OPERATOR INSTRUCTION MANUAL

10 KLD Faecal Sludge Treatment Plant at Kalpetta, Wayanad District

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This Manual is needed for the technical persons to be trained as Operators and helpers at the FSTP site at Wayanad. It contains Technical Guidelines for carrying out the works.

ACKNOWLEDGEMENTS

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Contents

ABBREVIATIONS

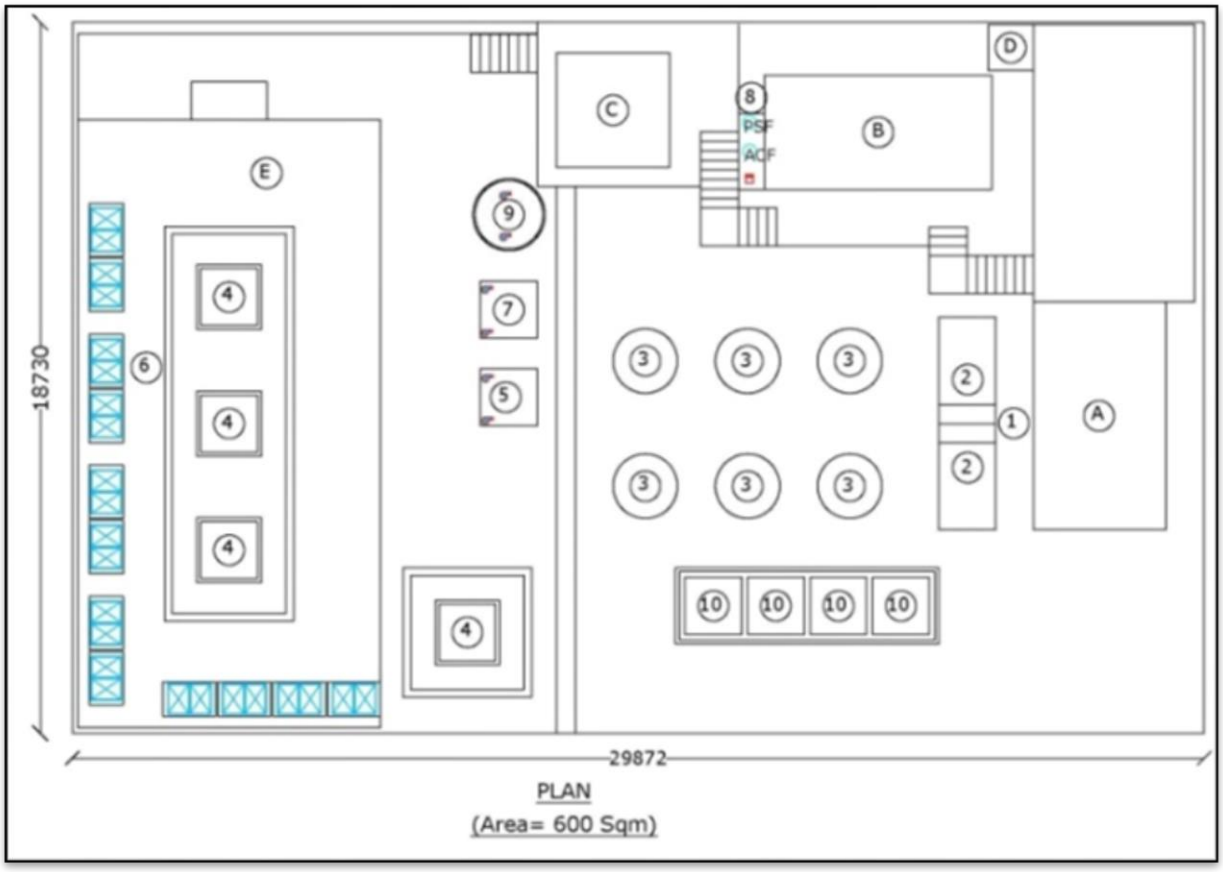
ACF	Activated Carbon Filter
BDT	Bio Digester Tank- Anaerobic
BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand
CCT	Chlorine Contact Tank
FSM	Faecal Sludge Management
FSTP	Faecal Sludge Treatment Plant
FRP	Fibre reinforced Plastic
HDPE	High density Polyethylene
HP	Horsepower
KMC	Kalpetta Municipality Council
KLD	Kilo Litre per Day
KPCB	Kerala Pollution Control Board
MOC	Material of Construction
MS	Mild Steel
O&M	Operations and Maintenance
Ppm	Parts per million
PVC	Polyvinyl chloride
PSF	Pressure Sand Filter
SOP	Standard operating Procedure
SS	Stainless Steel
TBF	Tiger Bio Filter
TDS	Total dissolved solids
TSS	Total suspended solids
UPVC	Unplastisized polyvinyl chloride

