



SECANT PILES

THORNTON WATER PROJECT - WINDSOR, COLORADO

The Thornton Water Project is being constructed to deliver water from the Water Supply and Storage reservoirs north of Fort Collins to the City of Thornton, a distance over 65 miles. The path of the pipe had several river crossings that needed to be tunneled under. Schnabel was contracted to design and build the launch and receiving shafts at two of these crossings and a receiving shaft for a third location. These five shafts needed to be water-tight to allow safe and effective excavation. The deepest of the shafts was 55 feet.

The subsurface conditions at the 5 shafts were similar. The generalized soil profile consisted of 10 to 15 feet of silty clay and sand underlain by soft interbedded claystone/sandstone bedrock. The water table was 12 foot below the surface on average. A secant pile wall was chosen by the Thornton Water Project Design Team to provide excavation support for the shafts and limit groundwater in the excavation. Schnabel was contracted to design and build the secant pile shafts.

A secant pile wall consists of drilling continuous overlapping concrete piers to provide a watertight, concrete wall. With the help of Schnabel Engineering, Schnabel designed the secant piles to be constructed out of plain concrete relying on only the compressive hoop strength of the pile group to resist the soil and water pressure. This design requires that close attention be given to the verticality and structural integrity of the individual piers. To ensure adequate pier overlap, the shafts had to be drilled within a 0.5% verticality tolerance. The verticality was monitored using the PRAD system to read the alignment of every hole. The volume of concrete was also monitored to ensure that the theoretical concrete volume is less than the actual volume of concrete placed; otherwise, the shaft may have an inclusion from the surrounding earth that will adversely affect the structural integrity of the entire shaft.

Schnabel was able to successfully complete this project on time and on budget with structurally sound shafts. The project totaled over 5,700 feet of vertical drilling and over 3,000 cubic yards of concrete. The construction of the project took 5 months to complete and was finished in December of 2020.

Owner: **City of Thornton**

General Contractor: **Scott Contracting**

Design/Build Specialty Contractor:

Schnabel Geostuctural Design & Construction



For more information on this project or any other of our projects please contact Schnabel at:

(703) 742-0020 or visit our website at www.schnabel.com

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