Enhancing NOM removal

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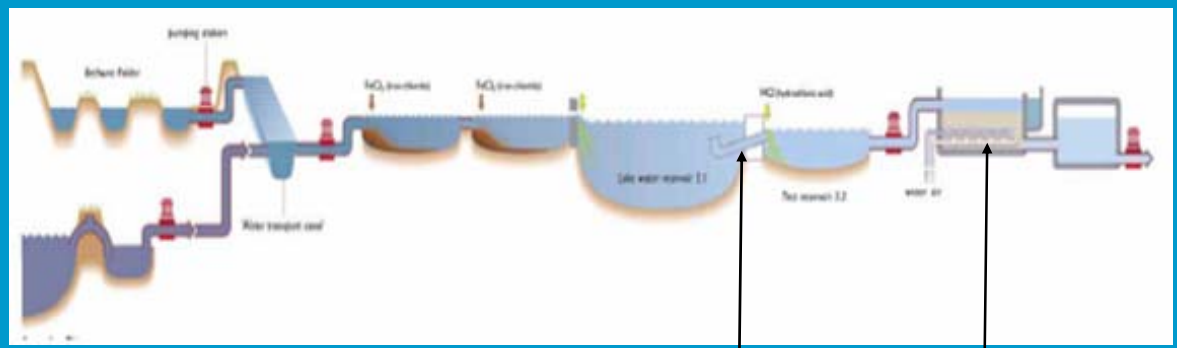
1. Analysis alternatives

Alternative 1

Fixed ion exchange together with the micro sieves



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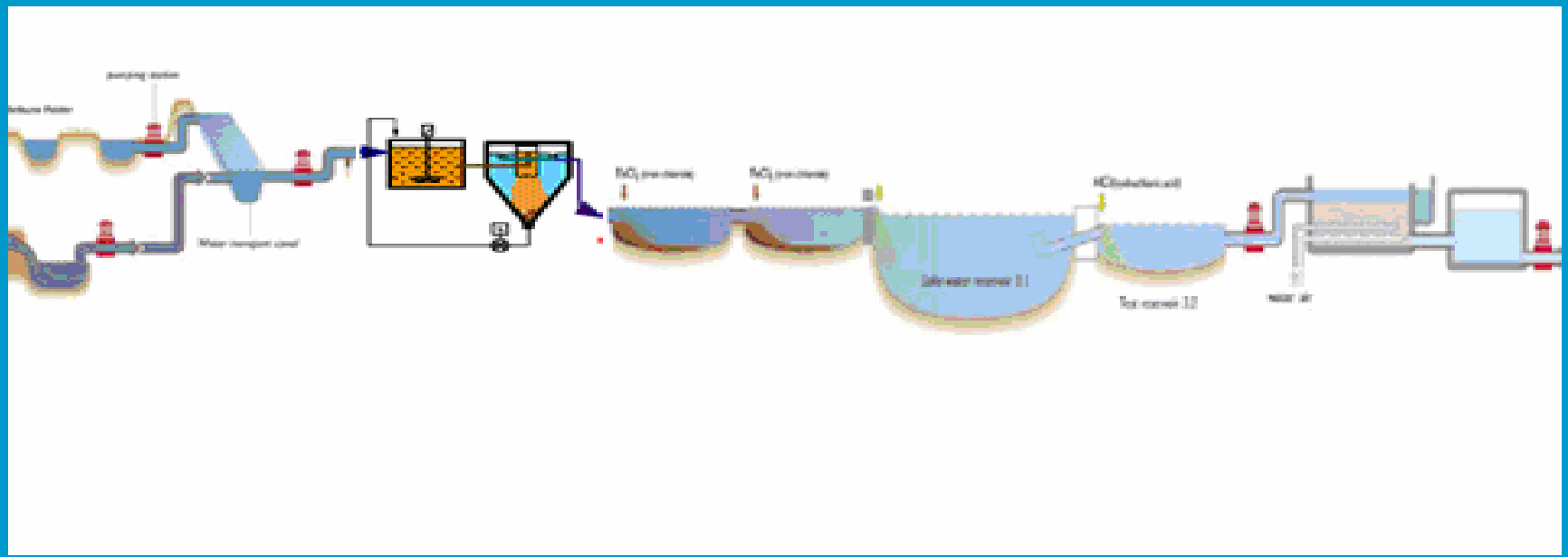
1. Analysis alternatives

