Geotechnical Monitoring of the Excavation for the Transbay Transit Center

Citizens Advisory Committee - March 13, 2012
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• Instrumentation Plan
• Instrument Types
• Data Distribution
• Data Interpretation and Actions
Plan of Instrumentation – First Street to Second Street
Plan of Instrumentation – First Street to Beale Street
• **Inclinometers** – 44 digital, 3 manual  
  - Measures the horizontal movement at various depths

• **Piezometers** – 51 digital, 5 manual  
  - Measures the elevation of groundwater

• **Deep Settlement Markers** – 16 digital  
  - Measures the settlement or heave of anchor installed beneath the ground surface

• **Extensometers** – 11 digital  
  - Measures the settlement or heave of an array of anchors installed at a variety of depths beneath the ground surface

• **Survey Monuments** – ~100 monitored by Automated Motorized Total Station (AMTS)  
  - Measures the horizontal and vertical movement of a survey prism

• Instrumentation supplied by our subcontractor, GEO-Instruments
Digital Inclinometer
• Datalogger located in underground vault box

• Vault box lid works as an antenna for the wireless transfer of digitally collected data

• Data is uploaded to an ftp site

• Arup has created a web portal to display data in real-time to allow efficient review and interpretation
• **Automated Motorized Total Station (AMTS)** reads the location of over 100 Survey Monuments once every 2 hours.

• Correction of readings based on the AMTS’s location using backsight prisms located away from the excavation.
Global Analyzer – Data Distribution Web Portal
Typical Plot of Survey Monument from the Global Analyzer
• Transbay Movement Review Panel

• Action Trigger Levels (Yellow/Orange)

• Maximum Allowable Movement Levels (Red)

• On-going review of data allows detection of areas which are not performing to plan prior to significant problems occurring

• Design adjustments can be made prior to the most critical stages of excavation
Questions