Regional Transmission Projects and Issues for 2011

January 6th, 2011 Operating Board Meeting

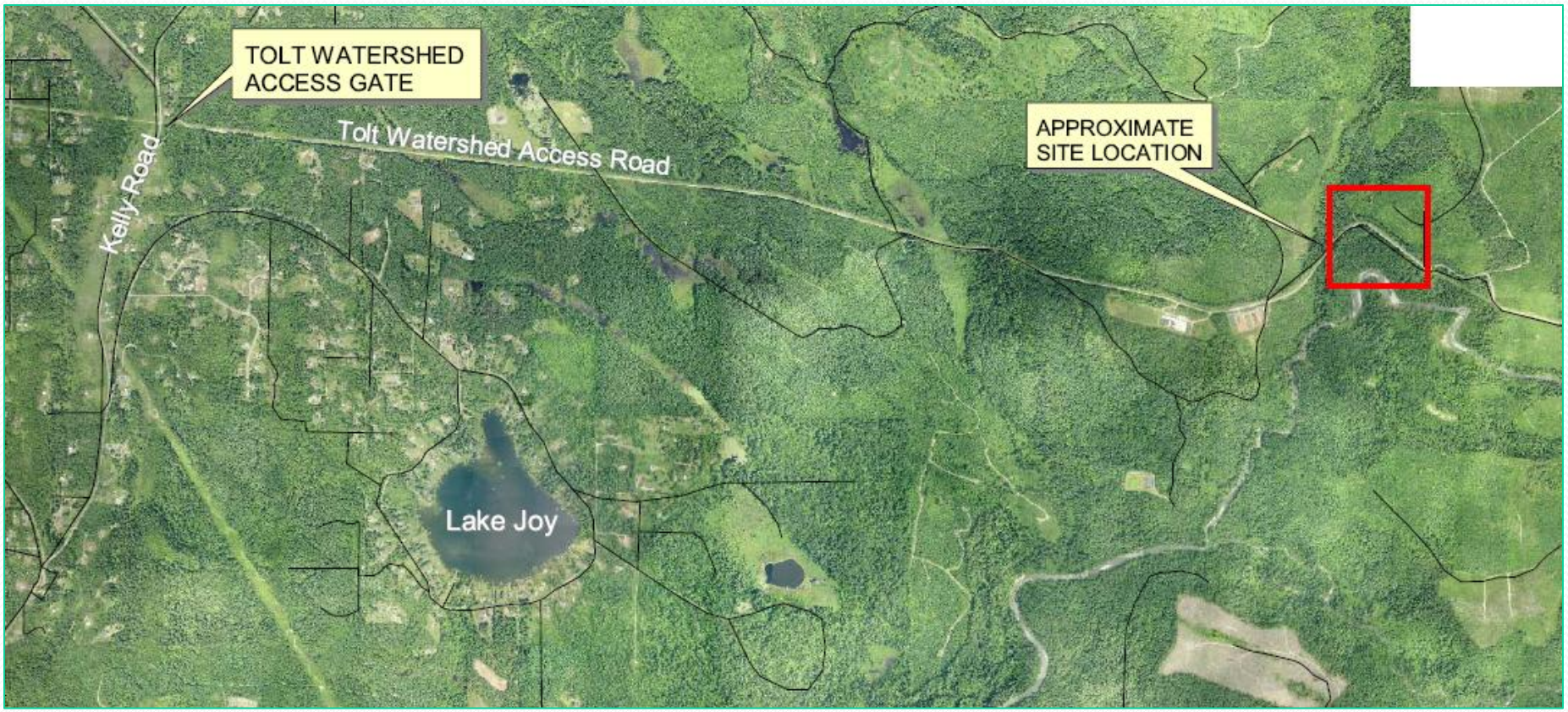
Projects & Issues to Cover

1. Tolt Slide
2. Brightwater Tunneling – 550 Pipeline risk management
3. Cathodic Protection Program
4. CRPL4 – impacts from Sound Transit and City of Renton projects in the Green River Valley
5. Tolt System Improvements completed in 2010
6. Whole Sale Meters
7. Lake Youngs algae management
8. Cedar Treatment Facility – UV valves upgrades

