

# Microtunneling to the Rescue: Increasing Capacity of Aging Interceptor Sewers in Irving, TX

## City of Irving:

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# Agenda

- Location
- History
- Initial Design Concept
- Final Alignment & Associated Design Elements
- Microtunnel Design
- Construction Progress



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# Irving, Texas

- Located in the 4<sup>th</sup> largest Metroplex
- Next to DFW International Airport
- Population: 263,720 and growing
- 2<sup>nd</sup> largest employer in Metroplex
- “Headquarter of Headquarters”
  - 8 Fortune 500 Co. headquarters
- Irving Water Utilities
  - Own major water supplies
  - About 1500 miles of pipe



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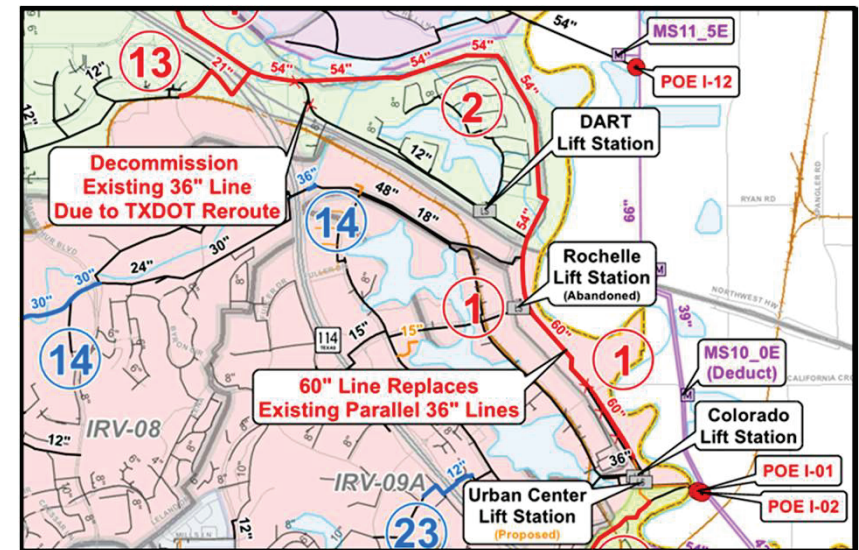


# Project Drivers

- Need increased capacity due to growth
- Need reliable wastewater system



*Urban Center Area*



*Irving's Wastewater Master Plan*



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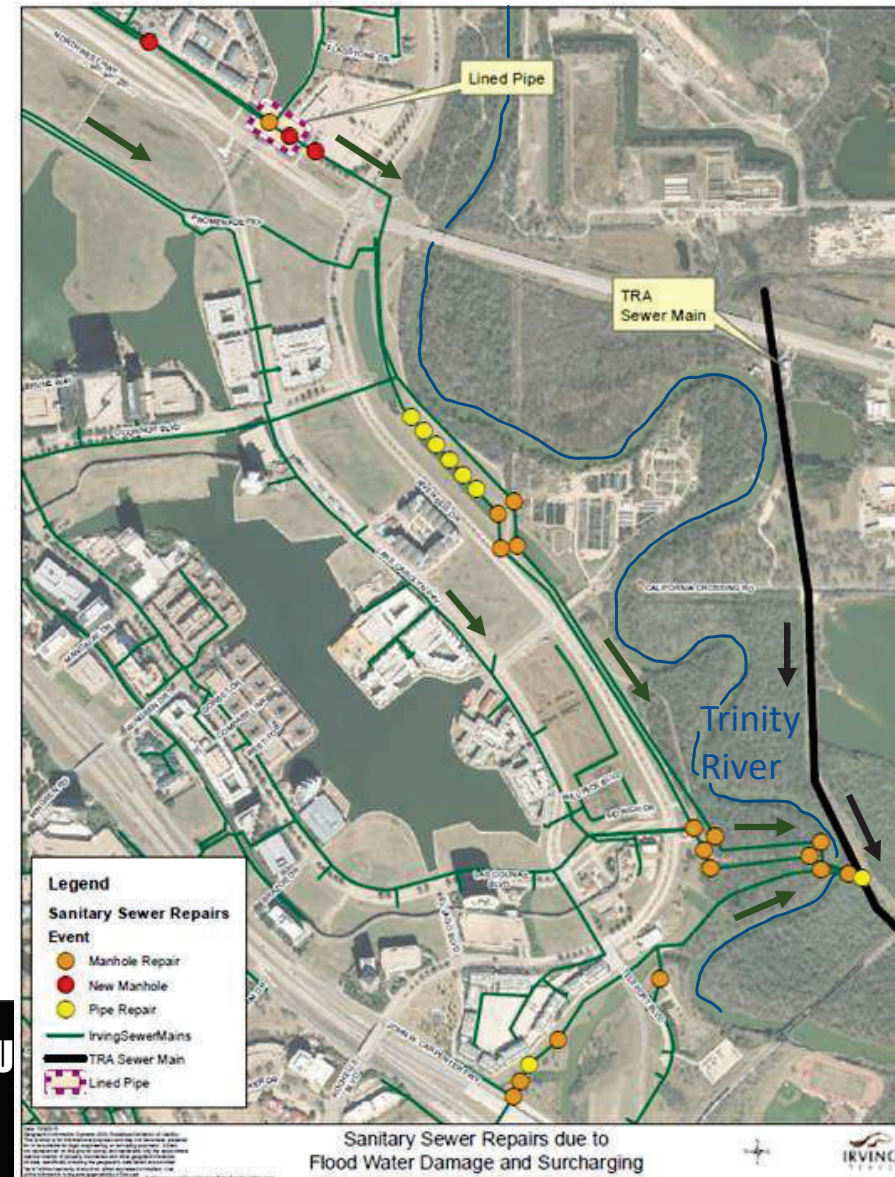
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# History

