

6.4.2 MBR Aeration Basin Process Control

The MBR Aeration Basin is the component of the MBR process that supports the biological stabilization of the waste stream that is being treated. This section will not go into the biology of activated sludge, but does provide a summary of the specific controls available within the MBR aeration basin.

Mixed Liquor Recycle Pumping

Denitrification occurs in the anoxic zones. Nitrate is returned to the aeration basin by the mixed liquor recycle pumps. The amount of nitrate that can be denitrified is dependent on the amount of readily available BOD (rBOD) available in the waste stream. The mixed liquor recycle return rate needs to be adjusted so that it provides enough nitrate to balance with the available rBOD. The flow rate of MLSS recycle can be varied from 1 to 4 times the plant flow. The higher the recycle rate, the more nitrate that is in recycle. There is a limit to the recycle rate, which is the rBOD available. The optimal recycle rate can be determined by monitoring the nitrate leaving anoxic Zone 2B.

Dissolved Oxygen

The aeration basin has been designed as a plug basin. This means that the waste strength is highest at the front of the basin and gets lower as stabilization occurs as it passes through the basin. Therefore, the oxygen demand is greatest at the front of the aerobic zone and lowest at the end. The aeration basin has four separate aerobic zones where the dissolved oxygen (DO) can be adjusted to a set-point. This has been done so the DO can be adjusted to meet the oxygen demand. The DO should be the highest in the first aerobic zone to provide adequate DO for nitrification when the waste strength is the highest and then can be tapered to the last zone. It is best to keep a lower DO in Zone 6 so that less DO is recycled back to the de-ox zone.