UCT THE Event For The Utility Infrastructure Industry
Underground Construction Technology
International Conference & Exhibition

Underground Construction Technology International Conference & Expo

You Just Lost 25% of Your Raw Water…Now What?

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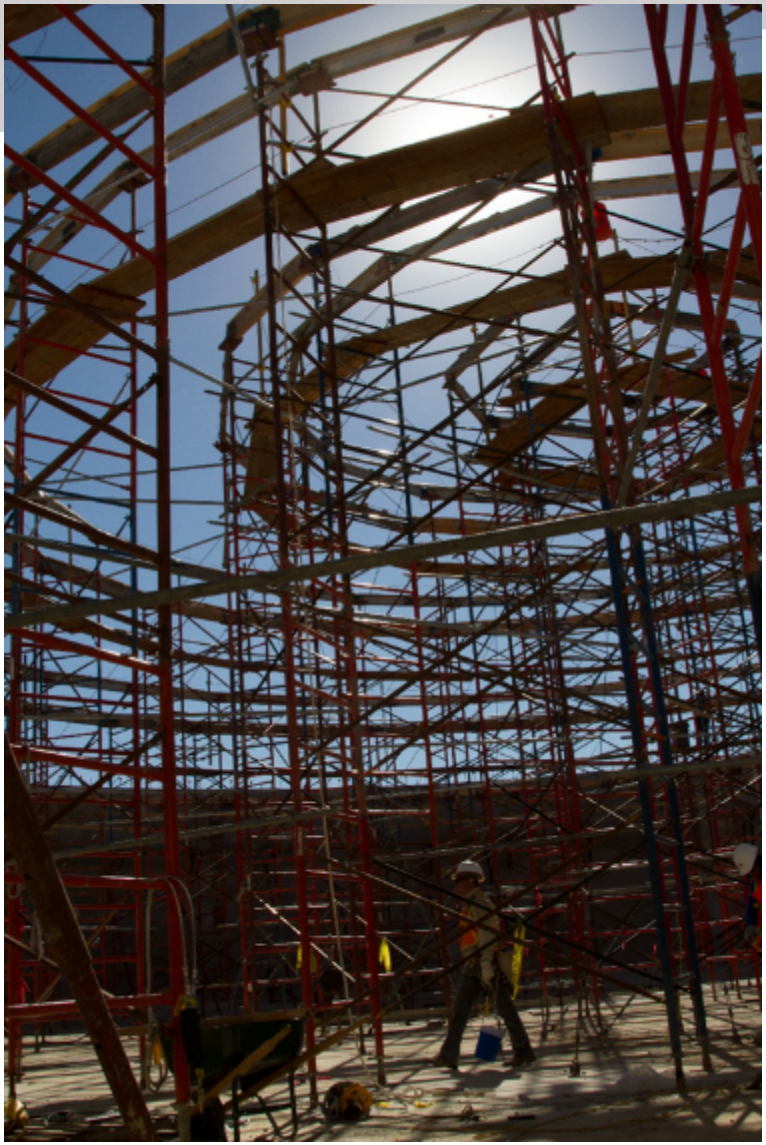
1/31/17

FREESE AND NICHOLS

Outline

- Owner Background
- Project Need & Initial Scope Development
- Project Delivery - CMAR
- Final Design – Technical Components
- Q&A



