City of Concord, NC
BID # 2415

INVITATION FOR BIDS – Concord

Bids will be publicly opened: 04 October 2019

Questions Due by 25 September 2019

Refer ALL Inquiries to: Marty Randall
Telephone No. 828-527-2416

Commodity: Install New Tower Site at 170 Pitt School Road NW, Concord, NC, North Carolina with access road per design documents.

E-Mail: marty.randall@1018consulting.com
Using Agency Name: City of Concord, NC

(See page 2 for mailing instructions.)

NOTICE TO BIDDERS

Sealed bids, subject to the conditions made a part hereof, will be received at 35 Cabarrus Ave NW, Concord NC 28025 until 3:00 PM on the day of opening and then opened, for furnishing and delivering the commodity as described herein. Refer to page 2 for proper mailing instructions.

Bids submitted via facsimile (FAX) machine in response to this Invitation for Bids will not be acceptable. Bids are subject to rejection unless submitted on this form.

EXECUTION

In compliance with this Invitation for Bids, and subject to all the conditions herein, the undersigned offers and agrees to furnish and deliver any or all items upon which prices are bid, at the prices set opposite each item within the time specified herein. By executing this bid, I certify that this bid is submitted competitively and without collusion (G.S. 143-54).

Failure to execute/sign bid prior to submittal shall render bid invalid.

Late bids are not acceptable.

BIDDER: ________________________________
FEDERAL ID OR SOCIAL SECURITY NO.

STREET ADDRESS: ________________________________
P.O. BOX: ________________________________

CITY & STATE & ZIP: ________________________________
TELEPHONE NUMBER: ________________________________

TOLL FREE TEL. NO (800)

PRINCIPAL PLACE OF BUSINESS ADDRESS IF DIFFERENT FROM ABOVE (SEE INSTRUCTIONS TO BIDDERS ITEM #21):

TYPE OR PRINT NAME & TITLE OF PERSON SIGNING: ________________________________
FAX NUMBER: ________________________________

AUTHORIZED SIGNATURE: ________________________________
DATE: ________________________________
E-MAIL: ________________________________

Offer valid for 120 days from date of bid opening unless otherwise stated here: _______ days

ACCEPTANCE OF BID

If any or all parts of this bid are accepted by City of Concord, NC, an authorized representative of City of Concord, NC shall affix their signature hereto and this document and the provisions of the Instructions to Bidders, special terms and conditions specific to this Invitation for Bids, the specifications, and the North Carolina General Contract Terms and Conditions shall then constitute the written agreement between the parties. A copy of this acceptance will be forwarded to the successful bidder(s).

FOR City of Concord, NC USE ONLY

Offer accepted and contract awarded this ______ day of ____________________, 20____, as indicated on attached certification, by ________________________________, (Authorized representative of City of Concord, NC).
In an effort to support the sustainability efforts of the City of Concord, North Carolina we solicit your cooperation in this effort.

It is desirable that all responses meet the following requirements:
- All copies should be printed double sided.
- All submittals and copies should be printed on recycled paper with a minimum post-consumer content of 30% and indicate this information accordingly on the response.
- Unless absolutely necessary, all bids and copies should minimize or eliminate use of non-recyclable or non re-usable materials such as plastic report covers, plastic dividers, vinyl sleeves, and GBC binding. Three-ring binders, glued materials, paper clips, and staples are acceptable.
- Materials should be submitted in a format which allows for easy removal and recycling of paper materials.

MAILING INSTRUCTIONS: Send two fully executed bid documents. Address envelope and insert bid name as shown below. It is the responsibility of the bidder to have the bid in this office by the specified time and date of opening.

<table>
<thead>
<tr>
<th>DELIVERED BY US POSTAL SERVICE</th>
<th>DELIVERED BY ANY OTHER MEANS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BID Concord</td>
<td>BID Concord</td>
</tr>
<tr>
<td>City of Concord Communications</td>
<td>City of Concord Communications</td>
</tr>
<tr>
<td>Attn: Bethany Ledwell</td>
<td>Attn: Bethany Ledwell</td>
</tr>
<tr>
<td>PO Box 308</td>
<td>35 Cabarrus Ave, West</td>
</tr>
<tr>
<td>Concord, NC 28026</td>
<td>Concord, NC 28025</td>
</tr>
</tbody>
</table>

City of Concord, NC Tower Construction Project
City of Concord, North Carolina

Scope of Work – City of Concord, NC proposes to install a communications tower site per the following specifications at a site in the City of Concord, North Carolina. All work shall comply with applicable North Carolina Building Codes and ANSI/TIA/EIA Standards. If the following Specification calls for a condition that is greater than the TIA/EIA Standards or North Carolina Building Codes, use the specifications shown in this document. All work shall be coordinated with City of Concord, NC. The tower and all appurtenances shall be installed and affixed with the highest quality of workmanship. The selected Contractor will advise City of Concord, NC’s Contracting Officer and Marty Randall (10-18 Consulting 828-527-2416 marty.randall@1018consulting.com) two weeks in advance of the date the work will start. The contractor will provide Marty Randall weekly project progress reports and immediately report any abnormal conditions encountered during construction.

As a minimum, the Tower and Foundation shall be designed to the requirements of ANSI/TIA/EIA-222-H, including released addendums.

COMPLETION DEADLINE: Work should be completed within 90 days of receipt of materials, not counting bad weather days.

If the above time is not possible state completion time in days from contract issue.

_________ Days

Understand all requirements in the Scope of Work  Yes________  No________
CONTRACTING OFFICER
This project will be under contract with City of Concord, NC and will be under the direction of the Contracting Officer. The Contracting Officer will be:

Bethany Ledwell
City of Concord, NC
35 Cabarrus Ave, West
Concord, NC 28025
Cell 980-521-1737
ledwellb@concordnc.gov

NOTE: Any questions prior to issue of a contract should be directed to marty.randall@1018consulting.com as stated on page one of this document.

Understand the Contact information as listed above  Yes_____  No_____  

CONTRACTOR REQUIREMENTS
The Contractor shall submit the following items with their bid:

1. A drawing of the tower profile sealed by a North Carolina Registered Engineer.
2. A list of all antennas and appurtenances that were considered in the tower and foundation designs.
3. Tower foundation design drawings, with a complete set of DESIGN CALCULATIONS showing the reactions of the tower on the foundation, sealed by a North Carolina Registered Engineer.
4. The Contractor awarded this project must submit a set of final erection drawings, sealed by a North Carolina Registered Engineer to the Contracting Officer and Marty Randall for written approval before starting the project. If these drawings are submitted on paper they must also be accompanied by digital copies. We must have these drawings in digital format.
5. The proposal from the tower manufacturer must specifically state that all pricing will be honored for the duration of this contract.
6. Contractor must supply a rigging plan for tower erection. If the contractor intends to use a gin pole for tower erection, then they must provide a copy of their gin pole certification and load charts. All gin pole certifications and load charts must be current, must be sealed by a qualified engineer licensed in the state of North Carolina, and must state they are in compliance with ANSI/TIA-322. All rigging plans must be in compliance with ANSI/TIA-322 and ANSI/ASSE A10.48, and completed by a qualified engineer licensed in the state of North Carolina.
7. Each bid must be accompanied by a bid bond, for an amount equal to five percent (5%) of the total base bid, at the time the bid is filed with the City. No bid shall be considered if the bond is not received simultaneously with the bid. Bid bonds may be submitted in any form allowed under the laws of North Carolina including cash, cashier’s check, certified check or surety issued bid bond.
8. Performance and payment bonds are required once bid is awarded.

Bids and tower designs that are submitted for opening will be submitted by City of Concord, NC to a Third party North Carolina Registered Engineer for review of design accuracy and compliance before an award can be made. This is the reason for requiring the above listed items to be sent with the bid response. The City of Concord reserves the right to accept or reject any or all bids and to waive minor irregularities.

Two complete copies of your bid response must be submitted with your package. Failure to submit the above listed items will forfeit your bid.

Understand Contractor Requirements Process  Yes_____  No_____  

BIDDING INSTRUCTIONS
Contractors bidding on this project must fully acquaint themselves with the following specifications, any attachments to this Invitation for Bid and conditions at the Designated Construction Site (DCS). The contractor is required to visit the DCS to fully understand any potential obstacles that would prevent speedy completion of this project. Any questions concerning any portion of the work or interpretation of documents should be referred to Marty Randall
and the Contracting Officer.

Bids must be submitted on this form and must reach the City of Concord, NC Office at 35 Cabarrus Ave, West, Concord, NC 28025 by 3:00 PM on the date specified on Page one, above. All parts of this form must be completed for consideration. **Send two copies of this bid document.**

**Understand Bidding Instructions**

Yes______    No______

**Pre-Award Engineering Review**

Bids and tower designs submitted for this IFB will be submitted by City of Concord, NC to a third-party engineering firm for design accuracy and compliance with all stipulated standards and building codes before an award can be made. A low responsible bid failing this engineering review will be invalid and the bid will be awarded to the next lowest responsible bidder that meets the Engineering Review requirements.

**Understand Pre-Award Engineering Review Process**

Yes______    No______

**Project Description**

This project shall consist of the furnishing and installation of a communications tower, compound, and access road per the following and any attached specifications. Project also includes the relocation of existing shelter and complete decommissioning of the old/existing site, including the removal of the old tower.

**Understand Project Description**

Yes______    No______

**Coordination of the Work**

The Tower Contractor shall notify Marty Randall and the Contracting Officer to coordinate a construction start date at least two weeks prior to the desired construction time. Contractor must contact Eric Dickerson (eric.dickerson 919-280-4191) at least 2 weeks prior to construction to coordinate the staking of the tower location. Failure to give advance notice may result in delay of the starting date. Failure to give advanced notice may result in the Contractor’s crew being on site and unable to perform and work.

**Understand the Coordination Requirement**

Yes______    No______

**Design Capacity Requirement**

The tower must be designed so that when installed with all loading as shown in the Antenna Loading Requirements Table that follows, the tower superstructure and substructure shall NOT exceed 95% of its capacity. If, upon evaluation by a third party, Engineered Tower Solutions, the design computes to be at a greater stress level than specified, the bid will not be accepted. Each bidder must provide as part of the bid submission package, design calculations verifying that this Design Capacity Requirement is met. This tower shall be designed for a 90-ft fall radius per the contract documents. Additionally, each bidder shall record either the Rated Capacity and/or the Percent of Stressed Value in the space provided below.

<table>
<thead>
<tr>
<th>Rated Capacity</th>
<th>Percent of Stressed Value</th>
</tr>
</thead>
</table>

**Understand the Design Capacity Requirement.**

Yes______    No______

**Permits**

Permits are required for this tower installation. Contractor is responsible for obtaining permits and scheduling inspections with the permitting office. The City is not exempt from permits.

**Understand the Permit Process**

Yes______    No______

**Foundation Inspection Management**

Prior to Construction Start, the Tower Contractor will obtain the services of third party Engineered Tower Solutions (“ETS”) to oversee, inspect, and document each phase of the foundation construction to ensure compliance with the Tower Manufacturer’s Tower Design Drawings and Specifications. (City of Concord, NC has a contract with ETS to perform these inspections with no more than two trips being made by ETS. Fees will be paid by City of Concord, NC for all initial inspections. Additional inspections due to non-conformity with contract documents are at the contractor’s expense. For scheduling, email Eric Dickerson: (eric.dickerson@ets-pllc.com 919-280-4191) prior to Construction Start, all materials to be used in the construction of the foundation.
shall be inspected to ensure compliance with the Tower Manufacturer’s Tower Design Drawings and Specifications. The Tower Contractor shall immediately report to Marty Randall and the Contracting Officer any deviations found during the on-site pre-construction start inspection and present a correction plan. The Tower Contractor shall provide to Marty Randall and the Contracting Officer, a written report, sealed by Engineered Tower Solutions that completely documents all results of the foundation oversight and inspection process, including a comprehensive set of digital photographs.

Understand the Inspections Management Process  Yes____  No____

CONCRETE: COMPLIANCE WITH MIX SPECIFICATIONS & STRENGTH TESTING

The Tower Contractor will obtain the services of the third party, Engineered Tower Solutions (“ETS”), to ensure proper oversight of the concrete pouring process and the inspection and recording of each concrete delivery ticket for compliance with the Tower Manufacturer’s Tower Design Drawings and Specifications. The Tower Contractor shall ensure the third party, (ETS), takes all steps to ensure competent monitoring of the concrete sampling process used during the concrete pouring process, and to ensure accurate recording of the time of day each sample was taken. (City of Concord, NC has a contract with ETS to perform the concrete testing. Fees will be paid by City of Concord, NC. This includes sampling, breaks, and reports. For scheduling, email Eric Dickerson: (eric.dickerson@ets-pllc.com 919-280-4191). The Tower Contractor shall provide to Marty Randall and the Contracting Officer, a written report, sealed by (ETS) that completely documents the compliance with mix specifications, and a detailed presentation of the concrete testing, to include a comprehensive set of digital photographs.

Understand Concrete Compliance and Testing Process  Yes____  No____

TOWER GROUND INSPECTION

The Tower Ground inspection will be conducted by 10-18 Consulting. Mr. Marty Randall, marty.randall@1018consulting.com Cell 828-527-2416, must be contacted at least 72 hours prior to requiring this inspection.

Understand Grounding Inspection Process  Yes____  No____

EXPEDITE CONSTRUCTION

It is expected that the contractor will expedite completion of the project, taking full advantage of the weather and other favorable working conditions.

Understand Post Construction Inspection Process  Yes____  No____

POST CONSTRUCTION INSPECTION (PCI)

Upon completion of the tower the Tower Contractor will obtain the services of the third party Engineered Tower Solutions (“ETS”) to conduct the Post Construction Inspection (“PCI”), and to generate a complete report documenting the findings of the Inspection. (City of Concord, NC has a contract to provide this service. Fees will be paid by City of Concord, NC for all initial inspections. Additional inspections due to non-conformity with contract documents are at the contractor's expense. For scheduling, email Eric Dickerson: (eric.dickerson@ets-pllc.com 919-280-4191). In the event any deviation from the Tower Manufacturer’s Design Drawings and Specifications is found during, or as a result of the PCI, the Tower Contractor shall provide to the Contracting Officer, a red-lined copy of each Drawing and/or Specification that clearly documents each deviation along with Engineer of Record (EOR) approval if applicable.

Understand Final Inspection Process  Yes____  No____

CONTRACTOR LICENSES

The Tower Contractor, and/or the subcontractor designated by the Tower Contractor, performing work on this tower, must be licensed to operate a contracting business in the State of North Carolina as required under NCGS 87.

NC General Contractors License Number____________________

NC Contractor must have a Public Utilities (PU) (Communications) Classification on their License.
The Contractor installing the tower must comply with the North Carolina Department of Labor’s Tower Climbing rules that were adopted in February 2005 and any following revisions.

Understand Requirements for Contractor Licenses

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Comply Yes or No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Location is 170 Pitts School Road NW, Concord, North Carolina, 28027 Latitude 35° 22’ 33.349 North Longitude 80° 40’ 22.166 West</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Tower is to be a self-supporting structure.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Tower Height is to be 180-ft AGL with a 90-ft Fall Zone.</td>
<td></td>
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<tr>
<td>4</td>
<td>Tower will be positioned on the DCS as indicated in the attached Construction Drawings.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>The Tower Structure shall utilize solid round or angle structural steel members. No other materials or shapes will be given consideration. Note all members must be hot dipped galvanized to prevent corrosion.</td>
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<tr>
<td>6</td>
<td>All structural bolts must meet the ASTM A325 or A490 Specification.</td>
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<tr>
<td>7</td>
<td>The Tower Contractor will provide all Materials to Complete the Tower &amp; Foundation Installation.</td>
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<tr>
<td>8</td>
<td>The Tower Contractor will build the Foundation and erect the Tower.</td>
<td></td>
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<tr>
<td>9</td>
<td>The Tower Contractor will provide a detailed set of foundation drawings (sealed by a North Carolina Registered Engineer) showing all details including all rebar sizes and quantities, and concrete volumes. The Tower Contractor shall install the tower foundation. The Tower Contractor may construct the foundation using the most cost-effective method. The type of foundation presented in this Bid shall be designed and constructed in accordance with the GeoTechnical Parameters specified in the Subsurface Exploration Report provided by Engineered Tower Solutions. That document is an attachment to this IFB.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Any damage to the access road from construction of this tower must be repaired by the contractor so as to restore to the design document condition. If there are repairs to the existing access in order to construct the tower those repairs must be included in the bid. Contractor must install site access road per the design drawings and gravel the parking area at the site. Contractor must grade the entire site including the location of the tower and where the building is to be located to a level condition. Contractor is responsible for all site clearing and grade work. Contractor must perform a final smooth grade removing all rocks, roots, and other debris on DCS and along access road. All finished grade work should allow for mowing with a standard commercial lawn mower. Site and access road must be seeded, and straw applied upon completion of the tower and access road. Erosion control measures must be installed on site and along the access road per contract documents and applicable codes.</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>All back-fill for grading, tower anchors and tower base must be compacted and tamped. This would be 8 inches of fill and adding moisture if need between each tamping.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>As a minimum this Tower and Foundation shall be designed to the requirements of ANSI/TIA-222H, including released addendums.</td>
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<td>---</td>
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<td>---</td>
</tr>
</tbody>
</table>
| 13 | **Design Wind Speed; Tower and Foundation:**  
In accordance with ANSI/TIA-222H (including released addendums) and county/jurisdictional specific requirements. |   |
| 14 | **Structure Class; Tower and Foundation:**  
Structure Class III – High Hazard (Essential Communications) |   |
| 15 | **Exposure Category; Tower and Foundation:**  
In accordance with ANSI/TIA-222H (including released addendums) and county/jurisdictional specific requirements. |   |
| 16 | **Topographic Category; Tower and Foundation:**  
In accordance with ANSI/TIA-222H (including released addendums) and county/jurisdictional specific requirements. |   |
| 17 | **Design Ice Loading; Tower and Foundation**  
Ice Loading per ANSI/TIA-222H requirements. |   |
| 18 | One cable ladder with at least Twelve (12) seven-sixteenths (7/16) inch diameter holes and twelve (12) three-quarter (3/4) inch diameter holes. The cable ladder will be centered on the tower face closest to the shelter (225°± azimuth) and shall extend to the top of the tower. Cross supports on the cable ladder will be no more than 3-ft. apart. Contractor shall provide and install a new (24) port entry port to the existing building. This new port shall correspond to the installed cable ladder. The new port will require installing a new hole in the shelter, and the contractor is responsible for covering, weatherproofing, and sealing the old port to the elements. **NOTE:** The Tower Contractor shall install the Cable Ladder per the design drawings. |   |
| 19 | One hot-dipped galvanized expanded metal Horizontal Cable/Wave-Guide Ice-Bridge, capable of mounting twenty (20) lines. Waveguide bridge shall be installed between the tower and shelter per the design drawings. The width of the Horizontal Cable/Wave-Guide Ice-Bridge shall be a minimum of twenty-four (24) inches. |   |
| 20 | The Tower shall have climbing facilities on each tower leg for installation and maintenance. Tower Contractor must provide and install a safety cable at the climbing ladder. |   |
| 21 | **OPTION: Must include lighting system in tower loading.** Install a new Drake Lighting LED E1:2M ARM/SPD/SMNP Avian Compliant Obstruction Lighting System. The E1 system requires one (1) top flashing beacon with two (2) LED single obstruction lights (OL1B-LED-120) mounted at mid-tower. All lights must flash at 30 flashes per minute (fpm) +/- 3 fpm. System must include Armored Cable, Power APT-TWL-SPD Surge Device and SNMP Network Interface Board w/Cable. Contact Doug Jones 615-804-8023 djones@drakelighting.com at Drake Lighting for system procurement. Pricing to be provided with and without lighting system. City of Concord will decide on option before construction is completed. |   |
| 22 | The Tower Contractor shall install one (1) #2/0 AWG bare tinned copper conductor between the base of each tower leg and a 10-ft ground rod at each tower leg. The top of the ground rod must be at least 3-ft below finished grade. Each of these #2/0 AWG bare tinned copper conductors shall be Exothermically Bonded to the ground rod, tower leg, and tower halo ring. **NOTE:** All grounding shall conform to construction drawings. **NOTE:** A representative of City of Concord, NC shall inspect the connections to the ground rods prior to filling the trench. This inspection does not eliminate the requirement for installing inspection tubes. The Tower Contractor shall notify the Contracting Officer at least forty-eight (48) hours prior to schedule and conduct this inspection. |   |
| 23 | The Tower Contractor will be responsible for moving the existing 30’x11’-6” shelter from the old tower location and installing it at the DCS. After removal of the shelter from the old site, the shelter foundation, existing tower, and fencing must be removed and properly disposed by the contractor. The existing tower foundation must be removed to 24” below grade and covered with soil. Old Site Location is 7225 Weddington Road, Concord NC. GPS: 32 22 46.74, 080 41 46.89. **Tower Contractor shall install two 240 VAC circuits with 30 AMP Twist Lock plugs above existing microwave rack and one 120VAC dedicated circuit for the waveguide dehumidifier after the building has been relocated to the DCS.** |   |
| 24 | The Tower Contractor is responsible for providing and installing a temporary power pole on the site for use during construction. Contractor is responsible for removing the temporary power pole once permanent power has been installed at the DCS. |   |
Tower Contractor is required to submit best and final price for this effort. Change orders will only be considered for circumstances or unusual situations not included in the contract documents. Any change orders must be approved in writing before work is started. Customer understands any additional work requested may incur additional costs outside of this contract pricing.

The Tower Contractor shall provide Tinned Copper Ground Bars (TCGBs) capable of attaching a minimum of twenty (20) ground kits. Tower must include a 6’ lightning rod at the top of structure. **NOTE:** The TCGB shall be mechanically attached directly to the Tower Structure with Stainless Steel Hardware using pre-drilled holes in the Tower Structural Steel provided expressly for this purpose.

The TCGBs shall be installed at approximately ten 10-ft AGL at the base of the cable ladder. The Tower Contractor shall install a sufficient length of #2/0 AWG bare tinned copper conductor between this TCGB and the tower halo ring closest to the cable ladder. A second set of TCGB’s to be install at the approx. 150 ft level with the TCGB’s bonded to the tower structure. **Exothermic Bonding** shall be used to provide the electrical connections of the #2/0 AWG bare tinned copper conductor to the TCGB and the ground ring.

Chain Link Fence, ground fabric, and gravel on the compound around the tower is required. The contractor must bring the compound to a graded, level, and landscaped condition as noted in item 10.

Antenna and Line installations on the new tower will not be the responsibility of the Tower Contractor. Existing antennas must be removed from the old tower.

The Tower Contractor shall provide and install antenna mounts in accordance with the included **Antenna Mount Schedule (AMS)** and **Antenna Loading Requirements**.

The location of the site is as shown on the attached drawings.

Excess soil created from foundation installs must be removed from the site. If soil is suitable it may be used for backfilling, access road construction, or site/compound leveling.

Contractor will need to install a gravel parking area as shown on the attached drawings. Other details of this installation are in item 10 above.

The Tower Contractor shall remove all Construction Materials and debris from the site.

Bidding contractors must attend a mandatory pre-bid site walk on 27 September 2019 at 10:30AM.

**ANTENNA MOUNT SCHEDULE (AMS)**

Contractor to provide and install the following Antenna Mounts on the Tower

<table>
<thead>
<tr>
<th>Item #</th>
<th>Antenna Mount Description</th>
<th>Comply Yes or No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>One microwave 4.5” Pipe Mount at 170-ft.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Two 6-ft standoff sidearm mounts with stabilizer at 160-ft</td>
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</tr>
<tr>
<td>3</td>
<td>Two 6-ft standoff sidearm mounts with stabilizer at 140-ft</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>One Microwave 4.5” Pipe Mount at 80-ft.</td>
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</tr>
<tr>
<td>5</td>
<td>One 6-ft standoff sidearm mount with stabilizer at 80-ft.</td>
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<td>7</td>
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<td>9</td>
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</tbody>
</table>

6’ standoff mounts must be heavy duty Connect-it CIW # HS6 or equivalent. If an alternate mount is used specifications must be provided by the manufacturer.

**ANTENNA LOADING REQUIREMENTS TABLE**

Antenna Mounts that are indicated ‘Y’ in the shaded column of the table below must be installed when tower is erected by the Tower Contractor. They are the same Antenna Mounts listed in the table above.

The Tower Contractor shall furnish and install **Dish Ice Shield** above the microwave antenna locations, in addition to furnishing and installing **Ice Shields** above each obstruction light listed below marked with a Y in the Provide Mount column on the far right of the table.
<table>
<thead>
<tr>
<th>Ant. No.</th>
<th>Antenna Model</th>
<th>Radome Y N</th>
<th>Elevation-ft</th>
<th>Trans Line Size &amp; Type</th>
<th>Freq in MHz</th>
<th>Azimuth To North</th>
<th>Antenna Mount</th>
<th>Support Pipe Length Ft</th>
<th>Provide Mount Y N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1” Dome Antenna</td>
<td>Y</td>
<td>180</td>
<td>CAT 5</td>
<td></td>
<td></td>
<td>Direct Mount</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PAD6-W57</td>
<td>Y</td>
<td>170</td>
<td>RFS E65</td>
<td>6 GHz</td>
<td>180° Leg</td>
<td>4.5” pipe Mount</td>
<td>see item # 1 above AMS</td>
<td>Y</td>
</tr>
<tr>
<td>3</td>
<td>RFICC807-11</td>
<td>N</td>
<td>160</td>
<td>1/2” Jumper</td>
<td>746-870</td>
<td>90° Leg</td>
<td>6 ft Side Arm</td>
<td>see item # 2 above AMS</td>
<td>Y</td>
</tr>
<tr>
<td>4</td>
<td>Bird Technologies 428E - Series TTA</td>
<td>N</td>
<td>159</td>
<td>(1) 7/8” &amp;1/2” Heliax</td>
<td>796-824</td>
<td>90° Leg</td>
<td>Direct mount for antenna #3</td>
<td>see item # 2 above AMS</td>
<td>Y</td>
</tr>
<tr>
<td>5</td>
<td>RFICC80711</td>
<td>N</td>
<td>160</td>
<td>1/2” Jumper</td>
<td>746-870</td>
<td>270° Leg</td>
<td>6 ft Sidearm</td>
<td>see item # 2 above AMS</td>
<td>Y</td>
</tr>
<tr>
<td>6</td>
<td>Bird Technologies 428E- Series TTA</td>
<td>N</td>
<td>159</td>
<td>(1) 7/8” &amp; (1) 1/2” Heliax</td>
<td>796-824</td>
<td>270° Leg</td>
<td>Direct Mount for antenna #5</td>
<td>see item # 2 above AMS</td>
<td>Y</td>
</tr>
<tr>
<td>7</td>
<td>RFI CC807-11</td>
<td>N</td>
<td>140</td>
<td>1 5/8” Heliax</td>
<td>746-870</td>
<td>180° Leg</td>
<td>6 ft Sidearm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>RFI CC80711</td>
<td>N</td>
<td>140</td>
<td>1-5/8” Heliax</td>
<td>746-870</td>
<td>90° Leg</td>
<td>6 ft Sidearm</td>
<td>See item # 3 Above AMS</td>
<td>Y</td>
</tr>
<tr>
<td>9</td>
<td>RFI CC87011</td>
<td>N</td>
<td>140</td>
<td>1-5/8” Heliax</td>
<td>746-870</td>
<td>270° Leg</td>
<td>6 ft Sidearm</td>
<td>See item # 3 Above AMS</td>
<td>Y</td>
</tr>
<tr>
<td>10</td>
<td>RFS PAD6-W57</td>
<td>Y</td>
<td>130</td>
<td>RFS E60</td>
<td>6 GHz</td>
<td>90° Leg</td>
<td>4.5” Pipe Mount</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>RFS PAD6-W57</td>
<td>Y</td>
<td>130</td>
<td>RFS E60</td>
<td>6 GHz</td>
<td>270° Leg</td>
<td>4.5” Pipe Mount</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>RFS PAD6-57W</td>
<td>Y</td>
<td>130</td>
<td>RFS E60</td>
<td>6 GHz</td>
<td>180° Leg</td>
<td>4.5” Pipe Mount</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>(3) RFICC80711</td>
<td>N</td>
<td>110</td>
<td>(3) 1-5/8” Heliax</td>
<td>796-870</td>
<td>90°, 180°, 270° Leg</td>
<td>6 ft Sidearm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>RFS SC3-W100</td>
<td>Y</td>
<td>80</td>
<td>(1) RFS E105</td>
<td>10-11 GHz</td>
<td>270° Leg</td>
<td>4.5” Pipe Mount</td>
<td>See item # 4 above AMS</td>
<td>Y</td>
</tr>
<tr>
<td>15</td>
<td>RFI COL54-160</td>
<td>N</td>
<td>80</td>
<td>(1) 7/8” Heliax</td>
<td>140-160MHz</td>
<td>180°</td>
<td>6’ Sidearm</td>
<td>see item # 5 above AMS</td>
<td>Y</td>
</tr>
<tr>
<td>16</td>
<td>DB224-A</td>
<td>N</td>
<td>70</td>
<td>(3) 7/8 Heliax</td>
<td>150-1870</td>
<td>90°, 180°, 270° Leg</td>
<td>4 ft Sidearm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>RFS SC3-W100</td>
<td>Y</td>
<td>60</td>
<td>(1) RFS E105</td>
<td>10-11 GHz</td>
<td>270° Leg</td>
<td>4.5” Pipe Mount</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* For design purposes, assume future antennas to be DB224, or equivalent, in size and weight.
TOWER COST BREAKDOWN:

1. Total cost of tower materials only $____________________

2. Total cost of all other services, including: $____________________
   a. All shipping
   b. Complete Installation
   c. Engineering Services
   d. All Inspections

3. Total cost to construct the tower with lighting\(^1\). $____________________
   (Sum of Item-1 and Item-2, above)

4. Total cost to construct the tower without lighting\(^2\). $____________________
   (Sum of Item-1 and Item-2, above)

LIST OF ATTACHMENTS

2. Construction Drawings, prepared by Engineered Tower Solutions.
3. Bid Document
4. Antenna Datasheets

Call the Contracting Officer prior to the opening date if you did not receive these attachments.

