

**April 17, 2024**

**REQUEST FOR QUALIFICATIONS  
CONSTRUCTION MANAGER AT RISK**

**ZEBULON FIRE AND EMS STATION**



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**REQUEST FOR QUALIFICATIONS  
CONSTRUCTION MANAGER AT RISK SERVICES  
ZEBULON FIRE AND EMS STATION**

**INTRODUCTION & PROJECT OVERVIEW**

Town of Zebulon is requesting Construction Manager at Risk qualifications packages for a new Fire and EMS station facility on a site adjacent to the Zebulon Municipal Complex. Located on West Judd Street off North Arendell Avenue (NC 96 Highway) in Zebulon, the station facility will house the Zebulon Fire Department and Wake County EMS. The project will be a joint-effort by the Town of Zebulon and Wake County. The owner of the property and building will be the Town of Zebulon. A portion of the project funding is provided through the United States Department of Agriculture (USDA), so design and construction will be subject to their restrictions and approval as well. The remainder of the funding will be provided by the Town and County.

The Town and County are operating under a Memorandum of Understanding where the County is acting as the Owner's Representative during planning, design and construction of the project. The intent of this RFQ is to hire the Construction Manager-At-Risk (CMAR) Project Team that will lead the project from preconstruction to completion, with CMAR involvement starting at the Design Development phase of design. The Town will contract directly with the CMAR; however, the Town and County will work cooperatively throughout the project.

This project will benefit from the expertise of a CMAR, which will bring significant value to the project in the constructability recommendations, cost control, schedule control and collaborative efforts that this delivery methods offers. One of the primary complexities of this project is the requirement to meet the Build America, Buy America Act (BABAA) as a condition of Federal USDA funds. The Town of Zebulon and Wake County are seeking a CMAR with Project Team experience in completing projects to meet the requirements of BABAA and/or similar Federal regulatory requirements.

The new Fire and EMS station will be single-story, with around 25,000 square feet for fire, EMS, and shared use space. The station will provide coverage to the Town of Zebulon and surrounding areas to reduce response time. The Town of Zebulon will own, operate and maintain the new Fire and EMS Station. The facility includes 5 pull-through apparatus bays, including 1 for EMS and 4 for Fire use. General programming in the building includes a Day Room, Training Room, 21-Bed Dormitory, Bathrooms, Gear Storage, and Offices for use by Zebulon Fire; a Day Room, Locker Room, Office, and Bathrooms for use by Wake County EMS; and shared use spaces including Kitchen, Dining, Exercise Room, Conference Room, Laundry, and Decontamination space for both Zebulon Fire and Wake County EMS use.

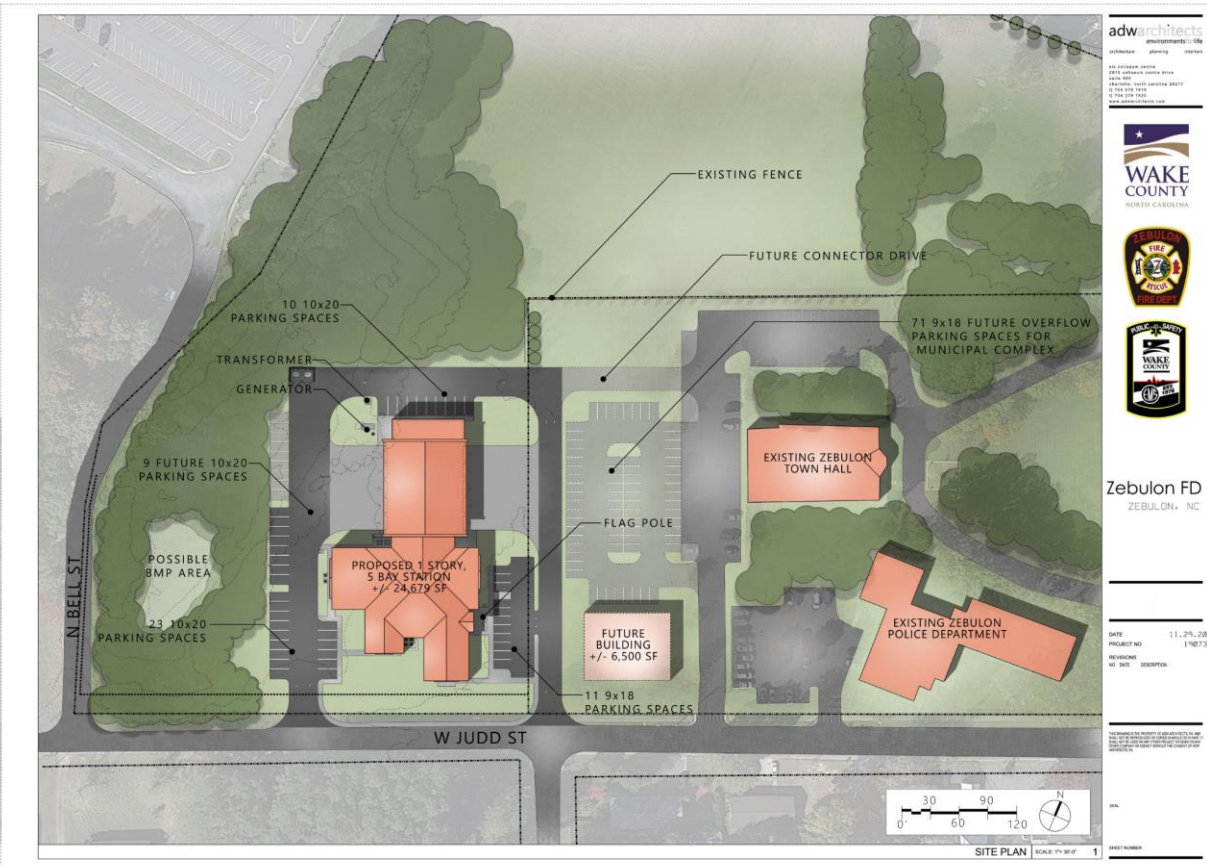
FLOOR PLAN



ZEBULON FIRE DEPARTMENT | Zebulon, NC  
 Concept Design - February 15, 2023



The site is approximately 11.13 acres and will front West Judd Street. The areas that receive fire apparatus traffic will be concrete pavement. The vehicle parking lot areas can be asphalt or concrete pavement. Forty-four parking spaces are proposed. A pedestrian connection will be made from the building to a sidewalk along West Judd Street. The site will require clearing and grading but significant cuts and fills are not anticipated. Public road improvements to West Judd Street are anticipated. The site plan will be permitted through the Town of Zebulon, while the erosion control plan will be permitted through the North Carolina Department of Environmental Quality (NCDEQ). Traffic and emergency signaling will be discussed with the Town and NCDOT as the project progresses into construction documents.



The Fire and EMS station non-bay area will be constructed with brick veneer overload bearing metal studs and the bays will be load bearing masonry clad with brick. The roof system is light gage metal trusses with standing seam metal. The exterior building fabric responds to the residential element across Judd as well as connectivity to the Town Hall complex.

**II. PROJECT TIMELINE & CURRENT STATUS.**

The project has completed the Schematic Design Phase. CMAR Preconstruction involvement will begin with Design Development phase through bid and permitting documents. Once the GMP is finalized, there will be required approvals from the Town of Zebulon, Wake County Government, the Local Government Commission (LGC) and the USDA to move forward with Construction.

A brief summary of the project milestones and anticipated durations is shown below:

<b>Task/ Activity</b>	<b>Duration</b>
CMAR Procurement	3 Months
Design & Preconstruction	8 Months
Bidding & GMP Finalization	2 Months
GMP Approvals and Agreements - Town of Zebulon, Wake County Government, the Local Government Commission (LGC) and the USDA	3 Months
Construction	15 Months
Move-in & Transition	2 Months

\* This is a general schedule. The Owner will entertain recommendations to phase portions of the work in order to provide for an earlier start to construction of the project.

**III. FUNDING PLAN FOR THE PROJECT**

This project is funded by Town of Zebulon, Wake County and the USDA. Wake County is acting as the Owner’s Representative for all components of the project. Current conceptual plan estimates indicate an overall estimated construction cost of approximately \$12 million, including contractor and CMAR fees, general conditions, site development, but excluding FFE, permits, contingencies, and other soft costs.

**IV. DELIVERY METHOD FOR DEVELOPMENT OF THE PROJECT**

A general outline of the anticipated delivery approach to development of the project follows:

**A. Design, Bidding, Construction, Warranty Phase Professional Services**

The following design team has prepared programming and schematic design:

Zebulon Fire and EMS Station Design Team

- adw architects – Architectural Design
  - CLH Design – Landscape Architecture & Civil Engineering
  - Stewart, Inc. – Structural Engineering
  - Sigma Engineered Solutions – Mechanical & Electrical Engineering

**B. Construction Services** - The Town of Zebulon will select a well-established construction firm experienced with the North Carolina Construction Manager at Risk (CMAR) delivery method.

- Preconstruction – Design Development through Construction Documents Phase:  
Construction Manager-at-Risk
- Procurement  
Minority Business Enterprise Outreach: Local firm with demonstrated success in recruitment and stimulation of interest by MBE firms (Part of CMAR Team)  
Bidding and Construction Contracting: Construction Manager-at-Risk

**C. Specialty Building Systems Consulting**

- Construction Quality Assurance: Testing and Inspection Firms under Direct Contract with Town of Zebulon to supplement Project Team basic services

**D. Furniture, Furnishings, Equipment and Signage Procurement**

1. Plans, Specifications: adw architects
2. Bidding and Contracting Entity: Town of Zebulon
3. Installation Coordination: Town of Zebulon (w/ assistance from CMAR Team)

- E. Project Management Systems** - The CMAR will be expected to implement and maintain a Web based project management service for the duration of the project. These services shall be used to coordinate and track all project correspondence.

**V. OUTLINE SCOPE OF SERVICES**

The following outline scope of services is meant to give the proposers an overview of the minimum services required for this project. The detailed scope of services will be contained in an Agreement for Construction Manager-at-Risk Services.

**A. Design**

- Review plans and schedules for phased construction and provide phasing recommendations.
- Provide input on availability and lead times for basis-of-design equipment options and other design considerations in meeting Build America, Buy America Act requirements.
- Develop preliminary CPM schedule; identify critical path for regulatory approvals/permitting.
- Perform “constructability” and maintainability reviews of the design and construction documents
- Develop cost estimates and schedule; from schematic design to construction documents phase
- Provide detailed construction cost estimates, in CSI format and sorted by trade bid packages.
- Provide quality and cost analyses of different construction methods in each major trade group for potential quality, cost and schedule enhancements; develop value engineering options.
- Prepare construction delivery and staging plans

**B. Bidding and Contracting**

- Prepare list of bid packages, advertise and distribute bidding documents
- Identify bidders, generate bid documents and prequalify bidders for all packages.
- Schedule and conduct pre-bid conferences in conjunction with the Designers.
- Conduct minority business outreach program to take affirmative steps such that small, minority and/or women-owned businesses are utilized as source of supplies, equipment, construction, and services.
- Manage bidding and contracting process in accordance with requirements of 7 CFR 1942.9, 1942.18, and the Build America, Buy America Act. Additionally, ensure bidding and contracting complies with any additional requirements of County, State, or Federal agencies.
- Review and analyze bids and work with Owner to develop GMP recommendations.

**C. Guaranteed Maximum Price (Post Bid GMP)**

- Develop draft Guaranteed Maximum Price (GMP) document
- Reconcile schedule and cost against pre-established budget and schedule.
- Develop Final Guaranteed Maximum Price document
- Develop Minority Trade Contractor Participation summary, documenting affirmative steps taken to utilize small, minority and/or women-owned businesses.

**D. Construction Phase**

- Maintain on-site staff for management of construction activities.
- Develop and maintain detailed CPM schedule
- Prepare and submit change order documentation for approval of the Designer and Owner.
- Maintain a system for review and approval of shop drawings, samples and product data.
- Maintain records and submit formal monthly reports to Designer and Owner.
- Manage construction process in accordance with requirements of 7 CFR 1942.18.
- Manage construction and documentation processes to meet Build America, Buy America Act (BABAA) requirements. Requirements include, but are not limited to, the following:
  - Procure and install only items that comply with BABAA or are subject to a waiver approved by the Secretary of Agriculture or designee.
  - Provide manufacturers' certifications for all BABAA compliant items to the architect/engineer no later than with applications for payment.
  - At substantial completion, certify that all items used on the contract complied with BABAA and that all manufacturers' certifications were provided to the architect/engineer.



- Maintain quality control and ensure conformity to plans.
- Coordinate post-completion activities, including all closeout, warranty and record documents
- Coordinate and monitor the satisfactory resolution of “punch-list” items.
- Coordinate building systems commissioning activities.

**E. Project Closeout/Warranty**

- Coordinate furniture, furnishings and equipment deliveries and installation.
- Submit record drawings for approval of the Designer and the Owner
- Assist in transition to occupancy
- Receive, record and satisfactorily address all warranty issues

**VI. SUBMISSION REQUIREMENTS**

Submittals shall be made on 8.5” x 11” paper, side bound with Table of Contents and reference tabs for key sections. The total submittal shall not exceed forty (40) single-sided pages. Supplemental proposal documents (legal history, trade contractor listing, team member resumes) are not included in the 40 page limitation. All pages are to be consecutively numbered. A thumb drive with the digital copy of the submission, .pdf format, shall accompany the hard copy submittal. All materials not clearly labeled “Trade Secret” or “Confidential” shall become property of Town of Zebulon and will be considered public documents (Reference Section XI - Confidentiality). Submittals must include, at a minimum, the following:

**A. Qualifications and Experience**

Overview and Profile of CMAR Firm(s)

- Provide corporate history of firm, including year first organized, corporate structure, partners, confirmation of authority to conduct business in North Carolina, including all licenses and any subsidiary or affiliated companies in which principals have financial interest.
- Provide organizational chart of company, including joint venture partners
- Provide contact information for key executive assigned to this project
- Describe years in business, length of time firm has provided construction services and dollar volume of all construction projects completed within the last 5 years by year.
- Provide the number of full-time employees within your company. If company has multiple branch offices, list the number of full-time employees within the local branch office, and/or the office from which the company proposes to provide services for this project.

