



INDUSTRIAL TRAINING PROJECT PRESENTATION

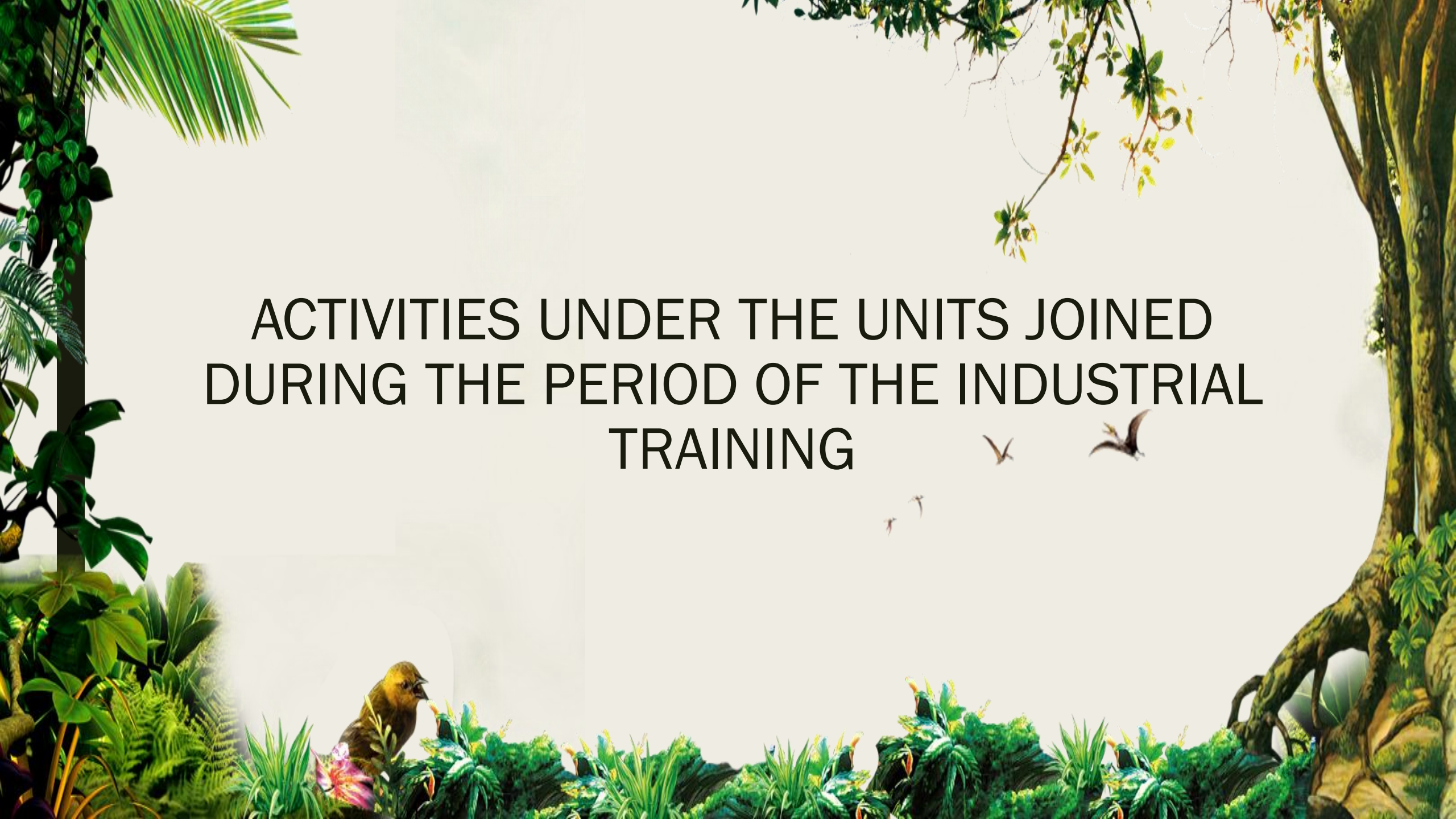
Department of Environment Negeri Sembilan

18 February 2018 – 15 June 2018

MUHAMMAD AFIQ WAZINI BIN JEMANI

PLACEMENT SCHEDULE

DATE OF PLACEMENT							
19/2-2/3	5/3-16/3	19/3-30/3	2/4-13/4	16/4-27/4	30/4-11/5	14/5-25/5	28/5-15/6
Licence & Education	(Enforcement) Negeri Sembilan Utara	Motor Vehicle, Asset & Technical Store	Environmental Impact Assessment (EIA) & Post EIA	Complaint & Contingency, GSR & Open Burning	Enforcement (Negeri Sembilan Barat)	PAT & Notification	Monitoring /BTM



ACTIVITIES UNDER THE UNITS JOINED
DURING THE PERIOD OF THE INDUSTRIAL
TRAINING

LICENCING & EDUCATION

- Participated in a meeting held in Kualiti Alam (KA) premise regarding the safety issues of scheduled waste plant – had a site visit, assisted by the KA's Fire HazMat Team.
- Went to SMK Warisan Puteri for an exhibition purpose – called by the school's representative to make an exhibition during the launching ceremony of the school.
- Registered the new members of Rakan Alam Sekitar (RAS).
- Went to Tanjung Tuan twice; 1. NBOS programme with PERHILITAN – hiked the Bukit Batu Putih, visited Tanjung Tuan lighthouse, watched the raptor's migration and 2. Eco Community Outreach Programme in conjunction with World Water Day 2018.
- Went to Kualiti Alam premise for the purpose of scheduled waste pre-licensing meeting – site visit to the KA's equipment (incinerator 1, Cenviro Recovery & Recycling plant).





ENFORCEMENT UNIT

- Attached to Enforcement Unit (NSU) – AHI Roofing (made roof top), Polyplus (made boxes), Emerson (assemble and spray valves), Shin Heung Sec (made battery terminal), MKS Metal (e-waste management), Peterlab Tech (made animal's food) and Malaysian Yoghurt (made yoghurt) to make an enforcement and inspection to the industries (effluent samples being took by DOE officer, to be checked whether they are complying with the Industrial Effluent (2009) regulations).
- Went to palm oil mill at Ulu Kanchong, Rantau with Enforcement Unit (NSB) for enforcement purpose – visited the site, being showed on how the process of obtaining the crude palm oil (CPO) and DOE officer took the final discharge effluent sample.







NAMA KOLAM : KOLAM BIOBIOESTER
KAPASITI KOLAM : 32.000,00 m³
KEDALAMAN KOLAM : 6,6 METER
TEMPON
TAHANAN HIDRAULIK : 22 HARI



MOTOR VEHICLE UNIT (UKB)

- Followed Motor Vehicle Unit (UKB) to Sendayan Tech Valley for a lorry inspection of Kualiti Alam Sdn Bhd and others – checked the amount of soot released (determined it has been serviced or not) and the PPE condition – for about 3 weeks in a row.
- Visited PUSPAKOM (to serve the people who received a notice to inspect their vehicle at PUSPAKOM after being serviced), road patrolling to observe soot released from the moving diesel-engine vehicles.
- Went to enforce the old workshops, car spray booth that subjected to Scheduled Waste (2005) and Clean Air (2014) regulations.



