MECHANICAL LEGEND

SUPPLY DUCT UP	PIPING DOWN
SUPPLY DUCT DOWN	PIPING UP
RETURN DUCT UP	TURNING VANES
RETURN DUCT DOWN	VOLUME DAMPER
FIRE DAMPER	CONDENSATE DRAIN
SMOKE DAMPER	MOTORIZED DAMPER
COMB. FIRE/SMOKE DAMPER	REMOTE ANNUNCIATOR
BACKDRAFT DAMPER	REMOTE TEMP. SENSOR
SMOKE DETECTOR	THERMOSTAT
SPIN-IN WITH VOLUME DAMPER	HUMIDISTAT
45° RETURN DUCT TAP WITH VOL. DAMPER	FLEX DUCT
DIFFUSER	LINEAR DIFFUSER WITH FLEX CONNECTION
DIFFUSER WITH FLEX CONNECTION	ROUND DUCT UP
GRILLE/REGISTER	ROUND DUCT DOWN
SIDEWALL GRILLE/ REGISTER/ DIFFUSER	REDUCER

ABBREVIATIONS

(A)	EXISTING TO BE ABANDONED	FPI	FINS PER INCH
(D)	EXISTING TO BE DEMOLISHED	GC	GENERAL TRADES CONTRACTOR
(E)	EXISTING TO REMAIN	ID	INNER DIAMETER
(F)	FUTURE	LAT	LEAVING AIR TEMPERATURE
(R)	EXISTING TO BE RELOCATED	LWT	LEAVING WATER TEMPERATURE
AAV	AUTOMATIC AIR VENT	MAU	MAKEUP AIR UNIT
AFF	ABOVE FINISHED FLOOR	MC	MECHANICAL CONTRACTOR
AHJ	AUTHORITY HAVING JURISDICTION	MFR	MANUFACTURER
AMB	AMBIENT	N/A	NOT APPLICABLE
APD	AIR PRESSURE DROP	NC	NORMALLY CLOSED
BAS	BUILDING AUTOMATIC SYSTEM	NO	NORMALLY OPEN
BFP	BACKFLOW PREVENTER	NTS	NOT TO SCALE
BLDG	BUILDING	OA	OUTSIDE AIR
BOB	BOTTOM OF BEAM	OD	OUTSIDE DIAMETER
BOD	BOTTOM OF DUCT	PD	PRESSURE DROP
BOP	BOTTOM OF PIPE	PRV	PRESSURE REDUCING VALVE
BOS	BOTTOM OF STRUCTURE	RA	RETURN AIR
CL	CENTER LINE	REL	RELIEF AIR
DB	DRY BULB	RTU	ROOFTOP UNIT
DIA	DIAMETER	SA	SUPPLY AIR
DN	DOWN	SCC	SENSIBLE COOLING CAPACITY
EA	EXHAUST AIR	SP	STATIC PRESSURE
EAT	ENTERING AIR TEMPERATURE	TCP	TEMPERATURE CONTROL PANEL
EC	ELECTRICAL CONTRACTOR	TSP	TOTAL STATIC PRESSURE
EF	EXHAUST FAN	TYP	TYPICAL
EFF	EFFICIENCY	UNO	UNLESS NOTED OTHERWISE
EG	ETHYLENE GLYCOL	VFD	VARIABLE FREQUENCY DRIVE
ESP	EXTERNAL STATIC PRESSURE	WB	WET BULB
EWT	ENTERING WATER TEMPERATURE	WG	WATER GAUGE
EXH	EXHAUST	WPD	WATER PRESSURE DROP

GENERAL NOTES:

A. ALL WORK TO BE PERFORMED TO MEET ALL STATE, CITY & LOCAL CODE REQUIREMENTS.

B. ALL WALL PATCHING TO BE BY GC.

C. MC IS TO COORDINATE WITH OTHER TRADES BEFORE INSTALLING DUCTWORK. IF THE MC FAILS TO COORDINATE WITH OTHER TRADES AND THE WORK MUST BE ALTERED THE MC WILL CHANGE IT AT HIS OWN EXPENSE.

D. COORDINATE THE EXACT LOCATION OF ALL GRILLES, REGISTERS & DIFFUSER WITH ARCHITECTURAL REFLECTED CEILING PLAN.

E. MECHANICAL CONTRACTOR IS TO VISIT THE SITE PRIOR TO SUBMITTING A BID & INCLUDE IN THE BID ANY ITEMS NECESSARY FOR A COMPLETE & OPERATIONAL SYSTEM.

F. DRAWINGS ARE SCHEMATIC IN NATURE & MC IS TO INCLUDE ANY ITEMS REQUIRED FOR A COMPLETE & OPERATIONAL SYSTEM WHETHER SHOWN OR NOT SHOWN ON THE DRAWINGS.

G. MC TO FURNISH ALL PERMITS REQUIRED FOR HIS PORTION OF THE WORK.

H. MC TO COORDINATE WITH ELECTRICAL CONTRACTOR CONCERNING ELECTRICAL REQUIREMENTS BEFORE ORDERING ANY EQUIPMENT.

I. CONTRACTOR IS RESPONSIBLE FOR ADHERING TO THE ENTIRETY OF THIS DRAWING SET, INCLUDING BUT NOT LIMITED TO; PLANS, ELEVATIONS, DETAILS, SCHEDULES, AND SPECIFICATIONS. CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF ALL DRAWINGS OF OTHER TRADES, INCLUDING BUT NOT LIMITED TO, ARCHITECTURAL, PLUMBING, ELECTRICAL, CIVIL, AND STRUCTURAL.

J. ALL CUTTING AND PATCHING OF ROOF IS TO BE BY GC.

SEQUENCE OF OPERATION

A. PROVIDE STAND ALONE OR APPLICATION SPECIFIC CONTROLLERS AS REQUIRED TO PERFORM THE FOLLOWING SEQUENCES OF OPERATIONS.

B. PACKAGED ROOFTOP UNITS
1. UNIT SHALL CONSIST OF SUPPLY AIR FAN, FILTERS, DX COOLING COIL, GAS-FIRED HEAT SECTION, AND A 7-DAY PROGRAMMABLE THERMOSTAT.
2. PROVIDE AN OVERRIDE SWITCH TO OPERATE THE UNIT DURING UNOCCUPIED HOURS. THIS SWITCH SHALL BE PART OF THE PROGRAMMABLE THERMOSTAT. OVERRIDE SWITCH ALLOWS THE UNIT TO OPERATE FOR TWO HOURS (ADJUSTABLE).
3. OCCUPIED MODE: BASED ON THE ROOFTOP UNIT'S HOURS OF OCCUPANCY, START THE UNIT AT THE BEGINNING OF OCCUPANCY AND SHUT DOWN THE UNIT AT THE END OF OCCUPANCY (NOTE: OUTSIDE AIR DAMPER WITHIN THE RTU SHALL OPEN AND THEN THE RTU SHALL START). THE UNIT SHALL START EARLIER AS DETERMINED BY THE PROGRAM FOR EARLY WARM-UP OR COOL DOWN. ON A SYSTEM STARTUP, THE RTU FAN SHALL START AND RUN CONTINUOUSLY AND THE INTERNAL FACTORY CONTROLS SHALL BE ENABLED, BASED ON THE SPACE TEMPERATURE SENSOR. THE UNIT SHALL CYCLE THE HEATING/COOLING TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.
   3.1. ECONOMIZER MODE: WHEN ENTHALPY OF OA IS BELOW 28 BTU/LB, ECONOMIZER MODE SHALL BE ENABLED. ECONOMIZER MODE SHALL LINEARLY MODULATE OUTDOOR AIR CFM FROM MINIMUM OA CFM TO 100% BASED ON ENTHALPY READINGS.
   3.2. HUMIDITY CONTROL (WHEN NEEDED BASED ON CLIMATE). UPON DETECTION OF RELATIVE HUMIDITY ABOVE 55%, THE UNIT SHALL CYCLE INTO DEHUMIDIFICATION MODE IF NOT ALREADY IN COOLING.
4. UNOCCUPIED MODE: THE RTU INTERNAL OA DAMPERS SHALL REMAINED CLOSED WHEN THE BUILDING IS NOT OCCUPIED. THE RTU SHALL STOP HEATING/COOLING AND THE FAN SHALL STOP. IF THE SPACE TEMPERATURE FALLS BELOW 60 DEGREE F (ADJUSTABLE), THE UNIT SHALL START AND HEAT UNTIL THE SPACE TEMPERATURE IS 64 DEGREE F (ADJUSTABLE) AND THEN SHUTDOWN. IF THE SPACE TEMPERATURE RISES ABOVE 85 DEGREE F (ADJUSTABLE), THE UNIT SHALL START AND COOL UNTIL THE SPACE TEMPERATURE IS 80 DEGREE F (ADJUSTABLE) AND THEN SHUTDOWN.
5. UPON DETECTION OF SMOKE BY UNIT SMOKE DETECTOR BOTH RTUS SHALL SHUT DOWN AND AN ALARM SHALL BE SENT TO THE FIRE ALARM CONTROL PANEL (WHERE APPLICABLE). LOCAL REMOTE ANNUNCIATORS SHALL ALSO BE ACTIVATED.

C. KITCHEN HOOD EXHAUST FAN (KEF-1)
1.1. THE KITCHEN HOOD EXHAUST FAN SHALL BE ENABLED WHEN ANY COOKING APPLIANCE LOCATED UNDER ITS RESPECTIVE HOOD, IS IN USE.

D. MAKE UP AIR UNIT
1.1. THE MAKE UP AIR UNIT SHALL BE ENABLED WHEN THE KITCHEN HOOD EXHUAST FAN (KEF-1) IS ENERGIZED. THE INTERNAL MOTORIZED DAMPER WITHIN WITH MAU-1 SHALL OPEN AND THE FAN SHALL RUN. IF OA IS LESS THAN 65° (ADJ.), THE MAU-1 GAS-FIRED HEAT SECTION SHALL BE ENABLED TO MAINTAIN A MINIMUM OF 65°.
1.2. WHEN KEF-1 IS OFF, MAU-1 SHALL BE DE-ENERGIZED AND THE INTERNAL MOTORIZED DAMPER SHALL CLOSE.

E. ANSUL SYSTEM ACTIVATION
1.1. UPON ACTIVATION OF ANSUL SYSTEM, SHUT DOWN MAU-1, RTU-1 AND RTU-2. PROVIDE RELAYS, CONTACTS, INTERLOCKS, TRANSFORMERS AND ALL ASSOCIATED WIRING TO ACCOMPLISH SEQUENCE. MAU-1 IS ALREADY PREWIRED TO SHUT DOWN IN HOOD CONTROL PANEL. MECHANICAL CONTRACTOR SHALL INTERLOCK RTU-1 AND RTU-2 TO ALSO SHUT DOWN.

CORE STATES GROUP
135 Wolter Street
Naperville, IL 60540
312.718.5415
corestates.com

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CAVA - CANTON MI
43450 FORD ROAD
CANTON, MI 48187
FOR
CAVA
14 Ridge Square NW #500, WASHINGTON, DC 20016

AOR PROJECT NUMBER:
CAV.38002

ISSUE	DATE
PERMIT SET	AUG 2, 2024
BID SET	SEP 18, 2024
1 BLDG RESPONSE	NOV 15, 2024
2 CONSTR SET	JAN 8, 2025

GENERAL INFORMATION MECHANICAL

SHEET:
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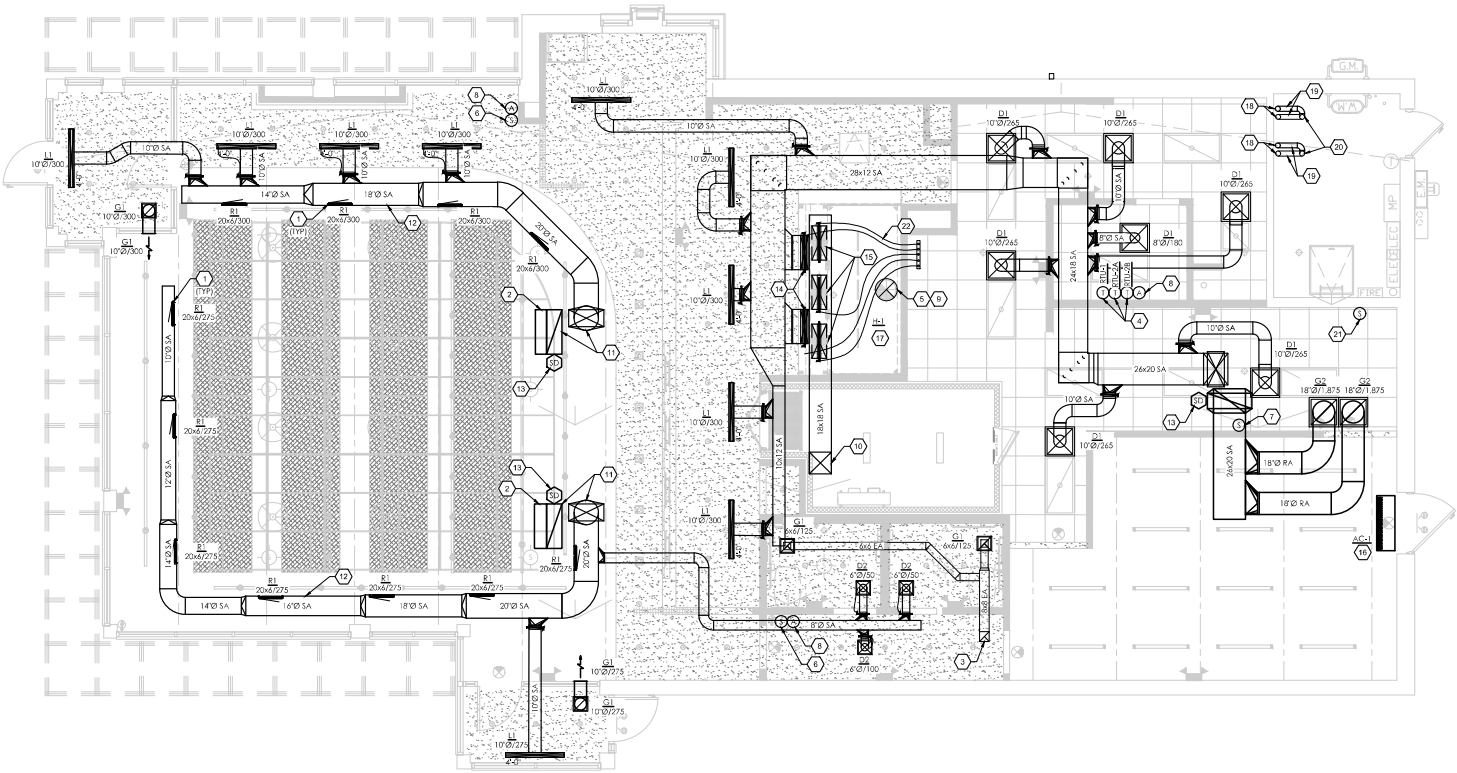

GENERAL NOTES:

A. DO NOT PENETRATE KITCHEN EXHAUST HOODS OR DUCTWORK WITH ANY TYPE OF FASTENING ASSEMBLY (I.E. SCREWS, RIVETS).

B. IF NOT PAINTED, ALL DUCTWORK SHALL HAVE A GASKET SEAL.

C. EXPOSED DUCTWORK IN THE DINING AREA SHALL BE MADE OF ELECTRO-GALVANIZED STEEL (PAINTLOCK). SEE MECHANICAL SPECIFICATIONS FOR ADDITIONAL INFORMATION.

D. GC TO PROVIDE ACCESS PANELS IN HARD LID CEILINGS FOR ACCESS TO DUCT MOUNTED SMOKE DETECTORS, SENSOR, BALANCING DAMPERS, ETC. LOCATION OF ACCESS PANEL TO BE CENTERED IN LINE WITH LIGHT FIXTURES AND DIFFUSERS. COORDINATE ACCESS PANEL LOCATIONS WITH ARCHITECTURAL SHEETS.

CODED NOTES: (#)

1. MOUNT REGISTER AT 15° ANGLE ON SIDE OF DUCT. ADJUST DIFFUSER BLADES TO 45° PATTERN. BALANCE AIR SCOOP TO CFM INDICATED.
2. ROUTE RETURN DUCT AND PROVIDE FULL METAL ANGLE WITH BIRD SCREEN. OPENING SHALL BE AT BOTTOM OF JOIST LOCATION. FIELD VERIFY.
3. 8x8 EXHAUST DUCT UP THROUGH ROOF.
4. INSTALL LED TOUCHSCREEN 24/7 PROGRAMMABLE THERMOSTAT (WITH CONTROLS LOCKED BY CODE) MOUNTED AT 48" AFF. COORDINATE EXACT LOCATION WITH OWNER.
5. ROUTE 18" Ø CUSTOM FABRICATED TYPE 1 KITCHEN EXHAUST DUCT UP THROUGH ROOF ABOVE AND CONNECT TO KITCHEN EXHAUST FAN. REFER TO SHEET M201 FOR CONTINUATION. COORDINATE WITH KES AND CAPTIVE AIRE DRAWINGS. SEAL WEATHER TIGHT.
6. REMOTE TEMPERATURE AVERAGING SENSOR MOUNTED AT 48" AFF FOR RTU-2A & 2B. WIRE BACK TO THERMOSTAT AT MANAGERS DESK.
7. REMOTE TEMPERATURE SENSOR MOUNTED WITHIN RETURN DUCT FOR RTU-1. WIRE BACK TO THERMOSTAT AT MANAGERS DESK.
8. PROVIDE AUDIO/VISUAL REMOTE SMOKE DETECTOR ANNUNCIATOR WITH REMOTE KEY OPERATED RESET FOR SMOKE DETECTOR MOUNTED AT 48" AFF. ALISN ANNUNCIATOR WITH THERMOSTAT OR SENSOR WHERE APPLICABLE.
9. ROUTE 18" Ø CUSTOM FABRICATED TYPE 1 KITCHEN EXHAUST DUCT DOWN FROM CEILING SPACE AND CONNECT TO HOOD. COORDINATE WITH KES AND CAPTIVE AIRE DRAWINGS. CONTRACTOR SHALL PROVIDE CLEANOUT EVERY 20' AND AT EVERY CHANGE OF DIRECTION IN TYPE 1 EXHAUST DUCT.
10. ROUTE 16"X18" MAKE UP AIR DUCT UP THROUGH ROOF ABOVE AND CONNECT TO MAKE UP AIR UNIT. REFER TO SHEET M201 FOR CONTINUATION. COORDINATE WITH KES AND HOOD DRAWINGS. SEAL WEATHER TIGHT.
11. NEW SUPPLY AND RETURN DUCT DROPS THROUGH ROOF. CONNECT NEW DUCTWORK IN APPROXIMATE LOCATION SHOWN. FIELD VERIFY EXACT LOCATION PRIOR TO COMMENCING WORK.
12. MOUNT SPIRAL DUCT TIGHT TO BOTTOM OF STRUCTURE. CONTRACTOR TO PROVIDE AND INSTALL DUCT MOUNTED SUPPLY GRILLES IN LOCATIONS SHOWN. FIELD VERIFY AND COORDINATE WITH EXISTING CONDITIONS PRIOR TO COMMENCING WORK.
13. PROVIDE DUCT MOUNTED SMOKE DETECTOR IN RETURN AIR DUCT. UPON DETECTION OF SMOKE UNIT SHALL DE-ENERGIZE.
14. ROUTE 24"X8" SUPPLY AIR DUCT DOWN FROM CEILING SPACE AND CONNECT TO SUPPLY AIR PLENUM ON HOOD. PROVIDE BALANCING DAMPER AND BALANCE TO 390 CFM. REFER TO KES AND CAPTIVE AIRE DRAWINGS FOR ADDITIONAL INFORMATION.
15. ROUTE 28"X12" MAKEUP AIR DUCT DOWN FROM CEILING SPACE AND CONNECT TO MAKE UP AIR PLENUM ON HOOD. CONNECT TO EXISTING 18x18 OUTDOOR AIR DUCT PROVIDED BY LANDLORD. PROVIDE BALANCING DAMPER AND BALANCE TO 658 CFM. REFER TO KES AND CAPTIVE AIRE DRAWINGS FOR ADDITIONAL INFORMATION.
16. PROVIDE AIR CURTAIN ABOVE ENTRANCE DOOR. INSTALL PER MANUFACTURES RECOMMENDATIONS.
17. TYPE 1 GREASE EXHAUST HOOD. REFER TO KES AND HOOD DRAWINGS FOR ADDITIONAL INFORMATION.
18. ROUTE 3" COMBUSTION AIR AND FLUE DOWN FROM CEILING SPACE AND CONNECT TO WATER HEATER. INSTALLATION SHALL BE PER MANUFACTURERS RECOMMENDATIONS.
19. EXTEND 3" COMBUSTION AIR AND FLUE IN CEILING SPACE. FIELD VERIFY EXACT ROUTING.
20. EXTEND 3" COMBUSTION AIR AND FLUE UP TO CONCENTRIC VENT THROUGH ROOF ABOVE. REFER TO SHEET M201 FOR ADDITIONAL INFORMATION.
21. PROVIDE CO2 MEASUREMENT SPECIALISTS RAD-0102-6 REMOTE CO2 STORAGE SAFETY ALARM (OR EQUAL), INSTALL PER MANUFACTURER'S RECOMMENDATIONS
22. PROVIDE CABLE OPERATED REMOTE BALANCING DAMPER. TYPICAL FOR BALANCING DAMPERS IN HARD CEILING APPLICATIONS.

MECHANICAL PLAN

1 / M101 — 1/4" = 1'-0"

CORE STATES GROUP
135 Wolter Street
Northbrook, IL 60540
312.718.5415
core-states.com

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CAVA - CANTON MI
43450 FORD ROAD
CANTON, MI 48187
FOR
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14 Ridge Square NW #500, WASHINGTON, DC 20016

AOR PROJECT NUMBER: CAV.38002

ISSUE	DATE
PERMIT SET	AUG 2, 2024
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1 BLDG RESPONSE	NOV 15, 2024
2 CONSTR SET	JAN 8, 2025

MECHANICAL PLAN

SHEET: M101

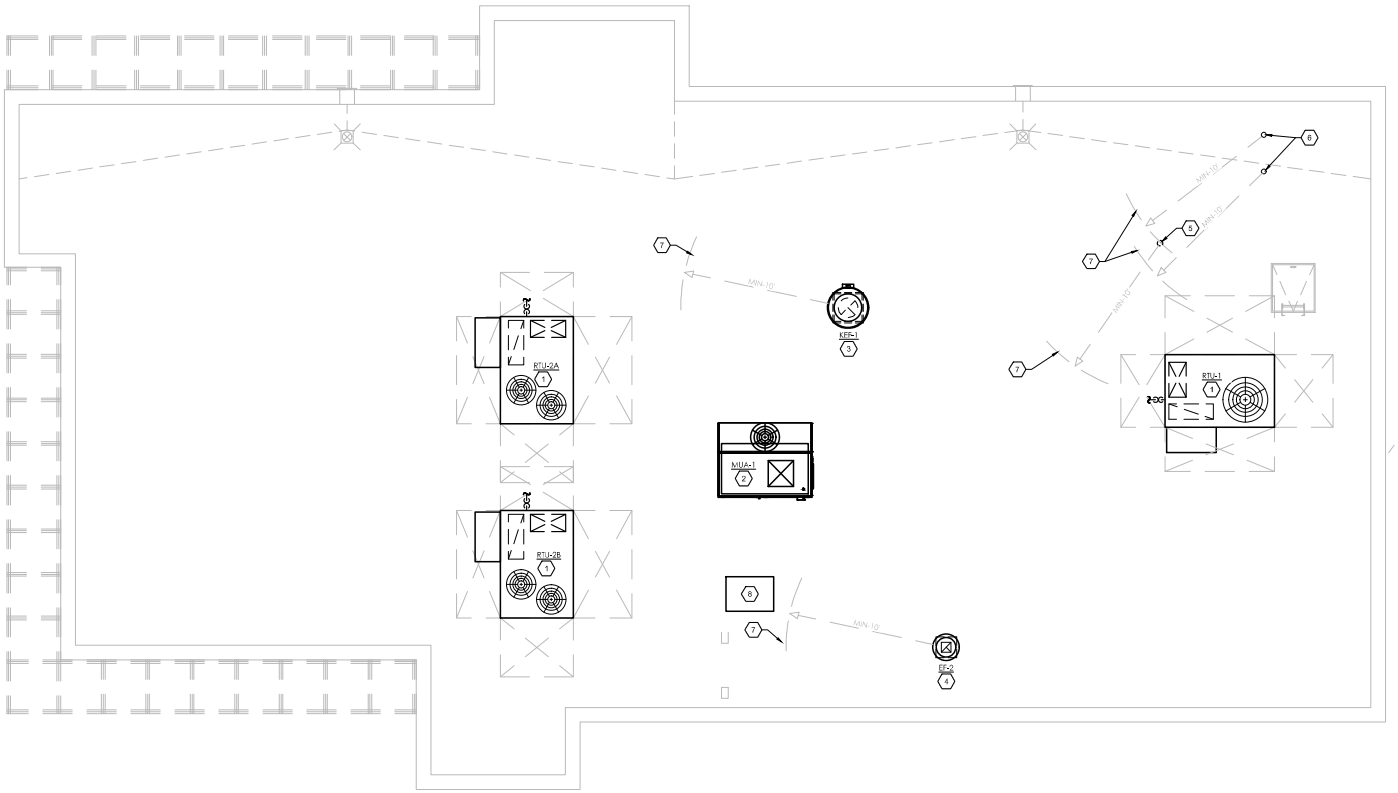
7/10/2024 3:00 PM

GENERAL NOTES:

A. DO NOT PENETRATE KITCHEN EXHAUST HOODS OR DUCTWORK WITH ANY TYPE OF FASTENING ASSEMBLY (I.E. SCREWS, RIVETS).

CODED NOTES: (#)

1. NEW ROOF MOUNTED ROOF TOP UNIT AND MANUFACTURERS ROOF CURB BY MECHANICAL CONTRACTOR. INSTALL UNIT AND CURB LEVEL TO ENSURE PROPER SLOPE FOR CONDENSATE DRAINAGE.
2. INSTALL NEW MAKE-UP AIR UNIT ON MANUFACTURERS ROOF CURB. CONTRACTOR SHALL CUT, PATCH, FLASH, AND AND COUNTER FLASH AROUND ROOF CURB TO MAINTAIN ANY APPLICABLE ROOF WARRANTY.
3. INSTALL NEW HOOD EXHAUST FAN ON MANUFACTURERS ROOF CURB. ENSURE LOCATION IS A MINIMUM OF 10' - 0" FROM ANY OUTSIDE AIR INTAKES. CONTRACTOR SHALL CUT, PATCH, FLASH, AND AND COUNTER FLASH AROUND ROOF CURB TO MAINTAIN ANY APPLICABLE ROOF WARRANTY.
4. INSTALL NEW RESTROOM EXHAUST FAN ON NEW ROOF CURB. ENSURE LOCATION IS A MINIMUM OF 10' - 0" FROM ANY OUTSIDE AIR INTAKES.
5. NEW 4" VENT THROUGH ROOF. CONTRACTOR SHALL ENSURE LOCATION IS A MINIMUM OF 10' - 0" FROM ANY OUTSIDE AIR INTAKES.
6. NEW COMBINATION AIR INTAKE AND FLUE EXHAUST FOR WATER HEATER. INSTALL PER MANUFACTURERS RECOMMENDATIONS. CONTRACTOR SHALL ENSURE LOCATION IS A MINIMUM OF 10' - 0" FROM ANY OUTSIDE AIR INTAKES.
7. ENSURE TO MAINTAIN 10'-0" CLEARANCE TO OUTSIDE AIR INTAKES.
8. NEW WALK-IN COOLER CONDENSING UNIT MOUNTED ON ROOF, SEE KES PLANS FOR MORE INFORMATION.



