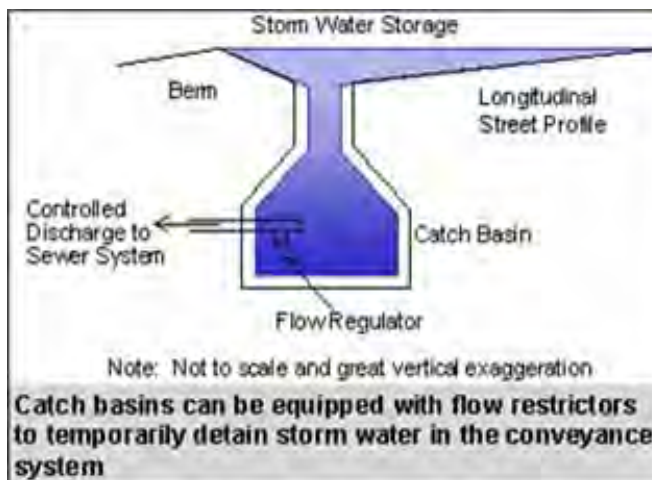


In-Line Storage



Source: EPA

Practice Description

In-line storage refers to a number of practices designed to use the storage within the storm drain system to detain flows. While these practices can reduce storm peak flows, they are unable to improve water quality and offer limited protection of downstream channels. Hence, the U.S. Environmental Protection Agency does not recommend using these practices in many circumstances. Storage is achieved by placing devices in the storm drain system to restrict the rate of flow. Devices can slow the rate of flow by backing up flow, as in the case of a dam or weir, or through the use of vortex valves (devices that reduce flow rates by creating a helical flow path in the structure). A description of various flow regulators is included in Urbonas and Stahre (1990).

Planning Considerations

In-line storage practices serve a similar purpose as traditional detention basins (see *Dry Detention Ponds Practice*). These practices can act as surrogates for aboveground storage when little space is available for aboveground storage facilities.

Design Criteria

Flow regulators cannot be applied to all storm drain systems. In older cities, the storm drain pipes may not be oversized, and detaining stormwater within them would cause upstream flooding. Another important issue in siting these practices is the slope of the pipes in the system. In areas with very flat slopes, restricting flow within the system is likely to cause upstream flooding because introducing a regulator into the system will

cause flows to back up a long distance before the regulator. In steep pipes, on the other hand, a storage flow regulator cannot utilize much of the storage available in the storm drain system.

Common Problems

In-line storage practices only control stormwater quantity and are not efficient at improving runoff water quality.

Without proper design, these practices often cause upstream flooding.

Maintenance

Flow regulators require very little maintenance because they are designed to be “self-cleaning,” much like the storm drain system. In some cases, flow regulators may be modified based on downstream flows, new connections to the storm drain, or the application of other flow regulators within the system. For some designs, such as check dams, regulations will require only moderate construction in order to modify the structure’s design.