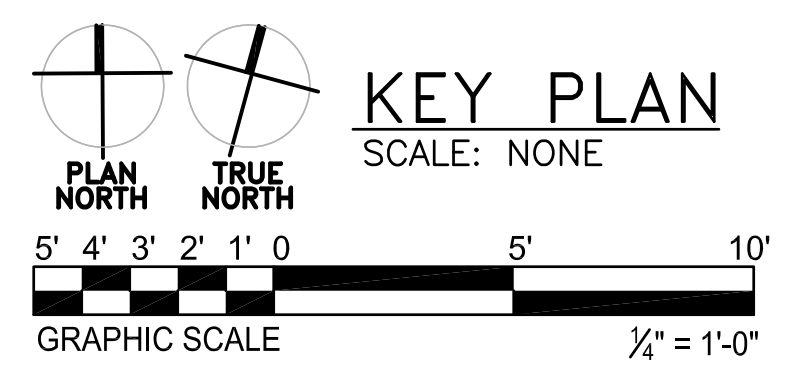


**KEYED NOTES:**

- 1 CONTRACTOR SHALL PROVIDE AN INITIAL AIR BALANCE PRIOR TO REMOVAL OF EXISTING AIR DEVICES. CONTRACTOR SHALL RECORD THE CFM OF EACH SUPPLY AIR DEVICE INDICATED FOR REPLACEMENT. RECORD THE COLLECTED DATA AND PRESENT DATA IN REPORT FORM, CONFORMING TO NEBB STANDARDS, TO ARCHITECT FOR DISTRIBUTION. AFTER INSTALLATION OF NEW AIR DEVICE, PROVIDE BALANCING DAMPER TO BALANCE NEW AIR DEVICES TO AIRFLOW RECORDED AT THE BEGINNING OF THE PROJECT. CONTRACTOR SHALL NOTE THAT INDICATED AIR DEVICES ARE AT NAIVE HEIGHT.
- 2 EXISTING AIR DEVICE SHALL BE DEMOLISHED AND REPLACED WITH NEW AIR DEVICE OF LIKE KIND IN NEW CEILING GRID LAYOUT. PROVIDED ALL APPURTENANCES REQUIRED AND NECESSARY TO PROVIDE A COMPLETE, FUNCTIONAL INSTALLATION, TURN-KEY IN NATURE AND READY FOR USE BY OWNER. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS, REQUIREMENTS, AND DETERMINE ALL REQUIRED AND RECOMMENDED APPURTENANCES TO ENSURE A COMPLETE, FUNCTIONAL SYSTEM.
- 3 AFTER INSTALLATION OF NEW AIR SUPPLY DEVICE, REBALANCE AIRFLOW TO CFM RECORDED PRIOR TO DEMOLITION OF AIR DEVICE. CONTRACTOR SHALL RECORD THE CFM AND PROVIDE REPORT, CONFORMING TO NEBB STANDARDS, TO THE ARCHITECT FOR DISTRIBUTION AND COMMENT. CONTRACTOR SHALL MAKE CORRECTIONS TO THE AIRFLOW AS NOTED BY ARCHITECT AND/OR ENGINEER.
- 4 CONNECT TO EXISTING DUCT ABOVE CEILING; FIELD VERIFY EXISTING CONDITIONS, LOCATIONS, SIZES, INSULATION, AND SUPPORTS. ROUTE NEW DUCT AS INDICATED. ROUTE TO SERVICE NEW ROOMS BELOW. COORDINATE EXACT FINAL ROUTING WITH ARCHITECT PRIOR TO STARTING WORK AND/OR FABRICATION OF MATERIALS. PROVIDE NEW AIR DEVICE IN NEW ROOM AS INDICATED. BALANCE AIRFLOW AS INDICATED.

**1**  
**UPPER CEILING**  
**HVAC PLAN**  
 M1 M1 SCALE: 1/4"=1'-0"



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Sheet Title:  
**HVAC PLAN**

Project: Immaculate Conception  
 Catholic Church  
 Location: 120 East Escobedo Street  
 Taft, Texas

Sheet  
**M1.0**  
 of X

### AIR DEVICES SCHEDULE

MARK	NECK SIZE	SERVICE	MOUNTING	DAMPER	MFG. & MODEL	REMARKS
S1	9"X9"	SUPPLY	SURFACE	IN DUCT	TITUS TDC-AA	1 WAY THROW, ALUMINUM, SQUARE NECK, WHITE, ADJUSTABLE. RAPID MTD FRAME.
S2	9"X9"	SUPPLY	SURFACE	IN DUCT	TITUS TDC-AA	2 WAY THROW, ALUMINUM, SQUARE NECK, WHITE, ADJUSTABLE. RAPID MTD FRAME.
S3	10"Ø	SUPPLY	LAY-IN	IN DUCT	TITUS TDC-AA	4 WAY THROW, ALUMINUM, 24"X24" PANEL, WHITE, ADJUSTABLE.
REPLACEMENT SUPPLY - TITUS TDC-AA WITH SIZES FIELD VERIFIED TO MATCH EXISTING PRIOR TO PURCHASE						
REPLACEMENT RETURN - TITUS PAR-A WITH SIZES FIELD VERIFIED PRIOR TO PURCHASE						
R1	22X22	RETURN	LAY-IN	NONE	TITUS PAR-A	RETURN, PROVIDE WITH SOUND DAMPENING BOOT. REFER TO DETAIL.

NOTES: APPLIES TO ALL UNITS

- PROVIDE INSULATION BLANKET ON REAR OF ALL AIR DEVICES.
- WHEN NOTED, PROVIDE ADJUSTABLE AIR VOLUME CONTROL DAMPER ON AIR DEVICE.
- CONTRACTOR IS RESPONSIBLE TO PROVIDE AIR DEVICE FRAME AND MOUNTING SYSTEM TO MATCH ARCHITECTURAL CEILING TYPES. COORDINATE WITH ARCHITECTURAL DRAWINGS. FIELD VERIFY FINAL AIR DEVICE LOCATION WITH ARCHITECTURAL CEILING PLAN PRIOR TO PURCHASE OF AIR DEVICE.
- PROVIDE SQUARE TO ROUND DUCT TRANSITION TO AIR DEVICES AS REQUIRED FOR EACH AIR DEVICE APPLICATION.
- COLOR WHITE ON ALL AIR DEVICES. CONFIRM AIR DEVICE COLOR WITH ARCHITECT PRIOR TO PURCHASE.
- FIELD VERIFY ROUTING OF FLEX DUCT. DO NOT CRIMP DUCT.
- ON SURFACE MOUNTED FRAMES, PROVIDE FOAM GASKET AND CONCEALED FRAME MOUNTING. NO SCREWS SHALL BE VISIBLE IN FACE OF FRAME.
- ON CEILING SURFACE MOUNTED FRAMES, PROVIDE RAPID MOUNT FRAME.
- ALL AIR DEVICES SHALL BE ALUMINUM CONSTRUCTION.
- PROVIDE SQUARE TO ROUND DUCT TRANSITION AS REQUIRED TO CONNECT AIR DEVICES TO DUCTWORK.

