

# Pre-Design of a Major Water Transmission Pipeline (The Tulalip Water Pipeline)

Gregory S. Harris

PNWS AWWA 2009 Spring Conference

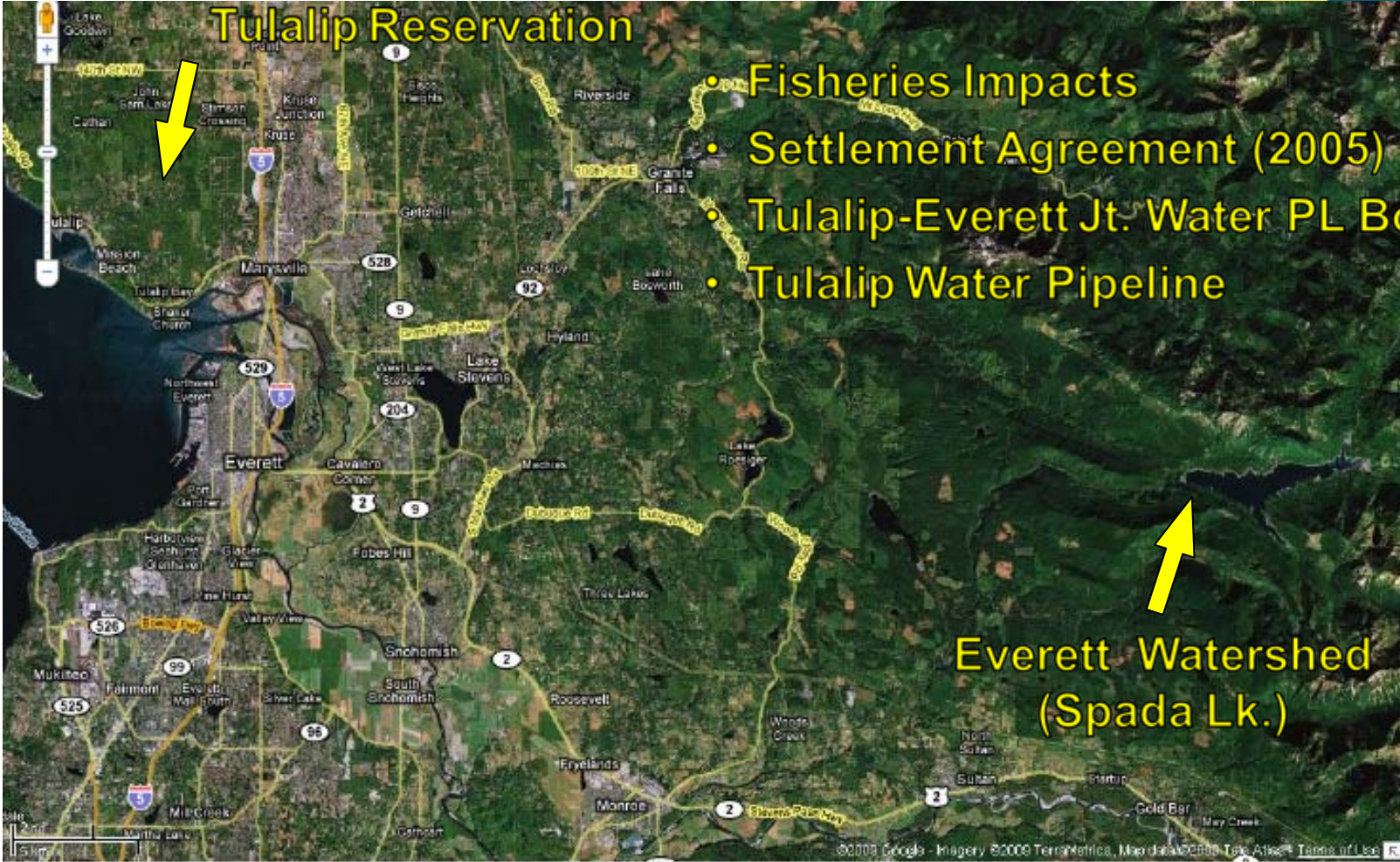
April 6, 2009



**MWH**

***BUILDING A BETTER WORLD***

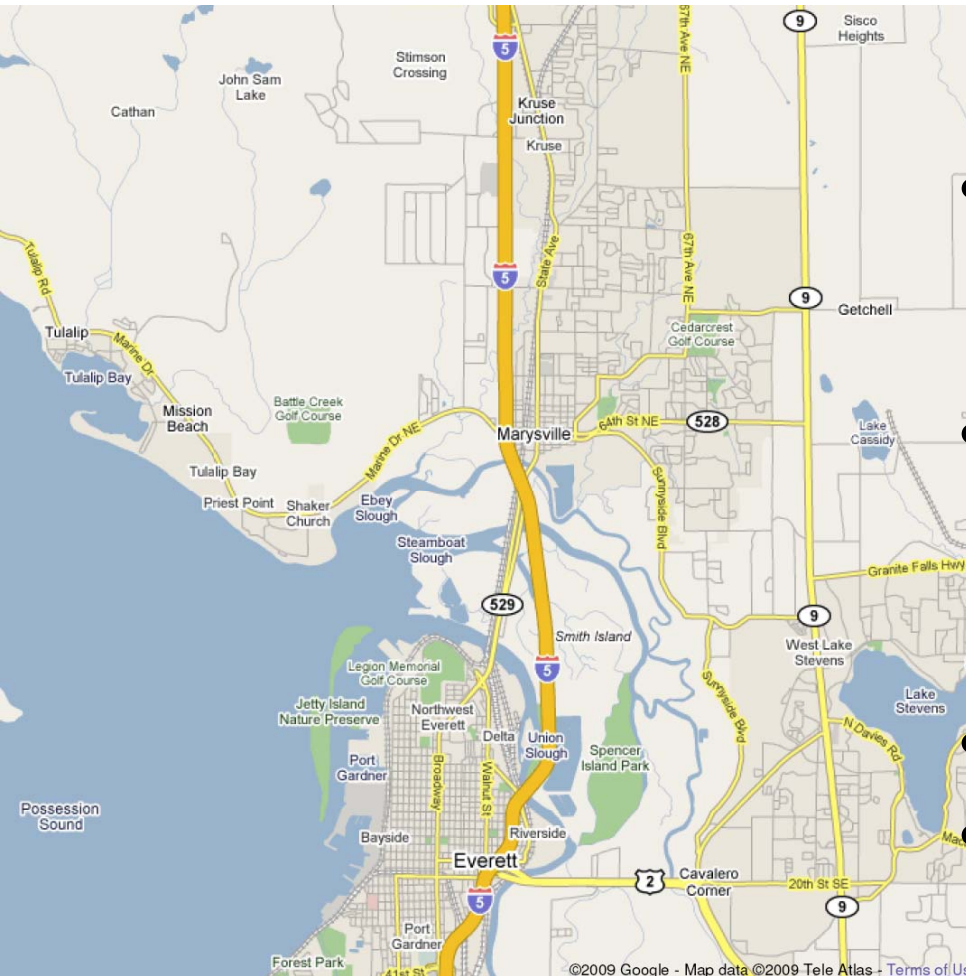
# Project Background



- Fisheries Impacts
- Settlement Agreement (2005)
- Tulalip-Everett Jt. Water PL Board
- Tulalip Water Pipeline

Everett Watershed  
(Spada Lk.)

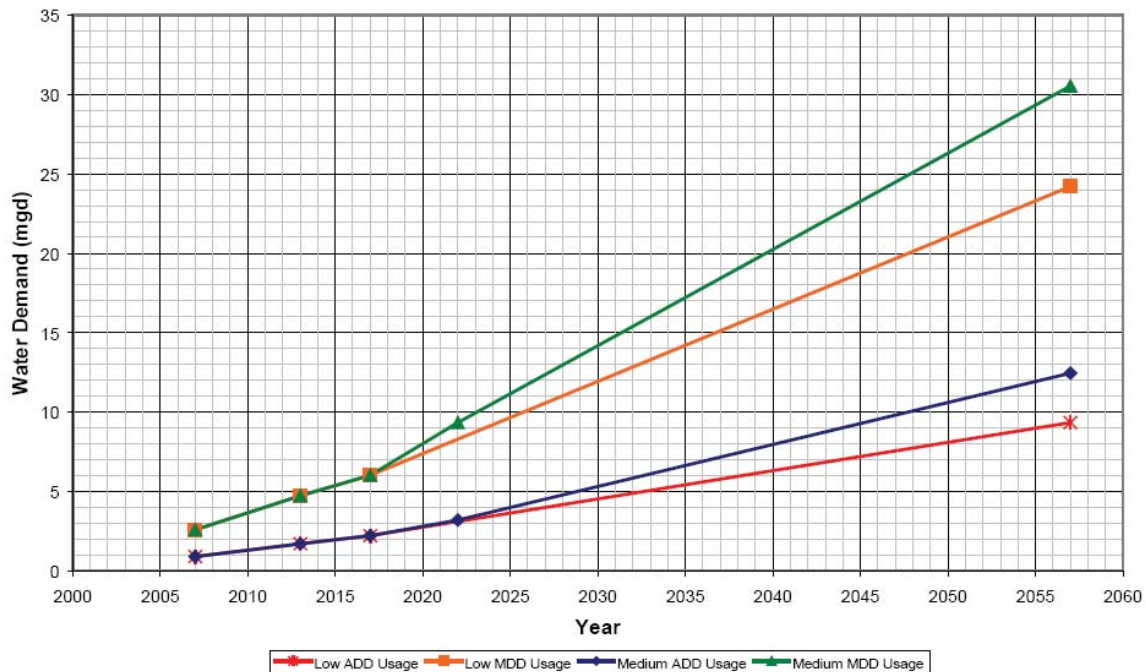
# Pre-design Project Purpose



- Long-term Water supply:
  - 36 mgd to Tulalip Reservation
  - 2 mgd to Smith Island
- Determine how best to deliver:
  - From Everett's Regional System
  - Consistent with Agreement between Everett / Tribes
- Pre-Design Report & Dwg's
- Develop Implementation Plan

