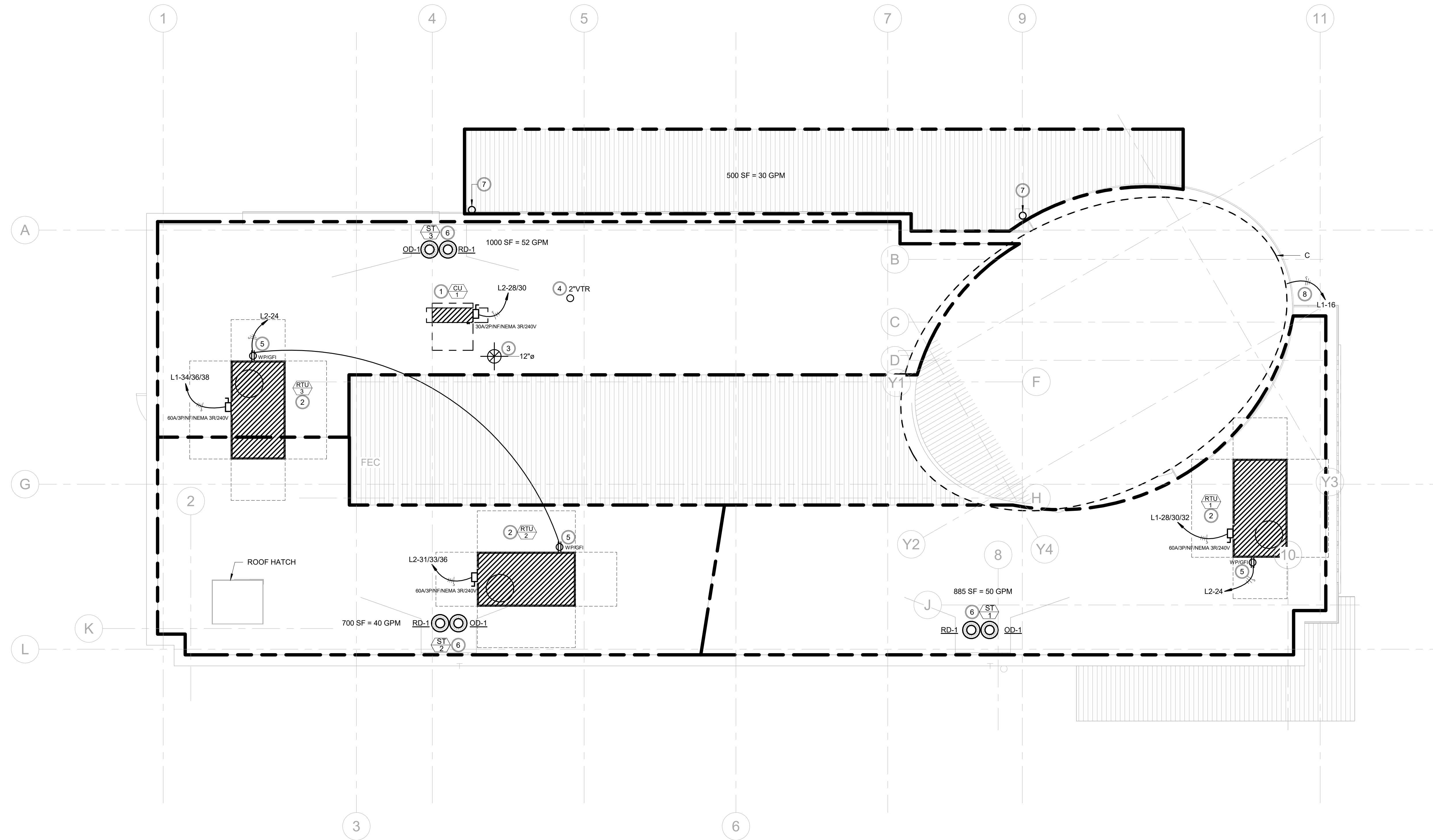


**KEYED NOTES**

- 1 NEW CONDENSING UNIT. MOUNT UNIT ON EQUIPMENT RAILS PER MANUFACTURER'S RECOMMENDATIONS. SEE DETAIL. FIELD VERIFY EXACT FINAL ROUTING BETWEEN UNIT AND DX COIL. SIZE REFRIGERANT PIPING PER MANUFACTURER'S REQUIREMENTS. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES AROUND CONDENSER. SEE SCHEDULE.
- 2 NEW PACKAGED ROOFTOP UNIT. COORDINATE EXACT FINAL LOCATION ON ROOF WITH STRUCTURE. MAINTAIN MIN. 15' CLEARANCE FROM ANY VENT OR EXHAUST OUTLETS. ROUTE CONDENSATE TO ROOF DRAIN OR CODE APPROVED LOCATION. COORDINATE EXACT FINAL ROUTING WITH FINAL LOCATION TO MAINTAIN REQUIRED SLOPE. ROUTE ELECTRICAL UP THROUGH CURB.
- 3 NEW 12" ROOF CAP FOR EXHAUST DISCHARGE. DISCHARGE TO BE MIN. 15' AWAY FROM AIR INTAKE OR BUILDING OPENINGS.
- 4 2" VENT THRU ROOF. COORDINATE ROOF PENETRATION WITH ROOF TOP EQUIPMENT. MAINTAIN A MINIMUM OF 10' CLEARANCE FROM OUTSIDE AIR INTAKE. SEE DETAIL AND RISER FOR MORE INFORMATION.
- 5 ROOFTOP UNIT TO BE PROVIDED WITH A CONVENIENCE OUTLET TO MEET THE CODE REQUIRED MAINTENANCE REQUIREMENTS. CONTRACTOR TO FIELD WIRE RECEPTACLE AS INDICATED. COORDINATE WORK WITH MANUFACTURER.
- 6 PROVIDE ROOF DRAIN AND OVERFLOW AS SHOWN. COORDINATE EXACT LOCATION WITH ARCHITECTURAL PLANS. REFER TO STORM RISER DIAGRAM FOR PIPE SIZES. SEE PLUMBING PLAN, SHEET P-101, FOR CONTINUATION.
- 7 STORM PIPING DOWN FROM CANOPY. FIELD VERIFY AND COORDINATE EXACT LOCATION/ROUTING OF STORM LINE WITH ARCHITECTURAL AND STRUCTURAL PLANS PRIOR TO INSTALL. SEE STORM RISER FOR PIPE SIZE(S).
- 8 ROUTE CIRCUIT THRU STANDALONE PHOTOCELL FOR AUTOMATIC CONTROL OF LIGHTING FIXTURES.

**MECHANICAL GENERAL NOTES**

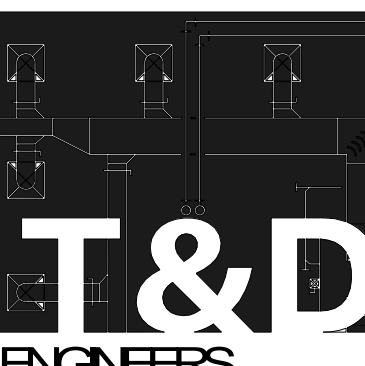
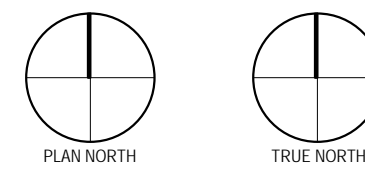
- A. CONTRACTOR TO PROPERLY SEAL ALL NEW DUCTWORK.
- B. ACTUAL CONDITIONS, LOCATIONS AND SIZES SHALL BE CONFIRMED IN THE FIELD.
- C. ALL CONSTRUCTION IS TO CONFORM TO MORE STRINGENT OF PLAN AND SPECIFICATION REQUIREMENTS AND LOCAL CODE. CONFORM TO SMACNA HVAC CONSTRUCTION STANDARDS AS A MINIMUM WHERE NO OTHER SPECIFICATIONS OR CODE REQUIREMENTS APPLY.



**1** MEP ROOF PLAN  
1/4" = 1'-0"



**SMART FINANCIAL**  
- SPRING  
--- HWY 99  
SPRING, TX



THOMAS & DUNNE  
ENGINEERS, LLC

738 S. HIGHWAY 6  
SUITE #260  
HOUSTON, TX 77079

PHONE: 713.933.1001  
FAX: 713.933.1004

TEXAS REGISTRATION #10421

ISSUE FOR PERMIT 08.03.22

Issues

T&D Project Number 22301

Drawn By WT

Checked By RT

© TRAMONTE DESIGN STUDIO, 2022. ALL RIGHTS RESERVED.

**MEP-102**

MEP ROOF PLAN

4203 Yorkm Blvd., Suite 300 Houston, TX 77006

tramonte  
design | studio

smart:financial

SECTION 01 00 00 - GENERAL REQUIREMENTS

1. Drawings are diagrammatic and should not be scaled for exact dimensions; exact dimensions and locations shall be determined by measurements in the field and shall be subject to approval by the Architect/Engineer. The Contractor shall verify dimension prior to ordering equipment and material.
2. Before submitting a bid, it will be necessary for each Contractor to visit the site and ascertain for himself/herself the conditions to be met in installing the work and make provisions for the conditions in the final price. Failure to comply with this requirement shall not be considered justification for the omission or faulty installation of any work. By submitting a bid, the Contractor is stating that the bid covers all work necessary to properly install the system indicated.
3. In case of disagreement between the Drawing and Specifications, or within the Drawings or Specifications, the bid shall include the greater amount of work and the matter shall be referred to the Architect/Engineer.
4. The Contractor shall secure and pay all fees associated with any and all necessary permits, licenses, and inspections required for the work.
5. All work shall comply with all pertinent national, state, and local ordinances and codes, and all American Disabilities Act (ADA) requirements, and any amendments. Nothing within the Drawings or Specifications shall be construed as waiving any of the rules, regulations, or requirements of the authorities having jurisdiction. In the event of a conflict, the requirements of the authority having jurisdiction shall govern. The conflict shall be reported to the Architect/Engineer immediately, and necessary modification shall be made at no additional cost to the Owner or Architect/Engineer.
6. If the requirements of these Construction Documents are in excess of those required by Code, the provisions of the Construction Documents shall take precedence.
7. All equipment and materials for which approval standards have been established by Underwriters Laboratories, Inc. (UL), Factory Mutual (FM), and American Standard Codes shall be so approved and shall bear approval labels.
8. All work shall be in compliance with all applicable safety regulations.
9. Should any doubt arise as to the true meaning of the Drawings or Specifications, reference shall be made to the Architect/Engineer, whose decision shall be final. The Architect/Engineer will respond within 10 business days after receipt of request for information. The Contractor shall conform to these responses as part of the Contract with no additional cost to the Owner or Architect/Engineer. No alleged statement by the Architect/Engineer is acceptable excuse for inferior work.
10. The listing of product manufacturers, materials and methods is intended to establish a standard of quality. Products by other manufacturers may be accepted provided they have the equivalent capacity, construction, and performance. The Engineer shall be the sole judge of quality and equivalence of equipment, materials, and methods. However, under no circumstances shall any substitution be made without written approval of the Architect/Engineer prior to bidding.
11. Equipment has been chosen to fit within the available space. Where substituted or alternative equipment is proposed, it shall be the Contractor's responsibility to verify that the equipment will fit within the space available, including all required code and maintenance clearances, and to coordinate all equipment requirements with other Contractors.
12. Obtain all equipment or material of each type through one source, locally when possible, from a single manufacturer.
13. Substitutions: Products of equal performance characteristics may be considered. Contractors wishing to substitute a product or material shall submit such request to the Architect/Engineer in writing at least 7 DAYS PRIOR to bids being due. Requests will not be considered after that time. The Architect/Engineer shall review the request and is acceptable will issue a letter allowing the substitution. Any anticipated use of a non-specified product without written approval is strictly the risk of the Contractor. If a request is rejected, the Contractor shall furnish the specified product or material. Each contractor is responsible for costs incurred by other trades as a result of any substitution made by the Contractor.
14. Submittals: Submit the following in accordance with Division 1 Specifications and the requirements of this section for each piece of equipment and each type of component and material.
  - 14.1. Submit product data for each type of product specified.

- 14.2. Submit shop/coordination drawings at a minimum scale of 1/4"=1'-0" detailing all major equipment, component, and systems in relation to work of other trades, indicating installation, code, and working clearances and access for all equipment and components.
- 14.3. Submit samples of color, lettering, and graphics for each identification product.
- 14.4. Contractor shall separate submittals to contain no more than one Specification section.
- 14.5. Within 30 days after award of Contract, the Contractor shall submit a minimum of four (4) copies of each submittal with coversheet to the Architect/Engineer. If acceptable to the Architect/Owner, an electronic version containing the coversheet and all submittal data within one file may be submitted in lieu of the 4 copies.
- 14.6. Each submittal shall include the following information. Submittals that do not comply with the following requirements will be marked "REJECTED" and returned.
  - 14.6.1. Coversheet: Indicating the names and address of the Project, Architect, Engineer, and Contractor, and the submittal name and number. Number shall be based on the Specification section, submittal sequence number, and a revision sequence number, if applicable. Ex: 262726-02-R1 is the 1st revision to the 2nd submittal for section 26 27 26.
  - 14.6.2. List of Variations: This page shall list all variations including furnished/unfurnished options and features between the submitted item and the schedule/specified item. If there are not variations, the page shall state "NO VARIATIONS."
  - 14.6.3. Product Information: Clearly indicate manufacturer's name, designation, size, performance and capacity data, dimensional data, sufficient pictorial and diagrammatic data to show conformance with the Construction Documents. Applicable information shall be clearly indicated and non-applicable information shall be struck-out.
  - 14.6.4. Warranty Information: Manufacturer's warranty certificate that meets or exceeds the requirements of the Construction Documents.
  - 14.6.5. Certification by the General and Sub-Contractor that material submitted is in accordance with the Construction Documents, signed and dated.
- 14.7. Submittal review time in the Engineer's office will be a minimum of 10 working days per review. The Contractor shall consider this review time when scheduling work.
- 14.8. Each submittal will be marked with one of the following:
  - 14.8.1. NO EXCEPTIONS TAKEN - Submittal was reviewed and no deviations were found.
  - 14.8.2. EXCEPTIONS NOTED, SUBMIT RESPONSE - Submittal was reviewed and found to have minor deviations or missing information. A re-submittal is not required; however, a written response to all review comments shall be submitted.
  - 14.8.3. EXCEPTIONS NOTED, RESUBMIT - Submittal was reviewed and major deviations were noted. The submittal shall be revised and the noted deviations and resubmitted.
  - 14.8.4. REJECTED - Submittal was reviewed and is not in conformance or is not in the correct format. A revised submittal that is in conformance shall be resubmitted.
- 14.9. Inadequate or incomplete submittals will not be reviewed and will be returned marked "REJECTED".
- 14.10. The Architect's/Engineer's review of a submittal shall not relieve the Contractor of the responsibility for errors, omissions, oversights, or deviations that may be contained within the submittal. If the Contractor proceeds based on undetected errors, omissions, oversights, or deviations, it is at his/her sole responsibility. Regardless of any information contained in the submittal or the Engineer's review thereof, the Contract Documents shall govern the Work and neither waived nor superseded by the submittal review.
- 14.11. Equipment and material purchased without a "NO EXCEPTIONS TAKEN" submittal review is at the risk of the Contractor. The cost of removal and replacement of such items which is judged unsatisfactory by the Architect/Engineer for any reason shall be at the Contractor's expense.

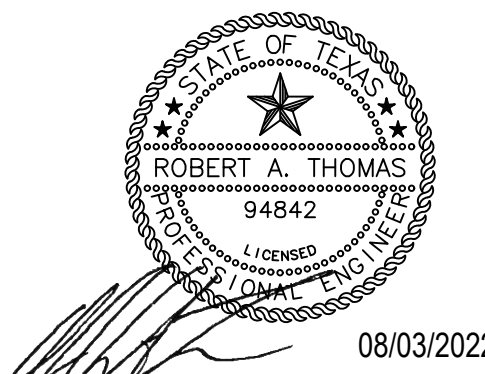
15. Operation & Maintenance Requirements (per energy code):
  - 15.1. Record Drawings: The Contractor shall maintain a set of clearly marked Record Drawing prints at the site, which indicated all alterations and changes. Within 90 days after the date of system acceptance provide a reproducible set of record drawings to the building owner or the designated representative of the building owner. Record drawings shall include as a minimum the location and performance data on each piece of equipment, general configuration of duct and pipe distribution system including sizes, and the terminal air or water design flow rates. Record drawings provided to building owner or building owner's representative shall be in the building owner's requested format (plots, CAD, pdf, etc.) with the Architect's/Engineer's seals struck-out and each drawing marked with the General and associated Sub-Contractors' names and date.
  - 15.2. Operation and Maintenance Manuals: Provide operating manual and a maintenance manual to the building owner or the designated representative of the building owner within 90 days after the date of system acceptance. These manuals shall be in accordance with industry-accepted standards and shall include, at a minimum, the following:
    - 15.2.1. Submittal data stating equipment size and selected options for each piece of equipment requiring maintenance. Submittal data shall be based on final "NO EXCEPTIONS TAKEN" submission from previous specification section requirements.
    - 15.2.2. Operation manuals and maintenance manuals for each piece of equipment requiring maintenance, except equipment not furnished as part of the project. Required routine maintenance actions shall be clearly identified.
    - 15.2.3. Names and addresses of at least one service agency.
    - 15.2.4. HVAC controls system maintenance and calibration information, including wiring diagrams, schematics, and control sequence descriptions. Desired or field-determined set-points shall be permanently recorded on control drawings at control devices or, for digital control systems, in programming comments.
    - 15.2.5. A complete narrative/description of how each system furnished is intended to operate, including suggested initial set-points.
16. All equipment and material shall be installed, connected, and adjusted per the manufacturer's written instructions and recommendations.
17. The Contractor shall be held responsible for coordinating with all other trades prior to system installation. The Contractor shall refer to other trade plans for other work that may impact his/her work.
18. Where space requirements conflict, the following order of precedence shall be used.
  - 18.1. Building Lines and Structural Members.
  - 18.2. Soil, Drain, and Condensate Piping.
  - 18.3. Grease-Rated Ductwork.
  - 18.4. Refrigerant and Vent Piping.
  - 18.5. HVAC Ductwork.
  - 18.6. HVAC and Domestic Water Piping.
  - 18.7. Fire Protection (Sprinkler & Standpipe) Piping.
  - 18.8. Electrical Conduit.
19. The Contractor shall take care during work to avoid damage to work by other trades.
20. The Contractor shall keep the premises free of debris and rubbish caused by his/her work on a daily basis. This debris and rubbish shall be removed from the building and site.
21. Guarantee: The Contractor shall guarantee the entire installation to be in proper working order for a period of one (1) year, unless noted otherwise, after final acceptance and shall furnish free of charge all materials and labor necessary to comply with this guarantee.
22. Demolition: Where accessible work is to be demolished, it shall be removed in its entirety to a point of permanent concealment. Where work to be demolished is not accessible, remove system to 2' below the surface, cap, and patch surface to match existing. Where work to remain is damaged, remove the damaged portions and install new of equal capacity, quality, and function.
23. Work within Existing Building: Construction shall be arranged to minimize the hazard and interruption to the occupants. Do not interrupt services to the occupants without written permission from the Architect/Owner/Tenant, a minimum of 5 working days prior to the interruption. Where disruption of a service becomes necessary, provisions shall be made to provide temporary service throughout the interruption of the primary service.