1 M201 MECHANICAL ROOF PLAN
1/4" = 1'-0"

CORE STATES GROUP
135 Wolter Street
Northville, IL 60540
312.718.5415
core-states.com

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CANTON, MI 48187
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CAVA
14 Ridge Square NW #500, WASHINGTON, DC 20016

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MECHANICAL ROOF PLAN

SHEET:
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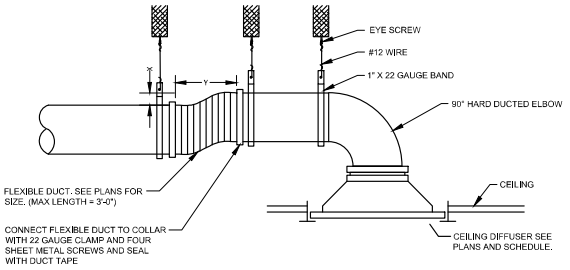
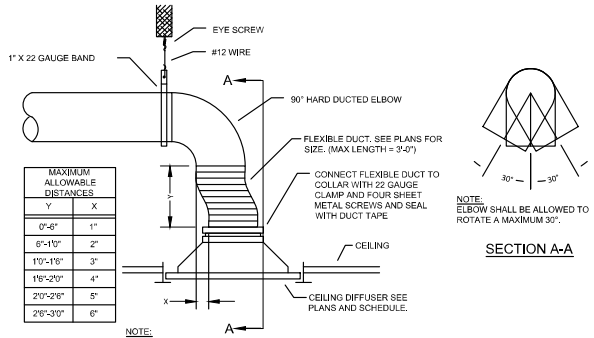


LIMITED CEILING SPACE

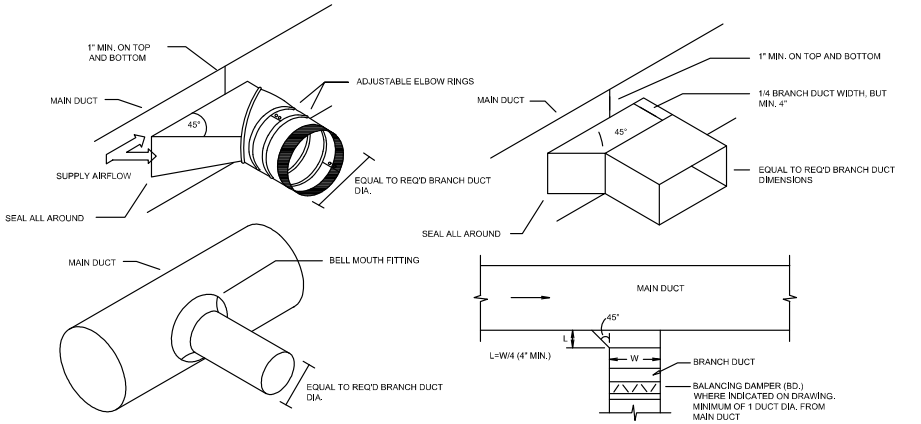


MAXIMUM ALLOWABLE DISTANCES	
Y	X
0"-6"	1"
6"-1'0"	2"
1'0"-1'6"	3"
1'6"-2'0"	4"
2'0"-2'6"	5"
2'6"-3'0"	6"

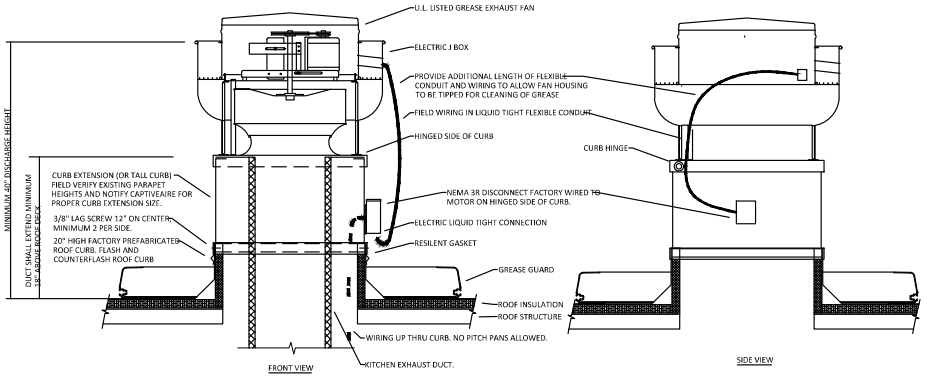
NOTE:
ELBOW SHALL BE ALLOWED TO ROTATE A MAXIMUM 30°.

SECTION A-A

5 CEILING DIFFUSER DETAIL
N.T.S.

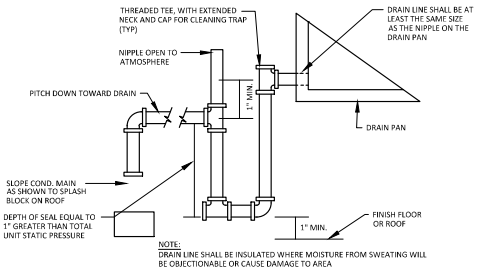


4 DUCT BRANCH DETAIL
N.T.S.



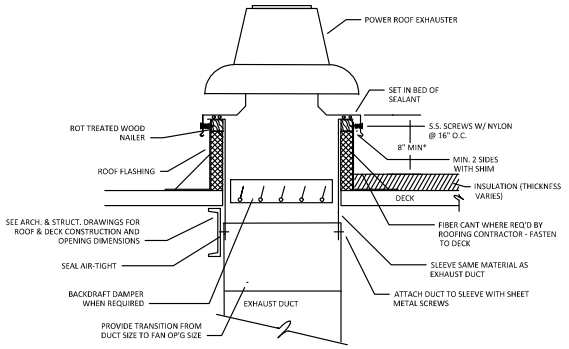
NOTES:
1. INSTALLATION SHALL BE IN ACCORDANCE WITH NFPA 96 REQUIREMENTS.
2. CUT AND PATCH EXISTING ROOFING AS REQUIRED FOR NEW CURB INSTALLATION (CONFIRM IF BY LL BASED ON WORK LETTER).
3. CURB SHALL BE TAPERED TYPE AND MATCH THE PITCH OF THE ROOF.
4. CONTRACTOR TO PROVIDE TREATED WOOD BLOCKINGS AND SHIM FLAT ROOF CURB TILL LEVEL FOR ALL EXHAUST FANS AND TO ACHIEVE ROOF CURB HEIGHTS. PROVIDE ROOF CURB EXTENSION IF REQUIRED.

3 GREASE EXHAUST FAN DETAIL
N.T.S.



NOTE:
DRAIN LINE SHALL BE INSULATED WHERE MOISTURE FROM SWEATING WILL BE OBJECTIONABLE OR CAUSE DAMAGE TO AREA

2 CONDENSATE DRAIN DETAIL
N.T.S



* MECH CONTRACTOR TO VERIFY INSULATION THICKNESS W/ GENERAL CONTRACTOR.

1 GENERAL EXHAUST FAN DETAIL
N.T.S.

CORE STATES GROUP
135 Wolter Street
Northbrook, IL 60540
312.718.5415
core-states.com

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CAVA - CANTON MI
43450 FORD ROAD
CANTON, MI 48187
FOR
CAVA
14 Ridge Square NW #500, WASHINGTON, DC 20016

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MECHANICAL DETAILS

SHEET:
M401

10/6/2023 3:53 PM

ROOFTOP UNIT SCHEDULE

OUTSIDE AIR CONDITIONS: SUMMER DB/WB: 90.2°F/73.8°F, WINTER DB: 0°F

TAG	MANUFACTURER	MODEL	TONS	AIRFLOW				HEATING (MBH)				COOLING (MBH)			COOLING DESIGN AMBIENT (95°F)	ELECTRICAL			WEIGHT (LBS)	NOTES
				CFM	OA MIN	ESP	MOTOR HP	INPUT	OUTPUT	STAGES	AFUE %	TOTAL	SENS.	EER/IEER		MCA	MOCP	VOLT/PH		
RTU-1	CARRIER	48GCFN12	10.0	4,000	305	1.20	5	200 / 250	164 /205	2	82	123.2	91.1	11.4/17.2	80°F DB / 67°F WB	62	80	208/3	1,467	1,2,3
RTU-2A	CARRIER	48GCFN07	6.0	2,400	360	1.00	3	115 / 150	96 / 123	2	82	74.4	54.7	12.2/17.5	80°F DB / 67°F WB	41	50	208/3	1,191	1,2,3
RTU-2B	CARRIER	48GCFN07	6.0	2,400	360	1.00	3	115 / 150	96 / 123	2	82	74.4	54.7	12.2/17.5	80°F DB / 67°F WB	41	50	208/3	1,191	1,2,3

NOTES:
1. PROVIDE WITH 14" ROOF CURB.
2. PROVIDE WITH ENTHALPY CONTROLLED 100% MODULATING ECONOMIZER, POWERED EXHAUST, AND SMOKE DETECTOR IN RETURN AIR DUCT.
3. PROVIDE WITH HONEYWELL VISIONPRO 8000 TOUCHSCREEN PROGRAMMABLE THERMOSTAT, MODEL TH8320. INTERLOCK WITH REMOTE TEMPERATURE SENSOR.

MAKEUP AIR UNIT SCHEDULE

TAG	MANUFACTURER	MODEL	TONS	AIRFLOW				FAN ELECTRICAL			HEATING (MBH)				COOLING (MBH)			COOLING DESIGN AMBIENT	WEIGHT (LBS)	NOTES
				CFM	OA MIN	ESP	MOTOR HP	MCA	MOCP	VOLT/PH	INPUT	OUTPUT	STAGES	AFUE %	TOTAL	SENS.	EER/IEER			
MUA-1	ECONAIR	EARTU1-1200-15-5T-MPU	5.0	2,163	2,163	0.5	2	28.4	30	208/3	197	160	1	92	66.0	27.9	—/17.9	82°F EDB / 75°F EWB	1,075	1

NOTES:
1. REFER TO KES AND HOOD DRAWINGS FOR ADDITIONAL INFORMATION.

KITCHEN HOOD SCHEDULE

UNIT DATA					LIGHTS		MISCELLANEOUS		NOTES
TAG	MODEL	HOOD LENGTH	MAX. COOKING TEMP	TOTAL EXHAUST CFM	QTY	TYPE	FIRE SUPP. SYSTEM	HANGING WEIGHT (LBS)	
H-1	6030 EX-2-ACPSP-F	11'-7"	600°F	2,606	6	LSS SERIES E26	YES	1,249	1

NOTES:
1. REFER TO KES AND HOOD DRAWINGS FOR ADDITIONAL INFORMATION.

AIR BALANCE SCHEDULE

TAG	SUPPLY CFM	RETURN CFM	OUTDOOR AIR CFM	EXHAUST CFM	
RTU-1	4,000	3,750	305	---	
RTU-2A	2,400	2,050	360	---	
RTU-2B	2,400	2,050	360	---	
MAU-1	2,163	---	2,163	---	
KEF-1	---	---	---	2,606	
EF-2	---	---	---	250	
TOTAL	10,963	7,850	3,188	2,856	332 CFM

BUILDING PRESSURE

EXHAUST FAN SCHEDULE

TAG	MANUFACTURER	MODEL	FUNCTION	FAN TYPE	CFM	ESP	DAMPER	BELT OR DIRECT	SONES RATING	HP	VOLT	PHASE	NOTES
KEF-1	CAPTIVEAIRE	DUBSHFA	HOOD EXHAUST	UPBLAST	2,381	1.0	---	DIRECT	17.3	1.0	115	1	1
EF-2	GREENHECK	G-080-VG	RESTROOM EXHAUST	DOWNBLAST	250	0.3	BDD	DIRECT	7.25	0.05	115	1	2-3

NOTES:
1. FAN SHALL BE INTERLOCKED WITH HOOD CONTROLS. REFER TO KES AND CAPTIVEAIRE DRAWINGS FOR ADDITIONAL INFORMATION.
2. FAN SHALL OPERATE DURING OCCUPIED HOURS.
3. PROVIDE VARIABLE SPEED CONTROLLER FOR ALL DIRECT DRIVE FANS. TEST AND BALANCE CONTRACTOR SHALL MARK BALANCED POSITION ON CONTROLLER.

AIR CURTAIN SCHEDULE

TAG	MANUFACTURER	MODEL	NOZZLE WIDTH	SERVICE	CFM	MOTOR HP	VOLT/PH	WEIGHT (LBS)	NOTES
AC-1	BERNER	A708-E-1048A	48"	BACK OF HOUSE	1,289	(1) 1/5	120/1	59	1-2

NOTES:
1. PROVIDE WITH INTEGRAL DISCONNECT SWITCH AND WALL MOUNTING BRACKET.
2. COORDINATE COLOR WITH ARCHITECT.

GRILLES, REGISTERS, AND DIFFUSERS SCHEDULE

TAG-NECK SIZE
CFM

D = DIFFUSER G = GRILLE
R = RESISTER

TAG	FUCTION	MODEL	MANUFACTURER	FACE SIZE	FRAME TYPE	MATERIAL	FINISH	BALANCE DAMPER	MAX N.C.	COMMENTS	NOTES
D1	SUPPLY	PAS	TITUS	24" X 24"	LAY-IN	STEEL	WHITE	---	25	---	1-7
D2	SUPPLY	OMNI	TITUS	12" X 12"	SURFACE	STEEL	WHITE	---	25	---	1,3-7
R1	SUPPLY	350FS	TITUS	20" X 6"	DUCT	ALUMINUM	WHITE	AIR SCOOP	25	---	4-5 & 7
L1	SUPPLY	FL-20-22	TITUS	48" X 4.75"	SURFACE	ALUMINUM	WHITE	---	25	1 SLOT, 2" SLOT WIDTH	3-7
G1	RETURN/EXHAUST	350RL	TITUS	12" X 12"	SURFACE	STEEL	WHITE	---	25	---	3-7
G2	RETURN	350RL	TITUS	24" X 24"	LAY-IN	STEEL	WHITE	---	25	---	3-7
G3	RETURN	350RL	TITUS	48" X 24"	SURFACE	STEEL	WHITE	---	25	---	3-7
G4	RETURN	350RL	TITUS	48" X 24"	SURFACE	STEEL	WHITE	---	25	---	3-7

NOTES:
1. SUPPLY DIFFUSERS TO BE INSULATED VIA FACTORY SYSTEM.
2. WITH NO INTERNAL DEFLECTOR
3. BORDER TYPES SHALL BE COMPATIBLE WITH ARCHITECTURAL CEILING TYPE FOR THE ROOM IN WHICH THE AIR DEVICE IS LOCATED.
4. SEE HVAC PLANS FOR LOCATION AND AIR QUANTITIES OF EACH AIR DEVICE.
5. PROVIDE WITH OPPOSED BLADE DAMPER AS NECESSARY IF CEILING DOES NOT ALLOW FOR ACCESS.
6. PROVIDE LAY-IN MODULE AS NECESSARY.
7. PROVIDE TRANSITION AS NECESSARY.

CORE STATES GROUP
135 Water Street
Naperville, IL 60540
312.718.5415
core-states.com

ISSUED FOR CONSTRUCTION

CAVA

CAVA - CANTON MI
43450 FORD ROAD
CANTON, MI 48187
FOR
CAVA
14 Ridge Square NW #500, WASHINGTON, DC 20016

AOR PROJECT NUMBER:
CAV.38002

ISSUE	DATE
PERMIT SET	AUG 2, 2024
BID SET	SEP 18, 2024
1 BLDG RESPONSE	NOV 15, 2024
2 CONSTR SET	JAN 8, 2025

MECHANICAL SCHEDULES

SHEET:
M501

7/26/2024 10:38 AM

SPECIFICATIONS - DIVISION 23 - HVAC

SECTION 230500 - GENERAL MECHANICAL REQUIREMENTS:

HVAC SUBCONTRACTOR SHALL PROVIDE AT BID TIME A BID TO PROVIDE PREVENTATIVE MAINTENANCE SERVICES FOR ONE YEAR.

FURNISH TO THE OWNER ALL OPERATING & MAINTENANCE MANUALS, RECORD DRAWINGS, TEST & BALANCE REPORT. CONTRACTOR SHALL COORDINATE WITH MANUFACTURER REPRESENTATIVES FOR EMPLOYEE TRAINING REQUIREMENTS FOR ALL EQUIPMENT.

MECHANICAL CONTRACTOR SHALL SUBMIT COMPLIANCE CHECKLIST TO BUILDING OFFICIAL UPON SUBSTANTIAL COMPLETION OF PROJECT. PROVIDE EQUIPMENT INDICATED ON THE DRAWINGS, AND AS REQUIRED FOR A COMPLETE FUNCTIONING SYSTEM.

DEFINITIONS:
FURNISH MEANS TO SUPPLY AND DELIVER TO PROJECT SITE, READY FOR INSTALLATION.
INSTALL MEANS TO PLACE IN POSITION AND MAKE CONNECTIONS FOR SERVICE OR USE.
PROVIDE MEANS TO FURNISH AND INSTALL, COMPLETE AND READY FOR INTENDED USE.

WARRANTY:
PROVIDE LABOR AND MATERIALS TO REPAIR OR REPLACE DEFECTIVE PARTS AND MATERIALS AS REQUIRED FOR ONE YEAR AFTER SUBSTANTIAL COMPLETION OR OWNER ACCEPTANCE OF THE COMPLETED PROJECT. PROVIDE A SEPARATE LINE ITEM DEDUCT AMOUNT ON THE PROPOSAL FORM TO DELETE WARRANTY SERVICE, AT THE OWNER'S OPTION. CONTRACTOR SHALL INCLUDE ONE YEAR WARRANTY ON OWNER FURNISHED EQUIPMENT. CONTRACTOR SHALL INCLUDE COSTS FOR RECEIVING, HANDLING, STORAGE, AND HOISTING OF OWNER FURNISHED EQUIPMENT.

COORDINATION:
COORDINATE WITH THE WORK OF OTHER SECTIONS, EQUIPMENT FURNISHED BY OTHERS, REQUIREMENTS OF THE OWNER, AND WITH THE CONSTRAINTS OF THE EXISTING CONDITIONS OF THE PROJECT SITE.

DUCT DIMENSIONS:
UNLESS OTHERWISE NOTED, DUCT DIMENSIONS ON THE DRAWINGS ARE INSIDE CLEAR DIMENSIONS.

TESTING AND BALANCING:
THE OWNER SHALL CONTRACT DIRECTLY WITH SUPERIOR INC. TO PROVIDE A THIRD PARTY TEST AND BALANCE OF THE HVAC SYSTEM. THE GC IS RESPONSIBLE FOR SCHEDULING THE TEST AND BALANCE. CONTACT SUPERIOR INC. (ERIC HOLCOMB) @ (800) 222-1819 AND (615) 479-1678 FOR COORDINATION AND SCHEDULING. IF THE SITE IS NOT READY WHEN SUPERIOR INC. ARRIVES AT THE SCHEDULED TIME, ALL COSTS REQUIRED FOR SUPERIOR TO RETURN TO THE SITE SHALL BE THE GC'S RESPONSIBILITY. TEST AND ADJUST ALL MECHANICAL SYSTEMS AND EQUIPMENT TO ASSURE PROPER BALANCE AND OPERATION, PERFORM TESTS IN ACCORDANCE WITH NBC AND ASHRAE STANDARDS, ELIMINATE NOISE AND VIBRATION, AND ASSURE PROPER FUNCTION OF CONTROLS. SUBMIT COMPLETED TEST AND BALANCE REPORT TO OWNER'S REPRESENTATIVE. BALANCING CONTRACTOR SHALL BE AN INDEPENDENT CERTIFIED TEST AND BALANCE CONTRACTOR, WITH NBC CERTIFICATION. BALANCE ALL SYSTEMS TO WITHIN 5% OF AIR FLOWS INDICATED ON THE DRAWINGS, AND REPORT ALL DISCREPANCIES TO HVAC INSTALLER FOR CORRECTION. MARK FINAL BALANCE POSITIONS ON DAMPERS WITH PERMANENT MARKER.

MAKE-UP AIR UNIT:
UNIT SHALL HAVE AN INTEGRAL DISCHARGE THERMOSTAT LINKED TO THE INTERNAL CONTROLS. THE HEATER SHALL BE SET TO MAINTAIN DUCT SUPPLY TEMPERATURE AT NO LESS THAN 65 DEG. F. (ADJ.).
HIGH LIMIT SWITCH SET TO 180 DEG. F.
INTAKE AIR SENSOR SET TO 10 DEG. F. (ADJ.) LOWER THAN DISCHARGE AIR SENSOR.

TEMPERATURE CONTROLS:
PROVIDE PROGRAMMABLE THERMOSTATS WITH REMOTE TEMPERATURE SENSORS AND REMOTE HUMIDISTATS COMPATIBLE WITH ROOFTOP UNIT. CONTROL WIRING SHALL BE INSTALLED IN CONDUIT. THERMOSTAT SHALL MEET SETPOINT ADJUSTMENT FOR UNOCCUPIED MODE: HEATING DOWN TO 55 DEGREES AND COOLING UP TO 85 DEGREES. PROVIDE INTERLOCK CONTROL WIRING BETWEEN HOOD EXHAUST FANS AND ROOFTOP UNITS.

END OF SECTION

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. SUBMITTALS:

1. CERTIFIED TAB REPORTS.

B. TAB FIRM QUALIFICATIONS: NBC CERTIFIED.

C. TAB REPORT FORMS: STANDARD TAB CONTRACTOR'S FORMS APPROVED BY ARCHITECT.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXAMINATION

A. EXAMINE THE CONTRACT DOCUMENTS TO BECOME FAMILIAR WITH PROJECT REQUIREMENTS AND TO DISCOVER CONDITIONS IN SYSTEMS' DESIGNS THAT MAY PRECLUDE PROPER TAB OF SYSTEMS AND EQUIPMENT.

B. EXAMINE THE APPROVED SUBMITTALS FOR HVAC SYSTEMS AND EQUIPMENT.

C. EXAMINE SYSTEMS FOR INSTALLED BALANCING DEVICES, SUCH AS TEST PORTS, GAGE COCKS, THERMOMETER WELLS, FLOW-CONTROL DEVICES, BALANCING VALVES AND FITTINGS, AND MANUAL VOLUME DAMPERS. VERIFY THAT LOCATIONS OF THESE BALANCING DEVICES ARE ACCESSIBLE.

D. EXAMINE SYSTEM AND EQUIPMENT INSTALLATIONS AND VERIFY THAT FIELD QUALITY-CONTROL TESTING, CLEANING, AND ADJUSTING SPECIFIED IN INDIVIDUAL SECTIONS HAVE BEEN PERFORMED.

E. EXAMINE HVAC EQUIPMENT AND FILTERS AND VERIFY THAT BEARINGS ARE GREASED, BELTS ARE ALIGNED AND TIGHT, AND EQUIPMENT WITH FUNCTIONING CONTROLS IS READY FOR OPERATION.

F. EXAMINE TERMINAL UNITS, SUCH AS VARIABLE-AIR-VOLUME BOXES, AND VERIFY THAT THEY ARE ACCESSIBLE AND THEIR CONTROLS ARE CONNECTED AND FUNCTIONING.

G. EXAMINE AUTOMATIC TEMPERATURE SYSTEM COMPONENTS TO VERIFY THE FOLLOWING:

1. DAMPERS, VALVES, AND OTHER CONTROLLED DEVICES ARE OPERATED BY THE INTENDED CONTROLLER.
2. DAMPERS AND VALVES ARE IN THE POSITION INDICATED BY THE CONTROLLER.
3. INTEGRITY OF DAMPERS AND VALVES FOR FREE AND FULL OPERATION AND FOR TIGHTNESS OF FULLY CLOSED THIS INCLUDES DAMPERS IN MULTIZONE UNITS, MIXING BOXES, AND AND FULLY OPEN POSITIONS. VARIABLE-AIR-VOLUME TERMINALS.
4. AUTOMATIC MODULATING AND SHUTOFF VALVES, INCLUDING TWO-WAY VALVES AND THREE-WAY MIXING AND DIVERTING VALVES, ARE PROPERLY CONNECTED.
5. THERMOSTATS AND HUMIDISTATS ARE LOCATED TO AVOID ADVERSE EFFECTS OF SUNLIGHT, DRAFTS, AND COLD WALLS.
6. SENSORS ARE LOCATED TO SENSE ONLY THE INTENDED CONDITIONS.
7. SEQUENCE OF OPERATION FOR CONTROL MODES IS ACCORDING TO THE CONTRACT DOCUMENTS.
8. CONTROLLER SET POINTS ARE SET AT INDICATED VALUES.
9. INTERLOCKED SYSTEMS ARE OPERATING.
10. CHANGEOVER FROM HEATING TO COOLING MODE OCCURS ACCORDING TO INDICATED VALUES.

H. REPORT DEFICIENCIES DISCOVERED BEFORE AND DURING PERFORMANCE OF TEST AND BALANCE PROCEDURES.

3.2 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. PERFORM TESTING AND BALANCING PROCEDURES ON EACH SYSTEM ACCORDING TO THE PROCEDURES CONTAINED IN AABC'S "NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE", NBC, ASHRAE 111, NEBB'S "PROCEDURAL STANDARDS FOR TESTING, ADJUSTING, AND BALANCING OF ENVIRONMENTAL SYSTEMS" OR SMACNA'S "HVAC SYSTEMS - TESTING, ADJUSTING, AND BALANCING" AND IN THIS SECTION.

B. CUT INSULATION, DUCTS, PIPES, AND EQUIPMENT CABINETS FOR INSTALLATION OF TEST PROBES TO THE MINIMUM EXTENT NECESSARY FOR TAB PROCEDURES. AFTER TESTING AND BALANCING, PATCH PROBE HOLES IN DUCTS WITH SAME MATERIAL AND THICKNESS AS USED TO CONSTRUCT DUCTS. INSTALL AND JOIN NEW INSULATION THAT MATCHES REMOVED MATERIALS. RESTORE INSULATION, COVERINGS, VAPOR BARRIER, AND FINISH.

C. MARK EQUIPMENT AND BALANCING DEVICES, INCLUDING DAMPER-CONTROL POSITIONS, VALVE POSITION INDICATORS, FAN-SPEED-CONTROL LEVERS, AND SIMILAR CONTROLS AND DEVICES, WITH PAINT OR OTHER SUITABLE, PERMANENT IDENTIFICATION MATERIAL TO SHOW FINAL SETTINGS.

