

Great Lakes Tunnel Project Overview

Mike Mooney, PhD PE

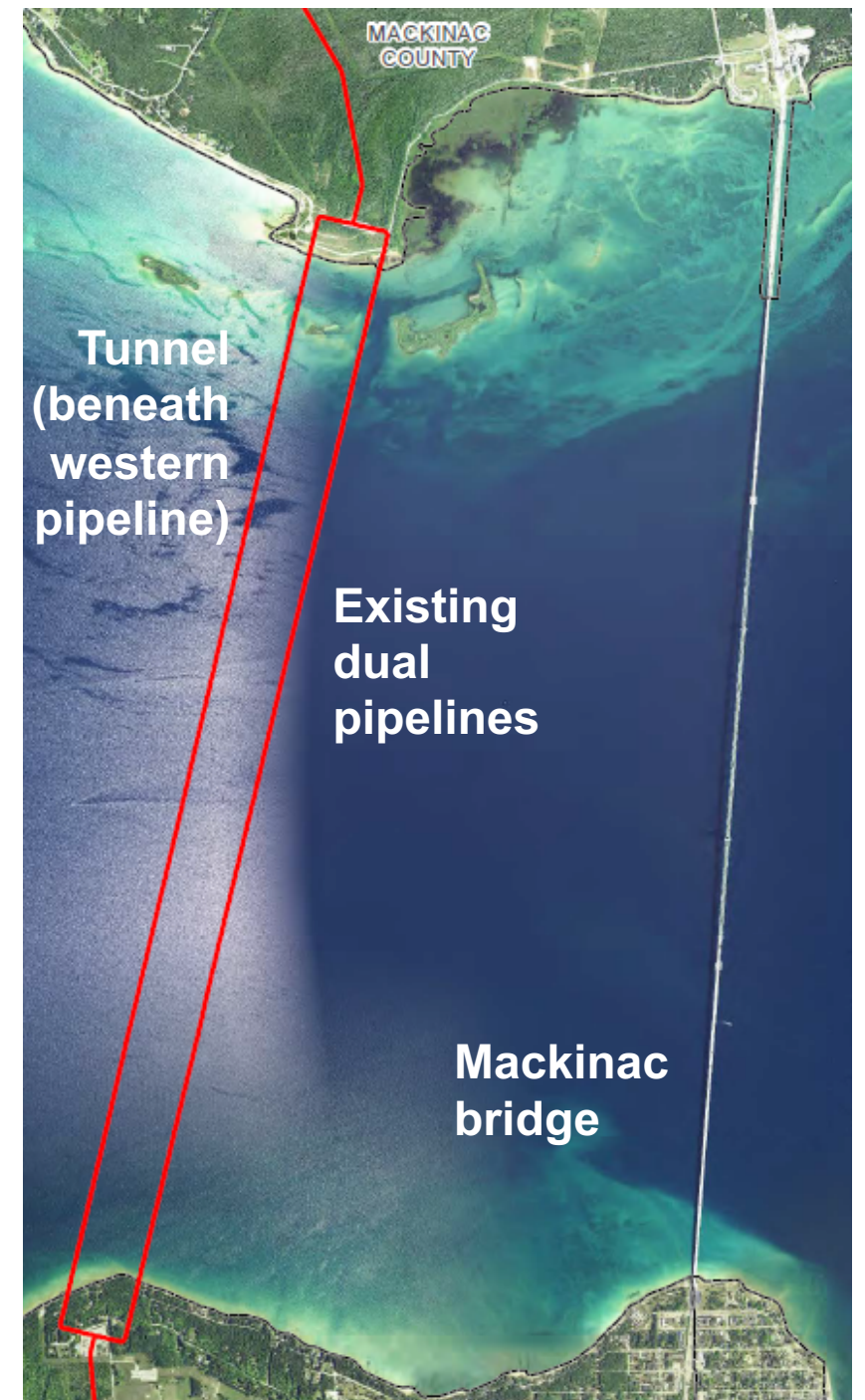
Grewcock Chair Professor of Underground Construction & Tunneling
COLORADO SCHOOL OF MINES

