

Enhancing NOM removal



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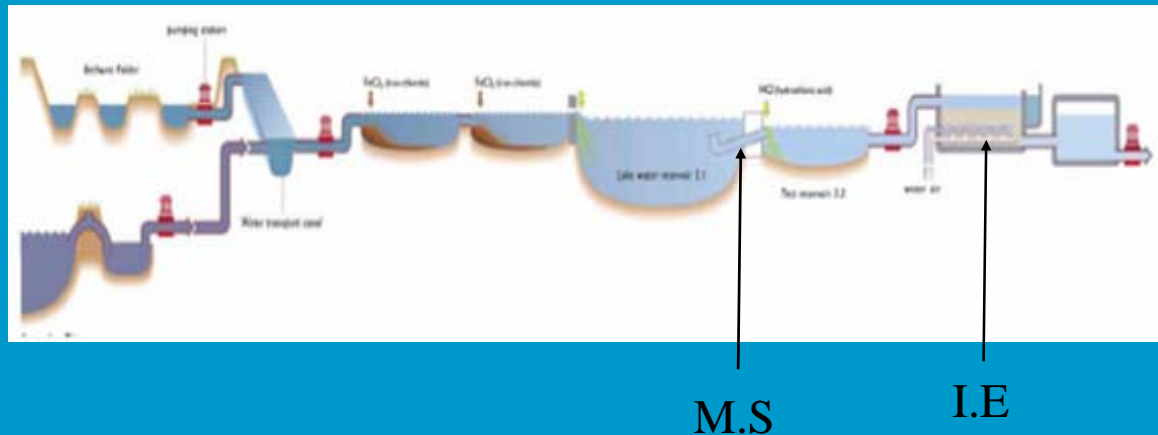
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1. Last presentation

