



ADDENDUM NO. 1

Issue Date: August 28, 2023

Project Name: Central (Gifford) WWTF Generator and ATS Replacement

Bid Number: 2024003

Bid Opening Date: **September 6, 2023**

This addendum is being released to modify the bid documents and answer questions received to date. The information and documents contained in this addendum are hereby incorporated in the Bid Documents. **This addendum must be acknowledged where indicated on the Bid Form, or the bid may be declared non-responsive.**

Modification to the Specifications

Section 01000 – Replace Table of Contents with Attached Table of Contents (Revised Per Addendum #1)
Specifications Replace Sections 16001, 16050 and 16200 with Attached Sections 16001 (Revised Per Addendum #1), 16050 (Revised for Addendum #1), and 16200 (Revised Per Addendum #1)

Modification to Plans

Replace Plansheets E-1, E-7, E-8, and E-9 with Attached Plansheets E-1, E-7, E-8 and E-9 marked with Addendum 1 Revisions

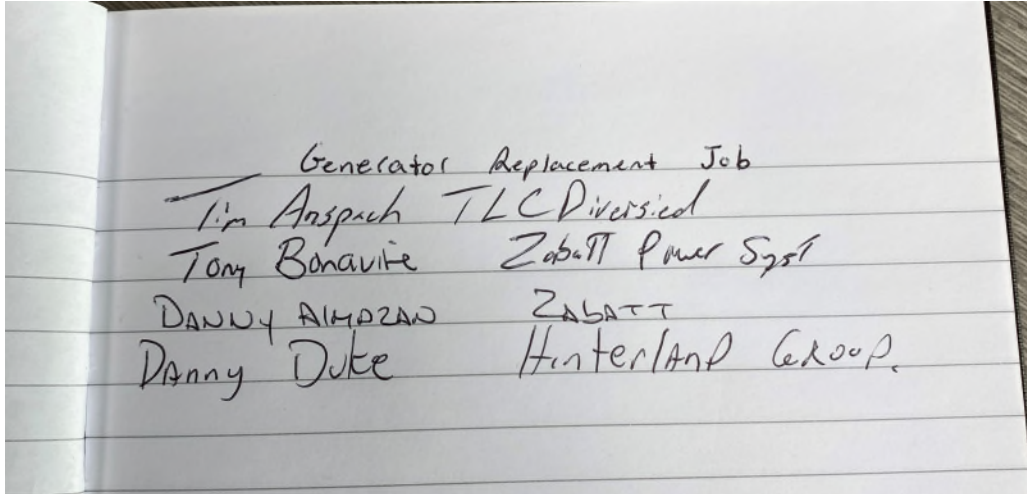
Questions and Answers

1. What is the Engineer's Estimate of Probable Cost for this bid?
\$2,320,700

2. The specifications (Qualifications for Bidders) state that the bidder must possess a "Fuel Contractor's License" and also be registered as a General Contractor. Can we request that the requirements be changed to a licensed General Contractor and that they subcontract the fuel piping to a licensed Fuel Contractor?

A General Contractor may utilize a subcontractor with a current Fuel Contractor's License. If bidder is the license holder, please list that license on the qualifications questionnaire. If bidder will use a subcontractor to satisfy the requirement, the subcontractor should be named, and license number listed, on Section 00458 – List of Subcontractors.

3. Who attended the site visits?
Sign in logs are attached.



4. For the Solids Handling Building Fuel Tank removal, how much diesel fuel should be included in our bid for removal and disposal?
We don't know how much fuel will be in the tank at that time, so it is recommended you bid in anticipation of the tank being full.

SECTION 01000

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SECTION 16001
ELECTRICAL DEMOLITION (REVISED PER ADDENDUM #1)

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Contractor shall take precautionary and safety measures to assure the safety of his personnel. All wires shall be identified and disconnected from power sources before removal.
- B. Contractor shall coordinate with the Owner, Engineer.
- C. The general demolition scope shall also include the following minimum requirements whether indicated on plans or not.
 - 1. Before demolition, Contractor shall verify that the equipment is no longer needed or that the demolition will not adversely effect plant operation.
 - 2. Removal of all exposed unused conduit. Removal of all abandoned wire within raceways, cabinets, outlet boxes, trenches and the like associated with equipment shown to be removed on plans.
 - 3. Removal of all hangers and support systems which are not needed as a result of the demolition.
 - 4. Contractor shall cover all openings as a result of demolition and removals including but not limited to the following:
 - a. Cabinets and enclosures
 - b. Wall and masonry openings.
 - c. Cut conduit, instrumentation line, etc. flush with slab, fill with concrete.
- D. Operational Systems
 - 1. To the fullest extent possible, all required systems shall remain operational. Contractor shall replace and/or repair existing facilities which may be damaged due to equipment removals.
 - 2. Where required wiring passes through or uses enclosures or raceways shown for demolition. Contractor shall provide raceways and wire as required to keep those systems operational.
 - 3. Contractor shall remove existing equipment in an orderly, planned and coordinated fashion. All replacement equipment shall be on site and ready to install immediately after the removal of existing equipment.
 - 4. Where demolition interrupts the normal automatic control of the station, Contractor shall provide full time manual control until automatic control is restored. Contractor shall obtain permission of the Owner before removing automatic control.

1.2 SPECIFIC EQUIPMENT REMOVALS

- A. The following include but do not limit the specific pieces of equipment for the removal and disposition.

1. Demo existing transfer switches and adjacent fill section. Provide temporary rental equipment in support of the disconnect of the former equipment, its demolition and eventual replacement.
2. Reuse former power and control wires, the Contractor shall include labor and equipment to perform megger testing of the existing wires to determine that these may be reused. In the event a wire, or several wires test bad then the Contractor shall provide replacement wires of the same type and AWG gauge as the existing one. **The replacement cost shall be based on a pre-determined cost per linear foot that the Contractor shall provide prices to replace 600MCM copper cable, 250MCM copper cable, #14 and #12 copper cables of the same insulation type as the existing one as add alternate bid items.**
3. Review other plans especially civil and mechanical and provide demolition as may be required in support of those efforts.

