THIS IS A MASTER LEGEND AND NOT ALL S STANDAR DAR DOM (DISPLAY) CONTROLS (CENTER OF DEVICE) EXIT SIGNS (SEE DRAWINGS) FIRE ALARM ANNUNCIATOR PANEL (DISPLAY) FIRE ALARM BELL (EXTERIOR) (CENTERLINE) FIRE ALARM CONTROL PANEL/UNIT (DISPLAY) PULL STATIONS (TOP OF DEVICE) RECEPTACLES (TO CENTER) RECEPTACLES (CO CENTER) RECEPTACLES (GARAGES) RECEPTACLES (BADVE COUNTER) RECEPTACLES (NEQUIPMENT ROOMS) REMOTE INDICATING LIGHT (EQUIPMENT ROOMS) REMOTE INDICATING LIGHT (FINISHED AREAS) SAFETY SWITCHES (TOP OF DEVICE) STARTERS (TOP OF DEVICE) STARTERS (TOP OF DEVICE) STARTERS (TOP OF DEVICE) STARTERS (TOP OF DEVICE) TELEPHONE, DATA OUTLETS TELEPHONE TERMINAL BOARD (BOTTOM) TELEVISION OUTLETS FIRE ALARM DEVICES (CENTERLINE) USE THE DEFAULT MOUNTING HEIGHTS SHOWN A THE CONSTRUCTION DOCUMENTS. MOUNTING HE	SYMBOLS OR ABBREVIATIONS ARE USE TING HEIGHTS 60" 48" 105" 60" 120" 60" 48" 16" 24" 24" 24" 24" 24" 44" 48" CEILING 60" 48" CEILING 60" 48" SAME AS ADJACENT DEVICE, UNO 6" REFER TO ARCH DRAWINGS 84" BOVE UNLESS NOTED OTHERWISE IN EIGHTS LISTED ARE ABOVE FINISHED	
AFCABOVE FINISHED CEILINGAFFABOVE FINISHED GRADEAFGABOVE FINISHED GRADEAHJAUTHORITY HAVINGJURISDICTIONAHUAIR HANDLING UNITAICAMPERE INTERRUPTINGCAPACITYASAMPERE SWITCHATAMPERE TRIP SETTINGATSAUTOMATIC TRANSFER SWITCHAVAUDIO VISUALBASBUILDING AUTOMATIONSYSTEMSYSTEMBKRBREAKERCCONDUITCATCATEGORYCATVCABLE TELEVISION SYSTEMCCTVCLOSED CIRCUIT TELEVISIONCDCANDELACKTCIRCUITCODEAPPLICABLE CODE ADOPTED BYJURISDICTIONCTCTRCENTERCVDCUMULATIVE VOLTAGE DROPDEMODEMOLITIONDPDTDOUBLE-POLE,DUBLE-POLE,DUBLE-POLE,DUBLE-POLE,SINGLE-THROW(E)EXISTINGECELECTRICAL CONTRACTOREFEXHAUST FANEMEMERGENCYEMSENERGY MANAGEMENTSYSTEMETREXISTING TO REMAINEWCELECTRIC WATER COOLERFAAPFIRE ALARM CONTROL PANELFCAFAULT CURRENT AMPS AVAILABLEFCCFOORGCGROUNDING ELECTRODECNDUCTORGESGESGROUNDING ELECTRODE SYSTEMGFRGROUNDING ELECTRODECONDUCTORGESGES		CIRCUIT CONTINUATION OR PARTIAL CIRCUIT CONDUIT CONCEALED CONDUIT INJUNDER FLOOR/GROUND CONSTRUCTION EXPOSED CONDUIT LOW VOLTAGE CABLE CONDUIT TURNING DOWN CONDUIT TURNING DOWN CONDUIT TURNING UP THROUCHOUT THE DRAWINGS DIFFERENT LINETYPES ARE USED IN CC WITH THE SYMBOLS TO INDICATE THE STATUS OF ITEMS AS EXISTING, DEMOLSHED. TO BE INDICATE THE STATUS OF ITEMS AS EXISTING, DEMOLSHED. TO BE INDICATE THE STATUS OF ITEMS AS EXISTING, DEMOLSHED. TO BE INDICATE THE STATUS OF ITEMS AS EXISTING, DEMOLSHED. TO BE INDICATE THE STATUS OF ITEMS AS EXISTING, DEMOLSHED. TO BE INDICATE THE STATUS OF ITEMS AS EXISTING, DEMOLSH, TO BE PROVIDED IN THE FUTURE. THE STATUS OF IT HESE LINETYPES ARE RELATIVE TO THE FEMINED BY THE CONTRACTO OF THEIR RESPONSIBILITIES. ANY SUCH PHASES DESCRIBED IN THE CONSTRUCTION PHASING, WHICH IS DETERMINED BY THE CONTRACTO OF THEIR RESPONSIBILITIES. ANY SUCH PHASES DESCRIBED IN THE CONSTRUCTION PHASING, WHICH IS DETERMINED BY THE CONTRACTO DEMOLSH

ALLOUT Image: Contract purples and one purples and source purples and	
OR EQUIPMENT Image: Control state contro	
Image: Shed, Contractor NoteD Image: Ontractor Furnished Image: SwitchBoard or Motor control center on Housekeeping pad Image: Ontractor Furnished Image: SwitchBoard or Motor control center on Housekeeping pad Image: Ontractor Furnished Image: SwitchBoard or Motor control center on Housekeeping pad Image: Ontractor Furnished Image: SwitchBoard or Motor control center on Housekeeping pad Image: Ontractor Furnished Image: SwitchBoard or Motor control center on Housekeeping pad Image: Ontractor Furnisher Image: SwitchBoard or Motor control center on Housekeeping pad Image: Ontractor Furnisher Image: SwitchBoard or Motor control center on Housekeeping pad Image: Ontractor Furnisher Image: SwitchBoard or Motor control center on Housekeeping pad Image: Ontractor Furnisher Image: SwitchBoard or Motor control center on Housekeeping pad Image: Ontractor Furnisher Image: SwitchBoard or Motor control center on Housekeeping pad Image: Ontractor Furnisher Image: SwitchBoard or Motor control center on Housekeeping pad Image: Ontractor Furnisher Image: SwitchBoard or Motor control center on Housekeeping pad Image: Ontractor Furnisher Image: SwitchBoard or Motor control center on Housekeeping pad Image: Ontractor Furnisher Image: SwitchBoard or Motor control center on Housekeeping pad Image: Ontractor Furnisher Image: SwitchBoard or Motor center on Housekeeping pad Image: Ontractor Furnisher Image: SwitchBoard or Motor center on Housekeeping pad Image: Ontractor Furnisher Image: SwitchBoard or Motor center on Housekeeping p	
ONTRACTOR FOR FOR FOR FOR FOR FOR FOR FOR FOR F	
ATES DETAIL NUMBER R T TRANSFORMER ELECTRICAL DISTRIBUTION PANELBOARD T TRANSFORMER GFCI TYPE RECEPTACLE* ISOLATED GROUND TYPE RECEPTACLE* ISOLATED GROUND TYPE RECEPTACLE*	
R ISOLATED GROUND TYPE RECEPTACLE*	
► MOTOR ■ EMERGENCY RECEPTACLE*	
DISCONNECT SWITCH - "200/3/150/3R" DENOTES AMPERES/POLE/FUSE/NEMA ENCLOSURE RATING, NF= NON-FUSED,	_ASH*
AT ARROWS ARE CIRCUIT CIRCUIT CIRCUIT BREAKER (200/3/CB), NO VALUE (200/3/150) FOR NEMA ENCLOSURE MEANS STANDARD NEMA 1 RATING RECEPTACLE INSTALLED IN CEILING*	
ATION. REFER TO RCUIT CONDUCTOR SIZES. 30/3/15/1/3R "30/3/15/1/3R" DENOTES AMPERES/POLE/FUSE/NEMA STARTER COMBINATION DISCONNECT (SAFETY) SWITCH AND MOTOR STARTER	
JIT SIZE/NEMA ENCLOSURE RATING. NF= NON-FUSED, CB= CIRCUIT BREAKER (30/3/CB/1), NO VALUE (200/3/150/1) FOR NEMA ENCLOSURE RECEPTACLE INSTALLED VIA DROP CORD* MEANS STANDARD NEMA 1 ENCLOSURE RATING RECEPTACLE INSTALLED VIA DROP CORD*	al j
TRUCTION	
TRUCTION	
VFD VARIABLE FREQUENCY DRIVE VFD VARIABLE FREQUENCY DRIVE ER = EXISTING ER = EXISTING TO BE RELOCATED GFCI = GROUND-FAULT CIRCUIT INTERRUPTER	
LOW-VOLTAGE PUSH-BUTTON (AUTO-OPENER / SECURITY) H = HORIZONTALLY MOUNTED IG = ISOLATED GROUND R = RELOCATED, NEW LOCATION	
BINDICATOR SWITCH/SENSOR S = MANUALLY SWITCHED TR = TAMPER RESISTANT TV = TELEVISION	
USB = USB/DUPLEX WP = WEATHER PROOF COVER WR = WEATHER RESISTANT	
ISTING, TO BE RITEMS WHICH US OF ITEMS USING APPEAR. PHASING LL NECESSARY TRACTOR AS PART ITHE ED TO INDICATE A THE FOLLOWING INE, SHAPE, ETC. INE, SHAPE, ETC.	
MULTI-OUTLET ASSEMBLY	
EVICES Annual Light fixture Light fixture	
ATION) a = SWITCHED BY SWITCH "a"	
OLLOWS: A = LIGHT FIXTURE TYPE "A" Image: Description of the second s	
$ \begin{array}{ c c } \hline \bigcirc & & \downarrow = \text{WALL MOUNT} \\ \hline & & \downarrow = \text{ARROW INDICATES AIMING DIRECTION} \end{array} \\ \end{array} $	
MULTI-SERVICE POWER POLE WITH TELEPHONE, DATA A OUTLETS A = TYPE, REFER TO PLANS, SCHEDULES AND SPECIFICATIONS	ND POWER
NL = NIGHT LIGHT FIXTURE NL = NIGHT LIGHT FIXTURE LIGHT FIXTURE WITH DUAL BALLASTS CIRCUITED SEPARATELY (SHADING IMPLIES EMERGENCY LIGHT FIXTURE)	
✓ ✓ ✓ LIGHTING TRACK WITH LIGHT FIXTURE TYPES AS INDICATED O POKE THROUGH, A = TYPE, REFER TO PLANS, SCHEDUL	ES AND
DICATES AIMING)	
EXTERIOR PEDESTRIAN POST TOP LIGHT FIXTURE	F
EXTERIOR LIT BOLLARD LIGHT FIXTURE CONS: CONS: CONSTRUCTION BOX/OUTLET BOX	
EXIT SIGN - CEILING / WALL MOUNTED, ARROWS AS INDICATED, FACE	
EMERGENCY LIGHTING UNIT EQUIPMENT WITH BATTERY PACK - SPEAKER	
ADDITIONAL LETTER DESIGNATIONS AS FOLLOWS: D = DEMOLISHED A NUMBER ADJACENT TO ANY TECHNOLOGY SYMBOL INDICATES TOTAL Q CABLES AND PORTS TO BE INSTALLED AT THAT LOCATION.	JANTITY OF LI
D = DEMOLISHED EX = EXISTING EM = EMERGENCY POWER ER = EXISTING TO BE RELOCATED R = RELOCATED, NEW LOCATION EX = RELOCATED, NEW LOCATION EX = DEMOLISHED IF A HOME-RUN IS USED ON ANY FLOOR-BOX OR MULTI-OUTLET ASSEMBLY THAT POWER IS ALSO TO BE INSTALLED IN THIS DEVICE.	, IT INDICATES

ELECT	RICAL ONE-LINE	1.	PROVIDE ALL SUB-CONTRACTORS A COMPLETE SET OF FULL-SIZE
, 3P	SWITCH (RATING AS INDICATED)		CONSTRUCTION DOCUMENTS AND FULLY COORDINATE WORK WITH PROJECT TRADES.
3P 3P 3P ##AS 3P	FUSED SWITCH (RATING, POLES AND FUSE TYPE AS INDICATED)	2.	PROVIDE VENDORS A COMPLETE SET OF ELECTRICAL DRAWINGS TO COMPLETE QUANTITY TAKE-OFFS AND TYPES, DO NOT
t d ##A 3P	CIRCUIT BREAKER (RATINGS AS INDICATED)	3.	LIMIT AVAILABLE INFORMATION.
	PANELBOARD, SINGLE OR MULTI-SECTION (REFER TO SCHEDULES)		FIXTURES SHALL BE PROVIDED AS SEPARATE QUOTES AND SHALL NOT BE COMBINED. LIGHTING CONTROLS AND LIGHTING FIXTURES MAY BE PURCHASED FROM SEPARATE VENDORS.
	ISOLATED POWER PANELBOARD W/ INTEGRAL TRANSFORMER (REFER TO SCHEDULES)	4.	CONTRACTOR SHALL BE FAMILIAR WITH THE EXISTING CONDITIONS UNDER WHICH THEY WILL HAVE TO OPERATE AND WHICH MAY
	TRANSFORMER (TYPE AND RATINGS AS INDICATED)		AFFECT THE WORK.
	SHIELDED TRANSFORMER (TYPE AND RATINGS AS INDICATED)	5.	CONTRACTOR SHALL REVIEW THE GENERAL NOTES, SPECIFICATIONS AND ALL CONSTRUCTION DOCUMENTS FOR ADDITIONAL REQUIREMENTS THAT MAY NOT BE SPECIFICALLY CALLED OUT IN THIS
	AUTOMATIC TRANSFER SWITCH (RATINGS AS INDICATED)		SECTION.
	AUTOMATIC TRANSFER SWITCH WITH BYPASS (RATINGS AS INDICATED)	6.	ELECTRICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE AND REPRESENT THE GENERAL SCOPE OF THE WORK AS IT PERTAINS TO THE ENGINEERED SYSTEMS AT HAND. NOTIFY THE ENGINEER OF ANY CONFLICTS OR DISCREPANCIES.
480Y/2/7V, 30, 4W	GENERATOR (RATINGS AS INDICATED)	7.	PRIOR TO PURCHASING ANY PANELS.
	NON-SEPARATELY DERIVED SOURCE	Γ.	PROTECTIVE DEVICES, SWITCHES,
	OR SEPARATELY DERIVED SOURCE		STARTERS, FUSES, CONDUIT, WIRE, ETC. TO FEED ANY PIECE OF EQUIPMENT VERIFY THE
MDP SWITCHBOARD EL	EC ROOM		VOLTAGE, PHASE, AND LOAD OF THAT ITEM IN THE FIELD AND CONTACT ENGINEER IF
### AMPS 480Y/277V 3	SWITCHGEAR, SWITCHBOARD AND/OR DISTRIBUTION PANELBOARD (TYPE, RATING, DEVICES AND ACCESSORIES AS INDICATED)	8.	THERE ARE ANY INCONSISTENCIES. VERIFY EXACT LOCATIONS AND ELEVATION OF ALL EQUIPMENT IN THE FIELD WITH THE
DIGITAL VM AM	COMBINATION DIGITAL VOLT METER/AMMETER		OWNER PRIOR TO ROUGH-IN. FINAL CONNECTIONS OF EQUIPMENT SHALL BE PER MANUFACTURERS RECOMMENDATIONS. ALL
	CIRCUIT IDENTIFICATION (REFER TO CIRCUIT SCHEDULE)		MATERIALS REQUIRED TO PROVIDE FINAL CONNECTION TO THE EQUIPMENT SHALL BE PROVIDED BY THE ELECTRICAL
GFR	GROUND FAULT RELAY		CONTRACTOR.
PFR	PHASE FAILURE RELAY	9.	ALL WORK SHALL CONFORM TO THE LATEST
ККЗ			EDITIONS OF LOCAL, STATE, AND NATIONAL CODES AND ORDINANCES. DRAWINGS AND
ST	SHUNT-TRIP RELAY AMMETER, RANGE AS SPECIFIED OR REQUIRED		SPECIFICATIONS GOVERN WHERE THEY EXCEED CODE REQUIREMENTS.
	VOLTMETER, RANGE AS SPECIFIED OR REQUIRED		
	UTILITY METER (AS REQUIRED BY UTILITY)	10.	CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT ALL PEOPLE AND STRUCTURES FROM DAMAGE, HARM, OR INJURY THROUGHOUT THE COURSE OF CONSTRUCTION.
7	CURRENT TRANSFORMER RATING AS SPECIFIED OR REQUIRED	11.	ANY SITE DAMAGES SHALL BE REPLACED IN KIND WITH NO COST TO THE OWNER.
36	POTENTIAL TRANSFORMER RATING AS SPECIFIED OR REQUIRED	12	THE CONTRACTOR SHALL EMPLOY QUALIFIED
TVSS	TRANSIENT VOLTAGE SURGE SURPRESSOR	12.	AND EXPERIENCED TRADES PEOPLE FOR THIS WORK.
● I	GROUND CONNECTION	13.	FURNISH ALL LABOR, MATERIALS, TOOLS, ACCESSORIES, ETC. REQUIRED FOR A
	GROUND CONNECTION WITH TEST WELL	14.	COMPLETE AND OPERABLE SYSTEM. ALL CIRCUITS SHALL BE PROVIDED WITH AN
⊕ — Iı	GROUND CONNECTION AND GROUND ROD		INSULATED GREEN GROUNDING CONDUCTOR.
$= \neq$	OPEN / CLOSED CONTACTORS	15.	CABLE LENGTHS WHEN INDICATED ARE APPROXIMATE AND USED FOR ENGINEERING CALCULATIONS ONLY, CONTRACTOR SHALL
$\int \sqrt{1}$	HEATER	16.	NOT UTILIZE FOR MATERIAL TAKE-OFFS. QUANTITIES WHERE INDICATED ARE FOR
	BLOCK LOAD KW OR KVA		CALCULATION USES ONLY AND SHALL NOT BE UTILIZED FOR MATERIAL TAKE-OFFS.
↓ F#	FAULT POINT REFERENCED IN SHORT CIRCUIT CURRENT AND	17.	MAINTAIN WORKING CLEARANCES AROUND ALL ELECTRICAL EQUIPMENT PER NEC ARTICLE 110.
	VOLTAGE DROP SPREADSHEET CONNECTION POINT OR EQUIPMENT TERMINATION	18.	ALL EQUIPMENT DEFINED IN THIS SCOPE OF WORK IS NEW UNLESS OTHERWISE INDICATED.
FIRE A	LARM	19.	LABEL ALL ELECTRICAL EQUIPMENT, FEEDER BREAKERS, JUNCTION BOXES, AND DEVICES AS INDICATED WITHIN PROJECT
\ F	WALL MOUNTED STROBE NOTIFICATION DEVICES		SPECIFICATIONS.
	PULL STATION	20.	PERFORM ALL WORK AS TO MINIMIZE ELECTRICAL SYSTEM DOWNTIME. SCHEDULE ALL INTERRUPTIONS WITH OWNER AT LEAST
FACP	FIRE ALARM CONTROL PANEL		5 DAYS PRIOR.
	FIRE ALARM CONTROL PANEL	21.	FIRE ALARM SYSTEM SHALL BE PERMITTED AND INSTALLED BY AN APPROVED CONTRACTOR AS PART OF A DEFERRED
LINE I TES INDIC	THE ON THIS GOVEN SHEET ALL AFFET TO THE UNE-LINE DIAGKAM		SUBMITTAL PACKAGE.

_ _

PROJECT NOTES

D LOAD OF THAT ITEM IN PROJECT ISSUE: PERMIT DRAWINGS

This drawing is the professional intellectual property of Optimized LED and protected by Copyright Usage of this drawing shall is restricted for use as a project example and shall not be reproduced, recreated, or utilized for any other purpose without express written consent of Optimized LED.

PROJECT NUMBER:	MDI190050
DRAWN BY:	RSM
APPROVED BY:	BSL

LA RISTRA - CHANDLER

LA RISTRA

SHEET LIST

E0.0 ELECTRICAL - SYMBOLS, NOTES, AND

E2.1 ELECTRICAL - ENLARGED KITCHEN PLANS

E4.1 ELECTRICAL - SCHEDULES AND DETAILS

E4.3 ELECTRICAL - PANELBOARD SCHEDULES

E5.1 ELECTRICAL - SPECIFICATIONS 1 E5.2 ELECTRICAL - SPECIFICATIONS 2 E5.3 ELECTRICAL - SPECIFICATIONS 3

E4.2 ELECTRICAL - ONE-LINE DIAGRAM AND

ABBREVIATIONS

E2.0 ELECTRICAL - POWER PLAN

E2.2 ELECTRICAL - ROOF POWER PLAN

E3.0 ELECTRICAL - LIGHTING PLAN

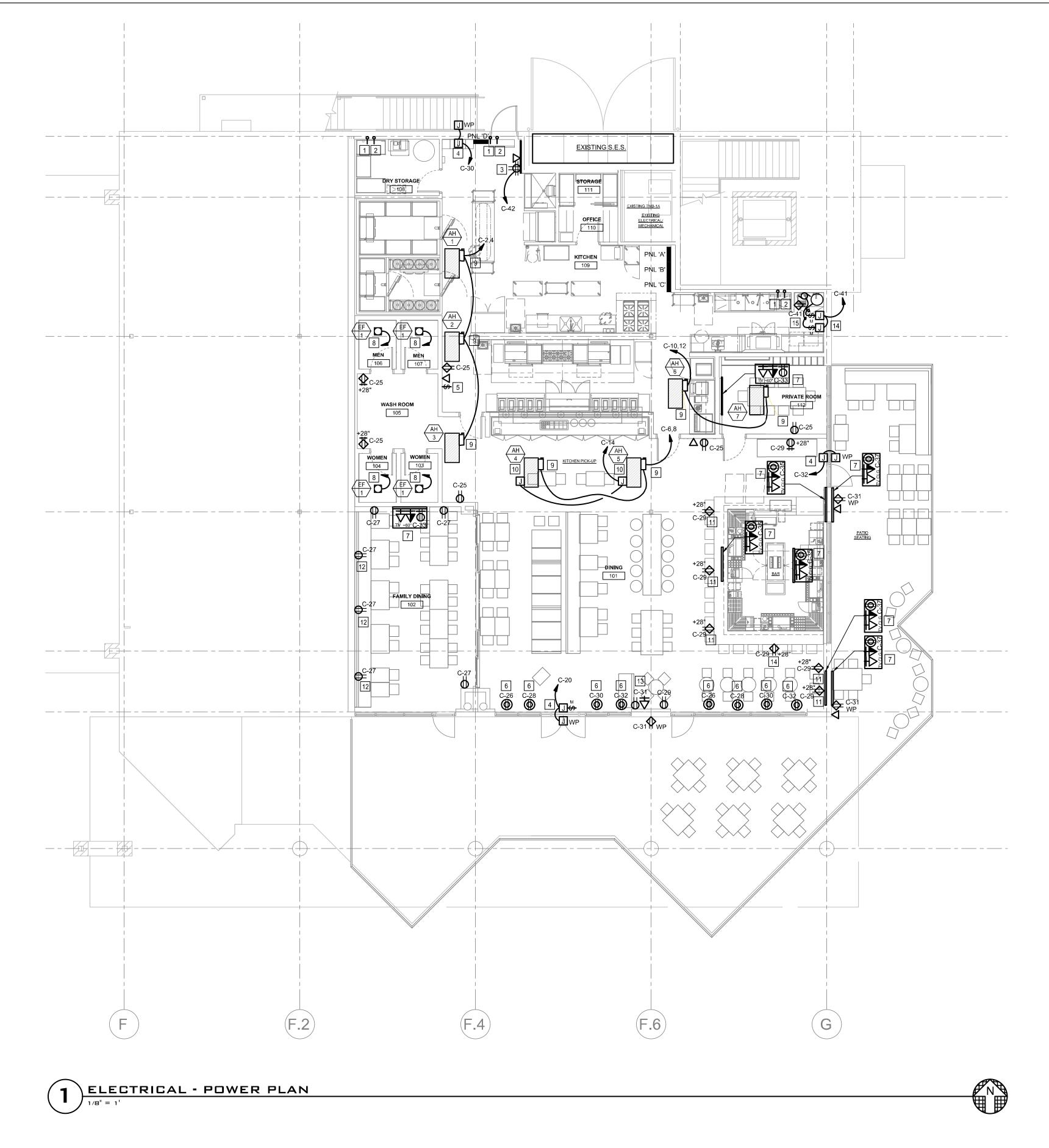
CALCULATIONS

_

	_	_	_		_
Date					
Description					
No.					
SHEE	т т				

SHEET TITLE SYMBOLS, NOTES, & ABBREVIATIONS

E0.0



GENERAL NOTES

- A. REFER TO ELECTRICAL SHEET E0.0 'ELECTRICAL SYMBOLS NOTES AND ABBREVIATIONS FOR ADDITIONAL INFORMATION BEFORE ESTIMATING OR CONSTRUCTING FROM THIS SHEET.
- B. REFER TO SHEET E2.1 FOR KITCHEN EQUIPMENT ELECTRICAL CONNECTIONS.
- C. REFER SHEET E4.3 FOR ONE-LINE DIAGRAM AND ELECTRICAL CALCULATIONS. D. REFER TO SHEET E4.1 FOR PANELBOARD
- SCHEDULES. E. PROTECT EXISTING EQUIPMENT, STRUCTURE, AND PERSONNEL FROM HARM.
- F. COMPLY WITH ALL SPECIFICATIONS OUTLINED ON <u> SH</u>ЕЕТ E5.1 - E5.3

