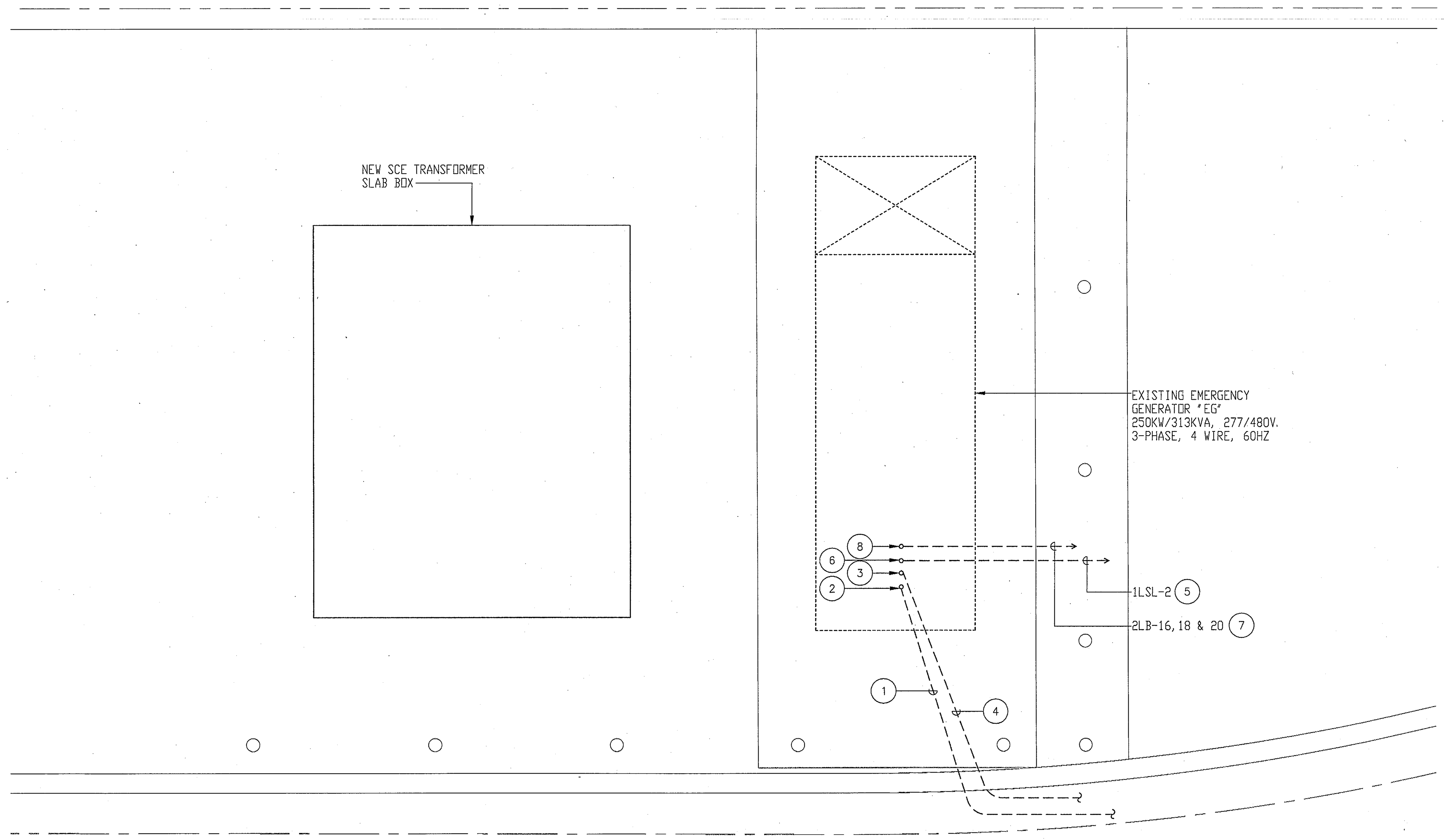

KEYNOTES

1. NEW FEEDER "GMDP" TO GENERATOR SWITCHBOARD. REFER TO SHEET E-1.1 FOR CONTINUATION.
2. CONNECT TO EXISTING GENERATOR CIRCUIT BREAKER. REFER TO RISER DIAGRAM, SHEET E-1.1.
3. CONNECT TO EXISTING GENERATOR CONTROLS.
4. (2)-1 1/4"C. TO "ATS2LS". REFER TO BLOCK DIAGRAM 4. SHEET E-0.2.
5. 2#10 AND 1#10 GRD. IN 3/4"C.
6. CONNECT TO EXISTING GENERATOR LIGHTS AND RECEPTACLE TO 120V LIFE SAFETY CIRCUIT.
7. 1#12, 2#8 PHASE CONDUCTORS 1#12 NEUTRAL CONDUCTOR AND 1#10 GRD WIRE IN 1 1/4"C.
8. CONNECT EXISTING GENERATOR CHARGER AND CRANKCASE HEATER TO 120V AND 208V NORMAL CIRCUITS.

