INDIVIDUALS WARNING: ALL INTERESTED IN BIDDING ON PROJECT MUST OBTAIN THE PLANS AND SPECIFICATIONS FROM THE DEPARTMENT MANAGING THE PROJECT OR AS OTHERWISE STATED IN THE ADVERTISEMENT FOR BIDS FOR THE PROJECT. DO NOT USE THE PLANS AND SPECIFICATIONS POSTED CLERK OF THE BOARD'S ON THE WFBSITF FOR BIDDING ON PROJECT.



800MHz GENERATOR REPLACEMENT GLEN HELEN

County Project #10.10.0923 Project Address: 18901 Institution Rd, San Bernardino, CA 92407

SUMMARY OF WORK

FURNISH AND INSTALL ALL ELECTRICAL CONNECTION, COMPONENTS, DEVICES AND EQUIPMENT

CONNECTION PROPERLY PRIOR TO DEMOLITION OF EXISTING GENERATOR AND ENCLOSURE. COORDINATE WITH COUNTY OF SAN BERNARDINO FOR REQUIREMENT.

REMOVE EXISTING PROPANE TANK. DISCONNECT PROPANE CONNECTION PROPERLY PRIOR TO DEMOLITION. COORDINATE WITH LOCAL ENVIRONMENTAL AGENCY FOR DISPOSAL OF EXISTING

CONTRACTOR TO PROVIDE ADDITIONAL ROCKS TO COVER EXISTING CONCRETE PADS OF THE

ROCKS TO MATCH EXISTING AND SHALL BE PAVED TO MATCH EXISTING SURFACE.

DEMOLISHED PROPANE TANK, GENERATOR AND GENERATOR ENCLOSURE AREA. NEW ADDITIONAL

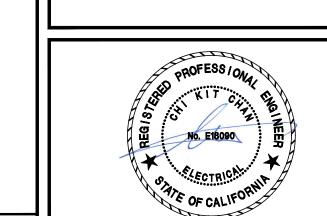
REMOVE EXISTING GENERATOR AND ENCLOSURE. DISCONNECT POWER AND PROPANE

PROPANE TANKS AND ASSOCIATED EQUIPMENT/DEVICES REQUIREMENT.





Local **Action.**



APPLICABLE CODES

PROJECT TEAM

UNLESS OTHERWISE INDICATED OR SPECIFIED, PERFORM THE WORK IN CONFORMANCE WITH THE LATEST EDITIONS OF ALL APPLICABLE REGULATORY REQUIREMENTS, INCLUDING, BUT NOT LIMITED TO,

1. CALIFORNIA BUILDING STANDARDS ADMINISTRATIVE CODE (PART 1, TITLE 24): 2019

2. CALIFORNIA BUILDING CODE (PART 2, TITLE 24): 2018 IBC WITH 2019 CA AMENDMENTS

3. CALIFORNIA ELECTRICAL CODE (PART 3, TITLE 24): 2017 NEC WITH 2019 CA AMENDMENTS

4. CALIFORNIA MECHANICAL CODE (PART 4, TITLE 24): 2018 UMC WITH 2019 CA AMENDMENTS

5. CALIFORNIA PLUMBING CODE (PART 5, TITLE 24) 2018 UPC WITH 2019 CA AMENDMENTS

6. CALIFORNIA ENERGY CODE (PART 6, TITLE 24): 2019

ARCHITECTURAL/ MECHANICAL

SANTA ANA, CALIFORNIA 92704

TEL (949) 517-4900 FAX (408) 297-2995

7. CALIFORNIA HISTORICAL BUILDING CODE, (PART 8, TITLE 24): 2019

8. CALIFORNIA FIRE CODE (PART 9, TITLE 24): 2018 IFC WITH CA AMENDMENTS

9. CALIFORNIA EXISTING BUILDING CODE (PART 10, TITLE 24): 2019 (2018 INTERNATIONAL EXISTING BUILDING CODE WITH CA AMENDMENTS)

10. CALIFORNIA GREEN BUILDING STANDARDS CODE OR CAL GREEN (PART 11, TITLE 24): 2019

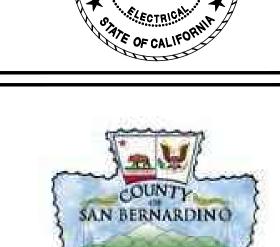
11. CALIFORNIA REFERENCED STANDARDS CODE (PART 12, TITLE 24): 2019

12. PUBLIC SAFETY (CCR TITLE 19), STATE FIRE MARSHAL: CURRENT REVISION

13. NFPA 72, NATIONAL FIRE ALARM CODE, 2019 EDITION

DRAWING INDEX

SHEET NO.	DESCRIPTION
G-0.0	COVER SHEET
E-0.1	ELECTRICAL GENERAL NOTES, SYMBOLS & ABBREVIATIONS
E-0.2	ELECTRICAL SPECIFICATIONS
E-0.3	ELECTRICAL SPECIFICATIONS
ES-1.1	ELECTRICAL SITE PLAN
E-4.1	ELECTRICAL PARTIAL SITE PLANS
E-4.2	ELECTRICAL PARTIAL SITE PLANS
E-5.1	ELECTRICAL DETAILS
ED-7.1	ELECTRICAL SINGLE LINE DIAGRAM — DEMO
E-7.1	ELECTRICAL SINGLE LINE DIAGRAM - NEW
S1.0	GENERAL NOTES & DETAILS



800MHz Generator Replacement Glen Helen Tower

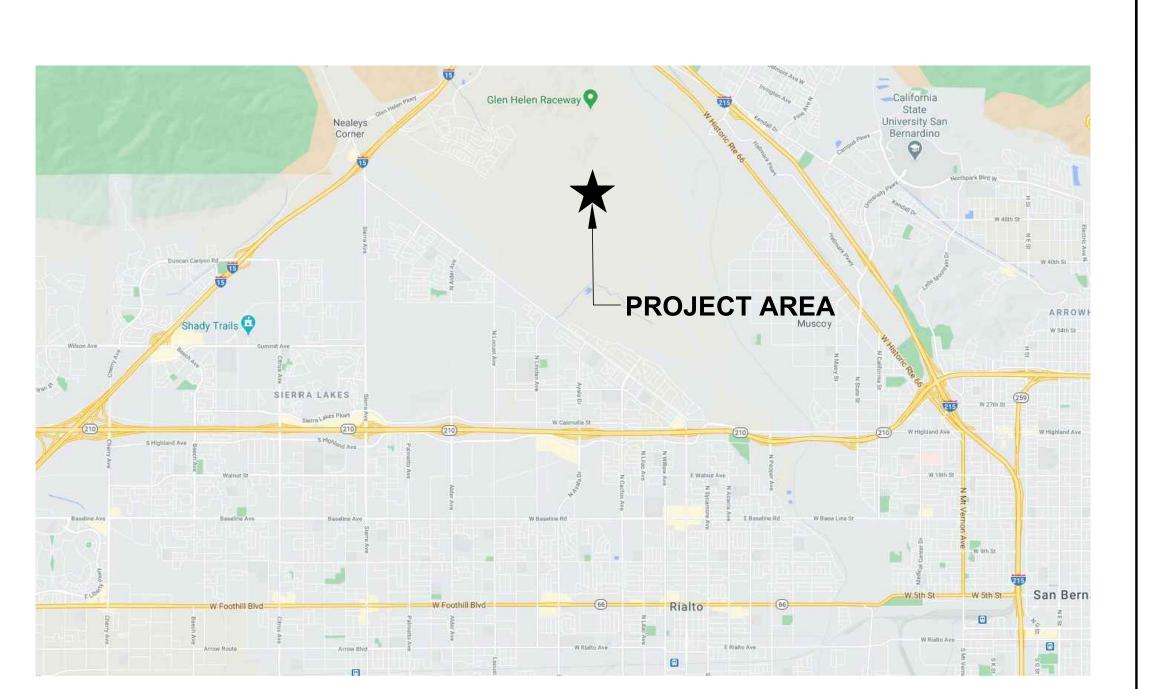
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SOBE PROJECT NO:	200154
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COVER SHEET

SCALE: AS NOTED AS NO THIS DRAWING IS 30" X 42" AT FUL

G-0.0



SITE MAP

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AREAS OF WORK —

VICINITY MAP

GENERAL NOTES

- 4. PATCH EXISTING AND NEW OPENINGS SO FINISH PROFILES, FIXTURES, ETC. MATCH ADJACENT
- 6. ALL WORK MUST BE SCHEDULED WITH THE PROJECT MANAGER TO MINIMIZE DISTURBANCE OF NORMAL
- 7. WHERE DISCREPANCIES OCCUR BETWEEN THE PLANS AND SPECIFICATIONS CONTRACTOR SHALL NOTIFY OWNER OF ANY DISCREPANCIES IN WRITING. ANY ADJUSTMENT OF THE CONTRACT DOCUMENTS WITHOUT A DETERMINATION BY THE OWNER SHALL BE AT THE CONTRACTOR'S OWN RISK AND EXPENSE.
- 8. CONTRACTOR SHALL PERFORM ALL WORK IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
- 9. THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS IS THAT THE WORK OF THE ALTERATION, REHABILITATION OR RECONSTRUCTION IS TO BE IN ACCORDANCE WITH TITLE 24, CALIFORNIA CODE OF REGULATIONS. SHOULD ANY EXISTING CONDITIONS SUCH AS DETERIORATION OR NONCOMPLYING CONSTRUCTION BE DISCOVERED WHICH IS NOT COVERED IN THE CONTRACT DOCUMENTS WHEREIN THE FINISHED WORK WILL NOT COMPLY WITH TITLE 24, CALIFORNIA CODE OF REGULATIONS, A
- 11. THE CONTRACTOR SHALL BE HELD FULLY RESPONSIBLE FOR THE PROPER RESTORATION OF ALL EXISTING SURFACES REQUIRING PATCHING, PLASTERING, PAINTING AND/OR OTHER REPAIR DUE TO THE INSTALLATION OF WORK UNDER THE TERMS OF THIS SPECIFICATION. CLOSE ALL OPENINGS, REPAIR
- 12. ALL TEMPORARY AND REMODELING WORK SHALL BE CONSIDERED A PART OF THIS CONTRACT AND NO EXTRA CHARGES WILL BE ALLOWED. THIS SHALL INCLUDE MINOR ITEMS OF MATERIAL OR EQUIPMENT
- MINE MECHANICAL & STRUCTURAL DRAWINGS AND SPECIFICATIONS TO DETERMINE THE SEQUENCE CONSTRUCTION THROUGHOUT THE PROJECT, INCLUDING EXISTING, TEMPORARY, REMODELED AND
- 14. ALL DEVICES & EQUIPMENT ARE NEW, UNLESS OTHERWISE NOTED.
- 15. CONTRACTOR SHALL PROPERLY DISPOSE OF OR RECYCLE DEMOLISHED MATERIALS.
- MAINTAIN FIRE RATING OF ALL ASSEMBLIES PENETRATED.

- ACTIVITIES. COORDINATE WORK WITH PROJECT MANAGER.
- THE MOST STRINGENT REQUIREMENTS SHALL APPLY AS DETERMINED BY THE OWNER
- CONSTRUCTION CHANGE DOCUMENT, OR A SEPARATE SET OF PLANS AND SPECIFICATIONS, DETAILING AND SPECIFYING THE REQUIRED WORK SHALL BE SUBMITTED TO AND APPROVED BY THE ENGINEER AND DSA BEFORE PROCEEDING WITH THE WORK.
- 10. PRIOR TO SUBMITTING PROPOSAL, BIDDER SHALL EXAMINE ALL GENERAL CONSTRUCTION DRAWINGS AND SHALL HAVE HAD VISITED THE CONSTRUCTION SITE. HE SHALL BE FAMILIAR WITH THE EXISTING CONDITIONS UNDER WHICH HE WILL HAVE TO OPERATE AND WHICH WILL IN ANY WAY AFFECT THE WORK UNDER THIS CONTRACT. NO SUBSEQUENT ALLOWANCE WILL BE MADE IN THIS CONNECTION IN BEHALF OF THE CONTRACTOR FOR ANY ERROR OR NEGLIGENCE ON HIS PART.
- ALL SURFACES, ETC., AS REQUIRED.
- O MEET THE REQUIREMENTS AND INTENT OF THE PROJECT

- 17. SEAL ALL EXTERIOR PENETRATIONS WATER-TIGHT.

29. DO NOT COMBINE DIFFERENT SYSTEM VOLTAGES AND NORMAL/EMERGENCY SYSTEMS IN SAME CONDUIT/JUNCTION BOX (EG., 120/208V VS. 277/480V), UNLESS SEPARATION/DIVIDER IS PROVIDED WITH APPROVAL BY ENGINEER. 30. ELECTRICAL SYSTEMS SHALL BE INSTALLED FOR FINAL INSPECTIONS. PROVIDE NEUTRAL TEST AND PROOF OF TORQUE DURING FINAL INSPECTION FOR ALL UNITS. FINAL TERMINATIONS OF CONDUCTORS TO ELECTRICAL EQUIPMENT AND DEVICES SHALL BE TORQUE WRENCH TIGHTENED TO THE MANUFACTURER'S RECOMMENDED SPECIFICATION, NO EXCEPTION. 31. CIRCUIT BREAKER TERMINALS IN SWITCHBOARDS AND LOAD CENTER SHALL BE UL LISTED AND APPROVED FOR USE WITH COPPER 75 DEGREE CELSIUS CONDUCTORS. 32. SIZES OF BREAKERS, SWITCHES, FUSES AND FEEDERS ARE BASED ON DESIGNED EQUIPMENT SIZES. THESE SIZES SHALL BE ADJUSTED TO SATISFY REQUIREMENTS OF ACTUAL INSTALLED OR SUBSTITUTE EQUIPMENT. UP-SIZING OR DOWNSIZING OF FEEDERS SHALL BE PROVIDED WITHOUT ADDITIONAL COST TO THE OWNER. 33. AS REQUIRED ALL OVERSIZED FEEDERS THAT WERE ADJUSTED IN SIZE TO COMPENSATE FOR VOLTAGE DROP SHALL BE PROVIDED WITH ADAPTER LUGS OR SPLICE BOX. ADAPTER LUGS SHALL BE PROVIDED IF SIZE IS AVAILABLE. OTHERWISE PROVIDE CABLE SPLICES IN THE SPLICE BOX TO REDUCE CABLES TO THE MAXIMUM SIZE THAT THE BREAKER LUGS CAN 34. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SAW-CUTTING, TRENCHING, BACKFILLING, COMPACTION AND PATCHING OF CONCRETE AND ASPHALT AS REQUIRED TO COMPLETE WORK. USE EXTREME CAUTION WHEN TRENCHING NEAR EXISTING UNDERGROUND UTILITY LINES. CONTRACTOR SHALL PROVIDE ALL REQUIRED CUTTING, PATCHING, PAINTING, AND REPAIRS

ELECTRICAL DEMOLITION NOTES 1. ELECTRICAL CONTRACTOR IS RESPONSIBLE TO DISCONNECT AND REMOVE ALL EXISTING ELECTRICAL EQUIPMENT AFFECTED BY THE PROJECT. THIS INCLUDES REROUTING OR THE EXTENSION OF EXISTING CONDUIT AND FEEDER WHERE NECESSARY TO MAINTAIN OPERATIONAL OF ANY EXISTING EQUIPMENT. WHERE EXISTING CONDUIT IS TO BE ABANDONED OR DEMOLISHED, THE CONDUIT SHALL REMOVED IF IT IS EXPOSED, IN A CRAWL SPACE OR IN AN ACCESSIBLE CEILING. ABANDONED OR DEMOLISHED CONDUIT FEEDS UP THROUGH THE FLOOR SHALL BE CUT OFF AND PLUGGED FLUSH WITH THE FLOOR. EXISTING CIRCUITS WHICH ARE REMOVED AND NOT REUSED SHALL BE IDENTIFIED ON THE PANEL SCHEDULE AS "SPARE". 4. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE OWNER PRIOR TO REMOVAL O EXISTING ELECTRICAL EQUIPMENT AND TURN OVER REMOVED EQUIPMENT THAT THE OWNER REQUESTS IN AN "AS-FOUND" CONDITION.

5. ALL DEMOLITION WORK SHOWN, IF ANY, WAS PREPARED FOR THE CONVENIENCE OF THE CONTRACTOR. NO REPRESENTATION HAS BEEN MADE THAT ALL ITEMS THAT MAY REQUIRE DEMOLITION HAVE BEEN SHOWN. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CAREFULLY EXAMINE THE SITE AND THE CONTRACT DOCUMENTS AND TO PERFORM ALL DEMOLITION AND RECONSTRUCTION WHICH MAY BE REQUIRED FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK. 6. WHEN CALLED FOR, OR SCOPE OF WORK REQUIRES ELECTRICAL EQUIPMENT TO BE REMOVED,

ALL CONDUIT, WIRE, BOXES, HANGERS, ETC. SHALL BE REMOVED COMPLETELY. AL OPENINGS SHALL BE PATCHED, SEALED AND PAINTED TO MATCH THE ADJACENT FINISH.

ELECTRICAL SCOPE OF WORK

SS CONNECTION TO EXISTING CAMP BMS (COORDINATE WITH COUNTY OF SAN IARDINO FOR LOCATION AND REQUIREMENT), NEW WORK PER FLOOR PLAN.

URNISH AND INSTALL DIESEL GENERATOR WITH LEVEL 2 ENCLOSURE, DUAL WALL BELLY

THE NEW GENERATOR. PROVIDE TEMPORARY GENERATOR DURING CONSTRUCTION FOR COUNTY OF SAN BERNARDINO

FURNISH AND INSTALL ALL ELECTRICAL CONNECTION, COMPONENTS, DEVICES AND EQUIPMENT

SYMBOLS & ABBREVIATIONS EXTENT OF DEMOLITION NEW TO EXISTING CONNECTION WORK ITEM (ELECTRICAL) DETAIL NUMBER DRAWING NUMBER (IF BLANK, SAME SHEET) EQUIPMENT EQUIPMENT TYPE DESIGNATION EQUIPMENT NUMBER **SALASO'BRIEN** SECTION NUMBER SECTION DESIGNATION DRAWING NUMBER (IF BLANK, SAME SHEET) EXISTING CONDU San Jose, California 95112-2218 877.725.2755 | 877.925.1477 (f) NNCH CIRCUIT WIRING IN CONDUIT CONCEALED IN CEILING SPACE

HEAVY DUTY HEAVY NO-FUSED DISCONNECT SWITCH, WALL MOUNTED

HEAVY DUTY HEAVY FUSED DISCONNECT SWITCH, WALL MOUNTED

THERMOSTAT

CARBON DIOXIDE SENSOR

CARBON MONOXIDE DETECTOR WITH SOUNDER BASE

AUTHORITY HAVING JURISDICTION BLDG BUILDING CONDUIT CB CIRCUIT BREAKER

CENTERLINE CLG CEILING CKT CIRCUIT

C.O. CONDUIT ONLY (W/PULLROPE) CONTINUATION CSFM CALIFORNIA STATE FIRE MARSHALL

DN DOWN DISCONNECT SWITCH DWG DRAWING

<E> EXISTING EM

EMS ENERGY MANAGEMENT SYSTEM EQ EQUAL EQUIP. EQUIPMENT

<ERR> EXISTING TO REMAIN AND BE RECONNECTED FA FIRE ALARM CONTROL PANEL

FIRE ALARM TERMINAL CABINET FLR FLOOR

GFI GROUND FAULT INTERRUPTER GND GROUND

IOR INSPECTOR OF RECORD LTG LIGHTING

LTS LIGHTS MAX. MAXIMUM

MINIMUM

NEW (BOLD) NETWORK AREA CONTROLLER

N.T.S. NOT TO SCALE PROGRAMMABLE EQUIPMENT CONTROLLER

PNL PANEL REMOVE <R>

<RRN> REMOVE REPLACE W/ NEW RECEPTACLE

ROOM REMOTE POWER SUPPLY SPB SIGNAL PULL BOX

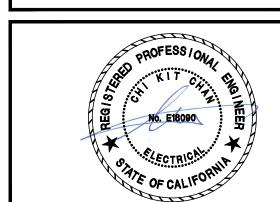
SPECS SPECIFICATIONS

TYPICAL TWISTED PAIR (SHIELDED) U.O.N. UNLESS OTHERWISE NOTED

VOLT VOLT AMP

V.I.F. VERIFY IN FIELD WATTS

WP WEATHERPROOF (NEMA 3R) XFMR TRANSFORMER



expect a difference

305 South 11th Street

WWW.SALASOBRIEN.COM

National **Strength.**

Local **Action.**



800MHz Generator Replacement Glen Helen Tower

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SHEET TITLE ELECTRICAL GENERAL NOTES, SYMBOLS & ABBREVIATIONS

SCALE: AS NOTED AS NOTE THIS DRAWING IS 30" X 42" AT FULL SIZ

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---- NEW CONDUIT ××××× CONDUIT ***** DEMOLISHE PANEL BOARD/TERMINAL CABINET - FLUSH/SURFACE MOUNTED OR WHERE POSSIBLE, EXPOSED ON ROOF OR BUILDING EXTERIOR. BRANCH CIRCUIT WIRING IN CONDUIT CONCEALED UNDER FLOOR. UNDERGROUND OR WHERE POSSIBLE. → BRANCH CIRCUIT HOME RUN TO PANEL. CONCEALED IN CEILING SPACE EXISTING DEVICES, CONDUITS, WIRES, ETC TO REMAIN NEW (BOLD) DEVICES, CONDUITS, WIRES, ETC. ----O CONDUIT UP WP \bigoplus GFI DUPLEX GFI RECEPTACLE, WEATHERPROOF, 20A, 165V, 3WG, NEMA 5-20R, GFI JUNCTION BOX - CEILING/FLOOR/ROOF/WALL MOUNTED HORSEPOWER RATED TOGGLE WITH THERMAL OVERLOAD WEATHER PROOF LIGHTING AUTOMATIC TIMER SWITCH. LIGHTING FIXTURE, SURFACE MOUNTED. $oldsymbol{\otimes}$ Exit sign, pendant / wall mounted.

WITH SUFFICIENT PULL BOXES OR JUNCTION BOXES TO LIMIT THE MAXIMUM LENGTH OF ANY SINGLE CABLE PULL TO 100 FEET. PULL BOXES SHALL BE SIZED PER CODE OR AS INDICATED ON DRAWINGS. LOCATIONS SHALL BE DETERMINED IN THE FIELD OR AS INDICATED

PROVIDE MATERIAL AND EQUIPMENT COMPATIBLE WITH EQUIPMENT ACTUALLY SUPPLIED.

