aperture TRUTH IN FOCUS.

BUILT ENVIRONMENT TEAM: GEOTECHNICAL ENGINEERING

STATEMENT OF QUALIFICATIONS



OVERVIEW

Aperture brings multidisciplinary engineering, geoscience, and forensic expertise to projects and disputes involving subsurface conditions, ground movement, and infrastructure performance. Our Built Environment Team supports attorneys, insurers, owners, developers, contractors, and design professionals in evaluating how soil, rock, and water affect buildings and infrastructure.

Our work combines field investigation, laboratory testing, geophysical exploration, instrumentation, and numerical modeling to evaluate site conditions and determine the causes of observed distress. We translate complex subsurface data into clear technical findings that support design decisions, repair planning, claims evaluation, and dispute resolution.

CORE GEOTECHNICAL SERVICES

Our team provides integrated geotechnical, geological, hydrologic, geophysical, testing, and forensic services for buildings, infrastructure, and development sites, including:

- Geotechnical and geological investigations, subsurface characterization, and laboratory testing.
- Foundation performance, settlement, expansive and collapsible soils, and soil-structure interaction.
- Slope stability, retaining walls, bulkheads, embankments, and mechanically stabilized earth walls.
- Groundwater, seepage, moisture migration, drainage, hydrology, and hydraulic analysis.
- Geophysical exploration, electrical resistivity imaging, ground-penetrating radar, and void assessment.
- Construction vibration, movement, groundwater, and remote monitoring.
- Foundation and geotechnical design, risk analysis, and numerical modeling.
- Forensic investigations, technical peer review, expert reporting, and testimony.

WHY APERTURE

Aperture provides scalable, multidisciplinary support, ranging from targeted assessments and testing to comprehensive forensic investigations, repair design, construction administration, and dispute resolution.

INTEGRATED INVESTIGATION AND ANALYSIS	TECHNICAL DEPTH FOR COMPLEX CONDITIONS	SUPPORT FROM ASSESSMENT THROUGH RESOLUTION
Geotechnical engineers, geologists, hydrologists, and geophysical specialists work with structural engineers and construction consultants to evaluate interacting causes and project impacts.	We combine direct observations and testing with three-dimensional visualization and numerical analysis to evaluate competing explanations for distress and make findings understandable.	Our team provides focused technical assessments or multidisciplinary support for design, construction, remediation, insurance matters, and litigation.

FOUNDATION PERFORMANCE & SOIL–STRUCTURE INTERACTION

HIGH-RISE FOUNDATION MOVEMENT | NEW YORK CITY, NEW YORK

DIFFERENTIAL SETTLEMENT & SOIL–STRUCTURE INTERACTION



Performed a forensic investigation of foundation distress and progressive tilting at a high-rise residential building where movement led to suspension of construction. The evaluation focused on the performance of a concrete mat foundation supported by a ground-improvement system.

FORENSIC INVESTIGATION & MONITORING

- Reviewed design and construction records, geotechnical reports, laboratory testing, foundation surveys, and project correspondence. Installed and monitored tiltmeters, performed LiDAR surveys, and developed finite element analyses to evaluate foundation support and building movement.

FOUNDATION PERFORMANCE & CAUSATION

- Attributed the building's tilt to differential settlement caused by design and construction deficiencies in the ground-improvement system. Variable soil conditions, inconsistent treatment, and construction modifications contributed to nonuniform foundation support, while soil creep contributed to continued movement.

IRON ORE STORAGE DOME COLLAPSE | CONVENT, LOUISIANA

INDUSTRIAL FOUNDATION FAILURE & NUMERICAL MODELING



Investigated the catastrophic collapse of an iron ore storage dome to determine the underlying failure mechanism and the sequence of events contributing to the loss.

DESIGN & FOUNDATION REVIEW

- Reviewed the finite element analysis originally used to design the dome foundation and evaluated its relationship to the subsurface and geological conditions at the site.

THREE-DIMENSIONAL FAILURE ANALYSIS

- Developed three-dimensional finite element models to investigate foundation behavior and the effects of site conditions. The analysis identified the cause and sequence of events that led to the dome's catastrophic failure.

