

Group Health Cooperative of South Central Wisconsin

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REQUEST FOR PROPOSALS (RFP)

4 – Generator

Group Health Cooperative of South Central Wisconsin (“GHC-SCW”) has hired **Iconica, Inc. (“Iconica”)** as their Architect, Engineer and Construction Manager and is seeking proposals from qualified contractor/vendors to assist with repair and/or mitigation of GHC-SCW’s Sauk Trails Clinic damaged as a result of the August – September 2018 floods.

GHC-SCW and Iconica will select the qualified firm(s) that is best suited to support and represent GHC-SCW in accordance with the criterion outlined below.

Please submit your Proposals to Iconica, Inc. **via email** no later than **March 15, 2019, at 12:00 p.m. Central Standard Time (CST)**, to Zain Heitz at zain.heizt@iconicacreates.com.

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1. INTRODUCTION AND INFORMATION

1.1 General

It is the intent of Group Health Cooperative of South Central Wisconsin (“GHC-SCW”) to contract with a contractor/vendor, hereafter referred to as the "Contractor", to furnish all materials, equipment and labor for its Sauk Trails Clinic Project (hereinafter the “Project”). All Contractors are responsible for any addendums issued for this Project.

1.2 Project Timeline

RFP Posted	2/26/19
All Questions Due to Iconica	3/11/19 by 10:00 am
All Questions Answered by Iconica	3/13/19 by 2:00 pm
RFP Responses Due from Contractors	3/15/19 by 12:00 pm
GHC-SCW Selection of Contractor (tentative)	3/22/19

1.3 Pre-Proposal and Site Inspection Meeting

If desired, request date and time through Iconica by contacting Zain Heitz at zain.heitz@iconicacreatives.com.

1.4 Selection Criteria

Selection based on qualified, responsible and responsive proposer.

1.5 Proposal Questions

All questions related to this RFP must be in writing and received by Zain Heitz, Project Manager, no later than 3/11/19 by 10:00 am. Email questions to zain.heitz@iconicacreatives.com. Phone call and faxed questions will not be accepted.

Answers to all written questions will be re-issued in the form of an addendum and entered on the GHC-SCW website, on 3/13/19 by 2:00 pm. It is the responsibility of all interested Contractors to access the web site for this information.

1.6 Project Changes

GHC-SCW reserves the right to make changes to this Project. Any changes in the scope of work shall be mutually agreed upon by the GHC-SCW and the Contractor.

1.7 Project Representative

Contractor shall provide a Project Representative who will act as a single point of contact for GHC-SCW.

1.8 Guarantees and Warranties

Guarantees and warranties on workmanship and materials shall be stated in your proposal.

1.9 Proposal and Performance/Payment Bonds

Bid, Performance, and Payment Bonds are not required for this solicitation due the lack of construction services being provided. Additional bonding requirements may be introduced at the time of contracting dependent on the proposed schedule of payment relative to the status of equipment delivery.

1.10 State of Wisconsin Requirements

This contract shall be subject to the laws of the State of Wisconsin. In connection with the performance of work under this contract, the Contractor agrees not to discriminate against any employee or applicant for employment because of age, race, religion, color, handicap, sex, physical condition, developmental disability as defined in Wis. Stat. § 51.01(5), Stats., sexual orientation as defined in Wis. Stat. § 111.32(13m), or national origin.

1.11 Contractor Verification Prior to Award

Contractor's financial solvency may be verified through financial background checks prior to contract award. GHC-SCW reserves the right to reject RFPs based on information obtained through these background checks if it's deemed to be in the best interest of GHC-SCW.

1.12 Insurance Requirements

Any issue of insurance and/or equipment warranty shall be introduced at the time of contracting.

1.13 Additional Contract Clauses

Contractor shall be responsible for adhering to the additional clauses outline in Appendix E, as applicable to the scope of work.

1.14 Other

- 1.14.1 All work shall conform to all applicable Industry, Federal, State and Local Laws, Codes, Ordinances, OSHA requirements and Standards.
- 1.14.2 Site protection/cleanup: Contractor is responsible for the proper handling of materials to include discard of debris and keeping the work site clean. Any cutting of sidewalks or parking areas must be patched accordingly. Contractor is responsible for restoring any ground or landscaping disruption due to construction of this Project.
- 1.14.3 All Contractors performing work are required to have a Contractor's License for the State of Wisconsin. All Licenses for any contractors must be current on the day of bidding and throughout the length of the Project.
- 1.14.4 All Contractors must indicate in their proposals if they intend to apply for any rebate incentives from Focus on Energy related to this Project.

1.14.5 Rejection of proposals: GHC-SCW reserves the right to accept or reject any or all proposals and to waive any informality in proposals.

2. STATEMENT OF WORK AND REQUIRED SUBMITTALS

2.1 Scope of Work

See Attachment A for the Project’s Scope of Work.

2.2 Submittal Requirements

2.2.1 General Submittal: Contractors shall submit one electronic copy of their proposal to Zain Heitz at zain.heitz@iconicacreatives.com by the deadline stated above.

2.2.2 Valuation of Submittal: GHC-SCW will base its scoring of proposals on the following Score Card criteria:

Factors	Weight/Pts
Contractor Qualifications and Experience	0-20 pts
Conformance with Scope of Work and specifications	0-25 pts
Pricing in response to Attachment A	0-25 pts
Material and Shop Drawing Lead Times	0-25 pts
Minority, women-owned and other small business participation	0-5 pts

2.2.3 Required Documentation

i. *Main Proposal:*

- Letter of Interest: Provide a letter of interest from a duly authorized representative confirming the Contractor’s active business status and authority to conduct work in the State of Wisconsin. Provide point of contact information for the Contractor’s proposal.

- Contractor Qualification and Experience: Provide a brief history of the company’s formation. Provide project specific experience completed by the Contractor similar to the scope of work described in Attachment A.

- Key Personnel: Provide a brief explanation of Contractor’s key personnel and make up of team that will be responsible for this Project.

- Federal Grant Program Experience: Provide brief history of the Contractor's experience constructing projects in accordance with disaster recovery funding requirements.

- Small Business Participation: Provide certification as a minority, woman-owned, or other government certified small business. If inapplicable, provide a brief explanation of how Contractor intends on soliciting small business participation to help meet the needs of this scope of work – if needed.

ii. *Additional Documents:*

- Attachment A (Scope of Work & Pricing Schedule) – Provide a pricing quote for all items listed.

- Attachment C (Addendum Receipts) – Submit a signed copy of Attachment C if any addendums are issued to this RFP.

- Licenses and Certifications – Provide required licenses and certifications necessary to complete the scope of work.

ATTACHMENT A – Scope of Work and Pricing Sheet

RFP 4 – Electrical Generator

Provide equipment per plan and specs.

Include cost to perform start up and testing, testing reports, and owner training.

GHC is a non-profit organization, all materials will be tax-exempt.

Provide a separate detailed cost breakdown sheet.

Include delivery to site, 8202 Excelsior Drive, Madison, WI 53717.

Exclude unloading and installation costs.

Materials : _____

Delivery: _____

Total: _____

SECTION 263213 - ENGINE GENERATORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes packaged engine-generator sets for emergency and standby power supply with the following features:
 - 1. Gas engine.
 - 2. Unit-mounted cooling system.
 - 3. Unit-mounted control and monitoring.
 - 4. Performance requirements for sensitive loads.
 - 5. Fuel system.
 - 6. Outdoor enclosure.
- B. Related Requirements:
 - 1. Section 263600 "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine-generator sets.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Include plans and elevations for engine-generator set and other components specified. Indicate access requirements affected by height of subbase fuel tank.
 - 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1.3 INFORMATIONAL SUBMITTALS

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA or an NRTL.
 - 1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with plan and specification requirements, provide products by a complying manufacturer.
- B. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. ASME Compliance: Comply with ASME B15.1.
- B. NFPA Compliance:
 - 1. Comply with NFPA 37.
 - 2. Comply with NFPA 70.
 - 3. Comply with NFPA 110 requirements for LEVEL 1 TYPE 10 emergency power supply system.
- C. UL Compliance: Comply with UL 2200.
- D. Noise Emission: Comply with applicable state and local government requirements for maximum noise level at adjacent property boundaries due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.
- E. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:
 - 1. Ambient Temperature: Minus 15 to plus 40 deg C.
 - 2. Relative Humidity: Zero to 95 percent.
 - 3. Altitude: Sea level to 1000 feet.