Solution: Ion Exchange

Normal ion exchange together with the micro sieve



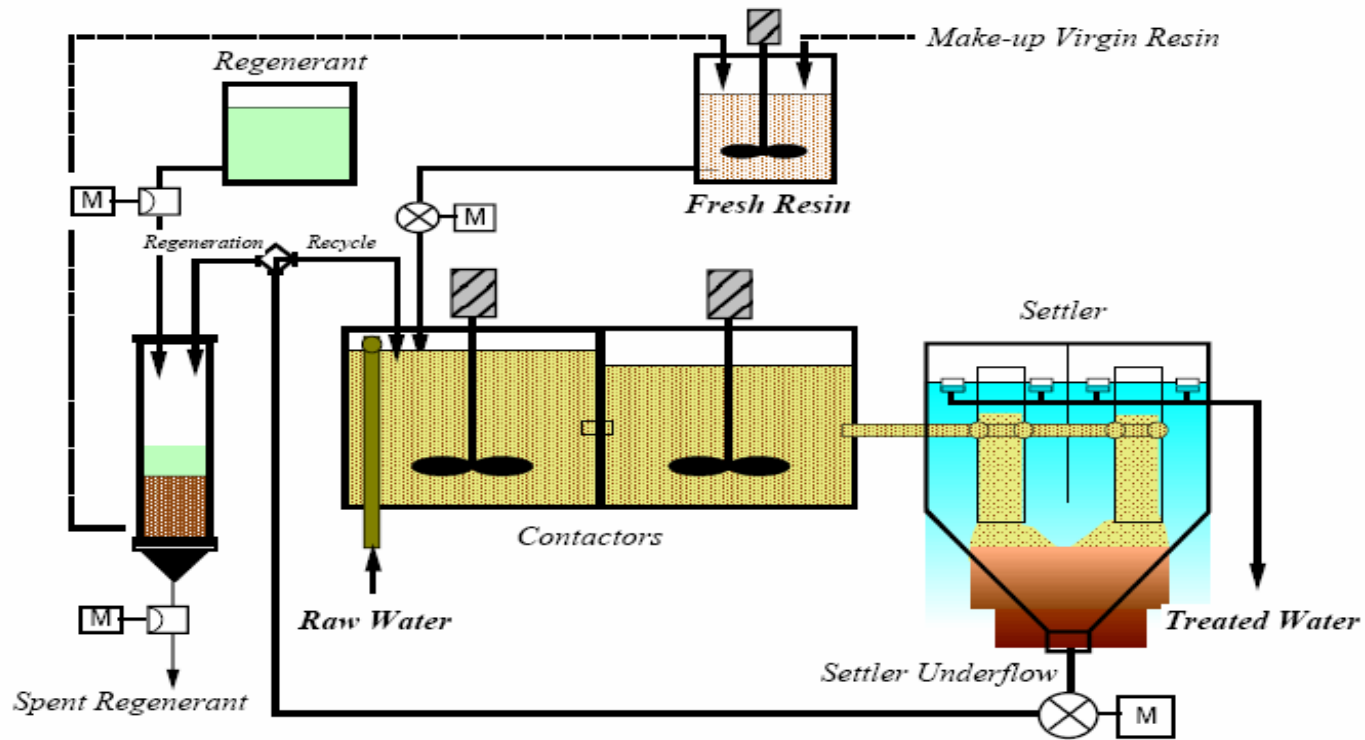
2. MIEX

Alternatives: Ion Exchange

1. Normal ion exchange together with the micro sieve
2. MIEX (Magnetic Ion Exchange)

2. MIEX

MIEX system



2. MIEX

Comparison

Remove the DOC more effectively

Large specific surface area

Resistance to fouling

Decrease the dose of the coagulant and other chemical demand

Improve the water odor and color

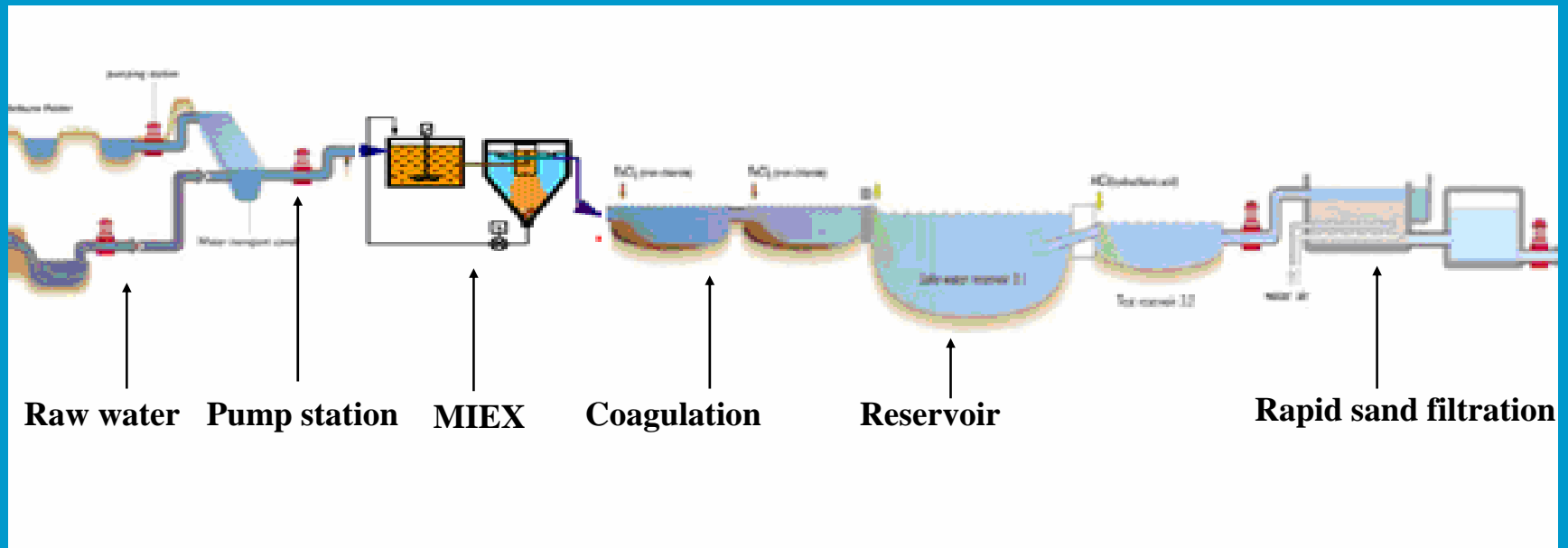
Resin reuse

Cost

...

