

T. GLENN ZEBLO, PE

Principal / Vice President



- Education:** Associate of Applied Science, 1981,
Architectural Technology, Wake Technical College
Bachelor of Engineering Technology, 1983,
Construction Engineering, UNC-Charlotte
- Registration:** Professional Engineer: NC License #032724
Certified Stormwater SCM Inspector: 2508
FHWA NBIS Program Manager / Team Lead Bridge Inspector
- Affiliations:** International Concrete Repair Institute
American Society of Highway Engineers
American Society of Civil Engineers
American Water Works Association
American Public Works Association

Professional Summary

Glenn is a project manager and engineer responsible for civil-site and civil-structural activities. His responsibilities include project design from initial client contact through construction administration. His experience consists of all aspects of civil-site and civil-structural design including bridges, structural renovations, concrete repairs, site design which includes grading, staking, erosion control, site drainage and site utilities, project specifications, cost estimates, construction administration and final plan review. Glenn is familiar with the review and approval processes of local and state agencies.

Experience

Religious

St. Michael the Archangel Catholic Parish, Cary, NC 2019 Project manager for the design and construction of an ADA-accessible sidewalk within the existing developed property. The sidewalk will provide a direct point of access from an existing parking lot to the basement level of an existing building. The work included local surveying, site plan, erosion control, grading and impervious surface area calculations. Municipal review and permitting was part of the work.

Raleigh Chinese Christian Church, Phases I and II, Cary, NC, 2018 Phase I included site engineering services for a 25,000 square foot building on 10 acres. Work included preparation of grading and soil erosion control plans, staking plan, on-site utility design, retaining wall design and off-site roadway improvements, on-site retention pond design and technical specifications.

Phase II consisted of building an expansion for a permanent sanctuary and additional education space. Maximized the site for parking toward a 1:2 ratio of spaces to seats and employed stormwater management necessary to accommodate the most impervious surface on the site.

Raleigh Chinese Christian Church, Cary, NC, 2018 Provided site engineering services for two phases of an expansion project. Roadway improvements in phase one included widening Chapel Hill Road (NC 54) and extending Allen Lewis Drive. Design for 870 feet of property frontage of Chapel Hill Road accommodates future plans to develop the road into a four-lane divided facility. The Town of Cary required a 500-foot extension of Allen Lewis Drive to connect it to an existing roundabout at the north end, and to Chapel Hill Road on the south end. Provided roadway design, piped storm drainage, sidewalk, and concrete curb and gutter along with roadway striping and signage. Oversaw construction administration during the construction phase.

Providence Baptist Church, Raleigh, NC, 2016 Project manager and engineer for the expansion of the worship center and parking lot at the established mega church in Raleigh, NC. The work included existing water and sanitary sewer utility relocation, piped storm drainage system relocation, grading, erosion control, staking layout and impervious surface area calculations.

North Haven Church, Raleigh, NC, 2017 Designed a stormwater control measure in accordance with NCDEQ and the City of Raleigh stormwater design requirements for the expansion of a gymnasium on church property. Project included design of a bio-retention pond for maximum buildout; a grading and erosion control plan; project submittal management with the City of Raleigh; and construction administration services.

Holy Transfiguration Orthodox Church, Wake County, NC, 2016 Project manager and engineer for preliminary engineering to assist the church with the development of a four-acre site for a new facility. The project site is within the Falls Lake Secondary Water Supply Watershed in northern Wake County. Preliminary engineering services included site layout, stormwater management design, water and sanitary sewer layout, parking lot layout, and driveway access. Coordinated and met with Wake County and City of Raleigh representatives for possible annexation for public utility services.

Crossroads Fellowship, Raleigh, NC Provided construction documents for new parking lots that consisted of plans and construction technical specifications. Also included delineation of five acres of permanently preserved undisturbed open space for mapping, coordination of tree conservation mapping, and developing an engineer's opinion of probable cost.

New Life Church, Morrisville, NC, 2016 Provided construction observation during the construction phase of the New Life Church building project. Field observation included addressing contractor questions at a pre-construction meeting; providing site construction product submittal review; witnessing and certifying a water line pressure test; reviewing as-built information for BMPs and certifying BMP construction; and being available to respond to general site construction issues that may arise during the construction.

St. Ha-Sang Paul Jung Catholic Church, Apex, NC Prepared a conceptual schematic master site plan to identify the maximum use of the property in accordance with the local development code to achieve the goals of the church on a seven-acre site. Developed a phase one site plan for the initial site development of a 5000-square-foot church and 50 parking spaces. Site design included grading, erosion control, geometric layout, water service, fire protection extension into property, and resource conservation area allocation.

St. Eugene's Catholic Church, Wendell, NC Prepared a site plan on a 19-acre site for a 13,600 square-foot new worship center and additional 180 parking spaces. Scope of work included water and sanitary sewer service design; piped storm drainage system; NC Division of Water Resources-extended dry detention pond and grass swale for nitrogen reduction credit and stormwater discharge control; grading; erosion control; and pavement design. Review agencies were Town of Wendell, City of Raleigh Public Works Department, Wake County, NCDOT, NCDEQ DWR and USACE.

Holy Trinity Greek Orthodox Church, Raleigh, NC Preliminary site engineering to assist the church and architect in placing a new permanent sanctuary and additional educational space on the existing property in conjunction with the existing buildings. Services included geometric layout, boundary, buffer and setback requirements; determining potable water and sanitary sewer service connection locations; preliminary grading; preliminary stormwater and nitrogen export calculations.

Cary Church of Christ, Cary, NC Civil-site design included modifying the existing wet detention pond for the proposed permanent sanctuary addition to the existing church building. Grading, erosion control, storm drainage design, nitrogen export loading calculations, stormwater management plan, pavement design and on-site fire protection, domestic water service and sanitary sewer service were included in the work.

St. Michael's Episcopal Church, Raleigh, NC Civil-site design for an addition to an existing church building. Grading, erosion control, layout plan and tree conservation plan were included in the design. Neuse River riparian buffer was a factor in the design process.

Church of the Nativity, Raleigh, NC Civil-site design for an addition to the existing fellowship building. Grading, staking layout plan, fire apparatus access road, sanitary sewer service design, piped stormwater drainage design and a tree conservation plan were included in the work.

