State of Utah

GARY R. HERBERT
*Governor*

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*Lt. Governor*

Department of Administrative Services
KIMBERLY K. HOOD
*Executive Director*

Division of Facilities Construction and Management
DAVID G. BUXTON
*Director*

# ADDENDUM NO. 3

Date: October 13, 2010

To: Contractors

From: Chris Atkins - Project Manager

Reference: Automation Controls and VAV Upgrade/Repair – State Office Building
Capitol Preservation Board – Salt Lake City, Utah
DFCM Project No. 09158050

Subject: **Addendum No. 3**

| | | | |
|---|---|---|---|
| Pages | Total Addendum | 3 | pages |
| | VAV Box Standards (Specification) | 1 | pages |
| | Drawings | 39 | pages |
| | Total | 43 | pages |

***Note: This Addendum shall be included as part of the Contract Documents. Items in this Addendum apply to all drawings and specification sections whether referenced or not involving the portion of the work added, deleted, modified, or otherwise addressed in the Addendum. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to Disqualification.***

**While we contend that SB220 should only be potentially applicable to a contract issued after the effective date of said bill, this is to clarify that for purposes of this contract, regardless of the execution or effective dates of this contract, the status of Utah Law and remedies available to the State of Utah and DFCM, as it relates to any matter referred to or affected by said SB220, shall be the Utah law in effect at the time of the issuance of this Addendum.**

**3.1 SCHEDULE CHANGES:** There are no Project Schedule changes.

**3.2 GENERAL ITEMS:**

3.2.1 **Scope Change:** The Division of Facilities Construction and Management (DFCM) has decided to remove the two chillers, the cooling tower and all the associated pumping systems for the State Office Building from this project. There is one air handler for the auditorium that was not shown through the walkthrough. Please review the attached specification and drawings.

3.2.2 **Additional Requirements:**

- Only one Ethernet port will be provided to the winning contractor to be used for this project.
- All pneumatic valves in the AHUs need to be replaced with DDC controls.
- Freestats need to be replaced in Air Handlers.
- All existing conduits, and panels used for the existing control systems need to be removed unless they can be used for the new control system.
- All existing cables used for the existing control systems need to be replaced with new cables.
- Any power transformers to be used need to be installed inside the electrical closets and rooms.
- Air balancing is specified in the attached VAV Standards.

**3.3. QUESTIONS/ANSWERS:**

3.3.1 Question: 239900 2.2 Acceptable Manufacturers: Basis of Design: Honeywell WEBs-AX or other manufacturers utilizing an "OPEN" License Niagara AX JACE Controller. Jace Controller shall be provided with embedded programming tool. Section 239900 2.2A Acceptable Installing contractors. Is it the intent of the State of Utah to allow the installing contractor to install a system by manufacturers that meet the "OPEN" License Niagara AX Jace with embedded tools or is it required to be the Honeywell Web AX system using the Spyder controller family?
Answer: It does not have to be branded "Honeywell". Other vendors have OEM branded Jaces that are made by Honeywell but have another name branded on them. They have to follow the standard and be equal to the "Honeywell Webs AX"

3.3.2 Question: Will this project be exempt from Utah State Sales Tax? If so, will a certificate be provided?
Answer: No, this project is not tax exempt.

3.3.3 Question: Are there wiring diagrams and/or points lists available for the existing AHU panels?
Answer: Yes.

3.3.4 Question: Regarding new communication wire, (24v VAV power wire, Ethernet cat 5), can this wire be plenum rated and run free air above the ceiling matching existing wiring?
Answer: Yes, unless conduit space is available then conduit is preferred; otherwise free air plenum rated is sufficient.

3.3.5 Question: Regarding Mechanical Room control wiring, is this preferred to be free air or conduit? We note that there is some of each existing.
Answer: If conduit space is available, then conduit is preferred; otherwise free air plenum rated is sufficient.

3.3.6 Question: Do the main chilled water pumps that circulate water from Central Plant or standby chillers have VFDs?
Answer: Yes they are on VFDs.

3.3.7 Question: Are the ONCON flow meters in each chilled circuit part of this project or part of building monitoring?
Answer: Building monitoring.

3.3.8 Question: Regarding VAV hot water valves, it had been stated that a count would be provided for these items. In addition to count, please list size and configuration (2 way, 3 way)
Answer: Please see attached specification and drawings.

3.3.9 Question: Regarding perimeter reheat valves, it had been stated that a count would be provided for these items. In addition to count, please list size and configuration (2 way, 3 way)
Answer: Please see attached specification and drawings.

3.3.10 Question: Regarding the existing four direct evaporative cooling sections for each AHU, are they staged or single?
Answer: Staged.

3.3.11 Question: Regarding the existing chiller enable control, is a simple contact closure adequate?
Answer: N/A. The chillers and their associated cooling tower, and pumps are no longer part of this project. See 3.2.1 above.

3.3.12 Question: Regarding the existing chiller cooling tower, is this currently controlled by the chiller?
Answer: N/A. The chillers and their associated cooling tower, and pumps are no longer part of this project. See 3.2.1 above.

3.3.13 Question: Regarding the existing chiller/tower control, please provide scope if requirements exceed contact closure for start/run and self contained tower operation; condenser pump stop/start; tower fan stop/start.
Answer: N/A. The chillers and their associated cooling tower, and pumps are no longer part of this project. See 3.2.1 above.

3.3.14 Question: Do the existing cooling tower fans have VFDs?
Answer: N/A. The chillers and their associated cooling tower, and pumps are no longer part of this project. See 3.2.1 above.

3.3.15 Question: Regarding building static pressure, are dampers 2 position or modulating?
Answer: 2 position.

3.3.16 Question: Are there to be any Davis Bacon Wage requirements for this project?
Answer: No

VAV box Standards;

All sensors field calibrated for proper reading of temps and delivered air flow.
(temps to within 0.5 deg f.)
A discharge air temp sensor shall be supplied with every vav box.

If the AHU that supplies air is <u>on</u> the VAV box shall be in the occupied mode.
There shall be a separate time schedule for the boxes to use for *normal occupied hours*.
(Occupied mode)

During *Occupied mode* when there isn't a cooling or heating load the box shall deliver a minimum amount of air to satisfy minimum air requirements.

If the AHU supplying air is <u>on</u> and it is <u>not</u> *normal occupied hours*, and there isn't a cooling or heating load the box shall go to a full closed position. (Standby mode)

<u>Normal Business Offices</u>

A heating band that is no larger than 2 deg f. and during normal operating conditions will deliver 100% heating output at 69 deg f.

A cooling band that is no larger than 3 deg f. and during normal operating conditions will deliver 100% cooling at 76 deg f.
(when there is a demand for energy saving the setpoints shall change to 78 deg f. for cooling and 67 deg f. for heating) (Energy Demand)

On non fan powered boxes the air volume shall reset from a minimum flow to a maximum flow when there a call for heat.

If there is not heat available for the box to use, lock out heating.

If the supply air to the box is too high to cool with the box needs to reverse operation to prevent over heating the space.

A means for toggling the boxes from a normal state to an energy demand state at one location shall be provided.

The boxes should be setup so that there is <u>not</u> a need to have <u>re-heat enabled</u> during the summer. This might mean resetting the discharge air temps at the AHU and closer scrutiny at the vav box level.

All vav box parameters shall be accessible remotely using the state wide area network.

The following shall be accessible with a standard web browser using HTTP.
All vav box values.
Time schedules, user adjustable.
Energy demand, user adjustable.

# LEGEND OF MECHANICAL SYMBOLS AND ABBREVIATIONS

| | |
|---|---|
| | POSITIVE PRESSURE DUCT - RISE |
| | POSITIVE PRESSURE DUCT - DROP |
| | NEGATIVE PRESSURE DUCT - RISE |
| | NEGATIVE PRESSURE DUCT - DROP |
| | ROUND DUCT - RISE |
| | ROUND DUCT - DROP |
| | RECTANGULAR DUCT |
| | ROUND DUCT |
| | UNDER FLOOR DUCT |
| | MEDIUM OR HIGH PRESSURE FLEX CONNECTION TO TERMINL UNIT |
| UP | INCLINED DUCT RISE |
| DN | INCLINED DUCT DROP |
| | MANUAL DAMPER |
| | FIRE DAMPER WITH ACCESS DOOR |
| | ATC DAMPER |
| | COMBINATION SMOKE AND FIRE DAMPER WITH ACCESS DOOR |
| | SMOKE DAMPER |
| | FLEXIBLE DUCT |
| | FLEXIBLE CONNECTION |
| | SUPPLY DIFFUSER |
| | EXHAUST AIR REGISTER |
| | TURNING VANES |
| | SPLITTER DAMPER WITH TURNING VANES |
| | RETURN AIR GRILLE WITH SOUND BOOT |
| | FRESH AIR LOUVER |
| | RELIEF AIR OR EXHAUST AIR LOUVER |
| | RECTANGULAR TO RECTANGULAR TRANSITION |
| | ROUND TO ROUND TRANSITION |
| | RECTANGULAR TO ROUND TRANSITION |

| | |
|---|---|
| | 90° ELBOW |
| | 45° ELBOW |
| | RISER TURNED UP (PIPE OUT OF PLANE) |
| | RISER TURNED DOWN (PIPE INTO PLANE) |
| | LR ELBOW |
| | SIDE OUT DOWN ELBOW |
| | SIDE UP OUT ELBOW |
| | BASE ELBOW |
| | DOUBLE ELBOW |
| | REDUCED ELBOW |
| | SWEEP TEE |
| | STRAIGHT TEE (PIPE BRANCH - IN PLANE) |
| | TEE UP |
| | TEE DOWN |
| | SIDE OUT UP (PIPE BRANCH - OUT OF PLANE) |
| | SIDE OUT DOWN (PIPE BRANCH - INTO PLANE) |
| | CROSS |
| | CONCENTRIC REDUCER |
| | ECCENTRIC REDUCER |
| | LATERAL STRAINER |
| | LATERAL STRAINER WITH BLOW-OFF VALVE |
| | GATE VALVE |
| | ATC VALVE - 2 WAY |
| | ATC VALVE - 3 WAY |
| | GLOBE VALVE |
| | HOSE GATE VALVE |
| | HOSE GLOBE VALVE |
| | ANGLE GLOBE VALVE |
| | ANGLE GLOBE VALVE DOWN |
| | ANGLE GATE VALVE |
| | ANGLE GATE VALVE DOWN |
| | PRESSURE REDUCING, SELF CONTAINED VALVE |
| | PRESSURE REDUCING, EXTERNAL PRESSURE VALVE |
| | BALL VALVE (PIPE SIZE 2" AND SMALLER) |
| | BUTTERFLY VALVE (PIPE SIZE 2-1/2" AND LARGER) |
| | CHECK VALVE |
| | 90° CHECK VALVE |

| | |
|---|---|
| | COCK VALVE |
| | SAFETY VALVE |
| | QUICK OPENING VALVE |
| | EXPANSION JOINT |
| | FLOAT VALVE |
| | MOTOR OPER. GATE VALVE |
| | MOTOR OPER. GLOBE VALVE |
| | RELIEF VALVE |
| | DIAPHRAGM |
| PE | PNEUMATIC-ELECTRIC CONTROL VALVE |
| | SOLINIOD VALVE |
| | ALIGNMENT GUIDE |
| | ANCHOR |
| | PRESSURE GAUGE WITH COCK |
| PS | PRESSURE SWITCH |
| | FLANGE |
| | UNION |
| GPM LB/HR. | FLOW METER ORIFICE |
| | AIR VENT-AUTO |
| | AIR VENT-MANUAL |
| | AIR SEPERATOR |
| | REDUCING FLANGE |
| | FLOW SWITCH |
| | SLEEVE |
| 0 - 100° F | THERMOMETER 0-100°F |
| 30 - 240° F | THERMOMETER 30-240°F |
| T | THERMOSTAT |
| T N | NIGHT THERMOSTAT |
| | STEAM TRAP |
| SD | DUCT SMOKE DETECTOR |
| H | DUCT HUMIDIFIER |
| | SHUT-OFF COCK FOR USE WITH PRESSURE GAUGE |
| | PUMP |
| | REDUCER |
| | EXPANSION LOOP |
| | FLEXIBLE CONNECTION |
| GPM #/HR. | FLOW METER |

| | |
|---|---|
| G | NATURAL GAS |
| | ARROW INDICATES DIRECTION OF FLOW IN PIPE LEADER INDICATES DOWNWARD SLOPE |
| | PIPE DIRECTION CHANGE |
| LPS | LOW PRESSURE STEAM |
| | LOW PRESSURE RETURN |
| HPS | HIGH PRESSURE STEAM |
| HPR | HIGH PRESSURE STEAM RETURN |
| P | PUMP DISCHARGE |
| MU | MAKE UP WATER |
| V | AIR RELIEF LINE (VENT) |
| FOF | FUEL OIL FLOW |
| FOR | FUEL OIL RETURN |
| FOV | FUEL OIL TANK VENT |
| (name) E | EXISTING PIPING |
| CWS | CHILLED WATER SUPPLY |
| CWR | CHILLED WATER RETURN |
| CS | CONDENSER WATER SUPPLY |
| CR | CONDENSER WATER RETURN |
| HWS | HEATING HOT WATER SUPPLY |
| HWR | HEATING HOT WATER RETURN |
| HTHWS | HIGH TEMPERATURE HOT WATER SUPPLY |
| HTHWR | HIGH TEMPERATURE HOT WATER RETURN |
| GPM | FLOW CONTROL VALVE |
| | CALIBRATED BALANCING VALVE |
| HRS | HEAT RECOVERY SUPPLY |
| HRR | HEAT RECOVERY RETURN |
| | |
| | |
| | |
| | |
| | |
| A M1-1 | SECTION TAG - TOP FIGURE IS SECTION NO. BOTTOM FIGURE IS SHEET NO. |
| 1 M1-1 | DETAIL TAG - TOP FIGURE IS DETAIL NO. BOTTOM FIGURE IS SHEET NO. |
| EF 1 | EQUIPMENT IDENTIFICATION |
| 1 | KEYED NOTE IDENTIFICATION |
| P-1 | PLUMBING FIXTURES |

JOB NO.
BC:89-098

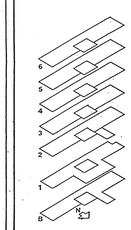
REVISIONS
RECORD DRAWINGS
12/91

REGISTERED PROFESSIONAL ENGINEER
No. 4537
John D Frank
STATE OF UTAH

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

STATE OFFICE BUILDING
REMODEL - PHASE 2

KEY PLAN

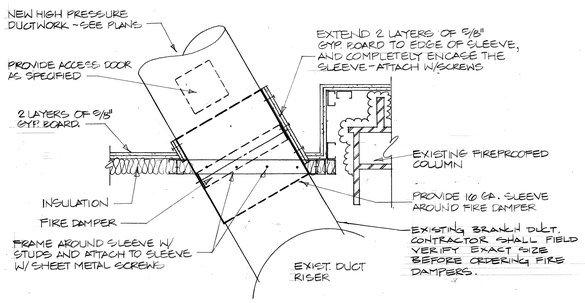


DATE
JUNE 1990

TITLE
MECHANICAL LEGEND

SHEET NO.
M·0

State Office Building; Phase Two, 2 Floor Remodel, Floors 1 & 2 - BC:89-098
Mechanical Legend - 3583
00006LM0

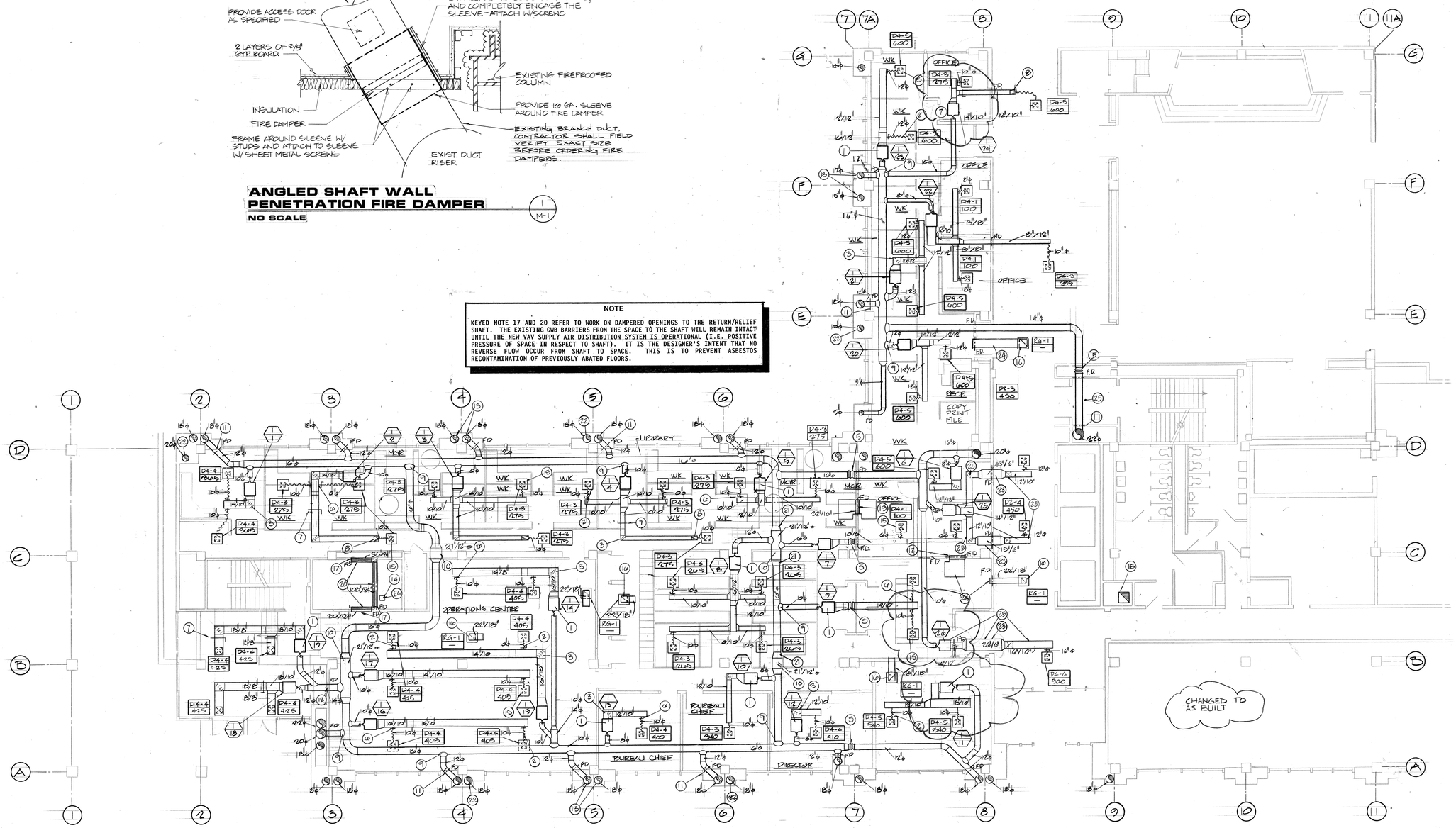



**ANGLED SHAFT WALL PENETRATION FIRE DAMPER** (1 / M-1)

**NO SCALE**

**NOTE**

KEYED NOTE 17 AND 20 REFER TO WORK ON DAMPERED OPENINGS TO THE RETURN/RELIEF SHAFT. THE EXISTING GWB BARRIERS FROM THE SPACE TO THE SHAFT WILL REMAIN INTACT UNTIL THE NEW VAV SUPPLY AIR DISTRIBUTION SYSTEM IS OPERATIONAL (I.E. POSITIVE PRESSURE OF SPACE IN RESPECT TO SHAFT). IT IS THE DESIGNER'S INTENT THAT NO REVERSE FLOW OCCUR FROM SHAFT TO SPACE. THIS IS TO PREVENT ASBESTOS RECONTAMINATION OF PREVIOUSLY ABATED FLOORS.




**FIRST FLOOR WEST MECHANICAL PLAN**

**SCALE: 1/8" = 1'-0"**

## KEYED NOTES

1. VAV REHEAT BOXES. SEE SCHEDULES FOR SIZE AND CAPACITIES. CONNECT TO HIGH PRESSURE DUCTWORK WITH NO MORE THAN 3'-0" OF H.P. FLEX DUCTING.
2. FLEXIBLE DUCTING CONNECT TO DIFFUSERS WITH NO MORE THAN 5'-0" FROM LOW PRESSURE DUCTWORK.
3. TURNING VANES, TYPICAL. LOCATE IN ALL ELBOWS OF RECTANGULAR DUCTWORK.
4. RETURN AIR TRANSFER DUCT STUBBED INTO RETURN AIR PLENUM ABOVE CEILING.
5. PROVIDE EXPANSION FITTINGS IN DUCTWORK AT ALL BUILDING EXPANSION JOINTS. SEE DETAIL 8/M-10.
6. ELONGATED FITTING - TYPICAL. SEE DETAIL 7/M-10.
7. MANUAL DAMPER WITH LOCKING QUADRANT, TYPICAL.
8. SQUARE TO ROUND TRANSITION, TYPICAL.
9. CONICAL TEE HIGH PRESSURE FITTING.
10. PROVIDE FLAT OVAL DUCTING UNDER BEAMS ON GRIDS B & C TO ALLOW FOR LIMITED CEILING SPACE.
11. PROVIDE FIRE DAMPERS AT ALL HIGH PRESSURE DUCT PENETRATIONS TO EXTERIOR DUCT SHAFTS. SEE DETAILS 1/M-1 FOR INSTALLATION, TYPICAL.
12. FIRE DAMPER, TYPICAL. PROVIDE AT ALL FIRE RATED WALLS. SEE ARCHITECTURAL DRAWINGS FOR LOCATION OF FIRE RATED WALLS.
13. EXISTING HOT DECK AND COLD DECK HIGH VELOCITY DUCT RISERS, TYPICAL, EXISTING SIZES SHOWN WERE TAKEN FROM RECORD DRAWING OF PREVIOUS CONSTRUCTION AND HAVE NOT BEEN FIELD VERIFIED.
14. LOCATED ATC COMMUNICATION PANELS IN NEW ELECTRICAL ROOMS. TYPICAL. COORDINATE LOCATION WITH ELECTRICAL CONTRACTOR.
15. SUPPLY DIFFUSERS - REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION.
16. RETURN AIR GRILLE WITH SOUND BOOT.
17. REMOVE THE EXISTING FIRE DAMPERS, AND PROVIDE NEW FIRE DAMPERS. MODIFY EXISTING OPENINGS AS REQUIRED FOR NEW DAMPER INSTALLATION.
18. EXISTING TOILET EXHAUST RISER.
19. FIRE DAMPERED RETURN AIR TRANSFER DUCT, TYPICAL.
20. INSTALL MANUAL VERTICAL BLADE VOLUME DAMPERS IN BACK OF FIRE DAMPERS IN SHAFT WALLS. PROVIDE LOCKING QUADRANT FOR VOLUME DAMPERS. TYPICAL. DAMPER DIMENSIONS TO BE SAME AS FIRE DAMPERS.
21. ROUND TO OVAL TRANSITIONS TO BE ECCENTRIC, FLAT ON THE BOTTOM, TYPICAL.
22. CAP UNUSED RISER TAKE-OFF BEHIND FIRE RATED WALL. TYPICAL.
23. DELETE INTERNAL DUCT LINER WHERE DUCT IS TRANSITIONED TO PASS UNDER BEAM. WRAP THIS SECTION OF UNLINED DUCT WITH INSULATION SPECIFIED FOR DUCTWORK UPSTREAM OF TERMINAL BOXES. USE TYPE "A" FIRE DAMPER AT THIS POINT.
24. RETURN AIR SOUND BOOT WITH FIRE DAMPER ABOVE CEILING.
25. RUN DUCTWORK AS HIGH AND CLOSE TO STRUCTURE AS POSSIBLE TRANSITION AS NECESSARY.
26. LOCATE SO CLEARANCE AROUND ELECTRICAL EQUIPMENT IS NOT AFFECTED.

State Office Building; Phase Two, 2 Floor Remodel, Floors 1 & 2 - BC:89-098
First Floor West Mechanical Plan - 3584
00006LM1

**JOB NO.** BC:89-098

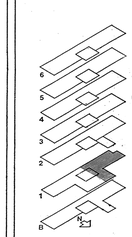
**REVISIONS** RECORD DRAWINGS 12/91

REGISTERED PROFESSIONAL ENGINEER No. 4537 John D. Frank STATE OF UTAH


BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.


# STATE OFFICE BUILDING REMODEL - PHASE 2

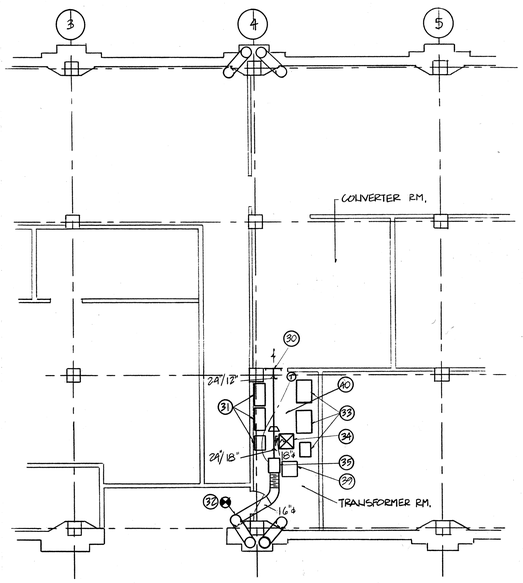
**KEY PLAN**



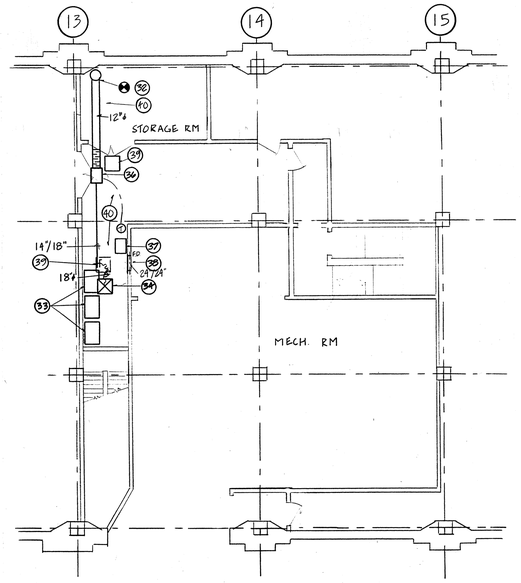
**DATE** JUNE 1990

**TITLE** FIRST FLOOR WEST MECH. PLAN

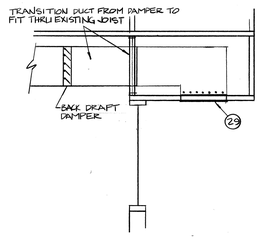
**SHEET NO.** M-1




**BASEMENT WEST TRANSFORMER AREA**
SCALE 1/8" = 1'-0"




**BASEMENT EAST TRANSFORMER AREA**
SCALE 1/8" : 1'-0"




**SECTION**
NO SCALE

## KEYED NOTES

30 NEW KRUEGER 880V OBD 24 X 12 SIDEWALL REGISTER.

31 EXISTING RELIEF FAN VFDS AND TRANSFORMERS.

32 CONNECT NEW DUCT TO EXISTING 18" DIA. RISER.

33 NEW TRANSFORMERS SERVING EXISTING VARIABLE FREQUENCY DRIVES.

34 NEW KRUEGER SH4 F21 24 X 24 DIFFUSER WITH 18" DIA. FLEX CONNECTION AND SPIN-IN DAMPER.

35 NEW KRUEGER LMHS OR EQUAL, SINGLE DUCT VAV BOX, 16" DIA., NO REHEAT COIL, 2800 CFM MAX, 0 CFM MIN., WITH CONTROLS AND T-STAT. POWER TO BOX BY ATC CONTRACTOR.

36 NEW KRUEGER LMHS OR EQUAL, SINGLE DUCT VAV BOX, 12" DIA., NO REHEAT COIL, 1500 CFM MAX, 0 CFM MIN, WITH CONTROLS AND T-STAT. POWER TO BOX BY ATC CONTRACTOR.

37 EXISTING TRANSFORMER.

38 NEW KRUEGER S80H 24 X 24 WITH A 24 X 24 TYPE A FIRE DAMPER IN NEW OPENING TO MECHANICAL SHAFT. COORDINATE LOCATION OF OPENING WITH EXISTING TRANSFORMER AND ELECTRICAL PANELS. PLACE RETURN LOW AS POSSIBLE.

39 NEW 24X24 CEILING ACCESS PANEL.

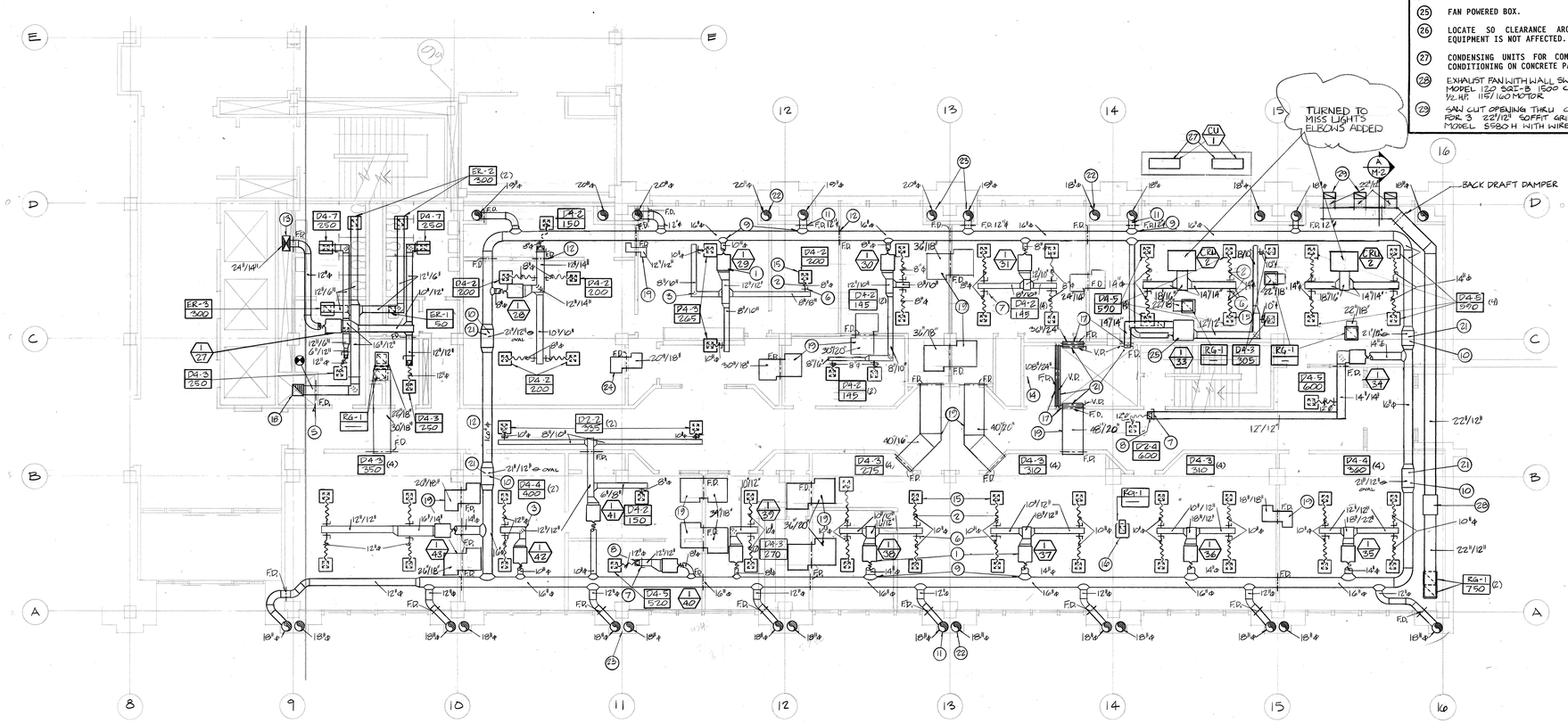
40 REMOVE GYP. BOARD CEILING AS NECESSARY FOR INSTALLATION OF NEW DUCTWORK. PATCH AND PAINT AFTER COMPLETED INSTALLATION. MOVE LIGHTS AS NECESSARY.

## KEYED NOTES

1. VAV REHEAT BOXES. SEE SCHEDULES FOR SIZE AND CAPACITIES. CONNECT TO HIGH PRESSURE DUCTWORK WITH NO MORE THAN 3'-0" OF H.P. FLEX DUCTING.
2. FLEXIBLE DUCTING CONNECT TO DIFFUSERS WITH NO MORE THAN 5'-0" FROM LOW PRESSURE DUCTWORK.
3. TURNING VANES, TYPICAL. LOCATE IN ALL ELBOWS OF RECTANGULAR DUCTWORK.
4. RETURN AIR TRANSFER DUCT STUBBED INTO RETURN AIR PLENUM ABOVE CEILING.
5. PROVIDE NEW FIRE DAMPER IN EXISTING DUCT PENETRATION OF WALL. EXTEND NEW EXHAUST DUCTWORK TO EXHAUST GRILLES.
6. ELONGATED FITTING - TYPICAL. SEE DETAIL 7/M-10.
7. MANUAL DAMPER WITH LOCKING QUADRANT, TYPICAL.
8. SQUARE TO ROUND TRANSITION, TYPICAL.
9. CONICAL TEE HIGH PRESSURE FITTING.
10. PROVIDE FLAT OVAL DUCTING UNDER BEAMS ON GRIDS B & C TO ALLOW FOR LIMITED CEILING SPACE.
11. PROVIDE FIRE DAMPERS AT ALL HIGH PRESSURE DUCT PENETRATIONS TO EXTERIOR DUCT SHAFTS. SEE DETAIL 1/M-1 FOR INSTALLATION, TYPICAL.
12. FIRE DAMPER, TYPICAL. PROVIDE AT ALL FIRE RATED WALLS. SEE ARCHITECTURAL DRAWINGS FOR LOCATION OF FIRE RATED WALLS.
13. CONNECT ONTO EXISTING COLD SUPPLY AIR DUCT IN SHAFT FOR NEW DUCTWORK TO TOILET ROOM.
14. LOCATED ATC COMMUNICATION PANELS IN NEW ELECTRICAL ROOMS. TYPICAL COORDINATE LOCATION WITH ELECTRICAL CONTRACTOR.
15. SUPPLY DIFFUSERS - REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION.
16. RETURN AIR GRILLE WITH SOUND BOOT.
17. REMOVE THE EXISTING FIRE DAMPERS, AND PROVIDE NEW FIRE DAMPERS. MODIFY EXISTING OPENINGS AS REQUIRED FOR NEW DAMPER INSTALLATION.
18. EXISTING TOILET EXHAUST RISER.
19. FIRE DAMPERED RETURN AIR TRANSFER DUCT, TYPICAL.
20. INSTALL MANUAL VERTICAL BLADE VOLUME DAMPERS IN BACK OF FIRE DAMPERS IN SHAFT WALLS. PROVIDE LOCKING QUADRANT FOR VOLUME DAMPERS. TYPICAL. DAMPER DIMENSIONS TO BE SAME AS FIRE DAMPERS.
21. ROUND TO OVAL TRANSITIONS TO BE ECCENTRIC, FLAT ON THE BOTTOM, TYPICAL.
22. CAP UNUSED RISER TAKE-OFF BEHIND FIRE RATED WALL. TYPICAL.
23. EXISTING HOT DECK AND COLD DECK HIGH VELOCITY DUCT RISERS, TYPICAL, EXISTING SIZES SHOWN WERE TAKEN FROM RECORD DRAWING OF PREVIOUS CONSTRUCTION AND HAVE NOT BEEN FIELD VERIFIED.
24. RETURN AIR SOUND BOOT.
25. FAN POWERED BOX.
26. LOCATE SO CLEARANCE AROUND ELECTRICAL EQUIPMENT IS NOT AFFECTED.
27. CONDENSING UNITS FOR COMPUTER ROOM AIR CONDITIONING ON CONCRETE PAD.
28. EXHAUST FAN WITH WALL SWITCH, COOK MODEL 120 SQEB 1500 CFM @ 3/8" S.P. 1/2 HP, 115/1 60 MOTOR
29. SAW CUT OPENING THRU CONCRETE SOFFIT FOR 3 22"/12" SOFFIT GRILLES, KRUGER MODEL S680 H WITH WIRE MESH SCREEN

NOTE

KEYED NOTE 17 AND 20 REFER TO WORK ON DAMPERED OPENINGS TO THE RETURN/RELIEF SHAFT. THE EXISTING GWB BARRIERS FROM THE SPACE TO THE SHAFT WILL REMAIN INTACT UNTIL THE NEW VAV SUPPLY AIR DISTRIBUTION SYSTEM IS OPERATIONAL (I.E. POSITIVE PRESSURE OF SPACE IN RESPECT TO SHAFT). IT IS THE DESIGNER'S INTENT THAT NO REVERSE FLOW OCCUR FROM SHAFT TO SPACE. THIS IS TO PREVENT ASBESTOS RECONTAMINATION OF PREVIOUSLY ABATED FLOORS.




**FIRST FLOOR EAST MECHANICAL PLAN**
SCALE 1/8" = 1'-0"

JOB NO.
BC:89-098

REVISIONS
1 12-5-90

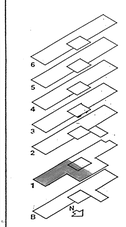
RECORD DRAWINGS
12/91

REGISTERED PROFESSIONAL ENGINEER
No. 4537
John D Frank
STATE OF UTAH

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

STATE OFFICE BUILDING
REMODEL - PHASE 2

KEY PLAN



DATE
JUNE 1990

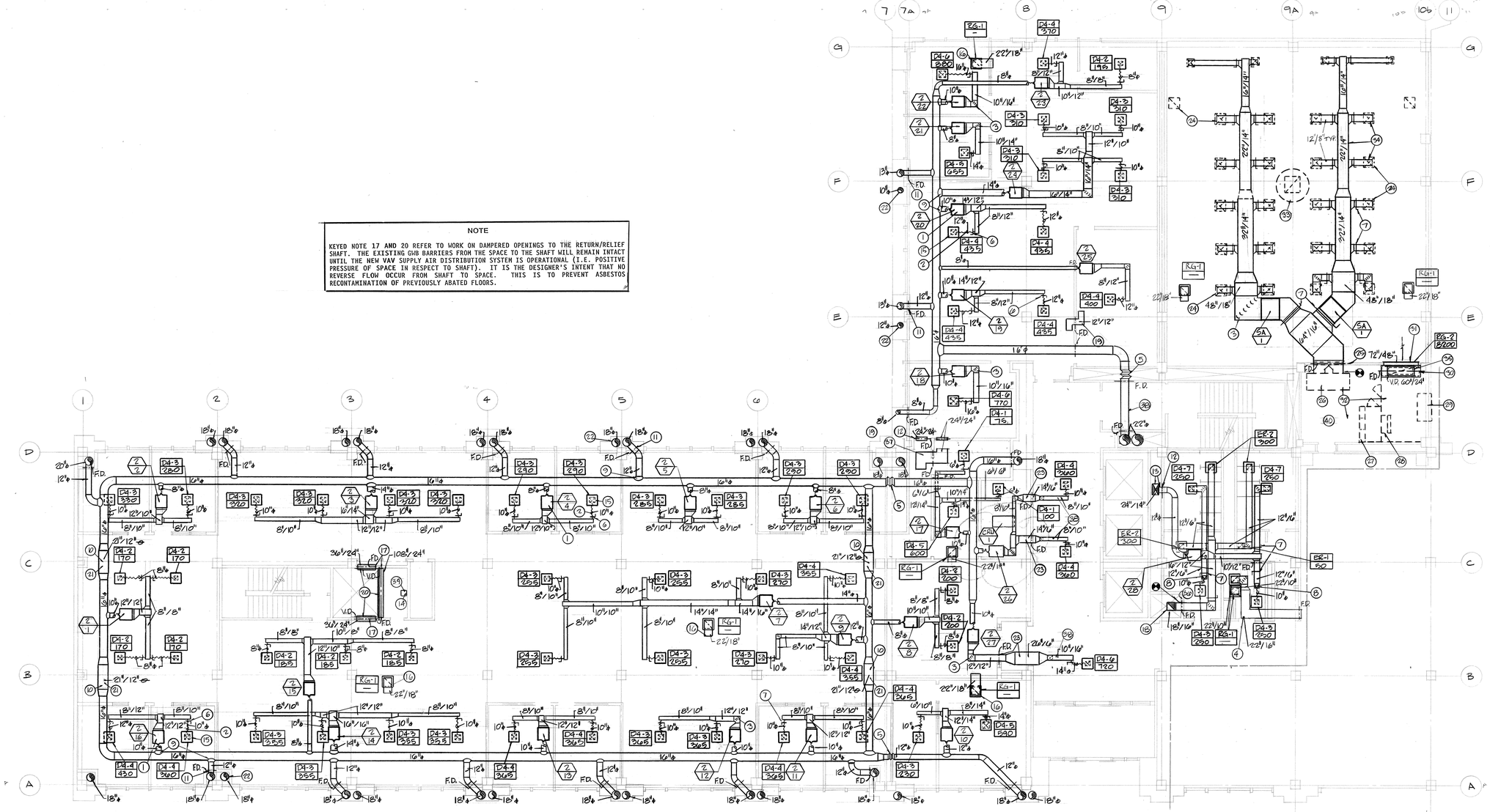
TITLE
FIRST FLOOR EAST MECH. PLAN

SHEET NO.
M-2

State Office Building; Phase Two, 2 Floor Remodel, Floors 1 & 2 - BC-89-098
First Floor East Mechanical Plan - 3585
00006LM2

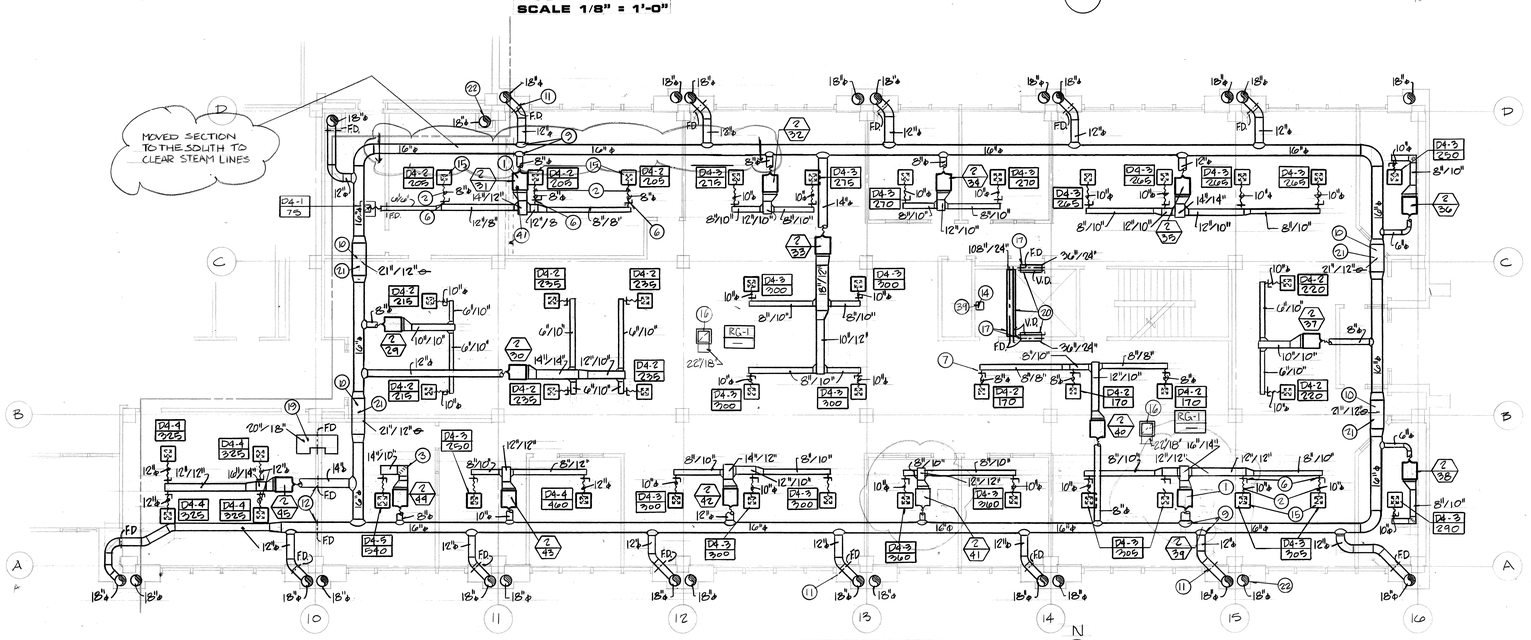
NOTE

KEYED NOTE 17 AND 20 REFER TO WORK ON DAMPERED OPENINGS TO THE RETURN/RELIEF SHAFT. THE EXISTING GWB BARRIERS FROM THE SPACE TO THE SHAFT WILL REMAIN INTACT UNTIL THE NEW VAV SUPPLY AIR DISTRIBUTION SYSTEM IS OPERATIONAL (I.E. POSITIVE PRESSURE OF SPACE IN RESPECT TO SHAFT). IT IS THE DESIGNER'S INTENT THAT NO REVERSE FLOW OCCUR FROM SHAFT TO SPACE. THIS IS TO PREVENT ASBESTOS RECONTAMINATION OF PREVIOUSLY ABATED FLOORS.



## SECOND FLOOR EAST MECHANICAL PLAN

SCALE 1/8" = 1'-0"




## SECOND FLOOR WEST MECHANICAL PLAN

SCALE 1/8" = 1'-0"

## KEYED NOTES

1. VAV REHEAT BOXES. SEE SCHEDULES FOR SIZE AND CAPACITIES. CONNECT TO HIGH PRESSURE DUCTWORK WITH NO MORE THAN 3'-0" OF H.P. FLEX DUCTING.
2. FLEXIBLE DUCTING CONNECT TO DIFFUSERS WITH NO MORE THAN 5'-0" FROM LOW PRESSURE DUCTWORK.
3. TURNING VANES, TYPICAL. LOCATE IN ALL ELBOWS OF RECTANGULAR DUCTWORK.
4. RETURN AIR TRANSFER DUCT STUBBED INTO RETURN AIR PLENUM ABOVE CEILING.
5. PROVIDE EXPANSION FITTINGS IN DUCTWORK AT ALL BUILDING EXPANSION JOINTS. SEE DETAIL 8/M-10.
6. ELONGATED FITTING - TYPICAL. SEE DETAIL 7/M-10.
7. MANUAL DAMPER WITH LOCKING QUADRANT, TYPICAL.
8. SQUARE TO ROUND TRANSITION, TYPICAL.
9. CONICAL TEE HIGH PRESSURE FITTING.
10. PROVIDE FLAT OVAL DUCTING UNDER BEAMS ON GRIDS B & C TO ALLOW FOR LIMITED CEILING SPACE.
11. PROVIDE FIRE DAMPERS AT ALL HIGH PRESSURE DUCT PENETRATIONS TO EXTERIOR DUCT SHAFTS. SEE DETAIL 1/M-1 FOR INSTALLATION, TYPICAL.
12. FIRE DAMPER, TYPICAL. PROVIDE AT ALL FIRE RATED WALLS. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS OF FIRE RATED WALLS.
13. CONNECT ONTO EXISTING COLD SUPPLY AIR DUCT IN SHAFT FOR NEW DUCTWORK TO TOILET ROOM.
14. LOCATED ATC COMMUNICATION PANELS IN NEW ELECTRICAL ROOMS. TYPICAL COORDINATE LOCATION WITH ELECTRICAL CONTRACTOR.
15. SUPPLY DIFFUSERS - REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION.
16. RETURN AIR GRILL WITH SOUND BOOT.
17. REMOVE THE EXISTING FIRE DAMPERS, AND PROVIDE NEW FIRE DAMPERS. MODIFY EXISTING OPENINGS AS REQUIRED FOR NEW DAMPER INSTALLATION.
18. EXISTING TOILET EXHAUST RISER.
19. FIRE DAMPERED RETURN AIR TRANSFER DUCT, TYPICAL.
20. INSTALL MANUAL VERTICAL BLADE VOLUME DAMPERS IN BACK OF FIRE DAMPERS IN SHAFT WALLS. PROVIDE LOCKING QUADRANT FOR VOLUME DAMPERS. TYPICAL. DAMPER DIMENSIONS TO BE SAME AS FIRE DAMPERS.
21. ROUND TO OVAL TRANSITIONS TO BE ECCENTRIC, FLAT ON THE BOTTOM, TYPICAL.
22. CAP UNUSED RISER TAKE-OFF BEHIND FIRE RATED WALL. TYPICAL.
23. DELETE INTERNAL DUCT LINER WHERE DUCT IS TRANSITIONED TO PASS UNDER BEAM. WRAP THIS SECTION OF UNLINED DUCT WITH INSULATION SPECIFIED FOR DUCTWORK UPSTREAM OF TERMINAL BOXES. USE TYPE "A" FIRE DAMPER AT THIS POINT.
24. REUSE EXISTING SUPPLY DIFFUSERS AND RELIEF AIR GRILLES.
25. ENLARGE EXISTING WALL OPENING AS REQUIRED. INSTALL 64" x 16" FIRE DAMPER IN DUCT PENETRATION OF WALL.
26. EXISTING AIR HANDLING UNIT. EXTEND FULL SIZE CONDENSATE DRAIN LINE WITH P-TRAP FROM COIL DRAIN PAN TO NEAREST FLOOR DRAIN.
27. EXISTING FILTER BANK TO REMAIN UNDER BASE BID.
28. REMOVE EXISTING ABANDONED ROLL FILTER AND ACCESSORY EQUIPMENT.
29. EXISTING OUTSIDE AIR LOUVER AND DAMPER TO REMAIN UNDER BASE BID. PROVIDE NEW DAMPER OPERATOR.
30. NEW TYPE "A" FIRE DAMPER AT FLOOR LEVEL. APPROXIMATELY 84" X 24" FIELD VERIFY. REVISE EXISTING PLENUM AND CUT AND PATCH CEMENT AS REQUIRED.
31. NEW RETURN AIR GRILL MOUNTED 6" FROM FLOOR LEVEL TO REPLACE EXISTING GRILLES.
32. PROVIDE NEW CONTROLS FOR AUDITORIUM AIR HANDLING SYSTEM C/W NEW 3-WAY CHILLED WATER VALVE, NEW 2-WAY STEAM VALVE, NEW MIXED AIR CONTROLS, SPACE TEMPERATURE SENSORS, DISCHARGE AIR TEMPERATURE CONTROLS, AND RELIEF AIR CONTROLS.
33. EXISTING RELIEF AIR HOOD TO REMAIN. PROVIDE NEW DAMPER AND OPERATOR. FIELD VERIFY EXACT SIZE.
34. REMOVE ALL EXISTING DUCTWORK FROM AIR HANDLER TO EXISTING CEILING DIFFUSERS. INSTALL NEW LINED SUPPLY AIR DUCTWORK OF SIZES SHOWN FROM AIR HANDLER TO CEILING DIFFUSERS.
35. EXISTING RETURN AIR ATC DAMPER TO REMAIN. PROVIDE NEW OPERATOR.
36. PROVIDE NEW FIRE DAMPER IN EXISTING DUCT PENETRATION OF WALL. EXTEND NEW EXHAUST DUCTWORK TO EXHAUST GRILLES.
37. PROVIDE 6" x 6" OPENING IN SIDE OF DUCT TO RETURN AIR FROM PLENUM ABOVE ROOM CEILING.
38. RUN DUCT AS CLOSE TO STRUCTURE AS POSSIBLE.
39. LOCATE SO CLEARANCE AROUND ELECTRICAL EQUIPMENT IS NOT AFFECTED.
40. SEE M-7 FOR ADDITIVE ALTERNATE.
41. LOCATE UNIT TO MISS FOLDING WALL TRACK.

