

A Special Lining For Lower Pogue Run Tunnel

Indianapolis, Indiana

2023



INDIANAPOLIS

FIVE CITIES PLUS

Presentation Overview



1914 Construction Photo of Lower Pogues Run Box Culvert

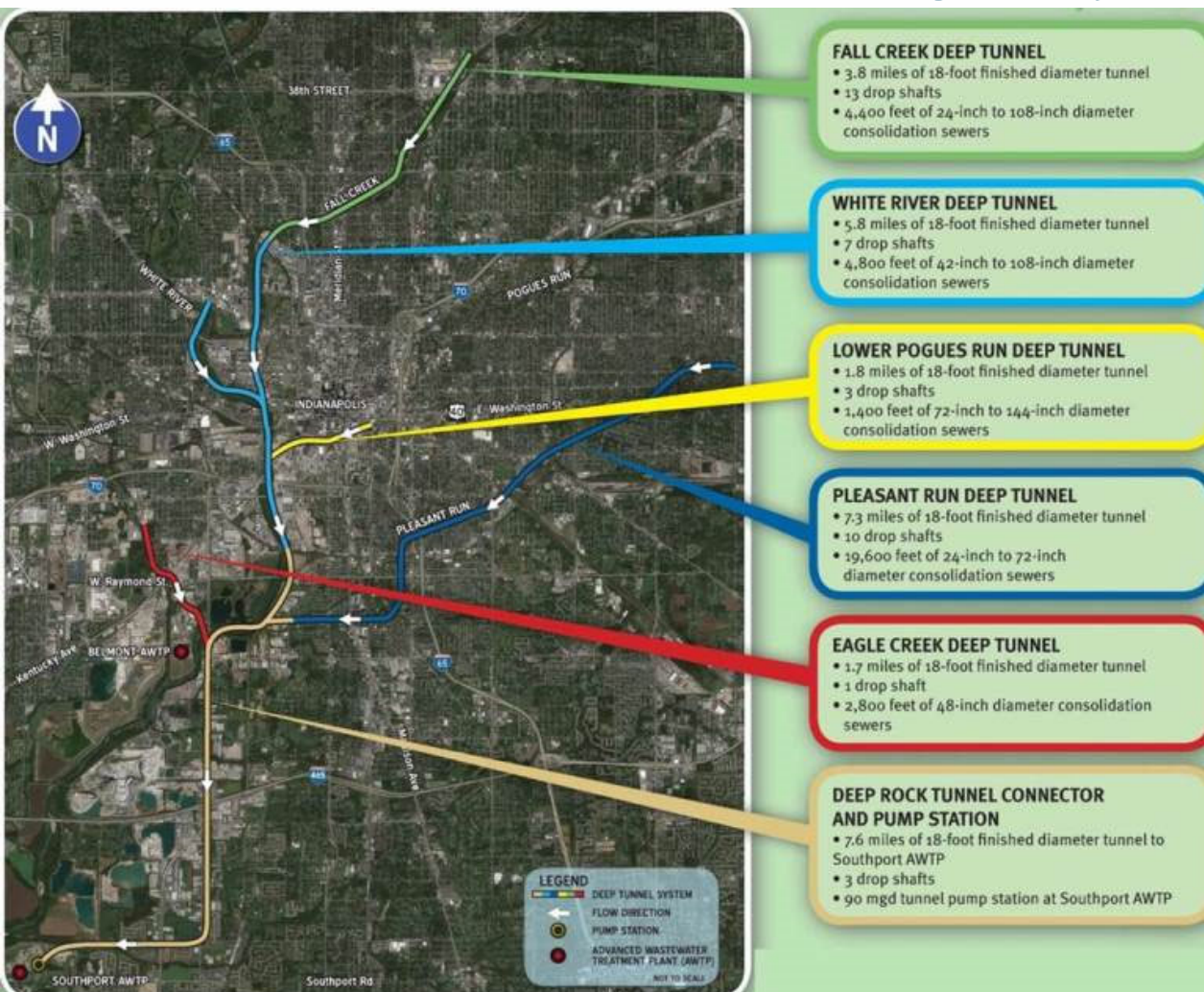
- Overview of DigIndy System
- Lower Pogues Run Tunnel
- Differing Site Condition
- Working Toward a Solution
- Alternatives
- Final Selected Lining

Overview of the DigIndy System



- CSO Discharge Points (130+)
- CSO Discharge Area (34 square miles)
- CSO Discharge Locations
 - White River
 - Fall Creek
 - Pogues Run
 - Pleasant Run
 - Eagle Creek
- CSO Frequency:
 - 60+/- times in a typical year
- CSO Discharge Volumes:
 - (Historically) ~5-6 billion gallons in a typical year

