

SPECIFICATIONS

SCOPE OF WORK:

THE CONTRACTOR SHALL PROVIDE ALL ELECTRICAL EQUIPMENT, MATERIALS AND LABOR NECESSARY FOR A COMPLETE AND OPERABLE ELECTRICAL SYSTEM, INCLUDING BUT NOT LIMITED TO THE FOLLOWING ITEMS, AND SHALL PERFORM WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

- 1. COORDINATE WITH POWER UTILITY AND SHALL PROVIDE ALL THE NECESSARY LABOR AND MATERIALS REQUIRED THAT ARE NOT PROVIDED BY THE UTILITY. SEE STANDARDS AND PROJECT DRAWINGS ISSUED BY THE UTILITIES.
2. PROVIDE NEW METER/MAN PANELBOARDS AS SHOWN OR AS REQUIRED FOR THIS PROJECT.
3. PHASE 3 WILL BE CONDUIT INSTALLATION ONLY. WIRING WILL BE INSTALLED IN FUTURE, NOT PART OF THIS CONTRACT.

THE CONTRACTOR SHALL PROVIDE EQUIPMENT AND/OR INCIDENTAL MATERIALS REQUIRED TO COMPLETE THE ELECTRICAL WORK. TYPICAL MATERIALS WHICH MAY BE INCIDENTAL ARE TERMINAL LUGS NOT FURNISHED WITH VENDOR-SUPPLIED EQUIPMENT, COMPRESSION CONNECTORS FOR CABLES, SPLICES, JUNCTION AND TERMINAL BOXES, AND CONTROL WIRES BY VENDOR-FURNISHED EQUIPMENT TO INTERCONNECT WITH OTHER EQUIPMENT.

THE WORK SHALL ALSO INCLUDE THE COMPLETION OF DETAILS OF ELECTRICAL WORK ETC. NOT SHOWN WHICH MAY BE NECESSARY FOR THE SUCCESSFUL OPERATION OF ALL SYSTEMS DESCRIBED ON THE DRAWINGS AND INSTALLED AS PART OF THIS CONTRACT.

CODES, REGULATIONS AND STANDARDS:

THE FOLLOWING INDUSTRY STANDARDS, SPECIFICATIONS AND CODES ARE MINIMUM REQUIREMENTS.

- 1. THE LATEST NATIONAL ELECTRICAL CODE (NEC), AS ADOPTED AND AMENDED BY THE AUTHORITY HAVING JURISDICTION.
2. THE NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION STANDARDS (NEMA).
3. UNDERWRITERS LABORATORIES INCORPORATED (U.L.).
4. AMERICAN STANDARDS ASSOCIATION.
5. BUILDING CODE(S) AS ADOPTED BY THE AUTHORITY HAVING JURISDICTION.

ALL EQUIPMENT AND MATERIALS SHALL BE APPROVED BY AND SHALL BEAR THE LABEL OF UNDERWRITERS LABORATORIES INCORPORATED (U.L.) OR BE APPROVED AND LABELED BY AN INDEPENDENT TESTING LABORATORY ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION.

THE CONSTRUCTION AND INSTALLATION OF THE ELECTRICAL EQUIPMENT AND MATERIALS SHALL COMPLY WITH ALL APPLICABLE PROVISIONS OF THE OSHA SAFETY AND HEALTH STANDARDS (29CFR1910 AND 29CFR1926, AS APPLICABLE), STATE BUILDING STANDARDS, AND APPLICABLE CODES AND REGULATIONS.

INSPECTION OF SITE AND OF OTHER TRADES' DRAWINGS(S):

PRIOR TO SUBMITTING A BID FOR ELECTRICAL WORK THE CONTRACTOR SHALL VISIT THE SITE OF THE PROPOSED CONSTRUCTION AND SHALL THOROUGHLY ACQUAINT HIMSELF WITH THE EXISTING UTILITIES AND WORKING CONDITIONS TO BE ENCOUNTERED. NO ALLOWANCE WILL BE MADE AFTER CONTRACT AWARD FOR FAILURE TO COMPLY WITH THIS CONDITION PRIOR TO BIDDING.

REFER TO ALL OTHER DRAWINGS THAT PERTAIN TO THIS PROJECT AND REPORT ANY CONFLICTS WITH THE DESIGN AND INTENT OF THESE DOCUMENTS. SEE GENERAL SPECIFICATION NOTES AND CAUTION TO CONTRACTOR (BELOW).

STORAGE AND HANDLING:

DELIVER MATERIALS AND EQUIPMENT TO THE PROJECT IN THE MANUFACTURER'S ORIGINAL, UNOPENED, LABELED CONTAINERS. PROTECT AGAINST MOISTURE, TAMPERING, OR DAMAGE FROM IMPROPER HANDLING, ETC.

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 MATERIALS WHICH MAY BE AFFECTED BY THE WEATHER WHILE IN TRANSIT OR STORED AT THE PROJECT SITE. ANY MATERIAL FOUND DEFECTIVE OR NOT FUNCTIONAL OR NOT INSTALLED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS MAY BE REJECTED BY THE ENGINEER, OWNER OR AUTHORITY HAVING JURISDICTION.

THE CONTRACTOR SHALL SECURE AND PROTECT ALL MATERIALS AND EQUIPMENT AND BE RESPONSIBLE FOR ANY DAMAGE. ANY DAMAGE OR LOSS THAT MAY OCCUR DURING THIS PERIOD SHALL BE REPAIRED OR REPLACED TO ITS ORIGINAL CONDITION WITHOUT ADDITIONAL COST TO THE OWNER OR ENGINEER.

CLEANUP:

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

EXCAVATION BACKFILL:

WHERE APPLICABLE, THE CONTRACTOR SHALL PERFORM ALL EXCAVATION AND BACKFILL REQUIRED FOR WORK UNDER THIS DIVISION OF THE SPECIFICATIONS. TRENCH BOTTOMS SHALL BE GRADED TRUE AND BE FREE OF DEBRIS, STONES OR SOFT SPOTS. USE EXCAVATED MATERIALS FOR BACKFILL UNLESS OFF-SITE MATERIALS ARE DEEMED NECESSARY BY THE OWNER, ARCHITECT, ENGINEER OR AUTHORITY HAVING JURISDICTION. TRENCHING AND BACKFILLING FOR ELECTRICAL AND TELEPHONE UTILITY SERVICES TO THE BUILDING SHALL BE PROVIDED BY THE CONTRACTOR.

DRAWINGS:

THE DRAWINGS INDICATE GENERAL LAYOUT OR ARRANGEMENT AND LOCATIONS OF ELECTRICAL WORK ONLY. DATA PRESENTED ON THESE DRAWINGS ARE AS ACCURATE AS THE ENGINEER CAN DETERMINE. FIELD VERIFICATION IS REQUIRED OF ALL DIMENSIONS, LOCATIONS, LEVELS, ETC. TO SUIT FIELD REVIEW ALL ARCHITECTURAL, STRUCTURAL, MECHANICAL AND OTHER TRADES' DRAWINGS AND ADJUST ALL WORK TO MEET THE REQUIREMENTS OF THE EXISTING FACILITIES AND CONDITIONS. THE ARCHITECTURAL DRAWINGS SHALL TAKE PRECEDENCE OVER ALL OTHER DRAWINGS, UNLESS OTHERWISE CLARIFIED BY THE ARCHITECT OR THE AUTHORITY HAVING JURISDICTION. 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 THE BETTER QUALITY, AND APPROPRIATE ADJUSTMENTS WILL BE MADE AFTER CONTRACT AWARD. CONTRACTOR SHALL BE RESPONSIBLE TO FIELD MEASURE AND CONFIRM MOUNTING HEIGHTS AND LOCATIONS OF ELECTRICAL EQUIPMENT WITH RESPECT TO COUNTERS, RADIATION, ETC. DO NOT SCALE DISTANCE OFF THE ELECTRICAL DRAWINGS. USE ACTUAL BUILDING DIMENSIONS. SEE GENERAL SPECIFICATION NOTES AND CAUTION TO THE CONTRACTOR.