- Irving wastewater discharges into the Trinity River Authority (TRA) wastewater system
- 2015: Historical Flooding
  - 62.61 inches → Double Annual Average
  - Trinity River Surge until late 2015
- Multiple failures on existing lines
- Millions \$\$\$ to repair
- Infrastructure in poor condition and high risk of future failures



# Design Concept

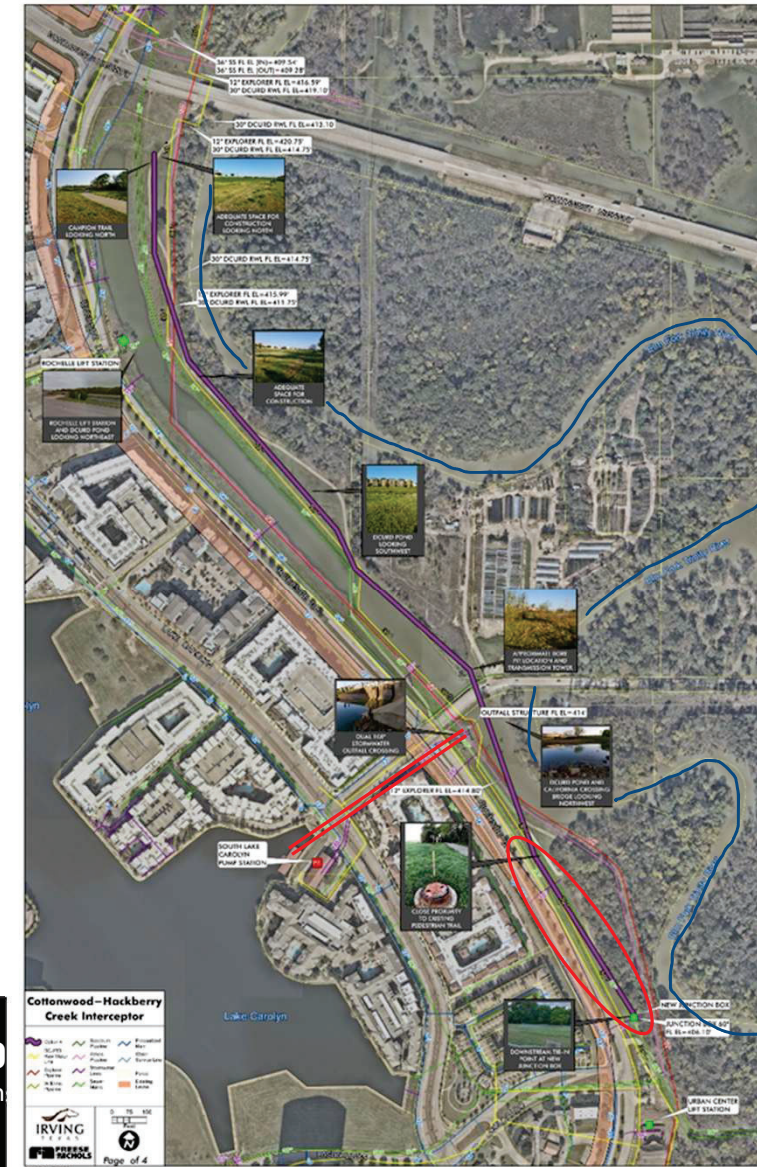
Replace existing 36" Hackberry & 36" Cottonwood line w/ single 60" interceptor south of Spur 348

- Concerns:

- Proximity of Trinity River
  - Flooding in 2015, 2018, 2020
- Proximity of existing flood control lakes
- Crossing of dual DCURD 108" storm drain
- Working within floodplain – bypass operations

- Stakeholders

- DCURD, Explorer, Atmos, Parks, Las Colinas Association





# Final Alignment

New 60" interceptor in median of Riverside Dr.