Tolt Slide

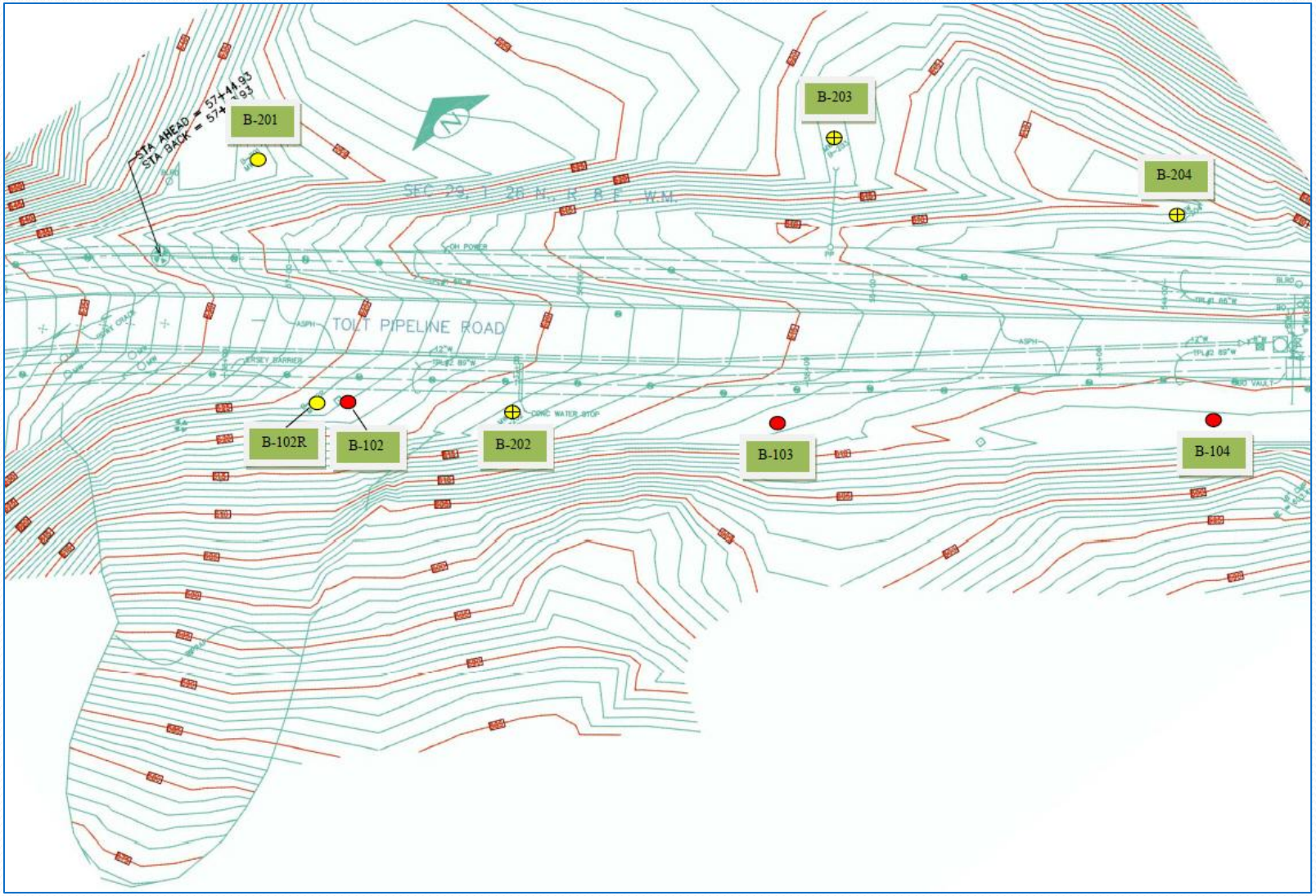
Tolt Slide

Location



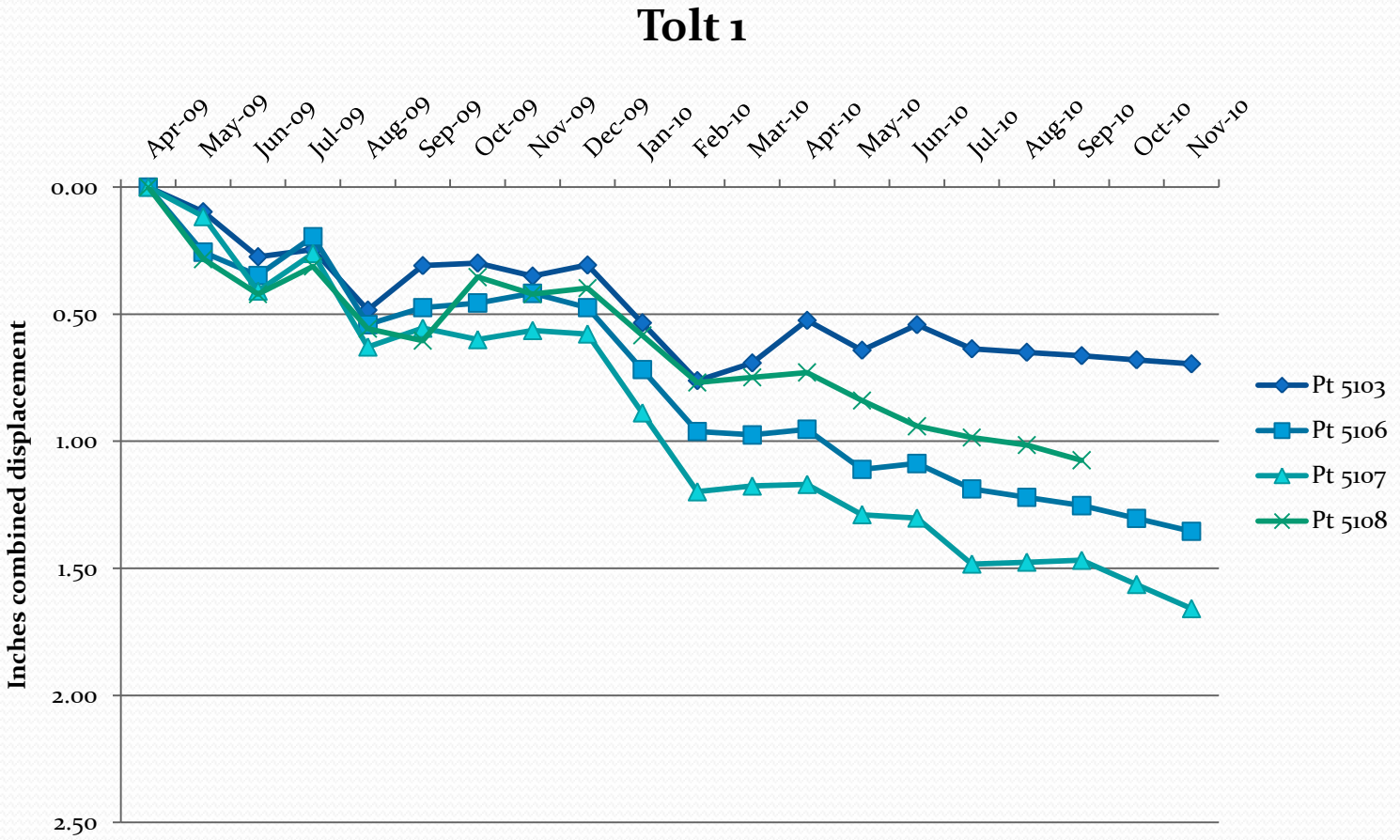
Tolt Slide

Location of Instruments and Monitoring Points



Tolt Slide

- Ground movement continues…



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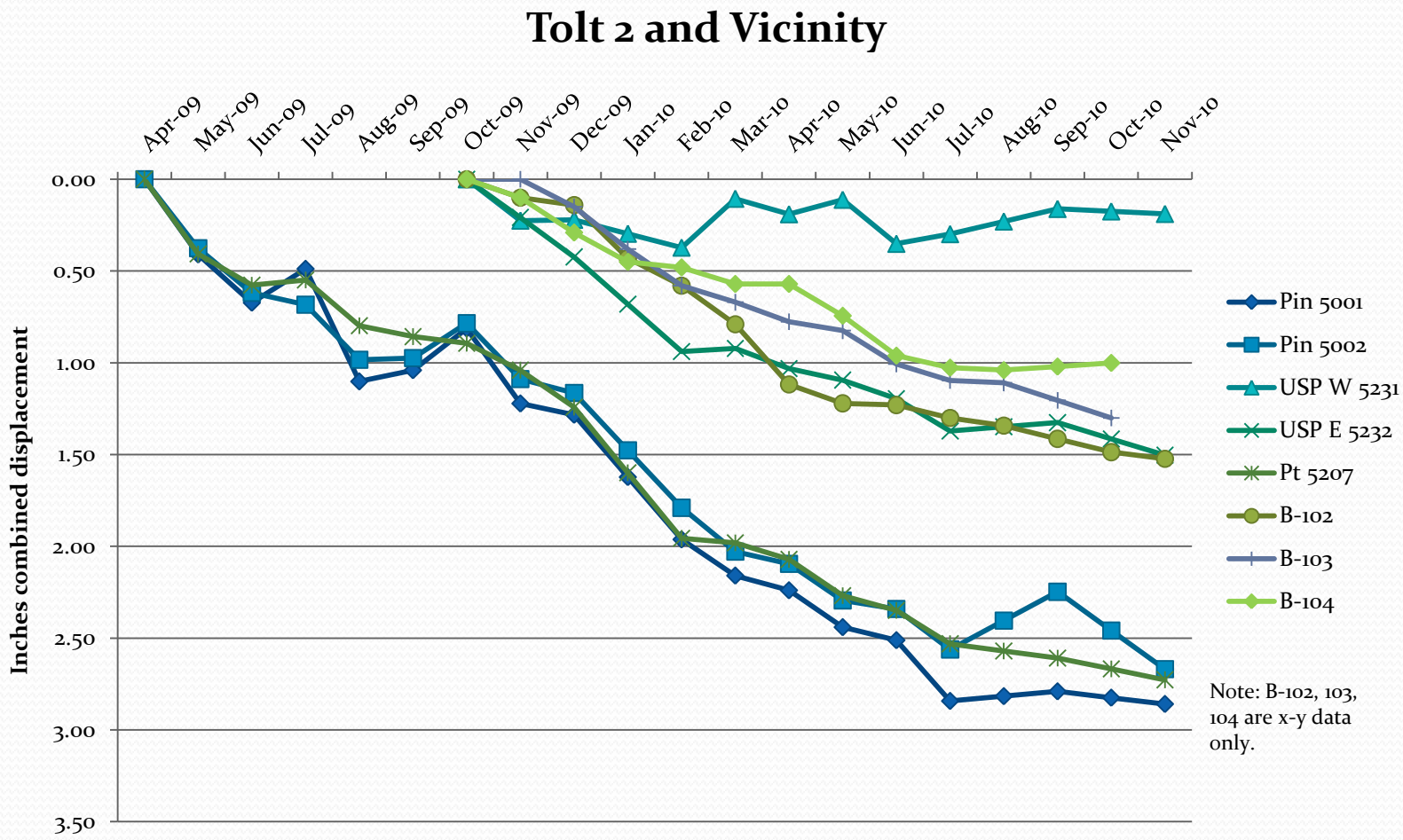