Construction Management at Risk Services:

1. Provide the number of years the company has provided CMAR related services.
2. List all public or privately funded North Carolina CMAR projects completed or begun within the past 5 years (with completion date and dollar value)

3. Provide the following information on the three (3) listed projects that you believe to be most similar or relevant, completed in the past 5 years and include the following information:
  - a. Project Description
    - Location, basic project description, square footage, number of stories
    - Total cost at completion
    - Federal regulatory requirements, such as Build America, Buy America compliance, where applicable
    - CM fees earned for each project as a percentage of GMP (construction)
    - Preconstruction fee.
    - Bid date and comparison of final estimated cost for the GMP immediately before bids were opened and actual cost of work immediately after bid opening (before VE)
    - Provide a detailed explanation if project cost exceeded initial GMP or estimated cost
    - Identify the quantity and total value of approved change orders.
    - Minority Business Participation achieved as a percentage of the Total Contract Amount or GMP (as applicable) for each project.
  - c. Time and Schedule
    - Show your record of meeting substantial completion dates for CMAR projects for each of the projects listed above.
    - Provide a detailed explanation if project completion date was beyond the completion date as adjusted by change order(s).
  - d. Reference Information - provide contact information for each of the following:
    - Developer (if appropriate)
    - Owner's Project Manager
    - Architect
    - Your firm's Project Manager
4. Provide a list of all the company's current "Construction Manager at Risk" project commitments in **North Carolina** including the name, location, time frame to complete, and the following information for each project:
  - Total Project budget
  - Construction cost
  - CMAR preconstruction fee
  - CMAR construction management fee
  - Contact information for Owner and Lead Designer for each project

5. Information on Proposed Project Team

- Provide Project Staff Organization Chart (In-house and Consultant team members)
- Provide brief resumes of each Project Team member; at minimum, list proposed Project Executive, Project Manager and Superintendent, list years of experience with the company, year of overall experience and relevant experience to this project

**Resumes should be included in a Supplemental bound document and included with the CMAR's submittal package. The Resume Supplement will not count towards the proposal page limitation.**

6. Financial Stability **(Information can be submitted in a separate envelope marked "Confidential-Do Not Release Publicly" – any information in the separate envelope will not count towards the proposal page limitation)**

- Attach an original letter addressed to Town of Zebulon from a surety company or its agent licensed to do business in North Carolina verifying company's *capacity* to provide adequate performance and payment bonds for this project.

7. Legal History for Past Five (5) Years **(Information can be submitted in a separate envelope marked "Confidential-Do Not Release Publicly – any information in the separate envelope will not count towards the proposal page limitation)**

Provide description of any claims not resolved within 180 days of substantial completion and/or any litigation for any project (CMAR or otherwise) completed within past 5 years

8. Project Approach

- Project Planning: Provide a brief narrative addressing how the proposer will provide professional construction services under the CMAR method of delivery for this project in both the pre-construction and construction phases for:
  - (1) Value Engineering
  - (2) Constructability Issues
  - (3) Cost Estimating and Budget Management
  - (4) Quality Control
  - (5) Adherence to Project Schedule
  - (6) Compliance with Build America, Buy America Act
- Minority Business Enterprise (MBE) Outreach: Identify your five (5) most successful projects relative to MBE participation (i.e., goals were met or exceeded); Describe what strategies were used to make these projects successful; Specifically indicate the percent MBE participation on each of the five (5) projects.

- Identify how you will achieve maximum “Local” trade contractor and supplier involvement. Describe your relationship with local trade contractors by providing list of trade contractors with whom you have done business in North Carolina within the past five years. **(Information can be submitted in a separate envelope marked "Confidential-Do Not Release Publicly" – any information in the separate envelope will not count towards the proposal page limitation)**
- Describe how the project team proposes to use technology to manage and control the project, including Building Information Modeling and a shared submittal system.
- Description of the CMAR's Safety Program and historical safety record.

**B. Questionnaire (Considered as part of the 40-page limit)**

Respondents are required to provide responses to the following questions. Each question is to be listed in italics, followed by the response in normal type style.

1. Provide an overview of your team’s philosophy for managing construction of a new public safety facility project with complex regulatory requirements numerous public agency stakeholders.
2. Describe your approach to maintenance considerations during the various review stages of the design and construction of a project.
3. Explain your procedures for document quality control and coordination of the various trade packages in the design and procurement phases relative to review of drawings and specifications.
4. Describe how the team would provide cost management services on this project using the CMAR delivery method. Provide the best cost-model format you have used on other projects.
5. Describe your proposed method and time frame for developing the Guaranteed Maximum Price.
6. Explain the management tools, techniques and procedures you use to monitor and maintain the project schedule (from conceptual design through closeout of the project).
7. Describe your approach to ensure that construction and documentation processes to meet Build America, Buy America Act (BABAA) requirements are met for this project.
8. How do you manage the time and quality aspects of the process of reviewing and approving subcontractor submittals, clarification requests, issuance of bulletin drawings, development of cost proposals, identification and justification of change orders, payment requests, commissioning, final inspections and assembly of the project close-out documents?

9. This project will have a tight construction schedule. Given that all permits are in place at the beginning of construction, briefly describe approaches you might consider for expediting the schedule by 30 days from that shown in this RFQ.
10. How do you manage project close out in a manner that quickly provides for occupancy with minimal punch list items and warranty issues?
11. Describe your team's commitment to the success of this project and why you believe your assembled team is the best choice for this project.
12. Describe your team's approach to encouraging MBE participation to ensure compliance with Town of Zebulon's MBE Policy and with the Minority business participation goals applicable to public building projects in the state of North Carolina and/or projects that include federal funding.

**Fully complete, sign, notarize and submit the "Submittal Certification Form" included as Attachment to this RFQ.**

## **VII. SELECTION OF CMAR TEAM**

A selection committee will conduct a rigorous review and evaluation of the qualifications and experience of any firm that expresses interest in providing such services to the Town of Zebulon. This approach ensures that the CMAR is selected in a fair and uniform manner, that the CMAR selected for the project is qualified and experienced in constructing public facilities and that every qualified CMAR has the opportunity to be considered for providing their services to the Town of Zebulon.

### **A. Process**

- **Qualification Stage:** In addition to public advertisement of Request for Qualifications (RFQ), this RFQ is being sent to firms identified on Wake County's current "Capital Improvement Program" List of Contractors that have previously expressed interest in being considered for providing CMAR services for this type of project. Upon receipt of Submittal Packages from respondents, Selection Committee members will review and identify ("short list") those teams that appear to be most qualified to provide services for the project.
- **Presentations and Interviews:** Separate presentations and interview sessions will be scheduled with the "short-listed" firms to permit Selection Committee members to further evaluate each firm's qualifications. Promptly after the interviews the Selection Committee will make their final selection.
- **Contract Negotiations:** Following the Selection Committee's final selection, the Town of Zebulon will be directed to negotiate final terms, conditions and fees of an agreement with the selected CMAR Team. In the event negotiations prove unsuccessful with this team, the Town will initiate negotiations with the next highest ranked short listed firm.

## **B. Proposal Submittal Timeline**

The key activities and milestone dates for the CMAR team selection and contracting process are listed below.

<b>CMAR Selection Task/ Activity</b>	<b>Completion Date</b>
RFQ Published and Distributed	4/17/24
Pre-Submission Conference	5/1/24
Deadline for Respondent Questions	5/3/24
Addendum Published and Distributed (if required)	5/10/24
Proposals Submission Deadline	5/17/24
Selection Committee presentation/interviews sessions - Anticipated	6/17/24-6/21/24
Contract Executed - Anticipated	7/8/24

**\*Note:** A Pre-submission Conference will be held at 2pm on Wednesday May 1<sup>st</sup> at the Zebulon Fire Department Training Room 131 E Vance St, Zebulon, NC 27597. It is requested that a maximum of four (4) persons from each CMAR Team attend. Any questions must be submitted in writing no later than May 3, 2024. Responses will be issued by May 10, 2024 to all those attending the Pre-submission Conference.

## **C. Evaluation Criteria**

Criteria similar to the following will be used to evaluate submittals from CMAR Teams and to select Teams for further consideration. The order in which criteria is listed does not indicate any priority, rank or relative importance. The Selection Committee will establish the relative importance and final listing of evaluation criteria.

1. Past performance and experience on similar projects.
2. Qualifications and experience of CMAR team proposed for the project.
3. Experience with and specific expertise related to compliance with federal guidelines such as the Build America, Buy America Act.
4. Experience and successful relationship with local trade contractors and suppliers.
5. Proposed approach and proven success in encouraging minority participation.
6. Demonstrated success in cost control and maintaining schedules on publicly funded projects.
7. Current workload and staff availability for the project.
8. Proposed approach to delivering construction services for projects of this type (including satisfactory response to this RFQ).
9. Proximity to and familiarity with the area where the project is located.
10. Record of successfully completed projects without significant legal or technical problems.
11. Other factors that may be appropriate for the project.

## **VIII. DUE DATE FOR SUBMITTING QUALIFICATIONS**

**Seven (7) complete packages must be received at the following address by 12:00 pm (Noon), EDT, on Friday, May 17, 2024, per the schedule above:**

To: Town of Zebulon  
Fire Department  
Attention: Christopher Perry, Fire Chief  
email: cperry@townofzebulon.org  
Phone: (919) 823-1840

Address: 113 E. Vance Street  
Zebulon, NC 27597

## **IX. GENERAL COMMENTS OR CLARIFICATIONS**

- A.** Any cost incurred by respondents in preparing or responding to this RFQ shall be the respondents' sole responsibility.
- B.** All responses, inquiries or correspondence relating to this RFQ will become the property of Town of Zebulon when received (subject to Section XI - Confidentiality).
- C.** Town of Zebulon has sole discretion and reserves the right to reject any and all responses received with respect to this RFQ and to cancel the RFQ process at any time prior to entering into a formal agreement. The Town of Zebulon reserves the right to request additional information or clarification of information provided in the response without changing the terms of the RFQ.
- D.** Respondents are advised to refrain from contact with Selection Committee members. Any specific questions regarding the Request for Proposal should be directed to the Town of Zebulon office in writing to the email listed above for Chief Christopher Perry.

## **X. CONFIDENTIALITY OF DOCUMENTS**

In general, documents that are submitted as part of the response to this RFQ will become public records, and will be subject to public disclosure. North Carolina General Statutes Section 132-1.2 and 66-152 provide a method for protecting some documents from public disclosure. If the CMAR Team follows the procedures prescribed by those statutes and designates a document "confidential" or "trade secret", the Town of Zebulon will withhold the document from public disclosure to the extent that it is entitled or required to do so by applicable law.

If the Town of Zebulon determines that a document that the CMAR Team has designated "confidential" or "trade secret" is not entitled to protection from public disclosure, the Town of

Zebulon will provide notice of that determination to the contact person designated by the CMAR Team, in any reasonable manner that the Town of Zebulon can provide such notice, at least five business days prior to its public disclosure of the document. If the CMAR Team does not designate anyone to receive such notice, or if, within five business days after the designated person receives such notice, the CMAR Team does not initiate judicial proceedings to protect the confidentiality of the document, the Town of Zebulon will not have any obligation to withhold the document from public disclosure.

By submitting to the Town of Zebulon a document that the CMAR Team designates as “confidential” or “trade secret”, the CMAR Team agrees that in the event a third party brings any action against the County or any of its officials or employees to obtain disclosure of the document the CMAR Team will indemnify and hold harmless the Town of Zebulon and each organization’s affected officials and employees from all costs, including attorney’s fees incurred by or assessed against any defendant, of defending against such action. The CMAR Team also agrees that at the Town of Zebulon’s request the CMAR Team will intervene in any such action and assume all responsibility for defending against it, and that the CMAR Team’s failure to do so will relieve the Town of Zebulon of all further obligations to protect the confidentiality of the document.

**An electronic version of this RFQ is available at the Town of Zebulon’s website under Bid Proposals at <http://www.townofzebulon.org/businesses/bid-proposals>**



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# ZEBULON

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NORTH CAROLINA

1003 N. Arendell Avenue  
Zebulon, North Carolina 27597  
919.823.1800

www.townofzebulon.org

**XI. SUBMITTAL CERTIFICATION FORM FOR TOWN OF ZEBULON FIRE AND EMS STATION CMAR RFQ**

**\*\*COMPANY NAME\*\***

Title:  
Attest:

(SEAL)

License number under which the project will be executed:  
Name license number above is held in

**REQUEST FOR QUALIFICATIONS**

VERIFICATION (Provide separate verifications for each Joint Venture or Partnership entity)

I HEREBY CERTIFY THAT THE RESPONSES OF ARE CORRECT AND TRUTHFUL TO THE BEST OF MY KNOWLEDGE AND FOR THOSE RESPONSES GIVEN WHICH ARE BASED ON INFORMATION AND BELIEF, THOSE RESPONSES ARE TRUE AND CORRECT BASED ON MY PRESENT BELIEF AND INFORMATION

This the day of , \_\_\_\_\_ 2024.

**\*\*COMPANY NAME\*\***

Title:

STATE OF

COUNTY OF

I, a Notary Public in and for the County and State aforesaid, do hereby certify that personally came before me this day and acknowledged that he is of and by that authority duly given and as an act of, the foregoing instrument was signed by, its, attested by him/herself as Secretary, and sealed with the common seal of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and Notarial Seal this the \_\_\_\_\_ day of 2024

Notary Public  
My commission expires:

**REQUEST FOR QUALIFICATIONS  
CONSTRUCTION MANAGER AT RISK SERVICES  
TOWN OF ZEBULON FIRE AND EMS STATION**

**APPENDIX A  
SCHEMATIC DESIGN NARRATIVE**



# SCHEMATIC DESIGN REPORT ZEBULON PUBLIC SAFETY BUILDING

ZEBULON, NORTH CAROLINA

MAY 2023



OWNER

**TOWN OF ZEBULON**  
1003 N ARENDELL AVE  
ZEBULON, NC 27597

PREPARED BY

ARCHITECT

**ADW ARCHITECTS, PA**  
2815 COLISEUM CENTRE DRIVE, SUITE 500  
CHARLOTTE, NORTH CAROLINA 28217

CIVIL ENGINEER

**CLH DESIGN, PA**  
400 REGENCY FOREST DRIVE, SUITE 120  
CARY, NORTH CAROLINA 27508

STRUCTURAL ENGINEER

**STEWART INC.**  
223 S. WEST STREET, SUITE 1100  
RALEIGH, NC 27601

PLUMBING | MECHANICAL | ELECTRICAL | FIRE PROTECTION ENGINEER

**SIGMA ENGINEERED SOLUTIONS PC**  
2100 GATEWAY CENTRE BLVD., SUITE 100  
RALEIGH, NC 27560

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## OVERVIEW

The new Zebulon Fire Department will be located on a combined +/- 11.1-acre property located on West Judd Street in the Town of Zebulon. The new fire department will be single-story and approximately 24,679 square feet for fire, EMS, and shared use space, providing coverage to the Town of Zebulon and surrounding areas to reduce response time.

The new public safety facility will be designed and constructed to serve for 50+ years. The project has a construction budget of approximately +/- 9.9 million. This budget excludes soft costs such as furniture, fixtures, fees, and equipment (FFE).

Two separate public meetings were held at the Town Hall, which presented design information to the surrounding neighbors. The response from the neighbors was positive.

## SITE DESIGN

A new public safety station is proposed on the adjacent parcel, southwest of the Town of Zebulon Town Hall campus in the Town of Zebulon. Currently, the Town owns the site where the public safety station is proposed. The design team and the Town are collaborating to either delineate a lot for this facility or propose a property recombination. Currently, the site is approximately 11.13 acres. The site will front West Judd Street.

The domestic water and fire protection lines for this facility will connect into the City of Raleigh Public Utilities 12-inch water main within West Judd Street. The sanitary sewer for this facility will connect to manhole at the southeast corner of the site within the West Judd Street right of way. This project will include a temporary sediment basin and permanent stormwater control measure (SCM). No impacts to the streams or wetlands are proposed at this time. A stream and wetland delineation study is currently being performed by others.

The areas that receive fire apparatus traffic will be concrete pavement. The vehicle parking lot areas can be asphalt or concrete pavement. The proposed landscaping will be designed to meet the Town's requirements. Forty-four parking spaces are proposed. A pedestrian connection will be made from the building to a sidewalk along West Judd Street. Site lighting will be designed and provided by Duke Energy. Trash and recycling will be collected and serviced from a proposed dumpster enclosure northwest of the building. The site will require clearing and grading but significant cuts and fills are not anticipated.