2.3 ASSEMBLY DESCRIPTION

- A. Factory-assembled and -tested, water-cooled engine, with brushless generator and accessories.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.

- C. EPSS Class: Engine-generator set shall be classified as a Class 6in accordance with NFPA 110.
- D. Induction Method: Naturally aspirated or Turbocharged.
- E. Governor: Adjustable isochronous, with speed sensing.
- F. Emissions: Comply with EPA Stationary Emergency certification.
- G. Mounting Frame: Structural steel framework to maintain alignment of mounted components without depending on concrete foundation. Provide lifting attachments sized and spaced to prevent deflection of base during lifting and moving.
- H. Capacities and Characteristics:
 - 1. Power Output Ratings: Nominal ratings as indicated at 0.8 power factor excluding power required for the continued and repeated operation of the unit and auxiliaries, with capacity as required to operate as a unit as evidenced by records of prototype testing.
 - 2. Output Connections: Three-phase, four wire.
 - 3. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.
- I. Generator-Set Performance:
 - 1. Steady-State Voltage Operational Bandwidth: 3 percent of rated output voltage from no load to full load.
 - 2. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within three seconds.
 - 3. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.
 - 4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
 - 5. Transient Frequency Performance: Less than 5 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within five seconds.
 - 6. Output Waveform: At no load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for single harmonics. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
 - 7. Sustained Short-Circuit Current: For a three-phase, bolted short circuit at system output terminals, system shall supply a minimum of 250 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to generator system components.
 - 8. Start Time: Comply with NFPA 110, Type 10, system requirements.

2.4 ENGINE

- A. Fuel: Natural gas.

- B. Rated Engine Speed: 1800 rpm.
- C. Rated Output: 200kW at 0.8 power factor (250kVA)
- D. Maximum Piston Speed for Four-Cycle Engines: 2250 fpm.
- E. Lubrication System: The following items are mounted on engine or skid:
 - 1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
 - 2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
 - 3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.
- F. Jacket Coolant Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity.
- G. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine-generator-set mounting frame and integral engine-driven coolant pump.
 - 1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
 - 2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
 - 3. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.
 - 4. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
- H. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.
 - 1. Minimum sound attenuation of 25 dB at 500 Hz.
 - 2. Sound level measured at a distance of 25 feet from exhaust discharge after installation is complete shall be 78 dBA or less.
- I. Air-Intake Filter: Heavy-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.
- J. Starting System: 12-V or 24-V electric, with negative ground.
 - 1. Components: Sized so they are not damaged during a full engine-cranking cycle with ambient temperature at maximum specified in "Performance Requirements" Article.

2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
3. Cranking Cycle: 60 seconds.
4. Battery: Lead acid, with capacity within ambient temperature range specified in "Performance Requirements" Article to provide specified cranking cycle at least three times without recharging.
5. Battery Stand: Factory-fabricated, two-tier metal with acid-resistant finish designed to hold the quantity of battery cells required and to maintain the arrangement to minimize lengths of battery interconnections.
6. Battery Charger: Current-limiting, automatic-equalizing and float-charging type designed for lead-acid batteries. Unit shall comply with UL 1236.

2.5 GASEOUS FUEL SYSTEM

- A. Natural-Gas Piping: Comply with requirements in Section 231123 "Facility Natural-Gas Piping."
- B. Gas Train: Comply with NFPA 37.
- C. Engine Fuel System:
 1. Natural-Gas, Vapor-Withdrawal System:
 - a. Carburetor.
 - b. Fuel-Shutoff Solenoid Valves: NRTL-listed, normally closed, safety shutoff valves; one for each fuel source.
 - c. Fuel Filters.
 - d. Manual Fuel Shutoff Valves: One for each fuel type.
 - e. Flexible Fuel Connectors: Minimum one for each fuel connection.

2.6 CONTROL AND MONITORING

- A. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms.
- B. Provide minimum run time control set for 30 minutes with override only by operation of an emergency-stop switch.
- C. Comply with UL 508A.
- D. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common control and monitoring panel mounted on the generator set. Mounting method shall isolate the control panel from generator-set vibration. Panel shall be powered from the engine-generator set battery.

- E. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common wall-mounted control and monitoring panel. Panel shall be powered from the engine-generator set battery.
1. Wall-Mounting Cabinet Construction: Rigid, self-supporting steel unit complying with NEMA ICS 6. Power bus shall be copper. Bus, bus supports, control wiring, and temperature rise shall comply with UL 891.
- F. Indicating Devices : As required by NFPA 110 for Level 1 system, including the following:
1. AC voltmeter.
 2. AC ammeter.
 3. AC frequency meter.
 4. EPS supplying load indicator.
 5. Ammeter and voltmeter phase-selector switches.
 6. DC voltmeter (alternator battery charging).
 7. Engine-coolant temperature gage.
 8. Engine lubricating-oil pressure gage.
 9. Running-time meter.
 10. Current and Potential Transformers: Instrument accuracy class.
- G. Protective Devices and Controls in Local Control Panel: Shutdown devices and common visual alarm indication as required by NFPA 110 for Level 1 system, including the following:
1. Start-stop switch.
 2. Overcrank shutdown device.
 3. Overspeed shutdown device.
 4. Coolant high-temperature shutdown device.
 5. Coolant low-level shutdown device.
 6. Low lube oil pressure shutdown device.
 7. Overcrank alarm.
 8. Overspeed alarm.
 9. Coolant high-temperature alarm.
 10. Coolant low-temperature alarm.
 11. Coolant low-level alarm.
 12. Low lube oil pressure alarm.
 13. Lamp test.
 14. Contacts for local common alarm.
 15. Coolant high-temperature prealarm.
 16. Generator-voltage adjusting rheostat.
 17. Run-Off-Auto switch.
 18. Low cranking voltage alarm.
 19. Battery-charger malfunction alarm.
 20. Battery low-voltage alarm.

21. Battery high-voltage alarm.

- H. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.
- I. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.

2.7 GENERATOR OVERCURRENT AND FAULT PROTECTION

- A. Overcurrent protective devices for the entire EPSS shall be coordinated to optimize selective tripping when a short circuit occurs. Coordination of protective devices shall consider both utility and EPSS as the voltage source.
 - 1. Overcurrent protective devices for the EPSS shall be accessible only to authorized personnel.
- B. Generator Circuit Breaker: Molded-case, electronic-trip type; 100 percent rated; complying with UL 489.
 - 1. Tripping Characteristics: Adjustable long-time and short-time delay and instantaneous.
 - 2. Trip Settings: Selected to coordinate with generator thermal damage curve.
 - 3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
 - 4. Mounting: Adjacent to or integrated with control and monitoring panel.

2.8 ALTERNATOR

- A. The alternator shall be salient-pole, brushless, 2/3-pitch, with 4 bus bar provision for external connections, self-ventilated, with drip-proof construction, and amortisseur rotor windings, and skewed for smooth voltage waveform.
- B. The ratings shall meet the NEMA standard (MG1-32.40) temperature rise limits.
- C. The insulation shall be class H per UL1446 and the varnish shall be a vacuum pressure impregnated, fungus resistant epoxy.

Temperature rise of the rotor and stator shall be limited to 130C Standby.
- D. The PMG based excitation system shall be of brushless construction controlled by a digital, three-phase sensing, solid-state, voltage regulator.
- E. The AVR shall be capable of proper orientation under sever non-linear loads and provide individual adjustments for voltage range, stability and volts-per-hertz operations.
- F. The AVR shall be protected from the environment by conformal coating.
- G. The waveform harmonic distortion shall not exceed 5% total RMS measured line-to-line at full load rated.

