Moretrench American Corp. construction site’s earth retention system using Tiebacks and Rock Bolts at West End Residences, Boston, MA.

In This Issue:
- Mass. 20% Apprenticeship Program
- Federal/State SRF Projects Funding
- CWSRF & DWSRF Funding Budget Proposal
- Final MassDEP CY2009 CW/DW SRF IUP
- MassDOT Update
- Clean & Green...Remediating Contaminated Sites More Sustainably
What is not so well known is that Moretrench began life as a sewer contractor. Founder Thomas Moore started his sewer construction business in Buffalo, NY in 1885, and designed and patented a “hoisting and conveyance apparatus” to streamline trenching excavation. In 1896/7, a Moore Trench Machine, as it became known, was successfully used to construct a section of 48-inch pipeline for the Boston water supply.

In 1918, Moore made the milestone decision to move his business from New York to Rockaway, NJ. In 1925, responding to trenching problems encountered with Bull’s Liver soils on a site where one of his machines was in use, Moore designed, built, and installed the first practical wellpoint dewatering system in the U.S. This marked the beginning of a successful new corporate direction.

Building on his initial success, Moore continued to develop and improve his wellpoint system, finding a growing local market. By 1931, demand for his dewatering products was so great that he decided to make this his sole focus, incorporating as Moretrench Corporation. As industry acceptance grew, so did Moretrench. Some ten years later, Moore established a separate company, American Dewatering Corporation, to subcontract the entire pumping operation. After three decades of successful operation, Moretrench and American Dewatering merged in 1972 and Moretrench American Corporation, the forerunner of modern-day Moretrench, was born.

During the mid-1970s, Moretrench worked coast to coast, dewatering mass transit station excavations as well as running tunnels in Washington D.C., Boston, Buffalo, Baltimore, Atlanta, New York, and San Francisco. At the same time, alert to current industry needs, Moretrench began to pursue U.S. ground freezing opportunities. The company subsequently formed Ground/Water Treatment & Technology (GWTT) to cater to the emerging groundwater remediation market, and also began to offer a wide range of specialized geotechnical construction services. Nowadays, Moretrench is a full-service contractor working throughout the United States.

THE HISTORY

New England homeowners, developers and general contractors that have experienced groundwater or complex soil problems are very likely to be familiar with specialty geotechnical contractor Moretrench. The New Jersey-headquartered company has a well-established regional presence and has worked on such high profile projects as Boston’s Big Dig, using ground freezing to aid jacking of three, massive tunnels beneath active Amtrak lines serving Boston’s South Station.

In 1896/97 the Moore Trenching Machine was used to construct a section of 48-inch pipeline for the Boston water supply.

Overcoming the Challenges of New England’s Water & Soil Conditions

continued on page 34
Moretrench American Corp. continued from page 33

**CSO ABATEMENT PROGRAMS**

Over the past several years, Moretrench has been actively involved in the ongoing Rhode Island and Massachusetts CSO abatement projects, using dewatering, ground freezing, grouting, deep casing installation and sheeted excavation support to aid shaft construction.

**Providence, RI**

The Narragansett Bay Commission’s comprehensive plan to abate CSO pollution was initiated in 2001. In the first phase of the program, Moretrench was contracted to Shank/Balfour Beatty to provide groundwater control and excavation support by means of ground freezing for two conventionally excavated access shafts, varying from 34 to 45 feet in diameter, and a pair of drop and vent raise bored shafts.

Ground freezing is recognized as the most effective method of providing groundwater cut-off and excavation support for deep shaft sinking. Design and application of the freezing program requires specialized engineering knowledge and experience, and its success is predicated on accurate subsurface information.

**STRATEGIC LOCAL PRESENCE**

Moretrench, and its subsidiary Ground/Water Treatment & Technology (GWTT), serve New England clients directly through strategic locations in Assonet and Worcester, MA. “Our Assonet office offers a full range of technologies, including dewatering and groundwater control, ground freezing, earth retention and excavation support, deep foundations, underpinning systems, and grouting systems,” says Moretrench Regional Manager Drew Floyd. “Our client list is just as varied. We’ve worked for homeowners and universities, on Federal and State projects, for large private sector owners and developers, and for major utility companies throughout the area.” GWTT’s environmental services, complementing Moretrench’s core dewatering business, include construction, systems integration, operation and maintenance, and equipment sales and rental. Its Worcester, MA office is headed up by Paul Lockwood.

**Providence CSO Tunnel: Initial vertical and secondary shallow freeze pipes.**
Moving groundwater and groundwater contamination can inhibit freeze closure. In such an event, accurate and early diagnosis of the condition and timely reaction to mitigate potential project delays is critical.

Ground freezing for the other shafts had been accomplished without incident. However, closure for the main 45-foot diameter, 160-foot deep access shaft proved to be particularly challenging due to three unanticipated factors: the presence of free-phase gasoline at the surface of the water table; highly permeable openwork gravel layers and seams within the glaciofluvial deposits; and groundwater flow from the rock into the overburden.

When freeze closure was not achieved at the main access shaft within the anticipated timeframe, temperature profiling of the freeze pipes was performed to evaluate the progression of the freeze and to determine why closure had not occurred. Profiling indicated temperature anomalies at shallow depth near the water table almost uniformly around the perimeter of the shaft and at shallower specific depths (150 and 160 feet) on the south side. Additional investigation revealed the presence of contaminants in the groundwater, slowing the freeze at shallow depths. Installation of a secondary series of shallow, angled freeze pipes, combined with tube à manchette grouting, corrected the anomalies, resulting in closure of the freeze wall. The project regained schedule and was successfully completed.