EXCAVATION, CUTTING AND FITTING:

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

COORDINATION AND COOPERATION WITH OTHER CONTRACTORS:

COORDINATE AND COOPERATE WITH THE OTHER CONTRACTORS SO THAT ELECTRICAL OUTLETS, CONDUITS, BOXES AND EQUIPMENT WILL BE SAFELY AND PROPERLY INSTALLED. ALL CONDUIT, FIXTURE AND OTHER EQUIPMENT LOCATIONS SHALL BE COORDINATED WITH OTHER TRADES TO AVOID CONFLICT WITH PIPING OR OTHER OBSTRUCTIONS.

COORDINATE THE LOCATIONS OF TRENCHES AND CONDUITS FOR ELECTRICAL UTILITY SERVICES WITH THE GENERAL CONTRACTOR.

MATERIALS:

ALL MATERIALS SHALL BE NEW AND EQUAL TO THE QUALITY SPECIFIED IN THE PLANS OR SPECIFICATIONS, AND MUST CARRY THE UNDERWRITERS LABORATORIES APPROVAL FOR THE PURPOSE(S) FOR WHICH THEY ARE USED, IN ADDITION TO MEETING ALL REQUIREMENTS OF THE CURRENT APPLICABLE CODES AND REGULATIONS. U.L. LISTINGS OF AN ASSEMBLY SHALL BE FOR THE ENTIRE ASSEMBLY, NOT FOR THE COMPONENTS ALONE.

PANELBOARDS:

PANELBOARDS AND DISCONNECT SWITCHES SHALL BE MANUFACTURED BY GENERAL ELECTRIC, SIEMENS, SQUARE D OR CUTLER HAMMER. INTERRUPTING RATINGS SHALL BE AS SHOWN ON THE DRAWINGS. SERVICES SHALL BE RATED AT 100% THROUGHOUT TO INCLUDE BUS AND MAIN CIRCUIT BREAKER.

PROVIDE ENGRAVED NAMEPLATES ON PANELBOARDS, DISCONNECT SWITCHES, ETC., INDICATING EQUIPMENT DESIGNATION (OR DESIGNATION OF EQUIPMENT BEING SERVED) AND VOLTAGE.

PANEL DIRECTORIES SHALL BE REMOVABLE, TYPED AND INSTALLED UNDER CLEAR PLASTIC COVERS.

DISCONNECT SWITCHES SHALL BE HEAVY DUTY TYPE.

CIRCUIT BREAKERS SHALL BE FULL SIZE. FOR COMMERCIAL INSTALLATIONS, CIRCUIT BREAKERS SHALL BE BOLT-ON TYPE HALF SIZE CIRCUIT BREAKERS ARE NOT ACCEPTABLE.

WIRE TERMINATION PROVISIONS FOR PANELBOARDS, CIRCUIT BREAKERS, SAFETY SWITCHES AND ALL OTHER ELECTRICAL APPARATUS SHALL BE LISTED AS SUITABLE FOR 75 DEGREE C.

WIRE AND CABLE:

UNLESS NOTED OTHERWISE, ALL FEEDER AND BRANCH CIRCUIT CONDUCTORS SHALL BE COPPER, 600V, 75 DEGREE C, TYPE THW, THWN, THHN, OR XHHW, FOR GENERAL USE. ALL INSULATION SHALL BE COLOR CODED PER THE NEC TO PROVIDE PHASE IDENTIFICATION. THE MINIMUM WIRE SIZE SHALL BE NO. 12 AWG. FOR BRANCH CIRCUITS WITH LENGTHS EXCEEDING 100 FEET FROM THE PANEL TO THE CENTER OF THE LOAD, CONDUCTORS SHALL NOT BE SMALLER THAN NO. 10 AWG. ALL CONDUCTORS LARGER THAN NO. 10 AWG SHALL BE STRANDED.

NO WIRES SHALL BE INSTALLED IN THE CONDUIT SYSTEM UNTIL THE CONDUIT SYSTEM IS COMPLETE. USE MINERALAC #100 OR EQUIVALENT AS LUBRICANT TO FACILITATE INSTALLATION OF CONDUCTORS IN THE CONDUIT SYSTEM. CONTRACTOR MAY USE MC CABLE OR NON-METALLIC CABLE PROVIDED THAT MATERIALS AND INSTALLATION ARE IN COMPLIANCE WITH ALL APPLICABLE CODES AND ARE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION.

CONDUITS:

ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METALLIC CONDUIT (IMC) AND MC CABLE MAY BE USED IN ALL INTERIOR AREAS. ELECTRICAL METALLIC TUBING (EMT) SHALL NOT BE USED IN DIRECT CONTACT WITH THE EARTH, IN CONCRETE SLABS, IN CONCRETE WALLS OR AREAS THAT ARE SUBJECT TO PHYSICAL DAMAGE. ALL HOMERUNS SHALL BE OF EMT, IMC, RGS OR MC CABLE. FLEXIBLE STEEL CONDUITS SHALL BE USED FOR INDOOR FINAL CONNECTIONS TO ALL MECHANICAL EQUIPMENT NOT TO EXCEED THREE FEET AND RECESSED REMOVABLE FLUORESCENT LIGHT FIXTURES NOT TO EXCEED SIX FEET. PROVIDE LIQUID-TIGHT FLEXIBLE CONDUIT ON ALL WEATHER EXPOSED INSTALLATIONS. RACEWAYS UNDER SLAB-ON-GRADE SHALL BE SCHEDULE 40 PVC. TRANSITIONS FROM BELOW TO ABOVE GRADE SHALL BE MADE WITH RGS ELBOWS WITH POLYETHYLENE TAPE, SPIRAL WRAPPED, AT LEAST 1/2" OVERLAP, WRAPPED TO PROVIDE DOUBLE THICKNESS. NO EXCEPTIONS.

WHERE CONDUIT RACEWAYS ENTER OUTLET BOXES, JUNCTION BOXES, FIXTURES OR CABINETS, FIRMLY FASTEN IMC CONDUIT RACEWAYS WITH DOUBLE LOCKNUTS AND BUSHINGS. USE SLIP-ON FITTINGS ON EMT CONDUIT RACEWAYS. FITTING SHOULDERS SHALL SEAT FIRMLY AGAINST THE BOX OR CABINET, WITH ONE LOCKNUT ON THE INSIDE OF BOXES AND CABINETS. FIRMLY FASTEN CONDUIT TO THE BUILDING STRUCTURE.

COVER ALL METALLIC CONDUIT IN CONTACT WITH THE EARTH WITH POLYETHYLENE TAPE, SPIRAL WRAPPED, AT LEAST 1/2" OVERLAP WRAPPED TO PROVIDE DOUBLE THICKNESS. TAPE SHALL BE SCOTCH NO. 50. PVC CONDUIT AND DUCTS NOT UNDER BUILDINGS SHALL BE RUN A MINIMUM OF 18" BELOW GRADE, UNLESS OTHERWISE INDICATED, WITH THE EXCEPTION THAT CONDUIT BENDS LARGER THAN 1" IN DIAMETER SHALL BE MADE WITH GALVANIZED STEEL CONDUIT TREATED AS NOTED ABOVE.

ALL EMPTY CONDUITS SHALL BE PROVIDED WITH PULL STRING.

SAFETY SWITCHES:

UNLESS OTHERWISE INDICATED ON THE DRAWINGS, SAFETY SWITCHES SHALL BE HEAVY DUTY TYPE, 600 OR 250-VOLT, WITH THE NUMBER OF POLES REQUIRED. THE SWITCH SHALL BE AS REQUIRED BY CODE AND AS INDICATED ON THE DRAWINGS. WHEN LOCATED OUTSIDE THE BUILDING, THE SWITCHES SHALL BE NEMA 3R. ALL SWITCHES SHALL BE LOCKABLE.

FUSES:

FUSES SHALL BE OF THE SIZE AND RATING INDICATED ON THE DRAWINGS. ALL FUSES SHALL BE AS MANUFACTURED BY COOPER BUSSMAN, LITTLEFUSE OR BY GOULD SHAWMUT. VERIFY FUSE AND SWITCH REQUIREMENTS FOR THE ACTUAL EQUIPMENT BEING SUPPLIED.

