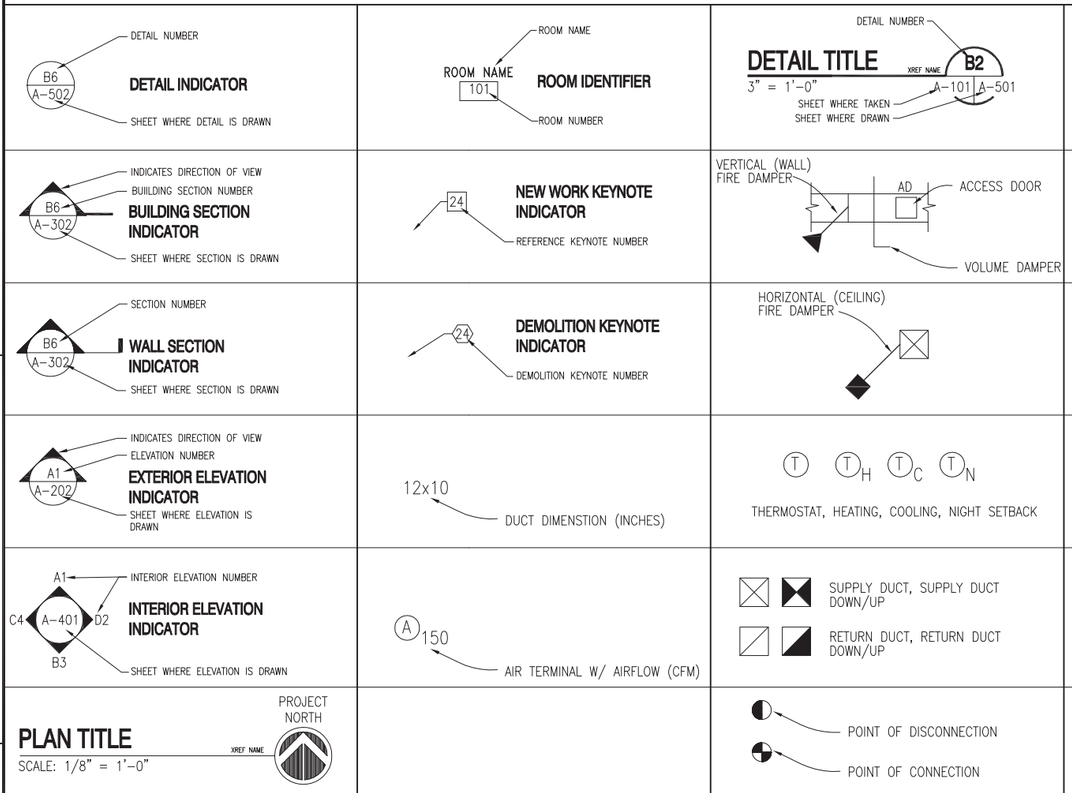
SP-381 Record Drawings

MECHANICAL SYMBOLS



PIPING LEGEND

---(NAME)---	REMOVE PIPING
—(NAME)E—	EXISTING PIPING
——C——	CONDENSER WATER SUPPLY
——CR——	CONDENSER WATER RETURN
——CWR——	CHILLED WATER RETURN
——CWS——	CHILLED WATER SUPPLY
——D——	CONDENSATE DRAIN
——FILL——	DOMESTIC WATER FILL LINE
——G——	NATURAL GAS
——HCR——	HOT/CHILLED WATER RETURN
——HCS——	HOT/CHILLED WATER SUPPLY
——HPS——	HIGH PRESSURE STEAM
——HWR——	HOT WATER RETURN
——HWS——	HOT WATER SUPPLY
——LPS——	LOW PRESSURE STEAM
——REF——	REFRIGERANT

MECHANICAL ABBREVIATIONS

AP	ACCESS PANEL
APD	AIR PRESSURE DROP
AHU	AIR HANDLING UNIT
BD	BALANCING DAMPER
BR	BASEBOARD RADIATOR
BTUH	BRITISH THERMAL UNIT PER HOUR
C	COMMON
Cv	LOSS COEFFICIENT
CU	CONDENSING UNIT
CW	CHILLED WATER
CFM	CUBIC FEET PER MINUTE
CND	CONDENSER UNIT
COP	COEFFICENT OF PERFORMANCE
CR	COMPUTER ROOM
DB	DEGREE
DDC	DIRECT EXPANSION
DEG	DRY BULB
DX	DIRECT DIGITAL CONTROL
EAT	ENTERING AIR TEMPRATURE
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
EFF	EFFICIENCY
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
FCU	FAN COIL UNIT
FD	FIRE DAMPER
FT	FEET
FTWG	FEET OF WATER GAUGE
GPM	GALLONS PER MINUTE
H	HEIGHT
HP	HEAT PUMP, HORSEPOWER
HR	HOUR
HW	HOT WATER
HX	HEAT EXCHANGER
IWG	INCHES OF WATER GAUGE
kW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LV	LOUVER
LWT	LEAVING WATER TEMPERATURE
MAU	MAKEUP AIR UNIT
MAX	MAXIMUM
MIN	MINIMUM
NC	NOISE CRITERIA, NORMALLY CLOSED
NO	NUMBER
N O	NORMALLY OPEN
OA	OUTSIDE AIR
PH	PHASE
PRS	PRESSURE REDUCING STATION
PSI	POUNDS PER SQUARE INCH
PTAC	PACKAGED THRU WALL AIR CONDITIONER
PTHP	PACKAGED THRU WALL HEAT PUMP
RA	RETURN AIR
RH	RELATIVE HUMIDITY
SA	SUPPLY AIR
SIM	SIMILAR
SP	STATIC PRESSURE
SQ	SQUARE
TYP	TYPICAL
UH	UNIT HEATER
UOI	UNLESS OTHERWISE INDICATED
V	VOLTS
W	WIDTH
WB	WET BULB
WPD	WATER PRESSURE DROP
°	DEGREES
ø	DIAMETER

MECHANICAL GENERAL NOTES

A) PATCH ALL HOLES FROM REMOVAL OF PIPING OR EQUIPMENT TO MATCH ADJACENT CONSTRUCTION. PATCH WITH NONSHRINK GROUT CONFORMING TO ASTM A276.

B) PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE.

C) INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.

D) PROVIDE VIBRATION ISOLATORS FOR ALL MECHANICAL EQUIPMENT TO PREVENT TRANSMISSION OF VIBRATION TO BUILDING STRUCTURE.

E) PROVIDE ACCESS PANELS FOR INSTALLATION IN WALLS AND CEILINGS, WHERE REQUIRED, TO SERVE FIRE DAMPERS, VALVES, SMOKE DETECTORS, AND OTHER CONCEALED MECHANICAL EQUIPMENT THAT REQUIRES ROUTING MAINTENANCE. COORDINATE WITH ACCESS DOOR SIZE.

F) ALL OPENING IN FIRE WALLS DUE TO DUCTWORK, PIPING, CONDUIT, ETC., SHALL BE FIRE STOPPED.

G) FIELD VERIFY ALL DIMENSIONS.

H) ALL RECTANGULAR MITERED ELBOWS SHALL HAVE TURNING VANES. SEE DETAIL A2/M-501.

J) ALL WOOD BLOCKING AND MISCELLANEOUS STEEL SHOWN IN DETAILS AND SECTIONS SHALL BE CONTINUOUS UNLESS SPECIFICALLY NOTED OTHERWISE.

K) EXISTING FURNITURE, SHELVING, AND EQUIPMENT ARE NOT SHOWN FOR CLARITY ON THE DEMOLITION FLOOR PLAN, AND SHALL BE REMOVED BY THE E2C ACTIVITY (GOVERNMENT).

L) WHERE PAINTING IS CALLED OUT FOR, UNLESS OTHERWISE NOTED, PAINTING SHALL MATCH TYPE, GLOSS AND FINISH COLOR OF ADJACENT PAINT. AT EXTERIOR LOCATIONS, PROVIDE PAINT TYPE MADE FOR EXTERIOR EXPOSURE. PAINTING SHALL BE PROVIDED WITH 3 FULL COATS AS FOLLOWS:

1. PRECAST CONCRETE LINTEL:
   BLOCK FILLER COAT, INTERMEDIATE COAT, AND TOP COAT WITH TOTAL DRY FILM THICKNESS OF 11 MILS.
2. ALL OTHER SURFACES:
   PRIMER COAT, INTERMEDIATE COAT, AND TOP COAT WITH TOTAL DRY FILM THICKNESS OF 4.5 MILS.

M) PROVIDE SETON SNAP-AROUND SETMARK PIPE LABELS EVERY 10' ON NEW AND EXISTING CHILLED WATER, HEATING HW, AND REFRIGERANT PIPING.

SYM	DESCRIPTION	DATE	APPR

NAVFAC

SEAL

SUBMITTED BY

FIRM MEMBER DATE

APPROVED

WILL TUCKER

ACTIVITY – SATISFACTORY TO DATE 20 DEC 05

APPROVED

FOR COMMANDER NAVFAC DATE 1/10/06

DES OLS DR OLS

CHK WRS QC

DESIGNER O. L. SAN ANTONIO

REVIEWED BY

QC

DESIGN MANAGER O. L. SAN ANTONIO, P. E.

FIRE PROTECTION RAD

BRANCH MANAGER WRS

ENGINEERING DIR. WRS (for)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND – MID-ATLANTIC
NAVAL STATION – NORFOLK, VIRGINIA
SEWELLS POINT / YORKTOWN IPT

SP-381
RENOVATE TRAINER COMPLEX
LEGEND, NOTES, AND ABBREVIATIONS

CODE ID. NO. 80091 SIZE D

SCALE: AS NOTED

MAXIMO NO. AMKCHV

JOB ORDER NO. 118257802006

SPEC. NO. 03-D-3029

CONSTR. CONTR. NO. N62470-03-D-3029

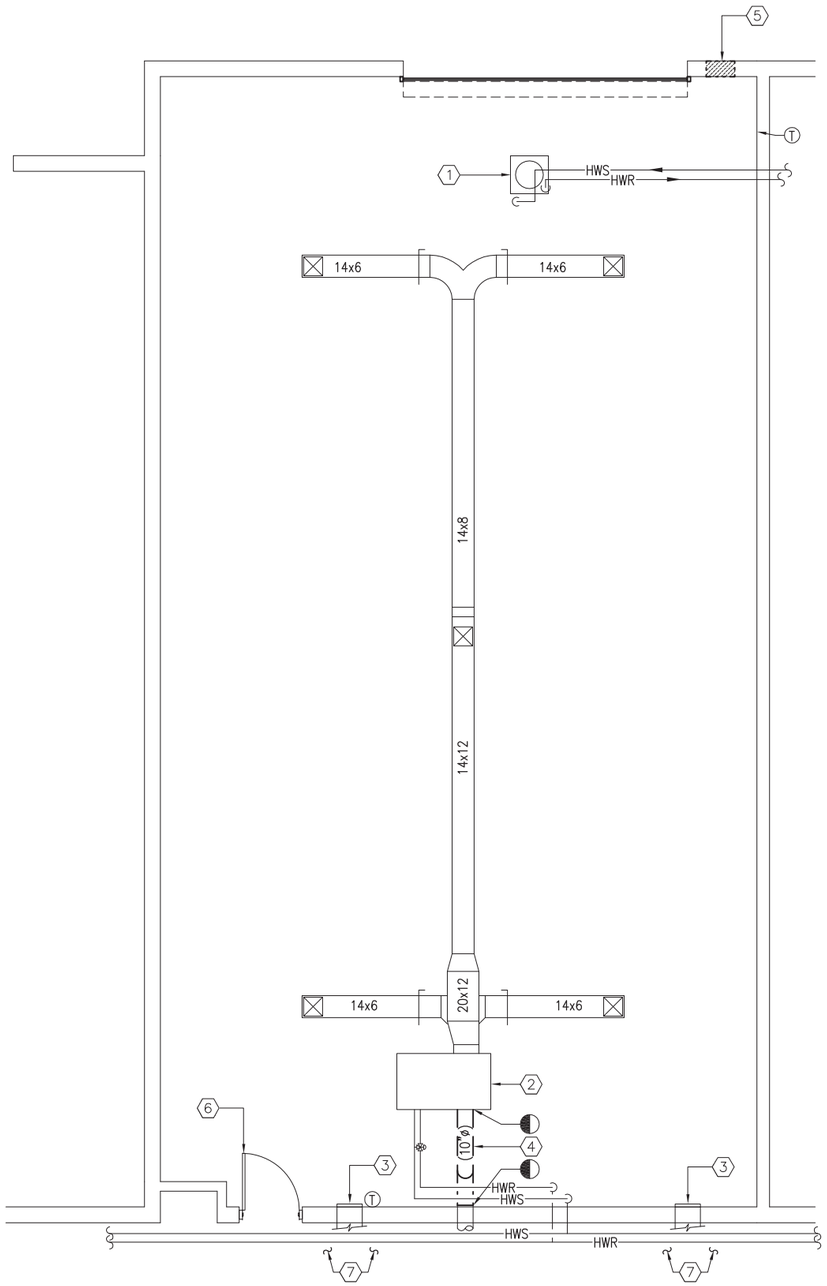
NAVFAC DRAWING NO. 4,537,853

SHEET 6 OF 14

M-001

DRAWFORM REVISION: 01 AUGUST 2004

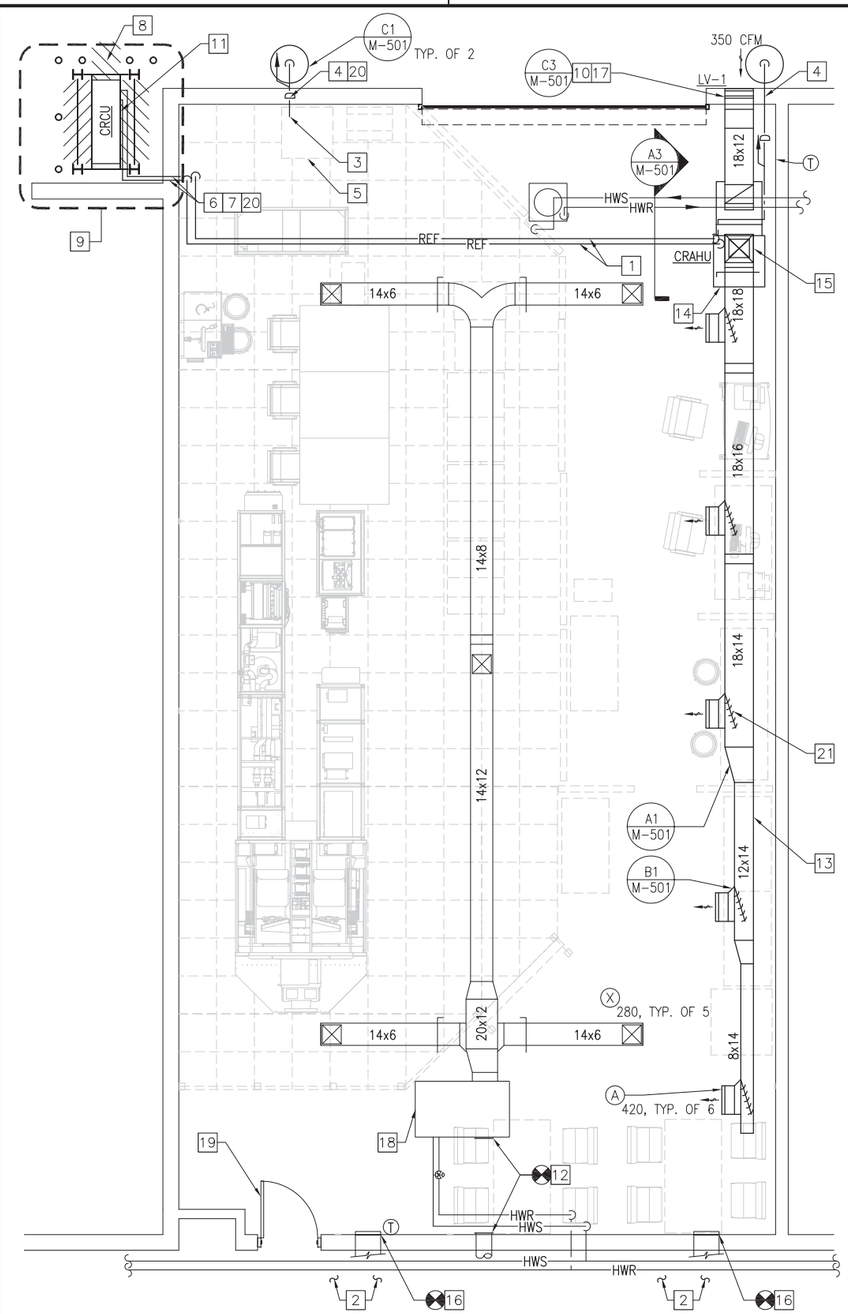
RENOVATE TRAINER COMPLEX – NAVAL STATION NORFOLK, SEWELLS POINT\Buildings\SP\Sp-381\AMKCHV – E2C Training Complex\Phase B – Design\Drawings\SP381-AMKCHV-M-001.dwg LAYOUT NAME: Layout1 PLOTTED: Thursday, December 22, 2005 – 3:19pm



DEMOLITION FLOOR PLAN - ROOM 134

1/4" = 1' - 0"

PLAN NORTH



NEW WORK FLOOR PLAN - ROOM 134

1/4" = 1' - 0"

PLAN NORTH

GENERAL SHEET NOTES

1. THE EXISTING BUILDING IS EQUIPPED WITH AN ALERTON ENVISION FOR BACTALK DIRECT DIGITAL CONTROL SYSTEM.
2. PAINT EXPOSED DUCTWORK AND PIPING JACKETS TO MATCH WALL COLOR.
3. SLOPE CONDENSATE DRAIN PIPING DOWN IN THE DIRECTION OF FLOW A MINIMUM OF 1/8" PER FOOT.
4. PROVIDE PIPE SLEEVES AND ESCUTCHEONS FOR ALL PIPING PENETRATIONS THRU WALLS. EACH PIPE SHALL BE SEPARATELY SLEEVED. PROVIDE CONTINUOUS SEALANT JOINT AROUND PIPE SLEEVE, BOTH SIDES OF WALL, WATERTIGHT. SEALANT COLOR SHALL MATCH EXISTING ADJACENT WALL SURFACE.
5. ASSUME EXISTING DUCTWORK, VAV BOX, AND TRANSFER GRILLES ARE APPROXIMATELY 15' ABOVE THE EXISTING FINISHED FLOOR.

DEMOLITION KEYNOTES

1. ABANDON IN PLACE CEILING MOUNTED, HW UNIT HEATER, ASSOCIATED PIPING AND CONTROLS.
2. PARALLEL FAN POWERED VAV BOX, ASSOCIATED PIPING, SUPPLY DUCTWORK, AND CONTROLS, TO REMAIN.
3. TRANSFER DUCT AND ASSOCIATED GRILLE, TO REMAIN.
4. REMOVE HIGH PRESSURE DUCTWORK BETWEEN POINTS OF DISCONNECTION.
5. CUT-OUT OPENING IN 10" CMU/MTL SIDING WALL PANEL FOR NEW LOUVER. EXTENT OF CUT-OUT IN CMU SHALL ALSO ACCOMMODATE FOR A NEW PRECAST CONCRETE LINTEL AND SOLID CMU SILL. SEE NEW WORK KEYNOTE 17 FOR HEIGHT OF NEW LOUVER.
6. REMOVE DOOR LOCKSET HARDWARE.
7. REMOVE AND SALVAGE EXISTING 2'X2' SUSPENDED ACOUSTICAL TILE CEILING SYSTEM AS REQUIRED TO PERFORM MECHANICAL WORK ABOVE. MINIMIZE CEILING REMOVAL TO THE FULLEST EXTENT POSSIBLE.

NEW WORK KEYNOTES

1. PROVIDE REFRIGERANT PIPING HIGH, ABOVE ELEVATION OF EXISTING SUPPLY DUCTWORK.
2. REINSTALL EXISTING SALVAGED 2'X2' SUSPENDED ACOUSTICAL TILE CEILING SYSTEM BACK AT ORIGINAL LOCATION, AFTER COMPLETION OF MECHANICAL WORK ABOVE.
3. PROVIDE 1" CONDENSATE DRAIN PIPE 6" INTO ROOM TO SERVE FUTURE TRAINER AHU (BY OTHERS).
4. PROVIDE 1" CONDENSATE DRAIN PIPING DOWN TO DRY WELL. HEIGHT OF CONDENSATE DRAIN PIPING SHALL BE 8" OR LESS ABOVE EXISTING FINISHED FLOOR AND A MINIMUM OF 4" ABOVE GRADE.
5. FUTURE TRAINER AHU (BY OTHERS); SHOWN USING SCREENED LINEWEIGHT.
6. PROVIDE REFRIGERANT PIPING AND ASSOCIATED PIPE SLEEVES FOR CRCU APPROXIMATELY 42" ABOVE GRADE.
7. PROVIDE PIPE SLEEVES TO SERVE REFRIGERANT PIPING FOR FUTURE TRAINER CU (BY OTHERS). HEIGHT OF SLEEVES SHALL BE APPROXIMATELY 6" ABOVE EXISTING FINISHED FLOOR. SINCE REFRIGERANT PIPING IS PROVIDED BY OTHERS, ENSURE PIPES ARE PROPERLY SEALED IN SLEEVE AFTER THEIR INSTALLATION.
8. CROSSHATCHED AREA INDICATES MINIMUM CLEARANCE REQUIREMENTS FOR BOTH FUTURE TRAINER AND COMPUTER ROOM CUS, 18" NORTH AND SOUTH, 24" EAST. DO NOT OBSTRUCT.
9. SEE GENERAL LAYOUT PLAN AND EQUIPMENT FRAME DETAILS ON SHEET S-101. EQUIPMENT FRAME SHALL NOT BLOCK ACCESS TO FUTURE TRAINER CU AS INDICATED IN NEW WORK KEYNOTE 8.
10. PROVIDE A 9-5/8" WIDE X 7-5/8" HIGH PRECAST CONCRETE LINTEL ABOVE NEW LOUVER OPENING. PRECAST LINTEL SHALL BE MINIMUM 4,000 PSI CONCRETE (AT 28 DAYS), WITH 2-#5 TOP AND BOTTOM, NO STIRRUPS, BEAR 8" MINIMUM AT EACH END. TOOTH-INTO EXIST CMU AND PAINT TO MATCH EXIST ADJACENT CMU.
11. PROVIDE CRCU AND ASSOCIATED PIPING, COMPLETE. MOUNT CRCU ON SECOND LEVEL OF EQUIPMENT FRAME AND ABOVE SIMILAR FUTURE TRAINER CU (BY OTHERS). CU AIRFLOWS SHALL DISCHARGE INTO PARKING LOT.
12. CAP EXISTING HIGH PRESSURE DUCTWORK AT EXISTING VAV BOX AND WALL WITH AIRTIGHT WITH 24 GA. SHEET METAL. INSULATE CAP AT EXISTING WALL. PAINT CAPS TO MATCH EXISTING WALL COLOR.
13. MOUNT DUCTWORK 11' ABOVE EXISTING FINISHED FLOOR (CENTERLINE).
14. PROVIDE CRAHU, ASSOCIATED PIPING AND DUCTWORK, COMPLETE.
15. PROVIDE DUCT SMOKE DETECTOR IN SUPPLY DUCT PER MANUFACTURER'S INSTRUCTIONS.
16. CAP EXISTING TRANSFER DUCT, AIRTIGHT WITH 24 GA. SHEET METAL. REMOVE EXISTING GRILLE AS REQUIRED. FACE OF CAP TOWARD ROOM SHALL BE PAINTED FLAT BLACK.
17. PROVIDE LOUVER; 18x16, TWO POSITION (WITH SPRING RETURN), NORMALLY CLOSED, MOTORIZED DAMPER (DOWNSTREAM OF LOUVER); AND 18x16 GRAVITY BACKDRAFT DAMPER (DOWNSTREAM OF MOTORIZED DAMPER). TOP OF LOUVER SHALL BE APPROXIMATELY 13'-4" ABOVE THE EXISTING FINISHED FLOOR. PROVIDE 18x16 TO 18x12 DUCT TRANSITION.
18. BALANCE THE EXISTING VAV BOX TO PROVIDE 3.1 GPM OF HOT WATER FLOW AND 1400 CFM OF SUPPLY AIR WHEN FAN IS ON (HEATING MODE). MODIFY EXISTING CONTROLS TO ACCOMPLISH SEQUENCE OF OPERATION LISTED ON M-601.
19. PROVIDE A CIPHER LOCKSET ON EXISTING HOLLOW METAL DOOR. CIPHER LOCKSET SHALL BE "SIMPLEX UNICAN HEAVY DUTY, L1041 MODEL SERIES, 5-PUSH BUTTON COMBINATION, KEY OVERRIDE FEATURE, PASSAGE FEATURE, LEVER HANDLE, PROVIDE WITH BEST CORE CYLINDER, KEY TO EXIST MASTERKEY SYSTEM, PROVIDE WITH BHMA 626 FINISH". PREPARE EXISTING HOLLOW METAL DOOR AND FRAME AS REQUIRED.
20. EXISTING EXTERIOR WALL AT THIS LOCATION IS COMPOSED OF 2" THICK EIFS ON 10" CMU.
21. PROVIDE ADJUSTABLE AIR EXTRACTOR, TYPICAL.

GRAPHIC SCALES

SCALE: 1/4" = 1'-0" 0 2' 4' 8'

SYM	DESCRIPTION	DATE	APPR

NAVFAC

SEAL

SUBMITTED BY

FIRM MEMBER DATE

APPROVED WILL TUCKER

ACTIVITY - SATISFACTORY TO DATE 20 DEC 05

APPROVED Terry Riley

FOR COMMANDER NAVFAC DATE 1/10/06

DES	OLS	DR	OLS
CHK	WDN	QC	
DESIGNER			
REVIEWED BY			
QC			
DESIGN MANAGER	O. L. SAN ANTONIO, P. E.		
FIRE PROTECTION	RJD		
BRANCH MANAGER	DRS		
ENGINEERING DIR.	WKS (WDN)		

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
SEWELLS POINT / YORKTOWN, IPT

NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NAVAL STATION - NORFOLK, VIRGINIA

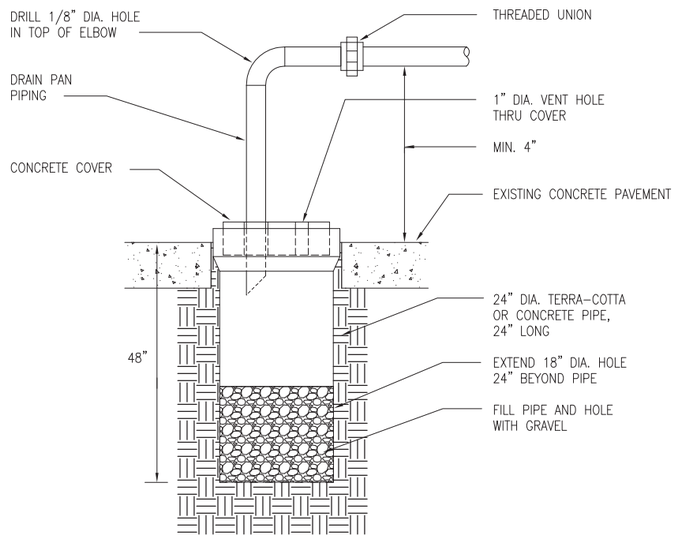
SP-381
RENOVATE TRAINER COMPLEX
DEMOLITION AND NEW WORK PLANS

CODE ID. NO. 80091	SIZE D
SCALE:	AS NOTED
MAXIMO NO.	AMKCHV
JOB ORDER NO.	118257802006
SPEC. NO.	03-D-3029
CONSTR. CONTR. NO.	N62470-03-D-3029
NAVFAC DRAWING NO.	4,537,854
SHEET	7 OF 14

M-101

DRAWFORM REVISION: 01 AUGUST 2004

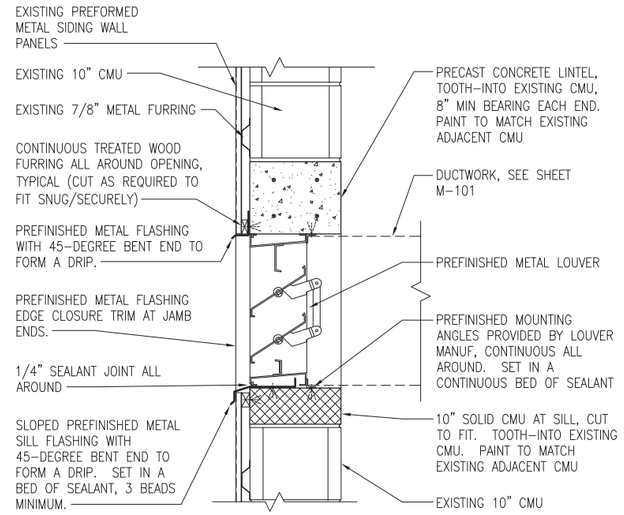
RENOVATE TRAINER COMPLEX - E2C Training Complex\Phase B - Design\Drawings\SP381-AMKCHV-M-101.dwg LAYOUT NAME: #-### PLOTTED: Friday, December 23, 2005 - 9:20am



DETAIL - DRY WELL

NOT TO SCALE

C1 M101 M501

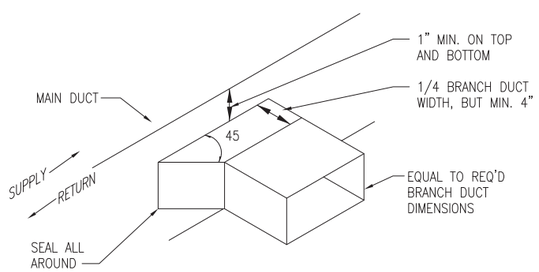


NOTES:
1. METAL LOUVER AND METAL FLASHINGS SHALL MATCH EXISTING BRONZE/BROWN COLOR OF EXISTING PREFORMED METAL SIDING WALL PANELS.
2. ALL METAL FLASHING SHALL HAVE HEMMED EDGES.

DETAIL - LOUVER

1 1/2" = 1'- 0"

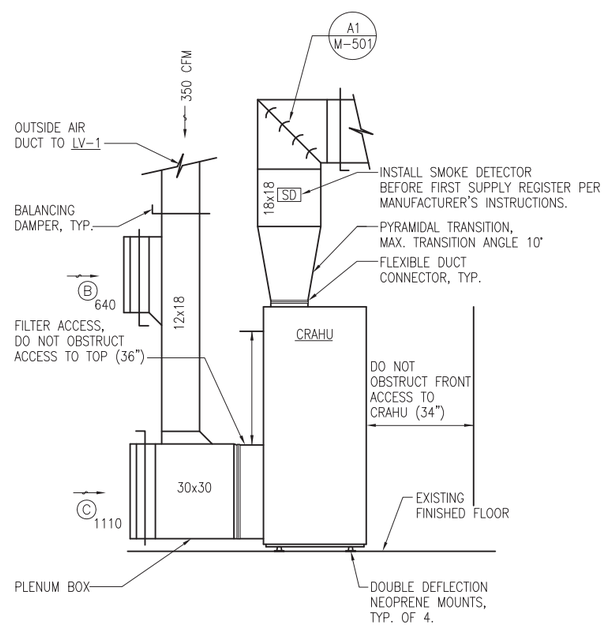
C3 M101 M501



DETAIL - BRANCH TAKE-OFF FITTINGS, TYPICAL

NOT TO SCALE

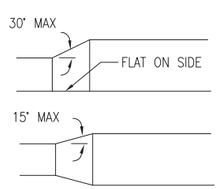
B1 M101 M501



SECTION - CRAHU DUCTWORK

1/2" = 1'- 0"

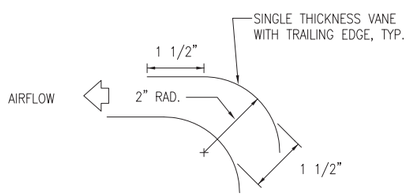
A3 M101 M501



DETAIL - DUCT TRANSITIONS, TYP.

NOT TO SCALE

A1 M101 M501



NOTE:
PROVIDE TURNING VANES ACROSS THE FULL WIDTH OF ALL SQUARE THROAT AND MITRED ELBOWS.

DETAIL - TURNING VANES, TYP,

NOT TO SCALE

A2 M001 M501

GRAPHIC SCALES

SCALE: 1/2" = 1'-0" 0 1' 2' 4'

SCALE: 1 1/2" = 1'-0" 0 4" 8" 1'-4"

DESIGNER	
REVIEWED BY	
QC	
DESIGN MANAGER	O. L. SAN ANTONIO, P. E.
FIRE PROTECTION	RAD
BRANCH MANAGER	DLRS
ENGINEERING DIR.	DLRS

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
SEWELLS POINT / YORKTOWN IPT
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NAVAL STATION – NORFOLK, VIRGINIA

SP-381
RENOVATE TRAINER COMPLEX

DETAILS AND SECTIONS

CODE ID. NO. 80091	SIZE D
SCALE:	AS NOTED
MAXIMO NO.	AMKCHV
JOB ORDER NO.	118257802006
SPEC. NO.	03-D-3029
CONSTR. CONTR. NO.	N62470-03-D-3029
NAVFAC DRAWING NO.	4,537,855
SHEET 8 OF 14	

M-501

DRAWFORM REVISION: 01 AUGUST 2004

SUBMITTED BY			
FIRM MEMBER	DATE		
APPROVED			
WILL TUCKER			
ACTIVITY – SATISFACTORY TO	DATE	20 DEC 05	
APPROVED			
Terry Riley			
FOR COMMANDER NAVFAC	DATE	1/10/06	
DES OLS	DR OLS		
CHK WDN	QC		

SYM	DESCRIPTION	DATE	APPR

SEAL

RENOVATE TRAINER COMPLEX – E2C Training Complex\Phase B – Design\Drawings\SP381-AMKCHV-M-501.dwg LAYOUT NAME: #-### PLOTTED: Thursday, December 22, 2005 – 3:20pm

REGISTER AND DIFFUSER SCHEDULE

MARK	TYPE	SERVICE	CFM	FACE SIZE	NECK SIZE	THROW (4)	MAX. P.D.	MAX. NC	MODEL # (1)	REMARKS
A	RECTANGULAR REGISTER, DOUBLE DEFLECTION	SUPPLY	420	--	18x12	18'	0.050	<20	300FS	2 3
B	RECTANGULAR REGISTER	RETURN	640	--	24x16	--	0.020	<25	350FS	2 3
C	RECTANGULAR REGISTER	RETURN	1110	--	30x30	--	0.010	<25	350FS	2 3
X	SQUARE DIFFUSER	SUPPLY	280	--	12x12	--	--	--	--	5

1. TITUS MODEL NUMBER
2. PROVIDE REGISTERS WITH OPTIONAL MANUFACTURER'S ALUMINUM OPPOSED BLADE VOLUME DAMPERS
3. BAKED OFF-WHITE ENAMEL FINISH, INCLUDING HEADS OF SCREWS
4. THROW BASED ON A TERMINAL VELOCITY OF 50 FPM AND 45 DEGREE DEFLECTION
5. EXISTING AIR TERMINAL

LOUVER SCHEDULE

MARK	SIZE (W" x H")	DEPTH (IN)	NET FREE AREA (SQFT)	EXTERNAL STATIC PRESSURE (IN. WG.)	AIRFLOW (CFM)	SERVICE	REMARKS
LV-1	18 x 16	6	0.74	0.075	350	OUTSIDE AIR INTAKE	1 2

REMARKS: 1. GREENHECK MODEL NUMBER ESD-603, FLANGED FRAME.
2. LOUVER COLOR SHALL BE BRONZE ANODIZED TO MATCH EXISTING EXTERIOR WALL COLOR.

DESIGN CONDITIONS

	SUMMER		WINTER
	°FDB	°FWB	°FDB
OUTSIDE	91	77	20
INSIDE	75	62.6	68

SPLIT SYSTEM COMPUTER ROOM AIR CONDITIONER SCHEDULE

UNIT NO.	CFM	O.A. CFM	ESP (IN. WG.)	FAN MOTOR HP	FAN MOTOR VOLTS	FAN MOTOR PHASE	DIRECT EXPANSION COOLING COIL MAX. COIL FACE VELOCITY (FPM)	EAT DB (°F)	EAT WB (°F)	MIN. TOTAL CAPACITY (BTU/HR)	MAX. SENS. CAPACITY (BTU/HR)	AIR ENT. COND. (°F)	NO. REFRIG. CIRCUITS	ELECTRIC REHEAT MIN. CAPACITY (BTU/HR)	INFRA-RED HUMIDIFIER (LBS/HR)	INFRA-RED HUMIDIFIER (KW)	REMARKS
CRAHU/CRCU	2100	350	0.3	1.5	460	3	313	79.4	65.7	65,000	50,800	95	1	28,000	11	4.8	1 2 3

REMARKS:
1. PROVIDE UPFLOW SUPPLY CABINET, REAR RETURN WITH ADVANCED MICROPROCESSOR AND PHENOLIC COATED COIL (LIEBERT BU060E-AAEI).
2. PROVIDE OUTDOOR SIDE DISCHARGE, PHENOLIC COATED COIL, PROPELLER FAN CONDENSING UNIT, 460V, 3PH, 60HZ (LIEBERT PFH067A-AL3).
3. PROVIDE DUCT-MOUNTED SMOKE DETECTOR. SEE NEW WORK KEYNOTE 15 ON M-101.

