



Helenschmidt Geotechnical, Inc.



**CONSULTING ENGINEERS**



# HGI'S GEOTECHNICAL SERVICES



## COMPANY OVERVIEW

Helenschmidt Geotechnical, Inc. (HGI) is a full service geotechnical consulting firm established in 2004. HGI's experience covers a broad range of projects including geotechnical hazard remediation, commercial and residential development, public works projects, seawall design and construction and seismic analysis and retrofit.

Specializing in investigation, analysis and mitigation of geotechnical hazards, HGI maintains state-of-the-art facilities including an in-house soil testing laboratory, geotechnical engineering software, technical illustration and an extensive geologic reference library.

HGI provides third-party review for municipalities in discretionary permitting issues, as well as for commercial and residential developers. We assist in the formulation of construction monitoring and response protocol where adjacent properties may be impacted by construction activities. We provide a full spectrum of geotechnical services, including the following:

## LANDSLIDE REMEDIATION



HGI's highly qualified personnel use sophisticated techniques and programs for evaluating stability of natural slopes, including those with pre-existing landslides or inherently unstable earth materials. Our analysis starts with detailed investigation characterization of site specific geotechnical features and continues through creative design for hazard mitigation. HGI provides rapid response and development of emergency mitigation measures for active landslides.



## FOUNDATION DESIGN



From the investigation and design of conventional earth retention structures to the complex design of large building foundations, retaining wall foundations and foundations on steep and geologically complex terrain, HGI provides reliable, innovative, and

cost-effective geotechnical engineering design solutions and recommendations.

## HAZARD STUDIES

HGI routinely performs mapping of geology, geologic hazards, fault features and distress documentation. Our hazard studies services range from development of hazard and geologic maps for planning purposes to site specific studies including subsurface characterization and remedial design.



# HGI'S GEOTECHNICAL SERVICES

## DEVELOPMENT



HGI provides geotechnical services on a variety of coastal, land/infrastructure, commercial and essential facility development projects. HGI provides technical support in all phases of the project including investigation, design, permitting, grading inspection and detailed documentation of as-built conditions.

## GEOTECHNICAL REVIEW



HGI's staff provides services as Geotechnical Consultant for public agencies and developers. We provide technical peer review of geologic and geotechnical engineering investigations, reports and construction issues. HGI's staff has provided peer review services to the Cities of Encinitas, Rancho Palos Verdes and San Juan Capistrano.

## EXPERT WITNESS SERVICES

HGI has substantial expertise in investigating and determining causative factors for distress to structures, retaining walls and soil movement. We maintain geotechnical instrumentation for evaluation and monitoring of distress. We specialize in providing large format court room exhibits, three-dimensional rendering of complex geotechnical conditions, annotated photographs, and Powerpoint presentations. HGI provides our valued insight, litigation support and expert witness testimony to many attorneys and law firms.



## CONSTRUCTION & DESIGN SERVICES

HGI provides turn-key design services for grading and construction of stabilization projects, including: civil drawings, plan submittal and permitting assistance, design specifications, calculations, bid and contract assistance, engineer's construction cost estimating, and construction observation/oversight, inspection and testing.


## LABORATORY & FIELD TESTING

HGI maintains a well equipped in-house laboratory testing facility at it's Carlsbad office. Staff routinely performs a wide variety of soils analyses ranging from soil classification and determination of index properties, settlement behavior and expansion potential, to analysis of strength characteristics for foundation and slope stability evaluation. HGI also provides soils testing and inspection services for grading and construction operations.



# LANDSLIDE REMEDIATION

## **CAMINITO AVOLA LANDSLIDE** LANDSLIDE EVALUATION AND REMEDIATION LA JOLLA, CALIFORNIA



HGI was retained to develop a stabilization plan for a landslide caused by heavy winter storms which occurred on the descending slope west of several residences on Caminito Avola. The landslide failure left several residences on Caminito Avola in a highly unstable condition since the head of a landslide undermined building foundations in several locations. HGI's investigation revealed that the landslide was part of a larger ancient landslide underlying the Colony Hill subdivision. Steep, uneven hillside terrain in the landslide required the use of limited access drilling equipment during the investigation. Failure plane geometry was verified by inclinometer monitoring, trenching, and hand dug test pits. HGI designed a mitigation plan that included staged construction of reinforced caissons, a shear key buttress with subdrain system and geogrid reinforced slopes.

A major failure occurred in the 5700 block of Soledad Mountain Road on October 3, 2007. HGI was retained to perform stabilization design and to develop emergency measures for protection of adjacent properties and improvements. The threat to adjacent properties posed by the landslide or potential expansion of the landslide established the need for rapid temporary shear pin stabilization of the perimeter of the slide mass. Our field exploration included: geologic mapping of the landslide features, drilling, logging and sampling of large and small diameter borings, backhoe trenches and hand excavated test pits. Inclinometers were also installed to monitor landslide movement. Accumulated subsurface data was utilized to develop a long-term stabilization plan for Soledad Mountain Road and Desert View Drive Alley, in order to restore use of the two right-of-ways and to restore residential access. The stabilization included 119 drilled caissons, improved surface and subsurface drainage features, shear key buttress construction, and geogrid reinforced fill slopes. Geotechnical monitoring was also provided to evaluate post construction roadway stability.