1.3 DISPOSITION OF EQUIPMENT

- A. Except as otherwise indicated, all removed or demolished electrical equipment shall become the property of the Contractor. All rubble shall be disposed of by the Contractor.
- B. Contractor shall load, transport, and dispose of all or demolished equipment including any removed equipment like all enclosed gear, cabinets, raceways, wire and cable, supports, ATS equipment including fill enclosure section, circuit breakers, panel covers, light fixtures, rigid galvanized steel conduit and the like.

- END OF SECTION -

SECTION 16050

BASIC MATERIALS AND METHODS (REVISED PER ADDENDUM #1)

PART 1 - GENERAL

1.1 SUBMITTALS

- A. Submit data sheets on all items per Section 16000.

1.2 CODES AND STANDARDS

- A. General applicable provisions of the following codes and standards and other codes and standards required by the State of Florida and local jurisdictions are hereby imposed on a general basis for electrical work (in addition to specific applications specified by individual work sections of these specifications):
 1. U.L.: Electrical materials shall be approved by the Underwriters' Laboratories, Inc. This applies to materials which are covered by U.L. standards. Factory applied labels are required.
 2. National Electrical Code
 3. OSHA: Standard of the Occupational Safety and Health Administration are to be complied with.
 4. NEMA: National Electrical Manufacturers Association Standards are to be met wherever standards have been established by that agency, and proof is specifically required with material submittals for switchboards, motor control centers, panelboards, cable trays, motors, switches, circuit breakers, and fuses.
 5. ANSI: American National Standards Institute
 6. NESC: National Electrical Safety Code

PART 2 - PRODUCTS

2.1 GROUNDING MATERIALS

- A. All ground rods shall be 20 foot 5/8" copperclad, unless otherwise indicated.
- B. Ground wires shall be soft drawn copper sized per National Electrical Code, unless otherwise indicated.

2.2 CONDUIT

- A. PVC Conduit
 1. PVC conduit shall be Schedule 80 or Schedule 40 unless otherwise noted and shall be U.L. approved. Comply with Federal Spec WC-1094 and NEMA TC-1.
- B. Flexible Conduit
 1. All flexible conduits shall be liquidtight, made of corrosion resistant plated steel with extruded polyvinyl covering and watertight connectors.

C. Aluminum Conduit

1. **All conduits used inside buildings shall be Rigid Aluminum Alloy, 6063 Aluminum Alloy, T-1 Temper, meeting UL-6 requirements, ANSI C80.5 Conduit as manufactured by Indalex or approved UL approved equal.**

- D. Refer to schedule in plans for requirements.

2.3 CABLE, WIRE AND CONNECTORS

A. 600 Volt Power Wiring

1. Individual conductors shall be rated for 600 volts and shall meet the requirements below:
 - a. Conductors shall be stranded.
 - b. All wire shall be brought to the job in unbroken packages and shall bear the date of manufacturing; not older than 12 months.
 - c. Type of wire shall be THWN except where required otherwise by the contract drawings.
 - d. No wire smaller than No. 12 gauge shall be used unless specifically indicated.
 - e. Conductor metal shall be copper.
 - f. All conductors shall be meggered after installation. Megger testing shall exceed 50 mega ohms.
2. Multi-conductor cables shall be type TC UL 1277 THWN, PVC jacketed 600V with conductor and quantities as indicated.

B. Instrumentation and Control Cable

1. Process instrumentation wire shall be 16 gauge twisted pair, 600 V., aluminum tape shielded, polyvinyl chloride jacketed, as manufactured by the American Insulated Wire Co., Eaton Corp., or equal. Multiconductor cables with individually shielded twisted pairs shall be installed where indicated.
2. Multiconductor control cable shall be stranded 14 gauge, 600 V. THWN insulated overall shielded with PVC jacket, as manufactured by the American Insulate Wire Co., Eaton Corp., or equal.
3. Refer to other specifications and drawings for other signal type of cables, like ethernet, Modbus, and other low voltage communications cables.

2.4 TERMINATIONS AND SPLICES (600 VOLTS AND LESS)

- A. Terminations of power cable shall be by means of U.L. approved connectors. All connectors shall meet U.L. 486B and shall be compatible with the conductor material.
- B. Terminate all control and instrumentation cable with fork type compression lugs.
- C. Splicing of power, control, or instrumentation wiring will not be allowed except by written approval of the Engineer. Where splicing is allowed, splices shall be made with approved compression connectors, and splices shall be made waterproof regardless of location.

2.5 BOXES

- A. Boxes for wiring devices, switches and receptacles installed outdoors shall be weatherproof fiberglass with polycarbonate cover plates.

2.6 PULL BOXES AND SPLICE BOXES

- A. Location

1. Units used outdoor or in a damp or corrosive environment shall be 316 ss or fiberglass unless otherwise indicated on plans.
2. Units used indoors in dry and clean environments shall be NEMA 1.
- B. Size
 1. Units shall be sized per NEC as minimum.
- C. Required Units
 1. Plans depict minimum requirements. Additional units shall be provided as may be required to complete raceway systems.

2.7 MOUNTING AND SUPPORTING ELECTRICAL EQUIPMENT

- A. Furnish and install all supports, hangers, and inserts required to mount fixtures, conduits, cables, pull boxes, and other equipment.
- B. Support system used indoors in clean, dry and air-conditioned areas shall be galvanized steel.
- C. Perforated straps and wires are not permitted for supporting electrical devices. Anchors shall be of approved types.
- D. All supports, hangers, hardware, etc. used outdoors or in in non-air-conditioned indoor areas or in hazardous areas shall be non-ferrous, corrosion resistant or 316 stainless steel. Supports shall be selected to avoid galvanic reactions. Support devices shall be submitted for approval.
- E. Provide trapeze, bridge systems or wall bracketed cantilevered system to support the raceway system.
- F. Spacing of support systems shall be per NEC. Provide spacing of conduits according to the NEC and the materials used. For PVC conduit, refer to NEC table 347-8.
- G. Plans depict minimum requirements. Provide additional units as required to complete raceway system.
- H. Refer to material schedule on plans. These specified requirements shall apply to all requirements not included in the material schedule.