Alternative 2: MIEX (Magnetic Ion Exchange)



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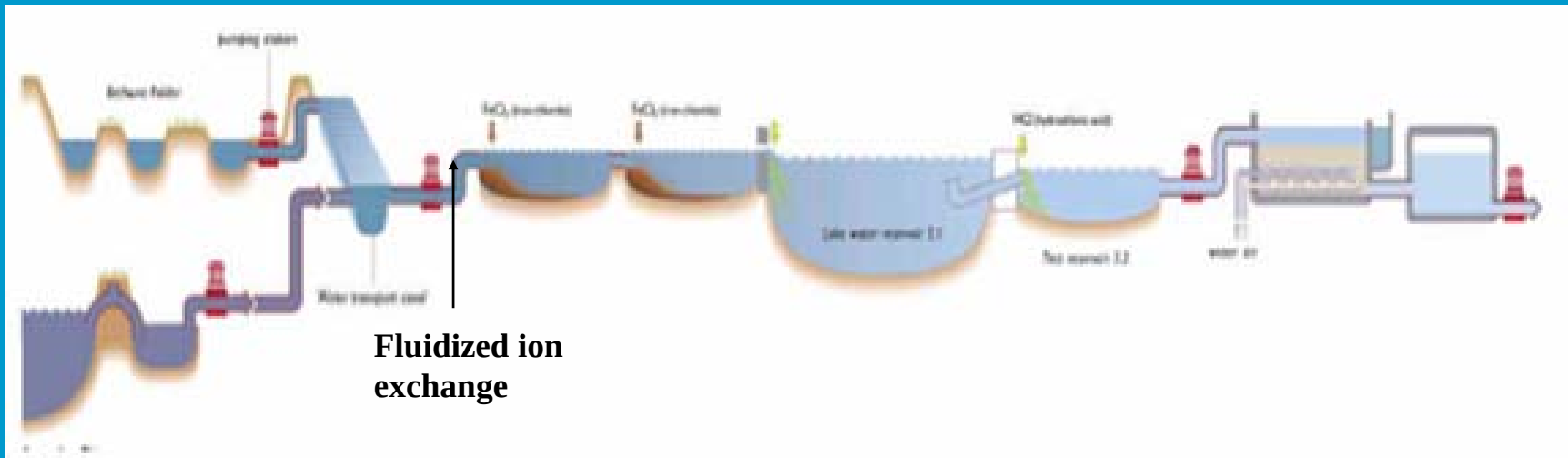
1. Analysis alternatives