MECHANICAL SYMBOL LEGEND

ALL SYMBOLS MAY NOT BE USED. VERIFY WITH PLANS. REFER TO SPECIFICATIONS AND PLAN NOTES FOR OTHER REQUIREMENTS

GRILLES, REGISTERS & DIFFUSERS		PIPING	
	SUPPLY AIR SLOT DIFFUSER (4', 3' & 2' LENGTHS SHOWN) (EXISTING - NEW - DEMOLITION)		HVAC PIPING - REFER TO ABBREVIATION FOR SYSTEM TAG (EXISTING - NEW - DEMOLITION)
	SUPPLY AIR CEILING DIFFUSER (2'X2' SHOWN, OTHERS SIMILAR) (EXISTING - NEW - DEMOLITION)		CHILLED WATER PIPING - REFER TO ABBREVIATION FOR SYSTEM TAG (EXISTING - NEW - DEMOLITION)
	RETURN AIR CEILING DIFFUSER (2'X2' SHOWN, OTHERS SIMILAR) (EXISTING - NEW - DEMOLITION)		CONDENSER WATER PIPING - REFER TO ABBREVIATION FOR SYSTEM TAG (EXISTING - NEW - DEMOLITION)
	EXHAUST AIR CEILING DIFFUSER (2'X2' SHOWN, OTHERS SIMILAR) (EXISTING - NEW - DEMOLITION)		PRIMARY CHILLED WATER PIPING - REFER TO ABBREVIATION FOR SYSTEM TAG (EXISTING - NEW - DEMOLITION)
	SUPPLY AIR CEILING DIFFUSER WITH SECTORING BAFFLE (ARROW DENOTES AIRFLOW - SHADING DENOTE NO AIRFLOW)		SECONDARY CHILLED WATER PIPING - REFER TO ABBREVIATION FOR SYSTEM TAG (EXISTING - NEW - DEMOLITION)
	SIDEWALL SUPPLY AND SIDEWALL RETURN (FACE SIZE NOTED ON PLANS)		REFRIGERANT PIPING - REFER TO ABBREVIATION FOR SYSTEM TAG (EXISTING - NEW - DEMOLITION)
	SUPPLY AIR LIGHT TROFFER (EXISTING - NEW - DEMOLITION)		GREASE WASTE PIPING - REFER TO ABBREVIATION FOR SYSTEM TAG (EXISTING - NEW - DEMOLITION)
	AIR DEVICE TAG (TYPE/CFM)		COMBINATION WASTE/VENT PIPING - REFER TO ABBREVIATION FOR SYSTEM TAG (EXISTING - NEW - DEMOLITION)
DUCTWORK (ALL DUCTWORK SHALL CONFORM WITH SMACNA REQUIREMENTS)			SANITARY SEWER PIPING - REFER TO ABBREVIATION FOR SYSTEM TAG (EXISTING - NEW - DEMOLITION)
	NEW RECTANGULAR DUCTWORK (CLEAR INSIDE DIMENSION)		DOMESTIC COLD WATER PIPING - REFER TO ABBREVIATION FOR SYSTEM TAG (EXISTING - NEW - DEMOLITION)
	NEW ROUND DUCTWORK (CLEAR INSIDE DIMENSION)		DOMESTIC HOT WATER PIPING - IF NOT NOTED, 105° (EXISTING - NEW - DEMOLITION)
	NEW FLEXIBLE DUCTWORK (SEE SPECS/DETAILS/SCHEDULES FOR SIZE AND MAX. LENGTH. EXISTING / DEMOLITION DUCTWORK)		DOMESTIC HOT WATER RETURN PIPING - IF NOT NOTED, 105° (EXISTING - NEW - DEMOLITION)
	HARD WALL / FLEXIBLE DUCTWORK BRANCH TAKEOFF WITH SPIN-IN DAMPERS		NATURAL GAS PIPING - REFER TO ABBREVIATION FOR SYSTEM TAG (EXISTING - NEW - DEMOLITION)
	RECTANGULAR BRANCH TAKEOFF WITH VOLUME DAMPER		FIRE PROTECTION PIPING - REFER TO ABBREVIATION FOR SYSTEM TAG (EXISTING - NEW - DEMOLITION)
	RECTANGULAR ELBOW PROVIDE TURNING VANES FOR ALL RECTANGULAR ELBOWS, REGARDLESS IF INDICATED		FITTINGS - NOT ALL FITTINGS SHOWN ON PLAN 1-ELBOW UP 6-TEE OUTLET 10-BOTTOM CONNECTION 2-DROP IN LINE DOWN 7-CAP 11-ELBOW DOWN 3-ELBOW 4-STRAIGHT TEE 8-ELBOW IN DROP 12-CONTINUATION 5-TEE OUTLET UP 9-TOP CONNECTION
	STANDARD RADIUS ELBOW		VALVES - REFER TO SPECS FOR TYPE BASED ON APPLICATION A-MANUAL VALVE D-CONTROLLED 3-WAY VALVE B-ACTUATED VALVE C-MANUAL 3-WAY VALVE E-CHECK VALVE
	SLOPING RISE IN DUCTWORK		GAS FITTINGS - NOT ALL FITTINGS SHOWN ON PLAN 1-GAS COCK 4-FLANGED UNION 2-PRESSURE REGULATOR 5-SOLENOID VALVE 3-THREADED UNION
	SLOPING DROP IN DUCTWORK		PLUMBING SPECIALTIES - SEE RISER & SCHEDULES FOR SIZE BACKFLOW PREVENTOR HUB DRAIN / P-TRAP FLOOR DRAIN FLOOR SINK FLOOR / GRADE CLEANOUT WALL CLEANOUT
	ELBOW UP IN DUCTWORK (SUPPLY - RETURN - EXHAUST)		VENT-THROUGH-ROOF TAG DENOTES DESIGNATION
	ELBOW DOWN IN DUCTWORK (SUPPLY - RETURN - EXHAUST)	<b>GENERAL SYMBOL LEGEND</b> ALL SYMBOLS MAY NOT BE USED. VERIFY WITH PLANS. REFER TO SPECIFICATIONS AND PLAN NOTES FOR OTHER REQUIREMENTS	
	MANUAL AND AUTOMATIC/MOTORIZED CONTROL DAMPERS "XX" DENOTES TYPE FIRST NUMBER IS VISIBLE DIMENSION OAD - OUTSIDE AIR DAMPER RAD - RETURN AIR DAMPER BDD - BACK DRAFT DAMPER		KEYED NOTE "F" DENOTES NUMBER
	SAFETY DAMPERS (ACCESS DOORS AND SLEEVES NOT SHOWN) "XX" DENOTES TYPE FD - FIRE DAMPER SD - SMOKE DAMPER FSD - FIRE/SMOKE DAMPER		REVISION DELTA TAG "F" DENOTES NUMBER
	EQUIPMENT (EXISTING - NEW - DEMOLITION) MAINTENANCE ACCESS NOT SHOWN ON EXISTING. KEEP OTHER SYSTEMS CLEAR. MANUFACTURER'S RECOMMENDED CLEARANCES SHALL PREVAIL.		REVISION CLOUD - DENOTES APPROXIMATE AREA OF CHANGES CONTRACTOR RESPONSIBLE TO VERIFY ACTUAL CHANGES
	EQUIPMENT TAG "XX" DENOTES EQUIPMENT TYPE - "F" DENOTES DESIGNATION TYPICAL EXISTING VAV BOX INFORMATION DESIGNATION SIZE MAX COOLING SETPOINT, CFM (FOR REFERENCE) MAX HEATING SETPOINT, CFM, IF APPLICABLE (FOR REFERENCE) HEATER SIZE, IF APPLICABLE		CONNECTION TO EXISTING FIELD VERIFY EXACT CONNECTION LOCATION AND SIZE
	CONTROLS THERMOSTAT OR TEMPERATURE SENSOR (PER PLAN NOTES) (EXISTING - NEW - DEMOLITION) HUMIDISTAT OR HUMIDITY SENSOR (PER PLAN NOTES) (EXISTING - NEW - DEMOLITION) GENERAL SENSOR - SEE PLAN NOTES FOR MOUNTING AND TYPE (EXISTING - NEW - DEMOLITION) CONTROL CABLEING OR TUBING	<b>TYPICAL DEVICE MOUNTING</b> ALL SYMBOLS MAY NOT BE USED. VERIFY WITH PLANS. REFER TO SPECIFICATIONS AND PLAN NOTES FOR OTHER REQUIREMENTS	
		<p>Diagram showing a device mounted on a wall above a finish floor. Dimensions include 12" from the top of the device to the ceiling, 88" from the top of the device to the floor, 48" from the center of the device to the left edge, and 42" from the center of the device to the right edge. Labels include: FIRE ALARM NOTIFICATION APPLIANCE, THERMOSTATS, SENSORS, ETC. UNDER SEPARATE FACEPLATES, LIGHTING SWITCHES, DIMMERS, ETC. UNDER COMMON FACEPLATE, CARD READER, PUSHBUTTON, ETC. UNDER SEPARATE FACEPLATES, RECEPTACLES UNDER COMMON FACEPLATE, VOICE/DATA OUTLETS UNDER COMMON FACEPLATE, FINISH FLOOR.</p>	

T:\PROJECTS\T & D-2022\22301 - SMART FINANCIAL - NEW BRANCH BANK BUILDING - SPRING, TX\DWGS\SSUE\_01\A\22301.MC00.DWG 8/5/2022 1:38 PM ZACHEY ANELL

