



INTERSECTION OF DAVENPORT & ALABAMA AVENUE
BREMEN, MN 55414
CELL ID: 252 0065

AMERICAN DAIRY QUEEN
MINNEAPOLIS, MN U.S.A.
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OUTSIDE AIR REQUIREMENTS

1. Summary
 Ventilation Sizing Method: ASHRAE 62.1-2010
 Design Condition: Heating operation
 Occupant Density (2): 1.000
 Unobstructed Outdoor Air Intake (Inlet): 756 CFM
 Supply Ventilation Efficiency (E_v): 0.800
 Outdoor Air Intake (Inlet): 945 CFM
 Outdoor Air Provided: 3250 CFM

2. Space Ventilation Analysis

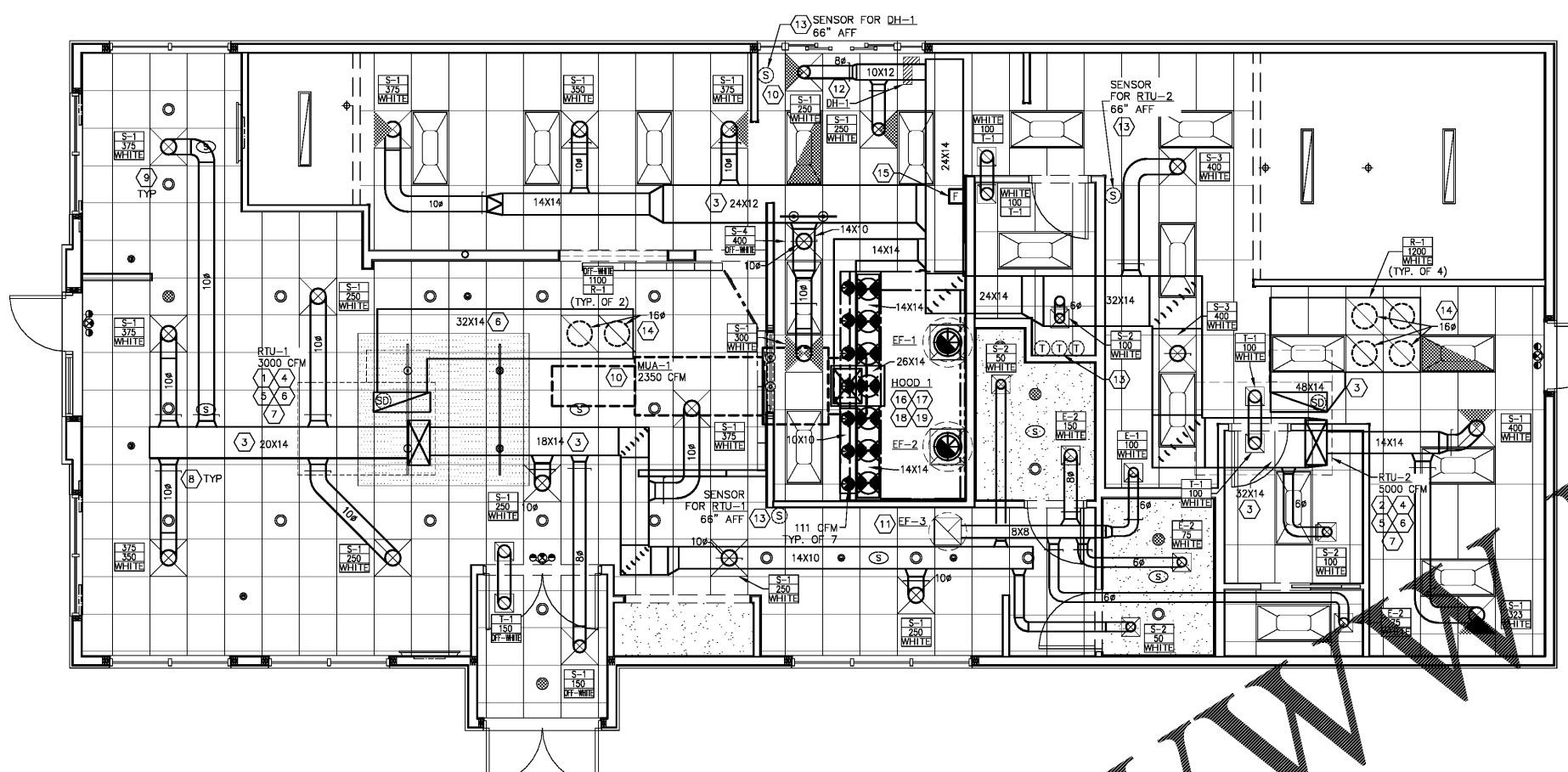
Zone Name / Space Name	Multi	Space Floor Area (SF)	Area Outdoor Rate (CFM/SF)	Time Averaged Occupancy (P _z)	People (P _z)	Outdoor Air Rate (CFM/Person)	Air Distribution Effectiveness (E _a)	Space Outdoor Air (CFM)	Zone Outdoor Air (CFM)
Zone 1									
Break	1	170.0	0.12	2.0	7.50	0.8	44		
Dining	1	679.0	0.18	52.0	7.80	0.8	689		
Drive Thru	1	324.0	0.12	3.0	7.50	0.8	77		
Kitchen Prep	1	434.0	0.12	2.0	0.0	0.8	84		
Office	1	53.0	0.08	1.0	0.0	0.8	10		
Office	1	60.0	0.08	0.0	0.0	0.8	11		
RR EXT	1	49.0	0.00	0.0	0.0	0.8	0		
RR EXT2	1	49.0	0.00	0.0	0.0	0.8	0		
RH INT	1	51.0	0.00	0.0	0.0	0.8	0		
Service	1	76.0	0.12	2.0	0.0	0.8	38		
Unoccupied	1	32.0	0.00	0.0	0.0	0.8	4		
Totals (incl. Space Multiplier)								756	