2.8 DUCT SEAL

- A. Provide Garvin Industries' duct seal or an approved equal
- B. Provide and install duct seal at all conduit ends for all new conduit installations.
- C. Duct seal shall be used to seal around junction boxes, control panels and the like. It shall be a permanently soft, non toxic compound. It shall also not affect other plastic materials or corrode metals.
- D. Duct seal shall be applied to the control panel conduit penetrations, VFD enclosure penetrations, analog and discrete terminal boxes conduit penetrations, MCC conduit penetrations, and disconnects. Apply to each penetration but not more than 20-2" conduits per panel.

PART 3 - EXECUTION

3.1 GROUNDING

- A. Provide ground system as indicated on the drawings and as required by the National Electrical Code.

- B. All raceways require grounding conductors. Metallic raceways are not adequate grounding paths. Bonding conductors through the raceway systems shall be continuous from main switch ground buses to panel ground bars of the panelboards, and from panel grounding bars of panelboards and motor control centers to branch circuit outlets, motors, lights, etc. THESE GROUND CONDUCTORS ARE REQUIRED THROUGHOUT THE PROJECT REGARDLESS OF WHETHER CONDUIT RUNS SHOW GROUND CONDUCTORS ON THE DRAWINGS.
- C. All connections made below grade shall be of the exothermic type.
- D. The grounding system test shall not exceed a 48 hour span dry resistance of 10 ohms. Additional grounding to meet this requirement shall be installed at no extra cost. Grounding and bonding connections shall not be painted.

3.2 CONDUIT

- A. Locations:
Conduits shall be used as follows:
 - 1. Refer to schedule on plans,
- B. Installation
 - 1. Conduits subjected to rough handling or usage shall be removed from the premises.
 - 2. Conduits must be kept dry and free of water or debris with approved pipe plugs or caps. Care shall be given that plugs or caps be installed before pouring of concrete.
 - 3. Where conduits pass through exterior concrete walls or fittings below grade, the entrances shall be made watertight.
 - 4. Infurred ceilings, conduit runs shall be supported from structure, not furring.
 - 5. Conduits entering panelboards, pull boxes, or outlet boxes shall be secured in place by galvanized locknuts and bushings, one (1) locknut outside and one (1) locknut inside of box with bushing on conduit end. The locknuts shall be tightened against the box without deforming the box. Bushings shall be of the insulating type.
 - 6. Field conduit bends shall be made with standard tools and equipment manufactured especially for conduit bending.
 - 7. Where embedded conduits cross expansion joints, furnish and install offset expansion joints or sliding expansion joints. Sliding expansion joints shall be made with straps and clamps.
 - 8. Exposed runs of conduits shall be installed with runs parallel or perpendicular to walls, structural members or intersections of vertical planes and ceilings, with right angle turns consisting of symmetrical bends. No attempts are made in plans to show required pull boxes, gutters, etc. necessary for the construction of the raceway system but the Contractor shall provide these raceways as may be required.
 - 9. Conduits in structural slabs shall be placed between the upper and the lower layers of reinforcing steel, requiring careful bending of conduits. Conduits embedded in concrete slabs shall be spaced not less than eight (8) inches on centers or as widely spaced as possible where they converge at panels or junction boxes. Conduits running parallel to slab supports, such as beams, columns and structural walls shall be installed not less than 12 inches from such supporting elements. To prevent displacement during concrete pour, saddle supports for conduit, outlet boxes, junction boxes, inserts, etc., shall be secured.
 - 10. Conduit runs shall always be concealed except where indicated on plans.

11. Pull lines shall be installed in all empty conduits. All pull wires shall be identified with conduit number at each end.
12. Where conduits are run individually, they shall be supported by approved pipe straps secured by means of toggle bolts or tapcons on hollow masonry; tapcons on concrete or solid masonry; machine screws or bolts on metal surfaces and wood screws on wood construction. The use of perforated straps or wires will not be permitted.
13. Wire shall not be installed until all work of any nature that may cause damage is completed, including pouring of concrete. Mechanical means shall not be used in pulling in wires No. 8 or smaller.
14. Underground conduits not under concrete slabs are to be buried at least two (2) feet below finished grade for circuits rated 600 volts or less, except under traffic areas where motor vehicles may cross. Under traffic areas, conduits are to be buried at least three (3) feet below finished grade.
15. All conduits shall be cleaned by pulling a brush swab through before installing cables.
16. All conduits shall be sealed at each end with electrical putty. Special care shall be taken at all equipment where entrance of moisture could be detrimental to equipment. Approved backing gauze is required prior to the installation of conduit putty.
17. At MOST two (2) feet of flexible conduit shall be used at connections of all motors, transformers, motor operated valve and gates, instruments and other items of equipment where vibration is present. It shall be supported where required with stainless steel bands.
18. PVC conduit shall be supported to walls and slabs using carlon snap strap conduit wall hangers. Two hole PVC conduit clamps shall not be permitted.

3.3 WIRES, CABLES AND CONNECTIONS

- A. Cables pulled into conduits shall be pulled using pulling eyes attached to conductors.
- B. Shields shall be grounded at only one termination point.

3.4 BOXES

- A. Installation of boxes shall be in accordance with the National Electrical Code requirements.
- B. Boxes shall be mounted plumb and level in accessible locations and mounting shall be secure, vibration resistant and galvanically compatible. Hardware shall be used that is specifically intended for the purpose. When mounted in corrosive, damp or wet locations, stainless steel hardware shall be utilized.

3.5 WIRING DEVICES

- A. Wiring devices shall be installed in device boxes approved for the application. All connections shall be made with screw terminals. Wiring devices shall be Leviton or approved equal.
- B. Wire devices on UPS systems shall be isolated ground, colored orange.
- C. Cover plates shall be provided as follows except as otherwise noted.
 1. Interior finished area – brush alum.
 2. Wet areas – gasketed plastic with flip cover.
- D. Receptacles installed outdoors, below grade, or in areas other than clean and dry environments shall be GFI and weatherproof. Receptacles shall be weatherproof with cords plugged in.

