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LOJI RAWATAN KUMBAHAN

SEWAGE TREATMENT PLANT

Ir. AKHTAR NURFITRI BIN MAT ZAIN

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TYPES OF SEWERAGE TREATMENT SYSTEM

Connected to public sewage treatment plant	Sewerage Treatment Plant	Small Sewerage Treatment System	Individual Septic Tank
(centralized)	> 150 PE	> 30 PE	< 30 PE

Small Sewage Treatment System (SSTS)

Individual Septic Tank (IST)

Public Sewerage Treatment Plan

Sewerage Treatment Plan

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SEWAGE TREATMENT SYSTEM

Selection of Sewage Treatment System

- Costing
- Approved Supplier by MOF (Check to the latest published of *Pekeliling Kontrak Perbendaharaan bagi Sistem Perawatan Najis on MOF website at http://www.mof.gov.my*)
- Site Condition (Size of Area)

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KEMENTERIAN KEWANGAN MALAYSIA

PEKELILING KONTRAK PERBENDAHARAAN BIL. 9 TAHUN 2011

Semua Ketua Setiausaha Kementerian
Semua Ketua Agensi Persekutuan
Semua Setiausaha Kerajaan Negeri
Semua Ketua Badan Berkanun Persekutuan
Semua Pihak Berkuasa Kerajaan Tempatan

KONTRAK SISTEM PANEL BAGI PEROLEHAN BEKALAN DAN PENGIRIMAN SISTEM PERAWATAN NAJIS KEPADA SEMUA AGENSI KERAJAAN DI SELURUH MALAYSIA

4. Tempoh Kontrak Sistem Panel adalah selama **tiga puluh (30) bulan** mulai **1 Julai 2011 sehingga 31 Disember 2013** dengan melantik lima (5) panel pembekal. Selepas tempoh tersebut, Kerajaan berhak untuk mengekalkan atau menggugurkan item Sistem Perawatan Najis daripada Kontrak Sistem Panel.

MAKLUMAT PANEL PEMBEKAL

5. Maklumat panel pembekal adalah seperti berikut:-

Bil	Nama Syarikat	Alamat	Perincian Bank
i.	Atostech Fibreglass Sdn. Bhd.	Lot PT 21554K, Jalan Gelam 1 Kawasan Perindustrian Gong Badak **21300 KUALA TERENGGANU** Terengganu Darul Iman No Tel: 09-666 6614 09-666 6682 No Faks: 09-666 6627 09-666 3682 E-mel: atostech@yahoo.com	RHB BANK BERHAD No 31, Jalan Sultan Ismail **20200 KUALA TERENGGANU** Terengganu Darul Iman No Akaun: 21303800002803
ii.	Bayu Tiara Engineering Sdn. Bhd.	No. 71 & 72, Jalan PKNK 1/8 Kawasan Perindustrian Sungai Petani **08000 SUNGAI PETANI** Kedah Darul Aman No Tel: 04-448 2427 04-448 2429 No Faks: 04-448 2428 E-mel: byutiara@yahoo.com.my	MALAYAN BANKING BERHAD 522-566, Jalan Jelutong **11600 PULAU PINANG** No akaun: 507031207836

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SEWAGE TREATMENT SYSTEM

Classification

- Correspond to Malaysian Sewage Industry Guideline Volume IV: Sewage Treatment Plants there are 4 classes of STP Classifications. Those are Class 1, Class 2, Class 3 and Class 4.
- Commonly uses in JKR projects are Class 1 and Class 2.
  - Class 1 - < 1000 PE
  - Class 2 – 1000 PE - 5000 PE
  - Class 3 – 5001 PE – 20000 PE
  - Class 4 - >20000 PE

Land Area Requirement

Population Equivalent	Land Area Requirement	
	m^2	acre
100	*210*	*0.052*
150	*285*	*0.070*
200	*360*	*0.089*
250	*430*	*0.106*
300	*485*	*0.120*
350	*545*	*0.135*
400	*600*	*0.148*
450	*655*	*0.162*
500	*700*	*0.173*
550	*745*	*0.184*
600	*790*	*0.195*
650	*835*	*0.206*
700	*870*	*0.215*
750	*905*	*0.224*
800	*940*	*0.232*
850	*980*	*0.242*
900	*1010*	*0.250*
950	*1040*	*0.257*
1000	*1070*	*0.264*

