

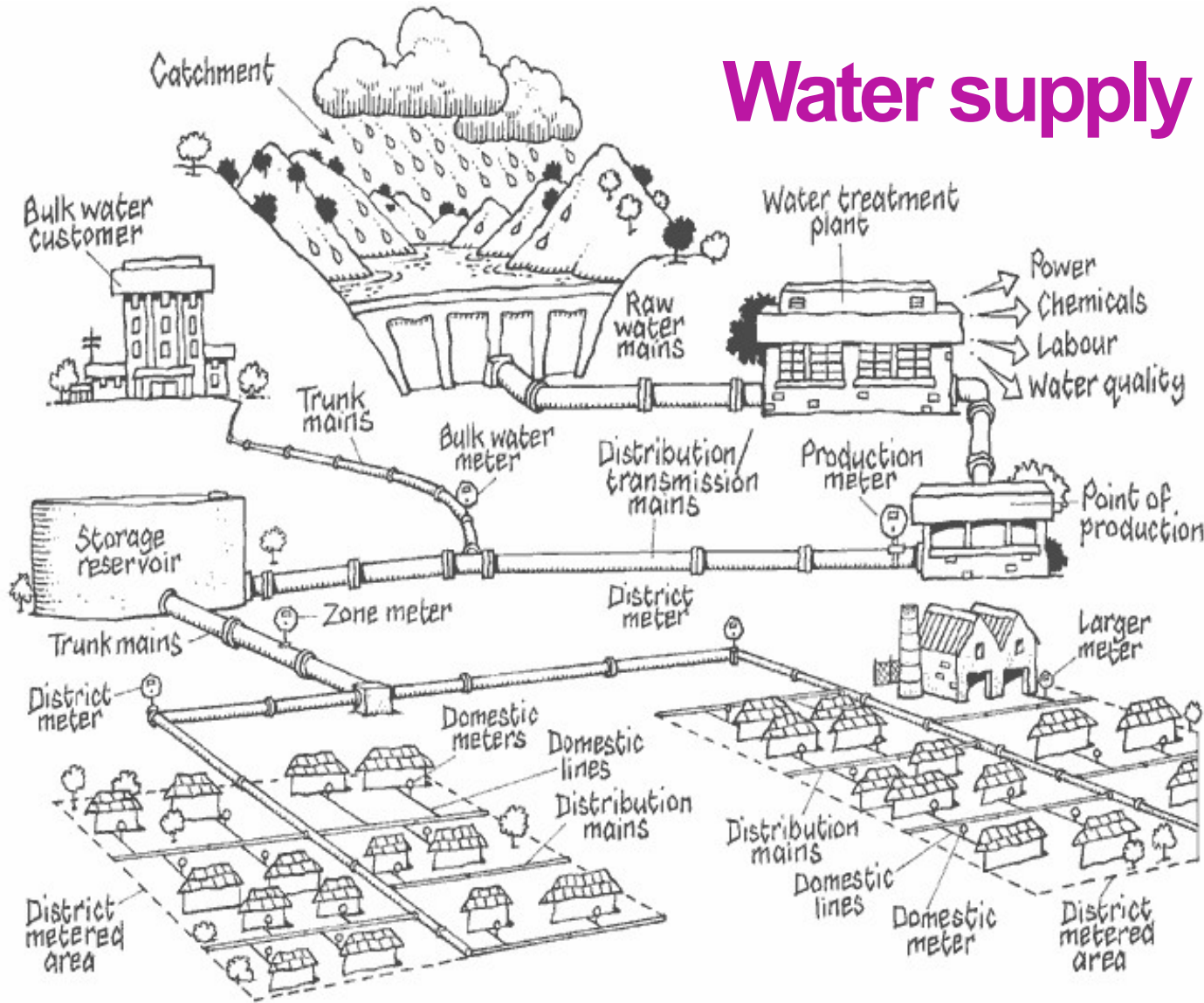


Aalto University
School of Engineering

Components of urban water supply and sanitation systems

Prof. Anna Mikola

Water supply system

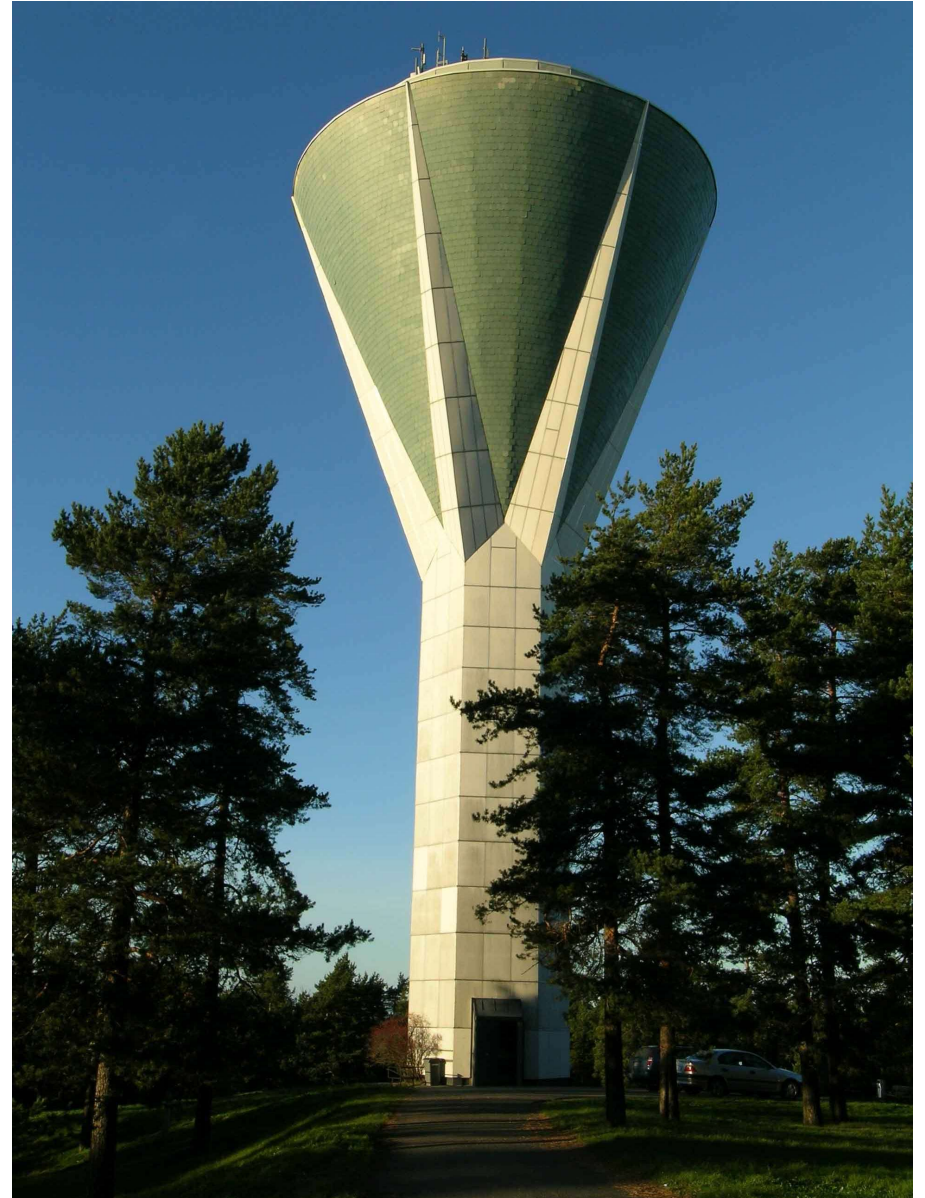


Water distribution



Water distribution