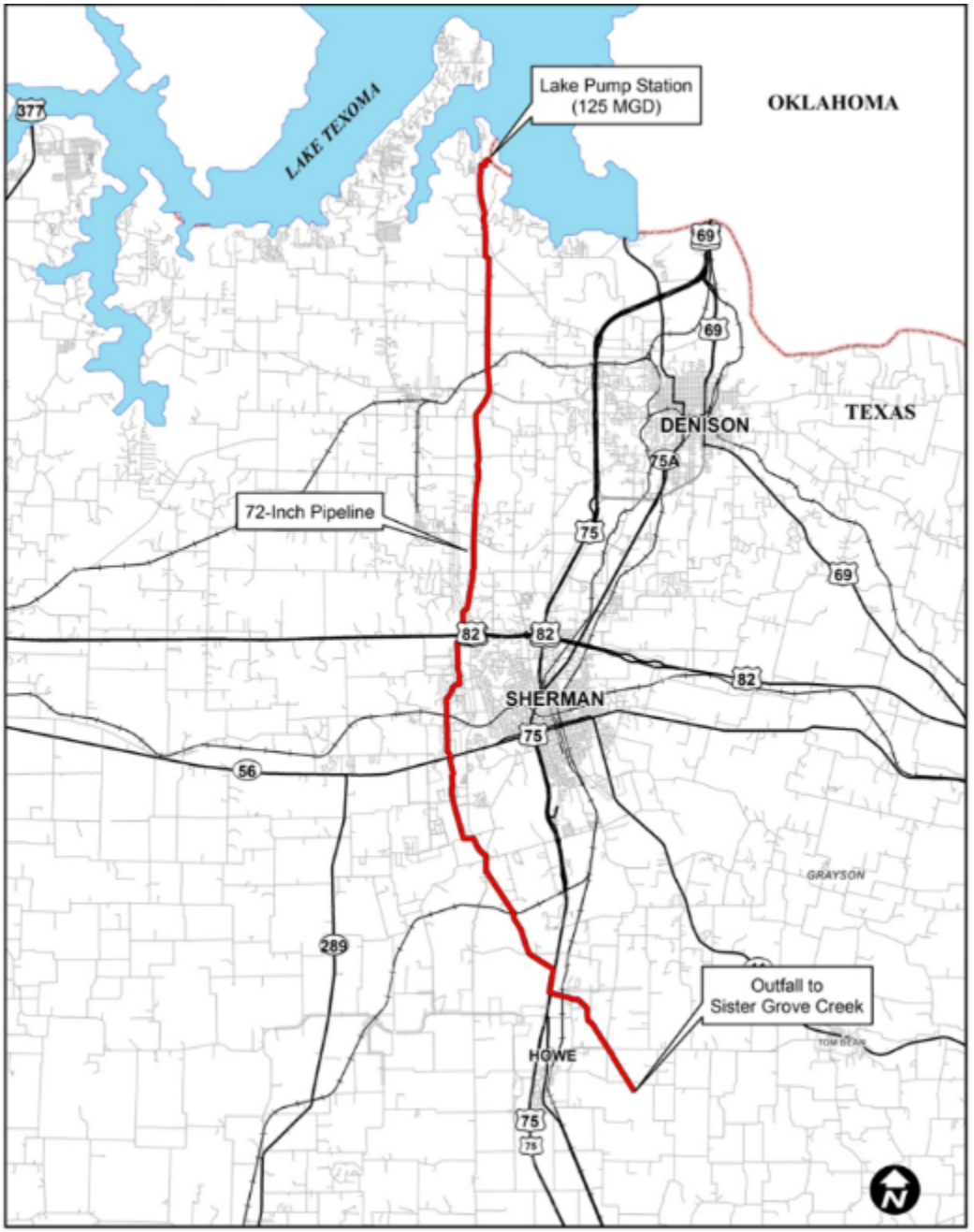

NORTH TEXAS MUNICIPAL WATER DISTRICT
BY THE NUMBERS
SERVE 90 COMMUNITIES
Service area of 2,200 square miles in 10 counties
Serving 1.6 million people in one of the fastest-growing regions in the country
DID YOU KNOW?
14
WATER PUMP STATIONS
6
WATER TREATMENT PLANTS
806+ MGD (million gallons/day) capacity
566 MILES
WATER TRANSMISSION PIPELINES
250+ MILES
LARGE-DIAMETER WASTEWATER PIPELINES
14
WASTEWATER TREATMENT PLANTS
151+ MGD
WASTEWATER TREATMENT CAPACITY
MGD (million gallons/day)
3 TRANSFER STATIONS
up to 3,295 tons of solid waste/day
800,000+
tons/year accepted at landfill