JOB NO.
BC:89-098

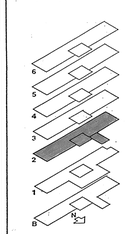
REVISIONS
Record Drawings
12/91

REGISTERED PROFESSIONAL ENGINEER No. 4537 John D Frank STATE OF UTAH

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

# STATE OFFICE BUILDING REMODEL - PHASE 2

KEY PLAN



DATE
JUNE 1990

TITLE
SECOND FLOOR MECHANICAL PLAN

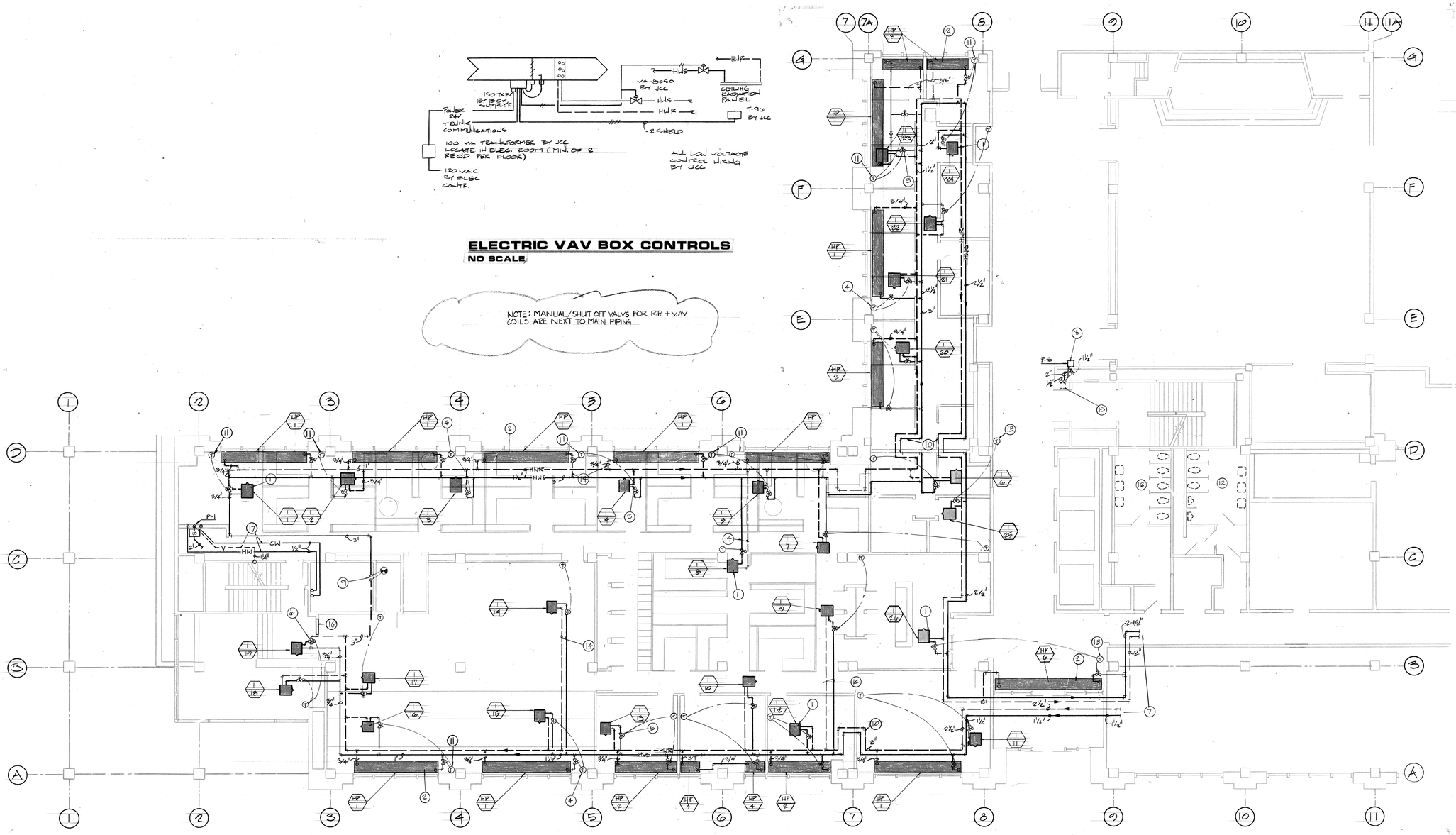
SHEET NO.
M-3

State Office Building; Phase Two, 2 Floor Remodel, Floors 1 & 2 - BC:89-098
Second Floor Mechanical Plan - 3586
00006LM3

## ELECTRIC VAV BOX CONTROLS

NO SCALE

NOTE: MANUAL/SHUT OFF VALVS FOR R.P. + VAV COILS ARE NEXT TO MAIN PIPING



## FIRST FLOOR WEST MECHANICAL PIPING PLAN

SCALE: 1/8" = 1'-0"

## KEYED NOTES

1. VAV REHEAT BOX WITH 2 OR 3 WAY AUTOMATIC ATC CONTROL VALVE AS SHOWN. SEE DETAIL FOR REQUIRED VALVING OF COILS. SEE BOX SCHEDULE FOR GPM'S REQUIRED.
2. EXTRUDED ALUMINUM RADIANT HEATING PANELS. INSTALL AS PER REQUIRED BY MANUFACTURER AND AS SHOWN IN DETAILS, TYPICAL. SEE PANEL SCHEDULE FOR SIZE AND GPM REQUIRED.
3. NEW ELECTRIC WATER COOLER. EXTEND CW, VENT AND WASTE LINES FROM OPPOSITE SIDE OF WALL TO SERVICE COOLER.
4. ROOM THERMOSTAT TO CONTROL VAV BOX AND RADIANT PANELS. REFER TO CONTROL DIAGRAMS. MOUNT THERMOSTAT ON WALL AT HEIGHT SPECIFIED BY ARCHITECT, TYPICAL.
5. 2-WAY ATC VALVE WITH OPERATOR MOUNTED IN VERTICAL POSITION, TYPICAL.
6. 3-WAY ATC VALVE WITH OPERATOR MOUNTED IN VERTICAL POSITION, TYPICAL.
7. FOR CONTINUATION SEE SHEET M-5.
8. NOT USED.
9. CONNECT TO EXISTING PIPE RISER.
10. PROVIDE EXPANSION LOOPS WHERE PIPES CROSS BUILDING EXPANSION JOINTS.
11. PROVIDE 12" x 12" x 3" DEEP RIGID INSULATION BEHIND THERMOSTATS LOCATED ON EXTERIOR WALLS (TYPICAL).
12. POSITION OF PREVIOUSLY REMOVED FIXTURES.
13. INSTALL NEW T-STAT IN EXISTING LOCATION AS DIRECTED BY ARCHITECT. DO NOT DAMAGE MARBLE!
14. 3/4" BRANCH TAKE-OFF TO RADIANT PANELS OR VAV BOXES TYPICAL.
15. APPROXIMATE LOCATION OF EXISTING WATER COOLER TO BE REMOVED. EXTEND LINES TO NEW COOLER. TAKE CARE NOT TO DAMAGE MARBLE.
16. TURN EXISTING F.H. CABINET AROUND SO IT FACES EAST. MAKE PLUMBING CONNECTIONS AS NECESSARY FOR PROPER FUNCTION OF EXISTING FIRE HOSE.
17. RUN NEW HW, CW & VENT LINES TO CONNECT TO EXISTING RISERS. RUN WASTE IN BASEMENT TO EXISTING WASTE LINE. REMOVE ALL EXISTING ABANDONED HW, CW, VENT & WASTE LINES AND CAP AS NECESSARY.

State Office Building; Phase Two, 2 Floor Remodel, Floors 1 & 2 - BC:89-098
First Floor West Mechanical Piping Plan - 3587
00006LM4

JOB NO.
BC:89-098

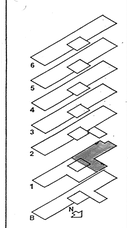
REVISIONS
RECORD DRAWINGS
12/91

REGISTERED PROFESSIONAL ENGINEER
No. 4537
John D Frank
STATE OF UTAH

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

STATE OFFICE BUILDING
REMODEL - PHASE 2

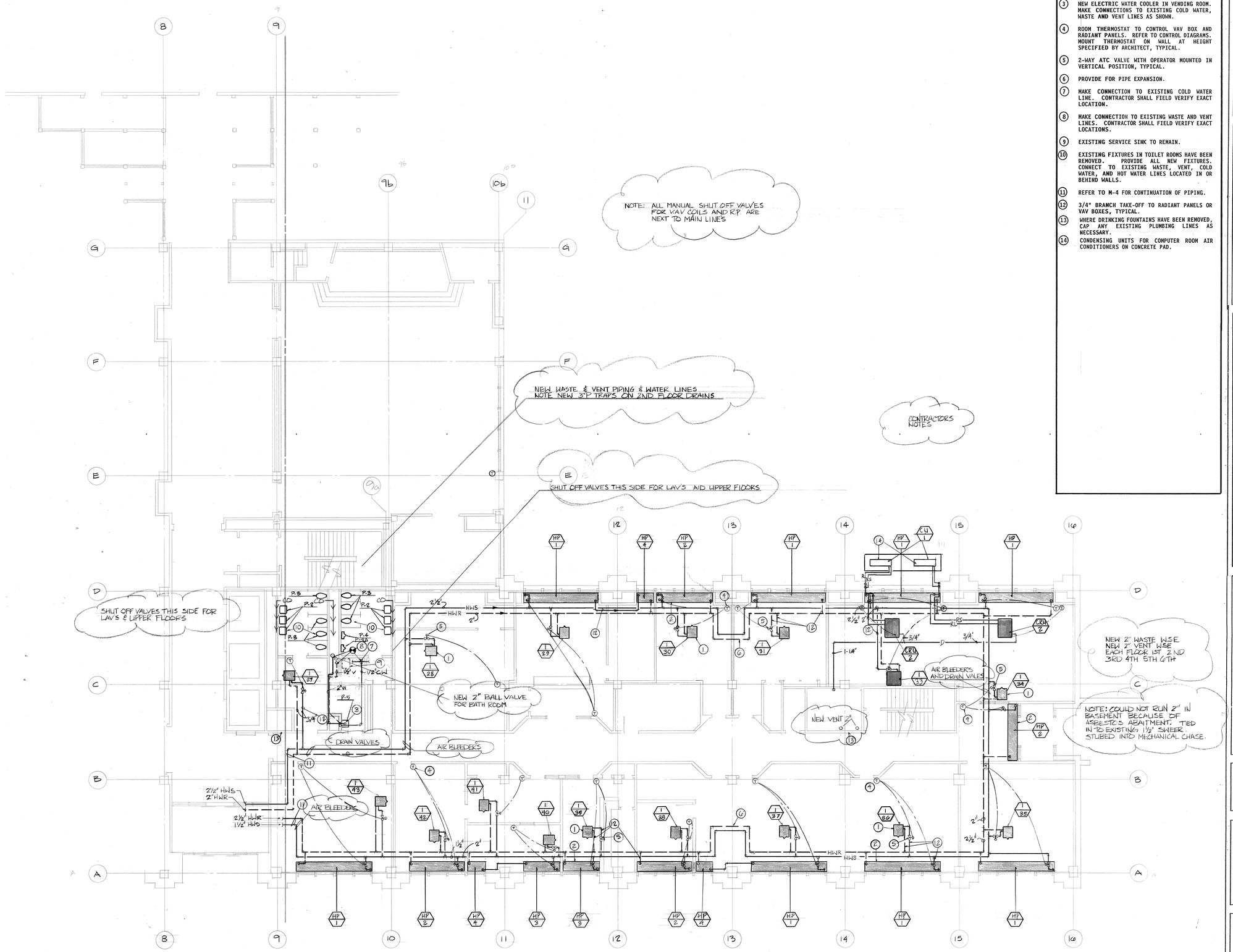
KEY PLAN



DATE
JUNE 1990

TITLE
FIRST FLOOR WEST MECH. PIPING PLAN

SHEET NO.
M-4




## FIRST FLOOR EAST MECHANICAL PIPING PLAN

SCALE 1/8" = 1'-0"

## KEYED NOTES

1. VAV REHEAT BOX WITH 2 OR 3 WAY AUTOMATIC ATC CONTROL VALVE AS SHOWN. SEE DETAIL FOR REQUIRED VALVING OF COILS. SEE BOX SCHEDULE FOR GPM'S REQUIRED.
2. EXTRUDED ALUMINUM RADIANT HEATING PANELS. INSTALL AS PER REQUIRED BY MANUFACTURER AND AS SHOWN IN DETAILS, TYPICAL. SEE PANEL SCHEDULE FOR SIZE AND GPM REQUIRED.
3. NEW ELECTRIC WATER COOLER IN VENDING ROOM. MAKE CONNECTIONS TO EXISTING COLD WATER, WASTE AND VENT LINES AS SHOWN.
4. ROOM THERMOSTAT TO CONTROL VAV BOX AND RADIANT PANELS. REFER TO CONTROL DIAGRAMS. MOUNT THERMOSTAT ON WALL AT HEIGHT SPECIFIED BY ARCHITECT, TYPICAL.
5. 2-WAY ATC VALVE WITH OPERATOR MOUNTED IN VERTICAL POSITION, TYPICAL.
6. PROVIDE FOR PIPE EXPANSION.
7. MAKE CONNECTION TO EXISTING COLD WATER LINE. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION.
8. MAKE CONNECTION TO EXISTING WASTE AND VENT LINES. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATIONS.
9. EXISTING SERVICE SINK TO REMAIN.
10. EXISTING FIXTURES IN TOILET ROOMS HAVE BEEN REMOVED. PROVIDE ALL NEW FIXTURES. CONNECT TO EXISTING WASTE, VENT, COLD WATER, AND HOT WATER LINES LOCATED IN OR BEHIND WALLS.
11. REFER TO M-4 FOR CONTINUATION OF PIPING.
12. 3/4" BRANCH TAKE-OFF TO RADIANT PANELS OR VAV BOXES, TYPICAL.
13. WHERE DRINKING FOUNTAINS HAVE BEEN REMOVED, CAP ANY EXISTING PLUMBING LINES AS NECESSARY.
14. CONDENSING UNITS FOR COMPUTER ROOM AIR CONDITIONERS ON CONCRETE PAD.

JOB NO.
BC:89-098

REVISIONS
RECORD DRAWINGS
12/91

REGISTERED PROFESSIONAL ENGINEER
No. 4537
John D Frank
STATE OF UTAH

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

STATE OFFICE BUILDING
REMODEL – PHASE 2

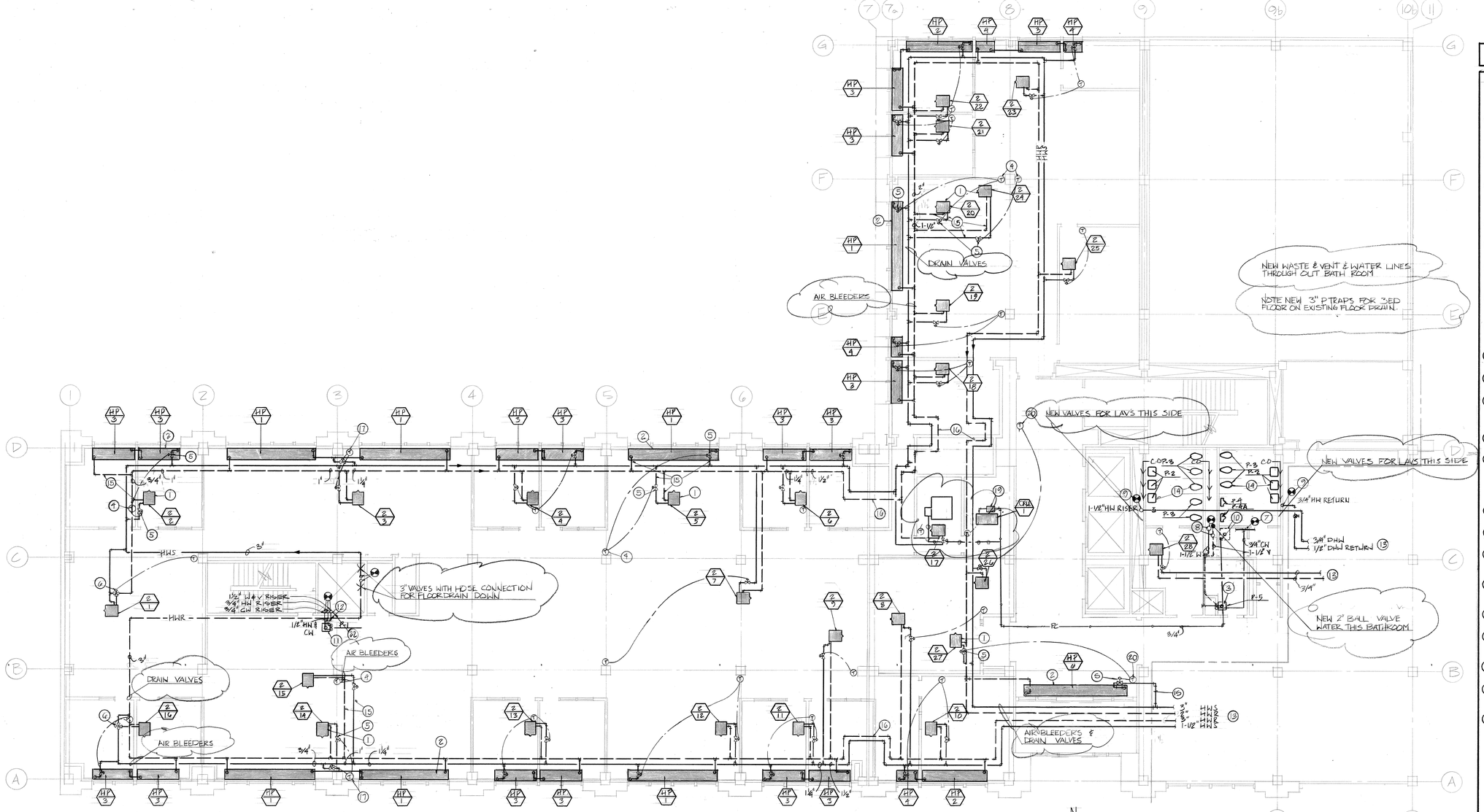
KEY PLAN

DATE
JUNE 1990

TITLE
FIRST FLOOR EAST MECH PIPING PLAN

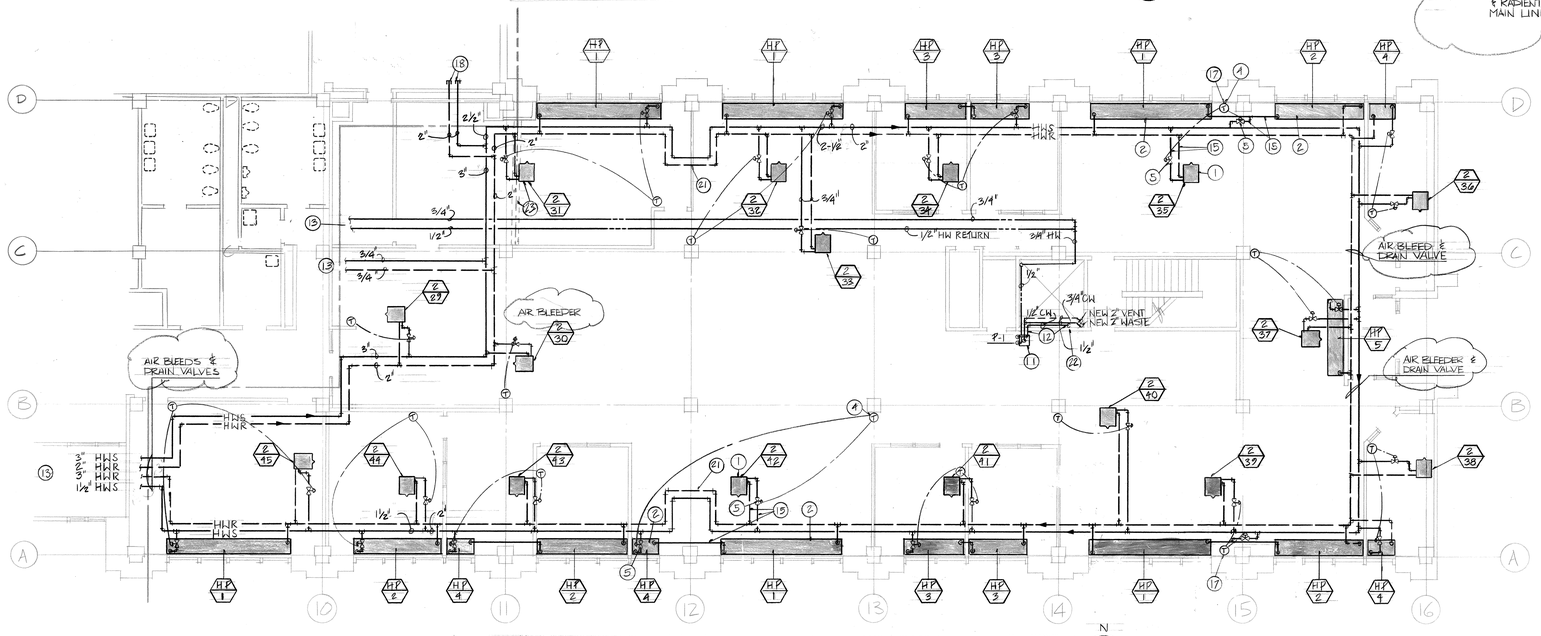
SHEET NO.
M-5

State Office Building; Phase Two, 2 Floor Remodel, Floors 1 & 2 - BC:89-098
First Floor East Mechanical Piping Plan - 3588
00006LM5




## SECOND FLOOR WEST MECHANICAL PIPING PLAN

SCALE 1/8" = 1'-0"




## SECOND FLOOR EAST MECHANICAL PIPING PLAN

SCALE 1/8" = 1'-0"

## KEYED NOTES

1. VAV REHEAT BOX WITH 2 OR 3 WAY AUTOMATIC ATC CONTROL VALVE AS SHOWN. SEE DETAIL FOR REQUIRED VALVING OF COILS. SEE BOX SCHEDULE FOR GPM'S REQUIRED.
2. EXTRUDED ALUMINUM RADIANT HEATING PANELS. INSTALL AS PER REQUIRED BY MANUFACTURER AND AS SHOWN IN DETAILS, TYPICAL. SEE PANEL SCHEDULE FOR SIZE AND GPM REQUIRED.
3. NEW ELECTRIC WATER COOLER IN VENDING ROOM. MAKE CONNECTIONS TO EXISTING COLD WATER, WASTE AND VENT LINES AS SHOWN.
4. ROOM THERMOSTAT TO CONTROL VAV BOX AND RADIANT PANELS. REFER TO CONTROL DIAGRAMS. MOUNT THERMOSTAT ON WALL AT HEIGHT SPECIFIED BY ARCHITECT, TYPICAL.
5. 2-WAY ATC VALVE WITH OPERATOR MOUNTED IN VERTICAL POSITION, TYPICAL.
6. 3-WAY ATC VALVE WITH OPERATOR MOUNTED IN VERTICAL POSITION, TYPICAL.
7. MAKE CONNECTION TO EXISTING COLD WATER LINE. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION.
8. MAKE CONNECTIONS TO EXISTING WASTE AND VENT LINES. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION.
9. MAKE CONNECTIONS TO EXISTING DOMESTIC HOT WATER SUPPLY AND RETURN LINES. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION.
10. EXISTING SERVICE SINK TO REMAIN. EXTEND CONDENSATE DRAIN LINE FROM CRU-1 TO SINK.
11. INSTALL NEW STAINLESS STEEL SINK IN COUNTER. VERIFY FIT WITH CABINET WORK.
12. RUN WASTE, VENT HW AND CW LINES FROM EXISTING LINES IN SHAFT, UNDER COUNTER TO SINK. REFER TO PLUMBING FIXTURE SCHEDULE FOR LINE SIZES REQUIRED.
13. REFER TO OTHER PLAN ON THIS SHEET FOR CONTINUATION OF PIPING.
14. EXISTING FIXTURES IN TOILET ROOMS HAVE BEEN REMOVED. PROVIDE ALL NEW FIXTURES. CONNECT TO EXISTING WASTE, VENT, COLD WATER, AND HOT WATER LINES LOCATED IN OR BEHIND WALLS. PROVIDE ALL NECESSARY PARTS AS REQUIRED TO RECONNECT PLUMBING FIXTURES.
15. 3/4" BRANCH TAKE-OFF TO RADIANT PANEL OR VAV BOXES. TYPICAL.
16. PROVIDE EXPANSION LOOPS WHERE PIPES CROSS BUILDING EXPANSION JOINTS.
17. PROVIDE 12" X 12" X 3" DEEP RIGID INSULATION BEHIND THERMOSTATS LOCATED ON EXTERIOR WALLS (TYPICAL).
18. VALVE AND CAP LINES FOR FUTURE CONNECTION. SEE SHEET M-7 FOR ADDITIONAL WORK REQUIRED UNDER ADDITIVE NO.1.
19. CONDENSATE PUMP. FURNISHED WITH COMPUTER ROOM UNIT.
20. INSTALL NEW THERMOSTAT IN EXISTING LOCATION AS DIRECTED BY ARCHITECT. DO NOT DAMAGE MARBLE.
21. PROVIDE EXPANSION LOOP FOR THERMAL EXPANSION OF PIPING.
22. WHERE DRINKING FOUNTAINS HAVE BEEN REMOVED, CAP ANY EXISTING PLUMBING LINES AS NECESSARY.
23. LOCATE UNIT TO MISS FOLDING WALL TRACK.

JOB NO.
BC:89-098

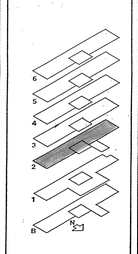
REVISIONS
RECORD DRAWINGS
12/91

REGISTERED PROFESSIONAL ENGINEER
No. 4537
John D Frank
STATE OF UTAH

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

# STATE OFFICE BUILDING REMODEL – PHASE 2

KEY PLAN



DATE
JUNE 1990

TITLE
SECOND FLOOR MECHANICAL PIPING PLAN

SHEET NO.
M-6

State Office Building; Phase Two, 2 Floor Remodel, Floors 1 & 2 - BC:89-098
Second Floor Mechanical Piping Plan - 3589
00006LM6

## PUMP SCHEDULE

| PUMP TAG | MFR. CATALOG NO. | SERVICE | CAPACITY GPM | CAPACITY HEAD FT WATER | EFF. % | BHP | MOTOR HP | MOTOR RPM | MOTOR VOLT | MOTOR Ø |
|---|---|---|---|---|---|---|---|---|---|---|
| P -1 | B&G SERIES 6019T-2A | RECIRCULATING PUMP | 40 | 30 | 45 | .65 | 1 | 1750 | 208 | 3 |
| | | | | | | | | | | |
| | | | | | | | | | | |

SC-04

## PLUMBING FIXTURE SCHEDULE

| SYMBOL | FIXTURE | CW | HW | W | V | REMARKS |
|---|---|---|---|---|---|---|
| P -1 | SINK | 1/2 | 1/2 | 2 | 1-1/2 | STAINLESS STEEL |
| P -2 | LAVATORY | 1/2 | 1/2 | -- | -- | EXISTING WASTE & VENT |
| P -3 | WATER CLOSET | 1 | -- | -- | -- | WALL HUNG MATCH EXISTING WASTE |
| P -4&4A | URINAL | 3/4 | -- | -- | -- | WALL HUNG MATCH EXISTING WASTE |
| P -5 | DRINKING FOUNTAIN | 1/2 | -- | 2 | 1-1/2 | -- |
| | | | | | | |
| | | | | | | |

SC-43

## REGISTER AND GRILLE SCHEDULE

| SYMBOL | MANUFACTURER | SIZE (IN) | MODEL | LOCATION | REMARKS |
|---|---|---|---|---|---|
| ER -1 | KRUEGER | 6 x 6 | C1190 | -- | C/W FRAME 22, OBD |
| ER -2 | KRUEGER | 12 x 12 | C1190 | -- | C/W FRAME 22, OBD |
| ER -3 | KRUEGER | 12 x 12 | 1190 | -- | C/W FRAME 23, OBD |
| -- | | | | | |
| RG - 1 | KRUEGER | 22 x 22 | EGC-5 | -- | C/W FRAME 23, |
| RG - 2 | KRUEGER | 72 x 48 | S480H | -- | C/W FRAME 22, |
| | | | | | |
| | | | | | |

SC-03

## SOUND TRAP SCHEDULE

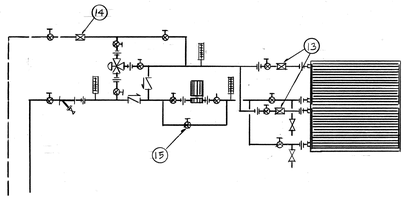
| PLAN SYMBOL | MANUFACTURER & MODEL | OCTAVE BAND DYNAMIC INSERT LOSSES, DB 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | WxH SIZE | CFM | P.D. IN. W.G. | COMMENTS QTY. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SA -1 | RINK A36 | 5 | 7 | 17 | 28 | 36 | 32 | 20 | 13 | 48x18 | 4100 | .12 | 2 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

SC-58

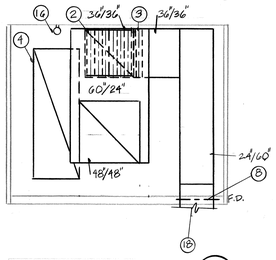
## DIFFUSER SCHEDULE

| SYMBOL | MANUFACTURER | SIZE | THROW | MODEL | REMARKS |
|---|---|---|---|---|---|
| D2 -1 | KRUEGER | 9 x 9 | 2-WAY | SH-2 | C/W FRAME 23, OBD |
| D2 -2 | KRUEGER | 12 x 12 | 2-WAY | SH-2 | C/W FRAME 23, OBD |
| D2 -3 | KRUEGER | 15 x 15 | 2-WAY | SH-2 | C/W FRAME 23, OBD |
| D2 -4 | KRUEGER | 18 x 18 | 2-WAY | SH-2 | C/W FRAME 23, OBD |
| -- | | | | | |
| D4 - 1 | KRUEGER | 6 x 6 | 4-WAY | SH-4 | C/W FRAME 23, OBD |
| D4 - 2 | KRUEGER | 9 x 9 | 4-WAY | SH-4 | C/W FRAME 23, OBD |
| D4 - 3 | KRUEGER | 12 x 12 | 4-WAY | SH-4 | C/W FRAME 23, OBD |
| D4 - 4 | KRUEGER | 15 x 15 | 4-WAY | SH-4 | C/W FRAME 23, OBD |
| D4 - 5 | KRUEGER | 18 x 18 | 4-WAY | SH-4 | C/W FRAME 23, OBD |
| D4 - 6 | KRUEGER | 21 x 21 | 4-WAY | SH-4 | C/W FRAME 23, OBD |
| D4 - 7 | KRUEGER | 12 x 12 | 4-WAY | SH-4 | C/W FRAME 22, OBD |
| | | | | | |
| | | | | | |

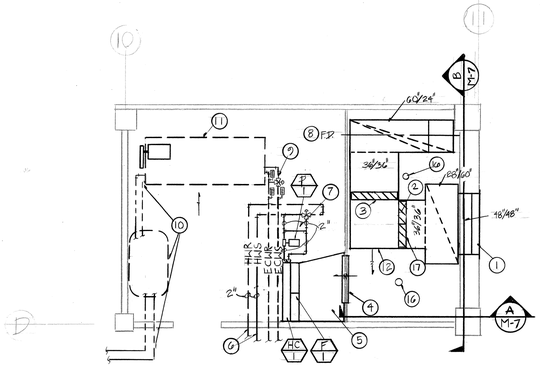
SC-02



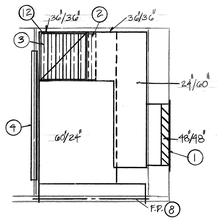
**HOT WATER COIL PIPING SCHEMATIC** (1 / M-7)



**SECTION** (B / M-7)
SCALE 1/4" = 1'-0"



**AUDITORIUM MECH. RM. ADDITIVE ALTERNATE #1** (N)
SCALE 1/4" = 1'-0"



**SECTION** (A / M-7)
SCALE 1/4" = 1'-0"

## CEILING RADIANT HEATER PANEL SCHEDULE

| SYMBOL | MANUFACTURER / CATALOG NO. | GPM | WATER IN/OUT | MAX P.D.(2) | BTU/SQ FT |
|---|---|---|---|---|---|
| HP -1 | AEROTECH AX - 16'-0" x 2'-0" * | 1.0 / 3/4" | 200/180 | 8 FT. | 243 |
| HP -2 | AEROTECH AX - 12'-0" x 2'-0" * | 1.0 / 3/4" | 200/180 | 8 FT. | 243 |
| HP -3 | AEROTECH AX - 8'-0" x 2'-0" * | 1.0 / 3/4" | 200/180 | 8 FT. | 243 |
| HP -4 | AEROTECH AX - 4'-0" x 2'-0" * | 1.0 / 3/4" | 200/180 | 8 FT. | 243 |
| HP -5 | AEROTECH AX - 10'-0" x 2'-0" * | 1.0 / 3/4" | 200/180 | 8 FT. | 243 |
| HP -6 | AEROTECH AX - 18'-6" x 2'-0" * | 1.0 / 3/4" | 200/180 | 8 FT. | 243 |
| | | | | | |
| | | | | | |

* SIZE OF PANEL IS APPOXIMATE CONTRACTOR TO FIELD VERIFY,COORDINATE WITH CEILING LAYOUT FOR EXACT FIT.

SC-22

## FILTER SCHEDULE

| SYMBOL | TYPE | CFM | SIZE | ARRANGMENT | MAX. S.P. DROP INITIAL | MAX. S.P. DROP FINAL |
|---|---|---|---|---|---|---|
| F -1 | FARR 30/30 | 2025 | 24x24x4 | 4'x8' BANK | .30 | .75 |
| | | | | | | |
| | | | | | | |

SC-41

## WATER COIL SCHEDULE

| SYMBOL | SYSTEM SERVED | SERVICE | TOTAL CFM | No. | SIZE W" x H" PER COIL | TOTAL AREA | MIN. ROWS/FPI | MAX. A.P.D. "W.C. | TOTAL MBH | AIR TEMP °F EDB/EWB | AIR TEMP °F LDB | FLUID TYPE | FLUID TEMP °F EWT | FLUID TEMP °F LWT | TOTAL GPM | WATER P.D. FT. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HC -1 | -- | AUDITORIUM | 8200 | 2 | 48 x 48 | 32 | 2/6 | 0.10 | 450 | 35 | 95 | WATER | 160 | -- | 40 | 2.0 |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

SC-05

## KEYED NOTES

1. EXISTING O.A. LOUVER TO REMAIN.
2. 18" X 36" ATC MINIMUM OUTSIDE AIR DAMPER.
3. 36" X 36" MODULATING ATC DAMPER.
4. EXISTING WALL OPENING WHERE ROLL FILTER WAS REMOVED UNDER BASE BID.
5. NEW 18 GA. GI. SHEET METAL PLENUM ACCESS PROVIDE THRU EXISTING WALL OPENING. PROVIDE 4" HIGH CONCRETE CURB UNDER PLENUM WALL. LINE INSIDE WALL OF PLENUM WITH 2" THICK ACCOUSTICAL DUCT INSULATION.
6. NEW HOT WATER SUPPLY AND RETURN LINES FOR HEATING COIL.
7. NEW HOT WATER COIL PIPING. SEE DETAIL 1/M-7.
8. NEW TYPE "A" HORIZONTAL FIRE DAMPER (ON BASE BID) APPROXIMATELY 84" X 24". FIELD VERIFY OPENING. CUT AND PATCH CEMENT AS REQUIRED.
9. EXISTING CHILLED WATER PIPING. REPLACE EXISTING THREE-WAY VALVE WITH A NEW THREE-WAY VALVE, REPLACE EXISTING TEMPERATURE SENSORS WITH NEW THERMOMETERS AND REPLACE EXISTING THERMOMETER WITH A NEW THERMOMETER.
10. REMOVE EXISTING STEAM AND CONDENSATE RETURN LINES, VALVES AND ACCESSORIES. ABANDON STEAM COIL IN AIR HANDLER. REMOVE PIPING BACK TO MAIN LINE IN BASEMENT AND CAP.
11. EXISTING AIR HANDLER.
12. 36" X 36" MIXED AIR OPENING.
13. CIRCUIT SETTERS SET FOR 20 GPM EACH.
14. CIRCUIT SETTER SET FOR 30 GPM.
15. BALL VALVES. TYPICAL.
16. RELOCATE LIGHT FIXTURE.
17. 18" X 36" ATC MODULATING OUTSIDE AIR DAMPER.
18. RETURN AIR RISER FROM AUDITORIUM.

JOB NO.
BC:89-098

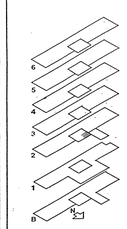
REVISIONS
RECORD DRAWINGS
12/91

REGISTERED PROFESSIONAL ENGINEER No. 4537 John D Frank STATE OF UTAH

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

STATE OFFICE BUILDING REMODEL - PHASE 2

KEY PLAN



DATE
JUNE 1990

TITLE
AUDITORIUM MECH. ROOM ADDITIVE ALTERNATE SCHEDULES

SHEET NO.
M-7

State Office Building; Phase Two, 2 Floor Remodel, Floors 1 & 2 - BC:89-098
Auditorium Mechanical Room Alternate and Schedules - 3590
00006LM7

# VAV BOX SCHEDULE

| BOX SYMBOL | CFM RANGE MIN | CFM RANGE MAX | MANUFACTURER & MODEL NO. | INLET SIZE | MIN. S.P. IN $H_2O$ | NC–AT 0.75"SP | COIL DATA MBH | EWT | LWT | EAT | LAT | GPM | LWPD | CONN. SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1–1 | 365 | 730 | KRUEGER LMHS | 10 | 0.85 | 28 | 10.9 | 200 | 180 | 55 | 87 | 1.1 | 0.33 | 3/4 |
| 1–2 | 415 | 825 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.7 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 1–3 | 415 | 825 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.7 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 1–4 | 415 | 825 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.7 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 1–5 | 275 | 550 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.4 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 1–6 | 300 | 600 | KRUEGER LMHS | 8 | 0.85 | 28 | 7.0 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 1–7 | 100 | 200 | KRUEGER LMHS | 6 | 0.85 | 28 | 2.3 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 1–8 | 530 | 1060 | KRUEGER LMHS | 12 | 0.85 | 28 | 12.3 | 200 | 180 | 55 | 80 | 1.2 | 0.55 | 3/4 |
| 1–9 | 300 | 600 | KRUEGER LMHS | 8 | 0.85 | 28 | 7.0 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 1–10 | 170 | 340 | KRUEGER LMHS | 6 | 0.85 | 28 | 4.0 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 1–11 | 540 | 1080 | KRUEGER LMHS | 12 | 0.85 | 28 | 12.6 | 200 | 180 | 55 | 80 | 1.3 | 0.55 | 3/4 |
| 1–12 | 205 | 410 | KRUEGER LMHS | 8 | 0.85 | 28 | 4.8 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 1–13 | 200 | 400 | KRUEGER LMHS | 8 | 0.85 | 28 | 4.7 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 1–14 | 405 | 810 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.4 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 1–15 | 405 | 810 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.4 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 1–16 | 405 | 810 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.4 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 1–17 | 405 | 810 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.4 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 1–18 | 425 | 850 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.9 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 1–19 | 425 | 850 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.9 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 1–20 | 600 | 1200 | KRUEGER LMHS | 14 | 0.85 | 27 | 14.0 | 200 | 180 | 55 | 80 | 1.4 | 0.55 | 3/4 |
| 1–21 | 600 | 1200 | KRUEGER LMHS | 14 | 0.85 | 27 | 14.0 | 200 | 180 | 55 | 80 | 1.4 | 0.55 | 3/4 |
| 1–22 | 240 | 475 | KRUEGER LMHS | 8 | 0.85 | 28 | 5.6 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 1–23 | 600 | 1200 | KRUEGER LMHS | 14 | 0.85 | 27 | 14.0 | 200 | 180 | 55 | 80 | 1.4 | 0.55 | 3/4 |
| 1–24 | 450 | 895 | KRUEGER LMHS | 10 | 0.85 | 28 | 16.0 | 200 | 180 | 55 | 93 | 1.6 | 0.55 | 3/4 |
| 1–25 | 450 | 895 | KRUEGER LMHS | 10 | 0.85 | 28 | 10.5 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 1–26 | 450 | 895 | KRUEGER LMHS | 10 | 0.85 | 26 | 10.5 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 1 – 27 | 500 | 1000 | KRUEGER LMHS | 12"ø | 0.85 | 28 | 11.5 | 200 | 180 | 55 | 80 | 1.2 | 0.55 | 3/4 |
| 1 – 28 | 475 | 950 | KRUEGER LMHS | 12"ø | 0.85 | 28 | 10.9 | 200 | 180 | 55 | 80 | 1.1 | 0.55 | 3/4 |
| 1 – 29 | 365 | 730 | KRUEGER LMHS | 10"ø | 0.85 | 28 | 8.4 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 1 – 30 | 290 | 580 | KRUEGER LMHS | 8"ø | 0.85 | 28 | 6.8 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 1 – 31 | 290 | 580 | KRUEGER LMHS | 8"ø | 0.85 | 28 | 6.8 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 1 – 32 | — | — | NOT USED | — | — | — | — | — | — | — | — | — | — | — |
| 1 – 33 | 305 | 610 | KRUEGER QFV 1 | 8"ø | 0.85 | 28 | 11.1 | 200 | 180 | 55 | 94 | 1.2 | 0.55 | 3/4 |
| 1 – 34 | 600 | 1200 | KRUEGER LMHS | 14"ø | 0.85 | 27 | 13.8 | 200 | 180 | 55 | 80 | 1.4 | 0.55 | 3/4 |
| 1 – 35 | 725 | 1450 | KRUEGER LMHS | 14"ø | 0.85 | 27 | 20.7 | 200 | 180 | 55 | 86 | 2.1 | 0.55 | 3/4 |
| 1 – 36 | 625 | 1250 | KRUEGER LMHS | 14"ø | 0.85 | 27 | 14.4 | 200 | 180 | 55 | 80 | 1.5 | 0.55 | 3/4 |
| 1 – 37 | 625 | 1250 | KRUEGER LMHS | 14"ø | 0.85 | 27 | 14.4 | 200 | 180 | 55 | 80 | 1.5 | 0.55 | 3/4 |
| 1 – 38 | 550 | 1100 | KRUEGER LMHS | 14"ø | 0.85 | 27 | 12.7 | 200 | 180 | 55 | 80 | 1.3 | 0.55 | 3/4 |
| 1 – 39 | 270 | 540 | KRUEGER LMHS | 8"ø | 0.85 | 28 | 6.2 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 1 – 40 | 260 | 520 | KRUEGER LMHS | 8"ø | 0.85 | 28 | 6.0 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 1 – 41 | 415 | 830 | KRUEGER LMHS | 10"ø | 0.85 | 28 | 9.6 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 1 – 42 | 400 | 800 | KRUEGER LMHS | 10"ø | 0.85 | 28 | 9.2 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 1 – 43 | 700 | 1400 | KRUEGER LMHS | 14"ø | 0.85 | 27 | 16.1 | 200 | 180 | 55 | 80 | 1.7 | 0.55 | 3/4 |

**1. FAN POWERED BOX 1/10 hp 120/1/60.**

SC–29

# VAV BOX SCHEDULE

| BOX SYMBOL | CFM RANGE MIN | CFM RANGE MAX | MANUFACTURER & MODEL NO. | INLET SIZE | MIN. S.P. IN $H_2O$ | NC–AT 0.75"SP | COIL DATA MBH | EWT | LWT | EAT | LAT | GPM | LWPD | CONN. SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 – 1 | 340 | 680 | KRUEGER LMHS | 10 | 0.85 | 28 | 10.5 | 200 | 180 | 55 | 89 | 1.1 | 0.33 | 3/4 |
| 2 – 2 | 305 | 610 | KRUEGER LMHS | 8 | 0.85 | 28 | 12.1 | 200 | 180 | 55 | 98 | 1.3 | 0.55 | 3/4 |
| 2 – 3 | 640 | 1280 | KRUEGER LMHS | 14 | 0.85 | 28 | 14.7 | 200 | 180 | 55 | 80 | 1.5 | 0.55 | 3/4 |
| 2 – 4 | 290 | 580 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.7 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 2 – 5 | 285 | 570 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.6 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 2 – 6 | 290 | 580 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.7 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 2 – 7 | 645 | 1290 | KRUEGER LMHS | 14 | 0.85 | 27 | 14.8 | 200 | 180 | 55 | 80 | 1.5 | 0.55 | 3/4 |
| 2 – 8 | 200 | 400 | KRUEGER LMHS | 8 | 0.85 | 28 | 4.6 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 2 – 9 | 490 | 980 | KRUEGER LMHS | 12 | 0.85 | 28 | 11.3 | 200 | 180 | 55 | 80 | 1.2 | 0.55 | 3/4 |
| 2 – 10 | 410 | 820 | KRUEGER LMHS | 12 | 0.85 | 28 | 9.4 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 2 – 11 | 365 | 730 | KRUEGER LMHS | 10 | 0.85 | 28 | 8.4 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 2 – 12 | 365 | 730 | KRUEGER LMHS | 10 | 0.85 | 28 | 8.4 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 2 – 13 | 365 | 730 | KRUEGER LMHS | 10 | 0.85 | 28 | 8.4 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 2 – 14 | 710 | 1420 | KRUEGER LMHS | 14 | 0.85 | 27 | 16.3 | 200 | 180 | 55 | 80 | 1.7 | 0.55 | 3/4 |
| 2 – 15 | 275 | 550 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.3 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 2 – 16 | 395 | 790 | KRUEGER LMHS | 10 | 0.85 | 28 | 11.6 | 200 | 180 | 55 | 87 | 1.2 | 0.55 | 3/4 |
| 2 – 17 | 390 | 775 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.0 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 2 – 18 | 385 | 770 | KRUEGER LMHS | 10 | 0.85 | 28 | 8.9 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 2 – 19 | 440 | 875 | KRUEGER LMHS | 10 | 0.85 | 28 | 10.1 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 2 – 20 | 440 | 875 | KRUEGER LMHS | 10 | 0.85 | 28 | 10.1 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 2 – 21 | 330 | 655 | KRUEGER LMHS | 10 | 0.85 | 28 | 7.6 | 200 | 180 | 55 | 80 | 0.8 | 0.33 | 3/4 |
| 2 – 22 | 440 | 880 | KRUEGER LMHS | 10 | 0.85 | 28 | 10.1 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 2 – 23 | 285 | 565 | KRUEGER LMHS | 8 | 0.85 | 28 | 7.8 | 200 | 180 | 55 | 85 | 0.8 | 0.33 | 3/4 |
| 2 – 24 | 620 | 1240 | KRUEGER LMHS | 14 | 0.85 | 27 | 14.3 | 200 | 180 | 55 | 80 | 1.5 | 0.55 | 3/4 |
| 2 – 25 | 200 | 400 | KRUEGER LMHS | 8 | 0.85 | 28 | 4.6 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 2 – 26 | 360 | 720 | KRUEGER LMHS | 10 | 0.85 | 28 | 8.3 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 2 – 27 | 360 | 720 | KRUEGER LMHS | 10 | 0.85 | 28 | 8.3 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 2 – 28 | 500 | 1000 | KRUEGER LMHS | 12 | 0.85 | 28 | 11.5 | 200 | 180 | 55 | 80 | 1.2 | 0.55 | 3/4 |
| 2 – 29 | 215 | 430 | KRUEGER LMHS | 8 | 0.85 | 28 | 4.9 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 2 – 30 | 475 | 950 | KRUEGER LMHS | 12 | 0.85 | 28 | 10.9 | 200 | 180 | 55 | 80 | 1.1 | 0.33 | 3/4 |
| 2 – 31 | 305 | 670 | KRUEGER LMHS | 8 | 0.85 | 28 | 7.0 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 2 – 32 | 275 | 550 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.3 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 2 – 33 | 605 | 1210 | KRUEGER LMHS | 14 | 0.85 | 27 | 13.9 | 200 | 180 | 55 | 80 | 1.4 | 0.55 | 3/4 |
| 2 – 34 | 270 | 540 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.2 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 2 – 35 | 530 | 1060 | KRUEGER LMHS | 12 | 0.85 | 28 | 12.2 | 200 | 180 | 55 | 80 | 1.3 | 0.55 | 3/4 |
| 2 – 36 | 125 | 250 | KRUEGER LMHS | 6 | 0.85 | 28 | 6.1 | 200 | 180 | 55 | 108 | 0.7 | 0.33 | 3/4 |
| 2 – 37 | 220 | 440 | KRUEGER LMHS | 8 | 0.85 | 28 | 5.1 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 2 – 38 | 145 | 290 | KRUEGER LMHS | 6 | 0.85 | 28 | 6.6 | 200 | 180 | 55 | 104 | 0.7 | 0.33 | 3/4 |
| 2 – 39 | 610 | 1220 | KRUEGER LMHS | 14 | 0.85 | 27 | 14.0 | 200 | 180 | 55 | 80 | 1.4 | 0.55 | 3/4 |
| 2 – 40 | 255 | 510 | KRUEGER LMHS | 8 | 0.85 | 28 | 5.9 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 2 – 41 | 360 | 720 | KRUEGER LMHS | 10 | 0.85 | 28 | 8.3 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 2 – 42 | 455 | 910 | KRUEGER LMHS | 12 | 0.85 | 28 | 10.5 | 200 | 180 | 55 | 80 | 1.1 | 0.33 | 3/4 |
| 2 – 43 | 355 | 710 | KRUEGER LMHS | 10 | 0.85 | 28 | 8.2 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 2 – 44 | 270 | 540 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.2 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 2 – 45 | 650 | 1300 | KRUEGER LMHS | 14 | 0.85 | 27 | 15.0 | 200 | 180 | 55 | 80 | 1.5 | 0.55 | 3/4 |

SC–29

# COMPUTER ROOM UNIT

| SYMBOL | MFR. CATALOG NO. | SERVICE | FAN SECTION CFM | HP | TOTAL CAP. BTUH @72FDB 50% RH. | CONDENSER | HP | ELECTRICAL VOLTS | FLA | ø | ACCESSORIES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CRU–1 | LIEBERT MM18A | | 700 | 1/4 | 15250 | 1 | 1/4 | 208 | 1 | 19.2 | CONDENSATE PUMP |
| CRU–2 | LIEBERT MME060E | | 2350 | 1 | 54600 | CU–2 | 1/2 | 208 | 3 | 31.7 | FILTER BOX/LINE SETS |

SC–62

1 INTIGRAL AIR COOLED CONDENSER IN RETURN AIR PLENUM

2 OUTDOOR PROPELLER FAN CONDENSING UNIT MODEL DMC067A 208/3/60 HZ. 24.2 FLA.

JOB NO.
BC:89-098

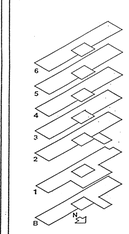
REVISIONS
RECORD DRAWINGS
12/91

REGISTERED PROFESSIONAL ENGINEER
No. 4537
John D Frank
STATE OF UTAH

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

STATE OFFICE BUILDING
REMODEL - PHASE 2

KEY PLAN



DATE
JUNE 1990

TITLE

SHEET NO.
M-8

State Office Building; Phase Two, 2 Floor Remodel, Floors 1 & 2 - BC:89-098
Schedules - 3592
000061M8

## DUCT BRACING GENERAL NOTES

1 DETAILS SHOWN PROVIDE GENERAL GUIDELINES FOR A LATERAL BRACING SYSTEM. A TYPICAL VERTICAL SUPPORT SYSTEM MUST ALSO BE USED.

2 BRACE ALL RECTANGULAR DUCTS OF AREA 6 SQ. FT. AND LARGER. BRACE ALL ROUND DUCTS 28" IN DIAMETER AND LARGER.

3 CABLE RESTRAINTS AND BRACING NOT TO EXCEED 30'-0" CENTERS AND SHALL BE PROVIDED AT EACH TURN, AT THE END OF EACH DUCT RUN, AND ON EACH SIDE OF FLEXIBLE CONNECTIONS. BRACE POINTS SHALL NOT EXCEED 15'-0" FROM FLEXIBLE CONNECTION.

4 WHEN COMBINING DUCT GROUPS ON COMMON BRACING SYSTEMS, USE WEIGHTS AND DIMENSIONS FROM BRACING SCHEDULE.

5 ALL HOLES IN ANGLES ARE TO BE 1/16 INCH OVERSIZED. PLACE STANDARD CUT WASHERS BETWEEN SHEET METAL ANGLES AND NUT.

6 DUCTS NOT BRACED SHALL BE INSTALLED WITH A 6" MIN. CLEARANCE TO VERTICAL CEILING HANGER WIRES.

7 REHEAT BOXES AND OTHER ITEMS WHICH ATTACH TO THE DUCT SYSTEM SHALL BE BRACED INDEPENDENTLY OF THE DUCTS.

8 ALL SHEET METAL FOR BRACING TO BE FY = 33 KSI MINIMUM. GAUGE FOR SHEET METAL BRACING SHALL BE AS FOLLOWS:

16 GA = (0.0598 INCH)
14 GA = (0.0747 INCH)
12 GA = (0.1046 INCH)

9 MINIMUM DISTANCE FROM EDGE OF ANGLE TO BOLTS SHALL BE AS FOLLOWS:

| BOLT DIAMETER | DISTANCE FROM EDGE |
|---|---|
| 1/4" TO 1/2" | 1" |
| 5/8" | 1 1/8" |
| 3/4" | 1 1/4" |
| 7/8" | 1 1/2" |

10 DO NOT FASTEN RESTRAINT SYSTEM TO TWO DISSIMILAR PARTS OF A BUILDING THAT MAY RESPOND IN A DIFFERENT MODE DURING AN EARTHQUAKE. FOR EXAMPLE, A WALL AND A ROOF.

11 ALTERNATE EVERY OTHER CABLE RESTRAINT IN OPPOSITE DIRECTION (SHOWN DOTTED).

## DUCT CABLE BRACING SCHEDULE

| DUCT SIZE MAX. | *WT/LIN FT (MAX) | BOLT SIZE | HORIZONTAL ANGLE | VERTICAL ANGLE | CABLE DIA.** | CABLE DES. *** | ANCHOR CONN. TYPE |
|---|---|---|---|---|---|---|---|
| 12" | 5# | 3/8" | 2 X 2 X 16 GA | 2 X 2 X 12 GA | 1/8" | 7x19 GALV | I |
| 18" | 8# | 3/8" | 2 X 2 X 16 GA | 2-1/2 X 2-1/2 X 12 GA | 1/8" | 7x19 GALV | I |
| 24" | 10# | 3/8" | 2 X 2 X 16 GA | 2-1/2 X 2-1/2 X 12 GA | 1/8" | 7x19 GALV | I |
| 30" | 13# | 3/8" | 2 X 2 X 16 GA | 2-1/2 X 2-1/2 X 12 GA | 1/8" | 7x19 GALV | I |
| 42" | 20# | 3/8" | 2-1/2 X 2-1/2 X 16 GA | 4 X 4 X 12 GA | 3/16" | 7x19 GALV | II |
| 54" | 27# | 3/8" | 2-1/2 X 2-1/2 X 16 GA | 4 X 4 X 12 GA | 3/16" | 7x19 GALV | II |
| 60" | 36# | 3/8" | 3 X 3 X 16 GA | 4 X 4 X 12 GA | 3/16" | 7x19 GALV | II |
| 84" | 53# | 3/8" | 4 X 4 X 14 GA | 4 X 4 X 1/4 | 1/4" | 7x19 GALV | III |
| 96" | 80# | 1/2" | 4 X 4 X 12 GA | 5 X 3 X 1/4 | 5/16" | 7x19 GALV | IV |

* MAXIMUM WEIGHT OF DUCTS OR COMBINATIONS OF DUCTS PER LINEAR FOOT. THE DUCTS MAXIMUM DIMENSION SHALL GOVERN WHAT BRACING IS REQUIRED. FOR ANCHOR CONNECTIONS SEE SCHEDULE. SEE DUCT BRACING DETAILS.

** TWO CABLES REQUIRED AT EACH RESTRAINT POINT, EACH CABLE TO BE INSTALLED 45° TO HORIZONTAL AND 45° TO LONGITUDINAL DIRECTION OF DUCT.

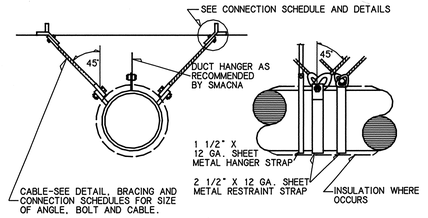
*** CABLE SYSTEMS TO BE EQUAL TO AMBER BOOTH C/W THIMBLES, CLAMPS AND GROMMETS.

## REHEAT BOX CABLE BRACING SCHEDULE

| BOX WEIGHT | BOLT SIZE | *CABLE DIA. | **CABLE DESIGN | ANCHOR CONN. TYPE |
|---|---|---|---|---|
| UP TO 300# | 3/8" | 1/8" | 7 X 19 GALV | I |
| 400# | 3/8" | 1/8" | 7 X 19 GALV | I |
| 600# | 3/8" | 3/16" | 7 X 19 GALV | II |
| 800# | 3/8" | 3/16" | 7 X 19 GALV | II |

1. *FOUR CABLES REQUIRED, ONE AT EACH CORNER. EACH CABLE TO BE INSTALLED 45 TO HORIZONTAL AND 45 TO LONGITUDINAL DIRECTION.

