ABBREVIATIONS

AD	ACCESS DOOR, AREA DRAIN
AFC	ABOVE FINISHED CEILING
AFF	ABOVE FINISHED FLOOR
AP	ACCESS PANEL
APD	AIR PRESSURE DROP
BWV	BACK WATER VALVE
CIRC	CIRCULATING
COND	CONDENSER, CONDENSATE
CONN	CONNECTION
CW	COLD WATER
D	DEPTH, DRAIN
DET	DETAIL
DF	DRINKING FOUNTAIN
DISC	DISCONNECT
DPR	DAMPER
DWH	DOMESTIC WATER HEATER
EC	ELECTRICAL CONTRACTOR
ECC	ECCENTRIC
EDB	ENTERING DRY BULB
EHC	ELECTRIC HEATING COIL
ESP	EXTERNAL STATIC PRESSURE
ETR	EXISTING TO REMAIN
FCO	FLOOR CLEAN OUT
FCS	FLOOR CONTROL STATION
FD	FLOOR DRAIN, FIRE DAMPER
FLR	FLOOR
FUT	FUTURE
GLV	GLOBE VALVE
GV	GATE VALVE
HB	HOSE BIBB
HD	HEAD, HUB DRAIN
HSC	HORIZONTAL SPLIT CASE
HTG	HEATING
HWC	HOT WATER CIRCULATOR
IE	INVERT ELEVATION
IW	INDIRECT WASTE
JB	JUNCTION BOX
JP	JOCKEY PUMP
L	LENGTH, LAVATORY
LAV	LAVATORY
M	METER
MC	MECHANICAL CONTRACTOR
MTD	MOUNTED
MVD	MANUAL VOLUME DAMPER
N.C.	NORMALLY CLOSED
NIC	NOT IN CONTRACT
N.O.	NORMALLY OPEN
OBD	OPPOSED BLADE DAMPER
OD	OUTSIDE DIAMETER, OVERFLOW DRAIN
OPG	OPENING
PC	PLUMBING CONTRACTOR
PD	PRESSURE DROP, PLANTER DRAIN
PNL	PANEL
PT	PLUMBING TRIM
PV	PLUG VALVE
R	RISER
RED	REDUCER
RV	RELIEF VALVE
SAF	SUPPLY AIR FAN
SCR	SILICON CONTROLLED RECTIFIER
SECT	SECTION
SENS	SENSIBLE
SFCS	SPRINKLER FLOOR CONTROL STATION
SKVA	STARTING KILOVOLT-AMPS
SKW	STARTING KILOWATTS
SP	SUMP PUMP, STATIC PRESSURE
SPR	SPRINKLER
SS	SERVICE SINK
SSFU	SANITARY SEWER FIXTURE UNITS
SSSC	SOLID STATE SPEED CONTROL
STR	STRAINER
SUSP	SUSPEND
SV	SANITARY VENT
TC	TEMPERATURE CONTROL
TDH	TOTAL DYNAMIC HEAD
TF	TRANSFER FAN
TP	TRAP PRIMER
U	URINAL
UON	UNLESS OTHERWISE NOTED
U/F	UNDERFLOOR
U/S	UNDERSLAB
VD	VOLUME DAMPER
VOV	VALVE ON VERTICAL
W	WATT, WASTE, WIDTH
WC	WATER CLOSET
WCO	WALL CLEANOUT
WH	WALL HYDRANT
WM	WATER METER
WP	WEATHERPROOF
WPD	WATER PRESSURE DROP
Z	ZONE

USE INDUSTRY STANDARD FOR OTHER THAN NOTED

MECHANICAL/PLUMBING SYMBOLS (ALL SYMBOLS SHOWN ARE NOT NECESSARILY USED ON THE DRAWINGS)

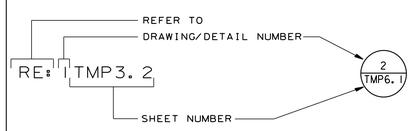
PIPING TYPES

- CHS — CHILLED WATER SUPPLY
- CHR — CHILLED WATER RETURN
- S — STEAM S=0 TO 15#, 60HPS=60# HIGH PRESS. STEAM
- C — CONDENSATE RETURN
- PC — PUMPED CONDENSATE
- RHG — REFRIGERANT HOT GAS LINE
- RS — REFRIGERANT SUCTION LINE
- RL — REFRIGERANT LIQUID LINE
- SANITARY DRAIN BELOW FLOOR
- SANITARY DRAIN ABOVE FLOOR
- SANITARY VENT
- GW — GREASE (KITCHEN) WASTE
- SD — STORM DRAIN
- OD — OVERFLOW DRAIN
- AW — ACID WASTE
- AV — ACID VENT
- COLD WATER
- HOT WATER
- HWR — HOT WATER RECIRCULATION
- G — NATURAL GAS
- A — COMPRESSED AIR
- AA — "AA" DENOTES GAS TYPE
- MA — MEDICAL AIR
- DI — DEIONIZED WATER
- V — VACUM
- F — FIRE STANDPIPE, FIRE LINE
- FS — FIRE SPRINKLER
- TP — TRAP PRIMER
- D — DRAIN LINE
- aaa — EXISTING PIPE, "aaa" DENOTES TYPE
- X aaa X — EXISTING PIPE TO BE REMOVED, "aaa" DENOTES TYPE

PIPING SYMBOLS

- ELBOW UP
- ELBOW DOWN
- VALVE IN DROP
- VALVE IN RISE
- DIRECTION OF FLOW
- DIRECTION OF SLOPE DOWN
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- TEE OUTLET UP
- TEE OUTLET DOWN
- UNION
- PIPE ANCHOR
- EXPANSION JOINT
- STRAINER WITH BLOWDOWN VALVE
- GATE VALVE, HVAC BALANCING/STOP VALVE
- GLOBE VALVE
- BALL VALVE
- BALANCING VALVE WITH DIFFERENTIAL PRESSURE TAPS
- OS&Y VALVE
- CHECK VALVE
- TWO POSITION CONTROL VALVE
- TWO-WAY MODULATING CONTROL VALVE
- THREE-WAY MODULATING CONTROL VALVE
- PRESSURE REDUCING VALVE
- FCS — SPRINKLER FLOOR CONTROL STATION
- GAS VALVE
- MANUAL AIR VENT
- AUTOMATIC AIR VENT
- T&P RELIEF VALVE
- VACUUM BREAKER
- LINE CLEANOUT
- FLOOR CLEANOUT
- PRESSURE GAUGE WITH GAUGE COCK
- THERMOMETER
- WATER METER
- FLEXIBLE CONNECTION
- PRESSURE AND TEMPERATURE TAP
- FLOW VENTURI

DRAWING/DETAIL REFERENCE KEY



MISCELLANEOUS

- FLOOR DRAIN
- AREA DRAIN
- ROOF DRAIN OR OVERFLOW DRAIN
- HOSE BIBB
- WALL HYDRANT
- PLUMBING FIXTURES
- POINT OF NEW CONNECTION TO EXISTING
- 1 — DRAWING NOTE REFERENCE
- 1 R620 — OWNER OR CONTRACTOR FURNISHED EQUIPMENT REFERENCE
- aaabb — MECHANICAL/PLUMBING EQUIPMENT REFERENCE. "aaa" DENOTES TYPE, "bb" DENOTES NUMBER.
- a bbb cc/dd — AIR DISTRIBUTION DEVICE REFERENCE. "a" DENOTES TYPE, "bbb" DENOTES CFM, "cc/dd" DENOTES NECK SIZE
- aaa bbb ccc KW — HVAC TERMINAL UNIT REFERENCE. "aaa" DENOTES TYPE, "bbb" DENOTES CFM, "ccc KW" DENOTES HEATING KW WHERE APPLICABLE
- P I — RISER DESIGNATION. "P" DENOTES WASTE/VENT OR WASTE/VENT/WATER, "W" DENOTES WATER, "DS" DENOTES DOWNSPOUT, "F" DENOTES FIRE.
- FS — FLOW SWITCH
- VS — VALVE SUPERVISORY SWITCH
- FIRE HOSE CABINET
- FIRE HOSE RACK
- FIRE DEPARTMENT SIAMESE CONNECTION
- T — THERMOSTAT
- S — TEMPERATURE SENSOR
- H — HUMIDISTAT
- F — FIRESTAT
- D RA — DUCT SMOKE DETECTOR. "SA" DENOTES SUPPLY AIR, "RA" DENOTES RETURN AIR PROVIDED AND WIRED BY DIV. 16 - INSTALL BY DIV. 15
- PNEUMATIC TUBING OR CONTROL WIRING
- TC — TEMPERATURE CONTROL PANEL
- DP — PRESSURE DIFFERENTIAL SENSOR (ANALOG)
- F — FLOW SENSOR (ANALOG)
- RH — RELATIVE HUMIDITY SENSOR (ANALOG)
- P — PRESSURE SENSOR (ANALOG)
- PI — POSITION INDICATOR (ANALOG)
- HL T — HIGH LIMIT T=TEMP P=PRESS F=FLOW RH= REL HUMIDITY
- LL T — LOW LIMIT T=TEMP P=PRESS F=FLOW RH= REL HUMIDITY

DUCTWORK

- SUPPLY AIR DIFFUSER, NO LETTER DENOTES NEW, "R" DENOTES RELOCATED EXISTING.
- EXISTING SUPPLY AIR DIFFUSER, NO LETTER DENOTES TO REMAIN, "R" DENOTES TO BE REMOVED AND REUSED AS APPLICABLE.
- RETURN AIR OR EXHAUST GRILL, NO LETTER DENOTES NEW, "R" DENOTES RELOCATED EXISTING.
- EXISTING RETURN AIR OR EXHAUST GRILL, NO LETTER DENOTES TO REMAIN, "R" DENOTES TO BE REMOVED AND REUSED AS APPLICABLE.
- 100 100 — LIGHT TROFFER SUPPLY AIR BOOTS, NO LETTER DENOTES NEW, "R" DENOTES RELOCATED EXISTING. NUMBER DENOTES CFM.
- 100 100 — EXISTING LIGHTING TROFFER SUPPLY AIR BOOTS, NO LETTER DENOTES TO REMAIN, "R" DENOTES TO BE REMOVED AND REUSED AS APPLICABLE. NUMBER DENOTES CFM.
- SUPPLY AIR SLOT, NO LETTER DENOTES NEW, "R" DENOTES RELOCATED EXISTING.
- EXISTING SUPPLY AIR SLOT, NO LETTER DENOTES TO REMAIN, "R" DENOTES TO BE REMOVED AND REUSED AS APPLICABLE.
- RETURN AIR SLOT, NO LETTER DENOTES NEW, "R" DENOTES RELOCATED EXISTING.
- EXISTING RETURN AIR SLOT, NO LETTER DENOTES TO REMAIN, "R" DENOTES TO BE REMOVED AND RELOCATED AS APPLICABLE.
- NEW RECTANGULAR OR ROUND DUCTWORK
- EXISTING DUCTWORK
- EXISTING DUCTWORK TO BE CLEANED, TREATED & COATED
- EXISTING RECTANGULAR OR ROUND DUCTWORK TO BE REMOVED AND RELOCATED AS APPLICABLE
- NEW FLEXIBLE DUCT
- EXISTING FLEXIBLE DUCT
- EXISTING FLEXIBLE DUCT TO BE REMOVED
- SUPPLY OR OUTSIDE AIR DUCT
- RETURN, RELIEF, OR EXHAUST AIR DUCT
- FLEXIBLE DUCT CONNECTION
- UP — INCLINED RISE IN DUCT (TWO ELBOWS)
- DN — INCLINED DROP IN DUCT (TWO ELBOWS)
- TURNING VANES
- DUCT EXTRACTOR
- SPLITTER DAMPER
- DUCT MOUNTED HEATING COIL
- DUCT MOUNTED FILTER
- IN-LINE FAN WITH FLEX CONNECTORS
- H — DUCT MOUNTED HUMIDIFIER
- DOUBLE DUCT HVAC TERMINAL UNIT (INDICATES FAN POWERED)
- SINGLE DUCT HVAC TERMINAL UNIT (INDICATES FAN POWERED)
- FIRE DAMPER
- S — SMOKE DAMPER
- FS — FIRE/SMOKE DAMPER
- MANUAL BALANCING DAMPER
- B — GRAVITY BACKDRAFT DAMPER
- M — MOTORIZED DAMPER
- HIDDEN LINES

GENERAL NOTES

A. REFER TO SPECIFICATIONS FOR MATERIALS AND METHODS FOR MECHANICAL/ELECTRICAL CONSTRUCTION.

B. REFER TO EXISTING SITE CONDITIONS. VISIT THE SITE TO DETERMINE ANY SPECIAL BUILDING CONDITIONS THAT ARE NOT INDICATED ON THE DOCUMENTS.

C. ALL DUCTWORK SIZES SHOWN ARE FREE AIR STREAM DIMENSIONS.

D. FURNISH AND INSTALL ACCESS DOORS IN DUCTS, WALL AND CEILINGS WHERE ACCESS IS REQUIRED TO CLEAN, TREAT AND COAT THE DUCTWORK.

E. COORDINATE ALL MECHANICAL WORK WITH THE OWNER'S REPRESENTATIVE. ALL MODIFICATIONS TO THE EXISTING ELECTRICAL SHALL BE DONE BY TRADES SPECIALIZING IN THAT WORK.

F. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PAINTING ANY MECHANICAL AND PLUMBING ITEMS WHICH ARE REQUIRED TO BE FIELD PAINTED. REFERENCE THE REQUEST FOR PROPOSAL (RFP).

G. THESE DOCUMENTS ARE BASED ON ACTUAL CONDITIONS DOCUMENTED DURING DESIGN. THE MECHANICAL CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY CONDITIONS WHICH VARY FROM THE DOCUMENTS AND BE RESPONSIBLE FOR COORDINATING THE LOCATION OF DUCTWORK WITH EXISTING CONDITIONS.

H. ALL MECHANICAL WORK SHALL COMPLY WITH APPLICABLE STATE & LOCAL BUILDING CODES & REQUIREMENTS.

I. THE MECHANICAL CONTRACTOR SHALL VISIT THE SITE & FAMILIARIZE THEMSELVES WITH EXISTING CONDITIONS WHICH WILL IMPACT CONSTRUCTION OF THIS PROJECT, PRIOR TO SUBMITTING PROPOSALS.

J. ALL INTERRUPTIONS TO SERVICES & ALL WORK IN OCCUPIED SPACES SHALL BE SCHEDULED WITH THE OWNER'S REPRESENTATIVE PER THE SPECIFICATIONS & SHALL BE PERFORMED AT TIMES WHICH ARE ACCEPTABLE TO THE OWNER.

K. COORDINATE THE EXACT LOCATION OF ALL WALL MOUNTED DEVICES WITH THE OWNER'S REPRESENTATIVE.

L. FURNISH ACCESS DOORS FOR INSTALLATION BY THE GENERAL CONTRACTOR WHERE ACCESS IS REQUIRED TO CONCEALED EQUIPMENT.

DRAWING LIST

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E&C Engineers & Consultants Inc. Texas Firm Registration No: F-003068

Date 5/01/2017
Drawn By DV
Checked By HEC

UTHSC Project No. 730022
E & C Project No. 3302.00
File Name

UTHealth — The University of Texas Health Science Center at Houston

MEDICAL SCHOOL BUILDING SOUTH PENTHOUSE AHU-L5 & L6 REPLACEMENT

DRAWING TITLE
MECHANICAL SYMBOLS AND ABBREVIATIONS

DRAWING NO.
M000

I:\3300\3302\m\AHU L5&L3302 MSA.dgn

DRAWING NOTES:

1. REMOVE AHU. ALL PIPING, DUCT, ELECTRICAL AND CONTROLS SERVING THE DEMOLISHED AHU SHALL BE REMOVED AS REQUIRED FOR RECONNECTION. RE: M300.

2. TEMPORARY BYPASS AHU.

3. TEMPORARY BYPASS UNIT SHALL BE CONNECTED TO THE RISERS AS NOTED ON THE ROOF PLAN. FLEX MAY BE USED. REFER TO M500 FOR ISOMETRIC OF DUCT CONNECTIONS. REMOVE ANY DUCTWORK IN THE CHASE NECISSARY TO MAKE CONNECITONS.

4. ONCE THE DUCTWORK AT THE ROOF HAS BEEN CONNECTED TO THE RISERS AND THE FLEXIBLE DUCT HAS CONNECTED THE TEMPORARY BYPASS AHUS TO THE RISERS, THE TEMPORARY AHUS SHALL BE ENERGIZED AND THE AHU SHALL BE DE-ENERGIZED. THE BYPASS AHUS ARE SIZED FOR BOTH AHUS TO SERVICE ONE EXISITNG LAB AHU OR TWO OFFICE AHUS. THE SEQUENCE OF THE UNITS TO BE REPLACES SHALL BE BASED ON CONSTRUCTABILITY AND CONFIRMED WITH UTHSC-H. ALL ISOLATION VALVES SHALL BE SHUT TO THE AHU AND THE AHU SHALL BE REPLACED AS DETAILED ON M300. ON THE LAB UNITS, THE WALL THE TWO UNITS SHARE MUST REMAIN IN PLACE DURING THE FIRST AHU REPLACEMENT. AHU-L5 SHALL BE REPLACED FIRST, THEN AHU-L6. PROVIDE A DEDUCTIVE ALTERNATE DI IF IT CAN BE COORDINATED TO REPLACE BOTH UNITS AT THE SAME TIME.

5. REMOVE EXISTING VSD. REPLACE WITH NEW VSD. REFER TO ELECTRICAL DRAWINGS.

6. PROVIDE A TAP INTO THE EXHUAST DUCT AS NOTED FOR VENTILLATION DURING CUTTING OF THE EXISITNG UNITS. PROVIDE A MANUAL BALANCING DAMPER (LOW LEAK) WITH FLEXIBLE DUCT TO ALLOW FOR MOVEMENT TO WHERE THE CUTTING IS TAKING PLACE. COORDINATE ANY NEEDED SHUT-DOWNS WITH THE OWNER. 12"Φ

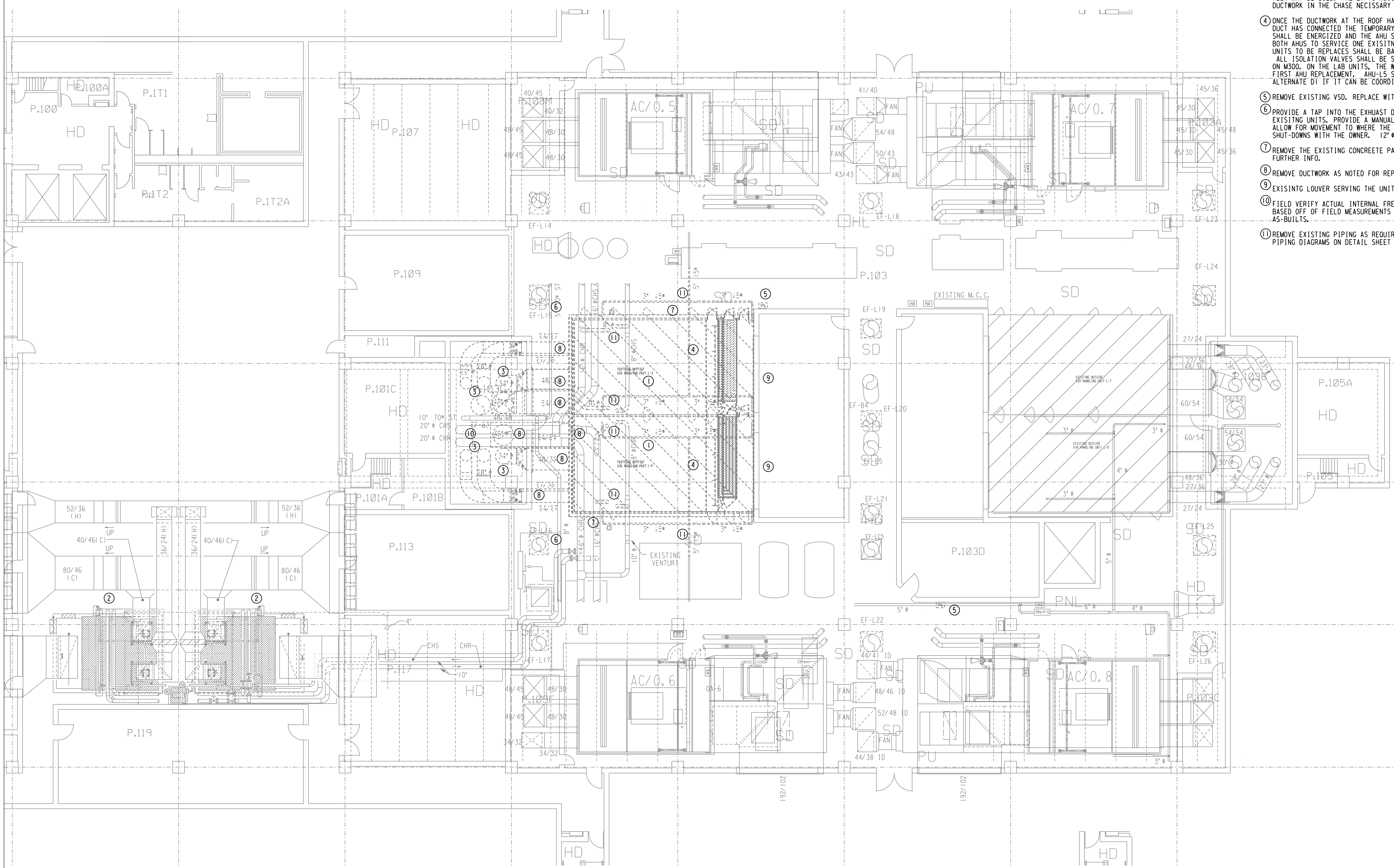
7. REMOVE THE EXISTING CONCREETE PAD AND REPOUR. REFER TO STRUCTURAL DRAWINGS FOR FURTHER INFO.