ENVIRONMENTAL IMPACT ASSESSMENT UNIT (EIA)

- Followed EIA Unit to several project sites – Senawang Perdana, Bandar Ainsdale (IJM Land), Sendayan (Matrix Concept), Gadong (Matrix Concept), Temiang (PRIMA), Bukit Mahogani, Jelebu (Seri Pajam) for EIA purposes (checked the condition of onsite equipment, percentage of earthwork, initiatives to avoid sand erosion – silt traps condition, slope condition, check dam, worker’s camp).
- Went to Tanah Merah, Sendayan with EIA Unit as received a complaint of river polluted with leachate – do a water sampling (took the reading of the parameter present in the water).
- Learned on how to make a sketch plan of the project sites and photo reports of the evaluated sites.



The slide features a white background with decorative green leaves in the corners. A thick black vertical bar is on the left side. The title 'COMPLAINT UNIT' is centered in a large, bold, black font.

COMPLAINT UNIT

- Followed Complaint Unit to Mambau as received some complaints from some residents about noise and air pollution from some small industries.





MONITORING UNIT

- Followed Monitoring Unit to Kualiti Alam and Senawang to take the underground water samples, make water sampling, and to be analysed at Department of Chemistry.
- Went to Air Pollution Index Monitoring Station in Ampangan, Seremban – learned some knowledge regarding the air monitoring procedures & equipment.



The background of the slide features a dynamic, high-speed photograph of water splashing and bubbling. The water is captured in various stages of motion, with numerous small, clear bubbles rising and larger, more turbulent splashes at the bottom. The color palette is a range of blues, from light, airy sky blues at the top to deep, vibrant cerulean blues at the bottom, creating a sense of freshness and movement.

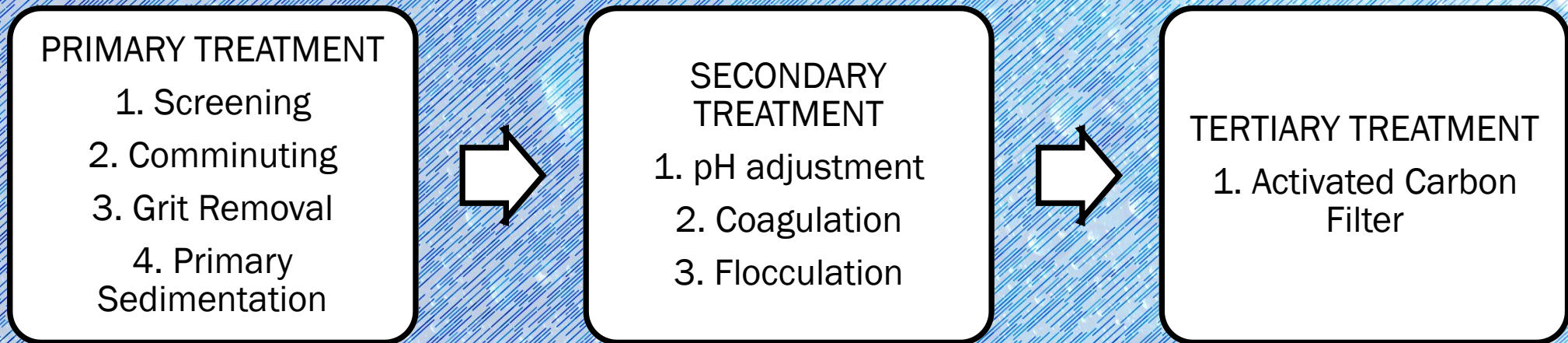
INDUSTRIAL TRAINING MINI PROJECT PRESENTATION

INDUSTRIAL EFFLUENT TREATMENT SYSTEM (IETS) PHYSICAL CHEMICAL TREATMENT

A decorative background featuring a horizontal splash of clear blue water with numerous bubbles and droplets, set against a light blue gradient. The water splash is centered horizontally and spans most of the width of the slide.

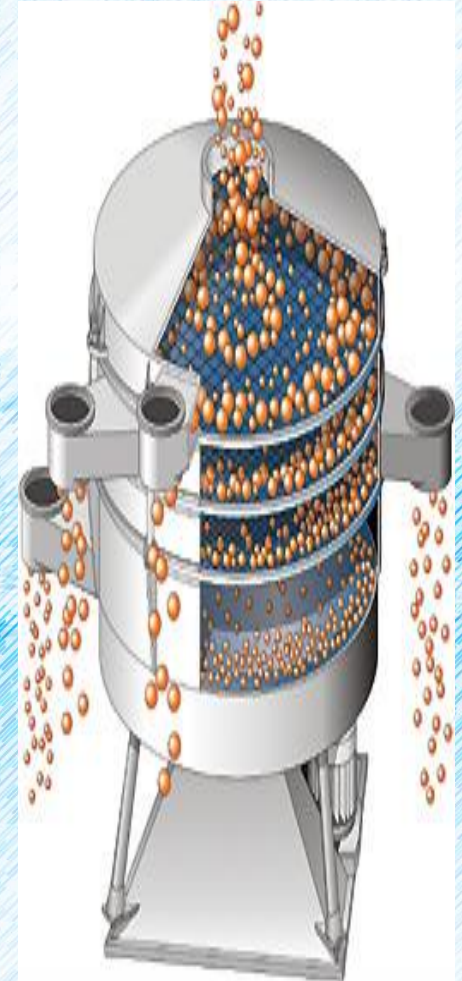
INTRODUCTION

- Industrial effluent/wastewater, one classification of wastewater, other than municipal wastewater.
- Require pre-treatment to remove non-compatible substances prior to discharge into municipal sewers.
- Characteristics vary from industry to industry and hence the treatment also vary.
- Consist of 3 types of treatment; chemical treatment, physical treatment, biological treatment.

