CRENSHAW CONSULTING engineers
www.crenshawconsulting.com

Committed to Customer Satisfaction through Quality Engineering

THE EXTRA MILE

We just wanted to thank you and The Crenshaw Team for all of their hard work and expertise in helping us get our Permit approval for our Walter Tower (North Hills Tower IV). Each and every member of your Team did a great job."

- David P. Parker, CSM, Kane Realty Corporation

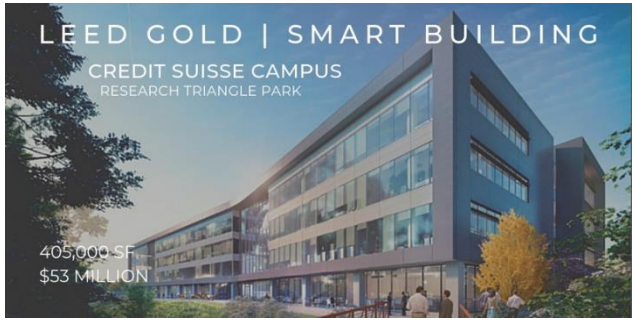
Firm Profile

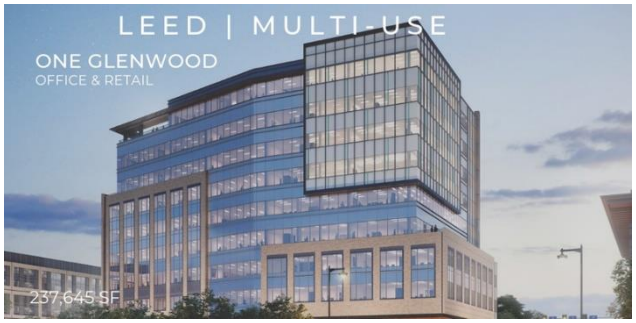
Engineering and Design Management Firm that Self-Performs

- Mechanical
- Electrical, Fire Protection and Fire Alarm
- Plumbing and Structural
- Telecommunications
- LEED/Sustainable Design, Coordination and Whole Building Commissioning
- Solar Photovoltaic Designs and Energy Management
- Regularly Providing Project Designs in BIM
- Industrial and Process Engineering

- ❑ Established in 1995 – Raleigh, NC and Melbourne, FL
- ❑ Staff of 48 Persons (22 Professional Engineers)
- ❑ Registered and Actively Engineering in 36 States

DIVERSE PORTFOLIO





SUSTAINABLE SOLUTIONS

1 LEED PLATINUM

13 LEED GOLD

15 LEED SILVER

23 LEED OR SUSTAINABLE

4 GREEN GLOBES

OVER 150 PV PROJECTS

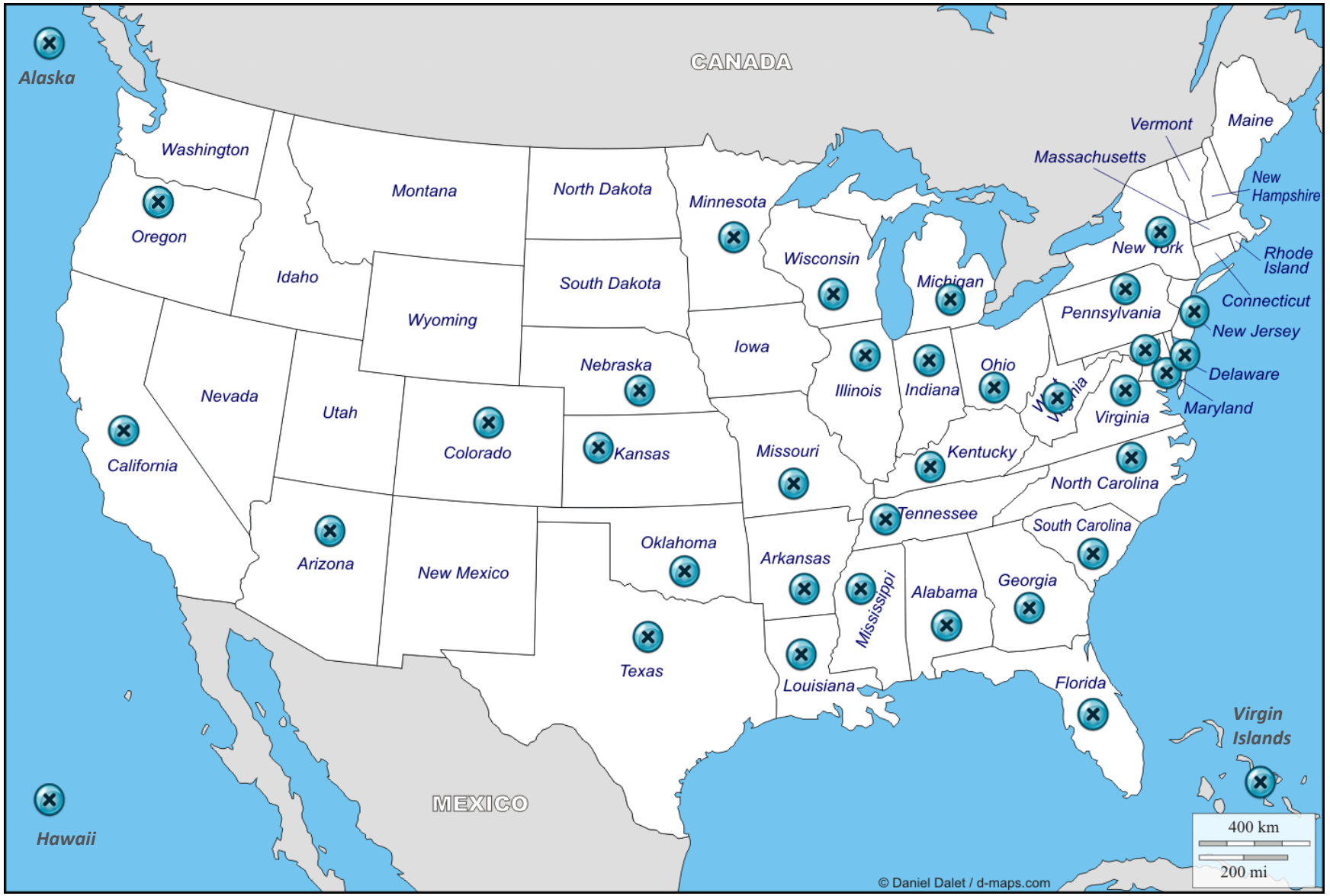
Providing Quality Designs that are Cost Effective and Exceed Expectations for Every Client

SUMMARY OF OUR QUALIFICATIONS

Key Staff/Personnel	Title	Prof Reg NC	LEED Exp	Yrs Exp	Systems Integ Exp	Commiss Exp	Military Exp
Jim Crenshaw, PE, LEED AP	Eng In Charge MEPF/ QC	X + 34	X	**27**	X	X	X
Paul Szalanski, PE, LEED AP	VP Operations Sr. Elec. Dept. Mgr./ QC	X	X	**22**	X	X	X
Brett Mabe, PE	Sr. Mech. Dept. Mgr. and QC/Plumbing QC	X + 6	X	**26**	X	X	X
Ron Cox	Plumbing Mgr. & QC		X	**30**	X	X	X
Danny Brush, PE, LEED AP	Sr. Electrical PM/QC	X	X	**16**	X	X	X
Jon Lehman, PE	Sr. Mech. Project Mgr.	X	X	**22**	X	X	X
Mike McMahon, PE	Sr. Mech. Project Mgr.	X	X	**29**	X	X	X
Matt Frazier, PE, LEED AP	Sr. Electrical PM/QC	X	X	**17**	X	X	X
Chris Aycock, PE	Structural/Elect. PM	X	X	**16**	X	X	X
Rick Copeland, PE, LEED AP, CxA	Sr. Electrical PM / Comm. Agent	X	X	**15**	X	X	X
Jeff Roseman, PE, RCDD, LEED	Sr. Elect PM / Telecomm	X	X	**17**	X	X	X
Daniel Spradling, PE – CCE FL	Sr. Elect PM /FL Mgr. Industrial and Process	X + 8	X	**31**	X	X	X

OUR YEARS OF HANDS ON EXPERIENCE AND EXPERTISE SURPASSES ALL

Where Does CCE Do Business – 36 States Offices in Raleigh, NC and Melbourne, FL



LEED & SUSTAINABLE
CRENSHAW CONSULTING
engineers
www.crenshawconsulting.com

SUSTAINABLE AND SMART DESIGN

Sustainable Design is integral to our team's process regardless of a requirement for LEED certification. We consistently provide energy modeling, solar photovoltaic designs, LEED coordinating and building commissioning.

CCE's LEED portfolio includes:

- ***1 LEED Platinum***
- ***13 LEED Gold***
- ***15 LEED Silver***
- ***23 LEED or Sustainable***
- ***4 Green Globes***

- ❑ 60% of CCE's Professionals are LEED accredited
- ❑ Team members have been trained in low-impact development principles
- ❑ Crenshaw Consulting is an Industry leader in Sustainable Design and innovative energy management
- ❑ Over 150 PV Projects

LEED GOLD | SMART BUILDING

CREDIT SUISSE | OFFICE TWO BUILDINGS | RTP, Durham, NC

$53 Million

- **Building One is New Construction**
  - LEED Gold | SMART Building
  - 205,000 SF | 4 Stories
  - Cafeteria
  - Fitness Center
  - LED Lighting | 400 KW Generator
  - IDF Room
  - Photovoltaics | Hot Water Solar
  - Fully Integrated Building Systems
  - Lighting Protection
  - Designed in BIM – REVIT
  - HVAC – Water Cooled Chiller, Hot Water Boiler and VAV Air Handlers
- **Building Two is Renovation**
  - LEED
  - 200,000 SF
  - 4 Stories
  - HVAC – VAV Rooftop Units

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

KDC Real Estate Development & Investments

Gensler

CITRIX OFFICE SYSTEMS – RALEIGH, NC – LEED GOLD – SMART BUILDING DESIGN

$45 Million

- ❑ Redevelopment of the 1915 Dillon Supply Warehouse into a state of the art smart office
- ❑ 4 Stories | 189,500 SF
- ❑ 210,900 SF | 7-story parking garage
- ❑ Retail on Ground Floor

Relevant criteria

- Downtown Raleigh Campus
- Shell & Fit Up
- Building Automation Systems
- Parking Deck & Pedestrian Bridge
- Site Lighting
- LED Lighting & Day Light Harvesting
- Full Building 24/7 Generator
- 4 Pipe/Hot Chilled Water VAV (550 Ton)
- Variable Flow Split with Energy Recovery
- Solar/Hot Water Solar
- Photovoltaics

Amenities

- Restaurant
- Yoga Studio & Bocce
- Fitness Center

LEED GOLD | MULTI-USE

NORTH HILLS | TOWER IV OFFICE, RETAIL, RESTAURANT | Raleigh, NC

$65 Million

- ❑ 21 Stories |347,969 Total SF
- ❑ First Level Retail and Restaurant
- ❑ Next 8 Levels | Parking Deck 321,906 SF
- ❑ 12 Stories of Office Stacked Above Parking
- ❑ 10th Floor Conference Center
- ❑ Designed in BIM – REVIT
- ❑ HVAC – Cooling Towers with Self Contained Units
- ❑ Comparative Energy Modeling
- ❑ 750 KW Generator

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical, Fire Alarm and Fundamental Fire Protection Engineering Designs

"We just wanted to thank you and The Crenshaw Team for all of their hard work and expertise in helping us get our Permit approval for our Walter Tower (North Hills Tower IV). Each and every member of your Team did a great job."
David Parker | CSM, Kane Realty Corporation

KANE
REALTY CORPORATION

SMOKEY HOLLOW | LEED GOLD | MIXED USE | OFFICE | RETAIL |RESTAURANT | Raleigh, NC

- ❑ Mixed Use | LEED Gold
- ❑ 251,000 SF | 10 Stories
- ❑ 1sr Floor Retail |Restaurant
- ❑ 9 Stories of Office
- ❑ BIM | Revit
- ❑ Building Emergency Generator
- ❑ LED Lighting
- ❑ Urban Market
- ❑ Design Build

KANE REALTY CORPORATION

WILLIAMS REALTY & BUILDING COMPANY, INC.

Crenshaw Consulting Engineers Provided the Electrical and Fire Alarm Engineering Design; as well as Code Consulting Services for the City of Raleigh in Review of Plumbing, Mechanical, Electrical Designs and Other Safety Features.

LEED SILVER| SMART BUILDING FEATURES

CHURCHILL SHELL OFFICE | RTP, Imperial Center, Durham, NC

- ❑ New Construction – LEED SILVER
- ❑ 150,000 SF Office Building
- ❑ 5 Stories
- ❑ HVAC System Design Utilized VAV Packaged Rooftop Units
- ❑ Comparative Energy Modeling
- ❑ LED Lighting and Lighting Control System
- ❑ Back-Up Generator
- ❑ Designed in BIM – REVIT
- ❑ View Dynamic Glass

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

LEED | MULTI-USE

ONE GLENWOOD | OFFICE AND RETAIL | Raleigh, NC

- ❑ 10 Story Tower Located at the Corner of Glenwood and Hillsborough Street
- ❑ 237,645 SF Total SF
- ❑ First Level Retail | 14,038 SF
- ❑ Office | 218,690
- ❑ Fitness Center | 1,487 SF
- ❑ Level 10 Indoor and Outdoor Amenities
- ❑ 5 Story Parking Deck
  321,906 SF | 661 Parking Spaces with Mechanical Ventilation
- ❑ Designed in BIM – REVIT
- ❑ All LED Lighting
- ❑ HVAC – Cooling Towers with Self Contained Units
- ❑ Comparative Energy Modeling
- ❑ 500 KW Generator

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

THE ROXBORO AT VENABLE CENTER | OFFICE | Historic Tobacco District of Durham, NC

- ❑ Office
- ❑ 202,000 SF | 8 Stories
- ❑ New Construction
- ❑ BIM | Revit
- ❑ Building Emergency Generator
- ❑ LED Lighting
- ❑ Generator
- ❑ Cooling Tower with Self Contained Units
- ❑ Sky Deck Lounge
- ❑ Fitness Center
- ❑ Conference Center

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

VARONIS | 3300 PARAMOUNT PARKWAY | OFFICE | SHELL & FIT UP | Morrisville, NC

- ❑ 100,000 SF Shell Building Plumbing and Electrical
- ❑ 66,560 SF | 2 Floor Office Fit Up MEP
- ❑ BIM | Revit
- ❑ HVAC – Roof Top VAV
- ❑ Generator
- ❑ LED Lighting
- ❑ Showers and Gang Toilets

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

2540 MERIDIAN PARKWAY OFFICE| RTP, Durham, NC

- ❑ 111,871 SF | 4 Story Shell Office Building
- ❑ HVAC | VAV Roof Top System
- ❑ Exterior Lighting
- ❑ LED Lighting
- ❑ Generator
- ❑ BIM | REVIT
- ❑ Fit-Ups Forthcoming

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

IMPERIAL TOWER, DURHAM, NC – LEED SILVER ($43M)

- ❑ **257,000 SF, 10 Story Office Building – (Large Campus)**
- ❑ **Design Build**
- ❑ **1,000 Space Parking Deck**
- ❑ **Included Full Building Generator Service**
- ❑ **Lighting Control System with Networked Relay Panels**
- ❑ **Boiler/Chiller HVAC System**
- ❑ **Obstacles to Overcome Included:**

- Required a 5 Phased Permitting Process to Meet Tight Deadline and Saved Owner Money on Procurement of Materials and Time on Long Lead Items.
- Developing the tower, designers were challenged to create a unified layout between two other distinct structures, a Westin hotel and a parking deck, that would serve both the hotel and the tower. By taking advantage of the natural qualities of the site and engaging the parking deck into an existing ravine, visibility of the parking deck was reduced, allowing the buildings to become the visual focus of the site. The top level of the parking deck became a plaza, creating an attractive, visible link between the Imperial Tower and the Westin hotel.
- Creating a unified layout between two other distinct structures, a Westin hotel and a parking deck, that would serve both the hotel and the tower. By taking advantage of the natural qualities of the site and engaging the parking deck into an existing ravine, visibility of the parking deck was reduced, allowing the buildings to become the visual focus of the site. The top level of the parking deck became a plaza, creating an attractive, visible link between the Imperial Tower and the Westin hotel. The plaza between the two buildings' entries provides an inviting public space as well as a pedestrian link.

LEED OR SUSTAINABLE DESIGN

Edison Tower - Office, Parking Deck and Multi Use Complex-Raleigh, NC (LEED SILVER)

This new $75M iconic in the Raleigh Skyline features:

- ❑ 245,000 SF
- ❑ 19 Stories 12 Stores of Office with a State of the Art Penthouse Level, 20,000 SF of Retail and 6 Levels of Parking
- ❑ Roof Top Terrace, Fitness, Café and Outdoor Pavilion
- ❑ Design Build - $75M
- ❑ LEED Silver
- ❑ Design Provided in BIM/Revit

Crenshaw Consulting Engineers provided the Plumbing, Mechanical, Electrical and Fire Alarm Engineering Designs to include individual packaged, water cooled air conditioning units totaling 500 tons individually selected for each office floor and the amenities floor. A cooling tower on the roof provides heat rejection for the units. Heat is provided via electric resistance heat in fan-powered variable air volume terminals. The initial design calls for terminal spaced about each floor with a trunk duct design for flexibility as tenants occupy spaces. Designed to achieve ASHRAE 62.1 ventilation standards with a proposed energy recovery ventilator to pretreat air via a total energy recovery wheel. This arrangement allows for plentiful ventilation air to the building at all times and energy is conserved by extracting it from the relief air stream rather than simply dumping it to the outdoors. The building also features a whole building generator. Numerous energy models were provided to determine the most cost efficient cutting edge energy savings methods and solutions.

LEED or SUSTAINABLE DESIGN & COMMISSIONING NATIONWIDE – 85 COLLEGES IN 15 STATES

EcoTech Institute – Aurora, CO.
LEED Gold – Solar/Wind Turbines (Const. Cost $7.4M):

- The project was the renovation of a 100,000 SF retail center converted to a 60,000 SF educational/training facility and an additional 40,000 SF of warehouse.
- Crenshaw Consulting designed the plumbing, mechanical, fire alarm, electrical telecom and Facility Performance Consulting performed commissioning for the 60,000 SF EcoTech University.
- Crenshaw Consulting also provided the engineering for a 38 kWdc photovoltaic (solar electric) that was a combination of building mounted and solar tree system that includes:
  - Designed Solar – Total of 38 kWdc in photovoltaic (solar electric).
  - Two Solar Trees = 26.5 kWdc
  - Canopy Panels = 8.5 kWdc
  - PV system Along the Front Edge of the Building = 3 kWdc
- In addition, CCE provided the design for a nine wind turbine system that generates 8 kWdc.
  - All of the systems on this building will be used to supplement the building's electrical service.

SOLAR AND RENEWABLE ENERGY DESIGN EXPERIENCE

Project	Size		Project
Gibson Solar - NC	5.0 MW ac		EM Johnson Solar
Albemarle Solar Farm - Kinston, NC	5.0 MW ac		Martin Creek Rd Solar Farm
Broadway Solar Farm - Chadbourn, NC	5.0 MW ac		Green Farm Solar - Robersonville, NC
Van Slyke Solar Farm - Elm City, NC	5.0 MW ac		Evans Farm & Downs Farm Solar - NC
Neisler Street Solar - Shelby, NC	2.0 MW ac		Simons Solar Farm - NC
Millikan Solar Farm - Randleman, NC	5.0 MW ac		Bellamy Mill Road Farm - Whitakers, NC
Innovative Solar 6 Farm - Leicester, NC	3.0 MW ac		Hardison Solar Farm - Williamston, NC
Germantown Solar Farm - Rural Hall, NC	1.5 MW ac		Modlin Solar Farm - Williamston, NC
Sunfish Solar Farm - Willow Springs, NC	5.0 MW ac		Tarrara Creek, Berry Hill, Harris, Tanner & Baird Solar Farm - VA
Sonne One Solar Farm - Goldsboro, NC	5.0 MW ac		Sweeney Solar Farm - Charlottesville, VA
Beaufort Solar Farm, NC	15.0 MW ac		Nick Solar
South Winston Solar Farm, NC	5.0 MW ac		Penny, Lillie, Beth Solar - NC
Community Energy Solar Farm - Gaston, NC	5.0 MW ac		Bradley, Milo, Minnie Solar - NC
Morgans Corner Solar Farm - Elizabeth City, NC	19.8 MW ac		Buster, Dustin Charlie, Sophie Solar - NC
Community Energy Solar Farm - Tarboro, NC	5.0 MW ac		Corbin, Owen, Katelynne, Jaren PV - NC
Community Energy Solar Farm - Winton, NC	5.0 MW ac		Spartan, Audrey, Elliana, Maya PV - NC
Community Energy Solar Farm - Woodland, NC	5.0 MW ac		Elmwood, Turkey, Amethyst, Beaver Solar - NC
Community Energy Solar Farm - Garysburg, NC	5.0 MW ac		Elliana Solar - NC
Community Energy Solar Farm - Seaboard, NC	5.0 MW ac		Star, Shadow, RJ, Miles, Duck, Charlotte, Buddy Solar - NC
Aaron thru Viking Solar (16) - NC			Julio thru Katherine Solar (12) - NC
			Al thru Nate Solar (12) - NC

OFFICE | MULTI-USE EXPERIENCE
CRENSHAW CONSULTING
engineers
www.crenshawconsulting.com

LEED GOLD | SMART BUILDING

CREDIT SUISSE | OFFICE TWO BUILDINGS | RTP, Durham, NC

$53 Million

- **Building One is New Construction**
  - LEED Gold | SMART Building
  - 205,000 SF | 4 Stories
  - Cafeteria
  - Fitness Center
  - LED Lighting | 400 KW Generator
  - IDF Room
  - Photovoltaics | Hot Water Solar
  - Fully Integrated Building Systems
  - Lighting Protection
  - Designed in BIM – REVIT
  - HVAC – Water Cooled Chiller, Hot Water Boiler and VAV Air Handlers
  - $39 Million
- **Building Two is Renovation**
  - LEED
  - 200,000 SF | 4 Stories
  - HVAC – VAV Rooftop Units
  - $19 Million

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

KDC Real Estate Development & Investments

Gensler

CITRIX OFFICE SYSTEMS – RALEIGH, NC – LEED GOLD – SMART BUILDING DESIGN

$45 Million

- ❑ Redevelopment of the 1915 Dillon Supply Warehouse into a state of the art smart office
- ❑ 4 Stories | 189,500 SF
- ❑ 210,900 SF | 7-story parking garage
- ❑ Retail on Ground Floor

Relevant criteria

- Downtown Raleigh Campus
- Shell & Fit Up
- Building Automation Systems
- Parking Deck & Pedestrian Bridge
- Site Lighting
- LED Lighting & Day Light Harvesting
- Full Building 24/7 Generator
- 4 Pipe/Hot Chilled Water VAV (550 Ton)
- Variable Flow Split with Energy Recovery
- Solar/Hot Water Solar
- Photovoltaics

Amenities

- Restaurant
- Yoga Studio & Bocce
- Fitness Center

LEED GOLD | MULTI-USE

NORTH HILLS | TOWER IV OFFICE, RETAIL, RESTAURANT | Raleigh, NC

$65 Million

- ❑ 21 Stories |347,969 Total SF
- ❑ First Level Retail and Restaurant
- ❑ Next 8 Levels | Parking Deck 321,906 SF
- ❑ 12 Stories of Office Stacked Above Parking
- ❑ 10th Floor Conference Center
- ❑ Designed in BIM – REVIT
- ❑ HVAC – Cooling Towers with Self Contained Units
- ❑ Comparative Energy Modeling
- ❑ 750 KW Generator

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David Parker | CSM, Kane Realty Corporation

KANE
REALTY CORPORATION

ADVANCE AUTO PARTS FIT UP| North Hills Tower IV | Raleigh, NC

- ❑ 250,00 SF | 7 Story
- ❑ LED Lighting
- ❑ HVAC | Self Contained Cooling Tower that Serves VAV Terminal Units with Electric Heat Along the Exterior
- ❑ BIM | Revit

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

LEED SILVER| SMART BUILDING FEATURES

CHURCHILL SHELL OFFICE | RTP, Imperial Center, Durham, NC

- ❑ New Construction – LEED SILVER
- ❑ 150,000 SF Office Building
- ❑ 5 Stories
- ❑ HVAC System Design Utilized VAV Packaged Rooftop Units
- ❑ Comparative Energy Modeling
- ❑ LED Lighting and Lighting Control System
- ❑ Back-Up Generator
- ❑ Designed in BIM – REVIT
- ❑ View Dynamic Glass

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

LEED | MULTI-USE

ONE GLENWOOD | OFFICE AND RETAIL | Raleigh, NC

- ❑ 10 Story Tower Located at the Corner of Glenwood and Hillsborough Street
- ❑ 237,645 SF Total SF
- ❑ First Level Retail | 14,038 SF
- ❑ Office | 218,690
- ❑ Fitness Center | 1,487 SF
- ❑ Level 10 Indoor and Outdoor Amenities
- ❑ 5 Story Parking Deck
  321,906 SF | 661 Parking Spaces with Mechanical Ventilation
- ❑ Designed in BIM – REVIT
- ❑ All LED Lighting
- ❑ HVAC – Cooling Towers with Self Contained Units
- ❑ Comparative Energy Modeling
- ❑ 500 KW Generator

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

MIDTOWN PLAZA TOWERS – OFFICE, PARKING DECK AND MULTI USE COMPLEX – RALEIGH, NC

Crenshaw Consulting Engineers provided the Plumbing, Electrical and Fire Alarm Engineering Designs for this 12 story tall Class A Office building set amongst the thriving development in Midtown Raleigh, NC. The project was designed to be LEED Certified by using cost efficient cutting edge energy savings methods and solutions.

