

**MARK BUNJE, FIRE CHIEF  
SHORELINE FIRE DEPARTMENT**

# Overview

- Water and the Fire Department
- Water System Performance and Reliability
- Codes and Standards
- Engineering
- Legal
- Problem Areas
- Summary

# Water and the Fire Department



# How Fire Departments use Water

- Water extinguishes fire by cooling
  - 10,000 BTU's to convert 1 gal to steam
  - Most cost effective and efficient extinguishing agent
- Flood vs. drip irrigation
  - Best – fire sprinklers, 13 to 25 gpm
  - Better – 1.75" hose line, 125 to 150 gpm
  - Good – 2.5" hose line, 250 to 300 gpm
  - Defensive – Master Stream, 1000 gpm +

# Water Supplies



# Water Supplies

- Hydrants
  - Some less than 500 gpm
  - Few at more than 2000 gpm
- Tanker or Tender
  - From 2000 to 4000 gallon capacity
  - Requires shuttle for larger fires
- Drafting or stored sources

# Pressure vs. Volume

- Fire Department needs volume not pressure from hydrants.
  - Low pressures contribute to low volumes in piped systems.
- Fire engines/pumpers produce the pressure we need at fires.
  - 150 to 200 psi or higher
- Fire Pumps in buildings

# Water System Performance & Reliability

- Test, test and test
  - Engines are tested every morning
  - Hoses are tested every year
  - Pumps are tested every year
- Hydrants?
- Street valves?
- Pressure reducing valves?
- Field flow tests?



# Codes and Standards

- No coordination between
  - AWWA, American Water Works Association
  - NFPA, National Fire Protection Association
  - I Codes, International Code Set
  - WSRB, Washington State Rating Bureau
- Different Design Standards from two purveyors serving one City

# Engineering

- Modeling
  - Field verified data?
  - Known areas where modeling not available
    - Innis Arden
    - Richmond Beach

