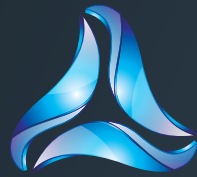




**Northeast Interceptor
Sewer**



GROUP DELTA



Eastside Light Rail Transit

Statement of Qualifications Geotechnical Instrumentation

Serving California Since 1986



Middle Fork Surge Shaft



U-220 University Link

Irvine
32 Mauchly
Suite B
Irvine, CA 92618
(949) 450-2100

Torrance
370 Amapola Avenue
Suite 212
Torrance, CA 90501
(310) 320-5100

San Diego
9245 Activity Road
Suite 103
San Diego, CA 92126
(858) 536-1000

Ontario
1035 So. Milliken Avenue
Suite G
Ontario, CA 91761
(909) 295-5550

Victorville
12180 Ridgecrest Road
Victorville, CA 92395
(760) 881-3224

Oakland
1970 Broadway
Suite 1100
Oakland, CA 94612
(510) 671-0010

Anaheim
1320 South Simpson Circle
Anaheim, CA 92806
(714) 660-7500

“Delta is the Difference”



GROUP DELTA

WHO WE ARE

Group Delta Group Delta Consultants, Inc. (Group Delta) has been providing Geotechnical Instrumentation services for contractors, designers and owners for more than 29 years. Group Delta has provided installation and monitoring of the geotechnical instrumentation for the U220 contract for Sound Transit's University Link Light Rail TBM Tunnels project. Instrumentation includes in-place inclinometers up to 200 feet deep, multi point 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.



Excavation

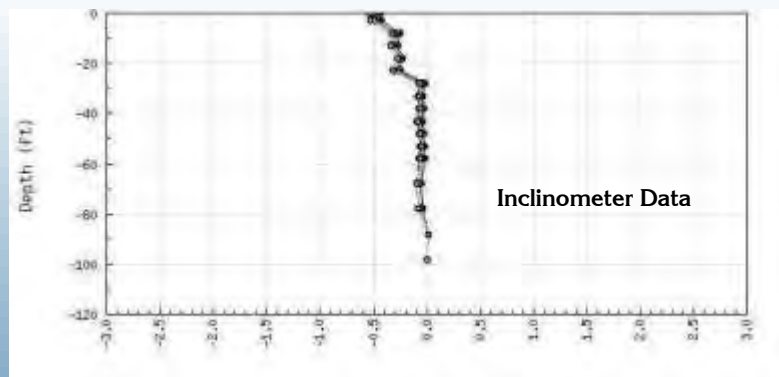
In Place Inclinometers

Group Delta has been responsible for the geotechnical instrumentation installation for two major tunneling projects, the North Outfall Sewer – East Central Interceptor Sewer (NOS-ECIS) and Northeast Interceptor Sewer (NEIS) in the City of Los Angeles. In addition, we have provided geotechnical instrumentation for Eastside LRT, MOS-1 (Metro Redline) and other projects. Additional project experience is provided in this SOQ.



INSTRUMENTATION SERVICES

Group Delta has an excellent relationship with major instrumentation manufacturers and has extensive experience working on major construction sites. Our scope typically includes the labor, equipment, and materials for installation and monitoring of geotechnical instrumentation. We are proficient in all types



Data Logger

of excavation and tunneling instrumentation such as inclinometers, extensometers, strain gauges, and load cells, piezometers, settlement points and data loggers.

Group Delta has extensive experience in data management with the use of data loggers and web-based data acquisition systems and monitoring for automated processing and distribution of data.

We are very interested in working with you on your next instrumentation project and would appreciate your reviewing our attached Statement of Qualifications and passing on to others in your organization. If you have any questions or would like additional information please call me at 949-450-2100 or e-mail me at Shahg@groupdelta.com for an immediate response. We look forward to the opportunity to work with you.

Sincerely,
Group Delta Consultants, Inc.

A handwritten signature in black ink, appearing to read "S. Ghanbari". The signature is written in a cursive style with a large initial "S".