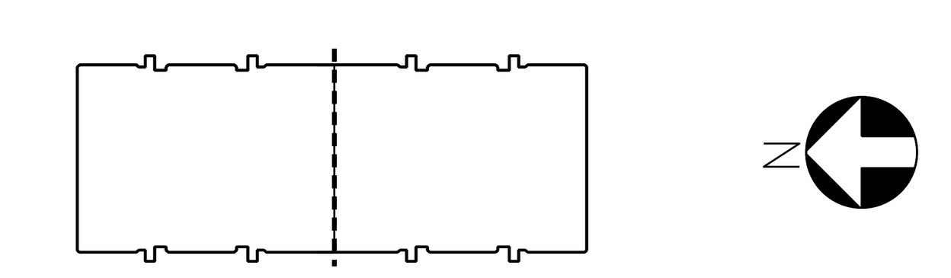
8. REMOVE DUCTWORK AS NOTED FOR REPLACEMENT. EXISITNG FIRE DAMPERS TO REMAIN.

9. EXISINTG LOUVER SERVING THE UNITS. VACUUM, CLEAN AND REPLACE THE BIRDSCREENS.

10. FIELD VERIFY ACTUAL INTERNAL FREE AREA DUCT SIZES. DUCT SIZE SHOWN IS AN ESTIMATE BASED OFF OF FIELD MEASUREMENTS WHERE THE DUCT COULD BE REACHED AND ORIGINAL AS-BUILTS.

11. REMOVE EXISTING PIPING AS REQUIRED TO INSTALL NEW PIPE TO THE NEW UNITS PER THE PIPING DIAGRAMS ON DETAIL SHEET M500.





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E & C Project No. 3302.00
File Name

UTHealth
The University of Texas
Health Science Center at Houston

MEDICAL SCHOOL BUILDING SOUTH PENTHOUSE AHU-L5 & L6 REPLACEMENT

DRAWING TITLE
MECHANICAL RENOVATION PLAN

DRAWING NO.
M108

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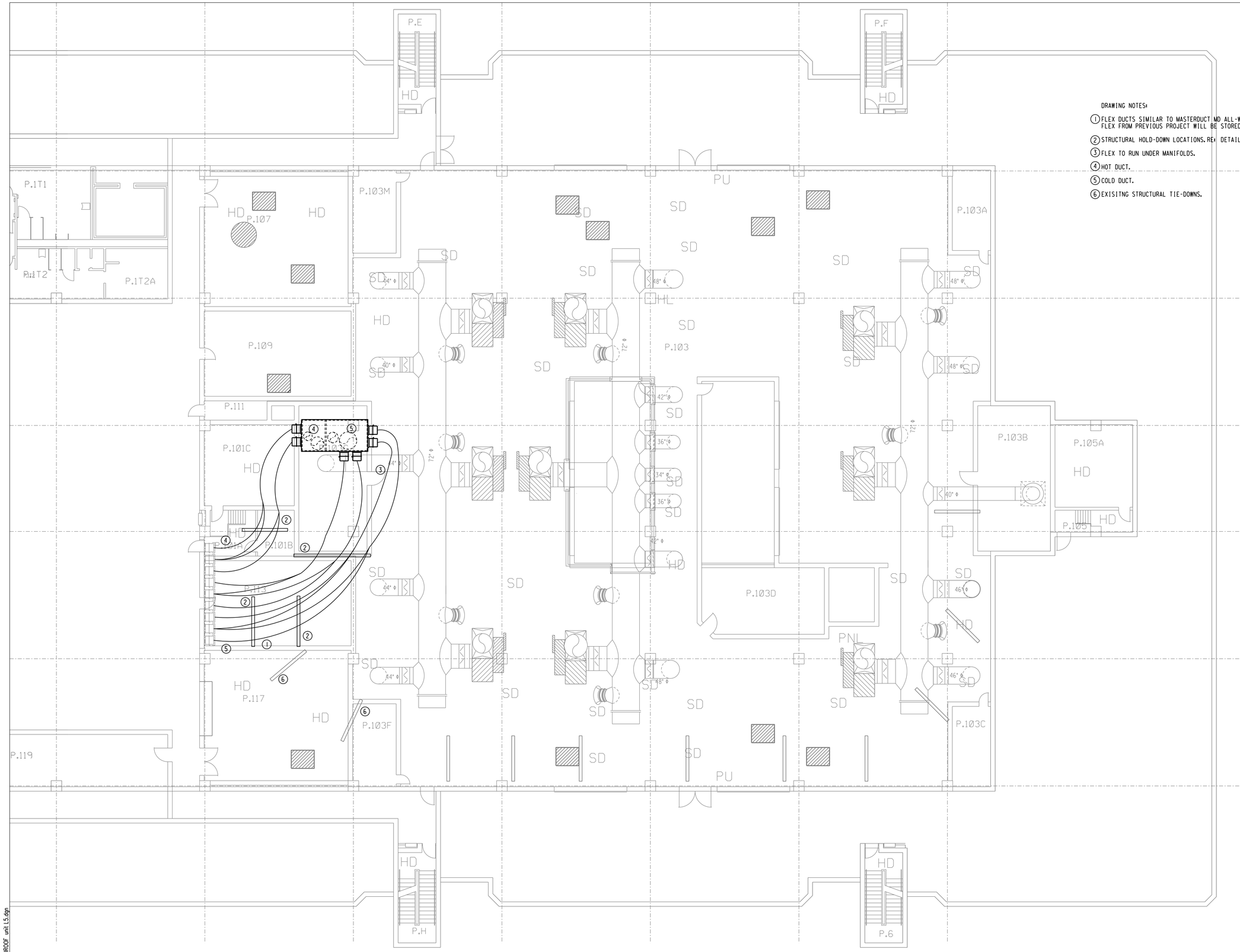

DRAWING NOTES:

1. FLEX DUCTS SIMILAR TO MASTERDUCT MD ALL-WEATHER FLEXIBLE DUCT R8. FLEX TO BE 20" ϕ. FLEX FROM PREVIOUS PROJECT WILL BE STORED BY UTHSC-H. REUSE.
2. STRUCTURAL HOLD-DOWN LOCATIONS. REF DETAIL 12 W501 & STRUCTURAL DRAWINGS.
3. FLEX TO RUN UNDER MANIFOLDS.
4. HOT DUCT.
5. COLD DUCT.
6. EXISITNG STRUCTURAL TIE-DOWNS.

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MEDICAL SCHOOL BUILDING SOUTH PENTHOUSE AHU-L5 & L6 REPLACEMENT

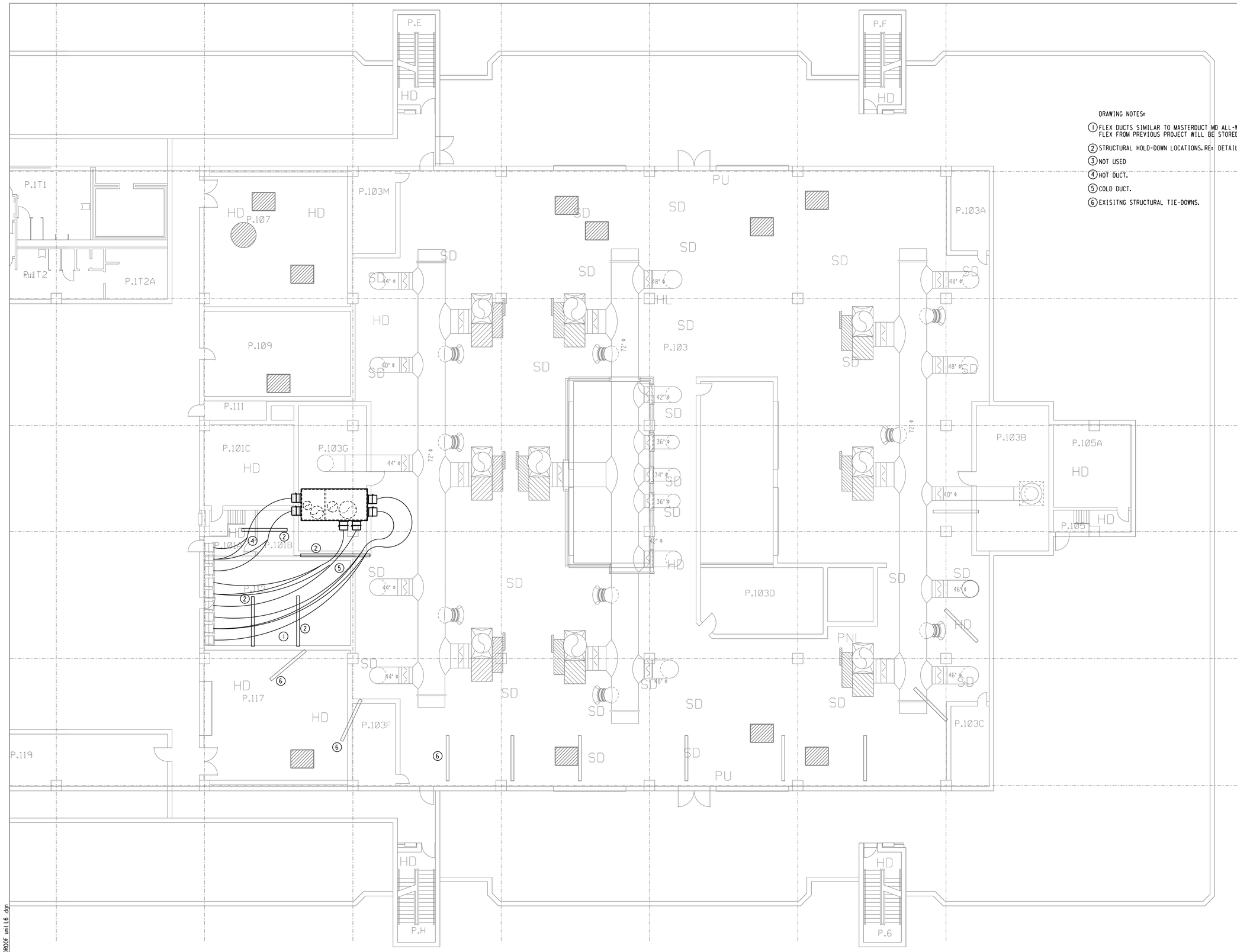
DRAWING TITLE
MECHANICAL ROOF DEMOLITION/ BYPASS DRAWING

DRAWING NO.
M109.5

I:\3300\3302\vm\AHU L5&L6\3302 MDROOF unit L5.dgn

DRAWING NOTES:

1. FLEX DUCTS SIMILAR TO MASTERDUCT MD ALL-WEATHER FLEXIBLE DUCT R8. FLEX TO BE 20' ϕ. FLEX FROM PREVIOUS PROJECT WILL BE STORED BY UTHSC-H. REUSE.
2. STRUCTURAL HOLD-DOWN LOCATIONS. REF DETAIL 12 M501
3. NOT USED
4. HOT DUCT.
5. COLD DUCT.
6. EXISITNG STRUCTURAL TIE-DOWNS.



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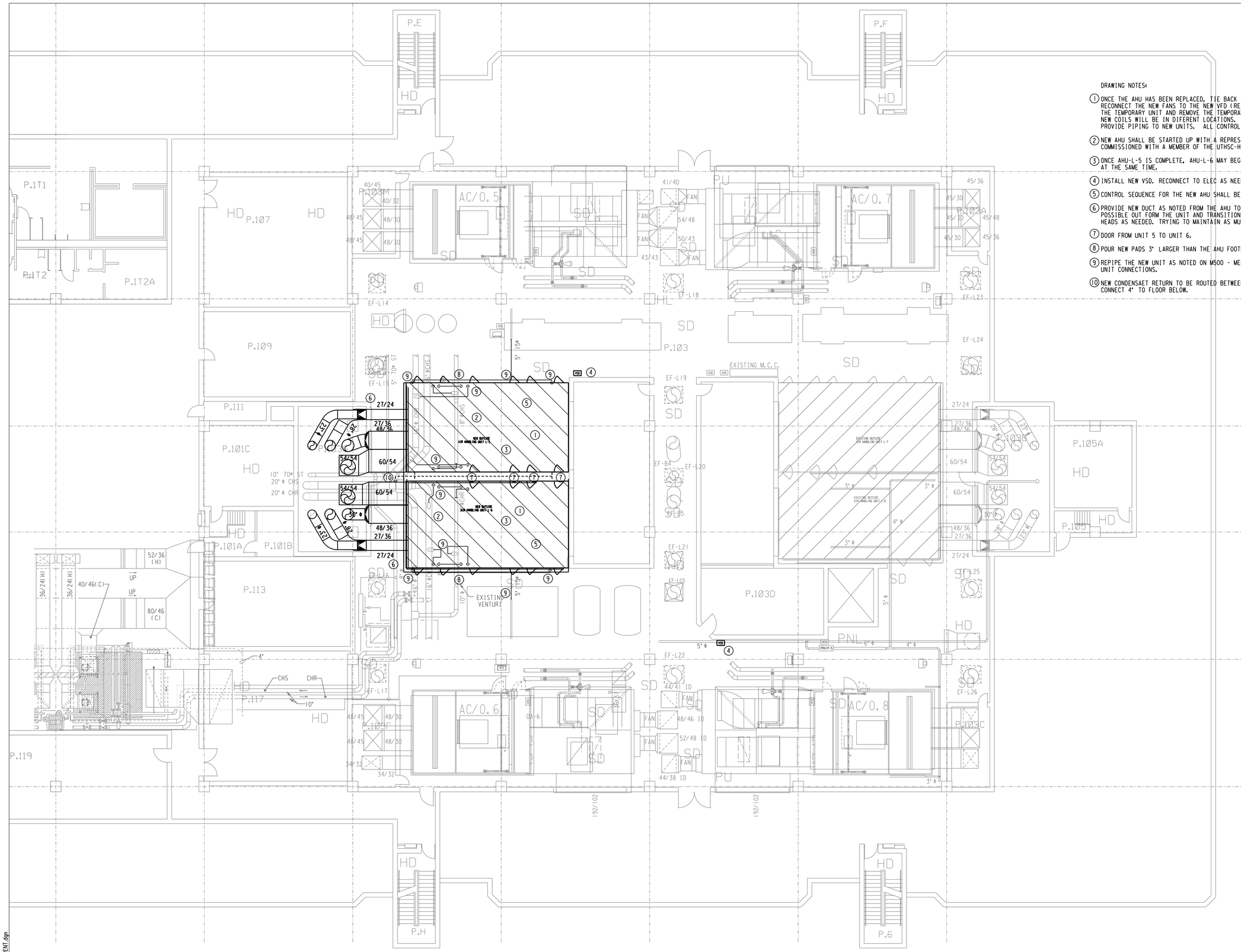
DRAWING TITLE
MECHANICAL ROOF DEMOLITION/ BYPASS DRAWING

DRAWING NO.
M109.5

P:\3300\3302\m\AHU L5&L6\3302 MDROOF unit L6 .dgn



DRAWING NOTES:

1. ONCE THE AHU HAS BEEN REPLACED, TIE BACK INTO THE CHILLED WATER, STEAM AND DUCTWORK. RECONNECT THE NEW FANS TO THE NEW VFD (REFER TO ELECTRICAL DRAWINGS) . DE-ENERGIZE THE TEMPORARY UNIT AND REMOVE THE TEMPORARY DUCT FROM THE PLENUM TO THE RISERS AND CAP TO MATCH EXISITNG. NEW COILS WILL BE IN DIFERENT LOCATIONS. ROUTE PIPE THORUGH STRUCTURAL OPENINGS AS NECISSARY TO PROVIDE PIPING TO NEW UNITS. ALL CONTROL VALVING SHALL BE PIPED IN THE UNITS AS NOTED.
2. NEW AHU SHALL BE STARTED UP WITH A REPRESENTATIVE FROM THE FACTORY AND COMMISSIONED WITH A MEMBER OF THE UTHSC-H STAFF IN ATTENDANCE.
3. ONCE AHU-L-5 IS COMPLETE, AHU-L-6 MAY BEGIN. PROVIDE A DEDUCTIVE ALTERNATE FOR REPLACING BOTH UNITS AT THE SAME TIME.
4. INSTALL NEW VSD. RECONNECT TO ELEC AS NEEDED.
5. CONTROL SEQUENCE FOR THE NEW AHU SHALL BE AS NOTED ON DRAWING M600 - CONTROL DIAGRAMS.
6. PROVIDE NEW DUCT AS NOTED FROM THE AHU TO THE CHASE CONNECTION. DUCT SHALL BE AS HIGH AS POSSIBLE OUT FORM THE UNIT AND TRANSITION DOWN TO THE EXISINTG FIRE DAMPER. RELOCATE SPRINKLER HEADS AS NEEDED. TRYING TO MAINTAIN AS MUCH HEAD HEIGHT AS POSSIBLE CLOSE TO THE COLUMNS.
7. DOOR FROM UNIT 5 TO UNIT 6.
8. POUR NEW PADS 3" LARGER THAN THE AHU FOOTPRINT ON EACH SIDE AND 6" TALL. REFER TO STRUCTURAL.
9. REPIPE THE NEW UNIT AS NOTED ON M500 - MECHANICAL DETAILS AND AS REQUIRED FOR LOCATION OF THE NEW UNIT CONNECTIONS.
10. NEW CONDENSAET RETURN TO BE ROUTED BETWEEN UNITS. PENETRATE FLOOR IN THE CHASE BELOW AND CONNECT 4" TO FLOOR BELOW.

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		04-04-16	ADDENDUM 1

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The University of Texas Health Science Center at Houston

MEDICAL SCHOOL BUILDING SOUTH PENTHOUSE AHU-L5 & L6 REPLACEMENT

DRAWING TITLE
MECHANICAL PH RENOVAITON DRAWING

DRAWING NO.
M208

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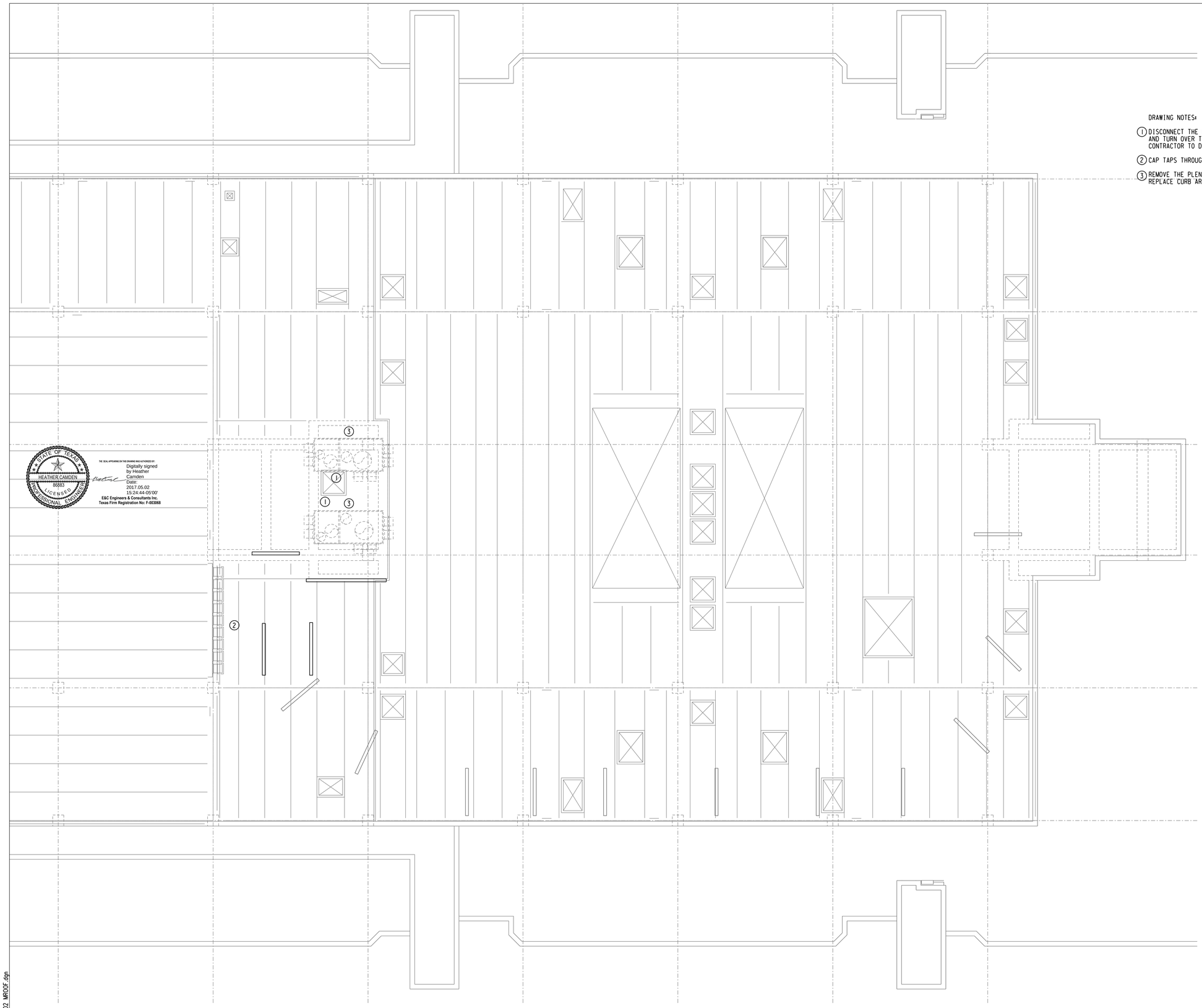
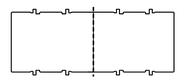
DRAWING NOTES:

1. DISCONNECT THE PLENUMS FROM THE RISERS. CAP THE RISERS AIRTIGHT. REMOVE FLEX DUCT FROM THE ROOF AND TURN OVER TO THE OWNER FOR USE ON FUTURE PHASES. IF THE OWNER FINDS THE DUCT UNUSABLE, CONTRACTOR TO DISPOSE.
2. CAP TAPS THROUGH EXTERIOR WALL FOR USE ON FUTURE PHASES.
3. REMOVE THE PLENUM ON TOP OF THE RISERS ON THE ROOF. PATCH THE ROOF TO MATCH EXISITNG. REPLACE CURB AROUND EXISTING EXHAUST DUCT PENETRATION.