First Assembly of God, Raleigh, NC Civil-site design for an existing building and parking lot expansion on a partially developed 14 acres. The work included grading, erosion control design, paving, potable water and sanitary sewer design, stormwater drainage design, tree conservation plan, extension of Edgemont Drive through the property and existing NCDOT roadway widening on Blue Ridge Road.

Swift Creek Baptist Church, Wake County, NC Civil-site design on a 5.8-acre site in southern Wake County. The property is zoned R-40W and is limited to a 24 percent maximum impervious surface coverage with stormwater management devices. The scope of the work included grading, erosion control design, paving, stormwater management, sanitary septic design coordination.

Hope Lutheran Church (Phase I), Wake Forest, NC Civil-site design on a 12-acre new community development. The congregation relocated from downtown to a more suburban setting. Services included stormwater design, erosion control design, and on-site utility design. The site has near-surface rock formations that require careful planning on building foundations and underground utilities.

Hope Lutheran Church (Phase II), Wake Forest, NC Civil-site design for the second phase of development on the 12-acre site. The design work included grading, erosion control, stormwater management BMP's, nitrogen calculations, fire protection, domestic water and sanitary service design, and pavement design.

Providence Baptist Church, Raleigh, NC Civil-site design for a 73-acre site in the Falls Lake secondary watershed in North Raleigh. The site design complexities included stormwater retention (wet) ponds, Neuse River riparian buffers, and pocket wetlands. The design services included grading, staking, erosion control, on-site stormwater management, pavement design, special drainage pavement design, off-site roadway improvements, off-site public water and sanitary extensions and on-site sanitary lift station design.

Wake Forest Presbyterian Church (Phase I), Wake Forest, NC Site engineering services for a 10-acre site located within the Falls Lake Watershed. Services included storm drainage design, soil erosion and sediment control plan, on-site utility design for water and sanitary. The sanitary design included an on-site sewage lift station that discharges into an existing public force main. On-site stormwater detention was required because of the watershed.

Wake Forest Presbyterian Church (Phase II), Wake Forest, NC Site engineering services for the second phase on the 10-acre site. Services included grading, soil erosion and sediment control plan, on-site utility design for water and sanitary. The initial detention facility design included the storage capacity to maximize the impervious surface area allowed by zoning code on the property.

First Presbyterian Church, Sanford, NC

Civil-site design for a multi-purpose family life center addition to the existing building, located within a scenic corridor along U.S. Highway 1/15-501 in downtown Sanford. The work included grading, staking, erosion control, stormwater design, on-site utility design coordination, and pavement design.

Apex Baptist Church, Apex, NC Site engineering services for a 28,500 square foot building addition on the existing urban site of 4.127 acres. Prepared construction contract documents that included grading, erosion control, storm drainage design, on-site water and sanitary utilities design, pavement design, staking plan, and coordination with the Town of Apex for review and approval.

King's Park International Church, Durham, NC Site engineering services for a 61,500 square foot multi-purpose facility on a 32-acre site. Northeast creek traverses through the lower portion of the site. Site design included grading plan, staking plan, soil erosion control plan, public water main extension for fire protection, domestic water and sanitary sewer utilities, storm drainage design and pavement design.

Garner Church of Christ, Garner, NC Site engineering services for a 1,300 square-foot fellowship hall addition on 6.5 acres. Site design included preparing a grading plan, staking plan, erosion control plan, storm water drainage design and onsite utility design.

Educational Institutions

Guilford Technical Community College Drainage Design, Jamestown, NC, 2016 Project manager and engineer for the design of roadway drainage, erosion control and cross pipe design for a 2,000-foot connector road that connects two sections of the campus together by tunneling underneath Guilford College Road. A structural plate pipe arch was used to create a tunnel. A stream was crossed by the alignment and required special erosion control phasing.

UNC Koury Cistern, Chapel Hill, NC, 2017 Project manager and lead engineer for investigation and repairs of an 8,100 cubic foot underground precast concrete water storage tank used for landscape irrigation. The project included Non-Permit Confined Space Entry to inspect the inside of the tank for water leakage. Developed a repair and oversaw the construction of the repair.

North Carolina State University Stair Repair, Raleigh, NC, 2017 Project manager. Provided civil engineering and construction administration for ADA compliance project to remove a set of steep stone stairs, foundation, and handrail behind David Clark Laboratory Building along Dan Allen Drive. Design involved closing the gap with the existing stone and moving brick pavers from the top of the stairs to the space left at the bottom to fill the gap in the brick walkway at the base of the wall. Construction administration involved site visits, review of contractor material submittals, a final inspection, punch list, and preparation of record drawings based on the contractor's redline drawings and on-site observations.

Lincoln Heights Elementary School, Fuquay-Varina, NC, 2018 Project manager and engineer for renovation of 50-year-old school to accommodate modern curriculum. Developed site plans, project management, and landscape plans. Selected existing buildings were demolished, while others were renovated and incorporated into the new 90,000 square-foot construction. The bus lane and car pool lane were also revised. Prepared construction documents to obtain site plan approval through the Town of Fuquay-Varina in accordance with Wake County Public School System program requirements. Engineering services included an overall master site plan, site demolition, erosion and sediment control, grading, drainage, nitrogen export loading calculations, water and sanitary sewer, and other details.

Aldert Root Elementary School, Raleigh, NC Project manager and engineer for a replacement school project of an existing elementary school. The new building area totaled 84,000 square feet on a 19-acre site. The new building was constructed immediately behind the existing building during the school year and opened on time for the next school year. The students were not displaced off-site for this project. The site work included fire protection, potable water and sanitary sewer utilities, grading, erosion and sediment control, pavement design and stormwater management with BMPs were included in the design. Review agencies included NCDEQ DWR and DLQ, City of Raleigh Public Works Department, and Wake County Public School System.

Aversboro Elementary School, Garner, NC Project manager and engineer for a major renovation and replacement school project of a 50-year-old elementary school. The renovation and new building areas total 65,000 square feet on an eight-acre site. New fire protection, potable water and sanitary sewer utilities were part of the design work. Grading, erosion and sediment control, pavement design and tree conservation were included in the design. Review agencies included NCDEQ DWR, City of Raleigh Public Works Department, NCDOT, Town of Garner, and Wake County Public School System.

