

Horizontal Directional Drilling & Trenchless Capabilities

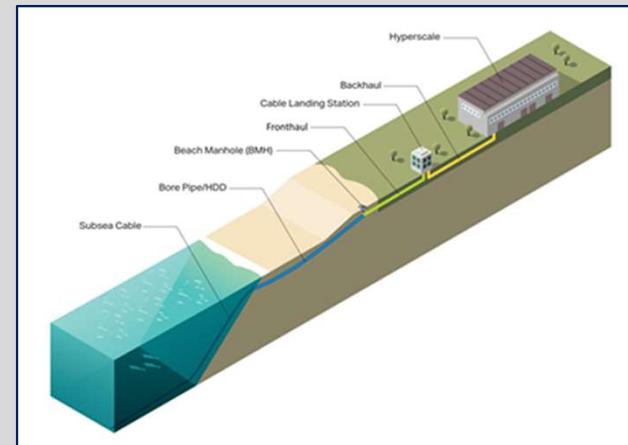
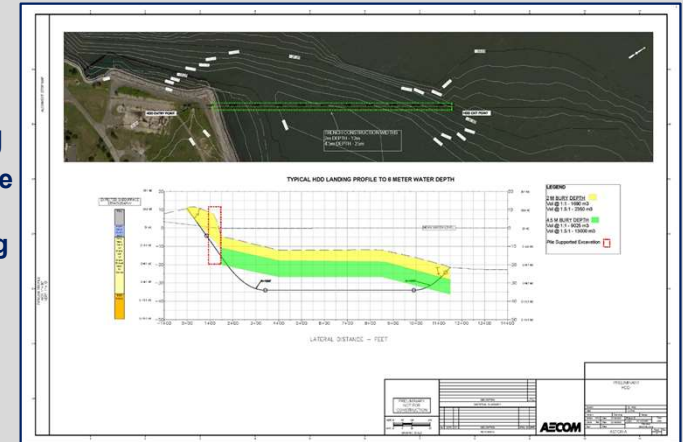


PLANNING, DESIGN, AND CONSTRUCTION PHASE SERVICES
OFFSHORE WIND | TELECOM | POWER TRANSMISSION | OIL & GAS | WATER/WASTEWATER

Scope of Trenchless Planning, Design and Construction Phase Services

- HDD, Micro-tunneling, Direct Pipe®, Conventional Boring
- Conduit & Cable Installation/Operation Stress Analyses
- Borehole Stability, Noise and Other Specialty Analyses
- Land-side, Near-shore Routing Development
- Geotechnical Studies
- Permitting Support – Federal, State, and Local
- Site Access, Temporary/Permanent Easement and Staging Options
- Construction Risk Profiles and Mitigation Options
- Construction Inspection and Monitoring

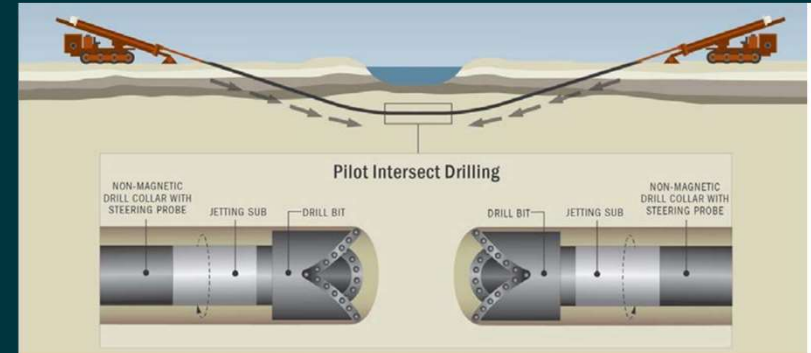
Shore Landing Design (Offshore Wind Client) - □ HDD / Trenching Feasibility for Marine Cable & Fiber Optic Landings



Data Cable Landing Design (Subsea Cable Installer) - □ HDD Designs for Marine Cable Landings & Beach Manhole