3.3 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. PREPARE SCHEMATIC DIAGRAMS OF SYSTEMS' "AS-BUILT" DUCT LAYOUTS.

B. FOR VARIABLE-AIR-VOLUME SYSTEMS, DEVELOP A PLAN TO SIMULATE DIVERSITY.

C. DETERMINE THE BEST LOCATIONS IN MAIN AND BRANCH DUCTS FOR ACCURATE DUCT AIRFLOW MEASUREMENTS.

D. VERIFY THAT MOTOR STARTERS ARE EQUIPPED WITH PROPERLY SIZED THERMAL PROTECTION.

E. CHECK FOR AIRFLOW BLOCKAGES.

F. CHECK CONDENSATE DRAINS FOR PROPER CONNECTIONS AND FUNCTIONING.

G. CHECK FOR PROPER SEALING OF AIR-HANDLING UNIT COMPONENTS.

H. CHECK FOR PROPER SEALING OF AIR DUCT SYSTEM.

3.4 TOLERANCES

A. SET HVAC SYSTEM AIRFLOW AND WATER FLOW RATES WITHIN THE FOLLOWING TOLERANCES:

1. SUPPLY, RETURN, AND EXHAUST FANS AND EQUIPMENT WITH FANS: PLUS OR MINUS 5 PERCENT.
2. AIR OUTLETS AND INLETS: PLUS OR MINUS 10 PERCENT.

END OF SECTION

SECTION 230700 - HVAC INSULATION

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. QUALITY ASSURANCE: LABELED WITH MAXIMUM FLAME-SPREAD INDEX OF 25 AND MAXIMUM SMOKE-DEVELOPED INDEX OF 50 ACCORDING TO ASTM E 84.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. SURFACE-BURNING CHARACTERISTICS:

1. INDOOR INSULATION AND RELATED MATERIALS: TO BE FACTORY LABELED DESIGNATING MAXIMUM FLAME-SPREAD INDEX OF 25 OR LESS, AND SMOKE-DEVELOPED INDEX OF 50 OR LESS ACCORDING TO ASTM E 84.

2.2 INSULATION MATERIALS

A. FLEXIBLE ELASTOMERIC: CLOSED-CELL, SPONGE- OR EXPANDED-RUBBER MATERIALS. COMPLY WITH ASTM C 534, TYPE I FOR TUBULAR MATERIALS AND TYPE II FOR SHEET MATERIALS.

B. MINERAL-FIBER BLANKET INSULATION: COMPLY WITH ASTM C 553, TYPE II AND ASTM C 1290, TYPE I.

1. FSK JACKET: ALUMINUM-FOIL, FIBERGLASS-REINFORCED SCRIM WITH KRAFT-PAPER BACKING; COMPLYING WITH ASTM C 1136, TYPE II.
2. FSK TAPE: FOIL-FACE, VAPOR-RETARDER TAPE MATCHING FACTORY-APPLIED JACKET WITH ACRYLIC ADHESIVE, COMPLYING WITH ASTM C 1136.

C. MINERAL-FIBER, PIPE AND TANK INSULATION: COMPLYING WITH ASTM C 1393, TYPE II OR TYPE IIIA CATEGORY 2, OR WITH PROPERTIES SIMILAR TO ASTM C 612, TYPE IB; AND HAVING FACTORY-APPLIED ASJ JACKET. NOMINAL DENSITY IS 2.5 LB/CU. FT, OR MORE. THERMAL CONDUCTIVITY (K-VALUE) AT 100 DEG F IS 0.29 BTU X IN/H X SQ. FT. X DEG F OR LESS.

1. ASJ: WHITE, KRAFT-PAPER, FIBERGLASS-REINFORCED SCRIM WITH ALUMINUM-FOIL BACKING; COMPLYING WITH ASTM C 1136, TYPE I.
2. ASJ TAPE: WHITE VAPOR-RETARDER TAPE MATCHING FACTORY-APPLIED JACKET WITH ACRYLIC ADHESIVE, COMPLYING WITH ASTM C 1136.

D. FLEXIBLE ELASTOMERIC ADHESIVE: COMPLY WITH MIL-A-24179A, TYPE II, CLASS I.

E. MINERAL-FIBER ADHESIVE: COMPLY WITH MIL-A-3316C, CLASS 2, GRADE A.

F. VAPOR-BARRIER MASTIC: WATER BASED; SUITABLE FOR INDOOR AND OUTDOOR USE ON BELOW AMBIENT SERVICES; COMPLY WITH MIL-PRF-19565C, TYPE II.

PART 3 - EXECUTION

3.1 INSULATION INSTALLATION

A. COMPLY WITH REQUIREMENTS OF THE MIDWEST INSULATION CONTRACTORS ASSOCIATION'S "NATIONAL COMMERCIAL & INDUSTRIAL INSULATION STANDARDS" FOR INSULATION INSTALLATION ON PIPES AND EQUIPMENT.

B. INSULATION INSTALLATION AT INTERIOR WALL AND PARTITION PENETRATIONS (THAT ARE NOT FIRE RATED): INSTALL INSULATION CONTINUOUSLY THROUGH WALLS AND PARTITIONS.

C. INSULATION INSTALLATION AT FIRE-RATED WALL, PARTITION, AND FLOOR PENETRATIONS: INSTALL INSULATION CONTINUOUSLY THROUGH PENETRATIONS. SEAL PENETRATIONS. COMPLY WITH REQUIREMENTS IN SECTION 078400.

D. FLEXIBLE ELASTOMERIC INSULATION INSTALLATION:

1. SEAL LONGITUDINAL SEAMS AND END JOINTS WITH ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF AIR TO SURFACE BEING INSULATED.
2. INSULATION INSTALLATION ON PIPE FITTINGS AND ELBOWS: INSTALL MITERED SECTIONS OF PIPE INSULATION. SECURE INSULATION MATERIALS AND SEAL SEAMS WITH ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF AIR TO SURFACE BEING INSULATED.

E. MINERAL-FIBER INSULATION INSTALLATION:

1. INSULATION INSTALLATION ON STRAIGHT PIPES AND TUBES: WHERE VAPOR BARRIERS ARE INDICATED, SEAL LONGITUDINAL SEAMS, END JOINTS, AND PROTRUSIONS WITH VAPOR-BARRIER MASTIC AND JOINT SEALANT.
2. FOR INSULATION WITH FACTORY-APPLIED JACKETS ON ABOVE AMBIENT SURFACES, SECURE LAPS WITH OUTWARD CLINCHED STAPLES AT 6 INCHES O.C.
3. FOR INSULATION WITH FACTORY-APPLIED JACKETS ON BELOW AMBIENT SURFACES, DO NOT STAPLE LONGITUDINAL TABS BUT SECURE TABS WITH ADDITIONAL ADHESIVE AS RECOMMENDED BY INSULATION MATERIAL MANUFACTURER AND SEAL WITH VAPOR-BARRIER MASTIC AND FLASHING SEALANT.
4. BLANKET INSULATION INSTALLATION ON DUCTS AND PLENUMS: SECURE WITH ADHESIVE AND INSULATION PINS.
5. FOR DUCTS AND PLENUMS WITH SURFACE TEMPERATURES BELOW AMBIENT, INSTALL A CONTINUOUS UNBROKEN VAPOR BARRIER

F. PLENUMS AND DUCTS REQUIRING INSULATION:

1. CONCEALED SUPPLY AIR.
2. CONCEALED AND EXPOSED OUTDOOR AIR.
3. CONCEALED AND EXPOSED RETURN AIR LOCATED IN NONCONDITIONED SPACE.

3.2 DUCT AND PLENUM INSULATION SCHEDULE

RETAIN " ONE OF" OPTION IN PARAGRAPHS IN THIS ARTICLE TO ALLOW CONTRACTOR TO SELECT PIPING MATERIALS FROM THOSE RETAINED.

A. CONCEALED DUCT INSULATION SHALL BE 1-1/2" THICK MINERAL-FIBER BLANKET WITH A 1.5-LB/CU. FT. NOMINAL DENSITY.

3.3 HVAC PIPING INSULATION SCHEDULE

A. CONDENSATE PIPING: INSULATION SHALL BE 1" THICK FLEXIBLE ELASTOMERIC.

B. REFRIGERANT PIPING: INSULATION SHALL BE 1" THICK FLEXIBLE ELASTOMERIC.

END OF SECTION

SECTION 232300 - REFRIGERANT PIPING

PART 2 - PRODUCTS

2.1 TUBES AND FITTINGS

A. COPPER TUBE: ASTM B 88, TYPE K OR TYPE L, ANNEALED OR DRAWN-TEMPER TUBING AND WROUGHT-COPPER FITTINGS WITH BRAZED OR SOLDERED JOINTS.

B. WROUGHT-COPPER FITTINGS AND UNIONS: ASME B16.22.

C. SOLDER FILLER METALS: ASTM B 32, USE 95-5 TIN ANTIMONY OR ALLOY HB SOLDER TO JOIN COPPER SOCKET FITTINGS ON COPPER PIPE.

D. BRAZING FILLER METALS: AWS A5.8.

2.2 VALVES AND SPECIALTIES

A. AS REQUIRED BY THE KITCHEN EQUIPMENT MANUFACTURER.

PART 3 - EXECUTION

3.1 INSTALLATION

A. INSTALL REFRIGERANT PIPING AND CHARGE WITH REFRIGERANT ACCORDING TO ASHRAE 15.

B. INSTALL REFRIGERANT PIPING AS REQUIRED BY THE KITCHEN EQUIPMENT MANUFACTURER.

END OF SECTION

SECTION 233100 - HVAC DUCTS AND CASINGS

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE."

B. STRUCTURAL PERFORMANCE: DUCT HANGERS AND SUPPORTS SHALL WITHSTAND THE EFFECTS OF GRAVITY LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS DESCRIBED IN SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE".

C. COMPLY WITH NFPA 96 FOR DUCTS CONNECTED TO COMMERCIAL KITCHEN HOODS.

2.2 DUCTS

A. ELECTROGALVANIZED-STEEL SHEET: ASTM A 879

1. PAINTLOK/PAINTLOCK OR EQUAL.

B. GENERAL DUCTWORK SHALL BE GALVANIZED STEEL, ASTM A653/A635M, CONSTRUCTED TO THE GAUGE AND CORRESPONDING REINFORCING SCHEDULE AS INDICATED IN THE LATEST EDITION OF SMACNA.

C. TYPE 1 KITCHEN EXHAUST DUCTWORK

1. FACTORY-BUILT COMMERCIAL KITCHEN GREASE DUCT:
   a. INSTALL REDUCED CLEARANCE, ROUND, DOUBLE-WALL GREASE DUCT AS SPECIFIED MEETING UL 1978 REQUIREMENTS. REFER TO KITCHEN EQUIPMENT SUPPLIER DRAWINGS FOR REQUIREMENTS.
   b. DUCTWORK AND FITTINGS FURNISHED BY OWNER FOR INSTALLATION BY THIS CONTRACTOR.
   c. NO FIRE WRAP SHALL BE REQUIRED FOR THIS INSTALLATION.

D. TYPE 2 KITCHEN EXHAUST DUCTWORK: 18 GAUGE ALUMINUM OR STAINLESS STEEL. SEAMS SHALL BE CONTINUOUSLY WELDED LIQUID TIGHT.

E. JOINT AND SEAM TAPE, AND SEALANT: COMPLY WITH UL 181A. PROVIDE POLYMERIC RUBBER TYPE SEALANT FOR USE ON BOTH INTERIOR LOCATED DUCTWORK AND DUCTWORK EXPOSED TO OUTDOOR CONDITIONS. SEALER SHALL HAVE HIGH BONDING STRENGTH FOR SURE, FIRST TIME SEALING OF JOINTS IN LOW, MEDIUM, AND HIGH PRESSURE DUCT SYSTEMS. SEALER SHALL BE HIGH IN SOLID CONTENT, PROVIDE A TWO PART TAPE SEALING SYSTEM, CONSISTING OF WOVEN FIBER TAPE IMPREGNATED WITH A GYPSUM MINERAL COMPOUND, AND A MODIFIED ACRYLIC/SILICONE ACTIVATOR THAT REACTS EXOTHERMICALLY WITH THE TAPE. TWO PART TAPE SEALING SYSTEM MUST BE RATED FOR BOTH INDOOR AND OUTDOOR APPLICATION. TAPE SHALL NOT CONTAIN ASBESTOS.

F. METAL DUCT FABRICATION: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE."

2.3 ACCESSORIES

A. VOLUME DAMPERS AND CONTROL DAMPERS: SINGLE-BLADE AND MULTIPLE OPPOSED-BLADE DAMPERS, STANDARD LEAKAGE RATING, HEAVY DUTY, AND SUITABLE FOR HORIZONTAL OR VERTICAL APPLICATIONS; FACTORY FABRICATED AND COMPLETE WITH REQUIRED HARDWARE AND ACCESSORIES.

2. ROUND VOLUME DAMPERS: PROVIDE MINIMUM 20 GAUGE GALVANIZED STEEL FRAME AND BLADES, MINIMUM 3/8" SQUARE STEEL AXLE, MOLDED SYNTHETIC BEARINGS, WITH LOCKING POSITION REGULATOR. REGULATOR SHALL BE POSITIONED WITH SHEET METAL BRACKET BEYOND DUCT COVERING. WHERE POSITIONING REGULATOR IS NOT ACCESSIBLE, PROVIDE COUPLING AND EXTENSION ROD WITH REGULATOR FOR CEILING OR WALL INSTALLATION, AS REQUIRED.

3. RECTANGULAR VOLUME DAMPERS: PROVIDE MINIMUM 16 GAUGE GALVANIZED STEEL CHANNEL FRAME, 16 GAUGE GALVANIZED STEEL BLADES, MINIMUM ½" HEXAGONAL AXLE, BOLDED SYNTHETIC BEARINGS, WITH 3/8" SQUARE PLATED STEEL CONTROL SHAFT. LINKAGES SHALL BE CONCEALED IN THE FRAME. OPERATING SHAFT SHALL EXTEND BEYOND FRAME AND DUCT TO A LOCKING QUADRANT WITH ADJUSTABLE LEVER. MAXIMUM BLADE WIDTH SHALL NOT EXCEED 6".

B. FLEXIBLE DUCT CONNECTORS: FLAME-RETARDED OR NONCOMBUSTIBLE FABRICS, COATINGS, AND ADHESIVES COMPLYING WITH UL 181, CLASS 1, CONNECTOR TO BE 30 OUNCE, NEOPRENE COATED, FIBERGLASS FABRIC.

C. FLEXIBLE DUCTS: FACTORY ASSEMBLED, UL 181, CLASS 1, WITH 1-1/2-INCH THICK (R-5 MIN.), 1 PCF FIBERGLASS INSULATION AND REINFORCED OUTER PROTECTIVE COVER/VAPOR BARRIER. FLEXIBLE DUCT SHALL MEET NFPA 90A WITH FLAME SPREAD UNDER 25, SMOKE DEVELOPED UNDER 50, AND SHALL BE RATED FOR MINIMUM 2-INCH WG PRESSURE AND 0 TO 250ºF TEMPERATURE, PROVIDE SCREW-OPERATED METAL ADJUSTABLE CLAMPING DEVICES. USE TWIST-LOCK CONICAL TAP COLLARS AT CONNECTIONS INTO SHEET METAL DUCTWORK. MAXIMUM EXTENDED LENGTH OF FLEXIBLE DUCT SHALL NOT EXCEED 5 FEET.

D. TURNING VANES: PROVIDE FABRICATED TURNING VANES AND VANE RUNNERS, CONSTRUCTED IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS". PROVIDE TURNING VANES CONSTRUCTED OF CURVED BLADES, SUPPORTED WITH BARS PERPENDICULAR TO BLADES, AND SET INTO SIDE STRIPS SUITABLE FOR MOUNTING IN DUCTWORK. FOLLOW SMACNA GUIDELINES FOR SPACING SUPPORT, AND CONSTRUCTION. ALL BLADES SHALL BE DOUBLE THICKNESS AIRFOIL TYPE.

E. BIRD SCREENS AND FRAMES: PROVIDE BIRD SCREENS THAT CONFORM TO ASTM E 2016, NO. 2 MESH, ALUMINUM OR STAINLESS STEEL. PROVIDE "MEDIUM-LIGHT" RATED ALUMINUM SCREENS, PROVIDE "LIGHT" RATES STAINLESS STEEL SCREENS.

F. DUCT-MOUNTED ACCESS DOORS: FABRICATE ACCESS PANELS ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE", FIGURES 2-10, "DUCT ACCESS DOORS AND PANELS," AND 2-11, "ACCESS PANELS - ROUND DUCT."

PART 3 - EXECUTION

3.1 INSTALLATION

A. INSTALL DUCTWORK, ACCESSORIES, AND SUPPORTS ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" UNLESS OTHERWISE INDICATED.

B. SEAL DUCTS TO THE FOLLOWING SEAL CLASSES ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE": 1-INCH WG, SEAL CLASS A.

C. AVOID PASSING THROUGH OR ABOVE ELECTRICAL EQUIPMENT SPACES AND ENCLOSURES.

D. CLEAN DUCT SYSTEMS BEFORE TESTING, ADJUSTING, AND BALANCING.

3.2 DUCTWORK SCHEDULE

A. EXPOSED DUCTWORK IN ARCHITECTURALLY FINISHED SPACES- ELECTRO-GALVANIZED STEEL SHEET.

B. CONCEALED DUCTWORK AND DUCTWORK IN UNFINISHED ARCHITECTURAL SPACES- GALVANIZED STEEL.

END OF SECTION

SECTION 233423 - HVAC EXHAUST FANS

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. PRODUCTS SHALL BE LICENSED TO USE THE AMCA-CERTIFIED RATINGS SEAL.

B. EXHAUST FANS SHALL COMPLY WITH UL 705, TYPE 1 FANS SHALL ALSO COMPLY WITH UL 762.

C. TYPE 1 FANS TO BE DESIGNED FOR HIGH HEAT OPERATION AT 300°F.

D. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.

2.2 CENTRIFUGAL VENTILATORS

A. HOUSING: REMOVABLE, SPUN-ALUMINUM, DOME TOP AND OUTLET BAFFLE; SQUARE, ONE-PIECE, ALUMINUM BASE WITH VENTURI INLET CONE.

1. UPBLAST UNITS: ALUMINUM DISCHARGE BAFFLE TO DIRECT DISCHARGE AIR UPWARD, WITH RAIN AND SNOW DRAINS.

B. FAN WHEELS: ALUMINUM HUB AND WHEEL WITH BACKWARD-INCLINED BLADES.

C. BELT-DRIVEN DRIVE ASSEMBLY: RESILIENTLY MOUNTED TO HOUSING.

1. FAN SHAFT: TURNED, GROUND, AND POLISHED STEEL; KEYED TO WHEEL HUB.
2. SHAFT BEARINGS: PERMANENTLY LUBRICATED, PERMANENTLY SEALED, SELF-ALIGNING BALL BEARINGS.
3. PULLEYS: CAST-IRON, ADJUSTABLE-PITCH MOTOR PULLEY.
4. FAN AND MOTOR ISOLATED FROM EXHAUST AIRSTREAM.

D. ACCESSORIES:

1. DISCONNECT SWITCH: NON-FUSIBLE TYPE, WITH THERMAL-OVERLOAD PROTECTION, FACTORY WIRED THROUGH AN INTERNAL ALUMINUM CONDUIT.
2. BIRD SCREENS: REMOVABLE, 1/2-INCH MESH, ALUMINUM OR BRASS WIRE.
3. DAMPERS: COUNTERBALANCED, PARALLEL-BLADE, BACKDRAFT DAMPERS MOUNTED IN CURB BASE; FACTORY SET TO CLOSE WHEN FAN STOPS.
4. MOTORIZED DAMPERS: PARALLEL-BLADE DAMPERS MOUNTED IN CURB BASE WITH ELECTRIC ACTUATOR; WIRED TO CLOSE WHEN FAN STOPS.

E. ROOF CURBS: 20 GAUGE GALVANIZED STEEL; MITERED AND WELDED CORNERS; 1-1/2-INCH THICK, RIGID, FIBERGLASS INSULATION ADHERED TO INSIDE WALLS; AND 1-1/2-INCH WOOD NAILER, SIZE AS REQUIRED TO SUIT ROOF OPENING AND FAN BASE.

1. CONFIGURATION: SELF-FLASHING WITHOUT A CANT STRIP, WITH MOUNTING FLANGE.
2. OVERALL HEIGHT: 12 INCHES FOR GENERAL EXHAUST FANS; 20 INCHES FOR KITCHEN EXHAUST FANS.
3. PITCH MOUNTING: MANUFACTURE CURB FOR ROOF SLOPE.
4. MOUNTING PEDESTAL: GALVANIZED STEEL WITH REMOVABLE ACCESS PANEL.
5. TYPE 1 ROOF CURBS TO BE VENTED TYPE.
6. TYPE 1 AND TYPE 2 ROOF CURBS TO BE HINGED TYPE.

F. CAPACITIES AND CHARACTERISTICS:

1. SEE SCHEDULE.

G. MOTORS

A. COMPLY WITH NEMA DESIGNATION, TEMPERATURE RATING, SERVICE FACTOR, ENCLOSURE TYPE, AND EFFICIENCY REQUIREMENTS FOR MOTORS.

1.1. MOTOR SIZES: MINIMUM SIZE AS INDICATED. IF NOT INDICATED, LARGE ENOUGH SO DRIVEN LOAD WILL NOT REQUIRE MOTOR TO OPERATE IN SERVICE FACTOR RANGE ABOVE 1.0.

A.B. ENCLOSURE TYPE: TOTALLY ENCLOSED, FAN COOLED.

PART 3 - EXECUTION

3.1 INSTALLATION

A. INSTALL UNITS WITH CLEARANCES FOR SERVICE AND MAINTENANCE.

B. ROOF-MOUNTED UNITS: INSTALL ROOF CURB ON ROOF STRUCTURE, ACCORDING TO ARI GUIDELINE B. INSTALL AND SECURE ROOF-MOUNTED FANS ON CURBS, AND COORDINATE ROOF PENETRATIONS AND FLASHING WITH ROOF CONSTRUCTION.

END OF SECTION

SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

PART 2 - PRODUCTS

2.1 DIFFUSERS, REGISTERS, AND GRILLES:

A. REFER TO SCHEDULES FOR FINISH TYPE, COLOR, MATERIAL, AND MOUNTING.

PART 3 - EXECUTION

3.1 INSTALLATION

A. INSTALL DIFFUSERS, REGISTERS, AND GRILLES LEVEL AND PLUMB.

B. CEILING-MOUNTED OUTLETS AND INLETS: DRAWINGS INDICATE GENERAL ARRANGEMENT OF DUCTS, FITTINGS, AND ACCESSORIES. MAKE FINAL LOCATIONS WHERE INDICATED, AS MUCH AS PRACTICAL. FOR UNITS INSTALLED IN LAY-IN CEILING PANELS, LOCATE UNITS IN THE CENTER OF PANEL UNLESS OTHERWISE INDICATED. WHERE ARCHITECTURAL FEATURES OR OTHER ITEMS CONFLICT WITH INSTALLATION, NOTIFY ARCHITECT FOR A DETERMINATION OF FINAL LOCATION.

C. AFTER INSTALLATION, ADJUST DIFFUSERS, REGISTERS, AND GRILLES TO AIR PATTERNS INDICATED, OR AS DIRECTED, BEFORE STARTING AIR BALANCING.

2. END OF SECTION

CORE STATES GROUP
135 Water Street
Naperville, IL 60540
312.718.5415
core-sites.com

ISSUED FOR CONSTRUCTION

CAVA

CAVA - CANTON MI
43450 FORD ROAD
CANTON, MI 48187
FOR
CAVA
14 Ridge Square NW #500, WASHINGTON, DC 20016

AOR PROJECT NUMBER:
CAV.38002

ISSUE	DATE
PERMIT SET	AUG 2, 2024
BID SET	SEP 18, 2024
1 BLDG RESPONSE	NOV 15, 2024
2 CONSTR SET	JAN 8, 2025

MECHANICAL SPECIFICATIONS

SHEET:
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9/20/2023 3:35 PM

SPECIFICATIONS - DIVISION 23 - HVAC (CONTINUED)

SECTION 237339 - DIRECT-FIRED MAKE-UP AIR UNIT

PART 2 - PRODUCTS

2.1 PACKAGED UNITS

A. FACTORY-ASSEMBLED, PREWIRED, SELF-CONTAINED UNIT CONSISTING OF CABINET, SUPPLY FAN, CONTROLS, FILTERS, AND DIRECT-FIRED GAS FURNACE TO BE INSTALLED OUTSIDE THE BUILDING.

2.2 CABINET

A. CABINET: GALVANIZED-STEEL PANELS WITH LIFTING LUGS. CABINET SHALL BE FULLY WEATHERIZED FOR OUTDOOR INSTALLATION., HEAT-RESISTANT, BAKED-ENAMEL FINISH, VERTICAL-PATTERN, GALVANIZED-STEEL DISCHARGE PLENUM WITH DIFFUSERS INCORPORATING INDIVIDUALLY ADJUSTABLE VANES.

B. ROOF CURB: FULL-PERIMETER CURB OF SHEET METAL, MINIMUM 20 INCHES HIGH, WITH WOOD NAILER, NEOPRENE SEALING STRIP, AND WELDED Z-BAR FLASHING.

C. OUTDOOR-AIR INTAKE: GALVANIZED-STEEL HOOD WITH RAIN BAFFLES, BIRD SCREEN, AND FINISH TO MATCH CABINET; AND SIZED TO SUPPLY 100 PERCENT OUTDOOR AIR. GALVANIZED-STEEL, OPPOSED-BLADE MOTORIZED DAMPERS WITH VINYL BLADE SEALS AND STAINLESS-STEEL JAMB SEAL.

D. FILTERS: COMPLY WITH NFPA 90A. 1 INCH THICK.

2.3 SUPPLY-AIR FAN

A. FAN: CENTRIFUGAL, RATED ACCORDING TO AMCA 210; STATICALLY AND DYNAMICALLY BALANCED, GALVANIZED STEEL; MOUNTED ON SOLID-STEEL SHAFT.

B. MOTOR: TOTALLY ENCLOSED, SINGLE SPEED MOTOR.

C. DRIVE: V-BELT DRIVE WITH MATCHING FAN PULLEY AND ADJUSTABLE MOTOR SHEAVES AND BELT ASSEMBLY.

D. GAS PRESSURE GAUGE: 2-1/2 INCH DIAMETER AND 1/4 INCH THREAD SIZE.

2.4 DIRECT-FIRED GAS FURNACE

A. DESCRIPTION: FACTORY ASSEMBLED, PIPED, AND WIRED; AND COMPLYING WITH ANSI Z83.4, ANSI Z83.18, AND NFPA 54. CAST-IRON BURNER WITH STAINLESS-STEEL MIXING PLATES. SINGLE-STAGE CONTROL VALVE. FUEL: NATURAL GAS.

B. SAFETY CONTROLS: AIRFLOW PROVING SWITCH; HIGH-TEMPERATURE LIMIT; SAFETY LOCKOUT; REDUNDANT, AUTOMATIC, MAIN GAS VALVES; ELECTRIC PILOT VALVE; MODULATING TEMPERATURE CONTROL VALVE; MAIN AND PILOT GAS REGULATORS; MAIN AND PILOT MANUAL SHUTOFF VALVES; MAIN AND PILOT PRESSURE TAPS; AND HIGH-LOW GAS PRESSURE SWITCHES TO COMPLY WITH ANSI STANDARDS.