Project Need

- Lake Texoma
  - 25% of NTMWD raw water supply
- Prior to 2009; up to 125 MGD to Sister Grove Creek and on to Lavon Lake
  - Lake Pump Station
  - 30 miles of 72-inch pipe to outfall
  - 25 miles of creek flow to lake
- 2009 Zebra Mussel Discovered – All pumps stopped
- Regain access to water

Zebra Mussel

Lake Texoma Water Supply System prior to 2009



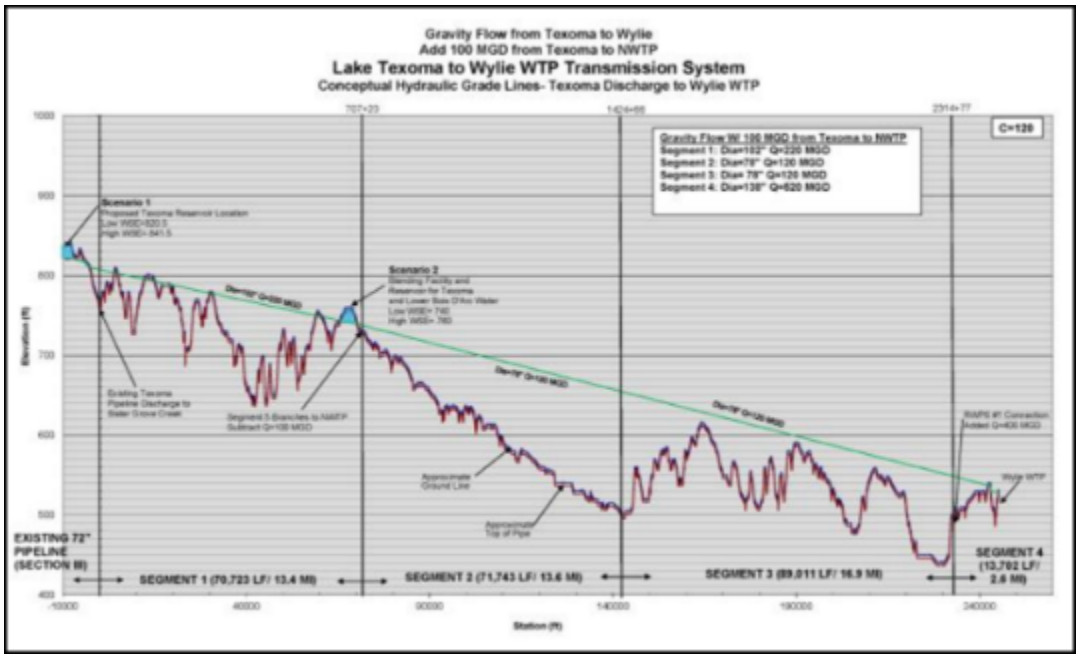
Initial Scope Development

- Project Status: Mid-Sept 2011
  - This is a big project!
  - What exactly are we building?
  - Whatever we build we need it fast!

Lavon Lake – Low Elevations
Source: Dallas Morning News

Initial Scope Development

- Over 2 Weeks –
  - Mile-wide pipeline corridor established
  - Initial hydraulic profile established – gravity flow!
  - Need for a balancing reservoir established
  - We need to connect to the WTP, but how?
- Initial construction budget: $243M
- Initial completion date: August 2013
- Design Start: Oct 1, 2011