Shah Ghanbari, PE
President

ADDITIONAL SERVICES GROUP DELTA PROVIDES

GEOTECHNICAL ENGINEERING AND GEOLOGIC SERVICES

- Feasibility studies
- Third Party Reviews
- Foundation design
- Earth Retaining Structures Design
- Pavement Design
- Earthwork and Grading
- Earthquake and Fault Studies
- Geologic Hazard Evaluations
- Numerical Modeling Analyses
- Seismic Design & Hazard Assessments
- Hydrogeologic Evaluations
- Dewatering
- Ground Improvement Analysis & Design
- Laboratory Testing
- Slope Stability & Landslide Investigation & Mitigation
- Instrumentation and Ground Monitoring



- Pile Drivability & Load Tests
- Seismic Retrofitting Design
- Geologic Reconnaissance & Mapping
- Geophysical Investigations
- Trenching Investigations

ENVIRONMENTAL SERVICES



Tank/Hazardous Materials

- Phase I Initial Site Assessments (ISAs) / Environmental Site Assessments (ESAs)
- Hazardous Materials Management & Industrial Hygiene
 - Surveys and Investigations
 - Technical Abatement Specifications and Work Plans
 - Abatement and Remediation Monitoring Services
- Phase II Site Investigations (SIs)
- Construction Environmental Compliance
- Phase III Site Remediation
- Stormwater

FORENSIC SERVICES

- Earthquake Damage Assessments: Causation studies and preparation of repair recommendations.
- Landslide Investigations: Causation studies and/or development of stabilization schemes.
- Construction Vibrations: Vibration monitoring and geotechnical testing.
- Dam Investigations
- Settlement Analyses: Floor level surveys, causation studies and/or preparation of repair recommendations.
- Expansive Soils: Subsurface investigations, preparation of repair recommendations.
- Groundwater: Subsurface investigations, preparation of subsurface drainage recommendation



GROUP DELTA

TESTING AND INSPECTION SERVICES

Group Delta has two materials testing laboratories located in Anaheim and San Diego, California. Our laboratories are licensed as an approved testing facility by various agencies including the Division of the State Architect (DSA), City of Los Angeles, Caltrans, CCRL and AASHTO. In addition, Group Delta's San Diego laboratory has been awarded accreditation to the technical competence and quality assurance requirements of ISO/IEC 17025:2005 as determined by the Laboratory Accreditation Bureau (L-A-B).

Soils Testing

- Classification & Index
- Strength Tests
- Volumetric Change
- Permeability
- Compaction
- Aggregate/Subgrade

Materials Testing

- Asphalt Testing
- Concrete Aggregate
- Concrete Cylinders
- Concrete Beams
- Masonry
- Masonry Unit Cubes
- Masonry Prisms
- Grout/Mortar
- Dry Pack Blocks
- Shotcrete
- Batch Plant Inspections
- Reinforcing Steel
- Structural Steel
- Chemical Physical Properties
- AWS/CWI Welding
- Post-Tensioning
- Epoxy Dowels/Drilled in Anchors
- Pull Testing
- Non Destructive Testing – UT/MT
- High Strength Bolting
- Fireproofing Inspections and Sampling
- Concrete & Masonry Coring and Extraction
- Mix Design Reviews & Trial Batched
- Fiber Wrap Inspection
- Vapor Emissions Testing





GROUP DELTA

Group Delta meets all the requirements as an approved testing agency with the following local and national accrediting/certification authorities:

- ISO 17025
- AASHTO (American Association of State Highway and Transportation Officials)
- ACI (American Concrete Institute)
- AMRL (AASHTO Materials Reference Laboratory)
- ANSI (American National Standards Institute)
- APWA (American Public Works Association)
- ASNT (American Society of Nondestructive Testing)
- ASTM (American Society for Testing and Materials)
- AWS/CWI (American Welding Society/Certified Welding Inspector)
- California Department of Transportation (Caltrans)
- CCRL (Cement and Concrete Reference Laboratory)



- City of Los Angeles
- DSA (Division of the State Architect)
- ICBO (International Conference of Building Officials)
- NICET (National Institute for Certification in Engineering Technologies)
- UBC (Uniform Building Code)

Inspection

Earthwork Inspection and Testing – Group Delta provides geotechnical observation and testing services for all stages of site grading. Our field compaction testing services are provided by experience soils technicians working under the supervision of licenses professional engineers.

