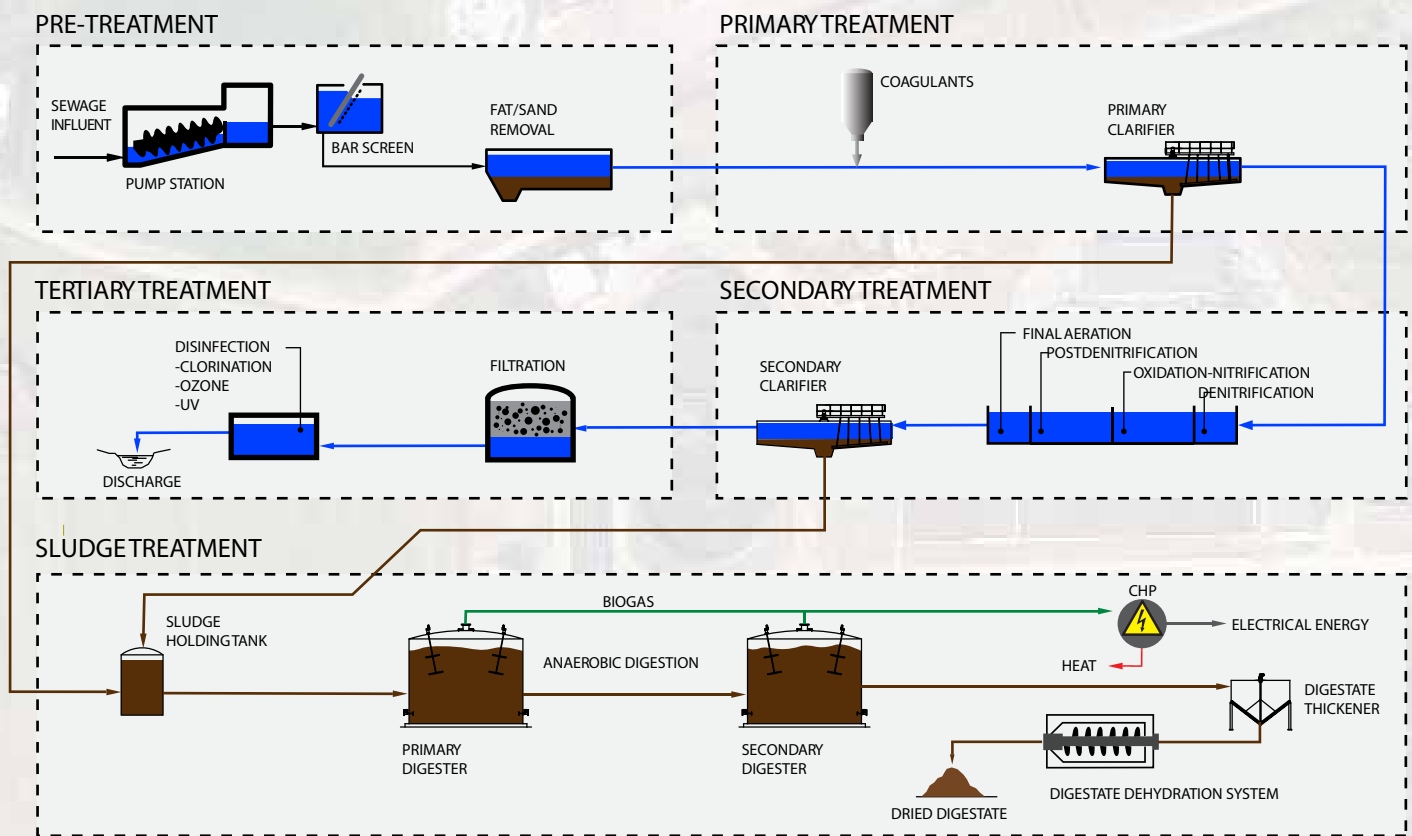




MUNICIPAL WASTEWATER TREATMENT



PRE-TREATMENT AND PRIMARY TREATMENT are designed to remove gross, suspended and floating solids and fat from raw sewage. These systems include screening to trap solid objects and sedimentation by gravity to remove suspended solids.

SECONDARY TREATMENT removes the dissolved organic matter that escapes primary treatment. This is achieved by microbes consuming the organic matter as food, and converting it to carbon dioxide, water, and energy for their own growth and reproduction. The biological process is then followed by additional settling tanks ("secondary clarifier") to remove more of the suspended solids. About 85% of the suspended solids and BOD can be removed.