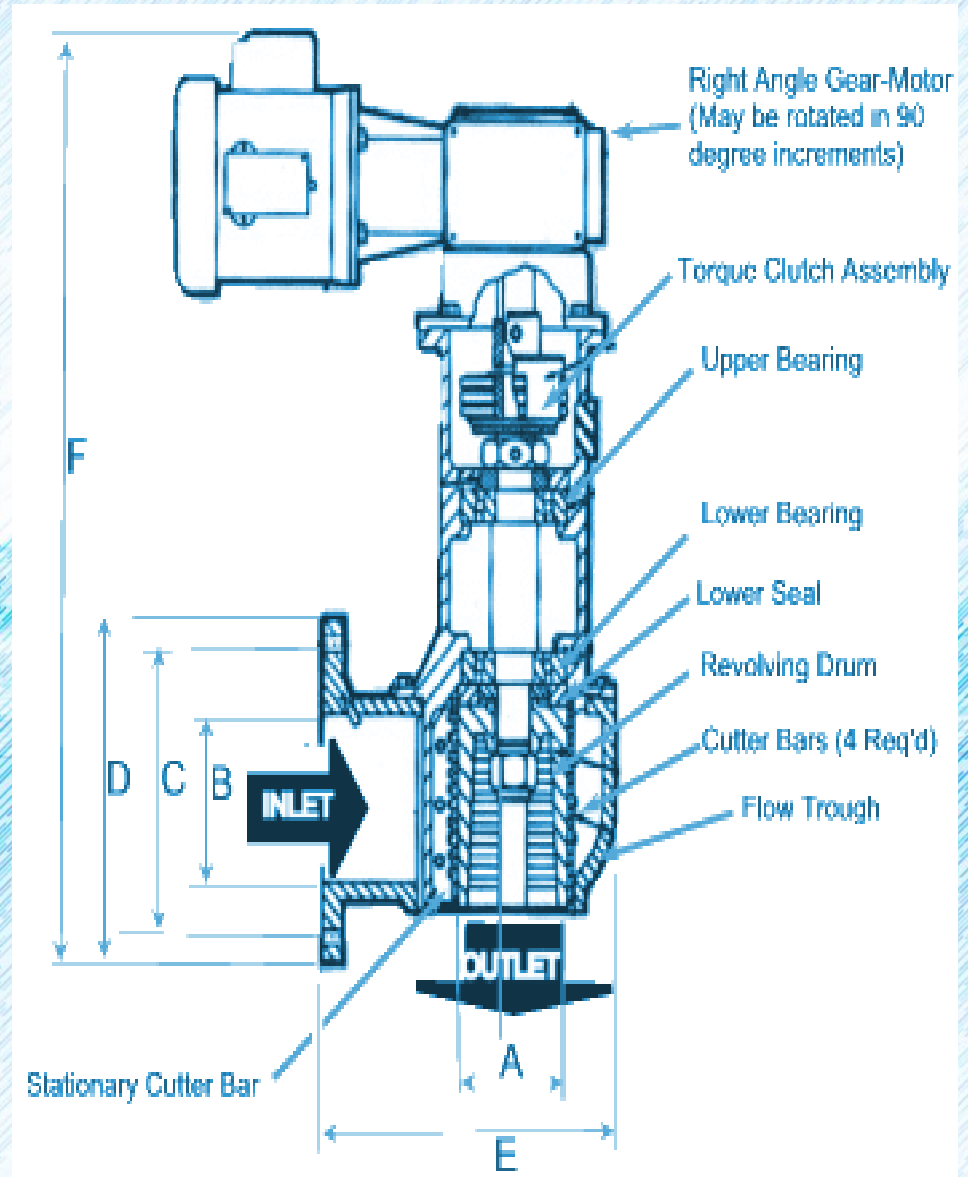


PRIMARY TREATMENT

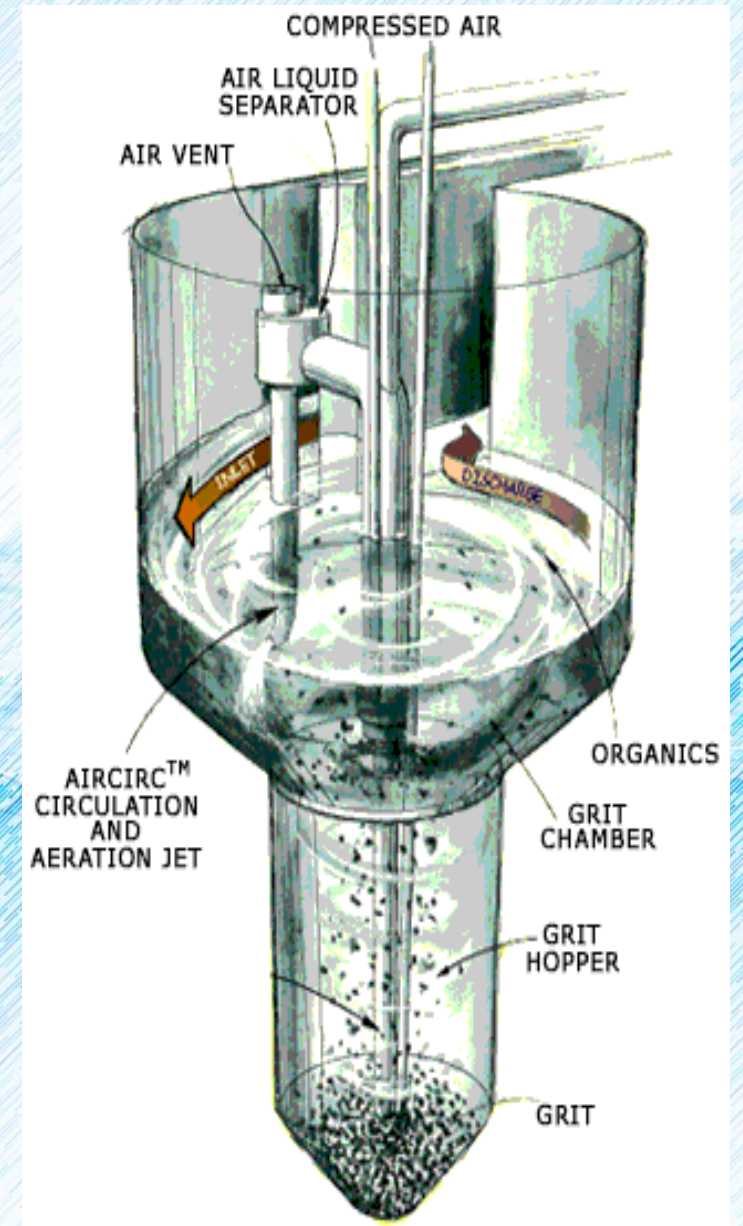
- SCREENING – Used to remove coarse solid (sticks, rags, boards) from wastewater.
- Protect pumps and other mechanical equipment.
- Prevent clogging of valves in wastewater plant.
- Normally the first method applied to wastewater treatment.



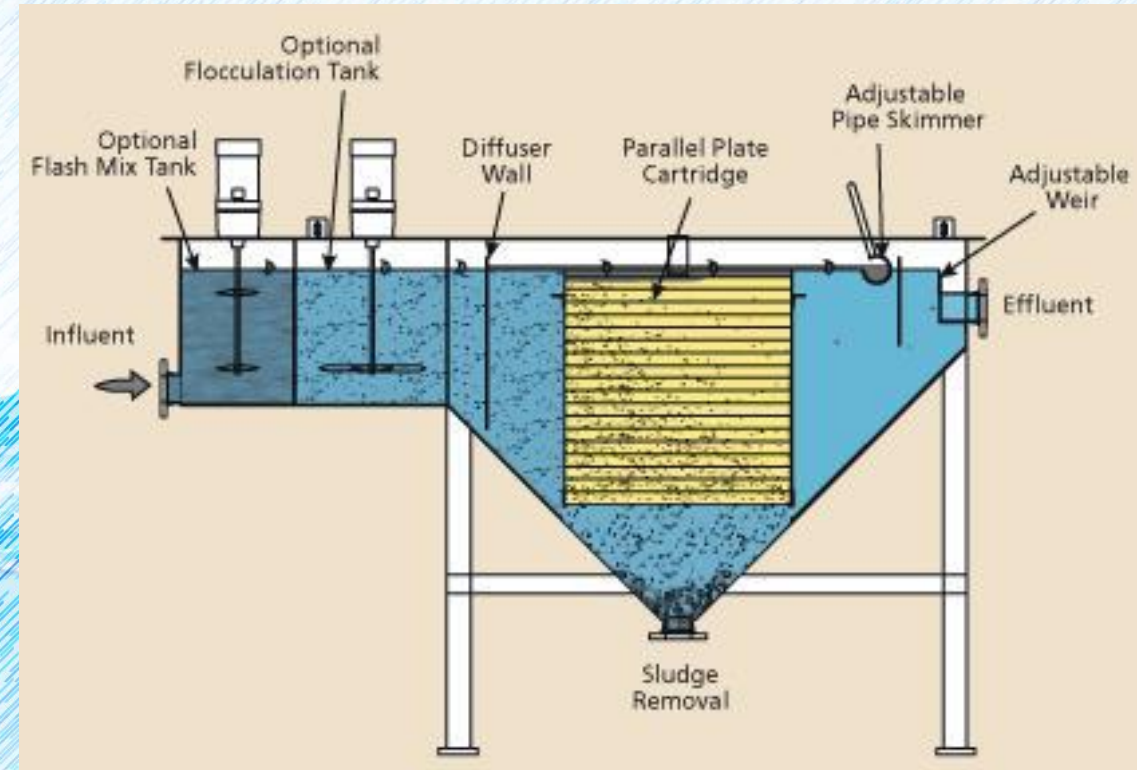
- **COMMINUTING** – screen & cutting teeth across the wastewater flow path, intercept the coarse solids (shred up to 8mm).



