GEI Consultants

STRUCTURAL ENGINEERING SERVICES

Building Envelope Evaluation

About GEI

GEI Consultants, Inc. is a consulting engineering firm that delivers value-laden professional services that improve our world's built environment. With more than 800 staff and approximately 40 offices nationwide, GEI is a leader in providing multi-disciplined engineering and technical services to a range of private and public sector clients, both domestically and abroad.

As an employee-owned firm, we foster personal relationships with our clients and support our staff in a partnership model, which is underpinned by continuous learning and sharing of knowledge. We retain proven, recognized experts and attract the best young minds to deliver to our clients a refreshing blend of technical expertise, collaborative spirit, and innovation that is rare in our profession.

GEI is consistently ranked among the top 100 engineering firms in Engineering News-Record's (ENR) annual rankings.

Structural Engineering Services

GEI's Structural Engineering Division provides Building Envelope services that include facade repairs, roofing, and plaza waterproofing to both existing and new buildings. Our in-house expertise has allowed the integration of the building envelope strategy with our structural/architectural and sustainable/environmental disciplines for the development of various challenging projects, in particular, "Green Roofs" in various locations in the New York City area. GEI's waterproofing for roofs and plazas services include testing and surveying of existing roof conditions to identify defects and pin point entries for water infiltration. Due to our structural engineering expertise, we are recognized as Forensic Experts in many building envelope litigation cases. Our expertise includes state-of-the-art non-destructive testing technology to identify building envelope issues and failures.

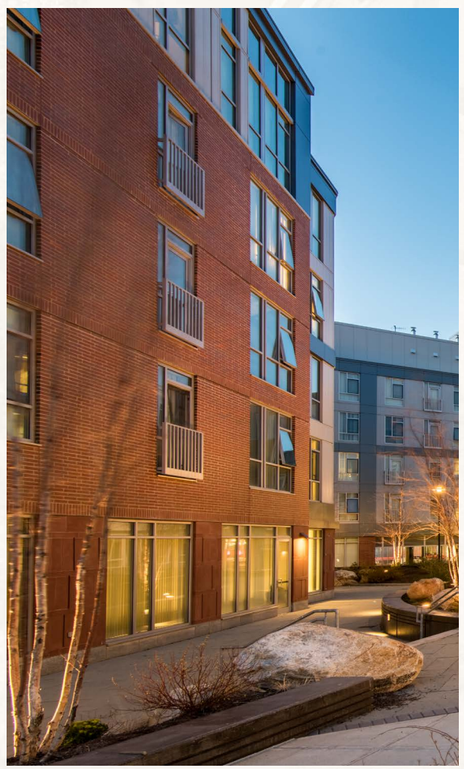
Services

- Investigation Services
- Design Services
- Repair and Rehabilitation Design
- Forensic Engineering/Failure Investigation/Collapses
- FISP/Local Law 11/98
- Facade Inspections/Repairs

Building Envelope Services

- Parking Structures
- Special Structures
- Structural Engineering/Design
- Formwork Analysis Design/Shoring Reshoring Analysis
- Foundations and Geotechnical Investigation

Structural Condition Assessments and Repairs



5TH AVENUE - NEW YORK, NY

GEI designed facade repairs for this Landmark residential building including stone and terra-cotta repairs. Construction administration services were provided as well.

STARRET CITY - BROOKLYN, NY

GEI investigated the masonry facade distress in this giant complex of 32 20-story buildings and prepared repair drawings and specifications for repairs of the balcony railing failure, concrete slab eyebrow spalling, and brick masonry distress. Construction administration services were provided.

CONFUSCIOUS PLAZA - NEW YORK, NY

The Confucius Plaza project is a 44-story reinforced concrete building with masonry brick facades. The brick facades exhibited compressed soft joints accompanied by masonry outward movement especially at the upper floors. GEI investigated the causes for the facade distress such as the effects of thermal expansion on the facade, shrinkage issues, and moisture absorption. GEI prepared construction documents for the repairs and provided construction administration services.

NEW YORK ATHLETIC CLUB - NEW YORK, NY

This 24-story building is constructed with limestone and brick facades. GEI performed condition surveys and investigated the spalled and cracked masonry facade distress. Based on the investigation, GEI prepared design drawings and specifications for the repairs. Construction administration services were provided.

KOLB LABORATORY BUILDING - NEW YORK, NY

The high-rise masonry facades experienced distressed facades and water leaks. GEI investigated the distress and prepared repair drawings and specifications for the damaged facades, expansion joints, and flashing at shelf angles. Construction administration services were provided.