Overview of the DigIndy System



- Six Deep Rock Tunnel Segments
- 28+ Miles of Deep Rock Tunnel
- 250' Deep
- 20' - 2'' Bore Diameter
- 12'' Concrete Liner
- 18' Finished Diameter
- 270+ Million Gallons
- 13 Years to Construct
- Completion by 2025

Lower Pogues Run Tunnel

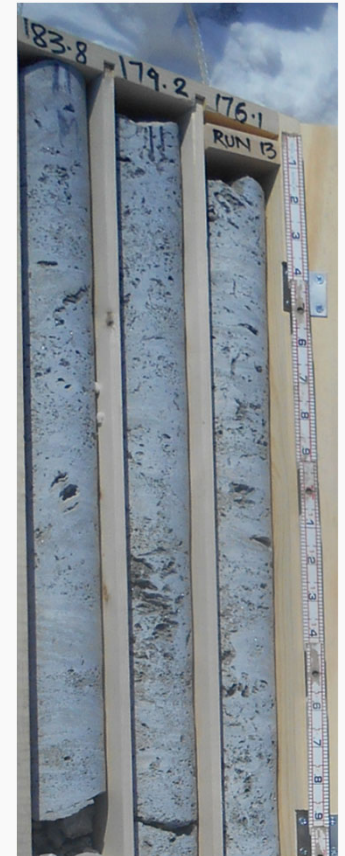
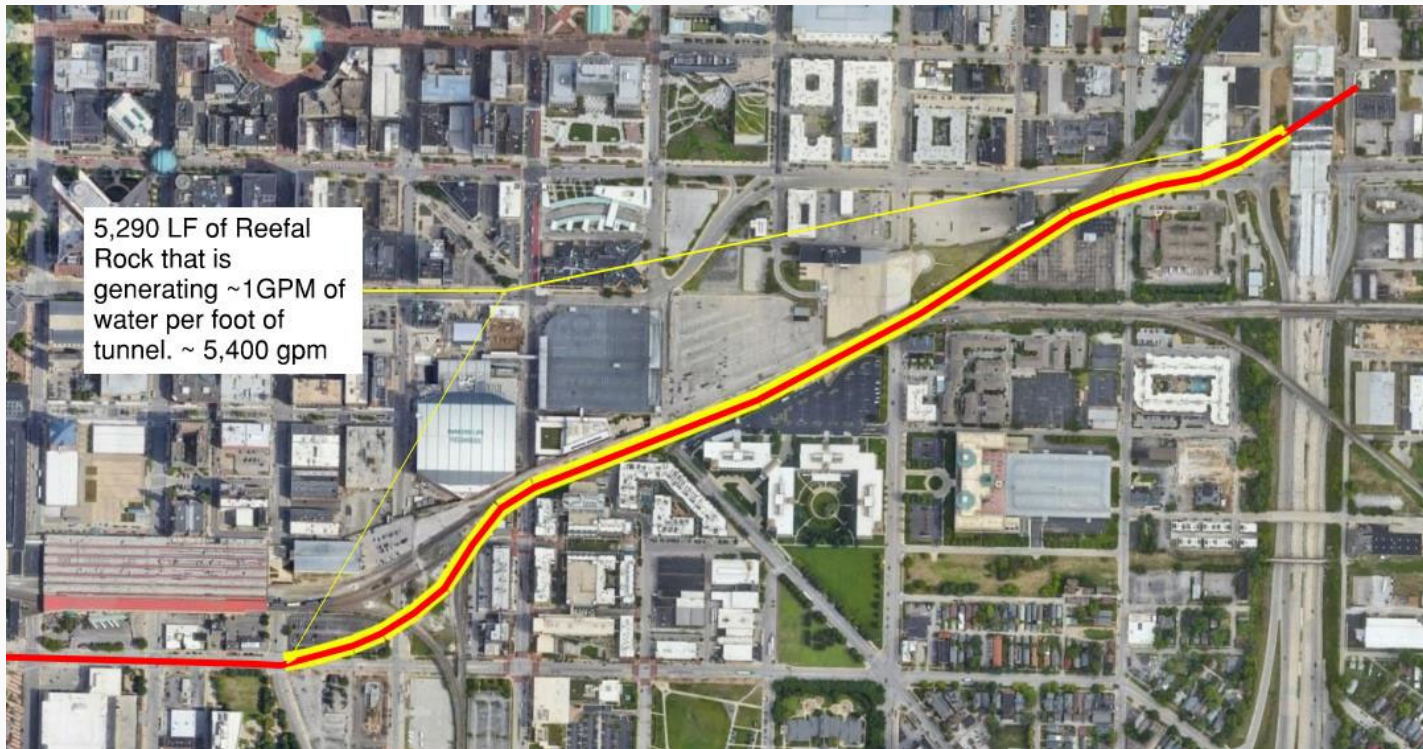
- Part of White River Lower Pogues Run Tunnel Contract
- White River Tunnel ~30,000 feet
- Lower Pogues Run Tunnel ~ 10,000 feet
- 20' -2'' Excavated Diameter
- 18' Finished Diameter
- 3 Drop Shafts
 - 2 with Connector Tunnels
 - 1 Drop Directly to Tunnel, 8' Diameter At Upstream End of Tunnel