1. OPERATOR INSTRUCTION MANUAL

1.1. General

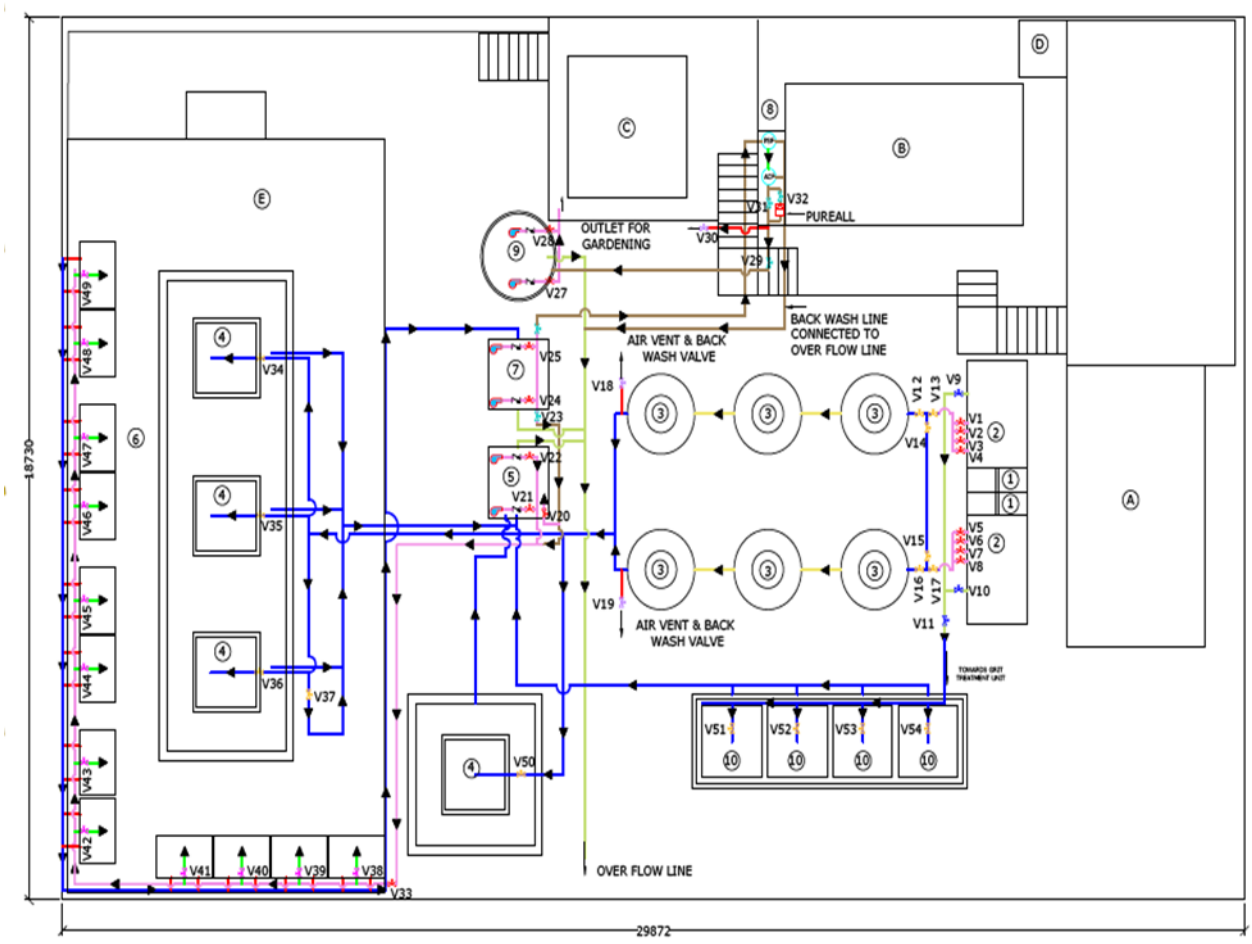
This Operator Instruction manual is the reference document for the operation and maintenance of the equipment and processes that comprise the Tiger Bio Filter (TBF) based Faecal Sludge Treatment Plant (FSTP) at Kalpetta, Kerala. This manual will enable the plant operator and helper to run the plant smoothly and assist during site operations and maintenance work.

1.2. Schematic Diagrams of the Plant



Sr. No.	Description	Sr. No.	Description
1	Screen Chamber	**5**	Intermediate Storage Tank
2	Solid-liquid Separation Tank	**6**	Tiger Bio Filter- II
3	Anaerobic Digester (BDT)	**7**	Filter Feed Tank
4	Tiger Bio Filter- I	**8**	Filter Platform
A	Unloading Platform	**9**	Treatment Water Tank
B	Cabin	**C**	Storeroom space
D	Toilet block	**E**	TBF Shed