- H. The TIF factor shall not exceed 50.
- I. The alternator shall have a maintenance free bearing, designed for 40,000 hour B10 life.
- J. The alternator shall be directly connected to the flywheel housing with a semi-flexible coupling between the rotor and the flywheel.
- K. The generator shall be inherently capable of sustaining at least 300% of rated current for at least 10 seconds under a 3-phase symmetrical short circuit without the addition of separate current-support devices.
- L. Motor starting performance and voltage dip determinations shall be based on the complete generator set. The generator set shall be capable of supplying 785.00LRKVA for starting motor loads with a maximum instantaneous voltage dip of 35% as measured by a digital RMS transient recorder in accordance with IEEE Standard 115. Motor starting performance and voltage dip determination that does not account for all components affecting total voltage dip (i.e., engine, alternator, voltage regulator, and governor) will NOT be accepted.
- M. Generator type shall be tested to optimize and determine performance as a generator set system.

2.9 OUTDOOR GENERATOR-SET ENCLOSURE

- A. Description: Vandal-resistant, sound-attenuating, weatherproof steel housing, wind resistant up to 100 mph. Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Panels shall be removable by one person without tools. Instruments and control shall be mounted within enclosure.
- B. Engine Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for 2 hours with ambient temperature at top of range specified in system service conditions.
 - 1. Louvers: Fixed-engine, cooling-air inlet and discharge. Storm-proof and drainable louvers prevent entry of rain and snow.
 - 2. Automatic Dampers: At engine cooling-air inlet and discharge. Dampers shall be closed to reduce enclosure heat loss in cold weather when unit is not operating.
 - 3. Ventilation: Provide temperature-controlled exhaust fan interlocked to prevent operation when engine is running.
- C. Interior Lights with Switch: Factory-wired, vapor-proof fixtures within housing; arranged to illuminate controls and accessible interior. Arrange for external electrical connection.
 - 1. AC lighting system and connection point for operation when remote source is available.
 - 2. DC lighting system for operation when remote source and generator are both unavailable.
- D. Convenience Outlets: Factory wired, GFCI. Arrange for external electrical connection.

- E. Enclosure to include an enclosure heater.
- F. Enclosure to be snow rated; include insulation.
- G.

2.10 VIBRATION ISOLATION DEVICES

- A. Elastomeric Isolator Pads: Oil- and water-resistant elastomer or natural rubber, arranged in single or multiple layers, molded with a nonslip pattern and galvanized-steel baseplates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment.
 - 1. Material: Standard neoprene separated by steel shims.
 - 2. Shore "A" Scale Durometer Rating: 50.
 - 3. Number of Layers: Two.
 - 4. Minimum Deflection: 1 inch.

2.11 MAINTENANCE SWITCH

- A. Generator manufacturer or distributor shall provide a maintenance bypass switch that complies with 2017 NEC Section 700.3(F).

2.12 FINISHES

- A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

2.13 SOURCE QUALITY CONTROL

- A. Prototype Testing: Factory test engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.

PART 3 - EXECUTION (For reference only)

3.1 INSTALLATION

- A. Comply with packaged engine-generator manufacturers' written installation and alignment instructions and with NFPA 110.
- B. Equipment Mounting:
 - 1. Install packaged engine generators on cast-in-place concrete equipment bases. Comply with requirements for equipment bases and foundations specified in [Section 033053 "Miscellaneous Cast-in-Place Concrete."
 - 2. Coordinate size and location of concrete bases for packaged engine generators. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.
- C. Install packaged engine-generator to provide access, without removing connections or accessories, for periodic maintenance.

- D. Install packaged engine-generator with elastomeric isolator pads having a minimum deflection of 1 inch on 4-inch- high concrete base.
- E. Install Schedule 40, black steel piping with welded joints and connect to engine muffler. Install thimble at wall. Piping shall be same diameter as muffler outlet.
 - 1. Install flexible connectors and steel piping materials according to requirements in Section 232116 Hydronic Piping Specialties."
 - 2. Insulate muffler/silencer and exhaust system components according to requirements in Section 230719 "HVAC Piping Insulation."
- F. Install condensate drain piping to muffler drain outlet full size of drain connection with a shutoff valve, stainless-steel flexible connector, and Schedule 40, black steel pipe with welded joints.
- G. Installation requirements for piping materials and flexible connectors are specified in Section 232116 "Hydronic Piping Specialties." Copper and galvanized steel shall not be used in the fuel-oil piping system.
- H. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

3.2 CONNECTIONS

- A. Connect cooling-system water piping to engine-generator set and heat exchanger with flexible connectors.
- B. Connect engine exhaust pipe to engine with flexible connector.
- C. Connect fuel piping to engines with a gate valve and union and flexible connector.
 - 1. Natural-gas piping, valves, and specialties for gas distribution are specified in Section 231123 "Facility Natural-Gas Piping."
 - 2. Install manual shutoff valve in a remote location to isolate natural-gas supply to the generator.
- D. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- E. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Provide a minimum of one 90 degree bend in flexible conduit routed to the generator set from a stationary element.
- F. Balance single-phase loads to obtain a maximum of 10 percent unbalance between any two phases.

3.3 IDENTIFICATION

- A. Identify system components according to Section 230553 "Identification for HVAC Piping and Equipment" and Section 260553 "Identification for Electrical Systems."
- B. Install a sign indicating the generator neutral is bonded to the main service neutral at the main service location.

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections.

B. Tests and Inspections:

1. Perform tests recommended by manufacturer and each visual and mechanical inspection and electrical and mechanical test listed in the first two subparagraphs as specified in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - a. Visual and Mechanical Inspection
 - 1) Compare equipment nameplate data with drawings and specifications.
 - 2) Inspect physical and mechanical condition.
 - 3) Inspect anchorage, alignment, and grounding.
 - 4) Verify the unit is clean.
 - b. Electrical and Mechanical Tests
 - 1) Perform insulation-resistance tests in accordance with IEEE 43.
 - a) Machines larger than 200 horsepower. Test duration shall be 10 minutes. Calculate polarization index.
 - b) Machines 200 horsepower or less. Test duration shall be one minute. Calculate the dielectric-absorption ratio.
 - 2) Test protective relay devices.
 - 3) Verify phase rotation, phasing, and synchronized operation as required by the application.
 - 4) Functionally test engine shutdown for low oil pressure, overtemperature, overspeed, and other protection features as applicable.
 - 5) Conduct performance test in accordance with NFPA 110.
 - 6) Verify correct functioning of the governor and regulator.
2. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here including, but not limited to, single-step full-load pickup test.
3. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.
 - a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
 - b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.

- c. Verify acceptance of charge for each element of the battery after discharge.
 - d. Verify that measurements are within manufacturer's specifications.
4. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
 5. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine-generator system before and during system operation. Check for air, exhaust, and fluid leaks.
 6. Exhaust-System Back-Pressure Test: Use a manometer with a scale exceeding 40-inch wg. Connect to exhaust line close to engine exhaust manifold. Verify that back pressure at full-rated load is within manufacturer's written allowable limits for the engine.
 7. Exhaust Emissions Test: Comply with applicable government test criteria.
 8. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.
 9. Harmonic-Content Tests: Measure harmonic content of output voltage at 25 percent and 100 percent of rated linear load. Verify that harmonic content is within specified limits.
 10. Noise Level Tests: Measure A-weighted level of noise emanating from generator-set installation, including engine exhaust and cooling-air intake and discharge, at four locations on the property line, and compare measured levels with required values.
- C. Coordinate tests with tests for transfer switches and run them concurrently.
 - D. Test instruments shall have been calibrated within the last 12 months, traceable to NIST Calibration Services, and adequate for making positive observation of test results. Make calibration records available for examination on request.
 - E. Leak Test: After installation, charge exhaust, coolant, and fuel systems and test for leaks. Repair leaks and retest until no leaks exist.
 - F. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation for generator and associated equipment.
 - G. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - H. Remove and replace malfunctioning units and retest as specified above.
 - I. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.
 - J. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators.