Consultant to Mackinac Straits Corridor Authority

Webinar for

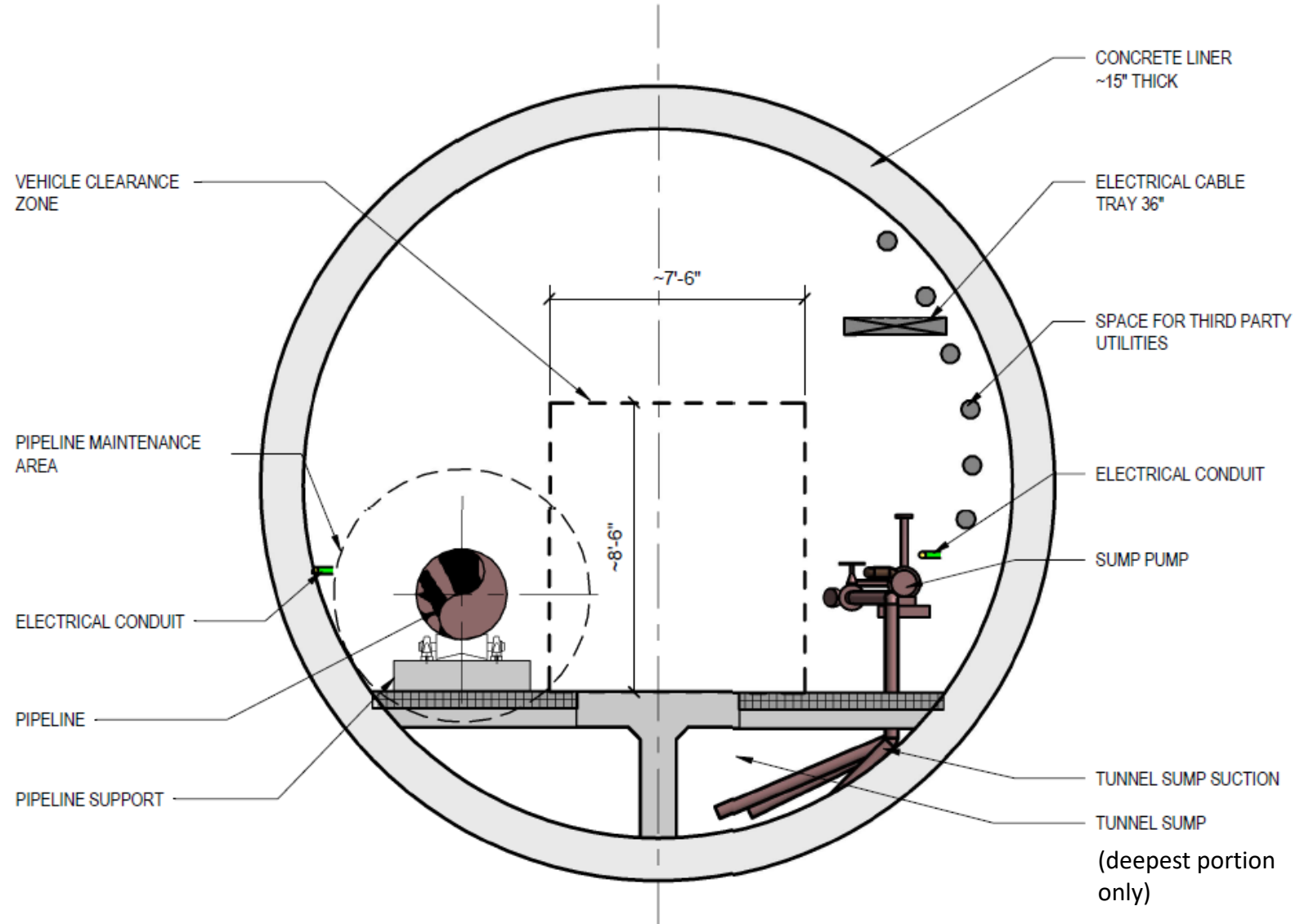


January 21, 2021



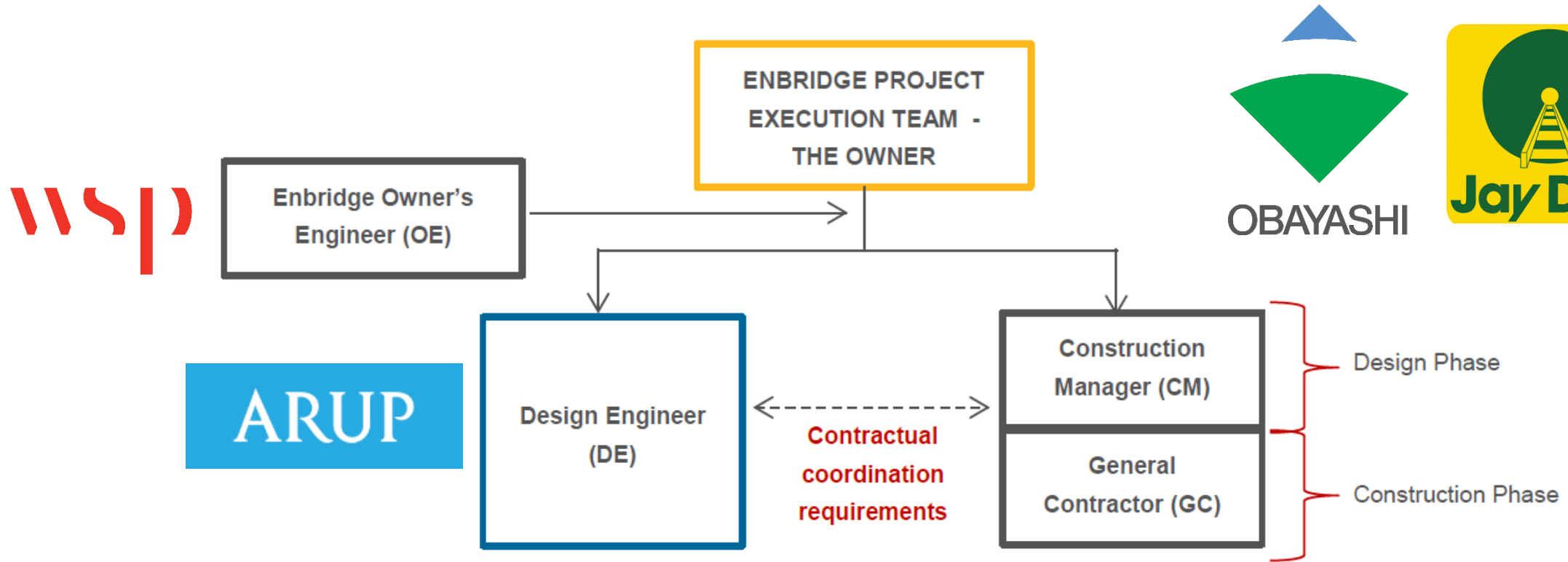
GLTP Overview

- 4 mile long, 21 ft internal diameter (nominal) concrete-lined tunnel.
- Shaft/portal structures at north and south shores.
- 99 year design service life.
- Design-build-operate-maintain by Enbridge.
- To be owned by Mackinac Straits Corridor Authority with lease agreement with Enbridge.
- Third party utility access.



Project Team (CM/GC model)

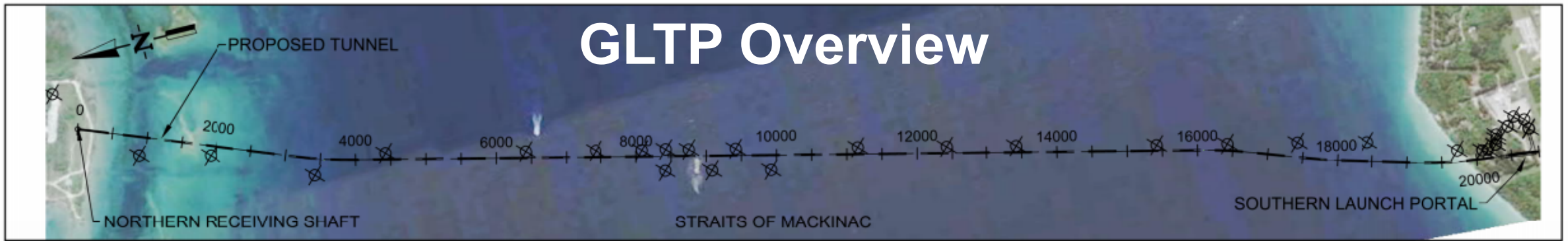
Great Lakes Tunnel Constructors



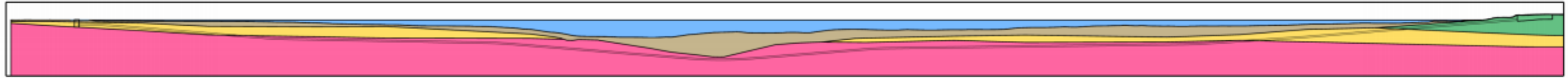
MSCA / MDOT

- Joint specification development
- Independent quality assurance
- Ownership after tunnel construction