AIR BALANCE SCHEDULE

RTU	SUM	RET	OSA	TRANSFER AIR	CFM EXHAUST
RTU-1	3,000	2,200	800	0	
RTU-2	5,000	4,800	200	0	
EF-1					1,468
EF-2					1,468
EF-3					400
MUA-1			2,350		
TOTALS	8,000	7,000	3,350	0	3,336

NOTES:
 1) BUILDING AIR BALANCE: 14 CFM POSITIVE PRESSURE.
 2) KITCHEN AIR BALANCE: 786 CFM NEGATIVE TO DINING ROOM.

NOTE:
 THE RTU'S SHALL BE INTERLOCKED WITH EF-1, & -2 TO OPERATE WHEN THE EXHAUST IS ON. THE ROOFTOP UNITS SHALL BE CONNECTED THRU CENTRAL TERMINAL BOARD FOR INTERCONNECTION.
 REFER TO THE EQUIPMENT SHEET FOR SPARE PARTS LIST AND CONTROL PANEL DRY CONTACT SFC1/SF01.



1 HVAC PLAN
 MI SCALE: 1/4" = 1'-0"

HVAC MECHANICAL EQUIPMENT/KITCHEN VENTILATION SYSTEM RESPONSIBILITY MATRIX

EQUIPMENT	TAG	SPECIFIED MFG.	PRICE QUOTE & ORDER THRU	EQUIPMENT PROVIDED BY	ROOF CURB PROVIDED BY	CHECK TEST & BALANCE	EQUIPMENT INSTALLED BY	EQUIPMENT STARTUP BY	1ST YEAR LABOR WARRANTY
EXHAUST FANS	EF-1, -2, -3	CAPTIVEAIRE	FRANCHISEE'S EQUIPMENT PACKAGE	FRANCHISEE'S EQUIPMENT PACKAGE			MECH. CONTR.	MECH. CONTR.	MECH. CONTR.
KITCHEN HOOD	HOOD 1 & MUA-1	CAPTIVEAIRE	FRANCHISEE'S EQUIPMENT PACKAGE	FRANCHISEE'S EQUIPMENT PACKAGE			MECH. CONTR.	MECH. CONTR.	MECH. CONTR.
HOOD FIRE SYS.	HOOD 1	CAPTIVEAIRE	FRANCHISEE'S EQUIPMENT PACKAGE	FRANCHISEE'S EQUIPMENT PACKAGE			CAPTIVEAIRE	CAPTIVEAIRE	CAPTIVEAIRE
DUCT HEATER	DH-1	REDDI	CARRIER	CARRIER	N/A	CAPTIVEAIRE	MECH. CONTR.	MECH. CONTR.	MECH. CONTR.
ROOFTOP UNITS	RTU-1, RTU-2	CARRIER	CARRIER	CARRIER	CARRIER	CAPTIVEAIRE	MECH. CONTR.	MECH. CONTR.	MECH. CONTR.
GRILLES/DIFFUSERS	-	RUEGER	HJC	HJC	N/A	N/A	MECH. CONTR.	MECH. CONTR.	MECH. CONTR.