2. **CABLE SYSTEMS TO BE EQUAL TO AMBER BOOT C/W THIMBLES, CLAMPS AND GROMMETS




CABLE BRACING FOR ROUND AND OVAL DUCTS (5 / M-9)
NO SCALE

## SCHEDULE FOR TYPICAL CONNECTIONS TO STRUCTURAL SUPPORTING MEMBERS

| TYPE | MAX. LOAD CAPACITY POUNDS | PHILLIP'S REDHEAD ANCHORS TO CONC. LT. WT. | HARD ROCK | CONC.-CAST-IN PLACE INSERT | BOLT OF STL.BM. CLAMP |
|---|---|---|---|---|---|
| I<br>II | 500<br>1000 | 3/8"<br>3/8" | 3/8"<br>3/8" | 3/8"<br>1/2" | 3/8"<br>3/8" |
| III<br>IV | 1500<br>2000 | 3/8"<br>1/2" | 3/8"<br>1/2" | 1/2"<br>5/8" | 3/8"<br>1/2" |
| V<br>VI | 3000<br>4000 | 2-1/2"<br>2-5/8" | 2-1/2"<br>2-5/8" | 2-1/2"<br>2-5/8" | 5/8"<br>5/8" |

| TYPE | SPREADER SIZE | BOLT THRU WOOD | SPAN-CRETE ROD | ANGLE TO SUPPORTING STRUCTURAL MEMBER | ROD SIZE FOR PIPES |
|---|---|---|---|---|---|
| I<br>II | C4X5.4<br>C5X6.7 | 1/2"<br>3/4" | 3/8"<br>3/8" | 3X2X1/4"X0'-3" LLH<br>3-1/2X2-1/2X5/16X0'-3" LLH | 1/2"<br>1/2" |
| III<br>IV | C6X8.5<br>C8X11.5 | ***<br>*** | 1/2"<br>1/2" | 3-1/2X2-1/2X7/16X0'-4" LLH<br>5X3X1/2X0'-4" LLH | 5/8"<br>3/4" |
| V<br>VI | C9X13.4<br>C10X15.3 | *** | | 2-3-1/2X2-1/2X7/16X0'-4"<br>2-5X3X1/2X0'-4" | 7/8" *<br>7/8" ** |

NOTES:

1 FOR SLABS LESS THAN 5" THICK ONLY, THIN SLAB INSERTS MAY BE USED.

*2 FOR USE W/CONC. CAST-IN PLACE INSERTS OR PHILLIPS REDHEAD IN HARD ROCK ONLY.

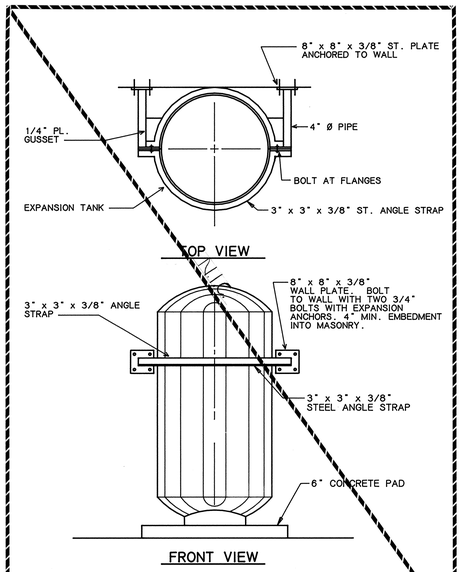
**3 FOR USE WITH CONC. CAST-IN PLACE INSERTS ONLY.

***4 WHERE TYPE III CONNECTIONS ARE REQUIRED FOR WOOD SYSTEMS, TYPE II CONNECTIONS SHALL BE USED WITH REDUCED RESTRAINT SPACING TO 20 FT. O.C. WHERE TYPE IV CONNECTIONS ARE REQUIRED FOR WOOD SYSTEMS, TYPE II CONNECTIONS SHALL BE USED WITH REDUCED RESTRAINT SPACING TO 15 FT. O.C. WHERE TYPE V CONNECTIONS ARE REQUIRED FOR WOOD SYSTEMS, TYPE II CONNECTIONS SHALL BE USED WITH REDUCED RESTRAINT SPACING TO 10 FT. O.C.

5 THE MECHANICAL CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO THE STRUCTURAL ENGINEER AND THEN TO THE MECHANICAL ENGINEER, SHOWING CONNECTION TYPE AND LOCATION OF ALL RESTRAINT CONNECTIONS TO THE STRUCTURE.

6 FOR ESSENTIAL FACILITIES WHERE CONCRETE ANCHOR BOLTS OF THE "REDHEAD" EXPANSION TYPE ARE LOADED IN PULL OUT, 50 PERCENT OF THE BOLTS (ALTERNATE BOLTS IN ANY GROUP ARRANGEMENT) SHALL BE PROOF TESTED TO TWICE THE ALLOWABLE LOAD. IF THERE ARE FAILURES, THE IMMEDIATELY ADJACENT BOLTS MUST THEN ALSO BE TESTED.

& "HILTI" AND "RAMSET" ANCHORS ARE EQUAL SUBSTITUTES FOR "REDHEAD".




EXPANSION TANK ANCHORAGE DETAIL (3 / M-9)
NO SCALE

## PIPE BRACING GENERAL NOTES

1 DETAILS SHOWN PROVIDE GENERAL GUIDELINES FOR A LATERAL BRACING SYSTEM. A TYPICAL VERTICAL SUPPORT SYSTEM MUST ALSO BE USED.

2 BRACE ALL PIPES 1-1/2" I.D. AND LARGER.

3 CABLE RESTRAINTS AND BRACING NOT TO EXCEED 30'-0" CENTERS AND SHALL BE PROVIDED AT ALL CHANGES IN DIRECTION OF PIPE. ALL DROPS TO EQUIPMENT, AND ON EACH SIDE OF FLEXIBLE CONNECTIONS. BRACE POINTS SHALL NOT EXCEED 15'-0" FROM FLEXIBLE CONNECTION.

4 ALL HOLES IN ANGLES ARE TO BE 1/16 INCH OVERSIZED. PLACE STANDARD CUT WASHERS BETWEEN SHEET METAL ANGLES AND NUT.

5 EQUIPMENT WHICH ATTACHES TO THE PIPING SYSTEM SHALL BE BRACED INDEPENDENTLY OF THE PIPES.

6 ALL SHEET METAL FOR BRACING TO BE FY=33 KSI MINIMUM. GAUGE FOR SHEET METAL BRACING SHALL BE AS FOLLOWS:

16 GA = (0.0598 INCH)
14 GA = (0.0747 INCH)
12 GA = (0.1046 INCH)

7 MINIMUM DISTANCE FROM EDGE OF ANGLE TO BOLTS SHALL BE AS FOLLOWS:

| BOLT DIAMETER | DISTANCE FROM EDGE |
|---|---|
| 1/4" TO 1/2" | 1" |
| 5/8" | 1 1/8" |
| 3/4" | 1 1/4" |
| 7/8" | 1 1/2" |

8 DO NOT FASTEN RESTRAINT SYSTEM TO TWO DISSIMILAR PARTS OF A BUILDING THAT MAY RESPOND IN A DIFFERENT MODE DURING AN EARTHQUAKE. FOR EXAMPLE, A WALL AND A ROOF.

9 PROVIDE LARGE ENOUGH PIPE SLEEVES THROUGH WALLS OR FLOORS TO ALLOW FOR ANTICIPATED DIFFERENTIAL MOVEMENTS.

10 DO NOT FASTEN ONE RIGID PIPING SYSTEM TO TWO DISSIMILAR PARTS OF A BUILDING THAT MAY RESPOND IN A DIFFERENT MODE DURING AN EARTHQUAKE. FOR EXAMPLE, A WALL AND A ROOF.

11 BRACING DETAILS, SCHEDULE AND NOTES ARE TO BE USED WITH THE FOLLOWING TYPES OF PIPE: STEEL PIPE SCHEDULE 40 AND 80, COPPER PIPE TYPE K,L,M (ONLY SILVER SOLDERED BRAZED JOINTS TO BE USED WITH COPPER PIPE).

12 FOR GAS PIPING, THE BRACING DETAILS, SCHEDULES AND NOTES MAY BE USED EXCEPT THAT RESTRAINTS SHALL BE INSTALLED AT EVERY 20'-0" O.C. ALSO ALL PIPE 1 INCH AND LARGER SHALL BE BRACED.

13 WASTE, VENT AND ROOF DRAINAGE PIPING SYSTEMS ARE EXCLUDED FROM THE RESTRAINT GUIDELINES.

14 ALTERNATE EVERY OTHER CABLE RESTRAINT IN OPPOSITE DIRECTION (SHOWN DOTTED).

## PIPE CABLE BRACING SCHEDULE

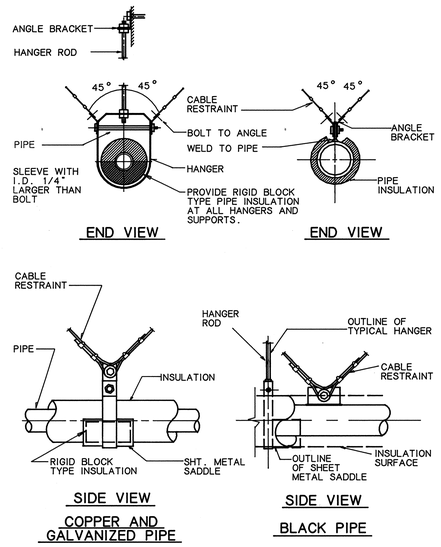
| PIPE SIZE | HANGER ROD SIZE | MAX. ROD LENGTH | HANGER TYPE | BOLTS TO CABLE | *CABLE SIZE | **CABLE TYPE | ANCHOR CONN. TYPE |
|---|---|---|---|---|---|---|---|
| 1-1/2" | 1/2" | 25" | CLEVIS | 3/8" | 1/8" | 7X19 GALV | I |
| 2" | 1/2" | 25" | CLEVIS | 3/8" | 1/8" | 7X19 GALV | I |
| 2-1/2" | 5/8" | 31" | CLEVIS | 3/8" | 1/8" | 7X19 GALV | I |
| 3" | 5/8" | 31" | CLEVIS | 3/8" | 3/16" | 7X19 GALV | II |
| 3-1/2" | 5/8" | 31" | CLEVIS | 3/8" | 3/16" | 7X19 GALV | II |
| 4" | 3/4" | 37" | CLEVIS | 3/8" | 3/16" | 7X19 GALV | II |
| 5" | 3/4" | 37" | CLEVIS | 1/2" | 1/4" | 7X19 GALV | III |
| 6" | 3/4" | 37" | CLEVIS | 5/8" | 1/4" | 7X19 GALV | IV |
| 8" | 7/8" | 43" | CLEVIS | 5/8" | 5/16" | 7X19 GALV | V |
| 10" | 7/8" | 43" | CLEVIS | 3/4" | 3/8" | 7X19 GALV | VI |

FOR ANCHOR CONNECTIONS SEE SCHEDULE.

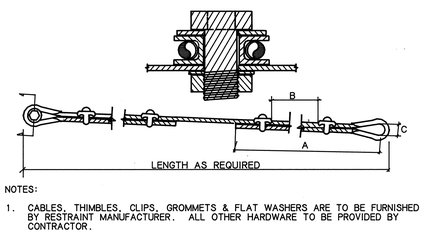
SEE PIPE BRACING DETAILS.

*TWO CABLES REQUIRED AT EACH RESTRAINT POINT. EACH CABLE TO BE INSTALLED 45° TO HORIZONTAL AND 45° TO LONGITUDINAL DIRECTION OF PIPE.

**CABLE SYSTEMS TO BE EQUAL TO AMBER BOOTH C/W CLAMPS THIMBLES AND GROMMETS.




PIPING RESTRAINT DETAIL (6 / M-9)
NO SCALE




NOTES:

1. CABLES, THIMBLES, CLIPS, GROMMETS & FLAT WASHERS ARE TO BE FURNISHED BY RESTRAINT MANUFACTURER. ALL OTHER HARDWARE TO BE PROVIDED BY CONTRACTOR.

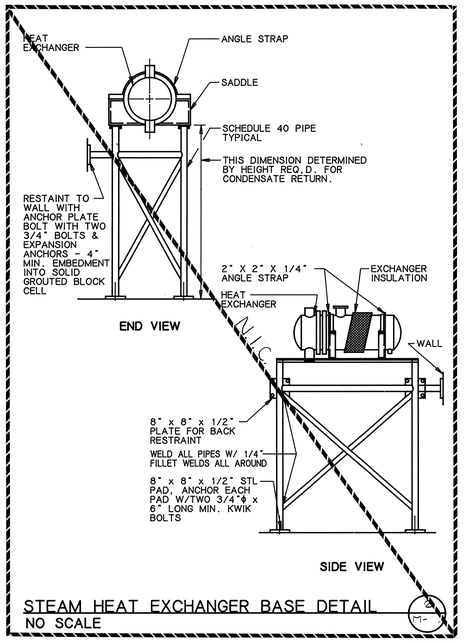
2. ENTIRE SYSTEM TO BE EQUAL TO AMBER BOOTH.

3. CABLE CLIPS MUST BE ORIENTED AS SHOWN WITH SHORT END OF CABLE ON THE CURVED PART OF THE CLIP.

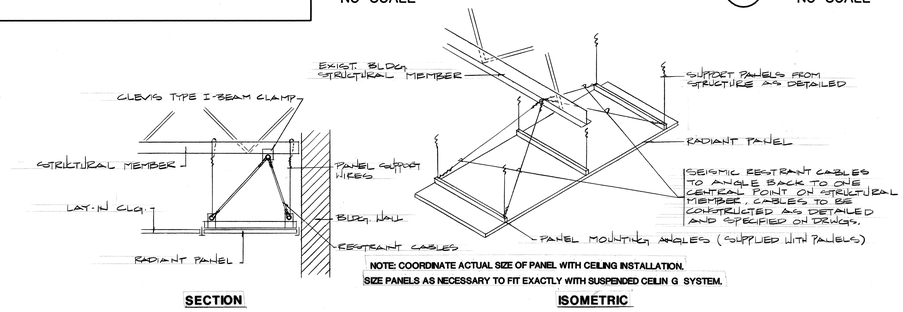
### CABLE SCHEDULE

| CABLE DIA. | CABLE DESIGN | A | B | C | BOLT SIZE | ALLOWABLE LOAD (lbf) | BREAKING STRENGTH (lbf) |
|---|---|---|---|---|---|---|---|
| 1/8" | 7X19 GALV. | 5-1/4" | 1-5/8" | 5/8" | 3/8" | 660 | 2000 |
| 3/16" | 7X19 GALV. | 5-3/4" | 1-7/8" | 5/8" | 3/8" | 1400 | 4200 |
| 1/4" | 7X19 GALV. | 6-3/4" | 2-3/8" | 11/16" | 3/8" | 2330 | 7000 |
| 5/16" | 7X19 GALV. | 7-3/8" | 2-5/8" | 13/16" | 5/8" | 3260 | 9800 |
| 3/8" | 7X19 GALV. | 8-7/8" | 3-1/4" | 1" | 5/8" | 4800 | 14400 |
| 7/16" | 6X19 IWRC | 17" | 3-5/8" | 1" | 5/8" | 5920 | 17800 |
| 1/2" | 6X19 IWRC | 18" | 3-7/8" | 1-1/8" | 3/4" | 7660 | 23000 |

CABLE RESTRAINT DETAIL (4 / M-9)
NO SCALE

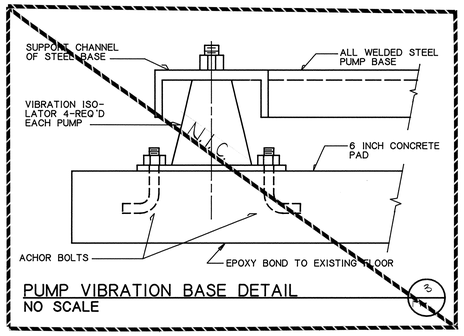



STEAM HEAT EXCHANGER BASE DETAIL (2 / M-9)
NO SCALE




NOTE: COORDINATE ACTUAL SIZE OF PANEL WITH CEILING INSTALLATION.
SIZE PANELS AS NECESSARY TO FIT EXACTLY WITH SUSPENDED CEILIN G SYSTEM.

PANEL RESTRAINT DETAIL (7 / M-9)
NO SCALE




PUMP VIBRATION BASE DETAIL (3 / M-9)
NO SCALE

JOB NO.
BC:89-098

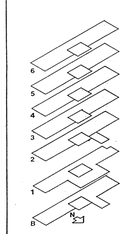
REVISIONS
RECORD DRAWINGS
12/91

REGISTERED PROFESSIONAL ENGINEER No. 4537 John D Frank STATE OF UTAH

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

STATE OFFICE BUILDING
REMODEL - PHASE 2

KEY PLAN

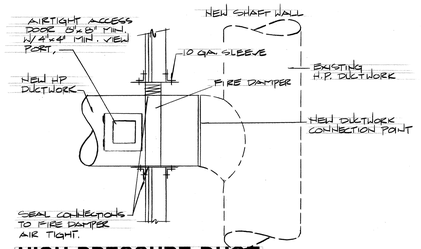


DATE
JUNE 1990

TITLE
MECHANICAL DETAILS

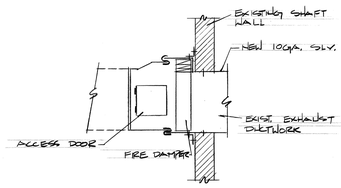
SHEET NO.
M-9

State Office Building; Phase Two, 2 Floor Remodel, Floors 1 & 2 - BC:89-098
Mechanical Details - 3593
00006LM9



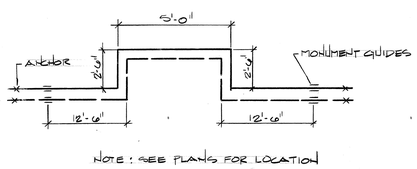

## HIGH PRESSURE DUCT FIRE DAMPER INSALLATION

NO SCALE — 19 / M-10



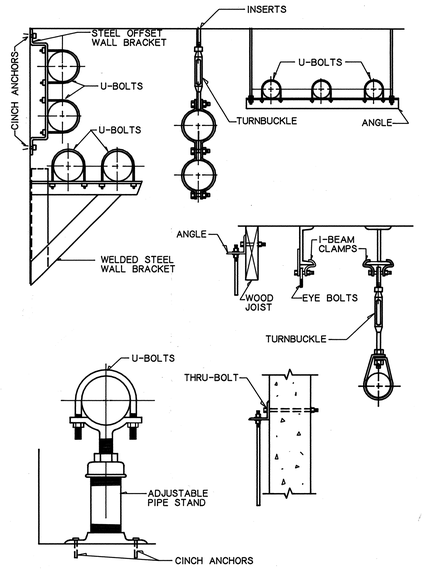

## EXIST. EXHAUST DUCTWORK FIRE DAMPER INSTALLATION

NO SCALE — 20 / M-10



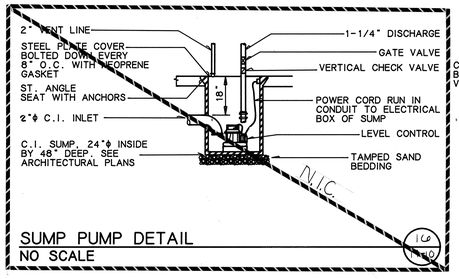

## EXPANSION LOOP DETAIL

NO SCALE — 21 / M-10



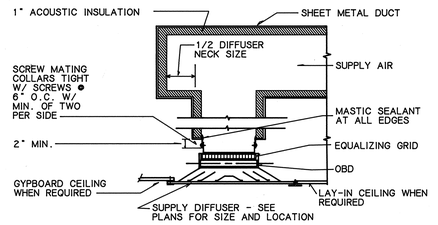

## TYPICAL PIPE SUPPORT DETAIL

NO SCALE — 15 / M-10



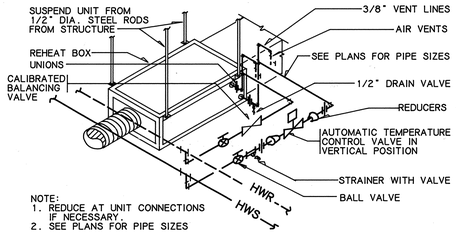

## SUMP PUMP DETAIL

NO SCALE — 16 / M-10



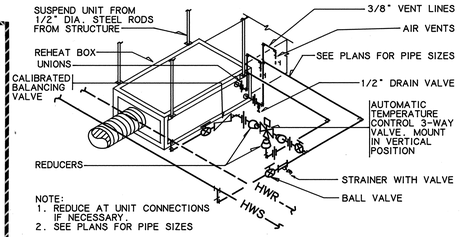

## TYPICAL CEILING DIFFUSER DETAIL

NO SCALE — 11 / M-10



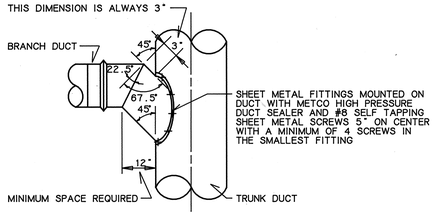

## REHEAT BOX PIPING DETAIL WITH 2-WAY AUTO-VALVE

NO SCALE — 12 / M-10



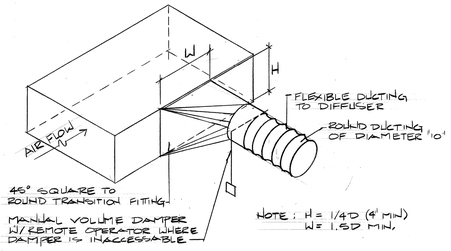

## REHEAT BOX PIPING DETAIL WITH 3-WAY AUTO-VALVE

NO SCALE — 13 / M-10



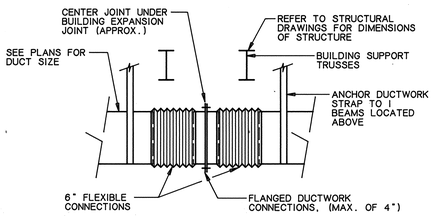

## CONSTRUCTION OF 45° - 90° TEE FITTING AND MOUNTING METHOD

NO SCALE — 6 / M-10



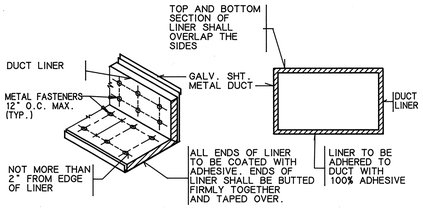

## ELONGATED SQUARE TO ROUND TEE

NO SCALE — 7 / M-10



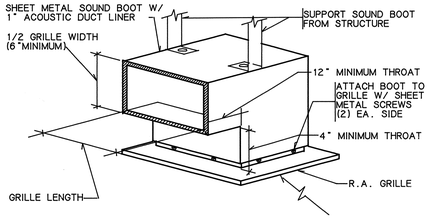

## FLEX CONNECTION DETAIL

NO SCALE — 8 / M-10



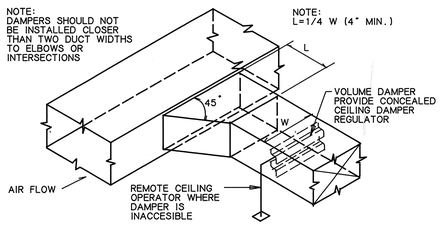

## DUCT LINER DETAIL

NO SCALE — 1 / M-10



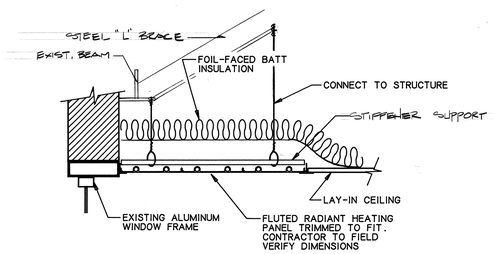

## R.A. GRILLE WITH SOUND BOOT

NO SCALE — 2 / M-10



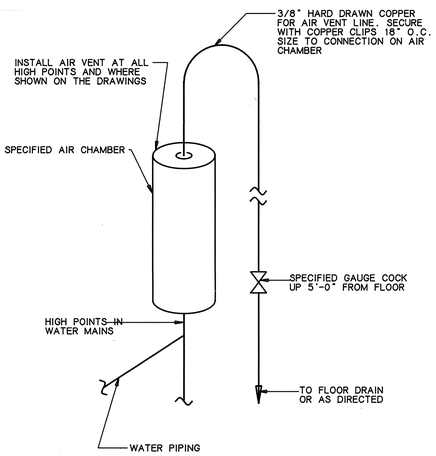

## BRANCH DUCT TAKE-OFF & DAMPER DETAIL

NO SCALE — 3 / M-10




## RADIANT HEATING PANEL INSTALLATION DETAIL

NO SCALE — 17 / M-10



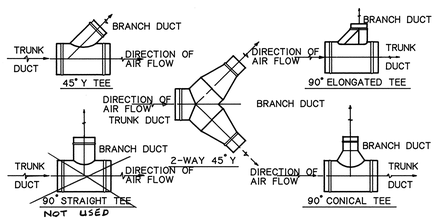

## MANUAL AIR VENT DETAIL

NO SCALE — 14 / M-10



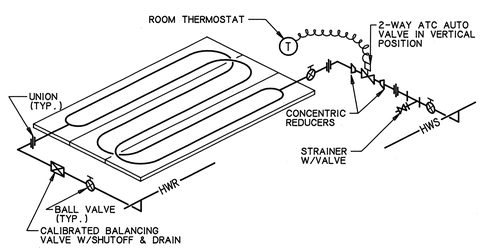

## WALL MOUNTED FIRE DAMPER DETAIL

NO SCALE — 9 / M-10



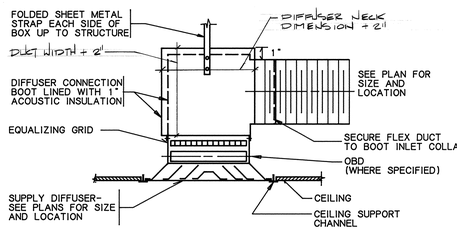

## ROUND DUCT BRANCH TAKE-OFF DETAILS

NO SCALE — 4 / M-10



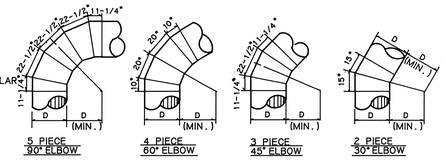

## RADIANT HEATING PANEL PIPING SCHEMATIC

NO SCALE — 18 / M-10




## SUPPLY DIFFUSER W/ FLEX DUCT DETAIL

NO SCALE — 10 / M-10




## ROUND DUCT ELBOW DETAILS

NO SCALE — 5 / M-10

JOB NO.
BC:89-098

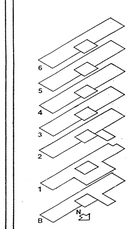
REVISIONS
RECORD DRAWINGS
12/91

REGISTERED PROFESSIONAL ENGINEER
No. 4537
John D Frank
STATE OF UTAH

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

# STATE OFFICE BUILDING REMODEL - PHASE 2

KEY PLAN



DATE
JUNE 1990

TITLE
MECHANICAL DETAILS

SHEET NO.
M-10

State Office Building; Phase Two, 2 Floor Remodel, Floors 1 & 2 - SC:89-098
Mechanical Details - 3594
00006LM10

# LEGEND OF MECHANICAL SYMBOLS AND ABBREVIATIONS

- POSITIVE PRESSURE DUCT - RISE
- POSITIVE PRESSURE DUCT - DROP
- NEGATIVE PRESSURE DUCT - RISE
- NEGATIVE PRESSURE DUCT - DROP
- ROUND DUCT - RISE
- ROUND DUCT - DROP
- RECTANGULAR DUCT
- ROUND DUCT
- UNDER FLOOR DUCT
- MEDIUM OR HIGH PRESSURE FLEX CONNECTION TO TERMINL UNIT
- INCLINED DUCT RISE (UP)
- INCLINED DUCT DROP (DN)
- MANUAL DAMPER
- FIRE DAMPER WITH ACCESS DOOR
- ATC DAMPER
- COMBINATION SMOKE AND FIRE DAMPER WITH ACCESS DOOR
- SMOKE DAMPER
- FLEXIBLE DUCT
- FLEXIBLE CONNECTION
- SUPPLY DIFFUSER
- EXHAUST AIR REGISTER
- TURNING VANES
- SPLITTER DAMPER WITH TURNING VANES
- RETURN AIR GRILLE WITH SOUND BOOT
- FRESH AIR LOUVER
- RELIEF AIR OR EXHAUST AIR LOUVER
- RECTANGULAR TO RECTANGULAR TRANSITION
- ROUND TO ROUND TRANSITION
- RECTANGULAR TO ROUND TRANSITION

- 90° ELBOW
- 45° ELBOW
- RISER TURNED UP (PIPE OUT OF PLANE)
- RISER TURNED DOWN (PIPE INTO PLANE)
- LR ELBOW
- SIDE OUT DOWN ELBOW
- SIDE UP OUT ELBOW
- BASE ELBOW
- DOUBLE ELBOW
- REDUCED ELBOW
- SWEEP TEE
- STRAIGHT TEE (PIPE BRANCH - IN PLANE)
- TEE UP
- TEE DOWN
- SIDE OUT UP (PIPE BRANCH - OUT OF PLANE)
- SIDE OUT DOWN (PIPE BRANCH - INTO PLANE)
- CROSS
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- LATERAL STRAINER
- LATERAL STRAINER WITH BLOW-OFF VALVE
- GATE VALVE
- ATC VALVE - 2 WAY
- ATC VALVE - 3 WAY
- GLOBE VALVE
- HOSE GATE VALVE
- HOSE GLOBE VALVE
- ANGLE GLOBE VALVE
- ANGLE GLOBE VALVE DOWN
- ANGLE GATE VALVE
- ANGLE GATE VALVE DOWN
- PRESSURE REDUCING, SELF CONTAINED VALVE
- PRESSURE REDUCING, EXTERNAL PRESSURE VALVE
- BALL VALVE (PIPE SIZE 2" AND SMALLER)
- BUTTERFLY VALVE (PIPE SIZE 2-1/2" AND LARGER)
- CHECK VALVE
- 90° CHECK VALVE

- COCK VALVE
- SAFETY VALVE
- QUICK OPENING VALVE
- EXPANSION JOINT
- FLOAT VALVE
- MOTOR OPER. GATE VALVE
- MOTOR OPER. GLOBE VALVE
- RELIEF VALVE
- DIAPHRAGM
- PNEUMATIC-ELECTRIC CONTROL VALVE (PE)
- SOLINIOD VALVE
- ALIGNMENT GUIDE
- ANCHOR
- PRESSURE GAUGE WITH COCK
- PRESSURE SWITCH (PS)
- FLANGE
- UNION
- FLOW METER ORIFICE (GPM, LB/HR.)
- AIR VENT-AUTO
- AIR VENT-MANUAL
- AIR SEPERATOR
- REDUCING FLANGE
- FLOW SWITCH
- SLEEVE
- THERMOMETER 0-100°F (0 - 100° F)
- THERMOMETER 30-240°F (30 - 240° F)
- THERMOSTAT
- NIGHT THERMOSTAT
- STEAM TRAP
- DUCT SMOKE DETECTOR (SD)
- DUCT HUMIDIFIER (H)
- SHUT-OFF COCK FOR USE WITH PRESSURE GAUGE
- PUMP
- REDUCER
- EXPANSION LOOP
- FLEXIBLE CONNECTION
- FLOW METER (GPM, #/HR.)

- G — NATURAL GAS
- ARROW INDICATES DIRECTION OF FLOW IN PIPE LEADER INDICATES DOWNWARD SLOPE
- PIPE DIRECTION CHANGE
- LPS — LOW PRESSURE STEAM
- LOW PRESSURE RETURN
- HPS — HIGH PRESSURE STEAM
- HPR — HIGH PRESSURE STEAM RETURN
- P — PUMP DISCHARGE
- MU — MAKE UP WATER
- V — AIR RELIEF LINE (VENT)
- FOF — FUEL OIL FLOW
- FOR — FUEL OIL RETURN
- FOV — FUEL OIL TANK VENT
- (name) E — EXISTING PIPING
- CWS — CHILLED WATER SUPPLY
- CWR — CHILLED WATER RETURN
- CS — CONDENSER WATER SUPPLY
- CR — CONDENSER WATER RETURN
- HWS — HEATING HOT WATER SUPPLY
- HWR — HEATING HOT WATER RETURN
- HTHWS — HIGH TEMPERATURE HOT WATER SUPPLY
- HTHWR — HIGH TEMPERATURE HOT WATER RETURN
- GPM — FLOW CONTROL VALVE
- CALIBRATED BALANCING VALVE
- HRS — HEAT RECOVERY SUPPLY
- HRR — HEAT RECOVERY RETURN
- A / M1-1 — SECTION TAG - TOP FIGURE IS SECTION NO. BOTTOM FIGURE IS SHEET NO.
- 1 / M1-1 — DETAIL TAG - TOP FIGURE IS DETAIL NO. BOTTOM FIGURE IS SHEET NO.
- EF / 1 — EQUIPMENT IDENTIFICATION
- 1 — KEYED NOTE IDENTIFICATION
- P-1 — PLUMBING FIXTURES

DOCUCOMO
State Office Building Remodel, Phase 1 - BC:87-136
Mechanical Legend - 11162

JOB NO.
BC:87-136

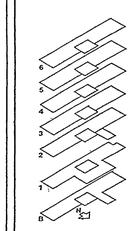
REVISIONS

REGISTERED PROFESSIONAL ENGINEER
No 4537
John D Frank
STATE OF UTAH

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC

STATE OFFICE BUILDING
REMODEL - PHASE 1

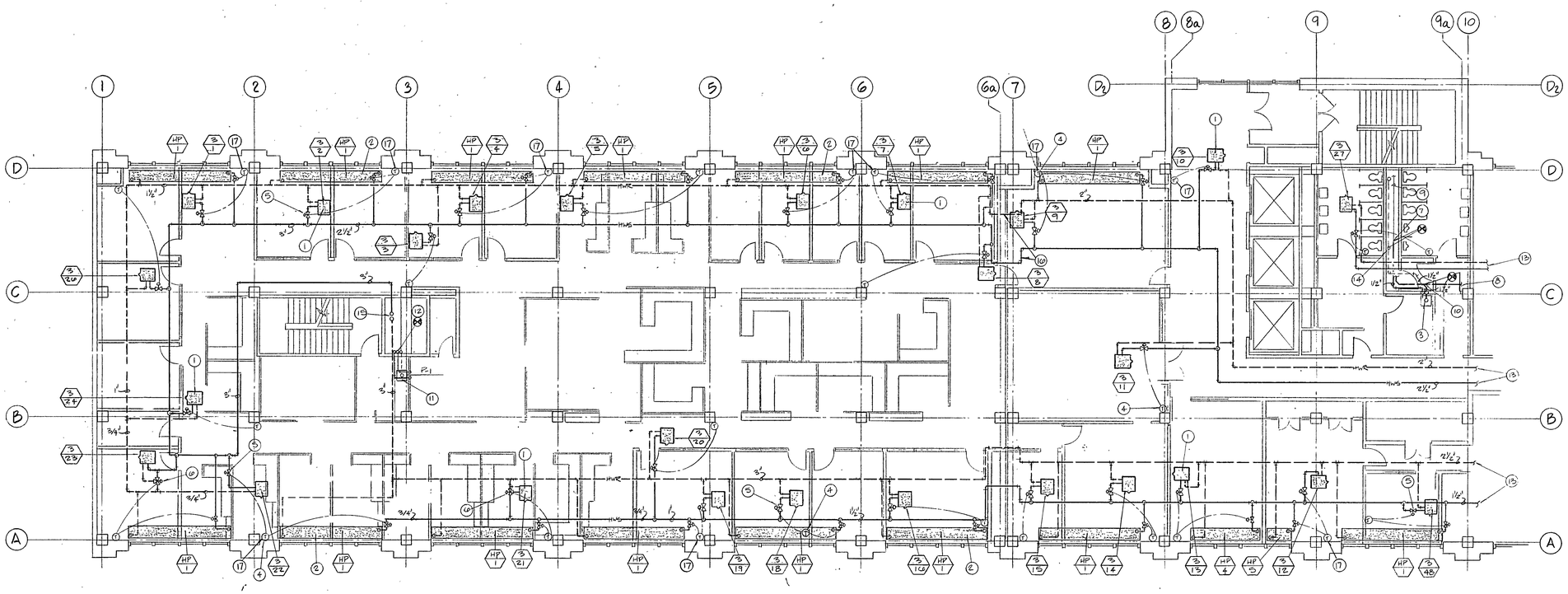
KEY PLAN

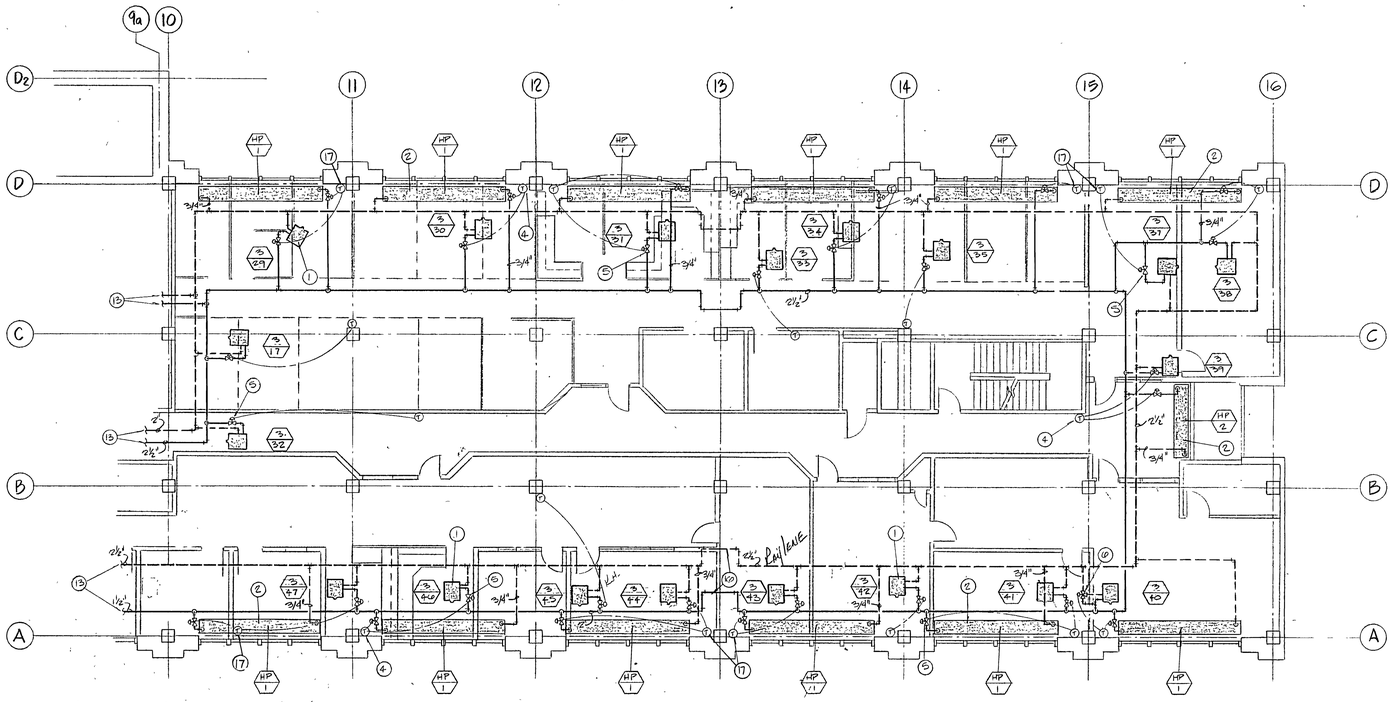


DATE
JANUARY 1989

TITLE
MECHANICAL LEGEND

SHEET NO.
M·0





THIRD FLOOR MECHANICAL PIPING PLAN

SCALE: 1/8" = 1'-0"

## KEYED NOTES

1. VAV REHEAT BOX WITH 2 OR 3 WAY AUTOMATIC ATC CONTROL VALVE. SEE DETAILS FOR CORRECT PIPING TO COILS, TYPICAL. SEE BOX SCHEDULE FOR GPM'S REQUIRED.
2. EXTRUDED ALUMINUM RADIANT HEATING PANELS. INSTALL AS PER REQUIRED BY MANUFACTURER AND AS SHOWN IN DETAILS, TYPICAL. SEE PANEL SCHEDULE FOR SIZE AND GPM REQUIRED.
3. RELOCATE EXISTING ELECTRIC WATER COOLER FROM CORRIDOR TO VENDING ROOM AS SHOWN. MAKE CONNECTIONS TO EXISTING COLD WATER, WASTE AND VENT LINES AS SHOWN.
4. ROOM THERMOSTAT TO CONTROL VAV BOX AND RADIANT PANELS. REFER TO CONTROL DIAGRAMS. MOUNT THERMOSTAT ON WALL AT HEIGHT SPECIFIED BY ARCHITECT, TYPICAL.
5. 2-WAY ATC VALVE MOUNTED IN VERTICAL POSITION, TYPICAL.
6. 3-WAY ATC VALVE MOUNTED IN VERTICAL POSITION, TYPICAL.
7. MAKE CONNECTION TO EXISTING COLD WATER LINE AT THIS POINT. CONTRACTOR SHALL VERIFY.
8. EXISTING WASTE LINE RUNNING IN CEILING OF FLOOR BELOW.
9. EXISTING COLD WATER SUPPLY LINE.
10. MAKE CONNECTION TO EXISTING WASTER LINE AT THIS POINT.
11. INSTALL NEW STAINLESS STEEL SINK IN COUNTER.
12. RUN WASTE, VENT HW AND CW LINES FROM EXISTING LINES IN SHAFT, UNDER COUNTER TO SINK. REFER TO PLUMBING FIXTURE SCHEDULE FOR LINE SIZES REQUIRED.
13. REFER TO OTHER PLAN FOR CONTINUATION OF PIPING.
14. MAKE CONNECTION TO EXISTING VENT LINE AT THIS POINT.
15. REFER TO SHAFT RISER DETAILS FOR ROUTING OF PIPING THROUGH SHAFT.
16. PROVIDE FOR PIPE EXPANSION OVER BLDG. THERMAL EXPANSION JOINT
17. PROVIDE 12" x 12" x 3" DEEP RIGID INSULATION BOUND T-STATS LOCATED ON EXTERIOR WALLS, (TYPICAL)

JOB NO.
BC: 87-136

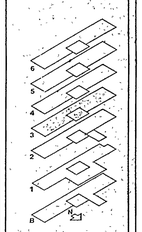
REVISIONS

REGISTERED PROFESSIONAL ENGINEER
No. 4537
John D. Frank
STATE OF UTAH

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

STATE OFFICE BUILDING
REMODEL - PHASE 1

KEY PLAN

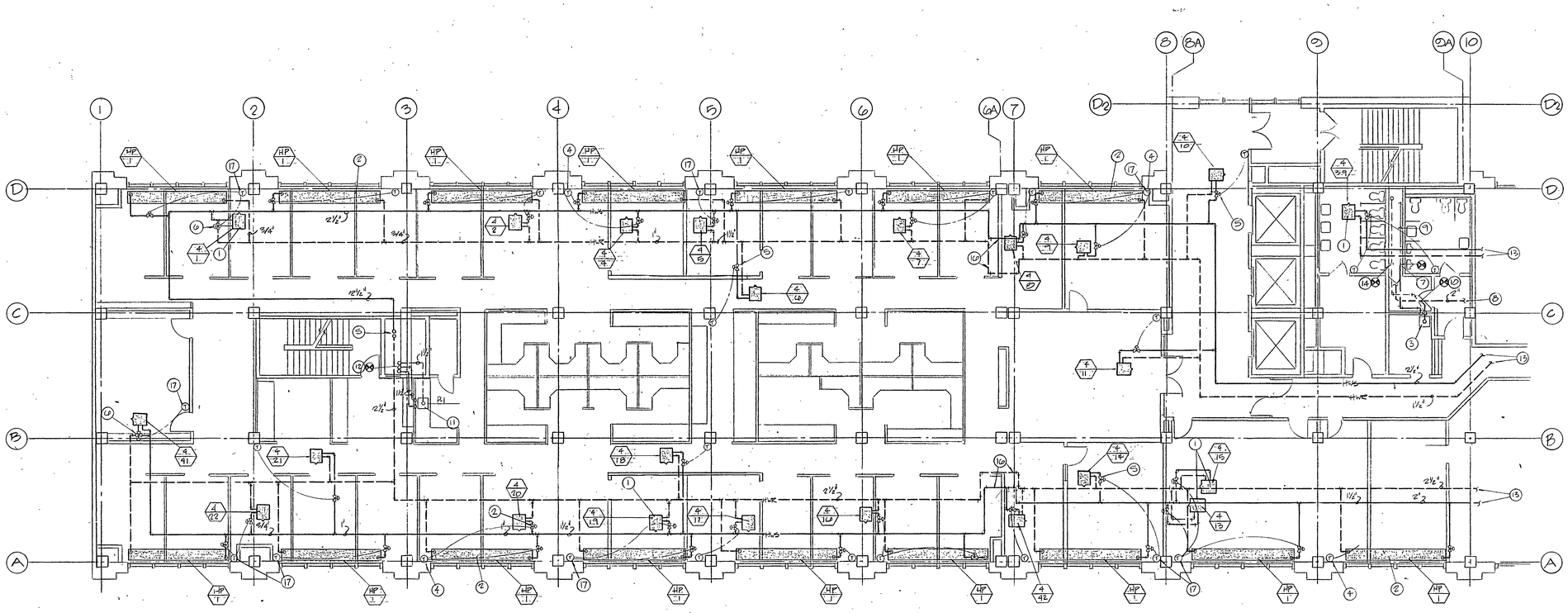


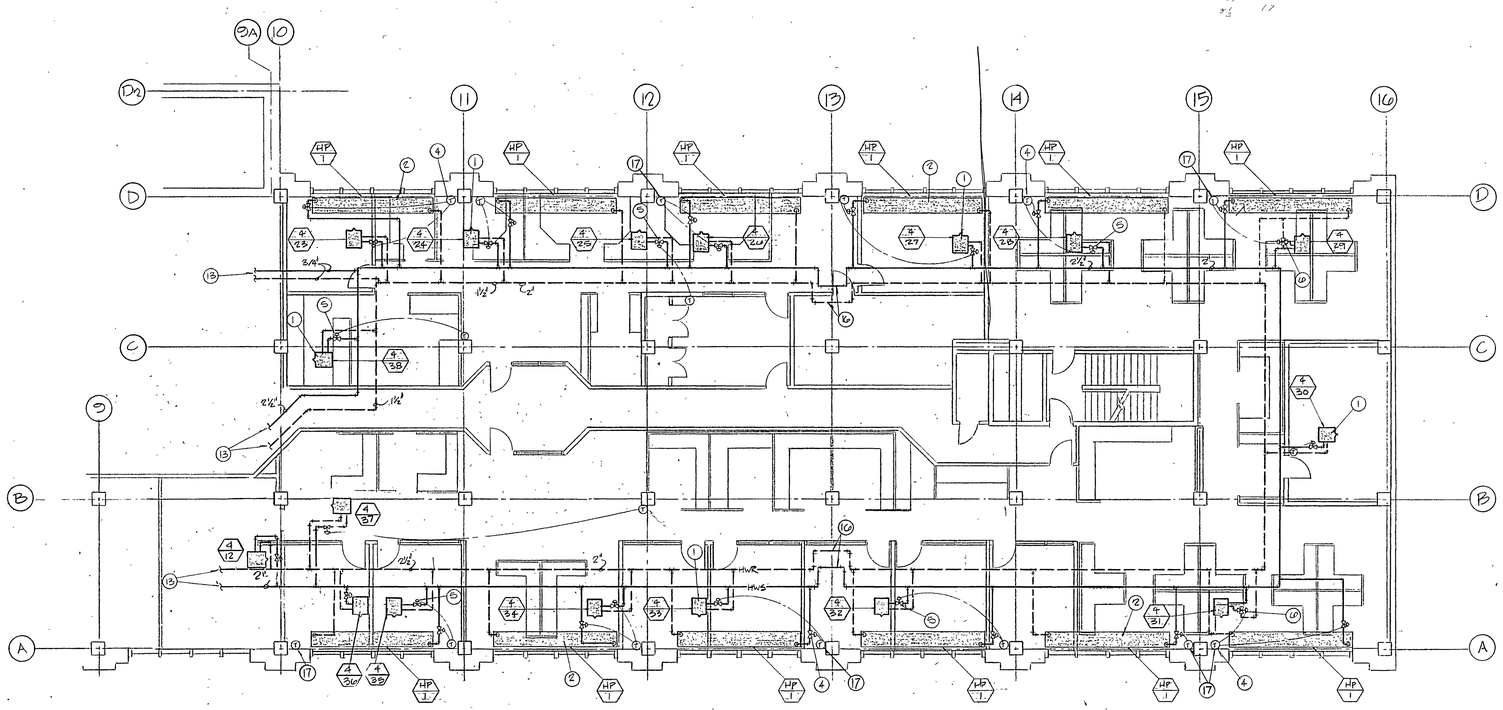
DATE
JANUARY 1989

TITLE
THIRD FLOOR MECHANICAL PIPING PLAN

SHEET NO.
M-6

QODCNNS
State Office Building Remodel Phase 1 - BC 87-136
3rd Floor Mechanical Piping Plan - 11166





FOURTH FLOOR MECHANICAL PIPING PLAN

SCALE: 1/8" = 1'-0"

## KEYED NOTES

1. VAV REHEAT BOX WITH 2 OR 3 WAY AUTOMATIC ATC CONTROL VALVE. SEE DETAILS FOR CORRECT PIPING TO COILS, TYPICAL. SEE BOX SCHEDULE FOR GPM'S REQUIRED.
2. EXTRUDED ALUMINUM RADIANT HEATING PANELS. INSTALL AS PER REQUIRED BY MANUFACTURER AND AS SHOWN IN DETAILS, TYPICAL. SEE PANEL SCHEDULE FOR SIZE AND GPM REQUIRED.
3. RELOCATE EXISTING ELECTRIC WATER COOLER FROM CORRIDOR TO VENDING ROOM AS SHOWN. MAKE CONNECTIONS TO EXISTING COLD WATER, WASTE AND VENT LINES AS SHOWN.
4. ROOM THERMOSTAT TO CONTROL VAV BOX AND RADIANT PANELS. REFER TO CONTROL DIAGRAMS. MOUNT THERMOSTAT ON WALL AT HEIGHT SPECIFIED BY ARCHITECT, TYPICAL.
5. 2-WAY ATC VALVE MOUNTED IN VERTICAL POSITION, TYPICAL.
6. 3-WAY ATC VALVE MOUNTED IN VERTICAL POSITION, TYPICAL.
7. MAKE CONNECTION TO EXISTING COLD WATER LINE AT THIS POINT. CONTRACTOR SHALL VERIFY.
8. EXISTING WASTE LINE RUNNING IN CEILING OF FLOOR BELOW.
9. EXISTING COLD WATER SUPPLY LINE.
10. MAKE CONNECTION TO EXISTING WASTER LINE AT THIS POINT.
11. INSTALL NEW STAINLESS STEEL SINK IN COUNTER.
12. RUN WASTE, VENT HW AND CW LINES FROM EXISTING LINES IN SHAFT, UNDER COUNTER TO SINK. REFER TO PLUMBING FIXTURE SCHEDULE FOR LINE SIZES REQUIRED.
13. REFER TO OTHER PLAN FOR CONTINUATION OF PIPING.
14. MAKE CONNECTION TO EXISTING VENT LINE AT THIS POINT.
15. REFER TO SHAFT RISER DETAILS FOR ROUTING OF PIPING THROUGH SHAFT.
16. PROVIDE FOR PIPE EXPANSION OVER BLDG. THERMAL EXPANSION JOINT.
17. PROVIDE 12" x 12" x 3' DEEP RIGID INSULATION BOUND T-STATS LOCATED ON EXTERIOR WALLS. (TYPICAL)

JOB NO.
BC-87-136

REVISIONS

REGISTERED PROFESSIONAL ENGINEER
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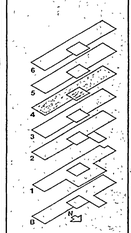
John D Frank
STATE OF UTAH

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

STATE OFFICE BUILDING
REMODEL - PHASE 1

KEY PLAN

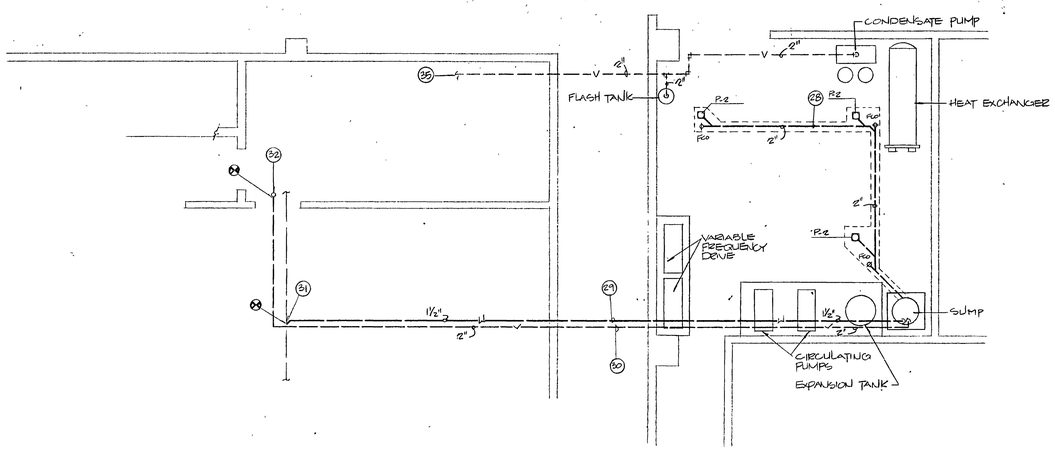


DATE
JANUARY, 1989

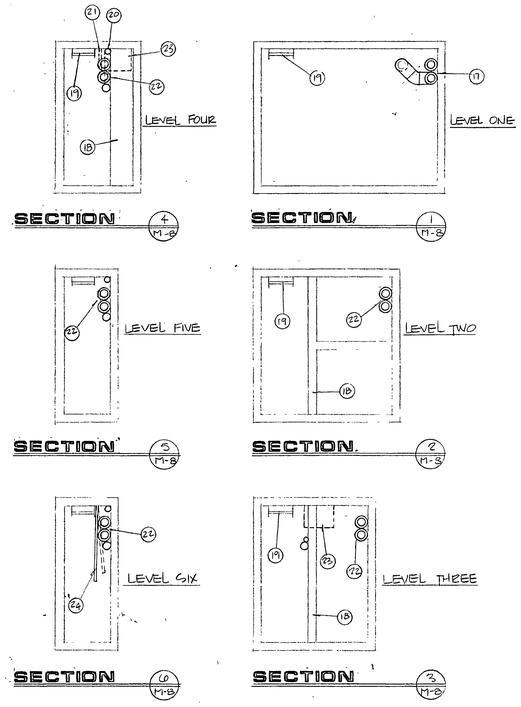
TITLE
FOURTH FLOOR MECHANICAL PIPING PLAN