Parks

US Forest Service Crooked Run Road Design, 2019 Project manager for H&H Study, realigning and upgrading the existing abandoned railroad bed to a single lane gravel road with intermittent turn outs to allow USFS access to the Croatan National Forest. Permitting with NCDEQ and the Army Corps of Engineers.

US Forest Service Outdoor Shooting Ranges, Nantahala National Forest, NC 2016 Project Manager and engineer of record for the design improvements at four outdoor shooting ranges in western North Carolina. Atoah, Moss Knob, Dirty John and Panther Top were re-design to improve the accessibility and safety of the shooting ranges. New shooting sheds were designed and the earthen backstops were redesigned to manage the lead containment. Erosion control, grading, Stormwater management and site pavements were part of the scope.

Fort Macon State Park – Coastal Education Center, Atlantic Beach, NC Civil site design for the 22,000 square-foot coastal education center at this historic site. Harvesting of rainwater from the roof system, minimum land disturbance and onsite infiltration methods were used to help contribute toward the LEED Gold Certification. Review agencies included NCDEQ, DLQ, DCM, and DPR, NC State Construction Office and Department of Insurance.

Cliffs of the Neuse State Park, Goldsboro NC Sanitary sewer upgrade of the existing sanitary septic system within the park. The project included demolishing the existing sewer outfall, septic and distribution box and designing a new pump station for a new toilet building. The new force main joined an existing force main and discharged into a recently-installed septic tank and nitrification field. Review agencies included NCDEQ DLQ, DPR, NC State Construction Office and the Department of Insurance.

Dismal Swamp Visitor Center, Camden County, NC Project manager for the civil site design services for the NC State Park System in an undeveloped state park in eastern North Carolina. The work included grading, staking, erosion control, stormwater design, sanitary septic tank with pressure manifold and nitrification field, and water extension design. Utilities were designed to be advanced under the Dismal Swamp Canal by directional bore. The Dismal Swamp Canal is part of the Intracoastal Waterway system between the Albemarle Sound, NC and the Chesapeake Bay, Virginia. Review agencies included US Coast Guard, USACE, NCDEQ DPR, DLQ and DCM, and the NC State Construction Office and Department of Insurance.

Anderson Point Park, Raleigh, NC Project manager for new 106-acre city park project. The park includes large meadows, ballfields, hiking trails, lookouts, restroom facilities, meeting facilities and picnic shelters. The work included design of domestic water service, sanitary sewer main extension, storm drainage, and erosion control.

Stanford M. Adams Forestry Training Center, Jordan Lake State Forest, Chatham Co, NC Project manager and engineer for site grading, parking improvements and water service extension to a new training center building. The project required coordination with a soil specialist for the septic system design because of poorly suited soils on site. Review agencies included NCDEQ DLQ, NC Forestry Service, the NC State Construction Office and Department of Insurance.

Pettigrew State Forest Maintenance Center, Washington County, NC Project manager for civil-site design. Design of grading, drainage and parking for this new maintenance office and garage. Project includes a rainwater cistern, reuse of an existing septic tank and field, innovative porous concrete paved drainage collection system and installation of a double contained above-ground fuel storage tank for department vehicles. The project achieved LEED certification. Review agencies included NCDEQ DLQ, DCM, DPR, Washington County Health Dept., and the NC State Construction Office and Department of Insurance.

Mayo River State Park Interim Facilities, Rockingham County, NC Project manager and engineer for the civil-site development of the Mayo River State Park. The scope included a 3,500-foot park entrance roadway with roadside ditching and a public water line extension into the property, multiple parking lots, on-site sanitary pumping station, pressure manifold and drainage fields, grading, drainage, erosion control, geometric layout, cost estimates and construction administration. Review agencies included NCDENR DLQ, DPR, Rockingham County Health Department, NC State Construction Office, and NC Department of Insurance.

Greenways

Carolina Springs Subdivision, Holly Springs, NC 2020 Project manager, as sub-consultant to WithersRavenel/LENNAR Homes, for the design of a 72-foot, single span precast prestressed concrete cored slab bridge to carry two lanes of vehicular traffic, two bike lanes and a sidewalk on each side of the bridge. Reinforced concrete end bents were supported on steel H piles to support the superstructure. A 275 foot timber boardwalk was also designed to fit within the new subdivision. Multiple cast-in-place reinforced concrete headwalls and wings were designed for culvert cross pipes within the subdivision.

Middle Creek Greenway Phase 2, Apex, NC 2018 Project Manager for the design of 1,600 linear feet of timber boardwalk, one 45-foot glu-laminated pedestrian bridge, one 40-foot glu-laminated pedestrian bridge, and two concrete segmental block retaining walls. Construction plans, preliminary and final opinions of construction cost and technical specification sections were part of the project scope.

Cary Sidewalk Improvements, Town of Cary, NC, 2016 Project manager for team of consultants that included Alpha & Omega Group, SEPI Engineering and Construction, and GeoTechnologies. A&O provided structural and water resources engineering services to design a new pedestrian bridge over Crabtree Creek, linking sidewalk sections along SW Cary Parkway. Led team to provide support for environmental permitting, traffic control, public outreach, construction documents, construction administration, and as-built documents. The work included sidewalk infill to the Town's existing sidewalk system.

Bearskin Creek Greenway Structures Design, City of Monroe, NC, 2015 Project manager, as a subconsultant to Kimley-Horn. Provided structural engineering, geometric layout, data collection and field investigation and reconnaissance for the design of a pre-engineered pedestrian bridge and four retaining walls. Coordinated with bridge manufacturer for the approximate bridge loads and coordinated with the geotechnical engineer for foundation recommendations for the bridge, and for soil loads and parameters needed for the retaining wall design.

Lakewood Park Trail, Town of Cramerton, NC, 2016 Project manager, as sub-consultant to WithersRavenel, for structural design of 135-foot timber boardwalk with 10-foot clearance, average spans of 12 feet, with 10-inch diameter pile foundations. Provided preliminary engineering, data collection, and field investigation and reconnaissance for the boardwalk; coordinated with the team's geotechnical engineer for foundations recommendations; and consulted with a contractor for constructability issues. Provided design development and construction drawings showing plan, profile, and details for the boardwalk and developed a preliminary engineer's opinion of probable construction cost.