# Water Supply Demands

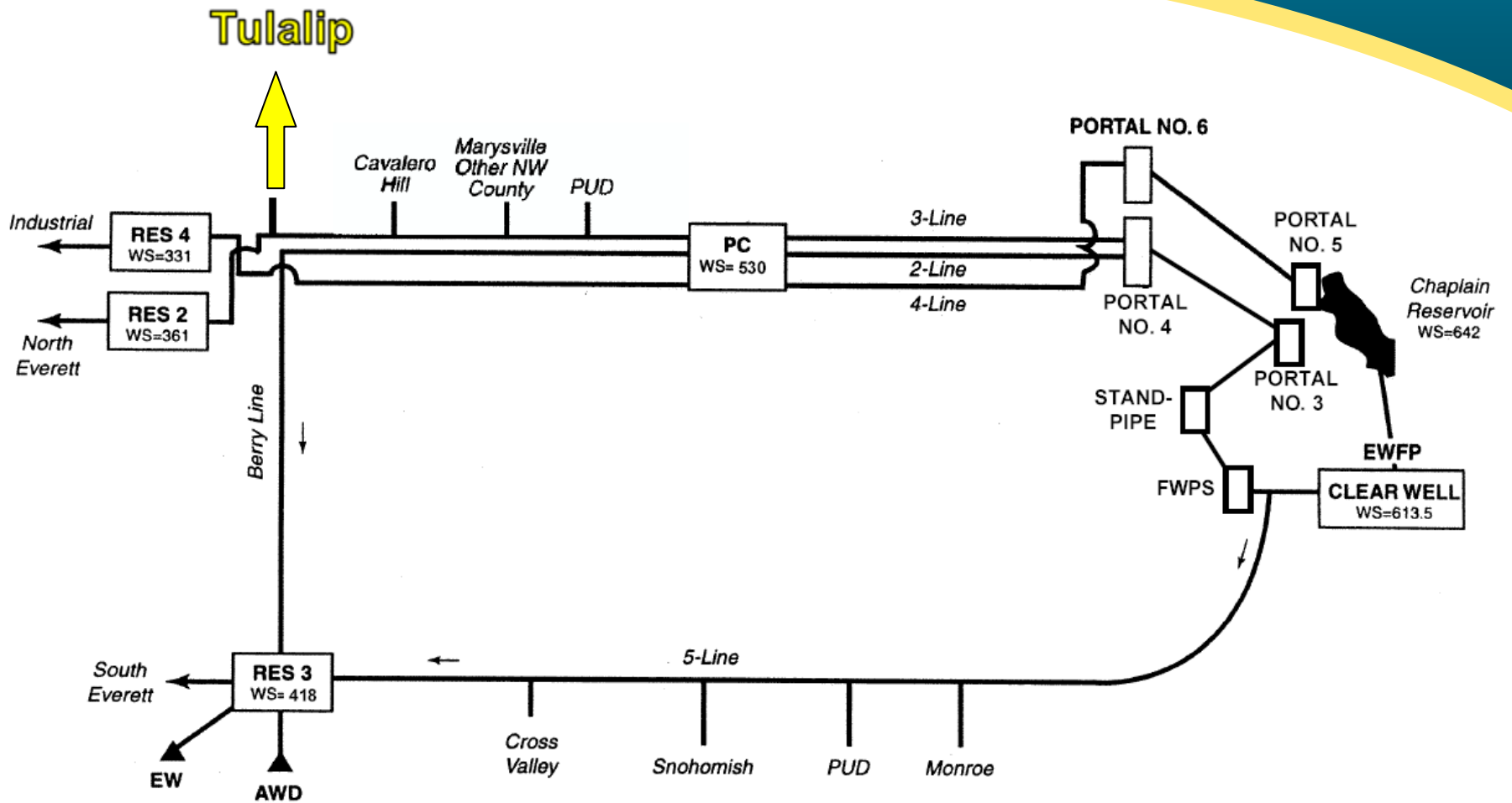
Exhibit 3  
50-Year Water Demand Projections with Streamflow Augmentation by Year



- TWP to meet Reservation water demands over the next 50 to 100+ years
- Includes an allocation of up to 10 mgd to augment flows in fish-bearing streams
- Potential Flows to other Purveyors

# Pipeline Hydraulics

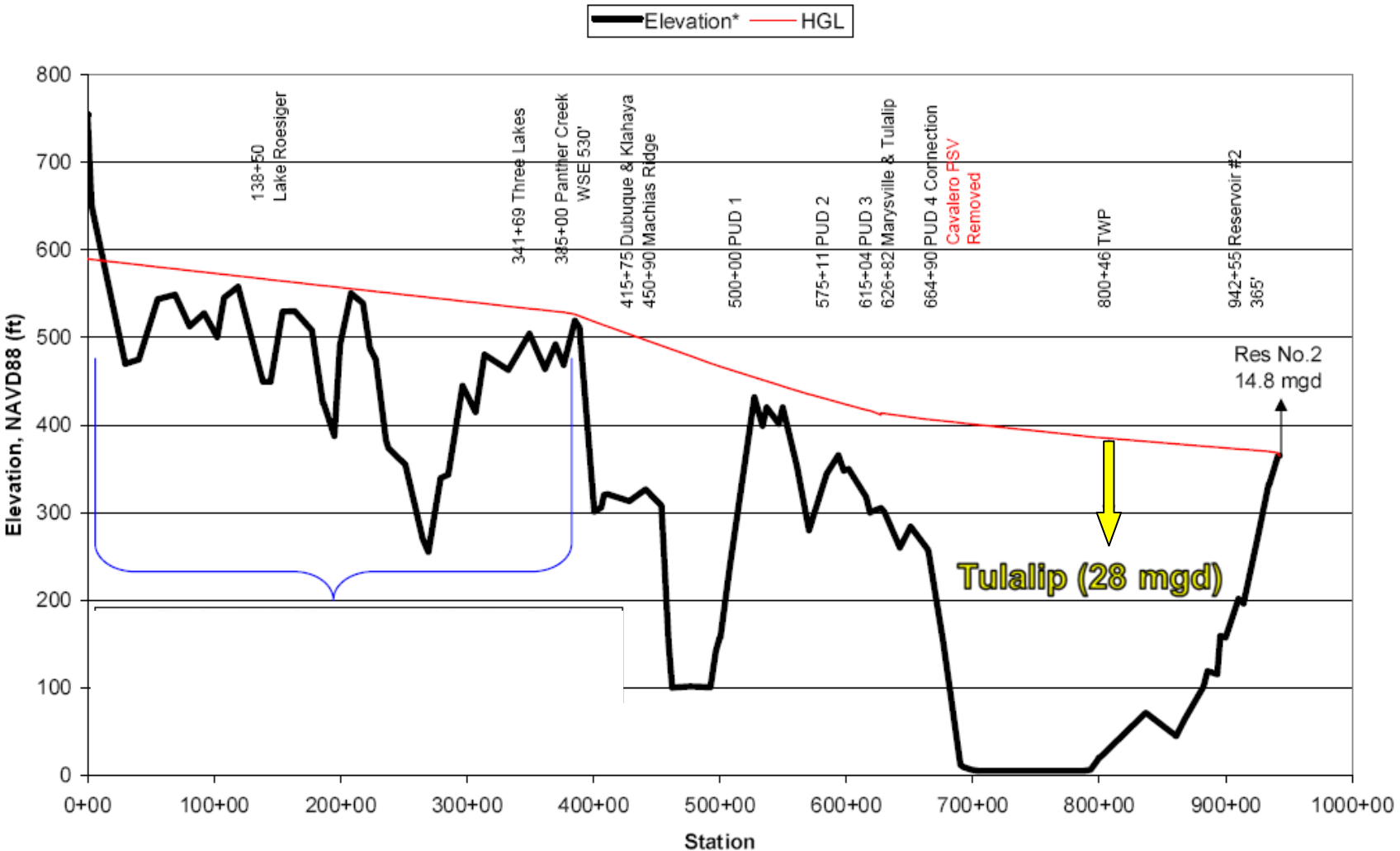
Source - Everett's T L No. 3 (TL No. 2 as reliable backup)