\(^1\) City of Concord, NC will NOT be responsible for any other charges.
\(^2\) City of Concord, NC will NOT be responsible for any other charges.
City of Concord
Concord, North Carolina

Communications Tower Construction Project
Bid # 2415

Bids will be publicly opened: 3:00pm Friday, 04 October 2019
City of Concord City Hall – City Council Chambers
35 Cabarrus Avenue West
P.O. Box 308
Concord, NC 28025
STANDARD FORM CONSTRUCTION CONTRACT

This contract (together with all exhibits and valid amendments, the “Agreement” or the “Contract”) is made and entered into as of the ___ day of ______________, 20___, by the City of CONCORD (“City”) and ______________________________ (“Contractor”), (  ) a corporation, (  ) a professional corporation, (  ) a professional association, (  ) a limited partnership, (  ) a sole proprietorship, or (  ) a general partnership; organized and existing under the laws of the State of ____________________________.

Sec. 1. Background and Purpose. The communications tower construction project consist of the installation of a new tower and compound along with decommission of the existing tower site.

Sec. 2. Services and Scope to be Performed. The Contractor shall provide the services at the charges set forth either in this paragraph or in Exhibit “A”. Additional exhibits may be used to further define this Agreement when the Contractor and City so agree. Any additional exhibits shall be designated as exhibits to the Agreement with capitalized, sequential letters of the alphabet, shall be attached hereto and incorporated herein by reference as if the same were fully recited, and shall become terms of this Agreement upon execution by both parties.

In this Contract, “services” means the services that the Contractor is required to perform pursuant to this Contract and all of the Contractor’s duties to the City that arise out of this Contract. Any amendments, corrections, or change orders by either party must be made in writing signed in the same manner as the original. (This form may be used for amendments and change orders.) The City reserves the right to refuse payment for any work outside that authorized herein or pursuant to a duly approved amendment or change order.

Sec. 3. Complete Work without Extra Cost. Unless otherwise provided, the Contractor shall obtain and provide, without additional cost to the City, all labor, materials, equipment, transportation, facilities, services, permits, and licenses necessary to perform the Work.

Sec. 4. Compensation. The City shall pay the Contractor for the Work as described in this paragraph below OR as described in Exhibit “A” attached. In the event of a conflict, the provisions of this paragraph shall control. Any additional expenses or charges shall only be paid after both the City and the Contractor agree to and execute a written change order. The City shall not be obligated to pay the Contractor any fees, payments, expenses or compensation other than those authorized in this Contract or in a duly-approved change order. All payments shall be deemed inclusive of tax and other obligations.

Sec. 4a. Retainage. The City shall withhold no retainage on Contracts having a “total project cost” of less than $100,000.00. The City may withhold retainage on contracts having a total project cost between $100,000 and $200,000. When withheld, retainage shall equal no more than five percent of each progress payment. When the project is fifty percent complete, the City shall not retain anything from future project payments provided that (i) the surety concurs in writing, (ii) the Contractor continues to perform satisfactorily, (iii) any non-conforming work identified in writing by the architect, engineer(s) or City has been corrected by the Contractor and accepted by the architect, engineer(s) or City. However, if the City determines that the Contractor’s performance is unsatisfactory, the City may withhold up to five percent retainage from each project payment. The City may withhold additional amounts above five percent for unsatisfactory job progress, defective construction not remedied, disputed work, third party claims filed against the owner or reasonable evidence that a third-party claim will be filed.

Definitions:

“Total Project Cost”: Total value of the Contract and any approved change orders or amendments.

“Project is Fifty Percent Complete”: When the Contractor’s validly-issued gross project invoices (excluding the value of the materials stored off-site) equal or exceed fifty percent of the value of the Contract, except that the value of materials stored on-site shall not exceed twenty percent of the Contractor’s gross project invoices for the purpose of determining whether the project is fifty percent complete.
Sec. 5. Term. The Contractor shall commence work within ten (10) days of the date of its receipt of written Notice to Proceed from the City. The date that is ten (10) days from the date of the Contractor’s receipt of the Notice to Proceed shall be the “Commencement Date.” All work as set forth in the Scope of Services in Exhibit “A” shall be completed within 90 days of receipt of materials, not to include bad weather days. The date that is 90 days of receipt of materials, not to include bad weather days calendar days from the Commencement Date shall be the “Completion Date.” Time is of the essence with regard to this Project. If Contractor’s obligations are not completed by the Completion Date, the City reserves the right to nullify this Agreement, order the Contractor to immediately cease all work under this Agreement and vacate the premises, and to seek professional services equivalent to those outlined in Exhibit “A.” The Contractor shall be held accountable for all damages incurred by the City as a consequence of the missed Completion Date. The exercise of any of these rights by the City shall not be interpreted to prejudice any other rights the City may have under this Agreement or in law or equity. This Contract shall not be automatically extended unless agreed to in writing by the City or as provided in Exhibit “A”.

Sec. 6. Contractor’s Billings to City. Payments will be made in accordance with the schedule found in this section below OR attached at Exhibit “A”. Contractor shall submit an original pay request (invoice) to the City Purchasing Agent by the first of each month in order to expedite payment. Upon receipt of the request the City Purchasing Agent shall verify the amounts and if correct forward the request to the Accounts Receivable Division of the Finance Dept. Final payment on the Contract shall be made in 45 days, except in the case of retainage. Within 60 days after the submission of the final pay request, the City (with the written consent of the surety) shall release to the Contractor all retainage payments IF the City receives a certificate of substantial completion from the architect, engineer or designer-in-charge of the project OR the City receives beneficial occupancy and use of the project. In either case, the City may retain up to 2.5 times the estimated value of the work to be completed or corrected.

Sec. 7. Insurance. Contractor shall maintain and cause all sub-contractors to maintain insurance policies at all times with minimum limits as follows:

<table>
<thead>
<tr>
<th>Coverage</th>
<th>Minimum Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workers’ Compensation</td>
<td>$500,000 each accident, $500,000 bodily injury by disease each employee, $500,000 bodily injury by disease policy limit</td>
</tr>
<tr>
<td>General Liability</td>
<td>$1,000,000 per occurrence regardless of the contract size</td>
</tr>
<tr>
<td>Automobile Liability</td>
<td>$1,000,000 per occurrence regardless of the contract size</td>
</tr>
<tr>
<td>Umbrella</td>
<td>$1,000,000 per occurrence if contract does not exceed 180 days; otherwise, $2,000,000 per occurrence</td>
</tr>
</tbody>
</table>

Contractor shall provide a Certificate of Insurance to the City listing the City as an additional insured. Such Certificate shall be in a form acceptable to the City.

Sec. 8. Documentation Requirements:
A. Contractor shall provide the City with a Certificate of Insurance for review prior to the issuance of any contract or Purchase Order. Certificates of insurance must be submitted on an Acord Form (revised 2010/05), and the City must be named as additional insured on all lines of coverage, except for Professional liability and Workers’ Compensation. Contractor shall provide a Certificate of Insurance to the City listing the City as additional insured as required by written contract. The General Liability, Automobile Liability and Workers Compensation policies include a Waiver of Subrogation in favor of the City of Concord. The Umbrella Policy shall follow the form of the General Liability and Automobile Liability Policies. All Certificates of Insurance will require written notice by the insurer or Contractor’s agent in the event of cancellation, reduction or other modifications of coverage by the insurer. Such notice shall be not less than 30 days for nonrenewal by the insurer, not less than 10 days for cancellation due to nonpayment of the premium and as soon as possible for all other types of modifications. In addition to the notice requirement above, Contractor shall provide the City with written notice of cancellation, reduction, or other modification of coverage of insurance whether instigated by the insurer or by the Contractor immediately upon Contractor’s receipt of knowledge of such modifications. Upon failure of the Contractor to provide such notice, Contractor assumes sole responsibility for all loses incurred by the City for which insurance
would have provided coverage. The insurance certificate shall be for the insured period in which the initial contract period begins and shall be renewed by the Contractor for each subsequent renewal period of the insurance for so long as the contract remains in effect.

The City shall be named as an **additional insured** on all policies except Workers’ Compensation and professional liability and it is required that coverage be placed with “A” rated insurance companies acceptable to the City. Statement should read, “City of Concord is added as an additional insured as evidenced by an endorsement attached to this certificate.” Failure to maintain the required insurance in force may be cause for termination of this Agreement. In the event that the Contractor fails to maintain and keep in force the insurance herein required, the City has the right to cancel and terminate the Agreement without notice.

Without limiting the coverage required pursuant to this Agreement, Contractor shall provide Workers’ Compensation insurance if it employs three or more employees. The Worker’s Compensation insurance shall have the North Carolina mandated statutory limits. Contractor shall fully comply with all applicable laws including, but not limited to, North Carolina’s Workers’ Compensation Act (Chapter 97 of the NC General Statutes).

B. Contractor shall provide a completed W-9 form to the City prior to execution by the City of this Agreement.

**Sec. 9. Performance of Work by Contractor.**

(a) The Contractor warrants that all work performed under this Contract conforms to the Contract requirements and is free of any defect in equipment, material, or design furnished, or workmanship performed by the Contractor or any subcontractor or supplier at any tier. This warranty shall continue for a period of 1 year from the date of issuance by the City of written final completion of the work.

(b) The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to City-owned or controlled real or personal property, when that damage is the result of--

   (1) The Contractor's failure to conform to contract requirements; or
   
   (2) Any defect of equipment, material, workmanship, or design furnished.

(c) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.

(d) The City shall notify the Contractor, in writing, within a reasonable time, not to exceed 30 days, after the discovery of any failure, defect, or damage.

(e) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time, not to exceed 30 days unless otherwise agreed in writing and signed by the City Manager or his designee, after receipt of notice, the City shall have the right to replace repair, or otherwise remedy the failure, defect, or damage at the Contractor’s expense.

(f) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this Contract, the Contractor shall--

   (1) Obtain all warranties that would be given in normal commercial practice,
   
   (2) Require all warranties to be executed, in writing, for the benefit of the City, if directed to do so by the City; and
   
   (3) Enforce all warranties for the benefit of the City, if directed to do so by the City.

(g) In the event the Contractor’s warranty has expired, the City may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.

(h) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the City nor for the repair of any damage that results from any defect in City-furnished material or design.
Sec. 10. **Performance of Work by City.** If the Contractor fails to perform the Work in accordance with the schedule referred to in Exhibit “A”, the City may, in its discretion, perform or cause to be performed some or all of the Work, and doing so shall not waive any of the City’s rights and remedies. Before doing so, the City shall give the Contractor reasonable notice of its intention. The Contractor shall reimburse the City for all costs incurred by the City in exercising its right to perform or cause to be performed some or all of the Work pursuant to this section.

Sec. 11. **Attachments.** Additional exhibits may be used to further define this Agreement when the Contractor and City so agree. Any additional exhibits shall be designated as exhibits to the Agreement with capitalized, sequential letters of the alphabet, shall be attached hereto and incorporated herein by reference as if the same were fully recited, and shall become terms of this Agreement upon execution by both parties.

The following attachments are made a part of this Contract and incorporated herein by reference:

(a) Exhibit “A” – Scope of Services / Fee for Scope of Services.
(b) Exhibit “B” – Contractor must execute the Affidavit attached as Exhibit “B”, attesting to compliance with state and federal laws related to E-Verify.
(c) Exhibit “C” – Tax Form(s).
(d) Exhibit “D” - Certificate of Insurance.

In case of conflict between an attachment and the text of this contract excluding the attachment, the text of this contract shall control. Any attachment that materially alters the standard terms contained herein must be reviewed by the City Attorney and approved by the City in writing.

Sec. 12. **Notice.** (a) All notices and other communications required or permitted by this Contract shall be in writing and shall be given either by personal delivery, fax, or certified United States mail, return receipt requested, addressed as follows:

To the City:
Sue Hyde, Director of Engineering  VaLerie Kolczynski, Esq.
City of Concord  City Attorney
P.O. Box 308  PO Box 308
Concord, NC 28026  Concord, NC 28026
Fax Number: (704) 786-4521  Fax Number: (704) 784-1791

(b) **Change of Address, Date Notice Deemed Given:** A change of address, fax number, or person to receive notice may be made by either party by notice given to the other party. Any notice or other communication under this Contract shall be deemed given at the time of actual delivery, if it is personally delivered or sent by fax. If the notice or other communication is sent by US Mail, it shall be deemed given upon the third calendar day following the day on which such notice or other communication is deposited with the US Postal Service or upon actual delivery, whichever first occurs.

Sec. 13. **Indemnification.** To the maximum extent allowed by law, the Contractor shall defend, indemnify, and save harmless the City of Concord, its agents, officers, and employees, from and against all charges that arise in any manner from, in connection with, or out of this Contract as a result of the acts or omissions of the Contractor or subcontractors or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable except for damage or injury caused solely by the negligence of the City its agents, officers, or employees. In performing its duties under this section, the Contractor shall at its sole expense defend the City of Concord, its agents, officers, and employees with legal counsel reasonably acceptable to City. As used in this subsection – “Charges” means claims, judgments, costs, damages, losses, demands, liabilities, duties, obligations, fines, penalties, royalties, settlements, expenses, interest, reasonable attorney’s fees, and amounts for alleged violations of sedimentation pollution, erosion control, pollution, or other environmental laws, regulations, ordinances, rules, or orders. Nothing in this section shall affect any warranties in favor of the City that are otherwise provided in or arise out of this Contract. This section is in addition to and shall be construed separately from any other indemnification provisions that may be in this Contract. This section shall remain in force despite termination of this Contract (whether by expiration of the term or otherwise) and termination of the services of the Contract under this Contract.

Sec. 14. **Corporate Status.** If the Contractor is dissolved or suspended and the Contractor does not notify the City of such dissolution within thirty (30) days from date of dissolution or suspension, and/or the corporate status is not reinstated within thirty (30) days, this Contract, at the sole option of the City and without prejudice to City’s other remedies, shall be declared null and void or the Contractor shall execute a new contract showing the Contractor’s correct legal entity.
Sec. 15. Miscellaneous.

(a) **Choice of Law and Forum.** This Contract shall be deemed made in Cabarrus County, North Carolina. This Contract shall be governed by and construed in accordance with the laws of North Carolina. The exclusive forum and venue for all actions arising out of this Contract shall be the appropriate division of the North Carolina General Court of Justice, in Cabarrus County. Such actions shall neither be commenced in nor removed to federal court. This section shall not apply to subsequent actions to enforce a judgment entered in actions heard pursuant to this section.

(b) **Waiver.** No action or failure to act by the City shall constitute a waiver of any of its rights or remedies that arise out this Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

(c) **Performance of Government Functions.** Nothing contained in this Contract shall be deemed or construed so as to in any way estop, limit, or impair the City from exercising or performing any regulatory, policing, legislative, governmental, or other powers or functions.

(d) **Severability.** If any provision of this Contract shall be unenforceable, the remainder of this Contract shall be enforceable to the extent permitted by law.

(e) **Assignment, Successors and Assigns.** Without the City’s written consent, the Contractor shall not assign (which includes to delegate) any of its rights (including the right to payment) or duties that arise out this Contract. Unless the City otherwise agrees in writing, the Contractor and all assign shall be subject to all of the City’s defenses and shall be liable for all of the Contractor’s duties that arise out of this Contract and all of the City’s claims that arise out of this Contract. Without granting the Contractor the right to assign, it is agreed that the duties of the Contractor that arise out of this Contract shall be binding upon it and its heirs, personal representatives, successors, and assigns.

(f) **Compliance with Law.** In performing all of the Work, the Contractor shall comply with all applicable law. Without limitation, Contractor shall comply with the requirements of Article 2, Chapter 64 (Verification of Work Authorization) of the North Carolina General Statutes relating to E-Verify. Further, if Contractor utilizes a subcontractor, Contractor shall require the subcontractor to comply with the requirements of Article 2 of Chapter 64 of the General Statutes. Pursuant to the requirements of the Iran Divestment Act, N.C.G.S. § 143C-6A-1, et. seq., Contractor certifies that that as of the Effective Date of this Agreement, Contractor is not on the Final Divestment List as created by the State Treasurer in compliance with N.C.G.S. § 143-6A-4 and located at www.nctreasurer.com/Iran. Furthermore, Contractor agrees that it will not enter into any subcontracts for the performance of this Agreement with any entity on the Final Divestment List.

(g) **City Policy.** THE CITY OPPOSES DISCRIMINATION ON THE BASIS OF RACE AND SEX AND URGES ALL OF ITS CONTRACTORS TO PROVIDE A FAIR OPPORTUNITY FOR MINORITIES AND WOMEN TO PARTICIPATE IN THEIR WORK FORCE AND AS SUBCONTRACTORS AND VENDORS UNDER CITY CONTRACTS.

(h) **EEO Provisions.** During the performance of this Contract the Contractor agrees as follows:

(1) The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, political affiliation or belief, age, or disability. The Contractor shall take affirmative action to insure that applicants are employed and that employees are treated equally during employment, without regard to race, color, religion, sex, national origin, political affiliation or belief, age, or disability. The Contractor shall post in conspicuous places available to employees and applicants for employment, notices setting forth these EEO provisions. (2) The Contractor in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, political affiliation or belief, age, or disability.

(i) **No Third Party Right Created.** This Contract is intended for the benefit of the City and the Contractor and not any other person.

(j) **Principles of Interpretation.** In this Contract, unless the context requires otherwise the singular includes the plural and the plural the singular. The pronouns “it” and “its” include the masculine and feminine. Reference to statutes or regulations include all statutory or regulatory provisions consolidating, amending, or replacing the statute or regulation. References to contracts and agreements shall be deemed to include all amendments to them. The word “person” includes natural persons, firms, companies associations, partnerships, trusts, corporations, governmental agencies and units, and any other legal entities.

(k) **Modifications, Entire Agreement.** A modification of this Contract is not valid unless signed by both parties and otherwise in accordance with requirements of law. Further, a modification is not enforceable against the City unless the City Manager or other duly authorized official signs it for the City. This Contract contains the entire agreement between the parties pertaining to the subject matter of this Contract. With respect to that subject matter, there are no promises, agreements, conditions, inducements, warranties, or understandings, written or oral, expressed or implied, between the parties, other than as set forth or referenced in this Contract.

(l) **Corporate Seal.** If a corporate seal is included by any party to this Contract, it is only for authentication purposes. This Contract is not signed under seal.
(m) No Employment Relationship. For all matters relating to this Agreement, Contractor shall be deemed an Independent Contractor. Nothing in this Agreement shall be construed in such a manner as to create an employee-employer relationship between City and Contractor.

(The following section applies to construction contracts only if amount is over $50,000)

Sec. 16. Bonding. Both performance and payment bonds for the full amount of this Contract are required to be attached. Instead of bonds, you may submit a deposit of money, certified check or government securities for the full amount of the Contract. The performance bond shall have a value equal to 100% of this Contract. This bond shall be conditioned upon faithful performance of the Contract in accordance with the plans, specifications and conditions of the Contract. The performance bond shall be solely for the protection of the City. The payment bond shall be in an amount equal to 100% of the Contract, and conditioned upon the prompt payment for all labor or materials for which a contractor or subcontractor is liable. The payment bond shall be solely for the protection of the persons furnishing materials or performance labor for which a contractor or subcontractor is liable.

Sec. 17. Dispute Resolution. It is understood and agreed that NCGS 143-128(f1-g) requires that disputes arising under an agreement for the erection, construction, alteration or repair of a building be subject to a dispute resolution process specified by the City. The amount in controversy shall be at least $15,000.00 before this dispute resolution procedure may be used. In compliance with this statutory provision, the City specifies this Section as the dispute resolution process to be used on this Project. It is further understood and agreed that this dispute resolution process is based on non-binding mediation and will only be effective to the extent that the Parties to any mediated dispute participate in the mediation in good faith. It is also understood and agreed that the City is under no obligation under any circumstance to secure or enforce the participation of any other Party in the mediation of any dispute subject to this Section and NCGS 143-128(f1-g).

This Section 17 does not apply to:

(a) The purchase and erection of prefabricated or relocatable buildings or portions of such buildings, except that portion of the work that must be performed at the construction site; or
(b) The erection, construction alteration or repair of a building when the cost of such building is $300,000 or less.

17.1 Any dispute arising between or among the Parties listed in Section 17.3 that arises from an agreement to construct the Project, including without limitation a breach of such agreement, shall be subject to non-binding mediation administered by the American Arbitration Association under its Construction Industry Mediation Rules ("Rules"), except as otherwise expressly set forth in this Section. To the extent any provision of the Rules is inconsistent with the provisions of this Section, the provisions of this Section shall control. The mediation provided in this Section shall be used pursuant to this Agreement and NCGS 143-128(f1-g) and is in lieu of any dispute resolution process adopted by the North Carolina State Building Commission, which process shall not apply to this Project.

17.2 For purposes of this Section the following definitions shall apply:

a. Agreement to construct the Project means an agreement to construct the Project that is subject to the requirements of NCGS 143-128 and does not include any agreement related to the Project that is not subject to said statute.

b. Construct or construction refers to and includes the erection, construction, alteration or repair of the Project.

c. Party or Parties refers to the parties listed in Section 16.4.

d. Project means the building to be erected, constructed, altered or repaired pursuant to this Agreement.

17.3 The City and any Party contracting with the City or with any first-tier or lower-tier subcontractor for the construction of the Project agree to participate in good faith in any mediation of a dispute subject to this Section and NCGS 143-128(f1-g), including without limitation the following Parties (if any): architect(s), engineer(s), surveyor(s), construction manager, construction manager at risk, prime contractor(s), surety(ies), subcontractor(s), and supplier(s).
17.4 In order to facilitate compliance with NCGS 143-128(f1-g), the Contractor and all other Parties shall include this Section 17 in every agreement to which it (any of them) is a Party for the construction of the Project without variation or exception. Failure to do so will constitute a breach of this Agreement, and the Contractor or other Party failing to include this Section in any agreement required by this Section shall indemnify and hold harmless the remaining Parties from and against any and all claims, including without limitation reasonable attorney fees and other costs of litigation, arising in any manner from such breach. Notwithstanding the foregoing provisions of this Section, it is expressly understood and agreed that the Parties are intended to be and shall be third-party beneficiaries of the provisions of this Section and can enforce the provisions hereof.

17.5 The following disputes are not subject to mediation: (i) a dispute seeking a non-monetary recovery; and (ii) a dispute seeking a monetary recovery of $15,000 or less.

17.6 A dispute seeking the extension of any time limit set forth in an agreement to construct the Project shall be subject to mediation pursuant to this Section and NCGS 143-128(f1-g), but only if the damages which would be suffered by the Party seeking the extension would exceed $15,000 if the disputed extension is denied. To the extent that liquidated damages are set forth in such agreement as the measurement of damages for failure by such Party to meet such time limit, such liquidated damages shall be the exclusive standard for determining the amount of damages associated with such dispute.

17.7 For purposes of this Section, a dispute is limited to the recovery of monetary damages from the same transaction or occurrence against a single Party or two or more Parties alleged to be liable jointly, severally or in the alternative. Two or more disputes may not be consolidated or otherwise combined without the consent of all Parties to such disputes.

17.8 In addition to such matters as are required by the Rules, a request for mediation shall include the amount of the monetary relief requested.

17.9 Prior to requesting mediation, a Party must form a good faith belief that it is entitled under applicable law to recover the monetary amount to be included in the request from one or more of the remaining Parties. Such belief must be based on a reasonable and prudent investigation into the dispute that is the subject of the request. The request for mediation must be based on such investigation and may not include any amount or the name of any remaining Party, unless supported by such investigation and good faith belief by the Party requesting the mediation.

17.10 If a Party breaches any provision of Section 17.9, it shall indemnify and hold harmless all other Parties from any costs, including reasonable attorney fees and other costs of litigation, and damages incurred by such other Parties that arise from such breach.

17.11 All expenses incurred by a Party to a dispute in preparing and presenting any claim or defense at the mediation shall be paid by the Party. Such expenses include without limitation preparation and production of witnesses and exhibits and attorney fees. All other expenses of the mediation, including filing fees and required traveling and other expenses of the mediator, shall be borne as follows: one half by the Party requesting the mediation, with the remaining parties paying equal shares of the remaining expenses and costs; provided that, if the City is named as a party to the mediation, the City shall pay at least one-third of the mediation expenses and costs divided among the Parties. If more than one Party to a dispute requests a mediation, the mediation expenses and costs to be divided among the Parties shall be borne equally by the Parties to the dispute; provided that, if the City is named as a Party to the mediation, the City shall pay at least one-third of the mediation expenses and costs divided among the Parties.

17.12 The mediation shall be held at a location agreeable to the mediator and all of the Parties; provided that, if no agreement can be reached, the mediation will be held at such location in Cabarrus County as the mediator shall determine.

17.13 The provisions of this Section are subject to any other provision of this Agreement concerning the submission, documentation and/or proof of any claim or dispute. Such other provisions shall apply in full force and shall be satisfied as a condition precedent to mediation pursuant to this Section.
17.14 The Parties understand and agree that mediation in accordance with this Section shall be a condition precedent to institution of any legal or equitable proceeding seeking monetary recovery based on any dispute that is subject to mediation pursuant to this Section.