28. FINAL CONNECTIONS TO ALL EQUIPMENT SHALL BE PER MANUFACTURER'S APPROVED WIRING DIAGRAMS, DETAILS, AND INSTRUCTIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO

1. FURNISH AND INSTALL ELECTRICAL PANELS, MTS, ATS, GENERATOR, GENERATOR ANNUNCIATOR,

TANK AND LEAK SENSOR, CONCRETE PAD AND FULL TANK OF FUEL SHALL BE PROVIDED. CONTRACTOR SHALL BE RESPONSIBLE TO APPLY AND OBTAIN APPROVAL FROM AQMD FOR

DOIT EQUIPMENT ROOM TO MAINTAIN BACKUP POWER AVAILABILITY.

ALL PERMIT FEES SHALL BE CONTRACTOR'S RESPONSIBILITY.

** GENERAC GENERATOR AND GE ATS WERE USED AS BASIS OF DESIGN. CONTRACTOR SHALL SUBMIT PRODUCTS PER BOD OR APPROVED EQUAL BY COUNTY AND EEOR. ANY SUBSTITUTION PRODUCTS SHALL MATCH ALL SPECIFICATION AND PHYSICAL REQUIREMENT. CONTRACTOR IS RESPONSIBLE TO PROVIDE REVISED STRUCTURAL DESIGN, ELECTRICAL DESIGN AND MECHANICAL DESIGN AS REQUIRED.

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THROUGH AN ATS, SHUNT TRIP BREAKERS, OR CONTROL CIRCUITS. 4.3.6. ONCE UTILITY POWER HAS RETURNED, THE TWO-WIRE START SIGNAL WILL BE REMOVED. THE GENERATOR PARALLELING CONTACTORS WILL OPEN, GENERATORS WILL

RUN IN A COOL DOWN MODE, AND THEN GENERATORS SHUT DOWN.

4.3.7. TRANSFER SWITCH(ES) SUPPLIED SHALL BE CAPABLE OF BEING INHIBITED FROM TRANSFERRING WITH A CONTACT FROM THE SYSTEM CONTROLLER. THE TRANSFER SWITCHES SUPPLIED SHALL ALSO BE ABLE TO SHED LOAD VIA TRIP-TO-NEUTRAL FEATURE -- THE LOAD IS SHED AND DOES NOT RE-CLOSE TO A UTILITY THAT MAY HAVE A FAULT PRESENT. FOR APPLICATIONS IN WHICH LOAD SHEDDING WITH THE TRANSFER SWITCH IS NOT FEASIBLE, LOAD SHEDDING REQUIREMENTS WILL BE EVALUATED AND ACCOMMODATED

5. ENGINE / ALTERNATOR PACKAGING

5.1. THE ENGINE/ALTERNATOR SHALL BE ISOLATED FROM THE GENERATOR FRAME WITH RUBBER ISOLATORS. THE PACKAGING SHALL NOT REQUIRE THE ADDITION OF EXTERNAL SPRING

5.2. A MAINLINE, THERMAL MAGNETIC CIRCUIT BREAKER CARRYING THE UL MARK SHALL BE FACTORY INSTALLED. THE BREAKER SHALL BE RATED BETWEEN 100 TO 125% OF THE RATED AMPACITY OF THE GENSET. THE LINE SIDE CONNECTIONS ARE TO FEED FROM THE ALTERNATOR, AND THE LOAD SIDE OF THE BREAKER SHALL FEED A PARALLELING SWITCH. THE BREAKER IS TO HAVE AUX CONTACT AND SHUNT TRIP. THE BREAKER WILL FUNCTION AS A REDUNDANT TRIPPING DEVICE IN THE SYSTEM. IF THE PARALLELING SWITCH FAILS TO OPEN, THE GENERATOR BREAKER WILL BE SHUNT TRIPPED.

5.3. EACH GENERATOR SHALL INCLUDE A CYCLE RATED PARALLELING SWITCH USING PROVEN CONTACTOR TECHNOLOGY. THE MECHANISM SHALL HAVE A MINIMUM CYCLE LIFE OF 20,000 OPERATIONS. THE GENERATOR PARALLELING SWITCH SHALL BE MOUNTED IN THE GENERATOR CONNECTION BOX. SOLUTIONS UTILIZING MOTOR OPERATED OR STORED ENERGY BREAKERS FOR GENERATOR PARALLELING SHALL PROVIDE DOCUMENTATION OF 20,000 OPERATION CYCLE

5.4. THE GENERATOR SHALL INCLUDE A UNIT MOUNTED AUXILIARY POWER LOAD CENTER. ALL ANCILLARY AC DEVICES (BLOCK HEATER, BATTERY CHARGER, ETC) SHALL HAVE A DEDICATED BREAKER WITHIN THE LOAD CENTER. 5.5. ENCLOSURE

5.5.1. THE GENSET SHALL BE PACKAGED WITH A SOUND ATTENUATING ENCLOSURE.

5.5.2. THE ENCLOSURE SHALL BE COMPLETELY LINED WITH SOUND DEADENING MATERIAL. THIS MATERIAL MUST BE OF A SELF EXTINGUISHING DESIGN WITH A REFLECTIVE SURFACE FOR ENHANCED SERVICEABILITY.

5.5.3. THE ENCLOSURE SHALL BE MADE OF STEEL WITH A MINIMUM THICKNESS OF 16 GAUGE. THE ENCLOSURE IS TO HAVE HINGED, REMOVABLE DOORS TO ALLOW ACCESS TO THE ENGINE, ALTERNATOR AND CONTROL PANEL. THE HINGES SHALL ALLOW FOR DOOR FIT ADJUSTMENT. HINGES AND ALL EXPOSED FASTENERS WILL BE STAINLESS STEEL OR SERMAGARD COATED. THE USE OF POP-RIVETS WEAKENS THE PAINT SYSTEM AND NOT ALLOWED ON EXTERNAL PAINTED SURFACES. EACH DOOR WILL HAVE LOCKABLE HARDWARE WITH IDENTICAL KEYS.

5.5.4. THE ENCLOSURE SHALL BE COATED WITH ELECTROSTATIC APPLIED POWDER PAINT, BAKED AND FINISHED TO MANUFACTURER'S SPECIFICATIONS. THE COLOR WILL BE MANUFACTURER'S STANDARD.

5.5.5. THE ENCLOSURE SHALL UTILIZE AN UPWARD DISCHARGING RADIATOR HOOD. DUE TO CONCERNS RELATIVE TO RADIATOR DAMAGE, CIRCULATING EXHAUST, AND PREVAILING WINDS, EQUIPMENT WITHOUT A RADIATOR DISCHARGE HOOD WILL NOT BE ACCEPTABLE.

5.5.6. THE GENSET SILENCER SHALL BE MOUNTED ON THE DISCHARGE HOOD OF THE ENCLOSURE. DUE TO ARCHITECTURAL CONCERNS, SILENCERS MOUNTED ON THE TOP OF THE GENERATOR ENCLOSURE ARE NOT ACCEPTABLE. GENSETS WITH SILENCERS MOUNTED INSIDE THE MAIN GENERATOR COMPARTMENT ARE ACCEPTABLE ONLY IF THE SILENCER IS THERMALLY WRAPPED TO MINIMIZE HEAT STRESS ON THE SURROUNDING COMPONENTS.

5.6. SUB-BASE FUEL TANK

5.6.1. THE PACKAGING SHALL INCLUDE A DOUBLE WALL, SUB-BASE MOUNTED, UL142 LISTED FUEL TANK. THE TANK SHALL BE 1325 GALLON SIZED TO PROVIDE 72 HOURS OF RUN

5.6.2. THE TANK SHALL INCLUDE FUEL SUCTION AND RETURN CONNECTIONS, NORMAL AND EMERGENCY VENTS, SECONDARY CONTAINMENT EMERGENCY VENT AND RUPTURE BASIN SENSOR, MECHANICAL FUEL LEVEL INDICATION AND A STUB-UP AREA CONVENIENT FOR

5.6.3. THE FUEL TANK SHALL USE AN ELECTRIC FUEL SENSOR TO PROVIDE AN ANALOG INDICATION OF FUEL LEVEL. THE CONTROLLER SHALL HAVE A WARNING INDICATION ON LOW FUEL LEVEL AND PROVIDE OPTIONAL SHUTDOWN FUNCTIONALITY FOR LOW, LOW FUEL

5.6.4. THE FUEL TANK MUST BE SUPPLIED BY THE ENGINE-GENERATOR SET MANUFACTURER AND BE INSTALLED BEFORE SHIPMENT.

6.1. SUPPLIER TO ITEMIZE LOOSE PARTS THAT REQUIRE SITE MOUNTING AND INSTALLATION. PREFERENCE WILL BE SHOWN FOR GENSETS THAT FACTORY MOUNT ITEMS LIKE MUFFLERS,

6.2.1. FUSES: ONE SPARE SET

6.2.2. FILTERS ONE SPARE SET (AIR, FUEL, OIL)

6. ADDITIONAL PROJECT REQUIREMENTS 6.1. FACTORY TESTING

6.1.1. BEFORE SHIPMENT OF THE EQUIPMENT, THE ENGINE-GENERATOR SET SHALL BE TESTED UNDER RATED LOAD FOR PERFORMANCE AND PROPER FUNCTIONING OF CONTROL AND INTERFACING CIRCUITS. TESTS SHALL INCLUDE:

6.1.1.1. VERIFY VOLTAGE & FREQUENCY STABILITY. 6.1.1.2. VERIFY TRANSIENT VOLTAGE & FREQUENCY DIP RESPONSE. LOAD TEST THE GENERATOR FOR 2 HOURS. 6.1.1.4. VERIFY PARALLELING AND LOAD SHARING CAPABILITIES

6.2.1. THREE (3) SETS OF OWNER'S MANUALS SPECIFIC TO THE PRODUCT SUPPLIED MUST ACCOMPANY DELIVERY OF THE EQUIPMENT. GENERAL OPERATING INSTRUCTION, PREVENTIVE MAINTENANCE, WIRING DIAGRAMS, SCHEMATICS AND PARTS EXPLODED VIEWS SPECIFIC TO THIS MODEL MUST BE INCLUDED.

6.3.1. CONTRACTOR SHALL INSTALL THE COMPLETE ELECTRICAL GENERATING SYSTEM INCLUDING ALL EXTERNAL FUEL CONNECTIONS IN ACCORDANCE WITH REQUIREMENTS OF NEC, NFPA, AND THE MANUFACTURER'S RECOMMENDATIONS AS REVIEWED BY THE ENGINEER.

6.4.1. SUPPLIER OF THE GENSET AND ASSOCIATED ITEMS SHALL HAVE PERMANENT SERVICE FACILITIES IN THIS TRADE AREA. THESE FACILITIES SHALL COMPRISE A PERMANENT FORCE OF FACTORY TRAINED SERVICE PERSONNEL ON 24 HOUR CALL, EXPERIENCED IN SERVICING THIS TYPE OF EQUIPMENT, PROVIDING WARRANTY AND ROUTINE MAINTENANCE SERVICE TO AFFORD THE OWNER MAXIMUM PROTECTION. DELEGATION OF THIS SERVICE RESPONSIBILITY FOR ANY OF THE EQUIPMENT LISTED HEREIN WILL NOT BE CONSIDERED FULFILLMENT OF THESE SPECIFICATIONS. SERVICE CONTRACTS SHALL ALSO BE AVAILABLE.

6.5.1. THE STANDBY ELECTRIC GENERATING SYSTEM COMPONENTS, COMPLETE GENSET AND INSTRUMENTATION PANEL SHALL BE WARRANTED BY THE MANUFACTURER AGAINST DEFECTIVE MATERIALS AND FACTORY WORKMANSHIP FOR A PERIOD OF TEN (10) YEARS. SUCH DEFECTIVE PARTS SHALL BE REPAIRED OR REPLACED AT THE MANUFACTURER'S OPTION, FREE OF CHARGE FOR PARTS, LABOR AND TRAVEL.

6.5.2. THE WARRANTY PERIOD SHALL COMMENCE WHEN THE STANDBY POWER SYSTEM IS FIRST PLACED INTO SERVICE. MULTIPLE WARRANTIES FOR INDIVIDUAL COMPONENTS (ENGINE, ALTERNATOR, CONTROLS, ETC.) WILL NOT BE ACCEPTABLE. SATISFACTORY WARRANTY DOCUMENTS MUST BE PROVIDED. ALSO, IN THE JUDGMENT OF THE SPECIFYING AUTHORITY, THE MANUFACTURER SUPPLYING THE WARRANTY FOR THE COMPLETE SYSTEM MUST HAVE THE NECESSARY FINANCIAL STRENGTH AND TECHNICAL EXPERTISE WITH ALL

COMPONENTS SUPPLIED TO PROVIDE ADEQUATE WARRANTY SUPPORT.

6.6. STARTUP AND COMMISSIONING

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6.6.1. THE SUPPLIER OF THE ELECTRIC GENERATING PLANT AND ASSOCIATED ITEMS COVERED HEREIN SHALL PROVIDE FACTORY TRAINED TECHNICIANS TO VALIDATE THE COMPLETED INSTALLATION AND TO PERFORM AN INITIAL STARTUP INSPECTION TO INCLUDE:

6.6.1.1. ENSURING THE ENGINE STARTS (BOTH HOT AND COLD) WITHIN THE SPECIFIED

VERIFICATION OF ENGINE PARAMETERS WITHIN SPECIFICATION. VERIFY NO LOAD FREQUENCY AND VOLTAGE, ADJUSTING IF REQUIRED.

TEST ALL AUTOMATIC SHUTDOWNS OF THE ENGINE-GENERATOR. PERFORM A LOAD TEST OF THE ELECTRIC PLANT, ENSURING FULL LOAD FREQUENCY AND VOLTAGE ARE WITHIN SPECIFICATION BY USING BUILDING LOAD.

7.6. TRAINING 7.6.1. TRAINING IS TO BE SUPPLIED BY THE START-UP TECHNICIAN FOR THE END-USER

DURING COMMISSIONING. THE TRAINING SHOULD COVER BASIC GENERATOR OPERATION AND COMMON GENERATOR ISSUES THAT CAN BE MANAGED BY THE END-USER.

7.6.2. TRAINING IS TO INCLUDE MANUAL OPERATION OF SYSTEM.

CONSIDERED LESS DESIRABLE

SHALL BE AVAILABLE.

4.1.5. CIRCUIT BOARDS SHALL UTILIZE SURFACE MOUNT TECHNOLOGY TO PROVIDE VIBRATION DURABILITY. CIRCUIT BOARDS THAT UTILIZE LARGE CAPACITORS OR HEAT SINKS MUST

4.1.6. A PREDICTIVE MAINTENANCE ALGORITHM THAT ALARMS WHEN MAINTENANCE IS REQUIRED. THE CONTROLLER SHALL HAVE THE CAPABILITY TO CALL OUT TO THE LOCAL SERVICING DEALER WHEN MAINTENANCE IS REQUIRED.

UTILIZE ENCAPSULATION METHODS TO SECURELY SUPPORT THESE COMPONENTS.

2.7.5. THE ENGINE INTAKE AIR IS TO BE FILTERED WITH ENGINE MOUNTED, REPLACEABLE,

3.1. THE ALTERNATOR SHALL BE THE VOLTAGE AND PHASE CONFIGURATION AS SPECIFIED IN

SYNCHRONOUS MACHINE. THE EXCITATION SYSTEM SHALL UTILIZE A BRUSHLESS EXCITER WITH

A THREE PHASE FULL WAVE RECTIFIER ASSEMBLY PROTECTED AGAINST ABNORMAL TRANSIENT

CONDITIONS BY A SURGE PROTECTOR. PHOTO—SENSITIVE COMPONENTS WILL NOT BE

3.3. THE ALTERNATOR SHALL INCLUDE A PERMANENT MAGNET GENERATOR (PMG) FOR EXCITATION

3.4. THE ALTERNATOR SHALL SUPPORT 1162 SKVA WITH A MAXIMUM VOLTAGE DIP OF 30 %.

3.5. THREE PHASE ALTERNATORS SHALL BE 12 LEAD, BROAD RANGE CAPABLE OF SUPPORTING

3.6. THE ALTERNATOR SHALL USE A SINGLE, SEALED BEARING DESIGN. THE ROTOR SHALL BE

3.7. THE ALTERNATOR SHALL MEET TEMPERATURE RISE STANDARDS OF UL2200 (120 DEGREES C).

3.8. THE ALTERNATOR SHALL BE PROTECTED AGAINST OVERLOADS AND SHORT CIRCUIT CONDITIONS

ENSURE PRECISION PROTECTION AND REPEATABLE TRIP CHARACTERISTICS, THESE FUNCTIONS

4.1.1. THE GENERATOR CONTROL SYSTEM SHALL BE A FULLY INTEGRATED MICROPROCESSOR

BASED CONTROL SYSTEM FOR STANDBY EMERGENCY ENGINE GENERATORS MEETING ALL

4.1.2. THE GENERATOR CONTROL SYSTEM SHALL BE A FULLY INTEGRATED CONTROL SYSTEM

ENABLING REMOTE DIAGNOSTICS AND EASY BUILDING MANAGEMENT INTEGRATION OF ALL

DIGITAL CONTROL OVER ALL GENERATOR FUNCTIONS INCLUDING: ENGINE PROTECTION,

LOAD-SHARING (REAL AND REACTIVE) AND ALL RELATED GENERATOR OPERATIONS. THE

GENERATOR CONTROLLER MUST ALSO PROVIDE SEAMLESS DIGITAL INTEGRATION WITH THE

ENGINE'S ELECTRONIC ENGINE CONTROL MODULE (ECM) IF SO EQUIPPED. GENERATOR

DO NOT PROVIDE SEAMLESS INTEGRATION WITH THE ENGINE MANAGEMENT SYSTEM ARE

4.1.3. COMMUNICATIONS SHALL BE SUPPORTED WITH BUILDING AUTOMATION VIA THE MODBUS

PROTOCOL WITHOUT NETWORK CARDS. OPTIONAL INTERNET AND INTRANET CONNECTIVITY

INCLUDING ENCAPSULATED CIRCUIT BOARDS AND SEALED AUTOMOTIVE STYLE PLUGS FOR

ALL SENSORS AND CIRCUIT BOARD CONNECTIONS. THE USE OF NON-ENCAPSULATED

4.1.4. THE CONTROL SYSTEM SHALL PROVIDE AN ENVIRONMENTALLY SEALED DESIGN

BOARDS, EDGE CARDS, AND PC RIBBON CABLE CONNECTIONS ARE CONSIDERED

CONTROLLER'S THAT UTILIZE SEPARATE VOLTAGE REGULATORS AND SPEED GOVERNORS OR

ALTERNATOR PROTECTION, SPEED GOVERNING, VOLTAGE REGULATION, SYNCHRONIZING,

GENERATOR FUNCTIONS. THE GENERATOR CONTROLLER SHALL PROVIDE INTEGRATED AND

MUST BE IMPLEMENTED ELECTRONICALLY IN THE GENERATOR CONTROL PANEL -- THERMAL

BY ADVANCED CONTROL PANEL PROTECTIVE FUNCTIONS. THE CONTROL PANEL IS TO PROVIDE

A TIME CURRENT ALGORITHM THAT PROTECTS THE ALTERNATOR AGAINST SHORT CIRCUITS. TO

THE INSULATION SYSTEM MATERIAL SHALL BE CLASS "H" CAPABLE OF WITHSTANDING 150

1 CONNECTION BOX FOR EASY TERMINATION. A FULLY RATED, ISOLATED NEUTRAL

CONNECTION MUST BE INCLUDED BY THE GENERATOR SET MANUFACTURER.

DIRECT CONNECTED TO THE ENGINE TO ENSURE PERMANENT ALIGNMENT.

MAGNETIC BREAKER IMPLEMENTATION ARE NOT ACCEPTABLE.

VOLTAGE RECONNECTION. SINGLE PHASE ALTERNATORS SHALL BE FOUR LEAD AND DEDICATED

VOLTAGE DESIGNS (600V) SHALL BE SIX LEAD. ALL LEADS MUST BE EXTENDED INTO A NEMA

CONNECTED TO THE ENGINE FLYWHEEL USING FLEXIBLE DRIVE DISKS. THE STATOR SHALL BE

SUPPORT. THE SYSTEM SHALL SUPPLY A MINIMUM SHORT CIRCUIT SUPPORT CURRENT OF

3.2. THE ALTERNATOR SHALL BE A 4-POLE, REVOLVING FIELD, STATIONARY ARMATURE,

300% OF THE RATING (250% FOR 50HZ OPERATION) FOR 10 SECONDS.

PERMITTED IN THE ROTATING EXCITER.

DEGREES C TEMPERATURE RISE.

4. CONTROLS & OPERATING SEQUENCE

REQUIREMENTS OF NFPA 110 LEVEL 1.

4.1. GENSET CONTROLLER

4.1.7. DIAGNOSTIC CAPABILITIES SHOULD INCLUDE TIME-STAMPED EVENT AND ALARM LOGS, ABILITY TO CAPTURE OPERATIONAL PARAMETERS DURING EVENTS. SIMULTANEOUS MONITORING OF ALL INPUT OR OUTPUT PARAMETERS, CALLOUT CAPABILITIES, SUPPORT FOR MULTI-CHANNEL DIGITAL STRIP CHART FUNCTIONALITY AND .2 MSEC DATA LOGGING

4.1.8. IN ADDITION TO STANDARD NFPA 110 ALARMS, THE APPLICATION LOADS SHOULD ALSO BE PROTECTED THROUGH INSTANTANEOUS AND STEADY STATE PROTECTIVE SETTINGS ON SYSTEM VOLTAGE, FREQUENCY, AND POWER LEVELS. 4.1.9. THE CONTROL SYSTEM SHALL PROVIDE PRE-WIRED CUSTOMER USE I/O: 4 RELA

OUTPUTS (USER DEFINABLE FUNCTIONS), 4 CONTACT INPUTS, 2 ANALOG INF COMMUNICATIONS SUPPORT VIA RS232, AND RS485. ADDITIONAL I/O MUST BE AN AVAILABLE OPTION. 4.1.10. CUSTOMER I/O SHALL BE SOFTWARE CONFIGURABLE PROVIDING FULL ACCESS TO ALL

ALARM, EVENT, DATA LOGGING, AND SHUTDOWN FUNCTIONALITY. IN ADDITION, CUSTOM LADDER LOGIC FUNCTIONALITY INSIDE THE GENERATOR CONTROLLER SHALL BE SUPPORTED TO PROVIDE APPLICATION SUPPORT FLEXIBILITY. THE LADDER LOGIC FUNCTION SHALL HAVE ACCESS TO ALL THE CONTROLLER INPUTS AND CUSTOMER ASSIGNABLE OUTPUTS. 4.1.11. THE CONTROL PANEL SHALL INCLUDE A TOUCH SCREEN TO DISPLAY ALL USER

PERTINENT UNIT PARAMETERS INCLUDING: ENGINE AND ALTERNATOR OPERATING CONDITIONS OIL PRESSURE AND OPTIONAL OIL TEMPERATURE; COOLANT TEMPERATURE AND LEVEL ALARM; FUEL LEVEL (WHERE APPLICABLE); ENGINE SPEED; DC BATTERY VOLTAGE; RUN TIME HOURS; GENERATOR VOLTAGES, AMPS, FREQUENCY, KILOWATTS, AND POWER FACTOR; ALARM STATUS AND CURRENT ALARM(S) CONDITION PER NFPA 110 LEVEL 1.