Capability Highlights

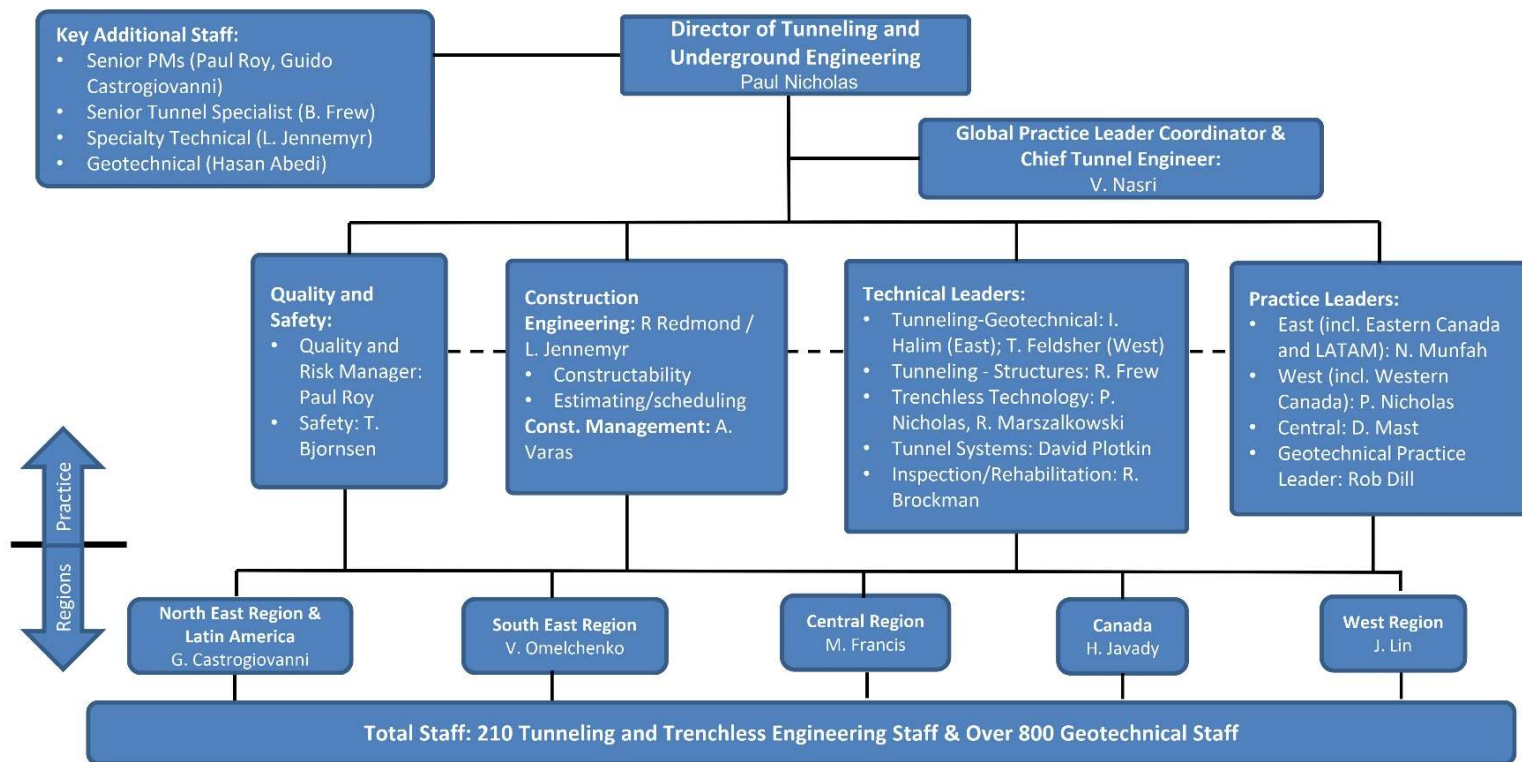
- Over 2,800 Trenchless Designs Completed To Date
- Technologies: Shore Approach and Intersect HDD Techniques, Direct Pipe®, Pilot-tube Micro-tunneling, Jack/Bore
- Installations include Data Cable & Offshore Power Landfalls, Water Body Crossings, Wetlands, Roadways and Railroads, and Similar Natural and Man-made Obstacles
- Experience working with all National HDD/Trenchless Contractors and many Regional and Local Drillers
- Local Subcontracted Services - Surveying, Bathymetry, Geophysics
- Geotechnical Investigation Services - In-house and Locally Subcontracted



