



A PROJECT ON...

SEWAGE TREATMENT PLANT

Under the direction of...

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INTRODUCTION:-

- **Sewage treatment** is the process of removing contaminants from wastewater, primarily from household sewage. Physical, chemical, and biological processes are used to remove contaminants and produce treated wastewater (or treated effluent) that is safer for the environment.

IMPORTANCE OF SEWAGE WATER TREATMENT PLANT:-

- ❖ It is very important **to provide some degree of treatment to wastewater before it can be used** for agricultural or landscape irrigation or for aquaculture.
- ❖ The principal objective of sewage treatment is generally **to allow human effluents to be disposed of without danger to human health** or unacceptable damage to the natural environment.
- ❖ According to a research, **a large number of people die** from water born diseases in most of the developing countries. Therefore, it is very important to get the proper treatment of the water for a healthy living.



SOURCES OF WASTE WATER:-

- ❖ **Human waste**
- ❖ **Washing water**
- ❖ **Rainfall collected on roofs, yards**
- ❖ **Domestic sources**
- ❖ **Direct entrance of river water**
- ❖ **Highway drainage**
- ❖ **Industrial waste**

Layout of sewage treatment:-

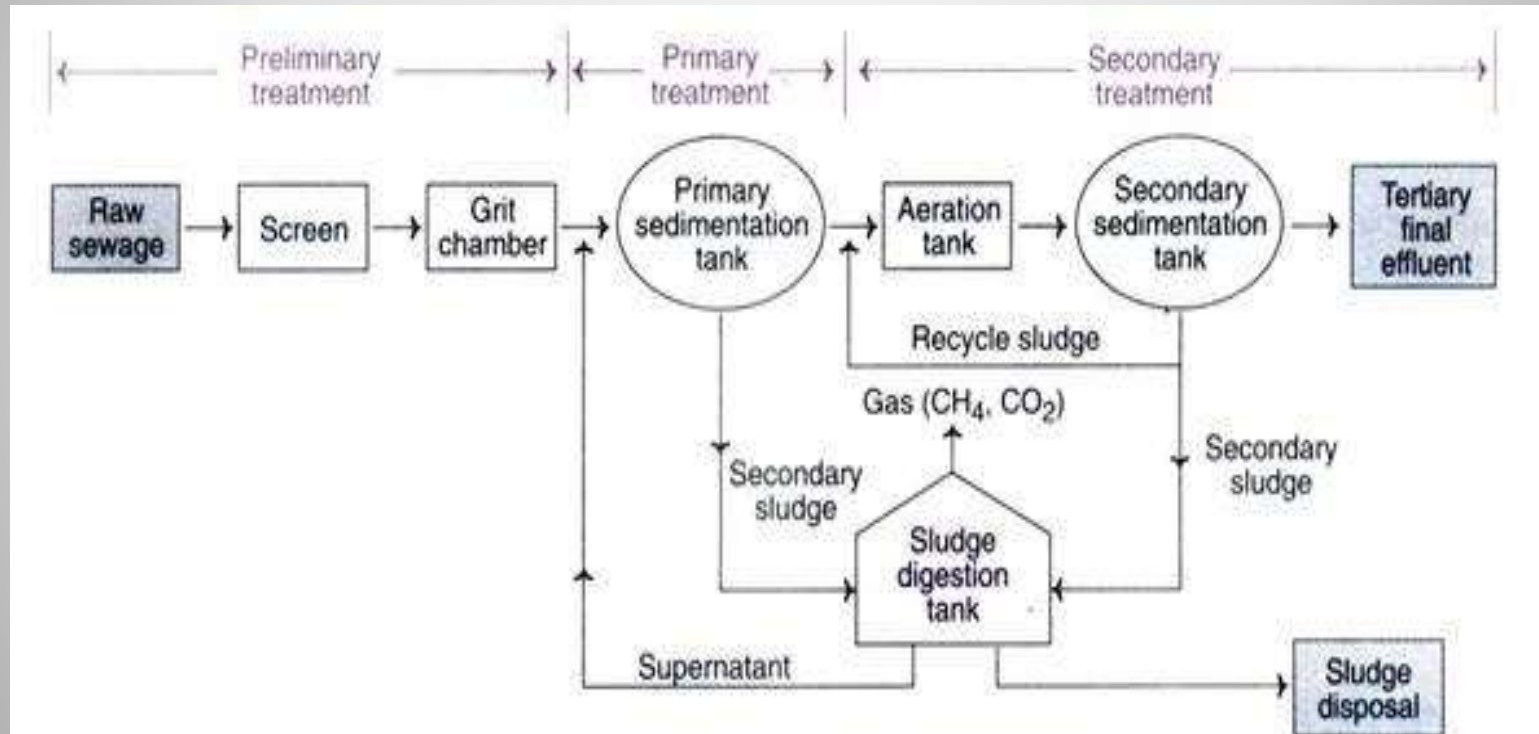


Fig. 57.18 : A diagrammatic representation of a flow chart of conventional sewage treatment plant.



SEWAGE TREATMENT PROCEDURE:-

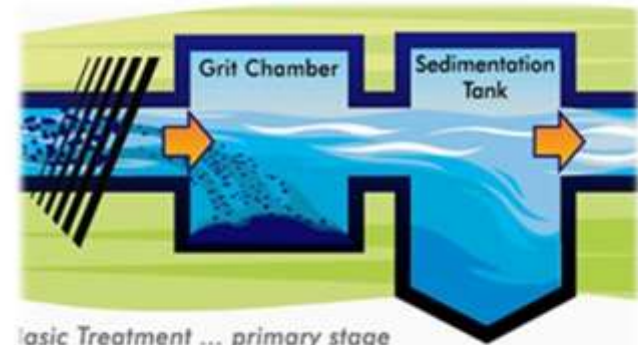
Sewage treatment generally involves three stages, called-

- θ **PRIMARY TREATMENT**
- θ **SECONDARY TREATMENT**
- θ **TERTIARY TREATMENT**

PRIMARY TREATMENT:-

Primary treatment removes all materials that can be easily collected from the raw sewage. Tree limbs, leaves, branches, and other large objects are removed from sewage. Sewage water passes through a bar screen to remove all large objects like cans, rags, sticks, plastic packets etc. carried in the sewage stream.

