ELECTRICAL SPECIFICATIONS **GENERAL ELECTRICAL NOTES** PART I - GENERAL A. CONDITIONS ENGINEER RESERVES THE RIGHT TO ALLOW OTHER METHODS AND MATERIALS NOT REFLECTED HEREIN. FURNISH AND INSTALL A COMPLETELY WIRED AND OPERATIONAL ELECTRICAL

- SYSTEM AS SHOWN ON THE DRAWINGS AND SPECIFIED HEREIN, INCLUDING BUT NOT LIMITED TO, THESE MAJOR ITEMS
- A. LIGHTING FIXTURES AS INDICATED AND SPECIFIED ON THE PLANS. B. ELECTRICAL PANELS, SERVICE, CONDUIT, WIRING, ETC., FOR ALL OUTLETS AND EQUIPMENT C. TELEPHONE OUTLETS AND CONDUIT AS INDICATED.

B. CODES, REGULATIONS, AND STANDARDS

- THE INSTALLATION SHALL COMPLY WITH APPLICABLE LOCAL AND STATE CODES. AND ORDINANCES WITH THE REGULATIONS OF THE CURRENTLY ACCEPTED EDITION OF THE NATIONAL ELECTRIC CODE AND WITH THE REQUIREMENTS OF THE POWER, TELEPHONE, AND CATV COMPANIES FURNISHING SERVICES TO THIS INSTALLATION
- THE FOLLOWING INDUSTRY STANDARDS, SPECIFICATIONS, AND CODES ARE MINIMUM REQUIREMENTS: THE NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION STANDARDS.
- THE NATIONAL ELECTRICAL CODE, INCLUDING LOCAL AMENDMENTS. UNDERWRITER LABORATORIES INCORPORATED STANDARDS. AMERICAN NATIONAL STANDARDS INSTITUTE.

C. INSPECTION OF SITE

PRIOR TO SUBMITTING A BID FOR ELECTRICAL WORK, THE CONTRACTOR SHALL VISIT THE SITE OF THE PROPOSED CONSTRUCTION AND SHALL THOROUGHLY ACQUAINT HIMSELF WITH EXISTING UTILITIES, AND WORKING CONDITIONS TO BE ENCOUNTERED, ETC. ALLOWANCE WILL NOT BE MADE FOR NONCOMPLIANCE WITH THIS CONDITION AFTER BIDDING

ELECTRICAL INSTALLATION SHALL MEET THE EXISTING CONDITIONS.

D. ST<u>ORAGE AND HANDLING OF MATERIAL</u>

- DELIVER MATERIALS AND EQUIPMENT TO THE PROJECT IN THE MANUFACTURER'S ORIGINAL, UNOPENED, LABELED CONTAINERS. PROTECT AGAINST MOISTURE, TAMPERING, OR DAMAGE FROM IMPROPER HANDLING OR STORAGE. CONTRACTOR SHALL PROTECT AND BE RESPONSIBLE FOR ANY DAMAGE TO WORK OR MATERIALS UNTIL FINAL ACCEPTANCE BY THE OWNER, AND SHALL MAKE GOOD WITHOUT COST TO THE OWNER, ANY DAMAGE OR LOSS THAT MAY OCCUR DURING THIS PERIOD.
- ARRANGE FOR TIMELY DELIVERY OF MATERIALS AND EQUIPMENT TO THE JOB SITE IN ORDER TO MINIMIZE THE LENGTH OF TIME BETWEEN DELIVERY AND INSTALLATION
- COVER AND PROTECT ANY MATERIAL WHICH MAY BE AFFECTED BY THE WEATHER WHILE IN TRANSIT OR STORED AT THE PROJECT SITE. ANY MATERIAL FOUND DEFECTIVE OR NOT INSTALLED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS MAY BE REJECTED BY THE ENGINEER.

E. CLEANUP

KEEP THE PREMISES FREE FROM ACCUMULATION OF WASTE MATERIALS. OR RUBBISH CAUSED BY EMPLOYEES OR WORK UNDER THIS DIVISION OF THE SPECIFICATIONS AT THE COMPLETION OF THE WORK REMOVE ALL SURPLUS MATERIALS, TOOLS, ETC., AND LEAVE THE PREMISES BROOM-CLEAN.

F. DRAWINGS

THE DRAWINGS INDICATE THE GENERAL ARRANGEMENT AND LOCATIONS OF THE ELECTRICAL WORK DATA PRESENTED ON THESE DRAWINGS ARE AS ACCURATE AS PLANNING CAN DETERMINE. BUT FIELD VERIFICATION OF ALL DIMENSIONS. LOCATIONS, LEVELS, ETC., TO SUIT FIELD CONDITIONS IS REQUIRED. REVIEW ALL ARCHITECTURAL, STRUCTURAL, AND MECHANICAL DRAWINGS AND ADJUST ALL WORK TO MEET THE REQUIREMENTS OF CONDITIONS SHOWN. THE ARCHITECTURAL DRAWINGS SHALL TAKE PRECEDENCE OVER ALL OTHER DRAWINGS. DISCREPANCIES BETWEEN DIFFERENT PLANS, OR BETWEEN DRAWINGS AND SPECIFICATIONS, OR REGULATIONS AND CODES GOVERNING THE INSTALLATION SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IN WRITING BEFORE THE DATE OF BID OPENING. IF DISCREPANCIES ARE NOT REPORTED. THE CONTRACTOR SHALL BID THE GREATER QUANTITY OR BETTER OUALITY, AND APPROPRIATE ADJUSTMENTS WILL BE MADE AFTER CONTRACT AWARD CONTRACTOR SHALL BE RESPONSIBLE TO FIELD MEASURE AND CONFIRM MOUNTING HEIGHTS AND LOCATION OF ELECTRICAL FOUIPMENT WITH RESPECT TO COUNTERS, RADIATION, ETC. DO NOT SCALE DISTANCES OFF THE ELECTRICAL DRAWINGS, USE ACTUAL BUILDING DIMENSIONS.

G. EXCAVATION, CUTTING, AND FITTING

PERFORM THE EXCAVATION, CUTTING, FITTING, REPAIRING, AND FINISHING OF THE WORK NECESSARY FOR THE INSTALLATION OF THE EQUIPMENT OF THIS SECTION. HOWEVER, NO CUTTING OF THE WORK OF OTHER TRADES OR OF ANY STRUCTURAL MEMBERS SHALL BE DONE WITHOUT THE CONSENT OF THE ARCHITECT.

H. COOPERATION WITH OTHER CONTRACTORS . COOPERATE WITH THE OTHER TRADES SO THAT THE INSTALLATION OF THE ELECTRICAL OUTLETS AND EQUIPMENT WILL BE PROPERLY COORDINATED. CONDUIT, LIGHTING FIXTURES, AND OTHER EQUIPMENT LOCATIONS SHALL BE CHECKED WITH OTHER TRADES TO AVOID CONFLICT WITH THE PIPING, DUCTWORK, STEEL BEAMS OR OTHER OBSTRUCTIONS CAREFULLY CHECK THE LOCATIONS OF THE OUTLET BOXES AND DETERMINE THAT THEY HAVE NOT BEEN DISTURBED DURING THE INSTALLATION OF MATERIALS OF OTHER TRADES.

COORDINATE HVAC EQUIPMENT CONNECTION REQUIREMENTS WITH HVAC CONTRACTOR.

