

ELECTRICAL SHEET INDEX

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ELECTRICAL DEMOLITION GENERAL NOTES

- REFERENCE ARCHITECTURAL DRAWINGS FOR FULL EXTENT OF DEMOLISHED WORK AND PHASING. NOTIFY ARCHITECT, ENGINEER AND OWNER, AS APPLICABLE, OF ANY CONFLICTS OR DISCREPANCIES BETWEEN DRAWINGS AND JOB SITE CONDITIONS PRIOR TO SUBMITTING BID.
- COORDINATE DEMOLITION AND REMOVAL OF EXISTING ELECTRICAL EQUIPMENT AND LIGHTING SYSTEMS WITH ARCHITECTURAL PHASING DRAWINGS AND OWNER TO ALLOW NECESSARY SYSTEMS TO REMAIN OPERATIONAL DURING CONSTRUCTION. (NOTE: NOT ALL EXISTING DEMOLISHED EQUIPMENT, LIGHT FIXTURES, DEVICES OR RACEWAYS WILL BE SHOWN ON THE DRAWINGS). COORDINATE ELECTRICAL REQUIREMENTS FOR REMODELED/RENOVATED SPACES WITH THE OWNER.
- AVOID DAMAGING FACILITIES, INCLUDING EQUIPMENT, LIGHT FIXTURES AND DEVICES THAT ARE EXISTING TO REMAIN, NEW OR REUSED. REPAIR ALL DAMAGE CAUSED DURING WORK AT NO EXTRA COST TO THE OWNER.
- DISPOSE OF ALL ELECTRICAL EQUIPMENT, LIGHT FIXTURES, AND DEVICES SHOWN TO BE REMOVED, UNLESS NOTED OTHERWISE. COORDINATE WITH THE OWNER THE ITEMS TO BE SALVAGED, AND THE LOCATION FOR STORAGE. AVOID DAMAGING SALVAGED ITEMS DURING DEMOLITION WORK AND DURING TRANSPORT TO OWNER'S DESIGNATED STORAGE LOCATION.
- WHERE ALTERATION OF ELECTRICAL EQUIPMENT, LIGHT FIXTURES, RACEWAYS OR WIRING DEVICES AFFECTS EXISTING SURFACE FINISHES: REPAIR/RESTORE AFFECTED SURFACE TO MATCH EXISTING ADJACENT SURFACE IN ACCORDANCE WITH OWNER REQUIREMENTS. MAINTAIN FIRE RATINGS OF ALL FLOOR/WALL/CILING AREAS THAT ARE AFFECTED.
- WHERE DEMOLITION WORK INTERRUPTS ELECTRICAL CONTINUITY OF CIRCUITS THAT ARE TO REMAIN IN USE, PROVIDE NECESSARY DEVICES AND RELATED CIRCUITRY TO MAINTAIN ELECTRICAL CONTINUITY IN ACCORDANCE WITH OWNER REQUIREMENTS. RECRUIT REUSED ELECTRICAL EQUIPMENT, LIGHT FIXTURES AND WIRING DEVICES PREVIOUSLY POWERED FROM DEMOLISHED EQUIPMENT TO NEW OR TEMPORARY EQUIPMENT AS NEEDED.
- COORDINATE DISCONNECTION OF POWER TO EQUIPMENT BEING DEMOLISHED/REMOVED/RELOCATED WITH OTHER TRADES PRIOR TO START OF WORK. ALL ELECTRICAL EQUIPMENT, LIGHT FIXTURES, RACEWAYS, WIRING DEVICES AND RELATED CIRCUITRY NOT BEING REUSED SHALL BE REMOVED IN ALL ACCESSIBLE AREAS AND IN FLOOR/WALL/CILING AREAS THAT ARE TO BE REMOVED, UNLESS NOTED OTHERWISE. AS ALLOWED BY OWNER, UNUSED ELECTRICAL EQUIPMENT, RACEWAYS AND RELATED CIRCUITRY THAT ARE INACCESSIBLE MAY BE ABANDONED IN PLACE AND NOT PERMANENTLY DISCONNECTED FROM ALL POWER SOURCES. INSULATED FROM CONTACT WITH OTHER LIVE ELECTRICAL WIRING/DEVICES, AND IDENTIFIED AT THE TERMINATIONS AS NO LONGER BEING IN SERVICE.
- LOW VOLTAGE CABLES/WIRING NOT BEING REUSED SHALL BE REMOVED UNLESS IDENTIFIED FOR FUTURE USE. COORDINATE REQUIREMENTS WITH OWNER. CARE SHOULD BE TAKEN DURING THE REMOVAL PROCESS TO PROTECT THE EXISTING REUSED CABLES/WIRING FROM DAMAGE.

ELECTRICAL GENERAL NOTES

- PRIOR TO SUBMITTING BID, VISIT THE JOB SITE AND BECOME FULLY ACQUAINTED WITH THE EXISTING CONDITIONS, AS APPLICABLE. REVIEW THE LANDLORD CRITERIA, SPECIFICATIONS, GENERAL NOTES AND ALL OTHER TRADE PLANS FOR ADDITIONAL REQUIREMENTS THAT MAY NOT BE CALLED OUT IN THIS PORTION OF THE CONSTRUCTION DOCUMENTS. NOTIFY ARCHITECT AND ENGINEER OF ANY CONFLICTS OR DISCREPANCIES PRIOR TO SUBMITTING BID.
- ALL WORK SHALL CONFORM TO ALL LOCAL CODES (INCLUDING THE 2014 NATIONAL ELECTRICAL CODE) AND ORDINANCES AS WELL AS APPLICABLE INDUSTRY STANDARDS. ALL EQUIPMENT SHALL BEAR LABELS FOR THE USE INTENDED BY AN AHJ ACCEPTED NATIONALLY RECOGNIZED TESTING LABORATORY, NRTL, (SUCH AS UL OR ETL). THE FINAL ELECTRICAL INSTALLATION OF THE FACILITY OCCUPIED BY TENANT SHALL BE FREE FROM ELECTRICAL DEFECTS TO THE SATISFACTION OF THE AHJ, TENANT, ARCHITECT AND ENGINEER.
- COORDINATE EXACT LOCATIONS OF ALL LIGHT FIXTURES AND ELECTRICAL DEVICES WITH ARCHITECTURAL PLANS AND OTHER TRADES PRIOR TO ROUGH-IN. ALL LIGHT FIXTURES, ELECTRICAL DEVICES AND RELATED EQUIPMENT SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. COORDINATE ALL WORK WITH OTHER TRADES AND EXISTING CONDITIONS AS REQUIRED TO PROPERLY INSTALL ALL SYSTEMS AS INTENDED WITHIN THE CONFINES OF THE SPACE AVAILABLE, AND WITHOUT INTERFERENCES.
- ELECTRICAL PLANS ARE DIAGRAMMATIC/SCHEMATIC IN NATURE AND REPRESENT THE GENERAL SCOPE OF WORK. IT IS NOT WITHIN THE SCOPE OF THE ELECTRICAL PLANS TO SHOW ALL NECESSARY RACEWAY ROUTING, BENDS, OFFSETS, PULL BOXES AND CONNECTIONS. CONTRACTOR SHALL COORDINATE THE EXACT LOCATION OF EQUIPMENT AND WIRING DEVICES WITH OTHER TRADES PRIOR TO INSTALLATION AND INSTALL ALL WORK TO CONFORM TO THE TENANT REQUIREMENTS.
- ALL CONDUIT AND CONDUCTOR LENGTHS SHOWN IN THESE DESIGN DOCUMENTS ARE INTENDED SOLELY FOR USE IN THE DESIGN CALCULATIONS BY THE DESIGN PROFESSIONAL. LENGTHS SHOWN SHALL NOT BE USED TO ASSIST IN THE BIDDING TAKEOFF PROCESS. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE MATERIAL QUANTITIES REQUIRED TO BID AND CONSTRUCT THE COMPLETE PROJECT.
- PROVIDE PROPER FIRE PROOFING AND SEALANT FOR PENETRATIONS THROUGH FIRE RATED ASSEMBLIES. THE FIRE STOPPING METHOD, MATERIAL AND ITS APPLICATION SHALL NRTL LISTED, CODE COMPLIANT AND APPROVED BY AHJ.
- PROVIDE AN INSULATED EQUIPMENT GROUNDING CONDUCTOR FOR ALL LINE-VOLTAGE CIRCUITS. PROVIDE ALL NECESSARY LINE VOLTAGE WIRING, CIRCUITRY AND CONDUITS FOR PROPER EQUIPMENT OPERATION. ALL ELECTRICAL EQUIPMENT, LIGHT FIXTURES AND DEVICES SHALL BE PROPERLY GROUNDING AND BONDED IN ACCORDANCE WITH LOCAL CODE REQUIREMENTS.
- PROVIDE DEDICATED NEUTRAL AND ISOLATED/INSULATED GROUND CONDUCTOR FOR ALL ISOLATED GROUND CIRCUITS.
- ALL 120V RECEPTACLES 50A OR LESS, 208V AND 240V RECEPTACLES 100A OR LESS, SHALL BE GFCI PROTECTED IN LOCATIONS REQUIRED BY CODE. THIS INCLUDES BATHROOMS, KITCHENS/COOKING PREP AREAS, EXTERIOR LOCATIONS AND RECEPTACLES WITHIN 6' OF A SINK. GFCI RECEPTACLES SHALL BE READILY ACCESSIBLE AND SHALL NOT BE LOCATED BEHIND STATIONARY EQUIPMENT. GFCI PROTECTION MAY BE VIA A GFCI CIRCUIT BREAKER OR GFCI RECEPTACLE, UNO, WHERE NECESSARY, GFCI PROTECTION MAY BE ACHIEVED VIA A BLANK FACE GFCI DEVICE LOCATED IN A READILY ACCESSIBLE LOCATION NEAR RECEPTACLE BEING PROTECTED.
- PROVIDE TAMPER-RESISTANT (TR), TYPE RECEPTACLES AT ALL CODE REQUIRED LOCATIONS, INCLUDING THOSE ACCESSIBLE BY CHILDREN/CUSTOMERS/PUBLIC MOUNTED LESS THAN 5'-0" AFF, UNO.
- FLEXIBLE CONDUIT IS ONLY PERMITTED FOR SHORT FINAL CONNECTIONS TO LIGHT FIXTURES AND EQUIPMENT IN LENGTHS OF 6'-0" OR LESS. FLEXIBLE CONDUIT IS NOT PERMITTED WITHIN WALLS, UNO.
- ALL EMPTY CONDUIT/RACEWAY SHALL BE INSTALLED WITH PULL STRINGS. TERMINATE CONDUIT STUB-UP WITH A BUSHING.
- CONDUITS/RACEWAYS SHALL BE CONCEALED FROM VIEW WHEREVER PRACTICABLE, UNO. ROUTE CONDUITS SERVING ROOFTOP EQUIPMENT CONCEALED INSIDE EQUIPMENT CURB AND MINIMIZE ROOF PENETRATIONS AND EXTERIOR CONDUITS RUNS WHERE PRACTICABLE. SUPPORT RACEWAY FROM STRUCTURE, NOT ROOF DECK. MAINTAIN 2" MIN SPACING FROM BOTTOM OF ROOF DECK TO PREVENT ROOFING SCREWS FROM PENETRATING RACEWAY. DO NOT ROUTE CONDUITS ACROSS SKYLIGHTS, UNO. ROUTE ALL EXPOSED NON-FLEXIBLE CONDUITS TIGHT TO STRUCTURE, PARALLEL TO BUILDING LINES AND IN STRUT OR CABLEPIPE TRAY WHERE PRACTICABLE. INSTALL CONDUITS PLUMB/LEVEL WHERE EXPOSED TO VIEW. COORDINATE RACEWAY ROUTING AND INSTALLATION WITH OTHER TRADES PRIOR TO ROUGH-IN.

DESCRIPTION	RESPONSIBILITY MATRIX						NOTES
	FURNISHED		INSTALLED				
	GC	OWNER	LL	GC	OWNER	LL	
DIVISION 26: ELECTRICAL							
PROVISIONS FOR UTILITY SERVICE INCLUDING XFMR PAD AND CONDUITS TO CONSTRUCTION LINE							
UTILITY SERVICE METER AND CT ENCLOSURE							
FIRE ALARM ANNUNCIATOR PANEL (DISPLAY) CONTROLS (TOP OF DEVICE)							
EXIT SIGNS (WALL MOUNTED)							
FIRE ALARM ANNUNCIATOR PANEL (DISPLAY) FIRE ALARM BELL (EXTERIOR) (CENTERLINE) FIRE ALARM CONTROL PANEL/UNIT (DISPLAY) INTERCOM (AREA ONLY) INTERCOMS (TOP OF DEVICE)							
REMOVAL INDICATING LIGHT (FINISHED AREAS) PHOTOCELLS							
RECEPTACLES (EXTERIOR) RECEPTACLES (GARAGES) RECEPTACLES (POOLS) RECEPTACLES (ABOVE COUNTER) 4" ABOVE BACKSPLASH/COUNTER, 40" MAX RECEPTACLES IN EQUIPMENT ROOMS							
REMOVAL INDICATING LIGHT (EQUIPMENT ROOMS) REMOTE INDICATING LIGHT (FINISHED AREAS) SAFETY SWITCHES (TOP OF DEVICE) STARTERS (TOP OF DEVICE)							
SWITCHES (TOP OF DEVICE) TELEPHONE, DATA OUTLETS TELEPHONE TERMINAL BOARD (BOTTOM) TELEVISION OUTLET BOX, UNO. ALL DEVICES SHALL BE INSTALLED IN COMPLIANCE WITH CURRENT ADA AND LOCAL REQUIREMENTS.							
VISIBLE APPLIANCES (CENTERLINE)							
INSTALL OUTLET BOXES AT THE MOUNTING HEIGHTS SHOWN ABOVE UNO IN THE CONSTRUCTION DOCUMENTS. MOUNTING HEIGHTS LISTED ABOVE, OR ELSEWHERE IN THE CONSTRUCTION DOCUMENTS, ARE AFF OR AFG TO BOTTOM OF OUTLET BOX, UNO. ALL DEVICES SHALL BE INSTALLED IN COMPLIANCE WITH CURRENT ADA AND LOCAL REQUIREMENTS.							
ANNOTATION							
MECHANICAL OR FIRE PROTECTION PLAN NOTE CALLOUT							
PLUMBING PLAN NOTE CALLOUT							
ELECTRICAL OR FIRE ALARM PLAN NOTE CALLOUT							
TECHNOLOGY PLAN CALLOUT							
PLUMBING EQUIPMENT DESIGNATION (CONTRACTOR FURNISHED AND INSTALLED). REFER TO PLUMBING FIXTURE OR EQUIPMENT SCHEDULES							
EQUIPMENT DESIGNATION (OWNER FURNISHED, CONTRACTOR INSTALLED)							
EQUIPMENT DESIGNATION (CONTRACTOR FURNISHED AND INSTALLED UNLESS NOTED OTHERWISE)							
MECHANICAL EQUIPMENT DESIGNATION (CONTRACTOR FURNISHED AND INSTALLED UNLESS NOTED OTHERWISE)							
CONNECTION POINT OF NEW WORK TO EXISTING							
DETAIL REFERENCE UPPER NUMBER INDICATES DETAIL NUMBER LOWER NUMBER INDICATES SHEET NUMBER							
SECTION CUT DESIGNATION							
ABBREVIATIONS							
AF AMPERE FUSE SIZE	MCC MOTOR CONTROL CENTER						
AFC ABOVE FINISHED CEILING	MFR MANUFACTURER						
AFF ABOVE FINISHED FLOOR	MIN MINIMUM						
AG ABOVE GRADE	MJL MAKE-UP AIR UNIT						
AHJ AUTHORITY HAVING JURISDICTION	MLV MAGNETIC LOW-VOLTAGE						
AHU AIR HANDLING UNIT	MOCP MAXIMUM OVERCURRENT PROTECTION						
AIC AMPERE INTERRUPTING CAPACITY	MTD MOUNTED						
AS AMPERE SWITCH SIZE	NA NOT APPLICABLE						
AT AMPERE TRIP SETTING	NF NON-FUSED						
ATS AUTOMATIC TRANSFER SWITCH	NL NIGHT LIGHT (24HR ON)						
AV AUDIO VISUAL	NRTL NATIONALLY RECOGNIZED TESTING LABORATORY (CSA, ETL, NSF, UL)						
BAS BUILDING AUTOMATION SYSTEM	NTS NOT TO SCALE						
BKR BREAKER	OS OCCUPANCY SENSOR						
C CONDUIT	P POLE						
CAT CATEGORY	PART PARTIAL CIRCUIT						
CATV CABLE TELEVISION SYSTEM	PNL PANEL						
CCTV CLOSED CIRCUIT TELEVISION CAMERA	PNLBD PANELBOARD						
CD CANCEL	PROVIDE FURNISH AND INSTALL POTENTIAL TRANSFORMER						
CKT CIRCUIT	QTY QUANTITY						
CODE APPLICABLE CODE	R/REL RECEPTACLE						
CT CENTER	R/REL RUNNING LOAD AMPS						
CTR CENTER	R/RTD RUNNIN LOAD AMPS						
CVD CUMULATIVE VOLTAGE DROP	R/SCCR SHORT-CIRCUIT CURRENT RATING						
DD DEMOLITION	SD SMOKE DUCT DETECTOR						
DPDT DOUBLE-POLE DOUBLE-THROW	SF SQUARE FEET						
DPST DOUBLE-POLE, SINGLE-THROW	SPDT SINGLE-POLE DOUBLE-THROW						
E/ETREX EXISTING TO REMAIN	SPST SINGLE-POLE						
EC ELECTRICAL CONTRACTOR	SSBJ SUPPLY SIDE BONDING JUMPER						
EF EXHAUST FAN	ST SHUNT TRIP						
EM EMERGENCY	SWBD SWITCHBOARD						
EMS ENERGY MANAGEMENT SYSTEM	SWGR SWITCHGEAR						
ELV ELECTRONIC LOW-VOLTAGE	TBB TELECOMMUNICATIONS						
EWC ELECTRIC WATER COOLER	TBD TO BE DETERMINED						
FAAP FIRE ALARM ANNUNCIATOR PANEL	TGB TELECOMMUNICATIONS AVAILABLE						
FACP FIRE ALARM CONTROL PANEL AVAILABLE	TL TWISTLOCK						
FCU FAN COIL UNIT	TMBG TELECOMMUNICATIONS MARK GROUND BUS BAR						
FF FINISHED FLOOR	TYP TYPICAL						
FLA FULL LOAD AMPS	UF UNDERFLOOR						
FLR FLOOR	UG UNDERGROUND						
GC GENERAL CONTRACTOR	U/S UNDERSLAB						
GEQ GROUNDING ELECTRODE CONDUCTOR	UH UNIT HEATER						
GES GROUNDING ELECTRODE SYSTEM	UNO UNLESS NOTED OTHERWISE						
GFR GROUND FAULT RELAY	UPS UNINTERRUPTIBLE POWER SUPPLY						
GS GROUND	VD VOLTAGE DROP						
IS SHORT CIRCUIT CURRENT	VFD VARIABLE FREQUENCY DRIVE						
J/B-BOX JUNCTION BOX	VS VACANCY SENSOR						
LF LINEAR FEET	W WIRE						
LRA LOCKED ROTOR AMPS	WI WITHIN UNIT						
LTL/LTLS LIGHTING FIXTURES	WP WEATHER PROOF						
MAU MAKE-UP AIR UNIT	WR WEATHER RESISTANT						
MAX MAXIMUM	WT WATER TIGHT						
MCA MINIMUM CIRCUIT AMPACITY	XP EXPLOSION PROOF						
MCS MAIN CIRCUIT BREAKER							

SUBMITTAL MATRIX							
SUBMITTAL DESCRIPTION	REQUIRED REVIEW TIME (BUSINESS DAYS)	ARCHITECT OF RECORD	SHAKE SHACK	COMMISSIONING AGENT	PHYSICAL SAMPLE REQUIRED	SUBMITTAL FOR RECORD	SUBMITTAL FOR RECORD ONLY
Electrical Distribution Equipment	5						
Light Fixtures (Submitted by Vendor directly to AOR/EOR prior to construction)	5						
Lighting Controls (Submitted by Vendor directly to AOR/EOR prior to construction)	5						
MEP Tests, Start-Up, and Programming Reports	5						

Table 3.2

ELECTRICAL SYSTEM COMPONENTS EARTHQUAKE LOAD RESISTANCE

Occupancy Category ()	Anchorage to Floors, Roofs, Etc. (See Note 1 below)				Sway Bracing (See Note 1 below)		Location of Professionally Sealed Anchorage and Sway Bracing Details		Comments
	Not Provided For Project		Provided For Project		On Const. Documents Drawing No. or Spec. Section	Subsequent Submittal Separate Permit & Plans (See Note 2 below)			
FIRE PROTECTION, DETECTION & ALARM EQUIPMENT, & SYSTEM COMPONENTS: * See Chapter 4, Table 4.1 (List items such as fire alarm panels, electric conductors powering fire protection equipment, etc.)									
EMERGENCY OR STANDBY EQUIP. AND SYSTEM COMPONENTS: * See Chapter 4, Table 4.1 (List items such as emergency generators, panel boards, single hanger and trapeze supported system components, bus-ducts, primary cable systems, motors control centers and devices, switch-gears, transformers, unit substations, cable tray, conduit, lighting fixtures, etc.)									
OTHER EQUIPMENT & SYSTEM COMPONENTS NEEDED FOR CONTINUED OPERATION OF OCCUPANCY CATEGORY IV FACILITIES OR WHOSE FAILURE COULD IMPAIR THEIR CONTINUED OPERATION * See Chapter 4, Table 4.1 (List items) OTHER GENERAL EQUIPMENT & SYSTEM COMPONENTS (list items such as panel boards, single hanger & trapeze supported system components, communication systems, electrical bus ducts, primary cable systems, electrical motor control centers, motor control devices, switchgear, transformers, unit substations, cable tray, conduit, lighting fixtures, etc.)									

- It is the basic intent of this Code Block to declare whether or not anchorage and sway bracing is being provided on the project. If so, to declare whether or not the details are shown on the plans or will be shown on a subsequent submittal. If seismic restraint of a component is not required by code this should be stated in comments. If seismic restraint, which is not required by code, is being provided due to owner/designer requirements this should also be stated in the comments.
- Plans signed and sealed by a Missouri Professional Engineer along with a separate permit application need to be submitted to the County a minimum of two weeks prior to the planned installation to allow for plan review and distribution to the inspector. Additional time may be needed if such submissions are deficient.

ELECTRICAL SYMBOLS

THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS OR ABBREVIATIONS ARE USED.

STANDARD MOUNTING HEIGHTS

CIRCUITING & WIRING

ELECTRICAL ONE-LINE & RISER DIAGRAM

BRANCH CIRCUIT CONDUCTOR TABLE

BOXES, LIGHTING CONTROL & WIRING DEVICES

LIGHTING

POWER EQUIPMENT & DEVICES

SIGNALING

ABBREVIATIONS

LINE TYPE LEGEND

THROUGHOUT THE DRAWINGS DIFFERENT LINE TYPES ARE USED IN COMBINATION WITH THE SYMBOLS TO INDICATE THE STATUS OF ITEMS AS EXISTING, TO BE DEMOLISHED, TO BE INCLUDED AS PART OF NEW WORK AND/OR ITEMS WHICH ARE ANTICIPATED TO BE PROVIDED IN THE FUTURE. THE STATUS OF ITEMS USING THESE LINE TYPES ARE RELATIVE TO THE VIEW IN WHICH THEY APPEAR. PHASING SHOWN IN DRAWINGS IS NOT INTENDED TO FULLY DESCRIBE ALL NECESSARY CONSTRUCTION PHASING, WHICH IS DETERMINED BY THE CONTRACTOR AS PART OF THEIR RESPONSIBILITIES. ANY SUCH PHASING DESCRIBED IN THE CONSTRUCTION DOCUMENTS ARE GENERAL AND ONLY INTENDED TO INDICATE A BROAD ORDER FOR THE SAME OF DESCRIBING THE PROJECT. THE FOLLOWING LINE TYPES MAY BE USED ON ANY DEVICE, EQUIPMENT, NOTE, LINE, SHAPE, ETC.

EXISTING _____ NEW _____
DEMOLISH - - - - - FUTURE - - - - -

REFER TO LIGHTING CONTROL DEVICE SCHEDULE FOR MORE INFORMATION.