KEYED NOTES

- EXISTING STUB-OUT (2) 2-1/2" EMPTY CONDUIT UNDERGROUND TO BUILDING S.E.S. VERIFY EXACT LOCATION WITH BUILDING MANAGEMENT IN FIELD, AND UTILIZE AS NEEDED FOR THIS PROJECT TENANT.
- 2. EXISTING STUB-OUT (2) 1-1/2" EMPTY CONDUIT UNDERGROUND TO BUILDING TMB-1A. VERIFY EXACT LOCATION WITH BUILDING MANAGEMENT IN FIELD, AND UTILIZE AS NEEDED FOR THIS PROJECT TENANT.
- 3. PROVIDE TENANT TELECOMMUNICATIONS TERMINAL BOARD (TTB). INCLUDE BARE COPPER GROUNDING CONDUCTOR WITH COPPER BUS-BAR, (SEE 1-LINE FOR FEEDER SIZE), QUADPLEX RECEPTACLE, 1-1/2" INCOMING CONDUIT, AND 4'X8' PERMIT DRAWINGS MOUNTING PLYWOOD. PROVIDE AND TERMINATE CIRCUIT TO QUADPLEX RECEPTACLE.
- 4. PROVIDE POWER, WATER-PROOF BACK-BOX, AND MOTOR RATED DISCONNECT FOR TENANT SIGNAGE INSTALLED BY OTHERS. COORDINATE EXACT LOCATION WITH INTERIOR DESIGNER AND ARCHITECT. PROVIDE LOCK-OFF CIRCUIT BREAKER IN COMPLIANCE WITH NEC 600.6(A)(1).
- 5. PROVIDE DECORATOR STYLE PADDLE SWITCH AND (4) SINGLE POLE, 120V COIL CONTACT RELAYS NEAR LIGHTING CONTROL TOUCHSCREEN FOR OPERATION OF SHOW WINDOW SIGNAGE.
- 6. PROVIDE SWITCHED SHOW WINDOW RECEPTACLE ON WALL 6" ABOVE STOREFRONT. COORDINATE EXACT LOCATION WITH ARCHITECT PRIOR TO ROUGH-IN. ROUTE CIRCUIT VIA SWITCH IN NOTE #5 PRIOR TO TERMINATION AT PANELBOARD.
- 7. PROVIDE RECESSED 3-GANG BACK BOX WITH DUPLEX RECEPTACLE, DATA PORT, AND COAXIAL CABLE FOR FINAL CONNECTION TO FLAT PANEL TV AND TELEVISION RECEIVER (PROVIDED BY OTHERS). PROVIDE 1" EMPTY EMT CONDUIT AND PULL-STRING TO ABOVE ACCESSIBLE CEINLING IN ADDITION TO POWER CIRCUIT. COORDINATE EXACT LOCATIONS, MOUNTING, AND ORIENTATION WITH ARCHITECT AND INTERIOR DESIGNER PRIOR TO ROUGH-IN.
- 8. PROVIDE POWER, DISCONNECT, AND CONTROL BY ROUTING TOILET ROOM EXHAUST FAN THROUGH LINE-VOLTAGE OCCUPANCY SENSOR WITH DUAL SWITCHES INDICATED ON LIGHTING PLAN SHEET E3.1. RELAY 2 SHALL OPERATE EXHAUST FAN AND AUTOMATICALLY TURN OFF AFTER 20 MIN. OF NO OCCUPANCY.
- 9. PROVIDE NEW 30A, 208V, 1PH HEAVY DUTY FUSED APPROVED BY: **DISCONNECT SWITCH WITH 15A FUSES FOR FINAL** CONNECTION TO MECHANICAL AIR-HANDLER UNIT. ALL LOW-VOLTAGE THERMOSTAT WIRING SHALL BE COMPLETED BY MECHANICAL CONTRACTOR.
- 10. PROVIDE 120V POWER CONNECTION TO DUCT SMOKE DETECTOR AND DAMPER. ROUTE POWER VIA FIRE ALARM RELAY. COORDINATE WITH FIRE ALARM INSTALLING CONTRACTOR. SEE MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.
- 11. PROVIDE DUPLEX RECEPTACLE WITH (2) USB PORTS.
- 12. CONTRACTOR SHALL INSTALL RECEPTACLES FLUSH WITHIN THE FACE OF THE SEATING CASEWORK AT STANDARD MOUNTING HEIGHT.
- 13. PROVIDE POWER AND DATA JUNCTION BOXES AT 42" AFF FOR FINAL CONNECTION TO THE CHECK IN DESK EQUIPMENT BY OWNER, PROVIDE 6" FROM WINDOW MAX 1" FROM WINDOW TO EDGE OF SINGLE GANG BACKBOX.
- 14. PROVIDE JUNCTION BOX AND MOTOR RATED DISCONNECT SWITCH FOR FINAL CONNECTION TO GAS WATER HEATER AND RECIRCULATION PUMP.
- 15. PROVIDE DUPLEX RECEPTACLE OR JUNCTION BOX WITH DISCONNECT SWITCH FOR FINAL CONNECTION TO WATER SOFTENER.



PROJECT ISSUE:

This drawing is the professional intellectual property of Optimized LED and protected by Copyright Usage of this drawing shall is restricted for use as a project example and shall not be reproduced, recreated, or utilized for any other purpose without express written consent of Optimized LED.

	842 EAST ISABELLA AVE., MESA, AZ, 85204 WWW. OPTIMIZED-LED.COM 602-699-6224 PROJECT: MDI190050 EOR: BRETT LORENZEN DIELLIOHENZEN DIELLIOHENZEN DIELLIOHENZEN DIELLIOHENZEN AZ-FIRM: 21458 AZ-FIRM: 21458 Marciag and a remeticatio prover (of Animaset Lis, Usago af the dawng and a verticatio for the opticated by copyford. Usago af the dawng and a verticatio for the opticated by copyford. Usago af the dawng and a verticatio for the opticated by copyford.
PROJECT NUM	1BER: MDI190050
DRAWN BY:	RSM

BSL

LA RISTRA - CHANDLER

LA RISTRA

				_
Date				
Description				
No.				
	т ті			

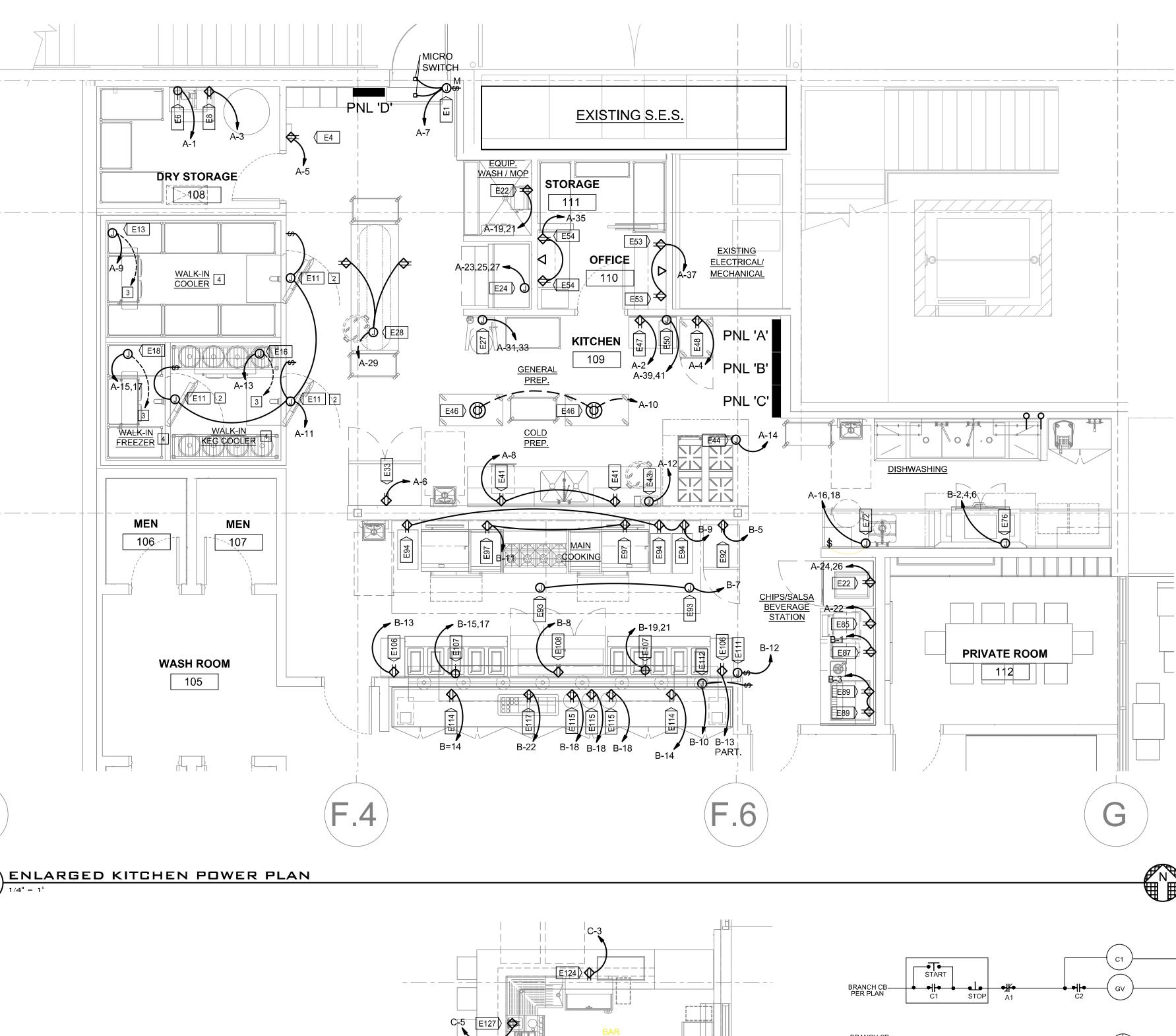
SHEET TITLE ELECTRICAL POWER PLAN

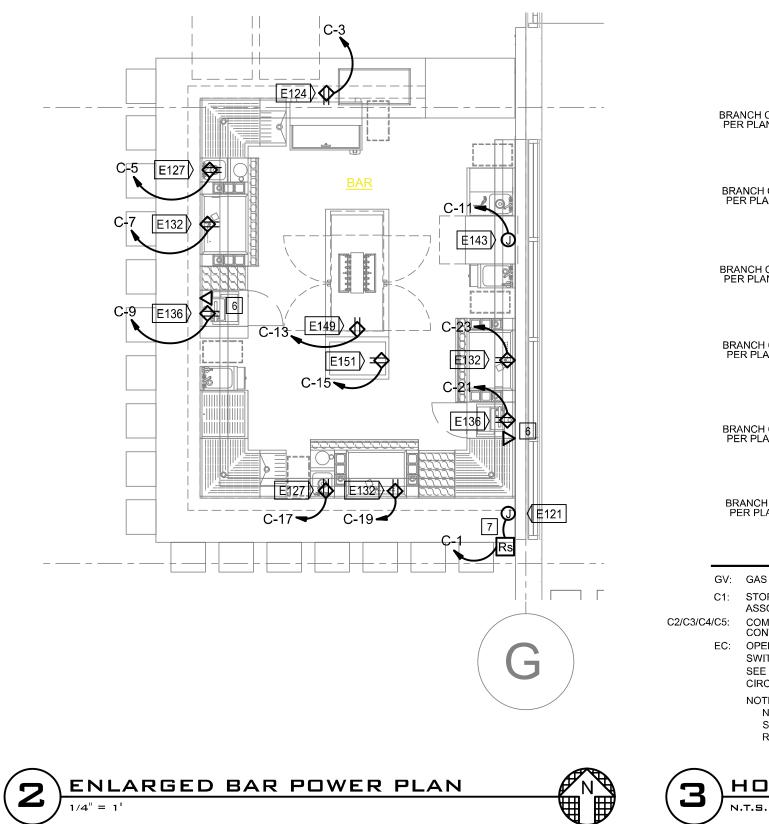


	EQUIPMENT SCHED	ULE									
								ШС			
								NIENCE			
			ST			S.	SE	IVEN	ECT	REMARKS	
"E" ITEM	DESCRIPTION	QTY.	VOLTS	ЧH	₹	AMP	PHA	CON	DIRE	REMARKS	
1	AIR CURTAIN	1	120	1/2		5.1	1		×	E.C. TO WIRE AIR DOOR TO MICRO SWITCH SUPPLIED BY KEC	
4	EMPLOYEE TIME CLOCK	1LOT	120			10.0	1	Х			
6	DRAFT BEER SYSTEM	1	120	1/2		15.7	1		х		
8	SODA SYSTEM	1LOT	120			16.0	1	х		1 EA. UTILITY OUTLET	
11	WALK-IN COOLER / FREEZER BOX	1LOT	120			16.0	1			STUB-DN 3 EA. J-BOX FOR WALK-IN COOLER / FREEZER LIGHTS	
13	WALK-IN COOLER COIL	1	120			10.0	1			STUB-DN FOR FINAL CONN. TO COIL BY E.C.	
16	WALK-IN KEG COOLER COIL	1	120			10.0	1		X	STUB-DN FOR FINAL CONN. TO COIL BY E.C.	
18	WALK-IN FREEZER COIL	1	208			10.0	1		Х	STUB-DN FOR FINAL CONN. TO COIL BY E.C.	
22	WALL MOUNTED PRESURE WASHER	1	208	2.0		15.0	1	Х		NEMA 6-15P	
24	1300 LBS ICE MACHINE	1	208			12.4	3		x	20 AMP BREAKER	
27	FLOOR MIXER	1	208			18.0	1			VERIFY EXACT LOAD WITH EXISTING MIXER	
28	WORK TABLE	1	120			16.0	1		v	2 EA. UTILITY OUTLETS TABLE MOUNTED FROM J-BOX STUB-UP	
33	REACH-IN FREEZER	1	120			8.7	1	х		SELF-CONTAINED, NEMA 5-15P	
41	WORK TABLE W/ SINK(S)	1	120			16.0	1	x		2 EA. UTILITY OUTLETS	
	FIRE SUPPRESSION SYSTEM	1	120			16.0	1		~	SEE MECHANICAL DATA	
	EXHAUST HOOD (TYPE 1)	1	120	<u> </u>		16.0	1			SHEETS FOR MORE INFO. STUB-DN FOR	
46	MOBILE WORK TABLE	2	120			16.0		x		HOOD LIGHTS 2 EA. RETRACTABLE DROP	
47	WORK TABLE	1	120	<u> </u>		16.0	1	x		CORD UTILITY OUTLETS 1 EA. UTILITY OUTLET	
47		1	120			16.0		×		OUTLETNEMA	
50	COFFEE BREWER	1	120/208			30.0	1	^		5-20P VERIFY WITH OWNER EXACT COFFEE BREWER	
53	OFFICE COUNTER	1	120/200			16.0		х	-	TO BE SUPPLIED PRIOR TO ROUGH-IN 2 EA. UTILITY	🔂
54	OFFICE DESK	1	120			16.0				OUTLETS 2 EA. UTILITY	
72	FOOD WASTE DISPOSER	1	208	2.0		12.1				OUTLETS E.C. TO WIRE DISPOSER TO COUNTER	
76	CONVEYOR DISHWASHER (TALL)	1	208	2.0		12.1	3			MOUNTED CONTROL PANEL SINGLE POINT ELECTRICAL	
83	ROLL-IN REFRIGERATOR	1	120	~ 1/Z		6.0		Х		CONNECTION SELF-CONTAINED,	
85		1	120			9.0	1	× X		NEMA 5-15P NEMA	
87	ICE TEA BREWER / DISP.	•					<u> </u>			5-15P	
87	SODA AND ICE DISPENSER	1	120 120			12.0 10.0	1	X X		2 EA. OUTLET	
92	REACH-IN FREEZER	1	120			9.0	1	×		RECEPTICLES SELF-CONTAINED,	·
	EXHAUST HOOD (TYPE 1)	4	120			16.0	1			NEMA 5-15P ELECTRICAL CONN.	
93	45 LBS FRYER	4	120				1	Х		FOR HOOD LIGHTS ELECTRICAL CONN. FOR	
94	REFRIG. EQUIPMENT STAND			410		2.0	<u> </u>			FRYER CONTROLS SELF-CONTAINED,	
97	LANDING TABLE	2	120	1/6		2.7	1	X		NEMA 5-15P 2 EA. UTILITY	
	HOT FOOD TABLE W/ STOR. BASE	2	120			16.0		X		OUTLETS	
107		2	208			20.0	1	X		NEMA L6-30P SELF-CONTAINED,	
108	72" REFRIGERATED PREP. TABLE	1	120			6.3	1	Х		NEMA 5-15P ELECTRICAL CONN. FOR EXHAUST	
	EXHAUST HOOD CONTROL PANEL	1	120			16.0	1		X	HOOD CONTROL PANEL 8 EA. TOTAL PENDANT HEAT LAMPS,	
112	PENDANT HEAT LIGHT LAMPS	8	120			3.2	1		X	TRACK MOUNTED W/ WALL SWITCH	
	EXPO STATION SERVICE COUNTER	1LOT	120			16.0	1	Х		2 EA. UTILITY OUTLETS	
115	SOUP WELL(S)	3	120		0.2	8.5	1	X		NEMA 5-15P SELF-CONTAINED.	
117	NARROW COLD PAN (2 PAN UNIT)	1	120			8.0	1	Х		NEMA 5-15P	
	BAR DIE	1LOT	120			16.0	1		X	ELECTRICAL CONN. FOR UNDER BAR LIGHTING	
124	BOTTLE COOLER	1	120	1/6		3.0	1	Х	_	SELF-CONTAINED, NEMA 5-15P	
	BAR BLENDER	2	120			16.0	1	х		NEMA 5-15P	
132	SODA GUN	3	120			10.0	1	х		ÉLÉCTRICAL CONN. FOR CARBONATOR	
	POS SYSTEM	2	120			12.0	1	х		RUN POS ELECTRICAL ON DESIGNATED CIRCUIT	
143	GLASSWASHER	1	120			16.0	1		Х		
149	PASS-THRU REFRIGERATOR	1	120	1/6		2.5	1	Х		SELF-CONTAINED, NEMA 5-15P	
454	FROZEN DRINK DISPENSER	1	120			16.0	1	х		VERIFY EXACT ELECTRICAL CONN. WITH OWNER SUPPLIED MACHINE	
151		1LOT	208	1 1/2		10.5	3		V	FREEZER COMPRESSOR, ROOF MOUNTED, 15 AMP BREAKER	
151	REMOTE REFRIGERATION SYSTEM	1201								MOUNTED, 15 AMP BREAKER	
	REMOTE REFRIGERATION SYSTEM	1LOT	208	1 1/2		10.5	3		V	COOLER COMPRESSOR, ROOF MOUNTED, 15 AMP BREAKER	
152			208	1 1/2		10.5	3		V	COOLER COMPRESSOR, ROOF	

SEE ITEM# ON PLAN FOR OUTLET LOCATION TYPICAL

* U.N.O. COORDINATE RECEPTACLE TYPE WITH KITCHEN EQUIPMENT VENDOR





GENERAL NOTES A. REFER TO ELECTRICAL SHEET E0.0 'ELECTRICAL

- SYMBOLS NOTES AND ABBREVIATIONS FOR ADDITIONAL INFORMATION BEFORE ESTIMATING OR CONSTRUCTING FROM THIS SHEET.
- B. REFER SHEET E4.2 FOR ONE-LINE DIAGRAM AND ELECTRICAL CALCULATIONS. C. REFER TO SHEET E4.1 FOR PANELBOARD
- SCHEDULES. D. PROTECT EXISTING EQUIPMENT, STRUCTURE,
- AND PERSONNEL FROM HARM. E. COMPLY WITH ALL SPECIFICATIONS OUTLINED ON SHEET E5.1 - E5.3.

KEYED NOTES

- 1. PROVIDE POWER, BACK-BOX, AND MOROR RATED DISCONNECT SWITCH FOR FLY FAN
- 2. PROVIDE FINAL CONNECTION TO WALK-IN LIGHTING AND CONTROLS PROVIDED WITH EQUIPMENT. 3. PROVIDE 2" CONDUIT WITH FIVE (5) #12 THHN FROM
- EVAPORATOR COIL TO CONDENSING COIL FOR TIMECLOCK DEFROST CYCLE AND EVAPORATOR COIL POWER. SEE ARCHITECTURAL DRAWINGS FOR ROOF PENETRATION DETAILS.
- 4. SEAL ALL PENETRATIONS IN/OUT OF WALK-IN COOLER ENCLOSURE (PERMA SEAL OR EQUAL).
- 5. PROVIDE NEW 240V, 3PH, NEMA 3R HEAVY DUTY FUSED DISCONNECT SWITCH WITH 20A FUSES FOR FINAL CONNECTION TO WALK-IN CONDENSING UNIT. EQUIPMENT LOCATED ON ROOF, COORDINATE EXACT LOCATION WITH EQUIPMENT SUPPLIER, ARCHITECT, AND INTERIOR DESIGNER PRIOR TO ROUGH-IN. PROVIDE APPROPRIATE ROOF PENETRATION ASSEMBLY COMPLYING WITH ARCHITECTURAL AND LANDLORD ROOF SPECIFICATIONS.
- 6. PROVIDE DATA PORT AND DEDICATED GROUND WIRE FROM POS SYSTEM RECEPTACLE TO SERVING PANELBOARD.
- 7. PROVIDE JUNCTION BOX BELOW COUNTERTOP FOR FINAL CONNECTION TO LED STRIP LIGHTS. VERIFY EXACT LOCATION WITH ARCHITECT PRIOR TO ROUGH-IN. ROUTE CIRCUIT THOUGH LIGHTING CONTROL RELAY MODULE AND CONNECT TO LIGHTING CONTROL SYSTEM.
- 8. TYPICAL ALL KITCHEN EQUIPMENT, PROVIDE GFCI PROTECTION AT FLOOR RECEPTACLES PER NEC 210.8(B). PROVIDE GFCI CIRCUIT BREAKER WHERE OUTLET IS NOT READILY ACCESSIBLE.
- 9. HOOD SYSTEM CONTROL PANEL (HSCP). PROVIDE CONTACTORS TO CONTROL ALL LOADS UNDER HOOD, EXHAUST AND MAKE-UP AIR FAN DISCONNECT SWITCHES. SEE PANEL SCHEDULES, & HOOD SYSTEM CONTROL DIAGRAM IN DETAIL ON THIS SHEET.