## **SOLEDAD MOUNTAIN ROAD LANDSLIDE** LANDSLIDE EVALUATION AND REMEDIATION LA JOLLA, CALIFORNIA

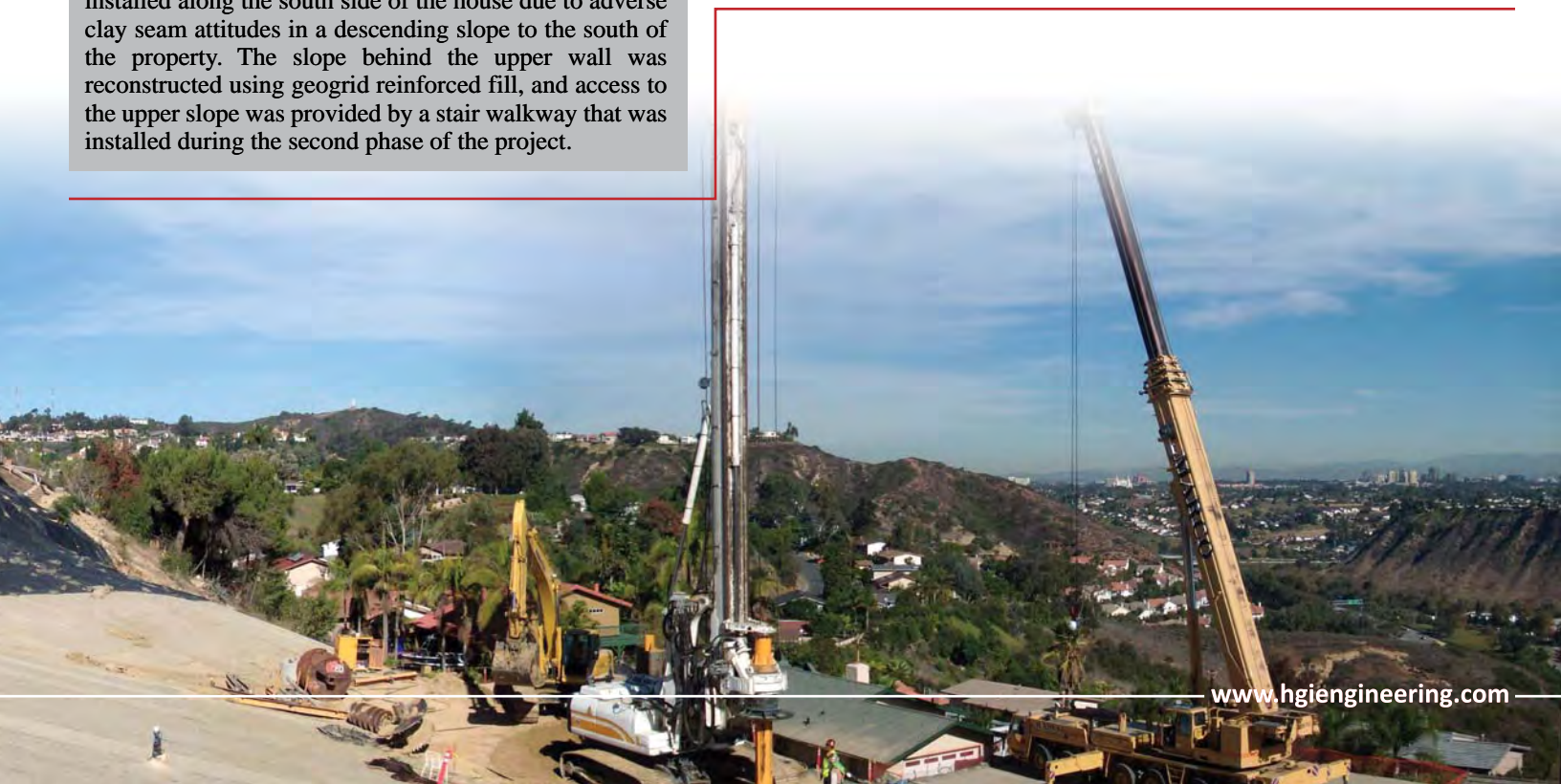
# LANDSLIDE REMEDIATION

## **VIA VALVERDE LANDSLIDE**

LANDSLIDE EVALUATION AND REMEDIATION  
SAN DIEGO, CALIFORNIA



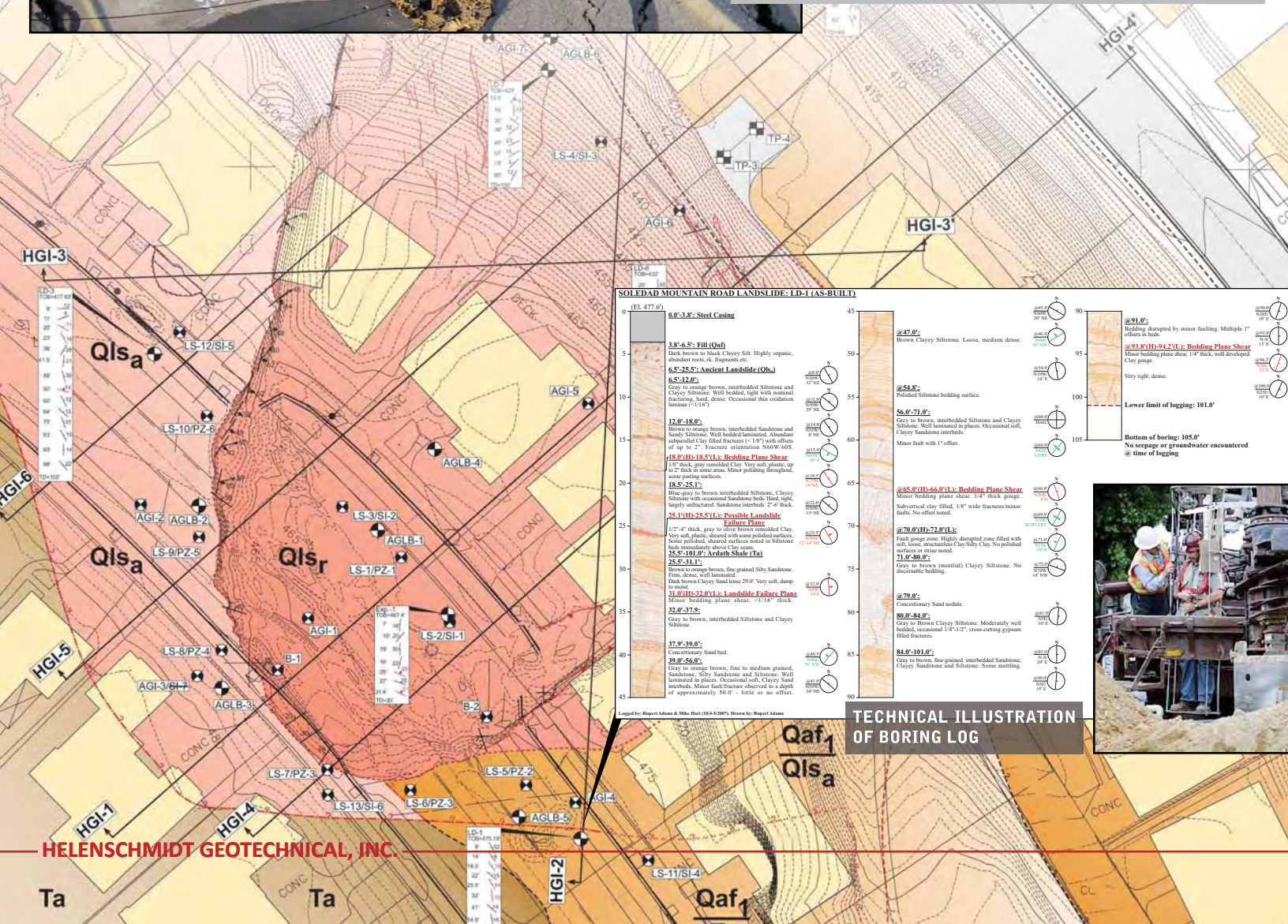
Following heavy rainfall, a slope failure occurred at the rear of a residence on Via Valverde in San Diego, which overturned a retaining wall at the toe of slope and cut off access to the rear yard. HGI was retained to investigate the cause of slope failure, to provide mitigation options, and to provide repair plans suitable for permitting and construction. To increase level rear yard space, a concept using three arcuate, masonry retaining walls was selected. The upper block wall was sited atop a grade beam and drilled caissons. Additional caissons were installed along the south side of the house due to adverse clay seam attitudes in a descending slope to the south of the property. The slope behind the upper wall was reconstructed using geogrid reinforced fill, and access to the upper slope was provided by a stair walkway that was installed during the second phase of the project.



# HAZARD STUDIES



Specializing in investigation and mitigation of geologic and geotechnical hazards, HGI has assisted both municipal and private clients who require evaluation of sites with landsliding and slope instability, faulting or other hazards such as liquefaction, dynamic settlement issues or expansive soil problems. HGI provides its clients with detailed reports supported with appropriate technical illustrations that can range from accurate, hand-drafted representations of subsurface geology to full color geologic maps, cross sections and logs and details. If hazard mitigation is required, HGI can also deliver full civil engineering and structural drawings in AutoCAD to the client, that are suitable for permit submittal and construction. If necessary, representations of more complex subsurface geology or repair elements such as caissons can be rendered in 3D, and models can be provided to the client or contractor to assist in construction. In some situations, emergency response is needed to deal with events such as rapid mobilization of landslides that affect property and infrastructure. In these situations, experienced HGI staff can be available 24 hours a day to provide recommendations and assistance with emergency stabilization measures, geotechnical monitoring and rapid acquisition of geologic and geotechnical field data that can be used in stabilization efforts.