VISTA RIDGE RESIDENTIAL SUBDIVISION | ERIE, COLORADO

FOUNDATION MOVEMENT & EXPANSIVE SOILS



Investigated alleged foundation movement and related distress affecting approximately 70 single-family homes. The evaluation addressed subsurface conditions, moisture migration, foundation performance, and claims involving basement wall pressures.

GEOTECHNICAL & GEOPHYSICAL INVESTIGATION

- Performed site investigations, laboratory testing, electrical resistivity scans, and seismic testing to characterize subsurface conditions and evaluate factors contributing to movement.

MODELING & REPAIR RECOMMENDATIONS

- Used moisture-migration analysis, finite element analysis, and three-dimensional geologic modeling to evaluate the active zone, potential additional foundation movement, and subsurface moisture pathways. Developed causation opinions and repair recommendations for the affected homes.

INFRASTRUCTURE & RETAINING SYSTEM FAILURES

STATE HIGHWAY 130 | BUDA, TEXAS

PAVEMENT DISTRESS, EXPANSIVE SOILS & SLOPE FAILURES



Investigated excessive pavement heaving and cracking along a 42-mile toll road and deep-seated slope failures affecting slopes supporting its frontage roads.

SUBSURFACE & CONSTRUCTION ANALYSIS

- The investigation included laboratory testing of samples from 474 borings, 517 electrical resistivity scans, active-zone analysis, and evaluation of the contractor's application of specified subgrade compaction testing procedures.

FORENSIC & EXPERT SUPPORT

- Evaluated competing technical opinions and prepared rebuttals to numerous expert reports. Dr. John Bryant provided deposition and arbitration testimony in proceedings arising from the dispute, which ultimately settled.

SLOPE & RETAINING WALL MOVEMENT | EL PASO, TEXAS

SLOPE STABILITY, GROUNDWATER & CONSTRUCTION SAFETY



Investigated observed movement in a 140-foot-tall slope and a 35-foot pile retaining wall on behalf of the general contractor.

FIELD INVESTIGATION & MODELING

- Performed a drone survey, electrical resistivity profiling, and soil borings. Analyzed site hydrology and groundwater movement and used finite element analysis to evaluate the behavior and stability of the slope and retaining wall.

STABILITY & RISK EVALUATION

- Determined that the slope and retaining wall were unstable and posed a threat to construction workers and nearby occupants. Recommended evacuation of residents from houses at the top of the slope.

RETAINING WALL FAILURE | RICHMOND, TEXAS

FLOOD IMPACTS, SCOUR & RETAINING SYSTEM PERFORMANCE



Investigated failures affecting a 2,200-foot-long, two-tiered retaining wall system along Jones Creek following flooding associated with Hurricane Harvey.

GEOTECHNICAL & HYDRAULIC ANALYSIS

- Evaluated drainage capacity and performed slope stability analyses to assess local and global stability. Developed a discharge hydrograph and used HEC-RAS to evaluate changes in creek flow velocity during the storm.

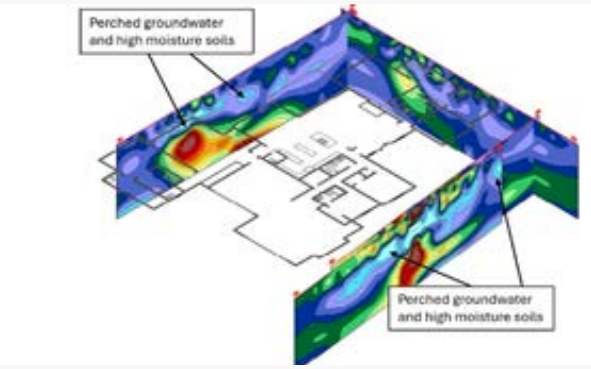
CAUSATION & REMEDIATION

- Evaluated storm-related scour and its relationship to wall performance. Determined the nature, extent, and causes of the failures and provided recommendations to remediate the affected retaining wall system.

GEOPHYSICAL INVESTIGATION

RESIDENTIAL FOUNDATION MOVEMENT | JOSHUA, TEXAS

EXPANSIVE SOILS & FOUNDATION DISTRESS



Investigated significant distress and movement at a residential foundation to evaluate performance and determine causation.

FORENSIC & GEOPHYSICAL INVESTIGATION

- Reviewed records, documented site conditions, and performed elevation surveys and engineering analyses. Used electrical resistivity surveying to evaluate variable subsurface conditions and perched groundwater.