Preliminary HGL

Project Delivery

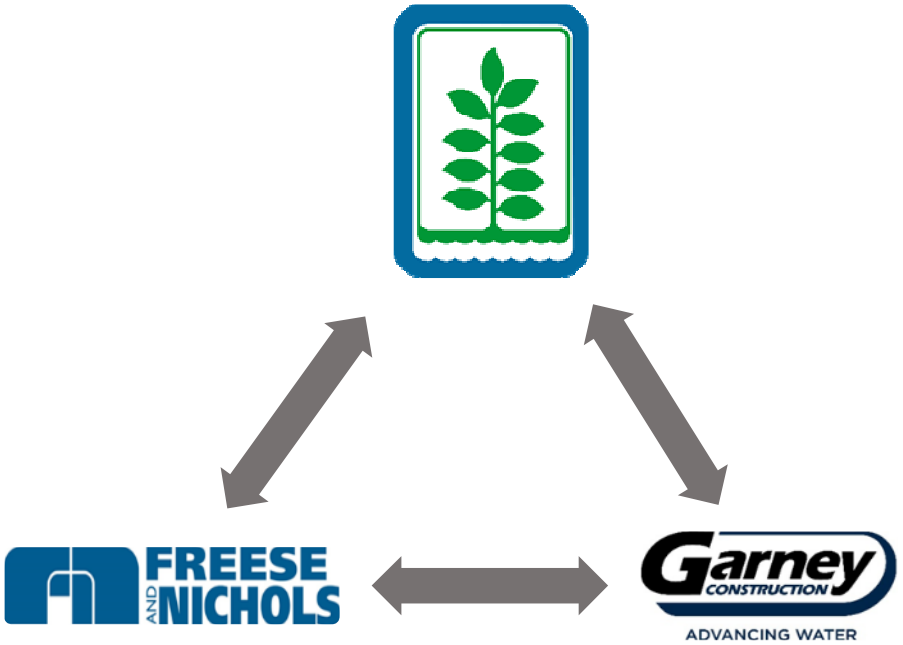
- Traditional Design-Bid-Build would not meet Schedule
- Alternate Delivery Methods Analyzed
  - Modified Design-Bid-Build
  - Design-Build
  - Construction Manager at Risk

Project Delivery

- Results of Project Delivery Analysis
  - Modified DBB – ruled out
  - Design-Build – ruled out
  - CMAR - recommended
- CMAR Advantages
  - Best chance of meeting schedule
  - Manage pre-purchase
  - Pre-construction services
- Easement Acquisition

CMAR Lessons Learned

- **Create a Team!**
  - Project Objectives w/ Corresponding Metrics
  - Tailor Engineering Contracts to CMAR
  - Clear Roles & Responsibilities
  - Clear Channels of Communication
  - Break Down Traditional Contractor/Owner Barriers
  - Open & Honest Communication

