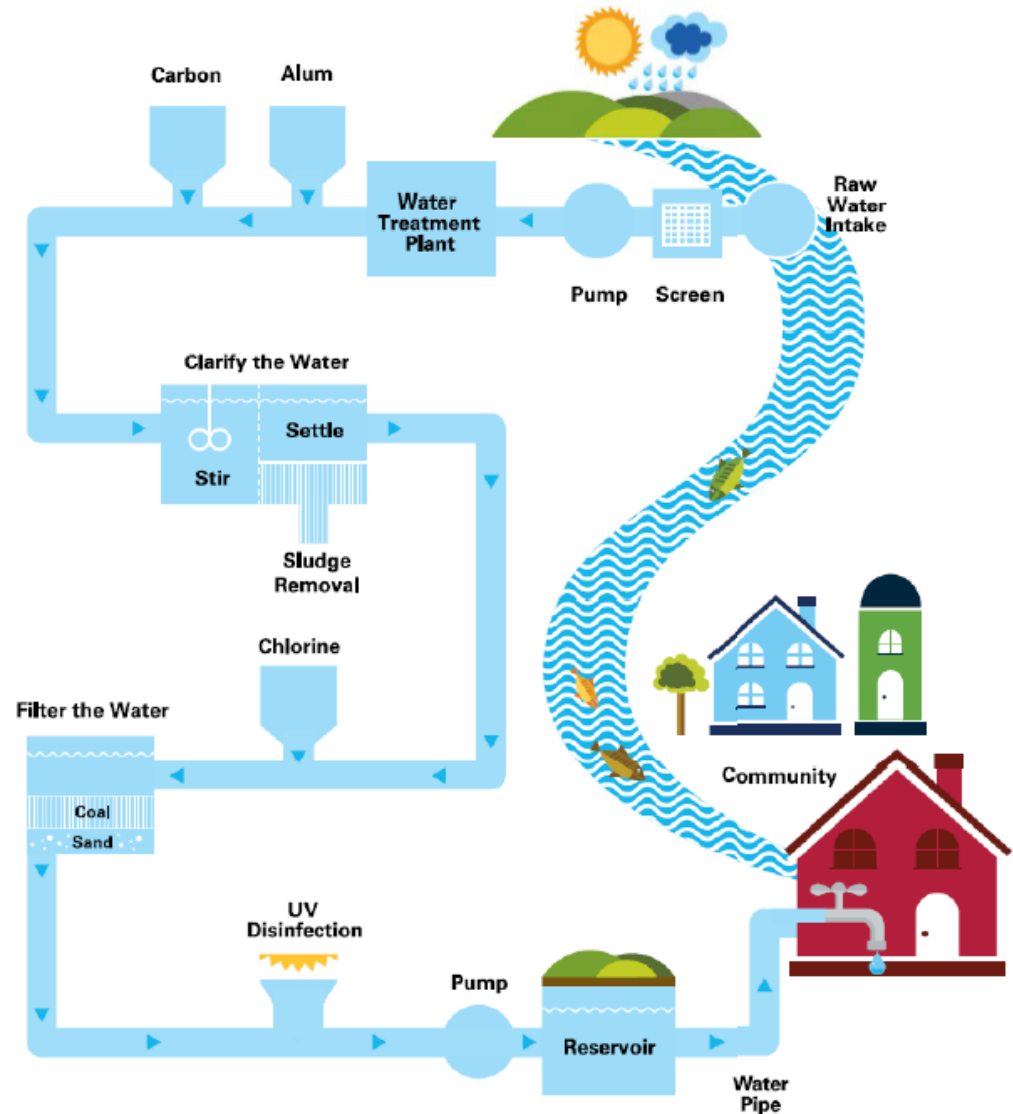
What is Color?



