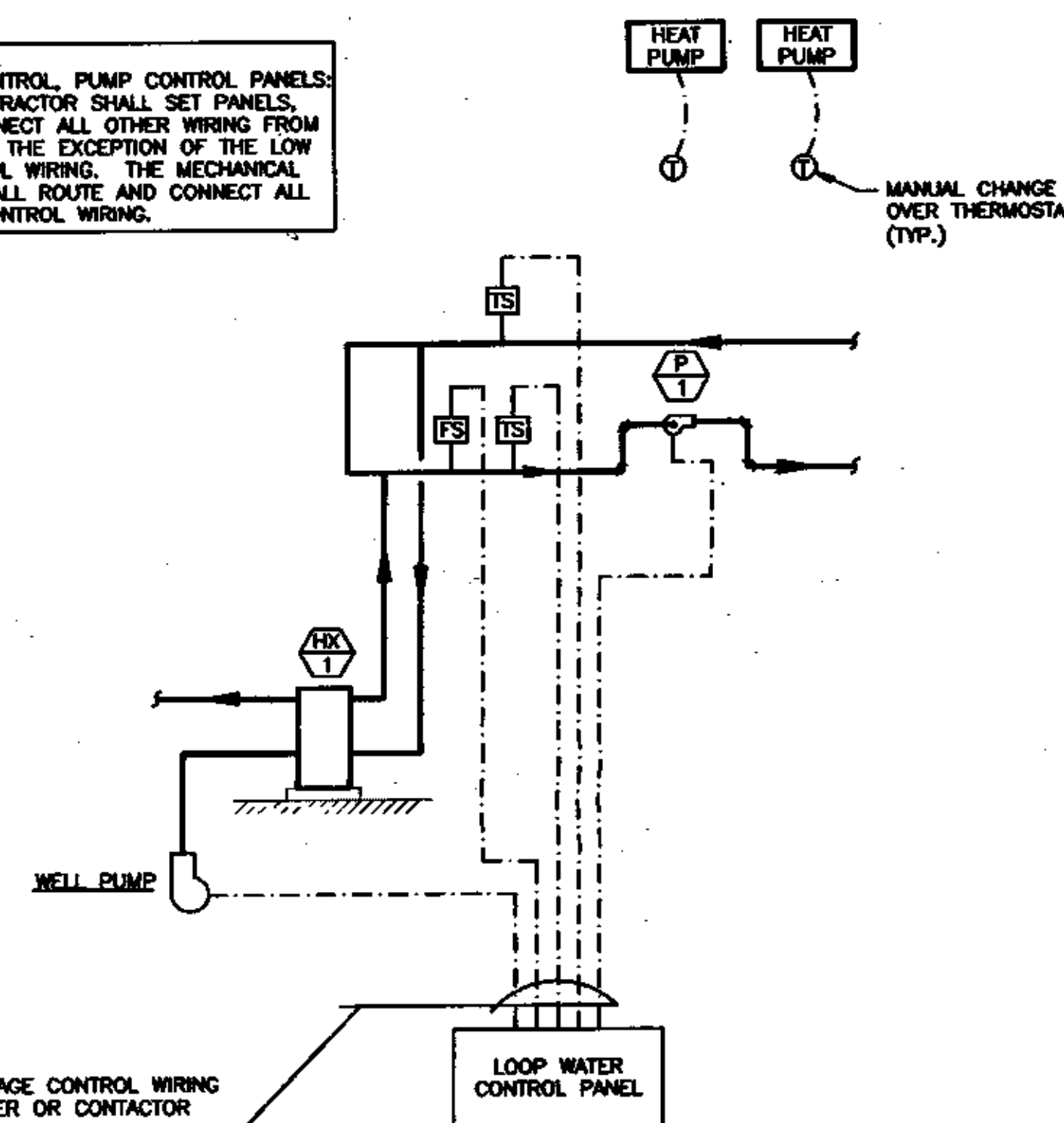


# HYDRONIC SYSTEM CONTROL SCHEMATIC

NOTE: LOOP WATER CONTROL, PUMP CONTROL PANELS: ELECTRICAL CONTRACTOR SHALL SET PANELS, ROUTE AND CONNECT ALL OTHER WIRING FROM THE PANEL WITH THE EXCEPTION OF THE LOW VOLTAGE CONTROL WIRING. THE MECHANICAL CONTRACTOR SHALL ROUTE AND CONNECT ALL LOW VOLTAGE CONTROL WIRING.



LOW VOLTAGE CONTROL WIRING TO STARTER OR CONTACTOR (TYP.)

LOOP WATER CONTROL PANEL LOCATED IN MECHANICAL ROOM.

# CONDENSER WATER SYSTEM FLUSHING AND TREATMENT

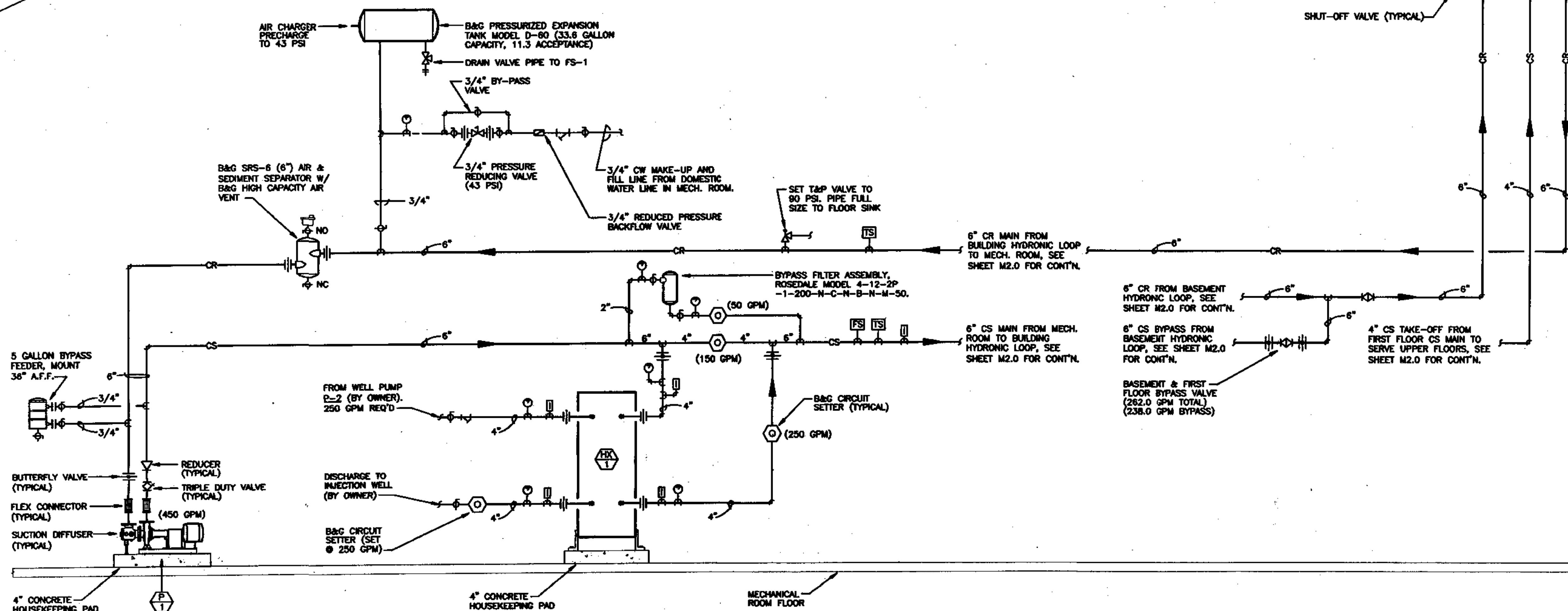
A QUALIFIED WATER TREATMENT CONTRACTOR SHALL BE UTILIZED TO FURNISH THE CLEANING MATERIAL & SUPERVISE THE FLUSHING & TREATMENT OF THE SYSTEM. APPROVED WATER TREATMENT CONTRACTORS MUST SHOW PROOF OF SIMILAR SERVICE FOR NOT LESS THAN 3 YEARS, & SHALL HAVE FULL TIME SERVICE PERSONNEL LOCATED WITHIN ONE-HOUR FROM THE JOB SITE. MONITORING & TREATMENT OF THE SYSTEM SHALL BE PROVIDED FOR A PERIOD OF ONE-YEAR FOLLOWING FINAL ACCEPTANCE OF BUILDING & SYSTEM.