This Soaring New Addition to the North Hills Skyline features:

- ❑ 345,000 SF, 12 Stories Office Building
- ❑ Retail
- ❑ Two 168,000 SF, 8 Story Detached Parking Decks
- ❑ Design Build
- ❑ Design Provided in BIM & BIM Coordination
- ❑ 600 KW Emergency Generator
- ❑ LED Lighting
- ❑ LEED Certified

SLATER OFFICE BUILDING – RALEIGH, NC

This New Building Features:

- ❑ 204,000 SF, 5 Story Office Building
- ❑ Design Build
- ❑ UPS and Server Rooms
- ❑ Shell Construction Cost $20 Million

Crenshaw Consulting Engineers provided the Plumbing, Mechanical, Electrical and Fire Alarm Engineering Designs for this 5 story Class A Office building. Conditioned air will be supplied to the occupied spaces via a self-contained DX Variable Air Volume (VAV) Air Conditioning System located on each floor and thermostatically controlled from individual zones. A cooling tower located on the roof shall discharge heat from water that is piped to each DX unit. The HVAC system has been designed with an "open office" plan. Each zone has a thermostat and a maximum interior zone of 1,500 SF and maximum exterior zone of 800 SF.

OFFICE

PERIMETER PARK OFFICE BUILDING | Morrisville, NC

$30 Million Plus Fit-Up Costs

- ❑ Shell, Only Fit-ups Forthcoming
- ❑ 215,000 SF
- ❑ 6 Stories
- ❑ 180,000 SF, 4 Story Parking Garage
- ❑ LED Lighting Throughout
- ❑ Elevator and Emergency Lights Generator
- ❑ Designed in BIM – REVIT
- ❑ HVAC – Cooling Towers with Self Contained Units
- ❑ Comparative Energy Modeling

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

BRASFIELD & GORRIE

OFFICE

RHO, INC.| Durham, NC

- ❑160,000 SF New Office Building
- ❑5 story
- ❑Core and Shell Class A Office Building
- ❑Designed in BIM - REVIT
- ❑1.5 MW Full Building Generator
- ❑LED lighting
- ❑Exterior lighting
- ❑HVAC – Cooling Towers with Self Contained Units
- ❑Comparative Energy Modeling
- ❑Fit-Ups Forthcoming

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

ALLSTATE OFFICE BUILDING – ROANOKE, VA

This New Building Features:

- ❑ 75,000 SF, 3 Story Office Building
- ❑ Design Build
- ❑ UPS and Server Rooms
- ❑ Raised Floor System on First Floor

Crenshaw Consulting Engineers provided the Plumbing, Mechanical, Electrical and Fire Alarm Engineering Designs for this 3 story Class A Office building featuring a duct distribution system that is tied together to provide redundancy on the floors so if a HVAC Unit were to go down the other two could support the floors that are down.

OFFICE

TORINGDON MIXED-USE DEVELOPMENT – CHARLOTTE, NC:

- 160 acre Master Planned Development
- Construction Cost: $100 M
- 200,000 SF of restaurants and specialty retail shops
- 700,000 SF of Class A office buildings
- 170,000 SF of parking decks
- 800 luxury town homes

Challenges to Overcome Included:

- Very fast track scheduling due to tenant lease requirements and financing. Design deadlines were requested earlier than originally scheduled. We would take part in conference calls each time to identify the new quicker schedule without incurring additional cost.
- We had to expedite the engineering design process dramatically without overlooking any critical areas while still providing the highest quality designs.
- An additional challenge was geographical: the architect was in Atlanta, GA, the owner was in Raleigh, NC and the project was in Charlotte, NC. Communication was key. A kickoff conference call and weekly conference calls to coordinate design phases overcame distance.

OFFICE

Red Hat Worldwide Headquarters – Centennial Campus, Raleigh NC consists of two separate buildings; 1801 Varsity Drive, a 4 story building and 900 Main Campus, a 5 story building that are home to approximately 700 Red Hat employees.

- ❑ Red Hat came to North Carolina in 1996, First office was in Durham
- ❑ Relocated to Centennial Campus; a Research Park and Educational Campus owned and Operated by North Carolina State University
- ❑ CCE has been providing on-site engineering designs for Red Hat since 2002
  - Provided PME Engineering Designs for Two Floors in the Varsity Drive Building; Consisting of Office Space, Conference Rooms, and Server Rooms
  - Provided PME Engineering Designs for Additional Floors in the Varsity Drive Building; Office Space, Conference Rooms, and Server Rooms
  - Provided PME Engineering Designs for all Five Floors of the 900 Main Campus Building; Consisting of Second Generation Office Fit-ups for Server Rooms, Conference Rooms, and Office Space

LEED GOLD | Office

DCRI OFFICE FIT UP | Durham, NC

Construction Cost $10.6 Million

- 150,000 SF First Generation Fit-Up on 7 Floors
- The Mechanical Systems are VAV Terminal Boxes Served by Water-Cooled SCU Units with Critical Area Served by Split System CRAC Units
- LED Lighting with Back Up Generator

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

HAZEN SAWYER RENOVATION OFFICE FIT UP | Morrisville, NC

- ❑ 55,000 SF 2nd Generation Fit-Up on 3 Floors
- ❑ Design Included New Interior Stairwell to Connect all 3 floors
- ❑ New Water Testing Lab
- ❑ Café
- ❑ Breakroom
- ❑ Employee Showers

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

OFFICE – IBM RTP ON CAMPUS

- IBM Buildings 635 and 695: Provided the plumbing, mechanical, and electrical engineering designs for 167,000 SF of office fit ups and renovations.
- IBM Building 201: Provided the plumbing, mechanical, electrical, and fire alarm engineering designs for this 35,000 SF renovation from a former manufacturing facility into office and meeting spaces.
- IBM Building 001: Provided the electrical engineering designs for their 12,000 SF ISSC Command Center.
- IBM 419 Davis Drive: Provided the plumbing, electrical, and fire alarm engineering designs for this 62,000 SF office fit up.
- IBM Building 695: Provided the electrical engineering designs for several projects within this building; revisions to office spaces, cafeteria, and laboratory space.
- IBM Building 62: Provided the fire alarm engineering designs for this 306,215 SF building.
- IBM Building 002: CCE provided the fire alarm engineering designs for this 412,025 SF building.
- IBM Building 306: Provided the fire alarm engineering designs for this 80,905 SF building.

- IBM Building 305 VESDA: CCE provided the fire alarm engineering designs for this building.
- IBM Collaboration Rooms – Building 500: Provided mechanical engineering for 7,000 SF LAB
- IBM Clean Steam Project – Building 001: Provided mech and electrical to remove live building steam humidifier system from a large air handler with local electrical steam generator to provide humidification for lab.

OFFICE

Before Renovation

- **Alfred Williams – Raleigh, NC**: Originally opened its doors back in the 1940's on historic Fayetteville Street in Downtown Raleigh.
- In the 1970's relocated to a space out on Capital Blvd.
- Wanted to relocate back to Downtown Raleigh and purchased a non descript brown concrete building on Salisbury Street.
- The building was completely transformed into a modern, open, minimalist space filled with light.
- CCE provided the plumbing, mechanical, and electrical engineering designs for this 60,740 SF complete renovation project.

After Renovation - Exterior

After Renovation - Interior

NCSECU RENOVATION, 801 HILLSBOROUGH OFFICE | Raleigh, NC

- 54,000 SF Renovation
- 4 level NCSECU Facility
- Design Included Expansion of Existing Data Center
- 2 Level Enclosed Parking Deck Renovation Included Life Safety Upgrades

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

NCSECU

State Employees' Credit Union

36 Projects Over the Past 17 Years

16 Cities Statewide

Over 500,000 SF of Projects Including

Engineering Studies,
Site Lighting,
Data Center Renovations

- ❑ Wake Forest Rd Office Renovation | 60,000 SF
- ❑ Wade Ave Office Renovation | 55,580 SF
- Yonkers Road Office Renovation | 41,500 SF
- ❑ Spring Forest Rd Office Renovation | 30,000 SF
- ❑ 119 N Salisbury Street Lobby Evaluation
- ❑ Rocky Mount Office

119 Salisbury Street Office, Raleigh

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

CENTER FOR DISEASE CONTROL AND PREVENTION (CDC)
Raleigh, NC | *$1.044 Million* | Single Tenant | GSA | Secured Area

- ❑16,065 SF 2nd Generation Fit-Up
- ❑Features Include
  - Office
  - Conference Rooms
  - Training/Auditorium
  - Fitness Center
  - Mothers Room
  - Sensitive Information Rooms
- ❑ HVAC Consists of 30 Rooftop gas package Units, 2 Electric Rooftop Condenser Units, and a 4 Split System Electric Units
- ❑ Dedicated Server Room
- ❑ Security Features Include a Building Access Control System, Security and CCTV
- ❑ Site Electrical Design

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

IMMIGRATIONS AND CUSTOMS ENFORCEMENT OFFICE (ICE)
Cary, NC | *$1.267 Million* | Single Tenant | GSA |Secured Area

- **16,900 Total SF | 2 Story**
- **1st Floor is 15,500 SF that Includes:**
  - Office
  - Interview Rooms
  - Evidence Rooms
  - Computer Rooms
  - Two Cell Holding Area
  - Sensitive Information Rooms
- 2nd Floor is a 1,400 SF First Generation Fit-Up Featuring an Enclosed Sally Port for Detainee Transfers Weapons Room
- HVAC Consist of Single Zone VAV Rooftop Units
- Dedicated Server Room
- Security Features Include a Fence with Man and Vehicle Access, Building Access Control System, Security, CCTV and IDS
- Site Electrical Design

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

OFFICE

- **HCL – 11000 Regency – Cary, NC:** Crenshaw Consulting Engineers provided the plumbing, mechanical, and electrical engineering designs for several fit-ups and renovations for HCL. In total we provided engineering designs for 85,000 SF. CCE also provided the designs for a generator and UPS.

- **NIH – 530 Davis Drive – Durham, NC:** Crenshaw Consulting Engineers provided the plumbing, mechanical, and electrical engineering designs for several office fit-ups, totaling 75,000 SF. In addition we provided the engineering designs for a generator, UPS, and site lighting for this government office project.

- **Global Knowledge – 9000 Regency – Cary, NC:** Crenshaw Consulting Engineers provided the plumbing, mechanical, and electrical engineering designs for this 60,000 SF office fit up in Cary, that included a generator and UPS.

- **Duke Corporate Education – Durham, NC:** Crenshaw Consulting Engineers provided the plumbing, mechanical, electrical, and fire alarm engineering designs for 59,000 SF multi-floor historic renovation and re-use project that is comprised of an educational and office environment.

OFFICE

- **Time and Temperature Building – Raleigh, NC:** This 37,500 SF building was returned to shell condition as part of a complete renovation. In conjunction with this work, the building was fitted with upgraded plumbing, mechanical, and electrical systems and designed to meet **LEED Silver** certification. The mechanical system was completely retrofitted with a new water cooled, rotary-screw chiller, cooling tower, chilled water and condenser water pumps, variable air volume air handling unit and a new building management and control system.
- **Wade I, Wade II, and Parking Decks – Raleigh, NC**: Crenshaw Consulting Engineers, Inc. provided the plumbing and electrical engineering designs for these two buildings that total 200,000 SF. CCE additional provided a full mechanical systems design review.
- **Pallisades II and Parking Deck – Raleigh, NC**: Crenshaw Consulting Engineers, Inc. provided the plumbing and electrical engineering designs for this 81,000 SF office building and 87,000 SF parking deck. CCE also performed a complete review of the mechanical engineering designs.
- **Brier Creek Corporate Center – Raleigh, NC**: Crenshaw Consulting Engineers, Inc. provided the electrical engineering designs for this 5 building office complex totaling 590,000 SF.
- **Quintiles – Berrington I – Durham, NC:** Crenshaw Consulting Engineers provided the plumbing, mechanical, and electrical engineering designs for this 95,000 SF office fit-up.

OFFICE

- **Kilpatrick Stockton (LEED Gold) – Raleigh, NC**: Crenshaw Consulting Engineers provided the plumbing, mechanical, electrical, and fire alarm engineering designs for this 28,000 SF office fit up that was designed to **LEED Gold** requirements. CCE also provided LEED documentation of engineering credits and commissioning.
- **WebAssign – Raleigh, NC**: Crenshaw Consulting Engineers provided the mechanical and electrical engineering designs for this 32,000 SF single floor office fit-up project.
- **PeopleClick – Raleigh, NC**: Crenshaw Consulting Engineers provided the plumbing, mechanical, and electrical engineering designs for this 33,000 SF multi-floor office fit-up project.
- **AICPA – Durham, NC**: Crenshaw Consulting Engineers provided the plumbing, mechanical, and electrical engineering designs for this 25,000 SF office fit up project.
- **Young Moore and Henderson – Raleigh, NC**: Crenshaw Consulting Engineers provided the plumbing, mechanical, and electrical engineering designs for this 15,000 SF multi-floor office fit up project.

MULTI FAMILY
CRENSHAW CONSULTING engineers
www.crenshawconsulting.com

NORTH HILLS TOWER IV MULTI-USE APARTMENT, HOTEL & RESTAURANT | Raleigh, NC | *$106 Million*

- ❑ Mixed Use Apartment, Hotel & Attached Parking Deck
- ❑ 34 Stories
- ❑ 567,218 Total SF
- ❑ 11 Stories | Hotel – 237,259 SF
- ❑ 22 Stories | Multi-Family Apartments – 329,959 SF
- ❑ 1,2 and 3 Bedroom Floor Plans
- ❑ 294 Apartments
- ❑ 65,600 SF Parking Deck Connected to an Additional 321,906 SF Shared Parking Deck with the New Tower Office Complex
- ❑ Level – 34 is Rooftop Outdoor Pool & Restaurant
- ❑ Exercise Facility Shared with Hotel and Multi-Family

- ❑ **Designed in BIM – Revit**
- ❑ **HVAC – Two Cooling Towers with Water Source Heat Pumps**
- ❑ **Comparative Energy Modeling**

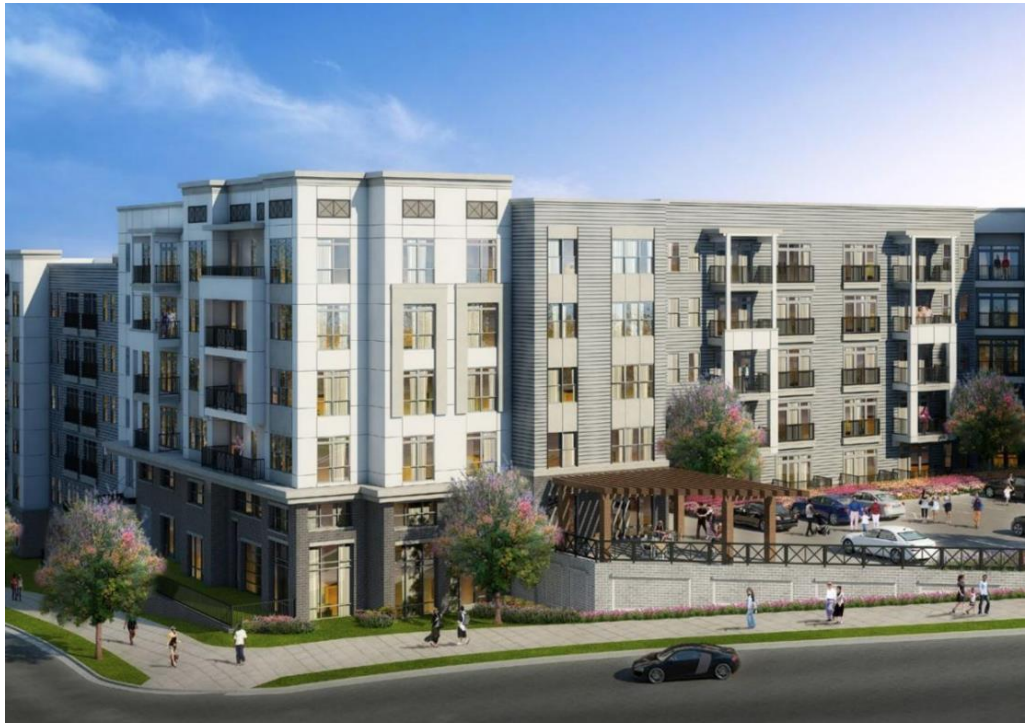
Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical, Fire Alarm and Fundamental Fire Protection Engineering Designs

"We just wanted to thank you and The Crenshaw Team for all of their hard work and expertise in helping us get our Permit approval for our Walter Tower (North Hills Tower IV). Each and every member of your Team did a great job."
David Parker | CSM, Kane Realty Corporation

KANE
REALTY CORPORATION

GADDY RESIDENTIAL MULTI FAMILY | North Hills | Raleigh, NC

- ❑ New Construction
- ❑ 344,250 SF Multi Story Residential Building
- ❑ Contains 340 Total Residential Units - Studio, One, Two and Three Bedroom Floor Plans
- ❑ Pool and Amenity Courtyard
- ❑ Fitness Facility
- ❑ Yoga Room
- ❑ 8 Story Parking Deck with 1,060 Parking Spaces
- ❑ Split System HVAC Units
- ❑ Designed in BIM - REVIT



Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

KANE
REALTY CORPORATION

THIRD AND GRAND RESIDENTIAL MIXED USE| Detroit, Michigan

$53.2 Million

- ❑ 370,000 Total SF | 6 Stories
- ❑ First Floor Retail
- ❑ 5 Floors of Residential | 231 Units
- ❑ Studio, 1, 2 & 3 Bedroom Floor Plans
- ❑ State of the Art Fitness Center
- ❑ Club Room
- ❑ Split System HVAC
- ❑ 59,969 SF Basement Parking Deck

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

MULTI-USE

STANHOPE | RESIDENTIAL, RETAIL, RESTAURANT | Raleigh, NC

$48 Million

- 441,361 Total SF
- 300 Apartments | 800 Residents
- 1, 2, 3, AND 4 Bedroom Floor Plans
- First Level Retail and Restaurant | 26,000 SF
- Attached Parking Deck | 202,287 SF
- State of the Art Multi-Level Exercise Facility, Cyber Café and Tanning Facility
- Game/Arcade Room with Mezzanine
- Ground Level Outdoor Pool Area with Built in Fire Pits and Grills
- Designed in BIM – REVIT

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical, Fire Alarm and Fundamental Fire Protection Engineering Designs

KANE REALTY CORPORATION

EAST CAROLINA UNIVERSITY MULTI-FAMILY | Greenville, NC
$50 Million

- ❑ Mixed Use Apartment/Student Housing
- ❑ 429,719 SF
- ❑ 7 Stories
- ❑ 255,135 SF Attached Parking Deck
- ❑ 1,2,3, & 4 Bedroom Floor Plans
- ❑ 294 Apartments | 812 Beds
- ❑ HVAC – Split Systems
- ❑ Prescient Structural System
- ❑ Designed in BIM - REVIT
- ❑ Largest Campus Housing at ECU
- ❑ State of the Art Multi- Level Exercise Facility and Cyber Café
- ❑ Roof Top Outdoor Pool Facility with Built in Fire Pits and Grills

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

SHORTBREAD LOFTS | MULTI-USE | Chapel Hill, NC
$18.2 Million

Shortbread Lofts – Chapel Hill, NC

- Mixed-Use, Multi-Family, For Rent Apartment Homes
- 85 Apartments
- Seven Story Building with Rooftop Gardens and Running Track
- Onsite Resident Parking
- 3,500 SF of Retail Space on Ground Level

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

RIVERBEND PHASE II | MIXED USE| MULTI FAMILY | RETAIL | PARKING DECK | Wilmington, NC | *$8.2 Million*

- ❑ 125,000 SF | 6 Stories
- ❑ 95 Multi-Family Apartments | 8 Floor Plans
- ❑ First Floor Lobby | Retail | 12,000 SF
- ❑ New Construction
- ❑ BIM | Revit
- ❑ LED Lighting
- ❑ Generator
- ❑ HVAC – Split System Heat Pumps
- ❑ Fitness Center
- ❑ Game Room| Lounge | Co-Work Space
- ❑ 152,900 SF Parking Deck | 5.5 Stories | 500 Spots

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

SHELTON STATION | MULTI-USE | Downtown Carrboro, NC

- ❑ 115,332 SF | 4 Story
- ❑ Retail On First Floor
- ❑ 94 Units of Multi-Family
- ❑ Covered Parking Garage
- ❑ Standby Generator for Accessible Elevator
- ❑ Site Lighting
- ❑ LED Lighting
- ❑ Split System Heat Pumps

Amenities

- Additional Storage
- Clubhouse
- Fitness Center
- Media Center

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

RIVER LANDING MIXED USE DEVELOPMENT |Daniels Island, SC

- 7 Building Planned Mixed Use Development
- Multi-Family Building M7 | 4 Stories | 37,800 SF | Parking on 1st Level
  - 4 Units Per Floor with Lobbies
- Garden Building GR-04 | Multi-Family, Retail and Fitness on First Level | 4 Stories | 40.000 SF
- Multi-Family G-06 | 4 Stories | 42,000 SF | Parking on 1st Level | Residential Above
- 6 Townhomes | Building T5 | 2 Different Unit Types | 3 Levels with Optional Rooftop Terrace
- 7 Townhomes | Building T13 | 2 Different Unit Types | 3 Levels with Optional Rooftop Terrace
- Pool | Pool House | Outdoor Plaza
- Building R03 | 11,000 SF | Restaurant and Market Place

- **Designed in BIM – Revit**
- **HVAC – Split System Heat Pumps**
- **Phased Development**

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical, Fire Alarm and Fundamental Fire Protection Engineering Designs

MULTI-FAMILY

Arbors at East Village – Apartment Homes – Clayton, NC

- ❑ Provided plumbing, mechanical, electrical and fire alarm engineering designs for 6, 3 story (24 units) buildings; 192 units for a total of 256,500 SF; the 6,600 SF clubhouse, 1,000 SF pool-house, and garages. Const. Cost $19M

Heritage at Arlington - Apartment Homes – Greenville, NC

- ❑ Provided plumbing, mechanical, electrical and fire alarm engineering designs for multiple 3 story buildings; totaling 186 units for a total of 176,000 SF: 8,800 SF clubhouse, 1,350 SF pool house and multi-bay garage building. Const.

MULTI-FAMILY

MaCumber Road Apartments – Wilmington, NC:
Provided the Plumbing, Mechanical, Electrical, Fire Alarm, and Security Designs.

- 39,000 SF, 2 Buildings, 204 Units
- 1,700 SF Pool House
- 4,500 SF Club House

Alexander Pointe – HUD Project - Mebane, NC: Provided the Plumbing, Mechanical, and Electrical Designs.

- Building 1: 29,000 SF – 24 Units
- Building 2: 32,000 SF – 24 Units
- Building 3: 31,000 SF – 24 Units
- 1,500 SF Pool House
- 2,300 SF Club House
- 2 Garage Buildings – 900 SF & 1,400 SF

ACOM Apartments – Dothan, AL: Provided the Plumbing, Mechanical, Electrical, and Fire Alarm Designs

- 3 - 30,000 SF Buildings – 24 Units Each Building
- 3,700 SF Clubhouse

MULTI-FAMILY

Erwin Terrace I – Apartment Homes – Durham, NC

- Provided electrical engineering designs for this 64,700 SF, 4 story multi-family and retail building. Each unit is approximately 1,100 SF.

Savannah Park – Lake Mary, FL

- Provided plumbing, mechanical, and electrical designs for a 54,000 SF building with 54 units and a 90,000 SF building with 84 units that also included a clubhouse, pool house, gym, and small office space for residents.

Rivermill – Apartment Homes and Lofts – Saxapahaw, NC

- Provided plumbing, mechanical, and electrical engineering designs for this multi-building historic renovation from a cotton mill to a multi-family apartment and loft project. Each unit is approximately 2,000 SF.

MULTI-FAMILY

Bloomsbury Estates – Raleigh, NC was a design build, new construction project consisting of 178,000 square feet of multi-family housing and retail space. CCE provided the MEP and Fire Alarm designs. Const. cost of $20M.

- 56 Units
- Energy Efficient Designs and Building Materials
- European Architectural Details
- Limestone from Israel, Slate from Vermont, and Marble from Italy

West at North and Parking Deck – Raleigh, NC

CCE provided the electrical and fire alarm engineering designs for this 257,000 SF, 165 story residential condominium complex with retail space and 116,000 SF parking deck. Const. Cost $60M

Fort Meade – Fort Meade, MD (Military Housing)

CCE provided the plumbing, mechanical, and electrical designs:

- Building 1 – 33,000 SF with 24 Units
- Building 2 – 39,000 SF with 30 Units
- Building 3 – 48,000 SF with 36 Units
- Building 4 – 56,000 SF with 42 Units
- 1,000 SF Pool House
- 6,500 SF Club House
- 2,100 SF Maintenance Building
- Construction cost $72M

MULTI-FAMILY

Huntington Place – Greensboro, NC

- Designed plumbing, mechanical, electrical and fire alarm for this mixed use complex consisting of a 5 story, 80,000 SF building and three additional one story retail buildings totaling 20,000 SF. Const. Cost $12.5 M

Renaissance Plaza – Raleigh, NC

- Designed the electrical for this 204,000 SF, 5 story multi-family and retail building.

Lakeview Phase II – Durham, NC

- Designed the electrical and fire alarm for this 175,000 SF multi-family complex.