- Is caused by dissolved organic material from decaying vegetation and certain inorganic matter
- Organic release during decomposition may contribute to increased in Color and Raw Ammonia

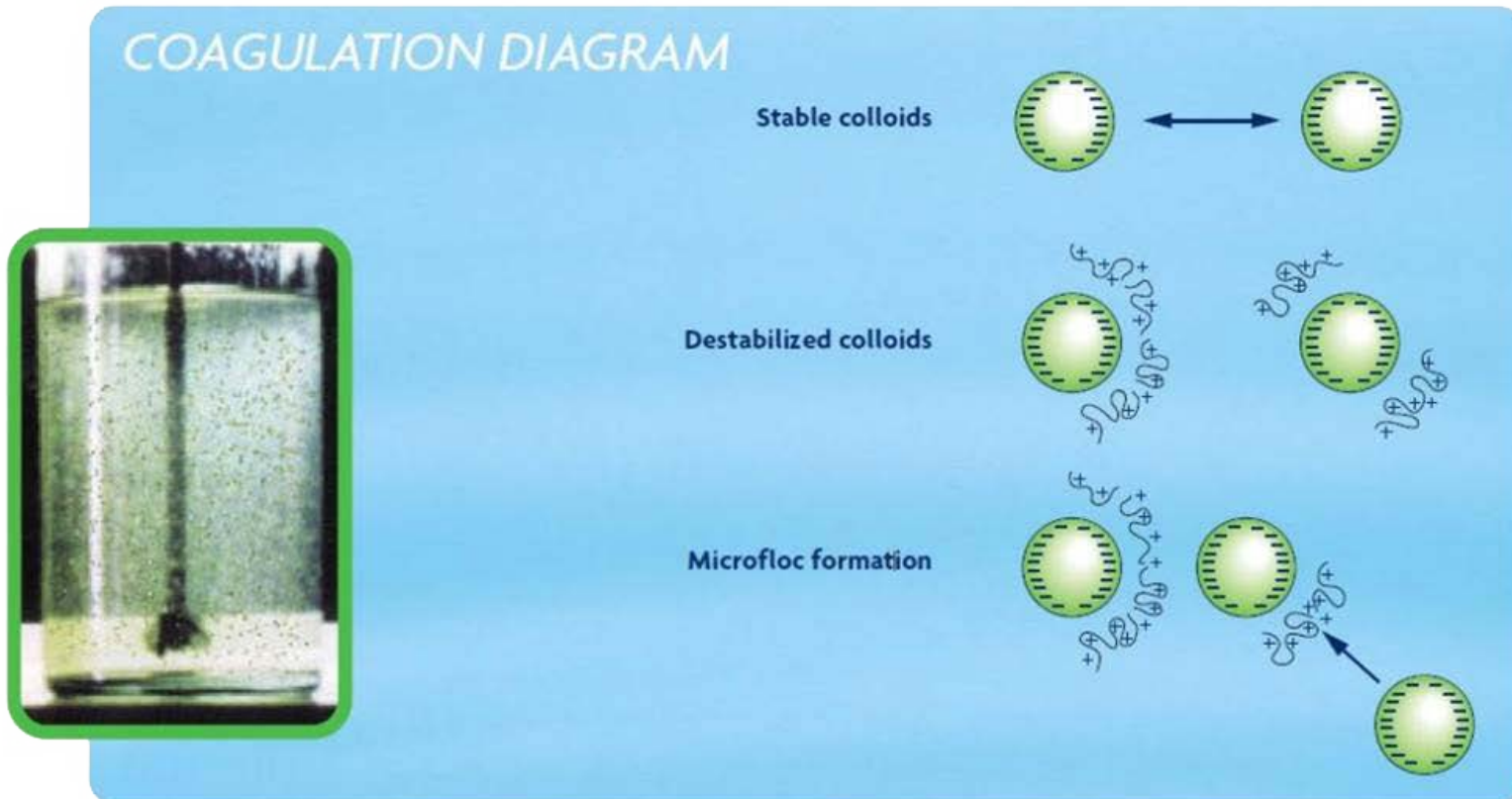
How Water Gets Treated

- Raw Water Intake
- Clarification
 - Coagulation
 - Flocculation
 - Sedimentation
- Disinfection – Chlorine
- Filtration
- Disinfection – UV Light
- Reservoirs