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WWW.HENDERSONENGINEERS.COM
205003215
EXPIRES 12/31/2021

SEAL/SIGNATURE:

10/18/2021
DEAN W. CHANDLER
LICENSE # PE-2017036652

NO.	BY	DATE	DESCRIPTION
B		2021-10-18	ISSUE FOR CONSTRUCTION
C		2021-06-10	ADDENDUM # 8
A		2021-05-25	ADDENDUM A
		2021-03-15	BID/PERMIT SET
		2021-02-23	75% SET
		2020-11-16	DD SET

SHAKE SHACK - CHESTERFIELD MO

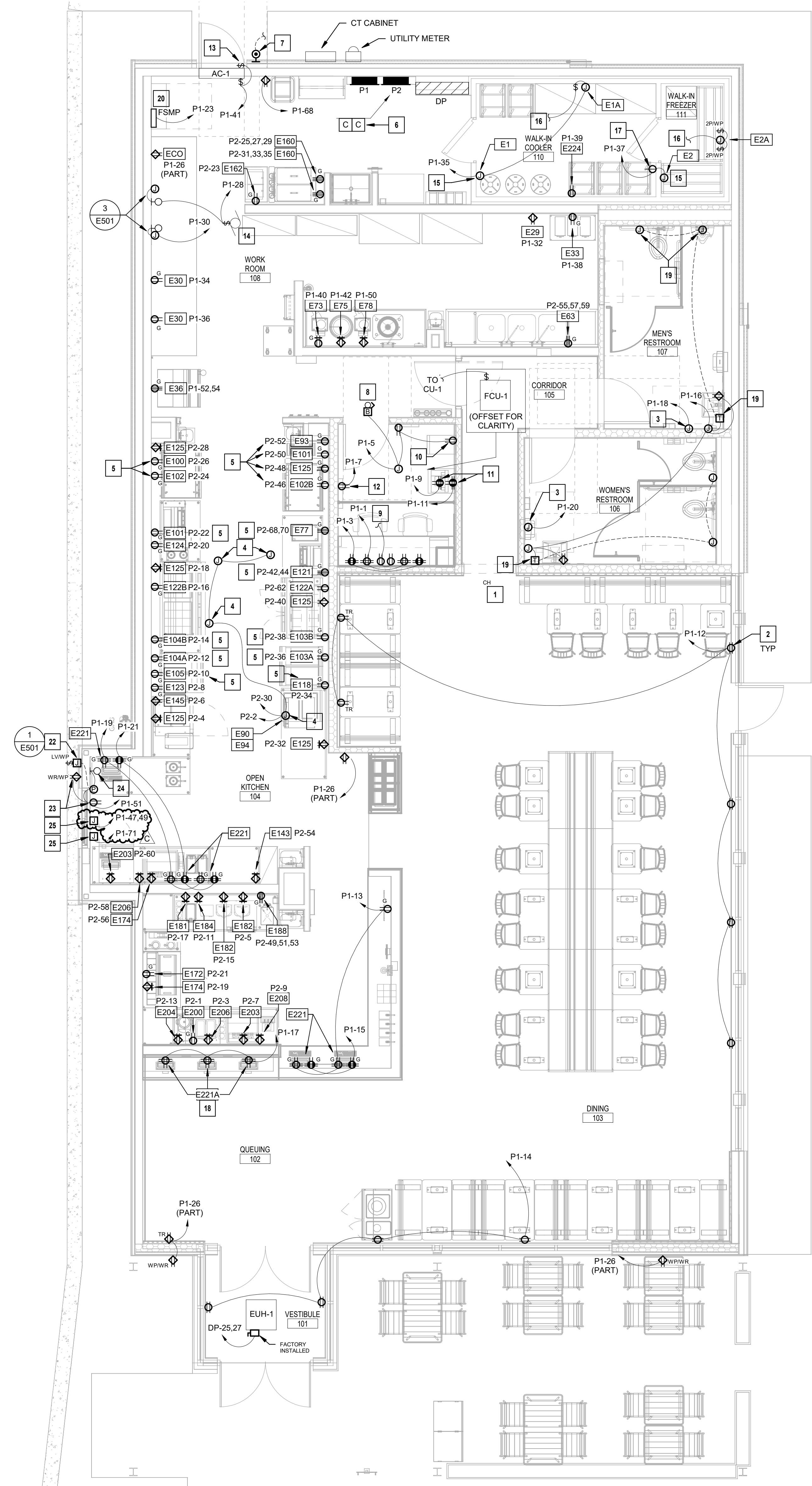
17312 CHESTERFIELD AIRPORT ROAD
CHESTERFIELD, MO 63005
SHACK #1352

PERMIT SET

ELECTRICAL GENERAL INFORMATION

DRAWN BY: ELT
CHECKED BY: BLM
JOB NO: 20087.00

E001



Ⓢ ELECTRICAL POWER PLAN
1/4" = 1'-0"

GENERAL POWER NOTES:

- REFER TO KITCHEN EQUIPMENT CONSULTANT DRAWINGS FOR EXACT ROUGH-IN LOCATIONS, MOUNTING HEIGHTS AND ADDITIONAL REQUIREMENTS FOR ALL EQUIPMENT TAGS SHOWN ON THIS SHEET. INCLUDING KITCHEN EQUIPMENT CONNECTIONS, KDS EQUIPMENT AND POS OUTLET LOCATIONS.
- REFER TO ELECTRICAL KITCHEN EQUIPMENT CONNECTION SCHEDULE, SHEET E602 FOR EQUIPMENT CONNECTION INFORMATION FOR ALL EQUIPMENT WITH TAGS SHOWN IN RECTANGLES ON THIS SHEET.
- REFER TO SHEET E102 FOR LOW VOLTAGE SYSTEMS, CABLING, AND CONDUIT REQUIREMENTS.
- ALL EXPOSED POWER AND COMMUNICATION DATA CONDUIT SHALL BE RIGID TYPE CONDUIT AND ROUTED PARALLEL TO BUILDING LINES. INSTALL ALL CONDUITS PLUMB AND LEVEL WHERE EXPOSED TO VIEW.
- ALL 120V RECEPTACLES 50A OR LESS, 208V AND 240V RECEPTACLES 100A OR LESS, SHALL BE GFCI PROTECTED IN LOCATIONS REQUIRED BY CODE. THIS INCLUDES BATHROOMS, KITCHENS/FOOD PREP AREAS, EXTERIOR LOCATIONS AND RECEPTACLES WITHIN 6' OF A SINK. GFCI RECEPTACLES SHALL BE READILY ACCESSIBLE AND SHALL NOT BE LOCATED BEHIND STATIONARY EQUIPMENT. GFCI PROTECTION MAY BE VIA A GFCI CIRCUIT BREAKER OR GFCI RECEPTACLE, UNO WHERE NECESSARY, GFCI PROTECTION MAY BE ACHIEVED VIA A SINK FACE GFCI DEVICE LOCATED IN A READILY ACCESSIBLE LOCATION NEAR RECEPTACLE BEING PROTECTED.
- INSTALL CONDUITS FOR WALK-IN COOLER/FREEZER LIGHTS AND EVAPORATOR COILS ABOVE THE WALK-IN BOXES AND CONNECT TO EACH DEVICE FROM ABOVE. SEAL CONDUIT PENETRATIONS WITH SILICON SEALANT AND SEAL-OFF INTERIOR OF CONDUITS WITH EXPANDING FOAM SEALANT.

ELECTRICAL POWER PLAN NOTES:

- PROVIDE RECESSED CLOCK RECEPTACLE FOR INTERIOR ILLUMINATED DECOR SIGNAGE. REFER TO INTERIOR SIGNAGE SHEET A2101 FOR EXACT LOCATION AND MOUNTING HEIGHT. CONNECT TO LUTRON VIVE CONTROLLER DESIGNATED FOR INTERIOR SIGNAGE. REFER TO SHEET E120 FOR MORE INFORMATION.
- PROVIDE RECEPTACLE WITHIN 18" OF TOP OF WINDOW FOR EACH 12' LINEAR FEET OF WINDOW IN ACCORDANCE WITH NEC 210.62. MOUNT RECEPTACLE ON WALL OR CEILING AS APPLICABLE. COORDINATE EXACT LOCATION WITH OTHER TRADES PRIOR TO ROUGH-IN. CONNECT TO LUTRON VIVE CONTROLLER DESIGNATED FOR INTERIOR SIGNAGE. REFER TO SHEET E120 FOR MORE INFORMATION.
- PROVIDE CONNECTION TO ELECTRIC HAND DRYER. COORDINATE FINAL HAND DRYER LOCATION AND REQUIREMENTS WITH ARCHITECTURAL DRAWINGS, OWNER AND MANUFACTURER'S RECOMMENDATIONS PRIOR TO ROUGH-IN.
- PROVIDE CONNECTION TO KITCHEN EXHAUST HOOD CONTROL PANEL. REFERENCE MANUFACTURER'S WIRING DIAGRAMS FOR CONNECTIONS TO: HOOD LIGHTS AND CONTROLS, EXHAUST AND SUPPLY FANS, GAS SOLENOID SHUTOFF, SHUNT TRIP CIRCUIT BREAKERS AND HOOD FIRE SUPPRESSION SYSTEM.
- ROUTE COOK LINE RECEPTACLE CIRCUITS THROUGH SHUNT TRIP CONTACTOR NEAR PANELBOARDS. SEE NOTE 6.
- PROVIDE (2) SQUARE D 8903 SERIES, OR EQUIVALENT, ELECTRICALLY HELD, NORMALLY CLOSED, 20A RATED CONTACTS WITH 120V CONTROL COILS IN AN ENCLOSURE ABOVE CEILING. CONNECT CONTACTOR COILS TO SHUNT TRIP TERMINALS IN HOOD CONTROL PANEL FOR AUTOMATIC SHUT-DOWN OF COOK LINE RECEPTACLE CIRCUITS ON FIRE CONDITION. LABEL CONTACTOR ENCLOSURE "SHUNT TRIP CONTACTORS".
- PROVIDE WEATHERPROOF PUSHBUTTON FOR DELIVERIES. COORDINATE LOCATION WITH OWNER AND ARCHITECT AND CONNECT PUSHBUTTON TO LOW VOLTAGE TRANSFORMER AND BELL OUTSIDE OF MANAGER'S OFFICE.
- PROVIDE LOW VOLTAGE TRANSFORMER AND BELL ABOVE DOOR. CONNECT TO PUSHBUTTON AT RECEIVING DOOR.
- PROVIDE RECEPTACLES FOR UNDER-CABINET LIGHTS INSTALLED IMMEDIATELY BELOW LOWEST SHELF. CONNECT TO ROOM LIGHTING CIRCUIT DOWNSTREAM OF OCCUPANCY SENSOR FOR CONTROL. REFER TO OFFICE ELEVATIONS ON SHEET A401 FOR LOCATIONS AND MOUNTING HEIGHTS.
- PROVIDE RECEPTACLE AT 48" AFF AND ALIGNED WITH ADJACENT DATA OUTLET FOR PRINTER ON SAFE. REFER TO OFFICE ELEVATIONS ON SHEET A401 FOR LOCATION.
- PROVIDE (2) DOUBLE DUPLEX IG RECEPTACLES STACKED VERTICALLY FOR THE IT RACK AT +72" AND +87". SEE OFFICE ELEVATIONS ON SHEET A401.
- PROVIDE RECEPTACLE +72" AND ALIGNED WITH ADJACENT DATA OUTLET FOR SECURITY ALARM PANEL. REFER TO OFFICE ELEVATIONS ON SHEET A401 FOR LOCATION.
- PROVIDE DOOR SWITCH AND INTERLOCK WITH AIR CURTAIN FOR ON/OFF CONTROL. PROVIDE WITH SINGLE POLE TOGGLE SWITCH FOR LOCAL DISCONNECT. AIR CURTAIN SHALL OPERATE WHEN DOOR IS OPEN. REFER TO AIR CURTAIN SCHEDULE ON SHEET M601 FOR MORE INFORMATION.
- PROVIDE CONNECTIONS TO HOT WATER RECIRCULATION PUMP AND RELATED EQUIPMENT INCLUDING, MALFUNCTION INDICATOR LIGHTS, AQUASTATS AND TIME SWITCH FURNISHED BY PLUMBING CONTRACTOR.
- PROVIDE CONNECTION TO JUNCTION BOX ON WALK-IN COOLER/FREEZER FOR LIGHTS, DOOR HEATER, AND VENT HEATER AS REQUIRED. INSTALL LIGHT FIXTURES SHIPPED LOOSE WITH COOLER/FREEZER AND CONNECT COMPLETE.
- COORDINATE INTERCONNECTION AND CONTROL CABLING REQUIREMENTS BETWEEN CONDENSER AND EVAPORATOR WITH EQUIPMENT SUPPLIER.
- PROVIDE SIMPLEX RECEPTACLE IN WEATHERPROOF CAST ALUMINUM BOX FOR WALK-IN FREEZER CONDENSATE PIPING HEAT TAPE. COORDINATE EXACT LOCATION WITH PLUMBING CONTRACTOR.
- INSTALL RECEPTACLES FOR KIOSKS CONCEALED IN ACCESSIBLE COMPARTMENT BELOW COUNTER. COORDINATE INSTALLATION REQUIREMENTS WITH ARCHITECT PRIOR TO ROUGH-IN.
- PROVIDE CONNECTION TO HANDS FREE PLUMBING FIXTURE SENSORS AND LOW VOLTAGE TRANSFORMERS. LOCATE LOW VOLTAGE TRANSFORMER AND AN ACCESSIBLE LOCATION AND PROVIDE ACCESS PANEL. IF REQUIRED, COORDINATE LOCATION AND ELECTRICAL REQUIREMENTS WITH PLUMBING CONTRACTOR AND OWNER PRIOR TO ROUGH-IN. PROVIDE JUNCTION BOXES AND INTERCONNECTING CONDUIT BETWEEN LOW VOLTAGE TRANSFORMERS AND SENSORS AS REQUIRED. CONCEAL DEVICES AND RELATED CONDUIT FROM CUSTOMER VIEW.
- PROVIDE CONNECTION TO FIRE SPRINKLER SYSTEM MONITORING PANEL. COORDINATE EXACT LOCATION AND REQUIREMENTS WITH FIRE SPRINKLER SYSTEM SUBMITTAL DRAWINGS AND FIRE SPRINKLER SYSTEM INSTALLER.
- PROVIDE CONNECTION TO PICKUP WINDOW AIR CURTAIN. COORDINATE REQUIREMENTS WITH MANUFACTURER AND ARCHITECT PRIOR TO ROUGH-IN.
- PROVIDE EXTERIOR LOW VOLTAGE VEHICLE SENSOR SWITCH, POWER SUPPLY, AND NOTIFICATION LIGHT FOR PICKUP WINDOW NOTIFICATION SYSTEM. REFER TO DETAIL 1, SHEET E501.
- PROVIDE RECEPTACLES +96" AFF FOR FUTURE INTERIOR AND EXTERIOR DIGITAL DISPLAYS. COORDINATE EXACT LOCATIONS WITH SHAKE SHACK CONSTRUCTION MANAGER PRIOR TO ROUGH-IN.
- PICKUP WINDOW NOTIFICATION LIGHT. COORDINATE EXACT LOCATION WITH ARCHITECT PRIOR TO ROUGH-IN. REFER TO SHEETS E120 AND E20 FOR MORE INFORMATION.
- PROVIDE CONNECTION TO AUTOMATIC PICKUP WINDOW.

NOTE:
REFER TO KITCHEN EQUIPMENT ELECTRICAL ROUGH-IN PLAN, SHEET KE101, FOR DIMENSIONED ROUGH-IN LOCATIONS, MOUNTING HEIGHTS, AND ADDITIONAL REQUIREMENTS FOR ALL DEVICE TAGS SHOWN ON THIS SHEET, INCLUDING KITCHEN EQUIPMENT POWER AND LOW VOLTAGE OUTLET LOCATIONS.

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SEALED SIGNATURE:

10/18/2021
DEAN W. CHANDLER
LICENSE # PE-2017036652

NO.	BY	DATE	DESCRIPTION
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		2021-03-15	BID/PERMIT SET
		2021-02-23	75% SET
		2020-11-16	DD SET



SHAKE SHACK -
CHESTERFIELD MO

17312 CHESTERFIELD AIRPORT ROAD
CHESTERFIELD, MO 63005
SHACK #1352

PERMIT SET

ELECTRICAL POWER
PLAN

DRAWN BY: ELT
CHECKED BY: BLM
JOB NO: 20087.00

E101

C	2021-10-18	ISSUE FOR CONSTRUCTION
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SHAKE SHACK -
 CHESTERFIELD MO

17312 CHESTERFIELD AIRPORT ROAD
 CHESTERFIELD, MO 63005
 SHACK #1352

PERMIT SET

LOW VOLTAGE SYSTEMS
 PLAN

DRAWN BY: ELT
 CHECKED BY: BLM
 JOB NO: 20087.00

E102

CAMERA WIRING LEGEND					
SYMBOL	CABLE REQUIREMENTS			ADDITIONAL INFORMATION	NOTES
	TYPE	QTY	ORIGIN		
	1	CAT 5E	IT RACK		

GENERAL NOTES:
 A. VERIFY FINAL LOCATIONS AND AIMING OF ALL CAMERAS WITH TENANT.
 B. PROVIDE SERVICE LOOPS SPOOLED AND HUNG NEATLY AT BOTH ENDS OF EACH CABLE 15'-0" AT CAMERA LOCATION AND 5'-0" AT THE IT RACK.
 C. SUSPENDED INTERIOR CAMERAS TO 10'-0" AFF IN AREAS OPEN TO STRUCTURE.
 D. INSTALL EXTERIOR CAMERAS AT 11'-0" AFG UNLESS NOTED OTHERWISE.
 E. PROVIDE WP JUNCTION BOX WITH 3/4" CONDUIT STUBBED INTO TENANT SPACE FOR ALL EXTERIOR CAMERAS.

LOW VOLTAGE DEVICE COLOR SCHEDULE		
AREA	CAMERAS	SPEAKERS
BACK OF HOUSE/KITCHEN (WHITE CEILING)	WHITE	WHITE
FRONT OF HOUSE/DINING (LIGHT CEILING)	WHITE	WHITE
EXTERIOR/PATIO	BLACK	BLACK

GENERAL NOTES:
 A. EXPOSED LOW VOLTAGE CABLING SHALL MATCH THE DEVICE COLORS SPECIFIED ABOVE.

LOW VOLTAGE OUTLET LEGEND					
SYMBOL	CABLE REQUIREMENTS			ADDITIONAL INFORMATION	NOTES
	TYPE	QTY	ORIGIN		
174	2	CAT 5E	IT RACK	+60" AFF FOR ITEM #174 KDS	1
208	2	CAT 5E	IT RACK	+60" AFF FOR ITEM #208 KDS	1
CPU	4	CAT 5E	IT RACK	+18" AFF FOR WORKSTATION	3
HOOD	1	CAT 5E	IT RACK	IN HOOD CONTROL CABINET	
KDS	2	CAT 5E	IT RACK	+60" AFF FOR KDS SYSTEM	1
KVM	2	CAT 5E	IT RACK	+42" AFF FOR KVM SWITCH	3
KIOSK	2	CAT 5E	IT RACK	+26" AFF FOR KIOSK	3
PAGER	2	CAT 5E	IT RACK	+26" AFF FOR PAGER SYSTEM	2
POS	4	CAT 5E	IT RACK	+26" AFF FOR POS SYSTEM	2
PRINT	2	CAT 5E	IT RACK	+48" FOR PRINTER ON SAFE	3
REF	1	CAT 5E	IT RACK	AT EVAPORATOR FOR MONITORING	
RTI	-	-	-	AS NOTED FOR RTI SYSTEM	6
SEC	1	CAT 5E	IT RACK	+72" FOR SECURITY ALARM PANEL	3
VIVE	1	CAT 5E	IT RACK	AT CEILING FOR LUTRON VIVE	3
VOL	1	CAT 5E	IT RACK	+48" FOR VOLUME CONTROL	3
WAP	2	CAT 5E	IT RACK	AT CEILING FOR WIRELESS	5

GENERAL NOTES:
 A. PROVIDE 4" SQUARE BOX WITH SINGLE GANG PLASTER RING AND 3/4" EMT TO ACCESSIBLE CEILING AREA FOR ALL LOW VOLTAGE WALL OUTLETS UNO.
 B. PROVIDE 4" OCTAGON BOX FOR ALL LOW VOLTAGE CEILING OUTLETS UNO.

SCHEDULED NOTES:
 1. REFER TO KITCHEN EQUIPMENT ROUGH-IN PLANS FOR EXACT LOCATION AND MOUNTING HEIGHTS OF LOW VOLTAGE OUTLETS FOR KITCHEN DATA SYSTEM.
 2. LOW VOLTAGE OUTLET TO BE INSTALLED IN KITCHEN OVERSHELF ABOVE CHEF'S COUNTER. REFER TO KEC SHOP DRAWINGS FOR OUTLET LOCATIONS. PROVIDE 15" OF EXCESS CABLE FOR ALL DATA OUTLETS IN OVERSHELF.
 3. REFER TO ARCHITECTURAL INTERIOR ELEVATIONS FOR EXACT LOCATION AND MOUNTING HEIGHTS OF LOW VOLTAGE OUTLETS FOR OFFICE EQUIPMENT AND TELEVISIONS.
 4. PROVIDE DATA OUTLET AT STRUCTURE ABOVE FOR CEILING MOUNTED TELEVISION. ROUTE CABLES CONCEALED DOWN INSIDE OF TELEVISION SUPPORT TUBE TO TELEVISION.
 5. PROVIDE DATA OUTLET FOR WIRELESS ACCESS POINT AT SAME ELEVATION AS LIGHTING FIXTURES.
 6. CABLING PROVIDED BY OWNER'S VENDOR. PROVIDE OUTLET BOX WITH BLANK COVER PLATE, CONDUIT, AND PULL STRING TO ACCESSIBLE CEILING AREA PER GENERAL NOTE 'A'.

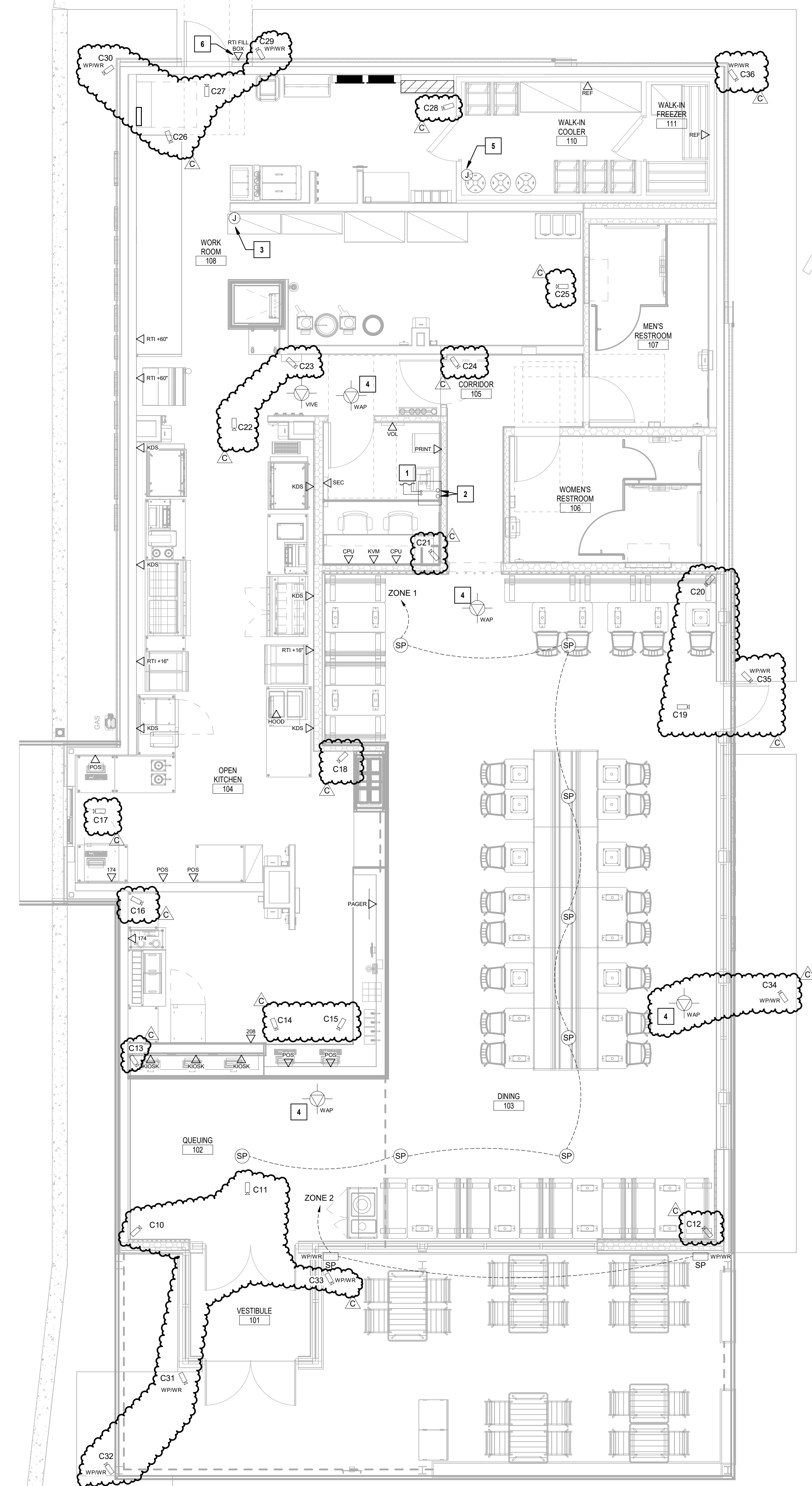
GENERAL LOW VOLTAGE SYSTEMS NOTES:

- REFER TO ARCHITECTURAL PLAN FOR RESPONSIBILITY SCHEDULE
- FURNISH AND INSTALL (PULL) ALL CABLE, NO TERMINATIONS REQUIRED
- ALL LOW VOLTAGE CABLES TO BE CAT5E PLENUM-RATED. CABLE SHOULD NOT BE IN CONDUIT UNLESS REQUIRED BY CODE
- ALL SPEAKER WIRE TO BE 16-GAUGE AWG. CABLE SHOULD NOT BE IN CONDUIT UNLESS REQUIRED BY CODE.
- PROVIDE BACK BOXES AND STUB UPS TO ABOVE THE CEILING FOR EACH DATA LOCATION
- ALL DATA CABLES TO BE HOME RUNS FROM THE DEVICE TO THE MANAGER'S OFFICE, WITH THE EXCEPTION OF SPEAKERS THAT SHOULD BE DAISY-CHAINED TOGETHER AS SHOWN ON THE PLAN.
- PROVIDE SERVICE LOOPS SPOOLED AND HUNG NEATLY AT BOTH ENDS OF EACH CABLE: 3'-0" AT THE FINAL DEVICE HEIGHT AND 5'-0" AT THE IT RACK, UNLESS NOTED OTHERWISE
- ALL LOW VOLTAGE CABLES TO BE TAGGED AND CLEARLY LABELED ON BOTH ENDS WITH A P-TOUCH OR OTHER PRINTED LABEL
- GENERAL CONTRACTOR RESPONSIBLE FOR COORDINATING CONDUIT/ INFRASTRUCTURE WORK FOR PATHWAYS FROM BASE BUILDING IT CLOSET TO SHAKE SHACK'S MANAGER OFFICE.
- REFER TO MECHANICAL DRAWINGS FOR LOCATIONS OF ALL THERMOSTATS, TEMPERATURE, AND HUMIDITY SENSORS. PROVIDE CONDUIT AND BACK BOX SIZE AS REQUIRED FOR ALL HVAC CONTROLS. CONDUIT FOR LOW VOLTAGE CONTROLS SHALL TERMINATE AT STRUCTURE ABOVE WITH BUSHING. CONDUIT SYSTEM FOR LINE VOLTAGE CONTROLS SHALL ROUTE CONTINUOUS TO EQUIPMENT SERVICE.
- PROVIDE (1) 3/4" SLEEVE FOR EACH EXTERIOR DEVICE TO INSIDE OF SPACE
- PROVIDE (1) 1" EMT CONDUIT FROM ABOVE THE IT RACK TO ROOF FOR SATELLITE DISH, IF REQUIRED. VERIFY WITH SHAKE SHACK IF REQUIRED.
- PROVIDE ALL EMPTY CONDUITS WITH PULL STRINGS.
- CONSULT DOCUMENTATION FOR FINAL INSTALLATION REQUIREMENTS. VERIFY WITH ARCHITECT AND SHAKE SHACK FOR CONFLICTS.
- PROVIDE CONDUIT, BUSHINGS, SLEEVES, AND PROTECTIVE GROMMETS FOR ALL DATA CABLING AS REQUIRED.
- PROVIDE ALL-THREAD AT EACH CAMERA AND SPEAKER LOCATION SHOWN ON PLAN FROM CEILING DECK TO 1'-0" BELOW LIGHT TRACK HEIGHT (REFER TO ARCHITECTURAL PLANS FOR LIGHT TRACK HEIGHT) AT CAMERA LOCATIONS. PROVIDE (1) 4" ROUND / OCTAGON JUNCTION BOX ATTACHED TO BOTTOM OF ALL-THREAD.

