Lamp holes: Sewer inspection holes large enough to lower a lamp into but too small for a man.

Lateral: A sewer line which goes off at right angles to another.

Main: A large sewer at which all other branches terminate.

Malodorous: Offensive smelling.

Mesophilic bacteria: Bacteria growing between 10 and 40°C , with an optimum temperature of 37°C. 40°C is, therefore, the upper limit for most wastewater processes.

Mohlman index: Same as the 'Sludge volume index.'

Nitrogenous demand: Oxygen demand from nitrogen-consuming bacteria.

Outfall: The pipe which discharges completely treated wastewater into a lake, stream, or ocean.

Partial treatment: Primary treatment only.

Post-chlorination: Addition of chlorine after all other processes have been completed.

Pre-chlorination: Addition of chlorine prior to sedimentation to help control odors and to aid in grease removal.

Putrefaction: Anaerobic decomposition of organic matter with accompanying foul odors.

Refractory: Dissolved organic materials which are biologically resistant and difficult to remove.

Regulator: A device or weir which deflects large volume flows into a special high-capacity sewer.

Sag pipe: See 'Inverted siphon.'

Second stage demand: See 'Nitrogenous demand.'

Seed: The activated sludge initially taken from the secondary settling tank and returned to the aeration tank to start the activated sludge process.

Separate system: Separate sewers for domestic and storm waste water.

Septic: Produced by putrefaction.

Sludge bulking: Failure of suspended solids to completely settle out.

Split chlorination: Addition of chlorine prior to sedimentation and after final processing.

Submain: See 'Branch.'

Supernatant: The clarified liquid floating on top of a digesting sludge layer.

Thermophilic bacteria: Bacteria which thrive in the 45°C to 75°C range (optimum near 55°C).

Volatile solid: Solid material in a water sample or in sludge which can be burned or vaporized at high temperature.

Wet well: A short-term storage tank containing a pump or pump entrance, and into which the raw influent is brought.

Zooglea: The gelatinous film of aerobic organisms which cover the rocks in a trickling filter.

3 WASTEWATER QUALITY CHARACTERISTICS

A. DISSOLVED OXYGEN

Fish and most aquatic life require oxygen.[1] The biological decomposition of organic solids is also dependent on oxygen. If the dissolved oxygen content of water is less than the saturated values given in appendix B, there is good reason to believe that the water is organically polluted. Other reasons for measuring the dissolved oxygen concentration are for aerobic treatment monitoring, aeration process monitoring, BOD testing, and pipe corrosion studies.

The difference between the saturated and actual dissolved oxygen concentrations is known as the *oxygen deficit.*

$$D = DO_{\text{sat}} - DO \qquad 8.1$$

The oxygen deficit is reduced by aerating the water (i.e., the dissolved oxygen concentration is increased) An exponential decay is traditionally used to predict the oxygen deficit as a function of time. Equation 8.2 assumes that oxygen is not being depleted during the reoxygenation process.

$$D_t = D_o 10^{-K_R t} \qquad 8.2$$

K_R is the *reoxygenation (reaeration) coefficient*, which depends on the type of flow and temperature.[2] Reoxygenation coefficients are also given for use with a different logarithmic base.

$$D_t = D_o e^{-K'_R t} \qquad 8.3$$

[1] 4–6 mg/l is the generally accepted range of dissolved oxygen required to support fish populations. 5 mg/l is adequate, as is verifiable from high-altitude trout lakes. However, 6 mg/l is preferable, particularly for large fish populations.

[2] K_R may be written as K_2 in the literature.