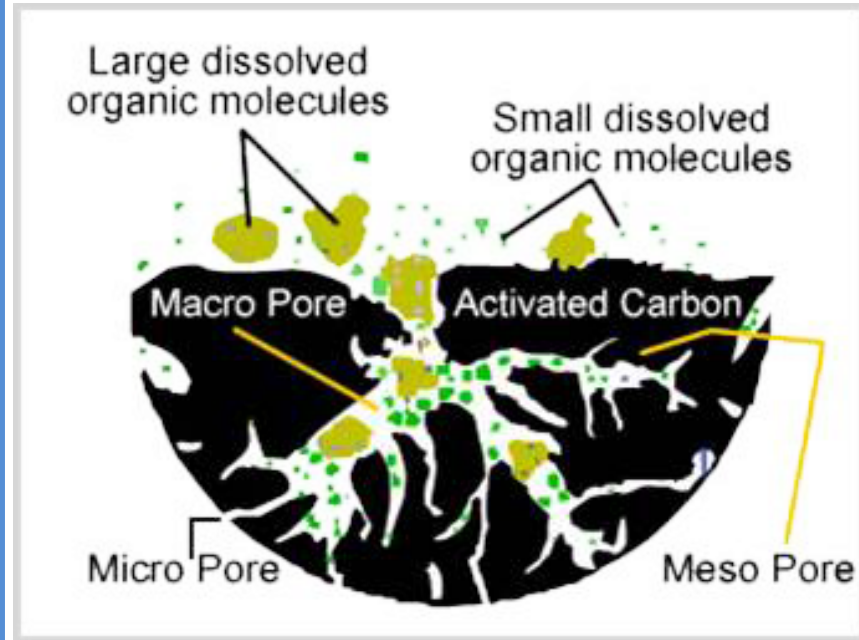
Coagulation

ALUM, a coagulant, is added to water to **NEUTRALIZE** or “destabilize” the charges on the colloidal particles, thus bringing particles together to allow flocs to form.



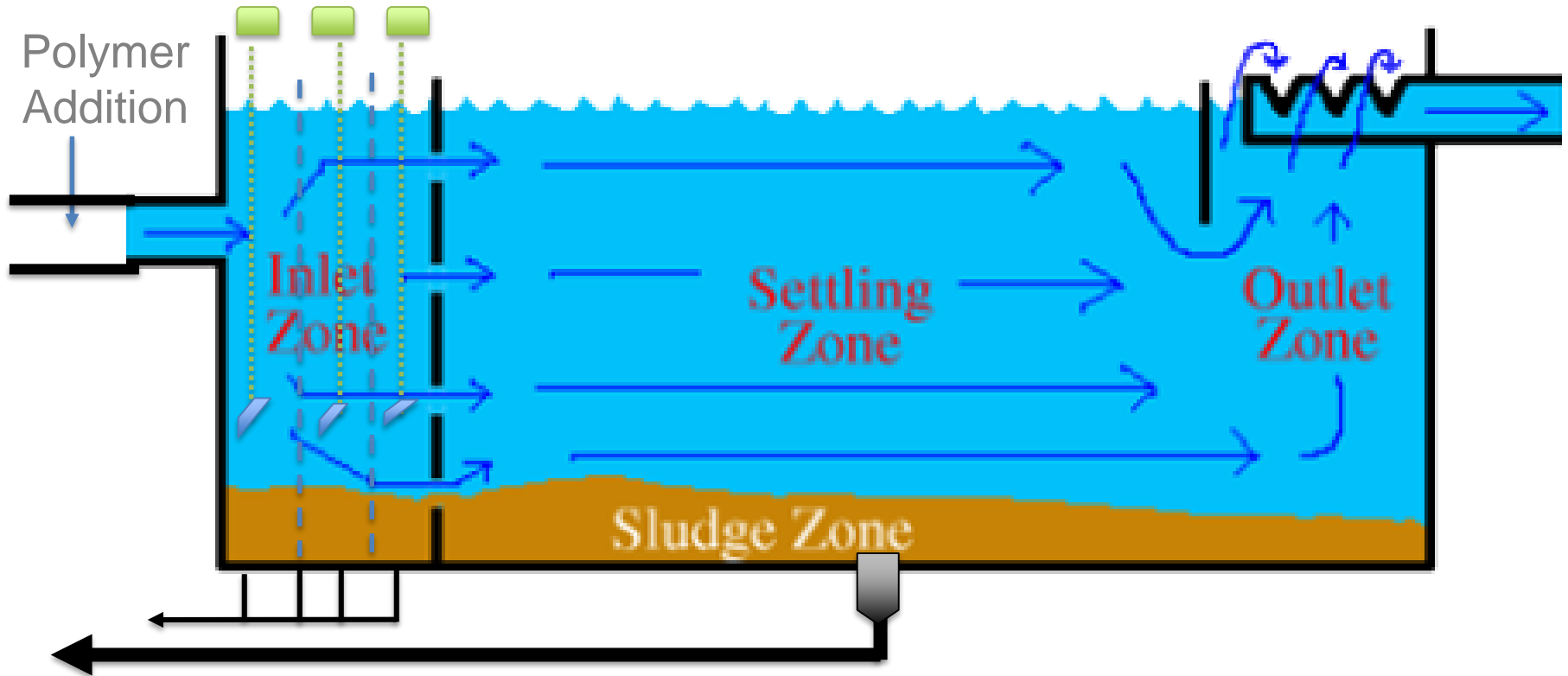
- Coagulation process occurs very quickly, in a matter of fractions of a second.