## DESCRIPTION OF WORK (CLOSED LOOP):

1. FILL SYSTEM WITH A SOLUTION OF 10% BY WEIGHT OF A HEAVY DUTY ALKALINE LIQUID CLEANER. THE CLEANER SHALL BE CAPABLE OF WETTING & PENETRATING HEAVY SOIL DEPOSITS OF OIL OR GREASE, & KEEPING THESE PRODUCTS IN SUSPENSION.
2. CIRCULATE SOLUTION FOR A MINIMUM OF 8 HOURS, THEN FLUSH SYSTEM WITH CLEAN FRESH WATER UNTIL ALL SOLIDS HAVE BEEN CLEANED FROM THE SYSTEM. CLEAN ALL STRAINERS IN SYSTEM.
3. AFTER CLEANING, REFILL SYSTEM WITH A MIXTURE OF CLEAN WATER & CHEMICAL INHIBITOR. ADD NITRITE TO SYSTEM TO MAINTAIN A NITRITE LEVEL OF 800-1000 PPM. TEST FOR NITRITE USING A "DROP TEST" KIT.
4. AT THE CONCLUSION OF CLEANING & TREATING, WATER TREATMENT CONTRACTOR SHALL CERTIFY IN WRITING THAT THE SYSTEM HAS BEEN CLEANED & TREATED AS SPECIFIED.
5. AT THE END OF ONE-YEAR, SYSTEM SHALL AGAIN BE CHECKED & REFILLED AS REQUIRED TO MEET ABOVE SPECIFICATIONS. SERVICE DURING THE YEAR WARRANTY PERIOD SHALL BE AS REQUIRED TO MAINTAIN ABOVE SPECIFICATIONS.

