

## Combined Sewer Overflows (CSO)

The water treatment industry in general is primarily concerned with treating influent water for human consumption either at the point-of-entry (POE) or at the point-of-use (POU). However, it is equally interesting to consider what happens to water after consumption. Indeed, innovative design and engineering is involved in the treatment of wastewater and sewage.

One of the most important achievements of municipal engineering is the development of centralized sewer networks for the collection and treatment of wastewater. In older cities, sewer systems consist of one major pipe network that collects wastewater from residential and commercial sources, as well as storm and rain water from streets. The rationale is saving the cost of building a secondary network for storm water collection.

In dry weather conditions or low rainfall, all wastewater is collected and treated at designated wastewater treatment facilities before being discharged into waterways. However, during heaving rainfall episodes, both sewage and rainwater flow in the same pipe. In order to avoid flooding, some of the mixed water is diverted and directly discharged into lakes and rivers without treatment. This is known as Combined Sewer Overflows (CSO).

Unfortunately, the impacts of CSO discharge can be quite extensive on aquatic ecosystems, such as algae growth and pollution of fish



In older cities rainwater drains to sewer pipes

habitat. Municipalities are therefore faced with a major challenge to treat excessive sewer flow. Some are adopting innovative strategies to divert CSO without causing negative impact on the environment.

One of the ways to deal with CSO is diverting flow to temporary storage tanks and storing water for up to 36 hours. After the storm, stored wastewater is pumped through the sewer pipeline to the treatment facility before being safely discharged into water courses. Water management authorities utilize Supervisory Control and Data Acquisition (SCADA) systems to monitor and manage the flow of wastewater automatically through the maze of pipe network.

In addition to temporary storage tanks, some municipalities build satellite CSO treatment facilities that utilize simple mechanical filtration like vortex separators. The advantage of this approach is reduction of tanks sizes and hence costs.