Alternative 3: Fluidized Ion Exchange



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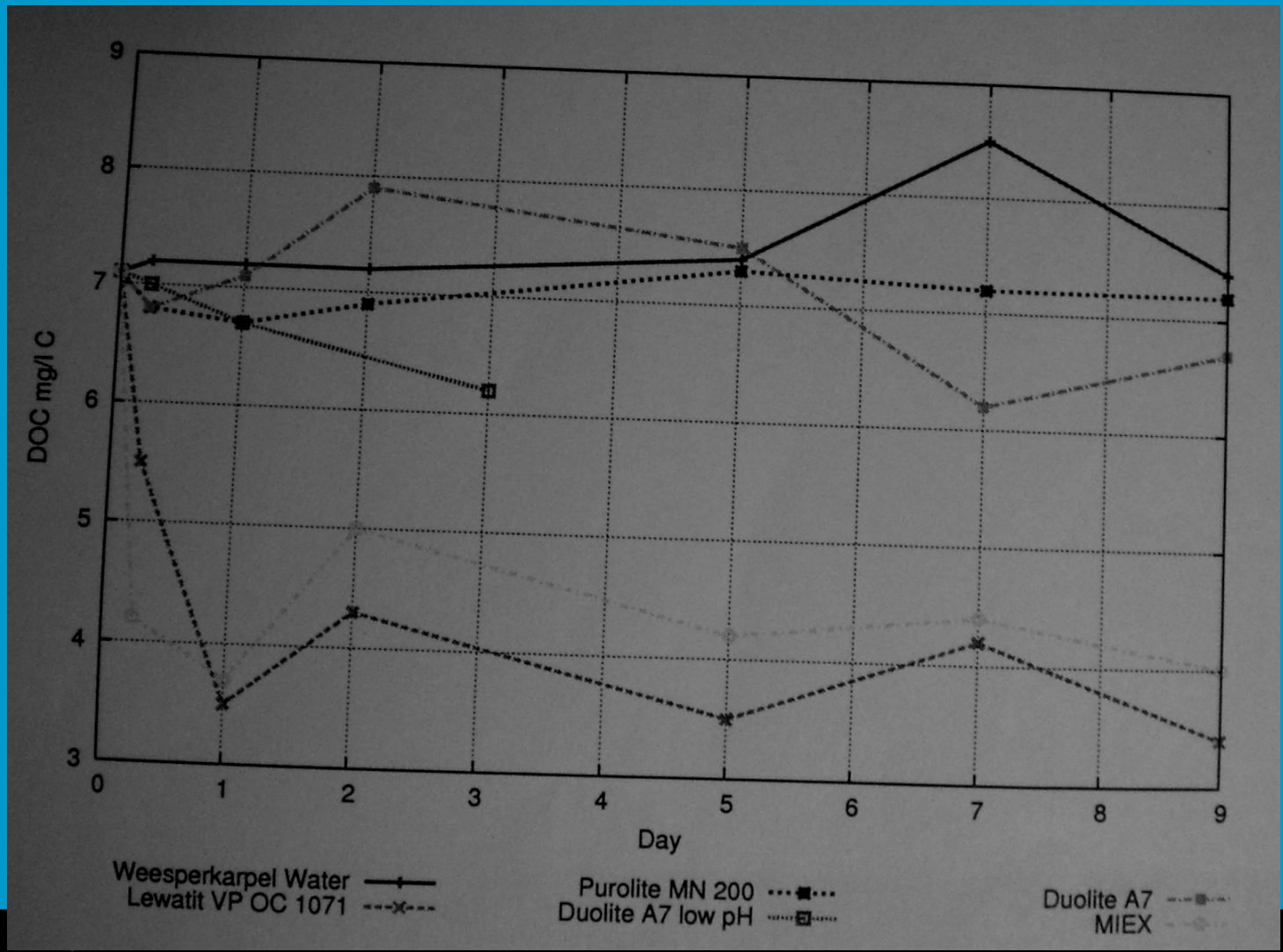
1. Analysis alternatives