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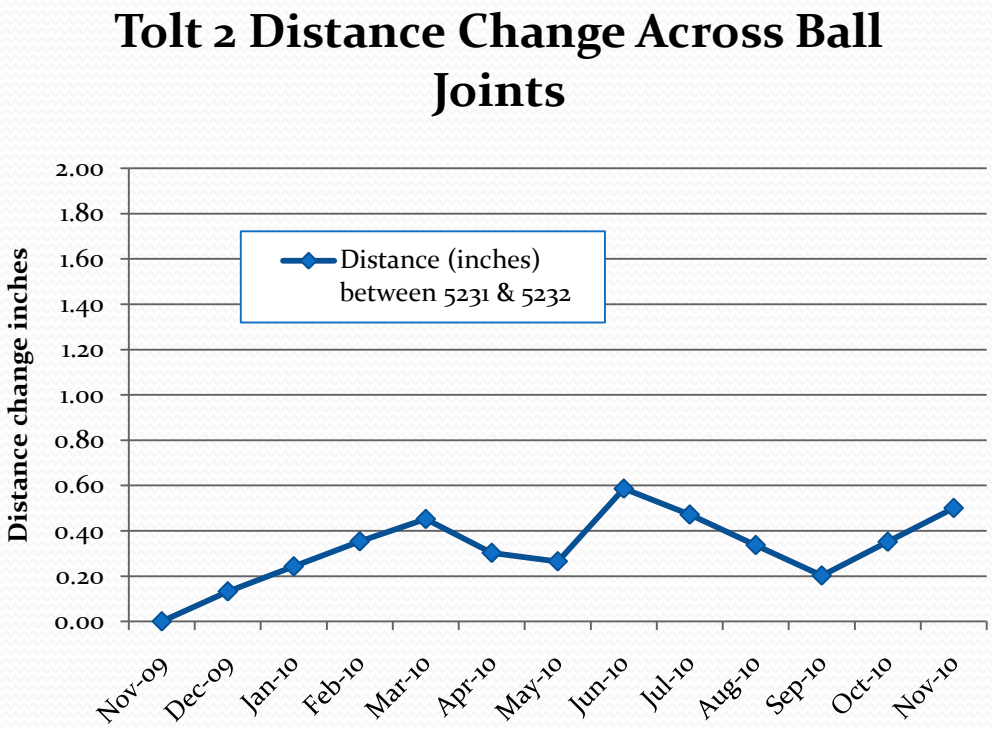
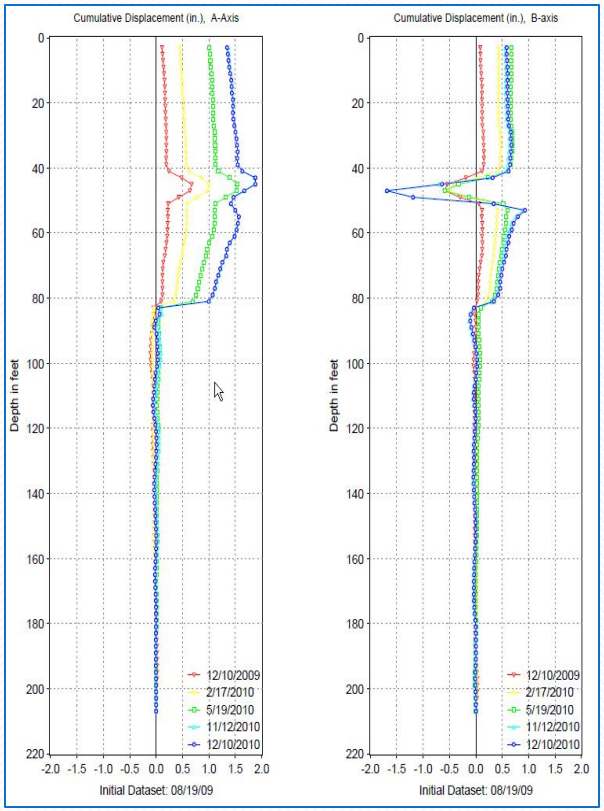


Tolt Slide

Ground movement - Inclinometers along TPL2



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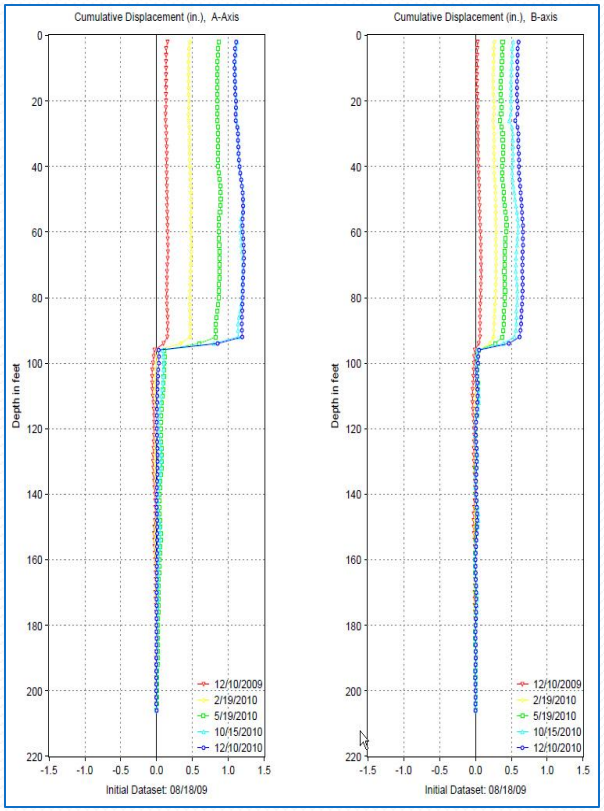