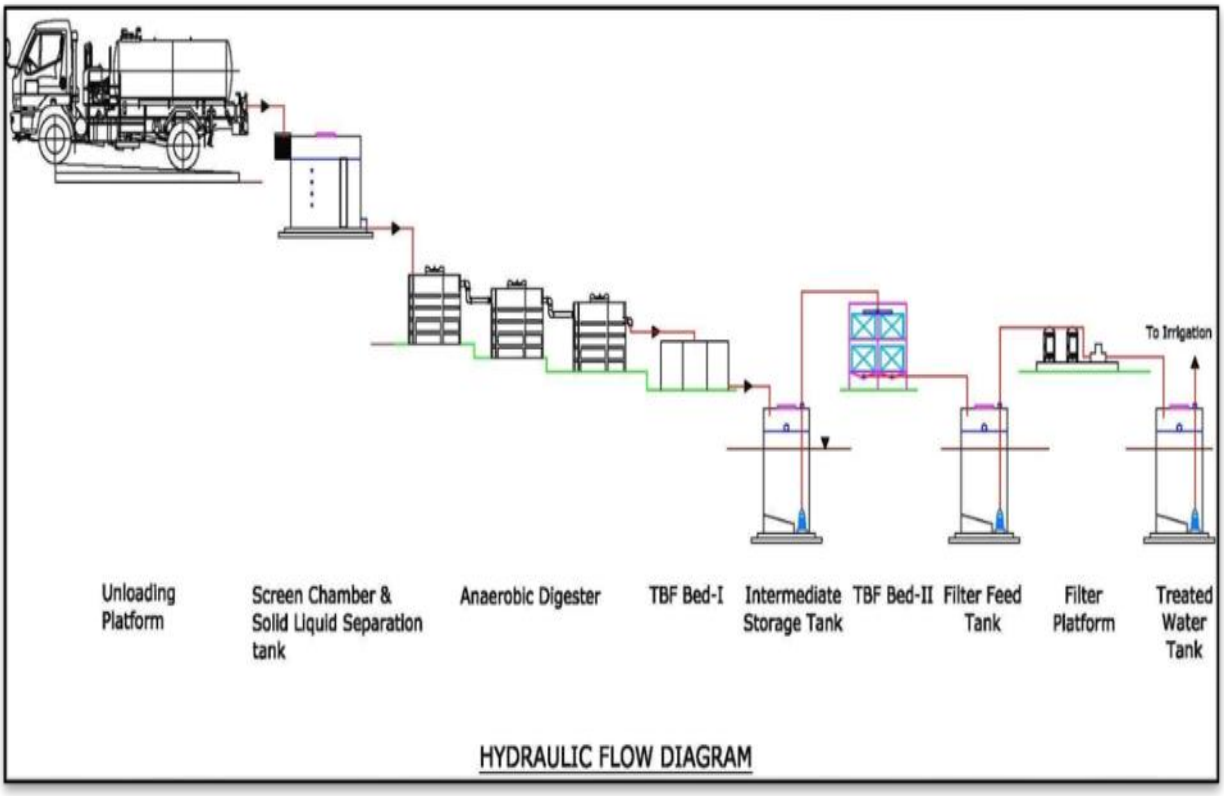
1.3. Flow diagrams with flow direction, FSTP Kalpetta



PIPE Details		
Sr. No	Code	Dia
1		25 mm (u PVC)
2		40 mm (u PVC)
3		50 mm (u PVC)
4		18.5 mm (u PVC)
5		100 mm (u PVC)
6		150 mm (u PVC)
7		100 mm (PVC)

PARTICULARS		
Sr. No	Code	Dia
1		25 mm (BALL VALVE)
2		40 mm (BALL VALVE)
3		50 mm (BALL VALVE)
4		18.5 mm (BALL VALVE)
5		100 mm (BALL VALVE)
6		150 mm (KNIFE GATE VALVE)
7		50 mm NRV
8		PUMP
9		PURALL (Chlorinator)
10		Filter

1.4. Hydraulic Diagram of FSTP Kalpetta



2. PROCEDURE OF OPERATION AND MAINTENANCE

2.1. Collection of septage

2.1.1. Operation photos of septage receiving

1	2	3
		
Septic Tanker	**During unloading septage**	**Septage receiving**

2.1.2. Operations (Septage receiving)

- Start the pump for sucking waste from the septic tank without spilling the septage.
- Close valve and vessel outlet properly with proper precautions while handling the valves.
- Empty the suction tanker at FSTP Screen Chamber and Septage Storage Tank.
- Septage delivery must be made in the presence of FSTP operators, and as per delivery schedule.
- Ensure the schedule for various suppliers' delivery at FSTP septage is followed, with calendar entries and quantity of septage evacuated recorded.
- Daily septage holding and treatment is 10,000 litres only. The plant cannot store excess septage, so it must be ensured that no excess septage is brought to the FSTP
- Ensure there is no spillage of septage while it is being emptied at the FSTP.
- Do not allow septage unloading at the site without any pre-information about delivery at FSTP site.
- Only septage will be accepted for treatment. Kitchen waste from hotels and unknown sources waste is not allowed for treatment at FSTP.
- Septage will be accepted only during operating hours which are 8.00 am to 6.00 pm.
- Filling the datasheet or form before unloading septage properly is the responsibility of the Plant In-Charge.