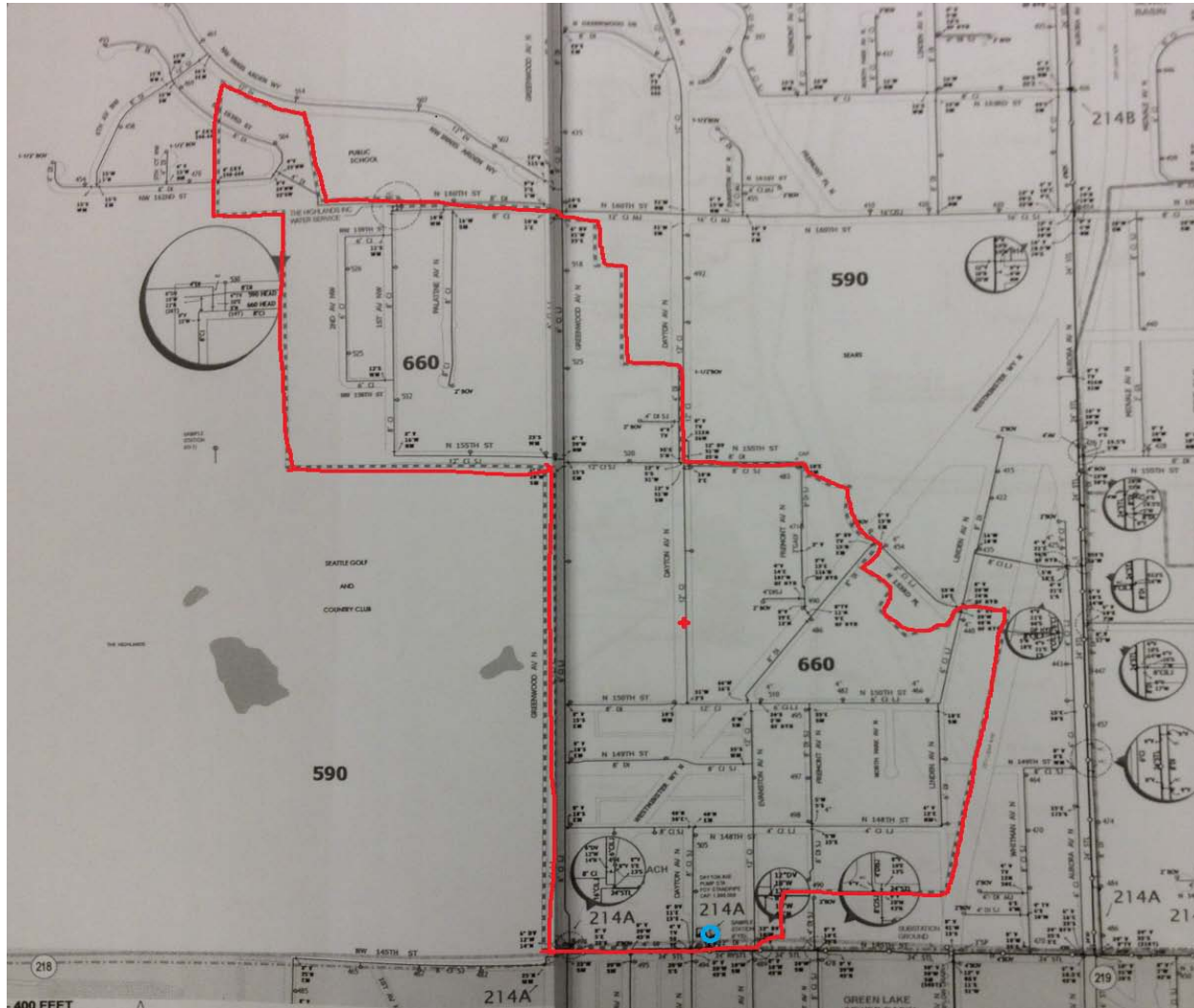
# Legal

- Aurora Corridor Improvement
  - City unable to invest in infrastructure improvements
- Innis Arden
  - City unable to extend new mains

# Problem Areas

- 660 Zone
- PRV – Pressure Reducing Valves
- Hydrant Main Deficient Areas
  - SE neighborhood
  - East Aurora N 198th to 200<sup>th</sup>
- Water Supply Integrity

# Problem Areas - 660 Zone



# 660 Zone

## ❖ High Risk, High Probability

– Max flow of 1440 gpm with pumps?

- Last performance test?
- New hydrant on Dayton off of a 12" main less than 1000 gpm
- Many unsprinklered multi-family and commercial structures with more than 2000 gpm fire flows
- Nearest out of zone hydrants are not good

# 660 Zone

- No power?
  - Tested flow rate with feed thru check valves?
  - Red cap hydrants less than 500 gpm off an 8-inch main in 590 Zone
- SPU plans for improvement?