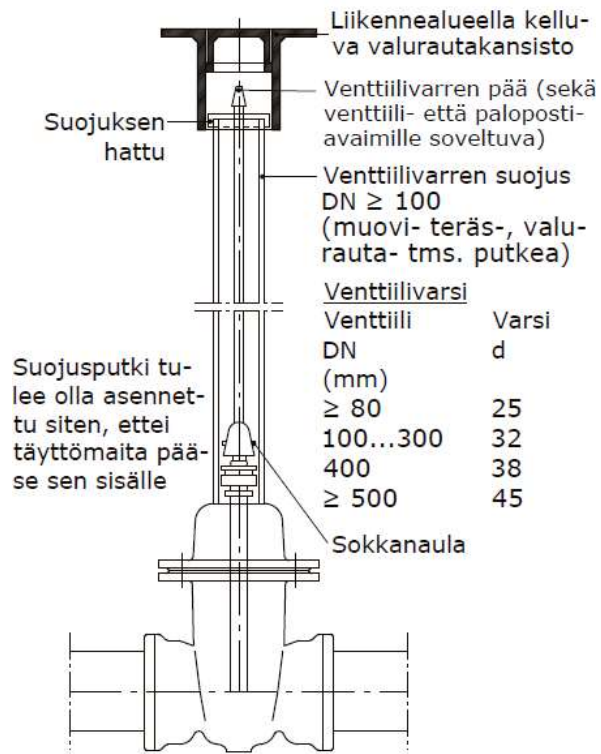
- **Pressurised underground system consisting of:**
 - **Pipes (mains and domestic lines)**
 - **Valves**
 - **Fire hydrants**
 - **Storage reservoir (tanks and water towers)**
 - **Pumping stations**
 - **Water meters**