2.5 CONTROLS

A. FACTORY-WIRED, FUSE-PROTECTED CONTROL TRANSFORMER, CONNECTION FOR POWER SUPPLY AND FIELD-WIRED UNIT TO REMOTE CONTROL PANEL.

1. FAN CONTROL: INTERLOCK FAN TO START WITH EXHAUST FAN(S) AND WITH RTU COOLING CYCLE.
2. OUTDOOR-AIR DAMPER CONTROL: OUTDOOR-AIR DAMPER OPENS WHEN SUPPLY FAN STARTS, AND CLOSES WHEN FAN STOPS.
3. TEMPERATURE CONTROL: OPERATES GAS VALVE TO MAINTAIN SUPPLY-AIR TEMPERATURE.

2.6 INSTALLATION

A. INSTALL GAS-FIRED UNITS ACCORDING TO NFPA 54.

B. INSTALL ROOF CURB ON ROOF STRUCTURE, ACCORDING TO ARI GUIDELINE B OR NRCA'S "LOW-SLOPE MEMBRANE ROOFING CONSTRUCTION DETAILS MANUAL."

C. CONNECT GAS PIPING WITH SHUTOFF VALVE AND UNION AND WITH SUFFICIENT CLEARANCE FOR BURNER REMOVAL AND SERVICE.

D. DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF DUCTS. CONNECT SUPPLY DUCTS TO DIRECT-FIRED MAU WITH FLEXIBLE DUCT CONNECTORS; FLEXIBLE DUCT CONNECTORS ARE SPECIFIED IN SECTION 233100 "HVAC DUCTS AND CASINGS."

END OF SECTION

SECTION 237413 - PACKAGED ROOFTOP UNITS

1.1 SUMMARY

A. THIS SECTION INCLUDES PACKAGED, ROOFTOP UNITS WITH THE FOLLOWING COMPONENTS AND ACCESSORIES:

1. DIRECT-EXPANSION COOLING.
2. HUMIDITY CONTROL WITH HOT-GAS REHEAT (OPTIONAL)
3. GAS FURNACE.
4. ECONOMIZER OUTDOOR-AND RETURN-AIR DAMPER SECTION.
5. INTEGRAL, SPACE TEMPERATURE CONTROLS.
6. ROOF CURBS.

1.2 SECTION REQUIREMENTS

A. SUBMITTALS:

1. PRODUCT DATA: INCLUDE MANUFACTURER'S TECHNICAL DATA FOR EACH RTU, INCLUDING RATED CAPACITIES, DIMENSIONS, REQUIRED CLEARANCES, CHARACTERISTICS, FURNISHED SPECIALTIES, AND ACCESSORIES.

PART 2 - PRODUCTS

2.1 CASING

A. GENERAL FABRICATION REQUIREMENTS FOR CASINGS: FORMED AND REINFORCED INSULATED PANELS, FABRICATED TO ALLOW REMOVAL FOR ACCESS TO INTERNAL PARTS AND COMPONENTS, WITH JOINTS BETWEEN SECTIONS SEALED.

B. EXTERIOR CASING MATERIAL: GALVANIZED STEEL WITH FACTORY-PAINTED FINISH. WITH PITCHED ROOF PANELS AND KNOCKOUTS WITH GROMMET SEALS FOR ELECTRICAL AND PIPING CONNECTIONS AND LIFTING LUGS.

1. CASING THICKNESS: 18 GAUGE THICK.

C. CASING INSULATION AND ADHESIVE: COMPLY WITH NFPA 90A.

1. MATERIALS: ASTM C 1071, TYPE I.
2. THICKNESS: 1/2 INCH
3. LINER MATERIALS SHALL HAVE AIR-STREAM SURFACE INSULATED WITH A MINIMUM 1/2-IN. THICK, MINIMUM 1 1/2 LB DENSITY, FLEXIBLE FIBERGLASS INSULATION BONDED WITH A PHENOLIC BINDER, NEOPRENE COATED ON THE AIR SIDE.
4. LINER ADHESIVE: COMPLY WITH ASTM C 916, TYPE I.

D. UNIT SHALL HAVE A THRU-THE-BASE GAS AND ELECTRICAL CONNECTIONS.

2.2 FANS

OPTION A OR B:

A. DIRECT-DRIVEN SUPPLY-AIR FANS: DOUBLE WIDTH, BACKWARD INCLINED, CENTRIFUGAL, WITH PERMANENTLY LUBRICATED, MOTOR RESILIENTLY MOUNTED TO THE FAN INLET. ALUMINUM OR PAINTED-STEEL WHEELS, AND GALVANIZED- OR PAINTED-STEEL FAN SCROLLS.

B. BELT-DRIVEN SUPPLY-AIR FANS: DOUBLE WIDTH, FORWARD CURVED, CENTRIFUGAL; WITH PERMANENTLY LUBRICATED, SINGLE-SPEED MOTOR INSTALLED ON AN ADJUSTABLE FAN BASE RESILIENTLY MOUNTED IN THE CASING. ALUMINUM OR PAINTED-STEEL WHEELS, AND GALVANIZED- OR PAINTED-STEEL FAN SCROLLS.

C. CONDENSER-COIL FAN: DIRECT DRIVE, PROPELLER, MOUNTED ON SHAFT OF PERMANENTLY LUBRICATED MOTOR WITH THERMAL OVERLOAD PROTECTION.

D. POWER EXHAUST: FORWARD CURVED, SHAFT MOUNTED ON PERMANENTLY LUBRICATED MOTOR.

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2.3 COILS

A. SUPPLY-AIR REFRIGERANT COIL:

1. ALUMINUM-PLATE FIN AND SEAMLESS INTERNALLY GROOVED COPPER TUBE IN STEEL CASING WITH EQUALIZING-TYPE VERTICAL DISTRIBUTOR.
2. POLYMER STRIP SHALL PREVENT ALL COPPER COIL FROM CONTACTING STEEL COIL FRAME OR CONDENSATE PAN.
3. CATHODIC EPOXY COATING.
4. CONDENSATE DRAIN PAN: GALVANIZED STEEL WITH CORROSION-RESISTANT COATING FORMED WITH PITCH AND DRAIN CONNECTIONS.

B. OUTDOOR-AIR REFRIGERANT COIL:

1. ALUMINUM-PLATE FIN AND SEAMLESS INTERNALLY GROOVED COPPER TUBE IN STEEL CASING WITH EQUALIZING-TYPE VERTICAL DISTRIBUTOR.
2. POLYMER STRIP SHALL PREVENT ALL COPPER COIL FROM CONTACTING STEEL COIL FRAME OR CONDENSATE PAN.
3. CATHODIC EPOXY COATING.

C. HOT-GAS REHEAT REFRIGERANT COIL (OPTIONAL):

1. ALUMINUM-PLATE FIN AND SEAMLESS INTERNALLY GROOVED COPPER TUBE IN STEEL CASING WITH EQUALIZING-TYPE VERTICAL DISTRIBUTOR.
2. POLYMER STRIP SHALL PREVENT ALL COPPER COIL FROM CONTACTING STEEL COIL FRAME OR CONDENSATE PAN.
3. CATHODIC EPOXY COATING.

2.4 REFRIGERANT CIRCUIT COMPONENTS

A. NUMBER OF REFRIGERANT CIRCUITS: TWO

B. COMPRESSOR: HERMETIC, SCROLL, MOUNTED ON VIBRATION ISOLATORS; WITH INTERNAL OVERCURRENT AND HIGH-TEMPERATURE PROTECTION, INTERNAL PRESSURE RELIEF AND CRANKCASE HEATER.

C. REFRIGERATION SPECIALTIES:

1. REFRIGERANT: R-410A
2. EXPANSION VALVE WITH REPLACEABLE THERMOSTATIC ELEMENT.
3. REFRIGERANT FILTER/DRYER.
4. MANUAL-RESET HIGH-PRESSURE SAFETY SWITCH.
5. AUTOMATIC-RESET LOW-PRESSURE SAFETY SWITCH.
6. MINIMUM OFF-TIME RELAY.
7. AUTOMATIC-RESET COMPRESSOR MOTOR THERMAL OVERLOAD.
8. BRASS SERVICE VALVES INSTALLED IN COMPRESSOR SUCTION AND LIQUID LINES.
9. LOW-AMBIENT KIT HIGH-PRESSURE SENSOR.
10. HOT-GAS REHEAT SOLENOID VALVE WITH A REPLACEABLE MAGNETIC COIL.

2.5 AIR FILTRATION

A. PROVIDE 2" THROW-AWAY FIBERGLASS FILTERS.

2.6 GAS FURNACE

A. BURNERS: IN-SHOT TYPE CONSTRUCTED OF ALUMINUM-COATED STEEL.

1. FUEL: NATURAL GAS.
2. IGNITION: DIRECT SPARK IGNITION (DSI).

VERIFY AVAILABILITY OF HIGH-ALTITUDE FEATURE WITH MANUFACTURERS.

3. HIGH-ALTITUDE KIT: FOR PROJECT ELEVATIONS MORE THAN 2,000 FEET ABOVE SEA LEVEL.

B. HEAT-EXCHANGER AND DRAIN PAN: STAINLESS STEEL.

C. INDUCED DRAFT COMBUSTION BLOWER.

D. SAFETY CONTROLS:

1. GAS CONTROL VALVE: TWO STAGE.
2. GAS TRAIN: SINGLE-BODY, REGULATED, REDUNDANT, 24-V AC GAS VALVE ASSEMBLY CONTAINING PILOT SOLENOID VALVE, PILOT FILTER, PRESSURE REGULATOR, PILOT SHUTOFF, AND MANUAL SHUTOFF.

2.7 DAMPERS

A. OUTDOOR AND RETURN AIR MIXING DAMPERS: PARALLEL OR OPPOSED-BLADE GALVANIZED-STEEL DAMPERS MECHANICALLY FASTENED TO CADMIUM PLATED FOR GALVANIZED-STEEL OPERATING ROD IN REINFORCED CABINET, CONNECT OPERATING RODS WITH COMMON LINKAGE AND INTERCONNECT LINKAGES SO DAMPERS OPERATE SIMULTANEOUSLY.

1. DAMPER MOTOR: MODULATING WITH ADJUSTABLE MINIMUM POSITION.
2. RELIEF AIR DAMPER: GRAVITY ACTUATED, WITH BIRD SCREEN AND HOOD.

2.8 ELECTRICAL POWER CONNECTION

A. PROVIDE FOR SINGLE CONNECTION OF POWER TO UNIT WITH UNIT-MOUNTED DISCONNECT SWITCH ACCESSIBLE FROM OUTSIDE UNIT AND CONTROL-CIRCUIT TRANSFORMER WITH BUILT-IN OVERCURRENT PROTECTION.

2.9 CONTROLS

A. BASIC UNIT CONTROLS:

1. CONTROL-VOLTAGE TRANSFORMER.
2. WALL-MOUNTED THERMOSTAT OR SENSOR WITH THE FOLLOWING FEATURES:
   a. HEAT-COOL-OFF SWITCH.
   b. FAN ON-AUTO SWITCH.
   c. FAN-SPEED SWITCH.
   d. AUTOMATIC CHANGEOVER.
   e. ADJUSTABLE DEADBAND.
   f. EXPOSED SET POINT.
   g. EXPOSED INDICATION.
   h. DEGREE F INDICATION.
   i. UNOCCUPIED-PERIOD-OVERRIDE PUSH BUTTON.
   j. DATA ENTRY AND ACCESS PORT TO INPUT TEMPERATURE AND HUMIDITY SET POINTS, OCCUPIED AND UNOCCUPIED PERIODS, AND OUTPUT ROOM TEMPERATURE AND HUMIDITY, SUPPLY-AIR TEMPERATURE, OPERATING MODE, AND STATUS.
3. WALL-MOUNTED HUMIDISTAT OR SENSOR WITH THE FOLLOWING FEATURES:
   a. EXPOSED SET POINT.
   b. EXPOSED INDICATION.
4. REMOTE WALL-MOUNTED ANNUNCIATOR PANEL WITH KEYED ACCESS FOR EACH UNIT:
   a. LIGHTS TO INDICATE POWER ON, UNIT ALARM OR FAILURE, SMOKE DETECTION.

B. DDC CONTROLLER:

1. CONTROLLER SHALL HAVE VOLATILE-MEMORY BACKUP.
2. SAFETY CONTROL OPERATION:
   a. SMOKE DETECTORS: STOP FAN AND CLOSE OUTDOOR-AIR DAMPER IF SMOKE IS DETECTED. PROVIDE ADDITIONAL CONTACTS FOR ALARM INTERFACE TO FIRE ALARM CONTROL PANEL.
   b. FIRE ALARM CONTROL PANEL INTERFACE WHERE APPLICABLE.
   c. LOW-DISCHARGE TEMPERATURE: STOP FAN AND CLOSE OUTDOOR-AIR DAMPER IF SUPPLY AIR TEMPERATURE IS LESS THAN 40°F.
      RETAIN FIRST SUBPARAGRAPH BELOW FOR AIR-TO-AIR HEAT-PUMP FEATURE.
   d. DEFROST CONTROL FOR CONDENSER COIL: PRESSURE DIFFERENTIAL SWITCH TO INITIATE DEFROST SEQUENCE.
3. UNIT SHALL BE CAPABLE OF DIRECT COMMUNICATION WITH GENERIC OPEN PROTOCOL SUCH AS BACNET MS/TP, LONTALK, OR MODUS. THIS WILL ALLOW THE UNIT TO INTEGRATE WITH A FACILITY ENERGY MANAGEMENT SYSTEM.
4. SCHEDULED OPERATION: OCCUPIED AND UNOCCUPIED PERIODS ON SEVEN-DAY CLOCK WITH A MINIMUM OF FOUR PROGRAMMABLE PERIODS PER DAY.
5. UNOCCUPIED PERIOD:
   a. HEATING SETBACK: 10°F.
   b. COOLING SETBACK: SYSTEM OFF.
   c. OVERRIDE OPERATION: TWO HOURS.
6. SUPPLY FAN OPERATION:
   a. OCCUPIED PERIODS: RUN FAN CONTINUOUSLY.
   b. UNOCCUPIED PERIODS: CYCLE FAN TO MAINTAIN SETBACK TEMPERATURE.
7. REFRIGERANT CIRCUIT OPERATION:
   a. OCCUPIED PERIODS: CYCLE OR STAGE COMPRESSORS, AND OPERATE HOT-GAS BYPASS TO MATCH COMPRESSOR OUTPUT TO COOLING LOAD TO MAINTAIN ROOM TEMPERATURE AND HUMIDITY. CYCLE CONDENSER FANS TO MAINTAIN MAXIMUM HOT-GAS PRESSURE. OPERATE LOW-AMBIENT CONTROL KIT TO MAINTAIN MINIMUM HOT-GAS PRESSURE.
   b. UNOCCUPIED PERIODS: CYCLE COMPRESSORS AND CONDENSER FANS FOR HEATING TO MAINTAIN SETBACK TEMPERATURE.
8. HOT-GAS REHEAT-COIL OPERATION (OPTIONAL):
   a. OCCUPIED PERIODS: HUMIDISTAT OPENS HOT-GAS VALVE TO PROVIDE HOT-GAS REHEAT, AND CYCLES COMPRESSOR.
   b. UNOCCUPIED PERIODS: REHEAT NOT REQUIRED.
9. GAS FURNACE OPERATION:
   a. OCCUPIED PERIODS: STAGE BURNER TO MAINTAIN ROOM TEMPERATURE.
   b. UNOCCUPIED PERIODS: CYCLE BURNER TO MAINTAIN SETBACK TEMPERATURE.
10. FIXED MINIMUM OUTDOOR-AIR DAMPER OPERATION:
    a. OCCUPIED PERIODS: OPEN TO 25 PERCENT.
    b. UNOCCUPIED PERIODS: CLOSE THE OUTDOOR-AIR DAMPER.
11. ECONOMIZER OUTDOOR-AIR DAMPER OPERATION:
    a. OCCUPIED PERIODS: OPEN TO 25 PERCENT FIXED MINIMUM INTAKE, AND MAXIMUM 100 PERCENT OF THE FAN CAPACITY TO COMPLY WITH ASHRAE CYCLE II. CONTROLLER SHALL PERMIT AIR-SIDE ECONOMIZER OPERATION WHEN OUTDOOR AIR IS LESS THAN 60 ° F. USE MIXED-AIR TEMPERATURE AND SELECT BETWEEN OUTDOOR-AIR AND RETURN-AIR ENTHALPY TO ADJUST MIXING DAMPERS DURING ECONOMIZER CYCLE OPERATION, LOCK OUT COOLING.
    b. UNOCCUPIED PERIODS: CLOSE OUTDOOR-AIR DAMPER AND OPEN RETURN-AIR DAMPER.

2.10 ACCESSORIES

A. DUPLEX, 115-V, GROUND-FAULT-INTERRUPTER OUTLET WITH 15-A OVERCURRENT PROTECTION. INCLUDE TRANSFORMER IF REQUIRED.

B. LOW-AMBIENT KIT STAGED DOWN TO 0°F.

C. FILTER DIFFERENTIAL PRESSURE SWITCH WITH SENSOR TUBING ON EITHER SIDE OF FILTER. SET FOR FINAL FILTER PRESSURE LOSS.

D. HAIL GUARDS OF GALVANIZED STEEL, PAINTED TO MATCH CASING.

E. DUCT MOUNTED SMOKE DETECTOR IN RETURN AIR STREAM CAPABLE OF SHUTTING DOWN THE UNIT IN THE PRESENCE OF SMOKE DETECTION.

2.11 ROOF CURBS

A. MATERIALS: GALVANIZED STEEL WITH CORROSION-PROTECTION COATING, WATERTIGHT GASKETS, AND FACTORY-INSTALLED WOOD NAILER; COMPLYING WITH NRCA STANDARDS.

1. CURB INSULATION AND ADHESIVE: COMPLY WITH NFPA 90A OR NFPA 90B.
   a. MATERIALS: ASTM C 1071, TYPE I OR II.
   b. THICKNESS: 1-1/2 INCHES.
2. APPLICATION: FACTORY APPLIED WITH ADHESIVE AND MECHANICAL FASTENERS TO THE INTERNAL SURFACE OF CURB.
   a. LINER ADHESIVE: COMPLY WITH ASTM C 916, TYPE I.
   b. MECHANICAL FASTENERS: GALVANIZED STEEL, SUITABLE FOR ADHESIVE ATTACHMENT, MECHANICAL ATTACHMENT, OR WELDING ATTACHMENT TO DUCT WITHOUT DAMAGING LINER WHEN APPLIED AS RECOMMENDED BY MANUFACTURER AND WITHOUT CAUSING LEAKAGE IN CABINET.
   c. LINER MATERIALS SHALL HAVE AIR-STREAM SURFACE INSULATED WITH A MINIMUM 1/24N, THICK, MINIMUM 1 1/2 LB DENSITY, FLEXIBLE FIBERGLASS INSULATION BONDED WITH A PHENOLIC BINDER, NEOPRENE COATED ON THE AIR SIDE.
   d. LINER ADHESIVE: COMPLY WITH ASTM C 916, TYPE I.

B. CURB HEIGHT: 14 INCHES TYPICAL UNO. PROVIDE 24 INCH CURB IN AREAS WITH EXPECTED HEAVY SNOWFALL.

PART 3 - EXECUTION

3.1 EXAMINATION

A. EXAMINE SUBSTRATES, AREAS, AND CONDITIONS, WITH INSTALLER PRESENT, FOR COMPLIANCE WITH REQUIREMENTS FOR INSTALLATION TOLERANCES AND OTHER CONDITIONS AFFECTING PERFORMANCE OF RTUS

B. EXAMINE ROUGHING-IN FOR RTUS TO VERIFY ACTUAL LOCATIONS OF PIPING AND DUCT CONNECTIONS BEFORE EQUIPMENT INSTALLATION.

C. EXAMINE ROOFS FOR SUITABLE CONDITIONS WHERE RTUS WILL BE INSTALLED.

D. PROCEED WITH INSTALLATION ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.

3.2 INSTALLATION

A. ROOF CURB: INSTALL ON ROOF STRUCTURE, LEVEL AND SECURE. INSTALL RTUS ON CURBS AND COORDINATE ROOF PENETRATIONS AND FLASHING WITH ROOF CONSTRUCTION. RTUS TO UPPER CURB RAIL, AND SECURE CURB BASE TO ROOF FRAMING OR CONCRETE BASE WITH ANCHOR BOLTS.

3.3 CONNECTIONS

A. . THE FOLLOWING ARE SPECIFIC CONNECTION REQUIREMENTS:

1. INSTALL DUCTS TO TERMINATION AT TOP OF ROOF CURB.
2. REMOVE ROOF DECKING ONLY AS REQUIRED FOR PASSAGE OF DUCTS. DO NOT CUT OUT DECKING UNDER ENTIRE ROOF CURB.

3.4 COORDINATION

A. CONTRACTOR TO COORDINATE WITH KITCHEN EQUIPMENT SUPPLIER TO ENSURE THAT THE RTUS ARE COORDINATED WITH THE KITCHEN EQUIPMENT, PARTICULARLY THE EXHAUST HOODS AND THE MAKE-UP AIR UNIT, TO PROPERLY PRESSURIZE THE BUILDING/SPACE.

B. CONTRACTOR TO ENSURE THAT ALL THERMOSTATS AND SENSORS ARE COMPATIBLE WITH THE RTU CONTROLS.

3.5 FIELD QUALITY CONTROL

A. MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT, TEST, AND ADJUST COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS. REPORT RESULTS IN WRITING.

B. PERFORM TESTS AND INSPECTIONS AND PREPARE TEST REPORTS.

1. MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS, AND TO ASSIST IN TESTING. REPORT RESULTS IN WRITING.

C. TESTS AND INSPECTIONS:

1. AFTER INSTALLING RTUS AND AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, TEST UNITS FOR COMPLIANCE WITH REQUIREMENTS.
2. OPERATIONAL TEST: AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, START UNITS TO CONFIRM PROPER MOTOR ROTATION AND UNIT OPERATION.
3. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.

D. REMOVE AND REPLACE MALFUNCTIONING UNITS AND RETEST AS SPECIFIED ABOVE.

3.6 STARTUP SERVICE

A. ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO PERFORM STARTUP SERVICE.

B. COMPLETE INSTALLATION AND STARTUP CHECKS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS AND DO THE FOLLOWING:

1. INSPECT FOR VISIBLE DAMAGE TO UNIT CASING, FURNACE COMBUSTION CHAMBER, COMPRESSOR, COILS, AND FANS.
2. VERIFY THAT LABELS ARE CLEARLY VISIBLE, CLEARANCES HAVE BEEN PROVIDED FOR SERVICING, CONTROLS ARE CONNECTED AND OPERABLE, AND FILTERS ARE INSTALLED.
3. CLEAN CONDENSER COIL AND FURNACE AND INSPECT FOR CONSTRUCTION DEBRIS.
4. REMOVE PACKING FROM VIBRATION ISOLATORS.
5. VERIFY LUBRICATION ON FAN AND MOTOR BEARINGS.
6. INSPECT FAN-WHEEL ROTATION FOR MOVEMENT IN CORRECT DIRECTION WITHOUT VIBRATION AND BINDING.
7. ADJUST FAN BELTS TO PROPER ALIGNMENT AND TENSION.
8. START UNIT ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.
   a. INSPECT AND RECORD PERFORMANCE OF INTERLOCKS AND PROTECTIVE DEVICES; VERIFY SEQUENCES.
10. OPERATE UNIT FOR AN INITIAL PERIOD AS RECOMMENDED OR REQUIRED BY MANUFACTURER.
11. PERFORM THE FOLLOWING OPERATIONS FOR BOTH MINIMUM AND MAXIMUM FIRING. ADJUST BURNER FOR PEAK EFFICIENCY.
    a. MEASURE GAS PRESSURE ON MANIFOLD.
    b. INSPECT OPERATION OF POWER VENTS.
    c. MEASURE SUPPLY-AIR TEMPERATURE AND VOLUME WHEN BURNER IS AT MAXIMUM FIRING RATE AND WHEN BURNER IS OFF. CALCULATE USEFUL HEAT TO SUPPLY AIR.
20. ADJUST AND INSPECT HIGH-TEMPERATURE LIMITS.
21. INSPECT OUTDOOR-AIR DAMPERS FOR PROPER STROKE AND INTERLOCK WITH RETURN-AIR DAMPERS.
22. INSPECT CONTROLS FOR CORRECT SEQUENCING OF HEATING, MIXING DAMPERS, REFRIGERATION, AND NORMAL AND EMERGENCY SHUTDOWN.
23. SIMULATE MAXIMUM COOLING DEMAND AND INSPECT THE FOLLOWING:
    a. COMPRESSOR REFRIGERANT SUCTION AND HOT-GAS PRESSURES.
    b. SHORT CIRCUITING OF AIR THROUGH CONDENSER COIL OR FROM CONDENSER FANS TO OUTDOOR-AIR INTAKE.
27. VERIFY OPERATION OF REMOTE PANEL INCLUDING PILOT-LIGHT OPERATION AND FAILURE MODES. INSPECT THE FOLLOWING:
    a. HIGH-TEMPERATURE LIMIT ON GAS-FIRED HEAT EXCHANGER.
    b. LOW-TEMPERATURE SAFETY OPERATION.
    c. FILTER HIGH-PRESSURE DIFFERENTIAL ALARM.
    d. ECONOMIZER TO MINIMUM OUTDOOR-AIR CHANGEOVER.
    e. RELIEF-AIR FAN OPERATION.
    f. SMOKE ALARMS.
28. AFTER STARTUP AND PERFORMANCE TESTING AND PRIOR TO SUBSTANTIAL COMPLETION, REPLACE EXISTING FILTERS WITH NEW FILTERS.

3.7 CLEANING AND ADJUSTING

A. OCCUPANCY ADJUSTMENTS: WHEN REQUESTED WITHIN 12 MONTHS OF DATE OF SUBSTANTIAL COMPLETION, PROVIDE ON-SITE ASSISTANCE IN ADJUSTING SYSTEM TO SUIT ACTUAL OCCUPIED CONDITIONS. PROVIDE UP TO TWO VISITS TO SITE DURING OTHER-THAN-NORMAL OCCUPANCY HOURS FOR THIS PURPOSE.

B. AFTER COMPLETING SYSTEM INSTALLATION AND TESTING, ADJUSTING, AND BALANCING RTU AND AIR-DISTRIBUTION SYSTEMS, CLEAN FILTER HOUSINGS AND INSTALL NEW FILTERS.