Bond Lake Pedestrian Improvements, Town of Cary, NC, 2016 Project manager for the replacement of two bridges and a section of boardwalk at Cary's Bond Lake Park, damaged from flooding during the summer of 2016. The structures were built over 24-inch sanitary sewer lines that were at risk because of the damage. The two bridges were replaced with culverts. A&O provided data collection, hydrologic and hydraulic analysis, grading and erosion control design, structural design, and construction documents on these projects.

Greensboro Downtown Bridge Modifications, Greensboro, NC Project manager for the design of modifications to three roadway bridges to be incorporated into the Greensboro Downtown Greenway. The design widened the bridges for bicycle and pedestrian use and included a concrete barrier to separate the path from vehicle traffic. Subconsultant to WithersRavenel.

Walnut Creek Pedestrian Bridge Replacement, Raleigh, NC Hurricane Fran had washed out the existing pedestrian bridge in the fall of 1996. Services included reinforced concrete substructure design, plan preparation and construction administration.

Riverwalk Phase II Flood Study for Four Pedestrian Bridges, Hillsborough, NC Oversaw all aspects of structural and hydraulic engineering including preliminary engineering and final design for three bridges; data collection and field investigation /reconnaissance; hydraulic analysis; a FEMA flood study inclusive of all four bridge locations; a conditional letter of map revision (CLOMR); conceptual design of the four bridges; and conceptual bridge alignments. As on every project, ensured quality assurance and quality control.

City of Raleigh Greenway System, Raleigh, NC Sub-consultant bridge and hydraulic engineer for WithersRavenel. Design involved hydrologic study, CLOMR preparation and submittal, design of pedestrian bridges, timber boardwalks and segmental concrete retaining walls, plan preparation, specification, and review for new asphalt trail system. The project included greenway trails along Rocky Branch, Crabtree Creek, and Walnut Creek.

Lake Crabtree Greenway, Cary, NC As project structural engineer, provided calculations and construction documents for built-in-place substructure to support pre-fabricated 50-foot, 80-foot and 105-foot pedestrian bridges and 730-foot timber boardwalk design. The pedestrian bridge substructure consisted of reinforced concrete end abutments on shallow spread footings and interior bents on reinforced concrete caps supported on steel piles.

Crabtree Lake Fishing Pier and Floating Dock Repairs, Wake County, NC Investigation, design and construction administration for the repairs to the Crabtree Lake floating fishing pier, boat launch, and access ramp. The work included replacement of the existing timber decking with composite decking, removal of the railing pickets and replacement with galvanized pickets, and modifying the access railing to conform to Americans with Disabilities Act code requirements.

Lakewood Park Trail, Cramerton, NC As sub-consultant to WithersRavenel, provided structural engineering services for approximately 150-foot timber boardwalk. The 10-foot-wide boardwalk was designed to support emergency vehicles by timber piles, timber sleepers and timber crib walls.

Elkin Pedestrian Bridge Substructure Design, Elkin, NC As project structural engineer, provided calculations and construction documents for built-in-place substructure to support a pre-fabricated 80-foot pedestrian bridge and two 30-foot pre-fabricated approach spans, spanning approximately 140 feet. The substructure design is based on the pre-fabricated structure reaction loads provided by the manufacturer. The pedestrian bridge substructure consisted of reinforced concrete end abutments on shallow spread footings and interior bents on reinforced concrete caps supported on steel piles.

City of Salisbury Greenway Trail Pedestrian Bridge, Salisbury, NC As sub-consultant to WithersRavenel, designed reinforced concrete substructure for an eight-foot wide, 65-foot single span, pre-manufactured pedestrian bridge. Provided contract documents for bidding and construction.

City of Raleigh Greenway System, Raleigh, NC As sub-consultant to WithersRavenel, designed two pedestrian bridges crossing under existing railroad bridges, pedestrian bridges over streams in various locations throughout the trail and boardwalks over wetlands. Provided contract documents for bidding and construction.

Battle Branch Pedestrian Boardwalk Replacement, Chapel Hill, NC Oversaw structural engineering for the design of a timber boardwalk and stairs to replace approximately 340 feet of decayed timber boardwalk and stairs along the Battle Branch Trail. Timber rails, decking and framing was supported on isolated concrete footings, shallow foundations, timber sleepers and timber posts.

Public

Sanitary Aerial Assessment, Cape Fear Public Utilities Authority, 2019 Project manager for structural assessment of timber supports for an aerial sewer line along Summer Rest Road in Wilmington, NC. The project included an inspection and assessment, photographs to document conditions, a written report, and recommendations for repairs for seven sets of two timber piles.

W5107A, Johnston County, NC 2018 Project engineer for the erosion control design, environmental permit plans and plan production for a new 60-inch diameter Welded Steel Pipe to be installed beneath existing US Highway 70. The pipe was to be installed via a bore and jack method.

Carpenter Fire Station Road Anchored Wall Design, Cary, NC 2019 Project Engineer for the development of design plans for two permanent tie-back anchored walls and one temporary tie-back anchored wall. The permanent walls were for the roadway underpass to be constructed below the existing CSX railroad to allow a railroad bridge to be constructed. The temporary wall was to support a railroad detour bridge adjacent to the proposed roadway cut to keep the railroad operational during the bridge construction. The walls were steel soldier piles with lagging supported by tie-back anchors.

Hydrologic and Hydraulic Analysis – Neuse River Basin, NC 2019 Provided an H&H analysis for six of 25 dams within the Neuse River Basin for the NC Department of Environmental Quality (DEQ) Division of Energy, Mineral and Land Resources (DEMLR). Performed analysis using a simplified HEC-HMS rainfall-runoff hydrologic analysis and reservoir routing models for 6 frequency-based storms per dam; Stream Stats reports; calculation of watershed hydrologic and hydraulic parameters; reservoir stage and storage relationships and calculation of dam spillway stage-discharge relationships for all spillways.