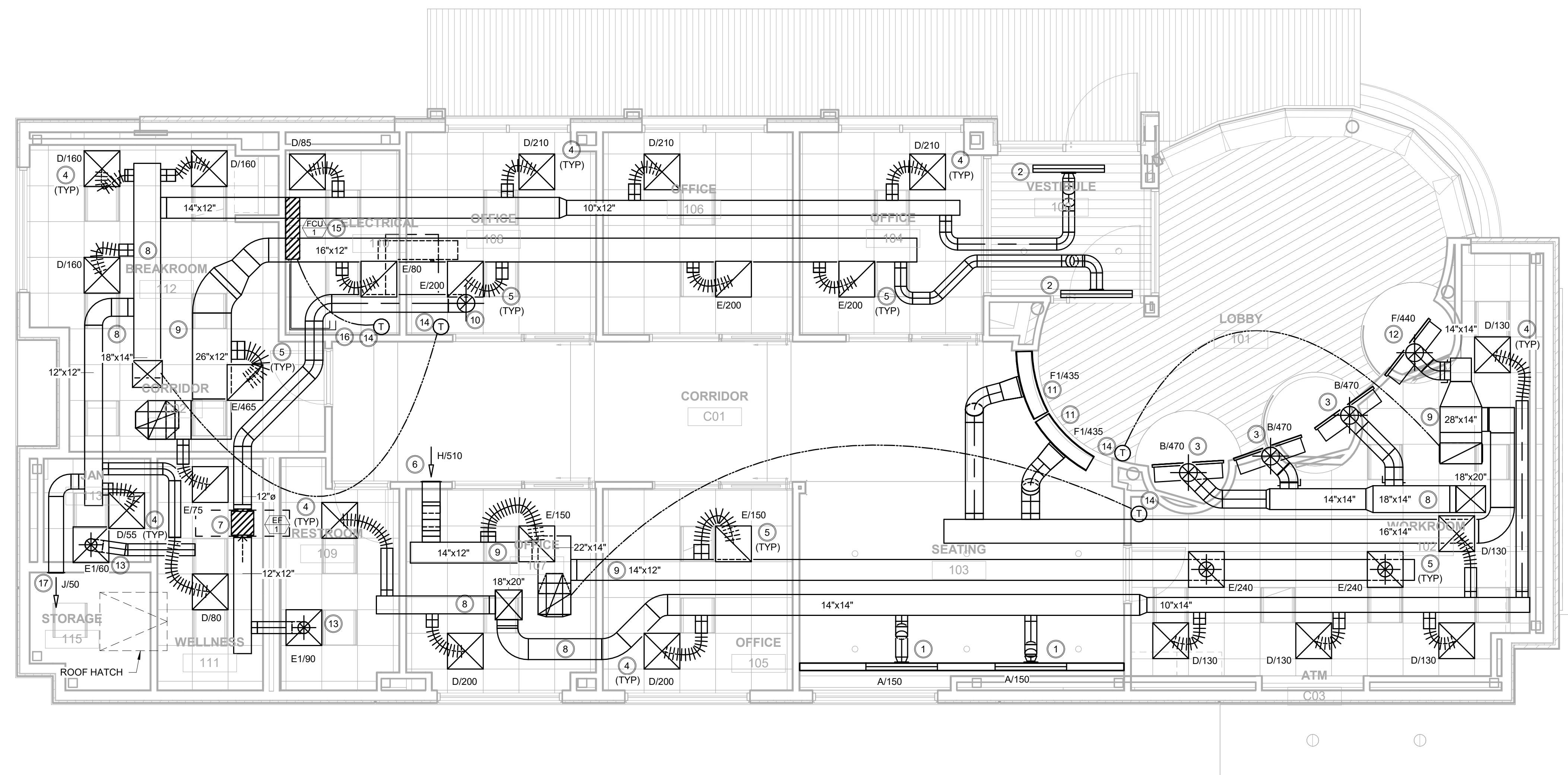


**KEYED NOTES**

- 1 PROVIDE FL-15-HT TYPE FLOWBAR TRACK AS SHOWN. PROVIDE FBRL-15 TYPE INSULATED LIGHT SHIELD FOR TRACK OPENING NOT USED FOR SUPPLY AIR. FLOWBAR TRACK IS TO BE FLOATED/TAPED AND SPACKLED INTO NEW CEILING SO THAT TRACK FLANGES ARE NOT VISIBLE. COORDINATE INSTALLATION METHOD WITH GENERAL CONTRACTOR AND DRYWALL INSTALLER PRIOR TO STARTING WORK. PROVIDE BALANCE AT THE FACE CAPABILITIES WITHIN SLOT. BALANCE TO CFM INDICATED. COORDINATE EXACT FINAL LENGTH AND LOCATION WITH ARCHITECT. SEE DETAILS AND SCHEDULE.
- 2 PROVIDE FL-15-HT TYPE FLOWBAR TRACK AS SHOWN. FLOWBAR TRACK IS TO BE INSTALLED BETWEEN NEW WOOD CEILING SLATS. COORDINATE INSTALLATION METHOD WITH GENERAL CONTRACTOR AND CEILING INSTALLER PRIOR TO STARTING WORK. PROVIDE BALANCE AT THE FACE CAPABILITIES WITHIN SLOT. BALANCE TO CFM INDICATED. COORDINATE EXACT FINAL LENGTH AND LOCATION WITH ARCHITECT. SEE SCHEDULE AND DETAIL.
- 3 PROVIDE FL-20-JT TYPE CURVED FLOWBAR TRACK FOR SUPPLY AIR AS SHOWN. FLOWBAR TRACK IS TO BE FLOATED/TAPED AND SPACKLED INTO SIDE WALL SO THAT TRACK FLANGES ARE NOT VISIBLE. COORDINATE INSTALLATION METHOD WITH GENERAL CONTRACTOR AND DRYWALL INSTALLER PRIOR TO STARTING WORK. PROVIDE BALANCE AT THE FACE CAPABILITIES WITHIN SLOT. BALANCE TO CFM INDICATED. COORDINATE EXACT FINAL LENGTH AND LOCATION WITH ARCHITECT. SEE SCHEDULE AND DETAIL.
- 4 NEW 2X2 CEILING SUPPLY DIFFUSER. PROVIDE NEW SPIN-IN AND FLEX DUCTWORK. BALANCE TO CFM INDICATED. SEE SCHEDULE.
- 5 NEW DUCTED 2X2 RETURN AIR GRILLE. PROVIDE NEW SPIN-IN AND FLEX DUCTWORK. BALANCE TO CFM INDICATED. SEE SCHEDULE.
- 6 NEW SIDEWALL RETURN AIR GRILLE PROVIDE NEW SPIN-IN AND DUCTWORK. BALANCE TO CFM INDICATED. SEE SCHEDULE.
- 7 NEW ABOVE CEILING INLINE TOILET EXHAUST FAN WITH BACK DRAFT DAMPER. PROVIDE NEW EXHAUST DUCTWORK AS SHOWN AND ROUTE UP AND THRU ROOF AS SHOWN. FAN TO BE CONTROLLED BY TIME CLOCK AND RUN DURING BUILDING HOURS. SEE SCHEDULE FOR MORE INFORMATION.
- 8 NEW LOW PRESSURE SUPPLY DUCTWORK FROM NEW ROOFTOP UNIT. COORDINATE EXACT SUPPLY DUCT ROUTING WITH BUILDING ENGINEER AND STRUCTURE PRIOR TO INSTALL.
- 9 NEW RETURN DUCTWORK UPSTREAM OF NEW ROOF TOP UNIT. COORDINATE EXACT RETURN DUCT ROUTING WITH BUILDING ENGINEER, SUPPLY DUCTWORK AND STRUCTURE PRIOR TO INSTALL.
- 10 CONTRACTOR TO ROUTE EXHAUST DUCTWORK UP THRU ROOF TO ROOF CAP.
- 11 PROVIDE FL-20-HT TYPE CURVED FLOWBAR TRACK FOR RETURN AIR AS SHOWN. FLOWBAR TRACK IS TO BE FLOATED/TAPED AND SPACKLED INTO NEW CEILING SO THAT TRACK FLANGES ARE NOT VISIBLE. COORDINATE INSTALLATION METHOD WITH GENERAL CONTRACTOR AND DRYWALL INSTALLER PRIOR TO STARTING WORK. PROVIDE BALANCE AT THE FACE CAPABILITIES WITHIN SLOT. BALANCE TO CFM INDICATED. COORDINATE EXACT FINAL LENGTH AND LOCATION WITH ARCHITECT. SEE SCHEDULE AND DETAIL.
- 12 PROVIDE FL-20-JT TYPE CURVED FLOWBAR TRACK FOR RETURN AIR AS SHOWN. FLOWBAR TRACK IS TO BE FLOATED/TAPED AND SPACKLED INTO SIDE WALL SO THAT TRACK FLANGES ARE NOT VISIBLE. COORDINATE INSTALLATION METHOD WITH GENERAL CONTRACTOR AND DRYWALL INSTALLER PRIOR TO STARTING WORK. PROVIDE BALANCE AT THE FACE CAPABILITIES WITHIN SLOT. BALANCE TO CFM INDICATED. COORDINATE EXACT FINAL LENGTH AND LOCATION WITH ARCHITECT. SEE SCHEDULE AND DETAIL.
- 13 NEW 2X2 EXHAUST AIR DIFFUSER. BALANCE TO CFM INDICATED. PROVIDE HARD ROUND DUCT CONNECTION. SEE SCHEDULE.
- 14 NEW T-STAT. PROVIDE NEW CONTROL WIRING AS NECESSARY. FIELD VERIFY EXACT FINAL LOCATION WITH ARCHITECT PRIOR TO INSTALLATION TO AVOID CONFLICT WITH SHELVING, FURNITURE, ETC.
- 15 NEW WALL MOUNTED DX FAN COIL UNIT MOUNTED ABOVE DOOR. SEE SCHEDULE AND SEQUENCE OF OPERATION. PROVIDE NEW REFRIGERANT PIPING AS SHOWN. SIZE REFRIGERANT PIPING PER MANUFACTURERS REQUIREMENTS. PROVIDE WITH INTEGRAL CONDENSATE PUMPS AS REQUIRED. ROUTE NEW CONDENSATE DRAIN LINE TO FUNNEL DRAIN BELOW BREAK ROOM SINK, OR OTHER CODE APPROVED LOCATION. COORDINATE CONDENSATE DRAINAGE WITH BUILDING ENGINEER. PROVIDE FACTORY T-STAT. MAINTAIN MANUFACTURERS RECOMMENDED UNIT CLEARANCES. VERIFY EXACT LOCATION WITH TENANT PRIOR TO INSTALLATION TO AVOID CONFLICT WITH EQUIPMENT.
- 16 ROUTE NEW REFRIGERANT PIPING BETWEEN FAN COIL UNIT AND CONDENSER ON ROOF ABOVE. FIELD VERIFY EXACT FINAL UNIT LOCATION AND ROUTING TO ROOF WITH BUILDING STRUCTURE. SIZE REFRIGERANT PIPING PER MANUFACTURERS REQUIREMENTS. MAINTAIN MANUFACTURERS RECOMMENDED CLEARANCES AROUND CONDENSER. CONTRACTOR TO PENETRATE ROOF AS CLOSE TO CONDENSER AS POSSIBLE.
- 17 NEW SIDE WALL MOUNTED SUPPLY AIR DIFFUSER. PROVIDE NEW SPIN-IN. BALANCE TO CFM INDICATED. PROVIDE HARD DUCT AS REQUIRED. OPPOSED BLADE DAMPER TO BE ACCESSIBLE THRU FACE OF REGISTER. SEE SCHEDULE.

**MECHANICAL GENERAL NOTES**

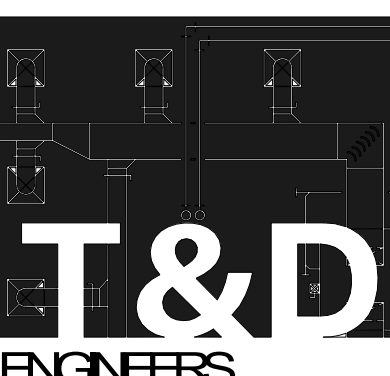
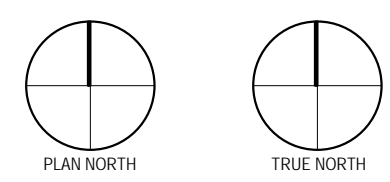
- A. CONTRACTOR TO PROPERLY SEAL ALL NEW DUCTWORK.
- B. ACTUAL CONDITIONS, LOCATIONS AND SIZES SHALL BE CONFIRMED IN THE FIELD.
- C. ALL CONSTRUCTION IS TO CONFORM TO MORE STRINGENT OF PLAN AND SPECIFICATION REQUIREMENTS AND LOCAL CODE. CONFORM TO SMACNA HVAC CONSTRUCTION STANDARDS AS A MINIMUM WHERE NO OTHER SPECIFICATIONS OR CODE REQUIREMENTS APPLY.



**1 MECHANICAL PLAN**  
1/4" = 1'-0"



**SMART FINANCIAL - SPRING**  
--- HWY 99  
SPRING, TX



THOMAS & DUNNE ENGINEERS, LLC  
738 S. HIGHWAY 6  
SUITE #260  
HOUSTON, TX 77079  
PHONE: 713.933.1001  
FAX: 713.933.1004  
TEXAS REGISTRATION #10421

ISSUE FOR PERMIT 08.03.22

Issues	
T&D Project Number	22301
Drawn By	WT
Checked By	RT

© TRAMONTE DESIGN STUDIO, 2022. ALL RIGHTS RESERVED.

**M-101**  
MECHANICAL PLAN

OUTSIDE AIR CALCULATIONS										
PER 2018 IMC, Multiple Zone Recirculating System per 403.5										
SYSTEM / SPACE	AREA, SQ.FT. (A <sub>z</sub> )	MIN OA, CFM/SQ.FT. (R <sub>a</sub> )	PEOPLE (P <sub>z</sub> )	MIN OA CFM REQUIRED BY AREA (R <sub>A</sub> )	MIN OA CFM REQUIRED BY POPULATION (R <sub>P</sub> )	BREATHING ZONE OA (V <sub>bz</sub> )	ZONE AIR DIST. EFFECTIVENESS (E <sub>z</sub> )	ZONE OA FLOW (V <sub>oz</sub> )	PRIMARY AIRFLOW (V <sub>pz</sub> )	PRIMARY AIR FRACTION (Z <sub>pz</sub> )
<b>RTU-1</b>										
<b>Zone 1</b>										
Lobby	351	0.06	3	5	21	15	0.8	45	1410	0.03
RTU-1 VARIABLES: P <sub>z</sub> TOTAL = 3, SYSTEM POPULATION (P <sub>s</sub> ) = 3, OCCUPANT DIVERSITY (D) = 1.00, UNCORRECTED OA INTAKE (V <sub>ou</sub> ) = 36, MAXIMUM Z <sub>pz</sub> = 0.03, SYSTEM VENT EFF (E <sub>v</sub> ) = 1.0, OUTDOOR AIR INTAKE FLOW REQUIRED (V <sub>ot</sub> ) = 36, OUTDOOR AIR PROVIDED = 100										
<b>RTU-2</b>										
<b>Work Room</b>										
Office	323	0.06	2	5	19	10	0.8	37	650	0.06
Seating and Corridor	235	0.06	2	5	14	10	0.8	30	400	0.08
Restroom	192	0.06	4	5	12	20	0.8	39	300	0.13
Utility	71	**	**	**	**	**	**	**	80	**
RTU-2 VARIABLES: P <sub>z</sub> TOTAL = 8, SYSTEM POPULATION (P <sub>s</sub> ) = 8, OCCUPANT DIVERSITY (D) = 1.00, UNCORRECTED OA INTAKE (V <sub>ou</sub> ) = 85, MAXIMUM Z <sub>pz</sub> = 0.13, SYSTEM VENT EFF (E <sub>v</sub> ) = 1.0, OUTDOOR AIR INTAKE FLOW REQUIRED (V <sub>ot</sub> ) = 85, OUTDOOR AIR PROVIDED = 120										
<b>RTU-3</b>										
<b>Breakroom</b>										
Sanitor	155	0.06	4	5	9	20	0.8	37	480	0.08
Office	39	**	**	**	**	**	**	**	55	**
Corridor	349	0.06	3	5	21	15	0.8	45	630	0.07
Wellness	151	0.06	0	5	9	0	0.8	11	150	0.08
Utility	76	0.06	0	5	5	0	0.8	6	80	0.07
Utility	69	0.06	0	5	4	0	0.8	5	85	0.06
RTU-3 VARIABLES: P <sub>z</sub> TOTAL = 7, SYSTEM POPULATION (P <sub>s</sub> ) = 7, OCCUPANT DIVERSITY (D) = 1.00, UNCORRECTED OA INTAKE (V <sub>ou</sub> ) = 83, MAXIMUM Z <sub>pz</sub> = 0.08, SYSTEM VENT EFF (E <sub>v</sub> ) = 1.0, OUTDOOR AIR INTAKE FLOW REQUIRED (V <sub>ot</sub> ) = 83, OUTDOOR AIR PROVIDED = 120										

**OUTSIDE AIR PROVIDED TO A/C UNITS EXCEEDS MINIMUM REQUIREMENTS**  
**ZONE PRIMARY AIRFLOW TO BE LOWEST EXPECTED PRIMARY AIRFLOW RATE DURING OCCUPIED CONDITIONS FOR VAV SYSTEMS**  
 R<sub>z</sub> FROM TABLE 403.2.2  
 E<sub>v</sub> FROM TABLE 403.5.2  
 P<sub>s</sub> SHALL BE MAXIMUM NUMBER OF OCCUPANTS SERVED BY SYSTEM AND MAY BE LESS THAN SUM OF ZONE P<sub>z</sub> SUBTOTALS DUE TO DIVERSITY  
 \*CFM/SQ.FT. ONLY  
 \*\*50 CFM EXHAUST EACH URINAL OR WATER CLOSET  
 \*\*\* SEE PLAN FOR NATURAL VENTILATION CALCULATION

**SEQUENCE OF OPERATION**

**RTU-1 THRU RTU-3:**  
 OCCUPIED/VENTILATION MODE:  
 EVAPORATOR FAN TO CYCLE BASED ON COOLING/HEATING MODES. UPON CALL FOR COOLING (73°F, ADJUSTABLE) BY ZONE SPACE THERMOSTAT, COMPRESSOR(S) SHALL SEQUENCE TO MEET COOLING SETPOINT. MINIMUM DEADBAND OF 4°F REQUIRED BETWEEN COOLING AND HEATING SETPOINTS. UPON CALL FOR HEATING (69°F, ADJUSTABLE) THE ELECTRIC HEATER SHALL STAGE TO MEET HEATING SETPOINT. EACH UNIT TO BE PROVIDED WITH A LOCAL WALL THERMOSTAT AND A MOTORIZED DAMPER. EVAPORATOR FAN TO RUN ONLY DURING COOLING/HEATING MODES.

**UNOCCUPIED/NIGHT SETBACK MODE:**  
 UNIT'S EVAPORATOR FAN AND COOLING/HEATING STAGES TO CYCLE WITH CALL FOR COOLING AND HEATING. NIGHT SETBACK COOLING/HEATING SETPOINTS TO BE 80°F (ADJUSTABLE) FOR COOLING AND 67°F (ADJUSTABLE) FOR HEATING.

**EF-1:**  
 EXHAUST FAN SHALL BE CONTROLLED BY TIMELOCK INSTALLED AT ELECTRICAL PANEL. TIMELOCK SCHEDULE SHALL BE SET TO COORDINATE WITH SPACE HOURS OF OPERATION. MOTORIZED DAMPER SHALL OPEN/CLOSE TO MATCH OPERATION OF EF-1.

**FCU/OU-1:**  
 SHALL OPERATE BASED ON UNIT CONTROLLER PROVIDED WITH UNIT. THE UNIT SHALL ACTIVATE THE EVAPORATOR/CONDENSER TO MAINTAIN THE ROOM TEMPERATURE SETPOINT OF 72°F (ADJUSTABLE). UNIT SHALL BE PROVIDED WITH A LOCAL THERMOSTAT IN THE ROOM.

