



Statement of Qualifications

Water and Wastewater



Prepared By:
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Please visit us on the web at www.GroupDelta.com

Company Profile

Company Profile

Geotechnical Engineering

Geology

Earthquake Engineering

*Materials Testing and
Inspection*

Forensic Services



Group Delta Consultants, Inc. (GDC) is a consulting engineering firm with offices located in the counties of; Orange, Los Angeles and San Diego. The firm has highly skilled professionals consisting of civil and geotechnical engineers, engineering geologists, laboratory and field technicians, deputy inspectors, drafting/CADD, and drilling and support personnel specialized in their respective fields. We offer a broad range of services to serve the needs of our clients. Our capabilities and services include geotechnical feasibility study, geotechnical field investigation, in-situ testing, foundation design, construction monitoring and materials testing, ground improvement and design, slope stability investigation and analyses, preparation of plans and specifications, coastal engineering, instrumentation, seismic studies and earthquake engineering.

We have established a record of completing projects on schedule and within budget for major clients in the public and private sectors since 1986. Our laboratories are licensed as an approved testing facility by various agencies including AASHTO and Caltrans. The involvement of our principals and senior managers in each project and particularly our focus on developing innovative design solutions to reduce overall construction cost has resulted in repeat business. The evidence of our work indicating the unique benefits of our approach and methodologies are provided in various awards and recommendations from well-known organizations in the public and private sectors.

Corporate Summary

| | |
|--------------------|-------------------------------|
| Firm's Name: | Group Delta Consultants, Inc. |
| Firm Type: | California Corporation |
| Year Established: | 1986 |
| Small Business: | (SBE) State of California |
| Minority Business: | (MBE) City of Los Angeles |



Geotechnical Services



Geotechnical Engineering – Our services include:

- Feasibility Study
- Field Investigation
- Laboratory Testing
- Shallow Foundation Design
- Pile Foundation Design
- Settlement Analyses
- Ground Improvement & Design
- Slope Stability Investigation & Analyses
- Preparation of Plans & Specifications
- Earthwork & Grading Specifications
- Pavement Design
- Pile Drivability & Load Tests
- Instrumentation & Monitoring
- Forensic Engineering

Geologic and Seismic Hazard Evaluation - Our services include:

- Geologic Mapping
- Landslide Studies & Mitigation
- Groundwater Investigations
- Fault Hazard Investigations
- Geophysical Investigations
- Deterministic/Probabilistic Ground Motion Analyses
- Liquefaction & Lateral Spreading Analyses

Earthquake Engineering - Our services include:

- Liquefaction & Lateral Spreading Analyses
- Seismic Earth Pressure
- Seismic Deformation Analysis
- Seismically Induced Settlement
- Liquefaction Mitigation Measures
- Design Recommendations for New And Retro-fit Projects
- Seismic Design Criteria
- Earthquake Response Spectra

Laboratory Services



Laboratory Testing Services

Group Delta Consultants, Inc. has in-house geotechnical and materials testing laboratory facilities to conduct a variety of testing on soils and other building materials. Our laboratories are equipped with state-of-the-art equipment to perform tests in accordance with the American Society of Testing and Materials (ASTM) and other applicable standards. Our laboratories are certified by Caltrans and the City of Los Angeles. Our service capabilities in geotechnical and materials laboratory testing include the following:

Materials Testing & Special Inspection

- Moisture Content
- Dry Density
- Maximum Density & Optimum
- Moisture Content
- Specific Gravity
- Atterberg Limits
- Sieve Analysis
- Hydrometer Analyses
- Sand Equivalent
- Corrosion Potential (pH, Sulfate, Chloride, and Resistivity)
- Consolidation/Collapse
- R-Value
- California Bearing Ratio (CBR)
- Los Angeles Abrasion
- Shear Shrinkage
- Swell Expansion Index
- Direct Shear
- Asphaltic Concrete (AC)
- Concrete
- Epoxy
- Masonry
- Structural Steel
- Reinforcing Steel
- Welding
- Fireproofing
- Batch Plant
- FRP