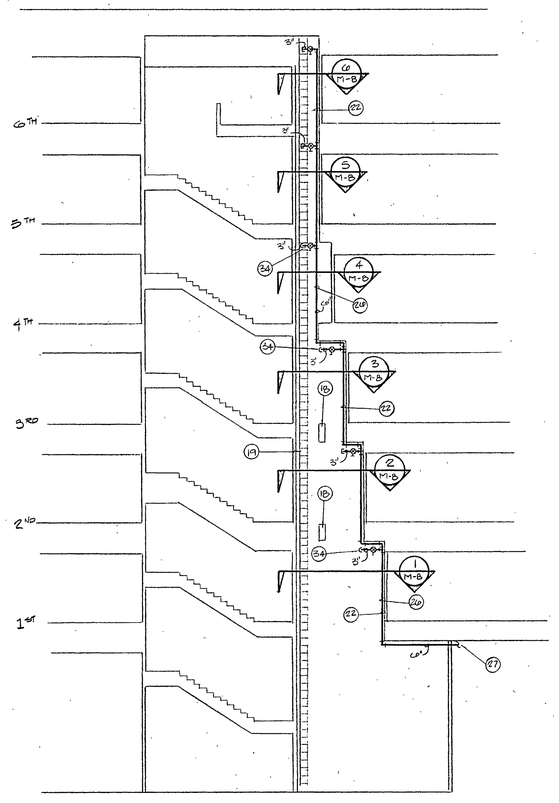
SHEET NO.
M-7

00000MM7
State Office Building Remodel, Phase 1 - BC 87-136
4th Floor Mechanical Piping Plan - 11/1/87

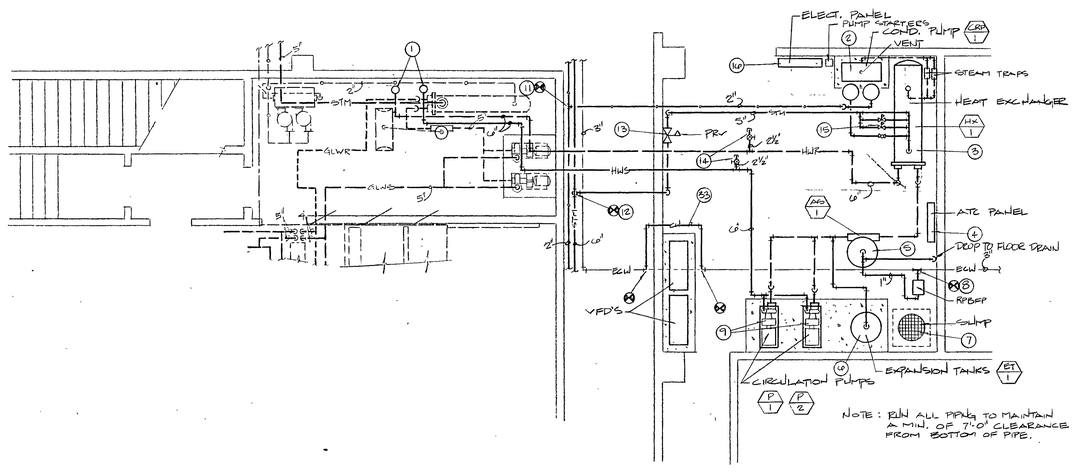



## MECHANICAL ROOM PLUMBING PLAN
SCALE 1/4" = 1'-0"




## SECTION - WEST UTILITY SHAFT (LOOKING NORTH)
NO SCALE




## MECHANICAL ROOM LAYOUT (BASEMENT LEVEL)
SCALE 1/4" = 1'-0"

## KEYED NOTES

1. NEW HWS AND HWR SYSTEM PIPING TO RUN UP EXISTING WEST MECHANICAL SHAFT. SEE SHAFT SECTIONS DRAWINGS THIS SHEET FOR ROUTING OF PIPING.
2. NEW CONDENSATE RETURN PUMP. SEE SCHEDULES FOR SIZE AND CAPACITIES. MOUNT PUMPS ON 6" CONCRETE PAD.
3. NEW STEAM TO WATER HEAT EXCHANGER. SEE SCHEDULES FOR SIZE AND CAP. BOTTOM OF EXCHANGER TO BE AT 48" AAF.
4. LOCATION OF NEW ATC PANEL.
5. NEW AIR SEPARATOR. SEE SCHEDULES FOR SIZE AND CAPACITY. SEPARATOR TO BE HUNG FROM EXISTING STRUCTURE. RUN LINE FROM SEPARATOR PRESSURE VALVE TO NEAREST FLOOR DRAIN.
6. NEW VERTICAL BLADDER TYPE EXPANSION TANK. SEE SCHEDULES FOR SIZE AND CAPACITY. TANK TO BE MOUNTED ON 6" CONCRETE PAD. SEE DETAIL FOR SEISMIC SUPPORTING REQUIRED.
7. NEW MECHANICAL ROOM SUMP PUMP. SEE SCHEDULES FOR SIZE AND CAPACITY. INSTALL AS PER DETAIL.
8. NEW COLD SYSTEM WATER CONVECTION FROM EXISTING 2" CW LINE. LINE TO BE COMPLETE WITH REDUCED PRESSURE BACKFLOW PREVENTER. SEE PIPING SCHEMATIC.
9. NEW HOT WATER CIRCULATING PUMPS. SEE SCHEDULES FOR SIZE AND CAPACITIES. PUMPS TO BE MOUNTED ON 6" CONCRETE PAD.
10. NEW VARIABLE FREQUENCY DRIVES FOR CIRCULATING PUMPS. MOUNT ON 6" CONCRETE PADS. ALL EXISTING PIPING THAT IS RUNNING OVER THE LOCATION OF THESE PANELS SHALL BE RE-ROUTED TO AVOID THEM.
11. MAKE NEW CONNECTION TO EXISTING 2" CONDENSATE LINE; FROM NEW CONDENSATE PUMP.
12. MAKE NEW CONNECTION TO EXISTING 6" HIGH PRESSURE STEAM LINE TO NEW SYSTEM HEAT EXCHANGER.
13. STEAM PRESSURE REDUCING STATION, TO BE MOUNTED ON WALL. PRV TO REDUCE 5450 LBS OF STEAM FROM 80 PSI TO 30 PSI.
14. PROVIDE 2-1/2" CAPPED TEES FROM HOT WATER SYSTEM PIPING, FOR FUTURE BASEMENT SYSTEM.
15. 1/3, 2/3 STEAM CONTROL VALVES FOR HEAT EXCHANGER. SEE PIPING SCHEMATIC.
16. LOCATION OF NEW ELECTRICAL PANEL.
17. OFFSET HOT WATER PIPING TO RUN UP PERPENDICULAR WALL.
18. CONCRETE STRUCTURAL MEMBERS.
19. STEEL LADDER IN MECHANICAL SHAFT.
20. ON 3RD LEVEL, RE-ROUTE EXISTING VENT LINE TO MISS NEW ROUTING OF HOT WATER PIPING. CONTRACTOR TO FIELD VERIFY EXTENT OF WORK TO BE DONE, WITH MECHANICAL ENGINEER.
21. ON 3RD LEVEL, RE-ROUTE EXISTING 1/2" WATER LINE SO THAT IT RUNS BEHIND NEW HOT WATER PIPING. CONTRACTOR TO FIELD VERIFY WORK WITH ENGINEER.
22. NEW HOT WATER PIPING TO BE ROUTED UP SHAFT APPROXIMATELY AS SHOWN. CONTRACTOR TO FIELD VERIFY ROUTING WITH ENGINEER. SUPPORT PIPING IN SHAFT AS SPECIFIED.
23. EXISTING ELECTRICAL TRANSFORMERS TO BE REMOVED. MECHANICAL CONTRACTOR TO COORDINATE HIS WORK WITH ANY ELECTRICAL WORK IN SHAFT.
24. ON 6TH LEVEL, RE-ROUTE EXISTING CONDUITS SO THAT NEW HOT WATER PIPING CAN BE MOUNTED ON SHAFT WALL.
25. ROUTE NEW HOT WATER PIPING THROUGH EXISTING EQUIPMENT AND PIPING IN EXISTING MECHANICAL ROOM.
26. ROUTING OF PIPING UP EXISTING SHAFT TO FOLLOW THIS APPROXIMATE ROUTING. CONTRACTOR TO FIELD VERIFY EXACT ROUTING WITH ENGINEER.
27. FOR CONTINUATION OF PIPING IN BASEMENT LEVEL SEE MECHANICAL ROOM LAYOUT, THIS SHEET.
28. EXISTING CONCRETE FLOOR TO BE SAW CUT TO ACCEPT NEW WASTE PIPING FOR FLOOR DRAINS.
29. WASTE PIPING FROM SUMP PUMP TO RUN AT CEILING OF MECHANICAL ROOM. PIPING SHALL BE ROUTED AS TO AVOID ANY ELECTRICAL PANELS ETC.
30. VENT PIPING FROM SUMP PUMP TO RUN AT CEILING OF MECHANICAL ROOM. PIPING SHALL BE ROUTED SO AS TO AVOID ANY ELECTRICAL PANELS ETC.
31. MAKE NEW CONNECTION TO EXISTING 2" WASTE LINE WITH WASTE PIPING FROM SUMP PUMP.
32. MAKE NEW CONNECTION TO EXISTING VENT RISER WITH VENT LINE PIPING FROM SUMP PUMP.
33. RE-ROUTE EXISTING PIPING RUNNING IN CEILING OF MECHANICAL ROOM TO AVOID ANY ELECTRICAL PANELS, ETC.
34. PIPING TO RUN THROUGH SHAFT WALL TO FIRST, THIRD, AND FOURTH LEVEL CEILINGS. ALL OTHER CAPPED TEES TO REMAIN IN SHAFT FOR FUTURE CONNECTION.
35. CONNECT 2" VENT LINE FROM CONDENSATE AND FLASH TANKS TO EXISTING CONDENSATE VENT LINES LOCATED IN EXISTING MECH. ROOM. CONTRACTOR TO FIELD VERIFY LINES PRIOR TO CONNECTIONS.

0000CMM8
State Office Building Remodel, Phase 1 - BC 87-136
Enlarged Mechanical Room Plan & Shaft Sections - 11168

JOB NO.
BC: 87-136

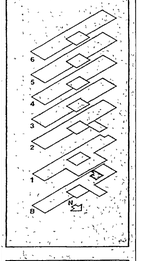
REVISIONS

REGISTERED PROFESSIONAL ENGINEER No. 4537 John D Frank STATE OF UTAH

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

STATE OFFICE BUILDING REMODEL - PHASE 1

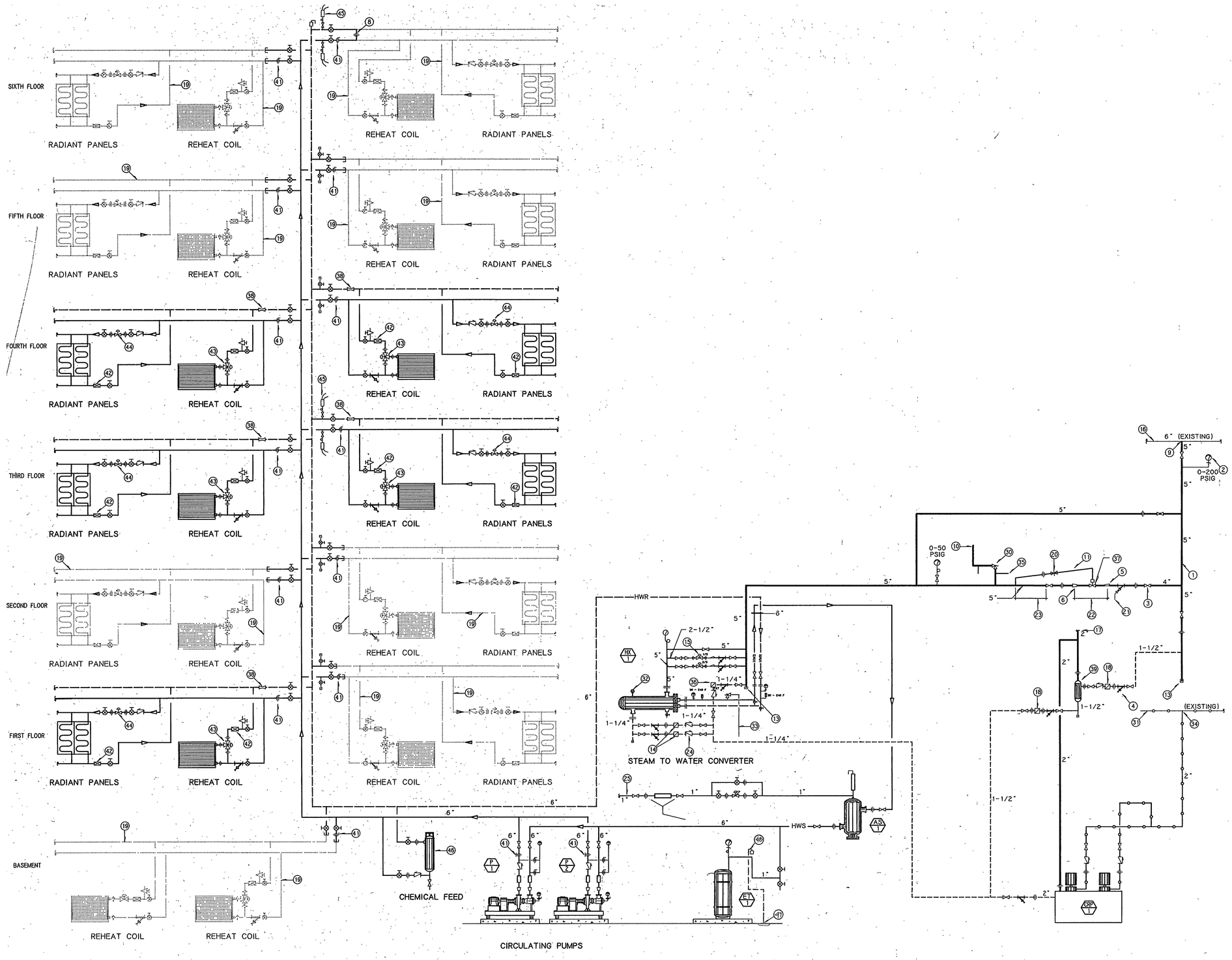
KEY PLAN



DATE
JANUARY 1989

TITLE
ENLARGED MECHANICAL ROOM PLAN AND SHAFT SECTIONS

SHEET NO.
M-8




## STEAM / HOT WATER (HEATING)

NO SCALE

## KEYED NOTES

1. NEW INCOMING STEAM HEADER.
2. PRESSURE GAGE. 0-200 PSI. COMPLETE WITH GAGE COCK AND PIGTAIL.
3. GATE VALVE. TYPICAL.
4. STRAINER WITH SHUTOFF VALVE. TYPICAL.
5. ECCENTRIC REDUCER. TYPICAL.
6. CONENTRIC REDUCER. TYPICAL.
7. BYPASS GLOBE VALVE.
8. UNION. TYPICAL.
9. CONNECT TO EXISTING 6" STEAM SUPPLY.
10. VENT TO ROOM SPACE
11. PILOT CONTROL LINE. PITCH AWAY FROM PILOT. NO WATER POCKETS PERMITTED.
12. BYPASS IN HORIZONTAL PLANE. INSTALL LEVEL WITH PRV.
13. DRIP LEG. EXTEND 6" MINIMUM. FULL LINE SIZE. TYPICAL.
14. F & T TRAP. 750 POUNDS PER HOUR MIN. CAPACITY AT 2 PSI ΔP.
15. AUTOMATIV STEAM CONTROL VALVES. 5450 POUNDS PER HOUR TOTAL CAPACITY. SPLIT 1/3, 2/3.
16. EXISTING 6" STEAM LINE.
17. VENT AS CALLED OUT ON SHEET M6. SIZE TO HANDLE SAFETY VALVE CAPACITY.
18. F & T TRAP. 5450 POUNDS PER HOUR MIN. CAPACITY AT .25 PSI ΔP.
19. PIPING TO BE DONE IN FUTURE PHASES OF BUILDING REMODEL.
20. NEEDLE VALVE.
21. STRAINER WITH GLOBE VALVE. PIPE TO FLOOR DRAIN. DRAIN PIPE SIZE EQUAL TO FULL SIZE OF BLOWOFF CONNECTION ON STRAINER.
22. HOLD TO MINIMUM.
23. MINIMUM 10" STRAIGHT RUN.
24. CHECK VALVE. TYPICAL.
25. COLD WATER MAKE UP WITH BACKFLOW PREVENTOR AND DRAIN CUP. EXTEND DRAIN TO NEAREST FLOOR DRAIN.
26. AUTOMATIC STEAM CONTROL VALVES. 5450 LBS/HR TOTAL CAPACITY SPLIT 1/3, 2/3.
27. BUTTERFLY VALVE ON ALL 2-1/2" OR LARGER PIPES AND FULL PORTED BALL VALVES ON 2" OR SMALLER PIPES. TYPICAL.
28. FLOW CONTROL VALVE.
29. BALL VALVE. TYPICAL.
30. 3" SAFETY VALVE SIZED FOR 18000 LBS/HR.
31. EXISTING PUMPED CONDENSATE RETURN LINE.
32. VACUUM RELIEF VALVE.
33. VACUUM RELIEF VALVE AND LINE. RUN TO NEAREST DRAIN.
34. CONNECT TO EXISTING CONDENSATE LINE.
35. DRAIN FROM VALVE BODY.
36. F & T TRAP. 1500 LBS/HR MIN. CAPACITY AT 2 PSI ΔP.
37. PILOT OPERATED STEAM PRESSURE REDUCING VALVE. 80 PSIG INLET 30 PSIG OUTLET. 5450 LBS/HR. CAPACITY.
38. VENTURI TYPE FLOW METER. TYPICAL.
39. 10" DIA. / 38" HIGH FLASH TANK.
40. MANUAL AIR VENT
41. LUBRICATED PLUG COCK. TYPICAL.
42. CIRCUIT SETTER. TYPICAL.
43. 3-WAY AUTOMATIC CONTROL VALVE. TYPICAL.
44. 2-WAY AUTOMATIC CONTROL VALVE. TYPICAL.
45. INSTALL PRESSURE DIFFERENTIAL SENSORS AT 6TH & 3RD LEVELS, AND PROVIDE VALVED CAPPED TEE AT EACH FLOORS HWS & HWR PIPING FOR INSTALLATION OF PRESSURE SENSORS IN FUTURE.
46. BY-PASS WATER TREATMENT SYSTEM.
47. FLOOR DRAIN, TYPICAL.
48. VENT RELIEF VALVE TO NEAREST FLOOR DRAIN

0000CMM9
State Office Building Remodel, Phase 1 - BC 87-136
Piping Schematic - 11169

JOB NO.
BC:87-136

REVISIONS

REGISTERED PROFESSIONAL ENGINEER No. 4537 John D. Frank STATE OF UTAH

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

STATE OFFICE BUILDING
REMODEL - PHASE 1

KEY PLAN

DATE
JANUARY 1989

TITLE
PIPING SCHEMATIC

SHEET NO.
M-9

## CONDENSATE RETURN PUMP SCHEDULE

| PUMP TAG | MANUFACTURER AND MODEL NUMBER | SERVICE | CAPACITY GPM | CAPACITY HEAD | TYPE | STORAGE CAPACITY | BHP | MOTOR HP | MOTOR RPM | MOTOR VOLT | MOTOR Ø |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CRP-1 | FEDERAL CCV-2550 | HX-1 | 37.5 | 50 | DUPLEX | 35 GAL | | 3 | 1750 | 208 | 3 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

SC-51

## SHELL & TUBE HEAT EXCHANGER SCHEDULE

| SYMBOL | MFR. CATALOG NO. | SERVICE | PASSES | TOTAL MBH | HEATING SURFACE (FT.²) | FOULING FACTOR | STEAM SIDE LBS/HR | STEAM SIDE PSI | STEAM SIDE | STEAM SIDE LOCATION | STEAM SIDE GPM | WATER SIDE | WATER SIDE LWT (°F) | WATER SIDE P.D. (PSI) | WATER SIDE LOCATION | WATER SIDE GPM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HX-1 | B & G SU14 4-2 | HEATING | 2 | 5050 | 115 | .0005 | 5450 | 30 | | SHELL | 11.6 | | 200 | .6 | TUBE | 505 |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

SC-60

## VAV BOX SCHEDULE

| BOX SYMBOL | CFM RANGE MIN / MAX | MANUFACTURER & MODEL NO. | INLET SIZE | MIN. S.P. IN $H_2O$ | NC-AT 0.75" SP | COIL DATA MBH | EWT | LWT | EAT | LAT | GPM | WPD | CONN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4-1 | △440 880 | KRUEGER LMHS | 10 | 0.85 | 28 | 11.3 | 200 | 180 | 55 | 83 | 1.1 | 0.33 | 3/4 |
| 4-2 | 445 890 | KRUEGER LMHS | 10 | 0.85 | 28 | 10.4 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| | | | | | | | | | | | | | |
| 4-4 | △140 280 | KRUEGER LMHS | 6 | 0.85 | 28 | 3.3 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 4-5 | △120 235 | KRUEGER LMHS | 6 | 0.85 | 28 | 2.8 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 4-6 | 580 1160 | KRUEGER LMHS | 12 | 0.85 | 28 | 13.6 | 200 | 180 | 55 | 80 | 1.4 | 0.33 | 3/4 |
| 4-7 | 475 950 | KRUEGER LMHS | 12 | 0.85 | 28 | 11.1 | 200 | 180 | 55 | 80 | 1.1 | 0.55 | 3/4 |
| 4-8 | 115 225 | KRUEGER LMHS | 6 | 0.85 | 28 | 2.7 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 4-9 | 385 770 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.0 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 4-10 | 380 760 | KRUEGER LMHS | 10 | 0.85 | 28 | 8.9 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 4-11 | 325 650 | KRUEGER LMHS | 10 | 0.85 | 28 | 7.6 | 200 | 180 | 55 | 80 | 0.8 | 0.33 | 3/4 |
| 4-12 | △345 685 | KRUEGER LMHS | 10 | 0.85 | 28 | 8.0 | 200 | 180 | 55 | 80 | 0.8 | 0.55 | 3/4 |
| 4-13 | △420 840 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.8 | 200 | 180 | 55 | 80 | 1.0 | 0.55 | 3/4 |
| 4-14 | 240 480 | KRUEGER LMHS | 8 | 0.85 | 28 | 5.6 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| △4-15 | 420 840 | KRUEGER LMHS | 10 | .85 | 28 | 9.8 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 4-16 | 505 1010 | KRUEGER LMHS | 12 | 0.85 | 28 | 11.8 | 200 | 180 | 55 | 80 | 1.2 | 0.55 | 3/4 |
| 4-17 | △130 255 | KRUEGER LMHS | 6 | 0.85 | 28 | 3.0 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 4-18 | 580 1160 | KRUEGER LMHS | 12 | 0.85 | 28 | 13.6 | 200 | 180 | 55 | 80 | 1.4 | 0.33 | 3/4 |
| 4-19 | △150 300 | KRUEGER LMHS | 6 | 0.85 | 28 | 3.5 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 4-20 | 465 930 | KRUEGER LMHS | 12 | 0.85 | 28 | 10.8 | 200 | 180 | 55 | 80 | 1.1 | 0.33 | 3/4 |
| 4-21 | 290 580 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.8 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 4-22 | △465 930 | KRUEGER LMHS | 12 | 0.85 | 28 | 10.8 | 200 | 180 | 55 | 83 | 1.1 | 0.55 | 3/4 |
| 4-23 | 135 270 | KRUEGER LMHS | 6 | 0.85 | 28 | 3.1 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 4-24 | 340 680 | KRUEGER LMHS | 10 | 0.85 | 28 | 7.9 | 200 | 180 | 55 | 80 | 0.8 | 0.33 | 3/4 |
| 4-25 | 260 520 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.1 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 4-26 | 340 680 | KRUEGER LMHS | 4 | 0.85 | 26 | 7.9 | 200 | 180 | 55 | 80 | 0.8 | 0.33 | 3/4 |
| 4-27 | 230 460 | KRUEGER LMHS | 8 | 0.85 | 28 | 5.4 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 4-28 | 350 700 | KRUEGER LMHS | 10 | 0.85 | 28 | 8.2 | 200 | 180 | 55 | 80 | 0.8 | 0.33 | 3/4 |
| 4-29 | 350 700 | KRUEGER LMHS | 10 | 0.85 | 28 | 11.0 | 200 | 180 | 55 | 89 | 1.1 | 0.55 | 3/4 |
| 4-30 | 625 1245 | KRUEGER LMHS | 14 | 0.85 | 27 | 16.4 | 200 | 180 | 55 | 83 | 1.6 | 0.55 | 3/4 |
| 4-31 | 435 870 | KRUEGER LMHS | 10 | 0.85 | 28 | 11.4 | 200 | 180 | 55 | 83 | 1.1 | 0.55 | 3/4 |
| 4-32 | 375 750 | KRUEGER LMHS | 10 | 0.85 | 28 | 8.7 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 4-33 | 275 550 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.4 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 4-34 | 270 535 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.3 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 4-35 | 145 285 | KRUEGER LMHS | 6 | 0.85 | 28 | 3.4 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 4-36 | 165 330 | KRUEGER LMHS | 6 | 0.85 | 28 | 3.8 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 4-37 | 475 945 | KRUEGER LMHS | 12 | 0.85 | 28 | 11.1 | 200 | 180 | 55 | 80 | 1.1 | 0.55 | 3/4 |
| 4-38 | 205 410 | KRUEGER LMHS | 8 | 0.85 | 28 | 4.8 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 4-39 | 500 1000 | KRUEGER LMHS | 12 | 0.85 | 28 | 11.8 | 200 | 180 | 55 | 80 | 1.2 | 0.33 | 3/4 |
| | | | | | | | | | | | | | |
| 4-41 | 300 600 | KRUEGER LMHS | 8 | 0.85 | 28 | 10.1 | 200 | 180 | 55 | 91 | 1.0 | 0.33 | 3/4 |
| 4-42 | 155 225 | KRUEGER LMHS | 6 | 0.85 | 28 | 7.4 | 200 | 180 | 55 | 107 | 0.7 | 0.33 | 3/4 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

SC-29

## EXPANSION TANK SCHEDULE

| SYMBOL | MFR. CATALOG NO. | SERVICE | TYPE | CAPACITY GALL. | DIMENSIONS | REMARKS |
|---|---|---|---|---|---|---|
| ET-1 | B & G B-500 | P-1, P-2 | VERT. | 132 | 24" X 80" | PRECHARGED TO 52 PSI |
| | | | | | | |
| | | | | | | |

SC-21

## AIR SEPARATOR SCHEDULE

| SYMBOL | MFR. CAT. NO. | CAP. GPM. | OPTIONS | REMARKS |
|---|---|---|---|---|
| AS-1 | B & G R-6 | 700 | C/W STRAINER | |
| | | | | |
| | | | | |

SC-24

0000CMM10
State Office Building Remodel, Phase 1 - BC 87-136
Mechanical Schedules - 11170

JOB NO.
BC-87-136

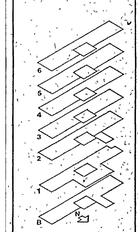
REVISIONS
△ AS NOTED 3/22/89

REGISTERED PROFESSIONAL ENGINEER No. 4537 John D Frank STATE OF UTAH

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

STATE OFFICE BUILDING
REMODEL - PHASE 1

KEY PLAN



DATE
JANUARY 1989

TITLE
MECHANICAL SCHEDULES

SHEET NO.
M-10

## PLUMBING FIXTURE SCHEDULE

| SYMBOL | FIXTURE | CW | HW | W | V | REMARKS |
|---|---|---|---|---|---|---|
| P-1 | STAINLESS STEEL SINK | 1/2 | 1/2 | 1-1/2" | 1-1/2" | |
| P-2 | FLOOR DRAIN | | | 2" | | |
| P-3 | | | | | | |
| P-4 | | | | | | |

## VAV BOX SCHEDULE

| BOX SYMBOL | CFM RANGE MIN | CFM RANGE MAX | MANUFACTURER & MODEL NO. | INLET SIZE | MIN. S.P. IN $H_2O$ | NC-AT 0.75"SP | COIL DATA MBH | EWT | LWT | EAT | LAT | GPM | WPD | COIL SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3-1 | 265 | 525 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.2 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-2 | 270 | 540 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.3 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-3 | 240 | 480 | KRUEGER LMHS | 8 | 0.85 | 28 | 5.6 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-4 | 270 | 540 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.3 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-5 | 270 | 540 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.3 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-6 | 265 | 525 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.2 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-7 | 245 | 490 | KRUEGER LMHS | 8 | 0.85 | 28 | 5.7 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-8 | 480 | 960 | KRUEGER LMHS | 12 | 0.85 | 28 | 11.2 | 200 | 180 | 55 | 80 | 1.1 | 0.55 | 3/4 |
| 3-9 | 525 | 1050 | KRUEGER LMHS | 12 | 0.85 | 28 | 12.2 | 200 | 180 | 55 | 80 | 1.2 | 0.55 | 3/4 |
| 3-10 | 380 | 760 | KRUEGER LMHS | 10 | 0.85 | 28 | 8.9 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 3-11 | 275 | 555 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.4 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-12 | 480 | 960 | KRUEGER LMHS | 12 | 0.85 | 28 | 11.2 | 200 | 180 | 55 | 80 | 1.1 | 0.55 | 3/4 |
| 3-13 | 460 | 920 | KRUEGER LMHS | 12 | 0.85 | 28 | 10.7 | 200 | 180 | 55 | 80 | 1.1 | 0.33 | 3/4 |
| 3-14 | 235 | 465 | KRUEGER LMHS | 8 | 0.85 | 28 | 5.5 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-15 | 245 | 485 | KRUEGER LMHS | 8 | 0.85 | 28 | 5.7 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-16 | 240 | 475 | KRUEGER LMHS | 8 | 0.85 | 28 | 5.6 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-17 | 340 | 675 | KRUEGER LMHS | 10 | 0.85 | 28 | 7.9 | 200 | 180 | 55 | 80 | 0.8 | 0.33 | 3/4 |
| 3-18 | 290 | 580 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.8 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-19 | 165 | 330 | KRUEGER LMHS | 6 | 0.85 | 28 | 3.8 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-20 | 480 | 960 | KRUEGER LMHS | 12 | 0.85 | 28 | 11.2 | 200 | 180 | 55 | 80 | 1.1 | 0.55 | 3/4 |
| 3-21 | 390 | 780 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.1 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 3-22 | 390 | 780 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.1 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 3-23 | 160 | 320 | KRUEGER LMHS | 6 | 0.85 | 28 | 6.1 | 200 | 180 | 55 | 96 | 0.7 | 0.33 | 3/4 |
| 3-24 | 480 | 960 | KRUEGER LMHS | 12 | 0.85 | 28 | 11.2 | 200 | 180 | 55 | 80 | 1.1 | 0.55 | 3/4 |
| | | | | | | | | | | | | | | |
| 3-26 | 225 | 425 | KRUEGER LMHS | 8 | 0.85 | 28 | 10.4 | 200 | 180 | 55 | 105 | 1.0 | 0.33 | 3/4 |
| 3-27 | 500 | 1000 | KRUEGER LMHS | 12 | 0.85 | 28 | 11.8 | 200 | 180 | 55 | 80 | 1.2 | 0.33 | 3/4 |
| | | | | | | | | | | | | | | |
| 3-29 | 260 | 515 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.1 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-30 | 260 | 515 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.1 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-31 | 260 | 515 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.1 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-32 | 325 | 645 | KRUEGER LMHS | 8 | 0.85 | 28 | 7.6 | 200 | 180 | 55 | 80 | 0.8 | 0.33 | 3/4 |
| 3-33 | 200 | 395 | KRUEGER LMHS | 8 | 0.85 | 28 | 4.7 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-34 | 260 | 515 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.1 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-35 | 225 | 450 | KRUEGER LMHS | 8 | 0.85 | 28 | 5.2 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| | | | | | | | | | | | | | | |
| 3-37 | 520 | 1035 | KRUEGER LMHS | 12 | 0.85 | 28 | 12.1 | 200 | 180 | 55 | 80 | 1.2 | 0.33 | 3/4 |
| 3-38 | 410 | 820 | KRUEGER LMHS | 10 | 0.85 | 28 | 13.5 | 200 | 180 | 55 | 91 | 1.3 | 0.55 | 3/4 |
| 3-39 | 715 | 1430 | KRUEGER LMHS | 14 | 0.85 | 27 | 16.9 | 200 | 180 | 55 | 80 | 1.7 | 0.55 | 3/4 |
| 3-40 | 490 | 975 | KRUEGER LMHS | 12 | 0.85 | 28 | 12.9 | 200 | 180 | 55 | 84 | 1.3 | 0.55 | 3/4 |
| 3-41 | 260 | 520 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.1 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-42 | 520 | 1040 | KRUEGER LMHS | 12 | 0.85 | 28 | 12.1 | 200 | 180 | 55 | 80 | 1.2 | 0.55 | 3/4 |
| 3-43 | 225 | 505 | KRUEGER LMHS | 8 | 0.85 | 28 | 5.2 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-44 | 310 | 615 | KRUEGER LMHS | 8 | 0.85 | 28 | 7.2 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-45 | 340 | 675 | KRUEGER LMHS | 10 | 0.85 | 28 | 7.9 | 200 | 180 | 55 | 80 | 0.8 | 0.33 | 3/4 |
| 3-46 | 320 | 640 | KRUEGER LMHS | 8 | 0.85 | 28 | 7.5 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-47 | 275 | 555 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.4 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 3-48 | 175 | 350 | KRUEGER LMHS | 8 | 0.85 | 28 | 4.1 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |

SC-29

## CEILING RADIANT HEATER PANEL SCHEDULE

| SYMBOL | MANUFACTURER / CATALOG NO. | GPM/COIL SIZE | WATER IN/OUT | MAX P.D.(2) | BTU/SQ FT |
|---|---|---|---|---|---|
| HP-1 | AEROTECH AX - 16'-0" X 2'-0" ① | 1.0/3/4" | 200/180 | 8 FT. | 243 |
| HP-2 | AEROTECH AX - 10'-0" X 2'-0" ① | 1.0/3/4" | 200/180 | 8 FT. | 243 |
| HP-3 | AEROTECH AX - 18'-6" X 2'-0" ① | 1.0/3/4" | 200/180 | 8 FT. | 243 |
| HP-4 | AEROTECH AX - 12'-0" X 2'-0" ① | 1.0/3/4" | 200/180 | 8 FT. | 243 |
| HP-5 | AEROTECH AX - 4'-0" X 2'-0" ① | 1.0/3/4" | 200/180 | 8 FT. | 243 |

① SIZE OF PANEL IS APPROXIMATE CONTRACTOR TO FIELD VERIFY AND TRIM TO FIT IN FIELD.

SC-22

## VAV BOX SCHEDULE

| BOX SYMBOL | CFM RANGE MIN | CFM RANGE MAX | MANUFACTURER & MODEL NO. | INLET SIZE | MIN. S.P. IN $H_2O$ | NC-AT 0.75"SP | COIL DATA MBH | EWT | LWT | EAT | LAT | GPM | WPD | COIL SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-1 | 365 | 730 | KRUEGER LMHS | 10 | 0.85 | 28 | 10.9 | 200 | 180 | 55 | 87 | 1.1 | 0.33 | 3/4 |
| 1-2 | 415 | 825 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.7 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 1-3 | 415 | 825 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.7 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 1-4 | 415 | 825 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.7 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 1-5 | 275 | 550 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.4 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 1-6 | 300 | 600 | KRUEGER LMHS | 8 | 0.85 | 28 | 7.0 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 1-7 | 100 | 200 | KRUEGER LMHS | 6 | 0.85 | 28 | 2.3 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 1-8 | 530 | 1060 | KRUEGER LMHS | 12 | 0.85 | 28 | 12.3 | 200 | 180 | 55 | 80 | 1.2 | 0.55 | 3/4 |
| 1-9 | 300 | 600 | KRUEGER LMHS | 8 | 0.85 | 28 | 7.0 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 1-10 | 170 | 340 | KRUEGER LMHS | 6 | 0.85 | 28 | 4.0 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 1-11 | 540 | 1080 | KRUEGER LMHS | 12 | 0.85 | 28 | 12.6 | 200 | 180 | 55 | 80 | 1.3 | 0.55 | 3/4 |
| 1-12 | 205 | 410 | KRUEGER LMHS | 8 | 0.85 | 28 | 4.8 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 1-13 | 200 | 400 | KRUEGER LMHS | 8 | 0.85 | 28 | 4.7 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 1-14 | 405 | 810 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.4 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 1-15 | 405 | 810 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.4 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 1-16 | 405 | 810 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.4 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 1-17 | 405 | 810 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.4 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 1-18 | 425 | 850 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.9 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 1-19 | 425 | 850 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.9 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 1-20 | 600 | 1200 | KRUEGER LMHS | 14 | 0.85 | 27 | 14.0 | 200 | 180 | 55 | 80 | 1.4 | 0.55 | 3/4 |
| 1-21 | 600 | 1200 | KRUEGER LMHS | 14 | 0.85 | 27 | 14.0 | 200 | 180 | 55 | 80 | 1.4 | 0.55 | 3/4 |
| 1-22 | 240 | 495 | KRUEGER LMHS | 8 | 0.85 | 28 | 5.6 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 1-23 | 600 | 1200 | KRUEGER LMHS | 14 | 0.85 | 27 | 14.0 | 200 | 180 | 55 | 80 | 1.4 | 0.55 | 3/4 |
| 1-24 | 450 | 875 | KRUEGER LMHS | 10 | 0.85 | 28 | 16.0 | 200 | 180 | 55 | 93 | 1.6 | 0.55 | 3/4 |
| 1-25 | 450 | 895 | KRUEGER LMHS | 10 | 0.85 | 28 | 10.5 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 1-26 | 450 | 895 | KRUEGER LMHS | 10 | 0.85 | 26 | 10.5 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |

SC-29

## DIFFUSER SCHEDULE

| SYMBOL | MANUFACTURER | SIZE | THROW | MODEL | REMARKS ① |
|---|---|---|---|---|---|
| D2-1 | KRUEGER | 9 X 9 | 2-WAY | SH-2 | C/W FRAME 22, OBD |
| D2-2 | KRUEGER | 12 X 12 | 2-WAY | SH-2 | C/W FRAME 22, OBD |
| D2-3 | KRUEGER | 15 X 15 | 2-WAY | SH-2 | C/W FRAME 22, OBD |
| D2-4 | KRUEGER | 18 X 18 | 2-WAY | SH-2 | C/W FRAME 22, OBD |
| | | | | | |
| D4-1 | KRUEGER | 6 X 6 | 4-WAY | SH-4A | C/W FRAME 23, OBD |
| D4-2 | KRUEGER | 9 X 9 | 4-WAY | SH-4A | C/W FRAME 23, OBD |
| D4-3 | KRUEGER | 12 X 12 | 4-WAY | SH-4A | C/W FRAME 23, OBD |
| D4-4 | KRUEGER | 15 X 15 | 4-WAY | SH-4A | C/W FRAME 23, OBD |
| D4-5 | KRUEGER | 18 X 18 | 4-WAY | SH-4A | C/W FRAME 23, OBD |
| D4-6 | KRUEGER | 21 X 21 | 4-WAY | SH-4A | C/W FRAME 23, OBD |
| D4-7 | KRUEGER | 12 X 12 | 4-WAY | SH-4A | C/W FRAME 22, OBD |
| D4-8 | KRUEGER | 15 X 15 | 4-WAY | SH-4A | C/W FRAME 22, OBD |
| D4-9 | KRUEGER | 18 X 18 | 4-WAY | SH-4A | C/W FRAME 22, OBD |

① ALL DIFFUSERS MOUNTED IN LAY-IN TEE BAR CEILINGS TO HAVE FRAME EXTEND TO FULL 24"x24" DIMENSIONS.

SC-02

## PUMP SCHEDULE

| PUMP TAG | MFR. CATALOG NO. | SERVICE | CAPACITY GPM | CAPACITY HEAD FT WATER | EFF. % | BHP | MOTOR HP | MOTOR RPM | MOTOR VOLT | MOTOR Ø |
|---|---|---|---|---|---|---|---|---|---|---|
| P-1 | B & G 1510-4BC | HEATING WATER | 505 | 57 | 81 | | 15 | 1750 | 208 | 3 |
| P-2 | B & G 1510-4BC | HEATING WATER | 505 | 57 | 81 | | 15 | 1750 | 208 | 3 |
| | | | | | | | | | | |
| SP-1 | FEDERAL 1 1/4P - 1/4 - 4 | HEATING WATER | 10 | 18 | | | 1/4 | 1750 | 120 | 1 |

SC-04

0000CMM11
State Office Building Remodel, Phase 1 - BC 87-136
Mechanical Schedules - 11171

JOB NO.
BC:87-136

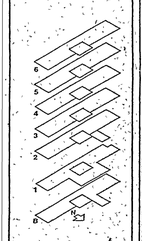
REVISIONS

REGISTERED PROFESSIONAL ENGINEER No. 4537 John D. Frank STATE OF UTAH

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

STATE OFFICE BUILDING REMODEL - PHASE 1

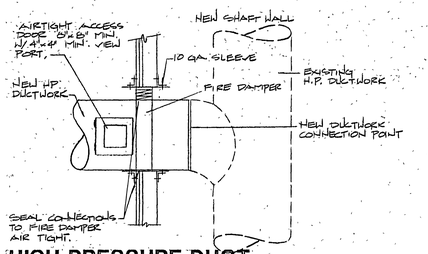
KEY PLAN



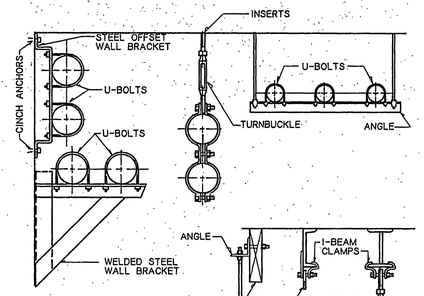
DATE
JANUARY 1989

TITLE
MECHANICAL SCHEDULES

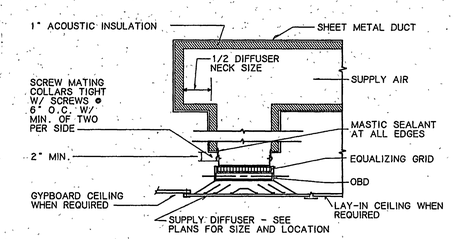
SHEET NO.
M-11



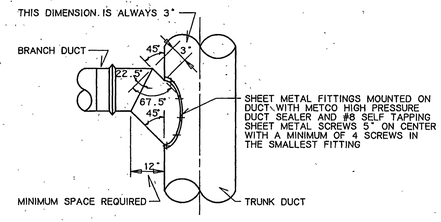

## HIGH PRESSURE DUCT FIRE DAMPER INSALLATION (19 / M-13)
NO SCALE



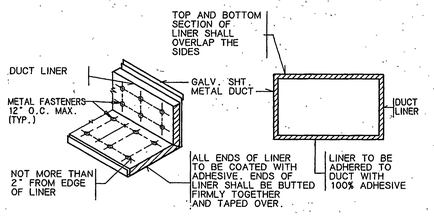

## TYPICAL PIPE SUPPORT DETAIL (15 / M-13)
NO SCALE



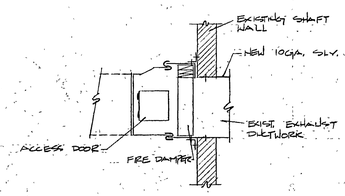

## TYPICAL CEILING DIFFUSER DETAIL (11 / M-13)
NO SCALE



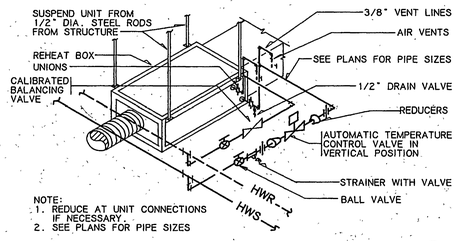

## CONSTRUCTION OF 45° - 90° TEE FITTING AND MOUNTING METHOD (6 / M-13)
NO SCALE



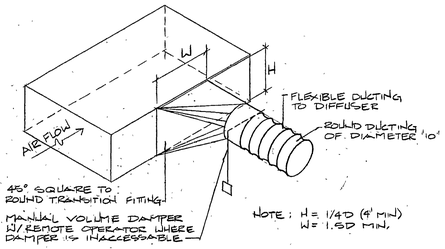

## DUCT LINER DETAIL (1 / M-13)
NO SCALE



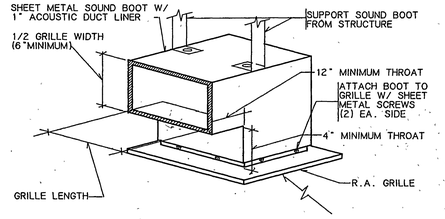

## EXIST. EXHAUST DUCTWORK FIRE DAMPER INSTALLATION (20 / M-13)
NO SCALE



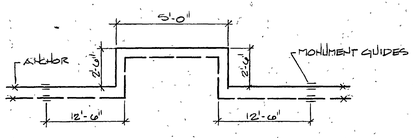

## REHEAT BOX PIPING DETAIL WITH 2-WAY AUTO-VALVE (12 / M-13)
NO SCALE




## ELONGATED SQUARE TO ROUND TEE (7 / M-13)
NO SCALE

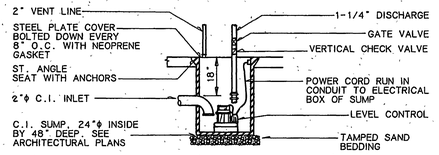



## R.A. GRILLE WITH SOUND BOOT (2 / M-13)
NO SCALE

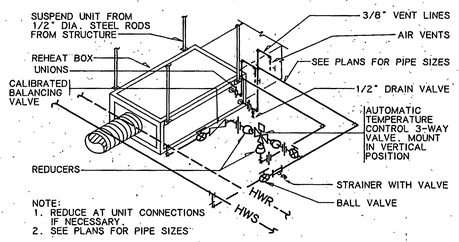



NOTE: SEE PLANS FOR LOCATION

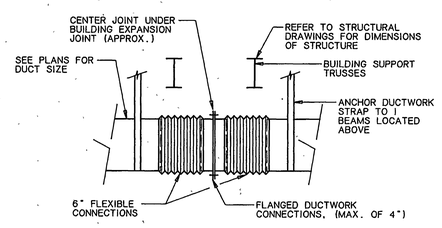
## EXPANSION LOOP DETAIL (21 / M-13)
NO SCALE



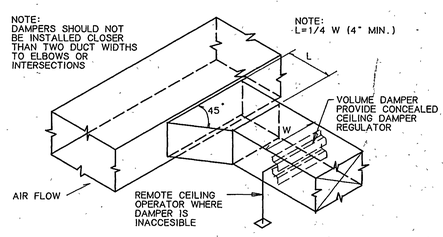

## SUMP PUMP DETAIL (16 / M-13)
NO SCALE



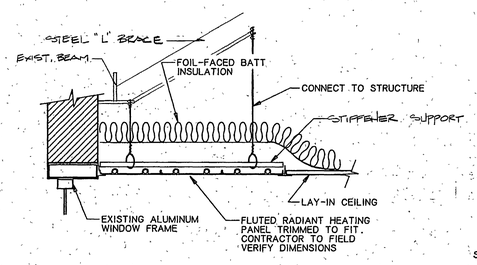

## REHEAT BOX PIPING DETAIL WITH 3-WAY AUTO-VALVE (13 / M-13)
NO SCALE



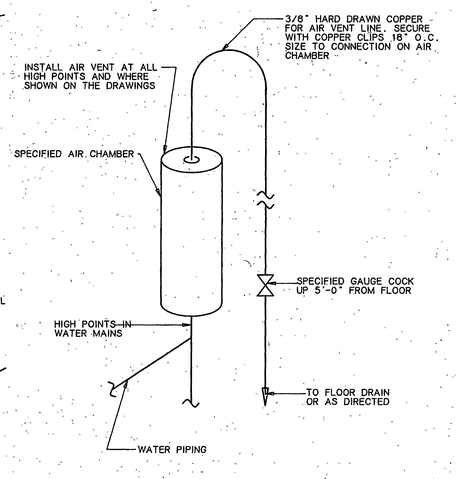

## FLEX CONNECTION DETAIL (8 / M-13)
NO SCALE



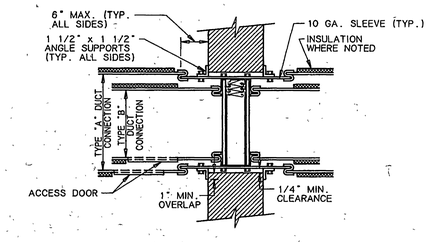

## BRANCH DUCT TAKE-OFF & DAMPER DETAIL (3 / M-13)
NO SCALE



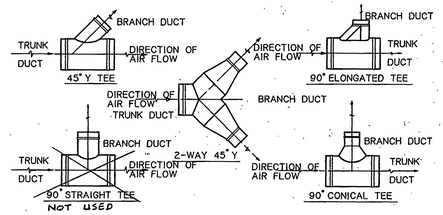

## RADIANT HEATING PANEL INSTALLATION DETAIL (17 / M-13)
NO SCALE



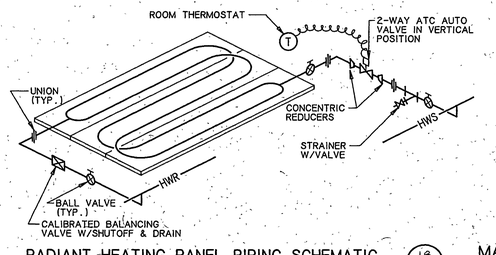

## MANUAL AIR VENT DETAIL (14 / M-13)
NO SCALE



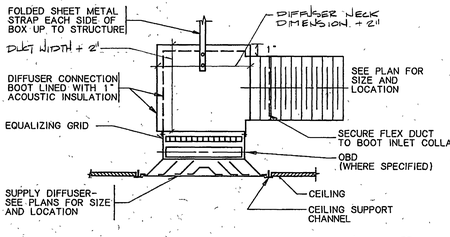

## WALL MOUNTED FIRE DAMPER DETAIL (9 / M-13)
NO SCALE



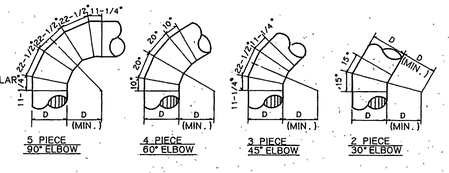

## ROUND DUCT BRANCH TAKE-OFF DETAILS (4 / M-13)
NO SCALE




## RADIANT HEATING PANEL PIPING SCHEMATIC (18 / M-13)
NO SCALE




## SUPPLY DIFFUSER W/ FLEX DUCT DETAIL (10 / M-13)
NO SCALE




## ROUND DUCT ELBOW DETAILS (5 / M-13)
NO SCALE

0000CMM13
State Office Building Remodel, Phase 1 - BC 87-136
Mechanical Details - 11173

JOB NO. BC:87-136

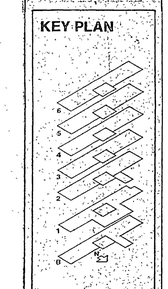
REVISIONS

REGISTERED PROFESSIONAL ENGINEER No. 4537 John D. Frank STATE OF UTAH

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

STATE OFFICE BUILDING REMODEL - PHASE 1

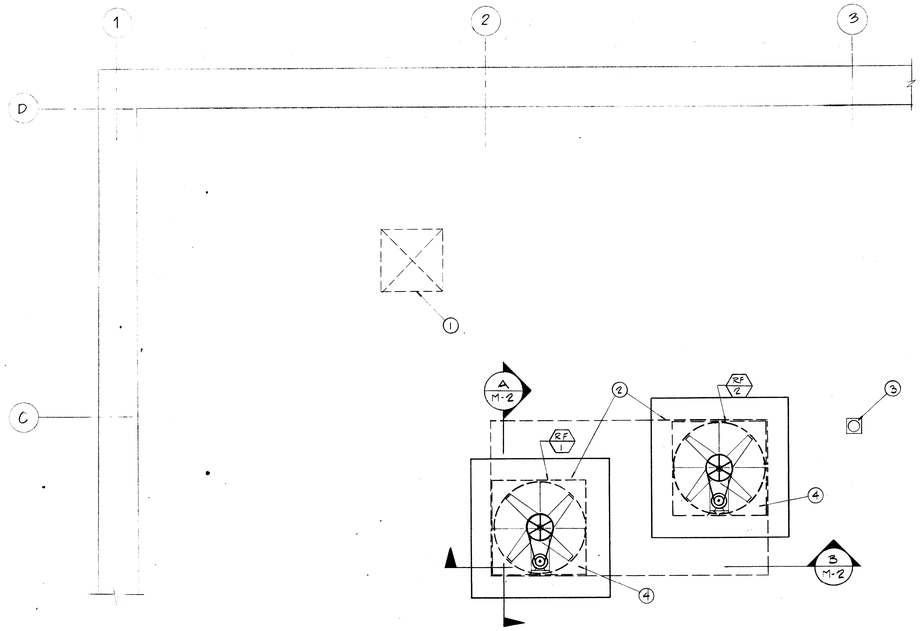
KEY PLAN



DATE
JANUARY 1989

TITLE
MECHANICAL DETAILS

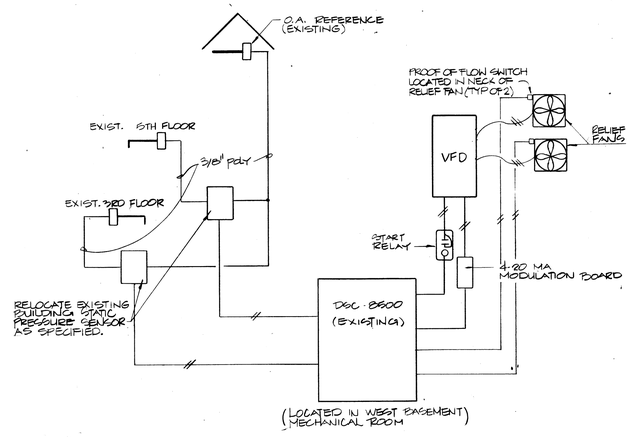
SHEET NO.
M-13




## PARTIAL EXISTING ROOF PLAN

SCALE: 1/4" = 1'-0"
(TYPICAL EAST STAIRWELL)

NORTH

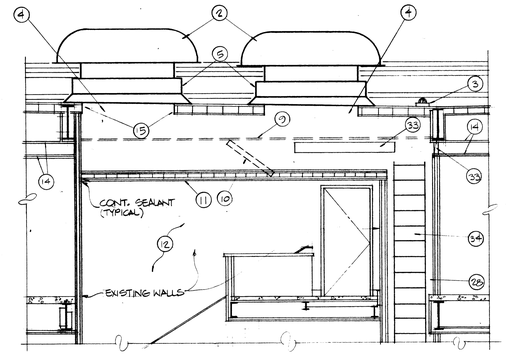



## BUILDING STATIC PRESSURE CONTROL

(TYPICAL FOR EAST AREA.)
NO SCALE

## KEYED NOTES

1. APPROXIMATE LOCATION OF EXISTING ROOFTOP RELIEF HOODS. RELIEF AIR DAMPERS IN HOODS SHALL BE SEALED SHUT AS PART OF NEW BUILDING PRESSURE CONTROL SYSTEM (TYPICAL).
2. LOCATE NEW LOW PROFILE BUILDING RELIEF FANS ABOVE EXISTING STAIRTOWERS. PROVIDE WITH FANS, CUSTOM ROOF CURB AND DISCONNECT SWITCH. CONTRACTOR TO FIELD VERIFY LOCATIONS OF FANS PRIOR TO INSTALLATION. FANS TO BE FLASHED AND COUNTER-FLASHED TO EXISTING ROOFING. SEE SCHEDULE FOR SIZE AND CAPACITIES REQUIRED FOR NEW FANS. (TYPICAL OF 4). INSTALLATION OF FANS WILL NOT BE DONE UNTIL SUB CEILING IN SHAFT HAS BEEN REMOVED AND ALL ASBESTOS ABATED AS REQUIRED AND APPROVED BY JOE LIGORI OF DFCM.
3. EXISTING ROOF DRAINS TO REMAIN AS INSTALLED. FIELD VERIFY EXACT LOCATIONS PRIOR TO NEW RELIEF FAN INSTALLATION.
4. PROVIDE NEW ROOF OPENINGS IN EXISTING ROOF TO ACCEPT NEW FANS. SEE DETAILS 1/M-1 AND 2/M-1 FOR FRAMING OF NEW ROOF OPENINGS. NEW ROOF OPENINGS WILL NOT BE DONE UNTIL SUB CEILING IN SHAFT HAS BEEN REMOVED AND ALL ASBESTOS ABATED AS REQUIRED AND ALL APPROVED BY JOE LIGORI OF DFCM.
5. NEW CUSTOM ROOF CURB TO BE SUPPLIED WITH NEW RELIEF FAN.
6. INSTALL SHEET METAL ON INTERIOR OF ROOF CURB OPENING. EXTEND SHEET METAL DOWN BELOW CURB SO THAT IT COVERS OPENINGS LEFT IN ROOF DECK FROM NEW ROOF PENETRATIONS. SEAL SHEET METAL AIR TIGHT TO ROOF DECK.
7. BACKDRAFT DAMPER, TO BE PROVIDED WITH FAN UNIT (TYPICAL).
8. EXISTING 10" I-BEAM.
9. REMOVE EXISTING FIRE RATED SUB-CEILING TO EXPOSE STRUCTURE ABOVE STAIRWELL ONLY. TYPICAL EAST AND WEST STAIRWELLS. CONTACT JOE LIGORI DFCM ASBESTOS COORDINATOR PRIOR TO REMOVAL.
10. REMOVE EXISTING 48" X 94" FIRE DAMPERS, (TYPICAL EAST AND WEST STAIRWELLS). PATCH AND SEAL WALLS AS REQUIRED. CONTACT JOE LIGORI AT DFCM, ASBESTOS COORDINATOR, PRIOR TO REMOVAL.
11. REMOVE EXISTING CEILING OF 6TH FLOOR STAIRWAY AND INSTALL NEW 2-HOUR RATED HORIZONTAL PARTITION IN IT'S PLACE. PARTITION TO BE COMPLETE AND MADE READY FOR PAINTING AT LATER DATE, (TYPICAL EAST AND WEST STAIRWELLS). CONTACT JOE LIGORI, DFCM, ASBESTOS COORDINATOR, PRIOR TO REMOVAL.
12. 6TH FLOOR STAIR LANDING.
13. LOCATE DISCONNECT SWITCH FOR FANS WITHIN WEATHERPROOF ENCLOSURE.
14. EXISTING BUILDING STRUCTURE BEYOND STAIRWELLS TO REMAIN AS INSTALLED.
15. NEW STRUCTURAL FRAMING FOR NEW ROOF OPENING. SEE DETAILS ON SHEET M-1.
16. SEE 1/4" SCALE PLAN THIS SHEET FOR ENLARGED MECHANICAL ROOM PLAN.
17. APPROXIMATE LOCATION OF EXISTING MAIN ELECTRICAL PANEL 277/480 V, 3 DIA. 4W. ELECTRICAL CONTRACTOR TO FIELD VERIFY EXACT LOCATION PRIOR TO HOOK-UP OF NEW FANS, ETC.
18. EXISTING ELECTRICAL PANEL.
19. EXISTING CONDENSATE PUMP.
20. EXISTING STEAM TO WATER HEAT EXCHANGER.
21. EXISTING ATC PANEL.
22. EXISTING AIR SEPARATOR.
23. EXISTING VERTICAL BASE MOUNTED EXPANSION TANK.
24. EXISTING HOT WATER CIRCULATING PUMPS.
25. EXISTING VARIABLE FREQUENCY DRIVES SERVING HOT WATER PUMPS.
26. EXISTING STEAM PRESSURE REDUCING STATION.
27. REROUTING OF EXISTING PIPING WAS DONE AS PART OF PREVIOUS CONTRACT. CONTRACTOR TO VERIFY LOCATIONS PIPING PRIOR TO INSTALLATION OF NEW VARIABLE FREQUENCY DRIVES.
28. EXISTING BUILDING UTILITY SHAFT.
29. LOCATE NEW VARIABLE FREQUENCY DRIVES ON WALL NEXT TO EXISTING DRIVES AS SHOWN. CONTRACTOR TO FIELD VERIFY EXISTING EQUIPMENT PRIOR TO INSTALLATION.
30. PROVIDE 3 #6 THW CU 1# 8 GND IN 1" CONDUIT TO EXISTING MAIN PANEL. (SEE 1/6" SCALE PLAN OF BASEMENT THIS SHEET). PROVIDE 60A, 3P CIRCUIT BREAKER IN EXISTING MAIN PANEL.
31. PROVIDE 3 #10 THW CU, 1 #10 GND IN 3/4" CONDUIT TO RELIEF AIR FANS ON WEST SIDE OF ROOF AND 3#6 THW CU, 1# GND IN 1" CONDUIT TO RELIEF AIR FANS ON EAST SIDE OF ROOF. ROUTE CONDUIT IN WEST UTILITY SHAFT AND IN INTERCONNECTING TUNNEL TO EAST UTILITY SHAFT. CONTRACTOR TO FIELD VERIFY PRIOR TO INSTALLATION.
32. PROVIDE 60A, 3P, 277/480V DISCONNECT SWITCH. MOUNT ABOVE VARIABLE FREQUENCY DRIVE AT MAX. 6'-6" TO TOP OF SWITCH HANDLE.
33. EXISTING FIRE DAMPERS (108" X 18") TO REMAIN AS INSTALLED.
34. EXISTING LADDER IN UTILITY SHAFT.

