

TRICARICO ARCHITECTURE AND DESIGN PC
502 VALLEY ROAD, WAYNE, NJ 07470
T: 973-692-0222 F: 973-692-0223
TRICARICO.COM



JOHN QUILLEN, PE, MBA
8394 GREENLEAF DR.
CINCINNATI, OH 45255

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DATE: ISSUE:

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LOCATION:
**2 SOUTH END AVE
NEW YORK, NY 10280**

DOBNOW #: M00995203-11

PROJECT NO. MQE 12401 DRAWN BY: JR

SCALE: AS NOTED CHECKED BY: JG

DATE: 01.31.24 THESE DRAWINGS WERE COMPLETED UNDER THE DIRECT SUPERVISION OF:

**JOHN W. QUILLEN
ENGINEER**

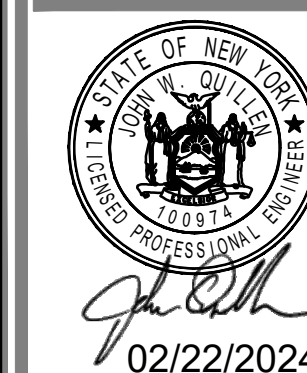
MARQUE ENGINEERING

DRAWING NAME:
MECHANICAL - SUPPLY FLOOR PLAN

DRAWING NO. PAGE: 1 of 7

M-100.00

FIRM REGISTRATION NO.: #AA26000822



APPLICATION #
02/22/2024 M00995203-11

KEYED NOTES

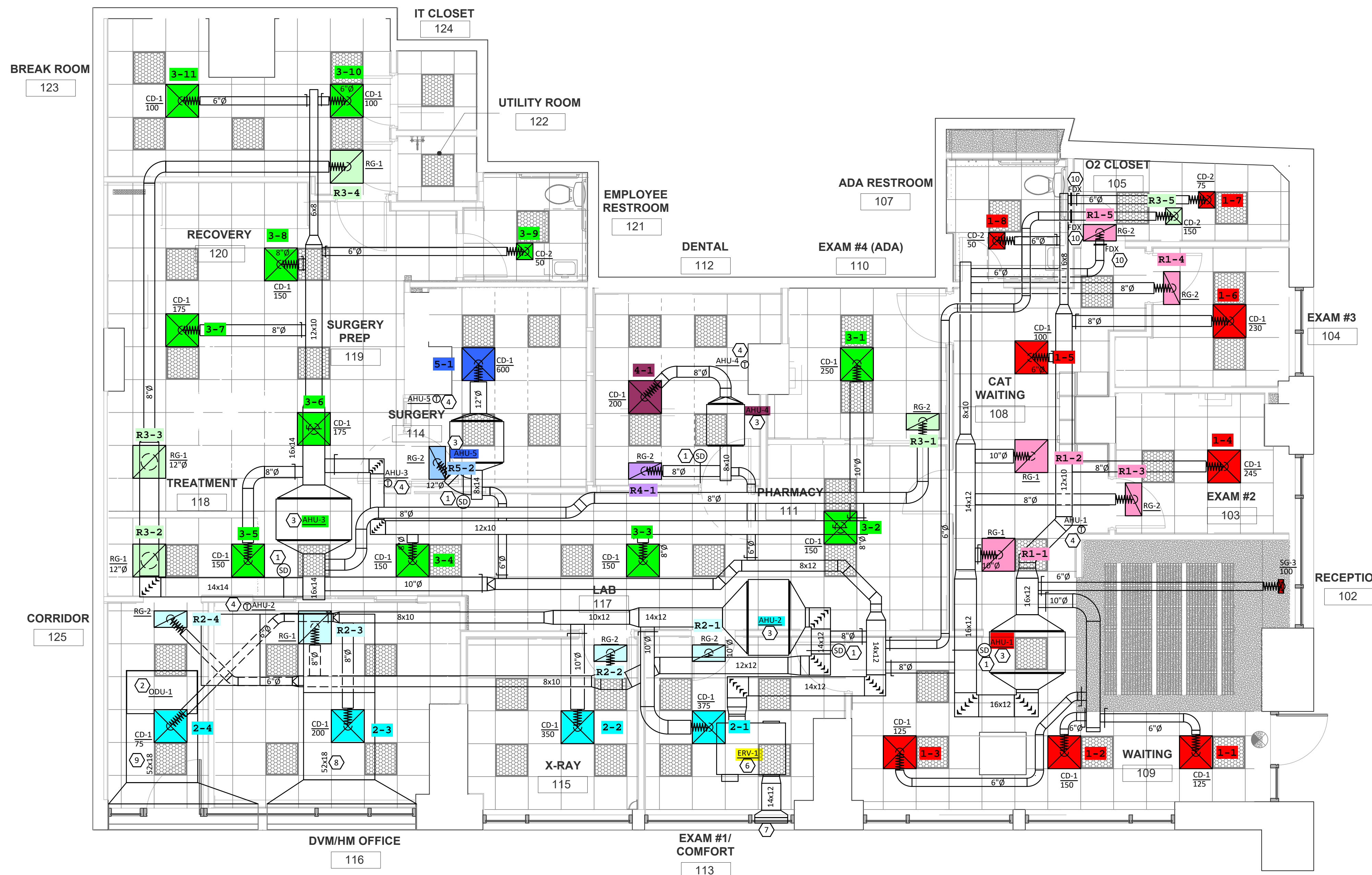
- EC TO FURNISH DUCT MOUNTED SMOKE DETECTOR AND PROVIDE COMPATIBLE REMOTE ANNUNCIATOR/TEST SWITCH. MC TO INSTALL SMOKE DETECTOR IN RETURN DUCT, PRIOR TO ANY OUTDOOR AIR CONNECTIONS. MC TO PROVIDE INTERLOCK WIRING BETWEEN SMOKE DETECTOR AND UNIT TO SHUT DOWN UNIT UPON DETECTION OF SMOKE. EC SHALL PROVIDE WIRING FOR FINAL CONNECTION TO CENTRAL FIRE ALARM SYSTEM, IF APPLICABLE, AND WIRING TO REMOTE ANNUNCIATOR/TEST SWITCH.
- PROVIDE HEAT PUMP AND LOCATE ON MEZZANINE ON ANVIL INTERNATIONAL HAYDON H-BLOCK OR EQUIVALENT. SUPPORT SYSTEM, COMPLETE WITH PAD. MAINTAIN UNIT MINIMUM REQUIRED SERVICE AND AIRFLOW CLEARANCE. ROUTE REFRIGERANT LIQUID AND SUCTION LINES BETWEEN HEAT PUMP AND AIR HANDLING UNITS AND SEAL ALL PENETRATIONS WEATHER-TIGHT. ROUTE AND SIZE LINES AND ACCESSORIES PER MANUFACTURER'S GUIDELINES. PROVIDE A FULLY CHARGED SYSTEM AND INSULATE ALL REFRIGERANT PIPING WITH ARMAFLEX INSULATION. COORDINATE EXACT INSTALLATION LOCATION WITH LANDLORD PRIOR TO BEGINNING WORK.
- PROVIDE AIR HANDLING UNIT AND LOCATE ON ANGLE IRON FRAME ABOVE CEILING. MOUNT FRAME TO STRUCTURE WITH BEAM CLAMPS, THREADED RODS AND SPRING VIBRATION ISOLATORS. ROUTE 3/4" CONDENSATE DRAIN LINE WITH TRAP TO FLOOR DRAIN. PROVIDE CONDENSATE PUMP AS REQUIRED. COORDINATE FLOOR DRAIN LOCATION WITH PLUMBING PLAN. FOR UNITS ABOVE CEILING, PROVIDE AUXILIARY DRAIN PAN WITH HIGH LEVEL ALARM UNDER AIR HANDLING UNIT, IN ACCORDANCE WITH SECTION 307.2.3 OF IMC. HIGH LEVEL ALARM SHALL SHUT UNIT OFF UPON DETECTION OF CONDENSATE IN THE OVERFLOW DRAIN PAN.
- G.C. TO FURNISH AND INSTALL 7-DAY PROGRAMMABLE THERMOSTAT WITH BATTERY BACKUP AND MOUNT ON WALL 4 FEET A.F.F. COORDINATE THERMOSTAT LOCATION WITH FURNITURE LAYOUT AND OWNER'S REPRESENTATIVE. T-STAT TO INCLUDE HUMIDITY SENSOR AND REMOTE SENSOR CAPABILITIES.
- VOLUME DAMPER IN EACH BRANCH SUPPLY DUCT (TYPICAL THROUGHOUT). LOCATE ABOVE LAY-IN CEILING ONLY. DAMPER TO BE ACCESSIBLE AFTER CONSTRUCTION IS COMPLETED.
- PROVIDE NEW ENERGY RECOVERY VENTILATOR AND LOCATE ON ANGLE IRON FRAME ABOVE CEILING. MOUNT FRAME TO STRUCTURE WITH BEAM CLAMPS, THREADED RODS AND SPRING VIBRATION ISOLATORS. ROUTE SUPPLY AIR DUCT TO LOUVER, AS INDICATED. BALANCE SUPPLY AND OUTSIDE AIRFLOW AS SCHEDULED. ERV FILTER MUST REMAIN ACCESSIBLE IN ACT GRID AT END OF CONSTRUCTION.
- PROVIDE 24x24 INTAKE WALL LOUVER, EQUIVALENT TO RUSKIN ELF-375DQ, AND MOUNT HIGH ON WALL, COMPLETE WITH BIRDSCREEN. PROVIDE DUCTWORK PLENUM BOX BEHIND LOUVER AND SEAL WATER TIGHT.
- ROUTE 52x18 DUCT FROM EXISTING LOUVER INTO NEW MEZZANINE TO ALLOW AIRFLOW FROM OUTSIDE TO BE USED FOR ODU-1'S OPERATION.
- ROUTE 52x18 DUCT FROM THE TOP OF ODU-1 TO EXISTING LOUVER, AS INDICATED. THIS DUCT IS TO ALLOW ODU-1 TO EXHAUST AIR OFF ITS MAIN COILS FOR UNIT FUNCTIONALITY.
- PROVIDE UL 555 LISTED, RUSKIN MODEL DIBD2, OR EQUIVALENT, DYNAMIC 1.5 HR TYPE B FIRE DAMPER AND INSTALL IN FIRE RATED WALL IN LOCATION INDICATED. PROVIDE ACCESS DOORS ON BOTH SIDES OF FIRE DAMPER. PROVIDE RUSKIN, OR EQUIVALENT, MODEL FDR25 FIRE DAMPER FOR ROUND DUCTWORK PENETRATING FIRE RATED WALL. P