END OF SECTION 263213

SECTION 263600 - TRANSFER SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes automatic transfer switches rated 600 V and less.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Include plans, elevations, sections, details showing minimum clearances, conductor entry provisions, gutter space, and installed features and devices.
 - 2. Single-Line Diagram: Show connections between transfer switch, power sources, and load.

1.3 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.4 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of transfer switch or transfer switch components that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NEMA ICS 1.
- C. Comply with NFPA 99.
- D. Comply with NFPA 110.
- E. Comply with UL 1008 unless requirements of these Specifications are stricter.
- F. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.

- G. Tested Fault-Current Closing and Short-Circuit Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.
 - 1. Short-time withstand capability for three cycles.
- H. Repetitive Accuracy of Solid-State Controls: All settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.
- I. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.62. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.
- J. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism. Switches for emergency or standby purposes shall be mechanically and electrically interlocked in both directions to prevent simultaneous connection to both power sources unless closed transition.
- K. Neutral Terminal: Solid and fully rated unless otherwise indicated.
- L. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, by color-code or by numbered or lettered wire and cable with printed markers at terminations. Color-coding and wire and cable markers are specified in Section 260553 "Identification for Electrical Systems."
 - 1. Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.
 - 2. Power-Terminal Arrangement and Field-Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
 - 3. Control Wiring: Equipped with lugs suitable for connection to terminal strips.
 - 4. Accessible via front access.
- M. Enclosures: General-purpose NEMA 250, Type 1, complying with NEMA ICS 6 and UL 508, unless otherwise indicated.

2.2 CONTACTOR-TYPE AUTOMATIC TRANSFER SWITCHES

- A. Manufacturers: Subject to compliance with plan and specification requirements, provide products by a complying manufacturer.
- B. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.
- C. Comply with Level 1 equipment according to NFPA 110.
- D. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
 - 1. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are unacceptable.
 - 2. Switch Action: Double throw; mechanically held in both directions.

3. Contacts: Silver composition or silver alloy for load-current switching. Contactor-style automatic transfer-switch units, rated 600 A and higher, shall have separate arcing contacts.
 4. Conductor Connectors: Suitable for use with conductor material and sizes.
 5. Material: Hard-drawn copper, 98 percent conductivity.
 6. Main and Neutral Lugs: Compression type.
 7. Ground Lugs and Bus-Configured Terminators: Compression type.
 8. Connectors shall be marked for conductor size and type according to UL 1008.
- E. Emergency System Automatic Open-Transition Transfer Switches: Interlocked to prevent the load from being closed on both sources at the same time.
1. Sources shall be mechanically and electrically interlocked to prevent closing both sources on the load at the same time.
- F. Optional Standby Automatic Delayed-Transition Transfer Switches: Pauses or stops in intermediate position to momentarily disconnect both sources, with transition controlled by programming in the automatic transfer-switch controller. Interlocked to prevent the load from being closed on both sources at the same time.
1. Adjustable Time Delay: For override of normal-source voltage sensing to delay transfer and engine start signals for alternative source. Adjustable from zero to six seconds, and factory set for one second.
 2. Sources shall be mechanically and electrically interlocked to prevent closing both sources on the load at the same time.
 3. Fully automatic break-before-make operation with transfer when two sources have near zero phase difference.
- G. Automatic Transfer-Switch Controller Features:
1. Controller operates through a period of loss of control power.
 2. Undervoltage Sensing for Each Phase of Normal and Alternate Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage shall be adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
 3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
 4. Time Delay for Retransfer to Normal Source: Adjustable from zero to 30 minutes, and factory set for 10 minutes. Override shall automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
 5. Test Switch: Simulate normal-source failure.
 6. Switch-Position Pilot Lights: Indicate source to which load is connected.
 7. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.

- a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
 - b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."
8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
 9. Transfer Override Switch: Overrides automatic retransfer control so transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
 10. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
 11. Engine Shutdown Contacts: Instantaneous; shall initiate shutdown sequence at remote engine-generator controls after retransfer of load to normal source.
 12. Engine Shutdown Contacts: Time delay adjustable from zero to five minutes, and factory set for five minutes. Contacts shall initiate shutdown at remote engine-generator controls after retransfer of load to normal source.
 13. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods shall be adjustable from 10 to 30 minutes. Factory settings shall be for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:
 - a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
 - b. Push-button programming control with digital display of settings.
 - c. Integral battery operation of time switch when normal control power is unavailable.

H. Large-Motor-Load Power Transfer:

1. In-Phase Monitor: Factory-wired, internal relay controls transfer so contacts close only when the two sources are synchronized in phase and frequency. Relay shall compare phase relationship and frequency difference between normal and emergency sources and initiate transfer when both sources are within 15 electrical degrees, and only if transfer can be completed within 60 electrical degrees. Transfer shall be initiated only if both sources are within 2 Hz of nominal frequency and 70 percent or more of nominal voltage.

2.3 SOURCE QUALITY CONTROL

- A. Factory Tests: Test and inspect components, assembled switches, and associated equipment according to UL 1008. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.
- B. Prepare test and inspection reports.

1. For each of the tests required by UL 1008, performed on representative devices, for emergency systems. Include results of test for the following conditions:
 - a. Overvoltage.
 - b. Undervoltage.
 - c. Loss of supply voltage.
 - d. Reduction of supply voltage.
 - e. Alternative supply voltage or frequency is at minimum acceptable values.
 - f. Temperature rise.
 - g. Dielectric voltage-withstand; before and after short-circuit test.
 - h. Overload.
 - i. Contact opening.
 - j. Endurance.
 - k. Short circuit.
 - l. Short-time current capability.
 - m. Receptacle withstand capability.
 - n. Insulating base and supports damage.

PART 3 - EXECUTION (For reference only)

3.1 INSTALLATION

- A. Annunciator and Control Panel Mounting: Flush in wall unless otherwise indicated.
- B. Identify components according to Section 260553 "Identification for Electrical Systems."
- C. Set field-adjustable intervals and delays, relays, and engine exerciser clock.
- D. Comply with NECA 1.

3.2 CONNECTIONS

- A. Wiring to Remote Components: Match type and number of cables and conductors to generator sets, control, and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to Owner if necessary to accommodate required wiring.
- B. Wiring Method: Install cables in raceways except within electrical enclosures. Conceal raceway and cables except in unfinished spaces.
 1. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.
- D. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

- E. Connect twisted pair cable according to Section 260523 "Control-Voltage Electrical Power Cables."
- F. Route and brace conductors according to manufacturer's written instructions and Section 260529 "Hangers and Supports for Electrical Systems." Do not obscure manufacturer's markings and labels.
- G. Brace and support equipment according to Section 260548.16 "Seismic Controls for Electrical Systems."
- H. Final connections to equipment shall be made with liquidtight, flexible metallic conduit no more than 18 inches in length.

