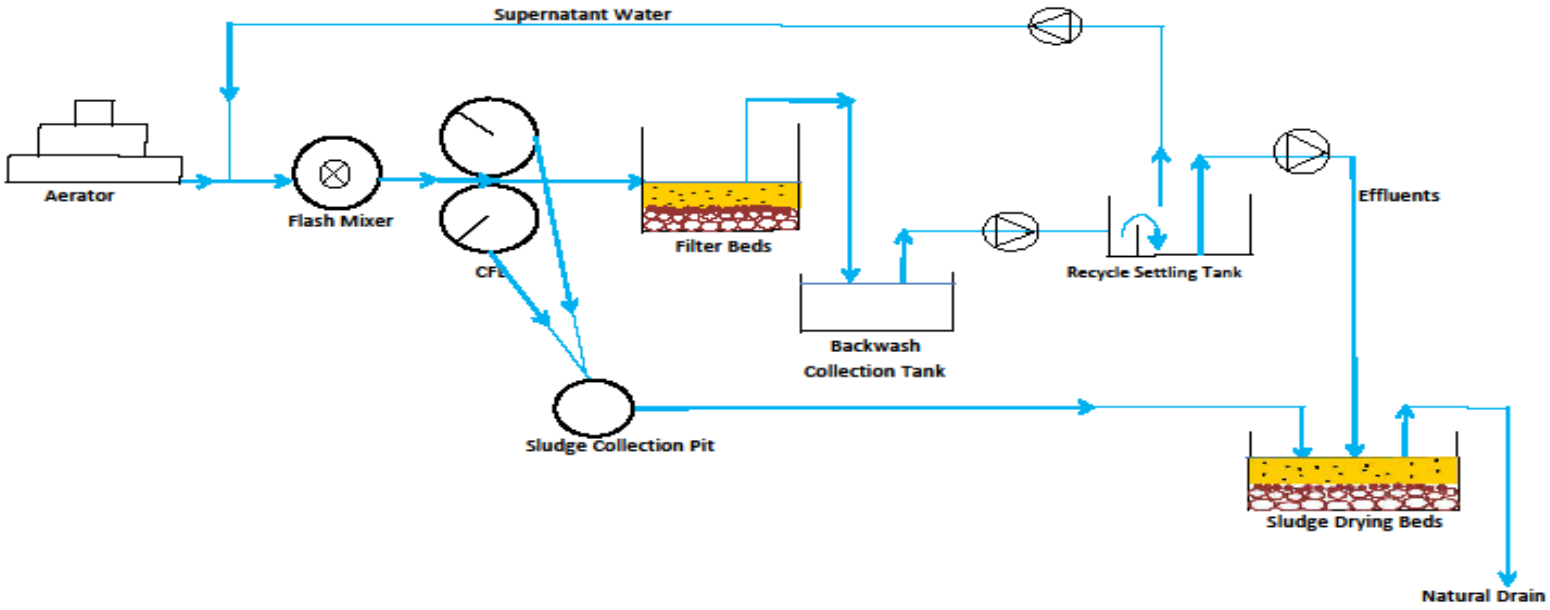
Mission Bhagiratha – Workshop on Grid O & M