Construction Phase Services



Construction Inspection & Materials Testing Services

Group Delta offers a full range of construction phase inspection and materials testing services. Our services during the construction phase are directed towards strict compliance of regulatory guidelines. Adherence to specifications is monitored and documented by registered geotechnical engineers, licensed inspectors and certified laboratories. Our service capabilities in construction monitoring and materials testing areas include:

Materials Testing

- Concrete & Masonry
- Beams
- Blocks
- Cubes
- Cylinders
- Grout/Mortar
- Prisms
- Vapor Emissions Testing

Water & Wastewater Experience

WATER & WASTEWATER RELATED PROJECTS

IRWD Water Pipeline Installation, Lake Forest, CA

REPRESENTATIVE EXPERIENCE

Aliso Creek Pumping Station and Pipelines

Arcadia Reservoir Seismicity Study

Bond Pit Reservoir, Orange

Big Dalton GAC Pump Station and Pipeline

Burbank Reclaimed Water Reservoir

Chino Basin Desalter Plant

Clark Canyon Dam, San Diego County

IRWD Water/Sewer Facilities, Lake Forest

L.A. County Waste Water Treatment Plant

Rio Vista Water Treatment Plant, Castaic

San Diego Clean Water Project

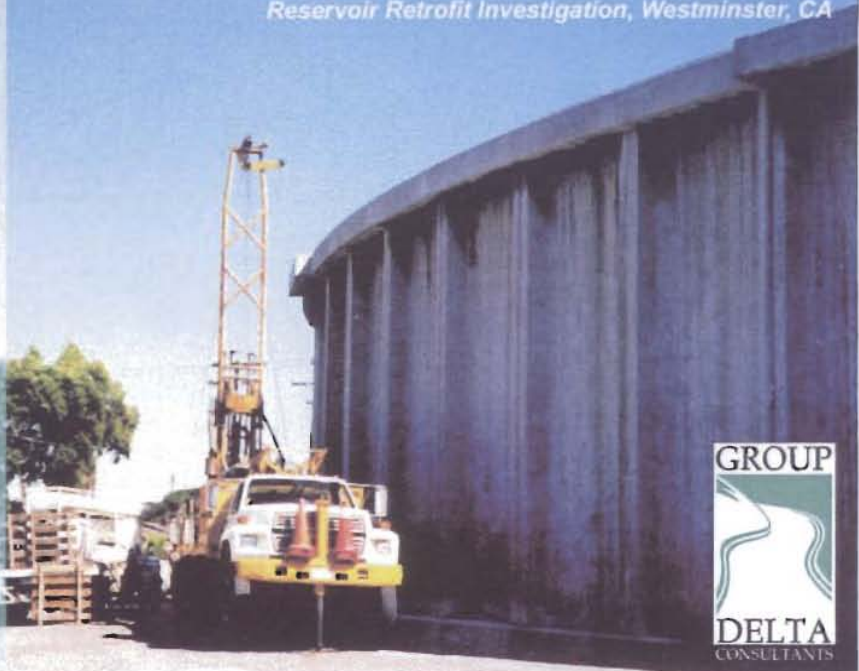
La Costa Dam, San Diego County

Malibu Treatment Plant & 30 mile pipeline

Westminster Reservoir Retrofit



Reservoir Retrofit Investigation, Westminster, CA



Santa Ana River, Trunk Sewer Riverside, California

Geotechnical Engineering

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The new sewer will be about four miles long beginning at the east end of the Water Quality Control Plant running along a bike path parallel to the Santa Ana River and ending at Tequesquite Avenue east of the Tequesquite Land Fill in Riverside. The proposed sewer trunk is 4- to 5.5-feet in diameter and 10- to 20-feet deep. About 2500-feet of the alignment will be tunneled under the railroad and in the park area.