FOUNDATION PERFORMANCE & CAUSATION

- Determined that moisture-induced expansion of subgrade soils caused differential foundation movement exceeding accepted industry performance criteria.

CONSTRUCTION IMPACTS

EXCAVATION-RELATED PROPERTY DAMAGE | BENTON, ARKANSAS

ADJACENT EXCAVATION & PROPERTY DAMAGE



Retained to investigate extensive property damage reportedly sustained following excavation immediately adjacent to an existing building. The property was reportedly rendered a total loss.

FORENSIC INVESTIGATION

- Investigated the reported distress to determine the cause of damage and its relationship to adjacent construction activities.

EXCAVATION IMPACT ASSESSMENT

- Evaluated whether the adjacent excavation contributed to building distress and the reported loss.

SHEET PILE BULKHEAD FAILURE | PORT ARTHUR, TEXAS

SOIL–STRUCTURE INTERACTION & CONSTRUCTION-RELATED INSTABILITY



Performed a cause-and-origin investigation of a sheet pile bulkhead failure, evaluating the system's initial stability and the effects of pile extraction.

STABILITY & FINITE ELEMENT ANALYSIS

- Used SLOPE/W and PLAXIS to evaluate the bulkhead following installation of a new sheet pile wall. Additional finite element analyses examined how pile extraction affected the system's stability.

FAILURE MECHANISM

- Determined that changes in mobilized soil resistance as the system transitioned from short-term to long-term behavior following pile extraction led to progressive instability and eventual failure.

DAMS, FLOODING & RENEWABLE ENERGY

FRANKLIN COUNTY DAM | MT. VERNON, TEXAS

EMBANKMENT STABILITY, SEEPAGE & EROSION



Investigated distress that developed along the dam's slopes following rehabilitation, including erosion, rills, rivulets, tunnels, and excessive seepage.

GEOTECHNICAL & GEOPHYSICAL ANALYSIS

- Collected soil samples, performed laboratory and geophysical testing, and reviewed historical project and site records. Conducted numerical slope stability analyses and evaluated the potential for progressive piping within the embankment slopes.

STABILITY & CAUSATION FINDINGS

- Determined that the slopes were unstable and that the instability resulted from improper fill material used during construction. The investigation connected observed distress with the embankment's material properties and engineering performance.

RESERVOIR RELEASE FLOODING | HOUSTON, TEXAS

HYDROLOGIC MODELING & FLOOD CAUSATION



Investigated downstream flooding during Hurricane Harvey to evaluate the extent of inundation attributable to releases from the Barker and Addicks reservoirs compared with storm runoff.

HYDROLOGIC & HYDRAULIC MODELING

- Used HEC-RAS and TR-55 to delineate watersheds and model flooding associated with reservoir releases. Calibrated the model against United States Geological Survey gaging station data to evaluate its accuracy.

FLOOD CONTRIBUTION ANALYSIS

- Used the calibrated model to quantify the additional flooding experienced by downstream property owners because of reservoir releases, providing a technical basis for distinguishing the contributions of separate flooding mechanisms.

200-ACRE SOLAR FARM | ESSEX COUNTY, VIRGINIA

EROSION, STORMWATER MANAGEMENT & SITE VERIFICATION



Performed a forensic investigation of distress following a precipitation event at a 200-acre solar development, where sediment migrated from the project site into nearby wetlands.

GEOTECHNICAL & AERIAL INVESTIGATION

- Used soil borings to verify geotechnical information relied upon for design. Conducted an aerial photogrammetric survey to collect photographic and elevation data and evaluate the survey information used for project design.

STORMWATER & CONSTRUCTION REVIEW

- Evaluated the adequacy of the stormwater management plan and reviewed whether sediment runoff controls were installed in accordance with design requirements.

KEY PERSONNEL



John Bryant, Ph.D., P.G., P.E., CPG, D.GE, M.ASCE, F.PTI

EXECUTIVE VICE PRESIDENT | GEOTECHNICAL & INFRASTRUCTURE FORENSIC ANALYSIS

Dr. Bryant has more than 25 years of experience investigating building and infrastructure performance, including foundation distress, soil-structure interaction, expansive soils, drainage, and moisture-related conditions. His work integrates geotechnical and geological engineering, geophysics, and hydrologic modeling. He has provided expert testimony in more than 400 depositions, arbitrations, and court cases.