PROVIDE DYMO-TAPE TAG INSIDE COVER OF EACH FUSIBLE SWITCH, INDICATED SIZE AND TYPE OF FUSES PROVIDED.

GUARANTEE:

CONTRACTOR SHALL GUARANTEE THE INSTALLATION AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP WHICH MAY OCCUR UNDER NORMAL USAGE FOR A PERIOD OF ONE YEAR AFTER OWNER'S ACCEPTANCE. ANY DEFECTS ARISING WITHIN THIS PERIOD THAT ARE THE RESULT OF MATERIALS FURNISHED AS PART OF THIS SECTION OR WORKMANSHIP PERFORMED HEREUNDER SHALL BE REPAIRED, REPLACED OR OTHERWISE MADE GOOD TO THE OWNER'S SATISFACTION IN ACCORDANCE WITH ACCEPTABLE INDUSTRY STANDARDS AND PRACTICE. ALL SUCH REPAIR OR REPLACEMENT OF DEFECTIVE WORK AND/OR MATERIALS SHALL BE PERFORMED AT NO ADDITIONAL COST TO THE OWNER.

GENERAL SPECIFICATION NOTES AND CAUTION TO CONTRACTOR:

ALL DRAWINGS, SPECIFICATIONS, SCHEDULES AND OTHER RELATED DOCUMENTS ARE COMPLETE AND ACCURATE ACCORDING TO THE BEST KNOWLEDGE OF THE ENGINEER AND DESIGNER. THE CONTRACTOR SHALL VERIFY THE ACTUAL EQUIPMENT TO BE INSTALLED, INCLUDING ALL ELECTRICAL REQUIREMENTS, INSTALLATION REQUIREMENTS, CLEARANCES, ETC., AND SHALL COORDINATE ALL WORK WITH DRAWINGS PREPARED BY OTHERS.

PROVIDE WITH SHOP DRAWINGS SUBMITTAL 1/4" SCALE LAYOUT DRAWINGS OF ROOMS WITH ELECTRICAL SWITCHGEAR AND TRANSFORMERS. LAYOUTS SHALL SHOW LOCATIONS OF EQUIPMENTS AND SHALL BE COORDINATED WITH MECHANICAL EQUIPMENT AND EQUIPMENT SHALL BE DRAWN TO SCALE.

VERIFY EXACT LOCATION OF EQUIPMENT TO BE FURNISHED BY OTHERS PRIOR TO ROUGH-IN.

VERIFY EXACT LOCATIONS OF EXISTING AND NEW UNDERGROUND UTILITIES, PIPING AND RACEWAY SYSTEMS PRIOR TO TRENCHING. PROVIDE NECESSARY TRENCHING, BACKFILL, EXCAVATION, SUPPORTS, SERVICE FEEDERS (CONDUIT AND/OR WIRE), PULLBOXES, TRANSFORMER PADS, SAWCUTTING AND PATCHING, CONCRETE/PAVING, ETC. AS REQUIRED. BACKFILL TRENCHES TO 90% COMPACTION AND PATCH TO MATCH EXISTING. CONTRACTOR SHALL OBTAIN AND VERIFY EXACT UTILITY COMPANY DRAWINGS AND REQUIREMENTS.

IT IS THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS TO ESTABLISH A STANDARD OF QUALITY. THE ENGINEER RESERVES THE RIGHT TO VERBALLY APPROVE METHODS AND MATERIALS NOT REFLECTED HEREIN.

CONTRACTOR SHALL VISIT THE SITE PRIOR TO BID AND VERIFY THAT CONDITIONS ARE AS INDICATED. CONTRACTOR SHALL INCLUDE IN HIS BID, COSTS REQUIRED TO MAKE HIS WORK MEET EXISTING CONDITIONS.

PROPOSED SUBSTITUTIONS OF ELECTRICAL EQUIPMENT OR REQUEST FOR "OR EQUAL" OR "APPROVED EQUAL" LISTING SHALL BE SUBMITTED TO ARCHITECT NOT LESS THAN TEN (10) WORKING DAYS PRIOR TO BID. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

WORK SHALL BE PERFORMED IN A WORKMANLIKE MANNER TO THE SATISFACTION OF THE ARCHITECT/ENGINEER.

ALL MATERIALS SHALL BE NEW AND SIMILAR MATERIALS SHALL BE OF THE SAME MANUFACTURER.

PROVIDE PERMITS AND INSPECTIONS AS REQUIRED.

GUARANTEE THE INSTALLATION AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP WHICH MAY OCCUR UNDER NORMAL USAGE FOR A PERIOD OF ONE YEAR AFTER OWNER'S ACCEPTANCE. DEFECTS SHALL BE PROMPTLY REMEDIATED WITHOUT COST TO THE OWNER.

PROVIDE RECORD DRAWINGS TO THE ARCHITECT. DRAWINGS SHALL INCLUDE ALL ADDENDUM ITEMS, CHANGE ORDERS, ALTERATIONS, REROUTINGS, ETC.

SYSTEMS SHALL BE TESTED FOR PROPER OPERATION. IF TESTS SHOW THAT WORK IS DEFECTIVE, CONTRACTOR SHALL MAKE CORRECTIONS NECESSARY AT NO COST TO OWNER.

PRESENT SHOP DRAWINGS SUBMITTAL DATA AT ONE TIME, BOUND IN THREE (3) RING BINDERS, INDEXED IN A NEAT AND ORDERLY MANNER. PARTIAL SUBMITTALS WILL NOT BE ACCEPTED. SUBMITTALS SHALL INCLUDE BUT NOT BE LIMITED TO: SWITCHGEAR, PANELBOARDS, WIRING DEVICES, COVER PLATES, SAFETY SWITCHES, FUSES, CONDUIT AND CONDUIT FITTINGS.

SPLICES IN EXTERIOR PULLBOXES OR MANHOLES SHALL BE MADE WATERPROOF USING 'SCOTCHCAST' SPLICE KIT OR APPROVED EQUAL. SEAL ENDS OF CONDUITS AND DUCTS WITH 'DUCTSEAL' OR APPROVED EQUAL.

ALL EMPTY RACEWAY SYSTEMS SHALL HAVE A #12 PULLWIRE OR EQUAL AND SHALL BE IDENTIFIED AT ALL JUNCTION, PULL AND TERMINATION POINTS, USING PERMANENT METALLIC TAGS. TAGS SHALL INDICATE INTENDED USE FOR CONDUIT, ORIGIN AND TERMINATION POINTS OF EACH INDIVIDUAL CONDUIT.

INSTALLATION OF CONDUITS SHALL BE ROUTED CONCEALED WHERE POSSIBLE.

ALL WIRING SHALL BE INSTALLED IN METALLIC RACEWAYS. RACEWAYS IN SLAB-ON-GRADE OR BELOW GRADE SHALL BE SCHEDULE 40 PVC.

EMT FITTINGS SHALL BE SLIP-ON TYPE.

NON-METALLIC AND FLEXIBLE METAL CONDUITS SHALL HAVE A CODE SIZED COPPER GROUNDING CONDUCTOR. INCREASE CONDUIT SIZE AS REQUIRED. FLEXIBLE METAL CONDUIT SHALL NOT EXCEED 6 FEET IN LENGTH.

ALL BELOW GRADE CONDUITS SHALL BE WATERTIGHT/SEALED TO PREVENT LEAKING.

ALL UNDERGROUND SERVICE CONDUITS SHALL BE SEALED AS PER NEC 230.8.

SHEET INDEX

Table with columns for SHEET NO., SHEET TITLE, and REVISIONS. Includes sheets E0, E1, and E2.

