

# General Mechanical Specifications

ALL WORK SHALL CONFORM TO ALL APPLICABLE STATE, LOCAL, AND NATIONAL CODES.

ALL WORK SHALL BE IN ACCORDANCE WITH RICHMOND BUILDING CODES. PROVIDE TESTS AND ARRANGE INSPECTIONS AS REQUIRED. THE CODE SHALL BE FOLLOWED AT A MINIMUM. PROVIDE HIGHER GRADES OF MATERIAL AND WORKMANSHIP WHERE REQUIRED.

THIS CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS AND INSPECTIONS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION.

ALL MATERIALS AND OR EQUIPMENT SHALL BE NEW UNLESS NOTED OTHERWISE.

ANY PRODUCT MANUFACTURER NOT LISTED ON THE DRAWINGS BUT WISHING TO BID MUST BE SUBMITTED TO ENGINEER FOR APPROVAL NOT LESS THAN 7 DAYS PRIOR TO BID DATE.

THE DRAWINGS AND SPECIFICATIONS ARE NOT INTENDED TO SHOW ALL DETAILS. THE CONTRACTOR SHALL SECURE SATISFACTORY INFORMATION BEFORE SUBMITTING THEIR BID PROPOSAL AND INCLUDE IN THE PROPOSAL A SUM SUFFICIENT TO COVER ALL ITEMS OF LABOR AND MATERIAL REQUIRED FOR THE COMPLETE INSTALLATION OF THE DEVICES AND SYSTEM DESCRIBED.

THE CONTRACTOR SHALL COORDINATE HIS WORK WITH THAT OF ALL OTHER TRADES PRIOR TO FABRICATION AND INSTALLATION.

IN AREAS WHERE NO CEILING REMOVAL OR REPLACEMENT IS SPECIFIED TO BE DONE BY GENERAL CONTRACTOR, THIS CONTRACTOR SHALL BE RESPONSIBLE TO REMOVE AND REINSTALL OR REPLACE ANY EXISTING CEILING TILES AND GRID AFFECTED BY HIS WORK. REPLACE ANY TILES BROKEN AS A RESULT OF THE ABOVE WORK. REFER TO ROOM FINISH SCHEDULE OR REFLECTED CEILING PLAN FOR SCOPE OF NEW CEILING WORK TO BE PROVIDED BY GENERAL CONTRACTOR WHERE APPLICABLE.

ALL SHEET METAL DUCTWORK SHALL BE G-40 COATED GALVANIZED STEEL CONFORMING TO ASTM A653 AND A924 STANDARDS OF GAUGE AND REINFORCEMENT COMPLYING WITH CURRENT ADDITIONS OF SMCNA STANDARDS. DUCTWORK SHALL BE AIRTIGHT (5% LEAKAGE). ALL TRANSVERSE JOINTS AND LONGITUDINAL SEAMS SHALL BE SEALED. FABRICATE ELBOWS WITH CENTERLINE RADIUS EQUAL TO 1.5 TIMES THE DUCT WIDTH IN THE PLANE OF THE TURN, AND FABRICATE TO INCLUDE FACTORY MANUFACTURED TURNING VANES IN ELBOWS WHERE SHORTER RADIUS IS NECESSARY. LIMIT ANGULAR TAPERS TO 30 DEGREES AND 20 DEGREES FOR EXPANDING TAPERS.

MAXIMUM STRAIGHT LENGTH OF FLEX DUCT SHALL BE 4 FEET.

FLEXIBLE DUCT SHALL NOT BE USED IN PLACE OF ELBOWS.

TAKE-OFFS SHALL NOT BE PLACED CLOSER THAN 12" FROM THE END OF A TRUNK OR LESS THAN 24" DOWNSTREAM FROM AN ELBOW.

MANUAL VOLUME DAMPERS ARE TO BE PROVIDED IN ALL DUCT RUN OUTS FOR SUPPLY DIFFUSERS, RETURN AND EXHAUST GRILLES. PROVIDE SQUARE-TO-ROUND AND ROUND-TO-ROUND DUCT TRANSITIONS AT SUPPLY DIFFUSERS AS REQUIRED FOR PROPER CONNECTION.