3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. Visual and Mechanical Inspection:
 - a. Compare equipment nameplate data with Drawings and Specifications.
 - b. Inspect physical and mechanical condition.
 - c. Inspect anchorage, alignment, grounding, and required clearances.
 - d. Verify that the unit is clean.
 - e. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.
 - f. Verify that manual transfer warnings are attached and visible.
 - g. Verify tightness of all control connections.
 - h. Inspect bolted electrical connections for high resistance using one of the following methods, or both:
 - 1) Use of low-resistance ohmmeter.
 - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method according to manufacturer's published data.
 - i. Perform manual transfer operation.
 - j. Verify positive mechanical interlocking between normal and alternate sources.
 - k. Perform visual and mechanical inspection of surge arresters.
 - l. Inspect control power transformers.
 - 1) Inspect for physical damage, cracked insulation, broken leads, tightness of connections, defective wiring, and overall general condition.
 - 2) Verify that primary and secondary fuse or circuit-breaker ratings match Drawings.
 - 3) Verify correct functioning of drawout disconnecting contacts, grounding contacts, and interlocks.
 - 2. Electrical Tests:

- a. Perform insulation-resistance tests on all control wiring with respect to ground.
 - b. Perform a contact/pole-resistance test. Compare measured values with manufacturer's acceptable values.
 - c. Verify settings and operation of control devices.
 - d. Calibrate and set all relays and timers.
 - e. Verify phase rotation, phasing, and synchronized operation.
 - f. Perform automatic transfer tests.
 - g. Verify correct operation and timing of the following functions:
 - 1) Normal source voltage-sensing and frequency-sensing relays.
 - 2) Engine start sequence.
 - 3) Time delay on transfer.
 - 4) Alternative source voltage-sensing and frequency-sensing relays.
 - 5) Automatic transfer operation.
 - 6) Interlocks and limit switch function.
 - 7) Time delay and retransfer on normal power restoration.
 - 8) Engine cool-down and shutdown feature.
3. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.
- a. Check for electrical continuity of circuits and for short circuits.
 - b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
 - c. Verify that manual transfer warnings are properly placed.
 - d. Perform manual transfer operation.
4. After energizing circuits, perform each electrical test for transfer switches stated in NETA ATS and demonstrate interlocking sequence and operational function for each switch at least three times.
- a. Simulate power failures of normal source to automatic transfer switches and retransfer from emergency source with normal source available.
 - b. Simulate loss of phase-to-ground voltage for each phase of normal source.
 - c. Verify time-delay settings.
 - d. Verify pickup and dropout voltages by data readout or inspection of control settings.
 - e. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.
- B. Coordinate tests with tests of generator and run them concurrently.
- C. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.

- D. Transfer switches will be considered defective if they do not pass tests and inspections.
- E. Remove and replace malfunctioning units and retest as specified above.
- F. Prepare test and inspection reports.
- G. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.
 - 1. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - 2. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
 - 3. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment.
- B. Coordinate this training with that for generator equipment.

END OF SECTION 263600

Xfmr Number	kVA	Description	MODEL NUMBER
T1	25KVA	480V PRIMARY TO 120/208V, 3-PHASE, 4-WIRE SECONDARY	EE28T3H
TEM	15KVA	480V PRIMARY TO 120/208V, 3-PHASE, 4-WIRE SECONDARY	EE15T3H
T8B	45KVA	480V PRIMARY TO 120/208V, 3-PHASE, 4-WIRE SECONDARY	EE45T3H

ALUMINUM FEEDER SCHEDULE

FEEDER NUMBER	CONDUIT QTY & SIZE	PHASE COND QTY & SIZE	NEUT COND QTY & SIZE	GND COND QTY & SIZE
3 PHASE WITH NEUTRAL				
AL300N	3 @ 3.5"	3 #800 MCM AL	1 #600 MCM AL	1 # 600 MCM AL
AL250N	7 @ 4"	3 #700 MCM AL	1 #700 MCM AL	1 #600 MCM AL
AL200N	4 @ 3.5"	3 #600 MCM AL	1 #600 MCM AL	1 #400 MCM AL
AL1600N	5 @ 3.5"	3 #600 MCM AL	1 #600 MCM AL	1 #350 MCM AL
AL1200N	4 @ 3"	3 #500 MCM AL	1 #500 MCM AL	1 #250 MCM AL
AL1000N	4 @ 3"	3 #350 MCM AL	1 #350 MCM AL	1 #400 AWG AL
AL800N	3 @ 2"	3 #400 MCM AL	1 #400 MCM AL	1 #30 AWG AL
AL700N	3 @ 2.5"	3 #300 MCM AL	1 #300 MCM AL	1 #30 AWG AL
AL600N	2 @ 3"	3 #500 MCM AL	1 #500 MCM AL	1 #20 AWG AL
AL500N	2 @ 3"	3 #350 MCM AL	1 #350 MCM AL	1 #10 AWG AL
AL400N	2 @ 2.5"	3 #400 MCM AL	1 #400 MCM AL	1 #1 AWG AL
AL350N	1 @ 3.5"	3 #600 MCM AL	1 #600 MCM AL	1 #1 AWG AL
AL300N	1 @ 3"	3 #500 MCM AL	1 #500 MCM AL	1 #2 AWG AL
AL250N	1 @ 3"	3 #350 MCM AL	1 #350 MCM AL	1 #2 AWG AL
AL225N	1 @ 2.5"	3 #300 MCM AL	1 #300 MCM AL	1 #2 AWG AL
AL200N	1 @ 2.5"	3 #250 MCM AL	1 #250 MCM AL	1 #4 AWG AL
AL175N	1 @ 2"	3 #400 MCM AL	1 #400 MCM AL	1 #4 AWG AL
AL150N	1 @ 2"	3 #300 MCM AL	1 #300 MCM AL	1 #4 AWG AL
AL125N	1 @ 1.5"	3 #100 MCM AL	1 #100 MCM AL	1 #4 AWG AL
3 PHASE NO NEUTRAL				
AL1600	5 @ 3"	3 #600 MCM AL (NONE)		1 #350 MCM AL
AL1200	4 @ 3"	3 #500 MCM AL (NONE)		1 #250 MCM AL
AL1000	4 @ 2.5"	3 #350 MCM AL (NONE)		1 #400 AWG AL
AL800	3 @ 2.5"	3 #400 MCM AL (NONE)		1 #30 AWG AL
AL700	3 @ 2.5"	3 #300 MCM AL (NONE)		1 #30 AWG AL
AL600	2 @ 3"	3 #500 MCM AL (NONE)		1 #20 AWG AL
AL500	2 @ 2.5"	3 #350 MCM AL (NONE)		1 #10 AWG AL
AL400	2 @ 2"	3 #400 MCM AL (NONE)		1 #1 AWG AL
AL350	1 @ 3"	3 #500 MCM AL (NONE)		1 #2 AWG AL
AL300	1 @ 3"	3 #350 MCM AL (NONE)		1 #2 AWG AL
AL250	1 @ 2.5"	3 #350 MCM AL (NONE)		1 #2 AWG AL
AL225	1 @ 2"	3 #300 MCM AL (NONE)		1 #2 AWG AL
AL200	1 @ 2"	3 #250 MCM AL (NONE)		1 #4 AWG AL
AL175	1 @ 2"	3 #400 MCM AL (NONE)		1 #4 AWG AL
AL150	1 @ 1.5"	3 #300 MCM AL (NONE)		1 #4 AWG AL
AL125	1 @ 1.25"	3 #100 MCM AL (NONE)		1 #4 AWG AL
SINGLE PHASE NO NEUTRAL				
AL200S	1 @ 1.5"	2 #250 MCM AL (NONE)		1 #4 AWG AL
AL175S	1 @ 1.5"	2 #400 MCM AL (NONE)		1 #4 AWG AL
AL150S	1 @ 1.25"	2 #300 MCM AL (NONE)		1 #4 AWG AL
AL125S	1 @ 1.25"	2 #100 MCM AL (NONE)		1 #4 AWG AL
TRANSFORMER SECONDARY FEEDERS				
AL1000T	3 @ 3.5"	3 #600 MCM AL	1 #600 MCM AL	1 #250 MCM AL
AL800T	3 @ 3"	3 #400 MCM AL	1 #400 MCM AL	1 #400 AWG AL
AL700T	3 @ 3"	3 #350 MCM AL	1 #350 MCM AL	1 #400 AWG AL
AL600T	2 @ 3"	3 #500 MCM AL	1 #500 MCM AL	1 #400 AWG AL
AL500T	2 @ 3"	3 #350 MCM AL	1 #350 MCM AL	1 #30 AWG AL
AL400T	2 @ 3"	3 #250 MCM AL	1 #250 MCM AL	1 #30 AWG AL
AL250T	1 @ 3"	3 #350 MCM AL	1 #350 MCM AL	1 #10 AWG AL
AL225T	1 @ 3"	3 #300 MCM AL	1 #300 MCM AL	1 #10 AWG AL
AL175T	1 @ 2.5"	3 #400 MCM AL	1 #400 MCM AL	1 #2 AWG AL
AL150T	1 @ 2.5"	3 #300 MCM AL	1 #300 MCM AL	1 #4 AWG AL