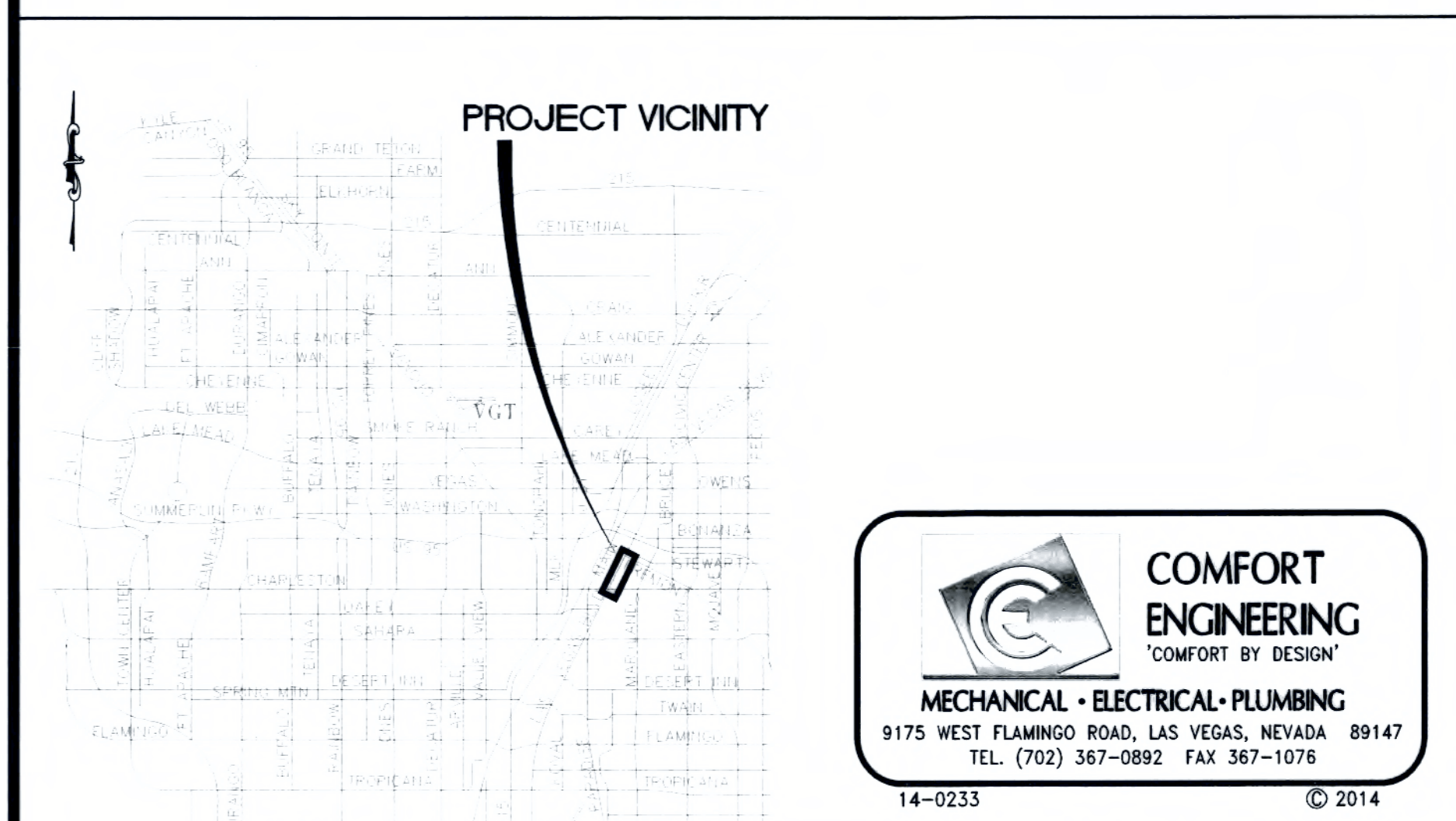
SYMBOL LIST (NOT ALL SYMBOLS ARE USED)

Table listing symbols for various electrical components like terminal cabinets, switchboards, panelboards, junction boxes, transformers, time switches, and service pedestals.

ABBREVIATIONS

Table listing abbreviations for electrical terms such as AMPERE, ALTERNATING CURRENT, AIR CONDITIONING, AMERICAN DISABILITIES ACT, ABOVE FINISHED FLOOR, ABOVE FINISHED GRADE, AMPERES, AMPERAGE, AMERICAN WIRE GAUGE, BARE COPPER, CONDUIT, CIRCUIT BREAKER, CONDUIT ONLY, COMMUNICATIONS, COPPER, DOUBLE POLE DOUBLE THROW DRAWING, ELECTRICAL CONTRACTOR, EXHAUST FAN, EMERGENCY, ELECTRICAL METALLIC TUBING, ELECTRIC HEATING UNIT, ELECTRIC WATER COOLER, FULL LOAD AMPERES (NAMEPLATE) FURNISHED BY OTHERS, FULL LOAD CURRENT (NEC) FLUORESCENT, GROUND FAULT INTERRUPTER, GROUND, HIGH INTENSITY DISCHARGE, HAND-OFF-AUTOMATIC, HORSEPOWER, HIGH PRESSURE SODIUM, HEATING, VENTILATING, A/C, HERTZ - CYCLES PER SECOND, INTERMEDIATE METAL CONDUIT, J-BOX, LIGHTING CONTACTOR, LIGHTING, MAXIMUM, MOTOR CONTROL CENTER, MAIN CONTROL BOARD, MOTOR CIRCUIT PROTECTOR, MINIMUM, MAIN LUGS ONLY, NORMALLY CLOSED, NATIONAL ELECTRICAL CODE, NIGHT LIGHT, NORMALLY OPEN, NEVADA POWER COMPANY, NOT IN CONTRACT, ON CENTER, PUSH BUTTON, PHOTOCELL, PHASE, PANEL, POLYVINYL CHLORIDE, RECEPTACLE, ROOT MEAN SQUARE, SHEET SPECIFICATIONS, SINGLE POLE SINGLE THROW STATION, TIME CLOCK, TYPICAL, UNDERGROUND, UNLESS OTHERWISE NOTED, VOLTAGE, VOLTS, VOLTS ALTERNATING CURRENT, VARIABLE FREQUENCY DRIVE, WATTS, WIRE, WEATHERPROOF, TRANSFORMER, 2#10 3 CONDUCTORS AT #10 AWG, 3/4" 4 EACH 4 INCH CONDUITS, MOUNTING HEIGHTS ARE TO CENTERLINE OF DEVICE ABOVE FINISH FLOOR OR FINISH GRADE. VERIFY EXACT MOUNTING HEIGHTS PER ADA REQUIREMENTS.