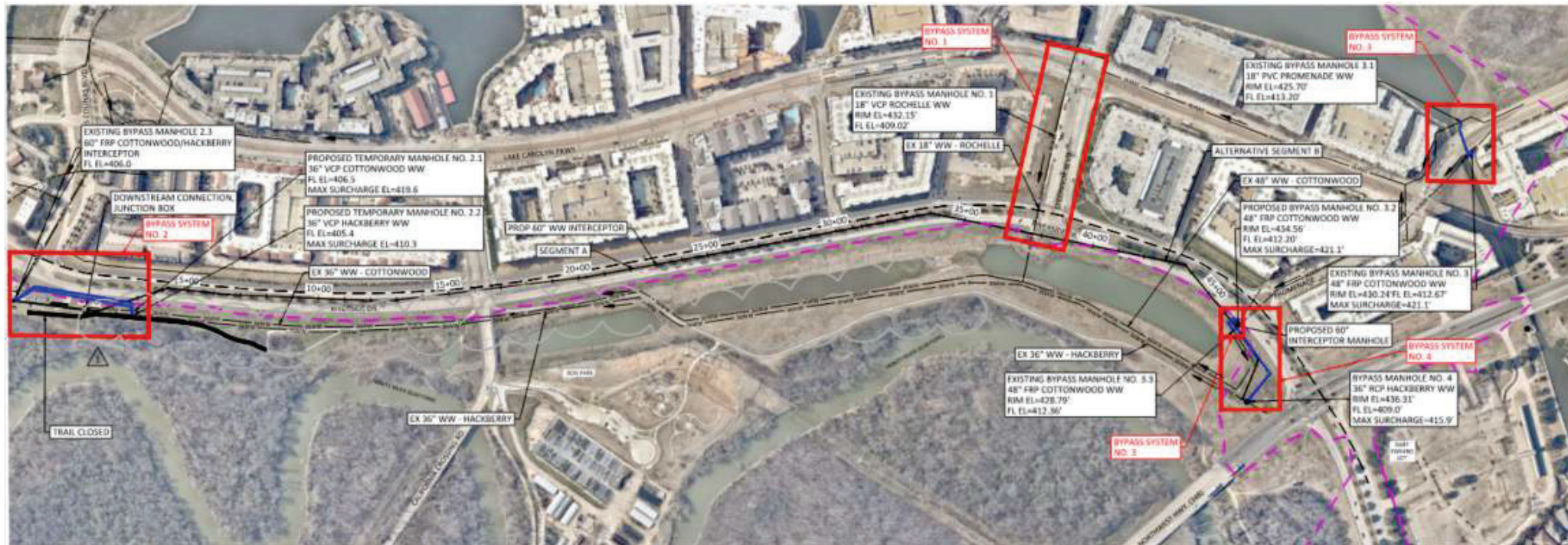
- Concerns:
  - 20+ feet Deep
  - Proximity of existing levee
  - Cost of Installation
  - Landscaping
  - Pavement Replacement & Traffic Disruptions

*All drivers for trenchless construction*

Underground  
Construction



# Bypass Pumping Plan



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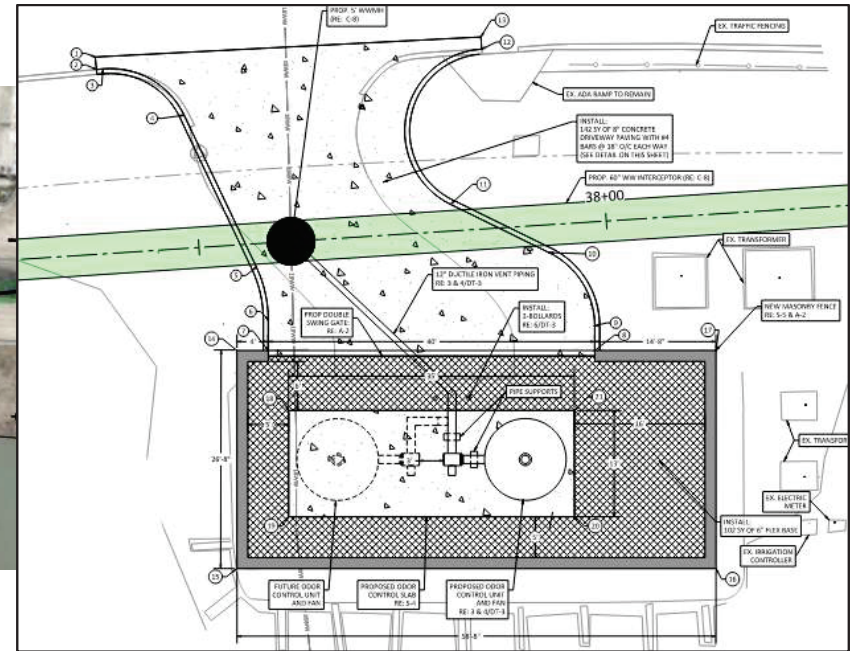
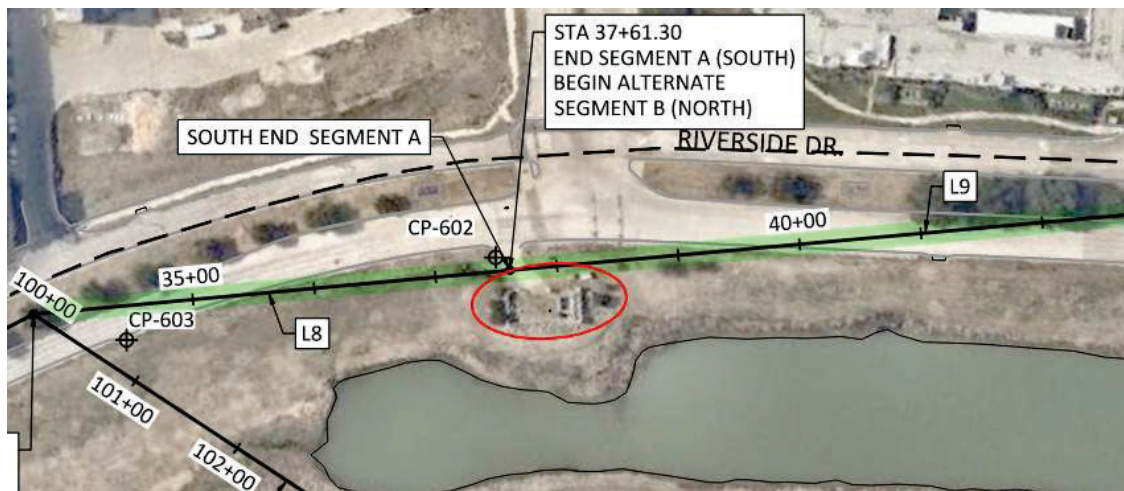
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# Odor Control