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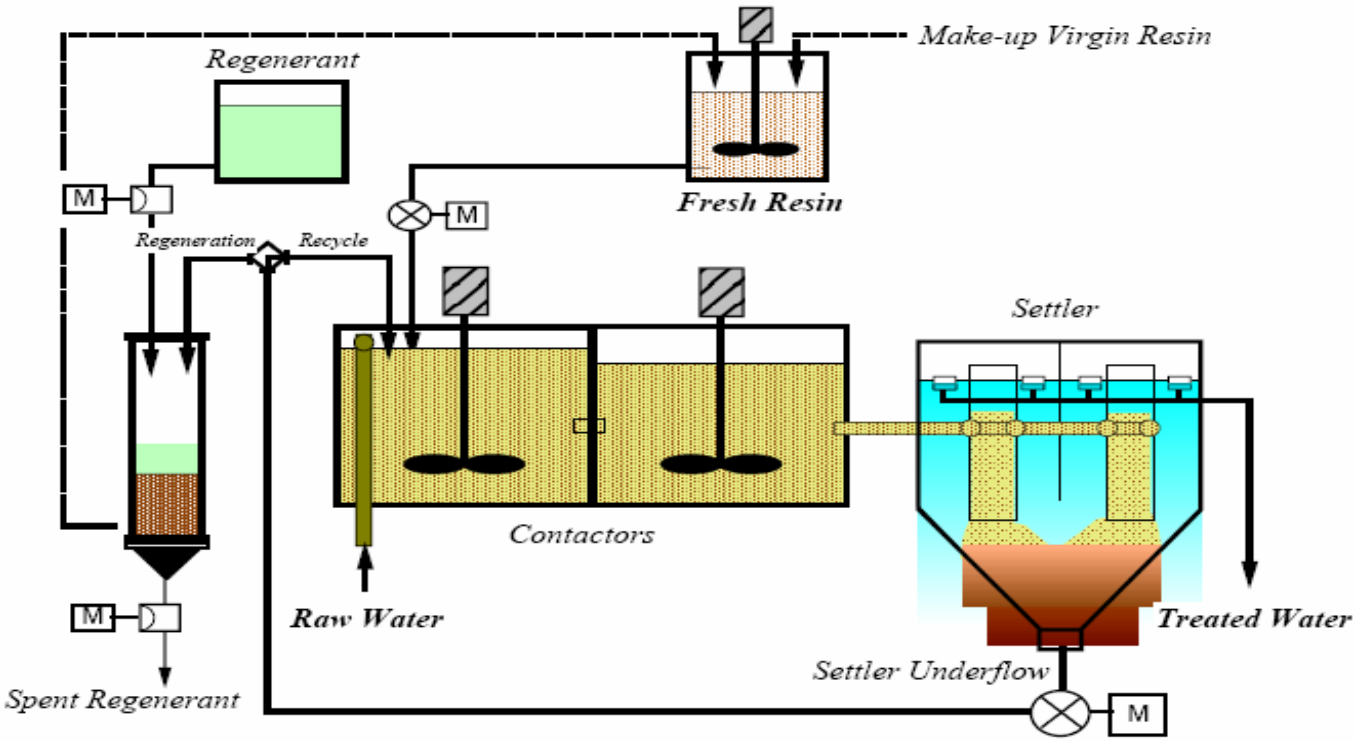
2. Dimensions of elements

2.1 MIEX system



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2. Dimensions of elements

2.2 Calculation

1. Capacity

30 million m^3/y $82*10^3$ m^3/d $3.4*10^3$ m^3/h

Maximun: $150*10^3$ m^3/d Minimum: $57*10^3$ m^3/d

2. Resin

(1) Resin diameter: 150um

(2) Resin dose: 8ml settled resin per liter water

8ml/l* $82*10^3$ m^3/d=$656m^3/d$

8% of resin slurry removed

$656/12.5=52.4m^3/d$

2. Dimensions of elements

2.2 Calculation

2. Resin

(3) Resin detention time: 20 min

Regeneration:

Contact time: 30 min

Frequency: 10 hours

Regenerant concentration: 90 g/l NaCl (Brine)