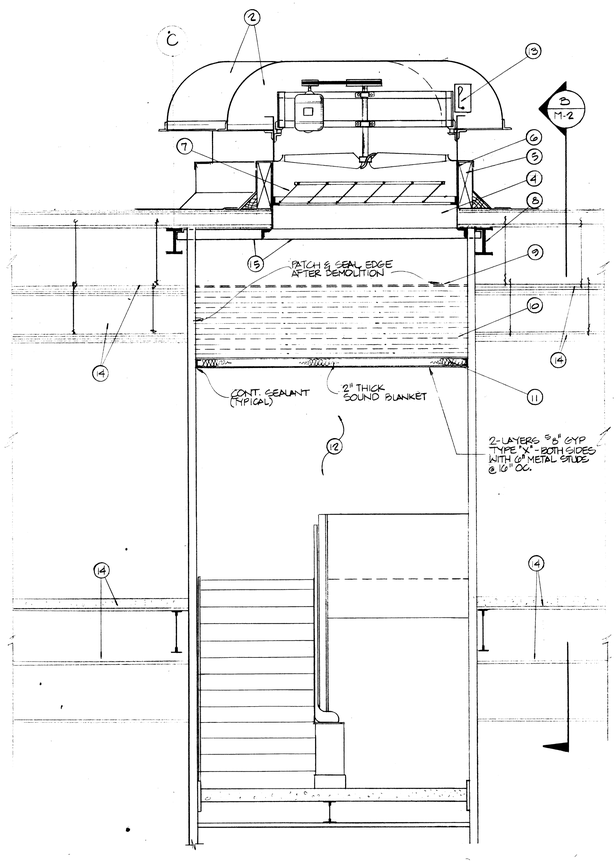



## SECTION

SCALE 1/4" = 1'-0"
D M-2

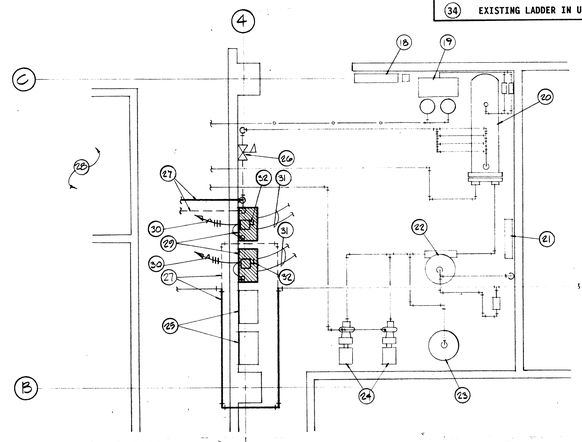
## EXHAUST FAN SCHEDULE

| FAN TAG | MFR. CATALOG NO. | SERVICE | FAN CAPACITY | | | | | | MOTOR | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | CFM | OV FPM | RPM | SP "WC | BHP | WHEEL NO-SIZE | HP | RPM | VOLT | Ø |
| RF-1 | COOK 72EM622B | BLDG. RELIEF | 45,000 | 1565 | 545 | .5" | 7.43 | 72" | 10 | 1750 | 480 | 3 |
| RF-2 | COOK 72EM622B | BLDG. RELIEF | 45,000 | 1565 | 545 | .5" | 7.43 | 72" | 10 | 1750 | 480 | 3 |
| RF-3 | COOK 72EM622B | BLDG. RELIEF | 45,000 | 1565 | 545 | .5" | 7.43 | 72" | 10 | 1750 | 480 | 3 |
| RF-4 | COOK 72EM622B | BLDG. RELIEF | 45,000 | 1565 | 545 | .5" | 7.43 | 72" | 10 | 1750 | 480 | 3 |



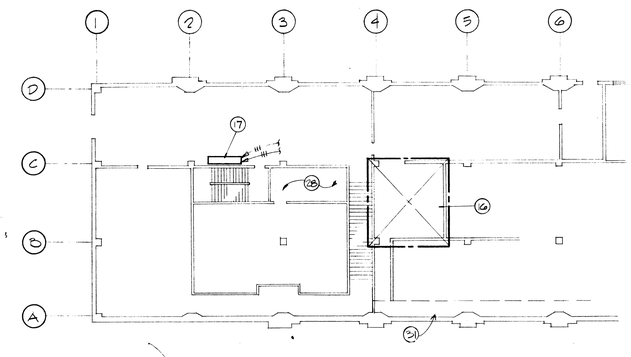

## SECTION

SCALE: 1/2" = 1'-0"
(TYPICAL EAST STAIRWELL)
A M-2




## EXISTING BSMNT MECHANICAL RM PLAN

SCALE 1/4" = 1'-0"




## EXISTING PARTIAL BSMNT PLAN

SCALE 1/16" = 1'- 0"

NORTH

VAN SCHRIUM & FRANK ARCHITECTS INC
CONSULTING ENGINEERS
SALT LAKE CITY, UTAH

PROJECT: RELIEF AIR SYSTEM MODERNIZATION
OWNER: DEPARTMENT OF FACILITIES CONSTRUCTION & MANAGEMENT
LOCATION: SALT LAKE CITY, UTAH
TITLE: ENLARGED PLANS & DETAILS

DATE
DRAWN
CHECKED
JOB NO.
SHEET NO. M-2

# RELIEF AIR SYSTEM MODIFICATION

# STATE OFFICE BUILDING

## SALT LAKE CITY, UTAH

STATE OF UTAH

**DEPARTMENT OF FACILITIES CONSTRUCTION & MANAGEMENT**
**PROJECT NO. BC87-136**

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### MECHANICAL ENGINEERS

VAN BOERUM & FRANK ASSOCIATES
220 So 200 E #450
Salt Lake City, Utah 84111

### ELECTRICAL ENGINEERS

BECHERER & NIELSON ASSOCIATES
146 Pierpont Avenue
Salt Lake City, Utah 84101

### STRUCTURAL ENGINEERS

E.W. ALLEN & ASSOCIATES
16 Exchange Place
Salt Lake City, Utah 84111

### ARCHITECT

BRIXEN & CHRISTOPHER ARCHITECTS
252 South 200 East
Salt Lake City, Utah 84111

### DRAWING INDEX


| SHEET NUMBER | DESCRIPTION |
|---|---|
| M-1 | ROOF PLAN MECHANICAL, ELECTRICAL, & STRUCTURAL |
| M-2 | ENLARGED MECHANICAL PLANS, DETAILS, & SCHEDULES |


### NOTICE TO CONTRACTORS

THE STATE OFFICE BUILDING IS IN THE PROCESS OF A MAJOR ASBESTOS ABATEMENT PROJECT. IT IS THEREFORE NECESSARY TO INFORM ALL CONTRACTORS THAT ASBESTOS HAS BEEN DETECTED IN THE CEILING PLENUM AREAS OF THE SIXTH FLOOR AND ABOVE THE SUB-CEILING OF THE EAST AND WEST UTILITY SHAFTS. MINOR DEMOLITION WILL BE REQUIRED AS PART OF THIS PROJECT, THEREFORE ALL DEMOLITION MUST BE COORDINATED, APPROVED, AND SUPERVISED BY JOE LIGORI OF DFCM. THOSE CONTRACTORS THAT WILL BE DOING THE ACTUAL DEMOLITION MUST HAVE PREVIOUSLY BEEN CERTIFIED, AS REQUIRED BY "SPECIAL CONTRACTOR QUALIFICATION REQUIREMENTS" OF THE SPECIFICATIONS, PRIOR TO DOING THE DEMOLITION.

### ASBESTOS ABATEMENT CONSULTANTS

INDUSTRIAL HEALTH INC.
640 Wilmington Ave.
Salt Lake City, Utah 84106

DFCM PRE-BID STAFF REVIEW
Division of Facilities Construction and Management

OTHER AGENCIES

REVIEW DOES NOT RELIEVE A/E OF DESIGN LIABILITY

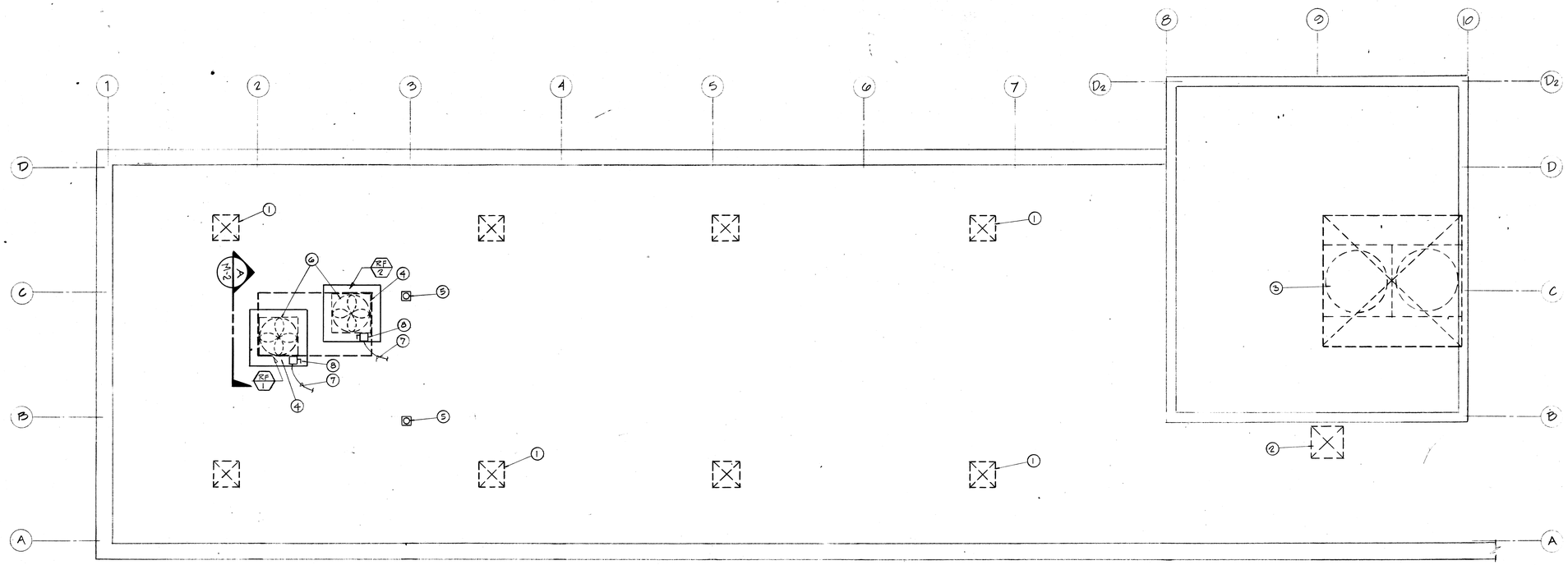
APPROVALS:

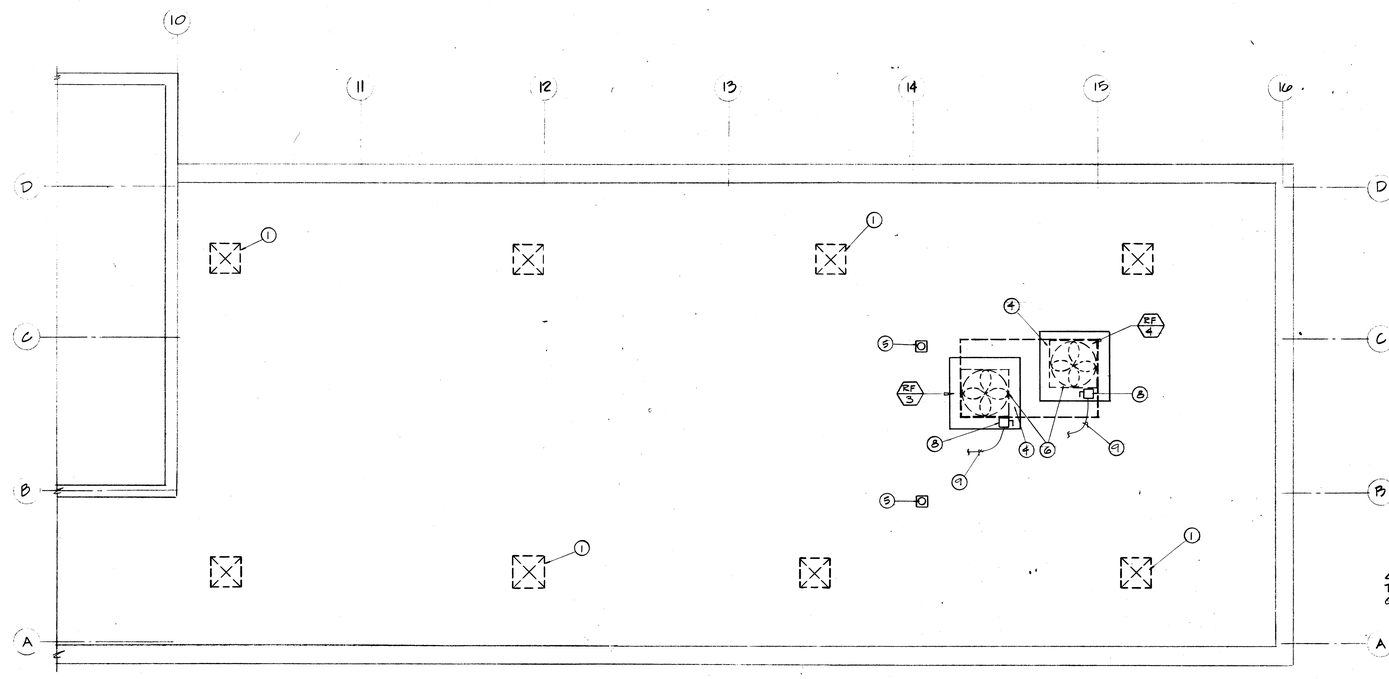
Prime Agency — Date
DFCM — Date

APPROVAL DOES NOT RELIEVE A/E OF DESIGN LIABILITY

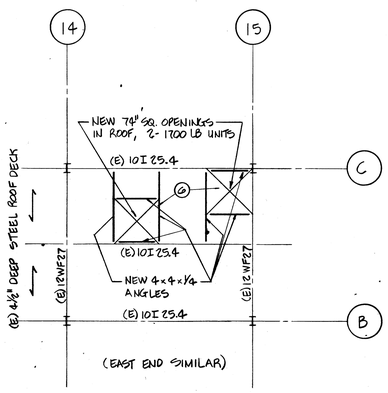
## KEYED NOTES

1. APPROXIMATE LOCATION OF EXISTING ROOFTOP RELIEF HOODS. RELIEF AIR DAMPERS IN HOODS SHALL BE SEALED SHUT AS PART OF NEW BUILDING PRESSURE CONTROL SYSTEM (TYPICAL).
2. APPROXIMATE LOCATION OF EXISTING TOILET ROOM EXHAUST FAN. FAN TO REMAIN AS INSTALLED.
3. APPROXIMATE LOCATION OF EXISTING COOLING TOWER. TOWER TO REMAIN AS INSTALLED.
4. LOCATE NEW LOW PROFILE BUILDING RELIEF FANS ABOVE EXISTING STAIRTOWERS. PROVIDE WITH FANS, CUSTOM ROOF CURB AND DISCONNECT SWITCH. CONTRACTOR TO FIELD VERIFY LOCATIONS OF FANS PRIOR TO INSTALLATION. FANS TO BE FLASHED AND COUNTER-FLASHED TO EXISTING ROOFING. SEE SCHEDULE FOR SIZE AND CAPACITIES REQUIRED FOR NEW FANS. (TYPICAL OF 4). INSTALLATION OF FANS WILL NOT BE DONE UNTIL SUB CEILING IN SHAFT HAS BEEN REMOVED AND ALL ASBESTOS ABATED AS REQUIRED AND APPROVED BY JOE LIGORI OF DFCM.
5. EXISTING ROOF DRAINS TO REMAIN AS INSTALLED. FIELD VERIFY EXACT LOCATIONS PRIOR TO NEW RELIEF FAN INSTALLATION.
6. PROVIDE NEW ROOF OPENINGS IN EXISTING ROOF TO ACCEPT NEW FANS. SEE DETAILS 1/M-1 AND 2/M-1 FOR FRAMING OF NEW ROOF OPENINGS. NEW ROOF OPENINGS WILL NOT BE DONE UNTIL SUB CEILING IN SHAFT HAS BEEN REMOVED AND ALL ASBESTOS ABATED AS REQUIRED AND ALL APPROVED BY JOE LIGORI OF DFCM.
7. PROVIDE 3#10 THW CU, 1#10 GND IN 3/4" CONDUIT TO VARIABLE FREQUENCY DRIVE IN BASEMENT MECHANICAL ROOM (SEE SHEET M-2). ROUTE CONDUIT IN WEST UTILITY SHAFT TO ROOF AS REQUIRED. ELECTRICAL CONTRACTOR TO FIELD VERIFY PRIOR TO INSTALLATION (TYPICAL OF 2). ELECTRICAL WORK SHALL NOT BE DONE ABOVE THE SIXTH FLORO LEVEL UNTIL THE SUB-CEILING IN THE SHAFT HAS BEEN REMOVED AND ALL ASBESTOS ABATED AS REQUIRED AND APPROVED BY JOE LIGORI OF DFCM.
8. PROVIDE WEMA 3R 25A 3P 277/480V DISCONNECT SWITCH WITH ELECTRICAL INTERLOCK KIT FOR SAFETY INTERLOCK WITH VARIABLE FREQUENCY DRIVE (TYPICAL OF 4).
9. PROVIDE 3#6 THW CU, 1# 8 GND IN 1" CONDUIT TO VARIABLE FREQUENCY DRIVE IN BASEMENT. MECHANICAL ROOM (SEE SHEET M-2). ROUTE CONDUIT IN EAST UTILITY SHAFT AND INTERCONNECTING TUNNEL AS REQUIRED. ELECTRICAL CONTRACTOR TO FIELD VERIFY PRIOR TO INSTALLATION (TYPICAL OF 2). ELECTRICAL WORK SHALL NOT BE DONE ABOVE THE SIXTH FLOOR LEVEL UNTIL THE SUB-CEILING IN THE SHAFT HAS BEEN REMOVED AND ALL ASBESTOS ABATED AS REQUIRED AND APPROVED BY JOE LIGORI OF DFCM.

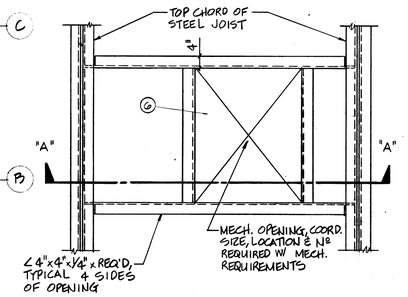


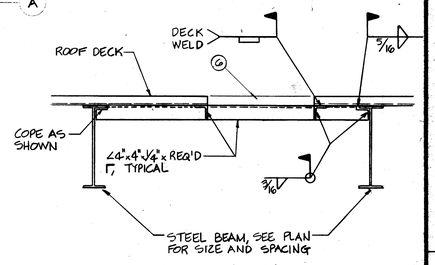

**EXISTING ROOF PLAN**
SCALE: 1/8" = 1'-0"




NEW FRAMING FOR ROOF OPENINGS (1 / M-1)
SCALE: 1/8"=1'-0




PLAN




SECTION "A-A"

TYPICAL OPENING IN ROOF (2 / M-1)
SCALE: 3/4"=1'-0"

MAHLE BOSERUP & ASSOCIATES INC
ARCHITECTS & ENGINEERS
SALT LAKE CITY, UTAH

PROJECT:
OWNER:
LOCATION:
TITLE:

M-1

DATE
DRAWN
CHECKED
SHEET NO.

# LEGEND OF MECHANICAL SYMBOLS AND ABBREVIATIONS

| | |
|---|---|
| | POSITIVE PRESSURE DUCT – RISE |
| | POSITIVE PRESSURE DUCT – DROP |
| | NEGATIVE PRESSURE DUCT – RISE |
| | NEGATIVE PRESSURE DUCT – DROP |
| | ROUND DUCT – RISE |
| | ROUND DUCT – DROP |
| | RECTANGULAR DUCT |
| | ROUND DUCT |
| | UNDER FLOOR DUCT |
| | MEDIUM OR HIGH PRESSURE FLEX CONNECTION TO TERMINL UNIT |
| UP | INCLINED DUCT RISE |
| DN | INCLINED DUCT DROP |
| | MANUAL DAMPER |
| | FIRE DAMPER WITH ACCESS DOOR |
| | ATC DAMPER |
| | COMBINATION SMOKE AND FIRE DAMPER WITH ACCESS DOOR |
| | SMOKE DAMPER |
| | FLEXIBLE DUCT |
| | FLEXIBLE CONNECTION |
| | SUPPLY DIFFUSER |
| | EXHAUST AIR REGISTER |
| OR | TURNING VANES |
| | SPLITTER DAMPER WITH TURNING VANES |
| | RETURN AIR GRILLE WITH SOUND BOOT |
| | FRESH AIR LOUVER |
| | RELIEF AIR OR EXHAUST AIR LOUVER |
| | RECTANGULAR TO RECTANGULAR TRANSITION |
| | ROUND TO ROUND TRANSITION |
| | RECTANGULAR TO ROUND TRANSITION |

| | |
|---|---|
| | 90~ ELBOW |
| | 45~ ELBOW |
| | RISER TURNED UP (PIPE OUT OF PLANE) |
| | RISER TURNED DOWN (PIPE INTO PLANE) |
| | LR ELBOW |
| | SIDE OUT DOWN ELBOW |
| | SIDE UP OUT ELBOW |
| | BASE ELBOW |
| | DOUBLE ELBOW |
| | REDUCED ELBOW |
| | SWEEP TEE |
| | STRAIGHT TEE (PIPE BRANCH – IN PLANE) |
| | TEE UP |
| | TEE DOWN |
| | SIDE OUT UP (PIPE BRANCH – OUT OF PLANE) |
| | SIDE OUT DOWN (PIPE BRANCH – INTO PLANE) |
| | CROSS |
| | CONCENTRIC REDUCER |
| | ECCENTRIC REDUCER |
| | LATERAL STRAINER |
| | LATERAL STRAINER WITH BLOW–OFF VALVE |
| | GATE VALVE |
| | ATC VALVE – 2 WAY |
| | ATC VALVE – 3 WAY |
| | GLOBE VALVE |
| | HOSE GATE VALVE |
| | HOSE GLOBE VALVE |
| | ANGLE GLOBE VALVE |
| | ANGLE GLOBE VALVE DOWN |
| | ANGLE GATE VALVE |
| | ANGLE GATE VALVE DOWN |
| | PRESSURE REDUCING, SELF CONTAINED VALVE |
| | PRESSURE REDUCING, EXTERNAL PRESSURE VALVE |
| | BALL VALVE (PIPE SIZE 2" AND SMALLER) |
| | BUTTERFLY VALVE (PIPE SIZE 2–1/2" AND LARGER) |
| | CHECK VALVE |
| | 90~ CHECK VALVE |

| | |
|---|---|
| | COCK VALVE |
| | SAFETY VALVE |
| | QUICK OPENING VALVE |
| | EXPANSION JOINT |
| | FLOAT VALVE |
| M | MOTOR OPER. GATE VALVE |
| M | MOTOR OPER. GLOBE VALVE |
| | RELIEF VALVE |
| | DIAPHRAGM |
| PE | PNEUMATIC–ELECTRIC CONTROL VALVE |
| S | SOLINIOD VALVE |
| | ALIGNMENT GUIDE |
| | ANCHOR |
| | PRESSURE GAUGE WITH COCK |
| PS | PRESSURE SWITCH |
| | FLANGE |
| | UNION |
| GPM LB/HR. | FLOW METER ORIFICE |
| | AIR VENT–AUTO |
| | AIR VENT–MANUAL |
| | AIR SEPERATOR |
| | REDUCING FLANGE |
| | FLOW SWITCH |
| | SLEEVE |
| 0 – 100°F | THERMOMETER 0–100°F |
| 30 – 240°F | THERMOMETER 30–240°F |
| T | THERMOSTAT |
| T N | NIGHT THERMOSTAT |
| | STEAM TRAP |
| SD | DUCT SMOKE DETECTOR |
| H | DUCT HUMIDIFIER |
| | SHUT–OFF COCK FOR USE WITH PRESSURE GAUGE |
| | PUMP |
| | REDUCER |
| | EXPANSION LOOP |
| | FLEXIBLE CONNECTION |
| GPM #/HR. | FLOW METER |

| | |
|---|---|
| G | NATURAL GAS |
| | ARROW INDICATES DIRECTION OF FLOW IN PIPE LEADER INDICATES DOWNWARD SLOPE |
| | PIPE DIRECTION CHANGE |
| LPS | LOW PRESSURE STEAM |
| | LOW PRESSURE RETURN |
| HPS | HIGH PRESSURE STEAM |
| HPR | HIGH PRESSURE STEAM RETURN |
| P | PUMP DISCHARGE |
| MU | MAKE UP WATER |
| V | AIR RELIEF LINE (VENT) |
| FOF | FUEL OIL FLOW |
| FOR | FUEL OIL RETURN |
| FOV | FUEL OIL TANK VENT |
| (name) E | EXISTING PIPING |
| CWS | CHILLED WATER SUPPLY |
| CWR | CHILLED WATER RETURN |
| CS | CONDENSER WATER SUPPLY |
| CR | CONDENSER WATER RETURN |
| HWS | HEATING HOT WATER SUPPLY |
| HWR | HEATING HOT WATER RETURN |
| HTHWS | HIGH TEMPERATURE HOT WATER SUPPLY |
| HTHWR | HIGH TEMPERATURE HOT WATER RETURN |
| GPM | FLOW CONTROL VALVE |
| | CALIBRATED BALANCING VALVE |
| HRS | HEAT RECOVERY SUPPLY |
| HRR | HEAT RECOVERY RETURN |
| | |
| | |
| | |
| | |
| | |
| | |
| A M1–1 | SECTION TAG – TOP FIGURE IS SECTION NO. BOTTOM FIGURE IS SHEET NO. |
| 1 M1–1 | DETAIL TAG – TOP FIGURE IS DETAIL NO. BOTTOM FIGURE IS SHEET NO. |
| EF 1 | EQUIPMENT IDENTIFICATION |
| 1 | KEYED NOTE IDENTIFICATION |
| P–1 | PLUMBING FIXTURES |

State Office Building; Phase Three, 6th Floor Remodel - FS:91-009
Mechanical Legend - 3624
00006MM0

B3PMDED 10-24-91

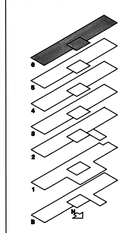
**JOB NO.**
FS:91-009

**REVISIONS**
RECORD DRAWING
DECEMBER 1992

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

**STATE OFFICE BUILDING REMODEL - PHASE 3 SIXTH FLOOR**

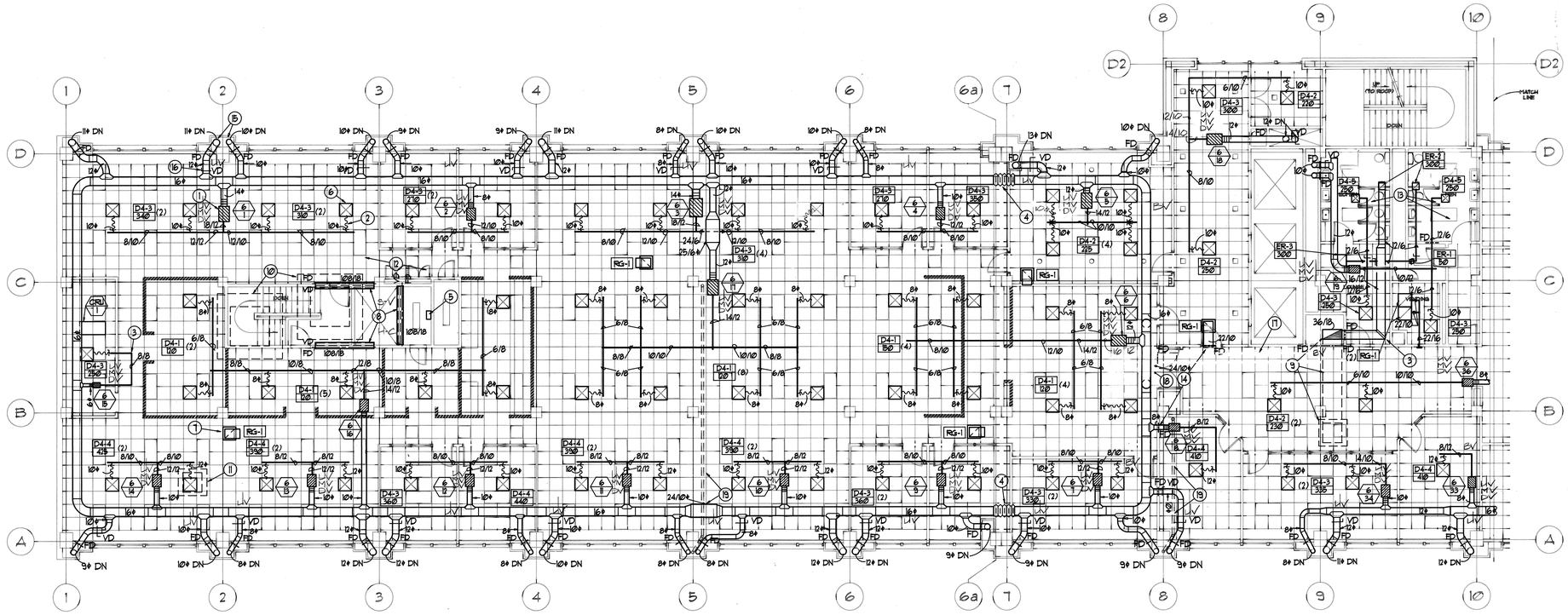
**KEY PLAN**



**DATE**
NOV. 1991

**TITLE**
MECHANICAL LEGEND

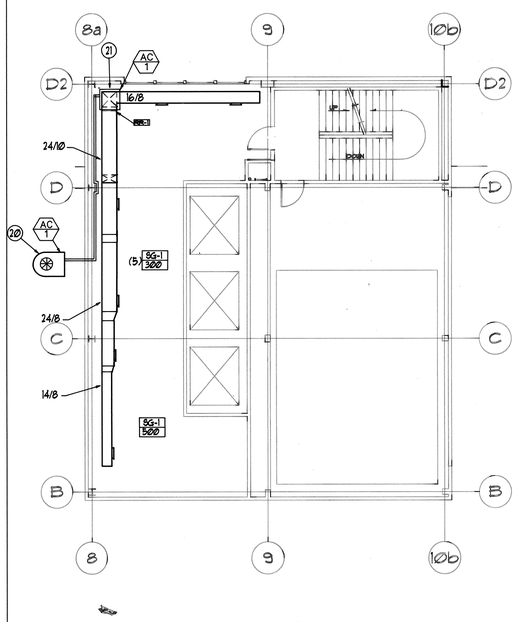
**SHEET NO.**
M-0



## WEST AREA SIXTH FLOOR MECHANICAL PLAN

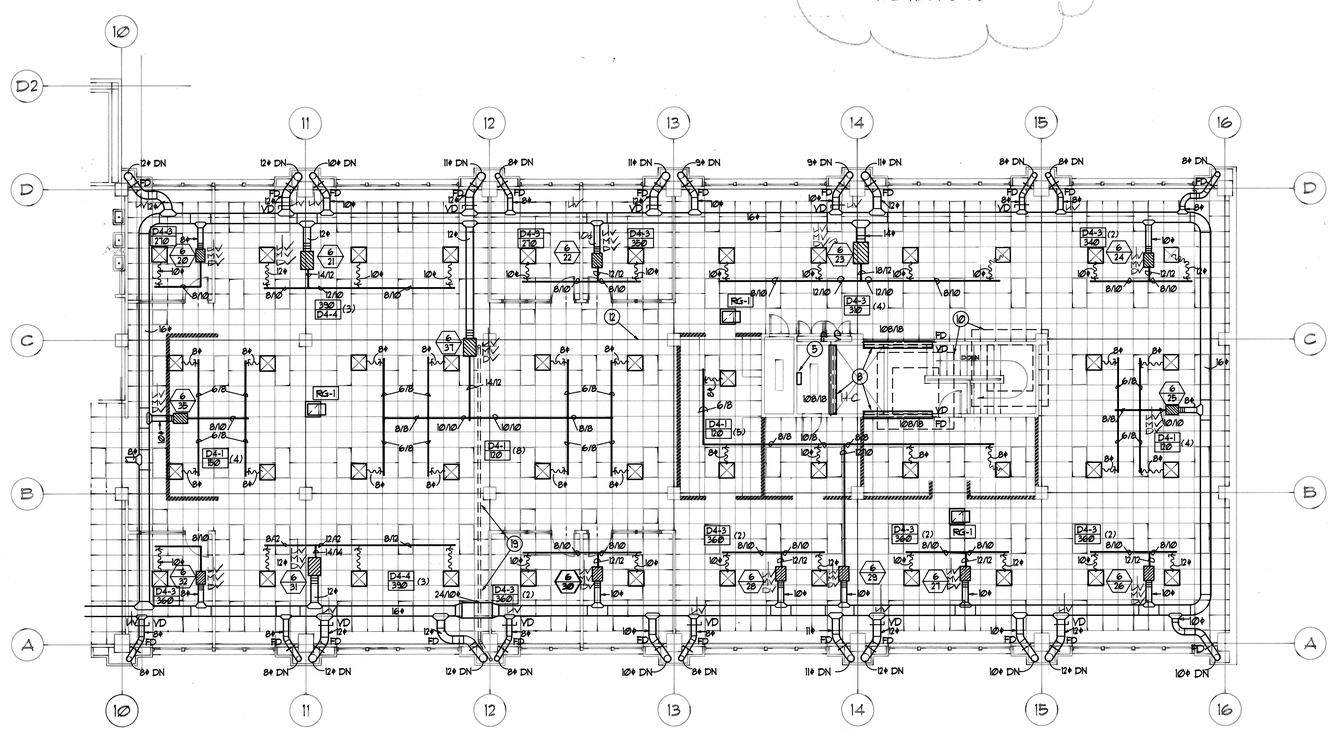
SCALE 1/8"=1'-0"

SV = SERVICE VALVES
UV = UNIT VALVES
MV = MANUEL VENT
DV = DRAIN VALVE
BV = BLEEDER VALVE
H-C = HOT / COLD



## SEVEVNTH FLOOR MECHANICAL PLAN

SCALE 1/8"=1'-0"



## EAST AREA SIXTH FLOOR MECHANICAL PLAN

SCALE 1/8"=1'-0"

B3MD6D 10-23-91

## KEYED NOTES

1. VAV REHEAT BOXES. SEE SCHEDULES FOR SIZE AND CAPACITIES. CONNECT TO HIGH PRESSURE DUCTWORK WITH NO MORE THAN 3' OF HIGH PRESSURE FLEX DUCT.
2. FLEXIBLE DUCT CONNECTION TO DIFFUSERS WITH SPIN-IN AND NO MORE THAN 5'-0" OF FLEX DUCT.
3. TURNING VANES LOCATED IN ALL ELBOWS OF RECTANGULAR DUCTWORK. TYPICAL.
4. PROVIDE EXPANSION FITTINGS IN DUCTWORK AT ALL BUILDING EXPANSION JOINTS. SEE DETAILS.
5. NEW ATC COMMUNICATION PANEL. LOCATE SO CLEARANCE AROUND ELECTRICAL EQUIPMENT IS NOT AFFECTED. COORDINATE WITH ELECTRICAL CONTRACTOR.
6. SUPPLY DIFFUSER WITH SUPPLY SOUND BOOT. SEE DETAILS. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION. TYPICAL FOR ALL SUPPLY DIFFUSERS.
7. RETURN AIR GRILLE WITH SOUND BOOT. SEE DETAILS. TYPICAL FOR ALL RETURN AIR GRILLES.
8. REMOVE THE EXISTING FIRE DAMPERS AND PROVIDE NEW FIRE DAMPERS. MODIFY EXISTING OPENINGS ON NORTH & SOUTH AS REQUIRED FOR NEW DAMPER INSTALLATION. INSTALL THIRD NEW DAMPER ON NEW WALL AS SHOWN. INSTALL MANUAL VERTICAL BLADE VOLUME DAMPERS IN BACK OF FIRE DAMPERS ON SHAFT WALLS. PROVIDE LOCKING QUADRANT FOR DAMPERS.
9. EXISTING TOILET EXHAUST RISER, DUCTWORK, AND EXHAUST FAN TO REMAIN. TIE IN NEW EXHAUST DUCTWORK INTO RISER WITH FIRE DAMPER AT THE SHAFT PENETRATION. RE-BALANCE EXHAUST FAN.
10. EXISTING RELIEF FANS FROM PREVIOUS PROJECT TO REMAIN.
11. EXISTING RELIEF HOOD SEALED SHUT FROM PREVIOUS PROJECT TO REMAIN. CHECK FOR PROPER SEAL. REPAIR SEAL AS NECESSARY, PROVIDE A MINIMUM R-9 FIBERGLASS INSULATION ON BOTTOM SIDE OF DAMPER. SECURE IN PLACE WITH A SHEET METAL PANEL. TYPICAL OF 16.
12. DUE TO CEILING SPACE CONSTRAINTS, COORDINATE DUCTWORK CAREFULLY WITH EXISTING MECHANICAL & STRUCTURAL EQUIPMENT AND NEW PIPING. TYPICAL OF ALL THIS FLOOR.
13. COORDINATE CAREFULLY WITH EXISTING COOLING TOWER PIPING IN THIS AREA.
14. FIRE DAMPER. TYPICAL. PROVIDE AT ALL FIRE RATED WALLS. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS OF FIRE RATED WALLS.
15. EXISTING HOT AIR & COLD AIR HIGH PRESSURE DUCT RISERS. CONNECT NEW DUCTWORK TO EXISTING RISERS. MAJORITY OF EXISTING DUCT HAS BEEN REMOVED BACK TO FLOOR LEVEL. SOME EXISTING DUCT MAY BE STUBBED AND CAPPED IN THE SPACE AND WILL NEED TO BE MODIFIED FOR INSTALLATION OF NEW DUCTWORK. PROVIDE A NEW FIRE DAMPER AT ALL WALL PENETRATIONS, SEE DETAILS FOR INSTALLATION. FIELD VERIFY EXISTING CONDITIONS. TYPICAL.
16. AIR CONTROL DAMPER SIMILAR TO AIR BALANCE MODEL AC 530 IN HOT AIR HIGH PRESSURE DUCTS. SHUT TIGHT FOR FUTURE OPENING. PRESENTLY THE HOT AIR DUCTS STILL SERVE A DUAL DUCT SYSTEM ON THE FIFTH FLOOR AND BASEMENT. THESE DUCTS WILL BE CHANGED OVER TO COLD AIR DUCTS IN PHASE IV, AT WHICH TIME THE DAMPERS WILL BE OPENED TO FULL OPEN POSITION. TYPICAL OF ALL CONNECTIONS TO HOT HIGH PRESSURE SUPPLY RISERS.
17. EXISTING 20" X 16" EXHAUST DUCT SERVING BASEMENT PRINT ROOM, TO REMAIN RECONNECT OR DISCONNECT POWER SOURCE TO EXHAUST FAN AS DIRECTED BY FACILITIES MANAGER. ADD FIRE DAMPERS AS SHOWN.
18. RAISE DUCTWORK OVER EXHAUST DUCT INTO BEAM SPACE. TRANSITION TO OVAL.
19. EXISTING ROOF DRAIN LINE. TRANSITION DUCTWORK AS SHOWN AND RUN ABOVE DRAIN LINE. RELOCATE DRAIN LINE IF NECESSARY. REINSULATE ALL ROOF DRAIN LINES. TYPICAL.
20. NEW OUTDOOR CONDENSING UNIT ON ROOF TO BE MOUNTED ON REDWOOD RAILS.
21. NEW 5 TON AIR HANDLING UNIT MOUNTED IN A VERTICAL POSITION.

State Office Building; Phase Three, 6th Floor Remodel - FS:91-009
Sixth Floor Mechanical Floor Plan - 3525
00006MM1

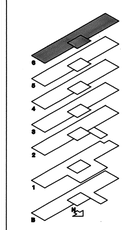
**JOB NO.**
FS:91-009

**REVISIONS**
RECORD DRAWING
DECEMBER 1992

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

# STATE OFFICE BUILDING REMODEL - PHASE 3 SIXTH FLOOR

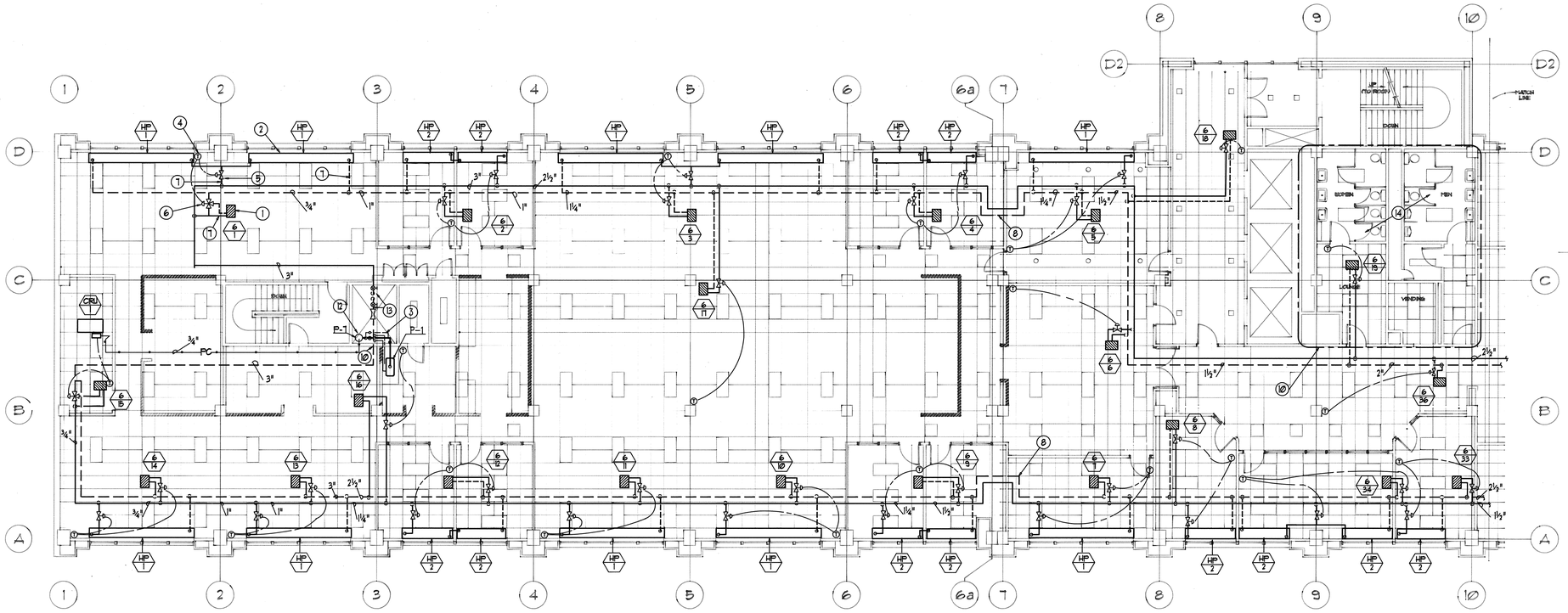
**KEY PLAN**



**DATE**
NOV. 1991

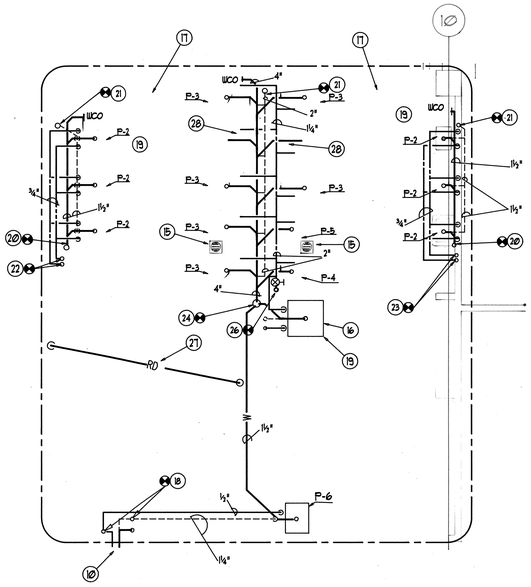
**TITLE**
MECHANICAL FLOOR PLAN

**SHEET NO.**
M-1



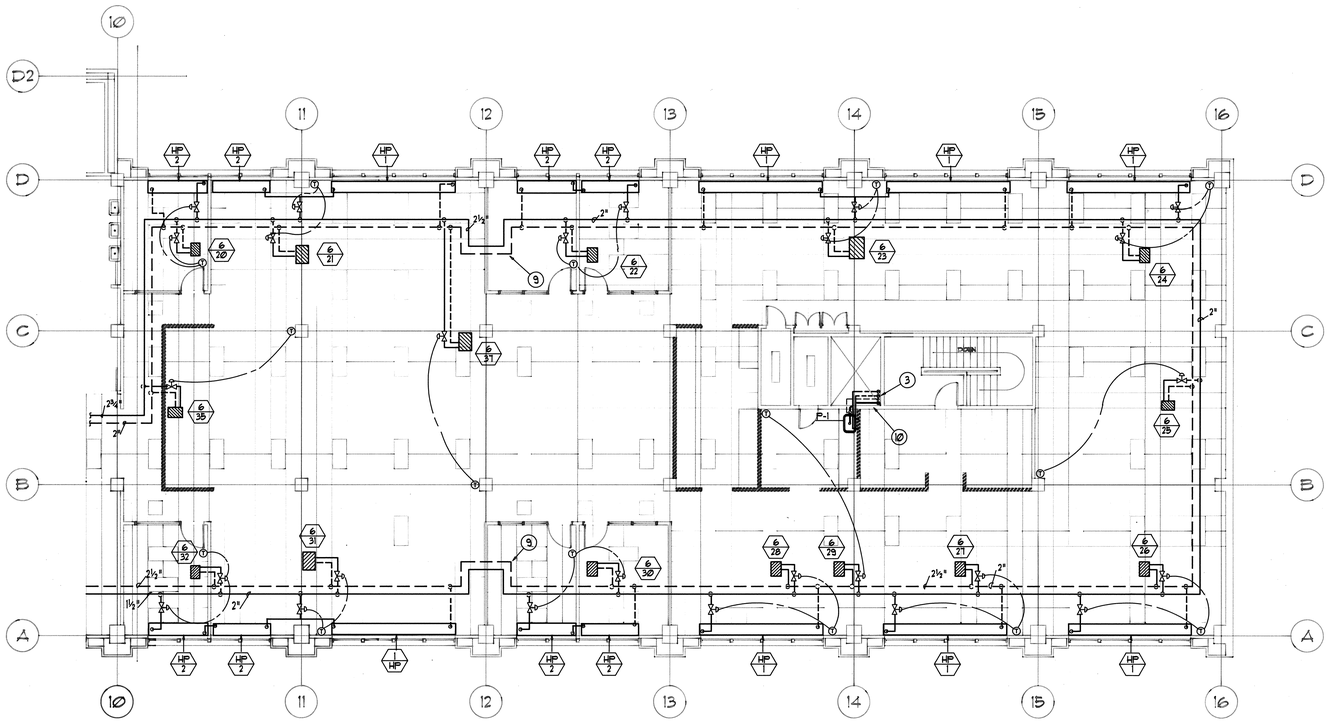
## WEST AREA SIXTH FLOOR MECHANICAL PIPING PLAN

SCALE 1/8"=1'-0"



## SIXTH FLOOR TOILET ROOMS PLUMBING PLAN

SCALE 1/4"=1'-0"



## EAST AREA SIXTH FLOOR MECHANICAL PIPING PLAN

SCALE 1/8"=1'-0"

## KEYED NOTES

1. VAV REHEAT BOX WITH 2 OR 3 WAY AUTOMATIC ATC CONTROL VALVE AS SHOWN. SEE DETAIL FOR REQUIRED VALVING OF COILS. SEE BOX SCHEDULE FOR GPM'S REQUIRED. TYPICAL.
2. EXTRUDED ALUMINUM RADIANT HEATING PANELS. INSTALL AS PER REQUIRED BY MANUFACTURER AND AS SHOWN IN DETAILS. SEE PANEL SCHEDULE FOR SIZE AND GPM REQUIRED. TYPICAL.
3. RUN WASTE, VENT HW AND CW LINES FROM EXISTING LINES IN SHAFT, UNDER COUNTER TO SINK. REFER TO PLUMBING FIXTURE SCHEDULE FOR LINE SIZES REQUIRED.
4. ROOM THERMOSTAT TO CONTROL VAV BOX AND RADIANT PANELS. MOUNT THERMOSTAT ON WALL AT HEIGHT SPECIFIED BY ARCHITECT. PROVIDE 12" X 12" X 3" DEEP RIGID INSULATION BEHIND THERMOSTATS LOCATED ON EXTERIOR WALLS. TYPICAL.
5. 2-WAY ATC VALVE WITH OPERATOR MOUNTED IN VERTICAL POSITION, TYPICAL.
6. 3-WAY ATC VALVE WITH OPERATOR MOUNTED IN VERTICAL POSITION, TYPICAL.
7. 3/4" BRANCH TAKE-OFF TO RADIANT PANEL OR VAV BOXES. TYPICAL.
8. PROVIDE EXPANSION LOOPS WHERE PIPES CROSS BUILDING EXPANSION JOINTS.
9. PROVIDE EXPANSION LOOP FOR THERMAL EXPANSION OF PIPING.
10. WHERE DRINKING FOUNTAINS HAVE BEEN REMOVED, CAP ALL EXISTING PLUMBING LINES AT MAINS.
11. CONDENSATE PUMP FURNISHED WITH COMPUTER ROOM UNIT. RUN PUMPED CONDENSATE TO INDIRECT WASTE RECEPTOR.
12. NEW INDIRECT WASTE RECEPTOR TIED INTO EXISTING WASTE AND VENT STACKS.
13. TIE NEW HUB & HWR LINES INTO EXISTING RISERS. INCLUDE A VENTURI TYPE FLOW METER IN THE RETURN LINE.
14. SEE 1/4 SCALE PLUMBING PLAN THIS SHEET.
15. EXISTING FLOOR DRAIN TO BE RE-USED. REFURBISH, CLEAN, & ROUTE OUT AND PROVIDE NEW COVER.
16. SERVICE SINK SHALL REMAIN IN SERVICE DURING CONSTRUCTION. REFINISH AS NECESSARY FOR FINAL INSPECTION.
17. NOTE: CEILING IN FLOOR BELOW MAY CONTAIN ASBESTOS. AVOID WORKING IN AREA. IF REQUIRED, MUST USE TRANED & CERTIFIED PERSONNEL, AND NOTIFY ENGINEER AND ARCHITECT BEFORE PROCEEDING.
18. CONNECT NEW CW, VENT AND WASTE SERVICING DRINKING FOUNTAIN TO EXISTING RISERS IN SHAFT.
19. ALL PIPING AND FIXTURES ARE TO BE REMOVED EXCEPT FOR THE MAIN RISERS, THE SERVICE SINK AND ITS ASSOCIATED PIPING. PROVIDE A DEDUCT TO BID PRICE FOR RE-USE OF EXISTING PIPING.
20. CONNECT NEW WASTE LINE TO EXISTING 1 1/2" WASTE STACK.
21. CONNECT NEW VENT LINE TO EXISTING 1 1/2" VENT STACK.
22. CONNECT NEW HOT AND COLD WATER LINE TO EXISTING WATER SUPPLY RISERS. PROVIDE NEW ACCESSIBLE SHUT-OFF VALVES.
23. CONNECT NEW HOT AND COLD WATER LINE TO EXISTING RISERS. PROVIDE NEW ACCESSIBLE SHUT-OFF VALVES.
24. CONNECT NEW WASTE LINE TO EXISTING 4" WASTE STACK.
25. CONNECT NEW VENT LINE TO EXISTING 4" VENT STACK.
26. COLD WATER RISER. PROVIDE A SHUT-OFF VALVE FOR NEW LINE. REFURBISH EXISTING WATER METER SERVING COOLING TOWER.
27. EXISTING PVC ROOF DRAIN LINE TO BE REPLACED WITH NEW 4" GALVANIZED STEEL LINE.
28. CAPP EXISTING LINES BEHIND WALL AND REMOVE CARRIER BOLTS TO ALLOW FOR FINISHED WALL.
29. GENERAL NOTE: WORK NOT ON SIXTH FLOOR SHALL INCLUDE THE REMOVAL OF FOUR WATER CLOSETS ON THE FIRST, SECOND, AND FOURTH FLOORS AND COPPING THEIR LINES BEHIND THE WALL. REUSE FIXTURES IF POSSIBLE ON THE SIXTH FLOOR. SEE ARCHITECTURAL PLANS SHEET A13 FOR EXACT LOCATION OF WATER CLOSETS TO BE REMOVED.