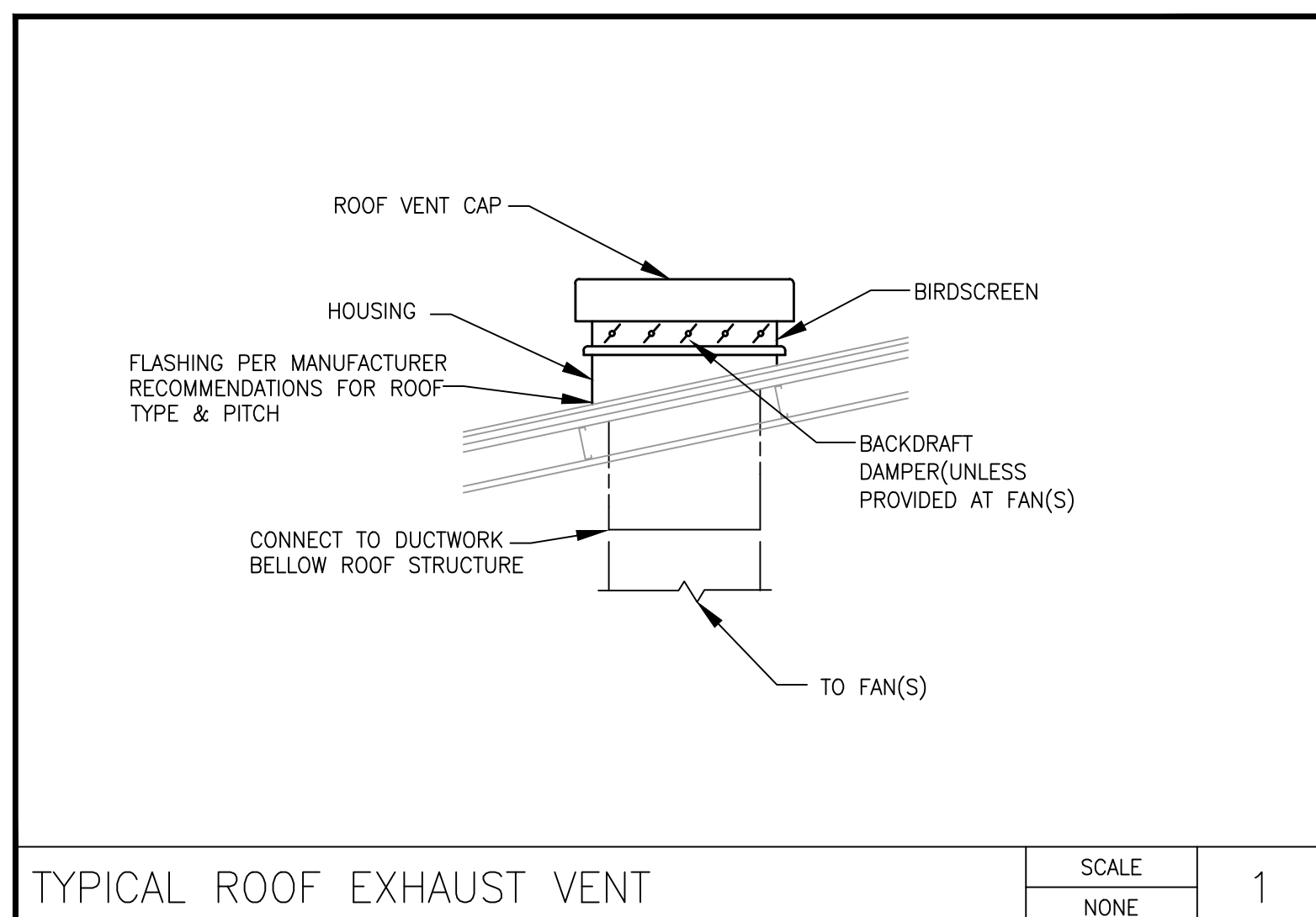
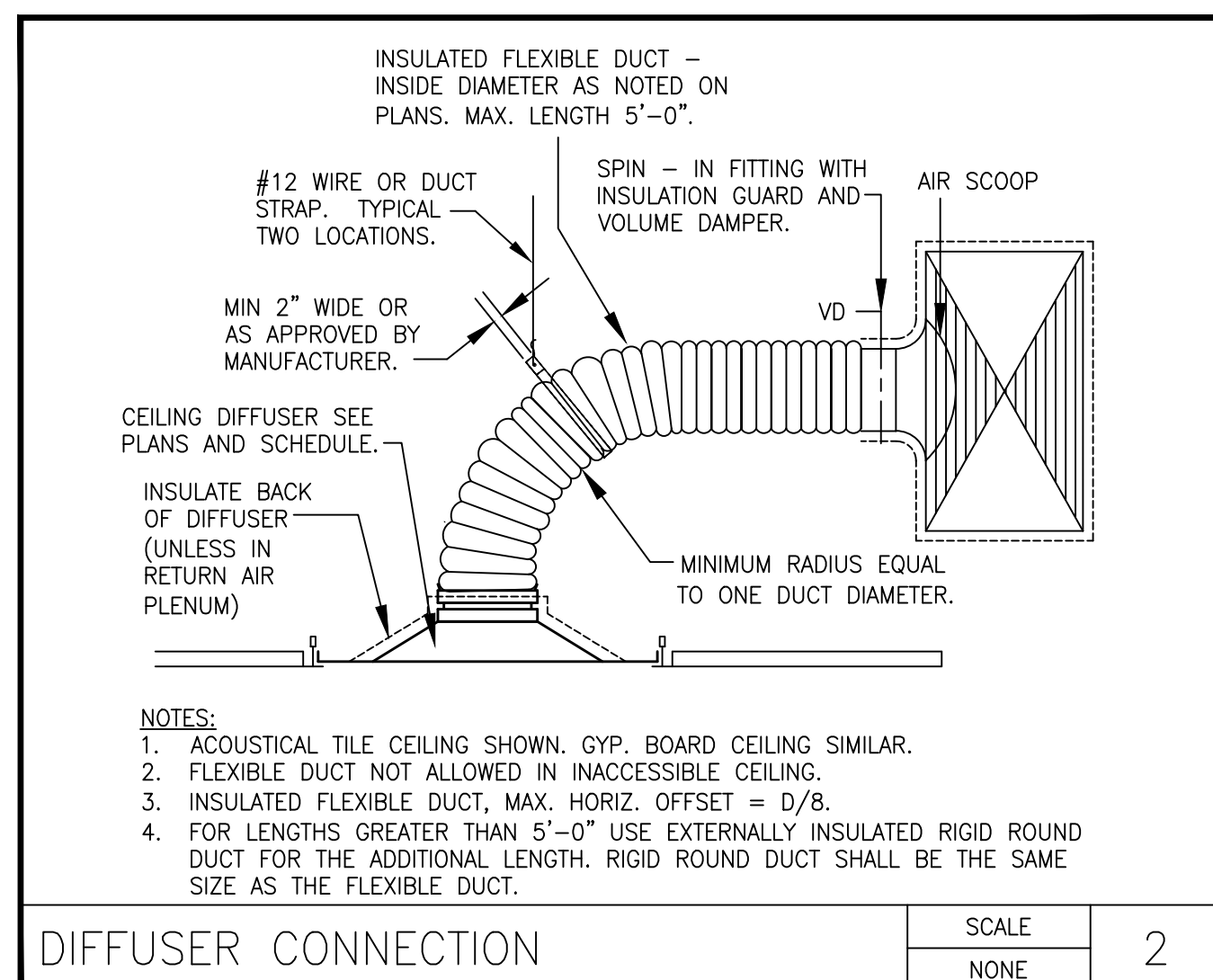
FAN SCHEDULE	
TAG	EF-1
SERVICE	EXHAUST
AREA SERVED	RR/JANITOR
FAN TYPE	INLINE
AIRFLOW	350
EXTERNAL STATIC PRESSURE, "WG	0.35
DRIVE	DIRECT
RPM	1276
MOTOR SIZE, HP (WATTS)	1/10
ELECTRICAL, V/PH/Hz	120/1/60
MANUFACTURER (OR EQUAL)	GREENHECK
MODEL	SQ-80-VG
ACCESSORIES/CONTROLS	1,2,3,A
CONTROLS:	A. FAN TO BE CONTROLLED BY TIMELOCK TO RUN DURING OCCUPIED HOURS, TIMELOCK PROVIDED AND INSTALLED BY ELECTRICAL

DX SPLIT SYSTEM	
SYSTEM	1
SERVES	ELECTRICAL 110
TYPE	WALL MOUNTED
EVAPORATOR SECTION:	FCU-1
SUPPLY FAN:	
TOTAL AIRFLOW, CFM	713
OUTSIDE AIRFLOW, CFM	-
EXTERNAL STATIC, "WG	0.15
COOLING COIL:	
MAX FACE VELOCITY, FPM	500
MINIMUM ROWS	2
ENTERING AIR DRY BULB, DEG F	75.0
ENTERING AIR WET BULB, DEG F	63.0
LEAVING COIL AIR DRY BULB, DEG F	55.0
LEAVING COIL AIR WET BULB, DEG F	54.0
SENSIBLE CAPACITY, BTUH	14,480
TOTAL CAPACITY, BTUH	18,000
MIN SEER @ ARI CONDITIONS	13.0
HEATING COIL:	N/A
RATED HEATING CAPACITY, BTUH	N/A
FILTERS:	
TYPE	INTEGRAL
EFFICIENCY	20%
CONDENSER SECTION:	CU-1
CONDENSER AMBIENT TEMPERATURE, DEG F	102
FANS	1
COMPRESSORS	1
ELECTRICAL:	
EVAPORATOR SECTION	VIA CU-1
MCA	VIA CU-1
MOP	VIA CU-1
CONDENSER SECTION	208/1/60
FLA	18.3
MOP	20
ACCESSORIES:	
FACTORY SENSOR/CONTROLLER	YES
PREMIUM EFFICIENCY MOTOR	YES
INTEGRAL CONDENSATE PUMP	YES (POWERED BY UNIT)
EXTENDED LUBE LINES	YES
FACTORY MOUNTED DISCONNECT	NO
SMOKE DETECTOR	NO
MANUFACTURER	DAIKIN
EVAPORATOR MODEL	FTK18MMVJU
REMOTE CONDENSER MODEL	RK18MMVJU
NOTES:	PROVIDE WITH INTERNAL ISOLATION OR EXTERNAL ISOLATION + FLEXIBLE DUCT CONNECTION REQUIRED COOLING CAPACITY TO INCLUDE FAN HEAT ALL UNITS TO HAVE FULLY DRAINING, DOUBLE WALL STAINLESS STEEL OR IAQ COMPLIANT CONDENSATE PANS PROVIDE WITH ACCESS PANELS FOR CLEANING OF COILS FAN MOTORS TO BE NON-OVERLOADING SMOKE DETECTORS (WHEN INDICATED) ARE TO BE PROVIDED AND INSTALLED BY MECHANICAL, POWERED BY ELECTRICAL SINGLE POINT CONNECTIONS TO INCLUDE INTERNAL FUSING AND CONTACTORS FOR HEATERS AND STARTERS FOR MOTORS. EXTERNAL STATIC INCLUDES DUCT, DIFFUSERS, FILTERS, AND RETURN AIR PLENUMS.

AIR DEVICE SCHEDULE										
TAG	MANUFACTURER	MODEL	DESCRIPTION	FACE SIZE	SERVICE	NECK SIZE	CFM	FINISH	MATERIAL	NOTES
A	TITUS	FBPI-15	SINGLE 1.5" SLOT	4"	SUPPLY	8"	0-220	BLACK	STEEL	1,3,4,5,6,7,8,9
B	TITUS	FBPI-20	TWO 2" SLOTS CURVED WALL MOUNTED	4"	SUPPLY	12"	0-510	BLACK	STEEL	1,3,4,5,6,12,14
C	TITUS	FBPI-15	SINGLE 1.5" SLOT	4"	SUPPLY	8"	0-220	BLACK	STEEL	1,3,4,5,6,11
D	TITUS	TMS	LOUVERED FACE	24"X24"	SUPPLY	10"	221-400	WHITE	STEEL	1,2,3,4,5
E	TITUS	PAR	PERFORATED FACE - DUCTED	24"X24"	RETURN	8"	0-220	WHITE	STEEL	1,2,3,4
F	TITUS	FBPI-20	TWO 2" SLOTS CURVED WALL MOUNTED	4"	RETURN	12"	0-510	BLACK	STEEL	1,3,4,5,6,12,14
F1	TITUS	FBPI-15	SINGLE 1.5" SLOT	4"	RETURN	8"	0-220	BLACK	STEEL	1,3,4,5,6,11
H	TITUS	350RL	LOUVERED FACE	14"X12"	RETURN	12"X10"	0-570	MATCH WALL	STEEL	1,3,4,5,7
J	TITUS	300RL	LOUVERED FACE	12"X8"	SUPPLY	10"X6"	0-300	MATCH WALL	STEEL	1,3,4,5,7

1. PROVIDE OPPOSED BLADE DAMPER AT EACH SUPPLY AND EXHAUST UNLESS BALANCING DAMPER IS PROVIDED AT RUNOUT TAKE-OFF.  
 2. 4-WAY UNLESS SHOWN OTHERWISE. PROVIDE SECTORING BAFFLES AS REQUIRED FOR 3-WAY OR 2-WAY THROW WHERE SHOWN ON PLANS.  
 3. COORDINATE LOCATION OF ALL GRILLES, REGISTERS, AND DIFFUSERS WITH CEILING GRID, LIGHTING, STRUCTURAL MEMBERS, AND ARCHITECTURAL FEATURES PRIOR TO CONSTRUCTION.  
 4. COORDINATE FINISH SELECTIONS WITH ARCHITECT PRIOR TO PURCHASE. COLORS INDICATED ARE TO BE USED WHERE OWNER/ARCHITECT HAS NO PREFERENCE.  
 5. INSULATE BACK OF SUPPLY AND RETURN PLENUMS IN UNCONDITIONED PLENUMS PRIOR TO CONSTRUCTION.  
 6. COORDINATE SLOT WIDTH, COUNT AND LOCATION WITH THE EXISTING FIELD CONDITIONS PRIOR TO PURCHASE.  
 7. PROVIDE GYP BOARD MOUNTING KIT WHEN LOCATED IN HARD CEILING.  
 8. PROVIDE FL-15-HT TYPE FLOWBAR TRACK WITH BOARD TYPE 22 AT LENGTH SHOWN PER PLANS. CONTRACTOR TO TAP AND SPACKLE FLOWBAR FLANGES SO THAT ONLY SUPPLY AIR OPENING IS VISIBLE.  
 9. PROVIDE BALANCING CABLE WITHIN FACE OF SLOT FOR AIR BALANCING WHEN LOCATED IN NON-ACCESSIBLE CEILING AREAS.  
 10. PROVIDE FL-15-JT TYPE FLOWBAR TRACK WITH CURVED BOARD TYPE 22 AT LENGTH SHOWN PER PLANS. CONTRACTOR IS TO TAP AND SPACKLE FLOWBAR FLANGES SO THAT ONLY SUPPLY AIR OPENING IS VISIBLE.  
 11. PROVIDE FL-15-HT TYPE FLOWBAR TRACK WITH BOARD TYPE 55 AT LENGTH SHOWN PER PLANS. CONTRACTOR IS TO INSTALL FLOWBAR BETWEEN WOOD SLATS SO THAT ONLY SUPPLY AIR OPENING IS VISIBLE.  
 12. PROVIDE FL-20-HT TYPE FLOWBAR TRACK WITH CURVED BOARD TYPE 22 AT LENGTH SHOWN PER PLANS. CONTRACTOR IS TO TAP AND SPACKLE FLOWBAR FLANGES SO THAT ONLY SUPPLY AIR OPENING IS VISIBLE.  
 13. RADIUS ON SCHEDULE IS BASED ON THE INSIDE EDGE OF INSIDE BORDER. CONTRACTOR TO FIELD VERIFY AND COORDINATE ALL INSTALLATION REQUIREMENTS WITH MANUFACTURER.  
 14. CONTRACTOR TO VERIFY EXACT RADIUS OF WALL WITH ARCHITECT. FIELD VERIFY AND COORDINATE ALL INSTALLATION REQUIREMENTS WITH MANUFACTURER.

PACKAGED ROOFTOP UNIT SCHEDULE			
TAG	RTU-1	RTU-2	RTU-3
SERVES	LOBBY	SOUTH	NORTH
TYPE	SINGLE ZONE	SINGLE ZONE	SINGLE ZONE
	CONSTANT VOLUME	CONSTANT VOLUME	CONSTANT VOLUME
	DOWN DISCHARGE	DOWN DISCHARGE	DOWN DISCHARGE
SUPPLY FAN:			
TOTAL AIRFLOW, CFM	1410	1430	1530
OUTSIDE AIRFLOW, CFM	100	120	120
EXTERNAL STATIC, "WG	0.8	0.8	0.8
MOTOR HP	1	1	1
COOLING COIL:			
MAX FACE VELOCITY, FPM	500	500	500
MINIMUM ROWS	3	3	3
ENTERING AIR DRY BULB, DEG F	75.6	75.6	75.8
ENTERING AIR WET BULB, DEG F	65.0	65.1	65.1
LEAVING COIL AIR DRY BULB, DEG F	55.0	55.0	55.0
LEAVING COIL AIR WET BULB, DEG F	54.5	54.5	54.5
SENSIBLE CAPACITY, BTUH	31,100	31,800	33,200
TOTAL CAPACITY, BTUH	36,600	37,400	39,100
CONDENSER AMBIENT TEMPERATURE	100	100	100
MIN SEER @ ARI CONDITIONS	14	14	14
MIN IPLV @ ARI CONDITIONS	NA	NA	NA
HEATING COIL:	ELECTRIC	ELECTRIC	ELECTRIC
MIN kW	15	15	15
MAX LEAVING AIR TEMP, DEG F	90	90	90
FILTERS:			
TYPE	2" THROWAWAY	2" THROWAWAY	2" THROWAWAY
MERV RATING	11	11	11
ELECTRICAL:			
V/PH/Hz	208/3/60	208/3/60	208/3/60
MCA	51	51	51
FLA	60	60	60
SINGLE POINT CONNECTION?	YES	YES	YES
CONVENIENCE OUTLET?	YES	YES	YES
ACCESSORIES:			
PREMIUM EFFICIENCY MOTOR	YES	YES	YES
COMPRESSORS	1	1	1
FACTORY CURB	YES	YES	YES
EXTENDED LUBE LINES	YES	YES	YES
FACTORY MOUNTED DISCONNECT	NO	NO	NO
CONVENIENCE OUTLET	YES	YES	YES
VARIABLE FREQUENCY DRIVE	NO	NO	NO
ENTHALPY ECONOMIZER	NO	NO	NO
MOTORIZED OUTSIDE AIR DAMPER	YES	YES	YES
STATIC PRESS. DIFF. SWITCH & WEATHER HEAD	NO	NO	NO
LOW AMBIENT CONTROLS	NO	NO	NO
SMOKE DETECTOR	NO	NO	NO
MANUFACTURER	LENNOX	LENNOX	LENNOX
MODEL	KCB048S4B	KCB048S4B	KCB048S4B
NOMINAL WEIGHT, LBS	686	686	686
NOTES:	PROVIDE WITH INTERNAL ISOLATION OR EXTERNAL ISOLATION + FLEXIBLE DUCT CONNECTION REQUIRED COOLING CAPACITY TO INCLUDE FAN HEAT ALL UNITS TO HAVE FULLY DRAINING, DOUBLE WALL STAINLESS STEEL OR IAQ COMPLIANT CONDENSATE PANS CONDENSATE DRAIN IS RESTRICTED ALL UNITS TO COMPLY WITH ASHRAE 62 AND 90.1, CURRENT VERSIONS PROVIDE WITH ACCESS PANELS FOR CLEANING OF COILS PROVIDE EXTRA HEIGHT CURB IF REQUIRED FOR HORIZONTAL DISCHARGE OR TRANSITION WITHIN CURB. FAN MOTORS TO BE NON-OVERLOADING SMOKE DETECTORS (WHEN INDICATED) ARE TO BE PROVIDED AND INSTALLED BY MECHANICAL, POWERED BY ELECTRICAL SINGLE POINT CONNECTIONS TO INCLUDE INTERNAL FUSING AND CONTACTORS FOR HEATERS AND STARTERS FOR MOTORS WEIGHTS INDICATED DO NOT INCLUDE OPTIONAL ACCESSORIES AND CURBS. COORDINATE WITH MANUFACTURER FOR ACTUAL WEIGHTS. EXTERNAL STATIC INCLUDES DUCT, DIFFUSERS, FILTERS, AND RETURN AIR PLENUMS. TOTAL STATIC (NOT SHOWN) TO INCLUDE INTERIOR COMPONENTS SUCH AS COILS. PROVIDE WALL OR DUCT MOUNTED TEMPERATURE SENSORS AS INDICATED ON PLANS		



