

BONDING & GROUND DETAIL

KEY NOTES - GROUNDING DIAGRAM

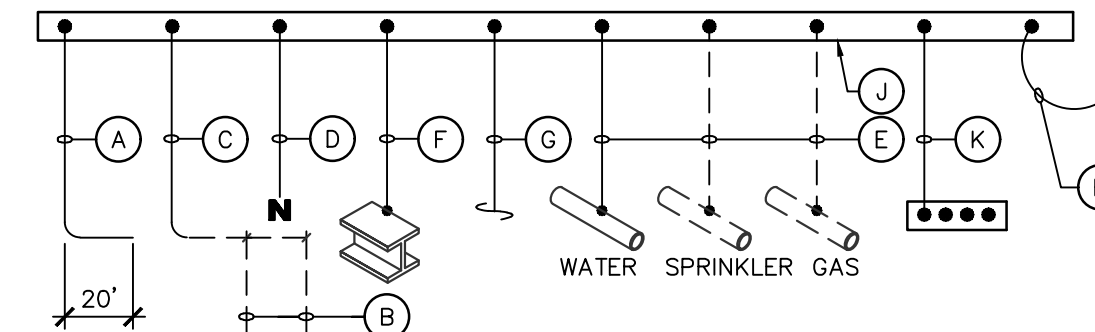
- (A) CONCRETE ENCASED ELECTRODE (UFER) (GROUNDING ELECTRODE #1). REFER TO CHART FOR SIZE. MINIMUM 20'.
- (B) MINIMUM 10 MIL ANNEALED COPPER CLAD STEEL GROUND ROD. (GROUNDING ELECTRODE #2). REFER TO CHART FOR SIZE. GROUND RODS ARE NOT OPTIONAL, MUST BE INSTALLED.
- (C) GROUNDING ELECTRODE CONDUCTOR. REFER TO CHART FOR SIZE.
- (D) INTEGRATED (FACTORY BONDED) BUS BAR MAIN BONDING JUMPER. REFER TO CHART FOR MINIMUM CONDUCTOR SIZE. (AMPACITY SHALL BE 150% RATED)
- (E) METALLIC PIPING BOND WIRE. REFER TO CHART FOR MINIMUM SIZE. BOND TO ALL METALLIC PIPING (WATER, SPRINKLER, GAS, PNEUMATIC LINES, ETC.) WITHIN THE FIRST ACCESSIBLE 5' OF PIPES ENTRY INTO BUILDING.
- (F) BUILDING STEEL BOND WIRE (IF REQUIRED PER BUILDING CONSTRUCTION TYPE). REFER TO CHART FOR MINIMUM SIZE.
- (G) BOND WIRE FOR USE WITH MULTIPLE SERVICE'S (WHEN PRESENT). REFER TO CHART FOR MINIMUM SIZE.
- (H) INTEGRATED (FACTORY BONDED) BUS BAR CASE BOND. REFER TO CHART FOR MINIMUM CONDUCTOR SIZE.
- (J) INTEGRATED (FACTORY INSTALLED) GROUND BUS BAR. SHALL BE SIZED TO ACCOMMODATE GROUND WIRE LUGS AS INDICATED ON THE ONE-LINE DIAGRAM.
- (K) INTERSYSTEM BONDING TERMINATION BAR AT SERVICE EQUIPMENT, W/ MIN. 3 POINTS OF CONNECTION FOR OTHER SYSTEMS. CONDUCTOR SHALL BE MIN. #6 CU, UNLESS SPECIFIED ELSEWHERE. INSTALL PER NEC 250.94.

CONDUCTOR SIZE CHART

SES AMPACITY	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
1000 AMP	#4	5/8" x 10' (2)	#4	#4/0	#3/0	#3/0	#4/0	#4/0

ALL SIZES SHOWN ARE FOR COPPER CONDUCTORS. ALUMINUM IS NOT PERMITTED.

