Association of Environmental and Engineering Geologists – Arizona Section

Dinner Meeting:
Thursday, July 23, 2015

SunUp Brewing Company in Phoenix

5:30 PM Mingling and Drinks
Sponsor: TBD

6:30 PM Dinner and Presentation

SPEAKER:
Ken Fergason
Senior Geologist with Amec Foster Wheeler

PRESENTATION:
The Geologic, Geohazard, and Geotechnical Field Investigation for the Hoover Dam Bypass Bridge

Cost: $30 AEG Member
$35 Non-Member
$15 Government
$10 Students

Location: SunUp Brewing Company
322 E. Camelback Rd.
Phoenix, Arizona 85012

RSVP by Friday July 20, 2015 to Zachery Shafer at zachery.shafer@aecom.com

BIOGRAPHY

Ken Fergason

Senior Geologist at Amec Foster Wheeler

Ken Fergason, P.G. (AZ) is a Senior Geologist with Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) in Phoenix, Arizona, and the 2014-2015 President of the Association of Environmental & Engineering Geologists (AEG). He has been with Amec Foster Wheeler since November 2000. Since that time, he has been utilized as a project manager, technical lead, project geologist, task manager, and field geologist performing geologic, geotechnical and geologic hazard investigations for dams, levees, channels, basins, buildings, roadways, bridges, power plants, transmission lines, mining projects, pipelines, and other structures. In addition, Mr. Fergason has been extensively involved in the characterization of land subsidence and subsidence-related hazards such as earth fissures and associated impacts for planning, design and remediation of significant infrastructure. Mr. Fergason has also been involved in projects that utilize remote sensing technologies such as interferometric synthetic aperture radar (InSAR) as they apply to geologic and geotechnical characterization, including ground subsidence and earth fissuring, landslides, and slope stability issues. Mr. Fergason has also utilized mountaineering techniques obtained in a specialized training course to map the geology, fracture patterns, and other concerns on canyon walls specifically applied to geotechnical characterization for bridge foundations and slope stability. He has experience investigating geologic hazards such as land subsidence, earth fissuring, landslides and seismic hazards and has received specialized training in the use of LiDAR and high resolution DEMs for landslides and slope stability. Mr. Fergason has worked internationally in Canada, Mexico, Germany, Romania, the Czech Republic, and has supported other projects worldwide.

Education: 1998: BS, Engineering Geology, Texas A&M University, 2001: MS, Geology, Arizona State University.

Mr. Fergason is also active with the Arizona Hydrological Society (AHS), The Arizona Land Subsidence Group, The Arizona Geological Survey Earth Fissure Advisory Group, and the Geotechnical Extreme Events Reconnaissance (GEER).

ABSTRACT

Someone is Paying Me to do This! The Geologic, Geohazard, and Geotechnical Field Investigation for the Hoover Dam Bypass Bridge

This presentation is a retrospective discussion of the field investigation portion of the geohazard investigation and geotechnical design of the Hoover Dam Bypass Bridge that spans the border of Arizona and Nevada, crossing the Colorado River immediately downstream of the Hoover Dam.

Or to put it another way, a collection of 'war stories' from a young field geologist who, on his first year on the job, had the opportunity to work on a career-defining project. This project was awarded the 2014 Outstanding Environmental and Engineering Project Award from AEG at the 57th Annual Meeting in Scottsdale, Arizona.