3. Design

3.1 Treatment process scheme



3. Design

3.2 Calculation

1. Capacity

30 million m³/y 8.2*10⁴ m³/d 3.4*10³ m³/h

Maximum: 150*10³ m³/d Minimum: 57*10³ m³/d

2. Resin

Resin diameter: 150um

Resin dose: 8ml settled resin per liter water

$$8\text{ml/l} * 15 * 10^4 = 1200\text{m}^3/\text{d}$$

8% of resin slurry removed

$$1200/12.5 = 96\text{m}^3/\text{d}$$

3. Design

3.2 Calculation

2. Resin

Resin detention time:

Normal: 20 min Peak: 10 min

Regeneration:

Contact time: 30 min

Frequency: 10 hours

Regenerant concentration: 90 g/l NaCl (Brine)

3. Design

3.2 Calculation

3. Plant design

Contactor

Design parameter: Number: 4 circle concrete contactors

Volume: 300m³ Diameter: 5m Height: 4m

Peak time: $T = V/Q = 300 / (150000 / 24 / 4)$
 $= 11.52 > 10$ min

Normal time: $T = V/Q = 300 / (82200 / 24 / 4)$
 $= 21.1 > 20$ min

3. Design

3.2 Calculation

3. Plant design

Separator

Design parameter: Number: 6 circle settlers

Settler Rise Rate 15m/h (peak time)