- GRIT REMOVAL – i) removing the grit (material compose of organic & inorganic solids – abrasive in nature, makes accelerated wear on pump & sludge handling equipment – not biodegrade, occupy space in sludge digester
- ii) reduced the velocity, then settled out the grit.



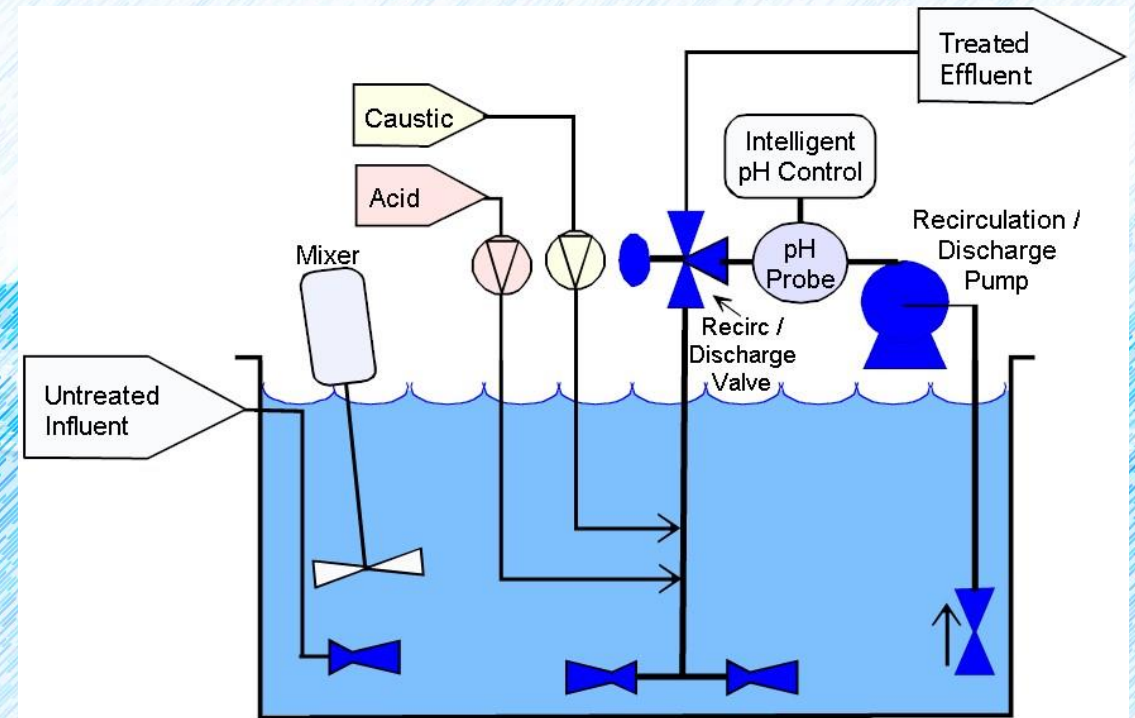
- PRIMARY SEDIMENTATION – concentrate & remove suspended solids (long-rectangular tanks, circular tanks) by using gravitational force.