- Foundation distress and soil-structure interaction.
- Geotechnical, geophysical, and hydrologic investigation.
- Forensic engineering, expert reporting, and testimony.



Hayden Fischer, M.S., P.E., P.G.

PRINCIPAL ENGINEER | CHIEF TECHNICAL OFFICER

Mr. Fischer is a geotechnical and hydrogeological engineer with more than a decade of forensic experience. He provides analysis and testimony involving ground movement, subsurface failure, and water intrusion. His expertise includes groundwater monitoring, geospatial analysis, remote sensing, slope stability, expansive and collapsible soils, and automated monitoring.

- Geotechnical and groundwater investigations.
- Electrical resistivity, ground-penetrating radar, and remote sensing.
- EVS, GIS, MODFLOW, and HYDRUS modeling and visualization.



Yasser M. Abdelhamid, Ph.D., P.E., M.ASCE

DIRECTOR OF FORENSIC ENGINEERING

Dr. Abdelhamid provides forensic geotechnical and geophysical expertise for residences, commercial sites, roadways, and pipelines. His work evaluates soil-structure interaction involving foundations, pavements, retaining walls, and slopes. His background in expansive soils, soil dynamics, and numerical modeling supports the evaluation of cause, scope, and responsibility in geotechnical disputes.

- Expansive soils, soil dynamics, and soil-structure interaction.
- Foundation, pavement, retaining wall, and slope investigations.
- Geophysical evaluation and numerical modeling.



M. Kabir Hossain, Ph.D., P.E.

DIRECTOR OF GEOTECHNICAL SPECIAL PROJECTS

Dr. Hossain specializes in soil mechanics, foundation engineering, subsurface characterization, and finite element analysis for onshore and subsea projects. His forensic work evaluates complex geotechnical conditions and soil-structure interaction involving foundations, retaining walls, buried pipelines, and slopes. His offshore experience includes foundations and anchor systems for floating structures, including wind platforms.

- Finite element modeling of soil-structure performance.
- Settlement and heave in expansive and collapsible soils.
- Subsea foundations, anchor piles, and offshore pipeline systems.



Jeong Yeon Cheon, Ph.D., P.E., M.ASCE

SENIOR GEOTECHNICAL ENGINEER

Dr. Cheon has more than 20 years of industry experience in geotechnical engineering. She manages forensic investigations, engineering analyses, report preparation, and data visualization for complex soil-structure interaction matters. Her experience includes shallow and deep foundations, slope stability, pipe-soil interaction, vibration monitoring, and integrated geological and geotechnical studies.

- Foundation performance, settlement, and soil-structure interaction.
- Retaining structures, MSE walls, dams, and slope stability.
- Construction vibration, drainage, and forensic investigations.



Mohamed Mansour, Ph.D., P.E.

SENIOR GEOTECHNICAL ENGINEER

Dr. Mansour brings more than 15 years of geotechnical and forensic engineering experience supporting infrastructure and building projects in the United States, Canada, and the Middle East. He investigates geotechnical problems and distressed structures, develops engineering solutions and remediation plans, and provides technical leadership from investigation through design and construction.

- Retaining and mechanically stabilized earth walls.
- Deep excavations, shoring, and shallow and deep foundations.
- Slope stabilization, ground improvement, and complex geotechnical systems.



Christopher Tony, M.S., P.E., M.ASCE
MANAGER OF FORENSIC ENGINEERING

Mr. Tony specializes in forensic geotechnical investigations, foundation performance, and soil–structure interaction. His background combines structural and geotechnical engineering for projects involving foundations, retaining systems, pavements, pipelines, and subsurface infrastructure. He manages field investigations, laboratory testing, engineering analysis, and technical reporting for residential, commercial, and infrastructure matters. His experience includes evaluating foundation movement, expansive soils, subgrade preparation, and construction-related deficiencies.

- Foundation performance, expansive soils, and soil–structure interaction.
- Retaining walls, slope stability, and pipeline investigations.
- Geotechnical and geophysical testing, subsurface characterization, and litigation support.