PART II - PRODUCTS AND EXECUTION

. MATERIALS

- ALL MATERIALS SHALL BE NEW AND OF QUALITY AS SPECIFIED ON THE PLANS OR SPECIFICATIONS AND MUST CARRY THE UNDERWRITER'S LABORATORIES APPROVAL COVERING THE PURPOSE FOR WHICH THEY ARE USED. IN ADDITION TO MEETING ALL REQUIREMENTS OF THE CURRENT APPLICABLE CODES AND REGULATIONS.
- B. CONDUIT
- ALL WIRING SHALL BE INSTALLED IN LISTED METALLIC CONDUIT EXCEPT AS PERMITTED BELOW. RGS. WITH A 20 MIL PVC COATING WILL BE USED WHEN IN CONTACT WITH EARTH. IMC MAY BE USED IN INDOOR LOCATIONS NOT IN CONTACT WITH THE EARTH. EMT MAY BE USED IN INDOOR LOCATIONS NOT IN CONTACT WITH EARTH, NOT IN CONCRETE SLABS OR WALLS AND NOT SUBJECT TO DAMAGE. PVC MAY BE USED IN OR BELOW CONCRETE AND DIRECT BURIED IN EARTH. FLEXIBLE STEEL CONDUIT SHALL BE USED FOR INDOOR FINAL CONNECTIONS TO EQUIPMENT IN LENGTHS NOT TO EXCEED 72". LIQUID-TIGHT FLEXIBLE STEEL CONDUIT SHALL BE FOR OUTDOOR FINAL CONNECTIONS TO EQUIPMENT NOT TO EXCEED 36".
- WHERE CONDUIT ENTERS OUTLET BOXES, FIXTURES OR CABINETS, FIRMLY FASTEN WITH STEEL SET SCREW, COMPRESSION CONNECTORS, OR DOUBLE LOCKNUTS FOR GRC. ALL CONNECTIONS SHALL HAVE BUSHINGS OR INSULATED THROAT CONNECTORS. FIRMLY FASTEN CONDUIT TO THE BUILDING CONSTRUCTION. RUN EXPOSED CONDUIT PARALLEL TO THE BUILDING LINES, SUPPORTED BY APPROPRIATE HANGERS (UNISTRUT, T & B OR APPLETON, OR EQUAL).
- COVER METALLIC CONDUIT IN CONTACT WITH EARTH WITH POLYETHYLENE TAPED SPIRAL WRAPPED. 1/2 LAPPED TO PROVIDE 20 MIL. THICKNESS. TAPE SHALL BE SCOTCH NO. 50 TAPE. CONDUIT AND DUCTS NOT UNDER BUILDINGS AND FEEDER DUCTS SHALL BE INSTALLED PER N.E.C. 300-5. MAKE JOINTS WITH COMPOUND TO BE WATERTIGHT.
- FITTINGS AND CONDUIT BODIES SHALL BE STEEL. NO DIECAST FITTINGS.
- . CONDUIT SIZES SHALL BE AS REQUIRED BY CODE AND AS INDICATED OR SPECIFIED.
- ALL EMPTY CONDUIT SYSTEMS SHALL HAVE A NYLON PULL STRING TO FACILITATE INSTALLATION OF FUTURE WIRE.
- SCHEDULE 40 PVC CONDUIT SHALL BE PERMITTED UNDERGROUND WITH PROPER FITTINGS, ALL UL APPROVED AND CEMENTED JOINTS. PENETRATIONS THROUGH FLOOR SLABS AND BENDS GREATER THAN 22° SHALL BE WRAPPED RIGID GALVANIZED STEEL ELBOWS.
- CONDUITS AND OUTLETS SHALL BE CONCEALED WITHIN THE BUILDING STRUCTURE. EXCEPT THAT CERTAIN MOTOR AND LIGHTING FEEDER CONDUITS MAY BE RUN EXPOSED IN CERTAIN AREAS AS INDICATED ON THE DRAWINGS. CONDUIT SHOWN TO BE INSTALLED IN CABINETS, COUNTERS, AND CASEWORK SHALL BE RUN AS DIRECTED BY THE ARCHITECT
- ALL CONDUIT SYSTEMS SHALL HAVE A CODE SIZED COPPER GROUND CONDUCTOR. INCREASE CONDUIT SIZE AS REQUIRED

1. ALL SYMBOLS ARE NOT NECESSARILY USED IN THIS PROJECT 2. IT IS THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS TO ESTABLISH A STANDARD OF QUALITY. THE

- THE CONTRACTOR SHALL BE RESPONSIBLE TO REQUEST THE ENGINEER WAIVE THE STANDARDS TO ALLOW ALTERNATE MEANS AND METHODS PRIOR TO BEGINNING THE PROJECT. CONTRACT DOCUMENT REVISIONS TO ACCOMMODATE INSTALLED CONDITIONS, WITHOUT PRIOR APPROVAL, WILL RESULT IN ADDITIONAL DESIGN CHARGES TO THE CONTRACTOR.
- 3. ELECTRICAL WORK SHALL BE PERFORMED IN A WORKMANLIKE MANNER IN ACCORDANCE WITH THE NECA INSTALLATION STANDARDS TO THE SATISFACTION OF THE OWNER AND ENGINEER
- 4. ALL WORK, MATERIALS AND EQUIPMENT SHALL CONFORM TO THE CURRENTLY ACCEPTED EDITION OF ALL APPLICABLE NATIONAL, STATE AND CITY CODES AND ORDINANCES
- 5. ALL ELECTRICAL SYSTEM COMPONENTS SHALL BE LISTED OR LABELED BY UL OR OTHER RECOGNIZED TESTING FACILITY AS ALLOWED BY AUTHORITY HAVING JURISDICTION.
- 6. WHERE AN APPARENT DISCREPANCY EXISTS BETWEEN THE REQUIREMENTS OF THE GENERAL NOTES AND INFORMATION PORTRAYED IN THE ELECTRICAL DRAWINGS, THE CONTRACTOR SHALL INCLUDE IN HIS COST OF THE GREATER QUALITY OR QUANTITY.
- 7. ALL ELECTRICAL SYSTEMS SHALL BE TESTED FOR PROPER OPERATION. IF TESTS SHOW THAT WORK IS DEFECTIVE, CONTRACTOR SHALL MAKE ALL NECESSARY CORRECTIONS
- 8. CONTRACTOR SHALL GUARANTEE ALL WORK AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP WHICH MAY OCCUR UNDER NORMAL USE FOR A PERIOD OF ONE YEAR AFTER OWNER'S ACCEPTANCE. ALL DEFECTS SHALL BE PROMPTLY CORRECTED BY CONTRACTOR.
- 9. THE ELECTRICAL CONTRACTOR SHALL MAINTAIN A SET OF DRAWINGS AT THE JOB SITE FOR THE EXCLUSIVE PURPOSE OF MAINTAINING A RECORD OF ALL WORK INSTALLED AND TO SHOW ANY DEVIATIONS FROM THE WORK INDICATED ON THE DRAWINGS 10. DO NOT SCALE ELECTRICAL DRAWINGS. VERIFY EXACT LOCATION OF ALL DEVICES, JUNCTION BOXES,
- LIGHTING FIXTURES, ETC. WITH ARCHITECTURAL AND INTERIOR DESIGN DRAWINGS PRIOR TO INSTALLATION. CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF ALL MECHANICAL EQUIPMENT AND OTHER EQUIPMENT REQUIRING ELECTRICAL CONNECTION PRIOR TO ROUGH-IN. EVERY OUTLET HEIGHT SHALL BE VERIFIED ON EACH WALL WITH THE INTERIOR PLANNING AND DESIGN DRAWINGS. COORDINATE WITH CABINET SHOP DRAWINGS TO ENSURE PROPER HEIGHT AND LOCATION WITH RESPECT TO MILLWORK, EQUIPMENT, ETC.
- 11. THESE DRAWINGS INDICATE THE FINISHED REQUIREMENTS FOR THE ELECTRICAL SYSTEMS, EQUIPMENT, LIGHTING FIXTURES, OUTLETS AND DEVICES. DUE TO STRUCTURAL CONDITIONS, MECHANICAL DUCT, PIPING CONFLICTS, OR OTHER LEGITIMATE REASONS, THE CONTRACTOR MAY DESIRE TO INSTALL THE WORK INDICATED IN A MANNER DIFFERENT FROM THAT SHOWN. SUCH CHANGES SHALL BE PRESENTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO PROCEEDING. UPON APPROVAL, THE WORK SHALL BE PERFORMED AND THE AS-BUILT DRAWINGS SHALL BE REVISED TO ACCURATELY REFLECT THE WORK AS ACTUALLY INSTALLED.
- 12. RACEWAY SYSTEMS ARE SHOWN DIAGRAMMATICALLY. ACTUAL LOCATION AND ROUTING OF ALL, SHALL BE DETERMINED BY CONTRACTOR TO SUIT FIELD CONDITIONS. 13. PROVIDE DEDICATED NEUTRAL FOR EACH NEW CIRCUIT. HOME RUN CONDUCTORS MAY BE COMBINED
- INTO ONE CONDUIT. NO RACEWAY OR CABLE SHALL CONTAIN MORE THAN NINE (9) CURRENT CARRYING CONDUCTORS, WHERE MULTIPLE CONDUCTORS IN EXCESS OF THREE (3) ARE INDICATED ON THESE DRAWINGS. THEY HAVE BEEN DERATED AS REQUIRED BY NEC ARTICLE 310 REQUIREMENTS. 14. WHERE ALLOWED, MC CABLE MAY BE INSTALLED PER NEC ARTICLE 330. WHERE MULTIPLE CABLES ARE
- ROUTED ADJACENT TO EACH OTHER (BUNDLED), A MINIMUM SEPARATION OF ONE (1) CABLE DIAMETER (LARGEST) SHALL BE REQUIRED. 15. PLASTIC CABLE TIES SHALL NOT BE USED AS A MEANS OF SUPPORT FOR MC CABLE. USE ONLY APPROVED
- CABLE SUPPORTS PER CABLE MANUFACTURER'S INSTALLATION REQUIREMENTS 16. RACEWAYS SHALL BE INSTALLED CONCEALED WHENEVER POSSIBLE. RACEWAYS INSTALLED EXPOSED SHALL BE ROUTED OUT OF PUBLIC VIEW. RACEWAYS SHALL BE RUN PARALLEL WITH, OR AT RIGHT ANGLE TO WALLS.
- 17. PROVIDE APPROVED EXPANSION FITTINGS WHERE RACEWAYS CROSS BUILDING EXPANSION JOINTS. PROVIDE BONDING JUMPER(S) SIZED PER CODE WHERE REQUIRED. PROVIDE ALL FITTINGS REQUIRED FOR A COMPLETE INSTALLATION, REFER TO ARCHITECTURAL DRAWINGS FOR EXPANSION JOINT LOCATION(S).
- 18. MINIMUM RACEWAY SIZE SHALL BE 1/2". MINIMUM HOMERUN SIZE SHALL BE 3/4". MINIMUM CONDUCTOR SIZE SHALL BE #12 AWG U.N.O. TYPICAL. ALL POWER RELATED CONDUITS SHALL HAVE A CODE SIZE GROUND WIRE INSTALLED IN EACH RUN. 19. CONTRACTOR SHALL PROVIDE PULL CORDS IN ALL EMPTY CONDUITS. WHERE MORE THAN ONE CONDUIT
- TERMINATES IN A JUNCTION BOX, THE CONTRACTOR SHALL IDENTIFY EACH CONDUIT AND JUNCTION BOX IN A MANNER ALLOWING IDENTIFICATION AFTER ALL WALL FINISHES HAVE BEEN APPLIED. 20. CONTRACTOR SHALL PROVIDE ALL RACEWAY SYSTEMS INDICATED ON THE DRAWING PER NEC REQUIREMENTS AND GENERAL NOTES. ANY DEVIATION FROM THE WIRING METHODS INDICATED SHALL BE
- ALLOWED ONLY BY SPECIFIC WRITTEN APPROVAL FROM THE ENGINEER OR OWNER, CONTRACTOR SHAL INCLUDE ALL COSTS FOR RACEWAY SYSTEMS AS SPECIFIED UNLESS SPECIFIC WRITTEN APPROVAL FOR AN ALTERNATIVE WIRING METHOD IS OBTAINED FROM EITHER THE ENGINEER OR OWNER. 21. CONTRACTOR SHALL BE RESPONSIBLE FOR CORRECT SIZE AND INSTALLATION OF ALL OUTLET, PULL AND
- JUNCTION BOXES IN ACCORDANCE WITH NEC 314-16. ALL BOXES SHALL BE MINIMUM 4" SOUARE BY 1-1/2" DEEP OR AS INDICATED ON THE DRAWINGS. ALL BOXES SHALL BE RECESSED WITH COVER PLATE TO SUIT THE INTENDED APPLICATION.
- 22. REFER TO THE ARCHITECTURAL REFLECTED CEILING PLAN(S) FOR EXACT LOCATION OF ALL CEILING MOUNTED LIGHTING FIXTURES. ARCHITECTURAL DRAWINGS SHALL GOVERN IN CASE OF CONFLICT WITH THESE DRAWINGS. 23. PRIOR TO INSTALLATION, CONTRACTOR SHALL REVIEW THE COMPLETE SET OF CONSTRUCTION
- DOCUMENTS FOR CONFLICTS WITH OTHER TRADES. CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE ALL WORK WITH OTHER TRADES TO AVOID CONFLICT DURING INSTALLATION. CONTRACTOR SHALL MAKE MINOR ADJUSTMENTS IN EQUIPMENT LOCATION AND ROUTING AS NECESSARY 24. CONTRACTOR SHALL BE RESPONSIBLE TO PROPERLY CUT AND PATCH EXISTING CONSTRUCTION AS
- REQUIRED TO INSTALL NEW ELECTRICAL WORK ALL PATCHING SHALL BE OF THE SAME MATERIALS. WORKMANSHIP AND FINISH AS THE EXISTING WORK AND SHALL ACCURATELY MATCH ALL SURROUNDING
- 25. ALL ELECTRICAL EQUIPMENT SHALL HAVE SUFFICIENT GUTTER SPACE AND LUGS TO ACCOMMODATE TITY AND SIZE OF CONDUCTORS REQUIRED. CONTRACTORS SHALL PROVIDE EQUIPMENT WITH OVERSIZED ENCLOSURES WHERE REQUIRED.
- 26. ALL NEW PANEL BOARDS AND SWITCHBOARDS SHALL BE OF THE SAME MANUFACTURER AND HAVE LOCKING DOORS AND BE KEYED THE SAME U.N.O.
- 27. PROVIDE TYPE WRITTEN UPDATED PANEL DIRECTORY WHICH IS TO BE MOUNTED ON INSIDE OF ALL PANEL DOOR COVERS. DIRECTORY SHALL REFLECT ALL ADDITIONS OR MODIFICATIONS TO EXISTING PANELS AND
- SHALL REFLECT ACTUAL "AS-BUILT" CONDITIONS. 28. VERIFY DEVICE COLOR AND MOUNTING ORIENTATION (VERTICAL OR HORIZONTAL) WITH ARCHITECTURAL AND INTERIOR DESIGN DRAWINGS PRIOR TO ORDERING ANY EQUIPMENT AND PROVIDE DEVICES AS REQUIRED. UNLESS NOTED OTHERWISE, DEVICES AND DEVICE PLATES SHALL BE WHITE IN COLOR.
- 29. WHERE MOTORS ARE INSTALLED IN SUSPENDED CEILINGS, CONTRACTOR SHALL PROVIDE DISCONNECT SWITCH IN SUSPENDED CEILING WITHIN REACH FROM ACCESS POINT.
- 30. SIZING OF MOTOR-RELATED ELECTRICAL COMPONENTS. INCLUDING FEEDER AND/ OR BRANCH CIRCUITS (WIRE AND CONDUIT) AND OVERCURRENT PROTECTION (BREAKER AND/ OR FUSES) IS BASED ON RATINGS INDICATED IN THE CONTRACT DOCUMENTS AS WELL AS NEC APPROXIMATED LOADS FOR A GIVEN MOTOR HORSEPOWER, VOLTAGE AND PHASE, IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ACTUAL MOTOR AND APPLIANCE RATING AND LOADS. CONTRACTOR TO PROVIDE CORRECTLY SIZED MOTOR OVERLOAD ELECTRICAL COMPONENTS BASED ON NAMEPLATE RATING. REFLECT ALL CHANGES IN THE AS-BUILT
- 31. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO ENGINEER FOR REVIEW OF THE FOLLOWING SPECIFIED NEW EQUIPMENT WHERE INDICATED ON PLANS: a. ELECTRICAL SWITCHGEAR: SWITCHBOARDS, WITH PANELS, MOTOR CONTROL CENTERS AND SAFETY
- DEVICES b. OVERCURRENT DEVICES: CIRCUIT BREAKERS AND FUSES INCLUDING TIME/CURRENT TRIP CURVES.
- c. LIGHTING FIXTURES: INDOOR/OUTDOOR AS SPECIFIED, PHOTOMETRIC PERFORMANCE DATA AND LAMPS
- d. DEVICES: SWITCHES, RECEPTACLES, MOTOR CONTROLLERS AND DEVICE PLATES. e. LIFE SAFTY/FIRE ALARM SYSTEM: CONTROL PANEL, ANNUNCIATOR PANEL, INITIATION AND