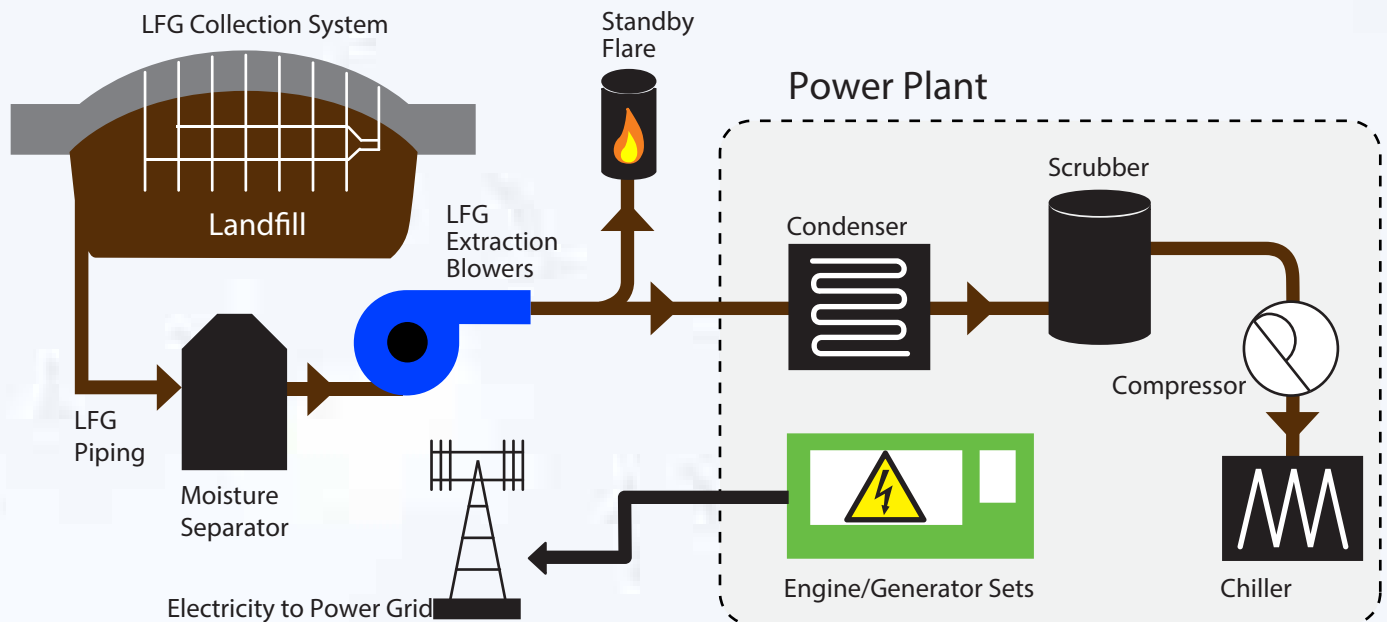
TERTIARY TREATMENT removes more than 99 percent of all the impurities from sewage, producing an effluent of almost drinking-water quality. The related technology requires a high level of technical know-how and well trained treatment plant operators, a steady energy supply, and chemicals and specific equipment for filtration and disinfection.

Disinfection, typically with chlorine, but also with ozonation or ultraviolet systems, is the final step before discharge of the effluent.





LANDFILL GAS COLLECTION SYSTEM



COLLECTION, CONTROL AND ENERGY RECOVERY COMPONENTS

A system for active landfill gas collection is made of several vertical wells connected to a control (flare) and an energy recovery system (gas engine).

LFG COLLECTION WELLS

Extraction wells normally have a “radius of influence” between approximately 1.25 – 2.5 times its depth, depending on the ratio of blank pipe length to slotted pipe length as well as waste permeability and other factors.

HEADER SYSTEM LAYOUT

Piping is provided to connect the extraction wells with the flare station, LFG control and energy recovery plant. This transportation line is comprised of:

- Main gas header piping designed to accommodate greater gas flow rate;
- Smaller secondary piping to connect the main header piping to the extraction wells.

CONDENSATION MANAGEMENT SYSTEM

LFG gas collection system is optimized with a series self-draining condensation traps located within the waste footprint, as well as condensation manholes located outside the waste limits, to effectively manage condensation accumulation. The collected condensation is then inserted directly into the leachate recirculation system.

LFG FLARE STATION

Active system gas extraction is achieved through a vacuum blower. The gas collected from the extraction wells is sent to an emergency flare station, equipped with a safety mechanism that can burn the entire quantity of gas if the engine is out. The flare is also equipped with a flame arrestor for emergency shutdown purposes.

LFG TREATMENT AND UTILIZATION SYSTEM

The gas must undergo a final process of dehydration and purification using activated carbon systems before being converted into energy in a traditional reciprocating engine generator.



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