INFORMATION OF EXISTING GENERATOR, UNIT #9057

MANUFACTURER I.D. ONAN
MODEL I.D. DQAB4960513
EQUIPMENT TYPE2002-ONAN-DQAB
DESCRIPTION 250KW GENERATOR
SERIAL NUMBER F10255375
CURRENT HOURS 229
OPERATIONS MANAGER COUNTY OF ORANGE
ORANGE COUNTY PUBLIC WORKS/FACILITY
OPERATIONS SUPERVISOR MR. MICHAEL DEUTSCH

GENERATOR CONDITION

THE GENERATOR IS IN GOOD CONDITION WITH LOW OPERATING HOURS (229) AND WAS UPGRADED IN 2007 WITH A CALIFORNIA AIR RESOURCES BOARD APPROVED PARTICULATE FILTER.

LOAD CAPACILITY

THE GENERATOR IS RATED 250KW/313KVA STANDBY WITH A DIESEL FUELLED 399HP CUMMINS ENGINE AND AN EPA TIER 1 RATING. ESTIMATED LOAD FOR THIS PROJECT CODE REQUIRED STANDBY EMERGENCY POWER IS 190 KVA. THIS IS ABOUT 60% OF THE TOTAL CAPACITY OF THIS GENERATOR. UNLESS SOME MAJOR NON-CODE REQUIRED LOADS ARE REQUIRED BY THE COUNTY. THE GENERATOR HAS ENOUGH CAPACITY TO SERVE THE NEEDS OF THIS PROJECT'S CODE REQUIRED EMERGENCY LOADS.

AQMD COMPLIANCE

THE EXISTING GENERATOR HAS A TIER 1 EPA RATING. THE INFORMATION PROVIDED BY THE COUNTY ON PARTICULATE FILTER UPGRADE DOES NOT DESCRIBE ANY IMPROVEMENTS TO THE TIER RATING BASED ON THIS MODIFICATION. THE GENERATOR MANUFACTURERS REPRESENTATIVE STATED THAT THIS GENERATOR CANNOT BE UPGRADED ECONOMICALLY TO A HIGHER TIER RATING. AN EXCEPTION THAT WOULD ALLOW THE USE OF THIS TIER 1 GENERATOR FOR THIS PROJECT IF THE OWNER AND THE ADDRESS DOES NOT CHANGE AND IF ALLOWED BY AQMD. COUNTY SHALL CONTRACT WITH THE CUMMINS REPRESENTATIVES, CUMMINS CAL PACIFIC, LLC (949) 253-6000 TO RESEARCH THE AQMD REQUIREMENTS FOR THIS SITUATION PRIOR TO COMMITTING TO THE REUSE OF THIS GENERATOR.

1.01 SCOPE OF WORK

WORK INCLUDED: ALL LABOR, MATERIAL APPLIANCES, TOOLS, EQUIPMENT, FACILITIES, TRANSPORTATION AND SERVICES NECESSARY FOR THE INCIDENTAL TO PERFORMING ALLOPERATIONS IN CONNECTION WITH FURNISHING, DELIVERY AND INSTALLATION OF THE WORK OF THIS SECTION, COMPLETE AS SHOWN ON THE DRAWINGS AND/OR SPECIFIED HEREIN. WORK INCLUDES, BUT IS NOT NECESSARILY LIMITED TO THE FOLLOWING:

1. EXAMINE ALL OTHER SPECIFICATION SECTIONS FOR WORK RELATED TO THOSE OTHER SECTIONS AND REQUIRED TO BE INCLUDED AS WORK UNDER THIS SCOPE OF WORK.
2. GENERAL PROVISIONS AND REQUIREMENTS FOR ELECTRICAL WORKS.

1.02 ENGINE GENERATOR REMOTE ALARM ANNUNCIATOR ALARM PANEL

A. GENERAL

1. A REMOTE MOUNTED ALARM ANNUNCIATOR PANEL IN A NEMA 1 FLUSH MOUNTED ENCLOSURE WITH CLEAR TAMPER RESISTANT LOCKING COVER DOOR, AT EACH LOCATION SHOWN ON THE DRAWINGS.