CORE STATES GROUP
135 Wolter Street
Naperville, IL 60540
312.718.5415
core-states.com

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MECHANICAL SPECIFICATIONS

SHEET:
M702

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ELECTRICAL LEGEND

DETAIL	DESCRIPTION
	20A SIMPLEX RECEPTACLE
	20A DUPLEX RECEPTACLE
	20A DUPLEX RECEPTACLE ABOVE COUNTER
GFCI	20A DUPLEX RECEPTACLE - GFCI
GFCI	20A DUPLEX RECEPTACLE - GFCI ABOVE COUNTER
	20A SPLIT RECEPTACLE
WP GFCI	20A DUPLEX RECEPTACLE - WITH WEATHERPROOF COVER & GFCI
	20A DOUBLE DUPLEX RECEPTACLE
	20A DUPLEX RECEPTACLE IN CEILING
	DUPLEX RECEPTACLE - 30A, 125V., WITH ISOLATED GROUND
A-1	BRANCH CIRCUIT HOMERUN WITH CIRCUIT NUMBER
	FLOOR MOUNTED 20A DUPLEX RECEPTACLE
	SPECIAL RECEPTACLE (SEE PLANS FOR TYPE)
	JUNCTION BOX
	MOTOR (THREE PHASE & SINGLE PHASE)
TC	TIME CLOCK
V	VOLUME CONTROL
P	PULL BOX - SIZE & TYPE AS REQUIRED
	TELEPHONE / DATA OUTLET
TV	TV CABLE OUTLET
	DISCONNECT - NON FUSED
	DISCONNECT - FUSED
M	UTILITY METER
	ELECTRICAL PANEL

LIGHTING LEGEND

TAG	DESCRIPTION
	INTERIOR RECESSED DOWNLIGHT
	INTERIOR RECESSED DOWNLIGHT
	PENDANT
	PENDANT
	PENDANT
	TRACK LIGHT
	VANITY LIGHT
	WALL SCONCE
	2X4 LAY-IN TROFFER
	2X4 NIGHT LIGHT
	2X4 EMERGENCY LIGHT
	EXIT/EMERGENCY LIGHT W/ BATTERY PACK AND DUAL HEADS
	EXIT/EMERGENCY LIGHT WITH BATTERY PACK
	EXIT LIGHT (CEILING MOUNTED)
	REMOTE EMERGENCY HEADS
	EMERGENCY BATTERY PACK AND DUAL HEADS
	DIMMER SWITCH EQUAL TO LUTRON NOVA SERIES T
	TOGGLE (ON/OFF) SWITCH SINGLE POLE SWITCH WITH COVER PLATE
	TOGGLE SWITCH 2 POLE SWITCH WITH COVER PLATE
	TOGGLE SWITCH 3 WAY SWITCH WITH COVER PLATE
PC	PHOTOCELL
	WALL MOUNTED OCCUPANCY SENSOR
	CEILING MOUNTED OCCUPANCY SENSOR SENSORSWITCH MODEL #CMR 9 2P
	CEILING MOUNTED DAYLIGHT SENSOR WITH POWER PACK

GENERAL NOTES:

A. ALL WORK TO COMPLY TO ALL STATE, LOCAL, NEC, & NFPA CODES.

B. ELECTRICAL CONTRACTOR TO VISIT THE SITE PRIOR TO SUBMITTING A BID & INCLUDE IN THEIR BID ANY R&M ANY ITEMS NECESSARY FOR A COMPLETE & OPERATIONAL SYSTEM.

C. DRAWINGS ARE SCHEMATIC IN NATURE. ELECTRICAL CONTRACTOR IS TO ADD ANY ITEMS THAT ARE REQUIRED FOR A COMPLETE & OPERATIONAL SYSTEM IN THEIR PROPOSAL.

D. ELECTRICAL CONTRACTOR IS TO COORDINATE THEIR INSTALLATION WITH THE OTHER TRADES. IF A CONFLICT OCCURS AND IT IS DUE TO THE ELECTRICAL CONTRACTOR'S LACK OF COORDINATION, ALL WORK INVOLVED IN RESOLVING THE CONFLICT WILL BE AT THE EXPENSE OF THE ELECTRICAL CONTRACTOR.

E. LIGHT FIXTURES & LAMPS ARE FURNISHED BY OWNER EXCEPT AS NOTED ON THE LIGHT FIXTURE SCHEDULE. FIXTURE INSTALLATION SHALL BE BY THE ELECTRICAL CONTRACTOR ACCORDING TO LOCAL CODE AUTHORITY. THE ELECTRICAL CONTRACTOR SHALL REVIEW MATERIALS AT THE TIME OF DELIVERY AND IMMEDIATELY REPORT ANY DAMAGE OR MISSING PIECES.

F. DATA CABLE TO BE FURNISHED AND INSTALLED BY OWNER.

G. CONTRACTOR IS RESPONSIBLE FOR ADHERING TO THE ENTIRETY OF THIS DRAWING SET, INCLUDING BUT NOT LIMITED TO: PLANS, ELEVATIONS, DETAILS, SCHEDULES, AND SPECIFICATIONS. CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF ALL DRAWINGS OF OTHER TRADES, INCLUDING BUT NOT LIMITED TO, ARCHITECTURAL, MECHANICAL, PLUMBING, HOOD SUPPLIER, CIVIL, AND STRUCTURAL.

H. IF FIRE MARSHALL REQUIRES HORN STROBE, ELECTRICIAN TO RUN POWER & GC TO INSTALL. COORD INSTALL WITH CM.

ABBREVIATIONS

(A)	EXISTING TO BE ABANDONED	JB	JUNCTION BOX
(D)	EXISTING TO BE DEMOLISHED	KVA	KILOVOLT AMPERE
(E)	EXISTING TO REMAIN	KW	KILOWATT
(F)	FUTURE	LTG	LIGHTING OR LIGHT
(R)	EXISTING TO BE RELOCATED	LRA	LOCKED ROTOR AMPS
A	AMPERE	MCA	MAXIMUM CURRENT AMPACITY
AC	ALTERNATING CURRENT OR AIR CONDITIONER	MCB	MAIN CIRCUIT BREAKER
AFF	ABOVE FINISHED FLOOR	MCC	MOTOR CONTROL CENTER
AFG	ABOVE FINISHED GRADE	MDP	MAIN DISTRIBUTION PANEL
AHJ	AUTHORITY HAVING JURISDICTION	MLO	MAIN LUGS ONLY
AIC	AMPS INTERRUPTING CAPACITY	MOCP	MAXIMUM OVERCURRENT PROTECTION
ANNC	ANNUNCIATOR	MSB	MAIN SWITCHBOARD
AWG	AMERICAN WIRE GAUGE	MH	METAL HALIDE
BPS	BOLTED PRESSURE SWITCH	MTS	MANUAL TRANSFER SWITCH
C	CONDUIT	NAC	NOTIFICATION APPLIANCE CIRCUIT
CB	CIRCUIT BREAKER	NEC	NATIONAL ELECTRIC CODE
CCTV	CLOSED CIRCUIT TELEVISION	NC	NORMALLY CLOSED
CKT	CIRCUIT	NO	NORMALLY OPEN
CM	CONSTRUCTION MANAGER	NF	NON-FUSED
DC	DIRECT CURRENT	OCC	OCCUPANCY
DP	DISTRIBUTION PANELBOARD	PA	PUBLIC ADDRESS
DTT	DOUBLE TWIN TUBE	PB	PULL BOX OR PUSH BUTTON
EB	ELECTRONIC BALLAST	PVC	POLYVINYL CHLORIDE (PLASTIC PIPE)
EC	ELECTRICAL CONTRACTOR	PWR	POWER
EM	EMERGENCY	RECPT	RECEPTACLE
EMT	ELECTRICAL METAL TUBING	STP	SHIELDED, TWISTED PAIR
EWC	ELECTRIC WATER COOLER	TC	TIME CLOCK
FA	FIRE ALARM	TRT	TRIPLE TUBE
FLA	FULL LOAD AMPS	TYP	TYPICAL
G	GROUND	UNO	UNLESS NOTED OTHERWISE
GC	GENERAL TRADES CONTRACTOR	UTP	UNSHIELDED, TWISTED PAIR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER	V	VOLT
GEN	GENERATOR	W	WATT
HOA	HAND-OFF-AUTOMATIC	WAP	WIRELESS ACCESS POINT
HP	HORSEPOWER	WH	WATTHOUR
HPC	HIGH PRESSURE CONTACT SWITCH	WP	WEATHERPROOF, NEMA 3R UNO
HZ	HERTZ	XFMR	TRANSFORMER
IG	ISOLATED GROUND	Z	IMPEDANCE
IMC	INTERMEDIATE METAL CONDUIT	Ø	PHASE
INCD	INCANDESCENT		
KEC	KITCHEN EQUIPMENT CONTRACTOR		

LIGHT FIXTURE SCHEDULE

TYPE	DESCRIPTION	MANUFACTURER	MODEL NUMBER	LAMP/SOURCE	MOUNTING	FINISH	CTT	DRIVER	COMMENTS	VOLTS	WATTS
R4	ROUND DOWNLIGHT	CONTECH LIGHTING	K4SA3-27KC-MVD-F	LED ENGINE	RECESSED	WHITE	2700K	0-10V DIMMING	ORDER W/CTR1W-P TRIM	120	20
R1	2X4 LED FLAT PANEL	CONTECH LIGHTING	RDA4L12712D2FX1BLK-P	LED ENGINE	RECESSED	WHITE	4000K	0-10V DIMMING	37 DEGREE BEAMS	120	10
A1	2X4 LED FLAT PANEL	NORA LIGHTING	NPDBL-E24/334W	LED ENGINE	CEILING	WHITE	3000K	TRIAC DIMMING		120	45
H1	HOOD BULBS	BULBRITE	CANOPY HOOD E26 BASE LED BULB	LED BULB	HOOD	CLEAR GLOBE	2700K	N/A	(6) TOTAL BULBS. MUST BE UL LISTED AND CSA CERTIFIED FOR USE IN COMMERCIAL COOKING HOODS W/ THERMAL SHOCK RESISTANT GLOBE	120	6
P1	DECORATIVE PENDANT	RBW LIGHTING	MP-S-27-10-TRIAC-120	LED ENGINE	CEILING	WHITE	2700K	TRIAC DIMMING	PHASE DIMMING	120	9
P6	PENDANT	CONTECH LIGHTING	CTL9051FCF27CD-P	LED ENGINE	CEILING	WHITE	2700K	TRIAC DIMMING		120	9
TL	LED TAPE	WAC LIGHTING	INVISIBLE PRO 2 LED-TX24	LED ENGINE	SURFACE	WHITE	2700K	DIMMABLE	15' TRACK W/ EN-2460-RB2-T REMOTE AND LED T-CH ALUMINUM CHANNEL	120	4/FT
T1	TRACK SYSTEM	CONTECH LIGHTING	CTL603-P TRACK HEADS W/LED PAR20 6.5 DIM WHITE FINISH BULBS AND LT SERIES TRACK	LED ENGINE	TRACK	WHITE	2700K	DIMMING	8' TRACK(S) IN WHITE FINISH W/ ALL POWER AND CONNECTION COMPONENTS INCLUDING: LT-P (TRACK), LA-10-P (TRACK END FEED), LA-2-P (TRACK I-CONNECTOR), SUSPENSION COMPONENTS BY ELECTRICAL CONTRACTOR.	120	7
EMF	EXIT SIGN (FOH)	CONTECH LIGHTING	REXA-MF-G-EM-P	LED ENGINE	UNIVERSAL	WHITE	2700K	N/A	GREEN LETTERS FOR FRONT OF HOUSE ONLY	120	2.5
EMB	EXIT SIGN (BOH)	NORA LIGHTING	NX-603-LED/G	LED ENGINE	UNIVERSAL	WHITE	2700K	N/A	GREEN LETTERS FOR BACK OF HOUSE ONLY	120	2.5
EM2	EXTERIOR EMERGENCY LIGHT	DUAL-LITE	PG-B-HTR	LED ENGINE	WALL	BLACK	2700K	N/A		120	2.5
EME	EMERGENCY LIGHT	CONTECH LIGHTING	EL2HALEDEM-P	LED ENGINE	UNIVERSAL	WHITE	2700K	N/A	MOUNT ABOVE BRICK AND TILE FINISHES ABOVE WALL	120	2.5
B1	4' LED STRIP LIGHT	ETI	ST-4FT-4900LM-50K-MV-LVD-EM	LED ENGINE	SUSPENDED	WHITE	5000K	0-10V DIMMING		120	33
A2	2X2 LED FLAT PANEL	NORA LIGHTING	NPDBL-E24/334W	LED ENGINE	CEILING	WHITE	3000K	TRIAC DIMMING		120	30

FIXTURES PACKAGE SUPPLIED BY ILLUMINATE LIGHTING DESIGN. CALL MR. BILLY MARCHETTI, 781-873-7979

NOTES:
1. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR MOUNTING REQUIREMENTS OF ALL LIGHT FIXTURES
2. PROVIDE ALL COMPONENTS FOR A FULLY FUNCTIONING SYSTEM
3. COORDINATE WITH OWNERS REP FOR AIMING OF TRACK HEADS
4. VERIFY SUSPENSION LENGTH/MOUNTING HEIGHT OF SUSPENDED FIXTURES WITH ARCHITECTURAL PLANS AND IN FIELD WITH OWNER REPRESENTATIVE

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CORE STATES GROUP
135 Wolter Street
Northville, IL 60540
312.718.5415
core-states.com

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CAVA

CAVA - CANTON MI
43450 FORD ROAD
CANTON, MI 48187
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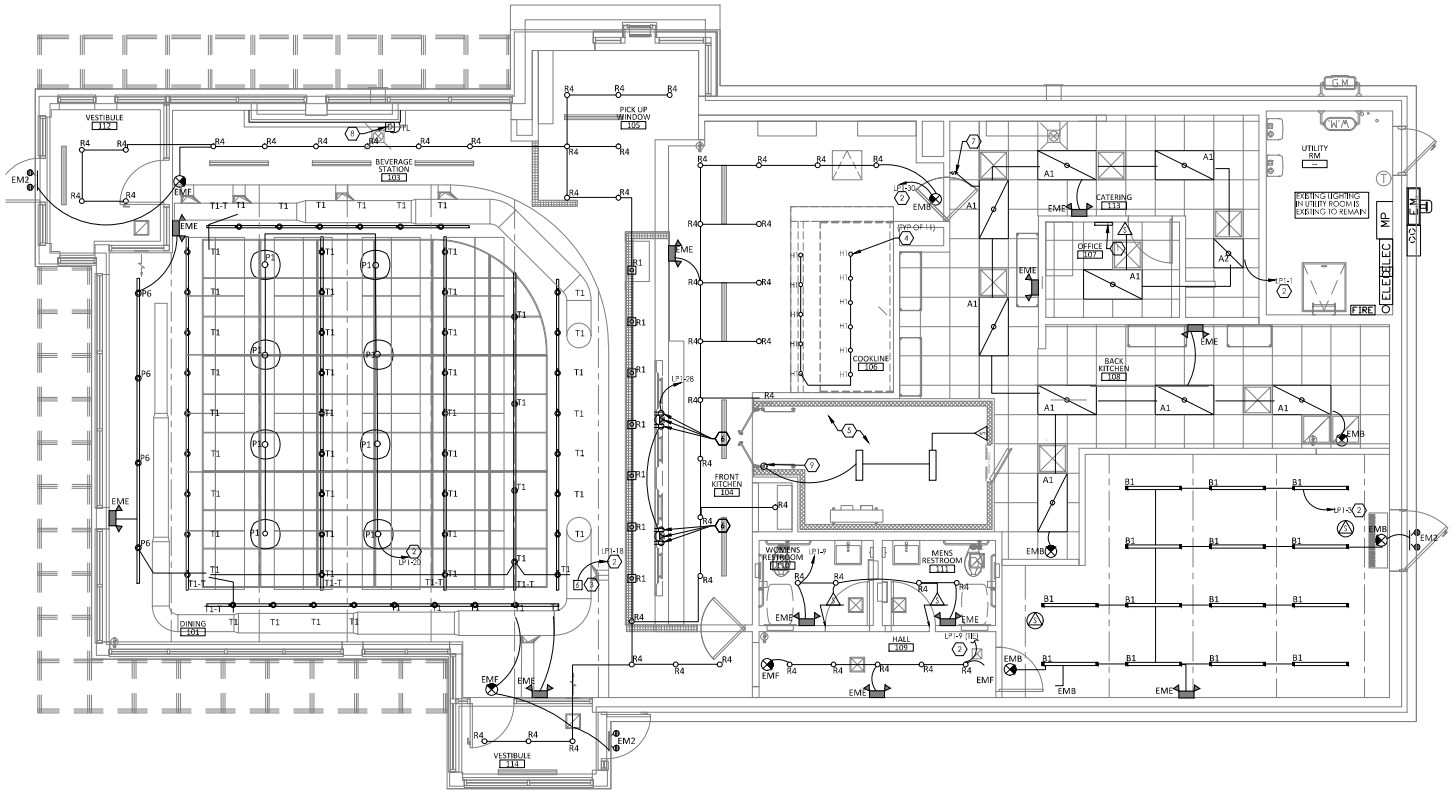
GENERAL INFORMATION ELECTRICAL

SHEET:
E000



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

GENERAL NOTES:

A. ALL LUMINAIRES AND LAMPS (INCLUDING SHATTER SHIELDS OR PROTECTED LAMPS FOR NON-LENSED FIXTURES ABOVE FOOD PREPARATION, WORK AND STORAGE AREAS) AND INVERTERS ARE FURNISHED BY OWNER AND INSTALLED BY EC U.N.O. COORDINATE SHIPPING AND STORAGE WITH OWNER PRIOR TO CONSTRUCTION.

B. ALL EMERGENCY AND EXIT LIGHTING TO BE CONNECTED TO LOCAL LIGHTING CIRCUIT AHEAD OF SWITCHING.

C. FIELD ADJUST AND AIM ALL MENUBOARD AND GRAPHICS TRACK LIGHTING FOR OPTIMUM COVERAGE.

D. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR LUMINAIRE PLACEMENT DIMENSIONS AND MTG HEIGHTS.

E. MC CABLE SHALL ONLY BE USED ABOVE ACCESSIBLE CEILINGS.

F. "STRAIGHT" LINES INDICATE LUMINAIRES ARE TO BE CONTROLLED TOGETHER WHILE "ARC'D" LINES INDICATE A COMMON BRANCH CIRCUIT.

G. GC TO CONTACT LIGHTING VENDOR TO REQUEST/CONFIRM LATEST LIGHTING CONTROLS DOCUMENTATION. REFER TO LIGHT FIXTURE SCHEDULE FOR CONTACT INFORMATION.

H. STANDARD OCC SENSOR TO BE SENSORWORX SWX-121-WH.

CODED NOTES: (#)

1. PLACE LIGHTING CONTROL PANEL, TOUCH PAD, INTERFACE, AND 4-BUTTON SCENE SWITCH ADJACENT TO MANAGERS DESK. REFER TO LIGHTING CONTROL VENDOR DRAWINGS FOR COMPLETE CONTROL AND WIRING DETAILS.
2. ROUTE CIRCUIT THROUGH LIGHTING CONTROL PANEL FOR CONTROL. REFER TO CONTROL SCHEDULE AND DIAGRAMS ON LIGHTING CONTROL VENDOR DRAWINGS FOR COMPLETE DETAILS.
3. TRACK MOUNTED CURRENT LIMITER. AMPERAGE AS INDICATED (TYP.).
4. HOOD BULBS SUPPLIED BY LIGHTING VENDOR. EC TO INSTALL HOOD BULBS AND MAKE FINAL CONNECTION. WIRE WITH HOOD CONTROL PANEL. REFER TO POWER PLAN, SHEET E200 FOR HOOD CONTROL PANEL CIRCUIT.
5. LIGHTING IN W.I.C. PROVIDED BY KEC (2) KASON 1810 LED). SHOWN FOR REFERENCE ONLY. EC TO INSTALL AND MAKE FINAL CONNECTION. REFER TO POWER PLAN, SHEET E200 FOR CIRCUIT. COORDINATE W/ W.I.C. VENDOR DRAWINGS.
6. REFER TO DIGITAL MENUBOARD DETAIL ON ARCHITECTURAL PLANS FOR DATA/POWER LOCATIONS. COORDINATE WITH VENDOR DRAWINGS FOR COMPLETE WIRING/CONTROL DETAILS.
7. ON/OFF SWITCH - 2 BUTTON. REFER TO LIGHTING CONTROL VENDOR DRAWINGS FOR COMPLETE CONTROL AND WIRING DETAILS.
8. DRIVER FOR TAPE LIGHT. INSTALL ABOVE ACCESSIBLE CEILING.
9. PROVIDE POWER FOR LED LIGHTS AT DISPLAY DOOR. COORDINATE W/ W.I.C. VENDOR DRAWINGS.

CORE STATES GROUP
135 Water Street
Naperville, IL 60540
312.718.5415
corestates.com

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LIGHTING PLAN

SHEET:
E100

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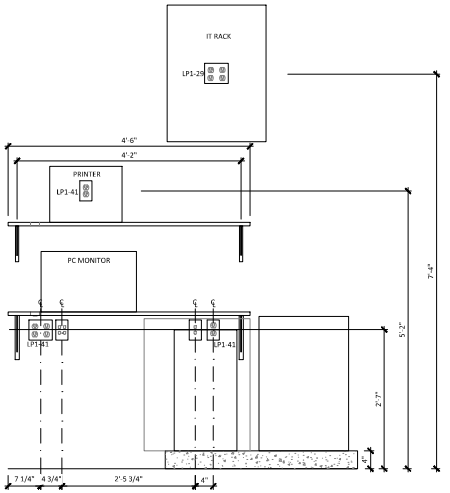
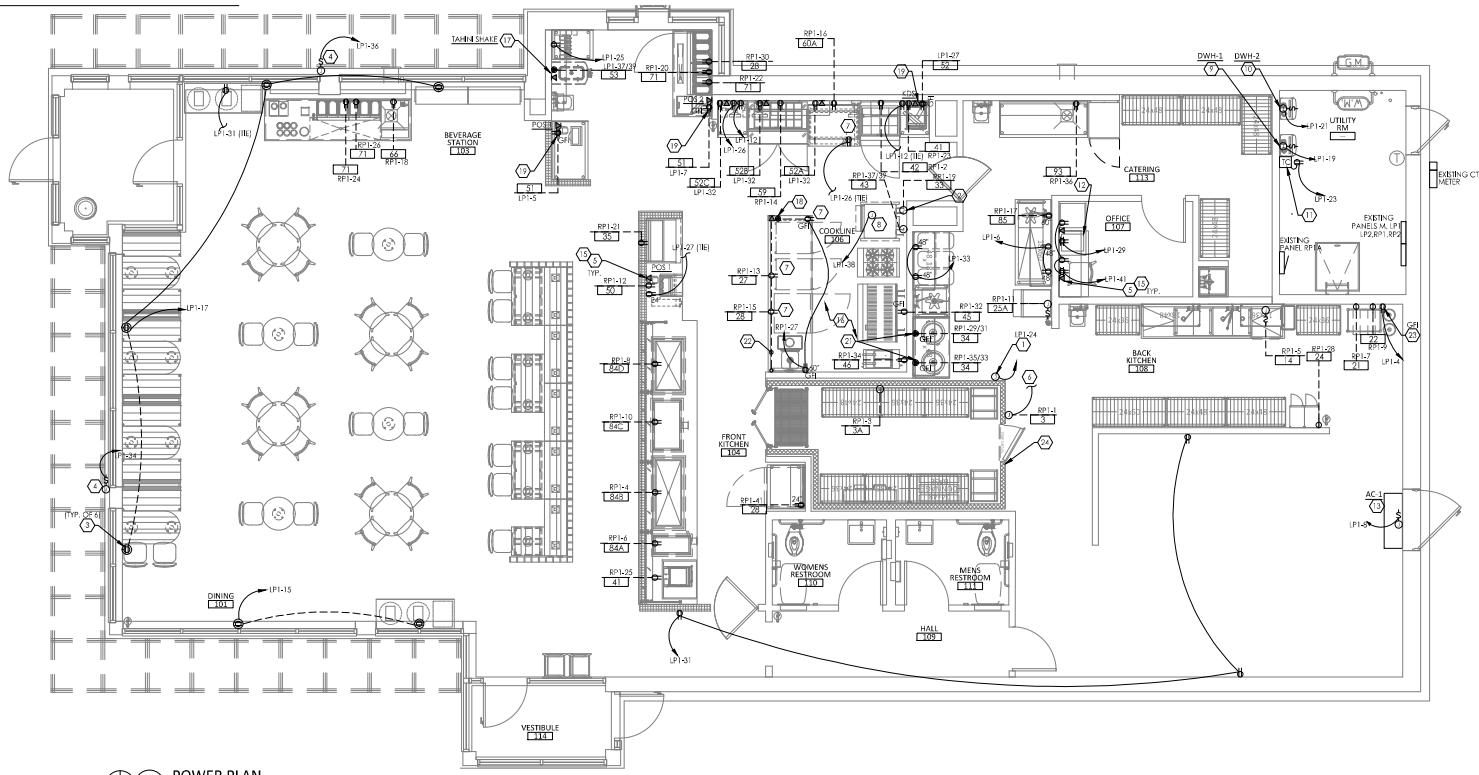


2 MANAGER'S DESK DETAIL
N.T.S.

CODED NOTES: (#)

1. STANDARD 1.5" DEEP SINGLE GANG JUNCTION BOX FOR ANSUL PULL STATION A MINIMUM OF 10'-0" FROM HOOD, NOT TO EXCEED 25'-0" FROM THE HOOD ON THE EXIT PATH. REFER TO ANSUL PULL STATION DETAIL, SHEET E401.
2. HOOD CONTROL PANEL BY KITCHEN EQUIPMENT SUPPLIER, EC TO MAKE FINAL CONNECTION TO TERMINALS IN CONTROL PANEL. CONTAINS STARTERS (FURNISHED WITH PANEL) FOR HOOD EXHAUST AND MAKE UP AIR FANS.
3. SHOW WINDOW RECEPTACLES TO BE CENTERED ON STOREFRONT WINDOWS (NO MORE THAN 18" ABOVE THE WINDOW). ROUTE CIRCUIT THRU NON DIM RELAY IN LIGHTING CONTROL PANEL FOR CONTROL. REFER TO LIGHTING CONTROL VENDOR DRAWINGS FOR DETAILS.
4. EXTERIOR SIGNAGE: COORDINATE FINAL MOUNTING HEIGHT AND LOCATION WITH CONSTRUCTION MANAGER PRIOR TO ROUGH-IN. IF SIGN DOES NOT COME EQUIPPED WITH DISCONNECT, FURNISH AND INSTALL DISCONNECT ON REAR OF SIGN. ROUTE THRU NON DIM RELAY IN LIGHTING CONTROL PANEL FOR CONTROL. REFER TO LIGHTING CONTROL VENDOR DRAWINGS FOR DETAILS. COORDINATE WITH SIGNAGE VENDOR. [SIGNAGE IS TBD BASED ON PROJECT SPECIFIC REQUIREMENTS.]
5. TELEPHONE/DATA JUNCTION BOX: RUN 3/4" EMPTY COND W/ PULL STRING TO ACESSIBLE CLG SPACE AND STUB. FACEPLATE AND CABLE BY VENDOR. (TYP.)
6. CONNECT TO LIGHT FIXTURES FURNISHED BY KEC, INSTALLED BY EC. COORDINATE FINAL LOCATION WITH COOLER LAYOUT PRIOR TO INSTALLATION.
7. FIXTURE MOUNTED RECEPTACLE. ROUTE POWER FROM NEAREST FULL HEIGHT WALL.
8. JUNCTION BOX ABOVE CEILING FOR GAS SOLENOID VALVE.
9. DHW-1 (ELECTRIC): 0.35 KW, 120V. MAKE FINAL CONNECTION.
10. DHW-2 (ELECTRIC): 0.35 KW, 120V. MAKE FINAL CONNECTION.
11. DUPLEX RCPT AND TIME CLOCK FOR RECIRC PUMP (EQ. TO INTERMATIC 101.)
12. REFER TO MANAGER'S DESK DETAIL ON THIS SHEET FOR MOUNTING HEIGHTS. ALL RECEPTACLES AT DESK TO HAVE INTEGRATED USB PORTS.
13. AC-1: 1/5 HP, 120V, MAKE FINAL CONNECTION. PROVIDE DISCONNECTING MEANS AS REQUIRED. COORDINATE FINAL LOCATION AND EXACT REQUIREMENTS WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN. REFER TO MECHANICAL SCHEDULES FOR ADDITIONAL INFORMATION.
14. NOT USED.
15. PROVIDE 4 GANG DATA JB.
16. VERIFY ELEC REQUIREMENTS OF KITCH EQUIP UNDER HOOD WITH MANUFACTURER'S SPECS. PROVIDE WATER GREASE RESISTANT COVERS WITH CORD ACCESS FOR RCPTS AS NEEDED. WIRE ALL ELECTRICAL EQUIP UNDER HOOD THRU CONTACTORS FOR SHUT DOWN CONTROL. REFER TO DETAIL 1/E401.
17. TAHINI SHAKE MACHINE: 22 MCA, 208V/1PH. PROVIDE (2) #10 CU AWG & (1) #10 CU AWG GND, IN 3/4" CONDUIT FROM 30A/2P BREAKER IN PANEL TO NEMA L6-30R RECEPTACLE AT 16" A.F.F. PROVIDE ADJACENT 3 GANG DATA JB AT 60" A.F.F.
18. TAHINI SHAKE MACHINE: 22 MCA, 208V/1PH. PROVIDE (2) #10 CU AWG & (1) #10 CU AWG GND, IN 3/4" CONDUIT FROM 30A/2P BREAKER IN PANEL TO NEMA L6-30R RECEPTACLE. PROVIDE ADJACENT DATA JB WITH 3 DATA PORTS FOR SHAKE KDS/PRINTER. MOUNT RECEPTS AT 20" A.F.F. ON INSIDE FACE OF UPPER RIGHT CORNER END PANEL OF SS TABLE AS SHOWN.
19. PROVIDE 4 GANG DATA JB AND DOUBLE DUPLEX POWER RCPT AT 60" A.F.F. FOR KDS/PRINTER.
20. PROVIDE DUPLEX RECEPT ABOVE DRIVE THRU WINDOW FOR AIR CURTAIN. COORDINATE FINAL LOCATION AND EXACT REQUIREMENTS WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN. REFER TO MECHANICAL SCHEDULES FOR ADDITIONAL INFORMATION.
21. PROVIDE RECEPTS FOR RICE COOKERS AT 48" A.F.F. W/ WEATHERPROOF COVERS.
22. ROUTE MC CABLE THROUGH ISLAND TO RECEPTACLES MOUNTED ON INTERIOR OF ISLAND.
23. PROVIDE RECEPT FOR CO2 DETECTOR. REFER TO SHEET M101 FOR SPECIFICATION. COORDINATE INSTALLATION OF DETECTOR WITH MANUFACTURER'S DRAWINGS.
24. GC TO INSTALL THERMOMETER SENSOR FOR W.I.C. AWAY FROM DOOR OPENING. COORDINATE WITH W.I.C. VENDOR DRAWINGS.



