Shah Ghanbari, PE
President

Professional Registrations

Civil Engineer, California No. 34575

40-Hour Hazardous Materials Code of Federal Regulations 1910.120

Education

BS Civil Engineering, University of Oklahoma, Norman,

Years of Experience: 30

SUMMARY

Mr. Ghanbari has more than 30 years of experience in the fields of geotechnical engineering, instrumentation, materials testing and inspection and construction support services. His responsibilities consist of project planning and management, complete geotechnical investigations and analyses, development of recommendations, report preparation, consultation during construction, coordination of construction monitoring, and data analysis. His experience includes extensive experience in transportation projects and managing complex field program. He has completed number of projects for MTA, Caltrans Districts 8, 12, 7, Sacramento, RCTC, OCTA, SANBAG and SANDAG. He has managed a number of projects requiring coordination with construction managers, designers, contractor and owners. Mr. Ghanbari has extensive experience in managing complex field program and has been responsible for geotechnical instrumentation for most major rail projects in Southern California As a principal of Group Delta, Mr. Ghanbari is committed to providing full support for Group Delta staff in order to achieve successful completion of projects.

MAJOR PROJECT EXPERIENCE

Anaheim Region Transportation Intermodal Center (ARTIC) Anaheim, California: This multi-year project offers transportation services as an intermodal hub for several transit modes such as Amtrak, Metrolink, local and international buses, shuttles, bicycles, and support development. Significant features of ARTIC include a new Architectural Iconic Terminal Building reaching 117-feet high with an approximate footprint of 48,000 square feet. The project also features a Concourse Bridge extending from the southern end of the Terminal Building and over the current LOSSAN railroad corridor. Mr. Ghanbari provided QA/QC oversight for the materials testing for ARTIC project which was performed in accordance with the UP Quality Management Plan and Caltrans Local Assistance Procedure Manual.

Exposition LRT Phase 2 Project, Los Angles and Santa Monica, California: The Los Angeles Metropolitan Transportation Authority Expo Light Rail Phase 2 is a $1.5 billion Design-Build project which is on track to be completed by 2015. The existing Expo Line connects downtown Los Angeles to Culver City, while the phase 2 of this project is a 6.6-mile westward extension of the Expo Line to Santa Monica. Mr. Ghanbari provided QA/QC for the geotechnical investigation, analysis, design and construction support for seven major bridges ranging from single span to nine span structures. Foundation design consisted of pile caps with groups of 2-ft diameter CIDH piles, and single 8-ft diameter piles for outrigger bents. The design was confirmed by a full scale pile load test. Abutment foundations were designed to accommodate downdrag from placement of MSE wall approaches after abutment construction.

Haynes Generating Station Units 3 & 4, Long Beach, California: Provided QA-QC oversight the for Los Angeles Department of Water and Power/Kiewit Industrial Company's evaluation of twin 60-in. diameter intake pipelines supported on 99 30- and 36-in. diameter cast-in-drilled-hole (CIDH) piles. Group Delta Consultants performed geotechnical investigation, analyzed and developed design recommendations, including seismic design criteria, axial and lateral capacity for CIDH piles, FLAC analysis for lateral spreading due to liquefaction, and construction considerations.

MTA Gold Line Iconic Bridge, Los Angeles County, California: Provided QA/QC oversight for the Foothill Extension Phase 2A, an 11.5 mile extension of the Metro Gold line from Pasadena to Azusa. An important component of the Phase 2A is the 584 foot long light rail transit (LRT) bridge over the I-210 in the City of Arcadia. This bridge is the Gold Line Foothills Extension's First Design/Build project.

Gerald Desmond Bridge Replacement Project, Port of Long Beach, California: Provided QA/AC for the geotechnical investigation, which included more than 150 mud-rotary borings to depths of up to 250 feet and more than 100 Cone Penetration Tests (CPT) to depths up to 150 feet. Group Delta is responsible for design engineering of the foundations which are groups of large diameter Cast-in-Drilled-Hole (CIDH) ranging from 5 to 8 feet in diameter with lengths up to 230 feet, and for engineering of approach embankments and retaining walls. Post-grouting of the pile tips is being performed to reduce the length of the shafts, and a full-scale Osterberg Cell (O-Cell) pile load testing program is underway to verify the pile skin friction and end bearing capacity.

John Wayne Airport Expansion, Orange County, California: Project Engineer for this $300 million dollar project that included a new terminal, parking structures, runways and taxiways and roadways. Mr. Ghanbari was involved in investigation, and design of taxiways, and runways. Mr. Ghanbari is very familiar with FAA guidelines and requirements.