The site plan will be permitted through the Town of Zebulon, while the erosion control plan will be permitted through the North Carolina Department of Environmental Quality (NCDEQ). No NCDOT permitting will be required as the West Judd Street is a state road. Public road improvements to West Judd Street are anticipated. Half of the ultimate road cross section would be required to be constructed along this project road frontage. This would include a sidewalk and road widening. Traffic and emergency signaling will be discussed with the Town and NCDOT as the project progresses into construction documents.

## **BUILDING DESIGN AND PROGRAMMING**

A new single story design was developed to maximize response time efficiency within the constraints of the site.

A programming review meeting was held to review the program and make any changes prior to preceding with Schematic Design and site plan approval. The final programmed square footage of the building is 24,679 sf. A copy of the program has been included with this SD report.

## BUILDING EXTERIOR

### PROPOSED ARCHITECTURAL MATERIALS

#### Exterior Wall Construction

The new EMS facility will be designed to have a 50+ year service life. The typical exterior wall construction for the non-bay areas will be comprised of (from interior to exterior) 5/8" gypsum wallboard, 6" load bearing metal studs @ 16" o.c. with R-19 batt insulation between studs, 1/2" glass mat sheathing, fluid applied air/weather barrier, 2" (min. R-10), an air space cavity, red modular brick veneer on top of shot-blasted CMU base, with precast architectural sills and accent bands. Prefinished insulated metal wall panels will be used at different areas of the building facade. Exterior walls of the apparatus bay will be comprised of 12" load bearing CMU, fluid applied air/weather barrier, 2" (min. R-10) rigid insulation, red modular brick veneer on top of a split-face CMU base.

#### Windows, Louvers, and Doors

The building entry vestibule will incorporate prefinished aluminum curtain wall framing with 1-inch insulated low-e glass. The rest of the building will be comprised of prefinished fixed aluminum clad wood windows with insulated low-e glass. All wall louvers will be prefinished fixed aluminum with insect screens and match the adjacent material color. All window sills will incorporate sloped precast architectural sills.

The vehicle bay doors will be 14'-0" x 14'-0" prefinished sectional overhead doors at the rear and bi-folding doors at the front. All vehicle bay doors will be protected by steel pipe bollards inside and outside filled with concrete and fitted with removable plastic bumper guard sleeves & caps.

#### Roofing

The apparatus bay roof construction will consist of a prefinished standing seam metal roof system on HT ice and water shield on cover board, on a rigid R-30 roof insulation on 1 1/2" steel decking supported by steel beam framing.

The business/living side of the building roof construction will consist of prefinished standing seam metal roof system on HT ice and water shield on cover board, on rigid R-30 roof insulation on pre-engineered light GA metal trusses at 48" o.c. One layer of 5/8" gypsum wallboard will be provided at the bottom of the trusses to isolate the attic space from conditioned space.

Metal roofing eave, rake trim, fascia, soffit panels, ridge caps, and valley plates will match the standing seam roof system. Prefinished aluminum gutters and downspouts, color matched to roofing, will be incorporated along all roof eaves. All downspouts will incorporate downspout protection shoes and be tied into the storm drainage system. Continuous snow and ice guards will be incorporated into the roof system where appropriate. Roof penetrations will be minimized as much as possible.

#### Additional Exterior Design Considerations

The building will incorporate building mounted signage at the main building entry and above the apparatus bay doors.

## BUILDING INTERIOR

### Wall Construction and Finishes

Interior business/living spaces will be constructed of 3 5/8" and 6" light gage metal stud framing with 5/8" gypsum wallboard. Required rated walls will be capped above the ceilings and non-rated walls will extend to the bottom of the truss chord.

Typical business/living space gypsum walls will be painted and will include standard rubber resilient base. The building restrooms and bathrooms will incorporate porcelain tile on the floors and porcelain tile on the wet walls. Showers will have porcelain tile on the floor and all 3 walls. The janitors closet will incorporate a sanitary wall finish (FRP) two sides of the mop sink and 8'-0" high above mop sink.

Areas that support the apparatus bay area will have partitions constructed of 12" CMU extending to the underside of the deck and sealed off (decontamination room, tool room, EMS medical supply, turnout gear, electrical, and storage rooms). The business/living side of the 12" CMU walls will be furred out with 7/8" furring channels and 5/8" gypsum wallboard (painted). The exposed 12" CMU walls will be painted with epoxy paint on the apparatus side of the rooms. The exposed 12" CMU walls at the apparatus bay space will be painted with epoxy paint.

### Floor Construction and Finishes

The apparatus bay floor will be 8" thick reinforced concrete with 10 mil vapor retarder and 6" crushed stone. All other building floor slabs will be 4" thick reinforced concrete with 10 mil vapor barrier and 4" crushed stone. The Decontamination Room will be 6" reinforced concrete with 10 mil vapor barrier and 6" crushed stone.

The apparatus bay slab finish will be finished with a hardener-densifier product. The decontamination room, tool room, and EMS medical supply room will all have sealed concrete slabs. The business/living spaces will have carpet tile. Kitchen, restrooms, and bathrooms/showers will have porcelain tile. The training room will have carpet tile. The vestibule, lobby, hallways & corridors will have vinyl composite tile. The vestibule area into the apparatus bay areas will have walk-off carpets to trap carcinogens from entering the living/business areas of the building.

### Ceilings

On the business/living side of the building, the primary ceiling type will be a 24" x 24" lay-in acoustical tile. The restroom, bathrooms, and janitors closet will be a 24"x24" lay-in vinyl wrapped tile (clean room and washable). Mechanical & electrical rooms will all have moisture resistant gypsum wallboard.

The apparatus bay exposed metal decking will have a 2" acoustical spray installed (color- light grey). All exposed steel will be painted to match the color of the acoustical spray. All exposed electrical conduit will be painted to match acoustical spray.

### Interior Doors

All business/living area interior doors (with the exception of the doors into the apparatus bay area) will be wood doors (stained) with painted hollow metal frames. The interior doors to the apparatus bay area will be painted hollow metal doors with painted hollow metal frames.

All doors are to be keyed to meet Wake County keying and hardware standards (Yale cylinders for interior spaces/Medco cylinders for exterior doors). Door security requirements as mentioned previously will be coordinated with Protus-3.

### Millwork

Built-in millwork will be incorporated in the building's kitchen, Dining/Workstation, restrooms, and bathrooms. Counters in the kitchen area will be quartz surface and other counters will be either solid surface, or plastic laminate. The building's storage rooms including janitor's closet will incorporate storage shelving. Base cabinets and wall mounted shelving/cabinets will be incorporated in the laundry room. EMS medical supply room will be open metal shelving.



**BUILDING INTERIOR  
(continued)**

**Appliances and Equipment**

The following appliances and equipment will be required (by owner):

Kitchen	(2) Stainless steel gas electric ranges (2) Stainless steel overhead mounted microwave (3) Stainless steel refrigerator/freezer (2) Stainless steel residential dishwasher Coffee maker
Dining Room + Day Rooms	Television (size TBD) Coffee maker Stainless steel overhead mounted microwave (2) Computer workstations
Fire Work/Radio	(2) Computer workstations with (1) shared printer
Conf. Room	LCD TV
Training Room	LCD TV Coffee maker
Medical Supply	Sharp medical waste container Shelving
Decon Room	Deep 2-compartment stainless steel sink with 2 drain boards & hand dryer Emergency eye-wash station Drying Cabinet Extractor Board Wash
Ice/Tool/Storage Room	Tire rack (Not included in general construction contract) Two vending machines Ice maker Compressor Tool bench Shelving
IT Room	Data/Communications equipment rack and associated equipment
Laundry Room	Residential washer & dryer, mop sink Counter & base cabinets
Janitor	Hose bib and mop sink Shelving
Apparatus Bay	CO sensors tied to exhaust systems Ceiling mounted vehicle shore power (20 & 30 amp) Ceiling mounted radiant gas heaters 14'-0" x 14'-0" Overhead sectional bay doors at the rear and bi-folding doors at the front

Fire extinguisher cabinets will be provided as required throughout the building

**Furnishings**

The furnishings will be provided through a contract separate from the general construction contract. A floor plan will be provided for reference along with cut sheets of furnishings to bid. The designer will review the bids, the furniture submittal, and perform a final punch list.

**General**

The proposed construction is a new single-story public safety building for Zebulon, NC. Much of the building is dedicated for the Zebulon Fire Department with some shared and dedicated space for Wake County EMS. The building will be approximately 24,700 SF and broken into two areas. The apparatus bay includes 5-bays for emergency vehicles with rooms for tools, turn out gear and storage space. The plan west side of the building is the administration side and includes day rooms, exercise room, large training room, dormitories, kitchen and dining, toilets and lockers, conference room, support spaces, and offices.

**Foundations**

A site-specific geotechnical investigation has not been performed at this time. Foundation discussion is presumptive until an investigation has been performed. We would anticipate a shallow foundation system will be utilized. Continuous footings will likely support the exterior and interior load bearing walls. Isolated spread footings would support interior columns where needed. Wall footing sizes would likely be 24" to 36" wide and approximately 12" to 16" deep. Interior spread footings will likely be 3' to 6' square. The foundation system will be determined by the geotechnical engineer following the investigation and laboratory work.

**Slab on Grade**

Slab on grade in the administration side will likely be 4" thick reinforced with welded wire fabric. Slab on grade in the apparatus room will be 8" thick reinforced with #4 bars at 12" on center each way. Slab on grade in the turnout gear, tool room, and storage and electrical spaces will be a 6" concrete slab on grade with #3 bars at 24" on center each way. Slabs will be constructed on 4" to 6" of crushed stone. A 15-mil vapor barrier will be placed over the stone. Sawed control joints will be utilized to control shrinkage cracking of the slabs on grade. Isolated mechanical equipment pads will be required for mechanical equipment.

**Framing Systems**

The superstructure of the building will be designed to support the code required gravity vertical loads and the horizontal lateral loads imparted by seismic and wind. The design will be based on strength of members along with stiffness to control deflection. Expansion joints will not be required for this building.

Apparatus Room:

The roof framing will be steel beams bearing on the masonry walls. Large bent steel beams will bear between each door, spanning approximately 79'. Shallow steel beams will frame into the bent steel beams spanning approximately 18'-0". The shallow beams will be spaced approximately 6'-0" down the building slope and at the ridge. Roof deck will be attached over the steel beams using 1½" 20 gage galvanized steel deck. The steel beams bearing on the 12" masonry walls will be supported with bearing plates installed in the masonry walls. The beam pockets will be filled with masonry after the beams are installed.

Administration Side and Turnout Gear/Tool Room Framing:

The administration side will consist of sloped light gage metal roof trusses spaced at 48" on center. The trusses will bear on exterior metal stud walls. Interior light gage framed walls or steel beam lines will be provided to break the span of the roof trusses where required. 1½" -

## STRUCTURAL SYSTEMS (continued)

22 gage galvanized steel roof decking will be installed over the light gage trusses. The turnout gear/tool room roof will also be framed with single slope light gage trusses spaced at 48" on center with steel roof deck installed over the trusses. The trusses will bear on the CMU wall of the apparatus room and exterior CMU walls.

### Mezzanine:

A steel framed mezzanine will be located over the tool/EMS storage/electrical rooms. The mezzanine floor will use steel beams supporting 2" – 20 gage composite steel decking. A normal weight concrete slab will be poured over the decking to create the floor surface.

### **Lateral Design**

The lateral system of the building will be designed to meet the strength and deflection criteria specified in the design criteria section. The lateral system will be designed to support the lateral forces imparted by the wind and seismic loads indicated in the building code.

This building will utilize light framed walls with wood structural panels or flat strap bracing at the administration side of the building. Masonry shear walls will be used at the apparatus room and gear turnout/storage spaces. Reinforcing will be provided throughout the wall and at the ends of wall segments. Depending on the geotechnical investigation, horizontal bond beams may be required in the masonry walls around the apparatus room. Where bond beams are required, they would be spaced 16" to 48" on center throughout this area.

### **Building Envelope**

We understand the building exterior will masonry or brick veneer. Loose lintels will be required to support the brick veneer over windows and doors. Steel beam and plate or bond beam lintels will be required to support large door openings in masonry walls. Exterior walls at the administration side will consist of 6" metal studs spaced approximately 16" on center. 8" metal stud walls may be required at the gable walls due to the height of the walls to support brick deflections.

12" masonry will be used at the apparatus room. 8" CMU will be used at the gear turnout room. The masonry walls will have reinforcing in most cells along the front and rear walls with large openings for the roll up doors. Rebar will be spaced periodically up to a maximum spacing of 48" on center in the other walls. Deeper masonry pilasters may be required between the apparatus bay doors with the long 5-bay space.

Galvanized steel angles bolted to the CMU walls will be required to support brick on the back side of parapet walls that extend above the roof on the apparatus room.

### **Special Inspections**

Special Inspections will be required for this project based on the building classification. The construction documents will include a Statement of Special Inspections which will outline the inspection types required for the project.

### **Design Criteria**

#### **Codes and Standards**

- North Carolina State Building Code- 2018 Edition based on IBC 2015
- North Carolina State Construction Manual
- ASCE 7-10 Minimum Design Loads for Buildings and Other Structures
- ACI 318-14 Building Code for Reinforced Concrete

## STRUCTURAL SYSTEMS (continued)

- Specification for the Design, Fabrication and Erection of Structural Steel for Buildings (AISC 360-10)
- ACI 530-13 Building Code Requirements for Masonry Structures
- AISI 2012 Cold Formed Steel Design Specification (2010 Supplement)

### Loads

- Live Loads
 

Roof	20 psf; 300# concentrated
------	---------------------------
- Snow Load
 

Ground Snow Load	15 psf
Snow Importance Factor	$I_s=12$
Roof Snow Load	18 psf
- Wind Load
 

Basic Wind Speed (including importance)	120 mph
Wind Exposure Category	Exposure C
Components and Cladding	Per Section 6.5 of ASCE 7-10
- Seismic Load
 

Basic Seismic Force Resisting System	Intermediate Reinforced Masonry Shear Walls; Light Framed Walls with Wood Structural Shear Panels or flat strap bracing
Response Modification Coefficient	To be determined (TBD) based on geotechnical investigation
Deflection Amplification Factor	TBD
Seismic Site Class	TBD
Spectral Response Coefficient (short)	$S_s=14.4\%g$
Spectral Response Coefficient (1-sec)	$S_1=7.2\%g$
Seismic Design Category	TBD
Seismic Importance Factor	$I_E=1.50$

### Serviceability Criteria

- Deflection
 

Dead plus Live Load	L/240
Live Load	L/360
Members Supporting Masonry	L/600 not to exceed 0.3 inches
- Drift
 

Due to wind	H/360
Due to seismic	$0.015 * \text{Story Height}$

### Materials

## STRUCTURAL SYSTEMS (continued)

- Concrete
  - Foundations/Footings 3,000 psi, normal weight
  - Slab on Grade 3,000 psi, normal weight
  - Apparatus Room Slab on Grade 4,000 psi, normal weight
  - Mezzanine Elevated Concrete Slab 4,000 psi, normal weight
  - Reinforcement: all ASTM A615 Grade 60
  
- Structural Steel
  - W Shapes ASTM A992
  - Plates, Channels, and Angles ASTM A36
  - Hollow Structural Sections ASTM A500, Grade B
  - Miscellaneous Steel ASTM A36,  $F_y=36$  ksi
  
- Masonry
  - CMU  $f'_m= 2,000$  psi
  - Mortar Type S - ASTM C270 28 day  
Compressive strength=1,900 psi
  
- Cold Formed Steel Studs  
Manufacturer's standard shaped steel per ASTM C955

# PLUMBING SYSTEMS

## MEPFP Schematic Design Narrative

This portion of the schematic design narrative addresses the proposed Mechanical, Electrical, Plumbing and Fire Protection (MEPFP) systems. All proposed systems in this portion of the schematic design document will meet the following general design criteria:

- All 2018 North Carolina building codes

### MEPFP Primary Narrative Assumptions

- 24000 sf (+/-) single-story,
- Full building standby power systems with automatic transfer
- No PSAP or EOC uninterruptible power systems or redundant infrastructure requirements
- Seismic Category 'C' (All MEPFP systems provided with design-build restraint systems designed by a professional engineer registered in North Carolina.)