State Office Building; Phase Three, 6th Floor Remodel - FS:91-009
Sixth Floor Mechanical Piping Plan - 3626
00006MM2

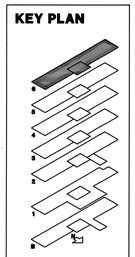
**JOB NO.** FS:91-009

**REVISIONS**
RECORD DRAWING
DECEMBER 1992

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

# STATE OFFICE BUILDING REMODEL - PHASE 3 SIXTH FLOOR

**KEY PLAN**



**DATE** NOV. 1991

**TITLE** MECHANICAL PIPING PLAN

**SHEET NO.** M-2

B3PP6D 11-5-91

## COMPUTER ROOM UNIT

| SYMBOL | MFR. CATALOG NO. | SERVICE | FAN SECTION | | | CONDENSER | | ELECTRICAL | | | ACCESSORIES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | CFM | HP | TOTAL CAP. BTUH @72~FDB 50% RH. | | HP | VOLTS | ø | FLA | |
| CRU-1 | LIEBERT MM18A | | 700 | 1\4 | 15250 | ① | 1/4 | 208 | 1 | 19.2 | CONDENSATE PUMP |
| | | | | | | | | | | | FILTER BOX/LINE SETS |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

① INTGRAL AIR COOLED CONDENSER IN RETURN AIR PLENUM.

SC-62

## PLUMBING FIXTURE SCHEDULE

| SYMBOL | FIXTURE | CW | HW | W | V | REMARKS |
|---|---|---|---|---|---|---|
| P -1 | SINK | 1/2 | 1/2 | 2 | 1-1/2 | STAINLESS STEEL |
| P -2 | LAVATORY | 1/2 | 1/2 | 1-1/2 | 1-1/2 | WALL HUNG |
| P -3 | WATER CLOSET | 1 | -- | 4 | 2 | WALL HUNG |
| P -5 | URINAL | 3/4 | -- | 2 | 1-1/2 | WALL HUNG |
| P -6 | DRINKING FOUNTAIN | 1/2 | -- | 1-1/2 | 1-1/2 | -- |
| P -7 | INDIRECT DRAIN | | | 1-1/2 | 1-1/2 | -- |
| | | | | | | |

SC-43

## REGISTER AND GRILLE SCHEDULE

| SYMBOL | MANUFACTURER | SIZE (IN) | MODEL | LOCATION | REMARKS |
|---|---|---|---|---|---|
| ER -1 | KRUEGER | 6 x 6 | C1190 | -- | C/W FRAME 22, OBD |
| ER -2 | KRUEGER | 12 x 12 | C1190 | -- | C/W FRAME 22, OBD |
| ER -3 | KRUEGER | 12 x 12 | 1190 | -- | C/W FRAME 23, OBD |
| -- | | | | | |
| RG - 1 | KRUEGER | 22 x 22 | EGC-5 | -- | C/W FRAME 23, |
| SR-1 | KRUEGER | 24 X 8 | 880V-OBD | -- | -- |
| RR-1 | KRUEGER | 20 X 20 | S80H | -- | -- |
| | | | | | |

SC-03

## CONDENSING UNIT SCHEDULE

| PLAN SYMBOL | MANUFACTURER AND MODEL NUMBER | REFRIGERANT | CAPACITY @ ARI COND BTUH TOTAL COOLING | COMPRESSOR RATED LOAD AMPS (RLA) | CONDENSER FAN FULL LOAD AMPS (FLA) | MINIMUM CIRCUIT AMPACITY (MCA) | LIQUID LINE CONNECTION (INCHES) | SUCTION LINE CONNECTION (INCHES) | OPTIONS | VOLT/ø | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AC-1 | LENNOX HS14-65IV | R-22 | 63,000 | 19.3 | 1.7 | 25.8 | 3/8 | 1 1/8 | LOW AMBIENT KIT & T STAT | 208/1 | | |
| | | | | | | | | | | | | |

SC-33

## FAN-COIL UNIT SCHEDULE

| UNIT NO. | MANUFACTURER & MODEL | VOLT/ø | CFM | FAN | | EVAPORATOR | | | | | | ELECTRIC HEAT | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | EXT SP. | HP | NORMAL COOLING CAPACITY (TONS) | REFRIGERANT | FACE AREA | ROWS | TUBE DIA. | F.P.I. | KW INPUT | STEPS | VOLT/ø |
| AC-1 | LENNOX CB19-65 UP FLOW | 460/3 | 2000 | .25 | 1/2 | 5 | R-22 | 7.0 | 3 | 3/4 | 14 | 15.0 | 3 | 460/3 |
| | | | | | | | | | | | | OPTIONS | | |
| | | | | | | | | | | | | R.A. FILTER, EXPANSION VALVE | | |

SC-56

## VAV BOX SCHEDULE

| BOX SYMBOL | CFM RANGE MIN | / MAX | MANUFACTURER & MODEL NO. | INLET SIZE | MIN. S.P. IN $H_2O$ | NC-AT 0.75"SP | COIL DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | MBH | EWT | LWT | EAT | LAT | GPM | WPD | CONN SIZE |
| 6-4 | 270 | 540 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.2 | 200 | 180 | 55 | 80 | 0.6 | 0.33 | 3/4 |
| 6-5 | 450 | 900 | KRUEGER LMHS | 12 | 0.85 | 28 | 10.4 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 6-6 | 540 | 1080 | KRUEGER LMHS | 12 | 0.85 | 28 | 12.4 | 200 | 180 | 55 | 80 | 1.2 | 0.55 | 3/4 |
| 6-7 | 330 | 660 | KRUEGER LMHS | 10 | 0.85 | 28 | 7.6 | 200 | 180 | 55 | 80 | 0.8 | 0.33 | 3/4 |
| 6-8 | 205 | 410 | KRUEGER LMHS | 8 | 0.85 | 28 | 4.7 | 200 | 180 | 55 | 80 | 0.5 | 0.33 | 3/4 |
| 6-9 | 360 | 720 | KRUEGER LMHS | 10 | 0.85 | 28 | 8.3 | 200 | 180 | 55 | 80 | 0.8 | 0.33 | 3/4 |
| 6-10 | 390 | 780 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.0 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 6-11 | 390 | 780 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.0 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 6-12 | 400 | 800 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.2 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 6-13 | 390 | 780 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.0 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 6-14 | 425 | 850 | KRUEGER LMHS | 10 | 0.85 | 28 | 13.0 | 200 | 180 | 55 | 88 | 1.3 | 0.55 | 3/4 |
| 6-15 | 200 | 250 | KRUEGER LMHS | 6 | 0.85 | 28 | 8.2 | 200 | 180 | 55 | 99 | 0.8 | 0.33 | 3/4 |
| 6-16 | 420 | 840 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.7 | 200 | 180 | 55 | 80 | 1.0 | 0.33 | 3/4 |
| 6-17 | 480 | 960 | KRUEGER LMHS | 12 | 0.85 | 28 | 11.0 | 200 | 180 | 55 | 80 | 1.1 | 0.55 | 3/4 |
| 6-18 | 770 | 770 | KRUEGER LMHS | 12 | 0.85 | 28 | 27.8 | 200 | 180 | 55 | 94 | 2.8 | 1.3 | 3/4 |
| 6-19 | 500 | 1000 | KRUEGER LMHS | 12 | 0.85 | 28 | 11.5 | 200 | 180 | 55 | 80 | 1.2 | 0.55 | 3/4 |
| 6-20 | 135 | 270 | KRUEGER LMHS | 6 | 0.85 | 28 | 3.1 | 200 | 180 | 55 | 80 | 0.5 | 0.33 | 3/4 |
| 6-21 | 465 | 930 | KRUEGER LMHS | 12 | 0.85 | 28 | 10.7 | 200 | 180 | 55 | 80 | 1.1 | 0.33 | 3/4 |
| 6-22 | 310 | 620 | KRUEGER LMHS | 8 | 0.85 | 28 | 7.1 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 6-23 | 620 | 1240 | KRUEGER LMHS | 14 | 0.85 | 27 | 14.3 | 200 | 180 | 55 | 80 | 1.4 | 0.55 | 3/4 |
| 6-24 | 340 | 680 | KRUEGER LMHS | 10 | 0.85 | 28 | 11.1 | 200 | 180 | 55 | 90 | 1.1 | 0.55 | 3/4 |
| 6-25 | 240 | 480 | KRUEGER LMHS | 8 | 0.85 | 28 | 9.1 | 200 | 180 | 55 | 96 | 0.9 | 0.33 | 3/4 |
| 6-26 | 425 | 850 | KRUEGER LMHS | 10 | 0.85 | 28 | 13.0 | 200 | 180 | 55 | 88 | 1.3 | 0.55 | 3/4 |
| 6-27 | 390 | 780 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.0 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 6-28 | 390 | 780 | KRUEGER LMHS | 10 | 0.85 | 28 | 9.0 | 200 | 180 | 55 | 80 | 0.9 | 0.33 | 3/4 |
| 6-29 | 300 | 600 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.9 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 6-30 | 360 | 720 | KRUEGER LMHS | 10 | 0.85 | 28 | 8.3 | 200 | 180 | 55 | 80 | 0.8 | 0.33 | 3/4 |
| 6-31 | 585 | 1170 | KRUEGER LMHS | 12 | 0.85 | 28 | 13.5 | 200 | 180 | 55 | 80 | 1.3 | 0.55 | 3/4 |
| 6-32 | 180 | 360 | KRUEGER LMHS | 8 | 0.85 | 28 | 4.1 | 200 | 180 | 55 | 80 | 0.5 | 0.33 | 3/4 |
| 6-33 | 205 | 410 | KRUEGER LMHS | 8 | 0.85 | 28 | 4.7 | 200 | 180 | 55 | 80 | 0.5 | 0.33 | 3/4 |
| 6-34 | 335 | 670 | KRUEGER LMHS | 10 | 0.85 | 28 | 7.7 | 200 | 180 | 55 | 80 | 0.8 | 0.33 | 3/4 |
| 6-35 | 300 | 600 | KRUEGER LMHS | 8 | 0.85 | 28 | 6.9 | 200 | 180 | 55 | 80 | 0.7 | 0.33 | 3/4 |
| 6-36 | 230 | 460 | KRUEGER LMHS | 8 | 0.85 | 28 | 5.3 | 200 | 180 | 55 | 80 | 0.5 | 0.33 | 3/4 |
| 6-37 | 480 | 960 | KRUEGER LMHS | 12 | 0.85 | 28 | 11.0 | 200 | 180 | 55 | 80 | 1.1 | 0.55 | 3/4 |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

SC-29

## CEILING RADIANT HEATER PANEL SCHEDULE

| SYMBOL | MANUFACTURER / CATALOG NO. | GPM/CONN. SIZE | WATER IN/OUT | MAX P.D.(2) | BTU/SQ FT |
|---|---|---|---|---|---|
| HP -1 | AEROTECH AX - 16'-0" x 2'-0" * | 1.0 / 3/4" | 200/180 | 8 FT. | 243 |
| | | | | | |
| HP -2 | AEROTECH AX - 8'-0" x 2'-0" * | 0.5 / 3/4" | 200/180 | 8 FT. | 243 |
| | | | | | |

* SIZE OF PANEL IS APPOXIMATE CONTRACTOR TO FIELD VERIFY, COORDINATE WITH CEILING LAYOUT FOR EXACT FIT.

SC-22

## DIFFUSER SCHEDULE

| SYMBOL | MANUFACTURER | SIZE | THROW | MODEL | REMARKS |
|---|---|---|---|---|---|
| D4 - 1 | KRUEGER | 6 x 6 | 4-WAY | SH-4 | C/W FRAME 23, OBD |
| D4 - 2 | KRUEGER | 9 x 9 | 4-WAY | SH-4 | C/W FRAME 23, OBD |
| D4 - 3 | KRUEGER | 12 x 12 | 4-WAY | SH-4 | C/W FRAME 23, OBD |
| D4 - 4 | KRUEGER | 15 x 15 | 4-WAY | SH-4 | C/W FRAME 23, OBD |
| D4 - 5 | KRUEGER | 12 x 12 | 4-WAY | SH-4 | C/W FRAME 22, OBD |
| | | | | | |

SC-02

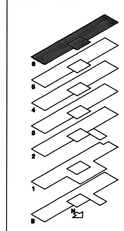
**JOB NO.**
FS:91-009

**REVISIONS**
RECORD DRAWING
DECEMBER 1992

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

**STATE OFFICE BUILDING REMODEL - PHASE 3 SIXTH FLOOR**

**KEY PLAN**



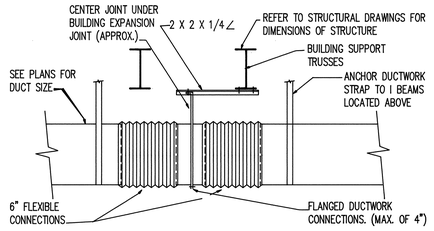
**DATE**
NOV. 1991

**TITLE**
MECHANICAL SCHEDULES

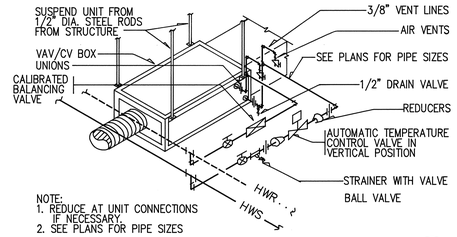
**SHEET NO.**
M-3

State Office Building; Phase Three, 6th Floor Remodel - FS:91-009
Sixth Floor Mechanical Schedules - 3527
00006MM3

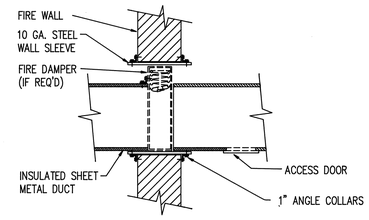
BSBCD 10-23-91



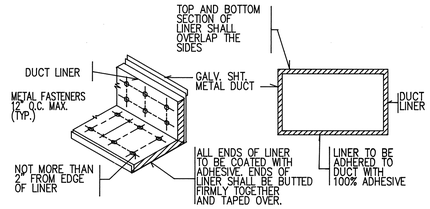

## FLEX CONNECTION DETAIL
NO SCALE — 17 / M-4



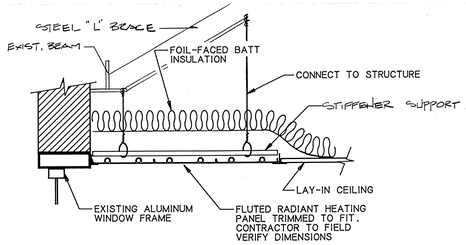

## VAV/CV BOX PIPING DETAIL WITH 2-WAY AUTO-VALVE
NO SCALE — 13 / M-4



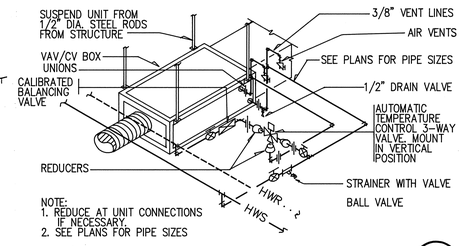

## TYPICAL FIRE DAMPER HIGH PRESSURE DUCT
NO SCALE — 9 / M-4



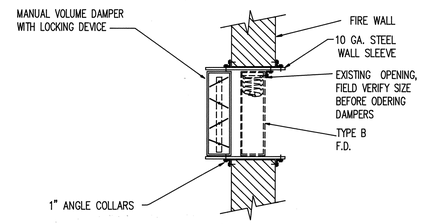

## DUCT LINER DETAIL
NO SCALE — 5 / M-4



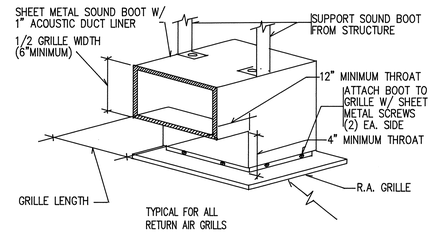

## RADIANT HEATING PANEL INSTALLATION DETAIL
NO SCALE — 16 / M-4



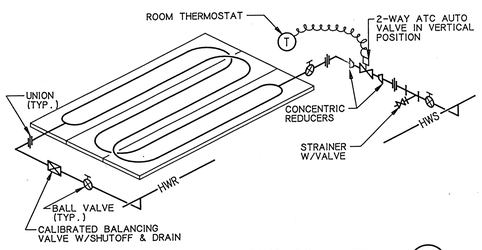

## VAV/CV BOX PIPING DETAIL WIHT 3-WAY AUTO-VALVE
NO SCALE — 12 / M-4



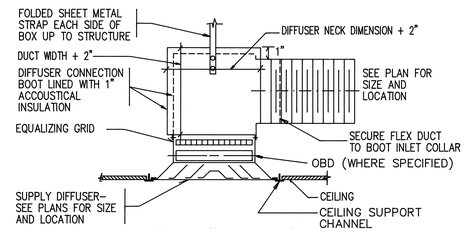

## RETURN AIR SHAFT FIRE AND VOLUME DAMPER DETAIL
NO SCALE — 8 / M-4



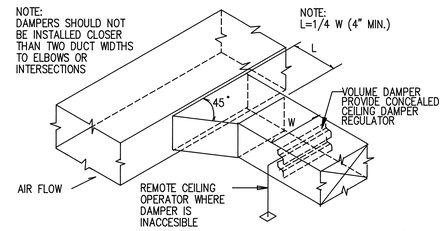

## R.A. GRILLE WITH SOUND BOOT
NO SCALE — 4 / M-4



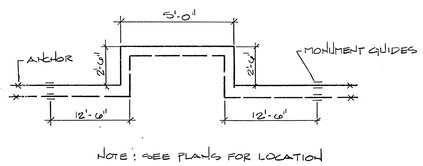

## RADIANT HEATING PANEL PIPING SCHEMATIC
NO SCALE — 15 / M-4



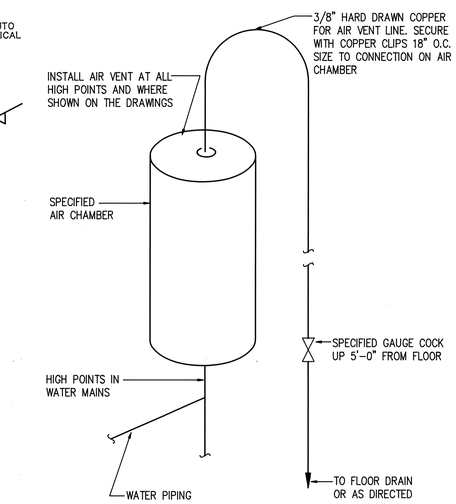

## SUPPLY DIFFUSER W/ FLEX DUCT DETAIL
NO SCALE — 7 / M-4



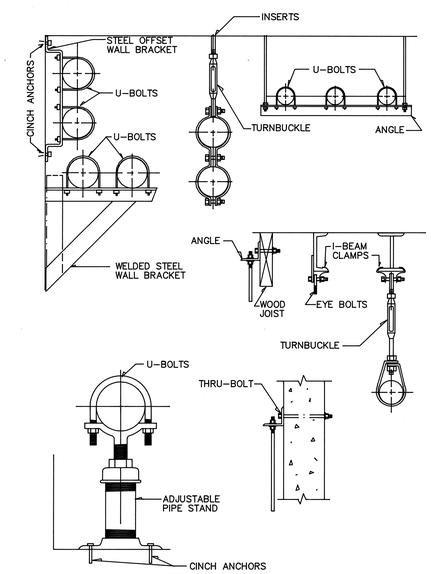

## BRANCH DUCT TAKE-OFF & DAMPER DETAIL
NO SCALE — 3 / M-4



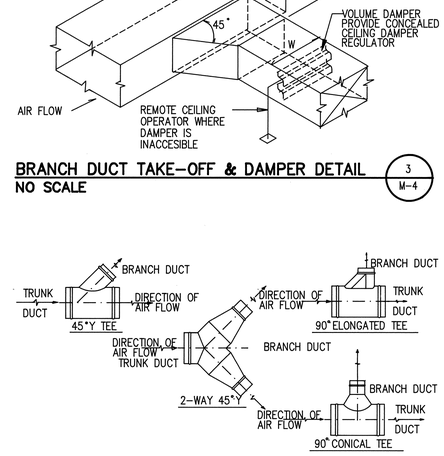

## EXPANSION LOOP DETAIL
NO SCALE — 14 / M-4




## MANUAL AIR VENT DETAIL
NO SCALE — 11 / M-4



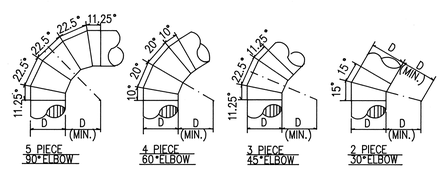

## TYPICAL PIPE SUPPORT DETAIL
NO SCALE — 6 / M-4




## ROUND DUCT BRANCH TAKE-OFF DETAILS
NO SCALE — 2 / M-4




## TYPICAL CEILING DIFFUSER DETAIL
NO SCALE — 10 / M-4




## ROUND DUCT ELBOW DETAILS
NO SCALE — 1 / M-4

B3PDD 10-23-91

State Office Building; Phase Three, 6th Floor Remodel - FS:91-009
Mechanical Details - 3628
00006MM4

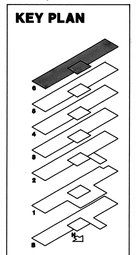
**JOB NO.** FS:91-009

**REVISIONS**
RECORD DRAWING DECEMBER 1992

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

# STATE OFFICE BUILDING REMODEL - PHASE 3 SIXTH FLOOR

**KEY PLAN**



**DATE** NOV. 1991

**TITLE** MECHANICAL DETAILS

**SHEET NO.** M-4

## DUCT BRACING GENERAL NOTES

1 DETAILS SHOWN PROVIDE GENERAL GUIDELINES FOR A LATERAL BRACING SYSTEM. A TYPICAL VERTICAL SUPPORT SYSTEM MUST ALSO BE USED.

2 BRACE ALL RECTANGULAR DUCTS OF AREA 6 SQ. FT. AND LARGER. BRACE ALL ROUND DUCTS 28" IN DIAMETER AND LARGER.

3 CABLE RESTRAINTS AND BRACING NOT TO EXCEED 30'-0" CENTERS AND SHALL BE PROVIDED AT EACH TURN, AT THE END OF EACH DUCT RUN, AND ON EACH SIDE OF FLEXIBLE CONNECTIONS. BRACE POINTS SHALL NOT EXCEED 15'-0" FROM FLEXIBLE CONNECTION.

4 WHEN COMBINING DUCT GROUPS ON COMMON BRACING SYSTEMS, USE WEIGHTS AND DIMENSIONS FROM BRACING LIST.

5 ALL HOLES IN ANGLES ARE TO BE 1/16 INCH OVERSIZED. PLACE STANDARD CUT WASHERS BETWEEN SHEET METAL ANGLES AND NUT.

6 DUCTS NOT BRACED SHALL BE INSTALLED WITH A 6" MIN. CLEARANCE TO VERTICAL CEILING HANGER WIRES.

7 REHEAT BOXES AND OTHER ITEMS WHICH ATTACH TO THE DUCT SYSTEM SHALL BE BRACED INDEPENDENTLY OF THE DUCTS.

8 ALL SHEET METAL FOR BRACING TO BE FY = 33 KSI MINIMUM. GAUGE FOR SHEET METAL BRACING SHALL BE AS FOLLOWS:

16 GA = (0.0598 INCH)
14 GA = (0.0747 INCH)
12 GA = (0.1046 INCH)

9 MINIMUM DISTANCE FROM EDGE OF ANGLE TO BOLTS SHALL BE AS FOLLOWS:

| BOLT DIAMETER | DISTANCE FROM EDGE |
|---|---|
| 1/4" TO 1/2" | 1" |
| 5/8" | 1 1/8" |
| 3/4" | 1 1/4" |
| 7/8" | 1 1/2" |

10 DO NOT FASTEN RESTRAINT SYSTEM TO TWO DISSIMILAR PARTS OF A BUILDING THAT MAY RESPOND IN A DIFFERENT MODE DURING AN EARTHQUAKE. FOR EXAMPLE, A WALL AND A ROOF.

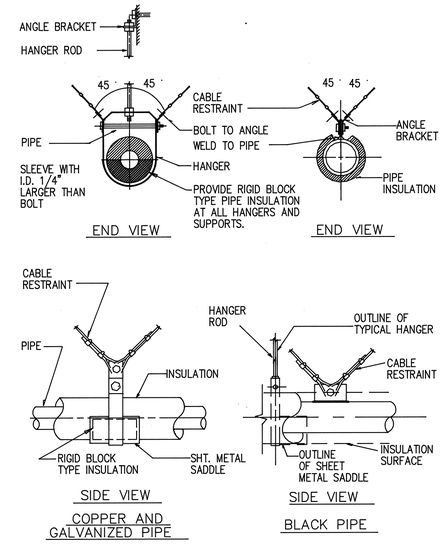
11 ALTERNATE EVERY OTHER CABLE RESTRAINT IN OPPOSITE DIRECTION (SHOWN DOTTED).

## DUCT CABLE BRACING LIST

| DUCT SIZE (MAX.) | *WT/ LIN FT (MAX) | BOLT SIZE | HORIZONTAL ANGLE | VERTICAL ANGLE | CABLE DIA.** | CABLE DES. | ANCHOR CONN. TYPE |
|---|---|---|---|---|---|---|---|
| 12" | 5# | 3/8" | 2 X 2 X 16 GA | 2 X 2 X 12 GA | 1/8" | 7x19 GALV | I |
| 18" | 8# | 3/8" | 2 X 2 X 16 GA | 2-1/2 X 2-1/2 X 12 GA | 1/8" | 7x19 GALV | I |
| 24" | 10# | 3/8" | 2 X 2 X 16 GA | 2-1/2 X 2-1/2 X 12 GA | 1/8" | 7x19 GALV | I |
| 30" | 13# | 3/8" | 2 X 2 X 16 GA | 2-1/2 X 2-1/2 X 12 GA | 1/8" | 7x19 GALV | I |
| 42" | 20# | 3/8" | 2-1/2 X 2-1/2 X 16 GA | 4 X 4 X 12 GA | 3/16" | 7x19 GALV | II |
| 54" | 27# | 3/8" | 2-1/2 X 2-1/2 X 16 GA | 4 X 4 X 12 GA | 3/16" | 7x19 GALV | II |
| 60" | 36# | 3/8" | 3 X 3 X 16 GA | 4 X 4 X 12 GA | 3/16" | 7x19 GALV | II |
| 84" | 53# | 3/8" | 4 X 4 X 14 GA | 4 X 4 X 1/4 | 1/4" | 7x19 GALV | III |
| 96" | 80# | 1/2" | 4 X 4 X 12 GA | 5 X 3 X 1/4 | 5/16" | 7x19 GALV | IV |

* MAXIMUM WEIGHT OF DUCTS OR COMBINATIONS OF DUCTS PER LINEAR FOOT. THE DUCTS MAXIMUM DIMENSION SHALL GOVERN WHAT BRACING IS REQUIRED. FOR ANCHOR CONNECTIONS SEE LIST. SEE DUCT BRACING DETAILS.

** TWO CABLES REQUIRED AT EACH RESTRAINT POINT, EACH CABLE TO BE INSTALLED 45~ TO HORIZONTAL AND 45~ TO LONGITUDINAL DIRECTION OF DUCT.




PIPING RESTRAINT DETAIL (4 / M-5)
NO SCALE

## SCHEDULE FOR TYPICAL CONNECTIONS TO STRUCTURAL SUPPORTING MEMBERS

| TYPE | MAX. LOAD CAPACITY POUNDS | PHILLIP'S REDHEAD ANCHORS TO CONC. LT. WT. | PHILLIP'S REDHEAD ANCHORS TO CONC. HARD ROCK | CONC. CAST-IN PLACE INSERT | BOLT OF STL.BM. CLAMP |
|---|---|---|---|---|---|
| I<br>II | 500<br>1000 | 3/8"<br>3/8" | 3/8"<br>3/8" | 3/8"<br>1/2" | 3/8"<br>3/8" |
| III<br>IV | 1500<br>2000 | 3/8"<br>1/2" | 3/8"<br>1/2" | 1/2"<br>5/8" | 3/8"<br>1/2" |
| V<br>VI | 3000<br>4000 | 2-1/2"<br>2-5/8" | 2-1/2"<br>2-5/8" | 2-1/2"<br>2-5/8" | 5/8"<br>5/8" |

| TYPE | SPREADER SIZE | BOLT THRU WOOD | SPAN-CRETE ROD | ANGLE TO SUPPORTING STRUCTURAL MEMBER | ROD SIZE FOR PIPES |
|---|---|---|---|---|---|
| I<br>II | C4X5.4<br>C5X6.7 | 1/2"<br>3/4" | 3/8"<br>3/8" | 3X2X1/4"X0'-3" LLH<br>3-1/2X2-1/2X5/16X0'-3" LLH | 1/2"<br>1/2" |
| III<br>IV | C6X8.5<br>C8X11.5 | ***<br>*** | 1/2"<br>1/2" | 3-1/2X2-1/2X7/16X0'-4" LLH<br>5X3X1/2X0'-4" LLH | 5/8"<br>3/4" |
| V<br>VI | C9X13.4<br>C10X15.3 | *** | | 2-3-1/2X2-1/2X7/16X0'-4"<br>2-5X3X1/2X0'-4" | 7/8" *<br>7/8" ** |

NOTES:

1 FOR SLABS LESS THAN 5" THICK ONLY, THIN SLAB INSERTS MAY BE USED.

*2 FOR USE W/CONC. CAST-IN PLACE INSERTS OR PHILLIPS REDHEAD IN HARD ROCK ONLY.

**3 FOR USE WITH CONC. CAST-IN PLACE INSERTS ONLY.

***4 WHERE TYPE III CONNECTIONS ARE REQUIRED FOR WOOD SYSTEMS, TYPE II CONNECTIONS SHALL BE USED WITH REDUCED RESTRAINT SPACING TO 20 FT. O.C. WHERE TYPE IV CONNECTIONS ARE REQUIRED FOR WOOD SYSTEMS, TYPE II CONNECTIONS SHALL BE USED WITH REDUCED RESTRAINT SPACING TO 15 FT. O.C. WHERE TYPE V CONNECTIONS ARE REQUIRED FOR WOOD SYSTEMS, TYPE II CONNECTIONS SHALL BE USED WITH REDUCED RESTRAINT SPACING TO 10 FT. O.C.

5 THE MECHANICAL CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO THE STRUCTURAL ENGINEER AND THEN TO THE MECHANICAL ENGINEER, SHOWING CONNECTION TYPE AND LOCATION OF ALL RESTRAINT CONNECTIONS TO THE STRUCTURE.

6 FOR ESSENTIAL FACILITIES WHERE CONCRETE ANCHOR BOLTS OF THE "REDHEAD" EXPANSION TYPE ARE LOADED IN PULL OUT, 50 PERCENT OF THE BOLTS (ALTERNATE BOLTS IN ANY GROUP ARRANGEMENT) SHALL BE PROOF TESTED TO TWICE THE ALLOWABLE LOAD. IF THERE ARE FAILURES, THE IMMEDIATELY ADJACENT BOLTS MUST THEN ALSO BE TESTED.

& "HILTI" AND "RAMSET" ANCHORS ARE EQUAL SUBSTITUTES FOR "REDHEAD".

## PIPE BRACING GENERAL NOTES

1 DETAILS SHOWN PROVIDE GENERAL GUIDELINES FOR A LATERAL BRACING SYSTEM. A TYPICAL VERTICAL SUPPORT SYSTEM MUST ALSO BE USED.

2 BRACE ALL PIPES 1-1/2" I.D. AND LARGER.

3 CABLE RESTRAINTS AND BRACING NOT TO EXCEED 30'-0" CENTERS AND SHALL BE PROVIDED AT ALL CHANGES IN DIRECTION OF PIPE. ALL DROPS TO EQUIPMENT, AND ON EACH SIDE OF FLEXIBLE CONNECTIONS. BRACE POINTS SHALL NOT EXCEED 15'-0" FROM FLEXIBLE CONNECTION.

4 ALL HOLES IN ANGLES ARE TO BE 1/16 INCH OVERSIZED. PLACE STANDARD CUT WASHERS BETWEEN SHEET METAL ANGLES AND NUT.

5 EQUIPMENT WHICH ATTACHES TO THE PIPING SYSTEM SHALL BE BRACED INDEPENDENTLY OF THE PIPES.

6 ALL SHEET METAL FOR BRACING TO BE FY=33 KSI MINIMUM. GAUGE FOR SHEET METAL BRACING SHALL BE AS FOLLOWS:

16 GA = (0.0598 INCH)
14 GA = (0.0747 INCH)
12 GA = (0.1046 INCH)

7 MINIMUM DISTANCE FROM EDGE OF ANGLE TO BOLTS SHALL BE AS FOLLOWS:

| BOLT DIAMETER | DISTANCE FROM EDGE |
|---|---|
| 1/4" TO 1/2" | 1" |
| 5/8" | 1 1/8" |
| 3/4" | 1 1/4" |
| 7/8" | 1 1/2" |

8 DO NOT FASTEN RESTRAINT SYSTEM TO TWO DISSIMILAR PARTS OF A BUILDING THAT MAY RESPOND IN A DIFFERENT MODE DURING AN EARTHQUAKE. FOR EXAMPLE, A WALL AND A ROOF.

9 PROVIDE LARGE ENOUGH PIPE SLEEVES THROUGH WALLS OR FLOORS TO ALLOW FOR ANTICIPATED DIFFERENTIAL MOVEMENTS.

10 DO NOT FASTEN ONE RIGID PIPING SYSTEM TO TWO DISSIMILAR PARTS OF A BUILDING THAT MAY RESPOND IN A DIFFERENT MODE DURING AN EARTHQUAKE. FOR EXAMPLE, A WALL AND A ROOF.

11 BRACING DETAILS, SCHEDULE AND NOTES ARE TO BE USED WITH THE FOLLOWING TYPES OF PIPE: STEEL PIPE SCHEDULE 40 AND 80, COPPER PIPE TYPE K,L,M (ONLY SILVER SOLDERED BRAZED JOINTS TO BE USED WITH COPPER PIPE).

12 FOR GAS PIPING, THE BRACING DETAILS, SCHEDULES AND NOTES MAY BE USED EXCEPT THAT RESTRAINTS SHALL BE INSTALLED AT EVERY 20'-0" O.C. ALSO ALL PIPE 1 INCH AND LARGER SHALL BE BRACED.

13 WASTE, VENT AND ROOF DRAINAGE PIPING SYSTEMS ARE EXCLUDED FROM THE RESTRAINT GUIDELINES.

14 ALTERNATE EVERY OTHER CABLE RESTRAINT IN OPPOSITE DIRECTION (SHOWN DOTTED).

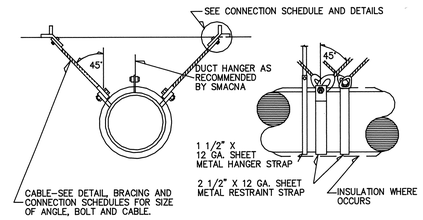
## PIPE SEISMIC BRACING SCHEDULE

| PIPE SIZE | HANGER ROD SIZE | MAX. ROD LENGTH | HANGER TYPE | BOLTS TO ANGLE | ANGLE CLIP | ANGLE BRACE | ANCHOR CONN. TYPE | ANCHOR BOLT OR INSERT |
|---|---|---|---|---|---|---|---|---|
| 1-1/2" | 1/2" | 25" | CLEVIS | 3/8" | 3x3x1/4 | 2x2x16GA | I | 3/8" |
| 2" | 1/2" | 25" | CLEVIS | 3/8" | 3x3x1/4 | 2x2x16GA | I | 3/8" |
| 2-1/2" | 5/8" | 31" | CLEVIS | 3/8" | 3x3x1/4 | 2x2x16GA | I | 3/8" |
| 3" | 5/8" | 31" | CLEVIS | 3/8" | 3x3x1/4 | 2-1/2x2-1/2x 16 GA | II | 1/2" |
| 3-1/2" | 5/8" | 31" | CLEVIS | 3/8" | 3x3x1/4 | 2-1/2x2-1/2x 16 GA | II | 1/2" |
| 4" | 3/4" | 37" | CLEVIS | 3/8" | 3x3x1/4 | 2-1/2x2-1/2x 16 GA | II | 1/2" |
| 5" | 3/4" | 37" | CLEVIS | 1/2" | 5x3x1/2 | 2-1/2x2-1/2x 16 GA | III | 3/4" |
| 6" | 3/4" | 37" | CLEVIS | 5/8" | 5x3x1/2 | 2-1/2x2-1/2x 16 GA | IV | 3/4" |
| 8" | 7/8" | 43" | CLEVIS | 5/8" | 2-5x3x1/2 | 3x3x12 GA | V | 2-5/8" |
| 10" | 7/8" | 43" | CLEVIS | 3/4" | 2-5x3x1/2 | 3x3x12 GA | VI | 2-5/8" |

FOR ANCHOR CONNECTIONS SEE LIST.

SEE PIPE BRACING DETAIL

*1-5/8"x1-5/8"x12 GA CHANNEL MAY BE USED



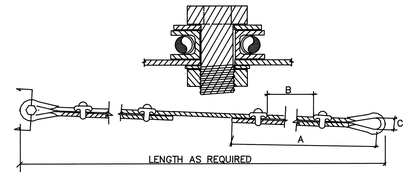

CABLE BRACING FOR ROUND AND OVAL DUCTS (3 / M-5)
NO SCALE

## REHEAT BOX CABLE BRACING SCHEDULE

| BOX WEIGHT | BOLT SIZE | *CABLE DIA. | **CABLE DESIGN | ANCHOR CONN. TYPE |
|---|---|---|---|---|
| UP TO 300# | 3/8" | 1/8" | 7 X 19 GALV | I |
| 400# | 3/8" | 1/8" | 7 X 19 GALV | I |
| 600# | 3/8" | 3/16" | 7 X 19 GALV | II |
| 800# | 3/8" | 3/16" | 7 X 19 GALV | II |

1. *FOUR CABLES REQUIRED, ONE AT EACH CORNER. EACH CABLE TO BE INSTALLED 45 TO HORIZONTAL AND 45 TO LONGITUDINAL DIRECTION.

2. **CABLE SYSTEMS TO BE EQUAL TO AMBER BOOT C/W THIMBLES, CLAMPS AND GROMMETS.




NOTES:

1. CABLES, THIMBLES, CLIPS, GROMMETS & FLAT WASHERS ARE TO BE FURNISHED BY RESTRAINT MANUFACTURER. ALL OTHER HARDWARE TO BE PROVIDED BY CONTRACTOR.

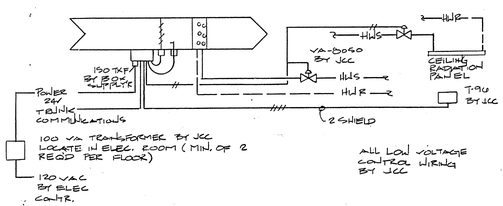
2. ENTIRE SYSTEM TO BE EQUAL TO AMBER BOOTH.

3. CABLE CLIPS MUST BE ORIENTED AS SHOWN WITH SHORT END OF CABLE ON THE CURVED PART OF THE CLIP.

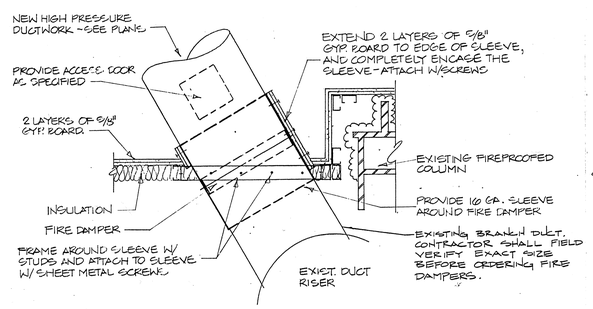
## CABLE SCHEDULE

| CABLE DIA. | CABLE DESIGN | A | B | C | BOLT SIZE | ALLOWABLE LOAD (lbf) | BREAKING STRENGTH (lbf) |
|---|---|---|---|---|---|---|---|
| 1/8" | 7X19 GALV. | 5-1/4" | 1-5/8" | 5/8" | 3/8" | 660 | 2000 |
| 3/16" | 7X19 GALV. | 5-3/4" | 1-7/8" | 5/8" | 3/8" | 1400 | 4200 |
| 1/4" | 7X19 GALV. | 6-3/4" | 2-3/8" | 11/16" | 3/8" | 2330 | 7000 |
| 5/16" | 7X19 GALV. | 7-3/8" | 2-5/8" | 13/16" | 5/8" | 3260 | 9800 |
| 3/8" | 7X19 GALV. | 8-7/8" | 3-1/4" | 1" | 5/8" | 4800 | 14400 |
| 7/16" | 6X19 IWRC | 17" | 3-5/8" | 1" | 5/8" | 5920 | 17800 |
| 1/2" | 6X19 IWRC | 18" | 3-7/8" | 1-1/8" | 3/4" | 7660 | 23000 |

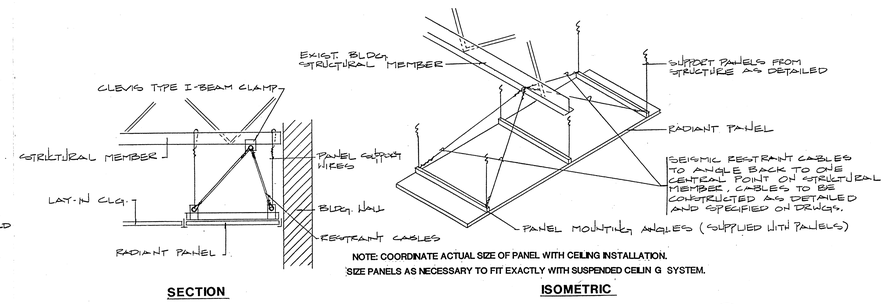
CABLE RESTRAINT DETAIL (2 / M-5)
NO SCALE




ELECTRIC VAV BOX CONTROLS (6 / M-5)
NO SCALE




ANGLED SHAFT WALL PENETRATION FIRE DAMPER (5 / M-5)
NO SCALE




SECTION

NOTE: COORDINATE ACTUAL SIZE OF PANEL WITH CEILING INSTALLATION.
SIZE PANELS AS NECESSARY TO FIT EXACTLY WITH SUSPENDED CEILIN G SYSTEM.

ISOMETRIC

PANEL RESTRAINT DETAIL (1 / M-5)
NO SCALE

B3RDD 10-23-91

State Office Building; Phase Three, 6th Floor Remodel - FS:91-009
Seismic Details - 3829
00006MM5

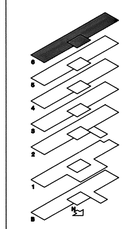
JOB NO.
FS:91-009

REVISIONS
RECORD DRAWING
DECEMBER 1992

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

STATE OFFICE BUILDING
REMODEL - PHASE 3
SIXTH FLOOR

KEY PLAN



DATE
NOV. 1991

TITLE
SEISMIC DETAILS

SHEET NO.
M-5

# LEGEND OF MECHANICAL SYMBOLS AND ABBREVIATIONS

| SINGLE LINE | DOUBLE LINE | |
|---|---|---|
| | | POSITIVE PRESSURE DUCT – RISE OR DROP |
| | | POSITIVE PRESSURE DUCT – DROP |
| | | NEGATIVE PRESSURE DUCT – RISE |
| | | NEGATIVE PRESSURE DUCT – DROP |
| | | ROUND DUCT – RISE |
| | | ROUND DUCT – DROP |
| | | UNDER FLOOR DUCT |
| | | MEDIUM OR HIGH PRESSURE FLEX CONNECTION TO TERMINL UNIT |
| | | SPLITTER DAMPER WITH TURNING VANES |
| | OR | TURNING VANES |
| | | RETURN AIR GRILLE WITH SOUND BOOT |
| | | FRESH AIR LOUVER |
| | | RELIEF AIR OR EXHAUST AIR LOUVER |
| | 12/12 3W 200 CFM | CEILING SUPPLY DIFFUSER |
| | 20/20 | CEILING RETURN REGISTER |
| | 12/12 200 CFM | CEILING EXHAUST REGISTER |
| | 24/10 200 CFM | SIDEWALL SUPPLY REGISTER |
| | 24/10 200 CFM | SIDEWALL EXHAUST OR RETURN REGISTER |
| | 12/12 200 CFM | CEILING SUPPLY DIFFUSER WITH FLEXIBLE DUCT |
| | 24/24 | CEILING PLENUM RETURN REGISTER |
| | 3 SLOT/48" 200 CFM | LINEAR DIFFUSER WITH ACOUSTICALLY LINED PLENUM AND FLEXIBLE DUCT CONNECTION. CFM ON TOP, NO. OF SLOTS, ACTIVE LENGTH, AND SLOT WIDTH AT BOTTOM. |
| | | FLEXIBLE DUCT CONNECTION |
| | | FLEXIBLE DUCT |
| | | FAN |
| | | PLENUM WITHOUT INSULATION LINER |
| | | PLENUM WITH INSULATION LINER |
| 12/8 | 12/8 | RECTANGULAR DUCT WITH NET INSIDE DIMENSIONS SHOWN IN INCHES. |
| 12"ø | 12"ø | ROUND DUCT WITH NET INSIDE DIMENSIONS SHOWN IN INCHES. |
| UP | UP | INCLINED RISE |
| DN | DN | INCLINED DROP |
| | W R | R/W=1. ROUND DUCT SIMILAR TO RECTANGULAR |
| | | RECTANGULAR TO RECTANGULAR OR ROUND TO ROUND DUCT TRANSFORMATION MAXIMUM 15° INCLUDED ANGLE EXCEPT WHERE SHOWN OTHERWISE. |
| 9/9 9"ø | 9/9 9"ø | RECTANGULAR TO ROUND DUCT TRANSFORMATION |
| | R | BRANCH DUCT SPLIT WITH 6" WIDTH AND MIN. R=WIDTH OF BRANCH DUCT DOWNSTREAM. ELBOW TURNING VANE OPTIONAL. |
| RECT. TO ø RECT ROUND ALL | 45° D D | TAP ENTRY AREA EQUALS 150% OF BRANCH AREA |

TOP FIGURES INDICATE NECK SIZE AND NUMBER OF THROWS. ON SUPPLY DIFFUSER DUCT SIZE IS FULL SIZE OF DIFFUSER/REGISTER CONNECTION. BOTTOM FIGURE INDICATES CFM.

WITH RESPECT TO AIR FLOW 15° NOMINAL INCLINE WITH RADIUS TURNS=DEPTH OF DUCT.

| SINGLE LINE | DOUBLE LINE | |
|---|---|---|
| | | SINGLE BLADE OR MULTIBLADE VOLUME DAMPER |
| | | MOTORIZED DAMPER IN DUCT |
| B.D. | | BACKDRAFT DAMPER |
| | | COMBINATION FIRE/SMOKE DAMPERS |
| | | FIRE DAMPER IN DUCT, ACCESS PANEL REQD. |
| OR | OR | ATC DAMPER |
| AP | AP | ACCESS PANEL |
| AD | AD | ACCESS PANEL IN DUCT OR PLENUM |
| | | HEATING OR COOLING COIL IN DUCT |
| | | SINGLE DUCT AIR TERMINAL WITH REHEAT COIL VARIABLE OR CONSTANT VOLUME. MIN. 1-1/2 TERMINAL INLET SIZE STRAIGHT DUCT AT TERMINAL INLET. |
| | | SINGLE DUCT AIR TERMINAL VARIABLE OR CONTANT VOLUME MIN. 1-1/2 TERMINAL INLET SIZE STRAIGHT DUCT AT TERMINAL INLET. |
| | | SUPPLY |
| | | RETURN |
| | | EXHAUST |
| | | ROUND DUCT SECTION |

RECTANGULAR DUCT SECTION

| | |
|---|---|
| G | NATURAL GAS |
| P | PUMP DISCHARGE |
| MU | MAKE UP WATER |
| V | VENT |
| (E)name | EXISTING PIPING |
| CHWS | CHILLED WATER SUPPLY |
| CHWR | CHILLED WATER RETURN |
| CS | CONDENSER WATER SUPPLY |
| CR | CONDENSER WATER RETURN |
| HWS | HEATING HOT WATER SUPPLY |
| HWR | HEATING HOT WATER RETURN |
| GHR | GLYCOL HEAT RECOVERY PIPING |
| G(NAME) | GLYCOL PIPING SOLUTION |
| LPG | LIQUIFIED PETROLEUM GAS |
| (NAME) | EXISTING PIPING TO BE REMOVED |
| RL | REFRIGERANT LIQUID |
| RS | REFRIGERANT SUCTION |
| HG | HOT GAS |

| | |
|---|---|
| | ARROW INDICATES DIRECTION OF FLOW IN PIPE LEADER INDICATES DOWNWARD SLOPE |
| | PIPE INTO PLANE |
| | PIPE OUT OF PLANE |
| | PIPE BRANCH – IN TO PLANE |
| | PIPE BRANCH – OUT OF PLANE |
| | PIPE BRANCH – IN PLANE |
| | ANGLE GLOBE VALVE |
| | ANGLE GLOBE VALVE DOWN |
| | ANGLE GATE VALVE |
| | ANGLE GATE VALVE DOWN |
| | PRESSURE REDUCING, SELF CONTAINED VALVE |
| | PRESSURE REDUCING, EXTERNAL PRESSURE VALVE |
| | BALL VALVE (PIPE SIZES 2" AND SMALLER) |
| | BUTTERFLY VALVE (PIPE SIZES 2-1/2" AND LARGER) |
| | CHECK VALVE |
| | MOTOR OPERATED BUTTERFLY VALVE |
| | COCK VALVE |
| | SAFETY VALVE |
| | QUICK OPENING VALVE |
| | EXPANSION JOINT |
| | FLOAT VALVE |
| M | MOTOR OPER. GATE VALVE |
| M | MOTOR OPER. GLOBE VALVE |
| | RELIEF VALVE |
| | DIAPHRAGM |
| PE | PNEUMATIC-ELECTRIC CONTROL VALVE |
| S | SOLENIOD VALVE |
| | ALIGNMENT GUIDE |
| | ANCHOR |
| | PRESSURE GAUGE WITH COCK |
| PS | PRESSURE SWITCH |
| | FLANGE |
| | UNION |
| GPM LB/HR. | FLOW METER ORIFICE |
| | AIR VENT-MANUAL |
| A | AIR VENT-AUTO |
| | FLOW SWITCH |

| | |
|---|---|
| | SLEEVE |
| 0 - 100°F | THERMOMETER 0-100°F |
| T | THERMOSTAT |
| T N | NIGHT THERMOSTAT |
| | STEAM TRAP, F&T=FLOAT & THERMOSTATIC B=BUCKET, T=THERMOSTATIC |
| SD | DUCT SMOKE DETECTOR |
| | SHUT-OFF COCK FOR USE WITH PRESSURE GAUGE |
| | PUMP |
| | EXPANSION LOOP |
| | FLEXIBLE CONNECTION |
| | FLOW METER |
| | 90° ELBOW |
| | 45° ELBOW |
| | SIDE OUT DOWN ELBOW |
| | SIDE UP OUT ELBOW |
| | DOUBLE ELBOW |
| | STRAIGHT TEE (PIPE BRANCH – IN PLANE) |
| | CROSS |
| | REDUCER |
| | CONCENTRIC REDUCER |
| | ECCENTRIC REDUCER |
| | LATERAL STRAINER |
| | LATERAL STRAINER WITH BLOW-OFF VALVE |
| | GATE VALVE |
| | ATC VALVE – 2 WAY |
| C | ATC VALVE – 3 WAY |
| | GLOBE VALVE |
| | HOSE GATE VALVE |
| | HOSE GLOBE VALVE |
| GPM | FLOW CONTROL VALVE |
| | CALIBRATED BALANCING VALVE |
| | POINT OF CONNECTION |
| 1430 | ROOM NUMBER |
| D- CFM | REGISTER, OR DIFFUSER SYMBOL WITH CFM LISTED |
| A M1-1 | SECTION TAG – TOP FIGURE IS SECTION NO. BOTTOM FIGURE IS SHEET NO. |
| 1 M1-1 | DETAIL TAG – TOP FIGURE IS DETAIL NO. BOTTOM FIGURE IS SHEET NO. |
| EF 1 | EQUIPMENT IDENTIFICATION |
| 1 | KEYED NOTE IDENTIFICATION |
| P-1 | PLUMBING FIXTURES |

This record drawing has been prepared, in part, based upon information furnished by others. While this information is believed to be reliable, the DESIGN PROFESSIONAL cannot assure its accuracy, and thus is not responsible for the accuracy of this record drawing or for any errors or omissions which may have been incorporated into it as a result. Those relying on this record document are advised to obtain independent verification of its accuracy before applying it for any purpose.