1 POWER PLAN
1/4" = 1'-0"

CORE STATES GROUP
135 Water Street
North Aurora, IL 60542
312.718.5415
core-states.com

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CAVA - CANTON MI
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POWER PLAN

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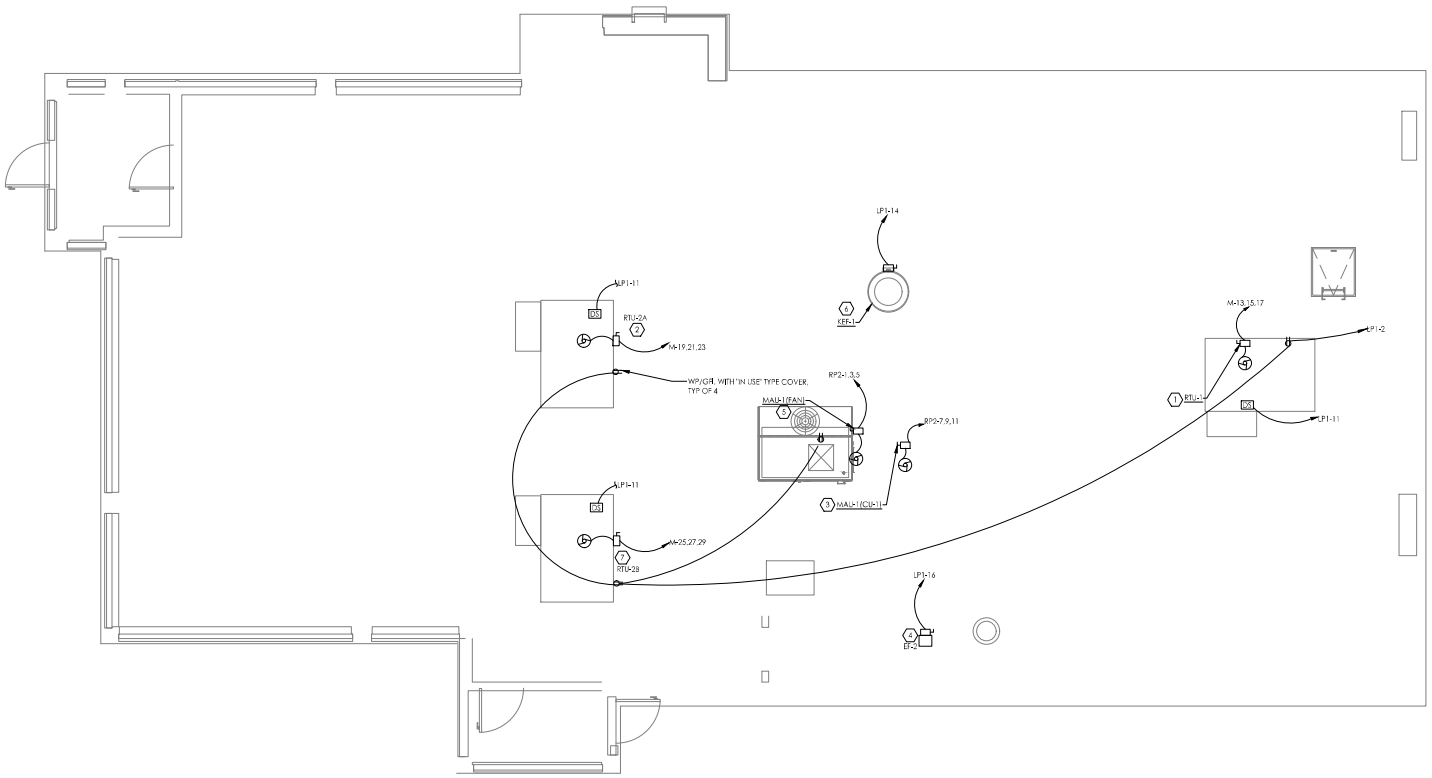
CODED NOTES: ⟨#⟩

1. RTU-1: 42 MCA, 208V/3PH, PROVIDE (3)#4 CU AWG & (1)#8 CU AWG GND, IN 1" CONDUIT FROM 80A/3P BREAKER THRU 100A/3P NEMA 3R NON FUSED DISC SWITCH TO UNIT, MAKE FINAL CONNECTION.
2. RTU-2A: 41 MCA, 208V/3PH, PROVIDE (3)#8 CU AWG & (1)#10 CU AWG GND, IN 3/4" CONDUIT FROM 50A/3P BREAKER THRU 60A/3P NEMA 3R NON FUSED DISC SWITCH TO UNIT, MAKE FINAL CONNECTION.
3. MAU-1 (CU-1): 11.9 MCA, 208V/3PH, PROVIDE (3)#12 CU AWG & (1)#12 CU AWG GND, IN 3/4" CONDUIT FROM 20A/3P BREAKER THRU 30A/3P NEMA 3R NON FUSED DISC SWITCH TO UNIT, MAKE FINAL CONNECTION.
4. EF-2: ROUTE CIRCUIT THRU TIMECLOCK SO THAT FAN IS OPERATIONAL DURING OCCUPIED HOURS.
5. MAU-1 (FAN): 7.7 MCA, 208V/3PH, PROVIDE (3)#12 CU AWG & (1)#12 CU AWG GND, IN 3/4" CONDUIT FROM 15A/3P BREAKER THRU HOOD CONTROL PANEL THRU 30A/3P NEMA 3R NON FUSED DISC SWITCH TO UNIT, MAKE FINAL CONNECTION.
6. KEF-1: 1 HP, 120V, PROVIDE (2)#12 CU AWG & (1)#12 CU AWG GND, IN 3/4" CONDUIT FROM 20A/1P BREAKER THRU HOOD CONTROL PANEL THRU 30A/1P NEMA 3R NON FUSED DISC SWITCH TO UNIT, MAKE FINAL CONNECTION.
7. RTU-2B 41 MCA, 208V/3PH, PROVIDE (3)#8 CU AWG & (1)#10 CU AWG GND, IN 3/4" CONDUIT FROM 50A/3P BREAKER THRU 60A/3P NEMA 3R NON FUSED DISC SWITCH TO UNIT, MAKE FINAL CONNECTION.



1 ROOF POWER PLAN
1/4" = 1'-0"

1/8/2025 3:14 PM

CORE STATES GROUP
135 Water Street
Suite 208
Naperville, IL 60540
312.718.5415
core-states.com

ISSUED FOR CONSTRUCTION

CAVA

CAVA - CANTON MI
43450 FORD ROAD
CANTON, MI 48187
FOR
CAVA
14 Ridge Square NW #500, WASHINGTON, DC 20016

AOR PROJECT NUMBER:
CAV.38002

ISSUE	DATE
PERMIT SET	AUG 2, 2024
BID SET	SEP 18, 2024
BLDG RESPONSE	NOV 15, 2024
CONSTR SET	JAN 8, 2025

ROOF POWER PLAN

SHEET:
E201

CODED NOTES: (#)

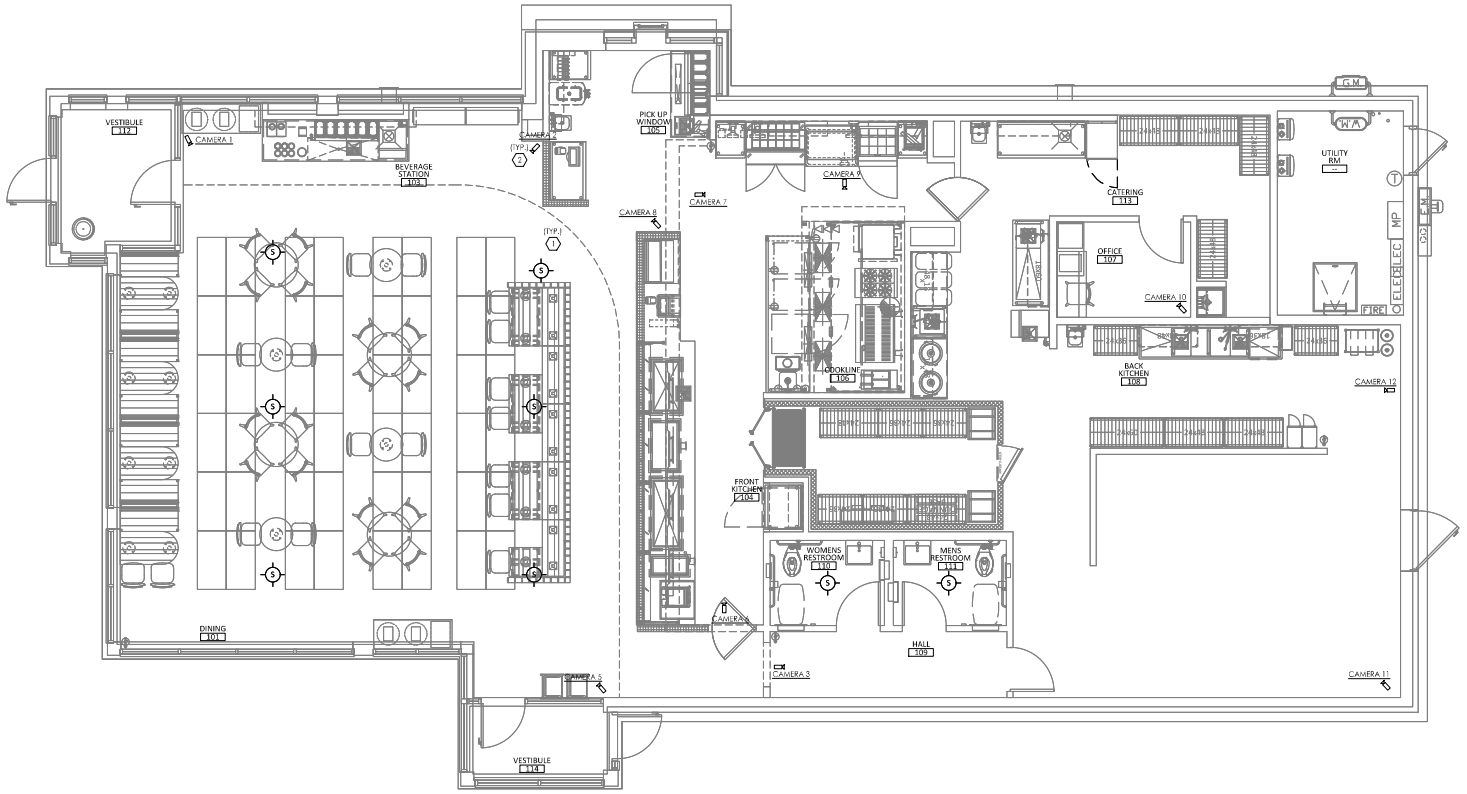
1. SPEAKER: WHITE FINISH FOR INTERIOR SPEAKERS. BLACK FINISH FOR EXTERIOR. B.O. SPEAKER AT 11'-8" AFF. PROVIDE SUPPORTS FOR SPEAKERS IN OPEN CEILINGS. OWNER VENDOR TO PROVIDE FIXTURE AND WIRING. COORDINATE WITH LOW VOLTAGE VENDOR (TYP.).
2. CAMERA: CAMERAS TO ALL ALIGN ON FACE OF SOFFIT. OWNER VENDOR TO PROVIDE FIXTURE AND WIRING. COORDINATE WITH LOW VOLTAGE VENDOR (TYP.).

CAMERA SCHEDULE:

CAM 1	FRONT ENTRANCE	CAM 8	PICK UP WINDOW
CAM 2	DINING	CAM 9	COOKLINE
CAM 3	HALLWAY/RESTROOMS	CAM 10	MANAGER'S DESK
CAM 4	QUEUE	CAM 11	BACK ENTRANCE & WIC DOOR
CAM 5	DINING	CAM 12	BACK OF HOUSE ENTRY
CAM 6	FRONT KITCHEN	CAM 13	LOCKERS AREA
CAM 7	SERVE LINE		

DATA CABLE SCHEDULE:

POS 1	4 CABLES
POS 2	2 CABLES
KDS	3 CABLES
MENUBOARDS	10 CABLES
SHAKES	3 CABLES
MANAGERS DESK	4 CABLES
AP/CELL	2 CABLES



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

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LOW VOLTAGE PLAN

SHEET:
E202

1/8/2025 3:14 PM

PANELBOARD: M (EXISTING)

BUS AMPS: 600A
MAIN SIZE/TYPE: 600A MCB
VOLTS/PHASE: 208Y/120V, 3PH, 4W
SERVES: FIRST FLOOR
LOCATION: UTILITY ROOM
MOUNTING: SURFACE
EQUIPMENT GROUND BUS

CKT NO.	DESCRIPTION	VA/PHASE A	VA/PHASE B	VA/PHASE C	WIRE NO.	BKR AMP	P	P	BKR AMP	WIRE NO.	VA/PHASE A	VA/PHASE B	VA/PHASE C	DESCRIPTION	CKT NO.
1														not usable space	2
3	main switch				-	600	3	-	-	-				not usable space	4
5														not usable space	6
7		9,644												not usable space	8
9	panel lp1		7,560		-	200	3	-	-	-				not usable space	10
11				7,200										not usable space	12
13		7,445									2,354				14
15	RTU-1		7,445		4	60	3	3	100			2,354		panel rp2	16
17				7,445									2,354		18
19		4,923									7,000				20
21	RTU-2A		4,923		8	50	3	3	100			6,000		panel lp2	22
23				4,923									5,000		24
25		4,923													26
27	RTU-2B		4,923		8	50	3	3	20					SPARE	28
29				4,923											30
	SUBTOTAL	26,935	24,851	24,491							9,354	8,354	7,354	SUBTOTAL	

		LOAD	CONN. VA	DF	LOAD	CONN. VA	DF	
TOTAL PHASE A - VA	36,289	COOLING		0	REFRIGERATION		1.00	
AMPS	302	HEATING	52,573	1.00	SIGN/DISPLAY	2,400	1.25	
TOTAL PHASE B - VA	33,205	LIGHTING	3,002	1.25	KITCHEN	4,576	0.65	
AMPS	277	RECEPTACLES	4,860	1.0/.5	EXISTING	18,200	1.00	
TOTAL PHASE C - VA	31,845	MOTORS	3,336	1.00	LARGE MOTOR		1.25	TOTAL DEMAND
AMPS	265	SUPP HEAT		1.00	SHOW WINDOW	2,550	1.25	101,725 VA
TOTAL PNLBD - VA	101,339	MISC EQUIP	9,842	1.00	LTG TRACK		1.00	282 A
AMPS	281							

CIRCUITS SHOWN IN LOWERCASE ARE EXISTING TO REMAIN.

PANELBOARD: RP1 (EXISTING)

BUS AMPS: 150A
MAIN SIZE/TYPE: MLO
VOLTS/PHASE: 208Y/120V, 3PH, 4W
SERVES: CAVA
LOCATION: UTILITY ROOM
MOUNTING: SURFACE
EQUIPMENT GROUND BUS

	CKT NO.	DESCRIPTION	VA/PHASE A	VA/PHASE B	VA/PHASE C	WIRE NO.	BKR AMP	P	P	BKR AMP	WIRE NO.	VA/PHASE A	VA/PHASE B	VA/PHASE C	DESCRIPTION	CKT NO.	
	1	3 - WALK-IN COOLER LIGHTS	120			12	20	1	1	20	12	300			42- PREP FRIDGE	2	GFI
	3	3A - EVAPORATOR COIL		240		12	20	1	1	20	12		660		84B- REFRIG COLD PANS	4	GFI
GFI	5	14 - WAREWASHER			1,440	12	20	1	1	20	12			1,800	84A- DROP-IN HOT WELL	6	GFI
GFI	7	21 - BAG N BOX	1,800			12	20	1	1	20	12	780			84D- REFRIG COLD PANS	8	GFI
GFI	9	22- CARBONATOR		1,800		12	20	1	1	20	12		600		84C- DROP-IN HOT WELLS	10	GFI
GFI	11	25A - ICE MAKER			1,596	12	20	1	1	20	12			1,800	50- POS SYSTEM #1	12	GFI
GFI	13	27 - WARMING CABINET	1,080			12	20	1	1	20	12	420			59- REACH IN FRIDGE	14	GFI
GFI	15	28 - UNDERCOUNTER FRIDGE		300		12	20	1	1	20	12		1,800		60A- HOT WELL	16	GFI
GFI	17	85- PREP AND PRINT			200	12	20	1	1	20	12			600	66- ICE DISPENSER	18	GFI
	19	33 - EXHAUST HOOD CONTROL PNL	600			12	20	1	1	20	12	720			71- COLD BEV. DISPENERS	20	GFI
GFI	21	36- SELF SERVICE FRIDGE		1,920		12	20	1	1	20	12		720		71- COLD BEV. DISPENERS	22	GFI
GFI	23	41- PANINI PRESS/GRILL			1,800	12	20	1	1	20	12			720	71- COLD BEV. DISPENERS	24	GFI
GFI	25	41- PANINI PRESS/GRILL	1,800			12	20	1	1	20	12	720			71- COLD BEV. DISPENERS	26	GFI
GFI	27	KITCHEN RECEPTS		360		12	20	1	1	20	12		200		24- BOOSTER PUMP	28	GFI
GFI	29	34- RICE COOKER			1,872	12	20	2	1	20	12			1,920	28-UNDERCOUNTER FRIDGE	30	GFI
	31		1,872						1	20	12	720			45- GRIDDLE	32	GFI
GFI	33	34- RICE COOKER		1,872		12	20	2	1	20	12		720		40-FRYER	34	GFI
	35				1,872				1	20	12			1,920	93-HEATED HOLDING CABINET	36	GFI
GFI	37	43- CONVECTION OVEN	4,992			6	50	2								38	
	39			4,992					3	60					panel rp1a	40	
GFI	41	28 - UNDERCOUNTER FRIDGE			300	12	20	1								42	
		SUBTOTAL	12,264	11,484	9,080							3,660	4,700	8,760	SUBTOTAL		

		LOAD	CONN. VA	DF	LOAD	CONN. VA	DF	
TOTAL PHASE A - VA	15,924	COOLING	240	1.00	REFRIGERATION		1.00	
AMPS	133	HEATING		0	SIGN/DISPLAY		1.25	
TOTAL PHASE B - VA	16,184	LIGHTING		1.25	KITCHEN	47,228	0.65	
AMPS	135	RECEPTACLES	2,360	1.0/.5	EXISTING		1.00	
TOTAL PHASE C - VA	17,840	MOTORS		1.00	LARGE MOTOR		1.25	TOTAL DEMAND
AMPS	149	SUPP HEAT		1.00	SHOW WINDOW		1.25	33,418 VA
TOTAL PNLBD - VA	49,948	MISC EQUIP	120	1.00	LTG TRACK		1.00	93 A
AMPS	139							

CIRCUITS SHOWN IN LOWERCASE ARE EXISTING TO REMAIN.
GFI - GFI BREAKER

PANELBOARD: LP1 (EXISTING)

BUS AMPS: 225A
MAIN SIZE/TYPE: MLO
VOLTS/PHASE: 208Y/120V, 3PH, 4W
SERVES: CAVA
LOCATION: UTILITY ROOM
MOUNTING: SURFACE
EQUIPMENT GROUND BUS

	CKT NO.	DESCRIPTION	VA/PHASE A	VA/PHASE B	VA/PHASE C	WIRE NO.	BKR AMP	P	P	BKR AMP	WIRE NO.	VA/PHASE A	VA/PHASE B	VA/PHASE C	DESCRIPTION	CKT NO.	
	1	KITCHEN/OFFICE,UTILITY LTS	570			12	20	1	1	20	12	720			RTU RECEPTS	2	
	3	STORAGE LIGHTS		462		12	20	1	1	20	12		200		CO2 DETECTOR	4	
GFI	5	POS 1			360	12	20	1	1	20	12			360	KITCHEN CONV. RECEPTS	6	GFI
GFI	7	POS 2	360			12	20	1	1	20	12	696			AC-1	8	
	9	HALL/RESTROOM LIGHTS		180		12	20	1	1	20	-				SPARE	10	
	11	SMOKE DETECTOR			540	12	20	1	1	20	12			360	KITCHEN RECEPTS	12	GFI
	13	SPARE				12	20	1	1	20	12	1,920			KEF-1	14	
	15	SHOW WINDOW RCPT		1,200		12	20	1	1	20	12		360		EF-2	16	
	17	SHOW WINDOW RCPT			1,350	12	20	1	1	20	12			720	TRACK LIGHTS DINING	18	
	19	DHW-1	350			12	20	1	1	20	12	120			PENDANT LIGHTS DINING	20	
	21	DWH-2		350		12	20	1	1	20			200		alarm panel	22	
GFI	23	RECIRC PUMP			180	12	20	1	1	20	12			100	ANSUL PULL STATION	24	
GFI	25	SHAKE PRINTER	180			12	20	1	1	20	12	360			PRINTER KDS	26	
GFI	27	PRINTER/KDS		360		12	20	1	1	20	12		400		DIGITAL MENU BOARDS	28	
	29	IT RACK			360	12	20	1	1	20	12			950	DOWNLIGHTS KIT/DINING/VEST	30	
	31	CONV. RECEPTS	540			12	20	1	1	20	12	1,440			PRINTER KDS,MAKE 1,2/EXPO	32	
GFI	33	KITCHEN RECEPTS		360		12	20	1	1	20	12		1,200		SIGNAGE	34	
	35	SPARE					20	1	1	20	12			1,200	SIGNAGE	36	
GFI	37	53-SHAKE MACHINE	2,288			10	30	2	1	20	12	100			GAS SOLENOID VALVE	38	
	39			2,288					1						space	40	
	41	MANAGER DESK RECEPTS			720	12	20	1	1						space	42	
		SUBTOTAL	4,288	5,200	3,510							5,356	2,360	3,690	SUBTOTAL		

		LOAD	CONN. VA	DF	LOAD	CONN. VA	DF	
TOTAL PHASE A - VA	9,644	COOLING		0	REFRIGERATION		1.00	
AMPS	80	HEATING	700	1.00	SIGN/DISPLAY	2,400	1.25	
TOTAL PHASE B - VA	7,560	LIGHTING	3,002	1.25	KITCHEN	4,576	0.65	
AMPS	63	RECEPTACLES	4,860	1.0/.5	EXISTING	200	1.00	
TOTAL PHASE C - VA	7,200	MOTORS	3,336	1.00	LARGE MOTOR		1.25	TOTAL DEMAND
AMPS	60	SUPP HEAT		1.00	SHOW WINDOW	2,550	1.25	24,790 VA
TOTAL PNLBD - VA	24,404	MISC EQUIP	2,780	1.00	LTG TRACK		1.00	69 A
AMPS	68							

CIRCUITS SHOWN IN LOWERCASE ARE EXISTING TO REMAIN.
GFI - GFI BREAKER

PANELBOARD: RP2 (EXISTING)

BUS AMPS: 100A
MAIN SIZE/TYPE: MLO
VOLTS/PHASE: 208Y/120V, 3PH, 4W
SERVES: CAVA
LOCATION: UTILITY ROOM
MOUNTING: SURFACE
EQUIPMENT GROUND BUS

CKT NO.	DESCRIPTION	VA/PHASE A	VA/PHASE B	VA/PHASE C	WIRE NO.	BKR AMP	P	P	BKR AMP	WIRE NO.	VA/PHASE A	VA/PHASE B	VA/PHASE C	DESCRIPTION	CKT NO.
1		925													2
3	MAU-1 FAN		925		12	15	3	3	20					SPARE	4
5				925											6
7		1,429						1	20					SPARE	8
9	MAU-1 CU-1		1,429		12	20	3	1	20					SPARE	10
11				1,429				1	20					SPARE	12
13								1	20					SPARE	14
15	SPARE					30	3	1	20					SPARE	16
17								1	20					SPARE	18
19	space						1	1						space	20
21	space						1	1						space	22
23	space						1	1						space	24
25	space						1	1						space	26
27	space						1	1						space	28
29	SPARE					20	1	1						space	30
	SUBTOTAL	2,354	2,354	2,354										SUBTOTAL	

		LOAD	CONN. VA	DF	LOAD	CONN. VA	DF	
TOTAL PHASE A - VA	2,354	COOLING		1.00	REFRIGERATION		1.00	
AMPS	20	HEATING		0	SIGN/DISPLAY		1.25	
TOTAL PHASE B - VA	2,354	LIGHTING		1.25	KITCHEN		0.65	
AMPS	20	RECEPTACLES		1.0/.5	EXISTING		1.00	
TOTAL PHASE C - VA	2,354	MOTORS		1.00	LARGE MOTOR		1.25	TOTAL DEMAND
AMPS	20	SUPP HEAT		1.00	SHOW WINDOW		1.25	7,062 VA
TOTAL PNLBD - VA	7,062	MISC EQUIP	7,062	1.00	LTG TRACK		1.00	20 A
AMPS	20							

CIRCUITS SHOWN IN LOWERCASE ARE EXISTING TO REMAIN.