4.2. PARALLELING SYSTEM CONTROLLER

4.2.1. THE SYSTEM CONTROLLER SHALL BE AN INTEGRATED MICROPROCESSOR BASED SOLUTION PROVIDING FULL DIGITAL INTEGRATION WITH THE GENERATOR CONTROLLERS. SYSTEM CONTROLLER SHALL UTILIZE STANDARD HARDWARE AND FIRMWARE MANUFACTURE BY THE GENERATOR SUPPLIER. THE USE OF PLC BASED SOLUTIONS WILL BE CONSIDERED LESS DESIRABLE DUE TO RELIABILITY AND SUPPORT CONCERNS POSED BY CUSTOM HARDWARE/CUSTOM SOFTWARE SOLUTIONS. A PREFERENCE WILL BE SHOWN FOR DESIGNS THAT USE THE SAME CONTROL BOARD HARDWARE FOR BOTH THE GENERATOR(S) AND

TO ENSURE RELIABILITY AND SERVICEABILITY, THE SYSTEM CONTROLLER SHALL BE REQUIRED TO MEET THE SAME REQUIREMENTS AS LISTED FOR THE GENERATOR CONTROLLER IN SECTIONS 4.1.3 TO 4.1.7 AND 4.1.10.

THE CONTROL PANEL WILL PROVIDE A TOUCH SCREEN DISPLAY TO PROVIDE INTUITIVE ACCESS TO ALL USER PERTINENT SYSTEM STATUS INFORMATION.

4.2.4. THE POWER FOR THE SYSTEM CONTROLLER SHALL UTILIZE REDUNDANT DC SOURCES - AN INTERNAL DC SOURCE INCLUSIVE OF CHARGING SYSTEM AND AN EXTERNAL DC SOURCE FROM ONE OF THE GENERATOR'S CRANKING BATTERIES.

4.2.5. THE SYSTEM CONTROLLER SHALL INTERFACE WITH THE GENERATORS USING DIGITAL COMMUNICATIONS. ANY OF THE GENERATOR(S) STATUS, OPERATION CONDITIONS, OR CONFIGURATION PARAMETERS SHALL BE ACCESSIBLE WITH A SINGLE POINT COMMUNICATION

VIA THE SYSTEM CONTROLLER. 4.2.6. THE SYSTEM CONTROLLER SHALL PROVIDE SEQUENCE OF FACILITY LOAD THROUGH 3 PRIORITY LOADING (PERMISSIVE) LOAD STEPS AND 3 LOAD SHEDDING STEPS. THESE OUTPUT PARAMETERS FUNCTION BASED ON THE NUMBER OF GENERATORS ON THE SENERATOR BUS. THE PRIORITY LOADING FUNCTION PROVIDES SEQUENTIAL PERMISSIVE CONTACT CLOSURES ENABLING LOAD TO BE TRANSFERRED ONTO THE GENERATOR IN RESPONSE TO GENERATORS COMING ON-LINE. THE LOAD SHEDDING FUNCTION PROVIDES CLOSURES THAT DISCONNECTS LOAD FROM THE GENERATOR BUS IN RESPONSE O A REDUCTION IN AVAILABLE GENERATOR CAPACITY.

4.2.7. COMMUNICATIONS SHALL BE SUPPORTED WITH BUILDING AUTOMATION VIA THE MODBUS OTOCOL WITHOUT NETWORK CARDS. OPTIONAL INTERNET AND INTRANET CONNECTIVITY

4.2.8. THE SYSTEM CONTROLLER AND DIGITAL COMMUNICATIONS SHALL ENHANCE SYSTEM OPERATION BUT NEITHER SHALL BE REQUIRED TO SYNCHRONIZE OR OPERATE THE NERATORS IN PARALLEL. SYSTEMS THAT REQUIRE EXTERNAL CONTROL HARDWARE OR ITAL COMMUNICATIONS TO SYNCHRONIZE AND OPERATE THE GENERATORS IN PARALLEL

9. THE DESIGN OF THE SYSTEM SHALL ALLOW CONTINUED GENERATOR PARALLELED OPERATION WITH FAILURES TO THE SYSTEM CONTROLLER AND/OR COMMUNICATION. OL SYSTEMS THAT HAVE ANY SYSTEMIC SINGLE POINT FAILURE MODES ARE NOT ACCEPTABLE. THIS IS INCLUSIVE OF SYSTEMS THAT RELY ON REACTIVE CROSS CURRENT AND ISOCHRONOUS LOAD SHARING CONTROL LOOPS. CONTROL SYSTEMS THAT RELY ON REDUNDANT COMMUNICATIONS WILL BE EVALUATED FOR POTENTIAL COMMON MODE FAILURES. THAT CAN IMPACT BOTH OF COMMUNICATION CHANNELS. DURING START-UP COMMISSION, ALL LOAD SHARE AND COMMUNICATION LINES WILL BE SHORTED WHILE THE GENERATORS ARE RUNNING. THE GENERATORS MUST CONTINUE RUNNING AND CONTINUE TO SHARE

4.3. TYPICAL / NORMAL OPERATING SEQUENCE

4.3.1. UPON THE FAILURE OF UTILITY POWER, THE AUTOMATIC TRANSFER SWITCH(ES) (ATS) PROVIDES A TWO-WIRE START SIGNAL TO THE SYSTEM CONTROLLER. THE SYSTEM CONTROLLER SENDS A START COMMAND TO THE GENERATORS VIA RS485 COMMUNICATION. THE FIRST GENERATOR THAT REACHES RATED VOLTAGE AND FREQUENCY REQUESTS PERMISSION TO CLOSE INTO THE "DEAD" GENERATOR BUS. THIS IS TO PROVIDE DEAD BUS ARBITRATION. AFTER THIS PROCESS, THE GENERATOR CLOSES ITS PARALLELING SWITCH CONNECTING TO THE GENERATOR BUS.

4.3.2. IF THE SYSTEM HAS AN EMERGENCY SYSTEM TRANSFER SWITCH, IT WILL TYPICALLY TRANSFER TO THE FIRST GENERATOR ON-LINE. IF THE EMERGENCY SYSTEM LOAD IS LARGER THAN A SINGLE UNIT, TWO GENERATORS MAY BE CONFIGURED TO COME ON-LINE PRIOR TO TRANSFERRING THE EMERGENCY SYSTEM LOAD.

4.3.3. THE SYSTEM CONTROLLER COMPARES THE ON-LINE GENERATOR CAPACITY TO ADDITIONAL LOAD SEGMENTATION. WHEN ADEQUATE GENERATOR CAPACITY BECOMES AVAILABLE, THE SYSTEM CONTROLLER ENABLES THE PRIORITY ONE LOADS TO BE SWITCHED TO THE GENERATOR BUS. THIS IS TYPICAL ACCOMPLISHED BY PROVIDING A PERMISSIVE CONTACT TO THE ATS. THE SYSTEM CONTROLLER SHALL SUPPORT 3 LOAD STEPS.

4.3.4. ADDITIONAL GENERATORS UPON SENSING GENERATOR BUS VOLTAGE, SYNCHRONIZE AND PARALLEL TO THE GENERATOR BUS.

ENGINE GENERATOR SPECIFICATION

GENERAL

1.1. DESCRIPTION OF SYSTEM & SITE

1.1.1. PROVIDE A 400 KW INTEGRATED PARALLELING, STANDBY POWER SYSTEM TO SUPPLY ELECTRICAL POWER AT 480 VOLTS, 60 HERTZ, 3 PHASE. THE SYSTEM WILL UTILIZE GENERATORS RATED 400 KW. THE GENERATOR SHALL CONSIST OF A LIQUID COOLED DIESEL ENGINE, A SYNCHRONOUS AC ALTERNATOR, A PARALLELING SWITCH, AND SYSTEM CONTROLS WITH ALL NECESSARY ACCESSORIES FOR A COMPLETE OPERATING SYSTEM, INCLUDING BUT NOT LIMITED TO THE ITEMS AS SPECIFIED HEREINAFTER.

1.1.2. THE SITE IS AN NEC ORDINARY LOCATION WITH NO SPECIFIC HARSH ENVIRONMENT

1.1.3. THE GENSET SHALL BE APPLIED AT THE LISTED AMBIENT AND ELEVATION. BIDDERS TO SUBMIT THE GENERATORS RATED POWER OUTPUT AT 120 AMBIENT (*F) AND 1200 FI FVATION (FT) 1.1.4. BIDDERS ARE TO SUBMIT THE GENSET'S SOUND LEVEL IN DBA AT 23 FT BASED ON THE CONFIGURATION SPECIFIED

1.2. REQUIREMENTS OF REGULATORY AGENCIES

STATIONARY ENGINE GENERATOR ASSEMBLY.

1.2.1. AN ELECTRIC GENERATING SYSTEM, CONSISTING OF A PRIME MOVER, GENERATOR, GOVERNOR, COUPLING AND ALL CONTROLS, MUST HAVE BEEN TESTED, AS A COMPLETE UNIT, ON A REPRESENTATIVE ENGINEERING PROTOTYPE MODEL OF THE EQUIPMENT TO BE

1.2.2. THE GENERATOR SET MUST CONFORM TO APPLICABLE NFPA REQUIREMENTS. 1.2.3. THE GENERATOR SET MUST INCLUDE A LISTING FOR THE UL2200 STANDARD FOR

1.2.4. THE GENERATOR SET MUST MEET EPA FEDERAL EMISSION GUIDELINES FOR STATIONARY EMERGENCY POWER GENERATION 1.3. MANUFACTURER QUALIFICATIONS

1.3.1. THIS SYSTEM SHALL BE SUPPLIED BY AN ORIGINAL EQUIPMENT MANUFACTURER (OEM) WHO HAS BEEN REGULARLY ENGAGED IN THE PRODUCTION OF ENGINE-ALTERNATOR SETS. AUTOMATIC TRANSFER SWITCHES, AND ASSOCIATED CONTROLS FOR A MINIMUM OF 25 YEARS, THEREBY IDENTIFYING ONE SOURCE OF SUPPLY AND RESPONSIBILITY. APPROVED SUPPLIERS ARE GENERAC INDUSTRIAL POWER OR AN APPROVED EQUAL.

1.3.2. THE MANUFACTURER SHALL HAVE PRINTED LITERATURE AND BROCHURES DESCRIBING THE STANDARD SERIES SPECIFIED, NOT A ONE OF A KIND FABRICATION. CUSTOM DESIGNED PARALLELING SOLUTIONS USING SITE SPECIFIC PLC PROGRAMS AND SITE SPECIFIC SCHEMATICS ARE NOT ACCEPTABLE.

1.3.3. MANUFACTURER'S AUTHORIZED SERVICE REPRESENTATIVE SHALL MEET THE FOLLOWING CERTIFIED, FACTORY TRAINED, INDUSTRIAL GENERATOR TECHNICIAN 1.3.3.2. SERVICE SUPPORT 24/7

1.3.3.3. SERVICE LOCATION WITHIN 50 MILES RESPONSE TIME OF 4 HOURS SERVICE & REPAIR PARTS IN-STOCK AT PERFORMANCE LEVEL OF 95%

1.4. SUBMITTALS

1.4.1. ENGINE GENERATOR SPECIFICATION SHEET 1.4.2. CONTROLS SPECIFICATION SHEET(S)

1.4.3. INSTALLATION / LAYOUT DIMENSIONAL DRAWIN 1.4.4. WIRING SCHEMATIC 1.4.5. SOUND DATA 1.4.6. EMISSION CERTIFICATION

1.4.7. WARRANTY STATEMENT

2.1. ENGINE RATING AND PERFORMANCE

2.1.1. THE PRIME MOVER SHALL BE A LIQUID COOLED, DIESEL FUELED, TURBOCHARGED AFTER-COOLED ENGINE OF 4-CYCLE DESIGN. IT WILL HAVE ADEQUATE HORSEPOWER TO ACHIEVE RATED KW OUTPUT WITH AT AN OPERATING SPEED OF 1800 RPM. 2.1.2. THE ENGINE SHALL SUPPORT A 100% LOAD STE

SYSTEM SHALL BE SIZED AND SEQUENCED TO ALLOW EMERGENCY SYSTEM LOAD S DEFINED BY NEC 700 TO BE TRANSFERRED ONTO THE GENERATOR(S) WITHIN 10 SECONDS. NON-EMERGENCY SYSTEM LOADS WILL BE SEQUENCED ONTO THE GENERATOR(S) AS GENERATOR CAPACITY COMES ON-LINE. 2. ENGINE OIL SYSTEM

FULL PRESSURE LUBRICATION SHALL BE SUPPLIED BY A POSITIVE DISPLACEMENT E OIL PUMP. THE ENGINE SHALL HAVE A REPLACEABLE OIL FILTER(S) WITH INTERNAL BYPASS AND REPLACEABLE ELEMENT(S).

E ENGINE SHALL OPERATE ON MINERAL BASED OIL. SYNTHETIC OILS SHALL NOT

2.2.3. THE OIL SHALL BE COOLED BY AN OIL COOLER WHICH IS INTEGRATED INTO THE

2.3.1. THE ENGINE IS TO BE COOLED WITH A UNIT MOUNTED RADIATOR, FAN, WATER PUMP, AND CLOSED COOLANT RECOVERY SYSTEM. THE COOLANT SYSTEM SHALL INCLUDE A COOLANT FILL BOX WHICH WILL PROVIDE VISUAL MEANS TO DETERMINE IF THE SYSTEM HAS ADEQUATE COOLANT LEVEL. THE RADIATOR SHALL BE DESIGNED FOR OPERATION IN 122 DEGREES F, (50 DEGREES C) AMBIENT TEMPERATURE.

2.3.2. THE ENGINE SHALL HAVE (A) UNIT MOUNTED, THERMOSTATICALLY CONTROLLED WATER JACKET HEATER(S) TO AID IN QUICK STARTING. THE WATTAGE SHALL BE AS RECOMMENDED BY THE MANUFACTURER.

2.3.3. ENGINE COOLANT AND OIL DRAIN EXTENSIONS, EQUIPPED WITH PIPE PLUGS AND SHUT-OFF VALVES, MUST BE PROVIDED TO THE OUTSIDE OF THE MOUNTING BASE FOR CLEANER AND MORE CONVENIENT ENGINE SERVICING. 2.3.4. A RADIATOR FAN GUARD MUST BE INSTALLED FOR PERSONNEL SAFETY THAT MEETS

2.4. ENGINE STARTING SYSTEM

UL AND OSHA SAFETY REQUIREMENTS.

2.4.1. STARTING SHALL BE BY A SOLENOID SHIFT, DC STARTING SYSTEM.

2.4.2. THE ENGINE'S CRANKING BATTERIES SHALL BE LEAD ACID. THE BATTERIES SHALL BE SIZED PER THE MANUFACTURER'S RECOMMENDATIONS. THE BATTERIES SUPPLIED SHALL MEET NFPA 110 CRANKING REQUIREMENTS OF 90 SECONDS OF TOTAL CRANK TIME. BATTERY SPECIFICATIONS (TYPE, AMP-HOUR RATING, COLD CRANKING AMPS) TO BE PROVIDED IN THE SUBMITTAL.

2.4.3. THE GENSET SHALL HAVE AN ENGINE DRIVEN, BATTERY CHARGING ALTERNATOR WITH INTEGRATED VOLTAGE REGULATION.

2.4.4. THE GENSET SHALL HAVE AN AUTOMATIC DUAL RATE, FLOAT EQUALIZE, 10 AMP BATTERY CHARGER. THE CHARGER MUST BE PROTECTED AGAINST A REVERSE POLARITY CONNECTION. THE CHARGERS CHARGING CURRENT SHALL BE MONITORED WITHIN THE GENERATOR CONTROLLER TO SUPPORT REMOTE MONITORING AND DIAGNOSTICS. THE BATTERY CHARGER IS TO BE FACTORY INSTALLED ON THE GENERATOR SET. DUE TO LINE VOLTAGE DROP CONCERNS, A BATTERY CHARGER MOUNTED IN THE TRANSFER SWITCH WILL BE UNACCEPTABLE

2.5. ENGINE FUEL SYSTEM

2.6. ENGINE CONTROLS

2.5.1. THE ENGINE FUEL SYSTEM SHALL BE DESIGNED FOR OPERATION ON #2 DIESEL FUEL AND COLD WEATHER DIESEL BLENDS.

2.5.2. THE ENGINE SHALL INCLUDE A PRIMARY FUEL FILTER, WATER SEPARATOR, MANUAL FUEL PRIMING PUMP, AND ENGINE FLEXIBLE FUEL LINES MUST BE INSTALLED AT THE

POINT OF MANUFACTURE. ELEMENT SHALL BE REPLACEABLE PAPER TYPE. 2.5.3. THE ENGINES SUCTION LINE SHALL BE FITTED WITH A CHECK VALVE TO SECURE PRIME FOR THE ENGINES INJECTION PUMP.

2.6.1. ENGINES THAT ARE EQUIPPED WITH AN ELECTRONIC ENGINE CONTROL MODULE (ECM), SHALL MONITOR AND CONTROL ENGINE FUNCTIONALITY AND SEAMLESSLY INTEGRATE WITH THE GENSET CONTROLLER THROUGH DIGITAL COMMUNICATIONS. ECM MONITORED PARAMETERS SHALL BE INTEGRATED INTO THE GENSET CONTROLLERS NFPA 110 ALARM AND WARNING REQUIREMENTS. ALL ECM FAULT CODES SHALL BE DISPLAYED AT THE GENSET CONTROLLER IN STANDARD LANGUAGE - FAULT CODE NUMBERS ARE NOT

2.6.2. FOR ENGINES WITHOUT ECM FUNCTIONALITY OR FOR ANY ADDITIONAL GENSET CONTROLLER MONITORING, SENSORS ARE TO BE CONDITIONED TO A 4-20MA SIGNAL LEVEL TO ENHANCE NOISE IMMUNITY AND ALL SENSOR CONNECTIONS SHALL BE SEALED TO

2.6.3. ENGINE SPEED SHALL BE CONTROLLED WITH AN INTEGRATED ISOCHRONOUS GOVERNOR FUNCTION WITH NO CHANGE IN ALTERNATOR FREQUENCY FROM NO LOAD TO FULL LOAD. STEADY STATE REGULATION IS TO BE 0.25%.

2.7. ENGINE EXHAUST & INTAKE

2.7.1. THE ENGINE EXHAUST EMISSIONS SHALL MEET THE EPA EMISSION REQUIREMENTS FOR STATIONARY EMERGENCY POWER GENERATION.

2.7.2. THE MANUFACTURER SHALL SUPPLY ITS RECOMMENDED STAINLESS STEEL, FLEXIBLE CONNECTOR TO COUPLE THE ENGINE EXHAUST MANIFOLD TO THE EXHAUST SYSTEM. A RAIN CAP WILL TERMINATE THE EXHAUST PIPE AFTER THE SILENCER. ALL COMPONENTS MUST BE PROPERLY SIZED TO ASSURE OPERATION WITHOUT EXCESSIVE BACK PRESSURE

2.7.3. THE MANUFACTURER SHALL SUPPLY A CRITICAL GRADE EXHAUST SILENCER AS STANDARD. FOR APPLICATIONS WITH SITE SPECIFIC SOUND REQUIREMENTS (REFERENCE SECTION 1.1), THE SILENCER SHALL BE SELECTED TO ACHIEVE SITE SOUND LEVELS. 2.7.4. FOR GENSETS IN A WEATHER OR SOUND ATTENUATED ENCLOSURE, ALL EXHAUST PIPING FROM THE TURBO-CHARGER DISCHARGE TO THE SILENCER SHALL BE THERMALLY

WRAPPED TO MINIMIZE HEAT DISSIPATION INSIDE THE ENCLOSURE.

GENERAL PROVISIONS:

19. SPLICING AND TERMINATING SHALL BE IN ACCORDANCE WITH CABLE

ROOMS SHALL BE MADE UP WATERTIGHT.

MANUFACTURER'S PUBLISHED PROCEDURES. MAKE UP ALL SPLICES IN OUTLE

OF TAILS PACKED IN BOX AFTER SPLICE IS MADE UP. ALL WIRE AND CABLE IN

20. ROUTE WIRE AND CABLE AS REQUIRED TO MEET PROJECT CONDITIONS. WIRE AND

USING INSULATING RESIN KITS. ALL SPLICES FOR EXTERIOR EQUIPMENT IN PUMP

CABLE ROUTING INDICATED IS APPROXIMATE UNLESS DIMENSIONED. WHERE WIRE

AND CABLE DESTINATION IS INDICATED AND ROUTING IS NOT SHOWN, DETERMINE

EXACT ROUTING AND LENGTHS REQUIRED. INCLUDE WIRE AND CABLE OF LENGTHS

CEILING, USING SPRING METAL CLIPS OR METAL CABLE TIES TO SUPPORT CABLES

FROM STRUCTURE OR CEILING SUSPENSION SYSTEM. DO NOT REST CABLE ON

SPLICES, TAPS, AND TERMINATIONS TO CARRY FULL AMPACITY OF CONDUCTORS

WITH NO PERCEPTIBLE TEMPERATURE RISE. USE SUITABLE REDUCING CONNECTORS

OR MECHANICAL CONNECTOR ADAPTORS FOR CONNECTING ALUMINUM CONDUCTORS TO COPPER CONDUCTORS. USE SPLIT BOLT CONNECTORS FOR COPPER CONDUCTOR

SPLICES AND TAPS, 6 AWG AND LARGER. TAPE UNINSULATED CONDUCTORS AND

CONNECTOR WITH ELECTRICAL TAPE TO 150 PERCENT OF INSULATION RATING OF

CONDUCTOR. USE SOLDERLESS PRESSURE CONNECTORS WITH INSULATING COV

22. MAKE ELECTRICAL CONNECTIONS IN ACCORDANCE WITH EQUIPMENT MANUFACTURER'S

WET LOCATIONS. CONNECT HEAT PRODUCING EQUIPMENT USING WIRE AND CABLE

23. INSTALL SUITABLE STRAIN-RELIEF CLAMPS AND FITTINGS FOR CORD CONNECTIONS

SWITCHES, CONTROLLERS, CONTROL STATIONS, AND CONTROL DEVICES TO

AT OUTLET BOXES AND EQUIPMENT CONNECTION BOXES. INSTALL DISCONNECT

TO COMPLETE EQUIPMENT WIRING REQUIREMENTS. INSTALL INTERCONNECTING

24. INSTALL JUNCTION OR PULLBOXES WHERE REQUIRED TO LIMIT BENDS IN CONDUIT

WOULD EXCEED THE MAXIMUM ALLOWABLE FOR THE CABLE TO BE INSTALLED.