NOTIFICATION DEVICES/APPLIANCES, SYSTEM WIRING REQUIREMENTS AND DIAGRAM, SYSTEM LOAD CALCS, STANDARD BATTERY CALCULATIONS, AND AUXILIARY POWER SUPPLY. 32. ALL PENETRATIONS OF FIRE RESISTIVE FLOORS OR WALLS SHALL BE PROTECTED BY MATERIALS AND INSTALLATION DIAGRAMS THAT CONFORM TO UL LISTING FOR "THROUGH-PENETRATION FIRE STOP

- SYSTEMS" 33. CONTRACTOR SHALL ENGAGE THE SERVICES FOR A STATE LICENSED FIRE ALARM
- MANUFACTURER/INSTALLER TO PREPARE ALL DESIGN DRAWINGS AND CALCULATIONS REQUIRED FOR SYSTEM APPROVAL BY THE AUTHORITY HAVING JURISDICTION. SUBMIT ALL PLANS AND PROVIDE ALL PERMITS REQUIRED FOR A COMPLETE AND OPERABLE APPROVED LIFE SAFETY SYSTEM. 34. FIRE ALARM DEVICE WIRING SHALL BE MINIMUM #14 AWG COPPER OR PER SYSTEM MANUFACTURER
- REQUIREMENTS. PROVIDE MINIMUM 3/4" SEPARATE RACEWAY SYSTEM OR AS REQUIRED FOR LIFE SAFETY SYSTEM WIRING CONFIGURATION. 35. UPON COMPLETION OF THE INSTALLATION OF LIFE SAFETY SYSTEM WIRING AND DEVICES, A PERFORMANCE
- TEST OF THE ENTIRE LIFE SAFETY SHALL BE PERFORMED TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION 36. ALL EQUIPMENT ELECTRICAL TERMINATIONS TO UNDERGO A TORQUE TEST. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR MANUFACTURER'S RECOMMENDED TORQUE DOCUMENTATION AND TOOLS TO
- PERFORM TORQUE TEST
- 37. ALL UNDERGROUND SERVICE CONDUITS SHALL BE SEALED PER NEC ARTICLE 230-8. 38. FLOOR MOUNTED ELECTRICAL EQUIPMENT SHALL BE MOUNTED ON A 4" HIGH CONCRETE PAD.
- 39. INSTALL TRANSFORMER FOLLOWING MANUFACTURER'S RECOMMENDATIONS FOR VENTILATION CLEARANCES.
- 40. COORDINATE ELECTRICAL REQUIREMENTS FOR ALL PLUMBING AND MECHANICAL EQUIPMENT WITH FINAL CONTRACTOR SELECTION. THE CONTRACTOR SHALL SIZE DISCONNECTS BASED UPON CIRCUIT BREAKER RATINGS AND PROVIDE FUSING AS REQUIRED PER EQUIPMENT MANUFACTURER RECOMMENDATIONS AND U.L. LISTING REQUIREMENTS.
- 41. PROVIDE 10 AWG CONDUCTORS FOR 20 AMPERE, 120V BRANCH CIRCUITS LONGER THAN 75' AND 8 AWG CONDUCTORS FOR 20 AMPERE, 120V BRANCH CIRCUITS LONGER THAN 120'. PROVIDE 10 AWG CONDUCTORS FOR 20 AMPERE, 277V BRANCH CIRCUITS LONGER THAN 200'.