- **Land area requirement are subjected to type of classes and no of PE.**
- **Shown are tables for Class 1 and Class 2.**

**Source: Malaysian Sewage Industry Guideline Volume IV: Sewage Treatment Plants*
Table 3: Class 1

Land Area Requirement

Population Equivalent	Land Area Requirement	
	m^2	acre
1100	*1115*	*0.276*
1200	*1160*	*0.287*
1300	*1200*	*0.297*
1400	*1240*	*0.306*
1500	*1275*	*0.315*
1600	*1310*	*0.324*
1700	*1340*	*0.331*
1800	*1370*	*0.339*
1900	*1395*	*0.345*
2000	*1420*	*0.351*
3000	*2226*	*0.55*
4000	*2671*	*0.66*
5000	*3076*	*0.76*

Source: Malaysian Sewage Industry Guideline Volume IV: Sewage Treatment Plants
Table 4: Class 2

Buffer Zone

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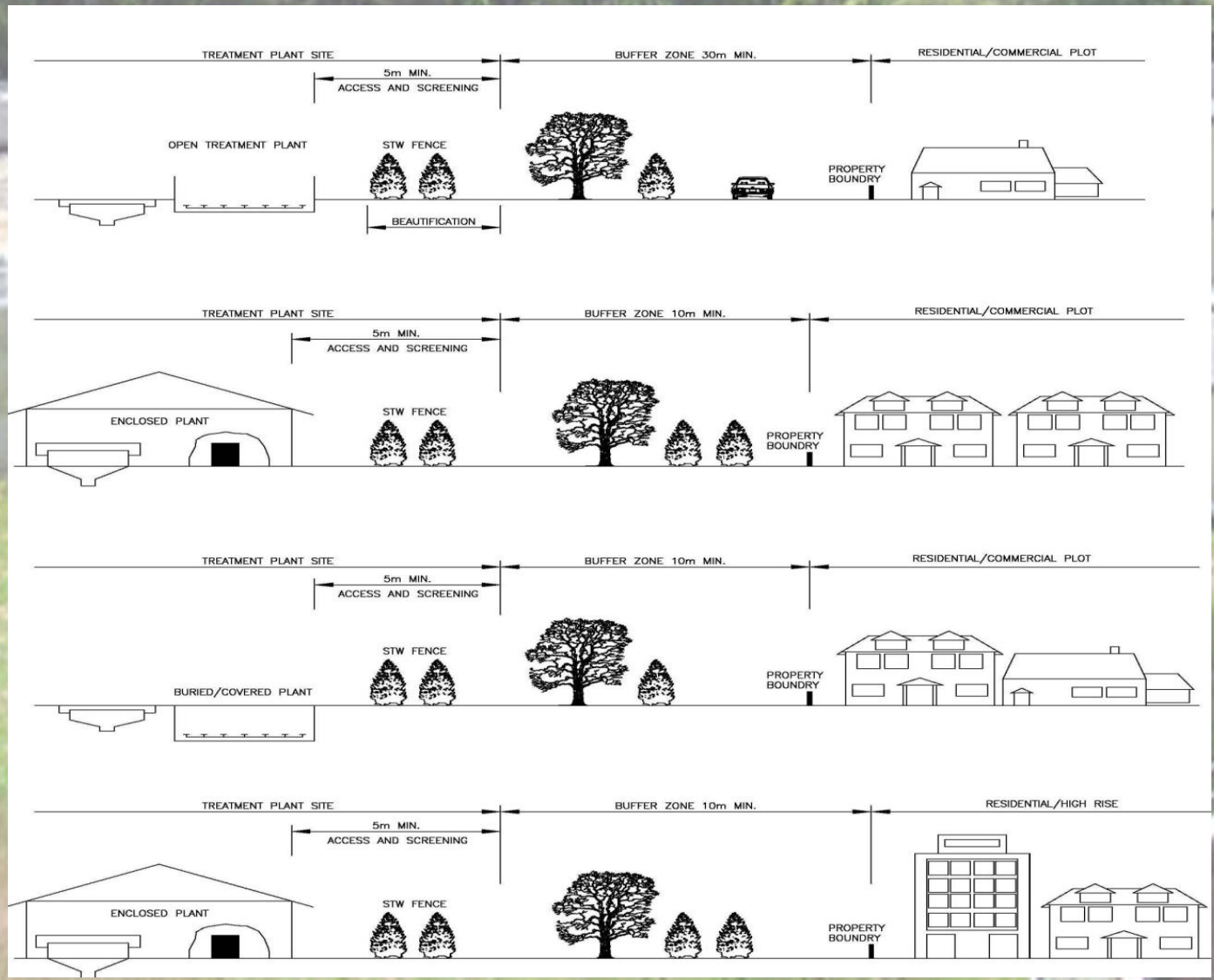
The buffer zone for STP situated in residential or commercial areas are as shown :-