Asphalt Inspection and Testing – Group Delta provides comprehensive asphalt testing and AC Mix Design Services. We are regularly certified by AMRL in our laboratories.

Concrete Inspection and Testing – Group Delta’s concrete inspection and testing staff is re-certified bi-annually by the Cement and Concrete Reference Laboratory (CCRL) and annually by Caltrans. Our ACI certified concrete technicians perform field and batch plan sampling of concrete materials to assure compliance with project specifications.

Specialty Construction Inspection – Group Delta provides experienced special inspectors licensed by the International Code Counsel (ICC) for Sprayed Applied Fireproofing, Structural Masonry, Structural Steel Bolting and Welding, Pre-Stressed Concrete, and Reinforced Concrete. Group Delta can also provide Certified Welding Inspectors (CWI) licensed by the American Welding Society (AWS) and non-destructive testing such as mag-particle and ultra-sonic testing.

Group Delta Technicians & Inspectors hold the following certifications:

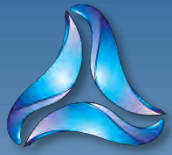
ICC Inspection

- Masonry
- Structural Steel/Welding
- Concrete
- Fireproofing
- Pre-Stressed Concrete

Caltrans Certified

- Materials Testing
- Soils Testing
- Nuclear Gauge Safety
- ACI Certified Concrete
- Soils

City of LA Deputy Inspector



GROUP DELTA

PROJECT EXPERIENCE



REGIONAL CONNECTOR TRANSIT CORRIDOR

Los Angeles, CA

Project Highlights

- A 1.9-mile fully underground line will connect the Metro Gold Line, Blue Line and Expo Line and provide three new downtown LA underground subway stations
- A massive cut and cover operation is proposed for the construction of the tunnel due to the extensive underground utility lines

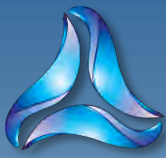
Group Delta Highlights

- Static and dynamic geotechnical recommendations for stations and structures
- Geomechanical numerical analyses to study seismic racking behavior of the underground structures
- Instrumentation and monitoring provided, analyses conducted to support the development of the building projection plan



Project Information

Client:	Skanska
Owner:	Los Angeles MTA
Total Cost:	\$1.47 Billion
Completed:	Ongoing



SAN GABRIEL TRENCH GRADE SEPARATION San Gabriel, CA

Project Highlights

- Lowering of 1.4-miles of Union Pacific rail line in a trench through the City of San Gabriel
- Will provide vehicles and pedestrians safe crossing over the tracks
- Reduction of locomotive horn and crossing bell noise, congestion and air pollution
- Eliminate delays for emergency responders and the potential for crossing collisions

Group Delta Highlights

- Management of hazardous waste and remediation services
- Performing air monitoring services
- Installed and monitored crack gauges and tilt meters to assess impact of construction on nearby buildings
- Installed inclinometers in piles to measure effectiveness of pile construction



Project Information

Client:	The Walsh Company
Owner:	Union Pacific Railroad
Total Cost:	\$340 Million (est.)
Completed:	Ongoing



MTA PUPLE LINE EXTENSION Los Angeles, CA

Project Highlights

- Project extends westward for about 9 miles with 7 new stations
- Provides a high-capacity, high-speed, dependable alternative
- Includes destinations such as Miracle Mile, Beverly Hills, Century City and Westwood

Group Delta Highlights

- Installation of Shape-AccelArray inclinometers, tilt meters, load cells, strain gauges, surface, building, and utility monitoring points, piezometers and extensometers.
- All data is uploaded to a cloud based server and accessible 24-hours/day. Group Delta will also program in alarms if action level is exceeded.