Primary treatment

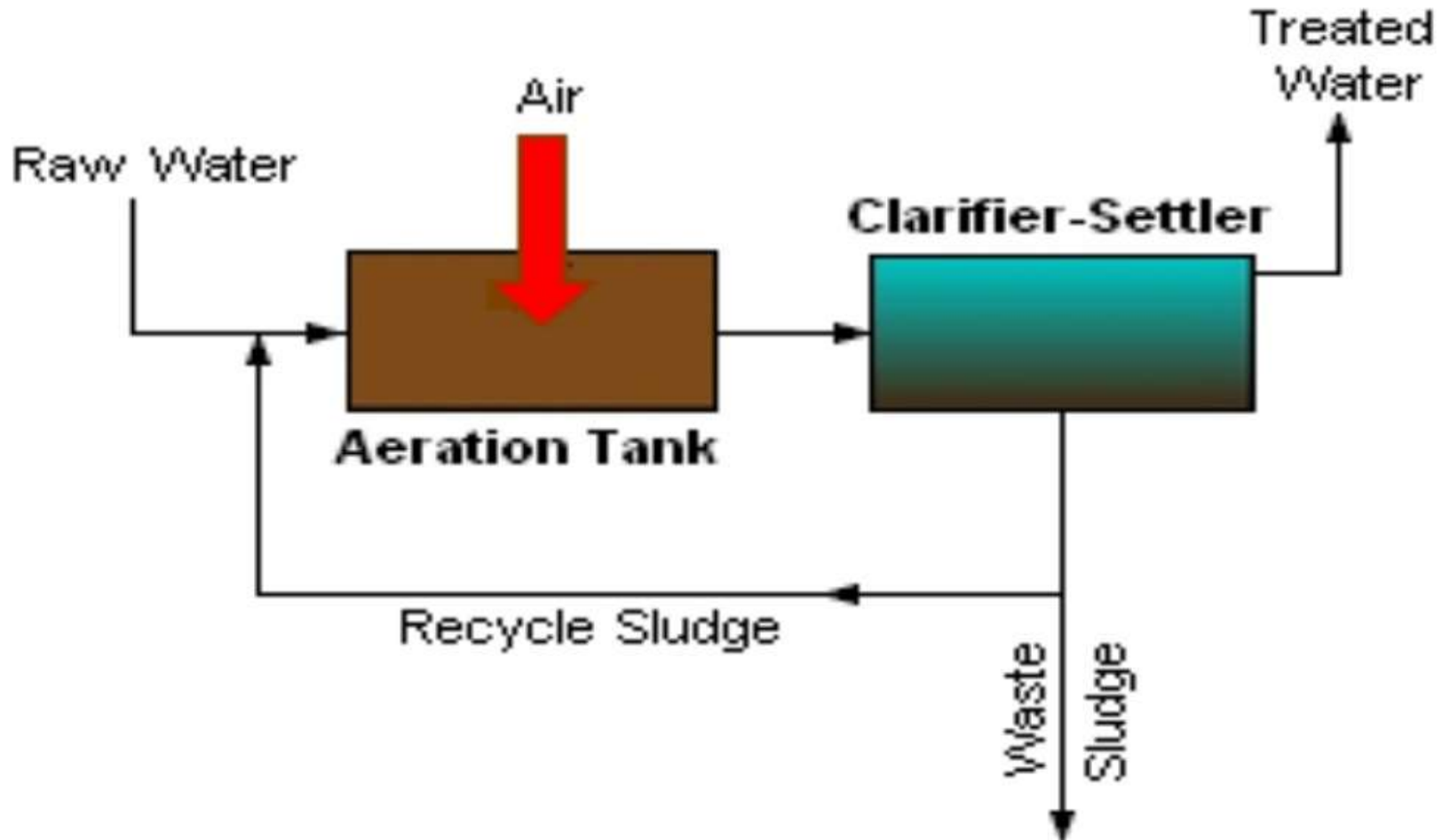


Basic Treatment ... primary stage

Secondary treatment:-

- It is designed to substantially degrade the biological content of the sewage which are derived from human waste, food waste, soaps and detergent. The majority of municipal plants treat the settled sewage liquor using aerobic biological processes. To be effective, the biota require both oxygen and food to live.