DUCT LAYOUT IS DIAGRAMATIC IN NATURE. ADJUST TO FIELD CONDITIONS. ADD OFFSETS WHERE NEEDED. RELOCATE MINOR INTERFERENCES (I.E. SPRINKLER, ELECTRICAL, CONDUIT, SMALLER HYDRONIC PIPING).

ALL RECTANGULAR SUPPLY DUCT SHALL BE LINED WITH 1/2" LINER. RETURN DUCT SHALL BE LINED AS INDICATED ON DRAWINGS. LAMINATE LINER TO INTERNAL SURFACES IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. DUCT DIMENSIONS ARE "FREE AREA" AND SHALL NOT BE REDUCED. ALL ROUND SUPPLY AND OUTSIDE AIR DUCT SHALL BE WRAPPED EXTERNALLY WITH 1 1/2" THICK FIBERGLASS INSULATION. THIS INSULATION SHALL ACHIEVE A 25/50 FLAME-SPREAD AND SMOKE-DEVELOPED RATING IN ACCORDANCE WITH NFPA 255. THE SMOKE DEVELOPMENT RATING FOR PIPE INSULATION SHALL NOT EXCEED 150. EXHAUST DUCT NEED NOT BE INSULATED OR LINED.

INSTALL INSULATION PRODUCTS ON SPECIFIED DUCTWORK, PIPING, AND EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS. MECHANICAL CONTRACTOR SHALL CHANGE BELTS AND SHEAVES ON AIR HANDLING EQUIPMENT AS DIRECTED BY BALANCING CONTRACTOR, IF REQUIRED, TO ACHIEVE DESIGN PARAMETERS WITH NO EXTRA COST TO THE OWNER.

MATERIALS EXPOSED WITHIN DUCTS OR PLENUMS SHALL HAVE A FLAME-SPREAD INDEX OF NOT MORE THAN 25 AND A SMOKE-DEVELOPED RATING OF NOT MORE THAN 50 IN ACCORDANCE WITH SECTION 102 (A), IBC (675 IAC 18-1). ANY PLASTIC PIPING, ROUTED IN SUCH LOCATION SHALL BE COVERED WITH INSULATION AS REQUIRED TO COMPLY WITH ABOVE INDICATED FLAME-SPREAD AND SMOKE-DEVELOPED RATINGS.

THIS CONTRACTOR SHALL FURNISH AND INSTALL ALL TEMPERATURE CONTROL WIRING, THERMOSTATS, RELAYS, AND INTERLOCKS ETC. AS REQUIRED.

INSTALL HANGERS, SUPPORTS, CLAMPS AND ATTACHMENTS TO SUPPORT PIPING PROPERLY FROM BUILDING STRUCTURE. COMPLY WITH MSS SP-69. ARRANGE FOR GROUPING OF PARALLEL RUNS OF HORIZONTAL PIPING TO BE SUPPORTED TOGETHER ON TRAPEZE HANGERS WHERE POSSIBLE. ALL PIPING HANGER AND SUPPORTS SHALL BE UL OR FM APPROVED.

UNIONS AND VALVES SHALL BE PROVIDED AT CONNECTIONS TO ALL EQUIPMENT.

ACCEPTABLE MANUFACTURERS FOR AIR GRILLES INCLUDE: CARNES, HART & COOLEY, KRUEGER INDUSTRIES, PRICE, TUTTLE & BAILEY.

THE CONTRACTOR SHALL MAKE USE OF EXISTING TEMPERATURE CONTROL SYSTEM, IF PRESENT. ALL NEW COMPONENTS SHALL BE COMPATIBLE WITH EXISTING SYSTEM AND SHALL MEET THE INTENT OF THE SEQUENCE OF OPERATIONS.

ALL THERMOSTATS SHALL BE MOUNTED NEAR DOORS OR CORNERS OF WALLS UNLESS SHOWN OTHERWISE. ALL THERMOSTATS TO BE MOUNTED AT 48" A.F.F.