- D. PANEL BOARDS

- E. WIRES

- F. WIRING DEVICES
- 120/277 VOLT.

- GROUNDED.

10. CONDUIT PENETRATION THROUGH ROOF SHALL HAVE ROOF FLASHING WITH CAULK TYPE COUNTER FLASHING SLEEVE. INSTALLATION SHALL BE

WATERTIGHT 11. CONDUITS SHALL BE ROUTED SURFACE ON THE STRUCTURE, PARALLEL AND PERPENDICULAR TO THE STRUCTURE

C. OUTLET, PULL, AND JUNCTION BOXES

1. EACH SWITCH, LIGHT, RECEPTACLE OR OTHER OUTLET SHALL BE PROVIDED WITH A CODE GAUGE, GALVANIZED STEEL OUTLET BOX, JUNCTION AND PULL BOXES SHALL BE CODE GAUGE, GALVANIZED STEEL, OUTLET BOXES SHALL BE OF THE ONE PIECE, KNOCKOUT TYPE, IN GENERAL 4" SQUARE WITH PLASTER RING. PLASTER RINGS SHALL BE SET TO PROVIDE NOT MORE THAN 1/8" FROM WALL SURFACE TO RING. IN NO CASE SHALL PLASTER RING PROJECT BEYOND SURFACE OF WALL, SINGLE GANG RINGS SIMILAR TO STEEL CITY 52050 SHALL BE USED FOR 4" BOXES IN UNFINISHED BRICK NUMBER 180 BOXES MAY BE USED FOR UNFINISHED MASONRY FLUSH WALL OUTLETS. CENTER ALL OUTLET BOXES IN BLOCK COURSE

2. BOXES INSTALLED IN POURED CEMENT FLOORS SHALL BE FLUSH TYPE CAST IRON OR STEEL WITH WATERTIGHT GASKETED COVERS. WHERE BOXES ARE INSTALLED IN FLOORS WITH TILE OR CARPET FLOOR COVERING, COVERS SHALL BE OF THE RECESSED TYPE TO ACCOMMODATE THE FLOOR COVERING.

3. BOXES INSTALLED FOR THE ALARM, COMPUTER, AND SECURITY SYSTEM SHALL BE PROVIDED WITH APPROPRIATE COVER PLATES.

4. BOXES FOR TELEPHONE, COMPUTER, T.V., FIRE ALARM, SECURITY, AND SIMILAR SYSTEMS SHALL BE MINIMUM 4" SQUARE AND 2-1/8" DEEP.

1. CIRCUIT BREAKER TYPE AS INDICATED ON DRAWINGS. UNLESS INDICATED THERWISE, ALL PANELS SHALL HAVE PANEL BOARD TYPE CONSTRUCTION WITH BOLT-ON CIRCUIT BREAKERS FOR 3¢ PANELS. MANUFACTURERS SHALL BE GENERAL ELECTRIC, SQUARE D, SIEMENS, CUTLER-HAMMER OR EQUAL WITH VOLTAGE, SIZES, AND RATINGS AS INDICATED ON DRAWINGS.

2. THE CIRCUIT BREAKERS SHALL BE OPERABLE IN ANY POSITION AND BE REMOVABLE FROM THE FRONT OF THE PANEL BOARD WITHOUT DISTURBING THE ADJACENT UNITS BRANCH BREAKERS SHALL BE OF SUCH DESIGN THAT COMBINATION OF SINGLE-POLE. DOUBLE-POLE. AND THREE-POLE BREAKERS CAN BE ASSEMBLED ON THE SAME PANEL. EACH BRANCH CIRCUIT SHALL BE CLEARLY

NUMBERED. BRANCH AND MAIN TERMINALS SHALL BE OF THE SOLDERLESS TYPE. HANDLE TIES TO FORM MULTI-POLE BREAKERS NOT ACCEPTABLE. 3. WIRE TERMINATION FOR PANEL BOARDS AND CIRCUIT BREAKERS SHALL BE LISTED AS SUITABLE FOR 75 DEGREES C.

4. PROVIDE A TYPEWRITTEN CIRCUIT INDEX BEHIND CLEAR PLASTIC COVER ON INSIDE OF DOOR. INFORMATION SHALL INCLUDE ROOM AND TYPE LOAD SERVED. ALL CIRCUIT BREAKERS SHALL BE IDENTIFIED, INCLUDING SPARES. INDEX CARD FRAME SHALL BE METAL, SECURED TO DOOR.

1. CONDUCTOR SIZES SHOWN ON THE DRAWINGS ARE BASED ON COPPER WIRE UNLESS OTHERWISE SPECIFIED. ALL WIRE SHALL BE TYPE XHHW FOR FEEDERS OR BRANCH CIRCUITS LARGER THAN 4 AWG TYPE THHN/THWN INSULATION FOR FEEDERS AND BRANCH CIRCUITS 4 AWG AND SMALLER. ALL BRANCH CIRCUIT WIRING SHALL BE COPPER SERVICE AND PANEL FEEDERS #1/0 AND LARGER MAY BE ALUMINUM. PROVIDED THE CONDUCTOR SIZES ARE INCREASED FOR EQUAL OR GREATER AMPACITY AND EQUAL OR LESS EQUIVALENT VOLTAGE DROP INCREASE CONDUIT SIZE AS REQUIRED. THE WIRES SHALL BE MARKED WITH COLOR TO SIMPLIFY CIRCUIT IDENTIFICATION. UNLESS OTHERWISE REQUIRED BY LOCAL ORDINANCES GROUND WIRES SHALL BE GREEN. NEUTRAL WIRES SHALL BE 120V-WHITE, 277V- GRAY, AND LIVE WIRES 208Y/120V AND 120/240 SHALL BE BLACK (PHASE A), RED (PHASE B), AND BLUE (PHASE C), FOR 480Y/277V CIRCUITS, THE COLOR CODE SHALL BE BROWN (PHASE A) ORANGE (PHASE B) AND YELLOW (PHASE C). THE WIRE SHALL BE 12 AWG UNLESS OTHERWISE INDICATED. CIRCUIT SHALL BE LABELED IN EACH J-BOX.

2. ALL WIRES SHALL BE COPPER. NO ALUMINUM WIRES PERMITTED.

3. NO WIRE SHALL BE INSTALLED IN THE CONDUIT SYSTEM UNTIL THE CONDUIT SYSTEM IS COMPLETE. USE MINERALAC NO. 100 OR EQUIVALENT AS A LUBRICANT TO FACILITATE THE INSTALLATION OF THE CONDUCTORS IN THE CONDUIT SYSTEM. 4. ALL CONDUCTORS SHALL BE STRANDED. NO SOLID WIRES PERMITTED.

1. WALL SWITCHES SHALL BE SPECIFICATION GRADE AC SILENT TYPE SWITCHES, 20A,

2. RECEPTACLES SHALL BE SPECIFICATION GRADE, DUPLEX TYPE, NEMA 5-20R, 20 AMPERE, 120 VOLT GROUNDED TYPE. SPECIAL APPLICATION RECEPTACLES SHAL BE INDICATED ON PLANS. MOUNT WITH THE GROUND DOWN.

3. DEVICE PLATES SHALL BE EQUAL TO SIERRA SMOOTH-LINE PLASTIC WALL PLATES COLOR SHALL BE WHITE, UNLESS OTHERWISE NOTED.

G. LIGHTING FIXTURES

1. PROVIDE ALL LIGHTING FIXTURES WIRED AND CONNECTED THE DRAWINGS INDICATE THE FIXTURES FOR EACH LOCATION. PROVIDE LAMPS FOR ALL FIXTURES. THE LAMPS SHALL BE BY THE SAME MANUFACTURER VERIFY CEILING CONSTRUCTION BEFORE ORDERING RECESSED UNITS. PROVIDE PLASTER FRAMES AND HANGERS AS REQUIRED. CEILING CONSTRUCTION ARCHITECTURAL ACCESSORIES, VOLTAGE, AND BALLASTS TO MEET THE EXISTING CONDITION.

H. SYSTEM GROUNDING 1. GROUNDING SHALL COMPLY WITH REQUIREMENTS OF ARTICLE 250. ALL EXPOSED

NONCURRENT CARRYING METALLIC PARTS OF ELECTRICAL EQUIPMENT. METALLIC RACEWAY SYSTEMS, METALLIC CABLE ARMOR, GROUNDING CONDUCTOR OF NONMETALLIC SHEATHED CABLES, GROUNDING CONDUCTOR IN NONMETALLIC RACEWAYS, AND GROUNDED CONDUCTORS OF THE WIRING SYSTEM SHALL BE 2. GROUNDING CONDUCTOR (NEUTRAL) OF THE WIRING SYSTEM SHALL BE

CONNECTED TO THE SYSTEM GROUNDING CONDUCTOR AT A SINGLE PLACE IN EACH SYSTEM BY REMOVABLE BONDING JUMPERS, SIZED ACCORDING TO THE APPLICABLE PROVISIONS OF THE NATIONAL ELECTRICAL CODE. THE GROUNDED CONDUCTOR (NEUTRAL) TO THE GROUNDING CONDUCTOR CONNECTION SHALL BE LOCATED IN THE ENCLOSURE FOR THE SYSTEM'S OVERCURRENT PROTECTION OR WHERE OTHERWISE INDICATED ON THE PLANS OR SPECIFICATIONS.