2. Dimensions of elements

2.2 Calculation

3. Plant design

(1) Contactor

Design parameter: Number: 4 circle concrete contactors

Volume:300m^3 Diameter:8m Height:6m

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

2. Dimensions of elements

2.2 Calculation

3. Plant design

(2) Separator

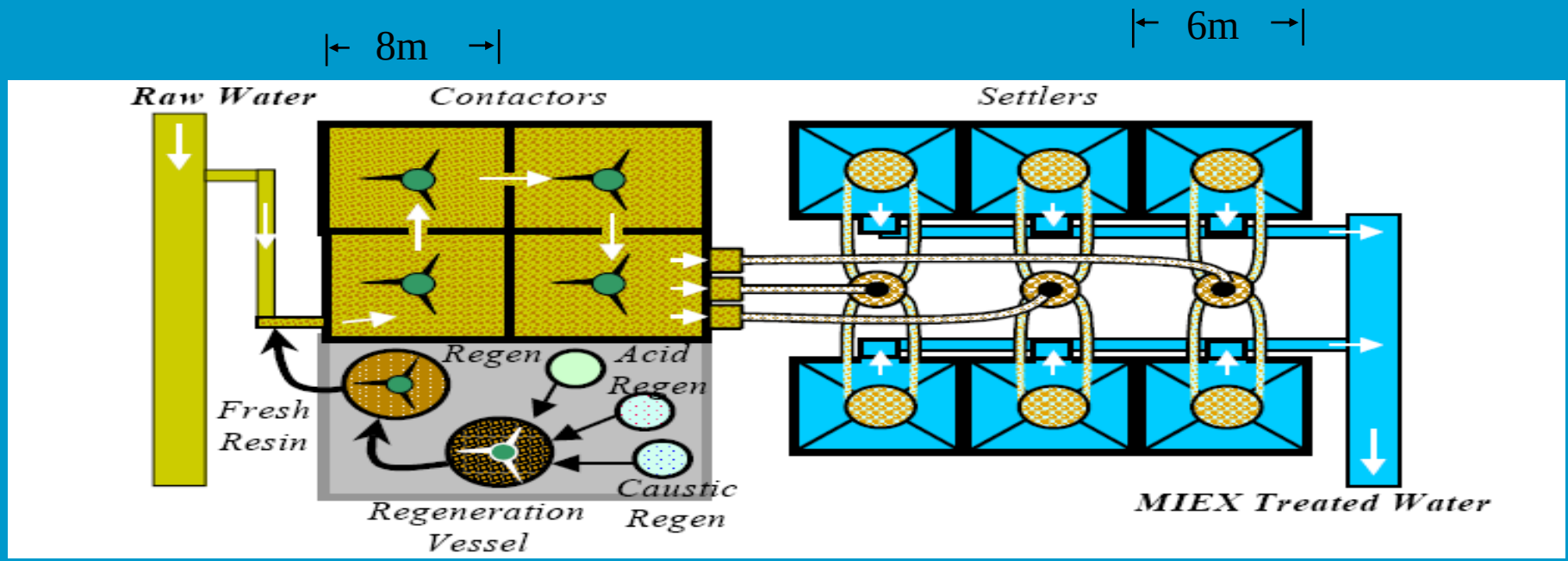
Design parameter: Number: 6 circle settlers

Settler Rise Rate 12m/h

Diameter: 6m High: 12m

2. Dimensions of elements

2.3 Dimension



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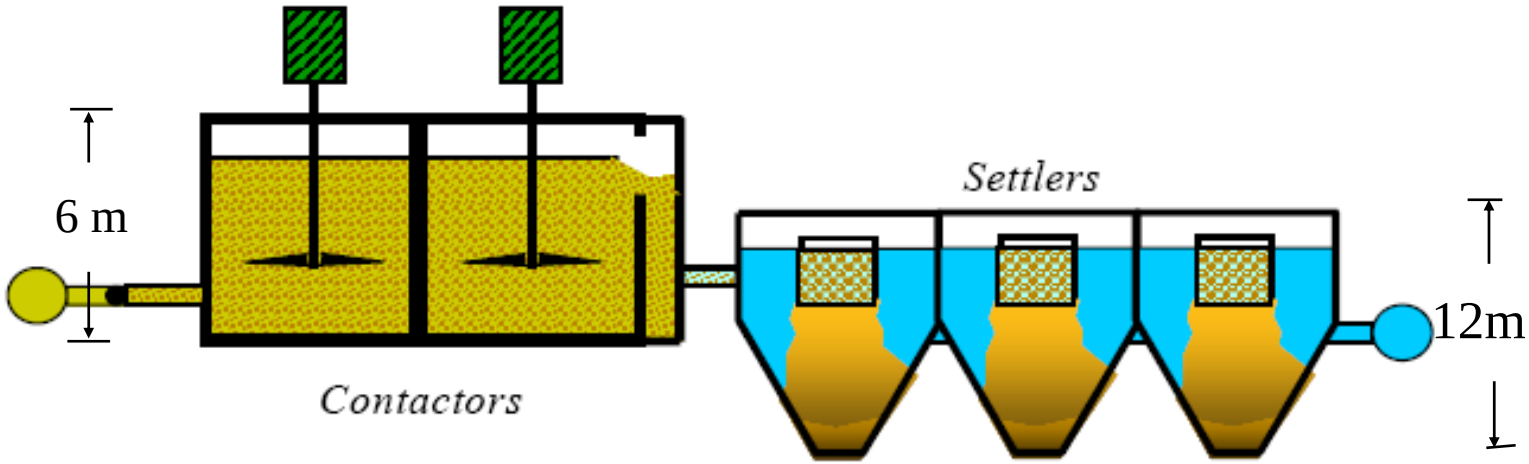
2. Dimensions of elements