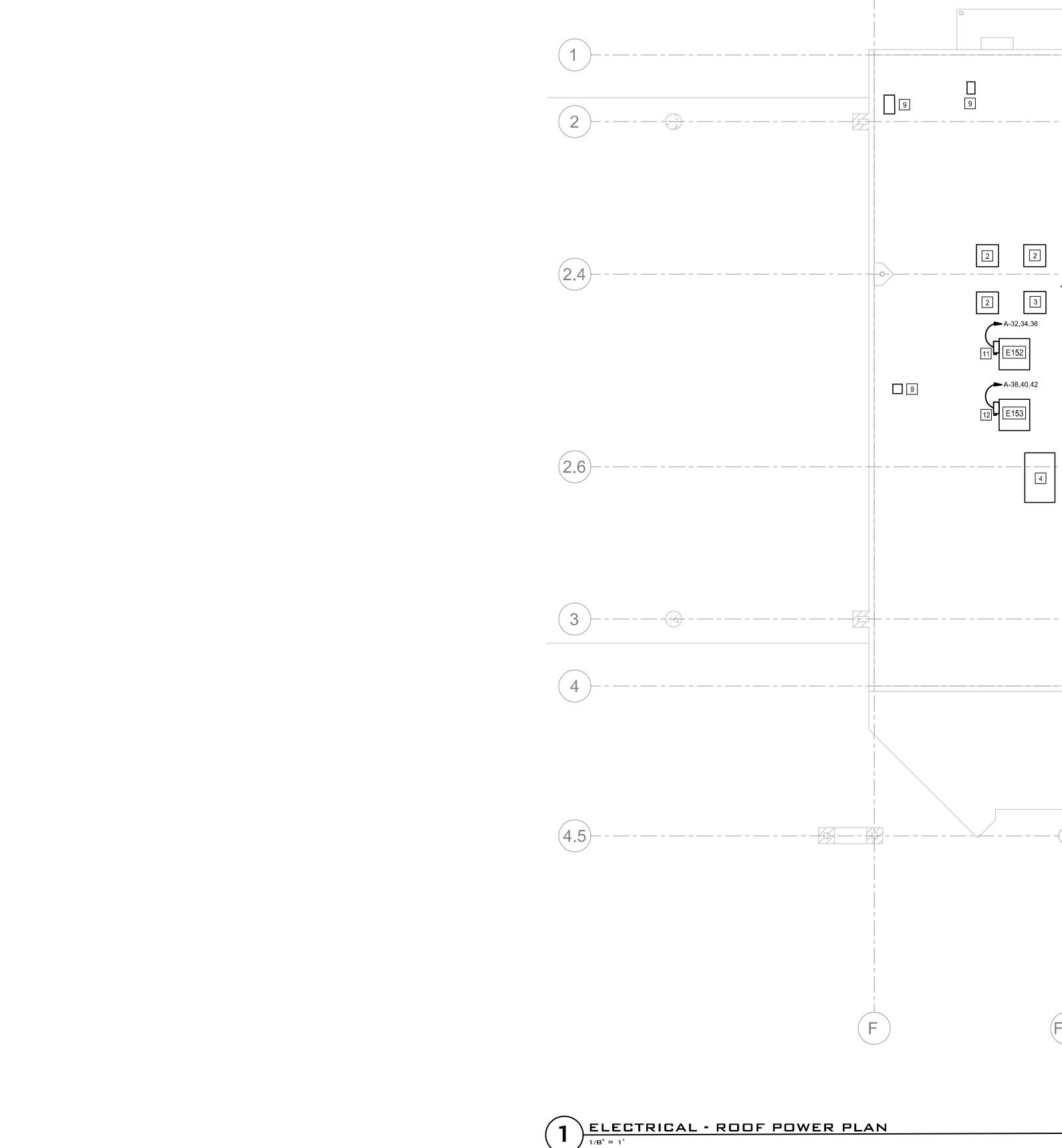


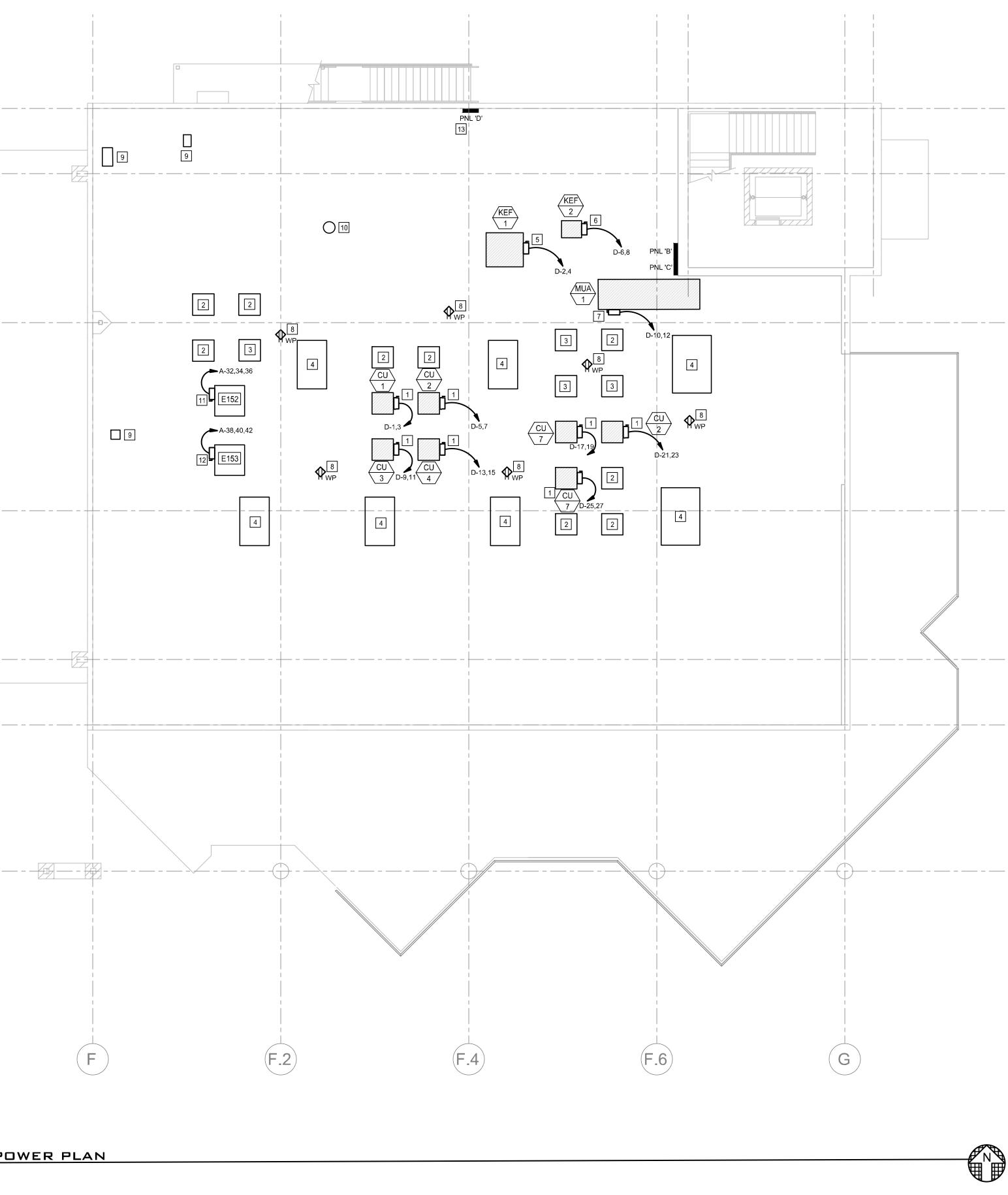
PROJECT ISSUE: PERMIT DRAWINGS

This drawing is the professional intellectual property of Optimized LED and protected by Copyright Usage of this drawing shall is restricted for use as a project example and shall not be reproduced, recreated, or utilized for any other purpose without express written consent of Optimized LED.

	OPTIMIZOD	Lighting Engineering Design	842 EAST ISABELLA AVE., MESA, AZ, 85204 WWW, OPTIMIZED-LED.COM 1602-699-5224	PROJECT: MD190050 EOR: BRETT LORENZEN	brett.lorenzen@optimized-led.com AZ: 534371 CA: 226601 CO: 55367	A.ZFIKMY: 214358 This drawing is the professional institution interfact on Ordinatical LED and products by Copyright. Usage of thes graving shells is startication the project inducted and shell not be projected.	recreated, or unitized for any other purpose writtour the express written consent of Uppintized LELD.
PRO	IECT	NUN	/IBEF	R: M	DI19	0050	
DRAV	VN B	Y:		R	SM		
APPF	ROVE	ED B`	Y:	B	SL		
LAR	ISTR	A - C	HAN	IDLE	R		
LA	R	IS ⁻	TR	RA			
Date							
No. Description							
SHEE ELE ENI KIT	ECT _AF	RI RGE	ΞD		IS		
	E	2	2	2			

BRANCH C PER PLAN	START START C1 STOP A1	GV C1 N GV VALVE GV
BRANCH C PER PLAN	B ●∦● A1	MAIN CIRCUIT BREAKER SHUNT-TRIP N IN PANEL C
BRANCH C PER PLAN	BS1A1	C2 N EC-1
BRANCH C PER PLAN		C3 OLs N EF-2
BRANCH C PER PLAN		C4 OLs N EF-3
BRANCH (PER PLA		C5 N EF-4
C1: STOP ASSO C2/C3/C4/C5: COME CONT EC: OPER SWITC SEE F CIRCI NOTE NE SY	ALVE SOLENOID OPERATOR. /START STATION SEAL-IN RELAY COIL AND CIATED CONTACTS. BINATION STARTER COILS AND AUXILIARY ACTS CONNECTED AS INDICATED. ATING COIL FOR MULTIPOLE CONTACTOR CHING UNDER-HOOD ELECTRICAL EQUIPMENT. PLAN FOR NUMBER OF POLES AND SPECIFIC JITS TO BE SWITCHED. : ELECTRICAL CONTRACTOR TO PROVIDE ALL E ECESSARY FOR A FULLY FUNCTIONING HOOD IN /STEM. COORDINATE WITH ALL VENDORS FOR E EQUIREMENTS.	ITERLOCK
(З)но N.т.б.	OD SYSTEM CONT	ROL DIAGRAM





GENERAL NOTES

- A. REFER TO ELECTRICAL SHEET E0.0 'ELECTRICAL SYMBOLS NOTES AND ABBREVIATIONS FOR ADDITIONAL INFORMATION BEFORE ESTIMATING OR CONSTRUCTING FROM THIS SHEET.
- B. REFER SHEET E4.2 FOR ONE-LINE DIAGRAM AND ELECTRICAL CALCULATIONS. C. REFER TO SHEET E4.3 FOR PANELBOARD
- SCHEDULES. D. PROTECT EXISTING EQUIPMENT, STRUCTURE, AND PERSONNEL FROM HARM.
- E. COMPLY WITH ALL SPECIFICATIONS OUTLINED ON SHEET E5.1 E5.3.

KEYED NOTES

- 1. PROVIDE NEW 60A, 208V, 1PH, NEMA 3R, HEAVY DUTY FUSED DISCONNECT SWITCH WITH 50A FUSES MOUNTED TO UNIT OR ON SEPARATE UNISTRUT ASSEMBLY FOR FINAL CONNECTION TO CONDENSING UNIT. SEE MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.
- 2. EXISTING 5-TON CONDENSING UNIT TO REMAIN. NO WORK TO BE COMPLETED AS PART OF THIS SCOPE OF WORK.
- 3. EXISTING CONDENSING UNIT CURB TO REMAIN. NO WORK TO BE COMPLETED AS PART OF THIS SCOPE OF WORK.
- 4. EXISTING ROOFTOP UNIT TO REMAIN. NO WORK TO BE COMPLETED AS PART OF THIS SCOPE OF WORK.
- 5. PROVIDE NEW 60A, 208V, 1PH, NEMA 3R, HEAVY DUTY FUSED DISCONNECT SWITCH WITH 60A FUSES MOUNTED TO UNIT OR ON SEPARATE UNISTRUT ASSEMBLY FOR FINAL CONNECTION TO KITCHEN EXHAUST FAN. PROVIDE AUX. INTERLOCK FOR CONTROL BY HOOD SYSTEM CONTROL PANEL. SEE MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.
- 6. PROVIDE NEW 30A, 208V, 1PH, NEMA 3R, HEAVY DUTY FUSED DISCONNECT SWITCH WITH 15A FUSES MOUNTED TO UNIT OR ON SEPARATE UNISTRUT ASSEMBLY FOR FINAL CONNECTION TO KITCHEN EXHAUST FAN. PROVIDE AUX. INTERLOCK FOR CONTROL BY HOOD SYSTEM CONTROL PANEL. SEE MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.
- 7. PROVIDE NEW 60A, 208V, NEMA 3R, 1PH HEAVY DUTY DISCONNECT SWITCH WITH 50A FUSES MOUNTED TO UNIT OR ON SEPARATE UNISTRUT ASSEMBLY FOR FINAL CONNECTION TO MAKE-UP AIR UNIT. PROVIDE AUX. INTERLOCK FOR CONTROL BY HOOD SYSTEM CONTROL PANEL. SEE MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.
- 8. EXISTING MAINTENANCE RECEPTACLE ON CONDUIT STUB-UP WITH WATERPROOF IN-USE COVER TO REMAIN. NO WORK TO BE COMPLETED AS PART OF THIS SCOPE OF WORK.
- 9. EXISTING MECHANICAL DUCTING EXHAUST EXIT TO REMAIN. NO ELECTRICAL WORK TO BE COMPLETED AS PART OF THIS SCOPE OF WORK.
- 10. EXISTING EXHAUST FAN TO REMAIN. NO ELECTRICAL WORK TO BE COMPLETED AS PART OF THIS SCOPE OF WORK.
- 11. PROVIDE 30A, 208V, 1PH, NEMA 3R, HEAVY DUTY DISCONNECT SWITCH WITH 20A FUSES FOR FINAL CONNECTION TO WALK-IN COOLER CONDENSER COIL.
- 12. PROVIDE 20A, 208V, 1PH, NEMA 3R, HEAVY DUTY DISCONNECT SWITCH WITH 20A FUSES FOR FINAL CONNECTION TO WALK-IN FREEZER CONDENSER COIL.
- 13. PANELBOARD LOCATED NEAR THE REAR DOOR WITHIN THE KITCHEN ON THE FIRST LEVEL OF THE BUILDING.



PROJECT ISSUE: PERMIT DRAWINGS

This drawing is the professional intellectual property of Optimized LED and protected by Copyright Usage of this drawing shall is restricted for use as a project example and shall not be reproduced, recreated, or utilized for any other purpose without express written consent of Optimized LED.

Child ht ing 1 Engine er ing 1 De sign Lighting 1 Engine er ing 1 De sign 842 EAST ISABELLA AVE., MESA, AZ, 85204 WWW. OPTIMIZED-LED.COMI 602-699-6224 PROJECT: MD1190050 PROJECT: MD1190050 PROJECT: MD1190050 COR: BRETT LORENIZET PROJECT: MD1190050 PROJECT: MD1
ROJECT NUMBER: MDI190050

DRAWN BY:	R
APPROVED BY:	В

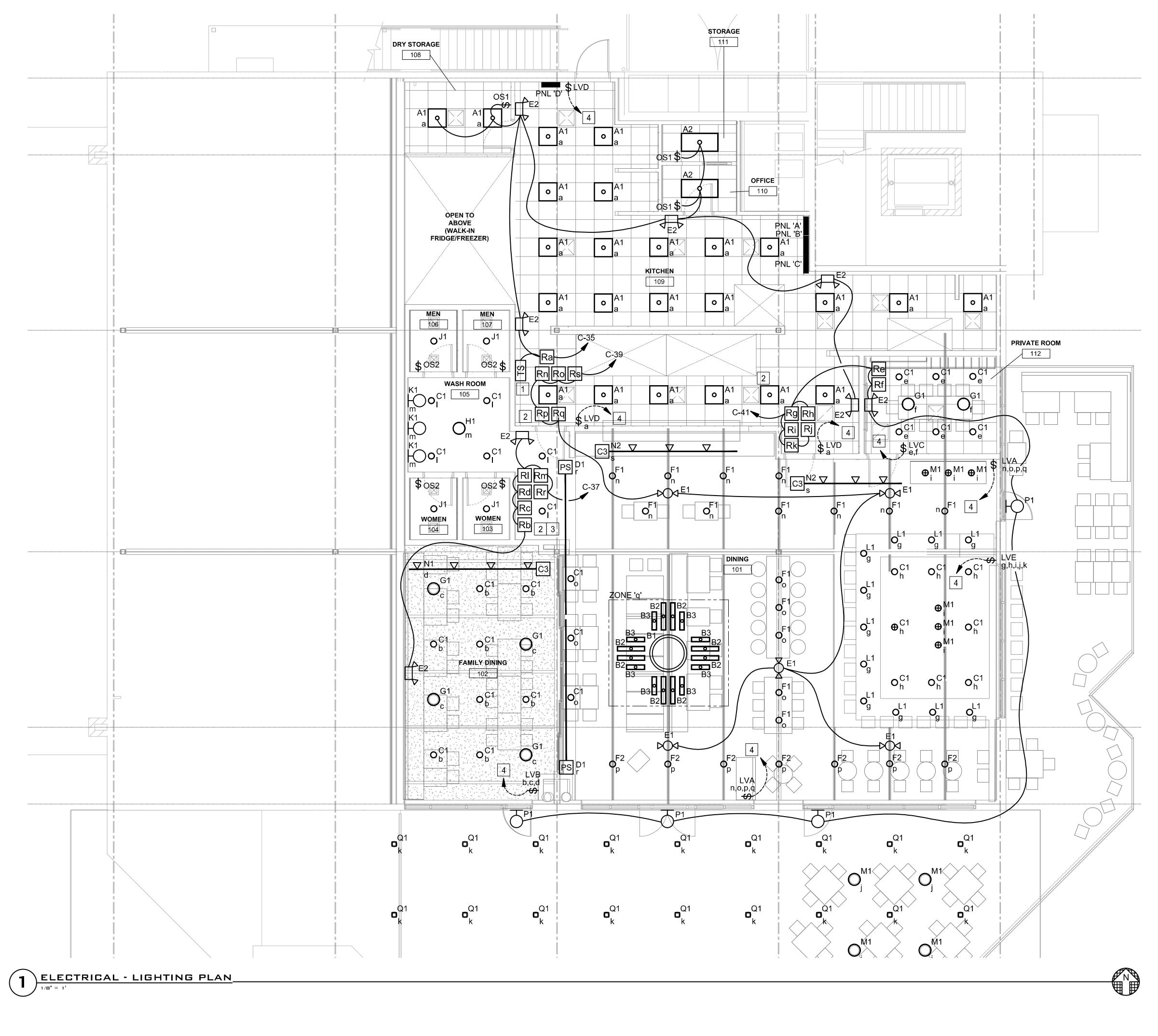
LA RISTRA - CHANDLER

LA RISTRA

Date					
Description					
No.					
SHEE	ET TI	TLE			

ELECTRICAL ROOF POWER PLAN





GENERAL NOTES

- A. REFER TO ELECTRICAL SHEET E0.0 FOR ADDITIONAL INFORMATION BEFORE ESTIMATING OR CONSTRUCTING FROM THIS SHEET.
- REFER TO SHEET E4.1 FOR LIGHT FIXTURE SCHEDULE.
- C. REFER SHEET E4.2 FOR ONE-LINE DIAGRAM AND ELECTRICAL CALCULATIONS.
- D. REFER TO SHEET E4.1 FOR PANELBOARD SCHEDULES.
- E. COMPLY WITH ALL SPECIFICATIONS OUTLINED ON SHEET E5.1 E5.3.
- F. PROVIDE A COMPLETE SET OF CONSTRUCTION DOCUMENTS TO VENDORS WHEN REQUESTING QUOTES, DO NOT LIMIT PROJECT INFORMATION.
- G. PROTECT EXISTING EQUIPMENT, STRUCTURE, AND PERSONNEL FROM HARM.
- H. PROVIDE ALL LIGHTING CONTROL SYSTEM COMPONENTS FROM A SINGLE MANUFACTURER, INDEPENDENT FROM LIGHTING FIXTURE PRICING AND INCLUDE ALL PARTS FOR A COMPLETE AND FULLY OPERATIONAL SYSTEM.
- I. ALL FIXTURES SHARING THE SAME LOWER CASE ZONE ASSIGNMENT i.e. 'a' SHALL SHARE A SINGLE HOME-RUN TO THE DESIGNATED CONTROL MODULE.
- J. PROVIDE CONSTANT CONDUCTOR TO ALL EMERGENCY LIGHTING UNITS AND EXIT SIGNS FOR CHARGING OR BATTERY BACK-UP. POWER SHOULD BE SUPPLIED FROM THE SAME CIRCUIT AS THE NORMAL LIGHTING IN THE SAME SPACE PER NEC 700.12(F).
- K. LAYOUT OF EMERGENCY LIGHTING UNITS ARE AN ESTIMATE BASED ON COMPUTER SIMULATIONS. CONTRACTOR SHALL ENSURE THAT 1FC AVERAGE AND 1FC MINIMUM ARE MAINTAINED ACCROSS A 3' EGRESS EXITING PATHWAY. COMPLY WITH ALL INSPECTOR REQUESTS TO MEET THE REQUIRED ILLUMINATION.
- L. LIGHTING CONTROL ZONES ARE INDICATED WITH LOWER-CASE LETTER TAGS 'a'. SWITCHES, SENSORS, MODULES, AND FIXTURES MAY CONTAIN THIS ZONE TAG, THESE DEVICES SHALL OPERATE IN CONJUNCTION.

KEYED NOTES

- CENTRAL LIGHTING CONTROL SYSTEM UNIT, TOUCHSCREEN, AND INTERNET HUB (BASIS OF DESIGN: ACUITY BRANDS 'FESCO' WITH nLIGHT DEVICES).
- 2. GROUP AND INSTALL REQUIRED LIGHTING CONTROL MODULES ABOVE ACCESSIBLE CEILING IN THIS GENERAL LOCATION TO CONTROL THE ZONES INDICATED. ROUTE LINE VOLTAGE WIRING VIA CONTROL MODULE AND PROVIDE REQUIRED LOW-VOLTAGE WIRING FOR DIMMING. VENDOR IS RESPONSIBLE FOR DETERMINING SUITABLE LIGHT CONTROL MODULE TO OPERATE FIXTURES SPECIFIED IN LIGHT FIXTURE SCHEDULE.
- 3. PROVIDE 18" X 18" ACCESS PANEL TO ACCESS LIGHTING CONTROL MODULES.
- 4. CONNECT TO LIGHTING CONTROL LOW-VOLTAGE COMMUNICATION BUS.



PROJECT ISSUE: PERMIT DRAWINGS

This drawing is the professional intellectual property of Optimized LED and protected by Copyright Usage of this drawing shall is restricted for use as a project example and shall not be reproduced, recreated, or utilized for any other purpose without express written consent of Optimized LED.