3. A GROUND BUS SEPARATE FROM THE NEUTRAL BUS SHALL BE PROVIDED IN ALL SWITCHBOARDS AND PANELBOARDS. GROUND BUS SHALL BE RETORQUED (CHECKED) PRIOR TO ENERGIZING EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS.

4. GROUND BUSES AND NEUTRAL BUSES IN ALL DISTRIBUTION PANELS, SWITCHBOARDS, PANELBOARDS, AND THOSE PROVIDED IN ANY EQUIPMENT SHALL BE ISOLATED EXCEPT WHERE REQUIRED TO BE CONNECTED AS SPECIFIED ABOVE FOR THE SERVICE ENTRANCE AND IN TRANSFORMER TERMINAL COMPARTMENTS.

5. WHEN INDICATED ON THE DRAWINGS, EQUIPMENT GROUNDING CONDUCTORS SHALL BE EXTENDED FROM THE GROUND BUS IN THE DISTRIBUTION EQUIPMENT TO THE RECEPTACLE, FIXTURE OR DEVICE LUGS WHERE THEY ARE PROVIDED. WHERE LUGS ARE NOT PROVIDED, EQUIPMENT GROUNDING CONDUCTORS SHALL BE CONNECTED TO EQUIPMENT ENCLOSURES. THE CONNECTIONS SHALL BE ARRANGED SUCH THAT REMOVAL OF THE RECEPTACLE. EQUIPMENT GROUND CONDUCTORS, OR GROUND JUMPERS FROM GROUND BUSING SHALL NOT AFFECT THE GROUND SYSTEM.

6. RACEWAYS MAY NOT BE USED AS A GROUNDING CONDUCTOR FOR POWER AND LIGHTING CIRCUITS. ALL CONDUIT SHALL HAVE SEPARATE CODE SIZED GREEN GROUND WIRE INSTALLED IN THE CONDUIT TO INSURE A CONTINUOS GROUNDING 7. IN INACCESSIBLE LOCATIONS, MAKE CONNECTIONS BY EXOTHERMIC WELD PROCESS.

8. IN ACCESSIBLE LOCATIONS, CONNECTIONS SHALL BE MADE WITH BOLTED THROUGH, APPROVED SOLDERLESS BRONZE GROUNDING DEVICES. 9. BOND TOGETHER METAL SIDING NOT ATTACHED TO GROUNDED STRUCTURE BOND TO

I. TELEPHONE SYSTEM

1. TELEPHONE WALL OUTLETS SHALL CONSIST OF STANDARD BOXES MOUNTED ABOVE THE FLOOR UNLESS OTHERWISE INDICATED. CONNECT OUTLETS TO TELEPHONE TERMINAL WITH SEPARATE 3/4" CONDUIT UNLESS OTHERWISE SI ON DRAWINGS. PROVIDE A TERMINAL MOUNTING BOARD FOR THE INCOMING SERVICE CABLE.

L. SHOP DRAWINGS AND APPROVALS

- 1. THE ITEMS SPECIFIED HEREIN AND ON DRAWINGS ARE USED AS A STANDARD OF QUALITY ANY MATERIALS OF FOUAL QUALITY AND AESTHETIC VALUE WIL GIVEN CONSIDERATION AS A SUBSTITUTE FOR THE MATERIALS SPECIFIED. N APPROVAL WILL BE GIVEN TO A SPECIFIC CATALOG NUMBER MODEL OR TYPI EQUIPMENT, PRIOR TO BIDDING. AFTER BIDDING, THE DECISION OF THE ARCH AND/OR ENGINEER DETERMINING EQUAL MATERIALS WILL BE FINAL.
- 2. THE CONTRACTOR SHALL SUBMIT SEVEN (7) IDENTICAL BOUND SETS OF SHOP DRAWINGS ON THE FOLLOWING NEW ITEMS WHERE SPECIFIED ON PLANS:
- A. LIGHTING FIXTURE CUTS AND PERFORMANCE DATA. B. OUTLINE DRAWINGS & DATA SHEETS OF EACH PANELBOARD &
- SWITCHBOARD. C. OUTLINE DRAWINGS OF ALL SWITCHGEAR.
- 3. SUBMIT ITEMS AT ONE TIME IN A NEAT AND ORDERLY MANNER WITHIN 15 DAYS AWARD OF CONTRACT. PARTIAL SUBMITTALS WILL NOT BE ACCEPTABLE.

I. RECORD AND AS-BUILT DRAWINGS

- 1. THE ELECTRICAL CONTRACTOR SHALL MAINTAIN A SET OF DRAWINGS AT THE SITE FOR THE EXCLUSIVE PURPOSE OF MAINTAINING A RECORD OF ALL WORK INSTALLED AND TO SHOW ANY DEVIATIONS FROM THE WORK INDICATED ON T DRAWINGS.
- J. LIGHTING CONTROL 1. FURNISH AND INSTALL TIME SWITCHES, PHOTOCELLS, CONTACTORS AND FUL LIGHTING CONTROL SYSTEMS AS REQUIRED FOR LIGHTING CONTROLS INDICA ON THE DRAWINGS
- 2. TIME SWITCHES SHALL BE EQUAL TO PARAGON, GENERAL ELECTRIC, TORK, O INTERMATIC AND SHALL HAVE SIZE AND NUMBER OF POLES AS REQUIRED.
- 3. PHOTOCELLS SHALL BE EQUAL TO TORK OR INTERMATIC WITH VOLTAGE AS INDICATED.
- K. GUARANTEE
- 1. GUARANTEE ALL MATERIAL FURNISHED AND ALL WORKMANSHIP PERFORMED FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE OF WORK. DEFECTS DEVELOPING WITHIN THIS PERIOD. TRACEABLE TO MATERIAL FURNISHED AS A PART OF THIS SECTION OR WORKMANSHIP PERFORMED HEREUNDER, SHALL BE MADE GOOD AT NO EXPENSE TO THE OWNER.

ELECTRICAL LEGEND LIGHTING

		LINEAR FLUORESCENT FIXTURE	
D 18"		SUSPENDED LINEAR FLUORESCENT FIXTURE	
HOWN	0	FLUORESCENT WALL MOUNT FIXTURE	
6		LINEAR FLUORESCENT STRIP FIXTURE	
	$\stackrel{\bigcirc}{\oplus}$	LIGHT FIXTURE - RECESSED OR SURFACE	
	\oplus	PENDANT FIXTURE	
) _L BE		WALL MOUNTED LIGHT FIXTURE	
O PE OF		ADJUSTABLE RECESSED MOUNTED LIGHT FIXTURE	
HITECT		RECESSED LIGHT FIXTURE	
		WALL SCONCE WALL WASHER	
P	A	LETTER REFERS TO FIXTURE TYPE	
1	•	MONO-POINT LIGHT FIXTURE	
		 TRACK LIGHT FIXTURE	
	•-	PARKING LOT POLE MOUNTED LIGHT FIXTURE	
	•		
/S OF		BOLLARD LIGHT FIXTURE	
		EXIT SIGN - CEILING MOUNTED	
	ΗŒ	EXIT SIGN - WALL MOUNTED	
E JOB K	⊗↓	EXIT SIGN - W/ARROWS INDICATE DIRECTION	
THE		EMERGENCY BATTERY UNIT WITH HEADS	
	•••••••••••••••••••••••••••••••••••••••	FIXTURE w/ EMERGENCY BATTERY OR GENERATOR	
	S	SINGLE POLE SWITCH, 20A, 120/277V	
LL ATED	S ₂	TWO POLE SWITCH, 20A, 120/277V	
OR	S ₃	THREE-WAY SWITCH, 20A, 120/277V	
	S ₄	FOUR-WAY SWITCH, 20A, 120/277V	
	S _d	DIMMER SWITCH, MIN. 2000W, 120/277V	
	SM	HP RATED MOTOR SWITCH WITH THERMAL OVERLOAD PROTECTION	
)	Sa	LOWER CASE LETTER DENOTES FIXTURES TO BE	
ANY	Sĸ	CONTROLLED KEY SWITCH, 20A, 120/277V	
	•	PUSH BUTTON CONTROL STATION	
	OS		F
	HOS	OCCUPANCY SENSOR - CEILING	┝
		OCCUPANCY SENSOR - WALL MOUNTED	•
	HOS D	OCCUPANCY SENSOR w/DIMMER- WALL MOUNTED	-
	LC	LIGHTING CONTACTOR	ŀ
	TC	TIME CLOCK	-
	PC	PHOTOCELL	1
		PHOTOCELL DUCT SMOKE DETECTOR	
			-
		DUCT SMOKE DETECTOR	
		DUCT SMOKE DETECTOR POWER	
		DUCT SMOKE DETECTOR POWER ISOLATED GROUND DUPLEX RECEPTACLE ISOLATED GROUND DUPLEX RECEPTACLE (CEILING MOUNTED)	
		DUCT SMOKE DETECTOR POWER ISOLATED GROUND DUPLEX RECEPTACLE ISOLATED GROUND DUPLEX RECEPTACLE (CEILING MOUNTED) SINGLE RECEPTACLE, NEMA 5-20R, 20A, 125V	
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APPLICABLE CODES