San Vicente Dam Raise, San Diego, California: QA/QC Oversight Manager for the crown jewel of the San Diego County Water Authority's Emergency Storage Project, the $145 million San Vicente Dam Raise project. The dam was at 220 feet and stored up to 90,000 acre-feet of water at the beginning of the project. The dam raise project increased the height by 117 feet making it the tallest dam raise in the United States, and more than doubling the capacity of the reservoir by adding another 152,000 acre-feet.

Rindge Dam Investigation, U.S. Army Corps of Engineers, Malibu, California: Project manager for the feasibility study that included performing geotechnical borings. Due to the inaccessible nature of the site, a helicopter was needed to stage the drill equipment and a bulldozer down into the canyon bottom. Group Delta procured the helicopter, and arranged for all necessary permits for this helicopter staging, (aviation, highway dept., insurance, etc.) and performed the geotechnical borings and sample collection.

SR-22 Design-Build Improvements Project, Orange County, California:: Technical reviewer QA/QC for the geotechnical investigation and prepared preliminary geotechnical reports for 34 bridges along the recently completed SR-22 improvements project which included construction of auxiliary lanes, car pool lanes, retaining walls, sound walls, and bridge widening and new bridge construction. During construction, Group Delta provided quality control testing of soil, concrete, and asphalt to the program manager, Parsons Transportation. Group Delta reviewed all geotechnical submittals by the Design-Build Contractor for compliance with Caltrans requirements and provided geotechnical support to the program manager for OCTA.

West County Connector Project I-405/SR-22 HOV Connector Segment, Orange County, California: The project included 2.1 miles of widening, two replacement bridges, one new HOV bridge, new pavements, retaining walls, drainage improvements, and overhead sign. Group Delta completed over 10 geotechnical reports and two ISA reports. All work was based on Caltrans latest requirements. Mr. Ghanbari was responsible for formal QA/QC documentation and review for this project. He is familiar with Caltrans requirements as well as parsons QA/QC guidelines.

SR- 55 Preliminary Geotechnical Evaluation and Site Assessment Report (ISA) for Widening from North of I-405 Connectors to South of I-5 Connectors, Orange County, California: Mr. Ghanbari provided QA/QC for both geotechnical and ISA report. Project reviewed by Caltrans.

I-405 Freeway Widening from SR-73 to I-605, Orange County, California: Provided QA/QC for the I-405 widening ISA investigation. Orange County Transportation Administration plans to widen a 14 -mile portion of I-405 from SR-73 to I-605. The project involves adding new freeway lanes and widening of the existing bridges. The report was reviewed and approved by Caltrans and OCTA.

I-710 Freeway Firestone Boulevard Improvements, Phase IV, Los Angeles County, California: Provided QA/QC for the ISA report for the fourth phase of the I-710 improvements at Firestone Boulevard. Project involves widening of the Firestone Bridge over Los Angeles River and I-710 on-ramp and off-ramp improvements. The project is situated in an industrial zone of City of South Gate and adjacent to the former oil refinery. The report was reviewed and approved by Caltrans.

SR-210/I-215 Widening, San Bernardino County, California: Provided QA/QC for the Phase II and geotechnical investigation. Project includes 4-mile long I-215 widening and construction of the new I-210/I-215 NW bridge connector and accompanying retaining walls and infiltration basins. Phase II Environmental Investigation consisted of Aerially Deposited Lead (ADL) investigation, and LBP and ACM Investigation for bridge to be demolished. The reports were reviewed and approved by Caltrans.

Hyatt Regency Grand Resort, Huntington Beach, California: Mr. Ghanbari was Principal Engineer for this project which consists of a 504-room hotel complex and associated facilities, including 2-levels of subterranean parking, a four-story hotel building, ballrooms and conference rooms, courtyards, retail facilities, tennis courts, landscaping and irrigation, walkways, pedestrian bridges, retaining walls, and other hardscape features.

Central Park West Project, Jamboree and Michelson, City of Irvine, California: Technical Reviewer for the geotechnical investigations, monitored grading and surcharge programs, provided recommendations for shoring and dewatering, reviewed shoring and dewatering plans, responded to City of Irvine review comments and had seven geotechnical reports reviewed and approved by the City. Group Delta monitored the excavations, installation of shoring, and construction of the foundations and retaining walls at the project. Group Delta provided recommendations for the support of both at-grade and podium buildings on mat and spread footings where previous consultants had proposed pile foundations, thus saving the owner substantial costs and time in foundation construction.