GROUNDING DIAGRAM



GENERAL NOTES - GROUNDING DIAGRAM

- THIS DETAIL IS PROVIDED IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE ARTICLE 250 PERTAINING TO THE "GROUNDING ELECTRODE SYSTEM".
- SPLICING OF CONDUCTORS SHALL BE ACCOMPLISHED VIA EXOTHERMIC WELD (CAD WELD) ONLY.
- ALL CONNECTIONS TO GROUND RODS BELOW GRADE OR IN CONCRETE SHALL BE MADE VIA EXOTHERMIC WELD (CAD WELD) ONLY. CONNECTIONS MADE ABOVE GROUND LEVEL CAN BE ACCOMPLISHED UTILIZING A U.L. LISTED MECHANICAL CLAMP SUITABLE FOR THE PURPOSE.
- ANY VARIANCE FROM THIS DRAWING AND/OR SPECIFICATION MUST BE REQUESTED AND APPROVED IN WRITING PRIOR TO INSTALLATION.
- ALL INSTALLATIONS SHALL COMPLY WITH THE LATEST ADOPTED EDITION OF ARTICLE 250 (ALL SUBPARAGRAPHS) OF THE NATIONAL ELECTRICAL CODE AND ALL STATE AND LOCAL CODE REQUIREMENTS.
- THE GROUNDING SYSTEM SHALL PROVIDE NO GREATER THAN (5) FIVE OHMS RESISTANCE TO GROUND AT THE SERVICE CONNECTION. THE RESULTS SHALL BE VERIFIED BY AN INDEPENDENT TESTING AGENCY VIA GROUND TEST (FALL-OF-POTENTIAL) AND SUBMITTED IN ACCORDANCE WITH THE ELECTRICAL SPECIFICATIONS CONTAINED HEREIN.
- THE GROUNDING ELECTRODE SYSTEM SHALL CONSIST OF GROUNDING ELECTRODES, ITEMS A (CONCRETE-ENCASED ELECTRODE (A.K.A. UFER), AND GROUND ROD(S) ITEM B, METAL UNDERGROUND WATER PIPE WITH 10' IN CONTACT WITH EARTH, AS DEFINED IN NEC 250.52(A)(1) AND METAL, N-GROUND SUPPORT STRUCTURE IN CONTACT WITH EARTH AS DEFINED IN 2017 NEC 250.52(A)(2) SHALL BE BONDED WITH ITEMS A & B AS PART OF THE GROUNDING ELECTRODE SYSTEM.
- GROUNDING ELECTRODE CONDUCTORS, ITEMS: A AND C, ((F) CONNECTION TO METAL FRAME AND (E) CONNECTION TO UNDERGROUND WATER PIPE, WHEN CONSIDERED A GROUNDING ELECTRODE), SHALL EACH BE MADE IN SEPARATE CONDUCTORS AND SUITABLY PROTECTED BY CONDUIT WHERE EXPOSED TO DAMAGE OR THEIR CONDUITS THAT ARE NOT CONTIGUOUS FROM GROUNDING ELECTRODE TO CABINET/ENCLOSURE SHALL BE BONDED TO THE GEC PER NEC 250.64(E).
- EXPOSED STRUCTURAL METAL AND METAL PIPING (NOT CONSIDERED A GROUNDING ELECTRODE) SHALL BE BONDED TO THE GROUNDING ELECTRODE SYSTEM AS INDICATED ON DETAIL CONNECTIONS E AND F, IN ACCORDANCE WITH BONDING REQUIREMENT IN ARTICLE 250 PART V.

FAULT CALCULATIONS

The following calculations are based on the "Point-to-Point" method

Three Phase: $f = \frac{\sqrt{3} \times L \times I_{sc}}{C \times V_p}$ Single Phase: $f = \frac{2 \times L \times I_{sc}}{C \times V_p}$ Three Phase Xfmr: $f = \frac{\sqrt{3} \times I_{sc} \times V_p \times \%Z}{100,000 \times kVA}$ Single Phase Xfmr: $f = \frac{I_{sc} \times V_p \times \%Z}{100,000 \times kVA}$

$M = \frac{1}{(1+f)}$ $M = \frac{1}{(1+f)}$ $I_{sc2} = \frac{V_p \times M \times I_{sc}}{V_s}$ $I_{sc2} = \frac{V_p \times M \times I_{sc}}{V_s}$

NOTE:

CONDUCTOR LENGTHS SHOWN ARE SHORTEST-PATH FOR USE IN CALCULATIONS ONLY AND ARE NOT INTENDED FOR USE IN BIDDING OR CONSTRUCTION. ACTUAL LENGTHS MUST BE MEASURED & VERIFIED BY THE CONTRACTOR, AND REPORTED TO ENGINEER IF DESIGN CHANGES ARE REQUIRED.