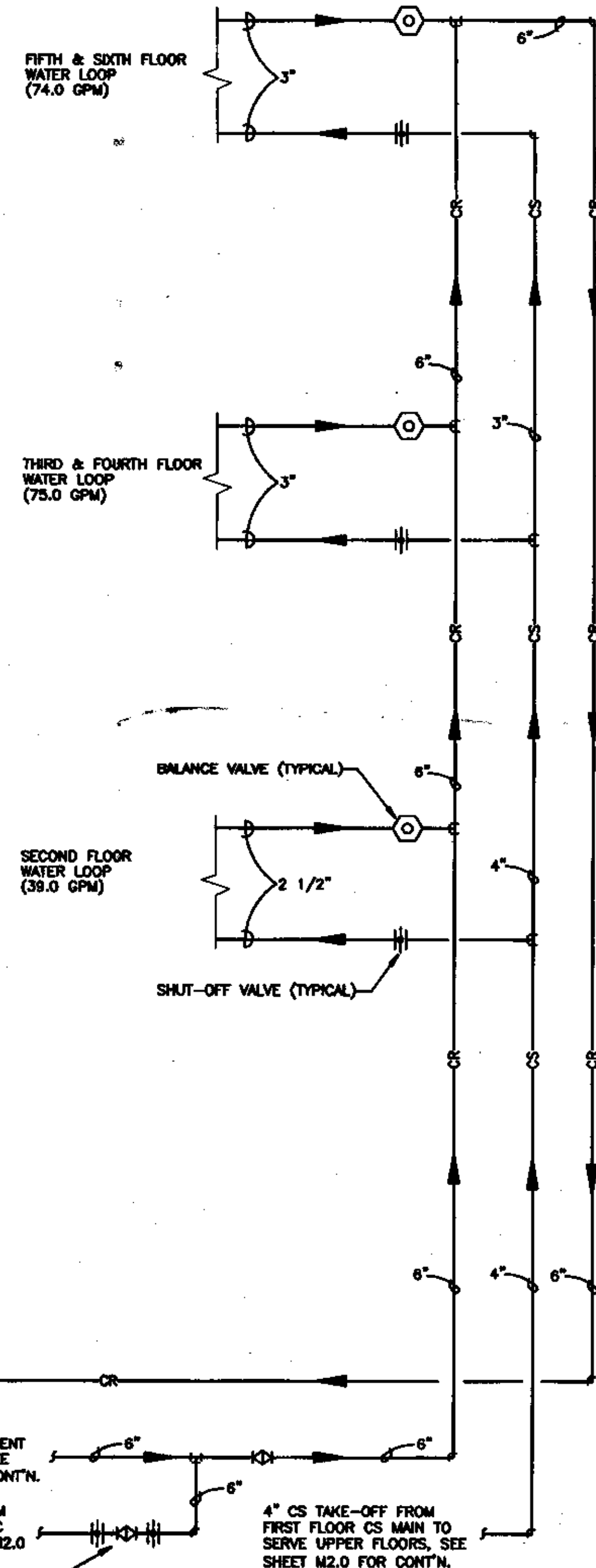
## SEQUENCE OF CONTROLS

1. LOOP WATER CONTROL PANEL (LWC) SHALL CONTROL THE OPERATION OF ALL COMPONENTS INCLUDING: CONTROL VALVE & PUMPS.
2. LOOP WATER TEMPERATURE: (ALL TEMP. SET POINTS SHALL BE ADJUSTABLE)
  - A. COOLING: (80°F RETURN) - PUMP AT WELL SHALL START PROVIDING FLOW THRU HK-1. FLOW SHALL CONTINUE UNTIL THE LOOP WATER RETURN TEMPERATURE OF 78°F IS MAINTAINED. ONCE MAINTAINED, WELL PUMP SHALL SHUT DOWN.
  - B. HEATING: (40°F RETURN) - PUMP SHALL START PROVIDING FLOW THRU HK-1. FLOW SHALL CONTINUE UNTIL THE LOOP WATER RETURN TEMPERATURE OF 42°F IS MAINTAINED. ONCE MAINTAINED, WELL PUMP SHALL SHUT DOWN.
  - C. NO HEATING OR HEAT REJECTION SHALL OCCUR WHEN THE RETURN WATER TEMPERATURE IS MAINTAINED BETWEEN THE SET POINTS OF 40°F AND 80°F.
3. ALARM LIGHTS AND HORN SHALL BE PROVIDED ON LWC TO INDICATED LOW WATER TEMPERATURE (35°F RETURN), HIGH WATER TEMPERATURE (100°F SUPPLY), AND NO-FLOW CONDITIONS.



# CONDENSER WATER PIPING DIAGRAM

NTS



FIFTH & SIXTH FLOOR WATER LOOP (74.0 GPM)

THIRD & FOURTH FLOOR WATER LOOP (75.0 GPM)

SECOND FLOOR WATER LOOP (38.0 GPM)

BALANCE VALVE (TYPICAL)

SHUT-OFF VALVE (TYPICAL)



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## REVISIONS

DRAWN: TDM  
PROJECT: 4121  
FILE NO.: 4121A2.DWG  
DATE: 11-15-01  
SHEET

**M3.0**

**MUSGROVE ENGINEERING, PA**  
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PROJECT NUMBER: 00-158

| WATER SOURCE HEAT PUMP SCHEDULE (EXTENDED RANGE) |                        |              |        |      |      |               |                  |             |               |            |                     |             |             |             |             |            |      |           |   |         |                                     |
|--------------------------------------------------|------------------------|--------------|--------|------|------|---------------|------------------|-------------|---------------|------------|---------------------|-------------|-------------|-------------|-------------|------------|------|-----------|---|---------|-------------------------------------|
| SYM                                              | UNIT TYPE              | NOMINAL TONS | BLOWER |      |      | HEATING REQ'D |                  |             | COOLING REQ'D |            |                     |             |             | COND. WATER |             | ELECTRICAL |      |           |   | REMARKS | RUN-OUT & HOSE KIT CONNECTOR SIZE ② |
|                                                  |                        |              | CFM    | ESP  | HP   | MBH           | E.A.T. (DB) (°F) | E.W.T. (°F) | MBH (TOTAL)   | MBH (SENS) | E.A.T. (DB/AB) (°F) | E.W.T. (°F) | L.W.T. (°F) | GPM         | MAX.PD (FT) | V/ø        | MCA  | FUSE SIZE |   |         |                                     |
| HP-1                                             | VERTICAL R.H. RET. AIR | .75          | 300    | 0.25 | 1/20 | 8.92          | 68               | 47          | 8.78          | 8.31       | 80/62               | 82          | 70          | 1.8         | 4.4         | 208/1      | 4.8  | 15        | ① | 3/4"    |                                     |
| HP-2                                             | VERTICAL L.H. RET. AIR | .75          | 300    | 0.25 | 1/20 | 8.92          | 68               | 47          | 8.78          | 8.31       | 80/62               | 82          | 70          | 1.8         | 4.4         | 208/1      | 4.8  | 15        | ① | 3/4"    |                                     |
| HP-3                                             | VERTICAL R.H. RET. AIR | 1.5          | 630    | 0.25 | 1/8  | 18.84         | 68               | 47          | 17.83         | 17.40      | 80/62               | 82          | 70          | 3.8         | 13.7        | 208/1      | 13.0 | 20        | ① | 1"      |                                     |
| HP-4                                             | VERTICAL L.H. RET. AIR | 1.5          | 630    | 0.25 | 1/8  | 18.84         | 68               | 47          | 17.83         | 17.40      | 80/62               | 82          | 70          | 3.8         | 13.7        | 208/1      | 13.0 | 20        | ① | 1"      |                                     |
| HP-5                                             | VERTICAL R.H. RET. AIR | 1.5          | 630    | 0.25 | 1/8  | 18.84         | 68               | 47          | 17.83         | 17.40      | 80/62               | 82          | 70          | 3.8         | 13.7        | 208/1      | 13.0 | 20        | ① | 1"      |                                     |
| HP-6                                             | VERTICAL R.H. RET. AIR | 2            | 800    | 0.40 | 1/5  | 23.8          | 68               | 47          | 23.70         | 22.13      | 80/62               | 82          | 70          | 5.0         | 5.9         | 208/1      | 14.9 | 25        | ① | 1"      |                                     |
| HP-7                                             | VERTICAL L.H. RET. AIR | 2            | 800    | 0.40 | 1/5  | 23.8          | 68               | 47          | 23.70         | 22.13      | 80/62               | 82          | 70          | 5.0         | 5.9         | 208/1      | 14.9 | 25        | ① | 1"      |                                     |
| HP-8                                             | VERTICAL R.H. RET. AIR | 1.25         | 500    | 0.35 | 1/8  | 12.70         | 68               | 47          | 12.35         | 11.93      | 80/62               | 82          | 70          | 2.7         | 8.8         | 208/1      | 8.3  | 15        | ① | 3/4"    |                                     |
| HP-9                                             | VERTICAL L.H. RET. AIR | 1.25         | 500    | 0.35 | 1/8  | 12.70         | 68               | 47          | 12.35         | 11.93      | 80/62               | 82          | 70          | 2.7         | 8.8         | 208/1      | 8.3  | 15        | ① | 3/4"    |                                     |
| HP-10                                            | VERTICAL R.H. RET. AIR | .50          | 230    | 0.25 | 1/20 | 7.48          | 68               | 47          | 6.54          | 6.30       | 80/62               | 82          | 70          | 1.4         | 0.80        | 208/1      | 4.0  | 15        | ① | 3/4"    |                                     |