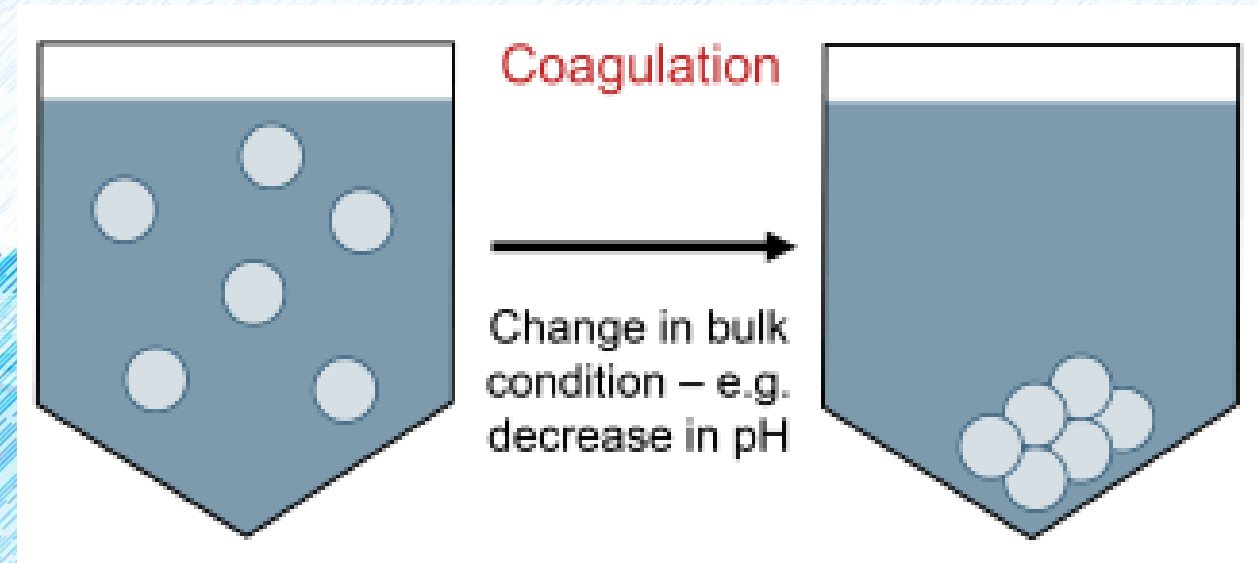
SECONDARY TREATMENT

CHEMICAL TREATMENT

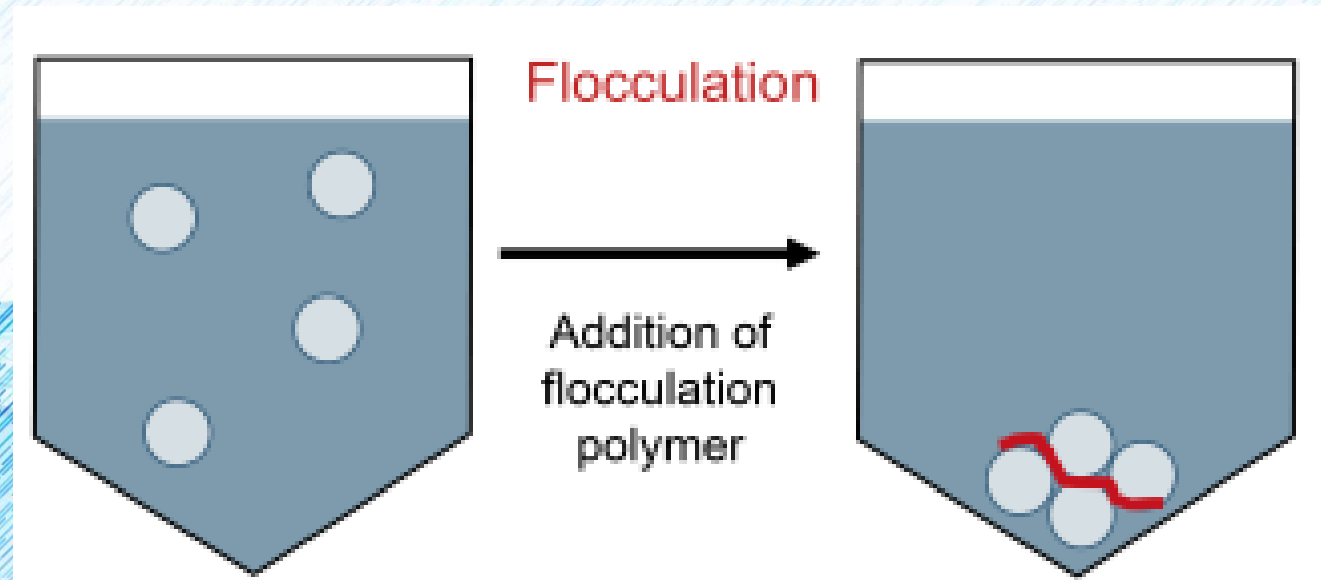
- Consist of 3 (*common*) processes; pH adjustment, coagulation, flocculation.
- pH adjustment - a process to neutralize the pH (*acidity or alkalinity*) reading into the defined acceptable discharge range (*1-very acidic, 7-neutral, 14-very alkaline*) while being stirred with a high speed rotating blade.
 - adding caustic soda (NaOH) if the water is having an **acidic** reading.
 - adding hydrochloric acid (HCl) if the water is having an **alkaline** reading.



- Coagulation – a process of a liquid changing to a solid or semi-solid state.
- Destabilization of colloids (*mixture in which one substance of microscopically dispersed insoluble particles is suspended throughout another substance*) by neutralizing the forces that keep them apart.
 - by adding **alum** ($\text{Al}_2(\text{SO}_4)_3$) or **ferric chloride** (FeCl_3) that consist of positive electric charges to reduce the negative charge of the colloids.
 - As a result, the particles collide and form coagulants with the aid of rapid mixing blade to disperse the coagulants throughout the liquid.



- Flocculation – a process of fine particulates are caused to clump together into a floc.
- Combination of coagulant with other coagulant to form a big size of coagulant called floc by adding **polymer** (act as a bridge between coagulants/flocs and then bind the particles into large agglomerates/clumps) to the water slowly and gentle mixing to allow contact between the smaller flocs to agglomerates together.
- The flocs then settle down in a clarifier by gravitational force.



TERTIARY TREATMENT

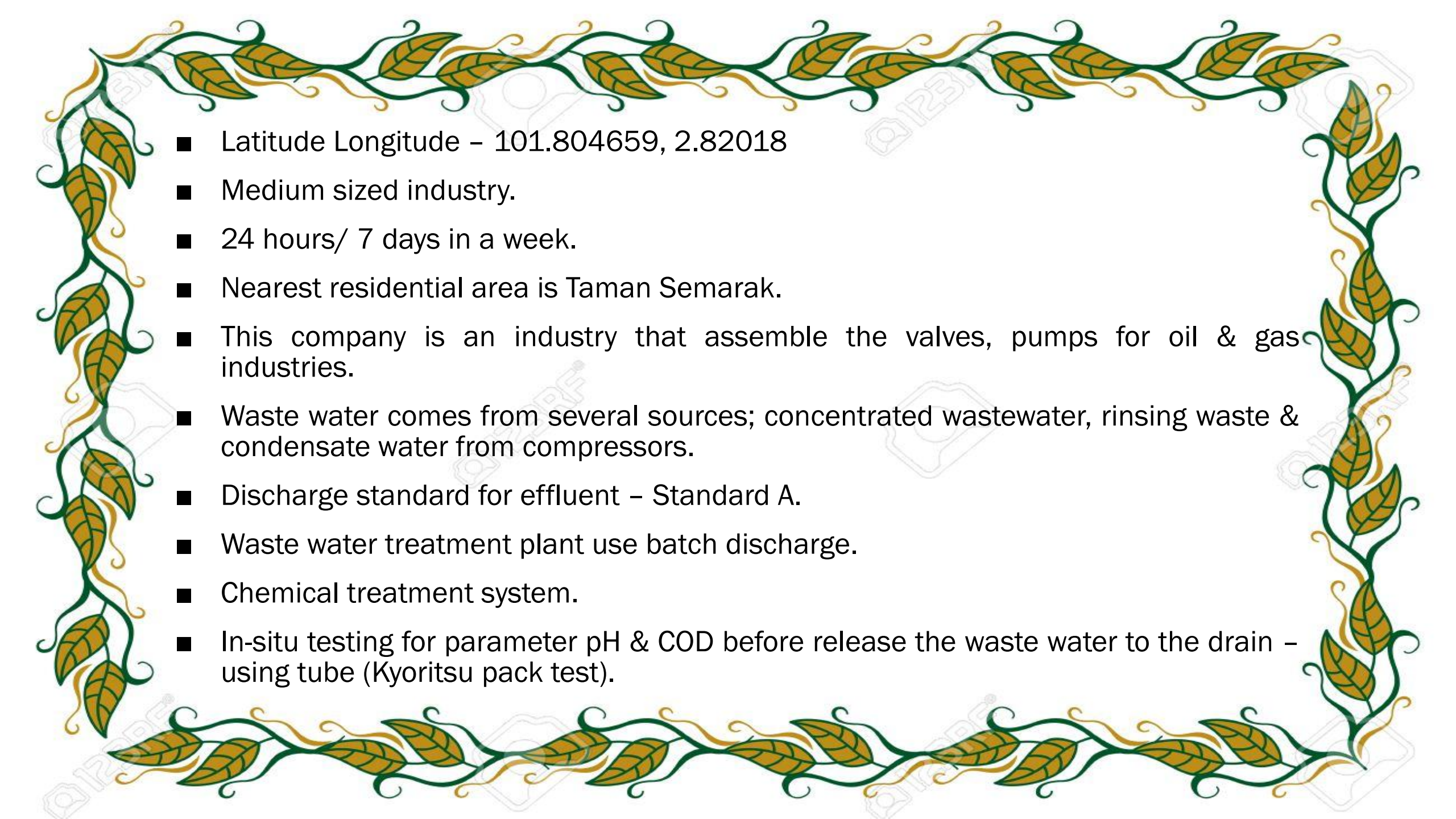
- Tertiary treatment is the next wastewater treatment process after secondary treatment.
- This treatment is sometimes called as the final or advanced treatment and consists of removing the organic load left after secondary treatment for removal of nutrients from sewage and particularly to kill the pathogenic bacteria.
- Secondary treated effluent also contains traces of suspended, dissolved constituents which may be required to be removed for reuse or disposal of the treated effluent.
- The purpose of tertiary treatment is to provide a final treatment stage to raise the effluent quality before it is discharged to the receiving environment, or to raise the treated water quality to such a level to make it suitable for intended reuse.
- This step removes different types of pollutants such as organic matter, SS, nutrients, pathogens, and heavy metals that secondary treatment is not able to remove.