Dawson on Morgan – Raleigh, NC

- Designed the plumbing for this 145,000 SF, 5 story residential condominium building.
- Const. Cost $20 Million

HISTORIC REVOLUTION MILL | MULTI-USE | CHANGE USE | MULTI-FAMILY, OFFICE, RETAIL AND RESTAURANT | Greensboro, NC

This historic renovation revitalized textile mill complex reuse project features:

- ❑ 45 Acres
- ❑ 1 Million SF of Office and Retail
- ❑ 150 Units of Multi-Family
- ❑ Restaurants
- ❑ Urban Market
- ❑ Fitness Center
- ❑ Outdoor Theater
- ❑ Indoor Gathering Hall and Dining
- ❑ Kitchen
- ❑ Wedding Venue

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

NATIONAL GREEN BUILDING SILVER| MULTI-USE

JUDSON MILL | MULTI-FAMILY | HISTORIC | CHANGE OF USE
Greenville, SC

Redevelopment of the 36-acre Judson Mill, 100 Year Old, 800,000 SF Textile Manufacturing Complex:

- ❑ Mixed Use Development | Multi-Family Apartments
- ❑ 55,929 SF | 3 Stories
- ❑ Building 5A is 3 Stories - 203,722 SF
- ❑ 180 Apartments
- ❑ 1-4 Bedroom Apartment Plans
- ❑ Outdoor Plaza
- ❑ HVAC – Split System Heat Pumps
- ❑ National Green Building Silver
- ❑ Designed in BIM - REVIT

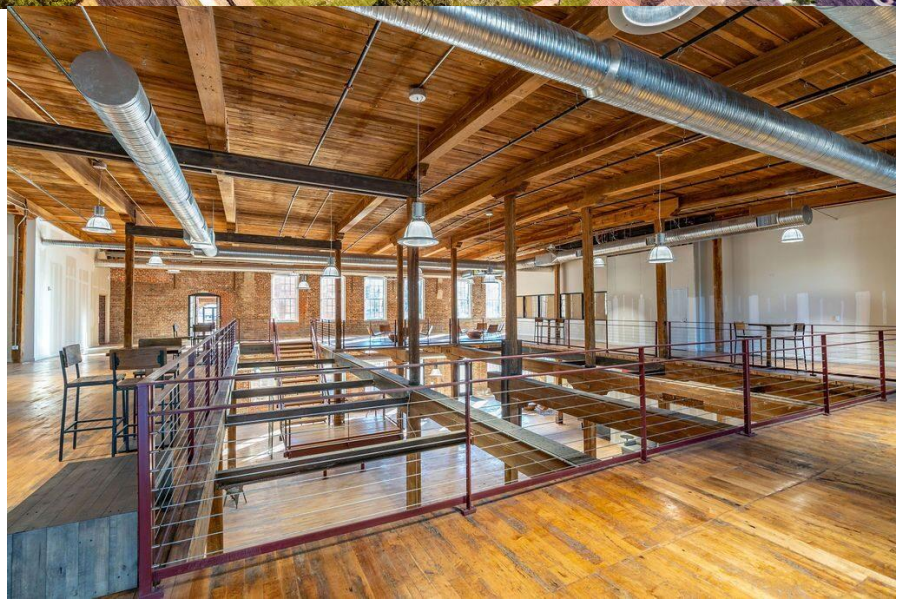
Future Scope to Include:

- ❑ 60,000 SF Retail
- ❑ 5,000 SF Amenity Space
- ❑ Parking Deck

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

ROCKY MOUNT MILL | MULTI-USE | CHANGE OF USE |Rocky Mount, NC

- ❑ 150 Acre Mixed Use
- ❑ 120,000 SF Office
- ❑ Retail
- ❑ 150 Units of Multi-Family
- ❑ Urban Market
- ❑ Fitness Center
- ❑ Indoor Gathering Hall and Dining
- ❑ Restaurants
- ❑ Brewery | Brewery Incubator



Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

MULTI-FAMILY

Brier Creek Townhomes-Building 9 – Raleigh, NC

Designed plumbing, mechanical, and electrical for this 52,736 SF townhome building.

Highgrove Townhomes – Chapel Hill, NC

Designed plumbing, mechanical, and electrical for this multi-unit townhome community. Each home is approximately 2,000 SF.

Six Forks Townhomes – Raleigh, NC

Designed plumbing, mechanical, and electrical for this multi-unit townhome community. Each home is approximately 3,000 SF.

HOTELS

Hyatt House and Conference Center – Raleigh, NC

- 120,000 SF Hotel
- **LEED Certified**
- Crenshaw Consulting Engineers (CCE) provided the plumbing, mechanical, electrical and fire alarm design. In addition to the design, CCE is also providing LEED documentation of engineering credits and energy modeling.
- Approximate Construction Cost - $13M

Facility Performance Consulting (FPC) performed the enhanced commissioning and has been on board with the project since the pre-design phase. Services will also be provided to verify that the owner has adequate system documentation and training.

CRENSHAW CONSULTING engineers
www.crenshawconsulting.com

FPC
Facility Performance Consulting

Origin Hotel | Raleigh, NC

- A boutique hotel above the new One Glenwood Office & Retail Building in downtown Raleigh.
- 67,500 SF | 7 Story
- Ground Floor Restaurant
- Kitchen
- Lobby
- 120 Rooms | 6 Floors
- Meeting Spaces
- Rooftop Bar
- Fitness Center
- VTAC HVAC System | Standard through wall units

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

HOTELS

Bartlett Hotel – Durham, NC

Designed fire alarm designs for this 98,000 SF hotel.

Mayton Inn – Cary, NC

Designed plumbing, and electrical designs for this 46,700 SF boutique hotel.

Umstead Hotel and Spa – Cary, NC

Designed electrical and fire alarm designs for renovations to the hotel and spa.

Courtyard by Marriott – Raleigh, NC

Designed plumbing, mechanical, and electrical for this 51,000 SF hotel.

Clarion at Hillsborough Street – Raleigh, NC

Designed plumbing, mechanical and electrical for this 20 story, phased renovation of a mid-century round hotel. Construction Cost of $9M.

Residence Inn – Rocky Mount, NC

Designed plumbing, mechanical and electrical for this 55,000 SF hotel.

Homewood Suites – Cary, NC

Designed plumbing, mechanical, and electrical for a small renovation project in this 115,000 SF hotel.

Holiday Inn Express – Wallace, NC

Designed plumbing, mechanical and electrical for this 41,000 SF hotel.

DORMITORIES AND BARRACKS

Truett McConnell Theological Seminary Campus - Cleveland, GA

- Provided the plumbing, mechanical, and electrical designs for the new dormitory, dining hall and a new state of the art education building. The dormitory building is 35,000 SF with a construction cost of $3.0M.

Building 17, 417 and 217 Barracks Renovation – MCB Camp Lejeune

- Provided the plumbing, mechanical, and electrical designs for the renovation of the barracks buildings 17, 417, and 217. Const. Cost $3.5M Each.

Building 4166 and 4167 Barracks Renovation – MCAS Cherry Point

Provided the plumbing, mechanical, and electrical designs for the renovation of the barracks buildings 4166 and 4167.

- 43,000 SF, Each
- 40 Sleeping Rooms Each

The new mechanical system is comprised of:

- Air Cooled Chiller
- Steam to Hot Water Generator Pumps
- Dedicated Outside Air Units with Energy Recovery
- 4 Pipe Fan Coil Units

Construction Cost: $4.9M Each

DATA CENTERS
CRENSHAW CONSULTING
engineers
www.crenshawconsulting.com

HEWLETT PACKARD – FACILITIES UNDER CONFIDENTIALITY FACILITIES ENGINEER AS THE PRIME

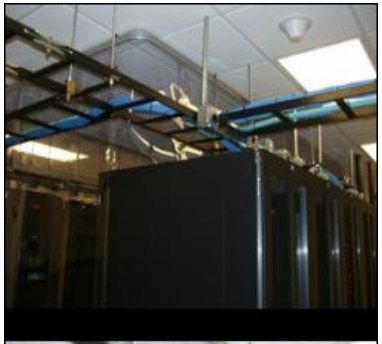
- ❑ Facilities Engineer since 2010
- ❑ Large Data Centers with Undisclosed SF
- ❑ Projects include humidification studies, controls projects, chiller replacements and overall maintenance of the facilities
  - **Sample Project of Facility – Mission Critical**
    - ✓ Provided Engineering Designs for Data Hall, Switch Gear Room and Chiller Plant
    - ✓ Electrical Designs to Increase Power Density (Watts Per SF)
    - ✓ Added Medium Voltage Switchgear, Backup Batteries and Generators as well as Additional Fuel Oil Tanks for Generators
    - ✓ Provided Design for Increased Cooling to Offset the Increase in Power Density CRAH Units, Chillers and Pumps
- ❑ Significant challenges
  - No Downtime Allowed

RED HAT WORLDWIDE HEAD QUARTERS | Raleigh, NC

Red Hat Worldwide Headquarters – Centennial Campus, Raleigh NC consists of two separate buildings; 1801 Varsity Drive, a 4 story building and 900 Main Campus, a 5 story building that are home to approximately 700 Red Hat employees.

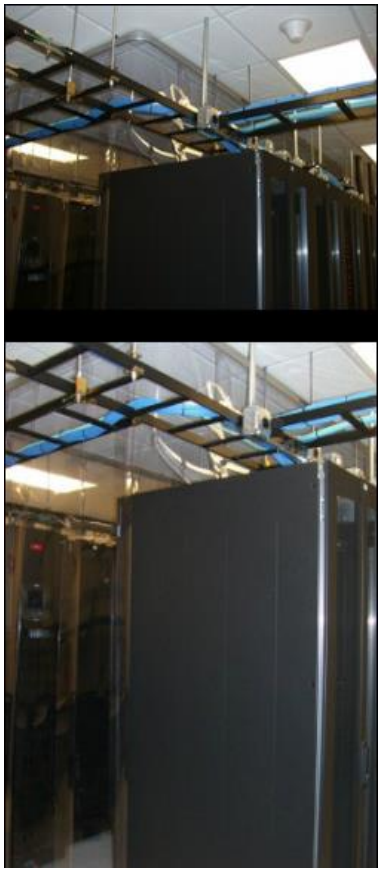
- ❑ Red Hat came to North Carolina in 1996, First office was in Durham
- ❑ Relocated to Centennial Campus; a Research Park and Educational Campus owned and Operated by North Carolina State University
- ❑ CCE has been providing on-site engineering designs for Red Hat since 2002
  - Provided PME Engineering Designs for Two Floors in the Varsity Drive Building; Consisting of Office Space, Conference Rooms, and Server Rooms
  - Provided PME Engineering Designs for Additional Floors in the Varsity Drive Building; Office Space, Conference Rooms, and Server Rooms
  - Provided PME Engineering Designs for all Five Floors of the 900 Main Campus Building; Consisting of Second Generation Office Fit-ups for Server Rooms, Conference Rooms, and Office Space

RELEVANT EXPERIENCE–DATA CENTERS



- **NC Judicial Center** – 4,000 SF floor server room that supports the judicial administrative center. Designed with 645 NEC raised floor, 225 KVA UPS and 750 KW standby generator. Designed electrical for a 180,000 SF office fit-up. This included several small telecommunication rooms, full service cafeteria & kitchen, private offices, open office space, reception & waiting areas and restrooms.
- **Martin Marietta –** 1,800 SF server room for corporate office. Designed with UPS, FM 200 fire suppression system and 550 KW generator. Designed plumbing, mechanical and electrical for a 45,000 SF office fit-up. This included private offices, open office space, break-room and restrooms.
- **Sensus RNI** – 1,600 SF server room that supports research lab. Design included 160 KV UPS and Pre-action sprinkler system. Designed plumbing, mechanical and electrical for a 15,000 SF office fit-up. This included private offices and open office space, break-room and restrooms.
- **Global Knowledge** – 1,800 SF server room that functions as consolidated corporate data storage area. Designed with a raised floor, 100 KVA UPS, FM 200 fire suppression system, 250 KW generator, pre-action sprinkler system, and 2 Leibert units with humidity controls. Designed plumbing, mechanical and electrical for a 50,000 SF office fit-up. This included private offices, open office space, restrooms and break-room.
- Federal Treasury – Raleigh, NC: 98,000 SF renovation fit up with a 1,000 SF Data Center to include a 250 Kw generator, 100 KW UPS, 2 Leibert units with humidity controls and an FM200 fire suppression system.

RELEVANT EXPERIENCE–DATA CENTERS



- **HCL – 11000 Regency – Cary, NC:** HCL is the provider of off-site data storage for various companies. Crenshaw Consulting Engineers provided the plumbing, mechanical, and electrical engineering designs for several fit-ups and renovations for a total of 85,000 SF. CCE also provided the designs for a generator and UPS. There were 3 server rooms totaling 1,500 SF and designed to include under-floor HVAC air distribution, 30 KVA UPS, and 750 KVA generator. This included private offices, open office space, restrooms, break-room and call center facility.
- **Itron** – 1,000 SF server room renovation designed with dedicated HVAC system, 250 KW UPS system and 250 KW generator. Designed plumbing, mechanical and electrical for a 52,000 SF fit-up. This included private offices, open office space, break-rooms, reception area and restrooms.
- **Charles Schwab** - 3 separate server rooms, totaling 1,000 SF, renovated and re-designed that included new glycol dedicated cooling system consisting of above-ceiling units and roof-mounted equipment with piping running between multiple floors. Also incorporated new central 80 KVA UPS system that replaced individual UPS units.
- **Kilpatrick Stockton (LEED Gold) – Raleigh, NC**: Crenshaw Consulting Engineers provided the plumbing, mechanical, electrical, and fire alarm engineering designs for this 28,000 SF office fit up that was designed to **LEED Gold** requirements. CCE also provided LEED documentation of engineering credits and commissioning. 200 SF server room that supports law office. Designed to include 10 KVA plug-in UPS and ceiling mounted Leibert HVAC system with humidity controls.

OFFICE WITH DATA CENTER – IBM RTP ON CAMPUS

- IBM Buildings 635 and 695: Provided the plumbing, mechanical, and electrical engineering designs for 167,000 SF of office fit ups and renovations.
- IBM Building 201: Provided the plumbing, mechanical, electrical, and fire alarm engineering designs for this 35,000 SF renovation from a former manufacturing facility into office and meeting spaces.
- IBM Building 001: Provided the electrical engineering designs for their 12,000 SF ISSC Command Center.
- IBM 419 Davis Drive: Provided the plumbing, electrical, and fire alarm engineering designs for this 62,000 SF office fit up.
- IBM Building 695: Provided the electrical engineering designs for several projects within this building; revisions to office spaces, cafeteria, and laboratory space.
- IBM Building 62: Provided the fire alarm engineering designs for this 306,215 SF building.
- IBM Building 002: CCE provided the fire alarm engineering designs for this 412,025 SF building.
- IBM Building 306: Provided the fire alarm engineering designs for this 80,905 SF building.

- IBM Building 305 VESDA: CCE provided the fire alarm engineering designs for this building.
- IBM Collaboration Rooms – Building 500: Provided mechanical engineering for 7,000 SF LAB
- IBM Clean Steam Project – Building 001: Provided mech and electrical to remove live building steam humidifier system from a large air handler with local electrical steam generator to provide humidification for lab.

FINANCIAL

CRENSHAW CONSULTING engineers
www.crenshawconsulting.com

NCSECU RENOVATION, 801 HILLSBOROUGH OFFICE | Raleigh, NC

- 54,000 SF Renovation
- 4 level NCSECU Facility
- Design Included Expansion of Existing Data Center
- 2 Level Enclosed Parking Deck Renovation Included Life Safety Upgrades

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

NCSECU

State Employees' Credit Union

36 Projects Over the Past 17 Years

16 Cities Statewide

Over 500,000 SF of Projects Including

Engineering Studies,
Site Lighting,
Data Center Renovations

- ❑ Wake Forest Rd Office Renovation | 60,000 SF
- ❑ Wade Ave Office Renovation | 55,580 SF
- ❑ Yonkers Road Office Renovation | 41,500 SF
- ❑ Spring Forest Rd Office Renovation | 30,000 SF
- ❑ 119 N Salisbury Street Lobby Evaluation
- ❑ Rocky Mount Office

119 Salisbury Street Office, Raleigh

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

FINANCIAL

- **North State Bank – Raleigh, NC** – Designed plumbing, mechanical and electrical for a 20,000 SF corporate head quarters and branch shell and fit up.
- **South Trust Bank – Somerset Center** - Designed plumbing, mechanical and electrical for a 20,000 SF corporate office in Raleigh, NC.
- **Square One Bank – Fowler Building** - Designed plumbing, mechanical and electrical for a 26,000 SF corporate office and branch in Durham, NC.
- **Square One Bank – Crowe Building** - Designed plumbing, mechanical and electrical for a 14,000 SF office fit up in Durham, NC.
- **Capital Bank – Holly Springs** – Designed plumbing, mechanical and electrical for a 6,200 SF branch shell and fit up in Holly Springs, NC.
- **Capital Bank – Clayton –** Designed plumbing, mechanical and electrical for a 3,500 SF branch shell and fit up in Clayton, NC.
- **Capital Bank – Raleigh** – Designed plumbing, mechanical and electrical for a 3,000 SF branch shell and fit up in Raleigh, NC.
- **Capital Bank – Hope Mills - LEED GOLD**: Designed plumbing, mechanical, and electrical for a new 3,800 SF branch bank .
- **Crescent State Bank - Cary, NC** – Designed mechanical and electrical for a 5,000 SF bank renovation.
- **BB&T – Raleigh** – Designed electrical for a 5,000 SF office renovation.
- **BB&T – Hope Mills, NC** – Designed plumbing, mechanical and electrical for a 3,200 SF new construction bank branch.

FINANCIAL

- **State Employees Credit Union – Hillsborough St**. - Designed plumbing, mechanical and electrical for a --30,000 SF corporate head quarters and branch shell and fit up in Raleigh, NC.
- **State Employees Credit Union – Wade Ave.** - Designed plumbing, mechanical and electrical for a 12,000 SF office and branch in Raleigh, NC.
- **State Employees Credit Union – Charlotte** - Designed plumbing, mechanical and electrical for a 12,000 SF office and branch in Charlotte, NC.
- **State Employees Credit Union – Fayetteville** - Designed plumbing, mechanical and electrical for a 2,500 SF branch in Fayetteville, NC.
- **State Employees Credit Union – Computer Dr.** - Designed plumbing, mechanical and electrical for a 2,500 SF branch in Raleigh, NC.
- **State Employees Credit Union – Salsibury St.** - Designed plumbing, mechanical and electrical for a 2,500 SF branch in Raleigh, NC.
- **Coastal Federal Credit Union – St. Albans** - Designed plumbing, mechanical, electrical and fire alarm for a 25,000 SF corporate head quarters and branch shell and fit up in Raleigh, NC.
- **Coastal Federal Credit Union – Olive Chapel** - Designed plumbing, mechanical, electrical and fire alarm for a 6,000 SF branch in Apex, NC.
- **Coastal Federal Credit Union – Wake Field** - Designed plumbing, mechanical, electrical and fire alarm for a 6,000 SF branch in Raleigh, NC.

MEDICAL
CRENSHAW CONSULTING
engineers
www.crenshawconsulting.com

HEALTHPARK AT KILDAIRE MOB 1| Cary, NC
$30 Million

- New Construction of Class A Medical Office Building
- 91,000 SF | 4 Stories Housing:
  - UNC REX Urgent Care and Lab
  - UNC Physician's Network
  - UNC Pulmonary Clinic
  - REX Raleigh Orthopedics
  - Wake Pain and Spine
  - Various Other Fit Ups to Come
- HVAC system Consists of DX Packaged VAV Rooftop Units
- Generator
- Parking Deck

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical and Fire Alarm Engineering Designs

HEALTHPARK AT KILDAIRE MOB 2| Cary, NC
$31 Million

- ❑ New Construction of Class A Medical Office Building
- ❑ 93,000 Gross SF | 5 Stories
- ❑ Shell and Fit Ups with Three Elevators
- ❑ HVAC system consists of DX packaged VAV rooftop units
- ❑ Back Up Generator
- ❑ Designed in BIM – REVIT
- ❑ Parking Deck

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical and Fire Alarm Engineering Designs

MEDICAL OFFICE

ARRINGDON | DUKE HEALTH MEDICAL OFFICE | Durham, NC

- 199,550 SF
- 5 stories
- Core Areas Fully Up-fit
- Tenant areas Warm, Dark, Shell
- HVAC – Cooling Towers with Self Contained Units
- 750 KW Generator
- Designed in BIM | REVIT
- Fit Ups Forthcoming

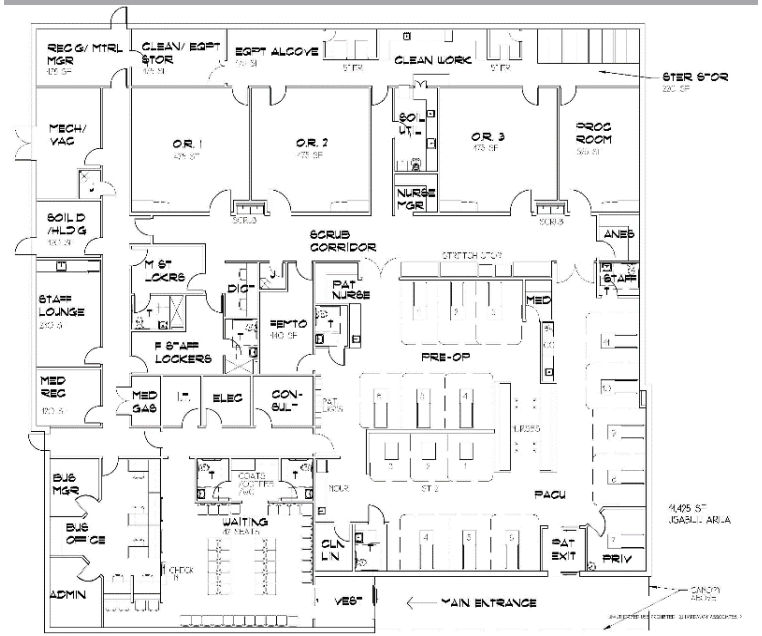
Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

HOLLY SPRINGS SURGERY CENTER | Holly Springs, NC | AHCA Equivalent | *$6 Million*

- ❑ 18,000 SF
- ❑ Three Operating Rooms
- ❑ One Procedure Room
- ❑ Sustainable Features
- ❑ Nurses Station
- ❑ Medical Gas Piping
- ❑ Stand Alone Center
- ❑ Shell and Fit Up
- ❑ New Construction
- ❑ Generator
- ❑ Design Build

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

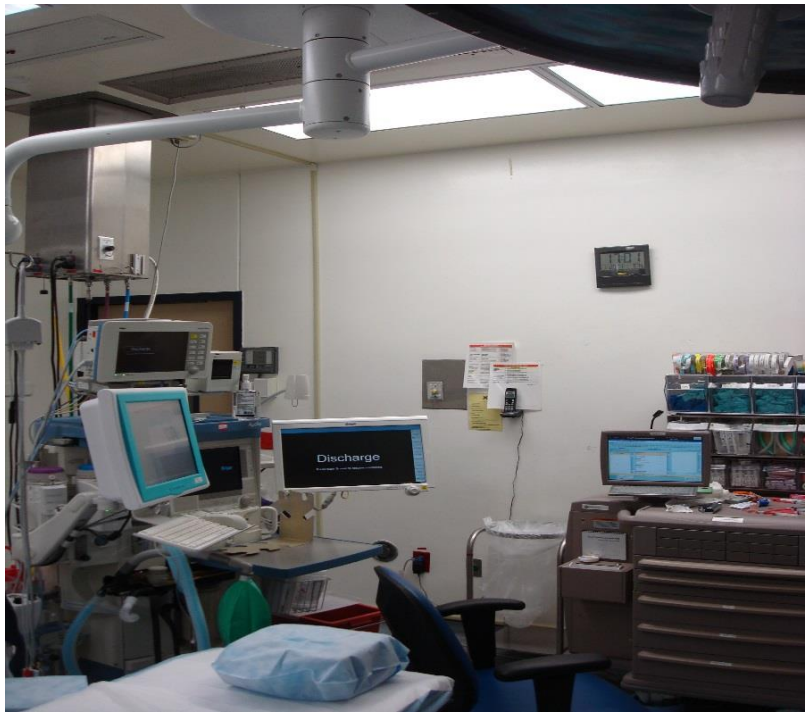
BRASFIELD & GORRIE



ALTERATIONS TO ELEVEN OPERATING ROOMS BUILDING NH 100 | Camp Lejeune, NC | AHCA Equivalent | *$1.355 Million*

Task order under an IDIQ for Architectural Engineering and Design Services for Various Projects, Marine Corps Base Camp Lejeune.

- ❑ 15,000 SF renovation of a space that was originally constructed in 1982
- ❑ Extensive field investigation and input from medical staff enabled the design team to make informed decisions regarding the design, and the selection of finish materials
- ❑ A complex phasing plan was developed, allowing portions of the OR suite to function continuously during the construction process



The electrical engineering designs for this project consisted of 25 push button hands free doors, 30 card readers, 40 station internal intercom per NH facilities, 2 additional duplex critical power outlets in each of the 11 operating/procedure rooms, and for new energy efficient lighting throughout the space.

The mechanical design consisted of installing new dual duct VAV terminals connected with existing four pipe VAV air handler and re-zoining air space.

- ❑ 11 Operating Rooms
- ❑ Cystoscopy Suite
- ❑ Nurses Station
- ❑ Medical Gas Piping
- ❑ Office and Corridors
- ❑ Locker Rooms
- ❑ Sustainable Features
- ❑ Sterile Supply Storage

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

CHATHAM PARK MEDICAL OFFICE BUILDING | Pittsboro, NC | LEED

The New Clinic Includes:

- Rehabilitation
- Pediatrics
- Women's Health
- Optometry
- Radiology
- Internal Medicine
- Public Health
- Heart
- Clinical Lab
- Many Other

UNC's New Chatham Park Medical Office Building is a single story, 25,000 SF medical office building that houses a Radiology Suite, Rehabilitation Suite, Laboratory and other medical offices. Crenshaw Consulting Engineers designed the electrical, fire alarm, mechanical and plumbing systems for the shell building and fit ups as well as preliminary bid documents/pricing sets along with approving and reviewing shop drawings. This project was designed to LEED design specifications. Crenshaw Consulting's sister company Facility Performance Consulting commissioned the project. The mechanical system is comprised of two 35 ton roof top VAV systems with energy recovery ventilation. The project was modeled and designed to meet the requirements of 20% improvement over the ASHRAE 90.1-2007.