Design Requirements to Achieve Environment Quality Act Effluent Standards

The Environmental Quality Act (EQA) 1974 specifies two standards for effluent discharge, which are:

- Standard A for discharge upstream of any raw intake
- Standard B for discharge downstream of any raw intake
- In JKR project, usually the standards must meet the **Standard A**. Table below indicates the design effluent values based on parameter needed.

Parameter	Effluent discharge to rivers/stream				Effluent discharge to stagnant water bodies*			
	Standard A		Standard B		Standard A		Standard B	
	Absolute	Design	Absolute	Design	Absolute	Design	Absolute	Design
BOD5	20	10	50	20	20	10	50	20
SS	50	20	100	40	50	20	100	40
COD	120	60	200	100	120	60	200	100
AMN	10	5	20	10	5	2	5	2
Nitrate Nitrogen	20	10	50	20	10	5	10	5
Total Phosphorus	N/A	N/A	N/A	N/A	5	5	10	5
O&G	5	2	10	5	5	2	10	5

Notes :
N/A =not applicable
All values in mg/l unless otherwise stated
*stagnant water bodies refer to enclosed water bodies such as lakes, ponds and slow moving watercourses where dead zone occur.
A : Discharge upstream of water supply sources
B : Discharge downstream of water supply sources

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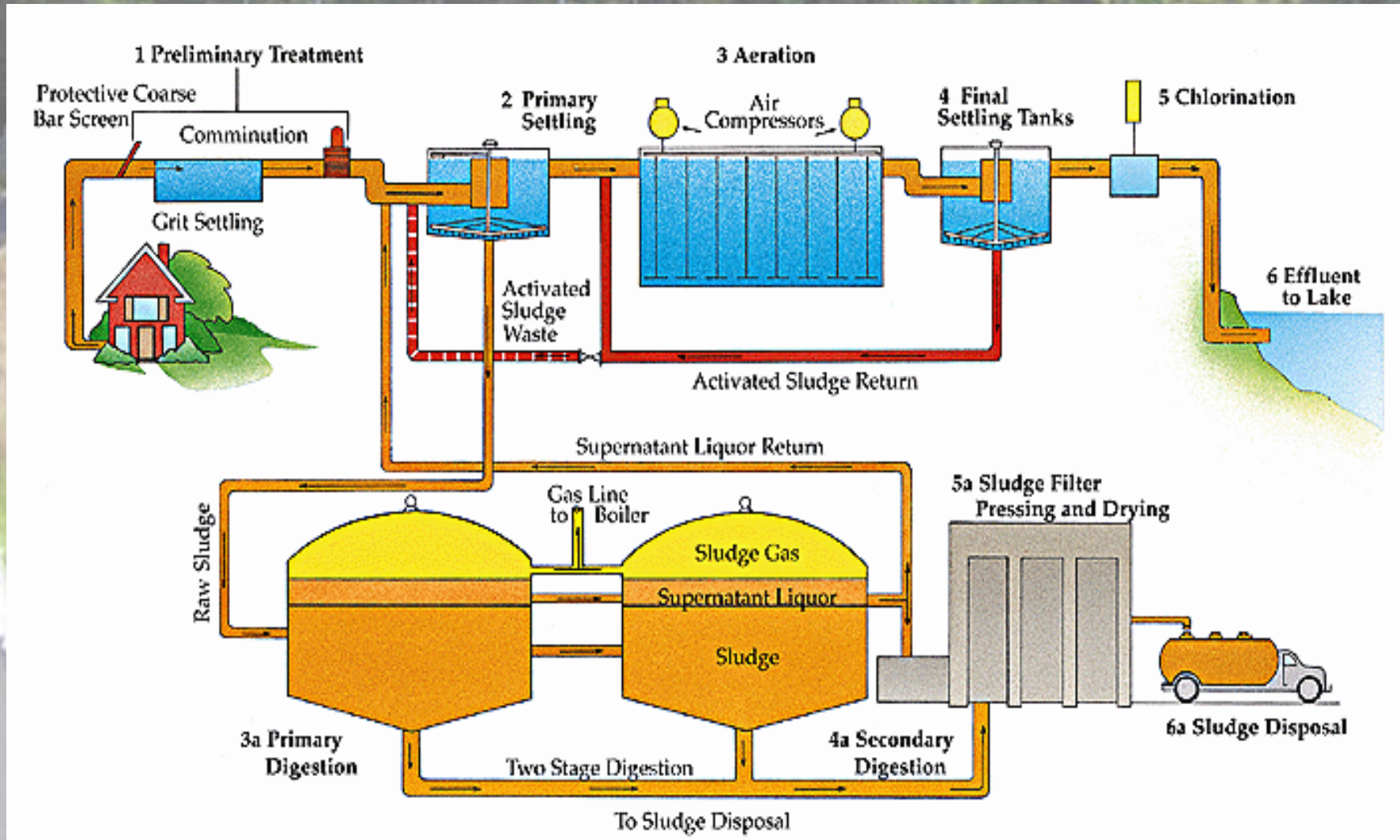
Typical Sewage Treatment Process



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Screen Chamber

- Screening is normally the first unit operation used at STP/SSTS. The purpose is to remove large objects such as rags, paper, plastics and metals.

Pump Sump

The purposes of pump sump are :

- To lift sewage to higher point for treatment
- To provide consistent inlet flows to the treatment system
- To prevent overflow of raw sewage

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Clarifier Tank

The purposes of this stage are :

- To remove maximum amount of pollutants such as settleable solids quickly and economically
- To separate sewage into sludge and settled sewage, which by being treated separately are normally dealt with more efficiently and economically
- Reducing the organic loadings on the secondary treatment units and is an essential component of secondary sewage treatment.

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Aeration Tank

- In this tank, the biological treatment took place and it is the heart of sewage treatment process. It is the process where the dissolved and non-settleable organic material remaining in the sewage are removed by living organisms.

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- **Hydraulic Retention Time (HRT)**

- Is a measure of the average length of time that a soluble compound remains in a constructed bioreactor.
- HYDRAULIC RETENTION TIME (HRT) =
  (Volume of aeration tank)/(influent flow rate)

- where using *Volume* is in [m^3] and *Influent flow rate* is in [m^3/h]. HRT is usually expressed in hours.

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Sedimentation Tank / Sludge Thickener Tank

- A sedimentation tank is structure in which wastewater is filled and stored for some time to remove the suspended particles present in the water. These particles may settle at the bottom of the tank and are removed by using scrapers. If the suspended particles have low specific gravity than water, they settle at the top of the tank.