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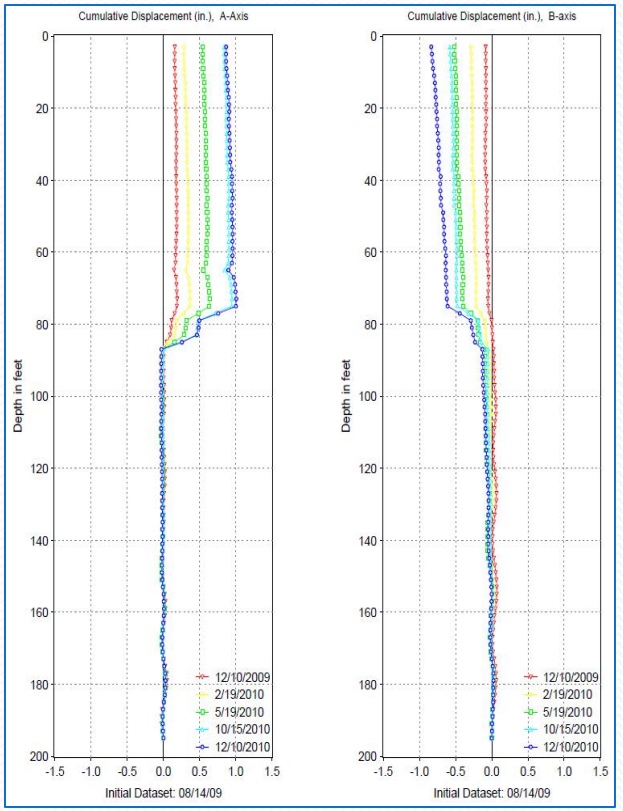

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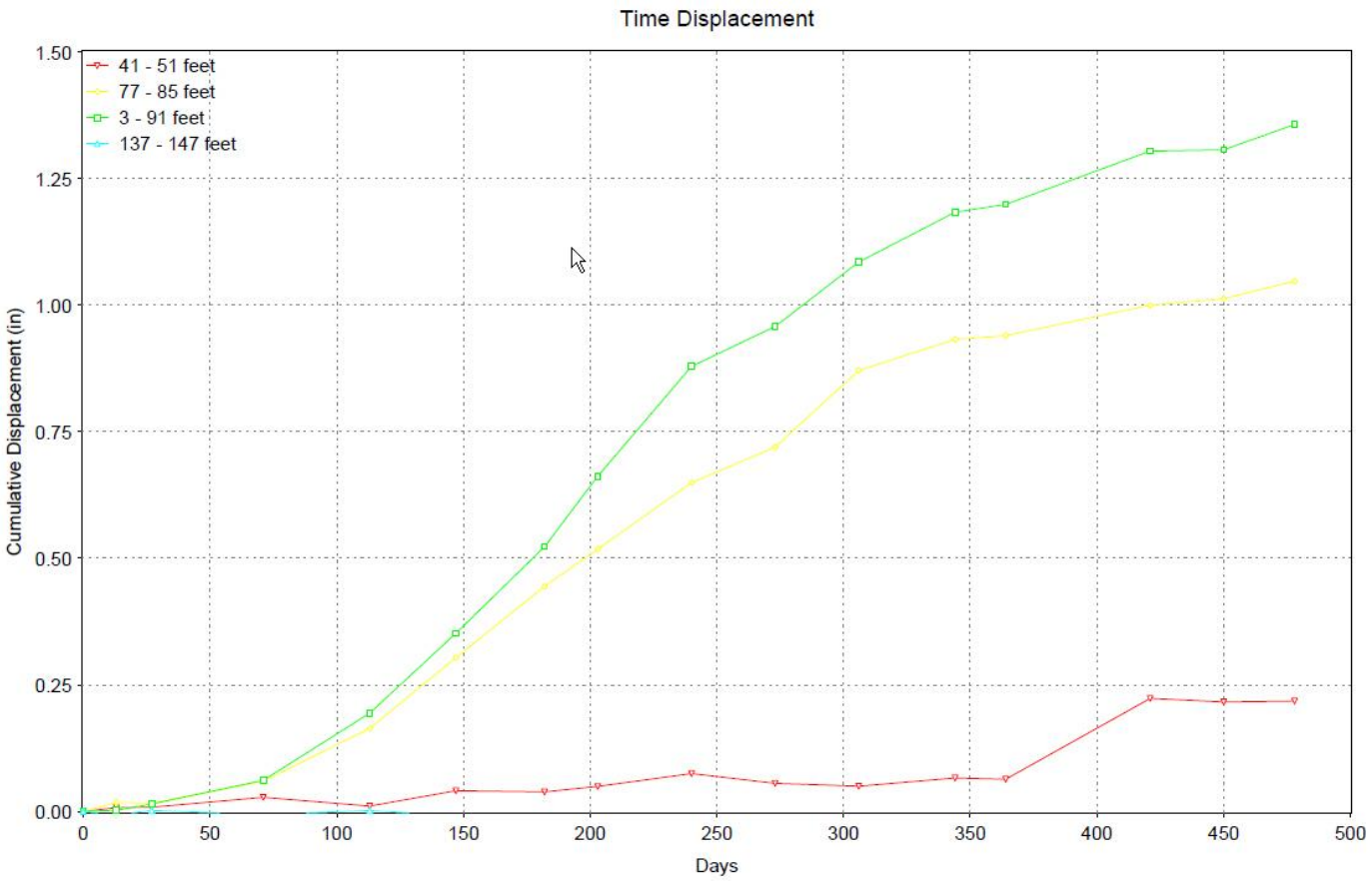
Tolt Slide

Inclinometers along TPL2 – displacement versus time



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Tolt Slide

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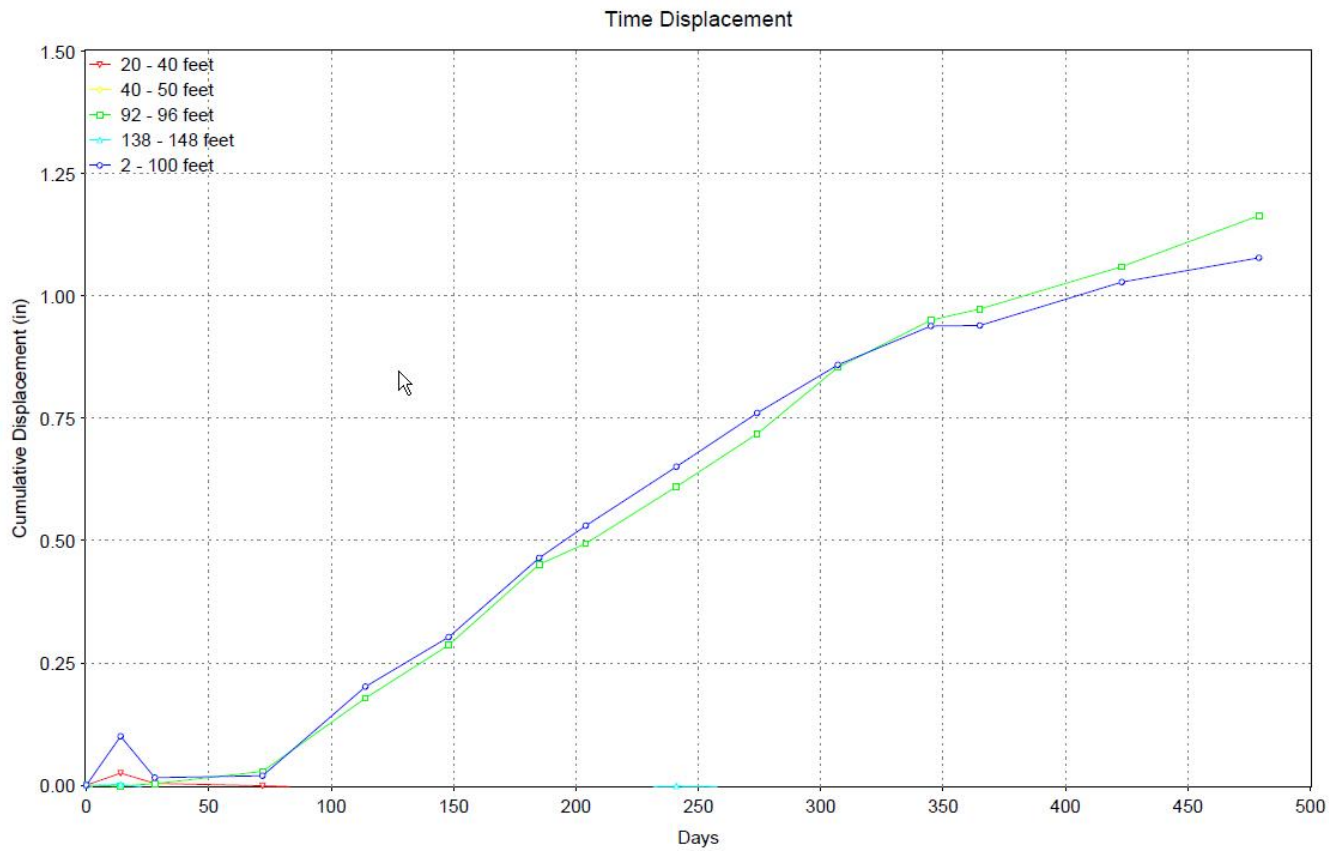

