Document Title:	Wastewater Management Plan	
Document ID Number:	CHAI-015	
Date of Issue:	9th December 2024	
Revision:	4	

Wastewater Management Plan

1. Project scope

The project will deliver a new plastics reprocessing facility with a maximum capacity throughput of up to 21,000 tonnes per annum to recycle PET, HDPE, PP, and mixed plastics. A facility of this size, assuming capture of all the relevant materials, will be able to manage the total 15,000t annually plastic materials which have been affected by the COAG export ban in WA.

The facility will consist of the following key components:

- Mixed plastics sorting and HDPE and PP flaking line
- PET flaking line
- HDPE and PET pelletising line

The planned sorting and reprocessing throughputs are:

Material	Annual volume/mass
Inputs	
High-density polyethylene (HDPE)	3,600 t/year
Polyethylene terephthalate (PET)	5,400 t/year
Mixed plastics (MP)	6,000 t/year
Water consumption	30 ML/year
Outputs	
Product:	
• HDPE pellets	4,200 t/year
• PET pellets	6,000 t/year
• PP flake (from MP)	1,800 t/year
Waste:	
• Plastic residue	3,000 t/year
• WWTP wastewater	30 ML/year
• WWTP sludge (80% moisture content)	600 t/year

The equipment will require the cleaning plastics and as such emit significant wastewater. This wastewater is first treated prior to being discharged into the sewer system.

2. Treatment Process

In this wastewater treatment system, the chemical treatment involves floatation for separation. The biological treatment primarily utilises fixed-bed systems with conventional activated sludge methods as a secondary option.
The wastewater undergoes physical and chemical treatment followed by biological (secondary) treatment at this wastewater treatment system. After secondary wastewater treatment (or undergoes tertiary treatment), the water is recycled for reuse in the front-end processes to conserve water resources.

Design flow rate: Designed flow rate of 15 CMD (cubic meters per day), actual flow rate of 10 CMD, and the effluent water should be less than 10 CMD.
The operation procedures: batch operation (8 hours of operation)