Adsorption



- **Adsorption** occurs when you add **Carbon** to the raw water
- Contaminants adhere to the surface and become trapped in the small pores

4 Typical Clarifier Zones

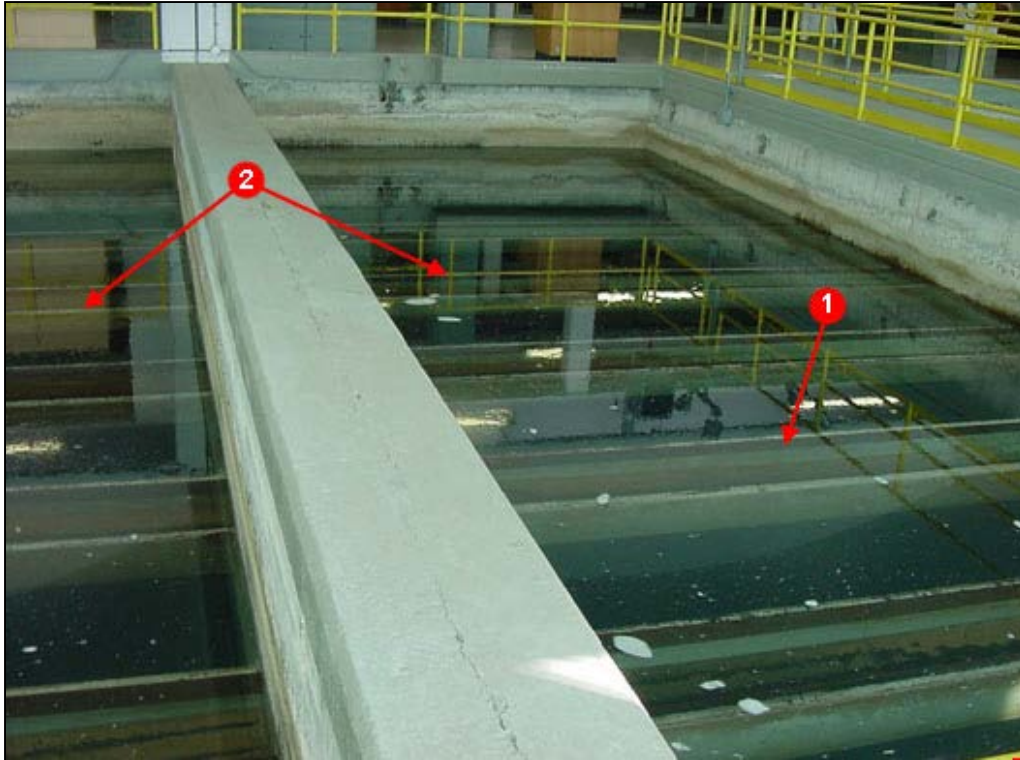


Primary Disinfection



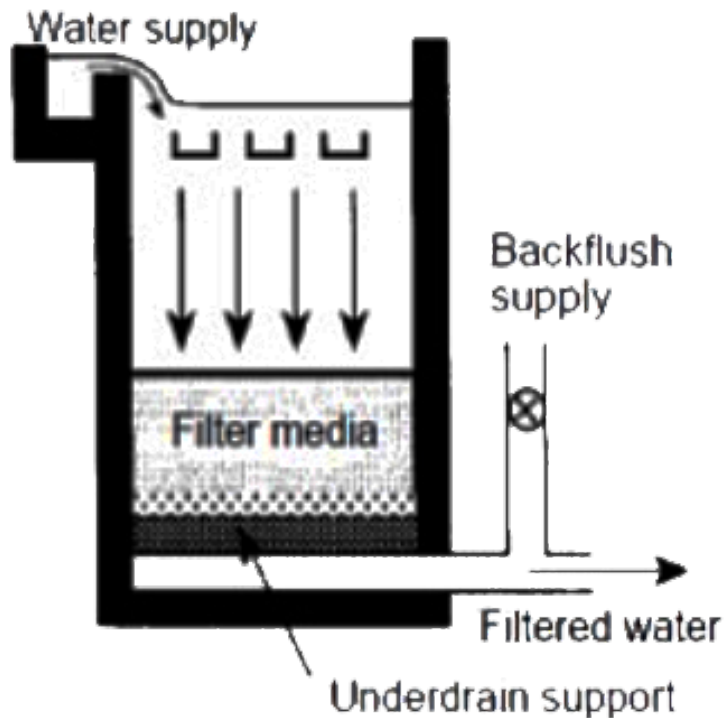
