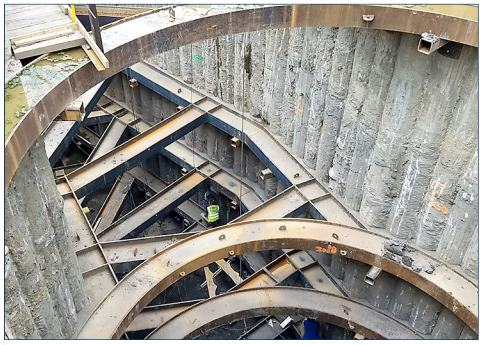
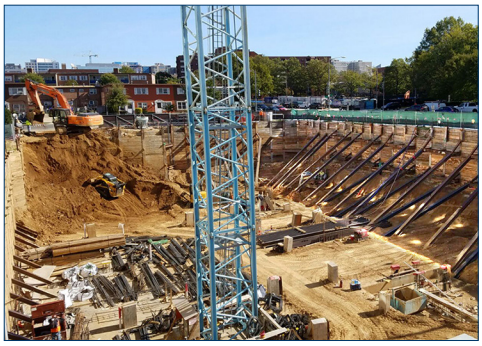
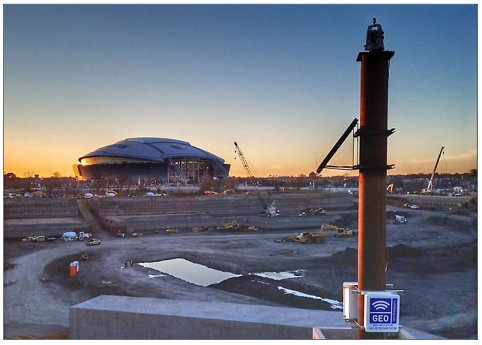
# Monitoring Support of Excavation







## Support of Excavation Systems

Support of excavation (SOE) systems are designed to provide lateral support for the soil around the excavation, maintain a safe work area, and minimize impact to adjacent structures.

The performance of SOE systems is affected by complex interactions of soil type, lateral loads from adjacent structures, porewater pressure, and the width and depth of the excavation. Other variables that may affect performance include weather conditions, repositioning of heavy equipment and stockpiled materials, and vibrations from road traffic, railways, and nearby construction.

## Monitoring SOE Systems

**AMTS** monitor lateral movement of shoring walls. Prisms can be clamped magnetically to soldier piles and sheet piles. Prisms can also be installed on soil-nail walls.

**Tiltmeters** placed on soldier piles and sheet piles can monitor deflection.

**Shape Arrays** monitor lateral movement in or behind earth retention structures.

**Piezometers** installed around the perimeter of the excavation monitor changes in pore-water pressure due to dewatering.

**Strain gauges** monitor changes in strain on struts and braces.

**Load cells** monitor changes in loads on tieback anchors.

**Weather stations** monitor rainfall and temperatures.

## SOE Performance Parameters

Instrumentation provides measurements that can validate design decisions, detect unwanted trends, and verify corrective measures. Monitored parameters include:

- Deflection or deformation of the retaining structures.
- Displacement of soil behind the retaining structures.
- Displacement of adjacent structures and utilities.
- Loads on anchors and bracing.
- Pore-water pressures and water levels.
- Vibration levels.

## Monitoring Adjacent Structures

**AMTS** monitor any movement of buildings adjacent to the excavation. Prisms are installed on building facades.

**Tiltmeters** placed on walls and structural elements monitor rotation (leaning or tilting).

**Crackmeters** monitor existing cracks that may worsen if settlement occurs.

**Hydrostatic Level Cells** monitor settlements across a wide area. HLCs are especially effective for masonry structures.

**Vibration Monitors** monitor for excessive vibrations from the excavation activities.

**GeoCloud Automation** provides wireless data acquisition, web-based data management, and secure website access to data.