

03/20/26

RFP F-FY26-001  
DSS Generator Installation



Beaufort County DSS Generator Installation

Request for Proposals (RFP)

Issue Date: March 20, 2026

Issued by: Beaufort County, North Carolina

Prepared by: MBP/CATE Services (Owner's Representative); Engineering Source of  
NC, P.A. (Engineer)

# Request For Proposal (RFP)

## Beaufort County DSS Generator Installation

**Issue Date:** March 20, 2026

**Issued By:** Beaufort County, North Carolina

**Owner's Representative:** MBP / CATE Services & Construction

**Engineer:** Engineering Source of NC, P.A.

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### 1. PROJECT INFORMATION

Beaufort County is soliciting **sealed bids** from qualified, licensed contractors for the installation of a standby generator system at:

**Beaufort County Department of Social Services**

632 W. 5th Street

Washington, NC 27889

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### 2. BID SCHEDULE

Event	Date
RFP Release	March 20, 2026
Pre-Bid Meeting (Non-Mandatory)	March 27, 2026 @ 10:00 AM
Questions Due	April 2, 2026 @ 5:00 PM
Final Addendum Issued	April 9, 2026
Bid Due / Opening	April 14, 2026 @ 3:00 PM

**Pre-Bid Location:** Beaufort County DSS, 632 W. 5th Street, AVC Room, Washington, NC 27889

Attendance is not mandatory but strongly recommended.

**Public Bid Opening Location:** Beaufort County Commissioner's Room at 136 West 2<sup>nd</sup> Street Washington, NC 27889

**Addenda:** No addenda will be issued less than seventy-two (72) hours prior to bid opening.

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### 3. PROPOSAL SUBMISSION REQUIREMENTS

Sealed proposals will be received until the stated time at:

**Beaufort County Administration Building**

Beaufort County Commissioner’s Room at 136 West 2<sup>nd</sup> Street Washington, NC 27889

- Proposals must be submitted in sealed hard-copy format
  - Clearly labeled: “PROPOSAL ENCLOSED – RFP-F-FY26-001 -DSS GENERATOR INSTALLATION”
  - Late proposal will not be accepted
  - Electronic submissions will not be accepted
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### 4. PROPOSAL SUBMISSION CHECKLIST

Bidders shall ensure the following items are included:

- Signed Proposal Form
- 5% Bid Bond
- Addenda Acknowledgment
- Non-Collusion Affidavit
- E-Verify Affidavit
- Contractor License Certification

Failure to include required items may result in rejection of the proposal.

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### Contractor Acknowledgment of Proposal Submission Requirements

By signing below, the Contractor certifies that all required proposal documents are included and complete.

Contractor Name: \_\_\_\_\_

Authorized Representative (Print): \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

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## 5. SCOPE OF WORK

Contractor shall furnish all labor, materials, equipment, supervision, permits, and coordination necessary to provide a complete and operational standby generator system, including but not limited to:

- Generator and automatic transfer switch (ATS)
  - Concrete equipment pad
  - Conduit, duct bank, and feeders
  - Grounding and bonding
  - Control wiring
  - Utility coordination
  - Startup, testing, and commissioning
- 

## 6. PROJECT CLARIFICATIONS

- No outages permitted during DSS business hours
  - Contractor responsible for coordination with City of Washington Electric
  - Generator shall serve entire facility
  - Fence shall match existing chain link fence
  - Contractor responsible for utility verification
  - Trenching must meet code separation requirements
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## 7. CONTRACT TIME

- Notice to Proceed: Anticipated April 2026
  - Substantial Completion: 120 calendar days from generator delivery
  - Liquidated Damages: \$250 per day after Substantial Completion date
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## 8. BONDS

- Bid Bond: 5% of bid amount
  - Performance Bond: 100% of contract value
  - Payment Bond: 100% of contract value
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## 9. INSURANCE REQUIREMENTS

Contractor shall provide certificates of insurance including:

- General Liability: \$1,000,000 per occurrence

- Automobile Liability: \$1,000,000 per occurrence
- Workers Compensation: Statutory limits

Beaufort County shall be listed as additional insured.

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## 10. BID VALIDITY AND WITHDRAWAL

- Proposal shall remain valid for sixty (60) days after bid opening
  - Proposals may not be withdrawn during this period
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## 11. AWARD

Award will be made to the lowest responsive, responsible bidder in accordance with North Carolina public contracting laws.

Beaufort County reserves the right to reject any or all proposals, waive informalities, and accept the bid deemed in its best interest.

## 11A. MINORITY AND WOMEN-OWNED BUSINESS PARTICIPATION

Minority-owned and women-owned businesses are strongly encouraged to submit proposals and participate in this project. Bidders are encouraged to utilize qualified MWBE firms where feasible.

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## 12. QUESTIONS

All questions must be submitted in writing to:

Rodney Renix  
rdrenix@catesvc.com

Subject Line: "F-FY26-001 – Questions"

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## 13. PUBLIC BID OPENING

Proposals will be publicly opened and read aloud at the Beaufort County Administration Building at the stated date and time.

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## 14. APPLICABLE DOCUMENTS

The following documents are part of this solicitation and contract:

- Drawings dated February 27, 2026 (E001–E101)
- Division 1 – General Requirements
- Division 2 – Earthwork
- Division 3 – Concrete
- Division 16 – Electrical Specifications

Attachments A–F are included and must be completed and submitted.

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## 15. GENERAL CONDITIONS

All work shall comply with applicable North Carolina General Statutes and Beaufort County procurement policies.

# ATTACHMENTS

## ATTACHMENT A – PROPOSAL FORM

Project: Beaufort County DSS Generator Installation

Bidder Name: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip: \_\_\_\_\_

Phone: \_\_\_\_\_ Email: \_\_\_\_\_

NC Contractor License #: \_\_\_\_\_

Lump Sum Base Bid: \$\_\_\_\_\_

The undersigned agrees to furnish all labor, materials, equipment, and services required to complete the Work in accordance with the Contract Documents.

Authorized Signature: \_\_\_\_\_

Name & Title: \_\_\_\_\_

Date: \_\_\_\_\_

Failure to execute this Proposal Form in full may result in rejection of the bid.

## ATTACHMENT B – ADDENDA ACKNOWLEDGMENT

The Bidder acknowledges receipt of the following Addenda:

Addendum No. \_\_\_\_\_ Date: \_\_\_\_\_

Addendum No. \_\_\_\_\_ Date: \_\_\_\_\_

Addendum No. \_\_\_\_\_ Date: \_\_\_\_\_

Authorized Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## ATTACHMENT C – NON-COLLUSION AFFIDAVIT

State of \_\_\_\_\_

County of \_\_\_\_\_

The undersigned certifies that this bid is made without prior understanding, agreement, or connection with any corporation, firm, or person submitting a bid for the same project.

Authorized Signature: \_\_\_\_\_

Name & Title: \_\_\_\_\_

Date: \_\_\_\_\_

Notary Public: \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

## ATTACHMENT D – E-VERIFY AFFIDAVIT

The undersigned Contractor certifies compliance with Article 2 of Chapter 64 of the North Carolina General Statutes.

Firm Name: \_\_\_\_\_

Authorized Signature: \_\_\_\_\_

Name & Title: \_\_\_\_\_

Date: \_\_\_\_\_

Notary Public: \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

### ATTACHMENT E – BID BOND (5%)

KNOW ALL MEN BY THESE PRESENTS, that we are bound unto Beaufort County in the sum of five percent (5%) of the total bid amount.

Principal: \_\_\_\_\_

Surety: \_\_\_\_\_

Authorized Signature (Principal): \_\_\_\_\_

Authorized Signature (Surety): \_\_\_\_\_

Date: \_\_\_\_\_

## ATTACHMENT F – CONTRACTOR LICENSE CERTIFICATION

The undersigned certifies that they hold a valid North Carolina Contractor License.

Contractor Name: \_\_\_\_\_

License Number: \_\_\_\_\_

Classification: \_\_\_\_\_

Authorized Signature: \_\_\_\_\_

Date: \_\_\_\_\_

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**END OF DOCUMENT**

## **DIVISION 1 GENERAL REQUIREMENTS**

### **SECTION 01000 ADMINISTRATIVE AND PROCEDURAL REQUIREMENTS**

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#### **RELATED DOCUMENTS**

Drawings and general provisions of the Contract, including Division 0 and Supplementary Conditions, apply to the work of this Section.

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#### **SUMMARY OF WORK**

- A. The work under this Contract includes all labor, materials, equipment, and services necessary to complete the **Beaufort County DSS Generator Addition**, located at **632 W. 5th Street, Washington, NC 27889**.
  - B. The Contractor shall coordinate with the **Owner's Representative (MBP/CATE Services)** and the **Engineer (Engineering Source of NC, P.A.)** to ensure all work conforms to approved drawings and specifications.
  - C. Work shall include coordination of all trades, project scheduling, submittals, and adherence to the schedule approved by the Owner's Representative.
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#### **ADMINISTRATIVE REQUIREMENTS**

- A. Conduct progress meetings bi-weekly, or as directed by the Owner's Representative. Prepare and distribute minutes to all participants.
  - B. Submit Requests for Information (RFIs) and Submittals through the Owner's Representative using approved electronic forms or the designated project platform.
  - C. Maintain an updated construction schedule. Submit schedule updates with each pay application showing current progress versus baseline.
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#### **SUBMITTALS**

- A. Provide shop drawings, product data, and samples as required by the technical sections and this Division.
  - B. Submit record drawings, operation & maintenance manuals, warranties, and test certificates prior to final acceptance.
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#### **QUALITY ASSURANCE**

- A. All work shall comply with applicable codes and standards, including the latest editions of the **North Carolina Building Code** and the **National Electrical Code (NEC 2005 or later)**.
- B. Employ only qualified, licensed subcontractors and skilled tradesmen for each discipline.

C. Hold pre-installation meetings as directed by the Owner's Representative to coordinate work between trades.

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#### **TEMPORARY FACILITIES AND CONTROLS**

- A. Provide temporary power, water, lighting, and sanitation as required to perform the work.
  - B. Maintain the project site in a clean, safe, and orderly condition at all times.
  - C. Comply with OSHA and all applicable state and local safety regulations.
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#### **EXECUTION REQUIREMENTS**

- A. Coordinate all work to prevent interference between trades. Review drawings and specifications before starting any work.
  - B. Protect existing structures, utilities, and landscaping from damage due to construction operations.
  - C. Perform cutting, patching, and finishing necessary to complete the project in a professional manner acceptable to the Owner's Representative.
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#### **CLOSEOUT PROCEDURES**

- A. Prepare a final punch list for review by the Owner's Representative and Engineer.
  - B. Submit a final pay application including lien waivers, warranties, and closeout documents.
  - C. Conduct a final walkthrough with the Owner's Representative and Engineer to verify substantial and final completion.
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#### **PAYMENT APPLICATIONS AND ADMINISTRATION**

- A. Submit monthly progress payment applications using **AIA Forms G702/G703** or the County's approved equivalent.
  - B. Retainage shall be withheld in accordance with the Contract until final acceptance and delivery of all closeout materials.
  - C. Payment for stored materials off-site will not be approved without written authorization from the Owner's Representative.
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#### **END OF SECTION**

**RELATED DOCUMENTS:**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

**PART 1: GENERAL**

**DESCRIPTION OF WORK:**

Work of this Section shall include furnishing all labor and materials required to provide all cast-in-place concrete scheduled on Drawings and as specified in this Section.

Related Work Specified Elsewhere:

Concrete Formwork (Section 03100)  
Concrete Reinforcement (Section 03300)

**INDUSTRY STANDARDS:**

For listing of names of industry standard agencies mentioned by abbreviation in this section refer to Industry Standards Index in Division 1.

LEED NC, U. S. Green Building Council

**DELIVERY AND PROTECTION OF MATERIALS:**

Store cement in weather tight structure with floor at least 12 inches off ground, and accessible for inspection in original packages.

Store fine and coarse aggregate separately. Segregate sizes and avoid getting dirt and foreign materials in concrete.

Deliver ready-mixed concrete in compliance with requirements set forth in ASTM C 94.

Provide documentation of LEED credits requirements for use of local regional materials.

**SEVERE-WEATHER PROVISIONS:**

Cold-Weather Concreting: (In accordance with ACI 306 and as follows):

Provide adequate equipment for heating concrete materials and protecting concrete during freezing or near-freezing weather. Do not use frozen materials, or materials containing ice.

All concrete materials and all reinforcement, forms, fillers, and around which concrete is in contact shall be free from frost.

Whenever temperature of surrounding air is below 40 degrees F., all concrete shall have temperature between 70 degrees and 80 degrees F. Provide adequate means for maintaining temperature not less than 70 degrees F. for three days, or 50 degrees F. for five days, or for as much more time as is necessary to insure curing of concrete.

Use no salt or other chemicals to prevent freezing.

Housing, covering, or other protection used in connection with curing shall remain in place, intact, at least 24 hours after artificial heat is discontinued.

Hot Weather Concreting: (In accordance with ACI 305 and as follows):

Provide adequate methods of lowering temperature of concrete ingredients so that temperature of concrete when placed does not exceed 90 degrees F.

When weather is such as to raise concrete temperature, as placed, consistently above 80 degrees F., use approved retarder.

Sprinkle all subgrade and forms with water before placing concrete. Remove all excess water before placing concrete.

Start curing as soon as practicable to prevent evaporation of water and keep forms wet. Protect flat work from dry wind, direct sun, and high temperatures.

## **PART 2: PRODUCTS**

### **CEMENT:**

Cement shall be standard portland cement of United States manufacture, conforming to ASTM C 150, Type I or Type III. Only one brand of commercial portland cement shall be used. Each bag shall weigh approximately 94 pounds and contain one cubic foot.

### **CONCRETE AGGREGATES:**

Fine Aggregate: Washed sand having clean, hard, durable, uncoated grains, free from harmful substances conforming to ASTM C 33.

Coarse Aggregate for standard-weight concrete: crushed stone, gravel, or other approved inert material having clean, hard, durable uncoated particles conforming to ASTM C 33. Maximum size, in accordance with ACI 318.

Lightweight Coarse Aggregate shall conform to ASTM C 330. Lightweight aggregate shall be expanded shale or slate. Maximum size of aggregate shall be of 3/4".

### **WATER:**

Clean and free from harmful amounts of acids, alkalis, or organic materials. No water shall be added at the site unless delivered, documented, and approved by the batch plant and testing agency.

### **VAPOR BARRIER:**

Vapor barrier under floor slabs on earth shall be puncture resistant polyethylene sheet not less than 15 mils thick, with permeance of less than 0.01 perms per ASTM F 1249 or ASTM E 96, and in compliance with ASTM E 1745 Class A and ACI 302. Accessories would include seam tape and vapor proofing mastic with permeance less than 0.03 perms. Provide pipe boots constructed from vapor barrier material, pressure sensitive tape and/or mastic per manufacturer's instructions.

### **EXPANSION JOINT MATERIALS:**

Expansion joint material shall be asphalt-impregnated fiber strips, 1/2" thick, unless otherwise shown or noted: Flexcell by Celotex Corporation, Sealtight by W. R. Meadows, Inc., Joint Filler by Serviced Products Corporation, or approved equal.

**ADMIXTURES:**

Water Reducing Admixture: ASTM C 494, Type A, and contain no chloride ions.

Air Entraining Admixture: ASTM C 60 for slabs permanently exposed to weather. No air entraining admixture is to be used for concrete not exposed to weather. Air content is to be confirmed by lab tests for both air entrained and non-air entrained mixes.

**CLASS OF CONCRETE:**

f'c minimum 4000 psi, maximum 150 pcf (regular weight) for exposed exterior concrete.

f'c minimum 3000 psi, maximum 150 pcf (regular weight).

f'c minimum 3000 psi, maximum 120 pcf (light weight-for use in elevated slabs).

f'c minimum 3000 psi, maximum 150 pcf (regular weight pea gravel) high slump mix for concrete masonry fill.

**MIX DESIGNS:**

Contractor shall select a testing laboratory acceptable to Architect to verify mixes of all classes of concrete.

Contractor shall submit samples in adequate quantities for each mix verification, of all concrete materials to be used on project to designated testing laboratory.

Laboratory shall be engaged by and paid by the contractor out of the material testing allowance.

Submit four (4) copies of all mix design, aggregate test results, and compression test results to Architect prior to use on the job.

**PLANT MIXING:**

Proportioning Concrete:

Stresses for design of this structure are based on specified minimum 28-day compressive strength of concrete. Proportions shall be in compliance with approved design mix for each class of concrete.

Batching:

Ready-mixed concrete shall be mixed and delivered in accordance with requirements of ASTM C 94.

Producer shall furnish delivery ticket with each load of concrete delivered under this Specification. Delivery ticket shall show clearly class and strength of concrete, size of coarse aggregate, slump ordered, and date and time of departure from batching plant.

1. Stresses for design of this structure are based on specified minimum 28-day compressive strength of concrete. Proportions shall be in compliance with approved design mix for each class of concrete.
2. Regular weight 3000 psi or 4000 psi concrete shall be proportioned for a slump of 4" + or - 1".
3. Lightweight 3000 psi concrete shall be proportioned for a slump of 6" + or - 1".

4. Fine aggregate 3000 psi concrete masonry grout shall be proportioned for a slump of 10" + or - 2".
5. All concrete shall be proportioned for a maximum water to cement ratio 0.5.
6. Concrete not permanently exposed to weather such as concrete for foundations, interior slabs on grade, concrete unit masonry grout, and elevated slabs on composite metal deck shall not have air added by entrainment admixtures. This requirement shall be verified by the testing laboratory.
7. Concrete to be permanently exposed to weather shall have air added by entrainment admixtures. Air content shall be 5% + or - 1%. This requirement shall be verified by the testing laboratory.

**CONVEYING EQUIPMENT:**

Carts or buggies transporting concrete more than 50 feet shall be equipped with pneumatic tires.

Equipment for chuting or conveying concrete shall be of sufficient size to insure continuous flow of concrete at delivery and without separation of materials.

**PART 3: EXECUTION**

**EVALUATION OF COMPRESSION TESTS:**

Evaluation of results of tests for ultimate-strength design concrete shall be according to ACI 318.

Neither results of laboratory verification tests nor any provision in Contract Documents shall relieve Contractor of obligation to furnish concrete of class and strength specified.

**INSPECTION OF WORK BEFORE PLACING:**

Inspect work to receive concrete for deficiencies which would prevent proper execution of finished work. Do not proceed with placing until such deficiencies are corrected.

Do not place concrete on earth until fill or excavation has been prepared as set forth under applicable sections of specifications for that work as verified by the testing lab.

Before any concrete is placed in form, all pipes or sleeves, openings, or embedded items shall be in place and shall receive all tests specified for them.