SEQUENCE OF OPERATION

GENERAL

ALL TEMPERATURES STATED HEREIN ARE IN DEGREES FAHRENHEIT. ALL CONTROL SET POINTS, DIFFERENTIALS, THROTTLING, AND ALARM RANGES SHALL BE ADJUSTABLE.

COMPUTER ROOM AIR CONDITIONER UNIT

THE COMPUTER ROOM AIR CONDITIONER UNIT (CRAHU & CRCU) SHALL BE CONTROLLED THROUGH ITS OWN FACTORY INSTALLED MICROPROCESSOR CONTROL SYSTEM AND SHALL MAINTAIN SET POINT, INITIALLY SET AT 75 DEGREES AND 50% RELATIVE HUMIDITY.

WHEN THE UNIT IS IN OCCUPIED MODE, THE MOTORIZED DAMPER IN THE OUTSIDE AIR INTAKE DUCT SHALL BE OPEN. WHEN THE UNIT IS IN UNOCCUPIED MODE, THE DAMPER SHALL BE CLOSED. SEE NOTE 17 ON M-101.

WHEN SMOKE IS DETECTED IN THE SUPPLY AIR BY THE DUCT MOUNTED SMOKE DETECTOR, THE CRAHU WILL DEENERGIZED AND THE EXISTING FIRE ALARM SYSTEM SHALL BE NOTIFIED.

TRAINER AIR CONDITIONER UNIT

THE TRAINER AIR CONDITIONER UNIT (BY OTHERS) SHALL BE CONTROLLED THROUGH ITS OWN FACTORY INSTALLED MICROPROCESSOR CONTROL SYSTEM.

WHEN SMOKE IS DETECTED IN THE SUPPLY AIR BY THE UNDER-FLOOR SMOKE DETECTORS, THE TRAINER AHU (BY OTHERS) WILL DEENERGIZED AND THE EXISTING FIRE ALARM SYSTEM SHALL BE NOTIFIED. PROVIDE NECESSARY WIRING.

VARIABLE AIR VOLUME UNIT (EXISTING)

ON A FALL IN SPACE TEMPERATURE, INITIALLY SET AT 68 DEGREES, THE HOT WATER VALVE SHALL MODULATE OPEN TO THE HOT WATER COIL AND THE SUPPLY FAN SHALL ENERGIZE. ON A RISE IN SPACE TEMPERATURE, THE REVERSE SHALL OCCUR.

STM	DESCRIPTION	DATE	APPR

NAVFAC

SEAL

SUBMITTED BY
FIRM MEMBER DATE
APPROVED WILL TUCKER
ACTMTY - SATISFACTORY TO DATE 20 DEC 05
APPROVED Terry Riley
FOR COMMANDER NAVFAC DATE 1/10/06
DES OLS DR OLS
CHK WDN QC
DESIGNER
REVIEWED BY
QC
DESIGN MANAGER O. L. SAN ANTONIO, P. E.
FIRE PROTECTION RAD
BRANCH MANAGER OLS
ENGINEERING DIR. OLS (for)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
SEWELLS POINT / YORKTOWN IPT
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NAVAL STATION – NORFOLK, VIRGINIA

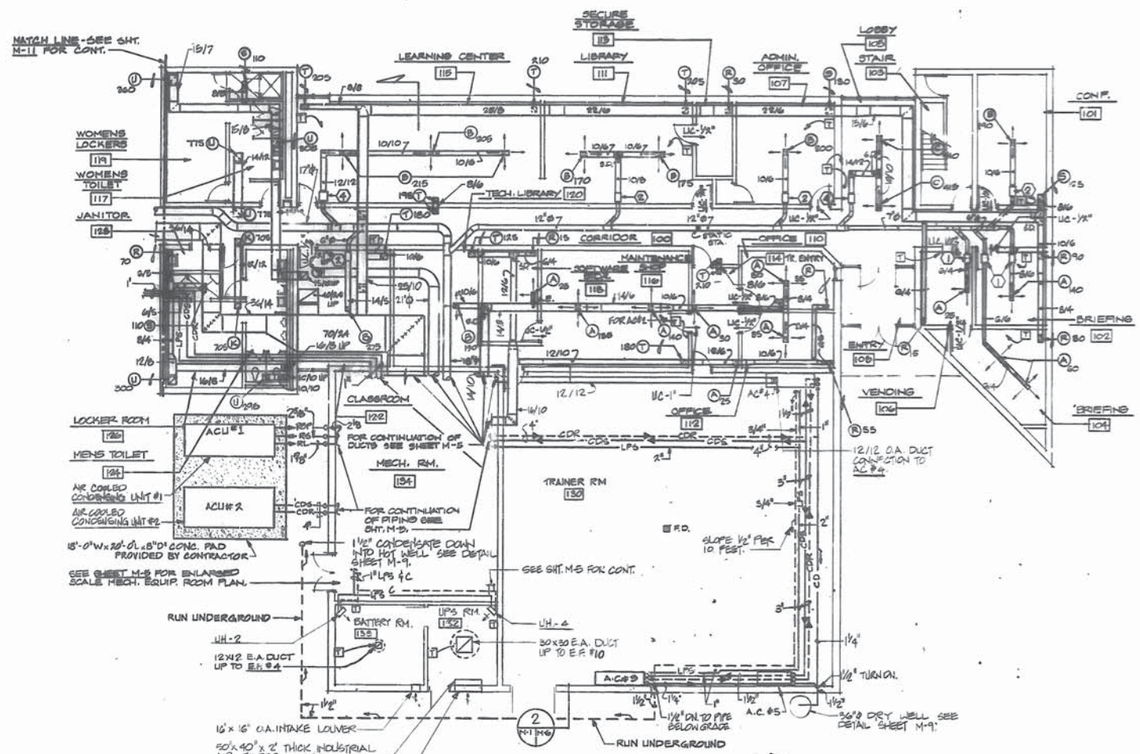
SP-381
RENOVATE TRAINER COMPLEX
SCHEDULES & SEQUENCE OF OPERATION

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. AMKCHV
JOB ORDER NO. 118257802006
SPEC. NO. 03-D-3029
CONSTR. CONTR. NO. N62470-03-D-3029
NAVFAC DRAWING NO. 4,537,856
SHEET 9 OF 14
M-601

DRAWFORM REVISION: 01 AUGUST 2004

RENOVATE TRAINER COMPLEX - E2C Training Complex\Phase B - Design\Drawings\SP381-AMKCHV-M-601.dwg LAYOUT NAME: #-### PLOTTED: Friday, December 23, 2005 - 8:56am

REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVED



MECHANICAL GROUND FLOOR PLAN-COOLING

SCALE 1/8" = 1'-0"

NOTES:

1. ALL FIRE RATED WALLS WILL NOT EXCEED MAX. 1 HOUR FIRE RATING.
2. FOR PERIMETER BASEBOARD RADIATION ON GROUND FLOOR LEVEL SEE SHT. M-2.
3. SEE SHEET M-6 FOR LEGEND.

RECORD DRAWING
LETTER DATED JUL 25 1983

M-1

GRAPHIC SCALES

1/8" = 1'-0" 0' 1' 2' 4' 6' 10' 15' 20'

VANSANT & GUSLER, INC.
CONSULTING ENGINEERS
Norfolk, Virginia

COMMONWEALTH OF VIRGINIA
No. 1721
PROFESSIONAL ENGINEER

HENDERSON ASSOCIATES, ARCHITECTS
a professional corporation
NORFOLK, VIRGINIA

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION — NORFOLK, VIRGINIA

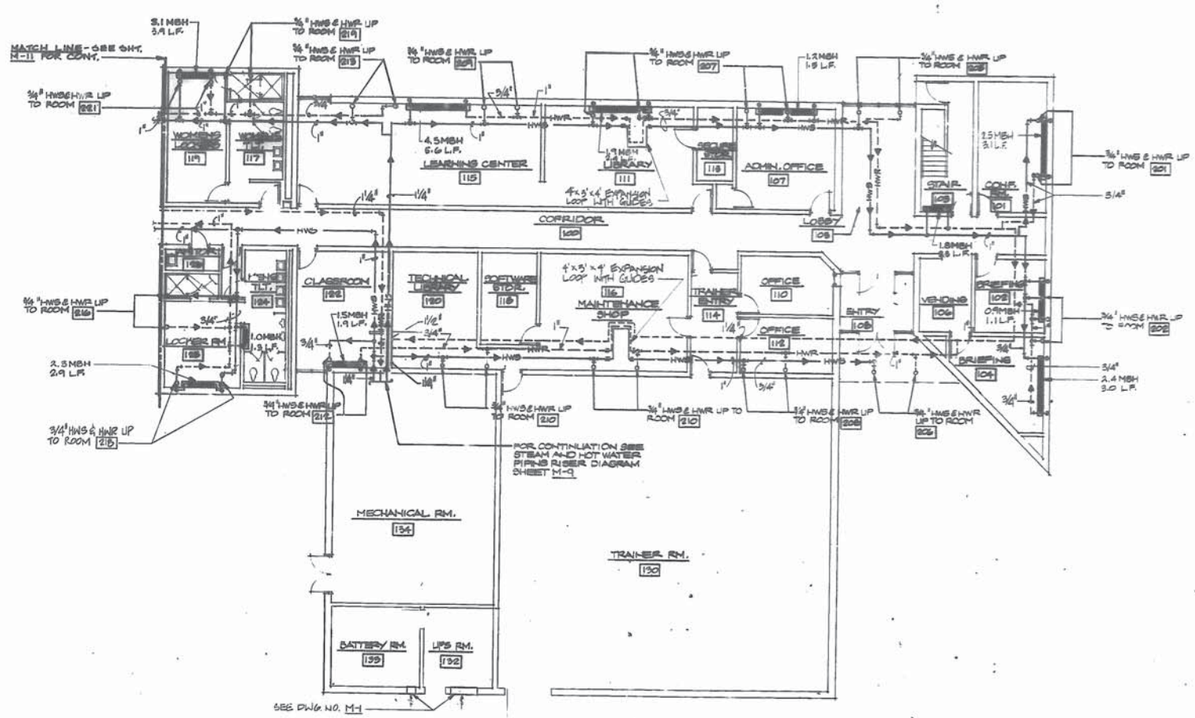
NAVAL AIR STATION, NORFOLK, VIRGINIA
E-2C & H-53 TRAINER BUILDINGS
E-2C
MECHANICAL GROUND FLOOR PLAN - COOLING

SIZE F — CODE IDENT NO. 81091 — NAVFAC DRAWING NO. 406667D

SCALE AS NOTED — SPEC. 05-79-9366 — SHEET 10 OF 57

NO. 106676

REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVED



MECHANICAL GROUND FLOOR PLAN-HEATING

SCALE 1/8" = 1'-0"

NOTES:

1. ALL HOT WATER SUPPLY AND RETURN PIPING SHALL BE RUN IN GROUND FLOOR CEILING SPACE UNLESS OTHERWISE INDICATED.
2. HEATING ZONE THERMOSTAT LOCATIONS SHOWN ON SHEET M-4

GRAPHIC SCALES

1/8" = 1'-0" 0' 2' 4' 6' 10' 18' 30'

RECORD DRAWING
LETTER DATED JUL 25 1983

M-2

VANSANT & GUSLER, INC
CONSULTING ENGINEERS
Norfolk, Virginia

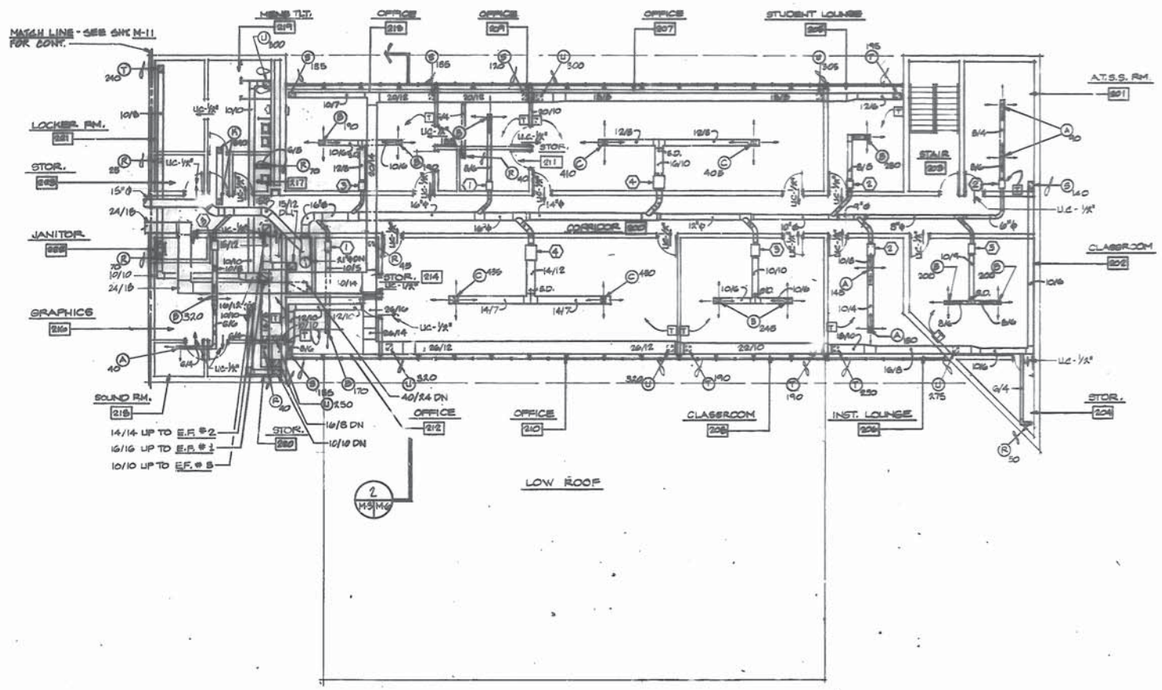
HENDERSON ASSOCIATES, ARCHITECTS
a professional corporation
NORFOLK, VIRGINIA

DES. L.A.D. | DR. J.E.D. | CHK. K.W.P.
PROJ. MGR. JKH | CH. ENGR. D.L.G.
SUBMITTED BY: DATE:
PROJ. ENGINEER
BR. CHF. BVD
DIV. CHF.
APPROVED DATE
OFFICER IN CHARGE
APPROVED DATE
FOR BID FOR COMMANDER NAVFAC

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION — NORFOLK, VIRGINIA

NAVAL AIR STATION, NORFOLK, VIRGINIA
E-2C & H-53 TRAINER BUILDINGS
E-2C
MECHANICAL GROUND FLOOR PLAN - HEATING

SIZE F | CODE IDENT NO. 80091 | NAVFAC DRAWING NO. 4065679
CONTR. CONTR. NO. N62470-79-B-5866
SCALE AS NOTED | SPEC. DE-79-0928 | SHEET 40 OF 7
BD DWG. NO. 1656079



MECHANICAL SECOND FLOOR PLAN - COOLING

SCALE 1/8" = 1'-0"

NOTES:

1. ALL FIRE RATED WALLS WILL NOT EXCEED MAX. 1 HOUR FIRE RATING.
2. FOR PERIMETER BASEBOARD RADIATION ON SECOND LEVEL SEE SHEET M-4.

GRAPHIC SCALES

1/8" = 1'-0"

RECORD DRAWING
LETTER DATED JUL 25 1983

M-3

VANSANT & GUSLER, INC.
CONSULTING ENGINEERS
Norfolk, Virginia

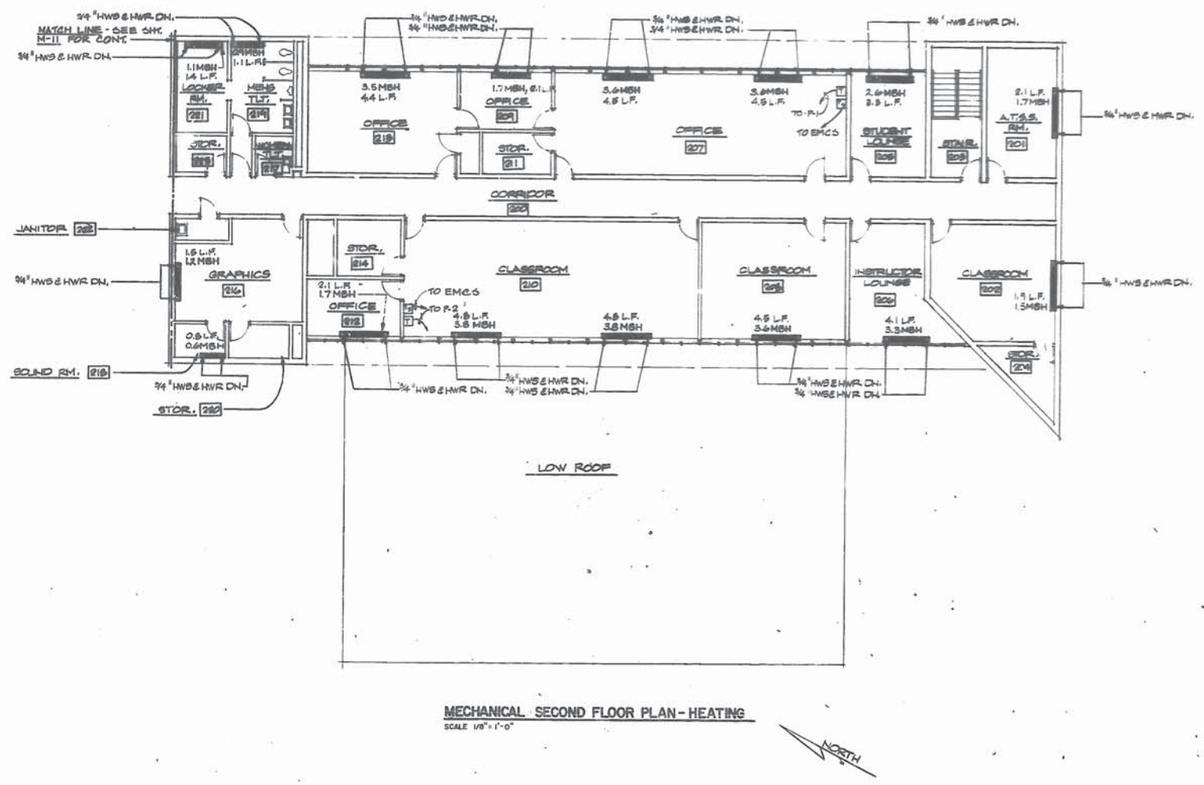
HENDERSON ASSOCIATES, ARCHITECTS
professional corporation
NORFOLK, VIRGINIA

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION, NORFOLK, VIRGINIA

NAVAL AIR STATION, NORFOLK, VIRGINIA
E-2C & H-53 TRAINER BUILDINGS
E-2C
MECHANICAL SECOND FLOOR PLAN - COOLING

SIZE F | CODE IDENT NO. 80091 | NAVFAC DRAWING NO. 4065680

REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVED



MECHANICAL SECOND FLOOR PLAN - HEATING
SCALE 1/8" = 1'-0"

GRAPHIC SCALES
1/8" = 1'-0"

VANSANT & GUSLER, INC.
CONSULTING ENGINEERS
Norfolk, Virginia

COMMONWEALTH OF VIRGINIA
DENNIS L. GUSLER
No. 1921
PROFESSIONAL ENGINEER

HENDERSON ASSOCIATES, ARCHITECTS
a professional corporation
NORFOLK, VIRGINIA

DES. A.P. DR. R.D. CHK. W.P.
PROJ. ENGR. HC-1 CH. ENGR. L.G.
SUBMITTED BY: DATE
RPR: RVP.
APPROVED DATE
OFFICER IN CHARGE DATE
FOR RPR FOR COMMANDER NAVFAC

RECORD DRAWING
LETTER DATED JAN 25 1983

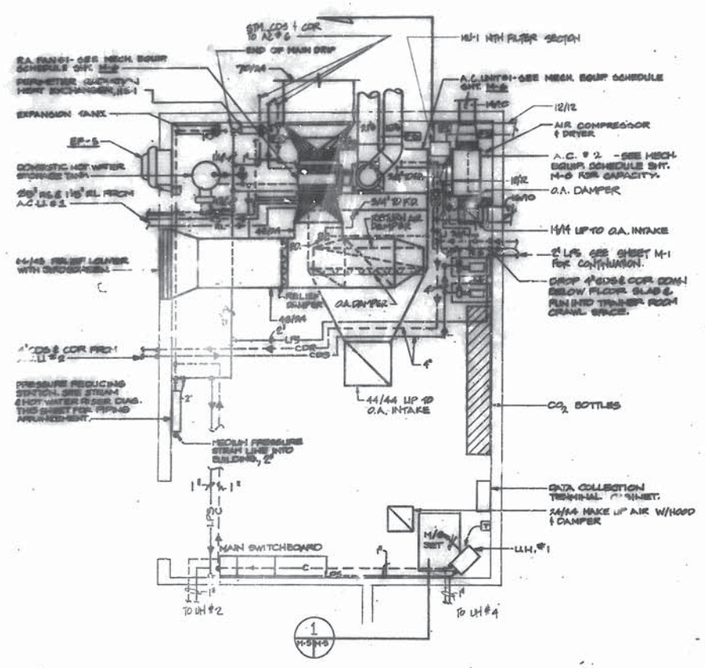
M-4

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION — NORFOLK, VIRGINIA

NAVAL AIR STATION, NORFOLK, VIRGINIA
E-2C & H-53 TRAINER BUILDINGS
E-2C
MECHANICAL SECOND FLOOR PLAN - HEATING.

SIZE	CODE IDENT NO.	NAVFAC DRAWING NO.
F	80091	1056481

CONTR. CONTR. NO. 1442-78-B-0568
SCALE AS NOTED SPEC. 1-23-1980 SHEET 2 OF 7
SFD DWG. NO. 1056481

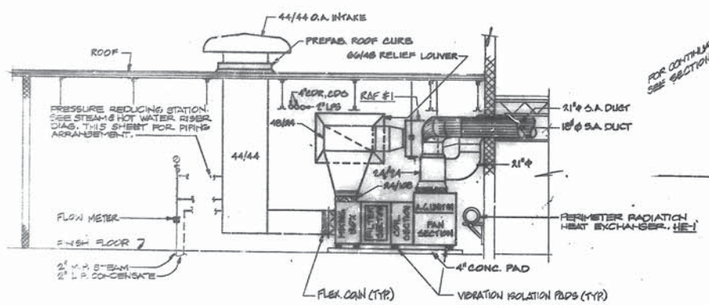


ENLARGED MECHANICAL EQUIPMENT ROOM

SCALE 1/4" = 1'-0"

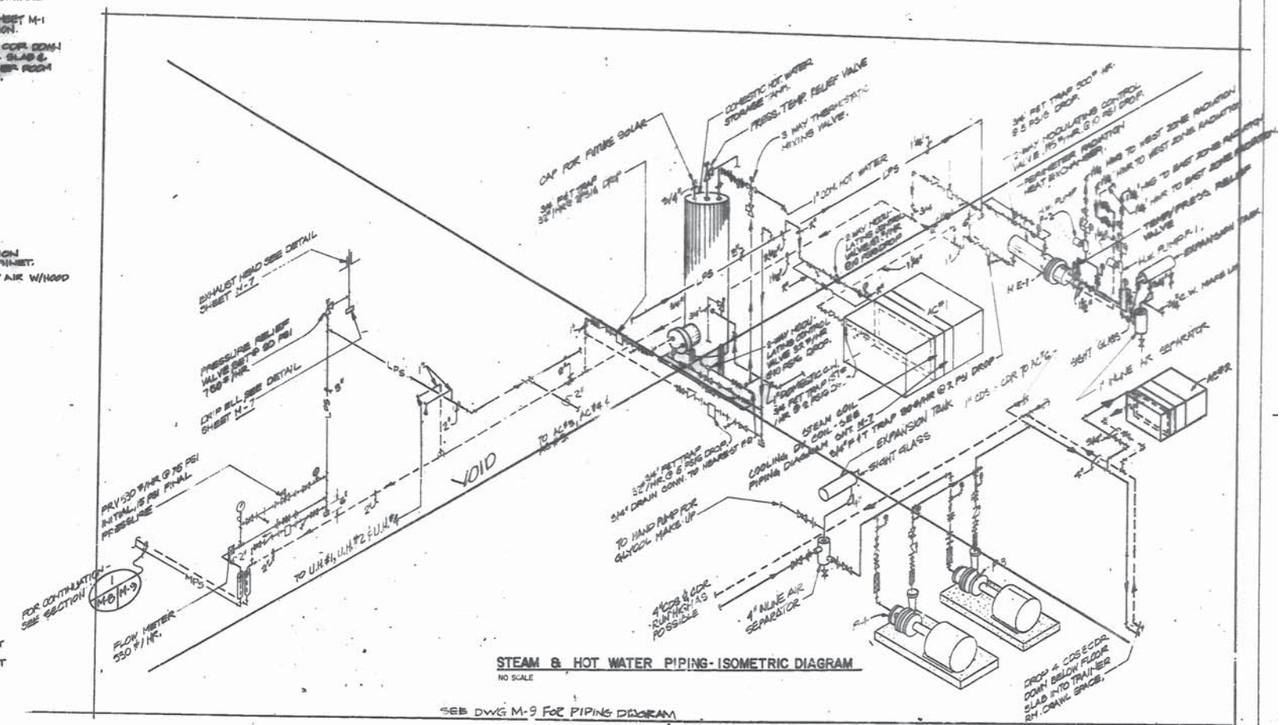
NOTES.

1. SEE DWG. M-1 FOR CONTINUATION OF PIPING



SECTION

SCALE 1/4" = 1'-0"



STEAM & HOT WATER PIPING - ISOMETRIC DIAGRAM

NO SCALE

SEE DWG M-9 FOR PIPING DIAGRAM

REV.	DESCRIPTION	DATE	APPROVED

RECORD DRAWING
LETTER DATED MAY 2 1988

M-5

VANSART & GUBLER, INC. CONSULTING ENGINEERS Norfolk, Virginia

HENDERSON ASSOCIATES, ARCHITECTS & professional engineers NORFOLK, VIRGINIA

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION NORFOLK, VIRGINIA

NAVAL AIR STATION, NORFOLK, VIRGINIA

E-2C & H-53 TRAINER BUILD'GS

MECH. EQUIP. ROOM PLAN, SECTION & R SEC.

CODE IDENT NO. F 80091

NAVFAC DRAWING NO. 1405682

CONTR. CONTL. NO. N62470-79-B-0880

SCALE AS NOTED

SHEET 25 OF 57

NO. SHEET NO. 1405682

GRILLE & DIFFUSER SCHEDULE

MARK	SIZE	APPLICATION
A	24x24	SUPPLY AIR - CEILING DIFFUSER
B	24x24	
C	24x24	
D	24x24	
E	24x24	
F	24x24	
G	24x24	
H	24x24	TRANSFER AIR GRILLE
I	24x24	WALL RETURN - CEILING DIFFUSER
J	24x24	SUPPLY OR EXHAUST AIR DIFFUSER
K	24x24	RETURN OR EXHAUST AIR GRILLE
L	24x24	
M	24x24	
N	24x24	
O	24x24	
P	24x24	
Q	24x24	
R	24x24	

VARIABLE AIR VOLUME UNIT TERMINAL SCHEDULE

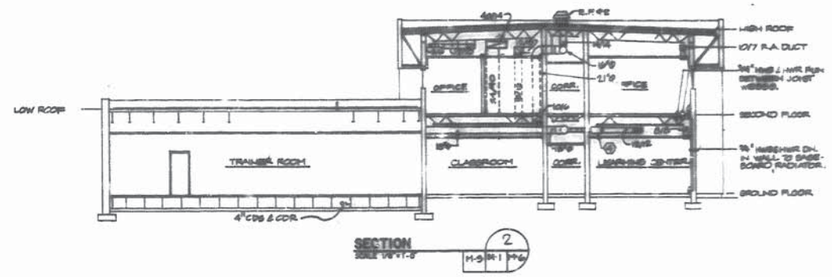
MARK	INLET SIZE	CFM RANGE
1	4"ø	0-170
2	5"ø	170-350
3	8"ø	350-600
4	10"ø	600-1000
5	14"ø	1000-2000
6	16"x24"	2000-4000
7	4"ø	50 CONSTANT VOL.

LEGEND

- SUPPLY DUCT SECTION
- RETURN OR EXHAUST DUCT SECTION
- FLEXIBLE DUCT CONNECTION
- HWS — HOT WATER SUPPLY PIPING
- HWR — HOT WATER RETURN PIPING
- MPS — MEDIUM PRESSURE STEAM PIPING
- LPS — LOW PRESSURE STEAM PIPING
- CR — CONDENSATE RETURN PIPING
- RL — REFRIGERANT LIQUID PIPING
- RS — REFRIGERANT SUCTION PIPING
- GATE VALVE
- CHECK VALVE
- RELIEF VALVE
- PIPE UNION
- PIPE REDUCER
- FLEXIBLE PIPE CONNECTION
- STRAINER W/ BLOW ON GATE VALVE
- THREE WAY CONTROL VALVE
- TWO WAY CONTROL VALVE
- BALANCING VALVE
- PRESSURE REDUCING VALVE
- THERMOMETER
- PRESSURE GAUGE W/ PIGTAIL AND PETCOCK
- FLOAT AND THERMOSTATIC TRAP
- ARROWS INDICATE FLOW OF PIPE
- (1) INDICATED V.A.V. BOX MARK. SEE SCHEDULE
- 100 INDICATES GRILLE OR DIFFUSER MARK. SEE SCHEDULE
- S.D. SPLITTER DAMPER
- F.D. FIRE DAMPER
- S.A. SUPPLY AIR
- O.A. OUTSIDE AIR
- R.A. RETURN AIR
- E.A. EXHAUST AIR
- A.E. AIR EXTRACTOR
- UH#1 UNIT HEATER. SEE MECHANICAL EQUIPMENT SCHEDULE
- PERIMETER BASEBOARD RADIATION, SIZE DWGS. FOR CAPACITIES.
- A.C.U.#1 AIR COOLED CONDENSING UNIT. SEE EQUIPMENT SCHEDULE.
- E.F.#1 EXHAUST FAN. SEE MECHANICAL EQUIPMENT SCHEDULE
- A.C.#1 AIR CONDITIONING UNIT. SEE MECHANICAL EQUIPMENT SCHEDULE
- P-5 INDICATES MECHANICAL PUMP. SEE MECHANICAL EQUIPMENT SCHEDULE
- CDS — CONDENSER WATER SUPPLY
- CDR — CONDENSER WATER RETURN.
- PNEUMATIC THERMOMETER
- FS-1 FLOW SWITCH
- * INDICATES PANEL MOUNTED CONTROLS
- E.P. ELECTRIC-PNEUMATIC
- P.E. PNEUMATIC-ELECTRIC
- T THERMOSTAT MOUNTED @ 60" A.F.F.
- M MAIN AIR
- N.C. NORMALLY CLOSED.
- N.O. NORMALLY OPEN
- R-1 RELAY
- AIR GAUGE
- EMCS TEMPERATURE SENSOR
- FIRESTAT
- DUCT WITH TURNING VANES
- MK. MARK
- BK BREAK
- GLOBE VALVE
- REF — REFRIGERANT BY-PASS PIPING
- CW#2 CONDENSER WATER COOLER (AIR COOLED)
- HG REFRIGERANT HOT GAS
- SCS SOLAR COLLECTOR SUPPLY
- SCR SOLAR COLLECTOR RETURN
- F FAN SWITCH
- MANUAL AIR VENT
- PIPE GUIDES OR SLEEVES
- DOOR LOUVER
- FLEXIBLE DUCT
- 152 ROOM NUMBER
- POINT OF CONNECTION - NEW TO EXISTING

DEVISIONS

SYM	DESCRIPTION	DATE	APPROVED
1	RE-ISSUED AS-BUILT		



SECTION 2 H-5 SH-1 M-6

AIR CONDITIONING UNIT SCHEDULE

MARK	AREA	AIR QUANTITY SUPPLY	AIR QUANTITY O.A.	FAN MOTOR E.S.P.	FAN MOTOR T.S.P.	FAN MOTOR H.P.	FAN MOTOR RPM	FAN MOTOR VOLTS	FAN MOTOR Ø	COOLING COIL EDB	COOLING COIL EWB	COOLING COIL LDB	COOLING COIL LWB	COOLING COIL MBH	COOLING COIL APD	HEATING COIL EDB	HEATING COIL LDB	HEATING COIL LWB	HEATING COIL APD	HUMIDIFIER EAT	HUMIDIFIER CAP	FILTER TYPE	FILTER THK.	COND. COIL GPM	COND. COIL WPD	COND. COIL EAT	COND. COIL LAT	COND. COIL RO.	REMARKS
AC-1	BLDG.	5,595	595	5.0	4.75	15	540	208	3	81.2	66.0	54.7	51.5	297.7	.85	54.5	68.4	67	.1	–	–	3AG	–	–	–	–	–	–	W7 VORTEX DMPR.-FAN MUST UNLOAD TO 2680
AC-2	TRAINER OPER.	685	105	4	–	1/6	1175	120	1	80.0	66.0	57.0	55.6	23.1	.4	–	–	–	–	–	–	DWP.	1"	6	3.7	2	1		
AC-3	TRAINER ROOM	7750	–	.5		7½	–	208	3	70.0	58.5	50.0	48.5	256.0	.7	70.0	70.7	62	.1	15	13.2	DWP.	4"	60	15.0	12	2	DOWN FLOW UNIT	
AC-4		5905	400			5		208	3	71.3	59.7	51.5	50.0	220		66.5	71.1	58.6			26.4			60	8.8	9	2		
AC-5		4360	–			1.5		208	3	70.0	58.0	52.0	48.5	44.6		70.0	72.2	4.3			3.5			20	10.5	5	1		
AC-6		1,120	–	.25		1.5	1750	208	3	75.0	64.5	54.5	50.1	31.0		70.0	75.6	8.5	.1		4.5		2"	12	11.5	3	1	UP FLOW UNIT	

AIR COOLED CONDENSING UNIT SCHEDULE

MARK	UNITS SERVED	LOCATION	COMPRESSOR MFR	COMPRESSOR NO.	COMPRESSOR HP	COMPRESSOR VOLTS	COMPRESSOR Ø	SST	CAP.	REF.	—	CONDENSER GPM	CONDENSER ENT	CONDENSER LWT	CONDENSER WPD	CONDENSER EAT	CONDENSER CFM	CONDENSER FANS	CONDENSER H.P.	CONDENSER VOLTS	CONDENSER Ø	REMARKS
ACU-1	AC-#1	YARD	[illegible]	1	40	208	3	44	3.5 TON	R-22	–	–	–	–	–	95°F		4	1.5	208	3	40°F GAS BYPASS
ACU-2	AC-2,3,4,5,6		–	–	–	–	–	–	–	–	–	146	85°F	97°F	6.5PSI	95°F	4000	5	1	208	3	40% GLYCOL COOLER

RETURN AIR FAN SCHEDULE

MARK	AREA SERVED	CFM	ESP	HP	VOLTS	Ø	REMARKS
RAF-1	BUILDING VAV SYSTEM	10,155	1"	5	208	3	W7 VORTEX DAMPER - FAN MUST UNLOAD TO 5280CFM

UNIT HEATER SCHEDULE

MARK	LOCATION	STEAM	LB/HR	HP	VOLTS	Ø
UH-1	MECH. RM 154	1/2"ø	4	1/25	120	1
UH-2	BATTERY RM.		28	1/20		
UH-3	MECH. RM 309		16	↓		
UH-4	LAB RM 152	↓	12	1/25	↓	↓

PUMP SCHEDULE

MARK	TYPE	GPM	HD.	HP	RPM	VOLTS	Ø	SERVICE
P-1	IN-LINE	67	22'	1/2	1750	208	3	HOT WATER RADIATION
P-2	↓	7.0	68'	↓		↓	↓	HOT WATER RADIATION
P-3	BASE MTD.	175	68'	7½		208	3	ACU-2
P-4	↓	175	68'	↓	↓	↓	↓	ACU-2 STANDBY

EXHAUST FAN SCHEDULE

MARK	LOCATION	CFM	SP	HP	RPM	VOLTS	Ø	REMARKS
EF-1	ROOF	1155	.37	1/6	1320	120	1	
EF-2		840	.25	1/6	1070			
EF-3		295	.25	1/8	1140			
EF-4		450	.12	1/12	860			PROVIDE VARIABLE SPEED CONTROL FOR 50 & 100 CFM
EF-5	WALL	2595	.10	1/8	870			
EF-6	ROOF	950	–	1/21	–			STAINLESS STEEL, WALL AND ROOF, CONTAINED E.F.
EF-7	WALL	760	.25	1/2	1095			
EF-8		2600	.125	1/4	775			
EF-9		1250	.25	1/4	975			
EF-10	ROOF	3750	.625	1	1155	208	3	

GRAPHIC SCALES

1/8" = 1'-0"

VANSANT & GUBLER, INC. CONSULTING ENGINEERS Norfolk, Virginia

HENDERSON ASSOCIATES, ARCHITECTS & ENGINEERS NORFOLK, VIRGINIA

RECORD DRAWING LETTER DATED JUL 25 1983

M-6

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION

NAVAL AIR STATION, NORFOLK, VIRGINIA

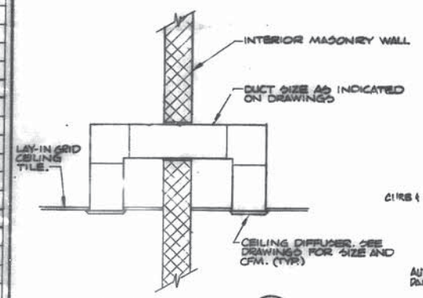
E-2C & H-53 TRAINER BUILDINGS

MECHANICAL LEGEND, SECTION & SCHEDULES.

