Pipe Jacking and Microtunneling: A Story of Rivers and Poor Ground Conditions

Gus O’Leary, PE
- Springfield Water and Sewer Commission (SWSC)
- Two collection systems – Main Intercepting Sewer, and the Connecticut River Interceptor
- ACO driven IWP for CSO volume and frequency reductions
- Phase 2 deadline of December 2022
The Project

- Phase 2 of SWSC’s Integrated Wastewater Plan (IWP)
- Project executed under Ch149A (MGL) (Construction Manager at Risk alternative delivery method)
Recommended Alternative

- 62 MGD pump station on the east side of the river
- River crossing using open cut cofferdam construction
  - Two 36-inch diameter force mains to convey CRI system flows,
  - And a 72-inch diameter siphon to provide redundancy for MIS system flows.
The Site
Pump Station
River Crossing Refinement

Dredged Crossing:
- Geotechnical Conditions
- Regulatory and Environmental Considerations
Influent Structure Expansion & Levee Crossing
East Bank Crossing

- Short run - ~150ft
- 3 bores – 96”, 2x 48”
- Active AMTRAK Rail
  - Must remain in service
- Army Corps Flood Damage Reduction System – Flood Wall
Geotechnical Information

- Poor soil\groundwater conditions
  - Alluvial clay primarily
  - Some alluvial sands and silts, hydraulically connected to the Connecticut River at top and bottom of bore
  - Potential for glacial till outcroppings at bottom of bore
Initial Approach - assumed Jack and Bore

- Jacking Pit east of FDRS\RR
- Access pit above MAHW in slope
- Ground improvements to handle water
- Less expensive than MTBM, higher risk
- Ended up issuing as “Trenchless Installation” – open to proposer method
Proposal Feedback

- Riverside access pit is expensive and substantial – slopes and permit constraints.
- Eliminating the pit ("blind jack") difficult and expensive
- Ground improvements are expensive and risky – risks of over improvement, frac-out, missing a sand seam
Alternate Proposal

- Proposer preferred MTBM approach:
  - Lower risk of ground loss, mitigates groundwater issues, eliminates ground improvements
- Proposed for roughly equivalent price
- Design team identified possibility to eliminate river side access pit by “daylighting” in river
Status of Project

• Design-Bid => Construction Manager at Risk (CMAR)
• Two phase project:
  • GMP1 – York Street Sewer Pump Station and Springfield Regional Wastewater Treatment Facility
    • Construction On-going through May 2021
  • GMP2 – Connecticut River Sewer Force Mains and Interceptor Crossing
    • Currently in proposal phase – received
    • Anticipated Award – February 13, 2020
    • Construction anticipated to begin: May 2020
  • Project to be fully completed by December 2021
Questions?

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