RECYCLING SYSTEM IN WTP AND OBSERVATIONS OF ADVISORY COMMITTEE

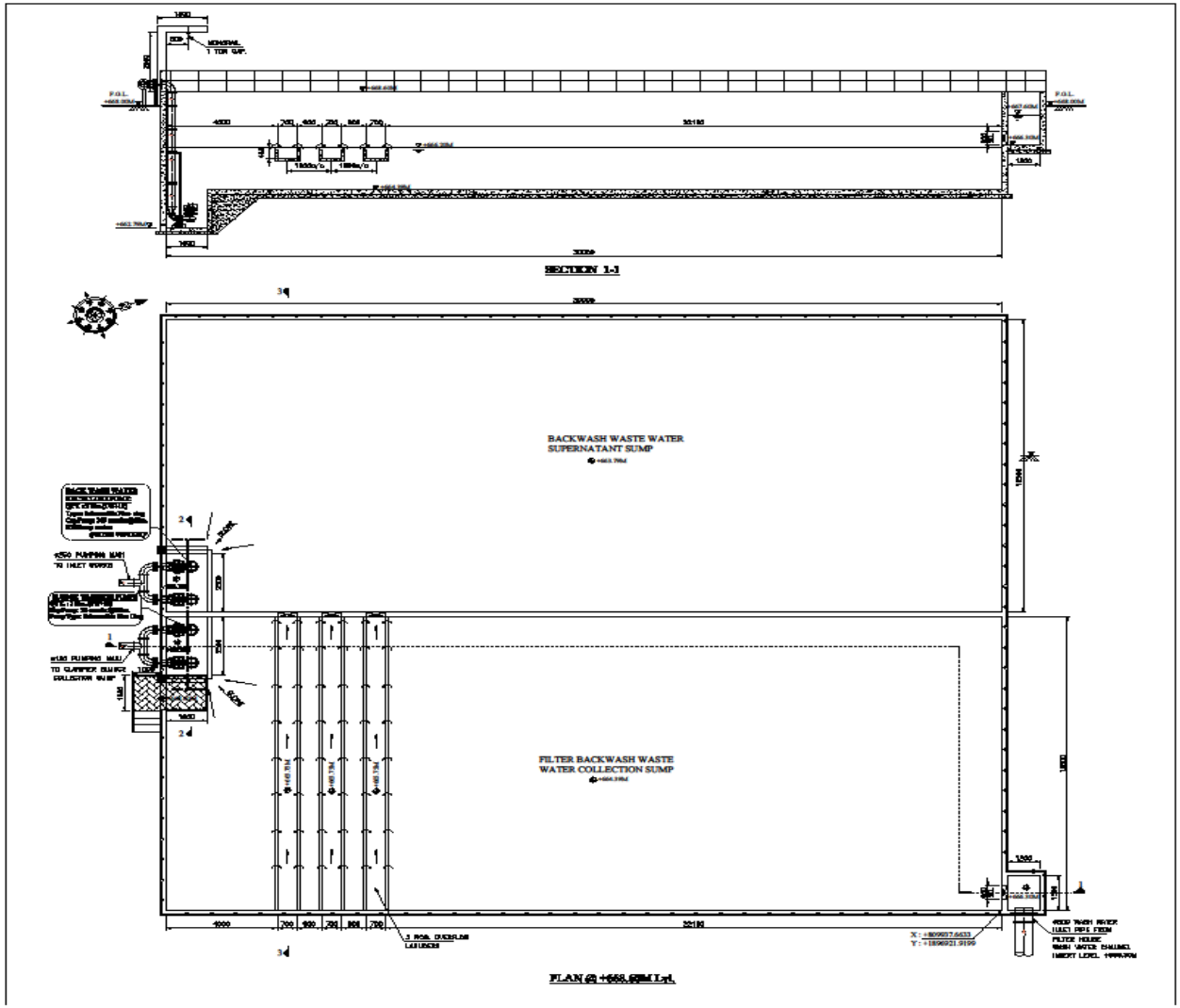
Introduction

- About 3 to 5% clear water production is required for RSF to backwash the beds.
- Every bed in RSF is to be washed in a day or When the loss of head in filter is more than 20%.
- Recycling the backwash water is an important activity to economise the production of water and as well to safeguard the environment.
- Example : 100 MLD Plant
  - Back Wash water - 3 to 5 MLD
  - Per annum - 1825 Million Litres