GLTP Overview

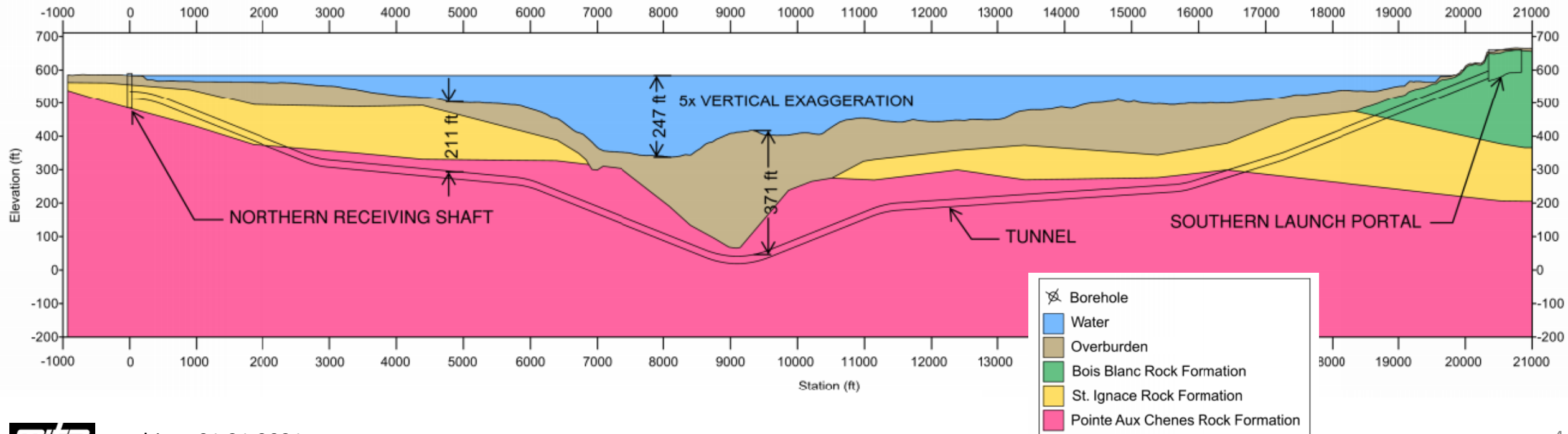


PROFILE (TRUE SCALE)

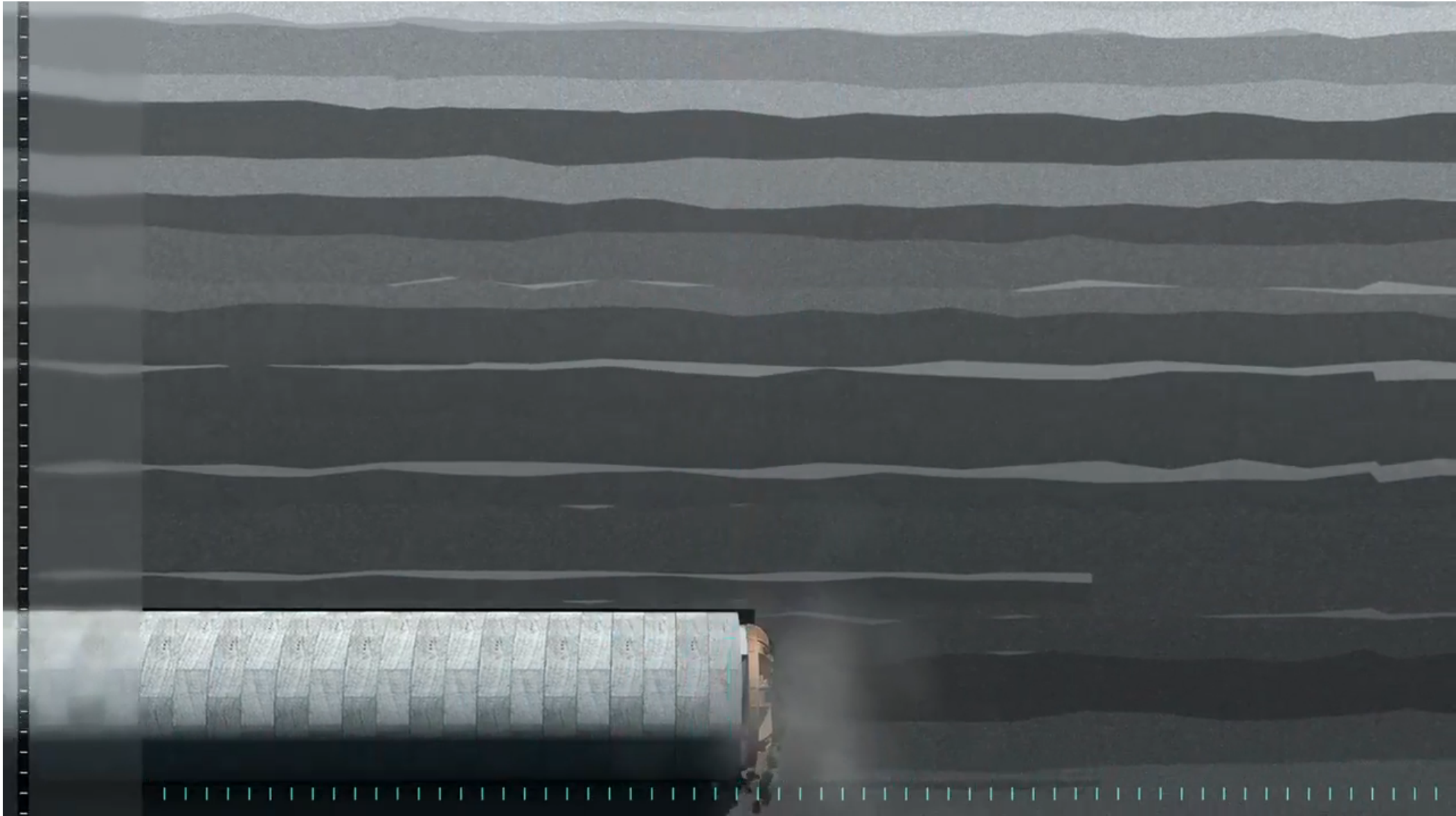


PROFILE (5x VERTICAL EXAGGERATION)