- 2016 CALIFORNIA BUILDING STANDARDS ADMINISTRATIVE CODE, 2016 CALIFORNIA BUILDING CODE (CBC), TITLE 24 C.C.R. 2016 CALIFORNIA ELECTRICAL CODE (CEC), TITLE 24 C.C.R. 2016 CALIFORNIA MECHANICAL CODE (CMC), TITLE 24 C.C.R. 2016 CALIFORNIA PLUMBING CODE (CPC), TITLE 24 C.C.R. 2016 CALIFORNIA GREEN BUILDING CODE (CGBC)
- 2016 CALIFORNIA ENERGY CODE ANY OTHER LOCAL AND STATE LAWS AND REGULATIONS

ELECTRICAL SHEET INDEX

SHEET NO.	SHEET TITLE	
E0.1	ELECTRICAL NOTES, LEGEND, ABBREVIATION AND SHEET INDEX	
E0.2	SINGLE LINE DIAGRAM & PANEL SCHEDULE	
E2.0	ELECTRICAL ROOF RENOVATION PLAN	

		ABBREVIATIONS	
۵ _{F-1}	SIGNAL	A AFF AF	AMPERE ABOVE FINISHED FLOOI ARC FAULT, AMP FUSE
	THERMOSTAT OUTLET AT +54" (HVAC UNIT DESIGNATION) ENCLOSED CIRCUIT BREAKER	AF AFG AIC AL ARCH'L	ABOVE FINISHED GRAD AMPERE INTERRUPTING ALUMINUM ARCHITECTURAL
R	RELAY	AS AMP AWG	SWITCH AMERICAN WIRE GAUGI
TS	TIME SWITCH CONTACTOR	BC BLDG	BARE COPPER BUILDING
Ŧ	TRANSFORMER	C CAB	
ATS	AUTOMATIC TRANSFER SWITCH	CAT C/B CKT	CATALOG/CATEGORY CIRCUIT BREAKER CIRCUIT
•	TELEPHONE OUTLET AT +18"	CLG CO, EC COMM	CEILING CONDUIT ONLY COMMUNICATION
\triangleleft	DATA OUTLET AT +18" COMBINATION TELE/COMPUTER OUTLET AT +18"	CU DEMO	COPPER DEMOLITION/DEM
4	TELEPHONE OUTLET ABOVE COUNTER	DISC. DN DWG	DISCONNECT DOWN DRAWING
4	TELE/DATA OUTLET ABOVE COUNTER	EA ELECT.	EACH ELECTRICAL
\triangleleft	DATA OUTLET ABOVE COUNTER	ELEV EM EMT	ELEVATOR EMERGENCY ELECTRICAL METALLIC
┥	FLUSH FLOOR BOX W \ COMBINATION TELE/DATA OUTLET TELEVISION OUTLET	EMT (E), EXIST (ER)	EQUIPMENT EQUIP
	TELEVISION CAMERA (CCTV)	FBO FF	FURNISHED BY OTHERS
SQ	FIRE ALARM HORN/STROBE	FIXT FLEX (STEEL)	FIXTURE FLEXIBLE METALLIC CO
CR (F3)		FLUOR FT	FLUORESCENT FEET OR FOOT
TS IS	FLOW SWITCH TAMPER SWITCH	GFA GFCI	GROUND FAULT ALARM GROUND FAULT CIRCUI INTERRUPTER
ŚD	SMOKE DETECTOR	GND HP	GROUND
\bigcirc	FIRE/SMOKE DAMPER	HVAC	HEATING, VENTILA CONDITIONING
<u>(</u>)	CARBON MONOXIDE DETECTOR (SPECIFIED BY MECHANICAL ENGINEER)	IBC IMC	INTERNATIONAL BUILDII INTERMEDIATE METAL (
(Ħ)	DUCT MOUNTED SMOKE DETECTOR HEAT DETECTOR	IN IRC CODE	INCH(ES) INTERNATIONAL RESIDE
s I	SPEAKER, CEILING OR WALL MOUNTED	ISC JB, J-BOX	SHORT CIRCUIT AMPER
DH	DOOR HOLD OPEN	KCMIL / MCM	THOUSAND CIRCULAR
DMX	LIGHTING CONTROL DMX HUB SINGLE LINE	KVA KW	KILOVOLT AMPERE KILOWATT
		LTG MAX.	LIGHTING MAXIMUM
≪	SERVICE CABLE TERMINATION	MCB MECH. MIN.	MAIN CIRCUIT BREAKEF MECHANICAL MINIMUM
	FUSE	MLO NC	MAIN LUGS ONLY MTD N
	FUSED DISCONNECT SWITCH	NEC NECA	NATIONAL ELECTRICAL NATIONAL ELECTR CONTRACTOR'S ASSOC
°‱	SWITCH SURGE SUPPRESSOR	NEMA NEUT	NATIONAL ELECTRICAL MANUFACTURERS ASSO NEUTRAL
÷.	CURRENT TRANSFORMER	NFC NF NIC	NATIONAL FIRE CODE NON-FUSIBLE NOT IN CONTRACT
٣	POTENTIAL TRANSFORMER	NL NO NTS	NIGHT LIGHT NORMALLY OPEN NOT TO SCALE
 	GROUNDING ELECTRODE	OCP	OVERCURRENT PROTEC
Ň	MOTOR	P PH PNL	POLE PHASE PANEL
<u>(</u> @/	GENERATOR	PV PVC PWR	PV PHOTOVOLTAIC POLYVINYL CHLORIDE POWER
জ জ		QTY	QUANTITY
Ň	GROUND FAULT INTERRUPT TRANSFER SWITCH	RECEP REQ'D RSC	RECEPTACLE REQUIRED RIGID STEEL CONDUIT
	CONTACT (NORMALLY OPEN)	(R) COMPLETE SCE	EXISTING TO BE REMOV
₩ ₩	CONTACT (NORMALLY CLOSED) TIME SWITCH	SCHED SECT SP	SCHEDULE SECTION SINGLE POLE
Т	CONTROL SWITCH PUSH BUTTON	SN SPEC SW	SOLID NEUTRAL SPECIFICATION SWITCH
	WIRING	SWBD SWGR SYS	SWITCHBOARD SWITCH GEAR SYSTEM
	CONDUIT ROUTED UNDERFLOOR / UNDERGROUND RACEWAY W/(2) #12 AND (1) #12	TEMP TELE	TEMPORARY
	RACEWAY W/#10 CONDUCTOR WITH (1) #12 GRND #10	T-STAT TTB BACKBOAF	THERMOSTAT TELEPHONE TERMINAL
	RACEWAY W/#12 CONDUCTORS FOR EMERGENCY	TTC TYP.	TELEPHONE TERMINAL TYPICAL
	RACEWAY TURNED UP RACEWAY TURNED DOWN	UBC UL U.N.O.	UNIFORM BUILDING COI UNDERWRITERS LABOR UNLESS NOTED OTHER
	HOMERUN TO PANELBOARD 3/4"C W/ 3#12 & (1) # 12G. CONDUCTORS UNO. PICK DEFINE # OF WIRES	V VA	VOLT OR VOLTAGE VOLT AMPERE
	CONDUIT CAP-OFF MISCELLANEOUS	VD VP	VOLTAGE DROP VAPOR PROOF
	EQUIPMENT TAG	W WCR WP	WATT, WIRE WITHSTAND CURRENT I UL LISTED WEATHERPR
+ SHEET	DIAGRAM TAG	3R XFMR	TRANSFORMER
\triangle	REVISION SYMBOL		
\mathbf{x}	KEYNOTE SYMBOL		
(E-XXX)	SCHEDULED EQUIPMENT		
	PANEL CALLOUT / DESIGNATION		
TITLE 24 C.C.R			
LL 27 0.0.K			