CARRIER NATIONAL ACCOUNTS PROVIDE HVAC EQUIPMENT AND MATERIAL PACKAGE

- THE HVAC EQUIPMENT AND MATERIALS OUTLINED IN THE RESPONSIBILITY MATRIX SHALL BE PROVIDED AND INSTALLED BY THE MECHANICAL CONTRACTOR THROUGH "CARRIER NATIONAL ACCOUNTS". FOR NATIONAL ACCOUNTS PRICING & SHIPPING REFER TO NATIONAL VENDORS LIST.
- THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR ORDERING, DELIVERY, AND STORAGE OF THE EQUIPMENT AND MATERIALS PACKAGE.
- UPON PLACING AN ORDER, THE HVAC CONTRACTOR WILL RECEIVE A CONTRACTOR ASSISTANCE MANUAL FROM THE CARRIER NATIONAL ACCOUNTS.
- THE CONTRACTOR IS RESPONSIBLE FOR THE COMPLETE INSTALLATION OF THE EQUIPMENT AND MATERIALS PACKAGE.

CARRIER NATIONAL ACCOUNTS - PROVIDED ROOF TOP EQUIPMENT PACKAGE

- INCLUDES ALL ROOF HEATING AND AIR CONDITIONING EQUIPMENT WITH ALL ACCESSORIES AS SPECIFIED ON THESE PLANS AND SPECIFICATIONS. SEE SCHEDULE ON SHEET M3.

KRUEGER NATIONAL ACCOUNTS - PROVIDED AIR DEVICE PACKAGE

- INCLUDES ALL REGISTERS, GRILLES & DIFFUSERS WITH SQUARE TO ROUND TRANSITIONS WHERE REQUIRED AS SPECIFIED ON THESE PLANS & SPECIFICATIONS.

CARRIER NATIONAL ACCOUNTS - PROVIDED CURB PACKAGE

- INCLUDES ROOF CURBS FOR RTU-1 & RTU-2. ROOF CURBS ARE TO BE ASSEMBLED & INSTALLED ON SITE.

CARRIER NATIONAL ACCOUNTS - PROVIDED DUCT HEATERS

- INCLUDES ALL ELECTRIC DUCT HEATERS & ACCESSORIES AS SPECIFIED ON THESE PLANS & SPECIFICATIONS.

CAPTIVEAIRE - FRANCHISEE PROVIDED KITCHEN VENTILATION SYSTEMS PACKAGE

- THE KITCHEN VENTILATION SYSTEM COMPONENTS OUTLINED IN THE RESPONSIBILITY MATRIX SHALL BE PROVIDED AS PART OF THE FRANCHISEE'S EQUIPMENT PACKAGE. COORDINATED AND INSTALLED BY THE MECHANICAL CONTRACTOR. REFER TO NATIONAL VENDORS LIST FOR CONTACT INFORMATION.

CAPTIVEAIRE - PROVIDED FIRE SUPPRESSION SYSTEM PACKAGE

- A FACTORY INSTALLED FIRE SUPPRESSION SYSTEM WILL BE PROVIDED FOR THE KITCHEN EXHAUST HOODS UNDER THE FRANCHISEE'S EQUIPMENT PACKAGE. LOCAL PERMITS, HOOK UP OF DETECTION AND SUPPLY LINES, INSTALLATION OF PULL STATION AND FIRE SUPPRESSION AGENT AND CHECKOUT ARE PROVIDED BY CAPTIVEAIRE UNDER THE FRANCHISEE'S EQUIPMENT PACKAGE.
- ITEMS THAT ARE NOT INCLUDED: SPECIAL DRAWINGS THAT MAYBE REQUIRED BY STATE/LOCAL AUTHORITIES, INSTALLATION OF GAS SHUNT TYPE VALVE, ELECTRICAL INTERLOCK TO EXHAUST FAN BY OTHERS, FULL DUMP TEST IF REQUIRED IS NOT INCLUDED.

CAPTIVEAIRE - PROVIDED THIRD PARTY CHECK, TEST & BALANCE PACKAGE

- A COMPLETE BUILDING AIR BALANCE, INCLUDING THE AIR CONDITIONING EQUIPMENT, TO ENSURE CORRECT KITCHEN HOOD CAPTURE & OCCUPANT COMFORT PROVIDED BY "CAPTIVEAIRE" UNDER THE FRANCHISEE'S EQUIPMENT PACKAGE.