ALL HVAC EQUIPMENT SHALL BE SUSPENDED PER MANUFACTURER'S RECOMMENDATIONS. COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS FOR INSTALLATION OF VIBRATION CONTROL ON ALL MECHANICAL EQUIPMENT. ADJUST TO ENSURE THAT UNITS HAVE EQUAL DEFLECTION, DO NOT BOTTOM OUT UNDER LOADS, AND ARE NOT SHORT-CIRCUITED BY OTHER CONTACTS OR BEARING POINTS.

A COMPLETE AIR TEST AND BALANCE SHALL BE PERFORMED IN COMPLETE ACCORDANCE WITH NEBB OR AABC NATIONAL STANDARDS FOR FIELD MEASUREMENTS AND INSTRUMENTATION.

MECHANICAL CONTRACTOR SHALL CHANGE BELTS AND SHEAVES ON AIR HANDLING EQUIPMENT AS DIRECTED BY BALANCING CONTRACTOR, IF REQUIRED, TO ACHIEVE DESIGN PARAMETERS WITH NO EXTRA COST TO THE OWNER.

THE CONTRACTOR SHALL ASSEMBLE AND SUBMIT THREE COPIES OF PRINTED INSTRUCTIONS, INCLUDING EQUIPMENT CUTS AND WIRING DIAGRAMS FOR THE OPERATION AND MAINTENANCE OF EACH ITEM OF INSTALLED EQUIPMENT.

THE CONTRACTOR SHALL GUARANTEE ALL WORK AND MATERIALS FOR ONE YEAR AFTER DATE OF ACCEPTANCE AGAINST ALL DEFECTS OF MATERIALS, EQUIPMENT AND WORKMANSHIP.

# General Demolition/ Renovation Notes

INCLUDE IN BID PROPOSAL ALL COSTS FOR CUTTING AND PATCHING REQUIRED TO INSTALL NEW OR REMOVE EXISTING WORK, EQUIPMENT OR SYSTEMS IN THE BUILDING. IF NEW FINISHES ARE NOT INCLUDED BY OTHERS IN THIS PROJECT IN RENOVATED PORTION OF THE FACILITY, THEN THIS CONTRACTOR MUST RESTORE FINISHES TO MATCH SURROUNDING UNDAUNAGED SURFACES.

DURING REMOVAL OF ITEMS SO INDICATED, CAUTION SHALL BE USED TO PREVENT DAMAGE TO ANY EQUIPMENT HAVING SALVAGE VALUE. ALL REUSABLE SALVAGED MATERIAL SHALL REMAIN PROPERTY OF THE OWNER AND BE RETAINED FOR HIS INSPECTION. ONLY ITEMS SO INSPECTED AND REJECTED BY THE OWNER SHALL BE DISPOSED OF BY THE CONTRACTOR. ALL OTHER ITEMS SHALL BE TURNED OVER AND DEPOSITED AS DIRECTED BY THE OWNER.

EXISTING DUCT, PIPING, AND EQUIPMENT SHOWN IS BASED ON EXISTING DRAWINGS AND FIELD SURVEY. THIS CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS AFFECTED AND NOTIFY ENGINEER IF THEY ARE NOT AS INDICATED.

COORDINATE INSTALLATION OF NEW PIPES, DUCTS, ETC. WITH REMAINING EXISTING UTILITIES. EXISTING UTILITIES TO BE REROUTED, IF NECESSARY, TO ALLOW NEW UTILITIES PASSAGE. DUCTWORK SHALL HAVE PRIORITY OF INSTALLATION, EXISTING VALVES AND OTHER DEVICES MADE UNACCESSIBLE BY NEW EQUIPMENT. DUCT AND/OR PIPING SHALL BE RELOCATED AS REQUIRED FOR PROPER ACCESS WITH NO EXTRA COST TO THE OWNER.

CONNECTIONS TO, AND SHUTDOWNS OF, EXISTING SYSTEMS SHALL BE COORDINATED WITH OWNER TO ALLOW MINIMUM INTERFERENCE WITH OWNER'S OPERATION AND DOWNTIME OF EXISTING SERVICES. CONTRACTOR SHALL SUBMIT TO OWNER, FOR REVIEW AND APPROVAL, THE PROPOSED PHASING PLAN FOR CONNECTING NEW SERVICES TO EXISTING SERVICES.

