GENERAL NOTES

1. CONTRACTOR IS RESPONSIBLE TO OBTAIN A COMPLETE SET OF CONTRACT DOCUMENTS, ADDENDA, DRAWINGS, AND SPECIFICATIONS. PRIOR TO SUBMITTING PROPOSAL, CONTRACTOR SHALL EXAMINE ARCHITECTURAL, STRUCTURAL AND MECHANICAL CONSTRUCTION DRAWINGS AND SPECIFICATIONS AND SHALL HAVE VISITED THE CONSTRUCTION SITE. HE/SHE SHALL BE FAMILIAR WITH THE EXISTING CONDITIONS UNDER WHICH HE/SHE 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/HER PART. DETERMINE THE SEQUENCE OF CONSTRUCTION THROUGHOUT THE PROJECT, INCLUDING TEMPORARY FACILITIES AND CONNECTIONS REQUIRED FOR THE DURATION OF THE PROJECT.
2. ALL TEMPORARY CONNECTIONS SHALL BE CONSIDERED PART OF THIS CONTRACT AND NO EXTRA CHARGES WILL BE ALLOWED. THIS SHALL INCLUDE MINOR ITEMS OF MATERIAL OR EQUIPMENT NECESSARY TO MEET THE REQUIREMENTS AND INTENT OF THE PROJECT.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF PERSONS AND PROPERTY AND SHALL PROVIDE INSURANCE COVERAGE AS NECESSARY FOR LIABILITY, PERSONAL, AND PROPERTY DAMAGE, TO FULLY PROTECT THE OWNER, ARCHITECT, AND ENGINEER FROM ANY AND ALL CLAIMS RESULTING FROM THIS WORK.
4. THE CONTRACTOR SHALL PROVIDE TO THE ARCHITECT A CONSTRUCTION SCHEDULE OF ALL ELECTRICAL WORK. THE CONSTRUCTION SCHEDULE SHALL IDENTIFY ALL SIGNIFICANT MILESTONES WITH COMPLETION DATES.
5. THE CONTRACTOR SHALL MAINTAIN RECORD DRAWINGS AT THE PROJECT SITE INDICATING ALL MODIFICATIONS TO ELECTRICAL SYSTEMS. THE CONTRACTOR SHALL, AT THE CONCLUSION OF THE PROJECT, PROVIDE A SET OF REPRODUCIBLE (AUTOCAD), ACCURATE AND NEAT "AS-BUILT" DRAWINGS ACCEPTABLE TO THE ARCHITECT.
6. THESE DRAWINGS DO NOT REPRESENT THE EXACT LOCATIONS, SIZES OR EXTENT OF UTILITIES ON SITE. CONTRACTOR SHALL TAKE STANDARD PRECAUTIONS FOR WORK IN EXISTING FACILITIES.
7. EXISTING ELECTRICAL WIRING WHICH WILL NOT BE MADE OBSOLETE AND WHICH WILL BE DISTURBED DUE TO CONSTRUCTION CHANGES REQUIRED BY THIS CONTRACT SHALL BE RESTORED TO OPERATING CONDITION, AS REQUIRED AND/OR DIRECTED. WHERE REQUIRED, SHOWN AND/OR DIRECTED, OUTLETS AND CONDUIT RUNS SHALL BE RELOCATED. IN SOME CASES IT MAY BE NECESSARY TO EXTEND CONDUITS AND PULL IN NEW WIRING OR INSTALL JUNCTION BOXES AND SPLICE IN NEW WIRING OR REPLACE OLD WIRING WITH NEW.
8. CERTAIN REMODELING OF ELECTRICAL FACILITIES WILL BE REQUIRED IN THE EXISTING BUILDING. EXISTING CONDUIT RUNS ARE GENERALLY NOT SHOWN, ALTHOUGH A FULL ATTEMPT HAS BEEN MADE TO SHOW SOME EXISTING CONDITIONS, OF WHICH INFORMATION HAS BEEN TAKEN FROM EXISTING RECORD DRAWINGS AND/OR LIMITED FIELD INVESTIGATIONS. THE DRAWINGS SHOWING LOCATION OF EXISTING EQUIPMENT, OUTLETS, FIXTURES, ETC., ARE APPROXIMATE ONLY (CONTRACTOR TO FIELD VERIFY).
9. ALL ELECTRICAL MATERIALS AND EQUIPMENT SHALL BE NEW AND SHALL BE LISTED AND LABELED BY A NATIONALLY RECOGNIZED TESTING LABORATORY AND SHALL BE INSTALLED AS PER LISTING OR LABELING (IE. MAXIMUM FUSE SIZE MEANS FUSE PROTECTION IS REQUIRED).
10. ALL ELECTRICAL EQUIPMENT AND INSTALLATION SHALL COMPLY WITH THE FOLLOWING REQUIREMENTS:
    a. AMERICAN STANDARD ASSOCIATION (ASA)
    b. AMERICAN NATIONAL STANDARD INSTITUTE (ANSI)
    c. AMERICAN SOCIETY OF TESTING MATERIALS (ASTM)
    d. CALIFORNIA CODE OF REGULATIONS TITLE 24 (CCR)
    e. INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS (IEEE)
    f. INSULATED POWER CABLE ENGINEERS ASSOCIATIONS (IPCEA)
    g. NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATIONS (NEMA)
    h. NATIONAL FIRE PROTECTION AGENCY (NFPA)
    i. ALL LOCAL CODE HAVING JURISDICTION
11. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS, FEES, AND INCIDENTAL COSTS NECESSARY FOR EXECUTION AND COMPLETION OF ELECTRICAL WORK, INCLUDING ALL CHARGES BY STATE, COUNTY AND LOCAL GOVERNMENTAL AGENCIES. CONTRACTOR SHALL BE RESPONSIBLE FOR THE ELECTRICAL UTILITY SYSTEM SHUT-DOWNS AND START-UP. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION REQUIRED WITH OTHER AGENCIES AND UTILITY COMPANIES.
12. CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL CROSSINGS ON NEW UTILITIES WITH THAT OF EXISTING ON SITE AND IN ADJACENT PROPERTIES. NOTIFY THE ENGINEER IMMEDIATELY OF ANY DEVIATIONS OR DISCREPANCIES FROM THIS PLAN.
13. CONTRACTOR SHALL COORDINATE HIS/HER WORK WITH OTHER TRADE ON SITE. ANY COST TO PERFORM WORK TO ACCOMPLISH SAID COORDINATION WHICH DIFFERS FROM THE WORK AS SHOWN ON THE DRAWINGS SHALL BE INCURRED BY THE CONTRACTOR. ANY DISCREPANCIES, AMBIGUITIES OR CONFLICTS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT DURING BID TIME FOR CLARIFICATIONS. ANY SUCH CONFLICTS NOT CLARIFIED PRIOR TO BID SHALL BE SUBJECT TO THE INTERPRETATION OF THE ARCHITECT/ENGINEER AT NO ADDITIONAL COST TO THE OWNER.
14. COORDINATE WITH OTHER TRADES AS TO THE EXACT LOCATION OF THEIR RESPECTIVE EQUIPMENT. PROVIDE POWER AND CONNECTION TO MOTORS AND EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS AS INDICATED ON ELECTRICAL DRAWINGS AND DRAWINGS OF OTHER TRADES. CONTRACTOR SHALL REVIEW DRAWINGS OF OTHER TRADES FOR CONTROL DIAGRAMS, SIZE AND LOCATION OF EQUIPMENT. DISCONNECT SWITCHES, STARTERS, AND CONDUITS FOR CONTROL WIRING FOR MECHANICAL AND PLUMBING EQUIPMENT SHALL BE PROVIDED BY ELECTRICAL CONTRACTOR. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING MANUFACTURER'S SHOP DRAWINGS PRIOR TO ROUGHING IN ALL CONDUITS TO THIS EQUIPMENT.
15. BEFORE ROUGH-IN, VERIFY ALL MOUNTING HEIGHTS AND EXACT LOCATIONS FOR ALL EQUIPMENT, ELECTRICAL CONNECTIONS, STUB-UPS, RECEPTACLES, OUTLETS, CONDUIT RUNS, ETC. WITH ARCHITECT AND OWNER. PLACE DEVICES LOCATED ABOVE COUNTERS, SHELVING, ETC. AND IN BATHROOMS SO AS NOT TO CONFLICT WITH EDGES OF WAINSCOTING, COUNTER SPLASH, SHELVING, ETC. ARCHITECTURAL DRAWINGS SHALL GOVERN. REFER TO ARCHITECTURAL ELEVATIONS FOR EXACT LOCATIONS OF ELECTRICAL DEVICES
16. MOUNTING HEIGHTS OF ALL CONTROL DEVICES TO BE USED BY OCCUPANT OF THE ROOM OR AREA SHALL BE MOUNTED AT THE FOLLOWING HEIGHTS:
    RECEPTACLES OUTLETS : +18" (TO BOTTOM OF OUTLETS)
    TELEPHONE/TV/DATA OUTLETS : +18" (TO BOTTOM OF OUTLETS)
    LIGHT SWITCHES : +44" (TO HIGHEST OPERABLE PART)
    OUTLETS ABOVE COUNTER : +44" (TO HIGHEST OPERABLE PART)
    MOUNTING HEIGHTS OF ALL DEVICES AND EQUIPMENT ARE FROM FINISHED FLOOR TO LOCATION OF DEVICE AS NOTED. EQUIPMENT INSTALLED IN LOCATIONS NOT APPROVED BY THE ARCHITECT SHALL BE RELOCATED AS DIRECTED BY THE ARCHITECT AT NO ADDITIONAL COST TO THE OWNER.
17. COORDINATE ALL OUTLET BOX INSTALLATION WITH ARCHITECTURAL WALL FINISH SCHEDULES. SPACE BETWEEN FACEPLATE AND DEVICE BOX SHALL NOT EXCEED 1/8".
18. FOR RENOVATION WORK, THE CONTRACTOR SHALL CONCEAL ALL WORK WHERE POSSIBLE. ALL EXPOSED RACEWAY AND BOXES IN OCCUPIED AREAS OR ON EXTERIOR WALLS SHALL BE PAINTED TO MATCH ADJACENT FINISHES.
19. 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 ELECTRICAL WORK UNDER THE TERMS OF THIS SPECIFICATION. CLOSE ALL OPENINGS, REPAIR ALL SURFACES, ETC., AS REQUIRED.
20. SEAL ALL CONDUIT PENETRATIONS THROUGH FIRE RATED WALLS AND CEILINGS. FURNISH AND INSTALL FIRE RATED BACKBOXES AS REQUIRED, MAINTAINING FIRE RATING OF CEILING OR WALLS WHERE RECESSED ELECTRIC EQUIPMENT SUCH AS LIGHT FIXTURES, SWITCHES, RECEPTACLES, PANEL, ETC. ARE INSTALLED IN RATED WALL OR CEILINGS. PENETRATIONS OF FIRE RATED WALLS, CEILINGS, OR FLOORS SHALL COMPLY WITH CBC CHAPTER 7 (714) REQUIREMENTS. CONDUIT PENETRATIONS THAT ARE NOT STUBBED-OUT INSIDE THE WALL SHALL MEET F AND T RATING. ALL FIRE PROOFING METHODS SHALL BE UL APPROVED.
21. ALL EXTERIOR EQUIPMENT SHALL BE NEMA 3R RATED. ALL WALL PENETRATIONS TO EXTERIOR WALLS SHALL BE SEALED WATER TIGHT.
22. PULLING TAPES: ALL RACEWAY WITHOUT CABLE OR WIRE SHALL BE INSTALLED WITH A MINIMUM 1100 LBS. STRENGTH TEST POLYESTER PULLING TAPE. PULLING TAPES SHALL BE DETECTABLE MULE-TAPE WITH SEQUENTIAL FOOTAGE MARKING.
23. RUN NO MORE THAN 3 CURRENT CARRYING CONDUCTORS IN ANY WIREWAY UNLESS DE-RATING IS APPROVED BY ENGINEER OR SHOWN ON DRAWINGS.
24. ALL BRANCH CIRCUIT CONDUCTORS SHALL BE COPPER, #12 AWG MINIMUM, RATED FOR 600V, THHN/THWN, 75 DEGREE CELSIUS. CONDUCTORS #12 AWG AND SMALLER SHALL BE SOLID. CONDUCTOR #10 AWG AND LARGER SHALL BE STRANDED. SYSTEM VOLTAGE SHALL BE IDENTIFIED AS TO VOLTAGE AND PHASE CONNECTIONS BY MEANS OF COLOR IMPREGNATED INSULATION OR APPROVED COLORED MARKING TAPE.
25. WHERE MULTI-HOMERUNS ARE INDICATED ON DRAWINGS INDICATING THE SAME CIRCUIT NUMBER, PROVIDE A JUNCTION BOX ABOVE THE ACCESSIBLE CEILING AND ROUTE ONE SET OF WIRES TO THE CIRCUIT BREAKER.
26. REFER TO THE SINGLE LINE DIAGRAM FOR THE CONDUIT AND CONDUCTOR SIZES HOMERUN TO ELECTRICAL PANELS. CONDUIT RUNS MAY NOT BE SHOWN ON DRAWINGS, BUT ARE PART OF THIS CONTRACT.
27. ALL CONDUIT RUNS INCLUDING STRAIGHT FEEDER AND BRANCH CIRCUIT SHALL BE PROVIDED 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 ON THE DRAWINGS.
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 PROVIDE MATERIAL AND EQUIPMENT COMPATIBLE WITH EQUIPMENT ACTUALLY SUPPLIED.
29. DO NOT COMBINE DIFFERENT SYSTEM VOLTAGES IN SAME CONDUIT (EG., 120/208V VS. 277/480V), UNLESS APPROVED BY ENGINEER OR SHOWN ON DRAWINGS.
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 ACCOMMODATE.
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 NECESSARY TO RESTORE DAMAGED SURFACES TO EQUAL OR BETTER THAN ORIGINAL CONDITIONS EXISTING AT THE START OF WORK.
35. ALL ELECTRICAL EQUIPMENT SHALL BE BRACED OR ANCHORED TO RESIST HORIZONTAL FORCE ACTING IN ANY DIRECTION IN ACCORDANCE WITH THE REQUIREMENTS OF THE LATEST EDITION OF ASCE.
36. ELECTRICAL METALLIC TUBING (EMT) WITH EMT COMPRESSION FITTINGS SHALL BE ALLOWED FOR ALL EXTERIOR AND INTERIOR APPLICATIONS.
37. CONNECTIONS TO VIBRATING EQUIPMENT (MOTOR, TRANSFORMER ENCLOSURE, ETC.) AND SEISMIC SEPARATIONS SHALL BE PROVIDED WITH LIQUID-TIGHT FLEXIBLE STEEL CONDUIT WITH WATERTIGHT CONNECTORS. MAXIMUM LENGTH OF CONDUIT SHALL BE SIX FEET, UNLESS OTHERWISE NOTED.
38. POLYVINYL CHLORIDE (PVC) SCHEDULE 40 MAY BE INSTALLED BENEATH SLAB AND UNDERGROUND INSTALLATION. INSTALL PVC COATED RIGID STEEL CONDUIT FOR TRANSITION FROM UNDERGROUND TO ABOVE GRADE INSTALLATION.
39. CONTRACTOR SHALL PROVIDE TERMINATIONS FOR ALL DATA/VOICE CABLES INDICATED AT OUTLET LOCATIONS INDICATED ON DRAWINGS.
40. CONTRACTOR SHALL PROVIDE AND INSTALL ACCESS PANELS IN NON-ACCESSIBLE CEILINGS WHERE REQUIRED TO ACCESS ELECTRICAL EQUIPMENT IN CEILING SPACE. ACCESS DOORS SHALL HAVE FIRE RATING EQUAL TO THE CEILING ASSEMBLY IN WHICH THEY ARE INSTALLED.
41. ALL FIRE LIFE SAFETY EQUIPMENT, SUCH AS FIRE ALARM CONTROL PANEL AND REMOTE POWER SUPPLIES SHALL BE PROVIDED WITH DEDICATED CIRCUITS. IDENTIFY CIRCUIT DESIGNATION AND PROVIDE PERMANENT LABELING, "FIRE ALARM CIRCUIT" ON ELECTRICAL PANEL. PROVIDE LOCKABLE CIRCUIT BREAKER.
42. CONTROL CONDUIT FOR ENERGY/BUILDING MANAGEMENT SYSTEM (E/BMS) SHALL BE PROVIDED AND INSTALLED BY ELECTRICAL CONTRACTOR.
43. ROUTE CONDUIT PARALLEL AND PERPENDICULAR TO WALLS AND ADJACENT PIPING. ARRANGE CONDUIT TO MAINTAIN HEADROOM AND TO PRESENT A NEAT APPEARANCE.
44. WHEN A DISCREPANCY IN QUANTITY OR SIZE OF CONDUIT, WIRE, EQUIPMENT, CIRCUIT BREAKERS, ETC., ARISES ON THE DRAWINGS OR SPECIFICATIONS, CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL MATERIAL REQUIRED BY THE MOST STRINGENT CONDITIONS NOTED ON THE DRAWINGS OR IN THE SPECIFICATIONS TO PROVIDE A COMPLETE AND OPERABLE SYSTEM, OR AS DIRECTED BY ENGINEER.
45. FOR SMALL AC MOTORS NOT HAVING BUILT-IN THERMAL OVERLOAD PROTECTION, PROVIDE MANUAL MOTOR STARTERS WITH OVERLOAD HEATER ELEMENTS SIZED PER MANUFACTURER'S RECOMMENDATION. FOR SMALL AC MOTORS WITH BUILT-IN THERMAL OVERLOAD PROTECTION, PROVIDE A HORSEPOWER RATED TOGGLE DISCONNECT SWITCH.
46. DISCONNECT SAFETY SWITCHES SHALL BE HEAVY DUTY AND BE RATED FOR THE NUMBER OF POLES, VOLTAGE, CURRENT AND HORSEPOWER RATING AS REQUIRED. PROVIDE FUSE PROTECTION BASED ON THE MOTOR NAMEPLATE RATINGS.
47. PROVIDE PERMANENT IDENTIFICATION (NAMEPLATES) FOR ALL ELECTRICAL PANELS, SWITCHBOARDS, MOTOR CONTROL CENTERS, DISCONNECT SWITCHES, TRANSFORMERS, TERMINAL CABINETS, ETC.
48. ELECTRICAL CONTRACTOR IS RESPONSIBLE TO VERIFY TYPE OF CEILING SYSTEMS AND TO FURNISH APPROVED LIGHTING FIXTURES OF THE TYPE REQUIRED FOR MOUNTING IN SUBJECT CEILING. PROVIDE ALL NECESSARY MOUNTING KIT/HARDWARE TO PROVIDE A COMPLETE WORKING LIGHTING SYSTEM.
49. ALL FINAL ELECTRICAL CONNECTIONS TO OWNER FURNISHED EQUIPMENT SHALL BE MADE BY THE ELECTRICAL CONTRACTOR.
50. ALL SPLICES AND TERMINALS SHALL BE COMPRESSION TYPE, OF SEAMLESS PURE COPPER, TIN PLATED, LONG BARREL, INSPECTION WINDOW, TERMINALS WITH TWO-HOLE PAD (WITH NEMA DRILLING). CLEAN ALL SURFACES AND INSTALL WITH OXIDE INHIBITING COMPOUND BURNDY PENETROX-E OR EQUAL. APPLY COMPOUND BETWEEN BUS BAR AND LUG PAD AND BETWEEN CONDUCTOR AND LUG BARREL. INSTALL COMPRESSION CONNECTORS WITH A FULLY CIRCUMFERENTIAL COMPRESSION DIE BURNDY HYPRESS OR EQUAL.
51. LABEL ALL CONDUIT WHERE IT BEGINS, AND WHERE IT TERMINATES INTO A BOX, PANEL, DEVICE, LOAD, OR DISCONNECT. CONDUIT SHALL BE LABELED EVERY 30 FEET OR LESS. CONDUIT SHALL BE LABELED WHERE IT PENETRATES ANY WALL OR FLOOR. LABEL SHALL BE PERMANENT PRINTED LABELS (DESCRIBING SOURCE, CIRCUIT, AND LOAD) LEGIBLE FROM FLOOR WHERE POSSIBLE (STANDING POSITION).
52. CONTRACTOR'S FAILURE TO ORDER OR RELEASE ORDER FOR MATERIALS AND/OR EQUIPMENT WILL NOT BE ACCEPTED AS A REASON TO SUBSTITUTE ALTERNATE MATERIALS, EQUIPMENT OR INSTALLATION METHODS.
53. PROVIDE ARC-FLASH HAZARD WARNING LABELS ON ALL AFFECTED ELECTRICAL EQUIPMENT, INCLUDING SWITCHBOARDS, PANEL BOARDS, INDUSTRIAL CONTROL PANELS, METER SOCKET ENCLOSURES, AND MOTOR CONTROL CENTERS. MARKING SHALL BE LOCATED SO AS TO BE CLEARLY VISIBLE TO QUALIFIED PERSONS. LABEL SHALL BE FACTORY PRE-PRINTED OR MACHINE-PRINTED SELF-ADHESIVE VINYL MATERIAL; UV, CHEMICAL, WATER, HEAT AND ABRASION RESISTANT; PRODUCED USING MATERIALS RECOGNIZED BY UL 969. MINIMUM SIZE: 3.5 BY 5 INCHES.
54. UNLESS OTHERWISE NOTED, ARRANGE, PAY FOR, COORDINATE AND PROVIDE ALL PERMITS NECESSARY FOR A COMPLETE AND OPERABLE SYSTEM.