Remove all grease, oil, mud or other foreign matter from forms and have reinforcing steel in proper condition and position before placement of concrete. Dowels shall be in place and tied off prior to placing concrete.

Remove hardened, or partially hardened, concrete on forms or reinforcement before placing concrete.

**CONVEYING:**

Convey concrete from mixer to placement by methods which will prevent separation or loss of material. No water shall be added at the site to aid placement of concrete. Concrete too stiff to be properly placed shall be rejected and removed from the site and legally disposed of at no additional cost to the owner.

Runway supports shall not bear upon reinforcing steel or fresh concrete.

If pump(s) are used for conveying concrete, there shall be no aluminum in contact with the concrete, either in pump or in conveying pipes.

Clean conveying equipment thoroughly before run of concrete at frequent intervals.

**CONSTRUCTION AND EXPANSION JOINTS:**

Construction Joints: Early in construction program, contractor shall review with Architect construction joints he proposes to use, not indicated on the Drawings. Contractor shall not use any construction joints not approved by Architect.

Expansion Joints: Install as indicated.

**PLACING:**

Deposit concrete as nearly as practicable in its final position to avoid rehandling. Do not deposit concrete on work partially hardened or contaminated by foreign material. Do not use retempered concrete. In no case use concrete when elapsed time, after addition of water and cement to batch, exceeds one hour.

Concrete shall not be dropped more than four feet. For dropping greater distances use metal chutes or tremie pipes.

Once concreting is started carry on as continuous operation until placing of section is completed. Finish top surface to true plane. When construction joints are necessary, they shall be made in accordance with article above. Do not allow cold joints to occur within pours.

Compact all concrete thoroughly by suitable means during placing, and work thoroughly around reinforcement, embedded fixtures, and into corners of forms. When vibrator is used, apply directly to concrete. Do not over vibrate.

**PROTECTION**

During curing period protect concrete from damaging mechanical disturbances, particularly load stresses, heavy stock, and excessive vibration. Protect all finished concrete surfaces from damage by construction equipment, materials, or methods, and by rain, running water, hot sun, or windy conditions. Do not load self supporting structures in such a way as to overstress concrete.

Coordinate with protection requirements of Section 03362 – Polished Concrete Floor Finishes.

**TESTING:**

Conduct strength tests of concrete in accordance with following procedures:

Secure composite samples in accordance with "Method of Sampling Fresh Concrete" (ASTM C 172).

Mold and cure five specimens from each sample in accordance with "Method of Making and Curing Concrete Compression and Flexure Specimens in the Field" (ASTM C 31). Five specimen comprise one test.

Test Two Specimens at 7 days (ASTM C 39). Test two specimens at 28 days in accordance with "Method of Test for Compressive Strength of Molded Concrete Cylinders" (ASTM C 39). Test evaluation shall be conducted in accordance with provisions of ACI 318. Keep one Specimen in reserve.

Make one strength test for each 100 cu. yds. or fraction thereof for each mix design of concrete placed in any one day, except that in no case shall given mix design be represented by less than five tests.

Testing Laboratory shall be selected and paid by the Contractor out of the material testing allowance.

Report all test results to Architect, Structural Engineer, and Contractor on same day that tests are made.

Testing laboratory shall make and handle all test cylinders.

**NON-CONFORMING MATERIAL**

Any tested concrete material that fails to meet design strength at 28 days shall be removed and repoured. Substandard concrete may be allowed to remain if certified structurally adequate by a qualified independent engineer and approved by the Owner and Architect, however, the cost of the substandard material shall be deducted from the contract sum.

*END OF SECTION*

**RELATED DOCUMENTS:**

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

**PART 1: GENERAL**

**DESCRIPTION OF WORK:**

Extent of earthwork is indicated on drawings.

Earthwork includes all excavation (removal of material) necessary to reach subgrade elevations indicated. This includes subsequent disposal of material. Preparation of subgrade for building pads, parking areas, access roads and storm drainage installation are included as part of this work.

Refer to Geotechnical Report recommendations for fill. On site excavated soils may be used in non-structural areas. Off-site select material must be used for fill and trench backfill at structural areas (buildings, drives, and walkways). Off-site select material used for fill from subgrade (natural grade less stripped organics) to reach design elevations is to be included in bid and is not to be charged against the off-site fill allowance under Section 01056. Off-site select material used for trench backfill is to be included in bid and is not to be charged against the off-site fill allowance under Section 01056.

**BUILDING PADS PREPARATION (PERQUIMANS)**

1. Contractor to strip topsoil and organics (depths of 0.5' to 1.5') and compact exposed subgrade in building pad areas under Geotech consultant's observation, to improve the top 1.5 feet of native soils as needed; Geotech consultant will evaluate as compaction progresses and provide direction to minimize instability.
2. Geotech consultant will provide subgrade evaluations during stripping and compacting operations to include proofrolling, hand augers, and DCP testing to determine specific additional needs for mass undercut for slab and/or foundation support.
3. Specific needs for mass undercut and backfill with select material will be identified by the Geotech consultant, and performed using the mass undercut – disposal on site, and select backfill allowance in the Base Bid of 12,000 cubic yards.
4. Contractor shall have access to select material stockpiled at the County Marine Industrial Park, approximately 4.3 miles from the project site, at no charge for material.
5. During foundation excavation procedures within the areas anticipated for undercuts, or other areas as determined, Geotech consultant will continuously monitor the excavation procedures as they progress and direct the contractor to extend excavations deeper as required and backfill with #57 stone, using the Base Bid allowance for foundation undercut – disposal on site, and #57 stone backfill, total 750 cubic yards.
6. Material to be spoiled on site shall be deposited and graded as directed, graded, seeded and fertilized as specified.

**DRIVES AND PARKING AREAS PREPARATION (INCLUDING HEAVY DUTY CONCRETE AREAS)  
(PERQUIMANS)**

1. Contractor to strip topsoil and organics (depths of 0.5' to 1.5') and compact exposed subgrade in drives and parking areas under Geotech consultant's observation, to improve the top 1.5 feet of native soils as needed; Geotech consultant will evaluate as compaction progresses and provide direction to minimize instability.
2. Geotech consultant will provide subgrade evaluations during stripping and compacting operations to include proofrolling and other testing to determine specific additional needs for mass undercut.

3. Specific needs for mass undercut and backfill with select material will be identified by the Geotech consultant, and performed using the mass undercut – disposal on site, and select backfill allowance in the Base Bid of 12,000 cubic yards (this is for both buildings and drives / parking).
4. Contractor shall have access to select material stockpiled at the County Marine Industrial Park, approximately 4.3 miles from the project site, at no charge for material.
5. After successful proofroll of each area, contractor shall seal with specified stone base and install curb and gutter and drainage systems, and initial lift of asphalt paving. Any areas that fail subsequent to a passing proofroll will be the responsibility of the contractor to repair at his cost.
6. Material to be spoiled on site shall be deposited and graded as directed, graded, seeded and fertilized as specified.

## **QUALITY ASSURANCE**

### **TESTING AND INSPECTION SERVICE:**

All sub-grade and stone base shall be proof-rolled in accordance with NCDOT Standards and as directed by Engineer. Project Engineer shall be present at proof rolling.

### **CODES AND STANDARDS:**

All work conducted as part of this are to be in compliance with NCDOT specifications for Roadway Construction.

### **SUBMITTALS:**

Test Reports-Excavating: Submit following reports directly to Engineer from the testing services, with copy to Contractor:

Field density test reports on all trench backfill located beneath existing or proposed roadways.

### **JOB CONDITIONS:**

Existing Utilities: Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations.

Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner and Project Engineer immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

Do not interrupt existing utilities serving facilities occupied and used by Owner or others, during occupied hours, except when permitted in writing by Engineer and then only after acceptable temporary utility services have been provided.

Provide minimum of 48-hour notice to Engineer, Owner, and Local Government and receive written notice to proceed before interrupting any utility.

Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active.

Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.

Operate warning lights as recommended by authorities having jurisdiction.

Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

## **PART 2: PRODUCTS**

### **SOIL MATERIALS**

#### **DEFINITIONS:**

Satisfactory soil materials are defined as those complying with ASTM D 2487 soil classification groups GW, GP, GM, SM, SW and SP.

Drainage Fill: Washed, evenly graded mixture of crushed No. 57 - Stone.

Off-Site Select Backfill: Approved borrow material of coarse sands, fine sands or sandy clay mixture. Required for fill and trench backfill at structural areas (buildings, drives, and walkways).

Backfill Materials: Satisfactory (tested and approved by soils engineer) Class I through Class VII soil materials free of clay, rock or gravel larger than 2" in any dimension, debris, waste, frozen material, vegetable and other deleterious matter.

Excavation: Removal of material encountered to subgrade elevations and the reuse or disposal of materials removed. Refer to the following section for additional definitions and classified excavations.

Unauthorized Excavation: Removing materials beyond indicated invert/subgrade elevations or dimensions without direction by the design authority, or Owner. Unauthorized excavations, as well as associated remedial work directed by design authority or Owner, shall be at contractor's expense. Backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by design authority.

Subgrade: The uppermost surface of an excavation (after stripping is fully complete) or the top surface of a new fill or backfill immediately below base course, drainage course, walks, drainage fill, slab base materials, or topsoil materials.

Borrow: Suitable (tested and approved by soils engineer) soil materials obtained from off-site when sufficient approved soil material is not available from on-site excavations.

Surface Course: The top layer of the pavement structure placed on aggregate base course, asphalt base course, or subgrade, as required.

Aggregate Base Course: Aggregate material layer placed between the subgrade elevation and asphalt paving course, meeting the requirements of Section 910-1, Paragraph (a) of "Standard Specifications for Roads and Structures" by NCDOT.

Bedding Course: Layer placed over excavated subgrade in trench bottoms before laying pipe.

Structures: Buildings, footings, foundations, retaining walls, slabs-on-grade, curbs, tanks, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.

Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within building lines.

**UNIT PRICES**

Rock Measurement: Volume of rock actually removed, measured in original position (as observed and recorded by the Geotechnical Engineer), but not exceeding the following:

1. 24 inches outside of concrete forms other than at footings.
2. 12 inches outside of concrete forms at footings.
3. 6 inches outside of minimum required dimensions of concrete cast against grade.
4. 6 inches beneath bottom of concrete slabs-on-grade.
5. 6 inches beneath bottom of footings.
6. 6 inches beneath invert elevation of pipe and/or related structures in trenches, and the greater of 24 inches wider than outside pipe diameter, or 42 inches wide (regardless of trench box sizes). 24 inches wider than related structures in trenches.

Unsuitable Soil Measurement: Volume of unsuitable soil actually removed below subgrade elevations (as recommended and classified by Owner's Geotechnical Testing Firm) measured in-place, but not exceeding the following:

1. 24 inches outside of concrete forms other than at footings.
2. 12 inches outside of concrete forms at footings.
3. 6 inches outside of minimum required dimensions of concrete cast against grade.
4. 12 inches beneath invert elevation of pipe and/or related structures in trenches, and the greater of 24 inches wider than outside pipe diameter, or 42 inches wide (regardless of trench box sizes). 24 inches wider than related structures in trenches.
5. Minimum dimensions as recommended by Owner's Geotechnical Testing Firm in any other areas.

Unit prices for unsuitable soil and rock removal shall include all work and materials as defined in Division 1 Sections, including any required replacement with suitable fill soils or other materials, as required.

Structural Geo-Grids: Integrally Formed Biaxial Geogrid for base reinforcement and subgrade improvement formed with polypropylene polymer in roll form providing positive mechanical interlock. Provide Tensar BX1100 Geogrid.

**PART 3: EXECUTION**

**EXCAVATION CLASSIFICATIONS:**

Excavation Classifications: All excavation is classified as General Excavation except for Mass Rock, Trench Rock and Unsuitable Soil Materials as defined in this section.

General Excavation: Excavation, removal and/or disposal of pavements and other obstructions visible on surface, underground structures, utilities, and other items indicated to be demolished and/or removed; together with soil, boulders, and other materials encountered that are not classified as Mass Rock, Trench Rock, Unsuitable Soil, or unauthorized excavation.

- a. Intermittent drilling, ripping or blasting to increase production and not necessary to permit excavation of materials encountered will be considered general excavation.
- b. Soil (irregardless of nature) or other debris encountered above plan subgrade elevations shall be considered general excavation unless determined by the Owner's Geotechnical Testing Firm to meet the definition of Mass Rock.

Unsuitable Soil Excavation: Removal and disposal of soil materials or other debris encountered at or below plan subgrade elevations, which are deemed unsuitable to remain in place by the owner's Geotechnical Testing Firm or design authority.

- a. Soil and/or other debris encountered above plan subgrade shall be considered general excavation.
- b. Soil material which, in the opinion of the Owner's Geotechnical Testing Firm, can be repaired by scarifying, drying or moistening, and recompacting, or material which is made unsuitable by delay of

work, lack of protection, inclement weather, or other actions of the Contractor or their Sub-Contractors shall not be considered as unsuitable soil and shall be repaired or replaced by the contractor at no additional cost to the Owner.

- c. Any material moved or removed without the prior classification, measurement and approval by the Owner's Geotechnical Testing Firm or design authority will be considered as general excavation.

Mass Rock Excavation: Removal of a rock formation within an open excavation that (1) is a boulder larger than 1.5 cubic yards in one piece, or (2) cannot be excavated without systematic drilling and blasting. In the event Mass Rock (as defined above) is encountered, the Contractor shall demonstrate (at no additional cost to the owner) to the Owner's Geotechnical Testing Firm that the rock cannot be ripped with equipment equivalent to the following size and performance ratings, without systematic drilling and blasting.

- a. Mass Rock Excavation Equipment: Late-model, track-type tractor rated at not less than 270 hp flywheel power with a draw bar pull of 65,000 lbs at 1 mph in the lowest available gear, and the highest normal operating rpm pulling a sharp, single-toothed shank ripper. The equipment operator should be adequately qualified and experienced with ripping rock with this type equipment.

Trench Rock Excavation: Removal of a rock formation within a trench excavation that (1) is a boulder larger than 1.0 cubic yards in one piece, or (2) cannot be excavated by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling and blasting.

- a. Trench Rock Excavation Equipment: Late-model, track mounted hydraulic excavator equipped with a 42-inch wide (or smaller), short tip-radius bucket with rock teeth; rated at not less than 120-hp flywheel power with a pull of not less than 36,500-lb at a rate of 10 cubic yards per hour. The equipment operator should be adequately qualified and experienced with excavating rock with this type equipment.

Classified Excavation Requirements:

- a. Excavations more than 10 feet in width and pits more than 30 feet in either length or width are defined as open excavations.
- b. Contractor shall expose and clean the surface and any exposed areas of the rock material for classification and measurement (in-place) by the Owner's Geotechnical Testing Firm.
- c. Do not excavate rock or unsuitable soil until it has been classified and measured by the Owner's Geotechnical Testing Firm. Any material moved or removed without the prior classification and measurement by the Owner's Geotechnical Testing Firm will be considered as unclassified excavation.
- d. The Owner or the Owner's Geotechnical Testing Firm shall be the final judge on what is classified as Mass Rock, Trench Rock, or Unsuitable Soils.
- e. The contractor may be required to provide equipment specification data verifying that the above minimum-rated equipment will be used for demonstration purposes. The equipment shall be in good repair and proper working condition. The contractor may be required to provide verification of the equipment operator's qualifications and experience operating the noted equipment for rock removal purposes.
- f. Rippable rock, weathered rock, partially weathered rock, soft rock, or hard overburden soil, which is not classified as Mass Rock or Trench Rock according to the above definitions, shall be considered unclassified excavation.

**EXCAVATION AND BACKFILL:**

Roadway Excavation: Excavation for the roadways, drives, and parking areas shall conform to the lines, grades, cross sections, and dimensions indicated on the drawings and shall include the excavation of all unsuitable materials from the subgrade. Subgrade shall conform to proposed line, grade and cross-section. This operation shall include any reshaping and wetting or drying required to obtain proper

compaction. All soft or otherwise unsuitable material shall be removed and replaced with approved off-site select material.

Proof Rolling and Undercut Excavation: When excavation has reached required subgrade elevations, provide a proof rolling of the prepared pavement subgrade with a loaded tandem axle dump truck (+25 tons) in the presence of the Owner's Geotechnical Testing Firm. The proof rolling shall be covered by the wheels of the proof rolling vehicle operating at a speed between 2 and 3 miles per hour.

Any areas that rut or pump excessively shall be allowed to dry or shall be undercut and backfilled with select material as directed by the Owner's Geotechnical Testing Firm.

After undercut and backfill operations are complete, a final proof rolling of the undercut areas will be performed in the presence of the Owner's Geotechnical Testing Firm.

Additional Excavation: When excavation has reached required invert/subgrade elevations, notify the Owner's Geotechnical Testing Firm, who will make an inspection of conditions.

Stability of Excavations: Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction.

Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.

Dewatering: Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.

Do not allow water to accumulate in excavations. Remove water to prevent softening of excavation bottoms. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.

Material Storage: Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.

Excavation for Pavement: Cut surface directly beneath proposed pavement to comply with cross-sections, elevations and grades as shown.

**CONTRACTOR IS TO CONTACT NC ONE CALL 48 HOURS PRIOR TO ANY EXCAVATION. CONTRACTOR SHOULD UNDERSTAND THAT ONCE EXISTING UTILITIES ARE LOCATED THAT SAID LOCATION IS VALID ONLY FOR TEN DAYS.**

Should it be necessary to cut pavement or otherwise work within a public street, the North Carolina Department of Transportation is to be contacted prior to work, and applicable permits obtained.

**TRENCH BACKFILL:**

Excavation, bedding, haunching & backfilling shall conform to Section 02210 TRENCHING AND BACKFILLING FOR UTILITIES, and Drawings.

Refer to Geotechnical Report recommendations for trench backfill. On site excavated soils may be used in non-structural areas. Off site select material must be used for backfill at structural areas (buildings, drives, and walkways). Off site select material used for this purpose is to be included in bid and is not to be charged against the off site fill allowance under Section 01056.

Width of trenches at any point below top of pipe shall not be greater than outside diameter of pipe plus 16" for pipes measuring up to 30", and 24" for pipe measuring greater than 30", to permit satisfactory jointing and thorough tamping of bedding material under and around pipe. Care shall be taken not to over-excavate.

Bedding surface for piping shall provide a firm foundation of uniform density throughout entire length of pipe. Carefully bed pipe in a sand or stone material foundation as specified, that has been accurately shaped and rounded to conform to lowest 1/4 of outside portion of circular pipe, or lower curved portion of pipe arch for entire length of pipe or arch. When necessary, tamp bedding firmly. Bell holes and depressions for joints shall be only of such length, depth, and width as required for properly making particular type joint.

Bed pipe located under pavement or building footprints in a sand or stone material foundation as specified and as indicated on Drawings.