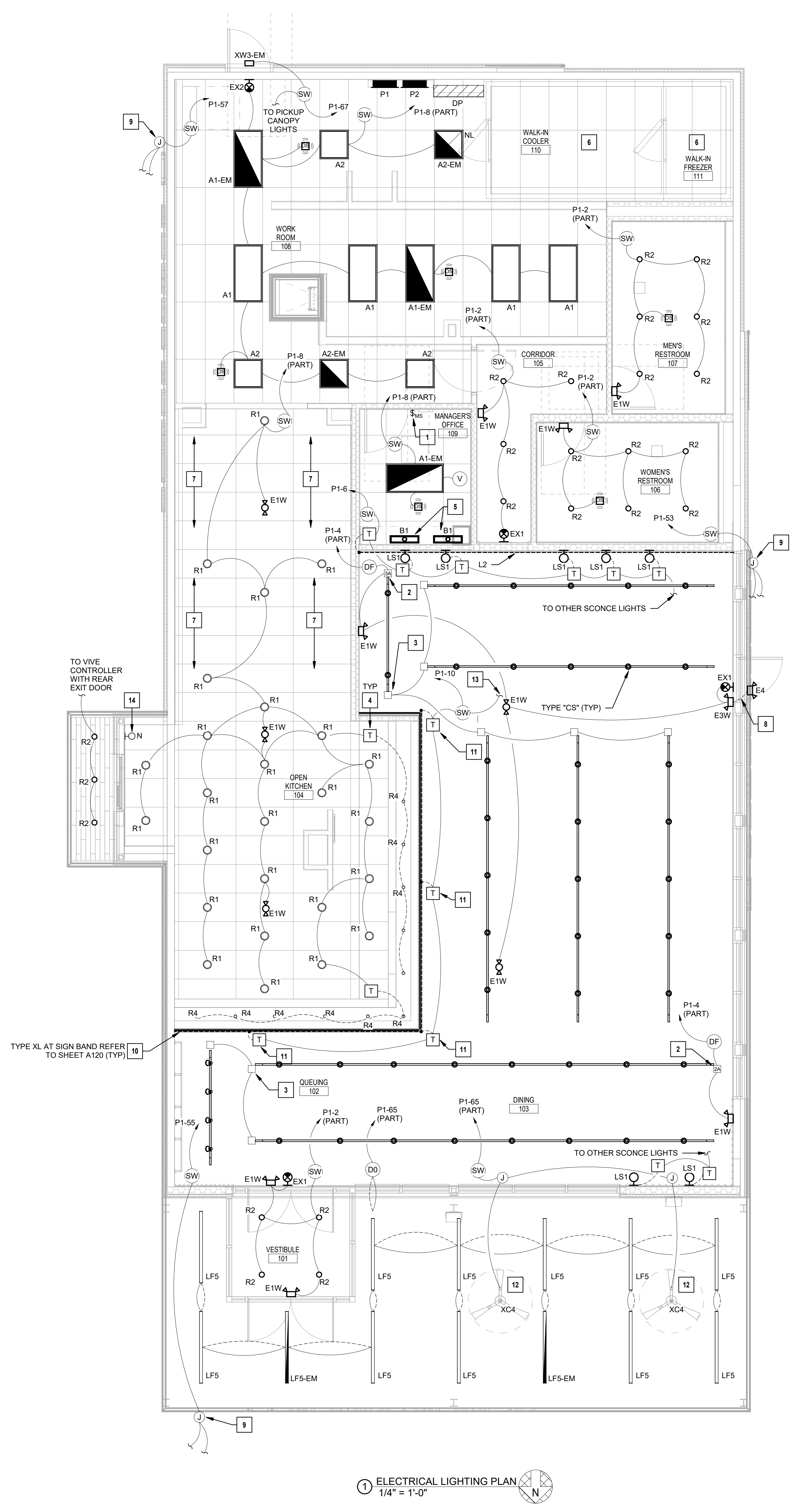
LOW VOLTAGE SYSTEMS PLAN NOTES:

- PROVIDE (2) 2" CONDUITS FOR TELEPHONE AND CABLE TV FROM UTILITY POINT OF CONNECTION AT UTILITY POLE OR PEDESTAL TO MANAGER'S OFFICE.
- PROVIDE (2) 3" CONDUITS ABOVE THE IT RACK TO ABOVE THE CEILING FOR CABLE MANAGEMENT. ROUTE ALL DATA CABLES THROUGH ONE OF THE 3" CONDUITS AND ALL OTHER CABLES THROUGH THE OTHER 3" CONDUITS. PROVIDE SLEEVES THROUGH WALL ABOVE CEILING AT FULL-HEIGHT WALLS.
- PROVIDE FLUSH MOUNT OCTAGON BOX AT 48" AFF WITH 1" CONDUIT ABOVE ACCESSIBLE CEILING FOR HOOD FIRE SUPPRESSION SYSTEM CONTRACTOR. REFER TO PLANS FOR LOCATION.
- PROVIDE JUNCTION BOX SURFACE MOUNTED INSIDE THE WALK-IN COOLER AT 6" AFF FOR ALARM PANIC BUTTON. ROUTE 3/4" EMT WITH PULL-WIRE TO ABOVE CEILING IN THE MANAGER'S OFFICE FOR ALARM CABLING BY OTHERS.
- PROVIDE 3/4" CONDUIT WITH PULL-STRING FROM RTI FILL BOX TO ACCESSIBLE CEILING AREA FOR RTI CABLING BY OWNER'S VENDOR. FIELD VERIFY FINAL LOCATION OF RTI FILL BOX PRIOR TO CONDUIT INSTALLATION.

NOTE:
 REFER TO KITCHEN EQUIPMENT ELECTRICAL ROUGH-IN PLAN, SHEET KE101, FOR DIMENSIONED ROUGH-IN LOCATIONS, MOUNTING HEIGHTS, AND ADDITIONAL REQUIREMENTS FOR LOW VOLTAGE OUTLETS LOCATED IN THE KITCHEN AND FOOD SERVICE AREAS.



1 LOW VOLTAGE SYSTEMS PLAN
 1/4" = 1'-0"



1 ELECTRICAL LIGHTING PLAN
1/4" = 1'-0"

GENERAL LIGHTING NOTES:

- REFER TO ARCHITECTURAL DRAWINGS AND ELEVATIONS FOR EXACT LOCATIONS AND MOUNTING HEIGHTS OF ALL LIGHT FIXTURES. COORDINATE DIMMER/SWITCH BANK LOCATIONS WITH ARCHITECT PRIOR TO ROUGH-IN.
- PROVIDE AIMING OF ALL ADJUSTABLE LIGHT FIXTURES AFTER SETUP IS COMPLETE TO EVENLY ILLUMINATE TABLE SURFACES, SIGNAGE, DECOR, AND EMERGENCY EGRESS PATHS. COORDINATE AIMING OF NORMAL FIXTURES WITH ARCHITECT. REFER TO ARCHITECTURAL EGRESS PATH PLAN ON SHEET A002 FOR AIMING OF EMERGENCY LIGHT FIXTURES.
- REFER TO LIGHT FIXTURE SCHEDULE ON SHEET E620 FOR LIGHT FIXTURE TYPES AND REQUIREMENTS.
- REFER TO LIGHTING CONTROL DEVICE SCHEDULE ON SHEET E620 FOR OCCUPANCY SENSOR TYPES AND CONTROL INFORMATION.
- CONNECT ALL EXIT SIGNS AND EMERGENCY LIGHTING UNITS TO THE INDICATED CIRCUIT WITH A SEPARATE AND UN-SWITCHED CONDUCTOR BYPASSING ALL CONTROLS AND CONTACTORS. REFER TO THE MANUFACTURER'S WRITTEN INSTRUCTIONS FOR PROPER INSTALLATION AND TESTING.
- CONTRACTOR SHALL BE RESPONSIBLE FOR INSURING THAT COORDINATION AND CONFLICT ISSUES BE RESOLVED BY THE ARCHITECT AND CONTRACTOR PRIOR TO INSTALLATION OF LIGHT FIXTURES. CONTRACTOR SHALL BE HELD FINANCIALLY RESPONSIBLE FOR COMPLYING WITH REQUEST THAT THE ARCHITECT BE CONTACTED IN CASE OF CONFLICT WITH LIGHTING POSITIONS AS INDICATED ON THIS SHEET AND WITH ANY OTHER TRADES.
- ROUTE ALL EXPOSED, RIGID CONDUIT TIGHT TO STRUCTURE, PARALLEL TO BUILDING LINES AND IN UNISUIT CABLEPIPE TRAY WHERE POSSIBLE. COORDINATE CONDUIT ROUTING AND INSTALLATION WITH OTHER TRADES PRIOR TO ROUGH-IN. SUPPORT CONDUIT FROM STRUCTURE NOT ROOF DECK. MAINTAIN 2" MIN SPACING FROM BOTTOM OF ROOF DECK TO PREVENT ROOFING SCREWS FROM PENETRATING CONDUITS. DO NOT ROUTE CONDUIT/RACEWAY ACROSS SKYLIGHTS.
- 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 ALLOW FOR RELOCATING EACH LIGHT FIXTURE WITHIN A 5-FOOT RADIUS OF ITS INSTALLED LOCATION, BUT NOT EXCEEDING 6 FEET IN UNSUPPORTED LENGTHS.
- ALL LIGHT FIXTURES OVER KITCHEN AND FOOD PREP AREAS SHALL BE PROVIDED WITH PROTECT-A-LAMP COVERS OR EQUIVALENT SHIELDED OR SHATTERPROOF LAMPS. CONTRACTOR SHALL VERIFY THAT ALL AREAS ARE PROPERLY PROTECTED AFTER STORE SETUP IS COMPLETE.
- ALL INTERNALLY ILLUMINATED SIGNS SHALL BE PROVIDED WITH AN ACCESSIBLE DISCONNECTING MEANS. VERIFY EACH SIGN IS FURNISHED WITH AN INTEGRAL DISCONNECT SWITCH. PROVIDE WEATHERPROOF DISCONNECT SWITCHES WITHIN SITE OF ALL SIGNS AS REQUIRED.
- PROVIDE FUNCTIONAL TESTING OF LIGHTING CONTROL DEVICES INCLUDING OCCUPANCY SENSORS, AUTOMATIC TIME OF DAY CONTROLS, AND DAY-LIT AREA CONTROLS. LIGHTING CONTROLS SHALL BE TESTED IN ACCORDANCE WITH IECC C408.

LIGHTING PLAN NOTES:

- PROVIDE LUTRON VIVE MASTER CONTROL SWITCH FOR LIGHTING CONTROL. REFER TO SHEET E620 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
- PROVIDE LIGHTING TRACK POWER END FEED CURRENT LIMITER DEVICE WITH RATING AS SHOWN. REFER TO LIGHT FIXTURE SCHEDULE, SHEET E620 FOR COMPLETE MODEL NUMBER.
- PROVIDE LIGHTING TRACK POWER END FEEDS WITH APPROPRIATE POLARITY TO CONNECT NON-ADJOINING TRACK LIGHTING SECTIONS AS SHOWN.
- PROVIDE REMOTE LED DRIVER ABOVE ACCESSIBLE CEILING FOR LOW VOLTAGE LIGHT FIXTURES. REFER TO LIGHT FIXTURE SCHEDULE, SHEET E620.
- PROVIDE UNDER CABINET LIGHT FIXTURES WITH CORD AND PLUG CONNECTIONS. REFER TO POWER PLANS FOR RECEPTACLE LOCATIONS.
- INSTALL LIGHT FIXTURES SHIPPED LOOSE WITH WALK-IN COOLER. REFER TO POWER PLANS FOR CIRCUIT CONTINUATION.
- LIGHT FIXTURES FURNISHED WITH EXHAUST HOOD. EQUIPMENT MANUFACTURER SHALL BE RESPONSIBLE FOR PROVIDING SUFFICIENT ILLUMINATION TO COMPLY WITH LOCAL REQUIREMENTS. REFER TO MANUFACTURER'S WIRING DIAGRAMS FOR CONNECTION INFORMATION AND CONNECT COMPLETE.
- CONNECT EXTERIOR EMERGENCY LIGHTING REMOTE HEADS TO INTERIOR EMERGENCY LIGHTING BATTERY UNIT INDICATED.
- PROVIDE JUNCTION BOX, DISCONNECT SWITCH AND CONDUIT AT ACCESSIBLE LOCATION AS DIRECTED BY OWNER, FOR CONNECTION OF STOREFRONT SIGNAGE. COORDINATE REQUIREMENTS WITH OWNER AND SIGN INSTALLER PRIOR TO ROUGH-IN AND ADJUST ELECTRICAL PROVISIONS AS NECESSARY. PROVIDE CONCEALED CONDUIT THRU WALL FOR CONNECTION TO SIGN AND CONCEAL CONDUIT FROM CUSTOMER VIEW.
- PROVIDE LINEAR LED TAPE LIGHTING AT SIGN BAND. INSTALL LED TAPE LIGHTING IN PROTECTIVE ALUMINUM CHANNEL AND END TO END FOR CONTINUOUS ILLUMINATION BUT WIRE EACH STRIP SEPARATELY TO DRIVER PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. REFER TO SIGNAGE PACKAGE FOR INSTALLATION DETAILS. WIRING OF LINEAR LED TAPE LIGHTING SHALL OCCUR AFTER SIGN BAND LETTERS AND BACKER PLATES ARE INSTALLED. PROVIDE END FEED CABLES AND ALL REQUIRED CONNECTORS AND SECURE ALL CABLING CONCEALED FROM VIEW.
- PROVIDE REMOTE LED DRIVER FOR LINEAR LED LIGHTING. CONNECT EACH LENGTH OF LED STRIP IN PARALLEL TO REMOTE DRIVER PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE ALL REQUIRED CONNECTORS AND SECURE ALL LOW VOLTAGE CABLING CONCEALED FROM VIEW. PROVIDE WATERPROOF ENCLOSURES FOR LED DRIVERS INSTALLED OUTSIDE AND COORDINATE EXACT LOCATIONS OF LED LIGHTING CHANNEL AND REMOTE DRIVERS WITH ARCHITECT.
- PROVIDE EXTERIOR WET LOCATION CEILING FAN. SEE LIGHT FIXTURE SCHEDULE ON SHEET E620 FOR MORE INFORMATION. COORDINATE EXACT LOCATIONS, MOUNTING DETAILS, AND CONDUIT ROUTING WITH OWNER PRIOR TO ROUGH-IN. INSTALL CONDUIT CONCEALED FROM VIEW AS MUCH AS PRACTICAL. ROUTE CIRCUIT THROUGH FAN SPEED SWITCH IN OFFICE FOR CONTROL.
- CONNECT TO INTERIOR SIGNAGE FOR CONTROL. REFER TO SHEET E101 FOR CONTINUATION OF CIRCUIT.
- PICKUP WINDOW NOTIFICATION LIGHT. REFER TO SHEET E101 AND E501 FOR MORE INFORMATION. COORDINATE REQUIREMENTS WITH OWNER PRIOR TO ROUGH-IN.

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SHAKE SHACK

SHAKE SHACK -
CHESTERFIELD MO

17312 CHESTERFIELD AIRPORT ROAD
CHESTERFIELD, MO 63005
SHACK #1352

PERMIT SET

ELECTRICAL LIGHTING PLAN

DRAWN BY: ELT
CHECKED BY: BLM
JOB NO: 20087.00


TRACK LIGHTING MODULE UPDATE
DATE: 07/19/2021
SCALE: AS INDICATED
REVISION TO SHEET: E120

ESK
01

E120

DEAN W. CHANDLER
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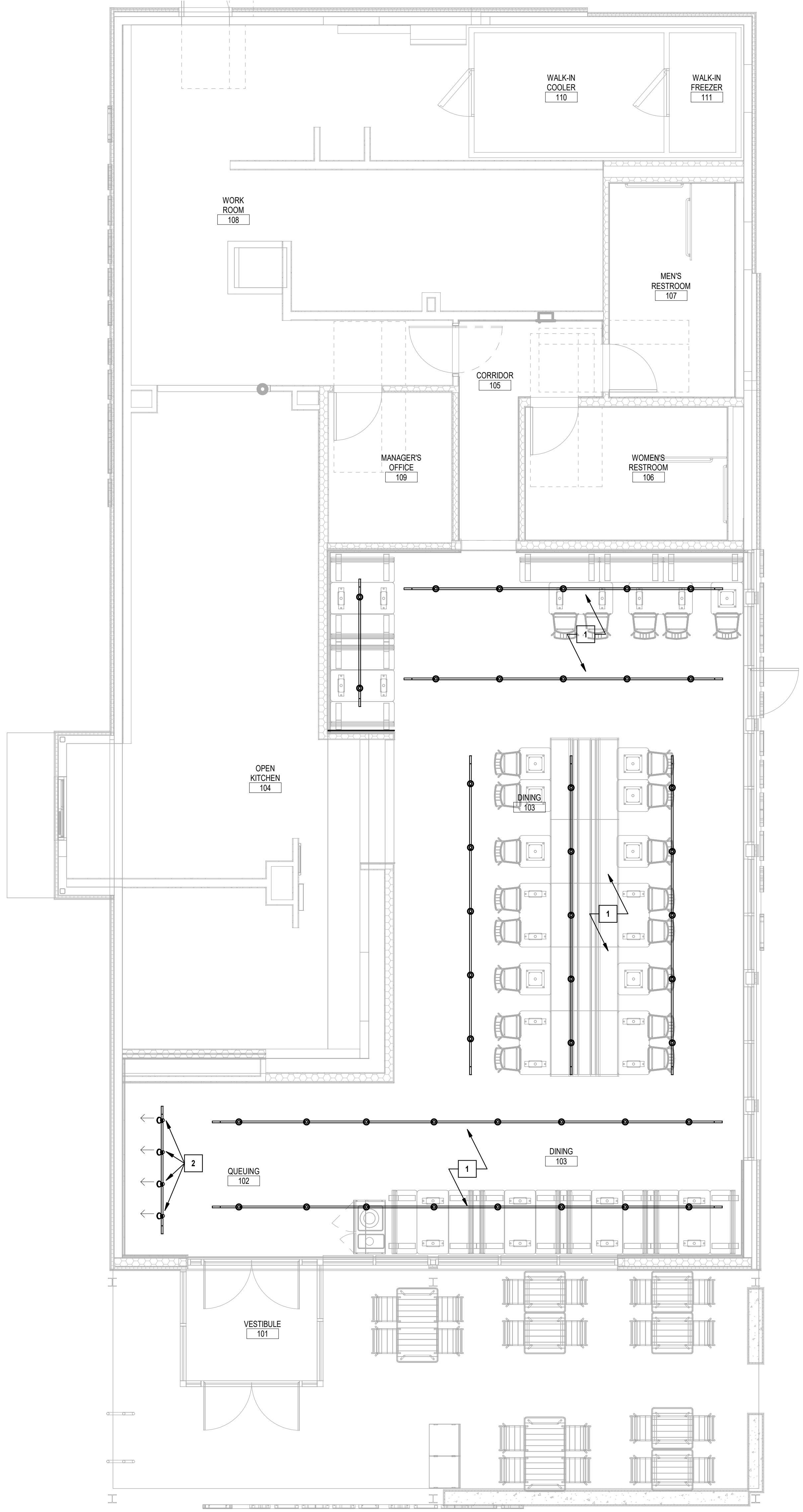
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LIGHTING AIMING PLAN

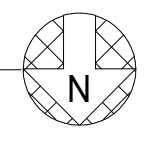
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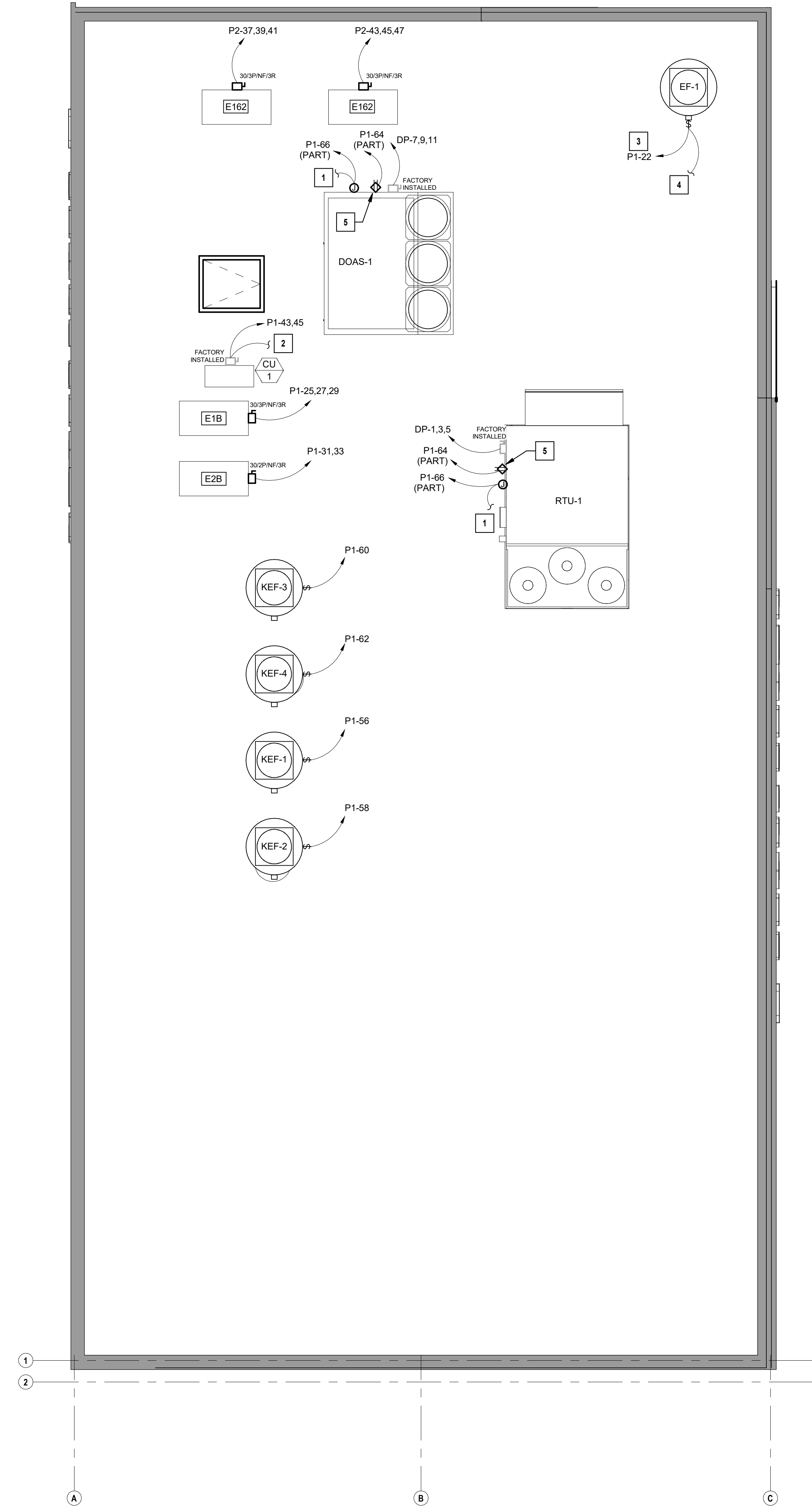
- GENERAL AIMING NOTES:**
- REFER TO ARCHITECTURAL DRAWINGS AND ELEVATIONS FOR EXACT LOCATIONS AND MOUNTING HEIGHTS OF ALL LIGHT FIXTURES. COORDINATE DIMMER/SWITCH BANK LOCATIONS WITH ARCHITECT PRIOR TO ROUGH IN.
 - PROVIDE AIMING OF ALL ADJUSTABLE LIGHT FIXTURES AFTER SETUP IS COMPLETE TO EVENLY ILLUMINATE TABLE SURFACES, SIGNAGE, DECOR, AND EMERGENCY EGRESS PATHS. COORDINATE AIMING OF NORMAL FIXTURES WITH ARCHITECT. REFER TO ARCHITECTURAL EGRESS PATH PLAN ON SHEET A002 FOR AIMING OF EMERGENCY LIGHT FIXTURES.
 - PROVIDE FUNCTIONAL TESTING OF LIGHTING CONTROL DEVICES INCLUDING OCCUPANCY SENSORS, AUTOMATIC TIME OF DAY CONTROLS, AND DAY-LIT AREA CONTROLS. LIGHTING CONTROLS SHALL BE TESTED IN ACCORDANCE WITH IECC C408.
- LIGHTING AIMING PLAN NOTES:**
- AIM ALL TRACK HEADS TO TABLE SURFACES UNLESS INDICATED OTHERWISE.
 - AIM TRACK HEADS TO LIGHT MENU BOARD PANELS.