ELECTRICAL SYMBOLS

- DATA OUTLET, FLUSH MOUNT IN WALL W/ 1" C., UON
- TELEPHONE OUTLET, FLUSH MOUNT IN WALL W/ 1" C., UON
- DUPLEX RECEPTACLE 20A, 125V, 3WG, NEMA 5-20R
- GFI — DUPLEX GFI RECEPTACLE, ABOVE COUNTER SPLASH
- BRANCH CIRCUIT WIRING IN CONDUIT EXPOSED ON ROOF OR BUILDING EXTERIOR.
- BRANCH CIRCUIT WIRING IN CONDUIT CONCEALED UNDER FLOOR OR UNDERGROUND
- BRANCH CIRCUIT HOME RUN TO PANEL. CONCEALED IN CEILING SPACE OR WHERE POSSIBLE.
- CIRCUIT BREAKER
- #, # — REFERENCE SHEET NOTE.
- 1 / E4.01 — DETAIL TAG. REFER TO DETAIL 1 ON SHEET E4.01.
- ELECTRICAL PANEL
- FUSED DISCONNECT SWITCH
- PULLBOX, SEE SITE PLAN FOR SIZE
- PD — CONCRETE PEDESTAL
- CONDUIT STUBUP
- LEGRAND OUTDOOR POWER GROUND BOX, MODEL NO. XB814C520BK 2-GANG,20A GFI RECEPTACLE FOR POWER
- LEGRAND OUTDOOR SIGNAL GROUND BOX, MODEL NO. XB814CLVBK 2-GANG, LOW VOLTAGE BOX WITH SIGNAL COMMUNICATION PORTS.
- SINGLE HEAD LIGHT FIXTURE AND POLE
- DOUBLE HEAD LIGHT FIXTURE AND POLE
- PB — UNDERGROUND POWER AND SIGNAL PULLBOX
- TRANSFORMER
- J — JUNCTION BOX
- FUSE
- G — GROUND WELL; CHRISTY G05T W/GROUND ROD

ELECTRICAL ABBREVIATIONS

A	AMPS
AC	ALTERNATING CURRENT
AF	AMP FRAME
AFF	ABOVE FINISH FLOOR
ALT	ALTERNATE
AT	AMP TRIP
AWG	AMERICAN WIRE GAUGE
BC	BARE COPPER
BP	BLUE PHONE
C	CONDUIT
CLG	CEILING
CKT	CIRCUIT
C.O.	CONDUIT ONLY
COMM	COMMUNICATION
DC	DIRECT CURRENT
DSW	FUSED DISCONNECT SWITCH
<E>	EXISTING
ELEC	ELECTRICAL
EM	EMERGENCY
EMH	ELECTRICAL MAN-HOLE
<F>	FUTURE
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
FATC	FIRE ALARM TERMINAL CABINET
FT	FEET
G	GROUNDING CONDUCTOR
GFI	GROUND FAULT INTERRUPTER
GND	GROUND
IDF	INTERMEDIATE DISTRIBUTION FRAME
INT	INTERIOR
INTLTS	INTERIOR LIGHTS
IPC	INTEGRATED POWER CENTER
IRR	IRRIGATION
KVA	KILOVOLT AMPS
LCP	LIGHTING CONTROL PANEL
LIU	LIGHTING GUIDE INTERCONNECTION UNIT
LTG	LIGHTING
LTS	LIGHTS
MIC	MICROPHONE
MIN	MINIMUM
MSB	MAIN SWITCHBOARD
MM	MULTI MODE
<N>	**NEW (BOLD)**
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
P	POWER
PB	PULLBOX
PC	PATCH CORD
PH	PHONE
PD	PEDESTAL
PLTS	PATHWAY LIGHTING
PNL	PANEL
PRKLTS	PARKING LIGHTS
PTC	POLE AT TENNIS COURT
PV	PHOTOVOLTAIC
PWR	POWER
<R>	REMOVE
<RRN>	REMOVE AND REPLACE WITH NEW
RPS	REMOTE POWER SUPPLY
RR	RESTROOM
REC	RECEPTACLE
S	SIGNAL
SB	SCOREBOARD
SEC	SECURITY CAMERA
SLD	SINGLE LINE DIAGRAM
SLTS	SPORTS FIELD LIGHTS
SPK	SPEAKER
SS	SOUND SYSTEM
SWBD	SWITCHBOARD
T	TRIP
TB	TICKET BOOTH
TC	TIME CLOCK
TEL	TELECOM
TS	TIMING SYSTEM
TYP	TYPICAL
UG	UNDERGROUND
UON	UNLESS OTHERWISE NOTED
V	VOLTS
VOIP	VOICE OVER INTERNET PROTOCOL
W	WIRE, WATTS
WP	WEATHERPROOF
XFMR	TRANSFORMER