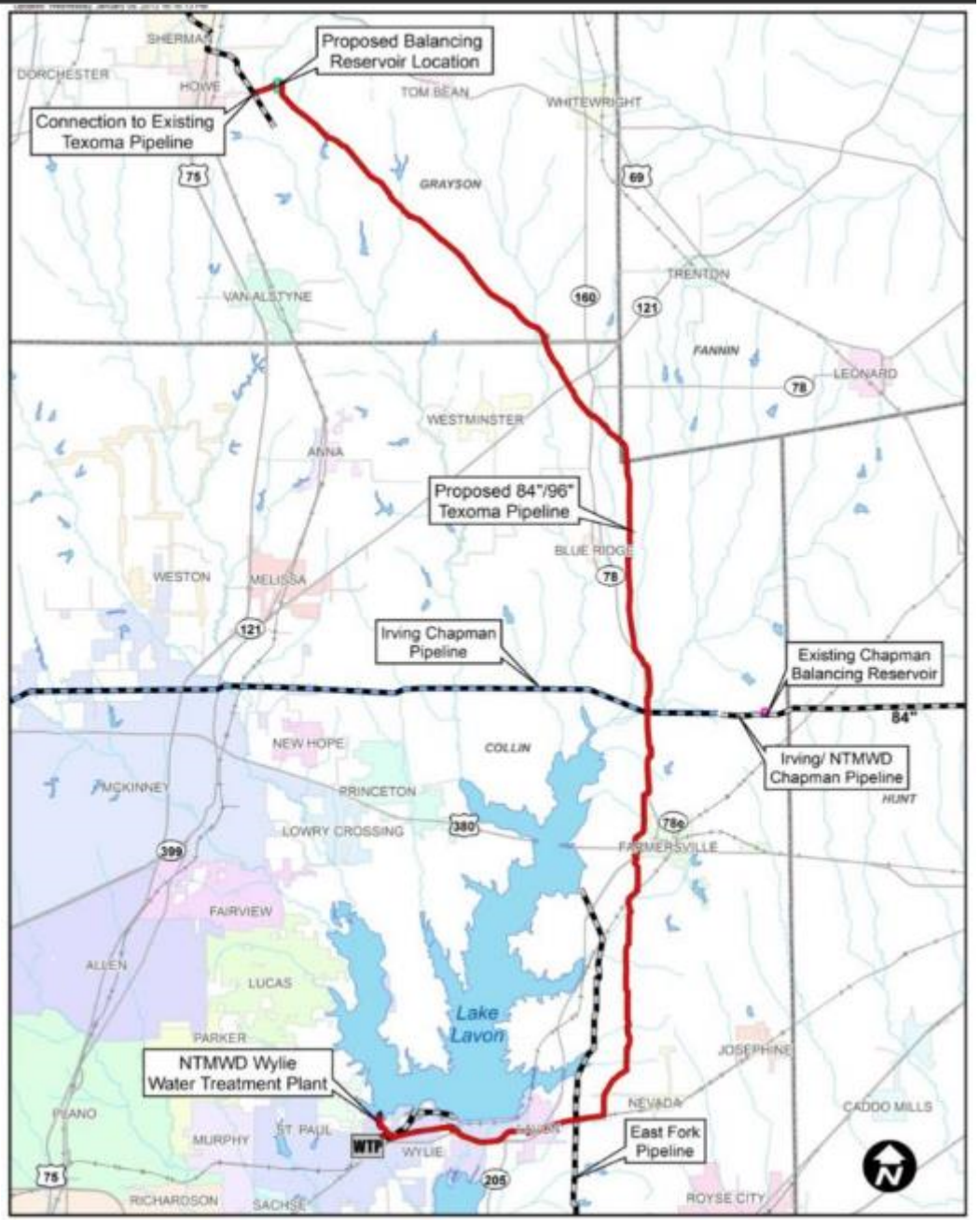


Final Design – Technical Components

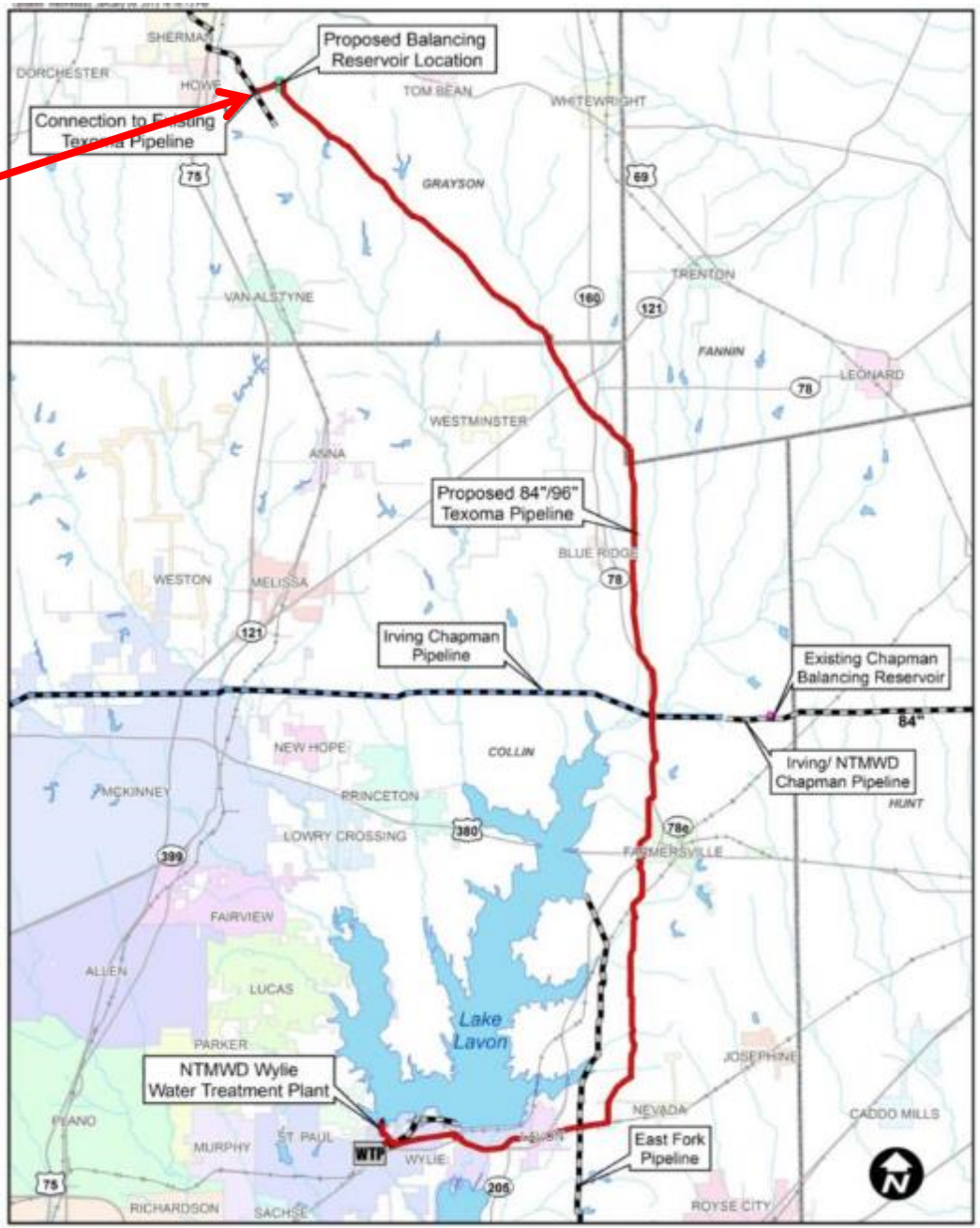
- Balancing reservoir
- 48 Miles of pipeline
- Interconnections w/ other raw water sources
- Connections to the water treatment plants
- Invasive species considerations

Section A (96” Diameter)

