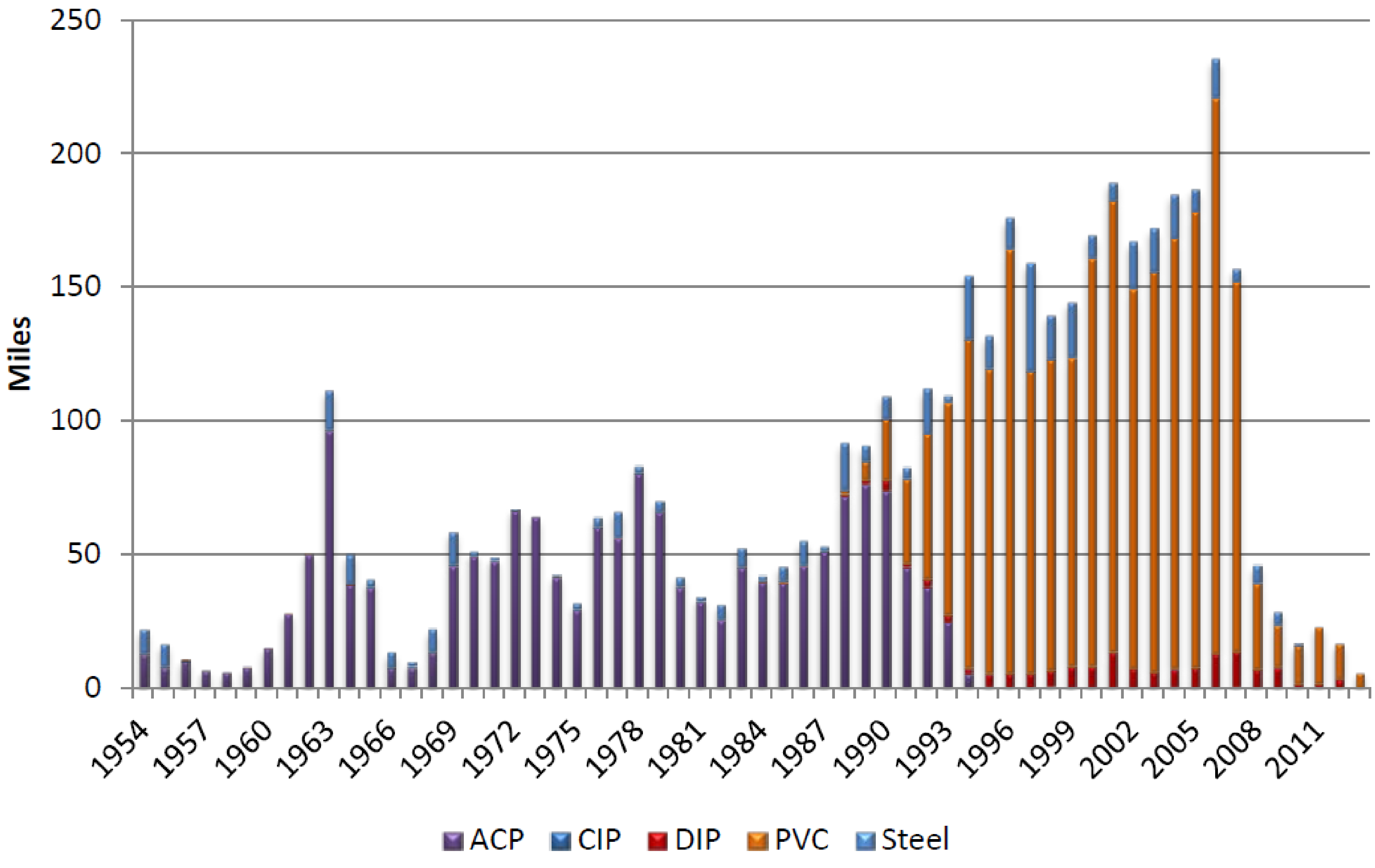
Different Plans for Different Pipes

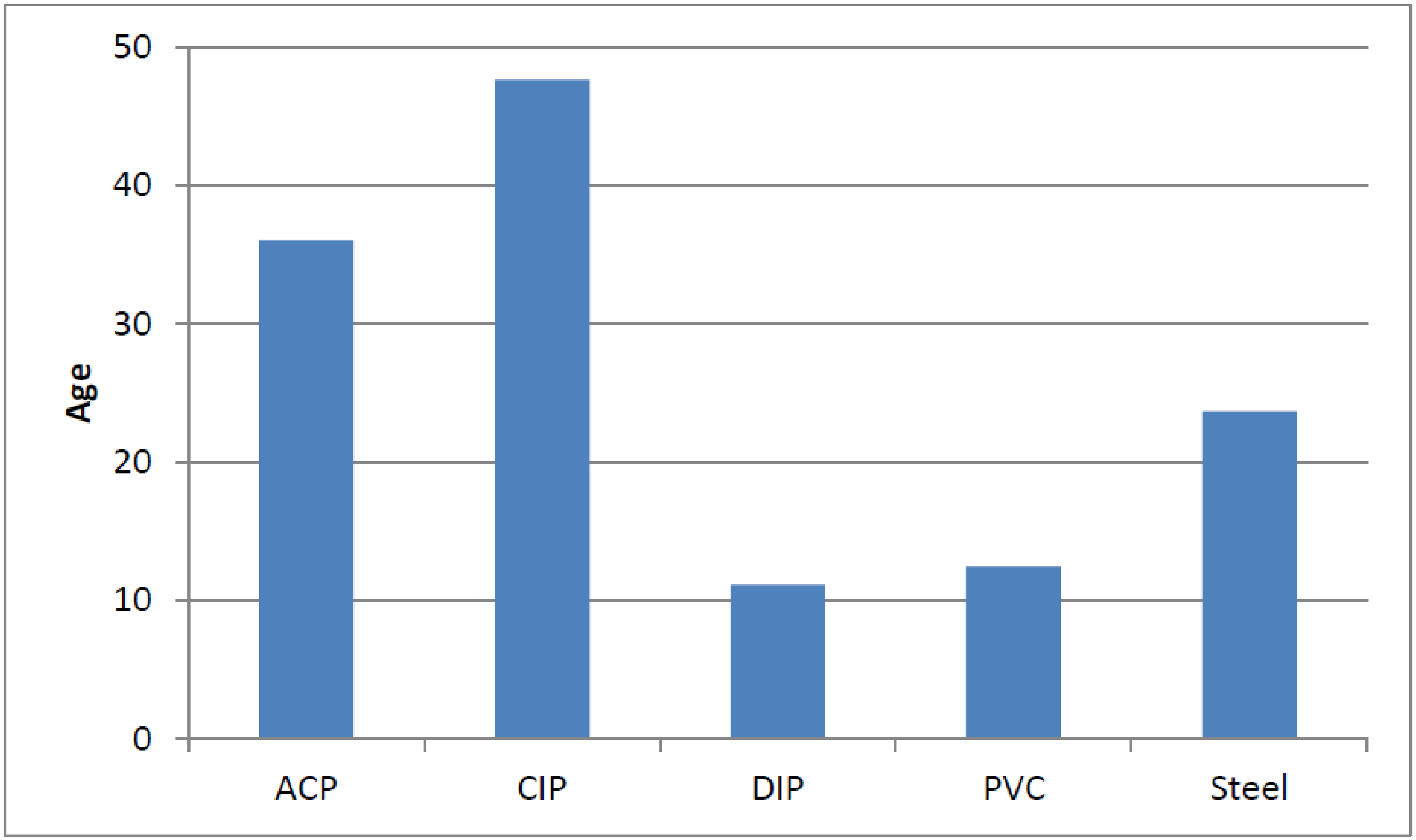
Las Vegas Valley Water District

- > 1 million people
- > 361,000 active services
- 23 active pressure zones
- > 4,500 miles of pipe (4” to 102”)
- > 1,900 miles of service laterals (3/4”-3”)