WORK IN THIS AREA MUST BE CAREFULLY COORDINATED WITH OWNER. THIS SPACE WILL BE OCCUPIED DURING NORMAL BUSINESS HOURS THROUGHOUT CONSTRUCTION. WORK THAT CREATES EXCESSIVE NOISE AND DUST OR DISTURBS THE OCCUPANTS IN ANY WAY MUST BE PERFORMED ON WEEKENDS OR AFTER HOURS.

WORK IN THIS TENANT SPACE THAT DISRUPTS FIRE PROTECTION OR UTILITY SERVICE TO OTHER TENANT SPACES, CREATES EXCESSIVE NOISE AND DUST OR OTHERWISE DISTURBS THE OCCUPANTS OF OTHER TENANT SPACES, MUST BE PERFORMED ON WEEKENDS OR AFTER HOURS.

THE EQUIPMENT SHOWN ON THE DRAWINGS IS BELIEVED TO BE A REASONABLE INDICATION OF THE EXISTING LAYOUT. EXACT QUANTITY AND LOCATION SHALL BE DETERMINED BY THE CONTRACTOR AT THE JOB SITE. ALL MECHANICAL DEMOLITION THAT IS REQUIRED FOR THE INSTALLATION OF THE SYSTEMS SHOWN SHALL BE BY THIS CONTRACTOR.