25. SECURELY FASTEN DEVICES INTO BOXES AND ATTACH APPROPRIATE COVER PLATES.

CAULK AROUND EDGES OR OUTDOOR DEVICE PLATES AND BOXES WHEN ROUGH

OF DEVICES LOCATED OR PENETRATING FIRERATED CONSTRUCTION ASSEMBLIES.

EXHAUST FANS, MOTORS, EQUIPMENT SYSTEMS, ETC. NOT LOCATED WITHIN SIGHT

27. MOUNT RECEPTACLES VERTICALLY WITH U-SHAPED GROUND POSITION, GROUND PIN

28. FUSES SHALL BE INSTALLED AND SIZED AS NOTED ON PLANS AND AS REQUIRED

29. GROUND NON-CURRENT CARRYING METAL PARTS OF ELECTRICAL EQUIPMENT

NON-CURRENT CARRYING METAL PARTS TOGETHER. INSTALL A GROUND

GROUNDED. SIZE GROUND CONDUCTORS PER NEC 250 UNLESS LARGER

30. GROUNDING CONDUCTORS SHALL BE IDENTIFIED WITH GREEN INSULATION, EXCEPT

31. INSTALL RACEWAY COUPLINGS. FITTINGS AND TERMINATIONS SECURE AND TIGHT TO

BONDING JUMPER WHERE METAL RACEWAY IS NOT DIRECTLY ATTACHED TO

32. CONDUIT TERMINATING IN CONCENTRIC KNOCKOUTS AT PANELBOARDS, CABINETS

33. PANELBOARDS SHALL HAVE COPPER BUSSING, COPPER GROUND BAR AND

AND GUTTERS SHALL HAVE INSULATED GROUNDING BUSHINGS AND BONDING

1. AT COMPLETION OF JOB, CHECK VOLTAGE AT SEVERAL POINTS OF UTILIZATION ON

ENERGIZE ALL LOADS INSTALLED. MEASURE 3-PHASE VOLTAGES AND NOTE

THE SYSTEM WHICH HAS BEEN INSTALLED UNDER THIS CONTRACT. DURING TEST,

CONTRACTOR SHALL PERFORM TESTS AS SPECIFIED TO PROVE INSTALLATION IS IN

CONFORMITY WITH APPLICABLE CODES AND WITH THESE SPECIFICATIONS. TESTS, IN

PERFORM TESTING AS DESCRIBED IN NETA ATS. INCLUDE TESTING OF

ENGINEER AT THE EXPENSE OF THE CONTRACTOR. TESTS SHALL BE

PERFORMED AFTER REPAIRS, REPLACEMENTS, OR CORRECTIONS UNTIL

MOTORS FOR CORRECT OPERATION AND ROTATION. ANY PRODUCTS WHICH

FAIL DURING THE TESTS OR ARE RULED UNSATISFACTORY BY THE ENGINEER

SHALL BE REPLACED, REPAIRED, OR CORRECTED AS PRESCRIBED BY THE

ACCORDANCE WITH CONTRACT REQUIREMENTS. TESTS SHALL BE CONDUCTED

ADDITION TO SPECIFIC SYSTEM TEST DESCRIBED ELSEWHERE, SHALL INCLUDE:

DURING THE CONSTRUCTION PERIOD AND AT COMPLETION TO DETERMINE

SATISFACTORY PERFORMANCE IS DEMONSTRATED.

JUMPERS INSTALLED INTERCONNECTING ALL SUCH CONDUITS AND THE PANELBOARD

OF GROUNDING TERMINAL AT EQUIPMENT, SHALL BE 5 OHMS OR LESS.

EQUIPMENT METAL ENCLOSURE AND AT CONCENTRIC KNOCK-OUTS.

A BOLTED SOLDERLESS LUG CONNECTION ON THE METAL FRAME.

SHALL BE FACING DOWN. DO NOT COMBINE GFCI PROTECTED CIRCUITS WITH OTHER

PER MANUFACTURER. BE SURE TO OBSERVE MAXIMUM BRANCH CIRCUIT FUSE SIZE

ENCLOSURES, FRAMES, CONDUCTOR RACEWAYS OR CABLE TRAYS TO PROVIDE A

CONDUCTOR IN EACH RACEWAY SYSTEM IN ADDITION TO CONDUCTORS SHOWN.

EQUIPMENT GROUND CONDUCTOR SHALL BE ELECTRICALLY AND MECHANICALLY

CONTINUOUS FROM THE ELECTRICAL CIRCUIT SOURCE TO THE EQUIPMENT TO BE

CONDUCTORS ARE SHOWN ON THE DRAWINGS. MOTORS SHALL BE CONNECTED TO

EQUIPMENT GROUND CONDUCTORS WITH A CONDUIT GROUNDING BUSHING AND WITH

LOW IMPEDANCE PATH FOR LINE-TO-GROUND FAULT CURRENT AND TO BOND ALL

CUITS IN THE SAME RACEWAY. LIMIT NUMBER OF GFI PROTECT CIRCUITS IN ANY

BY ENGINEER. FIREPROOF AROUND OPENING OF DEVICES LOCATED OR

26. FURNISH AND INSTALL ENGRAVED LEGEND OF EACH SWITCH THAT CONTROLS

WALL SURFACES PREVENT RAINTIGHT SEAL. USE CAULKING MATERIALS APPROVED

PENETRATING FIRERATED CONSTRUCTION ASSEMBLIES. FIREPROOF AROUND OPENING

RUNS TO NOT MORE THAN 360 DEGREES OR WHERE PULLING TENSION ACHIEVED

COMPLETE EQUIPMENT WIRING REQUIREMENTS. INSTALL TERMINAL BLOCK JUMPERS

CONDUIT AND WIRING BETWEEN DEVICES AND EQUIPMENT TO COMPLETE EQUIPMENT

RUCTIONS. FOR CONDUIT CONNECTIONS TO EQUIPMENT USE FLEXIBLE CONDUIT.

IT FLEXIBLE CONDUIT WITH WATERTIGHT CONNECTORS IN DAMP OR

FOR COPPER CONDUCTOR SPLICES AND TAPS, 8 AWG AND SMALLER, USE

INSULATED SPRING WIRE CONNECTORS WITH PLASTIC CAPS FOR COPPER

CONDUCTOR SPLICES AND TAPS, 10 AWG AND SMALLE

WIRING REQUIREMENTS.

OF THE CONTROLLING SWITCH.

CABINET, GUTTER, ETC.

DOOR-IN-DOOR TRIM.

PERCENTAGE DIFFERENCES.

CONSULT WIRE AND CABLE MANUFACTURER.

ONE RACEWAY TO A MAXIMUM OF ONE (1) CIRCUIT.

WITH INSULATION SUITABLE FOR TEMPERATURES ENCOUNTERED

REQUIRED TO INSTALL CONNECTED DEVICES WITHIN 10 FT OF LOCATION SHOWN

21. PROTECT EXPOSED CABLE FROM DAMAGE. SUPPORT CABLES ABOVE ACCESSIBLE

CEILING PANELS. USE SUITABLE CABLE FITTINGS AND CONNECTORS. CLEAN

CONDUCTOR SURFACES BEFORE INSTALLING LUGS AND CONNECTORS. MAKE

BOXES WITH CONNECTORS AS SPECIFIED HEREIN WITH SEPARATE TAILS OF

. FURNISH ALL LABOR, MATERIALS, APPARATUS, TOOLS, EQUIPMENT, TRANSPORTATION, TEMPORARY CONSTRUCTION AND SPECIAL OR OCCASIONAL SERVICES AS REQUIRED O MAKE A COMPLETE WORKING ELECTRICAL INSTALLATION, AS SHOWN ON THE DRAWINGS OR DESCRIBED IN THESE SPECIFICATIONS. CORRECT COLOR TO BE MADE UP TO SPLICE. PROVIDE AT LEAST SIX (6) INCHES

2. STRUCTURAL MEMBERS SHALL IN NO CASE BE DRILLED, BORED OR NOTCHED IN PANELS, CONTROL CENTERS AND EQUIPMENT ENCLOSURES SHALL BE BUNDLED AND SUCH A MANNER THAT WILL IMPAIR THEIR STRUCTURAL VALUE. CUTTING OF CLAMPED. ENCAPSULATE SPLICES IN EXTERIOR OUTLET, JUNCTION AND PULL BOXES HOLES, IF REQUIRED, SHALL BE DONE WITH CORE DRILL AND ONLY WITH THE APPROVAL OF THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RETURNING ANY SURFACE FROM WHICH HE HAS REMOVED EQUIPMENT OR DEVICES TO THE CONDITION AND FINISH OF THE ADJACENT SURFACES.

> 3. KEEP CONDUITS, JUNCTION BOXES, AND OUTLET BOXES, AND OTHER OPENINGS CLOSED TO PREVENT ENTRY OF FOREIGN MATTER: COVER FIXTURES, EQUIPMENT, AND APPARATUS AND PROTECT AGAINST DIRT, PAINT, WATER, CHEMICAL, OR MECHANICAL DAMAGE, BEFORE AND DURING CONSTRUCTION PERIOD. RESTORE TO ORIGINAL CONDITION ANY FIXTURE, APPARATUS, OR EQUIPMENT DAMAGED PRIOR FINAL ACCEPTANCE. INCLUDING RESTORATION OF DAMAGED SHOP COATS OF PAINT, BEFORE FINAL ACCEPTANCE. PROTECT BRIGHT FINISHED SURFACES AND SIMILAR ITEMS UNTIL IN SERVICE. NO RUST OR DAMAGE WILL BE PERMITTED. 4. DRAWINGS FOR THE WORK UNDER THIS SECTION ARE DIAGRAMMATIC. THE CONTRACTOR SHALL VISIT THE SITE AND DETERMINE THE LOCALE, WORKING CONDITIONS, CONFLICTING UTILITIES, AND THE CONDITIONS IN WHICH THE

CONTRACTOR SHALL INSURE RECONNECTION OF EXISTING EQUIPMENT AND CIRCUITS ECTED BY CONTRACT DEMOLITION WHETHER OR NOT RECONNECTION IS SPECIFICALLY SHOWN ON THE CONTRACT DOCUMENTS.

6. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS AND TECHNICAL DATA PARTICULAR TO THE PRODUCT SPECIFIED AND/OR ACCEPTED EQUAL EXCEPT AS OTHERWISE SPECIFIED AND IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CONTRACTOR'S ASSOCIATION "STANDARD OF INSTALLATION" FOR GENERAL INSTALLATION PRACTICE.

BASIC MATERIALS AND METHODS:

LECTRICAL WORK WILL TAKE PLACE.

1. RIGID STEEL CONDUIT SHALL BE FULL WEIGHT, PIPE SIZE, FINISHED INSIDE AND OUT BY HOT-DIP GALVANIZING AFTER FABRICATION, AND SHALL CONFORM WITH ANSI C80.1 AND UL.

a. USE RIGID STEEL CONDUIT FOR THE FOLLOWING LOCATIONS OR CONDITIONS: ALL EXTERIOR APPLICATIONS, ALL CONDUITS LARGER THAN 2"TRADE DIAMETER, AND ALL CONDUITS INDOOR BELOW EIGHT (8) FEET ABOVE FINISHED FLOOR.

b. COUPLINGS SHALL BE ELECTROPLATED STEEL. INSULATING BUSHINGS THREADED POLYPROPYLENE OR THERMO-SETTING PHENOLIC RATED 150°C MINIMUM. INSULATED GROUNDING BUSHINGS: THREADED CAST MALLEABLE IRON BODY WITH INSULATED THROAT AND STEEL "LAY-IN" GROUND LUG WITH COMPRESSION SCREW. INSULATED METALLIC BUSHINGS: THREADED CAST MALLEABLE IRON BODY WITH PLASTIC INSULATED THROAT RATED 150°C. RUNNING THREADS ARE NOT ACCEPTABLE

2. ELECTRICAL METALLIC TUBING (EMT) SHALL BE FORMED OF COLD ROLLED STRIP STEEL, AND SHALL COMPLY WITH ANSI C80.3 AND UL REQUIREMENTS. a. EMT IS ALLOWED FOR THE FOLLOWING CONDITIONS: INTERIOR (2" AND SMALLER) ONLY AND ABOVE EIGHT (8) FEET FROM FINISHED FLOOR AND

INTERIOR ONLY AND WHEN ENTERING A PANEL FROM ABOVE. b. COUPLINGS: ELECTROPLATED STEEL, UL LISTED RAIN AND CONCRETE TIGHT THROUGH 1-1/4" TRADE SIZE. ALL EMT FITTINGS SHALL BE COMPRESSION TYPE. CONNECTORS: STEEL, GLAND COMPRESSION TYPE WITH INSULATED PLASTIC THROAT, 150°C TEMPERATURE RATED. ALL EMT FITTINGS SHALL BE COMPRESSION TYPE.

LIQUID TIGHT FLEXIBLE METAL CONDUIT SHALL BE FABRICATED IN CONTINUOUS THS FROM GALVANIZED STEEL STRIP, SPIRALLY WOUND. FLEXIBLE CONDUIT EXCEPT WHERE INSTALLED IN CONCEALED DRY LOCATIONS, SHALL BE LIQUID TIGHT WITH PLASTIC JACKET EXTRUDED OVER THE OUTER ZINC COATING. NO ALUMINUM SUBSTITUTE WILL BE ACCEPTED.

WITH CAST MALLEABLE IRON BODIES AND THREADED MALE HUBS WITH

a. USE LIQUIDTIGHT FOR THE FOLLOWING CONDITIONS: IN DAMP AND WET LOCATIONS FOR CONNECTIONS TO MOTORS, TRANSFORMERS, VIBRATING EQUIPMENT AND MACHINERY AND FOR CONNECTIONS TO ALL PUMP MOTORS, FLOW SWITCHES. AND SIMILAR DEVICES. b. CONNECTORS SHALL BE THE SCREW CLAMP ON SCREW-IN (JAKE) VARIETY

INSULATED THROAT OR INSULATED BUSHINGS. SET SCREW TYPE CONNECTORS ARE NOT ACCEPTABLE. LIQUID TIGHT FITTINGS SHALL BE OF CADMIUM PLATED CAST MALLEABLE IRON, WITH INSULATED THROAT. WHERE A BARE GROUND CONDUCTOR IS SPECIFIED. MEASURE GROUND RESISTANCE

4. LOW VOLTAGE WIRING SHALL BE INSTALLED IN CONDUIT, MINIMUM 3/4" TRADE INSURE GOOD GROUND CONTINUITY. PROVIDE INSULATED GROUNDING BUSHING AND 5. CONDUITS SHALL BE TIGHTLY COVERED AND WELL PROTECTED DURING CONSTRUCTION USING METALLIC BUSHINGS AND BUSHING "PENNIES" TO SEAL OPEN ENDS. IN MAKING JOINTS IN RIGID STEEL CONDUIT, REAM CONDUIT SMOOTH AFTER CUTTING AND THREADING. CLEAN ANY CONDUIT IN WHICH MOISTURE OR ANY FOREIGN MATTER HAS COLLECTED BEFORE PULLING IN CONDUCTORS. PAINT ALL

> FIELD THREADED JOINTS TO PREVENT CORROSION. 6. CONDUIT SYSTEMS SHALL BE ELECTRICALLY CONTINUOUS THROUGHOUT. INSTALL CODE SIZE, UNINSULATED, COPPER GROUNDING CONDUCTORS IN ALL CONDUIT RUNS, GROUNDING CONDUCTOR SHALL BE BONDED TO CONDUIT, EQUIPMENT

FRAMES AND PROPERLY GROUNDED. 7. LOW VOLTAGE CONDUIT SHALL BE GROUPED SEPARATELY AND LABELED EVERY 10

FT INTERVAL AS TO SYSTEM (I.E. FIRE, CONTROL, ETC) 8. EXPOSED CONDUIT SHALL BE RUN PARALLEL OR AT RIGHT ANGLES TO THE CENTERLINES OF THE COLUMNS AND BEAMS. CONDUITS SHALL NOT BE PLACED CLOSER THAN 12 INCHES FROM A PARALLEL HOT WATER OR STEAM LINE OR THREE INCHES FROM SUCH LINES CROSSING PERPENDICULAR TO THE RUNS. IN LONG RUNS OF CONDUIT, PROVIDE SUFFICIENT PULL BOXES PER NEC INSIDE BUILDINGS TO FACILITATE PULLING WIRES AND CABLES. SUPPORT PULL BOXES FROM STRUCTURE INDEPENDENT OF CONDUIT SUPPORTS. THESE PULL BOXES AR

NOT SHOWN ON THE PLANS. 9. ALL RACEWAY SYSTEMS SHALL BE SECURED TO BUILDING STRUCTURES USING SPECIFIED FASTENERS, CLAMPS AND HANGERS SPACED ACCORDING TO CODE. SUPPORT SINGLE RUNS OF CONDUIT USING TWO HOLE PIPE STRAPS. WHERE RUI HORIZONTALLY ON WALLS IN DAMP OR WET LOCATIONS, INSTALL "CLAMP BLOCKS" TO SPACE CONDUIT OFF THE SURFACE. MULTIPLE CONDUIT RUNS SHALL BE SUPPORTED USING "TRAPEZE" HANGERS FABRICATED FROM 3/8 INCH DIAMETER, THREADED STEEL RODS SECURED TO BUILDING STRUCTURES. FASTEN CONDUIT CONSTRUCTION CHANNEL WITH STANDARD TWO HOLE PIPE CLAMPS. PROVIDE

LATERAL SEISMIC BRACING FOR HANGERS. 10. LOCATE AND INSTALL ANCHORS, FASTENERS, AND SUPPORTS IN ACCORDANCE WITH NECA "STANDARD OF INSTALLATION". DO NOT FASTEN SUPPORTS TO PIPES, DUCTS, MECHANICAL EQUIPMENT, OR CONDUIT. DO NOT DRILL OR CUT STRUCTURAL MEMBERS. RIGIDLY WELD SUPPORT MEMBERS OR USE HEXAGON-HEAD BOLTS TO PRESENT NEAT APPEARANCE WITH ADEQUATE STRENGTH AND RIGIDITY. USE SPRING LOCK WASHERS UNDER ALL NUTS.

11. RACEWAYS SHALL BE JOINED USING SPECIFIED COUPLINGS OR TRANSITION COUPLINGS WHERE DISSIMILAR RACEWAY SYSTEMS ARE JOINED. RIGID CONDUIT CONNECTION TO ENCLOSURES SHALL BE MADE BY MYERS TYPE GROUNDING HUBS ONLY. EMT CONNECTIONS TO ENCLOSURES SHALL BE MADE WITH COMPRESSION CONNECTOR WITH GROUNDING LOCK-NUTS OR BUSHINGS. INSTALL CABLE SEALING BUSHINGS OR CAULK CONDUIT TERMINATIONS IN ALL GRADE LEVEL OR BELOW GRADE EXTERIOR PULL, JUNCTION OR OUTLET BOXES.

12. FURNISH AND INSTALL METAL SLEEVES FOR ALL EXPOSED INTERIOR CONDUIT RUNS PASSING THROUGH CONCRETE FLOORS OR WALLS. FOLLOWING CONDUIT INSTALLATION, SEAL ALL PENETRATIONS USING NON-IRON BEARING, CHLORIDE FREE,

NON-SHRINKING, DRY-PACK, GROUTING COMPOUND. 13. CONDUITS PENETRATING RATED WALLS, FLOORS, ETC. SHALL BE FIREPROOFED. 14. FOR EXISTING CONDUITS THAT WILL BE REUSED, PULL OUT EXISTING CONDUCTORS AND COMPLETELY AND THOROUGHLY SWAB RACEWAY BEFORE INSTALLING WIRE. USE 50/50 SOLUTION OF SIMPLE GREEN. USE CO2 TO BLOW WATER AND SOAP INTO CONDUIT — LET SOAK TO BREAK UP DRIED OUT PULLING COMPOUNDS, THEN PULL CONDUCTORS. PULL ONE CONDUCTOR AT A TIME IF WILL NOT PULL ALL

OUT TOGETHER. 15. CONDUCTORS SHALL BE MANUFACTURED BY SOUTHWIRE. ALL WIRE AND CABLE SHALL BE INSULATED. COPPER CONDUCTORS, SOFT DRAWN ANNEALED COPPER

WIRE 98% CONDUCTIVITY, BEARING THE UL LABEL. 16. WIRE AND CABLE, O TO 600 VOLT SHALL BE NEC TYPE THWN, OR TYPE XHHW FOR FEEDERS AND BRANCH CIRCUITS IN WET OR DRY LOCATIONS. NEC TYPE THHN FOR BRANCH CIRCUITS IN DRY LOCATIONS. MINIMUM CONDUCTOR SIZE: AWG NO. 12 FOR ALL POWER AND LIGHTING BRANCH CIRCUITS. AWG NO. 14 FOR ALL

SIGNAL AND CONTROL CIRCUITS. 17. COLOR CODING: SYSTEM CONDUCTORS SHALL BE IDENTIFIED AS TO VOLTAGE AND PHASE CONNECTIONS BY MEANS OF COLOR IMPREGNATED INSULATION OR APPROVED COLORED MARKING TAPE AS FOLLOWS:

- RED, PHASE C - ORANGE FOR HIGH LEG (208V TO NEUTRAL), NEUTRAL WHITE, GROUND — GREEN. b. 120/208 VOLT, 3 PHASE, 4 WIRE SYSTEMS. PHASE A — BLACK, PHASE B —

a. 120/240 VOLT, SINGLE PHASE, 3 WIRE SYSTEM. PHASE A — BLACK, PHASE B

RED, PHASE C - BLUE, NEUTRAL - WHITE, GROUND - GREEN c. 277/480 VOLT, 3 PHASE, 4 WIRE SYSTEM. PHASE A — BROWN, PHASE B ORANGE, PHASE C — YELLOW, NEUTRAL — GREY, GROUND — GREEN 18. U.L. APPROVED NON-PETROLEUM BASE AND INSULATING TYPE PULLING COMPOUND SHALL BE USED AS NEEDED. ALL CABLES SHALL BE INSTALLED AND TESTED IN

ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS AND WARRANTY. BLOCK AND

TACKLE, POWER DRIVEN WINCH OR OTHER MECHANICAL MEANS SHALL NOT BE

USED IN PULLING CONDUCTORS OF SIZE SMALLER THAN AWG # 1.