T:\PROJECTS\T & D-2022\22301 - SMART FINANCIAL - NEW BRANCH BANK BUILDING - SPRING, TX\DWG\SSUE\_01\A\22301M200.DWG 8/3/2022 5:12 PM JEAN CHAUN

tramonte design studio

4203 Yeakum Blvd., Suite 300 Houston, TX 77006

smart financial

08/03/2022

**SMART FINANCIAL - SPRINGLAND**  
 7206 N. GRAND PARKWAY W  
 SPRING, TX 77379

THOMAS & DUNNE ENGINEERS, LLC  
 738 S. HIGHWAY 6  
 SUITE # 260  
 HOUSTON, TX 77079  
 PHONE: 713.933.1001  
 FAX: 713.933.1004  
 TEXAS REGISTRATION #F-10421

ISSUE FOR PERMIT 08.03.22

Issues

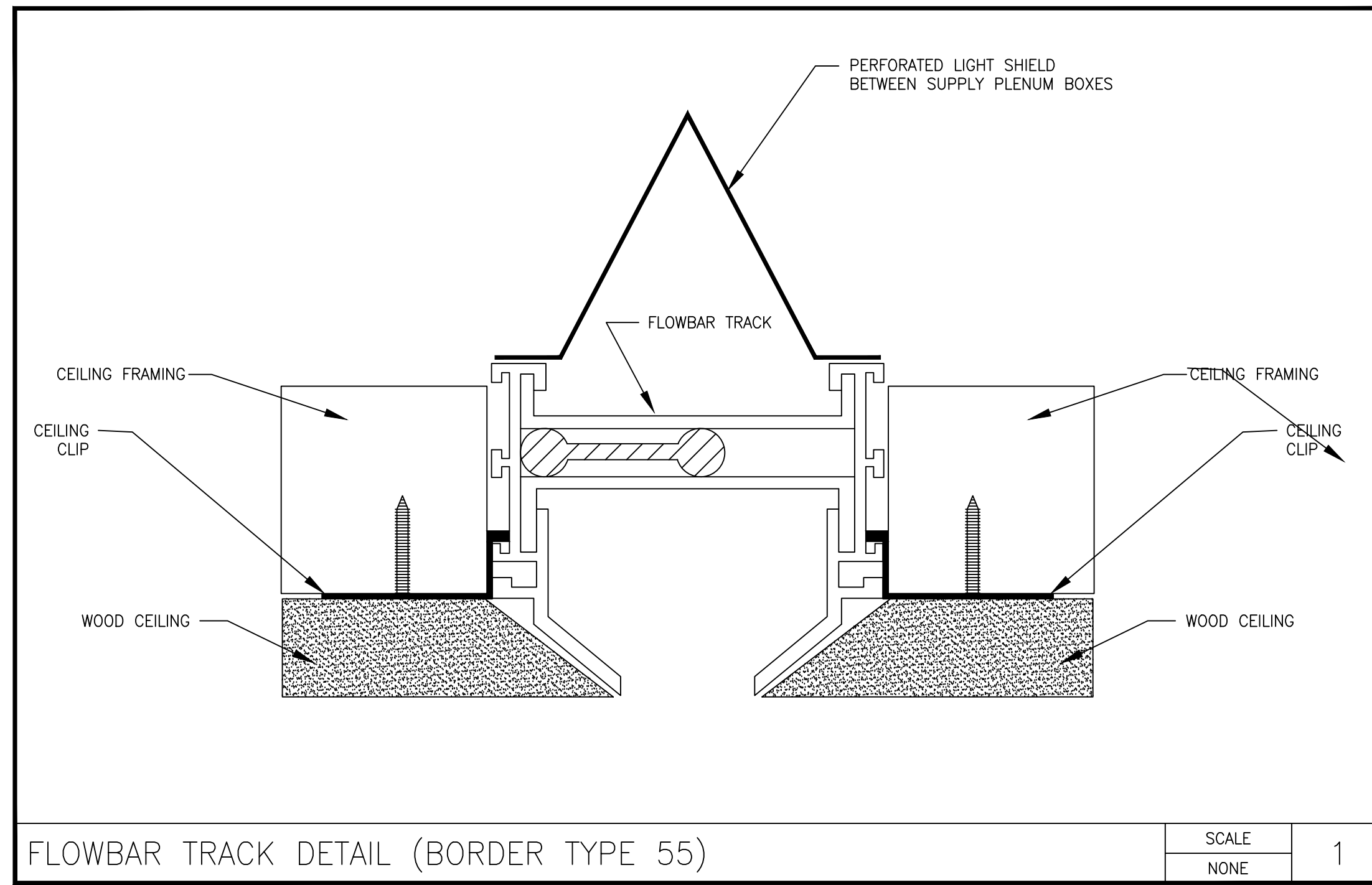
T&D Project Number 22301

Drawn By WT

Checked By RT

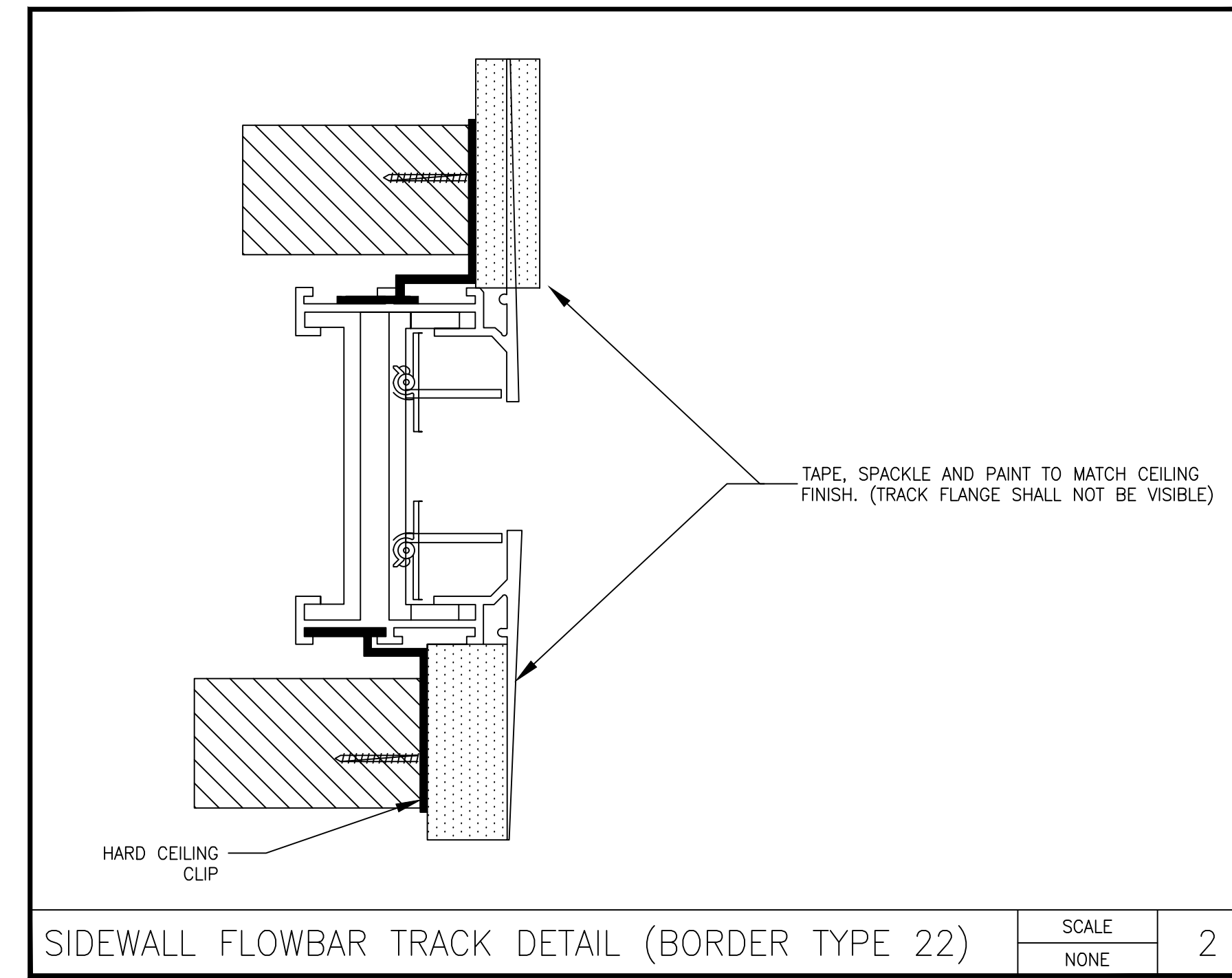
M-200

MECHANICAL SPECS, DETAILS & SCHEDULES



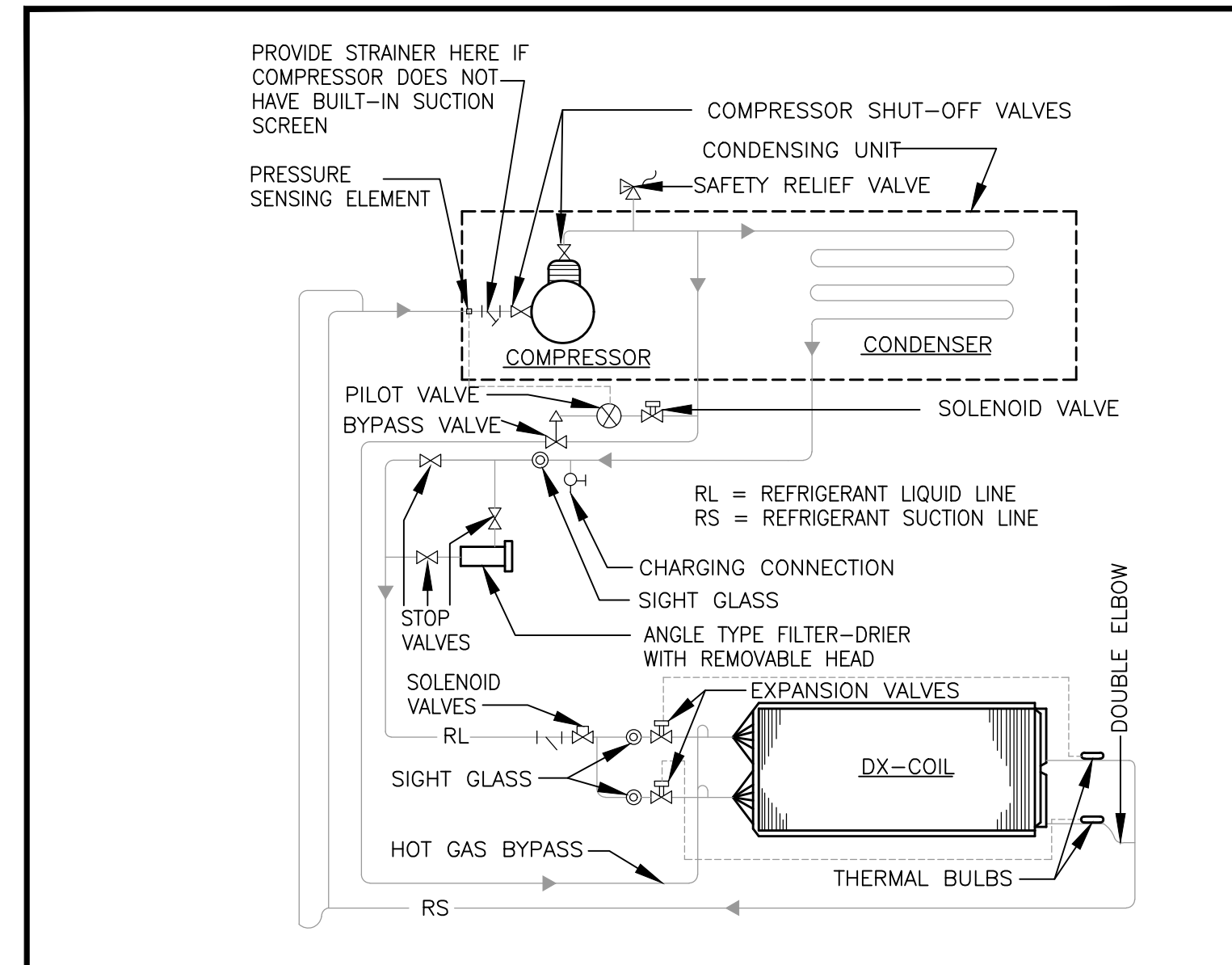
FLOWBAR TRACK DETAIL (BORDER TYPE 55)

SCALE NONE 1



SIDEWALL FLOWBAR TRACK DETAIL (BORDER TYPE 22)

SCALE NONE 2

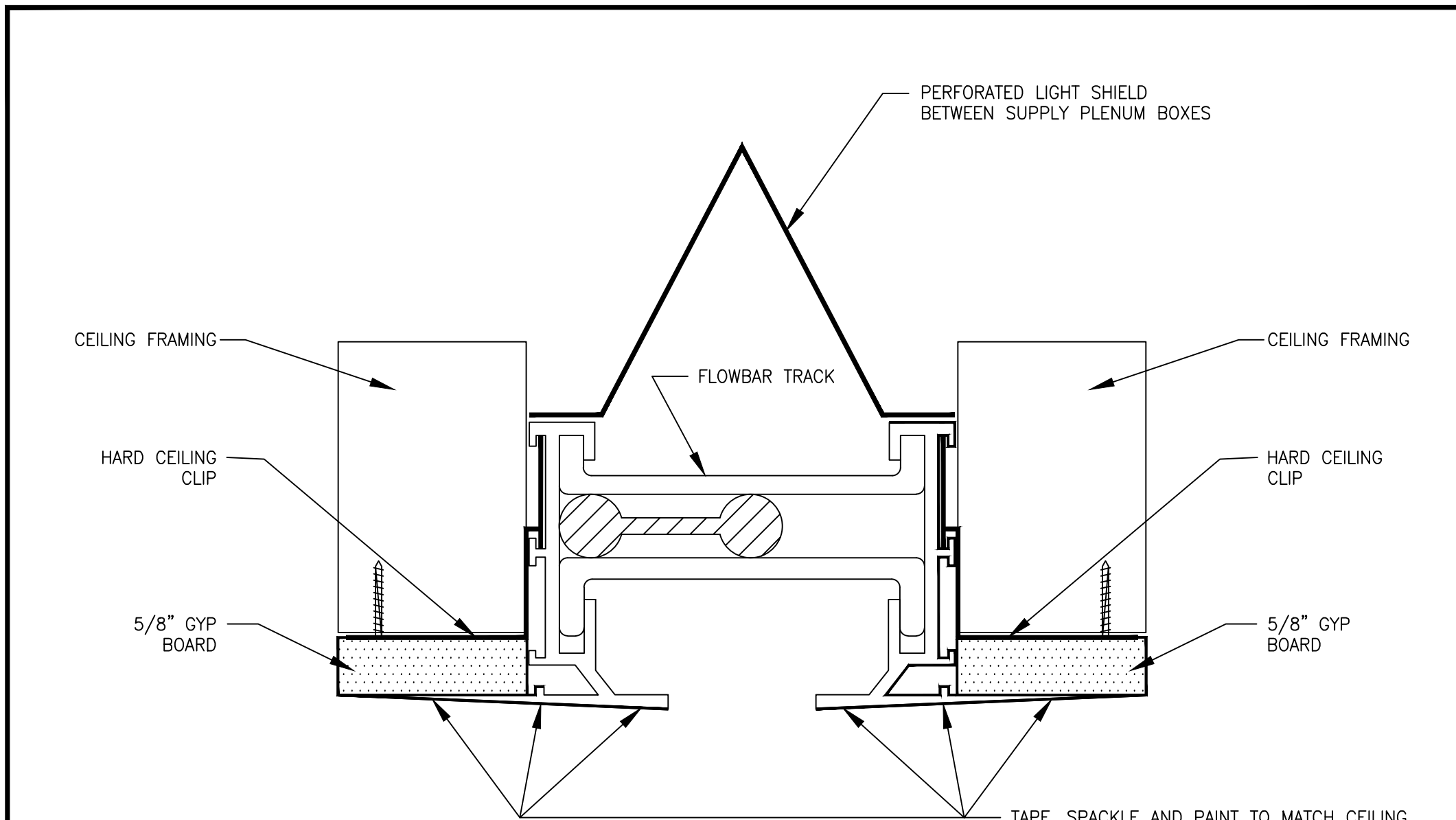


EVAPORATOR LOWER OR SAME LEVEL AS CONDENSER

- NOTES:
- SUCTION LINE TO BE INSULATED: 25/50 FLAME/SMOKE RATINGS ALL INDOOR SECTIONS. UV PROTECTION ALL EXPOSED OUTDOOR SECTIONS. R-VALUE AND/OR THICKNESS PER SPECIFICATIONS.
  - REFRIGERANT PIPING, SIZING AND ACCESSORIES TO BE INSTALLED IN FIELD SHALL BE APPROVED BY MANUFACTURER OF EQUIPMENT BEFORE STARTING INSTALLATION.
  - DOUBLE REFRIGERANT SUCTION RISER IS SHOWN. COORDINATE W/ MANUFACTURER REQUIREMENTS FOR SINGLE OR DOUBLE SUCTION RISER REQUIREMENTS. REFRIGERANT SUCTION RISERS TO BE PER MANUFACTURER OF EQUIPMENT SIZING REQUIREMENTS DEPENDING ON COMPRESSOR CAPABILITIES.
  - DETAIL SHOWS SINGLE CIRCUIT REFRIGERANT PIPING. DUPLICATE REFRIGERANT PIPING REQUIRED FOR DOUBLE CIRCUIT SYSTEMS.
  - DETAIL SHOWS HOT GAS BYPASS PIPING AND ACCESSORIES. ASSOCIATED PIPING AND ACCESSORIES NOT REQUIRED IF EQUIPMENT IS NOT SCHEDULED OR SELECTED WITH HOT GAS CAPABILITIES.
  - PROVIDE ADDITIONAL ACCESSORIES NOT SHOWN (SUCH AS RECEIVERS AND/OR ACCUMULATORS) AS REQUIRED BY MANUFACTURER FOR ACTUAL INSTALLATION CONDITIONS (I.E. LONG LINE APPLICATIONS WHERE APPLICABLE)
- MINIMUM TRAP REQUIREMENTS:
- TRAP SUCTION AT EVAPORATOR (AFTER EXPANSION VALVES AND DOUBLE ELBOW)
  - OIL TRAP SUCTION AT LEAST ONCE EVERY 20 VERTICAL FEET OF RISE WHEN CONDENSING UNIT IS ABOVE EVAPORATOR.
  - USE INVERTED TRAP WHERE LARGER RISER(S) OF DOUBLE RISER HOT GAS AND/OR SUCTION RISERS RECONNECT TO ASSOCIATED MAIN LINE.
  - PROVIDE ADDITIONAL TRAPS WHERE RECOMMENDED BY MANUFACTURER BASED ON ACTUAL INSTALLATION CONDITIONS.