GENERAL NOTES

- THE DRAWINGS ARE DIAGRAMMATIC IN NATURE. EXACT LOCATIONS OF DEVICES AND ROUTING OF DUCTWORK SHALL BE DETERMINED BY CONTRACTOR AFTER COORDINATION WITH ALL OTHER TRADES AND FIELD DETERMINATION OF FINAL CONSTRUCTION DETAILS. MINOR ADJUSTMENTS TO DUCT ROUTING AND CONFIGURATION TO AVOID CONFLICT WITH BUILDING STRUCTURE OR OTHER TRADES SHALL BE INCLUDED IN CONTRACTOR'S PRICE. CONTRACTOR SHALL OBTAIN ENGINEER'S APPROVAL IN WRITING FOR ANY MODIFICATIONS TO SYSTEM DESIGN PRIOR TO INSTALLATION.
- ALL EXPOSED MATERIALS AND EQUIPMENT SHALL BE INSTALLED AND SUPPORTED IN A FIRST-CLASS AND WORKMANLIKE FASHION. DUCTWORK SHALL BE INSTALLED AND SUPPORTED IN A FIRST-CLASS AND WORKMANLIKE FASHION, IN THE ARCHITECT'S OPINION, SHALL BE REDONE AT THE CONTRACTOR'S EXPENSE.
- ALL DUCT JOINTS, SEAMS AND CONNECTIONS SHALL BE SECURELY FASTENED AND SEALED. DUCTS SHALL BE SUPPORTED WITH APPROVED HANGERS AT INTERVALS NOT EXCEEDING TEN FEET. DUCT COVERINGS AND LININGS SHALL HAVE A FLAME-SPREAD INDEX NOT MORE THAN 25 AND A SMOKE DEVELOPED INDEX NOT MORE THAN 50.
- PROVIDE VOLUME DAMPERS AT ALL ROUND BRANCH DUCT TAKE-OFFS THAT ARE ACCESSIBLE. PROVIDE TURNING VANES AT ALL 90 DEGREE SQUARE ELBOWS IN SUPPLY AIR DUCTS. PROVIDE 45 DEGREE HEEL AT ALL RECTANGULAR SUPPLY AND RETURN BRANCH DUCT TAKE-OFFS.
- OUTDOOR AIR INTAKES SHALL BE 10'-0" MINIMUM AWAY FROM ANY EXHAUST AND PLUMBING VENT OUTLET.
- WIRE UP ALL LOW VOLTAGE (24V) THERMOSTATS.
- CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL PIPES, DUCTWORK, UNITS, ETC. WITH ALL OTHER TRADES AND SHIFT LOCATION OR OFFSET WHERE NECESSARY. PROVIDE TRANSITIONS IN DUCTWORK TO AVOID CONFLICT WITH EXISTING DUCTWORK AND OTHER STRUCTURES.
- CONTRACTOR SHALL COORDINATE ALL AIR DEVICES WITH ELECTRICAL AND ARCHITECTURAL REFLECTED CEILING PLANS.
- COORDINATE LOCATION OF ALL EXTERIOR LOUVER OR OUTLET WITH ARCHITECTURAL ELEVATION PLAN.
- COORDINATE ROOF WORK WITH BUILDING OWNER'S ROOFING CONTRACTOR TO ASSURE THAT THE ROOF WARRANTY IS NOT VOIDED.
- INSTALL DUCTWORK AS HIGH AS POSSIBLE. ENSURE PROPER CLEARANCE ABOVE CEILING. NOTIFY NVA PROJECT REPRESENTATIVE IMMEDIATELY OF ANY ABOVE CEILING CONFLICTS.
- EXHAUST AIR DUCTS SHALL BE EQUIPPED WITH BACKDRAFT DAMPERS.
- ALL DUCT OPENINGS AND OTHER AIR DISTRIBUTION OPENINGS SHALL BE COVERED DURING CONSTRUCTION EXCEPT FOR TESTING AND INSPECTION.
- PROVIDE BUILDING OWNER OR REPRESENTATIVE WITH DETAILED OPERATING AND MAINTENANCE INSTRUCTIONS AND WARRANTIES / WRITTEN GUARANTEE FOR EACH SYSTEM. O&M INSTRUCTIONS SHALL BE CONSISTENT WITH OSHA REQUIREMENTS IN CCR TITLE 8, SECTION 5142 AND OTHER RELATED REGULATIONS.
- ALL DUCT ELBOWS SHALL BE LONG RADIUS OR MITERED.

HVAC LEGEND

SYMBOL	DESCRIPTION
①	DRAWING NOTE SYMBOL
26x16	NEW RECTANGULAR DUCTWORK AND SIZE
10"Ø	NEW ROUND DUCTWORK AND SIZE
[Symbol]	BALANCING/VOLUME DAMPER
[Symbol]	FLEX DUCT
⊙	THERMOSTAT
CD-1 240	NEW SUPPLY AIR DIFFUSER AND CFM
RG-1	NEW RETURN GRILLE
EG-1 300	NEW EXHAUST GRILLE AND CFM
[Symbol]	AIR FLOW DIRECTION
SD	SMOKE DETECTOR
[Symbol]	SUPPLY DUCT UP THROUGH ROOF
[Symbol]	RETURN/EXHAUST DUCT UP THROUGH ROOF
[Symbol]	CONNECT TO EXISTING
FDX	FIRE DAMPER