VICINITY MAP

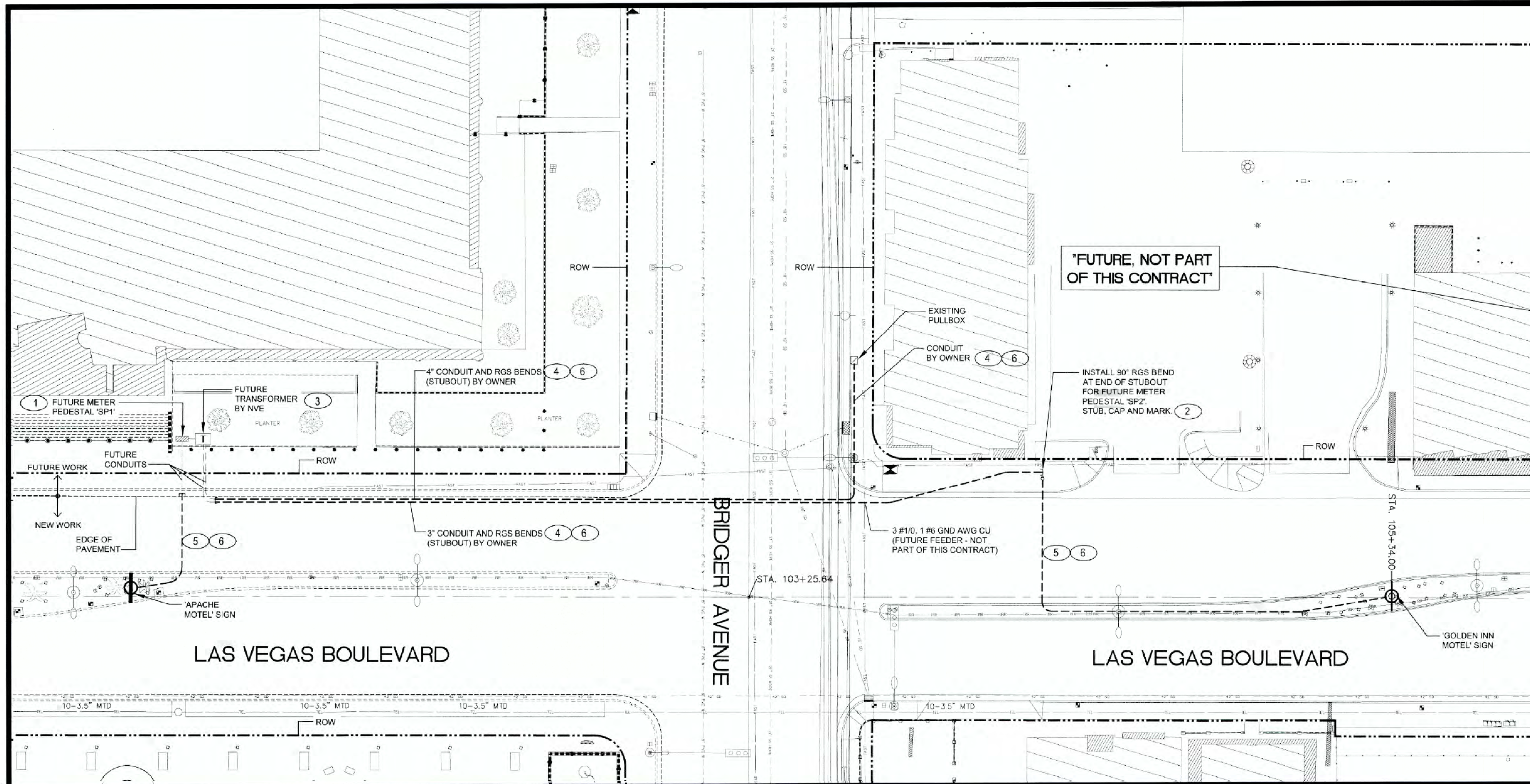


COMFORT ENGINEERING logo and contact information: 9175 WEST FLAMINGO ROAD, LAS VEGAS, NEVADA 89147. TEL. (702) 367-0892 FAX 367-1076. 14-0233 © 2014

APPROVED FOR CONSTRUCTION. LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER. DATE: 8/3/15 PROJECT# 123668

Vertical sidebar containing project information: CITY OF LAS VEGAS, LAS VEGAS BOULEVARD NEON SIGNS, PHASE 3, ELECTRICAL SPECS, SYMBOL LIST, SHEET INDEX AND VICINITY MAP, PREPARED BY, DESIGNED BY, DRAWN BY, CHECKED BY, SUBMITTAL STAGE: FINAL, SHEET E0, 5 of 7, DRAWING NO. 107V4819-3, FEDERAL PROJECT NO. SB-0003(184).

7/29/15 I:\A\CL\DC14\CLVA14-0233 LV BLDG NEON SIGN PHASE 3\ELEC14-0233 LV BLDG RECORD.DWG



**ELECTRICAL SITE PLAN**

SCALE: 1" = 20'-0"



CALL BEFORE CONSTRUCTION		
BEFORE YOU DIG	USA NORTH	811 OR 800-227-2600
	F.A.S.T.	702-432-5300
BEFORE YOU UNDERGROUND	CLARK COUNTY TRAFFIC OPERATIONS	702-455-7511
	CITY OF LAS VEGAS T.E.F.O.	702-229-6611
BEFORE YOU OVERHEAD	NV ENERGY	702-227-2929

**KEYED PLAN NOTES**

- 1 FUTURE SERVICE PEDESTAL 'SP1'. REFER TO SHEET E2 FOR ADDITIONAL INFORMATION.
- 2 FUTURE SERVICE PEDESTAL 'SP2'. REFER TO SHEET E2 FOR ADDITIONAL INFORMATION.
- 3 PROPOSED UTILITY COMPANY TRANSFORMER LOCATION. VERIFY EXACT LOCATION WITH UTILITY COMPANY APPROVED DRAWINGS PRIOR TO ROUGH-IN. PROVIDE VEHICULAR PROTECTIVE BARRIERS PER UTILITY COMPANY STANDARDS RS-6.
- 4 REFER TO UTILITY COMPANY APPROVED DRAWINGS FOR ROUTING, CONDUIT SIZE AND FEEDERS.
- 5 (8) 1" CONDUIT AND (1) 2" CONDUIT MINIMUM ROUTED UNDERGROUND TO BE TERMINATED ON POLE BASE SIGN AS INDICATED. EXACT QUANTITY OF CONDUITS MUST BE VERIFIED WITH SIGNAGE REQUIREMENT PRIOR TO BIDDING AND INSTALLATION.
- 6 MAINTAIN A MINIMUM 3' PARALLEL SEPARATION WITH WATER FACILITIES. MAINTAIN MINIMUM 12" VERTICAL SEPARATION AT ALL POINTS OF CROSSING WITH WATER FACILITIES.

**GENERAL NOTES**

1. ALL WIRING SHALL BE IN APPROVED RACEWAY.
2. WIRE SIZE SHALL BE MINIMUM #12 AWG, THWN SOLID COPPER UNLESS OTHERWISE NOTED. PROVIDE GROUND WIRE WHERE REQUIRED BY CODE. INCREASE WIRE SIZE TO COMPENSATE FOR VOLTAGE DROP WHERE TOTAL LENGTH OF ANY BRANCH EXCEEDS 100 FEET.
3. WIRE SIZE SHALL NOT BE LESS THAN CORRESPONDING CIRCUIT BREAKER RATING AS REQUIRED BY CODE.
4. MAXIMUM NUMBER OF UNGROUNDED WIRES IN ANY CONDUIT SHALL BE THREE. ADDITIONAL WIRES ARE ACCEPTABLE IF WIRE SIZE IS INCREASED TO ALLOW FOR DERATING PER CODE. PROVIDE ADDITIONAL WIRES FOR SWITCHING AS REQUIRED.
5. ALL CONDUIT SHALL BE INSTALLED WITHIN ROW ONLY.
6. UTILITY COMPANY CONDUITS & ROUTING SHOWN FOR BIDDING PURPOSES ONLY. ACTUAL LOCATION SIZE & ROUTING SHALL BE DETERMINED BY THE UTILITY COMPANY AND APPROVED BY OWNER. CONTACT UTILITY COMPANY FOR COORDINATION & INSTALLATION REQUIREMENTS.
7. SIGN INSTALLATIONS SHALL COMPLY WITH ARTICLE 600 OF THE NATIONAL ELECTRIC CODE.
8. SAWCUT EXISTING CONCRETE AND/OR ASPHALT ROADWAY TO ACCOMMODATE NEW WORK AS REQUIRED. PATCH TO MATCH EXISTING.

NO.	DATE	REVISIONS

PREPARED BY: CITY OF LAS VEGAS  
 DEPARTMENT OF PUBLIC WORKS  
 CAPITAL PROJECT MANAGEMENT

PREPARED FOR: CITY OF LAS VEGAS  
 BID# 15-42371-01-JH  
 H# 42371  
 DATE: JUNE 2015  
 DESIGNED BY: MHA  
 DRAWN BY: WIP  
 CHECKED BY: DM  
 SUBMITTAL STAGE: FINAL