Photo Credit: © Tom Rossiter Photography

MANHATTAN PLAZA - NEW YORK, NY

This high-rise structure experienced distressed facades with spalled bricks. The brick facade was tested by GEI to determine the causes for the spalled bricks. Stress Relief tests and other relevant tests were conducted. Based on the investigation, GEI prepared construction documents for the repairs. The repairs included cutting new soft joints and replacing damaged bricks.

EAST 20TH STREET - NEW YORK, NY

This landmark building had a deteriorated and damaged facade. GEI designed repairs including fiberglass replacement of terra cotta units, and provided construction administration services.

MLK FEDERAL BUILDING - ATLANTA, GA

GEI was retained to investigate and provide a second opinion related to the causes of marble facade distress. Additionally, we were asked to review the structural safety of the building facades. GEI performed a condition survey of the building facades, identified various causes for the structural distress, and recommended a course of action for repair details and immediate safety precaution measures. An engineering report with findings, conclusions, and recommendations was issued.

ATLANTIC AVENUE - STAMFORD, CT

The facades of this high-rise office building consisted of precast concrete walls finished with marble panels. Several marble panels exhibited extensive cracking and out-of-plane warping. GEI performed a condition survey and retrieved marble samples for laboratory testing. GEI investigated the effects of the various design and construction details including the marble anchoring system. A report was issued with findings, conclusions, and recommendations.

WASHINGTON STREET - NEWARK, NJ

This building complex consists of a 2-story office structure and an 18-story tower structure located in Newark, New Jersey. The tower building was originally used as a parking garage and later converted to a storage facility. The brick facade of both the office and tower buildings display various signs of distress and deterioration, including water leaks, brick cracking, bulging, structural steel corrosion, and window damage. GEI performed a structural evaluation of the brick facade to identify the type, cause, and extent of the facade damage and deterioration. Scaffold drop observations and probe openings were performed. GEI prepared an engineering report, including the findings of the investigation with the preliminary repair details and construction repair cost estimates.

ONE IRVING PLACE - GREEN ROOF NEW YORK, NY

The Green Roof at One Irving Place, NYC (aka Zeckendorf Towers) has a 17,000 square feet roof located on the 7th floor in the center of this residential complex surrounded by four towers. GEI designed this “Green Roof” on top of the existing 12-inch thick concrete roof slab. The new roofing consists of many layers of materials that make up the green roof including free-form raised mounds. Green Roof benefits include aesthetics, heat reduction during the summer when urban areas tend to become heat sinks, and reduction of water run-off into the storm sewer system.

BUENA VIDA - BROOKLYN, NY

The existing roofing system was a torched-down modified bitumen roofing that developed wrinkles and blisters a short time after the original installation. GEI performed a roof investigation to determine the cause of the failure and prepared repair documents for the roofing system replacement. The repair included complete removal of existing 10,000 square foot of roofing membrane, insulation and flashing, and the installation of a new gravel surfaced 3-ply modified bitumen roofing (upside down) system with associated flashing. A two-part metal counter-flashing system was provided at the junction between the roof deck and building walls, liquid applied, and flashing was installed at all roof penetrations. GEI provided construction administration services.

CONFUCIUS PLAZA - NEW YORK, NY

Complete removal of existing 4,000 square foot roofing membrane and flashing on the 2nd floor setback and the installation of a new gravel surfaced 2-ply modified bitumen roofing system with associated flashing. Mechanical equipment was installed and a 2-part metal counter-flashing system was provided at the junction between the roof deck and building walls.

HOLMDEL SCHOOL - HOLMDEL, NJ

GEI performed studies of 280,000 square foot polyurethane roof system that experienced delamination and coating failure resulting in water penetration into the school facility. The study included material sample tests and moisture studies including infrared imaging. An engineering report with findings, conclusions, and recommendations was issued.

SEAPOINTE VILLAGE - WILDWOOD CREST, NJ

The Seapointe Village plaza deck and parking garage is a single level underground precast/prestressed concrete structure located at the site of Seapointe Village in Diamond Beach, Wildwood Crest, New Jersey. The plaza deck is a park-like area with pedestrian sidewalks, landscaping, pool, spa, and other amenities. Since the plaza deck construction completion in 1993, the deck has been experiencing extensive water leaks. The water leaks have caused some structural deterioration to the plaza deck. GEI was retained by the owners to investigate the cause of the water leaks, assess the structural damage and develop repair plans and details.