STATE OF TEXAS
HEATHER CAMDEN
86883
LICENSED
PROFESSIONAL ENGINEER

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E&C Engineers & Consultants Inc.
Texas Firm Registration No: F-003068

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		05-01-17	FOR CONSTRUCTION

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UTHSC Project No. 730022
E & C Project No. 3302.00
File Name

UTHealth
The University of Texas
Health Science Center at Houston

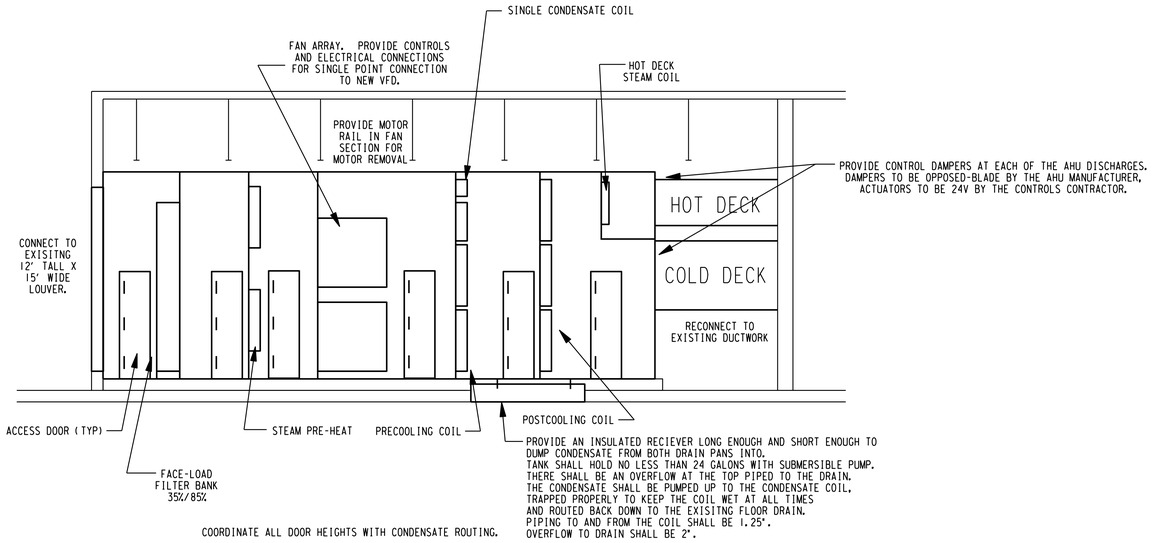
MEDICAL SCHOOL BUILDING SOUTH PENTHOUSE AHU-L5 & L6 REPLACEMENT

DRAWING TITLE
MECHANICAL ROOF RENOVATION DRAWING

DRAWING NO.
M209

I:\3300\3302\vm\AHU L5&L3302 MROOF.dgn

PROVIDE FANS WITH BALANCE STREAM DAMPERS



01 LABORATORY REPLACEMENT UNIT DETAIL W/ CONDENSATE RECOVERY

NOT TO SCALE

ALL LAB UNITS MAXIMUM DIMENSIONS ARE:
14' 0" TALL
36' 0" LONG
18' 6" WIDE

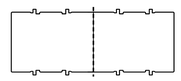
DUCT PENETRATIONS INTO CHASE APPROXIMATE LOCATIONS - FIELD VERIFY:
BOTTOM OF HOTDECK L5 EAST - 10' 8"
BOTTOM OF COLDDECK L5 EAST - 5' 8"
BOTTOM OF HOTDECK L5 WEST - 9' 4"
BOTTOM OF COLDDECK L5 WEST - 4' 2"

BOTTOM OF COLDDECK L6 EAST - 4' 2"
BOTTOM OF HOTDECK L6 EAST - 9' 11"
BOTTOM OF COLDDECK L6 WEST - 5' 8"
BOTTOM OF HOTDECK L6 WEST - 10' 9"

UNIT WILL SIT ON A 6" HOUSEKEEPING PAD.

LAB AHU COIL PIPING IS HOUSED INSIDE THE UNIT.
THERE SHALL BE ONE PIPING INLET TO THE AHU
ON EACH SIDE SERVED FROM THE TOP OF THE UNIT.
THE MANIFOLD SHALL DROP AND COIL
ISOLATION AND BALANCING VALVES SHALL BE
ACCESSED INSIDE THE UNIT.
COILS SHALL BE INTERNALLY DEMOUNTABLE TO BE
REMOVED FROM INSIDE THE UNIT FORWARD AND
OUT THE CLOSEST ACCESS DOOR.

REFER TO THE FLOOR PLANS TO NOTE WHERE DOORS
ARE REQUIRED TO BE ON ONE OR BOTH SIDES OF THE UNIT.



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UTHealth
The University of Texas Health Science Center at Houston

MEDICAL SCHOOL BUILDING SOUTH PENTHOUSE AHU-L5 & L6 REPLACEMENT

DRAWING TITLE
MECHANICAL AHU DETAILS

DRAWING NO.
M300

E:\3300\3302\rvm\AHU_L5&L6\3302_MAHU.dgn

AIR HANDLING UNIT SCHEDULE - REPLACEMENT

UNIT INFORMATION		
UNIT NO.	AHU-L-5	AHU-L-6
OPERATION TYPE	NORMAL	NORMAL
LOCATION	SOUTH PENTHOUSE (BLUE CHASE)	SOUTH PENTHOUSE (BLUE CHASE)
MANUFACTURER (BASIS OF DESIGN)	CLIMATECRAFT	CLIMATECRAFT
TYPE	WELDED FRAME OR BUILT ON SITE	WELDED FRAME OR BUILT ON SITE
CONFIGURATION	FANWALL DUAL DUCT	FANWALL DUAL DUCT
SERVICE	GREEN CHASE EAST	GREEN CHASE WEST
SUPPLY FAN DESIGN INFORMATION		
DESIGN SET FAN AIR QUANTITY	79,800	79,800
MAX OA	79,800	79,800
TOTAL STATIC PRESSURE (IN.W.G.)	5.50	5.50
BASIS OF DESIGN	TEMTROL FAN ARRAY 6@ PF11-27	TEMTROL FAN ARRAY 6@ PF11-27
FAN DESCRIPTION	6 @ 27" MAXIMUM DIAMETER	6 @ 27" MAXIMUM DIAMETER
FAN TYPE	PLUG FAN ARRAY (PF)	PLUG FAN ARRAY (PF)
FAN RPM	1696	1696
BRKE HP	16.9 MAX/FAN	16.9 MAX/FAN
NOMINAL MOTOR HP	20 MAXIMUM / FAN	20 MAXIMUM / FAN
NOMINAL MOTOR RPM	1750 MAX	1750 MAX
VOTALGE/PHASE	480/3	480/3
EMERGENCY POWER REQUIRED (YES/NO)	NO	NO
VFD REQUIRED	YES - NEW 125HP	YES - NEW 125HP
DRIVE ARRANGEMENT TYPE	DIRECT	DIRECT
COOLING COIL DESIGN INFORMATION		
COIL POSITION	PRE COOLING	PRE COOLING
COIL DESCRIPTION	6@58WC39X088-04-09-CW	6@58WC39X088-04-09-CW
CASE MATERIAL	16 GA. 304 S.S.	16 GA. 304 S.S.
QUANTITY OF COILS	3LH/3RH	3LH/3RH
COIL AIRFLOW	78,430	78,430
MAX FACE VELOCITY	550.0	501.0
MINIMUM NUMBER ROWS	4	4
MINIMUM NUMBER OF FINS PER INCH	9	9
MAXIMUM AIR PRESSURE DROP	0.56	0.56
ENTERING AIR TEMP (DB) (°F)	98.0	98.0
ENTERING AIR TEMP (WB) (°F)	80.0	80.0
LEAVING AIR TEMP (DB) (°F)	71.2	71.2
LEAVING AIR TEMP (WB) (°F)	68.8	68.8
ENTERING WATER TEMP (°F)	52.2	52.2
LEAVING WATER TEMP (°F)	62.2	62.2
MINIMUM COIL LATENT HEAT (MHB)	1,416,416.0	1,416,416.0
MINIMUM COIL SENSIBLE HEAT (MBH)	2,272,696.0	2,272,696.0
MINIMUM COIL TOTAL HEAT (MBH)	3,689,112.0	3,689,112.0
MAX WATER FLOW (GPM)	770.0	770.0
CHILLED WATER TEMP DIFFERENCE (°F)	10.0	10.0
MAX WATER PRESSURE DROP (FT OF WATER)	8.6	8.6
TUBE MATERIAL / FIN MATERIAL	CU / CU	CU / CU
UV LIGHTS (YES/NO)	YES	YES
COOLING COIL DESIGN INFORMATION		
COIL POSITION	POST COOLING	POST COOLING
COIL DESCRIPTION	6@58WC45X088-06-08-CW	6@58WC45X088-06-08-CW
CASE MATERIAL	16 GA. 304 S.S.	16 GA. 304 S.S.
QUANTITY OF COILS	3LH/3RH	3LH/3RH
COIL AIRFLOW	79800	79800
MAX FACE VELOCITY	484.0	484.0
MINIMUM NUMBER ROWS	6	6
MINIMUM NUMBER OF FINS PER INCH	8	8
MAXIMUM AIR PRESSURE DROP	0.56	0.56
ENTERING AIR TEMP (DB) (°F)	71.2	71.2
ENTERING AIR TEMP (WB) (°F)	68.8	68.8
LEAVING AIR TEMP (DB) (°F)	52.7	52.7
LEAVING AIR TEMP (WB) (°F)	52.7	52.7
ENTERING WATER TEMP (°F)	42.0	42.0
LEAVING WATER TEMP (°F)	52.2	52.2
MINIMUM COIL LATENT HEAT (MHB)	2,413,367.0	2,413,367.0
MINIMUM COIL SENSIBLE HEAT (MBH)	1,590,140.0	1,590,140.0
MINIMUM COIL TOTAL HEAT (MBH)	4,003,507.0	4,003,507.0
MAX WATER FLOW (GPM)	770.0	770.0
CHILLED WATER TEMP DIFFERENCE (°F)	10.7	10.7
MAX WATER PRESSURE DROP (FT OF WATER)	17.76	17.76
TUBE MATERIAL / FIN MATERIAL	CU / CU	CU / CU
UV LIGHTS (YES/NO)	YES	YES
HEATING COIL DESIGN INFORMATION		
COIL POSITION	PREHEAT	PREHEAT
COIL DESCRIPTION	4@11SD48X85-6-1-W--R	4@11SD48X85-6-1-W--R
CASE MATERIAL	16 GA. 304 S.S.	16 GA. 304 S.S.
QUANTITY OF COILS	4	4
COIL AIRFLOW IN FULL HEATING	79,800	79,800
MAX FACE VELOCITY AT FULL HEATING	704	704
MINIMUM NUMBER OF ROWS	1	1
MINIMUM NUMBER OF FINS PER INCH	6	6
MAXIMUM AIR PRESSURE DROP AT FULL HEAT	0.13	0.13
ENTERING AIR TEMP (DB) (°F)	18	18
LEAVING AIR TEMP (DB) (°F)	55.3	55.3
STEAM PRESSURE	10#	10#
CONDENSATE RATE	3384#/HR	3384#/HR
MINIMUM COIL SENSIBLE HEAT (MBH)	3,226,626.0	3,226,626.0
TUBE MATERIAL / FIN MATERIAL	CU/AL	CU/AL
UV LIGHTS (YES/NO)	NO	NO
HEATING COIL DESIGN INFORMATION		
COIL POSITION	REHEAT	REHEAT
COIL DESCRIPTION	2@11SD48X88-10-1-W-F-R	2@11SC48X88-10-1-W-F-R
CASE MATERIAL	16 GA. 304 S.S.	16 GA. 304 S.S.
QUANTITY OF COILS	2	2
COIL AIRFLOW IN FULL HEATING	40,000	40,000
MAX FACE VELOCITY AT FULL COOLING	682	682
MINIMUM NUMBER OF ROWS	1	1
MINIMUM NUMBER OF FINS PER INCH	10	10
MAXIMUM AIR PRESSURE DROP AT FULL HEAT	0.21	0.21
ENTERING AIR TEMP (DB) (°F)	52.5	52.5
LEAVING AIR TEMP (DB) (°F)	96.4	96.4
STEAM PRESSURE	10#	10#
CONDENSATE RATE	1967#/HR	1967#/HR
MINIMUM COIL SENSIBLE HEAT (MBH)	1,899,861.0	1,899,861.0
TUBE MATERIAL / FIN MATERIAL	CU/AL	CU/AL
UV LIGHTS (YES/NO)	NO	NO
FILTER SECTION		
2" - MERV 8 PLEATED PRE-FILTER	YES	YES
12" - MERV 14 FINAL FILTER	YES	YES

NOTES

UNIT SHALL BE PROVIDED WITH FACTORY INSTALLED JUNCTION BOXES AUXILIARIES, RECEPTACLES, SERVICING LIGHTS, ETC. RE: ELECTRICAL DRAWINGS FOR FURTHER INFORMATION.

FACTORY INSTALLED JUNCTION BOXES ARE FOR CONNECTION BY DIVISION 26. DIVISION 26 IS NOT TO PENETRATE AIR HANDLING UNIT HOUSING. WIRING FROM JUNCTION BOX TO LOAD INSIDE AIR HANDLING UNIT SHALL BE BY THE MANUFACTURER.

ALL POWER WIRING BETWEEN VARIABLE FREQUENCY DRIVES, MOTOR CONTROLLERS AND MOTORS SHALL BE COMPLETED BY THE AIR HANDLING UNIT MANUFACTURER.

INFORMATION SHOWN IS PER UNIT.

PROVIDE WITH BALANCE STREAM DAMPERS ON FANS

COIL SCHEDULE - CONDENSATE

THE TOP EXTERIOR PRE-COOLING COIL SHALL INCLUDE AN ADDITIONAL CONDENSATE COIL AS FOLLOWS:

UNIT NO.	AHU-L-5	AHU-L-6
COOLING COIL DESIGN INFORMATION		
COIL POSITION	COOLING - CONDENSATE	COOLING - CONDENSATE
COIL DESCRIPTION	1@5WC-8-6X84X6-8CU	1@5WC-8-6X84X6-8CU
CASE MATERIAL	16 GA. 304 S.S.	16 GA. 304 S.S.
QUANTITY OF COILS	1	1
COIL AIRFLOW	1370	1370
MAX FACE VELOCITY	391	391
MINIMUM NUMBER ROWS	6	6
MINIMUM NUMBER OF FINS PER INCH	8	8
MAXIMUM AIR PRESSURE DROP	0.42	0.42
ENTERING AIR TEMP (DB) (°F)	98.0	98.0
ENTERING AIR TEMP (WB) (°F)	80.0	80.0
LEAVING AIR TEMP (DB) (°F)	67.4	67.4
LEAVING AIR TEMP (WB) (°F)	66.7	66.7
ENTERING WATER TEMP (°F)	55.0	55.0
LEAVING WATER TEMP (°F)	72.1	72.1
MINIMUM COIL LATENT HEAT (MHB)	25,521.0	25,521.0
MINIMUM COIL SENSIBLE HEAT (MBH)	43,076.0	43,076.0
MINIMUM COIL TOTAL HEAT (MBH)	68,597.0	68,597.0
MAX WATER FLOW (GPM)	8.0	8.0
CHILLED WATER TEMP DIFFERENCE (°F)	17.1	17.1
MAX WATER PRESSURE DROP (FT OF WATER)	6.2	6.2
TUBE MATERIAL / FIN MATERIAL	CU / CU	CU / CU
UV LIGHTS (YES/NO)	YES	YES

PUMP SCHEDULE - CONDENSATE

UNIT NO.	LOCATION	SERVICE	TYPE	GPM	FT. HEAD H_2O	SHUT OFF HEAD FT. H_2O	DESIGN PRESSURE PSI	MOTOR					REMARKS
								BHP	HP	RPM	VOLTS @ 60 HZ	PH	
CP-L5	CONDENSATE RECEIVER	CONDENSATE	SUBMERSIBLE	8.5	20.0	22.0	150	4.0	1/6	3450	120	1	SIMILAR TO FLINT & WALLING ECP062S
CP-L6	CONDENSATE RECEIVER	CONDENSATE	SUBMERSIBLE	8.5	20.0	22.0	150	4.0	1/6	3450	120	1	SIMILAR TO FLINT & WALLING ECP062S

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UTHealth
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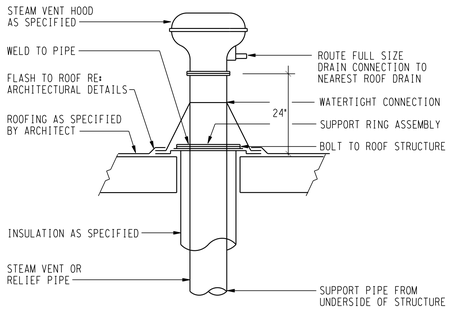
MEDICAL SCHOOL BUILDING
SOUTH PENTHOUSE
AHU-L5 & L6 REPLACEMENT

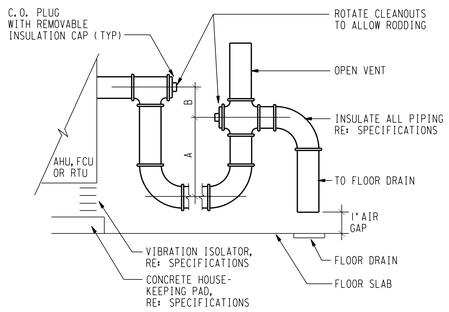
DRAWING TITLE
MECHANICAL SCHEDULES

DRAWING NO.
M400



10 TYPICAL STEAM VENT THRU ROOF ASSEMBLY

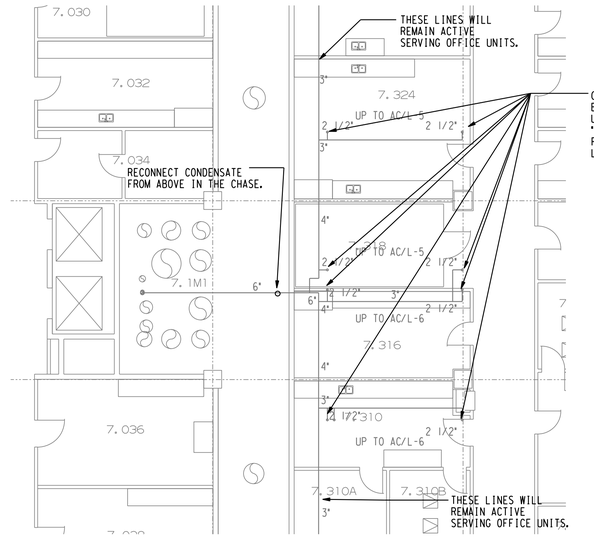
NOT TO SCALE



A - MINIMUM = B/2+1/2"
B - MINIMUM = UNIT FAN DISCHARGE PRESSURE +2"

9 TYPICAL CONDENSATE DRAIN PIPING

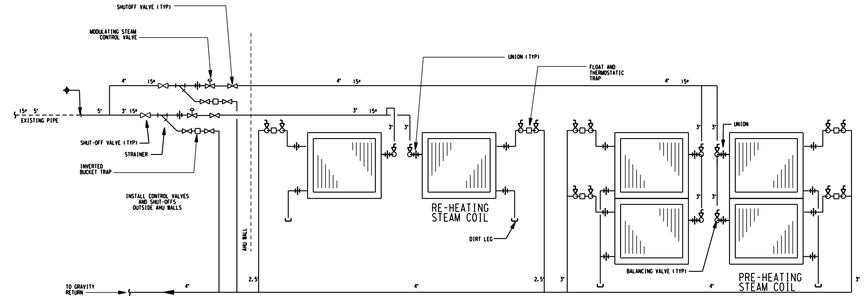
NOT TO SCALE



7 7TH FLOOR CONDENSATE

NOT TO SCALE

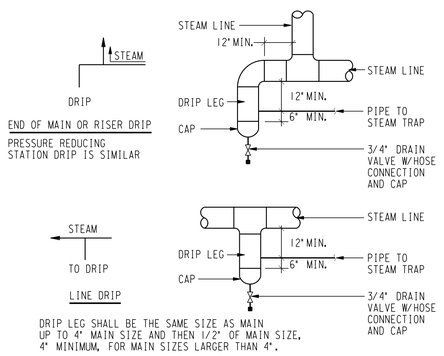
PIPING COMING TO THE EXISTING UNIT IS 5'.



NOTES:
1. INSULATE ALL PIPING, VALVES, FITTINGS AND ACCESSORIES. RE: SPECIFICATIONS.