TITLE: LAS VEGAS BOULEVARD NEON SIGNS, PHASE 3  
 SHEET: SITE ELECTRICAL PLAN AND HISTORICAL SIGN PHOTOS

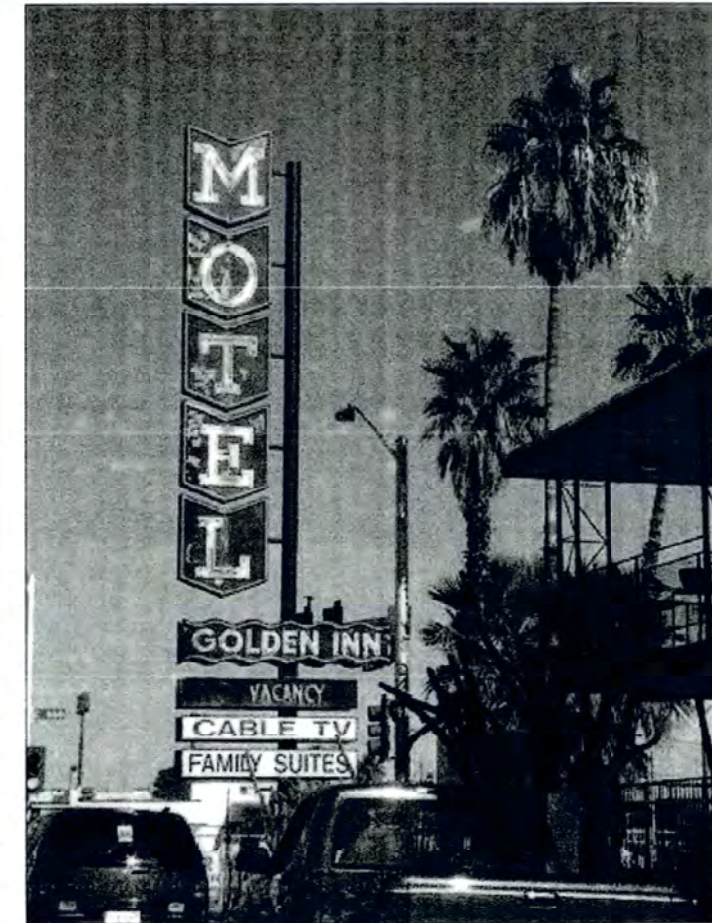
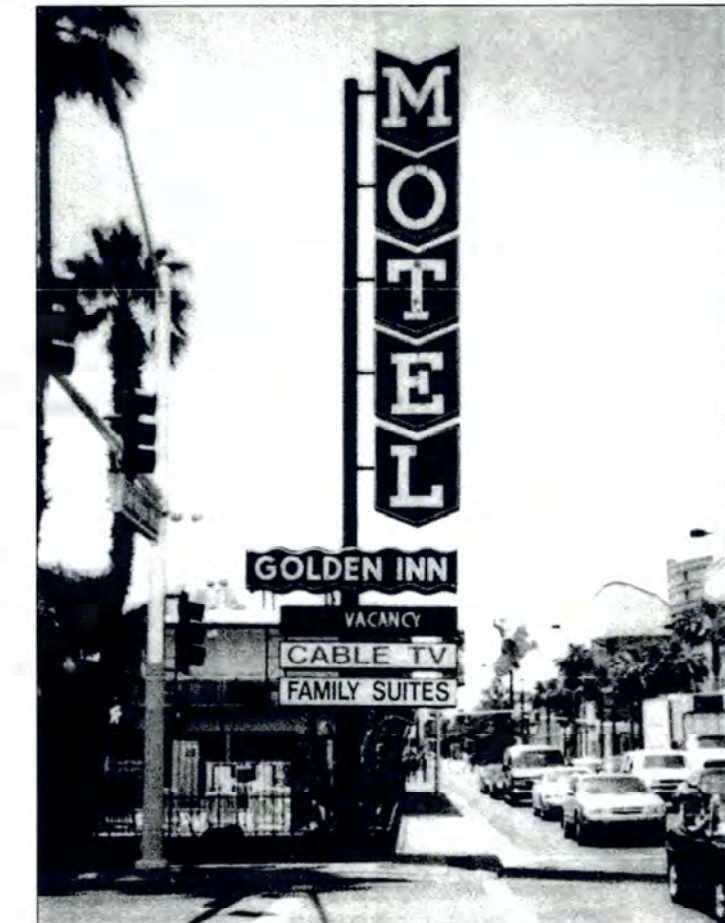


**COMFORT ENGINEERING**  
 "COMFORT BY DESIGN"  
 MECHANICAL • ELECTRICAL • PLUMBING  
 9175 WEST FLAMINGO ROAD, LAS VEGAS, NEVADA 89147  
 TEL. (702) 367-0892 FAX 367-1076  
 14-0233 © 2014

APPROVED FOR CONSTRUCTION  
  
 LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER  
 DATE: 8/3/15 PROJECT# 123668  
 FEDERAL PROJECT NO. 88-0003(184)