FR	SOURCE	Isc1	C	(SETS) OF WIRE SIZE	TYPE	C' VALUE	Vp(Va)	#	L' feet	Xfmr kVA	Xfmr %Z	Isc2
1	SES	28917	NM	(1) OF #3/0's	Cu	13923	208	3	20	N/A	N/A	21485
2	SES	28917	NM	(1) OF #3/0's	Cu	13923	208	3	60	N/A	N/A	14191
3	SES	28917	NM	(1) OF #3/0's	Cu	13923	208	3	45	N/A	N/A	16261
4	SES	28917	NM	(1) OF #3/0's	Cu	13923	208	3	43	N/A	N/A	16584
5	SES	28917	NM	(1) OF #3/0's	Cu	13923	208	3	40	N/A	N/A	17092

GENERAL NOTES - ONE-LINE

- THE ELECTRICAL CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS TO FULLY FAMILIARIZE HIMSELF WITH ALL EXISTING CONDITIONS PRIOR TO BID. NO ADDITIONAL CONSIDERATIONS WILL BE ALLOWED AFTER THE BID.
- THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL INDICATED EQUIPMENT TO CODE COMPLIANT CLEARANCES. PROVIDE SUBMITTALS AS INDICATED IN SPECIFICATIONS TO PROPERLY COORDINATE PHYSICAL LOCATIONS OF NEW AND/OR EXISTING EQUIPMENT.
- REFER TO ELECTRICAL SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS AND COMPLETE CONTRACTUAL OBLIGATIONS.
- ALL DASHED LINES ARE INDICATING EXISTING EQUIPMENT.
- THE ELECTRICAL CONTRACTOR SHALL PROVIDE CIRCUIT DIRECTORY OR CIRCUIT IDENTIFICATION FOR PANELBOARDS AND SOURCE OF SUPPLY FOR SWITCHBOARDS AND PANELBOARDS SUPPLIED BY A FEEDER IN OTHER THAN ONE- TWO-FAMILY DWELLINGS IN ACCORDANCE WITH NEC 408.4(A)&(B).
- WHERE A RACEWAY ENTERS A BUILDING OR STRUCTURE FROM AN UNDERGROUND DISTRIBUTION SYSTEM, ELECTRICAL CONTRACTOR SHALL PROVIDE RACEWAY SEALS PER NEC 225.27.
- THE ELECTRICAL CONTRACTOR SHALL PROVIDE FOR AND COORDINATE ALL TESTING AND INSPECTIONS REQUIRED BY THE AUTHORITY HAVING JURISDICTION, AND SHALL PROVIDE WRITTEN REPORTS TO THE ENGINEER OF ALL TEST RESULTS AND INSPECTION REPORTS FOR THIS DISCIPLINE.
- WHERE SPECIAL INSPECTION/OBSERVATION IS REQUIRED, QUALIFIED 3RD PARTY INDIVIDUALS ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION SHALL WORK DIRECTLY FOR THE OWNER TO PERFORM ALL REQUIRED TESTING & INSPECTION.
- UPON SUBSTANTIAL COMPLETION, THE ELECTRICAL CONTRACTOR SHALL NOTIFY THE ENGINEER AND SHALL ALLOW, AT THE ENGINEER'S DISCRETION, FOR THE INSPECTION OF NEW WORK PRIOR TO ENERGIZING.
- THE ELECTRICAL CONTRACTOR SHALL PROVIDE ARC-FLASH HAZARD WARNING FIELD LABELING TO ELECTRICAL EQUIPMENT IN ACCORDANCE WITH NEC 110.16.
- THE ELECTRICAL CONTRACTOR SHALL PROVIDE MAXIMUM AVAILABLE FAULT CURRENT FIELD LABELING TO SERVICE EQUIPMENT INSTALLED IN OTHER THAN DWELLING UNITS IN ACCORDANCE WITH NEC 110.24.
- GFP MUST BE ON-SITE TESTED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. ELECTRICAL CONTRACTOR SHALL PROVIDE COPY OF MANUFACTURER'S INSTRUCTIONS AND TEST RESULTS TO AUTHORITY HAVING JURISDICTION.
- ALL EQUIPMENT RATED @ 1000 AMPS OR MORE SHALL BE TESTED IN CONFORMANCE WITH UL STANDARD 869 OR 891 FOR INSULATION BREAKDOWN PRIOR TO ITS BEING ENERGIZED. THIS TEST SHALL BE PERFORMED BY A TESTING FACILITY APPROVED BY THE BUILDING OFFICIAL. (SEE SECTION 4.6 OF ELECTRICAL SYSTEM SPECIFICATIONS)
- ALL UNDERGROUND CONDUITS ENTERING BUILDING/STRUCTURE FROM OUTSIDE SHALL BE SEALED PER NEC 225.27 & 300.5(G).