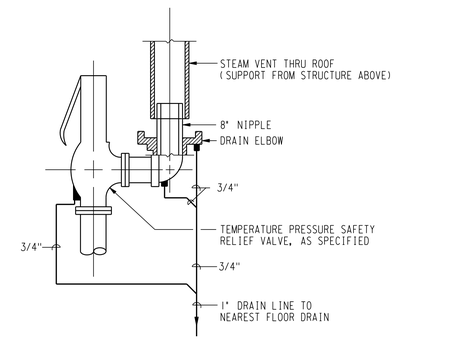
3 TYPICAL LAB AIR HANDLING UNIT STEAM COIL PIPING

NOT TO SCALE



5 TYPICAL STEAM DRIP TRAP POCKETS

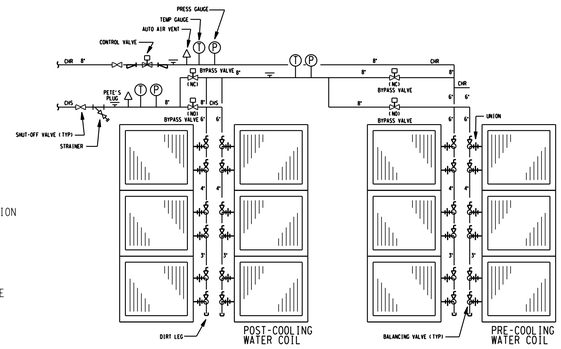
NOT TO SCALE

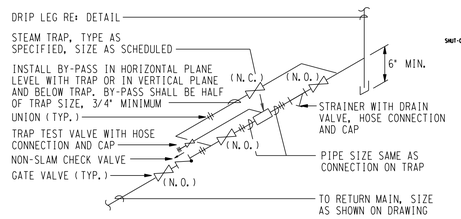


2 TYPICAL STEAM SAFETY RELIEF VALVE

NOT TO SCALE

PIPING COMING TO THE EXISTING UNIT IS 10'. ANY PIPE THAT IS TO BE REUSED CAN BE OF A LARGER SIZE THAN NOTED BELOW, BUT NOT SMALLER.





NOTES:
1. BY-PASS IS NOT REQUIRED ON THE TRAP PROVIDED FOR THE DRIPPING OF LOW PRESSURE SUPPLY MAINS (15 PSIG OR LESS).
2. CHECK VALVE IS NOT REQUIRED FOR LOW PRESSURE STEAM SYSTEM WITH GRAVITY RETURN.

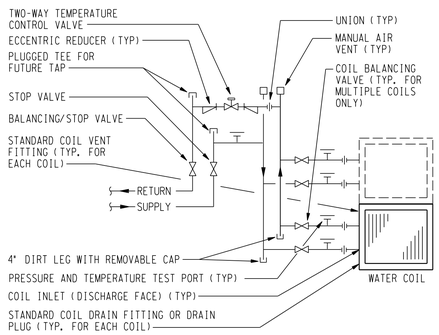
8 TYPICAL STEAM DRIP TRAP PIPING

NOT TO SCALE

NOTES:
1. INSULATE ALL PIPING, VALVES, FITTINGS AND ACCESSORIES. RE: SPECIFICATIONS.
2. INSTALL TEST PORTS IN EASILY ACCESSIBLE LOCATIONS WITH MINIMUM OF 12" CLEARANCE ABOVE AND IN FRONT OF PORTS.

TYPICAL AIR HANDLING UNIT COIL PIPING

NOT TO SCALE



NOTES:
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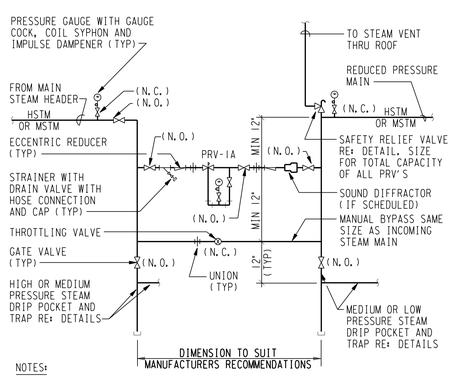
2. INSTALL TEST PORTS IN EASILY ACCESSIBLE LOCATIONS WITH MINIMUM OF 12" CLEARANCE ABOVE AND IN FRONT OF PORTS.

4 TYPICAL AIR HANDLING UNIT COIL PIPING

NOT TO SCALE



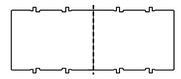
NOTES:
1. SIZE PRV-1A SIZED FOR 100% OF REDUCED PRESSURE STEAM LOAD.
2. HIGH PRESSURE TO MEDIUM PRESSURE OR MEDIUM PRESSURE TO LOW PRESSURE. DO NOT USE FOR HIGH PRESSURE TO LOW PRESSURE.

1 TYPICAL SINGLE STAGE STEAM PRESSURE REDUCING STATION

NOT TO SCALE

06 AIR HANDLING UNIT WITH SERIES COILS CHILLED WATER COIL PIPING DETAIL (REPLACEMENT UNIT)

NOT TO SCALE



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MEDICAL SCHOOL BUILDING
SOUTH PENTHOUSE
AHU-L5 & L6 REPLACEMENT

DRAWING TITLE
MECHANICAL DETAILS

DRAWING NO.
M500

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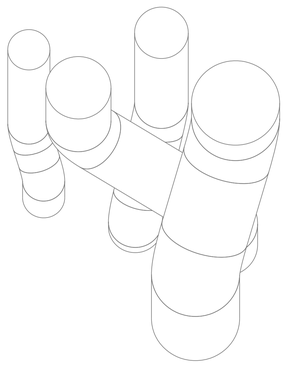
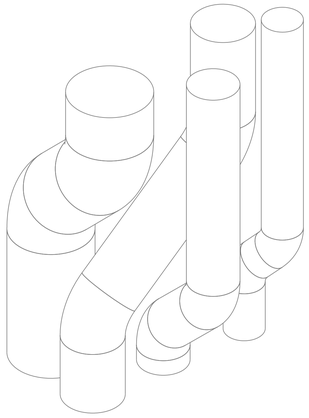


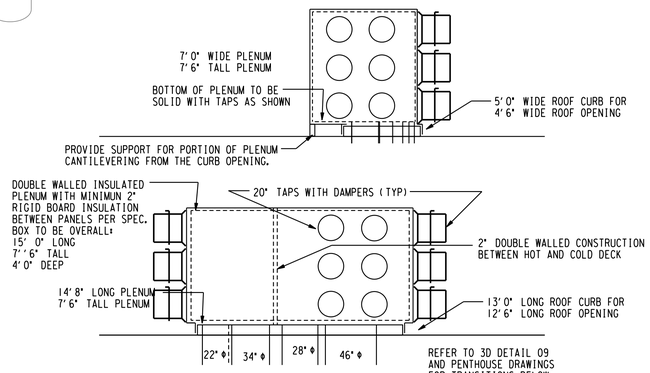
AHU-L5 TEMPORARY
CONNECTION ISOMETRIC



AHU-L6 TEMPORARY
CONNECTION ISOMETRIC

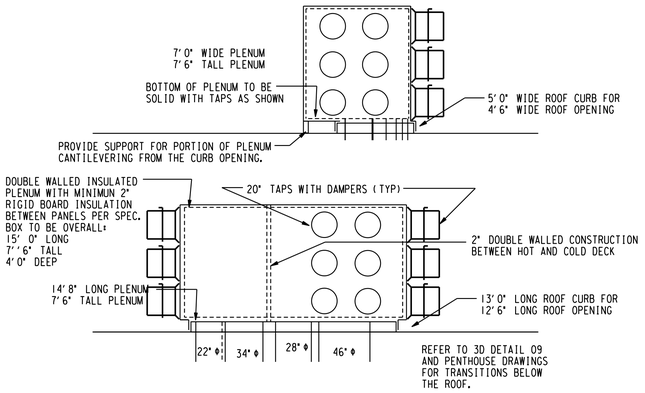
9 DUCT RISER CONNECTIONS IN CHASE ISOMETRIC

NOT TO SCALE



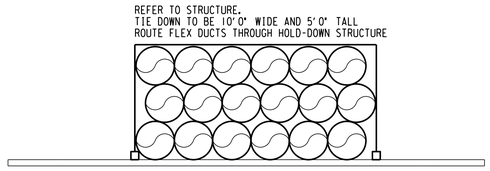
7 AHU-L5 RISER PLENUM

NOT TO SCALE



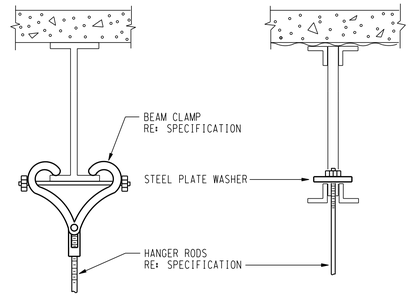
6 AHU-L6 RISER PLENUM

NOT TO SCALE



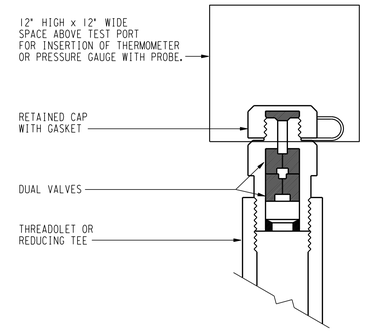
8 TYPICAL HOLD-DOWN LAY-OUT - RE: STRUCTURE

NOT TO SCALE



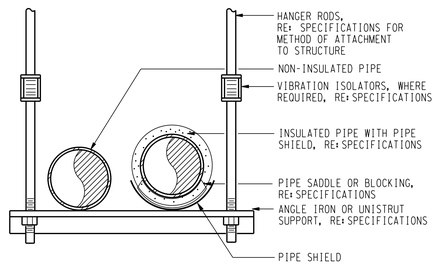
5 TYPICAL PIPE AND DUCT SUPPORT ATTACHMENT

NOT TO SCALE



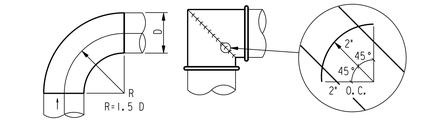
4 TYPICAL PRESSURE/TEMPERATURE TEST PORT INSTALLATION

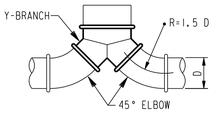
NOT TO SCALE



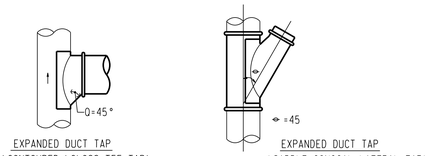
3 TYPICAL TRAPEZE TYPE MULTIPLE PIPE HANGER

NOT TO SCALE



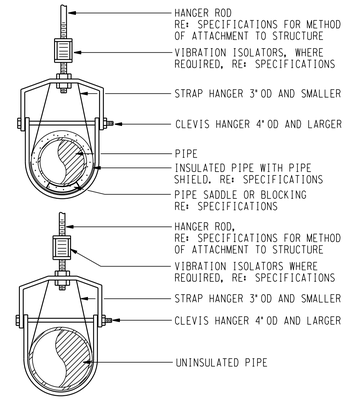


EQUAL SPLIT TEE
(Y-2PLUS 45° ELBOWS MAX. C=.22)
(FOR UP STREAM VELOCITY ABOVE 2500 FPM)



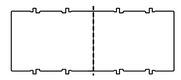
2 TYPICAL ROUND/OVAL DUCT FITTINGS

NOT TO SCALE



1 TYPICAL SINGLE PIPE HANGER

NOT TO SCALE



N

ISSUE FOR:			
Area	Rev.	Date	Description
		05-01-17	FOR CONSTRUCTION
	1	04-04-16	ADDENDUM

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Date: 2017.05.02 15:24:44-05'00'
E&C Engineers & Consultants Inc.
Texas Firm Registration No: F-003068

Date 5/01/2017
Drawn By DV
Checked By HEC

UTHSC Project No. 730022
E & C Project No. 3302.00
File Name

UTHealth
The University of Texas Health Science Center at Houston

MEDICAL SCHOOL BUILDING
SOUTH PENTHOUSE
AHU-L5 & L6 REPLACEMENT

DRAWING TITLE
MECHANICAL DETAILS

DRAWING NO.
M501

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AIR HANDLING UNIT

A. This unit shall be a medium pressure, dual duct, blow-through unit serving multiple dual duct boxes. The unit shall consist of a mixing box, 30%/85% filter bank, a steam preheat coil, fan array section, pre and post cooling coils and a dual duct section with steam heating coils.

B. When the VFD - H-O-A switch is in automatic, the BAS system shall start and stop the supply fan by way of a signal to the VFD control input port. When the switch is in hand, the supply fan shall start and run at the set speed. When in the bypass mode the fan shall start and run at full speed.

C. For the supply fans to start in either hand or automatic, the following permissives shall be satisfied:

1. the smoke detector in the unit discharge.
2. supply air duct high pressure switch is closed indicating a safe operating condition.
3. the door switch is closed.

D. When the supply fan array is off, the heating coils and chilled water valves shall be closed to the coils, except in freeze protection mode. In freeze protection mode, the preheat coil valves shall be open when the outdoor temperature is under 36 degrees.

E. Upon a signal to start the fan array, the fan array shall be energized and ramp up to control speed through the VFD to maintain the riser pressure requiring the highest speed to achieve the static pressure setpoint (Owner adjustable setpoint).

F. When the supply fan array is operating, the preheating and chilled water valve shall modulate to maintain the desired leaving air conditions. The discharge conditions for the cold deck shall be set for a dewpoint no greater than 53 degrees and dry bulb no less than 51 degrees. The preheat and cooling coil control valves shall not be open at the same time.

1. When inlet air temperature entering the AHU is below 65 degrees F (owner adjustable), the normally-open two-position valve located in the return piping for the pre cooling coil shall close, while the normally-closed bypass two-position valve shall open allowing chilled water to flow through the post-cooling coil only. Once the outside air temperature rises above the setpoint, the valves shall actuate to normal positions.

G. The discharge conditions for the hot deck shall be set for a dry bulb no greater than 97 degrees.

H. Condensate pump controls:

1. A condensate pump shall operate to flow condensate through a coil. The trap shall be sized to keep the coil wet. When the condensate collection basin float switch rises to the "pump on" setpoint, the condensate pump shall turn on to flow condensate through the coil.
2. When the basin float lowers below the shut-off setpoint, the pump shall be de-energized.
3. If at any time the float rises above a high-limit point, the two-position drain valve shall open to dump to drain until the float lowers back below the "pump on" setpoint.
4. If the temperature of the condensate rises above 75 degrees, the overflow valve shall open and the condensate shall dump to drain. Once the float is to the "pump off" low limit, the valve shall close and the basin will begin to fill again.

I. A current sensing relay shall independently indicate status of each of the supply fans. Status shall be input to the BAS system and to the fire alarm system.

J. The filter bank shall have an adjustable differential pressure switch to indicate high differential pressure across the filters. The switch shall be an alarm input to the BAS system.

K. The supply air duct shall have a pressure sensor to indicate duct static pressure at the discharge of the unit on both the hot and cold decks. The pressure sensor shall provide an input to the BAS system.

L. The supply air duct shall have an adjustable pressure switch to indicate high pressure downstream of the fan and a low pressure switch upstream of the fan. The switches shall be an alarm input to the BAS system and shall be an interlock for the supply air fan.

M. There shall be a discharge smoke detector interlocked with the fire alarm system to shut the system down in the event of smoke in the fan discharge.

N. There shall be a low temperature limit switch that shall be before the inlet of the cooling coil. Upon a signal from the switch that the temperature is below 35 degrees, the outside air damper shall shut and an alarm shall be sent to the BAS. If the temperature remains below the limit of 35 degrees for more than 1 minute after the outside air damper is shut, the fan shall be de-energized and the cooling coil shall open fully to circulate water to avoid freezing the coil.

O. There shall be a door switch on the fan section. When the door switch is open, the fan shall be de-energized for safety.

P. There shall be a door switch on the cooling coil section. When the door switch is open, the UV lights shall be de-energized for safety. Otherwise, the UV lights shall be on if the AHU is operational.

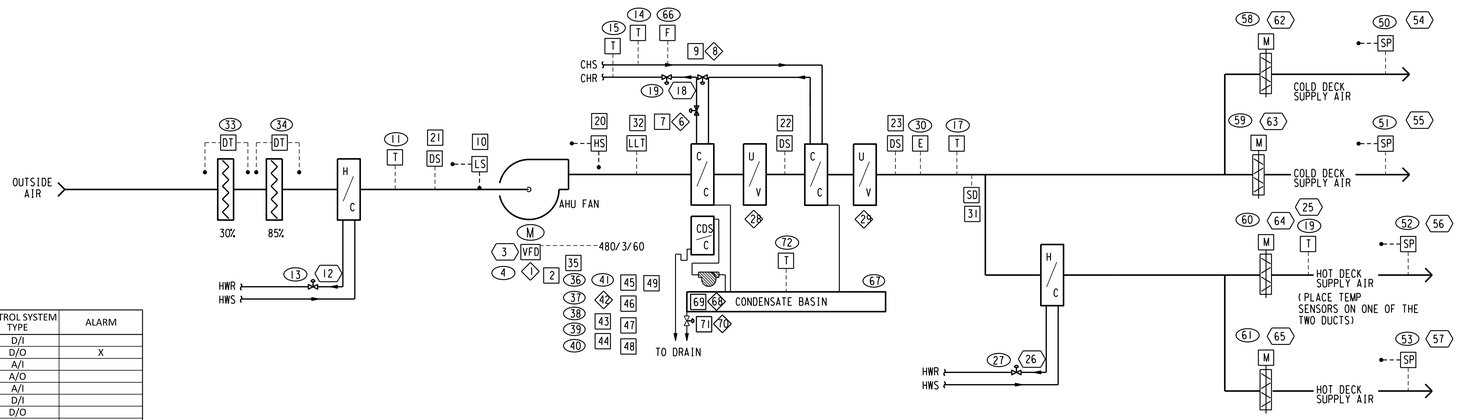
Q. There shall be a contractor-provided Nutech venture flowmeter installed in the chilled water supply or return line with high and low pressure points (contractor option based on ease of installation). Controls contractor to connect to the ports and provide flow to the BAS.

If Alternate A1 is selected, the risers will be set with a minimum and maximum SP setpoint. Once the worst case riser is satisfied to the minimum SP setpoint, the dampers at the unit discharge will operate to maintain static pressure between the minimum and maximum for that riser.

NAE 8

POINT NO.	POINT	DESCRIPTION	UNIT OF MEASURE	CONTROL SYSTEM TYPE	ALARM
1	FAN_C	FAN ARRAY COMMAND	ON|OFF	D/I	
2	FAN_S	FAN ARRAY STATUS	ON|OFF	D/O	X
3	VFD_C	VFD COMMAND	%	A/I	
4	VFD_FB	VFD FEEDBACK	%	A/O	
5	OABP_SP	OA TEMP COOLING BYPASS SETPOINT	°F	A/I	
6	BP_V1_C	BYPASS VALVE 1 CONTROL (NO)	OPEN/CLOSE	D/I	
7	BP_V1_FB	BYPASS VALVE 1 FEEDBACK (NO)	OPEN/CLOSE	D/O	
8	BP_V2_C	BYPASS VALVE 2 CONTROL (NC)	OPEN/CLOSE	D/I	
9	BP_V2_FB	BYPASS VALVE 2 FEEDBACK (NC)	OPEN/CLOSE	D/O	
10	LS_A	LOW STATIC ALARM	NORMAL/ALARM	D/I	X
11	PH_T	PREHEAT TEMPERATURE	°F	A/O	
12	PH_V_C	PREHEAT VALVE COMMAND	%	A/I	
13	PH_V_FB	PREHEAT VALVE FEEDBACK	%	A/O	
14	CHW_S_T	CHILLED WATER SUPPLY TEMP	°F	A/O	
15	CHW_R_T	CHILLED WATER RETURN TEMP	°F	A/O	
16	CD1_T_SP	COLD DECK 1 TEMP SETPOINT	°F	A/I	
17	CD1_T	COLD DECK 1 TEMPERATURE	°F	A/O	
18	CHW_V1_C	CHILLED WATER VALVE 1 CMD	%	A/I	
19	CHW_V1_F	CHILLED WATER VALVE 1 FB	%	A/O	
20	HS_A	HIGH STATIC ALARM	NORMAL/ALARM	D/O	X
21	DS1	FAN DOOR SWITCH	OPEN/CLOSE	D/O	
22	DS2	UV LIGHT DOOR SWITCH	OPEN/CLOSE	D/O	
23	DS3	UV LIGHT DOOR SWITCH	OPEN/CLOSE	D/O	
24	HD1_T_SP	HOT DECK 1 TEMP SETPOINT	°F	A/I	
25	HD1_T	HOT DECK 1 TEMPERATURE	°F	A/O	
26	HTG_V1_C	REHEAT VALVE 1 CMD	%	A/I	
27	HTG_V1_FB	REHEAT VALVE 1 FB	%	A/O	
28	UV1	UV LIGHTS ON/OFF	ON|OFF	D/O	
29	UV2	UV LIGHTS ON/OFF	ON|OFF	D/O	
30	LA_DP	LEAVING AIR DEWPOINT	°F	A/I	X
31	LA_SD	LEAVING AIR SMOKE DETECTOR	NORMAL|ALARM	D/O	X
32	LL_A	LOW LIMIT ALARM	NORMAL|ALARM	D/O	X
33	PRE_FIL_DP	PREFILTER DP	IWC	A/O	X
34	FIN_FIL_DP	FINAL FILTER DP	IWC	A/O	X
35	VFD_S	VFD STATUS	ON|OFF	D/O	
36	VFD_HTZ	VFD HERTZ	Hz	A/O	
37	VFD_AMP	VFD AMPS	A	A/O	
38	VFD_RPM	VFD RPM	RPM	A/O	
39	VFD_PWR	VFD POWER	kW	A/O	
40	KWH	VFD KILOWATT HOURS	kWh	A/O	
41	VFD_RT	VFD RUNTIME	hours	A/O	
42	VFD_RT_RS	VFD RUNTIME RESET	OFF|RESET	D/I	
43	VFD_FS	VFD FAULT STATUS	OF|FAULT	D/O	X
44	FAN_S1	FAN 1 STATUS	NORMAL|ALARM	D/O	X
45	FAN_S2	FAN 2 STATUS	NORMAL|ALARM	D/O	X
46	FAN_S3	FAN 3 STATUS	NORMAL|ALARM	D/O	X
47	FAN_S4	FAN 4 STATUS	NORMAL|ALARM	D/O	X
48	FAN_S5	FAN 5 STATUS	NORMAL|ALARM	D/O	X
49	FAN_S6	FAN 6 STATUS	NORMAL|ALARM	D/O	X
50	CD1_DP_SP	COLD DECK 1 STATIC PRESSURE SETPOINT	IWC	A/I	
51	CD2_DP_SP	COLD DECK 2 STATIC PRESSURE SETPOINT	IWC	A/I	
52	HD1_DP_SP	HOT DECK 1 STATIC PRESSURE SETPOINT	IWC	A/I	
53	HD2_DP_SP	HOT DECK 2 STATIC PRESSURE SETPOINT	IWC	A/I	
54	CD1_DP	COLD DECK 1 STATIC PRESSURE	IWC	A/O	X
55	CD2_DP	COLD DECK 2 STATIC PRESSURE	IWC	A/O	X
56	HD1_DP	HOT DECK 1 STATIC PRESSURE	IWC	A/O	X
57	HD2_DP	HOT DECK 2 STATIC PRESSURE	IWC	A/O	X
58	CD1_D_C	COLD DECK 1 DAMPER CONTROL	%	A/I	
59	CD2_D_C	COLD DECK 2 DAMPER CONTROL	%	A/I	
60	HD1_D_C	HOT DECK 1 DAMPER CONTROL	%	A/I	
61	HD2_D_C	HOT DECK 2 DAMPER CONTROL	%	A/I	
62	CD1_D_FB	COLD DECK 1 DAMPER FEEDBACK	%	A/O	
63	CD2_D_FB	COLD DECK 2 DAMPER FEEDBACK	%	A/O	
64	HD1_D_FB	HOT DECK 1 DAMPER FEEDBACK	%	A/O	
65	HD2_D_FB	HOT DECK 2 DAMPER FEEDBACK	%	A/O	
66	CHW_FL	CHILLED WATER FLOW (NUTECH VENTURI PROVIDED BY THE MECHANICAL CONTRACTOR)	GPM	A/I	
67	CDS_FLT	FLOAT POSITION	OFF/ON/OVERFLOW	A/I	X
68	CDS_P_C	PUMP CONTROL	ON/OFF	A/I	
69	CDS_P_FB	PUMP FEEDBACK	ON/OFF	A/O	
70	CDS_V_C	OVERFLOW - DUMP CONTROL	OPEN/CLOSE	D/I	X
71	CDS_V_FB	OVERFLOW - DUMP FEEDBACK	OPEN/CLOSE	D/O	
72	CDS_T	CONDENSATE TEMPERATURE	°F	A/O	
73	LEAK	FUTURE LEAK DETECTION ALARM POINT	NORMAL|ALARM	D/I	X

POINTS 51-53 AND 58-65 SHALL BE PART OF ALTERNATE PRICING A1.
VERIFY NAMING ON ALL POINTS WITH UTHSC-H PRIOR TO PROGRAMMING.