COPPER FEEDER SCHEDULE

FEEDER NUMBER	CONDUIT QTY & SIZE	PHASE COND QTY & SIZE	NEUTRAL COND QTY & SIZE	GND COND QTY & SIZE
3 PHASE WITH NEUTRAL				
1600N	5 @ 3.5"	3 #500 MCM CU	1 #500 MCM CU	1 #40 AWG CU
1200N	4 @ 3"	3 #350 MCM CU	1 #350 MCM CU	1 #30 AWG CU
1000N	3 @ 3.5"	3 #500 MCM CU	1 #500 MCM CU	1 #20 AWG CU
800N	2 @ 3.5"	3 #500 MCM CU	1 #500 MCM CU	1 #10 AWG CU
600N	2 @ 3"	3 #350 MCM CU	1 #350 MCM CU	1 #1 AWG CU
500N	2 @ 2.5"	3 #250 MCM CU	1 #250 MCM CU	1 #2 AWG CU
400N	1 @ 3.5"	3 #500 MCM CU	1 #500 MCM CU	1 #3 AWG CU
350N	1 @ 3.5"	3 #500 MCM CU	1 #500 MCM CU	1 #3 AWG CU
300N	1 @ 3"	3 #350 MCM CU	1 #350 MCM CU	1 #4 AWG CU
250N	1 @ 2.5"	3 #250 MCM CU	1 #250 MCM CU	1 #4 AWG CU
225N	1 @ 2.5"	3 #400 MCM CU	1 #400 MCM CU	1 #4 AWG CU
200N	1 @ 2"	3 #300 MCM CU	1 #300 MCM CU	1 #6 AWG CU
175N	1 @ 2"	3 #200 MCM CU	1 #200 MCM CU	1 #6 AWG CU
150N	1 @ 2"	3 #100 MCM CU	1 #100 MCM CU	1 #6 AWG CU
125N	1 @ 1.5"	3 #1 AWG CU	1 #1 AWG CU	1 #6 AWG CU
110N	1 @ 1.25"	3 #2 AWG CU	1 #2 AWG CU	1 #6 AWG CU
100N	1 @ 1.25"	3 #3 AWG CU	1 #3 AWG CU	1 #6 AWG CU
90N	1 @ 1.25"	3 #3 AWG CU	1 #3 AWG CU	1 #6 AWG CU
80N	1 @ 1.25"	3 #4 AWG CU	1 #4 AWG CU	1 #6 AWG CU
70N	1 @ 1.25"	3 #4 AWG CU	1 #4 AWG CU	1 #6 AWG CU
60N	1 @ 1"	3 #6 AWG CU	1 #6 AWG CU	1 #10 AWG CU
50N	1 @ 0.75"	3 #8 AWG CU	1 #8 AWG CU	1 #10 AWG CU
40N	1 @ 0.75"	3 #8 AWG CU	1 #8 AWG CU	1 #10 AWG CU
30N	1 @ 0.5"	3 #10 AWG CU	1 #10 AWG CU	1 #10 AWG CU
3 PHASE NO NEUTRAL				
250	1 @ 2"	3 #250 MCM CU (NONE)		1 #4 AWG CU
225	1 @ 2"	3 #400 MCM CU (NONE)		1 #4 AWG CU
200	1 @ 2"	3 #300 MCM CU (NONE)		1 #6 AWG CU
175	1 @ 1.5"	3 #200 MCM CU (NONE)		1 #6 AWG CU
150	1 @ 1.5"	3 #100 MCM CU (NONE)		1 #6 AWG CU
125	1 @ 1.25"	3 #1 AWG CU (NONE)		1 #6 AWG CU
110	1 @ 1.25"	3 #2 AWG CU (NONE)		1 #6 AWG CU
100	1 @ 1.25"	3 #3 AWG CU (NONE)		1 #6 AWG CU
90	1 @ 1.25"	3 #3 AWG CU (NONE)		1 #6 AWG CU
80	1 @ 1"	3 #4 AWG CU (NONE)		1 #6 AWG CU
70	1 @ 1"	3 #4 AWG CU (NONE)		1 #6 AWG CU
60	1 @ 0.75"	3 #6 AWG CU (NONE)		1 #10 AWG CU
50	1 @ 0.75"	3 #8 AWG CU (NONE)		1 #10 AWG CU
40	1 @ 0.75"	3 #8 AWG CU (NONE)		1 #10 AWG CU
30	1 @ 0.5"	3 #10 AWG CU (NONE)		1 #10 AWG CU
SINGLE PHASE NO NEUTRAL				
150S	1 @ 1.25"	2 #100 MCM CU (NONE)		1 #6 AWG CU
125S	1 @ 1.25"	2 #1 AWG CU (NONE)		1 #6 AWG CU
110S	1 @ 1"	2 #2 AWG CU (NONE)		1 #6 AWG CU
100S	1 @ 1"	2 #3 AWG CU (NONE)		1 #6 AWG CU
90S	1 @ 1"	2 #3 AWG CU (NONE)		1 #6 AWG CU
80S	1 @ 1"	2 #4 AWG CU (NONE)		1 #6 AWG CU
70S	1 @ 1"	2 #4 AWG CU (NONE)		1 #6 AWG CU
60S	1 @ 0.75"	2 #6 AWG CU (NONE)		1 #10 AWG CU
50S	1 @ 0.5"	2 #8 AWG CU (NONE)		1 #10 AWG CU
40S	1 @ 0.5"	2 #8 AWG CU (NONE)		1 #10 AWG CU
30S	1 @ 0.5"	2 #10 AWG CU (NONE)		1 #10 AWG CU
20S	1 @ 0.5"	3 #12 AWG CU (NONE)		1 #6 AWG CU
GROUNDING CONDUCTOR				
250G	1 @ 1"	(NONE)	(NONE)	1 #250 MCM CU
225G	1 @ 1"	(NONE)	(NONE)	1 #40 AWG CU
200G	1 @ 1"	(NONE)	(NONE)	1 #30 AWG CU
175G	1 @ 0.75"	(NONE)	(NONE)	1 #20 AWG CU
150G	1 @ 0.75"	(NONE)	(NONE)	1 #10 AWG CU
45G	1 @ 0.5"	(NONE)	(NONE)	1 #4 AWG CU
15G	1 @ 0.5"	(NONE)	(NONE)	1 #8 AWG CU
TRANSFORMER SECONDARY FEEDERS				
1000T	3 @ 3.5"	3 #500 MCM CU	1 #500 MCM CU	1 #30 AWG CU
800T	2 @ 3.5"	3 #600 MCM CU	1 #600 MCM CU	1 #30 AWG CU
700T	2 @ 3.5"	3 #500 MCM CU	1 #500 MCM CU	1 #30 AWG CU
600T	2 @ 3"	3 #350 MCM CU	1 #350 MCM CU	1 #20 AWG CU
500T	2 @ 2.5"	3 #250 MCM CU	1 #250 MCM CU	1 #20 AWG CU
400T	1 @ 3.5"	3 #600 MCM CU	1 #600 MCM CU	1 #10 AWG CU
250T	1 @ 3"	3 #250 MCM CU	1 #250 MCM CU	1 #2 AWG CU
225T	1 @ 2.5"	3 #400 MCM CU	1 #400 MCM CU	1 #2 AWG CU
150T	1 @ 2"	3 #100 MCM CU	1 #100 MCM CU	1 #6 AWG CU
110T	1 @ 1.5"	3 #2 AWG CU	1 #2 AWG CU	1 #6 AWG CU
60T	1 @ 1"	3 #6 AWG CU	1 #6 AWG CU	1 #6 AWG CU