# Pipeline Hydraulics

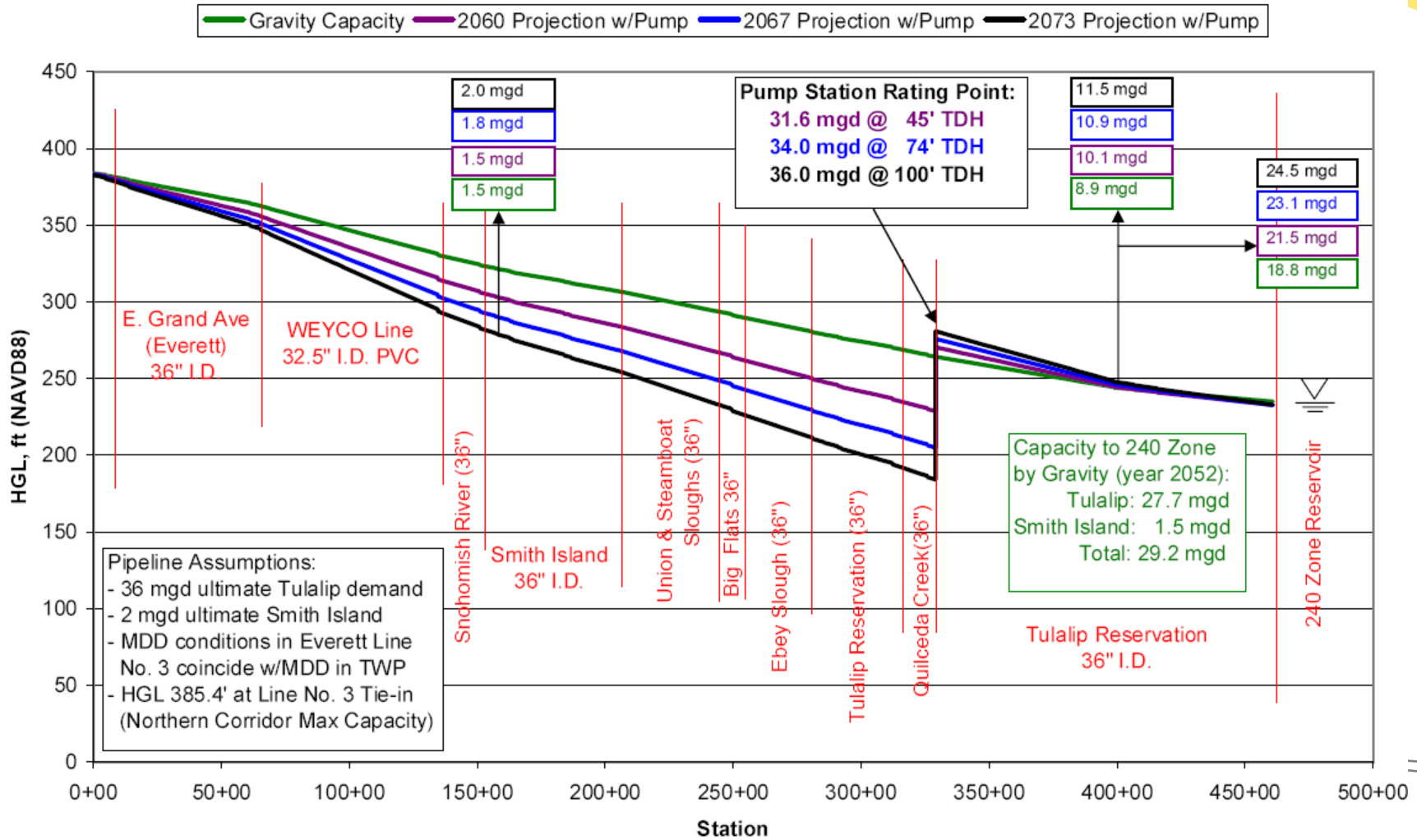
## Source - Everett's T L No. 3 (TL No. 2 as reliable backup)

Transmission Line No. 3 Profile  
at Max Capacity (Without Cavalero PSV), 77.6 mgd Total Flow, 2043



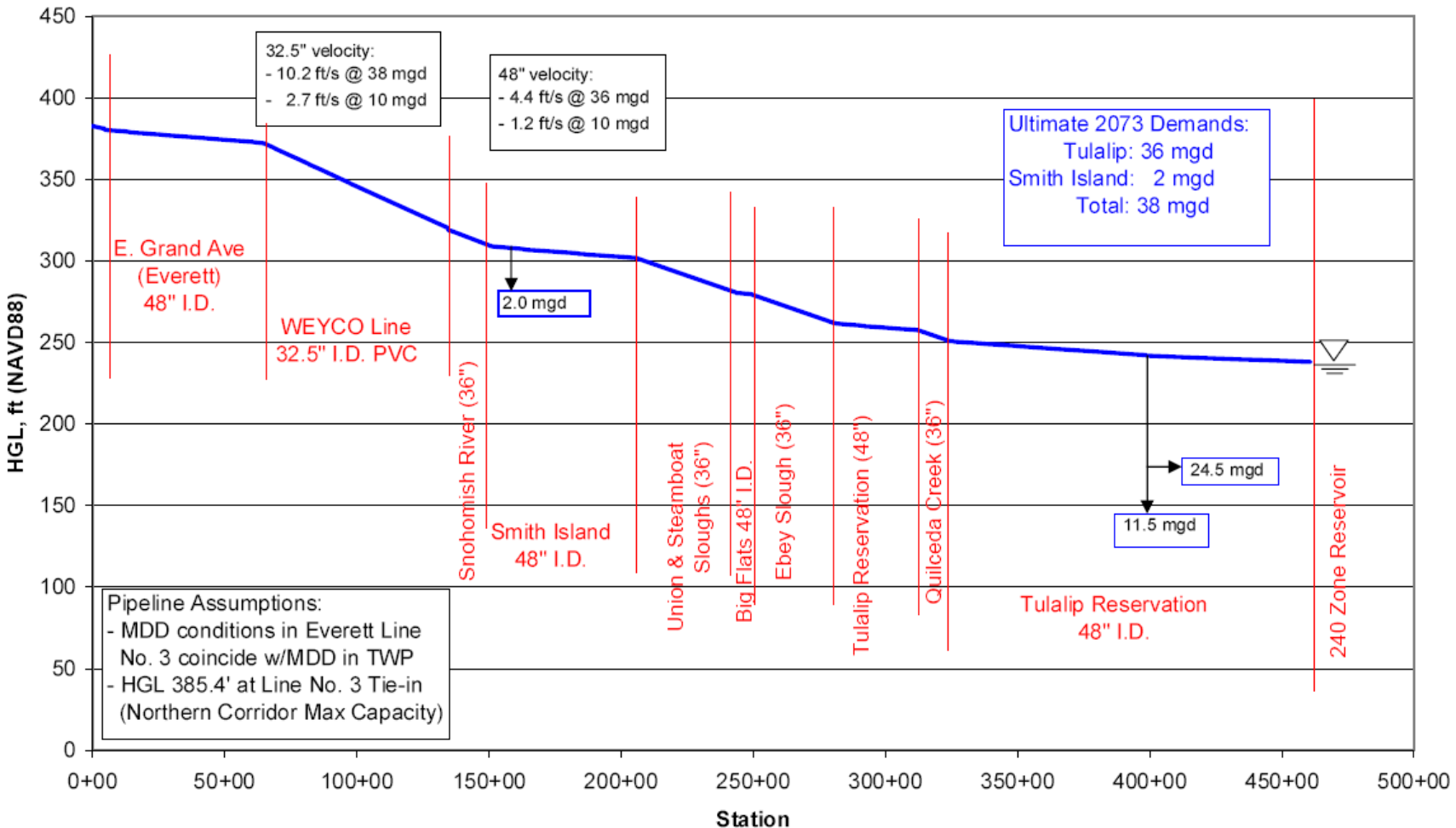
# Pipeline Hydraulics & Sizing Pumped Option

Option 1: TWP Hydraulic Profile with 36" Pipe, 36" Waterway Crossings, and Pump Station



# Pipeline Hydraulics & Sizing (Gravity Option)

Option 2A: Tulalip Water Pipeline Hydraulic Profile  
48" Pipe and 36" Waterway Crossings