ABOVE FINISHED FLOOR

ARC FAULT, AMP FUSE ABOVE FINISHED GRADE

AMERICAN WIRE GAUGE

SHORT CIRCUIT AMPERES

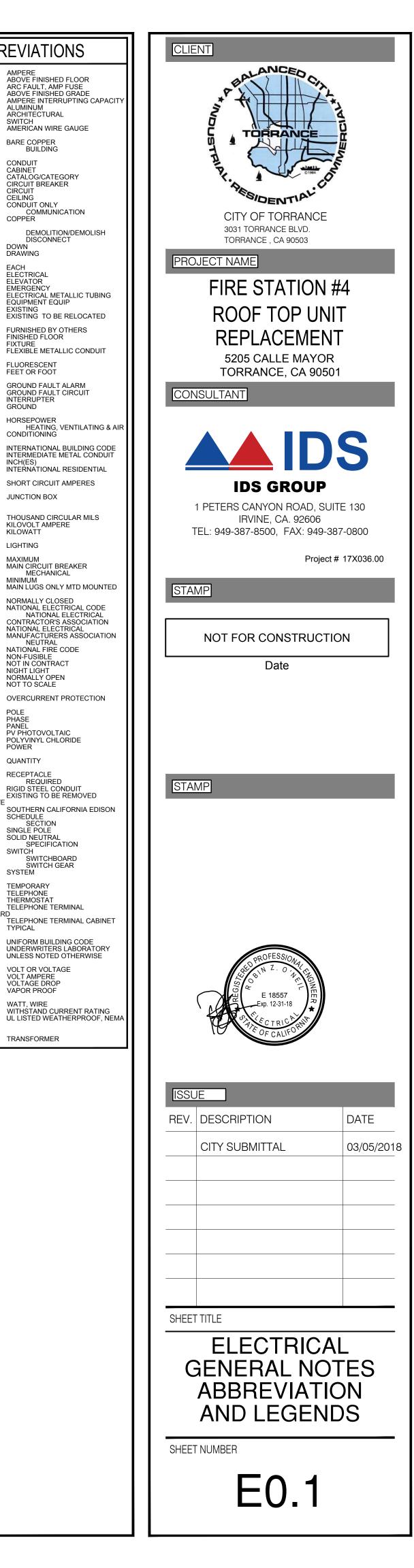
THOUSAND CIRCULAR MILS

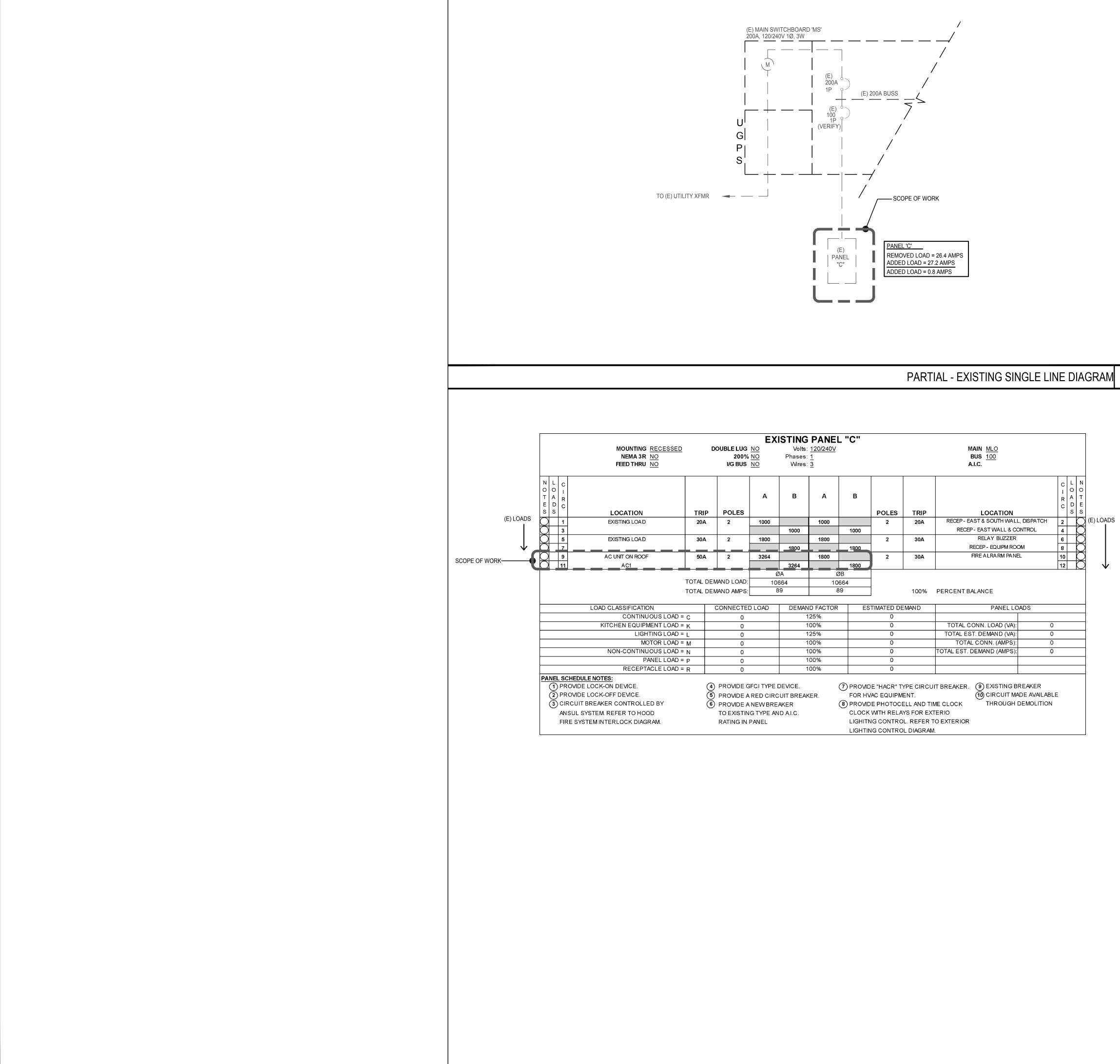
NATIONAL ELECTRICAL

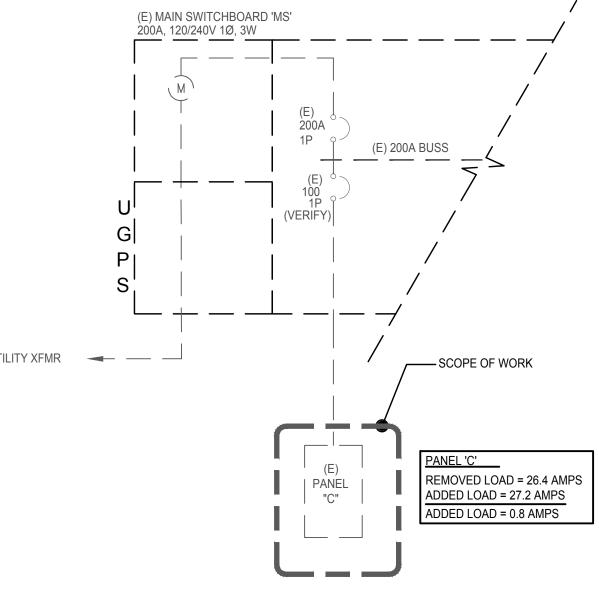
RIGID STEEL CONDUIT EXISTING TO BE REMOVED

UNIFORM BUILDING CODE

UNLESS NOTED OTHERWISE

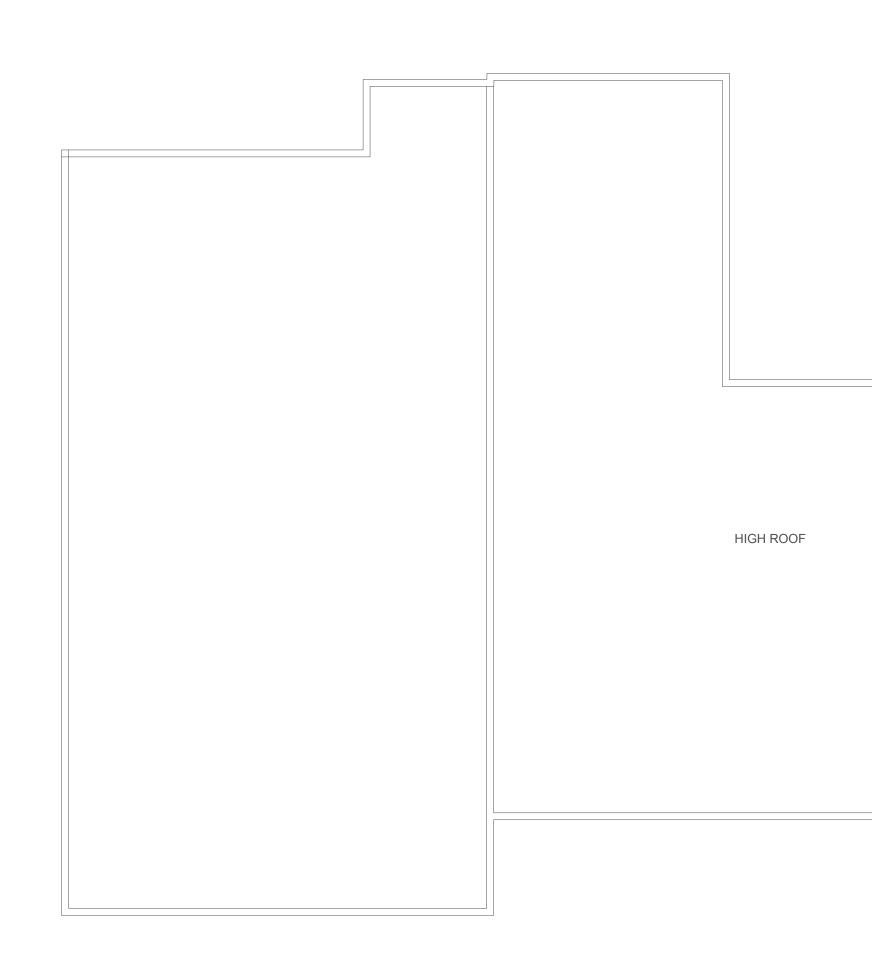


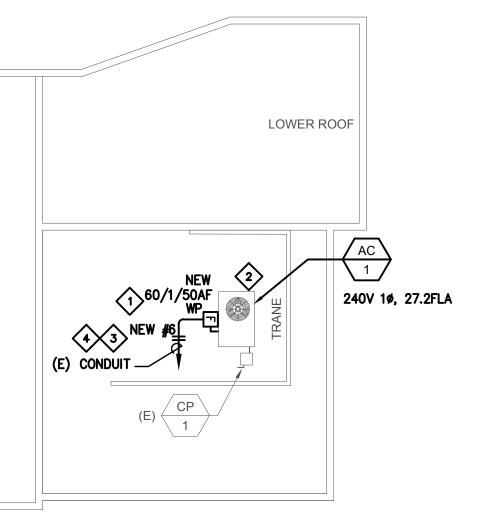




NONE

	SINC	GLE LINE GENERAL NOTES	CLIENT
		ALL OVERCURRENT DEVICES IN AN INDIVIDUAL PIECE OF EQUIPMENT SHALL HAVE AN AIC RATING EQUAL TO THE OVERALL RATING OF THE EQUIPMENT - SERIES RATING OF DEVICES WITHIN A PIECE OF EQUIPMENT IS NOT ALLOWED. SERIES CONNECTED DEVICES SHALL HAVE BEEN INVESTIGATED	CITY OF TORRANCE
		BY UL IN COMBINATION WITH THE END USE EQUIPMENT, AND THE EQUIPMENT IN WHICH THESE DEVICES ARE USED SHALL BE MARKED WITH THE SERIES CONNECTED RATING. ALL EQUIPMENT SHALL BE MARKED IN ACCORDANCE WITH NEC REQUIREMENTS.	THE RESIDENTIAL
	3.	ALL TERMINATIONS AND ENCLOSURES SHALL BE RATED FOR USE WITH 75 DEGREE CELSIUS CONDUCTORS.	
	4.	ALL SERVICE ENTRANCE EQUIPMENT, SWITCHBOARDS, DISTRIBUTION BOARDS, AND PANELBOARDS RATED AT 400 AMPS OR GREATER, SHALL BE PROVIDED WITH A MAIN OVERCURRENT DEVICE AND BUSSING RATED AT 100% CONTINUOUS OPERATION.	3031 TORRANCE BLVD. TORRANCE , CA 90503 PROJECT NAME FIRE STATION #4
	5.	ALL BRANCH OR FEEDER CIRCUIT OVER-CURRENT DEVICES RATED AT 400 AMPS OR HIGHER SHALL BE RATED FOR 100% CONTINUOUS OPERATION.	ROOF TOP UNIT
	6.	CONTRACTOR SHALL SUBMIT SWITCHBOARD SHOP DRAWINGS TO THE SERVING UTILITY FOR APPROVAL PRIOR TO FABRICATION. CONTRACTOR SHALL SECURE CONFIRMATION THAT THE PROPOSED SWITCHBOARD COMPLIES WITH THE POWER COMPANY REGULATIONS.	REPLACEMENT 5205 CALLE MAYOR TORRANCE, CA 90501 CONSULTANT
	7.	BUSSING: A. ALL BUSSING SHALL BE COPPER OR ALUMINUM IN CONSTRUCTION. MAIN HORIZONTAL AND VERTICAL BUSSING SHALL BE FULL CAPACITY IN ALL SWITCHBOARD SECTIONS.	
		B. HORIZONTAL AND VERTICAL BUSSING SHALL BE FULL LENGTH. ALL BUSSING SHALL HAVE A MINIMUM WITHSTAND RATING EQUAL TO THE AVAILABLE FAULT CURRENT INDICATED, BUT IN NO CASE SHALL THE RATING BE LESS THAN 65,000 AMPS, SYMMETRICAL.	IDS GROUP 1 PETERS CANYON ROAD, SUITE 130 IRVINE, CA. 92606
A	8.	 GROUND FAULT RELAY SETTINGS: A. TO MINIMIZE NUISANCE TRIPPING OF THE MAIN AND FEEDER BREAKER, THE CONTRACTOR SHALL ADJUST THE GROUND FAULT RELAY SETTINGS FOR ALL THE GFP DEVICES TO BE HIGHER THAN ALL DOWNSTREAM GFP AND NON-GFP DEVICES. THE GROUND FAULT CURRENT PICK-UP AND TIME DELAY SETTINGS SHALL BE ADJUSTED, PER THE MANUFACTURERS RECOMMENDATIONS, RESULTING FROM A CONTRACTOR/MANUFACTURER PREPARED COORDINATION STUDY - WHICH SHALL BE DOCUMENTED IN THE SHOP DRAWING SUBMITTAL. 	TEL: 949-387-8500, FAX: 949-387-0800 Project # 17X036.00