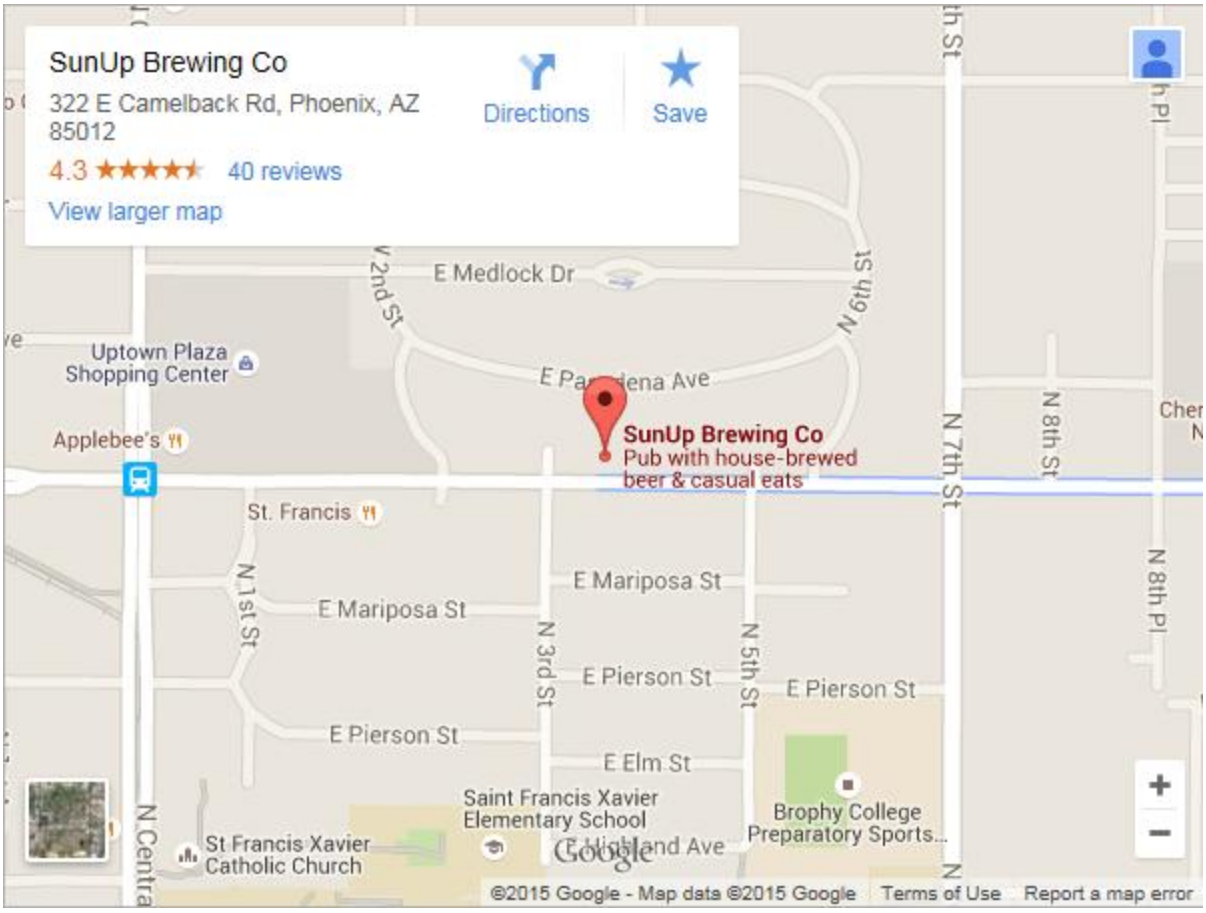
The river bridge structure — the Mike O'Callaghan-Pat Tillman Memorial Bridge — is as grand as its safety, security and economic impact. The 1,900-foot-long Colorado River crossing is the centerpiece of the project, which included 3.5 miles of new approach roadway on both sides of the river and seven other bridges. It is the highest and longest arched concrete bridge in the Western Hemisphere and features the world's tallest precast concrete columns. The innovative hybrid structure is designed to complement the dam with the high-performance concrete arch while limiting the load demands with a modern steel superstructure. It is the first steel-concrete hybrid arch bridge in the United States.

The spectacular setting provides a backdrop for one of America's most significant modern civil engineering projects but also proved to be the greatest challenge. The Black Canyon below the dam is an 800-foot-gorge with dramatic rock cliffs, steep to vertical canyon walls and a vast geological palette. Working in such a setting required rock cuts and fills exceeding 100 feet in height, accounting for winds up to 70 miles per hour and setting concrete at night to avoid desert heat reaching more than 120 degrees.

Major challenges faced by the geotechnical investigation included

- Extreme heat (on site temperatures in excess of 130°F in the shade were measured – there was very little shade),
- Extreme access – mountaineering rope work techniques were required, drill rigs were mobilized via helicopter, crane, track, and 'spyder',
- High voltage overhead electrical transmission lines constraining helicopter access were present in many locations,
- Security – initial field work began the week after September 11, 2001, and
- Accelerated project schedule due to security concerns.

The project consisted of several investigative phases – 1) Geologic mapping and seismic hazard investigation, 2) Canyon wall mapping, 3) Preliminary drilling investigation at river bridge foundation locations and potential tunnel location, 4) Arizona approach drilling, 5) Colorado River bridge foundation drilling, and 6) Nevada approach drilling. Total time in the field was a little over 6 months over a 1-year period with up to 4 drill rigs on site at a time. Several thousand feet of corehole sampling with optical borehole surveys were drilled. Additional characterization included early adoption of LiDAR scanning to map the canyon walls, pushing the technology at the time, and other techniques such as Goodman Jack testing, surface refraction and downhole seismic surveys, helicopter reconnaissance, and fixed-wing aerial search for any previously unknown area faults.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322 E Camelback Rd, Phoenix, AZ 85012
4.3 40 reviews
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