PHOTOGRAPHIC CONSTRUCTION RECORDS

THE CONTRACTOR SHALL PROVIDE PRECONSTRUCTION DIGITAL PHOTOGRAPHS AND VIDEO RECORDINGS PRIOR TO COMMENCEMENT OF WORK ON THE SITE. BEFORE CONSTRUCTION MAY START, CONTRACTOR SHALL DOCUMENT ANY EXISTING CONDITIONS THAT ARE NOT COVERED BY THE CONTRACT DOCUMENTS (DAMAGED CONCRETE, WALLS, LANDSCAPE, ETC.). FAILURE TO DOCUMENT EXISTING DAMAGE WILL RESULT IN CONTRACTOR REPAIRS TO SURFACE TO MATCH ADJACENT AFTER CONSTRUCTION ACTIVITIES. ADDITIONAL PRECONSTRUCTION PHOTOGRAPHS/VIDEOS SHALL BE TAKEN AT LOCATIONS TO BE DESIGNATED BY THE OWNER'S REPRESENTATIVE.

CONTRACTOR SHALL MAKE A VIDEO RECORDING OF ALL PROPOSED ROUTINGS FOR INFRASTRUCTURE WORK, NOTING CONDITIONS OF EXISTING SURFACES AND ADJACENT IMPROVEMENTS. ONE COPY OF COMPLETE VIDEO SHALL BE TRANSMITTED TO THE OWNER'S REPRESENTATIVE.

CONSTRUCTION PHOTOGRAPHS

THE CONTRACTOR SHALL PROVIDE CONSTRUCTION PHOTOGRAPHS SHOWING THE PROGRESS OF THE WORK AND AS MAY BE DIRECTED BY THE OWNER'S REPRESENTATIVE. PHOTOGRAPHS/VIDEOS SHALL BE FORMATTED, IDENTIFIED, AND DELIVERED AS DESCRIBED ABOVE FOR DIGITAL PHOTOS AND VIDEOS. STARTING ONE MONTH AFTER THE DATE OF THE PRECONSTRUCTION PHOTOGRAPHS AND CONTINUING AS LONG AS THE WORK IS IN PROGRESS, APPROXIMATELY 40 MONTHLY PHOTOGRAPHS SHALL BE TAKEN, CATALOGED AND CROSS REFERENCED TO DRAWINGS/PLANS.

ANY WORK TO BE CONCEALED (BURIED, BEHIND WALLS, ABOVE CEILING, BELOW SLAB, ETC.) SHALL BE PHOTO DOCUMENTED AFTER ANY TESTING AND INSPECTION AND PRIOR TO CONCEALING TO CLEARLY INDICATE THE WORK. DOCUMENT ON PLANS THE LOCATION AND ORIENTATION FOR EACH PHOTO DOCUMENTING CONCEALED WORK.

FOR FINAL COMPLETION, DOCUMENT ALL PUNCH LIST ITEM COMPLETION BY PHOTOGRAPH OR VIDEO.

DELIVER CONSTRUCTION PHOTOGRAPHS AND VIDEOS WITHIN 10 DAYS OF CREATION. ALL PHOTOS AND VIDEOS SHALL BE OF SUFFICIENT QUALITY TO CLEARLY DEPICT WORK.

APPLICABLE CODES

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

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
7. CALIFORNIA HISTORICAL BUILDING CODE, (PART 8, TITLE 24): 2019
8. CALIFORNIA FIRE CODE (PART 9, TITLE 24): 2018 IFC WITH 2019 CA AMENDMENTS
9. CALIFORNIA EXISTING BUILDING CODE (PART 10, TITLE 24): 2019 (2018 INTERNATIONAL EXISTING BUILDING CODE WITH 2019 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, 2016 EDITION

SUMMARY OF WORK

1. FURNISH AND INSTALL 60kW DIESEL GENERATOR WITH BELLY TANK (GENERAC OR APPROVAL EQUAL).
2. RELOCATE <E>ATS AND INSTALL AT NEW LOCATION. (COORDINATE WITH COUNTY FOR EXISTING ATS LOCATION AND TRANSPORTING REQUIREMENT.)
3. MODIFY MAIN SWITCHBOARD FOR EMERGENCY POWER CONNECTION PER PLAN. RE-CERTIFY UL LISTING AS REQUIRED.
4. PROVIDE UNDERGROUND PULL BOXES AND CONDUITS FOR GENERATOR AND FUELING STATION. COORDINATE WITH CIVIL FOR EXACT LOCATION. PERFORM UNDERGROUND UTILITY SCANNING PRIOR TO ANY GROUND WORK.
5. PROVIDE POWER (PANELS/RACK/CONDUITS/WIRING ETC.) PER PLAN FOR FUELING STATION. EXPLOSION PROOF EQUIPMENT/DEVICES SHALL BE PROVIDED AT SHADED AREA PER PLAN, AND PER CODE REQUIREMENT. COORDINATE WITH FUEL STATION MANUFACTURER FOR EXACT REQUIREMENT.
6. SUBMIT PLAN TO AQMD FOR GENERATOR AND FUELING STATION PERMIT. SUBMIT PLAN TO AHJ (INCLUDING FIRE DEPARTMENT) FOR PERMIT.
7. CONTRACTOR IS RESPONSIBLE FOR ALL PERMITS/CERTIFICATIONS/TESTING FEE.
8. CONTRACTOR SHALL BE RESPONSIBLE TO ANCHOR ALL EQUIPMENT PER CALIFORNIA SEISMIC REQUIREMENT.

ELECTRICAL SHEET INDEX

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REGISTERED PROFESSIONAL ENGINEER — CHI KIT CHAN — No. E18090 — ELECTRICAL — STATE OF CALIFORNIA

COUNTY OF SAN BERNARDINO

VICTORVILLE FLEET MAINTENANCE BUILDING

15000 TOKAY STREET
VICTORVILLE, CA 92395

SBC VICTORVILLE GENERATOR & FUEL STATION

ISSUE

MARK	DATE	DESCRIPTION
	04/29/20	100% CD SET
	10/23/20	100% CD REVISED SET
	02/18/21	100% CD SET

SOBE	
PROJECT NO:	1901457
DATE:	04/29/20
DRAWN BY:	CAD
CHECKED BY:	BN
APPROVED BY:	AC

SHEET TITLE

ELECTRICAL NOTES, SYMBOLS & ABBREVIATIONS

SCALE: AS NOTED
THIS DRAWING IS 24" x 36" AT FULL SIZE

E-0

K:\drawings\County of San Bernardino\1901457 Victorville Fuel Infrastructure\1901457E-0.DWG 2/18/2021 9:04 PM Mario Gobea

THIS DRAWING IS 24" X 36" AT FULL SIZE. 12" X 18" AT HALF SIZE.

0 1 2 3 4 5 10 — 1/2" = 1'-0"

0 1 2 3 4 5 10 15 20 — 1/4" = 1'-0"

0 5 10 15 20 25 — 1/8" = 1'-0"

0 10 20 30 60 90 — 1" = 30'-0"

0 50 100 150 — 1" = 50'-0"

SPECIFICATIONS

GENERAL PROVISIONS:

1. FURNISH ALL LABOR, MATERIALS, APPARATUS, TOOLS, EQUIPMENT, TRANSPORTATION, TEMPORARY CONSTRUCTION AND SPECIAL OR OCCASIONAL SERVICES AS REQUIRED TO MAKE A COMPLETE WORKING ELECTRICAL INSTALLATION, AS SHOWN ON THE DRAWINGS OR DESCRIBED IN THESE SPECIFICATIONS.
2. STRUCTURAL MEMBERS SHALL IN NO CASE BE DRILLED, BORED OR NOTCHED IN SUCH A MANNER THAT WILL IMPAIR THEIR STRUCTURAL VALUE. CUTTING OF 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 TO 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 ELECTRICAL WORK WILL TAKE PLACE.
5. CONTRACTOR SHALL INSURE RECONNECTION OF EXISTING EQUIPMENT AND CIRCUITS AFFECTED 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:

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 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.
3. LIQUID TIGHT FLEXIBLE METAL CONDUIT SHALL BE FABRICATED IN CONTINUOUS LENGTHS 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.
   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 WITH CAST MALLEABLE IRON BODIES AND THREADED MALE HUBS WITH 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.
4. LOW VOLTAGE WIRING SHALL BE INSTALLED IN CONDUIT, MINIMUM 3/4" TRADE DIAMETER.
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 ARE 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 RUN 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 TO 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, STRANDED COPPER CONDUCTORS, SOFT DRAWN ANNEALED COPPER WIRE 98% CONDUCTIVITY, BEARING THE UL LABEL.
16. WIRE AND CABLE, 0 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:
   a. 120/240 VOLT, SINGLE PHASE, 3 WIRE SYSTEM. PHASE A - BLACK, PHASE B - 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 - 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.
19. SPLICING AND TERMINATING SHALL BE IN ACCORDANCE WITH CABLE MANUFACTURER'S PUBLISHED PROCEDURES. MAKE UP ALL SPLICES IN OUTLET BOXES WITH CONNECTORS AS SPECIFIED HEREIN WITH SEPARATE TAILS OF CORRECT COLOR TO BE MADE UP TO SPLICE. PROVIDE AT LEAST SIX (6) INCHES OF TAILS PACKED IN BOX AFTER SPLICE IS MADE UP. ALL WIRE AND CABLE IN PANELS, CONTROL CENTERS AND EQUIPMENT ENCLOSURES SHALL BE BUNDLED AND CLAMPED. ENCAPSULATE SPLICES IN EXTERIOR OUTLET, JUNCTION AND PULL BOXES USING INSULATING RESIN KITS. ALL SPLICES FOR EXTERIOR EQUIPMENT IN PUMP ROOMS SHALL BE MADE UP WATERTIGHT.
20. ROUTE WIRE AND CABLE AS REQUIRED TO MEET PROJECT CONDITIONS. WIRE AND 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 REQUIRED TO INSTALL CONNECTED DEVICES WITHIN 10 FT OF LOCATION SHOWN.
21. PROTECT EXPOSED CABLE FROM DAMAGE. SUPPORT CABLES ABOVE ACCESSIBLE CEILING, USING SPRING METAL CLIPS OR METAL CABLE TIES TO SUPPORT CABLES FROM STRUCTURE OR CEILING SUSPENSION SYSTEM. DO NOT REST CABLE ON CEILING PANELS. USE SUITABLE CABLE FITTINGS AND CONNECTORS. CLEAN CONDUCTOR SURFACES BEFORE INSTALLING LUGS AND CONNECTORS. MAKE 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 COVERS 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 SMALLER.
22. MAKE ELECTRICAL CONNECTIONS IN ACCORDANCE WITH EQUIPMENT MANUFACTURER'S INSTRUCTIONS. FOR CONDUIT CONNECTIONS TO EQUIPMENT USE FLEXIBLE CONDUIT. USE LIQUIDTIGHT FLEXIBLE CONDUIT WITH WATERTIGHT CONNECTORS IN DAMP OR WET LOCATIONS. CONNECT HEAT PRODUCING EQUIPMENT USING WIRE AND CABLE WITH INSULATION SUITABLE FOR TEMPERATURES ENCOUNTERED.
23. INSTALL SUITABLE STRAIN-RELIEF CLAMPS AND FITTINGS FOR CORD CONNECTIONS AT OUTLET BOXES AND EQUIPMENT CONNECTION BOXES. INSTALL DISCONNECT SWITCHES, CONTROLLERS, CONTROL STATIONS, AND CONTROL DEVICES TO COMPLETE EQUIPMENT WIRING REQUIREMENTS. INSTALL TERMINAL BLOCK JUMPERS TO COMPLETE EQUIPMENT WIRING REQUIREMENTS. INSTALL INTERCONNECTING CONDUIT AND WIRING BETWEEN DEVICES AND EQUIPMENT TO COMPLETE EQUIPMENT WIRING REQUIREMENTS.
24. INSTALL JUNCTION OR PULLBOXES WHERE REQUIRED TO LIMIT BENDS IN CONDUIT RUNS TO NOT MORE THAN 360 DEGREES OR WHERE PULLING TENSION ACHIEVED WOULD EXCEED THE MAXIMUM ALLOWABLE FOR THE CABLE TO BE INSTALLED. CONSULT WIRE AND CABLE MANUFACTURER.
25. SECURELY FASTEN DEVICES INTO BOXES AND ATTACH APPROPRIATE COVER PLATES. CAULK AROUND EDGES OR OUTDOOR DEVICE PLATES AND BOXES WHEN ROUGH WALL SURFACES PREVENT RAINTIGHT SEAL. USE CAULKING MATERIALS APPROVED BY ENGINEER. FIREPROOF AROUND OPENING OF DEVICES LOCATED OR PENETRATING FIRERATED CONSTRUCTION ASSEMBLIES. FIREPROOF AROUND OPENING OF DEVICES LOCATED OR PENETRATING FIRERATED CONSTRUCTION ASSEMBLIES.
26. FURNISH AND INSTALL ENGRAVED LEGEND OF EACH SWITCH THAT CONTROLS EXHAUST FANS, MOTORS, EQUIPMENT SYSTEMS, ETC. NOT LOCATED WITHIN SIGHT OF THE CONTROLLING SWITCH.
27. MOUNT RECEPTACLES VERTICALLY WITH U-SHAPED GROUND POSITION, GROUND PIN SHALL BE FACING DOWN. DO NOT COMBINE GFCI PROTECTED CIRCUITS WITH OTHER CIRCUITS IN THE SAME RACEWAY. LIMIT NUMBER OF GFI PROTECT CIRCUITS IN ANY ONE RACEWAY TO A MAXIMUM OF ONE (1) CIRCUIT.
28. FUSES SHALL BE INSTALLED AND SIZED AS NOTED ON PLANS AND AS REQUIRED PER MANUFACTURER. BE SURE TO OBSERVE MAXIMUM BRANCH CIRCUIT FUSE SIZE LABELS.
29. GROUND NON-CURRENT CARRYING METAL PARTS OF ELECTRICAL EQUIPMENT ENCLOSURES, FRAMES, CONDUCTOR RACEWAYS OR CABLE TRAYS TO PROVIDE A LOW IMPEDANCE PATH FOR LINE-TO-GROUND FAULT CURRENT AND TO BOND ALL NON-CURRENT CARRYING METAL PARTS TOGETHER. INSTALL A GROUND 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 GROUNDED. SIZE GROUND CONDUCTORS PER NEC 250 UNLESS LARGER CONDUCTORS ARE SHOWN ON THE DRAWINGS. MOTORS SHALL BE CONNECTED TO EQUIPMENT GROUND CONDUCTORS WITH A CONDUIT GROUNDING BUSHING AND WITH A BOLTED SOLDERLESS LUG CONNECTION ON THE METAL FRAME.
30. GROUNDING CONDUCTORS SHALL BE IDENTIFIED WITH GREEN INSULATION, EXCEPT WHERE A BARE GROUND CONDUCTOR IS SPECIFIED. MEASURE GROUND RESISTANCE, SHALL BE 5 OHMS OR LESS.
31. INSTALL RACEWAY COUPLINGS, FITTINGS AND TERMINATIONS SECURE AND TIGHT TO INSURE GOOD GROUND CONTINUITY. PROVIDE INSULATED GROUNDING BUSHING AND BONDING JUMPER WHERE METAL RACEWAY IS NOT DIRECTLY ATTACHED TO EQUIPMENT METAL ENCLOSURE AND AT CONCENTRIC KNOCK-OUTS.
32. CONDUIT TERMINATING IN CONCENTRIC KNOCKOUTS AT PANELBOARDS, CABINETS AND GUTTERS SHALL HAVE INSULATED GROUNDING BUSHINGS AND BONDING JUMPERS INSTALLED INTERCONNECTING ALL SUCH CONDUITS AND THE PANELBOARD CABINET, GUTTER, ETC.
33. PANELBOARDS SHALL HAVE COPPER BUSSING, COPPER GROUND BAR AND DOOR-IN-DOOR TRIM.
34. PROVIDE COMPUTER TYPED PRINTED PANEL SCHEDULE OR CIRCUIT DIRECTORY TO AFFECTED PANELBOARDS AND SWITCHBOARD.
35. FURNISH AND INSTALL PERMANENT ENGRAVED LEGEND OF EACH CIRCUIT BREAKER AT SWITCHBOARD/SWITCHGEAR FOR GENERATOR (STANDBY POWER SOURCE).

TESTING:

1. AT COMPLETION OF JOB, CHECK VOLTAGE AT SEVERAL POINTS OF UTILIZATION ON THE SYSTEM WHICH HAS BEEN INSTALLED UNDER THIS CONTRACT. DURING TEST, ENERGIZE ALL LOADS INSTALLED. MEASURE 3-PHASE VOLTAGES AND NOTE PERCENTAGE DIFFERENCES.
2. CONTRACTOR SHALL PERFORM TESTS AS SPECIFIED TO PROVE INSTALLATION IS IN ACCORDANCE WITH CONTRACT REQUIREMENTS. TESTS SHALL BE CONDUCTED DURING THE CONSTRUCTION PERIOD AND AT COMPLETION TO DETERMINE CONFORMITY WITH APPLICABLE CODES AND WITH THESE SPECIFICATIONS. TESTS, IN ADDITION TO SPECIFIC SYSTEM TEST DESCRIBED ELSEWHERE, SHALL INCLUDE:

PERFORM TESTING AS DESCRIBED IN NETA ATS. INCLUDE TESTING OF 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 ENGINEER AT THE EXPENSE OF THE CONTRACTOR. TESTS SHALL BE PERFORMED AFTER REPAIRS, REPLACEMENTS, OR CORRECTIONS UNTIL SATISFACTORY PERFORMANCE IS DEMONSTRATED.

MEDIUM-VOLTAGE CABLES

PART 1 GENERAL:

1.01 SECTION INCLUDES:

A. Medium voltage cable.
B. Cable accessories.

1.02 REFERENCE STANDARDS:

A. IEEE C2 - National Electrical Safety Code; 2017.
B. IEEE 48 - IEEE Standard for Test Procedures and Requirements for Alternating-Current Cable Terminations Used on Shielded Cables Having Laminated Insulation Rated 2.5 kV through 765 kV or Extruded Insulation Rated 2.5 kV through 500 kV; 2009.
C. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; 2009.
D. NEMA WC 71 - Nonshielded Cables Rated 2001-5000 Volts for Use in the Distribution of Electric Energy; 2014.
E. NEMA WC 74 - 5-46 kV Shielded Power Cable for Use in the Transmission and Distribution of Electric Energy; 2012.
F. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2017.
G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.03 SUBMITTALS:

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide for cable, terminations, and accessories.
C. Sustainable Design Documentation: Submit manufacturer's product data on conductor and cable showing compliance with specified lead content requirements.
D. Project Record Documents: Record actual sizes and locations of cables.
E. Certificate of Compliance: Indicate approval of installation by authority having jurisdiction.
F. Maintenance Data: Include instructions for testing and cleaning cable and accessories.

1.04 QUALITY ASSURANCE:

A. Comply with NFPA 70.
B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience and with service facilities within 100 miles (160 km) of Project.
C. Products: Listed, classified, and labeled as suitable for the purpose intended.
D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS:

2.01 MEDIUM-VOLTAGE CABLE:

A. Medium Voltage Cable: NEMA WC 70 rubber insulated cable.
   1. Voltage: 5 kV, grounded.
   2. Conductor: Copper, compact round, stranded, with foil conductor shield.
   3. Construction: Single conductor with metal wire insulation shielding.

2.02 CABLE ACCESSORIES:

A. Cable Terminations: IEEE 48, Class 2 porcelain insulator cable terminator in kit form.

PART 3 EXECUTION:

3.01 EXAMINATION:

A. Verify that conduit, duct, trench, or manholes are ready to receive cable.
B. Verify that field measurements are as indicated.
C. Cable routing is shown in approximate locations unless dimensioned. Route as required to complete wiring system.

3.02 INSTALLATION:

A. Avoid abrasion and other damage to cables during installation.
B. Use suitable lubricants and pulling equipment.
C. Sustain cable pulling tensions and bending radii below recommended limits.
D. Ground cable shield at each termination and splice.

3.03 FIELD QUALITY CONTROL:

A. Inspect exposed cable sections for physical damage.
B. Inspect cable for proper connections as indicated.
C. Inspect shield grounding, cable supports, and terminations for proper installation.
D. Inspect and test in accordance with NETA ATS, except Section 4.

END OF SECTION

County of San Bernardino
BUILDING AND SAFETY
THE PLANS AND DETAILS HAVE BEEN
REVIEWED
FOR CODE COMPLIANCE
THE REVIEW OF THESE PLANS SHALL NOT BE CONSTRUED TO BE A PERMIT FOR ANY VIOLATION OF ANY CODE OR ORDINANCE OF THIS COUNTY
By
Date 03/15/2021
THESE PLANS SHALL BE ON THE JOB FOR ALL REQUESTED INSPECTIONS

REVIEWED
FOR
CODE COMPLIANCE
Mar 12, 2021
INTERWEST CONSULTING GROUP

SALAS O'BRIEN
expect a difference
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SHEET 09 OF 13

K:\drawings\County of San Bernardino\1901457 Victorville Fuel Infrastructure\1901457E-1.dwg 2/18/2021 9:04 PM Mario Gobea

GENERATOR SPECIFICATION

GENERAL PROVISIONS:

1. FURNISH ALL LABOR, MATERIALS, APPARATUS, TOOLS, EQUIPMENT, TRANSPORTATION, TEMPORARY CONSTRUCTION AND SPECIAL OR OCCASIONAL SERVICES AS REQUIRED TO MAKE A COMPLETE WORKING ELECTRICAL INSTALLATION, AS SHOWN ON THE DRAWINGS OR DESCRIBED IN THESE SPECIFICATIONS.
2. GENERAL

2.1.DESCRIPTION OF SYSTEM & SITE

2.1.1. PROVIDE A 80 KW STANDBY POWER SYSTEM TO SUPPLY ELECTRICAL POWER AT 120/208 VOLTS, 60 HERTZ, THREE PHASE. THE GENERATOR SHALL CONSIST OF A LIQUID COOLED DIESEL ENGINE, A SYNCHRONOUS AC ALTERNATOR, AND SYSTEM CONTROLS WITH ALL NECESSARY ACCESSORIES FOR A COMPLETE OPERATING SYSTEM, INCLUDING BUT NOT LIMITED TO THE ITEMS AS SPECIFIED HEREINAFTER.

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

2.1.3. THE GENSET SHALL BE APPLIED AT THE LISTED AMBIENT AND ELEVATION. BIDDERS TO SUBMIT THE GENERATORS RATED POWER OUTPUT AT 115 AMBIENT (°F) AND 3500 ELEVATION (FT).

2.1.4. BIDDERS ARE TO SUBMIT THE GENSET'S SOUND LEVEL VERIFYING 72 DBA AT 23 FT BASED ON THE CONFIGURATION SPECIFIED.

2.2.REQUIREMENTS OF REGULATORY AGENCIES

2.2.1. 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 SOLD.

2.2.2. THE GENERATOR SET MUST CONFORM TO APPLICABLE NFPA REQUIREMENTS.

2.2.3. THE GENERATOR SET MUST BE AVAILABLE WITH THE UNDERWRITERS LABORATORIES LISTING (UL2200) FOR A STATIONARY ENGINE GENERATOR ASSEMBLY.

2.2.4. THE GENERATOR SET MUST MEET EPA FEDERAL EMISSION GUIDELINES FOR STATIONARY STANDBY POWER GENERATION.

2.3.MANUFACTURER QUALIFICATIONS

2.3.1. 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 SUPPLIER IS GENERAC INDUSTRIAL POWER, NO APPROVED EQUAL.

2.3.2. THE MANUFACTURER SHALL HAVE PRINTED LITERATURE AND BROCHURES DESCRIBING THE STANDARD SERIES SPECIFIED, NOT A ONE OF A KIND FABRICATION.