2.1.3. Preventive Measures

- Before septage unloading, ensure the waste comes from septic tanks only. If waste comes from unknown sources, do not allow the unloading, and inform the Plant In-charge.

2.1.4. Corrective Measures

- If valves of honeysucker are choked; remove and clean the valves properly and reinstall.
- If waste spilling is detected at the site or near a septic tank while sucking the waste or unloading the waste, it must be cleaned immediately with safe handling by using a cleaning agent.

2.1.5. Troubleshooting - Treatment at site

PROBLEM	CAUSE	REMEDIAL MEASURE
• Smelling Issue	• Spoiling waste on floor.	• Clean contaminated area. immediate by using cleaning agent • Spread bleaching powder after floor area cleaning.

2.2. Screen Chamber

2.2.1. Photos of Screen Chamber

1	2	3
		
Screening of floating material	**After screening septage passing into tank**	**Screening removal**

2.2.2. Operation of Screen Chamber

- Connect the septic tanker outlet pipe to the screen chamber inlet pipe coupler and open the valves fully to allow flowing septage from the septic tanker to enter the screen chamber.
- Observe and clean the bar screen during the emptying of faecal sludge from septic tanker using the hand rake.
- Check and clean the bar screen after complete drainage of faecal sludge after every feeding.
- Do not allow solids to overflow/ escape from the screen.
- After unloading of faecal waste, clean the screen chamber immediately using freshwater.
- After the screening, collect all waste and wash with fresh water and sundry for a few days. After sun drying, spread bleaching powder for disinfection, and with the proper packing, transport the waste to the solid waste dumping site for further treatment.

2.2.3. Preventive Measures

- Ensure the screen bars do not bend while removing screened waste.
- Clean the screen chamber properly after receiving septage by using freshwater to control the odour.

2.2.4. Corrective Measures

- Replace the corroded/ unserviceable bar screen immediately if the gap between screen bars has increased.

2.2.5. Troubleshooting - Screen Chamber

PROBLEM	CAUSE	REMEDIAL MEASURE
• Large solids particles pass through, and choke the plumbing • Overflow of septage from over the screen	• Negligence by helper. • Screen damaged. • Large solids passed though the bar screen due to high velocity during faecal sludge unloading activity.	• Helper must check septage level heading the upstream side of screen and rake the screen during feeding, continuously if required. • Check frequently that the gaps between bars are appropriate, and if required, the screen should be repaired or replaced immediately. • Drain the suction tanker without

		pumping, also ensure faecal sludge coming from suction tanker pipe will not directly impact on bar screen due to excess load pressure and screen bars may bend.
• Excessive collection of trash on screen	• Inadequate operation by helper.	• Helper must monitor the screen during emptying and clean as required.
• Excessive odour	• Spill over of septage during emptying. • Screened objects dumped near screen chamber.	• Helper must monitor and remove solids particles during feeding continuously (refer to picture 3). • Screenings to be removed immediately from site and dumped at designated location in waste dumping yard. • Clean screen chamber by water after unloading of faecal sludge immediately.

2.3. Solid-Liquid Separator Tank

2.3.1. Photos of Solid-Liquid Separation tank

1	2	3
		
Solid-liquid Separation Tank	**Plumbing Arrangement**	**Grit valve**

4	5	6
		
Four valves for flow operating	**Scale for water level at observation window**	**Valve operation**

2.3.2. Operation

- Wait for at least 2 hours after the septage is received in the tank to allow for settlement.
- Check the settled grit level on observation window at least once a day. There is a marking provided, with a '0' mark on the tank to denote maximum allowable grit level. Once the grit accumulation reaches '0' mark, it should be removed by opening the valve.
- There are four 50 mm valves provided on each tank.
- The septage is to be released into the BDT by opening the top valve.
- The septage is to be released at 20 min intervals and for each interval; a maximum of 200 litres is to be released from the solid-liquid separation tank. The approximate time for draining 200 litres should be 2 Min and 20 Sec.
- Thus, in each cycle, a total of 400 litres is to be drained. With a 20-minute cycle, the total release per hour should not exceed 1200 litre.
- Clean the top of the tank or cover at least weekly.
- Check and clean clogged valves, unions, and vent pipe monthly.
- Check daily leakages from the tanks, plumbing fittings, piping, etc.
- Keep the observation window of the solid-liquid tank clean daily. This can be done by flushing the window from inside with a jet of water when the tank is empty.

2.3.3. Preventive Measures

- Observe the faecal sludge level in the solid-liquid separation tank during unloading and ensure that the tank does not overflow.
- Solid-liquid separation tank cover must be closed properly, each time.

- After every three months, the tank should be cleaned to remove settled muck/ sediments.

2.3.4. Corrective Measures

- Remove grit from the solid-liquid separator tank at least weekly, or when grit level increases at the bottom of the tank, to prevent choking in the BDT.
- During septage unloading work, septage may spill out on the tanks. In this case, immediately clean the tank for safety purposes.