Our scope of work is to provide geotechnical information for design of the proposed pipeline and will consist of review of existing information, field exploration, and laboratory testing, engineering analyses and report preparation. Due to presence of loose to medium dense sands and the shallow groundwater along a portion of the alignment and proximity to Santa Ana River, GDC will also evaluate liquefaction and lateral spreading potential along the alignment. GDC just completed field investigation, 20 borings/CPTs. Laboratory testing and analysis are on-going.

GDC Role:

Provided geotechnical information for design of the proposed pipeline and review of existing information, field exploration, and laboratory testing, engineering analyses and report preparation. To supplement our existing borings, our field program consisted of drilling and sampling 16 borings each to 10-to 60-feet in depth. Relatively undisturbed and SPT samples of representative soil layers were obtained at appropriate depth intervals (typically 5-feet). The borings were backfilled with soil cuttings and grout where TW was encountered. The results of the field, laboratory, geologic, and engineering evaluations were presented in one report.

VWRA Treatment Facility

Victorville, California

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The project site is located at the Victor Valley Wastewater Reclamation Authority (VWRA) Treatment Facility located in Victorville, California. The facility has a number of percolation ponds that periodically impound water on site. The ponds were built by constructing compacted earth levees around the pond perimeters.

Group Delta Consultants, Inc. (GDC) understands that during periods of water impoundment, a portion of the levee at Pond No. 9 has been observed to have heavy seepage emerging from the face of the levee slope in an area approximately 100- feet in length, and 5 or more feet below the top of levee. GDC also understand that less severe seepage has been noted in areas of the Pond #10 levee to the south.

The purpose of our study was to provide geotechnical consultation and recommendations for construction of the contractor's selected option, which consists of excavation, recompaction and construction of a slurry seepage cut-off wall to reduce or minimize seepage through the limited zone of levee where heaviest seepage has been observed.

Key Project Issues:

- Attend a site visit and discuss the project with M&E and SSC
- Review available maps and aerial photographs
- Review the existing geotechnical report, boring logs, and laboratory testing
- Plot soil profile and sections using existing boring / lab data
- Develop geotechnical recommendations for construction

Pomona Anion Plant Expansion

Pomona, California

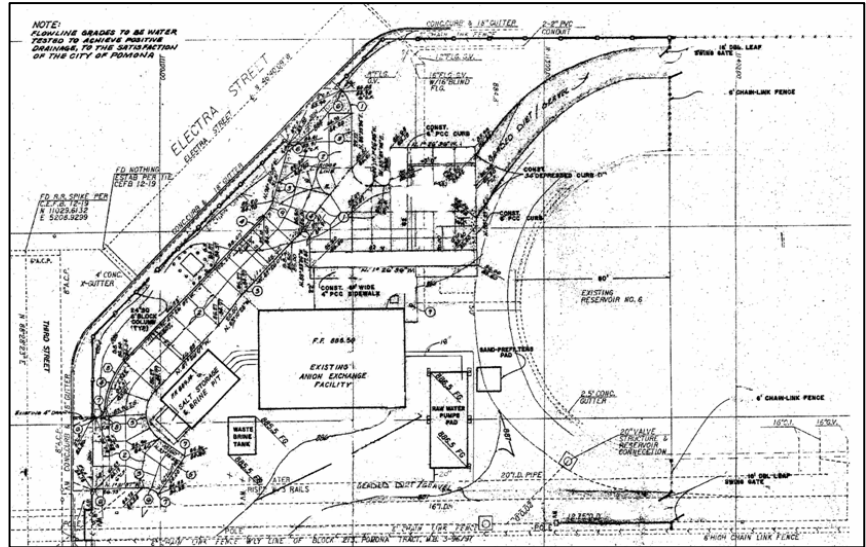
Geotechnical Engineering

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This project consists of capacity expansion of the existing Pomona Anion Exchange Water Treatment Plant located north of Third Street and east of Electra Street in the City of Pomona. It also consists of:

- Construction of three to four new salt storage tanks, each 12-feet in diameter with a height of 22-feet and a filled weight of 170 kips
- Construction of two to three new anion exchange vessels, each 10.5-feet in diameter with a height of 22-feet and a filled weight of 150 kips
- Partial demolition and abandonment of existing brine and dilution water tanks and pumps
- Construction of new gravity flow brine line to its connection with a municipal sewer.