# FOUNDATION DESIGN

## **RESTAURANT DEPOT WAREHOUSE**

GEOTECHNICAL INVESTIGATION, FAULT STUDY,  
CONSTRUCTION OBSERVATION & TESTING  
SAN DIEGO, CALIFORNIA

HGI was contracted to study the redevelopment of a 10-acre site, located in the South Bay area of San Diego north of the Coronado Bay Bridge overpass easement. The development included demolition of existing industrial buildings and re-grading of the site to produce a level building pad for a new 75,000 square foot warehouse with associated parking. Regional geotechnical influences on the site of the proposed improvements included both seismically induced liquefaction and expansive soil conditions. The site is located within the City of San Diego Special Studies Zone for potentially active faulting. Our investigation included multiple borings as well as exploratory trenches and test pits, excavated to determine the presence or absence of fill soils, evaluate formational soils, and characterize potential fault related features. Our report provided detailed grading recommendations to mitigate problems associated with highly expansive soils, liquefaction, differential settlement and poor pavement support characteristics.

## **LEONA VALLEY WATER STORAGE TANK SITE**

GEOTECHNICAL INVESTIGATION, FAULT STUDY,  
CONSTRUCTION OBSERVATION  
LEONA VALLEY, CALIFORNIA

The California Water Service Company requested a geotechnical investigation for a 150,000-gallon, welded steel water storage tank to supplement their existing infrastructure in Leona Valley, California. HGI was retained to evaluate the properties of the underlying materials and to provide foundation design parameters. Representative samples from our field exploration were tested for index properties as well as corrosivity, settlement, and strength parameters. Fault trenching was performed perpendicular to the known fault alignment. HGI provided geotechnical recommendations for site grading and foundation type as well as seismic design criteria, and estimated settlement of the proposed tank under static and dynamic conditions.

# DEVELOPMENT



## COMMERCIAL DEVELOPMENT

HGI has provided geotechnical services on many commercial structures, including large pre-fabricated steel framed warehouses and light commercial buildings. We understand the importance of working together in accomplishing project objectives and work closely with our clients and project consultants to develop innovative solutions to geotechnical issues during both the design and construction phases.

## ESSENTIAL FACILITIES

HGI has provided geotechnical services on a number of essential facility projects related to the health care industry, including new construction of a special skilled nursing and dementia care facility, central plants, commercial kitchen remodels, loading dock facilities and other site improvements such as utility installation, retaining wall construction and paving. Many of these projects require comprehensive geotechnical evaluation, as they require approval from the Office of Statewide Health Planning and Development (OSHPD).

## COASTAL DEVELOPMENT

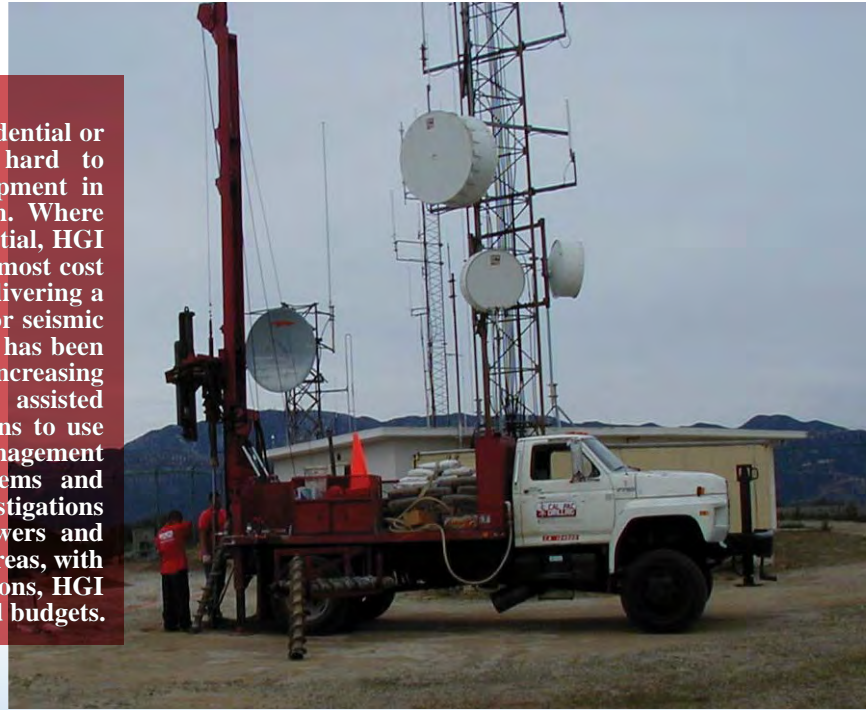
Coastal development presents a unique set of challenges, including limited site access, unstable bluff conditions, corrosion, tidal influences on construction operations and permitting requirements with the California Coastal Commission. HGI has assisted many clients in development or protection of coastal homes, in addition to providing geotechnical services on bluff stabilization projects and seawall construction.