B. ANNUNCIATOR DISPLAY

1. THE ANNUNCIATOR SHALL INCLUDE THE FOLLOWING WITH APPROPRIATE SENSORS "SENDING" UNITS INSTALLED IN THE EXISTING ENGINE GENERATOR, FUEL SYSTEM AND ATS UNITS.
   - A. GENERATING: GENERATING POWER READFOR LOAD.
   - B. OVERCRANK: ELECTRIC PLANT FAILED TO START.
   - C. LOW OIL PRERSSURE: LOW ENGINE LUBE OIL PRESSURE.
   - D. HI ENG TEMP: PRE-ALARM AND FINAL EXCESSIVE COOLING WATER TEMPERATURE
   - E. LOW ENG TEMP: LOW ENGINE COOLING WATER JACKET TEMPERATURE.
   - F. OVERSPEED: EXCESSIVE RPM OF ELECTRIC PLANT.
   - G. LOW FUEL: PRE-ALARM AND FINAL LOW FUEL SUPPLY.
   - H. LOW BAT VOLTAGE: HIGH STARTING BATTERY VOLTAGE.
   - I. HI BAT VOLTAGE: HIGH STARTING BATTERY VOLTAGE.
   - J. WEAK STARTING BATTERY ALARM.
   - K. OVERVOLTAGE: GENERATOR OUTPUT OVERVOLTAGE.
   - L. FUEL FILL: FUEL STORAGE UNIT RUPTURE BASIN FUEL SPILL DETECTION.
   - M. LOW COOLANT: ENGINE LOW COOLANT LEVEL.
   - N. LOW OIL LEVEL: LOW ENGINE LUBE OIL LEVEL.
   - O. GENERATOR GROUND FAULT ALARM.

     1) ATS: CONNECTED TO NORMAL UTILITY SOURCE.
     2) ATS: CONNECTED TO GENERATOR SOURCE. ENGINE GENERATOR SUPPLYING MORE THAN ONE ATS SHALL INCLUDE THE FOLLOWING ADDITIONAL ALARM ANNUNCIATION FOR EACH INDIVIDUAL ATS.
     3) ATS: GENERATOR OVERLOAD SHED.

2. AUDIBLE ALERT:
   - A. AN AUDIBLE ALERT WILL SOUND WITH THE VISUAL SIGNALS, EXCEPT FOR CONDITIONS 1.A, 1.N.1 AND 1.N.2. A SWITCH WILL BE INCORPORATED TO SILENCE THE AUDIBLE ALARM UNTIL THE ALARM CONDITION IS CORRECTED. THE AUDIBLE ALARM SHALL THEN SOUND UNTIL THE SWITCH IS REPOSITIONED TO THE "NORMAL" POSITION.