CHATHAM PARK HOSPICE | Pittsboro, NC | LEED
AHCA Equivalent | *$4.7 Million*

- 10 Licensed Beds
- Nurse Station
- Support Stations
- Kitchen
- Dining
- Meditation Space
- Family Visiting
- LEED
- Many Other

UNC's Chatham Park Hospice is a single story, 11,000 SF new inpatient hospice building. The medical facility houses 10 licensed beds, nurse station, support stations, kitchen, dining room, meditation space and family visiting areas. This project was designed to LEED design specifications and achieved a 14% improvement over ASHRAE 90.1-2007. The mechanical system is comprised of a VRF System with multiple independent zones for patient and staff comfort. The electrical system is comprised of a full essential system with life safety, critical and equipment branches backed-up by a 350 KW generator. Also provided medical and air vacuum systems with a micro bulk tank.

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical, Fire Alarm and Structural Engineering Designs

UNC ANNUAL SERVICES PROJECTS

UNC Rehabilitation Clinic

UNC Rehabilitation Clinic – Chapel Hill, NC: Designed the plumbing, mechanical, and electrical for a 24,250 SF medical clinic building. Const. Cost $2.5M.
UNC Podiatry Clinic – Chapel Hill, NC: Designed the plumbing, mechanical, and electrical for this 1,200 SF podiatry clinic.
UNC Orthopedic – Chapel Hill, NC: Designed the plumbing, mechanical, and electrical for this 7,600 SF orthopedic medical office.
UNC Urgent Care – Chapel Hill, NC: Designed the plumbing, mechanical, and electrical for this 2,800 SF full service urgent care facility.
UNC Cancer Support – Chapel Hill, NC: Designed the plumbing, mechanical, and electrical for this 3,416 SF cancer support center.

UNC Ophthalmology

UNC Ophthalmology – Chapel Hill, NC: Designed the plumbing, mechanical, and electrical for this 26,000 SF medical office space. The electrical systems had to incorporate laser units that came with their own UPS that required special coordination. Additionally the electrical design team had to spend considerable time coordinating with eye lane equipment for the automated lighting control. The mechanical system was designed with a roof-top VAV system with separate dedicated specialty units for selected areas. The predominant challenge in designing for this project was the complex specialty items involved while adhering to the budget. Construction Cost $3.8 million.

UNC Aesthetic and Laser Clinic

UNC Aesthetic and Laser Clinic – Chapel Hill, NC: Designed the plumbing, mechanical, and electrical for this 8,000 SF clinic. The clinic was designed with all of the requirements of a surgical suite, including humidification and HEPA filtration in the procedure and recovery rooms. A complete essential electrical system with life safety, critical and equipment branches, critical care procedure rooms with wet procedure locations and isolated power, and a hospital level fire alarm and notification were also provided. In addition, we designed the piping for medical gasses. Construction Cost $1.6 million.
UNC Dermatology – Chapel Hill, NC: Designed the plumbing, mechanical, and electrical for a 3,700 SF dermatology office.
UNC Home Health – Durham, NC: Designed the plumbing, mechanical, and electrical for this 92,000 SF medical use office space.

WAKEMED MEDICAL OFFICE BUILDING |SUNNYBROOK DRIVE | Raleigh, NC | *$18 Million*

The New Clinic Includes:

- Ambulatory Surgery
- Pediatrics
- Women's Health
- Outpatient Surgery
- Optometry
- Physical Therapy
- Public Health
- Heart
- Radiology
- Clinical Lab

WakeMed's Medical Physician's Office Building is a three story, 89,000 SF shell medical facility **w**ith a basement level covered parking area. The medical office building is located on Wake MED's main campus in east Raleigh. The building houses an Ambulatory Surgery Center, Radiology Suite and other medical offices. Crenshaw Consulting Engineers designed the electrical, fire alarm, mechanical and plumbing systems for the shell building and fit ups as well as preliminary bid documents/pricing sets along with approving and reviewing shop drawings. Archive drawings were also provided at the conclusion of the project. This project was designed to LEED design specifications. The building features a 480v main power service and a roof-top VAV HVAC system for the core and shell areas. This was a design build project with Brasfield and Gorrie who was recently ranked by Modern Health as the second largest health care provider in the country.

WAKEMED PHYSICIANS OFFICE PAVILION AND PARKING DECK
RALEIGH, NC | *$20 Million*

WakeMed'S Physician's Office Pavilion and Parking Deck is a WakeMed Medical Facility consisting of 80,000 SF medical building with 125,000 SF of parking decks. The medical office building is located in the northern part of Wake County in Raleigh, NC on hospital proper grounds directly next to Wake Med North Hospital. This building is used as Wake Med North Hospital's medical office pavilion and was a second phase while the hospital was in operation. The medical facility required building a 125,000 SF parking deck to accommodate the parking needs for the building and over flow from the hospital. This project required both retainer walls and drain off ponds to be built to accommodate the site needs. A fountain was an added feature to give the pond a more attractive look. The facility was a phased construction on hospital proper grounds while the hospital was operating.

The New Clinic Includes:

- Family Health
- Pediatrics
- Women's Health
- Outpatient Surgery
- Optometry
- Physical Therapy
- Public Health
- Pharmacy
- Mental Health
- Clinical Lab

WAKEMED VARIOUS PROJECTS

Project	Square Foot	Type	
WakeMed Falls Point Medical Group	5,200	Medical	Renovation
WakeMed Cary Urology	3,400	Medical	Renovation
WakeMed Epic Training Rooms	4,800	Office Building	Renovation
Wake Med Ironwood Renovation	12,500	Office Building	Renovation
WakeMed Springbranch, Clayton	8,000	Medical	First Time Fitup
WakeMed Primary Care, Cary at 50%	4,500	Medical	Renovation
WakeMed Office Space Bldg. E	3,100	Office Fitup	Second Gen Fitup
Administration Fitup, WakeMed Sunnybrook	2,510	Office Fitup	First Time Fitup
WakeMed – Patient Finance Services Hawthorn Blvd.	22,000	Office Fitup	Second Gen Fitup
WakeMed Cary Conference Room	690	Office Fitup	Renovation
WakeMed Cary Credit Union	700	Financial	Renovation
WakeMed Heart Center – Admin. Office	1840	Medical	Renovation
WakeMed Cary – Oncall Building	5,170	Office Fitup	Renovation

REPLACE MEDICAL CLINIC | Project #71325 | LEED Silver
Seymour Johnson Air Force Base | *$45.8 Million*

The existing Main Clinic Building #2800 is a 98,000 SF single story structure that was originally built in 1957 and was comprised of approximately 36,200 SF with a later addition in 1975, as well as two much smaller additions in 1988 and 1995.

The primary objective of this project was to replace the dated clinic with a new two story, 106,000 SF state-of-the-art primary care clinic.

- **LEED** Silver under the 2009 **LEED** Healthcare Program
- The HVAC System is Comprised of:
  - 3 Natural Gas Fired Condensing Boilers
  - 2 Air Cooled Screw Chillers
  - 4 VAV Double Wall Air Handling Units
  - Floor Mounted Radiant Fin tube Heaters
- The Electrical System is Comprised of:
  - Estimated Size at 3,000 amps
  - Dedicated Panels for Type of Loads They Serve
  - Lighting Controls

The New Clinic Includes:

- Family Health
- Pediatrics
- Women's Health
- Flight Medicine
- Optometry
- Physical Therapy
- Public Health
- Pharmacy
- Mental Health
- Clinical Lab

- The Mechanical, Plumbing, Electrical and Fire Alarm Systems were Designed to Meet the Requirements of a 30% Improvement over the ASHRAE 90.1-2007
- The Building Includes a Vegetated Roof System and Translucent PTFE Canopy
- Construction Cost: $45.8M

ALLIANCE BEHAVIORAL HEALTHCARE OFFICE FIT UP RENOVATION | Morrisville, NC | *5200 Perimeter Park*

- ❑ 125,000 SF Second Generation Fit Up for Healthcare Management Administration Office
- ❑ Two Floors Including Entry Level Lobbies and Building Core
- ❑ HVAC Design Involved the Retrofit of an Existing VAV system to meet the Needs of the New Tenant Space Plus Core Renovations
- ❑ Fit Up Included a New IT room with 24/7 Conditioning with a 3 Ton Dedicated HVAC Unit

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

HOLLY HILL HOSPITAL | Raleigh, NC | AHCA Equivalent | *$11.9 Million*

Holly Hill Hospital: has been treating patients for over 30 years providing psychiatric and addictive disease treatment. In response to a growing need for psychiatric care, the hospital is expanding with the addition of a new 53,000 SF facility dedicated to children and adolescent mental health treatment. The New Addition Includes:

- Four Outdoor Play Areas
- Walking Trails | Basketball Court.
- An Art Therapy Room
- Classrooms
- Game Room
- Half Court Indoor Gymnasium
- 80 Inpatient Beds Allowing the Original Hospital to Increase its Adult Inpatient Capacity

- Designed to incorporate state-of-the-art safety considerations relating to behavior health facilities
- HVAC | High efficiency Gas Fired Rooftop Units Zoned to Serve Patient Areas and Commons Spaces Separately | All Areas Received Full Supply and Return Duct Systems
- **Electrical |** 277/480V, 1200 Amp Electrical Service with a 175 kW Generator and Designed to Meet NED, NFPA 99, and NC DHSR Requirements for Hospitals
- Extensive Design Coordination with the Owners, Operators, and Contractors | Design Build
- Construction Cost of $11.9 Million

ROBESON MEDICAL CENTER | Fayetteville, NC | $14 Million

Robeson Medical Center is a 68,000 SF medical office building located in Fayetteville, North Carolina. The building is an attractive brick building consisting of various medical practices such as:

- 11,000 SF VA Dialysis Center
- Fayetteville Heart
- Fayetteville OBGYN
- Urology
- Physical Therapy
- Estimated Construction Cost $14M

Mechanical: The building was designed for a variety of medical office environments by utilizing three package VAV rooftop HVAC units totaling 180 tons. Fan powered boxes with electric heat are utilized for the perimeter areas with zone dampers utilized for interior spaces. A full DDC control system was installed to provide maximum system control and flexibility for the tenants. **Electrical Systems:** The electrical system for the building was designed with a 3000A main distribution panel on the first floor of the building. Transient voltage surge suppression was provided for the main distribution panel. This main distribution board provides power to distribution panels on each floor to allow the medical office tenants an adequate connection point on each floor for any medical equipment they may have in their practice. This design eliminates the need for future tenants to route large feeders down to the first floor MDP. The 120/208V distribution was designed for up to 8.2W/SF instead of the typical 5 W/SF to allow for additional medical equipment in the medical office spaces. **In the VA Dialysis Office** a 100 KW natural gas generator was included in the design as a stand-by power source to back up "critical" processes for the clinic. The generator backs up all the dialysis preparation and water treatment equipment, the actual dialysis stations, nurse work area, medical preparation, lab, biomed, isolation, server room, as well as about half the lighting in the office. This design allows patients the ability to continue with and/or have their critical treatment performed even in the event of power outages.

MEDEXPRESS – VARIOUS LOCATIONS

Physician-led urgent care facilities providing immediate treatment for illnesses and injuries, wellness exams, preventative care and employer services. Each facility was designed according to MedExpress corporate standards such as devices, fixtures, special equipment while ensuring local AHJ compliance:

- Bentonville, AR
  4,983 SF new facility
- Springdale, AR
  5,020 SF fit-up in an existing 8,214 SF facility
- Roxbury, NJ
  5,096 SF fit-up in an existing 9,486 SF facility
- Lawton, OK
  4,717 SF new facility
- Tulsa, OK
  4,717 SF new facility
- Roxbury, NJ
  5,096 SF fit-up in an existing 9,486 SF facility

Crenshaw Consulting Engineers provided the Plumbing, Mechanical, Electrical, Fire Alarm Engineering Designs. Analysis and Design was completed to determine the most cost efficient cutting edge energy savings methods and solutions.

MEDICAL

- **Camp Lejeune Mental Health Ward:** provided plumbing, mechanical, and electrical engineering designs for the renovation of 9,600 SF, 4th floor Mental Health Ward of the Naval Hospital in Camp Lejeune. Const. cost $1.8M.
- **UNC Aesthetic and Laser Clinic – Chapel Hill, NC:** provided plumbing, mechanical, and electrical engineering design services for this 8,000 SF Aesthetic and Laser Clinic for UNC.
- **Wake Med's Medical Office Building I and II (Sunnybrook Ave) - Raleigh, NC.**: Three story, 86,000 SF medical facility that includes an ambulatory surgery center, radiology suite and medical offices. Provided the plumbing, mechanical, electrical and fire alarm for these buildings. Construction cost of $20M for both phases.
- **Wake Med's Physician's Office Building and Parking Deck (Falls of Neuse Rd)– Raleigh, NC.:** Designed plumbing, mechanical , electrical and fire alarm for an 80,000 SF medical office building with 125,000 SF of parking decks. Construction cost of $20M.
- **American Institute of Health and Fitness – Wake Forest, NC.:** Designed plumbing, mechanical and electrical for a 138,000 SF shell medical office building. Construction cost of $15M.
- **Blue Cross Blue Shield - Bldg. 100, 200, 300, 400 and 500 – Durham, NC.:** Designed plumbing and electrical for multiple medical administrative buildings totaling 84,000 SF .
- **Creedmoor Road Medical Office – Raleigh, NC.:** Designed plumbing, mechanical and electrical for a 44,000 SF medical office building.

MEDICAL

- **Robeson Plaza – Fayetteville, NC.:** Designed plumbing, mechanical and electrical for a 68,000 SF shell medical office building. Construction cost of $10M
- **Fayetteville Heart Center – Robeson Plaza - Fayetteville, NC.:** Designed plumbing, mechanical and electrical for a 23,000 SF medical office fit up.
- **OBGYN – Robeson Plaza - Fayetteville, NC.:** Designed plumbing, mechanical and electrical for a 5,000 SF medical office fit up.
- **VA Dialysis Clinic – Raleigh and Fayetteville NC.:** Designed plumbing mechanical and electrical for two 10,000 SF dialysis clinics in new existing shell buildings, both designed to comply with Veterans Affairs specified guidelines including various requirements for mechanical ventilation, waste and purified water systems, and electrical safety and convenience features.
- **Blue Cross Blue Shield University Tower – 6 Floors – Durham, NC.:** Designed plumbing, mechanical and electrical for multiple floors of the University Towers Building totaling 66,000 SF.
- **Duke Development – West Village – Durham, NC.:** Designed plumbing, mechanical and electrical for a 42,000 SF medical office fit up.
- **Triangle Orthopedics – Durham, NC.:** Designed plumbing, mechanical and electrical for a 55,000 SF two-story medical facility fit up.
- **Rexview Medical Center – Raleigh, NC.:** Designed plumbing, mechanical and electrical for a 44,000 medical office shell building and fit ups. Construction cost of $9M.
- **Blue Ridge Medical – Raleigh, NC.:** Designed plumbing, mechanical and electrical for a 43,000 SF medical office shell.

MEDICAL

- **MedExpress Urgent Care – Multiple Locations:** CCE is providing the plumbing, mechanical, and Electrical designs for several MedExpress locations throughout the country.
- **Wilmington Orthopedics – Wilmington, NC.:** Designed plumbing, mechanical, electrical and fire alarm on a 39,000 SF medical office building.
- **Wake Forest Medical Office – Wake Forest, NC.:** Designed plumbing, mechanical, electrical and fire alarm for a 37,000 SF medical office building.
- **Wake Radiology Timber Dr.– Garner, NC.:** Designed plumbing, mechanical and electrical for a 32,000 SF medical office building.
- **Heritage Health Park – Wake Forest, NC.:** Designed plumbing, mechanical and electrical for a 28,000 SF shell medical office.
- **Brier Creek Medical Office Building – Raleigh, NC.:** Designed plumbing, mechanical and electrical for a 26,000 SF medical office building.
- **Falls Ridge Retail and Medical Center – Raleigh, NC.:** Designed plumbing, mechanical and electrical for a 23,000 SF shell medical office building.
- **Health Decisions – Durham, NC.:** Designed plumbing, mechanical and electrical for a 23,000 SF medical office building.
- **American Red Cross – One Renaissance – Raleigh, NC.:** Designed plumbing, mechanical and electrical for an 18,000 SF office.
- **Cary Medical and Surgical Center Building II – Cary, NC.:** Designed plumbing, mechanical and electrical for an 18,000 SF 3 story medical office building.

ASSISTED LIVING

SPRING ARBOR OF FREDERICK | ASSISTED LIVING FACILITY
Frederick, MD | AHCA Equivalent | *$20 Million*

- Single Story | 109,700 SF | New Assisted Living Facility
- Houses 57 Assisted Living Units Plus 36 Special Care (Dementia) Units
- Mechanical System are Split System with Packaged Heat Pumps
- Construction Cost $20 Million

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical, Fire Alarm and Generator Engineering Designs

CAMBRIDGE VILLAGE SENIOR LIVING | Apex, NC HCA Equivalent

- **Expansion of an Existing 165-Unit Congregate Care Facility which Includes**

▪ 30,000 SF Wellness	▪ Renovation of 15,000 SF Clubhouse
▪ 125 Additional Congregate Care Units	▪ Expansion of Dining
▪ 10 Supportive Care Units	▪ Full Commercial Kitchen
▪ Additional Parking	▪ Indoor Heated Pool
▪ Bistro Dining	▪ HVAC Consists of Packaged VTAC Units
▪ Medspa and Salon	

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs, Preliminary Bid Docs/Pricing, Shop Drawing Review and Code Consulting

WALTONWOOD OF CARY | Cary, NC | AHCA Equivalent

WALTONWOOD
CARY PARKWAY

243,000 SF of New Construction consisting of

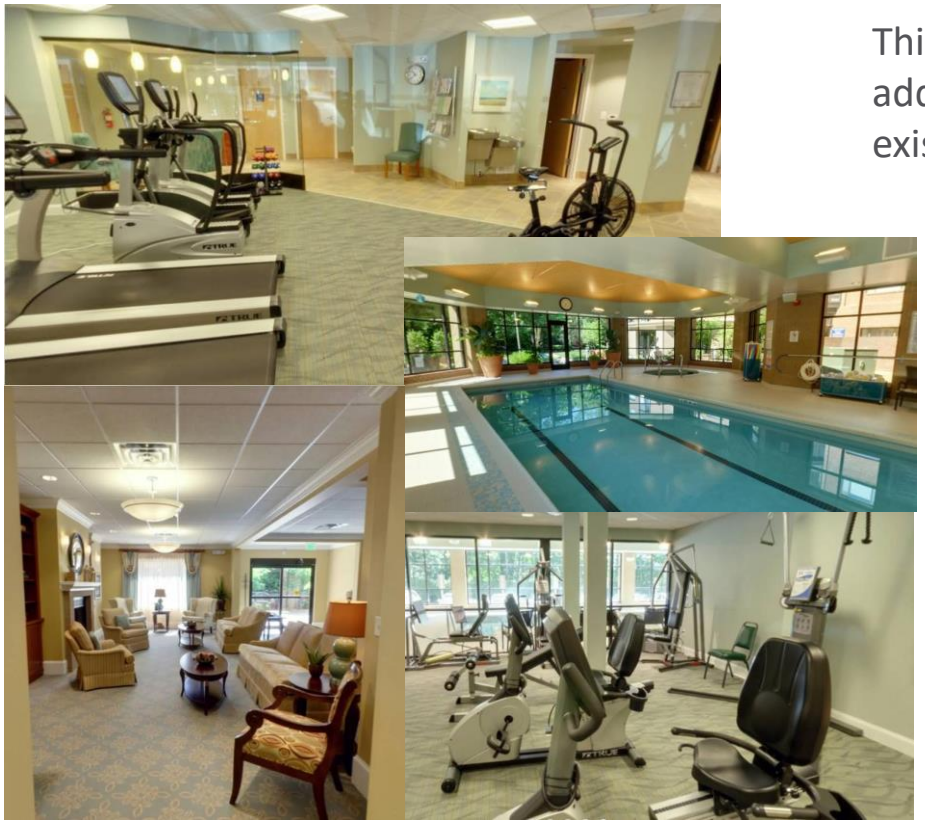
- ❑ 110 Independent Living Units
- ❑ 24 Memory Care Units
- ❑ 44 Assisted Living Units

Amenities Include:

- ❑ Theatre
- ❑ Lounge
- ❑ Salon Spa
- ❑ Multiple Dining Rooms
- ❑ Café
- ❑ Fitness Center

Crenshaw Consulting Engineers is Providing the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs, Preliminary Bid Docs/Pricing, Shop Drawing Review and Code Consulting

SPRINGMOOR LIFE CARE RETIREMENT COMMUNITY
RALEIGH, NC



This is a 24,000 SF major renovation and building footprint addition to incorporate new high-end amenities for an existing multi-building assisted living facility.

Significant design considerations included:

- Specialty lighting and controls.
- Special and specific power requirements for equipment, resident needs and facilities.
- Incorporating a kitchen and an Indoor Pool and Spa with equipment room into the facility in such a way as to provide desired comfort and continuity while addressing the specialty requirements of those areas.
- Properly conditioning and exhausting the new facilities not originally designed for the density of high air-change, ventilation and heat loading considerations associated with a commercial kitchen, indoor pool, etc.
- Meeting strict code requirements for spaces of this nature while preserving the desired home-like residential feel.

Amenities additions include:

- Indoor Pool and Spa
- Commercial Kitchen
- Theater
- Beauty Parlor
- Therapy Rooms
- Exercise Room
- Common Spaces
- Bathroom Facilities
- Wellness Offices

HOLLY HILL HOSPITAL | Raleigh, NC | AHCA Equivalent | *$11.9 Million*

Holly Hill Hospital: has been treating patients for over 30 years providing psychiatric and addictive disease treatment. In response to a growing need for psychiatric care, the hospital is expanding with the addition of a new 53,000 SF facility dedicated to children and adolescent mental health treatment. The New Addition Includes:

- Four Outdoor Play Areas
- Walking Trails | Basketball Court.
- An Art Therapy Room
- Classrooms
- Game Room
- Half Court Indoor Gymnasium
- 80 Inpatient Beds Allowing the Original Hospital to Increase its Adult Inpatient Capacity

- Designed to incorporate state-of-the-art safety considerations relating to behavior health facilities
- HVAC | High efficiency Gas Fired Rooftop Units Zoned to Serve Patient Areas and Commons Spaces Separately | All Areas Received Full Supply and Return Duct Systems
- **Electrical |** 277/480V, 1200 Amp Electrical Service with a 175 kW Generator and Designed to Meet NED, NFPA 99, and NC DHSR Requirements for Hospitals
- Extensive Design Coordination with the Owners, Operators, and Contractors | Design Build
- Construction Cost of $11.9 Million

CHATHAM PARK HOSPICE | Pittsboro, NC | LEED
AHCA Equivalent | *$4.7 Million*

- 10 Licensed Beds
- Nurse Station
- Support Stations
- Kitchen
- Dining
- Meditation Space
- Family Visiting
- LEED
- Many Other

UNC's Chatham Park Hospice is a single story, 11,000 SF new inpatient hospice building. The medical facility houses 10 licensed beds, nurse station, support stations, kitchen, dining room, meditation space and family visiting areas. This project was designed to LEED design specifications and achieved a 14% improvement over ASHRAE 90.1-2007. The mechanical system is comprised of a VRF System with multiple independent zones for patient and staff comfort. The electrical system is comprised of a full essential system with life safety, critical and equipment branches backed-up by a 350 KW generator. Also provided medical and air vacuum systems with a micro bulk tank.

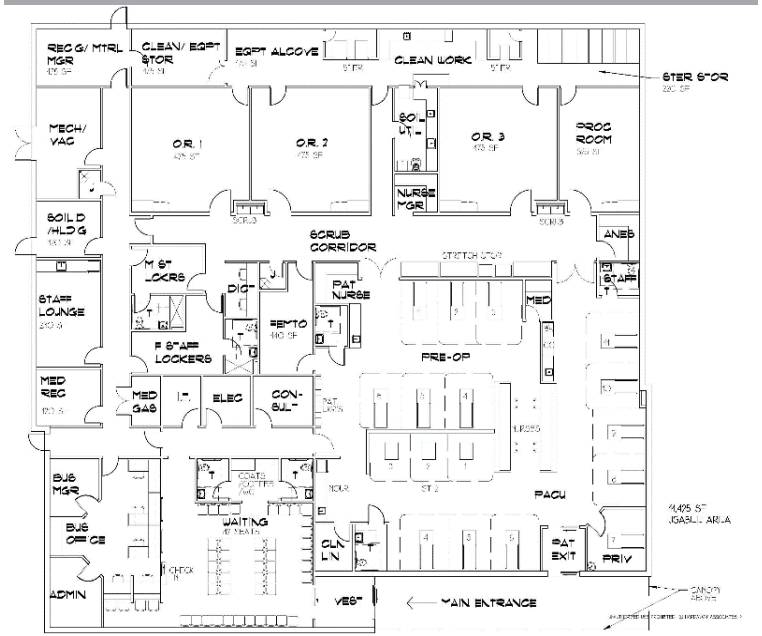
Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical, Fire Alarm and Structural Engineering Designs

HOLLY SPRINGS SURGERY CENTER | Holly Springs, NC | AHCA Equivalent | *$6 Million*

- ❑ 18,000 SF
- ❑ Three Operating Rooms
- ❑ One Procedure Room
- ❑ Sustainable Features
- ❑ Nurses Station
- ❑ Medical Gas Piping
- ❑ Stand Alone Center
- ❑ Shell and Fit Up
- ❑ New Construction
- ❑ Generator
- ❑ Design Build

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

BRASFIELD & GORRIE



DENTAL

- **Sexton Dental Clinic: - Florence SC.:** Designed plumbing, electrical and fire alarm for a 21,000 SF dental clinic.
- **Wake Orthodontics and Pediatric Dentistry – Raleigh, NC**: Designed the plumbing, mechanical, and electrical for this 11,500 SF dental office.
- **Dr. Sarantos – Raleigh, NC.**: Designed plumbing, mechanical and electrical for an 8,000 SF dental facility.
- **Thorne Dental Clinic – Raleigh, NC.**: Designed plumbing, mechanical and electrical for a 4,000 SF dentist office.
- **Raleigh Professional Center – Raleigh, NC.**: Designed plumbing, mechanical and electrical for a 4,000 SF dentist office.
- **Orthodontist – 163 Rutledge – Charleston, SC.:** Designed plumbing, mechanical, electrical and fire alarm for a 3,700 SF dental office.
- **Dr. Ghodrat – Creedmoor, NC.:** Designed plumbing, mechanical, electrical and fire alarm for a 2,100 SF dental office.
- **Dr. Steger – Cary, NC.:** Designed plumbing, mechanical and electrical for a 2,000 SF dental office.
- **Dr. Hudak – Raleigh, NC.:** Designed plumbing, mechanical and electrical for a 2,965 SF dental office.
- **Dr. Britt – Raleigh, NC.:** Designed plumbing, mechanical and electrical for a 2,700 SF dental office.
- **Dr. Bielinski – Cary, NC.:** Designed plumbing, mechanical and electrical for a 2,720 SF dental office.