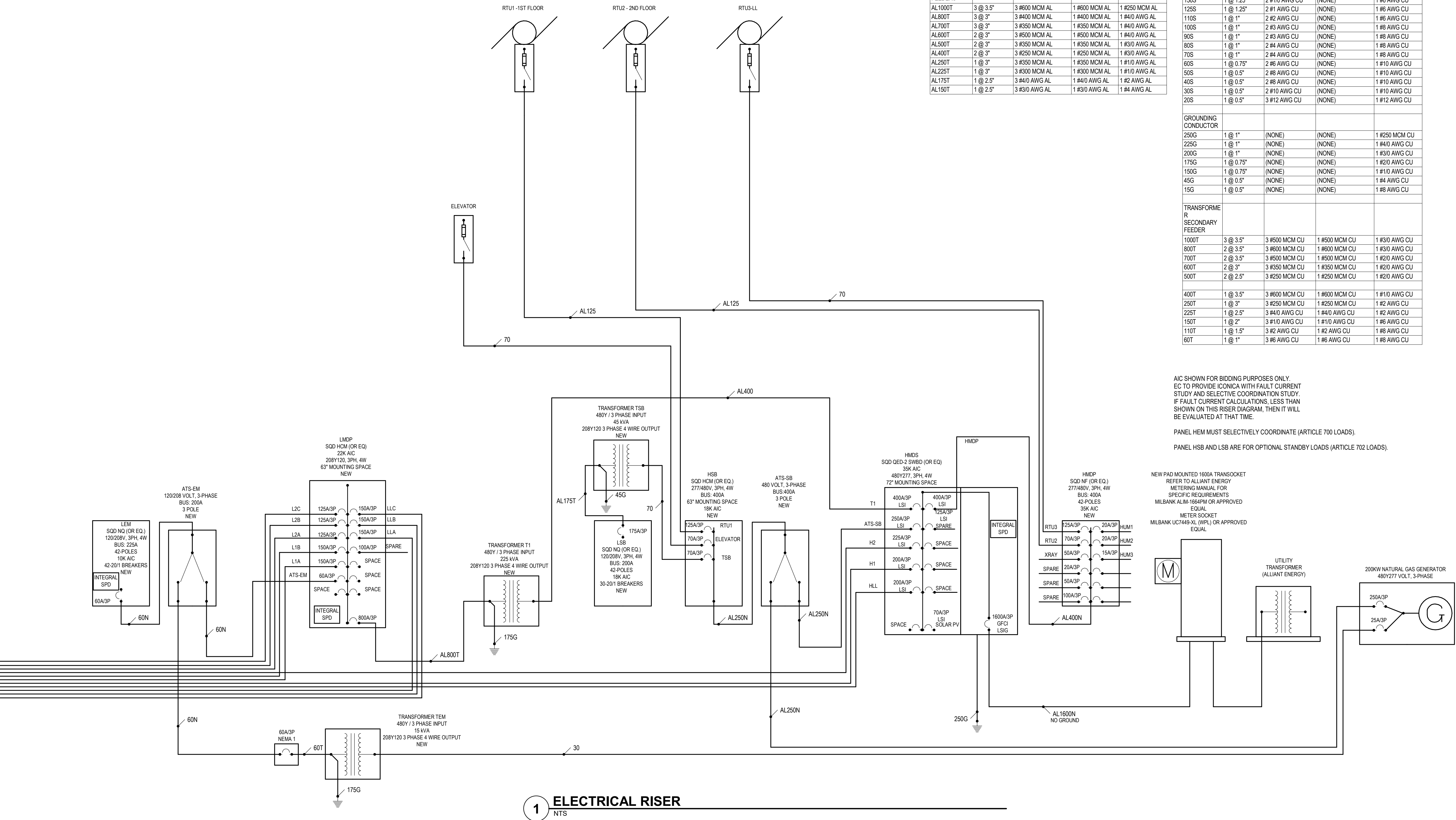
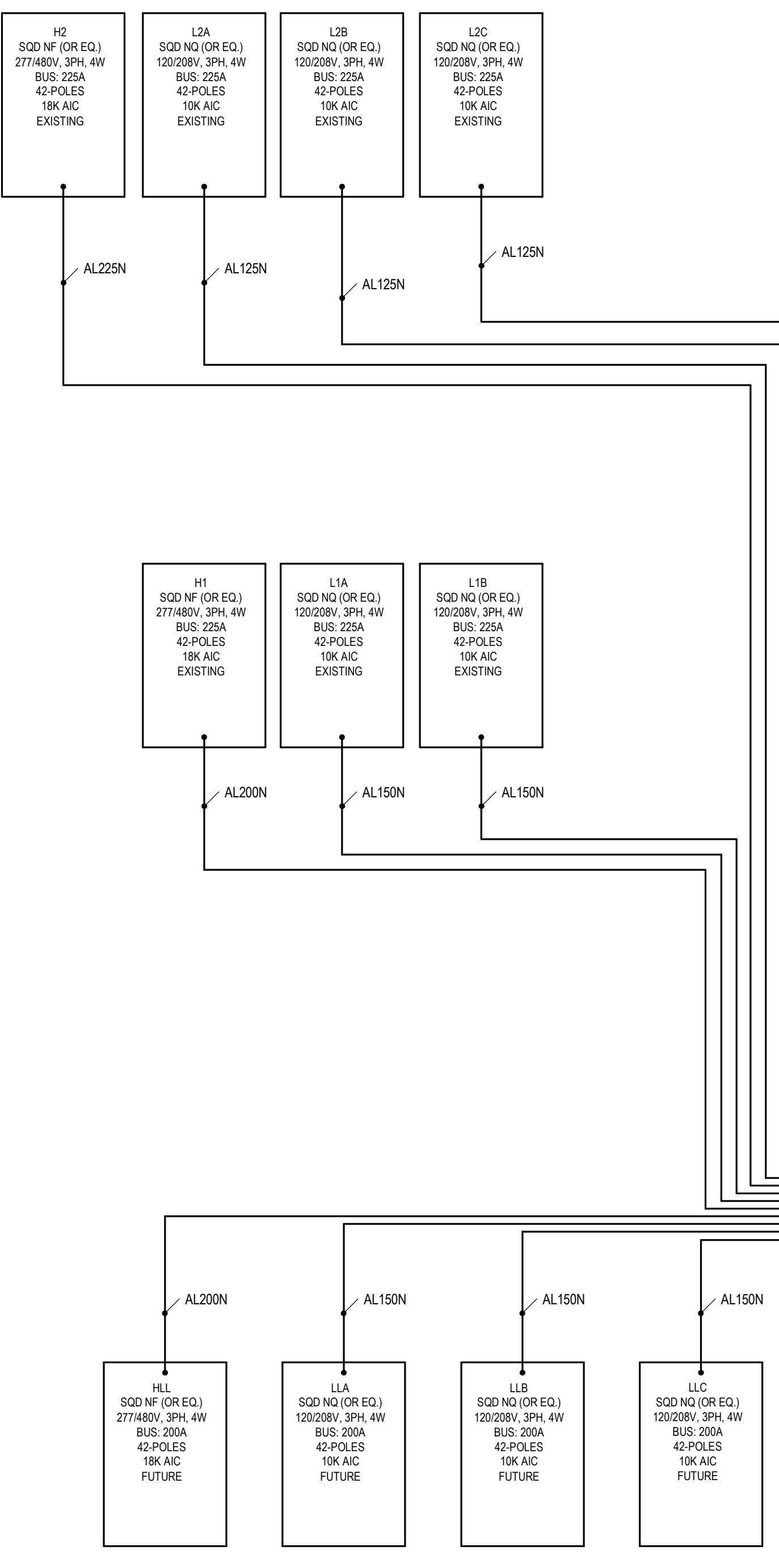
GHC SAUK CLINIC REMODEL PHASE 1

8202 Excelsior Ct., Madison, WI 53717
 GROUP HEALTH COOPERATIVE
 1235 JOHN O. HAMMONS DRIVE
 MADISON, WI

Issue	Description	Date
RFP3	SWITCHGEAR RFP	12-06-18
RFP4	GENERATOR RFP	12-06-18

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Sheet Title
ELECTRICAL SCHEDULES
 Project Number: 20180640
 Sheet Number
E701