PANELBOARD: LP2 (EXISTING)

BUS AMPS: 100A
MAIN SIZE/TYPE: MLO
VOLTS/PHASE: 208Y/120V, 3PH, 4W
SERVES: CAVA
LOCATION: UTILITY ROOM
MOUNTING: SURFACE
EQUIPMENT GROUND BUS

CKT NO.	DESCRIPTION	VA/PHASE A	VA/PHASE B	VA/PHASE C	WIRE NO.	BKR AMP	P	P	BKR AMP	WIRE NO.	VA/PHASE A	VA/PHASE B	VA/PHASE C	DESCRIPTION	CKT NO.
1	gooseneck lights	1,000				20	1	1	20		1,000			site lighting	2
3	site lighting		1,000			20	2	2	20			1,000		site lighting	4
5				1,000									1,000		6
7	space						1	1	20		1,000			site lighting	8
9	site lighting		1,000			30	2	1						space	10
11				1,000				1						space	12
13	pylon sign	1,000				20	1	1	20		1,000			awning	14
15	space						1	1	20			1,000		awning	16
17	space						1	1	20				1,000	awning	18
19	outdoor signage	1,000				20	1	1	20		1,000			awning	20
21	outdoor signage		1,000			20	1	1	20			1,000		awning	22
23	space						1	1						space	24
25	space						1	1						space	26
27	space						1	1						space	28
29	space						1	1	20				1,000	goosneck lights	30
31	space						1	1						space	32
33	space						1	1						space	34
35	space						1	1						space	36
37	space						1	1						space	38
39	space						1	1						space	40
41	space						1	1						space	42
	SUBTOTAL	3,000	3,000	2,000							4,000	3,000	3,000	SUBTOTAL	

		LOAD	CONN. VA	DF	LOAD	CONN. VA	DF	
TOTAL PHASE A - VA	7,000	COOLING		1.00	REFRIGERATION		1.00	
AMPS	58	HEATING		0	SIGN/DISPLAY		1.25	
TOTAL PHASE B - VA	6,000	LIGHTING		1.25	KITCHEN		0.65	
AMPS	50	RECEPTACLES		1.0/.5	EXISTING	18,000	1.00	
TOTAL PHASE C - VA	5,000	MOTORS		1.00	LARGE MOTOR		1.25	TOTAL DEMAND
AMPS	42	SUPP HEAT		1.00	SHOW WINDOW		1.25	18,000 VA
TOTAL PNLBD - VA	18,000	MISC EQUIP		1.00	LTG TRACK		1.00	50 A
AMPS	50							

CIRCUITS SHOWN IN LOWERCASE ARE EXISTING TO REMAIN.

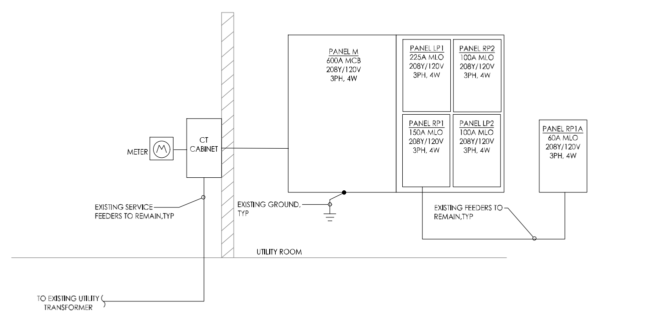
PANELBOARD: RP1A (EXISTING)

BUS AMPS: 60A
MAIN SIZE/TYPE: MLO
VOLTS/PHASE: 208Y/120V, 3PH, 4W
SERVES: CAVA
LOCATION: UTILITY ROOM
MOUNTING: SURFACE
EQUIPMENT GROUND BUS

CKT NO.	DESCRIPTION	VA/PHASE A	VA/PHASE B	VA/PHASE C	WIRE NO.	BKR AMP	P	P	BKR AMP	WIRE NO.	VA/PHASE A	VA/PHASE B	VA/PHASE C	DESCRIPTION	CKT NO.
1	SPARE					20	2	2	30					SPARE	2
3															4
5	SPARE					40	2	2	30					SPARE	6
7															8
9	SPARE					20	2	2	30					SPARE	10
11															12
	SUBTOTAL													SUBTOTAL	

		LOAD	CONN. VA	DF	LOAD	CONN. VA	DF	
TOTAL PHASE A - VA		COOLING		1.00	REFRIGERATION		1.00	
AMPS		HEATING		0	SIGN/DISPLAY		1.25	
TOTAL PHASE B - VA		LIGHTING		1.25	KITCHEN		0.65	
AMPS		RECEPTACLES		1.0/.5	EXISTING		1.00	
TOTAL PHASE C - VA		MOTORS		1.00	LARGE MOTOR		1.25	TOTAL DEMAND
AMPS		SUPP HEAT		1.00	SHOW WINDOW		1.25	
TOTAL PNLBD - VA		MISC EQUIP		1.00	LTG TRACK		1.00	
AMPS								

CIRCUITS SHOWN IN LOWERCASE ARE EXISTING TO REMAIN.



1 ONE LINE DIAGRAM
N.T.S.

CORE STATES GROUP
135 Water Street
Suite 201
Naperville, IL 60540
312.718.5415
core-states.com

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BLDG RESPONSE	NOV 15, 2024
CONSTR SET	JAN 8, 2025

SCHEDULES
ELECTRICAL

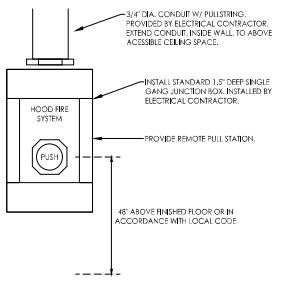
SHEET:
E301

1/8/2025 3:15 PM

ELECTRICAL SCHEDULE

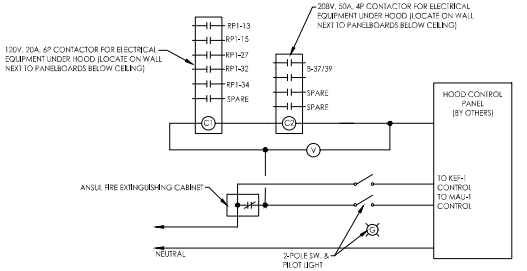
ITEM NO.	QTY	EQUIPMENT CATEGORY	PLUG	DIRECT	NEMA	ELECTRICAL AFF (IN.)	AMPS	KW	HP	VOLTS	PHASE	ELEC. REMARKS
3	1	REFRIGERATOR, WALK-IN COOLER		X		DN	2.0			120	1	ELECTRIC DOWN FROM ABOVE, FOR WALK-IN LIGHTS
3A	1	EVAPORATOR COIL, COOLER		X		DN	2.0			115	1	ELECTRIC DOWN FROM ABOVE
3B	1	CONDENSING UNIT, COOLER		X			15.0			208	1	
14	1	WAREWASHER, UNDERCOUNTER, LOW-TEMP		X		16"	12.0		1.0	115	1	BY VENDOR, VERIFY UTILITIES
21	1	BAG-N-BOX		X		16"	15.0			120	1	**********BY VENDOR, VERIFY UTILITIES
22	1	CARBONATOR	X			88""	6.5			120	1	BY VENDOR, VERIFY UTILITIES
24	1	BOOSTER PUMP	X		5-20P	88"	1.3					BY VENDOR, VERIFY UTILITIES
25A	1	ICE MAKER		X		60"	13.3			120	1	
27	1	UNDERCOUNTER HOT HOLDING (750-S)	X		5-15P		9.0	1.1		120	1	PLUGS INTO FIXTURE MTD. RECPT. LOCATED IN ITEM #26
28	2	UNDERCOUNTER REFRIGERATOR (ETBR1)	X		5-15P		2.5		0.2	115	1	PLUGS INTO FIXTURE MTD. RECPT. LOCATED IN ITEM #26
33	1	EXHAUST HOOD		X		DN	5.0			120	1	COORDINATE WITH HOOD VENDOR DRAWINGS
34	2	RICE COOKER (57155)	X		6-20P	48"	18.0			208	1	
35	1	DISPLAY REFRIGERATED CASE	X		5-20P	24"	12.0			120	1	
41	2	PANINI GRILL	X		5-20P	16"	18.0			120	1	
42	1	REFRIGERATOR, SANDWICH/SALAD PREP (SW32N12M)	X		5-15P	16"	2.5		0.2	120	1	W/RECESSED PLUG
43	1	CONVECTION OVEN, ELECTRIC	X			16"	48.0			208	1	
45	1	GROOVED GRIDDLE, GAS	X		5-15P	16"	0.1			120	1	********COORDINATE REQUIREMENTS W/OWNER
46	1	FRYERS, GAS	X				1.0			120	1	***************COORDINATE REQUIREMENTS W/OWNER AND MANUFACTURER
50	1	POS 1	X		5-15P	16"	3.0			120	1	BY VENDOR, VERIFY UTILITIES, DATA LINE INCLUDED
51	1	POS 2	X		5-15P	16"	3.0			120	1	BY VENDOR, VERIFY UTILITIES, DATA LINE INCLUDED
52	1	KDS	X		5-15P	60"	3.0			120	1	BY VENDOR, VERIFY UTILITIES, DATA LINE INCLUDED
52A	1	MAKE 1	X		5-15P	60"	3.0			120	1	BY VENDOR, VERIFY UTILITIES, DATA LINE INCLUDED
52B	1	MAKE 2	X		5-15P	60"	5.0			120	1	BY VENDOR, VERIFY UTILITIES, DATA LINE INCLUDED
52C	1	EXPO	X		5-15P	60"	5.0			120	1	BY VENDOR, VERIFY UTILITIES, DATA LINE INCLUDED
53	1	SHAKE MACHINE	X		L6-30P	60"	22.0			208	1	COORDINATE REQUIREMENTS W/MANUFACTURER FOR CORD AND RECEPTACLE SPECIFICATIONS
59	1	REFRIGERATOR, SANDWICH/SALAD PREP	X		5-15P	16"	3.5			120	1	
60A	1	HOT WELL (300-HW/D6)	X		5-20P	16"	15.0			120	1	
66	1	ICE DISPENSER W/ BEVERAGE HEADS	X			16"	5.0			120	1	BEVERAGE DISP., BY VENDOR, VERIFY UTILITIES
71	4	COLD BEVERAGE DISPENSER (D35-3)	X		5-15P	16"	8.5			120	1	
72	1	COMPACT UNDERCOUNTER REFRIGERATOR (24)	X		5-15P	16"	2.0			120	1	
84A	1	HOT WELL, DROP-IN W/ TEMPLATES	X		5-15P	16"	5.0			120	1	
84B	1	COLD PAN, REFRIGERATED W/ TEMPLATES	X		5-20P	16"	7.0			120	1	
84C	1	HOT WELL, DROP-IN W/ TEMPLATES	X		5-15P	16"	15.0			120	1	
84D	1	COLD PAN, REFRIGERATED W/ TEMPLATES	X		5-15P	16"	5.5			120	1	
85	1	PREP N PRINT	X		5-15P	60"	2.0			120	1	

ELECTRICAL CONTRACTOR TO VERIFY ALL ELECTRICAL POINTS OF INTERCONNECTION (TYPE AND HEIGHT) PRIOR TO ROUGH-IN.



NOTE: COORDINATE EXACT LOCATION WITH AUTHORITY HAVING JURISDICTION, FIRE INSPECTOR AND ARCHITECT PRIOR TO ROUGH-IN.

2 ANSUL PULL STATION DETAIL
N.T.S.



NOTES:
1. ELECTRICAL CONTRACTOR SHALL PROVIDE CONTACTORS AND ALL INTERLOCK WIRING. COORDINATE EXACT TERMINATION REQUIREMENTS WITHIN HOOD CONTROL PANEL AND ANSUL CABINET WITH HOOD MANUFACTURER.

1 EXHAUST HOOD SHUT-DOWN WIRING DIAGRAM
N.T.S.

CORE STATES GROUP
135 Water Street
Suite 208
Naperville, IL 60540
312.718.5415
core-states.com

ISSUED FOR CONSTRUCTION

CAVA

CAVA - CANTON MI
43450 FORD ROAD
CANTON, MI 48187
FOR
CAVA
14 Ridge Square NW #500, WASHINGTON, DC 20016

AOR PROJECT NUMBER:
CAV.38002

ISSUE	DATE
PERMIT SET	AUG 2, 2024
BID SET	SEP 18, 2024
1 BLDG RESPONSE	NOV 15, 2024
2 CONSTR SET	JAN 8, 2025

ELECTRICAL SCHEDULES & DETAILS

SHEET:
E401

1/8/2025 3:15 PM

SPECIFICATIONS - DIVISION 26 - ELECTRICAL

SECTION 26 00 01 - GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. DRAWINGS AND GENERAL PROVISIONS OF CONTRACT, INCLUDING GENERAL AND SUPPLEMENTAL CONDITIONS AND DIVISION-1 SPECIFICATION SECTIONS, APPLY TO WORK OF DIVISION 26 SECTIONS.

B. E-SERIES DRAWINGS APPLY TO WORK OF DIVISION 26 SECTIONS AND VICE VERSA.

1.2 GENERAL STANDARDS

A. PROVIDE WORK IN COMPLIANCE WITH APPLICABLE PROVISIONS OF THE FOLLOWING STANDARDS. PROVIDE UL LISTING AND UL LABEL FOR ALL ELECTRICAL MATERIALS, EQUIPMENT, LUMINAIRES, DEVICES, ETC. IN CASES WHERE UL LISTING AND/OR LABELING IS NOT AVAILABLE FOR A PARTICULAR PRODUCT, PROVIDE EQUIVALENT LISTING AND LABELING FROM ANOTHER THIRD PARTY NATIONALLY RECOGNIZED CERTIFICATION LABORATORY, SUBJECT TO APPROVAL BY LOCAL ELECTRICAL INSPECTOR AND AUTHORITIES HAVING JURISDICTION.

B. PROVIDE WORK IN STRICT ACCORDANCE WITH THE LATEST EDITION OF APPLICABLE CODES INCLUDING (BUT NOT LIMITED TO) THE FOLLOWING CODES AND STANDARDS.
1. NATIONAL ELECTRICAL CODE (NEC), NFPA 70.
2. LIFE SAFETY CODE, NFPA 101.
3. OTHER PROVISIONS OF NFPA AS APPLICABLE.
4. LOCAL ELECTRICAL CODES.
5. LOCAL UTILITY COMPANY REQUIREMENTS.
6. ADA/ADAAG REQUIREMENTS.
7. ASME.
8. INTERNATIONAL BUILDING CODE.
9. INTERNATIONAL ENERGY CONSERVATION CODE.

1.3 MATERIALS AND EQUIPMENT

A. UNLESS SPECIFICALLY INDICATED OTHERWISE PROVIDE (FURNISH AND INSTALL) ALL SPECIFIED AND DRAWN EQUIPMENT, RACEWAY, BOXES, LUMINAIRES, CONTROLS, WIRING, CABLING, SUPPORTS AND OTHER MATERIALS AS REQUIRED TO RENDER ALL ELECTRICAL AND ELECTRICALLY OPERATED EQUIPMENT, LUMINAIRES, DEVICES, ETC. FULLY OPERATIONAL. UNLESS SPECIFICALLY INDICATED OTHERWISE PROVIDE (FURNISH AND INSTALL) ALL MATERIALS THAT ARE SPECIFIED UNDER DIVISION 26. DISCREPANCIES OR UNCERTAINTIES PERCEIVED BY A BIDDER, OR OTHER QUESTIONABLE INTERPRETATIONS BY A BIDDER, ARE SUBJECT TO FINAL INTERPRETATIONS AND DECISIONS BY THE OWNER'S REPRESENTATIVE UNLESS ADDRESSED BEFORE BIDDING BY ADDENDUM OR UNLESS QUALIFIED OR EXCEPTED WITHIN BIDS.

B. PROVIDE MATERIALS THAT ARE NEW, FULL WEIGHT, OF THE BEST QUALITY. PROVIDE SIMILAR MATERIALS THAT ARE OF THE SAME TYPE AND MANUFACTURER. PROVIDE MATERIALS, APPARATUS AND EQUIPMENT WITH UNDERWRITER'S LABORATORY, INC. LABEL WHERE REGULARLY SUPPLIED.

C. MAINTAIN SAFETY AND GOOD CONDITION OF THE MATERIALS AND EQUIPMENT INSTALLED UNTIL FINAL ACCEPTANCE BY THE OWNER. STORE MATERIALS TO PREVENT DAMAGE AND WEATHERING PRIOR TO INSTALLATION.

D. WHEN SEVERAL MATERIALS, PRODUCTS OR ITEMS OF EQUIPMENT ARE SPECIFIED BY NAME FOR ONE USE, SELECT ONE OF THOSE SPECIFIED.

END OF SECTION

SECTION 26 00 01 - BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 GENERAL

A. FURNISH AND INSTALL ALL LABOR AND MATERIAL, TOOLS AND EQUIPMENT NECESSARY TO RENDER ALL SYSTEMS COMPLETE AND OPERATIONAL, AND READY FOR TURNOVER TO OWNER.

1.2 HEIGHT OF BOXES

A. CONTRACTOR TO VERIFY THE EXACT MOUNTING HEIGHTS (AND LOCATIONS) OF OUTLETS IN THE FIELD WITH RELATION TO ARCHITECTURAL DETAIL AND EQUIPMENT BEING SERVED. COORDINATE OUTLET LOCATION WITH EQUIPMENT, WITH FURNITURE PLANS AND WITH ARCHITECTURAL ELEVATION PLANS. WHERE MOUNTING HEIGHTS ARE NOT DETAILED OR DIMENSIONED, CONTACT THE OWNER'S REPRESENTATIVE FOR DIRECTION.

B. PRIOR TO ROUGH-IN, COORDINATE FINAL MOUNTING HEIGHTS OF SYSTEM OUTLET BOXES IN FIELD WITH OWNER'S REPRESENTATIVE. INSTALL BOXES AT HEIGHTS AS FOLLOWS, TO CENTER OF BOX, UNLESS DIRECTED OTHERWISE IN FIELD OR OTHERWISE NOTED ON E-SERIES DRAWINGS OR ARCHITECTURAL PLANS. HEIGHT OF BOXES DIMENSIONED FROM CEILING APPLY TO ROOMS HAVING CEILINGS 9' OR LESS; IN ROOMS HAVING HIGHER CEILINGS, LOCATE THESE AS DIRECTED IN THE FIELD.

SWITCHES - COUNTERS	44" (FIELD VERIFY & MATCH COUNTER RECEPT. HEIGHTS)
SWITCHES - ELSEWHERE	48" TO TOP OF OUTLET BOX
OCCUPANCY SENSORS - WALLBOX SWITCHES	48" TO TOP OF OUTLET BOX
OCCUPANCY SENSORS - ELSEWHERE	AS RECOMMENDED BY MANUFACTURER
RECEPTACLES - COUNTERS	44" (FIELD VERIFY)
RECEPTACLES - ELSEWHERE	18"
DISCONNECTS	46"
CIRCUIT BREAKER PANELBOARDS	72" TO TOP OF PANEL UNLESS SPECIAL CIRCUMSTANCES ARE INDICATED OR OTHERWISE APPLY
WALL MOUNTED LUMINAIRES	AS NOTED ON PLANS OR AS DIRECTED BY ARCHITECT
CONTROL STATIONS	46"
FIRE ALARM MANUAL PULL STATIONS	46" TO TOP OF OPERATING HANDLE
FIRE ALARM AUDIO/VISUAL ANNUNCIATORS	80" TO BOTTOM OF OUTLET BOX
TELEPHONE OUTLETS - DESK PHONE	18"
TELEPHONE OUTLETS - WALL PHONE	46"
DATA OUTLETS	18" TO TOP OF OUTLET BOX.

1.3 ELECTRICAL INSTALLATIONS

A. INSTALL WORK CONDUIT, WIRING, OUTLET BOX TYPE WORK IN FINISHED AREAS CONCEALED. SUCH WORK INSTALLED IN UNFINISHED AREAS MAY BE EXPOSED AT THE DISCRETION OF THE OWNER'S REPRESENTATIVE.

B. VERIFY DIMENSIONS BY FIELD MEASUREMENTS. TAKE MEASUREMENTS AND BE RESPONSIBLE FOR EXACT SIZE AND LOCATIONS OF OPENINGS REQUIRED FOR THE INSTALLATION OF WORK. FIGURED DIMENSIONS ARE REASONABLY ACCURATE AND SHOULD GOVERN IN SETTING OUT WORK. WHERE DETAILED METHOD OF INSTALLATION IS NOT INDICATED OR WHERE VARIATIONS EXIST BETWEEN DESCRIBED WORK AND APPROVED PRACTICE, FOLLOW DIRECTION OF THE OWNER'S REPRESENTATIVE.

C. PROVIDE BRANCH SUBFEEDER CIRCUITS AS SHOWN ON THE PLANS. THE SYMBOLS USED TO INDICATE THE PURPOSE OF WHICH THE VARIOUS OUTLETS ARE INTENDED ARE IDENTIFIED IN THE ELECTRIC LEGEND. WHERE OUTLETS ARE INDICATED BY LETTERS ON PLANS, PROVIDE CORRESPONDING SWITCHES TO CONTROL THEM.

D. PROVIDE NO WIRE SIZE SMALLER THAN NO. 12 FOR BRANCH CIRCUITS UNLESS OTHERWISE NOTED ON PLANS FOR CONTROL CIRCUITS. PROVIDE LARGER SIZES WHERE REQUIRED BY PREVAILING CODES OR INDICATED ON CONTRACT DOCUMENTS. PROVIDE NEUTRAL CONDUCTOR FOR ALL MULTI-POLE FEEDERS. PROVIDE NEUTRAL CONDUCTOR(S) FOR ALL MULTI-POLE FEEDERS AND BRANCH CIRCUITS UNLESS THIS CONTRACTOR DETERMINES IN FIELD THAT THE AFFECTED LOAD(S) WILL NEVER HAVE NEED FOR A NEUTRAL CONDUCTOR AND NEC DOES NOT MANDATE OTHERWISE.

1.4 COORDINATION

A. PLANS ARE DIAGRAMMATIC INDICATING DESIGN INTENT AND INDICATING REQUIRED SIZE, POINTS OF TERMINATION AND, IN SOME CASES, SUGGESTED ROUTES OF RACEWAYS, ETC. HOWEVER, IT IS NOT INTENDED THAT DRAWINGS INDICATE FULLY COORDINATED CONDUIT ROUTING, NECESSARY OFFSETS, ETC. THE DRAWINGS ARE AN OUTLINE TO INDICATE THE APPROXIMATE LOCATION AND ARRANGEMENT OF DUCTWORK, PIPING, EQUIPMENT, OUTLETS, RACEWAYS, CABLES, ETC. INSTALL PIPING, CONDUIT, RACEWAYS, CABLE ASSEMBLIES, ETC. AS STRAIGHT AS POSSIBLE AND SYMMETRICAL (PERPENDICULAR TO OR PARALLEL WITH) WITH ARCHITECTURAL ITEMS. WORK IN AND ON THE BUILDING INSTALLED DIAGONAL TO BUILDING MEMBERS IS PROHIBITED.

B. CONSULT THE PLANS OF OTHER TRADES BEFORE INSTALLING WORK SO THAT WORK WILL NOT INTERFERE WITH THOSE.

C. PARTICIPATE IN COORDINATION EFFORTS AND IN PREPARATION OF COORDINATION DRAWINGS PRIOR TO FABRICATION OR INSTALLATION OF EQUIPMENT, MATERIALS, ETC. COORDINATE ACTUAL CLEARANCES OF INSTALLED EQUIPMENT. COORDINATE EXACT LOCATION OF ELECTRICAL OUTLETS, LIGHTING FIXTURES, CONDUITS, RACEWAYS, EQUIPMENT, CABLE ASSEMBLIES, APPLICABLE DEVICES, ETC. WELL IN ADVANCE OF INSTALLATION SO THERE WILL BE NO INTERFERENCES AT INSTALLATION BETWEEN THE VARIOUS TRADES.

D. ENSURE THAT WORK AND WORKING CLEARANCES IN ELECTRICAL ROOMS AND SIMILAR SPACES COMPLIES WITH NEC ARTICLE 110. THIS ALSO APPLIES TO FINALIZING LOCATIONS OF DISCONNECTS, STARTERS, CONTACTORS AND OTHER ELECTRICALLY OPERATED EQUIPMENT THAT MAY REQUIRE TESTING OR MAINTENANCE WHILE ENERGIZED.

E. COORDINATE AND CORRECT CONFLICTS IN EQUIPMENT AND MATERIALS PRIOR TO INSTALLATION. IF A CONFLICT CANNOT BE RESOLVED, REFER THE MATTER TO THE OWNER'S REPRESENTATIVE FOR A FINAL DECISION AS TO METHOD AND MATERIAL.

1.5 IDENTIFICATION

A. CABLE AND CONDUCTOR IDENTIFICATION
1. PROVIDE MANUFACTURER'S STANDARD VINYL-CLOTH SELF-ADHESIVE CONDUCTOR MARKERS OF WRAP-AROUND TYPE, EITHER PRE-NUMBERED PLASTIC COATED TYPE, OR WRITE-ON TYPE WITH CLEAR PLASTIC SELF-ADHESIVE COVER FLAP; NUMBERED TO SHOW CIRCUIT IDENTIFICATION. PROVIDE ON CONDUCTORS. PROVIDE COLOR CODED INSULATION FOR CONDUCTORS. PROVIDE COLOR CODED JACKETS FOR CABLES. MATCH COLOR SCHEMES WITH MARKING SYSTEM USED IN SUBMITTALS, CONTRACT DOCUMENTS, INDUSTRY STANDARDS, ETC. APPLY CABLE/CONDUCTOR IDENTIFICATION ON EACH CABLE IN EACH BOX/ENCLOSURE/CABINET FOR CABLES THAT ARE NOT AVAILABLE WITH COLOR CODED INSULATION OR JACKETS.