3.6 SUPPORTING DEVICES

- A. All items shall be supported from the structural portion of the building and studs, except standard ceiling mounted lighting fixtures and small devices may be supported from ceiling system where permitted by the Engineer. However, no sagging of the ceiling will be permitted. Supports and hangers shall be types approved by Underwriters' Laboratories.
- B. All floor-mounted devices (switchboards, motor control centers, transformers, etc.) shall be securely anchored to the floors. Where recommendations are made by manufacturer, these recommendations shall be followed.

3.7 CLEANING

- A. All electrical equipment enclosures shall be thoroughly cleaned before acceptable by the Owner. As a minimum, Contractor shall remove all debris including stripped wire insulation, dirt, empty Dunkin Donut cups, etc.

- END OF SECTION -

SECTION 16200
INDOOR GENERATOR (REVISED PER ADDENDUM #1)

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. Work included:
1. The work covered by this portion of the specifications consists of having **an-Owner purchased a Contractor purchased and installed** indoor type generator unit for emergency use, from one of the approved listed vendors of a diesel electric generator for standby continuous use. It shall include all necessary equipment and accessories as specified in these specifications, and as shown in the drawings. The indoor unit shall be provided with a control panel and main line breaker, along with any additional equipment required for a completely functional system.
 2. The unit specified herein shall be **purchased and** installed by the **Owner's Contractor** performing the demo of the existing diesel generator units, and the two automatic transfer switches as called out under the bid documents. Under the Contractor performing the demolition of the existing equipment, **provide** and installation of the new equipment, along with temporary rental of an ATS switch, and a portable 800kW trailer mounted generator to facilitate the demolition and replacement of the existing 2000Amp ATS switch and the 1000kW generator. Refer to the drawings for the proposed sequence of demolition and installation.
 3. Coordinate with Contractor and ATS manufacturer and provide all labor and materials for a complete and functional system.
 4. Unit shall be a TIER 2/3 type generator that meets the EPA TIER 2/3 requirements.
 5. The Unit shall be installed in the existing generator room at the main electrical building, reuse the existing conduits and reuse the existing support 120V branch circuits for battery charger, daytank and daytank fuel pumps, and jacket water heaters and alternator heater. The existing 5,000 gallon above ground fuel tank shall be reused and connected to the new day tank and new generator.

1.2 MANUFACTURER

- A. The unit shall be completely built, tested and shipped by one manufacturer who has been regularly engaged in the manufacturing of such equipment. The manufacturer and local dealer shall be limited to the following:
1. Cummins Systems Power
Javier Mazarredo
 2. Caterpillar/Pantropic Power.
Robert Butt
 3. FDDA-Detroit Diesel/MTU
Lenin Hernandez

1.3 CODES

- A. All equipment shall be provided per the requirements of the following codes as applicable for the intended use and installation.
1. NFPA 70, latest edition (National Electrical Code).
 2. NFPA 110, Emergency and Standby Power Systems, latest edition.
 3. NFPA 30, Flammable and Combustible Liquids, latest edition.
 4. UL2200, the complete generator set shall be UL listed.
 5. American Society of Mechanical ENGINEERs (ASME)
 6. Diesel Engine Manufacturers Association (DEMA)
 7. Electrical Generating Systems Association (EGSA)
 8. International Standards Organization (ISO)
 9. Institute of Electrical and Electronics ENGINEERs (IEEE)
 10. National Electric Manufacturers Association (NEMA)
 11. Occupational Safety and Health Administration (OSHA)

1.4 SUBMITTALS

- A. Provide 6 copies of shop drawings. As a minimum include:
1. Engine manufacturer, model number, power output parameters, plans and elevations of the units, entrance points for power, control and fuel, storage and foundation requirements.
 2. Engine Generator/Exciter control cubical.
 3. Fuel consumption rate curves at $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, $\frac{4}{4}$ loads.
 4. Exhaust mufflers and vibration isolators.
 5. Battery charger, batteries and battery racks.
 6. Day Tank and fuel connection points.
 7. Cooling water requirements of radiator.
 8. Engine cooling air requirements and radiator fan capacity.
 9. Electrical diagrams including schematic and interconnection wiring diagrams for all equipment to be provided.
 10. Legends for all devices on all diagrams.
 11. Sequence of operation, explanations of all portions of schematic wiring diagrams.
 12. Provide load calculations including starting and running kVA.
 13. Transient voltage response calculation, no voltage transient shall dip below 25%.
- B. The specified kW shall be for continuous electrical service during interruption of the normal utility source. These ratings must be substantiated by manufacturers standard published curves. Special ratings or maximum ratings are not acceptable.
- C. O&M Manuals
1. Five sets of O&M manuals shall be provided.

1.5 WARRANTY

- A. Equipment furnished under this section shall be guaranteed against defective parts and workmanship under terms of the manufacturers and dealer's standard warranty. But, in no event shall it be for a period of less than five (5) years from the date of the Owner's acceptance of the unit.

PART 2 - PRODUCTS

2.1 ENGINE

- A. Engine shall be water-cooled 4 cycle inline or vee type compression ignition diesel. It shall meet specifications when operating on No. 2 domestic burner oil. The engine shall be equipped with fuel, lube oil, coolant, exhaust system, silencer, fuel transfer pump, fuel priming pump, fuel water separator, service run time meter, engine driven water pump, engine driven alternator for batteries, batteries, instrument/control panel including: lube oil pressure gauge, tachometer, system voltage, jacket water temperature gauge, system diagnostics code display, other auxiliary equipment as may be required for proper operation of the units. Provide jacket water heaters, dual, 480V, 6kW each maximum.
- B. An electronic governor system shall provide automatic isochronous frequency regulation. The governing system dynamic capabilities shall be controlled as a function of engine coolant temperature to provide fast, stable operation at varying engine operating temperature conditions. The control system shall actively control the fuel rate and excitation as appropriate to the state of the generator set. Fuel rate shall be regulated as a function of starting, accelerating to start disconnect speed, accelerating to rated speed, and operating in various isochronous or parallel states.
- C. The engine/generator set shall be mounted on a structural steel sub-base and shall be provided with suitable quad spring vibration isolators.
- D. Safety devices for protection of the units shall be provided as per the generator supplier and shall minimally include: shutoffs for high water temperature, low oil pressure, overspeed and engine overcrank.
- E. Guards shall be provided over all exposed moving parts per OSHA.