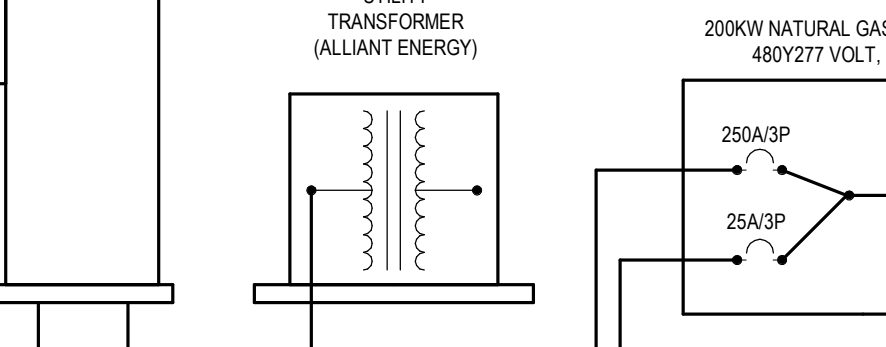


1 ELECTRICAL RISER

AC SHOWN FOR BIDDING PURPOSES ONLY. EC TO PROVIDE ICONICA WITH FAULT CURRENT STUDY AND SELECTIVE COORDINATION STUDY. IF FAULT CURRENT CALCULATIONS, LESS THAN SHOWN ON THIS RISER DIAGRAM, THEN IT WILL BE EVALUATED AT THAT TIME.

PANEL HSB MUST SELECTIVELY COORDINATE (ARTICLE 702 LOADS).
 PANEL LSB AND LSA ARE FOR OPTIONAL STANDBY LOADS (ARTICLE 702 LOADS).

NEW PAD MOUNTED 1600A TRANSFORMER REFER TO ALLIANT ENERGY METERING MANUAL FOR SPECIFIC REQUIREMENTS. MILBANK ALUM-1687PM OR APPROVED EQUAL. METER SOCKET.



ATTACHMENT B – RESERVED

ATTACHMENT C

(If Addendums exist for this project, please sign and date and send with your Proposal. Do not submit this form if there are no addendums issued.)

The undersigned acknowledges receipt of the following addendum:

Addendum #1 _____ Initials _____

Addendum #2 _____ Initials _____

Addendum #3 _____ Initials _____

Addendum #4 _____ Initials _____

ATTACHMENT D – RESERVED

ATTACHMENT E – Additional Contract Clauses

(Potential contractors are required to meet the following contract obligations in addition to the GHC-SCW contract.)

The Contractor and any sub-contractors acquired to provide services arising out of this RFP agree to abide by the following clauses and requirements:

1. **Disadvantaged Business Enterprises (DBE) and Labor Surplus Firms.** The following affirmative steps should be taken to ensure small businesses, minority and women’s owned businesses (DBEs), and labor surplus area firms (LSA) are used when possible:
 - a. Place DBEs/LSAs on solicitation lists and solicit to them when they are a potential source.
 - b. Use the services of organizations such as the Small Business Administration and the Minority Business Development Agency.
 - c. When economically feasible, divide total requirements into smaller tasks or quantities and establish delivery schedules.
 - d. Require subcontractors to follow these affirmative steps.

2. **Suspension and Debarment.**
 - a. This contract is a covered transaction for purposes of 2 C.F.R. pt. 180 and 2 C.F.R. pt. 3000. As such the Contractor is required, and will, verify that neither Contractor, its principals (defined at 2 C.F.R. § 180.995), nor its affiliates (defined at 2 C.F.R. § 180.905) are excluded (defined at 2 C.F.R. § 180.940) or disqualified (defined at 2 C.F.R. § 180.935).
 - b. The Contractor will comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C and must include a requirement to comply with these regulations in any lower tier covered transaction it enters into.
 - c. Contractor’s certification is a material representation of fact relied upon by the City. If it is later determined that the Contractor did not comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, in addition to remedies available to the State of Wisconsin, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.
 - d. The Contractor agrees to comply with the requirements of 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C throughout the period this Agreement. The Contractor further agrees to include a provision requiring such compliance in its lower-tier covered transactions.

3. **Access to Records.** The following access to records requirements apply to this contract:
 - a. The Contractor agrees to provide GHC-SCW, the State, the FEMA Administrator, the Comptroller General of the United States, or any of their authorized representatives access to any books, documents, papers, and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts, and transcriptions.
 - b. The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

- c. The Contractor agrees to provide the FEMA Administrator or his authorized representatives access to construction or other work sites pertaining to the work being completed under the contract.
4. **DHS Seals, Logos, and Flags.** The Contractor shall not use the DHS seal(s), logos, crests, or reproductions of flags or likenesses of DHS agency officials without specific FEMA pre-approval.
5. **Compliance with Federal Law, Regulations, and Executive Orders.** The Contractor acknowledges that FEMA financial assistance will be used to fund the contract only. The Contractor will comply with all applicable federal law, regulations, executive orders, FEMA policies, procedures, and directives.
6. **No Obligation by Federal Government.** The Federal Government is not a party to this contract and is not subject to any obligations or liabilities to the non-Federal entity, Contractor, or any other party pertaining to any matter resulting from the contract.
7. **Program Fraud and False or Fraudulent Statements or Related Acts.** The Contractor acknowledges that 31 U.S.C. Chap. 38 (Administrative Remedies for False Claims and Statements) applies to the Contractor actions pertaining to this Agreement.
8. **Procurement of Recovered Materials.** As required by federal program legislation, Contractor agrees to the following:
 - a. In the performance of this contract, the Contractor shall make maximum use of products containing recovered materials that are EPA-designated items unless the product cannot be acquired:
 - i. competitively within a timeframe providing for compliance with the contract performance schedule;
 - ii. meeting contract performance requirements; or
 - iii. at a reasonable price.
 - b. Information about this requirement, along with the list of EPA-designate items, is available at EPA's Comprehensive Procurement Guidelines web site, <https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program>.
9. **Equal Employment Opportunity.** During the performance of this Agreement, the Contractor agrees as follows:
 - a. Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
 - b. Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.

- c. Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- d. Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- e. Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- f. In the event of Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this Agreement may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions as may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
- g. The Contractor will include the portion of the sentence immediately preceding paragraph (a) and the provisions of paragraphs (a) through (g) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, That in the event that Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

10. Byrd Anti-Lobbying Amendment, 31 U.S.C. § 1352 (as amended)

- a. The Contractor certifies to GHC-SCW that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. § 1352. The required Certification must be provided as an addendum to any Agreement arising from this procurement.
- b. Contractor will also ensure that each tier of subcontractor(s) shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures will be forwarded from tier-to-tier up to GHC-SCW.

11. Compliance with the Contract Work Hours and Safety Standards Act.

- a. Overtime requirements. The Contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall not require nor permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless

such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

- b. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1) of this section the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, the Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (a) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (a) of this section.
- c. Withholding for unpaid wages and liquidated damages. GHC-SCW shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the *Contract Work Hours and Safety Standards Act*, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b) of this section.
- d. Subcontracts. The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (a) through (d) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (a) through (d) of this section.

12. Clean Air Act and Federal Water Pollution Control Act. As required by Federal program legislation: Contractor agrees to comply with the following federal requirements:

- a. Clean Air Act.
 - i. The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. 7401 et seq.
 - ii. The Contractor agrees to report each violation to GHC-SCW and understands and agrees that GHC-SCW will, in turn, report each violation as required to assure notification to the State, the Federal Emergency Management Agency, and the appropriate Environmental Protection Agency Regional Office.
 - iii. The Contractor agrees to include these requirements in each subcontract exceeding \$150,000 financed in whole or in part with Federal assistance provided by FEMA.
- b. Federal Water Pollution Control Act
 - i. The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq.
 - ii. The Contractor agrees to report each violation to GHC-SCW and understands and agrees that GHC-SCW will, in turn, report each violation as required to assure notification to the State, the Federal Emergency Management Agency, and the appropriate Environmental Protection Agency Regional Office.

- iii. The Contractor agrees to include these requirements in each subcontract exceeding \$150,000 financed in whole or in part with Federal assistance provided by FEMA.