Good Life Dam Assessment, Wake County, NC 2019 Engineer of record for the assessment of an existing 3.5 acre pond in Wendell, NC following a tornado in May 2019. The work included a site visit to visually observe the damage caused by the storm to the existing earthen dam; provide a written report and provide cost budget for anticipated repairs to the dam along with general maintenance to the dam.

Guilford Technical Community College, Jamestown, NC 2016 Project manager and engineer for the design of roadway drainage, erosion control and cross pipe design for a 2,000-foot connector road that connects two sections of the campus together by tunneling underneath Guilford College Road. A structural plate pipe arch was used to create a tunnel. A stream was crossed by the alignment and required special erosion control phasing.

Rumbling Bald Bridge Replacement, Lake Lure, NC, 2019 Project engineer for the design of erosion control measures for the replacement of an existing structure with a 30-foot-wide, 55-foot-long precast prestressed concrete bridge.

Wake County Water Impoundment No. 2, Cary, NC Project engineer for the design of repairs to a sloughing emergency spillway slope within the emergency spillway structure. The work included coordinating subsurface soil exploration and surveying. Designed a partial slope excavation and rebuild with underdrains to capture any potential subsurface drainage to prevent future sloughing. NRCS and the NC Dam Safety office provided design review and approval.

Raleigh Fire Station Repairs, Raleigh, NC Project manager and engineer for the design of improvements and repairs at 22 fire stations and the Keeter Fire Training Center in Raleigh. Included concrete structural slab-on-grade repair and replacement, plot plans for generators, and backflow preventers. The work included demolition and removal of damaged concrete pavement, unsuitable soil removal, replacement and construction of structural concrete slab-on-grade to support the fire truck apparatus operated by the fire department, cost estimates, and construction bidding and administration.

Raleigh Fire Station Emergency Standby Generator Pads, Raleigh, NC Develop plot plans for several fire stations to receive emergency standby generators in accordance with the City of Raleigh's zoning ordinances. Stormwater calculations for discharge and TN exportation were provided for each location.

Town of Apex Public Works Expansion, Apex, NC Sub-consultant to local architect to provide grading, erosion and sediment control, stormwater management (multiple bio-retention cells), potable water service design, public water line extension, public sanitary sewer extension, sanitary sewer service, rainwater harvesting for truck washing, widening of Highway NC 55, and highway storm drainage design for the addition of a new administration building and a new purchasing and inventory building on the existing campus.

Apex Public Works Expansion, Apex, NC Project manager for the civil site design for the expansion of the Town of Apex Public Works facilities. The project included reinforced concrete slab-on-grade for the maintenance yard to support electrical utility trucks, tractor-trailers, and forklifts with a total payload weight of 25,000 pounds. Extension of public water line system, public sanitary sewer system, fire protection lines, potable water service with backflow prevention, extension of an existing reinforced concrete box culvert under an NCDOT roadway, grading, erosion control, multiple bio-retention ponds, and asphalt pavement design. Review agencies included Town of Apex, NCDEQ DWR, DLQ, and the NCDOT.

Rollins Animal Disease Diagnostic Laboratory, Raleigh, NC Developed a site plan for a new building addition on the existing urban site. The work consisted of preparing construction contract documents that included grading, erosion control, storm drainage design, site layout plan, water and sanitary site utility design and coordination with the State Construction Office for review and approval.

Crosswinds Campground, B. Everett Jordan Lake, NC Plan preparation for a 185-acre campsite campground with associated underground utilities, washhouses, swim beach, boat launching ramp, and approximately 4.3 miles of roadway.

Sleep Inn, Wake Forest, NC Site engineering services for a three-story, 72-room hotel on a two-acre site. The work included a site retaining wall, storm drainage design and erosion control design, and construction document and technical specification preparation. Coordination with the Town of Wake Forest for approval.

Carter Finley Stadium Press Box Renovations, North Carolina State University, Raleigh, NC Designed a catwalk on the roof to provide access to the existing stairwells in the event of a fire. The catwalk is reinforced concrete supported by structural steel beams on pipe columns anchored to the existing roof. As

part of this project, the existing stairwells were enclosed to meet current fire codes. The work included structural design, review and approval through the State Construction Office and construction administration.

Cobb County Library, Marietta Georgia Developed a site plan for a new, relocated county library. The work included site retaining wall design, pavement design, grading plan, erosion control, site utility design, storm drainage design, cost estimates and project specifications. Coordination through the County and City of Marietta for plan review and approval.

North Cargo parking lot at RDU International Airport, Raleigh-Durham, NC Civil-site engineering services for the expansion of the North Cargo parking lot at Building D. The work included repairs of the existing asphalt parking lot and expansion of the lot by 50 spaces. Concrete curb and gutter, stormwater design along with lot lighting were incidental to the work.

Rental Car Drive, RDU International Airport, Raleigh-Durham, NC Roadway design services for the reconstruction of Rental Car Drive. The work included design, bidding and construction administration to remove and replace 2,100 linear feet of three-lane roadway and unsuitable subgrades.

RDU International Airport, Raleigh-Durham, NC Designed erosion repairs in the existing roadway interchanges and along the western-most runway. Design a series of level spreaders to discharge sheet flow through a riparian buffer per state regulations.

Civil Utility Design, Public

Willow Springs VFD Water Line Extension, Willow Springs, NC, 2015 Conducted a feasibility study to extend a water line from a nearby subdivision to the fire station, consulting with Aqua NC on current system capabilities, past performance, future system expansion and potential impacts. Determined permitting process through NCDEQ, developed a hydraulic model and consulted with NCDOT for right-of-way agreement. Coordinated with a plumbing engineer to determine end user demand and existing building plumbing changes. Reviewed the extension route for potential construction and property issues.

Civil Site Design, Private

Ebenezer Cabin, Raleigh, NC 2018 Project manager for the design of a gravity sanitary sewer service and water service connection for a proposed cabin at 4100 Ebenezer Church Road. The site is the location of a historic foundation of a previous one room house. The work included site utility design, erosion control design and municipality permitting.

Lake Royale Sagamore Road Bridge Replacement, Louisburg, NC 2017 Project manager and civil engineer for the replacement of an existing three span, precast prestressed concrete channel beam bridge supported by timber piles. The work consisted of roadway pavement design, erosion control, utility coordination, structure, hydraulic analysis and environmental permitting. Cost estimate was provided and bidding services were provided on behalf of the owner.