PROJECT NUMBER:	MDI190050
DRAWN BY:	RSM
APPROVED BY:	BSL

LA RISTRA - CHANDLER

LA RISTRA

Date			
iption			
Description			
No.			
SHEE			

ELECTRICAL LIGHTING PLAN

E3.0

LIGHT FIXTURE SCHEDULE

TYPE	LOCATION	DESCRIPTION	BASIS OF DESIGN	ALTERNATE	MOUNTING		LIGHT ENGINE	
			MANUFACTURER, MODEL	MANUFACTURER, MODEL		TYPE QTY	TEMP CRI	LUMENS EM LUMENS
	KITCHEN	SURFACE OR GRID MOUNTING EDGE-LIT FLAT-	GO ENERGY - GFS22	COOPER METALUX	LAY-IN T-BAR GRID	LED	4000K	4,400
A1		PANEL LED LIGHT FIXTURE WITH WET LOCATION RATING	GFS22-T-40-40-D-120-WET-WHITE	22FP4240C		1	90 CRI	N/A
	KITCHEN STORAGE	SAME AS A1 BUT A 2'X4' DESIGN	GO ENERGY - GFR24	COOPER METALUX	SAME AS A1	LED	4000K	3,000
A2			GFS22-T-40-60-D-120-WET-WHITE	24FP3140C		1	90 CRI	N/A
	LOGO CIRCLE	4' DIAMETER CIRCULAR EXTRUDED ALUMINUM	DELRAY - UNO	OCL LIGHTING	PENDANT MOUNT TO 10' AFF	LED	3000K	2,170
B1		PENDANT WITH FROSTED ACRYLIC DIFFUSER	UC4-TBD-W30-CS-D-XL2000	SL1-P1EE-48-MW-SGP-LED1-30K-UNVDM1	COORDINATE ADDITIONAL SUSPENSION CABLE	1	90 CRI	N/A
	LOGO 3' LINEARS	3' LINEAR EXTRUDED ALUMINUM PENDANT	DELRAY - UNO	CONFIRM FINISH WITH INTERIOR DESIGNER OCL LIGHTING	IF REQUIRED WITH VENDOR SAME AS B1	LED	3000K	1,175
B2		WTH FROSTED ACRYLIC DIFFUSER	ULR3-XX-W30-D-XL1000	MW-SGP-2LD18/30K-120-36-DMO		1	90 CRI	N/A
				CONFIRM FINISH WITH INTERIOR DESIGNER				
	LOGO 2' LINEAR	2' LINEAR EXTRUDED ALUMINUM PENDANT	DELRAY - UNO		SAME AS B1	LED	3000K	790
B3		WITH FROSTED ACRYLIC DIFFUSER	ULR2-XX-W30-D-XL500	MW-SGP-2LD12/30K-120-24-DMO CONFIRM FINISH WITH INTERIOR DESIGNER		1	90CRI	N/A
	DOWNLIGHTS	2.75" APERATURE COMPACT DOWNLLIGHT WITH 40 DEG	LUMENPULSE - NANO		RECESSED - COORDINATE WITH CEILING TYPE	LED	3000K	1,000LM
C1		POLYCARBONATE LENS, 0-10V DIM TO WARM DRIVER AND WHITE BEZEL AND TRIM	LCRN-QS-A-FD-120-R-L10-DWW-90-M-DA1-MB-MWH-RD-MWH- NC-1		INDICATED ON ARCHITECTURAL PLANS	1	90CRI	
	LEDGE UPLIGHT	COLOR CHANGING TAPE-LIGHT IN AN EXTRUDED	HOUSING: KELWX - CH-409-XX-WH-CP-EC	LEDI - INSPIRE V4	INSTALL ABOVE ARCHITECTURAL LEDGE WHERE	COLOR CHANGING	RGBW	340 LWFT
D1		ALUMINUM HOUSING. MAXIMUM 25' WITH 100W	ENGINE: KELVIX - RGBW-2-24V	HOUSING: ALUMINUM WITH DIFFUSE LENS	INDICATED ON PLANS WITH PROVIDED CLIPS	LED	N/A	VARIES
		POWER SUPPLY, PROVICE COMPLETE SYSTEM	SUPPLY: KELVIX - ULV-96 CONTROLLER - FRESCO	CONTROLLED BY FRESCO	INSTALL POWER SUPPLY AND C ONTROLLER		N 1/A	
E1	EMERGENCYUNIT	COMPACT THERMOPLASTIC EMERGENCY LIGHTING UNIT WITH 2 HEADS AND 90 MIN BACK-	LITHONIA - QUANTUM ELM2LBLTP		SURFACE OR PENDANT MOUT TO SAME HIGHT AS STRUCTURAL MEMBERS IN SPACE, AIM	LED	N/A N/A	N/A N/A
-		UP POWER USING LITHIUM IRON PHOSPHATE BAT			TO SATISFY CODE ILLUMINATION LEVELS	2	N/A	
	WALL EMERGENCY UNIT	SAME AS ABOVE BUT WALL MOUNTED WITH	LITHONIA - QUANTUM		WALL MOUNT AT 8' AFF AT LOCTION INDICATED	LED	N/A	N/A
E2		WHITE HOUSING	ELM2LLTP		ON DRAWINGS	2	N/A	N/A
	GENERAL PENDANT	5" DIAMETER BY 18" LONG CYLINDRICAL PENDANT	LUMENPULSE - NANO	CREATIVE LIGHTING SYSTEMS	CANOPY MOUNTED PENDANT TO 10' AFF	LED	3000K	1000
F1		WITH 25 DEG POLYCARBONATE LENS, 0-10V DIM TO	LACYN-A-PMD-MBK-ACC100-D-120-18-DL10-30K-CR90-N-DA1	LP2-15-304-S-LV		1	90CRI	N/A
			CONCRETE GREY FINISH - MATTE BROWN BEZEL	COORDINATE COLOR WITH INTERIOR DESIGNER			DIM TO WARM	
E2	WINDOW WALL PENDANT	SAME AS F1 BUT WITH DIFFERENT FINISH, BEAM, AND MOUNTING HEIGHT	LUMENPULSE - NANO LACYN-A-PMD-MBK-ACC100-D-120-18-DL10-30K-CR90-N-DA1	CREATIVE LIGHTING SYSTEMS	CANOPY MOUNTED PENDANT TO 10' AFF	LED 1	3000K 90CRI	1000 N/A
F2			MATTE BROWN FINISH - CONCRETE GREY BEZEL	LP2-15-304-S-LV COORDINATE COLOR WITH INTERIOR DESIGNER		I	DIM TO WARM	IN/A
	FAMILY DINING CHANDELIER	OWNER PROVIDED CONTRACTOR INSTALLED	AVAILABLE AT Y-LIGHTING		CANOPY MOUNTED FROM JUNCITON BOX AT	EDISON LOOK	3000K	150LM
G1		DECORATIVE INTERIOR CHANDLIER WITH 4 LED E12 CANDELABRA LAMPS	MARSDEN COMMONS CHANDLIER BY MINKA-LAVERY PRODUCT ID: MLVP204185		10' TO BOTTOM OF FIXTURE.	E12 BASE 6W LED CANDELABRA	90CRI	EACH
	DECORATIVE WASHROOM	OWNER PROVIDED CONTRACTOR INSTALLED	CDS - YUMA		SURFACE MOUNTED JUNCTION BOX/ GYPSUM	EDISON LOOK	3000K	150LM
H1		18" DIAMETER DECORATIVE SURFACE MOUNTED WAGON WHEEL APPEARANCE FIXTURE WITH 6 LAMPS	YUMA-BUSV		BOARD	E12 BASE 6W LED CANDELABRA	90CRI	EACH
	BATHROOMUNITS	OWNER PROVIDED CONTRACTOR INSTALLED	REJUVENATION - R100859		SURFACE MOUNT TO JUNCITON BOX	EDISON LOOK	3000K	1200LM
J1		SURFACE MOUNTED BARE LAMP FIXTURE WITH ANTIQUE HIGHLIGHTS	REJUVENATION.COM/S/191K9			A19 BASE, 18W LED GLOBE	90CRI	EACH
	DECORATIVE SCONCE	OWNER PROVIDED CONTRACTOR INSTALLED	REJUVENATION - A7233		WALL MOUNT BETWEEN MIRRORS AT 72" AFF	EDISON LOOK	3000K	1200LM
K1		WALL MOUNTED DIE CAST ANTIQUE KNUCKLES WITH	REJUVENATION.COM/S/18EJH			A19 BASE, 18W	90CRI	EACH
	BAR PENDANT	CURVED ARM AND SPUN BLACK/COPPER REFELCTOR OWNER PROVIDED CONTRACTOR INSTALLED	SONNEMAN - GOTHAM		PENDANT MOUNT TO 3' ABOVE BAR TOP	LED GLOBE EDISON LOOK	3000K	300LM
L1	BARFENDANI	CYLINDRICAL PENDANT WITH PERFORATED METAL	STYLE 7Y118 FOUND AT LAMPS PLUS		FENDANT MOONT TO 3 ABOVE BAR TOP	A19 BASE, 6W	90CRI	EACH
		DIFFUSER AND LONG EDISON LAMP				LED TUBE		
	DECORATIVE BAR ELEMENT	OWNER PROVIDED CONTRACTOR INSTALLED	COMMERCIAL ELECTRIC - 21325KIT-BK		SURFACE MOUNTE UNDER SHELVING	EDISON LOOK	3000K	300LM
M1		LOW-VOLTAGE SURFACE MOUONTED LED PUCK LIGHT			COORDIANTE TRANSFORMER LOCATION AND	A19 BASE, 6W	90CRI	EACH
	PENDANT MTD TRACK	FED FROM 24V TRANSFORMER TRACK MOUNTED LED HEAD WITH 25-DEG BEAM ANGLE	INTERNET: 206996741 STORE SKU: 1001799044 LUMENPULSE - ZEN		QUANTITY WITH INTERIOR DESIGNER MOUNTED TO RECESSED TRACK	LED LAMPS LED	3000K	1000LM
N1	FENDANT WID TRACK	AND DIM TO WARM DRIVER WITH CUSTOM COLOR AND	LATSZEN-A-120-L10-DWW-CR90-N (FINISH BY INTERIORS)		WTH 50W CURRENT LIMITER	1	90CRI	N/A
		POLYCARBONATE LENS	TRACK: GESA1204-WH, GES11-3, RECESSED HOUSING, GES41-	-3		,		
	RECESSED TRACK	SAME AS N2 BUT WITH PENDANT MOUNTED TRACK	LUMENPULSE - ZEN		TRACK MOUNTED HEAD WITH PENDANT	LED	3000K	1000LM
N2			LATSZEN-A-120-L10-DWW-CR90-N (FINISH BY INTERIORS) TRACK: GESA1204-WH, GES11-3, GES41-3		MOUNTED TRACK AT 12' AFF. 50W CURRENT	1	90CRI	N/A
	EXTERIOR DOOR EGRESS	WALL MOUNTED, OVER DOOR, EMERGENCY LIGHTING	LITHONIA - AFFINITY		WALL MOUNT 6" ABOVE EXTERIOR DOOR	LED	4000K	CODE
P1	FIXTURE	UNIT TO ILLLUMINATE EXIT DOOR AREA TO CODE MINIMUM STANDARDS, DIE CAST ALUMINUM	AFF-PELUVOLT-LTP-SDRT-WT		COORDINATE EXACT LOCATION WITH INTERIOR DESIGNER	1	90CRI	MINIMUM
	EXISTING EXTERIOR	EXISTING EXTERIOR DOWNLIGHT TO REMAIN	EXISTING EXTERIOR DOWNLIGHT TO REMAIN		EXTERIOR DOWNLIGHT TO REMAIN COORDINATE	LED	4000K	EXISTING
Q1	DOWNLIGHTS				WTH INTERIOR DESIGNER IF MODIFICATION IS NECESSARY	1	90CRI	
	SINGLE FACE EXIT SIGN	UNIVERSAL MOUNTED MATTE BLACK EXIT SIGN	LITHONIA - QUANTUM		UNIVERAL MOUNTED	LED	RED	N/A
X1		WITH BRUSHED ALUMINUM FACE AND RED STENCILED LETTERS	LQC1-R-ELN		SURFACE, END, TOP			
	DUAL FACE EXIT SIGN	SAME AS X1 BUT WITH DUAL FACES	LITHONIA - QUANTUM		ABOVE A DOOR MOUNT 6" ABOVE DOOR TRIM UNIVERAL MOUNTED	LED	RED	N/A
X2			LQC2-R-ELN		SURFACE, END, TOP			
				I		1		1

ZONE	DESCRIPTION		SWITCH	'LVA'			SWITCH	'LVB'			SWITC	H'LVC'		SWITCH 'LVD'	SWITCH 'ALL'
		SCENE 1	SCENE 2	SCENE 3	SCENE 4	SCENE 5	SCENE 6	SCENE 7	SCENE 8	SCENE 9	SCENE 10	SCENE 11	SCENE 12	SCENE 13	SCENE 5
		PREP/CLEAN	LUNCH	HAPPY HR	DINNER	PREP/CLEAN	LUNCH	DINNER	PRESENT	REP/CLEA	LUNCH	DINNER	PRESENT	KITCHEN	CLOSED
ZONE 'a'	KITCHEN	100%	100%	100%	100%									100%	0%
ZONE 'b'	FAMILY DINING - DOWNLIGHTS					100%	80%	60%	30%						0%
ZONE 'c'	FAMILY DINING - CHANDELIERS					100%	80%	60%	30%						0%
ZONE 'd'	FAMILY DINING - TRACK					0%	80%	60%	0%						0%
ZONE 'e'	PRIVATE DINING - DOWNLIGHTS									100%	80%	60%	30%		0%
ZONE 'f'	PRIVATE DINING - CHANDELIERS									100%	80%	60%	30%		0%
ZONE 'g'	BAR - PENDANTS	100%	100%	100%	80%										0%
ZONE 'h'	BAR - DOWNLIGHTS	100%	80%	80%	60%										0%
ZONE 'i'	BAR - CHANDELIER	100%	100%	100%	100%										0%
ZONE 'j'	EXTERIOR - CHANDELIER	0%	0%	100%	100%										0%
ZONE 'k'	EXTERIOR - DOWNLIGHTS	0%	0%	20%	80%										0%
ZONE 'I'	WASH ROOM - DOWNLIGHTS	100%	60%	50%	40%										0%
ZONE 'm'	WASH ROOM - SURFACE MOUNT	100%	100%	100%	100%										0%
ZONE 'n'	DINING ROOM - BACK	100%	80%	80%	80%										0%
ZONE 'o'	DINING ROOM - TABLES	100%	80%	60%	40%										0%
ZONE 'p'	DINING ROOM - FRONT	100%	80%	80%	50%										0%
ZONE 'q'	DINING ROOM - LOGO	100%	60%	40%	30%										0%
ZONE 'r'	DINING ROOM - COLOR CHANGE	100%	100%	100%	100%										0%
ZONE 's'	DINING ROOM - TRACK LIGHTING	0%	80%	60%	40%										0%
AUTO			11:00AM	3:00PM	6:00PM										12:00AM



PROJECT ISSUE: **PERMIT DRAWINGS** This drawing is the profes-sional intellectual property of Optimized LED and pro-tected by Copyright Usage of this drawing shall is re-stricted for use as a project example and shall not be re-produced, recreated, or utiproduced, recreated, or utilized for any other purpose without express written con-sent of Optimized LED.

OPTIMIZ Lighting Engineering Design	 B42 EAST ISABELLA AVE., MESA, AZ, 85204 WWW, OPTIMIZED-LED.COM 602-699-6224 PROJECT: MD1190050 EOR: BRETT LORENZEN brettlorenzen@optimized-led.com AZ-FIRM. 21458 TAZ-FIRM. 21458 Taga and no strenge on the proper indexted optimized on the optimized reduction of a strenge at late version to the proper indexted optimized reduction of a strenge of the proper indexted optimized optized optized optimized optimized optimized optimized optimize

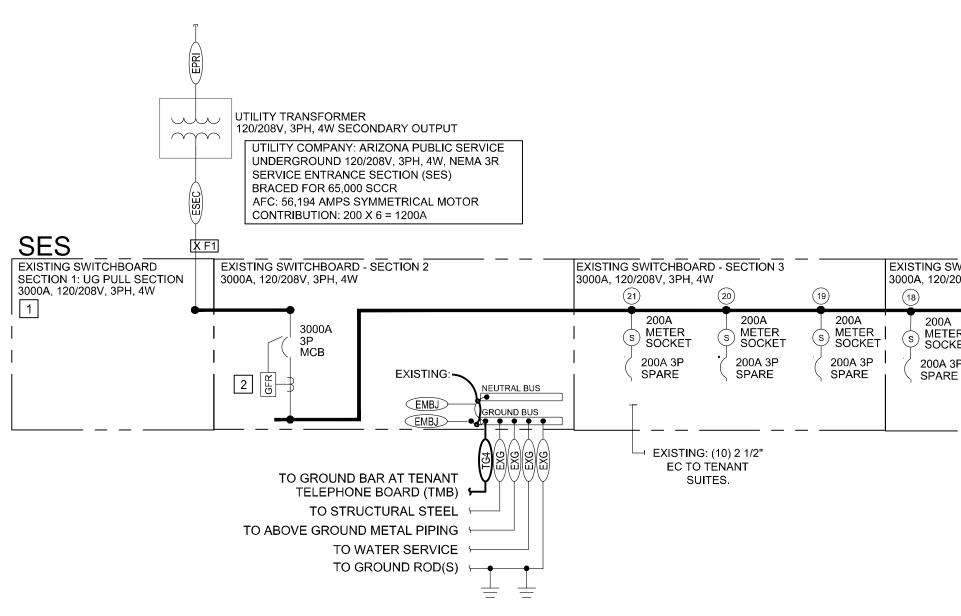
PROJECT NUMBER:	MDI190050
DRAWN BY:	RSM
APPROVED BY:	BSL

LA RISTRA - CHANDLER

LA RISTRA

				-		
Date						
Description						
No.						
SHEE SCH DET	HE	DUL	_ES	1A 8	١D	

E4.1





Short-Circuit and Voltage Drop Calculations Distances are for calculation purposes only and shall not be used for contractor takeoffs nor bidding - Contractor shall notify Engineer of any field condition that results in a change of 10% or greater circuit distance

		-			
The following calculations are based on the "Poi	int-by-Point" method where:				
$ISC_{(2)} = ISC_{(1)} \times M_{(1)}$	M= 1/(1+f)	Feeder:	$f_{(30)} = 1.732 \text{ x L x lsc}$	XFMR:	f _(3Ø) = <u>IP(sca)x Vp</u>
ISC (1) = short circuit current at fault point 1			CxE		100,000 x K
ISC $_{(2)}$ = short circuit current at fault point 2		Feeder:	f (1Ø)= <u>2 x L x Isc</u>	XFMR:	f _(1Ø) = <u>IP(sca)x Vp</u>
			CxE		100,000 x K
IP = Primary short circuit current					
Vp = Primary voltage					
IS= Secondary short circuit current					
Vs= Secondary voltage					

L = Length of circuit E = Line to line volts

C = "C" Factor from Bussman table where "C" = 1 / impedance per linear foot

Feeder Types = NM - Non Magnetic Conduit, M - Magnetic Conduit, FB - Feeder Busway, PB - Plug-in Busway, TX - Transformer

Fault		Source		Source			Feeder			Conductor	Buowov'C'	L-L	Circuit	Load	Circuit		Conductor				Т	ransform	ner				Fault	Voltage	Cumulative	Fau
Point	Bus/Feeder Description	(Fault	Phase	lsc	Conduit	Matorial	Quantity of Par	allel Sets	and Bus/	'C' Value	Busway'C' Value	Voltage	Length	Power	Circuit Load	Resistance	Reactance	Arccos (pf)	Tuno	Degree	kVA	New	Existing Secondary	Тар	f	M	Current	Drop	Voltage	Poir
(F#)		Point)		(amps)	Type/TX	Material	Phase &	Neutral	Size	C value	value	(E)	(L)	Factor (pf)	(Amperage)	(R)	(X)	(Radians)	Type	Rise	KVA	Xfmr Z	Xfmr Z Voltage	Setting			(amps)	(%VD)	Drop (%VD)	(F#
1	Utility Service Point	÷	•	64,959	at the Serv	ice Entrar	ce Switch									•							Source	lsc + 6X M	otor Contr	ibution =	68559			1
	Motor Contribution			600	The conne	cted full lo	ad motor amps	(include	s compre	ssors) on th	<mark>e syst</mark> em																			
2	PANEL 'A'	1	3	68559	Μ	CU	1 Set(s) of	3/0	AWG	12844		208	25	0.9	125	0.000079	0.000052	0.451027							1.111	0.47	32474	-0.24%	-0.24%	2
3	PANEL 'B'	1	3	68559	Μ	CU	1 Set(s) of	3/0	AWG	12844		208	25	0.9	170	0.000079	0.000052	0.451027							1.111	0.47	32474	-0.33%	-0.33%	3
4	PANEL 'C'	1	3	68559	M	CU	1 Set(s) of	3/0	AWG	12844		208	25	0.9	125	0.000079	0.000052	0.451027							1.111	0.47	32474	-0.24%	-0.24%	4
5	PANEL 'D'	1	3	68559	NM	CU	1 Set(s) of	3/0	AWG	13923		208	50	0.85	195	0.000077	0.000042	0.554811							2.050	0.33	22477	-0.71%	-0.71%	5

SWITCI 0/208V, 3	HBOARD - SECTIO	ON 4				EXISTING SWITC 3000A, 120/208V,	HBOARD - SECTIO 3PH, 4W	DN 5				EXISTING SWITC 3000A, 120/208V	CHBOARD , 3PH, 4W
	17	(16)	(15)	14	(13)	(12)	(11)		9	8	7	6	5
)A TER CKET A 3P	200A METER SOCKET 200A 3P	200A METER SOCKET 200A 3P	200A METER SOCKET 200A 3P	SOCKET	S 200A S METER SOCKET 200A 3P	200A METER SOCKET	S SOCKET	SOCKET	200A METER SOCKET 200A 3P	S 200A S METER SOCKET 200A 3P	NEW 200A METER EXISTING	NEW 200A METER EXISTING	M 20 MI EX
RE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	200A/3P	200A/3P	
		EXISTING: (EC TO TEI SUITE	NANT				EXISTING: (10) 2 EC TO TENAN SUITES.					507	204
											X F2	<u>x F3</u>	X F4
											NEW PANELBOARD 'A'	<u>NEW</u> PANELBOARD 'B'	<u>NEW</u> PANELBOARD 'C'
										L			

Vp x 1.73 x %Z x KVA $IS_{(sca)} = Vp x M x IP_{(sca)}$ Vs /p x%Z KVA

VOLTAGE DROP (3Ø): %VD= ((R x cos(arccos(pf)) + X x sin (arccos(pf))) x L/# x I x 1.73) / E VOLTAGE DROP (1Ø): %VD= ((R x cos(arccos(pf)) + X x sin(arccos(pf))) x 2 x L/# x I) / E

%VD CUM= Cumulative Voltage Drop from Fault Point 1 to Fault Point# R= resistance in ohms per LF X= reactances in ohms per LF

LOAD CAL PANEL 'D' MECH (LARG MECHANICA TOTAL CODE

PANEL 'C' LIGHTING 25% OF LIGHT RECEPTACLES MECHANICA MISCELLANIC

SHOW WINDO TOTAL CODE PANEL 'B'

LIGHTING 25% OF LIGH MECHANICA MISCELLANIC KITCHEN EQU SHOW WIND TOTAL CODE

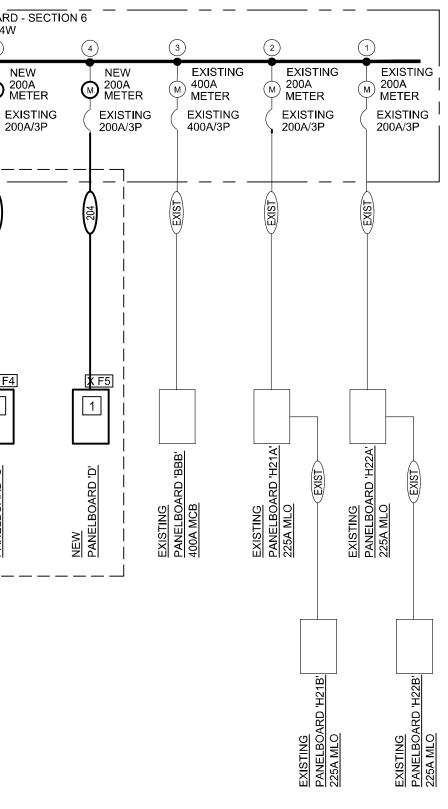
PANEL 'A' RECEPTACLES MECHANICA

MISCELLANIC KITCHEN EQU TOTAL CODE

LOAD CAL 3 PHASE CO

EXISTING TO RECEPTACLES MECHANICA MISCELLANIC KITCHEN EQ TOTAL CODE

EXISTING / FI



EST) @ 1.25%	8975.0
L	60770.0
VA	69745.0
69.7 KW @ 208V, 3Ø	
193.7 Amps 208V, 3Ø	
	7189.0
TING	1797.3
S	6120.0
L	8744.0
DUS	18060.0
OW RECEPTACLES @ 1.25%	6000.0
E VA	47910.3
47.9 KW @ 208V, 3Ø	
133.1 Amps 208V, 3Ø	
	384.0
TING	96.0
L	3840.0
DUS	43080.0
UIPMENT => 4 UNITS @80%	13902.0
OW RECEPTACLES @ 1.25%	61.0
E VA	61302.0
61.3 KW @ 208V, 3Ø	
170.3 Amps 208V, 3Ø	
r	
S	3840.0
L	2532.0
	22428.0
UIPMENT => 6 UNITS @65%	25030.2
	53830.2
53.8 KW @ 208V, 3Ø	
149.5 Amps 208V, 3Ø	
LCULATION FOR SERVICE ENTRANCI	ESECTION SES
	240000.0
TALKW @ .8 PF AND @ 1.25% DF	216000.0
<u>S</u>	9960.0
	75886.0
	83568.0
UIPMENT 2 UNITS @ 100%	38932.2
VA	448848.5
448.8 KW @ 208V, 3Ø	

F	EEDER LEGEND
EPRI	EXISTING UTILITY SERVICE LATERAL TO REMAIN
ESEC	EXISTING UTILITY XFMR SECONDARY TO REMAIN, (9) 4" CONDUITS.
EXIST	EXISTING FEEDER TO REMAIN
EXG	EXISTING GROUNDING ELECTRODE SYSTEM TO REMAIN
EMBJ	EXISTING MAIN BONDING JUMPER TO REMAIN
204	200A - (4) #4/0, #4GND, 2-1/2" EMT CONDUIT
EG4	PROVIDE #4 CU EQUIPMENT GROUND TO TENANT TELEPHONE MOUNTING BOARD

A. ALL EXISTING ENTITIES SHOWN IN THE ONE-LINE DIAGRAM ARE THE BEST REPRESENTATION OF THE INFORMAITON PROVIDED AT THE TIME OF DESIGN. CONTRACTOR SHALL VERIFY ALL

ON-SITE CONDITIONS PRIOR TO INITIATING WORK.

GENERAL NOTES

- B. OPTIMIZED LED HAS NOT VERIFIED AND IN NO-WAY ASSUMES ANY LIABILITY THAT EXISTING ELECTRICAL EQUIPMENT, WIRE, CONDUIT, ETC. MEET CURRENT ELECTRICAL CODE REQUIREMENTS. CONTRACTOR SHALL COMPLY WITH ALL CITY INSPECTOR REQUESTS. IF DRAWING REVISIONS ARE REQUIRED CONTACT THE ENGINEER OF RECORD.
- C. SHORT CIRCUIT CALCULATIONS HAVE BEEN PROVIDED FOR NEW EQUIPMENT ONLY.
- D. ALL CONDUCTORS SHALL BE DESIGNED BASED ON 75 DEGREE TERMINATIONS. PROVIDE 75 DEGREE TERMINATIONS. COPPER WITH 75 DEGREE INSULATION RATING OR HIGHER.
- E. F. ALL TERMINATIONS SHALL BE DESIGNED BASED ON 75 DEGREE TERMINATIONS. PROVIDE 75 DEGREE TERMINATIONS. COPPER WITH 75 DEGREE INSULATION RATING OR HIGHER.
- F. ALL PANELBOARD CIRCUITS SHALL BE IDENTIFIED AS TO ITS CLEAR, EVIDENT, AND SPECIFIC PURPOSE OR USE. THE IDENTIFICATIONS SHALL INCLUDE SUFFICIENT DETAIL TO ALLOW EACH CIRCUIT TO BE DISTINGUISHED FROM OTHERS. SPARE POSITIONS THAT CONTAIN UNUSED OVERCURRENT DEVICES OR SWITCHES SHALL BE DESCRIBED ACCORDINGLY. THE IDENTIFICATIONS SHALL BE INCLUDED IN A CIRCUIT DIRECTORY THAT IS LOCATED ON THE FACE OR INSIDE THE PANEL DOOR, OR AT EACH SWITCH IN THE SWITCHBOARD. PER NEC 408.4.

KEYED NOTES

1. PANEL SHALL BE SERIES RATED WITH IT'S RESPECTIVE UPSTREAM REMOTE MAIN PROTECTIVE DEVICE. A TWO TIER SYSTEM IS SPECIFIED IN THE PANELBOARD SCHEDULE ON SHEET E4.3. PROVIDE ARC-FLASH AND SERIES RATING WARNING SIGNS AS REQUIRED IN NEC 110.16 AND 110.21(B).



PROJECT ISSUE: PERMIT DRAWINGS

This drawing is the professional intellectual property of Optimized LED and protected by Copyright Usage of this drawing shall is restricted for use as a project example and shall not be reproduced, recreated, or utilized for any other purpose without express written consent of Optimized LED.