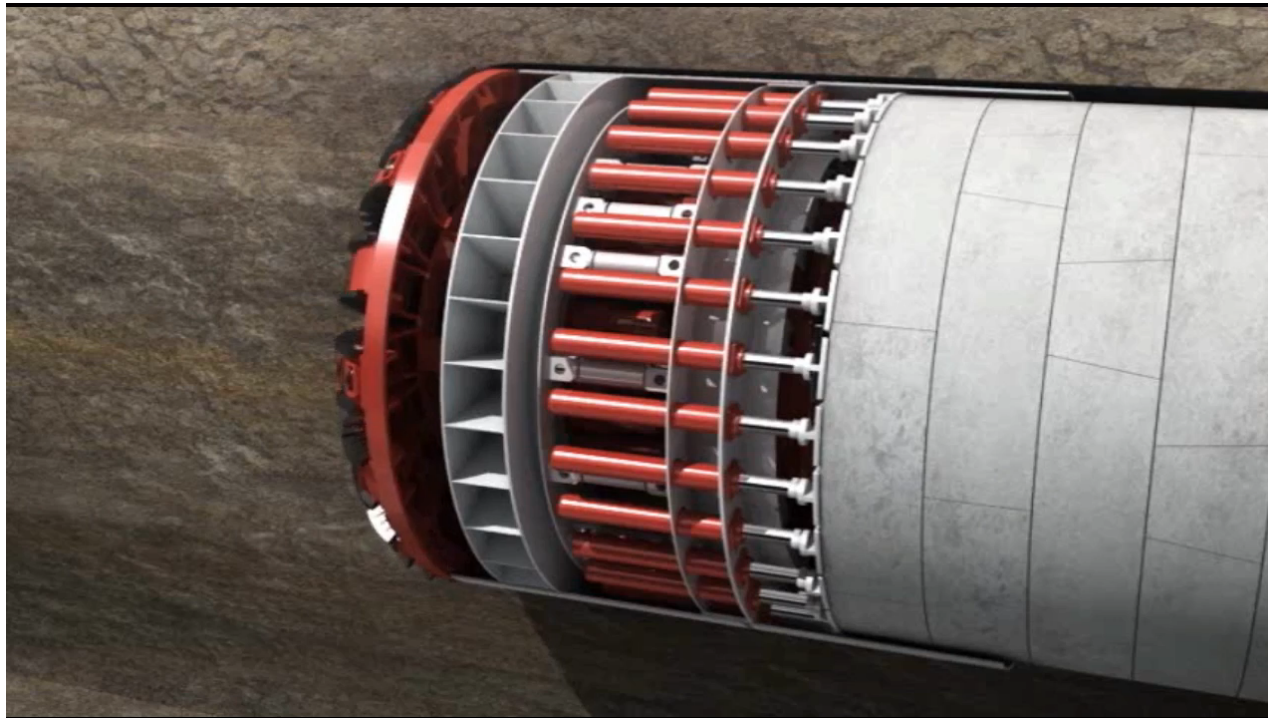
Direction of Tunnel Advance ←



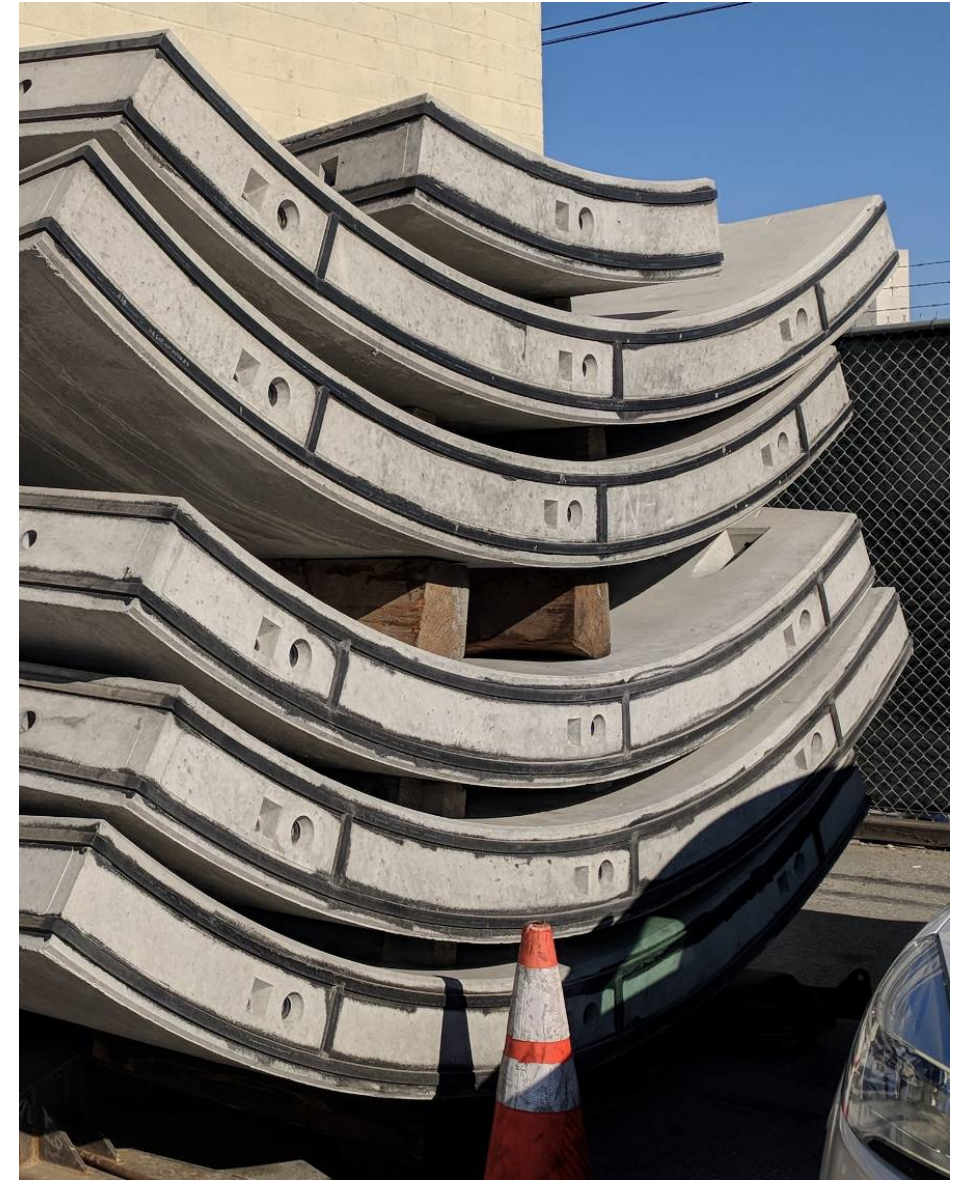
Enbridge GLTP Animation (from [Enbridge.com/Line5Tunnel](https://enbridge.com/Line5Tunnel))