608 Gaston Street, Raleigh, NC, 2016 Project manager and engineer for the design of grading, staking layout and stormwater management for a commercial building on a 0.2-acre site in the urban area of Raleigh. Additional planters were added to the site and onsite drainage was improved. Existing parking was redesigned to provide better functionality on the site.

VESCOM America, Inc., Henderson, NC, 2016 Project manager and engineer for the site design of the building addition to the existing facility on 14.4 acres. The work included grading, drainage, erosion control, demolition, and staking layout along with impervious surface area calculations. The existing parking lot was re-configured and a showroom was added to the facility.

Community Cab, Raleigh, NC Developed a site plan for a local cab company. The site is less than one-half acre, located in an urban setting adjacent to residential zoned property. The site was exempt from stormwater management and nitrogen reduction.

Red Dog Office Building, Raleigh, NC Prepared a site plan for a two-story 11,000 square-foot office building. The project was designed with LEED certification in mind. A public roadway extension was part of the scope to meet Raleigh and NCDOT requirements. Public utility extension, domestic water and sanitary sewer services, stormwater management and nitrogen export loading were part of the design effort.

Wake Radiology Fire Protection Upgrade, Raleigh, NC Project engineer to design a fire protection DDCVA and FDC connection for a building constructed prior to current codes. A new ductile iron fire protection line was connected to an existing public water-main and an above ground backflow preventer was provided in accordance with City of Raleigh requirements.

Cultural Commerce Center, Raleigh, NC Designed an extension of an existing public sanitary sewer system within the City of Raleigh's system to serve new properties and to provide future development. The extension was approximately 1,200 feet long.

Kildaire Lake Spillway Repairs, Kildaire Farms Subdivision, Cary, NC Investigation and repair of the earthen dam concrete primary spillway for the 30-acre lake. Investigation determined the cause of the failure of the concrete primary spillway, which was constructed of a fabricform. Construction contract documents for the repair were developed and construction administration was provided to assist the client through completion.

Greystone Lake Concrete Spillway Repair, Greystone Subdivision, Raleigh, NC Investigate and repair the existing concrete primary spillway for the existing 25-acre lake. The work consisted of spall repairs, crack repairs and joint repairs with marine epoxy mortars. A surface coating was designed to prolong the life of the concrete structure.

Apartment Building Complex, Raleigh, NC Site engineering services for two 4,700 square foot new apartment buildings on 1.36 acres located near NCSU. Site has an active stream running along the eastern boundary which requires Neuse River Riparian Regulations for development. The City of Raleigh's Special Highway Overlay District 3 requirements control development along Gorman Street. Site design elements include preparing a grading plan, staking plan, erosion control plan, storm water drainage design, pavement design and water and sanitary sewer utility design.

Structural Design - Buildings

Polymer Group Inc. Building Addition, Benson, NC Designed structural foundations, structural steel mezzanines, interior concrete masonry building and structural steel equipment supports. This project was a fast-track project over eight months for a 55,000 square-foot plant addition.

Morton International, Wytheville Plant, Wytheville, VA Designed several equipment mezzanines, support platforms, penthouse addition and service platforms for renovation and production improvements to existing manufacturing facility. The work involved structural steel framing utilizing both I-shapes and tube sections, matching existing equipment and coordination with existing framing and foundations under fast-track conditions while plant was in operation.

Satellite Dish Support, East Carolina University Design of a structural steel support for a ten-foot diameter satellite dish to be mounted on the roof top of the campus library. The work included design, construction contract documents, review and approval by the State Construction Office.

Cliffs of the Neuse State Park, Goldsboro, NC The project included a concrete segmental retaining wall. The wall is approximately 150 feet long and 5 feet high and transitions from existing stairs to tie into natural grade. The work included review of the installed wall, as compared to design and installation procedures, for adequacy. Provided construction administration.

Enplane Deck Concrete Repairs at Terminal "C", RDU Airport Structural investigation and development of contract documents, and construction administration of concrete repairs to the Enplane Deck at Terminal C. The work involved concrete spall repairs, expansion joint repairs and application of a water-repellant coating to the concrete surface to prevent moisture intrusion into the concrete. The work occurred at night to minimize disruption to the airport's normal service operations.

Carter-Finley Stadium Repairs, North Carolina State University Investigation, design and construction administration for the Carter-Finley Stadium facilities to prioritize and quantify restorations and repairs of

concrete stadium, field house, and auxiliary facilities. The work included concrete repairs, repairs to asphalt concourse, replacement of structure drainage systems, and improvements to field drainage systems.

Bridge Inspection

Mingo Creek Bridge Inspection, Knightdale, NC 2017 Project manager for the inspection and repair design of the existing timber bridge along Mingo Creek Trail. The existing bridge was damaged by Hurricane Matthew. Inspection, repair design and cost estimate were included in the project.

Manns Harbor Bridge NBIS Inspection, Manteo, NC, 2017 Team leader. Performed field inspections, analysis, rating and report preparation for three-mile, 312-span concrete and steel bridge built in 1955.

NCDOT Municipal Bridge Bi-annual Inspections, Bridge Maintenance Unit, Raleigh, NC Hands-on, visual, field inspection, analysis and rating, report preparation through seven inspection cycles for more than 1,400 structures across North Carolina. Reports included NBIS SI&A record, Bridge Record and Summary, written field reports, maintenance recommendations, condition photographs, NCDOT Structure Data Card, structure data sketches, stream soundings and profile sketches as required.

NC State Parks Bridge Inspections, NCDOT Bridge Maintenance Unit, Raleigh, NC

2003 NCDOT Open Ended Bridge Inspection Agreement Hands-on visual field inspection, analysis and rating, report preparation for 13 structures. Reports included NBIS SI&A record, Bridge Record and Summary, written field report, maintenance recommendations, condition photographs, NCDOT Structure Data Card, Structure Data sketches, stream soundings and profile sketches as required. Some of the structures were built or repaired in atypical ways. A prefabricated pedestrian truss was inspected at Umstead State Park.