APPROVED MANUFACTURERS: TRANE, CLIMATE MASTER, WATER FURNACE

CCH007: HP-10  
CCH009: HP-1,2  
CCH015: HP-8,9  
CCH018: HP-3,4,5  
CCH024: HP-6,7

- (1) PROVIDE W/EXTRA-QUIET CONSTRUCTION, LINE SIZED GRISWOLD 24" AUTOMATIC BALANCING HOSE KIT (W/AUTOMATIC FLOW CONTROL VALVE, TEST PLUGS, BALL VALVES AND STRAINER), DRAIN PAN OVERFLOW SENSOR, INTEGRAL DISCONNECT, AND MAN. HTG./COOLING T-STAT
- (2) PROVIDE FIRE RATED HOSE KITS

| PUMP SCHEDULE |                                   |                 |               |         |         |       |      |       |                      |  |  |
|---------------|-----------------------------------|-----------------|---------------|---------|---------|-------|------|-------|----------------------|--|--|
| SYM           | TYPE                              | SERVICE         | FLOW CAPACITY |         |         | MOTOR |      |       | MANUFACTURER & MODEL |  |  |
|               |                                   |                 | GPM           | HEAD FT | MIN EFF | HP    | RPM  | V/ø   |                      |  |  |
| P-1           | BASE MTD. CENTRIFUGAL END SUCTION | CONDENSER WATER | 450           | 100     | 78      | 20    | 1750 | 460/3 | B&G 1510 MODEL 4E    |  |  |

APPROVED MANUFACTURERS: TACO, PACO, PEERLESS, ARMSTRONG

- (1) PROVIDE W/B&G GG-3X SUCTION DIFFUSER AND B&G JDS-6S TRIPLE DUTY VALVE.

| HEAT EXCHANGER SCHEDULE |               |                  |     |                   |     |                  |           |                            |           |                      |         |
|-------------------------|---------------|------------------|-----|-------------------|-----|------------------|-----------|----------------------------|-----------|----------------------|---------|
| UNIT                    | SYSTEM        | HOT SIDE<br>(°F) |     | COLD SIDE<br>(°F) |     | HX FLOW<br>(GPM) |           | MAX PRESSURE LOSS<br>(PSI) |           | MANUFACTURER & MODEL | REMARKS |
|                         |               | COOLING          |     | COOLING           |     | HOT SIDE         | COLD SIDE | HOT SIDE                   | COLD SIDE |                      |         |
|                         |               | ENT              | LVG | ENT               | LVG |                  |           |                            |           |                      |         |
| HX-1                    | HYDRONIC LOOP | 78"              | 58" | 55"               | 75" | 255              | 255       | 10.0                       | 10.0      | ALFA-LAVAL M15-BFG   | ①②③     |
|                         |               | HEATING          |     | HEATING           |     |                  |           |                            |           |                      |         |
|                         |               | ENT              | LVG | ENT               | LVG |                  |           |                            |           |                      |         |
|                         |               | 42"              | 52" | 55"               | 45" |                  |           |                            |           |                      |         |

- (1) ALTERNATE MANUFACTURER: ITT STANDARD, BELL & GOSSETT, TRANTER, MUELLER, APV.
- (2) HEAT EXCHANGER SHALL BE ASME RATED, 316 STAINLESS STEEL CONSTRUCTION.
- (3) PIPING CONNECTIONS TO HEAT EXCHANGERS AS SHOWN ON PIPING SCHEMATICS MAY NOT REFLECT EACH MANUFACTURER'S ACTUAL CONNECTION ORDER.

| EXHAUST FAN SCHEDULE |                  |                    |        |      |         |        |            |       |       |                                                                          |  |
|----------------------|------------------|--------------------|--------|------|---------|--------|------------|-------|-------|--------------------------------------------------------------------------|--|
| SYM                  | TYPE             | AREA SERVED        | BLOWER |      |         | HEATER | ELECTRICAL |       | SONES | MANUFACTURER & MODEL                                                     |  |
|                      |                  |                    | CFM    | ESP  | MAX RPM |        | WATTS      | V/ø   |       |                                                                          |  |
| EF-1                 | CEILING FAN      | INTERIOR BATHROOMS | 80     | .125 | 1250    | ---    | 60         | 120/1 | 2.5   | BROAN MODEL NO. HD80 WITH AUTOMATIC BACKDRAFT DAMPER                     |  |
| EF-2                 | CEILING FAN/HEAT | EXTERIOR BATHROOMS | 70     | .125 | 1250    | ---    | 20AMPS     | 120/1 | 3.5   | BROAN MODEL NO. 958 WITH AUTOMATIC BACKDRAFT DAMPER                      |  |
| EF-3                 | RANGE HOOD (30") | KITCHEN            | 160    | .125 | 1250    | 4436   | 20AMPS     | 120/1 | 6.5   | BROAN MODEL NO. 403001 WITH ALUMINUM FILTER & AUTOMATIC BACKDRAFT DAMPER |  |
| EF-4                 | CEILING FAN      | UNIT 202 KITCHEN   | 110    | .125 | 1160    | ---    | .7AMPS     | 120/1 | 1.5   | BROAN MODEL NO. S110U WITH AUTOMATIC BACKDRAFT DAMPER                    |  |
| EF-5                 | CEILING FAN/HEAT | LAUNDRY ROOM       | 130    | .375 | 1400    | ---    | 113        | 120/1 | 3.4   | GREENHECK MODEL NO. SP-218 WITH AUTOMATIC BACKDRAFT DAMPER               |  |
| EF-6                 | CEILING FAN      | H.C. TOILET        | 104    | .250 | 1100    | ---    | 53         | 120/1 | 1.9   | GREENHECK MODEL NO. SP-216 WITH AUTOMATIC BACKDRAFT DAMPER               |  |
| EF-7                 | CEILING FAN/HEAT | ELEV. EQUIP. RM.   | 104    |      | 1100    | ---    | 53         | 120/1 | 1.9   | GREENHECK MODEL NO. SP-224 WITH AUTOMATIC BACKDRAFT DAMPER               |  |
| EF-8                 | CEILING FAN      | MEN'S RESTROOM     | 220    |      | 1000    | ---    | 83         | 120/1 | 3.4   | GREENHECK MODEL NO. SP-224 WITH AUTOMATIC BACKDRAFT DAMPER               |  |
| EF-9                 | CEILING FAN/HEAT | WOMEN'S RESTROOM   | 220    |      | 1000    | ---    | 83         | 120/1 | 3.4   | GREENHECK MODEL NO. SP-224 WITH AUTOMATIC BACKDRAFT DAMPER               |  |
| CAF-1                | CEILING FAN/HEAT | BASMENT MECH. RM.  | 200    | ---  | ---     | ---    | 15AMPS     | 120/1 | ---   | TJERNLUND MODEL PA-6 W/ MULTI-APPLIANCE CTL. PANEL & WALL INTAKE HOOD    |  |

ALTERNATE MANUFACTURERS: NUTONE, EMERSON, PENN, COOK, O.A.E.