HVAC/KITCHEN VENTILATION SERVICES AND WARRANTY PACKAGE

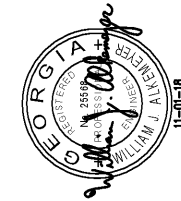
- MECHANICAL CONTRACTOR WILL PROVIDE THE HVAC SERVICES AND WARRANTY PACKAGE.
- HVAC SERVICES AND WARRANTY PACKAGE: SEE MATRIX ABOVE.
- MECHANICAL CONTRACTOR IS RESPONSIBLE TO CORRECT INSTALLATION DEFICIENCIES THAT OBSTRUCT THE COMPLETION OF THE BUILDING AIR BALANCING AND HVAC SERVICES WARRANTY PACKAGE.

MECHANICAL GENERAL NOTES

- HVAC CONTRACTOR SHALL PROVIDE FIELD APPLIED FOIL VAPOR BARRIER INSULATION TO ALL DIFFUSER BACKS.
- RTU AND EXHAUST FAN ROOF PENETRATIONS SHALL BE COORDINATED WITH STRUCTURAL.
- MECHANICAL CONTRACTOR IS RESPONSIBLE FOR ALL VERTICAL AND HORIZONTAL OFFSETS (NOT SHOWN) FOR DUCT AND EQUIPMENT INSTALLATION.
- REFERENCE ALL DETAILS ON SHEETS M3 THROUGH M5 FOR EQUIPMENT INSTALLATION.
- ALL ROOF CURBS SHALL BE SEALED AIR TIGHT FOR BUILDING AIR LEAK TESTING.
- MECHANICAL CONTRACTOR IS RESPONSIBLE FOR REFRIGERATION PIPING. PLUMBING CONTRACTOR WILL PROVIDE ALL CONDENSATE PIPING. ALL EQUIPMENT FURNISHED WITH PRE-CHARGED LINE SETS.
- SEE PROJECT MANUAL FOR BUILDING MATERIALS SPECIFICATIONS.
- DUCTWORK TO BE INSTALLED TIGHT TO BOTTOM OF STRUCTURE THROUGHOUT. COORDINATE WORK WITH OTHER TRADES TO AVOID CONTACT. MAINTAIN CLEARANCE ABOVE DUCT FOR INSULATION.
- CLEAN ALL DUCTWORK BOTH INSIDE AND OUT BEFORE START-UP OF ROOFTOP UNITS.
- FLEXIBLE DUCT LENGTH TO 30" MAX.
- LOCATE ALL THERMOSTATS/REMOTE SENSORS AT 54" MAXIMUM A.F.F. UNLESS OTHERWISE NOTED.
- PROVIDE TURNING VANES ON ALL 90° ELBOWS IN SUPPLY AND RETURN DUCTWORK.
- THE ANSUL FIRE SUPPRESSION SYSTEM, (LIQUID SYSTEM, TYPE-R102, SEE DETAIL 5/M3) IS PRE-PIPED IN HOOD BY HOOD MANUFACTURER AS PART OF THEIR PACKAGE. SEE "RESPONSIBILITY MATRIX."