01 AHU CONTROL DIAGRAM AHU-L7 & L8

NOT TO SCALE

GENERAL NOTES:

1 ALL SET POINTS SHALL BE REPORTED AS DISPLAYED.

2 ALL ALARMS SHALL BE REPORTED AND DISPLAYED.

3 ALL ALARM SETTINGS SHALL BE DISPLAYED.

4 REFER TO PIPING DIAGRAMS FOR ACTUAL PIPING DETAILS.

5 ALL CONTROLS EQUIPMENT REQUIRED TO PROVIDE THE SEQUENCE OF OPERATION IS REQUIRED TO BE PROVIDED BY THE CONTRACTOR EVEN IF NOT SPECIFICALLY SHOWN ON THE DRAWING OR POINTS LIST.

ISSUE FOR:			
Area	Rev.	Date	Description
		05-01-17	FOR CONSTRUCTION

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STATE OF TEXAS · HEATHER CAMDEN · 86883 · LICENSED · PROFESSIONAL ENGINEER

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E&C Engineers & Consultants Inc. Texas Firm Registration No: F-003068

Date 5/01/2017
Drawn By DV
Checked By HEC

UTHSC Project No. 730022
E & C Project No. 3302.00
File Name

UTHealth The University of Texas Health Science Center at Houston

MEDICAL SCHOOL BUILDING SOUTH PENTHOUSE AHU-L5 & L6 REPLACEMENT

DRAWING TITLE
MECHANICAL CONTROL DIAGRAMS

DRAWING NO.
M600

E:\3300\3302\vm\AHU L5&L3302 MCD.dgn

ABBREVIATIONS

A	AMPS, AIR (COMPRESSED)
AAP	AREA ALARM PANEL
ABV	ABOVE
AC	ALTERNATING CURRENT, AIR COMPRESSOR
A/C	AIR CONDITIONING
ACC	AIR COOLED CHILLER
ACCU	AIR COOLED CONDENSING UNIT
AD	ACCESS DOOR, AIR DRYER
ADJ	ADJUSTABLE
AF	AIR FILTER
AFC	ABOVE FINISHED CEILING
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
AIC	AMPERES INTERRUPTING CAPACITY
AL	ALUMINUM
ALT	ALTERNATE
AMB	AMBIENT
ANOD	ANODIZED
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
AP	ACCESS PANEL, ALARM PANEL
APD	AIR PRESSURE DROP
ARCH	ARCHITECT, ARCHITECTURAL
ARI	AMERICAN REFRIGERATION INSTITUTE
AS	AIR SEPARATOR
ASHRAE	AMERICAN SOCIETY OF HEATING AND REFRIGERATION AND AIR CONDITIONING ENGINEERS
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
ATP	AUTOMATIC TRAP PRIMER
ATS	AUTOMATIC TRANSFER SWITCH
ATT(S)	ATTENUATOR(S)
AUTO	AUTOMATIC
AUX	AUXILIARY
AV	AREA VALVE, ACID VENT
AVG	AVERAGE
AVTR	ACID VENT THRU ROOF
AW	ACID WASTE
AWS	AMERICAN WELDING SOCIETY
AWWA	AMERICAN WATER WORKS ASSOCIATION
BC	BELOW COUNTER
BFD	BOILER FEED DEAREATOR
BFP	BOILER FEED PUMP, BACKFLOW PREVENTER
BFV	BOILER FEED VALVE
BFW	BOILER FEED WATER
BH	BOX HYDRANT
BLDG	BUILDING
BM	BEAM, BENCH MARK
BOB	BOTTOM OF BEAM
BOF	BOTTOM OF FOOTING
BOH	BOTTOM OF HUB
BOP	BOTTOM OF PIPE
BOS	BOTTOM OF STRUCTURE
BOT	BOTTOM
BKT	BRACKET
BS	BLACK STEEL
BSMT	BASEMENT
BT	BATH TUB, BREAK TANK
BV	BUTTERFLY VALVE, BALL VALVE, BALANCING VALVE
BWV	BACKWATER VALVE
C	CELSIUS, CONDUIT
CA	CONTROL AIR, COMPRESSED AIR
CAB	CABINET
CB	CATCH BASIN
CC	CENTER TO CENTER
CD	CEILING DIFFUSER
CDP	CONDENSER WATER PUMP
CDR	CONDENSER WATER RETURN
CDS	CONDENSER WATER SUPPLY
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CFS	CUBIC FEET PER SECOND
CG	CEILING GRILL
CH	CHILLER
CHP	CHILLED WATER PUMP
CHS	CHILLED WATER SUPPLY
CHV	CHECK VALVE
CI	CAST IRON
CIP	CAST IN PLACE
CIRC	CIRCULATING
CL.	CENTER LINE
CLG	CEILING
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CO	CLEANOUT
CHR	CHILLED WATER RETURN
COL	COLUMN
COMB	COMBINATION
COMP	COMPRESSOR
CONC	CONCRETE, CONCENTRIC
COND	CONDENSER, CONDENSATE
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS, CONTROLLER, CONTINUATION
CONTR	CONTRACTOR
CONV	CONVERTER
CORR	CORRIDOR
CO2	CARBON DIOXIDE
CPI	CAST IRON PIPE INSTITUTE
CPVC	CHLORINATED POLYVINYL CHLORIDE
CPUC	CPU CHILLER
CR	CONSTANT VOLUME REHEAT, CONDENSATE RETURN
CRAC	COMPUTER ROOM A/C UNIT
CRT	CATHODE RAY TUBE
CRU	CONDENSATE RETURN UNIT
CSS	CLINICAL SERVICE SINK
CT	COOLING TOWER
CTR	CENTER
CU	COPPER
CU FT	CUBIC FEET
Cv	CAPACITY INDEX
CV	CONTROL VALVE, CHECK VALVE
CW	COLD WATER
CVRH	CONSTANT VOLUME REHEAT
D	DEPTH, DRAIN
Db	DECIBEL
DB	DRY BULB
DBL	DOUBLE
DC	DIRECT CURRENT, DOUBLE DUCT CONSTANT VOLUME
DD	DECK DRAIN, DOUBLE DUCT
DDC	DIRECT DIGITAL CONTROL
DEG	DEGREE
DEP	DEIONIZED WATER PUMP
DEPT	DEPARTMENT
DESIG	DESIGNATION
DET	DETAIL
DF	DRINKING FOUNTAIN
DI	DUCTILE IRON, DRAIN INLET, DEIONIZED WATER
DIA	DIAMETER
DIFF	DIFFUSER
DIM	DIMENSION
DIR	DEIONIZED WATER RETURN
DIS	DEIONIZED WATER SUPPLY
DISC	DISCONNECT
DIST	DISTRIBUTION
DIV	DIVISION
DL	DOOR LOUVER
DMH	DRAIN MANHOLE
DN	DOWN
DP	DIFFERENTIAL PRESSURE
DPR	DAMPER
DS	DOUBLE SUCTION, DOWN SPOUT
DV	DOUBLE DUCT VAV
DW	DISHWASHER, DISTILLED WATER
DWC	DRINKING WATER COOLER
DWG	DRAWING
DWH	DOMESTIC WATER HEATER
DWP	DOMESTIC WATER PUMP
DWR	DRINKING WATER RETURN
DWS	DRINKING WATER SUPPLY
DX	DIRECT EXPANSION
DXFC	DIRECT EXPANSION FAN COIL UNIT
E	EAST
(E)	EXISTING
EA	EACH
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
ECC	ECCENTRIC
EDB	ENTERING DRY BULB
EF	EXHAUST FAN
EJ	EXPANSION JOINT
EL	ELEVATION, EXPANSION LOOP
ELEC	ELECTRIC, ELECTRICAL
ELEV	ELEVATOR
EMER	EMERGENCY
ENCL	ENCLOSURE
ENGR	ENGINEER
EPA	ENVIRONMENTAL PROTECTION AGENCY
EQ	EQUAL
EQUIP	EQUIPMENT
EQUIV	EQUIVALENT
ES	END SUCTION
ET	EXPANSION TANK
ETR	EXISTING TO REMAIN
EVAC	EVACUATION PUMP
EUH	ELECTRIC UNIT HEATER
EVAP	EVAPORATOR
EW	EACH WAY
EWB	ENTERING WET BULB
EWC	ELECTRIC WATER COOLER
EWT	ENTERING WATER TEMPERATURE
EX	EXPLOSION PROOF
EXCV	EXCAVATE, EXCAVATION
EXH	EXHAUST
EXIST	EXISTING
EXP	EXPANSION
EXPD	EXPOSED
EXT	EXTERNAL
F	FAHRENHEIT, FAN, FIRE, FEMALE
F to F	FACE TO FACE
F & E	FURNITURE & EQUIPMENT
FA	FIRE ALARM
FAB(D)	FABRICATE(D)
FACP	FIRE ALARM CONTROL PANEL
FBO	FURNISHED BY OTHERS
FCO	FLOOR CLEAN OUT
FCS	FLOOR CONTROL STATION
FCU	FAN COIL UNIT
FCVA	FLOOR CONTROL VALVE ASSEMBLY
FD	FIRE DAMPER, FLOOR DRAIN
FDC	FIRE DEPARTMENT CONNECTION
FDN	FOUNDATION
FDS	FIRE DEPARTMENT SIAMESE
FDV	FIRE DEPARTMENT VALVE
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FF	FINAL FILTER, FINISHED FLOOR
FFE	FINISHED FLOOR ELEVATION
FG	FINISHED GRADE
FH	FIRE HYDRANT
FHC	FIRE HOSE CABINET
FHR	FIRE HOSE RACK
FHV	FIRE HOSE VALVE
FIN	FINISH
FIXT	FIXTURE
FL	FLOW LINE
FLA	FULL LOAD AMPERES
FLEX	FLEXIBLE
FLR	FLOOR
FM	FACTORY MUTUAL
FO	FUEL OIL
FOP	FUEL OIL PUMP
FOR	FUEL OIL RETURN
FOS	FUEL OIL SUPPLY
FOV	FUEL OIL VALVE
FP	FAN POWERED MIXING BOX, FIRE PUMP
FPC	FIRE PUMP CONTROLLER
FPT	FEMALE PIPE THREAD
FR	FLOOR REGISTER
FRM	FRAME
FRZR	FREEZER
FS	FUSED SWITCH, FLOW SWITCH, FIRE SPRINKLER, FLOOR SINK
FSCP	FIRE SUPPRESSION CONTROL PANEL
FT	FOOT, FEET
FTG	FOOTING
FTR	FINNED TUBE RADIATION
FURN	FURNITURE
FURND	FURNISHED
FUT	FUTURE
FVC	FIRE VALVE CABINET
FVNR	FULL-VOLTAGE, NON-REVERSING
FVR	FULL-VOLTAGE, REVERSING
G	GAS
GA	GAGE
GAL	GALLON
GALV	GALVANIZED
GB	GRADE BEAM
GC	GENERAL CONTRACTOR
GCO	GRADE CLEAN OUT
GEN	GENERATOR
GKT	GASKET
GL	GLASS
GLV	GLOBE VALVE
GND	GROUND
GOVT	GOVERNMENT
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GR	GRILLE
GRD	GRADE
GRV	GRAVITY ROOF VENT
GSH	GRAND SENSIBLE HEAT
GTH	GRAND TOTAL HEAT
GV	GATE VALVE
GW	GREASE WASTE
H	HIGH, HEIGHT, HUMIDIFIER
H-O-A	HAND-OFF-AUTOMATIC
H STAT	HUMIDISTAT/SENSOR
HB	HOSE BIBB
HC	HEATING COIL
HD	HEAD, HUB DRAIN, HEAT DETECTOR
HE	HEAT EXCHANGER
HGR	HANGER
HKP	HOUSEKEEPING PAD
HND D	HAND DRYER
HORIZ	HORIZONTAL
HP	HORSEPOWER, HIGH PRESSURE
HPT	HIGH POINT
HR	HOUR, HOT WATER RETURN
HS	HOT WATER SUPPLY
HSC	HORIZONTAL SPLIT CASE
HSTM	HIGH PRESSURE STEAM
HSZBT	HORIZONTAL, SINGLE-ZONE, BLOW-THRU
HSZDT	HORIZONTAL, SINGLE-ZONE, DRAW-THRU
HT	HEIGHT
HTG	HEATING
HTR	HEATER
HUH	HOT WATER/GAS UNIT HEATER
HVAC	HEATING, VENTILATING & AIR CONDITIONING
HVU	HEATING AND VENTILATING UNIT
HW	HOT WATER
HWB	HOT WATER BOILER
HWC	HOT WATER CIRCULATOR
HWP	HEATING WATER PUMP
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
HZ	HERTZ
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IG	IRRIGATION
IF	INTERMITTENT FAN VAV
IN	INCH
INCAND	INCANDESCENT
INC	INCLUDE, INCLUSIVE
INSUL	INSULATE, INSULATION
INT	INTERNAL, INTERIOR
INV	INVERT
IPS	IRON PIPE SIZE
JAN	JANITOR
JB	JUNCTION BOX
JP	JOCKEY PUMP
JPC	JOCKEY PUMP CONTROLLER
JS	JANITOR SINK
JST	JOIST
JT	JOINT
KEC	KITCHEN EQUIPMENT CONTRACTOR
KIT	KITCHEN
KO	KNOCKOUT
KVA	KILOVOLT-AMPS
KW	KILOWATTS
KWH	KILOWATT-HOUR
L	LENGTH, LONG, LAVATORY
LA	LAB AIR
LAC	LAB AIR COMPRESSOR
LAB	LABORATORY
LAV	LAVATORY
LAT	LEAVING AIR TEMPERATURES, LATENT
LB(S)	POUND(S)
LCD	LIQUID CRYSTAL DISPLAY
LD	LINEAR DIFFUSER
LDB	LEAVING DRY BULB
LED	LIGHT EMITTING DIODE
LF	LINEAR FEET
LG	LAB GAS OUTLET
LH	LEFT HAND
LOC	LOCATION, LIMIT OF CONSTRUCTION
LP	LOW PRESSURE
LPT	LOW POINT
LRA	LOCKED ROTOR AMPS
LSTM	LOW PRESSURE STEAM
LTG	LIGHTING
LV	LAB VACUUM
LVL	LEVEL
LVP	LABORATORY VACUUM PUMP
LW	LAUNDRY LINT WASTE
LWB	LEAVING WET BULB
LWCO	LOW WATER CUT OFF
LWT	LEAVING WATER TEMPERATURE
M	METER, MALE, MEN
MA	MEDICAL AIR
MAC	MEDICAL AIR COMPRESSOR
MAP	MASTER ALARM PANEL
MAX	MAXIMUM
MBH	THOUSANDS OF BTU'S
MC	MECHANICAL CONTRACTOR
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MDP	MAIN DISTRIBUTION PANEL
MECH	MECHANICAL
MED	MEDIUM
MEMB	MEMBRANE
M/E/P	MECHANICAL/ ELECTRICAL/ PLUMBING
MEZZ	MEZZANINE
MFGR	MANUFACTURER
MG	MEDICAL GAS OUTLET
MH	MANHOLE
MI	MALLEABLE IRON
MIN	MINIMUM
MISC	MISCELLANEOUS
ML	MATCH LINE
MON	MONITOR SWITCH
MP	MEDIUM PRESSURE
MPT	MALE PIPE THREAD
MS	MONITOR SWITCH
MSB	MAIN SWITCHBOARD
MSGR	MAIN SWITCHGEAR
MSTM	MEDIUM PRESSURE STEAM
MTD	MOUNTED
MTG	MOUNTING
MU	MAKE-UP
MV	MEDICAL VACUUM
MVA	MEGA VOLT-AMPS
MVD	MANUAL VOLUME DAMPER
MVP	MEDICAL VACUUM PUMP
MZU	MULTI-ZONE UNIT
N	NORTH, NITROGEN
(N)	NEW
NA	NOT ACCEPTABLE
NAT	NATURAL
NC	NOISE CRITERIA
N.C.	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NF	NON-FUSED
NFS	NON-FUSED SWITCH
NIC	NOT IN CONTRACT
NO	NUMBER
N.O.	NORMALLY OPEN
NOM	NOMINAL
NTS	NOT TO SCALE
O	OXYGEN
OA	OUTSIDE AIR
OAF	OUTSIDE AIR FAN
OBD	OPPOSED BLADE DAMPER
OC	ON CENTER
OCEW	ON CENTER EACH WAY
OD	OUTSIDE DIAMETER
OFF	OFFICE
OH	OVERHEAD
OPH	OPPOSITE HAND
OPNG	OPENING
OPP	OPPOSITE
OS&Y	OUTSIDE STEM & YOLK
OZ	OUNCE
P	PUMP, POLE, PLUMBING EQUIPMENT
PB	PUSH-BUTTON
PC	PLUMBING CONTRACTOR, PERSONAL COMPUTER
PCR	PUMPED CONDENSATE RETURN
PCHP	PRIMARY CHILLED WATER PUMP
PCHR	PRIMARY CHILLED WATER RETURN
PCHS	PRIMARY CHILLED WATER SUPPLY
PCW	PUMPED COLD WATER
PD	PRESSURE DROP
PEND	PENDANT
PERF	PERFORATED
PH	PHASE
PHWP	PRIMARY HEATING WATER PUMP
PHWR	PRIMARY HEATING WATER RETURN
PHWS	PRIMARY HEATING WATER SUPPLY
PIV	POST INDICATOR VALVE
PKG	PACKAGE, PARKING
PL	PILOT LIGHT
PLUMB	PLUMBING
PNEU	PNEUMATIC
PNL	PANEL
PNTH	PENTHOUSE
PP	POLY PROPYLENE
PPM	PARTS PER MILLION
PR	PAIR, PRINTER
PRES	PRESSURE
PRI	PRIMARY
PROJ	PROJECT
PROP	PROPERTY
PRS	PRESSURE REDUCING STATION
PRV	PRESSURE REDUCING VALVE
PS	PRESSURE SWITCH
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH GAUGE
PT	PLUMBING TRIM
PV	PLUG VALVE
PVC	POLYVINYL CHLORIDE
PVDF	POLYVINYLIDENE FLUORIDE
PVMT	PAVEMENT
PW	PROCESS WASTE
PWR	POWER
QTY	QUANTITY
R	RISER
(R)	RELOCATE
R&D	REMOVE & DISPOSE
RA	RETURN AIR
RAD	REFRIGERATED AIR DRYER
RAF	RETURN AIR FAN
RAG	RETURN AIR GRILLE
RCP	REFLECTED CEILING PLAN
RD	ROOF DRAIN
RE:	REFERENCE, REFER
REC	RECESSED
RECIRC	RECIRCULATE, RECIRCULATING
RECPT	RECEPTACLE
RED	REDUCER
REFR	REFRIGERATOR
REG	REGISTER
REINF	REINFORCED, REINFORCING
REQD	REQUIRED
REV	REVISION, REVISED
RH	RELATIVE HUMIDITY
RHG	REFRIGERANT HOT GAS
RIC	ROUGH-IN AND CONNECT
RIO	ROUGH-IN ONLY
RKVA	RUNNING KVA
RKW	RUNNING KW
RL	REFRIGERANT LIQUID
RLA	RUNNING LOAD AMPS
RM	REFRIGERATION MACHINE, ROOM
RND, ɸ	ROUND
RO	ROUGH OPENING, REVERSE OSMOSIS
ROW	RIGHT OF WAY
RPM	REVOLUTIONS PER MINUTE
RS	REFRIGERANT SUCTION
RTAH	ROOFTOP AIR HANDLING UNIT
RTU	ROOFTOP UNIT
RV	RELIEF VALVE
RVS	REVERSE
S	SOUTH, SUPPLY, SINK
SA	SUPPLY AIR, SHOP AIR, SOUND ATTENUATOR
SAD	SUPPLY AIR DIFFUSER
SAF	SUPPLY AIR FAN
SC	STEAM CONVERTER
SCHED	SCHEDULE(D)
SCHP	SECONDARY CHILLED WATER PUMP
SCR	SILICON CONTROLLED RECTIFIER
SCW	SOFTENED COLD WATER
SD	SMOKE DETECTOR
SE	SEWAGE EJECTOR
SEC	SECONDARY
SECT	SECTION
SENS	SENSIBLE
SERV	SERVICE
SF	SQUARE FEET
SH	SHOWER
SHR	SHOWER
SHT	SHEET
SHWP	SECONDARY HEATING WATER PUMP
SHWR	SECONDARY HEATING WATER RETURN
SHWS	SECONDARY HEATING WATER SUPPLY
SIM	SIMILAR
SK	SINK
SL	SLOPE
SKVA	STARTING KVA
SKW	STARTING KW
SP	STATIC PRESSURE, SUMP PUMP
SPEC	SPECIFICATION, SPECIFIED
SPF	STAIR PRESSURIZATION FAN
SPKLK	SPRINKLER
SQ	SQUARE
SQ IN	SQUARE INCHES
SRF	SMOKE REMOVAL FAN
SS	STOP-START PUSH-BUTTON, STAINLESS STEEL
SSSC	SOLID STATE SPEED CONTROL
SSD	SUBSURFACE DRAIN
SST	STAINLESS STEEL
ST	SOUND TRAP, STEAM TRAP, SURGE TANK
STA	STATION
STAP	SURGE TANK ALARM PANEL
STB	STEAM BOILER
STC	SOUND TRANSMISSION CLASS
STD	STANDARD
STL	STEEL
STM	STEAM
STOR	STORAGE
STR	STRAINER
STRUC	STRUCTURE, STRUCTURAL
SURF	SURFACE
SUSP	SUSPENDED
SV	SANITARY VENT
SW	SWITCH, SOFTENED WATER
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
SWR	SIDE WALL REGISTER
SYM	SYMMETRICAL
SYS	SYSTEM
T&P	TEMPERATURE & PRESSURE
T STAT	THERMOSTAT/SENSOR
TC	TEMPERATURE CONTROL
TCC	TEMPERATURE CONTROL COMPRESSOR
TD	TRENCH DRAIN
TDH	TOTAL DYNAMIC HEAD
TF	TRANSFER FAN
TEMP	TEMPORARY
TH BLK	THRUST BLOCK
THK	THICK
TK	TANK
TOC	TOP OF CURB
TOF	TOP OF FOOTING
TOIL	TOILET
TOS	TOP OF SLAB
TOT	TOTAL
TP	TRAP PRIMER, TOTAL PRESSURE
TR	TRENCH
TRD	THREAD, THREADED
TS	TAMPER SWITCH
TU	TERMINAL UNIT
TW	TREATED WATER, TEMPERED WATER
TXV	THERMAL EXPANSION VALVE
TYP	TYPICAL
2S-1W	TWO-SPEED, ONE WINDING
2S-2W	TWO-SPEED, TWO WINDING
U/F	UNDERFLOOR
U/S	UNDERSLAB
UG	UNDERGROUND
UH	UNIT HEATER
UL	UNDERWRITER'S LABORATORIES, INC.
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLT, VENT
V/D	VOICE/DATA
VA	VOLT-AMPERE, VARIABLE
VAC	VACUUM, VOLTS AC
VAV	VARIABLE AIR VOLUME
VB	VACUUM BREAKER
VD	VOLUME DAMPER
VEL	VELOCITY
VERT	VERTICAL
VEST	VESTIBULE
VFD	VARIABLE FREQUENCY DRIVE
VOL	VOLUME
VP	VACUUM PUMP
VR	VARIABLE AIR VOLUME REHEAT
VSZBT	VERTICAL SINGLE ZONE BLOW THRU
VSZDT	VERTICAL SINGLE ZONE DRAW THRU
W	WATT, WIDTH, WASTE, WEST, WIRE, WOMEN
W/	WITH
W/O	WITHOUT
WB	WET BULB
WC	WATER CLOSET
WCO	WALL CLEANOUT
WH	WATER HEATER, WALL HYDRANT
WM	WATER METER
WP	WEATHERPROOF
WPD	WATER PRESSURE DROP
WS	WATER SOFTENER
WT	WATERTIGHT, WEIGHT
WWF	WELDED WIRE FABRIC
XFMR	TRANSFORMER
XP	EXPLOSION PROOF
Z	ZONE
ZV	ZONE VALVE