2.2 ALTERNATOR

- A. The AC generator shall be synchronous, 2/3 pitch, revolving field, drip-proof construction, single pre-lubricated sealed bearing, air cooled by a direct drive centrifugal blower fan, and directly connected to the engine with flexible drive disc. All insulation system components shall meet NEMA MG1 temperature limits for Class H insulation system. Actual temperature rise measured by resistance method at full load shall not exceed 105 degrees Centigrade.
- B. The generator shall be capable of delivering rated output (kW) at rated frequency and power factor at any voltage not more than 5 percent above or below rated voltage.
- C. A permanent magnet exciter generator (PMG) shall be included to provide a reliable source of excitation power for optimum motor starting and short circuit performance. The PMG and controls shall be capable of sustaining circuit performance. The PMG and controls shall be capable of sustaining and regulating current supplied to a single phase or three phase fault at approximately 300% of rated current for not more than 10 seconds.
- D. The subtransient reactance of the alternator shall not exceed 12 percent based on the standby rating of the generator set.
- E. Space Heater – Alternator shall be provided with 120V, 100W max. space heater interlocked with generator run relay.
- F. For system 750kW above alternator shall be form wound. Units below 750kW shall be random wound.

2.3 COOLING SYSTEM

- A. Radiator – An engine mounted radiator with blower type fan shall be sized to maintain safe operation at 122 degrees Fahrenheit maximum ambient temperature.
- B. The engine cooling system shall be pretreated by the engine supplier for the inhibiting of internal corrosion.
- C. The radiator shall exhaust through the building.

2.4 DAY TANK

- A. Provide a day tank with a differential level control, U.L. 142 listed. Construction of the day tank shall be all seam welded of heavy gauge steel with internal reinforcements. A machine formed fuel supply suction tube with all fittings, except the drain, located above the normal “full” level. Finish shall be epoxy coated interior with the day tank’s exterior chemically treated to resist corrosion, primed and finish painted in Simplex blue. Manufacturer shall be Simplex, Pryco, or an approved equal. Unit shall be provided with rupture basin. Unit shall fit into the space allowed where the former daytank was installed. Reuse former power circuits from panelboard to power new daytank.
- B. Provide Simplex or Pryco Daytank with control panel.
- C. Unit shall be furnished with two fully integrated, pre-plumbed and pre-wired fuel pumps; one is used as a backup; refer to plans for additional requirements.
- D. Unit shall be U.L. listed.
- E. Provide 150% rupture basin with integral leak detection sensor and alarm. A separate alarm control panel shall be provided or the alarm may be sent to the generator control panel.
- F. Day tank shall be sized for 200 gallons, ¾ load full consumption rate as a minimum.
- G. Fuel supply and return solenoid valves shall be provided, installed and wired as may be required.
- H. Day tank shall operate with the existing 5,000-gallon main fuel tank.
- I. Supply and return fuel pumps shall be provided.
- J. Provide all instrumentation and control signals per plans.

2.5 MAIN FUEL TANK MEASURING AND SENSORS

- A. Provide a digital display of the fuel tank level, based on the daytank’s level system level, and interstitial leak detectors.
- B. Silencer shall be located within the building or as otherwise indicated on plans.
- C. Exhaust silencer and flex shall have insulation blankets installed.

2.6 AUTOMATIC STARTING SYSTEM

- A. Starting Motor – A DC electric starting system with positive engagement drive shall be provided. The motor voltage shall be as recommended by the engine manufacturer.
- B. Automatic control – Fully automatic generator start/stop controls in the generator control panel shall be provided. Controls shall provide shutdowns for low oil pressure, emergency stop, high water temp, engine overspeed, low coolant level, overcrank, internal fault shutdown. Controls shall include a 30 second cranking cycle with lock out. Lock out shall have remote reset capability.
- C. Batteries

1. Current limiting battery charger shall be furnished to automatically recharge the batteries. Charger shall be the float charging type furnished to properly charge the batteries. It shall include overload protection, silicone diode full wave rectifiers, voltage surge suppressor, DC ampmeter, DC voltmeter, fused AC input. Input power shall be 120V single phase. A battery charger fail alarm contact shall be provided.

2.7 GENERATOR CONTROL PANEL

A. Generator Set Control

1. The generator set shall be provided with a microprocessor-based control system that is designed to provide automatic starting, monitoring and control functions for the generator set. The control system shall also be designed to allow local monitoring and control of the generator set and remote monitoring and control as described in this specification.
2. The control shall be mounted on the generator set. The control shall be vibration isolated and prototype tested to verify the durability of all components in the system under the vibration conditions encountered.
3. The generator set mounted control shall include the following features and functions:

B. Generator set A/C output metering

1. The generator set shall be provided with a metering set including the following features and functions:
 - a. Analog voltmeter, ammeter, frequency meter, and kilowatt (KW) meter. Voltmeter and ammeter shall display all three phases. Ammeter and KW meter scales shall be color coded in the following fashion: readings from 0-90% of generator set standby rating: green, readings from 90-100% of standby rating: amber; readings in excess of 100%: red.
 - b. Digital metering set, 0.5% accuracy, to indicate generator RMS voltage and current, frequency, output current, output KW, KW-hours, and power factor. Generator output voltage shall be available in line-to-line and line-to-neutral voltages, and shall display all three phase voltages (line to neutral or line to line) simultaneously.
 - c. Both analog and digital metering are required. The analog and digital metering equipment shall be driven by the single microprocessor, to provide consistent readings and performance.