LABORATORY

PRECISION BIOSCIENCE | ADAPTIVE REUSE

Durham, NC Tobacco Warehouse Building District | Venable Center

- ❑ DNA Research Laboratory
- ❑ Second Generation Fit Up | Multi-Tenant Building
- ❑ Emphasis Placed on Leaving Materials Exposed and Preserving the character of the Existing Building
- ❑ Open Air Work Spaces
- ❑ Heavy Lab Special Connection Requirements
- ❑ New Tenant Electrical Service Configured
- ❑ Optional 70 KW Natural Gas Stand By Generator
- ❑ Pressurization Control | New Exhaust
- ❑ New Fume Hood with Dedicated Exhaust Fan for the Sterilization Room

Features Include:

- Cell Culture Lab
- Sterilization Area
- Refrigeration Area
- Open Offices
- Work Stations
- Work Benches
- Admin Spaces

Crenshaw Consulting Provided the Plumbing, Mechanical, Electrical and Fire Alarm Engineering Designs

NUVATRONICS | MANUFACTURING/LABORATORY | RENOVATION | *RTP Durham, NC*

- ❑ Renovation 100,000 SF Facility
- ❑ ISO8 Clean Room Served by Dedicated Chilled Water Air Handling
- ❑ Air Supplied through Ceiling HEPA Filter Modules
- ❑ Raised Floor Return Plenum
- ❑ Temp Requirements 68 Degrees | Humidity 50%
- ❑ Required to be Under Positive Pressure
- ❑ Gowning Area
- ❑ New Nitrogen, Air and Vacuums

Crenshaw Consulting Provided the Plumbing, Mechanical, Electrical and Fire Alarm Engineering Designs

METABOLON | LABORATORY | 4 LAB RENOVATION & EXPANSIONS
M*orrisville, NC*

- ❑ 4 Lab Renovation | Expansions
- ❑ New Lab Work Stations with Utility Exhaust Plenum, Quick Connection Couplers & Distributed UPS
- ❑ New Nitrogen & Air
- ❑ Pressurization Between Lab | Office Spaces
- ❑ Redundant HVAC | HEPA Filter Air Intakes
- ❑ Exhaust Hoods for Various Processes
- ❑ Generator Back-Up
- ❑ Special Voltage | Distribution Transformers

Crenshaw Consulting Provided the Plumbing, Mechanical, Electrical and Fire Alarm Engineering Designs

METABOLON®

CATALENT | LABORATORY | RENOVATION | *Morrisville, NC*

- ❑ Renovation to Existing Lab
- ❑ New Lab Work Stations
- ❑ Ceiling Distribution of Power
- ❑ Data
- ❑ New Nitrogen | Air
- ❑ Snorkel Exhaust System Added
- ❑ Two New 100% Outdoor Air Units
- ❑ Two Additional Exhaust Fans Added to Serve 7 New Fume Hoods

Crenshaw Consulting Provided the Plumbing, Mechanical, Electrical and Fire Alarm Engineering Designs

Catalent

TRIANGLE LABS | DNA TESTING LABORATORY FIT-UP
Durham, *NC*

- ❑ 25,000 SF Laboratory and Office Fit-Up
- ❑ New Lab Work Stations with Utility Exhaust Plenum, Quick Connection Couplers & Distributed UPS
- ❑ New Nitrogen | Air
- ❑ Pressurization Between Lab | Office Spaces
- ❑ Process Chill Water
- ❑ Exhaust Hoods for Various Processes
- ❑ 200 KW Generator
- ❑ Special Voltage | Distribution Transformers

Crenshaw Consulting Provided the Plumbing, Mechanical, Electrical and Fire Alarm Engineering Designs

HZO HEADQUARTERS | Raleigh, NC

"A Global Leader in Delivering World-class Protective Nano Coatings that Safeguard Electronics From The Most Demanding Corrosive And Liquid Environments"

- ❑ 5,664 SF Second Generation Office and Lab Renovation
- ❑ Specialized Equipment with Built in Controls
  - CVD, PEVD coating equipment for R/D Area & Production Areas
  - Vacuum Coating Machines
  - Benches
  - Automation Conveyer Belts
- ❑ 24/7 HVAC for Specialty Server Room/IT
- ❑ Specific Temperature and Humidity Controls
- ❑ DX Equipment

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

LOPAREX | OFFICE AND LABORATORY | Cary, *NC*

Leading Global Manufacturer of Silicone Release Liners Used in Variety of Adhesive Applications

❑ 24,000 SF Office and Lab Fit-Up

❑ Testing Lab Includes:

- Tight Temperature and Humidity Requirements
- High Performance Split System Air Handling Unit with Hot Gas Reheat and Inline Duct Mounted Canister Humidifier to Control Upper and Lower End Humidity Requirements

❑ Main Lab Includes:

- 2 Fume Hoods
- 4 Ovens
- Atomic Absorption Machine
- Utility Exhaust Fan
- High Performance Dedicated Outdoor Unit
- Hot Gas Reheat and Inline Canister Humidifier

❑ Pressurization Between Lab | Office Spaces

❑ Exhaust Hoods for Various Processes

❑ Special Voltage | Distribution Transformers

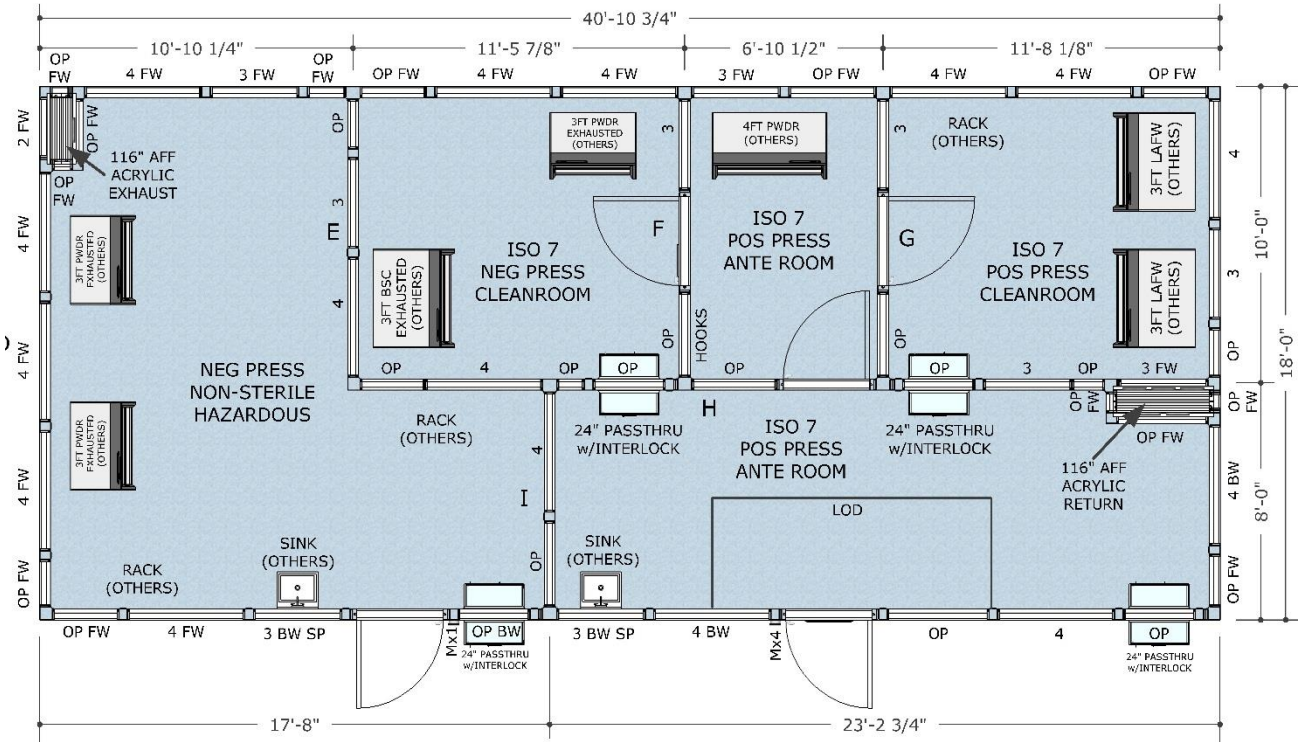
- Specialty Benching Lighting
- Controls to Provide Multiple Levels of Light and Color
- Waste and Vent Considerations for Specialty Equipment
- Point of Use Deionized Water
- Water Distribution with Specific Water Temp Requirements
- Provisions for Distribution of Compressed Air with Compressed Air Drops and Connections

Crenshaw Consulting Provided the Plumbing, Mechanical, Electrical and Fire Alarm Engineering Designs

REALO DRUGS | Morrisville, NC

- ❑ 6,800 SF Renovation
- ❑ Pharmacy Cleanroom for Compounding of Vet Medications
- ❑ Cleanroom with Strict Temperature and Humidity Requirements | Continuous 66-68 Degrees F | 40-60% Humidity
- ❑ HVAC Controls to Monitors and Log the Environment
- ❑ 2 Freezer Rooms | 2 Refrigerated Rooms
- ❑ 24/7 HVAC Specialty Server Room/IT
- ❑ Ductless Mini Split System
- ❑ Backup Generator

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs



ENTHALPY ANALYTICAL | LABORATORY | OFFICE | CONFERENCE | SUPPORT SPACES | *Durham, NC*

- ❑ New Building Fit Up
- ❑ Environmental Testing Lab
- ❑ Exhaust Hoods for Various Processes with Energy Recover
- ❑ Redundant HVAC | HEPA Filter Air Intakes
- ❑ Pressurization Between Lab | Office Spaces

Crenshaw Consulting Provided the Plumbing, Mechanical, Electrical and Fire Alarm Engineering Designs

LABORATORY

- **Cellz Direct: P**rovided the plumbing, electrical, and fire alarm engineering designs for this 29,000 SF laboratory facility and office fit up in Raleigh, NC which are utilized for providing cell products and contract laboratory services to bio/pharmaceutical companies.
- **URS - 900 Perimeter Park**: Provided the mechanical, electrical and fire alarm engineering designs for a 25,000 SF laboratory facility in Morrisville, NC which are utilized for the study of physical and engineering sciences.

- **Forbo**: Provided the electrical engineering designs for this 22,000 SF laboratory facility in Research Triangle Park, NC. Forbo utilizes their laboratory space for the development of new innovative commercial and residential flooring materials.
- **Innerpulse:** Provided the plumbing, mechanical, electrical and fire alarm engineering designs for this 20,000 SF laboratory facility and office fit up in Durham, NC.

- **Micromedic**: Provided the plumbing, mechanical, electrical and fire alarm engineering designs for this 11,500 SF laboratory facility and office fit up in Durham, NC.
- **Athenix**: Provided the plumbing, mechanical, electrical and fire alarm engineering designs for this 8,000 SF laboratory and office fit up in Durham, NC.

- **Qualyst – Raleigh and Durham**: Provided the plumbing, electrical and fire alarm engineering designs for two separate 5,400 SF laboratory fit ups in Raleigh and Durham, NC. Qualyst's laboratories were designed for discovering and developing products related to cell-based technologies.
- **Chapel Hill Compounding**: Provided the plumbing, mechanical, electrical and fire alarm engineering design for containment secondary engineering controls room (C-SEC) per the <800> Hazardous Drugs Requirements. This area was required to be externally vented through HEPA filtration, have a negative pressure between .02 and .03 inches of water column and have a minimum air change rate of 12 air changes per hour. The room was served by a dedicated HVAC unit.
- **Transenterix Clean Room**: Renovation of existing clean room to remedy HVAC issues. HEPA filter units were retrofitted and replaced. Ceiling power distribution was reworked. The existing clean room ceiling was also removed and replaced.

EDUCATION
CRENSHAW CONSULTING
engineers
www.crenshawconsulting.com

RALEIGH CTE HIGH SCHOOL | EDUCATION | Wake County, NC
$20 Million

Raleigh CTE High School: is a joint effort between; Wake County, Wake County Public Schools, and Wake Technical Community College. The focus of this venture is to create a state of the art educational facility to prepare high school students in technical careers/occupations. Career and Technical Education (CTE) is designed to empower students to be successful citizens, workers, and leaders.

- Crenshaw Consulting Engineers provided the plumbing, mechanical, electrical engineering designs – Produced in Revit
- 103,931 SF total renovation from former bottling plant into a state of the art educational facility

Relevant Experience Associated with this Project:

- Large Scale Renovation of Shell Warehouse Space into Specialized State of the Art Educational Space
- Provided MEP Engineering Designs for a 2-Bay Automobile Maintenance/Repair Facility
- Provided MEP Engineering Designs for a Full Service Paint Booth

LEED or SUSTAINABLE DESIGN & COMMISSIONING NATIONWIDE – 85 COLLEGES IN 15 STATES

EcoTech Institute – Aurora, CO.
LEED Gold – Solar/Wind Turbines (Const. Cost $7.4M):

- The project was the renovation of a 100,000 SF retail center converted to a 60,000 SF educational/training facility and an additional 40,000 SF of warehouse.
- Crenshaw Consulting designed the plumbing, mechanical, fire alarm, electrical telecom and Facility Performance Consulting performed commissioning for the 60,000 SF EcoTech University.
- Crenshaw Consulting also provided the engineering for a 38 kWdc photovoltaic (solar electric) that was a combination of building mounted and solar tree system that includes:
  - Designed Solar – Total of 38 kWdc in photovoltaic (solar electric).
  - Two Solar Trees = 26.5 kWdc
  - Canopy Panels = 8.5 kWdc
  - PV system Along the Front Edge of the Building = 3 kWdc
- In addition, CCE provided the design for a nine wind turbine system that generates 8 kWdc.
  - All of the systems on this building will be used to supplement the building's electrical service.

VIRGINIA COLLEGE NATIONAL IDIQ - EDUCATION

EcoTech Institute – Austin, TX.
LEED Silver – Solar/Wind Turbines (Const. Cost $7 M):

- ❑ The project was the renovation of a 43,500 SF former ice skating rink.
- ❑ Crenshaw Consulting designed the plumbing, mechanical, electrical and fire alarm engineering design. Facility Performance Consulting provided the commissioning.
- ❑ Photovoltaic design is a combination of building mounted and solar tree system that includes:
  - Two Solar Trees = 26.4 kW(DC)
  - Roof Mounted Polycrystalline System – Comprised of 48 Modules Connected through one 12 kW Inverter = 11.52 kW(DC
  - Second Roof Mounted Polycrystalline System – Comprised of 12 Modules Connected through one 3 kW Inverter = 2.88 kW(DC)
- ❑ In addition, Crenshaw Consulting provided the design for 2 wind turbine systems on the site.
- ❑ All of the systems on this building will be used to supplement the buildings electrical service.
  - A vertical axis turbine
  - 7 horizontal axis roof mounted turbines

WELCH COLLEGE NEW CAMPUS – NASHVILLE, TN

This New Campus Features A Collection of 4 New Buildings Totaling 87,300 SF to include:

- ❑ **Administration Buildings – 28,000 SF**
  - Office and classroom
  - Served with two direction expansion 25 ton VAV air handlers and one direct outdoor unit. The Variable volume terminal units have electric heating coils.
  - 2,000 Amp Service
- ❑ **Dining Hall – 21,000 SF**
  - Kitchen, Dining and Office
  - Served by constant volume and variable air volume rooftop mounted units with 93 tons of cooling.
  - 2,000 Amp Service
- ❑ **Two 3 story Dormitories – each 18,700 SF**
  - Outside air unit served by ground source heat pump
  - 1200 AMP Service

Crenshaw Consulting Engineers provided the Plumbing, Mechanical Electrical and Fire Alarm Engineering Designs for this new campus.

ST. DAVID'S SCHOOL (K-12TH GRADE) | RALEIGH, NC.

Phase I – 65,000 SF Addition and Renovation ($10 Million) Includes:

- ❑ New Performing Arts Center
- ❑ Dining Hall and Kitchen
- ❑ Gymnasium | Weight Room
- ❑ Commons Areas and Offices

Phase II – New Sports Complex ($3 Million):

- ❑ New Soccer, Lacrosse, Tennis, Baseball, Track, Field Houses and Concessions

Phase III – Lower School Addition ($2 Million)

Phase IV | New 32,500 SF | 3 Story Middle School Building ($8.35 Million)

- ❑ Classrooms, Library and Labs
- ❑ Packaged Rooftop Units with VAV

Crenshaw Consulting Engineers provided the Plumbing, Mechanical, Electrical and Fire Alarm Engineering Designs for this new campus

Awarded 'Outstanding School Design' by *American School & University magazine*

NEUSE CHARTER HIGH SCHOOL | Smithfield, NC

American School&University

Out of hundreds of entries, Neuse Charter is the only high school in NC awarded this honor. American School & University publication is the premier showcase celebrating the best in educational design on a national level.

High School Building

- ❑ New Construction of Classrooms & Student Common Areas
- ❑ 32,000 SF | 3 Story
- ❑ Combined Functionality and Aesthetics to Craft an Environment to Maximize Student Experience and Parallel Higher Learning Institutions
- ❑ Advanced Electrical Systems Tailored to Enhance the Design Goals and Aesthetics
- ❑ Lighting & Control System Designs Emphasize Energy Efficiently and Day Lit Spaces
- ❑ HVAC Consists of Gas Fired Packaged Rooftop Units with Active Humidity Control, Allowing each Classroom to have Temperature Control Capabilities

Gym Addition & Additional Classrooms

- ❑ 4,800 SF
- ❑ 2 New Gang Bathrooms
- ❑ Exterior Lighting

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

EAST WAKE ACADEMY MIDDLE SCHOOL| Zebulon, NC

$4,010,500

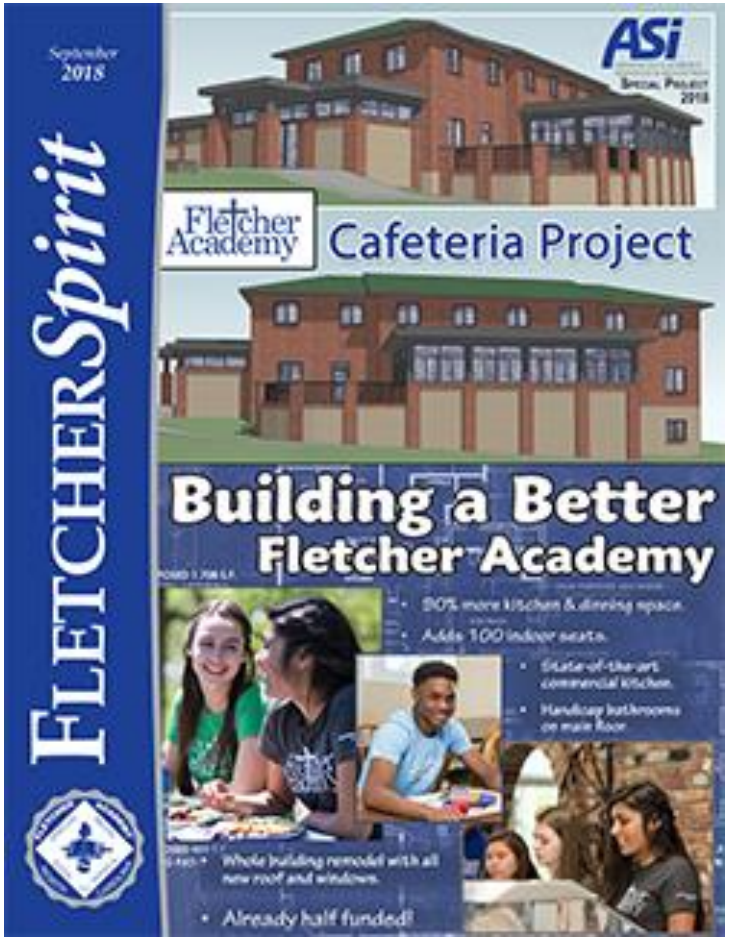
- ❑ 23,500 SF | 2 Story Middle School
- ❑ Classrooms | Student Commons | Offices | Bathrooms
- ❑ Double- Loaded Corridor Scheme
- ❑ Building Designed to Maximize Daylighting
- ❑ Expansive Glass Facing North for Light and Energy Efficiency
- ❑ Classrooms Intentionally have North or South Facing Glass
- ❑ Sustainable Features
- ❑ LED Lighting
- ❑ Packaged Rooftop Units with Central Zone
- ❑ Expansion of the Master Plan for the School

Awarded 'Outstanding School Design' by *American School & University magazine*

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

FLETCHER ACADEMY | EDUCATIONAL | RENOVATION | Raleigh, NC

- ❑ 23,400 SF of Renovations | 4 Separate Buildings Instructing Grades 3-12
  - Residential Building | 2,025 SF
  - Media Center | 528 SF
  - Gymnasium | 2,597 SF
  - Main Building |18,200 SF
- ❑ 24/7 HVAC Unit for Specialty Server/IT Room



Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

EDUCATION

- **Wilson Technical Community College – LEED Gold– Wilson, NC.:** Designed plumbing, mechanical, electrical and fire alarm engineering for a 16,000 SF student center. The mechanical system used was a **geothermal heat pump system** that uses the relatively constant temperature of the earth as its means to reject and/or draw heat. Construction cost of $2.5M.
- **Southeastern Seminary - Patterson Hall**: Designed plumbing, mechanical, electrical and fire alarm for a new 32,000 SF classroom building for Southeastern Baptist Theological Seminary in Wake Forest, N.C. Construction cost of $2.5m.
- **St. David's School – Raleigh, NC.:** Designed plumbing, electrical and fire alarm for a 65,000 SF for renovation and addition of an existing K through 12th school to include a new performing arts center, state of the art indoor athletic facilities, dining hall, common areas and parking deck. Construction cost of $10M.
- **Truett McConnell Theological Seminary Campus - Cleveland, GA**: Provided the plumbing, mechanical, and electrical engineering designs for the complete renovation of the Miller Building that is comprised of state of the art classrooms and laboratory spaces. In addition we provided the engineering designs for the renovation and addition to the dining hall and for the new multi-story residence hall/dormitory building on the campus.
- **The Maureen Joy Charter School – Durham, NC**: Provided the plumbing, electrical and fire alarm designs to LEED for schools design criteria for this 48,000 SF renovation, but this project will not be USGBC certified. Construction cost of $10M.

*The Maureen Joy Charter School renovation won the Triangle Business Journal's Real Estate award for **Top Sustainable Project**.*

EDUCATION

- **Duke Corporate Education – Durham, NC.:** Designed plumbing, mechanical, electrical, and fire alarm for a 59,000 SF multi-floor renovation educational office environment.
- **Miller Motte – Raleigh, NC. :** Designed plumbing, mechanical, electrical and fire alarm for a 57,000 SF renovation of an old shopping center for a technical college (including cosmetology, computer, dental, and other curriculums) and associated support space.
- **Miller Motte – Wilmington, NC.** : Designed plumbing, mechanical, electrical and fire alarm for a 11,500 SF renovation for the technical college (including the addition of an auto repair curriculum) and associated support space.
- **East Wake Academy – Wake County, NC.:** Designed plumbing, mechanical, electrical and fire alarm for 27,000 SF for a new education building at an existing high school .
- **St. Thomas More Academy – Raleigh, NC.:** Designed plumbing, mechanical, electrical and fire alarm for a 15,000 SF renovation for a school.
- **Durham Technical Community College – Durham, NC.:** Designed plumbing, mechanical, electrical and fire alarm for a 7,100 SF renovation for the technical college in an existing high rise office building.
- **ECPI – Raleigh, NC.:** Designed plumbing, electrical and fire alarm for a 30,000 SF fit-up for the technical college in an existing building.