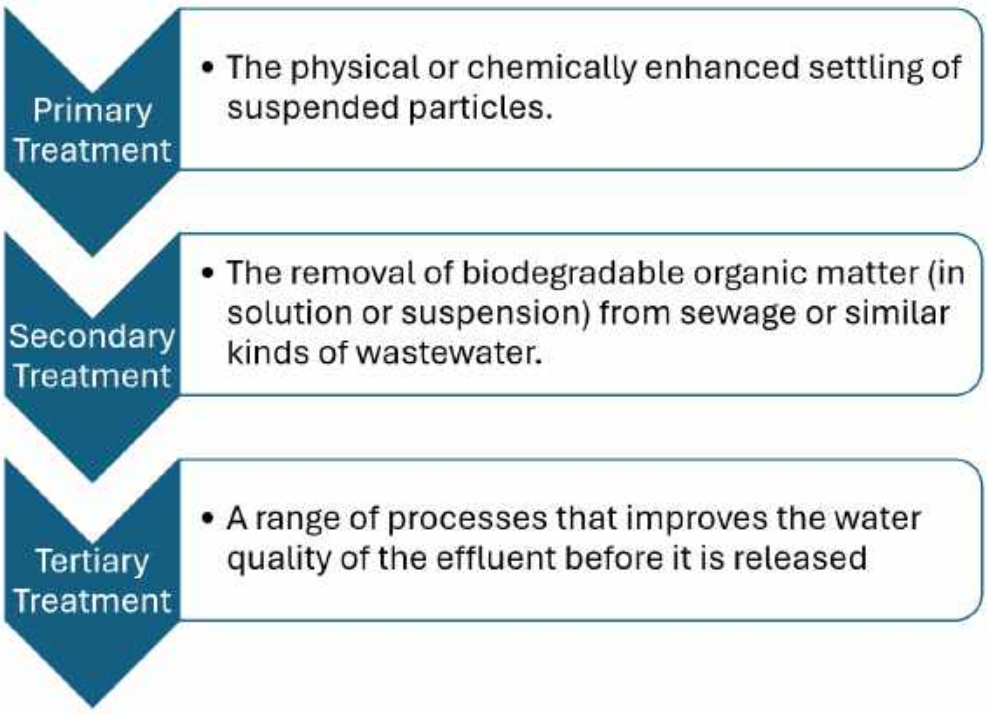

Figure 1 – Treatment diagram

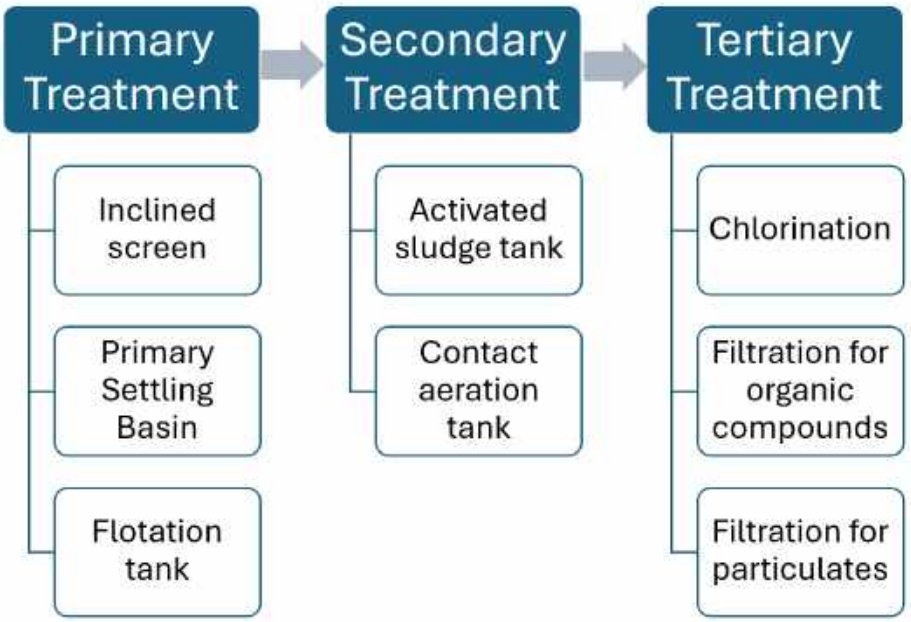

Figure 2 – Treatment diagram

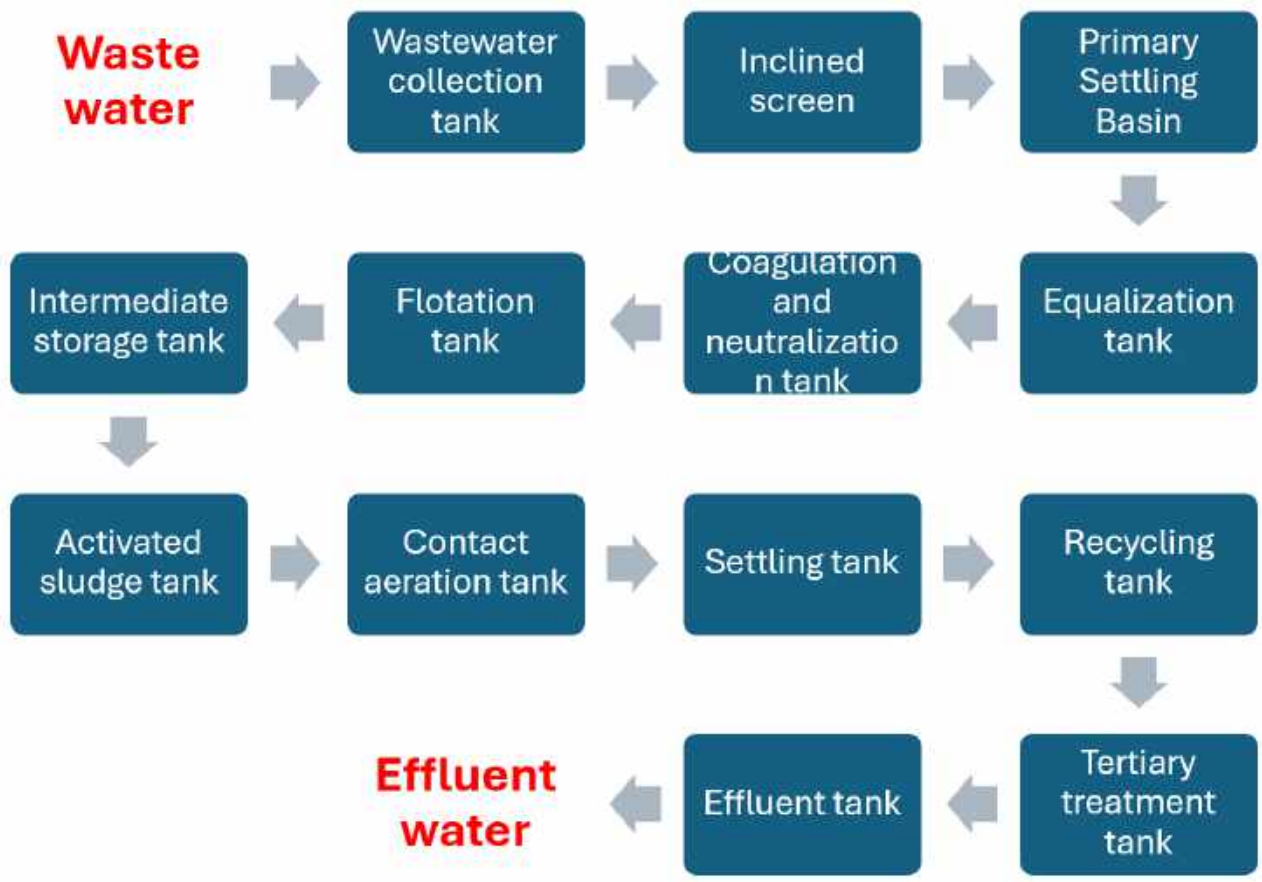

Figure 3 – Process flow chart