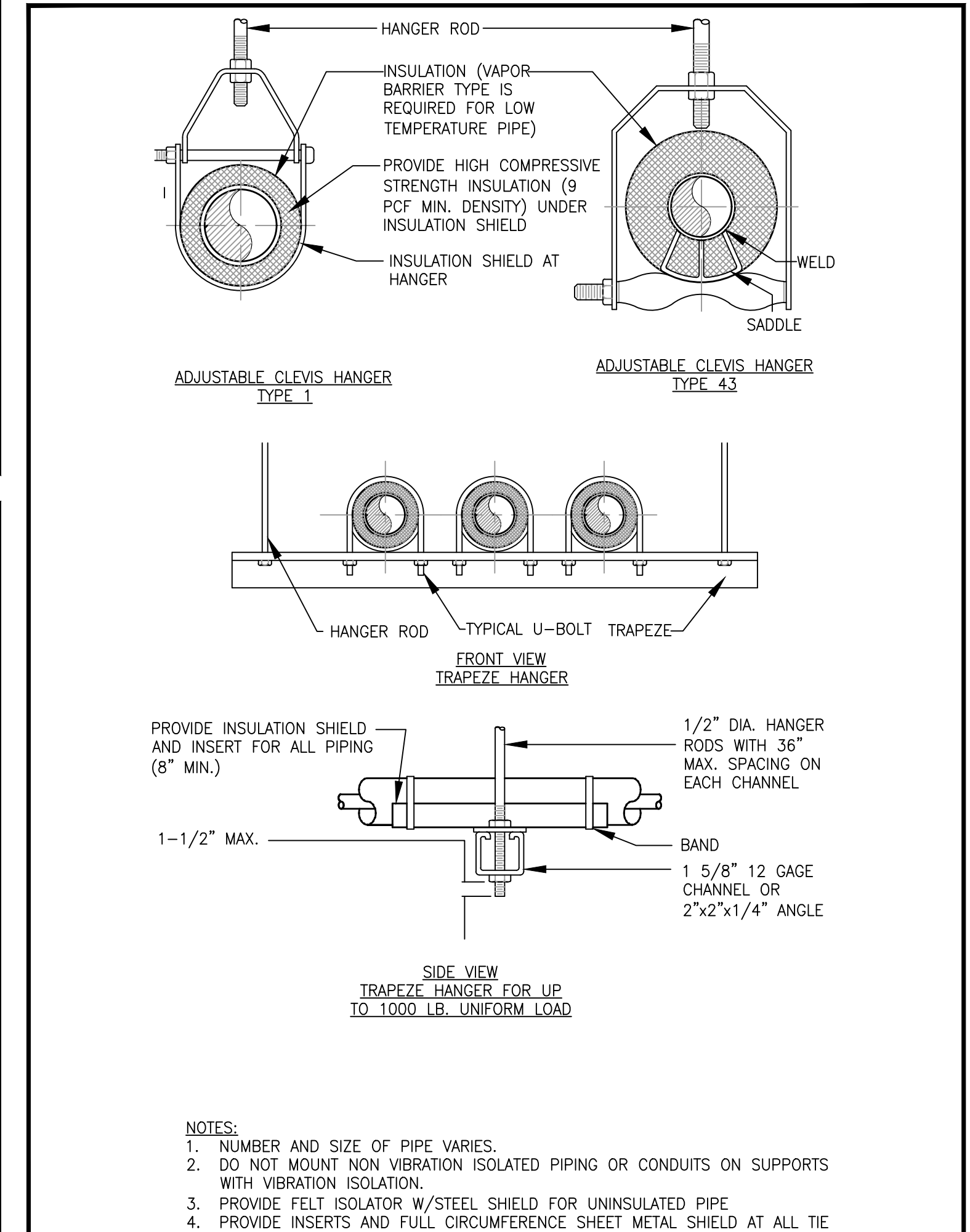
REFRIGERANT PIPING DETAIL

SCALE NONE 3



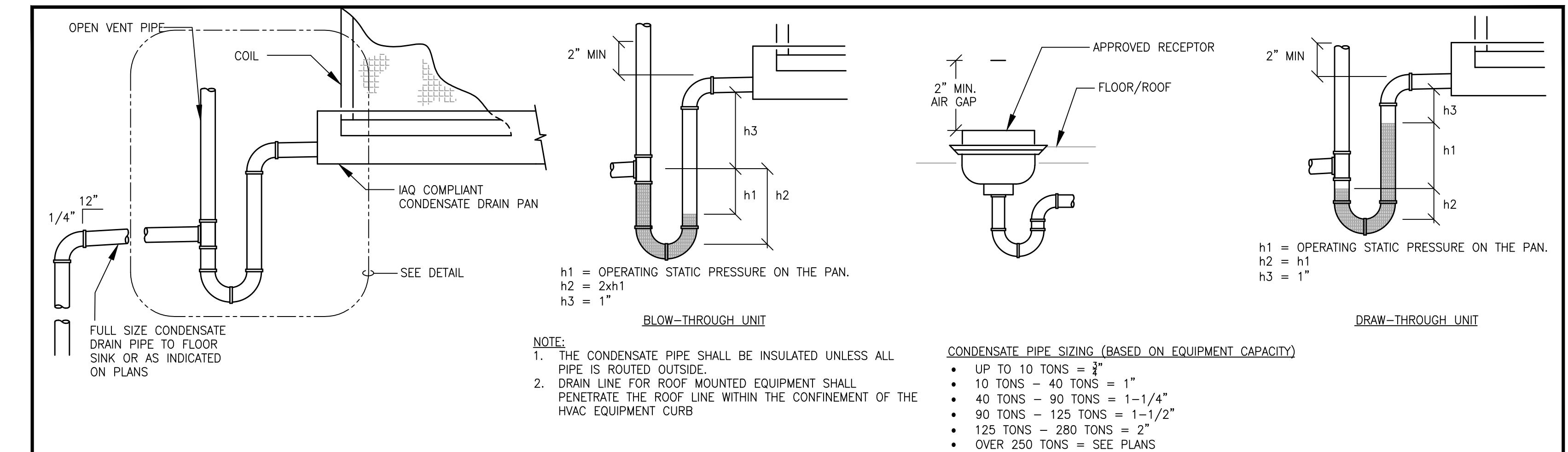
FLOWBAR TRACK DETAIL (BORDER TYPE 22)