Sec. 18. Breach. In the event of a violation of any material term of this Agreement, the non-violating party may terminate the Agreement upon written notice. Such notice shall state the violation with specificity and shall give ten (10) days to cure the violation. The cure period shall be measured as ten (10) days from the date of receipt of notice by the violating party, or, if the date is not known, then thirteen (13) days from the date the notice is placed in the United States Post. If the violation remains uncorrected at the end of the cure period, the Agreement shall be terminated without any further action by the non-violating party. Any remaining disputes shall be subject to the dispute resolution procedure set forth above, if applicable.

[Signature Page to Follow]
IN WITNESS WHEREOF, the City of Concord and the Contractor have caused this Contract to be executed by their respective duly authorized agents or officers.

CITY OF CONCORD:  
(Typed or Printed Legal Name of Contractor)

By: ___________________________  
City Manager

By: ___________________________  
Signature of President/Vice President/Manager/Partner

Date: ___________________________  
Printed Name: ___________________________

Title: ___________________________

ATTEST BY: ___________________________

City Clerk

Date: ___________________________

ATTEST: ___________________________

BY: ___________________________
Signature of Vice President, Secretary, or other officer

Printed Name: ___________________________

Title: ___________________________

APPROVED AS TO FORM: ___________________________

Attorney for the City of Concord  
SEAL

APPROVAL BY CITY FINANCE OFFICER

This instrument has been pre-audited in the manner required by the Local Government Budget and Fiscal Control Act.

_______________________________
Signature
EXHIBIT “A”

Attached Invitation for Bids
STATE OF NORTH CAROLINA
COUNTY OF CABARRUS

**************************
I, _________________________________(the individual signing below), being duly authorized by and on behalf
of _________________________________ (the legal name of the entity entering the contract, "Employer") after first being duly sworn hereby swears or affirms as follows:

1. Employer understands that E-Verify is the federal E-Verify program operated by the United States
Department of Homeland Security and other federal agencies, or any successor or equivalent program used to
verify the work authorization of newly hired employees pursuant to federal law in accordance with NCGS §64-26.

2. Employer understands that Employers Must Use E-Verify. Each employer (as such term is defined in
NCGS § 64-25), after hiring an employee (as such term is defined in NCGS § 64-25) to work in the United States,
shall verify the work authorization of the employee through E-Verify in accordance with NCGS§64-26(a).

Employer attests that Employer is in compliance with the requirements of the federal and state laws relevant to E-
verify.

3. Employer is a person, business entity, or other organization that transacts business in the State of North
Carolina. Employer employs 25 or more employees in this State. (mark Yes or No)
   a. YES ____, or   b. NO ____.

4. Employer attests that all subcontractors employed by it as part of this contract comply with the
requirements of E-Verify, and Employer will ensure compliance with E-Verify by any subcontractors subsequently
hired by Employer as part of any contract with the City of Concord.

5. Employer shall have a continuing duty to inform the City of Concord of any changes to this sworn
information.

This ____ day of _______________, 20___.

Signature of Affiant
Print or Type Name: _________________________

___________________________
(State of North Carolina  County of Cabarrus

(Affix Official/Notarial Seal)

Signed and sworn to (or affirmed) before me, this the _____
day of ________________, 20__.

My Commission Expires:
___________________________
___________________________
   Notary Public
EXHIBIT “C”

TAX FORM(S)
EXHIBIT “D”

CERTIFICATE OF INSURANCE

4824-4465-9749, v. 1
EXHIBIT “E”
PERFORMANCE BOND

Date of Execution of this Bond

Name and Address of Principal (Contractor)

Name and Address of Surety

Name and Address of Contracting Body

Amount of Bond

That certain contract by and between the Principal and the Contracting Body above named dated

KNOW ALL MEN BY THESE PRESENTS, that we, the PRINCIPAL and SURETY above named, are held and firmly bound unto the above-named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGAITON IS SUCH, that whereas the Principal entered into a certain contract with the Contracting Body, identified as shown above and hereto attached;

NOW THEREFORE, if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the Contracting Body, with or without notice to the Surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of the contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, then, this obligation to be void; otherwise, to remain in full force and virtue.
PERFORMANCE BOND: (Continued)

THIS PERFORMANCE BOND is made and given pursuant to the requirements and provisions of Section 129 of Chapter 143 of the General Statutes of North Carolina and pursuant to Article 3 of Chapter 44-A of the General Statutes of North Carolina, and each and every provision set forth and contained in Section 129 of Chapter 143 and in Article 3 of Chapter 44-A of the General Statutes of North Carolina is incorporated herein, made a part hereof, and deemed to be conclusively written into this Bond.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals as of the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned and representative, pursuant to authority of its governing body.

WITNESS:

______________________________
Principal (Name of individual and trade name, partnership, corporation, or joint venture)

(Proprietorship or Partnership)
Printed Name_______________________

______________________________
Surety (Name of Surety Company)
Printed Name_______________________

TITLE _________________________
(Corporate Seal of Principal)

ATTEST: (Corporation)

______________________________
Title ___________________________
(Corporation Secretary or Assistant Secretary Only)

______________________________
Title ___________________________

ATTEST: (Corporation)

______________________________
Title ___________________________

WITNESS:

______________________________
Title ___________________________

______________________________
Title ___________________________

______________________________
(Address of Attorney in Fact)
EXHIBIT “F”

GENERAL CONDITIONS

ARTICLE 1.0 – DEFINITIONS

1.1 Defined Terms:
Wherever used in the Contract Documents and printed with initial or all capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof.

1.1.1 Acceptance - By the OWNER of the Work as being fully complete in accordance with the Contract Documents subject to waiver of claims.
1.1.2 Addenda - Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the Contract Documents.
1.1.3 Agreement - The written instrument which is evidence of the agreement between OWNER and CONTRACTOR covering the work.
1.1.4 Application for Payment - The form acceptable to ENGINEER which is to be used by CONTRACTOR during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
1.1.5 Asbestos - Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
1.1.6 Bid - The offer or proposal of a bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
1.1.7 Bidder - The one who submits a Bid directly to Owner, as distinct from a sub-bidder who submits a bid directly to a Bidder.
1.1.8 Bidding Documents - The Bidding Requirements and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).
1.1.9 Bidding Requirements - The Advertisement or Invitation to Bid, Instructions to Bidders, Bid security form, if any, and the Bid form with any supplements.
1.1.10 Bonds - Performance and payment bonds and other instruments of security.
1.1.11 Change Order - A document recommended by ENGINEER which is signed by CONTRACTOR and OWNER and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
1.1.12 Claim - A demand or assertion by OWNER or CONTRACTOR seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
1.1.13 Contract - Executed agreement between the OWNER and the successful bidder, covering the performance of the WORK and the compensation therefore. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.
1.1.14 Contract Documents - The definition of the Contract Documents shall be as set forth in the Agreement. Approved Shop Drawings and the reports and drawings of subsurface and physical conditions are not Contract Documents. Files in electronic media format of text, data, graphics, and the like that may be furnished by OWNER to CONTRACTOR are not Contract Documents.
1.1.15 Contract Price - The moneys payable by OWNER to CONTRACTOR for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.3 in the case of Unit Price Work).
1.1.16 Contract Times - The number of days or the dates stated in the Agreement to complete the Work so that it is ready for final payment as evidenced by ENGINEER's written recommendation of final payment.
1.1.17 CONTRACTOR - The individual or entity with whom OWNER has entered into the Agreement.
1.1.18 Cost of the Work - See paragraph 11.1.1 for definition.
1.1.19 Drawings - That part of the Contract Documents prepared approved by ENGINEER which graphically shows the scope, extent, and character of the Work to be performed by CONTRACTOR. Shop Drawings and other CONTRACTOR submittals are not Drawings as so defined.
1.1.20 Effective Date of the Agreement - The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
1.1.21 ENGINEER – Director of Engineering, City of Concord.
1.1.22 ENGINEER’s Consultant – An individual or entity having a contract with ENGINEER to furnish services as ENGINEER, independent professional associate or consultant with respect to the Project.
1.1.23 **Field Order** - A written order issued by ENGINEER which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

1.1.24 **General Requirements** - Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

1.1.25 **Hazardous Environmental Condition** - The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

1.1.26 **Hazardous Waste** - The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

1.1.27 **Laws and Regulations; Laws or Regulations** - Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

1.1.28 **Liens** - Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

1.1.29 **Milestone** - A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

1.1.30 **Notice of Award** - The written notice by OWNER to the apparent successful bidder stating that upon timely compliance by the apparent successful bidder with the conditions precedent listed therein, OWNER will sign and deliver the Agreement.

1.1.31 **Notice to Proceed** - A written notice given by OWNER to CONTRACTOR fixing the date on which the Contract Times will commence to run and on which CONTRACTOR shall start to perform the Work under the Contract Documents.

1.1.32 **OWNER** – City of Concord, North Carolina.

1.1.33 **Partial Utilization** - Use by OWNER of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.

1.1.34 **PCB's** – Polychlorinated biphenyls

1.1.35 **Petroleum** - Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

1.1.36 **Project** - The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part as may be indicated elsewhere in the Contract Documents.

1.1.37 **Project Manual** - The bound documentary information prepared for bidding and construction the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

1.1.38 **Radioactive Material** - Source, special nuclear, or byproduct material as defined by the atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

1.1.39 **Resident Project Representative** - The authorized representative of ENGINEER who may be assigned to the Site or any part thereof.

1.1.40 **Samples** - Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

1.1.41 **Shop Drawings** - All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for CONTRACTOR and submitted by CONTRACTOR to illustrate some portion of the Work.

1.1.42 **Site** - Lands or areas indicated in the Contract Documents as being furnished by OWNER upon which the Work is to be performed, including right-of-way and easements for access thereto, and such other lands furnished by OWNER which are designated for the use of CONTRACTOR.

1.1.43 **Specifications** - That part of the Contract Documents consisting of written technical descriptions of materials, equipment, systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.

1.1.44 **Subcontractor** - An individual or entity having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the Site.

1.1.45 **Substantial Completion** - The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

1.1.46 **Supplementary Condition** - That part of the Contract Documents which amends or supplements these General Conditions.

1.1.47 **Supplier** - A manufacturer, fabricator, supplier, distributor, material man, or vendor having a direct contract with CONTRACTOR or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by CONTRACTOR or any Subcontractor.
1.1.48 **Underground Facilities** - All underground pipeline, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic of other control systems.

1.1.49 **Unit Price Work** - Work to be paid for on the basis of unit prices.

1.1.50 **Work** - The entire completed construction OR the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

1.1.51 **Work Change Directive** - A written statement to CONTRACTOR issued on or after the Effective Date of the Agreement and signed by OWNER and recommended by ENGINEER ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.1.51 **Written Amendment** - A written statement modifying the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the non-engineering or non-technical rather than strictly construction-related aspects of the Contract Documents.

1.1.53 **Resident Observer** - Shall have the same definition as "Resident Project Representative" when referred to in these documents or during the duration of the Project.

1.1.54 **Written Notice** - The "Notice" as used herein shall mean and include all written notices, demands, instruction, claims, approvals, and disapprovals required to obtain compliance with Contract requirements. Written notice shall be deemed to have been duly served if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or to an authorized representative of such individual, firm or corporation, or if delivered at or sent by registered mail to the last business address known to him who gives the notice. Unless otherwise stated in writing, any notice to or demand upon the OWNER under this Contract shall be delivered to the OWNER through the ENGINEER.

1.2 **Terminology**

1.2.4 **Intent of Certain Terms or Adjectives**

1.2.1.1 Whenever in the Contract Documents the terms "as allowed", "as approved", or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper", "satisfactory", or adjectives of like effect or import are used to describe an action or determination of ENGINEER as to the Work, it is intended that such action or determination will be solely to evaluate, in general, the completed Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of section 9.9 or any other provision of the Contract Documents.

1.2.2 **Day**

1.2.2.1 The work "day" shall constitute a calendar day or 24 hours measured from midnight to the next midnight.

1.2.3 **Defective**

1.2.3.1 The word "defective", when modifying the work "Work", refers to Work that is unsatisfactory, faulty, or deficient in that it does not conform to the Contract Documents or does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents, or has been damaged prior to ENGINEER's recommendation of final payment (unless responsibility for the protection thereof has been assumed by OWNER at Substantial Completion in accordance with paragraph 14.4 or 14.5).
1.2.4 Furnish, Install, Perform, Provide

1.2.4.1 The word "furnish", when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

1.2.4.2 The word "install", when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

1.2.4.3 The words "perform" or "provide", when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

1.2.4.4 When "furnish", "install", "perform", or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of CONTRACTOR, "provide" is implied.

1.2.5 Unless stated otherwise in the Contract Documents, words or phrases which have a well known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2.0 – PRELIMINARY MATTERS

2.1 Delivery of Bonds

2.1.1 When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds as CONTRACTOR may be required to furnish.

2.2 Copies of Documents

2.2.1 The CONTRACTOR will be furnished without charge up to five sets of specifications and full size drawings. Additional sets of drawings and specifications requested by the CONTRACTOR will be furnished at the cost of reproduction, plus handling.

2.3 Commencement of Contract Times: Notice to Proceed

2.3.1 The Contract Time will commence to run on the day indicated in the Notice to Proceed.

2.4 Starting the Work

2.4.1 CONTRACTOR shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.5 Before Starting Construction

2.5.1 CONTRACTOR's Review of Contract Documents: Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error, ambiguity, or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby; however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless CONTRACTOR knew or reasonably should have known thereof.

2.5.2 Preliminary Schedules: Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for its timely review:

2.5.2.1 a preliminary progress schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2.5.2.2 a preliminary schedule of Shop Drawing and Sample submittals which will list each required submittal and the times for submitting, reviewing, and processing such submittal; and
2.5.2.3 a preliminary schedule of values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.5.3 Evidence of Insurance: The CONTACTOR shall submit three copies of his insurance certificate with submittal of his executed Contract Documents. The CONTRACTOR may use the "Accord Form" for the Certificate of Insurance, but the form shall be modified to state that the described insurance policies shall not be canceled without 30 days prior written notice to the OWNER and the ENGINEER by registered mail. CONTRACTOR shall review "Accord Form" before forwarding to the ENGINEER.

2.6 Pre-Construction Conference

2.6.1 Before any Work at the Site is started, a conference attended by CONTRACTOR, ENGINEER, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in paragraph 2.5.2, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.7 Initial Acceptance of Schedules

2.7.1 Unless otherwise provided in the Contract Documents, at least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER, and others as appropriate will be held to review for acceptability to ENGINEER as provided below the schedules submitted in accordance with paragraph 2.5.2. CONTRACTOR shall have an additional ten days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to CONTRACTOR until acceptable schedules are submitted to ENGINEER.

2.7.1.1 The progress schedule will be acceptable to ENGINEER if it provides an orderly progression of the Work to completion within any specified Milestones and the Contract Times. Such acceptance will not impose on ENGINEER responsibility for the progress schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve CONTRACTOR from CONTRACTOR's full responsibility therefore.

2.7.1.2 CONTRACTOR's schedule of Shop Drawing and Sample submittals will be acceptable to ENGINEER if it provides a workable arrangement for reviewing and processing the required submittals.

2.7.1.3 CONTRACTOR's schedule of values will be acceptable to ENGINEER as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

2.8 Award

2.8.1 The award of the Contract, if it is awarded, will be to the lowest responsive, responsible Bidder whose qualifications indicate the award will be in the best interest of the OWNER and whose Bid complies with all the prescribed requirements. Notice of Award will not be given until the OWNER has concluded such investigations as he deems necessary to establish the responsibility, qualifications, and financial ability of the Bidders to do the Work in accordance with the Contract Documents to the satisfaction of the OWNER within the time prescribed. The OWNER reserves the right to reject the Bid of any Bidder who does not pass such investigation to the OWNER'S satisfaction. In analyzing Bids, the OWNER may take into consideration alternates and unit prices, if requested by the Bid forms. If the Contract is awarded, the OWNER will give the successful Bidder a Notice of Award within 90 days after the opening of Bids.
ARTICLE 3.0 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.1 Intent

3.1.1 The Contract Documents are complementary; what is called for by one is as binding as if called for by all.

3.1.2 It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to OWNER.

3.1.3 Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in Article 9.0.

3.2 Reference Standards

3.2.1 Standards, Specifications, and Codes.

3.2.1.1 Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, whether such reference be specific or by implication, shall mean the standard, specification, manual, or code in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

3.2.1.2 No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of OWNER, CONTRACTOR, or ENGINEER, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents, nor shall any such provision or instruction be effective to assign to OWNER, ENGINEER, or any of ENGINEER's Consultants, agents, or employees any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.3 Reporting and Resolving Discrepancies

3.3.1 Reporting Discrepancies

3.3.1.1 If, during the performance of the Work, CONTRACTOR discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, CONTRACTOR shall report it to ENGINEER in writing at once. CONTRACTOR shall not proceed with the Work affected thereby (except in an emergency as required by paragraph 6.16.1) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in paragraph 3.4; provided, however, that CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any such conflict, error, ambiguity, or discrepancy unless CONTRACTOR knew or reasonably should have know thereof.

3.3.2 Resolving Discrepancies

3.3.2.1 Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

3.3.2.1.1 the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents)

3.4 Amending and Supplementing Contract Documents

3.4.1 The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways: (i) a Written Amendment; (ii) a Change Order; or (iii) a Work Change Directive.

3.4.2 The requirements of the Contract Documents may be supplemented and minor variations and deviations in the Work may be authorized, by one or more of the following ways: (i) a Field Order; (ii) ENGINEER's approval of a Shop Drawing or Sample; or (iii) ENGINEER's written interpretation or clarification.
3.5 Reuse of Documents

3.5.1 CONTRACTOR and any Subcontractor or supplier or other individual or entity performing or furnishing any of the Work under a direct or indirect contract with OWNER: (i) shall not have or acquire any title in or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER or ENGINEER's Consultant, including electronic media editions; and (ii) shall not reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific written verification or adoption by ENGINEER. This prohibition will survive final payment, completion, and acceptance of the Work, or termination or completion of the Contract. Nothing herein shall preclude CONTRACTOR from retaining copies of the Contract Documents for record purposes.

ARTICLE 4.0 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS

4.1 Availability of Lands

4.1.1 OWNER shall furnish the Site. OWNER shall notify CONTRACTOR of any encumbrances or restrictions not of general application but specifically related to use of the Site with which CONTRACTOR must comply in performing the Work. OWNER will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If CONTRACTOR and OWNER are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in OWNER's furnishing the Site, CONTRACTOR may make a Claim therefore as provided in paragraph 10.5.

4.1.2 CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.2 Subsurface and Physical Conditions

4.2.1 Any testing, reports or drawings which are available or have been relied upon for this project are identified or included in the Special Provisions.

4.2.2 Limited Reliance by CONTRACTOR on Technical Data Authorized: CONTRACTOR may rely upon the general accuracy of the technical data. Except for such reliance on such technical data, CONTRACTOR may not rely upon or make any Claim against OWNER, ENGINEER, or any of ENGINEER's Consultants with respect to:

4.2.2.1 the completeness of such reports and drawings for CONTRACTOR's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by CONTRACTOR, and safety precautions and programs incident thereto; or
4.2.2.2 other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
4.2.2.3 any CONTRACTOR interpretation of or conclusion drawn from any “technical data” or any such other data, interpretations, opinion, or information.

4.3 Differing Subsurface or Physical Conditions

4.3.1 Notice: If CONTRACTOR believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:

4.3.1.1 is of such a nature as to establish that any "technical data" on which CONTRACTOR is entitled to rely as provided in paragraph 4.2 is materially inaccurate; or
4.3.1.2 is of such a nature as to require a change in the Contract Documents; or
4.3.1.3 differs materially from that shown or indicated in the Contract Documents; or
4.3.1.4 is of an unusual nature, and differs materially from condition ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents:

Then CONTRACTOR shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by paragraph 6.16.1), notify OWNER and ENGINEER in writing about such condition. CONTRACTOR shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.
4.3.2 ENGINEER's Review: After receipt of written notice as required by paragraph 4.3.1, ENGINEER will promptly
review the pertinent condition, determine the necessity of OWNER's obtaining additional exploration or tests with
respect thereto, and advise OWNER in writing (with a copy to CONTRACTOR) of ENGINEER's findings and
conclusions.

4.3.3 Possible Price and Times Adjustments

4.3.3.1 The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence
of such differing subsurface or physical condition causes an increase or decrease in CONTRACTOR's cost
of, or time required for,
performance of the Work; subject, however, to the following:
4.3.3.1.1 such condition must meet anyone or more of the categories
described in paragraph 4.3.1; and
4.3.3.1.2 with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract
Price will be subject to the provisions of paragraphs 9.8 and 11.3.

4.3.3.2 CONTRACTOR shall not be entitled to any adjustment in the Contract Price or Contract Times if:

4.3.3.2.1 CONTRACTOR knew of the existence of such conditions at the time CONTRACTOR
made a final commitment to OWNER in respect of Contract Price and Contract Times by
the submission of a Bid or becoming bound under a negotiated contract; or
4.3.3.2.2 the existence of such condition could reasonably have been discovered or revealed as a
result of any examination, investigation, exploration, test, or study of the Site and
contiguous areas required by the Bidding Requirements or Contract Documents to be
conducted by or for CONTRACTOR prior to CONTRACTOR's making such final
commitment; or
4.3.3.2.3 CONTRACTOR failed to give the written notice within the time and as required by
paragraph 4.3.1.

4.3.3.3 If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of
any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefore as
provided in paragraph 10.5. However, OWNER, ENGINEER, and ENGINEER's consultants shall not be
liable to CONTRACTOR for any claims, costs, losses, or damages (including but not limited to all fees and
charges of ENGINEERs, architects, attorneys, and other professionals and all court or arbitration or other
dispute resolution costs) sustained by CONTRACTOR on or in connection with any other project or
anticipated project.

4.4 Underground Facilities

4.4.1 Shown or Indicated: The information and data shown or indicated in the Contract Documents with respect to
existing Underground Facilities at or contiguous to the Site is based on information and data furnished to OWNER
or ENGINEER by the OWNERs of such Underground Facilities, including OWNER, or by others.

4.4.1.1 OWNER and ENGINEER shall not be responsible for the accuracy or completeness of any such
information or data; and
4.4.1.2 the cost of all of the following will be included in the Contract Price, and CONTRACTOR shall have full
responsibility for:
4.4.1.2.1 reviewing and checking all such information and data.
4.4.1.2.2 locating all Underground Facilities shown or indicated in the Contract Documents.
4.4.1.2.3 coordination of the Work with the OWNERs of such Underground Facilities, including
OWNER, during construction and
4.4.1.2.4 the safety and protection of all such Underground Facilities and repairing any damage
thereto resulting from the Work.

4.4.2 Not Shown or Indicated
4.4.2.1 If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated reasonable accuracy in the Contract Documents, CONTRACTOR shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by paragraph 6.16.1), identify the OWNER of such Underground Facility and give written notice to that OWNER and to OWNER and ENGINEER. ENGINEER will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility.

4.4.2.2 If ENGINEER concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that CONTRACTOR did not know of and could not reasonably have been expected to be aware of or to have anticipated. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, OWNER or CONTRACTOR may make a Claim therefore as provided in paragraph 10.5.

4.5 Reference Points

4.5.1 OWNER shall provide engineering surveys to establish reference points for construction which in ENGINEER's judgment are necessary to enable CONTRACTOR to proceed with the Work. CONTRACTOR shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of OWNER. CONTRACTOR shall report to ENGINEER whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.6 Hazardous Environmental Condition at Site

4.6.1 Reports and Drawings: Reference is made to these General Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the site, if any, that have been utilized by the ENGINEER in the preparation of the Contract Documents.

4.6.2 Limited Reliance by CONTRACTOR on Technical Data Authorized: CONTRACTOR may rely upon the general accuracy of the technical data contained in such reports and drawings, but such reports and drawings are not Contract Documents. Except for such reliance on such "technical data", CONTRACTOR may not rely upon or make any Claim against OWNER, ENGINEER or any of ENGINEER's Consultants with respect to:

4.6.2.1 the completeness of such reports and drawings for CONTRACTOR's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by CONTRACTOR and safety precautions and programs incident thereto; or

4.6.2.2 other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

4.6.2.3 any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.6.3 CONTRACTOR shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. CONTRACTOR shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by CONTRACTOR, Subcontractors, Suppliers, or anyone else for whom CONTRACTOR is responsible.

4.6.4 If CONTRACTOR encounters a Hazardous Environmental Condition or if CONTRACTOR or anyone for whom CONTRACTOR is responsible creates a Hazardous Environmental Condition, CONTRACTOR shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by paragraph 6.16); and (iii) notify OWNER and ENGINEER (and promptly thereafter confirm such notice in writing). OWNER shall promptly consult with ENGINEER concerning the necessity for OWNER to retain a qualified expert to evaluate such condition or take corrective action, if any.
4.6.5 CONTRACTOR shall not be required to resume Work in connection with such condition or in any affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If OWNER and CONTRACTOR cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by CONTRACTOR, either party may make a Claim therefore as provided in paragraph 10.5.

4.6.6 If after receipt of such written notice CONTRACTOR does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then OWNER may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If OWNER and CONTRACTOR cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefore as provided in paragraph 10.5. OWNER may have such deleted portion of the Work performed by Owner’s own forces or others in accordance with Article 7.0.

4.6.7 To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, Engineer’s Consultants, and the officers, directors, partners, employees, agents, other consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of Engineers, architects, attorneys, and other professionals and all court of arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by CONTRACTOR or by anyone for whom CONTRACTOR is responsible. Nothing in this paragraph 4.6.6 shall obligate CONTRACTOR to indemnify any individual or entity from and against the consequences of that individual’s or entity’s own negligence.

4.6.7.1 The provisions of paragraphs 4.2, 4.3, and 4.4 are not intended to apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5.0 – BONDS AND INSURANCE

5.1 Performance and Payment Bonds

5.1.1 Concurrent with execution of the Agreement and within ten days of the Notice of Award, the successful CONTRACTOR shall procure, execute, and deliver to the OWNER and maintain, at his own cost and expense, the following bonds, in the forms attached, of a surety company approved by the state in which the Work is being performed as a Surety:

5.1.1.1 Performance Bond - in an amount not less than 100% of the total amount payable to the CONTRACTOR by the terms of the Contract as security for the faithful performance of the Work. Bond must be valid until one year after the date of issuance of the Certificate of Substantial Completion.

5.1.1.2 Payment Bond - in an amount not less than 100% of the total amount payable to the CONTRACTOR by the terms of the Contract as security for the payment of all persons performing labor and furnishing material in connection with the Work. Bond must be valid until one year after the date of issuance of the Certificate of Substantial Completion.

5.1.2 All Bonds signed by an agent must be accompanied by a certified copy of the authority to act. Bonds shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department.

5.1.3 If the Surety on any Bond furnished by the CONTRACTOR is declared bankrupt or becomes insolvent or its right to do business in the state in which the Work is being performed is revoked, the CONTRACTOR shall, within ten days thereafter, substitute another Bond or Surety, both of which shall be acceptable to the OWNER.

5.2 Insurance Requirements

5.2.1 Wherever in this Article the terms "The Insured" and "OWNER" occur with respect to coverage in a policy, it shall mean the OWNER and its agent and agencies, all municipalities where Work is being performed under the Contract, the ENGINEER, and any other parties specifically designated herein, who shall be named as insured in each policy issued. The insurance policies required herein shall not contain any Third Party Beneficiary Exclusion.
The CONTRACTOR shall not commence Work under the Contract until he has obtained all insurance required under this Article and such insurance has been approved by the OWNER, nor shall the CONTRACTOR allow any Subcontractor to commence Work on his subcontract until all similar insurance required of the Subcontractor has been so obtained and approved.

Provision of some types of insurance by a Subcontractor may be waived, at the option of the OWNER, where it is deemed that adequate coverage is provided by the CONTRACTOR's insurance. Subcontractors must, in all cases, provide Workmen's Compensation and Employer's Liability Insurance and Motor Vehicle Liability Insurance. One copy of each such insurance policy and certificates indicating each type of coverage mentioned, and the correlation between the insurance furnished and that required, shall be filed with each of The Insured.