Document Title:	Wastewater Management Plan	
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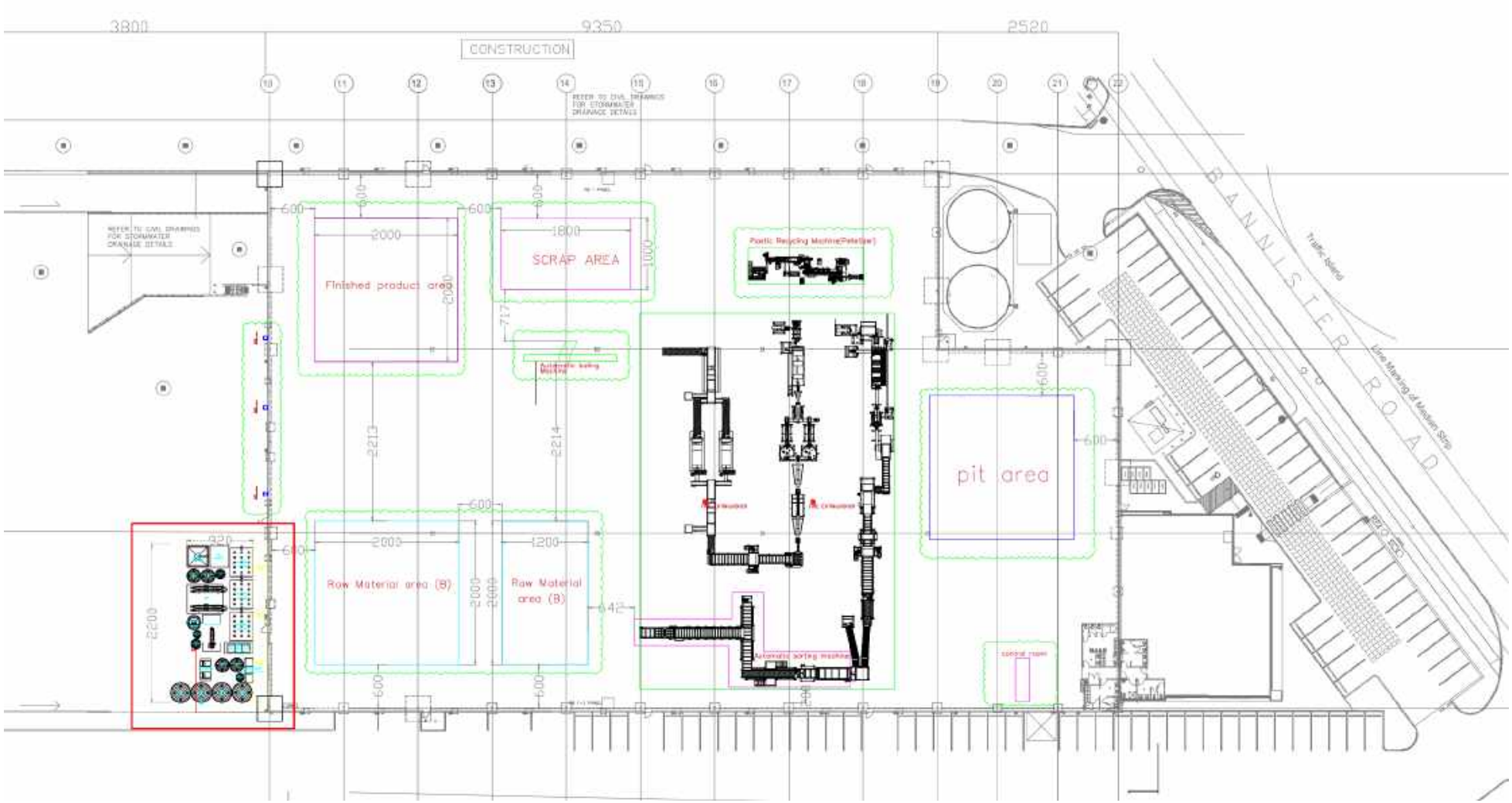
Facility Layout – 204 Bannister Road, Canning Vale