Key Project Issues:

- Reviewing existing data on the site;
- Performing three soil borings to depths of 10- to 40-feet;
- Performing engineering analyses to develop geotechnical recommendations for project construction and foundation design

Plant 13 Reservoir Site Indio, California

Geotechnical Engineering

Geology

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The City of Indio is planning to construct a 10-MG buried concrete water storage reservoir in Indio Hills in the City of Indio, California. Associated improvements include a pump station and two pipelines.

This site is located in a highly active seismic area of Southern California, and is located within an Alquist Priolo Special Studies Zone of Banning Fault which is a branch of the San Andreas Fault. Due to the location of the site within the Alquist Priolo Zone, and the importance of the reservoir, the primary purpose of the investigation was to perform trenching at the site to determine whether or not active faulting is present under the reservoir. A secondary purpose of the investigation was to estimate the magnitude of secondary movements at the tank site, if anticipated, due to rupture on nearby major fault(s).

The major geologic / seismic issues at the site are potential for fault rupture and associated displacements, and very high seismic shaking. Extensive trenching performed within the tank site indicated that no active faults were present within the tank area and the potential for primary movements due to fault rupture was low. However, it was discovered that movements of up to 4 inches had occurred due to secondary shearing on some surfaces during past earthquakes. Field consultation and office review was provided by fault expert Dr. Roy J. Shlemon concerning the geomorphology, geology, soil chronology and other geological issues.

Based on our work the reservoir will be built on this site.

Banning Reservoir Pipeline

Banning, California

Geotechnical Engineering

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GDC prepared the preliminary geotechnical report for the City of Banning for their new 8-million gallon water storage reservoir and 4700-feet of 30-inch pipeline. Our preliminary report on the geotechnical investigation of the site for the reservoirs was submitted and the preliminary tank report will be updated.

The general alignment of the 30-inch lines starts from the intersection of West Wilson Street and Brinton Road, runs north to the reservoir site, then run northwest and west along a subdivision boundary to the intersection with Mountain Avenue. It is our understand that the total pipeline length is approximately 4700-feet, and that the burial depth of the pipeline ranges between 4-and 7-feet below the existing grade.

Key Project Issues:

- Review of existing geotechnical data
- Drilling, logging, and sampling five soil borings along the pipeline alignment
- Performing laboratory tests to define the engineering properties of the foundation soils
- Performing engineering analyses to develop recommendations for excavation and shoring and pipeline installation and design

East Central Interceptor Sewer (ECIS)

Los Angeles, California

Geotechnical Engineering

Geology

Earthquake Engineering

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Inspection*

Forensic Services



The North Outfall Sewer – East Central Interceptor Sewer (NOS-ECIS) is a major sewer tunnel approximately 11.5-miles long furnished with an 11-ft inside diameter pipe. The NOS-ECIS corridor is located in a densely developed area within the central and southern sections of the City of Los Angeles. This area generally lies south of Interstate 10, north of Imperial Highway, east of La Cienega Boulevard and west of the Los Angeles easterly city limits.

The project was constructed in soft ground conditions in primarily alluvial soil conditions. An extensive geotechnical instrumentation program was set in place during construction. Group Delta Consultants installed and initialized the instrumentation equipment for KSTFK JV, who will utilize the readings for their own use.

GDC Role:

Installed 270 multipoint extensometers, 19 inclinometers, and 8 observation wells. Our responsibility included initial readings of each instrument before turning instruments over to the City of Los Angeles for monitoring.