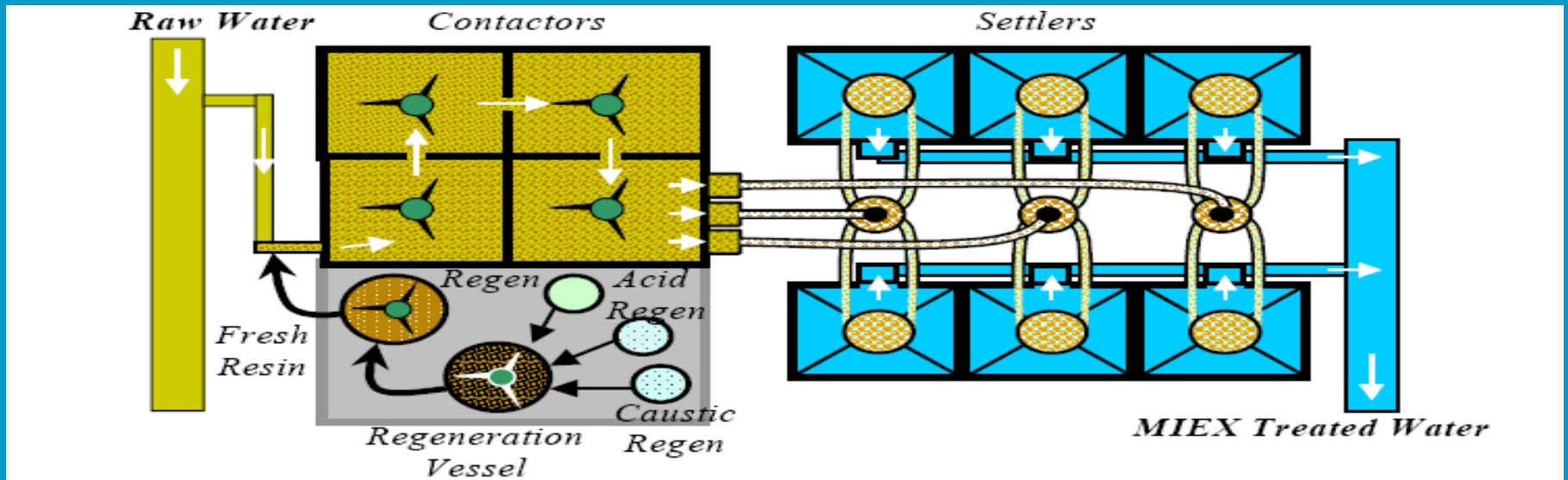
Diameter: 5m High: 10m

3. Design

3.2 Calculation

3. Plant design |← 5m →|

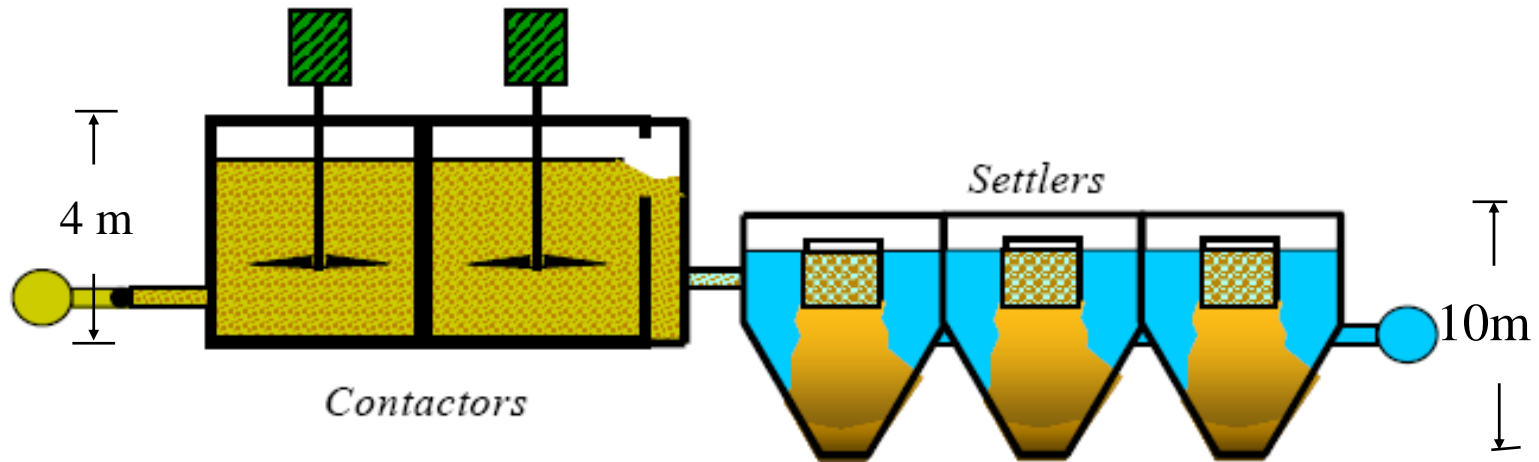
|← 5m →|



3. Design

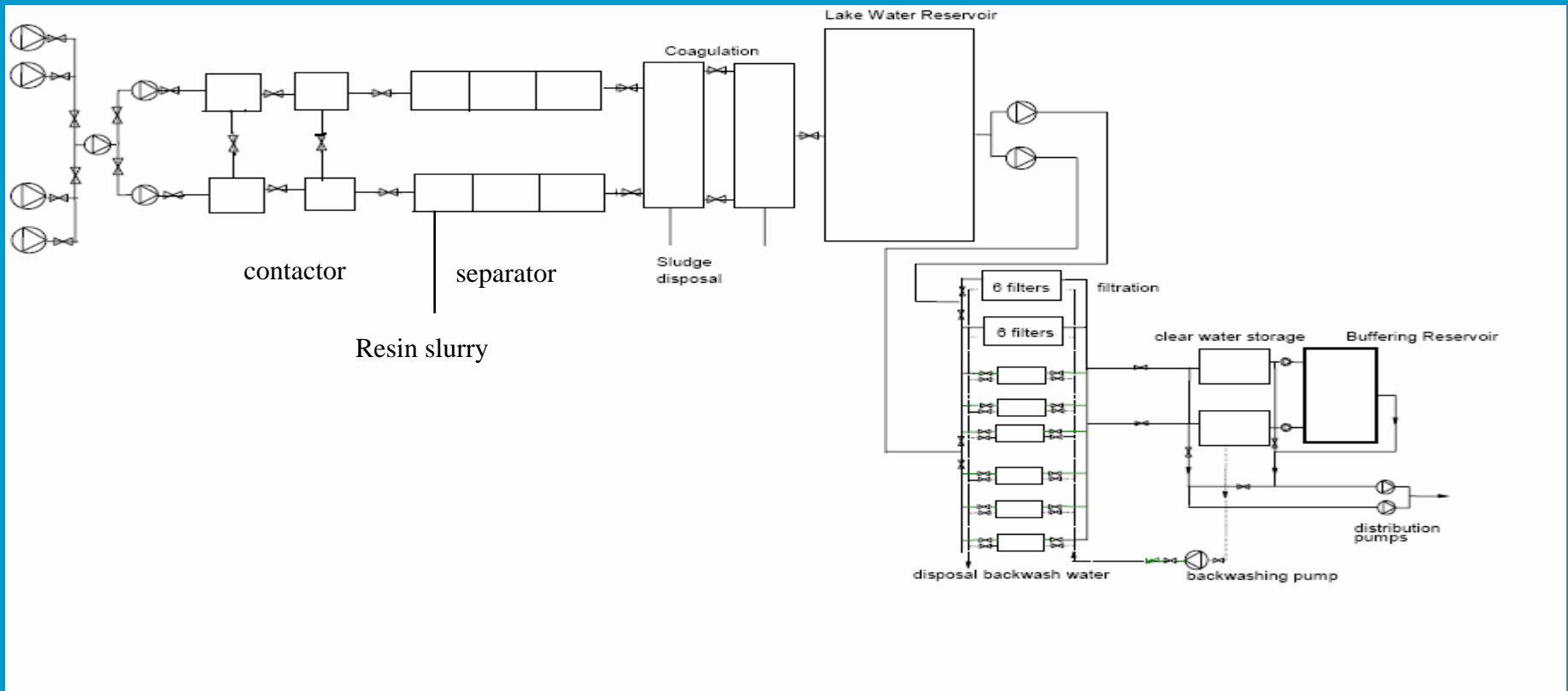
3.2 Calculation

3. Plant design