## LAND AND INFRASTRUCTURE DEVELOPMENT

HGI has extensive experience in investigating sites for new residential or commercial development or redevelopment. HGI works hard to characterize geotechnical hazards and constraints to development in order to help reduce costs during grading and construction. Where hazards exist such as expansive soils or high liquefaction potential, HGI will work with both developers and contractors to achieve the most cost effective solution to mitigate existing site hazards while still delivering a work product that meets the most recent code requirements for seismic analysis and design criteria. In recent years, greater emphasis has been placed on 'green development', with developers coming under increasing pressure to meet or exceed LEED project goals. HGI has assisted developers in these efforts, modifying pavement design sections to use crushed, recycled aggregate, and better storm water management techniques, such as bioswale and infiltration planter systems and permeable pavement design. HGI has also performed many investigations for infrastructure development, such as communications towers and water storage tanks. Often located in remote or limited access areas, with unique geotechnical constraints such as high ground accelerations, HGI provides clients with creative solutions to meet project goals and budgets.



# CONSTRUCTION & DESIGN SERVICES

## **SEACREST RETIREMENT VILLAGE** GEOTECHNICAL INVESTIGATION, CONSTRUCTION OBSERVATION & TESTING ENCINITAS, CALIFORNIA



HGI performed geotechnical investigation, observation, and testing for a 12-acre development known as Seacrest Retirement Village located in Encinitas, California. Proposed construction of the master plan consisted of 6 two-story residential units, a synagogue and leisure center complex, retaining walls, paved parking, a central plant facility and associated utilities. The purpose of the investigation was to characterize the site geologic, seismic and geotechnical conditions and to develop relevant recommendations regarding potential geotechnical hazards, site grading, foundation type and minimum design criteria, and estimated settlement. We also performed an additional geotechnical investigation for a new Dementia Care Facility at the subject site. Construction included a 16,000 square foot single story building, underground utilities, new parking and a two-tiered soil nail retaining wall.



## **CASA DE LAS CAMPANAS** **SPECIAL CARE FACILITY** GEOTECHNICAL INVESTIGATION, CONSTRUCTION OBSERVATION & TESTING SAN DIEGO, CALIFORNIA

HGI performed geotechnical observation and testing through multiple phases of construction and expansion of the Casa De Las Campanas Special Care Nursing Facility in San Diego, California. Recent development consists of a two-story facility over subterranean parking. The development also included the construction of retaining walls, utility trenches and roadway and parking lot subgrade and pavement improvements associated with the project. We performed the preliminary soils investigations and provided recommendations for pad preparation and foundation design. We provided construction services which included soils observation and testing, excavation mapping, foundation observation, and density testing of compacted fill, utility trench backfill, retaining wall backfill, and subgrade for pavement and flatwork throughout the site.