Sodium Hypochlorite
is added to the water
as a powerful primary
disinfectant known as
Free Chlorine

Rapid Sand Filtration

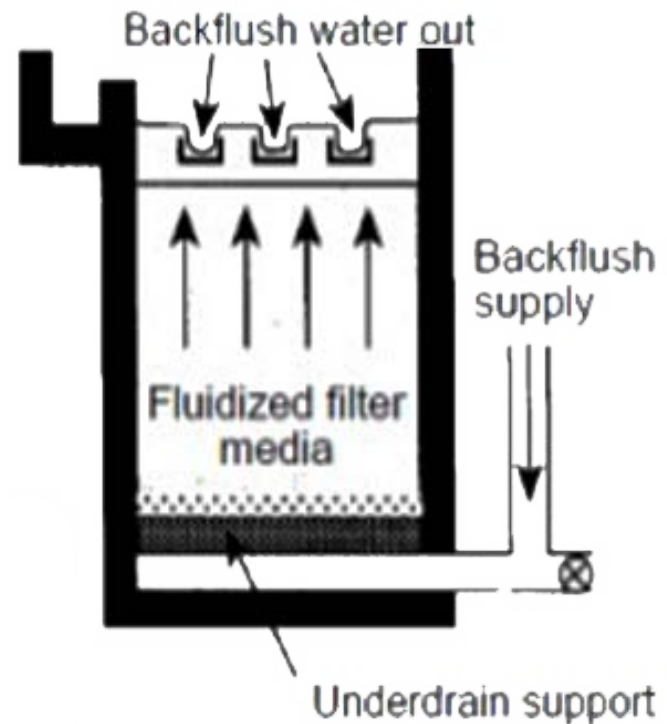


The purpose of Filtration is the removal of the remaining particulate impurities and floc from the treated water