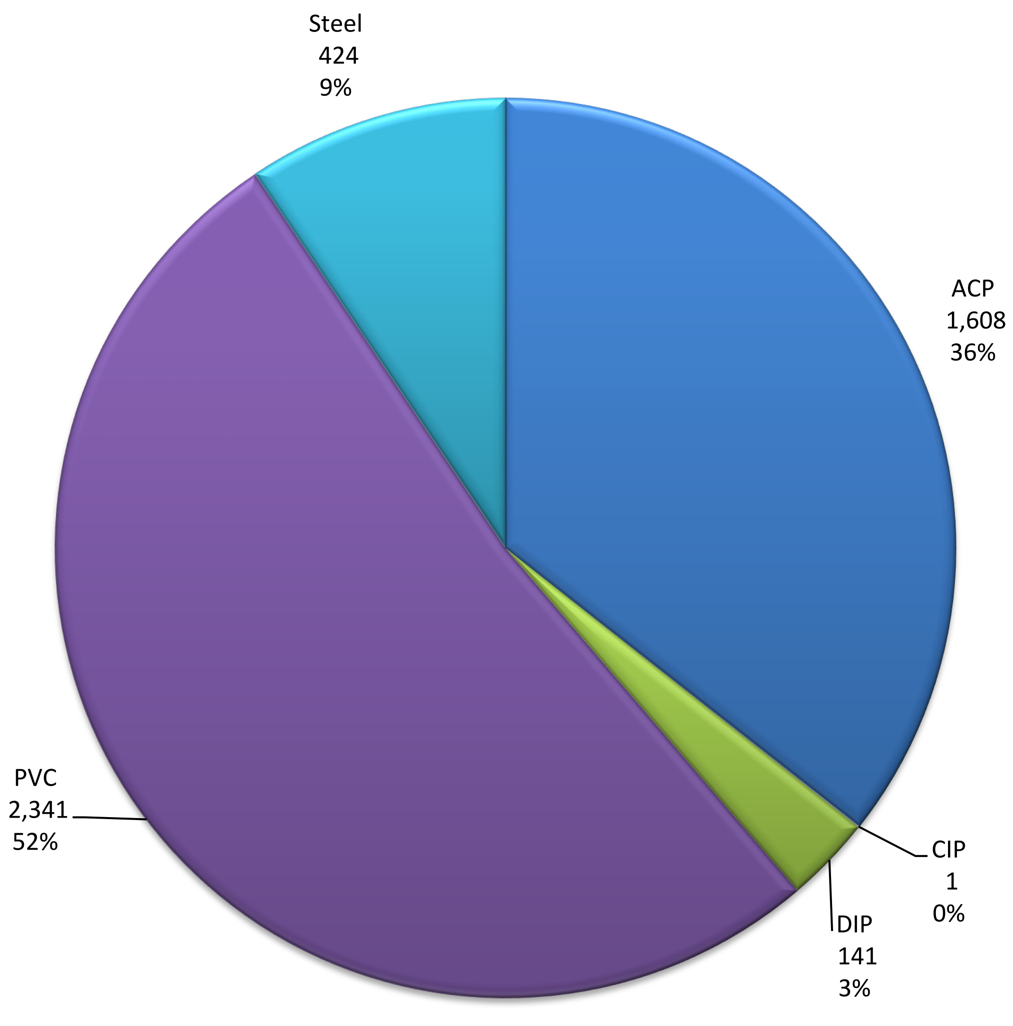
Pipe Install History by Material



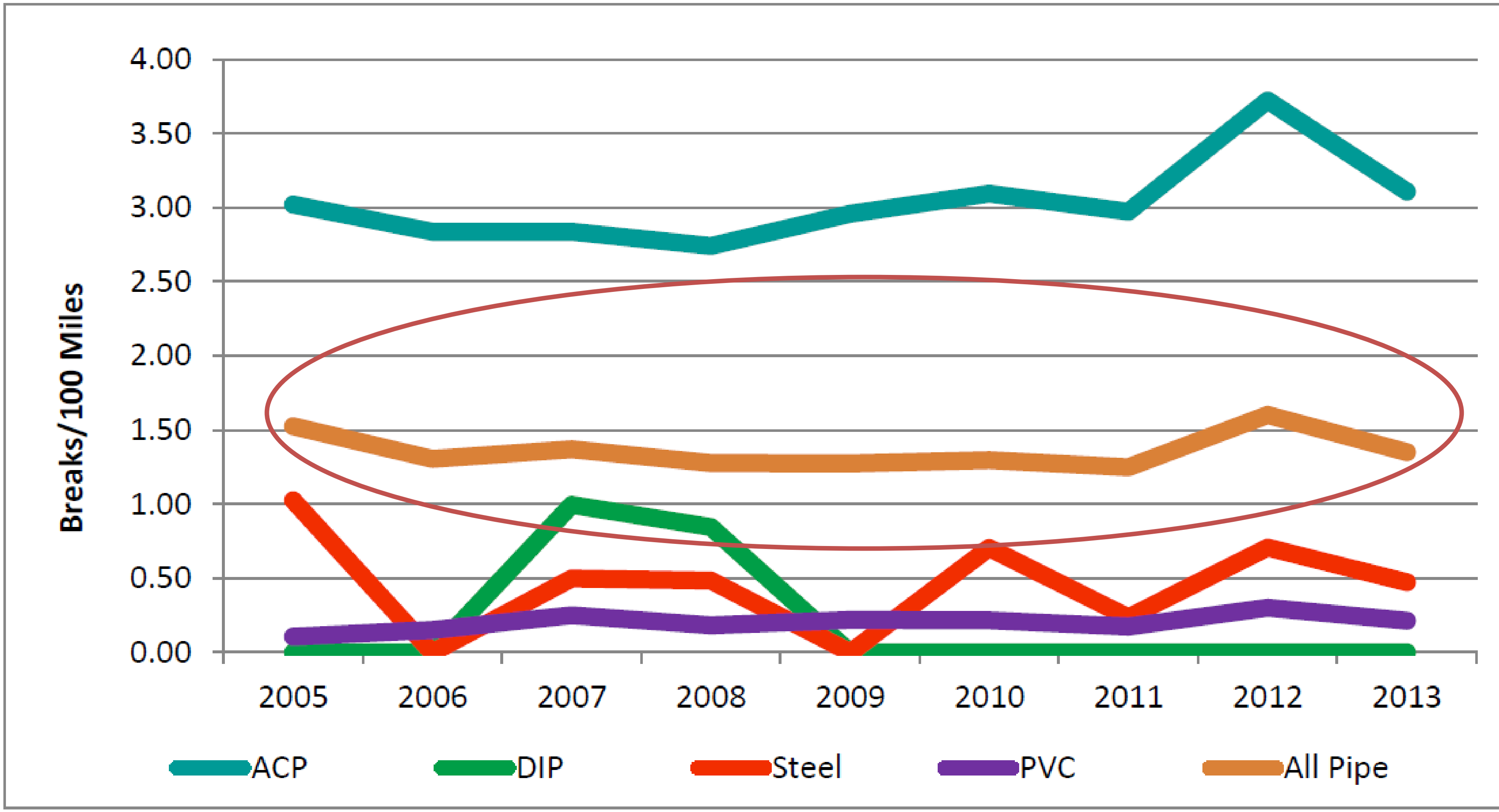
Average Age by Material



Pipe Inventory by Material

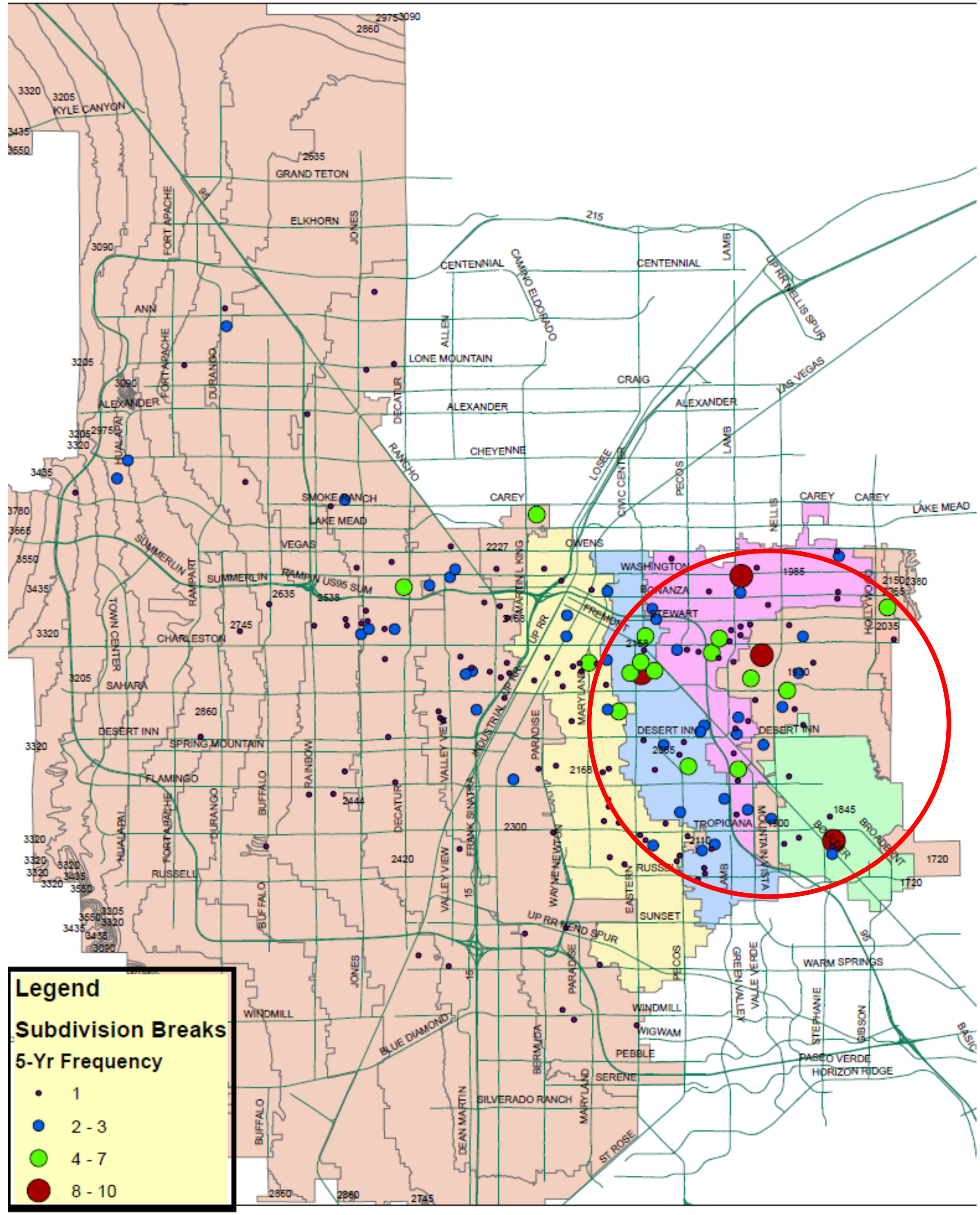


Break Rate by Material



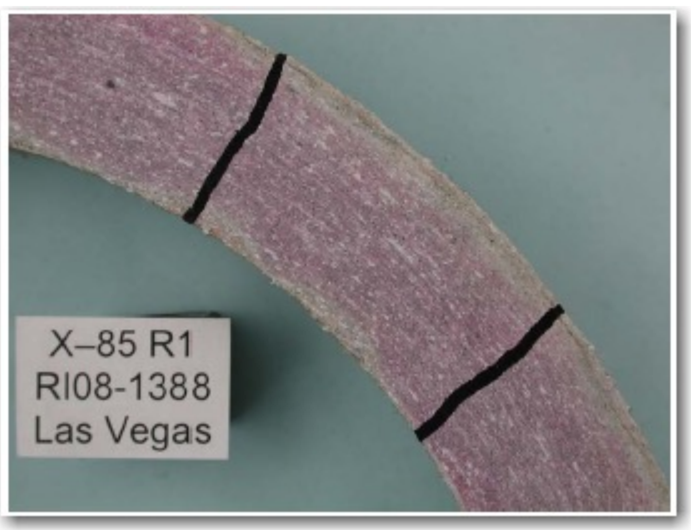
Small-Diameter ACP

- The majority of our breaks are small diameter ACP (8” and less)
- Average break-rate per 100 miles is about 3 breaks/100 miles/year
- Worst break-rate is about 12 breaks/100 miles/year
- Trend over the past several years has been essentially flat
- Recent statistical analysis suggests that break rate would only double in the next 50 years with no intervention
- Plan for this pipe – replace pipes in the highest break rate areas



Large-Diameter ACP

- Much fewer breaks than small-diameter ACP, but generally much higher consequence
- Plan for this pipe – Assess and address
  - Acoustical velocity testing
  - Phenol-Dye Staining



Continuous Steel Pipelines

- About 80% of our steel and ductile iron piping is continuous and can be protected by corrosion control

- For these pipes, the plan is to monitor and protect either with sacrificial or impressed current CP systems