1 MECHANICAL SUPPLY PLAN
M100 SCALE = 1/4" = 1' - 0"

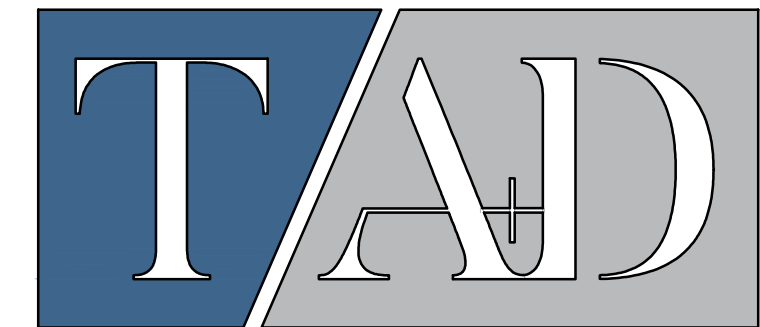
DATE: AS SHOWN

PROJECT NO.: 12401

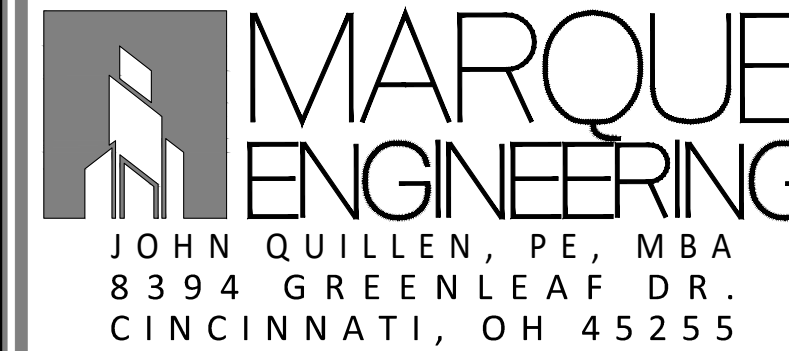
LOCATION: 2 SOUTH END AVE, NEW YORK, NY 10280

PROJECT: NVA

PLOT SCALE: 1:1



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NEW YORK, NY 10280**

DOBNOW #: M00995203-11

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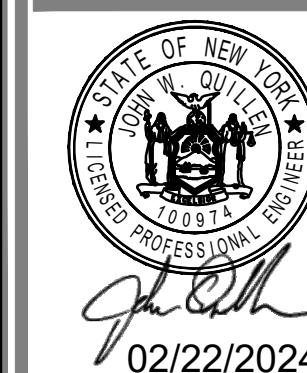
**JOHN W. QUILLEN
ENGINEER**

MARQUE ENGINEERING

DRAWING NAME:
MECHANICAL - EXHAUST FLOOR PLAN

DRAWING NO. PAGE: 2 of 7
M-101.00

FIRM REGISTRATION NO.: #AA26000822



APPLICATION #
M00995203-11

KEYED NOTES

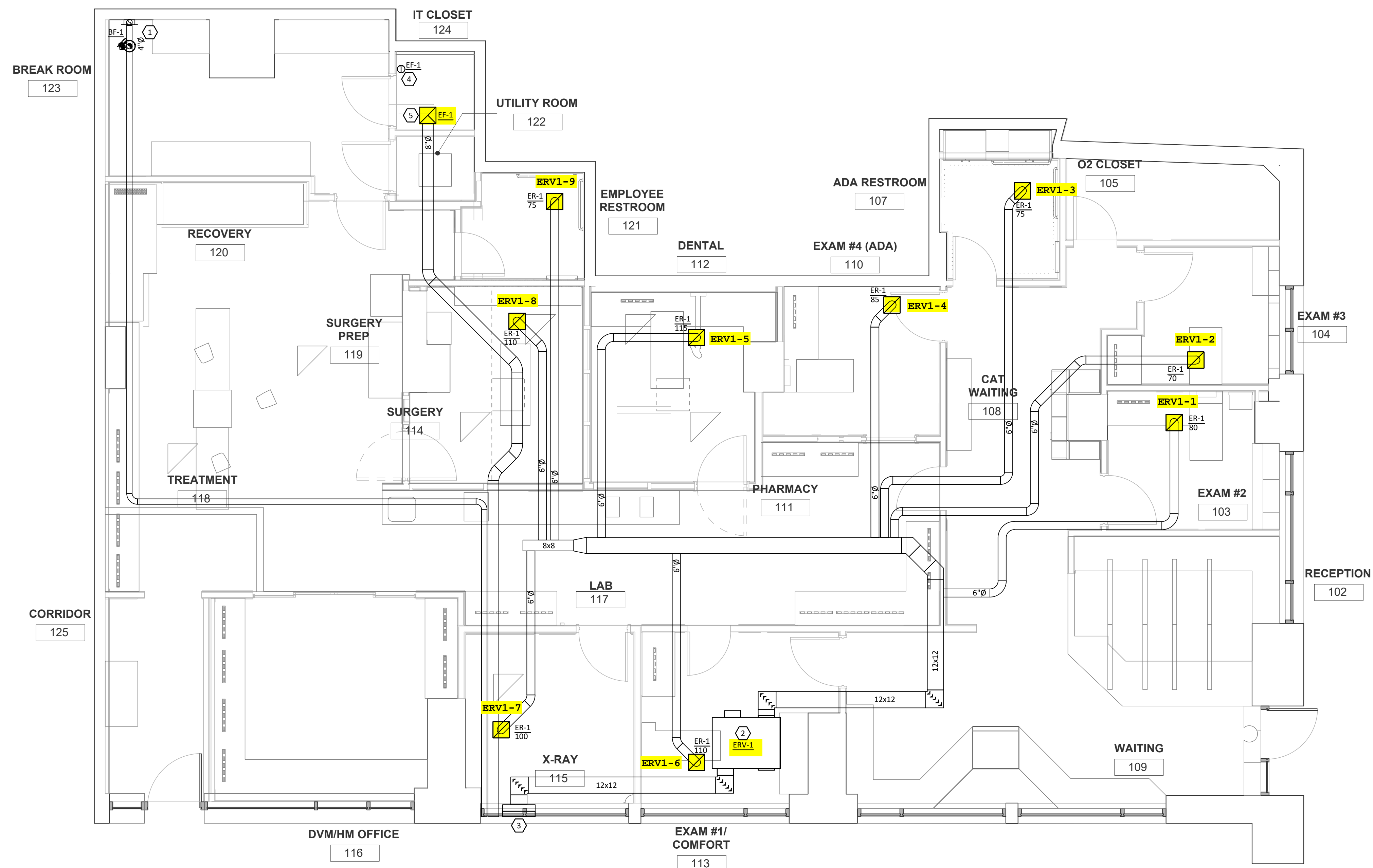
- 4 INCH SMOOTH DUCT TO OUTSIDE WALL. DRYER VENT PIPE TO BE 28 GAUGE GALVANIZED STEEL. ALL CONNECTIONS TO BE ALUMINUM POP RIVETS, NO SHEET METAL SCREWS ALLOWED, SEAMS TAPED W/ DUCT TAPE. PROVIDE A MEANS OF CLEANOUT IN EACH VERTICAL RISER. FIRE DAMPER THAT WILL OBSTRUCT THE EXHAUST FLOW SHALL BE PROHIBITED IN CLOTHES DRYER EXHAUST DUCTS. ALL CLOTHES DRYER EXHAUST RUNS SHALL BE LIMITED TO 35', INCLUDING ELBOWS, FROM THE DRYER CONNECTION TO THE OUTLET. THIS LENGTH MAY BE INCREASED BASED ON THE DRYER MANUFACTURER'S INSTALLATION INSTRUCTIONS SHOWING A LENGTH EXCEEDING 35'. AS AN OPTION, A DRYER EXHAUST POWER VENTILATOR MAY BE USED WHERE DRYER DUCT RUNS EXCEED 35'. TERMINATE WITH 4" FLUSH MOUNT LOUVERED FLAPPER GRILLE. PAINT GRILLE TO MATCH WALL COLOR. ROUTE EXHAUST DUCT TO IN WALL DRYER BOX, IN-O-VATE TECHNOLOGIES INC MODEL #350. COORDINATE VENT BOX LOCATION WITH DRYER MANUFACTURER'S RECOMMENDATIONS. PROVIDE REMOTE LINT CLEANOUT DIRECTLY AFTER BOOSTER FAN.
- PROVIDE NEW ENERGY RECOVERY VENTILATOR AND LOCATE ON ANGLE IRON FRAME ABOVE CEILING. MOUNT FRAME TO STRUCTURE WITH BEAM CLAMPS, THREADED RODS AND SPRING VIBRATION ISOLATORS. ROUTE EXHAUST AIR DUCT THROUGH LOUVER, AS INDICATED. BALANCE SUPPLY AND OUTSIDE AIRFLOW AS SCHEDULED.
- PROVIDE 24x24 EXHAUST WALL LOUVER, EQUIVALENT TO RUSKIN ELF-375DX, AND MOUNT HIGH ON WALL. COMPLETE WITH BIRDSCREEN. PROVIDE DUCTWORK PLENUM BOX BEHIND LOUVER AND SEAL WATER TIGHT. MAINTAIN MINIMUM 10' SEPARATION BETWEEN EXHAUST AND OUTSIDE AIR. REFER TO DRAWING M-100 FOR OUTDOOR AIR LOUVER LOCATION.
- PROVIDE COOLING ONLY LINE VOLTAGE THERMOSTAT. SET THERMOSTAT TO 80°F TO ENERGIZE FAN. MOUNT THERMOSTAT AT 5' A.F.F.
- PROVIDE NEW EXHAUST FAN AND ROUTE EXHAUST DUCTWORK TO 8" FLUSH MOUNT LOUVERED FLAPPER GRILLE. PAINT GRILLE TO MATCH WALL COLOR. FAN TO BE INTERLOCKED WITH REVERSE ACTING THERMOSTAT TO ENERGIZE FAN IF ROOM REACHES 80°F.