2.3.3. MANUFACTURER'S AUTHORIZED SERVICE REPRESENTATIVE SHALL MEET THE FOLLOWING CRITERIA:

- 2.3.3.1. CERTIFIED, FACTORY TRAINED, INDUSTRIAL GENERATOR TECHNICIANS
- 2.3.3.2. SERVICE SUPPORT 24/7
- 2.3.3.3. SERVICE LOCATION WITHIN 50 MILES
- 2.3.3.4. RESPONSE TIME OF 4 HOURS
- 2.3.3.5. SERVICE & REPAIR PARTS IN-STOCK AT PERFORMANCE LEVEL OF 95%
- 2.3.3.6. OFFER OPTIONAL REMOTE MONITORING AND DIAGNOSTIC CAPABILITIES

2.4.SUBMITTALS

2.4.1. ENGINE GENERATOR SPECIFICATION SHEET
2.4.2. CONTROLS SPECIFICATION SHEET(S)
2.4.3. INSTALLATION / LAYOUT DIMENSIONAL DRAWING
2.4.4. WIRING SCHEMATIC
2.4.5. SOUND DATA
2.4.6. EMISSION CERTIFICATION
2.4.7. WARRANTY STATEMENT

3. ENGINE

3.1.ENGINE RATING AND PERFORMANCE

3.1.1. 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.

3.1.2. THE ENGINE SHALL SUPPORT A 100% LOAD STEP.

3.1.3. THE GENERATOR SYSTEM SHALL SUPPORT GENERATOR START-UP AND LOAD TRANSFER WITHIN 10 SECONDS.

3.2.ENGINE OIL SYSTEM

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

3.2.2. THE ENGINE SHALL OPERATE ON MINERAL BASED OIL. SYNTHETIC OILS SHALL NOT BE REQUIRED.

3.2.3. THE OIL SHALL BE COOLED BY A OIL COOLER WHICH IS INTEGRATED INTO THE ENGINE SYSTEM.

3.3.ENGINE COOLING SYSTEM

3.3.1. 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.

3.3.2. 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.

3.3.3. 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.

3.3.4. A RADIATOR FAN GUARD MUST BE INSTALLED FOR PERSONNEL SAFETY THAT MEETS UL AND OSHA SAFETY REQUIREMENTS.

3.4.ENGINE STARTING SYSTEM

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

3.4.2. 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.

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

3.4.4. 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.

3.5.ENGINE FUEL SYSTEM

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

3.5.2. 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.

3.5.3. THE ENGINES SUCTION LINE SHALL BE FITTED WITH A CHECK VALVE TO SECURE PRIME FOR THE ENGINES INJECTION PUMP.

3.6.ENGINE CONTROLS

3.6.1. 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 ACCEPTABLE.

3.6.2. 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 PREVENT CORROSION.

3.6.3. 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%.

3.7.ENGINE EXHAUST & INTAKE

3.7.1. THE ENGINE EXHAUST EMISSIONS SHALL MEET THE EPA EMISSION REQUIREMENTS FOR STANDBY POWER GENERATION.

3.7.2. 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 WHEN INSTALLED.

3.7.3. 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.

3.7.4. 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.

3.7.5. THE ENGINE INTAKE AIR IS TO BE FILTERED WITH ENGINE MOUNTED, REPLACEABLE, DRY ELEMENT FILTERS.

4. ALTERNATOR

4.1.THE ALTERNATOR SHALL BE THE VOLTAGE AND PHASE CONFIGURATION AS SPECIFIED IN SECTION 1.1.1.

4.2.THE ALTERNATOR SHALL BE A 4 POLE, REVOLVING FIELD, STATIONARY ARMATURE, 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 PERMITTED IN THE ROTATING EXCITER.

4.3.THE ALTERNATOR SHALL INCLUDE A BRUSHLESS GENERATOR FOR EXCITATION SUPPORT.

4.4.THE ALTERNATOR SHALL SUPPORT 132 SKVA WITH A MAXIMUM VOLTAGE DIP OF 30 %.

4.5.SINGLE PHASE ALTERNATORS SHALL BE FOUR LEAD AND DEDICATED VOLTAGE DESIGNS. ALL LEADS MUST BE EXTENDED INTO A NEMA 1 CONNECTION BOX FOR EASY TERMINATION. A FULLY RATED, ISOLATED NEUTRAL CONNECTION MUST BE INCLUDED BY THE GENERATOR SET MANUFACTURER.

4.6.THE ALTERNATOR SHALL USE A SINGLE, SEALED BEARING DESIGN. THE ROTOR SHALL BE CONNECTED TO THE ENGINE FLYWHEEL USING FLEXIBLE DRIVE DISKS. THE STATOR SHALL BE DIRECT CONNECTED TO THE ENGINE TO ENSURE PERMANENT ALIGNMENT.

4.7.THE ALTERNATOR SHALL MEET TEMPERATURE RISE STANDARDS OF UL2200 (120 DEGREES C). THE INSULATION SYSTEM MATERIAL SHALL BE CLASS "H" CAPABLE OF WITHSTANDING 150 DEGREES C TEMPERATURE RISE.

4.8.THE ALTERNATOR SHALL BE PROTECTED AGAINST OVERLOADS AND SHORT CIRCUIT CONDITIONS BY ADVANCED CONTROL PANEL PROTECTIVE FUNCTIONS. THE CONTROL PANEL IS TO PROVIDE A TIME CURRENT ALGORITHM THAT PROTECTS THE ALTERNATOR AGAINST SHORT CIRCUITS. TO ENSURE PRECISION PROTECTION AND REPEATABLE TRIP CHARACTERISTICS, THESE FUNCTIONS MUST BE IMPLEMENTED ELECTRONICALLY IN THE GENERATOR CONTROL PANEL -- THERMAL MAGNETIC BREAKER IMPLEMENTATION ARE NOT ACCEPTABLE.

5. CONTROLS

5.1.THE GENERATOR CONTROL SYSTEM SHALL BE A FULLY INTEGRATED MICROPROCESSOR BASED CONTROL SYSTEM FOR STANDBY EMERGENCY ENGINE GENERATORS MEETING ALL REQUIREMENTS OF NFPA 110 LEVEL 1.

5.2.THE GENERATOR CONTROL SYSTEM SHALL BE A FULLY INTEGRATED CONTROL SYSTEM ENABLING REMOTE DIAGNOSTICS AND EASY BUILDING MANAGEMENT INTEGRATION OF ALL GENERATOR FUNCTIONS. THE GENERATOR CONTROLLER SHALL PROVIDE INTEGRATED AND DIGITAL CONTROL OVER ALL GENERATOR FUNCTIONS INCLUDING: ENGINE PROTECTION, ALTERNATOR PROTECTION, SPEED GOVERNING, VOLTAGE REGULATION 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 CONTROLLER'S THAT UTILIZE SEPARATE VOLTAGE REGULATORS AND SPEED GOVERNORS OR DO NOT PROVIDE SEAMLESS INTEGRATION WITH THE ENGINE MANAGEMENT SYSTEM ARE CONSIDERED LESS DESIRABLE.

5.3.COMMUNICATIONS SHALL BE SUPPORTED WITH BUILDING AUTOMATION VIA THE MODBUS PROTOCOL WITHOUT NETWORK CARDS. OPTIONAL INTERNET AND INTRANET CONNECTIVITY SHALL BE AVAILABLE.

5.4.THE CONTROL SYSTEM SHALL PROVIDE AN ENVIRONMENTALLY SEALED DESIGN INCLUDING ENCAPSULATED CIRCUIT BOARDS AND SEALED AUTOMOTIVE STYLE PLUGS FOR ALL SENSORS AND CIRCUIT BOARD CONNECTIONS. THE USE OF NON-ENCAPSULATED BOARDS, EDGE CARDS, AND PC RIBBON CABLE CONNECTIONS ARE CONSIDERED UNACCEPTABLE.

5.5.CIRCUIT BOARDS SHALL UTILIZE SURFACE MOUNT TECHNOLOGY TO PROVIDE VIBRATION DURABILITY. CIRCUIT BOARDS THAT UTILIZE LARGE CAPACITORS OR HEAT SINKS MUST UTILIZE ENCAPSULATION METHODS TO SECURELY SUPPORT THESE COMPONENTS.

5.6.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.

5.7.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 CAPABILITIES.

5.8.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.

5.9.THE CONTROL SYSTEM SHALL PROVIDE PRE-WIRED CUSTOMER USE I/O: 4 RELAY OUTPUTS (USER DEFINABLE FUNCTIONS), 4 CONTACT INPUTS, 2 ANALOG INPUTS, COMMUNICATIONS SUPPORT VIA RS232, RS485, OR AN OPTIONAL MODEM. ADDITIONAL I/O MUST BE AN AVAILABLE OPTION.

5.10. 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.

5.11. THE CONTROL PANEL SHALL INCLUDE A DIGITAL DISPLAY FOR 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.

6. ENGINE / ALTERNATOR PACKAGING

6.1.THE ENGINE/ALTERNATOR SHALL BE BOLTED DIRECTLY TO THE GENSET FRAME AND THE ENTIRE FRAME SHALL BE MOUNTED ON SPRING ISOLATORS. THE ENGINE/ALTERNATOR SHALL BE ISOLATED FROM THE GENERATOR FRAME WITH RUBBER ISOLATORS. THE PACKAGING SHALL NOT REQUIRE THE ADDITION OF EXTERNAL SPRING ISOLATORS.

6.2.A MAINLINE, THERMAL MAGNETIC CIRCUIT BREAKER CARRYING THE UL MARK SHALL BE FACTORY INSTALLED. THE BREAKER SHALL BE 100 % RATED 200 AMP TRIP. THE LINE SIDE CONNECTIONS ARE TO BE MADE AT THE FACTORY. OUTPUT LUGS SHALL BE PROVIDED FOR LOAD SIDE CONNECTIONS.

6.3.ENCLOSURE

6.3.1. THE GENSET SHALL BE PACKAGED WITH A LEVEL2 SOUND ATTENUATED WEATHERPROOF ENCLOSURE TO MEET THE 72 DBA SOUND LEVEL REQUIREMENT.

6.3.2. THE ENCLOSURE SHALL BE MADE OF STEEL WITH A MINIMUM THICKNESS OF 14 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 JS5000. 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.

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

6.3.4. THE ENCLOSURE SHALL UTILIZE AN UPWARD DISCHARGING RADIATOR HOOD. THIS MATERIAL MUST BE OF A SELF EXTINGUISHING DESIGN.

6.3.5. THE GENSET SILENCER SHALL NOT BE MOUNTED ON THE TOP OF THE ENCLOSURE DUE TO ARCHITECTURAL CONCERNS.

6.4.SUB-BASE FUEL TANK

6.4.1. THE PACKAGING SHALL INCLUDE A DOUBLE WALL, SUB-BASE MOUNTED, UL142 LISTED FUEL TANK. THE TANK SHALL BE 350 GALLON AND PROVIDE 56 HOURS OF RUN TIME AT FULL LOAD.

6.4.2. 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 ELECTRICAL CONDUIT ENTRY.

6.4.3. 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 LEVEL.

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

7. LOOSE ITEMS

7.1.SUPPLIER TO ITEMIZE LOOSE PARTS THAT REQUIRE SITE MOUNTING AND INSTALLATION. PREFERENCE WILL BE SHOWN FOR GENSETS THAT FACTORY MOUNT ITEMS LIKE MUFFLERS, BATTERY CHARGERS, ETC.
7.2.PROVIDE A 21 LIGHT REMOTE ANNUNCIATOR.
7.3.PROVIDE A BREAK GLASS REMOTE STOP SWITCH.

8. ADDITIONAL PROJECT REQUIREMENTS

8.3.FACTORY TESTING

8.3.1. 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:

- 8.3.1.1. VERIFY VOLTAGE & FREQUENCY STABILITY.
- 8.3.1.2. VERIFY TRANSIENT VOLTAGE & FREQUENCY DIP RESPONSE.

8.4.OWNER'S MANUALS

8.4.1. 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.

8.5.INSTALLATION

8.5.1. INSTALLATION WILL BE PROVIDED BY INSTALLATION CONTRACTOR.

8.6.SERVICE

8.6.1. SUPPLIER OF THE GENSET AND ASSOCIATED ITEMS SHALL HAVE PERMANENT SERVICE FACILITIES IN THIS TRADE AREA. THESE FACILITIES SHALL COMPRISE A PERMANENT FORCE OF EGSA CERTIFIED AND 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.

8.7.WARRANTY

8.7.1. 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. THIS WARRANTY MUST BE COMPREHENSIVE TYPE COVERAGE TO INCLUDE PARTS, LABOR, AND TRAVEL EXPENSES FOR THE FULL 10 YEAR COVERAGE TERM WHICH SHALL START AT THE TIME OF INITIAL FACTORY PROVIDED START AND TEST.

8.7.2. 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.