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# Traffic Control Plan



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# Construction Method: Open Cut vs Trenchless

| Open Cut                |   | Trenchless                                       |                            |
|-------------------------|---|--|----------------------------|
| Pros:                   | Cons:   | Pros:  | Cons:                      |
| Larger Bidder Pool      | Higher Potential for Lesser Qualified Bidders   | Lower Potential for Lesser Qualified Bidders     | Smaller Bidder Pool        |
| Lower Construction Cost | 4,500 LF Roadway Replacement                    | Minimal Roadway Restoration                      | Increase Construction Cost |
|                         | ~62 Trees to be Replaced                        | Minimal Tree Replacement                         |                            |
|                         | Deep Open Cut Excavation Likely with Dewatering | Minimize Deep Open Cut Excavation Only at Shafts |                            |
|                         | Traffic Detour Required                         | Lane Closures Required                           |                            |



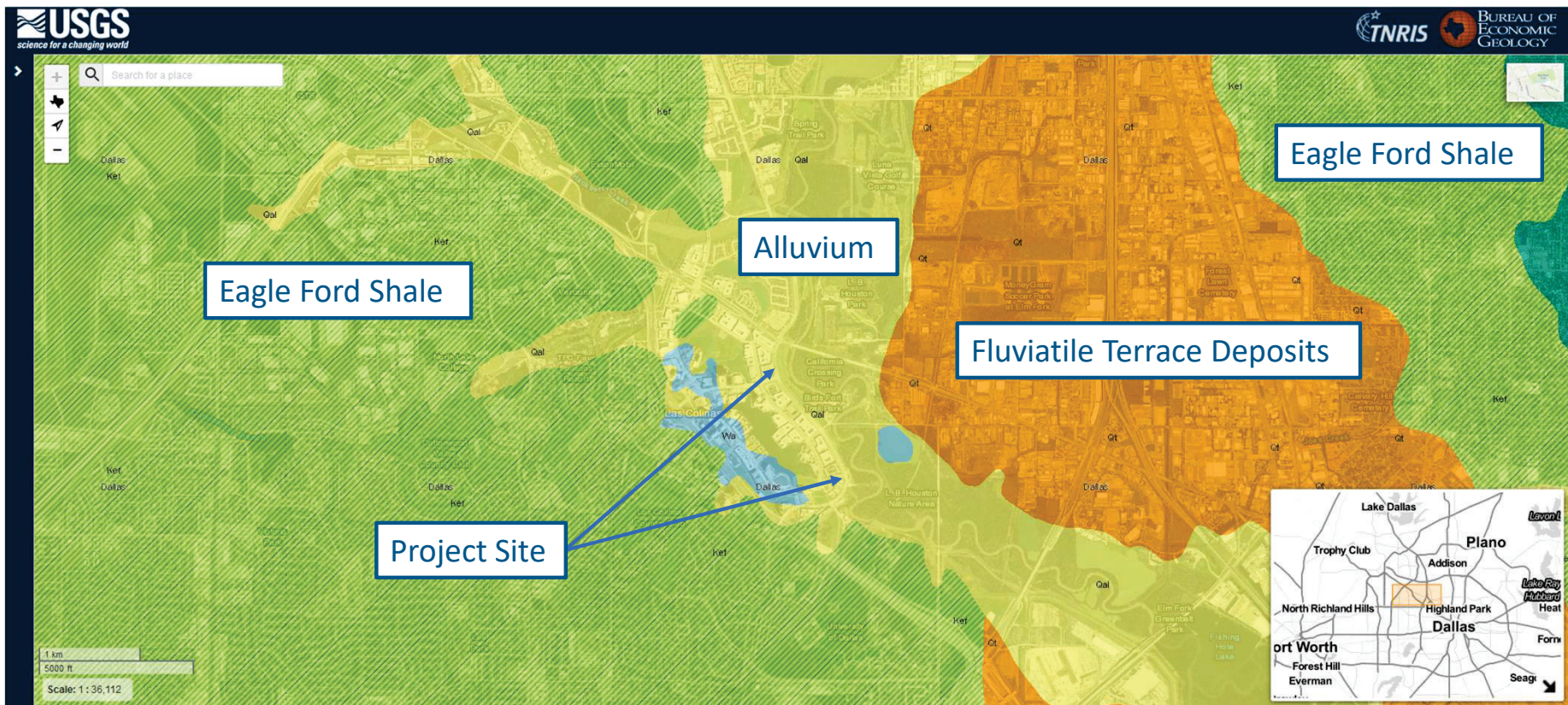
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# Regional Geologic Conditions @ Project Site