SECONDARY TREATMENT:-



BAR SCREENING

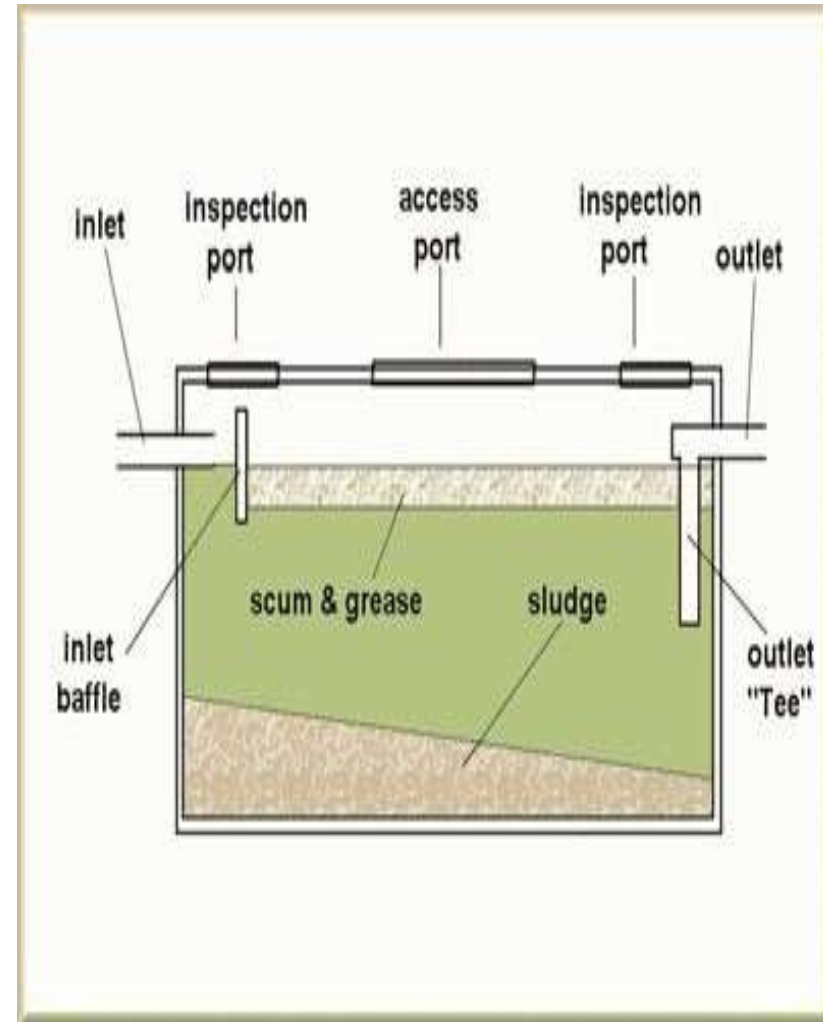
- The influent sewage water passes through a bar screen to remove all large objects like **cans, rags, sticks, plastic packets** etc. carried in the sewage stream. This is most commonly done with an automated mechanically raked bar screen in modern plants serving large populations, whilst in smaller or less modern plants, a manually cleaned screen may be used.

BAR SCREENING:-



GRIT REMOVAL PROCESS:-

- Pre-treatment may include a sand or **grit channel** or chamber, where the velocity of the incoming sewage is adjusted to allow the settlement of **sand, grit, stones, and broken glass**. These particles are **removed** because they may **damage pumps and other** equipment.

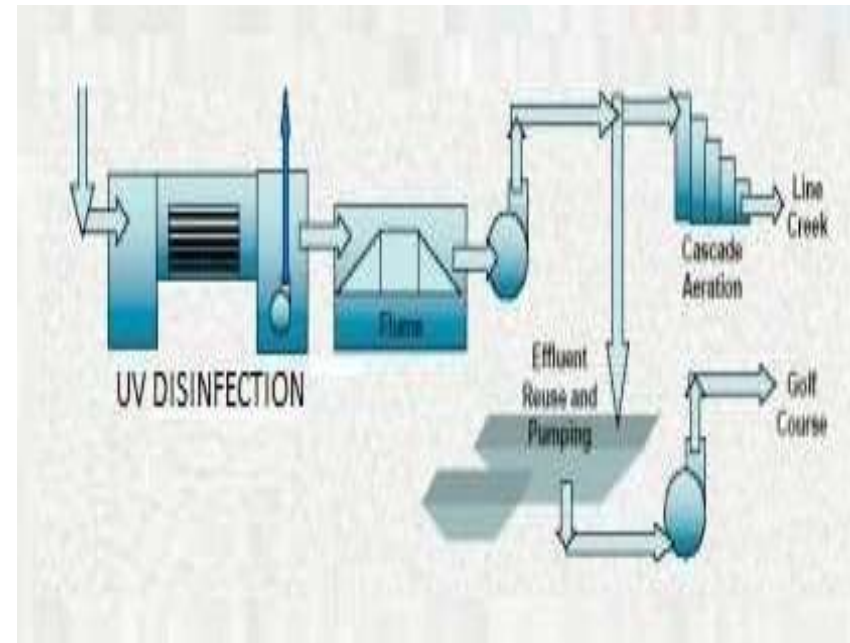


ACTIVATED SLUDGE:-

- In general, activated sludge plants encompass a variety of mechanisms and processes that use dissolved oxygen to promote the growth of biological flock that substantially removes organic material.