# Mechanical Symbols

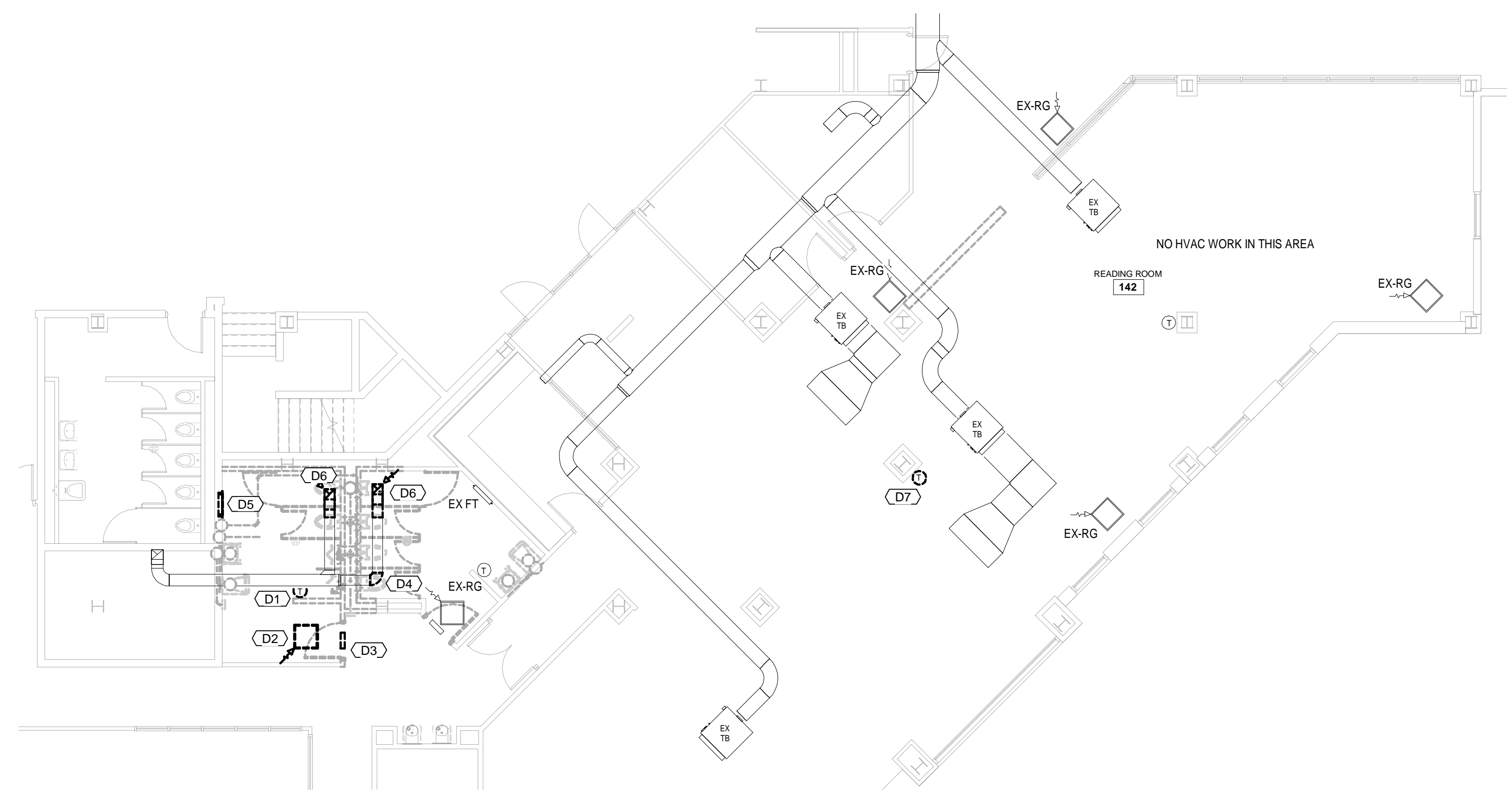
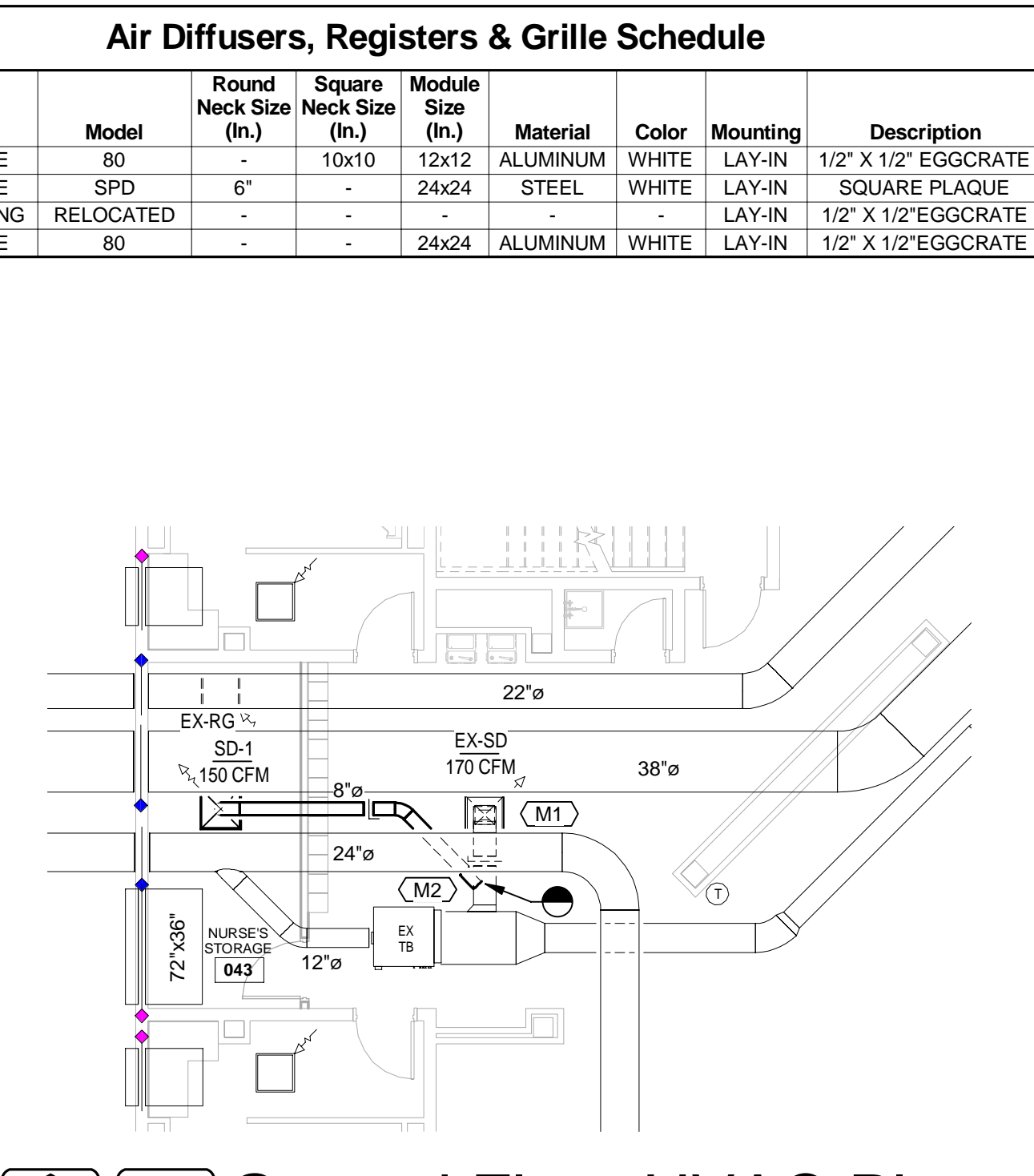
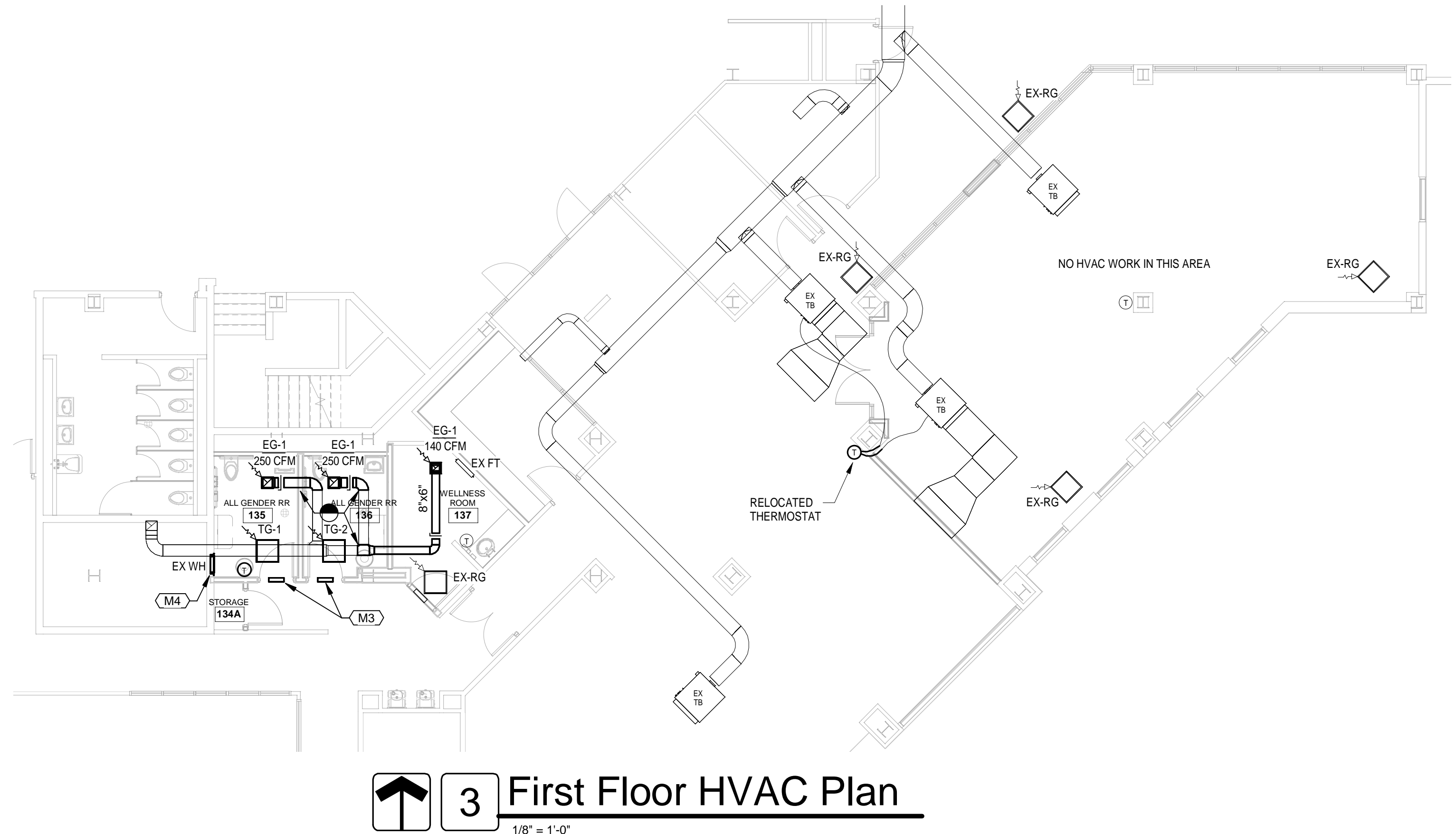
**ABBREVIATIONS:**