Recycling Unit –Flow Diagram



Recycling Unit – General Arrangement



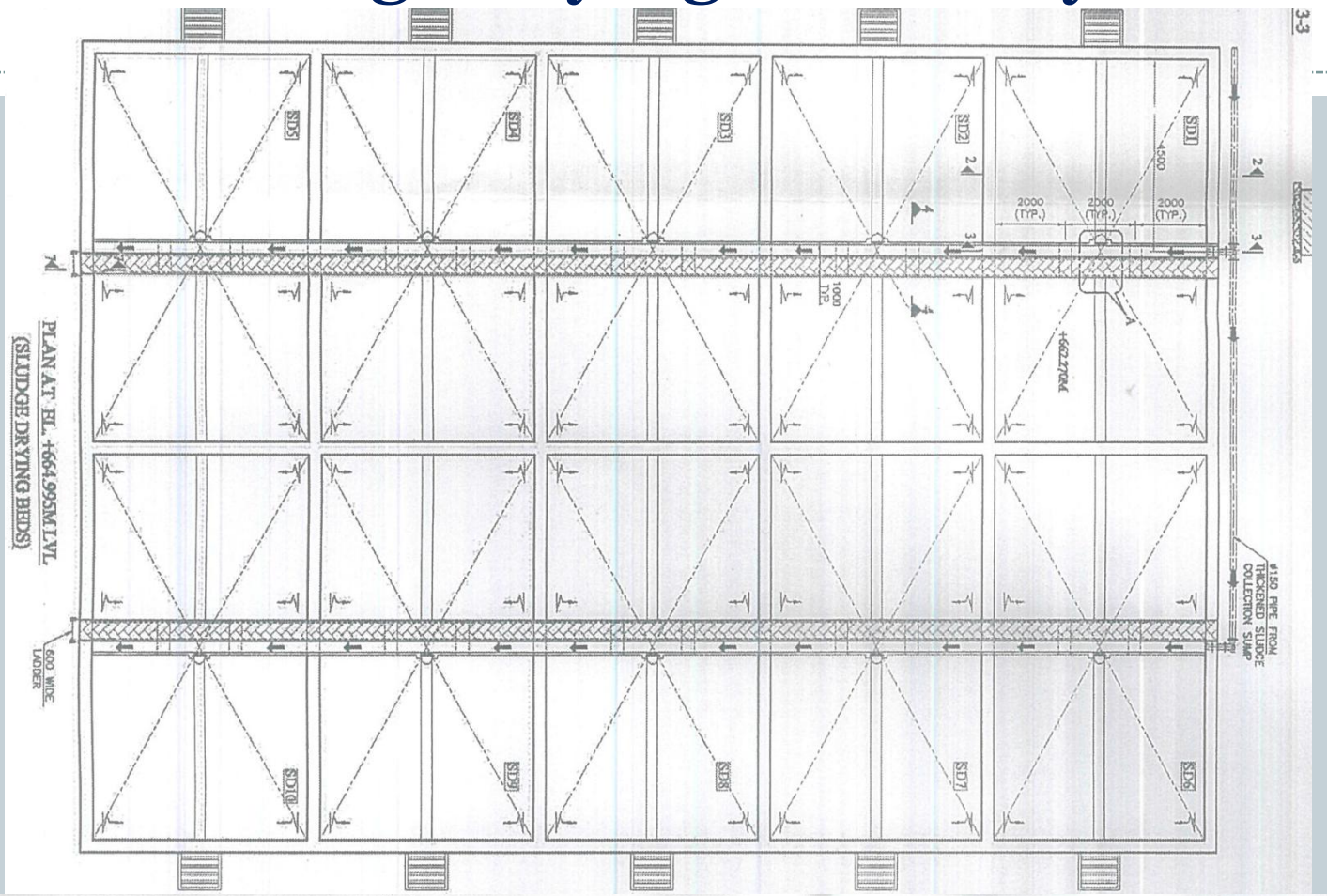
Process of Recycling

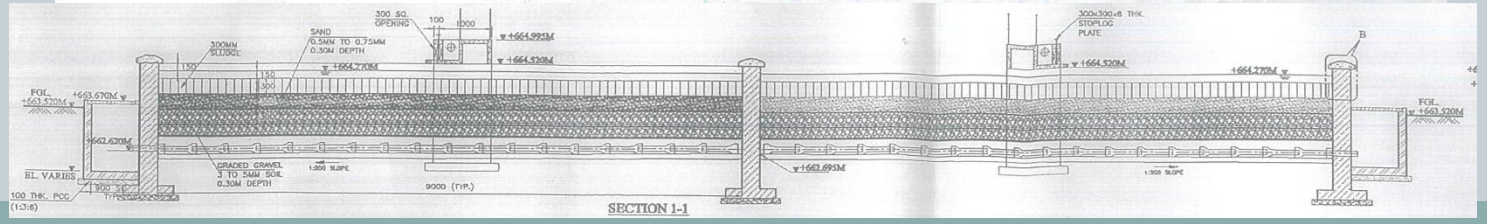
- The capacity of Recycling unit shall be 1/4th of the back wash quantity generated per day as per agreement provision.
- The recycling unit shall have two compartments 1) Sludge Collection sump 2) Supernatant Sump.
- Sludge collection sump needs a slope in floor 1 in 200 and Minimum Retention Period is 3 hrs
- The sludge collected in Sludge collection sump is pumped directly to Sludge Drying beds.

Process of Recycling

- The effluent collected in collection sump is sent to Supernatant Sump through troughs provided in the Sludge Collection sump.
- After settlement of sludge the Supernatant water shall be pumped into stilling chamber of WTP for recycling at an average rate i.e the total produced supernatant quantity of water is equally pumped back throughout the operation period. The Alum dosage is to be calculated accordingly based on turbidity.

Sludge Drying Beds -Layout





Sludge Drying Beds - Process

- Sludge drying beds are to be provided for the expected sludge in 10 days as per CPHEEO Manual.
- The depth of sludge when reached to 30 Cm, the influent to the bed is to be stopped and another bed shall be used. Once the sludge is dried, the same shall be removed and safely disposed to fill low lying areas/ in bricks manufacturing units.
- Sludge generated from the Sedimentation tanks/Clariflocculators/ Recycling unit is to be pumped directly to sludge drying beds.

Sludge Drying Beds - Process

- The filtered effluent from the beds is to be safely disposed to the nearest surface drains as per environmental acceptability.
- Ensure at any point of time at least 50% of the beds are available for proper disposal of effluent.