University Link Light Rail, Seattle, Washington: University Link is a 3.15 mile light rail extension that will run in twin-bored tunnels from downtown Seattle north to the University of Washington, with stations at Capitol Hill and on the University of Washington campus near Husky Stadium. The total cost for University Link is $1.9 Billion. Mr. Ghanbari served as Principal Project Manager for this project that included in-place inclinometers up to 200 feet deep, multipoint extensometers up to 300 feet deep, piezometers up to 120 feet deep, utility settlement points, strain gauges, data loggers and fully integrated real time web-based data presentation. Two inclinometers will be installed on the banks of the Lake Washington Ship Canal. A barge will be used to bring drilling equipment to these two locations.

Metro Red Line Various Sections, Los Angeles, California: Metro Red Line Project included:

- **Inclinometers** - approximately 110 installations for a total of 10,200 lineal feet. Inclinometers installed behind braced excavation walls of subway station and tunnel access shaft excavations to monitor potential ground

movement. Locations of inclinometers were compatible with instrumented bracing members to correlate soil movement with load changes in bracing members.

- **Observation Wells** - approximately 130 installations for a total of 11,000 lineal feet. Observation well installed behind braced excavation walls of subway station and tunnel access shaft excavations, and along tunnel alignment.
- **Multi-Position Borehole Extensometers** - approximately 90 installations for a total of 4,500 lineal feet. Borehole extensometers installed along tunnel centerline alignment to monitor soil settlement above tunnel crown at multiple depths.
- **Deep Borehole Subsurface Settlement Markers** - approximately 30 installations for a total of 1,100 lineal feet. Deep Subsurface Markers were installed at selected locations offset from tunnel center line to monitor deep settlements at a specific depth.
- **Strain Gages/Load Cells** - over 1,800 strain gages and load cells. Strain gages and load cells were installed on bracing members for shoring members for subway station and tunnel access shaft excavations. Strain gages were used for horizontal steel pipe struts or wide flange members, and load cells were used for tie-back anchor support.
- **Settlement Reference Points** - over 2,000 settlement point were installed on buildings, bridge structures, retaining walls, streets and sidewalks, along the tunnel alignments and deep excavations.

Northeast Interceptor Sewer (NEIS), & North Outfall Sewer – East Central Interceptor Sewer (NOS-ECIS) City of Los Angeles, California: Project Manager for a geotechnical instrumentation program of an 5.2 miles long sewer pipeline extending northward from the east terminus of the NOS-ECIS sewer located just east of the Los Angeles River near Mission Road to the intersection of San Fernando Road and Eagle Rock Boulevard. The sewer is 7 to 8 feet in diameter with an excavation diameter of approximately 12 feet at a depth varying between 50 and 110 feet below existing grade. Group Delta Consultants installed 23 multipoint extensometers, 24 inclinometers, 220 borros-type settlement points, and 12 piezometers. The geotechnical instrumentation will exceed- $1.2 million. The NOS-ECIS Project includes 18.5 km long sewer pipeline extending from the north part of Baldwin Hills in Culver City to just east of the Los Angeles River. Group Delta installed 270 multipoint extensometers, 19 inclinometers, and 8 observation wells. Our responsibility included all installations, initial readings of each instrument before turning instruments over to the City of Los Angeles for monitoring. In addition, we were responsible for monitoring the shaft excavation struts with a system of strain gauges and monitoring stresses in the struts. The overall budget for the geotechnical instrumentation exceeded $1.4 million.

Newport Mesa Unified School District (NMUSD) Measure F School Facility Improvement Program, Orange County, California: Provided QA/QC for the geotechnical services provided during construction for the approved improvements at Corona Del Mar High School (CDMHS) and Costa Mesa High School (CMHS). Responsibilities include review of previous geotechnical reports, performing site investigations, geologic seismic evaluations, laboratory testing and construction phase geotechnical services and take over as geotechnical engineer of record and assume responsibility for the geotechnical phase of the project.

Improvements will be made for both theatres and enclaves expansion at these schools. Specifically, NMUSD plans the following new construction:

- CDMHS: Earthwork and Utilities Package #106-11;
- CDMHS: Interim Housing and Utilities Package #113-11;
- CMHS: Earthwork and Utilities Package #107-11; and
- CMHS: Paving and Landscape Package #109-11.