8.8.STARTUP AND CHECKOUT

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

- 8.8.1.1. ENSURING THE ENGINE STARTS (BOTH HOT AND COLD) WITHIN THE SPECIFIED TIME.
- 8.8.1.2. VERIFICATION OF ENGINE PARAMETERS WITHIN SPECIFICATION.
- 8.8.1.3. VERIFY NO LOAD FREQUENCY AND VOLTAGE, ADJUSTING IF REQUIRED.
- 8.8.1.4. TEST ALL AUTOMATIC SHUTDOWNS OF THE ENGINE-GENERATOR.
- 8.8.1.5. PERFORM A LOAD TEST OF THE ELECTRIC PLANT, ENSURING FULL LOAD FREQUENCY AND VOLTAGE ARE WITHIN SPECIFICATION BY USING BUILDING LOAD.

8.7.TRAINING

8.7.1. TRAINING IS TO BE SUPPLIED BY THE START-UP TECHNICIAN DURING COMMISSIONING. THE TRAINING SHOULD COVER BASIC GENERATOR OPERATION AND COMMON GENERATOR ISSUES THAT CAN BE MANAGED BY THE END-USER.

8.8.TESTING

8.8.1. GENERATOR SHALL BE TESTED IN ACCORDANCE WITH UL2200, AND INSTALLED IN ACCORDANCE WITH NFPA 37, AND ITS MANUFACTURER'S INSTALLATION INSTRUCTION PER CMC 1602.0.

REVIEWED
FOR
CODE COMPLIANCE
Mar 12, 2021
INTERWEST CONSULTING GROUP

County of San Bernardino
BUILDING AND SAFETY
THE PLANS AND DETAILS HAVE BEEN
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FOR CODE COMPLIANCE
THE REVIEW OF THESE PLANS SHALL NOT BE CONSTRUED TO BE A PERMIT FOR ANY VIOLATION OF ANY CODE OR ORDINANCE OF THE COUNTY
By
Date 03/15/2021
THESE PLANS SHALL BE ON THE JOB FOR ALL REQUESTED INSPECTIONS

SALAS O'BRIEN
|expect a difference|
305 South 11th Street
San Jose, California 95112-2218
877.725.2755 | 877.925.1477 (f)
WWW.SALASOBRIEN.COM
National **Strength.**
Local **Action.**

REGISTERED PROFESSIONAL ENGINEER
CHI KIT CHAN
No. E18090
ELECTRICAL
STATE OF CALIFORNIA

COUNTY OF SAN BERNARDINO

VICTORVILLE FLEET MAINTENANCE BUILDING

15000 TOKAY STREET
VICTORVILLE, CA 92395

SBC VICTORVILLE GENERATOR & FUEL STATION

ISSUE

MARK	DATE	DESCRIPTION
	04/29/20	100% CD SET
	10/23/20	100% CD REVISED SET
	02/18/21	100% CD SET

SOBE PROJECT NO:	1901457
DATE:	04/29/20
DRAWN BY:	CAD
CHECKED BY:	BN
APPROVED BY:	AC

SHEET TITLE

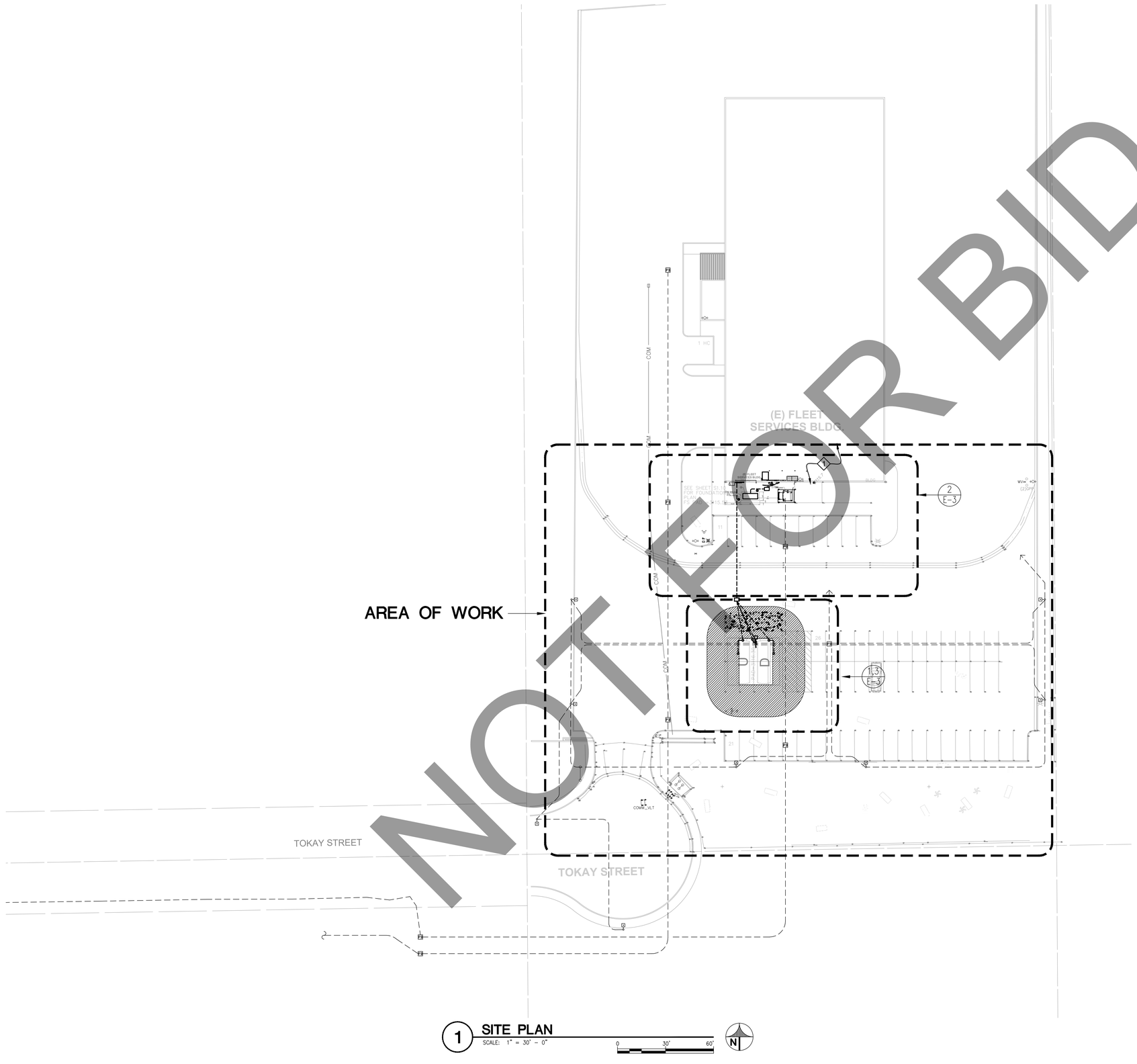
ELECTRICAL GENERATOR SPECIFICATION

SCALE: AS NOTED
THIS DRAWING IS 24" x 36" AT FULL SIZE

E-2
SHEET 09 OF 13

THIS DRAWING IS 24" X 36" AT FULL SIZE. 12" X 18" AT HALF SIZE.

1/2" = 1'-0" | 1/4" = 1'-0" | 1/8" = 1'-0" | 1" = 30'-0" | 1" = 30'-0"



1 SITE PLAN
SCALE: 1" = 30' - 0"

GENERAL SHEET NOTES

A. ALL UNDERGROUND SITE WORK CONDUIT TO BE BURIED MINIMUM 24" BELOW FINISH GRADE AND USE MIN. 3/4" CONDUIT U.O.N. SEE UNDERGROUND CONDUIT DETAIL FOR DIFFERENT INSTALLATION SCENARIOS.

B. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY IN NATURE AND IS NOT INTENDED TO SHOW EXACT CONDUIT ROUTING. THE ELECTRICAL CONTRACTOR SHALL DETERMINE, IN THE FIELD, THE BEST ROUTING TO AVOID ANY INTERFERENCE WITH UNDERGROUND UTILITIES OR OTHER EQUIPMENT. THE ELECTRICAL CONTRACTOR SHALL FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR INSTALLATION AND TERMINATION OF CONDUIT AND WIRING. CONTRACTOR SHALL HAVE UNDERGROUND UTILITIES SCANNING FOR PRIOR TO ANY GROUND BREAKING/SAWCUTING/BORING.

C. ALL UNDERGROUND CONDUITS FROM HAZARDOUS AREAS ENTERING THE BUILDING TO BE PROVIDED WITH EYS SEAL-OFFS AT POINTS OF ORIGIN AS WELL AS POINTS OF TERMINATION, AND SHALL BE LABELED WITH A METAL TAG AS TO THEIR ORIGIN.

D. ALL RIGID GALVANIZED STEEL (RGS) CONDUIT DIRECTLY BURIED IN GROUND SHALL BE PVC COATED. NO EXCEPTIONS.

CONDUIT SEAL-OFF FITTING NOTES

A. IF CONDUIT RUNNING FROM CLASS 1, DIVISION 2 HAZARDOUS AREA TO UNCLASSIFIED AREA, BOTH ENDS SHALL BE EQUIPPED WITH EYS EXPLOSION SEAL-OFF FITTING, NO EXCEPTION.

EMERGENCY POWER OFF (SHUTOFF) NOTE

A. EMERGENCY POWER OFF (SHUTOFF) SWITCH CONTROLS OPERATION OF FUELING CONTROLS EMERGENCY SHUTDOWN. PUSH-BUTTON OPERATOR IN SURFACE MOUNTED NEMA-3R, ENCLOSURE WITH HINGED CLEAR COVER, PROVIDED BY ELECTRICAL CONTRACTOR. (STI-SERIES 2000-RED MANUFACTURED BY STI). ELECTRICAL CONTRACTOR TO PROVIDE NAMEPLATE AT SHUTOFF SWITCH WITH THE INSCRIPTION "EMERGENCY SHUTOFF SWITCH". THE NAMEPLATE WILL BE RED WITH J-BOX FOR AUTOMATIC DOOR. VERIFY LOCATION OF J-BOX WITH DOOR MANUFACTURER.

REFERENCE SHEET NOTES

1. COORDINATE WITH COUNTY FOR GENERATOR ANNUNCIATOR LOCATION. PROVIDE CONDUITS/WIRING/J-BOX AS REQUIRED.

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ISSUE MARK	DATE	DESCRIPTION
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	10/23/20	100% CD REVISED SET
	02/18/21	100% CD SET