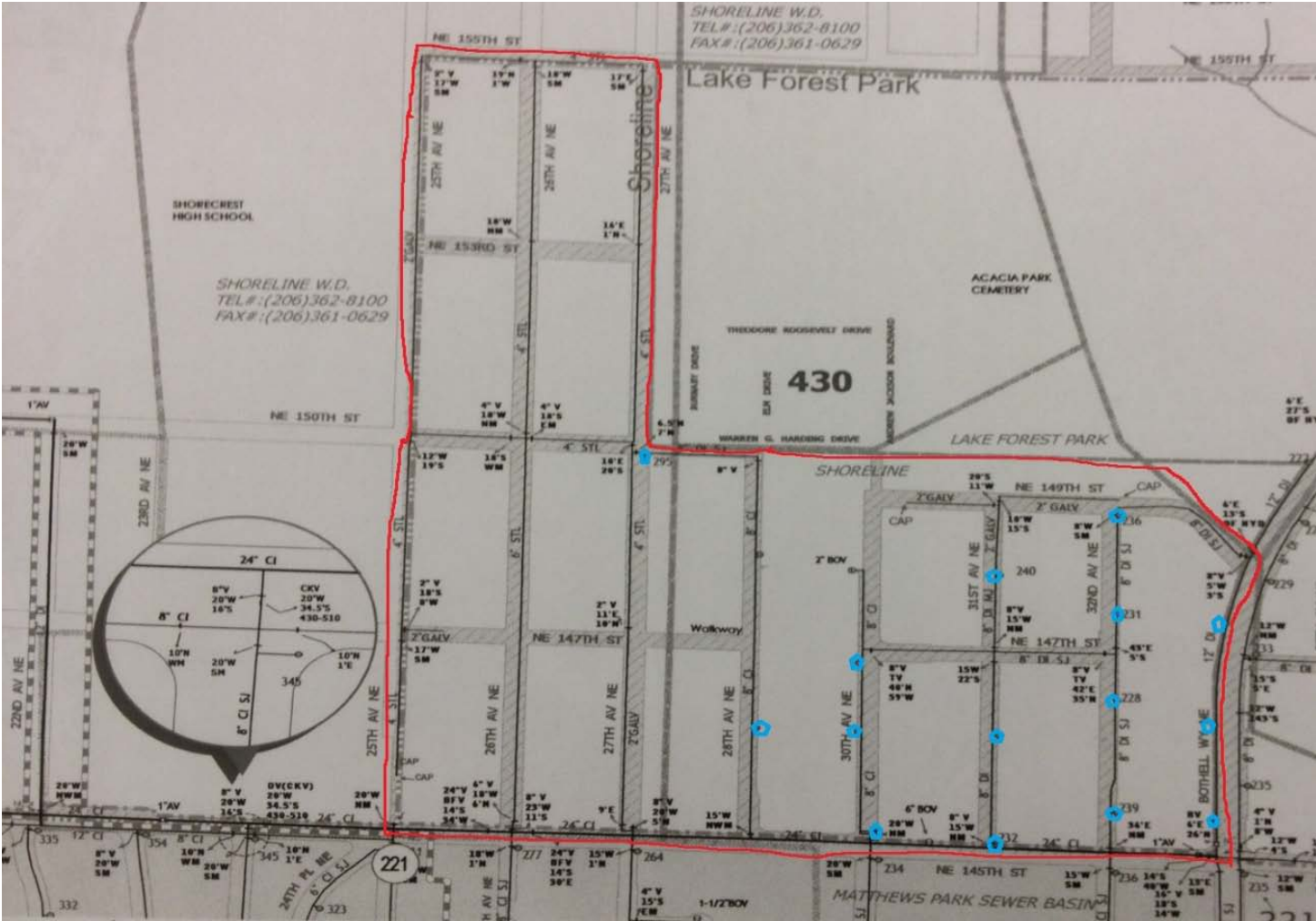
# Problem Areas

- PRV Stations
  - Innis Arden and Richmond Beach Reduced Pressure Zones
  - PRV's have failed to respond in fire flow conditions
  - Flow tests must be conducted at fire flow rates to ensure the system is working correctly