Project Information

Client:	Skanska/Traylor/Shea
Owner:	MTA
Total Cost:	\$6.3 Billion
Completed:	2014-Present



EXPOSITION LIGHT RAIL PHASE 2 Los Angeles, CA

Project Highlights

- 15.2-mile light rail line utilizing the exposition corridor with 19 stations
- Phase 2 includes 7 new stations along the Westside
- The Exposition Light Rail Transit (LRT) to Santa Monica is a significant and long-term public investment in transit, city-wide and regional mobility, and sustainability

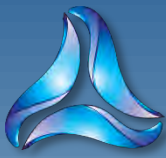
Group Delta Highlights

- Materials evaluation of 1920's brick arch tunnel under light rail road
- Provided geotechnical recommendations for Expo LRT stations
- Provided instrumentation and monitoring for Multiple Mechanical Stabilized Earth (MSE) light rail walls analyses



Project Information

Client:	Parsons Brinckerhoff/ Skanska – Rados JV
Owner:	Los Angeles MTA
Total Cost:	\$1.5 Billion
Completed:	On-going



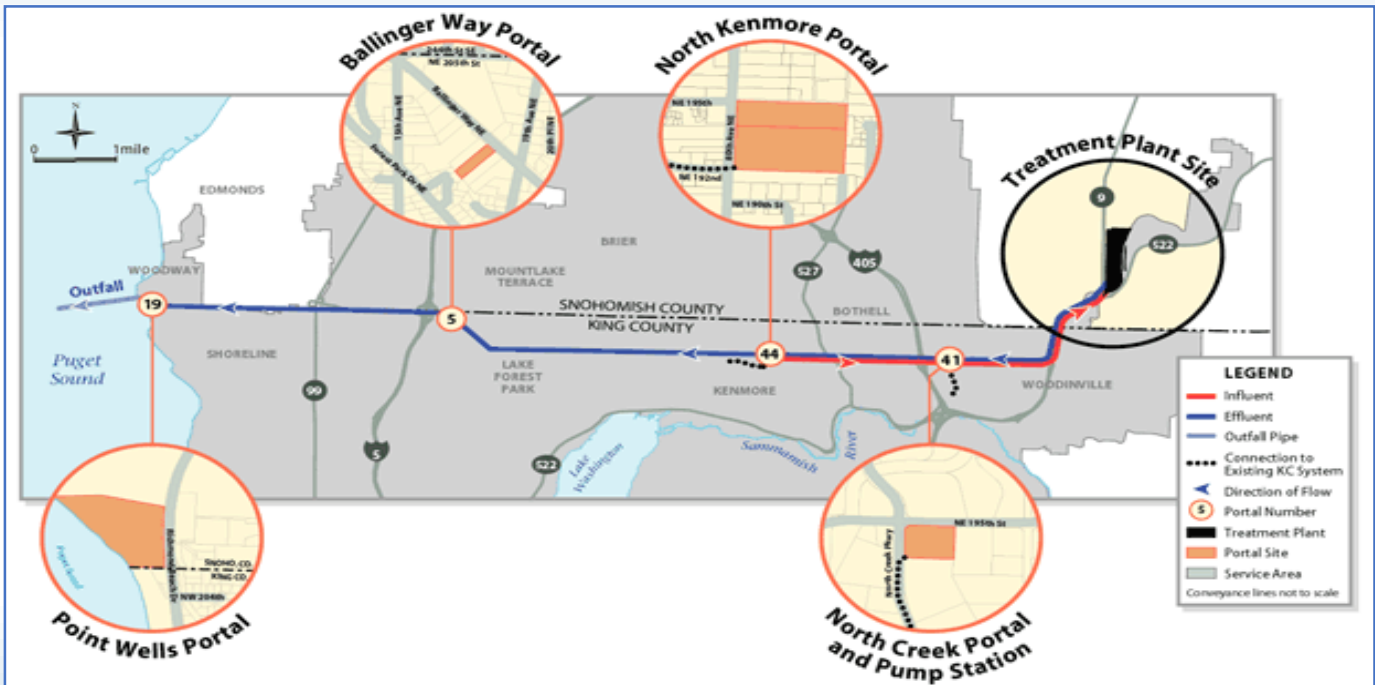
BRIGHTWATER EAST TUNNEL Bothell, Washington

Project Highlights

- Wastewater Conveyance System that includes the East Tunnel, Central Tunnel and West Tunnel Totalling 13 miles of conveyance in King County
- East Tunnel consists of 14,050 ft. of precast concrete segmentally-lined tunnel with an inside diameter of 16 ft.

