



Chilson/Eagle Lake Water System: Design Considerations

Main Design Considerations

- ▶ Filtration/Disinfection
- ▶ Gooseneck Pond dam condition
- ▶ Gooseneck Pond transmission main condition
- ▶ Water main condition
- ▶ System hydraulics

Filtration/Disinfection

- ▶ Surface waters must be filtered
- ▶ Disinfection must treat regulated contaminants
- ▶ System must have sufficient retention time to allow disinfection agents to act
- ▶ Disinfection systems must maintain a residual in the line
- ▶ UV systems require protection of the light bulbs (screening) and a building for equipment protection which must be kept separate from chlorine

Gooseneck Pond Transmission Main

- ▶ Issues with the main if reused
 - ▶ Water is continually flowing through the main, with a closed system pressures increase (which will stress an older main)
 - ▶ The low flow of the new system will likely result in frozen mains as the water sits in the main
 - ▶ The water main is exposed (sits on top of the ground) in many places
- ▶ The pipe is located on Forest Preserve land which limits mechanized equipment for access for repair and replacement

Water Distribution Main

- ▶ Water main is severely tuberculated (walls are covered in scale) which causes water quality issues by providing places for growth of bacteria and other biological material
- ▶ The water main is severely oversized which causes water quality issues as the water will become stale
- ▶ Changing water sources changes water quality, pressure, etc. all of which can cause pipe failure
 - ▶ There will be sections of main that will see significant changes in water pressure
- ▶ There are areas where the water main is in poor condition known due to breaks or shallow areas
 - ▶ Part of the design process is to optimize where water mains are replaced.
 - ▶ Water main design life is typically 75 years, current water mains are 90 years old
 - ▶ Even if the water mains are still in “good” condition, that won’t last forever
 - ▶ Water mains will require replacement at some point in the future and there will likely be no funding

Design Criteria: Hydraulic/Water Quality

- ▶ Fully closed system must be maintained between Eagle Lake and Divide
 - ▶ Otherwise, a pump station is required
- ▶ Minimal head loss (friction loss) between Eagle Lake and Divide
- ▶ Minimum 35 PSI at the curb
- ▶ Maximum of 80 PSI at the curb

Hydraulic Considerations

- ▶ The elevation of the water system is what drives the pressure in the system (it is gravity fed)
- ▶ The elevations of the system are just barely adequate to make the system function and even now, it does not meet regulatory requirements
- ▶ Adding any systems to the treatment process adds headloss (decreases pressure where pressures are already low)
 - ▶ Adding a treatment process to the system without adding pumps likely will mean that water will not flow over the divide