Existing utility lines shall be protected from damage during excavation and backfilling, and, if damaged, shall be repaired by the Contractor at his expense. In the event that the Contractor damages any existing utility lines, he shall report thereof immediately. If it is determined that repairs shall be made by the Contractor, such repairs shall be ordered under terms of other sections of these specifications.

After bedding has been prepared and pipe installed, selected material from excavation or borrow, at a moisture content that will facilitate compaction, shall be placed along both sides of pipe in layers not exceeding 6" in compacted depth. Bring backfill up evenly on both sides of pipe for its full length. Care shall be taken to ensure thorough compaction of fill under haunches of pipe. Thoroughly compact each layer to an elevation of at least 12" above top of pipe. Backfill and compact remainder of trench by spreading and rolling, or compact by mechanical rammers or tampers in layers not exceeding 8".

After bedding has been prepared and pipe installed for locations under pavement and building footprints, backfill and compact remainder of trench with selected Type II, III or IV material from excavation or borrow.

In compacting or rolling or operating heavy equipment parallel with pipe, displacement of or injury to pipe shall be avoided. Any pipe damaged thereby shall be repaired or replaced, at option of Engineer, and at expense of the Contractor.

When fill or backfill is required to be compacted to any specified density factor, tests shall be executed by an approved laboratory to ascertain compliance with requirements, at the expense of the Owner through the established Testing Allowance. One test shall be made for each 50 linear feet of open trench. Cost of laboratory services shall be borne by the Contractor as a part of costs for this section of work for any repeat tests for any specific area which fails to meet requirements.

Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F (1 degree C).

**GENERAL BACKFILL:**

Place acceptable soil fill material in layers to required subgrade elevations, for each area classification listed below.

In excavations, use satisfactory excavated or borrow material.

Under grassed areas, use satisfactory excavated or borrow material.

Under structural areas (buildings, walks and drive pavements), use approved off-site select borrow material.

Backfill excavations as promptly as work permits, but not until completion of the following: Inspection, testing, approval, and recording locations of underground utilities.

Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break-up sloped surfaces steeper than 1 vertical to 4 horizontals so that fill material will bond with existing surface.

When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

Placement and Compaction: Place backfill and fill materials in layers not more than 8" in loose depth for material compacted by heavy compaction equipment, and not more than 4" in loose depth for material compacted by hand-operated tampers.

Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content.

Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

Place backfill and fill materials evenly adjacent to structures, piping or conduit to required elevations. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping or conduit to approximately same elevation in each lift.

**COMPACTION:**

General: Control soil compaction during construction providing minimum percentage of density specified for each area classification indicated below.

Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density for soils which exhibit a well-defined moisture density relationship (cohesive soils) determined in accordance with ASTM D 698;

Structures, Building Slabs and Steps: Compact each layer of backfill or fill material at 95 % maximum density for cohesive material or 98 % for cohesionless material to within 2' of surface. From 2' deep to finish grade, compact 98% maximum density for cohesive material or 100% relative density for cohesionless material.

Pavements: Compact each layer of backfill or fill material at 95% maximum dry density to within 6" of surface. From 6" deep to finish grade, compact to 100% maximum density in accordance with AASHTO-T99.

Lawn or Unpaved Areas: Compact top 6" of subgrade and each layer of backfill or fill material at 85% maximum density for cohesive soils and 90% relative density for cohesionless soils.

Walkways: Compact top 6" of subgrade and each layer of backfill or fill material at 90% maximum density for cohesive material or 95% relative density for cohesionless material.

Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.

Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.

#### **GRADING:**

General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.

Grade areas as shown on the Drawings to prevent ponding. Finish surface free from irregular surface changes, and as follows:

Lawn or Unpaved Areas: Finish areas to receive a minimum of 3" layer topsoil to within not more than 0.10' above or below required sub-grade elevations.

Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.05' above or below required subgrade elevation.

Pavements: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than 1/2" above or below required subgrade elevation.

Patches in driveways and roadways shall be graded to depth required to match existing pavement or to provide minimum pavement specified.

Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

#### **PAVEMENT SUBBASE COURSE:**

General: Subbase course consists of placing subbase material, in layers of specified thickness, over subgrade surface to support a pavement base course.

Grade Control: During construction, maintain lines and grades including crown and cross-slope of subbase course.

Shoulders: Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each subbase course layer. Compact and roll at least a 12" width of shoulder simultaneously with compacting and rolling of each layer of subbase course.

Placing: Place subbase course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations.

When a compacted subbase course is shown to be 6" thick or less, place material in a single layer. When shown to be more than 6" thick, place material in equal layers, except no single layer more than 6" or less than 3" in thickness when compacted.

**FIELD QUALITY CONTROL:**

Quality Control Testing During Construction: Allow testing service to inspect and approve subgrades and fill layers before further construction work is performed.

If in opinion of Engineer, based on testing service reports and inspection, subgrade or fills which have been placed are below specified density, provide additional compaction and testing at no additional expense.

**MAINTENANCE:**

Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.

Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

**DISPOSAL OF EXCESS AND WASTE MATERIALS:**

Removal from Owner's Property: Remove waste materials, including unacceptable excavated material, trash and debris, and dispose of off Owner's property.

Comply with and coordinate with the project Construction Waste Management Plan (CWMP).

*END OF SECTION*

**RELATED DOCUMENTS:**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

**CHAIN LINK FENCING AND WELDED GATES:**

Provide black PVC coated galvanized chain link fences and welded gates as complete units controlled by a single source including necessary erection accessories, fittings, fastenings and weldments.

Product Data: Submit manufacturer's technical product data, and installation instructions for metal fencing, fabric, gates and accessories.

Dimensions indicated for pipe, roll-formed, and H-sections are outside dimensions, exclusive of coatings.

Manufacturer: Subject to compliance with requirements, provide products of one of the following:

Black PVC Coated Galvanized Steel Fencing and Fabric:

Hoover Fence Co.

Allied Tube and Conduit Corp.

American Fence Corp.

Anchor Fence, Inc.

Black PVC Coated Galvanized Steel Fencing:

Fabric: No. 9 ga. (0.148") finished size steel wires, 2" mesh, with top selvages knuckled for fabric 60" high and under, and both top and bottom selvages twisted and barbed for fabric over 60" high. Tennis court mesh to be 9 ga. X 1 3/4" mesh. Measure 8 gauge with PVC coating.

Fabric finish: Minimum 7 mil black PVC thermally bonded coating over galvanized, ASTM A 392, Class I, with not less than 1.2 oz. zinc per sq. ft. of surface.

Furnish one piece fabric widths for fencing up to 12' high.

Framework, Fittings and Accessories: Black powder coating over galvanized steel, ASTM A 120 or ASTM A 123, with not less than 1.8 oz. zinc per sq. ft. of surface.

Framing and Accessories:

End, Corner, and Pull Posts: Minimum sizes and weights as follows:

- Up to 6' fabric height, 2.375" od steel pipe, 3.65 lbs. per lin. ft., or 3.5" x 3.5" roll-formed sections, 4.85 lbs. per lin. ft.
- Over 6' fabric height, 2.875" od steel pipe, 5.79 lbs. per lin. ft., or 3.5" roll-formed sections, 4.85 lbs. per lin. ft.

Line Posts: Space 10' o.c. maximum, unless otherwise indicated, of following minimum sizes and weights.

- Up to 6' fabric height, 1.90" od steel pipe, 2.70 lbs. per lin. ft. or 1.875" x 1.625" C sections, 2.28 lbs. per lin. ft.
- Over 6' to 8' fabric height, 2.375" od steel pipe, 3.65 lbs. per lin. ft. or 2.25" x 1.875" H-sections, 2.64" lbs. per lin. ft.
- Over 8' fabric height, 2.875" od steel pipe, 5.79 lbs. per lin. ft. or 2.25" x 1.875" H-sections, 3.26 lbs. per lin. ft.

Gate Posts: Furnish posts for supporting single gate leaf, or one leaf of a double installation, for nominal gate widths as follows:

<u>Leaf Width</u>	<u>Gate Post</u>	<u>lbs. / lin. ft.</u>
• Up to 6'	3.5" x 3.5" roll-formed section or 2.875" od pipe	4.85 5.79
• Over 6' to 13'	4.000" od pipe	9.11
• Over 13' to 18'	6.625" od pipe	18.97
• Over 18'	8.625" od pipe	28.55

Top Rail: Manufacturer's longest lengths, with expansion type couplings, approximately 6" long, for each joint. Provide means for attaching top rail securely to each gate corner, pull and end post.

1.66" od pipe, 2.27 lbs. per ft. or 1.625" x 1.25" roll-formed sections, 1.35 lbs. per ft.

Tension Wire: 7-gage, coated coil spring wire, metal and finish to match fabric.

Locate at bottom of fabric.

Post Brace Assembly: Manufacturer's standard adjustable brace at end and gate posts and at both sides of corner and pull posts, with horizontal brace located at mid-height of fabric. Use same material as top rail for brace, and truss to line posts with 0.375" diameter rod and adjustable tightener.

Post Tops: Provide weathertight closure cap with loop to receive tension wire or top rail; one cap for each post.

Stretcher Bars: One-piece lengths equal to full height of fabric, with minimum cross-section of 3/16" x 3/4". Provide one stretcher bar for each gate and end post, and 2 for each corner and pull post, except where fabric is integrally woven into post.

Stretcher Bar Bands: Space not over 15" o.c., to secure stretcher bars to end, corner, pull, and gate posts.

Gates: Fabricate fully welded perimeter frames of gates from metal and finish to match fence framework. Assemble gate frames only by welding all connections, providing security against removal and breakage of connections. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware and accessories. Space frame members maximum of 8' apart unless otherwise indicated.

Provide same fabric as for fence, unless otherwise indicated. Install fabric with stretcher bars at vertical edges and at top and bottom edges. Attach stretcher bars to gate frame at not more than 15" o.c.

Install diagonal cross-bracing consisting of 3/8" diameter adjustable length truss rods on gates to ensure frame rigidity without sag or twist.

Where barbed wire is indicated above gates, extend end members of gate frames 1'-0" above top member. Provide necessary clips to receive and secure 3 strands of wire.

Swing Gates: Fabricate perimeter frames of minimum 1.90" od pipe.

Gate Hardware: Provide hardware and accessories for each gate, galvanized per ASTM A 153, and in accordance with the following:

- Hinges: Size and material to suit gate size, non-lift-off type, offset to permit 180° gate opening. Provide 1-1/2 pair of hinges for each leaf over 6' nominal height.
- Latch: Forked type or plunger-bar type to permit operation from either side of gate, with padlock eye as integral part of latch.

Double Gates: Provide gate stops for double gates, consisting of mushroom type flush plate with anchors, set in concrete, and designed to engage center drop rod or plunger bar.

Include locking device and padlock eyes as integral part of latch, permitting both gate leaves to be locked with single padlock.

Gate Egress and Security Hardware: Where indicated on Drawings, provide weather resistant Surface Mount Exit Bar Kit, equal to D-6040-S by Hoover. Assembly shall include: exit bar device, 24" adjustable mounting plate, adjustable receiver bracket, lock box with solid brass keyed cylinder and two keys for 5-pin Schlage keyway, stainless steel anchors and fasteners. Silver powder coated finish.

Sliding Gates (fully welded frames): Provide manufacturer's standard heavy-duty inverted channel track, ball-bearing hanger sheaves, overhead framing and supports, guides, stays, bracing, hardware, and accessories as required.

Wire Ties: For tying fabric to line posts, use wire ties spaced 12" o.c. For tying fabric to rails and braces, use wire ties spaced 24" o.c. For tying fabric to tension wires, use hog rings spaced 24" o.c.

Manufacturer's standard procedure will be accepted if of equal strength and durability.

Concrete: Provide concrete consisting of portland cement, ASTM C 150, aggregates ASTM C 33, and clean water. Mix materials to obtain concrete with a minimum 28-day compressive strength of 3000 psi using at least 4 sacks of cement per cu. yd., 1" minimum size aggregate, maximum 3" slump, and 2% to 4% entrained air.

Excavation: If not shown on drawings, excavate holes to minimum depth and diameter as recommended by fence manufacturer.

Installation: Install in accordance with ASTM F 567 and written installation instructions of fencing manufacturer to provide secure, aligned installation.

*END OF SECTION*

**RELATED DOCUMENTS:**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

**SCOPE OF WORK:**

The scope of work consists of the furnishing and installing of complete electrical systems including miscellaneous systems. The Electrical Contractor (hereafter referred to as "the Contractor", or Electrical Contractor) shall provide all supervision, labor, materials, equipment, machinery, and any and all other items necessary to complete the systems. The Contractor shall note that all items of equipment are specified in the singular; however, the Contractor shall provide and install the number of items of equipment as indicated on the drawings and as required for complete systems.

It is the intention of the Specifications and Drawings to call for finished work, tested and ready for operation.

Any apparatus, appliance, material, or work not shown on the drawings but mentioned in the specifications, or vice versa, or any incidental accessories necessary to make the work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be furnished, delivered, and installed by the Contractor without additional expenses to the Owner.

Minor details not usually shown or specified, but necessary for proper installation and operation, shall be included in the Contractor's estimate, the same as if herein specified or shown.

With submission of bid, the Contractor shall give written notice to the Architect of any materials or apparatus believed inadequate or unsuitable, in violation of laws, ordinances, rules, and any necessary items or work omitted. In the absence of such written notice, it is mutually agreed that the Contractor has included the cost of all required items in his proposal, and that he will be responsible for the approved satisfactory functioning of the entire system without extra compensation.

NOTICE TO BIDDERS, INSTRUCTIONS TO BIDDERS, SUPPLEMENTARY INSTRUCTIONS, GENERAL CONDITIONS, SUPPLEMENTARY GENERAL CONDITIONS, SPECIAL CONDITIONS, GENERAL REQUIREMENTS bound in the front of this document are included as a part of the specifications for this work.

**ELECTRICAL DRAWINGS AND SPECIFICATIONS:**

The electrical drawings are diagrammatic and indicate the general arrangement of fixtures, equipment, and work included in the contract. Consult the architectural, structural, plumbing, fire alarm, integrated communications, and mechanical drawings and details for exact locations and dimensions of fixtures and equipment; where same are not definitely located, obtain this information from the Architect.

The Contractor shall follow drawings in laying out work and check drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. Where headroom or space conditions appear inadequate, the Architect shall be notified before proceeding with installation. If directed by the Architect, the Contractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.

The plans and these specifications are intended to describe, imply and convey the materials and equipment as well as necessary labor, required for the installation as outlined in the paragraph entitled "Scope of Work". Any omissions from either the drawings or these specifications are unintentional, and it shall be the responsibility of this Contractor to call to the attention of the Architect or Engineer any pertinent omissions before submission of a bid. The drawings which accompany these specifications are not intended to show in complete detail every fitting which may be required; however wherever reasonable implied by the nature

of the work, any such material or equipment shall be installed by this Contractor as a part of his contract price. In no case will any extra charge be allowed unless authorized in writing by the Architect or Engineer.

The Contractor shall arrange with the General Contractor for required concrete and masonry chases, openings, and sub-bases so as not to delay progress of work. Work shall be installed sufficiently in advance of other construction to conceal piping and to permit work to be built in where required.

It shall be understood and agreed by all parties that where the words "Furnish", "Install", and / or "Provide" appear, the following definitions apply:

Furnish - to supply or give.

Install - to place, establish or fix in position.

Provide - to furnish and install as defined above.

**CODES, PERMITS, AND FEES:**

The Contractor shall give all necessary notices, including electric and telephone utilities, obtain all permits, and pay all government taxes, fees, and other costs, including utility connections or extensions in connection with his work file all necessary plans, prepare all documents, and obtain all necessary approvals of all governmental departments having jurisdiction at each phase of construction as required; obtain all required certificates of inspection for his work and deliver same to the Architect before request for acceptance and final payment for the work.

The Contractor shall include in the work, without extra cost to the Owner, any labor, materials, services, apparatus, drawings (in addition to contract drawing and documents) in order to comply with all applicable laws, ordinances, rules, and regulations, whether or not shown on drawings and / or specified.

All work and materials under this section shall be in strict compliance with more stringent requirements of the North Carolina State Building Code, including the National Electrical Code, NFPA 101-Life Safety Code, Regulations of the State Fire Marshall, UL Directory of Electrical Construction Materials, and requirements of the local utility company.

**VERIFICATION OF DIMENSIONS, DETAILS, EXISTING FIELD CONDITIONS:**

The Contractor shall visit the premises prior to bidding, and thoroughly familiarize himself with all details of the work, working conditions, verify dimensions in the field, provide advice of any discrepancy, and submit shop drawings of any changes he proposes to make in quadruplicate for approval before starting any work. The Contractor shall install all equipment in a manner to avoid building interference.

**COORDINATION WITH EQUIPMENT PROVIDED BY OTHERS:**

Electrical contractor shall coordinate voltage, phase and amperage requirements for all Plumbing, HVAC, and Kitchen equipment with the sub-contractor providing the equipment prior to ordering electrical gear submittals. Make adjustments to panels, feeders, and breakers as necessary to feed actual equipment being provided. Make engineer/architect aware of any conflicts or issues.

**ACCEPTABLE MANUFACTURERS:**

Acceptable manufacturers, as specified in the Contract Documents, implies that the specified manufacturer may produce acceptable products equal in quality of materials and performance to such item specified. The Contractor will be required to provide products meeting or exceeding the "Standard of Quality and Performance" as dictated by the product selection noted. However, any changes which result (from substitution of other manufacturers) in the electrical work or work of other Contractors, shall be paid for by the Contractor.

**SHOP DRAWINGS:**

The Contractor shall submit five (5) copies of the shop drawings to the Architect for approval within thirty (30) days after the award of the general contract. If such a schedule cannot be met, the Contractor may request in writing for an extension of time to the Architect. If the Contractor does not submit shop drawings in the prescribed time, the Architect has the right to select the equipment.

Provide manufacturer's cuts of items to be provided under this Contract. Included, but not limited to these items, are any of the following which may be required in this Contract: Fixtures, switches, outlet boxes, device plates, panelboards, transformers, conductors, pull boxes, wiring troughs, circuit breakers, disconnect switches, emergency fixtures, receptacles, etc.

The shop drawings shall be neatly bound in five (5) sets and submitted to the Architect with a letter of transmittal. The letter of transmittal shall list each item submitted along with the manufacturer's name.

Approval rendered on shop drawings shall not be considered as a guarantee of measurements or building conditions. Where drawings are approved, said approval does not mean that drawings have been checked in detail; said approval does not in any way relieve the Contractor from his responsibility or necessity of furnishing material or performing work as required by the contract drawings and specifications.