1.03 LOAD BANK

A. GENERAL

1. EXISTING GENERATOR ENGINE SET SHALL BE PROVIDED WITH A RESISTIVE LOAD BANK, WHICH SHALL OPERATE CONNECTED TO THE GENERATOR ELECTRIC OUTPUT ONLY UNDER EXCERCISING FUNCTION OF THE ENGINE GENERATOR. THE TOTAL KW RATING OF THE LOAD RESISTORS SHALL BE NOT LESS THAN 50% OF THE FULL LOAD OUTPUT KW RATING OF THE GENERATOR TO WHICH IT IS CONNECTED , BUT IN NO CASE LESS THAN REQUIRED BY ENGINE GENERATOR MANUFACTURER TO MAINTAIN THE UNIT MANUFACTURER WARRANTY.
2. LOAD BANK SHALL BE HOUSE IN A NEMA 3R WEATHER PROTECTIVE ENCLOSURE, MOUNTED INTEGRALLY TO THE ENGINE ON THE FRONT OF THE RADIATOR, AND COOLED BY THE AIR FLOW ACROSS THE RADIATOR. PROVIDE AIR DUCT METAL FLANGES ON THE INLET AND EXHAUST SIDE OF THE LOAD BANK. THE LOAD BANK HOUSING SHALL BE RUST INHIBITED GALVANIZED STEEL AFTER FABRICATION, WITH MANUFACTURER'S STANDARD FINISH COLOR FINISH PAINT. THE LOAD BANK LOAD CHAMBER SHALL HAVE THE PHYSICAL DDIMENSIONS COORDINATED WITH RADIATOR'S DUCT FLANGE. THE RADIATOR FAN'S COOLING CAPACITY (AIR FLOW) AND ENGINE STANDBY RATING HORSEPOWER SHALL BE INCREASED AS NECESSARY TO PREVENT EXCESSIVE STATIC BACK PRESSURE BILD UP CAUSED BY THE LOAD BANK.
3. THE LOAD BANK RESISTORS SHALL BE MOUNTED IN FIELD REMOVABLE TRAYS FOR SERVICING CAPABILITY.
4. RESISTORS SHALL BE CONSTRUCTED OF HIGH TEMPERATURE ALLOY CAPABLE OF CONTINUOUS OPERATION AT 1920 DEG. FAHRENHEIT WITH A MELTING POINT OF 2750 DEG. FAHRENHEIT. THE RESISTORS SHALL BE AASEMBLED IN A THREE PAHSE ARRAY WITH THE PHASE TO PHASE RESISTOR CURRENT BALANCED WITHIN 2% AND AN OVERALL KW TOLERANCE WITHIN 5% OF ITS NOMINAL RATING.
5. A CIRCUIT BREAKER AND LOAD BANK CONNECTION CIRCUITS SHALL BE PROVIDED IN THE ENGINE GENERATOR SUPPLYING THE LOAD BANK. THE CIRCUIT BREAKER SHALL BE SIZED AT 125% OF THE FULL LOAD CURRENT OF THE LOAD BANK. PROVIDE FUSE PROTECTION FOR EACH INDIVIDUAL LOAD BANK SECTION.
6. PROVIDE AUTOMATIC ELECTRIC CONTACTORS AS REQUIRED TO ACTIVATE LOAD BANK IN THE EXCERCISING MODE. PROVIDE ALL CONTROL INTERLOCKS WITH THE ATS REQUIRED TO PROVIDE THE FOLLOWING FUNCTIONS:
   - A. ATS EXCERCISING TIMER STARTS GENERATOR AND BRINGS LOAD BANK ON LINE.
   - B. EXCERCISING FUNCTION OPERATES FOR PRE-SELECTED PERIOD OF TIME WITH LOAD BANK CONNECTED AT 100% OF LOAD BANK CAPACITY.
   - C. AT END OF EXCERCISE PERIOD, AND PRIOR TO THE ENGINE 'COOL DOWN' RUN OUT, THE LOAD BANK SHALL BE AUTOMATICALLY TAKEN OFF-LINE.
   - D. IF UTILITY POWER OUTAGE OCCURS DURING THE EXCERCISE PERIOD, THE LOAD BANK SHALL IMMEDIATELY BE DE-ENERGIZED (UNDER ANY OPERATING MODE) BEFORE THE EMERGENCY LOAD ATS CHANGE POSITION, GENERATOR SHALL CONTINUE TO RUN DURING THE DISCONNECT OF THE LOAD BANK.
   - E. PROVIDE A LOAD BANK 'ON-OFF-AUTOMATIC' SELECTOR SWITCH. THE SWITCH SHALL CONTROL THE OPERATIONAL FUNCTION OF THE LOAD BANK. THE 'ON' POSITION SHALL BYPASS AUTOMATIC OPERATION AND CONNECT THE LOAD BANK TO THE ENGINE GENERATOR ONLY WHEN THE GENERATOR IS 'RUNNING' AT STABILIZED VOLTAGE OUTPUT AND RATED RPM. THE 'ON' SWITCH POSITION SHALL NOT OVERRIDE THE AUTOMATIC DISCONNECT OF THE LOAD BANK IN THE EVENT OF A 'EMERGENCY POWER' GENERATOR OPERATION MODE. THE 'OFF' POSITION SHALL BY-PASS AUTOMATIC OPERATION, DISCONNECT THE LOAD BANK AND PREVENT AUTOMATIC OPERATION OF THE LOAD BANK.
   - F. PROVIDE RED (LOAD BANK CONNECTED) AND GREEN (LOAD BANK DISCONNECTED) INDICATING LIGHTS WITH 'PUSH-TO TEST' FOR EACH LOAD BANK STEP LOAD.
   - G. LOAD BANK SYSTEM SHALL BE AS MANUFACTURED BY LOAD TECHNOLOGY, INC. LA MIRADA, CALIFORNIA; AVTRON; SIMPLEX OR EQUAL.