1 LIGHTING AIMING PLAN
 1/4" = 1'-0"



- GENERAL ELECTRICAL ROOF PLAN NOTES:**
- MECHANICAL EQUIPMENT LOCATIONS ON THIS SHEET HAVE BEEN ADJUSTED FOR CLARITY. REFER TO MECHANICAL ROOF PLAN, SHEET M150 AND TO ARCHITECTURAL ROOF PLAN, SHEET A150 FOR EQUIPMENT LOCATIONS.
 - COORDINATE ALL ROOF PENETRATIONS WITH REFRIGERATION PIPING. REFER TO ARCHITECTURAL ROOF PLAN, SHEET A150 FOR ADDITIONAL REQUIREMENTS.
- ELECTRICAL ROOF PLAN NOTES:**
- PROVIDE CONNECTION TO RTU ACCESSORIES INCLUDING DUCT SMOKE DETECTORS AND UV STERILIZATION EQUIPMENT. CONFIRM UV LIGHT SAFETY LABEL HAS BEEN APPLIED TO UNIT TO INFORM MAINTENANCE STAFF TO DE-ENERGIZE UV LIGHT CIRCUIT PRIOR TO MAINTENANCE. REFER TO MECHANICAL PLANS FOR ADDITIONAL INFORMATION. COORDINATE ELECTRICAL REQUIREMENTS WITH SYSTEM INSTALLER.
 - CONNECT TO INDOOR UNIT BELOW. REFER TO MANUFACTURER'S WIRING DIAGRAMS FOR CONNECTION REQUIREMENTS AND TO SHEET M101 FOR INDOOR UNIT LOCATION.
 - PROVIDE TIME SWITCH LOCATED NEAR ELECTRICAL PANELBOARDS FOR CONTROL OF RESTROOM EXHAUST FAN AND MOTORIZED OUTSIDE AIR DAMPER SERVING OFFICE. SET FAN AND DAMPER TO OPERATE DURING OCCUPIED HOURS.
 - CONNECT TO MOTORIZED DAMPER SERVING OUTSIDE AIR FOR OFFICE REFER TO SHEET M101 FOR LOCATION.
 - PROVIDE CONNECTION TO FACTORY INSTALLED RTU MAINTENANCE RECEPTACLE.



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 CHESTERFIELD, MO 63005
 SHACK #1352

PERMIT SET

ELECTRICAL ROOF PLAN

DRAWN BY: ELT
 CHECKED BY: BLM
 JOB NO: 20087.00

E150

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Division 26. GENERAL ELECTRICAL REQUIREMENTS

I. GENERAL INSTRUCTIONS

A. GENERAL REQUIREMENTS

All requirements under Division 01 and the general and supplementary conditions of these specifications apply to this section and division. Where the requirements of this section and division exceed those of Division 01, this section and division take precedence. Become thoroughly familiar with all its contents as to requirements that affect this division, section, or both. Work required under this division includes all material, equipment, appliances, transportation, services, and labor required to complete the entire system as required by the drawings and specifications, or reasonably inferred to be necessary to facilitate the function of each system as implied by the design and the equipment specified.

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. In the event of discrepancies, notify the Engineer and request clarification prior to proceeding with the Work involved.

Drawings are graphic representations of the work upon which the contract is based. They show the materials and their relationship to one another, including sizes, shapes, locations, and connections. They 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. Use the drawings as a guide when laying out the work and to verify that materials and equipment will fit in the designated spaces, and which when installed per manufacturers' requirements, will ensure a complete, coordinated, satisfactory, and properly operating system.

B. DEFINITIONS

Division: References contained in this specification follow the numbering system defined in the Construction Specifications Institute (CSI) MasterFormat 2004 Edition. Specification Divisions 01 through 13 provided with this project may reference the CSI MasterFormat 1995 Edition. The corresponding division references between the 2004 Edition and 1995 Edition are as follows:

- | | |
|---|--------------|
| 2004 Edition | 1995 Edition |
| 1. Division 21 - Fire Suppression | Division 15 |
| 2. Division 22 - Plumbing | Division 15 |
| 3. Division 23 - HVAC | Division 15 |
| 4. Division 26 - Electrical | Division 16 |
| 5. Division 27 - Communications | Division 16 |
| 6. Division 28 - Electronic Safety and Security | Division 16 |

Furnish: "to supply and deliver to the project site, ready for unloading, unpacking, assembling, installing, and similar operations."

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."

Provide: "to furnish and install."

Furnished by Owner (or Owner-Furnished) or Furnished by Others: "an item furnished by the Owner or under other divisions or contracts, and installed under the requirements of this division, 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.

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, as defined in the General and/or Supplementary Conditions. 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.

AHJ: The local code and/or inspection agency (Authority) Having Jurisdiction over the Work.

CLCAIT: Certified Lighting Controls Acceptance Test Technician. A professional certified to perform acceptance tests and commissioning for lighting control systems in accordance with the requirements of the Illuminating Engineering Society of North America (IESNA) and other applicable codes and standards. Technician shall be certified by an authorized lighting controls acceptance test technician certification provider.

NRTL: 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. Nationally recognized testing laboratories and standards listed are used only to represent the characteristics required and are not intended to restrict the use of other NRTLs that are acceptable to the AHJ and standards that meet the specified criteria.

Home-run: That portion of an electrical circuit originating at a junction box, termination box, receptacle, or switch with termination at an electrical panel. 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 load.

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.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.

2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

The terms "approved equal", "equivalent", or "equal" are used synonymously 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 over this project.

C. PRE-BID SITE VISIT

Prior to submitting bid, visit the site of the proposed work and become fully informed as to the conditions under which the work is to be done. Failure to comply with this requirement shall not be considered sufficient justification to request or obtain extra compensation over and above the contract price.

D. MATERIAL AND WORKMANSHIP

Provide new material, equipment, and apparatus under this contract unless otherwise stated herein, of best quality normally used for the purpose in good commercial practice, and free from defects. 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.

Provide markings or a nameplate for all material and equipment identifying the manufacturer and providing sufficient reference to establish quality, size, and capacity. 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.

Commercial specification grade:

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.

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.

At a minimum, general work practices for electrical construction shall be in accordance with NECA 1 (latest edition), "Standard Practices for Good Workmanship in Electrical Construction".

E. MANUFACTURERS

In other articles where lists of manufacturers are introduced, subject to compliance with requirements, provide products by one of the manufacturers specified.

Where a list is provided, manufacturers are listed alphabetically and not in accordance with any ranking or preference. 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

Coordinate all work with other divisions and trades so that various components of the systems are installed at the proper time, fit the available space, and allow proper service access to those items requiring maintenance. Components which are installed without regard to the above shall be relocated at no additional cost to the Owner.

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. 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.

Figured dimensions shall be taken in preference to scale dimensions. Contractor shall take his own measurements at the building, as variations may occur. Contractor shall be held responsible for errors that could have been avoided by proper checking and inspection.

Provide materials with trim that will properly fit the types of ceiling, wall, or floor finishes actually installed. Model numbers listed in the specifications or shown on the drawings are not intended to designate the required trim.

Make all offsets required to clear equipment, beams, and other structural members, and to facilitate concealing raceways in the manner anticipated in the design. Provide materials with trim that will fit properly the types of ceiling, wall, or floor finishes actually installed.

G. ORDINANCES AND CODES

Work performed under this contract shall, at a minimum, be in conformance with applicable national, state and local codes having jurisdiction. Equipment installation 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:

- 1. National Fire Protection Association (NFPA)
- 2. Underwriters Laboratories (UL)
- 3. Occupational Safety and Health Administration (OSHA)
- 4. American National Standards Institute (ANSI)
- 5. American Society of Testing Materials (ASTM)
- 6. Rules and regulations of public utilities and municipal departments affected by connection of services.
- 7. Other national standards and codes where applicable.

Where the contract documents exceed the requirements of the referenced codes, standards, etc., the contract documents shall take precedence. Where conflicts between various codes, ordinances, rules, and regulations exist, comply with the most stringent.

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. Contractor will be held responsible for any violation of the law.

Procure and pay for permits and licenses required for the accomplishment of the work herein described. Where required, obtain, pay for, and furnish certificates of inspection to Owner. Provide all safety lights, guards, and warning signs required for the performance of the work and for the safety of the public.

H. PROTECTION OF EQUIPMENT AND MATERIALS

Store and protect from damage equipment and materials delivered to job site. For materials and equipment susceptible to environmental conditions, store in a conditioned space. For materials and equipment not susceptible to these conditions, cover with waterproof, tear-resistant, heavy tarp or polyethylene plastic as required to protect from plaster, dirt, paint, water, or physical damage. 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.

Keep premises broom clean of foreign material created during work performed under this contract. Conduit, equipment, etc. shall have a neat and clean appearance at the termination of the work.

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.

I. SUBSTITUTIONS

Materials, products, equipment, and systems described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by the proposed substitution. The base bid shall include only the products from manufacturers specifically named in the drawings and specifications. To request a substitution, request the Substitution Request Form from the Architect or Engineer. Complete and send the Substitution Request Form for each material, product, equipment, or system that is proposed to be substituted. The burden of proof of the merit of the proposed substitution is upon the proposer.

Unless stated otherwise in writing to the Engineer by the Contractor, Contractor warrants to the Engineer, Architect, and Owner the following:

1. Proposed substitution has been fully investigated and determined to meet or exceed the specified Work in all respects unless stated otherwise in the substitution request.
2. Proposed substitution is consistent with the Contract Documents and will produce indicated results, including functional clearances, maintenance service, and sourcing of replacement parts.
3. Proposed substitution has received necessary approvals of authorities having jurisdiction.
4. Same warranty will be furnished for proposed substitution as for specified Work.
5. If accepted substitution fails to perform as required, Contractor shall replace substitute material or system with that originally specified and bear costs incurred thereby.

4. Proposed substitution, installation and changes in the Work as necessary for accepted substitution will be complete in all respects.

No substitutions will be considered unless the Substitution Request Form is completed and attached with the appropriate substitution documentation. No substitution will be considered prior to receipt of bids unless written request for approval to bid has been received by the Engineer at least ten (10) calendar days prior to the date for receipt of bids.

If the proposed substitution is approved prior to receipt of bids, such approval will be stated in an addendum. Bidders shall not rely upon approvals made in any other way. Verbal approval will not be given. No substitutions will be considered after the contract is awarded unless specifically provided in the contract documents.

Provide factory generated point-by-point calculations for all exterior light fixtures (photometric files supplied so the engineer can generate a point-by-point not sufficient for the point-by-point calculations). Provide interior point-by-point calculations at the discretion of the engineer.

J. SUBMITTALS

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. Provide submittals in sufficient detail so as to demonstrate compliance with these Contract Documents and the design concept. Note: 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. If the size of equipment furnished makes necessary any change in location or configuration, submit a shop drawing showing the proposed layout.

Transmit submittals as early as required to support the project schedule. Allow two weeks for Engineer review time, plus time mailing time via the Architect, plus a duplication of this time for resubmittals, if required. Only resubmit those sections requested for resubmittal.

Submittals shall contain the project name, applicable specification section, submittal data, equipment identifications acronym as used on the drawings, and the Contractor's stamp. The stamp shall certify that the submittal has been reviewed by the Architect and approved. The stamp shall be in accordance with the drawings and specifications with other trades. Manufacturer product literature shall include shop drawings, product data, performance sheets, samples, and other submittals required by this division. Highlight, mark, list, or indicate the materials, performance criteria, and accessories that are being proposed. General product catalog data not specifically noted to be part of the specified product will be rejected and returned without review.

Submittals and shop drawings shall not contain firm name, logo, the seal, or signature of the Engineer. They shall not be copies of the work product of the Engineer. If the Contractor desires to use elements of such product, refer to paragraph "Electronic Drawing Files" for procedures to be used.

Separate submittals according to individual specification sections. Illegible submittals will be rejected and returned without review. Catalog data shall be properly bound, identified, indexed and tabbed in a 3-ring binder. Each item or model number shall be clearly marked and accessories indicated. 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 specified equipment or materials. Mark out ineligible items. Shop drawings will be returned without review if the above mentioned requirements are not met. Provide the quantity of submittals required by Division 01. If not indicated and hard-copy sets are provided, submit a minimum of six (6) copies. Refer to Division 01 for acceptance of electronic submittals for this project. For electronic submittals, Contractor shall submit the documents in accordance with the procedures specified in Division 01. Contractor shall notify the Architect and Engineer that the submittals have been posted. If electronic submittal procedures are not defined in Division 01, Contractor shall include the website, user name, and password information needed to access the submittals. For submittals sent by e-mail, Contractor shall copy the designated representatives of the Architect and Engineer. Contractor shall allow for the Engineer review time as specified above in the construction schedule. Contractor shall submit only the documents required to purchase the materials and/or equipment in the submittal.

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, 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 deviation.

K. ELECTRONIC DRAWING FILES

In preparation of shop drawings or record drawings, Contractor may request electronic drawing files in AutoCAD or DXF format via. Contact the Architect for written authorization and Engineer for the necessary agreement form. Release agreement form from the Engineer must be received before electronic drawing files will be sent.

L. RECORD DRAWINGS (AS-BUILT DRAWINGS)

During progress of the work in this division, Contractor shall maintain an accurate record of all changes made during the installation of the system. Upon completion of the work, accurately transfer all record information to three identical sets of the approved shop drawings. Insert one set into each copy of the manual described below.

See Division 01 and General Conditions for additional information.

M. OPERATION AND MAINTENANCE INSTRUCTIONS

During the course of construction, collect and compile a complete brochure of equipment furnished and installed on this project. 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. Include an inside cover sheet that lists the project name, date, Owner, Architect, Engineer, General Contractor, Sub-Contractor, and an index of contents.

Submit three copies of literature bound in approved binders with index and tabs separating equipment types to the Architect for the Engineer's review, at the termination of the work. Paper clips, staples, rubber bands, loose-leaf binding, and mailing envelopes are not considered approved binders. Final approval of systems installed under this contract shall be withheld until this equipment literature is received and deemed complete by the Architect and Engineer. Instruct workmen to save required literature shipped with the equipment itself for inclusion in this brochure.

Include Record Drawings as described above.

Refer to Division 01 for acceptance of electronic manuals for this project. For electronic manuals, refer to paragraph "Submittals" for requirements.

N. TRAINING

At a time mutually agreed upon between the Owner and Contractor, provide the services of a factory trained and authorized representative to train Owner's designated personnel on the operation and maintenance of the equipment provided for this project.

Provide training to include, but not be limited to, an overview of the system and/or equipment as it relates to the facility as a whole; operation and maintenance procedures and schedules related to startup and shutdown, troubleshooting, servicing, preventive maintenance and appropriate operator intervention; and review of data logging in the operation and maintenance manuals.

Submit a certification letter to the Architect stating that the Owner's designated representative has been trained as specified herein. Letter shall include date, time, attendees and subject of training. The Contractor and the Owner's representative shall sign the certification letter indicating agreement that the training has been provided.

Schedule training with Owner with at least 7 days advance notice.

O. WARRANTIES

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 exceeding 12 months. Remedy all defects occurring within the warranty period(s) as stated in the General Conditions and Division 01.

Warranties shall include labor and material, including travel expenses. Make repairs or replacements without any additional costs to the Owner, and to the satisfaction of the Owner, Architect, and Engineer.

Perform the remedial work promptly, upon written notice from the Engineer or Owner.

Also warrant the following additional items:

- 1. All raceways are free from obstructions, holes, crushing, or breaks of any nature.
- 2. All raceway seals are effective.
- 3. The entire electrical system is free from all short circuits and unwanted open circuits and grounds.

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. Each warranty instrument shall be addressed to the Owner and state the commencement date and term.

2. GENERAL MATERIALS AND INSTALLATION

A. BUILDING OPERATION

Comply with the schedule of operations as outlined in the architectural portions of this specification. Accomplish work requiring interruption of building operation at a time when the building is not in operation and with written approval of building Owner and/or tenant. Coordinate interruption of building operation with the Owner and/or tenant a minimum of seven (7) days in advance of work.

B. EXISTING EQUIPMENT REUSE AND REMOVAL

Provide all demolition of existing electrical systems and new electrical system modifications required because of building remodeling, as noted on the Drawings, or necessary for proper operation and new construction. Remove all abandoned equipment and wiring and conduct above accessible ceilings and ventilation shafts.

Remove all existing wiring, light fixtures, exposed conduits, and other electrical installations not reused prior to substantial completion of the work.

Existing raceways may be reused if their points of terminations are suitable; if they are clean inside with no evidence of rust or burrs; if free from cracks, flattened sections, or sharp bends; and, if suitably located to avoid conflicts with other trades or installations. Carefully "fish" all existing conduits reused under this contract to remove all debris and obstructions, and swab until all moisture is removed.

Cut, patch, and repair where required for new electrical installations, and patch and repair all surface damage resulting from this work. Cut flush with the floor and plug at both ends recessed stubs above the floor and not used at substantial completion of the work.

Relocate all existing electrical systems required to be in operation at substantial completion of the contract, if required, as a result of work included under this contract, even if not specifically indicated in the drawings or specifications.

Existing service entrance conductors and feeder conductors may be reused if all of the following conditions are met:

1. Conductor sizes meet or exceed the sizes specified on the drawings.
2. Conductor insulation is in good or better condition.
3. Conductor insulation is the correct type for the conditions.

C. EXCAVATION AND BACKFILLING

Perform excavation and backfill required for installation of underground work under this contract. Trenches shall be of sufficient width. Curb or brace trenches to prevent cave-in or settlement. Do not excavate trenches close to columns and walls of new building without prior consultation with the Architect. Use pumping equipment if required to keep trenches free of water. Backfill trenches in maximum 6-inch layers of well tamped dry earth in a manner to prevent future settlement.

Excavation as specified herein shall be classified as common excavation. Common excavation shall comprise the satisfactory removal and disposition of material of whatever substances and of every description encountered, including rock, if any, within the limits of the work as specified and shown on the drawings. Excavation shall be performed to the lines and grades indicated on the drawings. Dispose of excavated materials that are considered unsuitable for backfill, and surplus of excavated material, which is not required for backfill, all to the satisfaction of the Engineer.

D. INCIDENTAL DAMAGE

Repair streets, sidewalks, drives, paving, walls, finishes, and other facilities damaged in the course of this Work. Repair materials shall match existing construction. Repair work shall meet all requirements of the Owner, local authorities having jurisdiction, and meet the satisfaction of the Architect. Repair work shall be thoroughly first class.

E. CUTTING AND PATCHING

Conform to the requirements in Division 01. Cut walls, floors, ceilings, and other portions of the facility as required to install work under this division. Obtain permission of the Architect prior to cutting. Do not cut or disturb structural members without prior approval from the Architect. Cut holes as small as possible. Patch walls, floors, and other portions of the facility as required by the Architect. Patching shall include all materials and construction including fire ratings, if applicable. Repair and refinish areas disturbed by work to the condition of adjoining surfaces in a manner satisfactory to the Architect.

F. ROUGH-IN

Coordinate without delay all roughing-in with other divisions. Conceal all conduit and raceways except in unfinished areas and where otherwise indicated on the drawings.

G. CONCRETE BASES

Provide concrete bases (e.g., housekeeping pads) for equipment where indicated on the drawings and as specified herein. Concrete bases shall have chamfered edges. Size of base shall be a minimum of 4 inches greater than the footprint of the equipment that it is supporting and shall have a minimum height of 3-1/2 inches.

Construct equipment bases of a minimum 28-day, 4000-psi concrete conforming to American Concrete Institute Standard Building Code for Reinforced Concrete (ACI 318) and the latest applicable recommendations of the ACI standard practice manual. Concrete shall be composed of cement conforming to ASTM C 150 Type I, aggregate conforming to ASTM C33, and potable water. Exposed exterior concrete shall contain 5 to 7 percent air entrainment.

Unless otherwise specified or shown on the structural drawings, reinforce equipment bases with No. 4 reinforcing bars spaced at 12 inches on center. Reinforce walls with No. 2 or No. 3 welded wire mesh conforming to ASTM A185. Place reinforcement bars 24 inches on center with a minimum of two bars each direction.

Provide galvanized anchor bolts for equipment placed on concrete bases or on concrete slabs. Anchor bolts size, number, and placement shall be as recommended by the manufacturer of the equipment.

H. SUPPORT SYSTEMS

Steel Slotted Support Systems (Slotted Channel): Comply with MFMA-3, factory-fabricated components for field assembly; 12-gauge, 1-5/8-inch by 1-5/8-inch.

Manufacturers: Cooper B-Line, ERICO International, Hilli, Power-Strut, Thomas and Betts, or Unistrut.

Field Fabrication:

Where field cutting of standard lengths of channel are required, make cuts straight and perpendicular to manufactured surfaces.

For field-cut or damaged surfaces of coated channels, dress cut ends, damaged surfaces, or both, with an abrasive material (e.g., file, grinding stone, or similar) and cleanser to remove oils, rust, sharp edges, and shards.

For channel with a factory-applied coating, re-finish cut edges with a coating compatible with the factory finish and as recommended by the manufacturer (e.g., manufacturer's touch-up paint or zinc-rich cold-galvanizing compound, as applicable).

I. ACCESS DOORS

Provide access doors for all concealed equipment where indicated or as required, except where above lay-in ceilings. Access doors shall be adequately sized for the devices served with a minimum size of 18 inches x 18 inches. Access doors must be of the proper construction for the type of construction in which it is installed. 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 access doors manufactured by Bar-Co., J.L. Industries, Karp Associates, Milcor, Nystrom Building Products, Wade, or Zum.

J. PENETRATIONS

Coordinate sleeve selection and application with selection and application of fire-stopping specified in Division 07 section "Through-Penetration Firestop Systems."

Roofs:

1. Coordinate all roof penetrations with Engineer, Owner, and as applicable, the roofing contractor providing a roof warranty.
2. Keep all raceway penetrations within mechanical equipment curbs wherever possible. Coordinate with Division 01.
3. Flash and counterflash all openings through roof, and/or provide pre-fabricated molded seals compatible with the roof construction installed, as required by the 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.

Walls and Floors:

1. Steel Pipe Sleeves for Raceways and Cables: ASTM A53/A55M, Type E, Grade B, Schedule 40, galvanized steel, plain ends, and drip rings.
2. Cast-Iron Pipe Sleeves for Raceways and Cables: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral warranty, unless otherwise indicated.
3. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052 inch thickness and of length to suit application.

K. FIRESTOPPING

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 acceptable to AHJ.

Manufacturers: Hilli, Recto-Seal, Specified Technologies Inc., United States Gypsum Company, or 3M corp.

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.

Where project conditions require modification to qualified testing and inspecting agency's illustrations for a particular firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Include qualifications data for testing agency.

L. EQUIPMENT FURNISHED BY OTHERS

Provide necessary equipment and accessories that are not provided by the equipment supplier or Owner to complete installation of equipment furnished by others in locations as indicated on the drawings, specified herein, or both. Equipment and accessories not provided by the equipment supplier may include, but not be limited to, flexible cords and plugs as required for proper operation of the complete system, in accordance with the manufacturers' instructions.

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.

M. SYSTEM TESTING AND ADJUSTING

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 for proper operation.

Test all systems and equipment according to the requirements in NETA ATS (latest edition) and all additional requirements specified in following sections.

Maintain the following on the project premises at all times: a true RMS reading voltmeter, a true RMS reading ammeter, and a megohmmeter insulation resistance tester. Provide test leads readings as requested or as required by the Engineer.

N. SEISM

Division 26: BASIC ELECTRICAL MATERIALS AND METHODS

1. RACEWAYS
A. METALLIC CONDUIT AND TUBING

Electrical Metallic Tubing, Couplings, and Fittings (EMT): ANSI C80.3, UL 797. Only steel products allowed. Reduced wall EMT is not allowed.
Flexible Metal Conduit (FMC): Zinc-coated steel or aluminum, UL 1. Reduced-wall FMC is not allowed.
Intermediate Metal Conduit (IMC): Hot-dip Galvanized Rigid Steel Conduit, ANSI C80.6, UL 1242.
Liquidtight Flexible Metal Conduit (LFMC): Flexible steel conduit with PVC jacket, UL 390; fittings: NEMA FB 1.
Rigid Metal Conduit (RMC):
1. Hot-dip Galvanized Rigid Steel Conduit (GRS): ANSI C80.1, UL 6.
2. Rigid Aluminum Conduit (RAC): ANSI C80.5, UL 6A.
Plastic-Coated IMC, RMC, and Fittings: NEMA RN 1, NRTL listed. Coating thickness of 0.04 inches minimum.
IMC and RMC Fittings: NEMA FB 1; compatible with conduit type and material, NRTL listed.

B. NON-METALLIC CONDUIT AND TUBING

Rigid Nonmetallic Conduit (RNC): Schedule 40 PVC, 90 deg C rated, NEMA TC-2, UL 651
Fittings: NEMA TC 3, TC 6, UL 651, compatible with conduit/tubing type and material, NRTL listed.
Manufacturers: AFC Cable, American International, Anamet Electrical, Elmex, Cantex, CertainTeed, Conduit International, Electys, Electric-Flex, Lamson and Sessions, Manhatnan/CDT/Coile-Flex, Prime Conduit, Raco, Spirarhulid, Superflex Ltd, or Thomas and Betts.