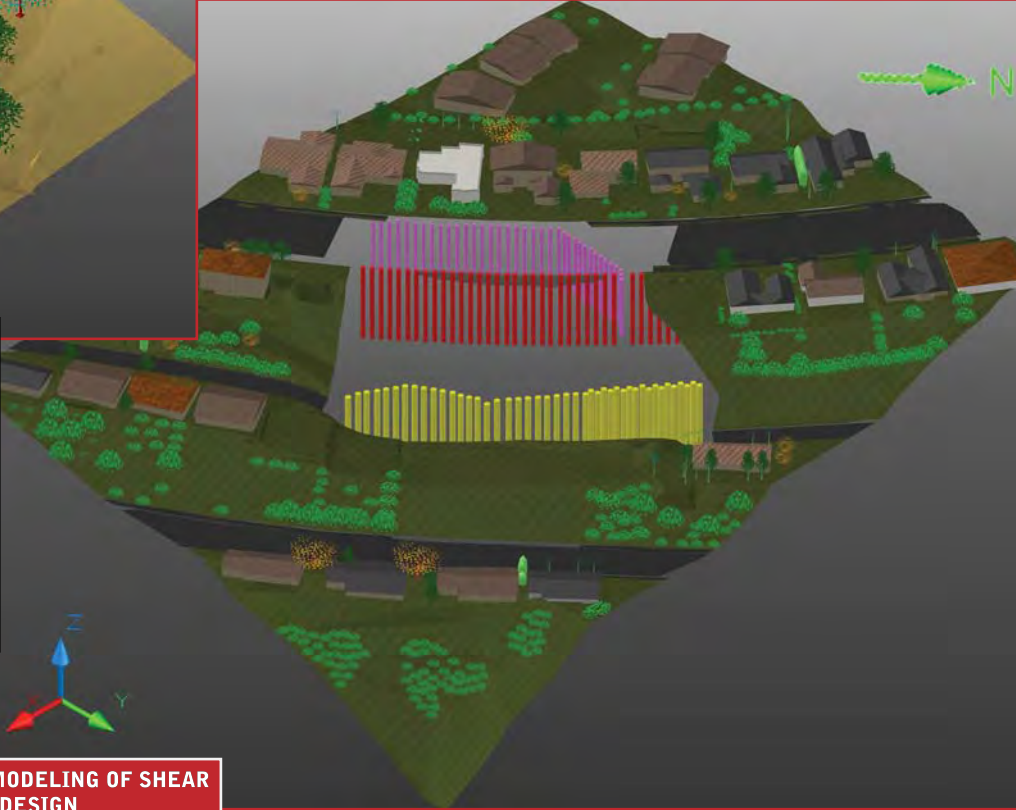
# CONSTRUCTION & DESIGN SERVICES



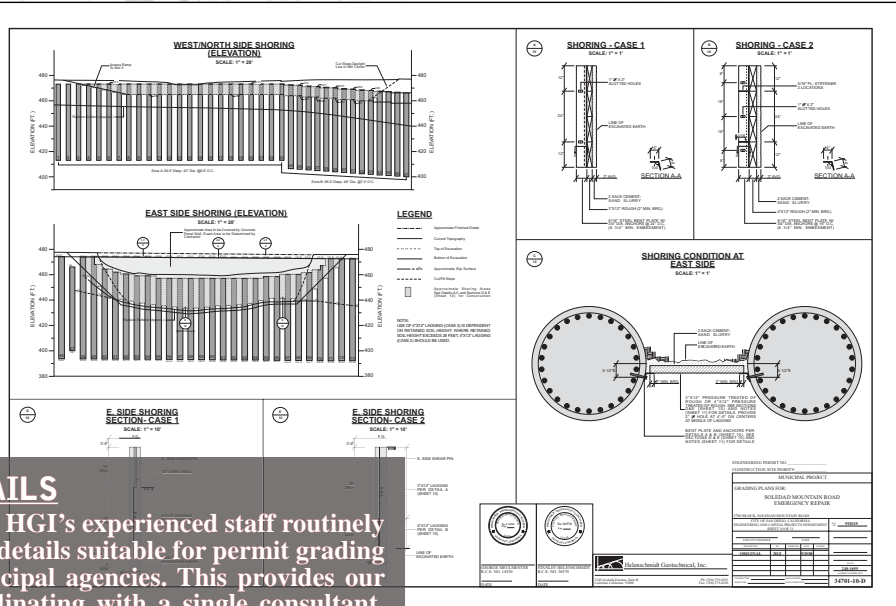
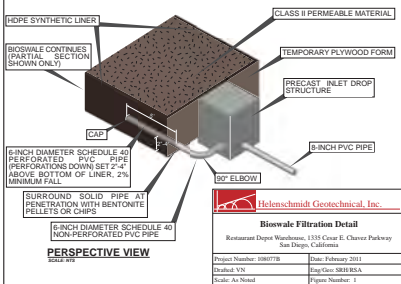
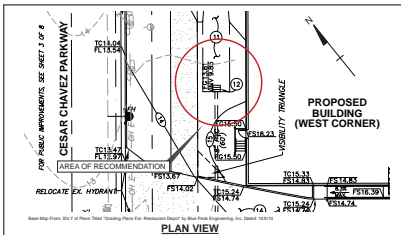
**HARDSCAPE IMPROVEMENTS ON STEEP HILLSIDE TERRAIN**

## 3D MODELING AND RENDERING

HGI utilizes state-of-the-art AutoCAD Civil 3D software to calculate accurate earthwork quantities, model open excavations during grading, and render field data for visualization and analysis of geologic structure and extrapolation of data between borings. HGI uses 3D rendering to model proposed improvements so clients can conceptualize the final design, which also provides a useful visualization tool for subcontractors.



**3D MODELING OF SHEAR PIN DESIGN**



## CONSTRUCTION PLANS AND DETAILS

In addition to soils investigations and reports, HGI's experienced staff routinely designs and drafts construction plan sets and details suitable for permit grading and building permit submittal at local municipal agencies. This provides our clients with the ease and flexibility of coordinating with a single consultant, which improves workflow and simplifies communication.