## Plumbing Systems Design

### General Parameters

### Codes and Standards

The Project is being designed using applicable design and construction criteria as determined from the following references:

- 2018 North Carolina Plumbing Code
- 2018 North Carolina Fuel Gas Code
- ADA Americans with Disabilities Act Accessibility Guidelines

### Domestic Water Supply Systems

A 2" water service will be provided through a 2" RPZ backflow preventer located in a hotbox outside. All domestic water piping shall be type L copper with fiberglass insulation.

### Water Heating Equipment

A high-efficiency gas fired water heater will be installed in the mechanical room and will service the hot water needs of sinks, lavatories, washers, and janitor sinks.

A recirculation pump will be used to maintain quick hot water response times.

### Plumbing Fixtures

Water closets shall be low flow flush-valve floor mounted type. Flush valves shall be battery powered automatic.

Lavatories shall be under-counter mounted or wall hung with hard-wired electronic infrared sensor faucets.

Water coolers shall be hi-low with bottle fillers.

Kitchen sinks and scullery sinks shall be stainless steel with gooseneck faucets and levered handles.

The janitor sink shall be cast terrazzo with vacuum breakers on both hot and cold water supplies.

### Piping Support and Bracing

Details will be provided for the appropriate support and bracing of gas piping based upon the designated seismic class.

# FIRE PROTECTION SYSTEMS

## Codes and Standards

The Project is being designed using applicable design and construction criteria as determined from the following references:

- NFPA 13
- NCFPC2018

## Sprinkler Systems

The building will be fully sprinklered, Ordinary Hazard Group 1. The sprinkler system will be wet-pipe and will protect all interior spaces with upright or concealed pendant heads depending on ceiling types in spaces. Overhangs will be protected with sidewall dry heads. This would include the covered patio Alternate, if accepted. It is not anticipated that a dry system will be required for this building.

A new 6" Fire Protection line will be brought into the apparatus bay in the NW corner as designated on the plans. A 4" RPDA assembly will be installed in a hot box located on the site. A fire pump is not expected to be needed; however, an analysis will be performed at the next phase of the project.

High temperature heads will be installed in the apparatus bay as required around radiant heaters.

All sprinkler piping over 2" shall be schedule 10 with Victaulic fittings. All sprinkler piping under 2" shall be schedule 40 threaded black pipe. No flexible sprinkler heads will be permitted.

It is expected that there will be a 2 1/2" truck fill line provided as part of the project.



An ERV shall be used to reclaim exhaust air energy generated mostly by the bathrooms and kitchen areas and pre-treat make-up air required to pre-treat the heavier ventilation air requirements of the conference and training room.

Decon, Exercise, and EMS supply rooms will be conditioned.

Electrical room and IT closet will each have a ductless mini split heat pump.

Additional stand-alone dehumidifiers will be provided for each of the shower rooms and locker-room to help to control localized humidity loads.

Apparatus bay will be heated with radiant tube heating located approximately 14' AFF. Heaters shall be controlled with a timed wall switch and activated manually. A bay ventilation system shall be installed. The system shall include one or multiple exhaust fans at one end and an intake louver at the other. Louver dampers shall be interlocked with exhaust fan start/stop. The exhaust system shall be activated upon alarm of a CO detection system or with manual timed operation.

A commercial hood may be required as the cooking equipment is further defined and if required will be a stand-alone exhaust system with an 80% conditioned make-up air unit. Otherwise, range exhaust will be handled through a partial-recirculating range hood.

## Electrical / Fire Alarm Design

### General Parameters

#### Codes and Standards

All electrical systems proposed for this building will be designed in accordance with the following codes and standards:

- NEC National Electric Code – 2020 Edition
- IES – Illuminating Engineering Society
- ANSI – American National Standards Institute
- NFPA 72 – National Fire Protection Association – National Fire Alarm Code – 2013 Edition
- NFPA 110 – Standard for Emergency and Standby Power Systems – 2013 Edition
- NFPA 101 – Life Safety Code – 2015 Edition
- 2018 North Carolina Fire Code
- 2018 North Carolina Energy Code

#### General

Distribution and branch panelboards shall be fully rated with main circuit breaker or main lugs only, as required by the project. Branch circuit panels shall be located where indicated on the drawings. All branch circuits shall be sized for a maximum voltage drop under a full load from the farthest device on the circuit to the panelboard of 3%.

All branch circuits shall be run in conduits. Indoor conduits shall be EMT in concealed locations, and rigid metal conduit in locations where exposed to potential physical damage. All feeders shall be sized for a maximum voltage drop from the main distribution point to any panelboard of 2%. All panelboards shall be specification grade with copper busses and lugs. All feeders and branch circuits shall be copper. All underground conduits shall be schedule 40 PVC and encased in concrete with galvanized rigid conduit "turn-ups".

All building exterior exposed conduits shall be galvanized rigid steel conduits.

Electrical systems shall be sized with 25% spare capacity. Panelboards shall be bolt-on circuit breaker type, with 98% conductivity hard drawn copper bus. The acceptable manufacturers are: Square-D, Eaton, and General Electric.

#### Proposed Electrical Service/Distribution Service

The main service will be approximately 1000A, 208Y/120V, 3 phase, and 4 wires. The service size is approximate as it is based on the size of the facility, and preliminary mechanical equipment loads. A pad mounted service transformer and primary service shall be furnished and installed by Duke Progress. The Contractor shall provide the 1000-amp secondary service entrance lateral, underground in concrete encased duct bank, to the 1000A main distribution panel located in the building's main electrical room.

The main distribution panel shall be rated at 1000A, 208Y/120V, 3 phase, 4 wires with main circuit breaker, and appropriately sized feeder circuit breakers supplying the following:

- (2) 208Y/120V, 3 phase, 4 wires, 42 pole, 1-section, 150A, lighting panel
- (2) 208Y/120V, 3 phase, 4 wires, 42 pole, 1-section, 225A, mechanical panels
- (3) 208Y/120V, 3 phase, 4 wires, 66 pole, 1-section, 225A, receptacle panel

Additionally, the main service shall be provided with transient surge suppression. All panels will be provided with copper bussing.

The building's electrical system will be provided with a NEC 702 Standby Power system, meaning the all electrical loads will be on the generator system. We estimate the generator to be provided at 350 kW with a 72-hour standby diesel fuel system.

An automatic transfer switch, rated for standby operation shall be provided to automatically transfer power from the utility to the generator. The ATS shall be 3-pole, open transition type, rated for 1000A at 208Y/120V.

Article 700 Systems, such as emergency egress lighting, exit signage and fire alarm systems will be provided via battery back-up, integral to the lighting fixtures or FACP.



## ELECTRICAL SYSTEMS (continued)

### Lighting

The lighting will be designed in accordance with Illuminating Engineering Society (IES) Standards for lighting levels. Interior lighting energy consumption shall meet the requirements of NC Energy Conservation Code (2018 edition) Section C405. Lighting voltage level shall be 120V.

Occupancy sensor switching will be provided in the following areas: restrooms, janitor closets, private offices, conference rooms, break rooms, and storage rooms. In general, spaces will be provided with dimming with the exception of the vehicle bays and mechanical rooms. Fixtures located outdoors or in wet areas shall be UL listed for wet locations.

Exit signs will be LED type with white thermoplastic or steel housing, located in all paths of egress as required by code. Lighting branch circuits will be designed to provide maximum versatility. Lighting control shall be provided for balancing the light within the space and for lighting on/off control. Some interior lighting fixtures shall be provided with internal emergency battery packs as required by the code for egress lighting.

### **LUMINAIRE SCHEDULE**

<b>Type</b>	<b>Description</b>	<b>Notes</b>	<b>Lumen Package</b>
Type RA	2x4 LED Troffer		6000
Type RB	2x2 LED Troffer		4500
Type RC	6" LED Downlight		2000
Type RD	6" LED Shower Lt.		1500
Type PA	48" LED Strip	With wire guard	5000
Type PB	96" LED Strip	With wire guard	14000
Type XA	Wall Mt Ext. LED Lt.	With photocell and battery	3000
Type XB	Wall Mt LED Flood		6000
Type EX	Exit Light		
Type EM	Egress Light		

## ELECTRICAL SYSTEMS (continued)

### **Fire Alarm System**

The new fire alarm system shall be a fully addressable fire alarm system complying with the NFPA 72, and NC Building Code. This single system shall be for the entire building and will have a temporal pulse sound alarm system throughout the entire facility. Provisions will be made to provide expansion of the entire system including 25% additional capacity. System shall include duct detection, local area smoke detection, annunciation (strobe and audible), remote annunciators, manual pull stations, water flow switches, tamper switches and all required expansion and signal expanders. DACT shall communicate to Owner's Central Station through Contact ID.

The 2018 North Carolina Fire Code requires that all new construction be provided with a DAS (Distributed Antenna System) for fire fighter radios. There are certain exemptions for this requirement and this site may be one of those once we have discussed with the Wake County Fire Marshal; however, an allowance should be provided in the Schematic Design Opinion of Probable Cost for this.

### **Special Systems – Telecommunications**

The building will be provided with a structured cabling system meeting the EIA/TIA requirements. In general, all telecom outlets will be provided with two (2) Cat 6 cables in a 1" conduit from the outlet to the MDF room. Cables will be tested and terminated.

The MDF room will be provided with ladder rack, grounding systems, plywood sheathing on all walls and a minimum of two (2) racks. Racks and patch panels will be provided by the Contractor.

Two (2) 4" and one (1) 2" conduits shall be provided from the MDF room to the property line and terminated in a quazite style handhole. Four (4) 1" innerducts will be provided in one (1) of the 4" conduits noted above. Conduit shall be provided in a concrete duct bank system.