2.3.5. Troubleshooting – Solid-liquid Separation Tank

PROBLEM	CAUSE	REMEDIAL MEASURE
• Faecal sludge will not transfer to BDT	• Due to thick septage, the valve might be choked. • Air traps. • Valves are not properly operated by helper. • Plastic waste, pads etc. blocked in the outlet pipe.	• Check and clean valves regularly. • Follow SOP for operating the valves and schedule for septage addition in BDT. • Replacement of damaged plumbing. • Dilute the thick sludge with water. • Check screening process regularly.
• Odour	• Due to storing septage for many days in the tank.	• Draining the tank regularly as per schedule. • Wash and clean the tank frequently.

2.4. Grit Removal Arrangement and Treatment Tank

2.4.1. Photos of Grit Chamber

1	2	3
		
Grit chambers	**Flow control valve**	**Main Gate valve for grit chamber operation**

2.4.2. Operation

- Open the gate valve of the solid-liquid separator tank to remove grit particles.
- Spread grit particles on the grit treatment bed.
- Every week, grit should be removed. Use four beds alternately each time to treat the grit, as per the schedule provided.
- Completely drain excess water and add this water to the TBF-II feed tank for further treatment.
- Check daily bed's activity and vermicompost conversion rate by visual observations. If waste is accumulated on the TBF beds then inform the Plant In-charge.

2.4.3. Preventive Measures

- Check the grit level in the solid-liquid separator tank at least once in a day.
- If the grit level increases, then immediately remove grit.
- Check valves daily to identify leakages if any.

2.4.4. Corrective Measures

- If grit is accumulated in a large quantity, then remove the excess grit and dispose safely at the dumping ground.

2.4.5. Troubleshooting – Grit Chamber

PROBLEM	CAUSE	REMEDIAL MEASURE
• No grit appears on the grit beds	• Grit removal valves are clogged. • Grit compaction in the tank.	• Check and clean valves before opening. • If required, clean manually.
• Excess grit deposition in solid-liquid separator tank	• Valves are choked. • Septage storage minimizes.	• Remove excess grit immediately by opening grit removal valve and spread into grit chamber. • Check plumbing and fittings.

2.5. Anaerobic - Bio Digester Tank (BDT)

2.5.1. Photos of BDT

1	2	3
		
BDT Tanks	**BDT Series**	**Flow Control valve in between Solid-liquid Separation Tank and BDT**

4	5	6
		
Air vent valve provided after 3rd BDT	**Piping arrangement**	**Valve arrangement in between Solid-liquid Separation Tank and BDT**

2.5.2. Operation

- Check water level inside the Solid-liquid Separator Tank and open the 4 valves as per water levels inside the tank to ensure feeding from top to bottom.
- Open the ball valve fully for a few seconds until the choked sludge is removed, and then set as per designed flow rate of solid-liquid separator tank to transfer the faecal sludge towards the BDT.
- Observe the BDT outlet point for faecal sludge outflow.

- If overflow is observed, then close the valve and wait for settlement.
- Always keep air vent valve of the BDT closed.
- After finalisation of valve opening, start a stopwatch.
- Open selected valve fully and stop the feeding after 2 Min 20 Sec.
- Simultaneously, check the level marking on solid-liquid separation tank. Within 2 Min 20 Sec, 200 litres of septage should be added into one series of BDT tank.
- After addition of 200 litres to BDT from solid-liquid separation tank, wait for a 20 min cycle completion for BDT-Series-I. 15-17 min is the recommended resting period between two feedings for BDT-Series-I.
- Repeat this septage additions and settlement cycle for BDT-Series-II.
- After the 20 min cycle, restart and operate the subsequent valve as per septage level inside the solid-liquid separation tank and repeat.
- Maximum 600 litres of septage should pass through each BDT Series per hour, and a total of 1200 litres per hour from both BDT.
- Observe the solid accumulation into BDT tanks on a weekly basis.
- If possible, record videos and photos while opening the BDT.
- Keep a record of visual observations like flies, gas bubbles etc.
- Maintain data records and provide update to plant in-charge.

2.5.3. Preventive Measures

- Check all valves and plumbing fittings daily.
- Check acrylic sheet and lid of the BDT at least once in a month for breakage. If any damage to the acrylic sheet is noticed, immediately inform the Plant in-charge. Replace the acrylic sheet with a new sheet in stock, or from the market if unavailable in stock.
- Always maintain anaerobic conditions inside the BDT.
- Do not open the lid or acrylic sheet in the BDT without instructions from the Plant In-Charge.
- Check the air vent pipe daily for accidental opening. Air vent pipe should always be kept closed.

2.5.4. Corrective Measures

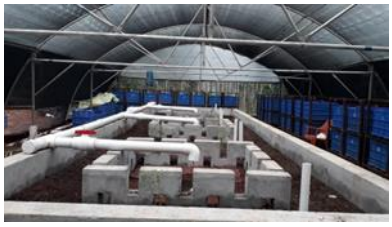
- If anaerobic conditions are not maintained, then check lid and acrylic sheet. If required, repair or replace immediate.
- If leakages from plumbing are observed, then repair or replace immediately.