HISTORICAL PHOTOS OF "APACHE MOTEL" SIGN



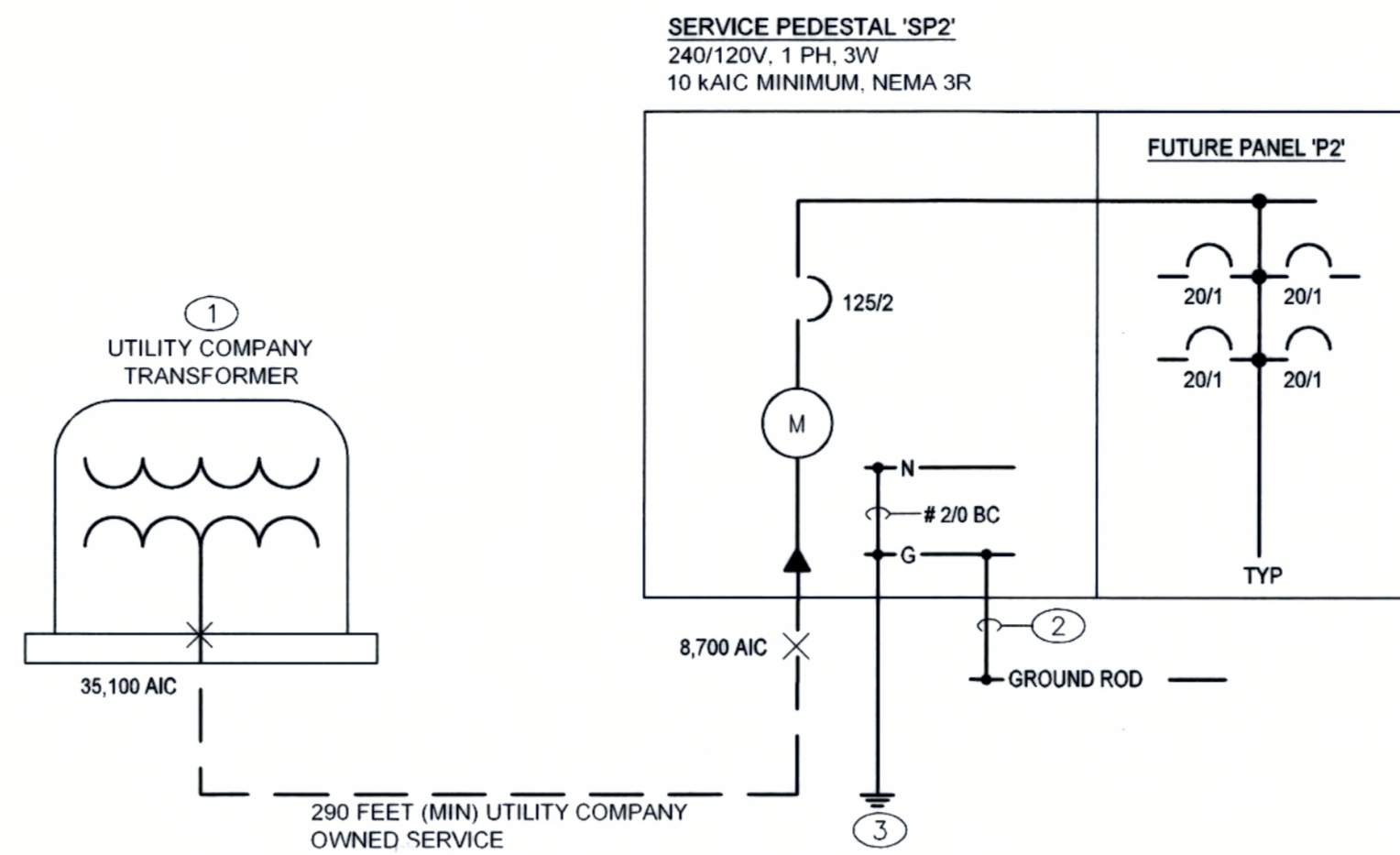
HISTORICAL PHOTOS OF "GOLDEN INN MOTEL" SIGN

7/29/15, 1:40:14, I:\AQ\TDC14\CLV14-0233 LV BLVD NEON SIGN PHASE 3\ELEC14-0233 LV BLVD NEON.DWG

7/29/15 I:\VAC\TDC14\CLV14-0233 LV BLVD NEON SIGN PHASE 3\ELEC14-0233 LV BLVD NEON.DWG

FUTURE PANEL 'P2'				X SERVICE ENTRANCE				SLIP-ON CIRCUIT BREAKERS			
VOLTS: 240/120				X METER				X BOLT-ON CIRCUIT BREAKERS			
PANEL AMP RATING: 125				X NEMA 1				X ALUMINUM BUS			
MAIN BREAKER AMP RATING: 125				X NEMA 3R				X COPPER BUS			
MINIMUM KAIC: 10				X SURFACE MOUNT							
PHASE: 1				X FLUSH MOUNT							
WIRE: 3				X HINGE DOOR							
NEUTRAL: FULL SIZE				X DOOR IN DOOR				PANEL LOCATION			
GROUND: CU-SOLID				X LATCH/LOCK DOOR				SEE FLOOR PLAN			
CKT NO.	CIRCUIT DESCRIPTION	BKR SIZE	LOAD TYPE	LOADS (VA)		LOADS (VA)		LOAD TYPE	BKR SIZE	CIRCUIT DESCRIPTION	CKT NO.
1	1 SIGN	20/1	L	1500	1500	1500	1500	20/1	SPARE	2	
3	3 SIGN	20/1	L	1500	1500	1500	1500	20/1	SPARE	4	
5	5 SPARE	20/1	L	1500	1500	1500	1500	20/1	SPARE	6	
7	7 SPARE	20/1						20/1	SPARE	8	
9	9 SPARE								SPARE	10	
11	11 SPARE								SPARE	12	
13	13 SPARE								SPARE	14	
15	15 SPARE								SPARE	16	
17	17 SPARE								SPARE	18	
19	19 SPARE								SPARE	20	
21	21 SPARE								SPARE	22	
23	23 SPARE								SPARE	24	
25	25 SPARE								SPARE	26	
27	27 SPARE								SPARE	28	
29	29 SPARE								SPARE	30	
TOTAL LOAD PER PHASE				3000	1500	0	0	TOTAL PANEL DEMAND AMPS = 23			
TOTAL PANEL LOAD (W/O DEMAND)				3000	1500	0	0	BALANCE			
TOTAL PANEL LOAD (W/ DEMAND)				3000	1500	0	0				

ABBREVIATIONS:  
 F=FIXED EQUIPMENT, L=LIGHTING LOAD, M=MOTOR LOAD, ML=LARGEST MOTOR LOAD, R=RECEPTACLE LOAD  
 SPECIAL PROVISIONS:  
 CONTRACTOR TO VERIFY EXACT QUANTITY OF CIRCUITS WITH SIGN MANUFACTURE AND LABEL PANEL ACCORDINGLY



SINGLE LINE DIAGRAM - FUTURE 'SP2'  
 NOT TO SCALE

**GENERAL NOTES:**

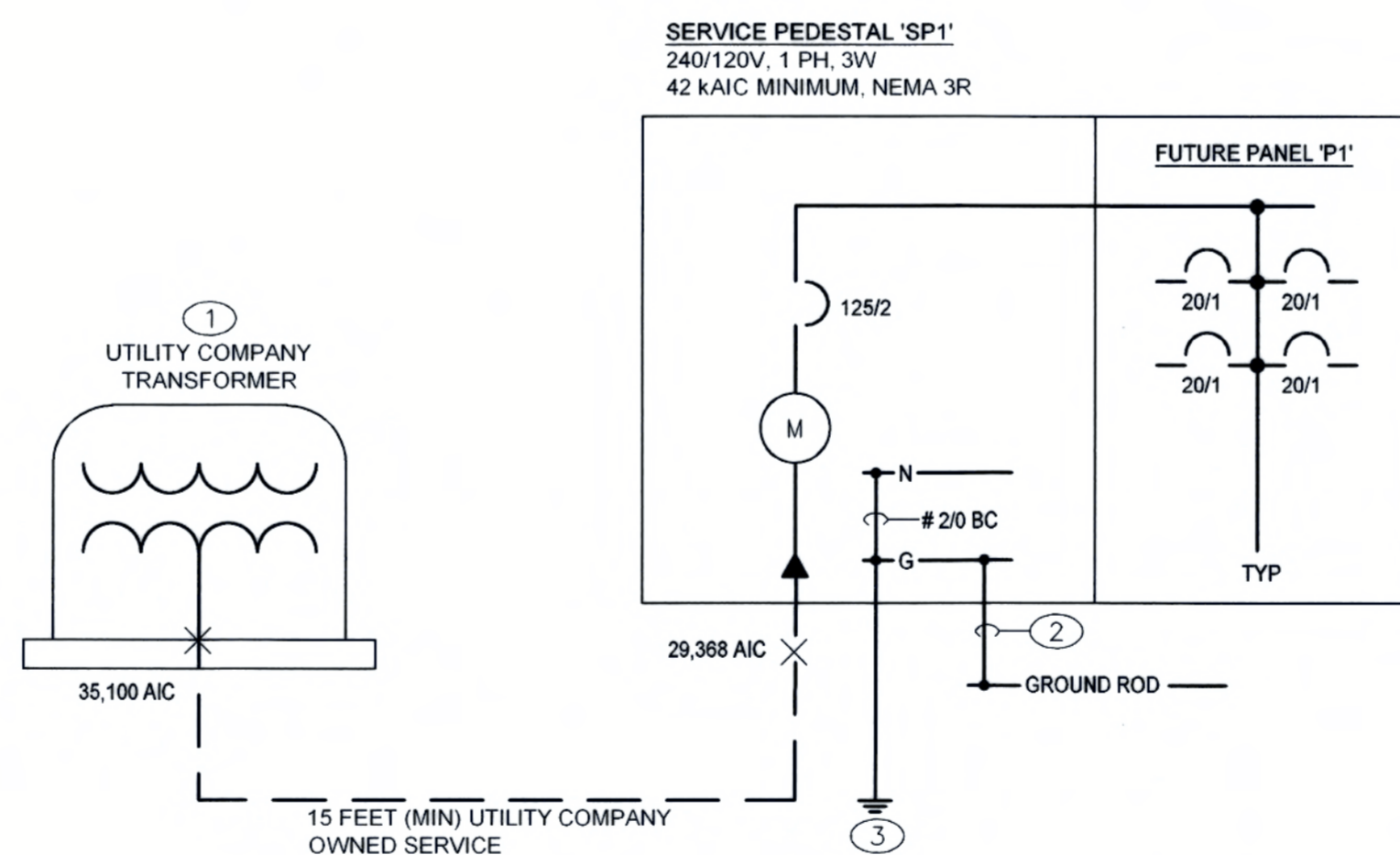
- REFER TO NV ENERGY DRAWINGS TITLED "CLV NEON SIGN, LAS VEGAS BLVD & BRIDGER" WITH A PROJECT ID OF 3000772851, FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
- PHASE 3 SHALL INCLUDE CONDUIT INSTALLATION ONLY, WITH 1 #8 BARE LOCATOR WIRE AND PULLSTRING IN EACH CONDUIT. ALL WIRING IS FUTURE, NOT PART OF THIS CONTRACT.