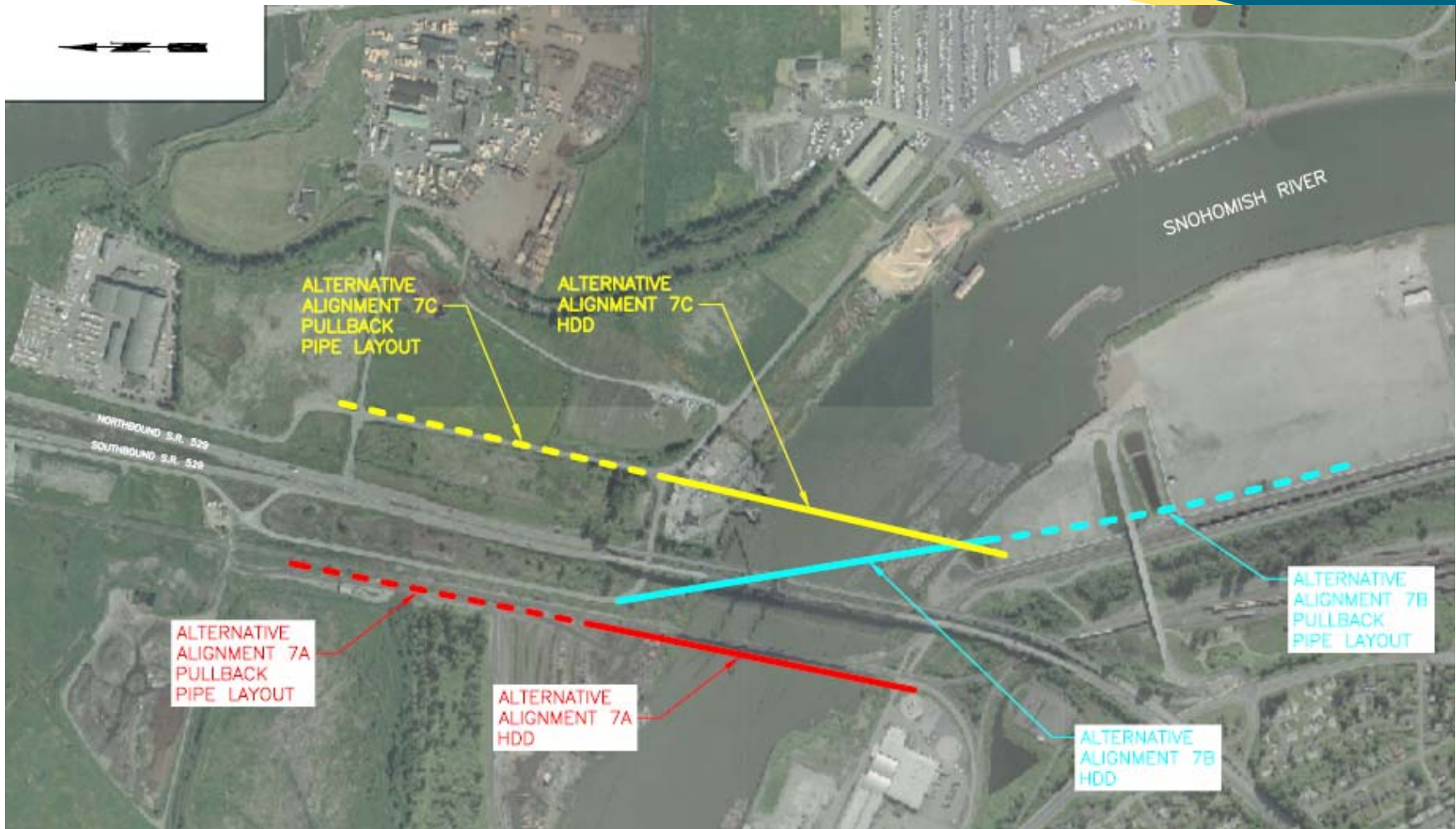
# Alignment Corridor



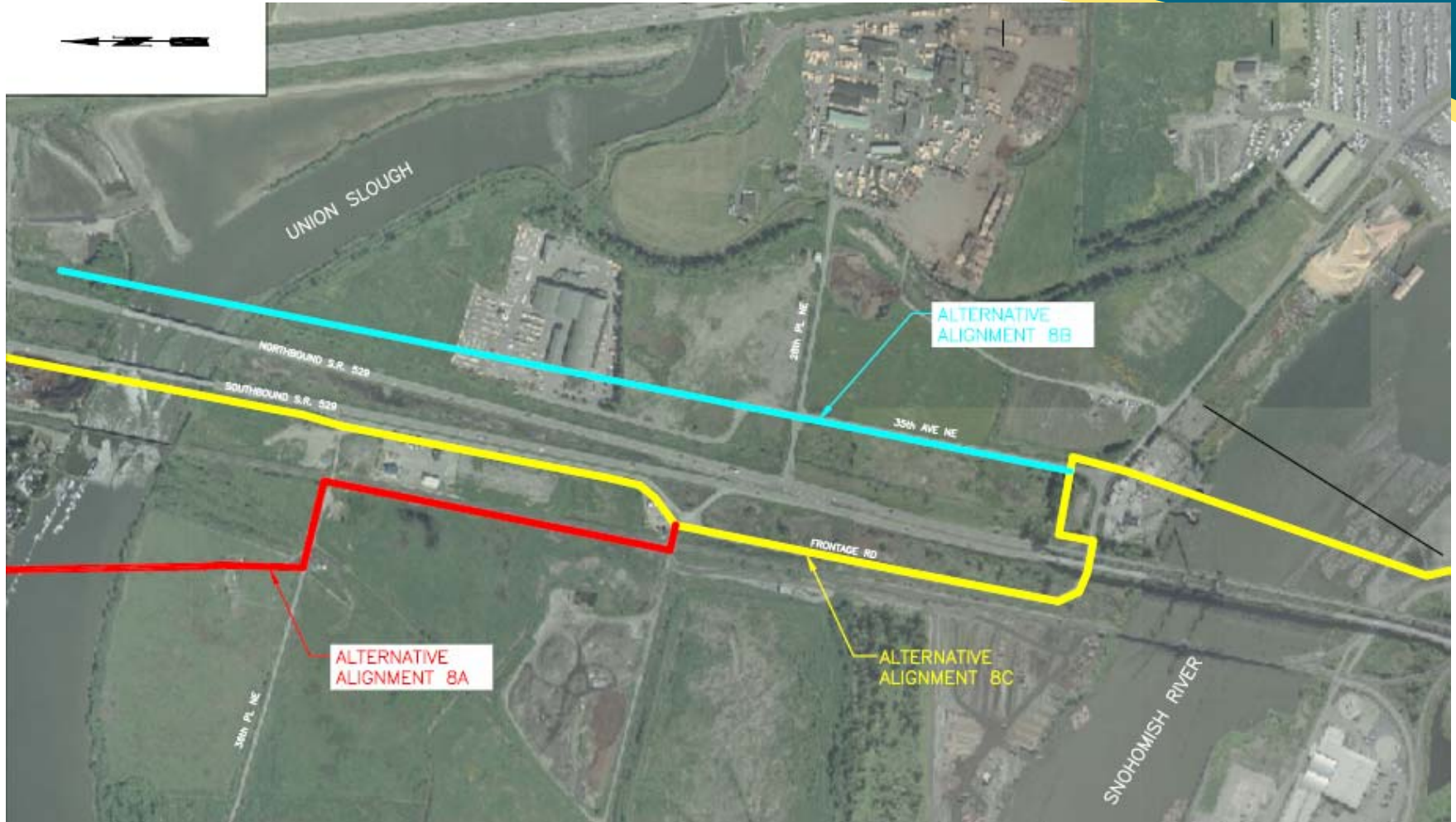
# Pipeline Route Analysis – Evaluated Numerous Alternatives



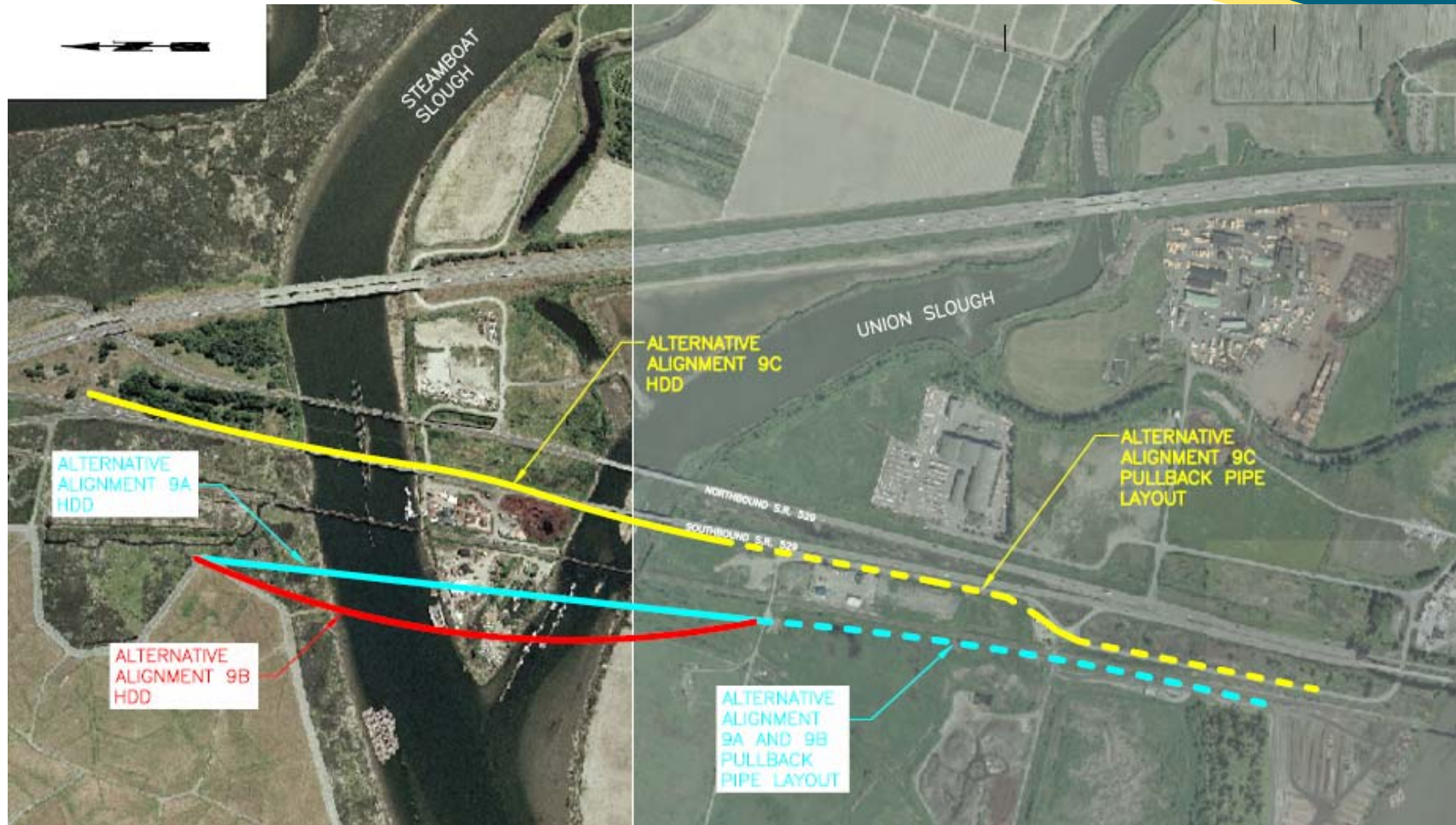
# Pipeline Route Analysis – Evaluated Numerous Alternatives