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SHEET TITLE LECTRICAL SPECIFICATIONS

SCALE: AS NOTED AS NOT HIS DRAWING IS 30" X 42" AT FULL SIZ

E-0.2

m. PROVIDE A MOMENTARY PUSHBUTTON TO BYPASS THE TIME DELAYS ON TRANSFER AND RETRANSFER AND PROGRAMMABLE COMMIT/NO COMMIT CONTROL LOGIC. 2.12 ADDITIONAL FEATURES REQUIRED, WHICH ARE AVAILABLE FOR ZBTS TRANSFER SWITCHES: 6/P - MICROPROCESSOR ACTIVATED MOMENTARY TEST SWITCH

A1 - S.P.D.T.-SOURCE 1-NORMAL FAILURE (QTY 1) A1E - S.P.D.T.- SOURCE 2-EMERGENCY FAILURE (QTY 1) A3 - SOURCE 2-EMERGENCY POSITION (QTY 2) A4 - SOURCE 1-NORMAL POSITION (QTY 2)

CAL - MICROPROCESSOR ACTIVATED CALIBRATION FEATURE CD/P - PROGRAMMABLE EXERCISER DAILY, 7-14-28-365 DAYS USER- SELECTABLE, WITH OR WITHOUT E - ENGINE START RELAY - S.P.D.T.

EL/P- EVENT LOG OF LAST 16 EVENTS J2E/J2N - ADJUSTABLE OVER/UNDER FREQUENCY SENSOR-SOURCE 2-EMERGENCY & SOURCE K/P - FREQUENCY INDICATION (ON THE CONTROLLER)

L1- LED SOURCE 2 (EMERGENCY) POSITION INDICATION L2 - LED SOURCE 1 (NORMAL) POSITION INDICATION L3 - LED SOURCE 1 (NORMAL) SOURCE AVAILABILITY INDICATION L4- LED SOURCE 2 (OR EMERGENCY) SOURCE AVAILABILITY INDICATION

P1 - ENGINE START TIMER P1 (ADJUSTABLE UP TO 6S) Q2 - PEAK SHAVE/REMOTE LOAD TEST/AREA PROTECTION-RELAY S.P.D.T. USER SPECIFY INPUT VOLTAGE 120V, 24VAC, 24VDC R16 - PHASE ROTATION SENSING OF SOURCE 1-NORMAL AND SOURCE 2-EMERGENCY

R17 - UNDER VOLTAGE SENSING 3-PHASE SOURCE 2-EMERGENCY R50 - IN PHASE MONITOR BETWEEN SOURCE 1-NORMAL AND SOURCE 2-EMERGENCY TO ALLOW TRANSFER (WITH ENABLE/DISABLE) R8 - OVER VOLTAGE SENSING-3 PHASE SOURCE 2-EMERGENCY S13P - MICROPROCESSOR ACTIVATED COMMIT/NO COMMIT ON TRANSFERRING TO EMERGENCY SOURCE (WITH ENABLE/DISABLE) T - RETRANSFER TO NORMAL

U - ENGINE STOP/COOL ADJUSTABLE COOL DOWN TIMER VI - VOLTAGE IMBALANCE BETWEEN PHASES (APPLIES TO 3-PHASE ONLY) W - ADJUSTABLE TIME DELAY ON TRANSFER TO EMERGENCY SOURCE YEN/P - BYPASS TRANSFER TIMER FUNCTION(SOFT SWITCH IN CONTROLLER) OPTION PACKAGE DESCRIPTION: 1A1,1A1E,2A3,2A4,C/D,Q2,R8,R16,R17,R50,VI Q2-REMOTE LOAD TEST: Q2120VS (REMOTE LOAD TEST INPUT - INCL IN OPTION PKG)

ADDITIONAL CONTACTS: -T3W3000 (TEST PRESIGNAL-TRANS TO SOURCE 1 OR SOURCE 2) -COMMUNICATIONS: ZNM0200 (MODBUS RTU COMMUNICATION MODULE) -SELECTOR SWITCHES: S5P0000 (AUTO/MANUAL RETRANSFER TO SOURCE 1)

-HEATER: HT60MX0 (HT2 - HEATER/THERMOSTAT) INHIBIT TRANSFER TO SOURCE 2 (Q3-120V)- INHIBIT TRANSFER TO SOURCE 1-120V (Q7-120V)

3 CONSTRUCTION AND PERFORMANCE

3.1 THE AUTOMATIC TRANSFER SWITCH SHALL BE OF DOUBLE THROW CONSTRUCTION OPERATED BY A RELIABLE ELECTRICAL MECHANISM MOMENTARILY ENERGIZED. THERE SHALL BE A DIRECT MECHANICAL COUPLING TO FACILITATE TRANSFER IN 6 CYCLES OR

3.2 THE NORMAL AND EMERGENCY CONTACTS SHALL BE MECHANICALLY INTERLOCKED SUCH THAT FAILURE OF ANY COIL OR DISARRANGEMENT OF ANY PART SHALL NO PERMIT A NEUTRAL POSITION.

3.3 FOR SWITCHES INSTALLED IN SYSTEMS HAVING GROUND FAULT DEVICES, AND/OR WIRED SO AS TO BE DESIGNATED A SEPARATELY DERIVED SYSTEM BY THE NEC, A 4TH POLE SHALL BE PROVIDED. THIS ADDITIONAL POLE SHALL ISOLATE THE NORMAL AND EMERGENCY NEUTRALS. THE NEUTRAL POLE SHALL HAVE THE SAME WITHSTAND AND OPERATIONAL RATINGS AS THE OTHER POLES AND SHALL BE ARRANGED TO BREAK LAST AND MAKE FIRST TO MINIMIZE NEUTRAL SWITCHIN TRANSIENTS. ADD-ON OR ACCESSORY POLES THAT ARE NOT OF IDENTICAL CONSTRUCTION AND WITHSTAND CAPABILITY ARE NOT ACCEPTABLE.

4 THE CONTACT STRUCTURE SHALL CONSIST OF A MAIN CURRENT CARRYING NTACT, WHICH IS A SILVER ALLOY WITH A MINIMUM OF 50% SILVER CONTENT. THE RENT CARRYING CONTACTS SHALL BE PROTECTED BY SILVER TUNGSTEN ARCING ONTACTS ON ALL SIZES ABOVE 400 AMPS.

TRANSFER SWITCH MANUFACTURER SHALL SUBMIT TEST DATA FOR EACH SIZE CH, SHOWING IT CAN WITHSTAND FAULT CURRENTS OF THE MAGNITUDE AND THE ON NECESSARY TO MAINTAIN THE SYSTEM INTEGRITY. MINIMUM UL LISTED TAND AND CLOSE INTO FAULT RATINGS SHALL BE AS FOLLOW

ANY MOLDED CASE BREAKER* (RMS SYMMETRICAL) 1201 -

CIFIC COORDINATED MOLDED CASE BREAKER TO 400 __ 800 65,000

1200 85,000 1201 - 4000 100,000

<u>SIZE (AMPS)</u> <u>CURRENT LIMITING FUSE</u> UP TO 4000 200,000

*ALL VALUES 480 VOLT, RMS SYMMETRICAL, LESS THAN 20% POWER FACTOR.

3.6 A DIELECTRIC TEST AT THE CONCLUSION OF THE WITHSTAND AND CLOSING TESTS SHALL BE PERFORMED.

THE AUTOMATIC TRANSFER SWITCH MANUFACTURER SHALL CERTIFY SUFFICIENT INTERRUPTING CAPABILITIES FOR

OPERATION BETWEEN A NORMAL AND EMERGENCY SOURCE THAT ARE 120

OUT OF PHASE AT 480 VOLTS, 600% OF RATED CURRENT AT .50 POWER FACTOR. THIS CÉRTIFICATION IS TO ENSURE THAT THERE WILL BE NO CURRENT FLOW BETWEEN THE TWO ISOLATED SOURCES DURING

SIZE (AMPS) NUMBER OF CYCLES OF OPERATION

UP TO 1600 1601-2500 2501 AND ABOVE

3.8 ALL RELAYS SHALL BE CONTINUOUS DUTY INDUSTRIAL TYPE WITH WIPING CONTACTS. CUSTOMER INTERFACE CONTACTS SHALL BE RATED 10 AMPERES MINIMUM. COILS, RELAYS, TIMERS AND ACCESSORIES SHALL BE READILY FRONT ACCESSIBLE. THE CONTROL PANEL AND POWER SECTION SHALL BE INTERCONNECTED WITH A HARNESS AND KEYED DISCONNECT PLUGS FOR MAINTENANCE.

3.9 MAIN AND ARCING CONTACTS SHALL BE VISIBLE WITHOUT MAJOR DISASSEMBLY TO FACILITATE INSPECTION AND MAINTENANCE.

3.10 A MANUAL HANDLE SHALL BE PROVIDED FOR MAINTENANCE PURPOSES WITH THE SWITCH DE-ENERGIZED. AN OPERATOR DISCONNECT SWITCH SHALL BE PROVIDED TO DEFEAT AUTOMATIC OPERATION DURING MAINTENANCE, INSPECTION OR MANUAL OPERATION.

3.11 THE SWITCH SHALL BE MOUNTED IN A NEMA 1 ENCLOSURE UNLESS OTHERWISE INDICATED ON THE PLANS.

3.12 SWITCHES COMPOSED OF MOLDED CASE BREAKERS, CONTACTORS OR COMPONENTS THEREOF NOT SPECIFICALLY DESIGNED, AS AN AUTOMATIC TRANSFER SWITCH WILL NOT BE ACCEPTABLE.

3.13 GE ZENITH'S SHALL PROTECT THE AUTOMATIC TRANSFER SWITCH FOR A PERIOD OF 2 YEARS, PARTS AND LABOR WARRANTY OR THE EQUIVALENT.

3.14 THE AUTOMATIC TRANSFER SWITCH MUST BE EQUIPPED WITH A SOLENOID PROTECTION SCHEME THAT REMOVES ANY ATTEMPTS OF OPERATING THE SOLENOIDS AFTER (3) CONSECUTIVE TRIALS UNTIL MANUAL INTERVENTION BY AN OPERATOR.

3.15 THE AUTOMATIC TRANSFER SWITCH SHALL BE GE ZENITH ZBTS SERIES OR APPROVED

AUTOMATIC TRANSFER SWITCH

1.22 FOR THOSE APPLICATIONS WHERE FRONT CONNECTION IS REQUIRED, THE DESIGN

MAKE THE APPROPRIATE CONNECTIONS WITHIN. IT WILL BE PERMISSIBLE FO

COMPARTMENTS SHALL BE PROVIDED AT THE TIME OF REQUEST.

LIFE OF THE PRODUCT.

SPECIFICATION REQUIREMENTS.

SHALL PERMIT FOR THE ADDITION OF COMPONENTS AND SUPPORTS NECESSARY

ADDITIONAL COMPARTMENTS TO BE ADDED TO THE BASE DESIGN SUCH THAT AL

BUSSING REQUIREMENTS FIT WITHIN THE ENCLOSURE OF THE DEVICE AND YET MEET

ALL UL, CSA, IEC, AND NEC STANDARDS. SPECIFIC SIZES FOR THESE ADD-ON

1.23 TO ENSURE THAT FOREIGN OBJECTS OR DEBRIS DOES NOT FALL ONTO THE AUTOMATIC

PARTS. THIS SHROUD OR BARRIER DEVICE SHOULD BE AN INTEGRAL PART OF TH

OF THE DESIGN AS DEBRIS MAY FALL ONTO THE UNIT AT ANY POINT DURING THE

1.24 THE COMPLETE BYPASS-ISOLATION TRANSFER SWITCH SHALL BE TESTED TO ENSURE

SEQUENCE OF OPERATION AND TO ENSURE THAT THE OPERATING TRANSFER TIME.

VOLTAGE, FREQUENCY AND TIME DELAY SETTINGS ARE IN COMPLIANCE WITH THE

1.25 THE EQUIPMENT SHALL BE CONSTRUCTED FOR USE IN SEISMICALLY VULNERABLE AREAS AND

CERTIFIED FOR COMPLIANCE WITH THE SEISMIC REQUIREMENTS IN THIS SPECIFICATION. TH

EQUIPMENT PROVIDER SHALL SUBMIT DETAILS OF THE REQUIRED INSTALLATION, INCLUDING

SUPPORTS, ANCHORS, AND RESTRAINTS. THE EQUIPMENT PROVIDER SHALL SUBMIT A

CERTIFICATION DOCUMENT, STAMPED BY A LICENSED PROFESSIONAL ENGINEER, STATING COMPLIANCE OF THE SUBMITTED EQUIPMENT TO THE FOLLOWING PARAMETERS:

SPECTRAL RESPONSE (% OF G) = 300%

1.26 THE BYPASS-ISOLATION TRANSFER SWITCH SHALL BE THE PRODUCT OF ONE

AND NEMA STANDARDS FOR INDUSTRIAL CONTROLS

SEQUENCE OF OPERATION

NORMAL SOURCE.

EMERGENCY SOURCE.

SPECIFICATIONS.

AND SETTINGS.

PROGRAMMABLE TIME DELAY.

MANUFACTURER AND COMPLETELY FACTORY INTERCONNECTED AND TESTED SO THAT

ONLY THE SERVICES AND LOAD CONNECTIONS TO THE BYPASS-ISOLATION SWITCH ARE

REQUIRED FOR FIELD INSTALLATION. ALL INTERCONNECTIONS BETWEEN THE TRANSFER

SWITCH AND THE BYPASS-ISOLATION SWITCH SHALL BE SILVER-PLATED BUS BAR. A

SWITCH POSITIONS. ENCLOSURE CONSTRUCTION SHALL BE IN ACCORDANCE WITH UL

VISUAL POSITION INDICATOR SHALL BE PROVIDED TO INDICATE BYPASS—ISOLATION

1.27 IN THE EVENT THAT THE AUTOMATIC TRANSFER SWITCH NEEDS TO BE REMOVED FROM

THIS TASK. INCLUDED IN THESE OPTIONS ARE OPTIONAL RAMPS THAT CAN BE

2.1 THE ATS SHALL INCORPORATE ADJUSTABLE THREE-PHASE UNDER AND

TEMPORARILY AFFIXED TO THE FRONT OF THE UNIT OR OPTIONAL CARTS/DOLLIES

THAT CAN BE WHEELED RIGHT UP TO THE UNIT FOR THE EASY TRANSFER OF THE

ATS FROM THE ENCLOSURE TO THE ROLLAWAY CART ASSEMBLY. THIS WILL ENSURE AN EASY AND SAFE REMOVAL OF THE ATS WITHOUT THE NEED TO CREATE INCLINED

OVER-VOLTAGE AND THREE PHASE UNDER AND OVER-FREQUENCY SENSING ON THE

2.2 WHEN THE VOLTAGE OF ANY PHASE OF THE NORMAL SOURCE IS REDUCED TO

NOMINAL, FOR A PERIOD OF 0-10 SECONDS (PROGRAMMABLE) A PILOT CONTACT

OVER-VOLTAGE AND THREE PHASE UNDER AND OVER-FREQUENCY SENSING ON THE

2.4 WHEN THE EMERGENCY SOURCE HAS REACHED A VOLTAGE VALUE WITHIN +/-

10% OF NOMINAL AND ACHIEVED FREQUENCY WITHIN +/- 5% OF THE RATED VALUE,

2.5 WHEN THE NORMAL SOURCE HAS BEEN RESTORED TO NOT LESS THAN 90% OF

NORMAL SOURCE AFTER A TIME DELAY OF 0 TO 30 MINUTES (PROGRAMMABLE). THE

RATED VOLTAGE ON ALL PHASES, THE LOAD SHALL BE RE-TRANSFERRED TO THE

GENERATOR SHALL RUN UNLOADED FOR 5 MINUTES (PROGRAMMABLE) AND THEN

AUTOMATICALLY SHUT DOWN. THE GENERATOR SHALL BE READY FOR AUTOMATIC

RETRANSFER TO THE NORMAL SOURCE SHALL BE MADE INSTANTANEOUSLY UPON

2.7 INSPECTION AND OPERATIONAL TESTS SHALL BE CONDUCTED BY THE CONTRACTOR

IN THE PRESENCE OF THE ENGINEER, TO INDICATE THAT THE SWITCH SATISFIES THE

2.8 THE TRANSFER SWITCH SHALL BE EQUIPPED WITH A MICROPROCESSOR BASED

CONTROL PANEL. THE CONTROL PANEL SHALL PERFORM THE OPERATIONAL AND

DISPLAY FUNCTIONS OF THE TRANSFER SWITCH. THE DISPLAY FUNCTIONS OF THE

2.9 THE DIGITAL DISPLAY SHALL BE ACCESSIBLE WITHOUT OPENING THE ENCLOSURE

2.10 THE CONTROL PANEL SHALL BE PROVIDED WITH MENU DRIVEN DISPLAY SCREENS

FOR TRANSFER SWITCH MONITORING, CONTROL AND FIELD CHANGEABLE FUNCTIONS

2.11 THE CONTROL PANEL SHALL BE OPTO-ISOLATED FROM ELECTRICAL NOISE AND

PROVIDED WITH THE FOLLOWING INHERENT CONTROL FUNCTIONS AND CAPABILITIES:

b. BUILT-IN DIAGNOSTIC DISPLAY THAT INCLUDES THE CAPTURING OF HISTORICAL

DATA, SUCH AS NUMBER OF TRANSFERS AND TIME ON EMERGENCY POWER

CODE PROTECTED AND ACCESSIBLE THROUGH THE KEYPAD.

c. CAPABILITY FOR EXTERNAL COMMUNICATION AND NETWORK INTERFACE.

INCREMENTS OF 1 SECOND) FACTORY SET AT 3 SECONDS.

THE EMERGENCY AND TO THE NORMAL SOURCE.

SWITCHING TRANSIENTS.

EMERGENCY SOURCE AVAILABILITY.

d. TOUCH PAD TEST SWITCH WITH FAST TEST/LOAD/NO LOAD POSITIONS TO

e. TIME DELAY TO OVERRIDE MOMENTARY NORMAL SOURCE FAILURE PRIOR TO

f. TIME DELAY ON RETRANSFER TO NORMAL SOURCE, PROGRAMMABLE 0-60

ENGINE START. FIELD PROGRAMMABLE 0-10 SECONDS (ADJUSTABLE BY

MINUTES (ADJUSTABLE BY INCREMENTS OF 1 SECOND) FACTORY SET AT 30

MINUTES. IF THE EMERGENCY SOURCE FAILS DURING THE RETRANSFER TIME

DELAY. THE TRANSFER SWITCH CONTROLS SHALL AUTOMATICALLY BYPASS THE

(ADJUSTABLE BY INCREMENTS OF 1 SECOND), FACTORY SET AT 1 SECOND.

h. TERMINALS FOR REMOTE TEST/PEAK SHAVE OPERATION AND TRANSFER INHIBIT TO

i. AN IN-PHASE MONITOR SHALL BE PROVIDED. THE MONITOR SHALL COMPARE THE

PHASE ANGLE DIFFERENCE BETWEEN THE NORMAL AND EMERGENCY SOURCES

AUXILIARY CONTACTS (1 N.O.) SHALL BE PROVIDED TO INDICATE NORMAL AND

k. A LOAD/NO LOAD CLOCK EXERCISER SHALL BE INCORPORATED WITHIN THE

BATTERY FOR MEMORY RETENTION DURING AN OUTAGE.

(ADJUSTABLE BY 1 SECOND INCREMENT).

MICROPROCESSOR AND SHALL BE PROGRAMMABLE TO START THE ENGINE

I. A TIMED AUXILIARY CONTACT (1 N.C.) ADJUSTABLE 0-60 SECONDS SHALL BE

GENERATOR SET AND TRANSFER THE LOAD (WHEN SELECTED) FOR EXERCISE

PURPOSES ON A WEEKLY BASIS. THE EXERCISER SHALL CONTAIN A LITHIUM

PROVIDED TO ALLOW MOTOR LOADS TO BE DISCONNECTED PRIOR TO TRANSFER

IN EITHER DIRECTION AND ADDED SIMULTANEOUSLY WITH THE TRANSFER OR

AFTER TRANSFER WITH POST TIME DELAY PROGRAMMABLE 0-60 SECONDS

AND BE PROGRAMMED TO ANTICIPATE THE ZERO CROSSING POINT TO MINIMIZE

TIME DELAY AND IMMEDIATELY RETRANSFER TO THE NORMAL POSITION.

q. TIME DELAY ON TRANSFER TO EMERGENCY, PROGRAMMABLE 0-5 MINUTES

SOURCE, FOR EASE OF TROUBLESHOOTING.

SIMULATE A NORMAL SOURCE FAILURE.

a. MULTIPURPOSE DISPLAY FOR CONTINUOUS MONITORING AND CONTROL OF THE ATS

FUNCTIONS AND SETTINGS. ALL FIELD CHANGEABLE FUNCTIONS SHALL BE PASS

DOOR AND SHALL BE PROVIDED WITH A 4 LINE BY 20 CHARACTER LCD DISPLAY

SCREEN WITH TOUCH PAD FUNCTION AND DISPLAY MENUS. THE PROGRAMMING

CONTROL PANEL SHALL INCLUDE ATS POSITION AND SOURCE AVAILABILITY.

FUNCTIONS SHALL BE PASS CODE PROTECTED.

2.6 IF THE ENGINE GENERATOR SHOULD FAIL WHILE CARRYING THE LOAD,

RESTORATION OF PROPER VOLTAGE (90%) ON THE NORMAL SOURCE.

2.3 THE ATS SHALL INCORPORATE ADJUSTABLE THREE PHASE UNDER AND

THE LOAD SHALL BE TRANSFERRED TO THE EMERGENCY SOURCE AFTER A

SHALL CLOSE TO INITIATE STARTING OF THE ENGINE GENERATOR.

OPERATION UPON THE NEXT FAILURE OF THE NORMAL SOURCE.

80% OR EXCEEDS 110% NOMINAL VOLTAGE, OR FREQUENCY IS DISPLACED 2 HZ FROM

THE ENCLOSURE, THE DESIGN SHALL PROVIDE FOR SEVERAL OPTIONS TO COMPLETE

CERTIFICATION TO IBC 2006 & IEEE STD 693-2005 (COVERING MODERATE

IMPORTANCE FACTOR (IP) = 1.5, WITH OPERATION DEFINED AS TRANSFERRING

PLICABLE FOR MOUNTING AT ANY LOCATION IN THE BUILDING, WITH Z/H =

OM THE PRIMARY TO THE ALTERNATE SUPPLY DURING THE SIMULATED EVENT.