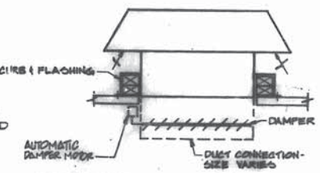
F 20091

426-6-83

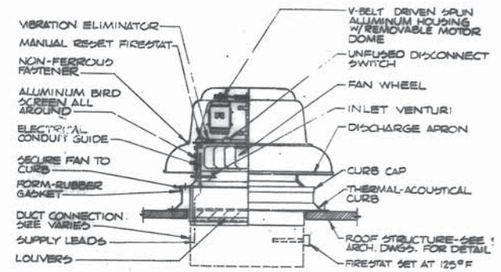
T&E
ARCH.
CIVIL
STRUCT.
HVAC
PLUMB.
ELEC.
LANDSCAPE



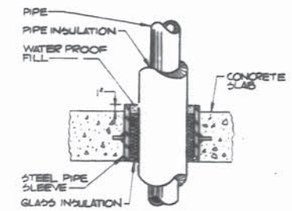
TRANSFER BOOT DETAIL (A) M-1 M-7
NO SCALE



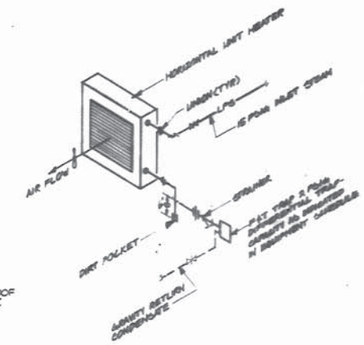
OUTSIDE AIR INTAKE HOOD DETAIL
NO SCALE



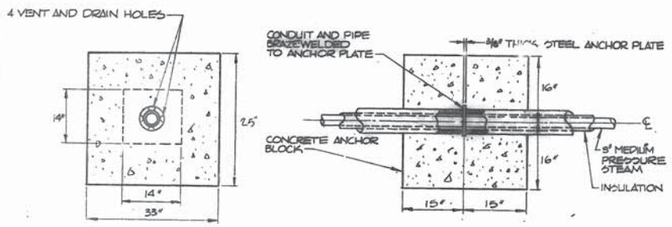
EXHAUST FAN DETAIL
NO SCALE



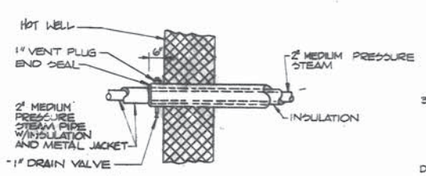
PIPE SLEEVE DETAIL
NO SCALE



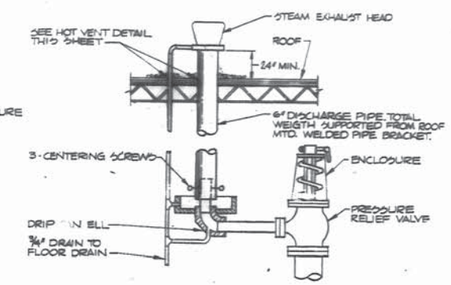
STEAM UNIT HEATER DETAIL
NO SCALE



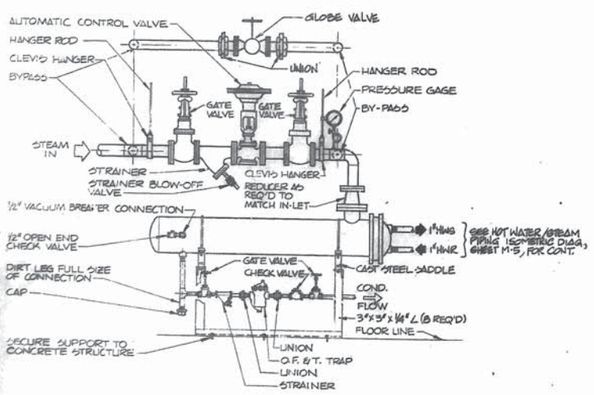
ANCHOR DETAIL
NO SCALE



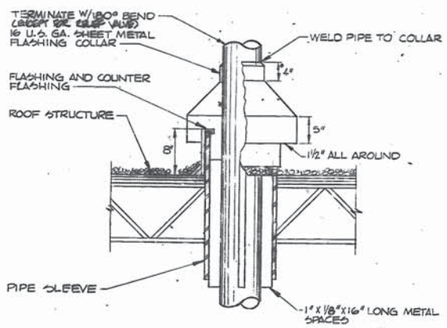
BUILDING WALL ENTRY DETAIL
NO SCALE



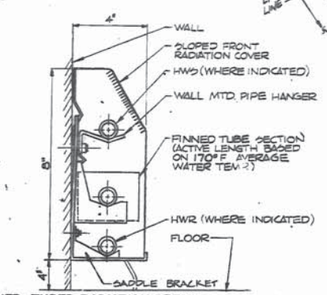
RELIEF VALVE PIPING DETAIL
NO SCALE



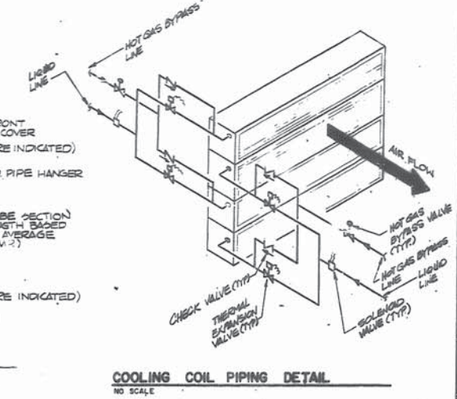
PERIMETER RADIATION HEAT EXCHANGER PIPING & SUPPORT DETAIL
NO SCALE



HOT VENT DETAIL (B) M-7 M-5
NO SCALE



FINNED TUBED RADIATION DETAIL
NO SCALE



COOLING COIL PIPING DETAIL
NO SCALE

REVISIONS

SYM.	DESCRIPTION	DATE	APPROVED

RECORD DRAWING
LETTER DATED JUL 25 1983

M-7

VANSANT & GUBLER, INC.
CONSULTING ENGINEERS
Norfolk, Virginia

HENDERSON ASSOCIATES, ARCHITECTS & ENGINEERS incorporated
NORFOLK, VIRGINIA

DRN. L.A.D. DR. J.E.G. CHK. W.P.

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VIRGINIA

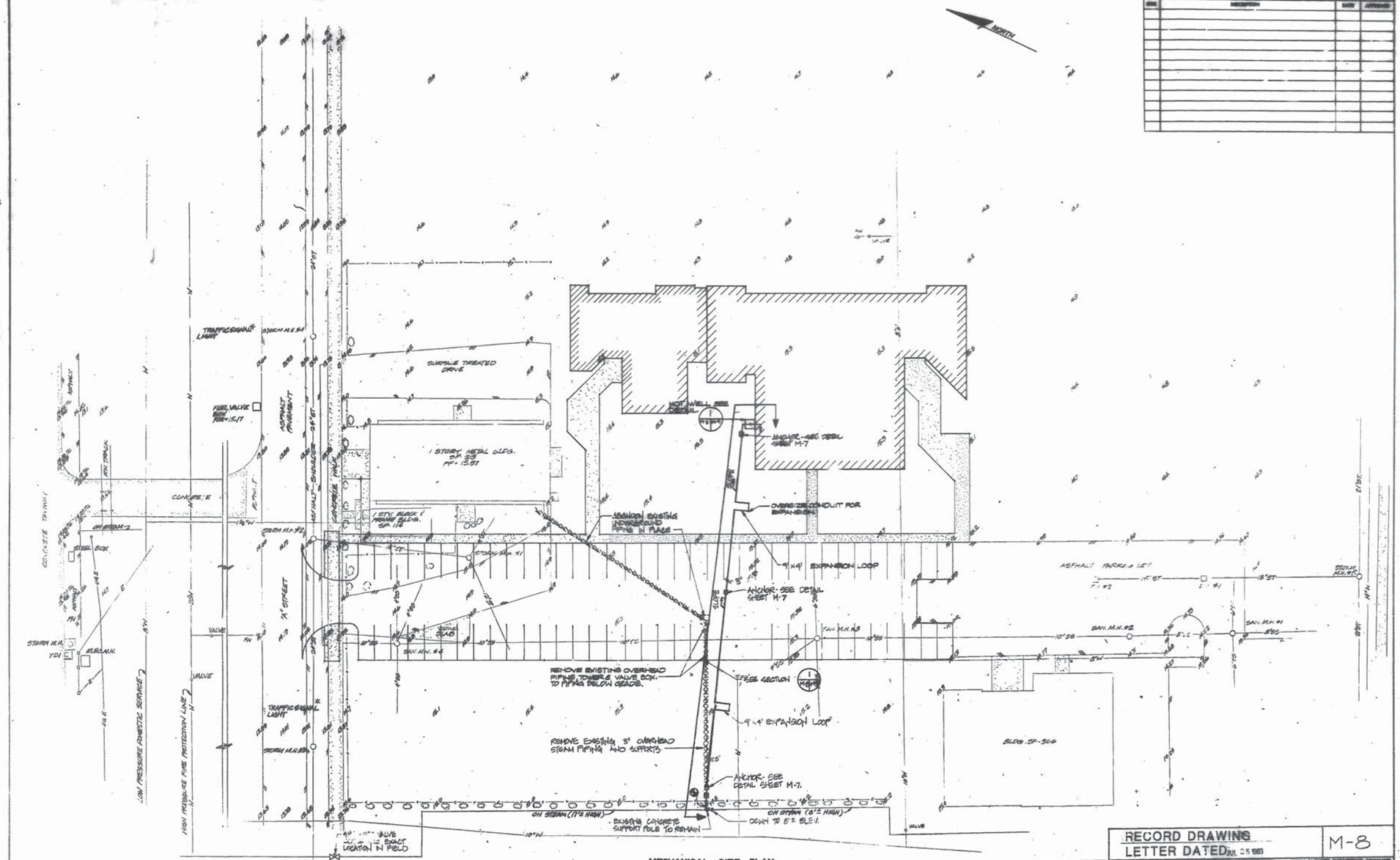
NAVAL AIR STATION, NORFOLK, VIRGINIA
E-2C & H-53 TRAINER BUILDINGS

MECHANICAL DETAILS.

APPROVED DATE
ENGINEER IN CHARGE

SIZE F
CODE IDENT NO. 80091
NAVFAC DRAWING NO. 4659684
CONTR. CODE NO. 4-20-79-B-9869
SCALE
SPEC. 08-79-9869
DATE 25 OCT 79
SHEET M-7
SYS. DWG. NO. 4659684

REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVED



SURVEY DATA FOR EXISTING STRUCTURES

SAN. M.H. #1
RIM = 14.41
INV. 8" IN = 11.71 SOUTH
INV. 6" IN = 11.66 WEST
INV. 8" IN. = 11.66 EAST
INV. 8" OUT = 11.60

SAN. M.H. #2
RIM = 14.38

SAN. M.H. #3
RIM = 15.28
INV. 10" IN = 11.53
INV. 10" OUT = 11.50

SAN. M.H. #4
RIM = 14.65
INV. 10" OUT = 10.39

STORM M.H. #1
RIM = 15.07
INV. 12" IN = 11.57 SOUTH
INV. 6" IN = 11.62 EAST
INV. 12" OUT = 11.02

STORM M.H. #2
RIM = 14.00
INV. 15" IN = 10.69 SOUTH
INV. 24" IN = 6.81 EAST
INV. 24" OUT = 6.01

STORM M.H. #3
RIM = 13.03
INV. = 5.99

STORM M.H. #4
RIM = 13.46
INV. 24" IN = 6.51 EAST
INV. 24" OUT = 6.47

D.I. #1
RIM = 13.95
INV. = 11.10

D.I. #2
RIM = 13.94
INV. = 11.69

MECHANICAL SITE PLAN

GRAPHIC SCALES

1" = 20'-0"

VANSANT & GUSLER, INC.
CONSULTING ENGINEERS
Norfolk Virginia

COMMONWEALTH OF VIRGINIA
JOHN E. GUSLER
No. 1128
PROFESSIONAL ENGINEER

RECORD DRAWING
LETTER DATED JUL 25 1983

M-8

MEDCROSS ASSOCIATES, ARCHITECTS
A professional corporation
NORFOLK, VIRGINIA

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION, NORFOLK, VIRGINIA

NAVAL AIR STATION — NORFOLK, VIRGINIA
E-2C & H-55 TRAINER BUILDINGS

MECHANICAL SITE PLAN

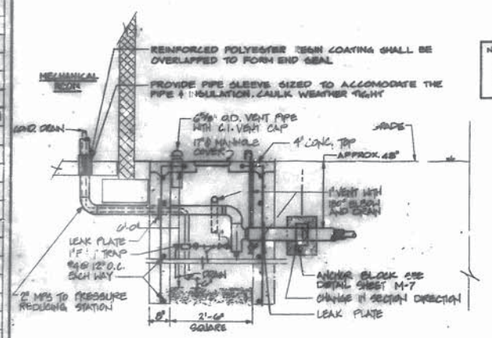
SIZE F — CODE IDENT NO. 80091 — PARTNO DRAWING NO. 405668

CONTRACT COMPL. NO. N62470-79-B-9560

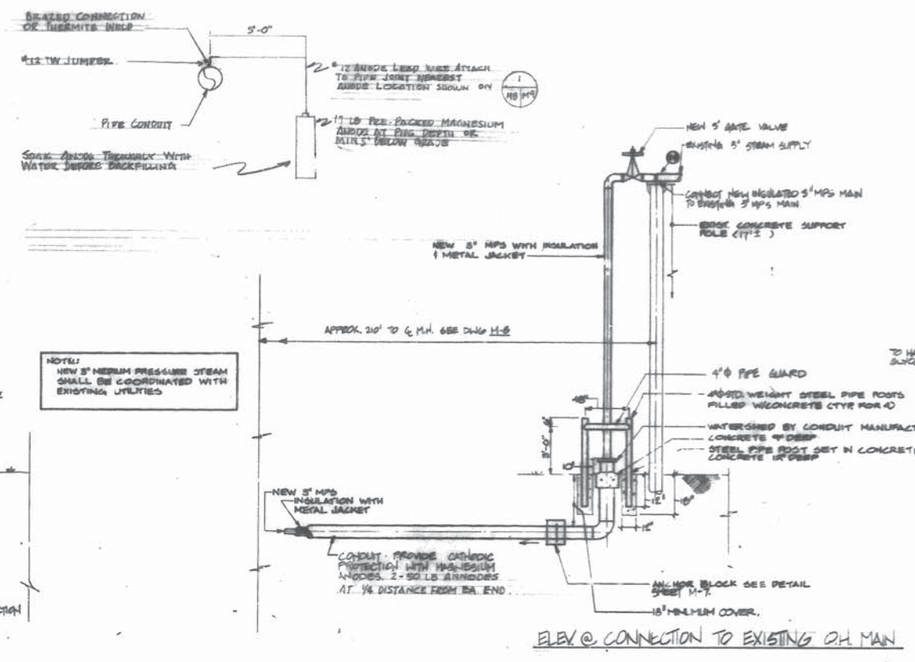
SCALE AS NOTED — DATE 08-79-9560 — SHEET 20 OF 27

NO. DWG. NO. 165665

T&C
ARCH.
CIVIL
STRUCT.
HVAC
PLUMB.
ELEC.
LANDSCAPE
CONCRETE

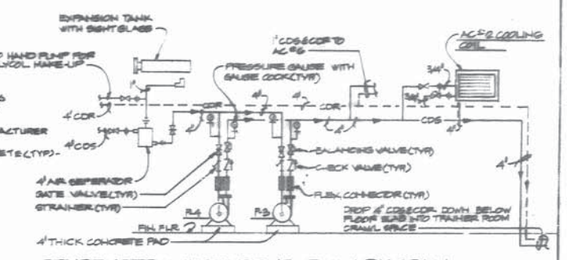


SECTION THRU WORK AREA AT MECHANICAL EQUIPMENT ROOM & NEW STEAM CONNECTION (1) M-9

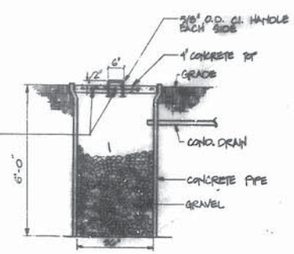


ELEV. @ CONNECTION TO EXISTING O.H. MAIN

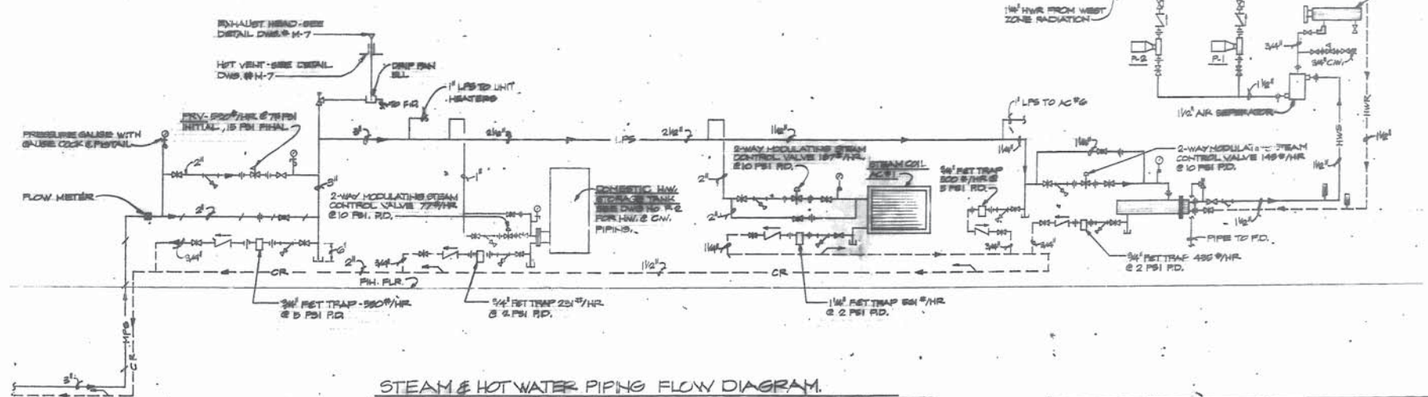
NOTE:
NEW 5" MEDIUM PRESSURE STEAM SHALL BE COORDINATED WITH EXISTING UTILITIES



CONDENSER WATER PIPING - FLOW DIAGRAM
NOT TO SCALE



DRY WELL DETAIL
NO SCALE



STEAM & HOT WATER PIPING FLOW DIAGRAM.
NOT TO SCALE

RECORD DRAWING
LETTER DATED JUL 25 1983

M-9

VANSANT & GUSLER, INC.
CONSULTING ENGINEERS
Norfolk, Virginia

DIMENSION ASSOCIATES, ARCHITECTS
NORFOLK, VIRGINIA

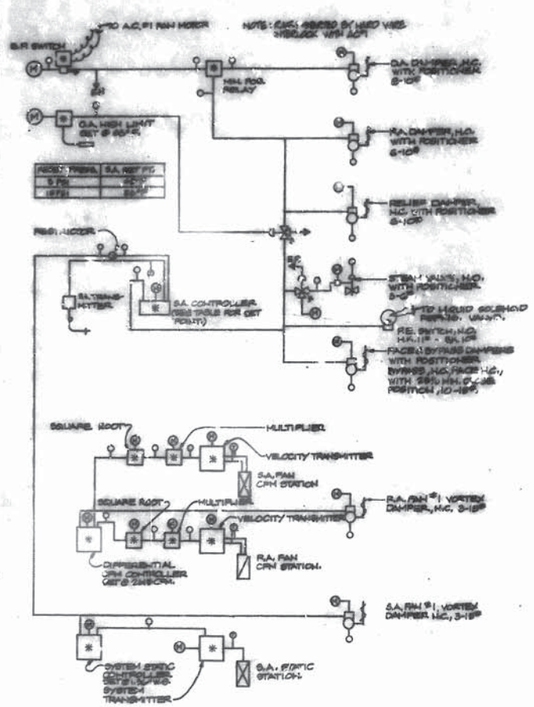
DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION, NORFOLK, VIRGINIA

NAVAL AIR STATION, NORFOLK, VIRGINIA
E-2C & H-53 TRAINER BUILDINGS

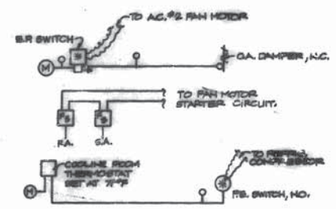
MECHANICAL SITE DETAILS & SECTIONS

SIZE F
CODE IDENT NO. 80091
NAVFAC DRAWING NO. 4045686
CONTR. CONTR. NO. N62470-79-B-2260
SCALE AS NOTED DATE 05-29-1980
SHEET 47 OF 57
DS DWG. NO. 165660

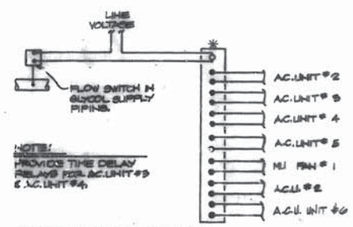
REV.	DESCRIPTION	DATE	APPROVED
A	REVISED AS BUILT		



A.C. UNIT 1 CONTROLS

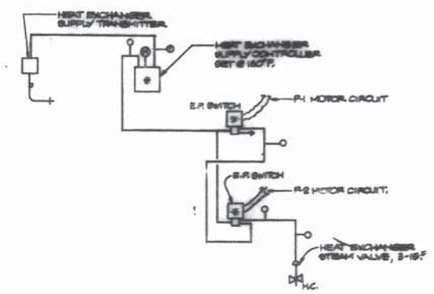


A.C. UNIT 2 CONTROLS



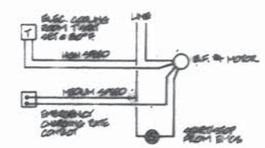
NOTE:
PROVIDES TIME DELAY RELAYS FOR A.C. UNIT #3 & A.C. UNIT #4.

COMPUTER ROOM SYSTEM INTERLOCKS



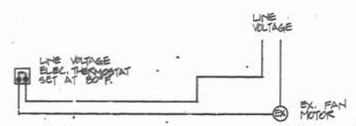
PERIMETER RADIATION HEAT EXCHANGER CONTROLS

STEAM UNIT HEATER - ROOM CONTROLS

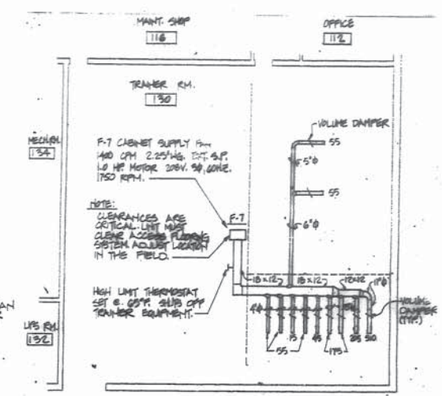


BATTERY ROOM - E.F-4

MU UNIT #1 CONTROLS

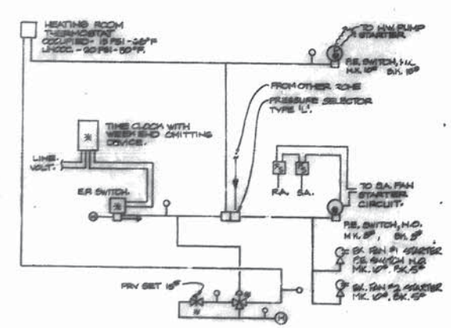


EXHAUST FAN CONTROLS
EF-5, EF-7, EF-8, EF-9 & EF-10

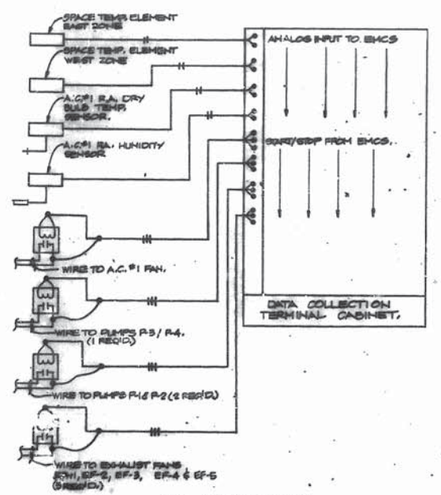


② PART PLAN TRAINER ROOM 130
SCALE: 1/8" = 1'-0"

NOTE:
1. ALL DUCTWORK & FAN ARE LOCATED BELOW ACCESS FLOORING SYSTEM.
2. DUCT CONNECTIONS TO TRAINER EQUIP. NOT IN CONTRACT.
3. REQUIRED CFM SHOWN. 05-71-1505 - AMEND NO. 0002



A.C. UNIT 1 OCCUPIED/UNOCCUPIED ROOM CONTROLS



EMCS INTERFACE CONTROLS

TEMPERATURE CONTROL DIAGRAMS

UNSCALE

RECORD DRAWING
LETTER DATED 28 JUL 1983

M-10

VANSANT & GUGLER, INC.
CONSULTING ENGINEERS
PORTSMOUTH, VIRGINIA

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NORFOLK, VIRGINIA

NAVAL AIR STATION, NORFOLK, VIRGINIA
E-2C & HSS TRAINER BUILDINGS

MECHANICAL TEMPERATURE CONTROL DIAGRAMS.

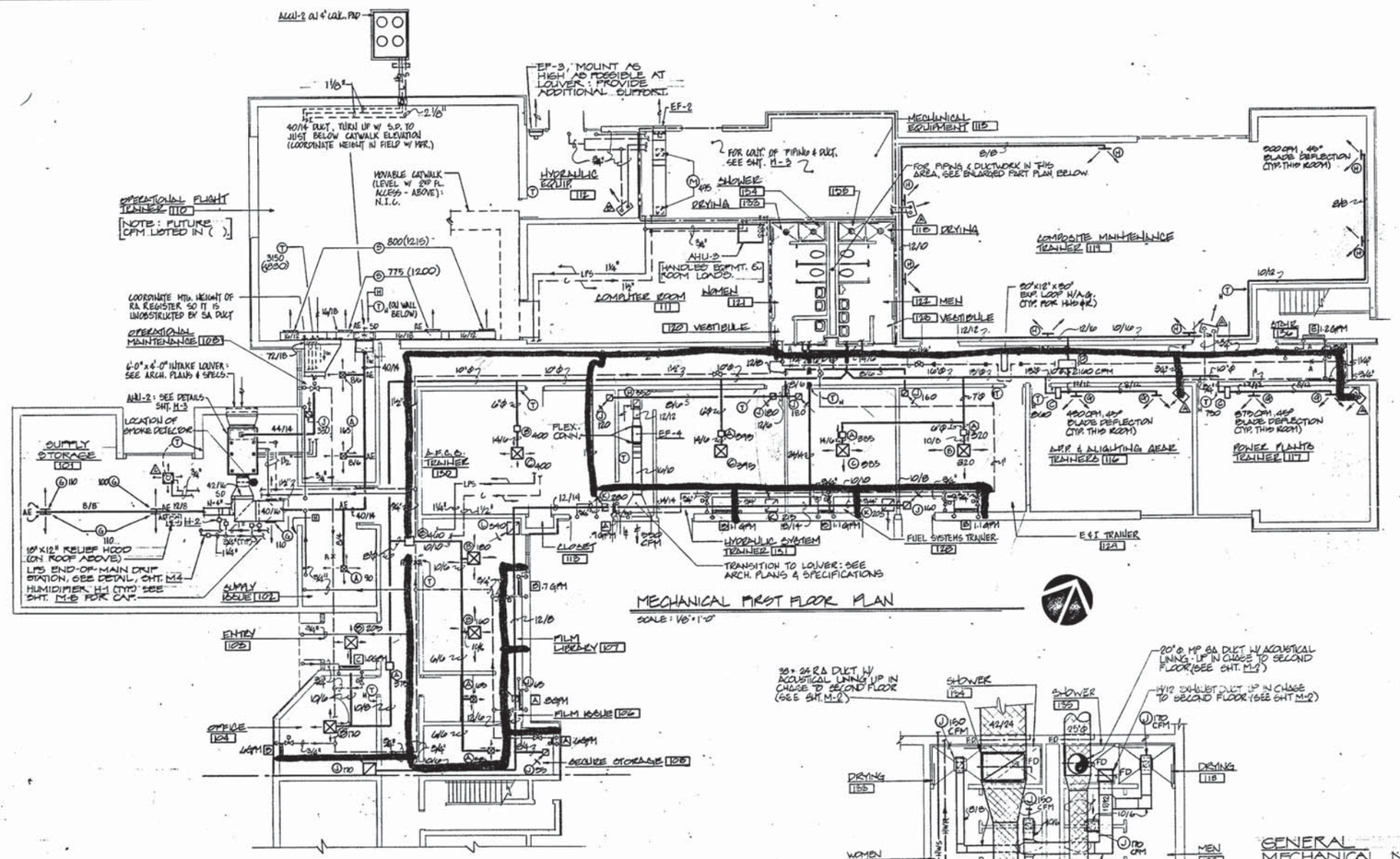
SIZE F — CODE IDENT NO. 80091 — DRAWING NUMBER 4065687

CONTRACT NO. N62470-79-B-0560

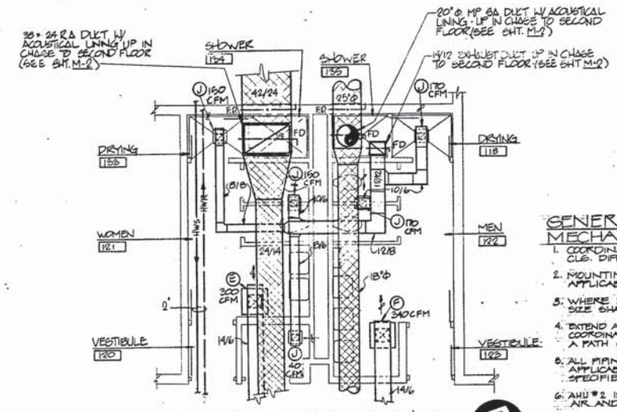
SCALE: 1/8" = 1'-0" — DATE: 05-79-0560

TO DWG. NO. 4065687

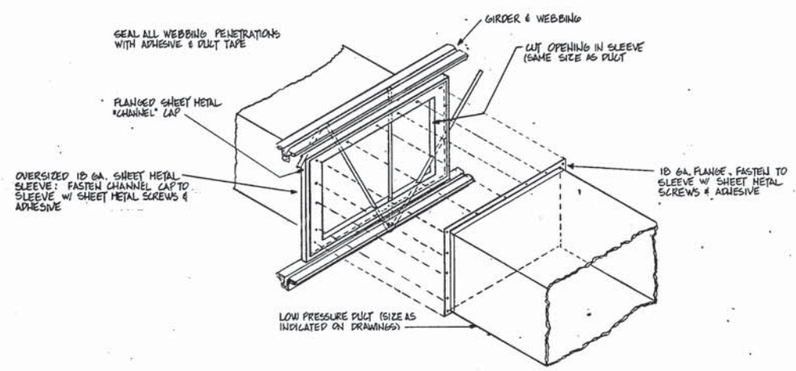
REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVED



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



ENLARGED PART PLAN-A
SCALE: 1/4" = 1'-0"



LOW PRESSURE DUCT SLEEVE @ GIRDER
NO SCALE

MECHANICAL LEGEND

- SUPPLY RETURN DUCT
- HWS — HOT WATER SUPPLY
- HWR — HOT WATER RETURN
- UNIT HEATER
- BASEBOARD RADIATION
- SA DIFFUSER (FLOW AS SHOWN ON DWGS.)
- RA REGISTER
- VAV BOX
- SIDEWALL REGISTER
- ACOUSTICALLY LINED DUCT
- UNION
- BALANCE VALVE
- GATE VALVE
- 2-WAY CONTROL VALVE
- 3-WAY CONTROL VALVE
- CHECK VALVE
- GLOBE VALVE
- STRAINER
- THERMOMETER W/WELL
- IN-LINE PUMP
- PRESSURE GAUGE
- FD — FIRE DAMPER
- DUCT RISES IN DIRECTION OF ARROW
- PIPE ALIGNMENT GUIDE
- PIPE ANCHOR
- PIPE ANCHOR (UNDERGROUND STEAM)
- SLOPE IN DIRECTION OF ARROW
- AE — AIR EXTRACTOR
- SD — SPLITTER DAMPER
- T — THERMOSTAT (COOLING OR HEATING)
- TH — THERMOSTAT (COOLING AND HEATING)
- VD — OPPOSED BLADE VOLUME DAMPER
- MS — MEDIUM PRESSURE STEAM @ 15 PSIG
- LS — LOW PRESSURE STEAM @ 10 PSIG
- C — CONDENSATE RETURN
- H — HUMIDISTAT
- HRS — HEAT RECOVERY WATER SUPPLY
- HRR — HEAT RECOVERY WATER RETURN

GENERAL MECHANICAL NOTES

1. COORDINATE ALL WORK W/OTHER TRADES. SEE ARCH. DWGS. FOR EXACT LOCATIONS OF CLG. DIFFUSERS, GRILLES AND SIDEWALL LOUVERS (FOR CONNECTION).
2. MOUNTING HEIGHT OF ALL THERMOSTATS AND HUMIDISTATS SHALL BE 5'-0" AFF; WHERE APPLICABLE, COORDINATE WITH LIGHTING SWITCH LOCATIONS.
3. WHERE DUCT LINER IS SHOWN OR NOTED, DUCT SIZE SHALL BE INCREASED SO THAT THE NOTED SIZE SHALL BE THE INSIDE DIMENSIONS.
4. EXTEND ALL DRAIN LINES FROM EQUIPMENT OR CONDENSATE DRAIN PAN TO CLOSEST FLR. DRAIN; COORDINATE INSTALLATION SO THE DRAIN LINES ARE RUN IN UN-OBTRUSIVE LOCATIONS (I.E., NOT IN A PATH OF ACCESS OR EGRESS).
5. ALL PIPING SERVICES SHALL BE PITCHED AS THEIR SERVICE REQUIRES, OR AS REQ'D BY ALL APPLICABLE CODES & GOOD PRACTICE STANDARDS. WHERE APPLICABLE, PROVIDE AIR VENTS AS SPECIFIED AT ALL HIGH POINTS OR AS REQ'D TO VENT AIR FROM THE PIPING SYSTEM.
6. AHU #2 IS SIZED TO HANDLE FUTURE EQUIPMENT LOADS; BALANCE SYSTEM FOR PRESENT DESIGN AIR AND WATER QUANTITIES.
7. MANUFACTURERS SHALL SUBMIT COMPLETE REFRIGERANT PIPING DIAGRAMS W/THEIR EQUIPMENT SHOP DRAWINGS; ALL REFRIGERANT RISERS EXTENDING UP 6' OR MORE SHALL BE DOUBLE RISERS. AHU #1 UTILIZES A FOW SPLIT COIL W/HOT GAS BY-PASS ON THE MAIN CIRCUIT. ALL HOT GAS LINES SHALL BE INSULATED AS SPECIFIED FOR SUCTION LINES. PROVIDE UNDER TEMPERATURE CONTROLS PROVISIONS FOR HOT-GAS BYPASS AND COMPRESSOR(S) SYSTEM SHUT-DOWN ON A "NO LOAD" SITUATION (I.E., UPON ACTIVATION OF ECONOMIZER OR HEATING SYSTEM, THE MECHANICAL COOLING SYSTEM SHALL BE DE-ENERGIZED.