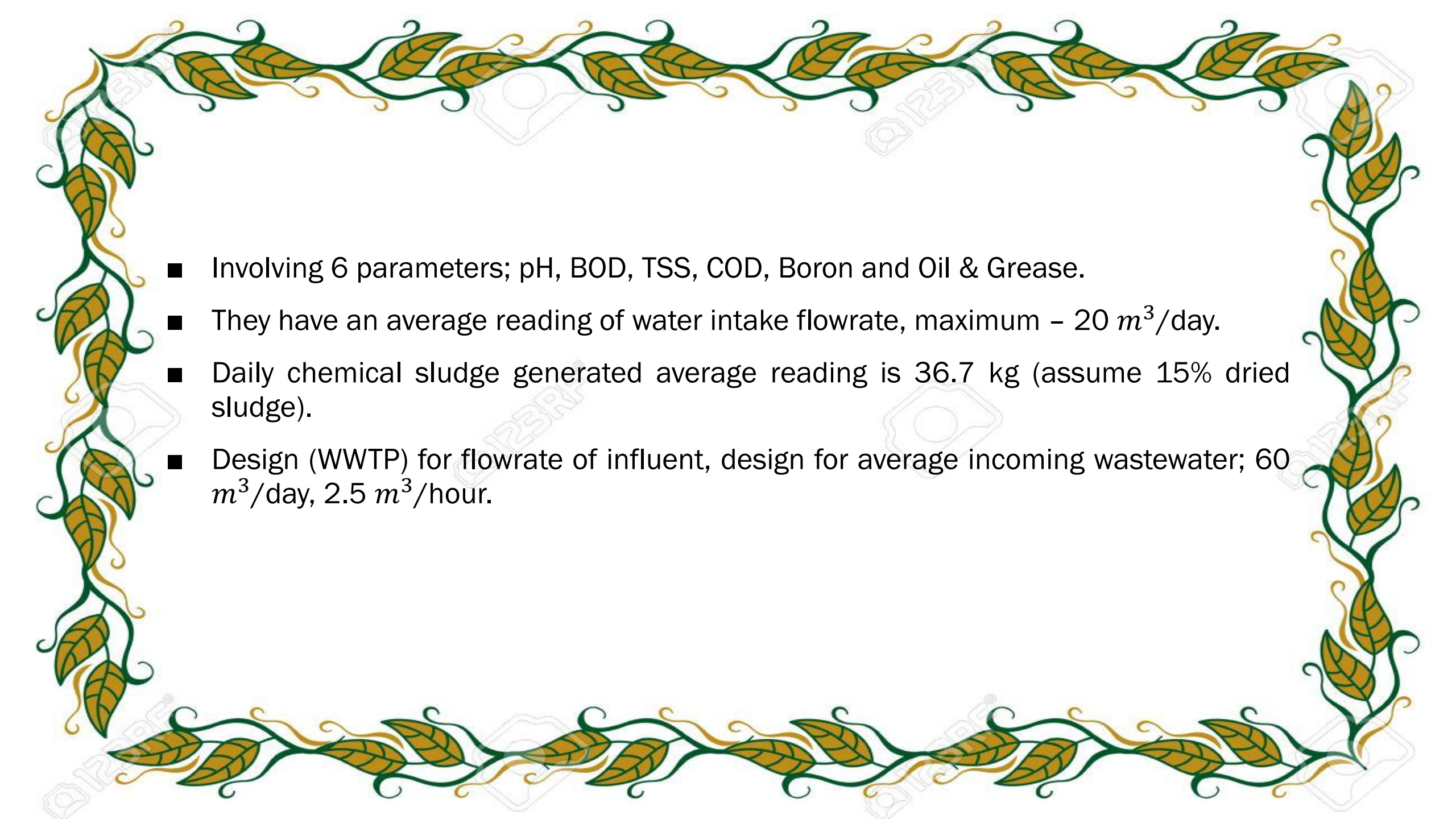


EMERSON PROCESS MANAGEMENT MANUFACTURING (M) SDN. BHD

PT 37592 (LOT 1311), MUKIM LABU, KAWASAN PERINDUSTRIAN NILAI, 71807, NILAI.



- 
- Latitude Longitude – 101.804659, 2.82018
 - Medium sized industry.
 - 24 hours/ 7 days in a week.
 - Nearest residential area is Taman Semarak.
 - This company is an industry that assemble the valves, pumps for oil & gas industries.
 - Waste water comes from several sources; concentrated wastewater, rinsing waste & condensate water from compressors.
 - Discharge standard for effluent – Standard A.
 - Waste water treatment plant use batch discharge.
 - Chemical treatment system.
 - In-situ testing for parameter pH & COD before release the waste water to the drain – using tube (Kyoritsu pack test).

- 
- Involving 6 parameters; pH, BOD, TSS, COD, Boron and Oil & Grease.
 - They have an average reading of water intake flowrate, maximum – $20 \text{ m}^3/\text{day}$.
 - Daily chemical sludge generated average reading is 36.7 kg (assume 15% dried sludge).
 - Design (WWTP) for flowrate of influent, design for average incoming wastewater; $60 \text{ m}^3/\text{day}$, $2.5 \text{ m}^3/\text{hour}$.



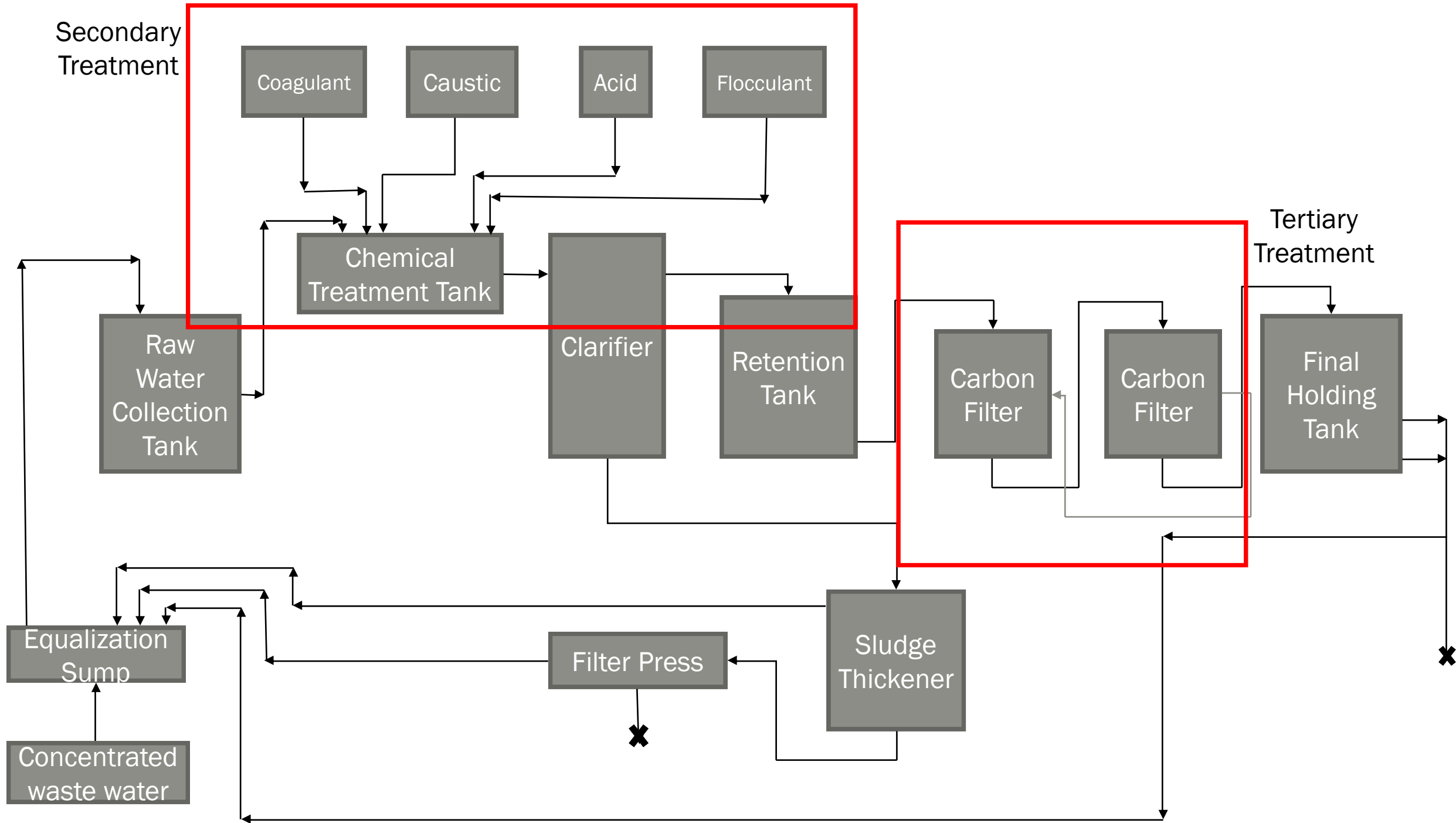
The assembled and sprayed valves.