OPTIMIZEDLEDCOM 602-699-6224 WWW. OPTIMIZEDLEDCOM 602-699-6224 WWW. OPTIMIZEDLEDCOM 602-699-6224 WWW. OPTIMIZEDLEDCOM 602-699-6224 PROJECT: MD149066 EOR: BRETT LORENZEN bretLionenzen@optimized-HeLCOM 234371 CA. 22600 1 CO. 55567 AZ-TERN: 21458	Usage on this of rawing shalls restricted to the project indicated and shall not be reproduced, recreated, or utilized for any other purpose without the express written consent of Optimized LED.
---	---

PROJECT NUMBER:	MDI190050
DRAWN BY:	RSM
APPROVED BY:	BSL

LA RISTRA - CHANDLER

LA RISTRA

			_		
Date					
Description					
No.					
shee ON ANI	E-L	INE			

E4.2

NEW				EL	ECI	RICAL	PANE	L SCH	EDU	LE				
PANEL: A										Voltage	: 208VY	(/1201/ 3	30 41/1	
LOCATION: KITCHEN WALL	RATING													
			35KAIC F	ULLIRA	IED		MAINS: 225 Amp MLO							
SURFACE	NEMA F	ATING :	1					BUS: 225 Amp CU						
LOAD	EMT	CU	PHASE	CKT	CIR	LOAD AMPS			CIR	CKT	PHASE	CU	EMT	LOAD
DESCRIPTION	E#	GRND	NEUT	BRKR	NO.			NO.	BRKR	NEUT	GRND	E#	DESCRIPTION	
KITCHEN	3/4"	12	12	20	1	15.7				20	12	12	3/4"	KITCHEN
DRAFT BEER SYSTEM	E6			L-OFF		<mark>16.</mark> 0		•	2					WORK TABLE
KITCHEN	3/4"	12	12	20	3		16.0			20	12	12	3/4"	KITCHEN
SODA SYSTEM	E8						16.0		4					MOBILE WARMING CABINET
MISC	3/4"	12	12	20	5			10.0		20	12	12	3/4"	MISC
EMPLOYEE TIME CLOCK	E4						1	8.7	6					REACH-IN FREEZER
MECH	3/4"	12	12	20	7	5.1				20	12	12	3/4"	KITCHEN
AIR CURTAIN	E1			L-OFF		<mark>16.</mark> 0		-	8					WORK TABLE W/ SINK(S)
MISC	3/4"	12	12	20	9		10.0			20	12	12	3/4"	KITCHEN
WALK-IN COOLER COIL	E13			L-OFF			16.0		10					MOBILE WORK TABLE
MISC	3/4"	12	12	20	11			16.0		20	12	12	3/4"	MISC
WALK-IN LTG / CONTROLS	E11			L-OFF			1	16.0	12	FA	HSCP			FIRE SUPPRESSION SYSTEM
MISC	3/4"	12	12	20	13	10.0				25	10	10	3/4"	MECH
WALK-IN KEG COOLER COIL				L-OFF		<mark>16.0</mark>			14	L-OFF	HSCP			EXHAUST HOOD (TYPE 1)
MISC	3/4"	12	12	20	15		10.0			20	12	12	3/4"	KITCHEN
WALK-IN FREEZER COIL				2			14.1		16	2				FOOD WASTE DISPOSER
			12		17			16.0			12			
				L-OFF				14.1	18	L-OFF				TO CONTROL PANEL
KITCHEN	3/4"	12	12	20	19	15.0	1			20	12	12	3/4"	MISC
WALL MOUNTED PRESURE WASHER A				2		6.0			20					ROLL-IN REFRIGERATOR
			12		21		15.0			20	12	12	3/4"	KITCHEN
							9.0		22					CHIP WARMING CABINET
MISC	3/4"	12	12	20	23			12.4		20	12	12	3/4"	KITCHEN
1300 LBS ICE MACHINE				3				15.0	24	2				PRESURE WASHER B
			12		25	12.4	1				12			
						15.0			26					
			12		27		12.4			20				SPARE
				L-OFF			0.0		28					
KITCHEN	3/4"	12	12	20	29			<mark>16.0</mark>		20				SPARE
WORK TABLE								0.0	30					
KITCHEN	3/4"	10	10	25	31	18.0				20	12	12	3/4"	MISC
FLOOR MIXER				2		10.5			32	3				COOLER CONDENSER COIL
			10		33		18.0				12			
				L-OFF			10.5		34					
RECEPTACLES	3/4"	12	12	20	35			16.0			12			
OFFICE DESK								10.5	36	HACR				
RECEPTACLES	3/4"	12	12	20	37	16.0				20	12	12	3/4"	MISC
OFFICE COUNTER						10.5			38	3				FREEZER CONDENSER COIL
KITCHEN	3/4"	10	8	40	39		30.0				12			
COFFEE BREWER				2			10.5		40					
			8		41			30.0			12			
				L-OFF				10.5	42	HACR				
AMPS PER PHASE (CONNECTED LOAD)	_				182.2	187.5	191.2						
RECEPTACLES	_						3840.0]	(FA) FI	RE-ALA	RM, PRO	OVIDE F	RED LOCK-ON DEVICE
MECHANICAL	_						2532.0			(HACR)	TYPE (CB'S		
MISCELLANEOUS	_						22428.0		1	(L-ON)	PROVID	E LOCK	ON DE	VICE
KITCHEN EQUIPMENT => 6 UNITS @65%	_						25030.2		1	(HSCP)	VIA HC	DOD SYS	STEM C	ONTROL PANEL
TOTAL CODE VA	=					53830.2 (L-OFF) PROVIDE HANDLE LOCK-OFF DEVICE								
	3 KW @	208V.	3Ø			L			1	<u></u>	,			
	ō Amps @			(CALCUL	ATEDI	OAD)								
		,	4			/				1				

NEW

ELECTRICAL PANEL SCHEDULE

PANEL: D										Voltage	: 208VY	//120V, 3	3Ø , 4W	
LOCATION: KITCHEN WALL	RATING:		35KAIC F		D					MAINS:	200	Amp	MLO	
SURFACE	NEMA R	ATING :	1							BUS:			CU	
LOAD	EMT	CU	PHASE	CKT	CIR	L	OAD AMP	S	CIR	CKT	PHASE	CU	EMT	LOAD
DESCRIPTION	COND	GRND	NEUT	BRKR	NO.	PHASE A	PHASE B	PHASE C	NO.	BRKR	NEUT	GRND	COND	DESCRIPTION
MECH	1"	8	6	50	1	29.9				60	6	8	1"	MECH (LARGEST)
MECH CU-1				2		38.2		1 1	2	2				MECH KEF-1
			6		3		29.9			4	6			
				HACR		-	38.2		4	HACR	-			
MECH	1"	8	6	50	5	_		29.9		20	12	12	3/4"	MECH
MECH CU-2				2	7			7.6	6	2	10			MECH KEF-2
			6		7	29.9 7.6		•	0		12			
MECH	1"	8	6	HACR 50	9	0.1	29.9	1	8	HACR 50	6	8	1"	MECH
MECH MECH CU-3	1.	0	0	2	9	_	29.9		10	2	0	0		MECH MUA-1
MECH CO-S			6	2	11	-	21.3	29.9	10		6			
			Ū	HACR				27.9	12	HACR	0			
МЕСН	1"	8	6	50	13	29.9		21.0		20				SPARE
MECH CU-4	1.000.1			2	10.102	0.0		•	14					
			6		15		29.9			20				SPARE
				HACR			0.0	•	16	1				
MECH	1"	8	6	50	17			29.9		<mark>50</mark>	6	8	1"	MECH
MECH CU-5				2				<mark>29.</mark> 9	18	2				MECH CU-7
			6		19	29.9					6			
				HACR		29.9		1	20	HACR				
MECH	1"	8	6	50	21	-	29.9		1.0	4				BUSSED SPACE
MECH CU-6				2		_	0.0	20.0	22					
			6		23	-		29.9	0.1	-				BUSSED SPACE
				HACR 20	25	0.0	1	0.0	24					
SPARE				20	20	0.0		•	26	{				BUSSED SPACE
SPARE				20	27	0.0	0.0	1	20					BUSSED SPACE
SF AIL				20	21	-	0.0		28	1				
SPARE				20	29	-	0.0	0.0	20					BUSSED SPACE
						-		0.0	30	1				
AMPS PER PHASE (CONNECTED L	OAD)	ļ	ļ I		ļ	195.4	185.8	185.1		I		1	ļ	1
MECH (LARGEST) @ 1.25%							11450.0			(HA	ACR) TY	PE CB	S	
MECHANICAL	_						58790.0							
TOTAL CODE VA	=						70240.0							
70.2	2 KW @	208V,	3Ø											
195.1	I Amps @	208V,	3Ø	(CALCULAT	ED LOA	ND)								

NEW				El	EC1	RICAL PANEL SCH	EDU	LE				
PANEL: B								Voltage	: 208VY	7/120V, 3	3Ø , 4W	
OCATION: KITCHEN WALL	RATING):	35KAIC F	ULLY RA	TED			MAINS:	225	Amp	MLO	
SURFACE	NEMA F	RATING	: 1					BUS:	225	Amp	CU	
LOAD	EMT	CU	PHASE	CKT	CIR	LOAD AMPS	CIR	CKT	PHASE	CU	EMT	LOAD
DESCRIPTION	E#	GRND	NEUT	BRKR	NO.	PHASE A PHASE B PHASE C	NO.	BRKR	NEUT	GRND	E#	DESCRIPTION
KITCHEN	3/4"	12	12	20	1	12.0		150	1/0	6	2"	MISC
ICE TEA BREWER / DISP.						111.0	2	3				CONVEYOR DISHWASHER (TALL
KITCHEN	3/4"	12	12	20	3	10.0			1/0			
SODA AND ICE DISPENSER						111.0	4					
MISC	3/4"	12	12	20	5	9.0			1/0			
REACH-IN FREEZER						111.0	6	L-OFF				
MECH	3/4"	10	10	25	7	16.0		20	12	12	3/4"	MISC
EXHAUST HOOD (TYPE 1)				HSCP		6.3	8	HSCP				72" REFRIGERATED PREP. TABLE
KITCHEN	3/4"	12	12	20	9	6.0		20	12	12	3/4"	LIGHTING
45 LBS FRYER				HSCP		3.2	10	HSCP				PENDANT HEAT LIGHT LAMPS
VISC	3/4"	12	12	20	11	2.7		25	10	10	3/4"	MECH
REFRIG. EQUIPMENT STAND				HSCP		16.0	12					EXHAUST HOOD CONTROL PANE
KITCHEN	3/4"	12	12	20	13	16.0		20	12	12	3/4"	KITCHEN
ANDING TABLE				HSCP		16.0	14					EXPO STATION SERVICE COUNT
KITCHEN	3/4"	10	10	25	15	20.0		20	12	12	3/4"	KITCHEN
HOT FOOD TABLE W/ STOR. BASE A				2		8.5	16					SOUP WELL (A)
			10		17	20.0		20	12	12	3/4"	KITCHEN
				HSCP		8.5	18					SOUP WELL (B)
SPARE				20	19	0.0		20	12	12	3/4"	KITCHEN
						8.5	20					SOUP WELL (C)
KITCHEN	3/4".	10	10	25	21	20.0		20	12	12	3/4"	MISC
HOT FOOD TABLE W/ STOR. BASE B				2		8.0	22					NARROW COLD PAN
			10		23	20.0		20				SPARE
				HSCP		0.0	24					
AMPS PER PHASE (CONNECTED LC	DAD)					185.8 186.7 187.2		_				
lghting	_					384.0		(L-0	OFF) PF	ROVIDE	HANDLE	E LOCK-OFF DEVICE
25% OF LIGHTING	_					96.0		(HS	SPC) VI	A HOOD	SYSTE	M CONTROL PANEL
MECHANICAL	_					3840.0						
VISCELLANEOUS	-					43080.0						
(ITCHEN EQUIPMENT 5 UNITS @70%						13902.0						
FOTAL CODE VA	-					61302.0						
61.3	KW@	208V,	3Ø									
170.3	Amps @	D 208V.	3Ø	(CALCUL	ATEDI							

NEW				E	EC	RICAI		L SCH	EDU	LE				
PANEL: C										Voltage	· 208V)	//120V, 3	30 41	1
LOCATION: KITCHEN WALL	RATING		35KAIC F		TED					MAINS			MLO	
SURFACE	NEMA F			OLLIIVA						BUS:		Amp	CU	
					010				010			-	1	1.045
LOAD DESCRIPTION	EMT E#	CU	PHASE	CKT	CIR	-	LOAD AMP		CIR NO.		PHASE NEUT	CU GRND	EMT	
LIGHTING	E# 3/4"	GRND 12	NEUT 12	BRKR 20	NO. 1	16.0	A PHASE B	PHASE C	NO.	BRKR 30	10	10	E# 3/4"	DESCRIPTION MECH
UNDER BAR LIGHTING	5/4	12	12	20	1.	15.6	-		2	2	10	10	5/4	MECH AH-1, AH-2 & AH-3
MISC	3/4"	12	12	20	3	10.0	3.0	1			10			
BOTTLE COOLER						-	15.6	-	4	HACR				
MISC	3/4"	12	12	20	5	-		<u>16.0</u>		20	12	12	3/4"	MECH
BAR BLENDER A								10.4	6	2				MECH AH-3 & AH-4
MISC	3/4"	12	12	20	7	10.0					12			
SODA GUN A						10.4		•	8	HACR				
MISC	3/4"	12	12	20	9	-	3.0			20	12	12	3/4"	MECH
POS SYSTEM A						_	10.4		10	2				MECH AH-5 & AH-6
MISC	3/4"	12	12	20	11	-		16.0			12			
GLASSWASHER		10	10	L-OFF			1	10.4	12	HACR		10		
MISC	3/4"	12	12	20	13	2.5	_			20	12	12	3/4"	MISC
PASS-THRU REF.	3/4"	12	12	20	15	3.0	16.0	1	14	L-OFF 20				DUCT SMOKE DETECTOR
MISC FROZEN DRINK DISP.	5/4	12	12	20	15	-	0.0	-	16	20				SPARE
MISC	3/4"	12	12	20	17	-	0.0	16.0	10	20				SPARE
BAR BLENDER B	5/4	12	12	20		-		0.0	18	- 20				
MISC	3/4"	12	12	20	19	10.0	1	0.0	10	20	10	10	3/4"	MISC
SODA GUN B						10.0	_		20	LC				BUILDING SIGNAGE - WEST
MISC	3/4"	12	12	20	21		3.0			20	12	12	3/4"	MISC
POS SYSTEM B							10.0		22	LC				BUILDING SIGNAGE - EAST
MISC	3/4"	12	12	20	23			10.0		20	12	12	3/4"	MISC
SODA GUN C						_	1	10.0	24	LC				BUILDING SIGNAGE - SOUTH
RECEPTACLES	3/4"	12	12	20	25	10.5	_			20	12	12	3/4"	SHOW WINDOW
RESTROOM & GENERAL						10.0		7	26	LC				WINDOW A
RECEPTACLES	3/4"	12	12	20	27	-	9.0	-		20	12	12	3/4"	SHOW WINDOW
	3/4"	10	10	20	20	-	10.0	0.0	28	LC	10	10	2/4"	WINDOW B SHOW WINDOW
RECEPTACLES BAR RECEPTACLES	5/4	12	12	20	29	-		9.0 10.0	30	20 LC	12	12	3/4"	WINDOW C
RECEPTACLES	3/4"	12	12	20	31	4.5		10.0	50	20	12	12	3/4"	SHOW WINDOW
EXTERIOR	0,1	12	12	20		10.0	-		32	LC	12	12	0/1	WINDOW D
RECEPTACLES	3/4"	12	12	20	33	10.0	3.0			20	12	12	3/4"	LIGHTING & EMERGENCY LIGHTING
TV SYSTEM A						-	11.3	-	34					KITCHEN & STORAGE
RECEPTACLES	3/4"	12	12	20	35	-	·	6.0	8	20	12	12	3/4"	LIGHTING & EMERGENCY LIGHTING
TV SYSTEM B								9.4	36					FAMILY DINE & RR
RECEPTACLES	3/4"	12	12	20	37	6.0				20	12	12	3/4"	LIGHTING & EMERGENCY LIGHTING
TV SYSTEM C						9.0		7	38					DINING ROOM
RECEPTACLES	3/4"	12	12	20	39	_	3.0			20	12	12	3/4"	LIGHTING & EMERGENCY LIGHTING
TV SYSTEM D						_	14.3		40					PATIO AND BAR
MISC	3/4"	12	12	20	41	-		6.0	10	20	12	12	3/4"	
WATER HEATER & PUMP			57			127.5	111.6	6.0 135.2	42		ļ		1	COMMUNICATIONS BOARD
AMPS PER PHASE (CONNECTE LIGHTING	D LOAD)					127.5	7189.0	133.2	-	(H		YPE CB	9	
25% OF LIGHTING							1797.3		1		,	IGHTING		ACTOR
RECEPTACLES							6120.0		1		~, v i ~ L		2 00111	
MECHANICAL							8744.0		1	(1 -	OFF) P	ROVIDE	HANDI	E LOCK-OFF DEVICE
MISCELLANEOUS							18060.0		1					
SHOW WINDOW RECEPTACLES	@ 1.25%						6000.0		1					
TOTAL CODE VA							47910.3		1					
	47.9 KW @	208V,	3Ø						-					
1	33.1 Amps @	208V,	3Ø	(CACULA	TED LO	DAD)								

GENERAL NOTES

- A. ALL PANELBOARD CIRCUITS SHALL BE IDENTIFIED AS TO ITS CLEAR, EVIDENT, AND SPECIFIC PURPOSE OR USE. THE IDENTIFICATIONS SHALL INCLUDE SUFFICIENT DETAIL TO ALLOW EACH CIRCUIT TO BE DISTINGUISHED FROM OTHERS, SPARE POSITIONS THAT CONTAIN UNUSED OVERCURRENT DEVICES OR SWITCHES SHALL BE DESCRIBED ACCORDINGLY. THE IDENTIFICATIONS SHALL BE INCLUDED IN A CIRCUIT DIRECTORY THAT IS LOCATED ON THE FACE OR INSIDE THE PANEL DOOR, OR AT EACH SWITCH IN THE SWITCHBOARD. PER NEC 408.4.
- B. WHERE CIRCUIT BREAKERS OR FUSES ARE APPLIED IN COMPLIANCE WITH THE SERIES COMBINATION RATINGS MARKED ON THE EQUIPMENT BY THE MANUFACTURER. CONTRACTOR SHALL LEGIBLY FIELD MARK THE ENCLOSURE OF THE THE EQUIPMENT AS FOLLOWS: "CAUTION ______SERIES COMBINATION SYSTEM RATED _____AMPERES. IDENTIFIED REPLACEMENT COMPONENTS REQUIRED.



PROJECT ISSUE: **PERMIT DRAWINGS** This drawing is the professional intellectual property of Optimized LED and pro-tected by Copyright Usage of this drawing shall is re-stricted for use as a project example and shall not be reproduced, recreated, or utilized for any other purpose without express written con-sent of Optimized LED.



PROJECT NUMBER:	MDI190050
DRAWN BY:	RSM
APPROVED BY:	BSL

LA RISTRA - CHANDLER

LA RISTRA

			 -		
Date					
Description					
No.					
SHEE PAN SCI	١EL	BC			

E4.3

26 00 00 - GENERAL ELECTRICAL REQUIREMENTS

- A. General Requirements
 - 1. All requirements under the architects general and supplementary conditions, if provided, apply to this section
 - 2. Where the requirements of this section and division exceed those of the general and
 - supplementary conditions, the requirements of this section take precedence 3. Become thoroughly familiar with all of its contents as to requirements that affect this
- section 4. Work required under this section includes all material, equipment, appliances, transportation, services, and labor required to complete the entire system as required by the drawings and specifications, or reasonable inferred to be necessary to facilitate the
- function of the system and design intent. 5. The specifications and drawings for the project are complementary, and any portion of work described in one shall be provided as if described in both
- 6. In the event of discrepancies between specifications and drawings, notify the engineer and request clarification prior to proceeding with the work involved.
- 7. Limitations to drawings:
- a. Drawings are graphic representations of the work upon which the contract is based. b. Drawings show the materials and their relationship to one another, including sizes,
- shapes, locations, and connections. c. Drawings convey the scope of work, indicating the intended general arrangement of the systems without showing all of the exact details as to elevations, offsets, control
- lines, and other installation requirements d. Contractor shall use the drawings as a guide when laying out the work and to verify that materials and equipment will fit into the designated spaces, which when installed per manufacturers' requirements, will ensure a complete, coordinated, and properly operating system.
- e. Exact location of any component shall be confirmed and/or dimensioned by architect prior to rough-in. Do not rely on engineer to provide any exact locations.
- B. Definitions
- Abbreviations/Acronyms:
 - a. <u>AHJ (Authority Having Jurisdiction)</u>: The local code and/or inspection agency Authority) Having Jurisdiction over the Work.
 - b. <u>EPDM</u>: Ethylene-Propylene-Diene-Terpolymer Rubber, used as a highly effective conductor insulating material and vibration isolator.
 - c. <u>NBR:</u> Acrynlonitrile-Butadiene Rubber
 - d. <u>NRTL</u>: Nationally Recognized Testing Laboratory, as defined and listed by OSHA in 29 CFR 1910.7 (e.g., UL, ETL, CSA), and acceptable to the AHJ over this project. e. PCF: Pounds per Cubic Foot
- 2. Trade/Industry Terminology:
- a. <u>Architect</u>: Registred design professional responsible for the overall structural concept of the facility constructed under this scope of work. In addition the Architect is typically the central authority for full design team and is the primary point of contact for coordination with the design team. Coordination of exact placement of any product or item associated with the division 26 specifications shall be coordinated with the Architect.
- b. Approved equal: Used synonymously with Equivalent and/or Equal, and shall mean "accepted by or acceptable to the Engineer as equivalent to the item or manufacturer specified". The term "approved" shall mean labeled, listed, certified, or all three, by an NRTL, and acceptable to the AHJ and/or Architect assigned to this
- Engineer: Where referenced in this Division, "Engineer" is the Engineer of Record and the Design Professional for the work under this division, and is a consultant to, and an authorized representative of the Architect, Contractor, and/or Owner. When used in this division, Engineer means increased involvement by and obligations to the Engineer, in addition to involvement by and obligations to the Architect.
- d. <u>Furnish</u>: "to supply and deliver to the project site, ready for unloading, unpacking, assembling, installing, and similar operations."
- e. Furnished by Owner or Furnished by Others: "an item furnished by the Owner or under other divisions or contracts, and installed under the requirements of this division, complete, and ready for the intended use, including all items and services incidental to the work necessary for proper installation and operation. Include the installation under the warranty required by this division.
- Homerun: That portion of an electrical circuit originating at a junction box, termination box, receptacle, or switch with termination at an electrical panelboard. Note: Where MC cable is utilized for receptacle and/or lighting branch circuiting loads, the originating point of the homerun shall be at the first load in the circuit or at a junction box located in an accessible ceiling space as close as possible to the first
- g. Install: "to perform all operations at the project site including, but not limited to, the actual unloading, unpacking, assembling, erecting, placing, anchoring, applying, working to
- dimension, finishing, curing, protecting, cleaning, testing, commissioning, starting up and similar operations, complete, and ready for the intended use." <u>Provide</u>: "to furnish and install."
- Substitution: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor Substitutions include Value Engineering proposals.
- . <u>Value Engineering</u>: A systematic method to improve the "value" of goods and services by using an examination of function. Value, as defined, is the ratio of function to cost. Value can therefore be increased by either improving the function or reducing the cost. The goal of VE is to achieve the desired function at the lowest overall cost consistent with required performance.
- C. Existing Conditions
- 1. Existing conditions indicated on the Drawings are taken from the best information available from the Owner, existing record drawings, and from limited, in-situ, visual site observations. They are not to be construed as "AS BUILT" conditions.
- 2. Contractor shall visit the project site and become fully aquatinted with actual existing conditions at the project site prior to submission of bid.
- 3. Contractor shall not be relieved of any necessary effort to address the Work indicated that could have been prevented by proper inspection of existing conditions.
- 4. Failure to comply with this requirement for any reason, shall not be considered sufficient justification to request or obtain extra compensation over and above the contract price.
- D. Material and Workmanship
 - . Unless indicated otherwise on the Drawings, provide all material and equipment new, of the best quality and design, free from defects and imperfections and with markings or a nameplate identifying the manufacturer and providing sufficient reference to establish quality, size and capacity. Provide all material and equipment of the same type from the same manufacturer whenever practicable.
- 2. Model numbers listed in the specifications or shown on the drawings are not necessarily intended to designate the required trim, written descriptions of the trim govern model numbers. Vendors shall confirm product with submittals prior to ordering.
- 3. Furnish only material and equipment that are listed, labeled, certified, or all three, by an NRTL whenever any listing or labeling exists for the types of material and equipment specified.
- 4. Unless specified otherwise, manufactured items of the same types specified within this Division shall have been installed and used, without modification, renovation, or repair for not less than one year prior to date of bidding for this Project. 5. Install all Work in strict conformance with all manufacturers' requirements and
- recommendations, unless these Documents exceed those requirements. 6. Install all equipment and materials in a neat and professional
- manner, aligned, leveled, and adjusted for satisfactory operation, in accordance with NECA 1 (latest edition), "Standard Practices for Good Workmanship in Electrical Construction"
- 7. All workmanship shall be of the finest possible by experienced mechanics of the proper trade. In general, provide the following quality grade(s) for all materials and equipment. a. Commercial specification grade
- 10. Provide all hoists, scaffolds, staging, runways, tools, machinery, and equipment required for the performance of the electrical work. Store and maintain material and equipment in clean condition, and protected from weather, moisture, and physical damage.

E. Manufacturers

- 1. In other articles where lists of manufacturers are introduced, subject to compliance with requirements, provide products by one of the manufacturers specified.
- 2. Where a list is provided, manufacturers are listed alphabetically and not in accordance with any ranking or preference.
- 3. Where manufacturers are not listed, provide products subject to compliance with requirements from manufacturers that have been actively involved in manufacturing the specified product for no less than 5 years.

F. Coordination

- 1. Visit the site and ascertain the conditions to be encountered in installing the Work under this Division, verify all dimensions and locations before purchasing equipment or commencing work, and make due provisions for same in the bid. Failure to comply with this requirement shall not be considered justification for omission, alteration, and incorrect or faulty installation of any of the Work under this Division or for additional compensation for any Work covered by this Division.
- 3. Maintain an Electrical Foreman at the job site to coordinate electrical work with the followina:
- a. Construction Drawings and Specification Sections of other trades b. Relevant equipment drawings, shop drawings, and submittal documents to determine the extent of clear spaces.