GRAPHIC SCALES
1/8" = 1'-0" 10 5' 10' 15' 20'
1/4" = 1'-0" 12" 0 1' 2' 3' 4' 5' 10'

VANSANT & GUSLER, INC.
CONSULTING ENGINEERS
Norfolk, Virginia

HENDERSON ASSOCIATES, ARCHITECTS
a professional corporation
NORFOLK, VIRGINIA

COMMONWEALTH OF VIRGINIA
RICHARD L. HOUSER
No. 1921
PROFESSIONAL ENGINEER

DES. HRK DR. LL CHK. KWP
PROJ. MGR. WGM CH. ENGR. RJHP
SUBMITTED BY: DATE 8-2-
FRANK MEEKER PRINCIPAL
EFD-SA RVD. HWC
NO. DR.
APPROVED DATE
OFFICER IN CHARGE
APPROVED DATE
FOR EFD FOR COMMANDER NAVFAC

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VIRGINIA

NAVAL AIR STATION, NORFOLK VIRGINIA
APPLIED INSTRUCTION BUILDING

LEGEND & GROUND FLOOR PLAN

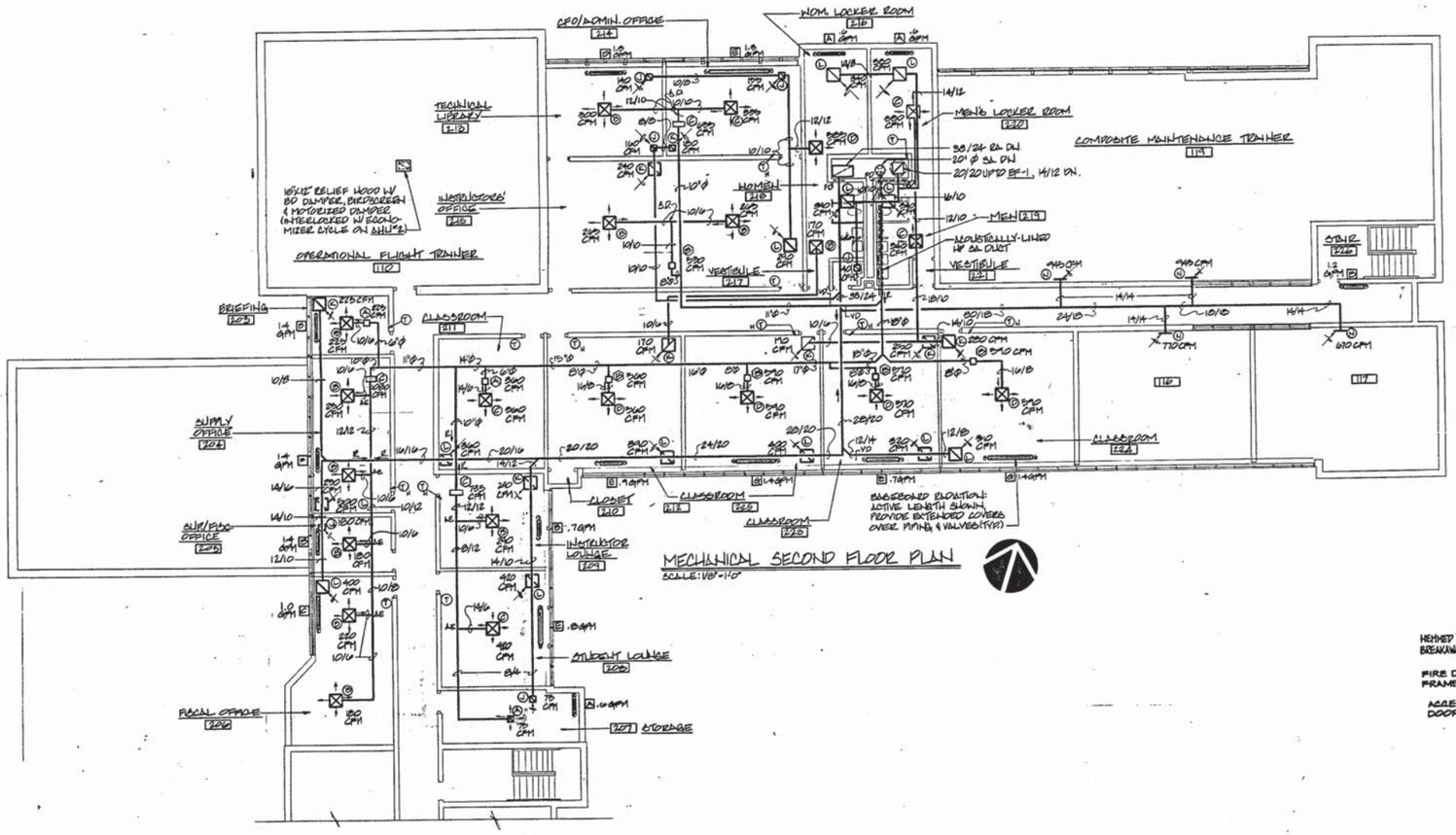
SIZE	CODE IDENT NO.	NAVFAC DRAWING NO.
F	80091	4088839

CONSTR. CONTR. NO. N62472-81-B-1412
SCALE GRAPHIC SPEC. 08-81-1412 SHEET 10 OF 33

EFD DWG. NO. 188839

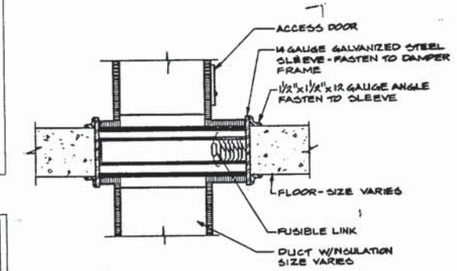
M-1

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED



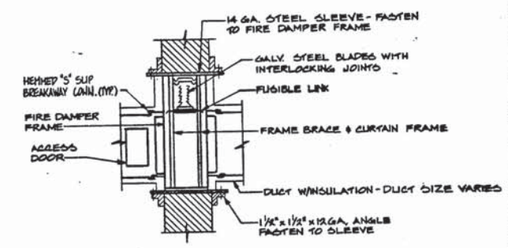
MECHANICAL SECOND FLOOR PLAN

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



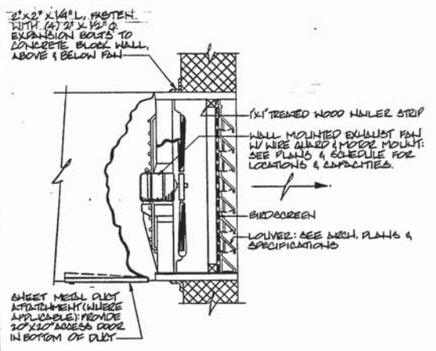
HORIZONTAL FIRE DAMPER DETAIL

NO SCALE



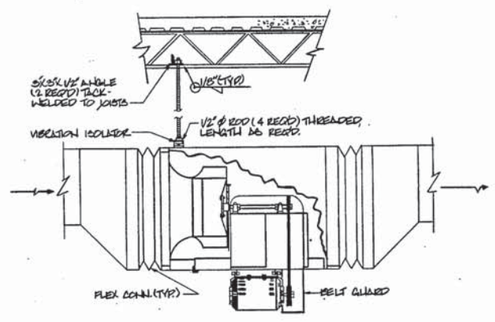
VERTICAL FIRE DAMPER DETAIL

NO SCALE



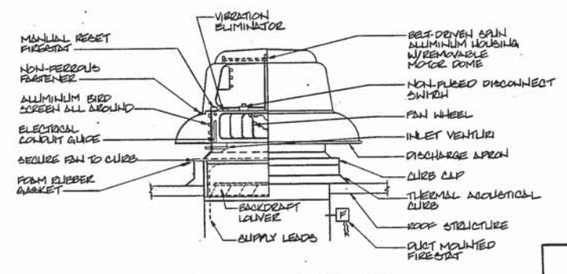
SIDEWALL EXHAUST FAN DETAIL

NO SCALE



IN-LINE FAN DETAIL

NO SCALE



POWER ROOF VENTILATOR MOUNTING DETAIL

NO SCALE

GRAPHIC SCALES

1/8" = 1'-0" 10' 5' 0' 15' 20'

VANSANT & GUSLER, INC. CONSULTING ENGINEERS Norfolk, Virginia

COMMONWEALTH OF VIRGINIA — DENNIS L. GUSLER No. 1921 — PROFESSIONAL ENGINEER

HENDERSON ASSOCIATES, ARCHITECTS a professional corporation NORFOLK, VIRGINIA

DES. HRK DR. WSH CHK. KWP
PROJ. MGR. WCM CH. ENGR. KWP
SUBMITTED BY: DATE: 10-21-82
BIDS RECEIVED: PARTICIPATE:
EFD: RVD.
NO. DR.
APPROVED: DATE:
SUPERVISOR IN CHARGE
APPROVED: DATE:
FOR EFD FOR COMMANDER NAVFAC

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION — NORFOLK, VIRGINIA

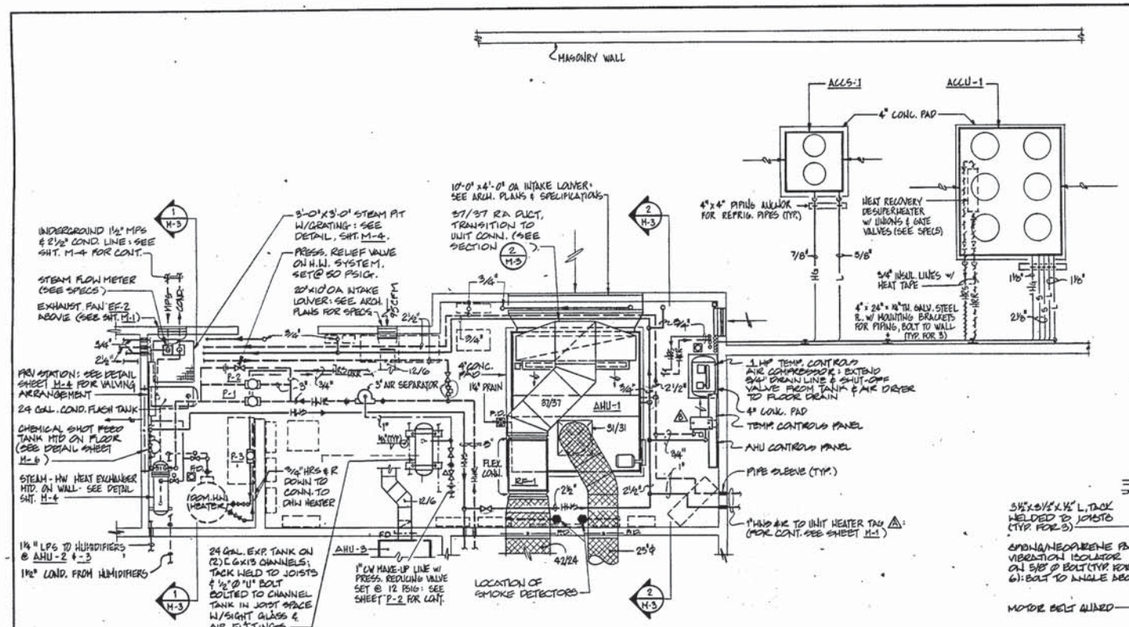
NAVAL AIR STATION, NORFOLK VIRGINIA
APPLIED INSTRUCTION BUILDING

SECOND FLOOR PLAN & DETAILS

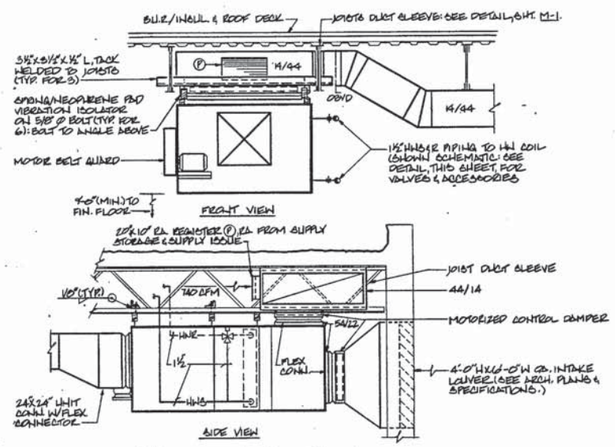
SIZE	CODE IDENT. NO.	NAVFAC DRAWING NO.
F	80091	4088840
SCALE GEMINIC	SPEC. 05-81-1412	CONSTR. CONTR. NO. N62470-81-B-1412
		SHEET 24 OF 50
		EFD DWG. NO. 1888840

M-2

REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVED

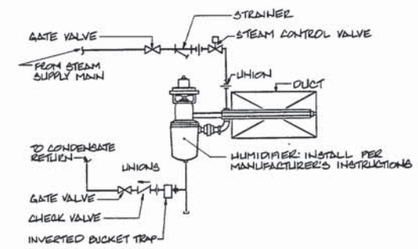


MECHANICAL EQUIPMENT ROOM
SCALE: 1/4" = 1'-0"

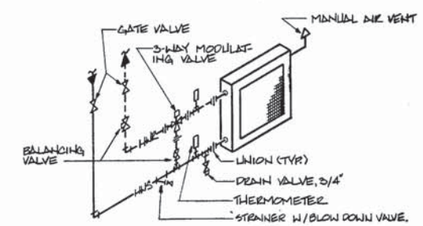


AHU #2 ELEVATION DETAILS
NO SCALE

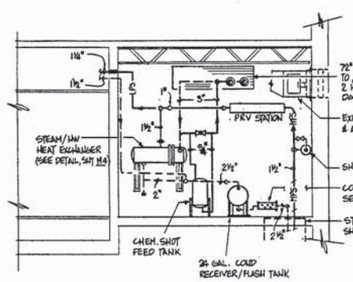
NOTE: REFRIGERANT PIPING NOT SHOWN; SEE 1/8" SCALE FLOOR PLAN (SHT. M-1.) & REFRIGERANT PIPING DIAGRAM (THIS SHEET).



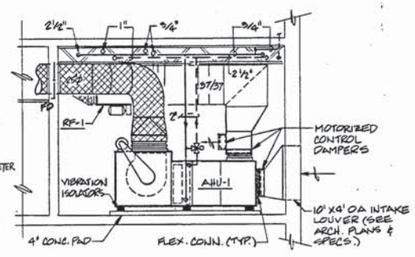
HUMIDIFIER DETAIL
NO SCALE



HOT WATER COIL PIPING DETAIL
NO SCALE



1/H-3 SECTION
SCALE: 1/4" = 1'-0"



2/H-3 SECTION
SCALE: 1/4" = 1'-0"

GRAPHIC SCALES
1/4" = 1'-0" 12" 0 1' 2' 3' 4' 5' 10'

VANSANT & GUSLER, INC.
CONSULTING ENGINEERS
Norfolk, Virginia

COMMONWEALTH OF VIRGINIA
JOHN L. GUSLER
No. 1921
PROFESSIONAL ENGINEER

HENDERSON ASSOCIATES, ARCHITECTS & PROFESSIONAL ENGINEERS
NORFOLK, VIRGINIA

DES. HRK | DR. JM | CHK. KWP
PROJ. MGR. WGM | CH. ENGR. KWP
SUBMITTED BY: 12-5-82
FIRM MEMBER | PRINCIPAL
EFD RVD.
HD. DIR.
APPROVED | DATE
OFFICER IN CHARGE
APPROVED | DATE
FOR EFD FOR COMMANDER NAVFAC

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION — NORFOLK, VIRGINIA

NAVAL AIR STATION, NORFOLK VIRGINIA
APPLIED INSTRUCTION BUILDING
PLAN, SECTION, DETAILS & DIAGRAMS

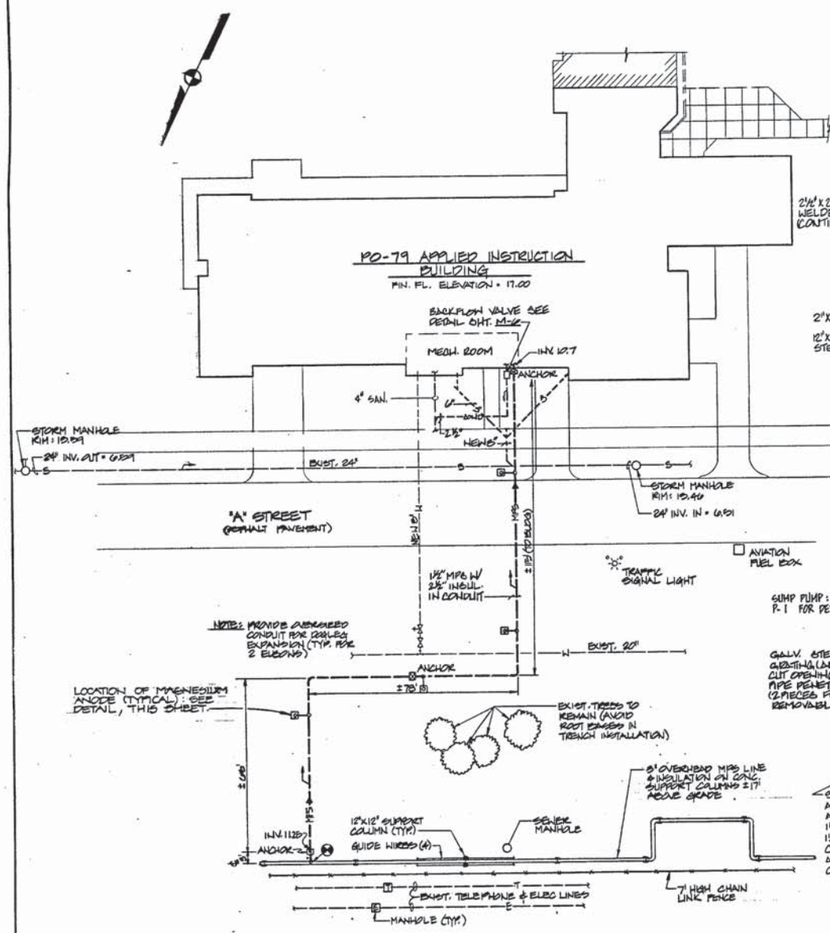
SIZE	CODE IDENT NO.	NAVFAC DRAWING NO.
F	80091	4088641

CONSTR. CONTR. NO. N62470-81-B-1412
SCALE GRAPHIC | SPEC. CB-81-1421 | SHEET 25 OF 38

EFD DWG. NO. 188841

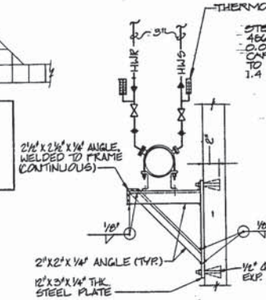
M-3

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED

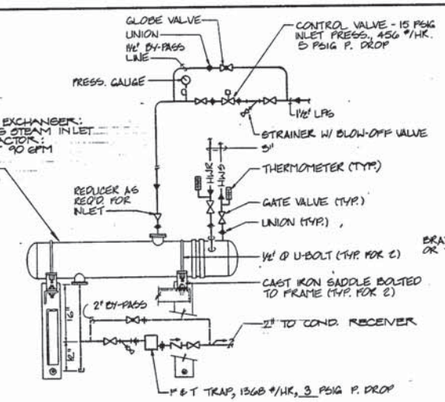


MECHANICAL SITE PLAN

SCALE: 1" = 20'-0"



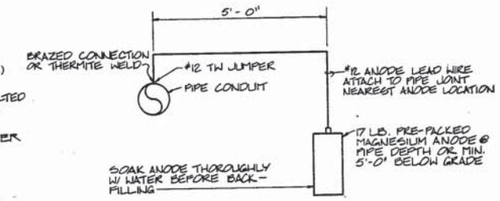
FRONT VIEW



SIDE VIEW

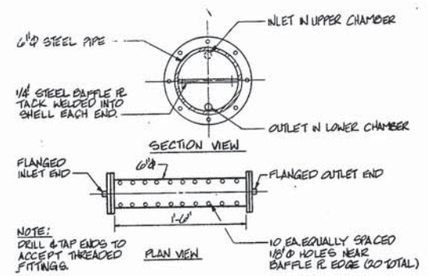
STEAM - HOT WATER CONVERTER DETAIL

NO SCALE



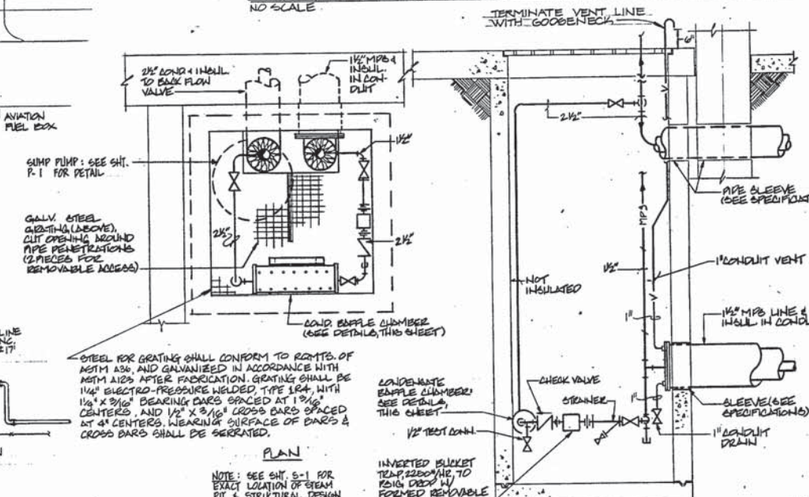
CATHODIC PROTECTION DETAIL

NO SCALE



CONDENSATE EXP. BAFFLE CHAMBER DETAIL

NO SCALE

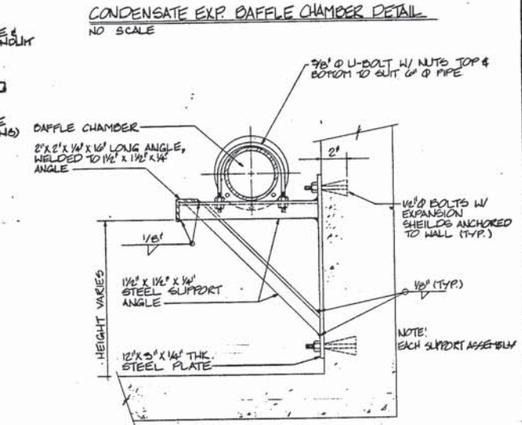


PLAN

NOTE: SEE SHT. S-1 FOR EXACT LOCATION OF STEAM PIT & STRUCTURAL DESIGN

STEAM PIT DETAIL

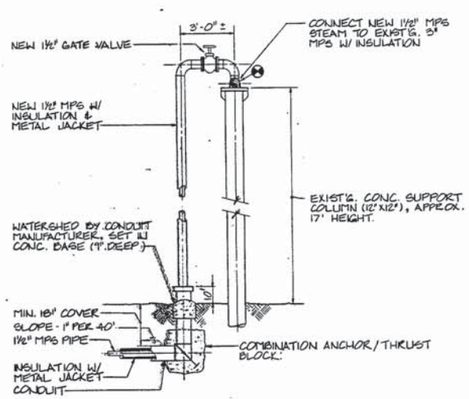
SCALE: 1" = 1'-0"



BAFFLE CHAMBER SUPPORT DETAIL

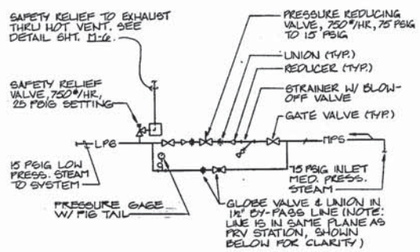
NO SCALE

NOTE EACH SUPPORT ASSEMBLY IS REQ'D @ BOTH ENDS OF BAFFLE CHAMBER, APPROX. ½" FROM FACE OF FLANGE TO BEGINING OF SUPPORTS @ EACH END.



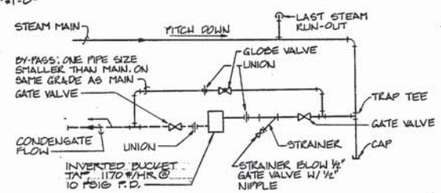
SECTION @ NEW STEAM CONNECTION

NO SCALE



PRESSURE REDUCING STATION DETAIL

NO SCALE



LOW OR MEDIUM PRESSURE END OF MAIN DRIP DETAIL

NO SCALE

GRAPHIC SCALES

1" = 1'-0" : 12" 9" 6" 3" 0 1' 2' 3'

1" = 20'-0" : 10' 5' 0 10' 20' 30' 40' 50' 60'

VANSANT & GUSLER, INC. CONSULTING ENGINEERS Norfolk, Virginia

COMMONWEALTH OF VIRGINIA — RICHARD J. GUSLER No. 1921 — PROFESSIONAL ENGINEER

HENDERSON ASSOCIATES, ARCHITECTS & ENGINEERS NORFOLK, VIRGINIA

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION — NORFOLK, VIRGINIA

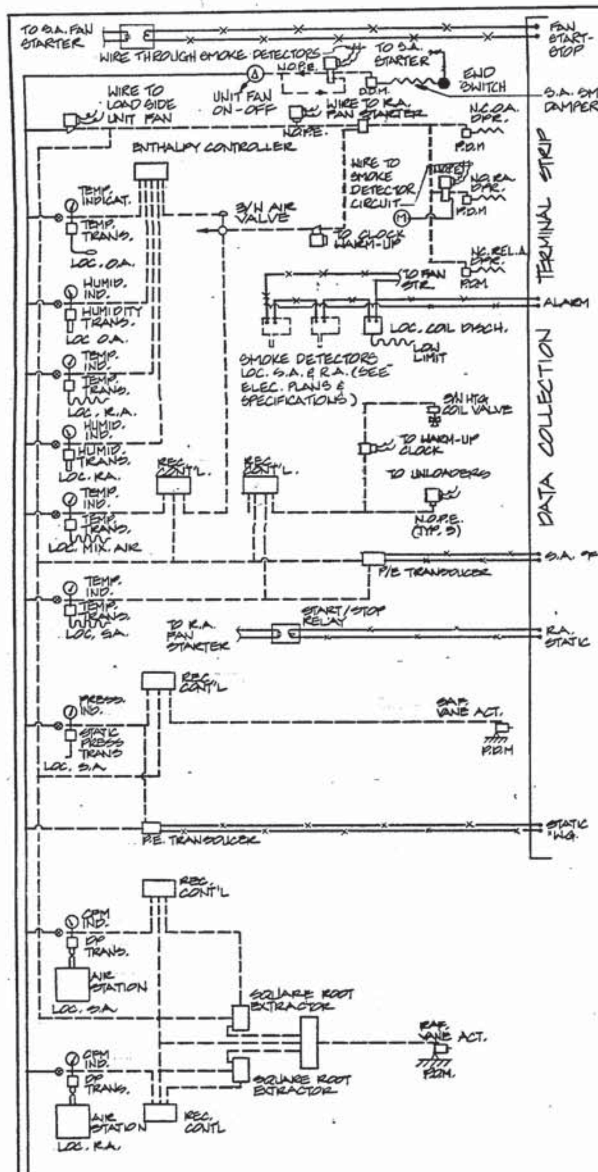
DES. MRK | DR. JB/MSI | CHK. KWP
PROJ. MGR. WGM | CH. ENGR. KWP
SUBMITTED BY: DATE: 11-1-82
PROJ. MGR. — PRINCIPAL
EFD — EVD. — HVC
MD — DR. — CTR
APPROVED — DATE
OFFICER IN CHARGE
APPROVED — DATE
FOR EFD FOR COMMANDER NAVFAC

NAVAL AIR STATION, NORFOLK VIRGINIA
APPLIED INSTRUCTION BUILDING
UNDERGROUND STEAM SERVICE TRENCH & DETAILS

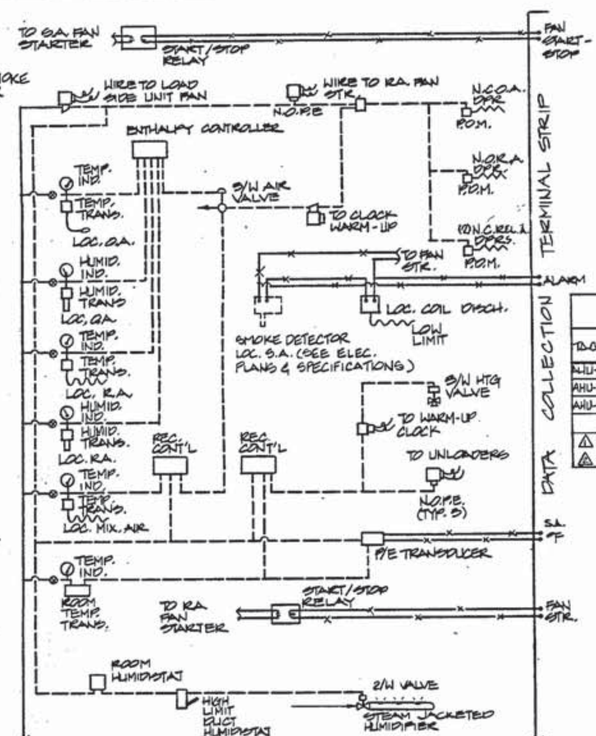
SIZE	CODE IDENT NO.	NAVFAC DRAWING NO.
F	80091	4088042
		CONSTR. CONTR. NO. H62470-81-B-1412
SCALE GRAPHIC	SPEC. 03-81-1412	SHEET 26 OF 30

EFD DWG. NO. 188042

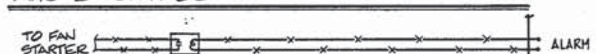
M-4



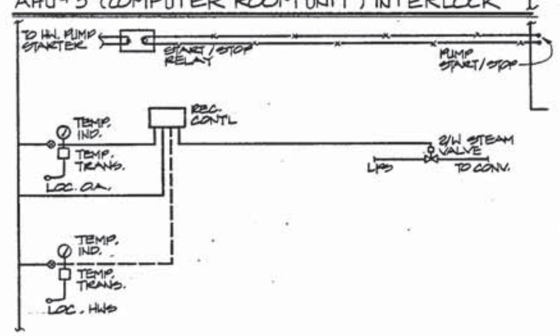
A.H.U. #1 CONTROL



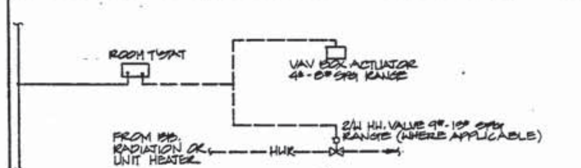
AHU#2 CONTROL



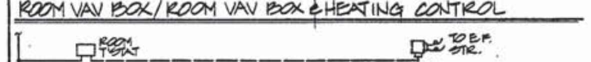
AHU#3 (COMPUTER ROOM UNIT) INTERLOCK



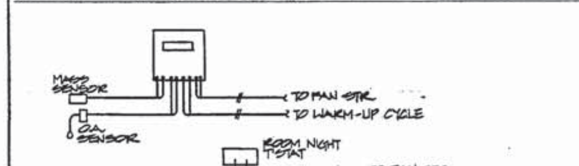
STEAM/H.W. CONVERTER CONTROL



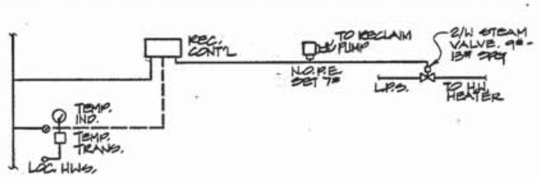
ROOM VAV BOX/ROOM VAV BOX & HEATING CONTROL



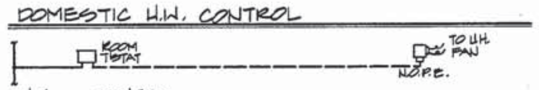
EF-2,-3 & -4 CONTROL



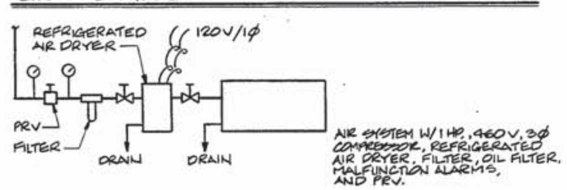
NIGHT SET-BACK CONTROL



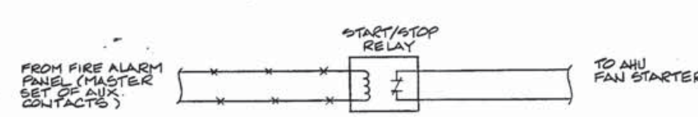
DOMESTIC H.W. CONTROL



U.H.- CONTROL



AIR SYSTEM CONTROL



AHU SHUT-DOWN ON ACTIVATION OF FIRE ALARM PANEL

[AHU-1,-2 & -3]

CONTROL DIAGRAMS

NO SCALE

CONDENSING UNIT SCHEDULE

TAG	SERVICE	TYPE	HT. REJECTION CAPACITY	EAT(°F)	ELECTRICAL	REMARKS
ACCU-1	MAIN BLDG.	AIR COOLED	TO MATCH EVAP. CAP	91°F	460V/3Ø	W/DESUPERHEATER
ACCU-2	FLT. TRAINER	AIRCOOLED	↓	91°F	460V/3Ø	

NOTE: MFR. OF CU & AHU TO BE THE SAME; MFR. TO PROVIDE INTERLOCK W/VAV CONTROL.

CONDENSER SECTION SCHEDULE

TAG	SERVICE	TYPE	HT. REJECTION CAP.	EAT (°F)	ELECTRICAL	REMARKS
ACCS-1	COMP. RM. UNIT	AIR COOLED	TO MATCH EVAP. CAP.	91°F	208V/3Ø	

NOTE: MFR. OF COND. SECTION & COMP. RM. UNIT TO BE THE SAME

AIR HANDLING UNIT SCHEDULE

TAG	SERVICE	TYPE	SUPPLY FAN CFM	MIN OA	TYPE/DIA	ESP("WG)	HP	RPM	ELECTRICAL	STARTER
AHU-1	MAIN BLDG.	VAV-DX	12,100	2330	FC/25"	2.8"	15	815	460V/3Ø	2
AHU-2	FLT. TRAINER	CV-DX	5900	450	FC/18.25"	1.0"	3	665	↓	0
AHU-3	COMP. RM.	COMP. RM. UNIT	2500	96	CENT/10"	0.50"	1½	1200	↓	00

TAG	COOLING COIL CAP.(MBH)	MAX FV(FPM)	EAT	LAT	CAP.(MBH)	APD("WG)	HEATING COIL CAP.(MBH)	EAT	GPM	LAT	WPD	APD("WG)	FILTER SECTION TYPE	EFF(%)	No & SIZE	REMARKS
AHU-1	342.65	550	81.1	55	485.0	0.52	196.9	55	42	70.6	2.5	.12	TA			W/INLET VANES, FAN
AHU-2	153.64	556	79.0	55	222.0	0.45	81.6	61.7	17.9	70.0	.4'	.12	TA			⚠1
AHU-3	60.90	550*	72°F	50	68.0	—	50.0	72°F	—	90°F	—	—	TA	60%	1-1", 1-2"	⚠2

⚠1 AHU #2 SIZED ON FUTURE: BALANCE PRESENT LOAD FOR CFM = 4220, 0.80" ESP, RPM = 580

⚠2 PROVIDE W/INTEGRAL HOT GAS REHEAT SYSTEM & STEAM HUMIDIFIER: UNIT HANDLES BOTH EQUIPMENT & ROOM LOADS.