KEYED NOTES

- ROOF TOP UNIT RTU-1: PROVIDE NEW CARRIER ROOFTOP UNIT IN VERTICAL DISCHARGE CONFIGURATION. PROVIDE WITH ROOF CURB, ECONOMIZER, SMOKE DETECTORS, THERMOSTAT AND STAINLESS STEEL HEAT EXCHANGER. SEE SHEET M3 EQUIPMENT SCHEDULE AND DETAILS FOR ADDITIONAL INFORMATION.
- ROOF TOP UNIT RTU-2: PROVIDE NEW CARRIER ROOFTOP UNIT IN VERTICAL DISCHARGE CONFIGURATION. PROVIDE WITH ROOF CURB, ECONOMIZER, SMOKE DETECTORS, THERMOSTAT AND STAINLESS STEEL HEAT EXCHANGER. SEE SHEET M3 EQUIPMENT SCHEDULE AND DETAILS FOR ADDITIONAL INFORMATION.
- INSTALL ALL DUCTWORK TIGHT TO BOTTOM OF DECK OR STRUCTURAL MEMBERS.
- PROVIDE SMOKE DETECTOR IN RETURN/SUPPLY AIR STREAM WHERE INDICATED. AIR HANDLING EQUIPMENT SHALL BE INTERLOCKED WITH THE DETECTOR TO SHUT DOWN THE UNIT. FURNISH AND INSTALL AN AUDIBLE AND VISUAL ALARM DEVICE IN MONITORED AREA, PER LOCAL CODE.
- DUCTWORK INSULATION: ALL RETURN AND SUPPLY DUCTWORK SHALL BE WRAPPED WITH 1 1/2 LBS (MINIMUM R-6) BLANKET INSULATION, WITH FOIL FACING.
- NO PLENUM "PUNCH-OUTS" ARE ALLOWED IN RTU DUCTWORK DROPS, UNLESS SPECIFICALLY INDICATED. SEE DETAIL 1/M3 FOR DUCTWORK DROP CONFIGURATION.
- RETURN/SUPPLY DUCTWORK DOWN FULL SIZE FROM AIR HANDLING EQUIPMENT WITH NEOPRENE FLEX CONNECTORS. SUPPORT DUCTWORK TO RELEASE TENSION IN FLEX CONNECTORS. TRANSITION AS SHOWN. SEE DETAIL 1/M3.
- VOLUME DAMPER. TYPICAL FOR ALL.
- FLEX DUCTWORK CONNECTION TO DIFFUSERS/GRILLES TYPICAL. FLEX DUCTWORK TO BE INSULATED WITH FOIL VAPOR BARRIER. FLEX DUCTWORK NOT TO EXCEED 5'-0" IN LENGTH. SEE DETAIL 4/M3.
- MUA-1: INSTALL DUCT WORK FROM MAKE-UP AIR UNIT WITH AUTOMATIC BACK DRAFT DAMPER. SEE HOOD DRAWINGS FOR SPECIFICATIONS AND REQUIREMENTS. FABRICATE AND INSTALL DUCTWORK FROM MUA-1 TO HVAC SUPPLY AT HOOD ACCORDING TO ASHRAE LOW PRESSURE STANDARDS. COORDINATE ROUTING WITH STRUCTURAL AND HOODS REQUIREMENTS.
- EF-3: PROVIDE ROOF MOUNTED TOILET EXHAUST FAN WITH BACK DRAFT DAMPER. MAINTAIN 10'-0" FROM ALL OUTSIDE AIR INTAKES. SEE SHEET M3 EQUIPMENT SCHEDULE AND DETAILS FOR ADDITIONAL INFORMATION.
- ELECTRIC DUCT HEATER: COORDINATE MOUNTING LOCATION WITH STRUCTURAL AND ELECTRICAL WIRING BY ELECTRICAL CONTRACTOR. SEE SHEET M3 EQUIPMENT SCHEDULE AND DETAILS FOR ADDITIONAL INFORMATION.
- REMOTE SENSORS AND THERMOSTATS: REMOTE SENSORS AND THERMOSTATS TO BE MOUNTED WHERE INDICATED. FIELD-VERIFY THE LOCATION WITH ARCHITECT, OWNER, AND ON-SITE CONDITIONS PRIOR TO PERFORMING WORK.
- EXTEND SHEET METAL RETURN AIR PLENUM UP FROM GRILLE AND CONNECT TO RETURN AIR DUCT AS INDICATED.
- MANUAL PULL STATION FOR ANSUL FIRE SUPPRESSION SYSTEM. VERIFY WITH LOCAL AUTHORITY NUMBER OF PULLS, LOCATION, AND HEIGHT ABOVE FINISH FLOOR. SEE DETAIL 5/M3.
- EXACT LOCATION OF ALL HOODS SHALL BE DETERMINED BY THE KITCHEN EQUIPMENT DRAWINGS AND EQUIPMENT CUT SHEETS. COORDINATE WITH ALL DISCIPLINES PRIOR TO INSTALLATION.
- KITCHEN HOOD SYSTEM & EF-1: INSTALL KITCHEN EXHAUST SYSTEM FROM INDICATED VENDOR. THE PACKAGE TO INCLUDE THE STAINLESS STEEL EXHAUST HOOD, GREASE FILTERS, GREASE CATCH PAN, WIRE WAYS, INCANDESCENT LIGHT FIXTURE RATED FOR EXHAUST HOODS, EXHAUST FAN, AND ROOF CURB.
- INSTALL KITCHEN HOOD EXHAUST DUCTWORK AS INDICATED ON PLANS. DUCTWORK SIZES AND LAYOUTS SHALL NOT BE MODIFIED WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
- HVAC CONTRACTOR TO PROVIDE ALL CONTINUOUSLY-WELDED GREASE EXHAUST DUCTWORK TO EXHAUST FAN WITH CLEAN OUT. INSULATION FOR EXHAUST DUCT SHALL BE CAPTIVEAIRE FIRE BARRIER DUCT WRAP. REFER TO CAPTIVEAIRE SHOP DRAWINGS FOR SPECIFICATIONS. THE WRAP SHALL BE 2-HOUR FIRE RATED. MAINTAIN 10'-0" FROM ALL OUTSIDE AIR INTAKES.



GEORGIA ENGINEER LICENSE
 NUMBER PE025568

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HVAC PLAN

SHEET NUMBER:
M1