PEAK DESIGN SPECTRAL RESPONSE ACCELERATION (SDS) = 3.6G

PROPER OPERATION OF THE INDIVIDUAL COMPONENTS AND CORRECT OVERALL

PROVIDE SHROUDS OR OTHER BARRIERS TO PROTECT THE BUS SYSTEM AND MOVING

PRODUCT DESIGN AND SHOULD NOT HAVE TO BE REMOVED OR REINSTALLED PRIOR

TO COMMISSIONING THE EQUIPMENT. THESE BARRIERS SHOULD BE A PERMANENT PART

TRANSFER SWITCH OR ANY MOVING PARTS THERE WITHIN, THE DESIGN SHOULD

1.1 THE TRANSFER SWITCH SHALL BE RATED FOR THE VOLTAGE AND AMPACITY AS HOWN ON THE PLANS AND SHALL HAVE 600-VOLT INSULATION ON ALL PARTS IN ACCORDANCE WITH NEMA STANDARDS.

1.2 THE CURRENT RATING SHALL BE A CONTINUOUS RATING WHEN THE SWITCH IS INSTALLED IN AN UNVENTILATED ENCLOSURE, AND SHALL CONFORM TO NEMA TEMPERATURE RISE STANDARDS.

1.3 THE UNIT SHALL BE RATED BASED ON ALL CLASSES OF LOADS, I.E., RESISTIVE, TUNGSTEN, BALLAST AND INDUCTIVE LOADS. SWITCHES RATED 400 AMPERES OR LESS SHALL BE UL LISTED FOR 100% TUNGSTEN LAMP LOAD.

1.4 AS A PRECONDITION FOR APPROVAL, ALL TRANSFER SWITCHES COMPLETE WITH ACCESSORIES SHALL BE LISTED BY UNDERWRITERS LABORATORIES, UNDER STANDARD UL 1008 (AUTOMATIC TRANSFER SWITCHES) AND APPROVED FOR USE ON EMERGENCY SYSTEMS.

1.5 THE WITHSTAND CURRENT CAPACITY OF THE MAIN CONTACTS SHALL NOT BE LESS THAN 20 TIMES THE CONTINUOUS DUTY RATING WHEN COORDINATED WITH ANY MOLDED CIRCUIT BREAKER ESTABLISHED BY CERTIFIED TEST DATA. REFER TO REQUIRED WITHSTAND AND CLOSE RATINGS AS DETAILED IN THIS SPECIFICATION. 1.6 TEMPERATURE RISE TESTS IN ACCORDANCE WITH UL 1008 SHALL HAVE BEEN

F THE UNITS TO CARRY THEIR RATED CURRENTS WITHIN THE ALLOWABLE TEMPERATURE LIMITS.

ONDUCTED AFTER THE OVERLOAD AND ENDURANCE TESTS TO CONFIRM THE ABILITY

1.7 TRANSFER SWITCHES SHALL COMPLY WITH THE APPLICABLE STANDARDS OF UL, CSA, ANSI, NFPA, IEEE, NEMA AND IEC.

1.8 THE TRANSFER SWITCHES SHALL BE SUPPLIED WITH A MICROPROCESSOR BASED CONTROL PANEL AS DETAILED FURTHER IN THESE SPECIFICATIONS.

1.9 THE MICROPROCESSOR AND ALL RELATED CONTROL SYSTEMS ARE HOUSED IN A SEPARATE COMPARTMENT THAT WILL PERMIT ALL CUSTOMER CONNECTIONS TO BE TERMINATED IN AN ENCLOSED CHAMBER FREE OF LINE VOLTAGE / LINE CURRENT CONNECTION TERMINALS. THIS ISOLATED COMPARTMENT SHALL BE COMPRISED OF STRICTLY CONTROL DEVICES AND CONNECTION POINTS. ALL CONNECTIONS WILL BE INTENDED FOR LOW VOLTAGE / LOW CURRENT FEED AND SHALL BE CLEARLY MARKED FOR EASE OF USE. EVERY CONNECTION POINT WILL BE EQUIPPED WITH SCREW TERMINALS AND WILL NOT PERMIT FOR BARE WIRE CONNECTIONS.

1.10 A BYPASS-ISOLATION TRANSFER SWITCH SHALL BE PROVIDED TO PERMIT CONVENIENT MANUAL ELECTRICAL BYPASS AND ISOLATION OF THE AUTOMATIC TRANSFER SWITCH THAT COULD NOT OTHERWISE BE TESTED, INSPECTED AND MAINTAINED WITHOUT INTERRUPTING THE LOAD. BYPASS OF THE LOAD TO EITHER THE NORMAL OR EMERGENCY POWER SOURCE WITH COMPLETE ISOLATION OF THE AUTOMATIC TRANSFER SWITCH SHALL BE POSSIBLE REGARDLESS OF THE STATUS OF THE AUTOMATIC TRANSFER SWITCH. THE BYPASS-ISOLATION SWITCH SHALL PERMIT PROPER OPERATION BY ONE PERSON THROUGH THE MOVEMENT OF A SEPARATE HANDLE. THE ENTIRE SYSTEM SHALL CONSIST OF TWO ELEMENTS: THE AUTOMATIC TRANSFER SWITCH AND THE BYPASS-ISOLATION SWITCH FURNISHED COMPLETELY FACTORY INTERCONNECTED AND TESTED.

1.11 THE CONSTRUCTION OF THE AUTOMATIC TRANSFER SWITCHING DEVICE SHALL BE SUCH THAT THE CURRENT CARRYING CONTACTS ARE FULLY ENCLOSED TO PREVENT EXTERNAL ARC FLASHES YET CONSTRUCTED SUCH THAT THEY CAN BE EASILY ACCESSED FOR VISUAL INSPECTION AND REPLACEMENT IF NECESSARY. IT IS DESIRED THAT ACCESS TO THESE CONTACTS BE DIRECTLY FROM THE FRONT OF THE ATS WITHOUT THE NEED TO REMOVE OR DISASSEMBLE MAJOR COMPONENTS OR DEVICES WITHIN THE BYPASS DESIGN.

1.12 A BYPASS-ISOLATION TRANSFER SWITCH SHALL BE PROVIDED WITH THE FEATURES NECESSARY TO ALLOW FOR ISOLATION OF THE AUTOMATIC TRANSFER SWITCH VIA EXTERNAL MEANS WITHOUT THE NEED TO ACCESS THE CURRENT CARRYING COMPONENTS OF THE DEVICE. ALL TRANSITIONAL MOTION OF THE AUTOMATIC TRANSFER SWITCH (AUTO / TEST / ISOLATE) SHALL BE ACCOMPLISHED VIA EXTERNAL MEANS WITHOUT THE NEED TO OPEN THE MAIN ENCLOSURE DOOR. INCLUDED IN TH REQUIREMENT IS THE ABILITY TO STORE ALL OPERATING HANDLES IN A SEPARATE COMPARTMENT THAT IS FREE AND AWAY FROM THE LINE VOLTAGE / LINE CURRENT CARRYING ELEMENTS. TO ENSURE THAT ONLY QUALIFIED PERSONNEL CAN ACCESS THE INTERNAL LIVE PARTS, THE DESIGN SHALL BE SUCH THAT ALL OPERATING HANDLES MAY BE STORED AND LOCKED IN THIS COMPARTMENT IF REQUIRED/DESIRED BY BUILDING/LOCAL FACILITIES MANAGEMENT.

1.13 A BYPASS-ISOLATION TRANSFER SWITCH SHALL BE EQUIPPED WITH AN AUTOMATIC SHUTTER SYSTEM THAT WILL AUTOMATICALLY OPEN AND CLOSE UPON INSTALLATION AND REMOVAL OF THE AUTOMATIC TRANSFER SWITCH PORTION OF THE SYSTEM. THE SHUTTER SYSTEM SHALL OPERATE IN SUCH A MANNER THAT WILL PREVENT INCIDENTAL CONTACT WITH ALL LIVE BUS SYSTEMS VIA A MOVING SHUTTER. DURING AUTOMATIC OPERATION, THE SHUTTER SYSTEM SHALL REMAIN OPEN ALLOWING FOR ELECTRICAL CONNECTION BETWEEN THE AUTOMATIC TRANSFER SWITCH AND THE BYPASS ASSEMBLY IN TEST MODE, THE SHUTTER SYSTEM WILL AUTOMATICALLY ADJUST, ISOLATING THE LIVE BUS FROM THE AUTOMATIC TRANSFER SWITCH. THIS WILL ENSURE A SAFE OPERATION OF THE AUTOMATIC TRANSFER SWITCH WITH ZERO CURRENT PASSING THROUGH THE MAIN CONTACT ASSEMBLIES. IN THE ISOLATE MODE, ONCE AGAIN THE SHUTTER SYSTEM WILL REMAIN CLOSED, ISOLATING THE LIVE BUS FROM THE AUTOMATIC TRANSFER SWITCH. UPON REMOVAL OF THE AUTOMATIC TRANSFER SWITCH FROM THE ASSEMBLY, THERE SHALL BE NO ACCESS OR EXPOSURE TO LIVE BUS SYSTEMS AND NO RISK OF ACCIDENTAL OR INCIDENTAL CONTACT BETWEEN THE LIVE BUS AND THE MAINTENANCE PERSONNEL. THE DESIGN OF THIS SYSTEM SHALL BE SUCH THAT IT WILL PROVIDE MAXIMUM PROTECTION AGAINST FAULT CONDITIONS THAT MAY OCCUR ON THE FRONT OR REAR PANELS OF THE BYPASS ASSEMBLY.

1.14 TO MINIMIZE INSTALLATION AND MAINTENANCE ACTIVITIES, THE INTERACTION BETWEEN THE FRONT (ATS) AND REAR (BPI) PANELS SHOULD BE SMOOTH AND CONSISTENT WITH NO UNREASONABLE EFFORT REQUIRED TO RE-ALIGN THE BUS SYSTEMS OR OTHER FEATURES WITHIN THE FRONT OR REAR PANELS. THIS APPLIES TO NEW INSTALLATIONS AS WELL AS REPLACEMENT OF THE AUTOMATIC TRANSFERRING DEVICE RELATIVE TO THE REAR PANEL. SHOULD A SPARE AUTOMATIC TRANSFER SWITCH O LIKE RATINGS BE AVAILABLE AND NEED TO BE INSTALLED TO REPLACE A DAMAGED UNIT OR DEVICE, THE INSTALLATION SHALL BE CONSISTENT WITH THE STANDARD OPERATING INSTRUCTIONS WITHOUT THE NEED TO READJUST COMPONENTS OR FEATURES WITHIN THE FRONT OR REAR PANELS.

1.15 THE OPERATING SPEED OF THE BYPASS-ISOLATION SWITCH CONTACTS SHALL BE INDEPENDENT OF THE SPEED OF OPERATION OF THE BYPASS HANDLE.

1.16 THE ISOLATION HANDLE SHALL PROVIDE THREE POSITIONS: AUTOMATIC, TEST AND ISOLATE. THE TEST POSITION SHALL PERMIT ELECTRICAL TESTING OF THE AUTOMATIC TRANSFER SWITCH WITHOUT DISTURBING THE LOAD. THE ISOLATE POSITION SHALL COMPLETELY ISOLATE THE TRANSFER SWITCH FROM BOTH SOURCES AND LOAD WITHOUT ACTUAL REMOVAL OF THE LINE OR LOAD CONDUCTORS AND ALLOW ITS REMOVAL FOR INSPECTION AND MAINTENANCE. THE TRANSFER SWITCH SHALL BE ARRANGED FOR DRAW OUT OPERATION TO FACILITATE ITS REMOVAL. ALSO, WHILE IN THE TEST OR ISOLATE POSITIONS, THE BYPASS-ISOLATION SWITCH SHALL FUNCTION AS A MANUAL TRANSFER SWITCH TO ALLOW LOAD TRANSFER TO EITHER SOURCE OF POWER REGARDLESS OF THE POSITION OR CONDITION OF THE TRANSFER SWITCH, INCLUDING THE CONDITION WHEN THE TRANSFER SWITCH IS REMOVED, AND WITHOUT RECONNECTING THE LOAD TERMINAL OF THE TRANSFER SWITCH.

1.17 THE LOAD SHALL NOT BE INTERRUPTED DURING BYPASS-ISOLATION FUNCTIONS. THE ADDITION OF LOAD-BREAK CONTACTS THAT CAUSE LOAD INTERRUPTION IS NOT ACCEPTABLE. THE BYPASS-ISOLATION SWITCH CONTACTS SHALL NOT BE IN THE SYSTEM CURRENT PATH EXCEPT DURING ACTUAL BYPASS OPERATION.

1.18 THE BYPASS-ISOLATION TRANSFER SWITCH SHALL BE FURNISHED WITH A DETAILED STEP-BY-STEP OPERATING INSTRUCTION PLATE, LOCATED OUTSIDE OF CABINET DOOR, AS WELL AS THE FOLLOWING FUNCTION DIAGNOSTIC LIGHTS:

 NORMAL SOURCE AVAILABLE EMERGENCY SOURCE AVAILABLE

 BYPASS SWITCH IN NORMAL POSITION BYPASS SWITCH IN EMERGENCY POSITION AUTOMATIC TRANSFER SWITCH IN TEST POSITION AUTOMATIC TRANSFER SWITCH ISOLATED

 AUTOMATIC TRANSFER SWITCH INHIBIT AUTOMATIC TRANSFER SWITCH OPERATOR DISCONNECT SWITCH "OFF" AUTOMATIC TRANSFER SWITCH IN NORMAL POSITION AUTOMATIC TRANSFER SWITCH IN EMERGENCY POSITION

1.19 THE BYPASS-ISOLATION SWITCH SHALL BE EQUIPPED WITH AN INDEPENDENT ENGINE START CIRCUIT SO THAT, SHOULD A UTILITY OUTAGE OCCUR WHILE IN THE BYPASS-NORMAL/ATS ISOLATED CONDITION, THE ENGINE WILL AUTOMATICALLY START AND ALLOW IMMEDIATE SELECTION OF EMERGENCY BYPASS.

1.20 FOR EASE OF CABLE / BUS CONNECTIONS, THE DESIGN SHALL BE SUCH THAT IT PERMITS ACCESS TO BOTH SIDES AND REAR OF THE ENCLOSURE. THIS WILL ENSURE ADEQUATE WORKSPACE AND ACCESS FOR CONNECTIONS DURING INSTALLATION AND MAINTENANCE

1.21 TO ENSURE MAXIMUM SYSTEM CAPABILITIES, THE DEVICE SHALL BE PROVIDED WITH MEANS NECESSARY TO ACCOMMODATE UP TO 8 CABLES OF 750 MCM FOR MAXIMUM CURRENT CARRYING CAPACITY. THIS CAPABILITY SHALL BE IN THE FORM OF TRADITIONAL MECHANICAL LUGS OR APPROVED COMPRESSION LUGS DEPENDING ON THE LOCAL SYSTEM REQUIREMENTS.



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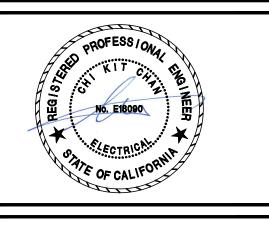
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800MHz Generator Helen Tower

MARK | DATE | DESCRIPTION

|04/23/21| 95% CD

|06/25/21| 100% CD

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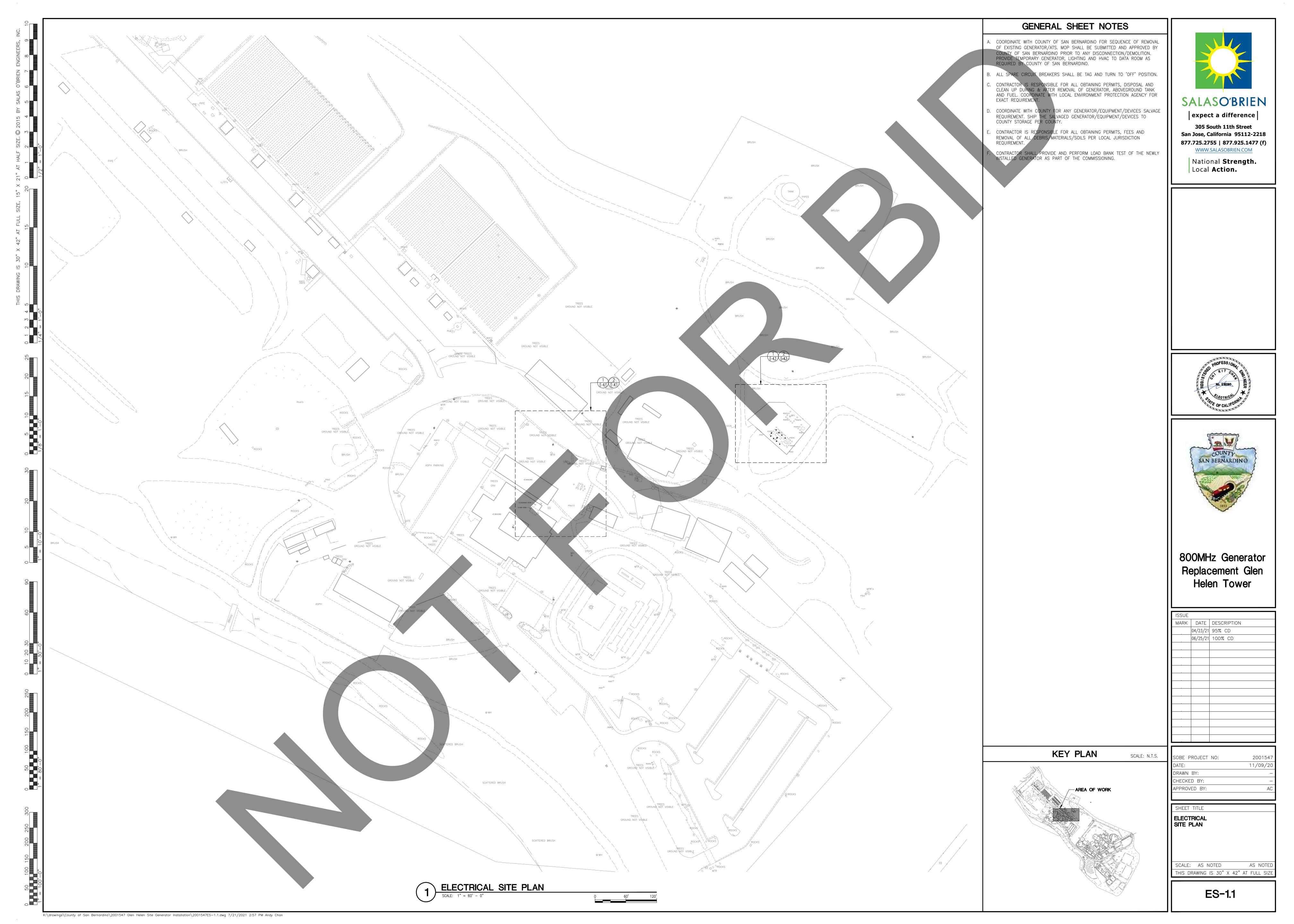
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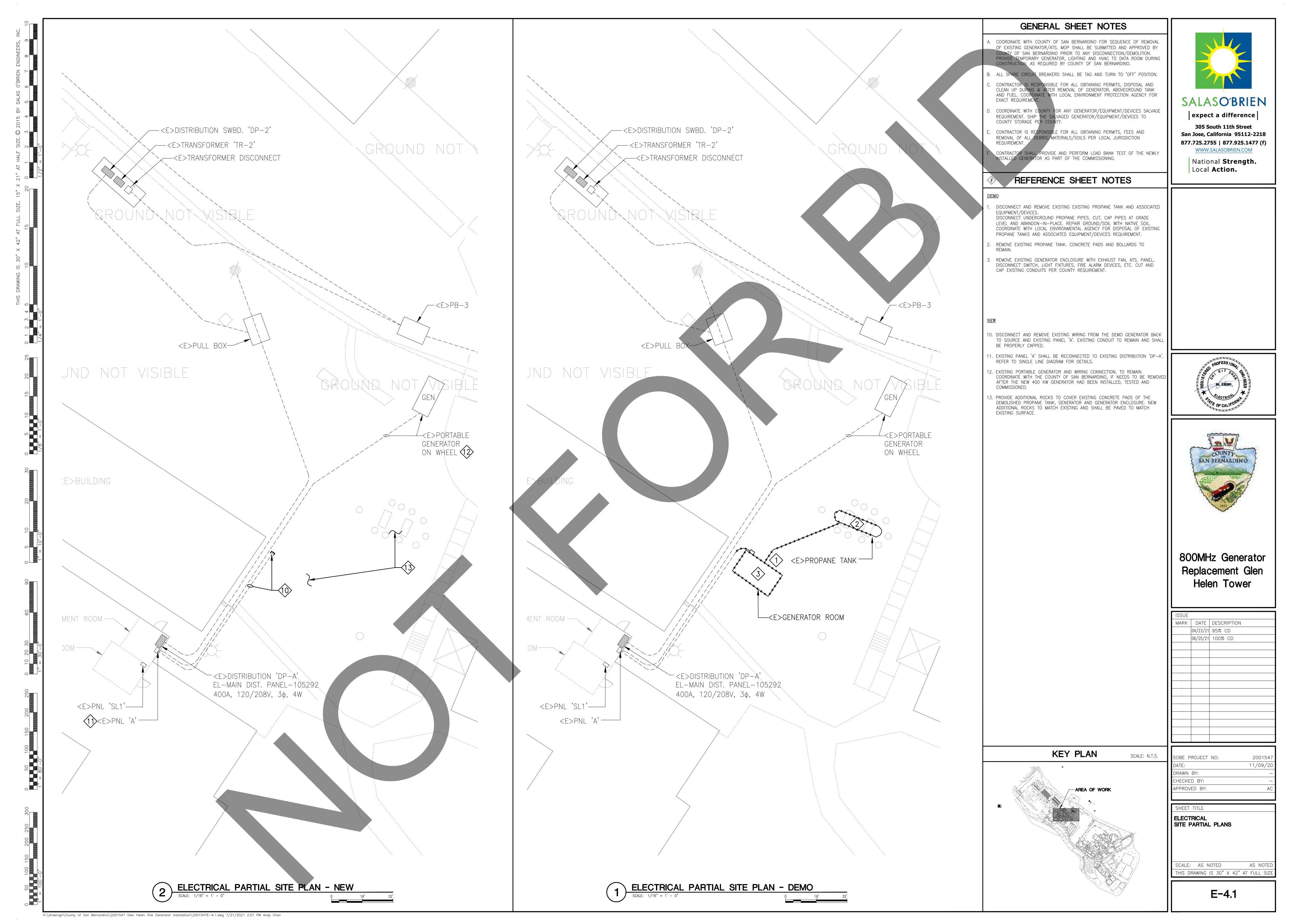
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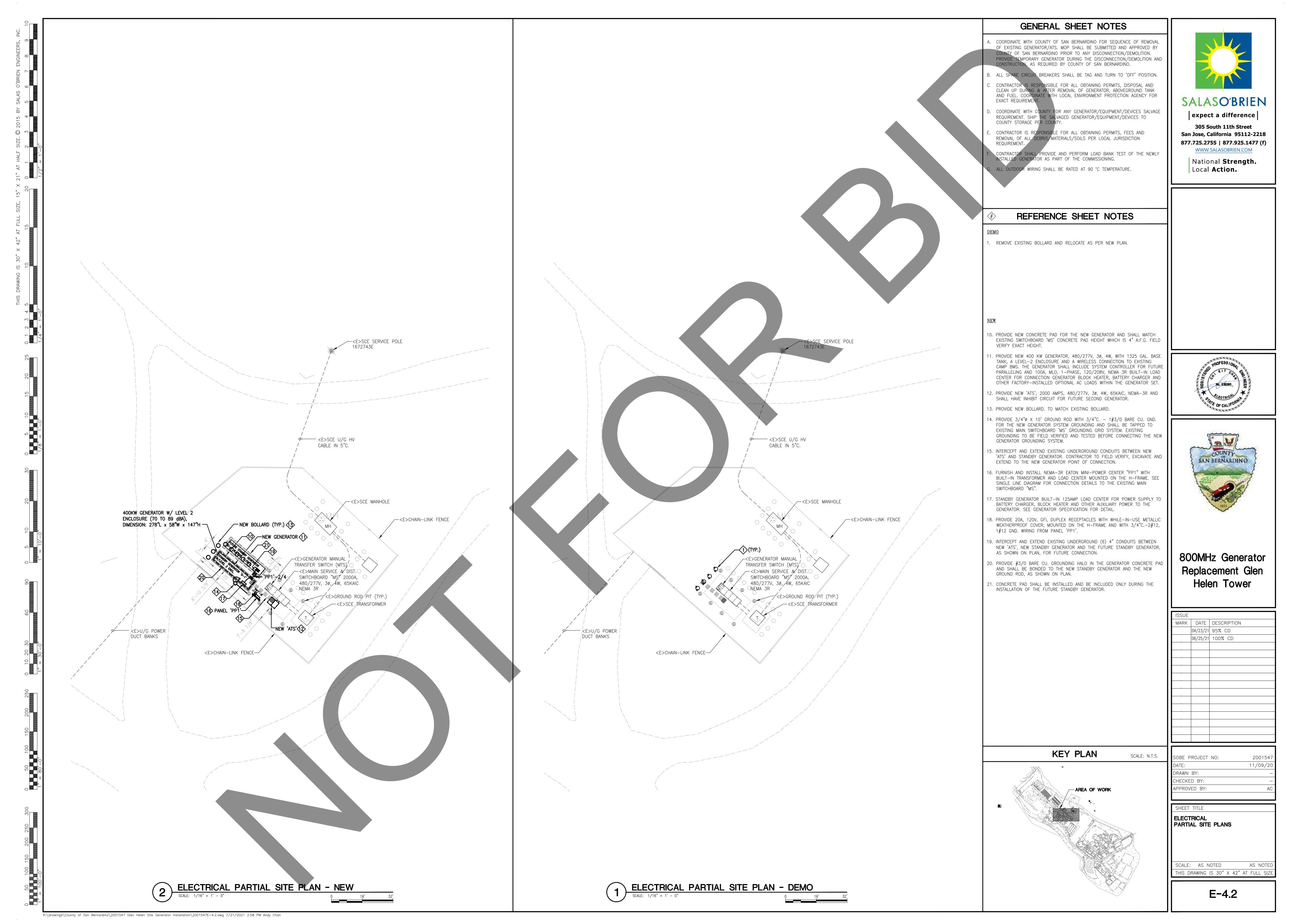
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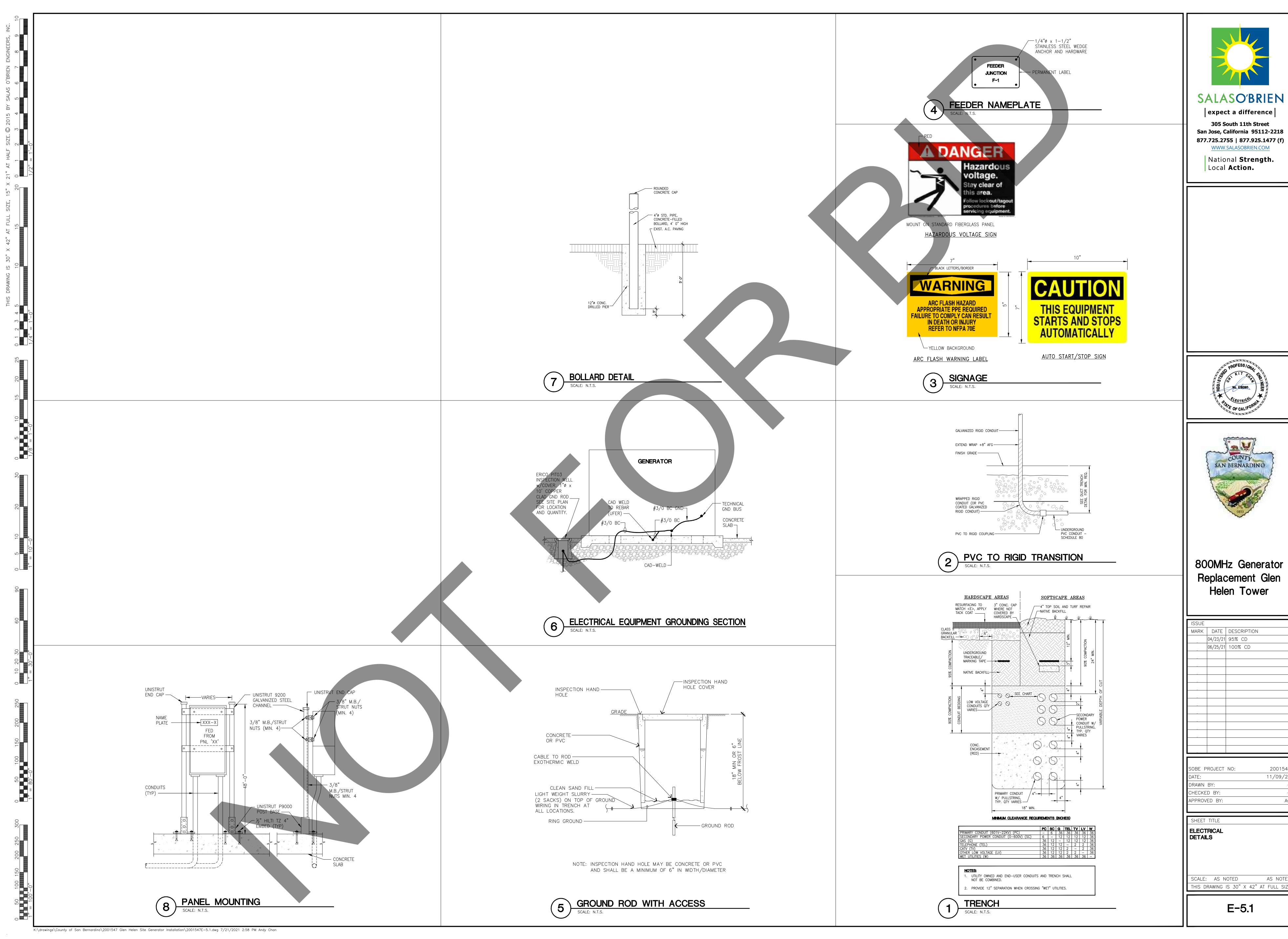
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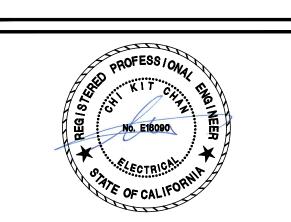