**COORDINATION WITH OTHER TRADES:**

Coordinate all work required under this section with work of other sections of the specifications to avoid interference. Bidders are cautioned to check their equipment against space available as indicated on drawings and shall make sure that proposed equipment can be accommodated. If interferences occur, Contractor shall bring them to attention in writing, prior to signing of contract; or, Contractor shall at his own expense provide proper materials, equipment, and labor to correct any damage due to defects in his work caused by such interference.

**INSPECTION AND CERTIFICATES:**

On the completion of the entire installation, the approval of the Architect and Owner shall be secured, covering the installation throughout. The Contractor shall obtain and pay for Certificate of Approval from the public authorities having jurisdiction. A final inspection certificate shall be submitted to the Architect prior to final payment. Any and all costs incurred for fees shall be paid by the Contractor.

**EQUIVALENTS:**

When material or equipment is mentioned by name, it shall form the basis of the Contract. When approved by the Architect in writing, other material and equipment may be used in place of those specified, but written application for such substitutions shall be made to the Architect as described in the Bidding Documents. The difference in cost of substitute material or equipment shall be given when making such request. Approval of substitute is, of course, contingent on same meeting specified requirements and being of such design and dimensions as to comply with space requirements.

**EXCAVATING AND BACKFILLING FOR ELECTRICAL WORK:** Refer to Sections 02202 & 02220.

**CUTTING AND PATCHING:**

On new work, the Electrical Contractor shall furnish sketches to the General Contractor showing the locations and sizes of all openings and chases, and furnish and locate all sleeves and inserts required for the installation of the electrical work before the walls, floors, and roof are built. The Electrical Contractor shall be responsible for the cost of cutting and patching where any electrical items were not installed or where incorrectly sized or located. The Contractor shall do all drilling required for the installation of his hangers. See also Section 01050.

*END OF SECTION*

**RELATED DOCUMENTS:**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

**CONDUIT SYSTEM:**

Furnish and install all conduits, or other raceways, fittings, boxes, and other component parts specified or required for completion and proper operation of the conduit system shown on the drawings.

Other than as noted above, conduit shall be sized in accordance with the 2005 NEC. All conduit shall be neatly installed parallel to, or at right angles to beams, walls and floors of the building in a neat and workmanlike manner. All bends shall be made with standard conduit elbows or conduit bent to not less than the same radius as that of a standard conduit elbow. Conduits shall be supported at intervals not greater than 8' and within 3' of any bend, cabinet, outlet or junction box. Conduits shall be supported by approved pipe straps or clamps, secured by means of toggle bolts on hollow masonry, expansion shields and machine screws or standard pre-set inserts on concrete or solid masonry, machine screws or bolts on metal surfaces, and wood screws on wood construction.

Conduit 1/2" (minimum) and larger shall be electrical metallic tubing (EMT). EMT shall be cold-rolled steel tubing with a coating on the outside and protected on the inside by a zinc, enamel, or equivalent corrosion-resistant coating and conforming to the requirements of ANSI C 80.3-1966 or later edition. EMT may be installed in dry construction in furred spaces, in partitions other than concrete and solid plaster, or for exposed work except on mechanical structures or supports, or in refrigerated areas. EMT shall not be installed where: it will be subject to physical damage; where it will be installed nearer than 4' from finished floor in exposed areas; where it will be subject to severe corrosive influence; where the trade size is larger than 2"; or where tubing, elbows, couplings, and fittings would be in concrete or indirect contact with the earth. Electric metallic tubing fittings shall be all plated steel hexagonal threaded compression type, with insulated throats. No pot metal, set screw, or indenter fittings shall be used.

Connections to lighting fixtures will be permitted with flexible steel conduit strapped every 6'-0", with UL listed AC type cables, used in strict accordance with 2005 NEC Article 333. Armored Cable assembly shall encase conductors in a continuous length of galvanized cold rolled steel strip, spirally wound with adjacent strips locked to turn all edges inward. The ends shall be terminated with fiber bushings to protect conductors from sharp edges. Fittings shall be the insulated throat type, T & B 3100 series or equivalent.

All underground conduit shall be UL Listed Schedule 40 PVC conforming to Article 347 of the 2005 NEC, or rigid galvanized steel. At the Contractor's option, this installation may consist of rigid steel conduit with PVC coating, minimum of 15 mils of PVC. Where schedule 40 PVC is installed under floor slabs, the elbows required to turn the raceway up into cabinets, equipment, etc., shall be of rigid steel. A copper ground wire shall be installed in all PVC conduits. PVC conduit shall not be used above the floor slab, unless roughed-in masonry wall.

All exposed conduit to 5'- 0" above finish floor shall be rigid galvanized steel or IMC conduit. Liquid-tight flexible steel conduit with an extruded PVC jacket shall be used for connections to exterior motors and compressors. Liquid-tight flexible conduit fittings shall be insulated throat type, Appleton STB type or equal.

All permanent conduit stub-outs shall be sealed with galvanized standard water pipe caps immediately after installation. All conduits crossing expansion joints shall have approved type expansion fittings as manufactured by Crouse Hinds, Killark or Appleton. Fittings shall be of type to ensure ground continuity. Provide a 240 lb. tensile strength poly pull-wire in all empty conduits.

**OUTLETS AND PULL BOXES:**

All boxes shall be UL labeled or listed by an approved agency. At each location where required, an outlet box of a type to suit the intended use shall be installed. Boxes shall be fastened to building structure in an approved manner. Flush outlet, junction and pull boxes shall be pressed galvanized or sheradized steel, either square or octagonal with knockouts on tops and sides, and fitted with plaster covers where necessary to set flush with the finished surface. For use in hollow-core masonry walls, switch boxes shall be of sufficient depth to permit conduit to rise in the core with minimum cutting of block. Provide plaster rings or box extensions for flush devices with finish surface. Boxes for unplastered masonry walls shall be masonry type with device mounting ears on the interior of the box.

Convenience outlet boxes shall be generally mounted approximately 18" above floor, 48" above floor in mechanical equipment rooms and shop type areas, and 4" above counter backsplash, unless otherwise noted. Convenience outlets for drinking fountains shall be installed behind fountain enclosure so as not to be visible; coordinate with Plumbing Contractor.

Lighting switch outlet boxes shall be 4' above floor, unless noted or required otherwise. Where switches occur in 4' high tile walls, they shall be lowered by 6 inches.

Pull boxes shall be used as required in long runs of conduit to facilitate pulling of wires. All interior pull boxes shall be constructed of code gauge galvanized sheet metal, and not less than the minimum size recommended by the NEC. Boxes shall be furnished with screw-fastened covers. When several feeders pass through a common pull box they shall be tagged to indicate clearly their electrical characteristics, circuit number, and panel designation. Wire markers shall be as manufactured by W. H. Brady Co., or equal. In no case shall a pull box be installed in an inaccessible location. Boxes shall be provided with fixed or removable steel barriers for each circuit where two or more feeders pass through the box. In case of banked conduit runs consisting of more than two horizontal rows of conduits, where barriers would be impracticable, the cables for each conduit shall be tied together with heavy waxed twine and wrapped with one wrap of heavy grade tape.

Where two or more outlets are to be installed in one location, they shall be installed in gang boxes suitable for the intended purpose.

Outlet boxes for outdoor use, and for exposed use where not covered by fixture canopies, shall be cast metal suitable for the intended purpose, having integral threaded hubs, and of the weatherproof type with gasket. Provide special outlet boxes where indicated.

All junction boxes shall be marked with panel and circuit number which it contains.

*END OF SECTION*

**RELATED DOCUMENTS:**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

**CONDUCTORS FOR 600 VOLTS OR LESS:**

All conductors shall be copper with a minimum conductivity of 98% and shall be delivered to the job site in their original packages, marked or tagged as follows : UL label , size, type, and insulation of the wire; name of manufacturer and trade name of the conductor: and date of manufacture. All conductors shall be insulated for 600 volts unless otherwise indicated. Furnish and install all conductors specified or required for completion and proper operation of the various systems shown on the drawings.

Conductors shall be 600 volt type THW or THWN. Branch circuit conductor shall not be smaller than No. 12 AWG, except where specifically noted otherwise. Home runs originating more than 80' at 120 volts from panel location shall be No. 10 AWG minimum size. Wires No. 10 AWG and smaller shall be solid; wires No. 8 AWG and larger shall be stranded. Where branch circuits are fed through fluorescent fixture channels, use code grade type THHN or XHHW. All AC cables where permitted shall include a separate copper ground conductor sized per phase conductors.

Provisions of Section 210-5, Color Code, NEC, shall be strictly complied with. Color coding shall include feeders and mains and be consistent throughout entire system. For 120/208 volt systems, use black, red, and blue for phases A, B, & C respectively. For 277/480 volt systems, use brown, orange, and yellow for phases A, B, & C respectively.

All conductors in vertical raceways shall be properly supported at intervals not greater than those specified in Section 300-19 of NEC.

All wire and cable except as specifically stated otherwise, shall be of one of the following makes: Anaconda Wire and Cable Co., General Cable Corp., General Electric Co., or Okonite Co.

**JOINTS AND CONNECTIONS:**

The Engineer reserves the right to inspect any and all joints made in wiring. If they are taped prior to being inspected, the tape shall be removed as ordered from any joint or joints for inspection. After inspection and correction of any fault found, the Contractor shall properly retape the joints.

Conductors shall be continuous without joints or splices in runs between outlet boxes. All splices shall be made at boxes only. Where stranded conductors are to be connected to any apparatus, bus work, switches or fuse blocks, they shall be connected by suitable mechanical solderless type lugs or spades. All lugs shall be permanently bolted in such position as to give maximum contact surface available. Where multiple circuits are run from same switch or panel, individual lugs for each conductor shall be used. Feeder taps in junction boxes or panel gutter shall be made with insulated cover panel gutter taps. Feeder conductors shall not be spliced, feeder conductors shall be continuous for the length of run.

Solid conductors, namely those sized #10 and #12 AWG copper, shall be spliced by using Ideal "wire-nuts", 3M Co. "Scotchlok", or T & B "Piggy" connectors for branch circuit splices in junction boxes and light fixtures, except recessed fixtures as noted above. "Sta-Kon" or other other permanent type crimp connectors shall not be used.

Stranded conductors, namely #8 AWG copper and larger, shall be spliced by approved mechanical connectors plus gum tape, plus friction or plastic tape. Solderless mechanical connectors, for splices and taps, provided with UL approved insulating covers, may be used instead of mechanical connectors plus tape.

**DEVICE PLATES:**

A device plate shall be provided for each outlet to suit the device installed. All plates shall be no. 302 stainless steel construction. All plates shall be "jumbo" size.

Device plates shall be of the one piece type, of suitable shape for the devices to be covered. The use of sectional device plates will not be permitted. Plates having a .375" bushed hole in the center shall be installed on all wall mounted outlets for telephones.

Devices and/or plates installed prior to painting shall be properly taped and shall be cleaned after painting, if necessary. Blank plates shall be installed on all unused outlets.

Plates shall be manufactured by Pass & Seymour, Bryant, or Hubbell. Provide sample of plates to Architect for approval.

**RECEPTACLES:**

Duplex convenience outlets for general use shall be rated 20 amperes, 125 volts, duplex, for standard parallel blade three-wire grounded type caps, Hubbell No. 5362-I (ivory), Leviton, Pass & Seymour or Arrow-Hart or approved equal. Color to be selected by Architect. Where outlets are installed vertically, ground plug position shall be on top and on right side where outlets are installed horizontally.

**SPECIAL USE RECEPTACLES:**

Provide special receptacles including receptacles with ground fault circuit interrupter protection, where needed, as required by equipment. Provide MOV-based transient voltage surge suppression devices (SS), where shown on plan. Tamper-resistant receptacles (TP) shall prevent insertion of objects other than a properly rated 2 or 3 wire plug using "floating" shutters. Equal devices by Hubbell, Leviton, Pass & Seymour or Arrow-Hart are considered acceptable.

**WALL SWITCHES:**

Wall switches shall be installed as shown on the drawings and shall be connected to provide control of the outlets indicated. Switches shall be rated at 20 amperes for 120 volts or 277 volts lighting circuits. Hubbell No. 1221 (or 1221-1), for single pole; Hubbell Catalog No. 1223 (or 1223-1) for 3-way; Hubbell Catalog No. 1224 (or 1224-1) for 4-way. Weather-proof switches shall be Hubbell No. 1781 single pole or Hubbell No. 1783 3-way. Provide sample of switches to Engineer for approval. Color of switches to be selected by Architect.

Automatic light switches shall have passive infra-red occupancy switch with light sensor to prevent light from switching on when daylight is above pre-set level. Switch shall be UL listed, have adjustable time delay of 30 seconds to 30 minutes, auto/off control, and minimum coverage of 900 square feet, Automatic light switch shall be UNENCO model no. D-IS.

Provide special purpose switches where noted on the drawings, or elsewhere. Equal devices by Pass & Seymour or Arrow-Hart are considered acceptable.

For wall switches indicated as dimmers on LED lighting, coordinate the exact 0-10 volt dimmer that is compatible with LED driver at 277V for the specific fixtures provided. Install the correct size wall box to accommodate the specific dimmer to be installed.

*END OF SECTION*

**SERVICE EQUIPMENT AND POWER DISTRIBUTION:**

Furnish, install and completely connect the circuit breaker type service, panelboard and distribution equipment as indicated. All construction shall meet applicable standards of ANSI, IEEE, and NEMA, and all equipment shall bear UL label insofar as it is available. Equipment shall be Square D QED, I-Line or QMB; equipment manufactured by Cutler-Hammer (Eaton) , General Electric, or ITE Siemens will be considered equal.

Provide a copper bus interior with and insulated neutral in the Main Distribution Panel. This neutral bus shall be the source for all insulated neutral conductors of the system. Jumpers shall be installed to connect the insulated neutral bus to the uninsulated grounding bus. The uninsulated grounding bus shall be the source of grounds for all grounding and bonding (not neutrals) of equipment.

Electrical contractor is responsible for providing all transformer and equipment data to gear supplier as necessary for the supplier to evaluate and coordinate any circuit breaker settings to ensure that downstream breakers trip prior to any upstream breakers.

**LIGHTING AND POWER PANELBOARDS:**

Panelboards shall be of the thermal-magnetic circuit-breaker type and shall consist of an assembly of single, double, and triple-pole breakers. Each circuit-breaker shall be bolted-in, removable without disturbing the adjacent units and shall have trip ratings as indicated. All multipole breakers shall be common trip. Ground fault circuit breakers shall be used as indicated on the drawings.

Each panelboard shall be installed in an appropriate cabinet of sufficient size with top 6'- 0" above finish floor and shall conform to the requirements of UL standard for cabinets and boxes. Standard cabinets with surface or flush type trim and door shall be used, as required. Cabinets shall have a minimum width of 20" unless noted otherwise. A neutral bar shall be provided in each panel with a terminal for each breaker. Grounding lugs shall be provided.

Cabinet shall be made of spot welded galvanized sheet steel not less than N.E.C. gauge with hinged door and trim of the same material. When closed, the door shall fit accurately in the opening provided and present a flush finish with the trim. The door shall be equipped with a key operated lock. Furnish one key with each lock. All door locks shall be keyed alike. Knockouts in cabinets are not acceptable. Cabinets shall be finished with manufacturer's standard painted finish.

On the inside of each door, a typewritten directory identifying each circuit shall be mounted in a suitable protective enclosure. Panelboards shall have laminated plastic designations on inside corresponding to feeder and drawing identifications.

Panelboards shall be Square D I-Line or NQOD Series or equal by Cutler-Hammer, General Electric, or Siemens.

**SHUNT TRIP PROTECTION:**

All electrical equipment located under a kitchen hood with a fire suppression system shall be protected by a shunt trip device that is interlocked with the suppression system. Upon activation of the suppression system the shunt device shall trip and disconnect power for the equipment under the hood. This may be done via individual shunt trip breakers or a single main breaker that is shunted upon activation of the suppression system. If a main shunt breaker is utilized no circuits should be fed from the respective distribution panel other than the circuits for the equipment under the hood. Elevator feeder circuits shall also be protected by a shut trip device if the elevator shaft and/or the elevator equipment room are protected by a fire suppression system. Coordinate with the General Contractor for final plans from the Sprinkler Design-Build Contractor.

**SURGE PROTECTION:**

Furnish and install transient voltage surge suppressor (TVSS) units where indicated on the drawing risers as 'SP' to protect AC electrical circuits from the detrimental effects of lightning, utility switching transients, AC motor transients, and other internal generated transients. TVSS shall comply with UL 1449, have a Category C pulse life for all protection modes (L-N, L-G or L-L where applicable), shall operate bio-directionally, and shall have a maximum single pulse current capacity of 50 KA per mode in accordance with NEMA LS1-1992. Acceptable manufacturers include Leibert, Current Technology, LEA, and United Power. Provide complete shop drawing submittal including installation instructions, dimensional drawings, clamp voltage data, and 3rd party data confirming single pulse current capacity rating. Provide on-site manufacturer's testing and start-up.

**SAFETY DISCONNECT SWITCHES:**

Disconnect switches shall be horsepower rated, installed where indicated and / or required by the NEC. Switches, except where shown as beined by other sections shall be furnished under this Section. Switches shall be heavy duty, fused unless otherwise noted, sized as shown, quick-make, quick-break, NEMA type "ND" with NEMA 1 enclosure, type HD, Square D. Switches to be installed outdoors shall be NEMA type 3R, with raintight conduit hubs. All switches shall be capable of being locked in the "off" position. Fuses shall be one-time, non-renewable types, dual-element, time-delay, Bussman or equal as required for application.

**MOTOR STARTERS:**

Motor controllers shall, unless otherwise specifically noted, be combination magnetic type, with thermal overload relays and heaters in each phase conductor, with operating coils for 120 volts as noted on the drawings or as required. Maximum trip rating of starters for hermetic motors shall be at least 105% of the nameplate full load current of the motor.

Starters shall be provided with build-in selector switches (H-O-A) or pushbutton stations where required. Combination starters shall be provided with sufficient auxiliary contacts or control relays for control sequence as specified, indicated or as required, and with sufficient auxiliary contacts on its circuit breaker or with control relays so that opening the circuit breaker ahead of the starter unit opens all hot control lines within the starters. All starters furnished under this Section shall be mounted in individual NEMA 1 enclosures, unless otherwise specified or indicated on drawings. Special requirements are specified in the separate Sections of this Division or indicated on the drawings.

**LIGHTING CONTACTORS:**

Each lighting contactor shall have heavy-duty ballast load rated contacts. Each contactor shall have mechanically held contacts, and silver cadmium oxide double break contacts. Contacts shall be field convertible with normally open and normally closed indicators. Each contactor shall be UL listed and CSA certified. All new lighting contactors for each new building shall be housed in a properly sized NEMA-1 enclosure with fully hinged and lockable door.