ACCU	AIR COOLED CONDENSING UNIT	LDB	LEAVING DRY BULB
A.F.F.	ABOVE FINISHED FLOOR	LWB	LEAVING WET BULB
AHU	AIR HANDLER UNIT	MAT	MIXED AIR TEMP
ATV	AIR TURNING VANE	MD	MANUAL DAMPER
BDD	BACK DRIFT DAMPER	MOD	MOTOR OPERATED DAMPER
CAL	COMBUSTION AIR LOUVER	MUA	MAKE-UP AIR UNIT
CH	CABINET HEATER	OAD	OUTSIDE AIR DAMPER
EA	EXHAUST AIR LOUVER	OAI	OUTSIDE AIR INTAKE
EAT	ENTERING AIR TEMPERATURE	OAL	OUTSIDE AIR LOUVER
EAV	EXHAUST AIR VENTILATOR	RAD	RELIEF AIR DAMPER
CB	ENTERING DRY BULB	RAL	RELIEF AIR LOUVER
EF	EXHAUST FAN	RHP	RADIANT HEATING PANEL
EG	EXHAUST GRILLE	RTU	ROOFTOP UNIT
ESP	EXTERNAL STATIC PRESSURE	REL	RELIEF VENT
EWB	ENTERING WET BULB	RVI	SUPPLY DIFFUSER
EX	EXISTING EQUIPMENT	SF	SUPPLY FAN
FCU	FAN COIL UNIT	SG	SNOKE FIRE DAMPER
FD	FIRE DAMPER	T	THERMOMETER
FTR	FINNED TUBE RADIATION	TS	TRANSFER GRILLE
GPM	GALLONS PER MINUTE	TSP	TOTAL STATIC PRESSURE
HP	HEAT PUMP	UH	UNIT HEATER
HVAC	HTG, VENT, & AC UNIT	VAV	VARIABLE AIR VOLUME BOX
L	LOUVER		
LAT	LEAVING AIR TEMP		