All policies relating to this Contract shall be so written that each of The Insured shall be notified by the carrier of cancellation or change at least 30 days prior to the effective date of such cancellation or change. Renewal certificates covering the renewal of all policies expiring during the life of the Contract shall be filed with each of The Insured not less than 30 days before the expiration of such policies.

Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and furnished. The insurance shall provide protection from claims set forth herein which may arise out of or result from Contractor's performance and furnishing of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed or furnished by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform or furnish any of the Work, or by anyone for whose acts any of them may be liable:

a. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

b. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

c. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

d. claims for damages insured by personal injury liability coverage which are sustained: (1) by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or (2) by any other person for any other reason;

e. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting there from; and

f. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle.

5.3 General Insurance Requirements

5.3.1 The insurance required to be purchased and maintained by Contractor shall

a. include at least the specific coverages and be written for not less than the limits of liability specified herein or required by Laws or Regulations, whichever is greater;

b. include completed operations insurance;

c. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.12, 6.16, and 6.31 through 6.33 of the General Conditions;

d. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 30 days' prior written notice has been given to Owner and Engineer;

e. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work.
f. with respect to completed operations insurance, and any other insurance coverage written on a claims-made basis, remain in effect for at least 2 years after final payment (and Contractor shall furnish Owner and Engineer evidence satisfactory to Owner of continuation of such insurance at final payment and one year thereafter);

g. contain a cross liability or severability of interest clause or endorsement. Insurance covering the specified additional insured shall be primary insurance, and all other insurance carried by the additional insured shall be excess insurance; and

h. with respect to workers' compensation and employers' liability, comprehensive automobile liability, commercial general liability, and umbrella liability insurance, Contractor shall require its insurance carriers to waive all rights of subrogation against Owner, Engineer, and their respective officers, directors, partners, employees, and agents.

5.3.2 Workers' Compensation and Employers' Liability Insurance. This insurance shall protect Contractor against all claims under applicable state workers' compensation laws. Contractor shall also be protected against claims for injury, disease, or death of employees which, for any reason, may not fall within the provisions of a workers' compensation law. This policy shall include an "all states" or "other states" endorsement. The liability limits shall be not less than:

Workers' compensation Statutory

Employers' liability $1,000,000 each occurrence

5.3.3 Comprehensive Automobile Liability Insurance. This insurance shall be occurrence type written in comprehensive form and shall protect Contractor, and Owner, and Engineer as additional insured, against all claims for injuries to members of the public and damage to property of others arising from the use of motor vehicles, either on or off the project site whether they are owned, non-owned, or hired. The liability limits shall be not less than:

Bodily injury and property damage $1,000,000 combined single limit for each occurrence

5.3.4 Commercial General Liability Insurance. This insurance shall be occurrence type written in comprehensive form and shall protect Contractor, and Owner, and Engineer as additional insured, against claims arising from injuries, sickness, disease, or death of any person or damage to property arising out of performance of the Work. The policy shall also include personal injury liability coverage, contractual liability coverage, completed operations and products liability coverage, and coverage for blasting, explosion, collapse of buildings, and damage to underground property. The liability limits shall be not less than:

Bodily injury and property damage $1,000,000 combined single limit for each occurrence $1,000,000 general aggregate

5.3.5 Umbrella Liability Insurance. This insurance shall protect Contractor, and Owner, and Engineer as additional insured, against claims in excess of the limits provided under workers' compensation and employers' liability, comprehensive automobile liability, and commercial general liability policies. The umbrella policy shall follow the form of the primary insurance, including the application of the primary limits. The liability limits shall be not less than:

Bodily injury and property damage $4,000,000 combined single limit for each occurrence $4,000,000 general aggregate

5.3.6 Owner's Protective Liability Insurance. This insurance shall be issued in the name of Owner and shall protect and defend Owner against claims arising as a result of the operations of Contractor or Contractor's Subcontractors. The liability limits shall be not less than:

Bodily injury and property damage $1,000,000 combined single
5.37 Property Insurance. Contractor shall purchase and maintain property insurance coverage for the Work at the site in the amount of the full replacement cost thereof. This insurance shall:

a. include the interests of Owner, Contractor, Subcontractors, Engineer, and Engineer's Consultants, each of whom is deemed to have an insurable interest and shall be listed as a named insured;

b. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false-work, Work in transit including ocean transit, and Work in storage at the project site or at another location acceptable to Owner, and shall insure against at least the following perils: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, and damage caused by frost and freezing;

c. cover, in an amount not less than $100,000, the Owner-furnished equipment and materials to be erected or installed by Contractor;

d. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects); and

e. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer, with 30 days' written notice to each other insured.

If Owner requests in writing that other special insurance be included in the property insurance provided by Contractor, Contractor shall, if possible, include such insurance, and the cost thereof will be charged to Owner by appropriate Change Order or Written Amendment. Prior to commencement of the Work at the site, Contractor shall in writing advise Owner whether or not such other special insurance has been procured by Contractor.

5.4 Other Insurance Requirements

5.4.1 If any of the property and casualty insurance requirements are not complied with at their renewal dates, payments to the CONTRACTOR will be withheld until these requirements have been met, or at the option of the OWNER, the OWNER may pay the renewal premiums and withhold such payments from any monies due to the CONTRACTOR.

5.4.2 In the event that claims in excess of the insured amounts provided herein are filed by reason of any operations under the Contract, the amount of excess of such claims, or any portion thereof, may be withheld from payment due or to become due the CONTRACTOR until such time as the CONTRACTOR shall furnish such additional security covering such claims as may be determined by the OWNER.

5.4.3 All policies and certificates of insurance of the CONTRACTOR shall contain the following clauses:

5.4.3.1 insurers shall have no right of recovery or subrogation against the OWNER and its agents and agencies and the ENGINEER, it being the intention of the parties that the insurance policies so effected shall protect both parties and be primary coverage for any and all losses covered by the above-described insurance.

5.4.3.2 the clause "other insurance provisions" in a policy in which the OWNER and its agents and agencies and the ENGINEER is named as an insured, shall not apply to these parties.

5.4.3.3 the insurance companies issuing the policy or policies shall have no recourse against the OWNER and its agents and agencies and the ENGINEER, for the payment of any premiums or for assessments under any form of policy.

5.4.3.4 any and all deductibles in the above-described insurance policies shall be assumed by and be for the amount of, and at the sole risk of the CONTRACTOR.

ARTICLE 6.0 - CONTRACTOR'S RESPONSIBILITIES

6.1 Supervision and Superintendence

6.1.1 CONTRACTOR shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences,
and procedures of construction, but CONTRACTOR shall not be responsible for the negligence of OWNER or ENGINEER in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents. CONTRACTOR shall be responsible to see that the complete Work complies accurately with the Contract Documents.

6.1.2 At all times during the progress of the Work, CONTRACTOR shall assign a competent resident superintendent thereto who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the Site and shall have authority to act on behalf of CONTRACTOR. All communications given to or received from the superintendent shall be binding on CONTRACTOR.

6.2 Labor; Working Hours

6.2.1 CONTRACTOR shall provide competent, suitably qualified personnel to survey, layout, and construct the Work as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the Site.

6.2.2 Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday, or any legal holiday without OWNER's written consent (which will not be unreasonably withheld) given after prior written notice to ENGINEER.

6.3 Services, Materials, and Equipment

6.3.1 Unless otherwise specified in the General Requirements, CONTRACTOR shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing start-up, and completion of the Work.

6.3.2 All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for by the Specifications shall expressly run to the benefit of OWNER. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.4 Progress Schedule

6.4.1 CONTRACTOR shall adhere to the progress schedule established in accordance with paragraph 2.7 as it may be adjusted from time to time as provided below.

6.4.1.1 CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.7) proposed adjustments in the progress schedule that will not result in changing the Contract Times (or Milestones). Such adjustments will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

6.4.1.2 Proposed adjustments in the progress schedule that will change the Contract Times (or Milestones) shall be submitted in accordance with the requirements of Article 12.0. Such adjustments may only be made by a Change Order or Written Amendment in accordance with Article 12.0.

6.5 Substitutes and "Or-Equals"

6.5.1 Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item equipment or material or equipment of other Suppliers may be submitted to ENGINEER for review under the circumstances described below.
6.5.1 "Or-Equal" Items: If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by ENGINEER as an "or-equal" item, in which case review and approval of the proposed item may, in ENGINEER's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this paragraph 6.5.1.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

6.5.1.1 in the exercise of reasonable judgment ENGINEER determines that: (i) it is at least equal in quality, durability, appearance, strength, and design characteristics; (ii) it will reliably perform at least equally well the function imposed by the design concept of the completed Project as a functioning whole, and;

6.5.1.2 CONTRACTOR certifies that: (i) there is no increase in cost to the OWNER; and (ii) it will conform substantially, even with deviations, to the detailed requirements of the item named in the Contract Documents.

6.5.1.2 Substitute Items

6.5.1.2.1. If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR does not qualify as an "or-equal" item under paragraph 6.5.1.1, it will be considered a proposed substitute item.

6.5.1.2.2 CONTRACTOR shall submit sufficient information as provided below to allow ENGINEER to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute. Such information on items of material or equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR.

6.5.1.2.3 The procedure for review by ENGINEER will be as set forth in paragraph 6.5.1.2.4, as supplemented in the General Requirements and as ENGINEER may decide is appropriate under the circumstances.

6.5.1.2.4 CONTRACTOR shall first make written application to ENGINEER for review of a proposed substitute item of material or equipment that CONTRACTOR seeks to furnish or use. The application shall certify that the proposed substitute item will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified, and be suited to the same use as that specified. The application will state the extent, if any, to which the use of the proposed substitute item will prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not use of a proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) to adapt the design to the proposed substitute item and whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute item from that specified will be identified in the application, and available engineering, sales, maintenance, repair, and replacement services will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other CONTRACTORs affected by any resulting change, all of which will be considered by ENGINEER in evaluating the proposed substitute item. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute item.

6.5.2 Substitute Construction Methods or Procedures: If a specific means, method, technique, sequence, or procedure of construction is shown or indicated in and expressly required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by ENGINEER. CONTRACTOR shall submit sufficient information to allow ENGINEER, in ENGINEER's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in subparagraph 6.5.1.2.

6.5.3 ENGINEER's Evaluation: ENGINEER will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to paragraphs 6.5.1 and 6.5.2. ENGINEER will be the sole judge of acceptability. No "or-equal" or substitute will be ordered, installed or utilized until ENGINEER's review is complete, which will be
6.6 Concerning Subcontractors, Suppliers, and Others

6.6.1 CONTRACTOR shall not employ any Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, against whom OWNER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

6.6.2 Within ten days after Notice of Award has been issued, the CONTRACTOR shall furnish to the ENGINEER a list of subcontractors, suppliers, or other persons or organizations who will participate in the Work or furnish principal items of materials and equipment to be utilized in the Work. The list shall include the subcontractors, suppliers, or other persons or organizations indicated on the Bid Form. Within ten days after receipt of the list but prior to the Effective Date of the Agreement, the ENGINEER shall notify the CONTRACTOR in writing if the ENGINEER (or OWNER) has reasonable objection to any subcontractor, suppliers, or other person or organization on the list. Failure by the ENGINEER to object to anyone on the list within the specified time shall constitute acceptance of the subcontractor, supplier, or other person or organization. Acceptance of a subcontractor, supplier, other person or organization named shall not constitute a waiver of the requirements of the contract specifications or the right of the OWNER or ENGINEER to reject defective work. If the ENGINEER (or OWNER) has a reasonable objection as described above, the CONTRACTOR may either (1) submit an acceptable substitute without an increase in his Bid price, or (2) withdraw his Bid without forfeiting his Bid security.

6.6.3 CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between OWNER or ENGINEER and any such Subcontractor, Supplier or other individual or entity, nor shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations. OWNER or ENGINEER may furnish to any such Subcontractor, Supplier, or other individual or entity. Acceptance of a subcontractor, supplier, other person or organization named shall not create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship with OWNER or ENGINEER to be responsible for all acts and omissions of CONTRACTOR and CONTRACTOR's Subcontractors or other persons or organizations performing or furnishing the Work just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions.

6.6.4 CONTRACTOR shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR.

6.6.5 CONTRACTOR shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with ENGINEER through CONTRACTOR.

6.6.6 The divisions and sections of the Specifications and the identifications of any Drawings shall not control CONTRACTOR in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

6.6.7 All Work performed for CONTRACTOR by a Subcontractor shall be pursuant to an appropriate agreement between the CONTRACTOR and Subcontractor. The Subcontractor shall not commence Work until the CONTRACTOR has obtained all insurance as required by Article 5.0, inclusive.

6.6.8 The CONTRACTOR shall not subcontract more than 50 percent of the Contract price without prior written approval of the OWNER.

6.7 Patent Fees and Royalties

6.7.1 CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of OWNER or ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by OWNER in the Contract Documents. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees or agents, and other
consultants of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of ENGINEER's, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.8 Permits

6.8.1 CONTRACTOR shall obtain and pay for all construction permits and licenses. OWNER shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. CONTRACTOR shall pay all charges of utility OWNERS for connection to the Work.

6.9 Laws and Regulations

6.9.1 CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither OWNER nor ENGINEER shall be responsible for monitoring CONTRACTOR's compliance with any Laws or Regulations.

6.9.2 If CONTRACTOR observes that the Specifications or Drawings are at variance with any Laws or Regulations, he shall give ENGINEER prompt written notice thereof. If CONTRACTOR performs any Work knowing it to be contrary to such Laws or Regulations, and without such notice to ENGINEER, he shall bear all costs arising therefrom. The CONTRACTOR shall, at all times, observe and comply with and shall cause all his agents and employees and all his Subcontractors to observe and comply with all such existing Laws or Regulations, and shall protect and indemnify the OWNER and the ENGINEER and the municipalities in which Work is being performed, and their officers and agents against any claim or liability arising from or based on the violation of any such Law or Regulation, whether by himself or his employees or any of his Subcontractors.

6.9.3 Changes in Laws or Regulations not adopted or in effect at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work may be the subject of an adjustment in Contract Price or Contract Times. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefore as provided in paragraph 10.5.

6.10 Taxes

6.10.1 CONTRACTOR shall pay all sales, consumer, use, and other similar taxes required to be paid by CONTRACTOR in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work. A listing of sales tax paid for the period shall be submitted with each Progress Payment.

6.11 Use of Site and Other Areas

6.11.1 Limitation on Use of Site and Other Areas

6.11.1.1 CONTRACTOR shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

6.11.1.2 Should any claim be made by any such owner or occupant because of the performance of the work, CONTRACTOR shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

6.11.1.3 To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultant, and the officers, directors, partners, employees, agents, and other consultants of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of ENGINEER's, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such OWNER or occupant against OWNER, ENGINEER, or any other party.
indemnified hereunder to the extent caused by or based upon CONTRACTOR's performance of the Work.

6.11.2 Removal of Debris During Performance of the Work: During the progress of the Work CONTRACTOR shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

6.11.3 Cleaning: Prior to Substantial Completion of the Work CONTRACTOR shall clean the Site and make it ready for utilization by OWNER. At the completion of the Work CONTRACTOR shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus material and shall restore to original condition all property not designated for alteration by the Contract Documents.

6.11.4 Loading Structures: CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 Record Documents

6.12.1 CONTRACTOR shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to ENGINEER for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to ENGINEER for OWNER. CONTRACTOR is advised that failure to furnish the ENGINEER with accurate and detailed record drawings shall be reason for withholding final payment.

6.13 Safety and Protection

6.13.1 CONTRACTOR shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

6.13.1.1 all persons on the Site or who may be affected by the Work;

6.13.1.2 all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

6.13.1.3 other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

6.13.2 CONTRACTOR shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property. All damage, injury, or loss to any property referred to in paragraph 6.13.1.2 or 6.13.1.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of OWNER or ENGINEER or ENGINEER's Consultant, or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable directly or indirectly, in whole or in part, to the fault or negligence of CONTRACTOR or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them). CONTRACTOR's duties and responsibilities for safety and for protection of the work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with paragraph 14.7.2 that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 Safety Representative
6.14.1 CONTRACTOR shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 Hazard Communication Programs

6.15.1 CONTRACTOR shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 Emergencies

6.16.1 In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, CONTRACTOR is obligated to act to prevent threatened damage, injury, or loss. CONTRACTOR shall give ENGINEER prompt written notice if CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If ENGINEER determines that a change in the Contract Documents is required because of the action taken by CONTRACTOR in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 Shop Drawings and Samples

6.17.1 CONTRACTOR shall submit Shop Drawings to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals. CONTRACTOR shall submit four copies of all shop drawings plus the number required for use by the ENGINEER. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show ENGINEER the services, materials, and equipment CONTRACTOR proposes to provide and to enable ENGINEER to review the information for the limited purposes required by paragraph 6.17.5.

6.17.2 CONTRACTOR shall also submit Samples to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals. Each Sample will be identified clearly as to material, Supplier, pertinent data such as catalog numbers, and the use for which intended and otherwise as ENGINEER may require to enable ENGINEER to review the submittal for the limited purposes required by paragraph 6.17.5. CONTRACTOR shall submit three samples plus the number required to be returned to the CONTRACTOR for each sample required.

6.17.3 Where a Shop Drawing or Sample is required by the Contract Documents or the schedule of Shop Drawings and Sample submittals acceptable to ENGINEER as required by paragraph 2.7, any related Work performed prior to ENGINEER's review and approval of the pertinent submittal will be at the sole expense and responsibility of CONTRACTOR

6.17.4 Submittal Procedures

6.17.4.1 Before submitting each Shop Drawing or Sample, CONTRACTOR shall have determined and verified:

6.17.4.1.1 all field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
6.17.4.1.2 all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;
6.17.4.1.3 all information relative to means, methods, techniques, sequences, and procedures of construction and safety precautions and programs incident thereto; and
6.17.4.1.4 CONTRACTOR shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
6.17.4.1.5 each Shop Drawing submitted to the ENGINEER must be accompanied by a transmittal which references the applicable section(s) of the specifications. In addition, each Shop Drawing shall be numbered in the order of submittal sequence. All submittals called for in the specifications shall be submitted in the number of copies as indicated in the Contract Documents.
6.17.4.2 Each submittal shall bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's obligations under the Contract Documents with respect to CONTRACTOR's review and approval of that submittal.

6.17.4.3 At the time of each submittal, CONTRACTOR shall give ENGINEER specific written notice of such variations, if any, that the Shop Drawing or Sample submitted may have from the requirements of the Contract Documents, such notice to be in a written communication separate from the submittal; and, in addition, shall cause a specific notation to be made on each Shop Drawing and Sample submitted to ENGINEER for review and approval of each such variation.

6.17.5 ENGINEER's Review

6.17.5.1 ENGINEER will timely review and approve Shop Drawings and Samples in accordance with the schedule of Shop Drawings and Sample submittals acceptable to ENGINEER. ENGINEER's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

6.17.5.2 ENGINEER's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

6.17.5.3 ENGINEER's review and approval of Shop Drawings or Samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of each submittal as required by paragraph 6.17.4.3 and ENGINEER, has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for complying with the requirements of paragraph 6.17.4.1.

6.17.6 Resubmittal Procedures

6.17.6.1 CONTRACTOR shall make corrections required by ENGINEER and shall return the required number of corrected copies of Shop Drawings and submit as required new Samples for review and approval. CONTRACTOR shall direct specific attention in writing to revision other than the corrections called for by ENGINEER on previous submittals.

6.18 Continuing the Work

6.18.1 CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by paragraph 15.4 or as OWNER and CONTRACTOR may otherwise agree in writing.

6.19 CONTRACTOR's General Warranty and Guarantee

6.19.1 CONTRACTOR warrants and guarantees to OWNER, ENGINEER, and ENGINEER's Consultants that all Work will be in accordance with the Contract Documents and will not be defective. CONTRACTOR's warranty and guarantee hereunder excludes defects or damage caused by:

6.19.1.1 abuse, modification, or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors, Suppliers, or any other individual or entity for whom CONTRACTOR is responsible; or

6.19.1.2 normal wear and tear under normal usage.

6.19.2 CONTRACTOR's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents:
6.19.2.1 observations by ENGINEER;
6.19.2.2 recommendation by ENGINEER or payment by OWNER of any progress or final payment;
6.19.2.3 the issuance of a certificate of Substantial Completion by ENGINEER or any payment related thereto by OWNER;
6.19.2.4 use or occupancy of the Work or any part thereof by OWNER;
6.19.2.5 any acceptance by OWNER or any failure to do so;
6.19.2.6 any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by ENGINEER;
6.19.2.7 any inspection, test, or approval by others; or
6.19.2.8 any correction of defective Work by OWNER.

6.20 Indemnification

6.20.1 To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of ENGINEER’s, architects, attorneys, and other professionals and all court of arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage:

6.20.1.1 is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom; and
6.20.1.2 is caused in whole or in part by any negligent act or omission of CONTRACTOR, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by any negligence or omission of an individual or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations regardless of the negligence of any such individual or entity.

6.20.2 In any and all claims against OWNER or ENGINEER or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of CONTRACTOR, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.20.1 shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for CONTRACTOR or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

6.20.3 Nothing in the Contract Documents shall create or give to third parties any claim or right of action against the CONTRACTOR, the OWNER or the ENGINEER beyond such as may legally exist irrespective of the Contract.

6.21 Operation and Maintenance Manuals

6.21.1 CONTRACTOR shall submit two copies of Operation and Maintenance Manuals for all equipment for review. Upon receipt of approval, six complete sets must be provided. No equipment may be placed into service until the approved manuals are received by the ENGINEER. Instruction manuals shall list all of the equipment specified in this and other sections of the Specifications and shall include equipment serial numbers, design data, operating instructions, maintenance instructions, lubrication instructions, piping, wiring and control diagrams, assembly drawings showing location of parts, part numbers and spare parts list.

ARTICLE 7.0 - OTHER WORK

7.1 Related Work at Site

7.1.1 OWNER may perform other work related to the Project at the Site by OWNER's employees, or let other direct contracts therefore, or have other work performance by utility owner. If such other work is not noted in the Contract Documents, then:

7.1.1.1 written notice thereof will be given to CONTRACTOR prior to starting any such other work; and
7.1.1.2 if OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefore as provided in paragraph 10.5.

7.1.2 CONTRACTOR shall afford each other CONTRACTOR who is a party to such a direct contract and each utility owner (and OWNER, if OWNER is performing the other work with OWNER's employees) proper and safe access to the Site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly coordinate the Work with theirs. Unless otherwise provided in the Contract Documents, CONTRACTOR shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. CONTRACTOR shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of ENGINEER and the others whose work will be affected. The duties and responsibility of CONTRACTOR under this paragraph are for the benefit of such utility owners and other CONTRACTORs to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between OWNER and such utility owners and other CONTRACTORs.

7.1.3 If the proper execution or results of any part of CONTRACTOR's Work depends upon work performed by others under this Article 7.0, CONTRACTOR shall inspect such other work and promptly report to ENGINEER in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of CONTRACTOR's Work. CONTRACTOR's failure to so report will constitute an acceptance of such other work as fit and proper for integration with CONTRACTOR's Work except for latent defects and deficiencies in such other work.

7.2 Coordination

7.2.1 If OWNER intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth:

7.2.1.1 the individual or entity who will have authority and responsibility for coordination of the activities between the various CONTRACTORs will be identified;
7.2.1.2 the specific matters to be covered by such authority and responsibility will be itemized; and
7.2.1.3 the extent of such authority and responsibilities will be provided.

7.2.2 OWNER shall have sole authority and responsibility for such coordination.

ARTICLE 8.0 - OWNER'S RESPONSIBILITIES

8.1 Communications to CONTRACTOR

8.1.1 Except as otherwise provided in these General Conditions, OWNER shall issue all communications to CONTRACTOR through ENGINEER.

8.2 Replacement of ENGINEER

8.2.1 In case of termination of the employment of ENGINEER, OWNER shall appoint an ENGINEER to whom CONTRACTOR makes no reasonable objection, whose status under the Contract Documents shall be that of the former ENGINEER.

8.3 Furnish Data

8.3.1 OWNER shall promptly furnish the data required of OWNER under the Contract Documents.

8.4 Pay Promptly When Due

8.4.1 OWNER shall make payments to CONTRACTOR promptly when they are due as provided in paragraphs 14.2.3. and 14.7.3.

8.5 Lands and Easements; Reports and Tests
8.5.1 OWNER's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.1 and 4.5. Paragraph 4.2 refers to OWNER identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by ENGINEER in preparing the Contract Documents.

8.6 Insurance

8.6.1 OWNER's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.0.

8.7 Change Orders

8.7.1 OWNER is obligated to execute Change Orders as indicated in paragraph 10.3.

8.8 Inspections, Tests, and Approvals

8.8.1 OWNER's responsibility in respect to certain inspections, tests, and approvals is set forth in paragraph 13.3.2.

8.9 Limitations on OWNER's Responsibilities

8.9.1 The OWNER shall not supervise, direct, or have control or authority over, nor be responsible for CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the work. OWNER will not be responsible for CONTRACTOR's failure to perform the Work in accordance with the Contract Documents.

8.10 Undisclosed Hazardous Environmental Condition

8.10.1 OWNER's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in paragraph 4.6.

8.11 Evidence of Financial Arrangements

8.11.1 If and to the extent OWNER has agreed to furnish CONTRACTOR reasonable evidence that financial arrangements have been made to satisfy OWNER's obligations under the contract Documents, OWNER's responsibility in respect thereof will be as set forth in these General Conditions.

ARTICLE 9.0 - ENGINEER'S STATUS DURING CONSTRUCTION

9.1 OWNER's Representative

9.1.1 ENGINEER will be OWNER's representative during the construction period and his instructions shall be carried into effect promptly and efficiently.

9.2 Project Representative

9.2.1 ENGINEER will furnish a Resident Project Representative to assist ENGINEER in providing more extensive observation of the Work. The responsibilities and authority and limitations thereon of any such Resident Project Representative and assistants will be as provided in section 9.9.

9.3 Clarifications and Interpretations

9.3.1 The ENGINEER will furnish a Resident Project Representative (and assistants) to assist the ENGINEER in observing the performance of the Work. The Resident Project Representative will serve as the ENGINEER's liaison with the CONTRACTOR, working principally through the CONTRACTOR's superintendent to assist him in understanding the intent of the Contract Documents.
9.3.2 The Resident Project Representative shall conduct on-site observations of the Work in progress to confirm that the Work is proceeding in accordance with the Contract Documents. He will verify that tests, equipment and systems start-ups and operating and maintenance instructions are conducted as required by the Contract Documents. He will have the authority to disapprove or reject defective Work in accordance with Article 13.0.

9.3.3 Except upon written instruction of the ENGINEER, the Resident Project Representative:

9.3.3.1 Shall not authorize any deviation from the Contract Documents or approve any substitute materials or equipment.

9.3.3.2 Shall not exceed limitation of ENGINEER's authority as set forth in the Contract Documents.

9.3.3.3 Shall not undertake any of the responsibilities of CONTRACTOR, Subcontractors, or CONTRACTOR's superintendent, or expedite the Work.

9.3.3.4 Shall not advise on or issue directions relative to any aspect of the means, methods, techniques, sequences or procedures of construction unless such is specifically called for in the Contract.

9.3.3.5 shall not advise on or issue directions as to safety precautions and programs in connection with the Work.

9.4 Authorized Variations in Work

9.4.1 ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on OWNER and also on CONTRACTOR, who shall perform the Work involved promptly. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of a Field Order, a Claim may be made therefore as provided in paragraph 10.5.

