

World Trade Center Monitoring

The \$1B World Trade Center (WTC) Transportation Hub Project in New York City, at the northeast corner of the site at Church and Vesey Streets, will form an underground connection between the World Financial Center and the Metropolitan Transportation Authority's Fulton Street Transit Center. Through it, pedestrians will have access to Hudson River ferry terminals, PATH trains, 14 subway lines, and, potentially, a direct rail link to JFK International Airport.

The client for the project is the Port Authority of New York and New Jersey. The prime contractor is Phoenix Constructors JV, a joint venture consisting of Fluor, Slattery Skanska, Bovis Lend Lease and Granite Construction. Initial work on this project began in early 2006, with beneficial occupancy expected in 2009.

The first construction package of the project is the underpinning of New York City Transit's No. 1 Train subway box that runs through the center of the site in a north-south direction. The project involved the installation of over 450 mini-piles and jet grout cut-off walls to support the subway box while excavations are conducted below the subway box.

Geocomp won the subcontract for geotechnical and structural instrumentation that are required to ensure the integrity



and stability of the subway box and uninterrupted operation of the train during the underpinning and undermining activities.

The monitoring system implemented by Geocomp includes:

- Automated Motorized Total Stations (AMTS) and reflective prismatic targets on top of the subway box and on existing slurry wall to continuously monitor tunnel and wall deformations during construction
- Horizontal inclinometers on the subway roof and in the subway track to monitor settlement
- Strings of horizontal beam sensors mounted on the subway walls to monitor the settlement
- Seismographs installed inside the tunnels to record vibrations caused by construction activities
- Observation wells on both sides along the subway box to measure groundwater levels during dewatering
- Liquid level gages installed in the subway track to measure potential heave during the jet grouting
- WEB-based data processing, presentation, reporting and alarm system to provide project members with up-to-date performance measurements to control the work.