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Tolt Slide

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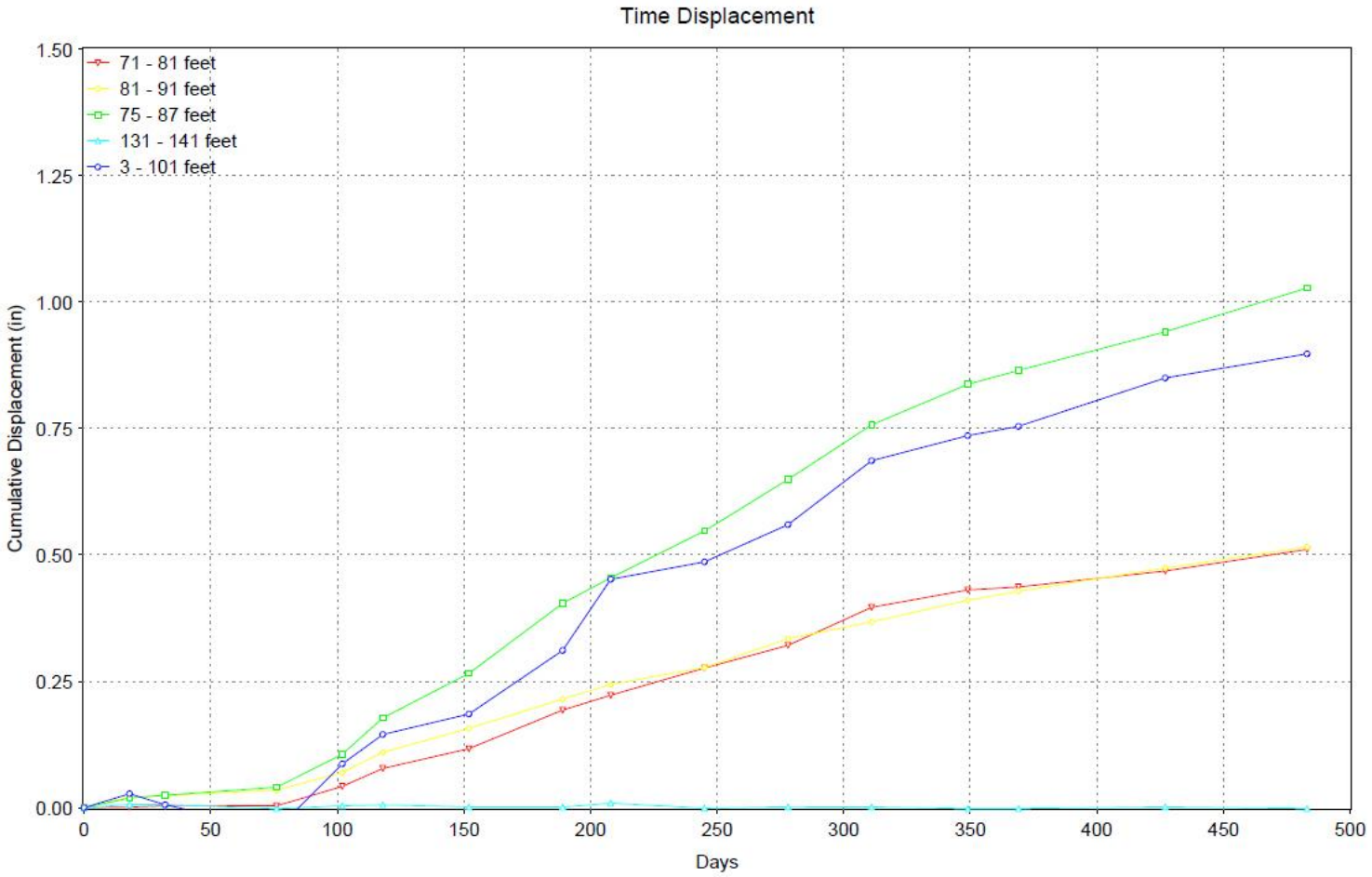