9.5 Rejecting Defective Work

9.5.1 ENGINEER will have authority to disapprove or reject Work which ENGINEER believes to be defective, or that ENGINEER believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. ENGINEER will also have authority to require special inspection or testing of the Works provided in paragraph 13.4, whether or not the Work is fabricated, installed, or completed.

9.6 Shop Drawings, Change Orders and Payments

9.6.1 In connection with ENGINEER's authority as to Shop Drawings and Samples, see paragraph 6.17.

9.6.2 In connection with ENGINEER's authority as to Change Orders, see Articles 10.0, 11.0, and 12.0.

9.6.3 In connection with ENGINEER's authorities to Applications for Payment, see Article 14.0.

9.7 Determinations for Unit Price Work

9.7.1 ENGINEER will determine the actual quantities and classifications of Unit Price Work performed by CONTRACTOR. ENGINEER will review with CONTRACTOR the ENGINEER's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). ENGINEER's written decision thereon will be final and binding (except as modified by ENGINEER to reflect changed factual conditions or more accurate data) upon OWNER and CONTRACTOR, subject to the provisions of paragraph 10.5.

9.8 Decisions on Requirements of Contract Documents and Acceptability of Work

9.8.1 ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work there under. Claims, disputes and other matters relating to the acceptability of the Work, the quantities and classifications of Unit Price Work, the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, and Claims seeking changes in the Contract Price or Contract Times will be referred to ENGINEER in writing, in accordance with the provisions of paragraph 10.5, with a request for a formal decision.

9.8.2 The rendering of a decision by ENGINEER pursuant to this paragraph 9.8 with respect to any such Claim, dispute, or other matter (except any which have been waived by the making or acceptance of final payment as provided in
paragraph 14.7) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such Claim, dispute, or other matter.

9.9 Limitations on ENGINEER's Authority and Responsibilities

9.9.1 Neither ENGINEER's authority or responsibility under this Article 9.0 or under any other provision of the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by ENGINEER shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

9.9.2 ENGINEER will not supervise, direct, contract, or have authority over or be responsible for CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the Work. ENGINEER will not be responsible for CONTRACTOR's failure to perform the Work in accordance with the Contract Documents.

9.9.3 ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

9.9.4 ENGINEER's review of the final Application for Payment and accompanying documentation and all maintenance and operating instruction, schedules, guarantees, Bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by paragraph 14.7.1 will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents.

9.9.5 The limitations upon authority and responsibility set forth in this section 9.9 shall also apply to ENGINEER's Consultants, Resident Project Representative, and assistants.

10.1 Authorized Changes in the Work

10.1.1 Without invalidating the Agreement and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Written Amendment, a Change Order, or a Work Change Directive. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

10.1.2 If OWNER and CONTRACTOR are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefore as provided in paragraph 10.5.

10.2 Unauthorized Change in the Work

10.2.1 CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in paragraph 3.4, except in the case of an emergency as provided in paragraph 6.16 or in the case of uncovering Work as provided in paragraph 13.4.2.

10.3 Execution of Change Orders

10.3.1 OWNER and CONTRACTOR shall execute appropriate Change Orders recommended by ENGINEER (or Written Amendments) covering:

10.3.1.1 changes in the Work which are: (i) ordered by OWNER pursuant to paragraph 10.1.1, (ii) required because of acceptance of defective Work under paragraph 13.8.1 or OWNER's correction of defective Work under paragraph 13.9, or (iii) agreed to by the parties;

10.3.1.2 changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
10.3.1.3 Changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 10.5; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, CONTRACTOR shall carry on the Work and adhere to the progress schedule as provided in paragraph 6.18.1.

10.4 Notification to Surety

10.4.1 If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be CONTRACTOR's responsibility. The amount of each applicable Bond will be adjusted to reflect the effect of any such change.

10.5 Claims and Disputes

10.5.1 Notice: Written notice stating the general nature of each Claim, dispute, or other matter shall be delivered by the claimant to ENGINEER promptly (but in no event later than 30 days) after the start of the event giving rise thereto. Notice of the amount or extent of the Claim, dispute, or other matter with supporting data shall be delivered to the ENGINEER within 60 days after the start of such event (unless ENGINEER allows additional time for claimant to submit additional or more accurate data in support of such Claim, dispute, or other matter). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of paragraph 12.1.2. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of paragraph 12.2.2. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to ENGINEER and the claimant within 30 days after receipt of the claimant's last submittal (unless ENGINEER allows additional time).

10.5.2 ENGINEER's Decision: ENGINEER will render a formal decision in writing within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any. ENGINEER's written decision on such Claim, dispute, or other matter will be final and binding upon OWNER and CONTRACTOR unless:

10.5.2.1 an appeal from ENGINEER's decision is taken within the time limits and in accordance with the dispute resolution procedures set forth in Article 16.0; or

10.5.2.2 if no such dispute resolution procedures have been set forth in Article 16, a written notice of intention to appeal from ENGINEER's written decision is delivered by OWNER or CONTRACTOR to the other and to ENGINEER within 30 days after the date of such decision, and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction within 60 days after the date of such decision or within 60 days after Substantial Completion, whichever is later (unless otherwise agreed in writing by OWNER and CONTRACTOR), to exercise such rights or remedies as the appealing party may have with respect to such Claim, dispute, or other matter in accordance with applicable Laws and Regulations.

10.5.3 If ENGINEER does not render a formal decision in writing within the time stated in paragraph 10.5.2, a decision denying the claim in its entirety shall be deemed to have been issued 31 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any.

10.5.4 No Claim for an adjustment in Contract Price or Contract Times (or Milestones) will be valid if not submitted in accordance with this paragraph 10.5.

ARTICLE 11.0 - COST OF THE WORK; UNIT PRICE WORK

11.1 Cost of the Work

11.1.1 Costs Included: The term Cost of the Work means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to CONTRACTOR will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by
OWNER, such costs shall be in the amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in paragraph 11.1.2.

11.1.1 Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by OWNER and CONTRACTOR. Such employees shall include without limitation superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, worker’ compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by OWNER.

11.1.1.1 The cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to CONTRACTOR unless OWNER deposits funds with CONTRACTOR with which to make payments, in which case the cash discounts shall accrue to OWNER. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to OWNER, and CONTRACTOR shall make provisions so that they may be obtained.

11.1.1.2 Payments made by CONTRACTOR to Subcontractors for Work performed by Subcontractors and all subcontracts shall be subject to the provisions of the Contract Documents.

11.1.1.3 Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

11.1.1.4 Supplemental costs including the following:

11.1.1.5.1 the proportion of necessary transportation, travel, and subsistence expenses of CONTRACTOR's employees incurred in discharge of duties connected with the Work.

11.1.1.5.2 cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the OWNER, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of the CONTRACTOR.

11.1.1.5.3 rentals of all construction equipment and machinery, whether rented from CONTRACTOR or others, shall be negotiated between the ENGINEER and the CONTRACTOR. These rates shall include all fuel, lubricants, insurance, etc. Equipment rental charges shall not exceed the prorated monthly rental rates listed in the current edition of the "Compilation of Rental Rates for Construction Equipment," as published by the Associated Equipment Distributors. Charges per hour shall be determined by dividing the monthly rates by 176. The rental of any such equipment and machinery shall cease when the use thereof is no longer necessary for the Work.

11.1.1.5.4 sales, consumer, use, and other similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by Laws and Regulations.

11.1.1.5.5 deposits lost for causes other than negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

11.1.1.5.6 losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance of otherwise, sustained by CONTRACTOR in connection with the performance of the Work (except losses and damages with the deductible amounts of property insurance established in accordance with paragraph 5.6.4), provided such losses and damages have resulted from causes other than the negligence of CONTRACTOR, and Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of OWNER. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining CONTRACTOR's fee.

11.1.1.5.7 the cost of utilities, fuel, and sanitary facilities at the Site.
11.1.5.8 minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expressage, and similar petty cash items in connection with the Work.

11.1.5.9 when the Cost of the Work is used to determine the value of a Change Order or of a Claim, the cost of premiums for additional Bonds and insurance required because of the changes in the Work or caused by the event giving rise to the Claim.

11.1.5.10 when all the Work is performed on the basis of cost-plus, the costs of premiums for all Bonds and insurance CONTRACTOR is required by the Contract Documents to purchase and maintain.

11.1.2 Costs Excluded: The term Cost of the Work shall not include any of the following items:

11.1.2.1 Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnerships and sole proprietorships), general managers, engineers, architects, estimators, attorney, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed CONTRACTOR, whether at the Site or in CONTRACTOR's principal or branch office for general administration of the work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.1.1.1 or specifically covered by paragraph 11.1.1.4, all of which are to be considered administrative costs covered by the CONTRACTOR's fee.

11.1.2.2 Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the Site.

11.1.2.3 Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the Work and charges against CONTRACTOR for delinquent payments.

11.1.2.4 Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

11.1.2.5 Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 11.1.1 and 11.1.2.

11.1.3 CONTRACTOR's Fee: When all the Work is performed on the basis of cost-plus, CONTRACTOR's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, CONTRACTOR's fee shall be determined as set forth in paragraph 12.1.3.

11.1.4 Documentation: Whenever the Cost of the Work for any purpose is to be determined pursuant to paragraphs 11.1.1 and 11.1.2, CONTRACTOR will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

11.3 Unit Price Work

11.3.1 Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER subject to the provisions of paragraph 9.8.

11.3.2 Each unit price will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR's overhead and profit for each separately identified item.

11.3.3 OWNER or CONTRACTOR may make a Claim for an adjustment in the Contract Price in accordance with paragraph 10.5 if:

11.3.3.1 the quantity of any item of Unit Price Work performed by CONTRACTOR differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

11.3.3.2 there is no corresponding adjustment with respect any other item of Work; and

11.3.3.3 if CONTRACTOR believes that CONTRACTOR is entitled to an increase in Contract Price as a result of having incurred additional expense or OWNER believes that OWNER is entitled to a
decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12.0 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.1 Change of Contract Price

12.1.1 The Contract Price may only be changed by a Changed Order or by a Written Amendment. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the ENGINEER and the other party to the Contract in accordance with provisions of paragraph 10.5.

12.1.2 The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

12.1.2.1 where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit price to the quantities of the items involved (subject to the provisions of paragraph 11.2); or

12.1.2.2 where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 12.1.3.2); or

12.1.2.3 where the Work involved is not covered by unit price contained in the Contract Documents and agreement to a lump sum is not reached under paragraph 12.1.2.2, on the basis of the Cost of the Work (determined as provided in paragraph 11.1) plus a CONTRACTOR's fee for overhead and profit (determined a provided in paragraph 12.1.3).

12.1.3 CONTRACTOR's Fee; The CONTRACTOR's fee for overhead and profit shall be determined as follows:

12.1.3.1 a mutually acceptable fixed fee; or

12.1.3.2 if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

12.1.3.2.1 for costs incurred under paragraphs 11.1.1.1 and 11.1.1.2, the CONTRACTOR's fee shall be 15 percent;

12.1.3.2.2 for costs incurred under paragraph 11.1.1.3, the CONTRACTOR's fee shall be five percent;

12.1.3.2.3 where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of paragraph 12.1.3.2. is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under paragraphs 11.1.1.1 and a11.1.1.2 and that any higher tier Subcontractor and CONTRACTOR will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

12.1.3.2.4 no fee shall be payable on the basis of costs itemized under paragraphs 11.1.1.4, 11.1.1.5, and 11.1.2;

12.1.3.2.5 the amount of credit to be allowed by CONTRACTOR to OWNER for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in CONTRACTOR's fee by an amount equal to five percent of such net decrease; and

12.1.3.2.6 when both additions and credit are involved in any one change; the adjustment in CONTRACTOR's fee shall be computed on the basis of the net change in accordance with paragraphs 12.1.3.2.1 through 12.1.3.2.5, inclusive.

12.2 Change of Contract Times

12.2.1 The Contract Times (or Milestones) may only be changed by a Change Order or by a Written Amendment. Any Claim for an adjustment in the Contract Times (or Milestones) shall be based on written notice submitted by the party making the claim to the ENGINEER and the other party to the Contract in accordance with the provisions of paragraph 10.5.

12.2.2 Any adjustment of the Contract Times (or Milestones) covered by a Change Order or of any Claim for an adjustment in the Contract Times (or Milestones) will be determined in accordance with the provisions of this Article 12.0.
12.3 Delays Beyond CONTRACTOR's Control

12.3.1 Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost due to such delay if a Claim is made therefore as provided in paragraph 12.2.1. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect by OWNER, acts or neglect of utility owners or other CONTRACTOR’s performing work as contemplated by Article 7.0, fires, floods, epidemics, abnormal weather conditions, or acts of God.

12.4 Delays Within CONTRACTOR's Control

12.4.1 The Contract Times (or Milestones) will not be extended due to delays within the control of CONTRACTOR. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.

12.5 Delays Beyond OWNER's and CONTRACTORS's Control

12.5.1 Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Times (or Milestones) in an amount equal to the time lost due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay.

12.6 Delay Damages

12.6.1 In no event shall OWNER or ENGINEER be liable to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from:

12.6.1.1 delays caused by or within the control of CONTRACTOR; or
12.6.1.2 delays beyond the control of both OWNER and CONTRACTOR including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God, or acts or neglect by utility OWNER’s or other CONTRACTOR’s performing other work as contemplated by Article 7.0.

12.6.2 Nothing in this paragraph 12.6 bars a change in Contract Price pursuant to this Article 12.0 to compensate CONTRACTOR due to delay, interference, or disruption directly attributable to actions or in actions of OWNER or anyone for whom OWNER is responsible.

12.7 Abnormal Weather Conditions

12.7.1 Abnormal Weather Conditions for rain shall be derived from the most recent 20-year (minimum) average for the nearest NOAA weather reporting station. The mean number of days of precipitation per month of 0.10 inch or more shall establish the mean number of weather days for the period.

12.8 Liquidated Damages

12.8.1 The required completion time for the Project is as set forth in the Agreement. The CONTRACTOR is advised that the Contract times stated in the Bid Form are of the essence of the Contract. For each and every day in excess of each Contract time stated in the Bid Form that the CONTRACTOR fails to complete the Work indicated, the CONTRACTOR shall pay to the OWNER the sum stated in the Bid Form as liquidated damages. The said amounts are fixed and agreed upon by and between the CONTRACTOR and the OWNER as an estimate of the actual damages which would be incurred by the OWNER.

ARTICLE 13.0 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.1 Notice of Defects

13.1.1 Prompt notice of all defective Work of which OWNER or ENGINEER has actual knowledge will be given to CONTRACTOR. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.0.

13.2 Access to Work
13.2.1 OWNER, ENGINEER, ENGINEER's Consultants, other representative and personnel of OWNER, independent testing laboratories, and governmental agencies with jurisdictional interest will have access to the Site and the Work at reasonable times for their observation inspecting, and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's Site safety procedures and programs so that they may comply therewith as applicable.

13.3 Tests and Inspections

13.3.1 CONTRACTOR shall give ENGINEER timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

13.3.2 OWNER shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

13.3.2.1 for inspections, tests, or approvals covered by paragraphs 13.3.3 and 13.3.4 below;

13.3.2.2 that costs incurred in connection with tests or inspections conducted pursuant to paragraph 13.4.2 shall be paid as provided in said paragraph 13.4.2; and

13.3.2.3 as otherwise specifically provided in the Contract Documents.

13.3.3 If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any Work to be specifically inspected, tested, or approved by some public body, CONTRACTOR shall assume full responsibility therefore, pay all costs in connection therewith and furnish ENGINEER the required certificates of inspection, testing or approval.

13.3.4 The OWNER reserves the right to independently perform at its own expense, laboratory tests on random samples of material or performance tests on equipment delivered to the site. These tests, if made, will be conducted in accordance with the appropriate referenced standards or specification requirements. The entire shipment represented by a given sample, samples or price of equipment may be rejected on the basis of the failure of samples or pieces of equipment to meet specified test requirements. All rejected materials or equipment shall be removed from the site, whether stored or installed in the Work, and the required replacement shall be made, all at no additional cost to the OWNER.

13.3.5 If any Work (or the work of others) that is to be inspected, tested, or approved is covered by CONTRACTOR without written concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation.

13.3.6 Uncovering Work as provided in paragraph 13.3.5 shall be at CONTRACTOR's expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

13.4 Uncovering Work

13.4.1 If any Work is covered contrary to the written request of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER's observation and replaced at CONTRACTOR's expense.

13.4.2 If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by other, CONTRACTOR, at ENGINEER's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as ENGINEER may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment. If it is found that such work is defective, CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and OWNER shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, OWNER may make a Claim therefore as provided in paragraph 10.5. If, however, such Work is not found to be defective, CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Times (or Milestones), or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a Claim therefore as provided in paragraph 10.05.
13.5 OWNER May Stop the Work

13.5.1 If the Work is defective, or CONTRACTOR fails to supply sufficient skilled workmen or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, or if the Work interferes with the operation of the existing facility, the OWNER may order CONTRACTOR to stop, by a written order any Work, or any portion thereof, until the cause for such order has been eliminated.

13.6 Correction or Removal of Defective Work

13.6.1 CONTRACTOR shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by ENGINEER, remove it from the Project and replace it with Work that is not defective. CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

13.7 Correction Period

13.7.1 If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for CONTRACTOR's use by OWNER or permitted by Laws and Regulations as contemplated in paragraph 6.11.1 is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instruction: (i) repair such defective land or areas, or (ii) correct such defective Work or, if the defective Work has been rejected by OWNER, remove it from the Project and replace it with Work that is not defective, and (iii) satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting there from. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the defective Work corrected or repaired or may have the rejected Work removed and replaced, and all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by CONTRACTOR.

13.7.2 In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications or by Written Amendment.

13.7.3 Where defective Work (and damage to other Work resulting there from) has been corrected or removed and replaced under this paragraph 13.7, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

13.7.4 CONTRACTOR's obligations under this paragraph 13.7 are in addition to any other obligation or warranty. The provisions of this paragraph 13.7 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.8 Acceptance of Defective Work

13.8.1 If, instead of requiring correction or removal and replacement of defective Work, OWNER (and, prior to ENGINEER's recommendation of final payment, ENGINEER) prefers to accept it, OWNER may do so. CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to OWNER's evaluation of and determination to accept such defective Work (such costs to be approved by ENGINEER as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by CONTRACTOR pursuant to this sentence. If any such acceptance occurs prior to ENGINEER's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and OWNER shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, OWNER may make a Claim therefore as provided in paragraph 10.5. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER.
13.9 OWNER May Correct Defective Work

13.9.1 If CONTRACTOR fails within a reasonable time after written notice from ENGINEER to correct defective Work or to remove and replace rejected Work as required by ENGINEER in accordance with paragraph 13.6.1, or if CONTRACTOR fails to perform the Work in accordance with the Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, OWNER may, after seven days written notice to CONTRACTOR, correct and remedy any such deficiency.

13.9.2 In exercising the rights and remedies under this paragraph, OWNER shall proceed expeditiously. In connection with such corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the Site, take possession of all or part of the Work and suspend CONTRACTOR's services related thereto, incorporate in the Work all materials and equipment stored at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which OWNER has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow OWNER, OWNER's representatives, agents and employees, OWNER's other CONTRACTOR's, and ENGINEER and ENGINEER's Consultants access to the Site to enable OWNER to exercise the rights and remedies under this paragraph.

13.9.3 All Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by OWNER in exercising the rights and remedies under this paragraph 13.9 will be charged against CONTRACTOR, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, OWNER may make a Claim therefore as provided in paragraph 10.5. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of CONTRACTOR's defective Work.

13.9.4 CONTRACTOR shall not be allowed an extension of the Contract Times (or Milestones) because of any delay in the performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies under this paragraph 13.9.

ARTICLE 14.0 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.1 Schedule of Values

14.1.1 The schedule of values established as provided in paragraph 2.5.2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to ENGINEER. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.1.2 With the above submittal, the CONTRACTOR shall submit for the ENGINEER's approval, a complete breakdown of all lump sum items in the Proposal. This breakdown, modified where directed by the ENGINEER, will be used as a basis for preparing partial estimates and establishing progress payments.

14.1.3 A lump sum payment equal to three percent of the total bid price (to include all bonds, insurance, move-on expenses, etc.) will be allowed for 'mobilization' as a progress payment line item. Up to half of the cost for mobilization will be considered in the initial payment request provided that cost documentation suitable to the ENGINEER is furnished by the CONTRACTOR. Any outstanding balance of mobilization line item will be payable when the Project Work is ten percent complete as indicated by the approved progress payments.

14.2 Progress Payments

14.2.1 Applications for Payments

14.2.1.1 The effective ending date of all applications for Progress Payments shall be the 25th day of each month unless mutually agreed upon otherwise. All applications for Progress Payments will be computer-generated based on the Schedule of Values as provided in paragraph 14.1, and submitted in triplicate. The application will be generated each period by the CONTRACTOR.

14.2.1.2 Prior to final preparation of each Progress Payment, the CONTRACTOR and Resident Project Representative shall mutually measure and agree upon the quality of Work completed each period.

14.2.1.3 Partial payment for materials or equipment properly stored on-site will be made on the basis of the invoice cost of the materials or equipment provided a detailed list of the materials for which partial payment is requested and supporting copies of the invoices is attached to each Application for Progress Payment. As the work progresses, the value of materials not entered into construction
will be reduced as materials or equipment are installed. At the completion of the Work, the value of stored materials not entered into construction must be zero.

14.2.1.4 The following paragraphs (i & ii) are for construction projects in North Carolina only:

14.2.1.4.1 Sales and Use Tax: With each application for Progress Payment, CONTRACTOR must furnish a certified and notarized statement setting forth the cost of the property purchased from each vendor and the amount of sales and/or use tax paid thereon. The statement shall show both the N.C. Sales Tax and the County Tax paid and shall list any payments made directly to the North Carolina Department of Revenue. Tax statements and certification shall be submitted on the forms provided in the Contract Documents. In the event the CONTRACTOR makes several purchases from the same vendor, such certified statement must indicate the invoice numbers, the inclusive dates of the invoices, the total amount of the invoices, and the sales and use taxes paid thereon. Such statement must include the cost of any tangible personal property withdrawn from the CONTRACTOR's warehouse stock and the amount of sales or use tax paid thereon by the CONTRACTOR. Similar certified statements by his subcontractors must be obtained by the prime CONTRACTOR and furnished with the Application for Progress Payment. If no tax has been paid during the pay request period, "NONE" shall be entered on the tax form.

14.2.1.4.2 Use tax may be due on construction equipment brought into North Carolina for use in the performance of contracts (NCGS §105-164.4 and 105-164.6). CONTRACTORS are also liable for payment of applicable privilege licenses (NCGS §105-54) and for payment of applicable franchise, corporate income and withholding taxes (NCGS §105-122, 105-123, 105-134, and 105-163.2).

14.2.1.5 Retainage: Retainage shall be as set forth in the Standard Contract Form or otherwise in the Contract Documents and shall be in compliance with the requirements of Laws and Regulations.

14.2.2 Review of Applications:

14.2.2.1 ENGINEER will, within 10 days after receipt of each Application for Payment, either indicate in writing his approval of payment or return the Application to CONTRACTOR indicating in writing his reasons for refusing to approve payment. In the latter case, CONTRACTOR may make the necessary correction and resubmit the Application. Within 30 days of receiving the submittal of an approvable Application for Payment, the OWNER will make partial payment to the CONTRACTOR on the basis of a duly certified approved estimate of the Work performed during the preceding period by the CONTRACTOR.

14.2.2.2 ENGINEER's recommendation of any payment requested in an Application for Payment will be based on ENGINEER's observations on the Site of the executed Work and on ENGINEER's review of the Application for Payment and the accompanying data and schedules, that to the best of ENGINEER's knowledge, information and belief:

14.2.2.2.1 the Work has progressed to the point indicated;
14.2.2.2.2 the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.8, and to any other qualifications stated in the recommendation); and
14.2.2.2.3 the conditions precedent to CONTRACTOR's being entitled to such payment appear to have been fulfilled in so far as it is ENGINEER's responsibility to observe the Work. By recommending any such payment ENGINEER will not thereby be deemed to have represented that: (i) inspections made to check the quality or the quantity of the Work as it have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents; or (ii) that there may not be other matters or issues between the parties that might entitle CONTRACTOR to be paid additionally by OWNER or entitle OWNER to withhold payment to CONTRACTOR;
14.2.2.4 neither ENGINEER's review of CONTRACTOR's Work for the purposes of recommending payments nor ENGINEER's recommendation of any payment, including
final payment, will impose responsibility on ENGINEER to supervise, direct, or control the Work or for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for CONTRACTOR's failure to comply with Laws and Regulations applicable to CONTRACTOR's performance of the Work;

14.2.2.5 ENGINEER may refuse to recommend the whole or any part of any payment if, in ENGINEER's opinion, it would be incorrect to make the representations referred to in paragraph 14.2.2.2. ENGINEER may also refuse to recommend any such payment because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in ENGINEER's opinion to protect OWNER from loss because:

14.2.2.5.1 the Work is defective, or completed Work has been damaged, requiring correction or replacement;
14.2.2.5.2 the Contract Price has been reduced by Written Amendment or Change Orders;
14.2.2.5.3 OWNER has been required to correct defective Work or complete Work in accordance with paragraph 13.9; or
14.2.2.5.4 ENGINEER has actual knowledge of the occurrence of any of the events enumerated in paragraph 15.2.1.

14.2.3 Payment Becomes Due

14.2.3.1 Thirty days after presentation of the Application for Payment to OWNER with ENGINEER's recommendation, the amount recommended will (subject to the provisions of paragraph 14.2.4) become due, and when due will be paid by OWNER to CONTRACTOR

14.2.4 Reduction in Payment

14.2.4.1 OWNER may refuse to make payment of the full amount recommended by ENGINEER because:

14.2.4.1.1 claims have been made against OWNER on account of CONTRACTOR's performance or furnishing of the Work;
14.2.4.1.2 Liens have been filed in connection with the Work, except where CONTRACTOR has delivered a specific Bond satisfactory to OWNER to secure the satisfaction and discharge of such Liens;
14.2.4.1.3 There are other items entitling OWNER to a set-off against the amount recommended; or
14.2.4.1.4 OWNER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.2.2.5.1 through 14.2.2.5.3 or paragraph 15.2.1.

14.2.4.2 If OWNER refuses to make payment of the full amount recommended by ENGINEER, OWNER must give CONTRACTOR immediate written notice (with a copy to ENGINEER) stating the reasons for such action and promptly pay CONTRACTOR any amount remaining after deduction of the amount so withheld. OWNER shall promptly pay CONTRACTOR the amount so withheld, or any adjustment thereto agreed to by OWNER and CONTRACTOR, when CONTRACTOR corrects to OWNER's satisfaction the reasons for such action.

14.2.4.3 If it is subsequently determined that OWNER's refusal of payment was not justified; the amount wrongfully withheld shall be treated as an amount due as determined by paragraph 14.2.3.1.

14.3 CONTRACTOR's Warranty of Title

14.3.1 CONTRACTOR warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporation in the Project or not, will pass to OWNER no later than the time of payment free and clear of all Liens.

14.4 Substantial Completion:

14.4.1 CONTRACTOR may, in writing to OWNER and ENGINEER, certify that the entire Project is substantially complete and request that ENGINEER issue a certificate of Substantial Completion. Within a reasonable time
thereafter, OWNER, CONTRACTOR and ENGINEER shall make an inspection of the Project to determine the status of completion. If ENGINEER and OWNER do not consider the Project substantially complete, ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion and the responsibilities between OWNER and CONTRACTOR for maintenance, heat and utilities. There shall be attached to the certificate a tentative list of items to be completed or corrected before Substantial Completion, and the certificate shall fix the time within which such items shall be completed or corrected, said time to be within Contract Time.