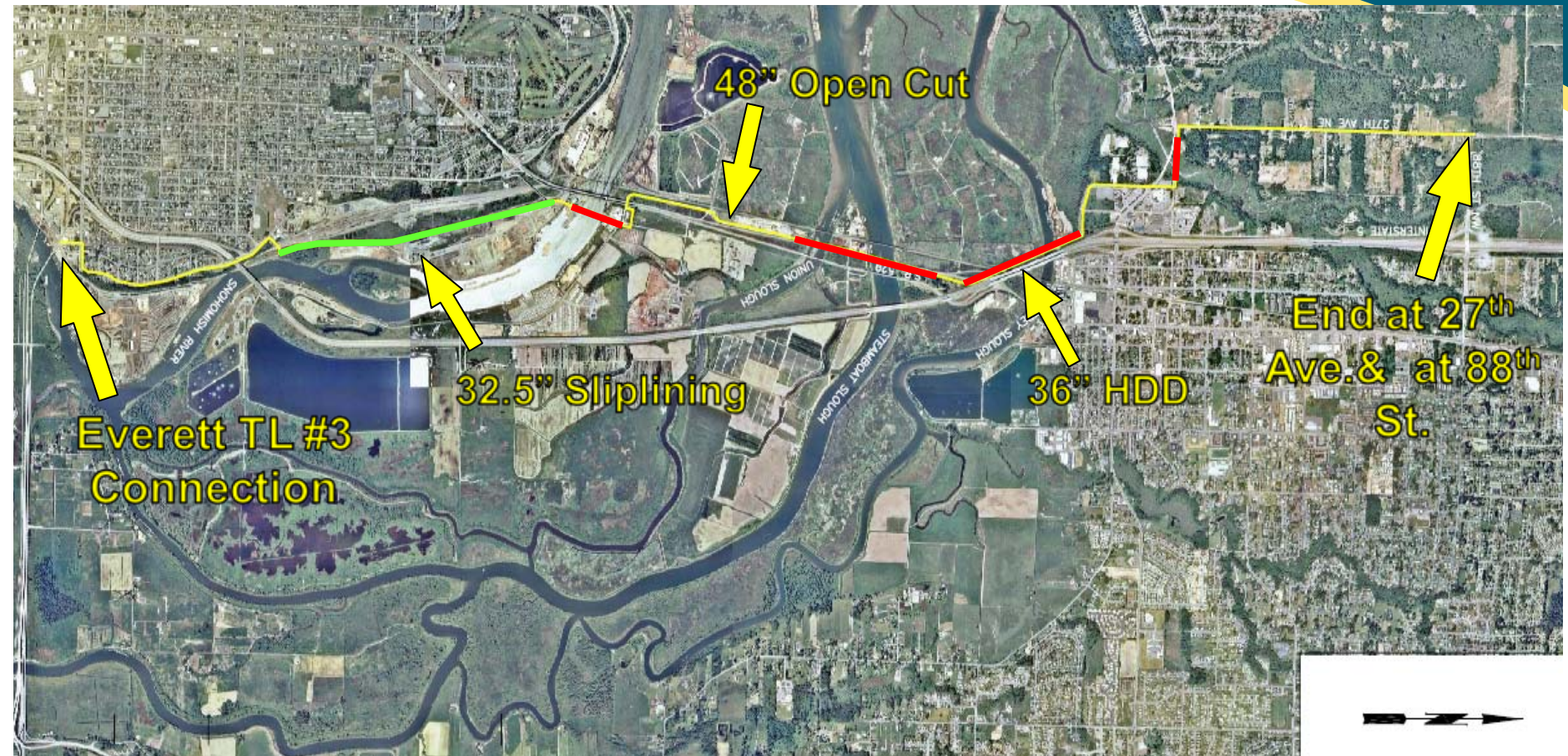
# Pipeline Route Analysis – Evaluated Numerous Alternatives



# Pipeline Route Analysis – Evaluated Numerous Alternatives



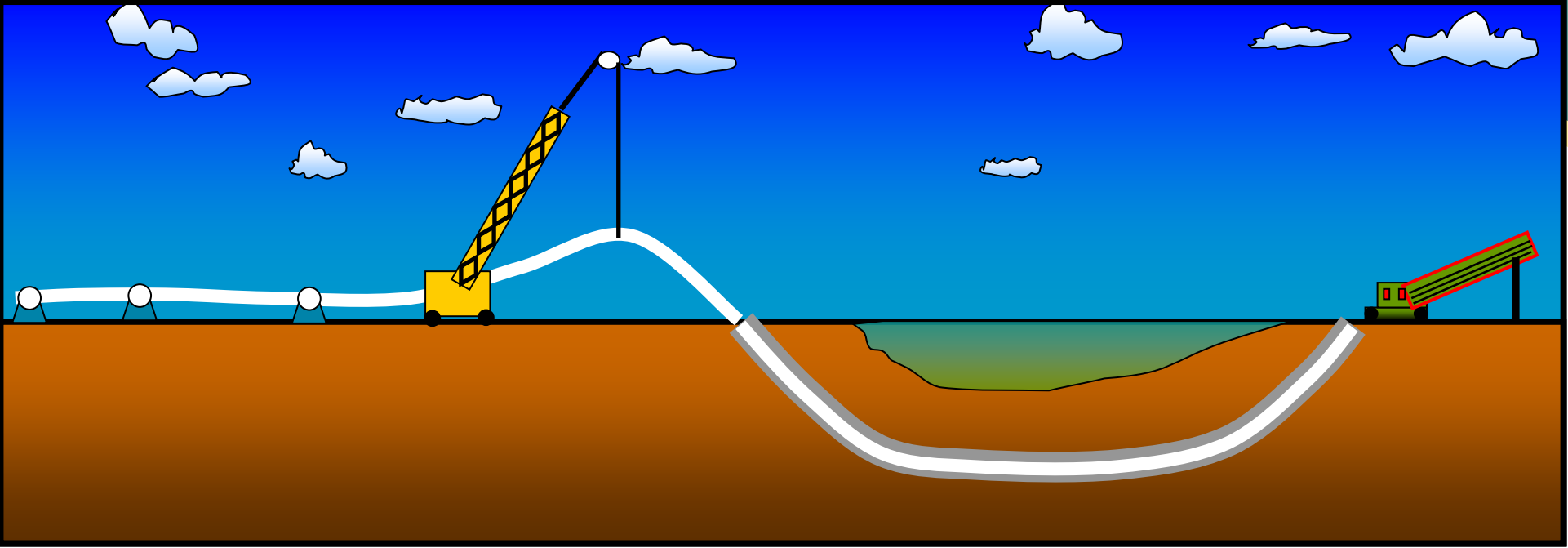
# Final Pipeline Route and HDD Crossings



# Pipeline Route- ROW / Easements

- 
- Utilizing existing ROW where feasible
  - Approx 29 temp / perm easements off-Reservation
  - Confirm ROW/easements for the portions on-Reservation (Approx 30 +/-)