SCALE NONE 4



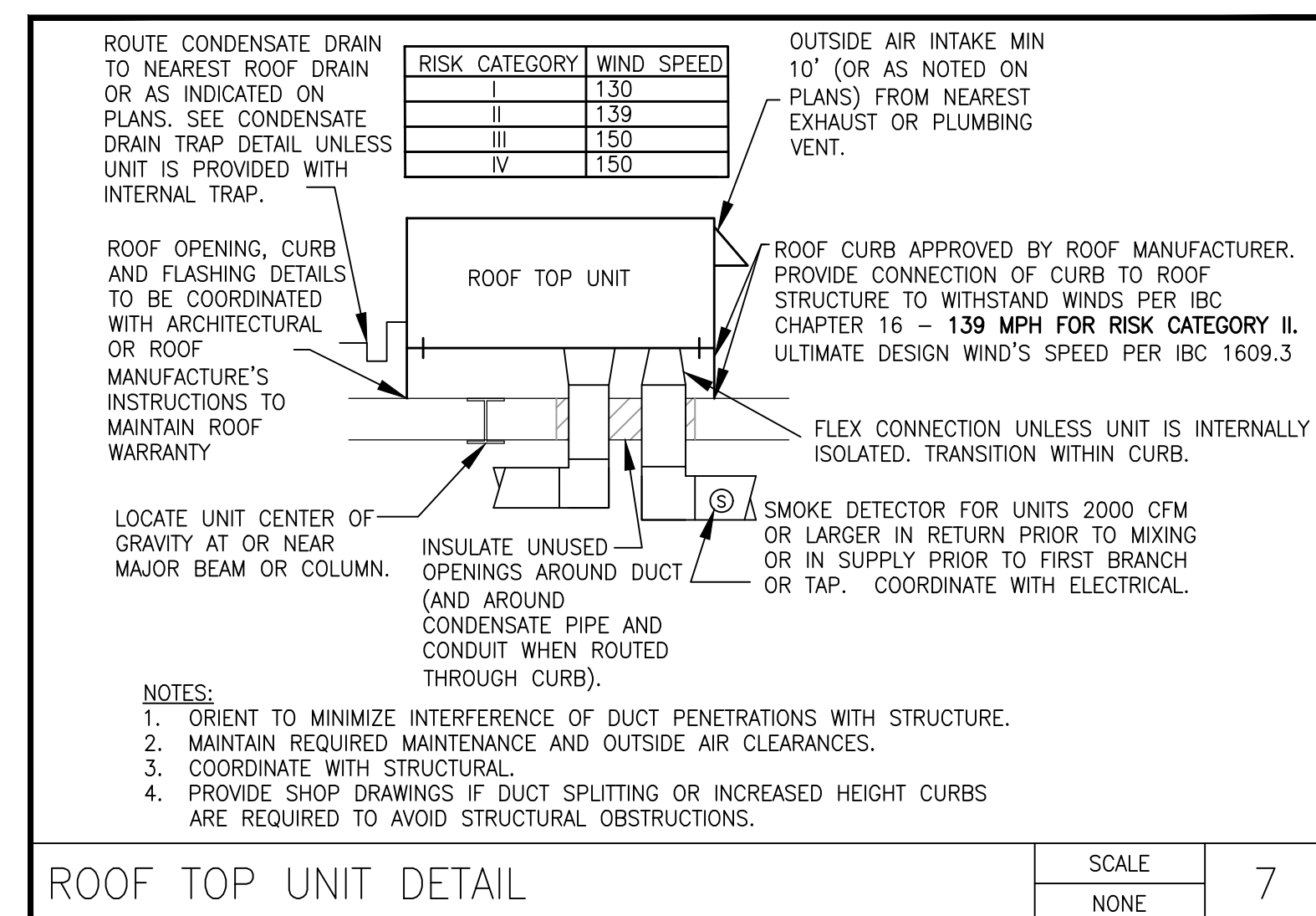
TYPICAL PIPE HANGERS

SCALE NONE 5



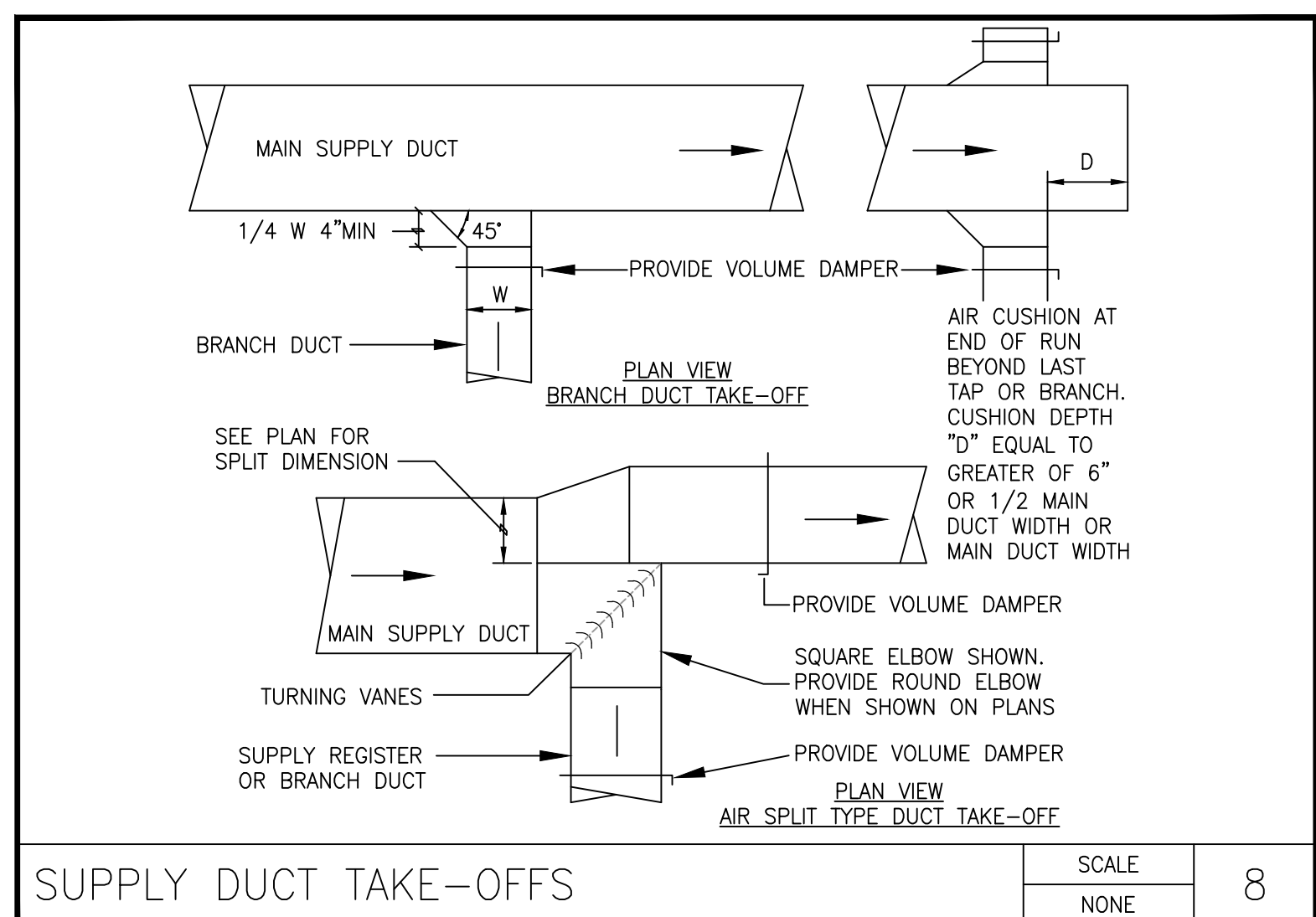
CONDENSATE DRAIN PIPE DETAIL

SCALE NONE 6



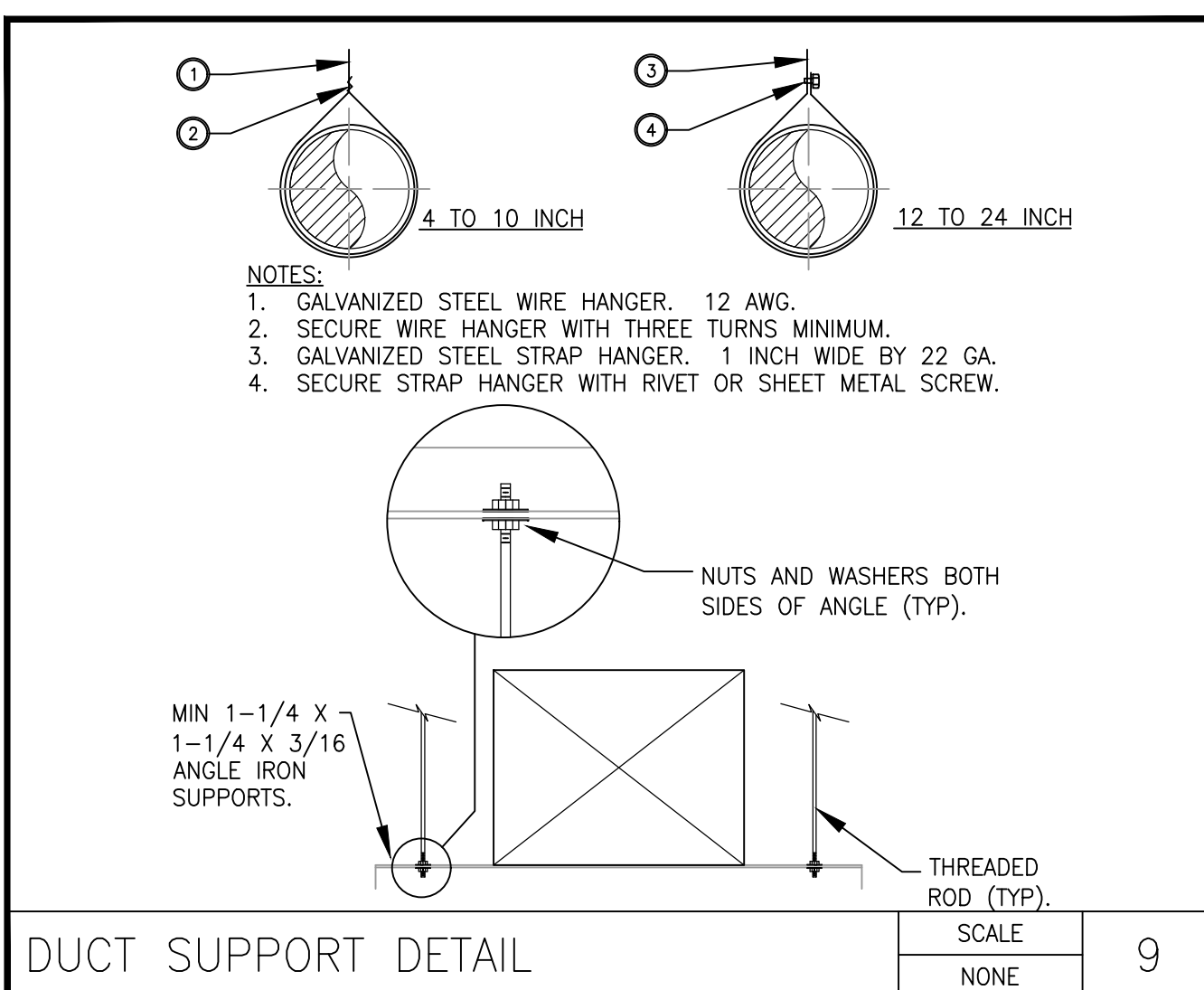
ROOF TOP UNIT DETAIL

SCALE NONE 7



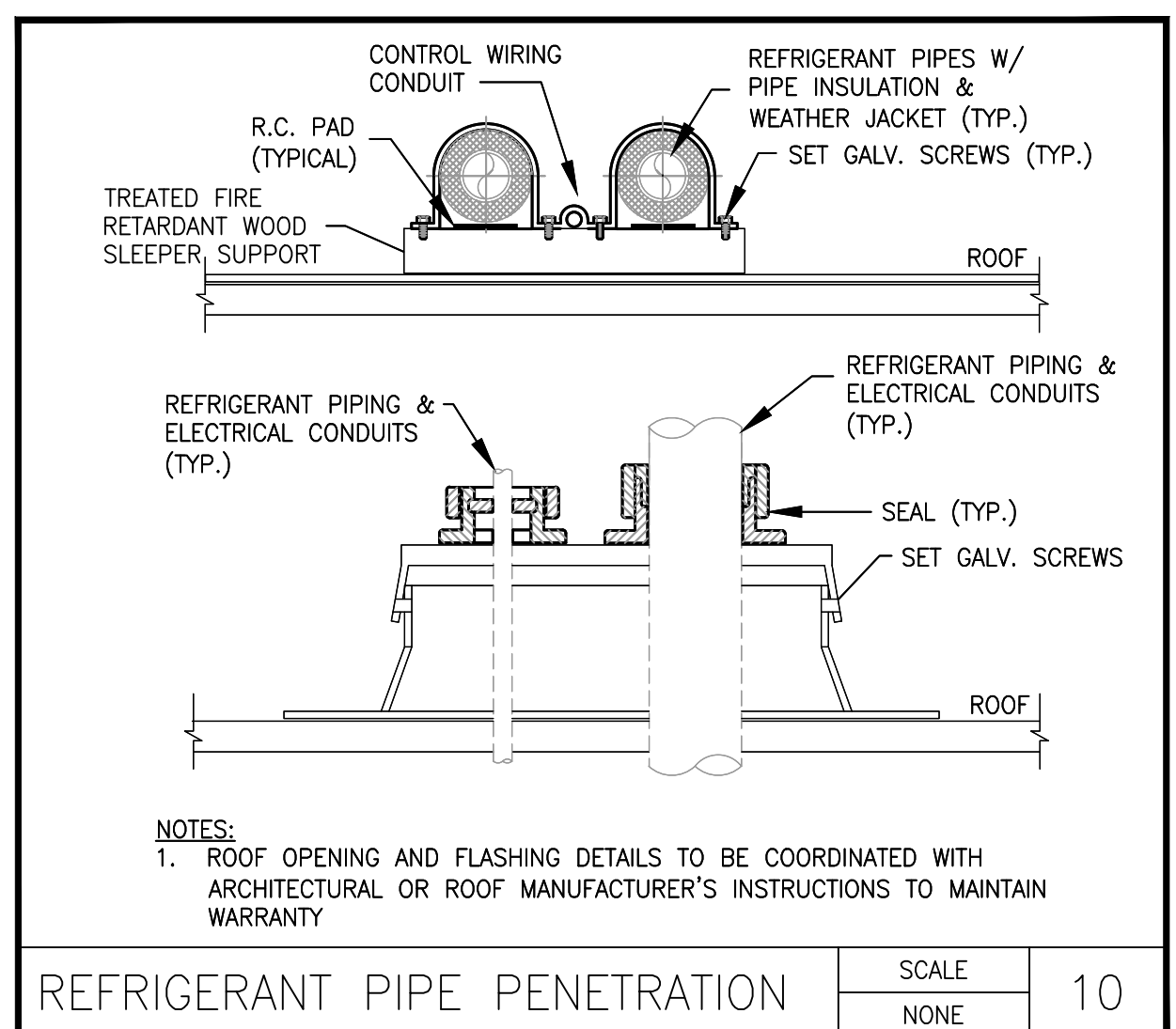
SUPPLY DUCT TAKE-OFFS

SCALE NONE 8



DUCT SUPPORT DETAIL

SCALE NONE 9



REFRIGERANT PIPE PENETRATION

SCALE NONE 10

T:\PROJECTS\T & D-2022\22301 - SMART FINANCIAL - NEW BRANCH BANK BUILDING - SPRING, TX\DWGS\ISSUE\_01\A\22301M300.DWG 8/5/2022 1:39 PM ZACHERY ANSELL

SECTION 23 00 00 GENERAL HVAC REQUIREMENTS

Code information  
Harris County, TX  
Applicable codes:  
2015 IBC, 2015 IMC, and 2015 IECC.  
Design criteria per:  
Winter design dry-bulb: 28 Deg F  
Summer design dry-bulb/wet-bulb: 96/80.5 deg F  
Degree days heating (65)/cooling (50): 1,371/7,534  
Climate Zone: 2A

Mechanical system commissioning not required, project is providing less than 480,000 Btu/h of new cooling capacity and less than 600,000 Btu/h of new combined service water-heating and space-heating capacity.

General Requirements  
Refer to sheet MEPO.00 for MEP general notes and legend.

HVAC Shop Drawings: Submit shop drawing submittals per requirements of Section 01 00 00 - General Requirements for all new equipment, piping, ductwork, and controls.

D SECTION 23 05 00 - COMMON WORK RESULTS FOR HVAC  
General requirements:

**New Ductwork**  
Install in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.  
Install at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.  
Install to permit access for damper servicing. Young's regulators or similar may be approved in lieu of access doors in some situations (coordinate with architect and engineer prior to construction).  
Install free of sags and bends.  
Install elbows for changes in direction and branch connections.  
Install with clearance to allow application of insulation.  
Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at penetrations. Provide fire and/or smoke dampers as required for duct penetrations.

**New Piping**  
Install in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.  
Install at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.  
Install to permit access for valve servicing.  
Install free of sags and bends.  
Install at indicated slopes.  
Install fittings for changes in direction and branch connections.  
Install with clearance to allow application of insulation.  
Cut sleeves to length for mounting flush with both surfaces except in floors of mechanical equipment areas or other wet areas cut 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.  
Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at penetrations. Seal pipe penetrations with firestop materials.  
Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

**New Equipment**  
Install in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.  
Install at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.  
Install equipment to allow maximum possible headroom unless specific mounting heights are indicated.  
Install equipment level and plumb, unless otherwise indicated.  
Install equipment to facilitate service, maintenance, and repair or replacement of components.  
Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations. Maintain min manufacturer recommended and code required service clearances.

Install equipment to allow right of way for piping or ductwork with slope requirements.  
**New Ductwork, Piping, and Equipment**  
Install above accessible ceilings to allow sufficient space for ceiling panel removal.  
Maintain a minimum of 36 inches clear working space, not less than 30 inches wide, clear of all duct, pipe, or HVAC equipment in front of all switches, overcurrent devices and electric control components.  
SECTION 23 05 29 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT  
Install hangers, supports, clamps, and attachments as required to properly support duct, piping and equipment per local code.  
HANGER AND SUPPORT INSTALLATION  
Fastener System Installation:  
Install hangers and supports to allow controlled thermal movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.  
Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers. NPS 2-1/2 and larger and at changes in direction of piping.  
Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.  
Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

**INSULATED PIPING:**  
Thermal Hanger Shield Insert Material for Cold or Hot Piping: ASTM C 552, Type II cellular glass with 100-psig or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength. Include vapor barrier for cold water piping.  
For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.  
For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.  
Insert Length: Extend 2 inches beyond steel metal shield for piping operating below ambient air temperature.  
Attach clamps and spacers to piping.  
Piping Operating above Ambient Air Temperature: Clamp may project through insulation.  
Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.  
Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.  
Install MSS SP-58, Type 30, protective shields if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.  
Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.  
Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.  
Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.  
Shield Dimensions for Pipe: Not less than the following:  
NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.  
NPS 4: 12 inches long and 0.06 inch thick.  
NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.  
NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.  
NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.  
Pipes NPS 8 and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.  
Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

**EQUIPMENT SUPPORTS**  
Fabricate structural-steel stands or unistrut support to suspend equipment from structure overhead or to support equipment above floor.  
Provide lateral bracing, to prevent swaying, for equipment supports.

**ADJUSTING**  
Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.  
Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

SECTION 23 05 48 - VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT  
Provide flexible duct connection at air handlers unless internally isolated.  
Roof or floor mounted equipment on pads: Resilient Material: Oil- and water-resistant neoprene.  
Arranged in single or multiple layers of sufficient stiffness for uniform loading over pad area, molded with a nonslip pattern and galvanized-steel baseplates, and factory cut to sizes that match requirements of supported equipment.  
Roof top units and fans shall be supported with spring isolators unless internally isolated.

SECTION 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT  
Equipment: Permanently affixed label (metal tag, stencil, or engraved plastic) indicating unit designation (consistent with plan, schedule, or owner direction) and area served.  
Piping: Pre-printed, color coded, with lettering indicating service. Flow arrow indicating flow direction.  
Valve: Stamped or engraved tag for each valve. For each system provide schedule of tag identification numbers/labels, locations (room or space), and normal operating position.  
Duct: Permanent label indicating service, duct size, and flow direction.

SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING (TAB) FOR HVAC  
Engage a TAB entity certified by AABC or NEBB. Balance may be performed by qualified employee(s) of mechanical contractor at owner's discretion (seek approval prior to bid and construction). TAB Field Supervisor and technician to be certified by AABC or NEBB.  
Prepare a certified written report: tabulate and divide the report into separate sections for tested systems and balanced systems. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer. Include a list of instruments used for procedures, along with proof of calibration. Include at minimum the following:  
-General: Manufacturer's nameplate data for all equipment. Settings on outdoor, return, and exhaust air dampers. Condition of filters (new and/or existing). Dry-bulb and wet bulb conditions at time of test. Space temperature vs setpoints. CFM each supply (and return if value indicated on contract documents) and reference key plan with diffusers indicated.  
-Dx Fan coil: Airflow and leaving air temperatures (db/w deg F) for total supply air, outdoor air, and return air. Static pressure. Fan motor amps & rpm.  
-Dx condensing units: Airflow, static pressure, motor amps & rpm. Ambient temperature (db/w deg F) at time of balance.  
-Packaged rooftop units: Airflow and leaving air temperatures (db/w deg F) for total air, outdoor air, return air and condenser section. Static pressure. Fan motor amps & rpm (indoor and condenser sections). Gas heater output capacity, verify ignition control operation, heating airflow, leaving air temperatures.  
-Fast: Total airflow, static pressure, motor amps & rpm.

Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting have been performed. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values. Provide description of system operation sequence if it varies from the Contract Documents.  
90 days after occupancy perform additional "comfort balance" in response to owner's perceived comfort. Verify via spot checking that balanced conditions are being maintained throughout and correct unusual conditions.

SECTION 23 07 00 - HVAC INSULATION  
Submittals required: For each type of product used include thermal conductivity, thickness, and jackets (both factory and field applied, if any). Flame-spread index of 25 or less, and smoke-developed index of 50 or less; tested in accordance with ASTM E 84.  
Install per most stringent of manufacturer recommendations or code requirements.  
PENETRATIONS: Install insulation continuously through roof and wall penetrations. R-value to match adjacent wall/roof insulation.

PIPE INSULATION:  
Indoor Condensate and Equipment Drain Water below 60 Deg F:  
All Pipe Sizes: Insulation shall be: Flexible Elastomeric, Phenolic, or Polyolefin 1 inch thick.  
Refrigerant Suction and Hot-Gas Piping or Flexible tubing:  
All Pipe Sizes: Insulation shall be: Flexible Elastomeric or Polyolefin : 1 inch thick indoors; 2 inches outdoors. Provide UV protective coating or jacketing for all outdoor exposed insulation.

Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity. Insulate pipe elbows, tee fittings, valves, and strainers using perforated fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment.  
DUCT INSULATION  
Mineral Fiber blanket. Comply with ASTM C 553, Type II and ASTM C 1290. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Apply adhesives according to manufacturer's recommended coverage rates. Create a facing lap for longitudinal seams and end joints. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface. Indoor supply, return and outdoor air in a nonconditioned space (ex. Attic or non-return air plenum): min 2" (3" for insulated flex), R-8 installed

SECTION 23 09 00 - INSTRUMENTATION AND CONTROL FOR HVAC  
Conceal signal and communication cable, except in mechanical rooms and areas where other conduit and piping are exposed. Install concealed and exposed cable in rigid raceways.  
Number-code or color-code conductors for future identification and service of control system, except local individual room control cables. Coordinate number-code or color-code with existing control system as applicable. Install wire and cable with sufficient slack and flexible connections to allow for vibration of piping and equipment. Flexible conduit for flexible connections not to exceed 72".

SECTION 23 09 93 - SEQUENCE OF OPERATIONS FOR HVAC CONTROLS  
General Requirements:  
For all systems greater than 2000 cfm, smoke detector in return air to shut unit down upon presence of products of combustion. Detectors located in return must be located prior to dilution by outside air. Dead bands: Systems used for both heating and cooling shall be capable of providing a temperature range or dead band of at least 5 deg F within which the supply of heating and cooling energy to the zone is shut off or reduced to a minimum.  
Off-hour controls: Heating systems shall have controls that can temporarily start system to maintain zone temperature above adjustable heating setpoint of 55 deg F or lower. Cooling systems shall have controls that can temporarily start system to maintain zone temperature below adjustable cooling setpoint of 65 deg F or higher or to prevent high space humidity levels.  
Automatic shutdown: HVAC systems with local controls shall have 7-day programmable controls capable of retaining programming and time settings during loss of power for at least 10-hours and include manual override for equivalent function for system start-up for up to two hours.  
Shutoff damper control: All outdoor air supply and exhaust systems shall be equipped with motorized dampers that automatically shut when the system is not in use. Ventilation outdoor air dampers shall be capable of automatically shutting off during pre-occupancy building warm-up, cool down, and setback except when ventilation reduces energy costs or is required for code requirements.  
Exception 1: Where dampers are prohibited by mechanical code.  
Exception 2: Non-motorized gravity hoods are acceptable in outdoor air intake or exhaust systems with a capacity of 300 cfm or less.

See plans for system specific sequences of operation  
SECTION 23 21 13 - HYDRONIC PIPING PERFORMANCE REQUIREMENTS  
Hydronic piping components and installation shall be capable of withstanding the following minimum working pressure and temperature:  
Condensate-Drain Piping: 150 deg F.

PIPING APPLICATIONS  
Condensate-Drain Piping Indoors: Type M, drawn-temper copper tubing, wrought-copper fittings, and soldered joints.  
Condensate-Drain Piping Outdoors: Schedule 40 PVC plastic pipe and fittings and solvent-welded joints.

COPPER TUBE AND FITTINGS  
Drawn-Temper Copper Tubing: ASTM B 88, Type L or M.  
Wrought-Copper Fittings: ASME B16.22.  
Grooved-End Copper Fittings: ASTM B 75 (ASTM B 75M), copper tube or ASTM B 584, bronze casting.  
Grooved-End-Tube Couplings: Rigid pattern, unless otherwise indicated; gasketed fitting. Ductile-iron housing with keys matching pipe and fitting grooves, preultrafilled EPDM gasket rated for minimum 230 deg F for use with housing, and steel bolts and nuts.