| ELECTRIC HEATER SCHEDULE |                      |     |     |     |            |       |    |                                    |  |  |  |
|--------------------------|----------------------|-----|-----|-----|------------|-------|----|------------------------------------|--|--|--|
| SYMBOL                   | TYPE                 | FAN |     |     | ELECTRICAL |       |    | MANUFACTURERS                      |  |  |  |
|                          |                      | HP  | RPM | CFM | WATTS      | VOLTS | PH |                                    |  |  |  |
| EH-1                     | SURFACE MOUNTED WALL | --- | --- | 100 | 2000       | 208   | 1  | Q-MARK AWH-4208 W/INTERGRAL T-STAT |  |  |  |
| EH-2                     | SURFACE MOUNTED WALL | --- | --- | 100 | 4000       | 208   | 1  | Q-MARK AWH-4408 W/INTERGRAL T-STAT |  |  |  |

ALTERNATE MANUFACTURERS: MARKEL, O.A.E.

| SUPPLY GRILLE SCHEDULE |              |           |         |
|------------------------|--------------|-----------|---------|
| SYMBOL                 | NOMINAL SIZE | CFM RANGE | REMARKS |
| G-1                    | 20"x8"       | 250-450   | (1)(2)  |
| G-2                    | 12"x6"       | 100-200   | (1)(2)  |
| G-3                    | 6"x4"        | 0-100     | (1)(2)  |
| G-4                    | 24"x8"       | 300-500   | (2)(3)  |

REMARKS:

- (1) WALL GRILLE SIZES BASED ON HART & COOLEY MODEL A861, TWO-WAY THROW BLADES, 3/4" SPACING, OPPOSED BLADE DAMPER W/ OPERATOR HANDLE, OFF-WHITE FINISH, APPROVED MANUFACTURERS INCLUDE ANEMOSTAT, CARNES, J&J REGISTER, NAILOR, TUTTLE & BAILEY, METAL-AIRE & TITUS.
- (2) SIZES BASED ON A MAXIMUM NC LEVEL OF 25.
- (3) WALL GRILLE SIZES BASED ON TITUS MODEL 272F, DOUBLE DEFLECTION ADJUSTABLE BLADES, 3/4" SPACING, OPPOSED BLADE DAMPER W/ OPERATOR HANDLE, OFF-WHITE FINISH, APPROVED MANUFACTURERS INCLUDE ANEMOSTAT, CARNES, J&J REGISTER, NAILOR, TUTTLE & BAILEY, & METAL-AIRE.

| DIFFUSER SCHEDULE |              |                  |           |              |
|-------------------|--------------|------------------|-----------|--------------|
| SYMBOL            | NOMINAL SIZE | NECK/RUNOUT SIZE | CFM RANGE | REMARKS      |
| D-1               | 6x6          | 6"               | 0-90      | (1)(2)(3)(4) |
| D-2               | 9x9          | 8"               | 90-200    | (1)(2)(3)(4) |
| D-3               | 12X12        | 10"              | 200-480   | (1)(2)(3)(4) |
| D-4               | 15X15        | 12"              | 300-500   | (1)(2)(3)(4) |

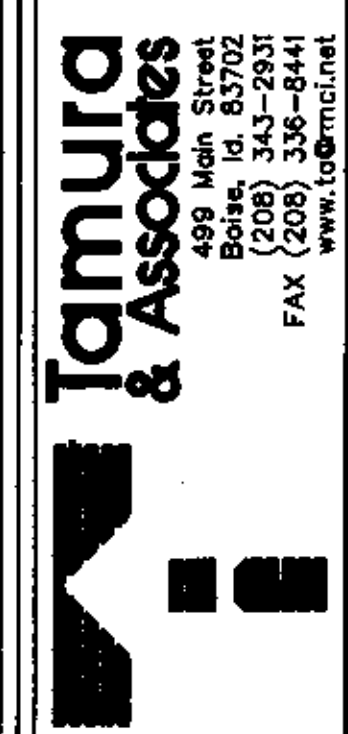
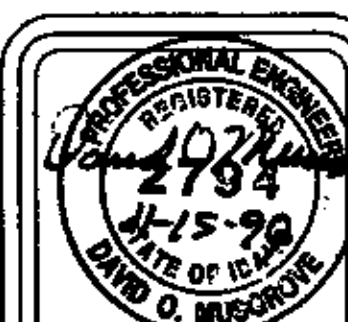
REMARKS:

- (1) SIZES BASED ON HART & COOLEY MODEL AFMF SERIES, APPROVED MANUFACTURERS INCLUDE ANEMOSTAT, CARNES, J&J REGISTER, NAILOR, TUTTLE & BAILEY, METAL-AIRE, KRUEGER AND PRICE.
- (2) SIZES BASED ON A MAXIMUM NC LEVEL OF 25.
- (3) SEE HVAC FLOOR PLANS FOR DIRECTIONAL THROW REQUIREMENTS FOR EACH DIFFUSER.
- (4) OFF-WHITE FINISH.

| RETURN & EXHAUST GRILLE SCHEDULE |              |                  |           |           |
|----------------------------------|--------------|------------------|-----------|-----------|
| SYMBOL                           | NOMINAL SIZE | NECK/RUNOUT SIZE | CFM RANGE | REMARKS   |
| R-1                              | 18X16        | 18X16            | 0-650     | (1)(3)(4) |
| R-2                              | 12X18        | 12X18            | 0-650     | (1)(3)(4) |
| R-3                              | 18X24        | 18X24            | 0-800     | (1)(3)(4) |
| R-4                              | 18X18        | ---              | 0-650     | (2)(3)(4) |

REMARKS:

- (1) WALL GRILLE SIZES BASED ON HART & COOLEY MODEL A700, HEAVY DUTY ALUMINUM BLADES & FRAME 45° DEFLECTION, APPROVED MANUFACTURERS INCLUDE ANEMOSTAT, CARNES, J&J REGISTER, NAILOR, TUTTLE & BAILEY, KRUEGER, METAL-AIRE, AND PRICE.
- (2) DOOR GRILLE SIZES BASED ON HART & COOLEY MODEL A700, HEAVY DUTY ALUMINUM BLADES & FRAME 45° DEFLECTION, APPROVED MANUFACTURERS INCLUDE ANEMOSTAT, CARNES, J&J REGISTER, NAILOR, TUTTLE & BAILEY, KRUEGER, METAL-AIRE, AND PRICE.
- (3) SIZES BASED ON A MAXIMUM NC LEVEL OF 25.
- (4) OFF-WHITE FINISH.