2. RACEWAY INSTALLATION
A. GENERAL RACEWAY INSTALLATION REQUIREMENTS

Install raceways parallel and perpendicular to building lines.
Install raceways to requirements of structure, to requirements of all other work on the project, and to clear all openings, depressions, pipes, ducts, reinforcing steel, and other immovable obstacles.

Install raceways set in forms for concrete structure in such a manner that installation will not affect the strength of the structure.

Except where approved in writing by the Engineer, install no raceway in a slab-on-grade. Locate raceway below finished slab on-grade.

Install raceways continuous between connectors to outlets, boxes, and cabinets with a minimum possible number of bends and not more than the equivalent of four 90-degree bends between connectors. 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 possible and never shorter than the corresponding trade elbow.

Use long radius elbows for all underground installations, where necessary, or where otherwise indicated.

Securely fasten raceways in place with approved straps, hangers, and steel supports as required. Attach raceway supports to the building structure. Hang single raceways for feeders with malleable split ring hangers with rod and turnbuckle suspension from inserts spaced not over 10 feet apart in construction above. Clamp groups of horizontal raceways to steel channels that are suspended from inserts spaced not over 10 feet apart in construction above. Securely clamp vertical feeder raceways to structural steel members attached to structure. Install cable clips 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 raceways from suspended ceiling components.

Ream raceway ends, thoroughly clean raceway before installation, and keep clean after installation. Plug or cover openings and boxes as required to keep raceways clean during construction and fill all raceways clear of obstructions before pulling conductor wires. 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. Homenuns containing more than one branch circuit shall not be less than 3/4-inch in size.

Protect all raceway installations against damage during construction. Repair all raceways damaged or moved out of line after roughing-in to meet Engineer's approval without additional cost to the Owner.

Align and install true and plumb all raceway terminations at panelboards, switchboards, motor control equipment, and junction boxes.
Install approved expansion/deflection fittings where raceways pass through (if 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.

Install a pull wire in each empty raceway that is left for installation of conductors or 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.

Make all joints and connections in a manner that will ensure mechanical strength and electrical continuity.
For raceways penetrating freezer and cooler walls, effectively seal raceways by installing a conduit fitting at the boundary of the two spaces and filling it with an approved pliable material after conductors or cables have been installed. Provide fitting whenever raceways pass from non-cooled to cooled spaces, raceways transition from outside a facility or enclosure to inside, or whether buried or exposed.

B. ABOVE-GROUND RACEWAY USE:
Install all circular raceways concealed above suspended ceilings or concealed in walls or floors wherever possible except where otherwise indicated. Provide GRS for all conduits exposed to weather or other hazardous conditions.
Unless noted otherwise, all other raceways may be EMT where approved by local code. Use compression type fittings for EMT, with all fittings NRTL listed for the environment in which they are used. Unless noted otherwise, set-screw type fittings are not allowed.

C. UNDERGROUND RACEWAY USE:
Provide GRS installed below grade with a corrosion-resistant bonded-plastic or approved mastic coating. This shall include the 90-degree elbow below grade and the entire vertical transition to above grade.
RNC conduit may be used underground where permitted by local code and where not specifically restricted by these code texts. When used, provide plastic coated GRS, as specified above, for all hands greater than 30 degrees, including the 90-degree elbows below grade and the entire vertical risers for transitions from below to above grade or above slab.

D. EQUIPMENT CONNECTIONS
Use FMC for final connection to each motor, transformer, and any device that would otherwise transmit motion, vibration, or noise. Use LFMC where exempted to liquids, vapors, or sunlight, and to connect to kitchen and food service equipment. Provide all FMC and LFMC with an insulated bonding conductor.
Use only metal raceways for all power wiring from the output of variable frequency drives to their respective motors.

3. BUSHINGS AND LOCKNUTS
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 outside. Conduit shall enter the enclosure squarely.
Provide bushings and locknuts made of galvanized malleable iron with sharp, clean-cut threads.
Where EMT enters a box, provide approved EMT compression connectors.
Use insulated, grounding, or combination bushings wherever connection is subject to vibration or moisture, when required by NFPA 70, or both.

4. CONDUCTORS AND CABLES
Annealed (soft) copper complying with ICEA S-95-658/NEMA WC70 and UL standards 44 or 83 as applicable.
Aluminum conductor option:
Compact stranded, aluminum alloy (AA-8000 series), complying with ICEA S-95-658/NEMA WC70; No. 1/0 AWG or larger only.
Terminations: Tinned, compression type only; NRTL-listed for copper and aluminum conductors at 75 degrees C minimum.
Increase the raceway size as required, at no additional cost to the Owner, to accommodate the increased size of the aluminum Conductors.

Aluminum conductor size shall meet or exceed the ampere rating of the scheduled copper conductors at 75 degrees C.
Option applies only to the following feeders or services No. 2 AWG and larger (based on copper conductors):
1. Service entrance conductors.
2. Feeders to switchboards.
3. Feeders to panelboards. Exception: Apartment unit load center feeder conductors shall be copper; aluminum is not acceptable.
4. Feeders to motor control centers.
5. Feeders to transformers
Where aluminum conductors terminate existing panelboards, switchboards or switchgear that utilize compression connections use hydraulic-compression type connectors with a zinc base, anti-oxidizing compound. Use compression tools of the type that will not release unless the correct pressure has been applied.
Measure the temperature of all aluminum conductors at all splices and terminations. Make each test under typical building load conditions after the building is occupied and in operation for a minimum of two weeks. Replace all joints or splices indicating excessive heating.
Take measurements with a non-contact type infrared thermometer, with target size not exceeding one inch at five feet and an accuracy of two percent or better. Submit the meter specifications and calibration date with the test results.
Aluminum Conductor Manufacturer: General Cable or approved equal.
Conductor Insulation Types: 90-degree C-rated, Type THHN/THWN-2 or XHHW-2 complying with ICEA S-95-658/NEMA WC70.

Sizes of conductors and cables indicated or specified are in American Wire Gauge (AWG - Brown and Sharpe).
All feeder and branch circuit conductors No. 8 AWG and larger; Stranded.
All conductors, No. 10 AWG and smaller: Solid copper.
All Branch Circuit Wiring: Not smaller than No. 12 AWG. If no conductor size is indicated on the Drawings for a branch circuit, provide conductors and conduit sized per NFPA 70 and based on the indicated branch circuit overcurrent protection device ratings and number of poles. Where no circuit size (i.e., conductors and OCPD) is indicated on the drawings for a branch circuit, provide three No. 12 AWG conductors, in 3/4-inch raceway, and a 20A circuit breaker.

Control Wiring: Stranded copper conductors, 600V insulation, of the proper type, size, and number as required to accomplish specified function. Minimum size: No. 14 AWG, unless noted otherwise.
Flexible Cords and Cables: Stranded copper conductors for all, unless noted otherwise.

Special Purpose Conductors And Cables, Such As Low Voltage Control And Shielded Instrument Wiring: As recommended by the system equipment manufacturer unless indicated otherwise.
Copper Conductor Manufacturers: Advance Wire and Cable, AFC Cable, Alan Wire, Alfex, American Insulated Wire, Encore Wire, Northern Cables, Okonite, or Southwire.
Connections: Apply a zinc based anti-oxidizing compound to connections. Do not use terminals on wiring devices to feed through to the next device.

5. CONDUCTORS AND CABLES INSTALLATION
Install all wiring in approved raceway and enclosures, except where specified or indicated for low-voltage wiring, where specified or indicated for direct-buried cables, or where type MC cable is indicated or specified as acceptable.
Install all conductors and cables in raceways continuous without taps or splices. Splice or tap only in approved boxes and enclosures with approved solderless connectors, or crimp connectors and terminal blocks for control wiring, and keep to the minimum required. Insulate all splices, taps, and joints as required by codes.
All materials used to terminate, splice, or tap conductors designed for, properly sized for, and NRTL listed for the specific application and conductors involved, and installed in strict accordance with the manufacturer's recommendations, using the manufacturer's recommended tools.
Where wiring is indicated as installed, but the connection is indicated "FUTURE" or "BY OTHER DIVISION, TRADES, OR CONTRACTS," leave a minimum 3-foot "tagtail" at the box, tape the ends of the conductors, and cover the box.

In general, the direction of branch circuit "home run" routing is indicated on the drawings, complete with circuit numbers and panelboard designation. Continue all such "home run" wiring to the designated panelboard, as though "circuit runs" were indicated in their entirety.
The number of conductors in a specific raceway "home run" is indicated with cross lines (tick marks) on each "circuit run" on the drawings.
Common or shared neutrals are not allowed unless shown on the drawings to be used or specifically noted to be allowed.
Where multi-wire branch circuits (i.e., shared neutral) are allowed, they shall be provided with a means that will simultaneously disconnect all ungrounded conductors at the point the branch circuit originates. Multi-pole breakers or 3 single-pole breakers with a handle tie are two examples.
When multiple home runs are combined into a single raceway such that the number of conductors exceeds four (conductor count is made up of any combination of phase and neutral conductors), the following restrictions apply, which are in addition to those in NFPA 70:
Normal or Non-Essential circuits:
1. Maximum of 16 conductors in a single raceway. For up to eight conductors in a raceway, minimum raceway size: 3/4-inch. For greater than eight conductors, minimum raceway size: 1-inch. Do not install any other type of circuit in this raceway.
2. Minimum wire size for all conductors in this raceway: No. 10 AWG.
3. Only 15A and 20A branch circuit homeruns may be combined into one raceway.

GFCI circuits:
Do not use multi-conductor circuits, with a shared neutral, for any GFCI circuit breaker or receptacle circuit.
For branch circuits fed from GFCI circuit breakers, limit the one-way conductor length to 100 feet between the panelboard and the most remote receptacle or load on the GFCI circuit.
Properly identify all terminal blocks and wire terminations for control wiring with vinyl stick-on markers or equivalent. Provide Engineer with a list of proposed identifying numbers for review prior to installing markers.
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 250.122, as applicable, unless indicated as larger on the drawings.
Wiring shall have insulation of the proper color to match color code system in the table below unless there is a color system in use by the facility, in which case the colors are to match the existing system. In larger sizes where properly colored insulation is not available, use vinyl plastic electrical tape of the appropriate color around each conductor at all termination points, junctions, and pull boxes.

System Voltage:
240V and under, including 208Y/120, 120/240, 120/208, and 240D/120 systems:
1. Phase A: Black.
2. Phase B: Red.
3. Phase C: Blue.
4. Neutral: White.
5. Equipment Ground: Green.
6. Isolated Ground: Green with yellow stripe.
7. MC CABLE

A. CABLE SPECIFICATIONS
Metal-clad cable (MC Cable): 600V, unjacketed; UL Standard 83, 1569, and 1685; NFPA 70 Article 330; aluminum or galvanized steel interlocked armor; THHN- or XHHW-insulated conductors; color code: ICEA Method 1, with green insulated grounding conductor; lister for use in UL 1, 2, and 3 hour through-penetration firestop systems. MC Cable Manufacturers: AFC Cable Systems, Encore Wire Corporation, Kai-Tech, or Southwire.
B. APPLICATIONS OF MC CABLE
1. In lieu of flexible conduit and wiring from light fixtures located in accessible ceilings to junction boxes attached to building structure directly above the ceiling. Provide cable whips of sufficient lengths to allow for relocating each light fixture within a 5 foot radius of its installed location, but not exceeding 6 feet in unsupported lengths.
2. For vertical drops in stud walls.
3. In lieu of EMT, only for 15A and 20A branch circuits (with up to four (4) conductors, not including ground conductor), and only in dry concealed locations above grade, except where specifically not permitted by NFPA 70, owner, landlord, AHJ, or noted in list below.
C. PROHIBITED USE OF MC CABLE (AC90 CABLE) UNLESS NOTED ABOVE
Examples of those uses include, but are not limited to the following:
1. Homenuns to panelboards (refer to Section 26: Definitions).
2. Where exposed to view.
3. Where exposed to damage.
4. Hazardous locations.
5. Wet locations.
6. When restricted otherwise.
7. When specifically disallowed by the local AHJ.
8. When specifically disallowed by the land lord.
9. Circuits supplied by an emergency or standby power source.

8. JUNCTION BOXES, PULL BOXES, CABINETS, AND WIREWAYS
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. 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.
Junction boxes installed behind wall cases and in or on other store fixtures, except where otherwise specified, shall be 4 inches square or larger with galvanized covers.
Horizontally-mount junction boxes under center fixtures (and cases), handy boxes or 4-inch square boxes with tops of boxes not more than 3-1/2 inches above the floor. Size junction boxes to adequately contain all required conductors and splices.

9. OUTLET BOXES
All outlets including light fixture, switch, receptacle, and similar outlets: galvanized steel knockout boxes, suitable in place for the purpose they serve and the space they occupy. Size as required for the specific function or as required by NFPA 70, whichever is larger. 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. Provide approved cast outlet boxes with hubs and weatherproof covers in all areas subject to damp, wet, or harsh conditions.

11. MOUNTING HEIGHTS
Unless noted otherwise, install wiring devices vertically aligned at height indicated on construction drawings.
A. RECEPTACLES
Unless indicated otherwise, install vertically with the ground slot mounted at the top.
Where installed horizontally, install with the neutral slot mounted at the top.
B. SWITCHES
General: All switches shall be mounted at the same height throughout the project unless noted otherwise.
12. WIRING DEVICES
The catalog numbers listed for wiring devices are generally for 20A rated devices. 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.
All receptacles located outdoors or in damp or wet locations: Listed as "weather Resistant", designated by a "WR" on the faceplate.
Minor changes relative to the location of electrical equipment may be made to comply with structural and building requirements as determined by consulting the various large scale detailed drawings used by other division trades, and not mixed on the project, to the maximum extent possible. Provide colors of wiring devices as indicated on the drawings.
Manufacturers: Refer to Wiring Device & Cover Plate Schedule, this sheet.

13. SWITCH AND OUTLET COVER PLATES
Switch and Outlet Plates: colored, smooth nylon or satin stainless steel as indicated on the drawings; by the same manufacturer as the wiring devices, wherever possible. Verify required materials and colors with Architect before installation. Switch plates in unfinished rooms only: Stamped steel, cadmium plated. Install groups of switches under one ganged-plate, usually horizontally; or, where required by details, vertically. Set all cover plates plumb, parallel, and finished flush with the wall.
14. WEATHERPROOF COVER PLATES
All areas noted for weatherproof covers: Nema 3R, Extra Duty rated, weatherproof while in use, expandable outlet with grey paintable polycarbonate housing, clear viewing window and neoprene rubber expandable gasket that expands from 1" to 3". Suitable for both horizontal and vertical mounting configurations.
Manufacturers: Refer to Wiring Device & Cover Plate Schedule, this sheet.

15. ELECTRICAL SERVICE AND GROUNDING
A. ELECTRICAL SERVICE
See drawings for type, size, voltage, phase, and other requirements.
Provide, or arrange with the serving utility for installation to provide, a recording voltmeter at the service point, on the first day the facility is open for business, for a 24-hour voltage test. If voltage and regulation are not within acceptable limits, arrange with the utility for proper voltage. Submit to the Owner a report of maximum and minimum voltage and a copy of the recording voltmeter chart.
B. CONNECTION TO SERVING UTILITIES
Provide raceways, terminations, metering provisions, and miscellaneous equipment as required for electrical and telephone services for connection by the serving utility, in strict compliance with the requirements of all applicable codes and of the serving utility involved. Verify all service terminations and connection points in the field and work in conjunction with the utility involved in the installation of all services. Provide all materials and equipment required for complete utility connection but not furnished by the serving utility. Notify the utility companies involved within two weeks after notice to proceed of all required information necessary for the utility to supply the project without delay. Pay all charges of the serving utility for the electrical service(s).
C. GROUNDING
Permanently and effectively ground and bond the electrical installation in a thorough and efficient manner, and in conformance, at a minimum, with NFPA 70, or these documents, where they exceed code requirements. Use bare or insulated conductors as specified herein, and other materials indicated on the Drawings.

16. DISTRIBUTION AND CONTROL EQUIPMENT
A. POWER DISTRIBUTION PANELBOARDS:
Panelboards: Dead-front distribution panelboards with number and sizes of circuit breakers as indicated on the drawings, where installed as service entrance equipment, permanently label as suitable for use as service entrance equipment; fully- or series-rated for the available fault current indicated on the drawings; hinged, lockable front door that covers the circuit breaker handles. Circuit breakers: Quick-make, quick-break, indicating type; engraved nameplates for circuit identification of each circuit breaker. Provide a typewritten card directory indicating exactly what each circuit breaker controls on the inside face of the door for circuit identification.
Manufacturers: Square D Type I-Line, Eaton type Pow-R-Line 4, G.E. types CCB or AV-1, or Siemens types 54 or S5.
B. LIGHTING AND APPLIANCE PANELBOARDS
Panelboards: Complete with both-on thermal magnetic, molded case circuit breakers assembled in a dead-front finished cabinet containing a typewritten card directory indicating exactly what each circuit breaker controls. Fully- or series-rated for the available fault current ratings indicated on the drawings. Plug-in type breakers will not be acceptable. All two- and three-pole breakers: Common trip type.

1. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip). Use as indicated on drawings.
2. Ground-Fault Equipment Protection (GFEF) Circuit Breakers: Class B ground-fault protection (30-mA trip). Use as indicated on drawings.
3. 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.
4. Handle padlocking device: fixed attachment for locking circuit breaker handle in "on" or "off" position. Use as indicated on drawings.

Manufacturers: Square D Type NQOD or NF (as applicable, based on voltage and ampere ratings and required short-circuit interrupting ratings as scheduled on the drawings) or approved equal by Eaton, G.E., or Siemens.
C. CIRCUIT BREAKERS IN EXISTING PANELBOARDS/SWITCHBOARDS
Provide new circuit breakers for installation in existing panelboards/switchboards, of the same manufacturer and type as the existing panelboard/switchboard circuit breakers. Short circuit current interrupting rating of any new breaker shall be the larger of the existing panel rating or the available fault current indicated on the drawings.
D. SERIES RATINGS ON SWITCHBOARDS AND PANELBOARDS
Label switchboards and panelboards with a NRTL integrated short circuit current rating.
When series ratings are applied with integral or remote upstream devices, provide labels complying with NFPA 70 Articles 240.86 and 110.22. In addition to the warning label, include, at a minimum, the following conditions of the UL 67 series ratings:
1. Size and type of upstream device.
2. Branch devices that can be used.
3. NRTL series short circuit current rating.

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.
Series ratings shall apply all trip ratings of installed frames.
E. DISCONNECT (SAFETY) SWITCHES
Disconnect (Safety) Switches: Heavy-duty, fused or non-fused (as indicated on drawings or required) NEMA KS1, externally operated, visible-blade safety switches; NEMA enclosure type indicated on the drawings or suitable for the environment in which installed, based on fusible switch and fuse sizes indicated, include Class R, J, or L fuse provisions as applicable.
Where indicated, provide fusible switch permanently labeled as suitable for use as service entrance equipment, with integral and separate neutral and ground assemblies, suitable for the sizes of conductors indicated. Do not double-lig any terminations not specifically listed as suitable for more than one conductor.
Provide switches where not furnished with the starting equipment, at all other points required by NFPA 70, and where indicated on the drawings.
Manufacturers: Eaton, G.E., Siemens, or Square D.

F. SURGE-PROTECTIVE DEVICES (SPD)
Provide SPD labeled in accordance with the latest editions of UL 1283 and 1449, including the highest fault current of Section 37.3 (NRTL Recognized for SPD integral to panelboard) that meets or exceeds the following criteria:
Maximum surge current capability (single pulse rated) per phase:
1. Service entrance switchboards, switchgear: 20kA.
2. Distribution panelboards, panelboards used for service entrance & MCC: 120kA.
3. Branch Panelboards: 80kA (non-modular is acceptable).
SPD shall have a minimum EMURF filtering of -50dB at 100kHz.
Indicators: The SPD shall use LED indicators that provide indication of suppression component failure in all protection modes including N-G, as well as optically isolated N/C dry contacts for remote monitoring.
Transient Protector: A transient voltage surge counter shall be included to tolerate transient voltage surges which deviate from the sine wave envelope by more than 125V. The readout shall be at least a six digit LCD located on the side of the hinged front cover. The counter shall be equipped with a battery back-up to retain memory when power is not present. A push-button switch on the display's face-plate shall be provided for manual counter reset.

Switchboard, Switchgear, Panelboard, and MCC internally mounted SPD: Factory installed and NRTL labeled by and at the facility of the electrical distribution equipment manufacturer.
Externally mounted SPD (only allowed where noted on the construction documents): Install with conductors as short and straight as possible. Twist the SPD input conductors together to reduce input conductor inductance. Follow the SPD manufacturer's recommended installation practices and comply with all applicable codes.

Thoroughly factory test the specified system before shipment. Testing of each system shall include, but shall not be limited to, quality control checks, dielectric voltage withstand tests at twice rated voltage plus 1000V per NRTL requirements, and operational and calibration tests.
Manufacturers: ABB USA, AC Data Solutions, APT, Atlantic Scientific, Current Technology, Danaher Power Solutions, Eaton, G.E., Intermatic, Lea International, Leviton, Liebert, Northern Technologies, Siemens, Square D, or Surge Suppression Incorporated.
G. FUSES
Provide each circuit and set of fuse clips throughout the work with sizes and types as required or indicated. All fuses larger than 600A, UL Class I, similar to type KRP-C; Busmann Low Peak or equal. Fuses used to protect motors: UL Class RK5, Busmann F (fusion) or equal. Fuses used to protect all other electrical equipment: UL Class RK1, dual element, Busmann LPS/LPN or equal. All fused devices shall be labeled as to type and size of fuse required.
Furnish three spare fuses of each size and type used on the project (except for main switch fuses, furnish one spare), neatly contained in a properly labeled cabinet.
Manufacturers: Busmann, Edison Fuse, Mersen/Ferraz Shawmut, or Littelfuse.

H. MOTOR STARTING SWITCHES
Motor starting switches shall consist of a toggle operated two- or three-pole switch. Contacts shall be double break silver alloy, visible from both sides of the switch, and shall have a direct linkage to the operator for positive break. All switches shall be mounted in finished areas and surface mounted units in unfinished areas. Starters shall have NEMA 1 general purpose enclosure, unless otherwise indicated, and be rated for the motor horsepower required. Provide handle guard with locking provisions.
Manufacturers: Square D Class 2510 Type K, Eaton 9115 series, G.E. TC2000 series, Siemens MS series, or Westinghouse MST series.

17. LIGHT FIXTURES, LAMPS AND BALLASTS
A. LIGHT FIXTURE LOCATIONS
Light fixtures shown on the drawings represent general arrangements only. Refer to architectural drawings for more exact locations. Coordinate location with all other trades before installation to avoid conflicts. Coordinate light fixture locations in mechanical rooms with final installed piping and ductwork layouts.
B. LIGHT FIXTURES
Provide light fixtures as scheduled on drawings, including all lamps, all necessary accessories, material and labor to securely hang, clean, and make light fixtures completely ready for use. Provide all hangers, supports, and miscellaneous hardware required to install light fixtures, 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 building code.
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 allow for relocating each light fixture within a 5-foot radius of its installed location, but not exceeding 6 feet in unsupported lengths.
C. EMERGENCY LIGHTING UNITS AND EXIT SIGNS
Description: Self-contained units complying with UL 924.
Battery: Sealed, maintenance-free, lead-acid type. The batteries shall be of suitable rating and capacity to supply and maintain at not less than 87-1/2 percent of the nominal battery voltage for the total lamp load associated with the unit for a period of at least 1-1/2 hours, or the unit equipment shall supply and maintain not less than 60 percent of the initial emergency illumination for a period of at least 1-1/2 hours.
Charger: Fully automatic, solid-state type with sealed transfer relay.
Operation: Relay automatically turns lamp on when power supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and flushed on charger.
Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power, and demonstrates unit operability.
LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge, and bright glow indicates charging at end of discharge cycle.
D. LAMPS
Provide lamps and color temperatures as indicated on the drawings for all light fixtures; or, if not indicated, per the Architect and/or lighting designer. Lamps shall be by the same manufacturer for color consistency. Lamps shall be compatible with the specified light fixture.
E. DIMMABLE LIGHT FIXTURES
For dimmable light fixtures provide both control and power wiring between light fixture and control device and between light fixtures. Quantity of low voltage and line voltage wiring and wire type shall be per manufacturer's recommendations. Coordinate light fixture and control device dimming types for compatibility.