- c. Make all offsets required to clear equipment, beams and other structural members,
- and to facilitate concealing conduit in the manner anticipated in the design. d. Ensure various system components are installed at the proper time, fit the available
- space, and allow proper service access. e. Products are ordered and provided with necessary trim to properly fit the types of
- ceiling, wall, or floor finishes actually installed. 4. Contractor shall keep informed as to the work of other trades engaged in the construction
- of the project and shall execute work in a manner as to not interfere with or delay the work of other trades. 5. Figured dimensions by the Architect shall be taken in preference to scale dimensions.
- Contractor shall take his own measurements at the building to confirm, as variations may occur
- 6. Contractor shall be held responsible for errors that could have been avoided by proper checking and inspection 7. Model numbers listed in the specifications or shown on the drawings are not intended to
- designate the required trim
- 8. Products shall be ordered and provided with necessary trim to properly fit the types of ceiling, wall, or floor finishes actually installed. 9. Unless otherwise indicated, the General Contractor shall provide chases and openings in
- building construction required for installation of the systems specified herein. Contractor shall furnish the General Contractor with information where chases and openings are required

G. Ordinances and Codes

- 1. Work performed under this contract shall, at a minimum, be in conformance with applicable national, state and local codes having jurisdiction. 2. Equipment furnished and associated installation work performed under this contract shall
- be in strict compliance with current applicable codes adopted by the local AHJ, including any amendments and standards as set forth by the following: a. IBC International Building Code b. IECC International Energy Conservation Code c. ADA Americans with Disabilities Act d. ANS American National Standards Institute e. ASTM American Society of Testing Materials f. IES Illuminating Engineering Society q. NEC National Electrical Code, NFPA 70 h. NECA National Electrical Contractors Association
- NEMA National Electrical Manufactures' Association
- NFPA National Fire Protection Association k. OSHA Occupational Safety and Health Act
- Underwriter's Laboratories I. UL 3. In addition to code sections listed above, Contractor shall comply with rules and
- regulations of public utilities or municipal departments affected by connection of services, as well as any other local or national codes where applicable.
- 4. Where the contract documents exceed the requirements of the referenced codes, standards, etc., the contract documents shall take precedence. 5. Where conflicts between various codes, ordinances, rules, and regulations exist, comply
- with the most stringent 6. Promptly bring all conflicts observed between codes, ordinances, rules, regulations,
- referenced standards, and these documents to the attention of the Architect and Engineer for final resolution 7. Procure and pay for permits and licenses required for the accomplishment of the work
- herein described. Contractor will be held responsible for any violation of the law. 8. Obtain timely inspections by the constituted authorities having jurisdiction; and, upon final
- completion of the Work, obtain and deliver to the Owner executed final certificates of acceptance from these authorities having jurisdiction. 9. Perform all electrical work in compliance with applicable safety regulations, including
- OSHA regulations. All safety lights, guards, and warning signs required for the performance of the electrical work shall be provided by the Contractor.
- H. Protection of Equipment and Materials
 - 1. Store and protect from damage equipment and materials delivered to job site. 2. For materials and equipment susceptible to changing weather conditions, dampness, or temperature variations, store inside in conditioned spaces.
 - 3. For other materials and equipment, cover with waterproof, tear-resistant, heavy tarp or polyethylene plastic as required to protect from plaster, dirt, paint, water, or physical damage
 - 4. Equipment and material damaged by construction activities shall be rejected, and
 - Contractor shall furnish new equipment and material of a like kind at his own expense. 5. Keep premises broom clean of foreign material created during work performed under this
 - contract. 6. Conduit, equipment, etc. shall have a neat and clean appearance at the termination of the
 - work.
 - 7. Plug or cap open ends of conduits while stored and installed during construction when not in use to prevent the entrance of debris into the systems.

Submittals

- 1. Assemble and submit for review shop drawings, material lists, manufacturer product literature for equipment to be furnished, and items requiring coordination between contractors under this contract.
- 2. Provide submittals in sufficient detail so as to demonstrate compliance with these Contract Documents and the design concept.
- 3. Prior to transmitting submittals, verify that the equipment submitted is mutually compatible with and suitable for the intended use, will fit the available space, and maintain manufacturer recommended service clearances.
- 4. If the size of equipment furnished makes necessary any change in location or
- configuration, submit a shop drawing showing the proposed layout. 5. Transmit submittals as early as required to support the project schedule. Allow two weeks
- for Engineer review time, plus to/from mailing time via the Architect, plus a duplication of
- this time for re-submittals, if required. 6. Update submittals to verify upon approval of substitution requests all required components will accommodate the substituted product.
- 7. Submittals shall contain:
- a. The project name
- b. Applicable specification section
- c. Submittal data
- d. Equipment identifications acronym as used on the drawings

b. They shall not be copies of the work product of the Engineer.

c. Separate submittals according to individual specification sections

e. Catalog data shall be properly bound, identified, indexed and tabbed

12. Review of submittals are considered the Engineers last opportunity to provide final

beyond the change in 'product' cost only not 'product and labor' cost.

d. Illegible submittals will be rejected and returned without review

- e. Contractors review stamp to certify that the submittal has been checked by the Contractor, complies with the drawings and specifications, and is coordinated with other trades.
- f. Shop drawings
- g. Product data

9. Electronic Submittals:

deviation.

J. Electronic Drawing Files

h. Performance sheets i. Highlight, mark, list, or indicate the materials, performance criteria, and accessories

that are being proposed.

signature of the Engineer

8. Requirements to prevent submittal rejection:

specified equipment or materials.

to access the submittals

of the Architect and Engineer.

a. Submittals and shop drawings shall not contain firm name, logo, the seal, or

f. Label the catalog data with the equipment identification acronym or number as used on the drawings and include performance curves, capacities, sizes, weights, materials, finishes, wiring diagrams, electrical requirements and deviations from

a. Contractor shall notify the Architect and Engineer that the submittals have been

b. Contractor shall include the website, user name, and password information needed c. For submittals sent by e-mail, Contractor shall copy the designated representatives

d. Contractor shall allow two weeks for the Engineer review time as specified above. 11. The checking and subsequent acceptance of submittals by the Engineer and/or Architect shall not relieve the Contractor from responsibility for deviations from the drawings and specifications, errors in dimensions, details, sizes of equipment, or quantities, omissions

of components or fittings, coordination of electrical requirements, and not coordinating items with actual building conditions and adjacent work. Contractor shall request and secure written acceptance from the Engineer and Architect prior to implementing any

verification that elements represented on contract documents are accurate. Rarely Engineer may request coordination with contractor to implement a product not originally specified in the contract documents. This adjustment shall not incur additional fees 13. If Contractor fails to provide submittals prior to ordering or installing any specified or

substituted products, he/she/they waives and releases the engineer from any and all responsibility for the proper fit, performance, and/or safety of the specified product.

1. Electronic drawing files are the intellectual property of the design professional stated on

- teh drawings and are covered under United States Copyright Laws.
- 2. Requests for electronic drawing files will be considered on a case by case basis. 3. Optimized-LED retains the right to charge for additional usage of the company's
- intellectual property outside of the original contractual agreement. 4. Request shall be made in writing to utilize electronic drawing files for any reason. Email is considered an acceptable form of written request.

C. Exisitng Utilities

E. Cutting and Patching

applicable.

F. Coincidental Damage

A. General Requirements

Control Wiring:

C. Cables

Flexible Cords and Cables:

1. Metal Clad (MC) Cable

d. May be used:

B. Conductors

Brown and Sharpe).

1. Single Phase Insulated Conductors

standards 44 or 83 as applicable.

specified in residential projects.

complying with ICEA S-95-658/NEMA WC70.

a. Stranded copper conductors, 600V insulation

b. Aluminum or galvanized steel interlocked armor

c. THHN- or XHHW-insulated conductors

d. All conductors, No. 10 AWG and smaller: Solid copper

c. Minimum size: No. 14 AWG, unless noted otherwise.

a. Stranded copper conductors for all, unless noted otherwise.

the course of this Work.

manner satisfactory to the Architect.

and meet the satisfaction of the Architect.

4. Repair work shall be thoroughly first class.

2. Repair materials shall generally match existing construction.

with the specification requirements of this section.

D. Excavation and Backfilling

- K. Record Drawings (As-built Documents)
 - 1. During progress of the work in this division, Contractor shall maintain an accurate record of all changes made during the installation of the system.
 - 2. Upon completion of the work, accurately transfer all record information to three identical sets of the approved shop drawings.
 - 3. If requested in project contract, Contractor may be requested to submit as-built drawings to Engineer to be incorporated into a CAD produced As-Built set.
- L. Operation and Maintenance Instructions
- 1. During the course of construction, collect and compile a complete brochure of equipment furnished and installed on this project.
- 2. Include operational and maintenance instructions, manufacturer's catalog sheets, wiring diagrams, parts lists, approved submittals and shop drawings, warranties, and descriptive literature as furnished by the equipment manufacturer
- 3. Include an inside cover sheet that lists the Project Name, Date, Owner, Architect,
- Engineer, General Contractor, Sub-Contractor, and an index of contents. 4. Submit a copy of literature bound in approved binders with index and tabs separating equipment types by specification sections to the Architect, at the completion or termination of the work.
- 5. Include Record Drawings as described above.

M. Training

- 1. Where requested in these contract documents, Contractor shall provide training at a time mutually agreed upon between the Owner and Contractor.
- 2. Provide the services of a factory trained and authorized representative to train Owner's designated personnel on the operation and maintenance of specific equipment, product, and/or system provided for this project.
- 3. Provide training to include, but not be limited to:
- a. an overview of the system and/or equipment as it relates to the facility as a whole. b. Operation and maintenance procedures and schedules related to startup and shutdown, troubleshooting, servicing, preventive maintenance and appropriate operator intervention
- c. Review of data included in the operation and maintenance manuals.
- 4. Notify Owner and Engineer 2 weeks prior to the scheduled training date to provide the option of attendance on site.
- 5. Include a certification letter with the Operation and Maintenance Manual to the Architect and Engineer stating that the Owner's designated representatives have been trained.

N. Warranties

- 1. Warrant each system and each element thereof against all defects due to faulty workmanship, design, or material for a period of 12 months from date of Substantial Completion unless specific items are noted to carry a longer warranty in these
- construction documents or manufacturer's standard warranty exceeds 12 months. Remedy all defects occurring within the warranty period(s).
- 3. Warranties shall include labor and material, including travel expenses
- 4. Make repairs or replacements without any additional costs to the Owner, and to the
- satisfaction of the Owner, Architect, and Engineer. 5. Perform the remedial work promptly, upon written notice from the Owner.
- 6. Also warrant the following additional items:
- a. All raceways are free from obstructions, holes, crushing, or breaks of any nature. b. All raceway seals are effective.
- c. The entire electrical system is free from all short circuits and unwanted open circuits and grounds.
- 7. At the time of Substantial Completion, deliver to the Owner all warranties, in writing and properly executed, including term limits for warranties extending beyond the one year period and any actions the Owner must take in order to maintain warranty status.
- 8. Each warranty instrument shall be addressed to the Owner and state the commencement date and term

O. System Testing and Adjusting

- I. Adjust, align, and test all electrical equipment on this project provided under this division and all electrical equipment furnished by others for installation or wiring under this division tor proper operation
- 2. Test all systems and equipment according to the requirements in NETA ATS (latest
- edition) and all additional requirements specified in following sections. 3. Perform the following prior to starting up the electrical systems:
- a. Check all components and devices and lubricate items accordingly.
- b. Tighten screws and bolts for connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- c. Adjust taps on each transformer for rated secondary voltage when the transformer is at minimum load. d. Check and record building's service entrance voltage, grounding conditions,
- grounding resistance, and proper phasing. Remedy grounding that is less than 25 Ohms of resistance.
- e. Replace all burned-out lamps and lamps used for temporary construction lighting in permanent light fixtures.
- f. After all systems have been inspected and adjusted, confirm all operating features required by the drawings and specifications and make final adjustments as necessary.

P. Cleaning

- 1. Remove dirt and refuse, resulting from the performance of the Work, from the premises as required to prevent accumulation. Cooperate in maintaining reasonably clean premises at all times.
- 2. Prior to final inspection, make a final cleanup of dirt and refuse resulting from Work and assist in making the premises broom clean. Clean all material and equipment installed under this Division.
- 3. Remove dirt, dust, plaster, stains, and foreign matter from all surfaces.

26 05 00 - COMMON WORK RESULTS FOR ELECTRICAL

remodeling shown in the Drawings or indicated in the Specifications.

necessary for proper operation and new construction.

not reused prior to substantial completion of the work.

and equipment not indicated to be salvaged.

all surface damage resulting from this work.

used at substantial completion of the work.

4. Touch up and restore damaged finishes to their original condition.

26 05 05 - SELECTIVE DEMOLITION FOR ELECTRICAL

A. Work in Existing Facilities

raceways.

ventilation shafts.

B. Existing Equipment Reuse and Removal

- 1. Coordinate any electric service interruption to facilities occupied by Owner or provide temporary
- electric service. 2. Notify Architect, Owner, and Landlord no fewer than two days in advance of proposed interruption
- of electrical service 3. Do not proceed with interruption of electrical service without Architect, Owner, and Landlord (s)
- written permission 4. Relocate and reconnect all electrical facilities that must be relocated in order to accomplish the

5. Where electrical fixtures or equipment are removed, cap all unused raceways behind the floor line

6. Where removal of existing wiring interrupts electrical continuity of circuits that are to remain in use,

modifications required because of building remodeling, as noted on the Drawings, or

3. Remove all existing wiring, light fixtures, exposed conduits, and other electrical materials

3. Disposal and Cleanup: Remove from the site and legally dispose of demolished materials

4. Cut, patch, and repair where required for new electrical installations, and patch and repair

5. Cut flush with the floor and plug at both ends raceways stubbed above the floor and not

completion of the contract, if required, as a result of work included under this contract,

6. Relocate all existing electrical systems required to be in operation at substantial

even if not specifically indicated in the drawings or specifications.

provide necessary wiring, raceways, junction boxes, etc., to ensure continued electrical continuity.

or wall line to facilitate restoration of finish, and, remove all existing wiring from abandoned

1. Provide all demolition of existing electrical systems and new electrical system

2. Remove all abandoned cables, wiring and conduit above accessible ceilings and

7. Existing service entrance conductors and feeder conductors may be reused if all of the	In lieu of flexible conduit and wiring from light fixtures located in accessible
following conditions are met: a. Conductor sizes meet or exceed the sizes specified on the drawings.	ceilings to junction boxes attached to building structure directly above the ceiling. Lengths may not exceed six feet.
 b. Conductor insulation is in good or better condition. 	 For vertical and horizontal routing in wood and metal stud walls.
c. Conductor insulation is the correct type for the conditions.	 Where approved in writing by manufactuer, applicable codes, and AHJ.
	e. May not be used (examples may include but are not limited to):
Exisitng Utilities	 Homeruns to panelboards (refer to Section 26: Definitions).
1. Schedule and coordinate with the Utility Company, Owner and with the Architect all	Where exposed to view.
connections to, relocation of, or discontinuation of normal utility services from any existing utility line. Include all premium time required for all such work in the Bid.	 Where exposed to damage.
 Repair all existing utilities damaged due to construction operations to the satisfaction of 	Hazardous locations.
the Owner or Utility Company without additional cost.	Wet locations.
Do not leave utilities disconnected at the end of a workday or over a weekend unless authorized by representatives of the Owner or Architect.	When restricted otherwise.
4. Make repairs and restoration of utilities before workmen leave the project at the end of the	 When specifically disallowed by the local AHJ.
workday in which the interruption takes place.	 When specifically disallowed by the landlord.
Include in Bid the cost of furnishing temporary facilities to provide all services during interruption of normal utility service.	Circuits supplied by an emergency or standby power source.
Excavation and Backfilling	C. Terminations
1. General:	1. Tinned, mechanical type only; NRTL-listed for copper and aluminum conductors at 75
a. Perform excavation of every description, of whatever substance encountered and to the	degrees C minimum.
depth required in connection with the installation of the work under this Division.	2. Where aluminum conductors terminate using compression connections:
 Excavation shall be in conformance with applicable Divisions and sections of the Specifications. 	 use hydraulic-compression type connectors with a zinc base, anti-oxidizing compound.
c. Erect barricades around excavations, for safety, and place an adequate number of amber lights on or near the work and keep those burning from dusk to dawn. Be responsible for all	b. Use compression tools of the type that will not release unless the correct pressure
damage that any parties may sustain in consequence of neglecting the necessary	has been applied. 3. Measure the temperature of all conductors at all splices and terminations. Make each test
precautions in prosecuting the work. d. Install sediment and erosion control measures in accordance with local codes and	under typical building load Conditions after the building is occupied and in operation for a
ordinances.	minimum of two weeks.
 Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area. 	a. Replace all joints or splices indicating excessive heating.
f. Do not allow water to accumulate in excavations. Remove water to prevent softening of	b. Take measurements with a non_contact type infrared thermometer.
bearing materials. Provide and maintain dewatering system components necessary to	
convey water away from excavations. g. Restore roads, alleys, streets and sidewalks damaged during this Work to the satisfaction of	D. Conductor Installation
Authorities Having Jurisdiction.	1. General Requirements
2. Trenching:	a. Install all wiring in approved raceway and enclosures, except:
a. Trenches shall be of sufficient width.b. Crib or brace trenches to prevent cave-in or settlement.	Properly rated low-voltage wiring
c. Do not excavate trenches close to columns and walls of new building without prior	Where type MC cable is indicated or specified as acceptable.
consultation with the Architect.	 Install all conductors and cables continuous without taps or splices between accessible boxes.
d. Use pumping equipment if required to keep trenches free of water.	c. Splice or tap only in approved boxes and enclosures with approved solderless
 Backfill trenches in maximum 6-inch layers of well tamped dry earth in a manner to prevent future settlement. 	connectors and keep to the minimum required. Insulate all splices, taps, and joints
3. Excavation:	as required by codes.
a. Excavation as specified herein shall be classified as common excavation.	d. All materials used to terminate, splice, or tap conductors shall be NRTL listed for the specific application and conductors involved, and installed in strict accordance with
b. Slope sides of excavations to comply with local, state and federal codes and ordinances. Shore and brace as required for stability of excavation.	the manufacturer's recommendations.
c. Dispose of excavated materials that are considered unsuitable for backfill, and	e. At a minimum provide a junction box or accessible location every 360 degrees of
surplus of excavated material, which is not required for backfill, all to the satisfaction	conduit bends for pulling and splicing conductors.
of the Engineer.	f. Provide an equipment-grounding conductor or bonding jumper, as applicable, in all feeders and branch circuits, sized in accordance with NFPA 70 Tables 250.66 or
 Backfill and Compaction Backfill excavations after completion of the following: 	250.122.
 Inspection, testing, approval, and locations have been recorded. 	g. Voltage drop in branch circuits shall not exceed 3 percent.
Removal of concrete formwork.	h. Home Run:
 Removal of shoring and bracing, and backfilling of voids. Removal of trash and debris. 	 In general, the direction of branch circuit "home run" routing is indicated on the drawings, complete with circuit numbers and panelboard designation.
 Removal of trash and debrs. b. Place backfill and fill materials in layers of not more than 8 inches in loose depth for material 	 Continue all such "home run" wiring to the designated panelboard, as though
compacted by heavy equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.	"circuit runs" were indicated in their entirety.
c. Support raceways from permanent structures or undisturbed earth at no less that 10-foot	 At contractor's discretion circuits may be combined to multi-wire branch circuits (i.e., shared neutral). In these instances, they shall be provided with a
intervals, while placing backfill materials, so that raceways are not deflected, crushed, broken, or otherwise damaged by the backfill placement.	means that will simultaneously disconnect all ungrounded conductors at the
d. Where soil material must be moisture conditioned before compaction, uniformly apply water.	point the branch circuit originates. Multi-pole breakers or 3 single-pole breakers with a handle tie are acceptable means.
Apply water in minimum quantity necessary to achieve required moisture content and to prevent water appearing on surface during, or subsequent to, compaction operations.	 When multiple home runs are combined into a single raceway the total
e. Compact soil to not less than the following percentages of maximum density, in accordance	circuits shall not exceed three and total current carrying conductors including
with ASTM D 1557 for cohesion soils and the following percentages of relative density, in accordance with ASTM D 2049 for cohesionless soils;	the neutral shall not exceed 4. Unless specifically indicated on the drawings.
 Areas Under Structures, Building Slabs and Steps, Pavements: Compact top 12 	i. GFCI Protected Circuits:
inches of subgrade and each layer of backfill or fill material to 90 percent maximum	Provide a dedicated neutral and not be shared.
 density for cohesive material, or 95 percent relative density for cohesionless material. Areas Under Walkways: Compact top 6 inches of subgrade and each layer of backfill 	 Limit the one-way conductor length to 100 feet between the panelboard and the most remote receptacle or load on the GFCI circuit.
or fill material to 90 percent maximum density for cohesive material, or 95 percent	j. MC Cable
relative density for cohesionless material.Other Areas: Compact top 6 inches of subgrade and each layer of backfill or fill	Secure and support cable per NFPA 70 Article 330. Secure cable within 12
 Other Areas: Compact top 6 inches of subgrade and each layer of backfill or fill material to 85 percent maximum density for cohesive soils, and 90 percent relative 	inches of every box or fitting.
density for cohesionless soils.	 Securing and supporting intervals shall not exceed six feet. Maintain consistent apaging to give identing due to bundling nor NERA 70 Section
Outline and Details	consistent spacing to avoid derating due to bundling per NFPA 70 Section 310.15.
Cutting and Patching	 Utilize steel cable hangers, Arlington SMC series or equivalent, to support
 Cut walls, floors, ceilings, and other portions of the facility as required to install work under this division. 	wherever possible so cables can be routed in a neat and workmanship like
 Obtain permission of the Architect prior to cutting. 	manner.
3. Do not cut or disturb structural members without prior approval from the Architect.	
4. Cut holes as small as possible.	
Patch walls, floors, and other portions of the facility as required by work under this division.	
6 Patching shall match the original material and construction including fire ratings, if	

6. Patching shall match the original material and construction including fire ratings, if 7. Repair and refinish areas disturbed by work to the condition of adjoining surfaces in a

1. Repair streets, sidewalks, drives, paving, walls, finishes, and other facilities damaged in

3. Repair work shall meet all requirements of the Owner, local authorities having jurisdiction,

26 05 19 - LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

1. Provide wiring products for the completion of the work by a manufacturer which complies

2. Sizes of conductors and cables indicated or specified are in American Wire Gage (AWG -3. If no conductor size is indicated on the Drawings for a branch circuit, contact engineer.

a. Annealed (soft) copper complying with ICEA S-95-658/NEMA WC70 and UL

b. Conductor Insulation Types: 90-degree C-rated, Type THHN/THWN-2 or XHHW-2

c. All feeder and branch circuit conductors No. 8 AWG and larger: Stranded.

e. All Branch Circuit Wiring: Not smaller than No. 12 AWG., except where specifically

b. Type, size, and number as required to accomplish specified function.

a. 600V, unjacketed; UL Standard 83, 1569, and 1685; NFPA 70 Article 330.

SHEET 1

- ch test n for a
 - oints
- for the with
- in all
- d on
- ough
- l with a the
- luding vings.
- and
- 12
- like



PROJECT ISSUE: PERMIT DRAWINGS

This drawing is the professional intellectual property of Optimized LED and protected by Copyright Usage of this drawing shall is restricted for use as a project example and shall not be re produced, recreated, or utilized for any other purpose without express written consent of Optimized LED.



PROJECT NUMBER:	MDI190050
DRAWN BY:	RSM
APPROVED BY:	BSL

LA RISTRA - CHANDLER



Date						
Description						
No.						
SHEET TITLE SPECIFICATIONS						

E5.1

26 05 29 - HANGARS AND SUPPORTS FOR ELECTRICAL SYSTEMS

- A. General Requirements
 - 1. Provide support systems, for the completion of the work, by a manufacturer which complies with the specification requirements of this section.
 - 2. Performance Requirements
 - a. Supports shall be designed by manufacturer to support multiple raceways through comprehensive engineering analysis by a qualified professional engineer.
 - b. Supports shall be for combined weight of multiple raceways and supported systems. c. Strength shall ensure adequate capability to resist maximum tension, shear, and
 - pullout force calculated for this project.
 - 3. Fitting materials shall match that of Support Systems

B. Support Systems

- 1. Steel Slotted Support Systems (Slotted Channel)
- a. Comply with MFMA-3, factory-fabricated components for field assembly
- b. 12-gauge, 1-5/8-inch by 1-5/8-inch.
- c. Finishes:
- Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-3
- Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane or polyester coating applied according to MFMA-3.
- Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-3
- Stainless Steel: Type 304, per ASTM A240.
- 3. Non-metallic Slotted Support Systems a. Construct with structural -grade, factory-formed, glass-fiber-resin channels and
- b. 9/16" diameter holes at a maximum of 8" on-center in at least one surface

C. Fittings and Accessories

- 1. Conduit and cable supports: Comply with NECA 1 and NECA 101 and provide manufacturer recommended clamp and fitting to support the type and size of raceway
- and/or cable provided.
- 2. Supports for conductors in vertical conduit: a. Factory-fabricated assembly consisting of threaded body and insulating wedging
- b. Wedging plugs shall consist of the quantity, size, and shape to properly support
- conductors and cables. 3. Mounting, anchoring, and attachment components
- a. Powder-actuated fasteners: Threaded-steel stud for use in portland cement, concrete, steel, or wood.
- b. Mechanical expansion anchors: Insert-wedge-type steel for use in hardened portland cement concrete
- c. Clamps for attachment to steel structural elements: MSS SP-58 type clamp suitable for attachment to structural elements.
- d. Through bolts: Structural hex-head, and high-strength ASTM A 325 compliant bolt.
- e. Toggle bolts: Steel springhead type
- f. Hanger rods: Threaded galvanized steel

26 05 33 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEM

- A. General Requirements
 - 5. Provide raceways, junction boxes, pull boxes, cabinets, and wireways wherever necessary for proper installation of various electrical systems according to NFPA 70 and where indicated on the drawings.
 - 6. Size as required for the specific function or as required by NFPA 70, whichever is larger. Construction shall be of a NEMA design suitable for the environment installed.