C. Generator Set Alarm and Status Display

1. The generator set shall be provided with alarm and status indicating lamps to indicate non-automatic generator status and existing warning and shutdown conditions. The lamps shall be high intensity LED type. The lamp condition shall be clearly apparent under bright room lighting conditions. The generator set control shall indicate the existence of the following alarm and shutdown conditions on an alphanumeric digital display panel:

Low oil pressure (alarm)
Low oil pressure (shutdown)
Oil pressure sender failure (alarm)
Low coolant temperature (alarm)
High coolant temperature (alarm)

- High coolant temperature (shutdown)
- Engine temperature sender failure (alarm)
- Low coolant level (alarm or shutdown—selectable)
- Fail to crank (shutdown)
- Fail to start/overcrank (shutdown)
- Overspeed (shutdown)
- Low DC voltage (alarm)
- High DC voltage (alarm)
- Weak battery (alarm)
- Low fuel-daytank (alarm)
- High AC voltage (shutdown)
- Low AC voltage (shutdown)
- Under frequency (shutdown)
- Over current (warning)
- Over current (shutdown)
- Short circuit (shutdown)
- Ground fault (alarm)
- Over load (alarm)
- Emergency stop (shutdown)

2. Provide form “A” contacts for each of the above to be used in SCADA system.
3. Provide additional signal per plans.
4. Provide signal to trip the remote generator circuit breaker in the event of overcurrent or other shutdown. Unit shall auto reset on return to normal condition.

2.8 GENERATOR RATINGS

- A. The generator shall be a minimum of 1,000 kW (1,250kVA), 0.8 PF, and shall also start and operate the electrical loads listed in the oneline diagram electrical sheet. All loads are considered fully loaded. Supplier shall submit load calculations showing the starting and running of the generator loads described in the electrical oneline diagram under generator loads.
- B. Provide load calculations during shop drawings based on the oneline generator loads for review and approval.

2.9 GENERATOR CIRCUIT BREAKER

- A. The generator circuit breaker shall be 100% rated 1600 amp LSI, 480V, 3 phase. Refer to the drawings with a fault current interrupting rating exceeding the generator output.
- B. Provide oversized, unit mounted, generator circuit breaker enclosure, similar in size as the existing 1000kW Caterpillar unit and along the same side of the new generator as the existing, and as shown on the drawings so the installation Contractor is able to reuse the existing power and control conduits that sub up below the generator breaker enclosure.

2.10 FLUIDS

- A. Unit shall be provided with all fluids, fully fuelled and ready for immediate use.

2.11 SPACE

- A. Dimensions are critical. Unit shall fit within the plan view space allowed.
- B. Unit requiring more space shall be rejected.

PART 3 - EXECUTION

3.1 TESTS

- A. The unit shall be tested at rated frequency and voltage.
- B. Following installation, the following tests shall be performed by the system manufacturer's local dealer representative(s) in the presence of the Owner's Engineer or designated appointee:
 - 1. Pre-start checks:
 - a. Oil level
 - b. Water level
 - c. Tank fuel level
 - d. Battery connection and charge condition
 - e. Engine to control interconnects
 - f. Engine generator intake/exhaust obstructions
 - C. Supplier shall provide onsite operation tests
 - 1. Load – One hour operation at 80% of full load rating. Two hours operation at 100% of full load rating. After the first half hour stabilization period at full load, the following shall be recorded at fifteen minute intervals:
 - a. Voltage, amps and frequency.
 - b. Fuel pressure, oil pressure and water temperature.
 - c. Exhaust gas temperature at engine exhaust outlet.
 - d. Ambient temperature
 - e. Kilowatts
 - f. Power factor
 - g. kVARS
 - h. Generator temperature
 - 2. Test shall utilize resistive load banks for the full load. Minimum load shall be equal to the nameplate rating of the engine/generator set in kW. Generator supplier shall supply all load banks equipment necessary for connecting generator to load banks. Supplier shall provide all labor and material to perform test.
 - 3. Proper operation of controls, engine shutdown and safety devices shall be demonstrated.
 - 4. Should these tests indicate that the equipment does not meet the specified performance requirements, National Electrical Code and local codes, the cost of all corrective measures shall be borne by the Supplier.

3.2 STARTUP AND INSTRUCTION

- A. Before start up, the Supplier shall provide the services of an on-site technician to confirm proper connection of external equipment. If acceptable to the Supplier and the Owner, the unit may be start up tested.

- B. At no additional cost to the Owner, the generator Supplier shall provide start up assistance and coordination as required.
- C. Operating and maintenance procedures shall be explained to the Owner's personnel by the dealer's factory trained representative.
- D. A minimum of one manday shall be provided for instructing the Owner's staff in the care and maintenance of the unit. Training shall be provided by the Supplier.
- E. Proper operation of controls, engine shutdown and safety devices shall be demonstrated.