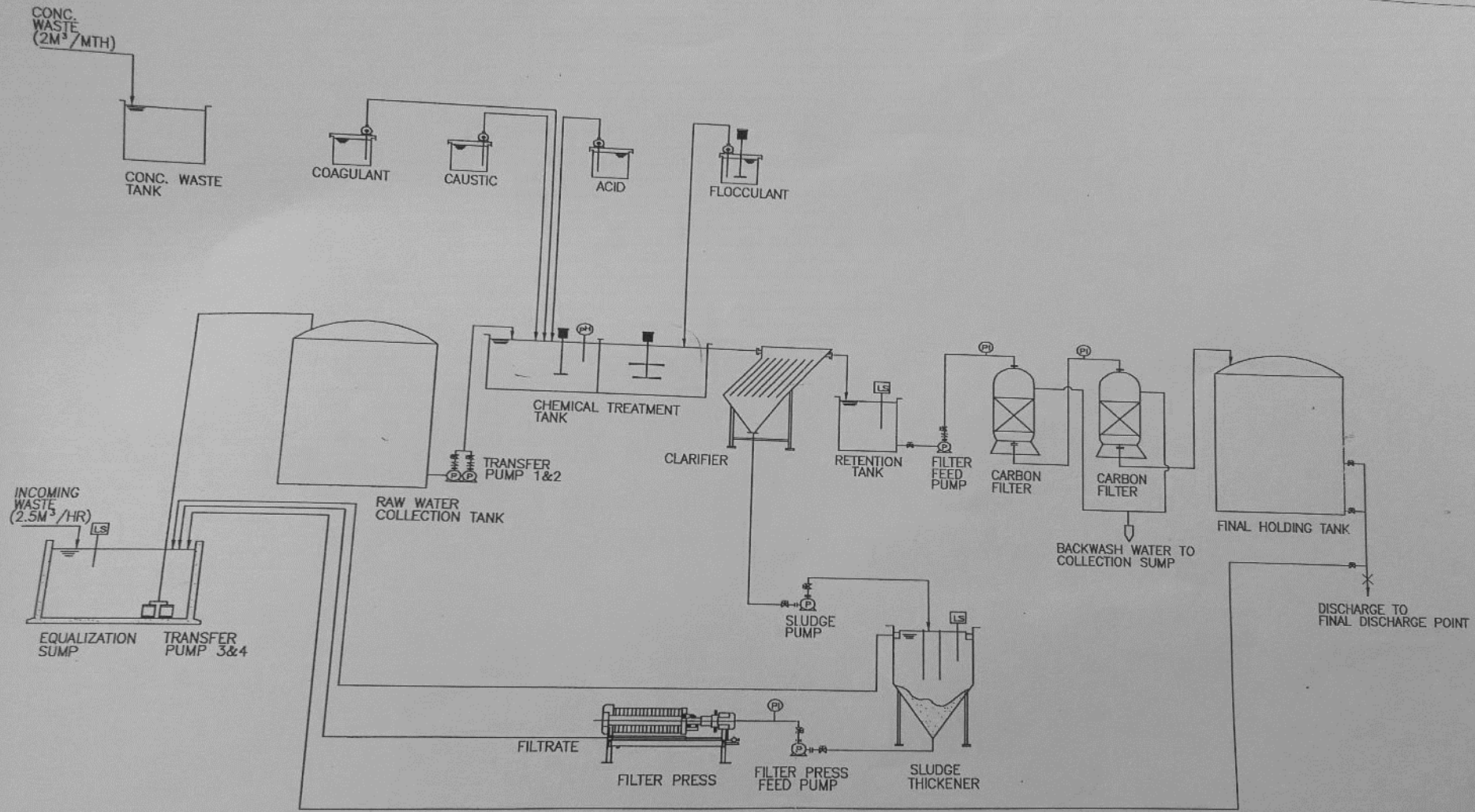


The spray booth for spraying works.

A decorative border composed of green vines with yellow and green leaves, framing the central text. The border is rectangular and follows the perimeter of the page.

Waste Water Treatment Plant Layout






- LEGEND**
- Ⓟ pH CONTROLLER
 - Ⓛ LEVEL SENSOR
 - Ⓜ PRESSURE GAUGE
 - Ⓣ FLOWMETER
 - Ⓢ TOTAL DISSOLVED SOLID METER

REV	DATE	DESCRIPTION	BY

CLIENT :
 EMERSON PROCESS MANAGEMENT
 MANUFACTURING (M) SDN BHD
 LOT 13111, MUKIM LABU
 KAWASAN PERINDUSTRIAN NILAI
 71800 NILAI
 NEGERI SEMBILAN

TITLE :
 WASTEWATER TREATMENT PLANT
 PLAN AND FRONT VIEW

CONTRACTOR :
 **ZETA WATER SDN BHD**
 7, JALAN BULAN US/4
 SEKSYEN US, BANDAR PINGGIRAN SUBANG
 40150 SERAI ALAM, SELANGOR
 TEL. NO: 03-7846 8010
 FAX NO: 03-7848 7060

SCALE	DRAWN	CHECKED	DATE
AS SHOWN	LIM		02-09-13
BY: DMR	DRG NO: ZTW/13/1477	REV: 0	



3 Sources of Waste Water



Concentrated Wastewater

- Solution for the processes of degreasing, iron phosphating & passivation (about 3% concentration) are being used again and again until no longer effective.
- Then, it will be discharged out completely and being replaced with new solution.
- The discharge will be collected in the concentrated tank at WWTP via gravity flow.
- Treated with bentonite before go to Equalization Sump.