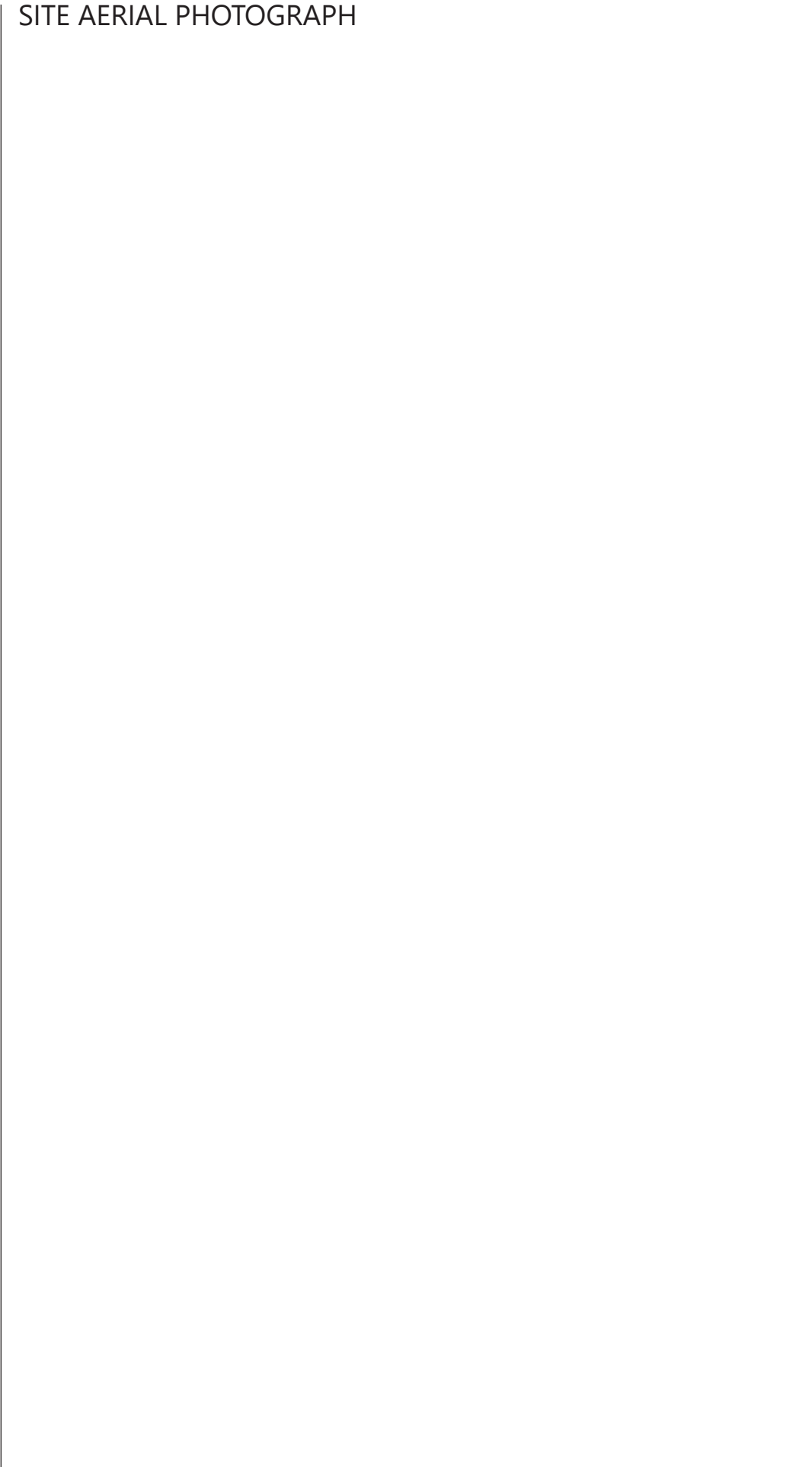
### **Special Systems – Security**

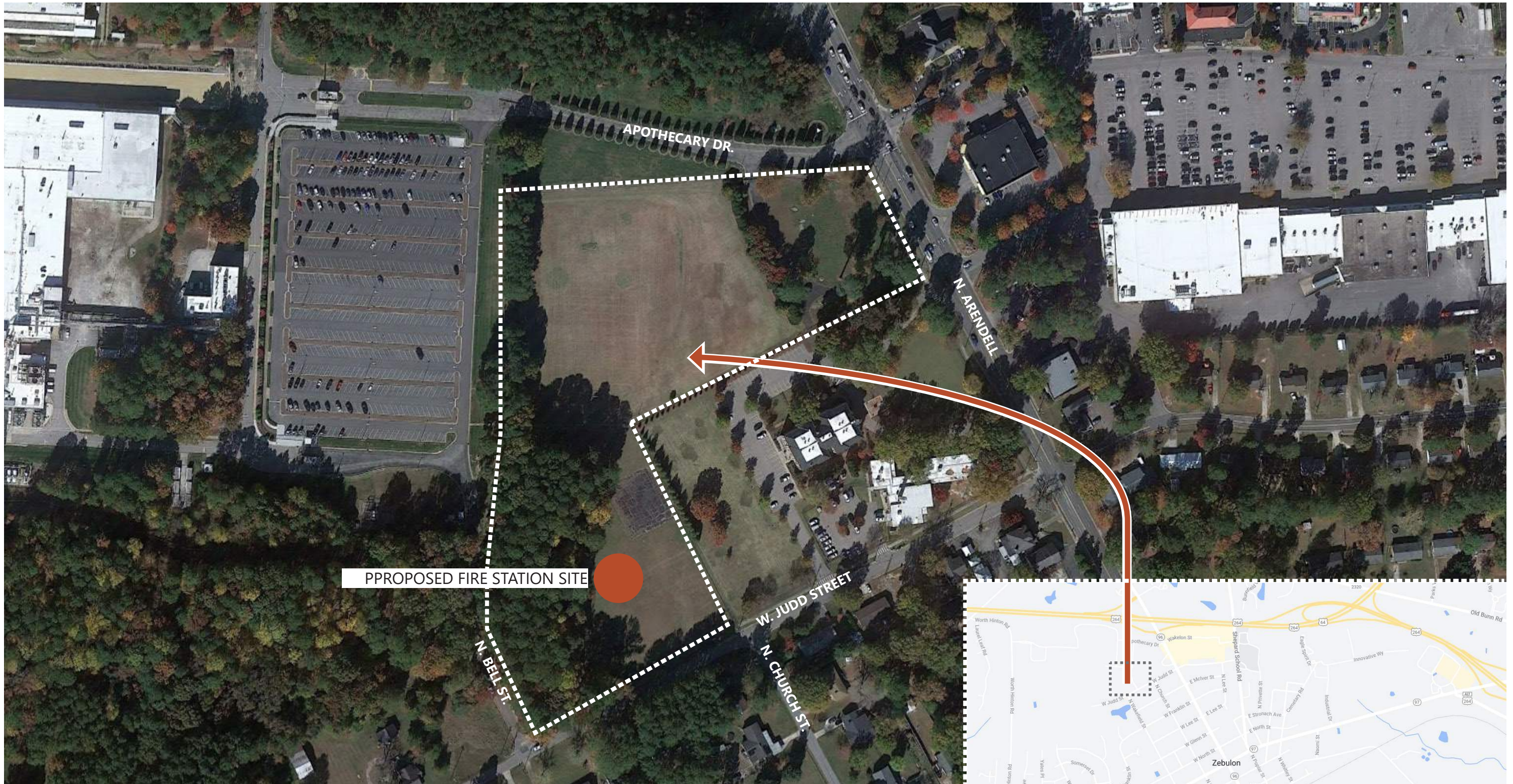
Box and conduit systems will be provided for the building's security system by the Division 26 contractor. Power will be provided for the security head-in equipment and any card reader systems requiring line voltage power.

### **Special Systems – Miscellaneous**

Computer aided dispatch and radio systems will be provided for the building. These systems will integrate to a trip-lite system to alert personnel when a call is received. Speakers will be provided throughout the building and tied into both systems.

APPENDIX 1 | SITE AERIAL PHOTOGRAPH





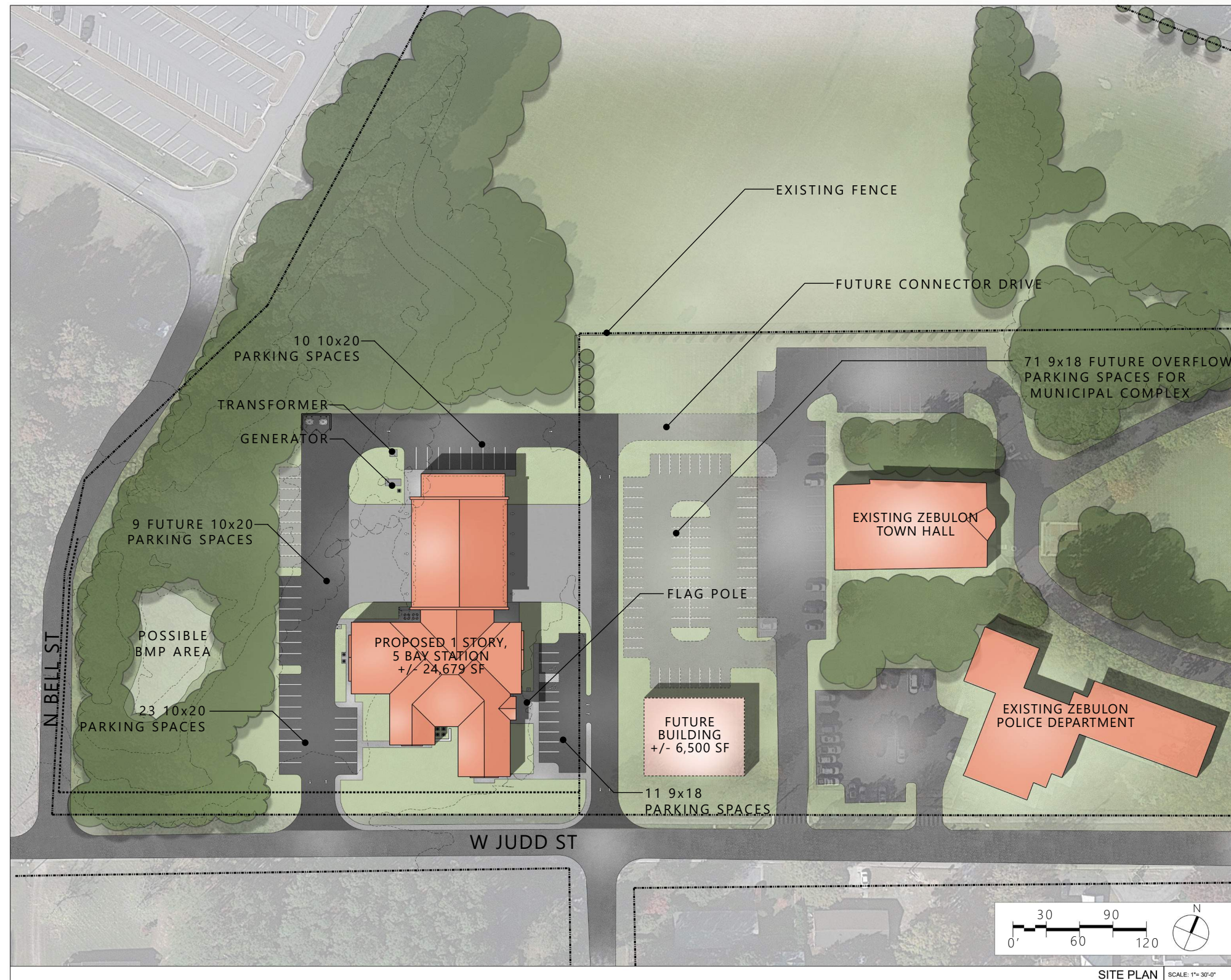
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APPENDIX 2 | SITE PLAN RENDERING  
BUILDING PROGRAM  
FLOOR PLAN RENDERING  
BUILDING PERSPECTIVE RENDERING



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**Zebulon FD**  
ZEBULON, NC

DATE 11.29.202  
PROJECT NO 19073

REVISIONS  
NO. DATE DESCRIPTION

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SEAL

SHEET NUMBER



Site Plan

ZEBULON FIRE DEPT. | ZEBULON, NC



Minimum Base Building	#	Room SF	Program SF	Remarks
<b>Shared Use Space</b>				
Public Entry Lobby & Vestibule	1	315	315	Seating for 2 visitors; 2-3 Display cases
Conference Room & Storage	1	363	363	Seating for 8; reinforced room, conference room storage
Kitchen/Dining	1	935	935	4 pantries, 3 refrigerators, 60" stove/oven w/commercial hood; seating for 10 Fire & 7 EMS
ADA Toilet	1	65	65	Located off lobby
Janitor / Storage	1	71	71	
Exercise Room	1	547	547	Located away from living space
Laundry Room	1	95	95	Residential washer & dryer; optional utility sink
Decontamination Room	1	266	266	Decon toilet w/shower, board wash, 2-compartment sink, eye wash, extractor, drying cabinet, janitor's sink
Tool Room	1	180	180	Tool/work bench, air compressor, ice machine, vending, parts storage, cascade system
Electrical Room	1	156	156	
IT Room	1	114	114	
General Storage	1	70	70	Shared Fire & EMS general storage accessible from apparatus bay
Storage	1	63	63	General storage for residential areas
Outdoor Storage	1	117	117	Space for typical lawn equipment
Mechanical Room (Main)	1	140	140	Main mechanical room for building
Mechanical Room (sub)	2	83	166	For apparatus support areas & residential areas
Miscellaneous Circulation, Walls, Etc. (30%)			1,099	
<b>Shared Use Space total</b>			<b>4,762</b>	
<b>Fire Departments</b>				
Training/Meeting Room	1	1,223	1,223	Seating for 40; separate from secured areas
Training/Meeting Room Storage	1	205	205	Storage for chairs, tables, AV; adjacent to training room
Training/Meeting Room Restrooms	1	420	420	Larger male & female restrooms w/ stalls for multipurpose room
Fire Work / Radio Room	1	176	176	2 workstations, copier, 75 mailslots
Fire Chief's Office	1	230	230	Desk and small conference table to seat 4
Battalion Chief's Office	1	230	230	Desk and small conference table to seat 2
FD Standard Office	3	172	516	Division/Deputy Chief, (2) Captains
Fire Marshall & Fire Inspector Shared Office	1	260	260	Space for 2 desks, 1 drafting table, & files
Training Chief	1	177	177	Adjacent to Training Room
Administration Assistant	1	157	157	
File Storage	1	82	82	Space for 4 file cabinets; adjacent to administration assistant
FD Storage	1	127	127	Accessible from apparatus bay
Logistics Storage	1	98	100	
FD Medical Supply Storage	1	67	67	Shelving & oxygen tank storage
FD Dormitory	10	170	1,700	Private bunkrooms (8 full-time, 2 volunteer); 2 beds & 3 personal lockers per room, 1 desk
FD Bathrooms/Showers	5	132	660	Private bathrooms with showers; adjacent to bunkrooms
Battalion Chief Bedroom	1	154	154	2 Beds, 3 lockers - will use shared bathrooms/showers
FD Day Room	1	508	508	10 recliners
Turnout Gear (27 - 2'x2' gear grid type lockers)	1	708	708	(65) 24"x24" gear grid type lockers - 50 currently needed + 15 additional in future
Miscellaneous Circulation, Walls, Etc. (30%)			2,310	
4 Bays in apparatus room	1	6,820	6,820	(4) double-deep pull-thru bays
<b>Fire Departments Total + Future Program</b>			<b>16,830</b>	
<b>EMS Operations</b>				
EMS Supervisor Office	1	154	154	Desk and small conference table to seat 2-4
EMS Day Room	1	541	541	7 recliners (4 current + 3 future); 2 workstations, small counter w/ sink, coffee, microwave, mini-fridge
EMS Medical Storage	1	92	92	Secure & separate from Fire medical supply storage; open shelving
EMS Gear Storage	1	57	57	(3) 3-tier storage rack for gear bags (24"W x 24"H X 36"D)
EMS Locker Room/Bathrooms/Showers	1	536	536	Private bathrooms with showers located within private locker room - (28) personal lockers (24 current + 4 future)
Miscellaneous Circulation, Walls, Etc. (30%)			414	
1 bay in Apparatus room	1	1,476	1,476	(1) double-deep pull-thru bay
<b>EMS Operations Total</b>			<b>3,270</b>	

Minimum Base Building	#	Room SF	Program SF	Remarks
<b>Department Subtotals</b>				
Shared Use Space Total			4,762	
Fire Department Total			16,830	
EMS Operations Total			3,270	
Total Base Building Floor Area			24,862	
<b>Total Building Floor Area + Future Program</b>			<b>24,862</b>	
<b>Outdoor Areas (not included in bldg sf)</b>				
Patio (with grill)	1	400	400	
<b>Parking Totals (10x20 spaces)</b>				
EMS				
Fire				
Visitor / HC				
Total Parking				





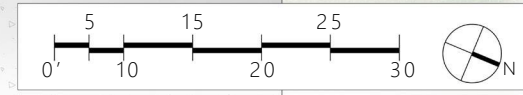
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environmentsforlife  
architecture planning interiors  
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2815 coliseum centre drive  
suite 500  
north carolina 28217  
919  
771.004.3716 1920  
www.adwarchitects.com



Zebulon FD  
ZEBULON, NC

FLOOR PLANS  
DATE 11.29.202  
PROJECT NO 19073  
REVISIONS  
NO DATE DESCRIPTION:

BASE BUILDING- 24,679 SF  
 ZEBULON FIRE DEPARTMENT  
 SHARED USE SPACES  
 WAKE COUNTY EMS



SEAL  
SHEET NUMBER **A100**



Floor Plan  
ZEBULON FIRE DEPT. | ZEBULON, NC



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Aerial View

ZEBULON FIRE DEPT. | ZEBULON, NC



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Northeast Elevation View

---

ZEBULON FIRE DEPT. | ZEBULON, NC



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June 11, 2021

The Wooten Company  
120 N. Boylan Ave  
Raleigh, North Carolina 27603

Attention: Mr. Lester Lowe, P.E.

Reference: **Preliminary Geotechnical Exploration Report  
Glaxo Site**  
Zebulon, North Carolina  
S&ME Project No. 207099  
NC PE Firm License No. F-0176

Dear Mr. Lowe:

S&ME, Inc. (S&ME) is pleased to submit this Preliminary Geotechnical Exploration Report for the referenced project. The exploration was performed in general accordance with our Proposal No. 207099, dated January 5, 2021. This report presents a brief description of our understanding of the project, the exploration and sampling methods used, general subsurface conditions observed, and our preliminary geotechnical conclusions and recommendations. A Site Vicinity Plan, Boring Location Plan, Generalized Subsurface Profile, and Boring Logs are attached.

We appreciate the opportunity to work with you on this project. Please contact us with any questions, or if you need additional information.

Sincerely,

**S&ME, Inc.**

Matthew L. Hartman, P.G.  
Project Geologist



Kevin A. Nadeau, P.E.  
Senior Geotechnical Engineer  
Registration No. 34358

Senior reviewed by J. Adam Browning, P.E.