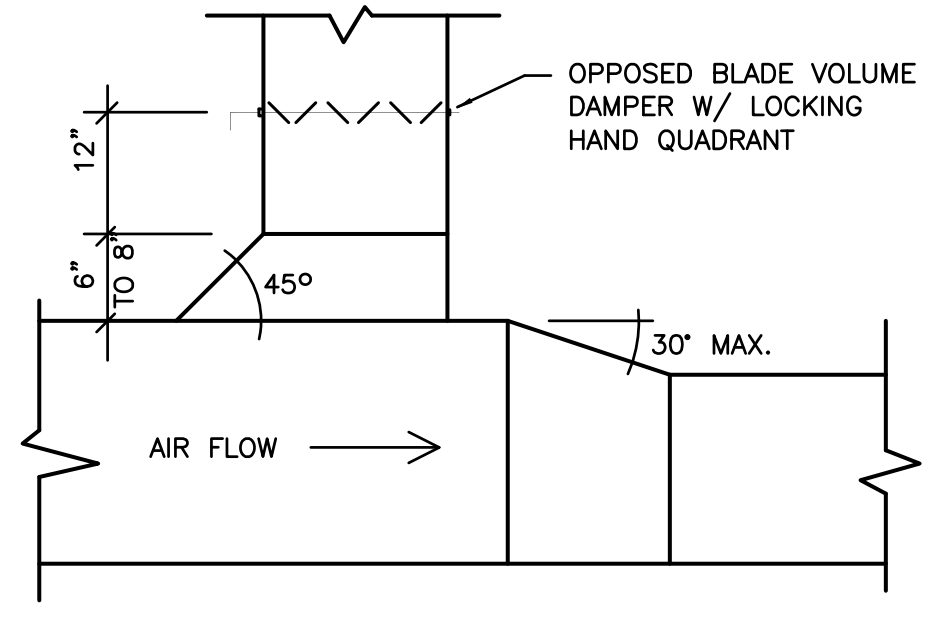
### TRUSS/DUCT COORDINATION NOTE

THE MECHANICAL CONTRACTOR INSTALLING DUCTWORK SHALL COORDINATE WITH OTHER TRADES INCLUDING, BUT NOT LIMITED TO, THE GENERAL CONTRACTOR, THE ROOFING CONTRACTOR, THE ROOF FRAMING VENDOR, ELECTRICAL CONTRACTOR, SECURITY CONTRACTOR, IT/NETWORK CONTRACTOR, AND ANY CONTRACTOR PLACING ITEMS IN THE CEILING AND/OR ABOVE THE CEILING. COORDINATION SHALL PRECEDE TAKE-OFF AND FABRICATION OF DUCTWORK AND INSTALLATION ANY HVAC RELATED ITEM REQUIRING INSTALLATION ABOVE AND/OR ON THE CEILING INCLUDING AIR DEVICES. FIELD VERIFY ALL DIMENSIONS PRIOR TO FABRICATION OF MATERIALS. MAKE FIELD ADJUSTMENTS TO DUCTWORK AS REQUIRED AND NECESSARY BASED ON ROOF FRAMING PROVIDED FOR THE PROJECT.

### GENERAL HVAC SYSTEMS INFORMATION:

THE CONTRACTOR SHALL FIELD VERIFY CONDITIONS PRIOR TO STARTING WORK. THE CONTRACTOR SHALL VERIFY CONDITIONS, REQUIREMENTS, LOCATIONS, AND ROUTING TO AVOID DUPLICATION, DISRUPTION, AND/OR DELAY TO PROJECT EFFORTS.

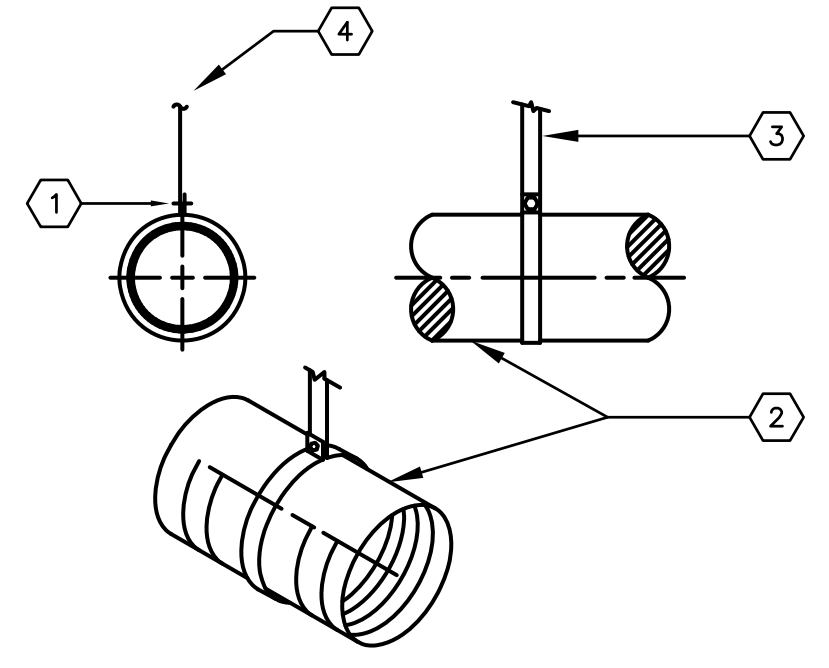
THE CONTRACTOR SHALL PROVIDE A COMPLETE, FUNCTIONAL HVAC SYSTEM. PROVIDE ALL REQUIRED, RECOMMENDED, AND NECESSARY COMPONENTS TO PROVIDE A COMPLETE, FUNCTIONAL SYSTEM TURN-KEY IN NATURE.



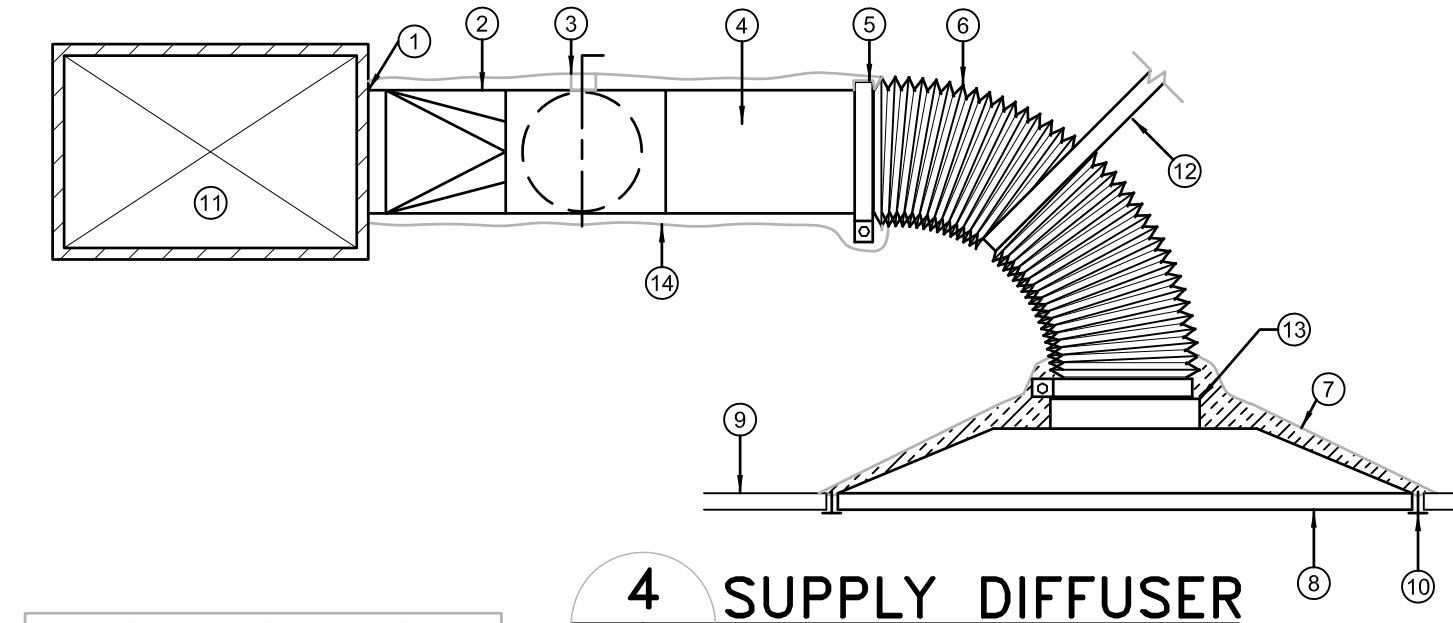
**1 BRANCH TAKEOFF**  
M2 M2 NOT TO SCALE