KEYED NOTES

- (6) 3" UNDERGROUND PRIMARY CONDUITS TO UTILITY COMPANY PAD MOUNTED TRANSFORMER. COORDINATE EXACT QUANTITY AND SIZE WITH UTILITY CO.
- UTILITY PAD MOUNTED TRANSFORMER.
- (4) 4" UNDERGROUND SECONDARY CONDUITS TO UTILITY COMPANY PAD MOUNTED TRANSFORMER.
- REFER TO SES BONDING AND GROUNDING DETAIL THIS SHEET FOR ADDITIONAL INFORMATION.
- 200AMP METER AND METER SOCKET. TYPICAL OF (5)
- 200AMP SPOLE CIRCUIT BREAKER. TYPICAL OF (6)
- PROVIDE (1) 2 1/2" UNDERGROUND EMPTY CONDUIT (EACH) WITH PULLSTRING FOR FUTURE 200A TENANT POWER STUBBED OUT OF SES AND INTO MAIN SES ROOM. COORDINATE EXACT TRENCHING, ROUTING AND POINT OF TERMINATION WITH OWNER.
- (4) #3/0's Cu., (1) #6 Cu. E.G. - 2" C.

SES LOAD SUMMARY

PANEL "HP"	5122 VA
PANEL "101"	25500 VA
PANEL "102"	25500 VA
PANEL "103"	25214 VA
PANEL "103A"	42840 VA
TOTAL LOAD ON S.E.S.	124176 VA
TOTAL LOAD ON S.E.S. @ 208V 3Ø	344.9A