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## Appendices

Appendix I – Figures

Appendix II – Boring Logs

## Preliminary Geotechnical Exploration Report

### Glaxo Site

Zebulon, North Carolina  
S&ME Project No. 207099

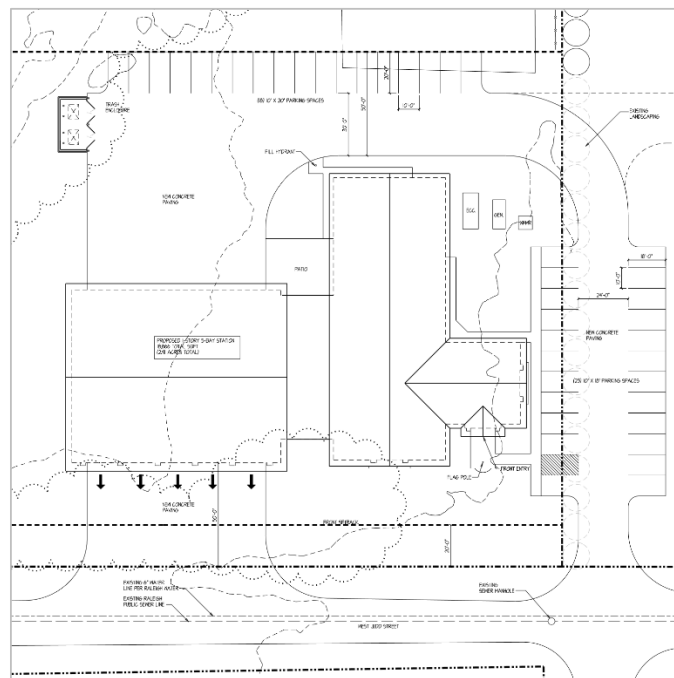


## 1.0 Project Information

This report is based on the following information:

- ◆ Email and telephone correspondence between Mr. Wester Lowe from The Wooten Company and Mr. Kevin Nadeau (S&ME) from December 18 to 22, 2020.
- ◆ PDF Drawings:
  - ◆ *Enlarged Site Plan* (sheet S101) prepared by ADW Architects dated October 24, 2019
- ◆ Aerial image with outlined property boundaries.
- ◆ Wake County GIS

We understand the Town of Zebulon is considering purchasing an approximate 10.97-acre parcel of land (Wake Co. PIN # 2705180148) from the current owner, Glaxo, Inc. The subject parcel is outlined in red in the image on the left below. Conceptually, we understand the Town is considering developing the southern portion of the property with a new 1-story, 5-bay fire station with an approximate footprint of 18,866 square feet and associated concrete paving. Structural loading information for the planned expansion was not available at the time of this report. For purposes of developing our preliminary recommendations, we have assumed maximum column and wall loads of 100 kips and 5 kips per foot, respectively. We have also assumed maximum grading (cuts/fills) within the planned development area of 2 feet. A snippet of the provided site plan is shown in the image on the right below.



## Preliminary Geotechnical Exploration Report

### Glaxo Site

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S&ME Project No. 207099



At the time of our field exploration, the site was mostly grass covered with an existing asphalt-paved basketball court near south-central portion of the site. The southwestern portion of the site is moderately to heavily wooded. Historic aerial imagery (1971 aerial shown below) indicates that several building structures were once present along the southeastern property boundary but were razed sometime prior to 1993. Topographic information presented on the Wake County GIS website indicates ground surface elevations within the property generally range from about 324 feet (southwest portion) to about 336 feet (north/northeast sides of site).



*Photo – 1973 aerial image.*

## 2.0 Exploration and Sampling Methods

Our field exploration included a visual site reconnaissance and performance of 10 soil test borings (B-1 through B-10). Soil test borings were performed between May 27 and 28, 2021.

Boring locations were established in the field by S&ME based on existing site features and should be considered approximate. Approximate test boring locations are shown on Figure 2 in the Appendix.

Soil test borings were advanced using hollow stem auger drilling procedures with an ATV-mounted CME-550X drill rig and were advanced to approximate depths of 20 feet below existing ground surface. Within each boring, samples of subsurface soils were taken at 2.5-foot intervals above a depth of 10 feet and at 5-foot intervals below 10 feet using a split-spoon sampler. Standard penetration testing was performed in conjunction with split-spoon sampling in general accordance with ASTM D 1586.



## Preliminary Geotechnical Exploration Report

### Glaxo Site

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S&ME Project No. 207099



Groundwater measurements were attempted after drilling was completed, and again after a period of approximately 24 hours in select borings. Boreholes were then backfilled with auger cuttings and a hole-closure device placed near the surface.

At completion of drilling operations, representative portions of split-spoon samples were returned to our laboratory for visual classification and testing. Soils were visually classified in general accordance with Unified Soil Classification System (USCS) guidelines.

### 3.0 Site Geology

This project site is located near the convergence of the eastern Piedmont (Raleigh Belt) and western Coastal Plain Physiographic Provinces, known as the "Fall Line". The Piedmont Province is characterized by gently to steeply sloping topography with well-rounded hills and along rolling ridges dissected by a moderate to well developed (mature) dendritic-type drainage system consisting of drainage swales, hollows, tributaries, streams, and rivers. Conversely, the Coastal Plain Province is typically characterized by marine and eolian sediments that were deposited during periods of fluctuating sea levels and moving shorelines. As such, the Coastal Plain Province is characterized by subdued topographic features and flat low-lying terrain.

Several geologic formations are in the vicinity of the site including the Raleigh Belt of the Piedmont and Terrace Deposits of the Coastal Plain. Natural soils within the Piedmont Province are the residual product of chemical and physical weathering of parent rock materials. The typical residual profile consists of finer grained silts and clays near the surface which gradually transition to coarser and denser material with depth. Based on previous mapping (NC Geologic Map 1985) and our knowledge of the local geology, the parent rock is interpreted to be metamorphosed gneiss with foliated to massive granitic rock of the Rolesville Suite.

Coastal Plain terrace deposits, generally consisting of sands with varying amounts of silt and gravel, are likely to be encountered at the Fall Line and, where present, can be relatively shallow in depth.

### 4.0 General Subsurface Conditions

The following is a brief and general description of surface and subsurface conditions encountered during our field exploration for this site. For more detailed information, refer to the individual boring logs contained in Appendix II.

A surficial layer of topsoil, ranging in thickness from about 3 to 4 inches was noted at all boring locations. Please note that surface conditions can vary significantly between boring locations. The transition from topsoil to underlying natural soils may be gradual.

Fill soils were encountered below topsoil in borings B-7, B-9, and B-10. Fill soils encountered consist of clayey sands (USCS designation SC) and low plasticity clays (CL) that extended to depths of about 3 or 5½ feet below the ground surface. Constituents within fill samples included trace amounts of gravel and rootlets. SPT N-values within the fill soils ranged from 5 to 17 blows per foot. Fill soils encountered were observed to be moist to wet.

## Preliminary Geotechnical Exploration Report

### Glaxo Site

Zebulon, North Carolina

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Residual soils were encountered below topsoil in all borings except B-7, B-9, and B-10 where they were encountered below fill materials. Residual soils encountered generally consist of silty and clayey sands (SM and SC), low plasticity silt (ML), and low plasticity clay (CL). SPT N-values within the residual soils ranged from 2 to 24 blows per foot, indicating very loose to medium dense sands and soft to very stiff silts and clays. Residual soils encountered were observed to be moist to wet. All borings were terminated in residual soils at depths of about 20 feet below the ground surface.

A Generalized Subsurface Profile (Figure 3) and Test Boring Records showing specific subsurface information from each test location are included in the Appendix. Stratification lines shown on Test Boring Records and Subsurface Profiles are intended to represent approximate depths of changes in soil types. Naturally, transitional changes in soil types are often gradual and cannot be defined at certain depths. Ground surface elevations shown on Test Boring Records and Subsurface Profiles were estimated from Wake County GIS elevation data for the site and should be considered approximate.

Groundwater was encountered in all borings at depths ranging from about 5 to 11 feet below the ground surface. Perched water may be encountered in sandier soils overlying less permeable soils. Groundwater elevations can be expected to fluctuate due to seasonal variations in rainfall, evaporation, and other factors.

## 5.0 Preliminary Geotechnical Conclusions

The following sections provide preliminary geotechnical conclusions pertaining to site development and are based upon our review of exploration data, our understanding of proposed construction, our preliminary engineering analyses, and experience with similar projects and subsurface conditions. Once site development and grading plans are finalized, a final geotechnical exploration should be performed to further evaluate subsurface conditions within the planned development area and provide final geotechnical recommendations.

### 5.1 General Discussion

Based on our understanding of project development plans and geotechnical analyses of field-testing data, it is our opinion that this site is adaptable for the planned fire station provided that site preparation recommendations presented herein are implemented during construction. Geotechnical considerations for this site include the following:

- **Previous Development** – Previously developed sites can create unexpected conditions during construction. These conditions may include underground structures, uncompacted fill material, buried debris, and others.
- **Existing Fills** – Existing fill soils were encountered during our exploration. Consistency and composition of previously placed fill can vary between borings and in unexplored areas of the site. Existing fill material should be further evaluated during a final geotechnical exploration.

## Preliminary Geotechnical Exploration Report

### Glaxo Site

Zebulon, North Carolina  
S&ME Project No. 207099



## 5.2 Earthwork

### 5.2.1 Site Preparation

Initial site preparation should begin with stripping asphalt, removing/relocating underground utilities, and removing any other deleterious materials. Borings performed indicated topsoil thicknesses of about 3 to 4 inches. Topsoil thicknesses are expected to vary across the site.

After stripping, the exposed subgrade of areas to receive fill and areas near final grades should be evaluated by the geotechnical engineer or his representative. This evaluation should include proofrolling with a fully loaded tandem axle dump truck or similar rubber-tired construction equipment. Any areas that deflect excessively and cannot be densified by further rolling should be undercut to suitable soils or moisture conditioned and recompacted.

### 5.2.2 Existing Fill

Existing fill materials were encountered at boring locations B-7, B-9, and B-10 to depths of about 3 or 5½ feet below the ground surface. Additional fill material is expected in other unexplored areas of the site, within utility trenches, and near areas where former building structures once stood. Fill soils sampled were highly variable in consistency with recorded SPT N-values ranging from 5 to 17 bpf. Constituents within fill samples included trace amounts of gravel and rootlets. This variability would indicate fill material that was likely not placed in a controlled manner.

A final geotechnical exploration should include further delineation/evaluation of existing fill soils. This could include additional soil test borings, hand auger borings with dynamic cone penetrometer testing, and/or test pits. We recommend removal of poorly compacted fill soils and replacement with structural fill.

### 5.2.3 Excavation Considerations

A site grading plan was not available at the time of this report. However, we assume cut and fill depths will be on the order of 2 feet or less within the footprint of the planned fire station. Based on results of our widely-spaced soil test borings, moderate consistency soils are present within the anticipated excavation depths. These soils can be excavated by routine earth moving equipment such as backhoes, dozers, and other types of typical earthmoving equipment.

Groundwater was encountered in all borings at depths ranging from about 5 to 11 feet below the ground surface. Based on assumed site grading, groundwater is not expected to be encountered during earthwork operations. However, shallow water or perched water conditions may be encountered in excavations such as utility trenches in other areas of the site, particularly during wet periods of the year or after heavy rainfall. The contractor should be responsible for determining water control measures.

## Preliminary Geotechnical Exploration Report

### Glaxo Site

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#### 5.2.4 *Reuse of On-Site Soils as Structural Fill*

Soils encountered in the preliminary borings with classifications of SC, SM, CL, and ML should be suitable for reuse as structural fill provided they don't contain deleterious debris or significant organics (greater than 5%) and moisture content is controlled during placement.

#### 5.2.5 *Subgrade Repair and Improvement Methods*

Exposed subgrade can deteriorate and lose support when subjected to construction traffic and adverse weather conditions. Deterioration can occur in the form of rutting, pumping, freezing, or erosion. We recommend that during construction, exposed subgrade surfaces be sealed at the end of each day or when wet weather is forecast. Water should not be allowed to pond on exposed subgrades. Heavy rubber-tired construction equipment should not be allowed to operate on exposed subgrades during wet conditions.

Immediately prior to floor slab or pavement construction, exposed subgrade soils should be evaluated by proofrolling to determine their stability. Soils which rut, pump, or deflect under proofrolling should be repaired prior to ABC stone placement. Repair measures may include scarifying/drying/recompacting, undercutting, placement of geotextiles, use of chemical additives, or some combination of these. Actual repair measures will be influenced by project schedule and weather conditions and can only be determined in the field by the geotechnical engineer.

### 5.3 Preliminary Foundation Considerations

Based on results of the widely-spaced soil test borings, assumed structural loads, and assumed grading, we anticipate that the proposed fire station could be supported on a shallow spread foundation system. Depending on final grading and structural loads, use of ground improvement beneath a shallow spread foundation system may be necessary to manage settlements under heavier loaded areas.

Geotechnical design parameters for foundation design, along with settlement estimates, can be provided in a final geotechnical exploration report once project information is further developed and additional exploration, laboratory testing, and analyses are performed.

## 6.0 Final Geotechnical Exploration

Once site and grading plans, and structural loading information have been developed, a final geotechnical exploration should be performed. The final exploration will include additional test borings, laboratory testing, and engineering analyses. The final exploration would further evaluate subsurface conditions within planned development areas to provide final geotechnical recommendations.



## 7.0 Qualifications of Report

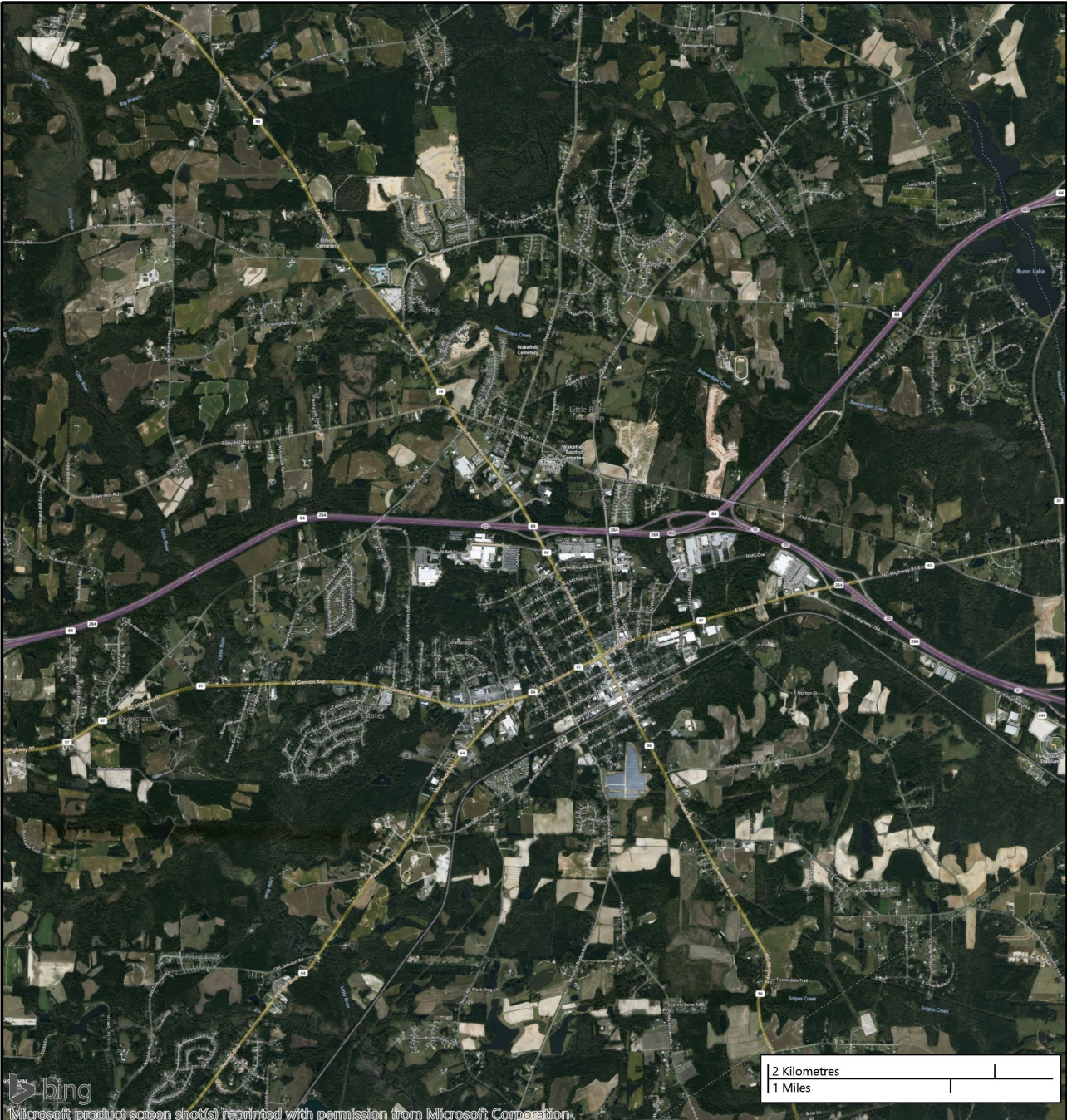
This preliminary report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The preliminary conclusions and recommendations contained in this report are based upon applicable standards of our practice in this geographic area at the time this report was prepared. No other representation or warranty either express or implied, is made.



