



مهندسی آب و فاضلاب

www.abfaeng.ir

جلوتر از دیگران حرکت کنید

اطلاعات آموزشی

اطلاعات فنی و مهندسی

اخبار روز آب و فاضلاب

اخبار استخدامی کارفرمایان



[T.me/mohandesifazelab](https://t.me/mohandesifazelab)



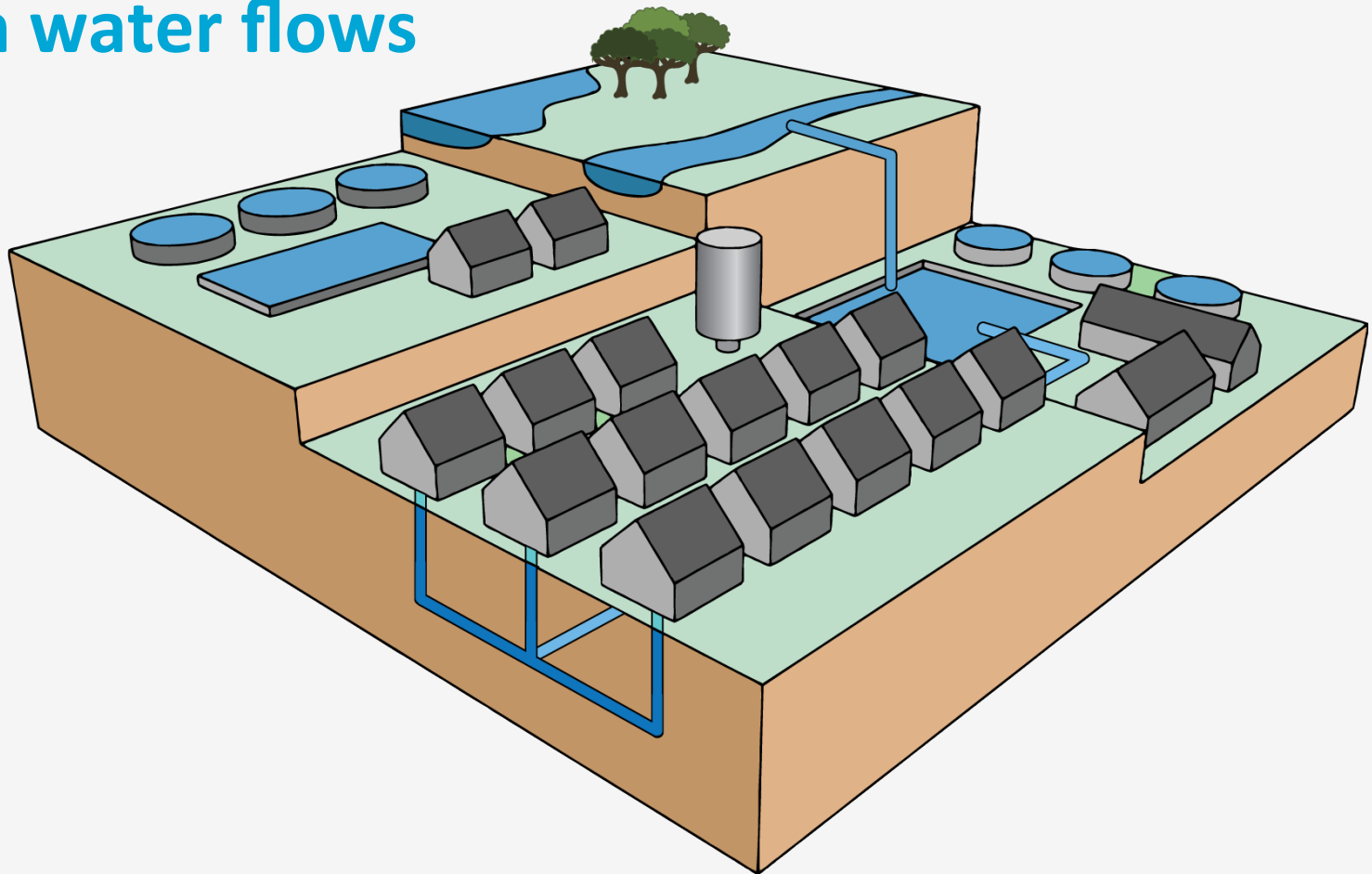
[Instagram.com/abfaeng](https://www.instagram.com/abfaeng)