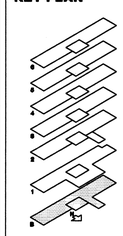
JOB NO.
FC:93-169

REVISIONS
1 JULY 7 94

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

STATE OFFICE BUILDING
REMODEL – PHASE 5
BASEMENT FINISH
FLOOR PLAN

KEY PLAN



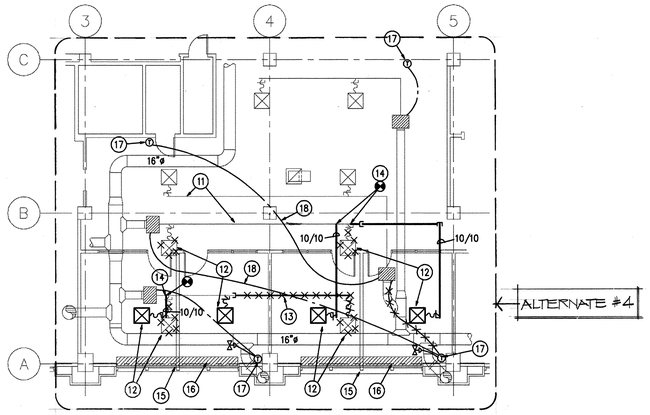
DATE
AUG 1993

TITLE
MECHANICAL LEGEND

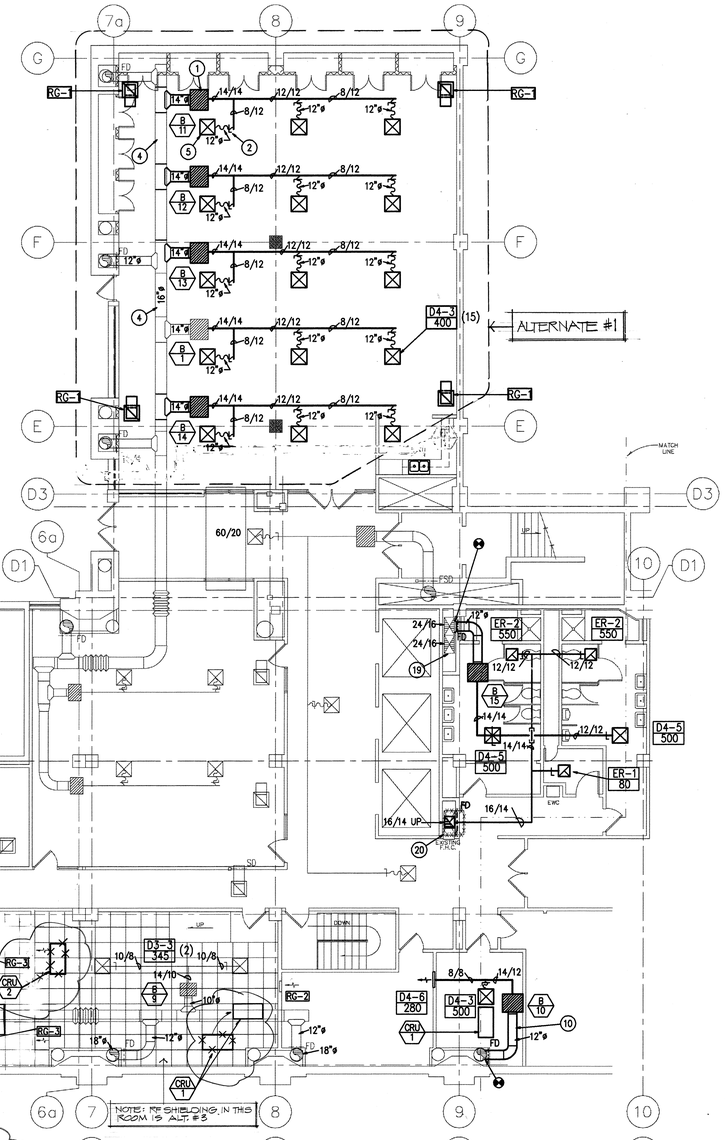
SHEET NO.
M-0

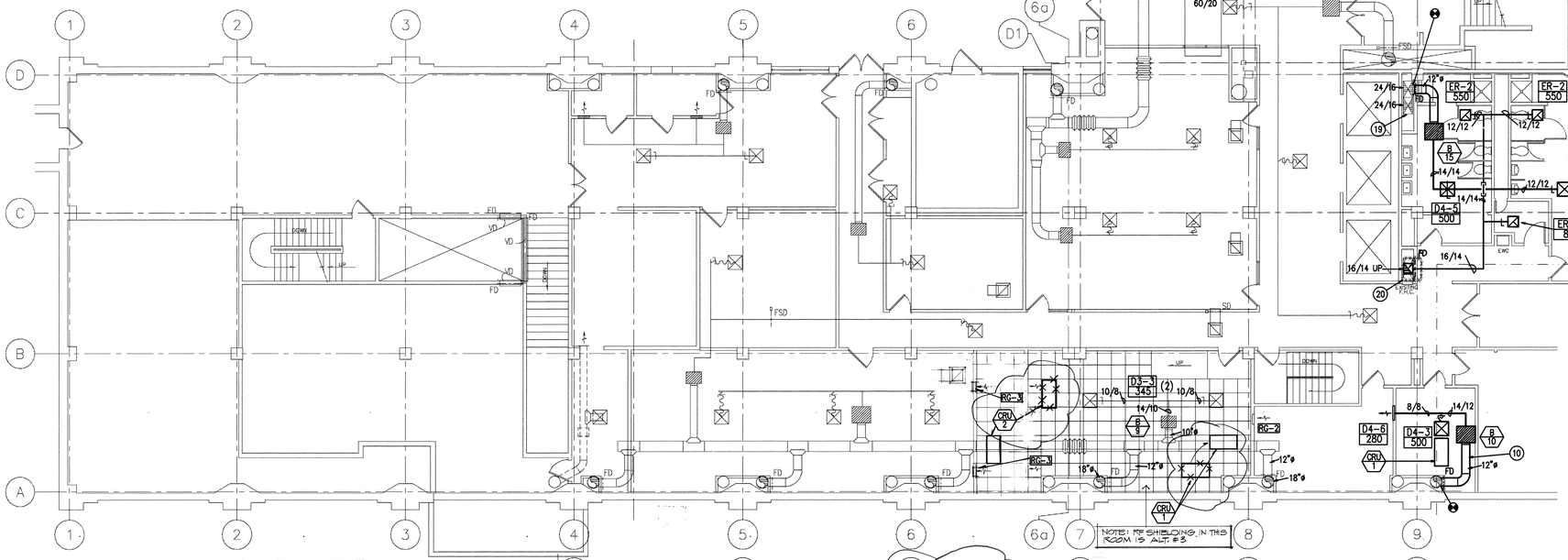
State Office Building, Three Fire, Basement Remodel and Partial First Floor - 5-Phase 1B
Mechanical Legend - 3345
000068(M)

1749MO 7-29-1993

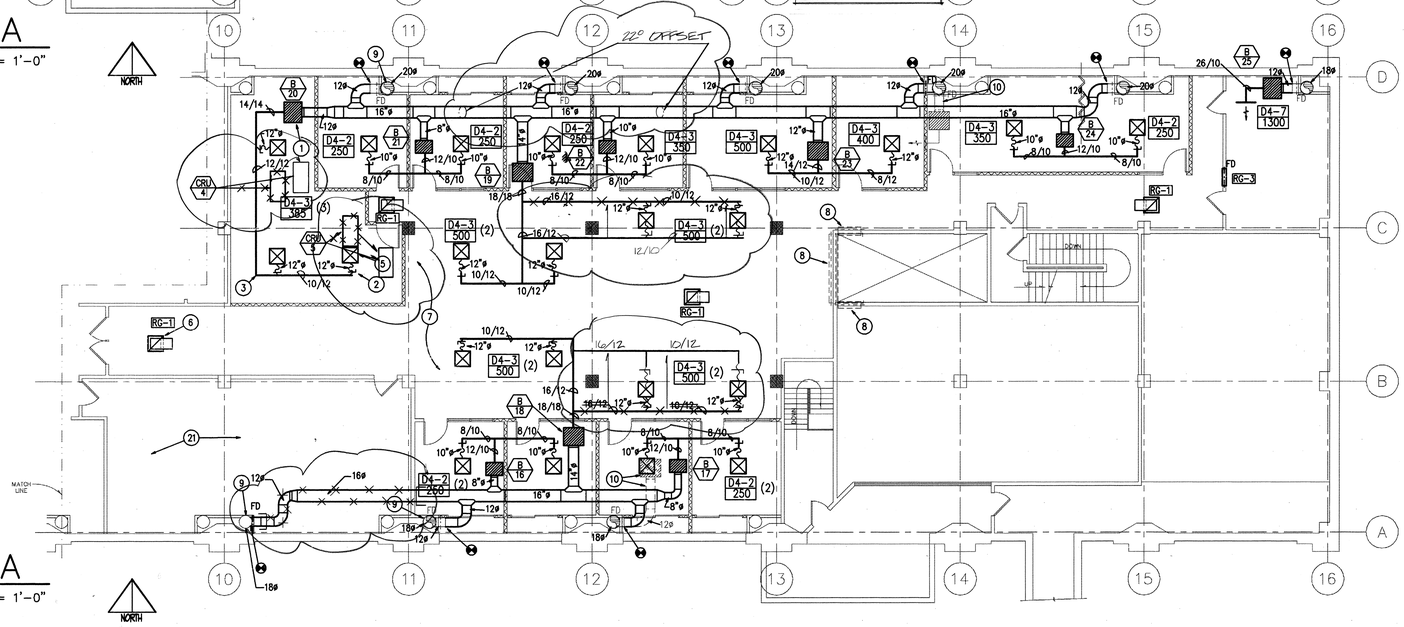



FIRST FLOOR REVISED MECHANICAL PLAN
SCALE: 1/8" = 1'-0"



WEST AREA
BASEMENT 1/8" = 1'-0"




EAST AREA
BASEMENT 1/8" = 1'-0"

## KEYED NOTES

1. VAV REHEAT BOXES. SEE SCHEDULES FOR SIZE AND CAPACITIES. CONNECT TO HIGH PRESSURE DUCTWORK WITH NO MORE THAN 3' OF HIGH PRESSURE FLEX DUCT.
2. FLEXIBLE DUCT CONNECTION TO DIFFUSERS WITH NO MORE THAN 5'-0" OF FLEX DUCT. SEE DETAILS FOR PROPER CONNECTION OF FLEX DUCT TO RIGID DUCTWORK.
3. TURNING VANES LOCATED IN ALL ELBOWS OF RECTANGULAR DUCTWORK TYPICAL.
4. EXISTING DUCTWORK TO REMAIN. MODIFY AS REQUIRED.
5. SUPPLY DIFFUSER WITH SUPPLY SOUND BOOT, SEE DETAILS. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION. TYPICAL FOR ALL SUPPLY DIFFUSERS.
6. RETURN AIR GRILLE WITH SOUND BOOT. SEE DETAILS. TYPICAL FOR ALL RETURN AIR GRILLES.
7. DUE TO CEILING SPACE CONSTRAINTS, COORDINATE DUCTWORK CAREFULLY WITH EXISTING MECHANICAL & STRUCTURAL EQUIPMENT AND NEW PIPING. TYPICAL OF ALL THIS FLOOR FIELD VERIFY EXISTING CONDITIONS.
8. RE-ADJUST RETURN AIR DAMPERS IN RETURN AIR OPENINGS.
9. EXISTING HOT AIR & COLD AIR HIGH PRESSURE DUCT RISERS. CONNECT NEW DUCTWORK TO EXISTING RISERS. EXISTING DUCT MAY BE STUBBED AND CAPPED IN THE SPACE AND WILL NEED TO BE MODIFIED FOR INSTALLATION OF NEW DUCTWORK PROVIDED A NEW FIRE DAMPER AT ALL WALL PENETRATIONS WHERE NECESSARY. FIELD VERIFY EXISTING CONDITIONS. TYPICAL.
10. REMOVE EXISTING VAV BOX AND ASSOCIATED DUCTWORK TO ACCOMMODATE NEW VAV BOX AND DUCTWORK.
11. EXISTING DUCTWORK TO REMAIN UNCHANGED.
12. RELOCATE DIFFUSER, FLEX AND SPIN-IN TO NEW LOCATION SHOWN. SEAL OPENING IN EXISTING DUCTWORK. REBALANCE TO 400 CFM EACH. COORDINATE WITH ARCHITECTURAL REFLECTED CEILING PLAN.
13. EXISTING DUCTWORK TO BE REMOVED.
14. MAKE NEW CONNECTIONS TO EXISTING DUCT AS SHOWN.
15. PORTION OF WALL UNDER RADIANT PANEL TO EXTEND TO CEILING LEVEL ONLY.
16. EXISTING RADIANT CEILING PANEL TO REMAIN.
17. EXISTING THERMOSTAT TO REMAIN. REWIRE AS SHOWN.
18. REROUTE CONTROL WIRING AS SHOWN FOR CORRECT CONTROL OF BOXES.
19. REPAIR DUCTWORK & SEAL AIR TIGHT
20. REMOVE EXISTING ABANDONED EXHAUST DUCT BACK FAR ENOUGH TO INSTALL NEW EXHAUST DUCT UP SHAFT & MAKE NEW CONNECTION IN SHAFT TO EXHAUST DUCT SERVING FIRST FLOOR TOILET ROOMS. MAKE CONNECTION THROUGH INSIDE SHAFT, OTHERWISE PATCH, REPAIR & PAINT TO MATCH SHAFT WALL ON FIRST LEVEL.
21. THIS AREA SERVED BY A SELF CONTAINED COMPUTER ROOM UNIT. COORDINATE ALL WORK IN THIS AREA WITH DFCM.
22. [illegible]

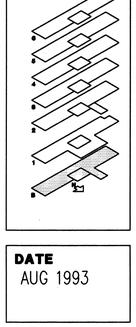
**JOB NO.**
FC:93-169

**REVISIONS**
1 JULY 7, 94


BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.


# STATE OFFICE BUILDING REMODEL – BASEMENT FINISH FLOOR PLAN

**KEY PLAN**



**DATE**
AUG 1993

**TITLE**
BASEMENT MECH. PLAN

**SHEET NO.**
M-1

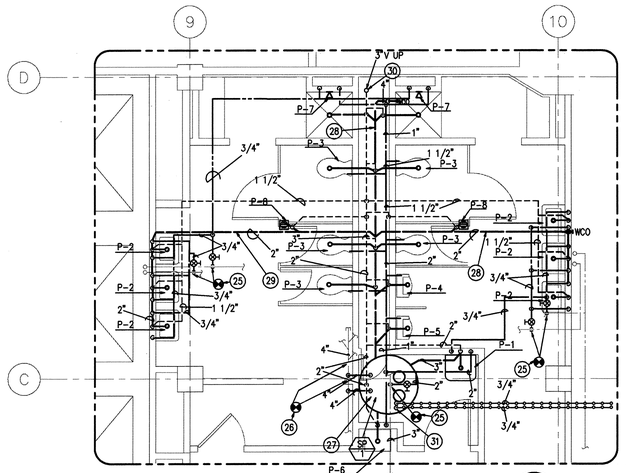

This record drawing has been prepared, in part, based upon information furnished by others. While this information is believed to be reliable, the DESIGN PROFESSIONAL cannot assure its accuracy, and thus is not responsible for the accuracy of this record drawing or for any errors or omissions which may have been incorporated into it as a result. Those relying on this record document are advised to obtain independent verification of its accuracy before applying it for any purpose.



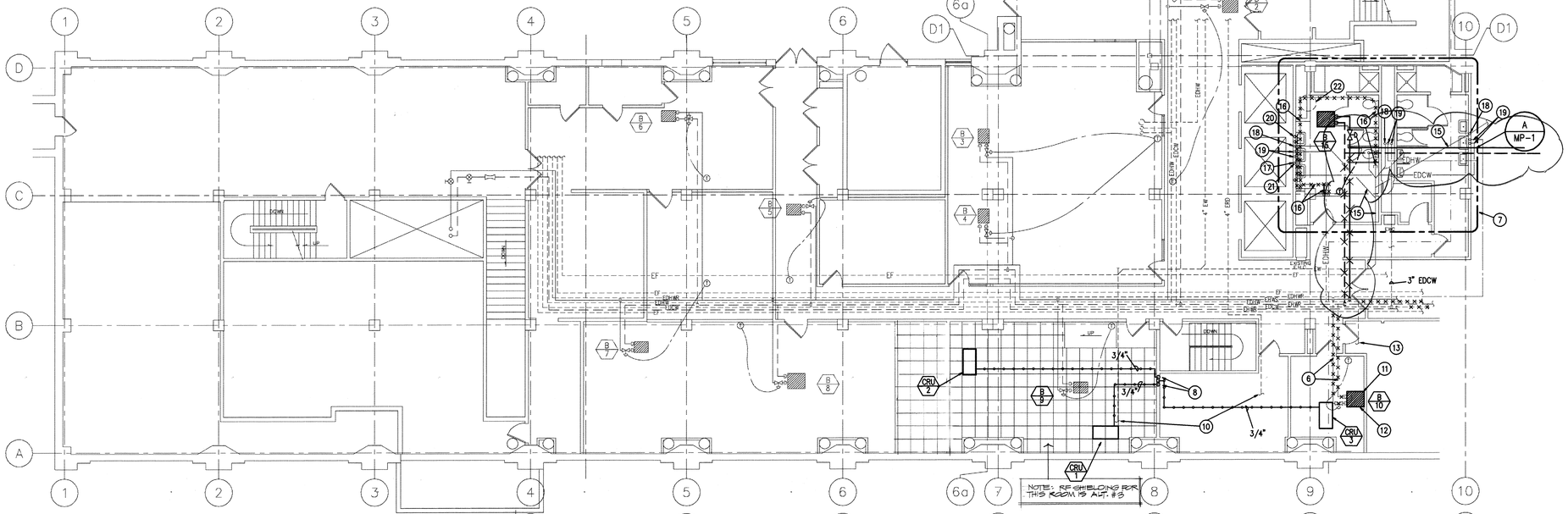
State Office Building: Phase II/III, Basement Remodel and Partial First Floor – FC:93-169
Basement Mechanical Plan - 3548
000006AW1



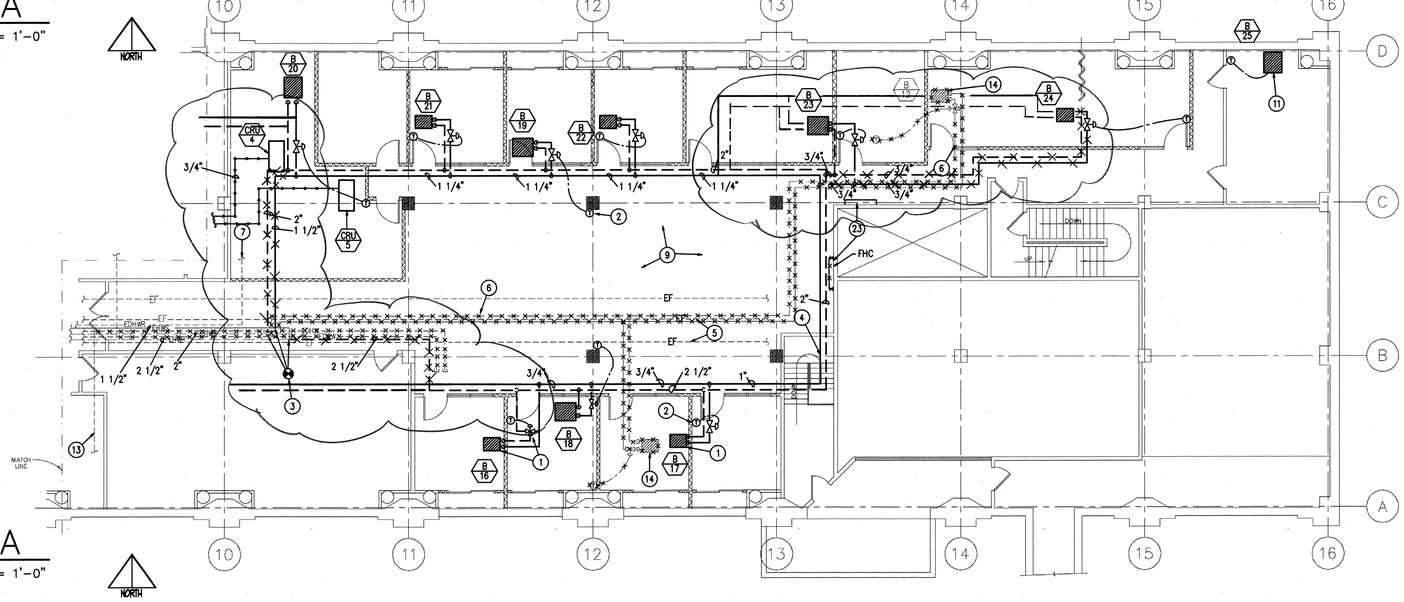
1749M1 7-29-1993




1/4 SCALE TOILET ROOM (A / MP-1)
SCALE: 1/4" = 1'-0"




WEST AREA
BASEMENT 1/8" = 1'-0"




EAST AREA
BASEMENT 1/8" = 1'-0"

## KEYED NOTES

1. VAV REHEAT BOX WITH 2 OR 3 WAY VALVE. SEE SCHEDULE FOR GPM AND CONNECTION SIZES, TYPICAL.
2. THERMOSTAT MOUNTED ON WALL, TYPICAL.
3. CONNECT NEW PIPING TO PIPING INSTALLED ON PREVIOUS PHASE OR EXISTING PIPING.
4. ROUTE PIPING ABOVE EXISTING CEILING TO AVOID NEW RAISED T-BAR CEILING.
5. REROUTE EXISTING FIRE LINES AS NECESSARY TO ACCOMMODATE NEW RAISED T-BAR CEILING IN THIS AREA. SEE ARCHITECTURAL PLANS.
6. EXISTING LINES TO BE REMOVED, TYPICAL.
7. SEE 1\4" SCALE DRAWINGS THIS SHEET.
8. DROP CONDENSATE LINES DOWN TO TUNNEL BELOW AND RUN INTO SUMP.
9. MODIFY EXISTING FIRE SPRINKLERS PER CODE FOR NEW FLOOR PLAN. REROUTE PIPING AS NECESSARY TO ACCOMMODATE RAISED PORTION OF CEILING.
10. EXISTING WASTE AND ROOF DRAIN LINES COORDINATE WORK WITH THESE LINES.
11. VAV BOX. COOLING ONLY.
12. REPLACE EXISTING VAV BOX WITH NEW BOX AS INDICATED.
13. EXISTING 3/8" DOMESTIC WATER LINE SERVING HUMIDIFIER IN COMPUTER ROOM UNIT SERVING TELEPHONE ROOM.
14. RELOCATE EXISTING VAV BOX, AS INDICATED.
15. EXISTING WASTE LINES IN CEILING TO REMAIN.
16. REMOVE EXISTING WASTE AND VENT LINES AS INDICATED.
17. EXISTING VENT RISER TO REMAIN AND TO BE REUSED. SEE 1/4" SCALE PLAN THIS SHEET.
18. EXISTING WASTE RISER TO REMAIN UNCHANGED.
19. EXISTING HOT AND COLD DOMESTIC WATER RISERS TO REMAIN UNCHANGED.
20. REMOVE EXISTING HOT AND COLD WATER SUPPLY BACK TO VAINS.
21. REMOVE EXISTING WASTE AND VENT FOR PREVIOUSLY DEMOLISHED FIXTURE. REMOVE WASTE BACK TO FLOOR LEVEL AND VENT BACK TO RISER.
22. REMOVE EXISTING 30" DIA X 36" TALL SUMP AND PUMP IN TUNNEL BELOW. REMOVE ASSOCIATED PIPING AND VALVING. REMOVE ALL PIPING IN TUNNELS RUNNING TO SUMP. THIS PIPING IS NO LONGER IN USE.
23. RELOCATE THE EXISTING FIRE HOSE VALVE AND HOSE TO LOCATION SHOWN.
24. NEW SINK CONNECTED TO EXISTING INDIRECT WASTE TO EXISTING HOT AND COLD WATER IN WALL.
25. CONNECT NEW HOT AND COLD DOMESTIC WATER TO EXISTING LINES IN CEILING PROVIDE SHUT OFF VALVE.
26. DISCHARGE NEW SUMP PUMPS LINE INTO EXISTING 4" WASTE LINE IN CEILING SPACE.
27. NEW 42" DIA X 6' DEEP PREFABRICATED FIBERGLASS DUPLEX SEWAGE EJECTOR SUMP. SEE DETAIL FOR PIPING. EXCAVATE FLOOR TO ACCOMMODATE SUMP TOP OF SUMP SHALL BE LEVEL WITH FLOOR.
28. SAW CUT FLOOR WHERE NECESSARY TO LAY WASTE LINES.
29. SAW CUT FLOOR EXCEPT WHERE WASTE PIPE PASSES THROUGH TUNNEL BELOW. FEED PIPE THROUGH TUNNEL. DO NOT SAW CUT ROOF OF TUNNEL.
30. RISE VENT UP. CORE DRILL TO PLUMBING CHASE ON FLOOR ABOVE. RISE VENT IN PLUMBING CHASE AND CONNECT TO EXISTING VENT RISER.
31. DROP CONDENSATE LINES INTO SUMP PUMP.

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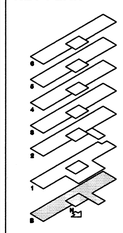
**JOB NO.**
FC:93-169

**REVISIONS**
△JULY 7, 94

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

# STATE OFFICE BUILDING REMODEL – PHASE 5 BASEMENT FINISH FLOOR PLAN

**KEY PLAN**



**DATE**
AUG 1993

**TITLE**
BASEMENT MECH. PIPING PLAN

**SHEET NO.**
M-2

State Office Building, Phase Five, Basement Remodel and Partial First Floor - FC:93-169
Basement Mechanical Piping Plan - 3547
00006KM2

1749MP1 7-29-1993

## PLUMBING FIXTURE SCHEDULE

| SYMBOL | FIXTURE | CW | HW | W | V | REMARKS |
|---|---|---|---|---|---|---|
| P -1 | SERVICE SINK | 3/4 | 3/4 | 3 | 2 | -- |
| P -2 | LAVATORY | 1/2 | 1/2 | 1-1/2 | 1-1/2 | WALL HUNG |
| P -3 | WATER CLOSET | 1 | -- | 4 | 2 | WALL HUNG |
| P -4 | URINAL | 3/4 | -- | 2 | 1-1/2 | WALL HUNG |
| P -5 | URINAL | 3/4 | -- | 2 | 1-1/2 | WALL HUNG |
| P -6 | DRINKING FOUNTAIN | 1/2 | -- | 1-1/2 | 1-1/2 | -- |
| P -7 | SHOWER | 1/2 | 1/2 | 1-1/2 | 1-1/2 | -- |
| P -8 | FLOOR DRAIN | -- | -- | 2 | 1-1/2 | -- |
| P -9 | DOUBLE COMPARTMENT SINK | 1/2 | 1/2 | 1-1/2 | 1-1/2 | -- |
| | | | | | | |

SC-43

## PUMP SCHEDULE

| PUMP TAG | MFR. CATALOG NO. | SERVICE | CAPACITY GPM | CAPACITY HEAD FT WATER | EFF. % | BHP | MOTOR HP | MOTOR RPM | MOTOR VOLT | MOTOR Ø |
|---|---|---|---|---|---|---|---|---|---|---|
| SP-1 | AURORA KSS 642 | DUPLEX SEWAGE EJECTOR | 60 | 16 | 50 | 1.5 | 2 | 1750 | 460 | 3 |
| | | | | | | | | | | |
| | | | | | | | | | | |

SC-04

## ~~EXHAUST FAN SCHEDULE~~

| FAN TAG | MFR. CATALOG NO. | SERVICE | FAN CAPACITY CFM | FAN CAPACITY OV FPM | FAN CAPACITY RPM | FAN CAPACITY SP "WC | FAN CAPACITY BHP | FAN CAPACITY WHEEL NO-SIZE | MOTOR HP | MOTOR RPM | MOTOR VOLT | MOTOR Ø |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EF-1 | LOREN COOK LITTLE GEM III | KITCHENET | 150 | --- | 1030 | 0.25 | --- | --- | 115W | 1500 | 115 | 1 |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

SC-07

## VAV BOX SCHEDULE

| BOX SYMBOL | CFM RANGE MIN | CFM RANGE MAX | MANUFACTURER & MODEL NO. | INLET SIZE | MIN. S.P. IN $H_2O$ | NC-AT 0.75"SP | COIL DATA MBH | EWT | LWT | EAT | LAT | GPM | ROWS | WPD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B-10 | 470 | 780 | KRUEGER LMHS | 12 | 0.85 | 28 | -- | -- | -- | -- | -- | -- | -- | -- |
| B-11 | 720 | 1200 | KRUEGER LMHS | 14 | 0.85 | 27 | 23.2 | 200 | 180 | 55 | 90 | 2.3 | 1.3 | 3/4 |
| B-12 | 720 | 1200 | KRUEGER LMHS | 14 | 0.85 | 27 | 23.2 | 200 | 180 | 55 | 90 | 2.3 | 1.3 | 3/4 |
| B-13 | 720 | 1200 | KRUEGER LMHS | 14 | 0.85 | 27 | 23.2 | 200 | 180 | 55 | 90 | 2.3 | 1.3 | 3/4 |
| B-14 | 720 | 1200 | KRUEGER LMHS | 14 | 0.85 | 27 | 23.2 | 200 | 180 | 55 | 90 | 2.3 | 1.3 | 3/4 |
| B-15 | 600 | 1000 | KRUEGER LMHS | 12 | 0.85 | 28 | 13.8 | 200 | 180 | 55 | 80 | 1.4 | 0.55 | 3/4 |
| B-16 | 300 | 500 | KRUEGER LMHS | 8 | 0.85 | 28 | 10.6 | 200 | 180 | 55 | 94 | 1.1 | 0.33 | 3/4 |
| B-17 | 300 | 500 | KRUEGER LMHS | 8 | 0.85 | 28 | 10.6 | 200 | 180 | 55 | 94 | 1.1 | 0.33 | 3/4 |
| B-18 | 1200 | 2000 | KRUEGER LMHS | 20 | 0.85 | 28 | 27.6 | 200 | 180 | 55 | 80 | 2.8 | 1.3 | 3/4 |
| B-19 | 1200 | 2000 | KRUEGER LMHS | 20 | 0.85 | 28 | 27.6 | 200 | 180 | 55 | 80 | 2.8 | 1.3 | 3/4 |
| B-20 | 690 | 1150 | KRUEGER LMHS | 12 | 0.85 | 28 | 20.1 | 200 | 180 | 55 | 87 | 2.0 | 1.3 | 3/4 |
| B-21 | 300 | 500 | KRUEGER LMHS | 8 | 0.85 | 28 | 11.0 | 200 | 180 | 55 | 95 | 1.1 | 0.55 | 3/4 |
| B-22 | 360 | 600 | KRUEGER LMHS | 10 | 0.85 | 28 | 12.2 | 200 | 180 | 55 | 92 | 1.2 | 0.55 | 3/4 |
| B-23 | 540 | 900 | KRUEGER LMHS | 12 | 0.85 | 28 | 17.5 | 200 | 180 | 55 | 90 | 1.7 | 0.55 | 3/4 |
| B-24 | 360 | 600 | KRUEGER LMHS | 10 | 0.85 | 28 | 13.3 | 200 | 180 | 55 | 95 | 1.3 | 0.55 | 3/4 |
| B-25 | 780 | 1300 | KRUEGER LMHS | 14 | 0.85 | 27 | -- | -- | -- | -- | -- | -- | -- | -- |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

SC-29

## REGISTER AND GRILLE SCHEDULE

| SYMBOL | MANUFACTURER | SIZE (IN) | MODEL | LOCATION | REMARKS |
|---|---|---|---|---|---|
| ER -1 | KRUEGER | 6 x 6 | C1190 | -- | C/W FRAME 22, OBD |
| ER -2 | KRUEGER | 12 x 12 | C1190 | -- | C/W FRAME 22, OBD |
| ER -3 | KRUEGER | 12 x 12 | 1190 | -- | C/W FRAME 23, OBD |
| -- | | | | | |
| RG - 1 | KRUEGER | 22 x 22 | EGC-5 | -- | C/W FRAME 23, |
| RG - 2 | KRUEGER | 12 x 8 | S80 | -- | WITH OBD |
| RG - 3 | KRUEGER | 12 x 12 | S80 | -- | WITH OBD |

SC-03

## DIFFUSER SCHEDULE

| SYMBOL | MANUFACTURER | SIZE | THROW | MODEL | REMARKS |
|---|---|---|---|---|---|
| D1 - 1 | KRUEGER | 6 x 6 | 1-WAY | SH-1 | C/W FRAME 23, OBD |
| D2 - 1 | KRUEGER | 6 x 6 | 2-WAY | SH-2 | C/W FRAME 23, OBD |
| D2 - 5 | KRUEGER | 9 x 9 | 2-WAY | SH-2 | C/W FRAME 22, OBD |
| D3 - 1 | KRUEGER | 6 x 6 | 3-WAY | SH-3 | C/W FRAME 23, OBD |
| D3 - 2 | KRUEGER | 9 x 9 | 3-WAY | SH-3 | C/W FRAME 23, OBD |
| D3 - 3 | KRUEGER | 12 x 12 | 3-WAY | SH-3 | C/W FRAME 22, OBD |
| D3 - 4 | KRUEGER | 15 x 15 | 3-WAY | SH-3 | C/W FRAME 23, OBD |
| D3 - 5 | KRUEGER | 9 x 9 | 3-WAY | SH-3 | C/W FRAME 22, OBD |
| D4 - 1 | KRUEGER | 6 x 6 | 4-WAY | SH-4 | C/W FRAME 23, OBD |
| D4 - 2 | KRUEGER | 9 x 9 | 4-WAY | SH-4 | C/W FRAME 23, OBD |
| D4 - 3 | KRUEGER | 12 x 12 | 4-WAY | SH-4 | C/W FRAME 23, OBD |
| D4 - 4 | KRUEGER | 15 x 15 | 4-WAY | SH-4 | C/W FRAME 23, OBD |
| D4 - 5 | KRUEGER | 12 x 12 | 4-WAY | SH-4 | C/W FRAME 22, OBD |
| D4 - 6 | KRUEGER | 12 x 8 | 4-WAY | 880 V | W/OBD |
| D4 - 7 | KRUEGER | 26 x 10 | 4-WAY | 880 V | W/OBD |
| | | | | | |

SC-02

## COMPUTER ROOM UNIT

| SYMBOL | MFR. CATALOG NO. | SERVICE | FAN SECTION CFM | FAN SECTION HP | FAN SECTION TOTAL CAP. BTUH @72°DB 50% RH. | CONDENSER | CONDENSER HP | ELECTRICAL VOLTS | ELECTRICAL Ø | ELECTRICAL FLA | ACCESSORIES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CRU-1 | LIEBERT MM18A | | 700 | 1/4 | 15250 | ① | 1/4 | 208 | 1 | 19.2 | CONDENSATE PUMP |
| CRU-2 | LIEBERT MM18A | | 700 | 1/4 | 15250 | ① | 1/4 | 208 | 1 | 19.2 | CONDENSATE PUMP |
| CRU-3 | LIEBERT MM18A | | 700 | 1/4 | 15250 | ① | 1/4 | 208 | 1 | 19.2 | CONDENSATE PUMP |
| CRU-4 | LIEBERT MM18A | | 700 | 1/4 | 15250 | ① | 1/4 | 208 | 1 | 19.2 | CONDENSATE PUMP |
| CRU-5 | LIEBERT MM18A | | 700 | 1/4 | 15250 | ① | 1/4 | 208 | 1 | 19.2 | CONDENSATE PUMP |
| | | | | | | | | | | | |

① INTEGRAL AIR COOLED CONDENSER IN RETURN AIR PLENUM.

SC-62

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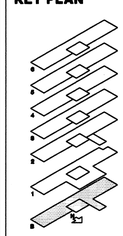
JOB NO.
FC:93-169

REVISIONS
1 JULY 7, 94

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

STATE OFFICE BUILDING
REMODEL - PHASE 5
BASEMENT FINISH
FLOOR PLAN

KEY PLAN

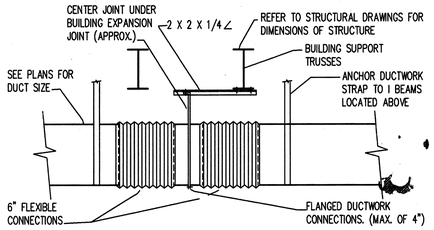


DATE
AUG 1993

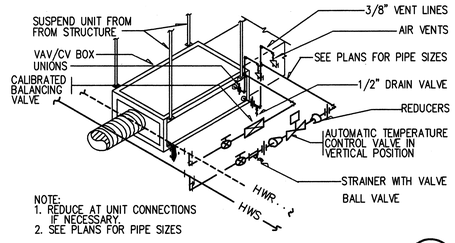
TITLE
SCHEDULES

SHEET NO.
M-3

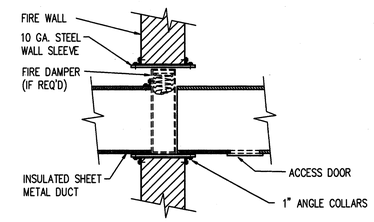
State Office Building, Phase Five, Basement Remodel and Tenant Finish - 93-169
Schedules - 3348
00006KM3



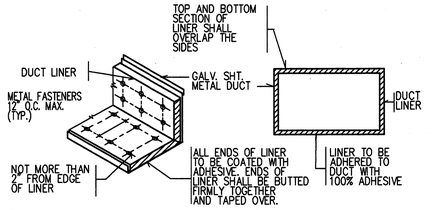

FLEX CONNECTION DETAIL (14 / M-4)
NO SCALE



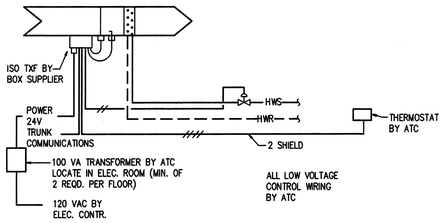

VAV/CV BOX PIPING DETAIL WITH 2-WAY AUTO-VALVE (10 / M-4)
NO SCALE



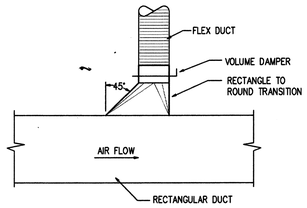

TYPICAL FIRE DAMPER HIGH PRESSURE DUCT (6 / M-4)
NO SCALE



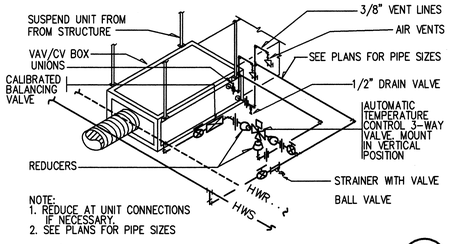

DUCT LINER DETAIL (1 / M-4)
NO SCALE



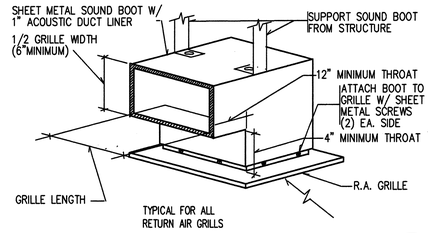

ELECTRIC VAV BOX CONTROLS (15 / M-4)
NO SCALE



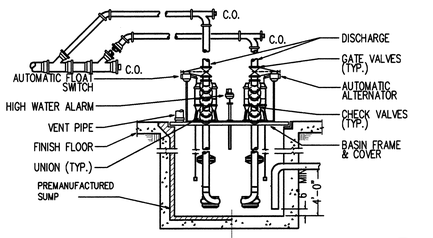

HIGH EFFICIENCY TAKE-OFF DETAIL (11 / M-4)
NO SCALE



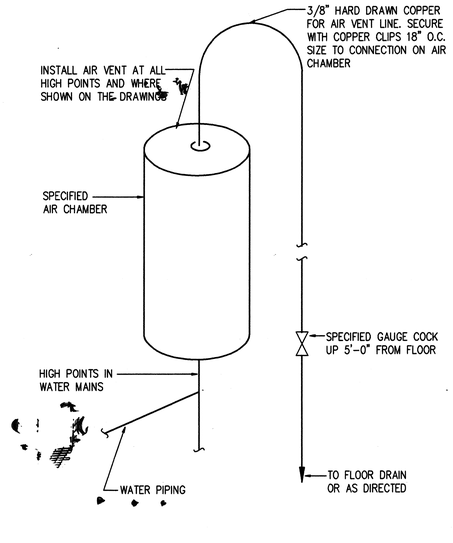

VAV/CV BOX PIPING DETAIL WIHT 3-WAY AUTO-VALVE (7 / M-4)
NO SCALE



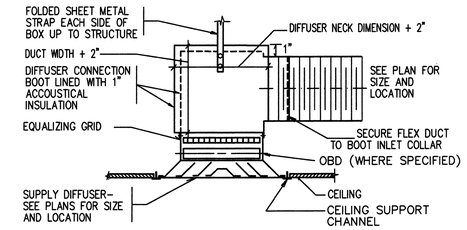

R.A. GRILLE WITH SOUND BOOT (2 / M-4)
NO SCALE



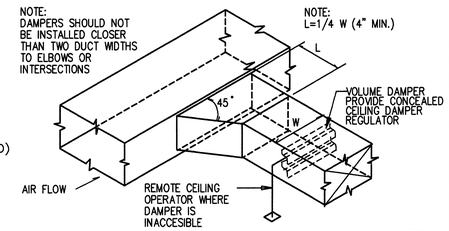

DUPLEX SUMP PUMP DETAIL (16 / M-4)
NO SCALE



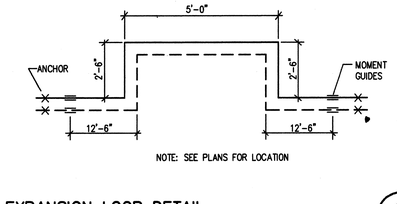

MANUAL AIR VENT DETAIL (12 / M-4)
NO SCALE



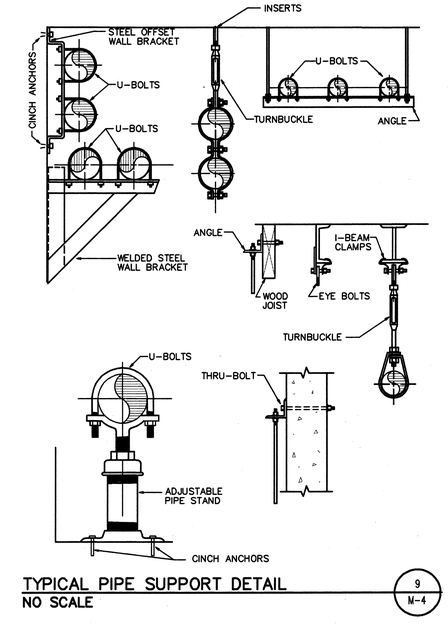

SUPPLY DIFFUSER W/ FLEX DUCT DETAIL (8 / M-4)
NO SCALE




BRANCH DUCT TAKE-OFF & DAMPER DETAIL (3 / M-4)
NO SCALE



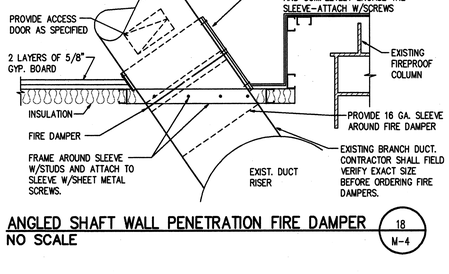

EXPANSION LOOP DETAIL (17 / M-4)
NO SCALE



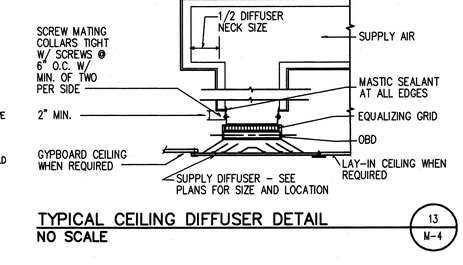

TYPICAL PIPE SUPPORT DETAIL (9 / M-4)
NO SCALE



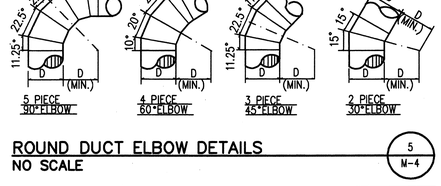

ROUND DUCT BRANCH TAKE-OFF DETAILS (4 / M-4)
NO SCALE




ANGLED SHAFT WALL PENETRATION FIRE DAMPER (18 / M-4)
NO SCALE




TYPICAL CEILING DIFFUSER DETAIL (13 / M-4)
NO SCALE




ROUND DUCT ELBOW DETAILS (5 / M-4)
NO SCALE

This record drawing has been prepared, in part, based upon information furnished by others. While this information is believed to be reliable, the DESIGN PROFESSIONAL cannot assure its accuracy, and thus is not responsible for the accuracy of this record drawing or for any errors or omissions which may have been incorporated into it as a result. Those relying on this record document are advised to obtain independent verification of its accuracy before applying it for any purpose.

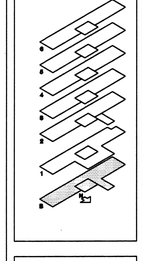
JOB NO.
FC:93-169

REVISIONS
1 JULY 7 94

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

STATE OFFICE BUILDING
REMODEL - PHASE 5
BASEMENT FINISH
FLOOR PLAN

KEY PLAN

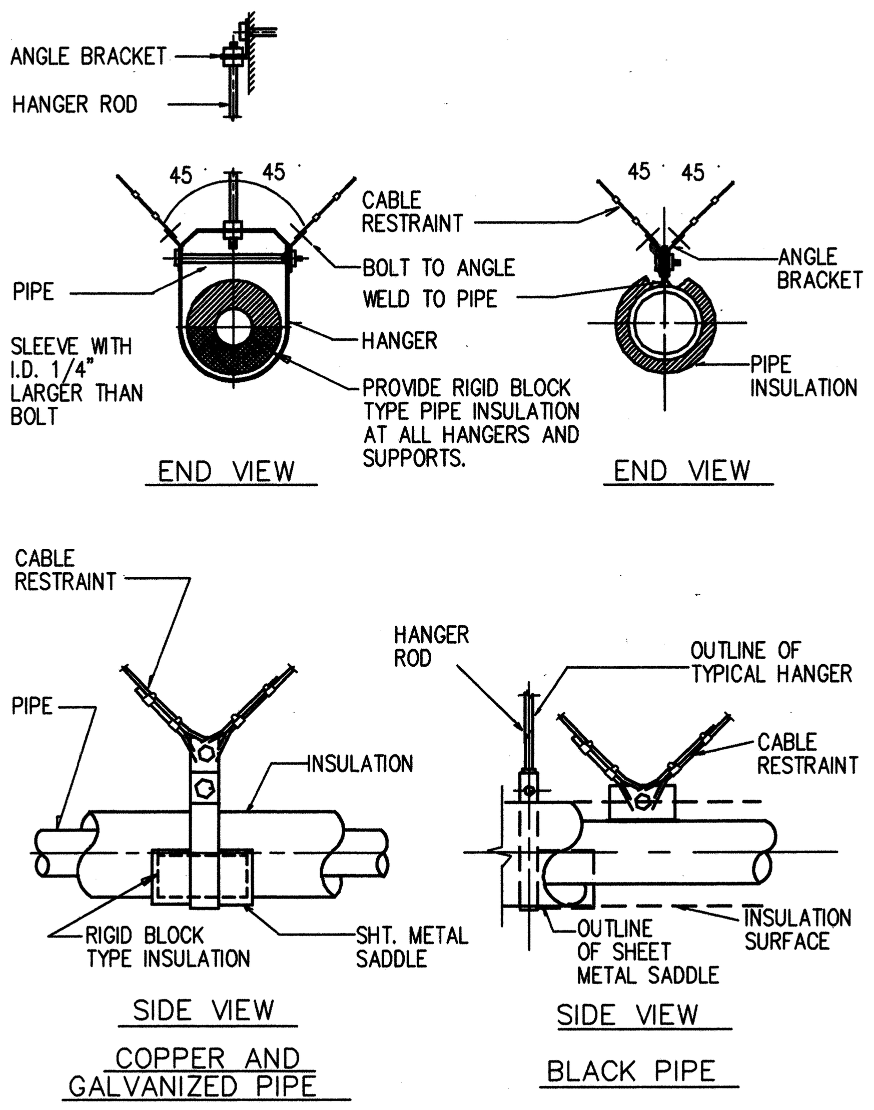


DATE
AUG 1993

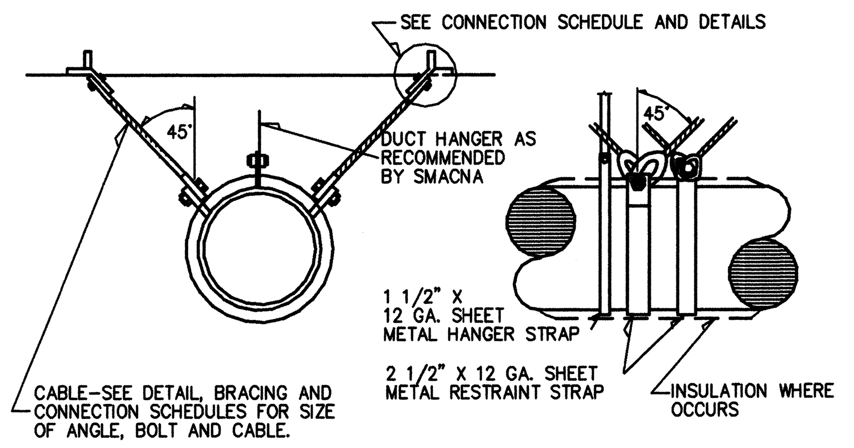
TITLE
MECHANICAL DETAILS

SHEET NO.
M-4

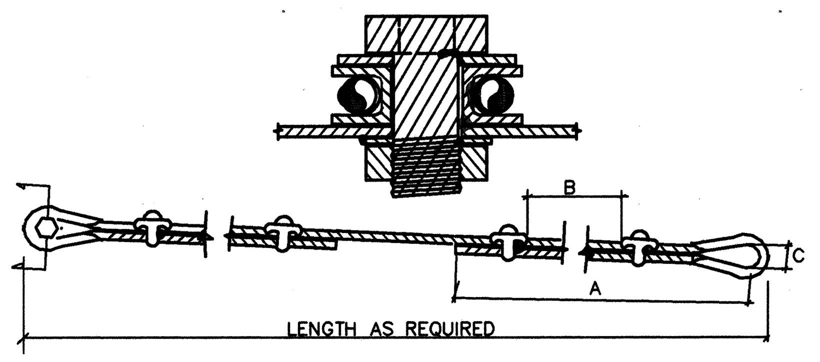
Dept. Office Building Fifteen Fire, Basement Remodel and Partial First Floor - FC:93-169
Mechanical Details - 3549
000060044




## PIPING RESTRAINT DETAIL
NO SCALE
2 / M-5




## CABLE BRACING FOR ROUND AND OVAL DUCTS
NO SCALE
3 / M-5




NOTES:

1. CABLES, THIMBLES, CLIPS, GROMMETS & FLAT WASHERS ARE TO BE FURNISHED BY RESTRAINT MANUFACTURER. ALL OTHER HARDWARE TO BE PROVIDED BY CONTRACTOR.
2. ENTIRE SYSTEM TO BE EQUAL TO AMBER BOOTH.
3. CABLE CLIPS MUST BE ORIENTED AS SHOWN WITH SHORT END OF CABLE ON THE CURVED PART OF THE CLIP.