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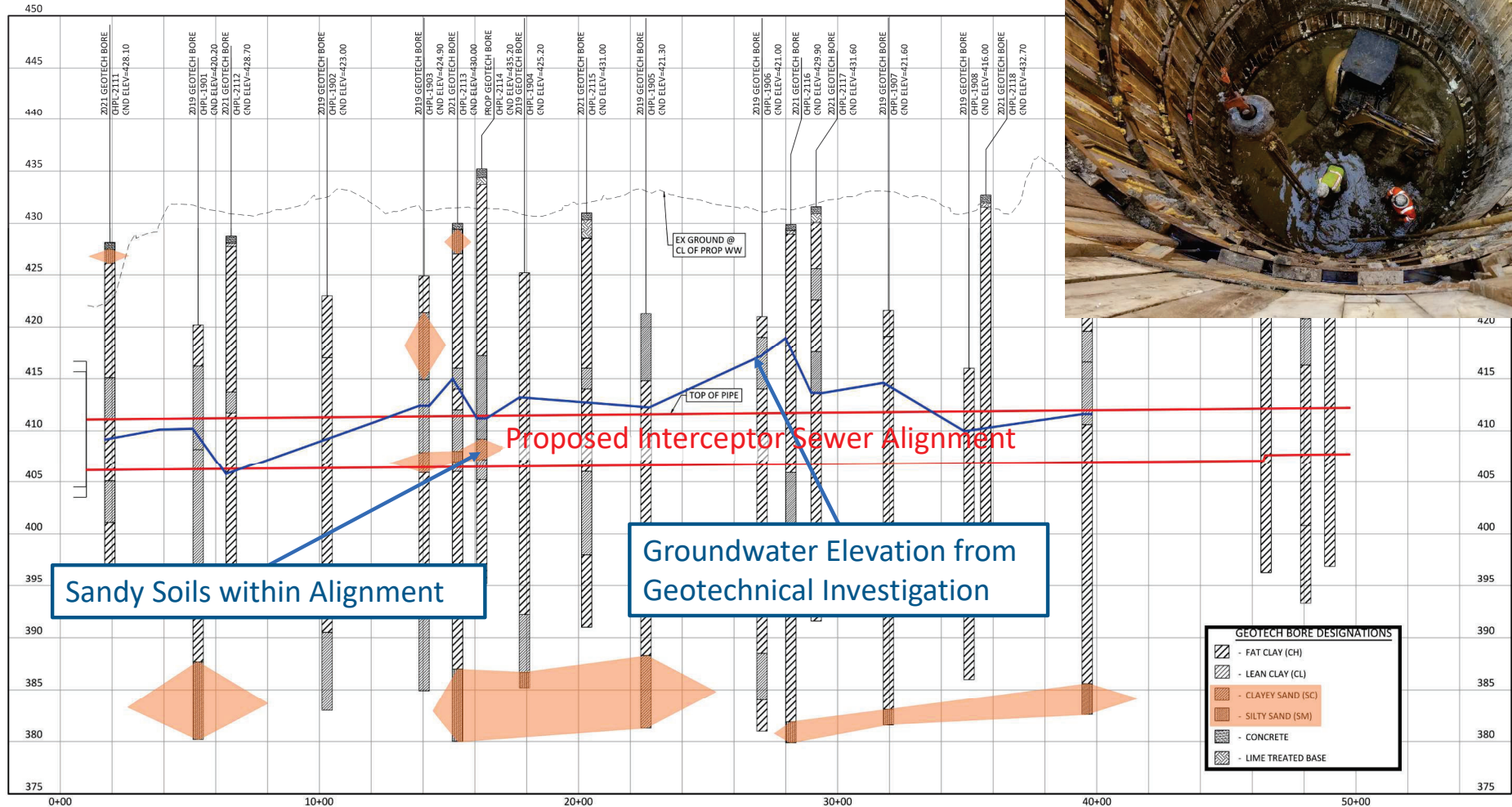
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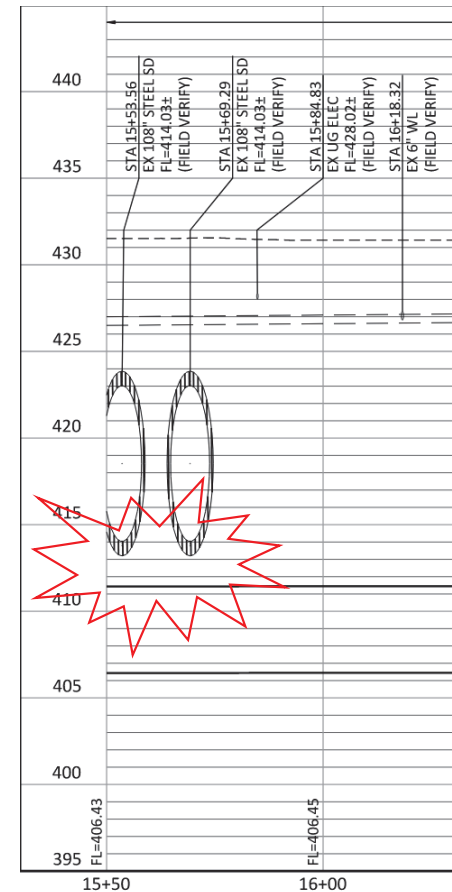