**FIRE ALARM & HVAC CONTROLS:**

Electrical contractor is responsible for all conduit and wiring required to power any fire alarm control or booster panels, magnetic door holders, and the HVAC Building Automation Controls system cabinets. There shall be at least (2) Fire Alarm and (2) HVAC control system circuits per wing of the school. Coordinate exact location and quantity of cabinets with Fire Alarm and Mechanical's Controls Sub-Contractor. Termination to Fire Alarm and HVAC controllers and to HVAC equipment shall be by controls contractor. Electrician shall use 1P-20A circuits designated as Fire Alarm or HVAC Controls on panel schedules or the closest available spare 1P-20A (120V) breakers for powering the controls system. Notify Engineer if circuits were not indicated and update panel directories on Record Drawings.

**GROUNDING:**

Provide a bare stranded continuous copper grounded conductor, size as indicated, from the service equipment grounding bus to the cold-water service main where it enters the building ahead of main valve on water pipe main. Also, provide a driven ground per NEC 250-81 (a). Provide all necessary grounding clamps and full-size jumpers around all valves, meters, and similar fittings between point of connection and street main. The main grounding conductor shall be connected to the neutral conductor at one location only, within and on the low voltage side of the main transformer and more specifically the equipment grounding bus associated with the main insulated neutral bus in the MDP. The insulated neutral bus must be insulated and serve to provide the neutral source for all the insulated neutral conductors of the system. Jumpers shall be installed to connect the insulated neutral bus to the uninsulated grounding bus and all grounding and bonding of equipment (not neutrals) shall be attached to the uninsulated grounding bus.

System and equipment grounds shall be checked for proper value of resistance using the Megger ground tester in accordance with the method prescribed by the manufacturer of the instruments. Resistance of ground shall not be in excess of 25 ohms, measured to include the grounding cable. The Contractor shall report the results of these tests to the Engineer in writing. If the resistance cannot be reduced to the value prescribed above, further instructions will be given the Contractor.

All equipment connected under this section shall be grounded and shall conform with the more stringent requirements of the NEC, National Electrical Safety Code, the N. C. State Building Code, or this specification.

Panels, junction boxes, safety switches, disconnect switches, contactors, starters, motors, dry transformers, bus duct and other equipment shall be bonded to the conduit system with a grounding conductor by means of grounding locknuts and bushings as required hereinafter, except where conduit terminates in threaded hub or fittings. All joints or terminations shall be made with standard tapered pipe threads drawn tight to preserve electrical continuity.

Provide grounding bushings and copper jumpers across all concentric or eccentric knockouts and on all conduits larger than 1". Elsewhere, double-lock-nuts with plastic or fiber bushings, or a single lock-nut and malleable bushing may be used. If Contractor selects to use a single locknut and malleable bushing, care shall be taken that the full number of threads project through to permit the bushing to pull tight against the ends of the conduit, after which the lock-nut shall be made up sufficiently tight to draw the bushing into firm electrical contact with the box.

Where flexible conduits are used, provide grounding conductor within flexible conduit to ensure continuity of ground. Minimum size of jumper around flex shall be No. 10.

**EQUIPMENT IDENTIFICATION:**

Provide black-on-white laminated plastic name plates for each switch or circuit breaker on service equipment, disconnect switches, terminal cabinets, panelboards and wiring troughs. The name plate shall be engraved to indicate the equipment controlled or identified. Name plates shall be securely fastened to equipment using two screws.

**CONNECTIONS TO EQUIPMENT:**

Electrical Contractor shall provide rough-in, junction box, or wiring trough as indicated. Electrical Contractor shall provide and install disconnect switches and motor starters for equipment provided under Division 16. All external disconnect switches, motor starters, and any fuses required for equipment furnished under Division 15 shall be provided by the Div 15 contractor and installed by the Electrical Contractor. Coordinate all equipment locations with all other contractors prior to installation of electrical equipment. Consult all Contract drawings which may affect location of equipment or apparatus furnished by others and make any minor adjustments as required. Electrical Contractor is responsible for all line side and load side wiring for all equipment requiring electrical power. Line side wiring is defined as the wiring from the distribution panel circuit to the point of disconnect (internal or external) for the equipment, whether provided by the contractor or

factory installed by the equipment manufacturer. Load side wiring is defined as the wiring from the point of disconnect to all equipment requiring electrical power. All final electrical terminations to the piece of equipment shall be done by the contractor providing the equipment.

Electrical Contractor must closely coordinate with the equipment supplier regarding Voltage, H. P., F. L. A., outlet mounting heights, connection cord plug-receptacle electrode configurations and other special wiring requirements.

Electrical Contractor is responsible for coordinating quantity and location of all sprinkler system devices with sprinkler contractor.

Electrical Contractor shall review the Architectural, Civil, Plumbing, Mechanical, Fire Alarm and IC plans to provide branch circuits and final connections to powered equipment furnished by others for complete and operational equipment. This is a sample list and may not represent all connections required:

- 1) Data Equipment Racks not in MDF or IDF rooms.
- 2) HVAC Controls Equipment
- 3) Controlled Access electrified security doors (See Door Hardware Schedule)
- 4) Sprinkler controls/panels
- 5) Projectors and associated screens
- 6) Hand Dryers (See Architectural plans and elevations)
- 7) Electric Water Heaters & Associated Recirculation Pumps (Refer to Plumbing Plans)
- 8) Clothes Washers and Dryers
- 9) Fire Pumps (Main and Jockey)
- 10) Fire Alarm Control Panels and Booster Panels (See FA Contractor Shop Drawings)
- 11) Motorized Basketball Goals and/or Gym Divider Curtains
- 12) Scoreboards and Shot Clocks
- 13) Motorized Bleachers
- 14) PA Systems and associated amplifiers (Gym, Café, Auditoriums and MP Rooms)
- 15) Powered Hotboxes (See Civil Site Plan for exact locations)

*END OF SECTION*

**PART 1 - GENERAL**

1.1 Description of Work:

It is the intent of this specification to describe a standby power generator system that has been prototype tested, factory built, production tested, site tested, of the latest commercial design, together with all accessories necessary for a complete and operational installation per the design documents. The equipment supplied and installed shall meet the requirements of the National Electrical Code and all applicable local codes and regulations. All equipment shall be new, of current production by a national firm which manufactures the generator, controls, and assembles the generator set as a matched unit so that there is one source responsibility for warranty, parts, and service through a local representative with factory-trained service personnel. The firm shall have a minimum of 10 years experience in manufacturing systems of the type specified herein.

1.2 Submittal:

Submittal shall include specification sheets showing all standard and optional accessories to be supplied, schematic wiring diagrams, dimension drawings, and interconnection diagrams identifying by terminal number each required interconnection between the generator set and other remote devices if included elsewhere in these specifications. Generator sizing calculations as well as fuel tank sizing calculations shall be included in submittal.

1.3 Testing:

To assure that the equipment has been designed and built to the highest reliability and quality standards, the manufacturer shall be responsible for design prototype tests as described herein. Components of the emergency system, such as the engine/generator set, transfer switch, and accessories shall not be subjected to prototype tests since the tests are potentially damaging. Rather, similar design prototypes, which will not be sold, shall be used for these tests. Prototype test programs shall include the requirements of NFPA-110 and the following:

1. Maximum power (kw).
2. Maximum starting (kva) at 35% instantaneous voltage dip.
3. Alternator temperature rise by embedded thermocouple and by resistance method per NEMA MG1-22.40 and 16.40.
4. Governor speed regulation under steady-state and transient conditions.
5. Voltage regulation and generator transient response.
6. Fuel consumption at  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ , and full load.

7. Harmonic analysis, voltage waveform deviation, and telephone influence factor.
  8. Three-phase line-to-line short circuit test.
  9. Cooling airflow.
  10. Torsional analysis testing to verify that the generator set is free of harmful torsional stresses.
  11. Endurance testing.
- 1.4 Warranty:  
The emergency generator system shall be warranted by the manufacturer for one year or 2,000 hours, whichever occurs first, from the date of the site start-up.

## **PART 2 - PRODUCTS**

The standby generator set shall be rated standby power (defined as continuous operation for the duration of any power outage) voltage as indicated on plans (typically 480V or 208V), 3 phase, 4 wire, 0.8 power factor, and kw rating as indicated on plans. The generator shall be capable of handling the inrush current from starting and running the largest single motor load x 125%.

- 2.1 Final Production Tests:  
Each generator set shall be tested under varying loads with guards and exhaust system in place. The tests shall include the following:
1. Single-step load pickup.
  2. Transient and steady-state governing.
  3. Safety shutdown device testing.
  4. Voltage regulation.
  5. Rated power.
  6. Maximum power.
- Upon request, arrangements to witness this test will be made or a certified test record will be sent prior to shipment.
- 2.2 Engine:  
The engine shall run at a governed speed not to exceed 1,800 rpm. The engine shall be equipped with the following:
1. Engine driven or electric fuel transfer pump, fuel filters and electric fuel shut-off valve.
  2. Gear driven governor capable of regulating the no load to full load frequency to a 5% maximum and capable of 0.33% Steady State frequency regulation.

3. 12 volt positive engagement solenoid shift-starting motor.
4. Battery charging alternator with solid-state voltage regulation.
5. Positive displacement, full pressure lubrication oil pump, cartridge oil filters, dipstick, and oil drain.
6. Dry-type replacement air cleaner elements.
7. NOTE: Engines requiring glow plugs will not be acceptable when NFPA-99 or NFPA-110 Type 10 (ten-second) transfer requirement must be met.

The naturally aspirated or turbo charged engine shall be fueled with Natural Gas and shall be liquid cooled. A unit-mounted radiator, blower fan, water pump, thermostat, and radiator duct flange (unhoused only) shall properly cool the engine with up to 0.5 inches H<sub>2</sub>O external static pressure on the cooling system.

### 2.3 Generator:

The alternator shall be salient-pole, reconnectable, 12-lead, self ventilated, of drip-proof construction with amortisseur rotor windings and skewed for smooth voltage waveform. The insulation material shall meet the NEMA standard (MGI-22.40 and 16.40) for Class H and be vacuum impregnated with epoxy varnish to be fungus resistant per MIL I-24092 or be multiply dipped and baked with nonhygroscopic varnish with a final dip of epoxy. The excitation system shall be brushless construction controlled by a solid-state voltage regulator with adjustable volts-per-Hertz operation capable of maintaining voltage within  $\pm 2\%$  at any constant load from 0 to 100% of rating. The regulator must be sealed from the environment and isolated from the load to prevent tracking when connected to SCR loads.

On application of any load up to the rated load, the instantaneous voltage dip shall not exceed 20% and shall recover to  $\pm 2\%$  of rated voltage within one second.

The generator shall be capable of sustaining at least 250% of rated current for at least 10 seconds under a 3 phase symmetrical short by inherent design or by the addition of an optional current boost system.

The generator shall be capable of accepting the loads that were specified with the A/C equipment being the largest running loads and 15% being the largest instantaneous voltage dip when loads are started as specified on the loads report.

A resettable line current sensing circuit breaker with inverse time versus current response shall be furnished and shall not automatically reset preventing restoration of voltage if maintenance is being performed. This breaker shall protect the generator from damage due to its own high current capability and shall not trip within the 10 seconds specified above to allow selective tripping of downstream fuses or circuit breaker under a fault condition.

The generator, having a single maintenance free bearing, shall be directly connected to

the flywheel housing with a semiflexible coupling between the rotor and the flywheel.

2.4 Controller:

Set-mounted controller capable of facing right, left, or rear shall be vibration isolated on the generator enclosure. The microprocessor control board shall be moisture proof and capable of operation from -40C to 85C. Relays will only be acceptable in high current circuits.

Circuitry shall be of plug-in design for quick replacement. Controller shall be equipped to accept a plug-in device capable of allowing maintenance personnel to test controller performance without operating the engine. The controller shall include the following:

1. Fused DC circuits.
2. Complete two-wire start/stop control, which shall operate on closure of a remote contact.
3. Speed sensing and a second independent starter motor disengagement system shall protect against the starter engaging with a moving flywheel. Battery charging alternator voltage will not be acceptable for this purpose.
4. The starting system shall be designed for restarting in the event of a false engine start, by permitting the engine to completely stop and then reengage the starter.
5. Cranking cycler with 15-second ON and OFF cranking periods.
6. Overcrank protection designed to open the cranking circuit after 75 seconds if the engine fails to start.
7. Circuitry to shut down the engine when signal for high coolant temperature, low oil pressure, or over-speed is received.
8. Engine cool down timer factory set at five minutes to permit unloaded running of the standby set after transfer of the load to normal.
9. Three-position (AUTOMATIC-OFF-TEST) selector switch. In the test position, the engine shall start and run regardless of the position of the remote starting contacts. In the automatic position, the engine shall start when contacts in the remote control circuit close and stop five minutes after those contacts open. In the off position, the engine shall not start even through the remote start contacts close. This position shall also provide for immediate shutdown in case of an emergency. Reset of any fault lamp shall also be accomplished by putting the switch to the off position.
10. Indicating lights to signal:
  - 1) Not-in-auto (flashing red)
  - 2) Over-crank (red)
  - 3) Emergency Stop (red)
  - 4) High engine temperature/low coolant level (red)
  - 5) Over-speed (red)
  - 6) Low Oil Pressure (red)

- 7) \* Battery charger malfunction (red)
- 8) \* Low battery voltage (red)
- 9) \* Low fuel (red)
- 10) \* System ready (green)
- 11) \* Pre-alarm high engine temperature (yellow) - liquid cooled models
- 12) \* Pre-alarm low oil pressure (yellow)
- 13) \* Low coolant temperature (red) - liquid cooled models

\* Required to meet NFPA-99 or NFPA-110 Level 1 regulations.

11. Test button for indicating lights.
12. Alarm horn with silencer switch per NFPA-110.
13. Terminals shall be provided for each signal in 10 above for connection to remote monitoring devices.

#### 2.5 Instrument Panel:

A set instrument panel shall include the following:

1. Dual range voltmeter, 3 ½", ±2% accuracy.
2. Dual range ammeter, 3 ½", ±2% accuracy.
3. Voltmeter-ammeter phase selector switch.
4. Lights to indicate high or low scale.
5. Direct reading pointer-type frequency meter, 3 ½", ±5% accuracy, 45 to 65 Hertz scale.
6. Panel illuminating lights.
7. Battery charging meter.
8. Coolant temperature gauge (liquid cooled models).
9. Oil pressure gauge.
10. Running time meter.
11. Voltage adjust rheostat (±5% range).

#### 2.6 Accessories:

The following accessories shall be provided:

1. Over voltage protection will shut down the unit after one second of 15% more over voltage.
2. Battery rack, battery cables, 12-volt battery(ies) capable of delivering the minimum cold-cranking amps required at 0°Fahrenheit per SAE Standard J-537.
3. Gasproof, seamless, stainless steel, flexible exhaust connector(s) ending in pipe thread or SAE flange.
4. Flexible fuel lines rated 300°F and 100 PSI ending in pipe threads.
5. Engine exhaust silencer, coated to be temperature and rust resistant, rated for critical applications. Exhaust noise shall be limited to 85 dba as measured at 10 feet in a free-field environment.
6. Block heater of proper wattage and voltage, thermostatically controlled to

maintain engine coolant at 90°F (32°C) to meet the start up requirements of NFPA-99 or NFPA-110 regulations.

7. Trickle type battery charger with an adjustable low charge rate of 50 to 300 milli-amperes and a manual, high charge rate of 2 amperes.
8. Steel weather-protective enclosure with removable or hinged side panels to allow inspection and maintenance. The enclosure shall be coated with ASA gray primer and two coats of high-gloss, weatherproof, sag resistant vinylac in the manufacturer's standard color through an electrical bonding process. The specific exhaust silencer shall be vibration-mounted on the roof of the enclosure.
9. Vibration isolators shall be provided between the engine-generator and welded steel base.
10. Four (4) sets of keys shall be provided to the County.

2.7 Base Bid: Automatic Transfer Switch:

1. Except as otherwise indicated, provide manufacturer's standard design, materials and components as indicated by published project information, designed and constructed as recommended by manufacturer for duty indicated, and as required for a complete installation.
2. Transfer switch shall be capable of switching all classes of load and for continuous duty at the rated current with switch mounted in the enclosure.
3. The transfer switch shall be double throw type disconnect. (Alt Bid) Automatic Transfer switch shall be actuated by two electrical operators momentarily energized and connected to the transfer mechanism by a simple over-center linkage with a transfer time of 3 seconds. The time delay of 3 seconds between the opening of the closed contacts and the closing of the open contacts is to allow the loads to be demagnetized before transfer. The transfer switch shall be capable of transferring successfully in either direction with 70% of rated voltage applied to the switch terminals.
4. The normal and standby contacts shall be positively interlocked mechanically and electrically to prevent simultaneous closing. Main contacts shall be mechanically locked in position in both the normal and standby positions without the use of hooks, latches, magnets, or springs and shall be silver tungsten alloy protected by arcing contacts with magnetic blowouts in each pole. Interlocked molded case circuit breakers will not be acceptable.
5. The transfer switch shall be equipped with a safe manual operator that has been designed to prevent injury to the operating personnel if the electrical operator should suddenly become energized during manual transfer. The manual operator shall provide the same contact opening and closing speed as the electrical operator to prevent a flashover from switching the main contacts slowly.
6. Engine starting contacts shall be provided to start the generating plant if any phase of the normal source drops below 80% of rated voltage after a

- nonadjustable time delay period of 3 seconds to allow for momentary dips. The transfer switch shall transfer to standby as soon as the voltage and frequency have reached 90% of rating. After restoration of normal power on all phases to 90% of rated voltage, an adjustable time delay period of 0-30 minutes shall delay retransfer to normal power until it has had time to stabilize. If the standby power source should fail during the time delay period, the time delay shall be bypassed and the switch shall return immediately to the normal source. After the switch has retransferred to normal, the engine generator shall be allowed to operate at no load for an adjustable period of 5-30 minutes to allow it to cool before shutdown. The transfer switch shall include a test switch to simulate normal power failure, a test input to simulate a normal power failure upon closure of a SCADA dry contact provided for remote start, pilot lights on the cabinet door to indicate the switch closed on normal or emergency, and four spare auxiliary contacts on the main shaft, two closed on normal and two closed on emergency. All relays, timers controls, wiring, and accessories to be front accessible.
7. The transfer switch, complete with all timers, relays, and accessories shall be listed by Underwriters' Laboratories, Inc. at the time of the bid opening in their Electrical Construction Materials Catalogue under Standard UL-1008 (Automatic Transfer Switches) and approved for use on emergency systems. The UL listing shall include the specific amperage ratings that are called for in this specification.
  8. Transfer switch shall have adjustable over voltage, under voltage, phase reversal, and phase loss relays for the normal power source. Relays shall initiate transfer to standby if any abnormal voltage condition on the normal source occurs, including motor-generated voltages that occur during single phasing of the normal source.
  9. The transfer switch shall have a short circuit withstand capability of 50,000 RMS amperes symmetrical minimum. To establish conformance with the above, the manufacturer must produce certified test reports from an independent testing laboratory to verify that identical samples have been subjected to three phase short circuit at 480 VAC for a minimum of 3 cycles duration, without contact damage or contact welding, and without the use of current limiting fuse protection. Oscillograph traces are to be supplied to verify that the test parameters have been met.
  10. Transfer switch shall have one full-length door in front and shall be provided in a NEMA 3R enclosure for rack mounting.