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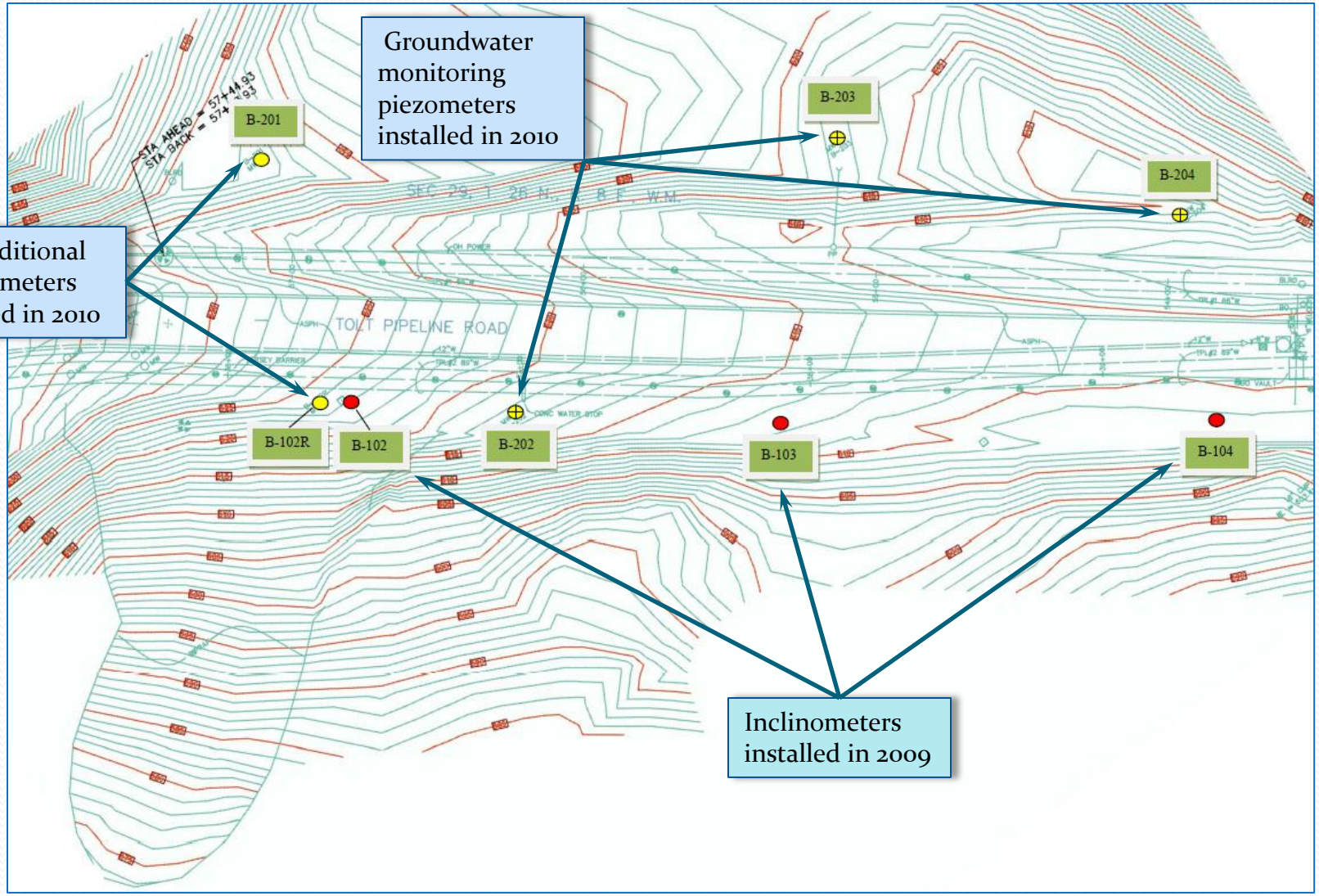
Tolt Slide

- Feasibility study completed in 2010 to identify possible slide stabilization measures
- Ground dewatering identified as a promising, relatively low cost solution
- Predesign of a vertical well dewatering system initiated
- A limited number of additional geotechnical instruments added to provide data in aide of dewatering system design

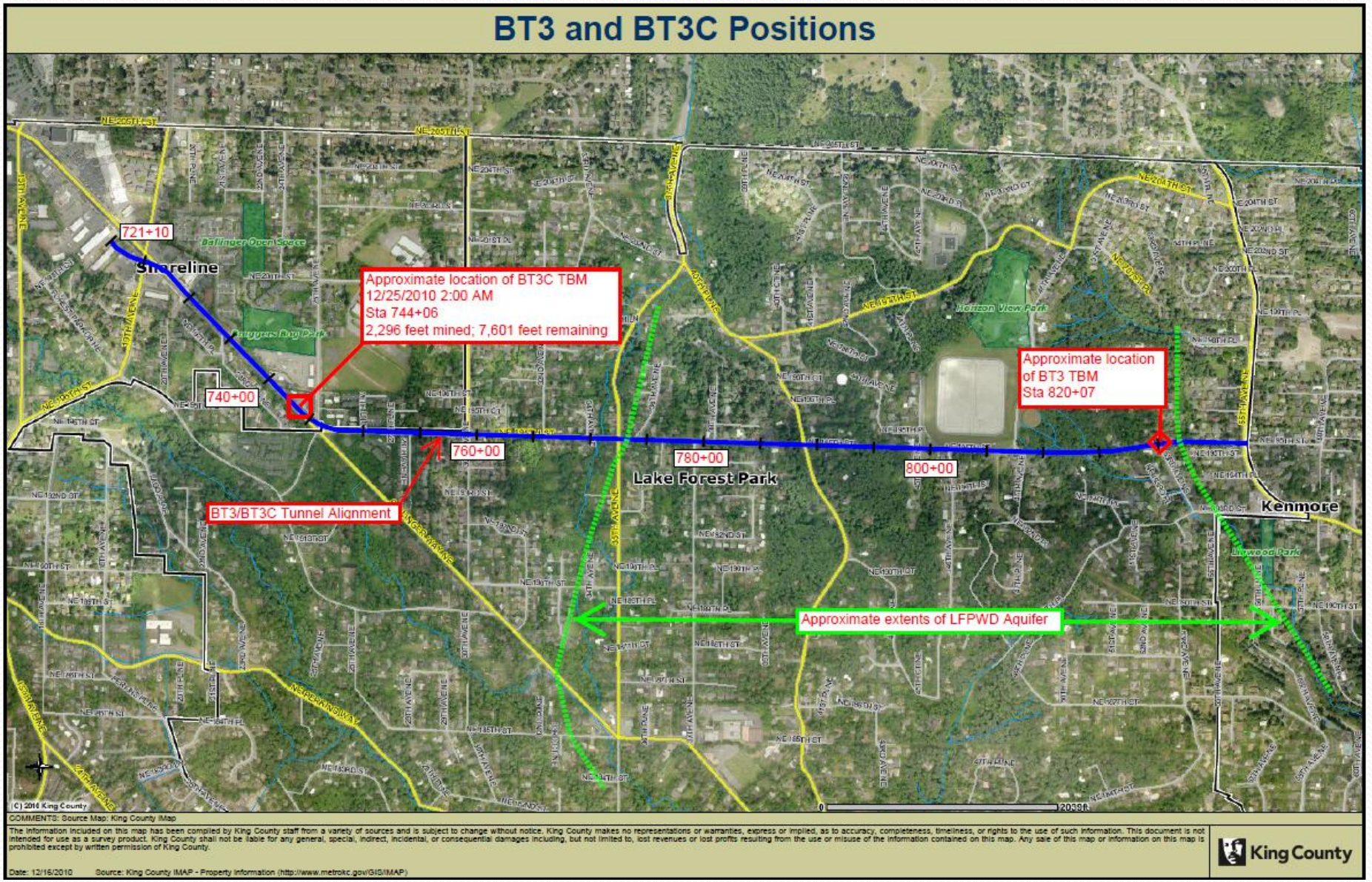
Tolt Slide

Geotechnical Field Work in 2011



Brightwater Tunneling

Brightwater Tunneling



Brightwater Tunneling

- Tunneling under the 550 Pipeline to begin in late January 2011
- Risk is very low – experienced contractor, different machine compared to the one that caused a sinkhole
- Relative risk is the highest at Lyons Creek – tunnel is "only" 100 feet below surface, soils are sandy
- Lyons Creek expected to be reached late April or in May 2011
- Settlement monitoring points installed every 500-1,000 feet along the tunnel alignment

