MORETRENCH

PROJECT SUMMARY

SHALLOW PENETRATING DEWATERING WELLS

Atlantic City-Brigantine Connector
Atlantic City, New Jersey

The 2.4-mile long Brigantine Connector connects the Atlantic City Expressway with the marina district of Atlantic City, NJ and Brigantine Island. To alleviate community noise concerns where a portion of the connector alignment would pass through a residential area, design of the new highway included a deep cut-and-cover tunnel. The approximately 2,900-foot long tunnel/depressed roadway section, which runs directly alongside the Penrose Canal, required excavation up to 35 feet at the deepest portion of the tunnel. With groundwater at approximately five feet below working grade, dewatering was required throughout the excavation and connector construction process.

During construction of the 2,900-foot long tunnel/depressed roadway section of the Atlantic City-Brigantine Connector, a shallow penetrating dewatering system ensured a dry excavation while minimizing offsite groundwater drawdown.

Organics Raise Settlement Concerns

Site soils through which excavation would take place consisted of a shallow but extensive compressible meadow mat, clean beach sands down to a depth of approximately 60 feet, a lower-permeability silty sand stratum, and a deeper, highly permeable coarse sand and gravel aquifer beneath. The presence of the compressible meadow mat layer gave rise to concerns regarding potential settlement along the connector alignment as a result of widespread groundwater lowering outside of the planned sheetpile excavation support. It was imperative, therefore that the dewatering system installed would limit drawdown outside the excavation support system and minimize offsite effects.

Hybrid Approach Provides Solution

Without the concern for drawdown-induced offsite settlement, the project could have been dewatered with a dozen deep penetrating high capacity wells. Instead, Moretrench worked with the design-build general contractor partnership of Yonkers Contracting Company and Granite Construction Company to develop a solution utilizing the excavation support in combination with a shallow penetrating dewatering system that would ensure a dry excavation while minimizing offsite groundwater drawdown. The design consisted of:

- Driving the tight interlocking steel sheeting to a depth of 60 feet on either side of the excavation to key into the underlying lower permeability silty sand stratum
- Installation of an interior system of 100 shallow penetrating wells that would terminate several feet above the toe of the excavation support

Atlantic City-Brigantine Connector, continued

Driving the sheetpiling deeper than would normally be required for the depth of excavation would provide a partial groundwater cut-off and reduce the amount of natural inflow into the excavation area. Limiting the depth of penetration of the dewatering system to the depth of the perimeter sheeting would substantially limit the volume of offsite groundwater drawdown yet adequately dewater the deep interior excavation to 28 feet below sea level. The effectiveness of the design approach was verified early on with several aquifer pumping tests.

System Installation and Operation

A 12-inch diameter holepuncher and casing was used to jet each well to design depth within the steel sheetpiling on either side of the excavation. The wells were constructed with a 6-inch diameter slotted wellscreen that could accommodate a wide range of submersible pumps. The wells were spaced from 30 to 60 feet apart, depending on depth to excavation subgrade. Surface discharge piping conveyed the pumped water into the adjacent canal.

The system operated continuously throughout the 16-month excavation and construction period. Excavation subgrade was kept dry while less than three feet of drawdown was measured outside of the excavation at the depths of the meadow mat compressible layer. No settlement or damage to nearby structures was observed.

The 100-well system was installed inside of the excavation support and operated continuously for the 16-month construction period.

Moretrench

100 Stickle Ave., Rockaway, NJ 07866

Tel: 973-627-2100 | Fax: 973-627-3950