### **PART 3 - EXECUTION**

- 3.1 The equipment shall be installed as shown on the plans with a reinforced concrete foundation sized in accordance with the manufacturer's recommendations and all applicable codes. All exposed edges of concrete foundation shall have a  $\frac{3}{4}$ "

chamfer. The concrete pad shall be a minimum of 12" in thickness with #5 rebar at 12" O.C. each way. The generator set concrete pad shall have a minimum of 6" exposed foundation on all sides of the pad.

3.2 Site Tests:

The manufacturer's local representative shall perform an installation check, start-up and a 4 hour minimum load test. The engineer and the County utility operating staff shall be notified of the time and date of the site test.

Contractor shall provide a full tank of fuel prior to testing.

Fuel, lubricating oil, and antifreeze (liquid cooled models) shall be checked for conformity to the manufacturer's recommendations under the environmental conditions present and expected.

Accessories that normally function while the set is standing by shall be checked prior to cranking the engine. This shall include engine heaters, battery charger, generator strip heaters and remote annunciator, etc.

Start-up under test mode to check for exhaust leaks, path of exhaust gases, cooling air flow, movement during starting and stopping, vibration during running, normal and emergency line-to-line voltage, and phase rotation.

Automatic start-up by means of simulated power outage to test remote-automatic starting, transfer of load and automatic shutdown shall be performed. Engine temperature, oil pressure, and battery charge level along with generator voltage, amperes, and frequency shall be monitored throughout the test.

Following testing and acceptance, the fuel tank shall be left at a full level, and a start-up report and spare parts must be furnished to the County.

**END OF SECTION**

**RELATED DOCUMENTS:**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

**TESTS:**

Test all lines to be concealed before burying or covering with new construction. Tests shall include proper operation of lights, receptacles, and equipment, continuity of conduit system, insulation leakage and impedance, elimination of motor single phasing or reverse rotation, and ground system resistance (see also Section 16400).

After the interior wiring system is completed and at such time as the Engineer or Owner's representative may direct, the Contractor shall conduct an operating test for approval. The tests shall be performed in the presence of the authorized representative of the Engineer and the installation shall be demonstrated to operate in accordance with the requirements of this specification. The Contractor shall furnish all instruments and personnel required for the test. The Contractor shall have sufficient tools and personnel available at the scheduled inspection to remove panel fronts, device plates, etc., as required for proper inspection of equipment, devices and wiring installation as may be required by the inspectors. Any material or workmanship which does not meet with approval of the engineer shall be promptly removed, repaired or replaced as directed, at no additional cost to the Owner.

**ADJUSTMENTS:**

Adjustments shall include load balancing of all electrical phases, at devices and panels. Balance all panelboards so that the maximum deviation of any one phase from the average of all the phases shall not exceed 10%. Re-type circuit directory as required after completion of adjustment.

**CLEANING AND PAINTING:**

Prior to final inspection, all equipment having factory finishes shall be thoroughly cleaned inside and outside. All damaged surfaces shall be replaced or refinished by Contractor, with paint same as original manufacturer. Engineer shall determine whether the damaged surface is to be replaced or painted.

**RECORD DRAWINGS:**

The Contractor shall maintain accurate records of all deviations in work as actually installed from work indicated on the drawings. On completion of the project, two (2) complete sets of marked-up prints shall be delivered to the Architect.

**OPERATING AND MAINTENANCE INSTRUCTIONS:**

Unless directed otherwise elsewhere in these specifications, the Contractor shall compile and bind three sets of all manufacturer's instructions and descriptive literature on all items of equipment furnished under this work. These instructions shall be delivered to the Engineer for approval prior to final inspection. Instructions shall include operating and testing procedures and a parts list of all equipment. The Contractor shall instruct the Owner's personnel in the proper operation of all systems and equipment. The front and side of the binder shall be titled "Electrical Operating and Maintenance Instructions", with name of the job and firm name of the Contractor.

**WARRANTY:**

The Contractor shall submit upon completion of the work, a warranty by his acceptance of the contract, that all work installed will be free from defects in workmanship and materials. If, during the period of one year, or as otherwise specified from date of Certificate of Completion and acceptance of work, any such defects in

workmanship, materials, or performance appear, the Contractor shall, without cost to the Owner, remedy such defects within reasonable time to be specified in notice from the Architect. In default, the Owner may have such work done and charge cost to Contractor.

*END OF SECTION*

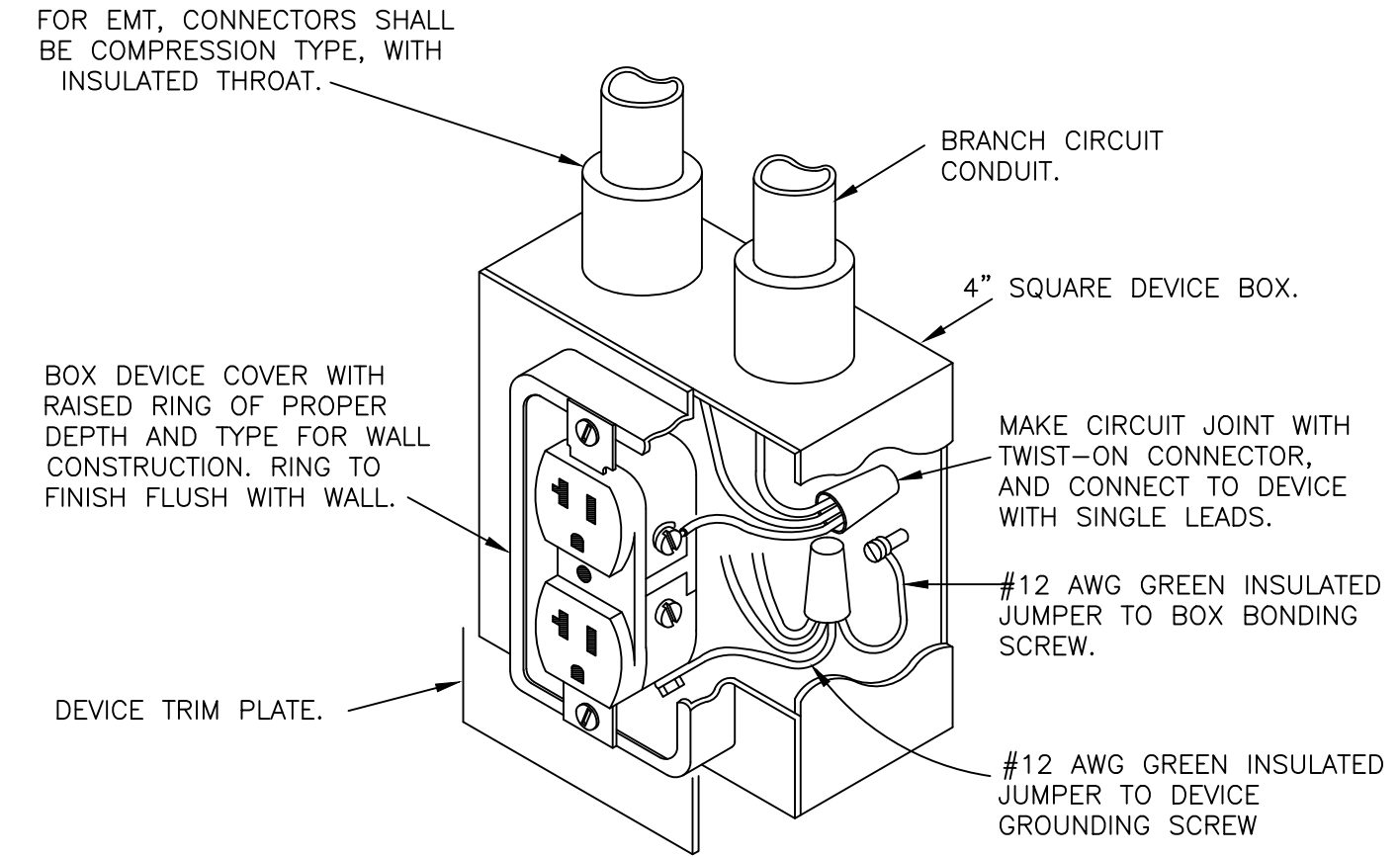
*END OF SPECIFICATIONS*

**GENERAL ELECTRICAL NOTES:**

- \* "NEC" IS DEFINED AS BEING THE CURRENT NFPA-70 THAT HAS BEEN ADOPTED BY THE NC CODE COUNCIL AND THE NC DEPT OF INSURANCE.
- 1. DO NOT SCALE THESE DRAWINGS; REFER TO LARGEST SCALE ARCHITECTURAL PLANS.
- 2. THESE DRAWINGS ARE DIAGRAMMATIC ONLY AND ARE NOT INTENDED TO SHOW MINOR DETAILS AND EXACT LOCATIONS. DESIGN ADJUSTMENTS SHALL BE ANTICIPATED BY THE CONTRACTOR TO PROVIDE A COMPLETE AND OPERATIONAL SYSTEM.
- 3. REFERENCE SPECIFICATIONS AND ARCHITECTURAL, STRUCTURAL, PLUMBING, & HVAC DRAWINGS PRIOR TO CONSTRUCTION.
- 4. ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH NEC/NFPA 70. CONTRACTOR SHALL NOTIFY ENGINEER REGARDING ANY CODE DISCREPANCIES SHOWN ON PLANS. ANY PERMIT OR INSPECTION FEES ARE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.
- 5. CONTRACTOR SHALL INSTALL, GROUND AND BOND SYSTEM PER THE NEC WITH ALL NC MODIFICATIONS.
- 6. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE METHOD & HAVE NOT BEEN VERIFIED; CONTRACTOR SHALL DETERMINE EXACT LOCATION OF UNDERGROUND UTILITIES PRIOR TO COMMENCING WORK & IS RESPONSIBLE FOR ANY DAMAGE INCURRED BY FAILURE TO DO SO. EACH PRIME CONTRACTOR PERFORMING EXCAVATIONS OR UNDERGROUND WORK SHALL BE RESPONSIBLE FOR THE LOCATION OF ANY EXISTING UTILITIES IN THE AREA OF THEIR WORK. NOTIFY THE UTILITY LOCATOR SERVICE (1-800-632-4949) AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION IN ORDER THAT EXISTING UTILITIES IN THE AREA MAY BE FLAGGED AND CONTRACTOR SHALL USE ALL CARE NECESSARY WHEN WORKING IN AREAS KNOWN OR SUSPECTED TO CONTAIN UNDERGROUND UTILITIES, INCLUDING HAND DIGGING.
- 7. THE ELECTRICAL CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ELECTRICAL FIXTURES AND EQUIPMENT WITH OTHER PRIME CONTRACTORS PRIOR TO INSTALLATION TO AVOID CONFLICTS. CONTACT ARCHITECT IF ALTERNATE INSTALLATION METHOD IS REQUIRED.
- 8. CONTRACTOR SHALL NOT PUT MORE THAN SIX (6) DUPLEX RECEPTACLES ON ANY GIVEN 1P-20A CIRCUIT UNLESS SHOWN OTHERWISE.
- 9. MINIMUM WIRE SIZE SHALL BE #12 AWG., MINIMUM CONDUIT SIZE SHALL BE 3/4".
- 10. CONDUCTORS SHALL BE TYPE THWN OR THW. BRANCH CIRCUIT CONDUCTOR SHALL NOT BE SMALLER THAN No. 12 AWG., EXCEPT WHERE SPECIFICALLY NOTED OTHERWISE. HOME RUNS ORIGINATING MORE THAN 80' AT 120V FROM PANEL LOCATION SHALL BE No. 10 AWG MINIMUM SIZE. WIRES No. 10 AWG AND SMALLER SHALL BE SOLID; WIRES No. 8 AWG AND LARGER SHALL BE STRANDED. PROVISIONS OF NEC SECTION 210-5 COLOR CODE SHALL BE STRICTLY COMPLIED WITH AND BE CONSISTENT THROUGHOUT ENTIRE SYSTEM.
- 11. ALL CIRCUITS SHALL BE PROVIDED WITH AN INSULATED EQUIPMENT GROUND CONDUCTOR SIZED IN ACCORDANCE WITH NEC TABLE 250-122. HASHMARK FOR GROUNDING CONDUCTOR IS NOT INDICATED ON THESE DRAWINGS. RACEWAY SHALL NOT BE USED AS EQUIPMENT GROUND.
- 12. ALL CONDUIT SHALL BE CONCEALED UNLESS OTHERWISE NOTED. ALL EMPTY CONDUIT SHALL HAVE A PULL WIRE.
- 13. ALL CONDUIT SHALL BE ELECTRICAL METALLIC TUBING. EMT SHALL NOT BE INSTALLED WHERE IT MAY BE SUBJECT TO PHYSICAL DAMAGE, WHERE IT WILL BE SUBJECT TO SEVERE CORROSIVE INFLUENCE, WHERE THE SIZE IS LARGER THAN 2", OR WHERE TUBING, ELBOWS, COUPLINGS, AND FITTINGS WOULD BE IN CONCRETE OR IN DIRECT CONTACT WITH THE EARTH. SCHEDULE 40 PVC CONDUIT SHALL BE USED IN ALL CONCRETE FLOOR SLABS AND WHEN IN DIRECT CONTACT WITH THE EARTH. PVC CONDUIT SHALL BE USED FOR ALL CONDUIT INSTALLED IN MASONRY WALLS AND SHALL TRANSITION BACK TO EMT OR RIGID CONDUIT AT THE TOP OF THE MASONRY WALL. PVC CONDUIT IS NOT ALLOWED IN STUD WALLS.
- 14. ALL CONDUIT ON THE EXTERIOR OF THE BUILDING SHALL BE EMT OR SHALL BE RIGID CONDUIT WHERE IT WILL BE EXPOSED TO PHYSICAL DAMAGE. PVC CONDUIT IS NOT ACCEPTABLE TO BE USED ON THE EXTERIOR OF THE BUILDING UNLESS IT IS IN DIRECT CONTACT WITH THE EARTH.
- 15. CONDUIT SHALL NOT BE RUN EXPOSED IN FINISHED AREAS UNLESS APPROVED BY ARCHITECT / OWNER. CONDUIT SHALL BE INSTALLED PARALLEL OR PERPENDICULAR TO WALL & FLOOR CONSTRUCTION IN FIRST CLASS WORKMANSHIP MANNER. CONDUIT SHALL BE BENT IN ACCORDANCE WITH NEC MINIMUM RADIUS REQUIREMENTS. WHERE SCHED 40 PVC IS INSTALLED UNDER FLOOR SLABS, THE ELBOWS REQUIRED TO TURN THE RACEWAY UP INTO CABINETS, EQUIPMENT, ETC., WHERE SUBJECT TO DAMAGE, SHALL BE OF RIGID STEEL.
- 16. ALL CONDUIT FITTINGS SHALL BE COMPRESSION TYPE WITH INSULATED THROATS. ALL EXTERIOR CONDUIT FITTINGS SHALL BE LISTED FOR USE IN WET LOCATIONS PER NEC ARTICLE 314.
- 17. SERVICE ENTRANCE CONDUCTORS SHALL BE IN CONDUIT (RIGID OR PVC). EXTERIOR CONDUIT EXPOSED ABOVE SLAB SHALL BE RIGID. INTERIOR CONDUIT EXPOSED SHALL BE ELECTRICAL METALLIC TUBING (EMT). EMT SHALL BE COLD-ROLLED STEEL TUBING WITH A COATING ON THE OUTSIDE AND PROTECTED ON THE INSIDE BY A ZINC, ENAMEL, OR EQUIVALENT CORROSION RESISTANT COATING AND CONFORMING TO THE REQUIREMENTS OF ANSI C 80.3-1996 OR LATER EDITION. ALL UNDERGROUND CONDUIT SHALL BE UL LISTED SCHED 40 PVC CONFORMING TO ARTICLES 352 & 300 OF THE NEC. WHERE SCHED 40 PVC IS INSTALLED BELOW GRADE OR UNDER FLOOR SLABS, THE ELBOWS REQUIRED TO TURN THE RACEWAY UP INTO CABINETS, EQUIPMENT, ETC., SHALL BE OF RIGID STEEL AND SHALL CONTINUE AS RIGID STEEL TO THE CABINET, EQUIPMENT, ETC. FEEDER CIRCUITS SHALL BE IN CONDUIT.
- 18. ALL JUNCTION OR DEVICE BOXES SHALL HAVE A COVER; PROVIDE COVER PLATES AS SPECIFIED IN SECTION 16140.
- 19. ALL 1P-20A CIRCUITS SHALL BE 2-#12 & 1-#12G IN 3/4" C WITH NO SHARED NEUTRALS U.N.O.
- 20. WHERE DISTANCE TO FIRST OUTLET ON A 20 AMP CIRCUIT EXCEEDS 50 FEET, MINIMUM SIZE OF CONDUCTOR TO BE #10 AWG TO FIRST OUTLET
- 21. ALL ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH ALL VOLUMES OF THE NCSBC, INSPECTORS HAVING JURISDICTION, AND ALL OTHER APPLICABLE CODES AND ORDINANCES.
- 22. EACH PIECE OF ELECTRICAL GEAR, EQUIPMENT, ETC., SHALL BEAR A "UL" LABEL.
- 23. ALL HOLES CUT IN FLOOR, CEILING AND WALLS SHALL BE CORE-DRILLED OR SAWED.
- 24. ROOF DECKING SHALL NOT BE PENETRATED TO SUPPORT ELECTRICAL ITEMS.
- 25. ALL PENETRATIONS THROUGH WALLS, FLOORS, CEILINGS, ETC., SHALL BE SEALED. PENETRATIONS THROUGH FIRE OR SMOKE RATED ASSEMBLIES SHALL BE SEALED TO THE SAME RATING OF THE ASSEMBLY.
- 26. ALL EMERGENCY AND EXIT LIGHTS SHALL BE CONNECTED TO THE UNINTERRUPTED SIDE OF THE LOCAL LIGHTING CIRCUIT.
- 27. PROVIDE AND INSTALL ENGRAVED PHENOLIC LABELS ON ALL ELECTRICAL GEAR, DISCONNECTS, ETC. FASTEN WITH SCREW FASTENERS.
- 28. WHERE PROVIDED BY E.C., DISCONNECTS SHALL BE HEAVY DUTY NEMA-1 RATED AT ALL INTERIOR LOCATIONS INDICATED AND HEAVY DUTY NEMA-3R RATED AT ALL EXTERIOR LOCATIONS INDICATED ON THESE DRAWINGS.
- 29. VERIFY WITH OWNER LOCATION/TYPE OF ALL FIXTURES, PANEL BOXES, OUTLET PLACEMENT, ETC. BY HOLDING AN ELECTRICAL WALK THROUGH ON THE BUILDING SITE ONCE FRAMING IS COMPLETED.
- 30. ELECTRICAL BOXES INSTALLED IN U.L. RATED WALLS SHALL BE LOCATED A MINIMUM OF 2'-0" FROM ANY OTHER ELECTRICAL BOX IN THAT WALL.
- 31. CABLE LOCATED IN PLENUMS SHALL BE PLENUM-RATED. ALL CABLE INSTALLED IN AREAS WITH EXPOSED STRUCTURE SHALL BE IN CONDUIT.
- 32. E.C. SHALL INSTALL COMPLY WITH ANSI A117.1 FOR OUTLET AND CONTROL SWITCH MOUNTING HEIGHTS FOR ADA ACCESSIBILITY.
- 33. E.C. SHALL BE RESPONSIBLE FOR ALL LINE SIDE AND LOAD SIDE WIRING ON ALL EQUIPMENT REQUIRING ELECTRICAL POWER, INCLUDING EQUIPMENT PROVIDED BY OTHERS. E.C. SHALL BE RESPONSIBLE FOR LINE SIDE WIRING AND INSTALLING DISCONNECT SWITCHES FOR EQUIPMENT PROVIDED BY OTHERS. DISCONNECT SWITCHES FOR EQUIPMENT PROVIDED BY OTHERS SHALL BE PROVIDED BY THE RESPECTIVE CONTRACTORS. LOAD SIDE WIRING FROM DISCONNECT SWITCH SHALL BE BY E.C. AND ALL FINAL CONNECTIONS TO EQUIPMENT PROVIDED BY OTHERS SHALL BE BY THE RESPECTIVE CONTRACTOR. FUSING FOR EQUIPMENT PROVIDED BY OTHERS SHALL BE PROVIDED BY THE RESPECTIVE CONTRACTOR. SEE "ELECTRICAL CONNECTION DETAIL".
- 34. "PROVIDE" IS DEFINED AS FURNISH AND INSTALL AS PER MANUFACTURER'S RECOMMENDATIONS.
- 35. THE TERM "VERIFY" RELATIVE TO THESE DRAWINGS SHALL BE DEFINED AS OBTAINING EQUIPMENT INSTALLATION INSTRUCTIONS FROM EQUIPMENT SUPPLIER OR OBTAINED OWNER'S REPRESENTATIVE'S APPROVAL.
- 36. ALL CIRCUITS SHOWN ON THESE PLANS ARE INTENDED TO BE IN THEIR OWN RACEWAY. E.C. MAY ROUTE MULTIPLE CIRCUITS IN A SINGLE RACEWAY BUT SHALL DERATE ALL CONDUCTORS IN ACCORDANCE WITH NEC TABLE 310.15(C)(1).
- 37. ALL SERVICE ENTRANCE MAIN BREAKERS 1000 AMPS OR LARGER SHALL BE GFI MAIN BREAKERS.