Tunnel Construction

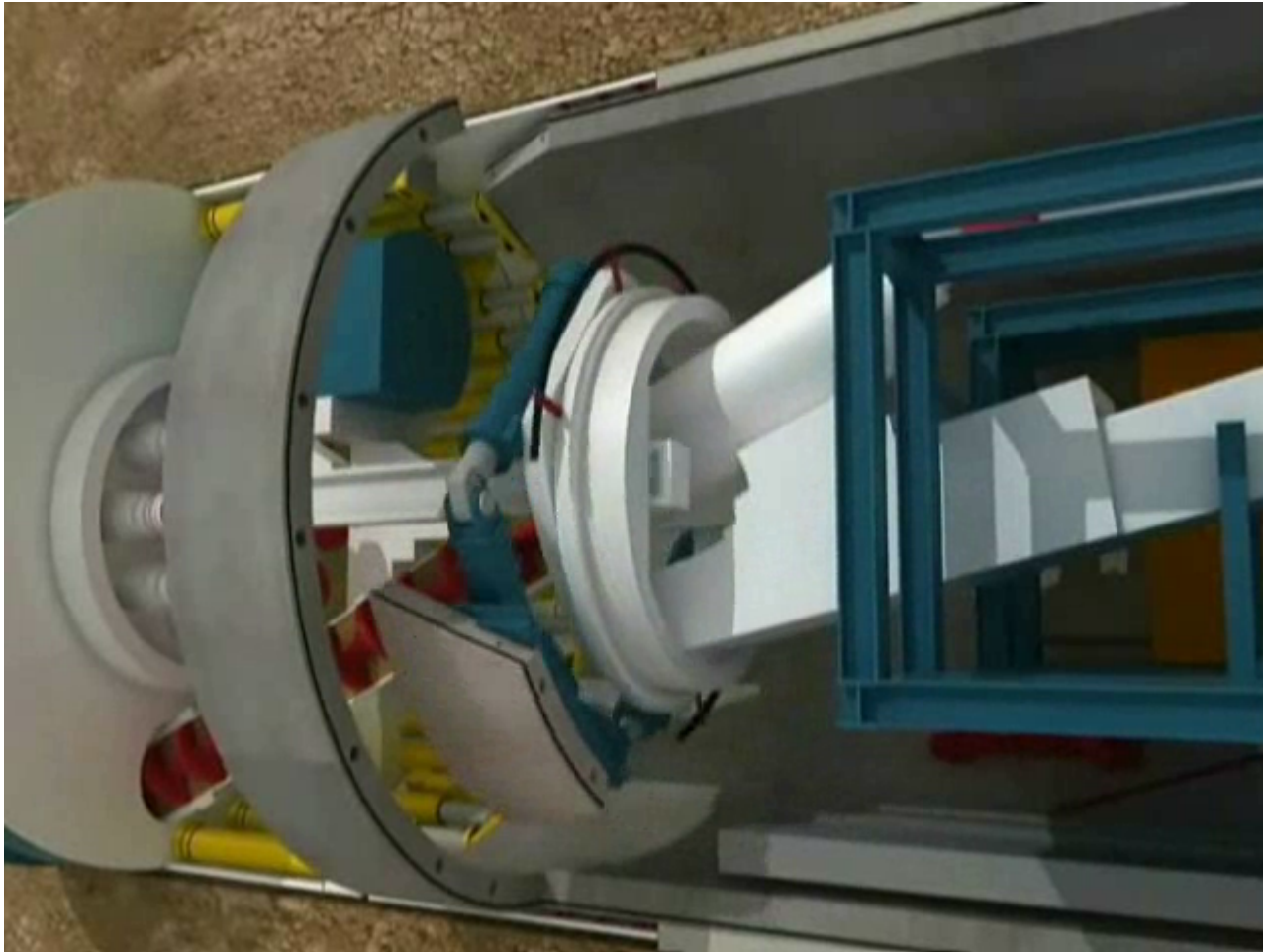


Source: Terratec (extracted from <https://www.youtube.com/watch?v=1XVkmbeB958> to show ring building. Note that type of TBM and cutterhead layout not representative of GLTP TBM type)



(from regional connector tunnel project, LA)

Tunnel Grouting

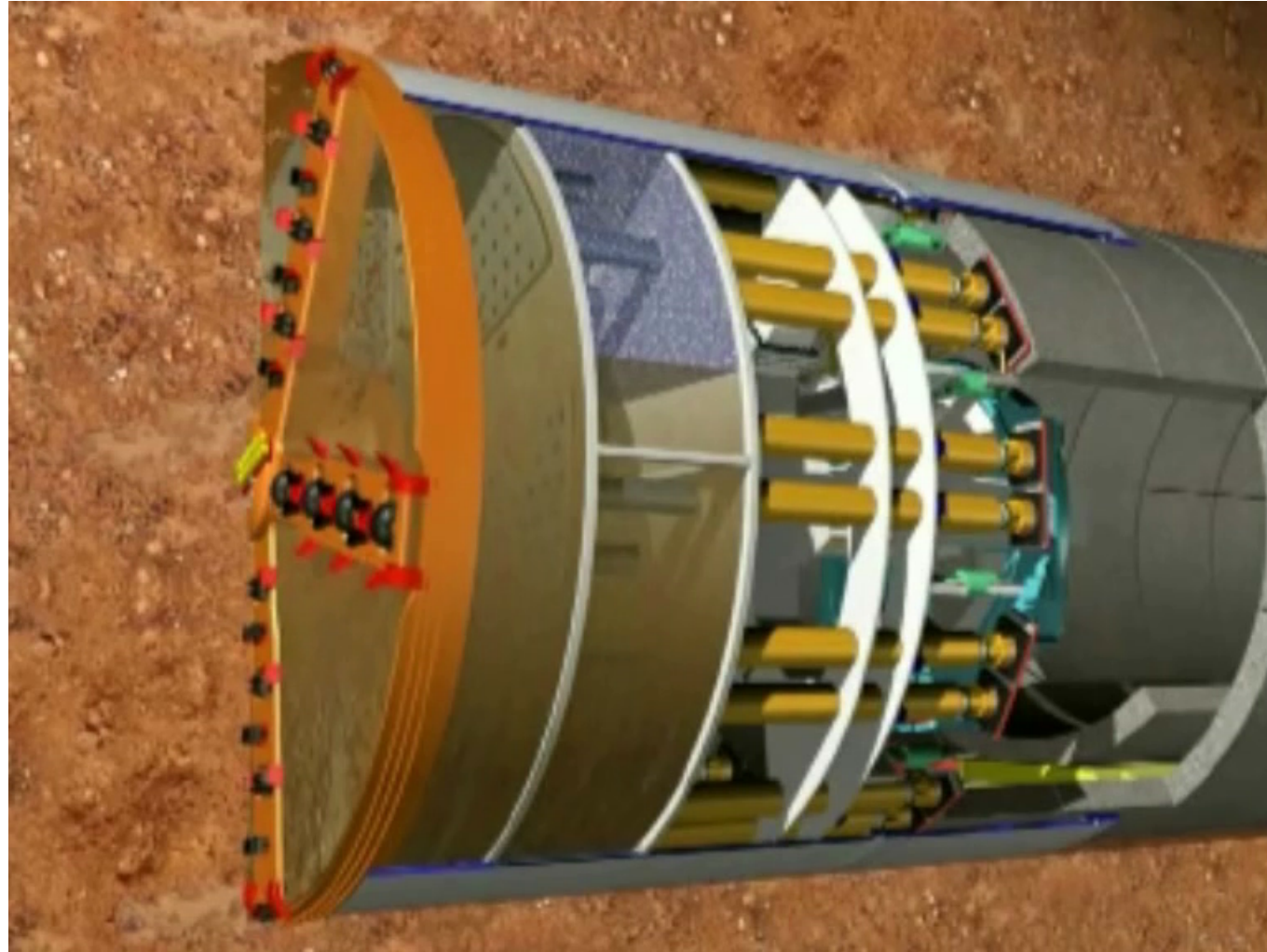


Source: Hatch Mott MacDonald – Bechtel (URL unavailable) to show annulus grouting.
Note that type of TBM and cutterhead layout not representative for Straits)