VAV BOX SCHEDULE

TAG	CFM RANGE	MAX APD("WG)	INLET SIZE	REMARKS
Ⓐ	0-400	.39	6"Ø	
Ⓑ	400-600	.37	8"Ø	
Ⓒ	600-1080	.49	10"Ø	
Ⓓ	1080-2220	.46	10"X18"	

FAN SCHEDULE

TAG	SERVICE	TYPE	CFM	SP("WG)	HP	RPM	ELECTRICAL	STARTER	REMARKS
RF-1	RETURN AIR	IN-LINE	9645	1.0	5	560	460V/3Ø	0	
EF-1	EXHAUST	CENTRIF. ROOF	2120	.50	1/3	785	120V/1Ø	00	
EF-2	EXHAUST	SIDEWALL PROP	990	.25	1/4	660	120V/1Ø	00	
EF-3	EXHAUST	↓	3640	.25	1/2	815	460V/3Ø	00	
EF-4	EXHAUST	IN-LINE	550	.22	1/4	860	120V/1Ø	00	

GRILLES, REGISTERS, DIFFUSERS SCHEDULE

TAG	SERVICE	TYPE	CFM	SP. DROP("WG)	NECK SIZE	FACE AREA	REMARKS
Ⓐ	SA	CEILING	AS NOTED ON PLANS	.04	6"X6"	12"X12"	
Ⓑ	SA			.13	9"X9"	24"X24"	
Ⓒ	SA			.07	12"X12"		
Ⓓ	SA			.06	15"X15"		
Ⓔ	SA			.05	12"X12"		3-WAY
Ⓕ	SA	↓		.04	12"X12"	↓	1-WAY
Ⓖ	SA	SIDEWALL		.08	10"X6"		45° BLADE DEFL.
Ⓗ	SA	↓		.07	12"X6"		45° BLADE DEFL.
Ⓙ	RA/EXHAUST	CEILING		.10	6"X6"	12"X12"	
Ⓚ	RA/EXHAUST			.09	8"X8"	24"X24"	
Ⓛ	RA/EXHAUST			.11	10"X10"		
Ⓜ	RA/EXHAUST	↓		.09	12"X12"		
Ⓝ	RA/EXHAUST	SIDEWALL		.10	14"X14"	↓	
Ⓟ	RA/EXHAUST			.22	20"X10"		
Ⓢ	SA			.175	24"X8"		45° BLADE DEFL.
Ⓣ	RA	↓	↓	.05	72"X18"		MULTIPLE SECTIONS

UNIT HEATERS SCHEDULE

TAG	TYPE	CAP.(BTUH)	EWT/LWT	GPM	WPD(FT)	CFM	HP	RPM	ELECTRICAL	REMARKS
⚠A	HORIZ. DISCH.	21,300	180°F/170°F	5.4	.75	514	1/20	1550	120V/1Ø	
⚠B	↓	5,740		1.5	.03	280	1/25	1050		
⚠C	VERT. DISCH.	19,500	↓	4.9	.26	595	1/25	1550	↓	

BASEBOARD RADIATION SCHEDULE

TAG	CAPACITY (BTUH)	GPM	AVG. WATER TEMP.(°F)	HEATING ELEMENT ACTIVE LGH		No ROWS	FIN SIZE	CASING SIZE (DXH)	REMARKS
A	1220	AS	175°F	2'		1	2¾"X2¾"	4"X10"	
B	1830	NOTED		3'					
C	2440	ON		4'					
D	3050	PLANS		5'					
E	3660			6'					
F	4270			7					
G	6710	↓	↓	11'		↓	↓	↓	

PUMP SCHEDULE

TAG	SERVICE	TYPE	GPM	HEAD(FT)	HP	RPM	ELECT	STARTER	REMARKS
P-1	HWS PRIMARY	IN-LINE	90	19.0	3/4	1750	460V/3Ø	00	
P-2	HWS STBY	"	90	19.0	3/4	1750	460V/3Ø	00	
P-3	DESUPERHTR CIRC.	"	2.8	7.0	1/12	1750	120V/1Ø	00	

HUMIDIFIER SCHEDULE

TAG	SERVICE	TYPE	CAP.(#/HR)	INLET PRESS.	TRAP CAP.(#/HR)	P.D.(PSIG)	TYPE	REMARKS
H-1	AHU-2	INJECT. MANIFOLD	160	15	480	5	INVERTED BUCKET	
H-2	↓	↓	15	15	45	5		
H-3*	AHU-3	—	15	15	45	10	↓	

* PROVIDED BY UNIT MFR. (LISTED FOR CAPACITY.)

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED

M-5

VANSANT & GUSLER, INC.
CONSULTING ENGINEERS
Norfolk, Virginia

COMMONWEALTH OF VIRGINIA — DENNIS L. GUSLER — No. 1921 — PROFESSIONAL ENGINEER

HENDERSON ASSOCIATES, ARCHITECTS
a professional corporation
NORFOLK, VIRGINIA

DES. NRK | DR. JB/JH | CHK. KWP
PROJ. MGR. KJCM | CH. ENGR. KWP
SUBMITTED BY: [signature] DATE 10-22-82
FIRM MEMBER | PRINCIPAL
EFD [signature] | RVD HYWC
HD [signature] | DIR [signature]
APPROVED | DATE
OFFICER IN CHARGE
APPROVED [signature] DATE 1983
FOR EFD FOR COMMANDER NAVFAC

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NORFOLK, VIRGINIA
NAVAL STATION
NAVAL AIR STATION, NORFOLK VIRGINIA
APPLIED INSTRUCTION BUILDING

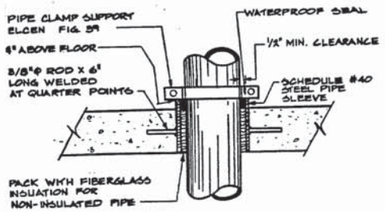
SCHEDULES & CONTROL DIAGRAMS

SIZE	CODE IDENT NO.	NAVFAC DRAWING NO.
F	80091	4088843
		CONSTR. CONTR. NO. N62470-81-B-1412

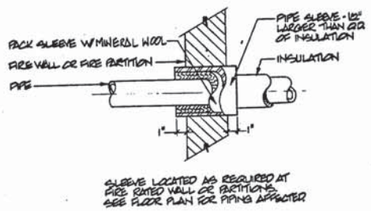
SCALE NONE | SPEC. 05-81-1412 | SHEET 27 OF 38

EFD DWG. NO. 188843

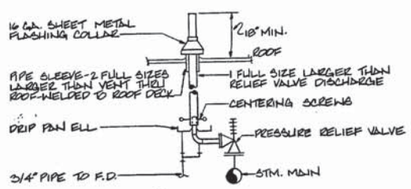
REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVED



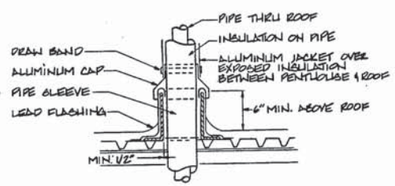
PIPE SLEEVE DETAIL
NOT TO SCALE



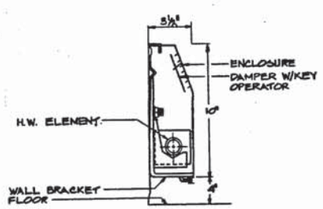
TYPICAL FIRE STOP SLEEVE DETAIL
NOT TO SCALE



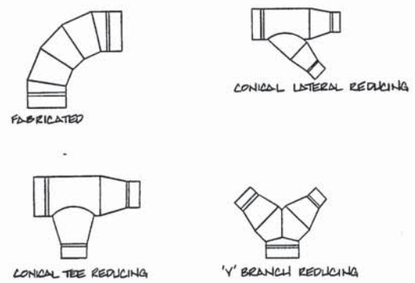
PRV & HOT VENT DETAIL
NOT TO SCALE



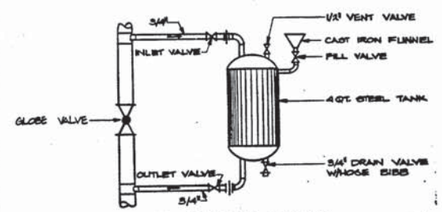
PIPE ROOF ENTRY DETAIL (TYP)
NOT TO SCALE



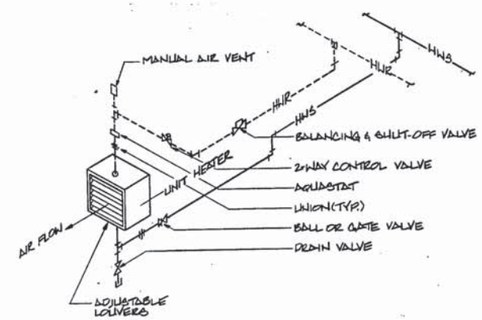
TYPICAL RADIATION MOUNTING DETAIL
NO SCALE



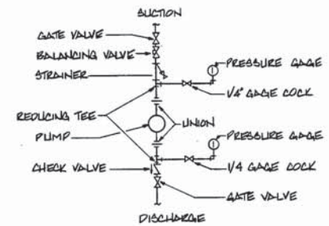
HIGH PRESSURE DUCT FITTING DETAIL
NOT TO SCALE



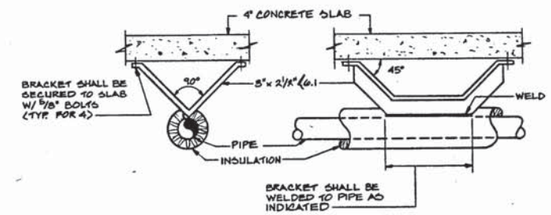
SHOT FEEDER DETAIL
NOT TO SCALE



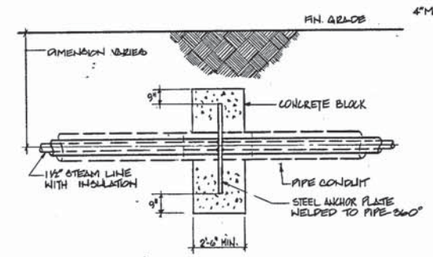
UNIT HEATER PIPING DETAIL
NOT TO SCALE



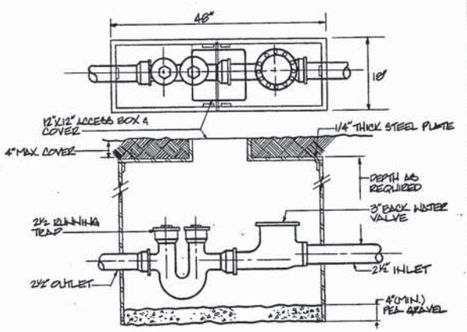
IN-LINE CIRCULATING PUMP DETAIL
NOT TO SCALE



PIPE ANCHOR SUPPORT DETAIL
NO SCALE



ANCHOR DETAIL - UNDERGROUND STEAM
NO SCALE



BACKWATER VALVE & RUNNING TRAP DETAIL
NO SCALE

M-6

VANSANT & GUSLER, INC.
CONSULTING ENGINEERS
Norfolk, Virginia

HENDERSON ASSOCIATES, ARCHITECTS
a professional corporation
NORFOLK, VIRGINIA

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION — NORFOLK, VIRGINIA

DES. HRK | DR. JM | CHK. KWP
PROJ. MGR. WRM | CH. ENGR. KWP
SUBMITTED BY: DATE 10-24-62
PLAN NUMBER — PRINCIPAL
EFD. RVD. HW
NO. DIR.
APPROVED — DATE
OFFICER IN CHARGE
APPROVED DATE 9-21-1962
FOR EFD FOR COMMANDER NAVFAC

COMMONWEALTH OF VIRGINIA — HENRY L. GUSLER — No. 1721 — PROFESSIONAL ENGINEER

NAVAL AIR STATION, NORFOLK VIRGINIA
APPLIED INSTRUCTION BUILDING

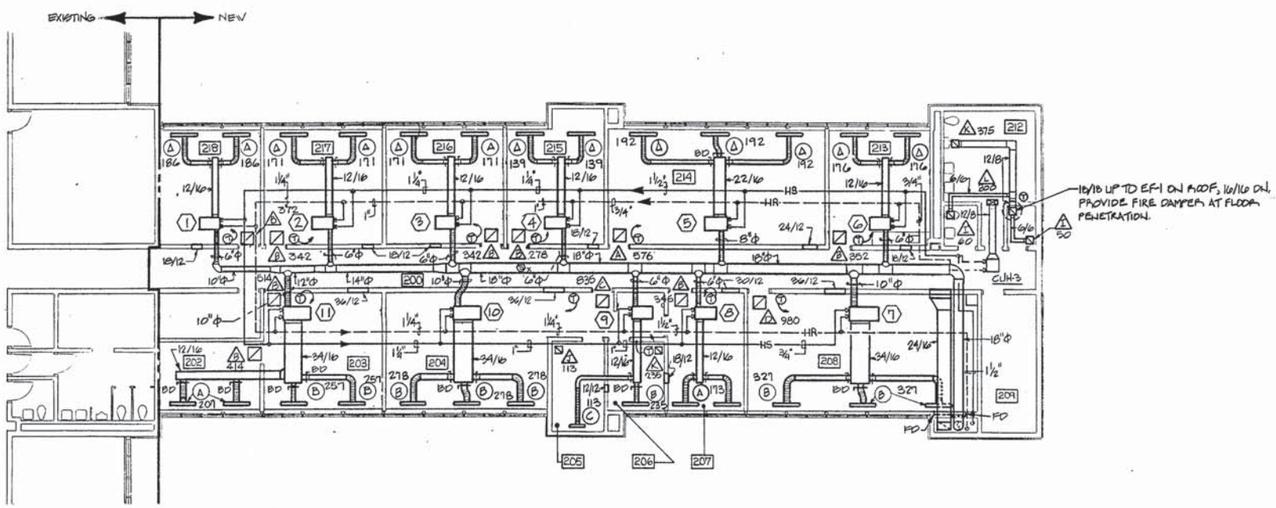
DETAILS

SIZE	CODE IDENT NO.	NAVFAC DRAWING NO.
F	80091	4088844
		CONSTR. CONTR. NO. N62470-81-B-1412
SCALE NONE	SPEC. 68-81-1412	SHEET 28 OF 38

EFD DWG. NO. 1888844

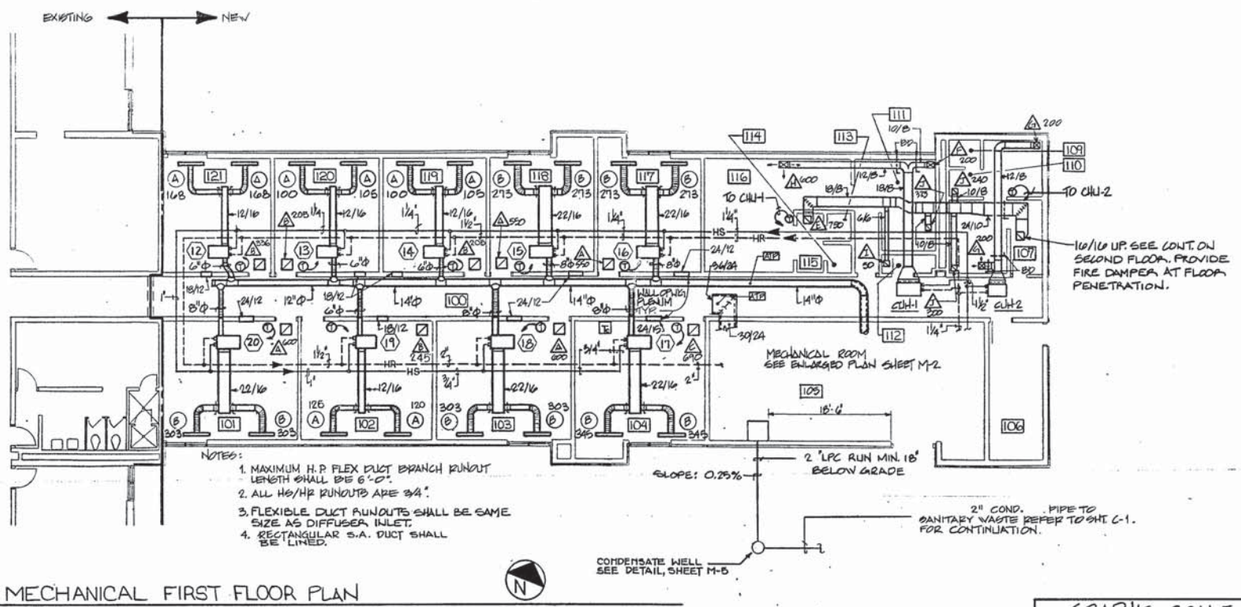
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED

DESIGN CONDITIONS					
INDOOR DESIGN			OUTDOOR DESIGN		
SUMMER °F		WINTER °F DB	SUMMER °F		WINTER °F DB
DB	WB		DB	WB	
78°	65°	68°	91°	76°	22°



MECHANICAL SECOND FLOOR PLAN

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



NOTES:

1. MAXIMUM H.P. FLEX DUCT BRANCH RUNOUT LENGTH SHALL BE 6'-0".
2. ALL HG/HR RUNOUTS ARE 3/4".
3. FLEXIBLE DUCT RUNOUTS SHALL BE SAME SIZE AS DIFFUSER INLET.
4. RECTANGULAR S.A. DUCT SHALL BE LINED.

MECHANICAL FIRST FLOOR PLAN

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

GRAPHIC SCALE

1/8"=1'-0" 0 8" 16" 24"

HENDERSON ASSOCIATES, ARCHITECTS a professional corporation NORFOLK, VIRGINIA

DEL. PLG DR. DKH CHK. KWP

PROJ. MGR. CH. ENGR.

SUBMITTED PRINCIPAL

MECH MEMBER PRINCIPAL

SPD TYPIC. EVP DNA

NO. EVP

APPROVED DATE

OFFICER IN CHARGE

APPROVED DATE

FOR SPD FOR COMMANDER NAVFAC

COMMONWEALTH OF VIRGINIA PROFESSIONAL ENGINEER

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND

ATLANTIC DIVISION

NAVAL STATION NAVAL AIR STATION NORFOLK, VIRGINIA

ADDITIONS TO BUILDING SP-381

(H-53 TRAINING FACILITY)

MECHANICAL FLOOR PLANS

SIZE	CODE IDENT NO.	NAVFAC DRAWING NO.
F	80091	4133216

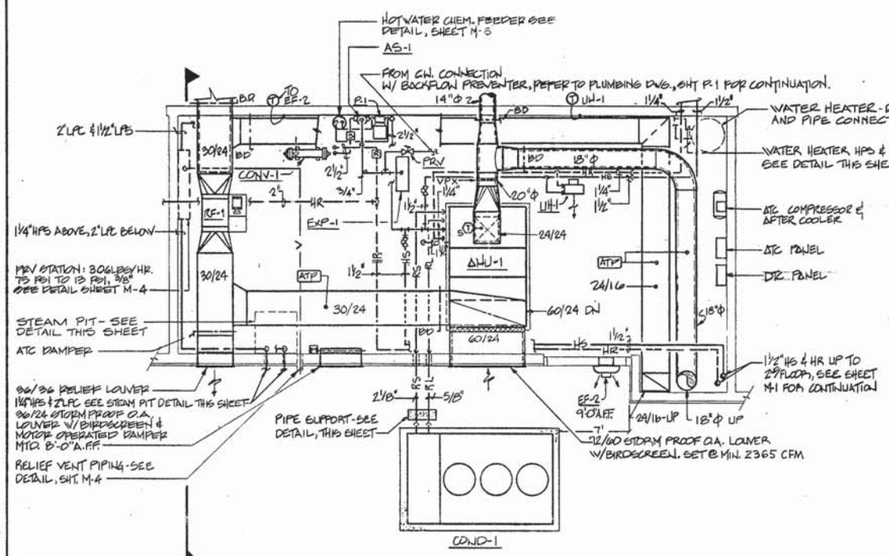
CONSTR. CONTR. NO. N62470-84-B-4064

SCALE GRAPHIC SPEC. 05-84-4064 SHEET 17 OF 46

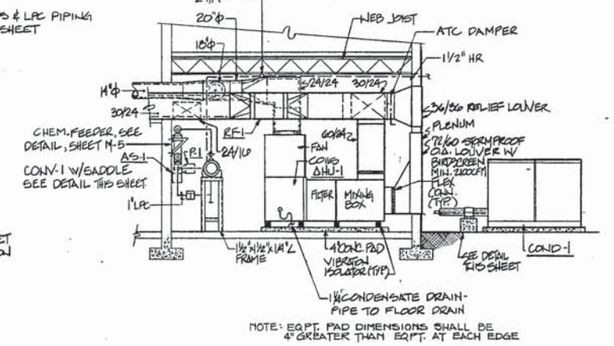
SPD DWG. NO. 233216

M-1

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED

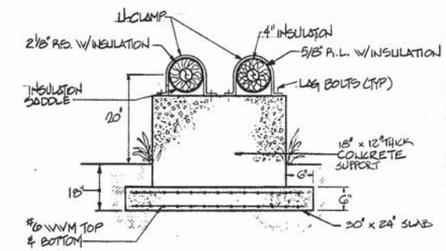


MECHANICAL ROOM PLAN
SCALE: 1/4" = 1'-0"

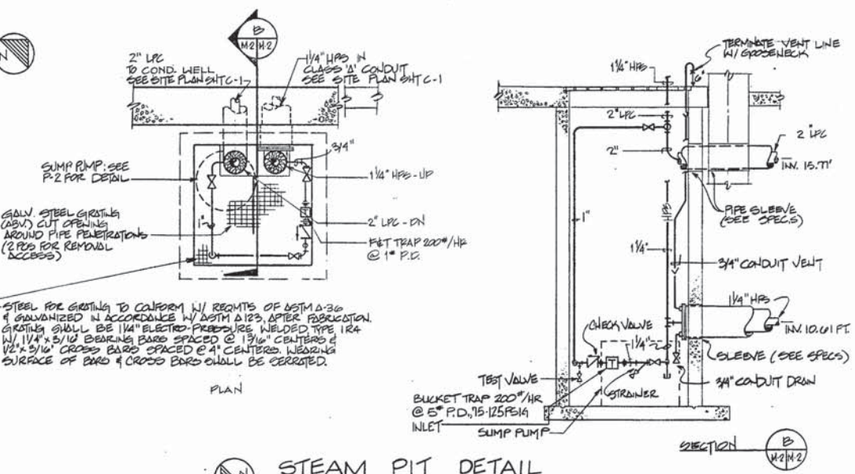


NOTE: EQPT. PAD DIMENSIONS SHALL BE 4" GREATER THAN EQPT. AT EACH EDGE

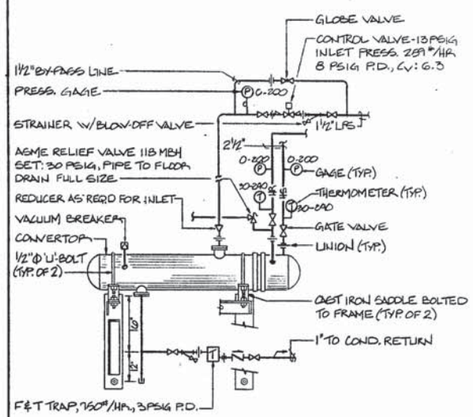
SECTION
SCALE 1/4" = 1'-0"



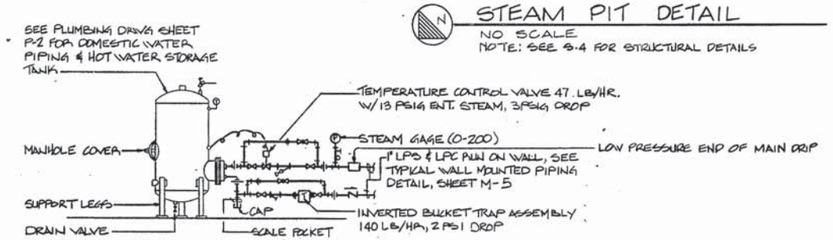
PIPE SUPPORT DETAIL
NO SCALE



STEAM PIT DETAIL
NO SCALE
NOTE: SEE S-4 FOR STRUCTURAL DETAILS



CONVERTOR DETAIL
NO SCALE



VERTICAL HOT WATER STORAGE TANK PIPING CONNECTION DETAIL
NO SCALE

GRAPHIC SCALE
1/4"=1'-0" 2' 1' 3' 1d

M-2

HENDERSON ASSOCIATES, ARCHITECTS
NORFOLK, VIRGINIA

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION — NORFOLK, VIRGINIA
NAVAL AIR STATION — NORFOLK, VIRGINIA

DES. PLG — DR. CL — CHK. KWP
PROJ. MGR. M.H. — CH. ENGR.
SUBMITTED/REC. — PRINCIPAL
PROJ. MANAGER
BYD 77/78 — WYD. 1250
NO. 1162 — DW 1162
APPROVED — DATE
OFFICER IN CHARGE
APPROVED — DATE
FOR BYD FOR COMMANDER NAVFAC

ADDITIONS TO BUILDING SP-381
(H-53 TRAINING FACILITY)
MECHANICAL ROOM PLAN & DETAILS

SIZE	CODE IDENT NO.	NAVFAC DRAWING NO.
F	80091	4133217
		CONSTR. CONTR. NO. N62470-84-B-4064
SCALE NONE	SPEC. 05-84-4064	SHEET 18 OF 46

BYD DWG. NO. 233217

AIR HANDLING UNIT SCHEDULE

MARK	TYPE	CFM TOTAL	CFM MIN.OA	EXT. S.P.	RPM	MAX. H.P.	VOLTS/PH	DX COOLING COIL EDB	EWB	LDB	LWB	REF	GEN.CAP MBH	TOTAL CAP MBH	A PD	PREHEAT COIL EDB	LDB	MBH	EWT	GPM	A PD	WPD	VALVE Cv	REMARKS	NEMA STARTER SIZE
AHU-1	DRAW THRU	6880	2365	2.4	1730	10	208/3	84.2	69.3	55.0	54.1	22	217.0	336.2	0.44	52.3	70.4	126.4	180	10	0.2	0.1	4.5	W/INLET & OAVANE, V-FILTER & MIX. BOX	2

LINEAR DIFFUSER SCHEDULE

MARK	LENGTH	INLET SIZE	NO. SLOTS	PATTERN	MAX. Δ S.P.	MAX. CFM
(A)	4'	8"	2	1-WAY	.10"	190
(B)	4'	10"	3	1-WAY		360
(C)	2'-6"	8"	1	1-WAY		115

AIR COOLED CONDENSING UNIT SCHEDULE

MARK	UNITS SERVED	COMPRESSOR MBH	NO.	KW	VOLTS	Ø	EST	CAP 90	REF	CONDENSER COIL	EAT	CFM	FANS	DRIVE	HP	VOLTS	Ø	MAX. KW	REMARKS	NEMA STARTER SIZE
COND-1	AHU-1	326	1	32.6	208	3	40°F	326/90	R-22	46	95°F	19,000	3	DIRECT	1	208	3	36.6	HOT GAS BY-PASS	5

REVISIONS

SYM.	DESCRIPTION	DATE	APPROVED

DIFFUSER / REGISTER / SCHEDULE

MARK	SIZE	TYPE	PATTERN	SERVICE	FINISH	MAX. Δ S.P.	MAX CFM
A	18/18	REG	—	R.A.	WHITE	.07	600
A	18/12	REG	—	R.A.		.07	550
A	24/18	REG	—	R.A.		.07	835
A	24/24	REG	—	R.A.		.07	1000
A	18/12	REG	—	EXH.		.07	750
A	9/9	DIFF	2-WAY	S.A.		.14	200
A	9/9	DIFF	3-WAY	S.A.		.14	200
A	15/12	DIFF	3-WAY	S.A.		.10	600
A	6/6	REG	—	EXH.		.07	60
A	10/10	REG	—	EXH/R.A.		.07	325
A	12/12	REG	—	EXH/R.A.		.07	375
A	12/9	DIFF	3-WAY	S.A.	WHITE	.07	500

FAN SCHEDULE

MARK	CFM	S.P. (IN WG)	RPM	TIP SPEED (FPM)	TYPE	DRIVE	HP MAX	VOLTS/PH	REMARKS	NEMA STARTER SIZE
RF-1	6800	.375	1025	7233	AXIAL	BELT	1.5	208/3	W/INLET VANES	00
EF-1	2150	.25	940	4100	ROOF	BELT	.25	120/1	W/ROOF CURB AND B.D.D	—
EF-2	1570	.125	1160	4360	WALL	DIR.	1/6	120/1	W/B.D.D. CONTROL W/T'STAT.	—

NOTE: 20A. MANUAL THERMAL SWITCH FOR EF-1 & EF-2

PUMP SCHEDULE

MARK	TYPE	COUPLING	GPM	HEAD	IMPELLER	RPM	HP	VOLTS	PHASE	NEMA STARTER SIZE
P-1	IN-LINE	CLOSE	360	39'	6 1/2"	1750	1	208	3	00

CONVERTOR SCHEDULE

MARK	MBH	GPM	EWT °F	LWT °F	PD IN WG	ENT. STM. PRESS. (PSI)	LBS/HR	FOULING FACTOR
CONV-1	243	360	160	180	1.0	5	258	0.0005

UNIT HEATER SCHEDULE

MARK	CFM	HP	VOLTS/PH	MBH	EDB	GPM	P.D	E.S.P.	MOUNTING
CUH-1	800	1/7	120/1	22.2	60	1	.15	0.15	CAB., HOR. CONCEALED
CUH-2	400	1/12	120/1	15.6	60	1	.13	0.10	
CUH-3	300	1/12	120/1	10.1	60	.5	.03	0.1	
UH-1	400	1/20	120/1	12.4	60	.7	.14	0.0	HORIZONTAL

NOTE
1. FAN MOTORS 20A. MANUAL THERMAL SWITCH.
2. PROVIDE PSC MOTORS FOR CUH.
3. CAPACITY BASED ON 180° EWT.

SPECIALTY SCHEDULE

MARK	DESCRIPTION
AS-1	CENTRIFUGAL AIR SEPARATOR, 2½" FLANGED CONNECTION; W/STRAINER
EXP-1	EXPANSION TANK; COMPRESSION TYPE, 15 GAL. W/SITE GLASS, AIR CHARGER, AND DRAIN VALVE
PRV-1	COMBINATION PRESSURE REDUCING/RELIEF VALVE STATION, ¾". FILL VALVE SET: 12 PSIG; RELIEF VALVE SET: 30 PSIG. WITH FAST FILL FEATURE.

VIBRATION ISOLATOR EQUIPMENT SCHEDULE

MACHINERY	TYPE	DEFLECTION	DESCRIPTION
AIR HANDLER (AHU-1)	S-A	1.0"	SPRING, RAIL
RETURN AIR FAN (RF-1)	H	1.75"	SPRING ISOLATION HANGER

FAN POWERED VAV BOX SCHEDULE

MARK	ROOM SERVED	PRIMARY AIR MAX.	PRIMARY AIR MIN.	FAN CFM ±10% CAP	FAN CFM ±10% START/STOP*	HEATING COIL (ENT. WATER @ 180°F) CAP. MBH	CFM.	E.A.T.	L.A.T	GPM	MAX. H_2O P.D.	VALVE Cv
(1)	218	372	45	110	155/190	5.5	155	64.2°	100°	1.0	1.0	.44
(2)	217	342		135	180/210	6.8	180	64.8°				
(3)	216											
(4)	215	277		105	150/170	5.8	150	64.1°				
(5)	214	577	50	280	330/385	12.1	330	66.0°		2.0		.89
(6)	213	352	45	110	155/185	5.9	185	64.2°		1.0		.44
(7)	208	981	50	310	360/455	13.1	360	66.2°		2.0		.89
(8)	207	345	20	100	120/150	4.4	120	63.8°		1.0		.44
(9)	205,206	348		95	115/140	4.2	115	63.9°				
(10)	204	834	40	250	290/370	10.6	290	66.2°				
(11)	203,202	928	45	230	275/365	10.1	275	65.9°				
(12)	121	336	180	165	—	6.3	165	60.0°	95.0			
(13)	120	192	100	60	160/175	6.2	160	63.0°	98.7			
(14)	119		100	60				63.0°	98.7			
(15)	118	547	200	160	—			60.0°	95.7			
(16)	117		200	160	—			60.0°	95.7			
(17)	104	689	385	215	—	8.7	215	60.0°	97.3			
(18)	103	606	300	215	—	8.1		60.0°	94.7			
(19)	102	245	150	65	215/235			62.4°	97.1			
(20)	101	606	300	215	—			60.0°	94.7			

* CFM BASED ON PRIMARY AIR.

NOTES:
1. FAN MOTOR SHALL BE 1/15 H.P., 120V, 1Ø, 3-SPEED, 20A. MANUAL THERMAL SWITCH.
2. MAXIMUM REQUIRED INLET STATIC PRESSURE SHALL NOT EXCEED .50" W.G. @ MAX. CFM. (BOX INLET)
3. NC LEVEL SHALL NOT EXCEED NC-35
4. FAN CAPACITY BASED ON 0.25" E.S.P., ±10% BASED ON CAPACITY.
5. UNIT FANS WITH NO START/STOP CFM OPERATE ONLY ON UNOCCUPIED CYCLE.

LEGEND

- —CW— DOMESTIC COLD WATER
- —HS— HEATING WATER SUPPLY
- —HR— HEATING WATER RETURN
- —RS— REFRIGERANT LIQUID LINE
- —RL— REFRIGERANT SUCTION LINE
- HIGH PRESSURE STEAM (HPS), 125 PSIG.
- LOW PRESSURE STEAM (LPS), 15 PSIG.
- LPC LOW PRESSURE CONDENSATE
- —CD— CONDENSATE DRAIN
- 2 - WAY CONTROL VALVE
- 3 - WAY CONTROL VALVE
- PRESSURE REDUCING VALVE
- PRESSURE RELIEF VALVE
- CHECK VALVE
- PLUG VALVE
- NEEDLE VALVE
- GATE VALVE
- GLOBE VALVE
- BALL VALVE
- COMBINATION BALANCING AND SHUTOFF VALVE WITH PRESSURE TAPS (GLOBE TYPE)
- UNION
- STEAM TRAP
- PIPE TURN DOWN
- PIPE TURN UP
- DOWNWARD SLOPE
- DIRECTION OF FLOW
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- FLEXIBLE PIPE CONNECTION
- STRAINER
- MANUAL AIR VENT
- PRESSURE GAUGE (RANGE: 0-200 PSI)
- THERMOMETER (RANGE: 30-240°F)
- BD BALANCING DAMPER (MULTI-LEAF)
- ELBOW WITH TURNING VANES
- FLEXIBLE CONNECTION
- BFP BACKFLOW PREVENTER, SEE PLUMBING DRAWINGS.
- PDM PNEUMATIC DAMPER MOTOR.
- S CHILLED WATER SUPPLY TEMP. SENSOR
- R CHILLED WATER RETURN TEMP. SENSOR.
- S HOT WATER SUPPLY TEMP. SENSOR.
- R HOT WATER RETURN TEMP. SENSOR.
- T_S SUPPLY AIR TEMP. SENSOR.
- S_x STATIC PRESSURE SENSOR

- FLEXIBLE DUCT
- ACOUSTICAL LINING
- A.F.F. ABOVE FINISHED FLOOR
- A.P.D. AIR PRESSURE DROP
- B.D.D. BACKDRAFT DAMPER
- B.D. BALANCING DAMPER (MULTI-LEAF)
- DN. DOWN
- D.B. DRY BULB
- E.S.P. EXTERNAL STATIC PRESSURE
- E.D.B. ENTERING DRY BULB
- E.W.T. ENTERING WATER TEMPERATURE
- E.W.B. ENTERING WET BULB
- F.D. FIRE DAMPER
- F.O.B. FLAT ON BOTTOM
- F.O.T. FLAT ON TOP
- GA. GAGE
- L.W.B. LEAVING WET BULB
- L.D.B. LEAVING DRY BULB
- L.W.T. LEAVING WATER TEMPERATURE
- O.A. OUTSIDE AIR
- P.D. PRESSURE DROP
- S.T. STATIC PRESSURE
- W.P.D. WATER PRESSURE DROP
- (1)100 LINEAR DIFFUSER MARK-SEE SCHEDULE (CFM NOTED).
- △100 RETURN OR EXHAUST REGISTER MARK-SEE SCHEDULE (CFM NOTED).
- (1) FAN POWERED VARIABLE AIR VOLUME BOX MARK-SEE SCHEDULE.
- (T) HEATING/COOLING THERMOSTAT MTD. @ 60" ABOVE FLOOR.
- FIRE DAMPER
- ATP AIR TEST PROBE
- PRV PRESSURE REDUCING VALVE
- (TC) SPACE COOL. SETBACK THERMOSTAT

M-3

HENDERSON ASSOCIATES, ARCHITECTS, a professional corporation, NORFOLK, VIRGINIA

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION — NORFOLK, VIRGINIA

DES. PLCR | DR. CM | CHK. RWP
PROJ. MGR. M.J. CIVIL ENGR.
SUBMITTED | FINAL MANAGER | V. PRINCIPAL
EFD "IN" | EFD OUT
NO. | DR. NAVFAC
APPROVED | DATE
OFFICER IN CHARGE
APPROVED | DATE
FOR EFD FOR COMMANDER NAVFAC

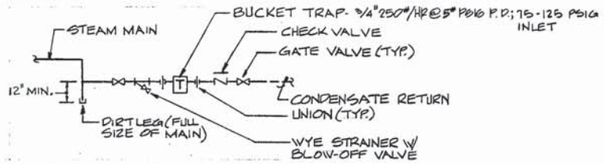
NAVAL STATION NORFOLK, VIRGINIA

ADDITIONS TO BUILDING SP-381
(H-53 TRAINING FACILITY)

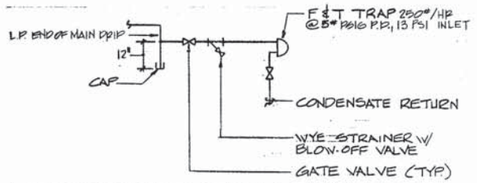
MECHANICAL SCHEDULES

SIZE	CODE IDENT NO.	NAVFAC DRAWING NO.
F	80091	4133218

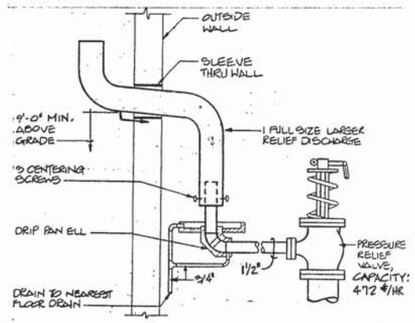
CONSTR. CONTR. NO. N62470-84-B-4064
SCALE NONE | SPEC. 05-84-4064 | SHEET 19 OF 40
EFD DWG. NO. 233218