Pipes



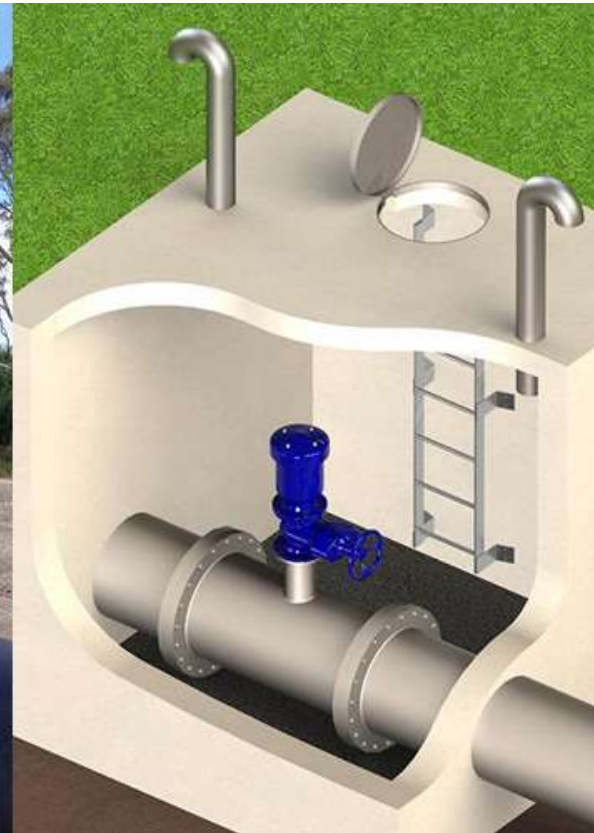
Gate valves



Venttiilin asennusalausta kuten johtolinjassa. Joustavat liitokset mahdollisimman lähelle maahan asennettavaa venttiiliä. Tuenta varmistettava.