2.3 Dimension



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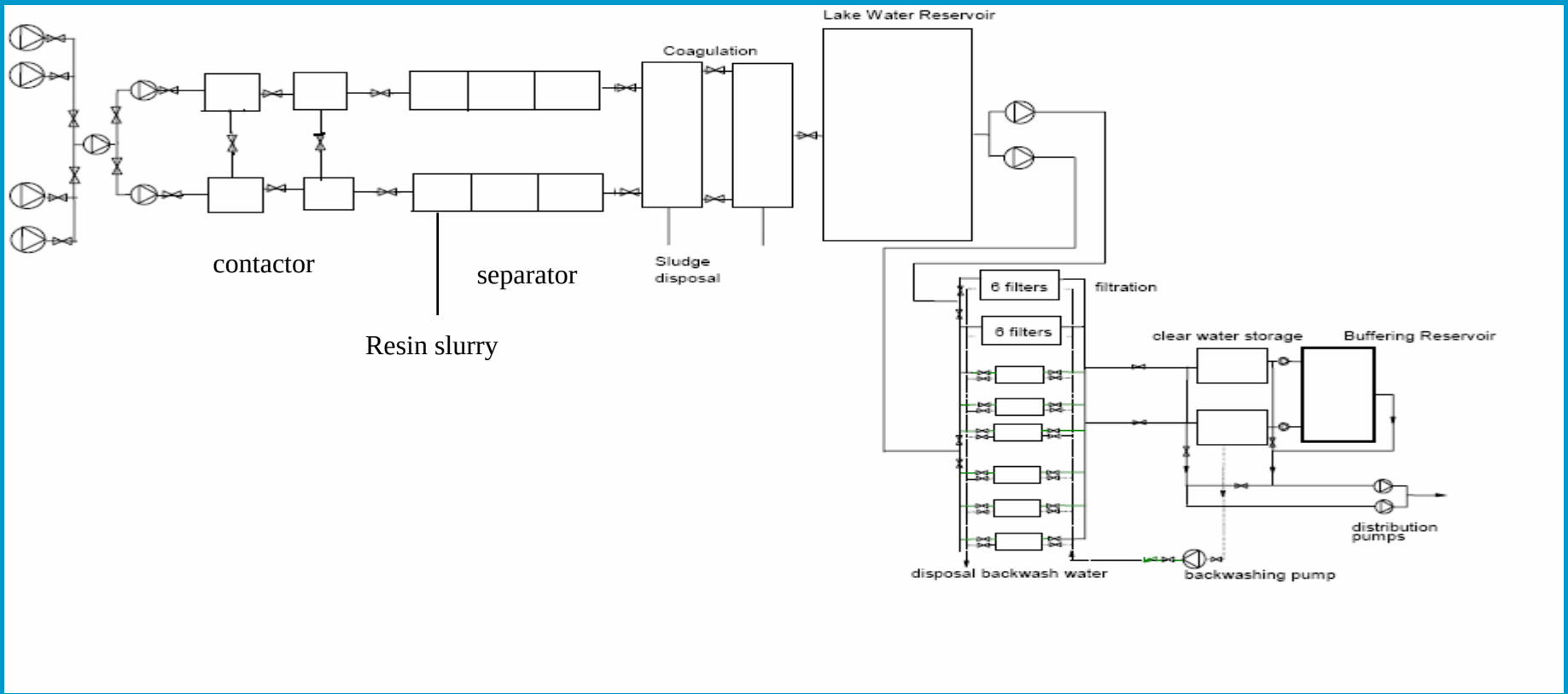
3. Main flow scheme