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- PROVIDE VOLUME DAMPERS AT ALL ROUND BRANCH DUCT TAKE-OFFS THAT ARE ACCESSIBLE. PROVIDE TURNING VANES AT ALL 90 DEGREE SQUARE ELBOWS IN SUPPLY AIR DUCTS. PROVIDE 45 DEGREE HEEL AT ALL RECTANGULAR SUPPLY AND RETURN BRANCH DUCT TAKE-OFFS.
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- ALL DUCT ELBOWS SHALL BE LONG RADIUS OR MITERED.

HVAC LEGEND

	DRAWING NOTE SYMBOL
	NEW RECTANGULAR DUCTWORK AND SIZE
	NEW ROUND DUCTWORK AND SIZE
	BALANCING/VOLUME DAMPER
	FLEX DUCT
	THERMOSTAT
	NEW SUPPLY AIR DIFFUSER AND CFM
	NEW RETURN GRILLE
	NEW EXHAUST GRILLE AND CFM
	AIR FLOW DIRECTION
	SMOKE DETECTOR
	SUPPLY DUCT UP THROUGH ROOF
	RETURN/EXHAUST DUCT UP THROUGH ROOF
	MOTOR OPERATED DAMPER
	CONNECT TO EXISTING



1 MECHANICAL EXHAUST PLAN
SCALE = 1/4" = 1'-0"

DATE: AS SHOWN PROJECT NO.: 12401 LOCATION: 2 SOUTH END AVE, NEW YORK, NY 10280 PROJECT: NVA PLOT SCALE: 1:1

DIVISION 23 MECHANICAL SPECIFICATIONS

23 05 01 COMMON REQUIREMENTS FOR HVAC

ALL MECHANICAL WORK AND TESTS SHALL BE DONE IN STRICT ACCORDANCE WITH THE LATEST STATE, COUNTY, AND LOCAL REGULATIONS, LAWS, AND ORDINANCES WHICH MAY BE APPLICABLE.

BEFORE SUBMITTING A BID, EXAMINE DOCUMENTS OF ALL OTHER TRADES, VISIT THE SITE AND GET ACQUAINTED WITH ALL CONDITIONS THAT MAY IN ANY WAY AFFECT THE EXECUTION OF THIS CONTRACT. TAKE MEASUREMENTS AND BE RESPONSIBLE FOR EXACT SIZE AND LOCATIONS OF ALL OPENINGS REQUIRED. VERIFY INSTALLATION MAY BE MADE IN COMPLETE ACCORDANCE WITH ALL PERTINENT CODES AND REGULATIONS. IN THE EVENT OF DISCREPANCY, IMMEDIATELY NOTIFY THE PROFESSIONAL ENGINEER OF RECORD. DO NOT PROCEED WITH THE INSTALLATION IN AREAS OF DISCREPANCY UNTIL ALL SUCH DISCREPANCIES HAVE BEEN FULLY RESOLVED.

IT IS NOT THE INTENT OF THE DRAWINGS THAT EXISTING CONDITIONS BE ACCURATELY SHOWN. EXISTING MECHANICAL WORK IS SHOWN TO LIMITED EXTENT ON DRAWINGS AND IS SHOWN FOR GENERAL REFERENCE ONLY. LOCATIONS AND INFORMATION WERE DERIVED FROM CURSORY SITE VISUAL OBSERVATIONS OR FROM DOCUMENTS THAT WERE PREPARED FOR PREVIOUSLY INSTALLED WORK WHEN AVAILABLE.

THE WORK COVERED BY THESE SPECIFICATIONS SHALL CONSIST OF PROVIDING ALL NEW MATERIAL, LABOR, EQUIPMENT, AND SERVICES NECESSARY FOR A COMPLETE MECHANICAL INSTALLATION AS SPECIFIED HEREIN. WORK IN THIS SECTION INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING ITEMS:

- VRF OUTDOOR UNITS
- VRF AIR HANDLING UNITS
- ENERGY RECOVERY VENTILATORS
- LOW VOLTAGE THERMOSTATS
- DUCT
- DAMPERS
- DIFFUSERS, REGISTERS, AND LOUVERS

WHENEVER THE WORDS "CONTRACTOR" APPEAR ON MECHANICAL DRAWINGS OR IN THESE SPECIFICATIONS, IT SHALL REFER TO THE MECHANICAL SUB-CONTRACTOR. WHENEVER THE WORD "PROVIDE" APPEARS IN THESE DOCUMENTS, IT SHALL BE INTERPRETED TO MEAN "FURNISH AND INSTALL".

COORDINATE ALL WORK WITH THE OWNER TO MINIMIZE INTERRUPTION OF BUILDING OPERATION.

COORDINATE THE INSTALLATION OF MECHANICAL ITEMS WITH THE SCHEDULES FOR WORK OF ALL OTHER TRADES TO PREVENT UNNECESSARY DELAYS IN THE TOTAL WORK.

THIS CONTRACTOR SHALL VERIFY AND SATISFY HIMSELF THAT ALL EQUIPMENT FURNISHED WILL PROPERLY FIT IN THE SPACE PROVIDED, THAT IT WILL FUNCTION PROPERLY, AND THAT ALL PARTS OF EQUIPMENT REQUIRING SERVICE ARE READILY ACCESSIBLE.

ALL PIPING SHALL BE RUN PARALLEL OR PERPENDICULAR TO BUILDING WALLS AND FRAMING SYSTEM. ALL VERTICAL RUNS SHALL BE HELD AGAINST WALLS, COLUMNS, ETC., AS POSSIBLE TO PERMIT MAKING OF PIPE JOINTS.

CONTRACTOR SHALL PROVIDE A GUARANTEE IN WRITTEN FORM STATING THAT ALL WORK SHALL BE FREE OF DEFECTS OR ERRORS, AND ALL EQUIPMENT, MATERIALS, OR PARTS FOR A PERIOD OF ONE YEAR FROM THE DATE OF OWNER'S FINAL ACCEPTANCE AND SHALL REPAIR, REVISE OR REPLACE AT NO COST TO THE OWNER ANY SUCH DEFECTS OCCURRING WITHIN THE GUARANTEE PERIOD.

CONTRACTOR SHALL ALSO STATE IN WRITTEN FORM THAT ANY ITEMS OR OCCURRENCES ARISING DURING THE GUARANTEE PERIOD WILL BE ATTENDED TO IN A TIMELY MANNER AND WILL IN NO CASE EXCEED THREE (3) WORKING DAYS FROM DATE OF NOTIFICATION BY OWNER.

PROVIDE A COMPLETE INSTALLATION IN CONFORMANCE WITH THE FOLLOWING STANDARDS.

- AGA: AMERICAN GAS ASSOCIATION
- ASHRAE: AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR CONDITIONING ENGINEERS
- NFPA-NATIONAL FIRE PROTECTION ASSOCIATION
- SMACNA: SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION.
- STATEWIDE BUILDING CODE
- INTERNATIONAL MECHANICAL CODE

CONTRACTOR SHALL DO ALL CUTTING AND PATCHING REQUIRED FOR INSTALLATION OF THIS WORK. ALL OPENINGS IN WALLS, FLOORS OR CEILINGS SHALL BE PROPERLY SEALED AND RESTORED IN KIND. FLASH AND COUNTERFLASH AT ROOF OPENINGS.

ALL EQUIPMENT SHALL BE LISTED AND LABELED, UNLESS OTHERWISE APPROVED.

ALL WIRING SHALL MEET THE REQUIREMENTS LISTED IN THE ELECTRICAL SPECIFICATIONS. ALL CONTROL AND INTERLOCK WIRING AND CONDUIT (120V OR 24V) SHALL BE BY THE MECHANICAL CONTRACTOR.

EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE CONDITIONS OF LISTING AND THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND THIS CODE.

CLEANING: THIS CONTRACTOR SHALL REMOVE FROM THE PREMISES ALL ACCUMULATION OF DIRT, DEBRIS, WASTE MATERIALS AND RUBBISH CAUSED BY HIS EMPLOYEES OR WORK, AT LEAST ONE WEEK, EXCEPT THAT COMBUSTIBLE MATERIALS SHALL BE REMOVED DAILY.

DURING PROGRESS OF THE WORK, MAINTAIN OR DRAWINGS AT THE SITE, AN ACCURATE RECORD OF THE INSTALLATION OF THE MECHANICAL SYSTEM, INDICATING ALL ITEMS WHICH HAVE BEEN CHANGED OR ADDED.

APPLY FOR AND PAY FOR ALL PERMITS AND INSPECTIONS REQUIRED BY LOCAL AUTHORITY, FOR THE APPROVAL OF WORK.

A CERTIFICATE OF FINAL INSPECTION AND APPROVAL SHALL BE SUBMITTED WITH THE CONTRACTOR'S REQUEST FOR FINAL PAYMENT. NO FINAL PAYMENT WILL BE APPROVED WITHOUT THIS CERTIFICATE.

GUARANTEE ALL WORKMANSHIP, MATERIAL, AND EQUIPMENT AND REPLACE ANY FOUND DEFECTIVE WORK WITHOUT COST TO THE OWNER, FOR A PERIOD OF ONE YEAR AFTER FINAL ACCEPTANCE.

EXISTING CONDITIONS

DO NOT REMOVE REMOVED MECHANICAL MATERIALS UNLESS SPECIFICALLY INDICATED ON DRAWINGS. EXISTING SYSTEMS MAY BE UTILIZED ONLY TO THE EXTENT INDICATED ON DRAWINGS.

IF REQUIRED TO ACCOMMODATE CONSTRUCTION RELATED ACTIVITIES TEMPORARILY REMOVE, STORE IN PROTECTED LOCATION OR SITE, AND REINSTALL CONFLICTING MECHANICAL EQUIPMENT, OR DEVICES THAT ARE TO REMAIN OR TO BE RELOCATED.

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

PROVIDE MECHANICAL DEMOLITION WORK AS REQUIRED TO ACCOMMODATE PROJECT DEMOLITION AND AS REQUIRED TO ACCOMMODATE NEW CONSTRUCTION. DISCONNECT AND REMOVE WORK TO BE ABANDONED, AND AS REQUIRED TO ACCOMMODATE WORK OF OTHER TRADES, IN AREAS AFFECTED BY THIS PROJECT.

LEGALLY DISPOSE OF MATERIALS TO SALVAGED OR RECLAIMED.

23 05 03 SUBMITTALS FOR MECHANICAL SYSTEMS

DESIGN BASIS MANUFACTURERS OF MATERIAL AND EQUIPMENT ARE SPECIFIED AND PLANS ARE DETAILED ACCORDING TO THIS MATERIAL. CONTRACTOR SHALL BASE HIS BID ON FURNISHING AND INSTALLING THIS MAKE OF MATERIAL AND EQUIPMENT.

AN ACCEPTABLE MANUFACTURER'S NAME AND MODEL NUMBER OF A PRODUCT MAY BE PROVIDED IN THESE DOCUMENTS. THIS IS THE EQUIPMENT INCLUDED DURING THE DESIGN PROCESS AND FORMS THE BASIS OF A STANDARD OF QUALITY. WHERE MORE THAN ONE MAKE OF MATERIAL OR EQUIPMENT IS SPECIFIED, THE CONTRACTOR SHALL STATE IN HIS BID WHICH MAKE HE PROPOSES TO FURNISH AND INSTALL. SHOP DRAWING APPROVAL SHALL BE OBTAINED PRIOR TO SHIPMENT OF EQUIPMENT.

VERIFY THE MODEL NUMBER OR PRODUCT IS STILL ACCURATE AND MEETS ALL REQUIREMENTS SHOWN ON THE DRAWINGS. IF THERE IS A DISCREPANCY BETWEEN THE REQUIREMENTS AND THE PRODUCT OR MODEL NUMBER, THE STRICTER OF THE TWO SHALL GOVERN.

SUBMIT SHOP DRAWINGS AND/OR PRODUCT DATA (ELECTRONIC COPIES) ON THE FOLLOWING ITEMS FOR REVIEW BEFORE FABRICATION OR SHIPMENT:

- VRF OUTDOOR UNITS
- VRF AIR HANDLING UNITS
- ENERGY RECOVERY VENTILATORS
- LOW VOLTAGE THERMOSTATS
- DUCT
- DAMPERS
- DIFFUSERS, REGISTERS, AND LOUVERS

MAINTENANCE MANUALS: THE MANUALS SHALL INCLUDE WIRING DIAGRAMS, MAINTENANCE AND OPERATING INSTRUCTIONS, PARTS LISTINGS, AND COPIES OF OTHER SUBMITTALS INDICATED FOR INCLUSION.

REVIEW AND CORRECTIONS OR COMMENTS MADE ON SHOP DRAWINGS, PRODUCT DATA: CATALOGS, CUT SHEETS, CHARTS, AND OTHER ITEMS DURING CONSTRUCTION PHASE SUBMITTAL REVIEW DO NOT RELIEVE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE CONTRACT DOCUMENTS, FOR PROVIDING A COMPLETE AND FUNCTIONING PROJECT, NOR SHALL THEY RELIEVE CONTRACTOR FROM RESPONSIBILITY FOR DEVIATIONS OR ERRORS OF ANY SORT. THIS REVIEW IS FOR THE LIMITED PURPOSE OF CHECKING FOR CONFORMANCE WITH INFORMATION GIVEN AND THE DESIGN CONCEPT EXPRESSED IN THE CONTRACT DOCUMENTS. CONTRACTOR REMAINS RESPONSIBLE FOR DETERMINING THE ACCURACY AND COMPLETENESS OF OTHER DETAILS SUCH AS DIMENSIONS AND QUANTITIES, FOR SUBSTANTIATING INSTRUCTIONS FOR INSTALLATIONS, VERIFYING MATERIALS REQUIRED, OBTAINING FIELD MEASUREMENTS AND RELATED CRITERIA, COORDINATING WORK WITH OTHER SPECIFICATIONS AND PERFORMING WORK IN COMPLIANCE WITH THE CONTRACT DOCUMENTS.

ANY CHANGES TO ITEMS SPECIFIED MUST BE SUBMITTED IN WRITING AS A SUBSTITUTION, WITH COMPLETE DOCUMENTATION OF PRICE DIFFERENTIAL AND EQUIPMENT DETAILS. ANY SUBSTITUTIONS PROVIDED SHALL BE REVIEWED AT MARQUE ENGINEERING'S HOURLY RATES. REVIEW SHALL BE PAID FOR BY THE CONTRACTOR TO MARQUE ENGINEERING AT NO COST TO THE OWNER. BY USING PRE-APPROVED SUBSTITUTIONS, THE CONTRACTOR ACCEPTS ALL RESPONSIBILITY AND ASSOCIATED COSTS FOR ALL REQUIRED MODIFICATIONS TO THE CONTRACT DOCUMENTS TO INCLUDE BUT NOT LIMITED TO MATERIAL, OR EQUIPMENT COSTS FOR THEIR OR OTHER TRADES, AND ENSURING THAT SUBSTITUTED MATERIALS AND EQUIPMENT TO BE FURNISHED FIT INTO SPACE AVAILABLE.

EXTENSIVE REVISIONS NECESSITATED TO THE CONTRACT DOCUMENTS, OR SUBSTITUTION ACTIONS RELATED TO ANY SPECIFIED PRODUCT NOT ABLE TO BE PROVIDED DUE TO A FAILURE TO COMMENCE WORK, RELEASE PRODUCT OR COORDINATE CONSTRUCTION ACTIVITIES SHALL BE PROVIDED AT MARQUE ENGINEERING'S HOURLY RATES. COSTS SHALL BE BORN BY THE CONTRACTOR AT NO COST TO THE OWNER.

23 05 29 HANGERS AND SUPPORTS

SUPPORT ALL PIPING, DUCTWORK AND EQUIPMENT BY HANGERS OR BRACKETS. FURNISH STRUCTURAL STEEL MEMBERS WHERE REQUIRED TO SUPPORT PIPING AND EQUIPMENT. NO PORTION OF PIPING OR VALVES SHALL BE SUPPORTED BY EQUIPMENT.