# HDD Construction





# HDD Construction/Staging



# HDD Construction/Staging



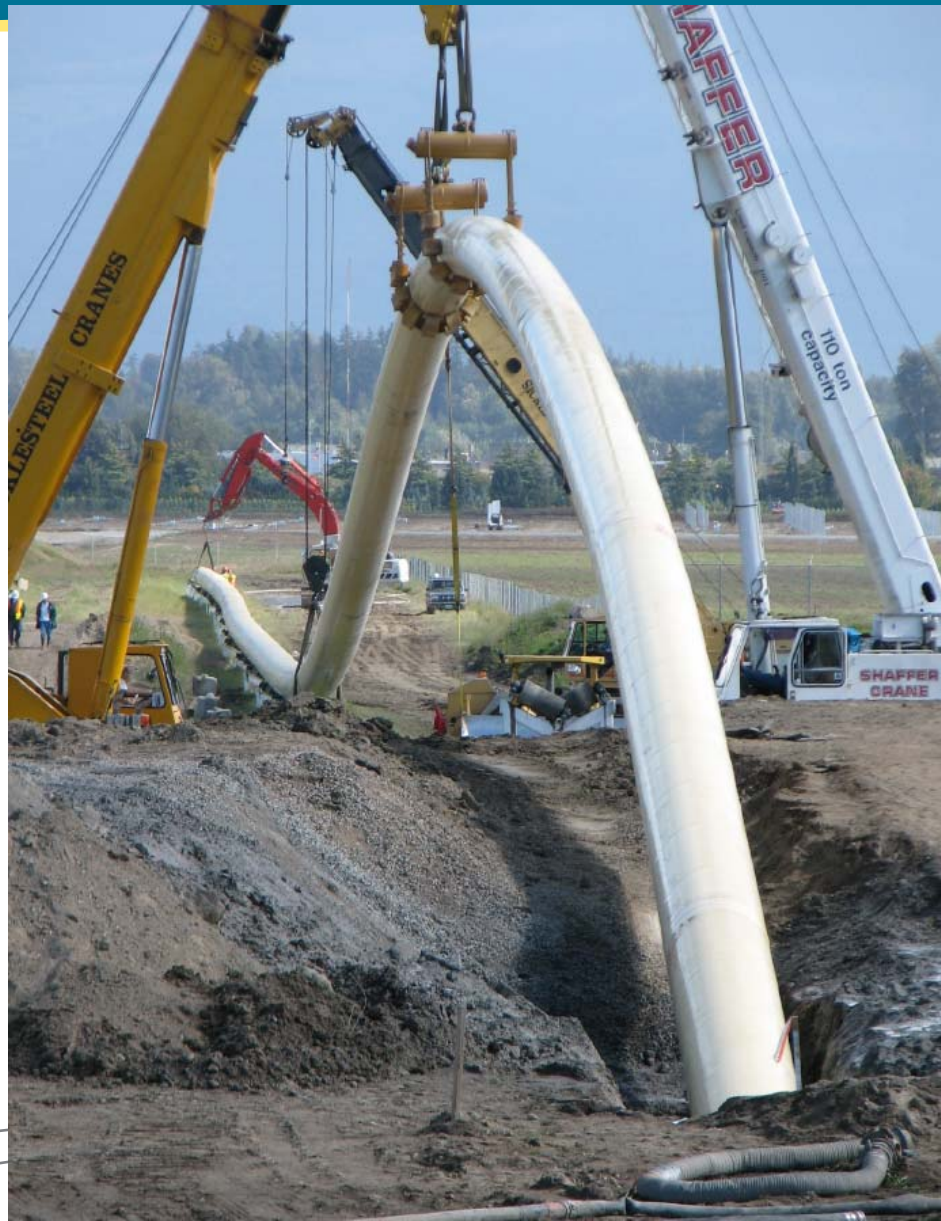
# HDD Construction



# HDD Construction

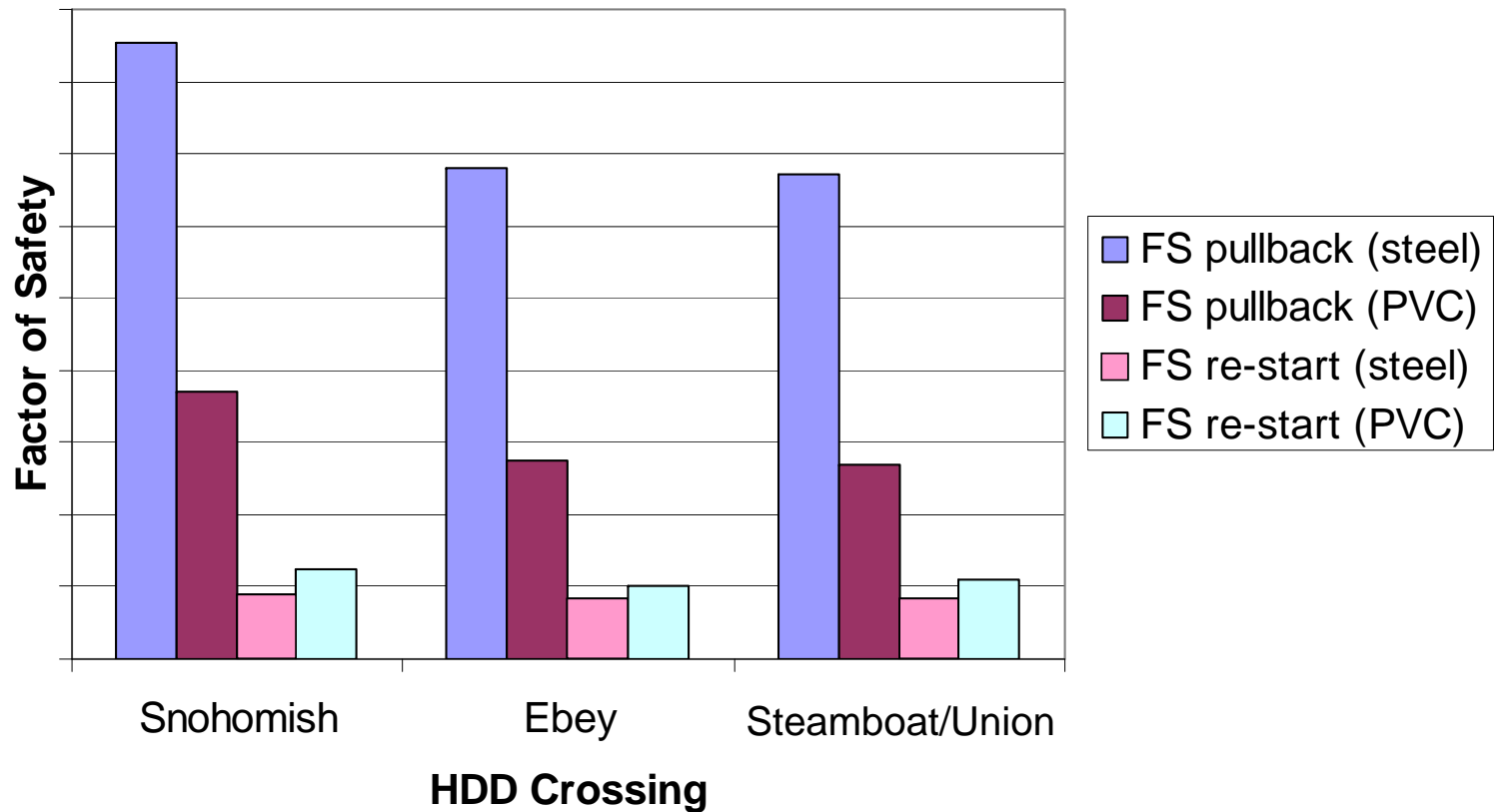


# HDD Construction



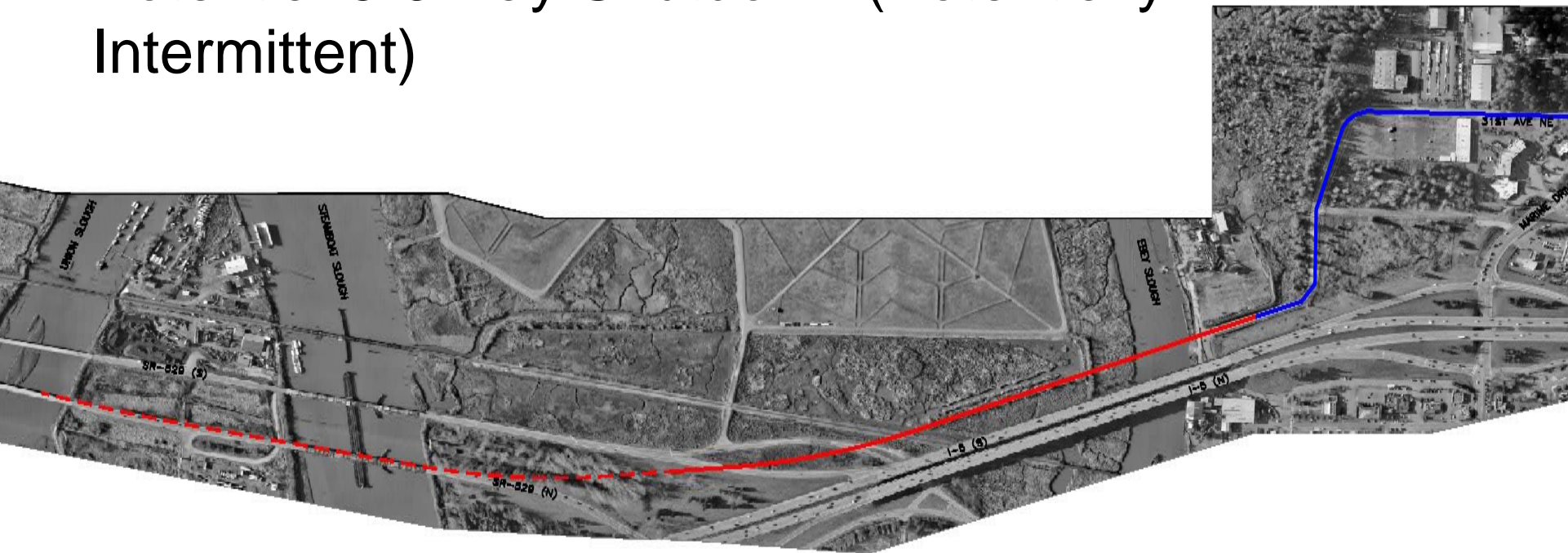
# HDD Crossing Factor of Safety Fusible PVC vs. Steel

Comparision - Factor of Safety pullback vs re-start



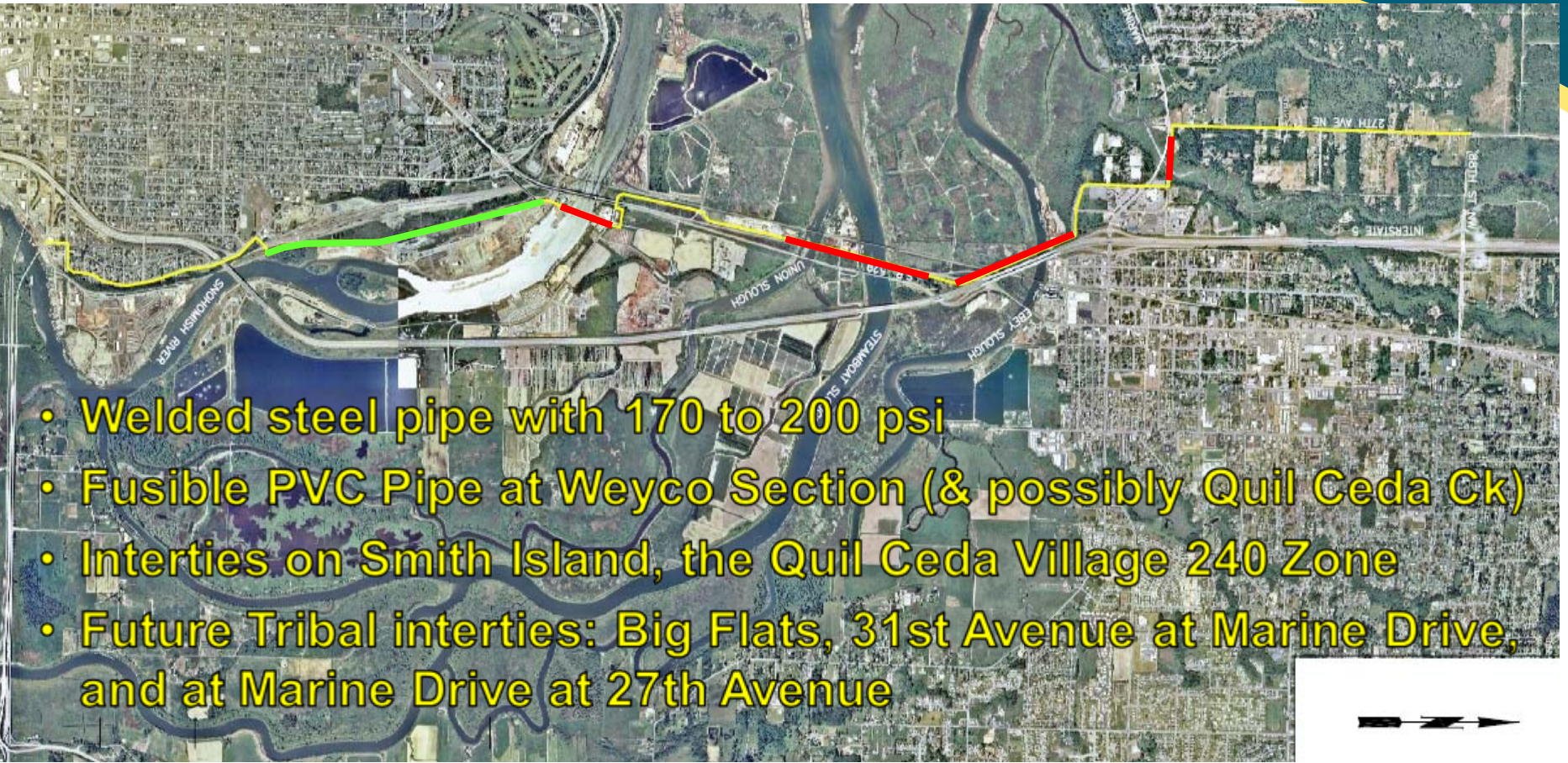
# Ebey Slough Crossing

- HDD Requires Pipe String Layout on Northbound SR 529
- Potential 3-5 Day Shutdown (Potentially Intermittent)



PLAN  
SCALE: 1"=300'

# Pipeline Facilities and Design Criteria

- 
- Welded steel pipe with 170 to 200 psi
  - Fusible PVC Pipe at Weyco Section (& possibly Quil Ceda Ck)
  - Interties on Smith Island, the Quil Ceda Village 240 Zone
  - Future Tribal interties: Big Flats, 31st Avenue at Marine Drive, and at Marine Drive at 27th Avenue