**IDANHA HOTEL RENOVATION**  
928 WEST MAIN  
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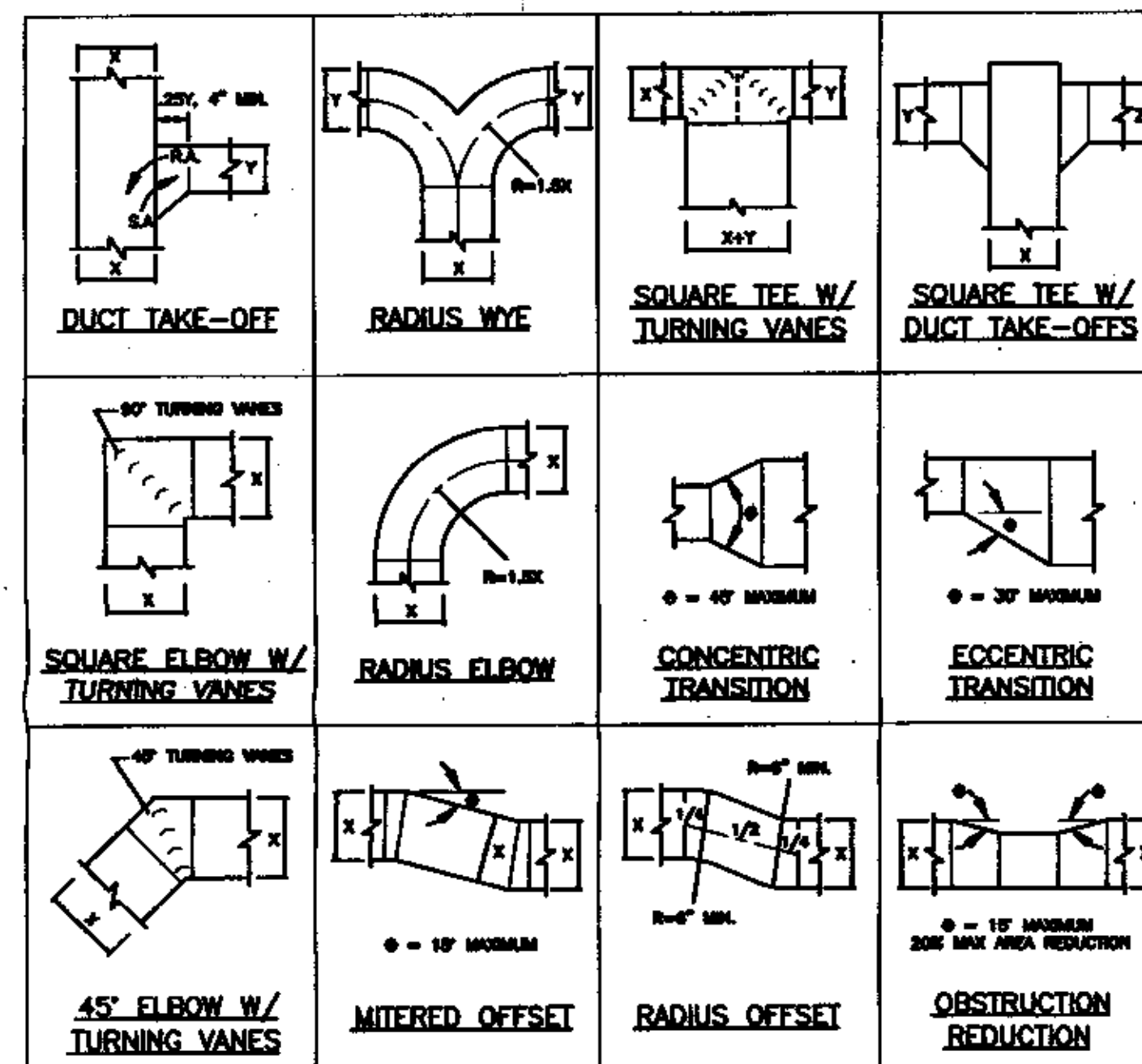
REVISIONS

|          |              |
|----------|--------------|
| DRAWN    | TDH          |
| PROJECT  | 1121         |
| FILE NO. | 1121A2.0.DWG |
| DATE     | 11-15-91     |
| SHEET    | M4.0         |

# MECHANICAL AND PLUMBING DRAWING LEGEND

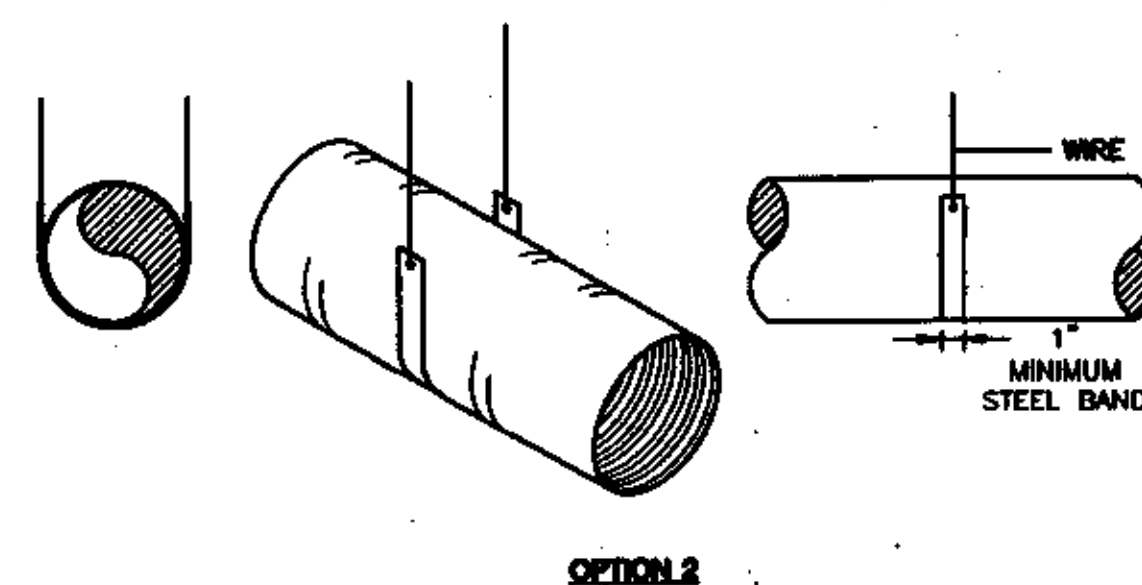
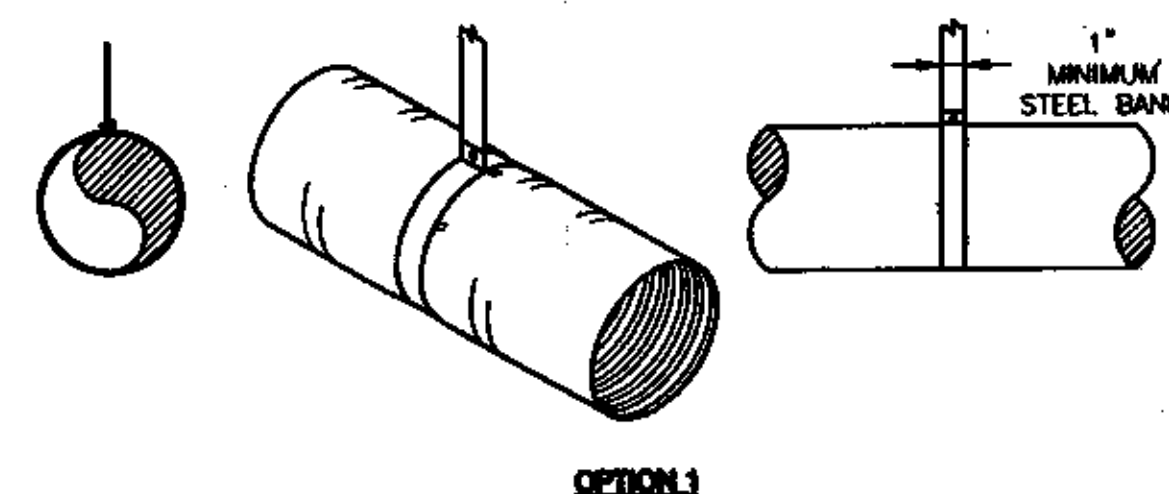
RE: ALL MECHANICAL AND PLUMBING SHEETS