2.5.5. Troubleshooting - BDT

PROBLEM	CAUSE	REMEDIAL MEASURE
• Overflow/ Short circuiting in the BDT	• Trapping air. • Plumbing breaking. • Due to no proper closing of Air vent pipe. • Solid accumulation.	• Check plumbing arrangement and air vent pipe. If plumbing pipe or fittings choked, remove, and clean or replace damaged fittings if any. • Always keep air vent pipe closed. • Remove excess solids every three months to TBF-I bed.
• Leakage	• Improper plumbing work. • Damage to plumbing.	• Repair or replace plumbing and fittings immediately.
• Presence of Inorganic waste	• Improper screening operation by operator.	• Check screening operation properly.
• No bubbling	• No anaerobic condition maintained.	• Ensure lid and vent pipe are kept closed every time.

2.6. TBF Vermifiltration – I (TBF-I)

2.6.1. Photos of TBF operation

1	2	3
		
TBF first arrangements	**Flow controller**	**Worms under mat**

4	5	6
		
Septage addition through the BDT tank	**Pipes for ventilation**	**Valve opening for TBF first chamber**

2.6.2. Operation

- Check all beds before beginning feeding from the BDT. Open the appropriate valve, as per schedule.
- Check the top of each bed layer to verify that the previous waste is converted, and if so, check the quality of vermicompost like granular type vermicompost and worm availability.
- Open only one valve before starting BDT feeding and confirm return valve is closed properly.
- Ensure before starting the addition of thickened septage from the BDT tank that the TBF-I beds first valve is open as per requirement (whether its chamber 1, 2, 3 or 4).
- Observe the beds during the start and end of septage flow for the worm's response towards the incoming solids from the BDT tanks.
- Water logging activity needs to be monitored due to thick sludge coming from BDT to TBF-I beds. If waterlogging condition is observed due to thick sludge, inform the plant in-charge before sludge is allowed to spread.
- Observe after every feeding cycle from BDT to TBF-I beds, excess solid accumulation on the TBF-I beds due to thick sludge coming from BDT.
- Before feeding to TBF-I beds from BDT, check worm quantity and worms health.
- Keep observational records of baby worms and cocoon.
- Rotate the TBF-I beds every one-hour cycle for feeding of sludge from BDT.
- Feed all three chambers alternately to prevent the TBF beds from overloading and water logging.

2.6.3. Preventive Measures

- Ensure all valves under the TBF-I beds network are closed after feeding is completed.
- Do not open all valves at a time. Only open one valve, as per schedule.

2.6.4. Corrective Measures

- If excess accumulation of solids is observed, then change the coir mats.
- If thickened wastewater is received from BDT after two to three cycles, inform the plant in-charge for preferred TBF-I bed for feeding to avoid excess solid accumulation and water logging condition on single beds.
- Vermicompost should be removed after every three months, or as required.

2.6.5. Troubleshooting – TBF-I

PROBLEM	CAUSE	REMEDIAL MEASURE
• Water logging	• Excess solid accumulation on the TBF bed surface.	• Remove excess solids as well as on mat or replace mat. • Stop the feeding.
• Excess solid accumulation or flow	• Variation in septage from BDT.	• Check BDT tank, if excess solids accumulation in the BDT, it needs to remove in the grit chamber.
• Thickened wastewater	• Excess solids accumulation in the BDT.	• Excess solids accumulation in the BDT, need to remove.
• Inorganic waste present	• Improper screening operation by operator.	• Check screening operation properly.
• Lack of flow	• Choking of plumbing. • Solid deposition in the pipe.	• Check and clean piping and fittings by using freshwater jet.

2.6.6. Removal of Vermicompost

- Vermicompost must be periodically removed from TBF-I beds and TBF-II crates.
- Frequency of VC removal is once in every three months, or earlier if required.
- First, observe the VC accumulation into TBF three chambers, as well as TBF crates.
- After every three months, collect at least two inches of vermicompost layers from each chamber and TBF crates into one corner. Make a heap of vermicompost and let rest for one day, so worms from the heaped vermicompost will evacuate into the biomedia layer and the vermicompost can be easily scooped out.
- During collection of vermicompost, operator should wear the hand gloves for safety.
- Keep the VC in sun to dry for at least 15 days to kill viruses from vermicompost before packing.

2.7. TBF Vermifiltration – II (TBF II)

2.7.1. Photos of TBF II operation

1	2	3
		
TBF second one set	**Distribution arrangement through the channels**	**TBF 2 stand arrangement**

4	5	6
		
TBF II arrangement	**TBF arrangement stand inside the shed**	**TBF second stand arrangements**

2.7.2. Operation

- After TBF-I bed, partially treated water is stored in an intermediate storage tank. In this tank, two submersible type pumps provided for water feed to TBF-II beds. These pumps are controlled by level sensors provided to check water level in the intermediate tank. Pumps are automatically started when the water level is increased up to level sensor and when water level drops below the level sensor, pumps will automatically stop.
- Feeding pumps should operate alternately.
- The plant can be run in both, automatic and manual modes. If the plant is on auto mode, there is no need to start pump - it will start by itself due to the level sensors. If the plant is on manual mode, check the water level into tanks and if a sufficient level is found in the tank, then start the pump.
- Two operating valves can be adjusted manually for TBF crates flow and return flow as well.