SUNY HEALTH SCIENCES CENTER AND UNIVERSITY HOSPITAL - STONY BROOK, NY

The curtain wall of the Stony Brook University Hospital consists of vertical aluminum mullions supported by steel brackets. The facade cladding contains square glass panels attached to the vertical mullions and horizontal mullions secured through neoprene gaskets. In this project, GEI provided structural engineering services required to mitigate a problem with the curtain wall mullions that developed in the 15th floor of the building. As part of this activity, GEI performed field investigations and ascertained the nature of the problem, reviewed pertinent shop drawings involving mullion connection to the building floor system and neoprene gasket details, prepared remediation strategy and strengthening details, and developed technical scope of the work to be performed by the curtain wall repair contractor.

SUNY HEALTH SCIENCES CENTER AND UNIVERSITY HOSPITAL - STONY BROOK, NY

Under this project GEI provided structural engineering services to Stony Brook University to tackle urgent structural needs at the Health Sciences Center regarding the bulging of infill CMU walls. This involved an engineering evaluation of the subject structure, materials testing, reporting of findings and recommendation, cost estimates, implementation schedule, and mitigation measures. GEI conducted field investigations to observe a damaged infill wall that forms the enclosure to the vent shaft. GEI performed a cost benefit analysis of different scenarios such as selective demolition and replacement of reinforced concrete walls versus bracing them. Repair plans and details were developed.

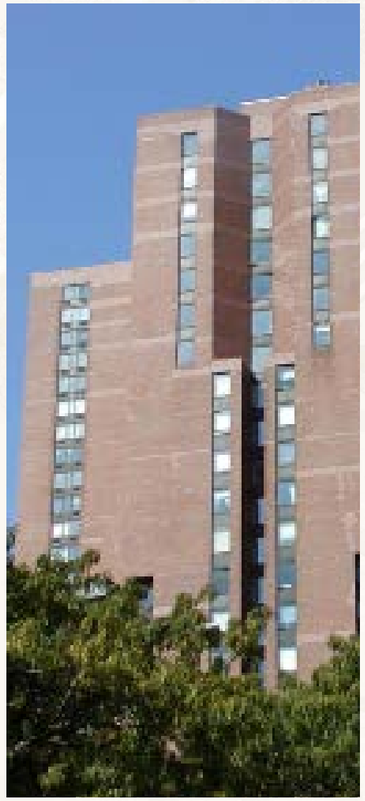
SUNY HEALTH SCIENCES CENTER AND UNIVERSITY HOSPITAL - STONY BROOK, NY

This project was involved with the condition assessment of the hospital elevator shaft walls and development of a corrective action plan. In 2002 GEI teamed up with the Thomas Group by providing expertise in assessing the condition of the elevator shaft panels and preparing plans and details for the damaged wall panel replacement. GEI was responsible for condition assessment involving field investigations, evaluation of the installation of protective scaffold shoring and walkway bridge in the vicinity of the damaged wall panels, preparations of cost estimates, review and evaluation of repair materials, preparation of drawings required for the project, review of demolition procedures, panel replacement shop drawings, temporary closure sections, and material submittals.

RUTGERS UNIVERSITY - NEWARK, NJ

This building complex consists of a 2-story office structure and an 18-story tower structure located in Newark, New Jersey. The building is owned by Rutgers, The State University of New Jersey (Rutgers). The tower building was originally used as a parking garage and later converted to a storage facility. The brick facade of both the office and tower buildings display various signs of distress and deterioration, including water leaks, brick cracking, bulging, structural steel corrosion, and window damage. GEI performed a structural evaluation of the brick facade to identify the type, cause, and extent of the facade damage and deterioration. Scaffold drop observations and probe openings were performed. GEI prepared an engineering report, including the findings of the investigation with the preliminary repair details and construction repair cost estimates.

Building Envelope/Facades



KNICKERBOCKER PLAZA - NEW YORK, NY

Knickerbocker Plaza is a multi-story building consisting of three attached towers containing 44, 35, and 30 stories. The building is constructed with a reinforced concrete frame enclosed by brick masonry. The brick facades exhibited bulging face brick, vertical cracks, and lateral movement with compressed soft joints at many of the horizontal expansion joints at the upper floors. GEI investigated the cause of the facade distress and developed repair details. The investigation revealed that the distress of the brick facade was mostly due to two adverse effects: a) the irreversible expansion of the bricks due to moisture absorption, and b) the differential movement due to shrinkage of the concrete structural frame and the brick masonry facade. The thermal expansion of the brick facade aggravated even further the stress level within the facade.

