PROJECT PROFILE

LANDSLIDE STABILIZATION WITH GROUND ANCHORS AND REACTION PADS

Corfu Street is perched on an isolated, lenticular plateau midway up the south valley wall of the Ohio River in the West End neighborhood of Pittsburgh. This plateau represents the head of a prehistoric rockslide that likely occurred following a period of glacial meltwater erosion during the Pleistocene Epoch.

Following a year-long period of above-average rainfall, a landslide, involving more than 120,000 cubic yards of accumulated soil and rock debris, was reactivated by a rise in the groundwater table and resulting saturation of the slide mass.

Geotechnical exploration of the site confirmed the composition of the slide debris mass and the geometry of the reactivated landslide. The exploration included 12 test borings and installation of slope inclinometers and vibrating wire piezometers. From the inclinometer data, it was determined that the base of the sliding mass was the surface of a claystone layer at depths of 25 to 40 feet below the ground surface.

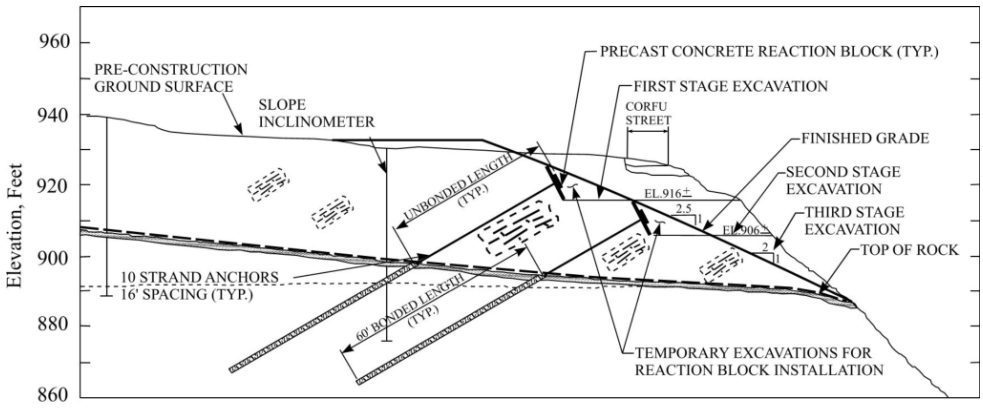
Large scale excavation of the slide debris mass was considered as a possible means to reduce driving forces and eliminate the steep debris outslope and protruding boulders. However, site access considerations and the depth of excavation that would be necessary eliminated this as a potential solution. To effectively stabilize the landslide, support elements would have to extend beneath the slide plane into bedrock. Two alternative remediation systems were considered:

Slope at Corfu Street during installation of ground anchors and surface reaction pads.

- A steel soldier beam and reinforced concrete lagging retaining wall with soldier beams and ground anchors extending into bedrock
- A series of precast reinforced concrete reaction pads with ground anchors extending into bedrock

The anchored reaction pad system was selected for final design and implementation for the following reasons:

- The system could be installed using relatively light and mobile ground anchor drills, and consequently there would be no need to mobilize large, heavy rigs to the site over winding, narrow residential streets. Also, this alternative would not require heavy equipment to operate on the surface of the unstable outer edge of the sliding mass
- Materials required for construction (anchors and reaction pads) could be more easily delivered to the site
- Installation of reaction pads and anchors would be easier and quicker
- The system would provide greater flexibility with respect to the sequence of construction, and would permit more expedient application of anchor forces in specific areas
- The time required for fabrication of construction materials (anchors and reaction pads) was significantly shorter
- The estimated construction cost of the reaction pad system was less than one-third of the estimated construction cost of the soldier beam and lagging wall.



Schematic cross section of Corfu Street slope stabilization.

In addition to performing stability analyses and developing the selected design, D'Appolonia monitored instrumentation data and provided full-time construction management services for the duration of the project. Negligible move of the slope has occurred since completion of construction.