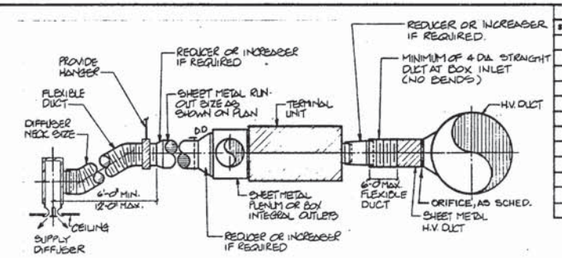
HIGH PRESSURE STEAM MAIN DRIP DETAIL
NO SCALE



LOW PRESSURE STEAM DRIP
NO SCALE



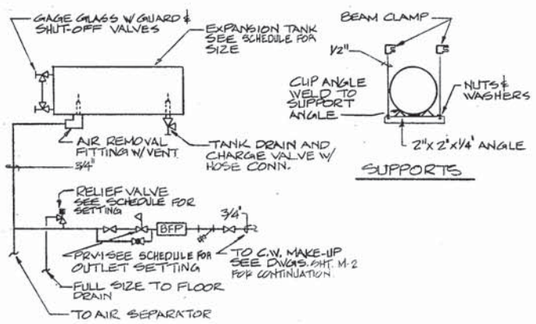
RELIEF VALVE PIPING DETAIL
NO SCALE



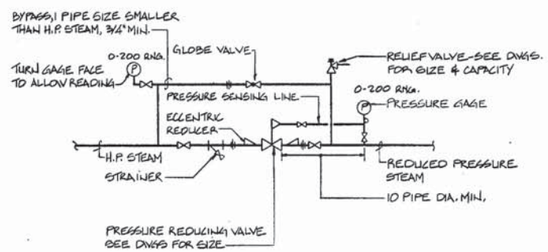
TYPICAL DUCT TAKE-OFF DETAIL
NO SCALE

APPLICABLE FOR DIFFUSERS SERVED BY ROUND DUCTS ONLY

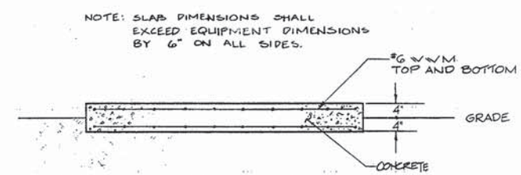
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED



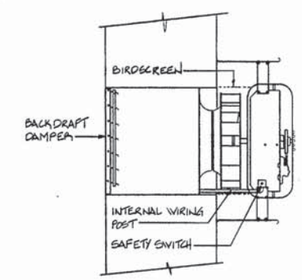
EXPANSION TANK DETAIL
NO SCALE



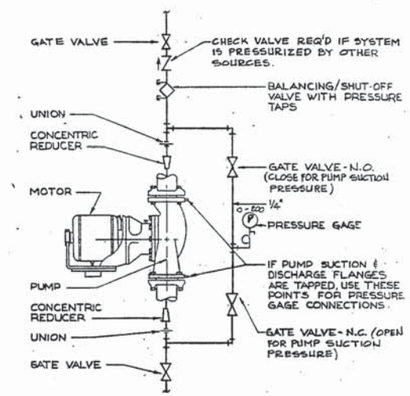
STEAM PRV STATION
NO SCALE



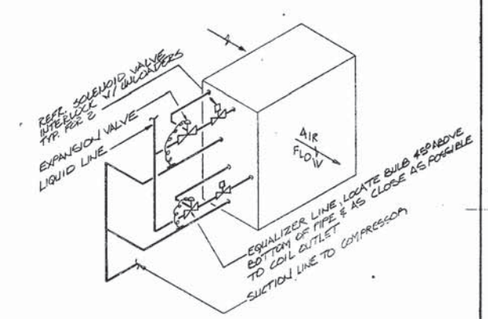
EQUIPMENT SUPPORT SLAB DETAIL
NO SCALE



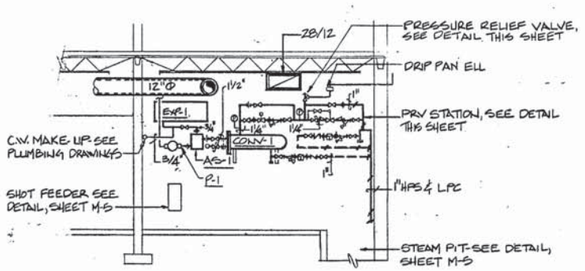
SIDEWALL EXHAUST FAN DETAIL
NO SCALE



INLINE CENTRIFUGAL PUMP
NO SCALE



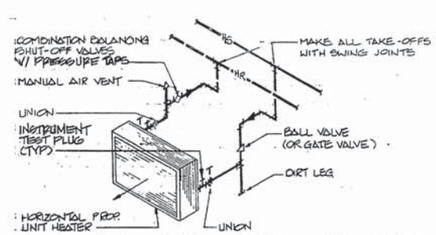
DX COIL PIPING DETAIL
NO SCALE



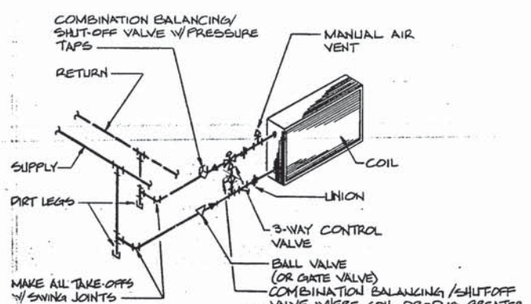
NOTES:
1) ALL PIPING SHALL BE SUPPORTED BY WALL BRACKETS-SEE DETAIL, SHEET M-5.
2) FOR PIPING ARRANGEMENTS SEE DETAILS THIS SHEET & SHEET M-5

SECTION AT E2C/C2A
SCALE: 1/4"=1'-0"

B
M1 M-4



HOT WATER HORIZONTAL PROPELLER UNIT HEATER PIPING DETAIL
NO SCALE



HOT WATER COIL PIPING DETAIL
NO SCALE

NOTE: ALL DETAILS THIS SHEET SHALL APPLY TO BUILDINGS H-53 & E2C/C-2A UNLESS OTHERWISE NOTED

GRAPHIC SCALE

1/4"=1'-0" 0 1 2 3 4 5 10 15

M-4

HENDERSON ASSOCIATES, ARCHITECTS
NORFOLK, VIRGINIA

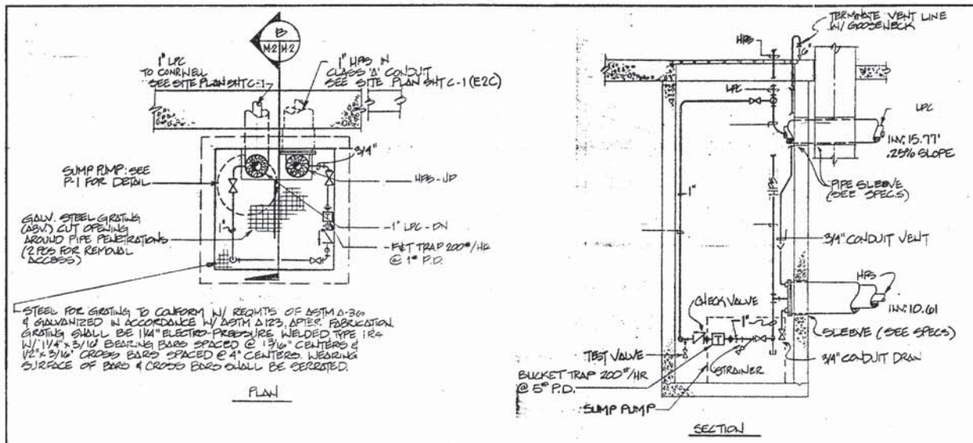
DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VIRGINIA
NAVAL AIR STATION NORFOLK, VIRGINIA

DES. PLG | DR. MJG | CHK. PLG
PROJ. MGR. MJA | CH. ENGR.
PRIN. MEMBER | PRINCIPAL
EFD MWK | EVD. DATA
NO. | DR. MJG
APPROVED | DATE
OFFICER IN CHARGE
APPROVED | DATE

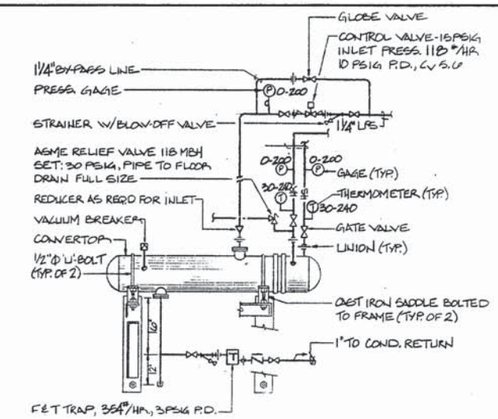
ADDITIONS TO BUILDING SP-381
(H-53 TRAINING FACILITY)
DETAILS

SIZE	CODE IDENT NO.	NAVFAC DRAWING NO.
F	80091	1433219

CONSTR. CONTR. NO. N62470-84-B-4004
FOR EFD FOR COMMANDER NAVFAC
SCALE AS NOTED | SPEC. 05-84-4004 | SHEET 20 OF 46
EFD DWG. NO. 233219

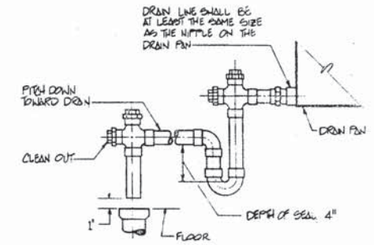


STEAM PIT DETAIL (E2C/C-2A ONLY)
NO SCALE

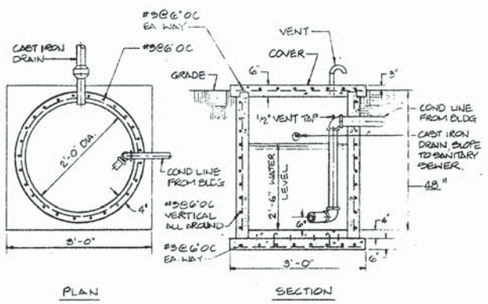


CONVERTOR DETAIL (E2C/C-2A ONLY)
NO SCALE

REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVED

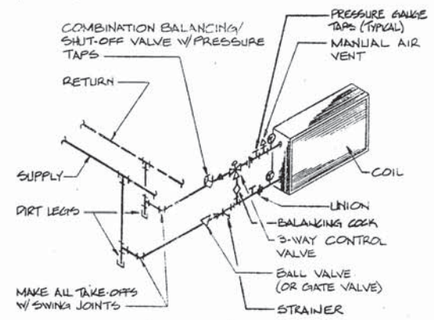


TYPICAL CONDENSATE DRAIN TRAP
NO SCALE



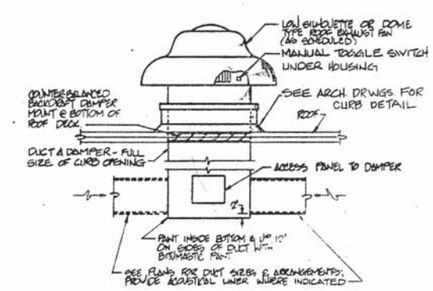
NOTE: SEE PLANS FOR PIPE SIZES, CONT. & INLET/OUTLET PENETRATION LOCATIONS

CONDENSATE WELL DETAIL (TYPICAL)
NO SCALE



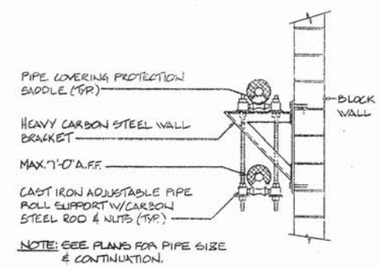
(H-53 ONLY)

AHU-1 HOT WATER COIL PIPING DETAIL
NO SCALE



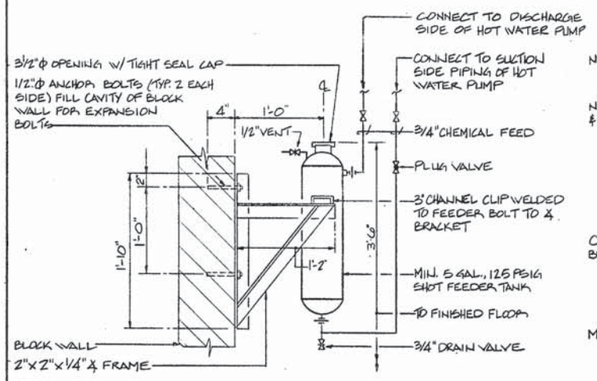
(H-53 ONLY)

ROOF EXHAUST FAN DETAIL (WITH DUCTWORK)
NO SCALE



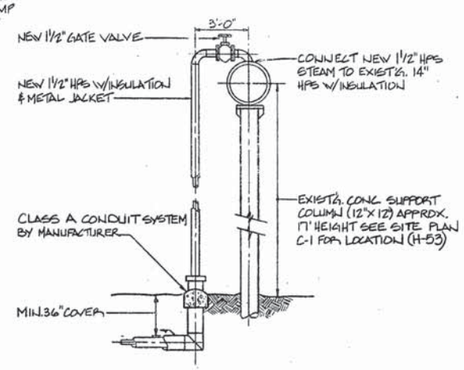
NOTE: SEE PLANS FOR PIPE SIZE & CONTINUATION.

TYPICAL WALL MOUNTED PIPING DETAIL
NO SCALE



NOTE:
CONNECTIONS TO ∡ BRACKETS SHALL HAVE WELDED JOINTS.

CHEMICAL SHOT FEEDER DETAIL
NO SCALE
(TYP. FOR 2)



STEAM DISTRIBUTION CONNECTION
NO SCALE

NOTE: ALL DETAILS THIS SHEET SHALL APPLY TO BUILDINGS H-53 & E2C/C-2A UNLESS OTHERWISE NOTED.

M-5

HENDERSON ASSOCIATES, ARCHITECTS & professional corporation
NORFOLK, VIRGINIA

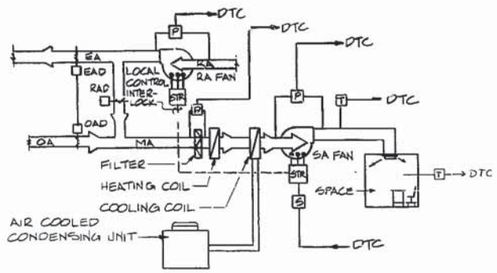
DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VIRGINIA
NAVAL AIR STATION NORFOLK, VIRGINIA

ADDITIONS TO BUILDING SP-381
(H-53 TRAINING FACILITY)
MECHANICAL DETAILS

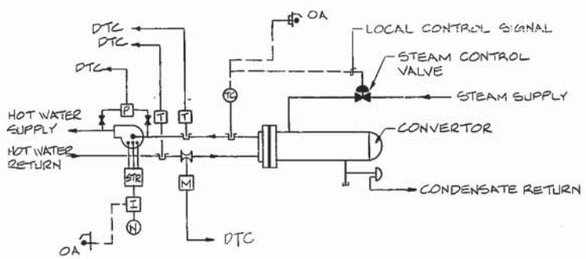
DES. PLA	DR. JBW
CHK. KWP	PROJ. MGR. MJA
CH. ENGR.	BUSINESS MGR.
FIRM MEMBER	PRINCIPAL
EFD NTC	EVD. DMA
HD.	DR.
APPROVED	DATE
OFFICER IN CHARGE	
APPROVED FOR EFD FOR COMMANDER NAVFAC	DATE

SIZE	CODE IDENT NO.	NAVFAC DRAWING NO.
F	80091	4133220
		CONSTR. CONTR. NO. N62470-81-B-4084
SCALE NOTED	SPEC. 05-84-4084	SHEET 21 OF 46
		EFD DWG. NO. 233220

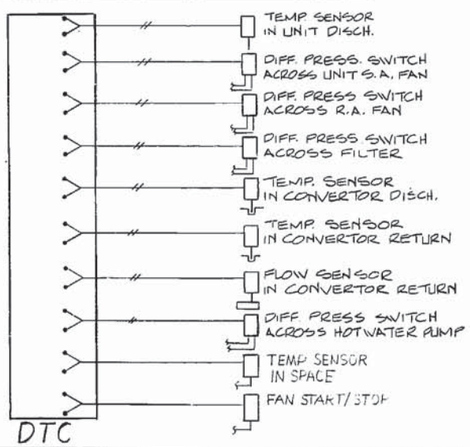
EMCS INTERFACE

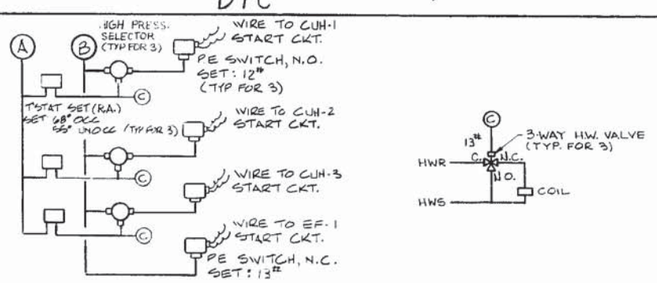


SINGLE ZONE SPLIT SYSTEM

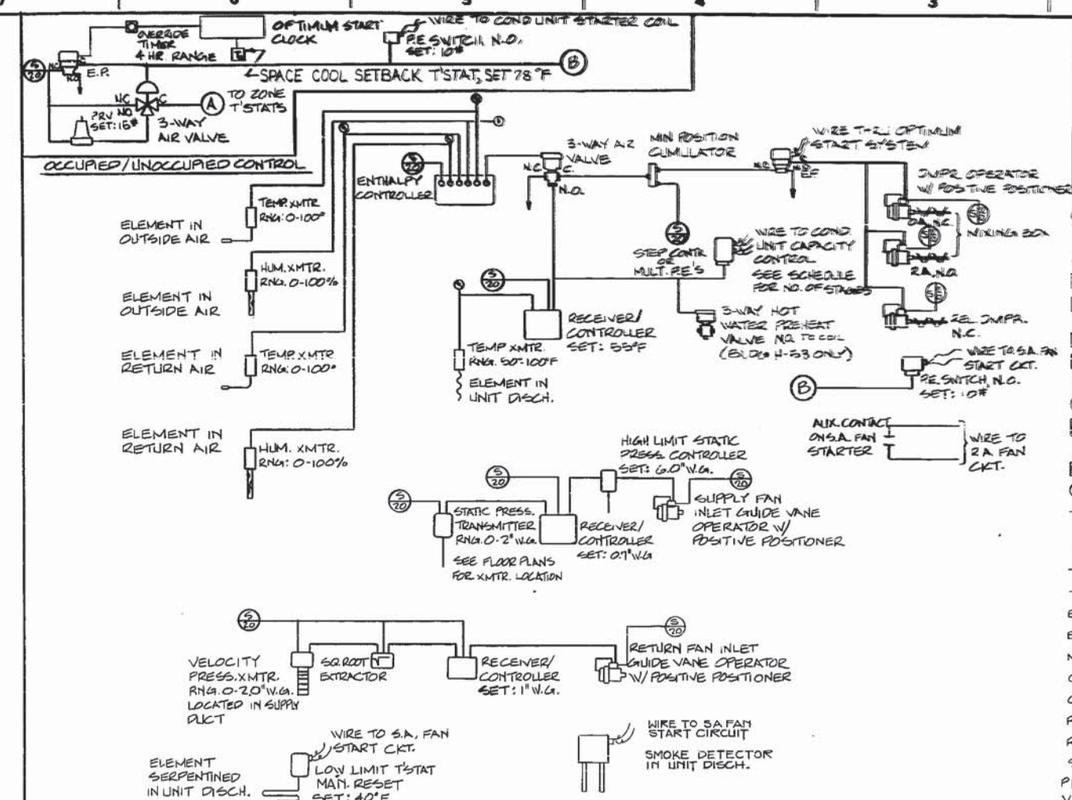


HOT WATER CONVERTOR

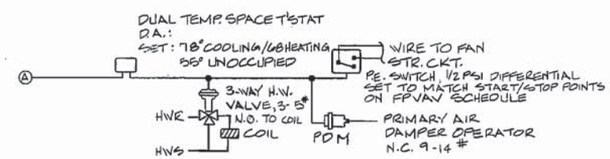




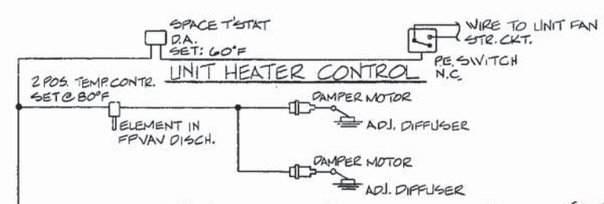
LOCKER RM/TOILET EXHAUST & MAKE-UP CONTROL



AHU CONTROL

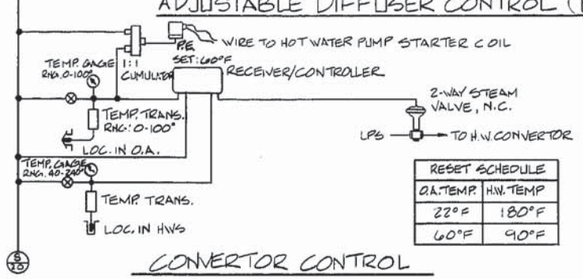


FAN POWERED VAV BOX CONTROL



UNIT HEATER CONTROL

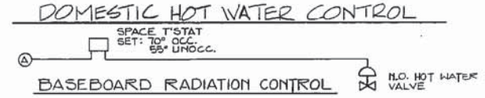
ADJUSTABLE DIFFUSER CONTROL (E2C)



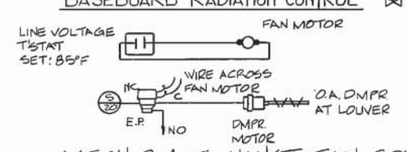
RESET SCHEDULE	
O.A. TEMP.	H.W. TEMP
22°F	180°F
60°F	90°F

CONVERTOR CONTROL

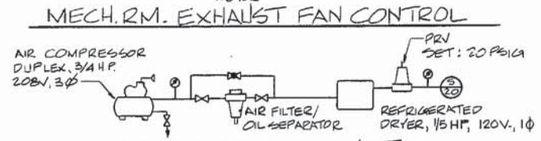
DOMESTIC HOT WATER CONTROL



BASEBOARD RADIATION CONTROL



MECH. RM. EXHAUST FAN CONTROL



COMPRESSED AIR SYSTEM

CONTROL LEGEND

→ DTC	SIGNAL TRANSMITTED TO DTC
← DTC	SIGNAL RECEIVED FROM DTC
I	INTERLOCK
P	DIFFERENTIAL PRESSURE SWITCH STATUS SIGNAL
S	START/STOP INTERFACE
T	TEMPERATURE INDICATION
⊗	RESTRICTOR
TC	TEMPERATURE CONTROLLER
STR	MOTOR STARTER
M	METER SIGNAL
N	MANUAL START/STOP
	SENSOR INSTALLED IN THERMOMETER WELL
	ISOLATION VALVE
----	LOCAL CONTROL SIGNAL
	ENERGY METER
EA	EXHAUST AIR
EAD	EXHAUST AIR DAMPER
MA	MIXED AIR
OA	OUTSIDE AIR
OAD	OUTSIDE AIR DAMPER
RA	RETURN AIR
RAD	RETURN AIR DAMPER
SA	SUPPLY AIR
PDM	PNEUMATIC DAMPER MOTOR
VPX	VELOCITY PRESS. TRANSMITTER
ⓘ	PRESSURE GAUGE

REVISIONS

RECORD DRAWING LETTER DATED 06 FEB 88

M-6

HENDERSON ASSOCIATES, ARCHITECTS, A PROFESSIONAL CORPORATION, NORFOLK, VIRGINIA

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND — ATLANTIC DIVISION — NAVAL STATION NORFOLK, VIRGINIA

NAVAL AIR STATION NORFOLK, VIRGINIA

ADDITIONS TO BUILDING SP-381 (H-53 TRAINING FACILITY)

CONTROL DIAGRAMS

DES. PLG | DR. RER | CHK. KWP

PROJ. MGR. MJA | CH. ENGR.

SUBMITTED BY | DATE 3-30-88

FIRM MEMBER | PRINCIPAL

EFD | RVD.

HD. | DIR.

APPROVED | DATE

OFFICER IN CHARGE

APPROVED | DATE

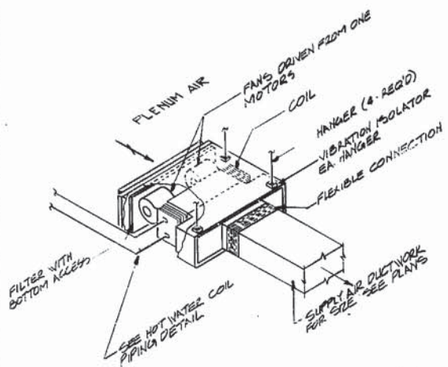
FOR EFD FOR COMMANDER NAVFAC

SIZE F | CODE IDENT NO. 80091 | NAVFAC DRAWING NO. 4133221

CONTR. CONTR. NO. N62470-84-B-4064

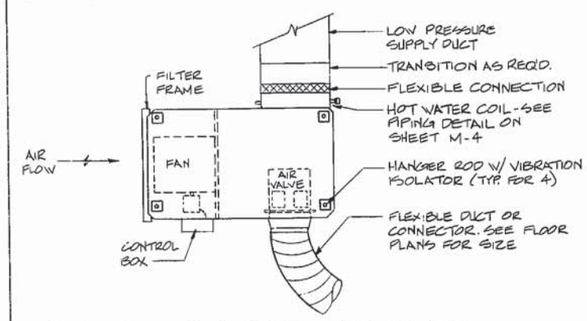
SCALE NONE | SPEC 05-84-4064 | SHEET 22 OF 46

EFD DWG. NO. 233221



HORIZONTAL CONCEALED CABINET UNIT HEATER DETAIL

NO SCALE



FAN-POWERED VARIABLE AIR VOLUME TERMINAL DETAIL

NO SCALE

SEQUENCE OF CONTROL

AIR HANDLING UNIT CONTROL

THE UNIT FAN SHALL BE ENERGIZED BY THE OPTIMUM START CLOCK. WHEN THE UNIT FAN IS ENERGIZED, THE RETURN AIR FAN SHALL BE ENERGIZED THROUGH INTERLOCK. WHEN THE BUILDING IS OCCUPIED, THE OPTIMUM START CLOCK SHALL OPEN THE OUTSIDE AIR DAMPER TO THE MINIMUM POSITION. WHEN THE SINGLE THERMOSTAT TEMPERATURE IS ABOVE SETPOINT, THE SYSTEM SHALL START AT THE OPTIMUM TIME AND SHALL ENTER THE COOLDOWN MODE.

ON A RISE IN UNIT DISCHARGE TEMPERATURE, A RECEIVER-CONTROLLER, WITH TEMPERATURE TRANSMITTER IN THE UNIT DISCHARGE, SHALL FIRST MODULATE THE PREHEAT COIL VALVE CLOSED TO THE COIL (H63 ONLY) AND THEN MODULATE THE OUTSIDE AIR DAMPER OPEN TO ADMIT UP TO 100% OUTSIDE AIR. ON A CONTINUED RISE IN DISCHARGE AIR TEMPERATURE, THE CONTROLLER SHALL ENERGIZE THE MECHANICAL COOLING IN STAGES AS SCHEDULED. ON A FALL IN DISCHARGE TEMPERATURE, THE REVERSE SEQUENCE SHALL OCCUR.

AN ENTHALPY CONTROLLER, WITH TEMPERATURE AND HUMIDITY SENSORS IN THE OUTSIDE AND RETURN AIR SHALL SELECT THE AIRSTREAM WITH THE LOWEST TOTAL HEAT CONTENT. WHEN OUTSIDE AIR TOTAL HEAT EXCEEDS RETURN AIR TOTAL HEAT, THE OUTSIDE AIR DAMPER SHALL INDEX TO THE MINIMUM POSITION.

ON A RISE IN DOWN-DUCT STATIC PRESSURE, A STATIC PRESSURE CONTROLLER, WITH PRESSURE TRANSMITTER LOCATED IN THE SUPPLY DUCT WHERE INDICATED, SHALL MODULATE THE INLET GUIDE VANE DAMPER CLOSED. A HIGH LIMIT STATIC PRESSURE CONTROLLER, WITH SENSOR LOCATED IN THE FAN DISCHARGE, SHALL LIMIT MAXIMUM DISCHARGE STATIC TO 6.5" W.G. ON A FALL IN DOWN DUCT STATIC PRESSURE, THE REVERSE OPERATION SHALL OCCUR.

A RECEIVER-CONTROLLER, WITH AIR FLOW MONITOR IN THE SUPPLY AIR, SHALL MODULATE THE RETURN AIR FAN INLET GUIDE VANE TO TRACK THE SUPPLY FAN. THE AIR FLOW MONITOR SIGNAL SHALL BE LINEARIZED BY SQUARE ROOT EXTRACTOR.

ON DETECTION OF PARTICLES OF COMBUSTION, A DISCHARGE AIR DUCT SMOKE DETECTOR SHALL ACT TO DEENERGIZE THE UNIT SUPPLY AND RETURN AIR FANS AND CLOSE THE OUTSIDE AIR DAMPER.

ON A FALL IN UNIT DISCHARGE TEMPERATURE TO 40 DEGREES, A LOW LIMIT THERMOSTAT SHALL DEENERGIZE THE UNIT SUPPLY AND RETURN FANS AND CLOSE THE OUTSIDE AIR DAMPER.

FAN POWERED VARIABLE AIR VOLUME TERMINAL

ON A RISE IN SPACE TEMPERATURE, THE SPACE THERMOSTAT SHALL MODULATE THE HOT WATER VALVE CLOSED. ON A CONTINUED RISE IN SPACE TEMPERATURE THE SPACE THERMOSTAT SHALL MODULATE THE TERMINAL AIR VALVE OPEN PARTIALLY (SEE FPVAV SCHEDULE) AND DEENERGIZE THE UNIT FAN. ON A CONTINUED RISE THE TERMINAL AIR VALVE SHALL OPEN FULLY. ON A FALL IN SPACE TEMPERATURE THE REVERSE SEQUENCE SHALL OCCUR. THE SET POINT OF THE SPACE THERMOSTAT SHALL BE INDEXED TO THE OCCUPIED OR UNOCCUPIED CONDITION BY SWITCHLINE.

OCCUPIED/UNOCCUPIED CONTROL

CONTROL OF THE AIR HANDLING UNIT SHALL BE AS SPECIFIED IN PARAGRAPH TITLED "AIR HANDLING UNIT CONTROL". WHEN INDEXED TO THE UNOCCUPIED CYCLE OF CONTROL BY THE OPTIMUM START CLOCK, THE ROOM THERMOSTATS SHALL BE INDEXED TO THE NIGHT SETBACK SETPOINT, THE TOILET EXHAUST FANS AND CABINET HEATERS SHALL BE DEENERGIZED (H63 ONLY), AND THE CONDENSING UNIT SHALL BE DEENERGIZED. WHEN INDEXED TO THE OCCUPIED CYCLE OF CONTROL BY THE OPTIMUM START CLOCK, THE TOILET EXHAUST FANS AND CABINET HEATER SHALL BE ENERGIZED AND RUN CONTINUOUSLY (H63 ONLY), THE ROOM THERMOSTATS SHALL BE INDEXED TO THE OCCUPIED SETPOINT, AND THE CONDENSING UNIT SHALL BE ENABLED. PROVIDE A MARK-TIME OVERRIDE TIME WHICH SHALL OVERRIDE UNOCCUPIED CONTROL AND PLACE THE SYSTEM IN OCCUPIED CONDITION.

UNIT HEATER CONTROL

A ROOM THERMOSTAT SHALL CYCLE THE UNIT FAN TO MAINTAIN SETPOINT.

LOCKER RM./TOILET EXHAUST & MAKE-UP CONTROL

WHEN INDEXED TO THE OCCUPIED CYCLE OF CONTROL, THE EXHAUST FAN AND THE CABINET UNIT HEATER FANS SHALL RUN CONTINUOUSLY. ON A RISE IS ROOM TEMPERATURE, THE ROOM THERMOSTAT SHALL MODULATE THE HOT WATER VALVE TO MAINTAIN ROOM TEMPERATURE. WHEN INDEXED TO THE UNOCCUPIED CYCLE OF CONTROL, THE EXHAUST FAN AND THE CABINET UNIT HEATER FANS SHALL BE DEENERGIZED. THE ROOM THERMOSTAT SHALL CYCLE THE UNIT FAN TO MAINTAIN REDUCED NIGHT SETBACK TEMPERATURE.

CONVERTOR CONTROL

ON A RISE IN HOT WATER DISCHARGE TEMPERATURE, A RECEIVER-CONTROLLER, WITH SUBMASTER TRANSMITTER LOCATED IN THE CONVERTOR DISCHARGE, SHALL MODULATE THE STEAM VALVE CLOSED. ON A FALL IN HOT WATER DISCHARGE TEMPERATURE, THE REVERSE OPERATION SHALL OCCUR. THE SETPOINT OF THE RECEIVER-CONTROLLER SHALL BE RESET BY OUTSIDE AIR MASTER TRANSMITTER IN ACCORDANCE WITH THE RESET SCHEDULE. ON A RISE IN OUTSIDE AIR TEMPERATURE TO 65 DEGREES, THE HOT WATER PUMP SHALL BE DEENERGIZED.

DOMESTIC HOT WATER CONTROL

A TEMPERATURE CONTROLLER WITH SENSOR IN THE DOMESTIC HOT WATER SUPPLY SHALL MODULATE THE HEATER STEAM VALVE TO MAINTAIN SETPOINT.

MECHANICAL ROOM EXHAUST FAN CONTROL

ON A RISE IN ROOM TEMPERATURE, A ROOM THERMOSTAT SHALL ENERGIZE THE EXHAUST FAN AND OPEN THE OUTSIDE AIR DAMPER.

BASEBOARD RADIATION CONTROL

A ROOM THERMOSTAT SHALL MODULATE THE RADIATION CONTROL VALVE TO MAINTAIN ROOM TEMPERATURE.

REVISIONS			
SYMB.	DESCRIPTION	DATE	APPROVED

RECORD DRAWING
LETTER DATED 04 FEB 88

M-7

HENDERSON ASSOCIATES, ARCHITECTS
A PROFESSIONAL CORPORATION
NORFOLK, VIRGINIA

DES. PLG DR. RER CHK. KWP
PROJ. MGR. AJV CH. ENGR.
SUBMITTED BY DATE
FIRM MEMBER PRINCIPAL
EFD RVD. DHA
HD DIR.
APPROVED DATE
ACTIVITY-SATISFACTORY TO
APPROVED DATE 19 Nov 86
FOR AND FOR COMMANDER NAVFAC

COMMONWEALTH OF VIRGINIA
PROFESSIONAL ENGINEER

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VA.
NAVAL AIR STATION NORFOLK, VIRGINIA

ADDITIONS TO BUILDING SP-381
(H-58 TRAINING FACILITY)

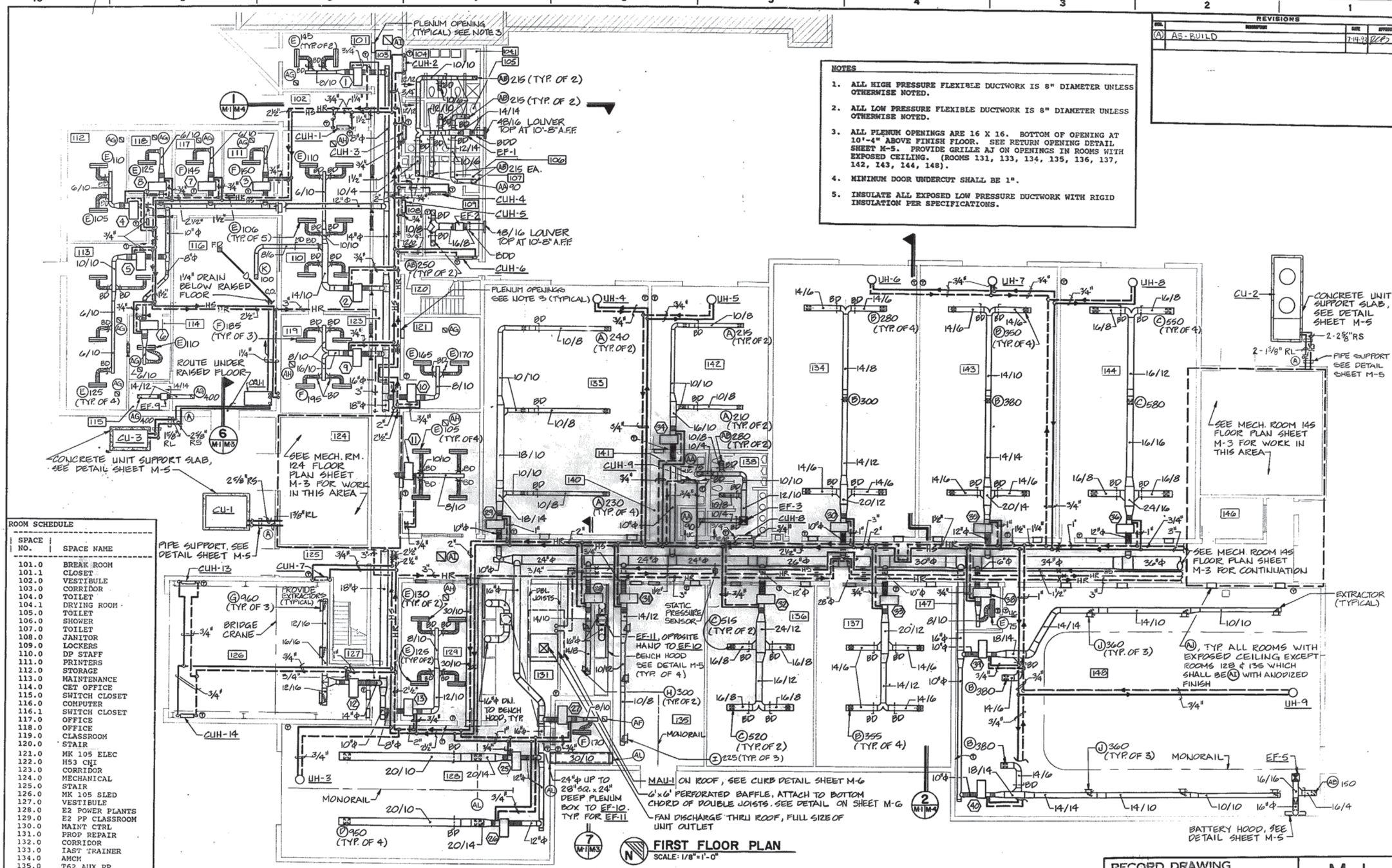
SEQUENCE OF CONTROL & NOTES

SIZE F | CODE IDENT. NO. 80091 | NAVFAC DRAWING NO. 4153222
CONSTR. CONTR. NO. N62470-84-B-4064
SCALE NONE | SPEC. 05-08-4064 | SHEET 23 OF 46
EFD DWG. NO. 283222

REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVED
(A)	AS-BUILD	7-14-92	RCF

NOTES

1. ALL HIGH PRESSURE FLEXIBLE DUCTWORK IS 8" DIAMETER UNLESS OTHERWISE NOTED.
2. ALL LOW PRESSURE FLEXIBLE DUCTWORK IS 8" DIAMETER UNLESS OTHERWISE NOTED.
3. ALL PLENUM OPENINGS ARE 16 X 16. BOTTOM OF OPENING AT 10'-4" ABOVE FINISH FLOOR. SEE RETURN OPENING DETAIL SHEET M-5. PROVIDE GRILLE AJ ON OPENINGS IN ROOMS WITH EXPOSED CEILING. (ROOMS 131, 133, 134, 135, 136, 137, 142, 143, 144, 148).
4. MINIMUM DOOR UNDERCUT SHALL BE 1".
5. INSULATE ALL EXPOSED LOW PRESSURE DUCTWORK WITH RIGID INSULATION PER SPECIFICATIONS.