Operations of Filters



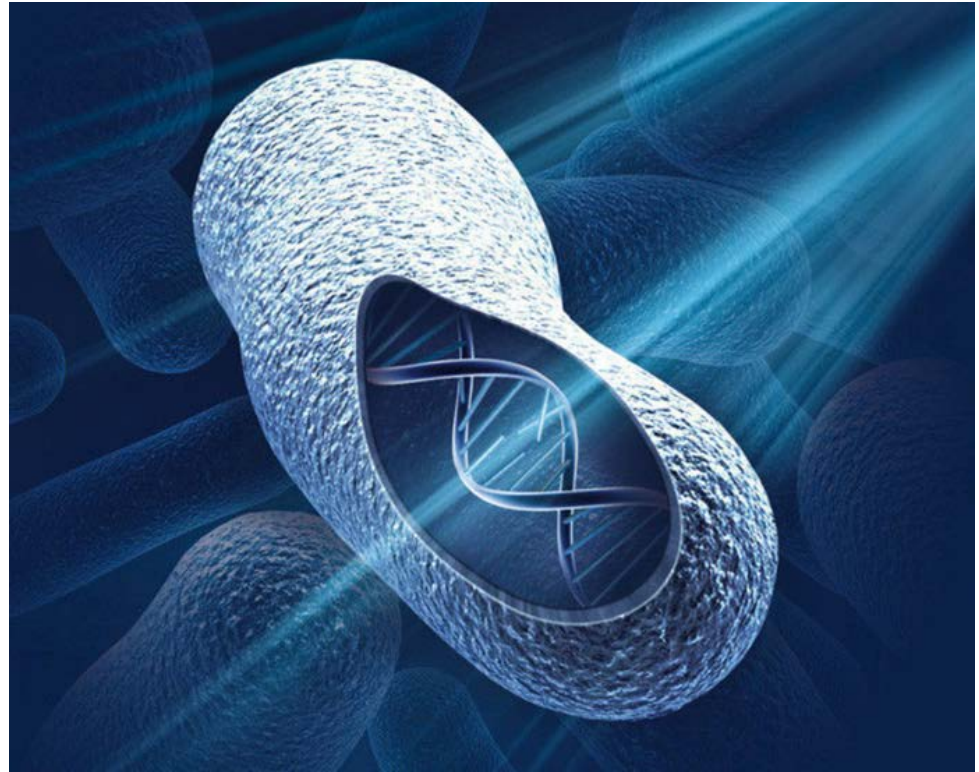
Operation during filtration



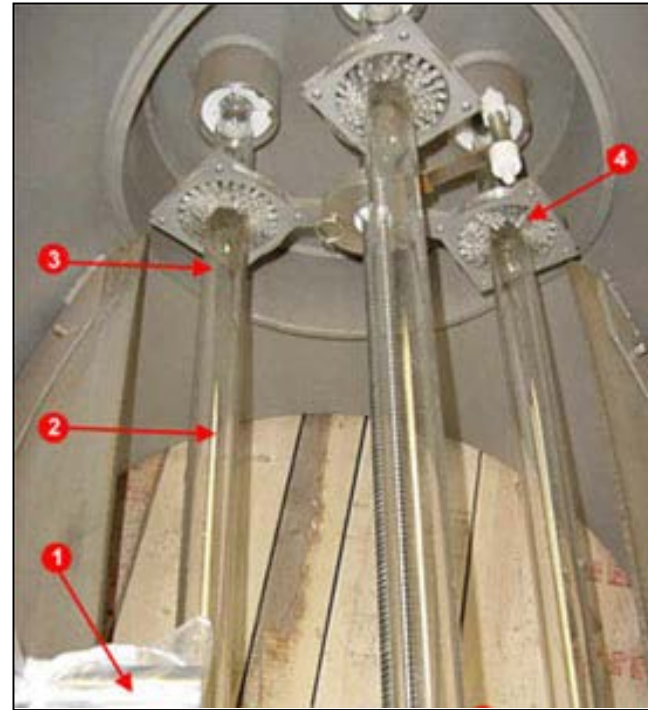
Operation during cleaning

UV Disinfection

- Filtered water is passed into a UV reactor chamber
- Inactivates micro-organisms
- UV rays penetrate the cell wall and destroys:
 - DNA material
 - cell components (i.e. proteins, enzymes, etc.) thus preventing reproduction and reactivation



UV Disinfection



UV Light (Ultraviolet) is used to inactivate microorganisms as well as to provide an additional barrier against *Giardia* and viruses.