# Geotechnical Considerations

- Geotechnical conditions generally suitable
- Soft soil conditions and high groundwater anticipated
- Welded steel pipe will help mitigate the potential for damage from seismic events



# Environmental and Cultural Resources

- 
- Environmental impacts will be minimized:
    - No permanent filling of any wetlands or in-water work
    - Not likely to adversely affect listed species or their critical habitat
  - Cultural resources:
    - Much of Route - High Potential for encountering cultural resources
    - No cultural artifacts encountered to date

# Permits and Approvals

- Local, Tribal, State, and Federal Regulatory Agencies
- Applications for 12 selected key permits or approvals to date
- Other construction-specific permits obtained during final design
  - WSDOT and BNSF permits are critical
- Compliance with the NEPA and SEPA
  - Work on Reservation and potential Federal funding
  - Requires EA (Finding of No Significant Impact anticipated)

# Interagency Coordination

- Coordination to secure approval by WSDOT
  - SR 529 and other crossings
  - Use of one SR 529 northbound lane (3 to 5 days) for Ebey HDD pullback
- Coordination with BNSF for the WEYCO slipline segment
- Coordination with Snohomish County for Quil Ceda Creek HDD pullback on Marine Drive Sturgeon Creek Bridge

# Project Cost Opinion

## Exhibit 18

Estimated Total Project Cost Summary with Costs Escalated to Year of Expenditures  
Tulalip Water Pipeline Project (48-Inch Pipeline with 36-Inch Waterway Crossings)

DESCRIPTION	YEAR IMPLEMENTED <sup>2</sup>	TOTAL COST (\$ MILLIONS)
Pre-Design	2007/2008	2.00
Final Design and Final Permits/Environmental	2009/2010	5.68
ROW and Easement Acquisition and Permit Fees	2008/2009/2010	0.97
Construction (with 10% Estimating and 10% Scope Contingency) <sup>1</sup>	2012/2013	66.35
Sales Tax and TERO Fee	2012/2013	4.32
Construction Observation	2012/2013	5.97
Administration	2012/2013	1.99
<b>Total Project Costs:</b>		<b>87.3</b>

### Notes:

<sup>1</sup> Construction costs escalated annually at 5%.

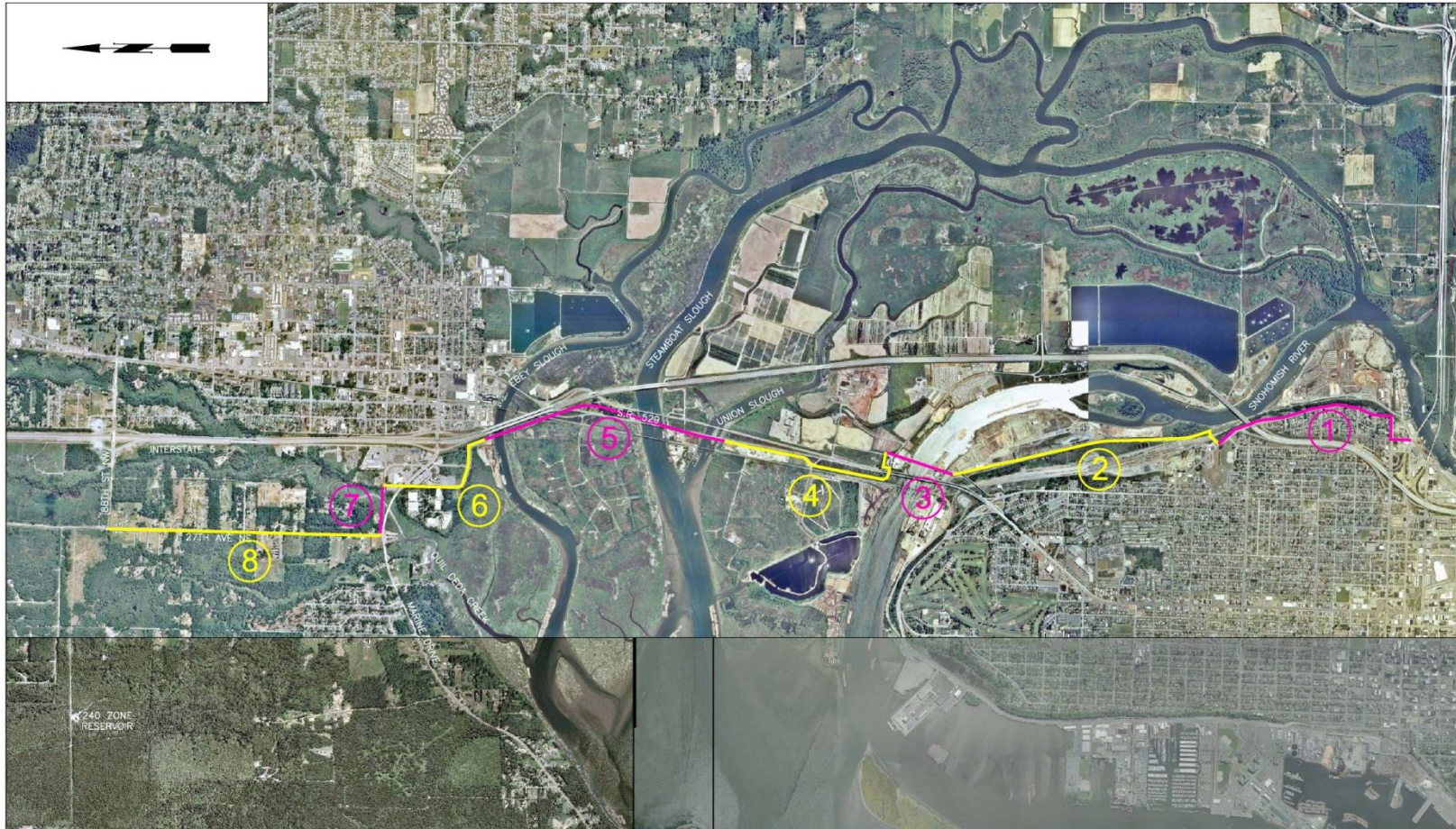
<sup>2</sup> When work is to be conducted over a two-year period, half is escalated to the first year and half is escalated to the second year.

# Project Implementation Plan



- Preferred Delivery: Design-Bid-Build
- Base Case Schedule:
  - Design, ROW and easement acquisition completed by end of 2010
  - Additional year to secure funding (2011)
  - Construction in 2012 and 2013
- If funding arranged earlier:
  - Project construction could be completed by 2012 or sooner

# Project Implementation – Potential Phasing Plan



TULALIP-EVERETT  
JOINT WATER PIPELINE BOARD



FIGURE 1  
TULALIP WATER PIPELINE  
SEGMENTS

SCALE 1" = 1/2 MILE

SHEET 1 OF 1

# Acknowledgements

## **Client:**

- Tulalip/Everett Joint Board
- Tulalip Tribes:
  - Gus Taylor
  - Mac McKinsey
- City of Everett Staff:
  - Jim Miller
  - Souheil Nasr

## **Subconsultants:**

- Parametrix
- Staheli Trenchless Consultants
- GeoEngineers
- Clair Olivers and Associates
- DOWL/HKM
- Northwest Archeology
- Northwest Corrosion