Group Delta Highlights

- Provided geotechnical instrumentation installation
- Instrumentation included observation wells, piezometers, three point rod extensometer and inclinometers.
- Instrumentation for tunnel included four pipes and three fiber optic cables, launch and receiving shafts, and pump station



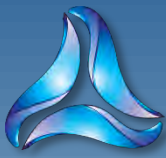
Project Information

Client: Kenny/Shea/
Traylor

Owner: King County

Total Cost: \$705 Million

Completed: 2010



UNIVERSITY LINK Seattle, Washington

Project Highlights

- University Link is a 3.15 mile light rail extension running in twin bored tunnels from downtown Seattle north to the University of Washington
- Stations located at Capitol Hill and on University of Washington Campus near Husky Stadium

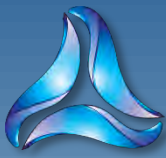
Group Delta Highlights

- Provided geotechnical instrumentation for tunnels and University Station
- Instrumentation monitors soil and groundwater movements around University and along alignments of both rail tunnels
- In-place inclinometers up to 200 ft. deep, multipoint extensometers up to 300 ft. deep and piezometers up to 120 feet deep



Project Information

Client:	Traylor/Frontier/ Kemper
Owner:	Sound Transit
Total Cost:	\$1.9 Billion
Completed:	2016



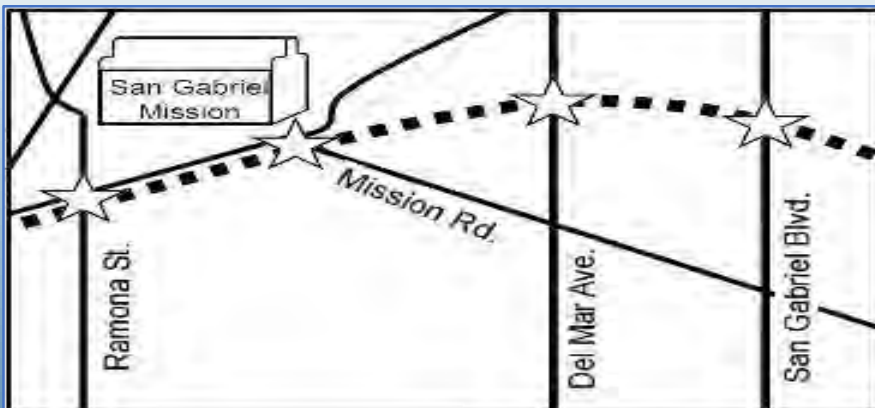
SAN GABRIEL TRENCH GRADE SEPARATION San Gabriel , California

Project Highlights

- The 2.2 mile grade separation will result in lowering of a 1.4 mile section of Union Pacific Railroad track into a trench through the City of San Gabriel
- Bridges constructed at Ramona Street, Mission Road, Del Mar Avenue and San Gabriel Boulevard allowing vehicles and pedestrians to pass over the tracks

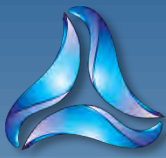
Group Delta Highlights

- Providing geotechnical instrumentation that includes traversing probe inclinometers, in-place inclinometers, tiltmeters and crack gauges
- Tiltmeters and in-place inclinometers are monitored with systems of remotely monitored data loggers. Data is posted on the web based data management system



Project Information

Client:	The Walsh Group
Owner:	Alameda Corridor East
Total Cost:	\$336 Million
Completed:	2017



NORTHEAST INTERCEPTOR SEWER (NEIS) Los Angeles, California

Project Highlights

- Major sewer tunnel 8.5 km long extending from the terminus of the ECIS sewer
- Corridor located within the densely developed and populated area of the city
- Built to provide downstream outlet for the Eagle Rock Interceptor Sewer (ERIS)
- Project accomplished by tunneling with Earth Pressure Balance method