14.4.2 OWNER shall have the right to exclude CONTRACTOR from the Site after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

14.5 Partial Utilization:

14.5.1 Prior to Substantial Completion of the Project, OWNER may request CONTRACTOR in writing to permit him to use a specified part of the Project which he believes he may use without significant interference with construction of the other parts of the Project. If CONTRACTOR agrees, he will certify to OWNER and ENGINEER that said part of the Project is substantially complete and request the ENGINEER to issue a certificate of Substantial completion for that part of the Project. Within a reasonable time thereafter, OWNER, CONTRACTOR, and ENGINEER shall make an inspection of that part of the Project to determine its status of completion. If ENGINEER and OWNER do not consider that it is substantially complete, ENGINEER will notify CONTRACTOR in writing giving his reasons therefore. If ENGINEER and OWNER consider that part of the Project to be substantially complete, ENGINEER will execute and deliver to OWNER and CONTRACTOR a certificate to that effect, fixing the date of Substantial Completion as to that part of the Project, attaching thereto a tentative list of items to be completed or corrected before Substantial Completion of the entire Project and fixing the responsibility between OWNER and CONTRACTOR for maintenance, heat, and utilities as to that part of the Project. OWNER shall have the right to exclude CONTRACTOR from any part of the Project which ENGINEER has so certified to be substantially complete, but OWNER shall allow CONTRACTOR reasonable access to complete items on the tentative list.

14.5.2 The CONTRACTOR is specifically advised that payment in full for sections so completed and used by the OWNER will NOT be made until the entire Project has been completed. Partial payments for Work completed and the retainage will be handled on the basis of the ENTIRE Contract Amount as here specified. The CONTRACTOR shall account for this in his Bid and under no circumstances will occupancy and use of completed sections of the Work by the OWNER be considered as grounds for reducing the retainage withheld from the CONTRACTOR's partial payments, or for an increase in the Contract Price.

14.6 Final Inspection

14.6.1 Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, ENGINEER will promptly make a final inspection with OWNER and CONTRACTOR and will notify CONTRACTOR in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. CONTRACTOR shall immediately take such measure as are necessary to complete such Work or remedy such deficiencies.

14.7 Final Payment

14.7.1 Application for Payment

14.7.1.1 After CONTRACTOR has, in the opinion of ENGINEER, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, Bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in paragraph 6.12), and other documents, CONTRACTOR may make application for final payment following the procedure for progress payments.

14.7.1.2 The final Application for Payment shall be accompanied (except as previously delivered) by: (i) all documentation called for in the Contract Documents; (ii) consent of the surety, if any, to final payment; and (iii) complete and legally effective releases or waivers (satisfactory to OWNER) of all Lien rights arising out of or Liens filed in connection with the Work.

14.7.1.3 In lieu of the releases or waivers of Liens specified in paragraph 14.7.1.2 and as approved by OWNER, CONTRACTOR may furnish receipts or releases in full and an affidavit of CONTRACTOR that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and
other indebtedness connected with the Work for which OWNER or OWNER's property might in any way be responsible have been paid or otherwise satisfied.

14.7.2 Review of Application and Acceptance

14.7.2.1 If, on the basis of ENGINEER's observation of the Work during construction and final inspection, and ENGINEER's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, ENGINEER is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled, ENGINEER will, within ten days after receipt of the final Application for Payment, indicate in writing ENGINEER's recommendation of payment and present the Application for Payment to OWNER for payment. At the same time ENGINEER will also give written notice to OWNER and CONTRACTOR that the Work is acceptable subject to the provisions of paragraph 14.9. Otherwise, ENGINEER will return the Application for Payment to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and resubmit the Application for Payment.

14.7.3 Payment Becomes Due

14.7.3.1 Thirty days after the presentation to OWNER of the Application for Payment and accompanying documentation, the amount recommended by ENGINEER will become due and, when due, will be paid by OWNER to CONTRACTOR.

14.8 Final Completion Delayed

14.8.1 If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed, and if ENGINEER so confirms, OWNER shall, upon receipt of CONTRACTOR's final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by OWNER for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in paragraph 5.1, the written consent of the surety to the payment of the balance due for that portion of the Work fully complete and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

ARTICLE 15.0 - SUSPENSION OF WORK AND TERMINATION

15.1 OWNER May Suspend Work

15.1.1 At any time and without cause, OWNER may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to CONTRACTOR and ENGINEER which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if CONTRACTOR makes a Claim therefore as provided in paragraph 10.5.

15.2 OWNER May Terminate for Cause

15.2.1 The occurrence of any one or more of the following events will justify termination for cause:

15.2.1.1 CONTRACTOR's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 2.7 as adjusted from time to time pursuant to paragraph 6.4);

15.2.1.2 CONTRACTOR's disregard of Laws or Regulations of any public body having jurisdiction;

15.2.1.3 CONTRACTOR's disregard of the authority of ENGINEER; or

15.2.1.4 CONTRACTOR's violation in any substantial way of any provisions of the Contract Documents.
15.2.2 If one or more of the events identified in paragraph 15.2.1 occur, OWNER may, after giving CONTRACTOR (and the surety, if any) seven days written notice, terminate the services of CONTRACTOR, exclude CONTRACTOR from the Site, and take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which OWNER has paid CONTRACTOR but which are stored elsewhere, and finish the Work as OWNER may deem expedient. In such case, CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by OWNER arising out of or relating to completing the Work, such excess will be paid to CONTRACTOR. If such claims, costs, losses, and damages exceed such unpaid balance, CONTRACTOR shall pay the difference to OWNER. Such claims, costs, losses, and damages incurred by OWNER will be reviewed by ENGINEER as to their reasonableness and, when so approved by ENGINEER, incorporated in a Change Order. When exercising any rights or remedies under this paragraph OWNER shall not be required to obtain the lowest price for the Work performed.

15.3 OWNER May Terminate For Convenience

15.3.1 Upon seven days written notice to CONTRACTOR, OWNER may, without cause and without prejudice to any other right or remedy of OWNER, elect to terminate the Contract. In such case, CONTRACTOR shall be paid (without duplication of any items):

15.3.1.1 for completed and acceptable Work executed in accordance with the contract Documents prior to the effective date of termination.

15.3.2 CONTRACTOR shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.4 CONTRACTOR May Stop Work or Terminate

15.4.1 If, through no act or fault of CONTRACTOR, the Work is suspended for more than 90 consecutive days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within 30 days after it is submitted, or OWNER fails for 30 days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven days written notice to OWNER and ENGINEER, and provided OWNER or ENGINEER do not remedy such suspension or failure within that time, terminate the Contract and recover from OWNER payment on the same terms as provided in paragraph 15.3. In lieu of terminating the Contract and without prejudice to any other right remedy, if ENGINEER has failed to act on an Application for Payment within 30 days after it is submitted, or OWNER has failed for 30 days after it is submitted, or OWNER has failed for 30 days to pay CONTRACTOR any sum finally determined to be due, CONTRACTOR may, seven days after written notice to OWNER and ENGINEER, stop the Work until payment is made of all such amounts due CONTRACTOR, including interest thereon. The provisions of this paragraph 15.4 are not intended to preclude CONTRACTOR from making a Claim under paragraph 10.5 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to CONTRACTOR's stopping the Work as permitted by this paragraph.

15.5 Assignment of Contract

15.5.1 CONTRACTOR shall not assign, transfer, convey or otherwise dispose of the Contract, or of his legal right, title, or interest in or to the same or to any part thereof, without the prior written consent of the OWNER. CONTRACTOR shall not assign by power of attorney or otherwise any monies due him and payable under this Contract without the prior written consent of the OWNER. Such consent, if given, will in no way relieve the CONTRACTOR from any of the obligations of this Contract. OWNER shall not be bound to abide by or observe the requirements of any such assignment.

ARTICLE 16.0 - DISPUTE RESOLUTION

16.1 Methods and Procedures

16.1.1 Dispute resolution methods and procedures, if any, shall be as set forth in these General Conditions, in the Standard Form Contract, or otherwise in the Contract Documents. If no method and procedure has been set forth, and subject
to the provisions of paragraph 9.9 and 10.5, OWNER and CONTRACTOR may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any dispute.
CIVIL SITE DRAWINGS

SITE NAME: CITY OF CONCORD
SITE NUMBER: N/A

SITE ADDRESS: 170 PITTS SCHOOL RD NW
CONCORD, NC 28027
(CABARRUS COUNTY)

PROJECT INFORMATION

IF YOU DIG IN NORTH CAROLINA... CALL US FIRST
1-800-632-4949
NORTH CAROLINA ONE CALL IT'S THE LAW

UTILITY STATEMENT

LOCATION MAP

CONTACT INFORMATION

SITE PROJECT MANAGER:
NAME: 18-18 CONSULTING
ADDRESS: 2274 PINEAPPLE CHURCH ROAD
NIEDER, NC 28081
CONTACT: MARTY RANDALL
PHONE: 828-527-3416

SITE APPLICANT:
NAME: CITY OF CONCORD
ADDRESS: 35 CABARRUS AVE. WEST,
CONCORD, NC 28025
CONTACT: BETHANY LEDWELL
PHONE: 704-920-5585

SURVEYOR:
NAME: BATTEMAN CIVIL SURVEY CO, PC
ADDRESS: 2234 RELIANCE AVENUE
APRIL, NC 27539
CONTACT: JEFF R. BAKER
PHONE: 704-684-9100

CIVIL ENGINEER:
NAME: ENGINEERED TOWER SOLUTIONS, PLLC
ADDRESS: 2054 LEGION RIDGE DRIVE, SUITE 100
WAKE FOREST, NC 27587
CONTACT: CHRISTOPHER G. FLY, P.E.
PHONE: 919-724-2710

ELECTRICAL ENGINEER:
NAME: TBD
ADDRESS: TBD
CONTACT: TBD
PHONE: TBD

PROPERTY OWNER:
NAME: CITY OF CONCORD
ADDRESS: 35 CABARRUS AVE. WEST,
CONCORD, NC 28025
PHONE: 704-920-5585

SITE ACQUISITION MANAGER:
NAME: CITY OF CONCORD
ADDRESS: 35 CABARRUS AVE. WEST,
CONCORD, NC 28025
CONTACT: BETHANY LEDWELL
PHONE: 704-920-5585

UTILITY COMPANY:
NAME: CITY OF CONCORD ELECTRIC SYSTEMS
CONTACT: CUSTOMER SERVICE
PHONE: 704-920-5329 / 704-920-5355

PHONE NUMBER:
METER # NEAR SITE: UNKNOWN

SITE ADDRESS:
SITE NUMBER:
SITE NAME:
SITE PROJECT MANAGER:
SITE APPLICANT:
SURVEYOR:
CIVIL ENGINEER:
ELECTRICAL ENGINEER:
PROPERTY OWNER:
SITE ACQUISITION MANAGER:
UTILITY COMPANY:
PHONE NUMBER:
METER # NEAR SITE:

CODE COMPLIANCE

SITE PROJECT MANAGER:
SITE APPLICANT:
SURVEYOR:
CIVIL ENGINEER:
ELECTRICAL ENGINEER:
PROPERTY OWNER:
SITE ACQUISITION MANAGER:
UTILITY COMPANY:
PHONE NUMBER:
METER # NEAR SITE:

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SITE PROJECT MANAGER:
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ELECTRICAL ENGINEER:
PROPERTY OWNER:
SITE ACQUISITION MANAGER:
UTILITY COMPANY:
PHONE NUMBER:
METER # NEAR SITE:
GENERAL NOTES:

1. ALL REFERENCES MADE TO OWNER IN THESE DOCUMENTS SHALL BE CONSIDERED CABARRUS COUNTY OR ITS DELEGATED REPRESENTATIVE.

2. ALL WORK PRESENTED ON THESE DRAWINGS MUST BE COMPLETED BY THE CONTRACTOR UNLESS NOTED OTHERWISE. THE CONTRACTOR MUST HAVE CONSIDERABLE EXPERIENCE IN PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED HEREIN. BY ACCEPTANCE OF THIS DOCUMENT, THE CONTRACTOR IS STATED THAT HE DOES NOT HAVE SUFFICIENT EXPERIENCE AND ABILITY; THAT HE IS KNOWLEDGABLE OF THE WORK TO BE PERFORMED AND THAT HE IS PROPERLY LICENSED AND PROPERLY LICENSED TO DO THIS WORK IN THE STATE OF NORTH CAROLINA.


4. WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE NORTH CAROLINA BUILDING CODE, 2012 EDITION.

5. UNLESS SHOWN OR NOTED OTHERWISE ON THE CONTRACT DRAWINGS, OR IN THE SPECIFICATIONS, THE FOLLOWING NOTES SHALL APPLY TO THE MATERIALS LISTED HEREIN, AND TO THE PROCEDURES TO BE USED ON THIS PROJECT.

6. ALL THOSE ASSEMBLY MANUFACTURER’S INSTRUCTIONS SHALL BE FOLLOWED EXACTLY AND SMALL SUPERFICIAL ANY CONFLICTING NOTES ENLOYED HEREIN.

7. IT IS THE CONTRACTOR’S SOLE RESPONSIBILITY TO DETERMINE ELECTRIC DEPARTMENT AND SUBSEQUENT SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ELECTRIC AND/OR FIELD WORK. THE CONTRACTOR IS NOT LIABLE FOR THE INTRODUCTION OF THE SYSTEMS THAT MAY BE NEEDED, SUCH MATERIAL SHALL BE REMOVED AND SMALL SUPERFICIAL ANY CONFLICTING NOTES ENLOYED HEREIN.

8. ALL DIMENSIONS, ELEVATIONS, AND EXISTING CONDITIONS SHOWN ON THE DRAWINGS SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO BEGINNING ANY MATERIALS ORDERING, FABRICATION OR CONSTRUCTION WORK ON THIS PROJECT. CONTRACTOR SHALL NOT SCALE DRAWING ORIGIN OF FIELD VERIFICATION. ANY DISCREPANCY SHALL BE IMMEDIATELY REPORTED TO THE ATTENTION OF THE OWNER AND THE OWNER’S ENGINEER. THE DISCREPANCY MUST BE RESOLVED BEFORE THE CONTRACTOR IS PROCEEDED WITH THE WORK. THE CONTRACT DOCUMENTS DO NOT INDICATE THE MANNER OF CONSTRUCTION, THE CONTRACTOR SHALL SOLE RESPONSIBILITY AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES. OBSERVATION WINS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT ALLOW INTOXICATED OR THE PROTECTIVE MEASURES OR THE CONTRACTOR.

9. ALL MATERIALS AND EQUIPMENT PURCHASED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMITY WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBCONTRACTS MUST BE PROPERLY APPROVED AND AUTHORIZED BY WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL ENSURE SATISFACTORY EXAMINATION AND THAT GOOD QUALITY OF THE MATERIALS AND EQUIPMENT IS SUBSTANTIAL.

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INVENTORY, MAINTENANCE AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONFORMANCE TO THE WORK. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ALL SYSTEMS AND RELATED WORK CONFORM WITH ALL APPROPRIATE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THE WORK.

11. ACCESS TO THE PROPOSED WORK SITE MAY BE RESTRICTED. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES, INCLUDING WORK SCHEDULE AND MATERIALS ACCESS WITH THE RESIDENT LEASING AGENT FOR APPROVAL.

12. BILL OF MATERIALS AND PART NUMBERS LISTED ON CONSTRUCTION DRAWINGS ARE INTENDED TO AID CONSTRUCTOR/OWNER/CONSTRUCTOR/OWNER SMALL VERIFIED PARTS AND QUANTITIES WITH MANUFACTURER PRIOR TO SHIPING AND/OR ORDERING MATERIALS.

13. ALL PERMITS THAT MUST BE OBTAINED ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE RESPONSIBLE FOR OBTAINING ALL CONSTRUCTION AND ANY PERMITS.

14. 24 HOURS PRIOR TO THE BEGINNING OF ANY CONSTRUCTION, THE CONTRACTOR MUST NOTIFY THE APPLICABLE JURISDICTIONAL (STATE, COUNTY OR CITY) ENGINEER.

15. THE CONTRACTOR SHALL NOTIFY (CITY, COUNTY, ETC.) ALL MATERIALS NOT SUITABLE FOR SUBGRADE IN ITS PRESENT STATE. AFTER REPORTING, IF THE MATERIALS REMAIN UNSUITE, THE CONTRACTOR SHALL REMOVE THE MATERIAL, REPLACE WITH APPROVED MATERIAL, AND ALL SUBGRADES SHALL BE PROFITAILED WITH A FULLY LOADED TRIAXLE DUMP TRUCK PRIOR TO PLACING ANY SOIL, GRASS, OR OTHER MATERIALS ON THE WORK. ANY COLLENS OR/OR EXCAVATION SHALL BE ROLLED OR REPLACED.

16. THE CONTRACTOR IS REQUIRED TO MAINTAIN SMALL TIED, RACED, AND OTHER DRAINAGE STRUCTURES FREE FROM OBSTRUCTION UNTIL WORK IS ACCEPTED BY THE OWNER. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGES CAUSED TO DRAINAGE BY FAILURE TO MAINTAIN DRAINAGE STRUCTURES IN OPERATIONAL CONDITION.

17. ALL MATERIALS AND WORKSHOPS SHALL ACCOUNT ONE YEAR FROM COMPLETION DATE.

18. ALL BUILDING DIMENSIONS SHALL BE VERIFIED WITH THE PLANS (LATEST REVISION) PRIOR TO COMMENCING CONSTRUCTION. NOTIFY THE ENGINEER IMMEDIATELY IF ANY DISCREPANCIES ARE OBSERVED. THE CONTRACTOR/OWNER SHALL HAVE A READ/DRAWN APPRAISAL AVAILABLE AT THE SITE AT ALL TIMES WHILE WORK IS BEING PERFORMED. A DESIGNATED RESPONSIBLE EMPLOYEE SHALL BE AVAILABLE FOR CONTACT BY GOVERNMENT AGENCY INSPECTORS.

GENERAL NOTES: (CONTINUED)

19. ANY BUILDINGS ON THIS SITE ARE INTENDED TO SHELTER EQUIPMENT WHICH WILL ONLY BE PERIODICALLY OCCUPIED AND ARE NOT INTENDED FOR HUMAN OCCUPANCY.

20. TEMPORARY FACILITIES FOR PROTECTION OF TOOLS AND EQUIPMENT SHALL CONFORM TO LOCAL REGULATIONS AND SHALL BE THE CONTRACTOR’S RESPONSIBILITY.

21. RENTAL CHARGES, SAFETY, PROTECTION, AND MAINTENANCE OF RENTED EQUIPMENT SHALL BE THE CONTRACTOR’S RESPONSIBILITY.

22. THE CONTRACTOR AND ITS SUBCONTRACTORS SHALL CARRY LIABILITY INSURANCE IN THE AMOUNTS AND FORM IN ACCORDANCE WITH CABARRUS COUNTY SPECIFICATIONS. LIABILITY INSURANCE COVERAGE FOR THE CONTRACTOR’S LIABILITY SHALL BE PROVIDED TO CABARRUS COUNTY PRIOR TO THE START OF THE WORK ON THE PROJECT.

23. THESE DOCUMENTS DO NOT INCLUDE THE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY, CARE OF ADJACENT PROPERTIES, AND COMPLIANCE WITH STATE AND FEDERAL REGULATIONS REGARDING SAFETY, SHALL BE THE CONTRACTOR’S RESPONSIBILITY.

24. THE CONTRACTOR SHALL CONTACT ALL APPROPRIATE UTILITY SERVICES TO VERIFY LOCATIONS OF EXISTING UTILITY AND REQUIREMENTS FOR NEW UTILITY CONNECTIONS PRIOR TO EXCAVATING.

25. THE CONTRACTOR SHALL MAINTAIN THE JOB SITE CLEAR OF TRASH AND DEBRIS. ALL WASTE MATERIALS SHALL BE REMOVED FROM THE SITE PRIOR TO SUBSTANTIAL COMPLETION AND PRIOR TO FINAL ACCEPTANCE. THE CONTRACTOR SHALL REMOVE ONE 50-GALLON BARREL AND TRASH BAGS, AND SMALL REMOVE TRASH, DEBRIS, ETC., ON A DAILY BASIS.

26. COSTS FOR BUILDING PERMITS, LANDLORD TAXES, USE TAXES, SALES TAXES AND OTHER CHARGES RELATIVE TO CONSTRUCTION OF THIS PROJECT SHALL BE INCLUDED IN THE CONTRACT PRICE.

27. THE CONTRACTOR SHALL NOTIFY THE SITE AND DEMO PLANNING WITH ALL CONSTRUCTION PRIOR TO SUBMITTING A PROPOSAL. CONTRACTOR SHALL VERIFY ALL CONDITIONS SHOWN ON THESE DRAWINGS WITH INSTRUCTIONS AT THE SITE. ANY VARIATION MasonTAKS REQUIREMENTS FOR THE PRECEDING MUST BE NOTIFIED TO THE ATTENTION OF THE CABARRUS COUNTY PROJECT MANAGER FOR CLASSIFICATION/ADJUSTMENT.

28. THE CONTRACTOR SHALL COMPARE THE WORK PERFORMED ON THE PROJECT AND ANY OWN OF ALL THE SUBCONTRACTORS WHO PERFORMED WORK FOR THE CONTRACTOR ON THIS Project. THE GUARANTEE SHALL BE FOR A FULL YEAR FOLLOWING ISSUANCE OF THE FINAL PAYMENT FOR REWORK.
TOWER NOTES:

1. TOWER TO BE DESIGNED BY ANOTHER PARTY.
2. TOWER TO BE DESIGNED WITH FALL ZONE MATCHING SPECIFICATION ON SHEET C-3.
CIVIL SITE DRAWINGS
City of Concord
N/A
DATE: 02/20/2018

ICE BRIDGE REPOSITIONED

REVISED PROPERTY OWNER

PROPOSED SHELTER DETAILS

PROPOSED SHELTER DETAILS
SCALE: 1/8" = 1'-0"
CONCRETE NOTES:

1. UNLESS OTHERWISE NOTED, ALL CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI IN 28 DAYS FOR TOWER FOUNDATIONS, FLOOR SLABS, CONCRETE ENCLOSURES.

2. UNLESS OTHERWISE NOTED, ALL DETAILS, FABRICATION AND PLACING OF REINFORCING STEEL SHALL CONFORM TO THE MANUAL OF STANDARD PRACTICE FOR FABRICATING REINFORCED CONCRETE STRUCTURES. (ACI 215).

3. UNLESS OTHERWISE NOTED, REINFORCEMENT ALL CONCRETE SLABS ON GRADE WITH W/10 x W/10 x 6 x 6 WELDED WIRE FABRIC.

4. WIRE FABRIC REINFORCING SHALL LAP TWO FULL WELDS AND BE SECURELY WIRE AT EACH SIDE AND END.

5. ALL BAR SPACERS SHALL BE CLASS "B" TENSION SPACERS, UNLESS OTHERWISE NOTED.

6. CHAMFER ALL EXPOSED EXTERNAL CORNERS OF CONCRETE WITH 3/4" X 45° CHAMFER, UNLESS OTHERWISE NOTED.

7. OWNER SHALL BE RESPONSIBLE FOR LOCATING, PROTECTING AND RELOCATING ALL SERVICE AND UTILITY LINES IN THE VICINITY OF THE WORK SITE, AS REQUIRED. ALL EXCAVATIONS NEAR THESE LINES SHALL BE CARRIED OUT WITH EXTREME CAUTION.

8. PROVIDE (2) #6 DIAGONAL BARS IN TOP FACE OF SLAB ON GRADE AT ALL RE-ENTRANT CORNERS, EXTEND THESE BARS 18" PAST THE CORNERS.

9. CONTRACTOR SHALL VERIFY ALL SIZES, LOCATIONS AND LOCATIONS OF ALL ELECTRICAL OPENINGS AND EQUIPMENT PADS WITH THE ELECTRICAL EQUIPMENT DETAIL AND SHOP DRAWINGS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ALL OPENINGS AND SLEEVES FOR THE PROPER DISTRIBUTION FOR ALL UTILITIES.

10. ALL REINFORCING STEEL SHALL BE TIED AND PLACED INTO A CASE PRIOR TO SETTING INTO POSITION IN EXCAVATED FOUNDATION HOLE. SPACING DEVICES SHALL BE USED TO MAINTAIN THE REQUIRED CLEARANCE BETWEEN THE STEEL CASES AND THE EXCAVATION WALL.

11. CONCRETE (EXCEPT FOR CARSONS) SHALL BE PLACED INTO EXCAVATION WITHIN 6 HOURS OF EXCAVATING WITH USE OF CAUBE ON HOPPER DECK TO DIRECT THE CONCRETE TO FALL AT THE CENTER OF THE STEEL CASE. CONCRETE SHALL NOT BE ALLOWED TO HIT THE STEEL CASE WHICH WOULD CAUSE DEFORMATION OF THE MATERIAL.

12. FOUNDATION BASED ON 2000 PSI SOIL BORING CAPACITY. IF OTHER CONDITIONS EXIST, FOUNDATION SHALL BE REDESIGNED. CONTRACTOR SHALL HAVE BORING CAPACITY VERIFIED PRIOR TO INITIATION OF CONSTRUCTION ACTIVITIES.

13. BACKFILL SHALL BE THOROUGHLY COMPACTED TO A MINIMUM OF 95% DENSITY USING THE MODIFIED PROCTOR METHOD.

14. SLAB TO BE LEVEL + 3/8".

SECTION A-A DETAILS

SCALE: N/S

TIE DOWN PLATE

SCALE: 1/8" = 1'-0"

FOUNDATION DETAIL

SCALE: 1/8" = 1'-0"
FENCE DETAILS

C-8

02/15/2018

CIVIL SITE DRAWINGS

City of Concord

DJN

107x203

02/28/2018

ICE BRIDGE REPOSITIONED

JED

02/19/2018

REVISED PROPERTY OWNER

FENCE SIDE DETAIL

SCALE: 1/16

FENCE FRONT VIEW

SCALE: 1/16

FENCE DETAILS

C-8

02/28/2018

REVISION: 2

ETS ENSHROFT TOWER SOLUTIONS, PLLC

2524 LEIGHTON RIDGE DR S, SUITE 100,
WAKE FOREST, NC 27587
OFFICE: (919) 792-2710
www.engineersolutionsnc.com

SITE NAME:

City of Concord

SITE NUMBER:

N/A

SITE ADDRESS:

170 PFEIFER SCHOOL RD NW
CONCORD, NC 28027
(CABARRUS COUNTY)

FENCE SIDE DETAIL

SCALE: 1/16

GATE POST BRACKET DETAIL

SCALE: 1/16

PLANS PREPARED BY:

ETS ENHROFT TOWER SOLUTIONS, PLLC

2524 LEIGHTON RIDGE DR S, SUITE 100,
WAKE FOREST, NC 27587
OFFICE: (919) 792-2710
www.engineersolutionsnc.com

PLANS PREPARED FOR:

SITE NAME:

City of Concord

SITE NUMBER:

N/A

SITE ADDRESS:

170 PFEIFER SCHOOL RD NW
CONCORD, NC 28027
(CABARRUS COUNTY)
GROUNDBED NOTES:

1. Grounding electrodes shall be connected in a ring using copper-clad steel solid copper, not dry-dipped galvanized steel or stainless steel wire. The top of the ground rods and the ring conductor shall be 20 inches below finished grade or below frost line, whichever is greater. Grounding electrodes shall be installed at a maximum spacing of 6'-0" and a maximum spacing of 10'-0".

2. Bonding of the ground conductor (braid) and the ground conductor shall be at the service disconnecting means. Bonding jumper shall be installed per NEC Article 250.330.

3. Contractor shall notify the construction manager when the grounding system is complete. The construction manager shall inspect the grounding system prior to backfilling.