1.04 EXCECUTION

ENGINE-GENERATOR TESTS

A. GENERAL

1. THE TESTS AHLL INCLUDE FULL LOAD TEST WITH A LOAD BANK OF ADEQUATE CAPACITY AND SHALL ASSURE PERFORMANCE OF ALL SPECIFIED FUNCTION TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE. PROVIDE FOUR COPIES OF COMPLETE TEST RECORDS. A COPY SHALL BE FRAMED AND MOUNTED IN THE UNIT BY THE CONTRACTOR. ALL SHOP LOAD TESTS SHALL BE RUN AT 80% LAGGING POWER FACTOR.
2. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY FACILITIES, FUEL, INSTRUMENTS AND EQUIPMENT, INCLUDING CAPACITY LOAD BANK REQUIRED FOR THE LOAD TESTS, AND ARRANGE FOR FINAL TEST RUN. FIELD TEST TO BE RUN AT UNITY POWER FACTOR WITH CONTRACTOR PROVIDED UNITY POWER FACTOR LOAD, AND FUEL.
   - A. GENERATOR SHALL START AND PICK UP FULL LOAD AT NORMAL VOLTAGE AND FREQUENCY WITHIN EIGHT SECONDS, FROM A COLD START.
   - B. LOAD TEST AT 0, 1/4, 1/2, 3/4, FULL LOAD AND 105% OVERLOAD UNTIL READINGS ARE CONTANT FOR 10 MINTES DURATION FOR EACH.
   - C. FOUR HOUR DURATION 100% CONTINUOUS FULL LOAD TEST AND CONDUCTED CONSECUTIVELY WITH THE ABOVE TEST.
3. THE CONTRACTOR SHALL INSTRUCT THE OWNER'S MAINTENANCE PERSONNEL IN THE OPERATION AND MAINTENANCE OF THIS EQUIPMENT. FOUR COMPLETE WRITTEN INSTRUCTIONS MANUALS, OPERATING SCHEDULES, PARTS, LIST, BLUEPRINTS, WIRING DIAGRAMS, MAINTENANCE AND REPAIR MANUALS INCLUDING ACTUAL PERFORMANCE CURVES SHALL BE SUBMITTED TO THE OWNER'S REPRESENTATIVE BEFORE FINAL APPROVAL.
4. PERFORM TESTS AS SPECIFIED AND AS REQUESTED BY THE OWNER'S REPRESENTATIVE TO PROVE INSTALLATION IS IN ACCORDANCE WITH CONTRACT REQUIREMENTS. PERFORM TEST IN THE PRESENCE OF THE OWNER'S REPRESENTATIVE, AND FRNISH ALL TEST EQUIPMENT, FACILTIES, AND TECHNICAL PERSONNEL REQUIRED TO PERFORM TESTS.
5. PROVIDE FULL FUEL TANK FUEL SUPPLY, PRIOR TO TRANSFERING ACCEPTANCE OF THE ENGINE GENERATOR TESTS INFORMATIONS AFTER COMPLETION OF THE TESTS.

B. COMMISSIONING

1. SET UP, TESTING START UP, AND COMMISSIONING SHAL BE PERFORMED BY THE A TRAINED TECHNICIAN, CERTIFIED AND AUTHORIZED BY THE EQUIPMENT MANUFACTURER AND THE ORANGE COUNTY PUBLIC WORKS. FINAL COMMISSIONING SHALL BE PERFORMED AFTER INSTALLATION AND CONNECTIONS ARE COMPLETE.
2. SIMULATE NORMAL SOURCE POWER FAILURE BY OPENING (TURN-OFF) BUILDING MAIN SERVICE DISCONNECT AND VERFY CONNECTIONS AND OPERATION OF EACH ELECTRICAL SYSTEM DEVICE CONNECTED TO THE ENGINE GENERATOR SYSTEM ON BOTH NORMAL SOURCE AND EMERGENCY POWER SOURCES. SIMULATED TEST TIME DURATION FOR OPERATING CONNECTED ON THE EMERGENCY SYSTEMS SHALL BE NOT LASS THAN 120 CONTINUOUS MINUTES WITHOUT FAILURE OR ANOMALIES IN THE SYSTEM OPERATION.
3. RECORD AND DOCUMENT ELECTRICAL DEMAND LOAD AND SEQUENCE OF OPERATIONS ON THE ENGINE GENERATOR SYSTEM WITH ALL CONNECTED LOADS OPERATING, INCLUDING BUT NOT LIMITED TO:
   - A. FIRE ALARMS
   - B. EGREE/EXIT LIGHTING
   - C. DOORS
   - D. AUTO-LOADING AND OVERLOAD SHEDDING CONTROLS
   - E. ELEVATOR
4. PROVIDE SYSTEM PROGRAMMING AND SET UP OF ALL CONTROL SEQUENCES AND RELATED EQUIPMENT INCLUDING BUT NOT LIMITED TO:
   - A. ATS
   - B. LIGHTING CONTROL SYSTEM
   - C. FIRE ALARM
   - D. HVAC
   - E. OTHER NON-CODE MANDATED ELECTRICAL LOADS
5. TEST ALL CONTROL SYSTEM FUNCTIONS AFTER THE INSTALLATION AND CONNECTIONS ARE COMPLETE AND THE SYSTEM HAS BEEN ENERGIZED. VERIFY EACH CONTROL SEQUENCE OF OPERATION AND EACH DEVICE TO BE CONTROLLED ARE EACH OPERATING CORRECTLY.
6. RECORD AND DOCUMENT EACH DEVICE SET UP AND PROGRAM SETTING.
7. SUBMIT WRITTEN REPORT (6 COPIES) TO OWNER'S REPRESENTATIVE CERTIFYING COMMISIONING HAS BEEN PERFORMED; ALL RESPECTIVE SYSTEMS ARE OPERATING CORRECTLY AND DOCUMENT ALL SOFTWARE SET UP AND EACH DEVICE SETTINGS.