		 B. DURING THE CONSTRUCTION PHASE OF THE PROJECT, ALL GROUND FAULT RELAYS SHALL BE SET AT THE SHORTEST AVAILABLE TIME DELAY. C. AFTER ALL SETTINGS HAVE BEEN ADJUSTED, THE CONTRACTOR SHALL HAVE THE GROUND FAULT SYSTEM TESTED BY AN INDEPENDENT TESTING AGENCY PER NEC 230-95 (C). THIS TEST SHALL BE PERFORMED IN THE PRESENCE OF THE LOCAL AUTHORITY HAVING JURISDICTION AND THE TEST RESULTS SHALL BE DELIVERED TO THE ENGINEER OF RECORD. 	Date
			STAMP
			E 18557 Exp. 12-31-18 Contraction Exp. 12-31-18 Contraction Exp. 12-31-18
			ISSUE
			REV. DESCRIPTION DATE
			CITY SUBMITTAL 03/05/2018
			SHEET TITLE
			ELECTRICAL SINGLE LINE DIAGRAM & PANEL SCHEDULE
			SHEET NUMBER
			E0.2





1/8" = 1'-0"

PLAN GENERAL NOTES

- 1. ELECTRICAL CONTRACTOR SHALL REFER TO MECHANICAL/FLUWBING, AND ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS AND CHARACTERISTICS OF ALL EQUIPMENT LISTED N SCHEDULE. ANY MODIFICATIONS AND/OR ADDITIONAL WORK NECESSARY SHALL BE INCLUDED IN THE BASE BD.
- 2. ALL TEMPERATURE CONTROL AND INTERLOCK CONDUIT AND WRING SHALL BE BY ELECTRICAL CONTRACTOR <u>UNLESS NOTED OTHERWISE</u>, SEE MECHANICAL/PLUMBING DRAWINGS FOR ALL INFORMATION.
- 3. ELECTRICAL CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF ALL CONNECTION POINTS WITH THE EQUIPMENT INSTALLER PRIOR TO ROUGH-IN.
- 4. ELECTRICAL CONTRACTOR SHALL PROVIDE LOCAL REMOTE DISCONNECTING MEANS FOR ALL ELECTRIC HEATING EQUIPMENT IF REQUIRED BY THE LOCAL ELECTRICAL CODE.
- 5. ELECTRICAL CONTRACTOR SHALL COORDINATE THE ROUTING OF POWER WIRING TO ROOF-MOUNTED EQUIPMENT WITHIN MECHANICAL PIPE CURB ASSEMBLY. NO SEPARATE ROOF PENETRATIONS WILL BE PERMITTED. ALL WIRING SHALL BE BELOW THE ROOF IN AN ACCESSIBLE CEILING SPACE LOCATION.
- 6. ALL ROOF MOUNTED EQUIPMENT SHALL BE NEMA 3R RATED.
- 7. ALL DISCONNECT SWITCHES SHALL BE HP RATED IN ACCORDANCE WITH NEC. 48/0-1/29.
- 8. ALL PENETRATIONS THROUGH FRE RATED WALLS SHALL BE PROTECTED FROM THE SPREAD OF FRE WITH AN APPROVED FRESTOP SYSTEM EQUAL OR GREATER THAN THE FRE RATING OF THE WALL.

SHEET NOTES

- PROVIDE NEW WEATHER PROOF FUSED DISC. SWITCH AND SEALTIE CONDUIT FOR POWER CONNECTION TO HVAC. UNIT. COORDINATE WITH MECHANICAL CONTRACTOR.
- PROVIDE WEATHER PROOF J-BOX AND 3/4" SEALTIE CONDUIT FOR MECHANICAL CONTROLS CONNECTION. COORDINATE WITH MECHANICAL CONTROLS CONTRACTORS.
- REMOVE ALL EXISTING CONDUCTORS AND DISCONNECTS.
- NEW CONDUCTORS BACK IN EXISTING, CONDUIT.

CLIENT
CLIENT
TORRANCE TURNE
CITY OF TORRANCE 3031 TORRANCE BLVD. TORRANCE, CA 90503
PROJECT NAME FIRE STATION #4
ROOF TOP UNIT REPLACEMENT
5205 CALLE MAYOR TORRANCE, CA 90501
CONSULTANT
IDS GROUP 1 PETERS CANYON ROAD, SUITE 130 IRVINE, CA. 92606
TEL: 949-387-8500, FAX: 949-387-0800 Project # 17X036.00
STAMP
NOT FOR CONSTRUCTION Date
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E 18557 Exp. 12-31-18 Control Control
ISSUE
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ELECTRICAL ROOF RENOVATION PLAN
SHEET NUMBER