3.3 SYSTEM SERVICE CONTRACT

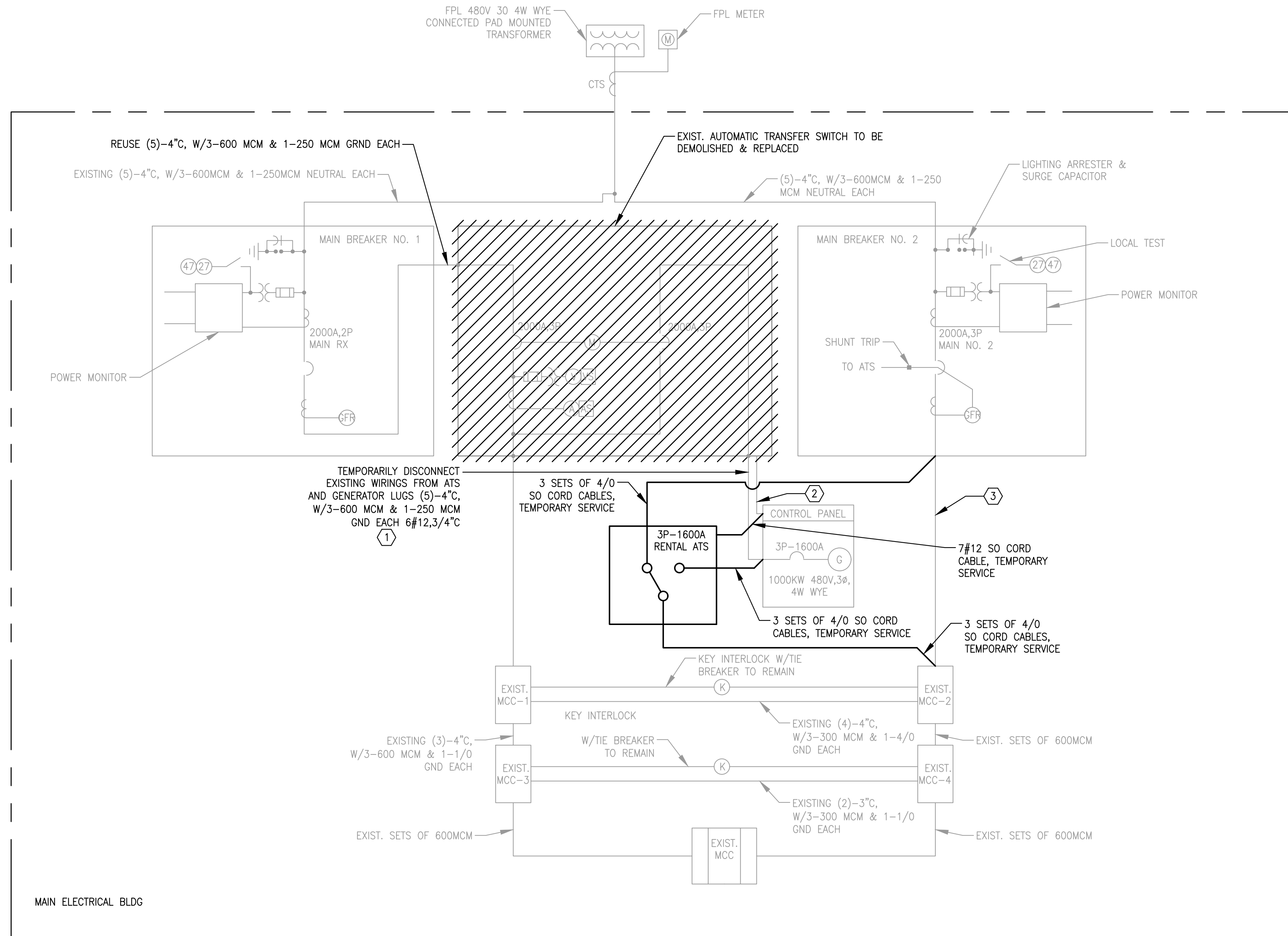
- A. Supplier shall make available to the Owner, this standard service contract which the Owner may or may not choose to exercise. This contract is separate from the warranty requirements contained herein.

3.4 SCHEDULE OIL SAMPLING

- A. The Supplier of the equipment must provide a quarterly oil sampling analysis for a period of one year from the date of acceptance. This scheduled oil sampling shall be of the atomic absorption spectrophotometry method as opposed to the spectrographic analysis method and shall be accurate to within a fraction of one part per million for the following elements:
 - 1. Iron
 - 2. Chromium
 - 3. Copper
 - 4. Aluminum
 - 5. Silicon
 - 6. In addition the sample shall be tested for the presence of water, fuel dilution, and antifreeze
- B. All equipment needed to take oil samples shall be provided in a kit at the time of acceptance and shall include the following:
 - 1. Sample gun kit (1)
 - 2. Bottles (4)
 - 3. Mailers (4)
 - 4. Written instructions (1)
- C. Immediate notification shall be provided to the Owner when analysis results shows any critical reading. If readings are normal, a report stating that the equipment is operating within established requirements shall be provided.
- D. This scheduled oil sampling program shall be made available to the Owner beyond the mandatory one (1) year specified above and shall be optional for the Owner to continue that program after that time period has elapsed.

- END OF SECTION -

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SPECIFIC ELECTRICAL NOTES

- ① CONTRACTOR SHALL ATTEMPT TO REUSE EXIST. PARALLEL POWER WIRES AFTER MEGGER TESTING. IN THE EVENT MEGGER TEST FAILS OR EXISTING SET OF WIRES CANNOT BE REUSED, CONTRACTOR IS TO PROVIDE, ALONG WITH BID, ADD ALTERNATE BIDS TO REPLACE 5 SETS OF 600 MCM, 1-250MCM GRND BETWEEN EACH. CONTRACTOR SHALL INFORM ENGINEER ANY REUSED POWER WIRES THAT NEED TO BE EXTENDED SHALL BE PROVIDED BY CONTRACTOR. MATCH EXISTING WIRE SIZES AND EXTEND VIA HIGH COMPRESSION SPLICE AND INSULATE USING HEAT SHRINK.
- ② TEMPORARILY DISCONNECT CONTROL WIRING FROM ATS BEING REMOVED.
- ③ DISCONNECT WIRES FROM EXIST. M-2 AND USE SO CORD TO CONNECT TO RENTAL ATS. WIRES TO BE RECONNECTED AT END OF 2000A ATS REPLACEMENT.