Brightwater Tunneling

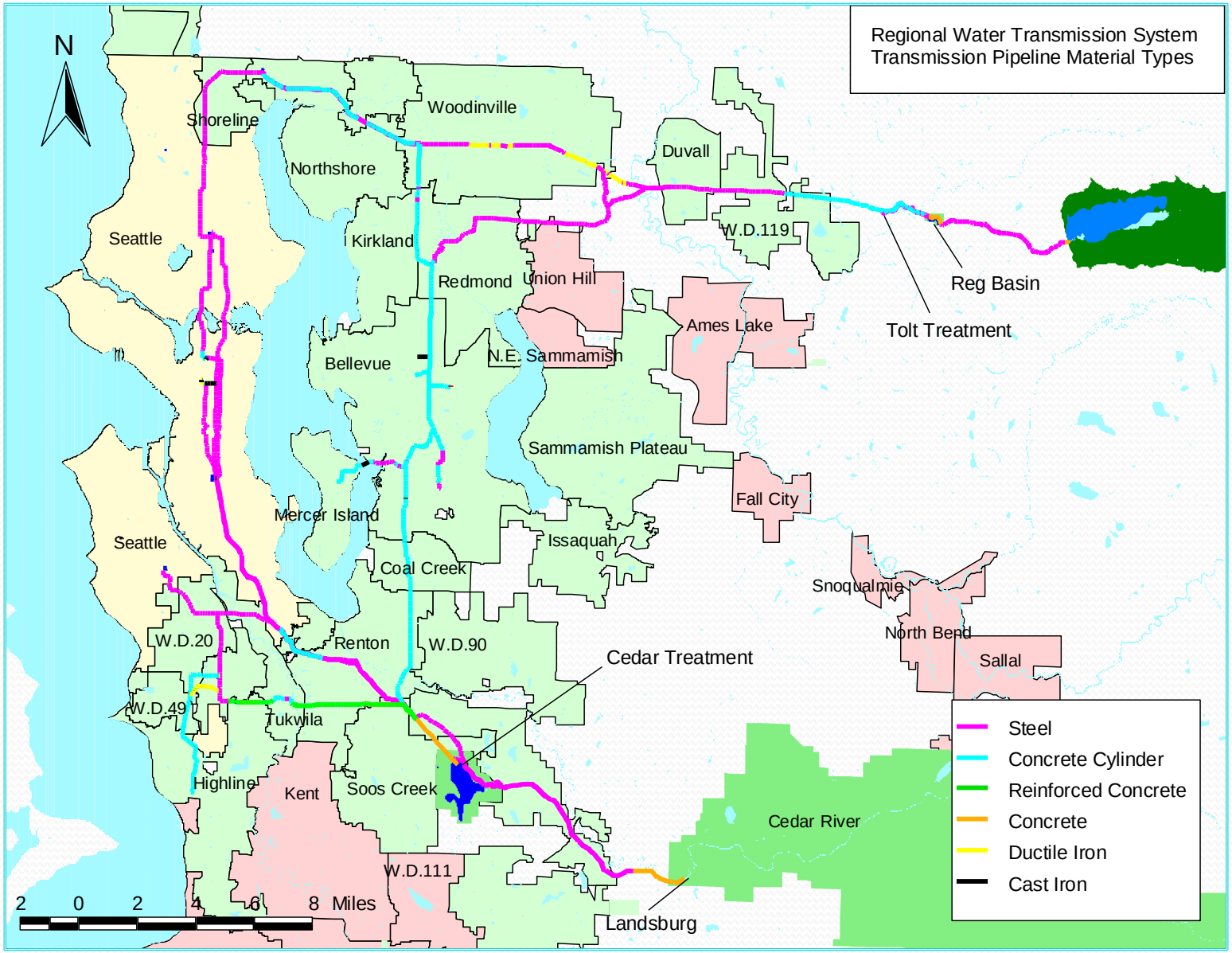
- Survey monitoring points at 100 foot spacing set up in the vicinity of Lyons Creek, and at 200 foot spacing near Lake Forest Reservoir
- Weekly updates on BT3C position
- Half of Lake Forest Reservoir will be taken off line while tunneling at Lyons Creek is underway
- Tunneling under Seattle facilities will be completed by end of July 2011

Cathodic Protection Program

Cathodic Protection Program

- Impressed Current Cathodic Protection (CP) is a key element of our long term Transmission System strategy
- CP has been used effectively by Seattle Water on selected segments of steel pipelines since the 1960s
- CP is installed where corrosive soils cause repeated leaks on steel pipelines
- Recently CP was successfully installed on 3.5 mi of concrete cylinder pipe, after electrically bonding the pipe sticks at every joint

Cathodic Protection Program



Cathodic Protection Program

- Cost effectiveness of CP varies greatly depending on how well the steel is electrically insulated from the surrounding soil
- A rectifier station costing approx. $300k and lasting 20-25 years would protect:
  - about 1,500 feet of bare steel pipe
  - About 5 miles of modern well insulated pipe (TPL2)
  - About 3 miles of Concrete Cylinder (CC) pipe
- A pipeline protected by a well run CP system does not corrode (any further)

Cathodic Protection Program

- In 1Q2011 a Strategic Transmission Plan will be finalized and presented to the AMC and the Operating Board
- The plan will expand on the Transmission System strategy paper from the 2007 Water System Plan
- A programmatic business case for the installation of CP on **all** CC pipelines will follow
- CC pipe fails catastrophically, in contrast to steel pipe
- Information is already available from a 1990s report on the relative condition of the CC pipelines

Cathodic Protection Program

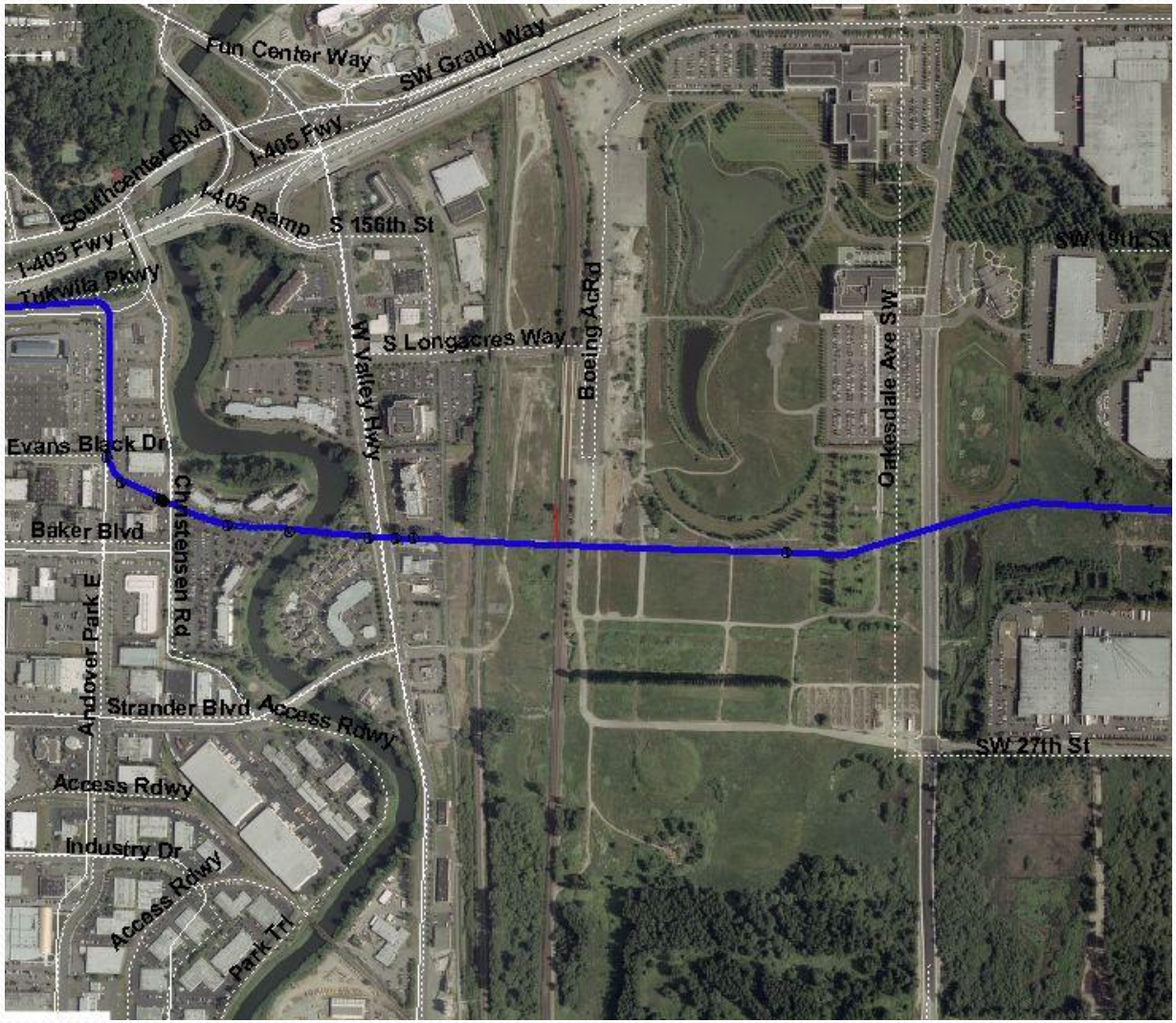
- CP will be installed, starting with the most deteriorated segments
- CCP has rubber gaskets at pipe joints
- To create an electrically continuous pipe a jumper must be welded to connect across
- Jumpers can be installed…
  - Internally – requires pipe to be empty and out of service
  - Externally – requires excavation, backfill, restoration
- Dense valve spacing on the CC pipelines would reduce extent of outages associated with internal joint bonding