OBSERVATIONS OF ADVISORY COMMITTEE AND REMEDIES

- Observation: At most of the WTPs Recycling units are provided with insufficient quantity and size and not as mentioned in the agreement conditions.
- **Requirement:** The volume of Recycling Tank shall be 25% of Backwash quantity.
- But the already constructed Recycling Tank can be used according to the local conditions.

Observations and Remedies

- Observation: The retention period is low for the capacity of Recycling tank constructed.
- **Requirement:** Retention period shall be Minimum three hours. In pumping back the unsettled backwash water to Aerator, creates extra load of turbidity and thus resulting excess dosage of Alum as per the procedures in vogue.
- In view of the above it is advisable to schedule the intervals in between backwashes per day so as to utilize the recycling tank effectively.

Observations and Remedies

- Observation: The Troughs and their section along with slope towards Supernatant Tank is less than the requirement, thus resulting unnecessary flooding in Sludge collection tank.
- **Requirement:** Workout the section required for the trough based on the discharge.
- To use effectively provide proper slopes and clean the troughs at regular intervals
- If time permits during the shut down period add one more trough if requied.

Observations and Remedies

- Observation: In Recycling tank Sludge Collection pit is not provided.
- **Requirement:** Provide a pit size of minimum 1.2 m x 1.2 m to accommodate suction pipe of Sludge pump into the Sludge collection pit to avoid unnecessary disturbance in supernatant water.
- During the shutdown period construct sludge collection pit and also provide a slope in flooring minimum 1 in 200 towards sludge collection pit.

Observations and Remedies

- Observation: Pumping of backwash water to Recycling Tank
- **Requirement:** As far as possible the Engg. staff shall ensure that the backwash water comes to Recycling Tank by gravity in future works so as to economize the process.

- **Observation:** Log books for pumps and treated quantity of recycling water at both the pumping stations not provided
- **Requirement:** Log books are need to be maintained separately for Pumps, pumping of Sludge and also Supernatant water so as to keep up the efficiency of treatment plant

- Observation: In one of the WTPs, Construction of Recycling tank is completed and also provided Pumps but they have not completed the Sludge Drying Beds. The infrastructure constructed is not in use.
- **Requirement:** The Recycling tank constructed can be used without any further loss of time duly pumping the supernatant water to Aerator/ Stilling Chamber

Observations and Remedies

- Observation: At most of the WTPs, Higher Capacity of pumps and pumping main are provided to pump supernatant water from Recycling Tank
- **Requirement:** By providing higher capacity of pumps and pumping main, we are unable to pump the supernatant water uninterruptedly resulting uneven dosage of Alum. It is advisable to provide required capacity of pumps including standby and pumping main for an uninterrupted supply to Aerator.

Observations and Remedies

- Observation: At some WTPs the effluent from the Sludge drying beds is also being pumped to Aerator.
- **Requirement:** This process needs a thorough chemical investigation before pumping back to Aerator. The literature mentions that the effluent is to be disposed in nearby drains as it may contain objectionable substances.

- Observation: No pathway and railing and approach to Recycling Tank provided.
- **Requirement:** A pathway of 1.20M width with SS Railing all along the Recycling Tank for inspection and suitable approach are very much needed for proper maintenance.
- If permits this item may be initiated in the next O&M year

- Observation: At some places sending the sludge generated at CFL to Recycling Tank
- **Requirement:** The sludge generated at CFL shall directly be pumped to Sludge drying beds but not to Recycling Tank

Observations and Remedies

- Observation: Without depositing sufficient depth of the sludge, the beds are being shifted.
- **Requirement:** It is better to have sludge formed to a thickness of minimum 20 to 30 cms or the rate of filtration falls down to minimum levels, then only shift the bed.

Observations and Remedies

- Observation: It is observed that the sludge formed in Sludge Drying beds is scraped and being dumped with in the campus or near by sludge drying beds only.
- **Requirement:** The sludge removed from Sludge Drying beds shall not be dumped within the campus but transported to faraway places to fill up low lying areas or to use in brick manufacturing units to avoid contamination

Observations and Remedies

- Observation: Operation of sludge drying beds without following the norms
- **Requirement:** Minimum 40 to 50 percent area of the sludge drying beds shall always be available to continue the process of filtration uninterruptedly.

Observations and Remedies

- Observation: Meshes not provided at the inlet of the sludge drying bed
- **Requirement:** It is to be ensured that proper meshes provided at the inlet of the sludge drying beds during shutdown period to avoid entry of unnecessary materials.
- Observation: No proper Disposal of filtrate from sludge drying beds.
- **Requirement:** The effluent is to be disposed to nearby drains to avoid ground water contamination and also to avoid crop damage.

THANKS