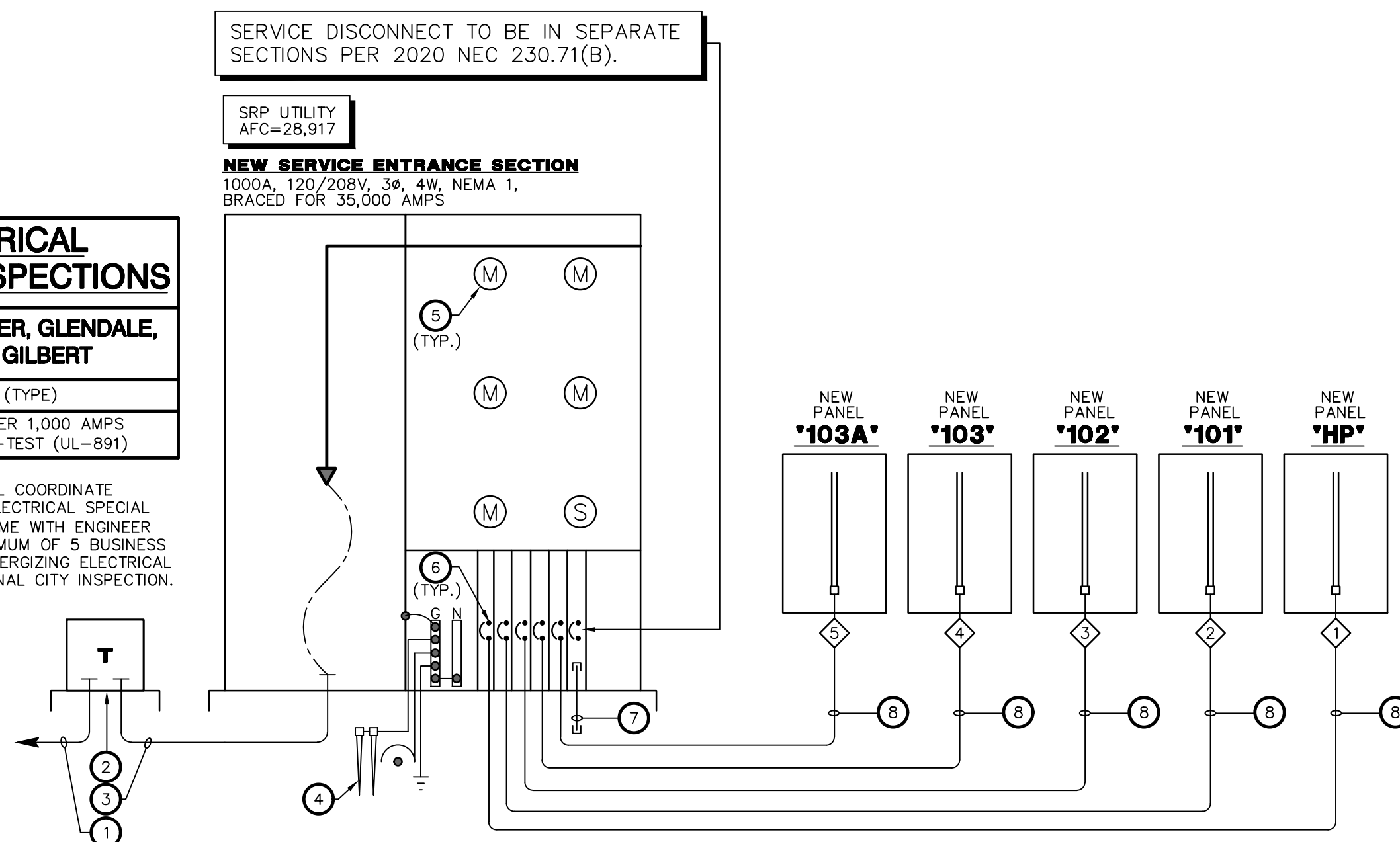
ELECTRICAL SPECIAL INSPECTIONS

CITY OF CHANDLER, GLENDALE, SURPRISE, GILBERT

(YES/NO)	(TYPE)
YES	SES OVER 1,000 AMPS HI-POT-TEST (UL-891)

NOTE:

- CONTRACTOR SHALL COORDINATE ON-SITE VISUAL ELECTRICAL SPECIAL INSPECTION DAY/TIME WITH ENGINEER OF RECORD A MINIMUM OF 5 BUSINESS DAYS PRIOR TO ENERGIZING ELECTRICAL EQUIPMENT AND FINAL CITY INSPECTION.



ELECTRICAL ONE-LINE DIAGRAM

N.T.S

DESIGN CODES
IECC, 2021 NEC, 2020

ELECTRICAL CONTRACTOR SHALL NOTIFY DESIGNER/ENGINEER PRIOR TO ANY DEVIATION FROM THIS SET OF ELECTRICAL DESIGN PLANS. ANY CHANGES TO THE DESIGN, IF APPROVED BY ENGINEER, WILL REQUIRE REVISIONS TO PLANS AND POSSIBLE ADDITIONAL SERVICE FEE.

Project Contact/Designer: MINDY ADLER
Project # 24197
HAWKINS DESIGN GROUP INC.
ELECTRICAL CONSULTING ENGINEERS
240 WEST HARWELL ROAD
GILBERT, ARIZONA 85233
PH: 480.813.9000 FAX: 480.813.9001
EMAIL: email@hawkinsdg.com

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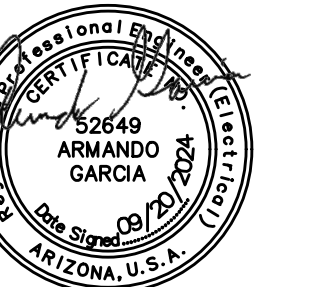
IF DRAWING IS NOT PLOTTED AT 24"x36" THEY ARE NOT FULL SIZE

NEW COMMERCIAL PAD
PAD 5B AT PASEO UNDO SHOPPING CENTER
NEC OF ARIZONA AVE AND OCOTILLO RD.
CHANDLER, AZ

design by: MA
drawn by: MA
checked by: AG

E4.0

project #: 23057



09.18.24 CITY COMMENTS
ELECTRICAL ONE-LINE DIAGRAMS

NOTICE OF ALTERNATE BILLING OR PAYMENT CYCLE: THIS CONTRACT MAY ALLOW THE OWNER TO REQUIRE THE SUBMISSION OF BILLING OR ESTIMATES IN BILLING CYCLES OTHER THAN THIRTY DAYS. THIS CONTRACT MAY ALLOW OWNERS TO MAKE PAYMENT CERTIFICATION AND APPROVAL OF BILLING AND ESTIMATES. A WRITTEN RESPONSE TO THESE BILLING CYCLE APPLICABLE TO THE PROJECT IS AVAILABLE FROM OWNER OR DESIGNATED AGENT.

NAME: _____
ADDRESS: _____
CONTACT: Name _____
PHONE: _____

CONSTRUCTION SET_11-12-24

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