Cathodic Protection Program

- CP Economics less clear on steel pipelines
- If too many rectifier stations are needed, replacing the pipeline segment may be more economical and full length CP
- CP needs to be more selective
- Leak frequency is a great indicator of where CP would be beneficial, but…
- …internal cement mortar lining delays the manifestation of leaks as it bridges pinholes
- Newer tools for Acoustic leak detection may be help

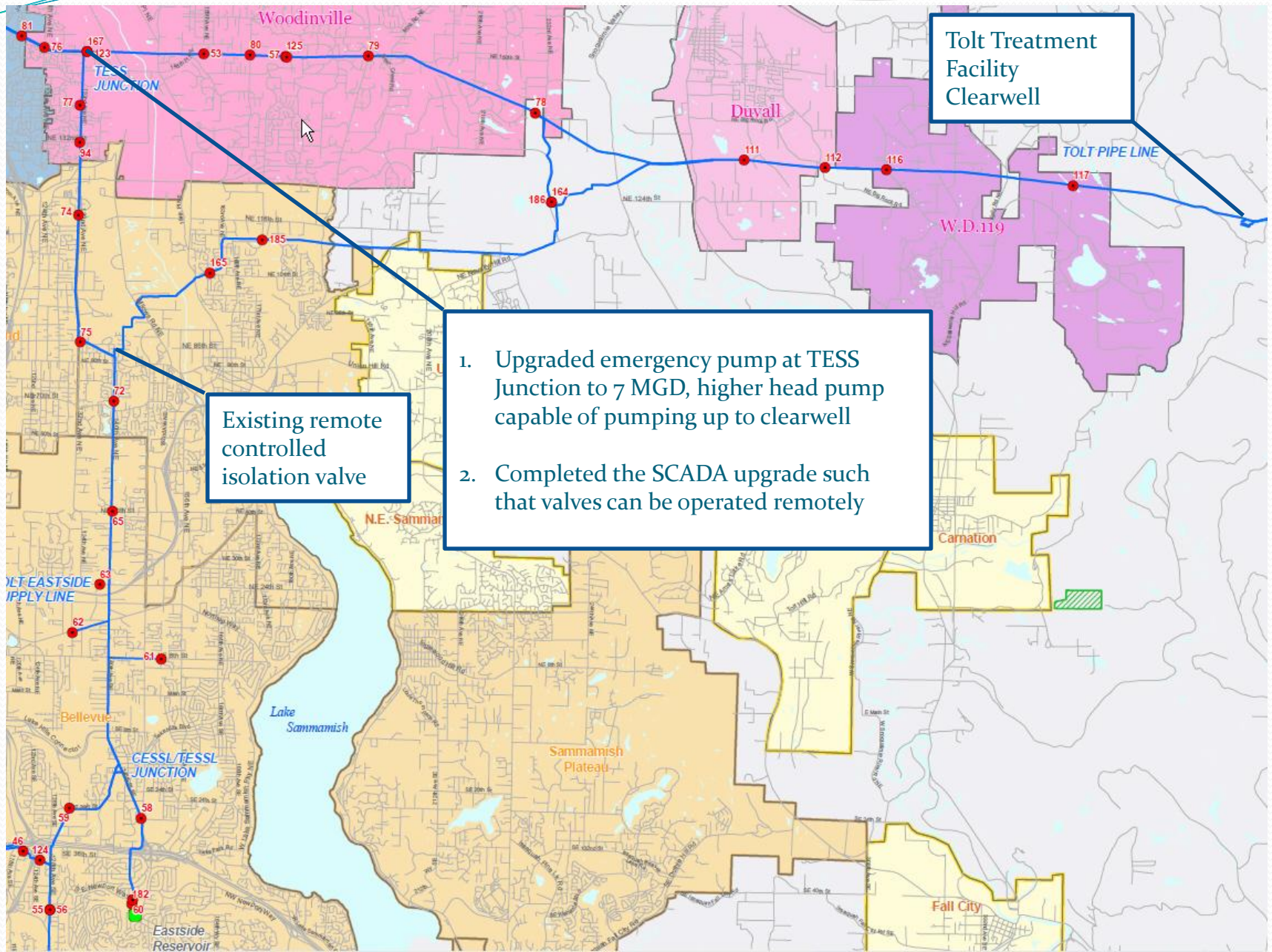
CRPL4 – Impacts from ST and Renton Projects

CRPL4 Impacts



Tolt System Improvements completed in 2010

2010 Tolt System Improvements



Whole Sale Meters

Whole Sale Meters

- Annual testing of Tolt meters is about to start and be completed in 1Q2011
- Annual testing of Cedar meters pushed to June-July after a possible algae bloom
- Strainer baskets on Protectus meters on the Cedar have been removed
- Several Cedar meters in Seattle retail that has not been worked on since the 2010 algae bloom will be tested and opened up to determine if algae buildup from 2010 has dissipated

Lake Youngs Algae Management

2010 Lake Youngs Algae Management

- Build on experience from 2008 and 2010
- Increased bypassing of Lake Youngs during algae blooms
- A Key Performance Indicator (KPI) instituted:

  Bypass Lake Youngs at least 90 percent of the time when cyclotella bio-volume is above 0.5 mm^3/L and Cedar River water quality at Landsburg is OK.
- *Distribution System Impacts Management Best Practices* forum scheduled for February 9, 2011

Cedar Treatment UV Isolation Valves Improvements

Cedar WTP UV Valve Leakage: 2011 Fix