- The flow rate is to be maintained at 750 ml/min to each crate, using beaker and stopwatch. The throttle ball valve will be used to set the flowrate at 750 ml/min to each crate.
- Take a beaker and put it the below of TBF crates flow start the stopwatch and stop the watch after 1 min check the volume collected after one minutes of flow it should not be more than 750 ml/min.
- Regularly check the flow rate of two to three crates per day and ensure it is set to approximately 750 ml / min. If flow fluctuates, reset it to 750 ml/min.
- Fresh vermicompost – observe all TBF second crates daily for fresh vermicompost and provide and update to plant in-charge.
- Check water logging or water draining from the side of the crates daily.
- Check plumbing at least once in a week to avoid the leakage problem.

2.7.3. Preventive Measures

- Check worm population in each crate at least once in a week to avoid water logging condition.
- Check plumbing and fittings at least once in a week to avoid leakages.
- Do not change valves arrangement to avoid flow rate variation.

2.7.4. Corrective Measures

- If water logging condition or water draining from side of the crates is observed in the crates, check flow rate as per design to ensure a rate of 750ml/min.
- If water logging condition or water draining from side of the crates is observed in the crates, then check worm quantity and add more worms if required.
- If water logging condition or water draining from side of the crates is observed in the crates, then check solids accumulation. If excess solids are present, then immediately remove solids and add to the grit chamber.
- If worms are not present in the crates, then add more worms immediately.
- Vermicompost will be removed after every three months if required.

2.7.5. Troubleshooting – TBF-II

PROBLEM	CAUSE	REMEDIAL MEASURE
• Water logging condition in the crates	• Excess flow rate. • Solid accumulation. • No worms present. • Filter media	• Adjust flow rate and check. • Remove excess solids with safe handling. • Addition of worms. • Check and replace filter media layers if

	disturbance.	required.
• Odour	• Improper treatment. • Dead worms in the crate.	• Verify if the treatment unit is malfunctioning and correct as required. • Remove dead worms immediately by gloves or put some fresh vermicompost.
• Varies in the flow rate	• Leakages from plumbing.	• Check and repair or replace plumbing.

2.8. Pressure Sand Filter (PSF), Activated Carbon Filter (ACF) and Chlorination

2.8.1. Photos of Operations

1	2	3
		
PurAll Unit	**PSF – ACF**	**Control valve**

2.8.2. Operation

- After treatment in the TBF-II bed, the partially treated water is stored in the filter feed tank. In this tank, two submersible type pumps are provided to feed water to the tertiary treatment units. These pumps are controlled by level sensors provided to check water level in the filter feed tank. Pumps are automatically started when water level increases up to level sensor and when water level falls below the level sensor, pumps will automatically stop.
- Feeding pumps will operate alternately.
- Check operating pump I or II switch on control panel before start pumping.
- Take a backwash at least once in a week for pressure sand filter and activated carbon filter.

2.8.3. Preventive Measures

- Check valve arrangement first before starting the feed. Return and backwash valve should be closed during feeding.
- Check all valves are closed after feeding work is completed.
- Do not open FRP vessel or multiport valve without instructions.
- Do not change plumbing without instruction.
- Do not change PurAll valve adjustments.
- Do not open all valves simultaneously. Multiport valves are provided for pressure sand filter and activated carbon filter so operate proper valve arrangement mentioned on multiport valve for backwash/filtration process.

2.8.4. Corrective Measures

- If output water quality is not good, then a back-wash operation must be conducted immediately to improve water quality from PSF and ACF.
- After chlorination, if chlorine is not present in the treated water, first check the cap of the PurAll – If red indicator is seen, then open the PurAll cap and replace chlorine cartridge immediately.

2.8.5. Troubleshooting - Treatment at site

PROBLEM	CAUSE	REMEDIAL MEASURE
• Bad water Quality • Dirty Water at outlet	• Irregular backwash. • Changing valves arrangements like select backwash mode during filtration.	• Conduct backwash immediately. • Adjust flow rate as per design. • Set filtration mode during filtration and for backwash, set backwash mode on multiport valve.
• Odour	• Irregular backwash taking. • Lack of Chlorine or chlorine cartridge finished.	• Take backwash immediately. • Check and Replace immediately with new chlorine cartridge.
• No water output from the PSF and ACF	• Filter Feed Pump is not functioning correctly. • Choking in the pump or plumbing line or fittings.	• Check pump and if any particles are choking the pump, then remove particles and recheck. • Check plumbing line and fittings first if any damages then replace it or if choking, clean it.