DUCTWORK - SUPPORT BY MEANS OF HANGERS AS FOLLOWS:

- DUCT WIDTH 30 OR LESS HANGER SIZE (16 GAUGE)
- TYPE MAX. SPACING 8

A PAIR OF HANGERS SHALL BE LOCATED AT EVERY TRANSVERSE JOINT AND ELSEWHERE ACCORDING TO THE TABLE.

23 05 93 HVAC SYSTEM TESTING, ADJUSTING AND BALANCING FOR HVAC

ALL SYSTEMS AND EQUIPMENT SHALL BE CAREFULLY ADJUSTED TO PROVIDE COMFORTABLE AND UNIFORM CONDITIONS IN EACH AND EVERY SPACE TO THE OWNER'S SATISFACTION. PROVIDE ANY REQUIRED DRIVES TO SATISFY QUANTITIES INDICATED. PROVIDE A CERTIFIED AIR BALANCE OF THE DIFFUSERS AND AIR HANDLERS.

AIR SYSTEM:

AIR BALANCE AND TESTING SHALL NOT BEGIN UNTIL THE SYSTEM HAS BEEN COMPLETED AND IS IN FULL WORKING ORDER. CONTRACTOR SHALL PUT ALL HEATING, VENTILATING AND AIR CONDITIONING SYSTEM AND EQUIPMENT INTO FULL OPERATION AND SHALL CONTINUE THE OPERATION OF SAME DURING EACH WORKING DAY OF TESTING AND BALANCING. CONTRACTOR SHALL SUBMIT WITHIN 30 DAYS AFTER RECEIPT OF CONTRACT, COPIES OF SUBMITTAL DATA FOR THE TESTING AND BALANCING OF THE AIR CONDITIONING, HEATING, AND VENTILATING SYSTEMS. THE AIR BALANCE AND TESTING AGENCY SHALL PROVIDE PROOF OF HAVING SUCCESSFULLY COMPLETED AT LAST FIVE PROJECTS OF SIMILAR SIZE AND SCOPE.

CONTRACTOR SHALL PROCURE THE SERVICES OF AN INDEPENDENT AIR BALANCE AND TESTING AGENCY, APPROVED BY THE ENGINEER, AND A MEMBER OF AABC, OR NEBB, WHICH SPECIALIZES IN THE BALANCING AND TESTING OF HEATING VENTILATION AND AIR CONDITIONING SYSTEMS, TO BALANCE, ADJUST AND TEST AIR MOVING EQUIPMENT AND AIR DISTRIBUTION OR EXHAUST SYSTEMS AS HEREIN SPECIFIED.

ALL WORK BY THIS AGENCY SHALL BE DONE UNDER THE DIRECT SUPERVISION OF A QUALIFIED HEATING AND VENTILATING ENGINEER EMPLOYED BY THIS AGENCY. ALL INSTRUMENTS USED BY THIS AGENCY SHALL BE ACCURATELY CALIBRATED AND MAINTAINED IN GOOD WORKING ORDER.

23 07 13 DUCT INSTALLATION

INSULATE ALL SUPPLY, DIFFUSER PLENUMS, AND OUTSIDE AIR DUCTWORK OF ALL UNITS WITH OWENS CORNING "ALL SERVICE DUCT WRAP" TYPE 150 GLASS FIBER INSULATION UNLESS OTHERWISE NOTED. INSULATION SHALL BE 1-1/2" THICK (2" THICK FOR SUPPLY AND RETURN IN TRUSS SPACE), 1.5 PCT. DENSITY WITH FRK JACKET. 802 THICK REINFORCED ALUMINUM FOIL VAPOR BARRIER. INSULATION SHALL CONFORM TO NFPA 90A AND 90B PER ASTM E-84 FOR FLAME SPREAD AND SMOKE DEVELOPED RATING.

INSULATE ALL EXTERIOR SUPPLY AND RETURN DUCTWORK WITH RIGID FIBERGLASS BOARD INSULATION WITH OUTDOOR JACKET. INSULATION SHALL BE 2" THICK WITH A 'K' VALUE OF 0.23 AT 75 F. INSTALL ON DUCTWORK USING IMPALE ANCHORS AND WIRES. SEAL VAPOR BARRIER WITH VAPOR BARRIER ADHESIVE.

PROVIDE INSULATION ON ALL CONCEALED SUPPLY, RETURN DUCTWORK. ALL LINERS, INSULATION AND ADHESIVES SHALL HAVE A FLAME SPREAD INDEX NOT MORE THAN 25 AND A SMOKE DEVELOPED INDEX OF NOT MORE THAN 50.

RIGID FIBERGLASS DUCTWORK INSULATION: GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 612, TYPE IB, WITHOUT FACING AND WITH VAPOR BARRIER ALL-SERVICE JACKET MANUFACTURED FROM KRAFT PAPER, REINFORCING SCRM, ALUMINUM FOIL, AND VINYL FILM. INSULATION SHALL HAVE A MINIMUM R VALUE AS REQUIRED BY CODE.

FLEXIBLE FIBERGLASS DUCTWORK INSULATION: GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 553, TYPE IB, WITHOUT FACING AND WITH VAPOR BARRIER ALL-SERVICE JACKET MANUFACTURED FROM KRAFT PAPER, REINFORCING SCRM, ALUMINUM FOIL, AND VINYL FILM. INSULATION SHALL HAVE A MINIMUM R VALUE AS REQUIRED BY CODE.

VAPOR BARRIER MATERIAL FOR DUCTWORK: PAPER-BACKED ALUMINUM-FOIL, EXCEPT AS OTHERWISE INDICATED; STRENGTH AND PERMEABILITY RATING EQUIVALENT TO FACTORY-APPLIED VAPOR BARRIERS ON ADJOINING DUCTWORK INSULATION, WHERE AVAILABLE; WITH FOLLOWING ADDITIONAL CONSTRUCTION CHARACTERISTICS:

HIGH PUNCTURE RESISTANCE: LOW VAPOR TRANSMISSION (FOR DUCTS IN EXPOSED AREAS: MECH. ROOMS, ETC.) MODERATE PUNCTURE RESISTANCE: MEDIUM VAPOR TRANSMISSION (FOR DUCTS IN CONCEALED AREAS).

INSTALLATION IS NOT PERMITTED ABOVE DRYWALL CEILINGS AND INACCESSIBLE CEILINGS.

23 22 00 CONDENSATE DRAIN PIPING

INSTALL TRAP AT EVAPORATOR COIL DRAIN. EXTEND DRAIN LINE FROM COIL TRAP TO DRAIN. PIPING SHALL BE STANDARD WEIGHT, PVC PIPE AND FITTINGS AND WITH JOINTS OF PVC SOLVENT CEMENT. PROVIDE CLEANOUTS THROUGHOUT RUN AND AT TOPS OF TRAPS.

23 30 00 AIR DISTRIBUTION SYSTEM

CEILING AIR DIFFUSERS:

SQUARE: SQUARE HOUSING, CORE OF SQUARE CONCENTRIC LOUVERS, SQUARE OR ROUND DUCT CONNECTION.

LINEAR: EXTRUDED ALUMINUM CONTINUOUS SLOT, SINGLE OR MULTIPLE.

DIFFUSER MOUNTINGS:

SURFACE MOUNT: DIFFUSER SHALL HAVE ROLLED EDGE BELOW FINISHED CEILING FOR SURFACE MOUNTING OR DIFFUSER SHALL BE FURNISHED WITH ACCESSORY PLASTER FRAME.

LAY-IN: DIFFUSER HOUSING SIZED TO FIT BETWEEN CEILING EXPOSED SUSPENSION TIE BARS AND REST ON TOP SURFACE OF TIE BAR.

DIFFUSER ACOUSTIC PERFORMANCE: NC LESS THAN OR EQUAL TO 30

DIFFUSER ACCESSORIES: PLASTER RING; PERIMETER RING DESIGNED TO ACT AS PLASTER STOP AND DIFFUSER ANCHOR.

DIFFUSER FINISHES: WHITE ENAMEL; SEMI-GLOSS WHITE ENAMEL PRIME FINISH.

REGISTER AND GRILLE ACOUSTIC PERFORMANCE: NC LESS THAN OR EQUAL TO 30

REGISTER AND GRILLE FINISHES: WHITE ENAMEL; SEMI-GLOSS WHITE ENAMEL PRIME FINISH.