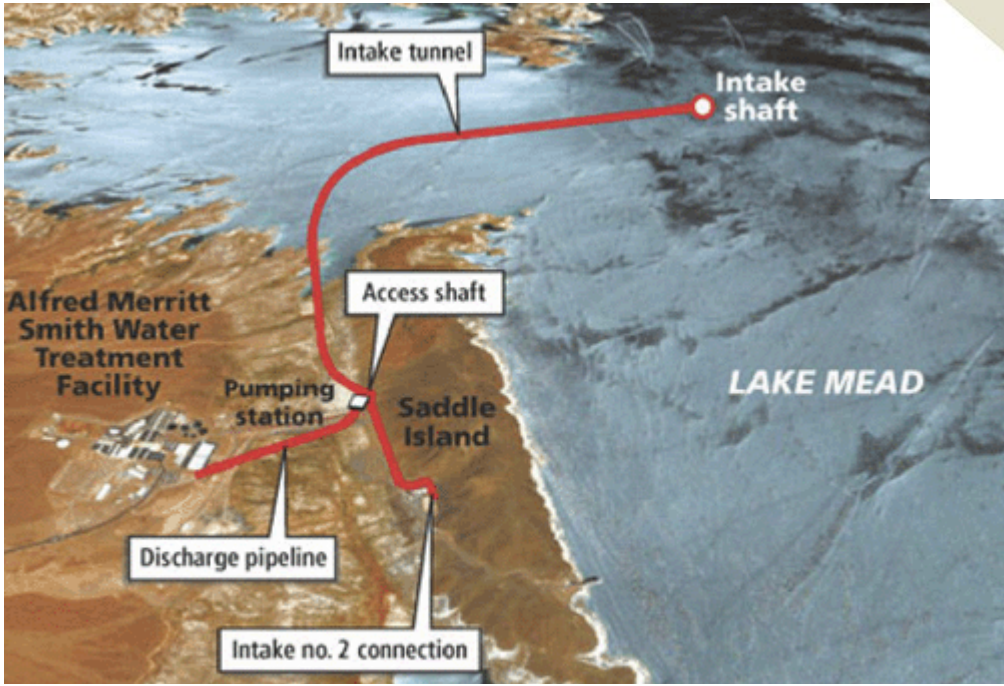
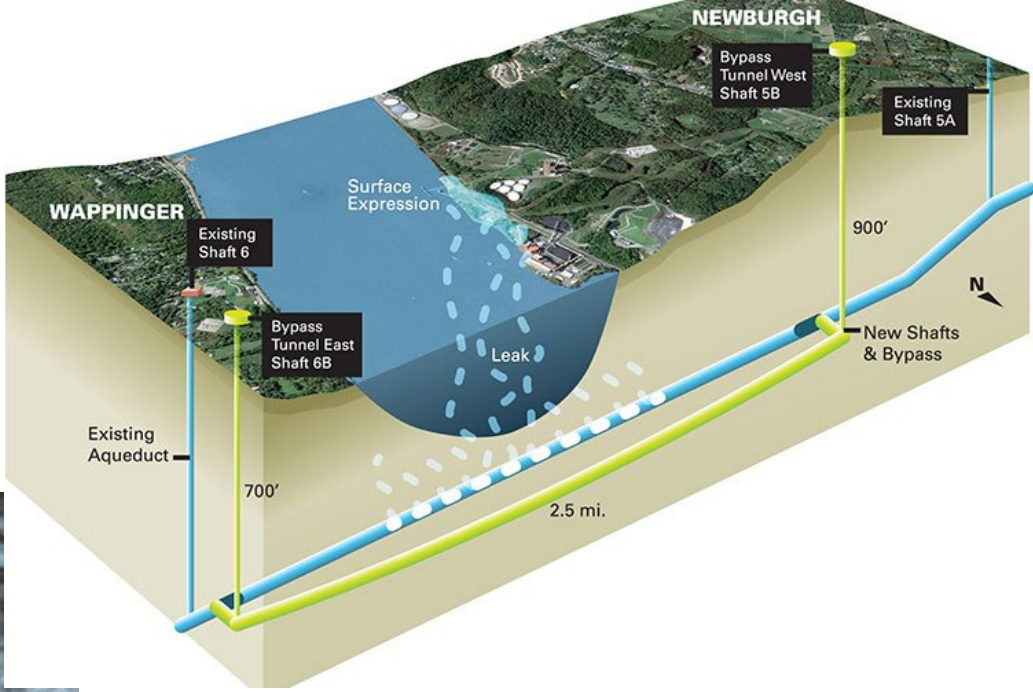
Gastau tunnel (Brazil): 17.5 ft internal diameter

Slurry Pressure Balance Tunnel Boring Machine



Source: Herrenknecht (extracted from https://www.youtube.com/watch?v=L1Kh_X6l-iE to show slurry pressure balance approach for high groundwater pressures. Note that cutterhead layout not representative for GLTC)