| SYMBOL | DESCRIPTION                                                                | SYMBOL | DESCRIPTION                       |
|--------|----------------------------------------------------------------------------|--------|-----------------------------------|
|        | FLEXIBLE DUCTWORK                                                          |        | BALL VALVE                        |
|        | THERMOSTAT / TEMP SENSOR                                                   |        | BUTTERFLY VALVE                   |
|        | MOTORIZED DAMPER                                                           |        | GATE VALVE                        |
|        | MANUAL VOLUME DAMPER                                                       |        | PRESSURE REDUCING VALVE           |
|        | SPIN-IN FITTING W/AIR EXTRACTOR                                            |        | BALANCE VALVE                     |
|        | DUCT SMOKE DETECTOR                                                        |        | CHECK VALVE                       |
|        | COMBINATION SMOKE/FIRE DAMPER                                              |        | GLOBE VALVE                       |
|        | FIRE DAMPER                                                                |        | TRIPLE DUTY VALVE                 |
|        | EQUIPMENT CALLOUT                                                          |        | THREE WAY CONTROL VALVE           |
|        | TURNING VANES                                                              |        | TWO WAY CONTROL VALVE             |
|        | INTAKE OR EXHAUST                                                          |        | GAS PRESSURE REGULATOR W/GAS COCK |
|        | DIRECTION OF AIRFLOW                                                       |        | PRESSURE RELIEF VALVE             |
|        | SUPPLY DIFFUSER                                                            |        | WATER HAMMER ARRESTOR             |
|        | RETURN GRILLE                                                              |        | STORM DRAIN                       |
|        | EXHAUST GRILLE                                                             |        | CONDENSER WATER SUPPLY LINE       |
|        | FLOOR GRILLE                                                               |        | CONDENSER WATER RETURN LINE       |
|        | DUCTWORK BREAK                                                             |        | CONDENSATE DRAIN LINE             |
|        | HEAT PUMP UNIT W/FLEXIBLE CONNECTORS                                       |        | SOIL, WASTE, OR SANITARY SEWER    |
|        | CONCENTRIC SQUARE TO ROUND TRANSITION                                      |        | VENT                              |
|        | FLOW DIRECTION                                                             |        | ROOF DRAIN LINE                   |
|        | TEMPERATURE GAUGE                                                          |        | OVERFLOW DRAIN LINE               |
|        | PRESSURE GAUGE (LIQUID FILLED)                                             |        | DOMESTIC COLD WATER (CW)          |
|        | TEMPERATURE SENSOR (DUCT OR PIPING)                                        |        | DOMESTIC HOT WATER (HW)           |
|        | FLOW SWITCH                                                                |        | DOMESTIC HOT WATER RETURN (HWR)   |
|        | FLEXIBLE CONNECTOR                                                         |        | MEDIUM PRESSURE NATURAL GAS       |
|        | SUCTION DIFFUSER                                                           |        | LOW PRESSURE NATURAL GAS          |
|        | Y TYPE STRAINER (ALL 1 1/2" OR LARGER SHALL BE PROVIDED W/BLOW DOWN VALVE) |        | FIRE SPRINKLER LINE               |
|        | REDUCER                                                                    |        | SLOPE PIPE IN DIRECTION OF ARROW  |
|        | UNION                                                                      |        | FLOOR CLEANOUT                    |
|        | MANUAL AIR VENT                                                            |        | WALL CLEANOUT                     |
|        | CAP                                                                        |        | GRADE CLEANOUT                    |
|        | REDUCED PRESSURE BACKFLOW PREVENTER                                        |        | FLOOR DRAIN                       |
|        | DOUBLE CHECK BACKFLOW PREVENTER                                            |        | FLOOR SINK                        |



NOTE: ALL DUCTWORK TRANSITIONS SHALL BE CONSTRUCTED AND INSTALLED TO SMACNA AND THE ABOVE NOTED STANDARDS. ANY DEVIATIONS SHALL BE COORDINATED WITH THE ENGINEER.