BID SUBMITTAL
NOT FOR CONSTRUCTION

C&W engineering
 ELECTRICAL CONSULTANTS
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No.	REVISIONS	DATE	BY
1	ADDENDUM 1	08/11/2023	JLR

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KHA PROJECT	044572075
DATE	MAY 2023
SCALE	AS SHOWN
DESIGNED BY	JLR
DRAWN BY	YGC
CHECKED BY	MAG

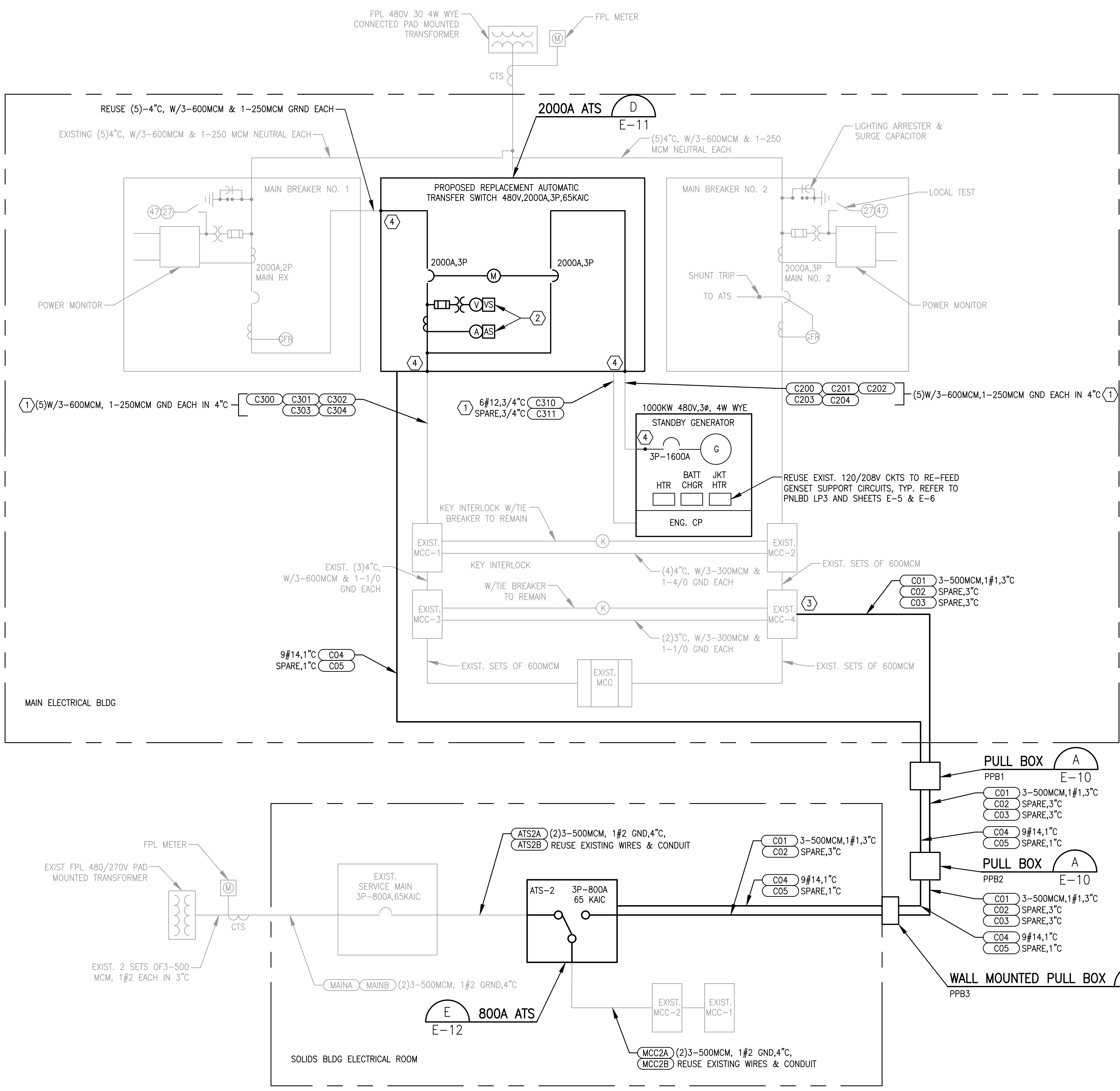
**CENTRAL (GIFFORD) WWTF
 GENERATOR AND ATS REPLACEMENT**
 PREPARED FOR
**INDIAN RIVER COUNTY
 DEPARTMENT OF UTILITY SERVICES**
 INDIAN RIVER COUNTY FLORIDA

LICENSED PROFESSIONAL
 MICHAEL A. GUIDA
 FLORIDA LICENSE NUMBER
 60755

**ELECTRICAL DEMO ATS
 ONELINE DIAGRAM**

SHEET NUMBER
E-7
 20 OF 26

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LOADS BASED OF POWER CO. 12 MONTH LOAD HISTORY:

- THE SOLIDS BUILDING 12 MONTH PEAK KW DEMAND LOAD OF 65KWD=92.1A PEAK AMPS. THIS LOAD IS BEING ADDED TO EXISTING MCC TO PROVIDE EMERGENCY POWER TO THE SOLIDS BUILDING.
- PEAK 12 MONTH HISTORY ON PLANT LOAD (DOES NOT INCLUDE SOLIDS BUILDING) IS 406KWD=575A.
- TOTAL COMBINED LOAD IS 667.1A.

- SPECIFIC ELECTRICAL NOTES**
- CONTRACTOR SHALL REUSE EXIST. PARALLEL POWER WIRES AFTER MEGGER TESTING. IN THE EVENT MEGGER TEST FAILS OR EXISTING SET OF WIRES CANNOT BE REUSED, CONTRACTOR IS TO PROVIDE, ALONG WITH BID, ADD ALTERNATE BIDS TO REPLACE PER FOOT COST OF 600MCM, 1-250MCM-GND. CONTRACTOR SHALL INFORM ENGINEER, ANY REUSED POWER WIRES THAT NEED TO BE EXTENDED SHALL BE PROVIDED BY CONTRACTOR, MATCH EXISTING WIRE SIZES AND EXTEND VIA HIGH COMPRESSION SPLICE AND INSULATE USING HEAT SHRINK.
 - PROVIDE A SMART METER W/ETHERNET COMM TO PLC TO PROVIDE V, A, KW, KVA, P.F., AND POWER QUALITY READINGS.
 - PROVIDE A 3P-300A CB, MATCH AIC RATING AND MODEL OF EXIST. MCC BREAKERS.
 - REUSE EXISTING PARALLEL WIRES AND CONDUIT, TORQUE LUGS TO WIRE SIZE REQUIREMENTS.

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**ELECTRICAL INSTALL ONELINE
 DIAGRAM**

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E-9
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