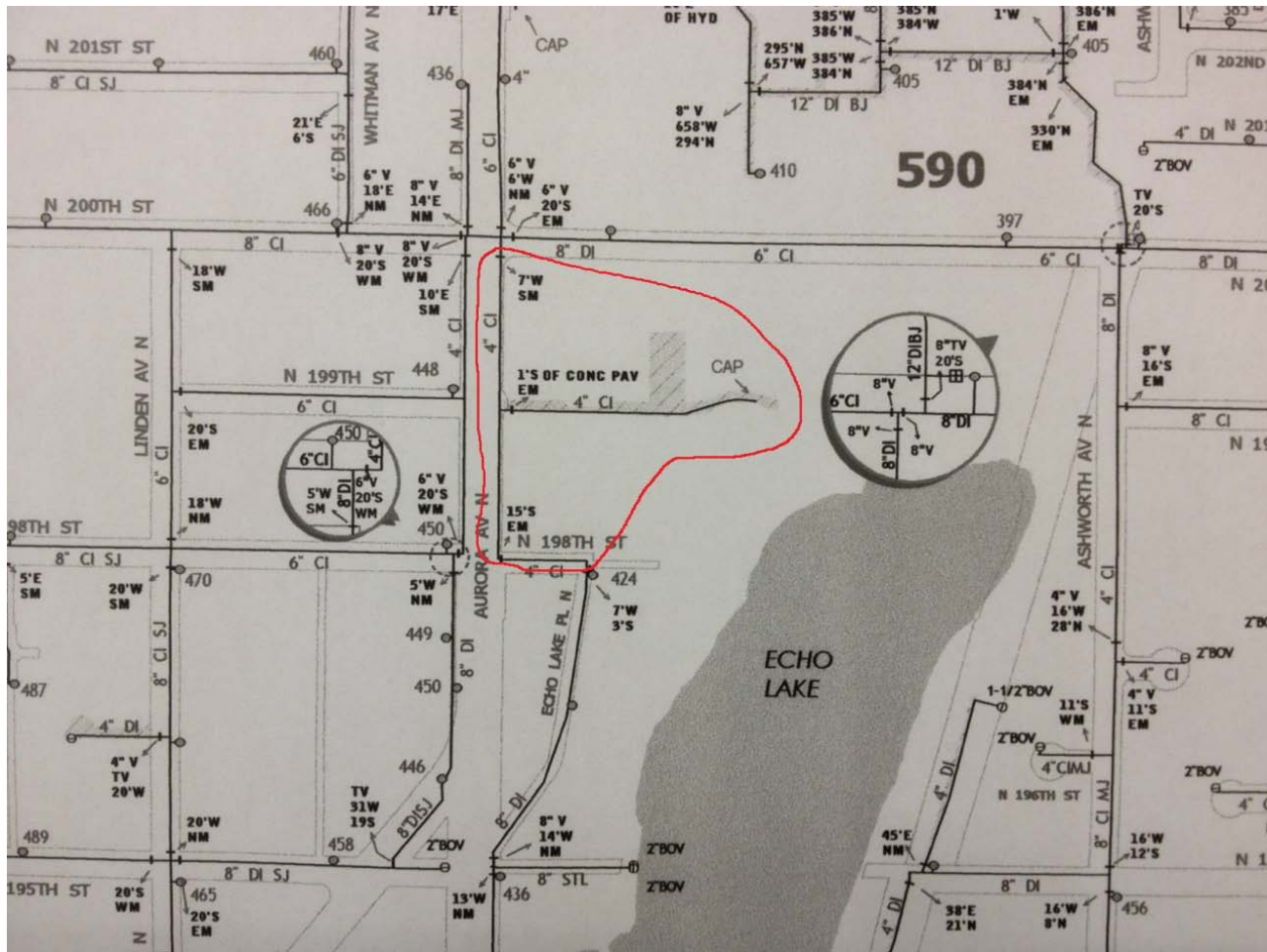
# Problem Areas

- Hydrant/Main Deficient Areas



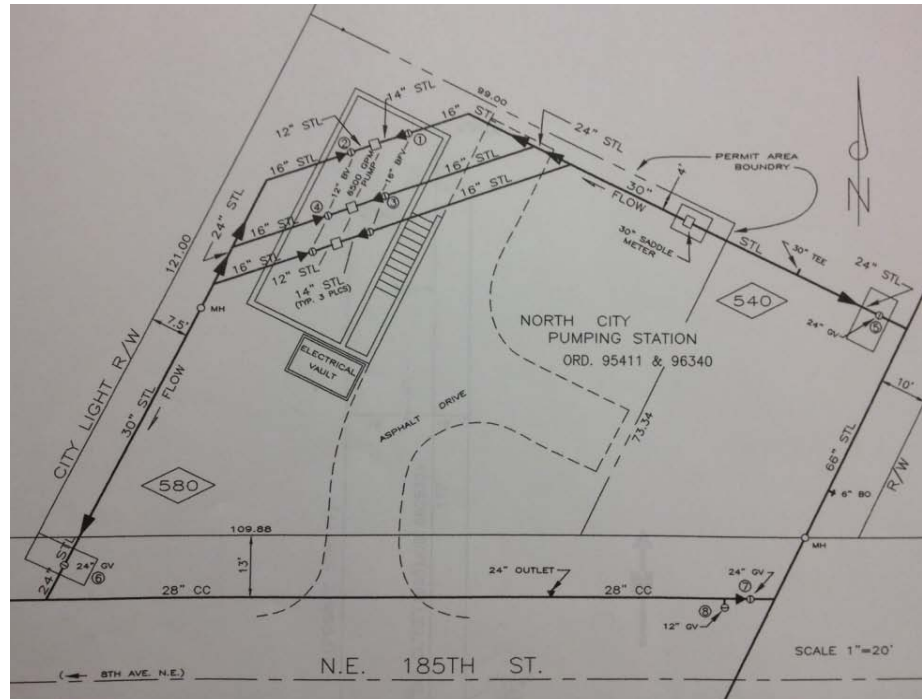
# Problem Areas

- Hydrant/Main Deficient Areas



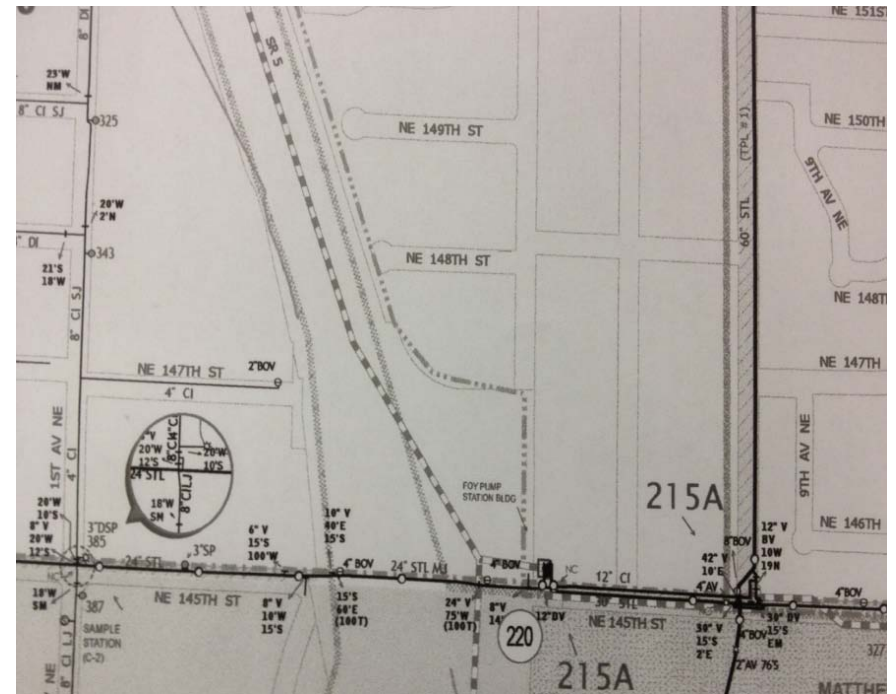
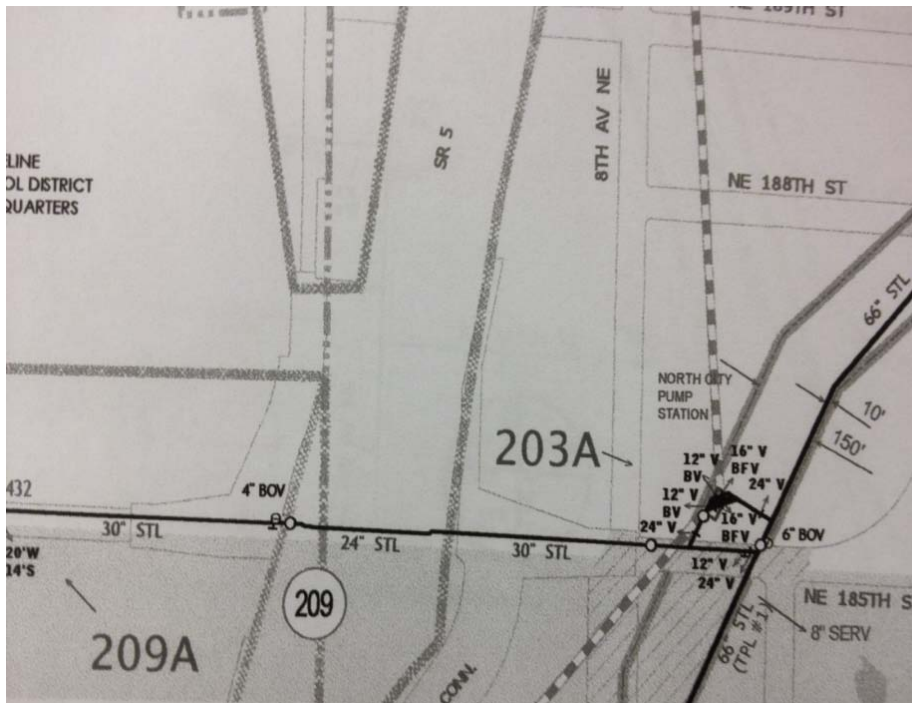
# Problem Areas

- Supply Integrity
  - Bypass capacity tested?
    - Tolt 550 supply to 590



# Problem Areas

- Supply Integrity
  - Seismic Integrity



# Summary

- The Fire Department requires a well maintained, reliable water supply to best meet the needs of all Shoreline residents and business owners.
- Can local control of the water system provide a better system to meet public safety needs?
  - 660 Zone
  - Hydrant deficient areas
  - Maintenance and testing
  - Disaster Planning