We relied on project information given to us to develop our preliminary conclusions and recommendations. If project information described in this report is not accurate, or if it changes during project development, we should be notified of the changes so that we can modify our recommendations based on this additional information if necessary.

Our preliminary conclusions and recommendations are based on data from a field exploration program. Subsurface conditions can vary widely outside the explored area. Some variations may not become evident until the final exploration or construction. If conditions are encountered which appear different than those described in our report, we should be notified. This report should not be construed to represent subsurface conditions for the entire site.

Unless specifically noted otherwise, our field exploration program did not include an assessment of regulatory compliance, environmental conditions or pollutants. If there is a concern about these items, other studies should be performed. S&ME can provide a proposal and perform these services if requested.

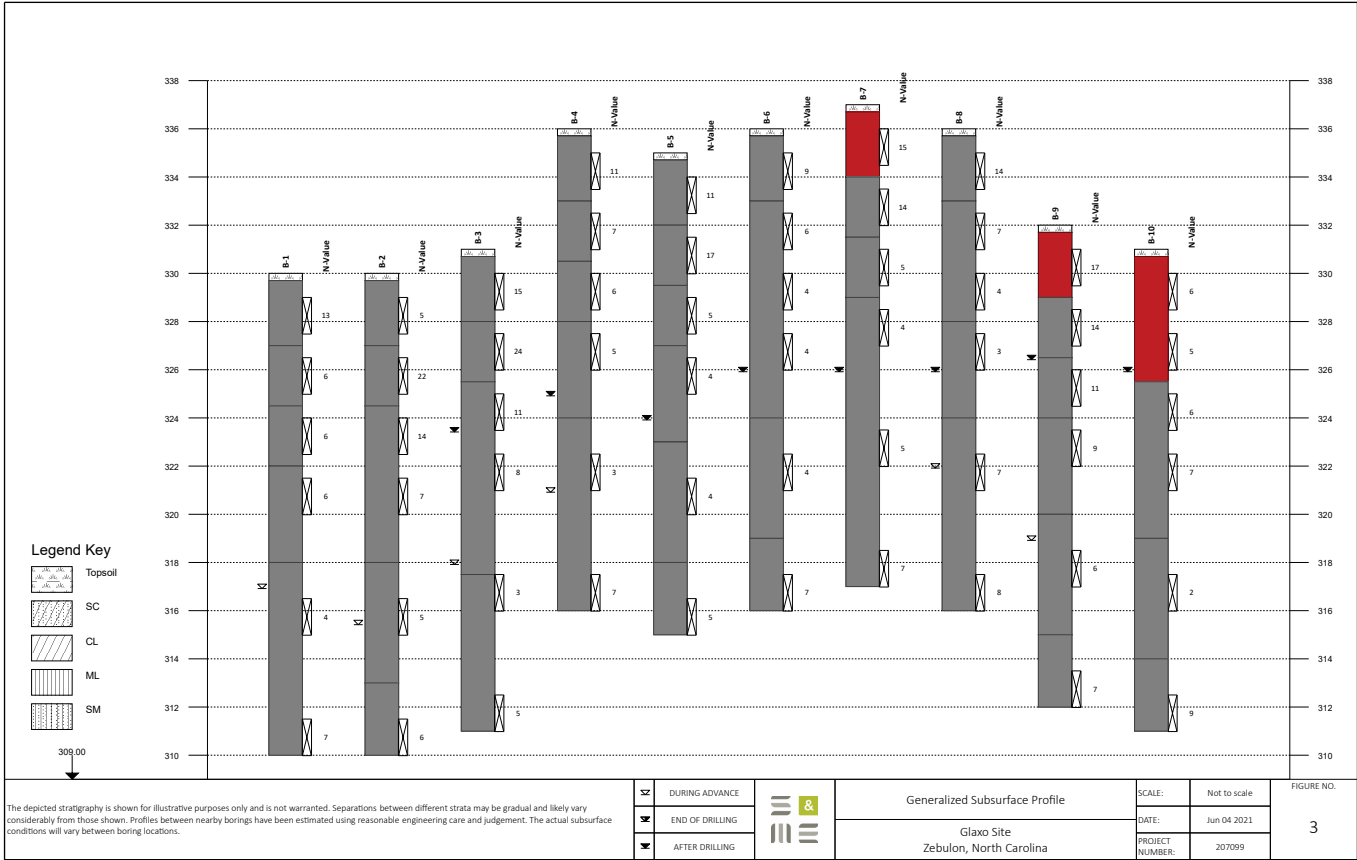
S&ME should be provided the opportunity to review the final plans and specifications to confirm that our recommendations are properly interpreted and implemented. The recommendations in this report are contingent on S&ME's completion of a final geotechnical exploration and our review of final plans and specifications followed by observation and monitoring during construction activities.



	Legend		
			
Site Vicinity Plan  Glaxo Site Zebulon, North Carolina		SCALE: NTS DATE: Jun 04 2021 PROJECT NUMBER: 207099	FIGURE NO.  1



	<p><b>Legend</b></p> <p> Boring Location</p>	<p>Note: Boring locations should be considered approximate.</p>		
	<p>Boring Location Plan</p>		<p>SCALE:</p>	<p>FIGURE NO.</p>
	<p>Glaxo Site Zebulon, North Carolina</p>		<p>NTS</p>	<p>2</p>
		<p>DATE:</p>	<p>Jun 04 2021</p>	
		<p>PROJECT NUMBER:</p>	<p>207099</p>	





PROJECT:		Glaxo Site Zebulon, North Carolina S&ME Project No. 207099		BORING LOG: B-1 Sheet 1 of 1							
DATE DRILLED: 05/28/2021		ELEVATION: 330 ft		NOTES: Boring location and elevation are approximate.							
DRILL RIG: CME 550		DATUM: NAVD88									
DRILLER: Scott Hardee		BORING DEPTH: 20.0 ft									
HAMMER TYPE: Automatic hammer		CLOSURE: Cuttings									
DRILLING METHOD: 3.25 HSA		LOGGED BY: William Harrison		LATITUDE: 35.830172 LONGITUDE: -78.32202							
SAMPLING METHOD: SS		PROJECT COORDINATE SYSTEM - World Geodetic System Longitude / Latitude (WGS 84)									
DEPTH (feet)	NOTES	Depositional Environment	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA				ELEVATION
							△ % Fines	○ NMC	┆ PL---LL		
0					TOPSOIL						330
				SS-1 (18 in)	LEAN CLAY WITH SAND (CL), trace mica, stiff, tan gray, moist	5-6-7 N= 13	●				
				SS-2 (18 in)	SANDY SILT (ML), trace mica, firm, tan gray, moist	3-3-3 N= 6	●				
5				SS-3 (18 in)	SILTY SAND (SM), trace mica, loose, tan gray, fine grained, moist	2-3-3 N= 6	●				
				SS-4 (18 in)	SANDY LEAN CLAY (CL), trace mica, firm, orange black, moist	2-3-3 N= 6	●				
10		Residuum									
				SS-5 (18 in)	SILTY SAND (SM), very loose to loose, tan orange, fine grained, wet	2-2-2 N= 4	●				
15											
				SS-6 (18 in)		2-3-4 N= 7	●				
20					Borehole terminated at 20.0 feet						310

GROUNDWATER	DATE/TIME	DEPTH (FT)	REMARKS
DURING ADVANCE	05/28/2021	13.0	Caved at 14'
END OF DRILLING			
AFTER DRILLING			
AFTER DRILLING			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED.  
 LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf)



PROJECT:		Glaxo Site Zebulon, North Carolina S&ME Project No. 207099		BORING LOG: B-2 Sheet 1 of 1							
DATE DRILLED: 05/28/2021		ELEVATION: 330 ft		NOTES: Boring location and elevation are approximate.							
DRILL RIG: CME 550		DATUM: NAVD88									
DRILLER: Scott Hardee		BORING DEPTH: 20.0 ft									
HAMMER TYPE: Automatic hammer		CLOSURE: Cuttings									
DRILLING METHOD: 3.25 HSA		LOGGED BY: William Harrison		LATITUDE: 35.830310 LONGITUDE: -78.32140							
SAMPLING METHOD: SS		PROJECT COORDINATE SYSTEM - World Geodetic System Longitude / Latitude (WGS 84)									
DEPTH (feet)	NOTES	Depositional Environment	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA				ELEVATION
							△ % Fines	○ NMC	┌ PL---LL		
0					TOPSOIL						330
				SS-1 (18 in)	SILTY SAND (SM), trace gravel, loose, brown, fine grained, dry	3-3-2 N= 5					
				SS-2 (18 in)	CLAYEY SAND (SC), medium dense, brown orange, fine grained, moist	6-9-13 N= 22					
5				SS-3 (18 in)	SANDY SILT (ML), trace mica, stiff to firm, gray, moist	5-6-8 N= 14					
				SS-4 (18 in)		4-3-4 N= 7					
10		Residuum		SS-5 (18 in)	SANDY SILT (ML), trace mica, firm, gray, wet	2-2-3 N= 5					
				SS-6 (18 in)	SANDY SILT (ML), trace mica, firm, tan orange, wet	2-3-3 N= 6					
15					Borehole terminated at 20.0 feet						
20											310

GROUNDWATER	DATE/TIME	DEPTH (FT)	REMARKS
DURING ADVANCE	05/28/2021	14.5	Caved at 15'
END OF DRILLING			
AFTER DRILLING			
AFTER DRILLING			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED.  
 LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf)



PROJECT:		Glaxo Site Zebulon, North Carolina S&ME Project No. 207099		BORING LOG: B-3 Sheet 1 of 1							
DATE DRILLED: 05/27/2021		ELEVATION: 331 ft		NOTES: Boring location and elevation are approximate.							
DRILL RIG: CME 550		DATUM: NAVD88									
DRILLER: Scott Hardee		BORING DEPTH: 20.0 ft									
HAMMER TYPE: Automatic hammer		CLOSURE: Cuttings									
DRILLING METHOD: 3.25 HSA		LOGGED BY: William Harrison		LATITUDE: 35.830602    LONGITUDE: -78.32167							
SAMPLING METHOD: SS		PROJECT COORDINATE SYSTEM - World Geodetic System Longitude / Latitude (WGS 84)									
DEPTH (feet)	NOTES	Depositional Environment	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA				ELEVATION
							△ % Fines	○ NMC	┌ PL---LL		
0					TOPSOIL SANDY LEAN CLAY (CL), stiff, brown, dry	9-8-7 N= 15					331
				SS-1 (18 in)							
					CLAYEY SAND (SC), trace mica, trace gravel, medium dense, tan orange, fine grained, moist	5-11-13 N= 24					
5				SS-2 (18 in)							326
					SANDY SILT (ML), trace mica, stiff to firm, gray, wet	4-5-6 N= 11					
				SS-3 (18 in)							
						4-4-4 N= 8					
10		Residuum		SS-4 (18 in)							321
					SANDY SILT (ML), trace gravel, trace mica, soft to firm, gray orange, wet	1-1-2 N= 3					
15				SS-5 (18 in)							316
						2-2-3 N= 5					
20				SS-6 (18 in)							311
					Borehole terminated at 20.0 feet						

GROUNDWATER	DATE/TIME	DEPTH (FT)	REMARKS
DURING ADVANCE	05/27/2021	13.0	Caved at 14'
END OF DRILLING			
AFTER DRILLING	05/28/2021	7.5	24 Hour Reading
AFTER DRILLING			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED.  
 LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf)



PROJECT:		Glaxo Site Zebulon, North Carolina S&ME Project No. 207099		BORING LOG: B-4 Sheet 1 of 1							
DATE DRILLED: 05/27/2021		ELEVATION: 336 ft		NOTES: Boring location and elevation are approximate.							
DRILL RIG: CME 550		DATUM: NAVD88									
DRILLER: Scott Hardee		BORING DEPTH: 20.0 ft									
HAMMER TYPE: Automatic hammer		CLOSURE: Cuttings									
DRILLING METHOD: 3.25 HSA		LOGGED BY: William Harrison		LATITUDE: 35.831321 LONGITUDE: -78.32211							
SAMPLING METHOD: SS		PROJECT COORDINATE SYSTEM - World Geodetic System Longitude / Latitude (WGS 84)									
DEPTH (feet)	NOTES	Depositional Environment	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA				ELEVATION
							△ % Fines	○ NMC	□ PL-LL		
0					TOPSOIL						336
				SS-1 (18 in)	SANDY LEAN CLAY (CL), stiff, brown red, dry	7-6-5 N= 11	●				
				SS-2 (18 in)	SANDY LEAN CLAY (CL), firm, brown black, moist	2-3-4 N= 7	●				
5				SS-3 (18 in)	SANDY LEAN CLAY (CL), firm, gray brown, moist	2-3-3 N= 6	●				331
				SS-4 (18 in)	SANDY SILT (ML), trace mica, trace manganese, firm, gray tan, moist to wet	2-3-2 N= 5	●				
10		Residuum									326
				SS-5 (18 in)	SANDY SILT (ML), trace mica, trace manganese, soft to firm, orange black, wet	1-1-2 N= 3	●				
15											321
				SS-6 (18 in)		2-3-4 N= 7	●				
20					Borehole terminated at 20.0 feet						316

GROUNDWATER	DATE/TIME	DEPTH (FT)	REMARKS
DURING ADVANCE	05/27/2021	15.0	Caved at 15'
END OF DRILLING			
AFTER DRILLING	05/28/2021	11.0	24 Hour Reading
AFTER DRILLING			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED.  
 LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf)