Rinsing Wastewater & Compressor Condensate

- Overflow of the rinse tanks in the pre-treatment process, contain pollutants such as COD, BOD, TSS, TDS, O&G, iron & phosphate.
- From the drag out process of degreasing solution tank, phosphating solution tank & passivation solution tank.
- Levels of COD, BOD & O&G caused by remnants of degreasing chemicals used to clean the valves bodies.
- Iron & phosphate are from the iron phosphating solution.
- TDS contributed by cation (sodium, calcium, magnesium) and anion (phosphate, chloride, bicarbonate & sulphate) in chemicals used.



The Main Process of Treating Waste Water



Chemical Treatment Process

- Aluminium-based coagulant (50-100 ppm) and high molecular weight poly electrolyte (2 ppm) is added to form insoluble metal flocs (will agglomerates organic matter, suspended particles, oil droplets & phosphate).
- The efficiency of this process ranges from 80%-90%. Some ions like iron and aluminium phosphates, which are very insoluble in water, can have a removal rate as high as 95%.
- The flocs formed will then flow over to the clarifier where the flocs will settle down into the bottom hopper of clarifier. The pH levels must maintained at between 6.5-8 at all times to ensure that this precipitation process is complete. A pH controller will be used to control this.



Chemical Treatment Tank of
WWTP at EMERSON.



Activated Carbon Filter

- The water after the chemical treatment will then flow into a retention tank where this water will be pumped into a series of carbon filter (Emerson have 2 carbon filters).
- During this stage, traces of oil, COD, BOD, organic acids and suspended solids level will be further reduced.
- The mechanism for this reduction is adsorption. The ionic bond in the pre site of the activated carbon is also capable of attracting ions such as iron and phosphate.
- When all adsorption sites in the activated carbon is fully accommodated, it will be replaced with new activated carbon media to restore the performance of these carbon filters.
- This is normally done once in 6 months and spent activated carbon is collected in individual drums and stored as scheduled waste.



The activated carbon filter of WWTP at EMERSON.



Sludge Dewatering

- The sludge from the clarifier will be transferred into the sludge thickener to be pumped to filter press for dewatering. The sludge is compressed into solid “cake” for temporary storage in labelled drum at factory site until collected for legal disposal by Kualiti Alam.
- Filtrate from the filter press will be returned to the equalization sump for further treatment.



The scheduled waste storage at EMERSON.

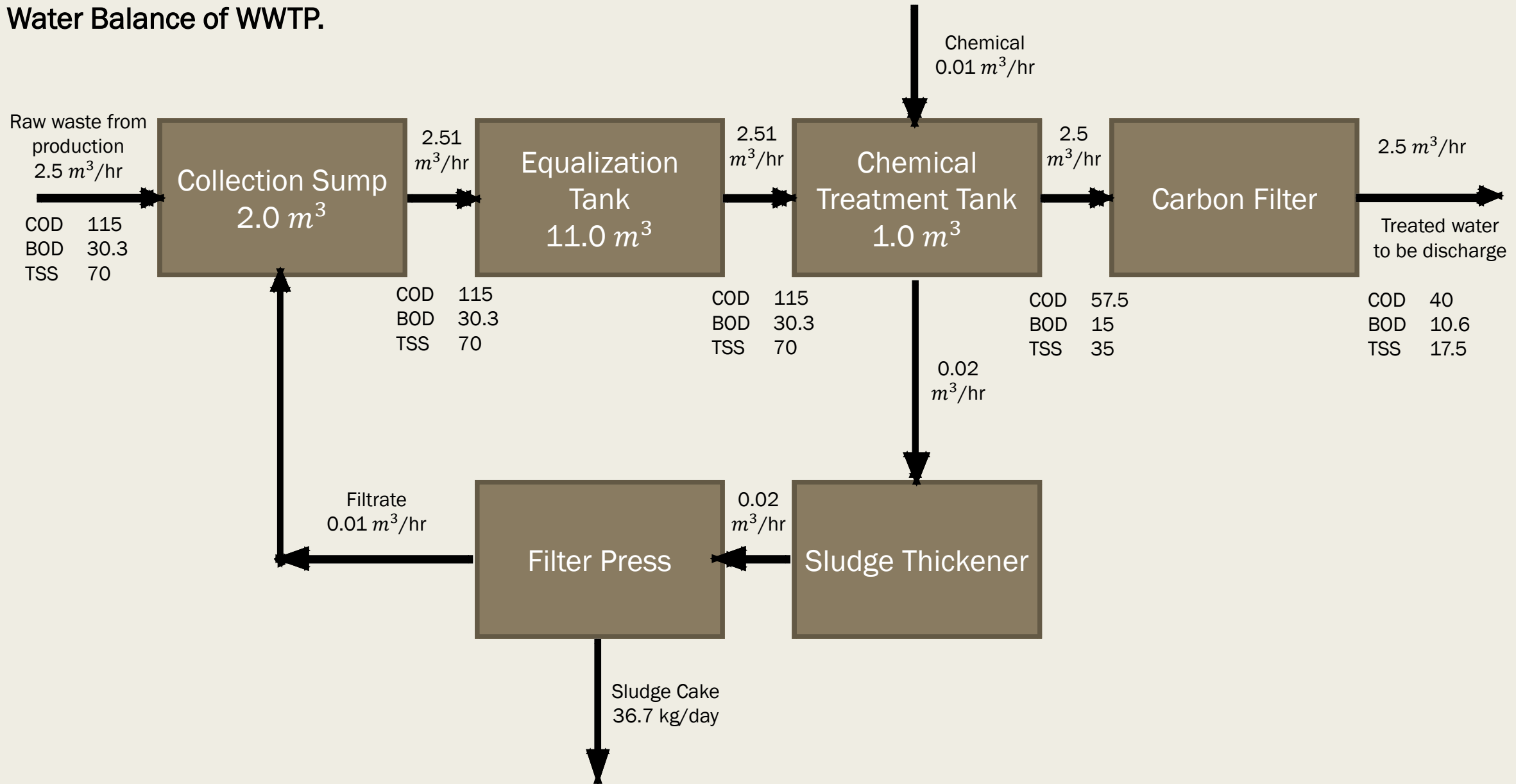


Sludge thickening in the sludge thickener tank.



The sludge the is being filtered in the filter press.

Water Balance of WWTP.



Amount of Sludge Generated, 36.7 kg/day.

Chemical Report Analysis (2014) – 23.10.2014

Sample taken on – 22.9.2014

- BOD₅, SS..... (<2.0, <110) mg/L
- AN, COD..... (1.12, 70) mg/L

They failed to comply in the year of 2014 as the reading of suspended solids (110 mg/L) are exceeding the standard value of the standard A discharge area.

Chemical Report Analysis (2015) – 8.5.2015

Sample taken on – 22.4.2015

- BOD₅, SS..... (<2.0, <5.0) mg/L
- AN, COD..... (1.16, 48) mg/L

They managed to comply in the year of 2015 after failed to comply in the previous year.



CONCLUSION

- IETS is an important system to ensure the water from the processing plant is treated well to be released to the inland water.
- For the sake of the aquatic life that existing in the water and also for the wellness of the people who needs water to stay alive.
- To have a good image of a good country that care about their rivers and water sources.