**SYMBOLS:**

—A—	AIR PIPING	+	EXHAUST GRILLE/DIFFUSER
—CHVR—	CHILLED WATER RETURN	—D—	FLEX DUCT
—CHWS—	CHILLED WATER SUPPLY	—F—	FLOW SETTER
—C—	CONDENSATE DRAIN	—G—	GAS COCK
—CWR—	CONDENSER WATER RETURN	—G—	GATE VALVE
—CWS—	CONDENSER WATER SUPPLY	—H—	HORIZONTAL FIRE DAMPER
—E—	EQUIPPING TO BE DEMOLISHED	—M—	HUMIDISTAT
—FP—	EXISTING TO REMAIN	—M—	LINE STRAINER
—FPR—	FIRE PROTECTION PIPING	—P—	METER
—HPWR—	HEAT PUMP WATER RETURN	—P—	PRESSURE SENSOR
—HPWS—	HEAT PUMP WATER SUPPLY	—R—	RECTANGULAR SUPPLY DIFFUSER
—HWR—	HOT WATER RETURN	—R—	RETURN GRILLE/DIFFUSER
—HWS—	HOT WATER SUPPLY	—R—	ROUND DIFFUSER
—LPR—	LOW PRESSURE STEAM RETURN	—S—	SENSOR
—LPS—	LOW PRESSURE STEAM SUPPLY	—S—	SLOT DIFFUSER
—MPR—	MED. PRESSURE STEAM RETURN	—T—	THERMOMETER
—MPS—	MED. PRESSURE STEAM SUPPLY	—T—	THERMOSTAT
—HG—	REFRIGERANT HOT GAS	—T—	VERTICAL FIRE DAMPER
—RL—	REFRIGERANT LIQUID	—T—	VOLUME DAMPER
—RS—	REFRIGERANT SUCTION		
—VAC—	VACUUM PIPING		
—2—	2-WAY CONTROL VALVE		
—3—	3-WAY CONTROL VALVE		
—B—	BALL VALVE		
—B—	BUTTERFLY VALVE		
—C—	CAP LINE		
—●—	CONNECT NEW TO EXISTING		