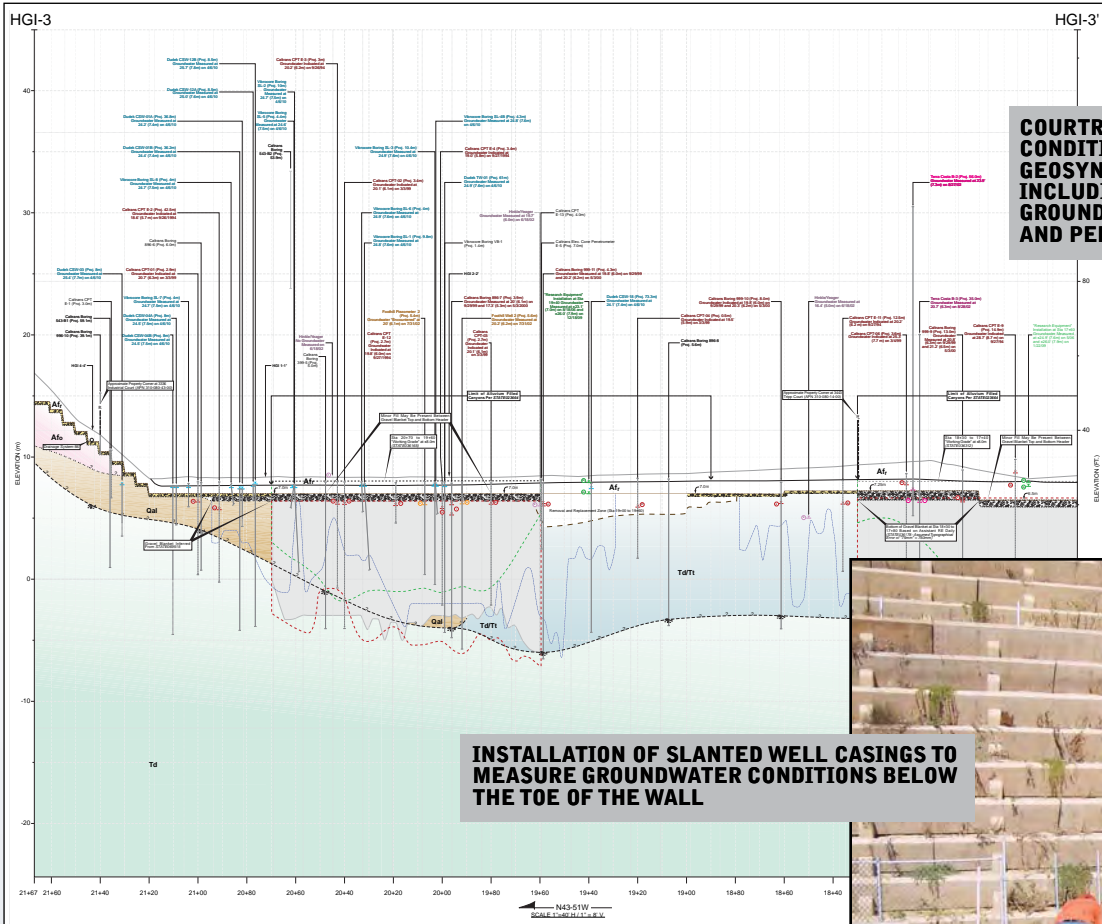
# EXPERT WITNESS SERVICES

## **CAL SORRENTO**

**GEOLOGIC / GEOTECHNICAL INVESTIGATION,  
LITIGATION SUPPORT & EXPERT WITNESS SERVICES  
SAN DIEGO, CALIFORNIA**

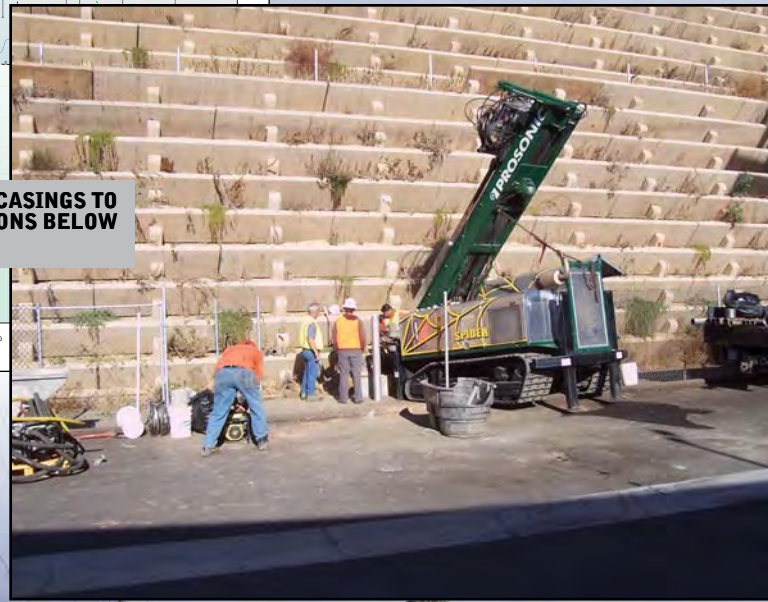
HGI was retained as a geotechnical expert to provide geologic/geotechnical investigation, litigation support and expert witness testimony on behalf of the owner of a 14-acre industrial park in the Sorrento Valley area of San Diego, California. After construction to expand the adjacent freeway, a rise in groundwater produced free flowing conditions on-site, causing saturated surface soil conditions, rapid pavement deterioration, moisture intrusion and flooding damage within the buildings. Construction to expand the freeway included a 4,000 foot long plantable geosynthetic reinforced earth wall founded on ground improvements consisting of soil cement mixing, stone columns, vertical drains, gravel blanket and gravel leveling pad. HGI investigated the cause of the rise in groundwater, linking it to the design features of the freeway expansion project. HGI also provided litigation support including plans and details for repair alternatives, construction cost estimating, and court room exhibits.