Note: Wastewater management plant is located in the red square

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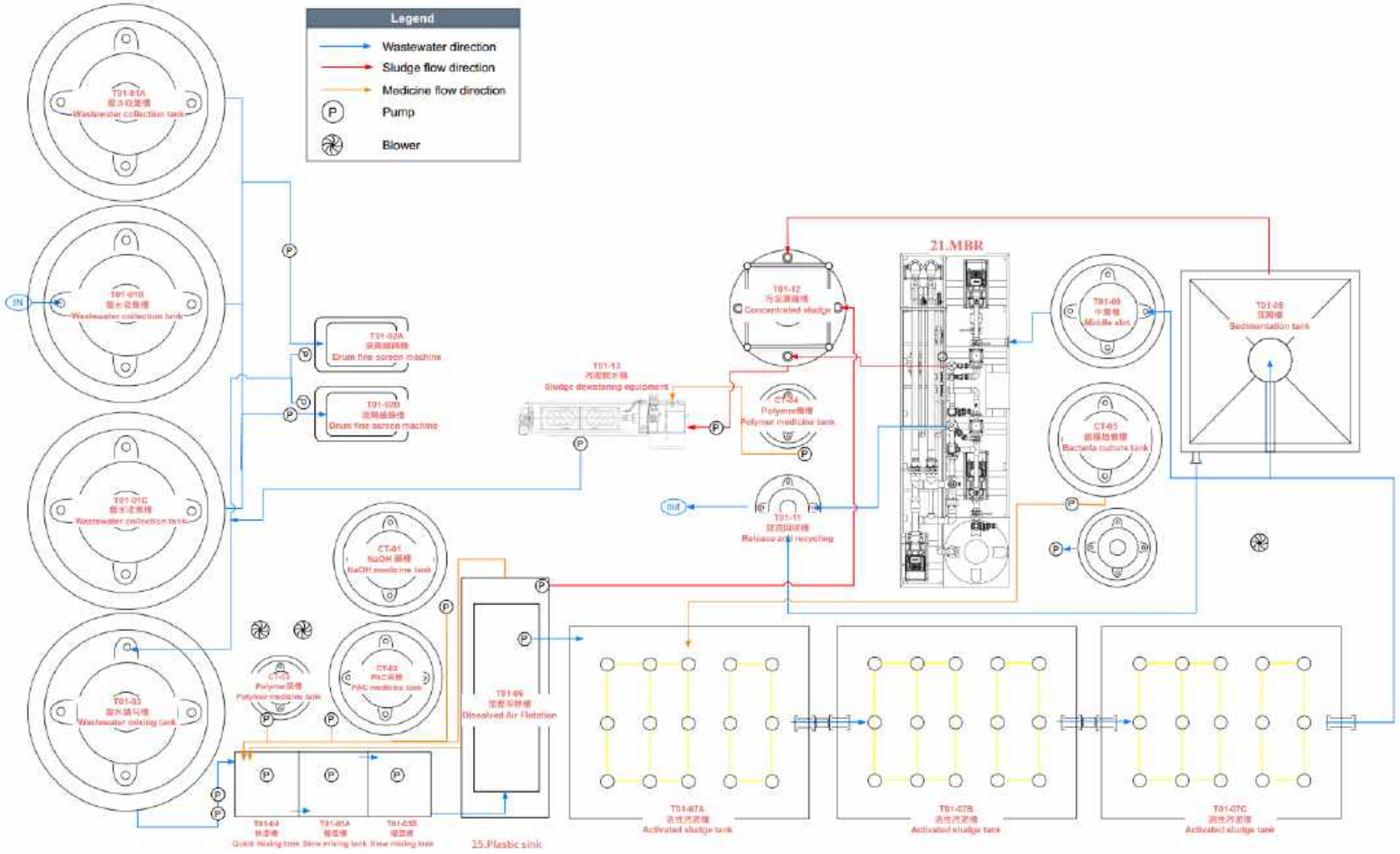

3. Wastewater emissions

It is expected that for every 1t of recycled material, approximately 2t of wastewater will be generated. For every 1t of wastewater, there will be about 20-30kg of sludge (with 80% moisture content). For example, assuming a daily processing of 6t of recycled material, an estimated 12t of wastewater will be discharged from the wastewater treatment system, with approximately 240-360kg of sludge produced. The water recovery rate is estimated to be 95%.