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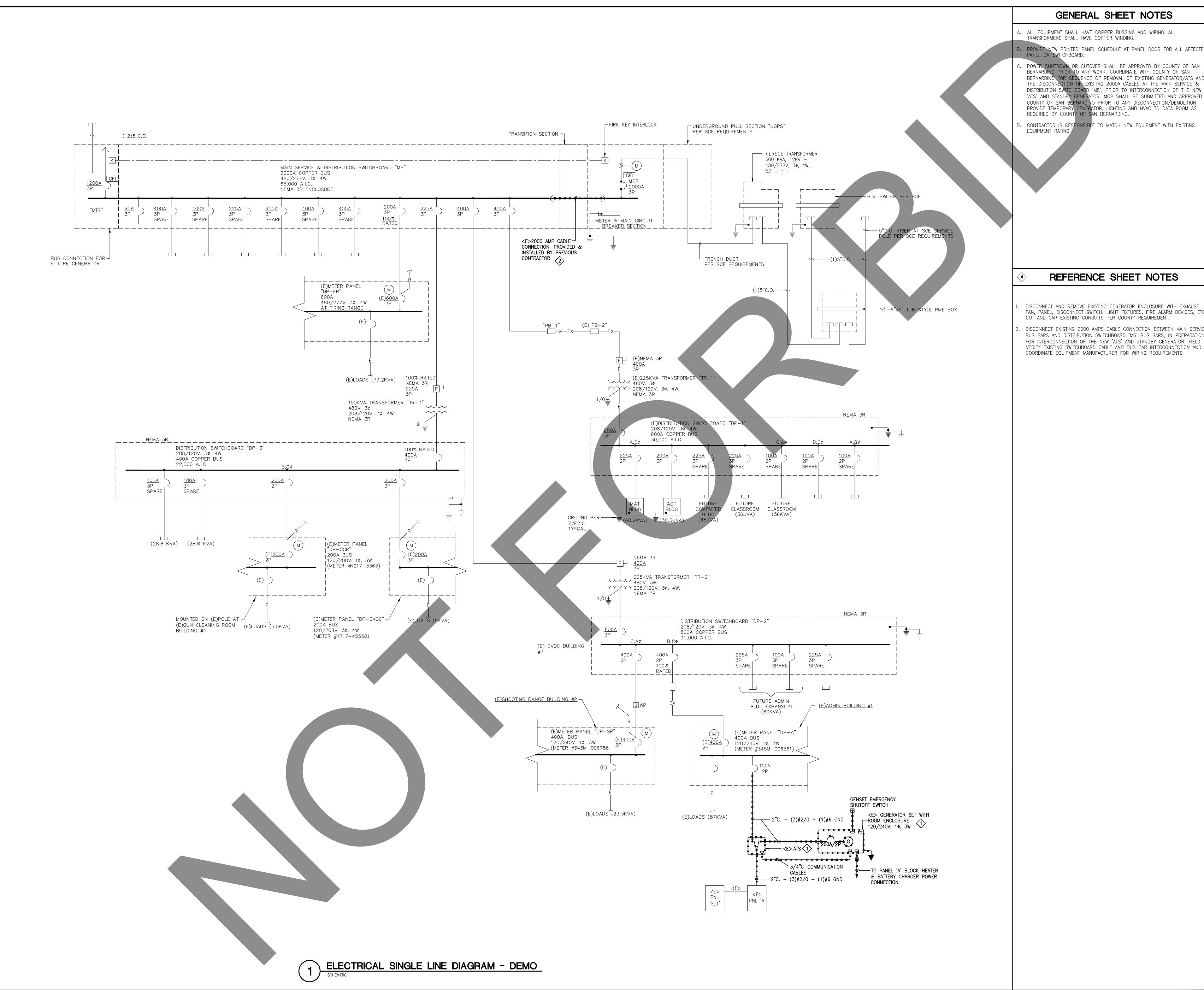
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- B. PROVIDE NEW PRINTED PANEL SCHEDULE AT PANEL DOOR FOR ALL AFFECTED
- BERNARDINO PRIOR TO ANY WORK. COORDINATE WITH COUNTY OF SAN BERNARDINO FOR SEQUENCE OF REMOVAL OF EXISTING GENERATOR/ATS AND THE DISCONNECTION OF EXISTING 2000A CABLES AT THE MAIN SERVICE & DISTRIBUTION SWITCHBOARD 'MS', PRIOR TO INTERCONNECTION OF THE NEW 'ATS' AND STANDBY GENERATOR. MOP SHALL BE SUBMITTED AND APPROVED E COUNTY OF SAN BERNARDINO PRIOR TO ANY DISCONNECTION/DEMOLITION.

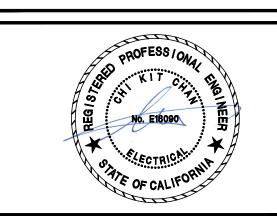


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- FAN, PANEL, DISCONNECT SWITCH, LIGHT FIXTURES, FIRE ALARM DEVICES, ETC.
- DISCONNECT EXISTING 2000 AMPS CABLE CONNECTION BETWEEN MAIN SERVICE BUS BARS AND DISTRIBUTION SWITCHBOARD 'MS' BUS BARS, IN PREPARATION FOR INTERCONNECTION OF THE NEW 'ATS' AND STANDBY GENERATOR. FIELD VERIFY EXISTING SWITCHBOARD CABLE AND BUS BAR INTERCONNECTION AND





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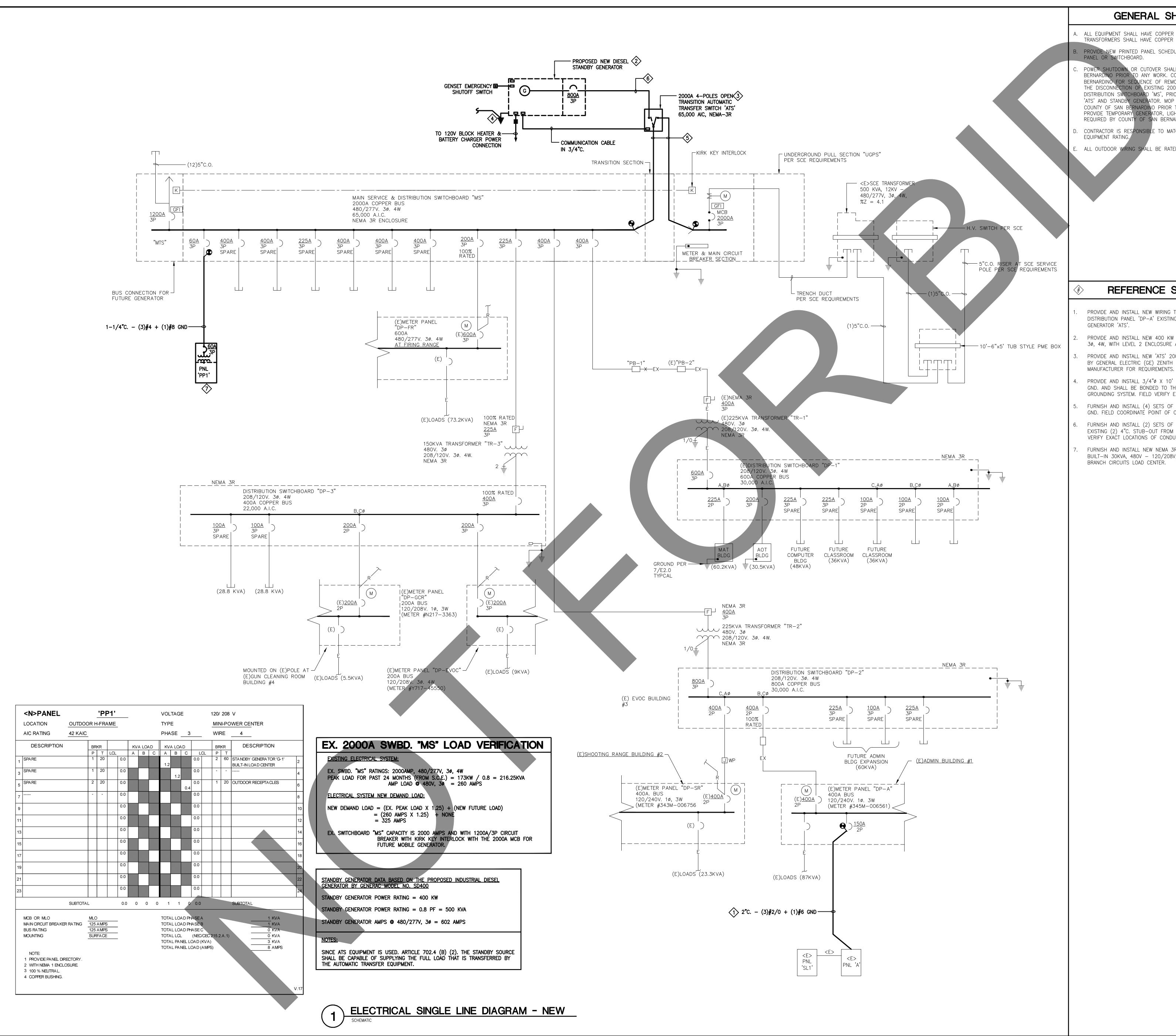
SINGLE LINE DIAGRAM - DEMO

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AS NOTE



GENERAL SHEET NOTES

- A. ALL EQUIPMENT SHALL HAVE COPPER BUSSING AND WIRING. ALL TRANSFORMERS SHALL HAVE COPPER WINDING.
- B. PROVIDE NEW PRINTED PANEL SCHEDULE AT PANEL DOOR FOR ALL AFFECTED PANEL OR SWITCHBOARD.
- POWER SHUTDOWN OR CUTOVER SHALL BE APPROVED BY COUNTY OF SAN BERNARDINO PRIOR TO ANY WORK. COORDINATE WITH COUNTY OF SAN BERNARDINO FOR SEQUENCE OF REMOVAL OF EXISTING GENERATOR/ATS AND THE DISCONNECTION OF EXISTING 2000A CABLES AT THE MAIN SERVICE & DISTRIBUTION SWITCHBOARD 'MS', PRIOR TO INTERCONNECTION OF THE NEW 'ATS' AND STANDBY GENERATOR. MOP SHALL BE SUBMITTED AND APPROVED E COUNTY OF SAN BERNARDINO PRIOR TO ANY DISCONNECTION/DEMOLITION. PROVIDE TEMPORARY GENERATOR, LIGHTING AND HVAC TO DATA ROOM AS REQUIRED BY COUNTY OF SAN BERNARDINO.
- CONTRACTOR IS RESPONSIBLE TO MATCH NEW EQUIPMENT WITH EXISTING EQUIPMENT RATING.
- ALL OUTDOOR WIRING SHALL BE RATED AT 90 °C TEMPERATURE.



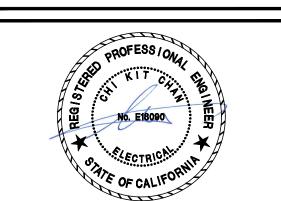
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REFERENCE SHEET NOTES

- PROVIDE AND INSTALL NEW WIRING TO <E>PANEL 'A' AND RECONNECT TO DISTRIBUTION PANEL 'DP-A' EXISTING BRANCH BREAKER OF THE DEMOLISHED GENERATOR 'ATS'.
- PROVIDE AND INSTALL NEW 400 KW STANDBY DIESEL GENERATOR, 480/277V, 30, 4W, WITH LEVEL 2 ENCLOSURE AND WITH 1325 GALLON BASE TANK.
- PROVIDE AND INSTALL NEW 'ATS' 2000A, 4 POLES, NEMA-3R ZENITH 'ZBTS' BY GENERAL ELECTRIC (GE) ZENITH CONTROLS. COORDINATE WITH EQUIPMENT
- PROVIDE AND INSTALL 3/4" X 10' GROUNDING ROD WITH 3/4"C. 1#3/0 GND. AND SHALL BE BONDED TO THE EXISTING MAIN SWITCHBOARD 'MS' GROUNDING SYSTEM. FIELD VERIFY EXACT LOCATION OF EXISTING GROUNDING.
- FURNISH AND INSTALL (4) SETS OF 4"C. (4)#750 KCMIL + #250 KCMIL GND. FIELD COORDINATE POINT OF CONNECTIONS.
- 6. FURNISH AND INSTALL (2) SETS OF (4)#600 KCMIL + 1#1/0 GND. UTILIZING EXISTING (2) 4"C. STUB-OUT FROM THE "ATS" TO THE GENERATOR. FIELD VERIFY EXACT LOCATIONS OF CONDUIT STUB-OUTS.
- FURNISH AND INSTALL NEW NEMA 3R 100AMP POWER PANEL "PP1" WITH BUILT-IN 30KVA, 480V - 120/208V, 3PH, 4W TRANSFORMER AND 24 BRANCH CIRCUITS LOAD CENTER.