Air valves



Fire fighting



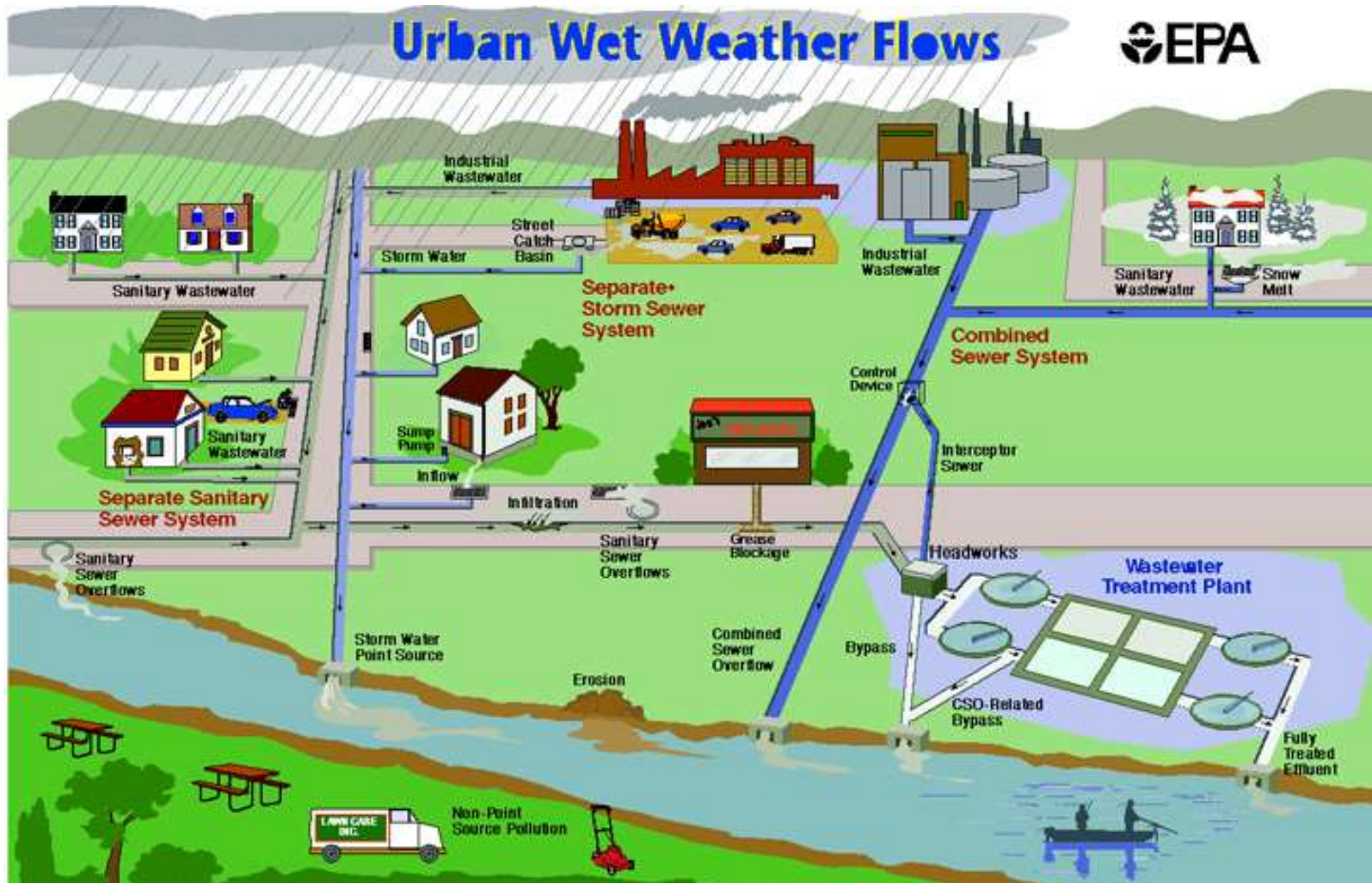
Storage reservoir



Water meters

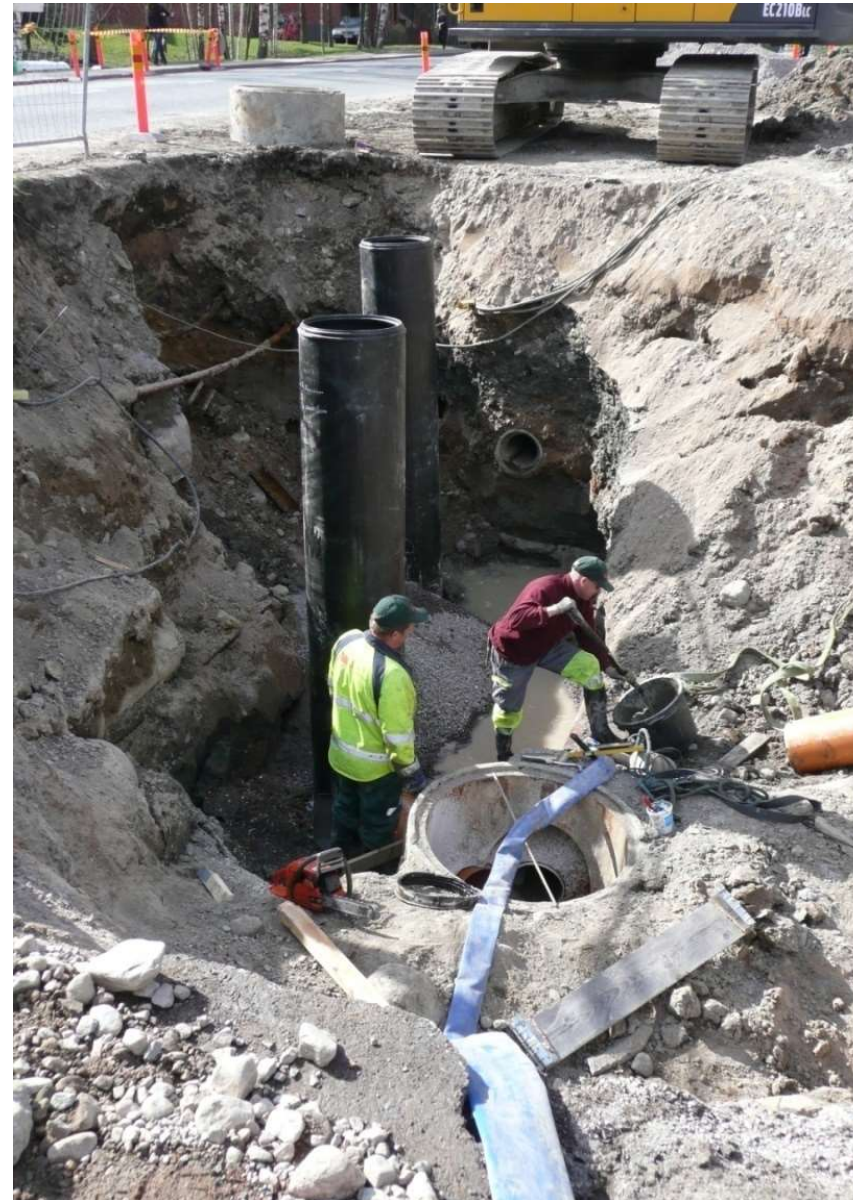


Centralised sewer system



Sewer system

- **Infrastructure that conveys sewage mainly by gravity**
- **Consists of pipes, pumping stations, manholes, storm overflows etc.**
- **Ends at the entry to a sewage treatment plant or at the point of discharge into the environment.**
- **Combined sewer systems are designed to transport both stormwater runoff and sewage in the same pipe**
- **Separate sanitary sewer systems are designed to transport sewage alone**



Components of the sewer system

- Sewer pipes
- Manholes
- Lift stations
- Street inlets (in CS)
- Retarding basins (in CS)
- Combined sewer overflows (CSOs)

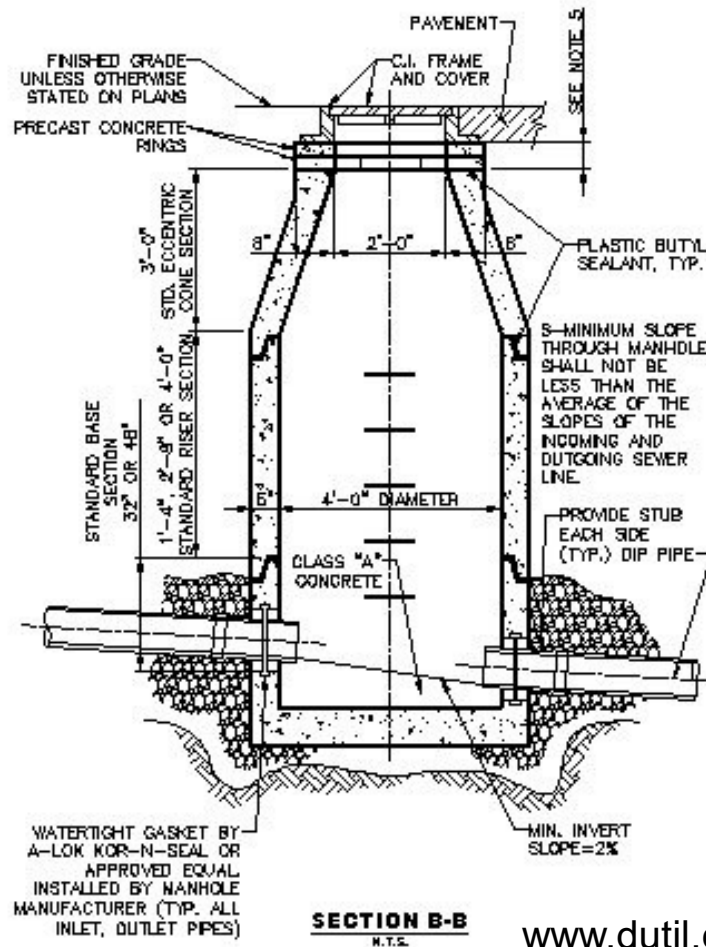


Sewer pipes

- **Service connection (house sewer) normally 110-315 mm in diameter**
- **Common (public) sewers up to 1000 mm in diameter**
- **Plastic pipes are easy to install, but need carefully constructed**
- **Concrete pipes are more tolerant against dynamic forces but are vulnerable to corrosion**
- **Laid deep to protect against traffic loads, freezing and to serve premises without need to pump**



STANDARD PRECAST MANHOLE SECTION B-B



www.dutil.co

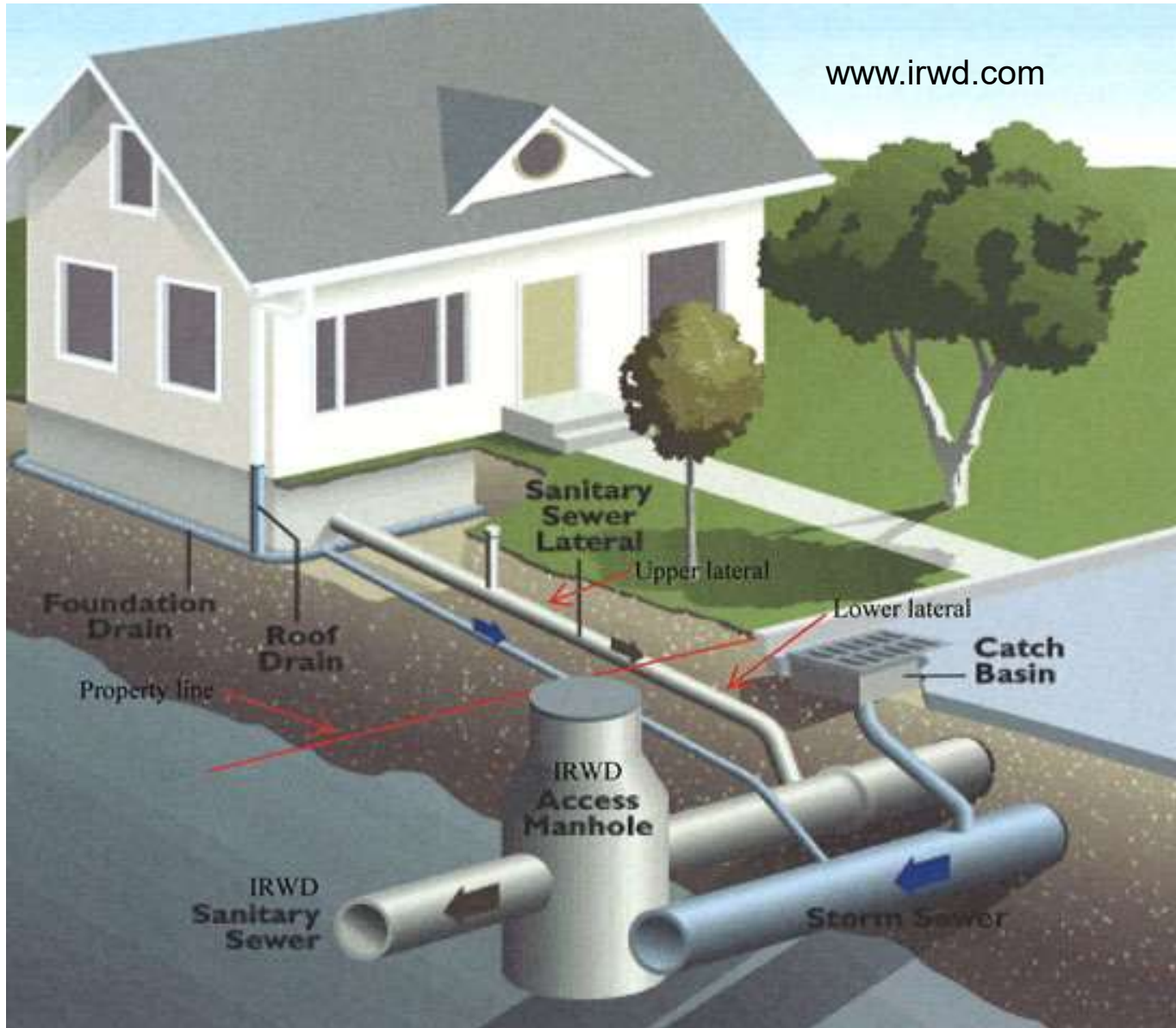
Manholes

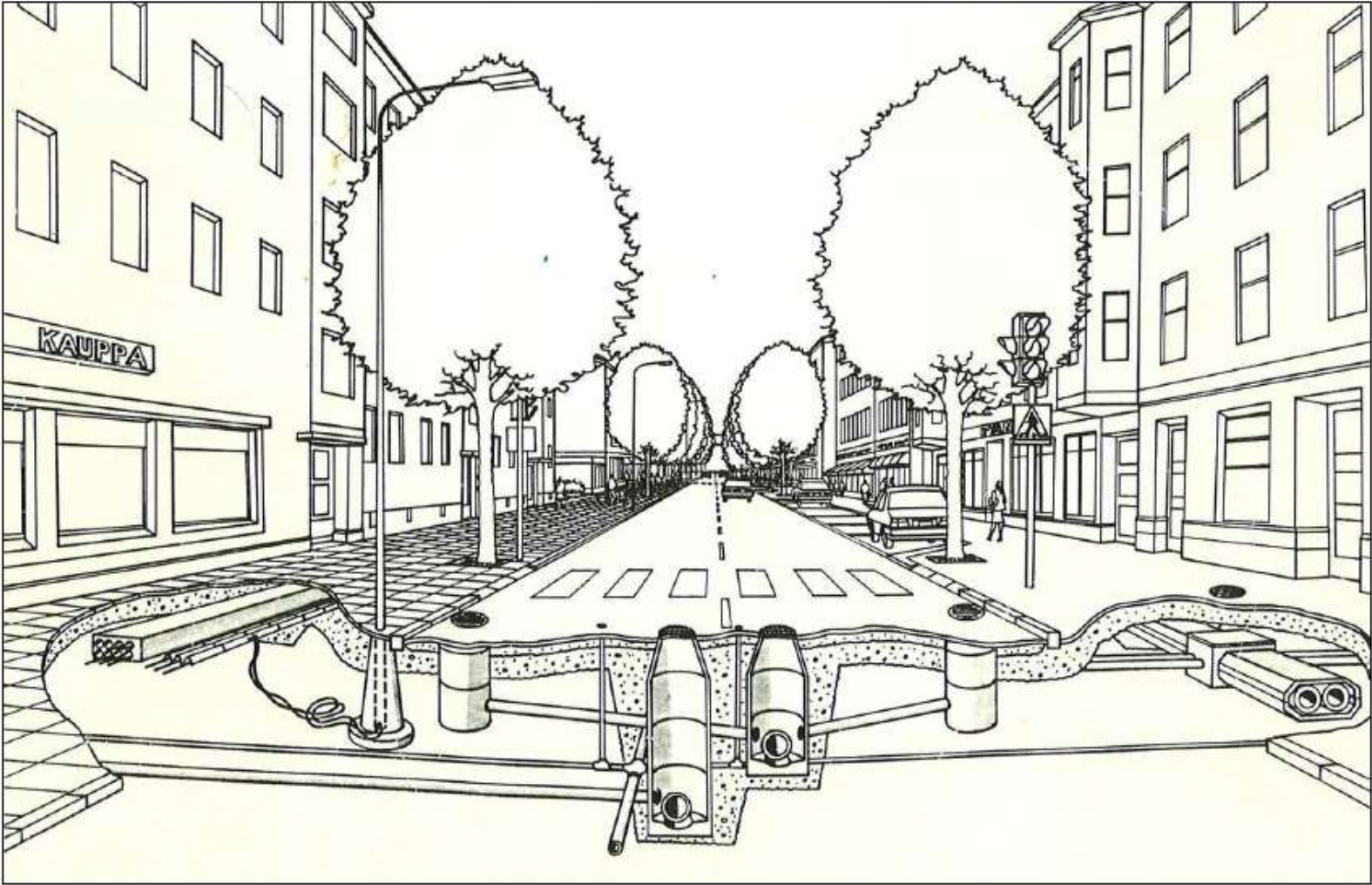


- Provide access point for connections and maintenance
- Required at junctions and at each change in pipe direction, size or slope
- Precast concrete or plastic
- Protected by cast-iron manhole cover



www.irwd.com





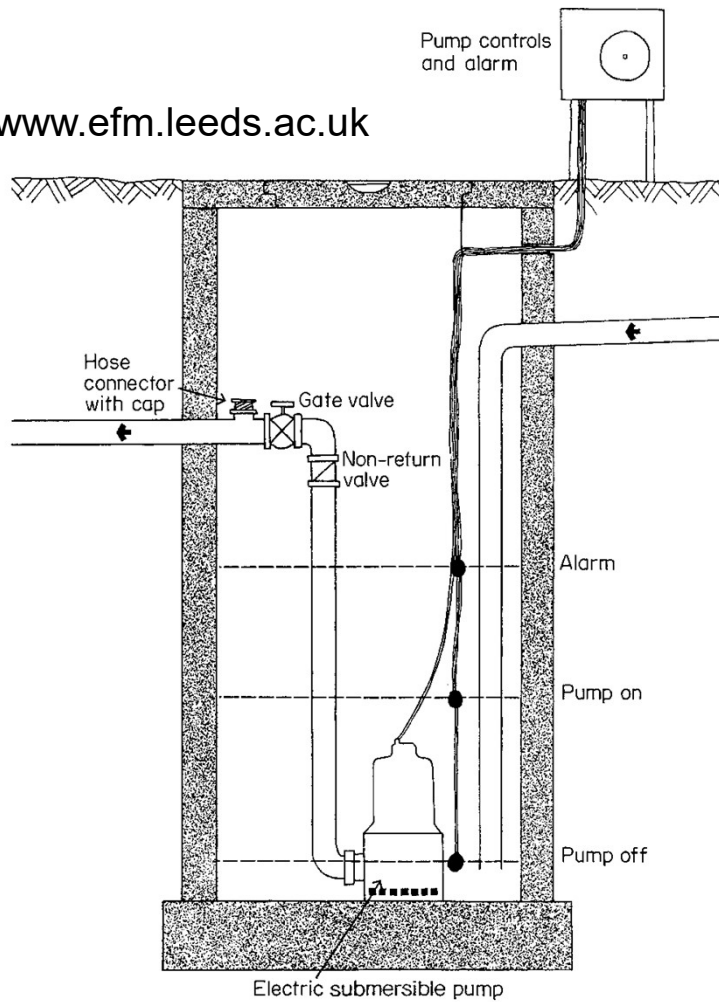
Lift stations (pumping stations)

- To move wastewater from lower to higher elevation
- Prefabricated or constructed on-site
- Centrifugal pumps where the flow can be adjusted by variable speed drives
- Two common types: Dry well and submersible lift stations

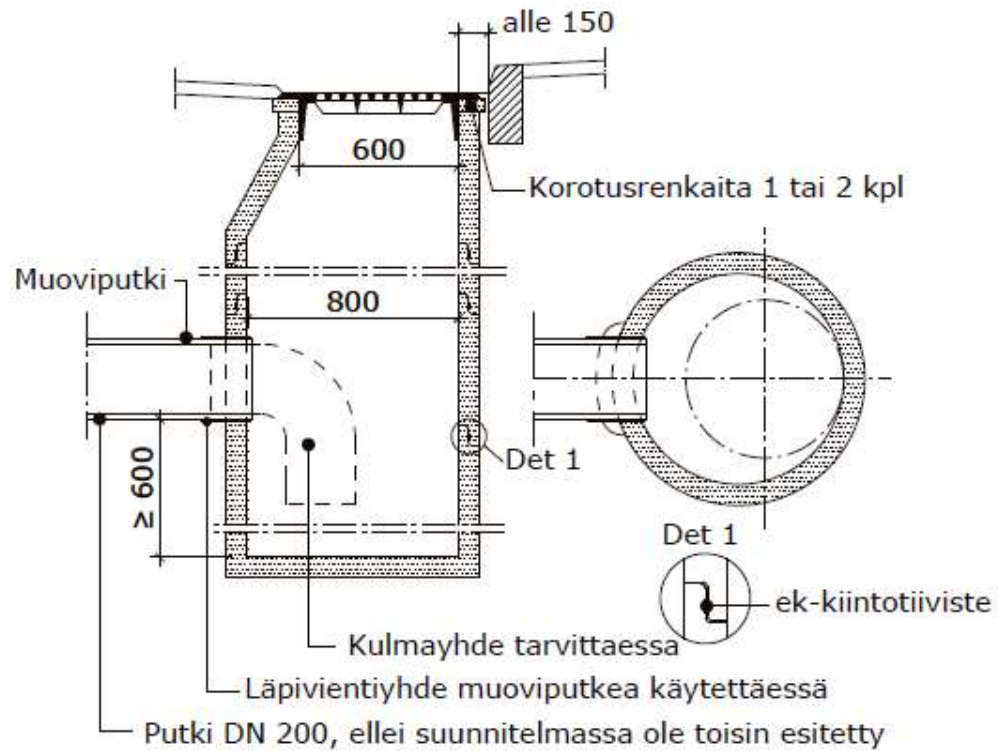


Prefabricated submersible lift station

www.efm.leeds.ac.uk



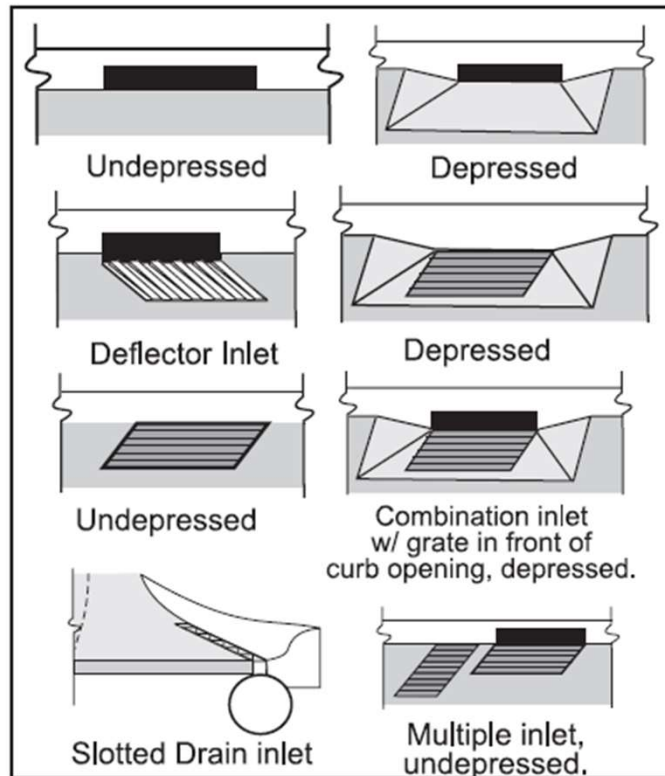
Gutter inlet



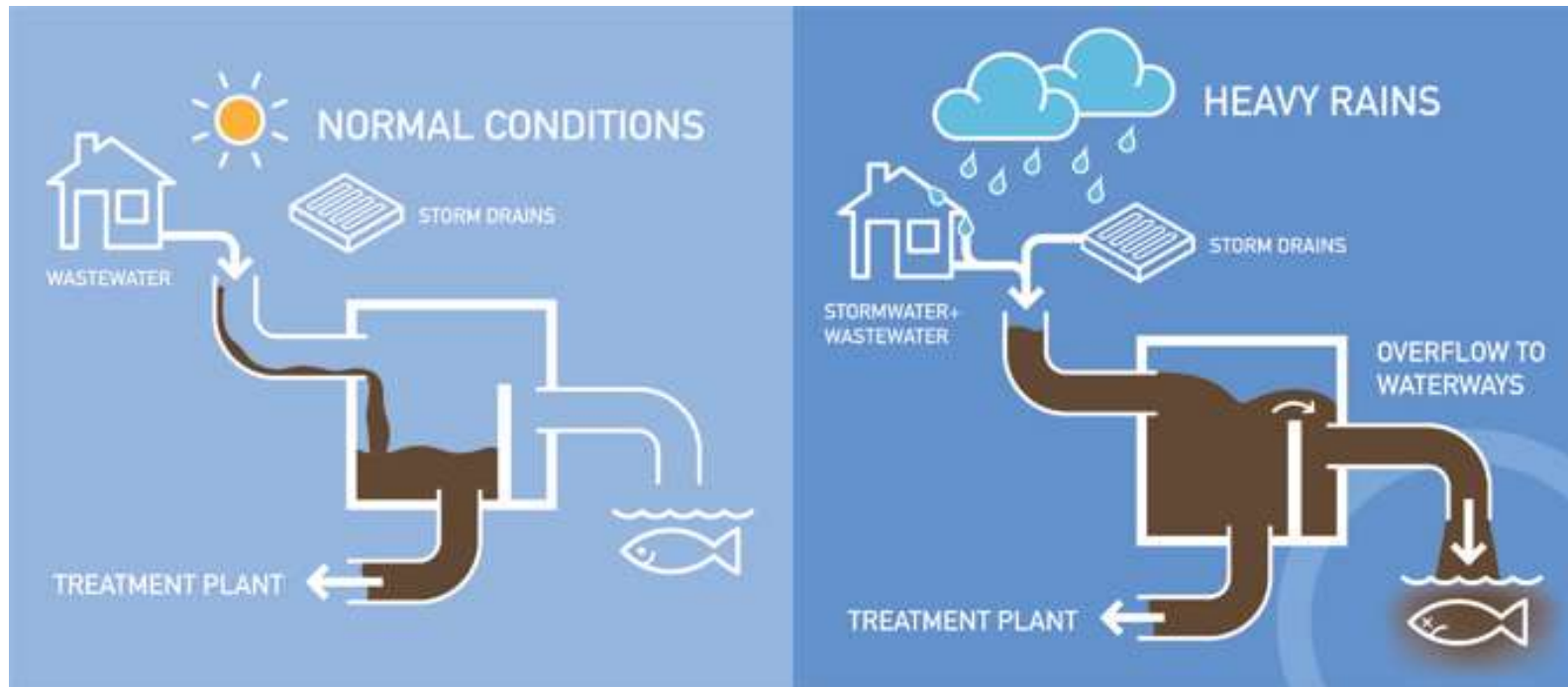
Curb inlet

Figure 1: Typical stormwater curb/gutter inlets

www.conteches.com



Combined sewer overflow



http://wayworks.net/illustration/tech_illus_06b.jpg

What are the advantages and disadvantages of separate and combined sewers?

Discussion in groups 5 min.

Wrap-up 5 min.



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BREAK 10 min