18. MISCELLANEOUS ELECTRICAL
A. WIRING OF MECHANICAL EQUIPMENT
Provide all raceways and power wiring for all Division 23 equipment requiring electrical connections, including but not limited to pumps, water heaters, and HVAC equipment, and all line-voltage control and interlock wiring not provided under Division 23. Connect per manufacturer's wiring diagrams. Coordinate with Division 23 for required ampacity and variable frequency drives (VFD) furnished with equipment, and provide all disconnect switches and final connections as required. If VFD is separate or does not have an integral disconnect feature, provide disconnect switch with auxiliary contacts such that motor will be lumen off if switch is off. Provide VFD cable. Detail or approved equivalent for connection of VFD to motor when required. After installing wiring, verify that each motor load has the correct phase rotation.
Verify the actual "Maximum Overcurrent Protection" (MOPP) device ratings and "Minimum Circuit Ampacity" (MCA) conductor sizing for mechanical equipment from the equipment nameplate. Base electrical installations on actual required ampacities, which may vary somewhat from the conductor and equipment sizes shown on the drawings; however, in no case, reduce the size of conductors indicated on the drawings without authorization from the Engineer. Provide properly sized electrical wiring and equipment without extra cost to the Owner. Notify the Engineer of all changes required in the electrical installation due to equipment variances so that the effects on feeders, branch circuits, panelboards, fuses and circuit breakers can be checked prior to purchasing and installation. Be responsible for coordinating with Division 23 to verify the actual ampacities and correct sizes of all conductors and overcurrent protective devices for all equipment, and correct overload heaters for all motors, when starters are provided under Division 26.
B. WIRING OF THERMOSTATS, TIME AND TEMPERATURE CONTROLS
Provide all raceways, power wiring, and line-voltage control and interlock wiring not provided under Division 23, for all thermostats, temperature control devices, and controls, including, but not limited to, night-stair water heater interlocks, time switches and override timers. See mechanical drawings for locations and temperature control diagrams. Low-voltage conductors for thermostats and temperature control system may be run exposed above finished accessible ceilings. If approved and listed for this purpose, but shall be installed in conduit within walls and where exposed in the work areas.
C. TELEPHONE SYSTEM PROVISIONS
Provide incoming telephone service raceways as indicated on drawings or as required by the serving telephone company. Provide 3/4-inch thick plywood board, fire-retardant-treated and stamped FRT, securely anchored to the wall, at the location and of the size as indicated on the drawings. 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.
D. DATA SYSTEM PROVISIONS
Provide flush mounted data outlet boxes with 1 inch conduit stub-up with pull-string concealed to accessible ceiling space at locations as indicated on the drawings.
E. TIME SWITCHES
Manufacturers: Intermatic, Paragon, or Torq.
Time switches: with manual bypass switch, NEMA enclosure suitable for the environment installed; number and type of contacts, sequence, and voltage as indicated on the drawings; or, as required, based on the specific switch function and the number of branch circuits or contactors controlled. Provide wiring to photoeyes, contactors, relays or other control points as required.
F. LIGHTING CONTACTORS
Industrial duty type; silver alloy, double break contacts, convertible with N.O. and N.C. indicators; capable of adding poles in the field; number and rating of poles as indicated on the drawings or required by the load controlled; typed directory affixed to the inside of the enclosure door listing all branch circuits switched and the control power branch circuit; complying with NEMA ICS 2 and UL 308.
Short Circuit Current Rating: 22,000A at 240V maximum.
Enclosures: NEMA 1.
Cool Voltage: 120V AC or as indicated on the drawings.
Mechanically-held type, control interface shall be 2-wire input module with 3-wire output; Square D Class 8903 LX or equivalent of G.E., Siemens, Cutler-Hammer, or ASCO.
G. SIGNALING SYSTEM
Provide a complete and functioning 24V signaling system for loading door signals, and others as indicated on the drawings. 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.
Signal bell units shall be 4-inch, single-stroke type, Edwards Signaling and Security Systems (Edwards) No. S32-425 or equal, for 24VAC operation, installed on a standard single-gang box. Transformers shall be Edwards 550 Series or equal, having adequate capacity for the connected load plus 10-percent at 24VAC, and mounted in a standard two-gang box. Exterior push button shall be Edwards No. 1786-C with solid brass cap.

H. MISCELLANEOUS EQUIPMENT AND CONNECTIONS
Provide wiring of fire extinguishing system for exhaust hoods, including but not limited to electrical interlock of automatic fire shut-off valves and/or provision of shunt trip breakers for shut-off of electrical equipment under hoods.
All wiring and connections for refrigerated cases and boxes including lighting, superstructure lighting, and control cable and wiring as required by refrigeration wiring diagrams.
All wiring and connections to illuminated cases.
All wiring and connections to equipment furnished by others, including but not limited to kitchen equipment, exhaust hood fire extinguishing system, etc.
All raceways, wiring, and connections of devices to energy management system that are not the responsibility of Division 23.
All wiring and connections of exit door alarms.
END OF SECTION 26

WIRING DEVICE AND COVER PLATE SCHEDULE

AREA	WIRING DEVICE	COVER PLATE
FRONT OF HOUSE		
- Dining Area	Black (Commercial Grade)	Black Matte (Nylon)
- Customer Restrooms		
- Queuing Area/Vestibule		
KITCHEN/BACK OF HOUSE		
- Areas w/ Stainless Steel Finish	Grey (Industrial Grade)	Stainless Steel
KITCHEN/BACK OF HOUSE		
- Areas w/ FRP Wall Finish	White (Industrial Grade)	White (Nylon)
KITCHEN COOKLINE		
- Locations Below Cooking Hood	Grey (Industrial Grade/ Water Resistant)	Greysexpandable (Weatherproof)
OTHER AREAS		
- Manager's Office	White (Commercial Grade)	White (Nylon)

WIRING DEVICE SPECIFICATIONS

TYPE OF DEVICE **HUBBELL** **PASS AND SEYMOUR** **LEVITON** **COPPER WIRING DEVICES**

DUPLEX RECEPTACLES - COMMERCIAL GRADE
Duplex Receptacle
Tamper Resistant
Duplex Receptacle - Weather Resistant
Isolated Ground (IG) Receptacle

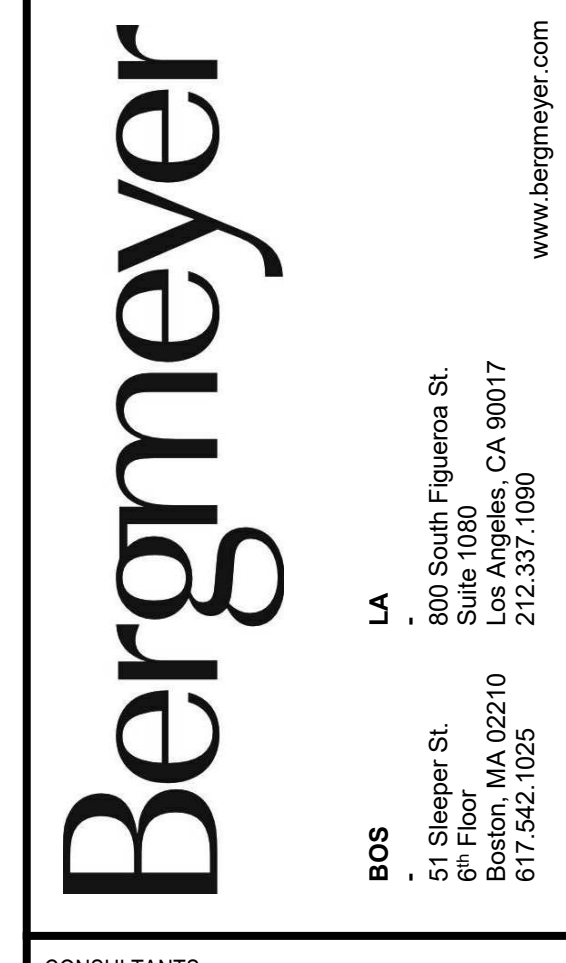
DUPLEX RECEPTACLES - INDUSTRIAL GRADE
Duplex Receptacle - Tamper Resistant
Duplex Receptacle - Weather Resistant
Isolated Ground (IG) Receptacle

OTHER RECEPTACLES
GFCI Receptacle
GFCI Receptacle - Weather Resistant
Blank Face GFCI
Clock Receptacle
USB Charging - Tamper Resistant

SWITCHES
Single Pole Switch
Double Pole Switch
Three-Way Switch
Lighted Handle Switch
Key Switch

COVER PLATES
Standard Cover Plates
Wetherproof Cover Plates

General Notes:
1. Colors and finishes specified above shall be applicable to all devices including low voltage outlets unless noted otherwise.
2. Isolated ground receptacles shall be orange in color.
3. Refer to Electrical Symbols Legend and Electrical Kitchen Equipment Connection Schedule for additional information and requirements.

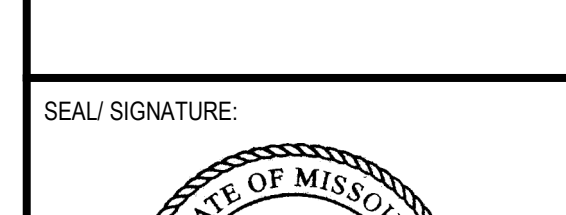


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2503003215
EXPRES 12312021

SEAL/SIGNATURE:
DEAN W. CHANDLER
LICENSE # PE-2017036852

10/18/2021

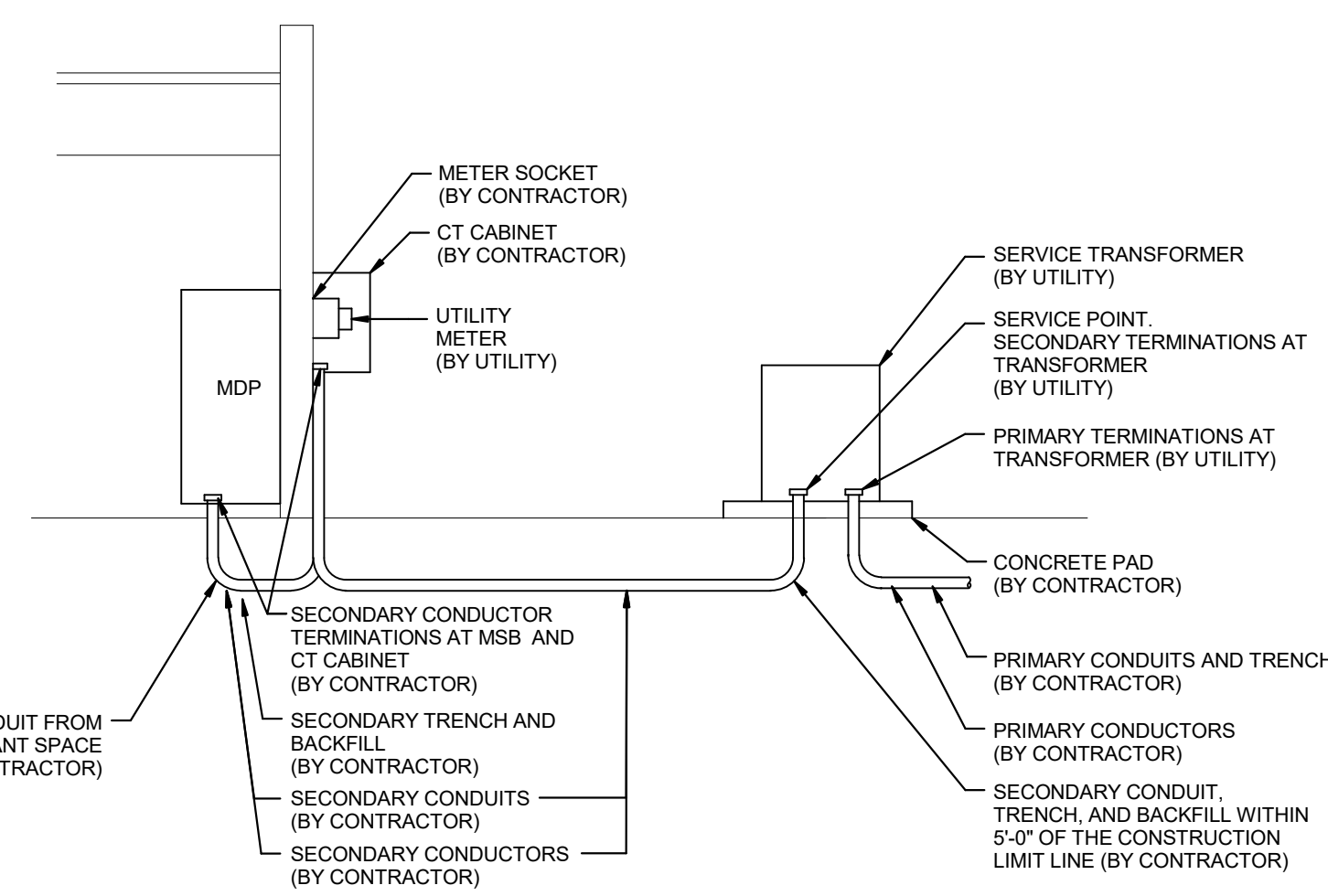


SHAKE SHACK
17312 CHESTERFIELD AIRPORT ROAD
CHESTERFIELD, MO 63005
SHACK #1352

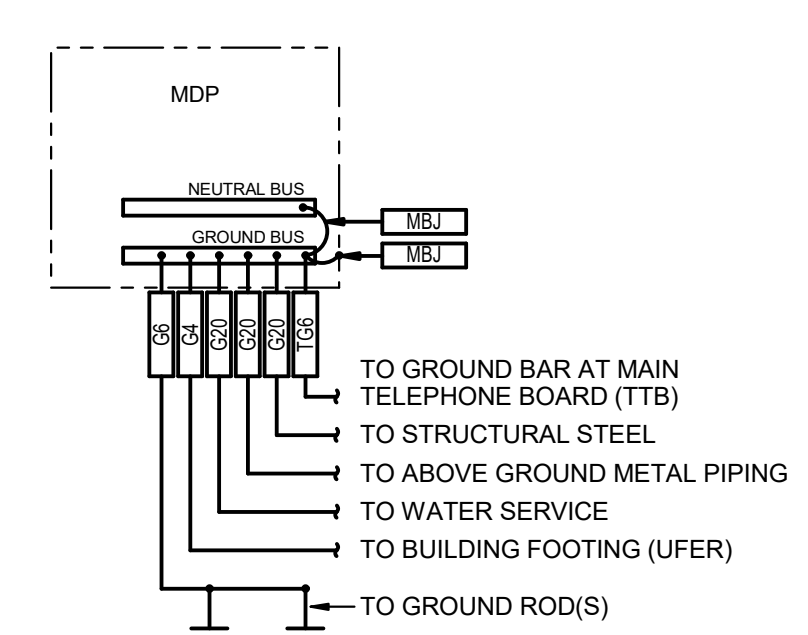
PERMIT SET

ELECTRICAL SPECIFICATIONS

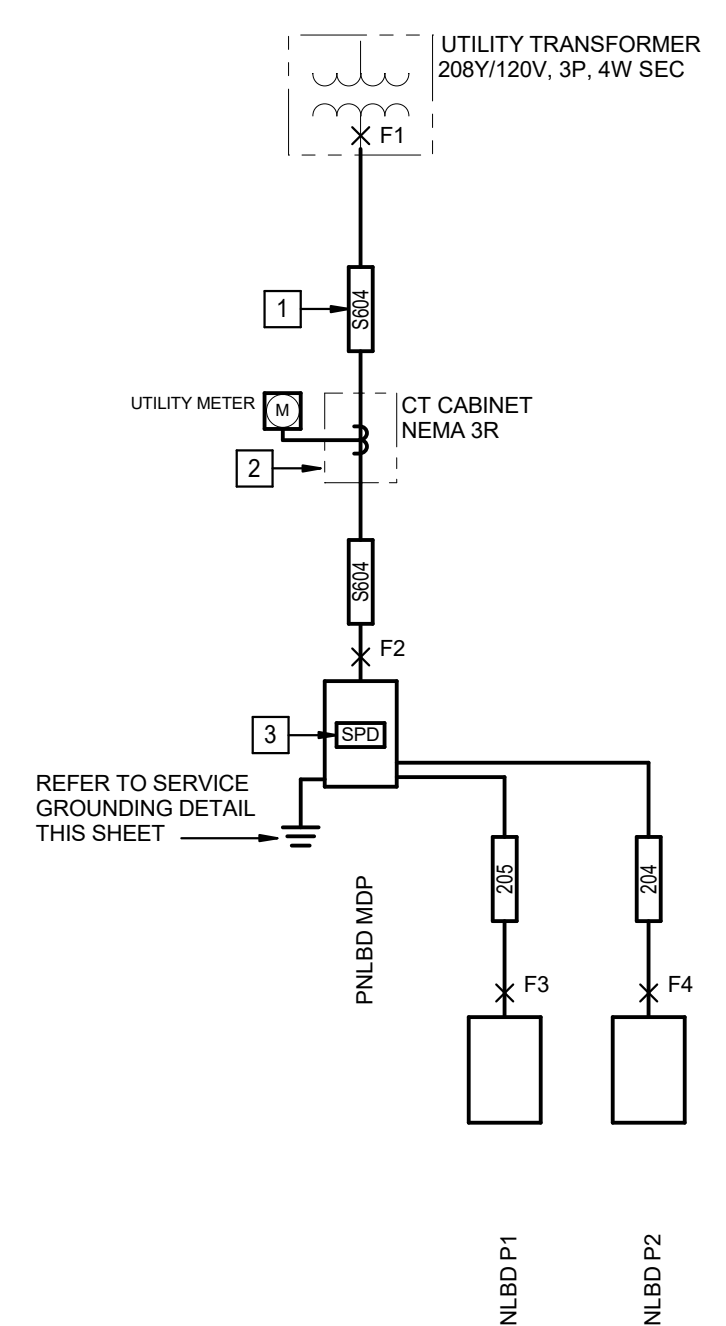
NO.	BY	DATE	DESCRIPTION
B		2021-10-18	ISSUE FOR CONSTRUCTION
A		2021-06-10	ADDENDUM B
A		2021-05-25	ADDENDUM A
		2021-03-15	BID/PERMIT SET
		2021-02-23	75% SET
		20	



1 UTILITY COORDINATION DETAIL
NO SCALE



2 SERVICE GROUNDING DETAIL
NO SCALE



3 ELECTRICAL ONE-LINE DIAGRAM
NO SCALE

ONE-LINE DIAGRAM NOTES:

1. PROVIDE SECONDARY CONDUITS AND CONDUCTORS PER UTILITY SERVICE STANDARDS. REFER TO FINAL CIVIL DRAWINGS FOR ADDITIONAL INFORMATION.
2. COORDINATE METERING REQUIREMENTS WITH UTILITY COMPANY AND PROVIDE UTILITY CT CABINET WITH REMOTE METER BASE OR CT CABINET WITH INTEGRAL METER BASE AS DIRECTED BY UTILITY.
3. PROVIDE INTERNALLY MOUNTED SURGE SUPPRESSION DEVICE FOR PANELBOARD. REFER TO SPECIFICATIONS, SHEET E501 FOR REQUIREMENTS.

ONE-LINE DIAGRAM GENERAL NOTES:

1. THE INFORMATION SHOWN IN THE SHORT-CIRCUIT AND VOLTAGE DROP CALCULATION SCHEDULE IS SHOWN FOR CALCULATION PURPOSES ONLY. CONTRACTOR SHALL NOT USE THE CONDUIT TYPES, CONDUCTOR TYPES, SIZES, QUANTITIES OR LENGTHS FOR TAKEOFFS OR BIDDING PURPOSES. CONTRACTOR SHALL NOTIFY ENGINEER OF ANY CONFLICTS BETWEEN THIS SCHEDULE AND OTHER PORTIONS OF THE CONSTRUCTION DOCUMENTS. CONTRACTOR SHALL NOTIFY ENGINEER OF AS-BUILT CONDITIONS THAT CONSTITUTE A CHANGE FROM WHAT IS SHOWN. THIS INCLUDES CONDUCTOR LENGTHS DIFFERING BY MORE THAN 10%.
2. COORDINATE ALL REQUIREMENTS FOR ELECTRICAL SERVICE WITH LANDLORD AND ELECTRIC UTILITY. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
3. PROVIDE (4) EMPTY 1" CONDUITS WITH PULL STRINGS FROM EACH RECESSED PANELBOARD UP TO ACCESSIBLE CEILING SPACE. CAP AND LABEL CONDUITS FOR FUTURE USE.
4. PROVIDE A PERMANENT LABEL TO FRONT OF EQUIPMENT ENCLOSURE. REFER TO SPECIFICATIONS FOR LABEL REQUIREMENTS. LABEL SHALL READ AS FOLLOWS (INCLUDE RESPECTIVE NAMES IN BLANKS):

SERVICE EQUIPMENT LABEL:
 LINE 1: NOMINAL VOLTAGE AND FREQUENCY IN HERTZ
 LINE 2: SERVICE EQUIPMENT BUS RATING IN AMPS
 LINE 3: SCCR OF SERVICE EQUIPMENT IN AMPS
 LINE 4: MAXIMUM AVAILABLE FAULT CURRENT IN AMPS
 LINE 5: DATE CALCULATED

EXAMPLE:
 208Y/120V, 60HZ
 400A
 SCCR = 65,000A
 MAX AVAILABLE FAULT CURRENT = 58,615A
 CALCULATED: 6/10/2020

PANELBOARD/SWITCHBOARD LABEL:
 LINE 1: PANELBOARD " " SUPPLIED BY UPSTREAM
 LINE 2: PANELBOARD/SWITCHBOARD " "
 LINE 3: LOCATED IN " "
 LINE 5: PANELBOARD(S) " "

5. ROOM NAMES/NUMBERS SHOWN IN PANELBOARD SCHEDULES ARE PER ARCHITECTURAL FLOOR PLANS. CONTRACTOR SHALL PROVIDE FINALIZED PANEL BOARD SCHEDULES AT THE COMPLETION OF THE PROJECT MATING ROOM NUMBERS AND NAMES REFER TO THE SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
6. PROVIDE TYPED FINAL CIRCUIT DIRECTORY FOR ALL PANELBOARDS TO REFLECT ACTUAL AS-BUILT CONDITIONS. CIRCUIT DESCRIPTIONS SHALL BE PER CODE AND SHALL BE DISTINGUISHABLE FROM ALL OTHERS.
7. THE INFORMATION SHOWN IN THE SHORT-CIRCUIT AND VOLTAGE DROP CALCULATIONS SCHEDULE IS SHOWN FOR CALCULATION PURPOSES ONLY. CONTRACTOR SHALL NOT USE THE INFORMATION SHOWN IN THIS SCHEDULE FOR TAKEOFFS OR BIDDING. THIS INCLUDES CONDUIT CONDUCTOR TYPES, SIZES, QUANTITIES AND LENGTHS. CONTRACTOR SHALL NOTIFY ENGINEER OF ANY CONFLICTS BETWEEN THIS SCHEDULE AND OTHER PORTIONS OF THE CONSTRUCTION DOCUMENTS. CONTRACTOR SHALL NOTIFY ENGINEER OF AS-BUILT CONDITIONS THAT CONSTITUTE A CHANGE FROM WHAT IS SHOWN BELOW. THIS INCLUDES CONDUCTOR LENGTHS DIFFERING BY MORE THAN 10%.