ELECTRICAL SYMBOLS (ALL SYMBOLS SHOWN ARE NOT NECESSARILY USED ON THE DRAWINGS)

ONE LINE/RISER DIAGRAMS

⌇	TRANSFORMER, TYPE AND RATINGS AS NOTED
800A/3P	SWITCH, RATING AS SHOWN
400A ▭	FUSE, RATING AS SHOWN
225A/3P ⌒	CIRCUIT BREAKER, RATINGS AS SHOWN, 3 POLE UNLESS NOTED OTHERWISE
2000A/3P ⌒ »	DRAWOUT CIRCUIT BREAKER, RATINGS AS SHOWN, 3 POLE UNLESS NOTED OTHERWISE
ST	SHUNT TRIP
GFR	GROUND FAULT RELAY
K	KIRK-KEY INTERLOCK
A 0-2000	AMMETER, RANGE AS SHOWN
AS	AMMETER SWITCH
V 0-600	VOLTMETER, RANGE AS SHOWN
VS	VOLTMETER SWITCH
M	FULL FUNCTION METER
1200/5	CURRENT TRANSFORMER, RATED AS SHOWN
12.47KV/120V	POTENTIAL TRANSFORMER, RATING AS SHOWN
⏚	GROUND CONNECTION
⏚	LIGHTNING ARRESTOR
G	GENERATOR SET
⊡	AUTOMATIC TRANSFER SWITCH
⧄	HOA OR SS AS NOTED

FIRE ALARM

FACP FACP	FIRE ALARM CONTROL PANEL (FLUSH/SURFACE)
FAAP FAAP	FIRE ALARM REMOTE ANNUNCIATOR (FLUSH/SURFACE)
AV◁	FIRE ALARM AUDIO VISUAL SIGNAL, WALL MOUNTED
V	FIRE ALARM VISUAL SIGNAL, WALL MOUNTED
A◁	FIRE ALARM AUDIO SIGNAL, WALL MOUNTED
Ⓐ	FIRE ALARM CEILING SPEAKER
H	HEAT DETECTOR
S	AREA SMOKE DETECTOR
S L	AREA SMOKE DETECTOR WITH LOCAL ALARM
D RA	DUCT SMOKE DETECTOR. "RA" DENOTES RETURN AIR, "SA" DENOTES SUPPLE AIR
RI	SMOKE DETECTOR REMOTE INDICATOR STATION
◁ J	FIREFIGHTER'S COMMUNICATION JACK
◁ H	STAIRWAY EMERGENCY TELEPHONE
ES	ELEVATOR LOBBY EMERGENCY SIGN
F	FIRE ALARM MANUAL PULL STATION
FJ	FIRE ALARM MANUAL PULL STATION WITH FIREMAN'S JACK
WF	SPRINKLER WATER FLOW SWITCH
VS	VALVE SUPERVISORY SWITCH
DH	MAGNETIC DOOR HOLDER
⌖	ELECTRIC DOOR LOCK
R	FIRE ALARM RELAY
HCP	HALON CONTROL PANEL

COMMUNICATIONS

◀•	NEW VOICE WALL OUTLET. "W" DENOTES WALL PHONE HEIGHT, "P" DENOTES PAY PHONE, DOT INDICATES ABOVE COUNTER
◀ E	EXISTING VOICE WALL OUTLET TO REMAIN
◀ R	EXISTING VOICE WALL OUTLET TO BE REMOVED
◁	NEW DATA WALL OUTLET
◁ R	RELOCATED EXISTING DATA WALL OUTLET
◁	EXISTING DATA WALL OUTLET TO REMAIN
◁ R	EXISTING DATA WALL OUTLET TO BE REMOVED AND REUSED AS APPLICABLE
◀▷	COMBINATION VOICE/DATA WALL OUTLET
ICM	INTERCOM MASTER STATION
ICS	INTERCOM STAFF STATION
ICP	INTERCOM EQUIPMENT PANEL
S	CEILING MOUNTED SPEAKER
S◁	PAGING HORN
M	PAGING SYSTEM MICROPHONE
PATC	PAGING SYSTEM TERMINAL CABINET

LIGHTING/SWITCHES

○A ◐B	NEW INCANDESCENT OR HID LIGHTING FIXTURE, LETTER DENOTES TYPE, H PREFIX DENOTES HID
®	RELOCATED EXISTING INCANDESCENT OR HID LIGHTING FIXTURE, LETTER DENOTES TYPE WHERE APPLICABLE
○	EXISTING INCANDESCENT OR HID LIGHTING FIXTURE TO REMAIN
R	EXISTING INCANDESCENT OR HID LIGHTING FIXTURE TO BE REMOVED AND REUSED AS APPLICABLE
⊗ X	NEW EXIT SIGN, ARROWS AS INDICATED, LETTER DENOTES TYPE
⊗ R	RELOCATED EXISTING EXIT SIGN, ARROWS AS INDICATED
⊗	EXISTING EXIT SIGN TO REMAIN, ARROWS AS INDICATED
⊗ R	EXISTING EXIT SIGN TO BR REMOVED AND REUSED AS APPLICABLE
▭ FB	NEW FLUORESCENT LIGHTING FIXTURE, LETTER DENOTES TYPE, F PREFIX DENOTES FLUORESCENT
R FB	RELOCATED EXISTING FLUORESCENT LIGHT FIXTURE, LETTER DENOTES TYPE WHERE APPLICABLE
FB	EXISTING FLUORESCENT LIGHT FIXTURE TO REMAIN
R FB	EXISTING FLUORESCENT LIGHT FIXTURE TO BE REMOVED AND REUSED AS APPLICABLE
● ◢	LIGHT FIXTURE ON EMERGENCY CIRCUIT
$	NEW SWITCH, SPST, 20A, 120/277V
$ R	RELOCATED EXISTING SWITCH
$	EXISTING SWITCH TO REMAIN
$ R	EXISTING SWITCH TO BE REMOVED AND REUSED AS APPLICABLE
$ 3	SWITCH, 20A, 120/277V, "2" DENOTES DPST, "3" DENOTES THREE-WAY, "4" DENOTES FOUR-WAY
$ L	SWITCH, SPDT, CENTER OFF, MOMENTARY CONTACT, "L" DENOTES TOGGLE, "LR" DENOTES ROCKER
$ K	SWITCH, SPST, 20A, 120/277V, "K" DENOTES KEY SWITCH, "P" DENOTES PILOT LIGHT, "T" DENOTES SPRING WOUND TIMER, "M" DENOTES MOTION DETECTOR
ɸ	DIMMER CONTROL SWITCH, 1000 WATT UNLESS OTHERWISE NOTED

RECEPTACLES/OUTLETS

⊖	SIMPLEX WALL RECEPTACLE, NEMA 5-20R, 20A, 125V
⊜•	NEW DUPLEX WALL RECEPTACLE, NEMA 5-15R, 15A, 125V OR NEMA 5-20R, 20A, 125V, RE: SPECIFICATIONS, DOT INDICATES ABOVE COUNTER
⊜ R	RELOCATED EXISTING DUPLEX RECEPTACLE
⊜	EXISTING DUPLEX RECEPTACLE TO REMAIN
⊜ R	EXISTING DUPLEX RECEPTACLE TO BE REMOVED AND REUSED AS APPLICABLE
⊜	DUPLEX WALL RECEPTACLE ON EMERGENCY CIRCUIT, RED COLOR
⊜	DUPLEX WALL RECEPTACLE ON A CIRCUIT DEDICATED TO DATA PROCESSING, GRAY COLOR. PROVIDE ISOLATED GROUND TYPE RECEPTACLES WHERE NOTED WITH IG.
⊜ WP	DUPLEX WALL RECEPTACLE. "WP" DENOTES WEATHERPROOF, "TP" DENOTES SAFETY TYPE.
⊕	FOURPLEX WALL RECEPTACLE. NEMA 5-15R, 15A, 125V OR NEMA 5-20R, 20A, 125V, RE: SPECIFICATIONS.
C	CLOCK OUTLET, NEMA 15-20R SIMPLEX, RE: SPECS
⊜	SPECIAL RECEPTACLE, NEMA CONFIGURATION AS NOTED
◉ PA	FLOOR OUTLET, "P" DENOTES POKE-THRU, "F" DENOTES FLUSH, "A" DENOTES TYPE WHERE APPLICABLE.
▬	MULTI-OUTLET SURFACE RACEWAY
J	JUNCTION BOX
◆	DIRECT CONNECTION TO EQUIPMENT
P	PULL BOX (OVER 4" SQUARE)
L	TENANT LIGHTING JUNCTION BOX
P	TENANT POWER JUNCTION BOX

ELECTRICAL EQUIPMENT/CIRCUITING

▨	DISTRIBUTION PANEL
▭	SWITCHBOARD OR MOTOR CONTROL CENTER
▬ ▬	NEW PANELBOARD (FLUSH/SURFACE MOUNT)
▯	EXISTING PANELBOARD
⧄	DRY-TYPE TRANSFORMER
ATS	AUTOMATIC TRANSFER SWITCH
▭	PLYWOOD TERMINAL BOARD, TYPE AS NOTED, 4' X 8' X 3/4", UNLESS NOTED OTHERWISE
▭ ▭	TERMINAL CABINET (FLUSH/SURFACE MOUNT), TYPE AS NOTED, 24"x48"x3 1/2", UNLESS NOTED OTHERWISE.
BAT	BATTERY/INVERTER UNIT
———	CIRCUIT CONCEALED IN WALL OR CEILING
– – –	CONDUIT CAST IN CONCRETE OR BELOW SLAB
— – —	EXPOSED CONDUIT
——○	CONDUIT TURNED UP
——●	CONDUIT TURNED DOWN
——‖‖——	HASH MARKS INDICATE NUMBER OF CONDUCTORS PHASE/NEUTRAL/SWITCH LEG/GROUND LEFT TO RIGHT. NO HASH MARKS INDICATES 2#12, UNLESS OTHERWISE NOTED.
ILA-2,4	HOMERUN TO PANEL WITH CIRCUIT NUMBER(S) AS INDICATED.
ILA-6	PARTIAL CIRCUIT HOMERUN TO PANEL
— T —	COMMUNICATIONS CONDUIT OR CABLE. "V" DENOTES VOICE, "D" DENOTES DATA, "I" DENOTES INTERCOM, "PA" DENOTES PAGING, "S" DENOTES SECURITY, "FA" DENOTES FIRE ALARM
⌀	SINGLE OR THREE PHASE MOTOR
⬚	ELECTRIC DUCT HEATER
□	DISCONNECT (SAFETY) SWITCH "200/3/150" DENOTES AMPERES/POLE/FUSE, "NF" DENOTES NON-FUSED
B	ENCLOSED CIRCUIT BREAKER
⊠	MOTOR STARTER
⊠	MOTOR STARTER FURNISHED WITH EQUIPMENT
⊠	COMBINATION DISCONNECT (SAFETY) SWITCH AND MOTOR STARTER, "30/3/15/#0" DENOTES AMPERES/POLES/FUSE/ STARTER SIZE, "NF" DENOTES NON-FUSED.
⊠	COMBINATION DISCONNECT (SAFETY) SWITCH AND MOTOR STARTER FURNISHED WITH EQUIPMENT
MS	MANUAL MOTOR STARTING WITH THERMAL OVERLOAD
T	MOTOR-RATED TOGGLE SWITCH
C	LIGHTING CONTACTOR
TS	TIME SWITCH
PC	PHOTOCELL
▣	PUSH BUTTON
DC	DOOR CONTACT SWITCH

PANEL DESIGNATIONS

2HEA-3
"2" DENOTES FLOOR WHERE PANEL IS LOCATED
"H" DENOTES VOLTAGE - "H" = 480Y/277V, "L" = 208Y/120V
"E" DENOTES SYSTEM TYPE - BLANK = NORMAL POWER, E=EMERGENCY POWER, U = UPS POWER
"A" DENOTES PANEL SEQUENCE

GENERAL NOTES

A. ALL ELECTRICAL WORK SHALL COMPLY WITH APPLICABLE STATE & LOCAL BUILDING CODES & REQUIREMENTS.

B. REFER TO THE SPECS FOR MATERIALS & METHODS FOR ELECTRICAL CONSTRUCTION.

C. REFER TO THE SPECS FOR SUBMITTAL REQUIREMENTS.

D. THE ELECTRICAL CONTRACTOR SHALL VISIT THE SITE & FAMILIARIZE THEMSELF WITH EXISTING CONDITIONS WHICH WILL IMPACT CONSTRUCTION OF THIS PROJECT, PRIOR TO SUBMITTING BIDS.

E. ALL INTERRUPTIONS TO UTILITY SERVICES & ALL WORK IN OCCUPIED SPACES SHALL BE SCHEDULED WITH THE BUILDING MANAGER AT LEAST 3 WEEKS IN ADVANCE & SHALL BE PERFORMED AT TIMES WHICH ARE ACCEPTABLE TO THE BUILDING MANAGER.

F. RE: ARCHITECTURAL REFLECTED CEILING PLANS FOR THE EXACT LOCATION OF ALL CEILING MOUNTED DEVICES.

G. RE: ARCHITECTURAL INTERIOR ELEVATIONS, IF PROVIDED FOR LOCATIONS OF WALL MOUNTED DEVICES.

H. FURNISH ACCESS DOORS FOR INSTALLATION BY THE GENERAL CONTRACTOR WHERE ACCESS IS REQUIRED TO CONCEALED ELECTRICAL EQUIPMENT.

I. ALL REQUIRED HVAC CONTROL WIRING & EQUIPMENT SHALL BE PROVIDED BY THE MECHANICAL CONTRACTOR.

J. ALL WIRING SHALL BE MINIMUM 2#12, #12G, 3/4"C, UNLESS NOTED OR SHOWN ON THE DRAWINGS OTHERWISE. REFER TO SPECIFICATIONS FOR REQUIREMENTS TO INCREASE WIRE SIZE FOR DISTANCES OVER 50 FEET FOR 120 VOLT AND 100 FEET FOR 277 VOLT. UNDER NO CIRCUMSTANCES SHALL THE VOLTAGE DROP BE WORSE THAN 3% FOR ANY BRANCH CIRCUIT AND 2% FOR ANY FEEDER.

GENERAL NOTES

K. COORDINATE ALL SLAB PENETRATIONS WITH THE EXISTING STRUCTURE AND OBTAIN WRITTEN APPROVAL FROM THE OWNER PRIOR TO CORE DRILLING. ALL RATED PARTITION PENETRATIONS SHALL BE SEALED WITH A UL-LISTED FIRE SAFING SYSTEM, IN ACCORDANCE WITH APPLICABLE STATE AND LOCAL REQUIREMENTS.

L. ALL FACEPLATES ON BRICK SHALL BE STAINLESS STEEL.

M. RE: ARCHITECTURAL ELEVATIONS FOR TYPICAL MOUNTING HEIGHTS. RE: ARCHITECTURAL ELEVATIONS FOR ADDITIONAL MOUNTING HEIGHT INFORMATION IN SPECIFIC LOCATIONS.

N. MULTI-OUTLET RACEWAY SHALL INCLUDE FACTORY ENTRANCE FITTINGS, COUPLINGS, ELBOWS , END CAPS, BRACKETS, COVERS AND BASE AS REQUIRED TO BE INSTALLED AS A COMPLETE SYSTEM.

O. THE MINIMUM CONDUIT SIZE ALLOWED IS 3/4", EXCEPT 3/8" PRE-MANUFACTURED FIXTURE WHIPS WITH A GROUND WIRE MAYBE USED FOR CONNECTION TO LIGHT FIXTURES.

P. ALL PANEL DIRECTORIES SHALL BE TYPED. LIST UNUSED BREAKERS AS SPARE. LIST AVAILABLE SPACES AS SPACE.

Q. CIRCUITS FROM DIFFERENT SOURCES SHALL NOT OCCUPY THE SAME RACEWAY, 120/208V AND 277/480 VOLT CIRCUITS SHALL NOT OCCUPY THE SAME RACEWAY. NORMAL AND EMERGENCY POWER SHALL NOT OCCUPY THE SAME RACEWAY.

R. CONTROL CIRCUITS OPERATING AT 50 VOLTS OR LESS SHALL NOT OCCUPY THE SAME CONDUIT AS CIRCUITS OPERATING AT GREATER THAN 50 VOLTS.

S. ALL ELECTRICAL EQUIPMENT SHALL BE LISTED AND LABELED FOR INSTALLATION PER RECOGNIZED ELECTRICAL TESTING LABORATORIES.

T. PROVIDE SEPERATE NETURALS FOR ALL BRANCH CIRCUITS. SHARED NEUTRALS ARE NOT ALLOWED.

U. PROVIDE SHEET METAL SLEEVES AT ALL PENETRATIONS WITH SURFACE MOUNTED FLANGES. FOR PENETRATIONS THAT ARE TOO SMALL FOR PROPER FIRE SAFING PER UL LISTING, CONTRACTOR TO INDICATE THOSE ARE TO BE IDENTIFIED AND BROUGHT TO THE ATTENTION OF UTHSCH FOR RESOLUTION DURING CONSTRUCTION.