**ELECTRICAL LEGEND** (REFER TO MOUNTING HEIGHT SCHEDULE FOR MOUNTING HEIGHT INFORMATION)

	FLUORESCENT LIGHT FIXTURE, 2x4 FT.		WALL SWITCH, SINGLE POLE, 20 AMP, 120 V., "SPEC. GRADE"
	FLUORESCENT LIGHT FIXTURE NIGHT LIGHT		WALL SWITCH, DIMMER, 20 AMP, 120 V., "SPEC. GRADE"
	FLUORESCENT STRIP LIGHT, 8 FT.		WALL SWITCH, 3-WAY, 20 AMP, 120 V., "SPEC. GRADE"
	FLUORESCENT STRIP LIGHT, 4 FT.		MANUAL MOTOR STARTER, 20A, 120V
	FLUORESCENT LIGHT FIXTURE, 1x4 FT.		DOUBLE GANG WALL SWITCH, 20 AMP, 120V., "SPEC. GRADE"
	FLUORESCENT LIGHT FIXTURE, 2'x2'		WALL MOUNTED OCCUPANCY SENSOR
	POLE MOUNTED LIGHT FIXTURE, AS SPECIFIED		CEILING MOUNTED OCCUPANCY SENSOR
	LIGHT		NON-FUSED DISCONNECT SWITCH, 240V, 30A, U.N.O.
	FLUORESCENT LIGHT FIXTURE WALL SCONCE		FUSED DISCONNECT SWITCH
	OWNER SELECTED PENDANT MOUNTED		DISCONNECT FUSE SIZE
	EXTERIOR TWO-HEAD LIGHT		FIRE ALARM MANUAL PULL STATION
	EXTERIOR DOOR LIGHT		FIRE ALARM HORN/STROBE
	LIGHT AND EXHAUST FAN COMBINATION		FIRE ALARM STROBE
	EXHAUST FAN		SMOKE DETECTOR
	H.I.D. LIGHT FIXTURE, AS SPECIFIED.		HEAT DETECTOR, CEILING MOUNTED
	RECESSED OR SURFACE MOUNTED ROUND FIXTURE		DUCT SMOKE DETECTOR
	RECESSED NIGHT LIGHT		FIRE ALARM CONTROL PANEL, FLUSH MOUNTED.
	H.I.D. WALL PACK		GROUND - EXTEND AND CONNECT TO APPROVED GROUND
	BOLLARD EXTERIOR LIGHT		ELECTRICAL PANEL - SURFACE MOUNTED.
	EXTERIOR GROUND MOUNTED FLOOD LIGHT		ELECTRICAL PANEL - FLUSH MOUNTED.
	JUNCTION BOX		SWITCHED CIRCUIT
	TELEPHONE OUTLET WITH COVER SEE DETAIL FOR INSTALLATION INSTRUCTIONS.		PANEL NAME-CIRCUIT #
	DATA/LAN OUTLET WITH COVER. SEE DETAIL FOR INSTALLATION INSTRUCTIONS.		WEATHER PROOF
	EXIT LIGHT		GROUND FAULT INTERRUPTER
	EMERGENCY EXIT LIGHT		ABOVE FINISHED FLOOR
	EMERGENCY LIGHT WALL MOUNTED UNLESS NOTED OTHERWISE.		NIGHT LIGHT
	DUPLEX RECEPTACLE, 20 AMP, 120 V., "SPEC. GRADE"		UNLESS NOTED OTHERWISE
	GFI DUPLEX RECEPTACLE, 20 AMP, 120 V., "SPEC. GRADE"		ISOLATED GROUND
	220 V. RECEPTACLE, MATCH APPLIANCE PLUG		LIGHTING CONTACTOR
	FLUSH MOUNTED FLOOR DUPLEX RECEPTACLE		ELECTRIC WATER COOLER
	FLUSH MOUNTED FLOOR DATA/LAN OUTLET		ABOVE COUNTER
	QUAD RECEPTACLE, 20 AMP, 120 V., "SPEC. GRADE"		BELOW COUNTER



**TYPICAL DUPLEX RECEPTACLE INSTALLATION**  
SCALE: NONE

**ELECTRICAL SUMMARY**

**ELECTRICAL SYSTEM AND EQUIPMENT**

**METHOD OF COMPLIANCE**

ENERGY CODE: PRESCRIPTIVE  PERFORMANCE   
ASHRAE 90.1: PRESCRIPTIVE  PERFORMANCE

**LIGHTING SCHEDULE**

LAMP TYPE REQUIRED IN FIXTURE: VARIES (SEE LIGHT FIXTURE SCHEDULE THIS DRAWING)  
NUMBER OF LAMPS IN FIXTURE: VARIES (SEE LIGHT FIXTURE SCHEDULE THIS DRAWING)  
BALLAST TYPE IN FIXTURE: VARIES (SEE LIGHT FIXTURE SCHEDULE THIS DRAWING)  
NUMBER OF BALLASTS IN FIXTURE: VARIES (SEE LIGHT FIXTURE SCHEDULE THIS DRAWING)  
TOTAL WATTAGE PER FIXTURE: VARIES (SEE LIGHT FIXTURE SCHEDULE THIS DRAWING)  
TOTAL INTERIOR WATTAGE SPECIFIED VS. ALLOWED: \* NOT IN CONTRACT \*  
EXTERIOR LIGHTING ZONE: 3  
EXTERIOR LIGHTING WATTAGE SPECIFIED VS. ALLOWED: \*\* 142W VS 750W \*\*

**ADDITIONAL PRESCRIPTIVE COMPLIANCE**

C406.2 More Efficient HVAC Equipment Performance  
 C406.3 Reduced Lighting Power Density  
 C406.4 Enhanced Digital Lighting Controls  
 C406.5 On-Site Renewable Energy  
 C406.6 Dedicated Outdoor Air System  
 C406.7 Reduced Energy Use in Service Water Heating

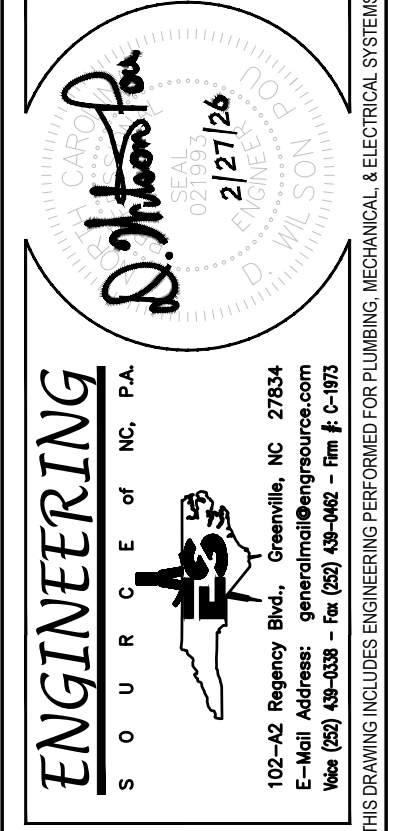
**DESIGNER STATEMENT:**  
To the best of my knowledge and belief, the design of this building complies with the electrical system and equipment requirements of the North Carolina Building Code, Energy Conservation Code.

SIGNED:

NAME: D. WILSON POU, P.E.

TITLE: PROFESSIONAL ENGINEER

**\* NOT IN CONTRACT \***  
**\*\* 1 WALL PACK @ 30W, 1 SITE LIGHT @ 112W \*\***



**ENGINEERING**  
S O U R C E S  
102-02 Regency Bldg., Greenville, NC 27834  
Tel: 252-338-1111 Fax: 252-338-1112  
www.dwilsonpou.com  
THIS DRAWING INCLUDES ENGINEERING PROFESSIONAL SEAL/STAMPING, MECHANICAL, ELECTRICAL SYSTEMS

DATE: 2-27-2026  
SCALE: 1/8"=1'-0"  
DRAWN BY: CDP  
CHKD. BY: DWP  
JOB NO.: ES25040

Renovation for:  
**BEAUFORT COUNTY DSS**  
GENERATOR ADDITION  
632 W. 5TH ST. WASHINGTON, NC 27889

REVISIONS

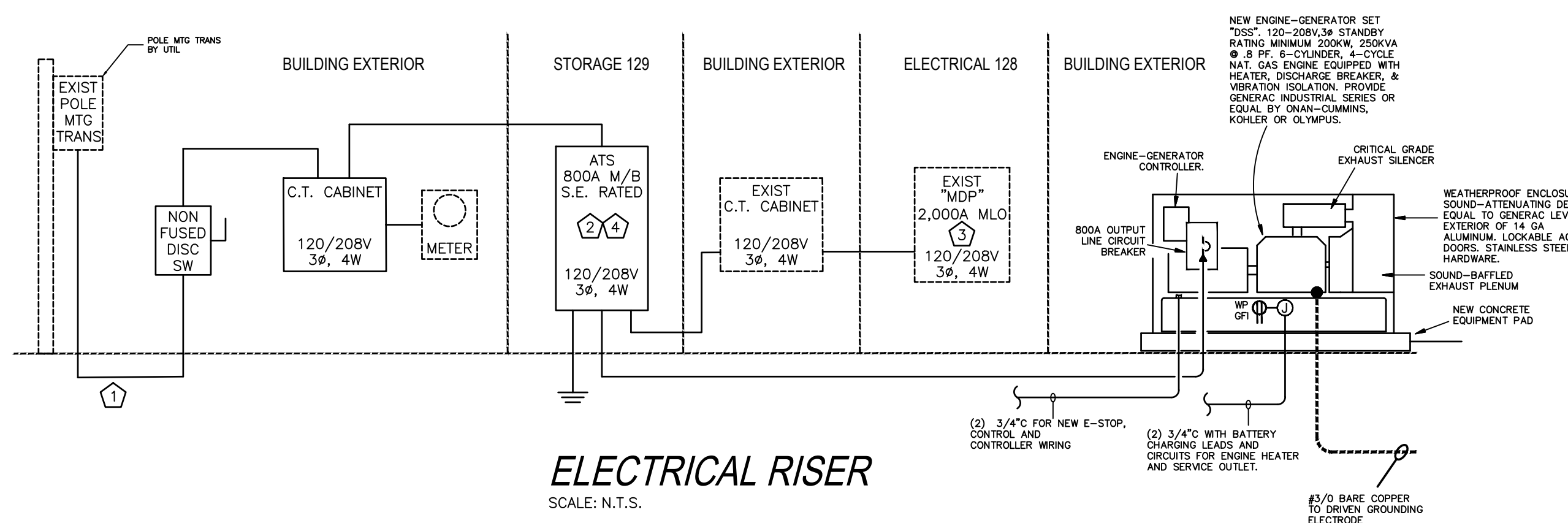
SHEET  
**E001**  
OF

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NEW PANELBOARD SCHEDULE - "P"																													
MAIN: 225A MCB				VOLTAGE: 208/120				PHASE: 3				WIRE: 4				MOUNTING: SURFACE				AIC: 22,000				BUS BARS: COPPER					
CKT #	BKR TRIP	POLE	WIRE SIZE	COND SIZE	DESCRIPTION	LOAD (KVA)				LOAD (KVA)				DESCRIPTION	COND SIZE	WIRE SIZE	POLE	BKR TRIP	CKT #										
						LTG	REC	MTR	A/C	HTG	KIT	MISC	LTG							REC	MTR	A/C	HTG	KIT	MISC				
1	20	2	12	3/4"	DUCTLESS															RECEPT - PHONES	3/4"	12	1	20	2				
3									0.5																	4			
5	20	1	12	3/4"	* GENERATOR CONTROLS																TELCOM UPS	3/4"	10	2	30	4			
7	20	1	12	3/4"	* GENERATOR BATTERY CHARGER																					6			
9	20	1	12	3/4"	* GENERATOR BLOCK HEATER																					8			
11	20	1	12	3/4"	* RECEPT - EXT. BY GENERATOR	0.2																				10			
13	20	1			SPARE																					12			
15	20	1			SPARE																					14			
17	20	1			SPARE																					16			
19	20	1			SPARE																					18			
21	20	1			SPARE																					20			
23	20	1			SPARE																					22			
25	20	1			SPARE																					24			
27	20	1			SPARE																					26			
29	20	1			SPARE																					28			
31	20	1			SPARE																					30			
33	20	1			SPARE																					32			
35	20	1			SPARE																					34			
37	20	1			SPARE																					36			
39	20	1			SPARE																					38			
41	20	1			SPARE																					40			
																										42			
LIGHTING (KVA):						0.0	0.0	0.2	1.0	0.0	0.0	0.0	0.0	1.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	CONNECTED LOAD (KVA):				6.7
RECEPTACLES (KVA):						0.4															DEMAND LOAD (KVA):				17.9				
MOTORS (KVA):						1.0															CONNECTED LOAD (AMPS):				18.5				
A/C (KVA):						0.0															DEMAND LOAD (AMPS):				49.7				
HEATING (KVA):						0.0																							
KITCHEN (KVA):						0.0																							
MISCELLANEOUS (KVA):						5.3																							

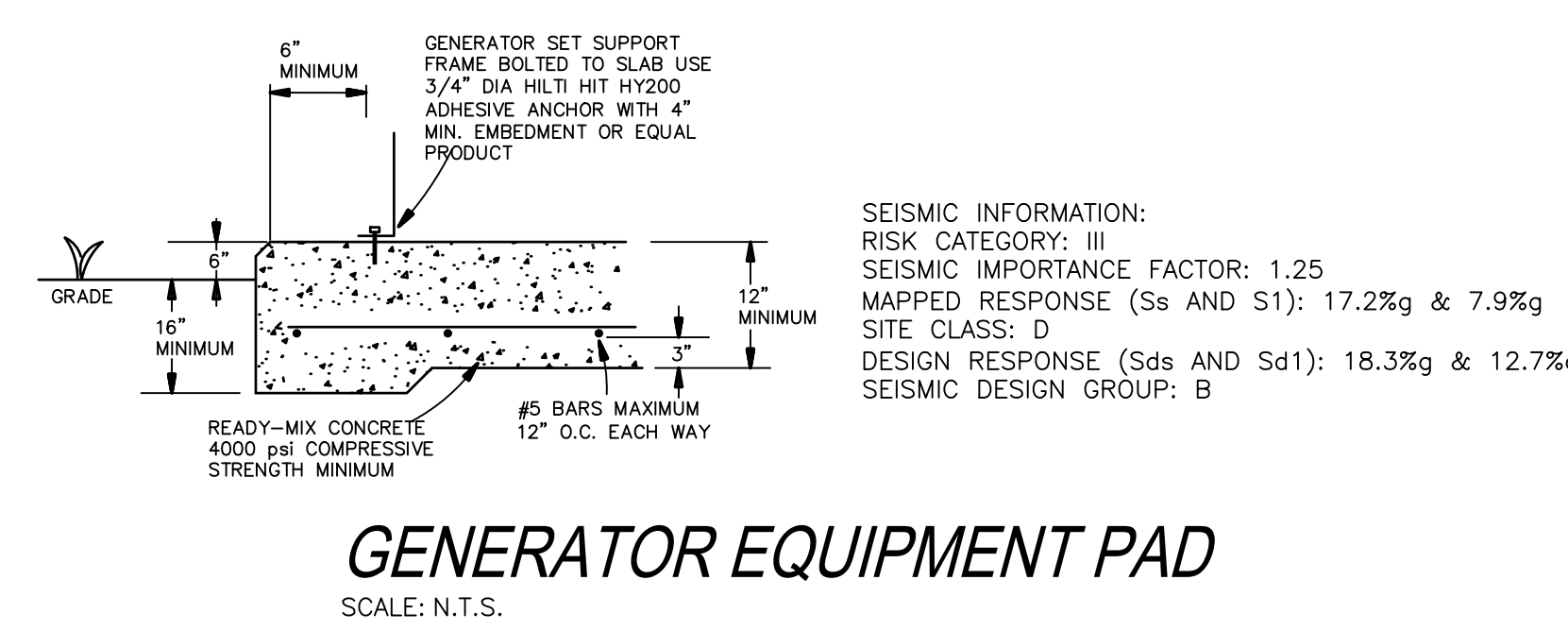
NOTES: \* INDICATES REPURPOSED BREAKER

P DEMAND CALCS						
LIGHTING	0.00	KVA	X 125 % =	0.0	KVA	
RECEPTAC TOTAL	0.40	KVA				
1ST	10.00	KVA	X 100 % =	0.4	KVA	
REMAIN	0.00	KVA	X 50 % =	0.0	KVA	
MOTORS	1.00	KVA	X 100 % =	1.0	KVA	
LARGEST	0.00	KVA	X 125 % =	0.0	KVA	
A/C	0.00	KVA	X 100 % =	0.0	KVA	
WATER HEATING	0.00	KVA	X 125 % =	0.0	KVA	
EXISTING	9.00	KVA	X 125 % =	11.3	KVA	
KITCHEN	0.00	KVA	X 65 % =	0.0	KVA	
MISCELLANEOUS	5.25	KVA	X 100 % =	5.3	KVA	
TOTAL	=	49.7	amps	=	17.9	KVA