B. Metallic Conduit and Tubing for Electrical Systems

- 1. Types:
 - a. Electrical Metallic Tubing, Couplings, and Fittings (EMT): ANSI C80.3, UL 797.
 - Only steel products allowed. Reduced wall EMT is not allowed. b. Flexible Metal Conduit (FMC): Zinc-coated steel or aluminum, UL 1. Reduced-wall FMC is not allowed
 - c. Intermediate Metal Conduit (IMC): Hot-dip Galvanized Rigid Steel Conduit,
 - ANSI C80.6, UL 1242. d. Liquidtight Flexible Metal Conduit (LFMC): Flexible steel conduit with PVC jacket, UL 360; fittings: NEMA FB 1.
 - e. Hot-dip Galvanized Rigid Steel Conduit (GRS): ANSI C80.1, UL 6.
 - f. Plastic-Coated IMC, RMC, and Fittings: NEMA RN 1, NRTL listed, Coating
 - thickness of 0.04 inches minimum.
 - g. IMC and RMC Fittings: NEMA FB 1; compatible with conduit type and material, NRTL listed.
- C. Non-Metallic Conduit and Tubing for Electrical Systems
- Types: a. Rigid Nonmetallic Conduit (RNC): Schedule 40 PVC, 90 deg C rated,
 - b. Electrical Nonmetallic Tubing (ENT): NEMA TC 13, NRTL listed.
 - c. Liquidtight Flexible Nonmetallic Conduit (LFNC): UL 1660.
 - d. ENT and LFNC Fittings: Compatible with conduit/tubing type and material, NRTL listed.
- 2. Fittings:
- a. NEMA TC 3, TC 6; UL 651, compatible with conduit/tubing type and material NRTL listed.

D. Outlet Boxes

DATE:

- 1. Galvanized steel knockout boxes, suitable in design to the purpose they serve and the
- space they occupy. 2. Size as required for the specific function or as required by NFPA 70, whichever is larger.
- 3. Set all outlet boxes in walls, columns, floors, or ceilings so they are flush with the
- finished surface, accurately set, and rigidly secured in position. Provide plaster rings, extension rings and/or masonry rings as required for flush mounting.
- 4. Provide approved cast outlet boxes with hubs and weatherproof covers in all areas subject to damp, wet, or harsh conditions.
- 5. Coordinate locations of outlet boxes prior to rough-in, consult architect for exact locations.
- 6. Applications:
- a. Light fixture
- b. Switch c. Receptacles

E. Junction and Pull Boxes

- 1. Small sheet metal pull and junction boxes: NEMA OS1
- 2. Cast-Metal Pull and Junction Boxes
- a. NEMA FB1 b. Cast Aluminum with gasketed cover
- F. Installation
- 1. Raceways
 - a. Install raceways to requirements of structure, other work on the project, and to clear all openings, depressions, pipes, ducts, reinforcing steel, and other immovable obstacles.
 - b. Install raceways continuous between connections to outlets, boxes, and cabinets with a minimum possible number of bends and not more than the equivalent of four 90-degree bends between connections.

- e. Ream raceway ends, thoroughly clean raceways before installatio clean after installation. Plug or cover openings and boxes as requ raceways clean during construction and fish all raceways clear of before pulling conductor wires.
- f. Provide raceways of ample size for pulling of wire, not smaller that requirements and not less than 1/2-inch in size, unless indicated of Drawings.
- g. Homeruns containing more than one branch circuit shall not be less in size.
- h. Protect all raceway installations against damage during construction raceways damaged or moved out of line after roughing-in to meet approval without additional cost to the Owner.
- i. Align and install true and plumb all raceway terminations at panell switchboards, motor control equipment, and junction boxes.
- i. Install approved expansion/deflection fittings where raceways pas embedded) or across (if exposed) expansion joints, and when using in exposed environments in accordance with NFPA 70 and expan properties of RNC or RAC.
- k. Install a pull wire in each empty raceway that is left for installation cables under other divisions or contracts. Use polypropylene or m plastic line with not less than 200-lb tensile strength. Leave at least slack at each end of pull wire.
- I. Make all joints and connections in a manner that will ensure mech and electrical continuity.
- 2. Above Ground Raceways
- a. Install raceways parallel and perpendicular to building lines. b. Use manufactured elbows for all 45- and 90-degree bends, unless Engineer in advance. Make other bends smooth and even and wit raceway or flaking galvanizing or enamel. Radii of bends shall be possible and never shorter than the corresponding trade elbow.
- c. Install all circular raceways concealed above suspended ceilings walls or floors wherever possible except where otherwise indicate
- d. Provide GRS for all conduits exposed to any forms of damage, ph or weather related.
- e. Securely fasten raceways in place with approved straps, hangers supports as required. Attach raceway supports to the building stru single raceways for feeders with supports spaced not more than ' clamp vertical feeder raceways to structural steel members attach Install cable clamps for support of vertical feeders where required supports within 12 inches of all bends, on both sides of the bends. raceways from suspended ceiling components.
- 4. Junction and Outlet Boxes
- c. Solidly mount all junction boxes to structural elements. d. Concrete Block Walls: As long as ADA requirements are maintain above may be adjusted slightly as required to compensate for vari dimensions such that bottom or top of boxes, as applicable, are a
- e. Set all outlet boxes in walls, columns, floors, or ceilings so they ar finished surface, accurately set, and rigidly secured in position. P rings, extension rings and/or masonry rings as required for flush r
- f. Unless noted otherwise, install wiring devices vertically aligned at on construction drawings.
- 5. Equipment Connections
- a. Use FMC or LMFC (liquid or vapor areas) for final connection to e transformer, and any device that would otherwise transmit motion. noise. Provide all FMC and LFMC with an insulated green or bare ground conductor.
- Bushings and Locknuts
- a. Rigidly terminate conduits entering sheet metal enclosures to the bushing and locknut on the inside and a locknut or an approved he outside. Conduit shall enter the enclosure squarely.
- b. Provide bushings and locknuts made of galvanized malleable iror clean-cut threads. c. Where EMT enters a box, provide approved EMT compression co
- d. Use insulated, grounding, or combination bushings wherever conr to vibration or moisture, when required by NFPA 70.

26 05 44 - PENETRATIONS, SLEEVES AND SLEEVE SEALS FOR SYSTEMS

A. Access Doors

- 1. Provide access doors for all concealed equipment where indicated or a except where above lay-in ceilings.
- 2. Access doors shall be adequately sized for the devices served with a m 18 inches x 18 inches.
- 3. Access doors must be of the proper construction for the type of constru is installed.
- 4. Obtain Architect's approval of type, size, location and color before orde factory-fabricated and assembled units, complete with attachment device ready for installation, concealed hinges, flush screwdriver-operated can anchor straps.

B. Penetrations

C. Firestopping

D. Manufacturers

2. Firestopping

a. Hilti

RectorSeal

e. Ream raceway ends, thoroughly clean raceways before installation, and keep clean after installation. Plug or cover openings and boxes as required to keep	c. Specified Technologies Inc d. United States Gypsum Company	exposed above finished accessible ceilings, if approved and list
raceways clean during construction and fish all raceways clear of obstructions before pulling conductor wires.	e. 3M corp.	A. Wiring to Kitchen Equipment
f. Provide raceways of ample size for pulling of wire, not smaller than code requirements and not less than 1/2-inch in size, unless indicated otherwise on Drawings.	26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS	 Provide wiring of fire extinguishing system for exhaust hoods ind a. Electrical interlock of automatic fuel shut-off valves b. Shunt trip breakers for shut-off of electrical equipment und
g. Homeruns containing more than one branch circuit shall not be less than 3/4-inch in size.	 A. Nameplates 1. Provide equipment identification nameplates: 	 All wiring and connections for refrigerated cases and boxes inclusions superstructure lighting, and control cable and wiring as required
 Protect all raceway installations against damage during construction. Repair all raceways damaged or moved out of line after roughing-in to meet Engineer's 	a. Switchboards	diagrams.
approval without additional cost to the Owner. i. Align and install true and plumb all raceway terminations at panelboards,	b. Panelboards c. Equipment enclosures	 B. Equipment Furnished by Owner 1. Provide all wiring and connections to equipment furnished by oth
switchboards, motor control equipment, and junction boxes. j. Install approved expansion/deflection fittings where raceways pass through (if	d. Access doors e. Transformers	limited to:
embedded) or across (if exposed) expansion joints, and when using RNC or RAC in exposed environments in accordance with NFPA 70 and expansion/contraction properties of RNC or RAC.	f. Disconnect switches	a. Junction Boxes b. Wiring
k. Install a pull wire in each empty raceway that is left for installation of conductors or	g. Enclosed circuit breakers h. Motor starters	c. Wire Nuts d. Bolts
cables under other divisions or contracts. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 24 inches of slack at each end of pull wire.	i. Feeder devices in switchboardsj. Distribution panelboards	e. Screws f. Cables
 Make all joints and connections in a manner that will ensure mechanical strength and electrical continuity. 	2. Apprpoved Types:	
2. Above Ground Raceways	 Engraved, contrasting color, three-layer, laminated plastic, indicating the name of the equipment, load, or circuit as designated on the drawings and in the specifications: 	26 09 00 - INSTRUMENTATION AND CONTROL
 a. Install raceways parallel and perpendicular to building lines. b. Use manufactured elbows for all 45- and 90-degree bends, unless approved by the Engineer in advance. Make other bends smooth and even and without flattening raceway or flaking galvanizing or enamel. Radii of bends shall be as long as 	b. Field-applied permanent epoxy adhesive, compatible with the equipment finish.c. Self-adhering, with a permanent weatherproof adhesive.d. Attached with stainless steel screws and hardware.	ELECTRICAL SYSTEMS 26 09 43 - NETWORKED LIGHTING CONTROLS AND INST
possible and never shorter than the corresponding trade elbow. c. Install all circular raceways concealed above suspended ceilings or concealed in	 Attachment method shall be acceptable to the manufacturers of the equipment to which the nameplates are being applied. 	
walls or floors wherever possible except where otherwise indicated. d. Provide GRS for all conduits exposed to any forms of damage, physical, chemical,	 Nameplate Color: a. Black background with white letters for Normal Power; 	A. Emergency Lighting Control Modules1. Automatic Load Control Relay (ALCR)
or weather related. e. Securely fasten raceways in place with approved straps, hangers, and steel	b. Red background with white letters for Emergency Power.	a. UL 924 listed as emergency lighting and power equipmentb. Connect ALCR in parallel with a lighting control device
supports as required. Attach raceway supports to the building structure. Hang single raceways for feeders with supports spaced not more than 10 feet. Securely	4. Letter height:a. 3/8-inch minimum	c. Loss of normal power shall cause relay to automatically sh
clamp vertical feeder raceways to structural steel members attached to structure. Install cable clamps for support of vertical feeders where required. Add raceway supports within 12 inches of all bends, on both sides of the bends. Do not support	b. 1/2-inch minimum	lighting circuit regardless of lighting control device position d. Emergency lighting circuit shall continue to operate at full p
raceways from suspended ceiling components. 4. Junction and Outlet Boxes	A. Wire Labels	automatically brought to full output) until normal power has e. Provide a two-gang junction box with separation barrier an
c. Solidly mount all junction boxes to structural elements.	 Label all conductors with vinyl stick-on circuit markers equating to the corresponding circuit number. 	ALCR and install it adjacent to its associated lighting contracted ceiling.
d. Concrete Block Walls: As long as ADA requirements are maintained, dimensions above may be adjusted slightly as required to compensate for variable joint dimensions such that better as top of hereas as applicable, are at block is into	 Provide an equipment-grounding conductor or bonding jumper, as applicable, in all feeders and branch circuits, sized in accordance with NFPA 70 Tables 250.66 or 	2. 3-Phase Power Loss Sensing Device
dimensions such that bottom or top of boxes, as applicable, are at block joints. e. Set all outlet boxes in walls, columns, floors, or ceilings so they are flush with the	250.122.3. Voltage drop in branch circuits shall not exceed 3 percent.	B. Software
finished surface, accurately set, and rigidly secured in position. Provide plaster rings, extension rings and/or masonry rings as required for flush mounting.	 Cable Color: a. Wiring shall have insulation of the proper color to match color code system in the 	 Install and program software to meet the Owner's requirements Provide current licenses and backup copies of the software for t
 f. Unless noted otherwise, install wiring devices vertically aligned at height indicated on construction drawings. 	table below unless there is a color system currently in use by the facility, in which case the colors are to match the existing system. In larger sizes where properly	C Concrel Installation Paguiromente
 Equipment Connections a. Use FMC or LMFC (liquid or vapor areas) for final connection to each motor, 	colored insulation is not available, use vinyl plastic electrical tape of the appropriate color around each conductor at all termination points, junctions, and	C. General Installation Requirements 1. Furnish and install all equipment, labor, system setup, and other
transformer, and any device that would otherwise transmit motion, vibration, or noise. Provide all FMC and LFMC with an insulated green or bare copper bonding	pull boxes. b. System Voltage:	the proper installation of the products/system as indicated on the herein
ground conductor. 6. Bushings and Locknuts	240V and under:	 System setup information shall include each devices load type, a control zone, and defining operational control functions
a. Rigidly terminate conduits entering sheet metal enclosures to the enclosure with a bushing and locknut on the inside and a locknut or an approved hub on the	Phase A: Black. Phase B: Red.	 Do not install network power controls until space is enclosed, H¹ running, and overhead and wet work in space are complete
outside. Conduit shall enter the enclosure squarely. b. Provide bushings and locknuts made of galvanized malleable iron with sharp,	Phase C: Blue.	 Install network power switching controls in accordance with man product data, technical bulletins, product catalog, installation ins
clean-cut threads. c. Where EMT enters a box, provide approved EMT compression connectors.	Neutral: White. Equipment Ground: Green.	sketches and drawings, and product carton instructions 5. Provide electrical grounding in accordance with NFPA 70
 Use insulated, grounding, or combination bushings wherever connection is subject to vibration or moisture, when required by NFPA 70. 	Isolated Ground: Green with yellow stripe.	6. Provide typed panelboard schedule in pocket provided in panel7. Install in strict accordance with all local and pertaining codes or
4 - PENETRATIONS, SLEEVES AND SLEEVE SEALS FOR ELECTRICAL	480V and 480Y/277V: Phase A: Brown	 8. Utilize an installer with demonstrated experience in projects of s 9. Equipment shall be in ready to use condition at end of installation
ЛS	Phase B: Orange	10. Schedule system commissioning by factory-authorized personne manufacturer's required lead times and written instructions
Access Doors	Phase C: Yellow Neutral: Gray	11. Touch up, repair, or replace damaged components before subst
 Provide access doors for all concealed equipment where indicated or as required, except where above lay-in ceilings. 	Equipment ground: green	 Remove temporary tags, coverings, and construction debris fror surfaces of equipment. Remove construction debris from equip of debris
 Access doors shall be adequately sized for the devices served with a minimum size of 18 inches x 18 inches. 	26 05 63 - MISCELANEOUS EQUIPMENT CONNECTIONS	 Clean integral air filters, heat sinks, grills, and fans before subst commissioning services
Access doors must be of the proper construction for the type of construction in which it is installed.	B. General Requirments	
4. Obtain Architect's approval of type, size, location and color before ordering. Provide factory-fabricated and assembled units, complete with attachment devices and fasteners ready for installation, concealed hinges, flush screwdriver-operated cam lock, and anchor straps.	 Provide necessary equipment and accessories that are not provided by the equipment supplier or Owner to complete installation and/or final connection to equipment furnished by others in locations indicated on the drawings, specified herein, or both. Equipment and accessories not provided by the equipment supplier may include flexible cords and plugs as required for proper operation of the complete system, in accordance with the manufacturer line muticare. 	 D. System Startup 1. Provide manufacturer's system startup and adjustment 2. Switch each load on and off with manual line test feature of the before installing processors 3. Perform operational testing to verify compliance with Specification
Penetrations 1. Coordinate sleeve selection and application with selection and application of	with the manufacturers' instructions. 3. Contractor shall be responsible for correct rough-in dimensions, and verify them with Architect and/or equipment supplier prior to rough-in and service installations.	E. Adjusting
fire-stopping specified in Division 07 section "Through-Penetration Firestop Systems." 2. Roofs:		 Within 12 months of the date of Substantial Completion provide the system to account for actual occupied conditions.
 Coordinate all roof penetrations with Engineer, Owner, and as applicable, the roofing contractor providing a roof warranty. 	 B. Wiring of Mechanical Equipment 1. Provide all raceways and power wiring for all Division 23 equipment requiring electrical 	F. Demonstration
 Keep all raceway penetrations within mechanical equipment curbs wherever possible. Coordinate with Division 01. 	connections, including but not limited: a. Pumps	 Factory authorized service representative to instruct owner's sta maintain network power switching systems; and provide instruct
c. Flash and counterflash all openings through roof, and/or provide pre-fabricated molded seals compatible with the roof construction installed, or as required by the	 b. Water heaters c. HVAC equipment 	software.
Engineer, Owner, or roofing contractor. All roof penetrations shall be leaktight at the termination of the work and shall not void any new or existing roof warranties.	d. Line-voltage control and interlock wiring not provided under Division 23.	26 09 43.13 - DIGITAL NETWORK LIGHTING CONTROLS
 Walls and Floors: a. Steel Pipe Sleeves for Raceways and Cables: ASTM A53/A53M, Type E, Grade B, 	 Connect per manufacturers' wiring diagrams Coordination and Verification 	A. Manufacturers
Schedule 40, galvanized steel, plain ends, and drip rings. b. Cast Iron Pipe Sleeves for Raceways and Cables: Cast or fabricated "wall pipe,"	 Coordinate with mechanical contractor for disconnects and variable frequency drives (VFD) furnished with equipment 	1. Basis of Design:
equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.	 b. Verify all disconnect switches and final connections as required c. After installing wiring, verify that each motor load has the correct phase rotation. 	a. Lutron Ecosystem 2. Approved Equals:
 Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated. 	 d. Verify the actual "Maximum Overcurrent Protection" (MOCP) device ratings and "Minimum Circuit Ampacity" (MCA) conductor sizing for mechanical equipment 	a. Wattstopper b. Encellium
 Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052 [0.138] inch thickness and of length to suit application. 	from the equipment nameplate e. Verify actual electrical requirements with mechanical equipment submittals and	c. Wattstopper
Firestopping	nameplates prior to rough-in. Provide properly sized electrical wiring and equipment without extra cost to the Owner. Notify the Engineer of all changes	d. Acuity Brands e. Crestron
 Sealants and accessories shall have fire-resistance ratings indicated, as established by testing identical assemblies in accordance with UL 2079 or ASTM E 814, or other NRTL 	required in the electrical installation due to equipment variances so that the effects on feeders, branch circuits, panelboards, fuses and circuit breakers can be	B. General
acceptable to AHJ.	checked prior to purchasing and installation. f. Contractor is responsible for coordinating with mechanical contractor to verify the	1. Description:
 Through and Membrane Penetration Firestopping Systems Product Schedule: Provide UL listing, location, wall or floor rating, and installation drawing for each penetration fire stop system. 	actual ampacities and correct sizes of all conductors and overcurrent protective devices for all equipment.	 a. Web-accessible, network-connected programmable lighting receives digital signals from addressable input devices. b. Signala addressad by at central signal processor and distri-
 Where project conditions require modification to qualified testing and inspecting agency's illustrations for a particular firestopping condition, submit illustration, with 	4. VFD installation requirementsa. If VFD is separate or does not have an integral disconnect feature, provide	 b. Signals addressed by at central signal processor and distrition to control devices to provide changes.
modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated	disconnect switch with auxiliary contact such that motor will be turned off if switch is off	 c. Electronic power switching and dimming modules and related effect circuit changes
assembly. Include qualifications data for testing agency.	 Provide VFD cable, Belden or approved equivalent, for connection of VFD to motor when required 	On/off switchingEmergency switching
Manufacturers	 Provide all raceways, power wiring, line-voltage control, and interlock wiring not provided under Division 23, including but not limited to: 	0-10V dimming 2. System Components:
1. Access Doors a. Bar-Co, J.L. Industries	 a. Thermostats b. All raceways, wiring, and connections of devices to energy management system 	a. Keypads
b. Karp Associates c. Milcor	that are not the responsibility of Division 23. c. Temperature control devices and controls, such as:	b. Window treatment controlsc. Occupancy sensors
d. Nystrom Building Products	Night-stats	d. Load shedding e. BAS interface
e. Wade f. Zum.	 Water heater interlocks Time switches 	f. A/V interface3. Provide all necessary components for a complete and fully oper
2 Firestopping	Override timers	

- Time switches Override timers
- 6. See mechanical drawings for locations and temperature control diagrams.

7. Low-voltage conductors for thermostats and temperature control system may be run

3. Provide all necessary components for a complete and fully operational system.

C. Lighting Control Panels

d listed for this purpose.	1.	
	2. 3.	
s including but not limited to:		
under hoods		
including lighting, ired by refrigeration wiring		
y others including but not		
y others including but not		
	4.	С
	5.	Ρ

- TROLS FOR
- D INSTALLATION
- auipment
- atically shunt emergency power to e position
- te at full power (dimming ower has been restored.
- parrier and plaster ring for the ting control device above
- irements ware for the Owner's records
- and other services necessary for ted on the drawings and specified
- ad type, assigning each device to
- losed, HVAC systems are
- with manufacturer's instructions, llation instructions, submittal
- in panel doors
- codes or regulations jects of similar size and scope installation
- personnel in accordance with
- ore substantial completion lebris from interior and exterior om equipment area and dispose
- ore substantial completion and
- re of the power switching module
- pecifications. Adjust as required.
- n provide onsite service to adjust
- vner's staff to adjust, operate and
- e instruction using the system
- ROLS

- Comply with NEMA PB 1 and UL 50, UL 67, UL 489, and UL 916
- Provide with a 20A 120V breaker protected branch circuit for operation power.
- Feed-thru relays
- a. Arc-less high inrush b. Positive air-gap
- c. Phase independent channels
- d. Non-volatile power failure memory
- e. Lifetime rated for minimum 500,000 switching cycles
- f. 120/277V, 60Hz g. 1/2HP motor at 120V
- h. 1HP motor at 277V
- i. Withstand 6kV/3kA surge per IEC 61000-4-5 and ANSI/IEEE C62.41-1991
- j. UL Listed, FCC Part 15 Cabinet:
- a. NEMA 1, IP20
- b. 16 Gauge galvanized steel with grey powder coat finish
- c. Capacity for 8-42 feed-thru relay circuits Power Supply:
- a. 24V regulated power supply with fuse-protection
- D. Remote Lighting Control Module
- 1. Integrated dimming and switching control module in metal enclosure for mounting in ceiling plenum.
- 2. Connections:
- a. Relay connections to controlled lighting zones b. Low-voltage connections to sensors and switches
- c. Network system connection
- 3. Local zone override buttons
- 4. Provide 120V power per circuit indicated on drawings
- 5. Fully programmable
- 6. Enclosure:
- a. Surface-mounted industrial control enclosure mounts directly on two side by side 4" square electrical junction boxes, suitable for concealed ceiling plenum locations.
- 7. Feed-thru relays
- a. Arc-less high inrush
- b. Positive air-gap c. Phase independent channels
- d. Non-volatile power failure memory
- e. Lifetime rated for minimum 500,000 switching cycles
- f. 120/277V, 60Hz
- i. 1/2HP motor at 120V
- j. 1HP motor at 277V
- k. Withstand 6kV/3kA surge per IEC 61000-4-5 and ANSI/IEEE C62.41-1991
- I. UL Listed, FCC Part 15 8. Power Supply:
- a. 24V regulated power supply with fuse-protection
- E. System Accessories
- 1 Remote Keypad Controls
- a. Field-configurable remote keypad
- b. Replaceable, engravable, programmable buttons in number indicated
- c. LED indication lights.
- d. Fits in standard single-gang box e. Configurable for 2 to 8 single action pushbuttons.
- f. Finish shall be selected by architect
- g. Operates on 24V power from control system bus
- 2. Occupancy Sensor Interface Device:
- a. Integrates occupancy sensors and related sensors with control network. In separate enclosure
- b. Four wire bus providing 24 VDC power to network devices, with two independent sensing inputs.
- 3. Photocell Sensor:
- a. Continually monitor daylight entering window or skylight.
- b. Equipped with 3-wire interface for direct connection to control system.
- c. Operates on 24V power from control system bus
- d. Easily programmable with handheld device
- e. Mounted to ceiling not extending more than 1" beyond ceiling plane
- F. Conductors and Cabling
- 1. UTP Cable:
- a. 100-OHM UTP
- b. Listed by an NRTL laboratory
- c. Comply with UL 444 and NFPA 70
- 2. Communication control cable:
- a. Plenum Rated
- b. 22 AWG stranded copper twisted pair for data
- c. 18 AWG stranded copper twisted pair for power
- d. Type CMP complying with NFPA 262
- e. Replaceable, engravable, programmable buttons in number indicated f. LED indication lights.
- g. Fits in standard single-gang box
- h. Configurable for 2 to 8 single action pushbuttons.
- i. Finish shall be selected by architect
- j. Operates on 24V power from control system bus

- ble lighting control system that
- and distributes operating signals
- and relays process signals and

PROJECT ISSUE: PERMIT DRAWINGS

This drawing is the professional intellectual property of Optimized LED and protected by Copyright Usage of this drawing shall is restricted for use as a project example and shall not be reproduced, recreated, or utilized for any other purpose without express written consent of Optimized LED.