**City Of Fall River, MA**

The City of Fall River’s CSO Abatement Plan is designed to improve the quality of treated effluent discharged into Mount Hope Bay. Under several separate subcontracts, General Contractor J. F. Shea of Walnut, CA retained Moretrench to perform dewatering, earth support and deep casing installation work at new drop shafts, located at Lowell, Third, Birch, and Globe Streets and North Plymouth Avenue, that would tie into the main CSO system via connector tunnels excavated through the bedrock.

Subsurface conditions were similar at all five sites, generally consisting of varying depths of urban fill overlaying dense, bouldery glacial till, with granite bedrock encountered at between 21 and 68 feet below working grade. Groundwater was generally present at a maximum depth of 6.5 feet below grade.

*continued on page 36*
Construction Dewatering was performed at all five sites. Duplex drilling was used to install small-diameter, closely spaced deep wells around each shaft perimeter, extending to the top of rock. Pump capacity was geared to the low flow anticipated. Each well was fitted with sensors that responded to the volume of flow, allowing the system to automatically turn on and off as needed. Pumped groundwater was discharged into nearby storm water sewers.

Temporary Earth Support was required at all five locations to allow complete overburden removal for excavation of vertical drop shafts into the underlying rock. Subsequent placement of a form liner (typically 14 feet in diameter but 18 feet at the North Plymouth site) and concrete backfilling provided a watertight excavation.

Given the intensely bouldery nature of the glacial till, Moretrench selected a drilled-in micropile and lagging system rather than conventional beam-and-lagging support. Micropiles were installed around the perimeter of the excavation zone at nominal 4 to 6 foot spacing. An overburden drilling system capable of penetrating the boulders, some up to six feet in diameter, was used to advance the micropile casing through the fill and glacial till and into bedrock. The rock sockets ensured the continued stability of the support system during tunnel blasting operations. As overburden excavation by a small excavator and by hand progressed in discrete lifts, Moretrench secured the timber lagging boards with welded studs and plates. Lateral support of excavation was provided by internal ring walers typically installed at 10 to 12 foot intervals.

Casing Installation for the construction of air and circulation shafts involved drilling 48-inch diameter holes with kelly-type auger tools. After placement of the 48-inch steel casings, grouting along the exterior and bottom of the casing ensured a watertight seal for the subsequent vent shaft construction.

Completed earth support system at the Fall River Globe Street site.
ENVIRONMENTAL REMEDIATION

GWTT’s environmental remediation services are frequently required as a result of either EPA or State-mandated clean-up, but this is not always the case. “We also work on environmentally ‘clean’ sites in conjunction with construction operations,” notes Worcester Office Manager, Paul Lockwood. The total suspended solids (TSS) or pH levels can be elevated as a result of normal construction operations and may need to be lowered to meet discharge criteria.” However, groundwater, soil or air remediation represents the bulk of GWTT’s core business.

Ferry Access Road, Bridgeport, CT

The access road to the Bridgeport Ferry, linking southwest Connecticut to Long Island, runs alongside the United Illuminating Company’s (UIC) Bridgeport power plant. When UIC planned to install several thousand feet of water and sewer line parallel to the roadway, a wellpoint system accompanied with localized sumping was needed to draw groundwater down below trench excavation subgrade. Since the groundwater was known to be contaminated with elevated levels of volatile organic compounds (VOCs) and polychlorinated biphenyls (PCBs), treatment before discharge was an essential component of the work. GWTT was retained on a design/build contract basis to install, operate and maintain a treatment system for the duration of the project.

The system, designed for a flow rate of 300 gpm, operated automatically, and had callout capability via an autodialer in the event of an alarm condition. Components included equalization tanks, an oil/water separator, electric transfer pump, mechanical filtration units and a flow meter/totalizer.

The Ferry access road is designated a high security area and comes under the jurisdiction of Homeland Security. Keeping the roadway clear during the busy daytime hours meant that all of GWTT’s work, including operation and maintenance, had to be completed at night.

Former Manufacturing Facility, Hyde Park, MA

Ongoing work in connection with extensive EPA and MassDEP-mandated clean-up at a facility formerly used for industrial purposes includes the re-routing of an adjacent river to bypass the facility and removal of impacted on-site soils, involving a number of large excavations up to 35 feet deep. Pumped groundwater from dewatering operations is being treated by a temporary system designed, installed, operated and maintained by GWTT.

In addition to equalization tanks, a clarifier, electric transfer pumps, filtration units and air strippers, the 500 gpm system features both air and liquid carbon adsorption units. Treatment will reduce the levels of total suspended solids, VOCs and PCBs prior to discharge back to the river.

“Moretrench and GWTT have worked for a variety of clients throughout New England,” notes Cam Klockner, the company’s North East Regional Dewatering Operations Manager. “We are currently doing dewatering for the closed loop cooling system at Brayton Point power plant in Somerset, MA and the CSO project in North Dorchester, MA.” Other ongoing geotechnical projects include soil nailing for Route 128 widening in Dedham, MA and drilled shafts for the Route 12 Bridge in Westminster, MA. And GWTT has just started a Rhode Island project for National Grid to treat sludge and water in two former gas holders.

UCANE is proud to count Moretrench American Corp. as a respected member and wishes the company continued growth and success.