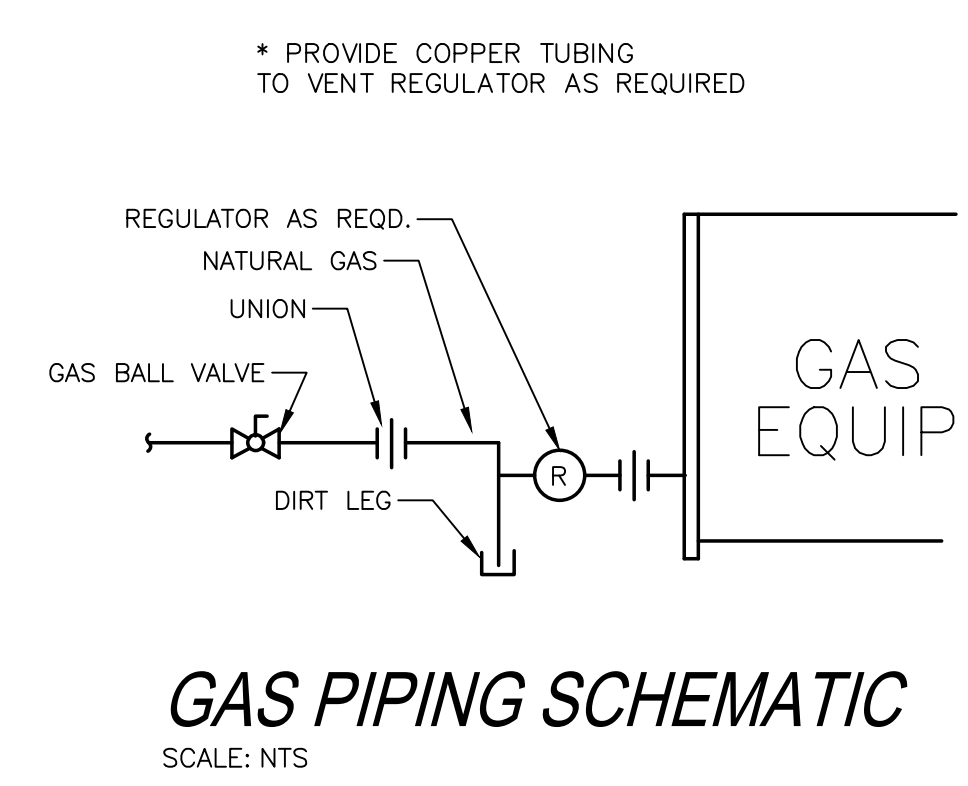


**ELECTRICAL RISER NOTES:**

- COORDINATE UNDERGROUND SERVICE WITH UTILITY CO. PROVIDE ALL CONDUIT, WIRING, LABOR, AND/OR OTHER WORK AS REQUIRED BY UTILITY CO.
- GROUND SERVICE ENTRANCE PANEL "ATS" AS REQUIRED BY "SERVICE ENTRANCE GROUNDING DETAIL" THIS DRAWING.
- EXIST. S.E. RATED "MDP". REMOVE BONDING JUMPER BETWEEN THE GROUND AND NEUTRAL BARS.
- ATS TO HAVE AN INTEGRAL SECONDARY REMOTE KILL SWITCH TO SHUT DOWN GENSET IN EMERGENCIES.



SEISMIC INFORMATION:  
RISK CATEGORY: III  
SEISMIC IMPORTANCE FACTOR: 1.25  
MAPPED RESPONSE (S<sub>s</sub> AND S<sub>1</sub>): 17.2%g & 7.9%g  
SITE CLASS: D  
DESIGN RESPONSE (S<sub>ds</sub> AND S<sub>d1</sub>): 18.3%g & 12.7%g  
SEISMIC DESIGN GROUP: B



\* PROVIDE COPPER TUBING TO VENT REGULATOR AS REQUIRED

**ENGINEERING**  
S O U R C E s o f N C . P A .  
102-02 Regency Blvd., Greenville, NC 27834  
Call: 252-338-1111 Fax: 252-338-1112  
www.dshannon.com  
D. Shannon  
2/27/26

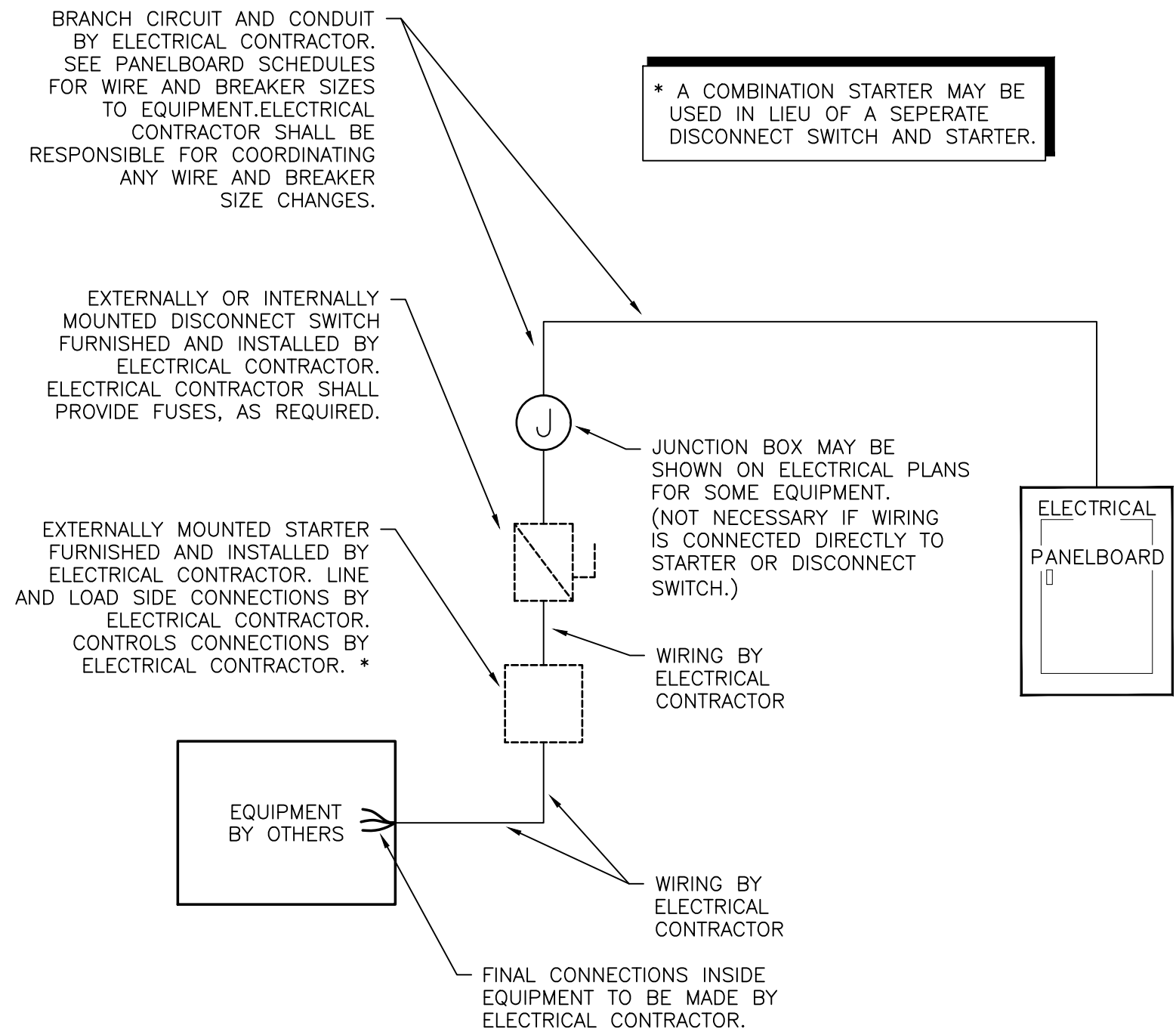
DATE: 2-27-2026  
SCALE: 1/8"=1'-0"  
DRAWN BY: CDP  
CHKD. BY: DWP  
JOB NO.: ES25040

Renovation for:  
**BEAUFORT COUNTY DSS**  
GENERATOR ADDITION  
632 W. 5TH ST. WASHINGTON, NC 27889

REVISIONS

SHEET  
**E002**  
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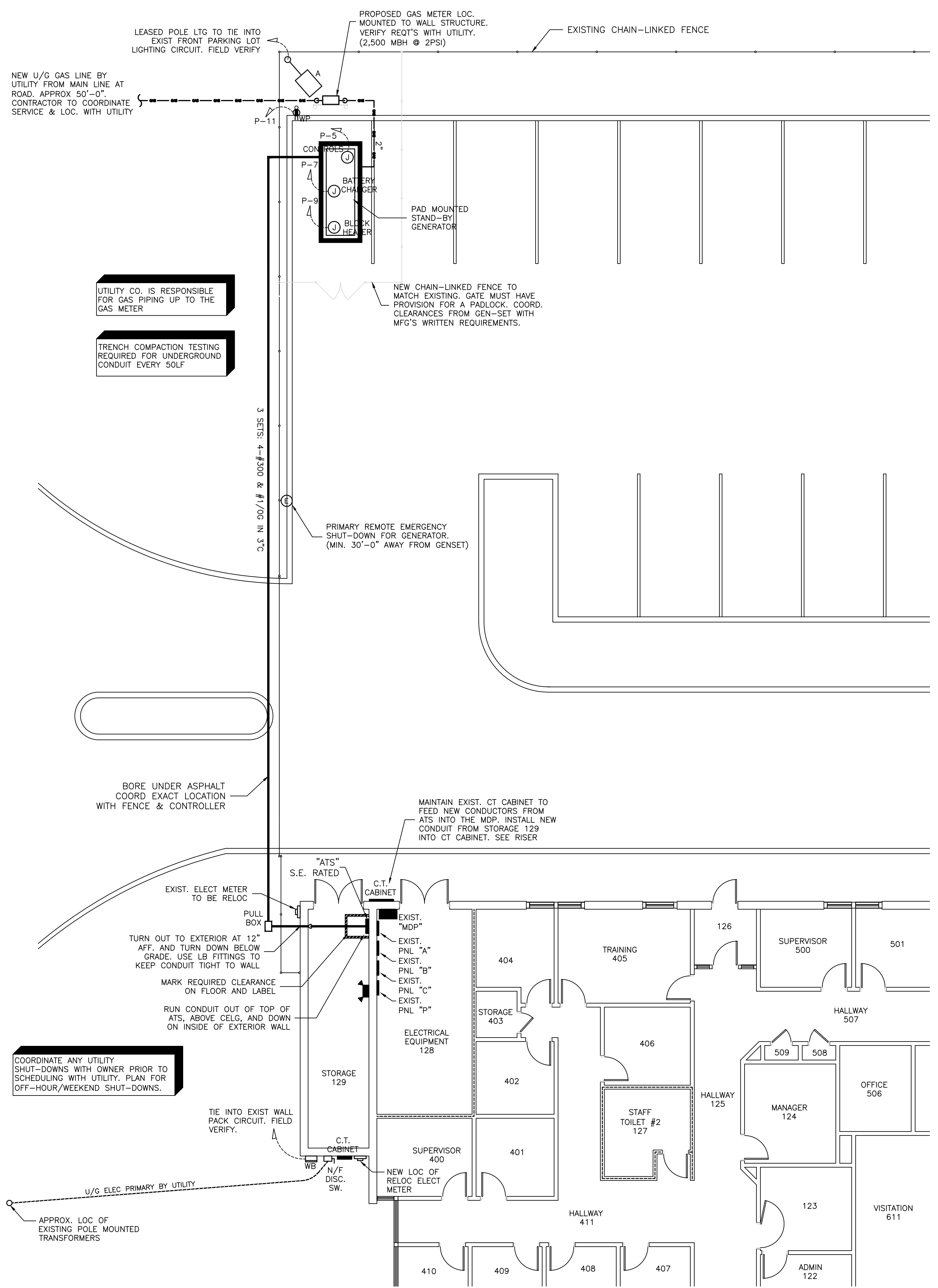


**ELECTRICAL CONNECTION DETAIL**  
SCALE: N.T.S

LIGHT FIXTURE SCHEDULE					
TYPE	DESCRIPTION	LAMPS	VOLTS	WATTS	B. F.
A	LEASED POLE MOUNTED SIGHT LIGHT INSTALLED BY WASHINGTON POWER.	LED	MVOLT	112W	N/A
WB	EXTERIOR LED WALL PACK WITH HEAVY DUTY TWO PIECE, DIE-CAST ALUMINUM HOUSING WITH CLEAR PRISMATIC BOROSILICATE GLASS LENS, MEDIUM SIZE AND UL LISTED FOR WET LOCATIONS. PROVIDE: PHILIPS DAY-BRITE #: WP60-SCT-G2-10-BZ OR LEDALUX #: MWPO8-30w-27v-40K-D-PO OR LITHONIA #: TWR1-LED-3-40K-MVOLT-PE	LED	UNV	30W	N/A
	AUTOMATIC, SELF-CONTAINED, SELF DIAGNOSTIC, MAINTENANCE FREE 2-HEAD EMERGENCY LIGHT. UL 924 LISTED AND NFPA 101 COMPLIANT, ABS THERMOPLASTIC HOUSING, PILOT & STATUS INDICATING LIGHTS. SELF DIAGNOSTICS SHALL INCLUDE CONTINUOUS SELF CHECKS AND 30 MINUTE FULL LOAD TEST WITH CHARGER OFF EVERY 30 DAYS. PROVIDE EXITRONIX #: NFT-W-G2 OR WILLIAMS #: EMER/LED-WHT-HL-SDT OR HUBBELL #: CU2SD	2-10W	UNV 277/ 6V	20W	N/A

**ENGINE - GENERATOR SYSTEM :**

ENGINE-GENERATOR SET SHALL BE GENERAC OR EQUAL BY ONAN-CUMMINS OR KHOLER.  
MIN STANDBY RATING OF 200KW OR AS SHOWN ON PLAN WITH 120/208V THREE PHASE 4-WIRE OUTPUT.  
PROVIDE WITH NATURAL GAS DRIVEN ENGINE.  
4 OR 6 CYLINDER 4 CYCLE ENGINE. RADIATOR COOLED. INCLUDE JACKET WATER HEATER WITH T'STAT. ENGINE CONTROL PANEL WITH AUTOMATIC SHUT-DOWNS ON OVER-TEMPERATURE, LOW OIL PRESSURE, ETC. HEAVY DUTY BATTERIES. HI-LO RATE AUTOMATIC CHARGER SYSTEM.  
ALTERNATOR SHALL BE BRUSHLESS ROTATING FIELD TYPE, WITH PERMANENT MAGNET EXCITATION SYSTEM. WINDINGS SHALL BE VACUUM-IMPREGNATED WITH FUNGUS-RESISTANT EPOXY VARNISH.  
UNIT SHALL BE PROVIDED WITH WEATHERPROOF HOUSING. HOUSING SHALL BE OF HEAVY-GAUGE ALUMINUM, WITH STAINLESS STEEL HARDWARE. HOUSING SHALL BE DESIGNED FOR LEVEL II SOUND ATTENUATION, WITH RADIATOR AND CRITICAL GRADE SILENCER INTERNALLY MOUNTED AND BAFFLED.  
MANUAL TRANSFER SWITCH SHALL BE ASCO 300-D SERIES OR EQUAL FOR GENERATOR MANUFACTURER. SWITCH SHALL BE FOR 120/208V THREE-PHASE FOUR-WIRE OPERATION, RATED 800A AS A MINIMUM. UL LABEL FOR SERVICE ENTRANCE USE. SERVICE ENTRANCE BREAKER SHALL BE SEPARATE FROM SWITCH OVER CIRCUIT BREAKER DISCONNECTS FOR NORMAL AND EMERGENCY INCOMING FEEDS. 3-POLE TRANSFER, WITH SOLID NEUTRAL, RATED FOR USE ON SYSTEM WITH AVAILABLE FAULT CURRENT OF 22,000A. EQUIP WITH INTEGRAL SURGE SUPPRESSION DEVICE.  
MICROPROCESSOR CONTROL INCLUDING ADJUSTABLE TIME DELAYS ON ENGINE START, TRANSFER, RE-TRANSFER, AND SHUT-DOWN, AUTOMATIC EXERCISE CONTROL, WITH SELECTOR SWITCH FOR LOAD OR NO-LOAD TEST, SYNC-CHECK RELAY FOR TRANSFER IN EITHER DIRECTION, MANUAL OPERATING LEVER. ENCLOSURE SHALL BE NEMA 3R RATED STEEL, EQUIP WITH HEATER AND T'STAT, ON FRONT OF ENCLOSURE, PROVIDE LED PILOT LIGHTS INDICATING SWITCH STATUS, AND EMERGENCY SHUT-DOWN PUSH-BUTTON.



**ELECTRICAL PLAN**  
SCALE: 1/8"=1'-0"

**ENGINEERING**  
S O U R C E s P A  
2/27/26  
102-A2 Regency Blvd., Greenville, NC 27834  
Call: 252-333-1111 Fax: 252-333-1112  
www.dss-engineering.com  
THIS DRAWING INCLUDES ENGINEERING PROFESSIONAL SEAL, TECHNICAL, ELECTRICAL SYSTEMS

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CHKD. BY DWP  
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