REGISTER AND GRILLE ACOUSTIC PERFORMANCE: NC LESS THAN OR EQUAL TO 30

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REGISTER AND GRILLE ACOUSTIC PERFORMANCE: NC LESS THAN OR EQUAL TO 30

REGISTER AND GRILLE FINISHES: WHITE ENAMEL; SEMI-GLOSS WHITE ENAMEL PRIME FINISH.

DUCT LINER SHALL BE OF FIBROUS GLASS OF THICKNESS INDICATED. 3-18 DENSITY. ALL LINERS, INSULATION AND ADHESIVES SHALL HAVE A FLAME SPREAD INDEX NOT MORE THAN 25 AND A SMOKE DEVELOPED INDEX OF NOT MORE THAN 50.

23 33 13 DAMPERS

DAMPERS WITH LOCKING DEVICE, WHERE ACCESSIBLE, SHALL BE RUSKIN MD-35, OPPOSED BLADE FOR RECTANGULAR DUCTS 12 INCHES AND ABOVE, AND MODEL MD-25 PARALLEL BLADE FOR DUCTS 10 INCHES AND BELOW, AND MODEL MDRS-25 FOR ROUND DUCTS. INSTALL PER MANUFACTURER'S INSTRUCTIONS. SINGLE BLADE ROUND DAMPERS WITH LOCKING DEVICE SHALL BE IN SPIN-IN COLLARS.

FIRE DAMPERS SHALL BE RUSKIN MODEL IBD, STYLE B WITH BLADE PACKAGE OUT OF AIR STREAM. HORIZONTAL, INSTALL WHERE INDICATED ON DRAWINGS AND AS REQUIRED BY AUTHORITY HAVING LOCAL JURISDICTION.

ELECTRIC MOTORIZED DAMPER SHALL BE SIZED TO OPERATE WITH SUFFICIENT RESERVE POWER TO PROVIDE SMOOTH MODULATING ACTION OR TWO-POSITION ACTION. INSTALL PER MANUFACTURER'S INSTRUCTIONS.

ZONE DAMPER SHALL BE FULLY MODULATING, PRESSURE DEPENDENT VAV DEVICES. DAMPER CONTROL ZONE TEMPERATURE BY VARYING THE VOLUME OF AIR FLOWING INTO THE SPACE. EACH DAMPER HAS A CONTROL BOX WITH CONTROL BOARD AND ACTUATOR ENCLOSED. DAMPER TO OPERATE IN STATIC PRESSURES UP TO 1.75 INCH. WG. AIR CERTIFICATION: GALV. STEEL CASING WITH MINIMUM 1/2-INCH MATTFACED INSULATION COMPLYING WITH UL-181. HEAVY GAUGE STEEL DAMPER WITH SELF-LUBRICATING SHAFT BEARINGS. PROVIDE ACTUATOR, TUBING AND AUXILIARY TEMPERATURE SENSOR.

VARIABLE REFRIGERANT FLOW (VRF) SYSTEM AND COMPONENTS

THE VARIABLE CAPACITY, HEAT PUMP HEAT RECOVERY AIR CONDITIONING SYSTEM SHALL BE A MITSUBISHI ELECTRIC CITY MULTI VRF (VARIABLE REFRIGERANT FLOW) ZONING SYSTEM, OR APPROVED EQUAL.

THE UNITS SHALL BE LISTED BY ELECTRICAL TESTING LABORATORIES (ETL) AND BEAR THE ETL LABEL.

ALL WIRING SHALL BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (N.E.C.).

THE UNITS SHALL BE MANUFACTURED IN A FACILITY REGISTERED TO ISO 9001 AND ISO14001 WHICH IS A SET OF STANDARDS APPLYING TO ENVIRONMENTAL PROTECTION SET BY THE INTERNATIONAL STANDARD ORGANIZATION (ISO).

ALL UNITS MUST MEET OR EXCEED THE 2010 FEDERAL MINIMUM EFFICIENCY REQUIREMENTS AND THE ASHRAE 90.1 EFFICIENCY REQUIREMENTS FOR VRF SYSTEMS. EFFICIENCY SHALL BE PUBLISHED IN ACCORDANCE WITH THE AIR-CONDITIONING, HEATING, AND REFRIGERATION INSTITUTE (AHRJ) STANDARD 1230.

A FULL CHARGE OF R-410A FOR THE CONDENSING UNIT ONLY SHALL BE PROVIDED IN THE CONDENSING UNIT.

VRF CONTROLS

THE CONTROL SYSTEM SHALL CONSIST OF A LOW VOLTAGE COMMUNICATION NETWORK OF UNITARY BUILT-IN CONTROLLERS WITH ON-BOARD COMMUNICATIONS AND A WEB-BASED OPERATOR INTERFACE TO ALLOW THE OPTION OF MONITORING AND ADJUSTING THE SYSTEM OPERATION REMOTELY. A WEB CONTROLLER WITH A NETWORK INTERFACE CARD SHALL GATHER DATA FROM THIS SYSTEM AND GENERATE WEB PAGES ACCESSIBLE THROUGH A CONVENTIONAL WEB BROWSER ON EACH PC CONNECTED TO THE NETWORK. OPERATORS SHALL BE ABLE TO PERFORM ALL NORMAL OPERATOR FUNCTIONS THROUGH THE WEB BROWSER INTERFACE.

VRF WARRANTY

THE VRF SYSTEM SHALL BE COVERED BY THE MANUFACTURER'S LIMITED WARRANTY FOR A PERIOD OF ONE (1) YEAR PARTS AND SEVEN (7) YEAR COMPRESSOR TO THE ORIGINAL OWNER FROM DATE OF INSTALLATION.

THE VRF SYSTEM SHALL BE INSTALLED BY A CONTRACTOR WITH EXTENSIVE CITY MULTI INSTALL AND SERVICE TRAINING. THE MANDATORY CONTRACTOR SERVICE AND INSTALL TRAINING SHOULD BE PERFORMED BY THE MANUFACTURER.

VRF PRODUCTS

GENERATION R2-SERIES OUTDOOR UNIT

THE R2-SERIES PURY OUTDOOR UNIT SHALL BE USED SPECIFICALLY WITH CITY MULTI VRF COMPONENTS. THE PURY OUTDOOR UNITS SHALL BE EQUIPPED WITH MULTIPLE CIRCUIT BOARDS THAT INTERFACE TO THE M-NET CONTROLS SYSTEM AND SHALL PERFORM ALL FUNCTIONS NECESSARY FOR OPERATION. EACH OUTDOOR UNIT MODULE SHALL BE COMPLETELY FACTORY ASSEMBLED, PIPED AND WHER TESTED AT THE FACTORY.

OUTDOOR UNIT SHALL HAVE A SOUND RATING NO HIGHER THAN 64 DB(A) INDIVIDUALLY OR 64 DB(A) TWINNED. UNITS SHALL HAVE A SOUND RATING NO HIGHER THAN 51 DB(A) INDIVIDUALLY OR 54 DB(A) TWINNED WHILE IN NIGHT MODE OPERATION. IF AN ALTERNATE MANUFACTURER IS SELECTED, ANY ADDITIONAL MATERIAL, COST, AND LABOR TO MEET PUBLISHED SOUND LEVELS SHALL BE INCURRED BY THE CONTRACTOR.

BOTH REFRIGERANT LINES FROM THE OUTDOOR UNIT TO THE (BRANCH CIRCUIT) CONTROLLER (SINGLE OR MAIN) SHALL BE INSULATED IN ACCORDANCE WITH THE INSTALLATION MANUAL.

THE OUTDOOR UNIT SHALL HAVE THE CAPABILITY OF INSTALLING THE MAIN REFRIGERANT PIPING THROUGH THE BOTTOM OF THE UNIT.

THE OUTDOOR UNIT SHALL HAVE AN ACCUMULATOR WITH REFRIGERANT LEVEL SENSORS AND CONTROLS.

THE OUTDOOR UNIT SHALL HAVE A HIGH PRESSURE SAFETY SWITCH, OVER-CURRENT PROTECTION, CRANKCASE HEATER AND DC BUS PROTECTION.

THE OUTDOOR UNIT SHALL HAVE THE ABILITY TO OPERATE WITH A MAXIMUM HEIGHT DIFFERENCE OF 164 FEET AND HAVE TOTAL REFRIGERANT TUBING LENGTH OF 1800-3100 FEET. THE GREATEST LENGTH IS NOT TO EXCEED 541 FEET BETWEEN OUTDOOR UNIT AND THE INDOOR UNITS WITHOUT THE NEED FOR LINE SIZE CHANGES OR TRAPS.