# Project Site Ground Conditions



# Trenchless Methods Considered

- Tunneling with Tunnel Boring Machine (TBM) or Hand Mining – Requires Two Pass Excavation, Limited Room
- Horizontal Auger Boring – Limited Length, Requires Casing
- Pipe Ramming – Limited Length, Requires Casing
- Guided Boring Method – Limited Length/Diameter
- Conventional Pipe Jacking – Line and Grade Concerns
- Microtunneling – Allows for Single Pass Operation, Sufficient Drive Lengths/Diameter, and Ensures Precise Line and Grade



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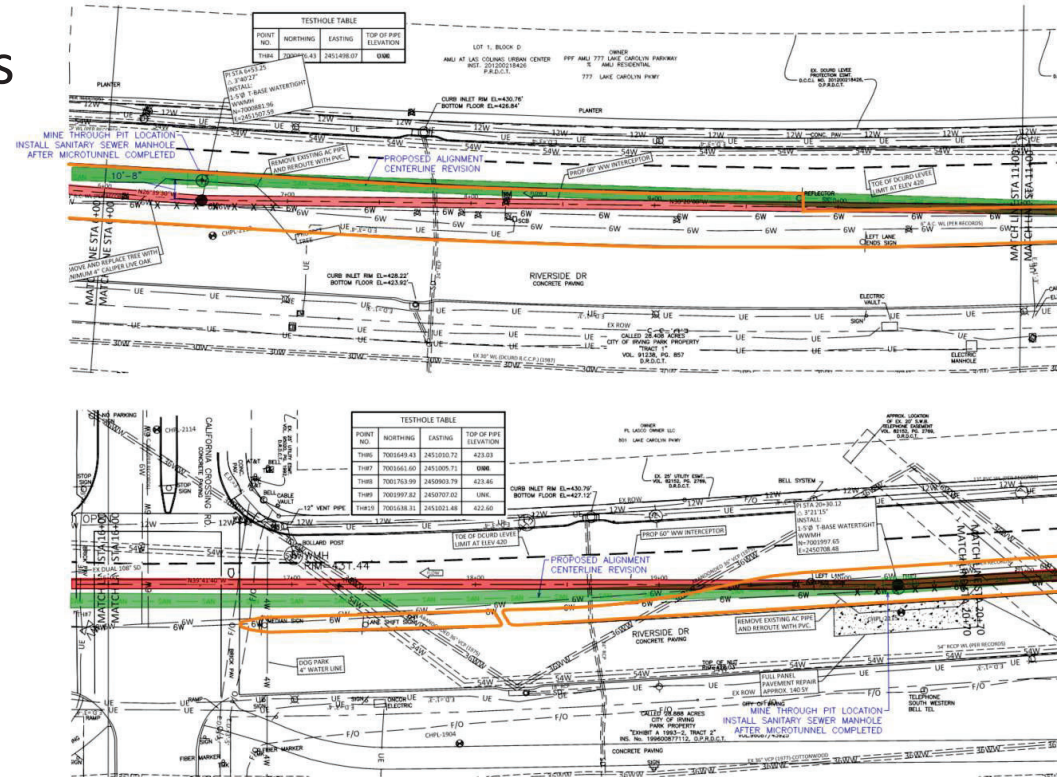
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# Constructed Alignment