Continuous Steel Pipelines
Sacrificial Anode Replacements

Continuous Steel Pipelines Impressed Current Retrofits

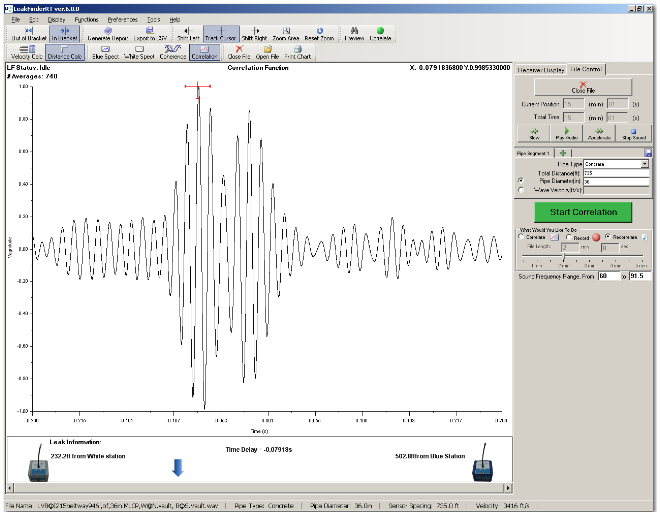
Non-Continuous Steel Pipelines

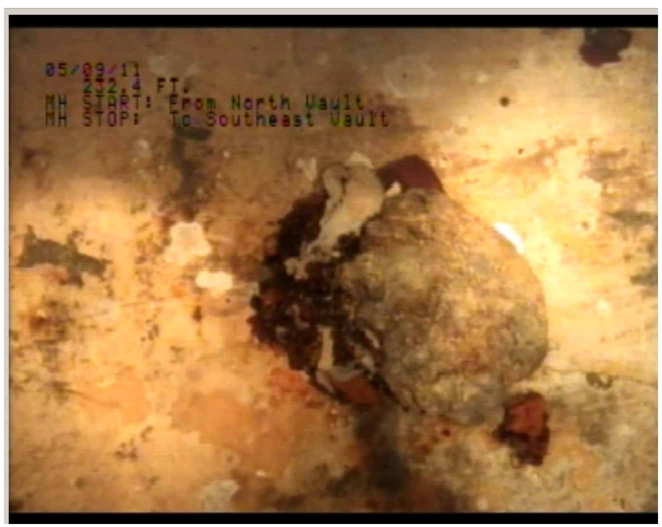
- Our oldest steel pipelines are not continuous and can't be protected

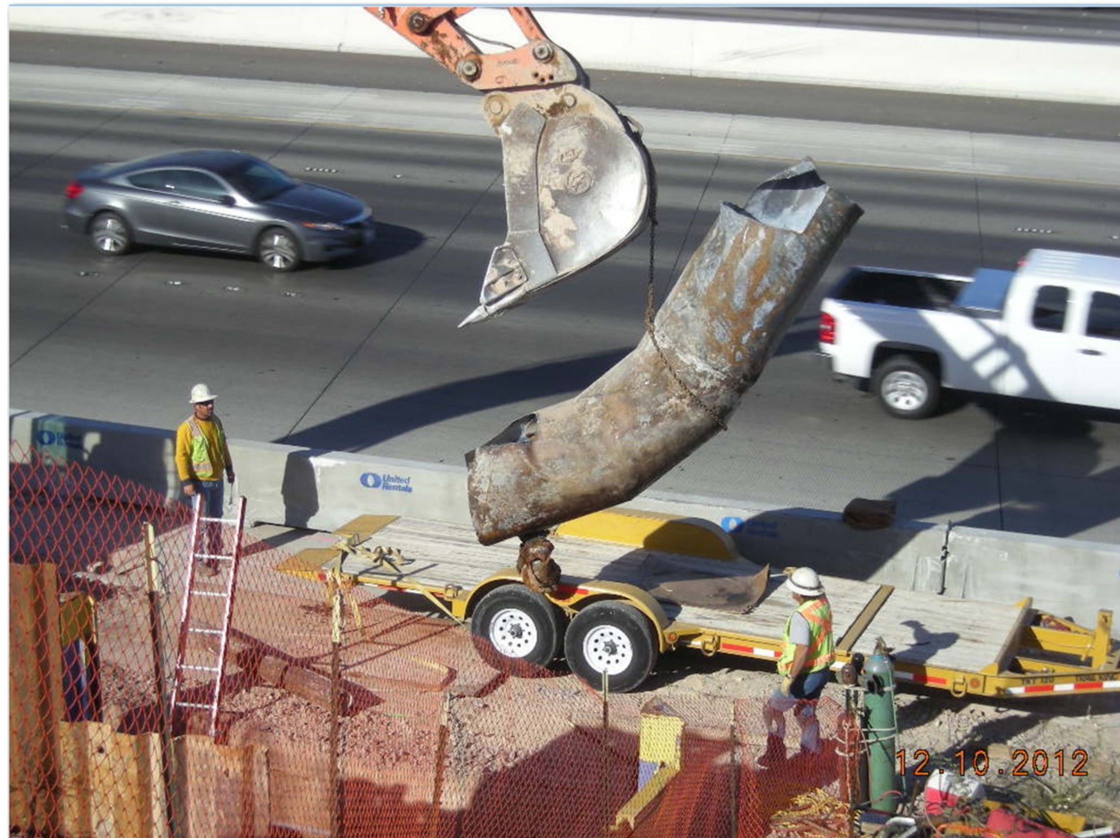
- Some of these are in high-profile areas such as Las Vegas Blvd, or under critical road crossings