### KEYED NOTES:

- BOLT
- METAL EXHAUST DUCT OR DRYER VENT
- 1" MIN. BAND CLAMP
- SUPPORT FROM STRUCTURE



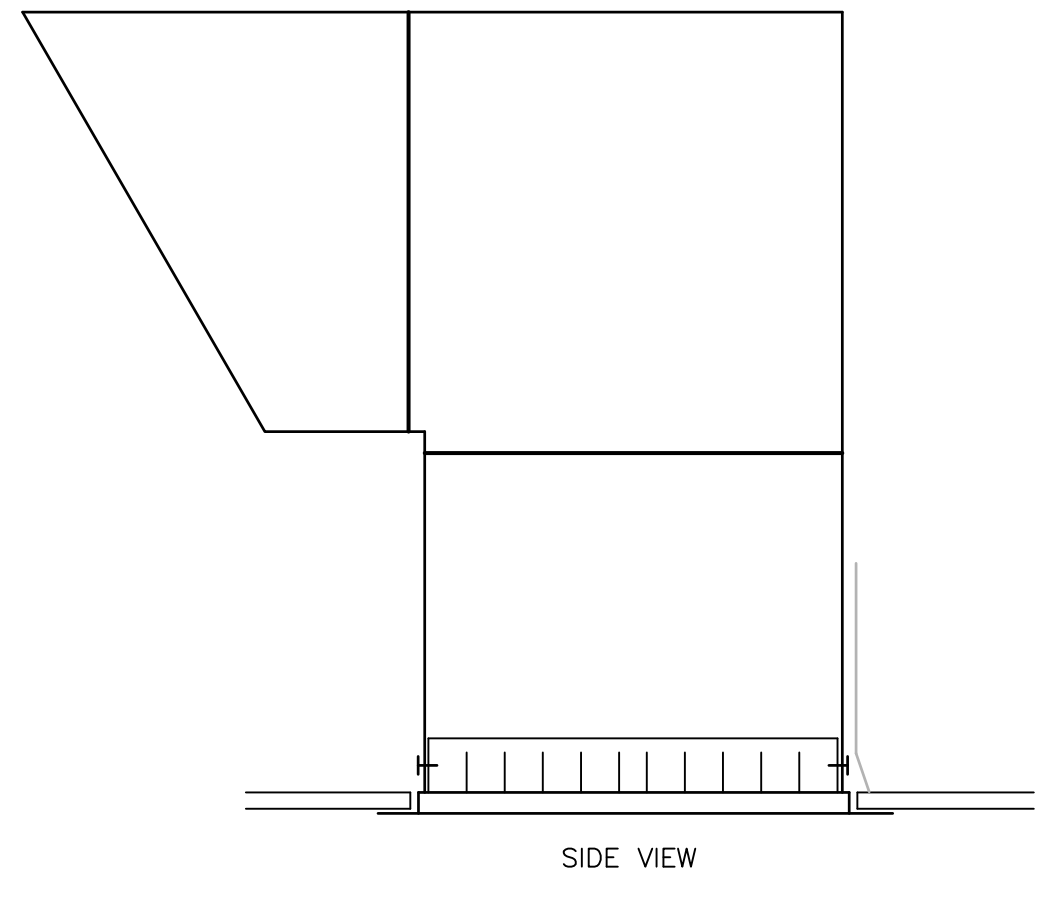
**2 FLEXIBLE DUCT SUPPORT**  
M2 M2 NOT TO SCALE



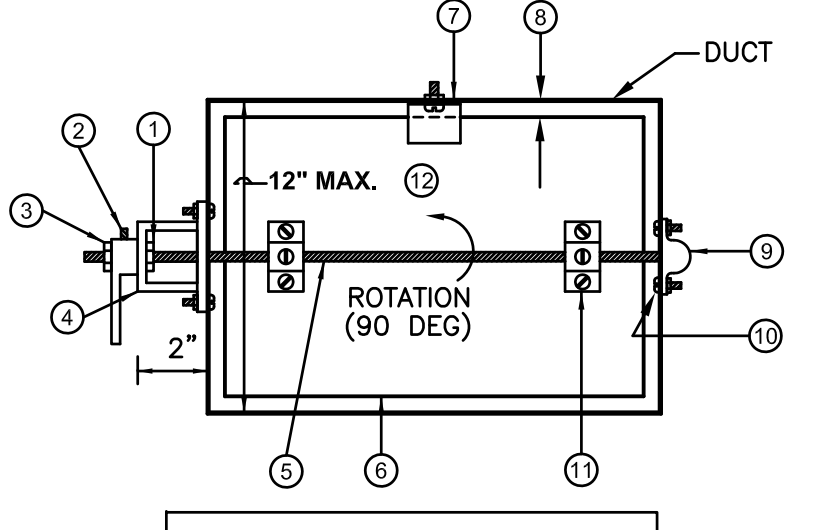
**4 SUPPLY DIFFUSER**  
M2 M2 NOT TO SCALE

### KEYED NOTES:

- RETURN AIR TRUNK DUCT. REFER HVAC PLANS FOR SIZE.
- BORDER AND MOUNTING TO MATCH CEILING TYPE. REFER HVAC SCHEDULES.
- CEILING. REFER TO ARCHITECTURAL FOR TYPE AND HEIGHT.
- RETURN AIR GRILLE.
- INSULATION. REFER TO SPECIFICATIONS.
- GALVANIZED SHEET METAL BRANCH DUCT.
- SECURE RETURN AIR DEVICE TO SHEET METAL DUCT WITH SHEET METAL SCREWS. (TYPICAL)



**3 RETURN WITH 'BOOT' FOR SOUND DAMPENING**  
M2 M2 NOT TO SCALE  
FOR NEW RETURNS ON LOWER CEILING ABOVE NEW ROOMS



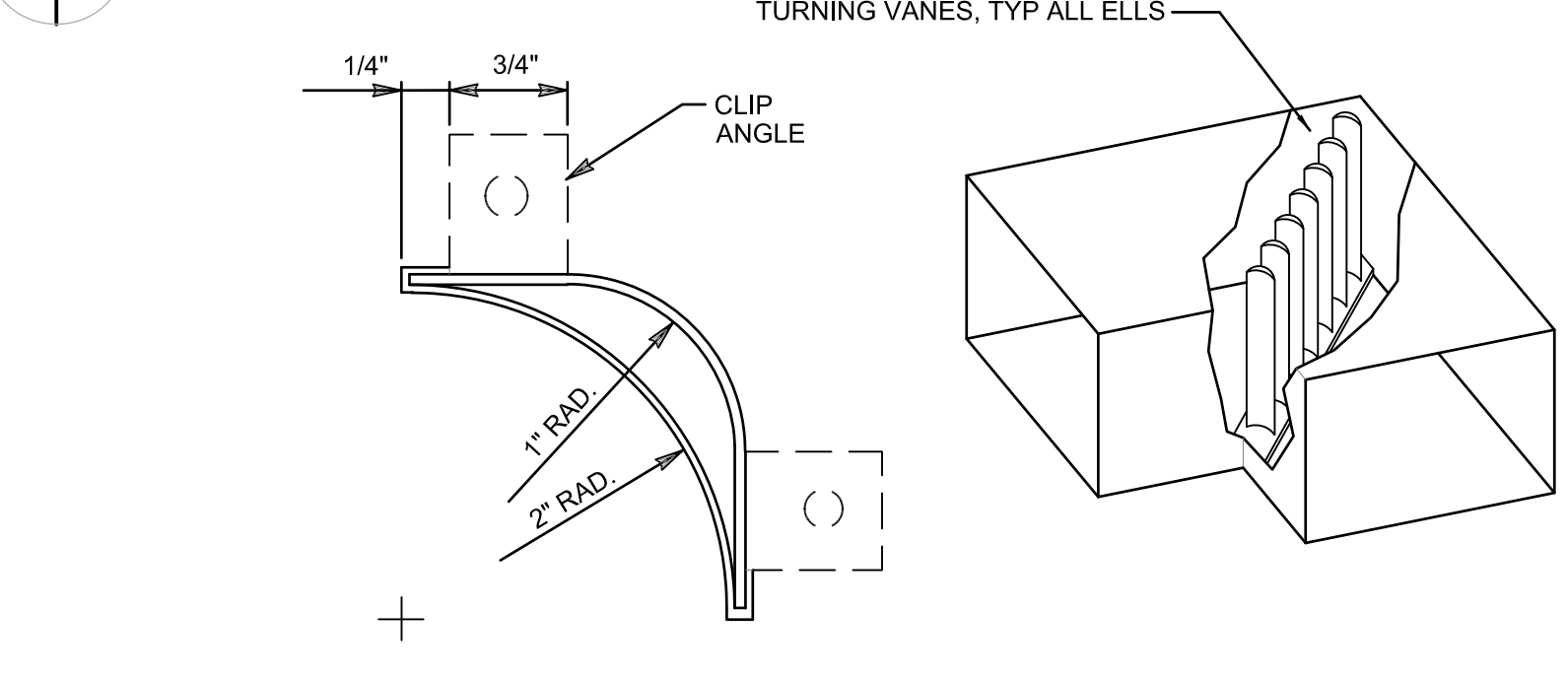
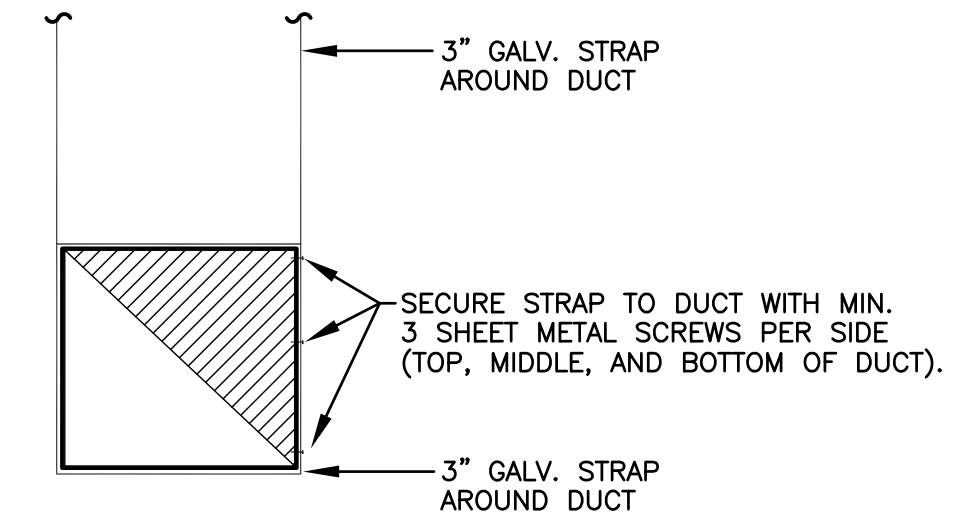
NOTE: DAMPERS SHALL BE SIMILAR FOR EQUIVALENT ROUND.