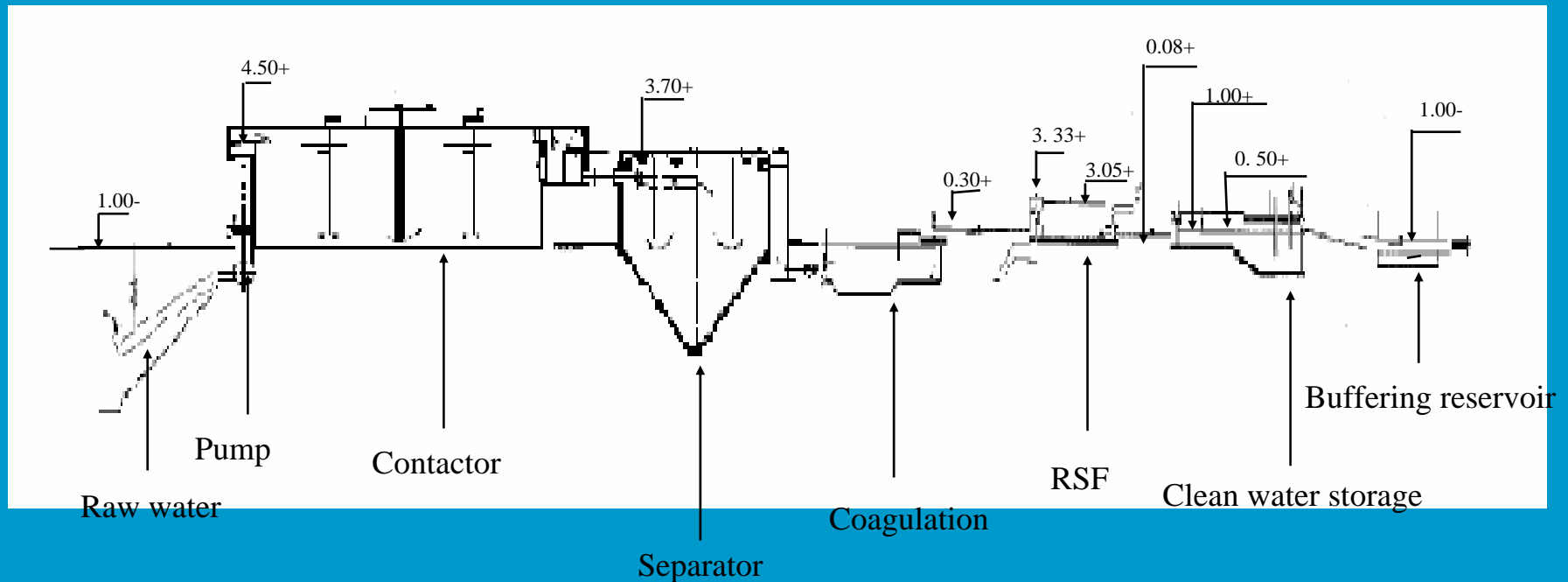
3. Design

3.3 Main flow diagram



3. Design

3.4 Hydraulic line scheme



4. Next step

- 1. Equipment choose (pump, agitator ...)**
- 2. Pipeline design**
- 3. Auxiliary design**
- 4. Cost**

Thank you !