SOBE PROJECT NO:	1901457
DATE:	04/29/20
DRAWN BY:	CAD
CHECKED BY:	BN
APPROVED BY:	AC

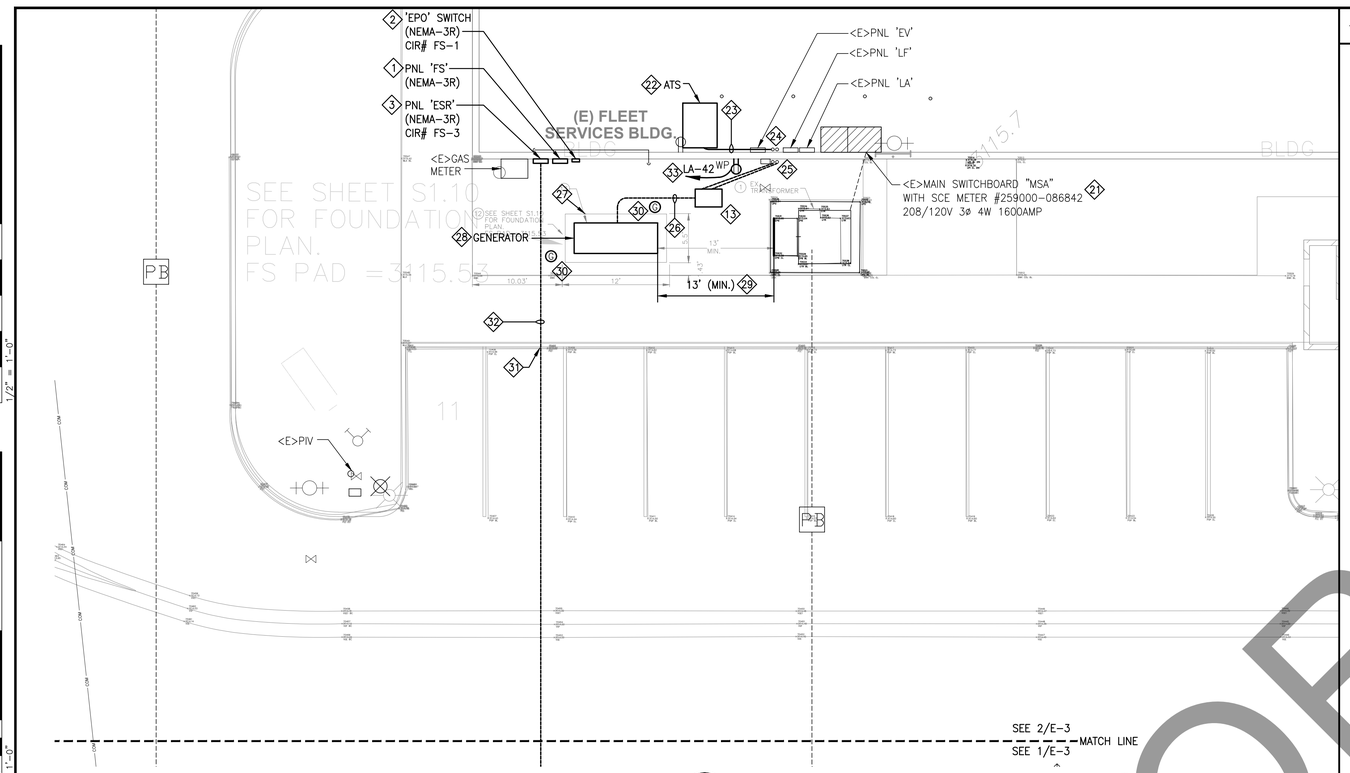
SHEET TITLE
ELECTRICAL SITE PLAN

SCALE: AS NOTED
THIS DRAWING IS 24" x 36" AT FULL SIZE

E-3
SHEET 10 OF 13

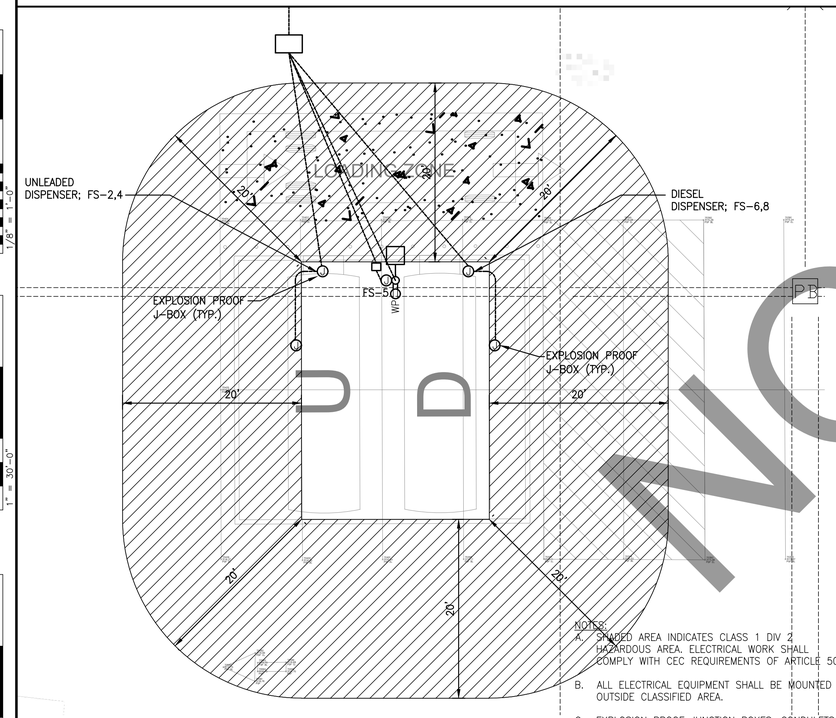
K:\drawings\County of San Bernardino\1901457 Victorville Fuel Infrastructure\1901457E-3.dwg 2/18/2021 9:05 PM Mario Gobea

THIS DRAWING IS 24" X 36" AT FULL SIZE. 12" X 18" AT HALF SIZE.



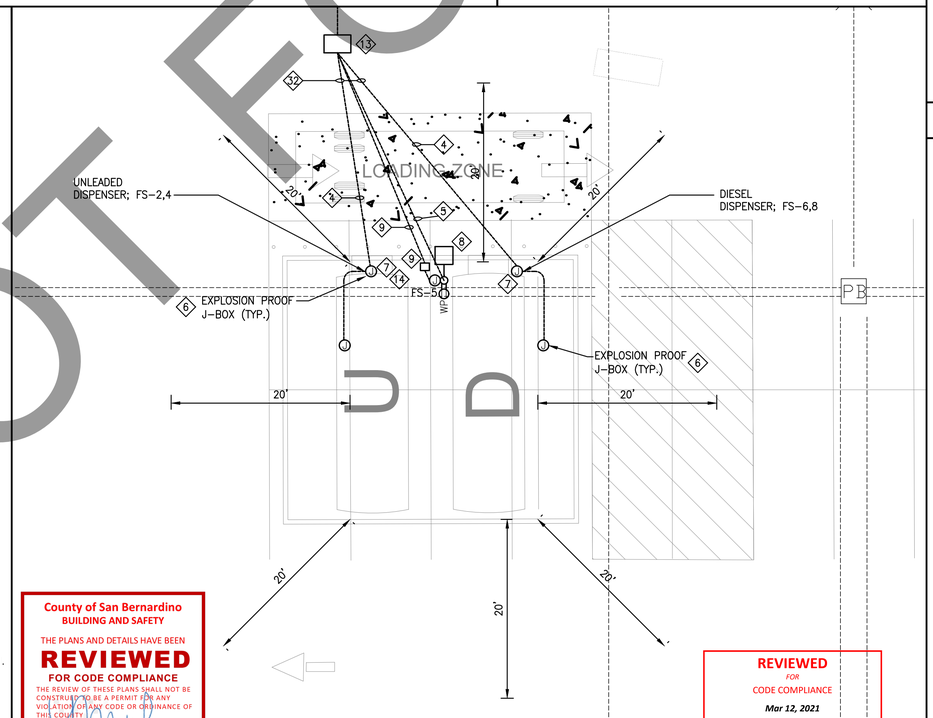
2 ENLARGED SITE PLAN

SCALE: 1/8" = 1' – 0"



3 DISPENSER FUEL TANK AREA (CLASS 1 DIV 2)

SCALE: 1/8" = 1' – 0"



1 ENLARGED SITE PLAN

SCALE: 1/8" = 1' – 0"

County of San Bernardino
BUILDING AND SAFETY
THE PLANS AND DETAILS HAVE BEEN
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FOR CODE COMPLIANCE
THE REVIEW OF THESE PLANS SHALL NOT BE CONSTRUED TO BE A PERMIT FOR ANY VIOLATION OF ANY CODE OR ORDINANCE OF THIS COUNTY
By
Date 03/15/2021
THESE PLANS SHALL BE ON THE JOB FOR ALL REQUESTED INSPECTIONS

REVIEWED
FOR
CODE COMPLIANCE
Mar 12, 2021
INTERWEST CONSULTING GROUP

REFERENCE SHEET NOTES

21. MODIFY EXISTING MAIN SWITCHBOARD 'MSA' WITH LOAD SIDE TAP FOR ATS AND GENERATOR CONNECTION. COORDINATE WITH MANUFACTURER FOR EXACT REQUIREMENT. SEE SINGLE LINE DIAGRAM FOR DETAIL.
22. OFCI 1600AMP 4POLE ATS WITH BYPASS. PROVIDE LUG REDUCER AT EMERGENCY SIDE FOR SMALL FEEDER SIZE PER SINGLE LINE DIAGRAM. COORDINATE WITH MANUFACTURER FOR EXACT REQUIREMENT. COORDINATE WITH COUNTY FOR TRANSPORTING REQUIREMENT AND LOCATION. CONTRACTOR IS RESPONSIBLE TO TEST <E>ATS PRIOR TO ENERGIZING THE GENERATOR.
23. FEEDER SHALL BE SURFACE MOUNTED ABOVE PANEL AND SWITCHBOARD HEIGHT. VERIFY WITH COUNTY FOR EXACT MOUNTING WITH. SEE SINGLE LINE DIAGRAM FOR FEEDER DETAIL.
24. USE (2) EXISTING 4" SPARE CONDUITS FOR GENERATOR CONNECTION AND PANEL 'FS'. PROVIDE JUNCTION BOX AS REQUIRED FOR CONDUITS DISTRIBUTION. FIELD VERIFY FOR EXACT LOCATION.
25. TRANSITION <E>(2)4" CONDUITS TO FEEDERS OF GENERATOR AND PANEL 'FS' + SPARE CONDUITS. PROVIDE JUNCTION BOX AS REQUIRED FOR INTERCEPTION. SEE SINGLE LINE DIAGRAM FOR ADDITIONAL INFO.
26. FEEDER OF GENERATOR, BATTERY CHARGER, BLOCK HEATER, COMM CABLE (600V RATED). SEE SINGLE LINE DIAGRAM FOR DETAIL.
27. CONCRETE HOUSEKEEPING PAD WITH #2 GROUND WIRE LOOP FOR GENERATOR. CONNECT GROUND LOOP BACK TO GROUNDING SYSTEM. SEE STRUCTURAL DRAWINGS FOR DETAIL. COORDINATE WITH GENERATOR MANUFACTURER FOR ANCHORAGE REQUIREMENT.
28. 60kW DIESEL STANDBY GENERATOR WITH LEVEL 2 SOUND ENCLOSURE WITH 350GALLON BELLY TANK AND INTEGRATED CIRCUIT BREAKER. VERIFY WITH COUNTY FOR EXACT GENERATOR REQUIREMENT. GENERAC IS USED AS BASIS OF DESIGN. GENERATOR SHALL BE APPROVED EQUAL BY COUNTY AND EEOR.
29. MAINTAIN WORKING CLEARANCE FROM EXISTING UTILITY TRANSFORMER. VERIFY WITH LOCAL UTILITY COMPANY FOR EXACT REQUIREMENT.
30. GROUND WELL WITH 1"x10FT COPPER GROUND ROD WITH #2 BARE COPPER GROUND WIRE. SEE DETAIL FOR ADDITIONAL INFORMATION.
31. CONTRACTOR SHALL REPLACE THE COMPLETE PIECE OF CONCRETE HARDSCAPE AND CONCRETE CURB.
32. UNDERGROUND FEEDER FOR PANEL 'FS' AND (1)4"C SPARE CONDUIT. SEE PANEL SCHEDULE AND SINGLE LINE DIAGRAM FOR DETAIL.
33. GFI RECEPTACLE WITH WHILE-IN-USE COVER.

GENERAL SHEET NOTES

A. ALL UNDERGROUND SITE WORK CONDUIT TO BE BURIED MINIMUM 24" BELOW FINISH GRADE AND USE MIN. 3/4" CONDUIT U.O.N. SEE UNDERGROUND CONDUIT DETAIL FOR DIFFERENT INSTALLATION SCENARIOS.

B. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY IN NATURE AND IS NOT INTENDED TO SHOW EXACT CONDUIT ROUTING. THE ELECTRICAL CONTRACTOR SHALL DETERMINE, IN THE FIELD, THE BEST ROUTING TO AVOID ANY INTERFERENCE WITH UNDERGROUND UTILITIES OR OTHER EQUIPMENT. THE ELECTRICAL CONTRACTOR SHALL FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR INSTALLATION AND TERMINATION OF CONDUIT AND WIRING. CONTRACTOR SHALL HAVE UNDERGROUND UTILITIES SCANNING FOR PRIOR TO ANY GROUND BREAKING/SAWCUTING/BORING.

C. ALL UNDERGROUND CONDUITS FROM HAZARDOUS AREAS ENTERING THE BUILDING TO BE PROVIDED WITH EYS SEAL-OFF'S AT POINTS OF ORIGIN AS WELL AS POINTS OF TERMINATION, AND SHALL BE LABELED WITH A METAL TAG AS TO THEIR ORIGIN.

D. UNDERGROUND WIRING SHALL BE INSTALLED IN THREADED RMC OR THREADED STEEL IMC. ANY PORTION OF ELECTRICAL WIRING THAT IS BELOW THE SURFACE OF A CLASS I, DIVISION 1, OR CLASS 1, DIVISION 2, LOCATION (AS CLASSIFIED IN TABLE 514.38(8)(1) AND TABLE 514.3(8)(2)) SHALL BE SEALDED WITHIN 10FT OF THE POINT OF EMERGENCE ABOVE GRADE. <CEC 514.8>. GALVANIZED RIGID STEEL CONDUIT (RMC) DIRECTLY BURIED IN GROUND SHALL BE PVC COATED. NO EXCEPTIONS.

E. ALL POWER AND CONTROL WIRING SHALL BE TAGGED WITH IDENTIFICATION AT JUNCTION BOXES/PULL BOXES/ENTRANCE/EXIT OF CONDUITS. IDENTIFICATION SHALL INCLUDE STARTING POINT/TERMINATION POINT WITH RELATING HOMERUN INFORMATION. SEE E-4 DETAIL 11.