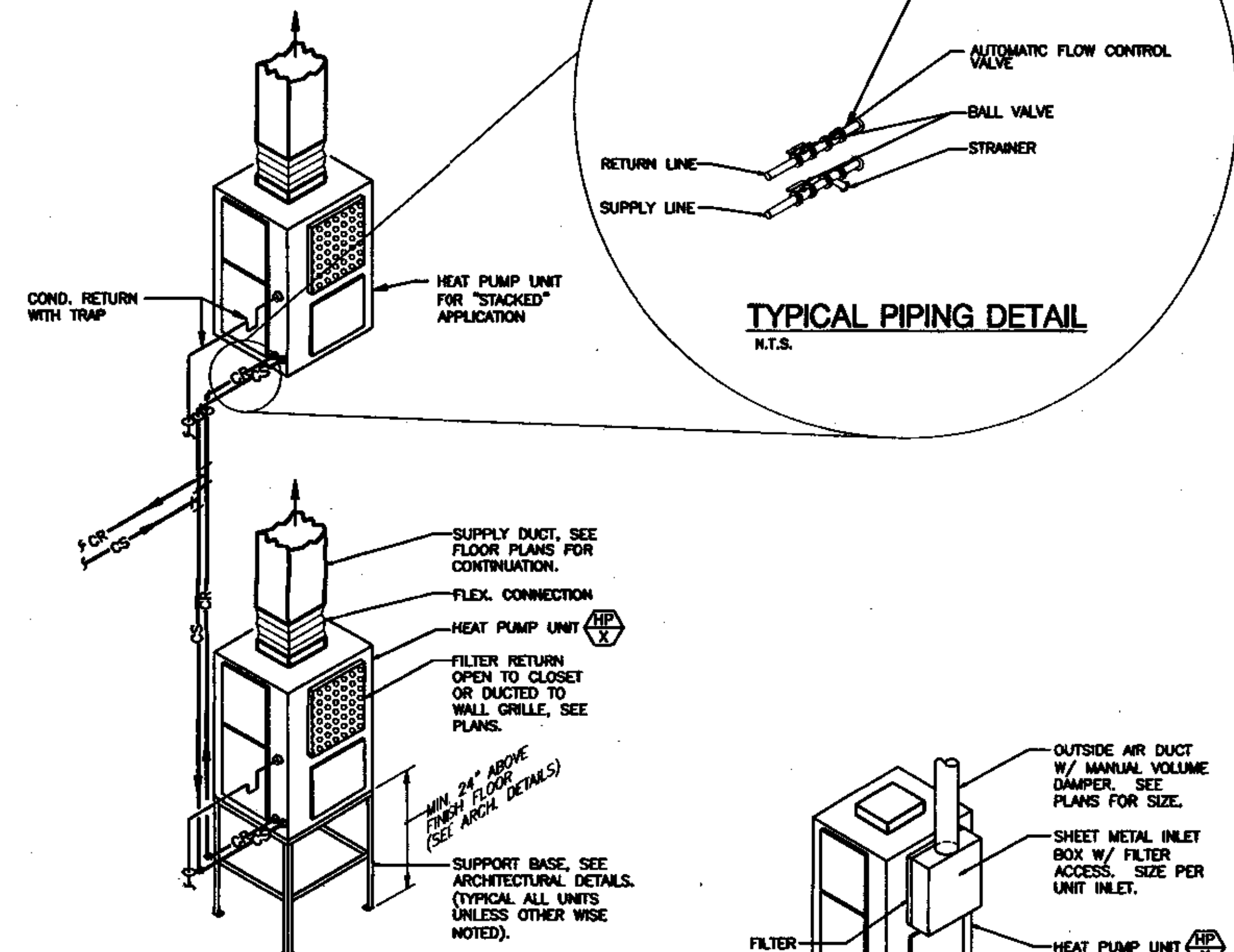
## RECTANGULAR DUCT FITTING DETAILS



- NOTES:
- SUPPORT SYSTEM MUST NOT DAMAGE OR CAUSE OUT OF ROUND SHAPE.
  - FLEX DUCT MUST NOT EXCEED 6'-0" FROM CONNECTION TO TERMINATION.
  - MAXIMUM LENGTH BETWEEN SUPPORTS MUST NOT EXCEED 3'-0" O.C.
  - ATTACH BANDS OR WIRES TO SUPPORT STRUCTURE ABOVE.

## FLEXIBLE DUCT SUPPORT

N.T.S.

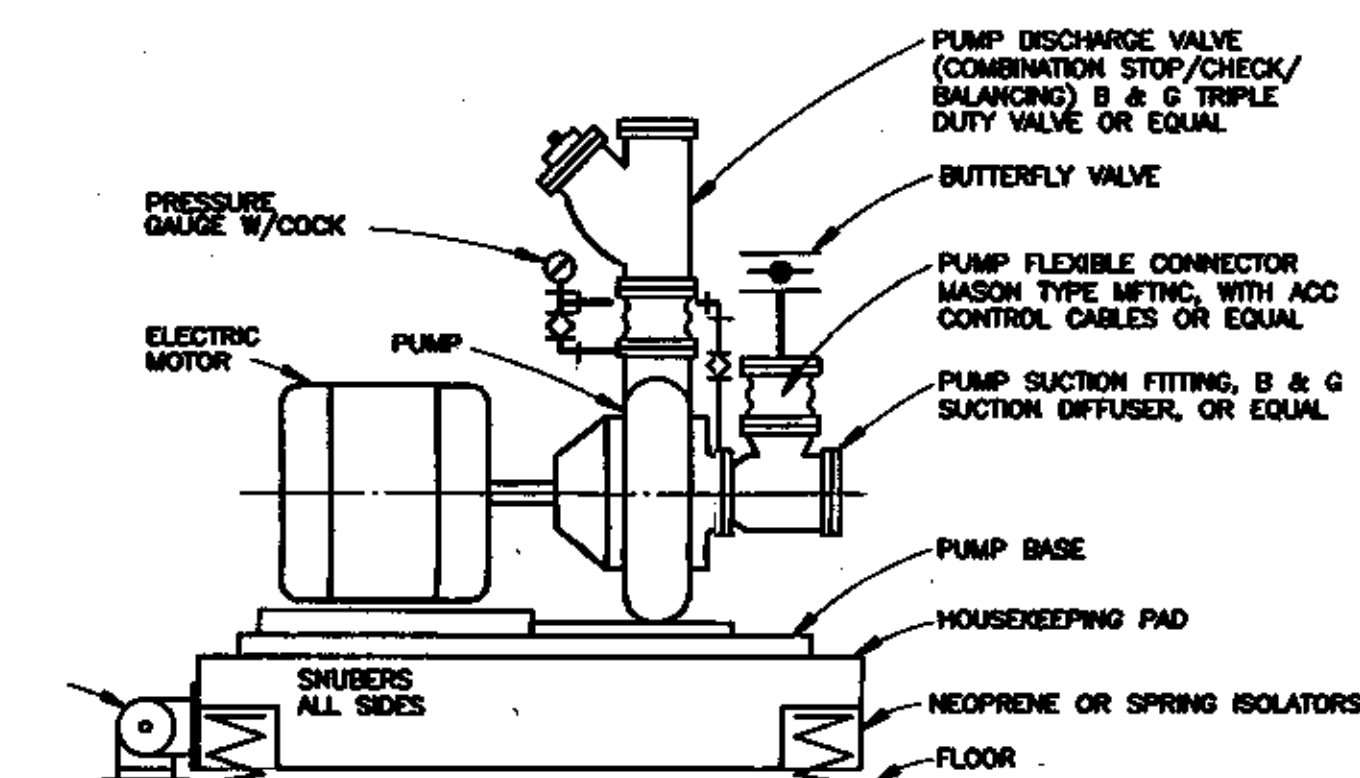


## HEAT PUMP DETAIL

N.T.S.

## FA INLET AT H.P. DETAIL

N.T.S. (FOR MAIN CORRIDOR HEAT PUMPS ONLY)



## CIRCULATING PUMP PIPING DETAIL

N.T.S.



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**IDANHA HOTEL RENOVATION**  
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BOISE, IDAHO

## REVISIONS

DRAWN  
TJH  
PROJECT  
4121  
FILE NO.  
4121A2.0.DWG  
DATE  
11-15-21  
SHEET

**M5.0**

**MUSGROVE ENGINEERING, PA**  
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PROJECT NUMBER: 90-100