RELIGIOUS
CRENSHAW CONSULTING engineers
www.crenshawconsulting.com

CHRIST BAPTIST CHURCH | Raleigh, NC

This New Church Complex Features:

- ❑ **Sanctuary – 36,500 SF**
  - Incorporates a full AV package
  - LED Down Lights with Dimming Integrated into an Existing Facility Management System
  - Constant-volume, packaged rooftop units with DX cooling and gas heat. Building zones were designed to allow spaces to operate independently based on the space function and occupancy schedule. Demand controlled ventilation was utilized for all high occupancy spaces as an energy saving measure and active dehumidification was provided to prevent high humidity conditions during periods of low occupancy.
- ❑ **New Fellowship Hall, Meeting Rooms and Choir Practice Room**
- ❑ **New Public Gathering and Restrooms**
- ❑ **Existing areas were renovated including the kitchen**

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical, and Fire Alarm Designs

HOLY TRINITY CHURCH | Downtown, Raleigh, NC

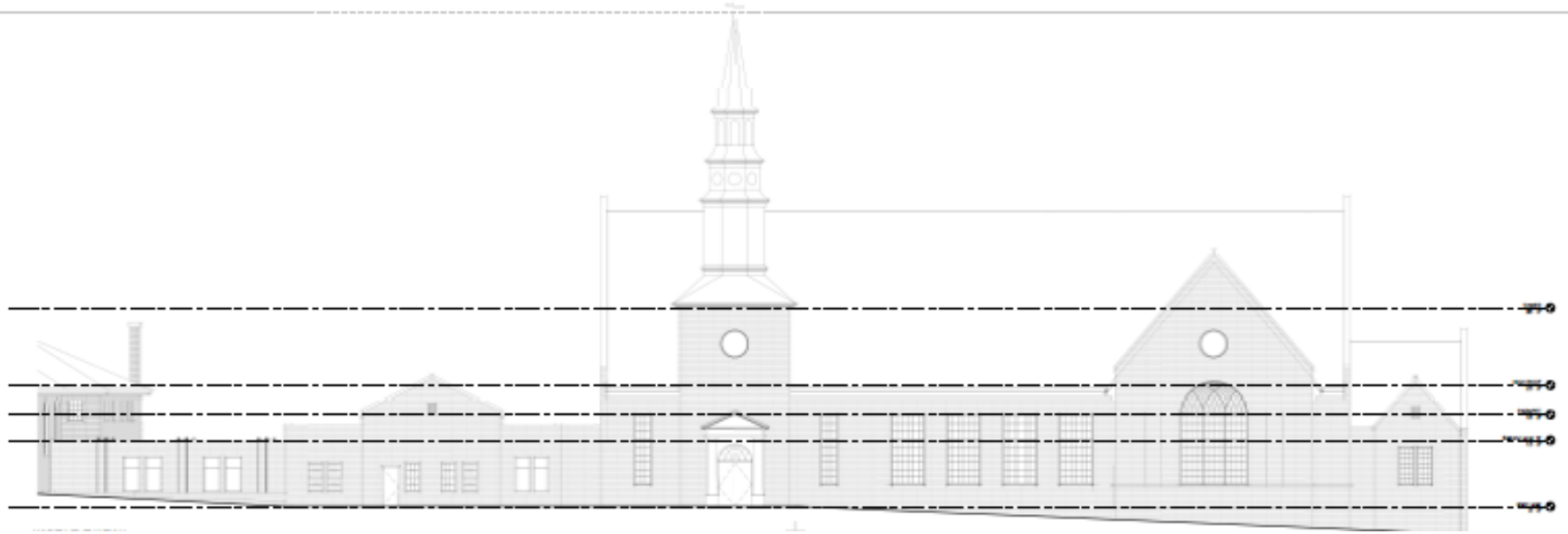
This New Church Features:

- ❑ **Sanctuary – 25,000 SF**
  - Second Level Choir And Balcony With Full Tracker Pipe Organ
  - Steeple Spire Extends 130 Ft. Above Street Level
  - Incorporates a Full AV Package
  - LED Down Lights With Dimming System
  - The Mechanical Systems Consist Of Roof Top And Split Systems. Challenges to Overcome Were Limited Space For Equipment.
- ❑ **New Fellowship Hall, Meeting Rooms and Choir Practice Room**
- ❑ **New Public Gathering and Restrooms**
- ❑ **A Connector Building to the New Education Building**
- ❑ **Courtyard**

Crenshaw Consulting Engineers provided the Plumbing, Mechanical Electrical and Fire Alarm Engineering Designs in Revit

ST. PAUL'S ANGLICAN CHURCH| Greenville, SC

- ❑ 28,252 SF New Construction
- ❑ 2 Story Includes:
  - Sanctuary
  - 1,391 SF Balcony
  - Office Space
  - Fellowship Hall
  - Commercial Kitchen
  - Nursery
- ❑ HVAC - Packaged Roof Top Units and Heat Pumps
- ❑ LED
- ❑ Exterior Lighting
- ❑ Designed in Revit



Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical, and Fire Alarm Designs

ST. LUKE THE EVANGELIST ROMAN CATHOLIC CHURCH | Raleigh, NC

- ❑ 10,500 SF | New Construction
- ❑ 2nd Story Balcony
- ❑ Lighting Control System
- ❑ LED Lighting
- ❑ Electrical to Support AV
- ❑ Exterior Lighting
- ❑ The new church design features a cruciform layout with a truncated apse, and clerestory windows throughout the nave and transepts.
- ❑ Accommodates Approximately 450 Congregants.
- ❑ Sanctuary and Altar of Sacrifice are located under the center of the crossing.
- ❑ Packaged Rooftop Units

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

WESTCHESTER BAPTIST FAMILY LIFE CENTER| High Point, NC

- ❑ 11,000 SF Single Story New Building
- ❑ Large Open Gym Space with Education Wing
- ❑ Restrooms
- ❑ Kitchen Shell Space
- ❑ Large Storage Room
- ❑ Gym | Gas Packaged Units
- ❑ Education Wing | Split Systems
- ❑ Exterior Lighting

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

PROVIDENCE BAPTIST CHURCH | Raleigh, NC |*$6.1 Million*

This New Church Complex Features:

- ❑ **Sanctuary Expansion | 21,298 SF**
- ❑ **2 Story**
- ❑ **Bathrooms**
- ❑ **Common Areas**
- ❑ **New AV for Stage Auditorium**
- ❑ **LED Lighting with Dimming Integrated into Existing Facility Management System**
- ❑ **Replace HVAC to Packaged Rooftop**

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical, and Fire Alarm Designs

RFA CHURCH | RENOVATION | Raleigh, NC | *$5 Million*

- ❑ **Renovations of Existing Flex Office Building into Sanctuary – 36,500 SF**
  - Incorporates full AV package
  - LED Down Lights with Dimming integrated into an existing facility management system
  - Constant-volume, packaged rooftop units with DX cooling and gas heat. Building zones were designed to allow spaces to operate independently based on the space function and occupancy schedule. Demand controlled ventilation was utilized for all high occupancy spaces as an energy saving measure and active dehumidification was provided to prevent high humidity conditions during periods of low occupancy.
- ❑ **New Fellowship Hall, Meeting Rooms and Choir Practice Room**
- ❑ **New Public Gathering and Restrooms**
- ❑ **Existing areas were renovated including the kitchen**

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical, and Fire Alarm Designs

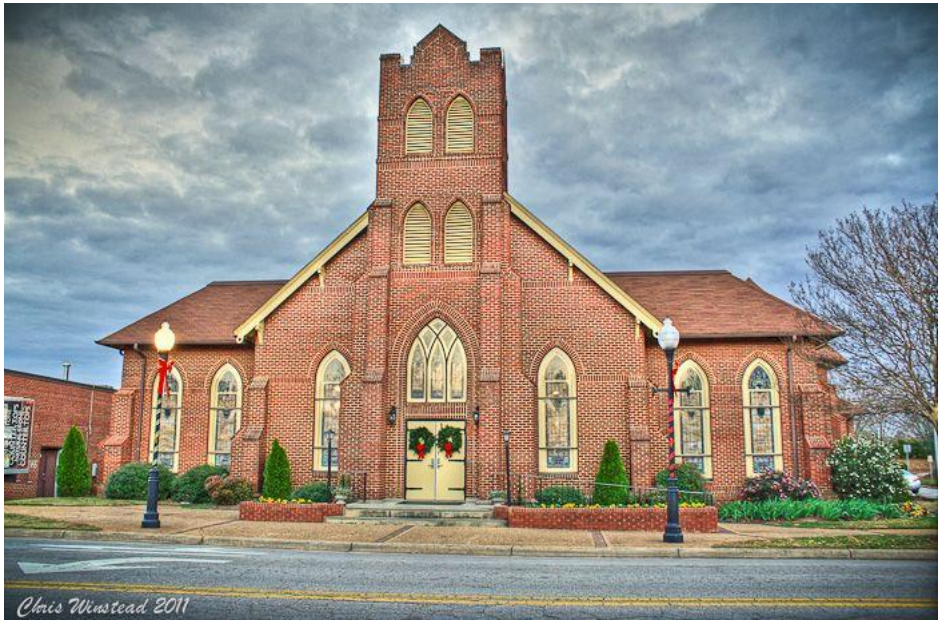
WATERLIFE CHURCH | RELIGIOUS | CHANGE OF USE | Lenoir, NC

- ❑ 36,000 SF | Second Generation Renovation of Belk in the Lenoir Mall into Religious Facility
- ❑ Auditorium with Movable Seating
- ❑ New AV for Stage Auditorium
- ❑ Cafe | Common Areas | Bathrooms
- ❑ Warming Kitchen
- ❑ New Packaged Rooftop HVAC
- ❑ Exterior Lighting
- ❑ Voice Evacuation System
- ❑ LED and Specialty Lighting with Dimming Integrated
- ❑ Low Voltage Lighting
- ❑ Conduit Plans

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

FIRST UNITED METHODIST CHURCH | YOUTH | COMMUNITY & KITCHEN ADDITION | Cary, NC

- ❑ 25,800 SF | 2 Story Youth and Community Building Addition
- ❑ Interior Renovations To The Adjacent Education Building
- ❑ Commercial Kitchen
- ❑ Gym | HVAC Gas Rooftop
- ❑ Variable Refrigerant Flow System for the Remaining
- ❑ LED Lighting
- ❑ Exterior Lighting



Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

RELIGIOUS

- **Central Baptist Church – Wendell, NC**.: Designed plumbing, mechanical, electrical and fire alarm for a 97,000 SF church.
- **Cleveland Community Baptist Church – Johnston County, NC**.: Designed plumbing, mechanical, electrical and fire alarm for a 82,000 SF church. Construction cost of $10M.
- **Colonial Baptist Church – Cary, NC.**: Designed plumbing, mechanical, electrical and fire alarm for a 77,000 SF church.
- **Westwood Baptist Church – Cary, NC.:** Designed plumbing, mechanical and electrical for a 50,000 SF building.
- **Cary Church of God – Cary, NC.:** Designed plumbing, mechanical and electrical for a 50,000 SF sanctuary. Construction cost of $9M.
- **Deeper Life Church Ministries – Goldsboro, NC.:** Designed plumbing, mechanical and electrical for new 47,100 SF sanctuary, education wing and church office.
- **Wake Crossroads Baptist Church – Raleigh, NC.:** Designed plumbing, mechanical, electrical and fire alarm for a 40,000 SF multi-purpose room, commercial kitchen and classroom addition. Construction cost of $5M
- **First Presbyterian Church – Sanford, NC.:** Designed plumbing, mechanical and electrical for a new 33,000 SF family life center building.
- **Shiloh Baptist Church - Clayton, NC. –** Designed plumbing, mechanical and electrical for a 32,000 SF sanctuary.

RELIGIOUS

- **Pleasant Grove Baptist Church – Raleigh, NC.:** Designed plumbing, mechanical, electrical and fire alarm for a 29,000 church in Raleigh, N.C.
- **Benson Grove Baptist Church – Johnston County, NC.:** Designed plumbing, mechanical and electrical for a new 25,000 SF sanctuary, fellowship hall and education building.
- **Temple Bethor – Raleigh, NC.:** Designed plumbing, mechanical and electrical for a new 23,500 SF congregational hall and classroom addition.
- **Springfield Baptist Church – Wake County, NC.:** Designed plumbing, mechanical and electrical for a new 23,000 SF sanctuary and church office building.
- **Faith Baptist Church – Youngsville, NC.:** Designed plumbing, mechanical and electrical for a 21,350 SF sanctuary, education wing and church office building .
- **First Freewill Baptist Church – Wilson, NC.:** Designed plumbing, mechanical and electrical for a 20,000 SF sanctuary, education wing, church office and commercial kitchen building.
- **Cumberland Church of God – Cumberland, NC.:** Designed plumbing, mechanical and electrical for a new 19,200 SF sanctuary, education wing and church office building.
- **Good Hope Baptist Church – Cary, NC.:** Designed plumbing, mechanical and electrical for a new 18,600 SF multi-purpose room and education wing with commercial kitchen.

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CRABTREE VALLEY MALL | FACILITIES ENGINEER | ON GOING PROJECTS
Raleigh, NC

Crabtree Valley Mall is a regional mall built in 1972 that is **1.3 million SF**, the largest enclosed mall in the Triangle Area. The mall contains over 220 stores, including large anchors and rest.

- ❑ The featured project was the Crabtree Valley Mall HVAC, Generator and Fire Alarm Phased Replacement and Upgrade, which was comprised of:
  - Replacement of 2 Roof Top Cooling Towers – 700 Tons Each
  - New Chilled Water Pumping System for New Chillers and Existing Chiller
  - New Chilled Water Control Valves for 2 Existing Air Handlers
  - New Chilled Water Piping Routed Down to the 1st Floor for Tenant Use
  - Smoke Evacuation
  - Complete DDC Controls
  - A 100Kw Generator Replacement, including a new Electrical Panel and additional Lighting and redesign
  - Fire Alarm Replacement and Upgrade to a Voice Evacuation System
- ❑ Estimated Construction Cost: $1.35M

CRABTREE VALLEY MALL | FACILITIES ENGINEER | ON GOING PROJECTS
Raleigh, NC

- 77,000 SF Food Court Renovation
  - Tenant Spaces Up-Fits Throughout Court
  - Chilled Water Taps
  - Grease | Sewer Stub Ups
  - Food Court Dining Areas
  - New Bathrooms
  - Escalators
  - New Lighting
  - Impacts to Existing Mall MEP Systems

- Addition of New Restaurants Throughout Mall
  - New Construction | Addition
  - PF Chang
  - Cheese Cake Factor
  - Red Monkey
  - Kanki

- Retail Tenant Fit-Ups (Hundreds) | Samples Include:
  - Brooks Brothers
  - Sunglass Hut
  - Game Stop
  - Reed's Jeweler's
  - Godiva Chocolates

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- **Park West Village - Morrisville, NC**: CCE provided the shell plumbing and electrical systems for larger anchor stores in addition to smaller retail spaces. Our electrical design consisted of exterior building lighting and power distribution. Construction cost of $120m.
- **Crabtree Valley Mall – Indefinite Quantity Contract – Raleigh, NC:** CCE has provided hundreds of engineering designs for various stores, restaurants, and parking decks for Crabtree Valley Mall.
- **Bechtle Crossings - Springfield ,OH**. – Main Building: Designed electrical for a 41,000 SF retail lighting and façade face lift. Small Shops – Designed plumbing, mechanical and electrical for a 12,000 SF retail addition.
- **Bechtle Crossings Springfield OH**. - New Building: Designed plumbing, mechanical , electrical and fire alarm for a 48,000 SF retail addition for shell building. Marshalls - Designed plumbing, mechanical, electrical and fire alarm for a 26,000 SF retail fit up in the new Bechtle Crossings Building. Bed Bath and Beyond – Designed plumbing, mechanical , electrical and fire alarm for a 22,000 SF fit up.
- **Sterling Plaza - Sterling ,VA.:** Designed electrical for a 52,000 SF retail lighting and façade face lift.
- **Patrick Henry – New Port News, VA.:** Designed plumbing, mechanical, electrical and fire alarm for a 23,000 SF retail shell and fit up.
- **Kendall Shopping Center – Kendall, FL.:** Designed plumbing, mechanical, electrical, site lighting and fire alarm for a 40,000 SF retail shopping center.

RETAIL

- **Skylines Commons – Nashville, TN.:** Designed plumbing, mechanical and electrical for a three building retail center totaling 77,000 SF.
- **Village Plaza – Augusta GA.:** Designed electrical for a 116,000 SF retail lighting and façade face lift.
- **Exchange at Savannah Park – Savannah, GA.:** Designed electrical for a 10 acre retail center lighting and façade face lift.
- **Augusta Shopping Center – Augusta, GA.:** Designed plumbing, mechanical, electrical, site lighting and fire alarm for a 21,000 SF retail center. Movie Stop - Designed plumbing, mechanical, electrical, site lighting and fire alarm for a 3,500 SF fit up in Augusta Shopping Center. Lifestyle Christian Book Store - Designed plumbing, mechanical, electrical, site lighting and fire alarm for a 7,000 SF fit up in Augusta Shopping Center. Verizon - Designed plumbing, mechanical, electrical, site lighting and fire alarm for a 4,500 SF fit up in Augusta Shopping Center. Vanilla Box - Designed plumbing, mechanical, electrical, site lighting and fire alarm for a 1,500 SF fit up in Augusta Shopping Center.
- **Northcross Shopping Center – Charlotte, NC.:** Designed plumbing, mechanical, electrical and fire alarm for a 145,000 SF shopping center.
- **Seaboard Station – Raleigh, NC**.: Designed plumbing, mechanical, electrical and fire alarm for a 90,000 SF shopping center.
- **Macon Outparcel – Macon, GA**.: Designed plumbing, mechanical and electrical for a retail center .
- **JS Elite – Myrtle Beach, SC.:** Designed plumbing, mechanical and electrical for a 27,000 SF retail center.

RETAIL

- **Brierdale – Raleigh, NC.:** Designed plumbing, mechanical, and electrical for a 57,000 SF shopping center.
- **Holly Park Shopping Center – Raleigh, NC.:** Designed plumbing, mechanical and electrical for a major renovation and addition to an existing shopping center.
- **Alexander Place Shopping Center – Raleigh, NC.:** Designed plumbing, mechanical and electrical for a multi-building approximately 60,000 SF shopping center.
- **Fall Pointe Shopping Center – Raleigh, NC.:** Designed plumbing, mechanical and electrical for a 61,000 SF shopping center.
- **Stone Fab – Myrtle Beach, SC.:** Designed plumbing, mechanical and electrical for a 40,000 SF retail center.
- **Falls River – Raleigh, NC.:** Designed plumbing, mechanical and electrical for a 45,000 SF grocery store and shops.
- **Avent Ferry Shopping Center – Raleigh, NC.:** Designed plumbing, mechanical and electrical for shopping center fit-ups totaling 38,000 SF.
- **Lafayette Village Shopping Center – Raleigh, NC.:** Designed plumbing, mechanical and electrical for a 100,000 SF multi-building boutique shopping center with an underground parking deck parking deck.
- **Falls Village Shopping Center – Raleigh, NC.:** Designed plumbing, mechanical and electrical for new buildings and a major renovation to a multi-building shopping center.
- **Falls Ridge Retail and Medical Center – Raleigh, NC.:** Designed plumbing, mechanical and electrical for a 16,000 SF multi-use center.

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- **Mia Francesca – Raleigh, NC:** provided the plumbing, mechanical, and electrical engineering designs for this 9,500 SF upscale Italian restaurant in a hotel in the trendy North Hills area of Raleigh, NC.
- **Cheesecake Factory – Grand Lux – Sawgrass, FL.:** Designed plumbing and gas for 14,000 SF restaurant.
- **Cheesecake Factory – Virginia Beach, VA.:** Designed plumbing and gas for 12,000 SF restaurant.
- **Bojangle's – Athens, GA. , Huntsville, AL and various areas in NC.:** Designed plumbing, mechanical and electrical for 3,800 SF restaurant.
- **Buffalo Wild Wings – Hendersonville and Gallatin, TN:** Designed fire alarm for 6,000 SF restaurant.
- **Neo-China Restaurant – Cary, NC.:** Designed plumbing, mechanical and electrical for a new 6,900 SF restaurant.
- **Fins Restaurant – Raleigh, NC.:** Designed plumbing, mechanical, electrical and fire alarm for an 8,000 SF restaurant in a high rise building.
- **Clarion 20th Floor Restaurant – Raleigh, NC.:** Designed plumbing, mechanical, electrical and fire alarm for an 8,000 SF restaurant.
- **Blue Restaurant – Raleigh, NC.:** Designed plumbing, mechanical and electrical for a 7,400 SF restaurant renovation.
- **Stonewood Tavern and Grill – Cary and Raleigh, NC.:** Designed plumbing, mechanical and electrical for a 6,900 SF restaurant.

RESTAURANT

- **An Restaurant – Cary, NC**.: Designed plumbing and electrical for a 10,000 SF high end restaurant.
- **Bloomsbury Bistro – Raleigh, NC.:** Designed plumbing, mechanical and electrical for a 5,500 SF restaurant renovation.
- **Last Catch Seafood – Raleigh, NC.:** Designed plumbing, mechanical and electrical for a 5,300 SF restaurant renovation.
- **Burger King – Garner, Cary, and Spring Hope, NC.:** Designed plumbing, mechanical and electrical for a new 4,100 SF restaurant.
- **The Mad Hatter's Restaurant – Durham, NC.:** Designed plumbing, mechanical and electrical for a 4,000 SF restaurant renovation.
- **NOFO Restaurant – Raleigh, NC.:** Designed plumbing, mechanical and electrical for a 3,700 SF restaurant renovation.
- **Raleigh Times Bar – Raleigh, NC.:** Designed the plumbing and electrical for a 3,300 SF restaurant.
- **The Loop Pizza and Grill – Apex, NC.:** Designed the plumbing, mechanical, electrical and fire alarm for a 2,700 SF restaurant.
- **The Mint – Raleigh, NC.:** Designed the plumbing, mechanical, electrical and fire alarm for a 8,000 SF restaurant/bar in a high rise building.
- **Tyler's Tap Room – Apex, NC.:** Designed the plumbing, mechanical, electrical and fire alarm for a 9,000 SF restaurant/bar.
- **Porter's Tavern – Raleigh, NC.:** Designed the plumbing, mechanical, electrical and fire alarm for a 4,800 SF restaurant/bar.

MILITARY

PROJECTS INCLUDE

6 MATOC	SAVANNAH, CHARLESTON, FT WORTH DISTRITCS & NATIONWIDE
3 IDIQ	A& E SERVICES AT CAMP LEJEUNE, CHERRY POINT, MID-ATLANTIC
3 SATOC	FORT BRAG, FORT BENNING, FORT GORDON
3 MACC	SJAB, GUANTANOMO
1 IDIQ	SJAB

Replace Medical Clinic, Project #71325
Seymour Johnson Air Force Base

The existing Main Clinic Building #2800 is a 98,000 SF single story structure that was originally built in 1957 and was comprised of approximately 36,200 SF with a later addition in 1975, as well as two much smaller additions in 1988 and 1995.

The primary objective of this project was to replace the dated clinic with a new two story, 106,000 SF state-of-the-art primary care clinic.

- ❑ **LEED** Silver under the 2009 **LEED** Healthcare Program
- ❑ The HVAC System is Comprised of:
  - 3 Natural Gas Fired Condensing Boilers
  - 2 Air Cooled Screw Chillers
  - 4 VAV Double Wall Air Handling Units
  - Floor Mounted Radiant Fin tube Heaters
- ❑ The Electrical System is Comprised of:
  - Estimated Size at 3,000 amps
  - Dedicated Panels for Type of Loads They Serve
  - Lighting Controls

The New Clinic Includes:

- Family Health
- Pediatrics
- Women's Health
- Flight Medicine
- Optometry
- Physical Therapy
- Public Health
- Pharmacy
- Mental Health
- Clinical Lab

- ❑ The Mechanical, Plumbing, Electrical and Fire Alarm Systems were Designed to Meet the Requirements of a 30% Improvement over the ASHRAE 90.1-2007
- ❑ The Building Includes a Vegetated Roof System and Translucent PTFE Canopy
- ❑ Construction Cost: $45.8M

P1219 SOF MARINE BATTALION COMPANY TEAM FACILITIES
CAMP LEJEUNE, NC

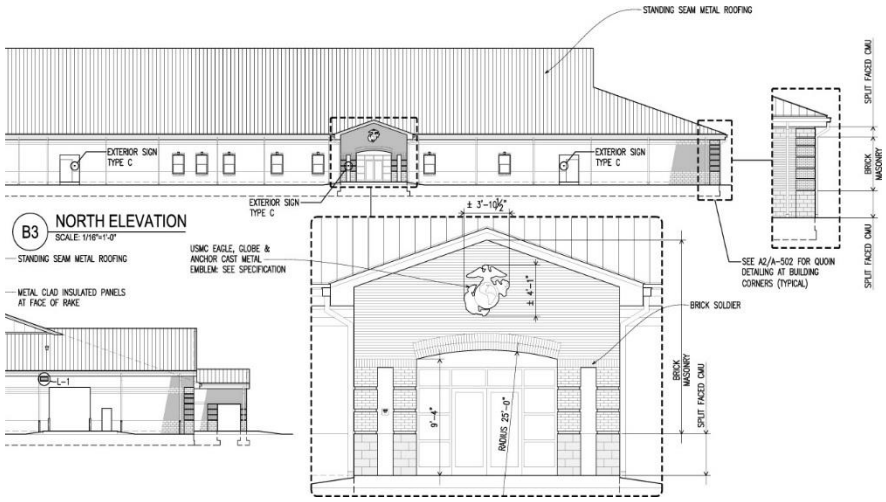
This is a collection of 10 buildings totaling 234,000 SF that will provide a variety of functions for it's users.