# EXPERT WITNESS SERVICES



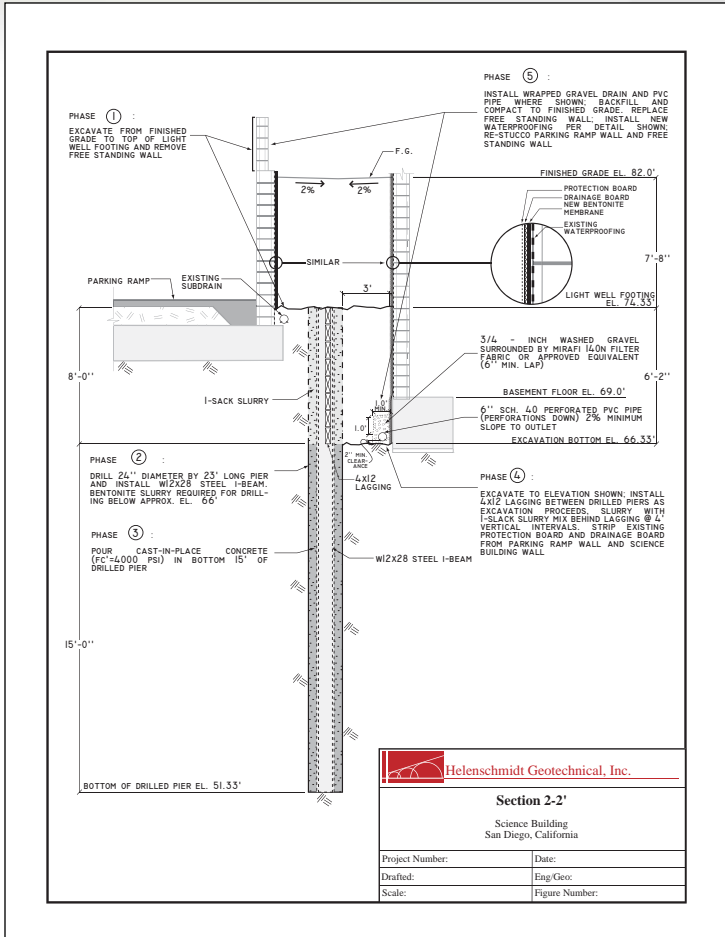
**COURTROOM EXHIBIT DETAILING GEOLOGIC CONDITIONS UNDER THE PLANTABLE GEOSYNTHETIC REINFORCED EARTH WALL, INCLUDING SUBSURFACE LIMITS OF GROUND IMPROVEMENTS UNDER THE WALL AND PERTINENT GROUNDWATER DATA**

**INSTALLATION OF SLANTED WELL CASINGS TO MEASURE GROUNDWATER CONDITIONS BELOW THE TOE OF THE WALL**



# EXPERT WITNESS SERVICES

**SCIENCE BUILDING**  
LITIGATION SUPPORT &  
EXPERT WITNESS SERVICES  
SAN DIEGO, CALIFORNIA



HGI was retained as an expert by one of the parties involved in litigation related to water intrusion at a new science building. Following heavy rains, several areas of the basement level were flooded causing significant interior damage to walls and floors as well as disrupting day-to-day operations within the building. HGI performed 15-foot deep, hand excavated test pits to examine the basement waterproofing and subdrain systems. In addition, through detailed review of utility camera footage and grading plans, HGI was able to reconstruct as-built conditions of the building's storm water collection and drainage systems and perform hydraulic calculations relevant to the design rainfall event that could cause flooding. In addition, HGI also provided repair alternatives, construction details and construction cost estimates.

# GEOTECHNICAL REVIEW



HGI and its staff have provided geotechnical review services for the City of Rancho Palos Verdes since 1998. Since our business opened in September 2004, we have continued to perform peer review of geotechnical investigations under subcontract to the City Geologist. Projects in Rancho Palos Verdes present technical challenges due to geologically complex terrain and geotechnical hazards such as large scale landsliding, faulting, seismicity, expansive soils and shoreline retreat. Our services have included review of consultants' reports, inspection of site conditions and subsurface exploration activities, review of aerial photographs, slope stability evaluation, and review of geotechnical design criteria for proposed development projects within the city. Mr. Helenschmidt has also served on a Geotechnical Peer Review Panel for the City of Rancho Palos Verdes. In this role, Mr. Helenschmidt was part of a three member panel to help resolve technical disputes between the City Geotechnical Reviewer and the Project Geotechnical Consultant.

HGI staff has also provided geotechnical review services for the Cities of Encinitas and San Juan Capistrano. We are well versed in communicating with developers, community officials and citizens. Our capabilities include the creation of clear and concise graphical presentations that make complicated geologic and geotechnical data easily understandable to a broad range of audiences including planning departments, community groups, city councils, and other design professionals. We are able to assist city governments in developing or implementing discretionary permit procedures with consideration of levels of risk based on proposed land usage and potential impacts to public safety.



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