**4 BALANCING DAMPER**  
M2 M2 NOT TO SCALE

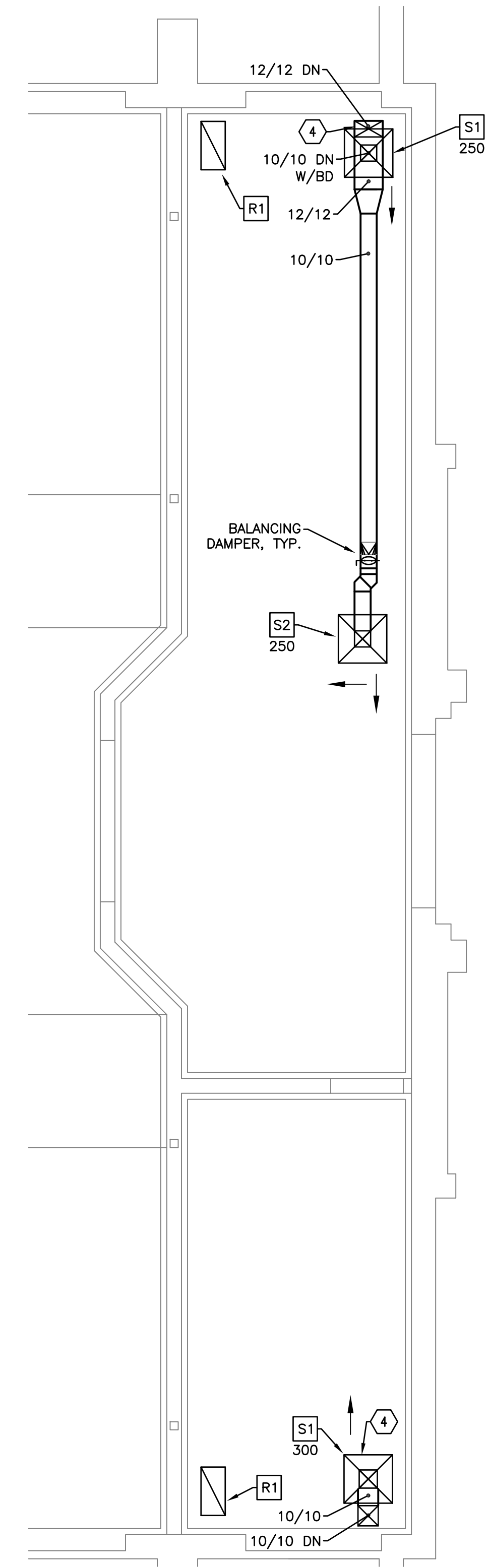
### KEYED NOTES:

- ROD POSITIONING NUT HANDLE WITH SET SCREW. ALIGN HANDLE WITH DAMPER BLADE. ENSURE THAT FULL 90° DAMPER BLADE MOVEMENT IS UNOBSTRUCTED.
- BLADE POSITION LOCKNUT.
- 2" STAND-OFF BRACKET, BOLT TO DUCT.
- 3/8" DIA. THREADED ROD.
- 16 GA. STEEL BLADE.
- STEEL ANGLE BLADE STOP, BOLT TO DUCT.
- 1/4" CLEARANCE ALL-AROUND.
- BEARING FITTING, BOLT TO DUCT.
- ENSURE BOLTS CLEAR BLADE, OR INSTALL THEM IN OPPOSING CORNERS AWAY FROM BLADE ROTATION.
- STEEL CLAMP, BOLT TO BLADE. PROVIDE AN ADDITIONAL ANTI-SLIP BOLT THROUGH THE ROD.
- FOR DUCT HEIGHTS MORE THAN 12" PROVIDE FACTORY-FABRICATED OPPOSED BLADE DAMPERS.

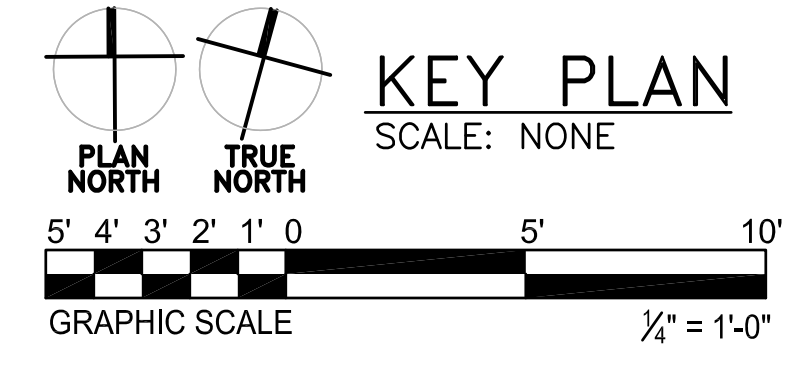
**5 DUCT SUPPORT**  
M2 M2 NOT TO SCALE



**6 TURNING VANE**  
M2 M2 NOT TO SCALE



**1 LOWER CEILING HVAC PLAN**  
M2 M2 SCALE: 1/4"=1'-0"



**KEY PLAN**  
SCALE: NONE

HEATING, VENTILATION, AND AIR CONDITIONING (HVAC) SPECIFICATION

PART 1 GENERAL

1.1 CONDITIONS

THE INSTRUCTIONS TO BIDDERS, GENERAL CONDITIONS, SUPPLEMENTAL GENERAL CONDITIONS, AND DIVISION 1 OF THE SPECIFICATIONS APPLY TO THIS SECTION.