SECTION 23 23 00 - REFRIGERANT PIPING  
Size piping and design actual piping layout, including oil traps, double risers, specialties, and pipe and tube sizes to accommodate, as a minimum, equipment provided, elevation difference between compressor and evaporator, and length of piping to include proper operation and compliance with warranties of connected equipment and ASHRAE 15.  
Provide thermostatic expansion valves, solenoid valves, hot gas bypass valves, filter dryers, strainers, pressure regulating valves, liquid line indicators, safety discharge piping and manufacturer recommended accessories for long run applications where required.  
Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.  
Install piping free of sags and bends. Slope refrigerant piping as follows:  
Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.  
Install horizontal suction lines with a uniform slope downward to compressor.  
Install traps and double risers per manufacturer recommendations to entrain oil in vertical runs.  
Liquid lines may be installed level.  
Select system components with pressure rating equal to or greater than system operating pressure.  
Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

COPPER TUBE AND FITTINGS  
Copper Tube: ASTM B 280 Type ACR or ASTM B 88, Type K or L per manufacturer's requirements for pipe size, pressure, and service.  
Wrought-Copper Fittings: ASME B16.22.  
Wrought-Copper Unions: ASME B16.22.  
Braze/Filler Metals: AWS A5.8.

Flexibility Connectors:  
Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.  
End Connections: Socket ends.  
Offset Performance: Capable of minimum 3/4-inch misalignment in minimum 7-inch-long assembly.  
Pressure Rating: Factory test at minimum 500 psig.  
Maximum Operating Temperature: 250 deg F.

SECTION 23 31 13 - METAL DUCTS  
Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Confirm all dimensions in the field and coordinate with existing conditions and other trades. Dimensions on plans are inside free area.

Install ducts with fewest possible joints.  
Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.  
Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.  
Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.  
Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.  
Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures. Where ducts pass through fire-rated interior partitions and walls, install fire dampers.  
Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "Duct Cleanliness for New Construction Guidelines."

Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article. Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2007.

DUCT SEALING  
Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."  
Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-inch wg and Lower: Seal Class B.  
Unconditioned Space, Exhaust Ducts: Seal Class C.  
Unconditioned Space, Return-Air Ducts: Seal Class B.

HANGER SPACING: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Sizes," and Table 4-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.

DUCT MINIMUM PRESSURE CLASS  
Fabricate ducts with galvanized sheet steel except as otherwise indicated and as follows:  
Supply Ducts:  
Ducts Connected to Fan Coil Units: Positive 1-inch wg.  
Return Ducts:  
Ducts Connected to Fan Coil Units: Positive or negative 1-inch wg  
Exhaust Ducts:  
Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air: Pressure Class: Negative 1-inch wg.  
Outdoor- (Not Filtered, Heated, or Cooled) Ducts:  
Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units: Positive or negative 1-inch wg.

LINER (for sound absorption):  
Supply or Exhaust Air Ducts: 15' from air handler or fan inlet. 25' from mechanical rooms. Fibrous glass, Type I, 1 inch thick.  
Return Air Ducts: 10' from air handler or fan inlet. 25' from mechanical rooms. Fibrous glass, Type I, 1 inch thick.  
Supply Fan Plenums: Fibrous glass, Type II, 1 inch thick.  
Return and Exhaust-Fan Plenums: Fibrous glass, Type II, 2 inches thick.  
Transfer Ducts: Fibrous glass, Type I, 1 inch thick.

DUCT LINER (where specified above)  
If the objective of duct liner includes achievement of both thermal performance and sound absorption, then ducts may need additional external insulation to achieve the thermal portion of the objective. See Division 23 Section "HVAC Insulation" for applicable duct insulation and installation requirements for external duct application.  
Fibrous-Glass Duct Liner: Comply with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standards." Flame-spread index of 25 or less, and smoke-developed index of 50 or less; tested in accordance with ASTM E 84. Apply antimicrobial compound to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.

FLEXIBLE DUCTWORK shall not exceed 6 ft in length or be bent more than 90 degrees. Size to match diffuser neck. Refer to section 23 07 00 for external insulation requirements.  
Flexible Duct Connectors:  
Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action in sizes 3 through 18 inches. To suit duct size. To suit duct size.  
Non-Clamp Connectors: Adhesive plus sheet metal screws.  
SECTION 23 33 00 - AIR DUCT ACCESSORIES  
Shop Drawings: Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:  
-Special fittings.  
-Manual volume damper installations.  
-Control damper installations.  
-Fire-damper, smoke-damper, combination fire- and smoke-damper, ceiling, and corridor damper installations, including sleeves; and duct-mounted access doors and remote damper operators.  
-Duct security bars.  
-Wiring Diagrams: For power, signal, and control wiring.

FIRE DAMPERS  
Type: Static where associated system is off upon detection of products of combustion. Dynamic where system may be on during fire incident; rated and labeled according to UL 555 by an NRTL.  
For dynamic dampers: Closing rating in ducts up to 4-inch wg static pressure class and minimum 4000-fpm velocity.  
Fire Rating: 1-1/2 and/or 3 hours per more restrictive of plans or assembly requirements.  
Frame: Curtain type with blades outside airstream fabricated with roll-formed, 0.034-inch-thick galvanized steel; with mitered and interlocking corners.  
Fire Rating: 1-1/2 and/or 3 hours per more restrictive of plans or assembly requirements.  
Minimum Thickness: 0.052 or 0.138 inch thick, as required by assembly, and of length to suit application.  
Exception: Omit sleeve where damper-frame with permits direct attachment of perimeter mounting angles on each side of wall or floor; thickness of damper frame must comply with sleeve requirements. Must be installed per manufacturer requirements.

Blades: Roll-formed, interlocking, 0.034-inch-thick, galvanized sheet steel. In place of interlocking blades, use full-length, 0.034-inch-thick, galvanized-steel blade connectors.  
Horizontal Dampers: Include blade lock and stainless-steel closure spring.  
Heat-Responsive Device: Replaceable, 212 deg F rated, fusible links.  
Door:  
Double wall, rectangular.  
Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.  
Hinges and Latches: 1-1/2-inch ball or pipe hinge and cam latches.  
Fabricate doors airtight and suitable for duct pressure class.  
Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.  
Number of Hinges and Locks: More stringent of detail on plans (if applicable) or SMACNA requirements.

DUCT-MOUNTED ACCESS DOORS  
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."  
Door:  
Double wall, rectangular.  
Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.  
Hinges and Latches: 1-1/2-inch ball or pipe hinge and cam latches.  
Fabricate doors airtight and suitable for duct pressure class.  
Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.  
Number of Hinges and Locks: More stringent of detail on plans (if applicable) or SMACNA requirements.

DUCT ACCESS PANEL ASSEMBLIES  
Labeled according to UL 1978 by an NRTL.  
Panel and Frame: Minimum thickness 0.0528-inch carbon or 0.0428-inch stainless steel.  
Fasteners: Carbon or Stainless steel. Panel fasteners shall not penetrate duct wall.  
Gasket: Comply with NFPA 96; grease-tight, high-temperature ceramic fiber, rated for minimum 2000 deg F.  
Minimum Pressure Rating: 10-inch wg positive or negative.

DUCT ACCESSORY HARDWARE  
Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pilot tube and other testing instruments and of length to suit duct-insulation thickness.  
Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

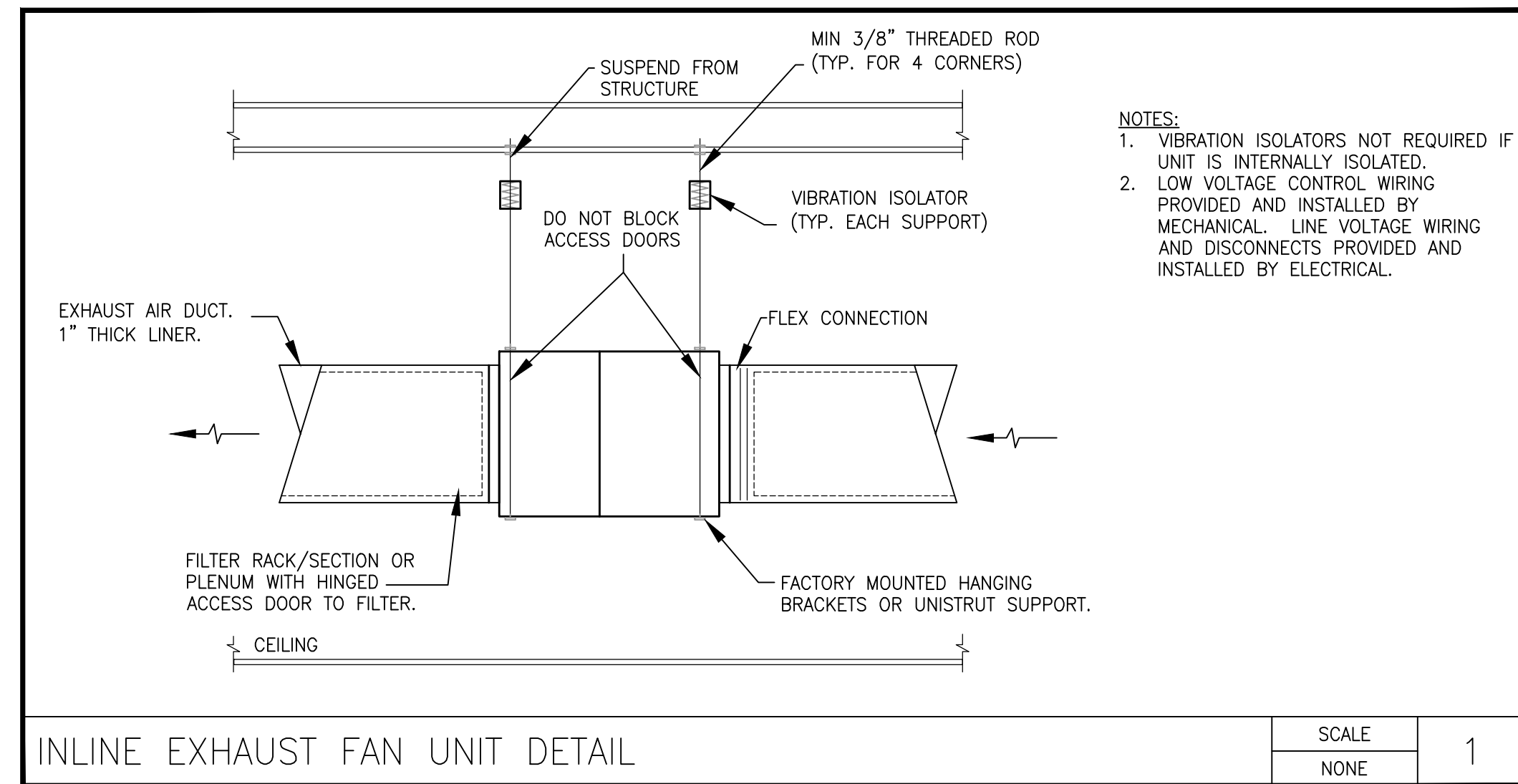
INSTALLATION  
Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.  
Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.  
Install backdraft dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.  
Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hot channels for pipe size, pressure, and service.  
Install dampers in line with nesting at hot channel.  
Set dampers to fully open position before testing, adjusting, and balancing.  
Install test holes of fan inlets and outlets and elsewhere as indicated.  
Install fire, smoke and combination dampers according to UL listing.  
Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:  
On both sides of duct coils.  
Upstream from duct filters.  
Adjacent to and close enough to fire or smoke dampers, to reset or reinstall fusible links. Access doors for access to fire or smoke dampers having fusible links shall be pressure relief access doors and shall be outward operation for access doors installed upstream from dampers and inward operation for access doors installed downstream from dampers.  
Control devices requiring inspection.  
Elsewhere as indicated.

Access Door Sizes:  
One-Hand or Inspection Access: 8 by 5 inches.  
Two-Hand Access: 12 by 6 inches.  
Head and Hand Access: 18 by 10 inches.  
Head and Shoulders Access: 21 by 14 inches.  
Body Access: 25 by 14 inches.  
Body plus Ladder Access: 25 by 17 inches.  
Unless otherwise indicated, to indicate the purpose of access door.  
Install duct test holes where required for testing and balancing purposes.

SECTION 23 37 13 - DIFFUSERS, REGISTERS, AND GRILLES  
Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where practical, protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "Duct Cleanliness for New Construction Guidelines."

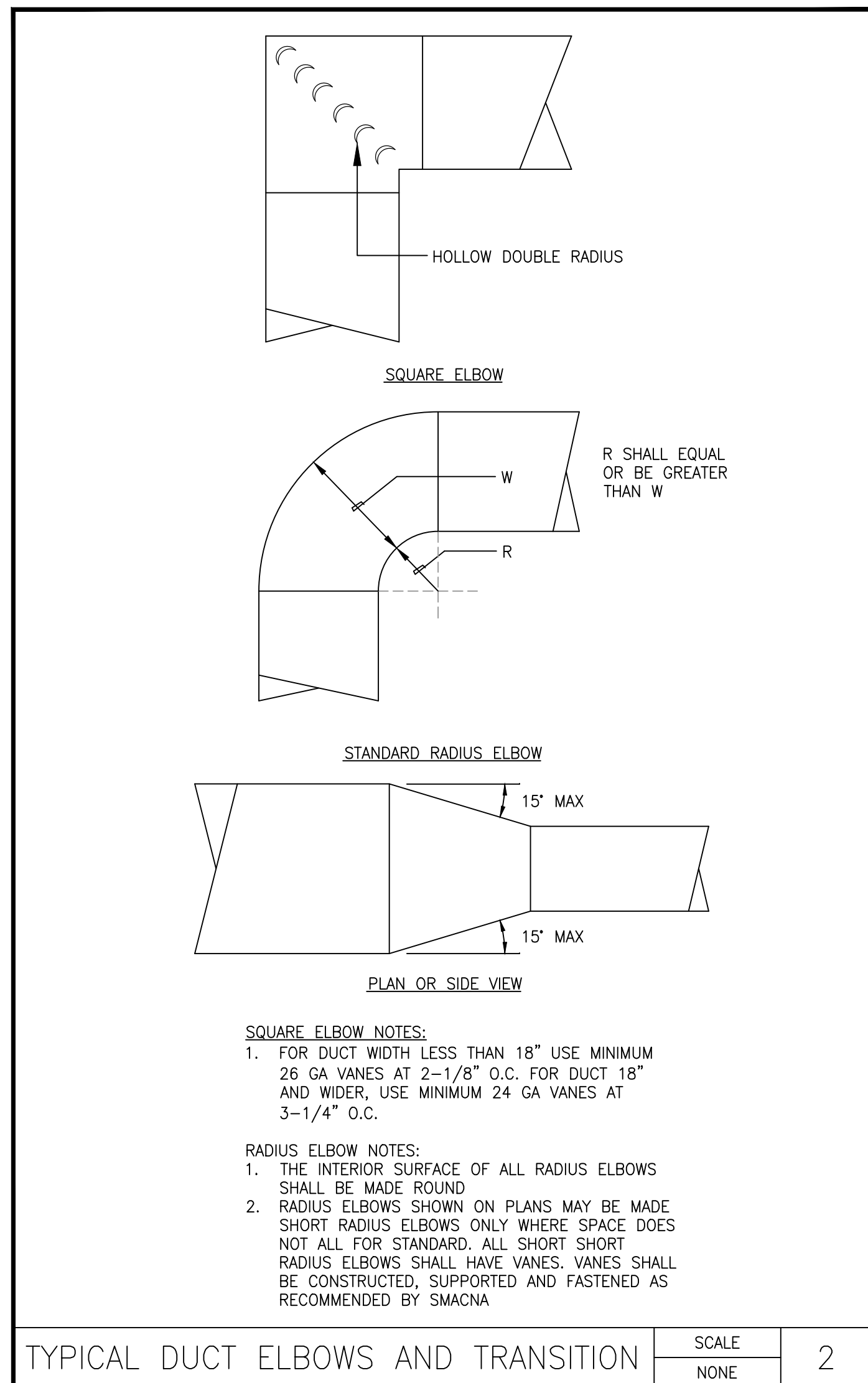
Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.  
BASIS-OF-DESIGN PRODUCT: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCT INDICATED ON DRAWINGS OR COMPARABLE PRODUCT BY ONE OF THE FOLLOWING: CARNES, KRUEGER, METALFARE, NAULOR INDUSTRIES, PRICE INDUSTRIES, TITUS, OR TUTTLE & BAILEY.

See schedules for more information  
SECTION 23 41 00 - PARTICULATE AIR FILTRATION  
Construction Filters: Provide temporary filters for all air handlers serving area of construction during project and replace with new after test and balance is complete. Provide temporary filter media over all return or exhaust grilles in project area to keep dust out of systems and ductwork.



INLINE EXHAUST FAN UNIT DETAIL

SCALE	1
NONE	



TYPICAL DUCT ELBOWS AND TRANSITION

SCALE	2
NONE	

T:\PROJECTS\T & D-2023\23201 - SMART FINANCIAL - NEW BRANCH BANK BUILDING - SPRING, TX\DWGS\SSUE\_01\VA\23201\H400.DWG 8/15/2022 1:40 PM ZACHERY ANSELL

tramonte design | studio  
4203 Yoakum Blvd., Suite 300 Houston, TX 77006

smart financial

STATE OF TEXAS  
ROBERT A. THOMAS  
4884  
LICENSED PROFESSIONAL ENGINEER  
08/03/2022

SMART FINANCIAL - SPRINGLAND  
7206 N. GRAND PARKWAY W  
SPRING, TX 77379

PLAN NORTH  
TRUE NORTH

T&D ENGINEERS

THOMAS & DUNNE ENGINEERS, L.L.C.  
738 S. HIGHWAY 6  
SUITE # 260  
HOUSTON, TX 77079  
PHONE: 713.933.1001  
FAX: 713.933.1004  
TEXAS REGISTRATION #F-10421

ISSUE FOR PERMIT 08.03.22

Issues

T&D Project Number 22301  
Drawn By WT  
Checked By BT

© TRAMONTE DESIGN STUDIO, 2022. ALL RIGHTS RESERVED.

M-400

MECHANICAL SPECS & DETAILS