1.05 ELECTRIC POWER AND CONTROL CIRCUITS

A. GENERAL

1. PROVIDE NEC CLASS-1, DIVISION-1 EXPLOSION-PROOF CONDUIT FITTINGS AND SEALS ON EACH CONDUIT ENTERING OR EXITING THE ENGINE GENERATOR LOCATION.
2. PROVIDE QUANTITY AND AWG CONDUCTOR SIZE/TYPE CAPACITY, CIRCUIT CONDUCTOR 'LUG' CONNECTION LANDINGS, COMPATIBLE WITH CONNECTIONS SHOWN ON THE DRAWINGS.
3. THE FINAL CONDUIT/RACEWAY CONNECTIONS TO ANY PART OF THE ENGINE GENERATOR FROM ANY "FIXED" LOCATION ENTRANCE TO THE ENGINE GENERATOR SHALL BE MADE WITH LIQUID-TIGHT FLEXIBLE RACEWAY. THE RACEWAY SHALL BE UL LABEL AND APPROVED FOR USE IN THE ATMOSPHERE ENVIRONMENT AT THE ENGINE GENERATOR, SHALL BE OIL AND FUEL RESISTANT.

B. ADDITIONAL CONDUIT HOMERUNS

1. PROVIDE THE FOLLOWING MINIMUM QUANTITY AND SIZE CONDUIT AND WIRE, TO CONNECT EMERGENCY GENERATOR, CONTROLS AND ANNUNCIATOR. INSTALL THE CONDUIT AND WIRE FROM THE ENGINE GENERATOR TO THE RESPECTIVE MONITORING AND CONTROL EQUIPMENT. REFER TO DRAWINGS FOR ADDITIONAL REQUIREMENTS. INSTALL CONDUIT UNDERGROUND AND/OR CONCEALED IN BUILDING STRUCTURE AT ALL LOCATIONS.

NOTE: COORDINATE EXISTING UNDERGROUND UTILITIES PRIOR TO DIGGING. SEE GENERAL NOTE 10, SHEET E-0.0.

EXISTING EMERGENCY GENERATOR PARTIAL SITE PLAN SCALE: 1/2"=1'-0" 1

0742 COUNTY OF ORANGE HEALTH CARE AGENCY 401 SOUTH TUSTIN STREET

County of Orange
OC PUBLIC WORKS
Architecture & Engineering

Revisions 0742 | Sym. | Descrip. | Date | By

Consultants: FBA ENGINEERING, Consulting Engineers, 3420 Irvine Avenue, Newport Beach, California 92660-3189, T: 949 852 9995 F: 949 852 1657, FBAengr.com, FBA # 446.025
Drawn ___ Chkd. ___ Date 11-26-09

A-E Seal

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Design ___ Chkd. ___ Date Nov. 26, 2009

Sht Title EXISTING EMERGENCY GENERATOR PARTIAL SITE PLAN
Project COUNTY OF ORANGE HEALTH CARE AGENCY 401 SOUTH TUSTIN STREET
401 SOUTH TUSTIN STREET ORANGE, CA 92866
PROJ. NO. 100-042-P210-4200

Plan No. 52333-03608

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