THE OUTDOOR UNIT SHALL BE CAPABLE OF OPERATING IN HEATING MODE DOWN TO -4F AMBIENT TEMPERATURES OR COOLING MODE DOWN TO 23F AMBIENT TEMPERATURES, WITHOUT ADDITIONAL LOW AMBIENT CONTROLS. IF AN ALTERNATE MANUFACTURER IS SELECTED, ANY ADDITIONAL MATERIAL, COST, AND LABOR TO MEET LOW AMBIENT OPERATING CONDITION AND PERFORMANCE SHALL BE INCURRED BY THE CONTRACTOR.

THE OUTDOOR UNIT SHALL HAVE A HIGH EFFICIENCY OIL SEPARATOR PLUS ADDITIONAL LOGIC CONTROLS TO ENSURE ADEQUATE OIL VOLUME IN THE COMPRESSOR IS MAINTAINED.

UNIT MUST DEFROST ALL CIRCUITS SIMULTANEOUSLY IN ORDER TO RESUME FULL HEATING MORE QUICKLY. PARTIAL DEFROST WHICH MAY EXTEND "NO OR REDUCED HEATING" PERIODS SHALL NOT BE ALLOWED.

THE UNIT CABINET CASING(S) SHALL BE FABRICATED OF GALVANIZED STEEL, BONDERIZED AND FINISHED. UNITS CABINETS SHALL BE ABLE TO WITHSTAND 960 HOURS PER ASTM B117 CRITERIA FOR SEACOAST PROTECTED MODELS (1-B5 MODELS).

EACH OUTDOOR UNIT MODULE SHALL BE FURNISHED WITH ONE DIRECT DRIVE, VARIABLE SPEED PROPELLER TYPE FAN. THE FAN SHALL BE FACTORY SET FOR OPERATION UNDER 0 IN. WG. EXTERNAL STATIC PRESSURE, BUT CAPABLE OF NORMAL OPERATION UNDER A MAXIMUM OF 0.12 IN. WG. EXTERNAL STATIC PRESSURE VIA DSPWITCH.

ALL FAN MOTORS SHALL HAVE AN INHERENT PROTECTION, HAVE PERMANENTLY LUBRICATED BEARINGS, AND BE COMPLETELY VARIABLE SPEED.

ALL FAN MOTORS SHALL BE MOUNTED FOR QUIET OPERATION.

ALL FANS SHALL BE PROVIDED WITH A RAISED GUARD TO PREVENT CONTACT WITH MOVING PARTS.

THE OUTDOOR UNIT SHALL HAVE VERTICAL DISCHARGE AIRFLOW.

THE OUTDOOR COIL HEAT EXCHANGER SHALL BE OF ZINC COATED ALUMINUM CONSTRUCTION WITH TURBULATING FLAT TUBE CONSTRUCTION.

THE COIL FINS SHALL HAVE A FACTORY APPLIED CORROSION RESISTANT FINISH.

THE COIL SHALL BE PROTECTED WITH AN INTEGRAL METAL GUARD.

EACH OUTDOOR UNIT MODULE SHALL BE EQUIPPED WITH ONE SCROLL COMPRESSOR.

A CRANKCASE HEATER(S) SHALL BE FACTORY MOUNTED ON THE COMPRESSOR(S).

THE OUTDOOR UNIT COMPRESSOR SHALL HAVE AN INVERTER TO MODULATE CAPACITY. THE CAPACITY SHALL BE COMPLETELY VARIABLE WITH A TURNDOWN OF 15%-5% OF RATED CAPACITY, DEPENDING UPON UNIT SIZE.

THE COMPRESSOR WILL BE EQUIPPED WITH AN INTERNAL THERMAL OVERLOAD AND SHALL BE MOUNTED TO AVOID THE TRANSMISSION OF VIBRATION.

THE OUTDOOR UNIT SHALL HAVE THE CAPABILITY OF UP TO 8 LEVELS OF DEMAND CONTROL FOR EACH REFRIGERANT SYSTEM

THE OUTDOOR UNIT SHALL BE CONTROLLED BY INTEGRAL MICROPROCESSORS. THE CONTROL CIRCUIT BETWEEN THE INDOOR UNITS, BE CONTROLLER AND THE OUTDOOR UNIT SHALL BE 240VDC COMPLETED USING A 2-CONDUCTOR, TWISTED PAIR SHIELDED CABLE TO PROVIDE TOTAL INTEGRATION OF THE SYSTEM.

(CEILING-CONCEALED DUCTED) INDOOR UNIT

THE PEFF SHALL BE A CEILING-CONCEALED DUCTED INDOOR FAN COIL DESIGN THAT MOUNTS ABOVE THE CEILING WITH A 2-POSITION, FIELD ADJUSTABLE RETURN AND A FIXED HORIZONTAL DISCHARGE SUPPLY AND SHALL HAVE A MODULATING LINEAR EXPANSION DEVICE. THE PEFF SHALL BE USED WITH THE R2-SERIES OUTDOOR UNIT AND BE CONTROLLER, Y-SERIES OUTDOOR UNIT, OR S-SERIES OUTDOOR UNIT. THE PEFF SHALL SUPPORT INDIVIDUAL CONTROL USING M-NET DDC CONTROLLERS. THE UNIT SHALL BE SUITABLE FOR USE IN PLENUMS IN ACCORDANCE WITH UL1995 ED 4.

THE INDOOR UNIT SHALL BE FACTORY ASSEMBLED, WIRED AND RUN TESTED. CONTAINED WITHIN THE UNIT SHALL BE

ALL FACTORY WIRING, PIPING, ELECTRONIC MODULATING LINEAR EXPANSION DEVICE, CONTROL CIRCUIT BOARD AND FAN MOTOR. THE UNIT SHALL HAVE A SELF-DIAGNOSTIC FUNCTION, 3-MINUTE TIME DELAY MECHANISM, AND AN AUTO RESTART FUNCTION. INDOOR UNIT AND REFRIGERANT PIPES SHALL BE CHARGED WITH DEHYDRATED AIR BEFORE SHIPMENT FROM THE FACTORY.

THE UNIT SHALL BE CEILING-CONCEALED, DUCTED. THE CABINET PANEL SHALL HAVE PROVISIONS FOR A FIELD INSTALLED FILTERED OUTSIDE AIR INTAKE. THE INDOOR UNIT FAN SHALL BE AN ASSEMBLY WITH ONE OR TWO DIRECT DRIVEN FAN(S) AND SHALL BE DRIVEN BY A SINGLE MOTOR. THE INDOOR FAN SHALL BE STATICALLY AND DYNAMICALLY BALANCED AND RUN ON A MOTOR WITH PERMANENTLY LUBRICATED BEARINGS. THE INDOOR FAN SHALL CONSIST OF THREE (3) SPEEDS, HIGH, MID, AND LOW PLUS THE AUTO-FAN FUNCTION. THE INDOOR UNIT SHALL HAVE A DUCTED AIR OUTLET SYSTEM AND DUCTED RETURN AIR SYSTEM. RETURN AIR SHALL BE FILTERED BY MEANS OF A STANDARD FACTORY INSTALLED RETURN AIR FILTER. THE INDOOR COIL SHALL BE OF NONFERROUS CONSTRUCTION WITH SMOOTH PLATE FINS ON COPPER TUBING. A CONDENSATE PAN AND DRAIN SHALL BE PROVIDED UNDER THE COIL. BOTH REFRIGERANT LINES TO THE PEFF INDOOR UNITS SHALL BE INSULATED IN ACCORDANCE WITH THE INSTALLATION MANUAL.

THE UNIT SHALL USE PRICE CONTROLS FACTORY MOUNTED TO PERFORM FUNCTIONS NECESSARY TO OPERATE THE SYSTEM. INDOOR UNIT SHALL COMPENSATE FOR THE HIGHER TEMPERATURE SENSED BY THE RETURN AIR SENSOR COMPARED TO THE TEMPERATURE AT LEVEL OF THE OCCUPANT WHEN IN HEAT MODE. DISABLING OF COMPENSATION SHALL BE POSSIBLE FOR INDIVIDUAL UNITS TO ACCOMMODATE INSTANCES WHEN COMPENSATION IS NOT REQUIRED.

CENTRALIZED CONTROLLER (WEB-ENABLED)