3. NOTE ON HEALTH AND SAFETY

3.1. General

- The plant operator will be trained by plant in-charge for a minimum of 10 days to understand the technology, FSTP safety terms, and plant operation.
- The intermediate tank, filter feed tank and treated water tank – Cleaning procedures of these tanks shall be done in the presence of plant in-charge to avoid any accident like fall in the tanks or injured during cleaning work.
- The gas generation risk is present at any end of the units (BDT) – in the BDT, methane gas is generated in very small amounts and gas will be released by opening air vent valve as per instruction by plant in-charge in his presence with while wearing mask and wearing hand gloves.
- Safety from mosquito-, insect-, and snakebites at the FSTP - the operators and supervisor shall use mosquito repellent while operating the plant. In the case of insect bites, use Lacto calamine lotion (kept in the first aid box) as a first response. As a safety precaution from snakes and potentially dangerous creatures, use the torch available in the first aid box. Close any crevices and possible hiding places on the plant premises. In the late evenings, the plant should be well lit.

3.2. Daily Safety Practices

- Use mask, safety coat, goggle, hand-gloves, and shoes daily during valve operating
- Take all necessary precautions during plant operations.
- Call emergency services if case of any accidents during daily operations.
- While checking the electrical panel, electricity supply should be switched off.
- While checking and cleaning the submersible pumps, the main electrical line should be switched off.
- Only use potable water for drinking, kept in the office. Do not use any other water for drinking without informing plant in-charge.
- Maintain an entry and exit record for all visitors, workers, and septage for security.

- Do not remove cover from all water storage tanks without permission by plant in-charge.

3.3. Safety Procedure for Operators

- This Health and Safety Rulebook is presented for the use of all employees of this utility to assist in the administration of our safety program and to provide means and methods that will aid in the performance of our various assignments in a safe and efficient manner.
- Employees working in the FSTP facility must be trained prior to commencement of work so that they are aware of the health and safety risks as well as the operational procedures associated with the FSTP.

3.4. Important Safety Rules

It is the intent of the management to conduct its operations in a safe and efficient manner with the utmost regard for the health and safety of the employees and the public. Safety is an integral part of everyone's duties and responsibilities.

- Working with Faecal sludge requires adequate protection for operators. This includes wearing steel toed shoes, hard hat, rubber aprons, and protective glasses with side shields, protective gloves, and ear plugs.
- All authorized personnel working in the FSTP must be inoculated against Hepatitis A and B through vaccines.
- The operator must keep their working area clean to minimize the risk of accidents.
- Regular personnel hygiene (like washing hands) is important to prevent illness.
- Always follow the lock-out, tag-out procedures when servicing equipment.
- No person shall drink water in the plant or the water that is discharged from the FSTP.
- Safety showers and eyewash are located within proximity of chemical systems in the FSTP plant.

3.5. Handling of Septage

- Any person handling or operating the plant or handling any waste matter, whether treated or non-treated, must essentially use a mask and gloves and provide a mask and gloves to the honey sucker personnel who discharge the Septage from Septage vehicle.
- First aid box - Always place a first aid box at FSTP location that includes, Band-Aid and bandages, crepe bandage, antiseptic creams, Vicks, cotton, Dettol, Lacto calamine, seizer, diarrhoea tablet and ORS packet.
- The first aid box will be checked every week by the supervisor, and any consumption will be replenished within 24 hours.

3.6. Contact Personnel for Health and Safety

- Owner of the plant - Kalpetta Municipality Council
- Operator of the plants - PriMove Infrastructure Development Consultants Pvt. Ltd.
- First respondent for Health and safety issue - Unaise Muhammad (Plant In-charge) Phone - +91 95394 91771
- Second respondent – Rohit Patankar (Project Manager) Phone - +91 95958 39521
- Emergency contact number – DIAL 102
- Ambulance services - +91 98473 93712
- Civil hospital, Kalpetta – FATIMA HOSPITAL 04936204018

3.7. Personal Protective Equipment (PPE)

Personal Protective Equipment (PPE) is required to operate this system safely. The following items should be readily available and properly fitted for operators of this system:

- Hardhat
- Rubber aprons
- Safety glasses with side shields
- Safety shoes
- Face shields
- Housekeeping equipment (brooms, mops, spill kits, rags)

Sr No	Photo	Description
1.		Mask – Always use hardhat during daily operations.
2.		Mask – Always use masks during daily operations.
3.		Hand gloves – Daily use hand gloves during operations.
4.		Use safety shoes daily.
5.		Wash your hand after operations by soap or hand-wash agents.
6.		Use sanitizer before entering the plant, during lunch or breakfast, and before going home after completing all tasks.
7.		Use rubber apron during sample collection.

3.8. Conclusion

By following standard operating procedure (SOP's) the FSTP will operate efficiently and provide satisfactory output. Also this helps to maintain accident free operation at plant, by following this standard operation procedure, FSTP will hazard free work space.