ROOM SCHEDULE

SPACE NO.	SPACE NAME
101.0	BREAK ROOM
101.1	CLOSET
102.0	VESTIBULE
103.0	CORRIDOR
104.0	TOILET
104.1	DRYING ROOM
105.0	TOILET
106.0	SHOWER
107.0	TOILET
108.0	JANITOR
109.0	LOCKERS
110.0	DP STAFF
111.0	PRINTERS
112.0	STORAGE
113.0	MAINTENANCE
114.0	CET OFFICE
115.0	SWITCH CLOSET
116.0	COMPUTER
116.1	SWITCH CLOSET
117.0	OFFICE
118.0	OFFICE
119.0	CLASSROOM
120.0	STAIR
121.0	MK 105 ELEC
122.0	H53 CNI
123.0	CORRIDOR
124.0	MECHANICAL
125.0	STAIR
126.0	MK 105 SLED
127.0	VESTIBULE
128.0	E2 POWER PLANTS
129.0	E2 PP CLASSROOM
130.0	MAINT CTRL
131.0	PROP REPAIR
132.0	CORRIDOR
133.0	IAST TRAINER
134.0	AMCM
135.0	T62 AUX PP
136.0	E2 ELEC
137.0	E2 ENVIRON
138.0	TOILET
139.0	JANITOR
140.0	CORRIDOR
141.0	TOILET
142.0	HYDRAULICS TR
143.0	LANDING GEAR
144.0	AIRFRAMES
145.0	MECHANICAL
146.0	OFFICE
147.0	OFFICE
148.0	MISSILE LAB

DESIGN CONDITIONS

INDOOR			OUTDOOR		
SUMMER		WINTER	SUMMER		WINTER
°F DB	%RH	°F DB	°F DB	°F WB	°F DB
76	50	68	91	76	23

GRAPHIC SCALE 1/8"= 1'-0" (5 0 5 10 25)

RECORD DRAWING LETTER DATED 17 AUG 1992

M-1

HENDERSON ASSOCIATES, ARCHITECTS A PROFESSIONAL CORPORATION NORFOLK, VIRGINIA

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION NAVAL STATION NORFOLK, VA.

EFD DWG. NO. 301211
JOB ORDER NO.
STA. PROJ. NO. P-128
DES. DKH DRWN. JMW
PROJ. MGR. DCS CH ARCH/ENGR JBW
EFD RVD. DES DIR
BR. MGR. DES DIR
APPROVED DATE

ACTIVITY - SATISFACTORY TO
APPROVED DATE
FOR KEF FOR COMMANDER NAVFAC

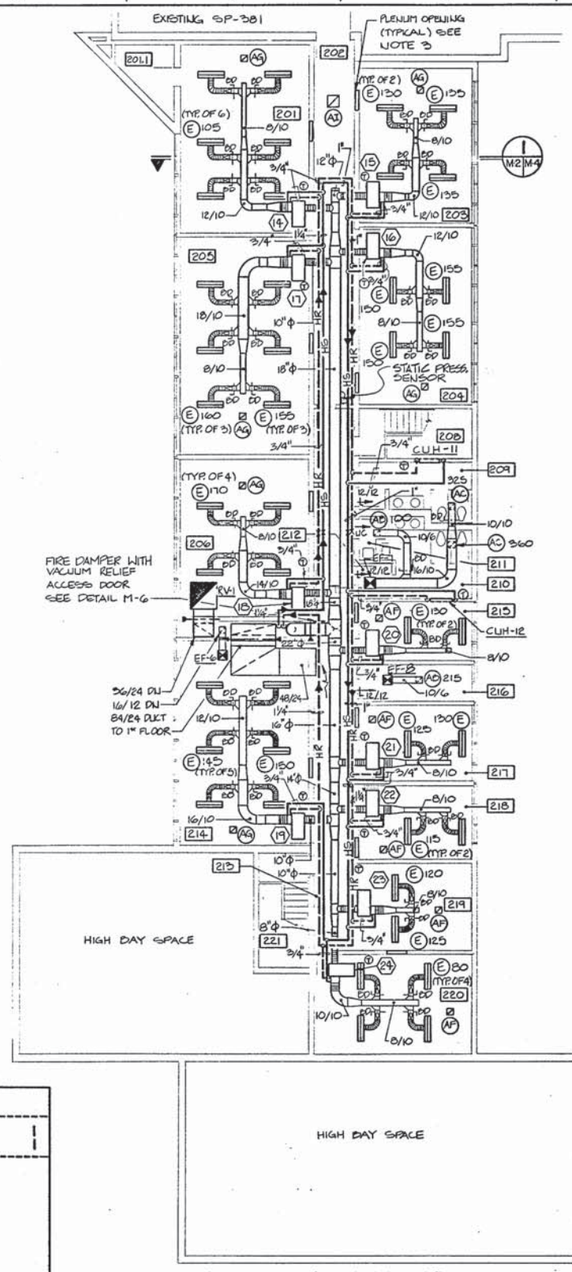
AVIATION MAINTENANCE TRAINING FACILITY

FIRST FLOOR PLAN

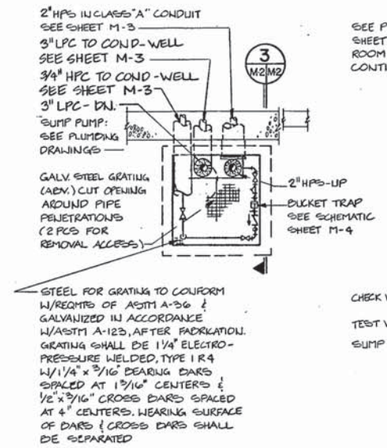
SIZE	CODE IDENT NO.	NAVFAC DRAWING NO.
F	80091	4201211

CONSTR. CONTR. NO. N62470-88-B-8154

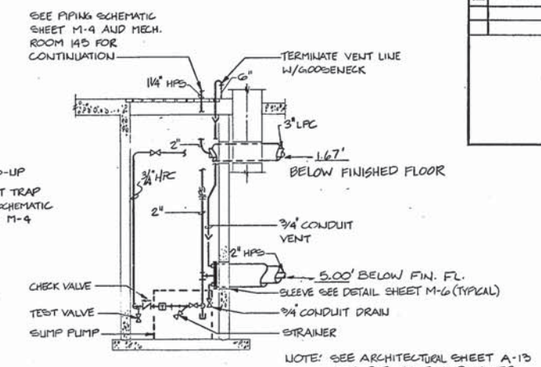
SCALE GRAPHIC SPEC. 05-88-8154 SHEET 29 OF 46



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

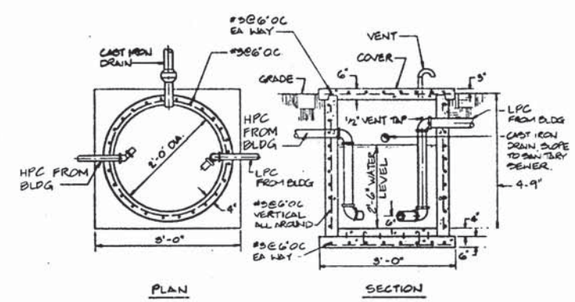


STEAM PIT DETAIL
SCALE: 1/2"=1'-0"

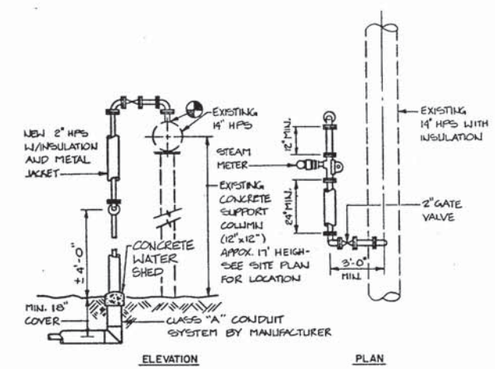


NOTE: SEE ARCHITECTURAL SHEET A-13 FOR PIT EDGE AND WATER-PROOFING DETAILS.

SECTION
SCALE: 1/2"=1'-0"



CONDENSATE COOLING WELL DETAIL
NO SCALE



STEAM DISTRIBUTION CONNECTION
NO SCALE

REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVED

ROOM SCHEDULE

SPACE NO.	SPACE NAME
201.0	INSTRUCTORS
201.1	CLOSET
202.0	CORRIDOR
203.0	H53 FAM CR
204.0	TECH LIBRARY
205.0	E2 FAM CR
206.0	CLASSROOM
207.0	CORRIDOR
208.0	STAIR
209.0	TOILET
210.0	TOILET
211.0	JANITOR
212.0	VESTIBULE
213.0	CORRIDOR
214.0	CLASSROOM
215.0	BREAK ROOM
216.0	STORAGE
217.0	OFFICE
218.0	OFFICE
219.0	RECEPTION
220.0	TESTING
221.0	STAIR

GRAPHIC SCALES
1/8"=1'-0" 5 0 5 10 25
1/2"=1'-0" 1 0 1 3 6

Reed Brown and Partners Corp. Consulting Engineers Virginia Beach, VA 804-486-8888

COMMONWEALTH OF VIRGINIA DALE K. BROWN 12/20/82 PROFESSIONAL ENGINEER

HENDERSON ASSOCIATES, ARCHITECTS A PROFESSIONAL CORPORATION NORFOLK, VIRGINIA

EFD DWG. NO. 301212
JOB ORDER NO.
STA. PROJ. NO. P-128
DES. DKH DRWN. DDB
PROJ. MGR. DCS CH. ARCHITECT JBW
EFD RVD. EP
BR. MGR. DES. DIR.
APPROVED DATE
ACTIVITY - SATISFACTORY TO
APPROVED 12-22-89
FOR EFD FOR COMMANDER NAVFAC

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VA.

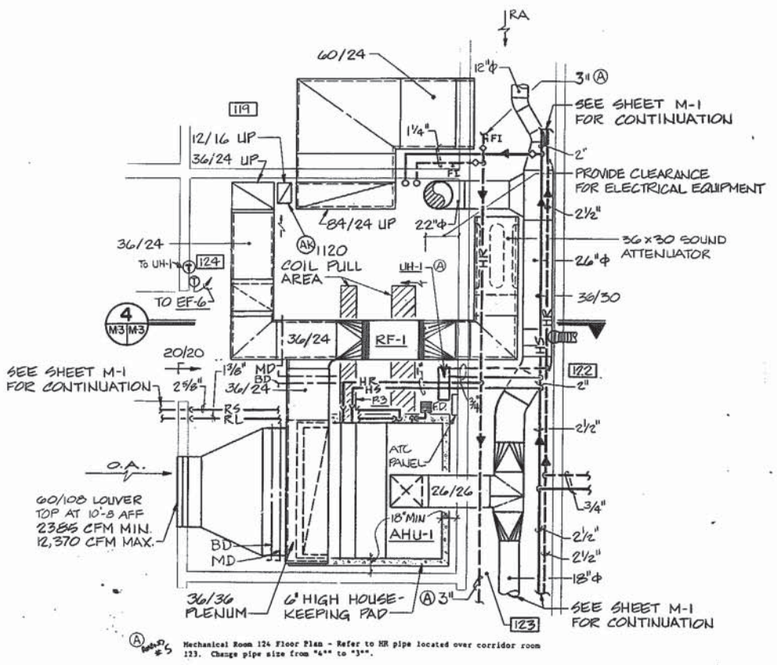
AVIATION MAINTENANCE TRAINING FACILITY

SECOND FLOOR PLAN, DETAILS AND SECTION

SIZE F | CODE IDENT. NO. 80091 | NAVFAC DRAWING NO. 4201212
CONTR. CONTR. NO. N62470-88-B-8154
SCALE GRAPHIC | SPEC. 05-88-8154 | SHEET 30 OF 46

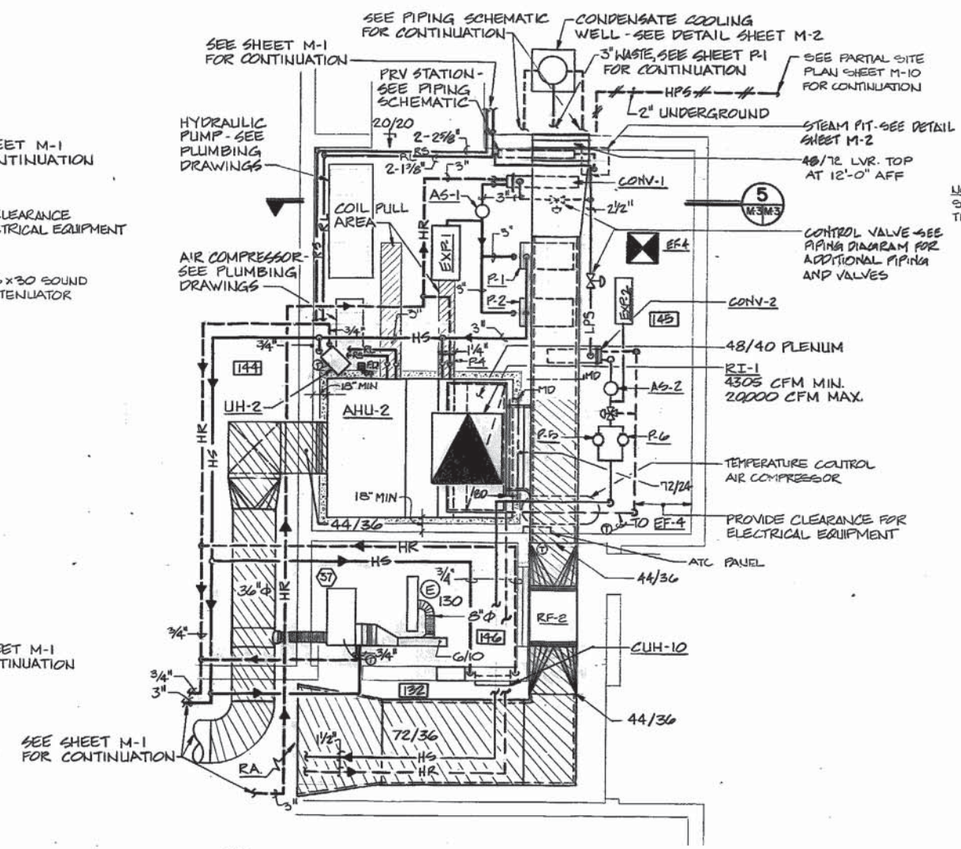
M-2

REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVED
(A)	AS-BUILDS	7-14-93	[illegible]



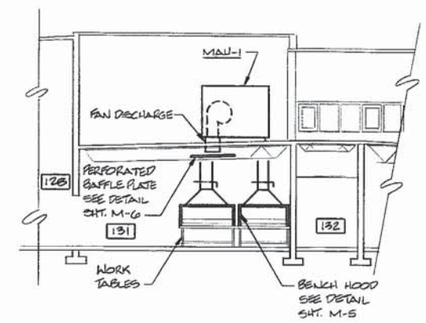
(A) Mechanical Room 124 Floor Plan - Refer to HR pipe located over corridor room 123. Change pipe size from "4" to "3".

MECHANICAL ROOM 124 FLOOR PLAN
SCALE: 1/4" = 1'-0"

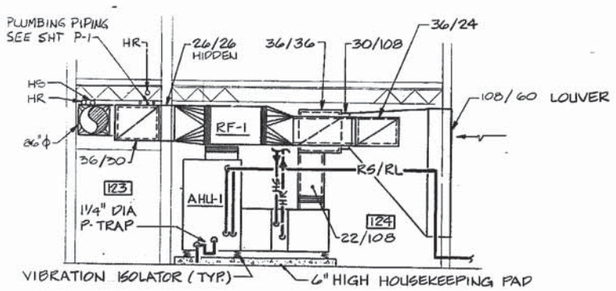


MECHANICAL ROOM 145 FLOOR PLAN
SCALE: 1/4" = 1'-0"

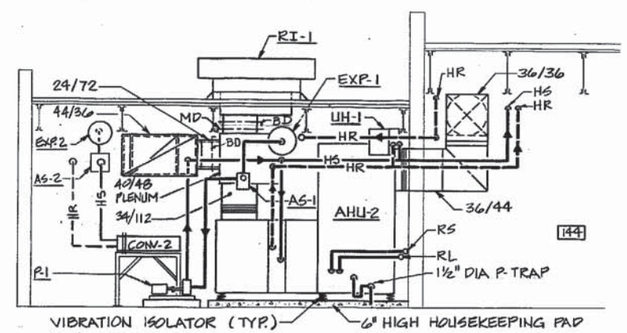
NOTE:
SEAL ALL DUCT AND PIPE PENETRATIONS THRU WALL OF MECHANICAL ROOMS.



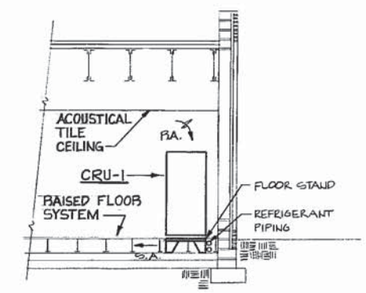
7 M-1 M-3 SECTION
SCALE: 1/8" = 1'-0"



4 M-3 M-3 SECTION
SCALE: 1/4" = 1'-0"



5 M-3 M-3 SECTION
SCALE: 1/4" = 1'-0"



6 M-1 M-3 SECTION
SCALE: 1/4" = 1'-0"

GRAPHIC SCALE
1/4" = 1'-0" 5 0 5 10

RECORD DRAWING LETTER DATED 19 AUG 1992

M-3

HENDERSON ASSOCIATES, ARCHITECTS A PROFESSIONAL CORPORATION NORFOLK, VIRGINIA

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VA.

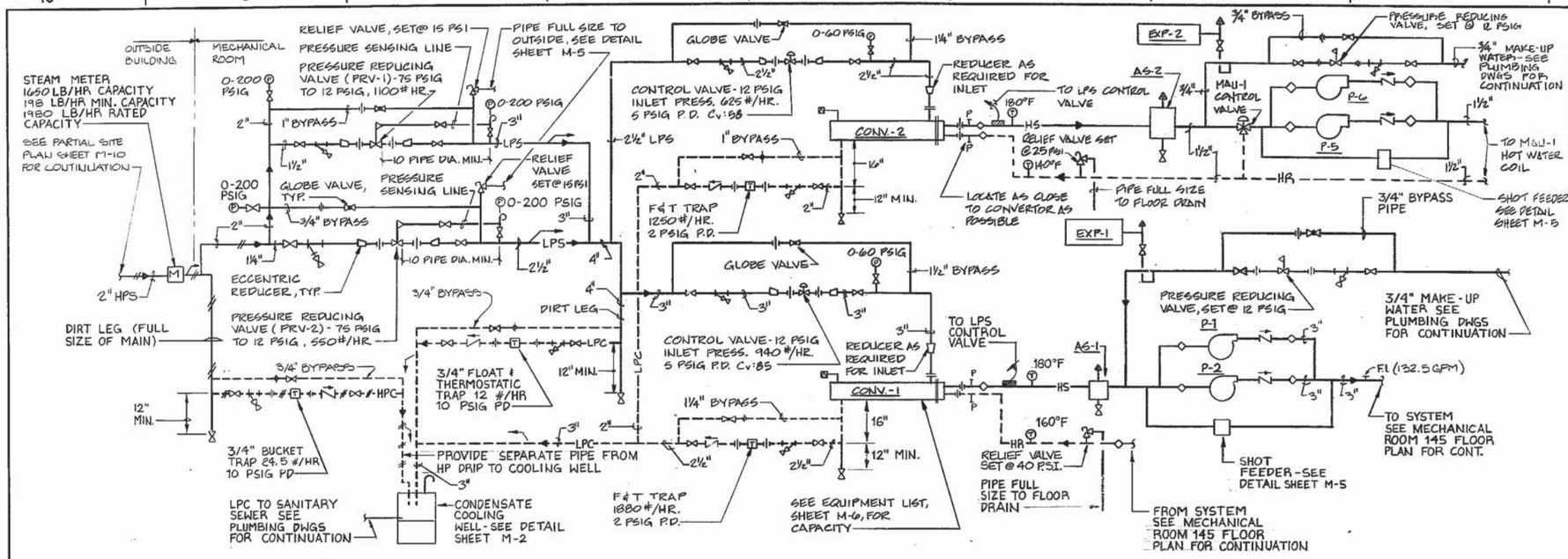
EFD DWG NO 301213
JOB ORDER NO.
STA. PROJ. NO P-128
DES DKH DRWN JMW
PROJ. MGR DCS CH. ARCH/ENGR JBW
EFD RVD. FP
BR. MGR DES DIR
APPROVED DATE
ACTIVITY - SATISFACTORY TO
APPROVED DATE 12-22-89
FOR EFD - FOR COMMANDER, NAVFAC

COMMONWEALTH OF VIRGINIA 014042 PROFESSIONAL ENGINEER

AVIATION MAINTENANCE TRAINING FACILITY

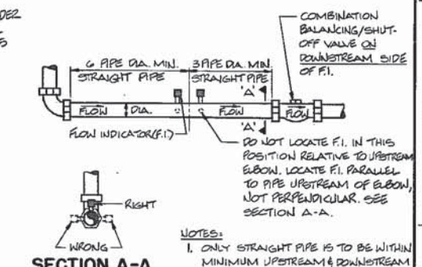
MECHANICAL ROOMS AND SECTIONS

SIZE	CODE IDENT NO.	NAVFAC DRAWING NO.
F	80091	4201213
		CONSTR. CONTR. NO. N62470-88-B-8154
SCALE GRAPHIC	SPEC. 05-88-8154	SHEET 31 OF 46



PIPING SCHEMATIC

NO SCALE



SECTION A-A

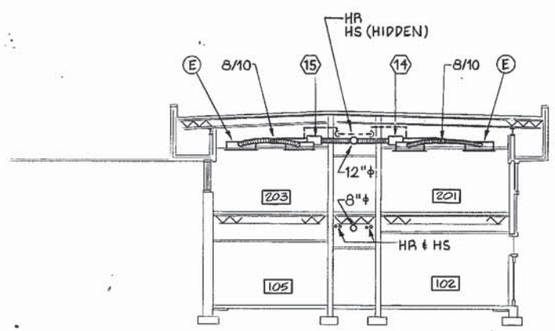
SHOWING RELATIONSHIP OF FLOW INDICATOR TO UPSTREAM ELBOW

NOTES:

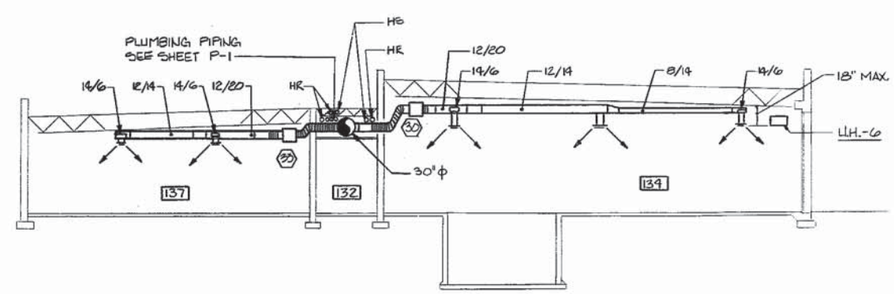
1. ONLY STRAIGHT PIPE IS TO BE WITHIN MINIMUM UPSTREAM & DOWNSTREAM DIMENSIONS, NO FITTINGS OR VALVES ARE ALLOWED.
2. F.I. & VALVES SHALL BE ORIENTED FOR EASY ACCESS. IF TOP OF PIPE IS CLOSE TO STRUCTURE OR OBSTRUCTIONS, ARRANGE PIPING TO LOCATE VALVE OPERATOR & F.I. CONNECTIONS ON SIDE OF PIPE. NO VALVE SHALL BE INSTALLED WITH THE OPERATOR BELOW THE HORIZONTAL.

FLOW INDICATOR (F.I.) DETAIL

NO SCALE



M-1 & M-2 — 1 M-4 SECTION
SCALE: 1/8" = 1'-0"



2 M-1 M-4 SECTION
SCALE: 1/8" = 1'-0"

GRAPHIC SCALE
1/8" = 1'-0"
5 0 5 10 25

RECORD DRAWING LETTER DATED 17 APR 1992

M-4

HENDERSON ASSOCIATES, ARCHITECTS A PROFESSIONAL CORPORATION NORFOLK, VIRGINIA

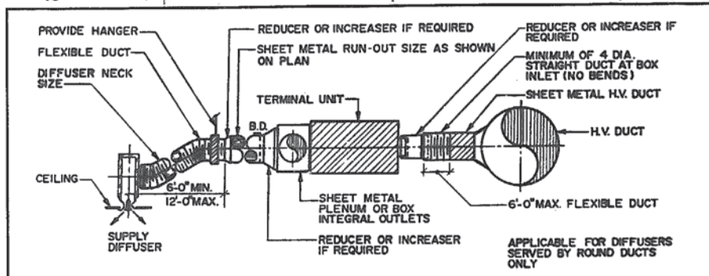
EFD DWG. NO 301214
JOB ORDER NO
STA. PROJ. NO. P-128
DES. DKH DRWN. LHB
PROJ. MGR. DCS CH ARCH/ENGR JBW
EFD RVD
BR. MGR. DES. SUP.
APPROVED DATE
ACTIVITY-SATISFACTORY TO
APPROVED DATE 12-22-89
FOR EFD FOR COMMANDER, NAVFAC

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VA.

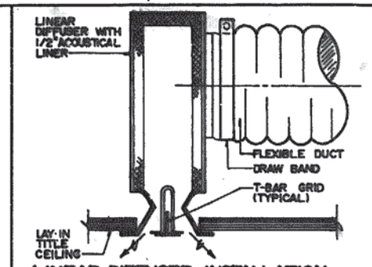
AVIATION MAINTENANCE TRAINING FACILITY

PIPING SCHEMATIC AND SECTIONS

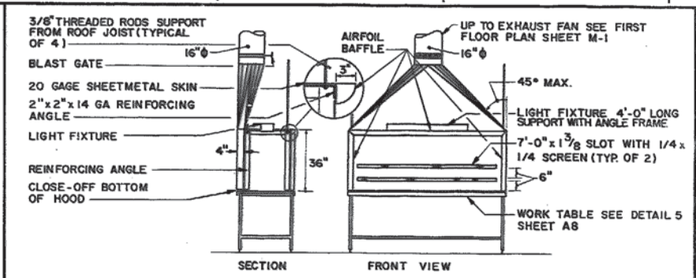
SIZE F | CODE IDENT. NO. 80091 | NAVFAC DRAWING NO. 4201214
CONSTR. CONTR. NO. N62470-88-B-8154
SCALE GRAPHIC | SPEC 05-88-8154 | SHEET 32 OF 46



TYPICAL DUCT TAKE OFF
NO SCALE

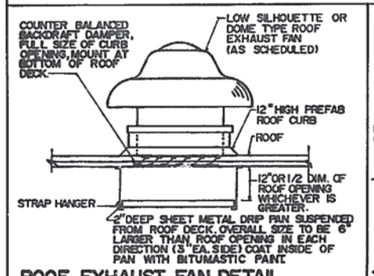


LINEAR DIFFUSER INSTALLATION DETAIL (LAY-IN CEILING)
NO SCALE

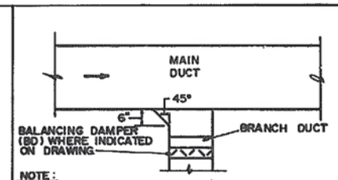


BENCH HOOD
NO SCALE

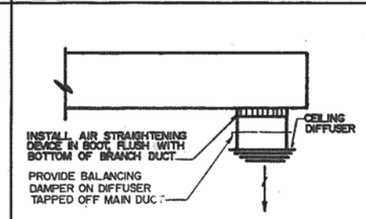
REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVED
(A)	AS-BUILD	7-14-92	RCB



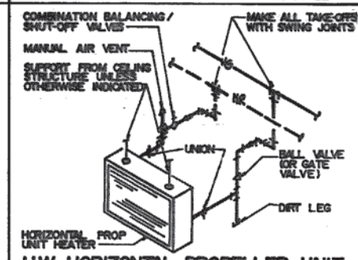
ROOF EXHAUST FAN DETAIL
NO SCALE



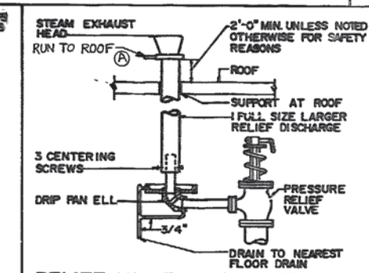
TYPICAL BRANCH CONNECTION
NO SCALE



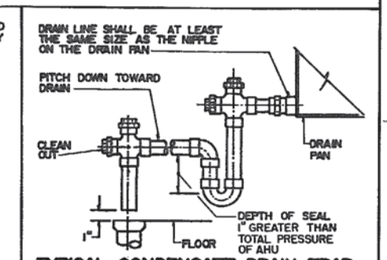
AIR STRAIGHTENER INSTALLATION DETAIL
NO SCALE



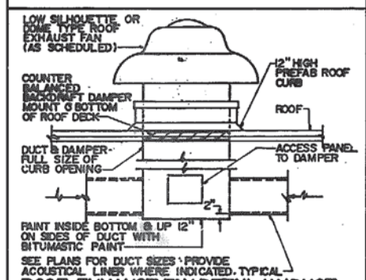
H.W. HORIZONTAL PROPELLER UNIT HEATER PIPING DETAIL
NO SCALE



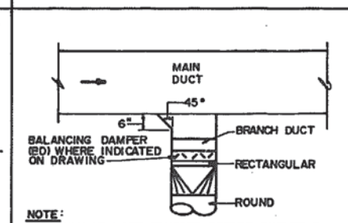
RELIEF VALVE PIPING DETAIL
NO SCALE



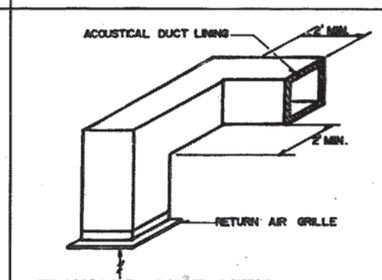
TYPICAL CONDENSATE DRAIN TRAP
NO SCALE



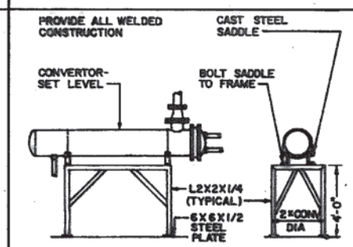
ROOF EXHAUST FAN DETAIL W/DUCT
NO SCALE



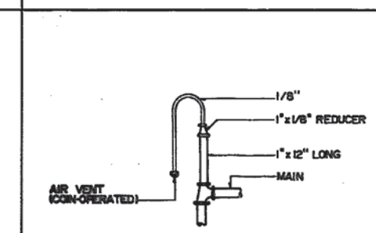
TYPICAL BRANCH CONNECTION
NO SCALE



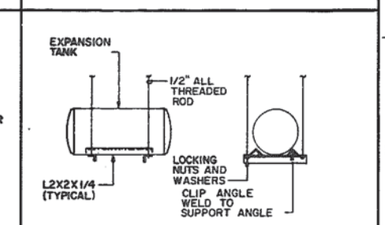
TRANSFER DUCT DETAIL
NO SCALE



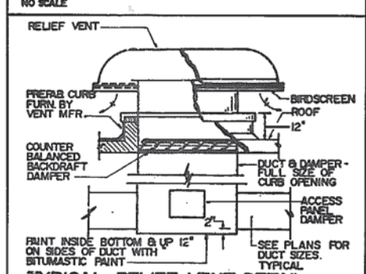
CONVERTOR SUPPORT DETAIL
NO SCALE



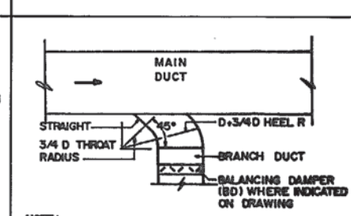
TYPICAL AIR CHAMBER
NO SCALE



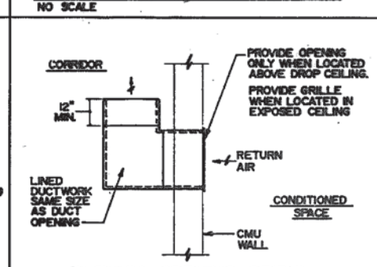
EXPANSION TANK SUPPORT DETAIL
NO SCALE



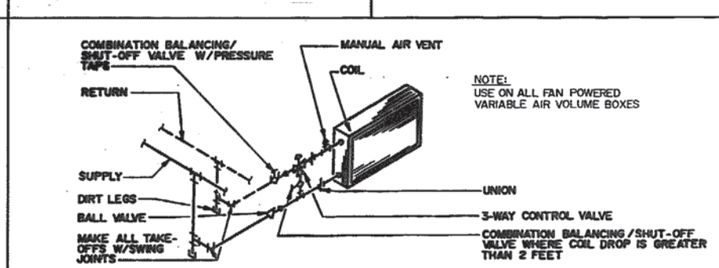
TYPICAL RELIEF VENT DETAIL (WITH DUCTWORK)
NO SCALE



TYPICAL BRANCH CONNECTION
NO SCALE

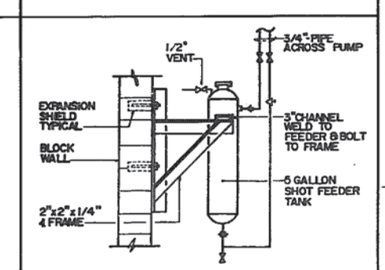


PLENUM OPENING DETAIL
NO SCALE

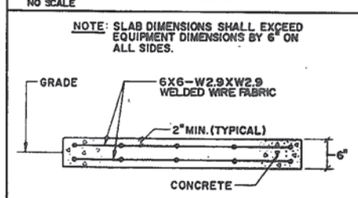


NOTE:
USE ON ALL FAN POWERED VARIABLE AIR VOLUME BOXES

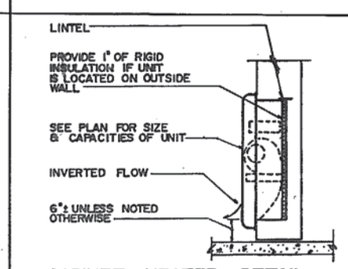
H.W. REHEAT PIPING DETAIL
NO SCALE



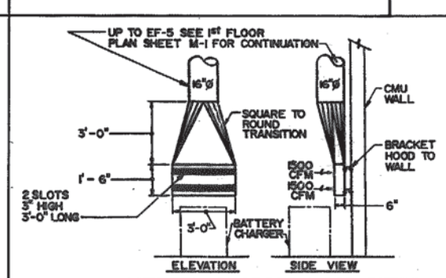
SHOT FEEDER DETAIL
NO SCALE



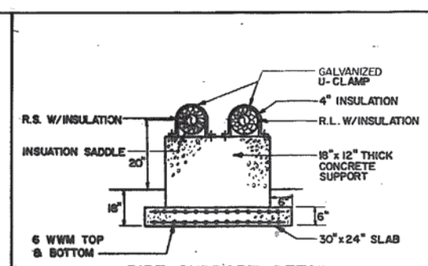
CONCRETE UNIT SUPPORT SLAB DETAIL
NO SCALE



CABINET HEATER DETAIL
NO SCALE



BATTERY CHARGER HOOD DETAIL
NO SCALE



PIPE SUPPORT DETAIL
NO SCALE

RECORD DRAWING BY AS BUILT LETTER DATED

M-5

HENDERSON ASSOCIATES, ARCHITECTS & PROFESSIONAL CORPORATION
NORFOLK, VIRGINIA

EFD DWG NO 301215
JOB ORDER NO
STA PROJ NO P-128
DES DKH DRWN AGB
PROJ MGR DCS CH ARCH/ENGR JBW
EFD RVD F.P.
BR MGR DES DIR
APPROVED DATE
ACTIVITY- SATISFACTORY TO
APPROVED DATE 12-22-92
FOR EFD FOR COMMANDER NAVFAC

COMMONWEALTH OF VIRGINIA
DALE C. HENDERSON
PROFESSIONAL ENGINEER

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VA.