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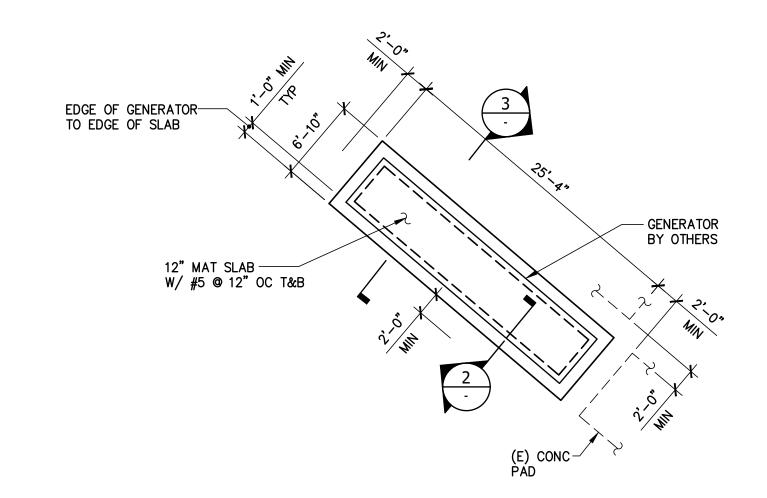
SINGLE LINE DIAGRAM - NEW

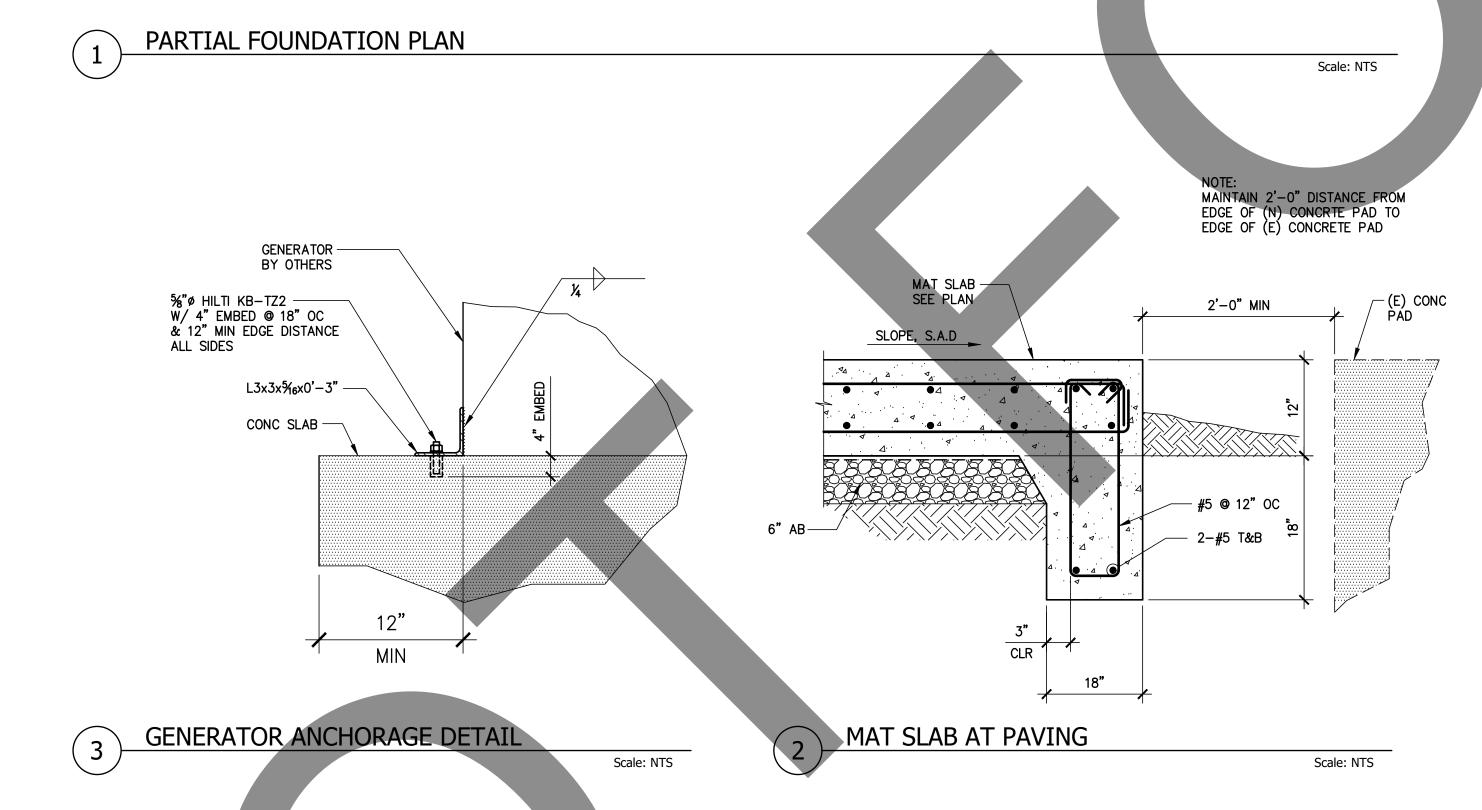
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- 7. MINIMUM CONCRETE COVER FOR REINFORCING STEEL:
 - A. SURFACES PLACED AGAINST EARTH 3"
 - B. FORMED SURFACES BELOW GRADE 2"
 - C. SURFACES EXPOSED TO WEATHER 2"
 - D. BEAM AND COLUMN BARS (INCLUDING STIRRUPS OR TIES) 1½"
 - E. EXTERNAL WALL AT EXTERIOR FACE 1½" FOR #5 OR SMALLER
 - F. SLABS NOT EXPOSED TO WEATHER 1"

FINISH: SLABS ACI 301 "FLOATED FINISH". U.O.N.

- 8. W AND WT SECTIONS: ASTM A992.
- 9. PLATES: ASTM A36 (UON ON DETAILS).
- 10. CHANNELS AND ANGLES, ASTM A36, U.O.N.
- 11. HSS: ASTM A500, GRADE B.
- 12. PIPES: ASTM A53, GRADE B.
- 14. MACHINE BOLTS: ASTM A307.

13. HIGH STRENGTH BOLTS: ASTM A325N, UON.

- 15. ANCHOR BOLTS / RODS: ASTM F1554, GR. 36. UON
- 16. WELDING ELECTRODES: E-70XX.
- 17. STEEL DECK: ASTM A653, GRADE 33 MIN. 18. WELDED HEADED STUDS: ASTM A108, TYPE H4L BY NELSON OR EQUAL
- 19. ALL STEEL SHAPES AND PLATES AND STEEL DECKING EXPOSED TO WEATHER OR UNHEATED SPACES SHALL BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH G90 GALVANIZATION. TOUCH UP WELDED AREAS WITH GALV WELD REPAIR. PAINT EXPOSED SURFACES WITH EPOXY PAINT SYSTEMS AS REQUIRED BY ARCHITECTURAL DRAWINGS. CONFIRM WITH ARCHITECT FOR

20. ALL BOLT HOLES SHALL BE STANDARD SIZE HOLES, UON.

XPANSION ANCHORS

EXPANSION ANCHOR PULL TEST VALUES:

HILTI KWIK-BOLT TZ2 EXPANSION ANCHORS IN NORMAL-WEIGHT CONCRETE-CRACKED						
ANCHOR	MINIMUM EMBEDMENT DEPTH (in.) "hnom" MINIMUM EMBEDMENT CONC. THICKNESS (in.)		TENSION TEST	TORQUE TEST VALUE		
ANCHOR DIAMETER		CONC.	CONCRETE ST			
(in.)			3000	4000	(ft-lbs)	
3/8	25/16	4	1510	1740	30	
1/2	3%	6	3265	3785	50	
%	47/16	6	5215	6030	40	
3/4	5%6	8	6765	7825	110	

- 2. TYPICAL EXPANSION ANCHORS ARE CARBON STEEL HILTI KWIK BOLT TZ2. INSTALLATION SHALL COMPLY WITH ICC REPORTS ESR-4266.
- SPECIAL INSPECTION OF ANCHORS IS REQUIRED AND SHALL COMPLY WITH CBC CHAPTER 17. THE SPECIAL INSPECTOR MUST BE ON THE JOB SITE PERIODICALLY DURING ANCHOR STALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSION, CONCRETE STRENGTH AND TYPE, HOLE DIMENSION AND CLEANLINESS, ANCHOR SPACING AND EDGE DISTANCE, CONCRETE THICKNESS, ANCHOR EMBEDMENT AND TIGHTENING TORQUE.
- 4. ALLOWABLE LOADS SHOWN CORRESPOND TO 100% OF THE VALUES CALCULATED FROM CODE REPORT FOR SINGLE ANCHORS IN CRACKED CONCRETE, HIGH SEISMIC ZONE LOADS, TEMP. RANGE A/1, CONDITIONAL, WITHOUT EDGE DISTANCE OR SPACING EFFECTS.
- . WHEN INSTALLING DRILLED-IN ANCHORS IN EXISTING NON-PRESTRESSED REINFORCED CONCRETE, USE CARE AND CAUTION TO AVOID CUTTING OR DAMAGING THE EXISTING REINFORCING BARS. MAINTAIN A MINIMUM CLEARANCE OF ONE INCH BETWEEN THE REINFORCEMENT AND THE DRILLED-IN ANCHORS.
- TENSION TEST OR TORQUE TEST ANCHORS TO VALUES TABULATED ABOVE. TEST 10% OF ANCHORS USED FOR SILL PLATE BOLTING, 50% OF ANCHORS USED FOR EQUIPMENT ANCHORAGE, AND 100% OF ALL OTHER ANCHORS U.O.N. ON DRAWINGS TENSION-TESTED ANCHORS SHALL MAINTAIN THE TEST LOAD FOR A MINIMUM OF 15 SECONDS AND SHALL EXHIBIT NO DISCERNIBLE MOVEMENT DURING THE TENSION TEST; E.G. AS EVIDENCED BY LOOSENING OF THE WASHER UNDER THE NUT. TORQUE-TESTED ANCHORS MUST ATTAIN THE SPECIFIED TORQUE WITHIN 1/2 TURN OF THE NUT.
- 7. HOLE DRILLING AND CLEANING PROCEDURES SHALL BE FOLLOWED AS DETERMINED BY THE MANUFACTURER'S INSTRUCTIONS.

EPOXY ANCHORS

1. EPOXY ANCHOR PULL TEST VALUES:

PULL TEST VALUES FOR EPOXY ANCHORS IN CONCRETE					
THREADED ROD DIAMETER (in.)	REBAR SIZE	MIN. EMBED. (in.)	TENSION TEST VALUE (LBS)		
			CONCRETE STRENGTH (PSI)		
			2500	4000	
¾	#3	4	2030	2030	
1/2	#4	4½	3000	3000	
%	# 5	6	4850	4850	
3⁄4	#6	7	6500	6500	
7∕8	# 7	8	7500	7500	
1	#8	9	8030	8030	

- 2. EPOXY SHALL BE HILTI RE-500-SD OR SIMPSON STRONG-TIE'S SET-XP. INSTALLATION SHALL COMPLY WITH LATEST ICC REPORTS ESR-2322 ESR-2508.
- 3. CARBON STEEL THREADED RODS SHALL CONFORM TO ASTM A193 GRADE B7. REINFORCING BARS SHALL COMPLY WITH ASTM A615 GRADE 60.
- 4. SPECIAL INSPECTION OF ANCHORS IS REQUIRED AND SHALL COMPLY WITH CBC CHAPTER 17. THE SPECIAL INSPECTOR MUST BE ON THE JOB SITE PERIODICALLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSION, CONCRETE STRENGTH AND TYPE, HOLE DIMENSION AND CLEANLINESS, ANCHOR SPACING AND EDGE DISTANCE, CONCRETE THICKNESS, ANCHOR EMBEDMENT AND TIGHTENING TORQUE. THE SPECIAL INSPECTOR MUST VERIFY THE INITIAL INSTALLATIONS OF EACH TYPE AND SIZE BY CONSTRUCTION PERSONNEL
- 5. ALLOWABLE LOADS CORRESPOND TO 100% OF VALUES CALCULATED FROM CODE REPORT FOR SINGLE ANCHORS IN CRACKED CONCRETE, TEMPERATURE RANGE A/1, HIGH SEISMIC ZONE C, D, E, OR F, CONDITION A, WITHOUT EDGE DISTANCE, CONCRETE THICKNESS OR SPACING
- 6. WHEN INSTALLING DRILLED-IN ANCHORS IN EXISTING NON-PRESTRESSED REINFORCED CONCRETE, USE CARE AND CAUTION TO AVOID CUTTING OR DAMAGING THE EXISTING REINFORCING BARS. MAINTAIN A MINIMUM CLEARANCE OF ONE INCH BETWEEN THE REINFORCEMENT AND THE DRILLED-IN ANCHORS.
- 7. TENSION TEST ANCHORS TO VALUES TABULATED ABOVE. TEST 10% OF ANCHORS FOR SILL PLATE BOLTING, 50% OF ANCHORS USED FOR EQUIPMENT ANCHORAGE, AND 100% OF ALL OTHER ANCHORS UNLESS NOTED ON DRAWINGS. TENSION-TESTED ANCHORS SHALL MAINTAIN THE TEST LOAD FOR 15 SECONDS AND SHALL EXHIBIT NO DISCERNIBLE MOVEMENT DURING THE TENSION TEST; E.G. AS EVIDENCED BY LOOSENING OF THE WASHER UNDER THE NUT.
- 8. HOLE DRILLING AND CLEANING PROCEDURES SHALL BE FOLLOWED AS DETERMINED BY THE MANUFACTURER'S INSTRUCTIONS.

SPECIAL INSPECTION:

SPECIAL INSPECTION SHALL BE PROVIDED PER CBC SECTION 1704 & 1707 FOR THE FOLLOWING ITEMS. SUBMIT TEST REPORTS TO THE ARCHITECT, JURISDICTION AND OWNER.

1. INSTALLATION OF ALL EXPANSION ANCHORS AND EPOXY ANCHORS.

TESTING:

OWNER'S TESTING AGENCY SHALL PERFORM THE FOLLOWING TESTS AND SUBMIT TEST REPORTS TO THE ARCHITECT, JURISDICTION AND OWNER.

1. SUBMIT COMPLETE RECORD OF INSPECTION OF WORK FOR INSTALLATION OF EPOXY ANCHORS

GENERAL

- 1. SEE DRAWINGS OTHER THAN STRUCTURAL FOR: TYPES OF FLOOR FINISH AND THEIR LOCATION, FOR DEPRESSIONS IN FLOOR SLABS, FOR OPENINGS IN WALLS AND FLOORS REQUIRED BY ARCHITECTURAL AND MECHANICAL FEATURES, FOR STAIRS, CURBS, ETC.
- NO PIPES OR DUCTS SHALL BE PLACED IN SLABS OR WALLS UNLESS SPECIFICALLY DETAILED OR APPROVED BY THE ARCHITECT. DRAWINGS AND SPECIFICATIONS REPRESENT FINISHED STRUCTURE. CONTRACTOR SHALL BE
- RESPONSIBLE FOR MEANS AND METHODS OF CONSTRUCTION, INCLUDING BUT NOT LIMITED TO SHORING AND TEMPORARY BRACING. THE CONTRACTOR SHALL TAKE ALL NECESSARY MEASURES TO INSURE SAFETY OF ALL PERSONS AND STRUCTURES AT THE SITE AND ADJACENT TO THE SITE. OBSERVATION VISITS TO THE SITE BY THE ARCHITECT, ENGINEER OR CONSTRUCTION MANAGER SHALL NOT RELIEVE THE CONTRACTOR OF SUCH RESPONSIBILITY.
- 4. OMISSIONS OR CONFLICTS BETWEEN VARIOUS ELEMENTS OF THE DRAWINGS, NOTES, AND DETAILS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND RESOLVED BEFORE PROCEEDING WITH THE WORK.
- 5. DO NOT USE SCALED DIMENSIONS; USE WRITTEN DIMENSIONS. WHERE NO DIMENSION IS PROVIDED, CONSULT THE ARCHITECT FOR CLARIFICATION BEFORE PROCEEDING WITH THE WORK.
- IF CERTAIN FEATURES ARE NOT FULLY SHOWN OR CALLED FOR ON THE DRAWINGS OR SPECIFICATIONS, THEIR CONSTRUCTION SHALL BE OF THE SAME CHARACTER AS FOR SIMILAR CONDITIONS THAT ARE CALLED FOR OR SHOWN. ALL DETAILS REFERENCED ONCE SHALL APPLY ALL SIMILAR CONDITIONS.
- IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN ALL NECESSARY LICENSES AND PERMITS. THE CONTRACTOR SHALL CONFORM TO ALL STATE AND LOCAL LAWS GOVERNING THE
- ALL CONSTRUCTION TO BE PERFORMED IN A MANNER TO MINIMIZE IMPACT ON THE CONTINUING OPERATION OF THE BUILDING & SITE. CONTRACTOR TO PROVIDE APPROPRIATE
- BARRIERS AROUND CONSTRUCTION. COORDINATE ALL OPERATIONS WITH THE OWNER. THE CONTRACTOR SHALL VERIFY THE LOCATION OF EXISTING UTILITIES BEFORE BEGINNING WORK. SPECIAL CARE SHALL BE TAKEN TO PROJECT UTILITIES THAT ARE TO REMAIN IN
- 10. ALL FINISHES, STRUCTURAL ELEMENTS AND ARCHITECTURAL FEATURES AFFECTED BY
- 11. THE SCOPE OF WORK INCLUDES CLEANUP NECESSARY TO LEAVE THE BUILDING IN A NEAT AND USABLE CONDITION. ALL REMOVED ITEMS, MATERIALS AND DEBRIS, UNLESS OTHERWISE NOTED. SHALL BECOME THE PROPERTY OF THE DEMOLITION CONTRACTOR AND SHALL BE REMOVED PROMPTLY FROM THE SITE AND DISPOSED OF IN A LEGAL MANNER.

CONSTRUCTION TO BE REPAIRED AND/OR REPLACED TO MATCH EXISTING CONSTRUCTION.

EXISTING CONSTRUCTION

SERVICE DURING CONSTRUCTION.

- 1. WORK SHOWN IS NEW UNLESS NOTED AS EXISTING: (E).
- 2. THE CONTRACTOR SHALL VERIFY ALL EXISTING JOB CONDITIONS, REVIEW ALL DRAWINGS AND VERIFY DIMENSIONS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT OF ALL DISCREPANCIES AND EXCEPTIONS BEFORE PROCEEDING WITH THE WORK.
- 3. THE REMOVAL, CUTTING, DRILLING, ETC. OF EXISTING WORK SHALL BE PERFORMED WITH GREAT CARE AND SMALL TOOLS IN ORDER NOT TO JEOPARDIZE THE STRUCTURAL INTEGRITY OF THE BUILDING. IF STRUCTURAL MEMBERS OR MECHANICAL, ELECTRICAL, OR ARCHITECTURAL FEATURES NOT INDICATED FOR REMOVAL INTERFERE WITH THE NEW WORK. THE ARCHITECT SHALL BE IMMEDIATELY NOTIFIED AND PRIOR APPROVAL SHALL BE OBTAINED BEFORE REMOVAL OF MEMBERS.
- 4. THE CONTRACTOR SHALL SAFELY SHORE EXISTING CONSTRUCTION WHEREVER EXISTING SUPPORTS ARE REMOVED TO ALLOW THE INSTALLATION OF THE NEW WORK. ALL SHORING METHODS AND SEQUENCING OF DEMOLITION SHALL BE SPECIFIED BY A LICENSED STRUCTURAL ENGINEER TO BE RETAINED BY THE CONTRACTOR. SEE SPECIFICATIONS FOR DETAILED REQUIREMENTS.

DESIGN BASIS

- APPLICABLE CODE: CALIFORNIA BUILDING CODE, 2019 EDITION.
- 2. LATERAL DESIGN:
- WIND LOADS: DESIGN WIND: 125 MPH, EXPOSURE C
- SEISMIC LOADS:

INTERIOR LATERAL PRESSURE: 5 PSF

- OCCUPANCY CATEGORY IV SEISMIC IMPORTANCE FACTOR I=1.00
- SITE CLASS D SEISMIC DESIGN CATEGORY D
- $S_1 = 0.971g$
- $S_{DS} = 1.939a$ $S_{D1} = 1.1g$

 $F_{V} = 1.7$

- SEISMIC FORCE DEMAND ON NON-STRUCTURAL COMPONENTS SHALL COMPLY WITH ASCE 7-16, SECTION 13.3.1, EQUATION 13.3-1, 13.3-2, AND 13.3-3
- $Fph = 0.4ap S_{DS} Wp (1+2 z/h) < 1.6 S_{DS} I_P W_P$ $> 0.3 S_{DS} I_{P} W_{P}$
- $Fp_V = \pm 0.2S_{DS} W_P$
- $R_{P} = 2.5$

$\Omega_0 = 2$

FOUNDATIONS

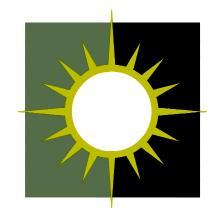
- 1. SIZES OF FOOTINGS AND ELEVATIONS AT BOTTOMS OF FOOTINGS HAVE BEEN ESTABLISHED
- BASED ON THE MINIMUM VALUES PER CBC. 2. AS EXCAVATION PROGRESSES, CONDITIONS MAY DEVELOP REQUIRING CHANGES IN THESE ELEVATIONS AND/OR FOOTINGS. SUCH CHANGES SHALL BE MADE ONLY AS DIRECTED BY THE SOILS ENGINEER.
- 3. ALLOWABLE SOIL BEARING PRESSURES ARE:
- A. DEAD + LIVE LOADS:
- B. DEAD + LIVE + SEISMIC LOADS: 2000 PSF
- 4. PERIMETER AND INTERIOR FOOTINGS SHALL EXTEND A MINIMUM OF 18 INCHES BELOW PAD SUBGRADE ELEVATION.
- 5. EXCAVATIONS SHALL BE MADE AS NEAR AS POSSIBLE TO THE NEAT LINES REQUIRED BY THE SIZE AND SHAPE OF THE STRUCTURE. NO MATERIAL IS TO BE EXCAVATED UNNECESSARILY.
- 6. ALL FOUNDATION EXCAVATIONS MUST BE REVIEWED AND APPROVED BY THE SOILS ENGINEER PRIOR TO PLACEMENT OF CONCRETE.
- 7. VERIFY LOCATION OF UNDERGROUND UTILITIES BEFORE EXCAVATION. NOTIFY ARCHITECT PRIOR TO EXCAVATION IN THE EVENT SUCH UTILITIES ARE ENCOUNTERED.
- 8. FOR DRAINAGE DETAILS, SUMPS, PITS, DAMP PROOFING, TRENCHES, CURBS, EXTERIOR WALKS, UTILITIES, EQUIPMENT DETAILS, STEPS, ETC., SEE DRAWINGS OTHER THAN STRUCTURAL.

CONCRETE

1. CONCRETE CLASSES:

1. 001	TORETE GEASSES.						
CLASS	USE	28-DAY STRENGTH (PSI)	AGGREGATE SIZE (INCH)	WEIGHT (PCF)		% FLY ASH	% SLA
Α	SLAB ON GRADE, PAD	3000	3/4	145	0.45	25	25

- 2. PROVIDE TYPE II PORTLAND CEMENT, TYP
- 3. CONCRETE MIXING SHALL COMPLY WITH ASTM C94.
- 4. ALL CONCRETE SHALL BE THOROUGHLY CONSOLIDATED.
- 5. REINFORCING STEEL:
- A. BARS: ASTM A615, GRADE 60.
- B. ALL CONCRETE SHALL BE REINFORCED UNLESS SPECIFICALLY MARKED "NOT REINFORCED"
- 6. TERMINATION OF REINFORCEMENT
- A. TERMINATE ALL BARS IN LAPS, 90 DEGREE BENDS, OR WITH DOWELS INTO EXISTING
- B. WELDED BARS: ASTM A706 GRADE 60
- C. BEND TOP FOOTING BARS DOWN TO BOTTOM MAT AT ENDS.
- D. BEND BOTTOM FOOTING BARS UP WITH STANDARD 90 DEGREE BENDS.
- E. PROVIDE DOWELS INTO FOOTINGS AT WALLS OF SAME SIZE AND SPACING AS WALL VERTICAL REINFORCEMENT.
- F. ALL REINFORCEMENT MAY LAP WITH COUPLERS WHICH ARE 125% OF BAR STRENGTH OR GREATER. TYPE 2 MECHANICAL COUPLER SHALL BE LENTON LOCK OR COUPLER BY ERICO, IAPMO ER-0129.



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MARK	DATE	
	04/22/21	95% CD 100% CD
	06/25/21	100% CD

SOBE PROJECT NO:	200154
DATE:	11/09/2
DRAWN BY:	вт
CHECKED BY:	RQ
APPROVED BY:	JK

SHEET TITLE

& DETAILS

GENERAL NOTES

THIS DRAWING IS 30" X 42" AT FULL SIZE

S1.0

AS NOTED