Post - UV Chemical Injection



Ammonia

- Combines with Free Chlorine to make a longer lasting (more stable) disinfectant (Chloramines) for the distribution system

Fluoride

- Added to improve dental health

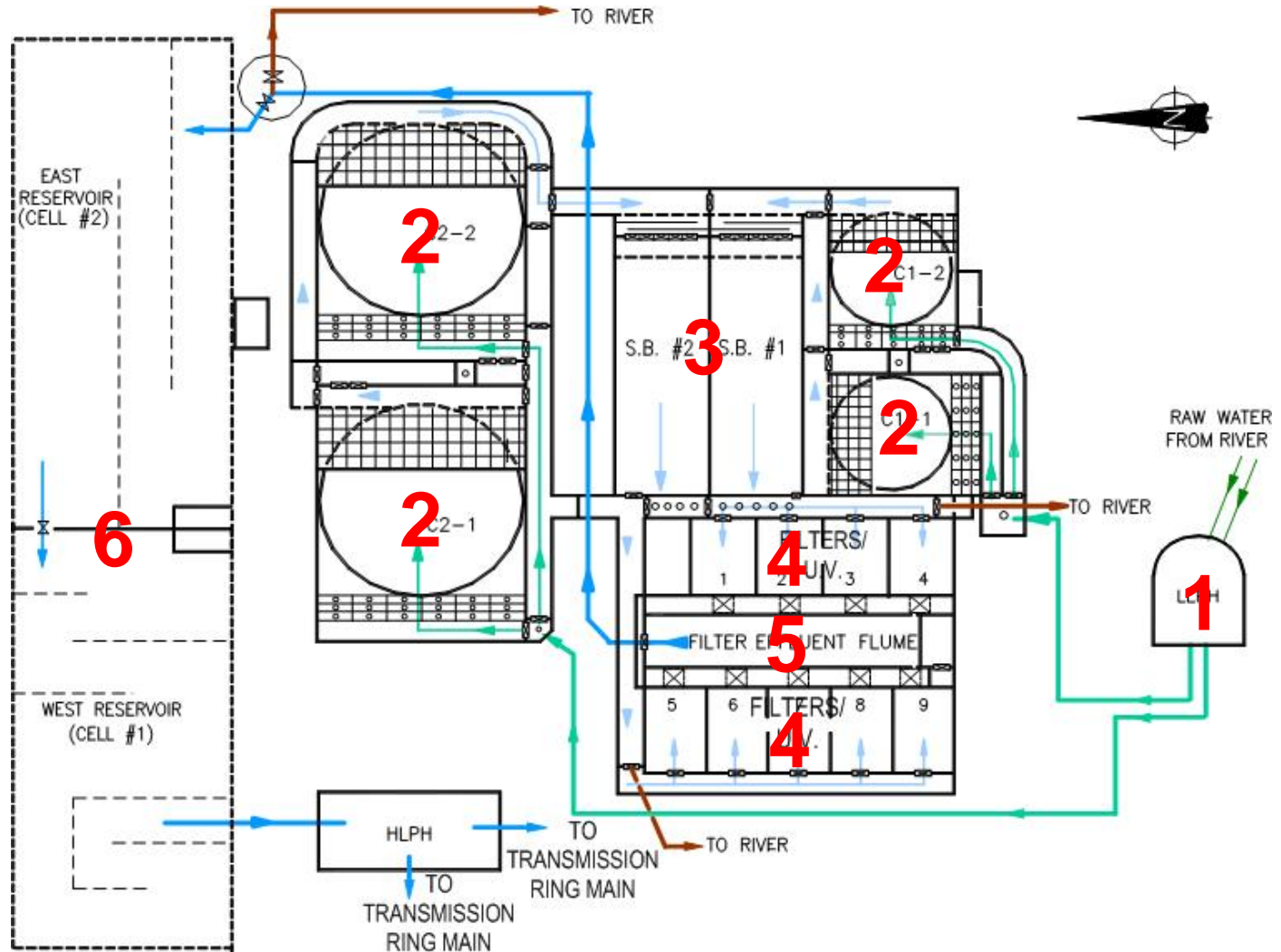
Caustic soda

- Added to adjust the pH of water to make it less corrosive for distribution system

Trim Chlorine (HYPO)