Valley Crossing Direct Pipe®
NASTT 2018 Project of the Year

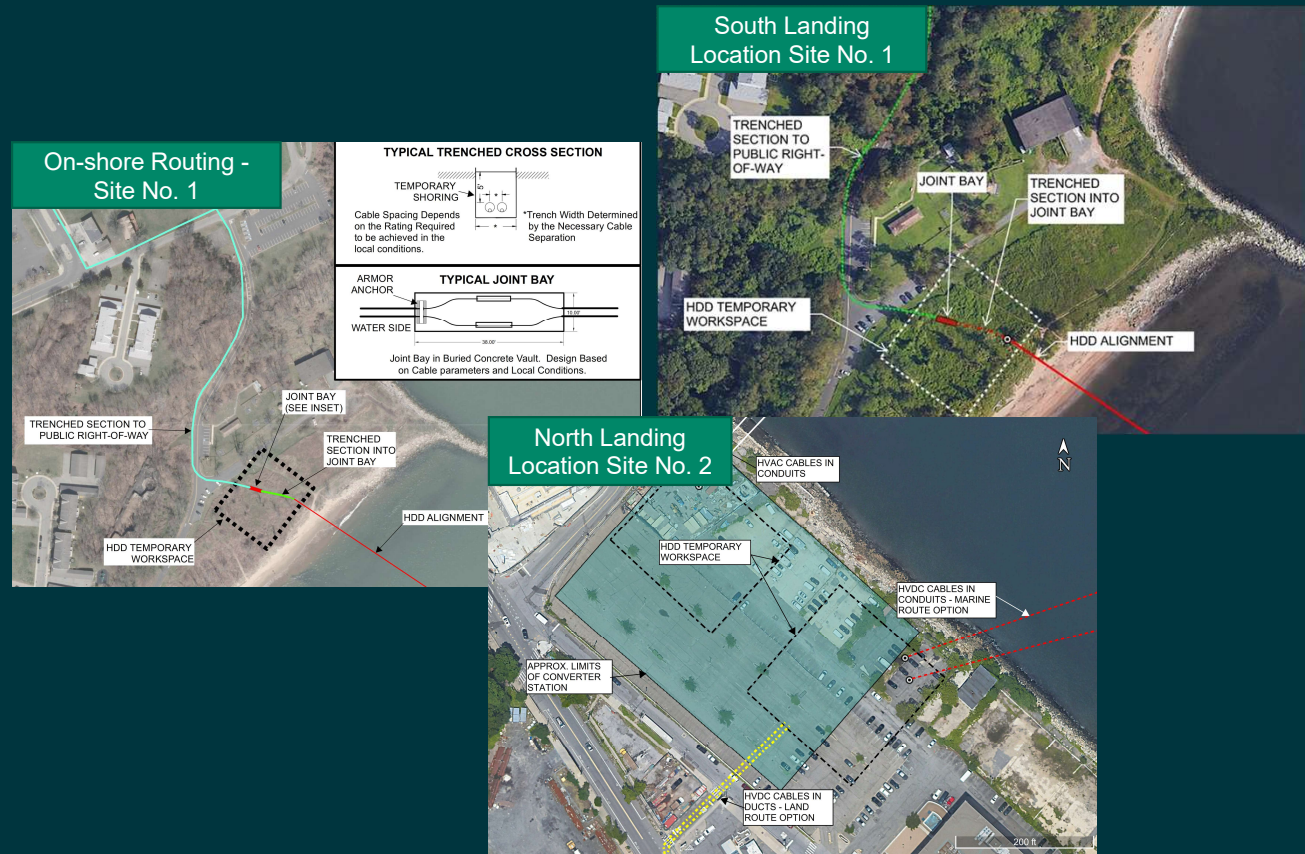
Professional Staff Resources

AECOM National Tunnel and Underground Engineering Organization Chart



Project Example – Offshore Wind Cable Landings & On-shore Routing Conceptual Designs, New York Harbor Area

- Evaluation of Multiple HDD Cable Primary and Alternate Landing Sites
- Marine And Terrestrial Routing Analysis in Highly Developed Areas of NYC
- Identification of Permitting Constraints Including Environmental, Cultural/ Historical, Land Ownership and Municipal Infrastructure
- Development of Conceptual Plans for Ductbank/Cables, Joint Bays and HDD Landing Profiles