FEEDER SCHEDULE:

SIZES ARE BASED ON COPPER (CU) THHN/THWN-2 INSULATION. UNO. NUMBER DESIGNATIONS PRECEDED BY "A" INDICATE THAT THE SIZE IS BASED ON ALUMINUM (AL) WIRE. AL CONDUCTOR SIZES ARE BASED ON XHHW-2 INSULATION. UNO. ALL CONDUCTOR SIZES ARE BASED ON 75 DEG C RATED TERMINATIONS. UNO. CONDUIT SIZES SHOWN ARE APPROPRIATE FOR SCHEDULE 40 PVC, EMT, GRC, IMC AND RMC. ADJUST SIZE AS NEEDED FOR OTHER RACEWAY TYPES. FOR ANY OTHER CONDITIONS MODIFY SIZES PER CODE. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

200	200A, (4)#3/0, (1)#6G, 2" C
205	200A, (4)#3/0, (1)#6G, (1)#6 IG, 2" C
05	GND, #4 COPPER GROUND, 3/4" C
05	GND, #6 COPPER GROUND, 3/4" C
05	GND, #10 COPPER GROUND, 3/4" C
MS	MAIN BONDING JUMPER; #20 AWG COPPER
500A	600A, (2) 3" C, EACH W/ (4) 350kcmil
100	COMM GND, #6 COPPER GROUND, 3/4" C

FAULT CURRENT GENERAL NOTE (ESTIMATED VALUE):

THE MAXIMUM AVAILABLE 3-PHASE SYMMETRICAL FAULT CURRENT VALUE AT THE UTILITY TRANSFORMER SECONDARY POINT OF SERVICE COULD NOT BE DETERMINED AT THE TIME OF THIS SUBMITTAL. THE ESTIMATED WORST CASE VALUE OF 33,309A IS BASED ON AN INFINITE BUS CALCULATION AT THE UTILITY TRANSFORMER. CONTRACTOR SHALL VERIFY ACTUAL AVAILABLE FAULT CURRENT VALUE WITH UTILITY. NOTIFY ENGINEER IF ACTUAL VALUE EXCEEDS ESTIMATED CALCULATED VALUE. ESTIMATED DESIGN VALUE IS BASED ON THE FOLLOWING:
 UTILITY TRANSFORMER SECONDARY VOLTAGE: 208Y/120V, 3Ø, 4W
 UTILITY TRANSFORMER SIZE: 300KVA, Z=2.5%

BUILDING ELECTRICAL SERVICE LOAD SUMMARY			
BUILDING OCCUPANCY TYPE:	A	SERVICE DESCRIPTION:	
BUILDING SQUARE FOOTAGE:	± 3,400	208Y/120V, 3PH	
LOAD DESCRIPTION	Connected KVA	Demand FACTOR	Demand KVA
HVAC - SUMMER	50.01	100%	50.01
HVAC - WINTER	10.43	100%	0.00
LIGHTING (PER NEC-220)	6.80	125%	8.50
RECEPTACLES	14.92	100%/50%	12.46
KITCHEN EQUIPMENT	56.35	65%	36.63
MOTOR LOADS	12.73	100%	12.73
LARGEST MOTOR LOAD	3.96	125%	4.95
SUPPLEMENTAL ELECTRIC HEAT	5.00	100%	5.00
MISCELLANEOUS EQUIPMENT	6.20	100%	6.20
REFRIGERATION EQUIPMENT	13.62	100%	13.62
DISPLAY CASE/SIGNAGE	6.00	125%	7.50
SHOW WINDOW / TRACK LIGHTING	16.96	PER NEC	20.96
EXTERIOR LIGHTING	5.34	125%	6.68
TOTAL LOAD	208.31	KVA	185.23
TOTAL AMPACITY	578	AMPS	514
SERVICE AMPACITY	600	AMPS	600
SPARE CAPACITY		AMPS	66

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 "Point-by-Point" method where:
 ISC (2) = ISC(1) x M(1) M = 1/(1+I)
 ISC (1) = short circuit current at fault point 1
 ISC (2) = short circuit current at fault point 2

Feeder: $I(30) = \frac{1.732 \times L \times I_{sc}}{C \times E}$ XFMR: $I(30) = \frac{I_{sc} \times V_p \times 1.73 \times \%Z}{100,000 \times KVA}$ $I_{sc} = \frac{V_p \times M \times I_{sc}}{V_s}$
 Feeder: $I(10) = \frac{2 \times L \times I_{sc}}{C \times E}$ XFMR: $I(10) = \frac{I_{sc} \times V_p \times \%Z}{100,000 \times KVA}$

VOLTAGE DROP (3Ø):
 $\%VD = \frac{(R \cos(\arccos(pf)) + X \sin(\arccos(pf))) \times L \times I \times 1.73}{E}$
 VOLTAGE DROP (1Ø):
 $\%VD = \frac{(R \cos(\arccos(pf)) + X \sin(\arccos(pf))) \times 2 \times L \times I \times 1}{E}$

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

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 Busman 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 Point (F#)	Bus/Feeder Description	Source (Fault Point)	Phase	Source Isc (amps)	Conduit Type TX	Material	Feeder Quantity of Parallel Sets and Bus/Phase & Neutral Size	Conductor "C" Value	Busway "C" Value	L-L Voltage (E)	Circuit Length (L)	Load Power Factor (pf)	Circuit Load (Amperage)	Conductor			Transformer		Secondary Voltage	Tap Setting	f	M	Fault Current (amps)	Voltage Drop (%VD)	Cumulative Voltage Drop (%VD)	Fault Point (F#)			
														Resistance (R)	Reactance (X)	Arccos (pf)	New Xlms Z	Existing Xlms Z											
1	Utility Service Point			33,309			The connected full load motor amps (includes compressors) on the system																						
2	MDB	1	3	34389	NM	CU	2 Set(s) of 3Ø	350 kcmil	22737	--	208	0.9	490	0.000038	0.000040	0.451027							0.945	0.51	17684	-1.58%	-1.58%	2	
3	P1	2	3	17684	M	CU	1 Set(s) of 3Ø	AWG	12844	--	208	0.9	155	0.000079	0.000052	0.451027							0.115	0.90	15865	-0.12%	-1.70%	3	
4	P2	2	3	17684	M	CU	1 Set(s) of 3Ø	AWG	12844	--	208	0.9	105	0.000079	0.000052	0.451027								0.115	0.90	15865	-0.08%	-1.66%	4

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 Los Angeles, CA 90017
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 2050003215
 EXPIRES 12/31/2021

SEALED SIGNATURE:

10/18/2021
 DEAN W. CHANDLER
 LICENSE # PE-2017036652

C	2021-10-18	ISSUE FOR CONSTRUCTION
B	2021-06-10	ADDENDUM B
A	2021-05-25	ADDENDUM A
	2021-03-15	BID/PERMIT SET
	2021-02-23	75% SET
	2020-11-16	DD SET

NO. BY DATE DESCRIPTION

SHAKE SHACK - CHESTERFIELD MO

17312 CHESTERFIELD AIRPORT ROAD
 CHESTERFIELD, MO 63005
 SHACK #1352

PERMIT SET

ELECTRICAL ONE-LINE DIAGRAM

DRAWN BY: ELT
 CHECKED BY: BLM
 JOB NO: 20087.00

E601

ELECTRICAL KITCHEN EQUIPMENT SCHEDULE											
Equipment Information			Rough-In				Connection Information				NOTES
TAG	DESCRIPTION	AMPS	VOLTS	PHASE	HEIGHT	ORIENT	TERMINATION				
E1	WALK-IN COOLER LTS	1.0	120	1	-	-	JUNCTION BOX ON TOP OF WALK-IN BOX				3, 5
E1A	WALK-IN COOLER EVAPORATOR	2.7	120	1	-	-	WP MOTOR RATED DISCONNECT SWITCH ADJACENT TO EVAPORATOR				3, 4, 6
E1B	WALK-IN COOLER CONDENSER	9.3	208	3	-	-	NEMA 3R DISCONNECT SWITCH AT UNIT, SIZE AS REQUIRED				3, 4, 6
E2	WALK-IN FREEZER LTS	1.0	120	1	-	-	JUNCTION BOX ON TOP OF WALK-IN BOX				3, 5
E2A	WALK-IN FREEZER EVAPORATOR	TBD	TBD	1	-	-	WP MOTOR RATED DISCONNECT SWITCH				3, 4, 6
E2B	WALK-IN FREEZER CONDENSER	9.3	208	1	-	-	NEMA 3R DISCONNECT SWITCH AT UNIT, SIZE AS REQUIRED				3, 4, 6
E29	NITROGEN GENERATOR	8.4	120	1	80"	V	NEMA 5-20R GFCI PROTECTED RECEPTACLE				1
E30	RTI OIL RECYCLING TANKS	15.0	120	1	80"	V	NEMA 5-20R RECEPTACLE				1
E33	SODA B.I.B. SYSTEM	6.5	120	1	72"	V	NEMA 5-20R RECEPTACLE				1
E36	ICE MACHINE	13.5	208	1	80"	V	NEMA L14-20R OR L6-20R TWIST-LOCK PER EQUIPMENT REQUIREMENTS				2
E63	UC DISHWASHER	21.3	208	3	12"	V	NEMA 15-30R RECEPTACLE				2
E73	FOOD PROCESSOR	12.0	120	1	44"	V	NEMA 5-20R GFCI PROTECTED RECEPTACLE				1
E75	IMMERSION BLENDER	2.3	120	1	44"	V	NEMA 5-20R GFCI PROTECTED RECEPTACLE				1
E77	REHEATER	24.0	208	1	44"	V	NEMA 6-30R RECEPTACLE				1
E78	FOOD PROCESSOR	5.0	120	1	44"	V	NEMA 5-20R GFCI PROTECTED RECEPTACLE				1
E90	COOKING HOOD	TBD	120	1	-	-	PROVIDE CONNECTION TO HOOD				5, 7
E91	HOOD EXHAUST FAN	6.3	120	1	-	-	PROVIDE CONNECTION TO EXHAUST FAN				7
E92	HOOD SUPPLY FAN	95.0	208	3	-	-	PROVIDE CONNECTION TO MAKE UP AIR UNIT				1
E93	GREASE COLLECTOR	7.1	120	1	12"	V	NEMA 5-20R RECEPTACLE WITH WP IN-USE COVER				1
E94	HOOD FIRE SUPPRESSION	TBD	120	1	-	-	PROVIDE CONNECTION FIRE SUPPRESSION SYSTEM FOR HOOD				5, 7
E100A	GAS GRIDDLE	2.0	120	1	12"	V	NEMA 5-20R RECEPTACLE WITH WP IN-USE COVER				1
E101	GAS GRIDDLE	2.0	120	1	12"	V	NEMA 5-20R RECEPTACLE WITH WP IN-USE COVER				1
E102	REFRIGERATED BASE	8.7	120	1	12"	V	NEMA 5-20R RECEPTACLE WITH WP IN-USE COVER				1
E102B	REFRIGERATED BASE	8.7	120	1	12"	V	NEMA 5-20R RECEPTACLE WITH WP IN-USE COVER				1
E103A	GAS FRYER	0.7	120	1	12"	V	NEMA 5-20R RECEPTACLE WITH WP IN-USE COVER				1
E103B	FRYER FILTER WITH PUMP	7.5	120	1	12"	V	NEMA 5-20R RECEPTACLE WITH WP IN-USE COVER				1
E104A	GAS FRYER	0.7	120	1	12"	V	NEMA 5-20R RECEPTACLE WITH WP IN-USE COVER				1
E104B	FRYER FILTER WITH PUMP	7.5	120	1	12"	V	NEMA 5-20R RECEPTACLE WITH WP IN-USE COVER				1
E105	FRY DUMP WITH WARMER	9.1	120	1	12"	V	NEMA 5-20R RECEPTACLE WITH WP IN-USE COVER				1
E118	UNDERCOUNTER REFRIGERATOR	2.4	208	1	12"	H	NEMA 5-20R GFCI PROTECTED RECEPTACLE				1
E121	CONVEYOR TOASTER	13.4	208	1	42"	H	NEMA 5-20R RECEPTACLE				1
E122	REFRIGERATED PREP UNIT	9.0	120	1	12"	V	NEMA 5-20R RECEPTACLE				1
E123	WORK TOP FREEZER	4.8	120	1	12"	V	NEMA 5-20R RECEPTACLE				1
E124	TOPPING DISPENSER	8.3	120	1	42"	H	NEMA 5-20R RECEPTACLE				1
E125	KDS SCREEN	1.0	120	1	-	-	PROVIDE DIRECT CONNECTION TO PRE-WIRED OVERSHELF				1
E143	CURVED LID DISPLAY FREEZER	2.3	120	1	12"	V	NEMA 5-20R RECEPTACLE				1
E145	TOPPING DISPENSER	4.3	120	1	42"	H	NEMA 5-20R RECEPTACLE				1
E160	CUSTARD MACHINE	3.3	208	3	12"	V	(2) NEMA L15-20R TWIST-LOCK RECEPTACLE				2
E161	CUSTARD MACHINE REMOTE COND.	14.0	208	3	-	-	NEMA 3R 30A/3P DISCONNECT SWITCH				3, 4, 6
E162	CUSTARD MOBILE FREEZER	6.0	120	1	12"	V	NEMA 5-20R RECEPTACLE				1
E172	CUSTARD DIPPING CABINET	6.5	120	1	12"	V	NEMA 5-20R RECEPTACLE				1
E174	KDS SCREEN	1.5	120	1	56"	V	NEMA 5-20R GFCI PROTECTED RECEPTACLE				1
E181	COLD BEVERAGE DISPENSER	3.9	120	1	42"	H	NEMA 5-20R GFCI PROTECTED RECEPTACLE				1
E182	THREE SPINDLE MIXER	7.5	120	1	42"	H	NEMA 5-20R GFCI PROTECTED RECEPTACLE				1
E184	CONCRETE MIXER	6.4	120	1	42"	H	NEMA 5-20R GFCI PROTECTED RECEPTACLE				1
E188	UC DISHWASHER	21.3	208	3	12"	V	NEMA 15-30R RECEPTACLE				2
E200	WORK TOP REFRIGERATOR	7.3	120	1	12"	V	NEMA 5-20R RECEPTACLE				1
E203	SODA DISPENSER	5.0	120	1	48"	V	NEMA 5-20R RECEPTACLE				1
E204	ICE TEA BREWER	14.4	120	1	42"	H	NEMA 5-20R GFCI PROTECTED RECEPTACLE				1
E206	LEMONADE DISPENSER	5.5	120	1	42"	H	NEMA 5-20R GFCI PROTECTED RECEPTACLE				1
E208	KDS SCREEN	1.5	120	1	56"	V	NEMA 5-20R RECEPTACLE				1
E221	POS EQUIPMENT	1.5	120	1	20"	V	NEMA 5-20R IG AND 5-20R GFCI PROTECTED RECEPTACLES				1
E221A	KIOSK TERMINAL	1.5	120	1	-	-	COORDINATE RECEPTACLE PLACEMENT WITH MILLWORK				1
E224	BEER SYSTEM	12.0	120	1	114"	V	NEMA 5-20R RECEPTACLE FOR CHILLER ABOVE WALK-IN BOX				1
E20	CONVENIENCE RECEPTACLE	1.5	120	1	VARIES	VARIES	NEMA 5-20R GFCI PROTECTED RECEPTACLE				1

GENERAL NOTES:
A. EQUIPMENT CONNECTION SCHEDULE BASED ON ORIGINAL EQUIPMENT SELECTIONS AVAILABLE AT THE TIME OF THIS DESIGN. VERIFY EQUIPMENT SELECTIONS AND ELECTRICAL REQUIREMENTS OF ALL EQUIPMENT BEING PURCHASED WITH EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN AND ADJUST ELECTRICAL PROVISIONS AS NECESSARY PER EQUIPMENT MANUFACTURER'S INSTALLATION REQUIREMENTS.
B. ROUGH-IN INFORMATION SHOWN IS BASED ON KITCHEN ROUGH-IN DRAWINGS AVAILABLE AT THE TIME OF THIS DESIGN. REFER TO FINAL KITCHEN DRAWINGS FOR EXACT LOCATIONS, MOUNTING HEIGHTS, AND ADDITIONAL REQUIREMENTS FOR ALL KITCHEN EQUIPMENT.
HEIGHT: AFF OR AFG TO BOTTOM OF OUTLET BOX UNO.
ORIENT: "H" = HORIZONTAL, "V" = VERTICAL.
C. ALL WP COVERS SHALL BE EXPANDABLE WEATHER PROOF WHILE IN-USE TYPE SEE SPECIFICATIONS
D. PROVIDE PRINTED LABELS FOR ALL DISCONNECT SWITCHES INDICATING THE LOAD SERVED

SCHEDULED NOTES:
1. EQUIPMENT SUPPLIED WITH FACTORY INSTALLED CORD AND PLUG
2. PROVIDE HEAVY DUTY CORD AND MATCHING PLUG AS SCHEDULED
3. PROVIDE LIQUID-TIGHT FLEXIBLE CONDUIT CONNECTION TO ALLOW FOR LOCATION ADJUSTMENTS.
4. PROVIDE DISCONNECT SWITCH IN AN ACCESSIBLE LOCATION WITHIN SIGHT OF THE EQUIPMENT SERVED.
5. EQUIPMENT MAY BE SEPARATED FOR SHIPPING. REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS AND CONNECT COMPLETE.
6. PROVIDE ALL INTERCONNECTIONS TO REMOTE CONDENSING UNIT. REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS AND CONNECT COMPLETE.
7. ROUTE CIRCUIT THROUGH HOOD CONTROL PANEL FOR CONTROL.

PANELBOARD: MDP													
Equipment Information			Rough-In				Connection Information				NOTES		
TAG	DESCRIPTION	AMPS	VOLTS	PHASE	HEIGHT	ORIENT	TERMINATION						
1	RTU-1	7.678	7.678	3	90	3	200	OL	22,086	20,718	PNLBD P1	2	
3	DOAS-1	11,421	11,421	3	110	3	200	OL	20,656	18,336	PNLBD P2	8	
11	SITE POLE LIGHT N	500	500	10	20	2	3	15			SPARE (OFF)	16	
15	SITE POLE LIGHT E	500	500	10	20	2	3	15			SPARE (OFF)	16	
19	SITE POLE LIGHT S	500	500	10	20	2	3	15			SPARE (OFF)	16	
21	SURGE SUPPRESSOR	500	500	10	20	2	3	15			SPARE (OFF)	16	
23	SURGE SUPPRESSOR	500	500	10	20	2	3	15			SPARE (OFF)	16	
25	EUH-1 VESTIBULE HEATER	500	500	10	20	2	3	15	2,500	2,500		26	
27	MONUMENT SIGN	1,200	1,200	10	20	1	1	1			SPACE	30	
31	SPACE										SPACE	32	
33	SPACE										SPACE	34	
35	SPACE										SPACE	36	
37	SPACE										SPACE	38	
39	SPACE										SPACE	40	
41	SPACE										SPACE	42	
SUBTOTAL		20,599	20,599	21,299					45,242	41,554	36,396		
TOTAL PHASE A - VA		65,841							LOAD	CONN. VA	DF		
AMPS		549							COOLING	13,616	1.00		
TOTAL PHASE B - VA		62,153							HEATING	6,000	1.25		
AMPS		518							LIGHTING	56,347	0.65		
TOTAL PHASE C - VA		57,695							RECEPTACLES	14,920	1.0/5		
AMPS		481							MOTORS	16,891	1.00		
TOTAL PNLBD - VA		185,689							SUPP HEAT	5,000	1.00	SHOW WINDOW	182,862 VA
AMPS		515							MISC EQUIP	6,200	1.00	LTG TRACK	508 A

LTG TRACK - TRACK LENGTH
SIGN/DISPLAY - SIGNAGE & DISPLAY CASE

PANELBOARD: P1																					
Equipment Information			Rough-In				Connection Information				NOTES										
TAG	DESCRIPTION	AMPS	VOLTS	PHASE	HEIGHT	ORIENT	TERMINATION														
1	MGR OFFICE DESK RCPTS	720							12	20	1	1	20	12	400				RR-VESTIBULE/HALL-EM LTS	2	EM
3	MGR OFFICE DESK IG RCPTS	720							12	20	1	1	20	12	600				DINING TRACK LTG + EM	4	EM
5	MGR OFFICE RCPTS/BELL								12	20	1	1	20	12					DINING DECORATIVE LTG	6	EM
7	MGR OFFICE SECURITY PANEL	180							12	20	1	1	20	12	1,000				SHOW WINDOW RCPTS S	8	EM
9	MGR OFFICE IT RACK 1	1,000							12	20	1	1	20	12	1,200				INTERIOR SIGNAGE	10	EM
11	MGR OFFICE IT RACK 2	1,000							12	20	1	1	20	12	1,080				SHOW WINDOW RCPTS E + BOOTH	12	EM
13	ORDER COUNTER GEN RCPTS	900							12	20	1	1	20	12	720				SHOW WINDOW RCPTS S	14	EM
15	ORDER COUNTER IG RCPTS	900							12	20	1	1	20	12	720				RESTROOM RCPTS	16	EM
17	KIOSK RCPTS	900							12	20	1	1	20	12	540		1,440		HAND DRYER - MENS RR	18	LOK
19	PICKUP WINDOW POS RCPTS	1,080							12	20	1	1	20	12	1,440				HAND DRYER - WOMENS RR	20	LOK
21	PICKUP WINDOW POS IG RCPTS	1,080							12	20	1	1	15	12	600				EF-1 (RESTROOM EXHAUST)	22	LOK
23	FSMP	500							12	20	1	1	20	12					SPARE (OFF)	24	LOK
25	BACK OF HOUSE RCPTS	816							12	20	1	1	20	12	720				BACK OF HOUSE RCPTS	26	LOK
27	(E1B) WALK-IN CLR CONDENSER	816							12	20	3	1	20	12	900				WATER HEATER 1/RECIRC	28	LOK
29	208/3	816							12	20	1	1	20	12	600				WATER HEATER 2	30	LOK
31	(E2B) WALK-IN FZR CONDENSER	1,072							12	20	2	1	20	12	1,440				(E2B) NITROGEN GENERATOR	32	LOK
33	208/1	1,072							12	20	1	1	20	12	1,440				(E30) OIL RECYCLING TANK	34	GF
35	(E1) WALK-IN CLR LTS/SEVAP																				

LIGHTING CONTROL DEVICE SCHEDULE							
LUTRON VIVE CONTROLLERS							
NETWORK CONTROLLERS							
SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION (W X D)	COVERAGE (W X D)	VOLTAGE	NOTES	
V	LUTRON VIVE HJS-0-FM	N/A	LUTRON VIVE WIRELESS CONTROL HUB, FLUSH-MOUNT ADAPTER, AND POWER SUPPLY.	N/A	120		
MS	LUTRON VIVE CONTROL STATION	N/A	LUTRON VIVE MASTER SWITCH BANK.	N/A	120		
SW	LUTRON VIVE RMS-16R	N/A	LUTRON VIVE 16 AMP SWITCHING POWERPAK MODULE.	N/A	120		
DF	LUTRON VIVE MRF2S-6ND	N/A	LUTRON VIVE FORWARD PHASE DIMMING CONTROLLER MODULE.	N/A	120		
DE	LUTRON VIVE MRF2S-6ELV	N/A	LUTRON VIVE REVERSE PHASE (ELV) DIMMING CONTROLLER MODULE.	N/A	120		
DD	LUTRON VIVE RMS-8TN	N/A	LUTRON VIVE 0-10V DIMMING CONTROLLER MODULE.	N/A	120		
OS	LUTRON VIVE LRF2-OCR2B-P	N/A	LUTRON VIVE CEILING MOUNTED OCCUPANCY SENSOR	N/A	120		

GENERAL NOTES:
A. OCCUPANCY SENSOR LAYOUT DESIGNED FROM BASIS-OF-DESIGN COVERAGE PATTERNS. IF SUBMITTING ALTERNATE PER EQUIVALENT MANUFACTURER COLUMN, ADJUST SENSOR QUANTITIES AND LOCATIONS PER MANUFACTURER-SPECIFIC SPACING CRITERIA.
B. PROVIDE SHOP DRAWINGS FOR ENGINEER AND ARCHITECT REVIEW THAT INCLUDE PRODUCT CUTSHEETS AND PROJECT-SPECIFIC LAYOUTS. LAYOUTS MUST INCLUDE SENSOR LOCATIONS, HEIGHTS, ORIENTATION, AND COVERAGE AREAS. SHOW COORDINATION WITH ALL OTHER CEILING DEVICES INCLUDING BUT NOT LIMITED TO HVAC SUPPLY AND RETURN GRILLES, SPRINKLERS, LIGHT FIXTURES, AND OTHER OWNER-PROVIDED CEILING MOUNTED DEVICES SUCH AS SPEAKERS, SECURITY CAMERAS, PROJECTORS, ETC. (SENSORS MAY BE ADVERSELY AFFECTED IF LOCATED TOO CLOSE TO OTHER CEILING MOUNTED DEVICES). ALSO PROVIDE SCHEMATICS AND SCHEDULES WHEN APPLICABLE.
C. LIGHTING CONTROLS PRICING SHALL BE COMPLETELY SEPARATE OF ANY LIGHT FIXTURE PRICING.
D. VERIFY COLOR(S) FOR ALL WALL AND CEILING MOUNTED DEVICES WITH THE ARCHITECT.
E. ALL WALL SWITCH AND CEILING SENSORS SHALL HAVE AN ADJUSTABLE TIME DELAY RANGE OF 0-30 MIN. UNO. CONFIRM SENSOR SETTINGS WITH SEQUENCE OF OPERATIONS AND OWNER PRIOR TO SYSTEM COMMISSIONING.
F. PROVIDE COPIES OF OPERATION AND MAINTENANCE INSTRUCTIONS FOR ALL DEVICES TO OWNER.
G. PROVIDE A NEUTRAL CONDUCTOR TO ALL WALL SWITCH LOCATIONS PER NEC REQUIREMENTS.
H. DO NOT SHARE NEUTRAL CONDUCTOR ON LOAD SIDE OF DIMMERS.

NOTES:
1. INSTALL CEILING SENSORS WITH CLEAR LINE OF SIGHT TO DOORWAY OPENINGS.

VERSION: 4

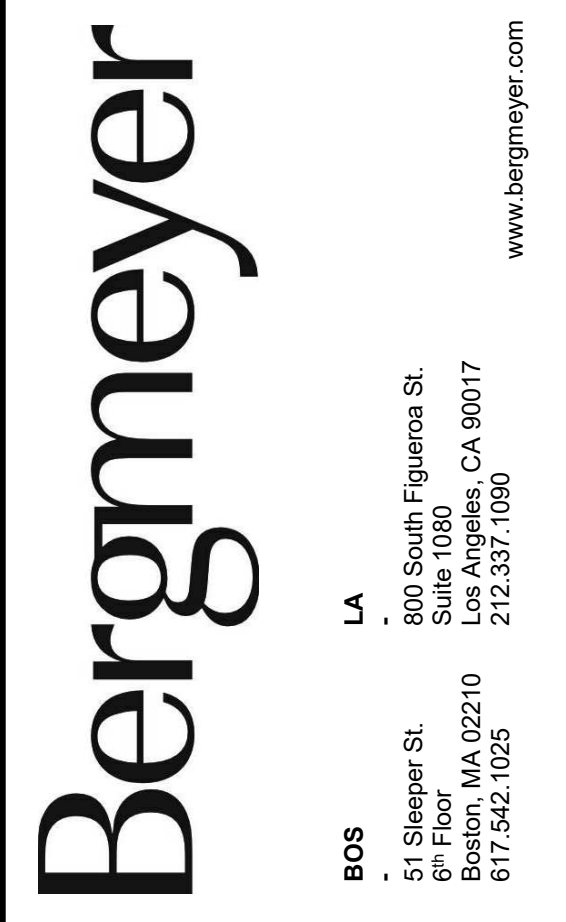
LIGHTING CONTROL SEQUENCE OF OPERATIONS						
ROOM OR AREA	SCENE CONTROL SCHEDULE					NOTE:
DIMMED LIGHTING						
DINING AREA: GENERAL LIGHTING	6:00 AM Scene 1 "MAX" @100%	11:00 AM Scene 2 "DAY" @75%	5 min dusk Scene 3 "EVENING" @50%	11:00 PM Scene 1 "MAX" @100%	12:00 AM Scene 4 "CLOSE" OFF	1
DINING AREA: DECORATIVE LIGHTS, PENDANTS, AND WALL SCONCES	6:00 AM Scene 1 "MAX" @100%	11:00 AM Scene 2 "DAY" @75%	5 min dusk Scene 3 "EVENING" @50%	11:00 PM Scene 1 "MAX" @100%	12:00 AM Scene 4 "CLOSE" OFF	1
DINING AREA: DEDICATED LIGHTING AT ORDERING KIOSKS (WHEN PRESENT)	6:00 AM Scene 1 "MAX" @100%	11:00 AM Scene 2 "DAY" @75%	5 min dusk Scene 3 "EVENING" @75%	11:00 PM Scene 1 "MAX" @100%	12:00 AM Scene 4 "CLOSE" OFF	1
RESTROOM HALLWAY DOWNLIGHTS	6:00 AM Scene 1 "MAX" @100%	11:00 AM Scene 2 "DAY" @75%	5 min dusk Scene 3 "EVENING" @50%	11:00 PM Scene 1 "MAX" @100%	12:00 AM Scene 4 "CLOSE" @10%	1
VESTIBULE DOWNLIGHTS	6:00 AM Scene 1 "MAX" @100%	11:00 AM Scene 2 "DAY" @75%	5 min dusk Scene 3 "EVENING" @50%	11:00 PM Scene 1 "MAX" @100%	12:00 AM Scene 4 "CLOSE" @10%	1
NON-DIMMED LIGHTING						
BACK OF HOUSE & PREP LIGHTING	CONTROLLED BY ROOM OCCUPANCY SENSORS					2
KITCHEN DOWNLIGHTS	CONTROLLED BY TIMECLOCK: ON: 6:00 AM OFF: 12:00AM					2
OFFICE LIGHTING	CONTROLLED BY ROOM OCCUPANCY SENSORS					
RESTROOM LIGHTING	CONTROLLED BY ROOM OCCUPANCY SENSORS					
INTERIOR ILLUMINATED SIGNAGE AND MENU BOARD LIGHTS (WHEN PRESENT)	CONTROLLED BY TIMECLOCK: ON: 15 MIN BEFORE OPEN OFF: 1 HOUR AFTER CLOSE					
EXTERIOR ILLUMINATED SIGNAGE INCLUDING LED TAPE AT BAND OF LETTERS	CONTROLLED BY TIMECLOCK: ON: 15 MIN BEFORE OPEN OFF: 1 HOUR AFTER CLOSE					
EXTERIOR PATIO STRING LIGHTS	CONTROLLED BY TIMECLOCK: ON: 15 MIN BEFORE OPEN OFF: 1 HOUR AFTER CLOSE					
EXTERIOR MOUNTED BUILDING LIGHTING	CONTROLLED BY TIMECLOCK: ON: 30 MIN BEFORE DUSK OFF: 30 MIN AFTER DAWN					
EXTERIOR PARKING LOT LIGHTS	CONTROLLED BY TIMECLOCK: ON: 30 MIN BEFORE DUSK OFF: 2:00 AM					
GENERAL NOTES						
A. HOURS OF OPERATION: CONFIRM ALL TIMECLOCK SCHEDULES WITH OWNER PRIOR TO FINAL PROGRAMMING. OCCUPIED HOURS: 6:00 AM - 12:00 AM DAILY BUSINESS HOURS: 11:00 AM - 11:00 PM DAILY						
B. UPON LOSS OF NORMAL POWER, ALL LIGHTS DESIGNATED AS EMERGENCY SHALL TURN ON AT FULL EMERGENCY BATTERY BACK-UP OUTPUT.						
SCHEDULED NOTES:						
1. PRESET LIGHTING SCENES SHALL BE AUTOMATICALLY INITIATED BY THE ASTRONOMIC CLOCK AND MAY BE TEMPORARILY OVERRIDDEN USING THE MASTER SCENE CONTROL.						
2. KITCHEN AND PREP AREA LIGHTS SHALL REMAIN ON AT 100% THROUGHOUT OCCUPIED HOURS FOR FOOD CODE COMPLIANCE.						