4. Provide a ground ring buried a minimum of 30" below grade or below frost line, whichever is greater. The ground ring shall be installed 3'-0" away from platform foundation (minimum unless shown otherwise on drawings).

5. If a fence is installed, bond fence post to ground ring as shown using an external heel bond fence gate to post with a flexible copper jumper strap, EPR-60224-0, brazed to the rail or approved equal. Provide insulating sleeves and any necessary accessories to bond strap to gate and fence post. Provide length as required to make connection.

6. Bond CPC and equipment enclosures to buried grounding conductor. Use a new drilled two-hole connector for bonds to equipment enclosures. Use an approved conduit clamp for connections to service conductors. Check all connections to grounding conductor.

7. 5/8" x 9" long ground rod, spaced between rods, as shown (non-linear), provide tee type external weld to bond ground rod to buried ground ring. Typical for all ground rods, minimum 1/4" overlap. See grounding ring installation sleeve details.

8. Bond all exterior conduits, pipes and cylindrical metallic objects with a Penn-Union WT series clamp, Blackburn Guy series clamp or a Bundy or 3360 series clamp.

9. Before and after installation is completed in accordance with these drawings and the standard specifications, the contractor shall confirm the impedance (ground resistance) between ground rods and between ground rods. The grounding system is designed to provide a maximum earth resistance of 5 ohms. The contractor shall notify the city of Concord prior to all testing and shall furnish the city of Concord in the event the earth resistance is measured greater than 5 ohms, use 3 point fall of potential method.

10. All grounding connections shall be made with cadmium on rod.

11. Contractor shall verify the location of existing underground utilities. Hang signs in this vicinity to protect from damage.

12. All bends on the ground conductor to be made with a minimum 6' radius. Bends are not to exceed 90° per NFPA 780, Section 3-2-5 and ANSI T-113-1997.

13. Grounding shall be in accordance with the following Motorola R56 standard practices (as required): (General Contractor shall confirm latest standards)

   13.4. Siz.e 3.018:02.004 bonding, grounding and transparent protection.
   13.6. Siz.e 3.018:10.02 for additional information and requirements.

14. Contractor shall verify the location of existing ground ring for proper insertion of and after completion of construction to verify less than 5 ohms resistance.
**STANDARD GROUND BAR DETAIL**

- Scale: NTS

**COPPER-CLAD STEEL GROUND ROD**

- Scale: NTS

**GROUND ROD WITH INSPECTION WELL**

- Scale: NTS

**CADWELD GROUNDING DETAIL**

- Scale: NTS

---

**WALL MOUNTING BRACKET**

- Newton Instrument Co. (Cat. # A-6086)

**INSULATORS**

- Newton Instrument Co. (Cat. # 3061-4)

**COPPER GROUND BAR**

- 3/8" x 4" x 20" min. Newton Instrument Co. (Cat. # B-5142)

**NOTE:** Ground bar shall be sized to accommodate all grounding connections required plus provide for spare capacity.

---

**MALE SCREW COVER**

- With Teflon lubricant

**PVC COLLAR**

**GROUNDED SLUG**

**GROUNDED WIRE**

**GROUND ROD**

**CADWELD**

**FINISHED GRADE**

---

**E-4**

**DATE:** 2/15/2018

**CIVIL SITE DRAWINGS**

**CIVIL SITE DRAWINGS**

**City of Concord**

**SITE NUMBER:** N/A

**SITE ADDRESS:** 170 PFEY SCHOOL RD NW, CONCORD, NC 28027 (CABARRUS COUNTY)

**SEAL:**

**DRAWN BY:** [Signature]

**CHECKED BY:** [Signature]

**ISSUED FOR:**

**SN:** E-4

**REVISION:** 2

**PLANS PREPARED BY:**

**ENGINEERED TOWER SOLUTIONS, PLLC**

**P.O. BOX 100, WAKE FOREST, NC 27509**

**OFFICE: (336) 703-2710**

**www.engineeredtowersllc.com**

---

**NOTE:** Minimum spacing of 12" between all cadwelds.
**ONE LINE PANEL SCHEDULE**

<table>
<thead>
<tr>
<th>LOAD</th>
<th>LOAD PER PHASE VA</th>
<th>LOAD</th>
<th>LOAD PER PHASE VA</th>
<th>LOAD</th>
<th>LOAD PER PHASE VA</th>
<th>LOAD</th>
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<tbody>
<tr>
<td>THHN</td>
<td>12AWG</td>
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<td></td>
<td>#12</td>
<td></td>
<td>#12</td>
<td></td>
</tr>
</tbody>
</table>

*NOTE: PANEL SCHEDULE PROVIDED FROM ORIGINAL SHELTER DRAWINGS*
BE LISTED FOR MULTI-BARRELL CONNECTIONS.

7. ALL LUGS THAT HOLD MORE THAN ONE WIRE SHALL (STRAPS, SCREWS, ETC.) SUPPLIED BY EQUIPMENT MANUFACTURER. IF NO SUCH DEVICE IS SUPPLIED, BOND IS TO BE MADE.

6. CONDUCTOR SIZING IS SELECTED FROM 1999 NEC (ARTICLE 215-2).

5. CONDUCTOR OVERCURRENT PROTECTION DEVICES ARE SELECTED IN ACCORDANCE WITH 1999 NEC (ARTICLE 240-3).

4. WHEN SERVICE OVERCURRENT DISCONNECT IS FIELD INSTALLED AND HAS A NEUTRAL TO GROUND CONNECTION ESTABLISHED, REMOVE NEUTRAL TO GROUND CONNECTION IN MANUAL TRANSFER.

3. SERVICE BOND IS TO BE MADE BY DEVICES IN ACCORDANCE WITH NEC ARTICLE 250.

2. BUILDING ELECTRICAL SYSTEM IS RATED AT 10,000 A.I.C. IF HIGHER RATINGS ARE REQUIRED, IT IS THE RESPONSIBILITY OF SITE CONTRACTOR/ENGINEER TO MEET SUCH REQUIREMENTS.

1. DASHED LINES DENOTE FIELD WORK.

NOTES:

9. LABEL SERVICE DISCONNECT WITH A RED TAG.

8. ALL CONDUCTORS SHALL BE COPPER.

7. GENERATOR TO MAIN BREAKER LOADCENTER

6. #4 #3/0 #3/0 #3/0 #3/0

5. 200 AMP 200 AMP 200 AMP

4. #4 #4 #4

3. 2" CONDUIT 2" CONDUIT 2" CONDUIT

2. 3 #3/0's, 1 #4 3 #3/0's, 1 #4 3 #3/0's, 1 #4

1. ONE LINE PANEL SCHEDULE

* NOTE: PANEL SCHEDULE PROVIDED FROM ORIGINAL SHEET DRAWINGS
### ITEM LIST

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
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</tr>
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### PACKING LIST

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<tr>
<th>QTY.</th>
<th>FIBREBOND PART NO.</th>
<th>MFG'S. PART NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*NOTE: PACKING LIST PROVIDED FROM ORIGINAL SHEET DRAWINGS.*
June 11, 2018

REPORT OF
GEOTECHNICAL EXPLORATION
Project Number 120-371
SITE NAME: City of Concord, NC
170 Pitts School Road NW
Concord, North Carolina 28027

Prepared For:
Cabarrus County
65 Church Street S
Concord, NC 28025
Subject: Geotechnical Engineering Report
Proposed Self Supporting Lattice (SST) Tower
PROJECT # - 120 371
Site Name: City of Concord
170 Pitts School Road NW
Concord, North Carolina

Engineered Tower Solutions, PLLC (ETS) is pleased to submit this report providing engineering analysis for the proposed unmanned wireless communication site at the above referenced project site.

The attached report summarizes the project information provided to us, describes the site and subsurface conditions encountered, and details our geotechnical recommendations for the project. The Appendix contains a boring location plan, photographs of the site, and our field test results.

We appreciate the opportunity to be of service to you for this phase of the project. If you have any questions concerning this report, please call us.

Sincerely,
Engineered Tower Solutions, PLLC

Herbert L. Hales, II  
Geotechnical Division Manager

F. Geoffrey Bost, P.E.  
Principal Engineer
1.0 INTRODUCTION ____________________________________________________ 2
1.1 Project Information _______________________________________________ 2
1.2 Purpose and Scope of Exploration __________________________________ 2
2.0 EXPLORATION FINDINGS__________________________________________ 3
2.1 Site Geology ___________________________________________________ 3
2.2 Subsurface Conditions __________________________________________ 3
2.3 Groundwater ____________________________________________________ 4
3.0 FOUNDATION SUPPORT AND RECOMMENDATIONS _____________________ 5
3.1 Shallow Fondation Design Considerations _____________________________ 5
3.2 Shallow Foundation Construction Considerations _____________________ 5
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3.4 Drilled Shaft Construction Considerations ____________________________ 7
4.0 CONSTRUCTION CONSIDERATIONS __________________________________ 7
5.0 GENERAL AND LIMITATIONS_________________________________________ 8

APPENDIX

Figure 1 - Site Location Diagram (One Sheet)
Figure 2 – Boring Location Plan (One Sheet)
Test Boring Log (Three Sheets)
Site Photographs (One Sheet)
1.0 INTRODUCTION

1.1 Project Information

The proposed Self Supported Lattice (SST) tower is planned to be constructed at 170 Pitts School Road NW in Concord, North Carolina. Currently the site is cleared, grass covered only. We understand preliminary plans are for a 180-foot tall SST tower. Foundations for this type of structure typically consist of a straight shaft drilled piers or shallow spread footing foundations.

Structural reactions were not provided at this time; however, based on our experience with this type of tower in this region, we would estimate the following factored reactions:

- **Downward Load:** 200 to 400 kips per leg
- **Uplift Load:** 150 to 300 kips per leg
- **Horizontal Shear:** 40 to 80 kips
- **Overturning moment:** 8,000 to 12,000 ft-kips

1.2 Purpose and Scope of Exploration

The purpose of this exploration was to obtain subsurface data at the project site to provide geotechnical engineering recommendations for the project. Services performed under this agreement included the drilling of three test borings and preparation of a geotechnical engineering report. The subsurface investigation data obtained for this study and related plans for the proposed tower have been considered to develop the following:

1. Description of the site and presentation of subsurface test boring data, including boring location plan drawing.
2. Recommendations for support of the proposed tower, including allowable bearing pressures, and design parameters for use by others in the design. Soil design parameters are included for design to resist lateral loads for the tower foundation.
3. Comments and recommendations regarding geotechnical construction considerations related to preparation of the construction plans and specifications.

Our scope of services does not include recommendations for allowable unsupported excavation slopes, stormwater management, erosion control, detailed cost or quantity estimates, final plan and specification documents, and construction observations and testing. Any statements in this report regarding odors, colors, or unusual or suspicious items or conditions are strictly for the information of the client.
2.0 EXPLORATION FINDINGS

2.1 Site Geology

The site is located in the Piedmont Physiographic Province of North Carolina according to the Geologic Map of North Carolina. In the Milton and Charlotte Belt, the soils in this region typically consist of clayey silts and sands weathered from the underlying intrusive rock.

2.2 Subsurface Conditions

The subsurface materials encountered were visually classified using the Unified Soil Classification System (USCS) as a guide. The Test Boring Log, which detail the subsurface conditions encountered at the boring location, are also included in the Appendix.

The borings initially encountered 4 to 10 inches of topsoil. Below the topsoil, 3 to 4 feet of fill, consisting of sandy CLAY (CL) was encountered, with N-values of 8 to 20. Residual soils were encountered at 3 to 4 feet, transitioning from sandy clayey SILT, with N-values of 9 to 14, to more dense silty clayey sand with N-values ranging 14 to 75. Auger refusal was encountered at 12 to 18.6 feet. Auger refusal is considered material having a resistance in excess of the penetrating capacity of the drilling equipment.

Subsurface conditions at the site are generally described in the table below:

<table>
<thead>
<tr>
<th>DEPTH (Ft)</th>
<th>SOIL DESCRIPTION</th>
<th>Density or Consistency</th>
<th>SPT Range (Blows/Ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.3 to 0.8</td>
<td>Topsoil</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>0.3-0.8 to 3.0</td>
<td>Sandy CLAY (CL) – Fill</td>
<td>Medium to Very Stiff</td>
<td>8-20</td>
</tr>
<tr>
<td>3.0 to 6.0-8.0</td>
<td>Clayey SILT, with Sand, Mica (ML) Residual</td>
<td>Stiff to Very Stiff</td>
<td>9-14</td>
</tr>
<tr>
<td>6.0-8.0 to 10.0-15.0</td>
<td>Silty SAND with Clay, Mica (SM)</td>
<td>Medium to Very Dense</td>
<td>14-75</td>
</tr>
</tbody>
</table>
2.3 Groundwater Conditions:

Groundwater level measurements were made in the boring during and upon completion of drilling operations. Groundwater was not encountered at the time of boring.

Generally, seasonal and yearly fluctuations of the water table should be expected with variations in precipitation, surface runoff, evaporation, pumping, and other similar factors.
3.0 FOUNDATION SUPPORT AND RECOMMENDATIONS

Soil data obtained during this subsurface exploration has been used to establish shearing strength and deformation characteristics for the various soil layers encountered at the site. These parameters have been used as guidelines for foundation system design and to estimate potential settlement due to anticipated foundation loading. The engineering analysis based on these parameters was performed in accordance with generally accepted engineering principles and practices. Based on the conditions encountered at the site, we recommend a shallow mat foundation system.

A drilled shaft foundation under each leg may also be considered. Drilling will likely become very difficult and become cost prohibitive. As the final design has yet to be determined, analysis parameters for a drilled shaft foundation are included.

3.1 Shallow Foundation Design Considerations

The foundation for the tower should extend far enough into the weathered materials to develop the required bearing and overturning capacity. No structural loads were provided to ETS. The foundation should bear at least 3 feet below the surface to penetrate the expected frost depth.

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Soil</th>
<th>Sliding Friction Coefficient (Ultimate Capacity)</th>
<th>Net Allowable Bearing Pressure Psf*</th>
<th>Moist Unit Weight, pcf</th>
<th>Friction Angle, Deg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 – 6</td>
<td>Stiff Fine Sandy Silt/Clay some mica (ML/CL)</td>
<td>0.3</td>
<td>2,500</td>
<td>125</td>
<td>28</td>
</tr>
<tr>
<td>6-10</td>
<td>Medium Dense to Dense Silty Sand some mica (SM)</td>
<td>0.4</td>
<td>4,000</td>
<td>135</td>
<td>34</td>
</tr>
</tbody>
</table>

*The Net Allowable Bearing Pressure above assumes a factor of safety of at least 3.

The bottom of the foundation system should be founded deep enough to resist the lateral loads and the anticipated overturning moments. Embedment should be based on the specific design of the foundation.

3.2 Shallow Foundation Construction Considerations

Excavation of the foundation should be performed in accordance with OSHA guidelines for excavation safety. Also, the foundation subgrade should be protected from rain and dry conditions due to the sensitive nature of the shallow silts.
3.3 Drilled Shaft Design Considerations

ETS understands that the proposed SST tower will be approximately 270 feet high. These structures are typically supported by a drilled shaft foundation system. As a general rule, these drilled shafts will be between 4 and 8 feet in diameter and between 15 and 40 feet deep. The foundation for the tower is expected to extend only far enough into the weathered materials to develop the required end bearing and overturning capacity. No structural loads were provided to ETS.

Drilled shaft foundation systems may be sized based on the following design criteria:

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Soil</th>
<th>Skin Friction, ksf (Compression)</th>
<th>Skin Friction ksf (Uplift)</th>
<th>End Bearing Psf*</th>
<th>Cohesion psf</th>
<th>Moist Unit Weight, pcf</th>
<th>Friction Angle, Deg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 3</td>
<td>Medium to Very Stiff Sandy CLAY (CL)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>115</td>
<td>24</td>
</tr>
<tr>
<td>3-6</td>
<td>Stiff Clayey SILT with Sand (ML)</td>
<td>0.4</td>
<td>0.2</td>
<td>2,500</td>
<td>1,000</td>
<td>125</td>
<td>28</td>
</tr>
<tr>
<td>6-10</td>
<td>Medium Dense to Very Dense Silty Sand with mica (SM)</td>
<td>2.0</td>
<td>1.0</td>
<td>4,000</td>
<td>0</td>
<td>135</td>
<td>34</td>
</tr>
<tr>
<td>10-12/18</td>
<td>Medium Dense to Very Dense Sand, some silt, mica (SM)</td>
<td>2.4</td>
<td>1.25</td>
<td>5,000</td>
<td>0</td>
<td>138</td>
<td>38</td>
</tr>
<tr>
<td>&gt;12-18</td>
<td>Rock/partially Weathered Rock/Very Dense Sand (&gt;50 BPF)</td>
<td>4.0</td>
<td>2.0</td>
<td>10,000</td>
<td>0</td>
<td>140</td>
<td>42</td>
</tr>
</tbody>
</table>

*The End Bearing Pressure is net allowable and assumes a factor of safety of at least 3.
3.4 Drilled Shaft Construction Considerations

The reinforcing steel and concrete for the drilled shafts will probably need to be placed by means of steel casing or drilling mud since the non-cohesive soils are susceptible to caving. The contractor must not allow the bottom of the casing to be raised faster than the upward advance of the upper surface of the concrete. This allows the concrete to flow out of the pipe into itself thus forcing the water or drilling mud up and out of the hole, minimizing the contamination of the concrete to the upper surface only.

Regardless of concrete placement method, segregation of the aggregate should be avoided. Specifically, concrete should not strike the sides of the drilled shaft and high slump concrete should not be vibrated. Reinforcing steel should be spaced appropriately to allow for the free passage of the aggregate. Also, installation tolerances of 2 percent plumbness and 3 inches by location should be adhered to.

As an overall guideline, The Standards and Specifications for Drilled Shafts, as published by the American Drilled Shaft Contractors should be adhered to. This incorporates the provision of the American Concrete Institute (ACI 336.1-1994). Due to the anticipated depth of excavation, careful attention should be given to excavation safety. Particularly, all work should adhere to OSHA 29 CFR Part 1926, as applicable, to insure worker safety and minimize liability.

4.0 CONSTRUCTION CONSIDERATIONS

For drilled pier excavations in non-cohesive soils, there may some sloughing. Use of temporary casing may be necessary. Generally, the final shaft should be concreted as soon as possible after completion of the drilling excavations. The pier shaft should not be left open overnight.

Where reinforcing steel is to be placed in the foundation, observations should be provided to ascertain that proper chairs or supports are provided and the reinforcing is properly positioned. A temporary protective caisson or pipe the full depth will be required for safety if ground conditions require inspection at the base of the pier. A minimum shaft diameter of 36-inches should be utilized to facilitate examination and testing of the founding soils.

Field observations and testing should also be provided for the earthwork construction for this project. As applicable, appropriate laboratory tests should be conducted on samples of the compacted backfill material, and field density tests should be conducted during the earthwork construction to ascertain that fill material and compaction requirements are being satisfied.
Field observations and testing should also be provided by our field engineer and/or technician personnel under supervision of our geotechnical engineer assigned to this project. We cannot be responsible for the interpretation or implementation, by others, of recommendations given herein.

Before beginning construction, the owner and contractor should become familiar with applicable local, state, and federal regulations, including the current OSHA Excavation and Trench Safety Standards. Construction site safety generally is the sole responsibility of the contractor, who should also be solely responsible for the means, methods, and sequencing of construction operations. We are providing this information solely as a service to our clients. Under no circumstances should the information provided herein be interpreted to mean that ETS is assuming responsibility for construction site safety or the contractor's activities. This responsibility is not being implied and should not be inferred.

5.0 GENERAL AND LIMITATIONS

Recommendations contained in this report are based on data obtained from the test boring performed at the location given on the Boring Location Plan in the Appendix. This report does not reflect any variations, which may occur beyond the test boring.

This report has been prepared for the exclusive use of Cabarrus County, to aid in the evaluation of this site and to assist their office and other design professionals in the design of this project. It is intended for use with regard to the specific project described herein. Any substantial changes in the design loading, site grading and estimated foundation depths, or location of the proposed structure, should be brought to our attention so that we may determine any affect on our recommendations given herein.

This report should be made available to bidders prior to submitting their proposals and to the successful contractor and subcontractors for their information only, and to supply them with information relative to the subsurface investigation, and laboratory tests, etc. The opinions and conclusions expressed in this report are those of the geotechnical engineer and represent his interpretation of the subsurface conditions based on tests and results of analysis and studies he has conducted for design.

This report has been prepared in accordance with generally accepted principles of geotechnical engineering practice and no other warranties are included, either expressed or implied, as to the professional services provided under the terms of our agreement.
APPENDIX

Figure 1 - Site Location Diagram (One Sheet)

Figure 2 – Boring Location Plan (One Sheets)

Test Boring Log (Three Sheets)

Site Photographs (One Sheet)
PROJECT NAME : City of Concord

TITLE : Site Location (Courtesy Google Maps)

LOCATION : Concord, NC

DATE : June 11, 2018
<table>
<thead>
<tr>
<th>Depth (Ft)</th>
<th>Blows per inches</th>
<th>Recovery Inches</th>
<th>Sample #</th>
<th>10&quot; Topsoil</th>
<th>Water Level and Lab Test Results</th>
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<td></td>
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<tr>
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<td>Residual - Stiff, moist, orange-brown Clayey SILT with Fine Sand, trace Gravel (ML)</td>
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<tr>
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Date Started: 5/31/2018
Date Completed: 5/31/2018
Driller: RDL Drilling

Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon
Page: 1 of 1
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Date Started: 5/31/2018  
Date Completed: 5/31/2018  
Driller: RDL Drilling
**Boring Log Of**

**City of Concord**

**Project Location:** Concord, NC

**Client:** Cabarrus

**Date:** 5/31/2018

**Engineer:** HLHII

**24 Hour = N/A**

**Time of Drilling = Not Encountered**

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<th>Water Table</th>
<th>Lab Test Results</th>
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</thead>
<tbody>
<tr>
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<tr>
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**Date Started:** 5/31/2018

**Drilling Method:** Hollow Stem Auger

**Date Completed:** 5/31/2018

**Sampling Method:** Split Spoon

**Driller:** RDL Drilling

**Page:** 1 of 1
City of Concord
170 Pitts School Road NW
Concord, North Carolina
Photos from January 3, 2018

Photo 1: Looking southeast across the site, EMS in background

Photo 2: Looking east across site

Photo 3: Looking north across site from EMS parking lot

Photo 4: Looking west across the site

Photo 5: Looking south across

Photo 6: Looking southeast, existing driveway in the foreground
1A Certification of Location and Elevation

Date of Survey: January 11, 2018

Prepared For: Engineered Tower Solutions, PLLC
2624 Leighton Ridge Drive
Wake Forest, NC 27587

Site Reference: City of Concord

Site Address: 170 Pitts School Road
Concord, NC 28027

The elevation of the ground at the tower center referenced hereon are based on NAVD 1988, and are accurate to within 3 feet as determined by our field survey of the subject property. The elevation is as follows:

Ground Elevation of Site Above Mean Sea Level (AMSL): 650.9 ft.

The horizontal values of the above referenced point, and the geodetic coordinates thereof, were established by taking multiple readings with Global Positioning Satellite receivers and are hereby certified to be within 15 feet. The values are based on NAD 1983 and are as follows:

Latitude: 35° 22' 33.349" North
Longitude: -80° 40' 22.166" West

Steven P. Carson
NC PLS No. 4752
TrunkLine Antenna, Standard (FCC 101, Cat A), Single Polarized, 6 ft

Product Description
(Only available in North America)

RFS Microwave Antennas are designed for microwave systems in all common frequency ranges from 4 GHz to 24 GHz. Different options of survival windspeeds are available. This allows the use of antennas in areas where extreme wind conditions are normal. The antennas utilise a conventional feed system and are available in three performance classes offering complete flexibility when designing a network. Standard Performance antennas are economical solutions for systems where side lobe suppression is of less importance. These antennas are required for use in networks where there is a low interference potential. Antennas are available in 2 ft (0.6m) to 12 ft (3.7m) diameters. Antennas from 4ft up to 12 ft (3.7m) can be equipped with a moulded radome to reduce wind load and to protect the feed against the accumulation of ice and snow.

Features/Benefits
• Field-proven reliability and long life
• Support for winds up to 200 km/h (125 mph) with high-wind versions that support winds up to 252 km/h (155 mph) and an optional sway bar for added assurance in case mistakes are made during installation
• A single-piece configuration and compact packaging to reduce transportation costs
• Frequencies ranging from 4 GHz to 15 GHz with support for two wideband frequency ranges (5.725-6.875 and 7.125-8.5 GHz) to reduce antenna requirements and simplify logistics

Technical Features

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Point to point antennas</th>
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<tr>
<td>Frequency, GHz</td>
<td>5.725 - 6.875</td>
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<tr>
<td>Diameter, ft (m)</td>
<td>6 (1.8)</td>
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<tr>
<td>Profile</td>
<td>TrunkLine</td>
</tr>
<tr>
<td>Reflector</td>
<td>1-part</td>
</tr>
<tr>
<td>Swaybar</td>
<td>1: (2.0 m x Ø60 mm)</td>
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<tr>
<td>optional Swaybar</td>
<td>1: SMA-SK-60-2000A (2.0 m x Ø60mm)</td>
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<td>Performance</td>
<td>Improved Performance</td>
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<tr>
<td>Polarization</td>
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<td>Regulatory Compliance</td>
<td>FCC Category A</td>
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<td>Antenna Input</td>
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<tr>
<td>High Band Gain, dBi</td>
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<td>Polarization Adjustment, degrees</td>
<td>± 5</td>
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<td>Radome</td>
<td>Optional</td>
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<tr>
<td>Mounting Pipe Diameter minimum, mm (in)</td>
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<tr>
<td>Mounting Pipe Diameter maximum, mm (in)</td>
<td>114 (4.5)</td>
</tr>
<tr>
<td>Approximate Weight, kg (lb)</td>
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<td>Survival Windspeed, km/h (mph)</td>
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</tr>
<tr>
<td>Operational Windspeed, km/h (mph)</td>
<td>190 (118)</td>
</tr>
<tr>
<td>Further Accessories</td>
<td>SMA-WK-6A : Wind Kit&lt; br /&gt;SMA-SKO-UNIVERSAL-L : Universal sway bar fixation kit</td>
</tr>
</tbody>
</table>

RFS The Clear Choice ®

PAD6-W57BC

Rev: A / 05. Apr 12
Print Date: 11.09.2014

Please visit us on the internet at http://www.rfsworld.com/
TrunkLine Antenna, Standard (FCC 101, Cat A) , Single Polarized, 6 ft

All values @ Survival Wind Speed

<table>
<thead>
<tr>
<th>Force</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>$F_{ST}$ Side force max, N (lb)</td>
<td>2910 (651)</td>
</tr>
<tr>
<td>$F_{AT}$ Axial force max, N (lb)</td>
<td>9900 (2217)</td>
</tr>
<tr>
<td>M Torque max., Nm (lb*ft)</td>
<td>3055 (2270)</td>
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Dimensions (mm (in))

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<th>Dimension</th>
<th>Value</th>
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<td>ØA</td>
<td>2000 (79)</td>
</tr>
<tr>
<td>B</td>
<td>364 (14.3)</td>
</tr>
<tr>
<td>C</td>
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</tr>
<tr>
<td>D @ Mounting pipe Ø 219 (8.5):</td>
<td>175 (6.9)</td>
</tr>
<tr>
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<td>D @ Mounting pipe Ø 89 (3.5):</td>
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</tr>
<tr>
<td>D @ Mounting pipe Ø 48 (1.9):</td>
<td>283 (11.1)</td>
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<tr>
<td>E</td>
<td>590 (23.2)</td>
</tr>
<tr>
<td>F</td>
<td>not applicable</td>
</tr>
<tr>
<td>G</td>
<td>not applicable</td>
</tr>
<tr>
<td>H</td>
<td>not applicable</td>
</tr>
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</table>

Notes
no notes

Documentation

Complete Antenna installation
RPE (IQ-Link format)
RPE (Pathloss format)
RPE (PDF format)
Product Description

RFS CompactLine® and CompactLine® Easy Antennas are designed for short-haul microwave systems in all common frequency ranges from 6 GHz to 80 GHz. They are typically deployed in dense urban areas, metropolitan and suburban locations, aggregation points. They are especially optimized to integrated radios to reduce costs, installation complexity and time.