2003 Neuse River Bridge Inspection, NCDOT Bridge Maintenance Unit, Raleigh, NC Hands-on visual field inspection, analysis and rating, report preparation for nine structures. Reports included NBIS SI&A record, Bridge Record and Summary, written field reports, maintenance recommendations, condition photographs, NCDOT Structure Data Card, structure data sketches, stream soundings and profile sketches as required. Three structures span over waterways and have navigational clearance of at least 65 feet above the water. This situation required use of a safety boat in the water at all times while using a snooper truck to inspect the underside of the superstructure and all substructure above the waterline. The safety boat was used to inspect the substructure at the waterline. Traffic control was key to the successful and safe inspection of these structures.

Metal Traffic Signal Pole Inspections

2003, 2012, 2015, 2016, 2017, 2018, 2019 NCDOT Open Ended Bridge Inspection Agreement Professional services for condition inspection of steel mast arm traffic signal poles and steel strain traffic signal poles. Approximately 1044 poles were inspected across 59 North Carolina counties, using hands-on visual field inspection and report preparation for state-owned steel traffic signal poles. Elements inspected include pole foundations, pole anchorage, weldments, bolted connections, and attachments. Reports included Pole Inspection Record and Summary, written field reports, maintenance recommendations, and condition photographs. A bucket truck was used to inspect the tops of poles and the attachments on the mast arms. A clearance of 20 horizontal feet was maintained at all times to overhead power lines. The proximity of the overhead power lines sometimes prohibited the inspection of the pole tops and overhead attachments.

NCDOT State-Owned Bridge Inspection 2003 Neuse River and Trent River Bridge Inspection – New Bern, NC (nine bridges), 2002 State Bridge Inspection - Beaufort County (60 bridges)

NCDOT Bi-Annual Municipal Bridge Inspection Performed field inspection and evaluation of municipal-owned bridges and reinforced concrete box and pipe culverts, performed rating analysis and prepared final reports.

NCDOT Cumberland County State-Owned Bridge Inspection Inspected 14 state-owned highway bridges along Interstate 95 and reported physical conditions for maintenance repairs.

NCDOT Iredell County State Bridge Inspection Inspected 14 state-owned highway bridges along Interstate 77 and reported physical conditions for maintenance repairs.

NCDOT Wake County State Bridge Inspection Inspected 14 state-owned highway bridges along Interstate 440 and other local roadways and reported physical conditions for maintenance repairs.

NCDOT Madison County State Bridge Inspection Inspected 20 state-owned highway bridges along secondary roads and reported physical conditions for maintenance repairs.

NCDOT State Bridge Inspection - Herbert C. Bonner Bridge 2006 Bi-annual routine inspection of this 2.5 mile, simple span pre-stressed concrete girder and structural steel plate girder bridge spanning the Oregon Inlet on the North Carolina Outer Banks. Traffic control was a key element to the success of this project given the narrow roadway, limited sight distance and multiple bridge inspection trucks in the roadway over a seven-week period.

NCDOT Cumberland County State Owned Bridge Inspection Inspected 14 state-owned highway bridges along Interstate 95 and reported physical conditions for maintenance repairs.

NCDOT Iredell County State Bridge Inspection Inspected 14 state-owned highway bridges along Interstate 77 and reported physical conditions for maintenance repairs.

NCDOT Wake County State Bridge Inspection Inspected 14 state-owned highway bridges along Interstate 440 and other local roadways and reported physical conditions for maintenance repairs.

NCDOT State Bridge Inspection and Assessment – Emerald Isle Bridge 2010

NCDOT State Inspection – Virginia Dare Bridge, Dare County – 2014, 2018 NBIS inspection of the five-mile, 268 span Virginia Dare Memorial Bridge crossing the Croatan Sound in the Outer Banks of North Carolina. The superstructure consists of seven lines of prestressed, precast concrete girders supporting a reinforced concrete deck on cast-in-place reinforced concrete substructure with integral bent diaphragms. The final inspection report was 1,645 pages of written notes, sketches documenting the deficiencies.

NCDOT State-Owned Bridge Inspection

- 2015 State Bridge Inspection – Watauga County (2 bridges)
- 2016 State Bridge Inspection – Wake County (4 bridges)
- 2016 State Bridge Inspection – Pender County (1 bridges)
- 2016 State Bridge Inspection – Davie County (11 bridges)
- 2016 State Bridge Inspection – Iredell County (1 bridge)

- 2016 State Bridge Inspection – Person County (5 bridges)
- 2016 State Bridge Inspection – Cleveland County (6 bridges)
- 2016 State Bridge Inspection – Mitchell County (11 bridges)
- 2017 State Bridge Inspection – Franklin and Duplin County (12 bridges)
- 2017 State Bridge Inspection – Watauga County (11 bridges)
- 2017 State Bridge Inspection – Pitt County (2 bridges)
- 2017 State Bridge Inspection – Washington County (6 bridges)

NCDOT Bi-Annual Municipal Bridge Inspection

Performed field inspection and evaluation of municipal-owned bridges and reinforced concrete box and pipe culverts, performed rating analysis and prepared final reports.

- 12th Cycle (2004) – 122 Municipal Bridges
- 11th Cycle (2002) – 64 Municipal Bridges
- 10th Cycle (2000) – 108 Municipal Bridges
- 8th Cycle (1996) - 101 Municipal Bridges
- 7th Cycle (1994) - 94 Municipal Bridges
- 6th Cycle (1992) - 105 Municipal Bridges
- 5th Cycle (1990) - 102 Municipal Bridges

RDU Bridges, Tunnels and Overhead Sign Structures 2005

- Eight bridges (vehicular and aircraft)
- One reinforced concrete box culvert pedestrian tunnel
- 32 overhead span sign structures
- Six overhead cantilever sign structures

Cardinal Parking Deck Inspection and Repairs, UNC Chapel Hill, NC A 131,500 square-foot multi-level parking deck located on Manning Drive. The original construction occurred in 1969 and consists of precast, prestressed concrete T-beams and columns on a four-level deck. An addition was completed in 1975 that consists of cast-in-place, post-tensioned concrete slab with reinforced concrete deck girders, beams and columns and has six levels. The project included an initial inspection that included a formal report to provide an assessment of the existing conditions, recommendations for repairs, prioritize types of repairs, cost estimate for repairs and a long-term maintenance program. Subsequently, repair plans were produced and repairs were made to the structure with periodic review by the engineer.