Saman Farzi Sizkow, Ph.D., P.E.
PROJECT ENGINEER

Dr. Sizkow specializes in geotechnical engineering analysis for residential, commercial, and infrastructure projects. His expertise includes advanced numerical modeling, soil–structure interaction, foundation performance, retaining walls, and slope stability. His forensic investigations address foundation movement, settlement, pavement distress, pipeline failures, and other subsurface infrastructure issues.

- Shallow and deep foundation performance and bearing capacity.
- Expansive soils, retaining wall failures, and slope stability.
- Numerical modeling, soil dynamics, and pavement analysis.



Kourosh Tamizdoust, Ph.D., P.E., M.ASCE
PROJECT ENGINEER

Dr. Tamizdoust specializes in geotechnical engineering and hydrogeology, focusing on numerical modeling, data visualization, and forensic investigations. He manages geotechnical and geophysical projects involving foundations, pavements, retaining walls, slopes, and underground pipelines. His work integrates field exploration, laboratory testing, long-term monitoring, and engineering analysis to evaluate soil–water–structure interaction and develop technical findings for litigated and non-litigated matters.

- Foundation performance, expansive and collapsible soils, and soil–structure interaction.
- Retaining walls, slope stability, and underground pipeline investigations.
- Geophysical testing, numerical modeling, drainage, and seepage analysis.



Rendon M. Rieth, M.S., P.E.
PROJECT ENGINEER

Mr. Rieth is a hydrologic and geotechnical engineer whose work combines field investigation, laboratory testing, engineering analysis, and multidisciplinary project coordination. His experience includes foundation performance, expansive and collapsible soils, slope stability, groundwater, and drainage. He uses hydrologic and hydraulic modeling, geospatial analysis, remote sensing, and geophysical methods to evaluate site conditions and causation.

- Foundation analysis, retaining walls, and soil-structure interaction.
- Drainage, seepage, erosion, and hydrologic and hydraulic modeling.
- Geophysical investigation, remote sensing, and material volume estimation.



Mark A. Mendel, P.E.
STAFF ENGINEER

Mr. Mendel has more than 25 years of experience in geotechnical and civil engineering, environmental consulting, construction materials testing, and forensic investigations. His work includes foundation and pavement evaluations, earthwork and site grading analysis, and environmental due diligence. He investigates differential foundation movement and property damage for residential, commercial, and government projects, supporting clients, insurers, and legal teams with field investigations, engineering analysis, and technical reporting.

- Geotechnical investigations, differential foundation movement, and pavement distress.
- Earthwork, site grading, and construction materials testing.
- Property damage assessments, environmental site assessments, and claims support.



Taryn DiLorenzo, Ph.D.
GRADUATE ENGINEER

Dr. DiLorenzo brings a background in civil and geotechnical engineering, experimental research, and infrastructure monitoring. Her work includes laboratory investigations of pavement behavior under changing environmental conditions and the development of sensor-based systems to detect bridge icing. Her doctoral research combined time-domain reflectometry, automated data analysis, and real-time monitoring to support transportation safety.

- Civil and geotechnical engineering research and analysis.
- Laboratory testing and environmental effects on pavement performance.
- Sensor development, instrumentation, and real-time monitoring.

A MULTIDISCIPLINARY PARTNER FOR THE BUILT ENVIRONMENT

Complex ground conditions often involve interacting subsurface, groundwater, structural, and construction factors. Aperture brings together geotechnical engineers, geologists, hydrologists, geophysical specialists, structural engineers, and construction consultants to evaluate these conditions and their effects on buildings and infrastructure.

Our services extend from condition assessments, testing, and forensic investigations through repair-scope development, cost evaluation, restoration design, construction administration, reconstruction, and dispute support. This integrated approach helps clients understand existing conditions, evaluate reasonable options, and make informed decisions about repairs, claims, and project delivery.

Aperture supports building owners, associations, property and facility managers, attorneys, insurers, developers, contractors, architects, and engineers across residential, commercial, hospitality, institutional, and industrial properties.

Whether the need is a targeted assessment or a complex multidisciplinary engagement, our team provides clear technical analysis, practical recommendations, and support through the next phase of the matter.

Contact Aperture to discuss your next geotechnical engineering challenge.

info@aperturellc.com | aperturellc.com