**SINGLE LINE DIAGRAM NOTES:**

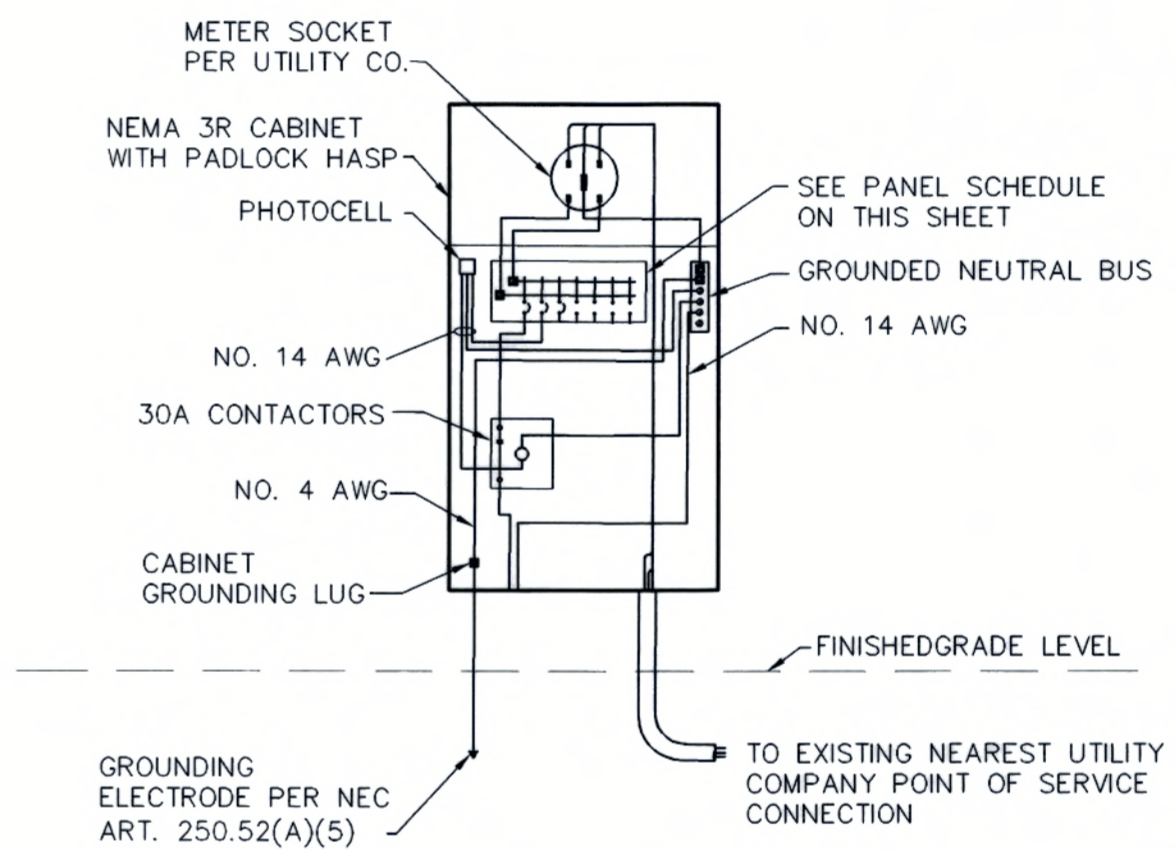
- MAXIMUM FAULT CURRENT AT TRANSFORMERS SHALL BE DETERMINED AND FURNISHED BY UTILITY COMPANY. PRELIMINARY INFORMATION INDICATES MAXIMUM AVAILABLE FAULT CURRENT IS 21,186 AMPS BASED UPON A MAXIMUM OF A 50 KVA TRANSFORMER.
- 3/4" C #4 STRANDED BARE COPPER. SYSTEM SHALL BE GROUNDED TO OTHER METAL PIPING IN ACCORDANCE WITH NEC 250.104(B).
- PROVIDE CONCRETE ENCASED GROUNDING ELECTRODE CONSISTING OF MIN 20' OF #4 BARE COPPER OR 1/2" REBAR INSTALLED PER NEC 250.52(A)(3).

FUTURE PANEL 'P1'				X SERVICE ENTRANCE				SLIP-ON CIRCUIT BREAKERS			
VOLTS: 240/120				X METER				X BOLT-ON CIRCUIT BREAKERS			
PANEL AMP RATING: 125				X NEMA 1				X ALUMINUM BUS			
MAIN BREAKER AMP RATING: 125				X NEMA 3R				X COPPER BUS			
MINIMUM KAIC: 42				X SURFACE MOUNT							
PHASE: 1				X FLUSH MOUNT							
WIRE: 3				X HINGE DOOR							
NEUTRAL: FULL SIZE				X DOOR IN DOOR				PANEL LOCATION			
GROUND: CU-SOLID				X LATCH/LOCK DOOR				SEE FLOOR PLAN			
CKT NO.	CIRCUIT DESCRIPTION	BKR SIZE	LOAD TYPE	LOADS (VA)		LOADS (VA)		LOAD TYPE	BKR SIZE	CIRCUIT DESCRIPTION	CKT NO.
1	1 SIGN	20/1	L	1500	1500	1500	1500	20/1	SPARE	2	
3	3 SIGN	20/1	L	1500	1500	1500	1500	20/1	SPARE	4	
5	5 SPARE	20/1						20/1	SPARE	6	
7	7 SPARE	20/1						20/1	SPARE	8	
9	9 SPARE								SPARE	10	
11	11 SPARE								SPARE	12	
13	13 SPARE								SPARE	14	
15	15 SPARE								SPARE	16	
17	17 SPARE								SPARE	18	
19	19 SPARE								SPARE	20	
21	21 SPARE								SPARE	22	
23	23 SPARE								SPARE	24	
25	25 SPARE								SPARE	26	
27	27 SPARE								SPARE	28	
29	29 SPARE								SPARE	30	
TOTAL LOAD PER PHASE				1500	1500	0	0	TOTAL PANEL DEMAND AMPS = 16			
TOTAL PANEL LOAD (W/O DEMAND)				1500	1500	0	0	BALANCE			
TOTAL PANEL LOAD (W/ DEMAND)				1500	1500	0	0				

ABBREVIATIONS:  
 F=FIXED EQUIPMENT, L=LIGHTING LOAD, M=MOTOR LOAD, ML=LARGEST MOTOR LOAD, R=RECEPTACLE LOAD  
 SPECIAL PROVISIONS:  
 CONTRACTOR TO VERIFY EXACT QUANTITY OF CIRCUITS WITH SIGN MANUFACTURE AND LABEL PANEL ACCORDINGLY



SINGLE LINE DIAGRAM - FUTURE 'SP1'  
 NOT TO SCALE



**NOTES:**

- PHOTOCELL TO TURN ON ALL SIGN CIRCUITS. PROVIDE CONTACTORS AS REQUIRED FOR CONTROL OF ALL SIGN CIRCUITS.
- ALL CONDUCTORS AND BUSSING TO BE COPPER, EXCEPT CONDUCTORS PROVIDED BY UTILITY COMPANY.
- INSTALL PER CLARK COUNTY STANDARD DRAWINGS 726 & 730.
- TRANSFORMER TO SERVICE PEDIESTAL DISTANCES GREATER THAN 195' FOR SPECIFIED COPPER CONDUCTORS, OR 190' FOR SPECIFIED ALUMINUM CONDUCTORS, MUST BE APPROVED BY ENGINEER.
- INSTALL RK5 CURRENT LIMITING FUSES ON THE LINE SIDE OF EACH CONTACTOR CIRCUIT TO LIMIT THE AVAILABLE SHORT CIRCUIT TO THE CONTACTOR TO LESS THAN 5K AIC.

TYPICAL UNISTRUT MOUNTED SERVICE PEDIESTAL DETAIL  
 NOT TO SCALE

**COMFORT ENGINEERING**  
 'COMFORT BY DESIGN'  
 MECHANICAL • ELECTRICAL • PLUMBING  
 9175 WEST FLAMINGO ROAD, LAS VEGAS, NEVADA 89147  
 TEL. (702) 367-0892 FAX 367-1076  
 14-0233 © 2014

PREPARED BY: [Signature]  
 CITY OF LAS VEGAS  
 BID# 15.42371.01-JH  
 H# 42371  
 DATE: JUNE 2015  
 DESIGNED BY: MHA  
 DRAWN BY: WIP  
 CHECKED BY: DM  
 SUBMITTAL STAGE: FINAL  
 TITLE: LAS VEGAS BOULEVARD NEON SIGNS, PHASE 3  
 SHEET: SINGLE LINE DIAGRAMS AND PANEL SCHEDULES  
 SHEET: E2  
 7 of 7  
 DRAWING NO. 107v4819-3  
 FEDERAL PROJECT NO. 88-0003(184)