V2020.1

LIGHT FIXTURE SCHEDULE*									
TYPE	MANUFACTURER/MODEL #	LAMPS		INPUT		DESCRIPTION			
		NO.	TYPE	WATTS	VA				
A1	TOPAZ #74246 FL24-50 835 D HE2	-	INTEGRAL LED 80 CRI, 3500°K 6250 LUMENS	50	54.0	120/277	2X4' RECESSED LED PANEL FOR GRID CEILING WITH WHITE ALUMINUM FRAME AND POLYCARBONATE LENS. PROVIDE WITH CABLE SUSPENSION KIT WHERE REQUIRED.		
A1-EM	TOPAZ #74246 FL24-50 835 D HE2 PROVIDE WITH #EMB80-10-UNV 8.5W EM DRIVER	-	INTEGRAL LED 80 CRI, 3500°K 6250 LUMENS	56	60.0	120/277	SIMILAR TO TYPE A1 EXCEPT WITH EMERGENCY LED DRIVER CAPABLE OF OPERATING FIXTURE IN EMERGENCY MODE AT 935 INITIAL LUMENS FOR 90 MINUTES.		
A2	TOPAZ #74236 FL22-30 835 D HE2	-	INTEGRAL LED 80 CRI, 3500°K 3550 LUMENS	32	32.0	120/277	2X2' RECESSED LED PANEL FOR GRID CEILING WITH EXTRUDED ALUMINUM BODY AND POLYCARBONATE LENS. PROVIDE WITH CABLE SUSPENSION KIT WHERE REQUIRED.		
A2-EM	TOPAZ #74236 FL22-30 835 D HE2 PROVIDE WITH #EMB80-10-UNV 8.5W EM DRIVER	-	INTEGRAL LED 80 CRI, 3500°K 3550 LUMENS	32	32.0	120/277	SIMILAR TO TYPE A2 EXCEPT WITH EMERGENCY LED DRIVER CAPABLE OF OPERATING FIXTURE IN EMERGENCY MODE AT 935 INITIAL LUMENS FOR 90 MINUTES.		
B1	BEST LIGHTING PRODUCTS LEDUC-E24-3K WITH CORDFLUG-WHT-6C3P	-	INTEGRAL LED 80 CRI, 3000°K 865 LUMENS	10	9.7	120	LINEAR UNDER CABINET LED TASK LIGHT WITH INTEGRAL ON/OFF SWITCH AND WHITE CORD FOR PLUG-IN CONNECTION.		
CS (WHITE)	JUNO #R552WH TRACK HEAD WITH TRAC-MASTER 1-CIRCUIT TRACK LIGHTING SYSTEM PROVIDE CURRENT LIMITING DEVICE PER PLANS 1A=TCL1WH, 2A=TCL2WH, 3A=TCL3WH, 4A=TCL4WH	1	TCP #LED12P30D27KNFL 80 CRI, 2700°K 850 LUMENS, 29" NFL	10.5	12.0	120	NOMINAL 1-3/8" W BY 3/4" H, 1-CIRCUIT LIGHTING TRACK WITH TRACK HEADS AS SHOWN FINISH IN LENGTHS AS SHOWN WITH ALL REQUIRED CONNECTORS AND HARDWARE. PROVIDE CURRENT LIMITING END FEED DEVICE AND CHANNEL STRUT SUSPENDED FROM STRUCTURE ABOVE FOR MOUNTING. TRACK AND FIXTURES SHALL HAVE WHITE FINISH.		
E1W	BEST LIGHTING #R-16-LED (WHITE HOUSING)	2	3.3W LED 219 LUMENS (INCLUDED)	4	4.0	120/277	SELF CONTAINED EMERGENCY LIGHTING UNIT WITH WHITE THERMOPLASTIC HOUSING (2) 6 VOLT, 3.3 WATT LED HEADS AND SEALED MAINTENANCE FREE LEAD ACID BATTERY TO POWER HEADS FOR MINIMUM 90 MINUTES.		
E3W	BEST LIGHTING #R-16-HO-LED (WHITE HOUSING)	2	3.3W LED 219 LUMENS (INCLUDED)	4	4.0	120/277	SELF CONTAINED EMERGENCY LIGHTING UNIT WITH WHITE THERMOPLASTIC HOUSING (2) 6 VOLT, 3.3 WATT LED HEADS AND SEALED MAINTENANCE FREE LEAD ACID BATTERY WITH REMOTE CAPACITY TO POWER INTEGRAL AND REMOTE HEADS FOR MIN. 90 MINUTES.		
E4	BEST LIGHTING #RHLED-2-WP-MV-B (BLACK HOUSING)	2	1W LED (INCLUDED)	N/A	N/A	6V	EXTERIOR REMOTE HEADS ACCESSORY WITH (2) 6V 1W LED HEADS. CONNECT TO INTERIOR EMERGENCY FIXTURE INDICATED.		
EX1	BEST LIGHTING #ELZXTU-01-G-C-A-EM (FRONT OF HOUSE X-RAY MOUNT)	-	GREEN LEDES (INCLUDED)	4	3.8	120/277	SURFACE CEILING/WALL MOUNT EDGE LIT LED EXIT SIGN WITH CLEAR PANEL, GREEN LETTERS AND BRUSHED ALUMINUM FINISH. INTEGRAL Ni-CAD BATTERY CAPABLE OF 90 MINUTES OF EMERGENCY OPERATION. UL 924 COMPLIANT. REFER TO PLANS FOR CEILING OR WALL MOUNT, CHEVRON ARROWS AND NUMBER OF FACES REQUIRED.		
EX2	BEST LIGHTING #ELXTEU X R W W EM SDT (BACK OF HOUSE AND EMPLOYEE AREAS ONLY)	-	RED LEDES (INCLUDED)	4	3.6	120/277	UNIVERSAL MOUNT LED EXIT SIGN WITH RED LETTERS, WHITE THERMOPLASTIC HOUSING, NIMH BATTERY AND DRYWALL FLANGLESS MOUNTING. REFER TO PLANS FOR CHEVRON ARROWS AND NUMBER OF FACES REQUIRED.		
L2	DIODE LED DI-12V-DB27-8009 LED TAPE WITH ALUMINUM CHANNEL AND FROSTED LENS	-	INTEGRAL LED 83 CRI, 2700°K 517 LUMENS/FT	5.75/1F	5.75/1F	12VDC	LINEAR HIGH OUTPUT FLEXIBLE LED TAPE LIGHTING. PROVIDE WITH REMOTE LED DRIVERS AND CONNECT WITH LOW VOLTAGE CABLING TO START OF EACH RUN AS REQUIRED PROVIDE WITH ALL REQUIRED CONNECTORS AND MOUNTING HARDWARE.		
LF5	WETBEAM-4 LED WBR-LED-900-80-27-S-5-W-UNV-DP-1-D	-	INTEGRAL LED 80 CRI, 2700°K 900 LUMENS/FT	9.90W/FT	9.90W/FT	120/277	5' LINEAR LED BEAM FIXTURE CAPABLE OF OUTPUTTING 4,500 LUMENS. WHITE FINISH WITH SATIN LENS AND DRYWALL FLANGLESS MOUNTING.		
LF5-EM	WETBEAM-4 LED WBR-LED-900-80-27-S-5-W-UNV-DP-1-D-B	-	INTEGRAL LED 80 CRI, 2700°K 900 LUMENS/FT	9.90W/FT	9.90W/FT	120/277	SIMILAR TO TYPE "LF5" BUT WITH OPTIONAL INTEGRAL EMERGENCY BATTERY BACKUP.		
LS1	SONNEMAN THIN-LINE 3' LED INDIRECT WALL BAR	-	INTEGRAL LED 90 CRI, 3000°K 1110 LUMENS	19	22	120	DECORATIVE LED SCENCE LIGHT FIXTURE WITH REMOTE POWER SUPPLY.		
N	NOTIFICATION LIGHT TBD	-	TBD	TBD	TBD	TBD	NOTIFICATION LIGHT TO BE DETERMINED. REFER TO ARCHITECTURAL SCHEDULES FOR MORE INFORMATION.		
R1	JUNO #IC1422LEDG4 27K 1 WITH 24W-WH TRIM	-	INTEGRAL LED 90 CRI, 2700°K 1400 LUMENS	20	20.4	120	RECESSED 6" LED DOWN LIGHT WITH IC HOUSING, CONICAL WHITE Baffle AND TRIM RING UL LISTED FOR THROUGH-BRANCH WIRING AND DAMP LOCATIONS ELV DIMMABLE LED DRIVER		
R2	JUNO #IC4AL 07LM 27K 90CRI FL 120 FRPC WITH 42L PTSC TRIM AND DIFF 200 LENS	-	INTEGRAL LED 90 CRI, 2700°K 700 LUMENS	10.5	12.0	120	RECESSED 4" ADJUSTABLE LED DOWN LIGHT WITH IC HOUSING, AND SATIN CHROME TRIM RING. UL LISTED FOR THROUGH-BRANCH WIRING AND DAMP LOCATIONS ELV DIMMABLE LED DRIVER		
R4	JUNO #M1LQ2-27K-80 CRI-NFL-SN WITH TL602E-60-WH REMOTE 60W 120/12 VOLT TRANSFORMER	-	INTEGRAL LED 80 CRI, 2700°K 287 LUMENS, 24" NFL	5	5.0	120/12	RECESSED 2" LED DOWNLIGHT WITH MINIATURE GIMBAL HOUSING AND SATIN NICKEL FINISH. PROVIDE WITH REMOTE MOUNTED 120/12 VOLT POWER SUPPLY ELV DIMMABLE LED DRIVER (REMOTE)		
XB	TECH LIGHTING 7000BARX3 830 36 B UNV	-	INTEGRAL LED 80 CRI, 3000°K 1360 LUMENS	15.3	15.3	120	EXTERIOR 36" TALL LIGHTED BOLLARD FIXTURE WITH LED LIGHT SOURCE, ALUMINUM HOUSING AND BLACK FINISH. PROVIDE FIXTURE WITH CONCRETE BASE FOR INSTALLATION.		
XL	DIODE LED DI-12V-0160 BLAZE LED TAPE PROVIDE WITH REMOTE POWER SUPPLY	-	INTEGRAL LED 70 CRI, 3000°K 240 LUMENS/FT	3/1F	3/1F	12VDC	EXTERIOR LINEAR FLEXIBLE LED TAPE LIGHTING. PROVIDE WITH REMOTE LED DRIVERS AND CONNECT WITH LOW VOLTAGE CABLING TO START OF EACH RUN AS REQUIRED PROVIDE WITH ALL REQUIRED CONNECTORS AND MOUNTING HARDWARE.		
XW3-EM	LUMARK XTORBA-N-CBP	-	INTEGRAL LED 70 CRI, 3500°K 6468 LUMENS	110	116.4	120	SIMILAR TO TYPE XW3 EXCEPT WITH INTEGRAL EMERGENCY BATTERY CAPABLE OF OPERATING FIXTURE IN EMERGENCY MODE AT 468 INITIAL LUMENS FOR 90 MINUTES.		
XC4	MINKA AIRE F753-KA EXTERIOR FAN	-	N/A	47	50.4	120	EXTERIOR WET LOCATION 54" CEILING FAN WITH 3 BLADES AND WET LOCATION HOUSING.		
*LIGHT FIXTURES AND LAMPS SHALL BE OBTAINED THROUGH SHAKE SHACK NATIONAL ACCOUNT. REFER TO SHEET T002 / NATIONAL ACCOUNTS LIST FOR MORE INFORMATION.									
LIGHT FIXTURE SCHEDULE NOTES:									
1. CATALOG NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER WITH CATALOG NUMBERS ONLY. FIRST READ THE COMPLETE DESCRIPTION, NOTES, AND SPECIFICATIONS IN CONJUNCTION WITH THE CATALOG NUMBER TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.									
2. CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING ALL FIXTURES OF DEBRIS, INCLUDING THE INTERIOR OF REFLECTORS TO REMOVE FINGERPRINTS.									
3. REFER TO LIGHTING PLANS AND ARCHITECTURAL DRAWINGS AND DETAILS FOR EXACT LOCATIONS, MOUNTING HEIGHTS, TRACK LENGTH AND ADDITIONAL MOUNTING INFORMATION PRIOR TO INSTALLATION.									
COORDINATE EXACT LOCATIONS OF ALL LIGHT FIXTURES WITH ARCHITECT PRIOR TO ROUGH-IN.									
4. CONTRACTOR SHALL SUPPLY A COMPLETE AND OPERATIONAL SYSTEM TO COMPLY WITH DESIGN INTENT.									
5. ALL LIGHT FIXTURES IN FOOD PREP AREAS SHALL BE PROVIDED WITH PROTECT-ALLAMP COVERS OR EQUIVALENT SHIELDED OR SHATTERPROOF LAMPS.									
CONTRACTOR SHALL VERIFY THAT ALL AREAS ARE PROPERLY PROTECTED AFTER SET-UP IS COMPLETE.									
6. PROVIDE FACTORY-INSTALLED MAXIMUM WATTAGE LABEL ON MEDIUM SCREW BASE LIGHT FIXTURES THAT CORRESPONDS TO THE MAXIMUM WATTAGE INDICATED IN THE LIGHT FIXTURE SCHEDULE.									
7. PROVIDE NOT LESS THAN (10) SPARE LAMPS OF EACH TYPE USED ON THE PROJECT TO THE OWNER AT PROJECT TURNOVER.									

SEE 2019.3

ELECTRICAL TRACK LIGHTING MODULE UPDATE DATE: 07/19/2021 SCALE: AS INDICATED REVISION TO SHEET: E620	ESK 02
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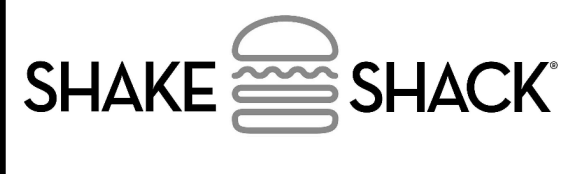
CONSULTANTS:

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2050003215
EXPIRES 12/31/2021

SEAL SIGNATURE:

STATE OF MISSOURI
DEAN W. CHANDLER
PROFESSIONAL ENGINEER
NUMBER PE-2017036652
10/18/2021
DEAN W. CHANDLER
LICENSE # PE-2017036652

C	2021-10-18	ISSUE FOR CONSTRUCTION
B	2021-06-10	ADDENDUM B
A	2021-05-25	ADDENDUM A
	2021-03-15	BID/PERMIT SET
	2021-02-23	75% SET
	2020-11-16	DD SET



SHAKE SHACK - CHESTERFIELD MO

17312 CHESTERFIELD AIRPORT ROAD
CHESTERFIELD, MO 63005
SHACK #1352

PERMIT SET

ELECTRICAL LIGHTING SCHEDULES

DRAWN BY:	ELT
CHECKED BY:	BLM
JOB NO:	20087.00

E620



COMcheck Software Version 4.1.5.1 Interior Lighting Compliance Certificate

Project Information
 Energy Code: 2015 IECC
 Project Title: Shake Shack
 Project Type: New Construction

Construction Site: 17312 Chesterfield Airport Road, Chesterfield, MO 63005
 Owner/Agent: Shake Shack
 Designer/Contractor: Henderson Engineers Inc., Lenexa, KS

Additional Efficiency Package(s)
 Reduced interior lighting power. Requirements are implicitly enforced within interior lighting allowance calculations.

A Area Category	B Floor Area (ft ²)	C Allowed Watts / ft ²	D Allowed Watts (B X C)
1-SHAKE SHACK (Dining; Cafeteria/Fast Food)	3425	0.81	2774
Total Allowed Watts = 2774			

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
1-SHAKE SHACK (Dining; Cafeteria/Fast Food)				
LED 1 copy 9: XL: LED TAPE LIGHT: Other:	1	40	3	120
Track lighting 1: CS: TRACK LIGHTING: Wattage based on current limiting device capacity	0	0	600	600
LED 1 copy 8: R4: 60W TRANSFORMER: Other:	1	2	60	120
LED 1 copy 7: R2: 4" LED DOWNLIGHT: Other:	1	22	11	242
LED 1 copy 6: R1: 6" LED DOWNLIGHT: Other:	1	26	20	520
LED 1 copy 5: LS1: LED SCONCE: Other:	1	7	19	133
LED 1 copy 2: B1: UNDERCABINET LTG: Other:	1	2	10	20
LED 1 copy 3: L2: LINEAR LED TAPE LTG: Other:	1	1	20	20
LED 1 copy 1: A2/A2-EM: 2X4 LED TROFFER: Other:	1	5	32	160
LED 1: A1/A1-EM: 2X4 LED TROFFER: Other:	1	7	50	350
Total Proposed Watts = 2285				

Interior Lighting PASSES: Design 18% better than code

Interior Lighting Compliance Statement

Compliance Statement: The proposed interior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 2015 IECC requirements in COMcheck Version 4.1.5.1 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Evan Talbot - Electrical Designer
 Name - Title: Signature: Date: 03/12/2021

Project Title: Shake Shack Report date: 03/12/21
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COMcheck Software Version 4.1.5.1 Exterior Lighting Compliance Certificate

Project Information
 Energy Code: 2015 IECC
 Project Title: Shake Shack
 Project Type: New Construction
 Exterior Lighting Zone: 2 (Neighborhood business district)

Construction Site: 17312 Chesterfield Airport Road, Chesterfield, MO 63005
 Owner/Agent: Shake Shack
 Designer/Contractor: Henderson Engineers Inc., Lenexa, KS

Allowed Exterior Lighting Power

A Area/Surface Category	B Quantity	C Allowed Watts / Unit	D Tradable Wattage	E Allowed Watts (B X C)
DINING CANOPY (Free standing/attached sales canopy)	463 ft ²	0.6	Yes	278
DRIVE THRU CANOPY (Drive-up windows/doors)	1 windows	400	No	400
REAR EXIT AREA (Other door (not main entry))	4 ft of door	20	Yes	80
Total Tradable Watts (a) =				358
Total Allowed Watts =				758
Total Allowed Supplemental Watts (b) =				600

(a) Wattage tradeoffs are only allowed between tradable areas/surfaces.
 (b) A supplemental allowance equal to 600 watts may be applied toward compliance of both non-tradable and tradable areas/surfaces.

Proposed Exterior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
DINING CANOPY (Free standing/attached sales canopy 463 ft²): Tradable Wattage				
LED 1: LFS: LINEAR LED: Other:	1	13	50	650
DRIVE THRU CANOPY (Drive-up windows/doors 1 windows or doors): Non-tradable Wattage				
LED 1 copy 2: R2: 4" LED DOWNLIGHT: Other:	1	2	11	22
REAR EXIT AREA (Other door (not main entry) 4 ft of door width): Tradable Wattage				
LED 1 copy 1: XW3-EM: WALL SCONCE: Other:	1	1	110	110
Total Tradable Proposed Watts = 760				

Exterior Lighting PASSES: Design 21% better than code

Exterior Lighting Compliance Statement

Compliance Statement: The proposed exterior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed exterior lighting systems have been designed to meet the 2015 IECC requirements in COMcheck Version 4.1.5.1 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Evan Talbot - Electrical Designer
 Name - Title: Signature: Date: 03/12/2021

Project Title: Shake Shack Report date: 03/12/21
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COMcheck Software Version 4.1.5.1 Inspection Checklist

Energy Code: 2015 IECC

Requirements: 100.0% were addressed directly in the COMcheck software

Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [PR4] ¹	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the interior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include interior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C103.2 [PR8] ¹	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the exterior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include exterior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C406 [PR9] ¹	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the additional energy efficiency package options.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

High Impact (Tier 1) Medium Impact (Tier 2) Low Impact (Tier 3)

Project Title: Shake Shack Report date: 03/12/21
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Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.2.1 [EL15] ¹	Lighting controls installed to uniformly reduce the lighting load by at least 50%.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C405.2.1 [EL18] ¹	Occupancy sensors installed in required spaces.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C405.2.1, C405.2.2, C405.2.3 [EL23] ²	Independent lighting controls installed per approved lighting plans and all manual controls readily accessible and visible to occupants.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C405.2.2 [EL22] ²	Automatic controls to shut off all building lighting installed in all buildings.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C405.2.3 [EL16] ²	Daylight zones provided with individual controls that control the lights independent of general area lighting.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Sidelight zones on first floor in Group A-2 and M occupancies.
C405.2.3, C405.2.3, C405.2.3, C405.2.3 [EL20] ¹	Primary sidelighted areas are equipped with required lighting controls.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Sidelight zones on first floor in Group A-2 and M occupancies.
C405.2.3, C405.2.3, C405.2.3, C405.2.3 [EL21] ¹	Enclosed spaces with daylight area under skylights and rooftop monitors are equipped with required lighting controls.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Requirement does not apply.
C405.2.4 [EL4] ¹	Separate lighting control devices for specific uses installed per approved lighting plans.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C405.2.4 [EL8] ¹	Additional interior lighting power allowed for special functions per the approved lighting plans and is automatically controlled and separated from general lighting.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C405.2.5 [EL25] ^{1(a)}	Automatic lighting controls for exterior lighting installed. Controls will be daylight controlled, set based on business operation time-of-day, or reduce connected lighting > 30%.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C405.3 [EL6] ¹	Exit signs do not exceed 5 watts per face.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

High Impact (Tier 1) Medium Impact (Tier 2) Low Impact (Tier 3)

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Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C303.3, C408.2.5, [F17] ³	Furnished O&M instructions for systems and equipment to the building owner or designated representative.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C405.4.1 [F18] ¹	Interior installed lamp and fixture lighting power is consistent with what is shown on the approved lighting plans, demonstrating proposed watts are less than or equal to allowed watts.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	See the Interior Lighting fixture schedule for values.
C405.5.1 [F19] ¹	Exterior lighting power is consistent with what is shown on the approved lighting plans, demonstrating proposed watts are less than or equal to allowed watts.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	See the Exterior Lighting fixture schedule for values.
C408.2.5, [F16] ³	Furnished as-built drawings for electric power systems within 90 days of system acceptance.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C408.3 [F13] ³	Lighting systems have been tested to ensure proper calibration, adjustment, programming, and operation.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

High Impact (Tier 1) Medium Impact (Tier 2) Low Impact (Tier 3)

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CONSULTANTS:



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 TEL 913.742.5000 FAX 913.742.5001
 WWW.HENDERSONENGINEERS.COM
 2050003215
 EXPIRES 12/31/2021

SEALED SIGNATURE:



10/18/2021

DEAN W. CHANDLER
 LICENSE # PE-2017036652

NO.	BY	DATE	DESCRIPTION
C		2021-10-18	ISSUE FOR CONSTRUCTION
B		2021-08-10	ADDENDUM B
A		2021-05-25	ADDENDUM A
		2021-03-15	BID/PERMIT SET
		2021-02-23	75% SET
		2020-11-16	DD SET



SHAKE SHACK -
 CHESTERFIELD MO

17312 CHESTERFIELD AIRPORT ROAD
 CHESTERFIELD, MO 63005
 SHACK #1352

PERMIT SET

ELECTRICAL ENERGY
 CODE COMPLIANCE

DRAWN BY: ELT

CHECKED BY: BLM

JOB NO: 20087.00

E630