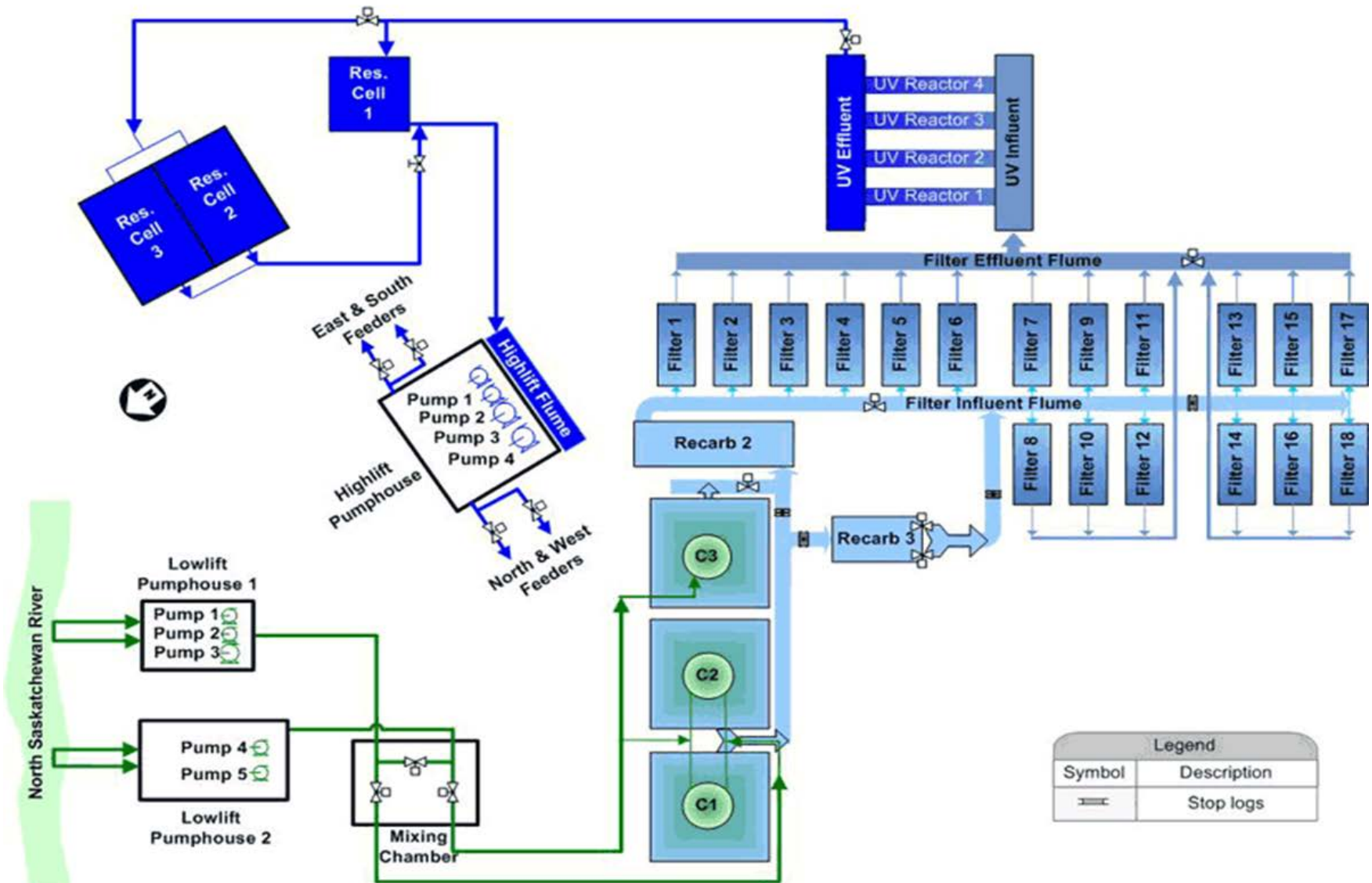
- Added to adjust the chlorine of water for distribution system

Rossdale Flow Diagram



E.L. Smith Flow Diagram

Treatment Systems Flow Overview





Thank You For Your Time

