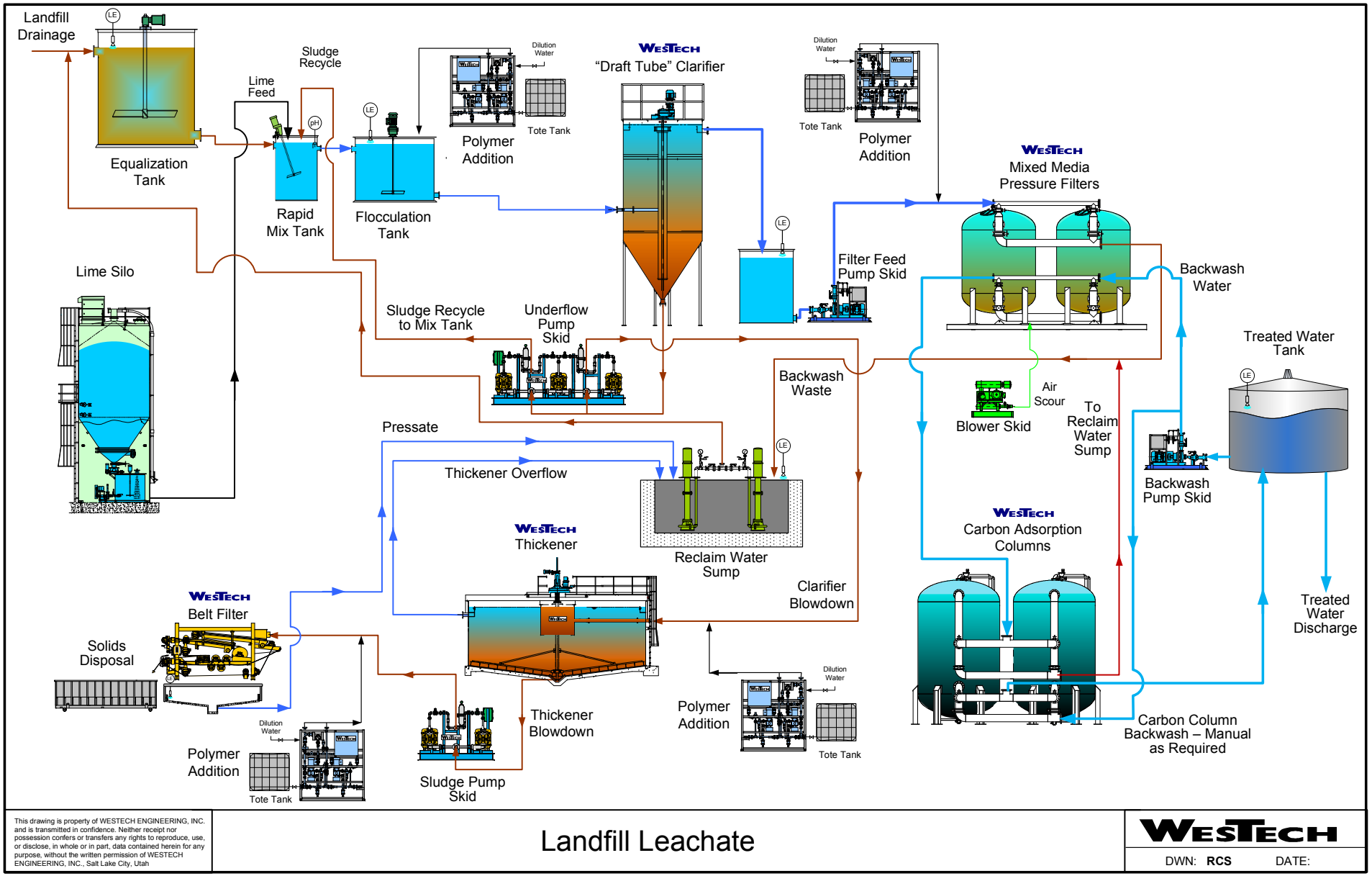

Landfill Leachate

WESTECH

DWN: **RCS** DATE:

WesTech ***Granular Activated Carbon (GAC)*** pressure filters are an effective means for removal of low-molecular-weight contaminants from aqueous solutions. They are especially suited for the removal of dissolved organic compounds responsible for poor taste and odor in drinking water, as well as removal of chlorine from industrial waters. When used as pretreatment equipment, these filters will prolong the life and efficiency of demineralizing ion exchange resins and reverse osmosis membranes.

Landfill Leachate

Landfills are categorized by regulations in three types: industrial, municipal, and hazardous. Individual landfills may be further differentiated by the types of waste which they accept.

All landfills are required to be capped, usually occurring at the end of each day. The cap is typically 6-8" of soil. The cap reduces odor and loss due to wind. At the closing of the landfill, a permanent cap consisting of a membrane and more soil is added.

Before the landfilling operation begins, an "impermeable" base is required. This usually consists of two layers of membranes separated by at least 12" of sand. A network of drain pipes is buried in the sand. These pipes transport the wastewater that must be treated.

Dissimilarity of Landfill Leachate

Rain or groundwater infiltrating through the buried waste can dissolve solids and heavy metal salts. The aqueous leachate may also contain organic and inorganic chemicals from the decomposition of waste inside the landfill. While landfills within the same categories may have similar leachates, each landfill has its own fingerprint when it comes to pollutants. Testing is required to determine leachate composition and the exact treatment required.

Some landfills produce a leachate with a high biochemical oxygen demand (BOD) and chemical oxygen demand (COD) together with a nitrogen component. These leachates may require biological treatment to achieve acceptable discharge levels.

Some leachates contain heavy metals such has chrome, lead, and mercury. These require treatment for removal of these heavy metals. Sludge produced by this treatment will naturally contain heavy metals and will require hazardous waste disposal.

Treatment plant design considerations include site, landfilling techniques, cover and cap design, bottom isolation, collection design, landfill gas utilization, and onsite operation facilities.

General Treatment Steps

Depicted here is a basic system for the removal of suspended solids and organics. The system consists of clarification, filtration, and treatment by activated carbon.

Clarification and filtration removes suspended solids and organics and acts as pretreatment for the activated carbon units. Clarifier underflow and backwash from the filters and activated carbon units flows to a thickener. The percent solids are increased in the final sludge stream which is sent to dewatering.

If biological treatment is required, it precedes the clarification step. A portion of the clarifier underflow cycles back to the biological treatment system, enriching the microbial population.

Heavy metals are removed downstream from the clarifier and upstream from the filter and activated carbon units. In this case, the filters and the activated carbon units become the polishing units to remove any trace solids and organics.

Landfill gases also must be treated. If the gases are vented to the atmosphere, hazardous and noxious substances must be removed. Usually contacted carbon is used for this purpose. The gases contain methane and may be used as fuel. This usually requires several treatment steps which produce another set of liquid wastes to be treated.