- ❑ The Goal for this Project was to achieve a certification level of Two (2) Green Globes through the Green Building Initiative.
- ❑ The HVAC System is Comprised of:
  - Variable Refrigerant Flow Systems
  - Conventional DX Systems
- ❑ The Electrical System Includes:
  - New Panels and Electrical Distribution Throughout Each Building
  - Lighting Controls
  - LED Lighting and Battery Back-up Fixtures
  - Outside Plant (OSP) and building telecommunications design.
  - Telecom Design for Secure and Non-Secure Communications Networks
- ❑ Mechanical, Plumbing, Electrical and Fire Alarm Systems were Designed to Meet the Requirements of a 30% Improvement over the ASHRAE 90.1-2007 and were designed per UFC requirements
- ❑ Estimated Construction Cost: $47.6M

The New Facilities Include:

- Office
- Training Facilities
- Sensitive Material
- Combat Services
- Class Rooms
- Storage
- Non-accredited SCIF
- Computer Rooms

P1280 2ND RADIO BN COMPLEX OPERATIONS CONSOLIDATION, CAMP LEJEUNE, NC



This project consists of two new buildings (Headquarters Building and Operations Center) totaling 76,831 SF that will be used for administration and communications missions.

- ❑ Designed to LEED Silver with government certification
- ❑ The HVAC System is Comprised of:
  - Variable Refrigerant Flow Systems
  - Conventional DX Systems
- ❑ The Electrical System is Comprised of:
  - Whole-Building Generator
  - Large Centralized UPS
  - Solar Hot Water Heating
  - Redundant Electrical Systems for Critical Areas in the Operations Center
  - Numerous Telecom Secure and Non-Secure Communications Networks
- ❑ Estimated Construction Cost: $36 M

The New Facilities Include:

- Office
- Storage Vaults
- Sensitive Material
- Combat Services
- Class Rooms
- Video Telecomm
- Accredited SCIF
- Computer Rooms

P1288 COMBAT SERVICE SUPPORT FACILITY
CAMP LEJEUNE, NC

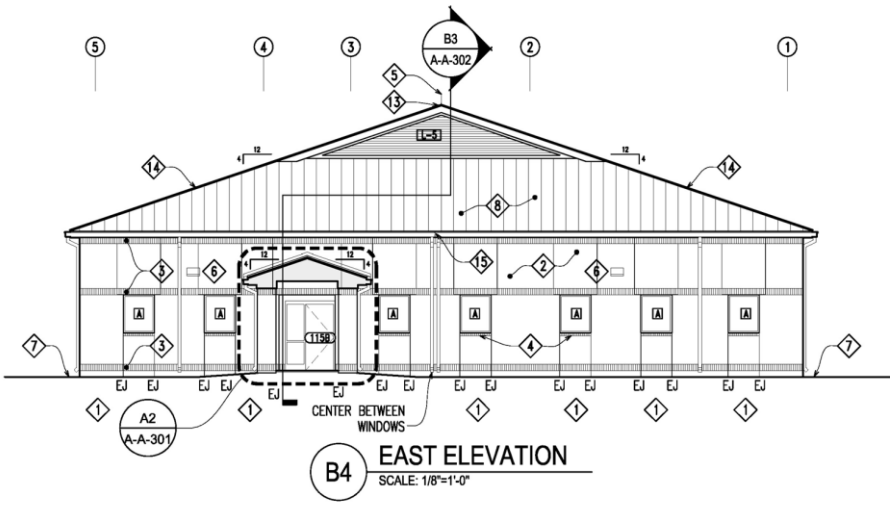
The New Facilities Include:

- Office
- Training Facilities
- Sensitive Material
- Combat Services
- Class Rooms
- Vehicle Wash
- Vehicle Maintenance
- Computer Rooms

This is a collection of 3 buildings totaling 53,845 SF that will provide a variety of functions for it's users.

- ❑ The Goal for this Project is to achieve a **certification** level of Two (2) Green Globes through the Green Building Initiative.
- The HVAC Systems are Comprised of:
  - Variable Refrigerant Flow Systems
  - Conventional DX Systems
  - The Vehicle Maintenance has full vehicle exhaust systems, multiple pumped fluids, air compressors systems, fueling stations and wash pad/racks installed.
- ❑ Electrical System Include:
  - New Dedicated Panels and Distribution throughout each building
  - Lighting Controls
  - LED and Emergency Lighting
  - New Pad-Mount Transformers for each building
  - Secure communications for the handling of sensitive material. (SIPR and NIPR)
- ❑ Estimated Construction Cost: $14.2M
- ❑ Designed to UFC Requirements

P686, RADAR AIR TRAFFIC CONTROL FACILITY ADDITION
P729, OPS TRAINER FACILITY - CAMP LEJEUNE, NC



These are two new facilities totaling approximately 8,060 SF will provide a variety of functions for their users. The Ops Trainer Facility is designed with spaces for flight training missions and night vision simulation classroom, bullpen office for trainers and a large storage room for CFTD parts. The Air Traffic Control Facility is designed for a new radar ATC Tower simulator, maintenance/training classrooms and offices.

- Designed to achieve a **certification** level of Guiding Principles Compliance in both facilities through the Green Building Initiative.
- Sustainable design practices were utilized for the buildings resulting in an energy savings of 35% in the Traffic Control Addition and 34% in the Operation Trainer Facility as compared to ASHRAE 90.1-2010
- Estimated Construction Cost: $4.4M

- The HVAC Systems are Comprised of:
  - 4-Pipe, Chiller/Boiler VAV Air Handling System for the Traffic Control Addition
  - Gas-Fired Furnaces with DX Cooling in the Operational Trainer Facility
- Electrical Systems Include:
  - New Pad-Mounted Transformers
  - New Panels and Electrical Distribution
  - Outside Plant (OSP) and Building Telecomm

The New Facilities Include:

▪ Tower Simulator	▪ Classrooms
▪ Training Facilities	▪ Conference Room
▪ Storage	▪ Offices

229 KC 130J EACTS FACILITY
CHERRY POINT, NC

This is a 9,202 SF facility designed to house a KC 130J Enlisted Air Crew Trainer (EACT), with administrative support spaces, miscellaneous utilities and infrastructure.

The New Facility Includes:

▪ High-Bay Area	▪ Classrooms
▪ Offices	▪ Training Room
▪ Break Area	▪ Comm Rooms

❑ Estimated Construction Cost: $4.1M

❑ The HVAC Systems are Comprised of:
- 4-Pipe Chiller/Boiler Air Handling System
- Energy Recovery Unit
- Exhaust Systems for the Trainer Bay and the FuT Trainer

❑ Electrical Systems Include:
- Energy Control Systems
- Intercom
- AV Networking Systems
- New Pad-Mounted Transformer
- New Panels and Electrical Distribution for the building
- Outside Plant (OSP) and Building Telecommunications

❑ Third Party Certification for Sustainable Design is being pursued through the Green Building Initiative's Guiding Principles Compliance **certification** process.

REPAIRS AND IMPROVEMENTS TO BEQ 4168 CHERRY POINT, NC

Bachelor Enlisted Quarter Building 4168

Building 4168 is a three-story, 35,796 SF Bachelor Enlisted Quarters (BEQ) built in 1987. The objective of this project is a complete building renovation, in order to provide a more comfortable and functional environment for the building occupants. CCE Provided the plumbing, mechanical, and electrical designs for the renovation of the barracks buildings. Sustainable Design and Energy Modeling were provided.

The New Facility Includes:

- 94 Sleeping Rooms
- Lounge
- Storage
- Baths
- Laundry Room
- Admin Offices

- The New HVAC Systems are Comprised of:
  - Air-Cooled Chiller
  - Steam-To-Hot Water Generator
  - Pumps
  - Dedicated Outside Air Units with Energy Recovery
  - 4-Pipe Fan Coil Units
  - New Complete Building Automation System with interface to the base wide energy management system

- Other Components of the Renovation Include:
  - New Electrical Fixtures to increase Safety, Security, and Energy Efficiency
  - Upgrades to Sprinkler Systems and Fire Protection
  - The Plumbing System will be Replaced in its Entirety
- Estimated Construction Cost: $5.7 M

REPAIRS AND IMPROVEMENTS TO BEQ 4166 and 4167 CHERRY POINT, NC

Bachelor Enlisted Quarter Building 4168

Building 4166 and 4167 are a three-story, 43,000 SF Bachelor Enlisted Quarters (BEQ) built in 1987. The objective of this project is a complete building renovation, in order to provide a more comfortable and functional environment for the building occupants. CCE Provided the plumbing, mechanical, and electrical designs for the renovation of the barracks buildings. Sustainable Design and Energy Modeling were provided.

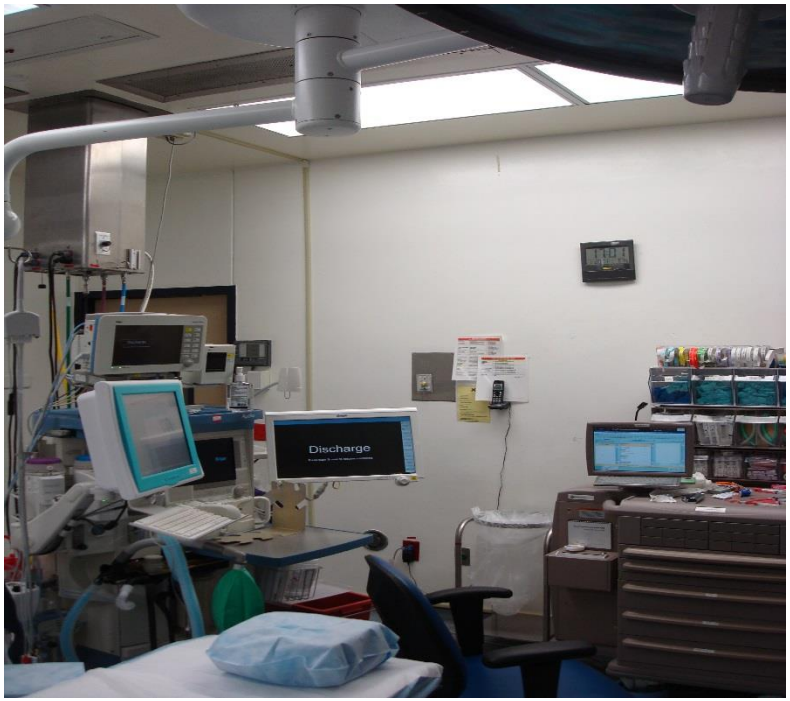
Each Updated Facility Includes:

- 40 Sleeping Rooms
- Lounge
- Storage
- Baths
- Laundry Room
- Admin Offices

- ❑ The New HVAC Systems are Comprised of:
  - Air-Cooled Chiller
  - Steam-To-Hot Water Generator
  - Pumps
  - Dedicated Outside Air Units with Energy Recovery
  - 4-Pipe Fan Coil Units
  - New Complete Building Automation System with interface to the base wide energy management system

- ❑ Other Components of the Renovation Include:
  - New Electrical Fixtures to increase Safety, Security, and Energy Efficiency
  - Upgrades to Sprinkler Systems and Fire Protection
  - The Plumbing System will be Replaced in its Entirety
- ❑ Estimated Construction Cost: $4.9 M

ALTERATIONS TO ELEVEN OPERATING ROOMS
BUILDING NH 100 – CAMP LEJEUNE, NC | AHCA Equivalent



Alterations to Eleven Procedure Rooms was a task order under an IDIQ for Architectural Engineering and Design Services for Various Projects, Marine Corps Base Camp Lejeune. Crenshaw Consulting Engineers, Inc. with MBF Architecture provided the engineering and the architectural designs for this 15,000 SF renovation of a space that was originally constructed in 1982. Extensive field investigation and input from medical staff enabled the design team to make informed decisions regarding the design, and the selection of finish materials. A complex phasing plan was developed, allowing portions of the OR suite to function continuously during the construction process.

Crenshaw Consulting Engineers provided the plumbing, mechanical, electrical, fire alarm/protection engineering designs for the renovation of eleven procedure/operating rooms and several additional spaces which included; recovery rooms, a nurses station and offices, a cystoscopy suite, a sterile supply storage room, a new corridor, and locker rooms for the staff. The electrical engineering designs for this project consisted of 25 push button hands free doors, 30 card readers, 40 station internal intercom per NH facilities, 2 additional duplex critical power outlets in each of the 11 operating/procedure rooms, and for new energy efficient lighting throughout the space. The mechanical design consisted of installing new dual duct VAV terminals connected with existing four pipe VAV air handler and rezoining air space. Const. Construction Cost: $1,355,000

REPAIRS B854 INTERIOR/EXTERIOR MARINE CORPS RECRUIT DEPOT, PARRIS ISLAND, SC (RELIGIOUS FACILITY)

The Updated Facility Includes:

- Sanctuary
- Classrooms
- Classrooms
- Fellowship Hall and Kitchen

"Your firm has been the most professional technically competent and timely firm we have worked with in the last 10 years. We hope you are able to continue with your outstanding Government work in future contracts."

James V. Berotti
Engineering Director, FEAD
B-854 Religious Ministries Center
Renovation, MCRD Parris Island, SC

Building B-854 is a 15,300 SF single story Religious Ministries Building built in 1963. The scope of work calls for updates to floor, wall, and ceiling finishes, various accessibility upgrades, replacement of roofing and HVAC systems, Plumbing and Electrical modifications.

- ❑ The HVAC Systems are Comprised of:
  - 4-Pipe Chilled/Hot Water System with Multi Zone Air Handlers.
  - Dedicated Outside Air System Unit to provide conditioned outside air to the building.
- ❑ Plumbing Modifications Included:
  - Replacing All Existing Plumbing Fixtures.
  - New Plumbing Piping/Fixtures for a New Set of Restrooms.
- ❑ Electrical System Modifications Included:
  - Power in the updated Kitchen
  - Relocating Lighting as Needed
  - Supplementing Emergency Lighting
- ❑ Estimated Construction Cost: $1.5M

MILITARY | MATOC Savannah District

Multiple Award Task Order Contract (MATOC), AST Ranger Battalion Upgrades and Ranger Camp Merrill Complex, Ft. Benning, GA.: Crenshaw Consulting Engineers, Inc. teamed to complete the renovations of multiple barracks buildings and upgrades to rope corral training facilities. The renovations included upgrades to electrical systems to provide energy efficient lighting, upgraded plumbing for restrooms including additional shower facilities within the dormitory buildings and low flow fixtures to increase efficiency. Additionally new HVAC systems were designed for each building which included installing air conditioning in several buildings that previously were not conditioned. The new HVAC systems are all high efficiency split system heat pumps. Various projects have been completed from initial programming through construction submittal review including:

- **Building 5004**: 6,407 SF Army Ranger Barracks Renovation
- **Building 5005:** 6,407 SF Army Ranger Barracks Renovation
- **Building 5008:** 6,407 SF Army Ranger Barracks Renovation
- **Building 5009:** 6,407 SF Army Ranger Barracks Renovation
- **Camp Merrill Building 13:** 3,400 SF Classroom Building Renovation
- **Camp Merrill Building 37:** Two Story Barracks Renovation
- **Camp Merrill Building 61:** Two Story Barracks Renovation
- **Camp Merrill Rope Corrals:** 6 - 1,935 SF Rope Technique Training Areas

Crenshaw Consulting Engineers, Inc. (CCE) provided the plumbing, mechanical, electrical, telecommunications, and fire alarm engineering designs for the various building renovations. CCE provided the electrical engineering designs for the lighting upgrades made to the 6 rope corrals as well. The design team has worked together on the projects listed above and worked closely with Base Facilities Engineers, and various user groups to ensure that designs satisfy criteria set forth by the group being served, meet all State Life Safety Requirements, and are built within budget. All projects also comply with Uniform Facilities Criteria set forth by NAVFAC. Construction Cost of $11M

MILITARY | MATOC Savannah District

Robins Air Force Base – 5th CCG - Various Buildings Additions and Renovations, Warner Robins, GA.: Crenshaw Consulting Engineers, Inc. teamed to complete the numerous renovations and additions required on Robins Air Force Base. All of the renovations included replacement of the entire HVAC system, new energy efficient lighting, and updated plumbing. Several of the additions were multi-story office structures seamlessly added to existing warehouse facilities, some were classroom additions and the remaining were additions for more warehouse space. Some of the building renovations included transforming a former warehouse space into multi-story office space with storage. Various projects have been completed from initial programming through construction submittal review including:

- Building 660 Renovation and Addition
- Building 949 Renovation and Addition
- Building 965 Renovation and Addition
- Building 950 Renovation and Addition
- Building 963 Renovation and Addition
- Building 1347 Renovation and Addition
- Building 1371 Renovation and Addition
- Building 1351 Renovation and Addition
- Building 1350 Renovation and Addition
- Building 1349 Renovation and Addition
- Building 1353 Renovation and Addition
- Building 1364 Renovation and Addition

The design team has worked together on the projects listed above and worked closely with Base Facilities Engineers, and various user groups to ensure that designs satisfy criteria set forth by the group being served, meet all State Life Safety Requirements, and are built within budget. All projects also comply with Uniform Facilities Criteria set forth by NAVFAC. Construction Cost of $7M.

SEYMOUR JOHNSON AIR FORCE BASE | REPAIR CHILLED WATER PLANT
$1.8 Million

- Chiller Plant Upgrade | Replacement Supporting 11 Buildings (10 Dormitories and 1 Administration Building
- Performed Life Cycle Cost Analysis to Determine Most Effective Way to Provide Chilled Water for all 11 Buildings
- Comparative Energy Modeling
- Analysis to Determine if any of the Existing Piping and Equipment could be Reused in the New System
- Scope of Work Included Chillers, Chilled/ Condenser Water Piping, Cooling Towers, Air/ Water treatment and Associated Pumps
- New Control System

Crenshaw Consulting Engineers Provided the Mechanical and Electrical Engineering Designs

SEYMOUR JOHNSON AIR FORCE BASE|REPLACE HYDRANT FUEL SYSTEM
$7.5 Million

- Demolishment of the Existing Pump House #2 (Building #4552), Six Underground Fuel Storage Tanks, Piping, and Fill Stand with the Goal of providing a Type III Fuel Hydrant Loop system
- Pump House #2 Sits Less than 1000 ft. from the Runway and Does NOT Comply with UFC 3-260-01 Primary Airfield Assurance Safety Clearance Criteria
- Provided the Mechanical and Electrical Engineering Designs which included the Piping designs for the Type III Hydrant Fueling System
- Provide the Necessary 2,400 GPM to all Fuel Hydrant Pits

Crenshaw Consulting Engineers Provided the Mechanical and Electrical Engineering Designs

MILITARY

- **Seymour Johnson Consolidated Support Center Executive Level Administrative Building LEED Gold -Seymour Johnson Air Force Base, NC:** CCE provided the plumbing, electrical, and fire alarm engineering designs for this 40,000 SF building as part of a design build team with Duke Construction. Construction cost of $9.5M.
- **Fort Gordon - The 35th Signal Brigade Headquarters - Augusta, GA:** CCE provided the plumbing, mechanical, electrical, fire alarm, and telecommunications engineering designs for this 9,800 SF total renovation project. Construction cost was $2.4M.
- **Fort Benning Warriors in Transition Complex - Soldier Family Assistance Center and the Battalion and Company Headquarters LEED Silver – GA:** CCE provided Plumbing, Mechanical, Electrical , Fire Alarm, and Telecommunications Engineering Designs for both buildings consisting of a total of 41,700 SF with a total construction cost of $11M.
- **Battalion Headquarters - Fort Jackson, SC LEED Silver -** CCE provided the Plumbing, Mechanical, Electrical, Fire Alarm, and Telecommunications Engineering Designs this 25,000 SF building with a total const. cost of $5M.
- **Fort Drum Warriors in Transition Complex - The Solder Family Assistance Center and The Battalion Head Quarters - LEED Silver: CCE provided the** plumbing, mechanical, electrical, fire alarm, and telecommunications engineering designs for these two buildings that total 23,100 SF. Construction cost $8M.

MILITARY | MACC Seymour Johnson Air Force Base

Multiple Award Construction Contract (MACC) Seymour Johnson Air Force Base - Goldsboro, NC: CCE has been providing mechanical, electrical, plumbing, and telecommunications engineering for MBF Architects for a MACC for Seymour Johnson Air Force Base with MBF and MW Services. Sample projects include:

- **Barracks Building 3616 – SJAB**: Crenshaw Consulting provided the mechanical engineering as part of a design build team with MW Construction for a 3 story, 24,000 SF barrack with a four pipe fan coil HVAC system that will tie into the existing base boiler and chiller system. Construction Cost - $3.6M.
- **Brigade HQs Roof Replacement – Building 4418**: CCE provided the plumbing, mechanical, electrical and fire alarm engineering for a 23,000 SF Brigade Head Quarters.
- **Fighting Squad rant Roof Replacement – Building 4423**: CCE provided the plumbing, mechanical, electrical and fire alarm engineering for a 24,000 SF Brigade Head Quarters.
- **Heritage Hall Banquet and Reception Hall**: CCE provided the mechanical, electrical, and plumbing design for the renovation of a 26,000 SF banquet and reception hall. This renovation mainly consisted of new mechanical systems, along with new lighting upgrades for selected areas of the building.
- **Barracks Roof Replacement – Building 4423**

MILITARY

Indefinite Quantity Contract - Architectural and Engineering Services - Marine Corps Air Station Cherry Point and MCB Camp Lejeune, NC: CCE has been providing mechanical, electrical, plumbing, and telecommunications engineering for MBF Architects (Prime) for an A and E Indefinite Quantity Contract (IQC) at both MCAS Cherry Point and MCB Camp Lejeune. MBF has held the IQC contracts since 2005 under a total of eight Indefinite Quantity Contracts for Architectural and Engineering Services. The latest Camp Lejeune IQC 36 task orders have been completed with 23 dealing with the renovations of 1940's era barracks averaging $3.5 million in construction cost. Most projects were under short term design schedules averaging 120 days from award of task order to completion of design. Sample projects from both the Camp Lejeune and Cherry Point IQC's include:

- Building 119 Office Renovation – MCB Camp Lejeune
- Camp Lejeune Mental Health Ward Renovation – MCB Camp Lejeune
- Hospital Pointe Officer Homes – MCB Camp Lejeune
- Building HP 295, HP 175, HP 195, BB 270, NH 120, 17, 417 and 217 Barracks Renovation – MCB Camp Lejeune
- Building 148 Office Renovation– MCAS Cherry Point
- Building 4166 and 4167 Barracks Renovation – MCAS Cherry Point
- Renovation of Homes - Nugget Cove – MCAS Cherry Point
- Alterations to Eleven Operating Procedures Rooms, NH 100

FORT BRAGG MATOC

USASOC BUILDING 2040 | Fort Bragg, NC
$4.7 Million

- ❑ **2 Stories |10,300 Total SF**
- ❑ **Lower Level Underground SCIF**
- ❑ **Upper Level Command Areas**
- ❑ **Mechanical Systems**
  - Lower Level SCIF | District Chilled Water
  - Two Local Backup Air Cooled Chillers to Insure Against Lower Level Downtime
  - District High Temperature Hot water with a Local Heat Exchanger
  - Mezzanine | Mounted 4-Pipe, Chiller/Boiler
  - VAV Air Handling System
- ❑ **Telecomm Included Numerous (Secure and Non-Secure) Networks**
- ❑ **Server Room**
- ❑ **Whole Building Generator**

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical, Fire Alarm and Fire Protection Engineering Designs

FORT BRAGG

FORT BRAGG NEW ELEMENTARY AND MIDDLE SCHOOL | LEED SILVER

$18 Million

- ❑ **183,000 Total SF**
- ❑ **LEED Silver**
- ❑ **BIM | Revit**

FORT BRAGG CUP | Honeywell

UTILITY PLANTS | Fort Bragg, NC

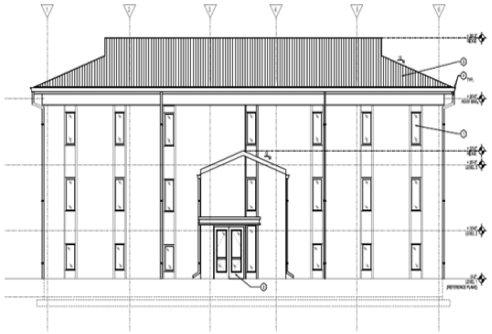
- ❑ 8 Various Plants at FT Bragg
- ❑ Provided As Built Design
- ❑ BIM

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical and Fire Alarm As Builts

Honeywell

MILITARY | Fort Bragg, NC

Fort Bragg Single Award Task Order Contract (SATOC) - Fayetteville, NC and August, GA: CCE provided the plumbing, mechanical, electrical, fire alarm and telecommunications engineering design services as part of a design/build team with Heery International (architect) and White Hawk/Todd (contractor) under a Single Award Task Order Contract (SATOC). We worked collaboratively with the architect, general contractor and the sub contractors to give the government the most cost efficient yet quality product possible. Projects awarded to date include ($5.7 million) with more anticipated:



- **Ft. Gordon One-Stop Building – LEED Silver/Construction Value:** $2.9 Million. This is the first chilled beam system used at Ft Gordon. The base is very pleased with the performance of the design and system and it allowed them to fit a cost efficient HVAC system into a very limited amount of ceiling space.
- **Ft. Bragg Vet Surgery Clinic/Construction Value: $650K**
- **Ft. Bragg School**
- **Ft. Gordon Outdoor Training Facility/Construction Value: $1.3M.**
- **Lake Hartwell Comfort Station/Construction Value: $800K**

HISTORIC
CRENSHAW CONSULTING engineers
www.crenshawconsulting.com

HISTORIC REVOLUTION MILL | MULTI-USE | CHANGE USE | MULTI-FAMILY, OFFICE, RETAIL AND RESTAURANT | Greensboro, NC

This historic renovation revitalized textile mill complex reuse project features:

- ❑ 45 Acres
- ❑ 1 Million SF of Office and Retail
- ❑ 150 Units of Multi-Family
- ❑ Restaurants
- ❑ Urban Market
- ❑ Fitness Center
- ❑ Outdoor Theater
- ❑ Indoor Gathering Hall and Dining
- ❑ Kitchen
- ❑ Wedding Venue