OPTION 2010 DETION 2010 Lighting Engineering Design 842 EAST ISABELA AVE., MESA, AZ, 85204 WWW. OPTIMIZED-LED.COM 602-699-6224 PROJECT: MOTI90050 EOR: BRETT LORENZEN DERLIDENZEN@Optimized-led.com AZ-FIRM: 21458	recreated, or utilized for any other purpose without the express written consent of Optimized LED.
---	--

PROJECT NUMBER: MDI190050

RSM

BSL

DRAWN BY:

APPROVED BY:

LA RISTRA - CHANDLER

LA RISTRA

Ō

SHEET TITLE

SHEET 2

SPECIFICATIONS

E5.2

26 20 00 - LOW-VOLTAGE ELECTRICAL DISTRIBUTION

26 21 00 - LOW-VOLTAGE ELECTRICAL SERVICE ENTRANCE

A. General Requirements

- 1. See one-line diagram for the following information:
- a. Equipment Type b. Size
- c. Voltage
- d. Phase
- e. NEMA Ratings
- f. Existing or New Equipment
- 2. Site voltage verification:
- a. Coordinate with the serving utility to ensure that provided voltage at project site is within acceptable limits (+/- 2.5%).
- b. Arrange correcting means with the serving utility prior to installation to provide proper regulation voltage to the project site.
- c. Submit to the Owner a report of maximum and minimum voltage and a copy of the recording voltmeter chart.
- B. Connection to Serving Utilities
- 1. Contractor shall provide and install all required raceways, terminations, and miscellaneous equipment as required for electrical service connection by the serving utility
- 2. Contractor shall become fully acquainted with serving utility installation guide, applicable codes in the jurisdiction, and install in strict compliance with such guidelines.
- 3. Contractor shall fully understand the division of work between the installing contractor and the utility prior to commencing work on-stie.
- 4. Contractor shall initiate a new service contract with providing electrical utility within two weeks of notice to proceed.
- 5. Contractor shall pay all applicable charges required by the serving electrical utility. 6. Contractor shall complete and provide necessary information to the utility company without delay. If concern about missing information arises contact the electrical engineer. Required
- information may include but is not limited to: a. Site Plan
- b. One-Line Diagram
- c. Load calculations
- d. Load calculation forms
- e. Load readings
- f. Submittal documentation
- 7. Contractor shall order electrical service with proper metering provisions that meet the requirements of the serving electrical utility.

C. Grounding

- 1. Permanently and effectively ground and bond the electrical installation in a thorough and efficient manner
- 2. All grounding shall meet or exceed the requirements of NFPA.
- 3. Where grounding on plans indicates grounding above minimum code requirements, drawings shall take precedence.
- 4. Use bare or green insulated conductors as specified herein, and other materials indicated on the Drawings.

26 24 00 - SWITCHBOARDS AND PANELBOARDS

A. Switchboards

- 1. Service entrance and power distribution switchboards must conform with the requirements of the local codes and serving utility.
- 2. Shall be manufactured according to current requirements of UL 891, "Dead-Front Switchboards"; NRTL listed and permanently labeled for service entrance use when applicable.
- 3. Short circuit interrupting and bracing rating shall exceed the maximum calculated fault-current value indicated on the drawings.
- 4. Provide integral ground fault relays and operators, self-powered, where indicated or required by NFPA 70.
- 5. Provide card holder for circuit identification at each feeder overcurrent protection device. Label according to one-line diagram.
- 6. Propagate with quantity and type of overcurrent protection devices indicated on the drawings and in accordance with specification section 'LOW-VOLTAGE PROTECTIVE DEVICES'.
- 7. Label equipment and overcurrent protection devices in accordance section 'EQUIPMENT LABELING'.

B. Power Distribution Panelboards - Circuit Breaker

- 1 Panelboards:
- a. Dead-front distribution panelboards with number and sizes of circuit breakers as indicated on the drawings in accordance with specification section 'LOW-VOLTAGE PROTECTIVE DEVICES'
- b. Provide meter connections and meter compliant with serving utility company.
- c. Number and sizes of circuit breakers as indicated on the drawings. d. Where required, equipment permanently label as suitable for use as service entrance equipment
- e. Fully-rated for the available fault current indicated on the drawings
- f. Hinged, lockable front door that covers the circuit breaker handles.
- 2. Circuit breakers:
- a. Quick-make, quick-break, Bolt-on type b. Engraved nameplates for circuit identification of each circuit breaker
- F. Lighting and Appliance Panelboard Circuit Breaker

1. Panelboards:

- a. Provide equipment with over-current protection devices indicated on the drawings and in accordance with specification section 'LOW-VOLTAGE PROTECTIVE DEVICES'.
- b. Dead-front finished cabinet
- c. Fully- or Series- rated and with the integrated short circuit current ratings indicated on
- the drawings d. All two- and three-pole breakers shall be of the common trip type.
- e. Typewritten card directory indicating exactly what each circuit breaker controls fully- or series- rated and with the integrated short circuit current ratings indicated on the drawings.
- 2. Accessories:
- a. Handle Clamp:
 - Loose attachment for holding circuit breaker handle in "on" position
 - Use for all circuits containing emergency lighting loads, fire alarm loads, and as indicated on drawings
- Breakers serving fire alarm loads must have a permanently-affixed red label stating "FA" in white letters adjacent to the circuit breaker. b. Handle padlocking device:
- Fixed attachment for locking circuit breaker handle in "on" or "off" position. Use as indicated on drawings.
- I. Series Ratings on Switchboards and Panelboards
- 1. Label switchboards and panelboards with a NRTL integrated short circuit current rating.
- 2. When series ratings are applied with integral or remote upstream devices, provide labels complying with NFPA 70 Articles 240.86 and 110.22
- 3. In addition to the warning label, include, at a minimum, the following conditions of the UL 67 series ratings:
- a. Size and type of upstream device.
- b. Branch devices that can be used.
- c. NRTL series short circuit current rating.
- 4. When there is not enough room in the equipment to show all the legitimate series rated combinations, reference a bulletin supplied with the panelboard, per UL 67.
- 5. Series ratings shall cover all trip ratings of installed frames.

26 27 00 - LOW-VOLTAGE DISTRIBUTION EQUIPMENT

A. Wiring Devices

- 1. General Requirements
- a. The catalog numbers listed for wiring devices are generally for 20A rated devices. b. Where 15A rated devices are indicated on the drawings or required for circuit rating limitations, provide wiring devices equivalent to those specified for 20A, but rated for
- c. All receptacles located outdoors or in damp or wet locations: Listed as 'weather
- Resistant', designated by a 'WR' on the faceplate. d. Minor changes relative to the location of electrical equipment may be made to comply with structural and building requirements as determined in the course of
- construction, but do not move more than 12" horizontally. e. Contractor shall provide all wiring devices of the same manufacturer and not mixed of
- the project, to the maximum extent possible. Provide color of toggles and receptacle as requested by the Architect.
- 2. Receptacles
- a. General Duplex Receptacle
- b. General Quadplex Receptacle c. GFCI Duplex Receptacle
- d. GFCI Double Duplex Receptacle
- e. Arc-Fault Receptacle
- f. Wireless Control Receptacle
- g. Tamper Resistant Receptacle
- h. Water Resistant Receptacle 3. Lighting Devices
- a. Line-Voltage Switch
- b. Pilot Switch
- 1/25 Watt neon pilot light, both installed in a single-gang box with cover plate. Pass and Seymour ACD201-IV switch and 1475 pilot light, or approved equals
- c. In-Wall Occupancy/Vacancy Sensor
- d. In-Wall Occupancy/Vacancy Sensor with Dimming
- e. Line-Voltage Ceiling Occupancy Sensor
- f. Low-Voltage Ceiling/Wall Occupancy Sensor
- g. Low-Voltage Control Relay Power Pack h. In-Wall 2-HR Countdown Time-Switch
- i. In-Wall Single-Zone Astronomical Timeclock

- B. Cover Plates
- 1. General Requirements

26 28 00 - LOW-VOLTAGE CIRCUIT PROTECTIVE DEVICES

C. Installation

D. Mounting

A. Circuit Breakers

b. GFCI Circuit Breakers:

trip). Use as indicated on drawings.

Class A ground fault 6mA trip

• Standard frame, trip, and number of poles

c. Ground-Fault Equipment Protection (GFEP) Circuit Breakers:

• Single- and two-pole configurations with Class A ground-fault protection (6-mA

• Class B ground-fault protection (30-mA trip). Use as indicated on drawings.

00 - LOW-VOLTAGE DISTRIBUTION EQUIPMENT	 Arc-Fault (AF) Circuit Breakers: Provide arc-fault hazard circuit breaker where indicated in panelboard for 	 a. Comply with ANSI C78.377 for white light LED color range b. Minimum CRI of 80 unless noted otherwise
Wiring Devices	residential projects.	c. LED binning specification tolerance to be within 3 macadam ellipses of rated value
1. General Requirements	 Circuit Breakers in Existing Panelboards/Switchboards Provide new circuit breakers for installation in existing panelboards of the same 	 All LEDs used for same fixture type throughout the project must originate from the same production bin
a. The catalog numbers listed for wiring devices are generally for 20A rated devices.	manufacturer and type as the existing panelboard circuit breakers	e. Minimum average rated life of 20,000 hours for LED lamps and 50,000 hours for L
 Where 15A rated devices are indicated on the drawings or required for circuit rating limitations, provide wiring devices equivalent to those specified for 20A, but rated for 15A. 	 Short circuit current interrupting rating of any new breakers shall be the larger of the existing panel rating or the available fault current indicted on the drawings. 	luminaires f. Rohs compliant.
 c. All receptacles located outdoors or in damp or wet locations: Listed as 'weather Resistant', designated by a 'WR' on the faceplate. 	B. Fuses	26 52 00 - SAFETY LIGHTING
 d. Minor changes relative to the location of electrical equipment may be made to comply with structural and building requirements as determined in the course of 	1. General Requirements	
construction, but do not move more than 12" horizontally.	 Provide each circuit and set of fuse clips throughout the work with sizes and types as required or indicated. 	A. Self-Contained Emergency Lighting Units and Battery Back-ups
 Contractor shall provide all wiring devices of the same manufacturer and not mixed on the project, to the maximum extent possible. Provide color of toggles and receptacles 	b. All fused devices shall be labeled as to type and size of fuse required.c. Furnish three spare fuses of each size and type used on the project (except for main	 General Self-contained units complying with UL 924.
as requested by the Architect. 2. Receptacles	switch fuses, furnish one spare), neatly contained in a properly labeled cabinet.	2. Battery:
a. General Duplex Receptacle	2. Types a. Fuses larger than 600A	a. Sealed, maintenance-free, lead-acid, typeb. Suitable rating and capacity to supply and maintain at not less than 87-1/2 percent
b. General Quadplex Receptacle c. GFCI Duplex Receptacle	UL Class L, similar to type KRP-C Bussmann Low Peak or equal.	the nominal battery voltage for the total lamp load associated with the unit for a pe of at least 90 minutes
d. GFCI Double Duplex Receptacle	 b. Fuses used to protect motors: UL Class RK5, Bussmann Fusetron or equal. 	c. Equipment shall supply and maintain not less than 60 percent of the initial emerger
e. Arc-Fault Receptacle	 OL Class RR6, Bussmann Fusetion of equal. c. Fuses used to protect all other electrical equipment: 	illumination for a period of at least 90 minutes. 3. Charger:
f. Wireless Control Receptacle g. Tamper Resistant Receptacle	UL Class RK1, dual element, Bussmann LPS/LPN or equal.	a. Fully automatic, solid-state type with sealed transfer relay.
h. Water Resistant Receptacle	26 28 16 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS	 4. Operation: a. Relay automatically turns lamp on when power supply circuit voltage drops to 80
 Lighting Devices a. Line-Voltage Switch 		percent of nominal voltage or below
b. Pilot Switch	A. Enclosed (Safety) Switches	b. Automatically disconnects from battery when voltage approaches deep-dischargec. When normal voltage is restored, relay disconnects from battery, and battery is
 1/25 Watt neon pilot light, both installed in a single-gang box with cover plate. Pass and Seymour ACD201-IV switch and 1475 pilot light, or approved equals. 	 Heavy-duty, fused or non-fused (as indicated on drawings or required) NEMA KS1, externally operated, visible-blade safety switches 	automatically recharged and floated on charger.
c. In-Wall Occupancy/Vacancy Sensor	 NEMA enclosure type indicated on the drawings or suitable for the environment in which installed. 	5. Accessories/Options a. Test Push Button:
 In-Wall Occupancy/Vacancy Sensor with Dimming Line-Voltage Ceiling Occupancy Sensor 	a. Based on fusible switch and fuse sizes indicated, include Class R, J, or L fuse	 Push-to-test type, in unit housing, simulates loss of normal power, and demonstrates unit operability.
f. Low-Voltage Ceiling/Wall Occupancy Sensor	provisions as applicable. b. Where indicated, provide fusible switches permanently labeled as suitable for use as	b. LED Indicator Light:
g. Low-Voltage Control Relay Power Pack h. In-Wall 2-HR Countdown Time-Switch	service entrance equipment	 Indicates normal power on. Normal glow indicates trickle charge, and bright g indicates charging at end of discharge cycle.
i. In-Wall Single-Zone Astronomical Timeclock	 Provide integral and separate neutral and ground assemblies, suitable for the sizes of conductors indicated 	c. Wire Guard:
	 Do not double-lug any terminations not specifically listed as suitable for more than one conductor. 	Heavy-chrome-plated wire guard protects lamp heads or fixtures.
Cover Plates 1. General Requirements	3. Provide switches where not furnished with the starting equipment, at all other points	 Remote Test: Switch in hand-held remote device aimed in direction of tested unit initiates
a. Contractor shall provide cover plates by the same manufacturer as the wiring devices;	required by NFPA 70, and where indicated on the drawings. 4. Where indicated, provide the disconnect switch with an integral auxiliary switch, open when	coded infrared signal. Signal reception by factory-installed infrared receiver in tested unit triggers simulation of loss of its normal power supply, providing vis
complying with NFPA 70 ARTICLES 406.9 (A) or (B). 2. Indoor Dry Applications	the main switch blades are open, and wire it into the controller to disable the motor whenever the switch is OPEN	confirmation of either proper or failed emergency response.
a. Colored, smooth nylon [Satin stainless steel] [Polished brass] [as directed by Architect]	5. Where indicated, provide shunt-trip disconnect switch, Bussmann power module switch or	 e. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test o
b. By the same manufacturer as the wiring devices.	approved equal, with a fire protection interface relay and auxiliary contacts.	unit emergency operation at required intervals. Test failure is annunciated by integral audible alarm and flashing red LED.
 c. Verify desired colors with Architect before installation. d. Install groups of switches under one ganged-plate, usually horizontally; or, where 	26 51 00 - INTERIOR LIGHTING	
required by details, vertically. Set all cover plates plumb, parallel, and finished flush with the wall.		27 05 00 - COMMON WORK RESULTS FOR
3. Outdoor Wet Applicaitons	 A. General Requirements 1. Light fixtures shown on the drawings represent general arrangements only 	COMMUNICATIONS
 Provide GFCI receptacles for designated weatherproof receptacles, unless indicated otherwise on the drawings. 	 Refer to architectural drawings and coordinate with architect for exact locations. 	27 05 10 - GENERAL COMMUNICATION SYSTEM PROVISIONS
b. In-use, NEMA 3R, recessed or flush mount, NRTL labeled plates molded from a clear high impact ultraviolet stabilized polycarbonate material for easy verification that cords	 Coordinate location with all other trades before installation to avoid conflicts. Coordinate light finate least increase beneficial examples with final installation and 	1. Provide incoming telephone service raceways as indicated on drawings or as required b
are plugged in and that the GFCI is functioning.	 Coordinate light fixture locations in mechanical rooms with final installed piping and ductwork layouts. 	the serving telephone company 2. Provide 3/4-inch thick plywood board, fire-retardant-treated and stamped FRT, securely
 Back box must be suitable for conduit connecting. Coordinate back box with wall depth. 	 Provide light fixtures as scheduled on drawings, including any lamps, and necessary accessories for a complete and operational system 	anchored to the wall, at the location and of the size as indicated on the drawings
d. Basis of Design: Intermatic WP1000RC/HRC or equal.	6. Light fixture model numbers scheduled on the drawings are complete and current according	 Provide flush mounted telephone outlet boxes with 1 inch conduit stub-up with pull-string concealed to accessible ceiling space at locations as indicated on the drawings.
Installation	to the latest information available at the time of specification. Model number shall be confirmed with description by providing vendor.	A. Communications Service Pathways
1. General Requierments	 Provide material and labor to securely hang, clean, and make light fixtures completely ready for use. 	 B. Grounding and Bonding Provisions C. Backbone Pathway Provisions
a. Solidly mount all junction boxes to structural elements.	8. Provide all hangers, supports, and miscellaneous hardware required to install light fixtures,	D. Hangars and Supports for Communication Systems
 b. Concrete Block Walls: As long as ADA requirements are maintained, dimensions above may be adjusted slightly as required to compensate for variable joint 	proper trim to fit each ceiling condition actually encountered, and additional tie wires connected to structure to conform to seismic requirements where required by the applicable	
dimensions such that bottom or top of boxes, as applicable, are at block joints. 2. Outlet Boxes	building code. 9. Packaging of light fixtures and controls is not acceptable and will be strictly enforced.	27 05 33 - CONDUITS AND BACKBOXES FOR COMMUNICATIONS SYSTEM
a. Set all outlet boxes in walls, columns, floors, or ceilings so they are flush with the finished surface, accurately set, and rigidly secured in position. Provide plaster rings,	Packaged price will be confirmed with contractor and failure to provide separate line items will result in complete submittal rejection.	A. General Requirements
extension rings and/or masonry rings as required for flush mounting.	10. Where the Light Fixture Schedule indicates an allowance for a specific light fixture, the price	 A. General Requirements 1. For things that apply to all communication systems such as boxes, conduit, innerducts,
 Unless noted otherwise, install wiring devices vertically aligned at height indicated on construction drawings. 	is a Contractor price. Include all additional costs for freight, lamps, and installation of light fixture and lamps.	termination panels, pull-strings, and trim rings, primarily refer to electrical
	11. Install light fixtures hung in continuous rows on channel struts specifically designed for this purpose.	B. Signaling System
Nounting See Electrical Cover Sheet for specific mounting heights if not called out elsewhere in the 	12. Install all light fixtures located in areas without ceilings immediately below the roof-framing	 Provide a complete and functioning 24V signaling system for loading door signals, and others as indicated on the drawings
drawings.	members, or suspended from chain hangers suitable in length to provide the indicated mounting height.	2. Low-voltage conductors for signaling system may be run exposed above finished ceiling
 Receptacles: a. Unless indicated otherwise, install vertically with the ground slot mounted at the 	13. Through-wiring of recessed light fixtures in suspended ceilings is not permitted. Connect each light fixture by a whip to a junction box. Provide cable whips of sufficient lengths to	but shall be installed in conduit within walls and where exposed in the work areas. 3. Signal bell units shall be 4-inch, single-stroke type, Edwards Signaling and Security
bottom.	allow for relocating each light fixture within a 5-foot radius of its installed location, but not exceeding 6 feet in unsupported lengths.	Systems (Edwards) No. 332-4G5 or equal, for 24Vac operation, installed on a standard
 b. Where installed horizontally, install with the neutral slot mounted at the top. c. Above counter: mount vertically aligned. 		single-gang box 4. Transformers shall be Edwards 590 Series or equal, having adequate capacity for the
 Mechanical and electrical equipment rooms and janitors closets: mount vertically oligned 	B. Lighting Sources, Ballasts, and Drivers	connected load plus 10-percent at 24Vac, and mounted in a standard two-gang box.
aligned. d. Garages: mount vertically aligned.	 General Requirements: a. Sound levels not exceeding Class A ambient noise levels 	C. Existing Fire-Alarm System Modifictions
e. Weatherproof exterior receptacles: vertically aligned.	 b. Line transient withstand ratings as defined in ANSI/IEEE C62.41, Category A; lamp current crest factor of 1.7 or less; 95-percent power factor or greater; low heat type; 	 Provide new equipment compatible with and connected to the existing fire alarm control system. Modify in accordance with NFPA 72 as applicable and with the AHJ.
 GFCI receptacles: Same as general receptacles. g. Isolated ground receptacles: Same as general receptacles. 	thermally protected against overheating.	 Provide all required initiating devices, notification appliances, auxiliary devices, and
2. Switches:	 Fluorescent Ballasts (General Requirements): a. Comply with UL 935 and ANSI C82.11 	interconnecting circuits. 3. Provide additional auxiliary panels as required to power new equipment for scope of wo
 All switches shall be mounted at the same height throughout the project unless noted otherwise. 	b. Designed for type and quantity of lamps served	 Sequence of operations shall match that of the existing system.
b. Above Counters: Same as for receptacles.	c. High-efficiency electronic type with NEMA premium label for linear lamps	All wiring and cable shall match that of the existing system and be in accordance with applicable codes.
 Walls with Wainscoting: 6 inches minimum above wainscoting, but not exceeding 48 inches above finished floor. 	 d. Electronic programmed-start e. Sound levels not exceeding Class A ambient noise levels 	6. Contractor shall install, program, and test all new/existing equipment to ensure system
	 Ballasts in indoor locations shall have disconnecting means either internal or external to the luminaire. 	functionality per NFPA 72 requirements for the scope of work.
00 - LOW-VOLTAGE CIRCUIT PROTECTIVE DEVICES	g. Less than 10 percent total harmonic distortion	27 05 20 - DATA SYSTEM PROVISIONS
Circuit Breakers	h. Operating frequency of 42kHzor greater with no visible flicker	
3. General Requirements	 High-Intensity Discharge (HID) Ballasts: a. Comply with UL 1029 and ANSI C82.4 	 A. General Requirements 1. Provide flush mounted data outlet boxes with 1 inch conduit stub-up with pull-string
a. Comply with:• UL 489	b. Lamps from 150W-500W must be pulse-start and meet EISA requirements.	concealed to accessible ceiling space at locations as indicated on the drawings.
NEMA AB1	C Lighting Sources	27 05 30 - TELEPHONE SYSTEM PROVISIONS
 NEMA AB3 b. Short Circuit Interrupting capacity shall exceed the value indicated on the drawings 	C. Lighting Sources 4. General	21 UJ JU - TELEFTIUNE STOTENI FRUVISIUNS
c. Engraved nameplates for circuit identification of each circuit breaker in accordance	a. Provide lamps and color temperatures as indicated on the drawings for all light fixtures	A. General Requirements
with specification section 'IDENTIFICATION OF ELECTRICAL SYSTEMS'. 2. Molded-Case Thermal Magnetric breakers:	 b. Lamps shall be by the same manufacturer for color consistency. c. Lamps shall be compatible with the specified light fixture 	 Provide incoming telephone service raceways as indicated on drawings or as required b the serving telephone company
a. Quick-make, quick-break, Bolt-on type	c. Lamps shall be compatible with the specified light fixture2. Incandescent Lamps:	2. Provide 3/4-inch thick plywood board, fire-retardant-treated and stamped FRT, securely
b. Standard frame, trip, and number of poles	 Type and wattage as shown on the drawings; rated 130V unless otherwise scheduled or specified. 	anchored to the wall, at the location and of the size as indicated on the drawings 3. Provide flush mounted telephone outlet boxes with 1 inch conduit stub-up with pull-string
c. inverse time-current element for low-level overloadsd. Magnetric trip element for short circuits	3. Fluorescent Lamps:	concealed to accessible ceiling space at locations as indicated on the drawings.
e. Magnetic element shall be adjustable for breakers over 250A.	 a. Low-mercury type in compliance with NEMA LL 1 b. Minimum color-rendering index (CRI) of 82 unless noted otherwise 	27 05 30 - AUDIO/VIDEO PROVISIONS
 Types: a. SWD Circuit Breakers: 	 Minimum color-rendering index (CRI) of 82 unless noted otherwise Minimum average rated life of 24,000 hours. 	
 Use when breaker serves as a switch for 120V or 277V lighting circuits. 	4. Metal Halide Lamps:	A. Signaling System

- a. Pulse-start (ceramic when available) coated
- b. Minimum CRI of 80 unless noted otherwise
- c. Minimum average rated life of 18,000 hours in the vertical position and 12,000 hours in the horizontal position d. Low-wattage lamps shall have a protective shroud or other suitable containment
- material for use in open fixtures.
- 5. LED Lamps and Luminaires:

connected load plus 10-percent at 24Vac, and mounted in a standard two-gang box.

f rated values

hours for LED

-1/2 percent of unit for a period

itial emergency

o-discharge level pattery is

r, and

and bright glow

nit initiates d receiver in providing visual

quired test of unciated by an

is required by

RT, securely vings

ith pull-string ngs.

SYSTEMS

ished ceilings, areas.

a standard city for the

ang box.

es, and

scope of work.

sure system

as required by

RT, securely

vings ith pull-string

1. Provide a complete and functioning 24V signaling system for loading door signals, and

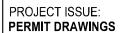
others as indicated on the drawings

single-gang box

2. Low-voltage conductors for signaling system may be run exposed above finished ceilings, but shall be installed in conduit within walls and where exposed in the work areas. 3. Signal bell units shall be 4-inch, single-stroke type, Edwards Signaling and Security

Systems (Edwards) No. 332-4G5 or equal, for 24Vac operation, installed on a standard 4. Transformers shall be Edwards 590 Series or equal, having adequate capacity for the





This drawing is the professional intellectual property of Optimized LED and protected by Copyright Usage of this drawing shall is restricted for use as a project example and shall not be re produced, recreated, or utilized for any other purpose without express written consent of Optimized LED.



PROJECT NUMBER:	MDI190050
DRAWN BY:	RSM
APPROVED BY:	BSL

LA RISTRA - CHANDLER

LA RISTRA

Date						
Description						
No.						
SHEE SPE SHE	ECI	FIC	AT	ION	IS	

E5.3