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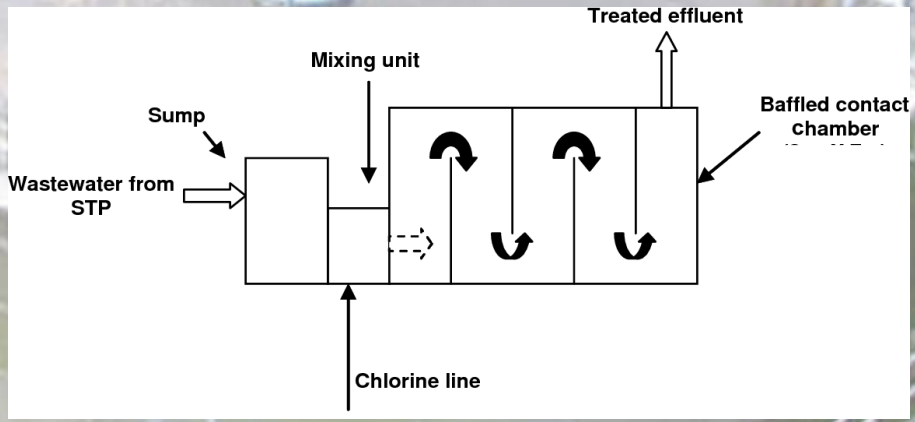
Chlorination Chamber

- A baffled basin that provides sufficient detention time of chlorine contact with wastewater for disinfection process before discharging it.
- To protect the public from disease-causing organisms commonly found in wastewater.



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WASTE WATER / SEWAGE TREATMENT SYSTEM IN MALAYSIA

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Type of system used in Malaysia.

Collection System

- Separate System
- Network Pump Station (NPS)

Treatment System

Communal
- Extended Aeration
- Aeration Lagoon
- Oxidation Pond
- RBC
- Combined STP

Centralized
- Sewage Treatment Plant and Facilities

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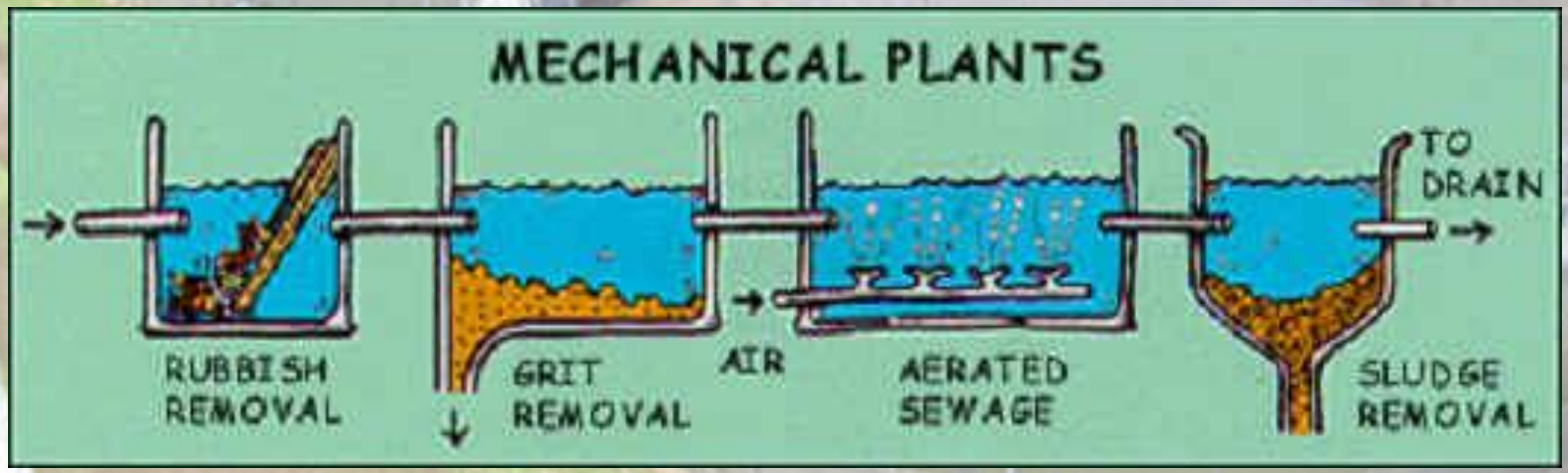
How to recycle the water?