2. USE THE FOLLOWING INSULATION COLOR CODE FOR POWER SYSTEM AND VOLTAGE IDENTIFICATION. THIS APPLIES TO BOTH FEEDER AND BRANCH CIRCUIT WIRING. DO NOT INTERCHANGE COLORS. THE USE OF SCOTCH COLOR CODING TAPES FOR PHASE IDENTIFICATION MAY BE USED ON FEEDER CABLES ONLY (#4 AWG AND LARGER).
   a. 480Y/277V SYSTEM BROWN, ORANGE, YELLOW & GRAY (NEUT.)
   b. 208Y/120V SYSTEM: BLACK, RED, BLUE & WHITE (NEUTRAL)
   c. 240V DELTA SYSTEM: BLACK, RED & BLUE
   d. 120/240V SYSTEM: BLACK, RED & WHITE (NEUTRAL)
   e. ELECTRONIC GROUND: GREEN WITH YELLOW TRACER (NEUTRAL)
   f. EQUIPMENT GROUNDING: GREEN

C. RACEWAY IDENTIFICATION
1. PROVIDE MANUFACTURER'S STANDARD SELF-ADHESIVE VINYL TAPE NOT LESS THAN 3 MILS THICK BY 1-1/2" WIDE. UNLESS OTHERWISE INDICATED OR REQUIRED BY GOVERNING REGULATIONS PROVIDE BLACK LETTERING ON ORANGE BASE WITH MINIMUM 1/2" HIGH LETTERING. AS A MINIMUM, NEATLY INSTALL MARKERS AT EACH AND EVERY ENTRY POINT TO ROOMS, JUNCTION BOXES, PULL BOXES, EQUIPMENT CONNECTIONS, ETC. DO NOT INSTALL THESE MARKERS ON EXPOSED RACEWAYS IN FINISHED AREAS THAT WILL BE OCCUPIED.

D. EMERGENCY SYSTEMS
1. PROVIDE PERMANENT IDENTIFICATION FOR BOXES, ENCLOSURES, ETC. THAT ARE ASSOCIATED WITH EMERGENCY SYSTEM WORK. PAINT AND IDENTIFY EMERGENCY SYSTEM PULL BOXES, JUNCTION BOXES, AND OTHER ACCESS/PULL POINTS (BOXES AND COVERS) IN ACCORDANCE WITH NEC. PROVIDE EMERGENCY SYSTEM EQUIPMENT PANELBOARDS, CABINETS, ENCLOSURES, ETC. WITH RED MECHANICALLY FASTENED ENGRAVED NAMEPLATES WITH THE FIRST LINE OF TEXT TO READ "EMERGENCY CIRCUITS" AND THE REMAINING LINES TO INCLUDE THE NECESSARY DESCRIPTIVE TEXT.

E. FIRE ALARM SYSTEMS
1. PROVIDE PERMANENT IDENTIFICATION FOR BOXES, ENCLOSURES, ETC. THAT ARE ASSOCIATED WITH FIRE ALARM SYSTEM WORK. PAINT AND IDENTIFY FIRE ALARM SYSTEM PULL BOXES, JUNCTION BOXES, AND OTHER ACCESS/PULL POINTS (BOXES AND COVERS) IN ACCORDANCE WITH NEC/NFPA. PROVIDE FIRE ALARM SYSTEM CONTROL PANEL EQUIPMENT CABINETS, ENCLOSURES, ETC. WITH RED MECHANICALLY FASTENED ENGRAVED NAMEPLATES WITH THE FIRST LINE OF TEXT TO READ "FIRE ALARM" AND THE REMAINING LINES TO INCLUDE THE NECESSARY DESCRIPTIVE TEXT.

F. KITCHEN EQUIPMENT RECEPTACLES
1. LABEL EACH RECEPTACLE FOR PROPER DEDICATED EQUIPMENT INDICATED.

FIRE ALARM SYSTEMS

1.6 CUTTING, PATCHING AND SEALING

E. GENERAL
1. PROVIDE CUTTING AND PATCHING FOR THE ADMISSION OF WORK. PERFORM CUTTING, FITTING, AND PATCHING FOR ELECTRICAL EQUIPMENT AND MATERIALS AS REQUIRED TO:
   a. UNCOVER WORK TO PROVIDE FOR INSTALLATION OF ILL-TIMED WORK.
   b. REMOVE AND REPLACE DEFECTIVE WORK.
   c. REMOVE AND REPLACE WORK NOT CONFORMING TO REQUIREMENTS OF THE CONTRACT DOCUMENTS.
   d. REMOVE SAMPLES OF INSTALLED WORK AS SPECIFIED FOR TESTING.
   e. INSTALL EQUIPMENT AND MATERIALS IN EXISTING BUILDINGS.
2. PATCH SURFACES AND BUILDING COMPONENTS USING NEW MATERIALS MATCHING EXISTING MATERIALS AS APPLICABLE AND USING EXPERIENCED INSTALLERS.

B. GROUT
1. PROVIDE NON-SHRINK, NONMETALLIC GROUT, PREMIXED, FACTORY-PACKAGED, NONSTAINING, NONCORROSIVE, NONGASEOUS GROUT, RECOMMENDED FOR INTERIOR AND EXTERIOR APPLICATIONS.

C. GENERAL FIRE STOPPING MATERIAL APPLICATION
1. FIRE STOPPING REQUIREMENTS/LOCATIONS ARE NOT INDICATED ON ELECTRICAL DRAWINGS. REVIEW ARCHITECTURAL AND OTHER DRAWINGS TO DETERMINE FIRE/SMOKE RATED WALLS AND FLOORS AND RATING REQUIREMENTS OF SAME. PROVIDE REQUIRED FIRE STOPPING WORK ASSOCIATED WITH ELECTRICALLY RELATED PENETRATIONS. PROVIDE FIRE STOP PILLOWS, PUTTY OR SEALANT, AS APPLICABLE, WITH MINIMUM UL CLASSIFICATION FOR 3 HOUR FIRE AND COLD SIDE TEMPERATURE RATINGS.

END OF SECTION

SECTION 26 05 01 - EXISTING CONDITIONS AND DEMOLITION

PART 1 - GENERAL

1.1 RELATED WORK

A. WHERE THE TERM "DEMOLITION" IS USED HEREIN, INTERPRET IT TO MEAN "DEMOLITION" OR "SELECTIVE DEMOLITION" AS APPLICABLE..

B. EXISTING ELECTRICAL WORK IS SHOWN TO A LIMITED EXTENT ON DRAWINGS AND IS SHOWN FOR GENERAL PLANNING REFERENCE ONLY. LOCATIONS AND INFORMATION WERE DERIVED FROM CURSORY VISUAL OBSERVATIONS OR FROM PORTIONS OF DOCUMENTS THAT WERE PREPARED FOR PREVIOUSLY INSTALLED WORK (NOT FROM RECORD DRAWINGS OR "AS-BUILTS").

C. HOLD ROUTING OF NEW RACEWAYS IN EXISTING BUILDINGS AS TIGHTLY AS POSSIBLE TO THE STRUCTURE ABOVE. OBTAIN APPROVAL OF OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.

1.2 AFFECT ON ADJACENT OCCUPIED AREAS

A. MAINTAIN EXISTING ELECTRICAL SERVICE AND FEEDERS TO OCCUPIED AREAS AND OPERATIONAL FACILITIES, UNLESS OTHERWISE INDICATED, OR WHEN AUTHORIZED OTHERWISE IN WRITING BY OWNER'S REPRESENTATIVE. PROVIDE TEMPORARY SERVICE DURING INTERRUPTIONS TO EXISTING FACILITIES. SCHEDULE MOMENTARY OUTAGES WHEN NECESSARY FOR REPLACING EXISTING WIRING SYSTEMS WITH NEW WIRING SYSTEMS. WHEN THAT "CUTTING-OVER" HAS BEEN SUCCESSFULLY ACCOMPLISHED, REMOVE RELATED WIRING THAT HAS BEEN ABANDONED.

1.3 GENERAL DEMOLITION

A. PROVIDE ELECTRICAL DEMOLITION WORK AS REQUIRED TO ACCOMMODATE PROJECT DEMOLITION AND AS REQUIRED TO ACCOMMODATE NEW CONSTRUCTION.

B. PERFORM CUTTING AND PATCHING REQUIRED FOR DEMOLITION.

END OF SECTION

SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 GENERAL

A. PROVIDE WIRE AND CABLE SUITABLE FOR THE TEMPERATURE, CONDITIONS, AND LOCATION WHERE INSTALLED.

1.2 CONDUCTORS

A. PROVIDE COPPER CONDUCTOR MATERIAL FOR WIRES AND CABLES UNLESS SPECIFICALLY INDICATED OTHERWISE ON SINGLE-LINE DIAGRAM ON DRAWINGS.

B. CONDUCTOR SIZES INDICATED ARE BASED ON COPPER UNLESS SPECIFICALLY INDICATED OTHERWISE ON SINGLE-LINE DIAGRAM ON DRAWINGS.

C. PROVIDE MINIMUM #12 AWG CONDUCTOR SIZE.

D. STRANDED OR SOLID CONDUCTORS MAY BE USED FOR TYPE MC CABLE CONDUCTORS THAT ARE #10 AWG OR LESS WHERE PERMITTED BY PREVAILING CODES AND AUTHORITIES HAVING JURISDICTION. PROVIDE STRANDED CONDUCTORS FOR ALL OTHER APPLICATIONS.

E. PROVIDE THE FOLLOWING MINIMUM WIRE SIZES BASED ON DISTANCES FROM PANEL TO FIRST DEVICE OF A 15 OR 20 AMPERE GENERAL LIGHTING OR RECEPTACLE BRANCH CIRCUIT. IN ADDITION TO UPSIZING CONDUCTORS AS REQUIRED FOR VOLTAGE DROP, PROVIDE MINIMUM #10 AWG CONDUCTORS TO THE LAST DEVICE FOR BRANCH CIRCUITS MORE THAN 150 FEET IN LENGTH.

DISTANCE	AWG WIRE SIZES
UP TO 60 FEET	#12
61 TO 90 FEET	#10
91 TO 150 FEET	#8
151 TO 240 FEET	#6

F. PROVIDE THE FOLLOWING MINIMUM AWG CONDUCTOR SIZES FOR GENERAL BRANCH CIRCUITING, BASED ON USING COPPER CONDUCTORS. WHERE APPLICABLE INCREASE AS REQUIRED TO ACCOMMODATE VOLTAGE DROP AND TO ACCOMMODATE SPECIAL CONDITIONS. DO NOT DERATE ANY GROUNDED (NEUTRAL) CONDUCTORS.

SOURCE BREAKER/FUSE	AWG WIRE SIZE	EQUIPMENT GROUNDING AWG WIRE SIZE
15 AMPERE	#14	#14
20 AMPERE	#12	#12
25 AMPERE	#10	#10
30 AMPERE	#10	#10
35 AMPERE	# 8	#10
40 AMPERE	# 8	#10
45 AMPERE	# 8	#10
50 AMPERE	# 6	#10
60 AMPERE	# 6	#10
70 AMPERE	# 4	#8
80 AMPERE	# 4	#8
90 AMPERE	# 2	#8
100 AMPERE	# 2	#8

G. PROVIDE CONDUCTOR INSULATION RATED AT 600VAC AND 90 DEGREES C. PROVIDE THHN/THWN INSULATION FOR CONDUCTORS SIZE 500 KCMIL AND LARGER, AND FOR CONDUCTORS # 8 AWG AND SMALLER. PROVIDE THW OR THHN/THWN INSULATION FOR OTHER SIZES AS APPROPRIATE FOR THE LOCATIONS WHERE INSTALLED.

H. PROVIDE XHHW-2 INSULATION FOR WIRING BELOW GRADE AND FOR WIRING SUBJECT TO MOISTURE CONDITIONS.

I. PROVIDE DEDICATED PARITY SIZED GROUNDED (NEUTRAL) CONDUCTOR FOR EACH BRANCH CIRCUIT PHASE CONDUCTOR FED FROM 15 AMPERE AND 20 AMPERE BRANCH CIRCUIT BREAKERS.

J. PROVIDE GROUNDED (NEUTRAL) CONDUCTOR(S) FOR ALL MULTI-POLE FEEDERS UNLESS INDICATED OTHERWISE ON POWER DISTRIBUTION SINGLE-LINE DIAGRAM.

K. PROVIDE GROUNDED (NEUTRAL) CONDUCTOR(S) FOR ALL MULTI-POLE BRANCH CIRCUITS.

1.3 TYPE AC/MC CABLES

A. PROVIDE TYPE AC/MC CABLES THAT ARE MINIMUM 90 DEGREES C RATED, WITH COMPONENTS AND FITTINGS LISTED FOR GROUNDING, AND COMPLIANT WITH THE FOLLOWING.
1. UL STD.4 AND UL STD. 83.
2. ANSI E119 AND E814.
3. NEC ARTICLES 250 AND 333.

B. PROVIDE CABLE FORMED FROM CONTINUOUS LENGTH OF SPIRALLY WOUND, INTERLOCKED ZINC-COATED OR GALVANIZED (INSIDE & OUTSIDE) STRIP STEEL. PROVIDE CABLES WITH FULL PARITY SIZED GREEN INSULATED EQUIPMENT GROUND CONDUCTOR.

C. PROVIDE COMPATIBLE STEEL FITTINGS WITH INTEGRAL RED PLASTIC INSULATED THROAT BUSHINGS, COMPLIANT WITH NEC 350-5.

D. TYPE AC/MC CABLE MAY BE UTILIZED ONLY IF NEC APPROVED AND IF APPROVED BY LOCAL AUTHORITY HAVING JURISDICTION AND IF INCLUDED IN THE LIMITED APPLICATIONS DEFINED BELOW.
1. PROVIDE FOR NEW 15 THROUGH 20 AMPERE BRANCH CIRCUIT WORK. THIS APPLIES ONLY UNDER ALL OF THE FOLLOWING CIRCUMSTANCES AND CONDITIONS.
   a. PROVIDE ONLY WHERE CONCEALED (INSTALL WIRING FOR EXPOSED APPLICATIONS IN RACEWAY).
   b. ALL EQUIPMENT WIRING SHALL BE IN CONDUIT.
   c. ROUTE CABLES PERPENDICULAR AND PARALLEL TO THE BUILDING ARCHITECTURAL LINES, SURFACES, AND STRUCTURAL MEMBERS, KEEPING OFFSETS TO A MINIMUM AND FOLLOWING SURFACE CONTOURS WHERE POSSIBLE. MAINTAIN A UNIFORM ELEVATION FOR CABLE RUNS WHEREVER POSSIBLE. SUPPORT AND ANCHOR CABLES AT MAXIMUM 4 FOOT INTERVALS AND WITHIN 12" OF BOX OR OUTLET IN A MANNER THAT PREVENTS SAGGING. INSTALL CABLES IN A MANNER THAT PREVENTS OVERHEATING. FASTEN CABLES DIRECTLY TO THE STRUCTURE USING FACTORY CLAMPS AND CLIPS SPECIFICALLY DESIGNED FOR THE RESPECTIVE CABLE (CADDY OR EQUAL).
   d. PROVIDE ONLY WHERE INSTALLED FOR NORMAL UTILITY CIRCUITS. INSTALL WIRING FOR EMERGENCY SYSTEM CIRCUITS IN STEEL CONDUIT, NO EXCEPTIONS.

1.4 THE USE OF NM/NMS CABLE IS PROHIBITED.

PART 2 - EXECUTION

2.1 INSTALLATION

A. PROVIDE GROUNDED ("NEUTRAL") CONDUCTOR IN ALL LIGHTING CONTROL DEVICE (SWITCH, DIMMER, OCCUPANCY SENSOR, ETC.) WALL OUTLET BOXES, EVEN IF NOT IMMEDIATELY USED.

B. CONNECT WIRES #6 AWG AND LARGER TO PANELS AND APPARATUS BY MEANS OF APPROVED LUGS OR CONNECTORS LARGE ENOUGH TO ENCLOSE ALL STRANDS OF THE CONDUCTORS. PROVIDE SOLDERLESS TYPE CONNECTORS.

C. PROVIDE FACTORY SPLICE KITS (U.L. APPROVED FOR SUBMERSION IN WATER AND DIRECT BURIAL) FOR WIRE SPLICING IN OUTDOOR GRADE, OR SLAB ON GRADE, JUNCTION BOXES.

END OF SECTION

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. THIS SECTION INCLUDES GROUNDING AND BONDING REQUIREMENTS FOR ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS, CIRCUITS, AND EQUIPMENT.

B. PROVIDE THE FOLLOWING MINIMUM REQUIREMENTS FOR GROUNDING.
1. NFPA: - COMPONENTS AND INSTALLATION SHALL COMPLY WITH NFPA 70, "NATIONAL ELECTRICAL CODE" (NEC).
2. UL - COMPLY WITH UL 467, "GROUNDING AND BONDING EQUIPMENT."
3. ANSI/TIA/EIA-607, "COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS.

PART 2 - PRODUCTS

2.1 MATERIALS

A. SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE GROUNDING AND BONDING PRODUCT MANUFACTURERS OF THE INSTALLER'S CHOICE UNLESS NOTED OTHERWISE.

B. EXCEPT AS OTHERWISE INDICATED, PROVIDE COPPER ELECTRICAL GROUNDING AND BONDING SYSTEMS AND MATERIALS WITH ASSEMBLY OF MATERIALS INCLUDING BUT NOT LIMITED TO CABLES/WIRES, CONNECTORS, SOLDERLESS LUG TERMINALS, GROUNDING ELECTRODES AND PLATE ELECTRODES, BONDING JUMPER BRAID, AND ADDITIONAL ACCESSORIES NEEDED FOR A COMPLETE INSTALLATION. WHERE MATERIALS OR COMPONENTS ARE NOT INDICATED, PROVIDE PRODUCTS THAT COMPLY WITH NEC, UL, AND IEEE REQUIREMENTS, AND WITH ESTABLISHED INDUSTRY STANDARDS FOR THOSE APPLICATIONS INDICATED. UTILIZE COMPATIBLE METALLIC MATERIALS THROUGHOUT SYSTEM TO ELIMINATE GALVANIC ACTION.

C. PROVIDE STEEL GROUNDING ELECTRODES WITH COPPER WELDED EXTERIOR, AND 3/4" DIAMETER BY 10 FEET LENGTH. PROVIDE SHEET COPPER PLATE ELECTRODES THAT ARE 20-GAGE BY 36" BY 36", WITH CABLE ATTACHMENTS (MINIMUM QUANTITY OF 2), SIZED FOR CABLES AS NECESSARY TO FULFILL PROJECT GROUNDING REQUIREMENTS. PROVIDE COPPER GROUND PLATES WHERE GROUND RODS CANNOT BE USED. PROVIDE CONNECTIONS TO GROUND ELECTRODES AT A POINT NOT LESS THAN 1 FOOT BELOW GRADE LEVEL, AND NOT LESS THAN 2 FEET AWAY FROM FOOTINGS AND FOUNDATIONS. WELD GROUNDING CONDUCTORS TO UNDERGROUND GROUNDING ELECTRODES WHERE MECHANICAL CONNECTIONS CAN NOT, OR SHOULD NOT, BE UTILIZED.

PART 3 - EXECUTION

3.1 INSTALLATION

A. TERMINATE FEEDER AND BRANCH CIRCUIT INSULATED EQUIPMENT GROUNDING CONDUCTORS WITH GROUNDING LUG, BUS, OR BUSHING. ROUTE GROUNDING CONNECTIONS AND CONDUCTORS TO GROUND AND PROTECTIVE DEVICES IN SHORTEST AND STRAIGHTEST PATHS AS POSSIBLE TO MINIMIZE TRANSIENT VOLTAGE RISES.

B. INSTALL CLAMP-ON CONNECTORS ON CLEAN METAL CONTACT SURFACES, TO ENSURE ELECTRICAL CONDUCTIVITY AND CIRCUIT INTEGRITY.

C. PROVIDE CORROSION-RESISTANT FINISH TO FIELD-CONNECTIONS, TO PLACES WHERE FACTORY APPLIED PROTECTIVE COATINGS HAVE BEEN DAMAGED, AND WHERE SUBJECT TO CORROSIVE ACTION.

D. ROUTE GROUND CONDUCTORS USED FOR BONDING IN PROTECTIVE CONDUIT SLEEVES. PROVIDE BOTH ENDS OF THESE CONDUIT SLEEVES WITH GROUND BUSHINGS, AND BOND GROUND BUSHINGS TO ENCLOSURES AND GROUND TERMINATIONS AT BOTH ENDS USING JUMPERS. SIZE GROUND JUMPER CONDUCTORS THE SAME AS THE RESPECTIVE GROUND CONDUCTOR THAT IS BEING PROTECTED WITHIN THE RESPECTIVE CONDUIT.

E. PROVIDE CORROSION-RESISTANT FINISH TO BURIED METALLIC GROUNDING AND BONDING PRODUCTS.

F. TERMINATE GROUND ELECTRODE CONDUCTORS WITH TWO-HOLE COMPRESSION LUGS. TERMINATE BONDING JUMPER CONDUCTORS WITH ONE-HOLE COMPRESSION LUGS.

G. INSTALL BRAIDED TYPE BONDING JUMPERS WITH GROUND CLAMPS ON VALVED WATER PIPING WHERE SUCH PIPING PENETRATES EXTERIOR WALLS AND FIRE WALLS. INSTALL WATER PIPE CONNECTOR FITTINGS SO THAT THEY MAKE CONTACT WITH THE WATER PIPE FOR A MINIMUM DISTANCE OF 1-1/2 INCHES (MEASURED ALONG THE AXIS), AND HAVE A MINIMUM CONTACT SURFACE AREA OF 3 SQUARE INCHES.

H. EQUALIZE (BOND TOGETHER) GROUND POTENTIALS ASSOCIATED WITH THE ELECTRICAL DISTRIBUTION SYSTEM, SEPARATELY DERIVED SYSTEMS, STEEL STRUCTURAL SYSTEMS, AND WATER SERVICES PER NEC AND AS APPLICABLE.

I. SERVICE ENTRANCE GROUNDING REQUIREMENTS
1. PROVIDE A PARITY SIZED INSULATED GROUNDED CONDUCTOR (NEUTRAL) FOR EACH SET OF SERVICE ENTRANCE FEEDER PHASE/LINE CONDUCTORS, TERMINATED AND BONDED TO SERVICE EQUIPMENT. THIS APPLIES WHETHER OR NOT DOWNSTREAM LOADS REQUIRE A NEUTRAL CONDUCTOR. INSTALL THESE NEUTRAL CONDUCTORS UNSPLICED AND UNBROKEN.
2. CONNECT GROUNDING ELECTRODE CONDUCTORS TO 1-INCH DIAMETER, OR GREATER, METALLIC COLD WATER PIPE AT SERVICE ENTRANCE USING A SUITABLY SIZED GROUND CLAMP. PROVIDE CONNECTIONS TO FLANGED PIPING AT STREET SIDE OF FLANGE. GROUND ELECTRICAL SERVICE SYSTEM NEUTRAL AT SERVICE ENTRANCE EQUIPMENT TO GROUNDING ELECTRODES. INSTALL BRAIDED TYPE BONDING JUMPERS WITH CODE-SIZED GROUND CLAMPS ON WATER METER PIPING TO ELECTRICALLY BYPASS WATER METERS AND WATER SERVICE ENTRANCE VALVES.
3. CONTACT AHJ ELECTRICAL INSPECTOR IN ADVANCE OF INSTALLING SERVICE GROUNDING WORK. DETERMINE LOCALLY APPROVED METHODS THAT MUST BE USED FOR RE-BAR GROUNDING THAT THE AHJ CONSIDERS COMPLIANT WITH NATIONAL ELECTRICAL CODE ARTICLE 250.52.
4. UPON COMPLETION OF INSTALLATION OF ELECTRICAL GROUNDING AND BONDING SYSTEMS, TEST GROUND RESISTANCE WITH GROUND RESISTANCE TESTER. WHERE TESTS SHOW RESISTANCE-TO-GROUND IS OVER 3 OHMS, TAKE APPROPRIATE ACTION TO REDUCE RESISTANCE TO 3 OHMS, OR LESS, BY DRIVING ADDITIONAL GROUND RODS OR INSTALLING ADDITIONAL GROUND PLATES OR CHEMICALLY TREATING ADJACENT SOIL, OR COMBINATIONS THEREOF. THEN RETEST TO DEMONSTRATE COMPLIANCE.

J. SEPARATELY DERIVED SYSTEM GROUNDING REQUIREMENTS
1. GROUND AND BOND EACH SEPARATELY-DERIVED SYSTEM NEUTRAL TO ROOM GROUND BUSBAR, TO EFFECTIVELY GROUNDED STRUCTURAL STEEL MEMBER, TO EFFECTIVELY GROUNDED METALLIC WATER PIPE, AND TO SEPARATE GROUNDING ELECTRODE SYSTEM AS REQUIRED PER NATIONAL ELECTRICAL CODE AND AS APPLICABLE.

END OF SECTION

SECTION 26 05 33 - RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED WORK

A. INSTALL WIRE IN RACEWAY/CONDUIT (SIZED PER NEC) UNLESS SPECIFICALLY PERMITTED OTHERWISE ELSEWHERE IN DIVISION 26 SECTIONS, OR ON DRAWINGS.

B. INSTALL WIRING FOR DIFFERENT POWER VOLTAGES IN RACEWAY SYSTEMS SEPARATE FROM EACH OTHER (I.E. 24V SEPARATE FROM 208Y/120V, SEPARATE FROM 480Y/277V, ETC.).

C. INSTALL WIRING, WITH THE EXCEPTION OF VOICE AND DATA, FOR THE VARIOUS ELECTRICAL SYSTEMS IN RACEWAY SYSTEMS, WHICH ARE SEPARATE FROM EACH OTHER (I.E. FIRE ALARM SEPARATE FROM VOICE/DATA SEPARATE FROM ETC.).

D. DO NOT INSTALL CONDUITS WITHIN SLABS UNLESS SPECIFICALLY NOTED ON DRAWINGS, OR UNLESS PART OF AN UNDERFLOOR DUCT RACEWAY SYSTEM.

E. DO NOT INSTALL CONDUITS BENEATH SLABS ON GRADE, EXCEPT IF WHERE SPECIFICALLY INDICATED OTHERWISE ON DRAWINGS, OR UNLESS SPECIAL CASE BY CASE PERMISSION IS OBTAINED FROM OWNER'S REPRESENTATIVE IN THE FIELD.

F. PROVIDE STEEL CONDUIT AND STEEL FITTINGS FOR INDOOR ABOVE-SLAB APPLICATIONS, AS SPECIFIED IN THIS SECTION.

CORE STATES GROUP
135 Water Street
Suite 201
Naperville, IL 60540
312.718.5415
core-states.com

ISSUED FOR CONSTRUCTION

CAVA

CAVA - CANTON MI
43450 FORD ROAD
CANTON, MI 48187
FOR
CAVA
14 Ridge Square NW #500, WASHINGTON, DC 20016

AOR PROJECT NUMBER: CAV.38002

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