RUPPERT AND YORKVILLE TOWERS - NEW YORK, NY

Ruppert and Yorkville Towers are each a multi-story building consisting of three attached towers. Ruppert Towers has 34, 29, and 24 stories, while Yorkville Towers has 42, 37, and 32 stories. Both are constructed with a reinforced concrete frame enclosed by brick masonry. The brick facades exhibited bulging face brick, vertical cracks, and lateral movement with compressed soft joints at many of the horizontal expansion joints, especially at the upper floors. GEI investigated the cause of the facade distress and developed repair details. The investigation revealed that the distress of the brick facade was mostly due to two adverse effects: a) the irreversible expansion of the bricks due to moisture absorption, and b) the differential movement due to shrinkage of the concrete structural frame and the brick masonry facade. The thermal expansion of the brick facade aggravated even further the stress level within the facade. In addition to the facade work, GEI was also involved with waterproofing of the window frames.

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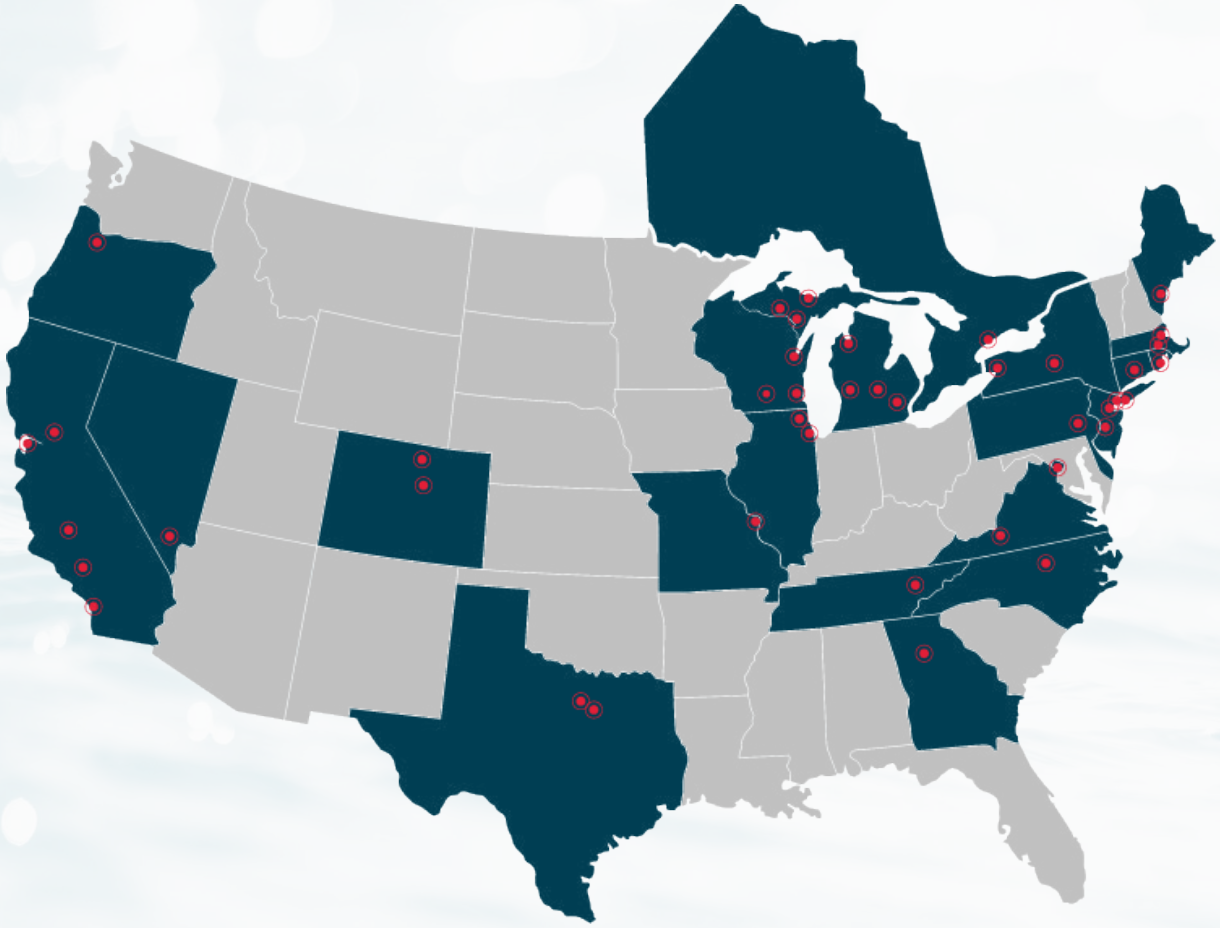

GEI is a multi-discipline engineering and scientific consultancy that employs over 800 professionals in 42 offices located throughout North America.

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