Dogwood Parking Deck Inspection and Repairs, UNC Chapel Hill, NC A 162,000 square foot multi-level parking deck on Manning Drive. The five-level deck was constructed in 1999 and consists of cast-in-place, post-tensioned concrete slab with reinforced concrete deck girders, beams and columns. The project included an initial inspection that provided a formal report to provide an assessment of the existing conditions, recommendations for repairs, prioritize types of repairs, cost estimate for repairs and a long-term maintenance program. Subsequently, repair plans were produced and repairs were made to the structure with periodic review by the engineer.

Business School Parking Deck Inspection and Repairs, UNC Chapel Hill, NC A 35,500 square foot multi-level parking deck on Skipper Bowles Drive. The five-level deck was constructed in 1996 and consists of cast-in-place, post-tensioned concrete slab with reinforced concrete deck girders, beams and columns. The project included an initial inspection that provided a formal report to provide an assessment of the existing conditions, recommendations for repairs, prioritize types of repairs, cost estimate for repairs and a long-term maintenance program. Subsequently, repair plans were produced and repairs were made to the structure with periodic review by the engineer. Drainage system repairs were also included in this project.

Bridge Design

Weston Parkway Pedestrian Tunnel, Cary, NC 2018 Project Manager and Engineer for the preliminary design of a pedestrian tunnel to be constructed under existing Weston Parkway in Cary, NC. Weston Parkway is a four-lane divided roadway facility with a 30-foot grassed median. Existing roadway profile along with existing utilities and an existing stream provided a unique challenge to fitting a pedestrian underpass with adequate vertical height and width to become part of an existing greenway trail. The goal was to eliminate the existing at grade pedestrian crossing to improve public safety. A 138 foot long 10'H x 12'W cast-in-place reinforced concrete box tunnel was designed to fit within the site constraints.

Lake Royale Sagamore Drive Bridge Replacement, Louisburg, NC 2018 Project Manager and Civil engineer of record for the design and plan preparation of the bridge replacement. A two-span prestressed concrete cored slab bridge was designed to replace a failing prestressed channel beam, multi-span bridge that was load posted below emergency vehicle weights. The project included bridge design, roadway design, utility relocation, erosion control design, cost estimate, and construction administration.

Rumbling Bald Bridge Replacement, Lake Lure, NC, 2018 Project manager and engineer for the design of erosion control measures, asphalt replacement, utility relocation coordination for the replacement of an existing structure with a 30-foot wide, 55-foot-long precast prestressed concrete bridge.

Emerald Isle Bridge In-Depth Assessment and Repair Plans NCDOT, Bogue Banks, NC Project manager for the in-depth condition assessment to determine deficiencies and recommend repairs to the 4,612-foot Emerald Isle Bridge, which crosses the Intracoastal Waterway. Responsible for QA/QC of plans and special provisions for concrete repairs using shotcrete, epoxy mortar, concrete and additional reinforcing.

NCDOT R-2633BB, US 17 Wilmington Bypass, Brunswick and New Hanover County, 2014

Project manager and engineer for a set of dual bridges over CSX Railroad between SR 2169 and US 421. Project consisted of 94-foot and 95-foot single-span bridges. Superstructure consisted of AASHTO prestressed concrete girder, simple span with integral end bents supported by a single row of steel H-piles with a mechanically stabilized earth retaining wall at both ends of the bridge.

R2514D New Bridges, Jones and Craven Counties, NC Project manager and engineer for dual NCDOT bridges. Each bridge is single-span with integral abutments and approximately 90 feet long. The alignment is in a slight curve which will be striped onto the straight bridges.

B-2659, SR 1212 over Mill Creek, Johnston/Wayne County, NC Project engineer for replacement for bridge No. 77. Assisted in the preparation of design and bridge survey report for four simple spans, prestressed, precast, concrete cored slab superstructure on post and beam substructure on steel H-piles.

U-3408, Cary Parkway Extension over Norfolk Southern Railway, Wake County, NC Project manager and designer of dual 365-foot, three continuous spans, structural steel plate girder superstructure supported by post and beam interior bents on drilled shafts and pile supported end bent. Horizontal alignment of 30 degrees, 37 minutes skew, tangent over spiral. This project was a joint venture between the Town of Cary and NCDOT that required a three-party agreement between the Town of Cary, NCDOT, and Norfolk Southern Railroad.

NCDOT R-2000BC, I-540 Ramp Flyovers at US 70, Wake County Design of substructure for 1,603-foot structural steel curved plate girder superstructure supported by hammerhead interior bents on spread footings and steel pile supported end bents. Horizontal alignment of 3.5-degree curve over tangent.

NCDOT X-3AA, Bridge on relocated SR1211 over I-40, Johnston County Project designer of 215-foot, four simple spans, pre-stressed concrete girder superstructure supported by post and beam interior bents on pile supported footings and steel pile end bents. Horizontal alignment of 66-degree, 45-minute skew, curve over tangent.

R-512E, US-74, Rockingham-Hamlet Bypass over NC 38, Richmond County Project manager and designer of dual 47-meter, three simple spans, prestressed concrete girder superstructure supported by pile end bents and post and beam interior bents with pile footings. Horizontal alignment of 101-degree skew, tangent over tangent.

BD-5101F, SR 1346 between US 258 and SR 1319, Hertford County Project manager and engineer for a single span, pre-stressed 21-inch-deep cored slab bridge simply supported on steel H-piles across Buckhorn Creek.

BD-5101F, SR1360 over Kirby's Creek between SR 1359 and SR 1361, Northampton County Project manager and engineer for a two-span, pre-stressed 21-inch-deep cored slab bridge simply supported on steel H-piles.

Chapel Hill Bridges #116 & #117, Chapel Hill,

B-2020, SR 1470 over Neuse River Overflow, Craven County, NC Bridge replacement for bridge No. 141. Assisted in the preparation of design and bridge survey report for a five-simple span, pre-stressed, precast, concrete cored slab superstructure on post and beam substructure on square pre-stressed, concrete piles.