Project Example – Confidential Owner for Subsea Cable Landing HDD, Massachusetts

- Owner's Site Representative - Construction Monitoring Services
 - Coordinated with Client, Supplier, HDD contractor and permitting team during planning stages
 - Reviewed engineering, health and safety, noise attenuation and traffic control plans
 - Participated in pre-mobilization site meetings with Client, Supplier, HDD contractor and local regulatory authorities
- Four Thousand Foot HDD from Congested Traffic Circle into Nahant Bay
- Six-Inch Steel Conduit for Landing Trans-Atlantic Data Cable

Installation of Casing Pipe



Beach Layout Of HDD Monitoring Grid

Project Example – Confidential Installer for Subsea Cable Landing HDD in Mexico

- Geotechnical Site Investigation, Planning and Preliminary Design Services For HDD Beach Landing
- Securing and Overseeing Local Subcontractors for Predesign On-shore and Off-Shore Studies
- Coordinating With Local and National Permitting Authorities
- Evaluating Landing Options and Developing Front-End Engineering Design For HDD Shore Approach Type Cable Landing and Connection to Beach Manhole

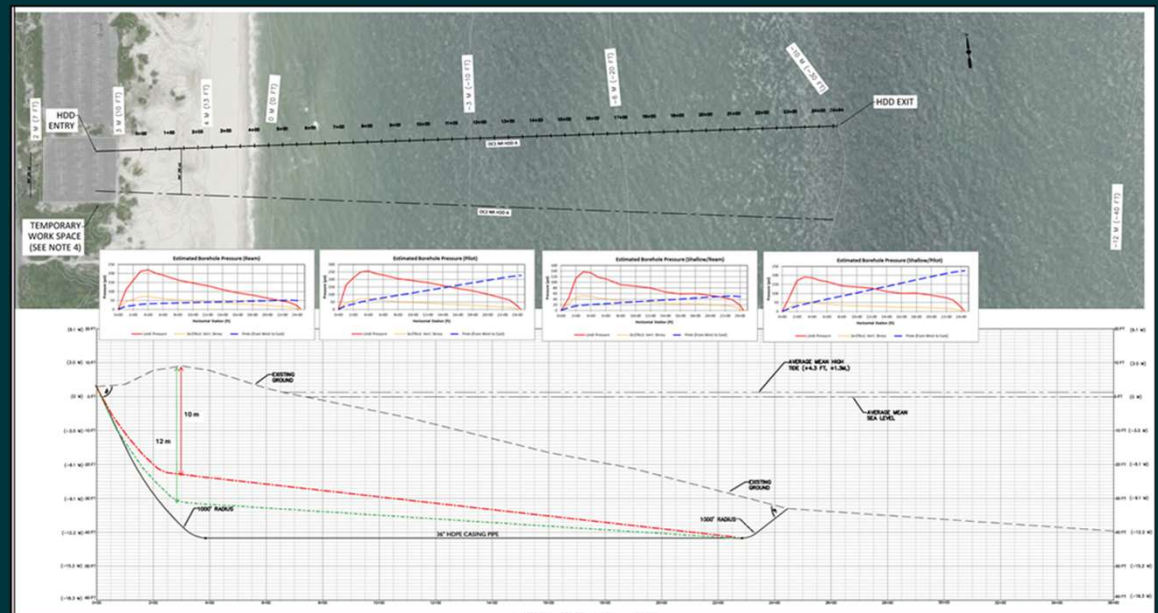
Site Conditions Evaluated for Temporary Work Space Requirements



Potential HDD Alignment

Project Example - Shore Landings, Offshore Wind Marine Cables, New Jersey

- Planning, Routing and Preliminary Design Services
- Evaluated Seven Landing Locations Along New Jersey Coast
- Shore Approach HDDs at Multiple Depths to Maximize Cable Ampacity
- Construction Permitting Support



Project Example - Dominion Virginia Gas 230kV, 600 MW U/G Transmission Lines, York, Virginia

- Full-Time Construction Monitoring Services
- Total of 17,000 FT HDD across York River – 3 Segments
- North Section = 6,000 FT
- Central = 7,500 FT
- South Section = 3,500 FT
- Twin 8-inch lines
- Fixed Platforms in River



Project Example - Tauranga Harbor Crossing, New Zealand

- Planning and Design Services
- 32-Inch Diameter 5,000-Ft HDD
- Challenging Subsurface Geology - 15-m Soft Silt Over Stiff Silt/Dense Sand
- Project Risk Classification - High Due to Limited Surface Access, Large Diameter Pipe for the Installation, and Unstable Soil Conditions



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