- 60" Microtunnel x ~4,670 LF in 7 Drives
- Primarily Follows 30' Wide Median
- Minimum Grade (0.023%) per TCEQ
- ~700' Manhole Spacing (City Requirement)
- Allowed Flexibility with Manhole Locations, Provided within Median
- According to Hobas, Currently Longest Single Microtunnel Drive with Hobas Pipe in North America (2,092 ft)



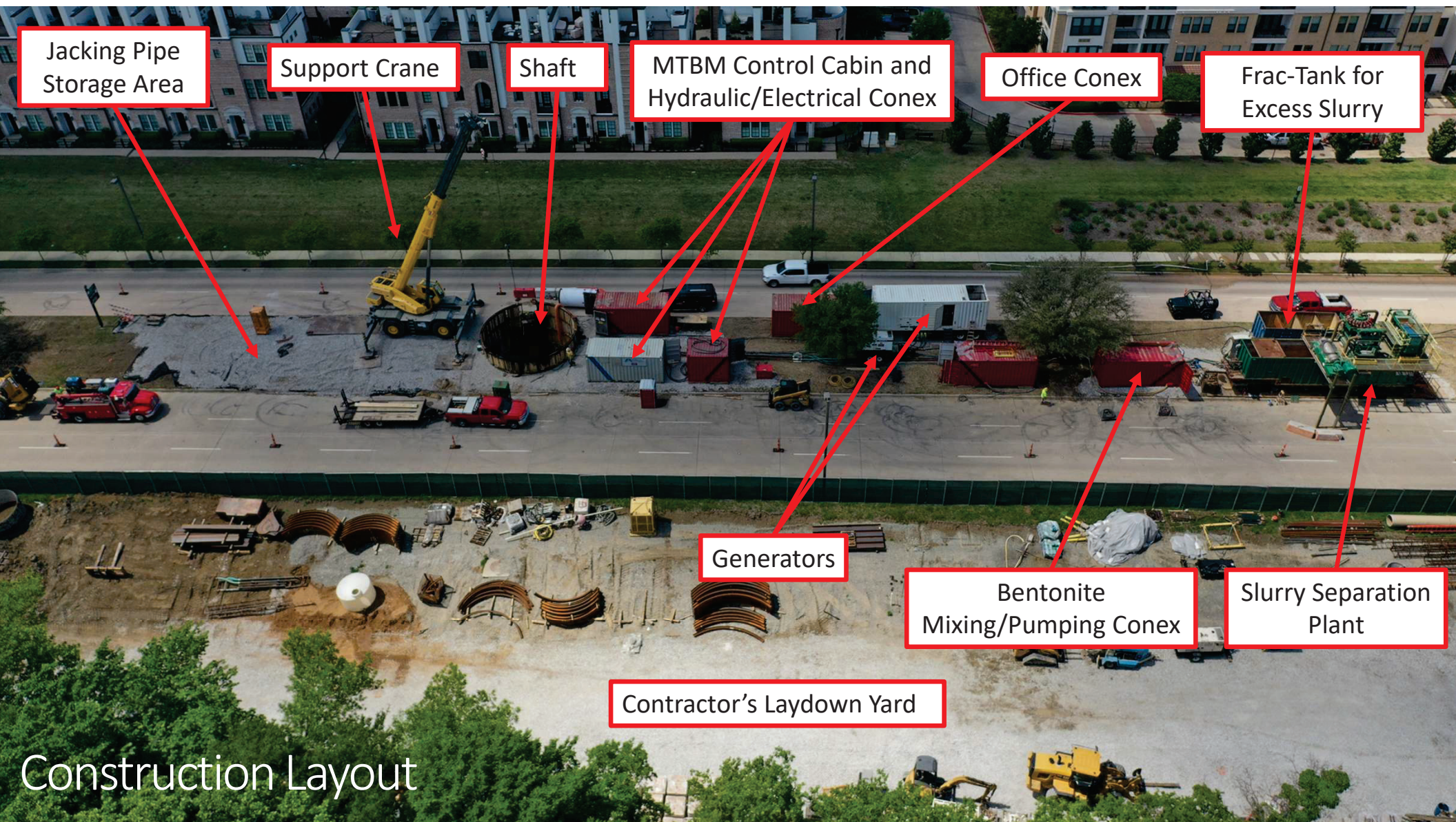
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Jacking Pipe  
Storage Area