PROJECT: Glaxo Site Zebulon, North Carolina S&ME Project No. 207099				BORING LOG: B-5 Sheet 1 of 1							
DATE DRILLED: 05/27/2021		ELEVATION: 335 ft		NOTES: Boring location and elevation are approximate.							
DRILL RIG: CME 550		DATUM: NAVD88									
DRILLER: Scott Hardee		BORING DEPTH: 20.0 ft									
HAMMER TYPE: Automatic hammer		CLOSURE: Cuttings									
DRILLING METHOD: 3.25 HSA		LOGGED BY: William Harrison		LATITUDE: 35.832246		LONGITUDE: -78.32234					
SAMPLING METHOD: SS				PROJECT COORDINATE SYSTEM - World Geodetic System Longitude / Latitude (WGS 84)							
DEPTH (feet)	NOTES	Depositional Environment	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA				ELEVATION
							△ % Fines	○ NMC	□ PL-LL		
0			slz slz		TOPSOIL						335
				SS-1 (18 in)	CLAYEY SAND (SC), medium dense, brown orange, fine grained, moist	5-6-5 N= 11	●				
				SS-2 (18 in)	SANDY SILT (ML), very stiff, gray orange, moist	6-8-9 N= 17	●				
5				SS-3 (18 in)	SANDY SILT (ML), firm, gray tan, moist	2-2-3 N= 5	●				330
				SS-4 (18 in)	SANDY SILT (ML), trace mica, soft, gray tan, moist to wet	2-2-2 N= 4	●				
10		Residuum		SS-5 (18 in)	SANDY SILT (ML), trace mica, soft, gray tan, wet	2-2-2 N= 4	●				325
				SS-6 (18 in)	SANDY SILT (ML), trace mica, firm, brown gray, wet	2-2-3 N= 5	●				
15					Borehole terminated at 20.0 feet						320
20											315

GROUNDWATER	DATE/TIME	DEPTH (FT)	REMARKS
DURING ADVANCE	05/27/2021		Caved Dry at 12'
END OF DRILLING			
AFTER DRILLING	05/28/2021	11.0	24 Hour Reading
AFTER DRILLING			



GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED.  
 LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf)

PROJECT:		Glaxo Site Zebulon, North Carolina S&ME Project No. 207099		BORING LOG: B-7 Sheet 1 of 1								
DATE DRILLED: 05/27/2021		ELEVATION: 337 ft		NOTES: Boring location and elevation are approximate.								
DRILL RIG: CME 550		DATUM: NAVD88										
DRILLER: Scott Hardee		BORING DEPTH: 20.0 ft										
HAMMER TYPE: Automatic hammer		CLOSURE: Cuttings										
DRILLING METHOD: 3.25 HSA		LOGGED BY: William Harrison		LATITUDE: 35.831695 LONGITUDE: -78.32105								
SAMPLING METHOD: SS		PROJECT COORDINATE SYSTEM - World Geodetic System Longitude / Latitude (WGS 84)										
DEPTH (feet)	NOTES	Depositional Environment	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA				ELEVATION	
							△ % Fines	○ NMC	┌ PL---LL			
0		Fill			TOPSOIL						337	
				SS-1 (18 in)	CLAYEY SAND (SC), trace gravel, medium dense, brown, fine grained, dry	9-8-7 N= 15	●					
				SS-2 (18 in)	SANDY SILT (ML), trace mica, stiff, red tan, moist	5-6-8 N= 14	●					332
				SS-3 (18 in)	SANDY SILT (ML), with mica, firm, tan gray, moist	2-2-3 N= 5	●					
				SS-4 (18 in)	SANDY SILT (ML), trace mica, trace manganese, soft to firm, tan orange, moist to wet	2-2-2 N= 4	●					327
				Residuum		SS-5 (18 in)		3-2-3 N= 5	●			
		SS-6 (18 in)				2-3-4 N= 7	●					317
					Borehole terminated at 20.0 feet							

GROUNDWATER	DATE/TIME	DEPTH (FT)	REMARKS
DURING ADVANCE	05/27/2021		Caved Dry at 14'
END OF DRILLING			
AFTER DRILLING	05/28/2021	11.0	24 Hour Reading
AFTER DRILLING			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED.  
 LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf)



PROJECT:			Glaxo Site Zebulon, North Carolina S&ME Project No. 207099		BORING LOG: B-8 Sheet 1 of 1						
DATE DRILLED: 05/27/2021		ELEVATION: 336 ft		NOTES: Boring location and elevation are approximate.							
DRILL RIG: CME 550		DATUM: NAVD88									
DRILLER: Scott Hardee		BORING DEPTH: 20.0 ft									
HAMMER TYPE: Automatic hammer		CLOSURE: Cuttings									
DRILLING METHOD: 3.25 HSA		LOGGED BY: William Harrison					LATITUDE: 35.832381 LONGITUDE: -78.32134				
SAMPLING METHOD: SS			PROJECT COORDINATE SYSTEM - World Geodetic System Longitude / Latitude (WGS 84)								
DEPTH (feet)	NOTES	Depositional Environment	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA				ELEVATION
							Δ % Fines	○ NMC	┆ PL-LL		
0			silc. silc.		TOPSOIL						336
				SS-1 (18 in)	SANDY LEAN CLAY (CL), stiff, brown red, moist	6-7-7 N= 14					
				SS-2 (18 in)	SANDY LEAN CLAY (CL), trace mica, firm, tan red, moist	3-3-4 N= 7					
5				SS-3 (18 in)		2-2-2 N= 4					331
				SS-4 (18 in)	SANDY SILT (ML), trace mica, soft, tan orange, moist to wet	2-1-2 N= 3					
10		Residuum									326
				SS-5 (18 in)	SILTY SAND (SM), trace mica, loose, tan orange, fine grained, wet	1-3-4 N= 7					
15											321
				SS-6 (18 in)		2-3-5 N= 8					
20					Borehole terminated at 20.0 feet						316

GROUNDWATER		DATE/TIME	DEPTH (FT)	REMARKS
DURING ADVANCE	☒	05/27/2021	14.0	Caved at 14.5
END OF DRILLING	☒			
AFTER DRILLING	☒	05/28/2021	10.0	24 Hour Reading
AFTER DRILLING	☒			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED.  
 LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf)



PROJECT:		Glaxo Site Zebulon, North Carolina S&ME Project No. 207099		BORING LOG: B-9 Sheet 1 of 1							
DATE DRILLED: 05/27/2021		ELEVATION: 332 ft		NOTES: Boring location and elevation are approximate.							
DRILL RIG: CME 550		DATUM: NAVD88									
DRILLER: Scott Hardee		BORING DEPTH: 20.0 ft									
HAMMER TYPE: Automatic hammer		CLOSURE: Cuttings									
DRILLING METHOD: 3.25 HSA		LOGGED BY: William Harrison		LATITUDE: 35.832385 LONGITUDE: -78.32065							
SAMPLING METHOD: SS		PROJECT COORDINATE SYSTEM - World Geodetic System Longitude / Latitude (WGS 84)									
DEPTH (feet)	NOTES	Depositional Environment	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA				ELEVATION
							20	40	60	80	
0			Site		TOPSOIL						332
		Fill	SS-1 (18 in)	CLAYEY SAND (SC), trace gravel, medium dense, brown, fine grained, moist	7-8-9 N= 17	●					
			SS-2 (18 in)	CLAYEY SAND (SC), medium dense, gray orange, fine grained, moist to wet	6-7-7 N= 14	●					327
			SS-3 (18 in)	SANDY LEAN CLAY (CL), trace mica, stiff, gray, wet	4-5-6 N= 11	●					
			SS-4 (18 in)	CLAYEY SAND (SC), trace mica, loose, gray, fine grained, wet	4-4-5 N= 9	●					322
		Residuum	SS-5 (18 in)	SANDY SILT (ML), trace gravel, trace mica, firm, white tan, wet	2-3-3 N= 6	●					317
			SS-6 (18 in)	SANDY SILT (ML), trace mica, firm, tan orange, wet	2-3-4 N= 7	●					
20				Borehole terminated at 20.0 feet							312

GROUNDWATER	DATE/TIME	DEPTH (FT)	REMARKS
DURING ADVANCE	05/27/2021	13.0	Caved at 14
END OF DRILLING			
AFTER DRILLING	05/28/2021	5.5	24 Hour Reading
AFTER DRILLING			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED.  
 LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf)





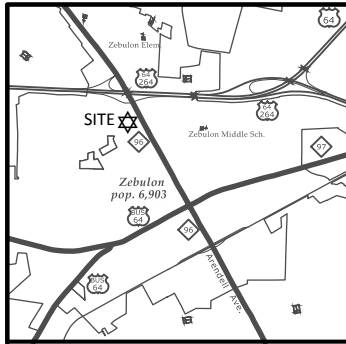
PROJECT:		Glaxo Site Zebulon, North Carolina S&ME Project No. 207099		BORING LOG: B-10 Sheet 1 of 1								
DATE DRILLED: 05/27/2021		ELEVATION: 331 ft		NOTES: Boring location and elevation are approximate.								
DRILL RIG: CME 550		DATUM: NAVD88										
DRILLER: Scott Hardee		BORING DEPTH: 20.0 ft										
HAMMER TYPE: Automatic hammer		CLOSURE: Cuttings										
DRILLING METHOD: 3.25 HSA		LOGGED BY: William Harrison		LATITUDE: 35.832171    LONGITUDE: -78.32027								
SAMPLING METHOD: SS		PROJECT COORDINATE SYSTEM - World Geodetic System Longitude / Latitude (WGS 84)										
DEPTH (feet)	NOTES	Depositional Environment	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA				ELEVATION	
							△ % Fines	○ NMC	┌ PL---LL			
0		Fill			TOPSOIL						331	
					SS-1 (18 in)	SANDY LEAN CLAY (CL), firm, gray black, moist to wet, organic staining, Small fibers, rootlets	2-3-3 N= 6	●				
				SS-2 (18 in)		2-3-2 N= 5	●				326	
5		Residuum			SANDY SILT (ML), trace mica, firm, white orange, wet	2-3-3 N= 6	●					
					SS-3 (18 in)		3-3-4 N= 7	●				321
					SS-4 (18 in)		1-1-1 N= 2	●				316
					SS-5 (18 in)	SILTY SAND (SM), trace gravel, trace mica, very loose, white, fine grained, wet						
15					SANDY SILT (ML), trace mica, stiff, orange tan, wet	5-6-3 N= 9	●				311	
20					Borehole terminated at 20.0 feet							

GROUNDWATER	DATE/TIME	DEPTH (FT)	REMARKS
DURING ADVANCE	05/27/2021		Caved Dry at 14'
END OF DRILLING			
AFTER DRILLING	05/28/2021	5.0	24 Hour Reading
AFTER DRILLING			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED.  
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf)





VICINITY MAP  
(NOT TO SCALE)

Survey Certificate

I, Timothy R. Ingold, certify that this map was prepared under my supervision from an actual field survey performed under my supervision and is based upon references herein; that the boundaries not surveyed are clearly indicated as being taken from references shown; that the ratio of precision as calculated is greater than 1:10,000; that this plat meets the requirements of The Standards of Practice for Land Surveying in North Carolina (21 NCAC 56.1600). Witness my original signature, registration number and seal this 24th day of August, 2021.

*Timothy R. Ingold*  
Timothy R. Ingold  
Professional Land Surveyor L-2933



REFERENCES

- ◆ BM 1982 PG 167
- ◆ Topographic Survey School Lot Glaxo, Inc. (Unrecorded Plat by Philip Post & Associates dated 12/8/86)
- ◆ BM 1999 PG 634
- ◆ Boundary Survey of Zebulon Campus for Glaxo Welcome, Inc. (Unrecorded Plat by McKim & Creed dated 7/24/00)
- ◆ BM 2003 PG 2038
- ◆ Topographic Survey Glaxo Incorporated Zebulon Elementary School Property (Unrecorded Plat by Green Engineering dated August 2006)
- ◆ BM 2007 PG 1609
- ◆ Recombination Survey for Glaxo Inc. (Unrecorded Plat by Lewis N. Cox PLS dated 7/1/2015)

Glaxo Inc.  
DB 2993 Pg. 127  
PIN 1795878684

AREA = 11.12977 ACRES

Privette Property, LLC  
DB 17600 Pg. 2165  
PIN 2705076800

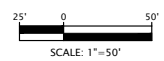
Donna P. Eddins Heirs  
Estate File 14-E-2376  
(Ref. DB 14066, Pg. 2466)  
Lot 1 - BM 2003 Pg. 2038  
PIN 2705077509

Town of Zebulon  
DB 12670 Pg. 2355  
Lot 2 - BM 2007 Pg. 1609  
PIN 2705184110

LEGEND	
CONTROL POINT	△CP-01
CONCRETE MONUMENT FOUND	CMF
IRON PIPE FOUND	IPF
IRON ROD FOUND	IRF
IRON ROD SET	IRS
RAILROAD SPIKE FOUND	RRSF
CABLE TV PEDESTAL	CTP
WARNING POST	WP
ELECTRICAL PEDESTAL	EP
TRANSFORMER	T
TELEPHONE PEDESTAL	TP
UTILITY POLE	UP
LIGHT POLE / AREA LIGHT	LP
GUY ANCHOR	GA
FIRE HYDRANT	FH
WATER VALVE	WV
WATER METER	WM
BOLLARD	B
GEOTECHNICAL BORE	B-1
CURB INLET	CI
YARD INLET	YI
SEWER MANHOLE	SM
DRAINAGE MANHOLE	DM
STORM DRAINAGE PIPE	SDP
FLARED END SECTION	FES
DITCH	D
RIGHT-OF-WAY	R/W
SETBACK	S
GRAVITY SEWER LINE	SS
OVERHEAD UTILITY	OHU
SEWER FORCE MAIN	FM
SPOT ELEVATION	X 330.1
MAJOR CONTOUR	330
MINOR CONTOUR	329
SHRUB / BUSH	S
CONIFEROUS TREE	C
DECIDUOUS TREE	D

NOTES

1. Unless otherwise noted all coordinates and distances shown hereon are US survey feet ground measurements. Measurements have been localized at NC State Plane NAD 83 (2011) coordinates North 758,000 sFT and East 2,201,000 sFT and NAVD 88 elevation 330 sFT yielding a combined factor of 0.9999131116.
2. All elevations are NAVD 88.
3. NC State Plane NAD 83(2011) and NAVD 88 is based on GNSS observations of CP-01 and CP-02 on May 17, 2021.
4. The parcel shown hereon is currently designated on the Wake County GIS as PIN 2705180148 and REID 0103437.
5. Per Town of Zebulon N. Bell St. has been maintained by the Town for 30+ years. No document recording this as public right-of-way as been provided or discovered thus no right of way width has been delineated.
6. This property is subject to all restrictions, easements and rights of way prior to the date of this plat. No Title Report has been provided.
7. Acreage calculation is by coordinate computation.



120 North Boylan Avenue • Raleigh, NC 27603-1423  
(919) 828-0531 • thewootencompany.com  
License Number : F-0115

FIELD SURVEY BY: RLD  
FIELD SURVEY DATE: MAY-AUGUST 2021  
DRAWN BY: jth  
CHECKED BY:

PLAT OF PROPERTY AND TOPOGRAPHIC SURVEY  
PREPARED FOR  
**TOWN OF ZEBULON**  
Being the property of Glaxo Inc. described in Quitclaim Deed recorded in Deed Book 5000 Page 50

DATE: AUGUST 24, 2021  
PROJECT No.: 2922-O  
DOCUMENT No.: 2922O-D001  
SHEET No.: