

Solid and Wastewater

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Definition of Wastewater: Decree of the Minister of Environment Number: KEP-51/MENLH/10/1995

Wastewater is waste in the form of liquid produced by industrial activities which is discharged into the environment and is thought to reduce the quality of the environment

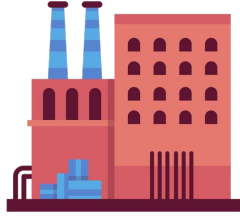
Physical Pollutants

Chemical Pollutants

- Organic chemical compounds
- Inorganic chemical compounds

Microbiological Pollutants

Sources of Wastewater



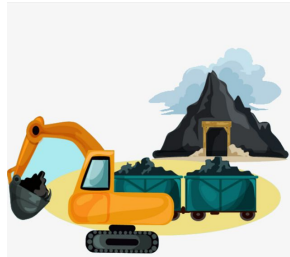
Industrial Activities



Hospital activities



Agricultural activities, animal husbandry



Mining activities



Household Activities

Classification of Wastewater/ Sewage

Sanitary Sewage

Industrial Sewage

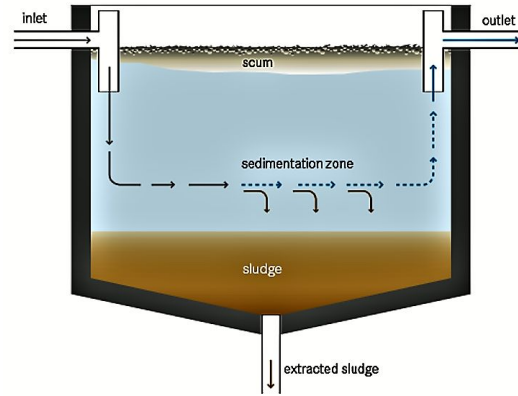
Storm sewage or
stormwater



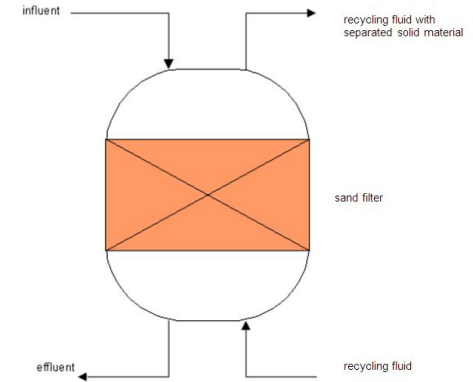
Treatment for Wastewater (Physical)



Screening



Sedimentation



Filtration

Definition of Solid Waste: SNI 19-2454-2002

Solid waste is waste consisting of organic and inorganic materials which are considered no longer useful and must be managed so they will not endanger the environment and further will protect development investment



Based on Its Composition, Solid Waste is Divided into

Wet Solid Waste

- Formed by organic materials that are easily decomposed by microorganisms

Dry Solid Waste

- Formed by organic and inorganic materials that are hard to decompose by microorganisms thus hard to decay

Based on Its Source, Solid Waste is Divided into:

Source	Typical waste generators	Types of solid wastes
Residential	Single and multifamily dwellings	Food wastes, paper, cardboard, plastics, textiles, leather, yard wastes, wood, glass, metals, ashes, special wastes (e.g., bulky items, consumer electronics, white goods, batteries, oil, tires), and household hazardous wastes.).
Industrial	Light and heavy manufacturing, fabrication, construction sites, power and chemical plants.	Housekeeping wastes, packaging, food wastes, construction and demolition materials, hazardous wastes, ashes, special wastes.
Commercial	Stores, hotels, restaurants, markets, office buildings, etc.	Paper, cardboard, plastics, wood, food wastes, glass, metals, special wastes, hazardous wastes.
Institutional	Schools, hospitals, prisons, government centers.	Same as commercial.

Construction and demolition	New construction sites, road repair, renovation sites, demolition of buildings	Wood, steel, concrete, dirt, etc.
Municipal services	Street cleaning, landscaping, parks, beaches, other recreational areas, water and wastewater treatment plants.	Street sweepings; landscape and tree trimmings; general wastes from parks, beaches, and other recreational areas; sludge.
Process (manufacturing, etc.)	Heavy and light manufacturing, refineries, chemical plants, power plants, mineral extraction and processing.	Industrial process wastes, scrap materials, off-specification products, slay, tailings.
Agriculture	Crops, orchards, vineyards, dairies, feedlots, farms.	Spoiled food wastes, agricultural wastes, hazardous wastes (e.g., pesticides).

Characteristics of Solid Waste

Physical

- Water content and humidity
- Particle size and distribution
- Permeability

Chemical

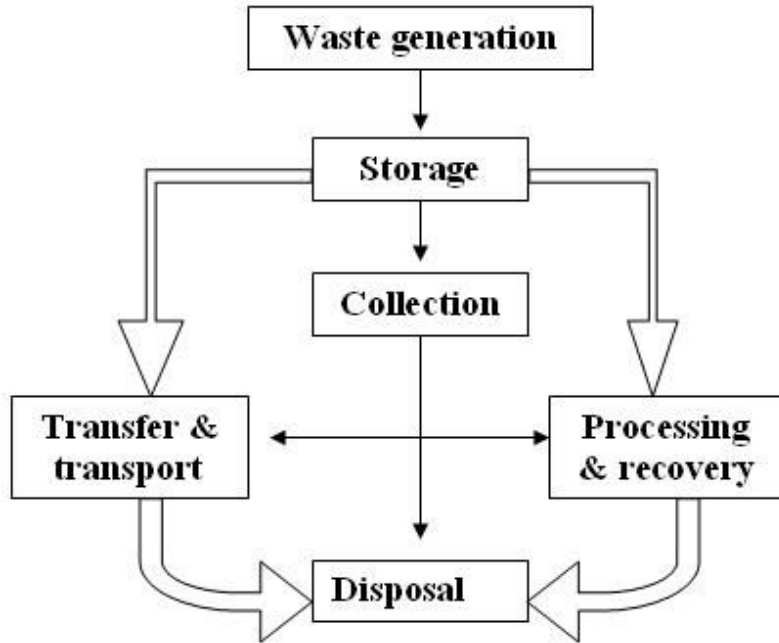
- Volatile content
- Ash content
- Energy content

Biological

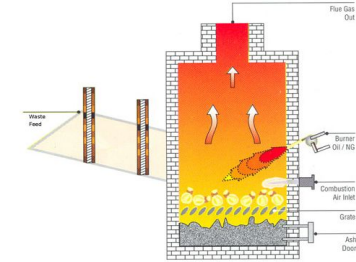
The number of flies in the solid waste sample using a fly grill



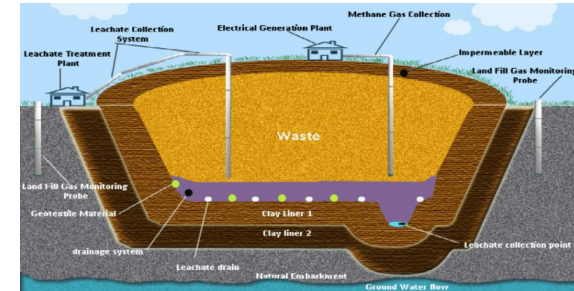
Functional Elements of Solid Waste Management System



Incineration



Sanitary Landfill



Composting