Support Crane

Shaft

MTBM Control Cabin and  
Hydraulic/Electrical Conex

Office Conex

Frac-Tank for  
Excess Slurry

Generators

Bentonite  
Mixing/Pumping Conex

Slurry Separation  
Plant

Contractor's Laydown Yard

Construction Layout



# Construction Progress

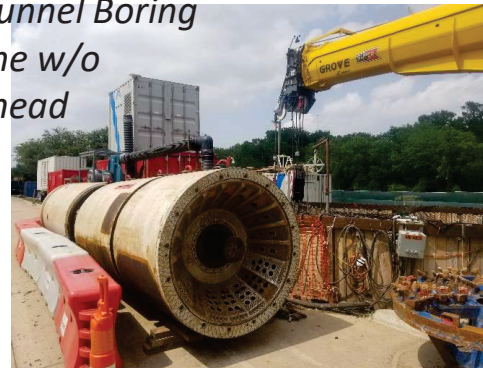


*Jacking Frame (Without Microtunnel Boring Machine)*



*Microtunnel Boring Machine*

*Microtunnel Boring Machine w/o Cutterhead*



*Cutterhead*



*MTBM Control Cabin and Power/Hydraulic Containers*

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# Construction Progress



*Slurry Separation Plant*



*Frac-Tank for Excess Slurry*



*Generators and Office/Storage Containers*



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# Construction Progress



*Staging Area for Microtunnel Drive*



*Lowering 60" FRP into Jacking Shaft*



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# Construction Schedule/Progress

- Limited Notice to Proceed: July 2022
- Full Notice to Proceed: January 2023
- Shaft Excavation: January to July 2023
- Microtunnel Excavation: April to December 2023
- Open Cut/Manholes/Tie-Ins: January to May 2024
- Backfill/Restoration: March to July 2024
- Estimated Project Completion: July 2024



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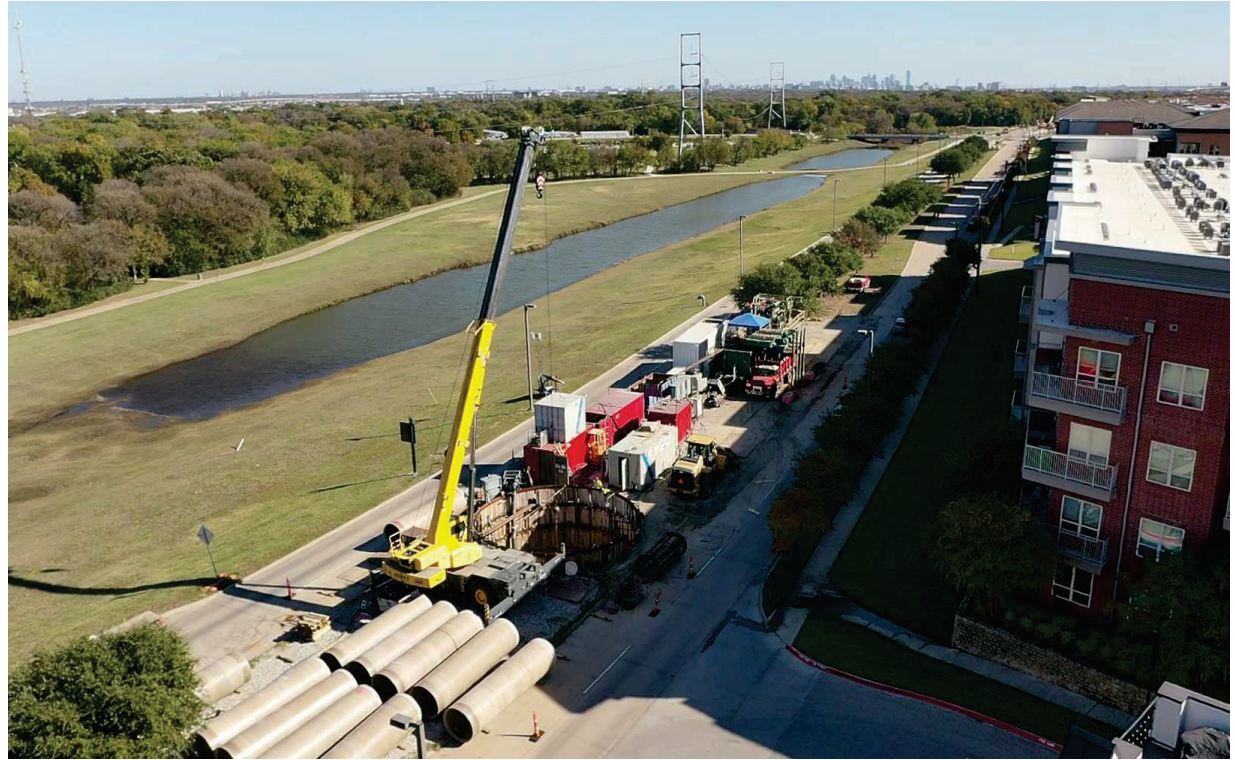
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# Questions?

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