V. CONTRACTOR SHALL SUBMIT RECORD DRAWINGS AND O&M MANUALS AS REQUIRED IN ASHRAE 90.1-2010 SECTION 8.7 & 9.7. THIS REQUIREMENT SHALL BE IN ADDITION TO RECORD DRAWINGS AS REQUIRED IN THE SPECIFICATIONS.

W. RE: SECTION 26 05 19 FOR VOLTAGE DROP REQUIREMENTS AND GUIDELINES. UNDER NO CIRCUMSTANCES SHALL THE VOLTAGE DROP REQUIREMENTS OF SECTION 8.4, ASHRAE 90.1-2010 BE EXCEEDED.

LIGHTING FIXTURE CIRCUITING NOTES:

A. THE LIGHTING PLANS INDICATE SWITCHING AND BRANCH CIRCUIT NUMBERS FOR ALL LIGHTING FIXTURES. LOWER CASE LETTERS AT SWITCHES AND LIGHT FIXTURES INDICATE SWITCHING WHERE THE CONTROL PATTERN IS NOT OBVIOUS. INSTALL BRANCH CIRCUIT WIRING IN A RACEWAY TO ALL RIGIDLY ATTACHED LIGHT FIXTURES AND TO JUNCTION BOXES FOR ALL LAY-IN LIGHT FIXTURES, AS REQUIRED TO PROVIDE SWITCHING AND CIRCUITING AS SHOWN ON THE DRAWINGS. RE; SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

B. BRANCH CIRCUIT HOMERUNS SHALL BE LIMITED TO THREE PHASE CONDUCTORS (ON DIFFERENT PHASES), ONE NEUTRAL CONDUCTOR PER PHASE AND ONE GROUND CONDUCTOR (WHERE SHOWN OR SPECIFIED), AND SHALL BE INSTALLED IN CONDUIT.

C. ALL LAY-IN LIGHTING FIXTURES SHALL BE CONNECTED TO A BRANCH CIRCUIT JUNCTION BOX WITH A FLEXIBLE FIXTURE TAIL, RE: SPECIFICATIONS. A MAXIMUM OF FOUR FIXTURE TAILS SHALL BE CONNECTED TO A SINGLE JUNCTION BOX. FIXTURE TO FIXTURE WIRING OF LAY-IN LIGHTING FIXTURES IS NOT PERMITTED.

POWER PLAN CIRCUITING NOTES:

A. THE POWER PLANS INDICATE BRANCH CIRCUIT NUMBERS FOR ALL RECEPTACLES. WHERE BRANCH CIRCUIT WIRING IS NOT SHOWN, INSTALL BRANCH CIRCUIT WIRING IN A RACEWAY, AS REQUIRED TO PROVIDE CIRCUITING AS SHOWN ON THE DRAWINGS. RE: SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

DRAWING LIST

E000 ELECTRICAL SYMBOLS & ABBREVIATIONS
E108 ELECTRICAL PH DEMOLITION DRAWING
E208 ELECTRICAL PH RENOVATION DRAWING

ISSUE FOR:

Area	Rev.	Date	Description
		05-01-17	FOR CONSTRUCTION

E & C

ENGINEERS & CONSULTANTS, INC.
1010 LAMAR, SUITE 650
HOUSTON, TEXAS 77002
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LARKIN GENTRY 97304

THE SEAL APPEARING ON THIS DRAWING WAS AUTHORIZED BY:
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E&C Engineers & Consultants Inc.
Texas Firm Registration No: F-003068

Date 5/01/2017
Drawn By RLG
Checked By RLG

UTHSC Project No. 730022
E & C Project No. 3302.00
File Name

UTHealth
The University of Texas
Health Science Center at Houston

MEDICAL SCHOOL BUILDING
SOUTH PENTHOUSE
AHU-L5 & L6 REPLACEMENT

DRAWING TITLE
ELECTRICAL SYMBOLS AND ABBREVIATIONS

DRAWING NO.
E000

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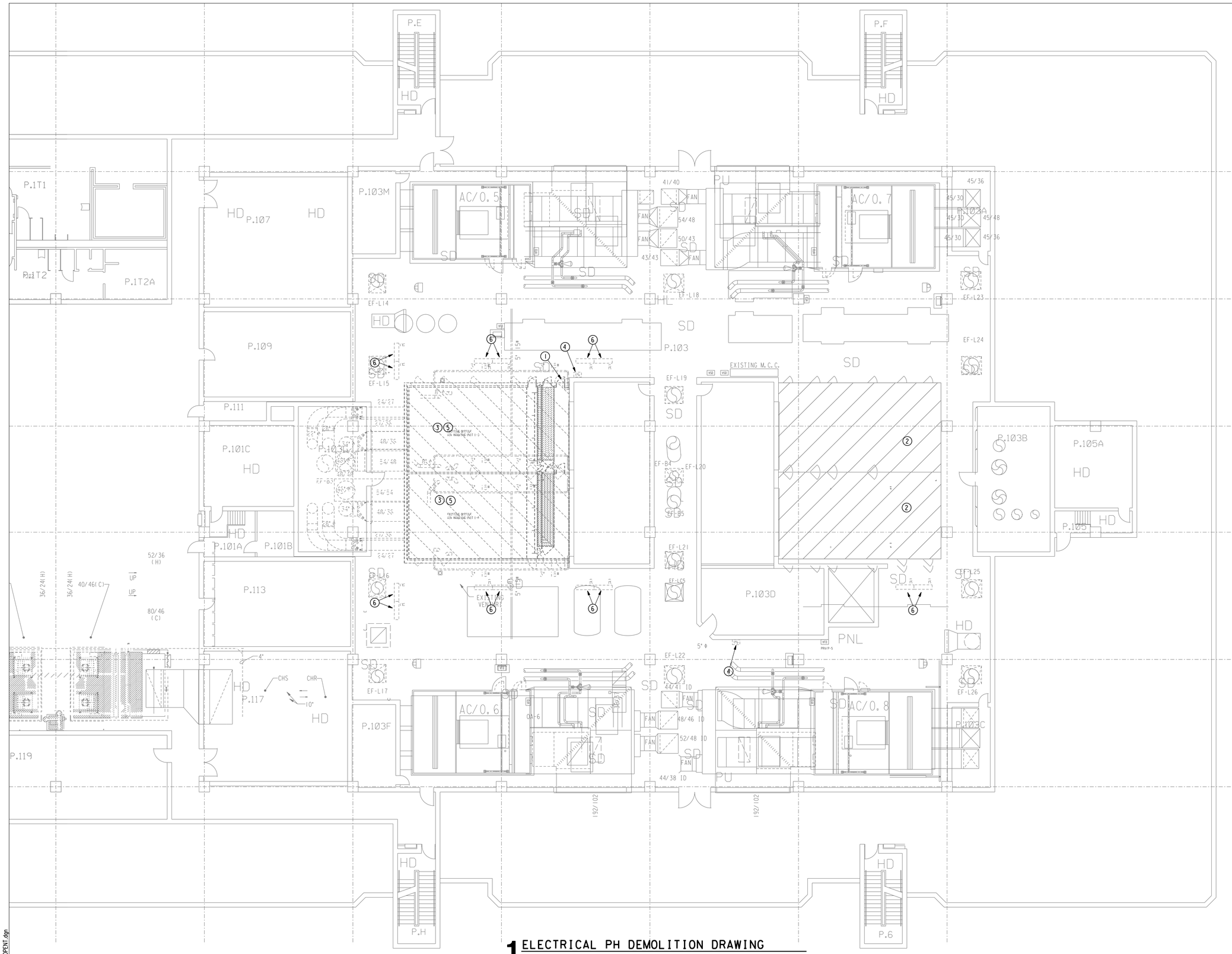


1 ELECTRICAL PH DEMOLITION DRAWING

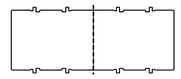
SCALE: 1/8" = 1'-0"

GENERAL NOTES:

A. RE: E000 FOR MORE GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS.

DRAWING NOTES:

1. RELOCATE FIRE ALARM PANEL TO PROVIDE ACCESS FOR INSTALLATION OF THE NEW UNITS.
2. EXISTING MECHANICAL UNIT TO REMAIN.
3. EXISTING MECHANICAL UNIT TO BE REMOVED AND REPLACED WITH SAME HORSEPOWER NEW UNIT. RE: MECHANICAL PLANS FOR MORE INFORMATION ON SCOPE OF MECHANICAL WORK. EXISTING POWER AND CIRCUITING FOR MOTOR TO REMAIN AND BE RECONNECTED TO NEW UNIT. RE: ELECTRICAL RENOVATION PLAN FOR MORE INFORMATION.
4. EXISTING VSD DRIVES TO BE REMOVED. DRIVES SERVE EXISTING MECHANICAL EQUIPMENT THAT IS BEING REPLACED. REMOVE DRIVES AND MAINTAIN CIRCUITING FROM PANEL SERVING AND TO EQUIPMENT FOR RECONNECTING TO NEW DRIVES AND NEW EQUIPMENT. RE: ALTERATION PLAN FOR MORE INFORMATION.
5. EXISTING 120V CIRCUIT SERVING UNIT LIGHTING AND RECEPTACLES SHALL BE DISCONNECTED AND REMAIN FOR RECONNECTION TO NEW UNIT. RE: ALTERATION PLAN FOR MORE INFORMATION.
6. EXISTING LIGHT FIXTURE TO BE REMOVED AND REPLACED WITH NEW FIXURE. ALL EXISTING CIRCUITING AND SWITCHING SHALL REMAIN.



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STATE OF TEXAS — LARKIN GENTRY — 97304 — LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DRAWING WAS AUTHORIZED BY Larkin Gentry, Houston, TX, 713.580.8833, 2017.05.02 15:27:36-05'00'
E&C Engineers & Consultants Inc.
Texas Firm Registration No: F-003068

Date 5/01/2017
Drawn By RLG
Checked By RLG

UTHSC Project No. 730022
E & C Project No. 3302.00
File Name

UTHealth — The University of Texas Health Science Center at Houston

MEDICAL SCHOOL BUILDING SOUTH PENTHOUSE AHU-L5 & L6 REPLACEMENT

DRAWING TITLE
ELECTRICAL PH DEMOLITION DRAWING

DRAWING NO.
E108

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GENERAL NOTES:

A. RE: E000 FOR MORE GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS.

B. TYPE A: LENSED LED STRIP LIGHT, 4 FEET LONG, 3500K, MEDIUM LUMEN OUTPUT, FIXED OUTPUT DRIVER, UNIVERSAL VOLTAGE BALLAST, CHAIN HANGER ACCESSORY. COLUMBIA LIGHTING * LCL4-35ML-EU-CSHC OR EQUAL BY COOPER, LITHONIA, OR OTHERS.

C. TYPE B: JUNCTION BOX MOUNTED LED FIXTURE, MOUNTED TO COLUMN, FROSTED GLASS GLOBE, ALUMINUM HOUSING, 5000 K, HUBBELL INDUSTRIAL * VL15PIG-VBLUI5 OR EQUAL BY COOPER, LITHONIA, OR OTHERS.

DRAWING NOTES:

1. NO WORK AT THIS UNIT.
2. EXISTING MECHANICAL UNIT TO REMAIN.
3. NEW MECHANICAL UNIT OF SAME HORSEPOWER AS EXISTING UNIT TO BE RECONNECTED. RE: MECHANICAL PLANS FOR MORE INFORMATION ON SCOPE OF MECHANICAL WORK. EXISTING POWER AND CIRCUITING FOR MOTOR TO REMAIN AND BE RECONNECTED TO NEW UNIT. EXTEND EXISTING CIRCUITING AS REQUIRED.
4. NEW VSD DRIVES FOR NEW EQUIPMENT. NEW DRIVES SERVE NEW MECHANICAL EQUIPMENT. RECONNECT CIRCUITING FROM PANEL SERVING AND TO NEW EQUIPMENT AS REQUIRED.
5. EXISTING HOMERUN TO REMAIN. CAPTURE HOMERUN AND CIRCUIT TO NEW VSD AND MECHANICAL EQUIPMENT AS REQUIRED IN NOTES 3 AND 4.
6. EXISTING 120V CIRCUIT SERVING UNIT LIGHTING AND RECEPTACLES SHALL BE RECONNECT TO NEW UNIT. NO MORE THAN 1440 WATTS ON A CIRCUIT.
7. NEW LIGHT FIXTURE TO REPLACE EXISTING FIXTURE. ALL EXISTING CIRCUITING AND SWITCHING SHALL REMAIN. RE: GENERAL NOTES FOR TYPE.
8. NEW LIGHT FIXTURE. EXTEND EXISTING CIRCUITING AND SWITCHING TO SERVE NEW FIXTURE. CHAIN HANG FIXTURE AT SAME ELEVATION AS EXISTING FIXTURES. NO MORE THAN 3000 WATTS ON A CIRCUIT. RE: GENERAL NOTES FOR TYPE.
9. NEW LIGHT FIXTURE. EXTEND EXISTING CIRCUITING AND SWITCHING TO SERVE NEW FIXTURE. SURFACE MOUNT FIXTURE AT 8 FEET A.F.F. NO MORE THAN 3000 WATTS ON A CIRCUIT. RE: GENERAL NOTES FOR TYPE.
10. RELOCATED FIRE ALARM PANEL

1 ELECTRICAL PH RENOVATION DRAWING

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

PENTHOUSE

ISSUE FOR:			
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STATE OF TEXAS — LARKIN GENTRY — 97304 — LICENSED PROFESSIONAL ENGINEER

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UTHealth
The University of Texas Health Science Center at Houston

MEDICAL SCHOOL BUILDING
SOUTH PENTHOUSE
AHU-L5 & L6 REPLACEMENT

DRAWING TITLE
ELECTRICAL PH RENOVAITON DRAWING

DRAWING NO.
E208

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GENERAL NOTES

I. DESIGN CRITERIA

A. GENERAL BUILDING CODE

1. The Documents are based on the requirements of the International Building Code 2012.
2. Hanging Ceiling and Mechanical Loads: An allowance of 20 PSF has been made for hanging ceiling and mechanical equipment loads such as duct work and sprinkler pipes.

B. LIVE LOADS

1. Design live loads are based on the more restrictive of the uniform load listed below or the concentrated load listed acting over an area 2.5 feet.
   a. Roofs: 20 PSF
2. Reduction of Live Loads:
   a. Live loads have been reduced using the standard procedure from the building code.

C. WIND LOADS

1. Wind pressures are based on the provisions of the American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures, ASCE 7-10 and the following criteria:
   a. Ultimate design wind speed (Vult): 139 MPH (3 second gust)
   b. Building risk category: II
   c. Wind exposure category: B

   Notes:
   a. Pressures act normal to the surface. Positive pressures act towards the surface and negative pressures act away from the surface.
   b. Design pressure for components and cladding shall not be less than 16 PSF acting in either direction normal to the surface.
   c. The design pressures listed above are calculated using a value of Kd of 0.85. The values must be increased by 18% unless load combinations specified in ASCE 7-10 are used in design.

II. NON-DESTRUCTIVE EVALUATION

A. ITEMS EMBEDDED IN CONCRETE STRUCTURES

1. Items embedded in concrete structures shall not be damaged during repair work or installation of new members requiring post-installed anchors. Embedded items may include mild reinforcement, prestressing reinforcement, dowels, embedded connections, electrical conduits, plumbing, etc.
2. Items embedded in concrete shall be located by non-destructive evaluation prior to performing any work. Contractor shall mark on the structure the location of embedded prior to coring in concrete.
3. Contractor shall not start fabrication of new members until items embedded in concrete have been located. Contact Engineer if existing embedded items interfere with location of post-installed anchors specified in drawings.

III. SELECTIVE DEMOLITION

A. RESPONSIBILITY OF THE CONTRACTOR FOR STABILITY OF THE STRUCTURE DURING DECONSTRUCTION / DEMOLITION

1. It is the responsibility of the Contractor to maintain the stability and safety of all structural elements during the demolition process.

B. MATERIAL OWNERSHIP

1. Except for items or materials indicated to be reused, salvaged, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site. The materials removed shall be disposed in a proper and legal manner per federal/state or local ordinances.

C. QUALITY ASSURANCE

1. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
2. Regulatory Requirements: Comply with governing Owner, Local, State, Federal, and EPA notifications and regulations before beginning selective deconstruction / demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

D. PROJECT CONDITIONS

1. Conduct selective demolition so Owner's operations will not be disrupted. Provide not less than 72-hour notice to Owner of activities that will affect Owner's operations.
2. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.
3. Owner assumes no responsibility for condition of areas to be selectively demolished.
   a. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
   b. Before selective demolition, Owner will remove items within space as needed.
4. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner. These materials shall be removed as disposed as approved by governing agency.
5. Storage or sale of removed items or materials on-site will not be permitted.
6. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations. Maintain fire-protection facilities in service during selective demolition operations.
7. All areas outside of demolition scope to be protected from damage by contractor. Restore areas subject to incidental damage to their pre-demolition condition.

E. PREPARATION

1. Dangerous Materials: Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.
2. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
   a. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of adjacent facilities.
3. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
4. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and to prevent unexpected or uncontrolled movement or collapse of construction being demolished. Strengthen or add temporary supports when required during progress of selective demolition.

F. EXECUTION OF SELECTIVE DEMOLITION

1. General: Demolish existing construction as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
   a. Use cutting methods least likely to damage construction to remain or adjoining construction.
   b. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
   c. Maintain adequate ventilation when using cutting torches.
   d. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, slabs, or framing.
   e. Dispose of demolished items and materials promptly.
2. Existing Facilities: Comply with Owner's requirements for using and protecting other building facilities during selective demolition operations.

G. DISPOSAL OF DEMOLISHED MATERIALS

1. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
2. Burning: Do not burn demolished materials.
3. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

IV. CONCRETE

A. CONCRETE REPAIR MATERIALS

1. Concrete shall conform to the following requirements:

Classes of Concrete Matrix							
Location	Comp Strength PSI	Type	Exposure Class	Max W/C Ratio	Air Content	Max Agg. Size (in.)	Notes
Housekeeping Pads	3,000	LWC	-	0.45	-	3/4	
Infill	4,000	NWC	C1	0.45	-	1	

B. HORIZONTAL CONSTRUCTION JOINTS IN CONCRETE POURS

1. There shall be no horizontal construction joints in any concrete pours unless shown on the drawings. The Engineer shall approve all deviations or additional joints in writing.

C. REINFORCING STEEL

1. All Reinforcing Steel shall be ASTM A 615 Grade 60 unless noted otherwise on the drawings or in these notes.
2. Deformed Welded Wire Reinforcement: ASTM A 497, yield strength 70,000 PSI.

D. PLACEMENT OF WELDED WIRE REINFORCEMENT

1. Wherever welded wire reinforcement is specified as reinforcement, it shall be continuous across the entire concrete surface [and not interrupted by beams or girders] and properly lapped per ACI 318, 12.18 and 12.19.

E. REINFORCEMENT IN TOPPING SLABS

1. Provide minimum reinforcement as noted below in all topping slabs unless specified otherwise on the drawings.
   a. Welded smooth wire reinforcement 6x6-W2.9xW2.9.

F. REINFORCING STEEL COVERAGE

1. Reinforcing steel coverage should conform to the requirements specified on the drawings. Cover in structural members not specified in the details shall conform to the requirements of ACI 318 unless specified otherwise on the drawings.

V STRUCTURAL STEEL

A. MATERIAL

1. Hot Rolled Structural Members: All hot rolled steel plates, shapes, sheet piling, and bars shall be new steel conforming to ASTM Specification A 6.
2. ASTM Specification and Grade: Clearly mark the grade of steel on each piece, with a distinguishing mark visible from floor surfaces, for the purpose of field inspection of proper grade of steel. Unless noted otherwise on the drawings, structural steel shall be as follows:
   a. W- and WT-Shapes: ASTM A 992.
   b. Plates: All plates shall conform to ASTM A 36 unless noted otherwise on the drawings.
   c. Angles, Bent Plates: ASTM A 36.
   d. Other Steel: Any other steel not indicated otherwise shall conform to ASTM A 992 or ASTM A 572, Grade 50, except plates and angles that shall be ASTM A 36.

B. STRUCTURAL BOLTS AND THREADED FASTENERS

1. A 325 Bolts: All bolts in structural connections shall conform to ASTM A 325 Type 1, unless indicated otherwise on the drawings.

C. WELDING

1. Unless noted otherwise, electrodes for welding shall conform to E70XX (SMAW), F7XX-EXXX (SAW), ER70S-X (GMAW), or E7XT-X (FCAW).

D. GROUT

1. Grout below structural steel base plates shall be non-metallic, non-shrink grout with a minimum strength of 8,000 psi.

VI. STEEL DECKS

A. COMPOSITE DECK

1. All deck shall be 40 KSI unless noted otherwise.
2. Attachment of Deck:
   a. Minimum Attachment at Supports: Steel deck units shall be welded to the support members with 5/8" diameter puddle welds at each end of sheet and each intermediate support at each low flute, unless noted otherwise. At members parallel to deck span, spacing of puddle welds shall be 12". A shear connector welded through the deck can replace a required deck weld.
   b. Minimum Attachment at Side Laps: Side laps of adjacent units shall be fastened by welding, sheet metal screws, or button punching at a maximum of one-half the span or 36", whichever is less, unless noted otherwise.

VII. SPECIAL INSPECTIONS

A. The Owner's testing laboratory shall provide special inspection services in accordance with the International Building Code for the items listed below. Special inspection shall be provided by an intendent testing laboratory employed by the Owner.

B. The Special Inspector shall furnish inspection reports to the Engineer of Record

C. Once corrections are performed by the Contractor, the special inspector shall submit a final report to the Engineering that to the best of the Special Inspector's knowledge the work is in accordance with the construction documents and applicable workmanship.