1.2 SECTION INCLUDES

- A THE EXTENT OF WORK SHALL BE AS SHOWN ON DRAWINGS AND CALLED FOR IN ALL SECTIONS OF THE SPECIFICATIONS AND AS NECESSARY FOR A COMPLETE INSTALLATION OF HVAC SYSTEM IN ACCORDANCE WITH THE DESIGN REQUIREMENTS.
- B IT IS INTENDED THAT THE HVAC WORK INDICATED IN THE SPECIFICATIONS OR ON DRAWINGS SHALL MAKE UP INTO WORKING SYSTEMS COMPLETE IN EVERY DETAIL UNLESS INDICATED OTHERWISE. ALL MATERIALS AND LABOR WHETHER SPECIFICALLY INDICATED OR NOT BUT INCIDENTAL TO THE PROPER INSTALLATION OF THE HVAC WORK SHALL BE FURNISHED COMPLETE IN EVERY DETAIL.
- C CHANGES IN PRICE FOR THE HVAC WORK CAN ONLY BE MADE FOR CHANGES IN THE ORIGINAL DESIGN INTENTIONS AND ONLY WITH WRITTEN CONSENT OF THE ARCHITECT.

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A PLUMBING
- B LINE VOLTAGE AND SERVICE WIRING

1.4 SHOP DRAWINGS

FURNISH SHOP DRAWINGS FOR THE HVAC WORK AS REQUIRED BY THE ARCHITECT, ENGINEER OR OTHER TRADES TO PROPERLY COORDINATE INSTALLATION OF ALL SYSTEMS. SHOW ALL TRADES THAT REQUIRE COORDINATION, INCLUDING ELECTRICAL, PLUMBING, FIRE PROTECTION AND MECHANICAL PLANS SHALL SHOW ACTUAL EQUIPMENT SUBMITTED AND ACCEPTED TO TRUE DIMENSIONS, INCLUDING SERVICE ACCESS RECOMMENDATIONS OF THE MANUFACTURER. MINIMUM SCALE IS 3/8" = 1'-0", SHEET SIZE IS NO LESS THAN 11" X 17" AND NO LARGER THAN BID DOCUMENTS (24" X 36" OR 30" X 42").

1.5 PRODUCT HANDLING

- A MATERIALS SHALL BE STORED IN SUCH A MANNER AS TO PROTECT THEM FROM DAMAGE OR DETERIORATION.
- B ALL MATERIALS AND EQUIPMENT INJURED OR DAMAGED (IN TRANSIT, STORAGE, INSTALLATION OR TESTING BEFORE COMPLETION OF THE CONTRACT) SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL EXPENSE TO THE OWNER PRIOR TO FINAL ACCEPTANCE.

1.6 QUALITY CONTROL

- A CODES AND PERMITS: THE HVAC WORK SHALL COMPLY WITH ALL LOCAL, STATE AND NATIONAL CODES APPLICABLE TO THIS PROJECT. THE CONTRACTOR SHALL OBTAIN ANY MECHANICAL PERMITS REQUIRED FOR THE HVAC WORK.
- B LICENSE: THE CONTRACTOR SHALL HAVE A CURRENT STATE LICENSE SUITABLE TO THE SCOPE OF WORK UNDER THIS CONTRACT.
- C SPECIFICATIONS AND DRAWINGS: THE HVAC WORK SHALL BE DONE ACCORDING TO THE HVAC SPECIFICATIONS, THE HVAC DRAWINGS, THE GENERAL SPECIFICATIONS, AND THE GENERAL DRAWINGS. IN CASE OF A CONFLICT, THE SPECIFICATIONS SHALL GOVERN.
- D JOB SITE: ANY JOB SITE CONDITIONS AFFECTING THE HVAC WORK SHALL BE THE RESPONSIBILITY OF THE HVAC CONTRACTOR UNLESS INDICATED OTHERWISE.
- E SUBMITTALS: A COMPLETE BROCHURE OF MATERIAL, EQUIPMENT, APPURTENANCES, AND ACCESSORIES PROPOSED FOR USE MUST BE SUBMITTED ACCOMPANIED BY COMPLETE DESCRIPTIVE LITERATURE, DRAWINGS, RATING TABLES OR CURVES NECESSARY TO GIVE FULL AND COMPLETE DETAILS. NO CONSIDERATION WILL BE GIVEN TO PARTIAL LISTS SUBMITTED FROM TIME TO TIME. ANY ITEM ON THIS LIST, WHICH IS REJECTED BECAUSE OF UNSUITABILITY OR INFERIOR QUALITY, MUST BE REPLACED BY ACCEPTABLE ITEMS WITHIN TWO WEEKS. AFTER THAT TIME THE ARCHITECT RESERVES THE RIGHT TO NOTIFY THE CONTRACTOR AS TO TYPE OF MATERIALS HE WILL BE REQUIRED TO FURNISH. APPROVAL OF MATERIALS OR EQUIPMENT SHALL NOT BE CONSTRUED AS RELEASING THIS CONTRACTOR FROM FURTHER RESPONSIBILITY FOR FULL COMPLIANCE WITH ALL PROVISIONS OF THESE CONTRACT DOCUMENTS, BUT RATHER AS A MEANS TO COORDINATE THE EQUIPMENT INSTALLATION.

1.7 ENGINEERING AND MAINTENANCE DATA

CONTRACTOR IS TO SUPPLY THE OWNER WITH 3 COPIES OF ENGINEERING PRODUCT AND PERFORMANCE DATA, INSTALLATION AND MAINTENANCE BULLETINS FOR EACH PIECE OF EQUIPMENT AND/OR INSTRUMENT FURNISHED.

PART 2 PRODUCTS

2.1 MATERIALS

- A USE NEW MATERIALS OF THE MANUFACTURER'S CURRENT PRODUCTION UNLESS INDICATED OTHERWISE. THE EQUIPMENT AND MATERIALS SPECIFIED INDICATE A MINIMUM GRADE AND DESIGN. ANY FEATURE INCLUDED AS STANDARD WITH THE MATERIALS LISTED SHALL BE INCLUDED IN ANY SUBSTITUTION. SUBSTITUTES OF EQUAL GRADE AND DESIGN MAY BE PERMITTED AND MUST BE SUBMITTED FOR APPROVAL IN ACCORDANCE TO THESE SPECIFICATIONS. ALL MATERIALS AND EQUIPMENT SHALL BE SUBJECT TO FINAL ACCEPTANCE BY THE ARCHITECT AT COMPLETION OF THE PROJECT.
- B ALL OTHER MATERIALS, NOT SPECIFICALLY DESCRIBED BUT REQUIRED FOR A COMPLETE AND PROPER INSTALLATION OF THE WORK OF THIS SECTION, SHALL BE NEW, FIRST QUALITY OF THEIR RESPECTIVE KINDS, AND AS SELECTED BY THE CONTRACTOR SUBJECT TO THE APPROVAL OF THE ARCHITECT.

2.2 SUPPLY AND RETURN DUCTS - GALVANIZED STEEL, SHEET METAL DUCT

- A GALVANIZED SHEET STEEL: G90 COATING, LOCK FORMING QUALITY (LFQ), WITH MINIMUM GALVANIZED COATING OF 1-1/4 OZ. TOTAL FOR BOTH SIDES OF ONE SQUARE FOOT OF A SHEET.
- B REINFORCING: REINFORCING BARS AND ANGLES SHALL BE OF THE SAME MATERIAL AS DUCTS ON WHICH THEY ARE USED.
- C FABRICATE AND INSTALL IN ACCORDANCE WITH SMACNA DUCT CONSTRUCTION STANDARDS.
- D DUCT SIZES SHALL BE AS INDICATED ON THE DRAWINGS. SIZES ON PLANS ARE CLEAR INSIDE DIMENSIONS.
- E PROVIDE INSULATION ON DAMPER HANDLE BUILD-OUT.

HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

(CONTINUED)

2.3 DUCT INSULATION

- A INSULATE ALL AIR HANDLING SYSTEMS OR PORTIONS THEREOF, DELIVERING CONDITIONED AIR, EXCEPT WHERE SPECIFICALLY NOTED OTHERWISE.
  - 1. INSULATE ALL MEDIUM PRESSURE DUCTS, AND ROUND LOW PRESSURE DUCTS, WITH FLEXIBLE GLASS FIBER INSULATION WITH FACTORY APPLIED REINFORCED FOIL-KRAFT FACING, JOHNS-MANVILLE MICROLOTE R-6 FSK OR APPROVED EQUAL, 1-1/2 INCH MINIMUM THICKNESS. SECURE TO DUCT WITH MECHANICAL FASTENERS ON 18 INCH CENTERS OR ADHESIVE, JOHNS-MANVILLE U-GLUE OR APPROVED EQUAL.
  - 2. SEAL ALL JOINTS, FASTENER PENETRATIONS AND OTHER BREAKS IN VAPOR BARRIER WITH 3 INCH WIDE STRIPS OF THE SAME FACING MATERIAL ADHERED WITH VAPOR BARRIER ADHESIVE, JOHNS-MANVILLE U-GLUE OR APPROVED EQUAL, OR 3 INCH WIDE STRIPS OF WHITE GLASS FABRIC, JOHNS-MANVILLE DURAMESH FABRIC NO. 206 OR APPROVED EQUAL, COATED WITH VAPOR BARRIER MASTIC, FOSTER 30-35 OR APPROVED EQUAL.

2.4 FLEXIBLE INSULATED DUCT

FLEXIBLE INSULATED DUCT SHALL HAVE A SEAMLESS INTERIOR ACOUSTICALLY RATED CPE LINER ENCAPSULATING A SPRING STEEL HELIX. THE INNER AIR CORE SHALL BE COVERED WITH R-6.0 FIBERGLASS INSULATION WRAPPED WITH A METALLIZED, SPIRALLY REINFORCED VAPOR BARRIER. THE DUCT SHALL BE ATTACHED TO BELL MOUTH STARTING COLLARS HAVING INTEGRAL BUTTERFLY BALANCING DAMPERS, INSULATION SHIELD AND DIE FORMED MOUNTING GROOVE, ALL OF GALVANIZED STEEL CONSTRUCTION. THE FLEXIBLE DUCT SHALL BE ATTACHED TO THE STARTING COLLAR AND DIFFUSER NECK WITH 1/2" STAINLESS STEEL LOCKING BANDS OR MACHINE TIGHTENED PLASTIC BANDS. MANUALLY TIGHTENED PLASTIC BANDS WILL NOT BE ACCEPTED.

2.5 REGISTER, GRILLES, DIFFUSERS

AIR DEVICES SHALL BE ALL ALUMINUM CONSTRUCTION EXCEPT AS SPECIFICALLY NOTED. SIZE AND TYPES AS INDICATED ON THE DRAWINGS.

2.6 FIRE SEAL CAULKING

FIRE RETARDANT FOAM SEALANT, U/L LISTED, CONFORMING TO ASTM E 814 AND APPROVED BY THE BUILDING DEPARTMENT.

PART 3 EXECUTION

3.1 REQUIREMENTS

- A DISCREPANCIES: SHOULD ANY DISCREPANCIES EXIST BETWEEN THE HVAC SPECIFICATIONS AND THE HVAC DRAWINGS, THE MORE STRINGENT SHALL GOVERN. THE ARCHITECT AND/OR ENGINEER SHALL DETERMINE THE MORE STRINGENT METHOD.
- B PROGRESS: THE HVAC WORK SHALL PROGRESS WITH THE OTHER WORK SO THAT NO DELAYS IN CONSTRUCTION ARE INCURRED.
- C WEAKENING STRUCTURES: LOCATE THE HVAC WORK SUCH THAT IT WILL NOT WEAKEN THE STRUCTURE BEYOND LIMITS ACCEPTABLE TO THE ARCHITECT.
- D WORKMANSHIP: PERFORM ALL WORK IN ACCORDANCE WITH STANDARD APPROVED PRACTICES.
- E LAYOUT: ARRANGE THE HVAC SYSTEM IN CAREFUL COORDINATION WITH THE DRAWINGS. FOLLOW THE GENERAL LAYOUT SHOWN ON THE DRAWINGS IN ALL CASES EXCEPT WHERE OTHER WORK MAY INTERFERE. LAY OUT ALL PIPES TO FALL WITHIN PARTITION, WALLS, OR ROOF CAVITIES, AND DO NOT REQUIRE FURRING OTHER THAN AS SHOWN ON THE DRAWINGS. COORDINATE LOCATIONS OF REGISTERS, GRILLES, AND DIFFUSERS WITH CEILING LAYOUT AND OTHER BUILDING COMPONENTS.

3.2 CONDITIONS

EXAMINE ALL AREAS AND CONDITIONS UNDER WHICH WORK OF THIS SECTION WILL BE INSTALLED. CORRECT CONDITIONS DETRIMENTAL TO THE PROPER AND TIMELY COMPLETION OF THE WORK. DO NOT PROCEED UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.

3.3 INSTALLATION

- A GENERAL (CONTINUED)
  - 1. SLEEVE AND ESCUTCHEONS: PROVIDE SLEEVES FOR ALL DUCTS PASSING THROUGH WALLS, ROOFS, AND FLOORS. SLEEVES SHALL BE OF SUFFICIENT SIZE TO CLEAR BY 1/4" ALL AROUND, INCLUDING INSULATION WHERE APPLICABLE. SLEEVES SHALL BE CUT OFF FLUSH WITH WALL FACE OR BELOW FLOORS AND SHALL EXTEND 6" ABOVE THE FLOOR OR ROOF. SLEEVES AROUND PIPE PASSING THROUGH GROUND FLOOR OR OUTSIDE WALLS SHALL BE CAULKED WATERTIGHT WITH OAKUM AND PLASTIC CEMENT. CHROME PLATED BRASS ESCUTCHEONS SHALL BE PROVIDED WHEREVER PIPES PASS THROUGH FLOORS, WALLS, AND CEILINGS OF FINISHED AREAS.
  - B AIR DUCT WORK:
    - 1. COORDINATE WITH OTHER TRADES TO AVOID DISRUPTION, DUPLICATION, AND/OR DELAY PRIOR TO FABRICATION AND INSTALLATION.
    - 2. FLEXIBLE AIR DUCT CONNECTIONS SHALL BE FURNISHED AND INSTALLED AS INDICATED ON THE DRAWINGS.
    - 3. SEAL ALL JOINTS TO MINIMIZE AIR LOSS WITH LATEX DUCT SEALANT

3.4 GUARANTEE

A CONTRACTOR SHALL GUARANTEE THAT ANY DEFECTS IN EQUIPMENT OR WORKMANSHIP ARISING IN THE HVAC WORK WITHIN A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE SHALL BE CORRECTED AT NO COST TO THE OWNER. THIS SHALL ALSO INCLUDE THE REPLACEMENT OF REFRIGERANT AND LABOR INCIDENTAL THERETO, PROVIDE THE OWNER WITH ANY ADDITIONAL GUARANTEES PROVIDED BY THE MATERIALS OR EQUIPMENT MANUFACTURERS WHETHER SPECIFICALLY MENTIONED OR NOT.

3.5 TESTS

- A TEST ALL REFRIGERANT PIPING WITH DRY NITROGEN TO 325 PSI. CARE SHALL BE EXERCISED TO REMOVE ANY PRESSURE BELLOWS MECHANISMS, TO BLOCK OFF EXPANSION AND SOLENOID VALVES, TO DISCONNECT EXTERNAL EQUALIZER CONNECTIONS, AND TO REMOVE POWER ASSEMBLY. SOLDERED CONNECTIONS SHALL BE TAPPED WITH Mallet WITH TEST PRESSURE IN THE SYSTEM. INSPECT ALL JOINTS WITH SOAP SOLUTION. AFTER SYSTEM IS FREE OF LEAKS, A SMALL AMOUNT OF REFRIGERANT SHALL BE CHARGED INTO THE SYSTEM AND THE JOINTS TESTED WITH AN ELECTRONIC LEAK DETECTOR. SYSTEM SHALL BE ALLOWED TO STAND FOR 24 HOURS WITH THE PRESSURE ON. WHEN TESTING IS COMPLETE, RECONNECT ALL CONTROLS. EVACUATE THE SYSTEM TO 28" HG. APPLY HEAT TO POCKETS, ELBOWS AND LOW SPOTS IN PIPING WHILE EVACUATING. AFTER CLOSING OFF VALVE CONNECTED TO VACUUM PUMP, HOLD VACUUM IN SYSTEM FOR A MINIMUM PERIOD OF 5 HOURS. BREAK VACUUM AT VAPOR CHARGING CONNECTION UNTIL PRESSURE REACHES APPROXIMATELY 2 LBS. COMPLETE CHARGING OF SYSTEM BY CHARGING LIQUID REFRIGERANT THROUGH A NEW DEHYDRATOR.

HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

(CONTINUED)

- B RUN AND TESTING: ALL HVAC EQUIPMENT SHALL BE THOROUGHLY RUN AND TESTED PRIOR TO THE BUILDING OCCUPANCY AS PART OF THE WORK OF THIS SECTION. FURNISH TO THE ARCHITECT A DATA SHEET, FOR BOTH HEATING AND COOLING CYCLES, SHOWING: 1) VOLTAGE AND AMPERE DRAW ON ALL MOTORS AND HEATING UNITS; 2) REFRIGERANT PRESSURE, TEMPERATURES AND CFM FOR EACH AIR CONDITIONING SYSTEM; 3) CFM FOR EACH EXHAUST FAN; 4) CFM FOR EACH DIFFUSER, GRILLE AND REGISTER BY SYSTEM. RECORD ACTUAL VALUES ADJACENT TO DESIGN VALUES. CORRECT ANY DEFICIENCY IN THE SYSTEM IF RELATED TO INSTALLATION DEFECTS. REPORT ANY SUBSTANDARD PERFORMANCE ISSUES TO THE ENGINEER.

3.6 PAINTING

"TOUCH UP" ALL EQUIPMENT SCRATCHED OR MARRED IN SHIPMENT AND HANDLING BEFORE FINAL ACCEPTANCE BY ARCHITECT. EQUIP-MENT WITHOUT FACTORY FINISH PAINT AND EXPOSED TO WEATHER SHALL BE GIVEN A ZINC CHROMATE PRIMER FINISHED WITH TWO COATS OF FINISH PAINT OF A TYPE AND COLOR AS DESIGNATED BY THE ARCHITECT.

3.7 CLEAN UP

REMOVE FROM THE SITE ALL DEBRIS FROM THE WORK OF THIS SECTION.

3.8 INSPECTION

COMPLETE INSPECTION AND PERFORMANCE TEST OF THE HVAC WORK SHALL BE REQUIRED BY AND DEMONSTRATED TO THE ENGINEER BEFORE FINAL ACCEPTANCE.

3.9 INSTRUCTIONS & O/M MANUALS

- A PROVIDE THE SERVICES OF A QUALIFIED PERSON TO THOROUGHLY INSTRUCT THE OWNER'S STAFF IN THE PROPER OPERATION OF THE SYSTEM. THESE INSTRUCTIONS SHALL INCLUDE EACH PIECE OF MAJOR EQUIPMENT AND SHALL INCLUDE INSTRUCTIONS IN THE PROPER MAINTENANCE OF EACH PIECE OF EQUIPMENT.
- B PREPARE A MANUAL FOR THE SYSTEM WHICH SHALL INCLUDE A TABULATION OF EACH PIECE OF EQUIPMENT, BY NAME, MODEL NUMBER AND SERIAL NUMBER. INCLUDE DESCRIPTIVE CATALOG INFORMATION, MAINTENANCE INSTRUCTION BOOKS AND REPAIR PARTS LISTS. INFORMATION SHALL BE BOUND IN A 8 1/2" X 11" HARDBACK BINDER. -FURNISH THREE (3) COPIES OF THIS BOOK TO THE OWNER.

END OF SECTION

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Sheet Title:  
HVAC SPECIFICATIONS

Project: Immaculate Conception Catholic Church

Location: 120 East Escobedo Street Taft, Texas

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HVAC LEGEND			
MARK	DESCRIPTION	MARK	DESCRIPTION
	AIR DEVICE - AIR FLOW-DEVICE TYPE AND CFM (DOUBLE LINE FLEX)	$\text{P}_{\text{AHU-1}}$	HUMIDISTAT - UNIT NUMBER
	AIR DEVICE - AIR FLOW-DEVICE TYPE AND CFM (SINGLE LINE FLEX)	$\text{SD}_{\text{AHU-1}}$	SMOKE DETECTOR
	SUPPLY AIR DIFFUSER (LAY-IN MOUNT)	$\text{CO}$	CO SENSOR
	SUPPLY AIR DIFFUSER (SURFACE MOUNT)	$\text{CO}_2$	CO <sub>2</sub> SENSOR
	RETURN AIR GRILLE	$\text{FD}$	FIRE DAMPER
	EXHAUST GRILLE	$\text{FSD}$	FIRE/SMOKE DAMPER
	DUCT WITH DIMENSION - WIDTHxDEPTH	$\text{V}$	DENOTES HVAC KEYED NOTE
	BRANCH TAKE-OFF WITH MANUAL VOLUME DAMPER. ARROW INDICATES AIRFLOW DIRECTION.		ROUND ELBOW WITH TURNING VANES
	AIR DEVICE - GRILLE STYLE - CFM		SQUARE ELBOW W/ TURNING VANES
	DUCT SECTION - SUPPLY		TRANSITION (TOP AND SIDE VIEWS)
	DUCT SECTION - RETURN		PIPING DOWN
	TRANSFER GRILLE - MAY NOT INCLUDE ARROWS. RE: PLAN		PIPING UP
	DOOR GRILLE		CLEANOUT
	CONTROL PANEL	SYMBOL	ABBREVIATIONS
	CONNECT TO EXISTING		CONDENSATE DRAIN (INDIRECT WASTE) PIPING (MAY NOT HAVE 'D')
	MANUAL BALANCING DAMPER IN DUCT	SF	SUPPLY FAN
	MOTORIZED BALANCING DAMPER IN DUCT	EF	EXHAUST FAN
	ROOF MOUNTED EXHAUST FAN	ACCU	CONDENSING UNIT
	ON DEMOLITION PLANS: DASHED DUCT - DEMOLISH SOLID DUCT - EXISTING TO REMAIN	AHU	AIR HANDLING UNIT
	ON NEW WORK PLANS: DASHED DUCT - EXISTING TO REMAIN SOLID DUCT - NEW DUCTWORK	MS	DUCTLESS MINI-SPLIT
$\text{AHU-2}$	THERMOSTAT - UNIT SERVICED INDICATED	UH	UNIT HEATER
$\text{AHU-2}$	THERMOSTAT SENSOR - UNIT SERVICED INDICATED	RTU	ROOF TOP UNIT
$\text{AHU-2}$	THERMOSTAT SENSOR - UNIT SERVICED INDICATED	AFF	ABOVE FINISHED FLOOR
		AFG	ABOVE FINISHED GRADE
		CO	CARBON MONOXIDE
		CO <sub>2</sub>	CARBON DIOXIDE
		AP	ACCESS PANEL
		CFM	CUBIC FEET PER MINUTE
		BTU	BRITISH THERMAL UNIT
		MBTUH	(THOUSAND) BRITISH THERMAL UNIT
		KW	KILOWATT
		HP	HORSEPOWER
		FT/IN	FEET / INCHES
		EAT	ENTERING AIR TEMPERATURE
		LAT	LEAVING AIR TEMPERATURE
		RLA	RATED LOAD AMPERAGE
		FLA	FULL LOAD AMPS
		MCA	MINIMUM CIRCUIT AMPACITY
		MOC	MINIMUM OVER CIRCUIT PROTECTION
		DB/WB	DRY BULB / WET BULB

NOTE THAT ALL SYMBOLS MAY NOT BE USED ON THIS PROJECT

#### TESTING, ADJUSTING, AND BALANCING

##### PART 1 GENERAL

###### 1.1 SCOPE OF WORK

- A. MECHANICAL DIVISION SHALL PROVIDE TESTING, ADJUSTING, AND BALANCING OF THE HEATING, VENTILATING AND AIR CONDITIONING SYSTEM.