CABLE SCHEDULE

| CABLE DIA. | CABLE DESIGN | A | B | C | BOLT SIZE | ALLOWABLE LOAD (lbf) | BREAKING STRENGTH (lbf) |
|---|---|---|---|---|---|---|---|
| 1/8" | 7X19 GALV. | 5-1/4" | 1-5/8" | 5/8" | 3/8" | 660 | 2000 |
| 3/16" | 7X19 GALV. | 5-3/4" | 1-7/8" | 5/8" | 3/8" | 1400 | 4200 |
| 1/4" | 7X19 GALV. | 6-3/4" | 2-3/8" | 11/16" | 3/8" | 2330 | 7000 |
| 5/16" | 7X19 GALV. | 7-3/8" | 2-5/8" | 13/16" | 5/8" | 3260 | 9800 |
| 3/8" | 7X19 GALV. | 8-7/8" | 3-1/4" | 1" | 5/8" | 4800 | 14400 |
| 7/16" | 6X19 IWRC | 17" | 3-5/8" | 1" | 5/8" | 5920 | 17800 |
| 1/2" | 6X19 IWRC | 18" | 3-7/8" | 1-1/8" | 3/4" | 7660 | 23000 |

## CABLE RESTRAINT DETAIL
NO SCALE
1 / M-5

## PIPE BRACING GENERAL NOTES

1 DETAILS SHOWN PROVIDE GENERAL GUIDELINES FOR A LATERAL BRACING SYSTEM. A TYPICAL VERTICAL SUPPORT SYSTEM MUST ALSO BE USED.
2 BRACE ALL PIPES 1-1/2" I.D. AND LARGER.
3 CABLE RESTRAINTS AND BRACING NOT TO EXCEED 30'-0" CENTERS AND SHALL BE PROVIDED AT ALL CHANGES IN DIRECTION OF PIPE. ALL DROPS TO EQUIPMENT, AND ON EACH SIDE OF FLEXIBLE CONNECTIONS. BRACE POINTS SHALL NOT EXCEED 15'-0" FROM FLEXIBLE CONNECTION.
4 ALL HOLES IN ANGLES ARE TO BE 1/16 INCH OVERSIZED. PLACE STANDARD CUT WASHERS BETWEEN SHEET METAL ANGLES AND NUT.
5 EQUIPMENT WHICH ATTACHES TO THE PIPING SYSTEM SHALL BE BRACED INDEPENDENTLY OF THE PIPES.
6 ALL SHEET METAL FOR BRACING TO BE FY=33 KSI MINIMUM. GAUGE FOR SHEET METAL BRACING SHALL BE AS FOLLOWS:

16 GA = (0.0598 INCH)
14 GA = (0.0747 INCH)
12 GA = (0.1046 INCH)

7 MINIMUM DISTANCE FROM EDGE OF ANGLE TO BOLTS SHALL BE AS FOLLOWS:

| BOLT DIAMETER | DISTANCE FROM EDGE |
|---|---|
| 1/4" TO 1/2" | 1" |
| 5/8" | 1 1/8" |
| 3/4" | 1 1/4" |
| 7/8" | 1 1/2" |

8 DO NOT FASTEN RESTRAINT SYSTEM TO TWO DISSIMILAR PARTS OF A BUILDING THAT MAY RESPOND IN A DIFFERENT MODE DURING AN EARTHQUAKE. FOR EXAMPLE, A WALL AND A ROOF.
9 PROVIDE LARGE ENOUGH PIPE SLEEVES THROUGH WALLS OR FLOORS TO ALLOW FOR ANTICIPATED DIFFERENTIAL MOVEMENTS.
10 DO NOT FASTEN ONE RIGID PIPING SYSTEM TO TWO DISSIMILAR PARTS OF A BUILDING THAT MAY RESPOND IN A DIFFERENT MODE DURING AN EARTHQUAKE. FOR EXAMPLE, A WALL AND A ROOF.
11 BRACING DETAILS, SCHEDULE AND NOTES ARE TO BE USED WITH THE FOLLOWING TYPES OF PIPE: STEEL PIPE SCHEDULE 40 AND 80, COPPER PIPE TYPE K,L,M (ONLY SILVER SOLDERED BRAZED JOINTS TO BE USED WITH COPPER PIPE).
12 FOR GAS PIPING, THE BRACING DETAILS, SCHEDULES AND NOTES MAY BE USED EXCEPT THAT RESTRAINTS SHALL BE INSTALLED AT EVERY 20'-0" O.C. ALSO ALL PIPE 1 INCH AND LARGER SHALL BE BRACED.
13 WASTE, VENT AND ROOF DRAINAGE PIPING SYSTEMS ARE EXCLUDED FROM THE RESTRAINT GUIDELINES.
14 ALTERNATE EVERY OTHER CABLE RESTRAINT IN OPPOSITE DIRECTION (SHOWN DOTTED).

## DUCT CABLE BRACING LIST

| DUCT SIZE (MAX.) | *WT/ LIN FT (MAX) | BOLT SIZE | HORIZONTAL ANGLE | VERTICAL ANGLE | CABLE DIA.** | CABLE DES. | ANCHOR CONN. TYPE |
|---|---|---|---|---|---|---|---|
| 12" | 5# | 3/8" | 2 X 2 X 16 GA | 2 X 2 X 12 GA | 1/8" | 7x19 GALV | I |
| 18" | 8# | 3/8" | 2 X 2 X 16 GA | 2-1/2 X 2-1/2 X 12 GA | 1/8" | 7x19 GALV | I |
| 24" | 10# | 3/8" | 2 X 2 X 16 GA | 2-1/2 X 2-1/2 X 12 GA | 1/8" | 7x19 GALV | I |
| 30" | 13# | 3/8" | 2 X 2 X 16 GA | 2-1/2 X 2-1/2 X 12 GA | 1/8" | 7x19 GALV | I |
| 42" | 20# | 3/8" | 2-1/2 X 2-1/2 X 16 GA | 4 X 4 X 12 GA | 3/16" | 7x19 GALV | II |
| 54" | 27# | 3/8" | 2-1/2 X 2-1/2 X 16 GA | 4 X 4 X 12 GA | 3/16" | 7x19 GALV | II |
| 60" | 36# | 3/8" | 3 X 3 X 16 GA | 4 X 4 X 12 GA | 3/16" | 7x19 GALV | II |
| 84" | 53# | 3/8" | 4 X 4 X 14 GA | 4 X 4 X 1/4 | 1/4" | 7x19 GALV | III |
| 96" | 80# | 1/2" | 4 X 4 X 12 GA | 5 X 3 X 1/4 | 5/16" | 7x19 GALV | IV |

* MAXIMUM WEIGHT OF DUCTS OR COMBINATIONS OF DUCTS PER LINEAR FOOT. THE DUCTS MAXIMUM DIMENSION SHALL GOVERN WHAT BRACING IS REQUIRED. FOR ANCHOR CONNECTIONS SEE LIST. SEE DUCT BRACING DETAILS.

** TWO CABLES REQUIRED AT EACH RESTRAINT POINT, EACH CABLE TO BE INSTALLED 45~ TO HORIZONTAL AND 45~ TO LONGITUDINAL DIRECTION OF DUCT.

## PIPE SEISMIC BRACING SCHEDULE

| PIPE SIZE | HANGER ROD SIZE | MAX. ROD LENGTH | HANGER TYPE | BOLTS TO ANGLE | ANGLE CLIP | ANGLE BRACE | ANCHOR CONN. TYPE | ANCHOR BOLT OR INSERT |
|---|---|---|---|---|---|---|---|---|
| 1-1/2" | 1/2" | 25" | CLEVIS | 3/8" | 3x3x1/4 | 2x2x16GA | I | 3/8" |
| 2" | 1/2" | 25" | CLEVIS | 3/8" | 3x3x1/4 | 2x2x16GA | I | 3/8" |
| 2-1/2" | 5/8" | 31" | CLEVIS | 3/8" | 3x3x1/4 | 2x2x16GA | I | 3/8" |
| 3" | 5/8" | 31" | CLEVIS | 3/8" | 3x3x1/4 | 2-1/2x2-1/2x 16 GA | II | 1/2" |
| 3-1/2" | 5/8" | 31" | CLEVIS | 3/8" | 3x3x1/4 | 2-1/2x2-1/2x 16 GA | II | 1/2" |
| 4" | 3/4" | 37" | CLEVIS | 3/8" | 3x3x1/4 | 2-1/2x2-1/2x 16 GA | II | 1/2" |
| 5" | 3/4" | 37" | CLEVIS | 1/2" | 5x3x1/2 | 2-1/2x2-1/2x 16 GA | III | 3/4" |
| 6" | 3/4" | 37" | CLEVIS | 5/8" | 5x3x1/2 | 2-1/2x2-1/2x 16 GA | IV | 3/4" |
| 8" | 7/8" | 43" | CLEVIS | 5/8" | 2-5x3x1/2 | 3x3x12 GA | V | 2-5/8" |
| 10" | 7/8" | 43" | CLEVIS | 3/4" | 2-5x3x1/2 | 3x3x12 GA | VI | 2-5/8" |

FOR ANCHOR CONNECTIONS SEE LIST.

SEE PIPE BRACING DETAIL

*1-5/8"x1-5/8"x12 GA CHANNEL MAY BE USED

## SCHEDULE FOR TYPICAL CONNECTIONS TO STRUCTURAL SUPPORTING MEMBERS

| TYPE | MAX. LOAD CAPACITY POUNDS | PHILLIP'S REDHEAD ANCHORS TO CONC. LT. WT. | PHILLIP'S REDHEAD ANCHORS TO CONC. HARD ROCK | CONC. CAST-IN PLACE INSERT | BOLT OF STL.BM. CLAMP |
|---|---|---|---|---|---|
| I<br>II | 500<br>1000 | 3/8"<br>3/8" | 3/8"<br>3/8" | 3/8"<br>1/2" | 3/8"<br>3/8" |
| III<br>IV | 1500<br>2000 | 3/8"<br>1/2" | 3/8"<br>1/2" | 1/2"<br>5/8" | 3/8"<br>1/2" |
| V<br>VI | 3000<br>4000 | 2-1/2"<br>2-5/8" | 2-1/2"<br>2-5/8" | 2-1/2"<br>2-5/8" | 5/8"<br>5/8" |

| TYPE | SPREADER SIZE | BOLT THRU WOOD | SPAN-CRETE ROD | ANGLE TO SUPPORTING STRUCTURAL MEMBER | ROD SIZE FOR PIPES |
|---|---|---|---|---|---|
| I<br>II | C4X5.4<br>C5X6.7 | 1/2"<br>3/4" | 3/8"<br>3/8" | 3X2X1/4"X0'-3" LLH<br>3-1/2X2-1/2X5/16X0'-3" LLH | 1/2"<br>1/2" |
| III<br>IV | C6X8.5<br>C8X11.5 | ***<br>*** | 1/2"<br>1/2" | 3-1/2X2-1/2X7/16X0'-4" LLH<br>5X3X1/2X0'-4" LLH | 5/8"<br>3/4" |
| V<br>VI | C9X13.4<br>C10X15.3 | *** | | 2-3-1/2X2-1/2X7/16X0'-4"<br>2-5X3X1/2X0'-4" | 7/8" *<br>7/8" ** |

NOTES:

1 FOR SLABS LESS THAN 5" THICK ONLY, THIN SLAB INSERTS MAY BE USED.

*2 FOR USE W/CONC. CAST-IN PLACE INSERTS OR PHILLIPS REDHEAD IN HARD ROCK ONLY.

**3 FOR USE WITH CONC. CAST-IN PLACE INSERTS ONLY.

***4 WHERE TYPE III CONNECTIONS ARE REQUIRED FOR WOOD SYSTEMS, TYPE II CONNECTIONS SHALL BE USED WITH REDUCED RESTRAINT SPACING TO 20 FT. O.C. WHERE TYPE IV CONNECTIONS ARE REQUIRED FOR WOOD SYSTEMS, TYPE II CONNECTIONS SHALL BE USED WITH REDUCED RESTRAINT SPACING TO 15 FT. O.C. WHERE TYPE V CONNECTIONS ARE REQUIRED FOR WOOD SYSTEMS, TYPE II CONNECTIONS SHALL BE USED WITH REDUCED RESTRAINT SPACING TO 10 FT. O.C.

5 THE MECHANICAL CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO THE STRUCTURAL ENGINEER AND THEN TO THE MECHANICAL ENGINEER, SHOWING CONNECTION TYPE AND LOCATION OF ALL RESTRAINT CONNECTIONS TO THE STRUCTURE.

6 FOR ESSENTIAL FACILITIES WHERE CONCRETE ANCHOR BOLTS OF THE "REDHEAD" EXPANSION TYPE ARE LOADED IN PULL OUT, 50 PERCENT OF THE BOLTS (ALTERNATE BOLTS IN ANY GROUP ARRANGEMENT) SHALL BE PROOF TESTED TO TWICE THE ALLOWABLE LOAD. IF THERE ARE FAILURES, THE IMMEDIATELY ADJACENT BOLTS MUST THEN ALSO BE TESTED.

& "HILTI" AND "RAMSET" ANCHORS ARE EQUAL SUBSTITUTES FOR "REDHEAD".

## DUCT BRACING GENERAL NOTES

1 DETAILS SHOWN PROVIDE GENERAL GUIDELINES FOR A LATERAL BRACING SYSTEM. A TYPICAL VERTICAL SUPPORT SYSTEM MUST ALSO BE USED.
2 BRACE ALL RECTANGULAR DUCTS OF AREA 6 SQ. FT. AND LARGER. BRACE ALL ROUND DUCTS 28" IN DIAMETER AND LARGER.
3 CABLE RESTRAINTS AND BRACING NOT TO EXCEED 30'-0" CENTERS AND SHALL BE PROVIDED AT EACH TURN, AT THE END OF EACH DUCT RUN, AND ON EACH SIDE OF FLEXIBLE CONNECTIONS. BRACE POINTS SHALL NOT EXCEED 15'-0" FROM FLEXIBLE CONNECTION.
4 WHEN COMBINING DUCT GROUPS ON COMMON BRACING SYSTEMS, USE WEIGHTS AND DIMENSIONS FROM BRACING LIST.
5 ALL HOLES IN ANGLES ARE TO BE 1/16 INCH OVERSIZED. PLACE STANDARD CUT WASHERS BETWEEN SHEET METAL ANGLES AND NUT.
6 DUCTS NOT BRACED SHALL BE INSTALLED WITH A 6" MIN. CLEARANCE TO VERTICAL CEILING HANGER WIRES.
7 REHEAT BOXES AND OTHER ITEMS WHICH ATTACH TO THE DUCT SYSTEM SHALL BE BRACED INDEPENDENTLY OF THE DUCTS.
8 ALL SHEET METAL FOR BRACING TO BE FY = 33 KSI MINIMUM. GAUGE FOR SHEET METAL BRACING SHALL BE AS FOLLOWS:

16 GA = (0.0598 INCH)
14 GA = (0.0747 INCH)
12 GA = (0.1046 INCH)

9 MINIMUM DISTANCE FROM EDGE OF ANGLE TO BOLTS SHALL BE AS FOLLOWS:

| BOLT DIAMETER | DISTANCE FROM EDGE |
|---|---|
| 1/4" TO 1/2" | 1" |
| 5/8" | 1 1/8" |
| 3/4" | 1 1/4" |
| 7/8" | 1 1/2" |

10 DO NOT FASTEN RESTRAINT SYSTEM TO TWO DISSIMILAR PARTS OF A BUILDING THAT MAY RESPOND IN A DIFFERENT MODE DURING AN EARTHQUAKE. FOR EXAMPLE, A WALL AND A ROOF.
11 ALTERNATE EVERY OTHER CABLE RESTRAINT IN OPPOSITE DIRECTION (SHOWN DOTTED).

## REHEAT BOX CABLE BRACING SCHEDULE

| BOX WEIGHT | BOLT SIZE | *CABLE DIA. | **CABLE DESIGN | ANCHOR CONN. TYPE |
|---|---|---|---|---|
| UP TO 300# | 3/8" | 1/8" | 7 X 19 GALV | I |
| 400# | 3/8" | 1/8" | 7 X 19 GALV | I |
| 600# | 3/8" | 3/16" | 7 X 19 GALV | II |
| 800# | 3/8" | 3/16" | 7 X 19 GALV | II |

1. *FOUR CABLES REQUIRED, ONE AT EACH CORNER. EACH CABLE TO BE INSTALLED 45 TO HORIZONTAL AND 45 TO LONGITUDINAL DIRECTION.
2. **CABLE SYSTEMS TO BE EQUAL TO AMBER BOOT C/W THIMBLES, CLAMPS AND GROMMETS.

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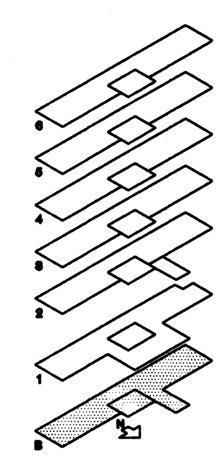
**JOB NO.**
FC: 93-169

**REVISIONS**
1 JULY 7, 94

BRIXEN & CHRISTOPHER ARCHITECTS
STRUCTURAL: E.W. ALLEN & ASSOC.
MECHANICAL: VAN BOERUM & FRANK
ELECTRICAL: KEY ENGINEERING INC.

STATE OFFICE BUILDING REMODEL – PHASE 5 BASEMENT FINISH FLOOR PLAN

**KEY PLAN**



**DATE**
AUG 1993

**TITLE**
SEISMIC DETAILS

**SHEET NO.**
M-5

174902 7-29-1993

State Office Building, Phase Five, Basement Remodel and Partial First Floor - FC:93-169
Seismic Details - 3550
00006KM5

# LEGEND OF MECHANICAL SYMBOLS AND ABBREVIATIONS

- POSITIVE PRESSURE DUCT – RISE
- POSITIVE PRESSURE DUCT – DROP
- NEGATIVE PRESSURE DUCT – RISE
- NEGATIVE PRESSURE DUCT – DROP
- ROUND DUCT – RISE
- ROUND DUCT – DROP
- RECTANGULAR DUCT
- ROUND DUCT
- UNDER FLOOR DUCT
- MEDIUM OR HIGH PRESSURE FLEX CONNECTION TO TERMINL UNIT
- UP — INCLINED DUCT RISE
- DN — INCLINED DUCT DROP
- MANUAL DAMPER
- FIRE DAMPER WITH ACCESS DOOR
- ATC DAMPER
- COMBINATION SMOKE AND FIRE DAMPER WITH ACCESS DOOR
- SMOKE DAMPER
- FLEXIBLE DUCT
- FLEXIBLE CONNECTION
- SUPPLY DIFFUSER
- EXHAUST AIR REGISTER
- OR — TURNING VANES
- SPLITTER DAMPER WITH TURNING VANES
- RETURN AIR GRILLE WITH SOUND BOOT
- FRESH AIR LOUVER
- RELIEF AIR OR EXHAUST AIR LOUVER
- RECTANGULAR TO RECTANGULAR TRANSITION
- ROUND TO ROUND TRANSITION
- RECTANGULAR TO ROUND TRANSITION

- 90~ ELBOW
- 45~ ELBOW
- RISER TURNED UP (PIPE OUT OF PLANE)
- RISER TURNED DOWN (PIPE INTO PLANE)
- LR ELBOW
- SIDE OUT DOWN ELBOW
- SIDE UP OUT ELBOW
- BASE ELBOW
- DOUBLE ELBOW
- REDUCED ELBOW
- SWEEP TEE
- STRAIGHT TEE (PIPE BRANCH – IN PLANE)
- TEE UP
- TEE DOWN
- SIDE OUT UP (PIPE BRANCH – OUT OF PLANE)
- SIDE OUT DOWN (PIPE BRANCH – INTO PLANE)
- CROSS
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- LATERAL STRAINER
- LATERAL STRAINER WITH BLOW-OFF VALVE
- GATE VALVE
- ATC VALVE – 2 WAY
- ATC VALVE – 3 WAY
- GLOBE VALVE
- HOSE GATE VALVE
- HOSE GLOBE VALVE
- ANGLE GLOBE VALVE
- ANGLE GLOBE VALVE DOWN
- ANGLE GATE VALVE
- ANGLE GATE VALVE DOWN
- PRESSURE REDUCING, SELF CONTAINED VALVE
- PRESSURE REDUCING, EXTERNAL PRESSURE VALVE
- BALL VALVE (PIPE SIZE 2" AND SMALLER)
- BUTTERFLY VALVE (PIPE SIZE 2-1/2" AND LARGER)
- CHECK VALVE
- 90~ CHECK VALVE

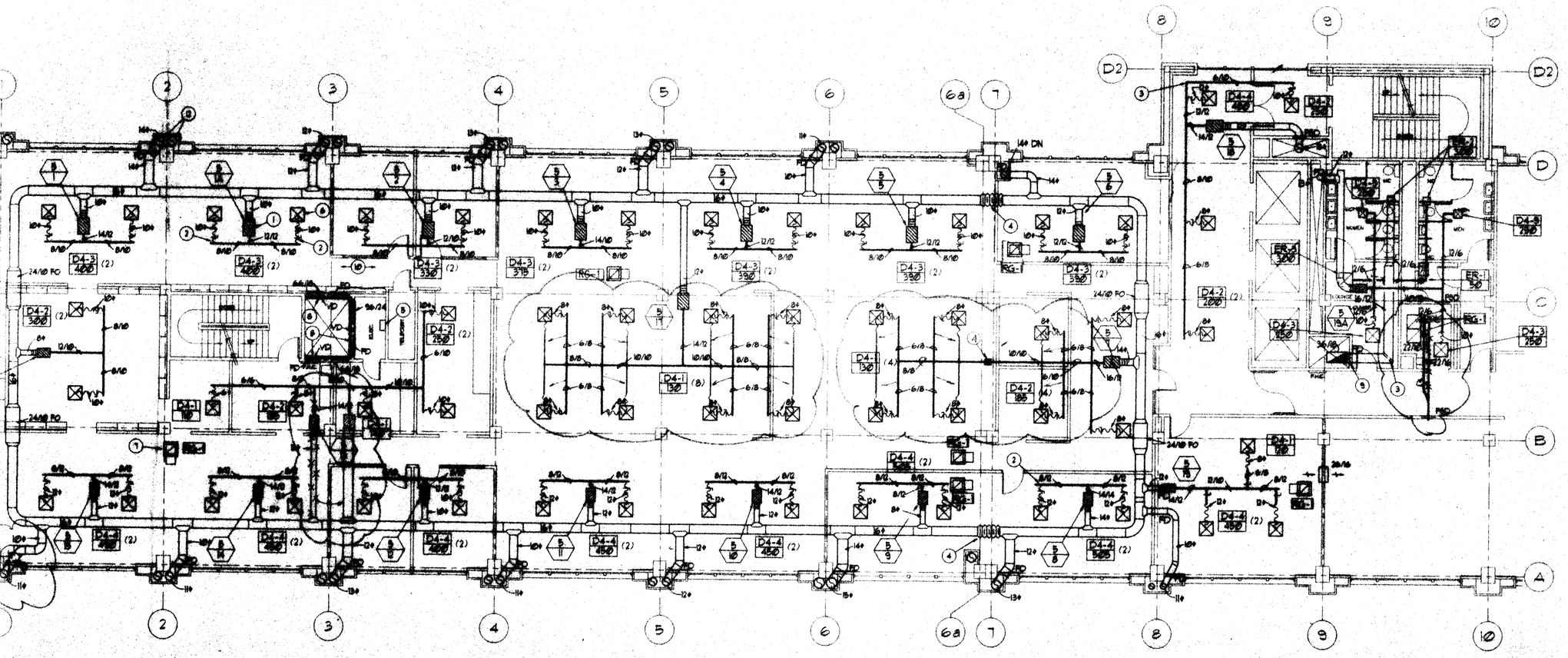
- COCK VALVE
- SAFETY VALVE
- QUICK OPENING VALVE
- EXPANSION JOINT
- FLOAT VALVE
- MOTOR OPER. GATE VALVE
- MOTOR OPER. GLOBE VALVE
- RELIEF VALVE
- DIAPHRAGM
- PE — PNEUMATIC-ELECTRIC CONTROL VALVE
- SOLINIOD VALVE
- ALIGNMENT GUIDE
- ANCHOR
- PRESSURE GAUGE WITH COCK
- PRESSURE SWITCH
- FLANGE
- UNION
- FLOW METER ORIFICE
- AIR VENT-AUTO
- AIR VENT-MANUAL
- AIR SEPERATOR
- REDUCING FLANGE
- FLOW SWITCH
- SLEEVE
- 0 - 100°F — THERMOMETER 0-100°F
- 30 - 240°F — THERMOMETER 30-240°F
- THERMOSTAT
- NIGHT THERMOSTAT
- STEAM TRAP
- SD — DUCT SMOKE DETECTOR
- H — DUCT HUMIDIFIER
- SHUT-OFF COCK FOR USE WITH PRESSURE GAUGE
- PUMP
- REDUCER
- EXPANSION LOOP
- FLEXIBLE CONNECTION
- GPM — FLOW METER

- G — NATURAL GAS
- ARROW INDICATES DIRECTION OF FLOW IN PIPE. LEADER INDICATES [illegible]
- PIPE DIRECTION CHANGE
- LPS — LOW PRESSURE STEAM
- LOW PRESSURE RETURN
- HPS — HIGH PRESSURE STEAM
- HPR — HIGH PRESSURE STEAM RETURN
- P — PUMP DISCHARGE
- MU — MAKE UP WATER
- V — AIR RELIEF LINE (VENT)
- FOF — FUEL OIL FLOW
- FOR — FUEL OIL RETURN
- FOV — FUEL OIL TANK VENT
- (name) E — EXISTING PIPING
- CWS — CHILLED WATER SUPPLY
- CWR — CHILLED WATER RETURN
- CS — CONDENSER WATER SUPPLY
- CR — CONDENSER WATER RETURN
- HWS — HEATING HOT WATER SUPPLY
- HWR — HEATING HOT WATER RETURN
- HTHWS — HIGH TEMPERATURE HOT WATER SUPPLY
- HTHWR — HIGH TEMPERATURE HOT WATER RETURN
- GPM — FLOW CONTROL VALVE
- CALIBRATED BALANCING VALVE
- HRS — HEAT RECOVERY SUPPLY
- HRR — HEAT RECOVERY RETURN

- SECTION TAG – TOP FIGURE IS SECTION NO. BOTTOM FIGURE IS SHEET NO.
- DETAIL TAG – TOP FIGURE IS DETAIL NO. BOTTOM FIGURE IS SHEET NO.
- EQUIPMENT IDENTIFICATION
- KEYED NOTE IDENTIFICATION
- P-1 — PLUMBING FIXTURES

[redacted]

D 3-10-1983



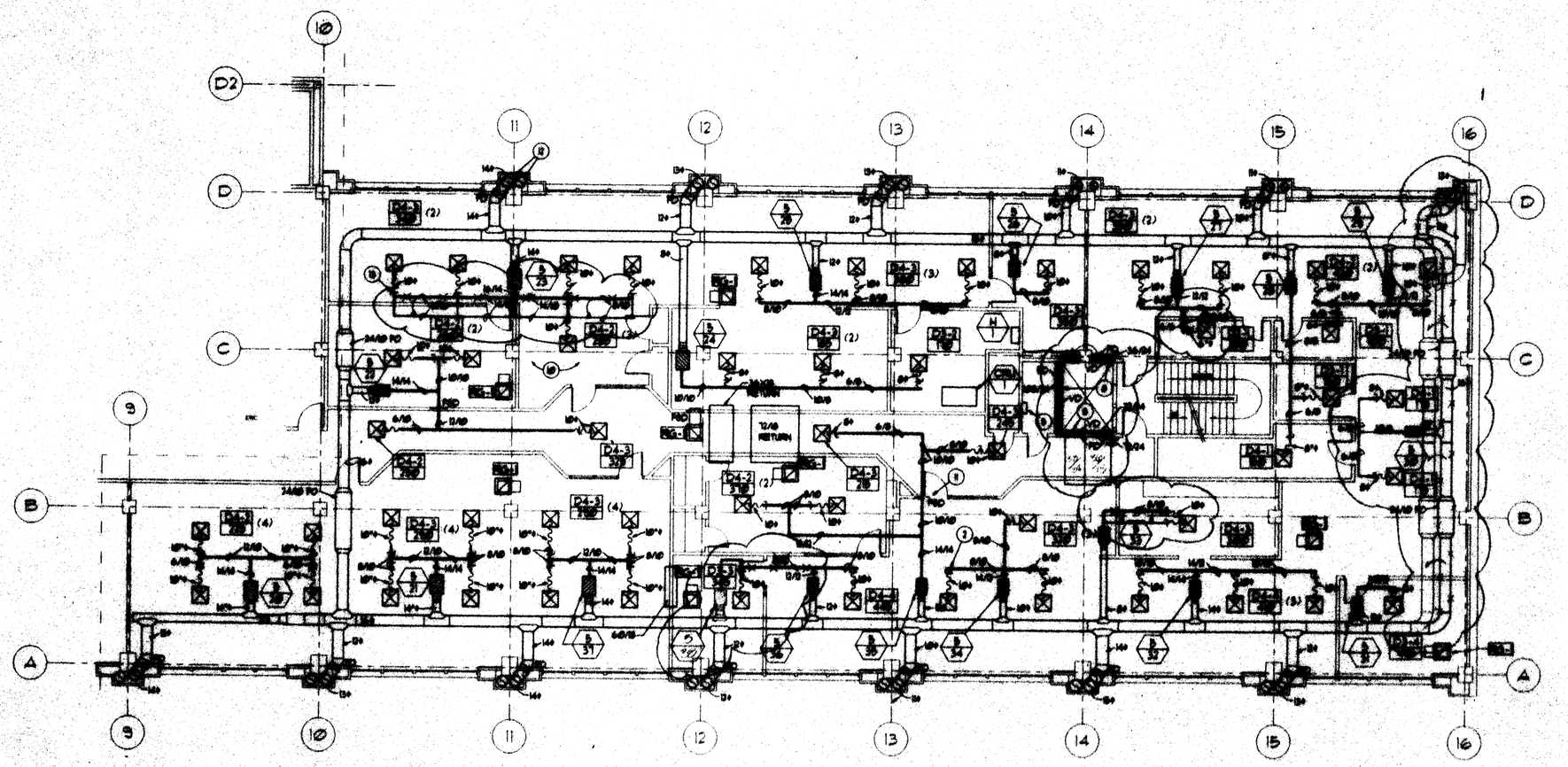
## WEST AREA MECHANICAL PLAN

FIFTH FLOOR 1/8" = 1'-0"

NORTH

## KEYED NOTES

1. [illegible]
2. [illegible]
3. [illegible]
4. [illegible]
5. NEW ATC COMMUNICATION PANEL. LOCATE 60 CLEARANCE AROUND ELECTRICAL EQUIPMENT IS NOT ATTACHED. COORDINATE WITH ELECTRICAL CONTRACTOR.
6. SUPPLY DIFFUSER WITH SUPPLY SOUND BOOT. SEE DETAILS. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION. TYPICAL FOR ALL SUPPLY DIFFUSERS.
7. RETURN AIR GRILLE WITH SOUND BOOT. SEE DETAILS. TYPICAL FOR ALL RETURN AIR GRILLES.
8. REMOVE THE EXISTING FIRE DAMPERS AND PROVIDE NEW FIRE DAMPERS. MODIFY EXISTING OPENING AS REQUIRED FOR NEW DAMPER INSTALLATION. INSTALL THIMBLE, VERTICAL SLEEVE WITH [illegible] IN FRONT OF FIRE DAMPER AT WALL. PROVIDE LOCKING ACCESS PANEL FOR DAMPER.
9. [illegible]
10. [illegible]
11. FIRE DAMPER WITH DAMPER, TYPICAL. [illegible] AT ALL FIRE RATED WALLS. REFER TO DRAWINGS FOR LOCATIONS OF FIRE RATED WALLS.
12. [illegible]

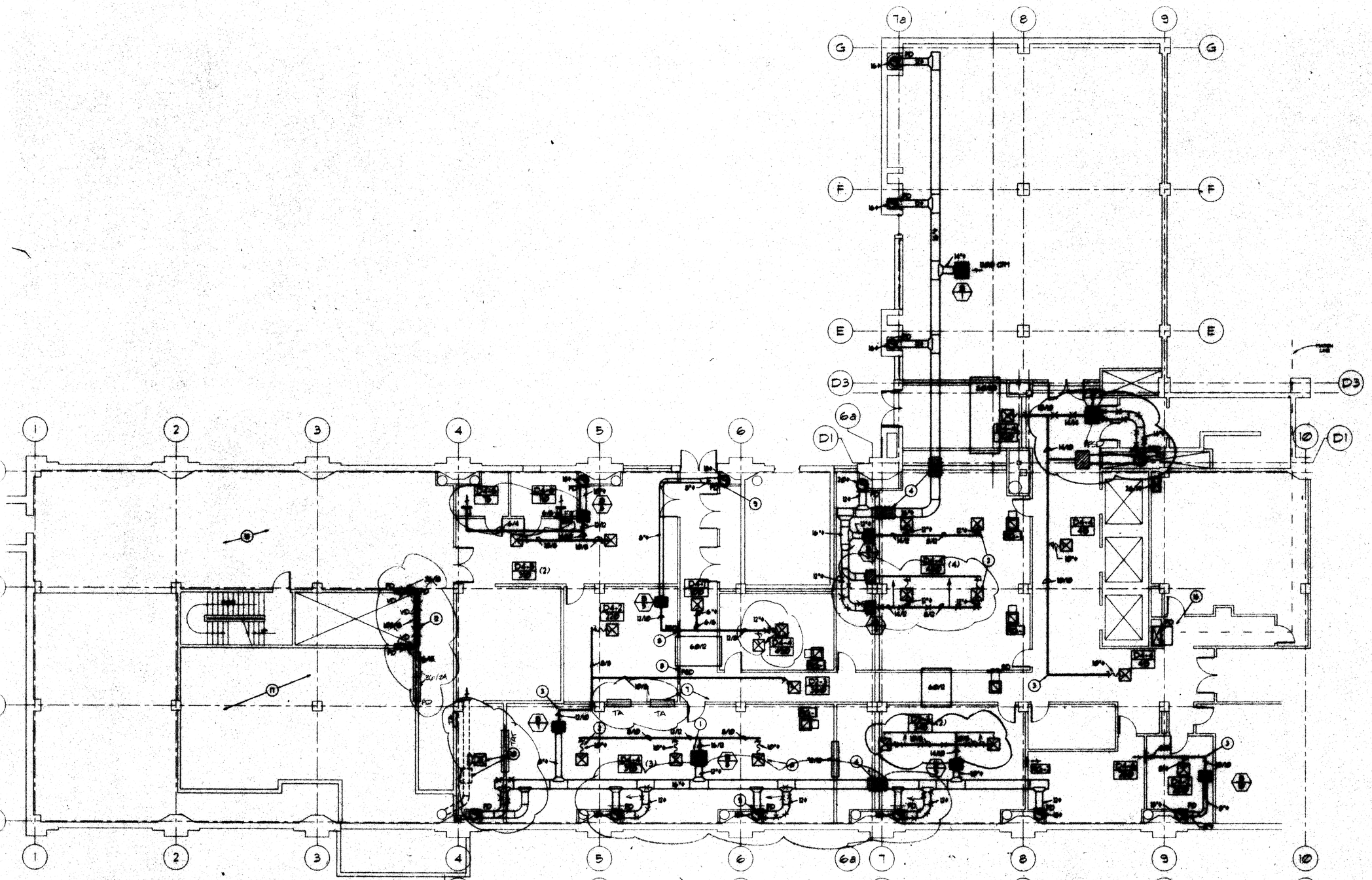


## EAST AREA MECHANICAL PLAN

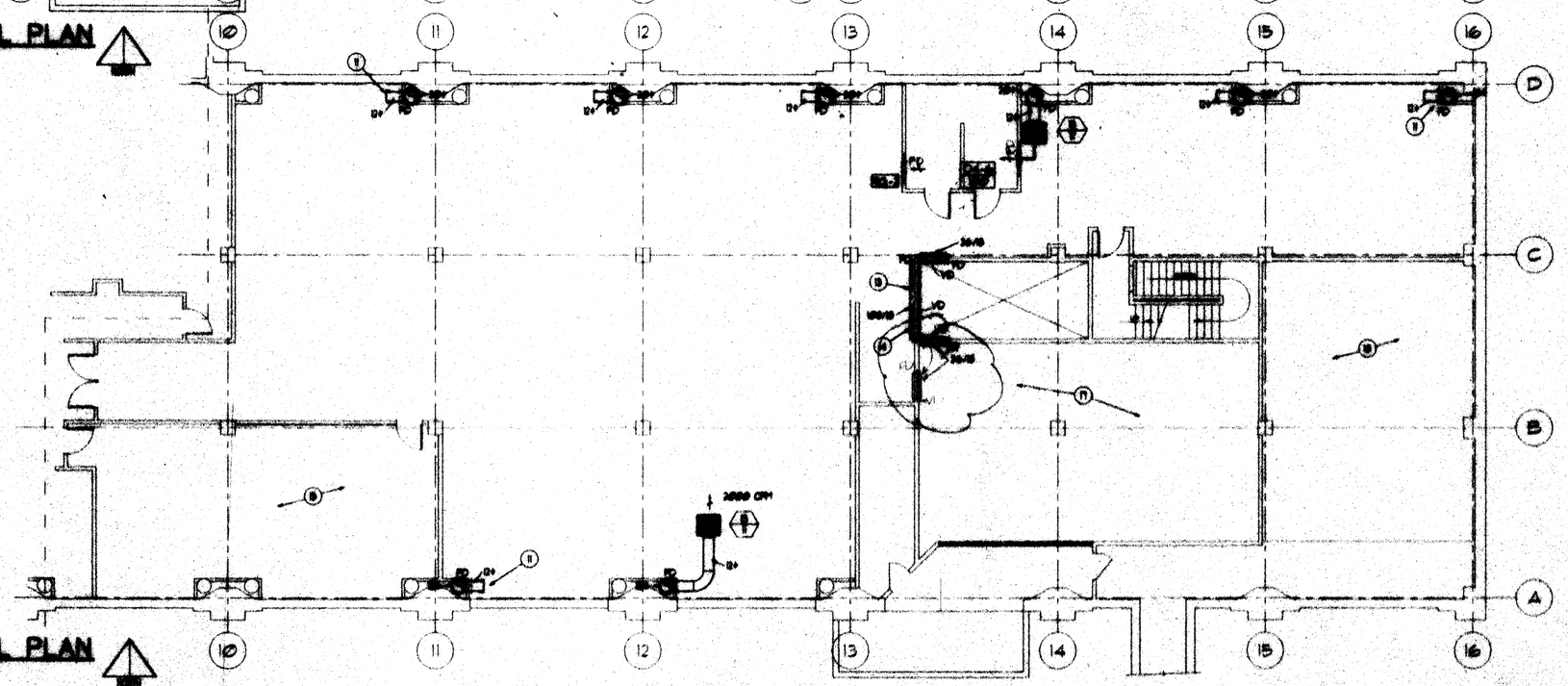
FIFTH FLOOR 1/8" = 1'-0"

NORTH

15-1983



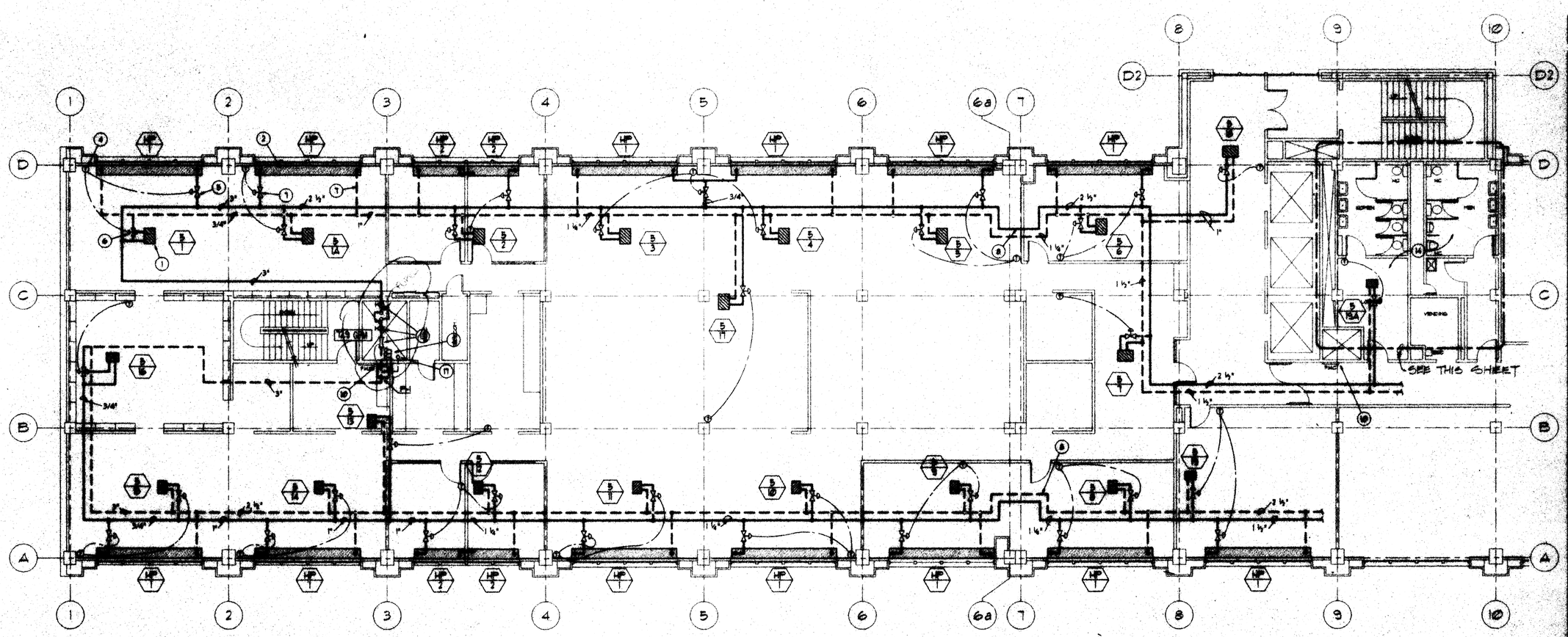
WEST AREA MECHANICAL PLAN
BASEMENT 1/8" = 1'-0"



EAST AREA MECHANICAL PLAN
BASEMENT 1/8" = 1'-0"

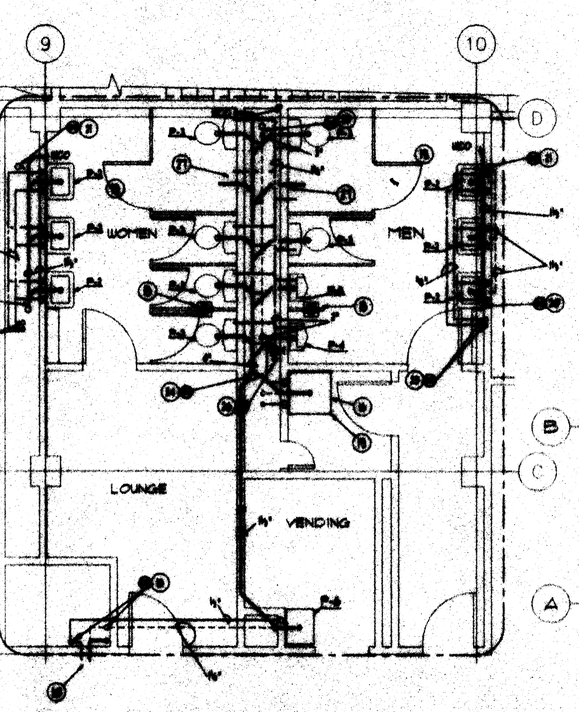
KEYED NOTES

[redacted]



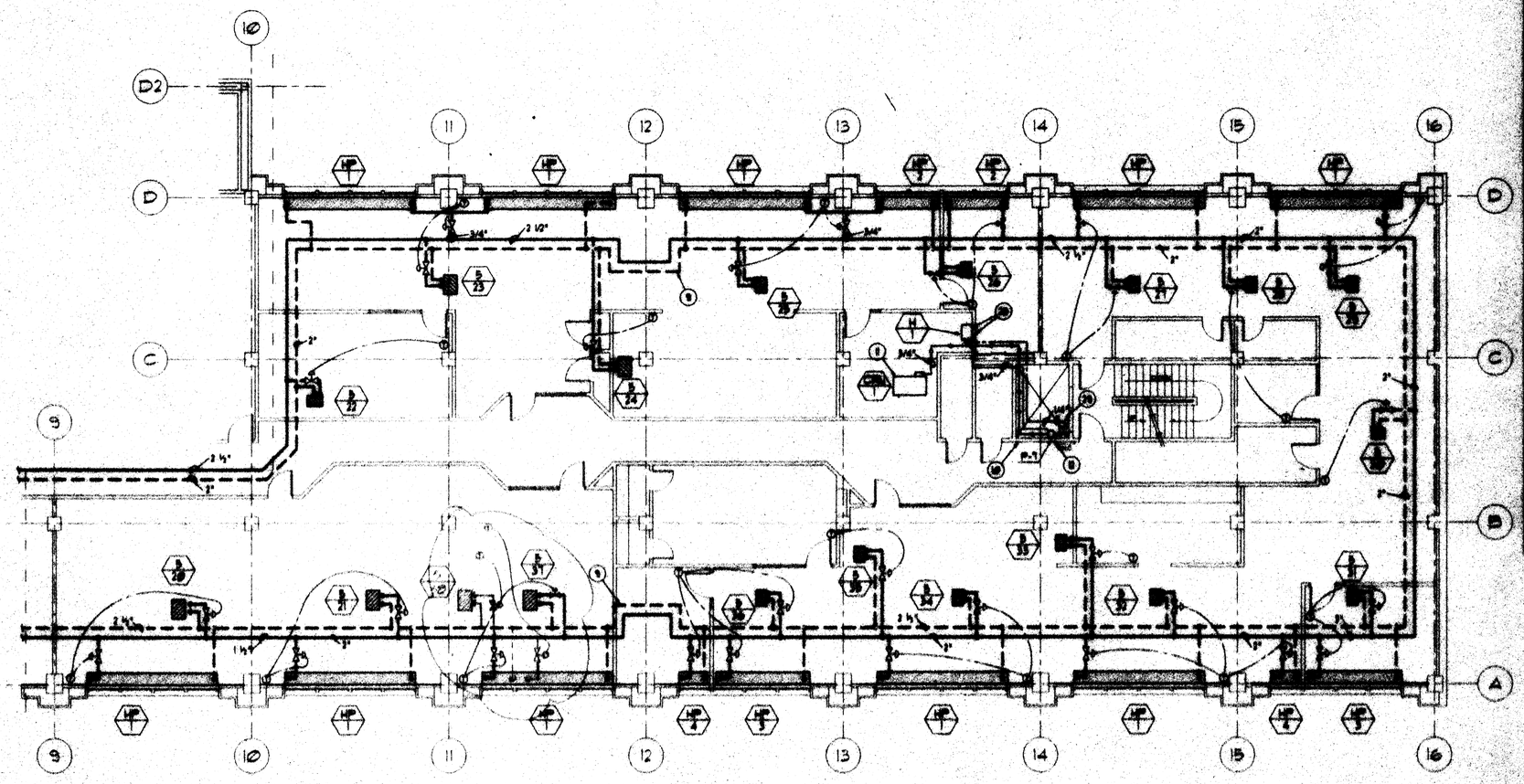

## WEST AREA MECHANICAL PIPING PLAN

FIFTH FLOOR 1/8" = 1'-0"




## 1/4 SCALE TOILET ROOM

FIFTH FLOOR 1/4" = 1'-0"



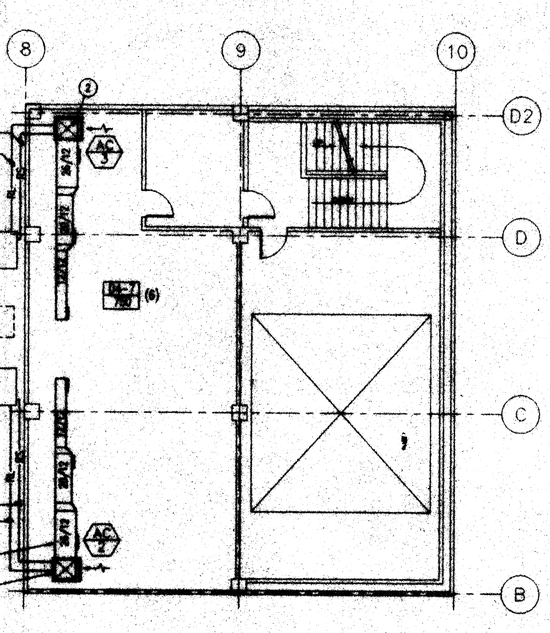
## EAST AREA MECHANICAL PIPING PLAN

FIFTH FLOOR 1/8" = 1'-0"

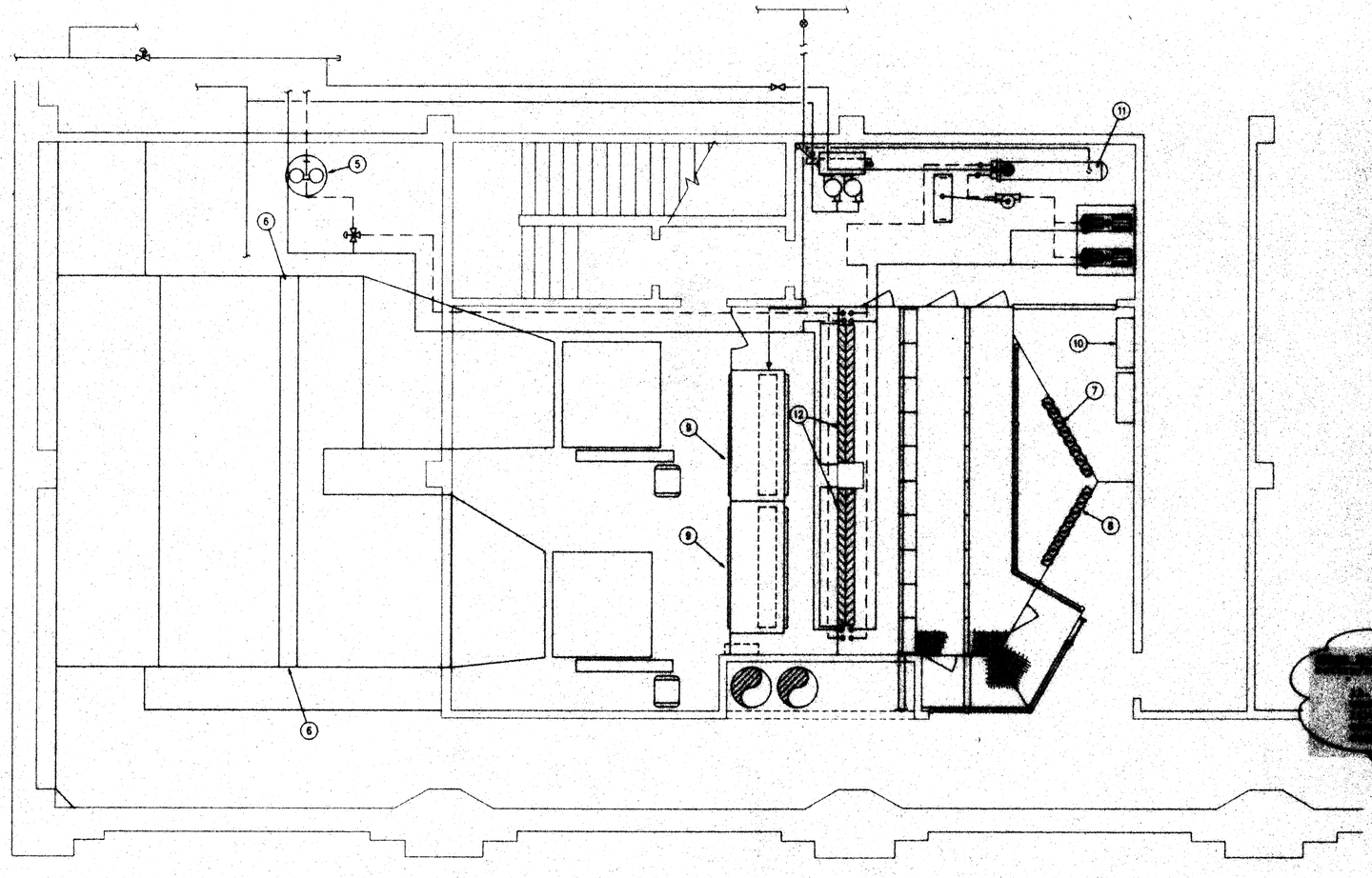
## KEYED NOTES

1. [redacted]
2. [redacted]
3. [redacted]
4. [redacted]
5. [redacted]
6. [redacted]
7. [redacted]
8. [redacted]
9. [redacted]
10. [redacted]
11. [redacted]
12. [redacted]
13. [redacted]
14. [redacted]
15. [redacted]
16. [redacted]
17. [redacted]

[redacted]




ELEVATOR PENTHOUSE FLOOR PLAN
SCALE: 1/8" = 1'-0"



WEST MECHANICAL ROOM FLOOR PLAN
SCALE: 1/8" = 1'-0"

## KEYED NOTES

1. [redacted]
2. [redacted]
3. [redacted]
4. [redacted]
5. [redacted]
6. [redacted]
7. [redacted]
8. [redacted]
9. [redacted]
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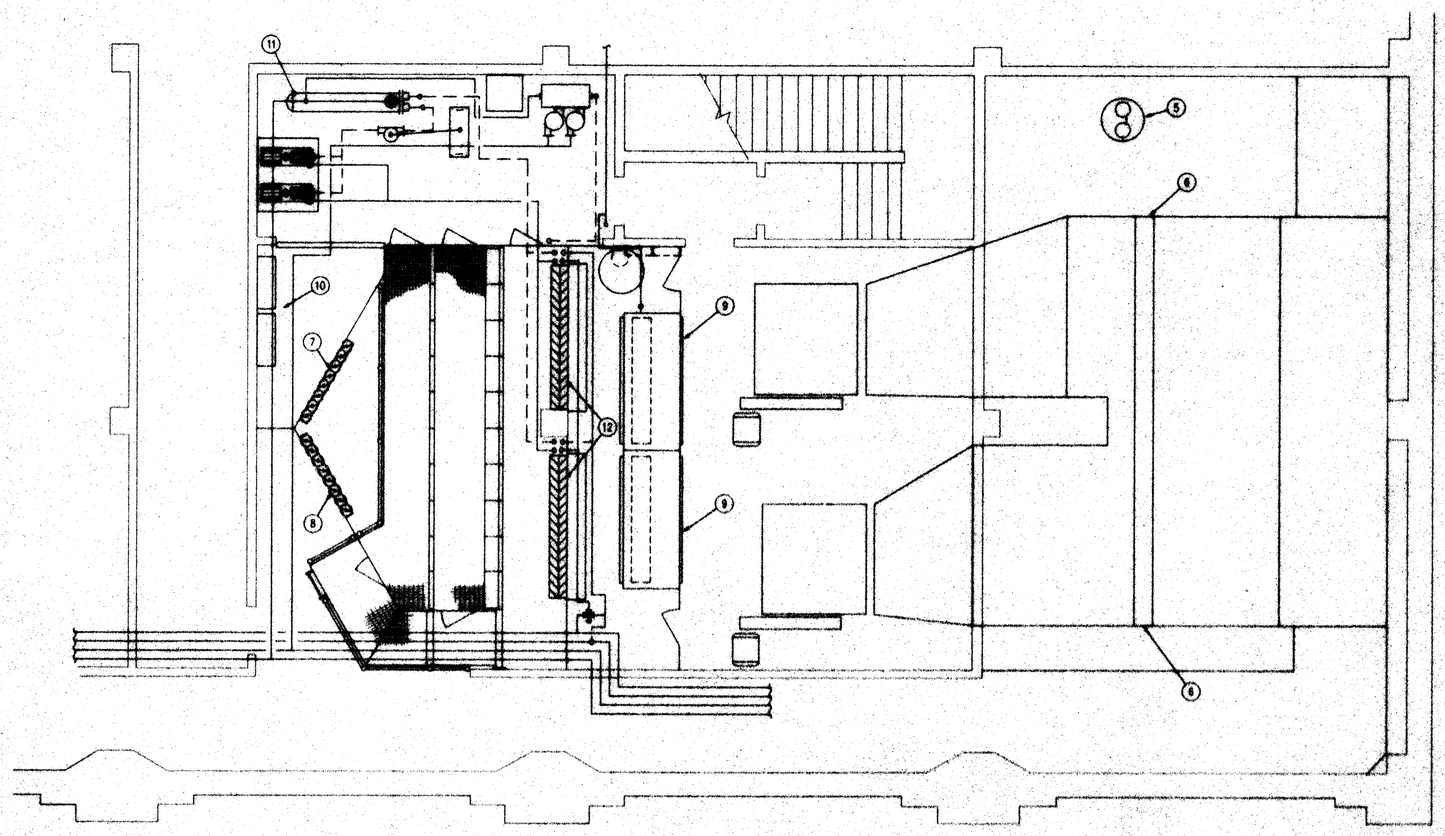
11. [redacted]
12. [redacted]



EAST MECHANICAL ROOM FLOOR PLAN
SCALE: 1/8" = 1'-0"

[redacted]