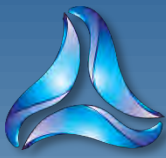
Group Delta Highlights

- Provided geotechnical instrumentation that included installation of 23 multi-point extensometers, 24 inclinometers, 220 borros type settlement points and 12 piezometers
- Tiltmeters were installed at critical historic bridge structures and buildings



Project Information

Client:	Kenny/Shea/ Traylor/Frontier
Owner:	County of Los Angeles
Total Cost:	\$1.5 Million
Completed:	2004



MIDDLE FORK SURGE SHAFT Foresthill, California

Project Highlights

- 17-kilometer long tunnel is a hydro-power/water pressure tunnel
- Tunnel has a 10 ft. diameter, 600 ft. deep surge shaft at the tunnel downstream, located in a remote area of the Sierra Mountains
- Project was to prevent leakage by placing an 8 ft. diameter steel liners inside the existing surge shaft and filling with concrete

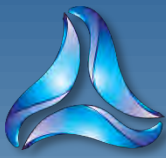
Group Delta Highlights

- Provided instrumentation that included 72 strain gauges, 6 piezometers and 4 load cells
- Monitored the steel liner movement after installation
- Monitored change of water level in the annulus and verified that the leakage of the surge shaft had stopped



Project Information

Client:	Kiewit Pacific
Owner:	City of Forethill
Total Cost:	Unknown
Completed:	2008



EASTSIDE LIGHT RAIL TRANSIT Los Angeles, California

Project Highlights

- Eastside LRT is a southeasterly extension of the Pasadena Gold Line
- Project consists of at-grade alignment, four existing bridges and one 456 ft. long new bridge across US 101 and a tunnel section
- Passes through the cities of Los Angeles and East Los Angeles and is 5.8 miles long

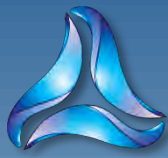
Group Delta Highlights

- Provided geotechnical instrumentation installation that included borehole extensometers, inclinometers, tape extensometers, strain gauges, over 1,000 building and ground settlement reference points, observation wells and data loggers
- Provided investigation, foundation recommendation and seismic design



Project Information

Client:	Metropolitan Transit Authority
Owner:	Metropolitan Transit Authority
Completed:	2003



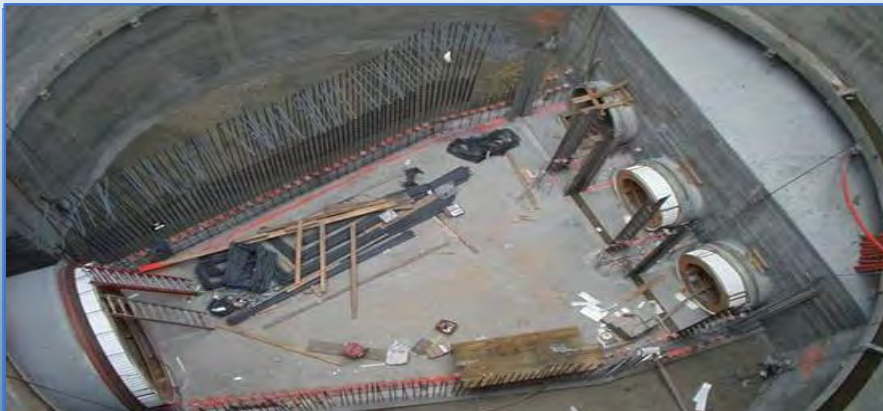
EAST CENTRAL INTERCEPTOR SEWER (ECIS) Los Angeles, California

Project Highlights

- ECIS is a major sewer tunnel approximately 11.5 miles long with an 11 ft. inside diameter pipe
- Corridor is located in a densely developed area within central and southern sections of the city
- Project constructed in soft ground conditions in primarily alluvial soil conditions

Group Delta Highlights

- Installed 270 multi-point extensometers, 19 inclinometers and 8 observation wells
- Responsibilities included initial readings of each instrument before turning instruments over to the City of Los Angeles for monitoring
- Responsible for instrumentation of shaft excavation struts with strain gauges and monitoring stresses on the struts



Project Information

Client:	Kenny/Shea/ Traylor/Fontier
Owner:	County of Los Angeles
Total Cost:	\$1.3 Million
Completed:	2003