Basic Concept



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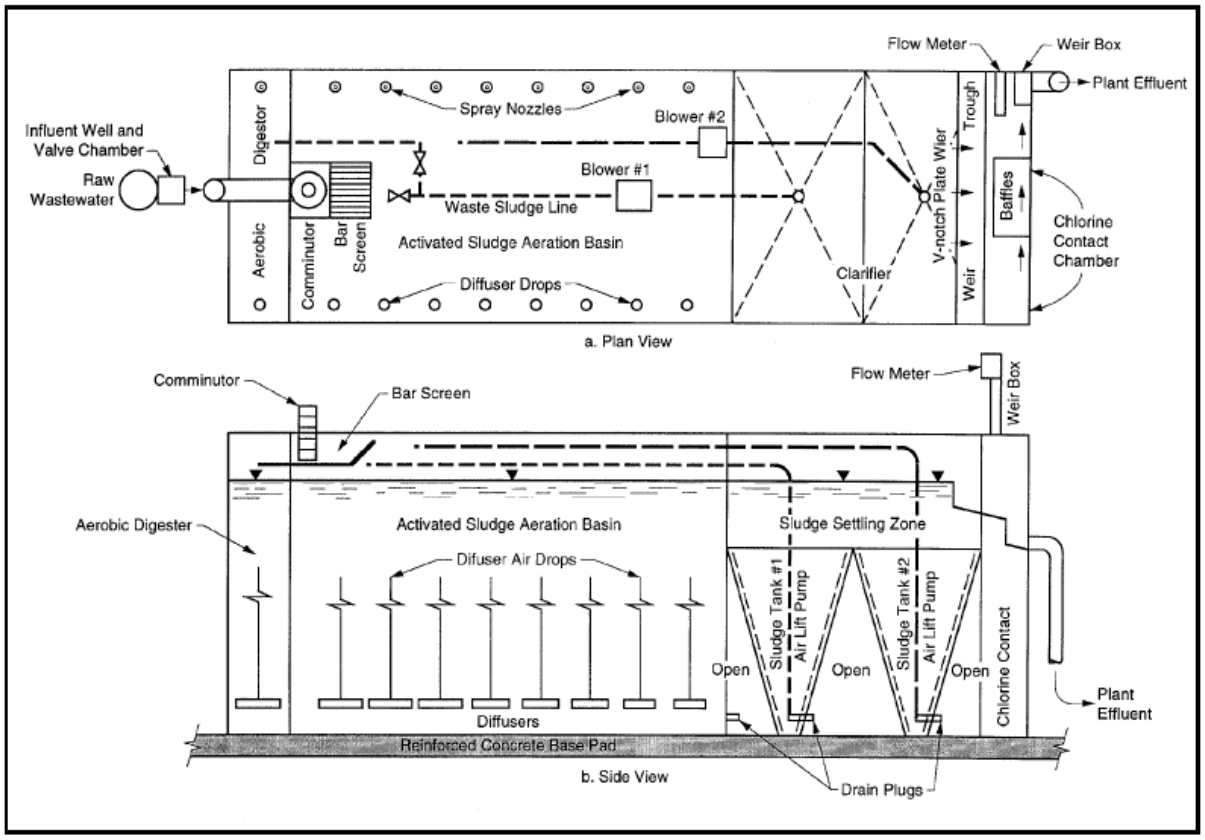
Extended Aeration