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

NATIONAL GREEN BUILDING SILVER| MULTI-USE

JUDSON MILL MULTI-FAMILY | Greenville, SC

Redevelopment of the 36-acre Judson Mill, 100 Year Old, 800,000 SF Textile Manufacturing Complex:

- ❑ Mixed Use Development | Multi –Family apartments
- ❑ 55,929 SF | 3 Stories
- ❑ Building 5A is 3 Stories - 203,722 SF
- ❑ 180 Apartments
- ❑ 1-4 Bedroom Apartment Plans
- ❑ Outdoor Plaza
- ❑ HVAC – Split System Heat Pumps
- ❑ National Green Building Silver
- ❑ Designed in BIM - REVIT

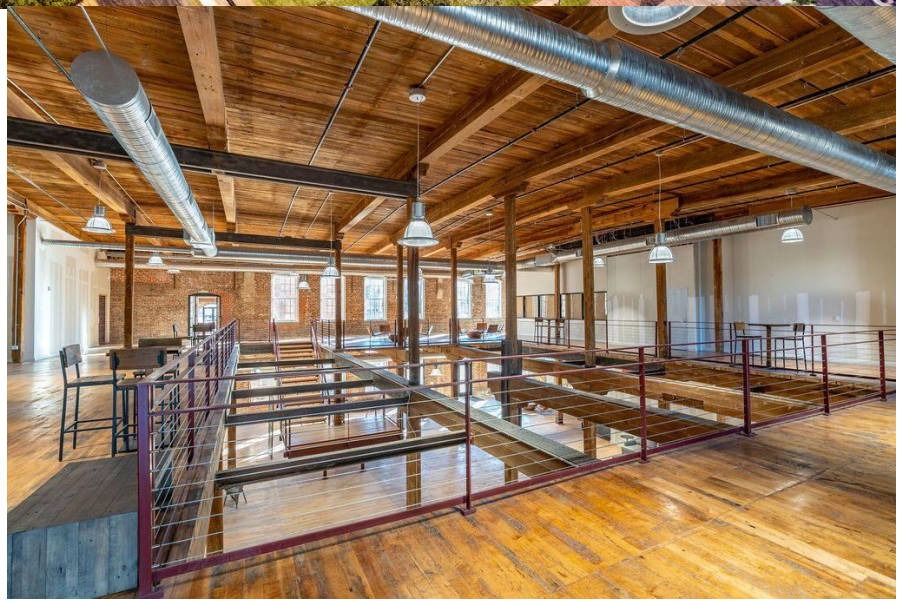
Future Scope to Include:

- ❑ 60,000 SF Retail
- ❑ 5,000 SF Amenity Space
- ❑ Parking Deck

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

ROCKY MOUNT MILL | MULTI-USE | CHANGE OF USE |Rocky Mount, NC

- ❑ 150 Acre Mixed Use
- ❑ 120,000 SF Office
- ❑ Retail
- ❑ 150 Units of Multi-Family
- ❑ Urban Market
- ❑ Fitness Center
- ❑ Indoor Gathering Hall and Dining
- ❑ Restaurants
- ❑ Brewery | Brewery Incubator



Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

HISTORIC

- **Heilig Levine Building – Raleigh, NC:** Designed the plumbing, mechanical, and electrical for this historic 16,902SF, 3-story historic building renovation project in downtown Raleigh.
- **The Raleigh Times Bar – Raleigh, NC:** Designed the plumbing, mechanical, and electrical for the fit-up for a bar/restaurant in this historic building.
- **Morning Times – Raleigh, NC:** Designed the plumbing, mechanical and electrical for this coffee shop/gallery fit-up in a historic building.
- **230 Fayetteville St. (Carolina Trust Building) – Raleigh, NC:** This was one of the first office buildings in Raleigh. CCE provided the plumbing, mechanical, and electrical designs on this historic building renovation.
- **Commerce Building (Odd Fellows Building) – Raleigh, NC:** This is one of Raleigh's original seven skyscrapers. We designed the plumbing, mechanical, and electrical for this 10 story historic building renovation.
- **Pilot Mill – Raleigh, NC: D**esigned the plumbing, mechanical, and electrical for this 110,000 SF renovation project of a historic mill into multi-use, multi-family, and educational facilities.
- **The American Tobacco Campus – Durham, NC:** CCE provided plumbing, mechanical, and electrical design work for numerous projects on the American Tobacco Campus. They vary in scope and complexity; office fit-up, laboratory, and educational facilities. All keeping with the historic character and fiber of the campus.

AUTO DEALERSHIPS & AUTO/TRUCK REPAIR

- **Crossroads Ford – Cary, NC and VA**: Designed the plumbing, mechanical, electrical, fire alarm and sprinkler for a 140,000 SF auto showroom and auto/truck repair garage.
- **Crossroads Chrysler – VA**.: Designed the plumbing, mechanical, electrical, fire alarm and sprinkler for a 51,000 SF auto showroom and auto/truck repair .
- **Carolina Auto Body – Cary, NC**.: Designed plumbing, mechanical and electrical for a 13,000 SF auto body repair shop fit-up.
- **Steve Ashworth Performance – Raleigh and Fuquay Varina, NC**.: Designed plumbing, mechanical and electrical for a 10,500 SF specialty performance engine building, testing and repair facility.
- **Centennial Maintenance Shop – Raleigh, NC**.: Designed plumbing, mechanical and electrical for a 11,900 SF maintenance facility, golf course equipment repair garage and staff office facility.
- **Milt's Auto Body – Cary, NC**.: Designed plumbing, mechanical and electrical for a 9,700 SF auto body facility with supporting staff offices. The entire facility including the shop areas is air conditioned.
- **Covenant Trucking – Youngsville, NC**.: Designed plumbing, mechanical and electrical for a 5,600 SF tractor trailer truck repair garage and office.
- **Meineke – Fuquay Varina, NC**.: Designed plumbing, mechanical, and electrical for a 4,300 SF auto repair garage.
- **Crossroads Nissan – Wake Forest, NC**.: Designed the plumbing, mechanical, electrical, fire alarm and sprinkler for 32,000 SF auto showroom and garage.

WAREHOUSE | MANUFACTURING | FLEX SPACE

CRENSHAW CONSULTING engineers
www.crenshawconsulting.com

PETER MILLAR – Durham, NC

Crenshaw Consulting Engineers provided the plumbing, mechanical and electrical engineering design for this 58,000 SF building renovation with an 8,600 SF office area

Facility Includes:

- Embroidery
- Office
- Sewing Equipment
- Warehouse
- Packing
- Steam Tables

- ❑ Mechanical:
  - Reworked existing rooftop units fore warehouse/embroidery space and office

- ❑ Electrical:
  - Electrical system design for the pack and ship areas along with the embroidery equipment including:
    - ✓ Steam Tables
    - ✓ Folding Machines
    - ✓ Sewing Equipment

PROCTOR & GAMBLE | RENOVATION TO EXISTING PLANT | OFFICE | MANUFACTURING | Greensboro, NC

- ❑ 15,100 SF Office that Serves Anti-Perspirant | Deodorant (APDO) Facility
- ❑ 9,673 SF | Administration Offices
- ❑ Isolation Vestibule For a Clean Room with Pressurization Fan to Prevent Infiltration from the Corridor Entry
  - Provided Differential Pressure Meters
  - New Control Access Security Turn Stiles

Oral Care Manufacturing

- 8,670 SF Office
- 700 SF | Electronic Control and Instrumentation
- 1,150 SF | Maintenance Shop with Power | Compressed Air
- Office
- 16 Work Stations
- 3 Team Rooms

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs in BIM | Revit

ECMT| Raleigh, NC

Crenshaw Consulting Engineers provided the plumbing, mechanical and electrical engineering design for this 45,000 SF metal treating facility with a 7,600 SF office space

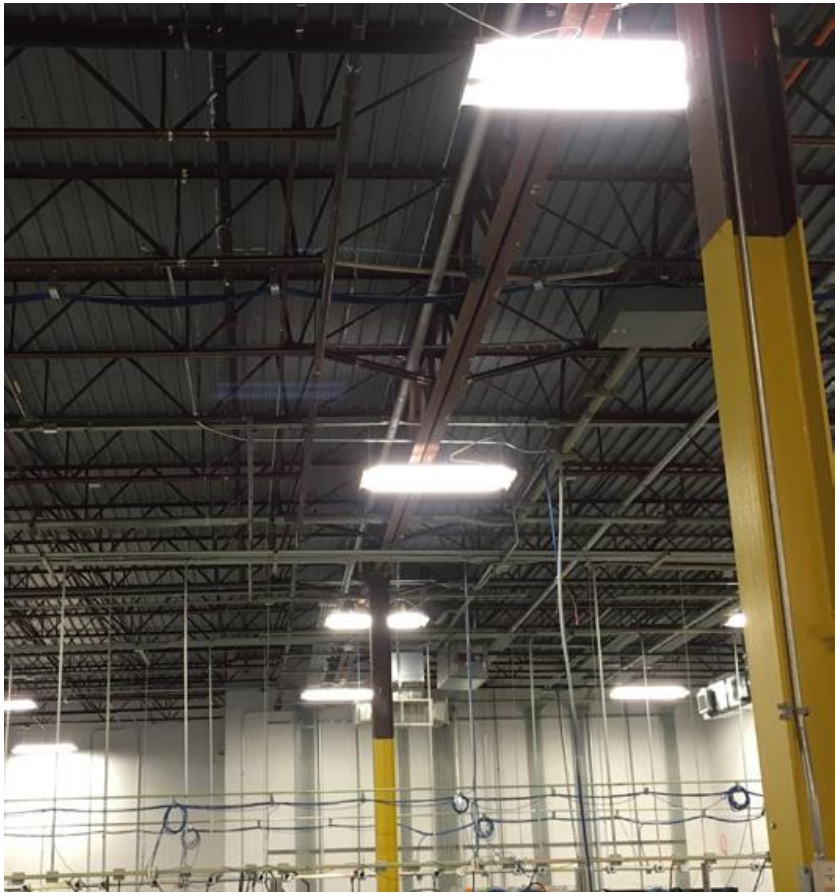
Hazardous Chemical Storage

- ❑ Chemicals used in the metal treatment process required hazardous location rooms for storage of oxidizers, corrosive and flammable materials

Diverse system requirements

- ❑ Several furnaces, bead blasting machines, and other metal related equipment
- ❑ Furnaces required outdoor argon and nitrogen fuel tanks
- ❑ Compressed air system routed to a central compressor
- ❑ Cooling system requiring outdoor cooling towers

FOXCONN – Durham, NC



Crenshaw Consulting Engineers provided the plumbing, mechanical and electrical engineering design for the renovation of a 36,000 SF computer testing facility with attached breakroom and office space. Provided the electrical for an additional 10,000 SF server testing area in the facility.

- Mechanical
  - Required new equipment to accommodate the cooling needs of the office space
- Electrical
  - Required new power connections for office work spaces and break room equipment

- Detailed information on existing circuitry was gathered prior to construction to evaluate what could be reused for new equipment
- Two additional transformers and three panels were added to accommodate the expansion

FERGUSON FIRE & FABRICATION WAREHOUSE FIT UP| Garner, NC

- ❑59,700 SF Office, Warehouse and Pipe Fabrication Space in a New Shell Building
- ❑5,950 SF Office Space
- ❑New Gang Toilets, Break Room, Offices and a Sales Area
- ❑Exterior Site Lighting
- ❑HVAC is Split System with Gas Furnace

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

MAITENANCE SUPPLY HQ WAREHOUSE RENOVATION| Durham NC

- ❑83,119 Total SF
  - 72,424 SF | Warehouse
  - 10,665 SF | Office
- ❑Warehouse HVAC Design Included LSHV (Low Speed, High Volume) Fans in Order to Achieve Specialized Air Flow Ventilation Requirements
- ❑Office HVAC Design is a Packaged Rooftop Unit
- ❑24/7 Cooling Server Room
- ❑Included Lighting Survey & Motion Censored Lighting

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

WAREHOUSE, MANUFACTURING, & FLEX SPACE

- **Presidential Park West - Durham, NC**: Provided the plumbing, mechanical, electrical, and fire alarm engineering designs for this 10 building warehouse/distribution complex totaling 550,000 SF. The Const. Cost was $20 M.
- **Lincoln Park South - Raleigh, NC:** Provided the plumbing, mechanical, electrical, and fire alarm engineering designs for this 5 building, 212,000 SF warehouse/distribution complex in Raleigh. Const. Cost was $10.6 M.
- **Raleigh Lions Clinic for the Blind - Raleigh, NC**: Provided the plumbing, mechanical, electrical and fire alarm engineering designs for the 240,000 SF warehouse/distribution facility renovation for the Raleigh Lions Clinic. Additionally portions of the manufacturing areas contained, created or manipulated potentially flammable fibers in the air in sufficient quantities that we designed those areas with enhanced filtration, very high air change rates and classified hazardous electrical systems. Construction cost of $3 Million.
- **Southport Business Park - Morrisville, NC**: Provided turnkey, indefinite quantity/indefinite delivery services including architectural, plumbing, mechanical, electrical, fire alarm, and structural engineering for Southport Business Park for over 3 years. The park is made up of 17 one story buildings totaling 900,000 SF of office and flex-space. The Const. Cost was $60 M.
- **Stock Building Supply – Raleigh, NC**: Provided the plumbing , mechanical, electrical, and fire alarm engineering designs for this 127,000 SF building supply warehouse in Raleigh.
- **Systech Retail Systems – Raleigh, NC:** Provided the plumbing, mechanical, and electrical engineering designs for this 82,000 SF fit-up project that included a vast manufacturing space and office space.
- **Lipomed – Raleigh, NC**: Provided the plumbing, mechanical, and electrical engineering designs for this 81,000 SF fit-up project that included a large manufacturing area and office space.

CHEP WAREHOUSE AND EQUIPMENT CONNECTIONS | Fayetteville, NC

- ❑ 69,800 SF Supply Chain Warehouse Fit-Up
  67,100 SF | Warehouse
  2,700 SF | Office
- ❑ Designed Equipment Connections for Conveyor Systems
- ❑ Paint Station
- ❑ Specialized Air Flow HVAC for Warehouse
- ❑ Packaged Rooftop Unit HVAC System for Office
- ❑ Added Natural Gas Service to Facilitate Heating Requirements

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

STORAGE FACILITIES

CRENSHAW CONSULTING engineers
www.crenshawconsulting.com

CAPITAL BOULEVARD STORAGE | Raleigh, NC

- ❑ 71,000 Total SF | 3 Story
- ❑ 5 Buildings
- ❑ 2,000 + Solar Panels | Net-Positive
- ❑ HVAC | Split System Heat Pumps

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical, and Fire Alarm.

410 West South St

My Neighborhood Storage

Harris Lake Boat Storage

- ❑ 410 West South Street Storage | Raleigh, NC | 123,000 SF
- ❑ Blackwater Storage | Polk County, FL | 118,000 SF
- ❑ My Neighborhood Storage Center | Jacksonville, FL | 102,650 SF
- ❑ State Road 54 Storage Building | FL | 97,500 SF
- ❑ Millenia Parc Storage Building | Orlando, FL | 90,000 SF
- ❑ Liberty Storage | New Smyrna Beach, FL | 83,000 SF
- ❑ Jacksonville 103rd Storage Building | Jacksonville, FL | 80,265 SF
- ❑ Cypress Storage Building | Tampa, FL | 78,500 SF
- ❑ Storage | Pendleton, SC | 75,000 SF
- ❑ Certain Teed Storage Building | Roxboro, NC | 7,300 SF
- ❑ Harris Lake Boat Storage | Morrisville, NC | 7,300 SF + Energy Modeling
- ❑ North Raleigh Christian Academy| Raleigh, NC | 4,000 SF

MUNICIPALITIES, PARKS & RECREATION

CRENSHAW CONSULTING engineers
www.crenshawconsulting.com

LEED GOLD

DURHAM FIRE STATION & EMS 17 | Durham, NC

$4.7 Million

New Construction | 10,770 SF

HVAC Systems are Comprised of:

- Packaged Rooftop Units
- Energy Recovery Ventilator
- Vehicle Exhaust Removal System

Features

- Apparatus Bay
- Administrative Space
- Fitness Center
- Sleeping Quarters
- Day & Dining Room

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

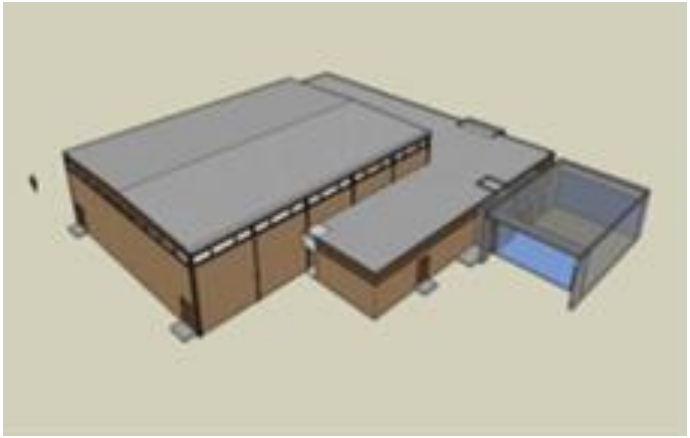
PULLEN PARK | Raleigh, NC
$6.3 Million

Pullen Park, covering 66.33 acres between Western Blvd., Hillsborough Street, Ashe Avenue and North Carolina State University, was founded in 1887 for the purpose of creating a recreational space for the people of Raleigh to enjoy.

The park was closed in December 2009 to November 2011 for extensive renovations and improvements.

- The Renovation Encompassed Multiple Buildings:
  - New Welcome Center
  - Concession Building
  - Restroom Building
  - Climate Controlled Carousel House
  - Train Depot
  - Various Shelters throughout the park with sustainable features
- This Project also included:
  - Extensive site renovation
  - Upgrades to the underground utilities
  - LED lighting
  - Upgraded Power Distribution throughout the park
- Estimated Construction Cost: $6.3M

CAROLINA PINES PARK AND JAYCEE PARK FACILITIES
Raleigh, NC

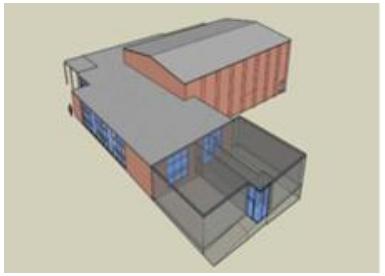


The New Facility Includes:

- Gymnasiums
- Offices
- Restrooms
- Welcome Areas

These are both existing City of Raleigh Park facilities that are approximately 15,000 to 16,000 SF each. The objective of this project was to assess the facilities, determine the longevity and the needs of the residents of the surrounding areas, and propose renovations and additions to meet those needs.

- The Scope of the Work Includes:
  - Plumbing, Mechanical, Electrical, and Fire Alarm designs for the renovations and additions to both Park Facilities.
  - Updating the existing Lighting and HVAC systems with sustainable features to maximize efficiency.
- This project also required systems integration with the City of Raleigh main utility controls.
- Estimated Construction Cost: $5M Each



CITY OF RALEIGH

- **222 West Hargett Street – Raleigh, NC**: designed the plumbing, mechanical, and electrical for eight different renovation projects in this building. The projects were for multiple departments house in the building; the City Manager, IT department, Parks and Recreation, Finance, and Personnel.
- **Dillon Building –Raleigh, NC:** Designed the plumbing, mechanical, and electrical for three separate renovation projects in this building. The projects were for several different departments housed in the building; the Fire Administration, Help Desk, and the Community Development department.
- **Police Substation - Litchford – Raleigh, NC**: Designed the plumbing, mechanical and electrical for a 6,100 SF conversion from a retail space to a City of Raleigh Police Substation at Litchford Village.
- **Police Substation - Southgate Plaza – Raleigh, NC**: Designed the plumbing, mechanical, and electrical for a 5,800 SF conversion from a former retail space into a City of Raleigh Police Substation at Southgage Plaza.
- **Police Substation - Avent Ferry – Raleigh, NC**: Designed the plumbing, mechanical, and electrical for a 6,300 SF conversion of a former retail space into a City of Raleigh Police Substation at the Avent Ferry Shopping Center.
- **Inspections Department - Litchford – Raleigh, NC**: Designed the plumbing, mechanical, and electrical for a 3,100 SF conversion of former retail space into a City of Raleigh Inspections Department at Litchford Village. While working on this project we provided plumbing, mechanical, and electrical designs for the 1,550 SF expansion of the existing Police Substation at Litchford Village.

PARKS AND RECREATION

- **Jaycee Park – Raleigh, NC** : The original Jaycee Park Community Center was built in 1961 and housed a gymnasium, two meeting rooms, weight room and locker rooms. **Crenshaw Consulting Engineers, Inc.** provided the plumbing, mechanical, and electrical designs for the complete renovation of the 16,000 SF Jaycee Park Community Center. Our major objective on this project is to provide designs for updating the existing electrical and lighting system as well as to the existing HVAC system. While the building will not be LEED certified, many sustainable features will be included in the designs. Construction cost of $5 Million.

- **Pullen Park – Raleigh, NC**: Situated on 66.33 acres between Western Blvd., Hillsborough St., Ashe Av. and North Carolina State University, Pullen Park has much to offer people of all ages. As part of the renovation that began in 2009, that included multiple buildings; the Welcome Center, a Concession Building, a Restroom Building, a Carousel House, a Train Depot and various shelters throughout the park with sustainable features. In addition this project included extensive site renovation and upgrades including LED Lighting and upgraded power distribution throughout the park for event support. **Crenshaw Consulting Engineers**, Inc. provided the Plumbing, Mechanical, and Electrical engineering designs for this multi-building total renovation project in Raleigh's Historic Pullen Park. Construction cost of $6.3 Million.

- **New Life Camp – Raleigh, NC:** is a privately operated youth camp that was started in the 1950's and is located on the boarder of Falls Lake in Raleigh, North Carolina and covers over 70 acres of land. The gymnasium addition includes classrooms and a 3 lane climbing wall as well as a new playground. The activities center is a multi-purpose facility use for home school enrichment courses. Crenshaw Consulting Engineers, Inc. assisted the owners of the facility with camp and building assessments, worked with the owner's to determine the longevity and the needs of the camp and uses of those attending the camp. **Crenshaw Consulting Engineers** designed the Plumbing, mechanical, electrical, and fire alarm for the renovations and additions for the camp to include the a new swimming pool, restrooms, gymnasium, craft building and other facilities throughout the camp.

CAROL JOHNSON POOLE CLUBHOUSE | LEED SILVER
Raleigh, NC

Carol Johnson Poole Clubhouse at NC State University's Centennial Campus is a two-story, 25,000 SF clubhouse which includes a variety of amenities for it's users.

- ❑ This project was designed for and achieved a LEED Silver **Certification.**
- ❑ **Crenshaw Consulting Engineers (CCE)** provided the plumbing, mechanical, and electrical engineering designs for this project and **Facility Performance Consultants (FPC)** provided the fundamental and enhanced commissioning for the clubhouse project. The commissioned systems include:
  - HVAC Systems and Controls
  - Test and Balance Verification
  - Lighting Controls
  - Daylighting Controls
  - Domestic Hot Water Systems

The New Facilities Include:

▪ Dining	▪ Food Prep
▪ Locker Rooms	▪ Golf Pro Shop
▪ Indoor Golf Range	▪ Cart Storage

TRIANGLE ROCK CLIMBING CLUB| Durham, NC

- ❑ Two Phased Project | 32,000 SF
- ❑ 14,000 SF of Eldorado Climbing Walls
- ❑ 40+ Lanes of Lead and Top Rope Climbing
- ❑ 18,000 SF of World-Class Bouldering Terrain
- ❑ Packaged Roof Top Units with Gas Heat
- ❑ LED Lighting

Features Include:

- 2 Group Exercise Studios
- Collaborative Workspace Area
- Full Locker Rooms
- Private Party Rooms
- Gear Shop
- Admin Spaces
- Conference Rooms

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

PLANET FITNESS | FITNESS | CHANGE OF USE | NC, VA, TX, AR & MO

Samples Include:

- ❑ Wake Forest | Sanford | Lumberton, NC
- ❑ Culpepper, VA
- ❑ Dallas | Arlington | North Hurst | Flower Mound | Forest Lane, TX
  - 22,000 SF Renovation | Change of Use
  - Kmart, Khols, Sears, Big Box Retail to Fitness
  - Entire Demo and Replacement of MEP and Fire Alarm Systems
  - Packaged Rooftop HVAC
  - LED Lighting
- ❑ Harrisonburg, VA | 4,000 SF Renovation

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

THE RIVETER |Mills River, NC

- ❑ 45,000 SF
- ❑ Fully Conditioned Climbing Gym
- ❑ Indoor and Outdoor Climbing Areas with Bouldering & Full Wall Systems
- ❑ Mezzanine Levels Overhead to Accommodate a Yoga and Spin Studio
- ❑ Designed in REVIT
- ❑ Packaged Rooftop Heat Pumps with Chalk Filtration Supplemental Units

Features Include:

- Spin Studio
- Bar
- Yoga Studio
- Bouldering Wall
- Indoor Mountain Biking
- Locker Rooms

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

CARDINAL GIBBONS | Raleigh, NC
Short Journey Retreat Center Renovation

- ❑ 2 Story | 23,500 SF Retreat Center
- ❑ Renovation
- ❑ Dorms, Class, Stage, Kitchen and Dining
- ❑ HVAC - Split System Heat Pumps
- ❑ LED Lighting
- ❑ 240 Single Phase – Electrical
- ❑ Complete Life Safety and Fire Alarm System Design

Crenshaw Consulting Engineers Provided the Plumbing, Mechanical, Electrical & Fire Alarm Engineering Designs

Our Team Believes in Planning for Quality, Not Just Checking for Quality

- Constructible
- Operable
- Maintainable
- Reliable
- Reasonable

Key Points

- Project Budget
- Project Schedule
- Full understanding of the Scope of Work
- Collaboration among team members

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Diverse Portfolio
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