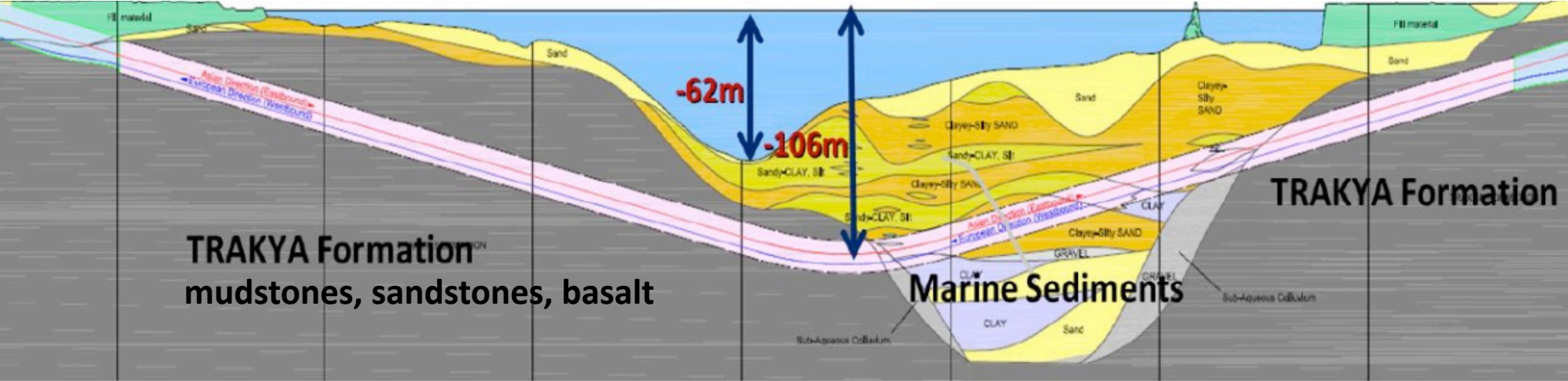
Contemporary Comparison



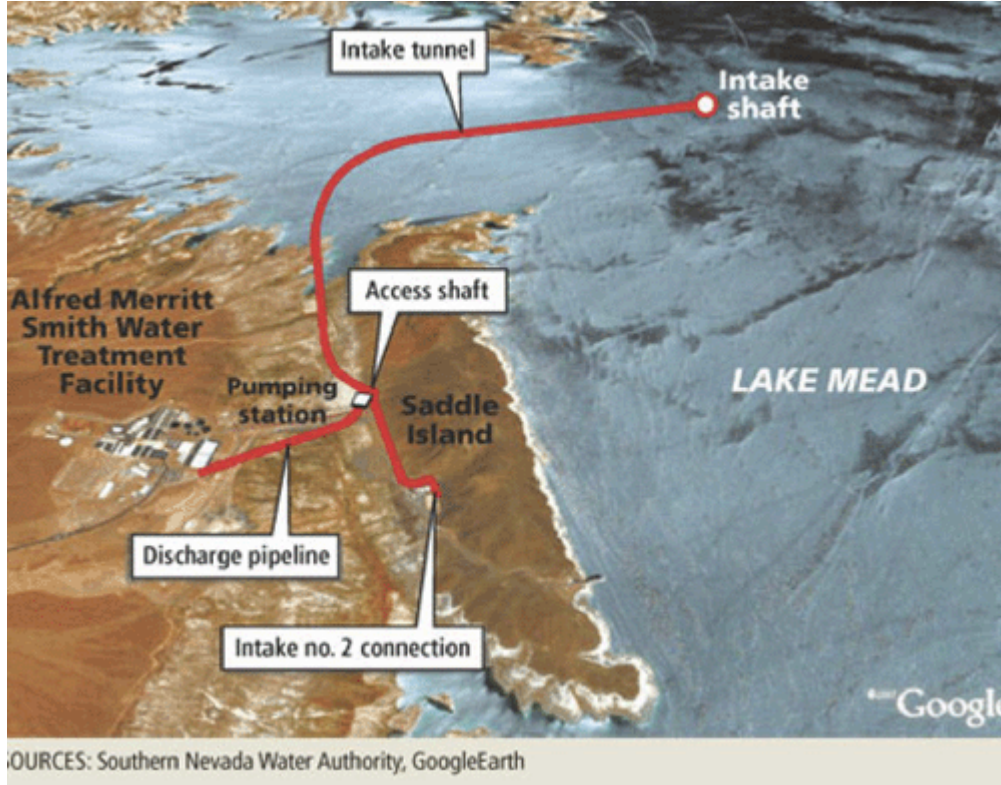
Eurasia Tunnel



- 2.1 miles long
- 45 ft excavated diameter
- 430 ft below water
- Experienced 12-14 bar water pressure