###### 1.2 RESPONSIBILITY OF MECHANICAL CONTRACTOR:

- A. MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETE SYSTEM START-UP PRIOR TO TESTING, ADJUSTING AND BALANCING AND SHALL DEMONSTRATE OPERATION OF EACH ITEM OF MECHANICAL EQUIPMENT.
- B. INSTALL CLEAN FILTERS IN THE AIR HANDLING UNIT.
- C. VERIFY THAT SYSTEMS ARE COMPLETE AND OPERABLE.
- D. FURNISH ALL LABOR AND MATERIAL REQUIRED TO ELIMINATE ANY DEFICIENCIES OR MALPERFORMANCE. RESOLVE ALL OPERATIONAL DEFICIENCIES PRIOR TO SUBMISSION OF FINAL TAB REPORT.

###### 1.3 RESPONSIBILITY OF CONTRACTOR:

- A. SUBMIT BRIEF WRITTEN REPORT OF EACH INSPECTION TO OWNER, ARCHITECT, AND ENGINEER.
- B. PROVIDE ALL INSTRUMENTS AND EQUIPMENT REQUIRED TO ACCOMPLISH NECESSARY TESTING, ADJUSTING AND BALANCING AND AS REQUIRED BY THE ENGINEER TO VERIFY PERFORMANCE. ALL INSTRUMENTS SHALL BE IN ACCURATE CALIBRATION AND SHALL BE CALIBRATED IN RANGES THAT WILL BE EXPECTED.
- C. UPON COMPLETION OF THE INSTALLATION AND START-UP OF THE MECHANICAL EQUIPMENT BY THE MECHANICAL DIVISION, THE CONTRACTOR WILL TEST, ADJUST AND BALANCE THE SYSTEM COMPONENTS TO OBTAIN OPTIMUM CONDITIONS IN EACH CONDITIONED SPACE IN THE FACILITY. THE CONTRACTOR IS ADVISED THAT DEFICIENCIES IN HVAC CONSTRUCTION ARE OFTEN ENCOUNTERED DURING FINAL TAB SERVICES AND THE CONTRACTOR SHOULD INCLUDE IN BID PROPOSAL AN AMOUNT IT DEEMS ADEQUATE TO COMPENSATE FOR TIME IN IDENTIFYING THE DEFICIENCIES AND THEIR CORRECTION.
- D. FOURTEEN DAYS, OR EARLIER, PRIOR TO OWNER'S FINAL INSPECTION AS REQUESTED BY THE GENERAL CONTRACTOR, PREPARE SEVEN COPIES OF THE COMPLETED TESTING AND BALANCING REPORT AND SUBMIT ONE COPY TO OWNER AND SIX COPIES TO THE ARCHITECT/ENGINEER. RESOLVE ALL OPERATIONAL DEFICIENCIES PRIOR TO SUBMISSION OF FINAL REPORT.

###### 1.4 REFERENCES

- A. AABC - NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE.
- B. ADC - TEST CODE FOR GRILLES, REGISTERS, AND DIFFUSERS.
- C. ASHRAE 111 - PRACTICES FOR MEASUREMENT, TESTING, ADJUSTING, AND BALANCING OF BUILDING HEATING, VENTILATION, AIR CONDITIONING, AND REFRIGERATION SYSTEMS.
- D. NEBB - PROCEDURAL STANDARDS FOR TESTING, ADJUSTING, AND BALANCING OF ENVIRONMENTAL SYSTEMS.
- E. SMACNA - HVAC SYSTEMS TESTING, ADJUSTING, AND BALANCING.

###### 1.5 SUBMITTALS

- A. FIELD REPORTS: INDICATE DEFICIENCIES IN SYSTEMS THAT WOULD PREVENT PROPER TESTING, ADJUSTING, AND BALANCING OF SYSTEMS AND EQUIPMENT TO ACHIEVE SPECIFIED PERFORMANCE.

###### 1.6 COMMENCEMENT OF WORK REQUIREMENTS

- A. PRIOR TO COMMENCING WORK, SUBMIT REPORT FORMS OR OUTLINES INDICATING ADJUSTING, BALANCING, AND EQUIPMENT DATA REQUIRED.
- B. SUBMIT DRAFT COPIES OF REPORT FOR REVIEW PRIOR TO FINAL ACCEPTANCE OF PROJECT. PROVIDE FINAL COPIES FOR ARCHITECT/ENGINEER AND FOR INCLUSION IN OPERATING AND MAINTENANCE MANUALS.
- C. PROVIDE REPORTS IN 3 RING BINDER MANUALS, COMPLETE WITH INDEX PAGE AND INDEXING TABS, WITH COVER IDENTIFICATION AT FRONT AND SIDE. INCLUDE SET OF REDUCED DRAWINGS WITH AIR OUTLETS AND EQUIPMENT IDENTIFIED TO CORRESPOND WITH DATA SHEETS, AND INDICATING THERMOSTAT LOCATIONS.
- D. INCLUDE DETAILED PROCEDURES, AGENDA, SAMPLE REPORT FORMS PRIOR TO COMMENCING SYSTEM BALANCE.

###### 1.7 TEST REPORT FORM REQUIREMENTS

- A. INDICATE DATA ON AABC NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE FORMS, FORMS PREPARED FOLLOWING ASHRAE 111 OR NEBB FORMS.

###### 1.8 QUALITY ASSURANCE

- A. PERFORM TOTAL SYSTEM BALANCE IN ACCORDANCE WITH AABC NATIONAL STANDARDS FOR FIELD MEASUREMENT AND INSTRUMENTATION, TOTAL SYSTEM BALANCE, ASHRAE 111 OR NEBB PROCEDURAL STANDARDS FOR TESTING, BALANCING AND ADJUSTING OF ENVIRONMENTAL SYSTEMS.

###### 1.9 QUALIFICATIONS

- A. THE MECHANICAL CONTRACTOR SHALL HAVE A MINIMUM THREE YEARS DOCUMENTED EXPERIENCE FOR TESTING, ADJUSTING, AND BALANCING WORK.
- B. PERFORM WORK UNDER ACCORDING TO GOVERNING AUTHORITIES RECOMMENDATIONS.

##### PART 2 PRODUCTS

###### 2.1 NOT USED

##### PART 3 EXECUTION

###### 3.1 PRE-BALANCING CONFERENCE

- A. CONVENE ONE WEEK PRIOR TO COMMENCING WORK OF THIS SECTION.

#### TESTING, ADJUSTING, AND BALANCING (CONTINUED)

###### 3.2 SEQUENCING

- A. SEQUENCE WORK TO COMMENCE AFTER COMPLETION OF SYSTEMS AND SCHEDULE COMPLETION OF WORK BEFORE SUBSTANTIAL COMPLETION OF PROJECT.

###### 3.3 DESIGN CONDITIONS

- A. THE HVAC SYSTEMS HAVE BEEN DESIGNED TO MAINTAIN THE INSIDE CONDITIONS INDICATED BELOW WHEN OPERATING WITH THE OUTSIDE CONDITIONS STATED. INSTALL, TEST, ADJUST AND BALANCE THE SYSTEMS SO THAT THEY WILL PRODUCE THE INSIDE CONDITIONS FOR DESIGN. MECHANICAL CONTRACTOR SHALL BE PREPARED TO PROVIDE A SUITABLE TEST TO PROVE THAT EQUIPMENT IS PRODUCING CAPACITIES SCHEDULED.

- 1) INSIDE CONDITIONS:  
SUMMER: 75 DEGREES FARENHEIT DRY BULB 55 % RELATIVE HUMIDITY  
WINTER: 70 DEGREES FARENHEIT DRY BULB

###### 3.4 FIELD REPORTS

- A. REPORT DEFECTS AND DEFICIENCIES NOTED DURING PERFORMANCE OF SERVICES THAT PREVENT SYSTEM BALANCE.
- B. BEGINNING OF WORK MEANS ACCEPTANCE OF EXISTING CONDITIONS.

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Sheet Title:  
HVAC SPECIFICATIONS

Project: Immaculate Conception  
Catholic Church

Location: 120 East Escobedo Street  
Taft, Texas

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