F. FURNISH AND INSTALL PERMANENT ENGRAVED LEGEND (WHITE PLAQUE WITH BLACK LETTERS) OF EACH CIRCUIT BREAKER AT SWITCHBOARD/SWITCHGEAR FOR GENERATOR (STANDBY POWER SOURCE).

CONDUIT SEAL-OFF FITTING NOTES

A. IF CONDUIT RUNNING FROM CLASS 1, DIVISION 2 HAZARDOUS AREA TO UNCLASSIFIED AREA, BOTH ENDS SHALL BE EQUIPPED WITH EYS EXPLOSION SEAL-OFF FITTING, NO EXCEPTION.

B. CONDUIT SEAL SHALL BE REQUIRED IN EACH CONDUIT RUN LEAVING A CLASS 1, DIVISION 2 LOCATION. THE SEALING FITTING SHALL BE PERMITTED TO BE INSTALLED AT EITHER SIDE OF THE BOUNDARY WITHIN 10FT OF THE BOUNDARY AND IT SHALL BE DESIGNED AND INSTALLED TO MINIMIZE THE AMOUNT OF GAS OR VAPOR WITHIN THE PORTION OF THE CONDUIT INSTALLED IN THE DIVISION 2 LOCATION THAT CAN BE COMMUNICATED BEYOND THE SEAL.

EMERGENCY POWER OFF (SHUTOFF) NOTE

A. EMERGENCY POWER OFF (SHUTOFF) SWITCH CONTROLS OPERATION OF FUELING CONTROLS EMERGENCY SHUTDOWN. PUSH-BUTTON OPERATOR IN SURFACE MOUNTED NEMA-3R, ENCLOSURE WITH HINGED CLEAR COVER, PROVIDED BY ELECTRICAL CONTRACTOR. (STI-SERIES 2000-RED MANUFACTURED BY STI). ELECTRICAL CONTRACTOR TO PROVIDE NAMEPLATE AT SHUTOFF SWITCH WITH THE INSCRIPTION "EMERGENCY SHUTOFF SWITCH". THE NAMEPLATE WILL BE RED WITH J-BOX FOR AUTOMATIC DOOR. VERIFY LOCATION OF J-BOX WITH DOOR MANUFACTURER.

REFERENCE SHEET NOTES

1. FUEL STATION PANEL 100AMP MCB 208/120V 3ø 4W. SEE PANEL SCHEDULE AND SINGLE LINE DIAGRAM FOR DETAIL.
2. EMERGENCY POWER OFF SWITCH 'EPO' WITH RESET CONTACT (SAFETY TECHNOLOGY INC. STOPPER STATION #SS-2000PS). SEE WIRING DIAGRAM FOR DETAIL. COORDINATE WITH MANUFACTURER FOR EXACT REQUIREMENT.
3. EMERGENCY SHUT OFF RELAY PANEL 'ESR' WITH 12 POLE MECHANICALLY HELD RELAYS. SEE WIRING DIAGRAM FOR DETAIL. COORDINATE WITH FUEL PUMP STATION VENDOR FOR EXACT REQUIREMENT.
4. 3/4" UNDERGROUND CONDUIT WITH 120V CONTROL WIRING PER MANUFACTURER REQUIREMENT WITH #10 GROUND WIRE.
5. 3/4" UNDERGROUND CONDUIT WITH 2#12, 1#12 GND. FOR LIGHT POLE. COORDINATE WITH FUEL PUMP STATION VENDOR FOR UNDERGROUND CONDUIT ROUTING.
6. ALL JUNCTION BOXES WITHIN DISPENSER FUEL TANK AREA SHALL BE EXPLOSION PROOF.
7. FUEL DISPENSER POWER POINT OF CONNECTION. COORDINATE WITH MANUFACTURER FOR EXACT LOCATION AND REQUIREMENT.
8. 20FT LED LIGHT SQUARE STEEL POLE (94W 120V LITHONIA #KAD-LED-40C-700-40K-R5-MVOLT-SPD-PER7-PIRH) WITH PHOTOCELL AND MOTION SENSOR. CONTROL VIA 2-POLE RELAY (SWITCH NEUTRAL) AND PHOTOCELL IN SEPARATE COMPARTMENT.
9. FURNISH AND INSTALL 1" CONDUIT AND UNDERGROUND 12"X10" PULLBOX WITH CAT6 CABLE FROM FLEET MANAGEMENT BUILDING TO EJ WARD TERMINAL. COORDINATE WITH COUNTY OF SAN BERNARDINO FOR EXACT LOCATION OF PULLBOX.
10. NOT USED.
11. NOT USED.
12. NOT USED.
13. 36x24x36"D ELECTRICAL PULL BOX WITH H20 TRAFFIC CONCRETE COVER AND LOCKABLE DEVICE. MARK 'ELECTRICAL' ON PULL BOX COVER. COORDINATE WITH CIVIL FOR EXACT LOCATION AND COORDINATE WITH COUNTY FOR EXACT REQUIREMENT.
14. GFI RECEPTACLE WITH EXPLOSION-PROOF AND WHILE-IN-USE COVER. CONDUITS, CONDULETS AND JUNCTION BOXES SHALL BE EXPLOSION-PROOF. COORDINATE WITH LIGHT POLE MANUFACTURER FOR PREFABRICATED EXPLOSION-PROOF JUNCTION BOX OPENING.

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National Strength. Local Action.

REGISTERED PROFESSIONAL ENGINEER
CHI KIT CHAN
No. E18090
ELECTRICAL
STATE OF CALIFORNIA

COUNTY OF SAN BERNARDINO

VICTORVILLE FLEET MAINTENANCE BUILDING

15000 TOKAY STREET
VICTORVILLE, CA 92395

SBC VICTORVILLE GENERATOR & FUEL STATION

ISSUE		
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SHEET TITLE
ELECTRICAL ENLARGED SITE PLAN

SCALE: AS NOTED
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E-4
SHEET 11 OF 13

K:\drawings\County of San Bernardino\1901457 Victorville Fuel Infrastructure\1901457E-4.dwg 2/18/2021 9:05 PM Mario Gobea

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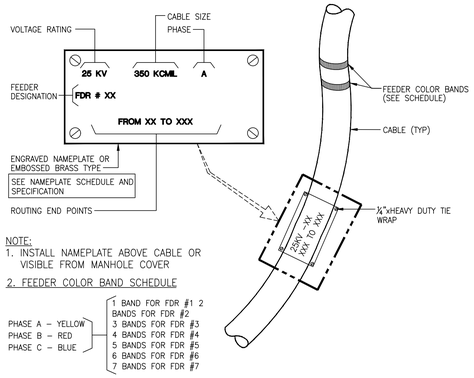
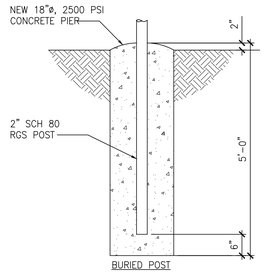
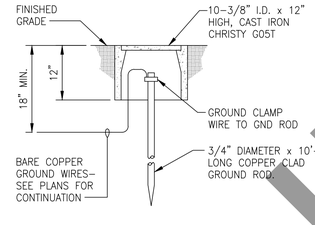


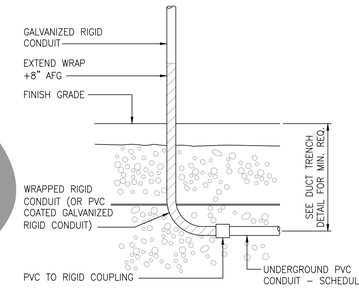
11 FEEDER TAG DETAIL
SCALE: N.T.S.



8 H-FRAME BASE DETAIL
SCALE: N.T.S.



5 GROUND WELL
SCALE: N.T.S.



2 PVC TO RIGID CONDUIT TRANSITION
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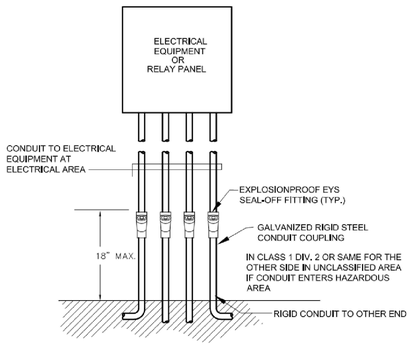
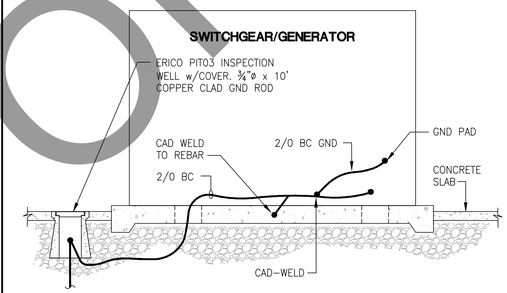
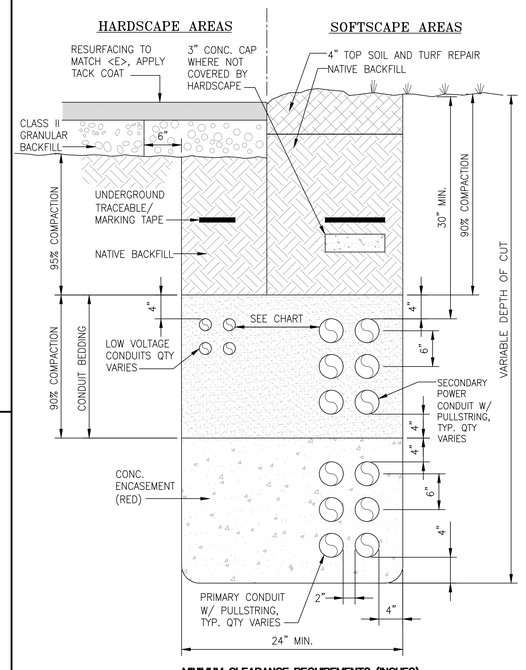


10 EXPLOSION-PROOF SEAL-OFF STUB-UP TO ELECTRICAL
SCALE: SCHEMATIC

7 SIGNAGE
SCALE: SCHEMATIC



4 ELECTRICAL EQUIPMENT GROUNDING SECTION
SCALE: N.T.S.



1 TRENCHING SECTION
SCALE: N.T.S.

MINIMUM CLEARANCE REQUIREMENTS (INCHES)

	PC	SC	G	TEL	TV	LV	W
PRIMARY CONDUIT (OVER 600V) (PC)	–	8	36	36	36	36	36
SECONDARY POWER CONDUIT (SC)	8	–	12	12	12	12	36
GAS (G)	36	12	–	12	12	12	36
TELEPHONE (TEL)	36	12	12	–	2	2	36
CATV (TV)	36	12	12	2	–	2	36
OTHER LOW VOLTAGE (LV)	36	12	12	2	2	–	36
WET UTILITIES (W)	36	36	36	36	36	36	–

NOTES:
1. UTILITY OWNED AND END-USER CONDUITS AND TRENCH SHALL NOT BE COMBINED.
2. PROVIDE 12" SEPARATION WHEN CROSSING "WET" UTILITIES.

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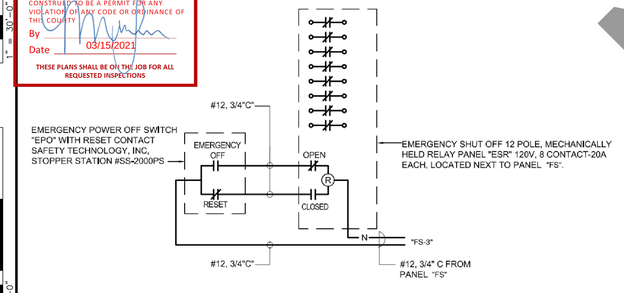
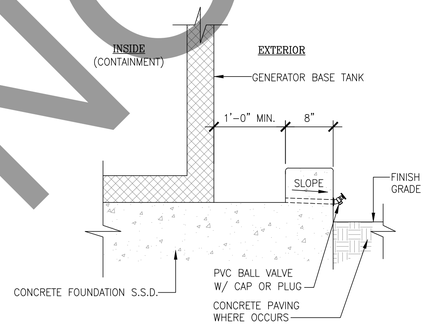


9 EMERGENCY SHUT OFF RELAY "ESR"
SCALE: N.T.S.



6 GENERATOR CONTAINMENT DETAIL
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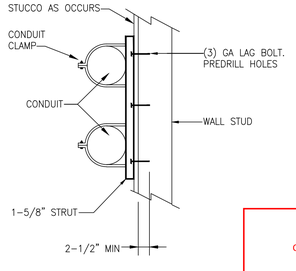

3 CONDUIT SUPPORT
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E-5
SHEET 12 OF 13