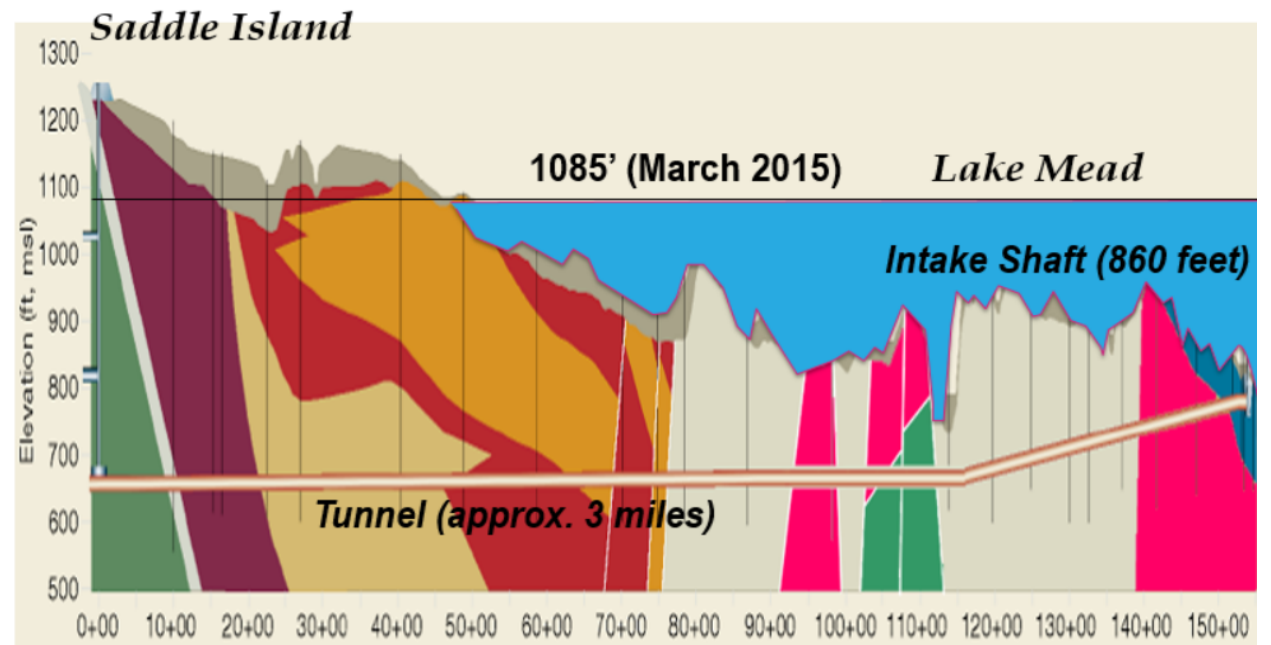


Lake Mead Intake 3 Tunnel

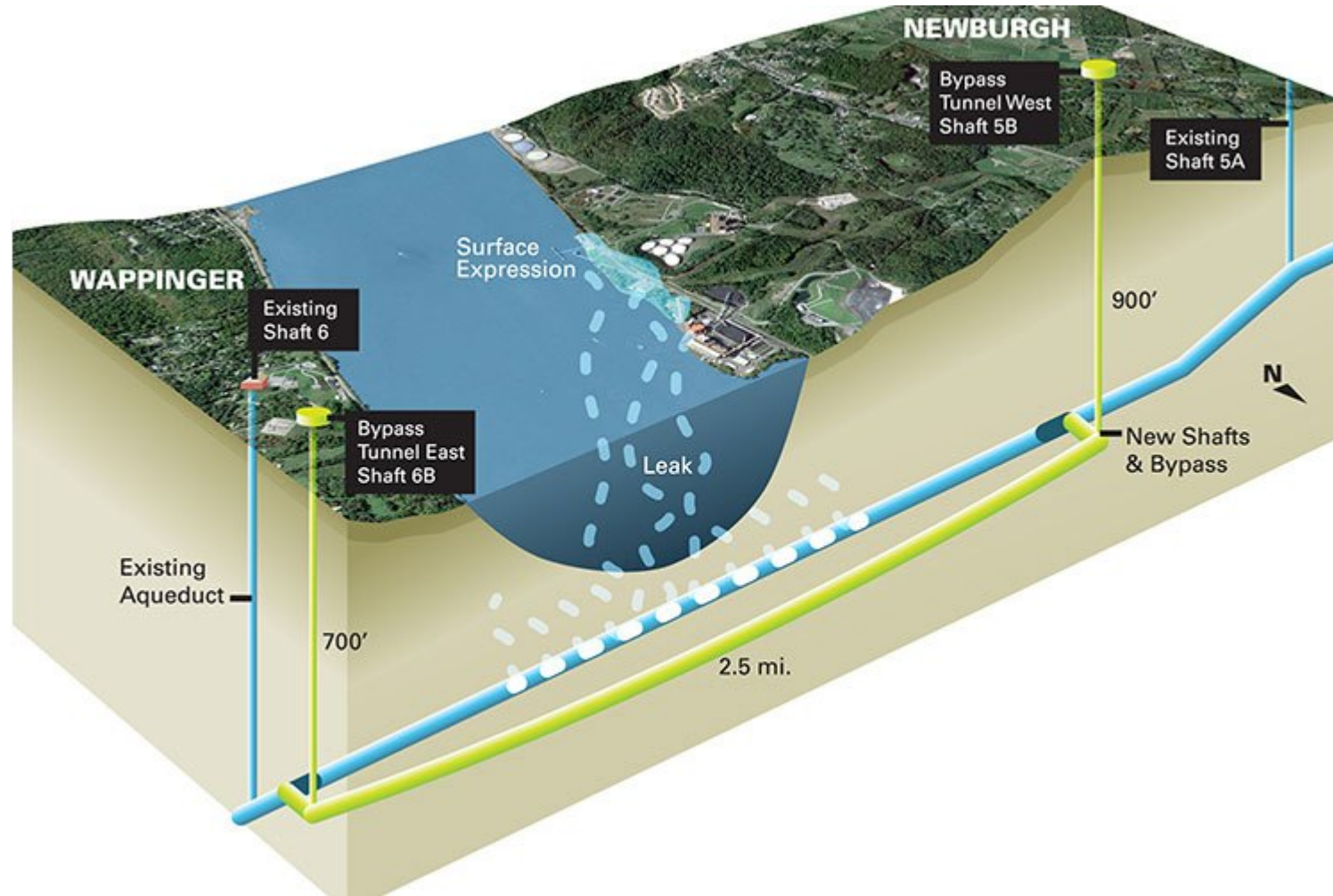


- 20 ft excavated diameter
- 450+ ft below water
- Up to 14 bar water pressure

Alignment Profile

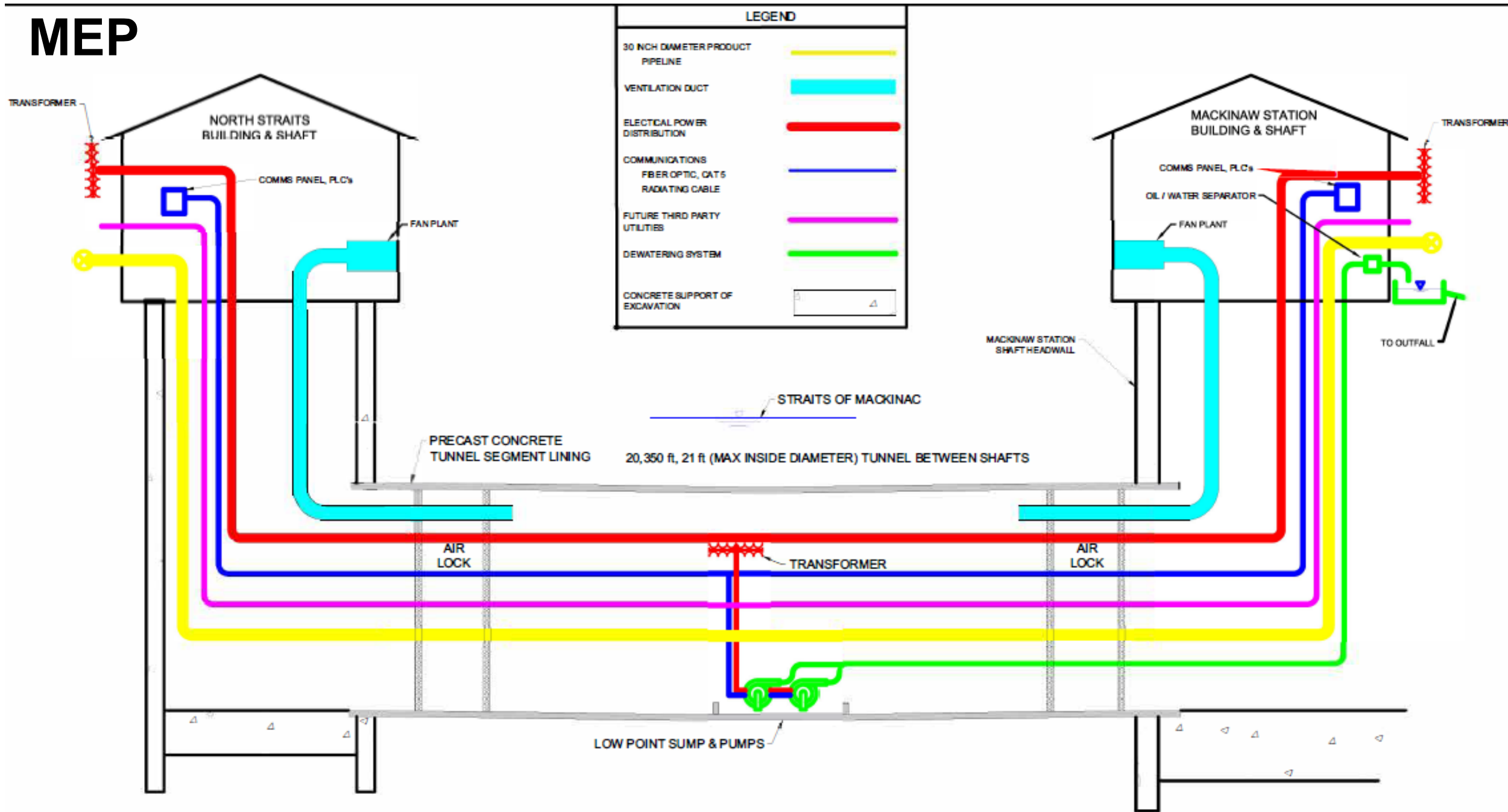


Rondout Bypass Tunnel



- 22 ft excavated diameter
- 900 ft deep
- Potential 20 bar water pressure

MEP



GLTP General Schedule

Item	Duration/Year
Design (with CM)	2020 + early 2021
Permit Application (USACE/EGLE/MPSC)	2020-2021 (estimate)
Construction	4 years (estimate; to commence when major permits received)

For further GLTP information:

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