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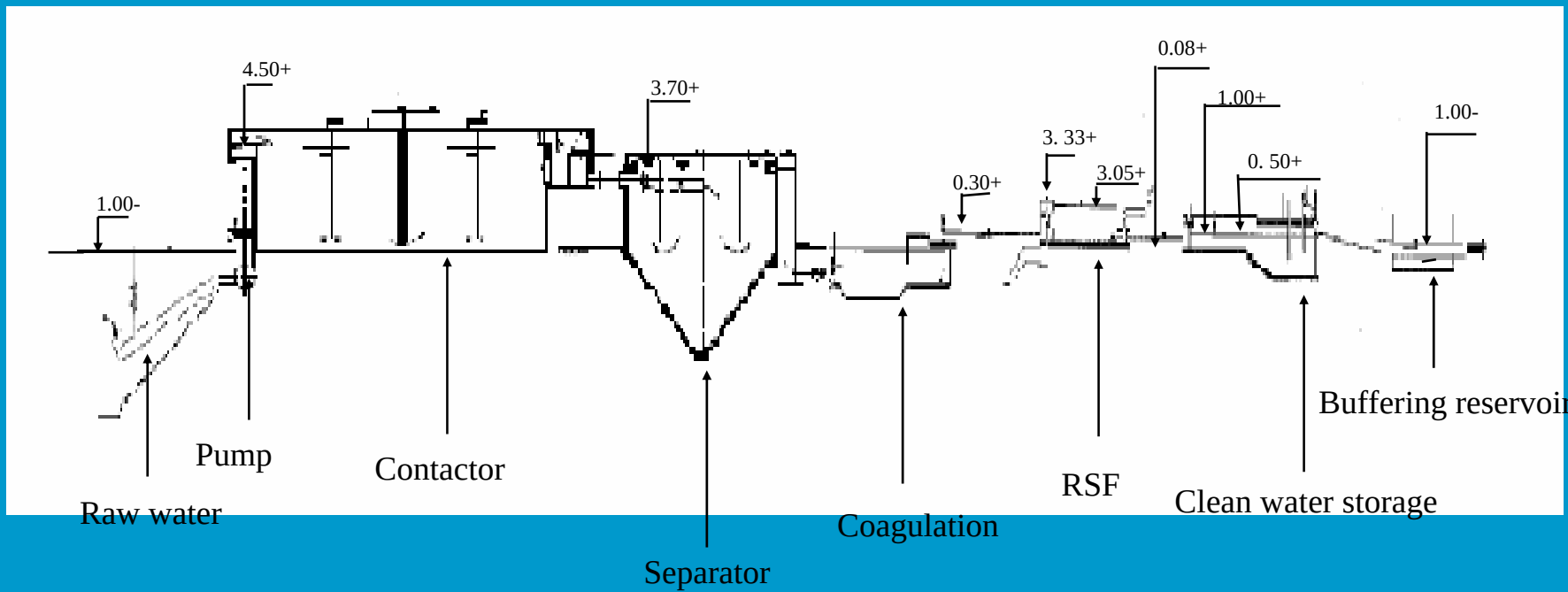
4. Hydraulic scheme



5. Site

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6. Cost analysis

- **Investment cost (6.2~7.6 million euro)**
  1. Construction costs
  2. Ground costs
  3. Furnishing costs
  4. Additional costs
- **Operating cost (5.9~6.8 cents/1000L)**
  1. Fixed costs
  2. Maintenance costs
  3. Administrative costs
  4. Specific operation cost

Thank you !