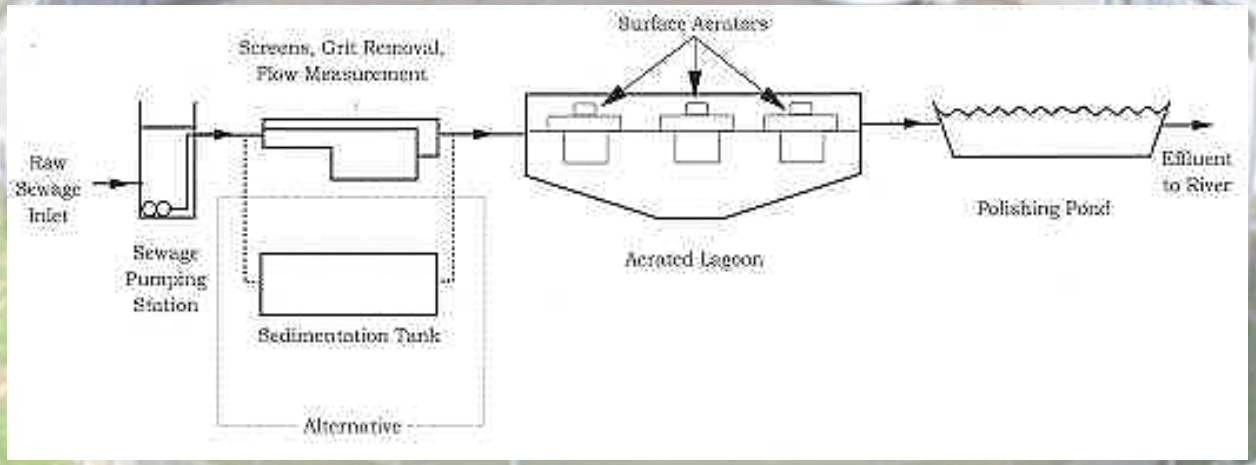


Type - Extended Aeration

Electrical – Three Phase

Mechanical – Blower & Motor Pump

Aeration Lagoon



Type – Aeration Lagoon

Electrical – Three Phase

Mechanical – Floating Surface Aerator & Motor Pump

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Oxidation Pond

Rotating Biological Contactor

Sewage Treatment Plant

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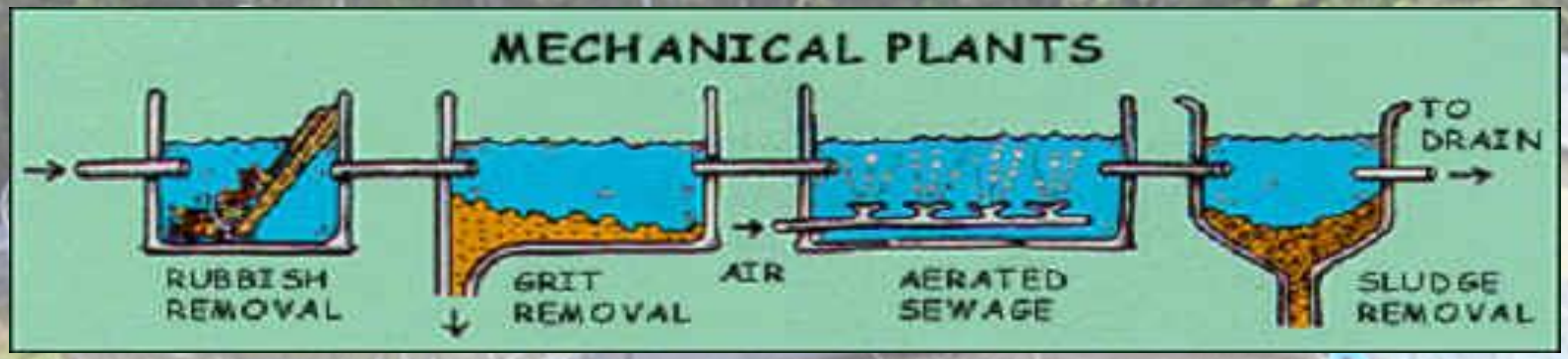
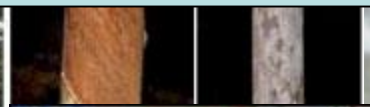


- **Sludge flow to Sludge Treatment facilities.**
- **Processing the sludge for fertilizer.**



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STP Facilities For Sludge Treatment

Compare old and new technology =

- Old Technology – Drying and Burning

- New Technology – Mechanised Dewatering Unit (MDU)

Old Technology – Drying Bed

New Technology – Mechanised Dewatering Unit

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Cost Effective

-Proximity to residential areas and town

-Access to plants

-Land availability

-Topography

-Costs (capital, operation and maintenance)

How to reduce bad smell?

-Aeration system always run.

-Increase the recirculation ratio.

-Using EM (Effective Microorganism) in treatment process.