In addition, we were responsible for the instrumentation of the shaft excavation struts with strain gages and monitoring stresses on the struts. GDC monitored the strain gages at the shaft excavations until the completion of the project. The monitoring of strain gages had been accomplished by using remote digital transmission of data from the excavation sites to our office in Orange County.



Northeast Interceptor Sewer (NEIS)

Los Angeles, California

Geotechnical Engineering

Geology

Earthquake Engineering

Materials Testing and
Inspection

Forensic Services



The Northeast Interceptor Sewer (NEIS) is a major sewer tunnel approximately 8.5-km long, 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 NEIS corridor is located within the densely developed and populated area of the City of Los Angeles. It was built to provide a downstream outlet for the proposed Eagle Rock Interceptor Sewer (ERIS).

The work for this project was accomplished by tunneling by Earth Pressure Balance (EPB) method using Tunnel Boring Machines (TBMs). In addition to tunneling, the project required four work shafts/diversion structures and seven drilled maintenance shafts. The project was constructed in soft ground conditions in primarily alluvial soil conditions. An extensive geotechnical instrumentation program was in place during construction. Group Delta Consultants installed the instrumentation equipment for TSFKK JV, who monitored the construction.

GDC Role:

Responsible for geotechnical instrumentation and installed 23 multipoint extensometers, 24 inclinometers, 220 borros-type settlement points, and 12 piezometers. In addition, tiltmeters were installed at critical historic bridge structures and buildings. The extensometers and inclinometers were concentrated at the shaft excavations and freeway crossings. Our responsibility included initial readings of each instrument before turning instruments over to the City of Los Angeles for monitoring.

Haynes Re-Powering Project Long Beach, California

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Group Delta Consultants, Inc. (GDC) was initially hired to evaluate indicator pile program Pile Driving Analyzer results, provide pile driving criteria, and assist Kiewit in getting piles approved by the Los Angeles Department of Water and Power (LADWP). GDC evaluated the results of CAPWAP, performed wave equation analyses and recommendations for driving of over 1,500 14-inch square prestressed concrete piles.

Subsequently, GDC performed evaluation of twin 60-inch diameter intake pipelines supported on 99 30- and 36-inch diameter drilled piles. GDC performed 17 Cone Penetration Test (CPT) soundings and four rotary borings to develop subsurface conditions along the alignment. GDC developed three representative ground motions for the design earthquake and performed seismic deformation; and soil-structure interaction analysis on three (3) representative cross sections using the computer Code FLAC. The results of these analyses provided parameters for the design of the drilled pile foundations and convinced the LADWP that a pile supported pipeline will be safe during an earthquake against liquefaction and lateral spreading.

GDC provided axial and lateral capacity of the 30- and 36-inch diameter CIDH piles. During construction, GDC provided observation and Gamma-Gamma testing to verify the integrity of the piles.



Westminster Storage Tanks

Westminster, California

Geotechnical Engineering

Geology

Earthquake Engineering

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The City of Westminster proposed construction of two 190-ft diameter, 40-ft high, 8 million-gallon, circular steel water storage tanks side-by-side on a 4-acre site. A geotechnical investigation by another firm had provided recommendations for tank design. At the request of Montgomery Watson, the tank designer, Group Delta Consultants, Inc. (GDC) reviewed the plans and discovered significant geotechnical problems with the site including large settlement and potential for liquefaction and lateral spreading.

Our subsequent investigation, which included drilling, CPTs, and laboratory tests, confirmed that the site had poor soil conditions. Also present were a 10-ft deep channel and a detention pond in close proximity to the tank pad. GDC estimated that with these conditions the potential for static settlements of about 12-inches was present. Also the potential for liquefaction and lateral spreading and resulting tank failure was high.

In lieu of expensive pile foundations GDC proposed an economical site remediation plan, including installation of stone columns and a soil surcharge, to improve the shear strength and bearing capacity of the soft clays, and decrease post-construction settlement of the tanks. The measured settlements during the surcharge ranged from 9- to 15-inches, close to our prediction.