1. Steel Construction:
   a. Welding Inspection
      (i) Periodic verification of welding procedure
      (ii) Periodic verification of material type and grade
      (iii) Periodic verification of welder qualifications
      (iv) Continuous verification of filet welds
   b. High-Strength Bolting
      (i) Periodic verification of bolt size, location and torque
   c. Steel members
      (i) Continuous verification of size and strength

2. Concrete Construction:
   a. Continuous Inspection of Reinforcing Steel Placing
      (i) Verify size, clearances and proper ties
   b. Periodic Inspection of concrete mix
      (i) Verify mix design meets strength and exposure
   c. Continuous Inspection of concrete placement/sampling
      (i) Include sampling for slump, strength and temperature

VIII. SUBMITTALS

A. SUBMITTAL LIST AND SCHEDULE

1. The Contractor shall prepare a detailed list and schedule of all submittal items to be sent to the Structural Engineer prior to the start of construction. This list shall be updated and revised and kept current as the job progresses. The submittal list shall be organized as shown below:
   a. Shop Drawings
   b. Product Data, Certificates, Reports, and Other Literature

B. SUBMITTALS TO BE PROVIDED TO STRUCTURAL ENGINEER

1. The following submittals shall be provided:
   a. Concrete mix.
   b. Structural steel.
   c. Roof (sheet metal, flashing etc...)

   Notes:

   (S&S) Items marked thus shall have the shop drawings and delegated design submittals (including calculations) sealed per the project specifications by an engineer registered in the state where the project is located.

   (REC) Items marked thus shall be submitted to Engineer for Record Only and will not have the Engineer's shop drawing stamp affixed.
2. Submittal Requirements:
   a. All shop drawings must be reviewed and electronically stamped by the Contractor prior to submittal.
   b. Contractor shall provide the submittal in electronic portable document format (PDF) per the Specifications.
   c. The omission from the shop drawings of any materials required by the Contract Documents to be furnished shall not relieve the Contractor of the responsibility of furnishing and installing such materials, regardless of whether the shop drawings have been reviewed and approved.

C. REPRODUCTION

1. The use of electronic files or reproductions of these contract documents by any contractor, subcontractor, erector, fabricator, or material supplier in lieu of preparation of shop drawings signifies their acceptance of all information shown hereon as correct, and obligates themselves to any job expense, real or implied, arising due to any errors that may occur hereon.

IX. MISCELLANEOUS

A. CONTRACT DOCUMENTS

1. It is the responsibility of the Contractor to obtain all Contract Documents and latest addenda and to submit such documents to all subcontractors and material suppliers prior to the submittal of shop drawings, fabrication of any structural members, and erection in the field.
2. The contract structural drawings and specifications represent the alteration made to the structure, and, except where specifically shown, do not indicate the method or means of construction. The Contractor shall supervise and direct the work and shall be solely responsible for all construction means, methods, procedures, techniques, and sequence.
3. Openings through floors, roofs, and walls for ducts, piping, and/or conduit shall be coordinated by the contractor. Contractor shall verify sizes and locations of holes and openings with the Mechanical, Electrical, Plumbing, and Fire Protection drawings and the respective subcontractors.

B. DRAWING CONFLICTS

1. The Contractor shall compare the Architectural and Structural drawings and report any discrepancy between each set of drawings and within each set of drawings to the Architect and Engineer prior to the fabrication and installation of any structural members.

C. CONFLICTS IN STRUCTURAL REQUIREMENTS

1. Where conflict exists among the various parts of the contract documents drawings, and general notes, the strictest requirements, as indicated by the Engineer, shall govern.

D. EXISTING CONDITIONS

1. The Contractor shall verify all dimensions and conditions of the existing building at the job site and report any discrepancies from assumed conditions shown on the drawings to the Engineer prior to the fabrication and erection of any members. Existing dimensions shown on the drawings are for general reference only and should not be used for final construction or detailing.
2. Existing construction shown on the drawings was obtained from existing construction documents and limited site observation. These drawings of existing construction are available for contractor use and shall be referenced for familiarization with existing conditions. However, the available drawings of existing construction are not necessarily complete. The contractor is responsible for being knowledgeable on information presented in available drawings and shall field verify all pertinent information.
3. Demolition, cutting, drilling, etc. of existing work shall be performed with great care so as not to jeopardize the structural integrity of the existing building. If any architectural, structural, or MEP members not designated for removal interfere with the new work, the Owner shall be notified immediately and approval obtained prior to removal of those members.
4. The contractor shall perform a survey to locate all existing utilities (including underground utilities) prior to the start of construction and take care to protect utilities that are to remain in service. Existing civil, mechanical, electrical, plumbing, and emergency protection system servicing any areas outside the work area are to be maintained in operable condition throughout the duration of construction. Contractor shall make necessary temporary connections to maintain existing utilities in service during the work. Temporary, localized interruption of these systems shall require approval by the Owner.
5. The contractor shall provide dust, odor, and noise protection, and safety measures as necessary for the duration of construction. Provide all measures necessary to protect the existing structure, building interior, facility patrons, and other persons during construction.
6. The contractor shall repair all damage caused during construction with similar materials and workmanship to restore conditions to levels acceptable to the Owner.

E. ADJACENT BUILDINGS AND PROPERTY

1. The Contractor shall ensure that all construction methods used will not cause damage to the adjacent buildings and property. This shall include all foundation installation.

F. RESPONSIBILITY OF THE CONTRACTOR FOR STABILITY OF THE STRUCTURE DURING CONSTRUCTION

1. Structural elements of the project have been designed by the Structural Engineer to resist the required code vertical and lateral forces that could occur in the final structure only. The ability of the structural frame to resist the required code forces derives from the complete installation of the new structural elements. It is the responsibility of the Contractor to provide all required bracing during construction to maintain the stability and safety of all structural elements during the construction.

G. RESPONSIBILITY OF THE CONTRACTOR FOR CONSTRUCTION LOADS

1. The structural elements has have been designed for the loads identified within these < drawings that are anticipated to be applied to the structure once work is completed. The Contractor shall not overload the structure during construction. The Contractor shall be responsible for checking the adequacy of the structure to support any applied construction loads. The Structural Engineer is not responsible to design or check the structure for loads applied to the structure for any construction activity.

H. THE STRUCTURAL ENGINEER'S ROLE DURING CONSTRUCTION

1. The Engineer shall not have control nor charge of, and shall not be responsible for, construction means, methods, techniques, sequences, or procedures, for safety precautions and programs in connection with the work, for the acts or omission of the Contractor, Subcontractor, or any other persons performing any of the work, or for the failure of any of them to carry out the work in accordance with the contract documents.
2. Periodic site observation by field representatives of Walter P. Moore and Associates is solely for the purpose of becoming generally familiar with the progress and quality of the Work completed and determining, in general, if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the structural contract documents. This limited site observation should not be construed as exhaustive or continuous to check the quality or quantity of the work, but rather periodic in an effort to guard the Owner against defects or deficiencies in the work of the Contractor.

I. MAINTENANCE STATEMENT

1. All structures require periodic maintenance to extend lifespan and to ensure structural integrity from exposure to the environment. A planned program of maintenance shall be established by the building owner. This program shall include such items such as but not limited to painting of structural steel, protective coating for concrete, sealants, caulked joints, expansion joints, control joints, spalls and cracks in concrete, and pressure washing of exposed structural elements exposed to a salt environment or other harsh chemicals.

X. DRAWING INTERPRETATION

A. DRAWING VIEWS LABELED AS "TYPICAL"

1. Partial plans, elevations, sections, details, or schedules labeled with "Typical" at the beginning of their title shall apply to all situations occurring on the project that are the same or similar to those specifically shown. The applicability of the content of these views to locations on the plan can be determined from the title of the views. Such views shall apply whether or not they are keyed in at each location. Decisions regarding applicability of these "Typical" views shall be determined by the Structural Engineer.

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85440
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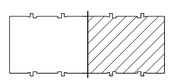
5/03/17



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Date 5/03/17
Drawn By
Checked By HB

UTHSC Project No. 730022
E & C Project No. 3302.00
File Name

UTHealth
The University of Texas Health Science Center at Houston

MEDICAL SCHOOL BUILDING
SOUTH PENTHOUSE
AHU-L5 & L6 REPLACEMENT

DRAWING TITLE
GENERAL NOTES

DRAWING NO.
S100

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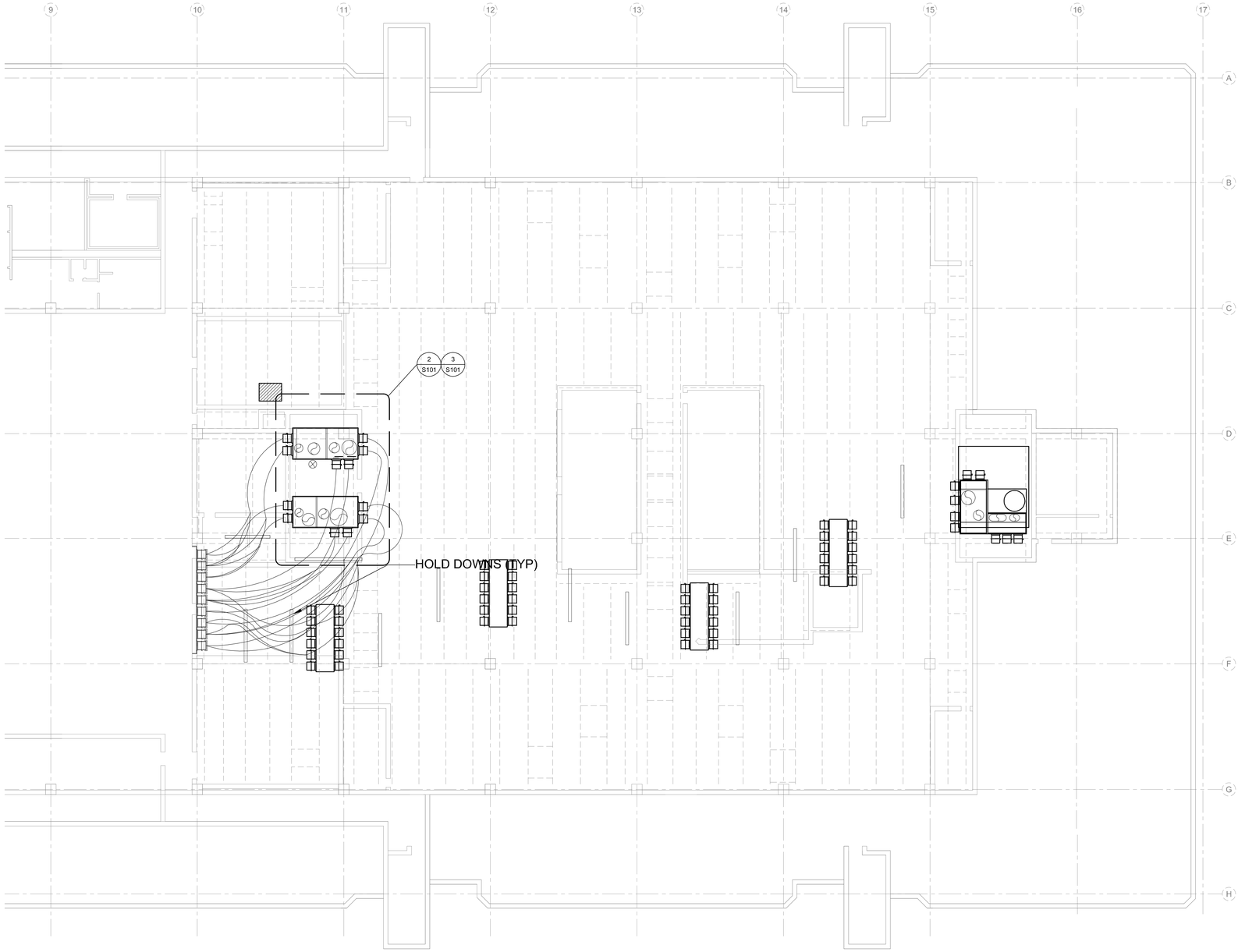
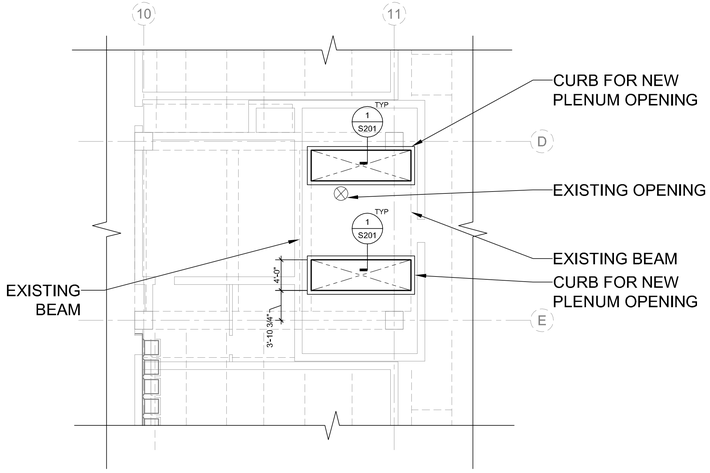


NOTES:
1. SEE MECHANICAL DRAWINGS FOR LOCATIONS OF ALL ROOFTOP PLENUMS, DUCTS, AND DUCTS HOLD-DOWNS.
2. SEE DETAIL 2/S101 FOR NEW TEMPORARY AHU OPENING.
3. SEE DETAIL 3/S101 FOR SLAB INFILL FOLLOWING REMOVAL OF TEMPORARY AHU
4. COORDINATE LOCATION OF HOLD-DOWNS WITH MEP DRAWINGS.
5. SEE DETAIL 3/S201 FOR SUPPORT OF HOLD-DOWNS.

1 PENTHOUSE ROOF PLAN
NTS



NOTES:
1. COORDINATE OPENING SIZE WITH MEP DRAWINGS AND MEP DUCTS.
2. COORDINATE LOCATION OF CURB FOR AHU WITH MEP DRAWINGS AND APPROVED EQUIPMENT SHOP DRAWINGS. CURB MAY BE SETBACK FROM OPENING EDGE.
3. KEEP A CLEAR DISTANCE OF 12 INCHES (MINIMUM) BETWEEN THE NEW OPENING AND THE EXISTING OPENING.
4. DO NOT DAMAGE OR DISTURB THE EXISTING OPENING OR THE EXISTING DUCT.

2 PENTHOUSE ROOF PLAN
NTS

NOTE:
1. AFTER REMOVAL OF TEMPORARY UNITS, INFILL THE OPENING AS SHOWN
2. PROVIDE NEW STEEL ANGLES ALL AROUND AS SHOWN IN DETAIL 6/S201
3. SEE DETAIL 6/S201 FOR ADDITIONAL INFORMATION

3 SLAB INFILL PLAN
NTS

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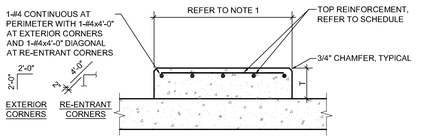
Health Science Center at Houston

MEDICAL SCHOOL BUILDING
SOUTH PENTHOUSE
AHU-L5 & L6 REPLACEMENT

DRAWING TITLE
PLAN

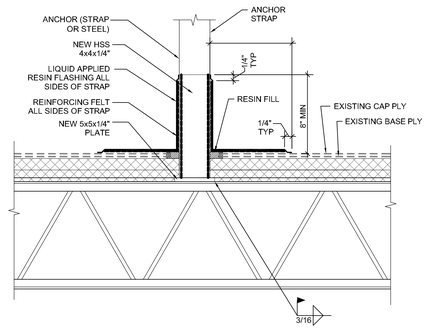
DRAWING NO.
S101



HOUSEKEEPING PAD REINFORCEMENT SCHEDULE		
PAD THICKNESS	TOP REINFORCEMENT	BOTTOM REINFORCEMENT
T = 4"	WWR 4x4-W2.9xW2.9 OR #3@12" EACH WAY	NONE
4" < T <= 6"	WWR 4x4-W4xW4 OR #4@18" EACH WAY	NONE
6" < T <= 8"	WWR 4x4-W6xW6 OR #4@12" EACH WAY	NONE

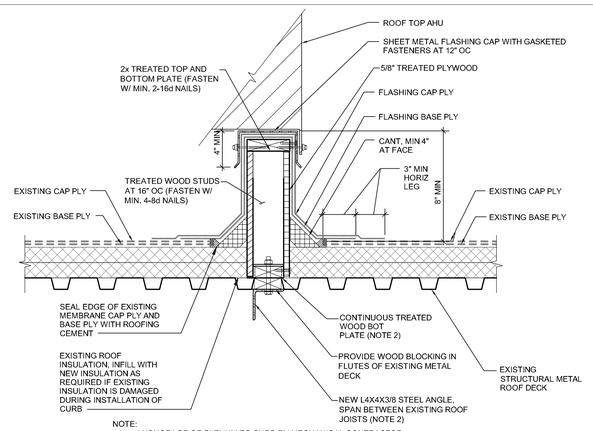
NOTES:
1. REFER TO ARCHITECTURAL OR MEP DRAWINGS FOR HOUSEKEEPING PAD PLAN DIMENSIONS AND THICKNESS (4" MINIMUM THICKNESS).
2. CONTRACTOR SHALL COORDINATE DIMENSIONS AND OTHER SPECIAL REQUIREMENTS WITH EQUIPMENT MANUFACTURERS AND PROVIDE WHERE REQUIRED WHETHER SHOWN ON STRUCTURAL DRAWINGS OR NOT.
3. HOUSEKEEPING PAD IS TO BE USED TO REPLACE THE EXISTING CONCRETE PAD AT THE PENTHOUSE FLOOR LEVEL, SUPPORTING UNITS.

4 TYPICAL HOUSEKEEPING PAD OVER SLAB
NO SCALE



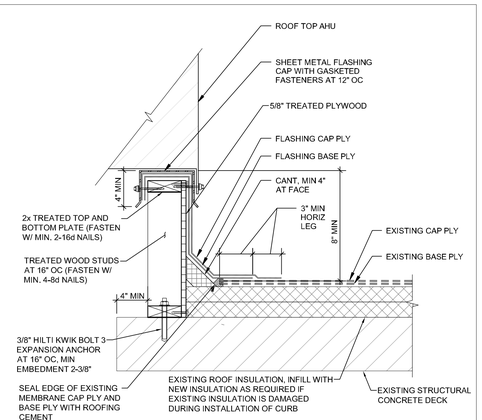
NOTE:
1. LOCATE HSS AT PANEL POINT OF EXISTING JOIST

3 TYPICAL ANCHOR CONNECTION TO ROOF STRUCTURE
1-1/2" = 1'-0"



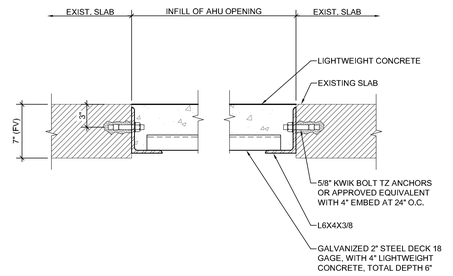
NOTE:
1. ANCHORAGE OF PLENUM TO CURB BY MECHANICAL CONTRACTOR.
2. CONNECT SUPPORT ANGLE TO CURB WITH 1/2" DIA. A307 BOLTS AT 16" O.C. PROVIDE PLATE WASHER AT BOTTOM PLATE.
3. SEE 9/S200 FOR ANGLE SUPPORT INFORMATION.

2 CURB DETAIL AT STEEL DECK - PLENUM WITHOUT ROOF OPENING
1-1/2" = 1'-0"



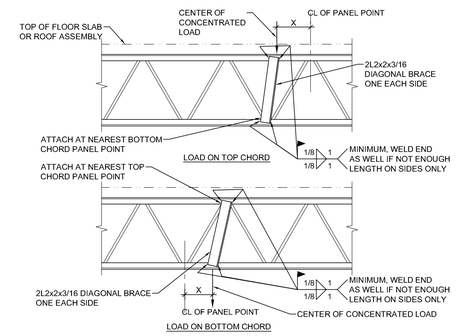
NOTE:
1. SEE DETAIL 2/S201 FOR CURB LOCATED AWAY FROM NEW OPENING.

1 CURB DETAIL AT CONCRETE SLAB - WITH ROOF PENETRATION
1-1/2" = 1'-0"



NOTES:
1. THIS DETAIL IS TO BE APPLIED AT THE AREAS OF SLAB OPENING WHICH WILL NEED TO BE INFILLED UPON COMPLETION OF WORK.
2. FASTEN DECK TO STEEL SUPPORTS PER SDI REQUIREMENTS PRIOR TO POURING CONCRETE.
3. APPLY FIREPROOFING AS REQUIRED TO MEET FLOOR RATING.
4. EXTEND ANGLES FULLY ACROSS SHORT OPENING SIDES. ANGLES ON LONG OPENING SIDES SHALL BE TRIMMED TO ALLOW PASSAGE OF SHORT OPENING SIDE ANGLES.

6 INFILL OF SLAB OPENING
1-1/2" = 1'-0"



NOTES:
1. DIAGONAL BRACE IS NOT REQUIRED FOR "X" LESS THAN THREE INCHES.
2. PROVIDE DIAGONAL BRACE AT LOCATION OF CONCENTRATED LOADS SUCH AS PARTITIONS, HEAVY PIPES, MECHANICAL UNITS, HEAVY LIGHTS AND ANY OTHER CONCENTRATED LOADS AND AS NOTED ELSEWHERE IN THE STRUCTURAL DRAWINGS. LOADS MUST BE APPLIED CONCENTRICALLY TO JOIST BOTTOM CHORD.

5 TYPICAL STIFFENING OF JOIST FOR CONCENTRATED LOADS
NO SCALE

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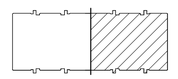

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DETAILS

DRAWING NO.
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