- Plan for this pipe – Assess, Monitor, and Address

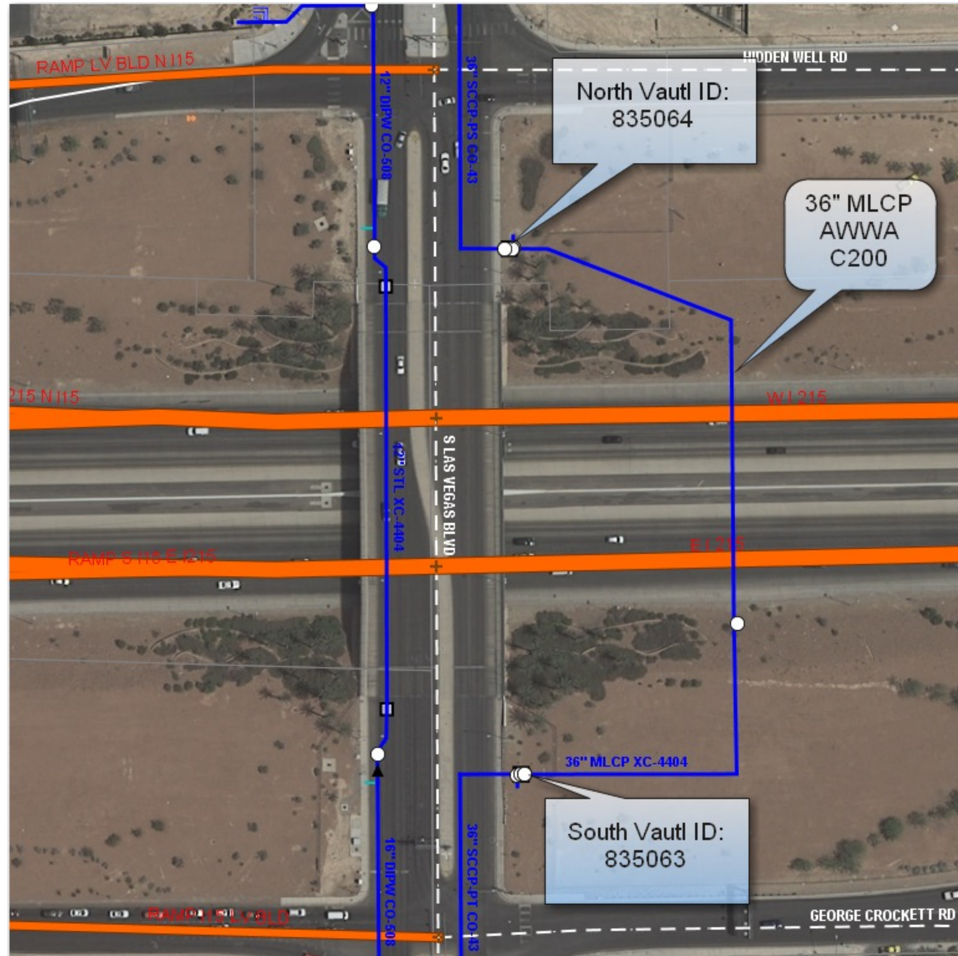
Assess
Critical Road Crossings







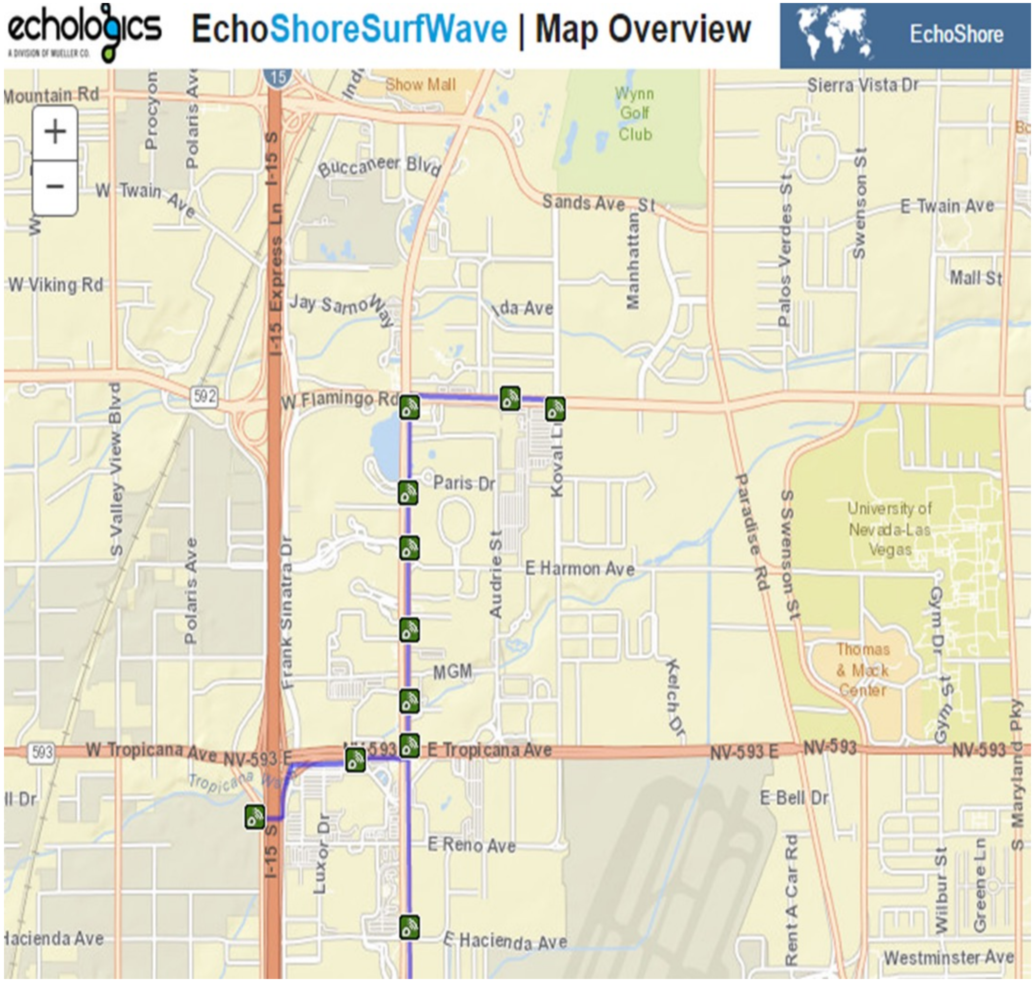
Critical Road Crossing Leak Assessment



Monitor
High Profile Areas

- About 5 years ago, we acoustically assessed the 16” and 24” pipelines in Las Vegas Blvd
- Acoustic testing indicated several sections of the pipe were degraded
- Very little break history
- Very disruptive/costly to replace
- Plan for this pipe – Permanent monitoring
  - Installed 13 nodes on existing air-vacs and vaults
  - System acoustically correlates for leaks between each node every day
  - Allows us to respond to small leaks before they develop into large leaks

Permanent Monitoring



Summary

- No “one size fits all” asset management plan
- Choose a plan that best fits the failure mode and consequence of the underlying asset