Proposed Extension to Lake Texoma Water Supply System

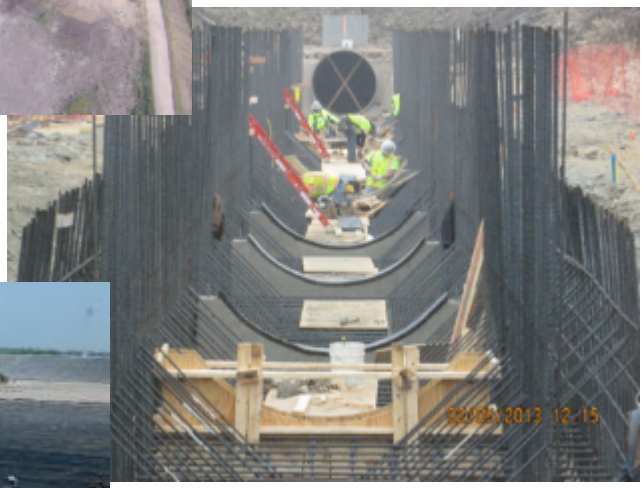


Balancing Reservoir



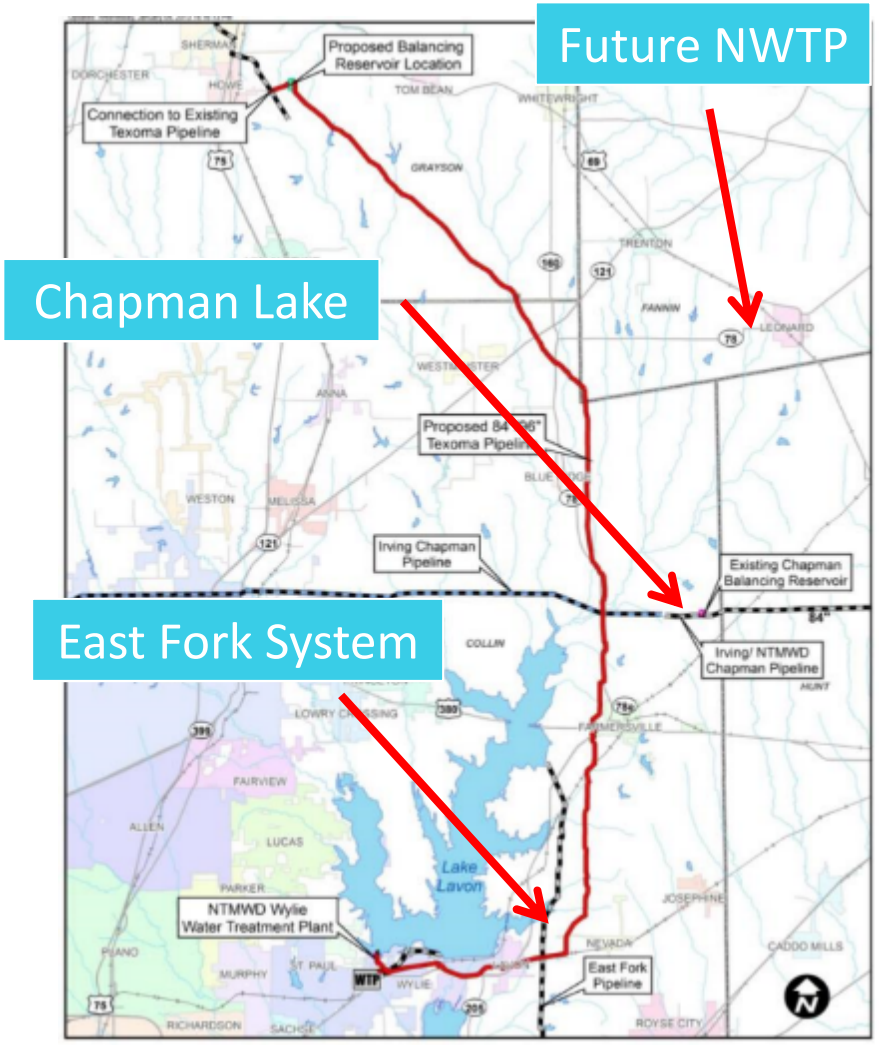
Technical Components – Balancing Reservoir

- Volume: 240 MG
- Siting Analysis
  - River basin considerations
  - Could not modify existing system hydraulics
- Design
  - Earthen embankment
  - Soil cement liner
  - 2-cell design



Pipeline & Interconnections

- Diameter optimization
- Interconnections
  - Added benefit to project
  - Mitigates Lavon Lake risk
- 84-inch needed for Texoma water
  - 96/84-inch ultimately chosen to accommodate interconnections
- 5 Sections – 4 contractors



Technical Components - Pipeline

Section B Rock Trench

Technical Components - Pipeline

Technical Components – WTP Connections

- Greatest unknown
- 4 Treatment Plants
- Establish an "Air Gap"
- Maintain blend ratio
- Major Components
  - 15,000 LF of 60-78" Pipe
  - 5 ground storage tanks
  - Flow control structures
  - Chemical flow pacing
- 5 major construction contracts

Technical Components – Invasive Species Considerations

- Invasive Species Plan developed
- The pipeline is the barrier
- Phased approach of more intense preventative measures planned
  - Chemical
  - Mechanical cleaning

Zebra Mussels Inside 72-Inch

Questions?