GDC Achievements

GDC saved the City from a potential disaster because if built according to the original plans, the tanks would have settled more than a foot and possibly failed during a seismic event.



Westminster Tank Failure

Westminster, California

Geotechnical Engineering

Geology

Earthquake Engineering

Materials Testing and

Inspection

Forensic Services



A five million gallon above ground concrete tank failed in the City of Westminster. When the tank ruptured, the resultant runoff damaged a nearby condominium development, requiring it's occupants to be temporarily evacuated. Montgomery Watson (MW) performed a forensic investigation to assess the causes of failure. As a part of the forensic investigation, Group Delta Consultants, Inc. (GDC) performed a geotechnical investigation at the location of the failed tank and a similar tank still in operation.

Our forensic investigation at the location of failed tank Reservoir No. 2, focused on determining whether the failure was caused by geotechnical conditions such as settlement. GDC took measurements of the tank's footing elevations and compared them to survey data and as-built drawings. GDC drilled borings, performed CPTs, took samples, and characterized the subsurface soils. GDC reviewed historical settlement data, and evaluated potential seismic hazards. GDC provided both deterministic and probabilistic seismic hazard assessment and provided response spectra for MW seismic evaluation of the both the reservoirs. MW determined that the failure was caused by structural failure of the ring beam due to the corrosion of the rebar. The evaluation also indicated that it was not economically feasible to repair the failed reservoir and seismically retrofit Reservoir No. 1 and both the reservoirs were condemned.

GDC Achievements

GDC completed the geotechnical investigation and report in a record time to meet aggressive schedule of MW report on the failure in 35 days.

Summary of GDC Staff

Technical Staff

| QUALIFICATIONS AND EXPERIENCE | | | |
|-------------------------------|---------------------------------|---|-------------|
| NAME | FUNCTION | REGISTRATION | YRS OF EXP. |
| Dr. Kul Bhushan | Principal Geotechnical Engineer | RCE, GE | 40 |
| Tom Swantko | Principal Geotechnical Engineer | RCE, GE | 35 |
| Mike Reader | Principal Geotechnical Engineer | RCE, GE | 23 |
| Shah Ghanbari | Principal Engineer | RCE | 25 |
| Curt Scheyhing | Senior Geotechnical Engineer | RCE, GE | 14 |
| Eugene Lewis | Senior Geologist | CEG | 10 |
| Chris Guesnon | Geologist | CEG | 17 |
| Joe Barr | Geologist | RCE, CEG | 10 |
| Eric Holliday | Geologist | | 7 |
| Opjit Ghuman | Environmental Engineer | RCE, GE | 33 |
| Vesna Glisic | Project Engineer | RCE | 8 |
| Nava Navaratnarajah | Field Engineer | RCE | 5 |
| Dr. Ying Liu | Seismic Engineer | RCE | 12 |
| Ray Basilio | Senior Field Engineer | ACI | 25 |
| Konrad Fernandes | CADD Manager | - | 15 |
| Jeanette Moreno | CADD Designer | | 5 |
| Ray Green | Materials Testing Manager | ME | 30 |
| Richard Mahoney | Manager of Soils Testing | Deputy Inspector | 15 |
| Eric Ycoy | Soils Lab Manager-Torrance | Caltrans Certified | 15 |
| Henry Kim | Soils Lab Manager-Irvine | Caltrans Certified | 34 |
| Ray Basilio | Senior Geotechnical Technician | Deputy Inspector | 25 |
| Mike Jacobs | Senior Geotechnical Technician | Deputy Inspector | 20 |
| Arnold Ramirez | Senior Geotechnical Technician | Deputy Inspector | 15 |
| Pool of Technicians (25) | Inspectors | ICBO, DSA, City of Los Angeles & Caltrans | 5 to 25 |
| Support Personnel (11) | Support | - | 2 to 20 |