At full capacity the estimated annual key wastewater derived outputs are:

- Wastewater: 30,000t
- Sludge: 600t (80% moisture content)

We will be further able to remove this moisture content from the sludge. The amount removed will be as per the requirements of the liquid waste contractor.

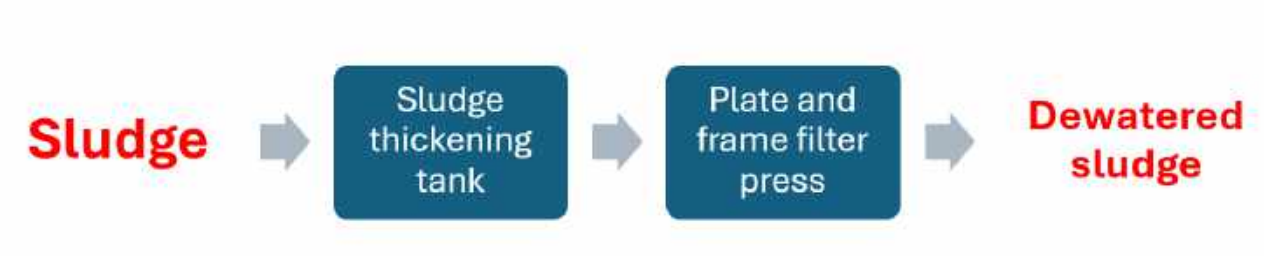

Figure 4 – Sludge dewatering process

4. Trade Waste Permit

Chairay is required to obtain a Trade Waste Permit due to it discharging non-domestic wastewater, known as trade waste, into the sewer system from the Water Corporation. This permit ensures that the wastewater meets specific criteria to protect public health, the environment, and the integrity of the wastewater infrastructure.

Wastewater quality parameters

- BOD = 384 mg/L
- SS = 1800 mg/L
- pH = 8~10

Discharge standards:

- BOD < 145 mg/L
- SS < 275 mg/L
- pH = 6~9

5. Contingencies

5.1 Emissions monitoring program

(1) Wastewater Discharge Volume: Flow meters will be installed at the discharge point to monitor the wastewater discharge. Additionally, flow meters will also be installed at the raw water inlet before entering the wastewater treatment system to record the flow simultaneously.

(2) Disposal of Waste Sludge: The waste sludge will be bagged and weighed, and the disposal will be outsourced.

(3) Operation and transportation of various units in the wastewater treatment process will be controlled using Programmable Logic Controllers (PLCs).

5.2 Controls in place to address unexpected emissions and discharges

(1) Initially, a physical treatment method will be employed, involving primary sedimentation, fine screening, oil-water separation, and the removal of suspended solids (SS) and oils from wastewater contaminants. Control measures include adjusting retention times, disk rotation speeds, and screen mesh sizes.

(2) A chemical treatment approach will be used, including neutralization (acid-base neutralization), coagulation, flocculation, and flotation to remove SS as well as BOD/COD and adjust the water's pH level. Control measures involve monitoring pH values, retention times, and mixing speeds, among others.

(3) A biological treatment method, such as the activated sludge process, will be applied, involving sedimentation primarily to remove BOD from the water. Control measures include monitoring dissolved oxygen levels, retention times, and the food-to-microorganism ratio, among others.

(4) Advanced treatment methods like ceramic membrane filtration will be employed to further remove BOD and SS from the water.

(5) Water quality testing instruments will be procured to conduct functional tests on the autonomous wastewater treatment units.

(6) Monitoring devices will be installed at the discharge point to include monitoring of flow rate, SS (suspended solids), COD (chemical oxygen demand), and continuous recording of these parameters (with data stored on a computer). Additionally, an abnormality notification system will be established to alert in case of any irregularities.

(7) Water quality testing instruments will be procured to conduct functional tests on other wastewater treatment units.

5.2 Emergency

In the event of an emergency:
(1) Immediately halt the discharge.
(2) Determine which parameter of water quality is abnormal (high SS, high BOD, or abnormal pH).
(3) Use storage tanks to collect the water with abnormalities.
(4) Inspect each unit of the wastewater treatment process (chemical, physical, biological units) to identify and resolve issues.
(5) Once equipment functionality is confirmed, reintroduce the abnormal wastewater back to the previous units for reprocessing until water quality returns to normal before resuming discharge.