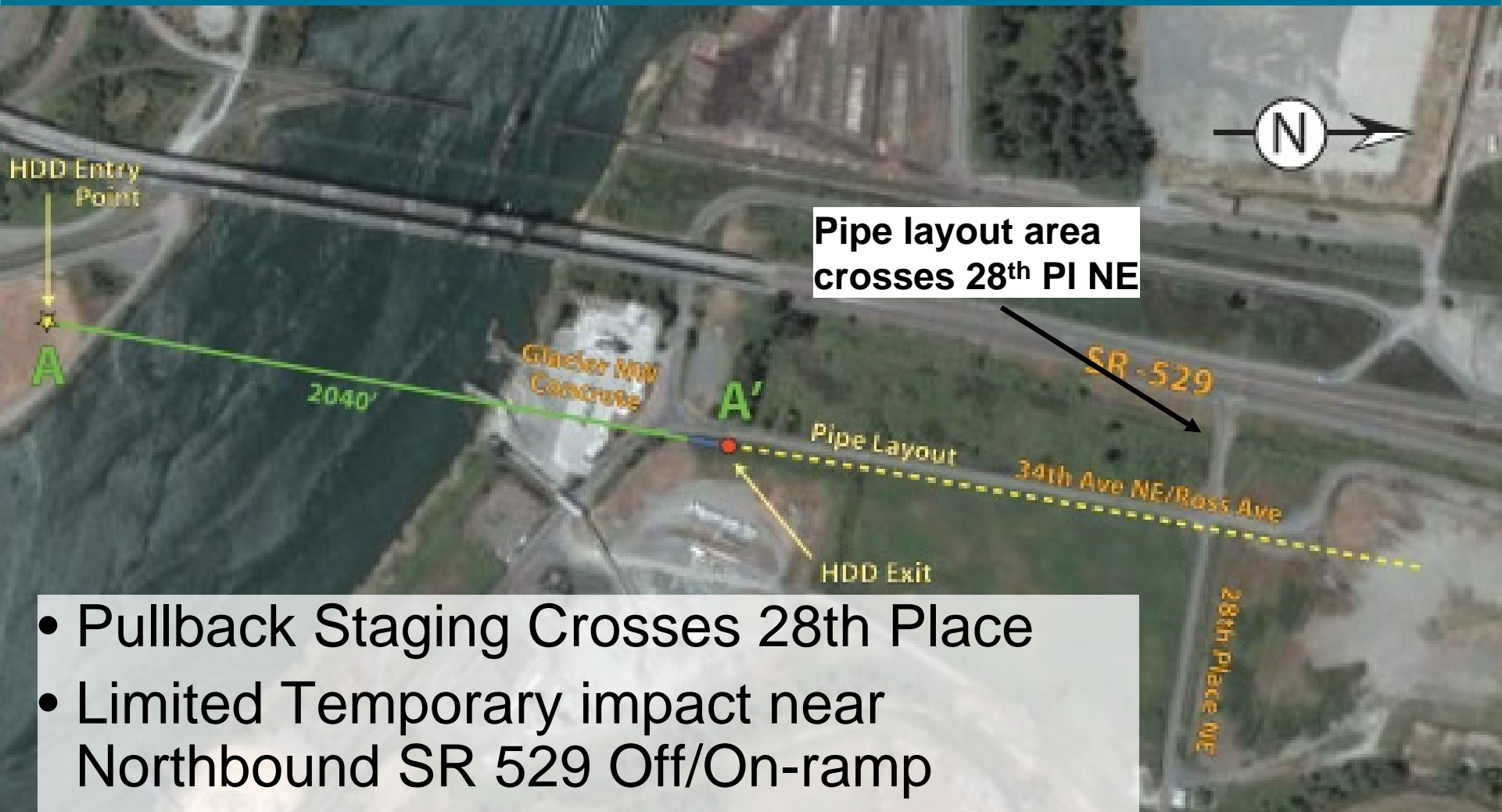
gregory.s.harris@mwhglobal.com







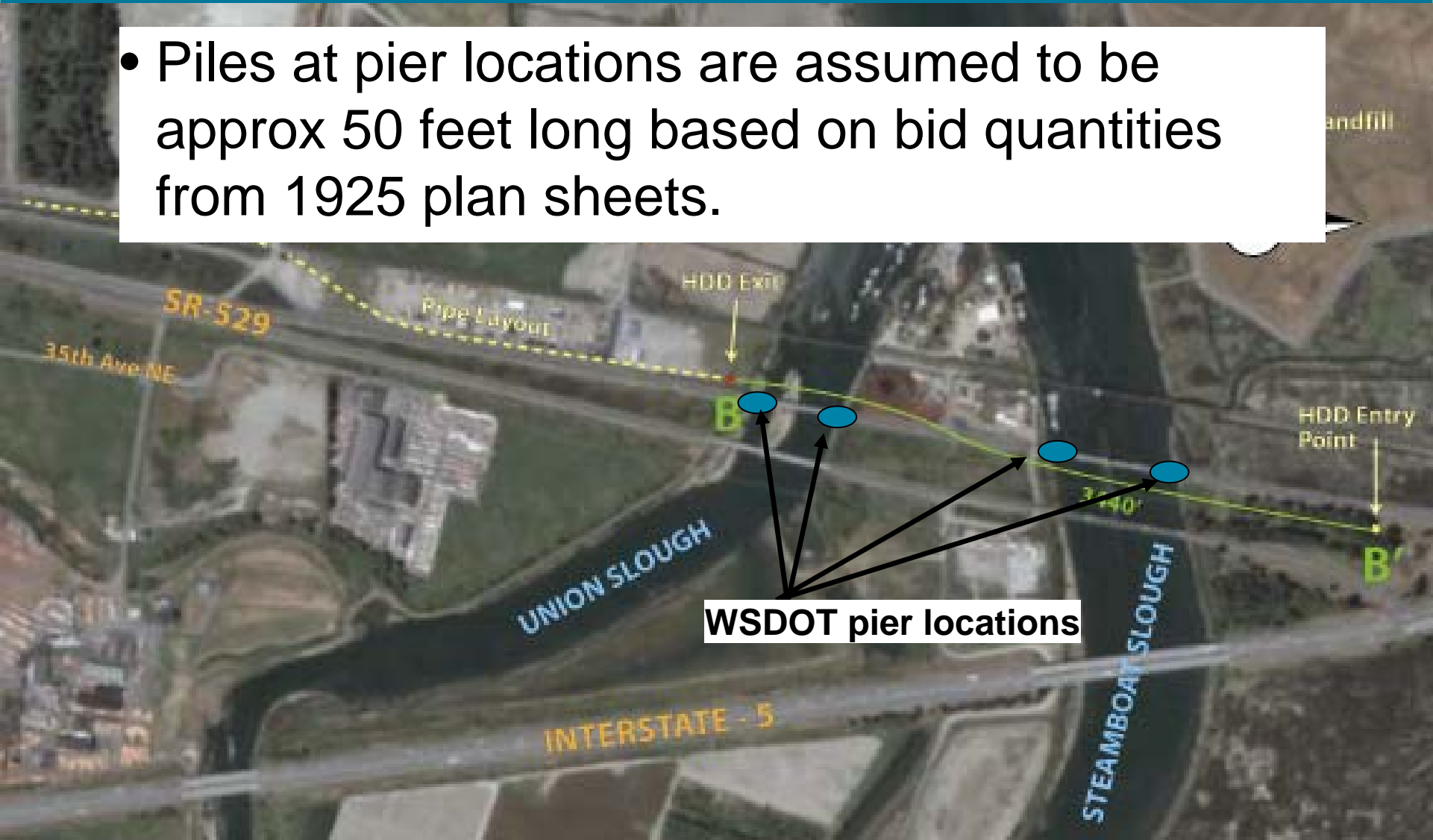
# Snohomish River Crossing



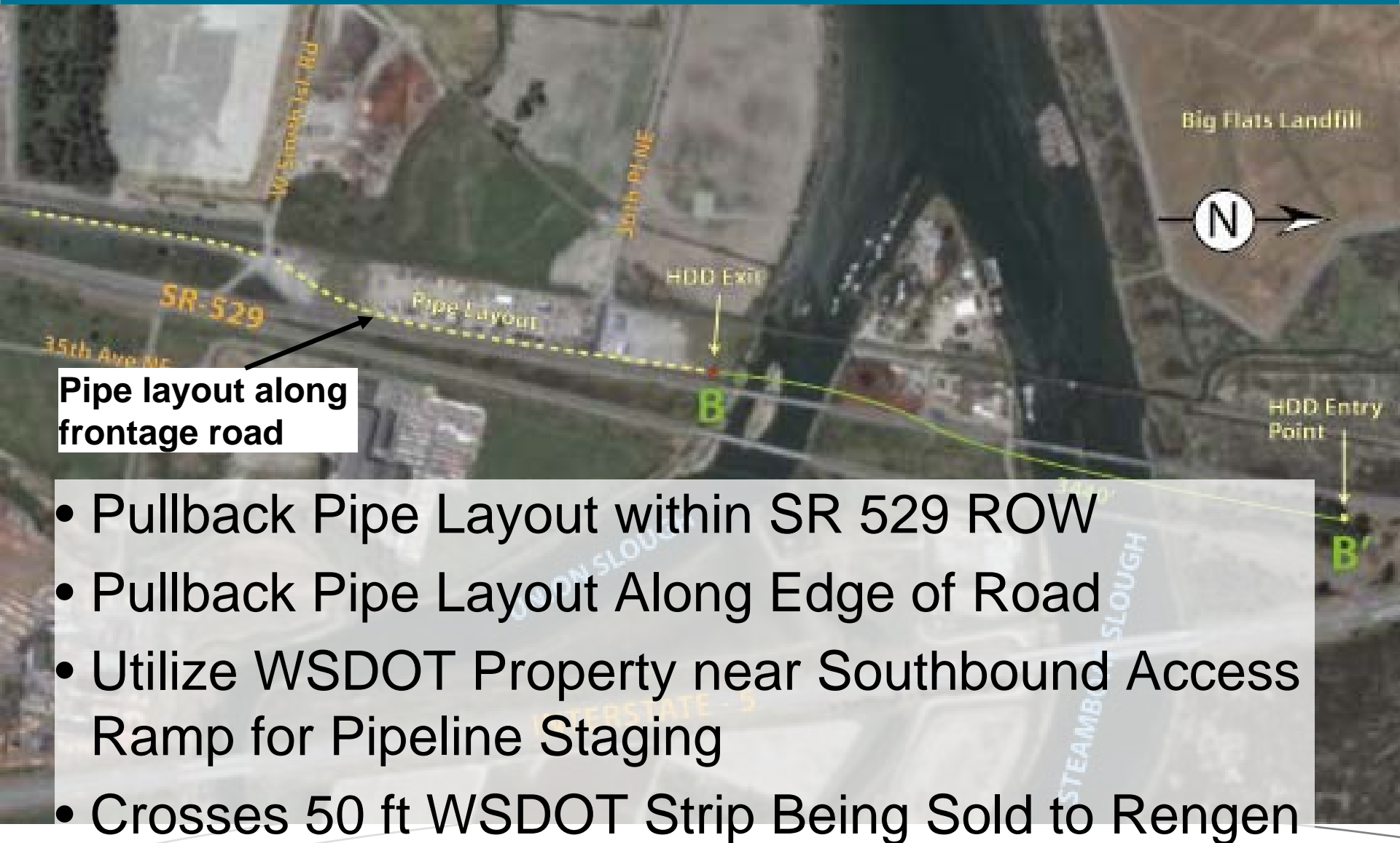
- Pullback Staging Crosses 28th Place
- Limited Temporary impact near Northbound SR 529 Off/On-ramp
- Scheduled to minimize impacts to traffic

# Union/Steamboat Slough Crossing

- Piles at pier locations are assumed to be approx 50 feet long based on bid quantities from 1925 plan sheets.



# Union/Steamboat Pipe Layout



# Pipeline Route Analysis – Evaluated Numerous Alternatives



**LEGEND**  
 FILTER FABRIC FENCE ————  
 ROAD CLOSURE ————  
**NOTE:**  
 PULLBACK PIPE RADIUS ASSUMED 36" DIA STEEL PIPE

DATE	TIME	BY	REVISION

DATE: 11-17-2009  
 TIME: 10:00 AM  
 BY: [Signature]  
 REVISION: 1

**TULALIP-EVERETT JOINT WATER PIPELINE BOARD**



TULALIP WATER PIPELINE PROJECT  
 MWH

EBEY SLOUGH HDD EXIT BORE ALTERNATIVE 1 PLAN SOUTH PULLBACK PIPE IN 1 SECTION

Sheet No: 10-3