TERTAIRY TREATMENT:-

- 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 (sea, river, lake, ground, etc.). More than one tertiary treatment process may be used at any treatment plant.
- If disinfection is practiced, it is always the final process. It is also called "effluent polishing."

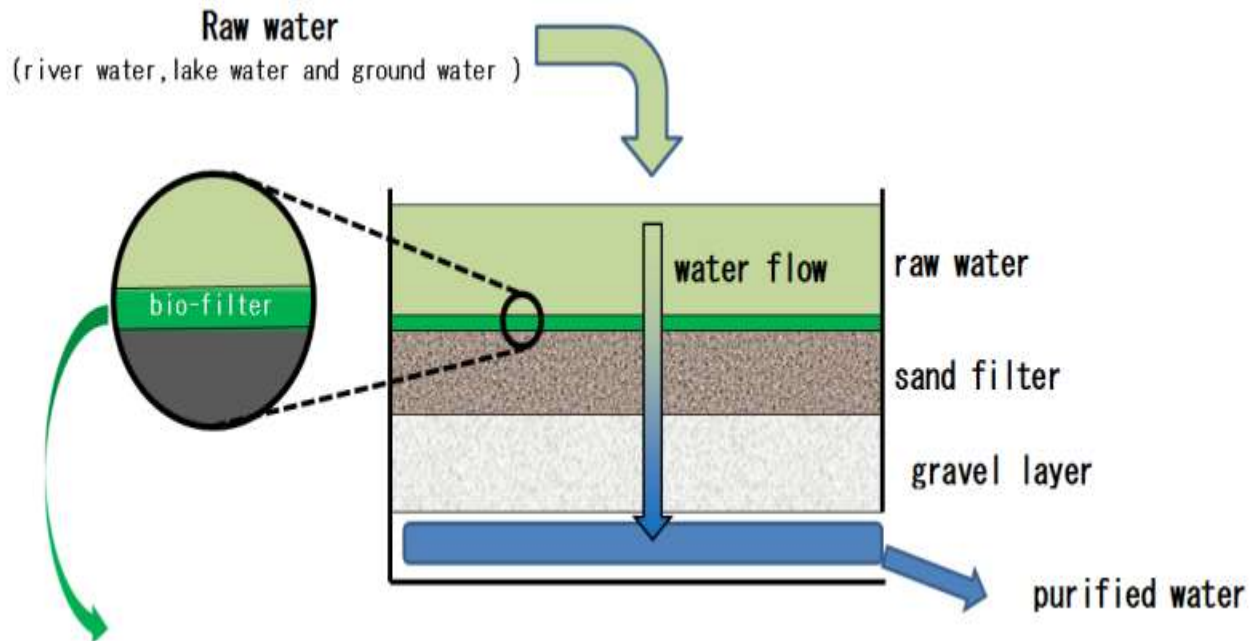


FILTRATION:-

- Sand filtration removes much of the residual suspended matter. Filtration over activated carbon, also called carbon adsorption, removes residual toxins.
- There are various type of filters used in sewage treatment:-

Types of Filter:-

SAND FILTER:-



PRESSURE SAND FILTER:-



Pressure Sand Filter

1. Sand
2. Gravels & Pables
3. Strainer Plate
4. Strainers
5. Hand hole
6. Service Inlet
7. Service Outlet
8. Air vent
9. Davit Arm
10. Backwash Inlet
11. Air Scoring

CARBON FILTER:-

- **Carbon filtering** is a method of filtering that uses a bed of activated carbon to remove contaminants and impurities, using chemical adsorption.
- Each particle/granule of carbon provides a large surface area/pore structure, allowing contaminants the maximum possible exposure to the active sites within the filter media. One pound (454 g) of activated carbon contains a surface area of approximately 100 acres (~40 Hectares).



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Activated Carbon Filter

When the treatment is done...

- **Effluent back to stream after**
 - a final carbon filtration and
 - chlorination/dechlorination

- **Sludge – very nutrient rich**
 - applied directly to land as fertilizer
 - incinerated (good fuel after drying)
 - composted .