Lower Pogues Run Tunnel



Differing Site Condition



Working Toward the Solution

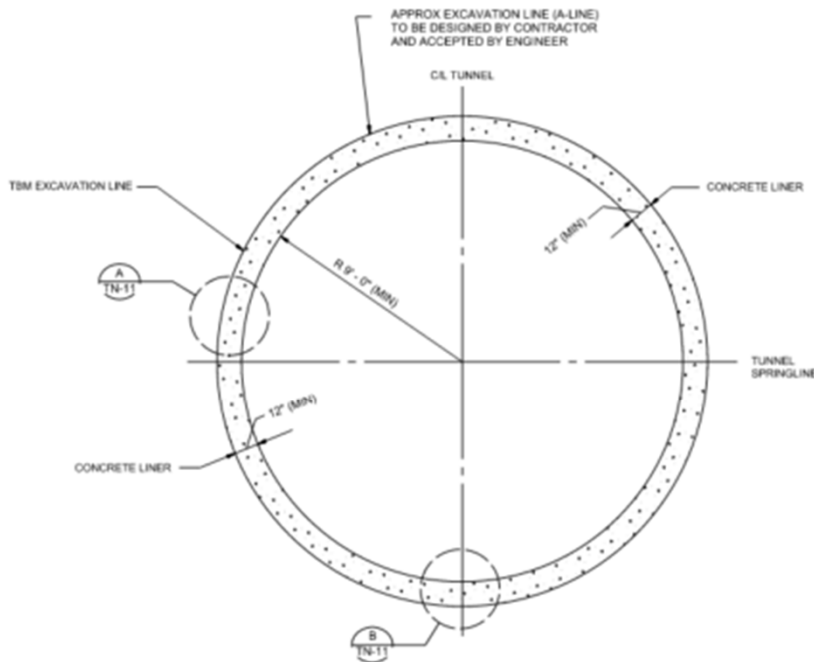
Truly a Collaborative Effort

- Citizens Energy Group
- Black & Veatch
- SK-JV
- AECOM
- Robbins
- Other Industry Experts
- Brainstorming Sessions
- One-on-One Meetings
- Workshops
- Iterative Process



The Final Lining Design

- Unreinforced Concrete
- 9'-0" Radius Above Spring Line
- 8'-6" Radius Below Spring Line
- 3-Layer System
- 150-foot Pour Length
- Invert Drainage
- Post Lining Grouting
- Water Stops End Detail