NOTE: SOME SYMBOLS MAY NOT BE USED



**Air Diffusers, Registers & Grille Schedule**

Tag	Mfr.	Model	Round Neck Size (in.)	Square Neck Size (in.)	Module Size (in.)	Material	Color	Mounting	Description
EG-1	PRICE	80	-	10x10	12x12	ALUMINUM	WHITE	LAY-IN	1/2" X 1/2" EGGRATE
SD-1	PRICE	SPD	6"	-	24x24	STEEL	WHITE	LAY-IN	SQUARE PLAQUE
TG-1	EXISTING	RELOCATED	-	-	-	-	-	LAY-IN	1/2" X 1/2" EGGRATE
TG-2	PRICE	80	-	24x24	ALUMINUM	WHITE	LAY-IN	1/2" X 1/2" EGGRATE	

**Construction Plan Notes**

M1	INSTALL NEW DAMPER DOWNSTREAM OF NEW TAP. ADJUST AIRFLOW AS INDICATED.
M2	TAP NEW 8" INTO EXISTING DUCT.
M3	16"x8" SHEET METAL SLEEVE FOR TRANSFER AIR THROUGH WALL ABOVE CEILING.
M4	RELOCATED EXISTING WALL HEATER. RECONNECT WIRING FROM THERMOSTAT.

**Demolition Plan Notes**

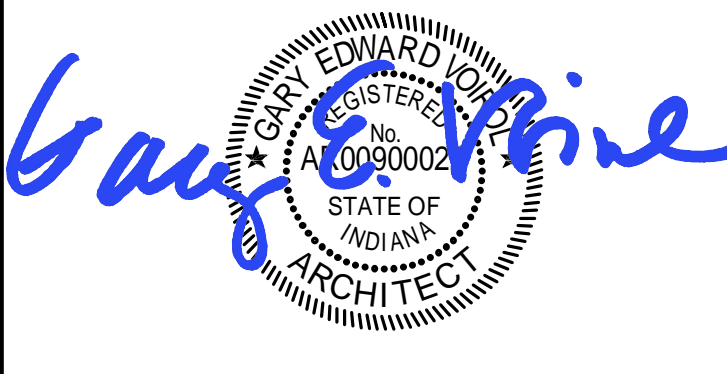
D1	DISCONNECT AND RELOCATE THERMOSTAT. SEE NEW HVAC PLAN ON THIS SHEET FOR NEW LOCATION.
D2	DISCONNECT AND RELOCATE RETURN GRILLE. SEE NEW HVAC PLAN ON THIS SHEET FOR NEW LOCATION.
D3	DISCONNECT AND REMOVE 16"x8" TRANSFER AIR DUCT IN WALL.
D4	DISCONNECT AND REMOVE ELBOW FOR INSTALLATION OF NEW TEE AND ADDITIONAL DUCTWORK. MODIFY EXISTING DUCT TO REMAIN AS REQUIRED.
D5	DISCONNECT AND RELOCATE EXISTING WALL HEATER. SEE NEW HVAC PLAN ON THIS SHEET FOR NEW LOCATION.
D6	DISCONNECT AND REMOVE PORTION OF DUCTWORK. REFURBISH AND RELOCATE EXHAUST GRILLE. SEE NEW HVAC PLAN ON THIS SHEET FOR NEW LOCATION.
D7	DISCONNECT AND RELOCATE THERMOSTAT TO SW SIDE OF COLUMN. SEE NEW HVAC PLAN ON THIS SHEET FOR NEW LOCATION.

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**Construction Set**

SHEET TITLE  
**Mechanical Plans**

SHEET NUMBER  
**M2-1**