Features/Benefits

- Sizes ranging from 0.3 m (1 ft) to 1.8 m (6 ft)
- Frequencies ranging from 5.925 GHz to 80 GHz with support for three wideband frequency ranges (5.925-7.125, 7.125-8.5 and 10.0-11.7 GHz) to reduce antenna requirements and simplify logistics
- Single (SB and SC) and dual-polarized (SBX and SCX) models with the ability to upgrade from single to dual polarization and change frequencies in the field
- Low-profile design to reduce transportation requirements, wind load and antenna weight
- Simplified mounting design to accelerate installation
- CompactLine EASY models are extra light and easy to transport, deploy and upgrade
- Hardcover radomes
- Tested and validated ultra-high (ETSI EN 302 217 Class 3, FCC Class A) electrical performance
- Support for winds up to 250 km/h (155 mph) and even 320 km/h (195 mph) for SB1/SBX1
- An optional sway bar for antennas 1 m (3 ft) and larger for added assurance in case mistakes are made during installation

Technical Features

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Point to point antennas</th>
</tr>
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<tbody>
<tr>
<td>Frequency, GHz</td>
<td>10 - 11.7</td>
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<td>Diameter, ft (m)</td>
<td>3 (0.9)</td>
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<tr>
<td>Profile</td>
<td>CompactLineEasy</td>
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<tr>
<td>Reflector</td>
<td>1-part</td>
</tr>
<tr>
<td>Swaybar</td>
<td>0: (not applicable)</td>
</tr>
<tr>
<td>optional Swaybar</td>
<td>1: SMA-SK-3 (1.00 m x Ø33 mm)</td>
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<tr>
<td>Performance</td>
<td>Ultra High</td>
</tr>
<tr>
<td>Polarization</td>
<td>Single</td>
</tr>
<tr>
<td>Regulatory Compliance</td>
<td>ETSI EN 302217 Range 1 Class 3, Brazil Anatel Class 2, Canada SRSP 310.5, FCC Category A</td>
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<tr>
<td>3 dB beamwidth, (degrees)</td>
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<td>Antenna Input</td>
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<td>Low Band Gain, dBi</td>
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<td>± 15</td>
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<td>SMA-SKO-UNIVERSAL : Universal sway bar fixation kit</td>
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CompactLine Easy Antenna, Ultra High Performance, Single Polarized, 3 ft

All values @ Survival Wind Speed

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Dimensions (mm (in))

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<td>C</td>
<td>56 (2.2)</td>
</tr>
<tr>
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<tr>
<td>D @ Mounting pipe Ø 114 (4.5)</td>
<td>392 (15.5)</td>
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<tr>
<td>D @ Mounting pipe Ø 89 (3.5)</td>
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<td>E</td>
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</tr>
<tr>
<td>F</td>
<td>182 (7)</td>
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<tr>
<td>G</td>
<td>not applicable</td>
</tr>
<tr>
<td>H</td>
<td>not applicable</td>
</tr>
</tbody>
</table>

Notes

no notes

Documentation

- Reflector Installation: RPE (10.55-10.88 GHz) (PDF format)
- Feed Installation: RPE (10.0-11.7 GHz) (Pathloss Format)
These industry leading PIM and PIP rated collinear arrays allow site operators to combine, with complete integrity, a large number of communications services into a single, low profile collinear antenna array.

The true corporate feed of these arrays maintains total pattern integrity over a very broad operating bandwidth, similar to that previously available only in exposed dipole configurations. This is now achieved in the preferred from factor of a fully enclosed fiberglass radome. The corporate collinears employ a unique corporate phasing system enabling precision control of the element placements ensuring phase purity resulting in exceptional bandwidth and electrical performance.

Gain is maximized and side lobes reduced dramatically. In a patented design approach the individual dipole elements including matching network are fabricated entirely of a flexible circuit board. The dipole elements are soldered to a brass support tube which is directly connected to the mounting tube and the lightning spike at the top of the antenna.

**Features:**
- 500W Continuous Power rating for CC807-11, CC807-08, CC807-06
- -150dBc Passive Intermodulation (PIM) rating
- 25kW Peak Instantaneous Power (PIP) rating
- Extraordinary bandwidth characteristics with superior pattern control
- DC grounding on all elements for the ultimate in lightning protection and dissipation of static noise
- Pre-set downtilt variations of 1, 3 and 5 degrees are available on CC807-08 & CC807-11 Models (see notes)

### Electrical

<table>
<thead>
<tr>
<th>Model Number</th>
<th>CC807-03</th>
<th>CC807-06</th>
<th>CC807-08</th>
<th>CC807-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Gain dBi (dBi)</td>
<td>3 (5.1)</td>
<td>6 (8.1)</td>
<td>8 (10.1)</td>
<td>10.5 (12.6)</td>
</tr>
<tr>
<td>Frequency MHz</td>
<td>746 - 870</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuned Bandwidth MHz</td>
<td>Full band</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VSWR (Return Loss)</td>
<td>&lt;1.5:1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal Impedance Ω</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical Beamwidth°</td>
<td>28</td>
<td>17</td>
<td>9</td>
<td>4.5</td>
</tr>
<tr>
<td>Horizontal Beamwidth°</td>
<td>Omni +/- 0.5dB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Power W</td>
<td>250</td>
<td>500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passive IM 3rd order (2x20W) dBc</td>
<td>-150</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak Instantaneous Power (kW)</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Mechanical

<table>
<thead>
<tr>
<th>Model Number</th>
<th>CC807-03</th>
<th>CC807-06</th>
<th>CC807-08</th>
<th>CC807-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>Composite fiberglass sky, blue radome, aluminum mounting tube</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length m</td>
<td>1.3</td>
<td>1.8</td>
<td>2.9</td>
<td>5.3</td>
</tr>
<tr>
<td>Radome Diameter mm</td>
<td>76</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight kg</td>
<td>4</td>
<td>7</td>
<td>12</td>
<td>22</td>
</tr>
<tr>
<td>Shipping Weight kg</td>
<td>8</td>
<td>11</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>Shipping Dimensions mm</td>
<td>H</td>
<td>139</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>139</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>1400</td>
<td>1900</td>
<td>3000</td>
<td>5600</td>
</tr>
<tr>
<td>Termination</td>
<td>7/16” DIN fixed female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suggested Clamps (not included)</td>
<td>2 x UC-114</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Invertible Mounting</td>
<td>Yes (1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Projected area cm²</td>
<td>no ice</td>
<td>806</td>
<td>1268</td>
<td>2320</td>
</tr>
<tr>
<td>with ice</td>
<td>1048</td>
<td>1571</td>
<td>2880</td>
<td>5760</td>
</tr>
<tr>
<td>Lateral Thrust @ 160km/h N</td>
<td>96</td>
<td>150</td>
<td>276</td>
<td>540</td>
</tr>
<tr>
<td>Wind Gust Rating km/h</td>
<td>240</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Torque @ 160km/h Nm</td>
<td>20</td>
<td>73</td>
<td>278</td>
<td>1032</td>
</tr>
</tbody>
</table>

(1) Downtilt versions can not be field inverted.

Note: Pre-set downtilt variations of 1, 3 and 5 degrees are available in the following models CC807-08, CC807-11. Simply add .-T1, .-T3 or .-T5 at the end of the model being ordered. E.g. CC807-08-T3, CC807-11-T3.

USA Patent: 7,365,698, and Australian Patent: 2005904524

Copyright RF Industries Pty Ltd 2013. Subject to change without notice.
This range of Meander™ collinear antennas have been specifically designed for VHF applications requiring high performance, strong bandwidth and exceptional PIM specifications.

The patented Meander™ collinear element design allows multiple half wave elements to be stacked without the variations in cable lengths and mechanical joints which have typified the construction techniques in high gain collinear antennas. With each dipole element being printed on a single sided PCB the susceptibility to passive intermodulation is practically eliminated. Placing the elements on a board not only controls PIM but also removes manufacturing variations so that each and every antenna will provide the same pattern, tilt and VSWR characteristics over its operating bandwidth. Consistency is guaranteed and a cost effective, reliable, high performance, low PIM antenna results.

The radome and mounting tube support this high performance antenna in a truly rugged package. Everything about these Meander™ collinears reflects the new demand for unquestioned performance electrically and physically in the most demanding public safety and industrial applications, where nothing can be left to chance.

The antenna has set frequency bands with the common bands generally available in stock.

- Strong Bandwidth
- Internally DC grounded for lightning protection and reduction of precipitation noise
- Tightly controlled radiation patterns for optimum coverage
- Patented PCB design for optimum RF pattern stability
- Full band coverage
- **Industry leading PIM ratings (-150dBc) providing low IM and low noise characteristics for optimum performance.**

USA Patent: 6909403B  
European Patent: 1411588  
Australian Patent: 2003255049  
China 200310100548.5 / India 844/CHE/2003
COL54 Series
VHF Meander™ Collinear
145-174 MHz

**Electrical Specifications**

<table>
<thead>
<tr>
<th>Model Number</th>
<th>COL54-155</th>
<th>COL54-160</th>
<th>COL54-166</th>
<th>COL54-174</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Gain (dBi)</td>
<td>6 (8.1)</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Frequency MHz</td>
<td>145 - 155</td>
<td>150 - 160</td>
<td>156 - 166</td>
<td>162 - 174</td>
</tr>
<tr>
<td>Tuned Bandwidth MHz</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>VSWR</td>
<td>&lt;1.5:1</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Vertical Beamwidth°</td>
<td>17</td>
<td>17</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Horizontal Beamwidth°</td>
<td>Omni +/- 0.5dB</td>
<td>Omni +/- 0.5dB</td>
<td>Omni +/- 0.5dB</td>
<td>Omni +/- 0.5dB</td>
</tr>
<tr>
<td>Input Power Watts</td>
<td>400</td>
<td>350</td>
<td>350</td>
<td>350</td>
</tr>
<tr>
<td>Passive IM 3rd order (2x20W) dBc</td>
<td>-150</td>
<td>-150</td>
<td>-150</td>
<td>-150</td>
</tr>
<tr>
<td>Peak Instantaneous Power kW</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
</tbody>
</table>

**Mechanical Specifications**

<table>
<thead>
<tr>
<th>Model Number</th>
<th>COL54-155</th>
<th>COL54-160</th>
<th>COL54-166</th>
<th>COL54-174</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>Composite fiberglass sky blue radome, aluminum mounting tube</td>
<td>Composite fiberglass sky blue radome, aluminum mounting tube</td>
<td>Composite fiberglass sky blue radome, aluminum mounting tube</td>
<td>Composite fiberglass sky blue radome, aluminum mounting tube</td>
</tr>
<tr>
<td>Length inches</td>
<td>260</td>
<td>256</td>
<td>249</td>
<td>239</td>
</tr>
<tr>
<td>Radome Diameter inches</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Weight lbs</td>
<td>50.7</td>
<td>46</td>
<td>44</td>
<td>42</td>
</tr>
<tr>
<td>Shipping Weight lbs</td>
<td>66.2</td>
<td>99</td>
<td>97</td>
<td>95</td>
</tr>
<tr>
<td>Shipping Dimensions H inches</td>
<td>5.9</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>W inches</td>
<td>5.9</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>L inches</td>
<td>275.6</td>
<td>261</td>
<td>256</td>
</tr>
<tr>
<td>Termination</td>
<td>Bulkhead mounted 7/16 DIN</td>
<td>Bulkhead mounted 7/16 DIN</td>
<td>Bulkhead mounted 7/16 DIN</td>
<td>Bulkhead mounted 7/16 DIN</td>
</tr>
<tr>
<td>Mounting Area inches</td>
<td>30&quot; x 3.5&quot; diam. aluminum</td>
<td>30&quot; x 3.5&quot; diam. aluminum</td>
<td>30&quot; x 3.5&quot; diam. aluminum</td>
<td>30&quot; x 3.5&quot; diam. aluminum</td>
</tr>
<tr>
<td>Suggested Clamps (not included)</td>
<td>UC1143</td>
<td>UC1143</td>
<td>UC1143</td>
<td>UC1143</td>
</tr>
<tr>
<td>Projected area if°</td>
<td>No ice</td>
<td>6.4</td>
<td>6.3</td>
<td>6.1</td>
</tr>
<tr>
<td></td>
<td>with ice</td>
<td>8.0</td>
<td>7.9</td>
<td>7.7</td>
</tr>
<tr>
<td>Lateral (Thrust) @ 100mph lbs</td>
<td>157</td>
<td>155</td>
<td>151</td>
<td>145</td>
</tr>
<tr>
<td>Wind Gust Rating mph</td>
<td>135</td>
<td>135</td>
<td>135</td>
<td>135</td>
</tr>
<tr>
<td>Torque @ 100mph lbs</td>
<td>1524</td>
<td>1296</td>
<td>1212</td>
<td>1105</td>
</tr>
</tbody>
</table>

**Typical VSWR Response (COL54-166)**

**COL54-160 - E Plane**
Product Specifications

**DB224-E**
1-port omni exposed dipole antenna, 138–150 MHz, 360° HPBW, fixed electrical tilt
- Broad response
- Two-piece mast for ease of shipping

### Electrical Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Band, MHz</td>
<td>138–150</td>
</tr>
<tr>
<td>Gain, dBi</td>
<td>8.1</td>
</tr>
<tr>
<td>Beamwidth, Horizontal, degrees</td>
<td>360</td>
</tr>
<tr>
<td>Beamwidth, Vertical, degrees</td>
<td>16.0</td>
</tr>
<tr>
<td>Beam Tilt, degrees</td>
<td>0</td>
</tr>
<tr>
<td>VSWR</td>
<td>Return Loss, dB</td>
</tr>
<tr>
<td>Input Power per Port, maximum, watts</td>
<td>500</td>
</tr>
<tr>
<td>Polarization</td>
<td>Vertical</td>
</tr>
<tr>
<td>Impedance</td>
<td>50 ohm</td>
</tr>
</tbody>
</table>

### Electrical Specifications, BASTA*

*CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper Time to Raise the Bar on BSAs.

### General Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Frequency Band</td>
<td>138–150 MHz</td>
</tr>
<tr>
<td>Antenna Type</td>
<td>Omni</td>
</tr>
<tr>
<td>Band</td>
<td>Single band</td>
</tr>
<tr>
<td>Performance Note</td>
<td>Outdoor usage</td>
</tr>
</tbody>
</table>

### Mechanical Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF Connector Quantity, total</td>
<td>1</td>
</tr>
<tr>
<td>RF Connector Quantity, low band</td>
<td>1</td>
</tr>
<tr>
<td>RF Connector Interface</td>
<td>N Male</td>
</tr>
<tr>
<td>Color</td>
<td>Silver</td>
</tr>
<tr>
<td>Grounding Type</td>
<td>RF connector inner conductor and body grounded to reflector and mounting bracket</td>
</tr>
<tr>
<td>Radiator Material</td>
<td>Aluminum</td>
</tr>
<tr>
<td>RF Connector Location</td>
<td>Bottom</td>
</tr>
<tr>
<td>Wind Loading, maximum</td>
<td>560.5 N @ 100 mph</td>
</tr>
<tr>
<td>Wind Speed, maximum</td>
<td>130 km/h</td>
</tr>
</tbody>
</table>

### Dimensions

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June 15, 2018
Product Specifications

D8224E

Length 6858.0 mm | 270.0 in
Net Weight, without mounting kit 17.2 kg | 37.9 lb

Regulatory Compliance/Certifications

Agency
RoHS 2011/65/EU
China RoHS SJ/T 11364-2006
ISO 9001:2008

Classification
Compliant by Exemption
Above Maximum Concentration Value (MCV)
Designed, manufactured and/or distributed under this quality management system

Included Products

DB365-OS — Pipe Mounting Kit that consists of two clamps for mounting antennas to round members 1.25 - 3.5 in (35 - 89 mm) OD round members.

* Footnotes
Performance Note Severe environmental conditions may degrade optimum performance
General Description

CIW Antenna Standoffs are a heavy duty, one-piece welded design constructed of schedule 40 galvanized steel. There is a solid 3/4” reinforcement rod running diagonal. Turning ring on the HS6 allows the bracket to rotate into tower face for service. Mounting clamps are sold separately. *Load ratings (below) are determined in accordance with TIA-EIA-222-G, Florida Building Code 2007, and A.S.C.E. 7-10.

Product Specifications

<table>
<thead>
<tr>
<th>Material</th>
<th>Galvanized Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standoff</td>
<td>6’</td>
</tr>
<tr>
<td>Vertical Pipe Length</td>
<td>42-1/2”</td>
</tr>
<tr>
<td>Pipe Construction</td>
<td>2-3/8” OD</td>
</tr>
<tr>
<td>Max Combined Load Weight</td>
<td>125 lbs</td>
</tr>
<tr>
<td>Max Combined Load Force (P.A.)</td>
<td>435 lbs</td>
</tr>
<tr>
<td>Max Combined Load Area at 140MPH (3 Sec. Gusts)</td>
<td>1,258 Square Inches (P 0.348 lbs/IN2)</td>
</tr>
<tr>
<td>Max Combined Load Area at 150MPH (3 Sec. Gusts)</td>
<td>1,094 lbs (P 0.400 lbs/IN2)</td>
</tr>
<tr>
<td>Max Projected Assembly Area</td>
<td>120 Square Inches (EPAT)</td>
</tr>
<tr>
<td>Max Normal Projected Assembly Area</td>
<td>684 Square Inches (EPAN)</td>
</tr>
<tr>
<td>Weight</td>
<td>115 lbs</td>
</tr>
</tbody>
</table>
COMPANY PROFILE

With over 20 years in the wireless communications industry, Connect-It Wireless is a leading manufacturer and supplier of wireless site hardware. All items are stocked and ready to ship from our Jupiter, Florida location.

Call today and let us customize a kit just for you. We’ll kit your sites per order!

CONNECT-IT WIRELESS IS THE STANDARD FOR YOUR WIRELESS SITE NEEDS.

QUALITY AS A STANDARD

— Same Day Shipping (on 99% of Orders)
— Engineered to Revision G Standards
— Manufactured by our certified fabricators
— Triple inspected to meet our stringent quality expectations
— All applicable safety items meet ANSI Z359, 3600 lb gate
— Technical assistance is available to help you determine what your site needs are
— Connect-It Wireless mounts are engineered to TIA-EIA-222-G standards, with that engineering available free of charge
— Experienced professionals offer the best customer service in the industry
— Site kitting is available
— Connect-It Wireless will design a custom Bill of Materials for ongoing projects to simplify ordering
— Freight is quick and economical

PRODUCT LINE

3M Fiber Accessories
Bolt & Gear Bags
Building & Wall Applications
Chemicals
Coax
Coax & Fiber Accessories
Connectors & Tools
Crossover Plates
Fall Protection
GPS Applications
General Hardware
Grounding
Jumpers
Monopole Applications
Pipe to Pipe Clamps
Rooftop Applications
Safety Equipment
Strut and Strut Hardware
Tools
Tower Applications
Tower Mod Steel
Water Tank Applications
Waveguide Bridge
Weatherproofing
Custom Fabrication

Connect-It Wireless
210 Commerce Way
Jupiter, Florida 33458
Toll Free (866) 781-1300
www.ciwireless.com
**Product Description**

FLEXWELL® elliptical waveguide is constructed of longitudinally continuous seam welded, highly conductive copper tube, corrugated and precision formed into an elliptical cross section. It is manufactured in continuous lengths using a special seam welding process developed by the RFS organization.

The corrugation design achieves high transverse stability, flexibility and crush strength for superior handling and forming at an installation. The inherent strength and flexibility of FLEXWELL waveguide allows on location, a continuous length of waveguide to be run directly from a tower-mounted antenna to the equipment building, eliminating flange joint discontinuities and the use of bends, twists and flex sections associated with a rigid rectangular waveguide system. Because of its flexibility, FLEXWELL elliptical waveguide can be easily transported to an installation site in coils or on reels and then uncoiled as required during installation.

FLEXWELL elliptical waveguide has set an industry standard for excellent electrical performance. Each waveguide has been carefully designed for low loss and low VSWR in specific frequency bands. For optimum system performance, there is no substitute for FLEXWELL waveguide.

As part of the RFS manufacturing process, all elliptical waveguides undergo several different electrical tests. Prior to shipping, every length is 100% tested again for input VSWR, and undergoes a twenty-four hour pressure test. This additional testing is performed to guarantee conformance with published specifications and to avoid any problems in the field.

A FLEXWELL elliptical waveguide feeder requires less planning and reduces installation costs when compared to a feeder system using a rigid rectangular waveguide. FLEXWELL waveguide is available cut to length with factory attached connectors or in continuous lengths for termination in the field.

**Features/Benefits**

**Technical Specifications**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Typical Operating Band, GHz</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimension over Jacket, mm (in)</td>
<td>10.0 - 11.7</td>
<td>Standard</td>
</tr>
<tr>
<td>Weight, kg/m (lb/ft)</td>
<td>33 x 20 (1.3 x 0.8)</td>
<td></td>
</tr>
<tr>
<td>Maximum Bending Radius E Plane, without rebending, mm (in)</td>
<td>780 (12)</td>
<td>(2)</td>
</tr>
<tr>
<td>Minimum Bending Radius H Plane, without rebending, mm (in)</td>
<td>280 (11)</td>
<td>(1)</td>
</tr>
<tr>
<td>Minimum Bending Radius E Plane, with rebending, mm (in)</td>
<td>150 (6)</td>
<td>(7)</td>
</tr>
<tr>
<td>Minimum Bending Radius H Plane, with rebending, mm (in)</td>
<td>300 (12)</td>
<td>(11)</td>
</tr>
<tr>
<td>Maximum Twist, degree/m (degree/ft)</td>
<td>6 (1.8)</td>
<td>(6)</td>
</tr>
<tr>
<td>Max. Operating Pressure, bar (psi)</td>
<td>0.5 (7)</td>
<td>(5)</td>
</tr>
<tr>
<td>Max. Pulling Length per Hoisting Grip, m (ft)</td>
<td>100 (305)</td>
<td>(7)</td>
</tr>
<tr>
<td>Standard Hanger Spacing, m (ft)</td>
<td>0.6 (2)</td>
<td>(2)</td>
</tr>
<tr>
<td>Recommended Installation Temperature Range, °C (°F)</td>
<td>-40 to +60 (-40 to +140)</td>
<td>(1)</td>
</tr>
<tr>
<td>Max. VSWR / Return Loss, dB</td>
<td>1.15 / 23.1</td>
<td>(1)</td>
</tr>
<tr>
<td>Cut-off Frequency, GHz</td>
<td>6.49</td>
<td>(1)</td>
</tr>
</tbody>
</table>

**Notes**

VSWR values include connectors and are valid for frequency band of connectors.

Max. Operating Band: 8.10 - 11.70 GHz

**Other Documentation**
### FLEXWELL® Standard Elliptical Waveguide

**Product Data Sheet**

**E105**

#### Attenuation, Average Power, Group Velocity, Group Delay

<table>
<thead>
<tr>
<th>Frequency (GHz)</th>
<th>Attenuation (dB/km)</th>
<th>Avg. Pow. (W)</th>
<th>Group Vel. (m/s)</th>
<th>Group Delay (ns/km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.30</td>
<td>9.46 (2.96)</td>
<td>1.72</td>
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</tbody>
</table>

For attenuation: VSWR 1.8, ambient temperature 20°C (68°F). For average power: VSWR 1.8 and 45°C (113°F) temperature rise over 40°C (104°F) ambient.

Attenuation, Average Power, Group Velocity, Group Delay
Product Description

FLEXWELL® elliptical waveguide is constructed of longitudinally continuous seam welded, highly conductive copper tube, corrugated and precision formed into an elliptical cross section. It is manufactured in continuous lengths using a special seam welding process developed by the RFS organization.

The corrugation design achieves high transverse stability, flexibility and crush strength for superior handling and forming at an installation. The inherent strength and flexibility of FLEXWELL waveguide allows on location, a continuous length of waveguide to be run directly from a tower-mounted antenna to the equipment building, eliminating flange joint discontinuities and the use of bends, twists and flex sections associated with a rigid rectangular waveguide system. Because of its flexibility, FLEXWELL elliptical waveguide can be easily transported to an installation site in coils or on reels and then uncoiled as required during installation.

FLEXWELL elliptical waveguide has set an industry standard for excellent electrical performance. Each waveguide has been carefully designed for low loss and low VSWR in specific frequency bands. For optimum system performance, there is no substitute for FLEXWELL waveguide.

As part of the RFS manufacturing process, all elliptical waveguides undergo several different electrical tests. Prior to shipping, every length is 100% tested again for input VSWR, and undergoes a twenty-four hour pressure test. This additional testing is performed to guarantee conformance with published specifications and to avoid any problems in the field.

A FLEXWELL elliptical waveguide feeder requires less planning and reduces installation costs when compared to a feeder system using a rigid rectangular waveguide. FLEXWELL waveguide is available cut to length with factory attached connectors or in continuous lengths for termination in the field.

Features/Benefits

Technical Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical Operating Band, GHz</td>
<td>5.9 - 7.125</td>
</tr>
<tr>
<td>Performance</td>
<td>Standard</td>
</tr>
<tr>
<td>Dimension over Jacket, mm (in)</td>
<td>51 x 30 (2.0 x 1.2)</td>
</tr>
<tr>
<td>Weight, kg/m (lb/ft)</td>
<td>0.75 (0.50)</td>
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<tr>
<td>Minimum Bending Radius E Plane, without rebending, mm (in)</td>
<td>200 (8)</td>
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<td>Minimum Bending Radius H Plane, without rebending, mm (in)</td>
<td>500 (20)</td>
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<tr>
<td>Minimum Bending Radius E Plane, with rebending, mm (in)</td>
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<tr>
<td>Minimum Bending Radius H Plane, with rebending, mm (in)</td>
<td>600 (24)</td>
</tr>
<tr>
<td>Maximum Twist, degree/m (degree/ft)</td>
<td>5 (1.5)</td>
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<tr>
<td>Max. Operating Pressure, bar (psi)</td>
<td>0.5 (7)</td>
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<tr>
<td>Max. Pulling Length per Hoisting Grip, m (ft)</td>
<td>100 (305)</td>
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<tr>
<td>Standard Hanger Spacing, m (ft)</td>
<td>0.9 (3)</td>
</tr>
<tr>
<td>Recommended Installation Temperature Range, °C (°F)</td>
<td>-40 to +60 (-40 to +140)</td>
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<tr>
<td>Max. VSWR / Return Loss, dB</td>
<td>1.15 / 23.1</td>
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<tr>
<td>Cut-off Frequency, GHz</td>
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</tbody>
</table>

Notes

VSWR values include connectors and are valid for frequency band of connectors.

Max. Operating Band: 5.00 - 7.125 GHz

Other Documentation
## E65/E06
### ATTENUATION, AVERAGE POWER, GROUP VELOCITY, GROUP DELAY

<table>
<thead>
<tr>
<th>Frequency GHz</th>
<th>Attenuation dB / 100 m (f)</th>
<th>Ave. Power kW</th>
<th>Group Vel. %c</th>
<th>Group Delay ns/100 m (f)</th>
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</tbody>
</table>

For attenuation: VSWM 1.5, ambient temperature 20°C (68°F).

For average power: VSWM 1.4, and 42°C (108°F) temperature der over 48°C (118°F) ambient.

Attenuation, Average Power, Group Velocity, Group Delay