Wastewater Characteristics

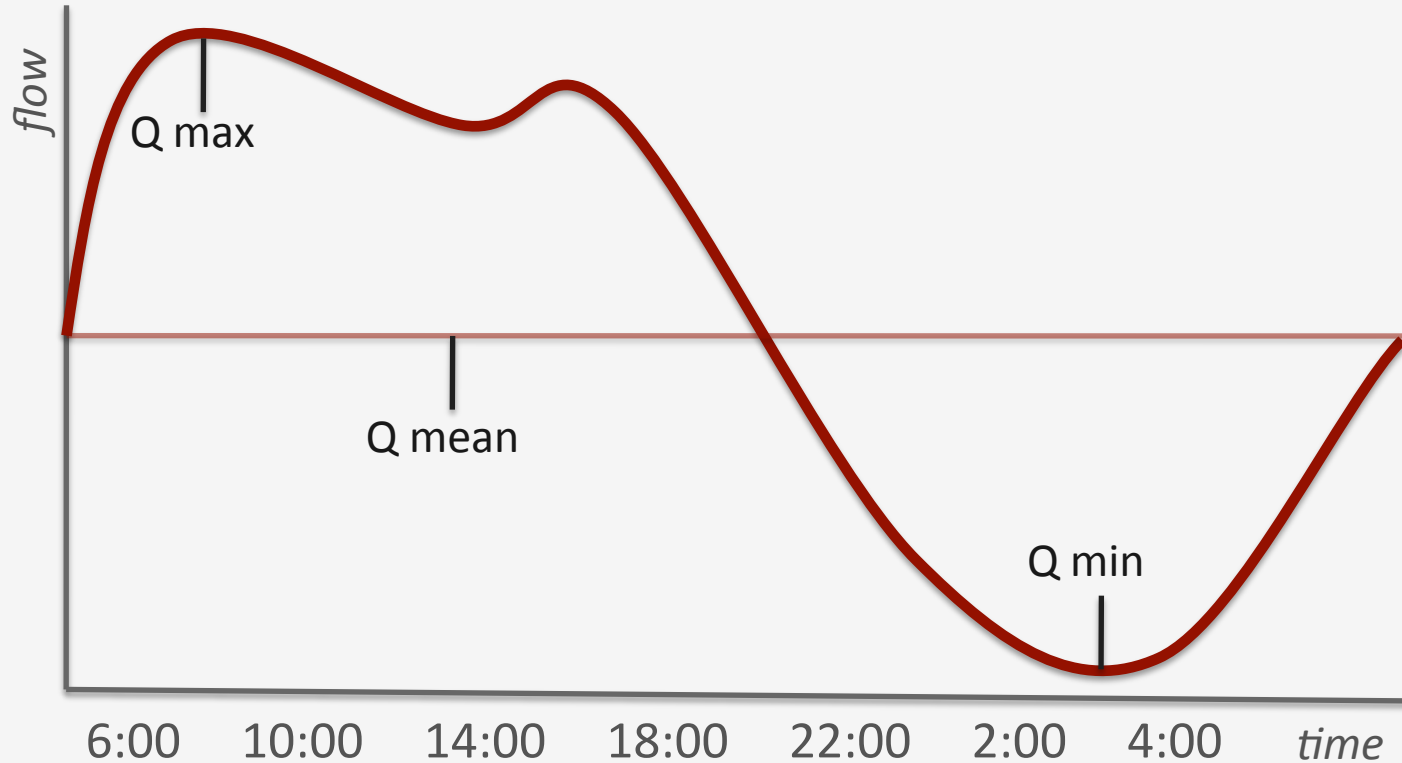
CTB 3365x Introduction to water treatment

Prof.dr.ir. Jules B. van Lier

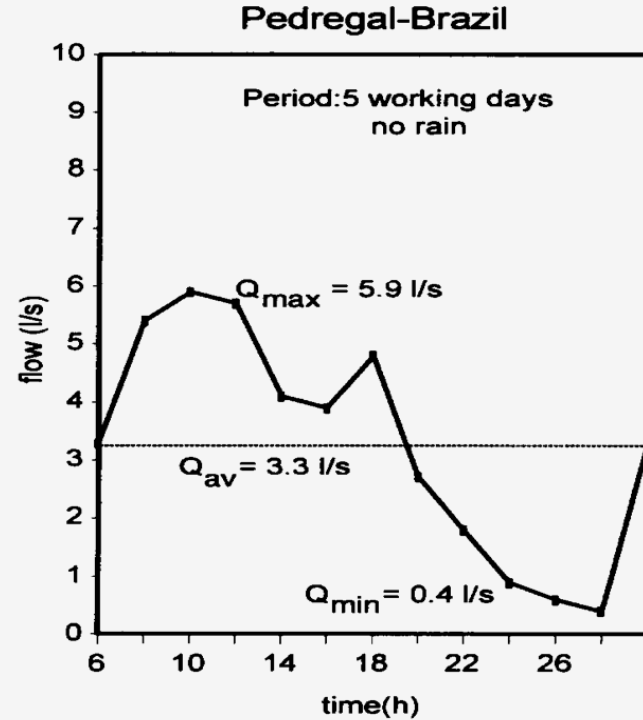
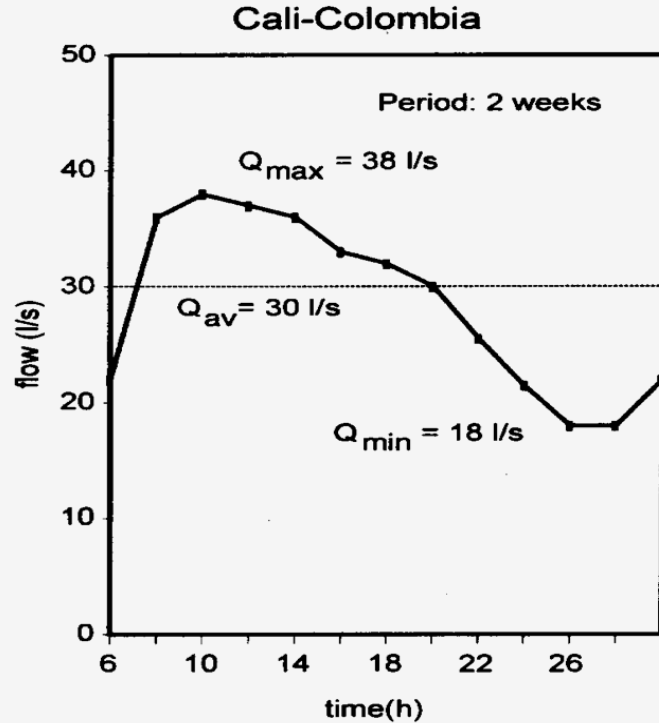
Urban water flows



Dry water conditions



Impact of City Size on Flow Characteristics



Dutch sewage network

- 50 % combined system, 50% separate system
- Sewer system used for urban drainage



Urban water flows

DRY WEATHER FLOW

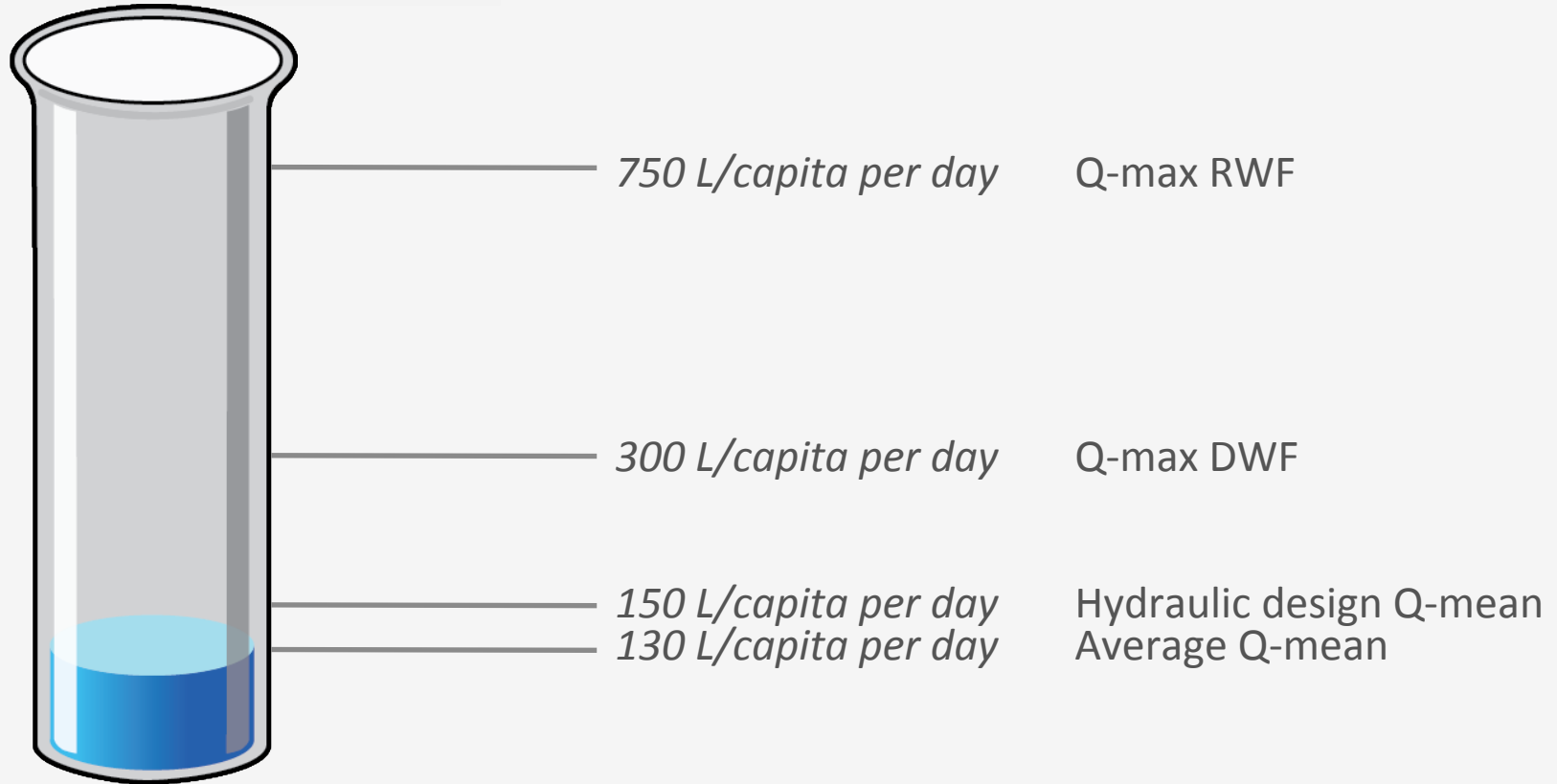
- Household waters
- Industrial effluents

RAIN WEATHER FLOW

- Household waters
- Industrial effluents
- Rain water

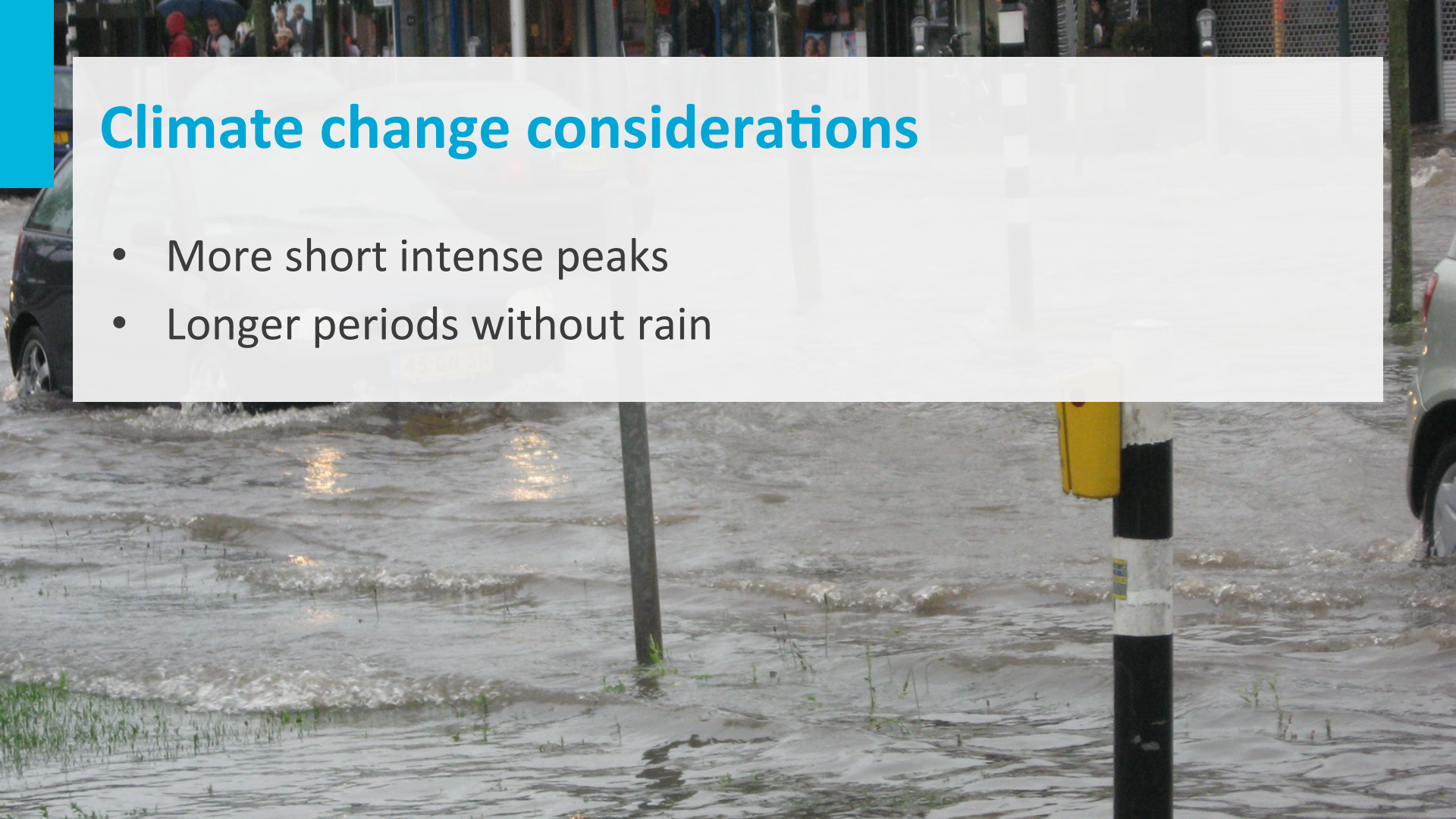
PEAK FLOW

Urban water flows

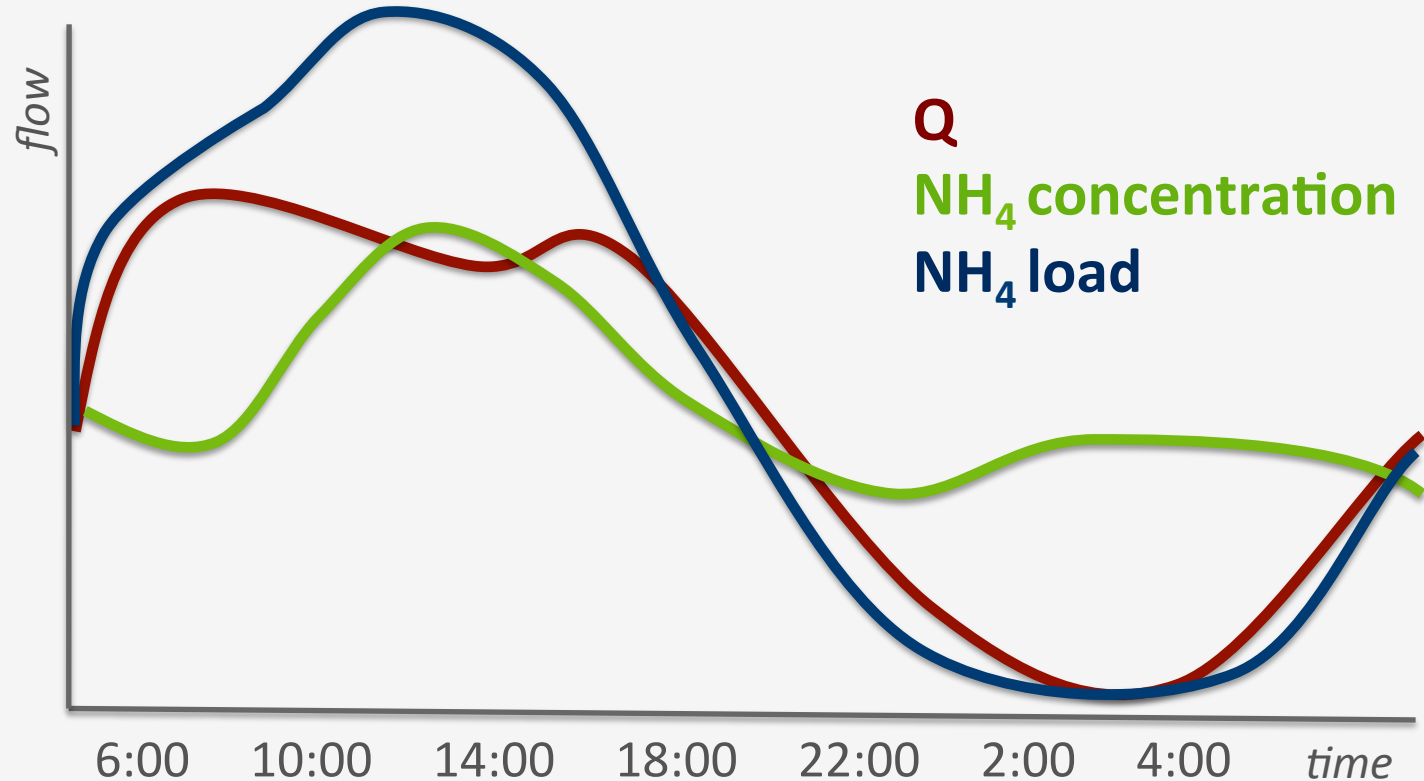


Climate change considerations

- More short intense peaks
- Longer periods without rain



Pattern of wastewater flow reaching a WWTP



Dutch sewage network

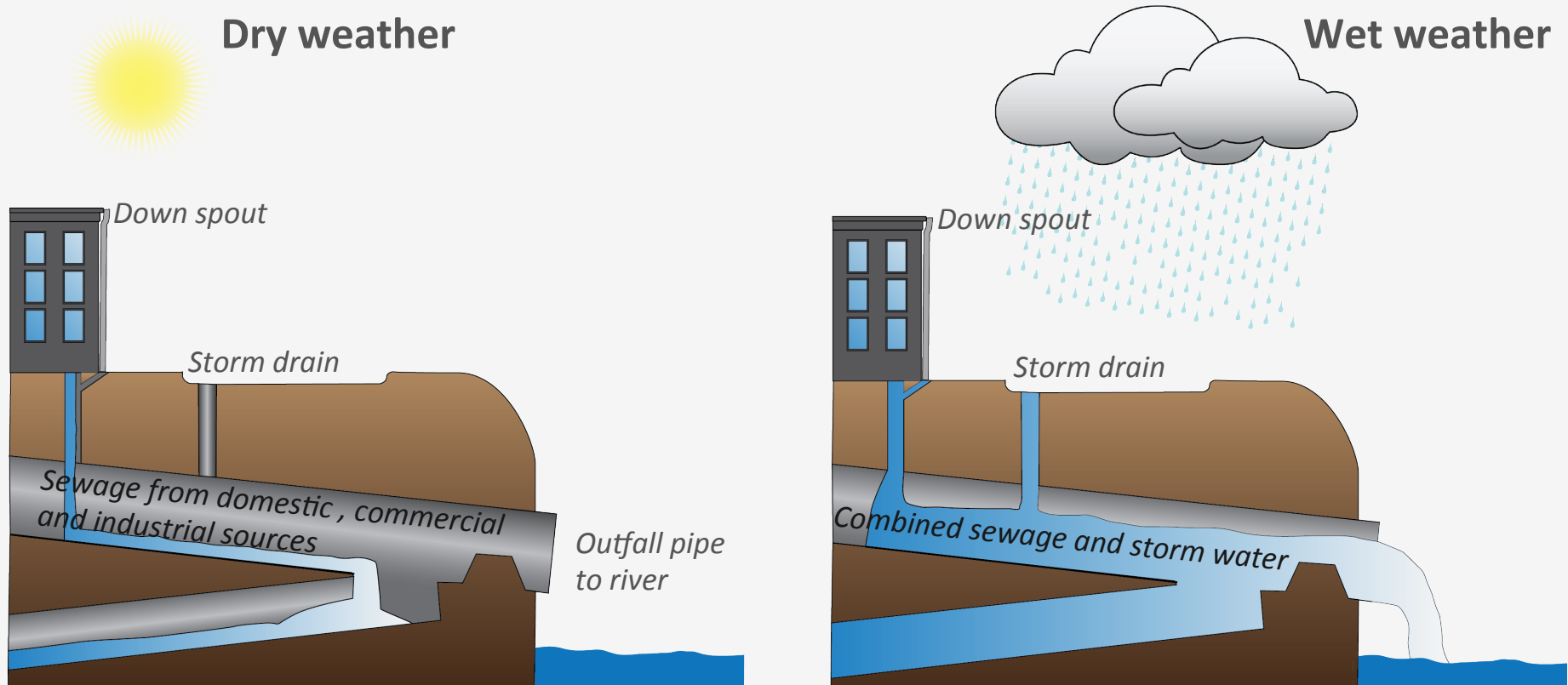
- 100% households connected to sewer network
- 350 STPs in the Netherlands



Costs of Sanitation in the Netherlands

- 110.000 km sewer pipes
- About 350 Sewage Treatment Plants
- CAPEX $\approx$ 110.000.000 euros
- 2/3 for sewerage
- OPEX $\approx$ 2-2.500.000 /year
- 40-50% for sewerage, 50-60% for sewage treatment

Combined Sewer Overflows



Next lecture

Focus on sewage pollutants



Wastewater Characteristics

CTB 3365x Introduction to water treatment

Prof.dr.ir. Jules B. van Lier