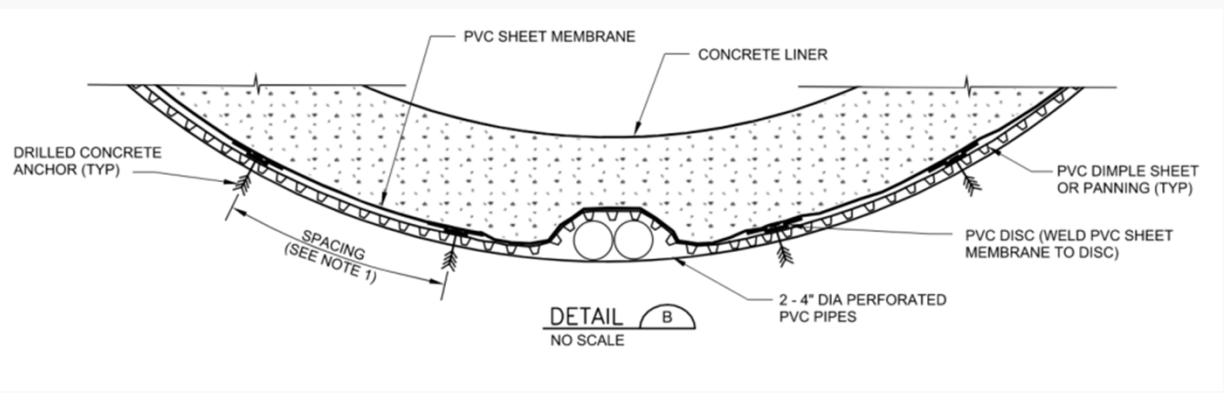
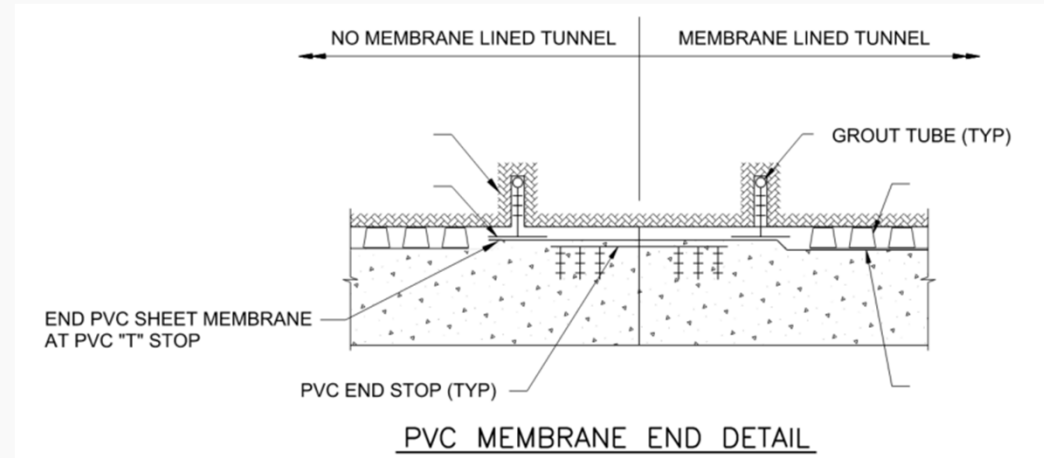
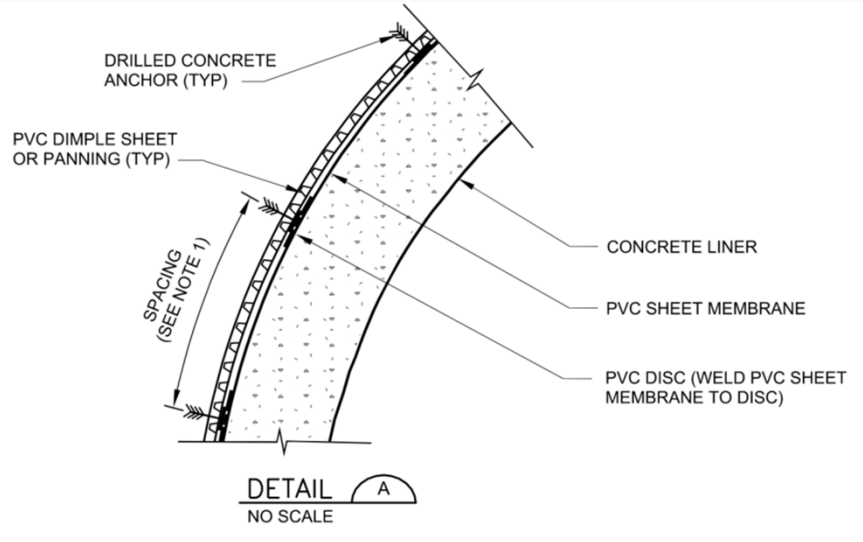


TUNNEL SECTION - MEMBRANE LINED, STA 48+00 TO STA 100+90



This took several iterations with SK-JV!

Final Lining Design Details



Getting it Built - Panning



Putting Up the Membrane



Membrane Going In!



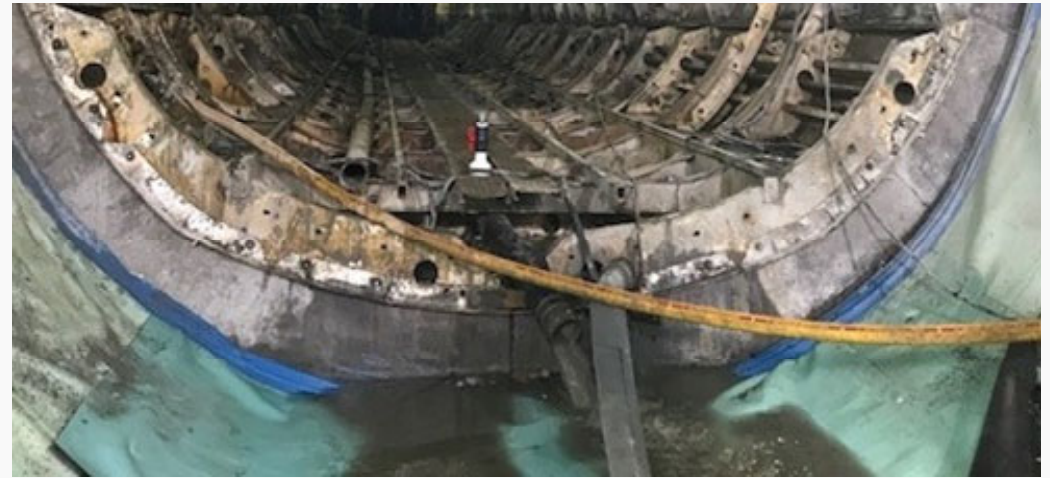
Getting Ready..



Poured!



Construction Details





Questions?