AVIATION MAINTENANCE TRAINING FACILITY

DETAILS

SIZE	CODE IDENT NO	NAVFAC DRAWING NO
F	80091	4201215

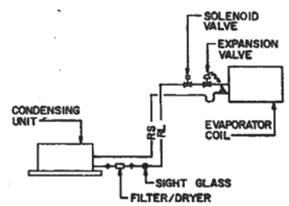
CONSTR. CONTR. NO. N62470-88-B-8154
SCALE NONE SPEC 05-88-8154 SHEET 33 OF 46

HVAC LEGEND AND SYMBOLS

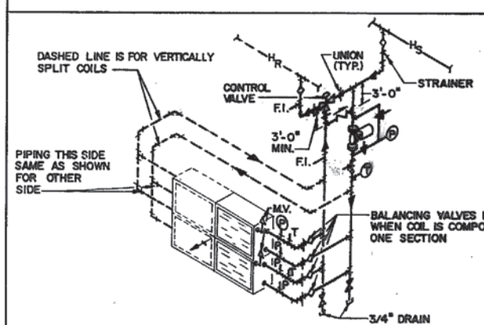
—HS—	HEATING WATER SUPPLY
--HR--	HEATING WATER RETURN
—MU—	MAKE UP WATER
	HIGH PRESSURE STEAM (HPS)
—LPS—	LOW PRESSURE STEAM
	HIGH PRESSURE CONDENSATE (HPC)
—LPC—	LOW PRESSURE CONDENSATE
—D—	CONDENSATE DRAIN
—RL—	REFRIGERANT LIQUID
—RS—	REFRIGERANT SUCTION
— — — —	EXISTING PIPING, DUCT, AND EQUIPMENT
	2-WAY CONTROL VALVE
	3-WAY CONTROL VALVE
	PRESSURE REDUCING VALVE
	PRESSURE RELIEF VALVE
	CHECK VALVE
	GATE VALVE
	GLOBE VALVE
	BALL VALVE
	COMBINATION BALANCING AND SHUTOFF VALVE (PLUG OR BUTTERFLY TYPE)
	COMBINATION BALANCING AND SHUTOFF VALVE (GLOBE TYPE)
	COMBINATION BALANCING AND SHUTOFF VALVE WITH PRESSURE TAPS (GLOBE TYPE)
	UNION
T	STEAM TRAP
	PIPE TURN DOWN
	PIPE TURN UP
	DOWNWARD SLOPE
	DIRECTION OF FLOW
	STRAINER
	MANUAL AIR VENT (MV)
	VACUUM BREAKER (VB)
	AUTOMATIC VENT
P	PRESSURE GAUGE
P	PRESSURE TAP NEEDLE VALVE
T	THERMOMETER
T	THERMOWELL
F.I.	FLOW INDICATOR
T	THERMOSTAT
	ROOF AIR INTAKE
	ROOF RELIEF VENT
	ROOF EXHAUST FAN
BD	BALANCING DAMPER (MULTI-LEAF)
	ELBOW WITH TURNING VANES
	FLEXIBLE CONNECTION
	FLEXIBLE DUCT
	ACOUSTICAL LINING
	ACOUSTICAL DUCT WRAP
Ø	ROUND DUCT
10/10	DOOR LOUVER (SIZE AS NOTED)
UC 1"	DOOR UNDERCUT (MINIMUM 1")
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
APD	AIR PRESSURE DROP
AS	AIR SEPARATOR
AV	AIR VENT
BDD	BACKDRAFT DAMPER
BD	BALANCING DAMPER (MULTI-LEAF)
CUH	CABINET UNIT HEATER
DN	DOWN
DB	DRY BULB
EA	EXHAUST AIR
EDB	ENTERING DRY BULB
EF	EXHAUST FAN
ESP	EXTERNAL STATIC PRESSURE
EWB	ENTERING WET BULB
EWT	ENTERING WATER TEMPERATURE
LWB	LEAVING WET BULB
LDB	LEAVING DRY BULB
LWT	LEAVING WATER TEMPERATURE
LVR	LOUVER
MV	MANUAL VENT
MD	MOTORIZED DAMPER
MAV	MAKE-UP UNIT
OA	OUTSIDE
PD	PRESSURE DROP
RF	RETURN FAN
RA	RETURN AIR
TSP	TOTAL STATIC PRESSURE
UH	UNIT HEATER
VI	VIBRATION ISOLATOR
WPD	WATER PRESSURE DROP

SECTION OR DETAIL NO.
SECTION OR DETAIL LOCATED ON THIS SHEET
SECTION OR DETAIL CUT ON THIS SHEET

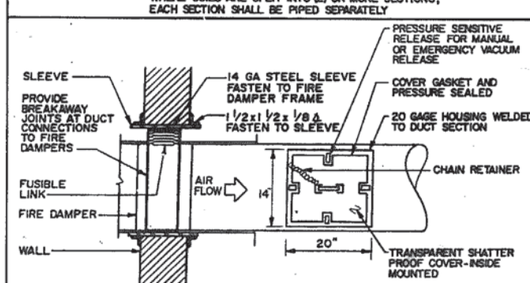
NOTES:
1. REFRIGERANT PIPING SIZES ARE APPROXIMATE FOR BIDDING PURPOSES ONLY. ACTUAL PIPING SIZES SHALL BE SIZED BY APPROVED EQUIPMENT MANUFACTURER AT A PRESSURE DROP CORRESPONDING TO 2°F.
2. ALL SOLENOID VALVES, EXPANSION VALVES, SIGHT GLASS, UNIONS AND FILTER/DRYER SHALL BE PROVIDED BY APPROVED EQUIPMENT MANUFACTURER.



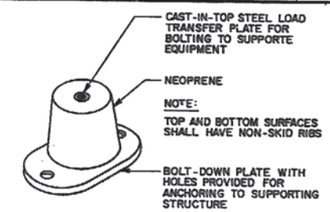
REFRIGERANT PIPING SCHEMATIC
NO SCALE



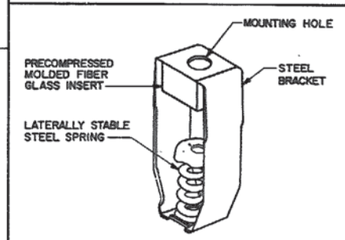
HOT WATER HEATING COIL PIPING DIAGRAM (A.H.U. 1&2)
NO SCALE
WHERE COILS ARE SPLIT INTO (2) OR MORE SECTIONS, EACH SECTION SHALL BE PIPED SEPARATELY



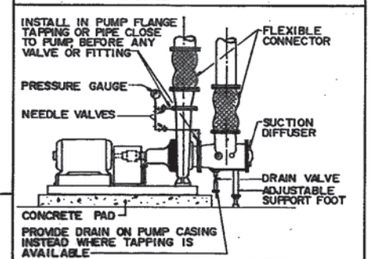
FIRE DAMPER DETAIL - VERTICAL - HIGH VELOCITY
NO SCALE



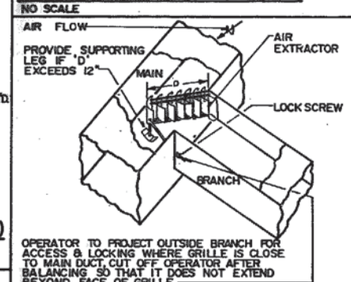
TYPE 1 ISOLATOR
NO SCALE



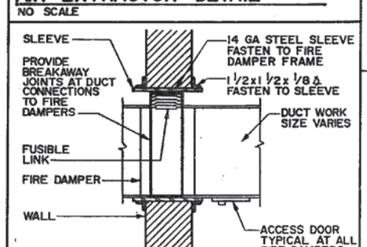
TYPE 2 ISOLATOR
NO SCALE



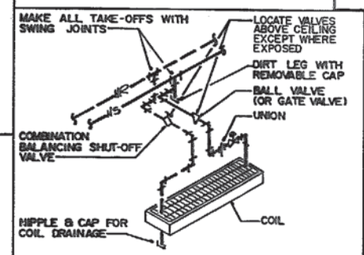
BASE MOUNTED PUMP DETAIL WITH SUCTION DIFFUSER
NO SCALE



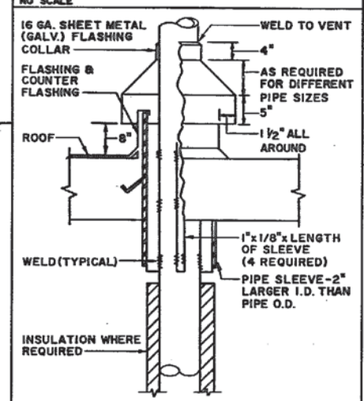
AIR EXTRACTOR DETAIL
NO SCALE



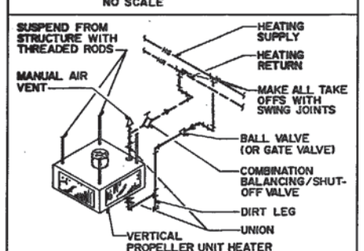
FIRE DAMPER DETAIL - VERTICAL
NO SCALE



HOT WATER CABINET UNIT HEATER PIPING DETAIL
NO SCALE

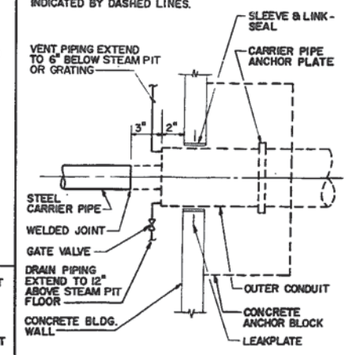


HOT VENT DETAIL
NO SCALE

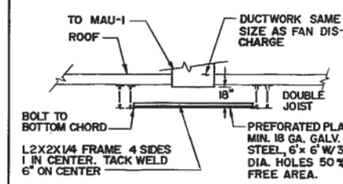


HOT WATER VERTICAL UNIT HEATER PIPING DETAIL
NO SCALE

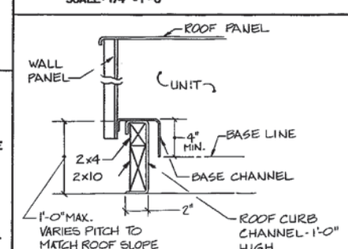
NOTE:
THE CONTRACTOR SHALL DESIGN ITEMS INDICATED BY DASHED LINES.



STEEL CARRIER PIPING STEAM PIT ENTRY DETAIL
NO SCALE



BAFFLE PLATE DETAIL
SCALE: 1/4" = 1'-0"



M.A.U.-1 ROOF CURB DETAIL
NO SCALE

REVISIONS

SYM.	DESCRIPTION	DATE	APPROVED

RECORD DRAWING AS BUILT LETTER DATED

M-6

HENDERSON ASSOCIATES, ARCHITECTS & PROFESSIONAL CORPORATION
NORFOLK, VIRGINIA

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VA.

AVIATION MAINTENANCE TRAINING FACILITY

LEGEND AND DETAILS

EFD DWG. NO. 301216
JOB ORDER NO.
STA. PROJ. NO. P-120
DES DKH DRWN JMW
PROJ. MGR DCS CH ARCH/ENGR JBW
EFD RVD 12/22/88 F.P. 100%
BR. MGR. RCC DER DIR WRC
APPROVED DATE
ACTIVITY - SATISFACTORY TO
APPROVED DATE 12.22.88
FOR EFD FOR COMMANDER NAVFAC

SIZE F | CODE IDENT. NO. 80091 | NAVFAC DRAWING NO. 4201216
CONTR. CONTR. NO. N62470-88-8-8154
SCALE NONE | SPEC. C5-88-8154 | SHEET 34 OF 46

VAV TERMINAL SCHEDULE

TERMINAL NO.	PRIMARY AIR MAX. CFM	PRIMARY AIR MIN. CFM	FAN CFM (+-10%) FAN CAP. CFM	FAN CFM (+-10%) START CFM	FAN CFM (+-10%) STOP CFM	HEATING COIL COIL CAP. BTUH	HEATING COIL FAN CAP. CFM	HEATING COIL EAT DEG F	HEATING COIL LAT DEG F	HEATING COIL GPM	MAXIMUM WATER PD FEET	FAN MOTOR HP
1	290	65	195	260	289	11143	260	65.5	105.0	1.0	8.0	1/15
2	740	180	425	605	669	26241	605	65.0	105.0	1.3	8.0	1/15
3	150	45	100	145	160	6309	145	64.9	105.0	1.0	8.0	1/15
4	215	80	145	225	247	9901	225	64.4	105.0	1.0	8.0	1/15
5	500	145	335	480	530	20843	480	65.0	105.0	1.0	8.0	1/15
6	110	30	75	105	116	4541	105	65.1	105.0	1.0	8.0	1/15
7	145	40	100	140	155	6054	140	65.1	105.0	1.0	8.0	1/15
8	125	35	85	120	133	5197	120	65.1	105.0	1.0	8.0	1/15
9	750	110	500	610	685	25682	610	66.2	105.0	1.3	8.0	1/8
10	335	85	225	310	344	13367	310	65.3	105.0	1.0	8.0	1/15
11	415	115	280	395	437	17105	395	65.1	105.0	1.0	8.0	1/15
12	2900	300	1930	2230	2520	92778	2230	66.7	105.0	4.6	8.0	1/2
13	510	130	340	470	521	20279	470	65.2	105.0	1.0	8.0	1/15
14	630	135	420	555	618	23745	555	65.6	105.0	1.2	8.0	1/15
15	530	95	355	450	503	19096	450	65.9	105.0	1.0	8.0	1/15
16	610	115	405	520	581	22123	520	65.8	105.0	1.1	8.0	1/15
17	945	150	630	780	875	32941	780	66.1	105.0	1.6	8.0	1/8
18	680	105	455	560	628	23620	560	66.1	105.0	1.2	8.0	1/15
19	875	140	585	725	813	30624	725	66.1	105.0	1.5	8.0	1/8
20	260	40	175	215	241	9065	215	66.1	105.0	1.0	8.0	1/15
21	255	45	170	215	241	9119	215	65.9	105.0	1.0	8.0	1/15
22	230	45	155	200	223	8517	200	65.8	105.0	1.0	8.0	1/15
23	245	70	165	235	260	10194	235	65.0	105.0	1.0	8.0	1/15
24	320	90	215	305	337	13221	305	65.0	105.0	1.0	8.0	1/15
25	1900	205	1265	1470	1660	61237	1470	66.6	105.0	3.1	8.0	1/2
26	1900	205	1265	1470	1660	61237	1470	66.6	105.0	3.1	8.0	1/2
27	170	40	115	155	172	6656	155	65.4	105.0	1.0	8.0	1/15
28	600	190	400	590	650	25747	590	64.8	105.0	1.3	8.0	1/15
29	1400	455	935	1390	1530	60738	1390	64.7	108.0	3.0	8.0	1/8
30	1420	455	950	1405	1547	61340	1405	64.8	105.0	3.1	8.0	1/8
31	675	185	450	635	703	27499	635	65.1	105.0	1.4	8.0	1/15
32	2070	220	1380	1600	1807	66619	1600	66.6	105.0	3.3	8.0	1/2
33	1420	280	950	1230	1372	52416	1230	65.7	105.0	2.6	8.0	1/8
34	850	225	570	795	880	34357	795	65.2	105.0	1.7	8.0	1/8
35	1780	425	1190	1615	1793	69445	1615	65.4	105.0	3.5	8.0	1/8
36	2780	420	1850	2270	2548	95686	2270	66.1	105.0	4.8	8.0	1/2
37	130	35	90	125	138	5398	125	65.2	105.0	1.0	8.0	1/15
38	75	25	50	75	83	3282	75	64.7	105.0	1.0	8.0	1/15
39	1455	470	970	1440	1586	62908	1440	64.7	105.0	3.1	8.0	1/8
40	1460	470	970	1440	1597	62908	1440	64.7	105.0	3.1	8.0	1/8

NOTES:

1. FAN STOP CFM BASED ON PRIMARY AIR.
2. FAN MOTORS SHALL BE 120 VOLTS, 1 PHASE BELOW 1/2 HP, 208 VOLTS, 3 PHASE 1/2 HP AND ABOVE.
3. MAXIMUM REQUIRED INLET STATIC PRESSURE SHALL NOT EXCEED .50" WG AT MAXIMUM CFM.
4. NC LEVEL SHALL NOT EXCEED NC = 35.
5. FAN CAPACITY BASED ON .25" E.S.P..
6. ENTERING WATER TEMPERATURE - 180 DEGREES F.
7. ALL MOTORS STARTERS TO BE SIZE 00.

REGISTER, GRILLE & DIFFUSER SCHEDULE

TAG NO.	MODEL	SERVICE	MATERIAL	FINISH	SIZE IN.	MAX PD IN H20	REMARKS
A	DIFFUSER	SUPPLY	ALUMINUM	ANODIZED	9 x 9	.1	
B	DIFFUSER	SUPPLY	ALUMINUM	ANODIZED	12 x 12	.1	
C	DIFFUSER	SUPPLY	ALUMINUM	ANODIZED	15 x 15	.1	
D	DIFFUSER	SUPPLY	ALUMINUM	ANODIZED	18 x 18	.1	
E	LINEAR	SUPPLY	ALUMINUM	OFF WHITE	2-SLOT 3/4" 48"L	.1	
F	LINEAR	SUPPLY	ALUMINUM	OFF WHITE	4-SLOT 3/4" 48"L	.1	
G	REGISTER	SUPPLY	ALUMINUM	ANODIZED	24/14	.1	
H	REGISTER	SUPPLY	ALUMINUM	ANODIZED	10/6	.1	
I	REGISTER	SUPPLY	ALUMINUM	ANODIZED	16/4	.1	
J	REGISTER	SUPPLY	ALUMINUM	ANODIZED	12/8	.1	
K	DIFFUSER	SUPPLY	ALUMINUM	OFF-WHITE	6X6	.1	
AA	REGISTER	EXHAUST	ALUMINUM	ANODIZED	6 x 6	.08	
AB	REGISTER	EXHAUST	ALUMINUM	ANODIZED	8 x 8	.08	
AC	REGISTER	EXHAUST	ALUMINUM	ANODIZED	10 x 10	.08	
AD	GRILLE	RETURN	ALUMINUM	OFF WHITE	6 x 6	.08	
AE	GRILLE	RETURN	ALUMINUM	OFF WHITE	8 x 8	.08	
AF	GRILLE	RETURN	ALUMINUM	OFF WHITE	10 x 10	.08	
AG	GRILLE	RETURN	ALUMINUM	OFF WHITE	12 x 12	.08	
AH	GRILLE	RETURN	ALUMINUM	OFF WHITE	18 x 18	.08	
AI	GRILLE	RETURN	ALUMINUM	OFF WHITE	24 x 24	.08	
AJ	GRILLE	RETURN	ALUMINUM	ANODIZED	16 x 16	.08	
AK	GRILLE	RETURN	ALUMINUM	ANODIZED	16 x 12	.08	
AL	GRILLE	RETURN	ALUMINUM	ANODIZED	30 x 10	.08	

CABINET UNIT HEATER SCHEDULE

TAG NO.	MODEL	FAN CFM SA	FAN HP	COIL TYPE	COIL EDB oF	COIL LWB oF	COIL GPM	COIL PD FT	MBH TOTAL	MOTOR STARTER	REMARKS
CUH-1	RECESSED	200	1/60	HOT WATER	68	105	1.0	.24	1.8	00	
CUH-2	RECESSED	200	1/60	HOT WATER	68	105	1.0	.24	2.2	00	
CUH-3	RECESSED	200	1/60	HOT WATER	68	105	1.0	.24	2.2	00	
CUH-4	RECESSED	200	1/60	HOT WATER	68	105	1.0	.24	1.4	00	
CUH-5	RECESSED	200	1/60	HOT WATER	68	105	1.0	.24	2.6	00	
CUH-6	RECESSED	200	1/60	HOT WATER	68	105	1.0	.24	2.7	00	
CUH-7	RECESSED	200	1/60	HOT WATER	68	105	1.0	.24	2.7	00	
CUH-8	RECESSED	200	1/60	HOT WATER	68	105	1.0	.24	2.3	00	
CUH-9	RECESSED	200	1/60	HOT WATER	68	105	1.0	.24	.3	00	
CUH-10	RECESSED	340	1/30	HOT WATER	68	105	1.4	.77	13.9	00	
CUH-11	RECESSED	200	1/60	HOT WATER	68	105	1.0	.24	1.7	00	
CUH-12	RECESSED	200	1/60	HOT WATER	68	105	1.0	.24	1.9	00	
CHU-13	RECESSED	200	1/60	HOT WATER	68	105	1.0	.24	12.0	00	
CHU-14	RECESSED	200	1/60	HOT WATER	68	105	1.0	.24	12.0	00	

120/1P/60HZ 180 EWT (HEATING)

REVISIONS

SYM.	DESCRIPTION	DATE	APPROVED

SEQUENCE OF CONTROL-CONTINUED

CONV-2 CONTROL

ON A RISE IN HOT WATER SUPPLY TEMPERATURE, A RECEIVER-CONTROLLER WITH TEMPERATURE TRANSMITTER IN THE HOT WATER SUPPLY, SHALL MODULATE THE CONVERTOR STEAM VALVE CLOSED. ON A FALL IN HOT WATER SUPPLY TEMPERATURE, THE REVERSE OPERATION SHALL OCCUR. THE RECEIVER-CONTROLLER SETPOINT SHALL BE RESET BY A TEMPERATURE TRANSMITTER WITH SENSING ELEMENT IN THE OUTSIDE AIR.

PUMPS SHALL BE CONTROLLED AS INDICATED ON MAU-1 CONTROL.

MAU-1

WHEN ONE OF THE TWO EXHAUST FANS ARE STARTED EITHER ONE OF THE EP SWITCHES ARE ENERGIZED TO START UNIT FAN ON LOW SPEED THROUGH THEIR RESPECTIVE PE SWITCHES. WHEN BOTH EXHAUST FANS ARE "ON", UNIT OPERATES ON HIGH SPEED THROUGH THE SELECTOR AND PE SWITCH. OPERATION IS SUCH THAT WHEN THE MAU-1 IS STARTED ON EITHER SPEED THE OUTSIDE AIR DAMPER WILL OPEN.

HOT WATER PUMPS SHALL BE ENERGIZED THROUGH THE PE SWITCH AND THE THERMOSTAT LOCATED IN DISCHARGE AIR. CONTROL SHALL BE ON A FALL IN TEMPERATURE, THE HOT WATER VALVE SHALL MODULATE SO THAT AN INCREASING AMOUNT OF HOT WATER IS SUPPLIED TO THE COIL, THUS BYPASSING A PROPORTIONALLY DECREASING AMOUNT. ON A RISE IN TEMPERATURE THE REVERSE SHALL OCCUR.

ON A FALL IN HOT WATER RETURN TEMPERATURE, AS SENSED BY THE THERMOSTAT LOCATED AT THE COIL, BELOW THE SET POINT THE HOT WATER PUMPS SHALL BE ENERGIZED TO CIRCULATE WATER THROUGH THE COIL. ON A RISE IN OUTSIDE AIR TEMPERATURE ABOVE THE SET POINT THE HOT WATER PUMPS SHALL BE DEENERGIZE. AT OTHER TEMPERATURES ABOVE THE OR BELOW THE THERMOSTAT SET POINTS THE HOT WATER PUMPS ARE INOPERATIVE WHEN MAU-1 IS OFF.

EF-9

EXHAUST FAN SHALL BE INTERLOCKED WITH CARBON DIOXIDE SYSTEM TO DEENERGIZE THE FAN WHEN THE SYSTEM IS DISCHARGED.

MOTORIZED DAMPER

DAMPER SHALL CLOSE ON THE ACTIVATION OF THE CARBON DIOXIDE SYSTEM.

M-7

HENDERSON ASSOCIATES, ARCHITECTS & PROFESSIONAL CORPORATION
NORFOLK, VIRGINIA

EFD DWG. NO. 301217
JOB ORDER NO.
STA. PROJ. NO. P-129
DES. DICH. DRWN AGB
PROJ. MGR. DCS CH. ARCH/ENGR JBW
EFD RVD FP
BR. MGR. DES. DIR
APPROVED DATE
ACTIVITY- SATISFACTORY TO
APPROVED DATE 12-22-99
FOR EFD FOR COMMANDER NAVFAC

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VA.

AVIATION MAINTENANCE TRAINING FACILITY

SCHEDULES

SIZE F | CODE IDENT NO. 80091 | NAVFAC DRAWING NO. 4201217
CONSTR. CONTR. NO. N62470-88-B-8154
SCALE NONE | SPEC. 05-88-8154 | SHEET 35 OF 46

AIR HANDLING UNIT SCHEDULE

TAG NO.	AREA SERVED	MODEL	FAN DATA: TYPE	CFM SUPPLY	CFM OA	EXT SP	TOT SP	RPM	MOTOR HP	MOTOR STARTER	COIL DATA: TYPE	MBH TOTAL	EDB oF	LDB oF	EWB oF	LWB oF	GPM OR # STM	WTR PD FT H20	AIR PD	FV FPM	REMARKS
AHU-1	OFFICE/ CLASSROOMS	VERT.	FORWARD CURVE	12370	2385	3.75	5.93	1120	20	2	DX	504.0	82.3	54.8	67.2	53.7	--	--	.59	514	
											HOT WATER	85.9	48.6	55.0	--	--	8.6	.2	.15	514	
AHU-2	TRAINERS	VERT.	AIR FOIL	20000	4305	3.75	5.35	1506	25	2	DX	855.6	82.8	54.8	67.5	53.7	--	--	.54	494	
											HOT WATER	154.1	47.9	55.0	--	--	15.4	.2	.14	494	
CRU-1	COMPUTER	VERT.		12000	0	.5	--	--	7.5	1	DX	275.6	76.5	56.9	62.0	54.1	--	--	--	480	
											HOT WATER	160.0	66.5	78.8	--	--	16.0	1.0	--	480	
MAU-1	ROOM 131	ROOF-TOP WTHRPRF.	FORWARD CURVE	10,800/ 5,400	10,800/ 5,400	.5	1.25	746/373	7.5	1	HOT WATER	525.0	23	68	--	--	26.4	1.0	.13	498	WEATHERPROOF

BELOW 3/4 HP - 120V/1P/60HZ; 3/4 HP AND ABOVE 460V/3P/60HZ; 180 EWT HEATING; 25 PSI

NOTES:

1. CRU-1 - INFRARED HEATER 6.0 KW, 7.5 KW ELECTRIC REHEAT 208 VOLTS, 3 PHASE TOTAL SYSTEM 133 FLA, 208 VOLTS, 3 PHASE.
2. PROVIDE AHU-1 AND AHU-2 WITH FAN SECTION, INLET VANES DX COOLING COIL, ACCESS SECTION, HOT WATER COIL, PREHEAT SECTION, AND MEDIUM CAPACITY FILTER/MIXING BOX.

VIRBRATION ISOLATION SCHEDULE

EQUIPMENT DESIGNA'N	TYPE	EQUIP. WEIGHT	BASE TYPE	ISOLATOR TYPE	MIN. DEFLECT.	MINIMUM NO. REQ.	REMARKS
AHU-1	AIR MOVING EQUIP	3500	NO BASE	TYPE 1	0.25"	6	
AHU-2	AIR MOVING EQUIP	6000	NO BASE	TYPE 1	0.25"	6	
RF-1	AIR MOVING EQUIP	450	NO BASE	TYPE 2	1.75"	4	
RF-2	AIR MOVING EQUIP	700	NO BASE	TYPE 2	1.75"	4	

SEE DETAILS SHEET M-6 FOR ISOLATOR TYPE

AIR COOLED CONDENSING UNIT SCHEDULE

MARK	COMPRESSOR DATA: TOTAL CAP. MBH.	SUCT. TEMP. DEG.F	REFRIG.	RATED LOAD AMPS	LOCKED ROTOR AMPS	CONDENSOR DATA: FAN TYPE	CFM TOTAL	EAT DEG.F	COND. TEMP DEG. F.	FULL LOAD AMPS	FAN MOTOR (EA) HP	NO.	ELECTRICAL DATA: VOLTS	PHASE
CU-1	504.0	40	R-22	19.4	185	PROP	---	95	110	1.8	1.0	6	460	3
CU-2	855.6	40	R-22	124.0	550	PROP	---	95	110	11.0	7.5	2	460	3
CU-3	275.6	40	R-22	---	---	PROP	---	95	110	14.4	1-1/2	2	208	3

1. CU-1 CAPACITY TO MATCH AHU-1. UNIT CAPACITY STEPS 100-83-50-33%
2. CU-2 CAPACITY TO MATCH AHU-2. UNIT CAPACITY STEPS 100-67-50-33%
3. CU-3 IS A CONDENSER ONLY. CAPACITY TO MATCH CRU-1.

UNIT HEATER SCHEDULE

TAG NO.	MODEL	CFM	RPM	HP	MBH	GPM	CABINET SIZE: PD FT.	LxWxH	MOTOR STARTER	REMARKS
UH-1	HORZ	420	1550	1/50	16.9	1.7	2.2	8x18x16	00	
UH-2	HORZ	420	1550	1/50	16.9	1.7	2.2	8x18x16	00	
UH-3	VERT	790	1050	1/30	19.4	1.3	.5	22x22x 6	00	
UH-4	VERT	790	1050	1/30	19.4	1.3	.5	22x22x 6	00	
UH-5	VERT	790	1050	1/30	19.4	1.3	.5	22x22x 6	00	
UH-6	VERT	790	1050	1/30	19.4	1.3	.5	22x22x 6	00	
UH-7	VERT	790	1050	1/30	19.4	1.3	.5	22x22x 6	00	
UH-8	VERT	790	1050	1/30	19.4	1.3	.5	22x22x 6	00	
UH-9	VERT	790	1050	1/30	19.4	1.3	.5	22x22x 6	00	

120V/1P/60HZ 180 EWT 25 PSI

INTAKE/RELIEF HOOD SCHEDULE

TAG NO.	SERVICE	MODEL	CFM	PD	THROAT SIZE	HOOD FREE AREA	REMARKS
RI-1	INTAKE		20000	.08	60 x 60	25 SQUARE FEET	
RV-1	RELIEF		9985	.10	48 x 48	16 SQUARE FEET	

CIRCULATING PUMP SCHEDULE

TAG NO.	LOCATION	GPM	HEAD FT	MOTOR: HP	VOLTAGE/ PHASE	RPM	IMPELLER SIZE	MODEL	MOTOR STARTER	REMARKS
P-1	MECH. 145	130.0	75	5	460/3	1750	8.9	BASE MOUNTING	0	
P-2	MECH. 145	130.0	75	5	460/3	1750	8.9	BASE MOUNTING	0	
P-3	MECH. 124	8	8	1/25	120/1	3250	--	CIRCULATOR	00	
P-4	MECH. 145	8	8	1/25	120/1	3250	--	CIRCULATOR	00	
P-5 & P-6	MECH. 145	26.4	42.5	3/4	460/3	1750	6.375	CIRCULATOR	00	1-1/2" SIZE

FAN SCHEDULE

TAG NO.	SERVICE	CFM	ESP	FAN RPM	HP	TIP SPEED	SOUND LEVEL	DAMPER SIZE	MOTOR START	REMARKS
EF-1	EXHAUST	1180	3/8	1725	1/4	5305	8.2	--	00	INLINE CENTRIFUGAL WITH LIGHT SWITCH CONTROL
EF-2	EXHAUST	500	3/8	1100	1/8	3420	14.2	--	00	INLINE CENTRIFUGAL WITH LIGHT SWITCH CONTROL
EF-3	EXHAUST	725	3/8	1225	1/4	3848	11.1	12 x 12	00	CENTRIFUGAL ROOF VENTILATOR WITH LIGHT SWITCH CONTROL
(A) EF-4	EXHAUST	3958	1/8	860	1/3				00	ROOF PROPELLER UP-BLAST WITH THERMOSTAT CONTROL
EF-5	EXHAUST	3150	3/4	1147	3/4	5406	14.1	19X 19	00	CENTRIFUGAL ROOF VENTILATOR EXPLOSION PROOF W/ WALL SW.CTRL
EF-6	EXHAUST	785	3/8	1225	1/4	3848	11.1	12 x 12	00	CENTRIFUGAL ROOF VENTILATOR WITH THERMOSTAT CONTROL
EF-8	EXHAUST	215	3/8	1100	1/28	2844	6.8	10 x 10	00	CENTRIFUGAL ROOF VENTILATOR WITH WALL SWITCH CONTROL
EF-9	EXHAUST	400	3/8	715	1/6	3090	52	--	00	INLINE CENTRIFUGAL
EF-10 & EF-11	EXHAUST	6000	1.0	690	2	5400	--	28 X 28	00	CENTRIFUGAL UP-BLAST ROOF VENTILATOR W/WALL SWITCH CTRL FOR EA
RF-1	RETURN EXHAUST	9985	1-1/4	966	5	--	--	--	0	AXIAL WITH INLET VANES
RF-2	RETURN EXHAUST	15695	1	587	5	--	--	--	0	AXIAL WITH INLET VANES

BELOW 3/4 HP - 120V/1P/60HZ; 3/4 HP AND ABOVE - 460V/3P/60HZ

REVISIONS

SYM.	DESCRIPTION	DATE	APPROVED
(A)	AS-BUILDS	7-1993	

EQUIPMENT LIST

CONV-1 STEAM TO WATER CONVERTOR. 7 PSI ENTERING STEAM PRESSURE, 1.9 TUBE PD, 900 MBH, 166.4°F EWT, 180°F LWT, 130.0 GPM, 8" DIAMETER, 4 FEET LENGTH, 2 PASS

CONV-2 STEAM TO WATER CONVERTOR. 7 PSI ENTERING STEAM PRESSURE, 1.0 TUBE PD, 578 MBH, 140°F EWT, 180°F LWT, 26.4 GPM, 6" DIAMETER, 5 FEET LENGTH, 2 PASS

AS-1 AIR SEPARATOR 130.0 GPM, .55 PD, 272 C_V FACTOR, 4" PIPE CONNECTION WITH STRAINER.

AS-2 AIR SEPARATOR 26.4 GPM, .30 PD, 72 C_V FACTOR, 2" PIPE CONNECTION WITH STRAINER.

EXP-1 EXPANSION TANK 950 GALLON SYSTEM VOLUME, 50° F MIN, OPERATING TEMP. 9 PSI MIN. OPERATING PRESS. 180° F MAX OPERATING TEMP., 35 PSI MAX. OPERATING PRESS., 28 GAL EXPANSION VOLUME, 57 GAL TANK VOLUME.

EXP-2 EXPANSION TANK 75 GALLON SYSTEM VOLUME, 50° F MIN, OPERATING TEMP. 9 PSI MIN. OPERATING PRESS. 180° F MAX OPERATING TEMP., 35 PSI MAX. OPERATING PRESS., 2.2 GAL EXPANSION VOLUME, 8 GAL TANK VOLUME.

FI FLOW INDICATORS
THE FLOW INDICATORS SHALL INCLUDE ANNULAR PRIMARY ELEMENT FLOW STATIONS. EACH ANNULAR MEASURING STATION SHALL BE COMPLETE WITH SAFETY SHUT OFF VALVES AND QUICK COUPLING CONNECTIONS, AND A PERMANENT METAL TAG SHOWING DESIGN FLOW RATES, METERED FLUID, LINE SIZE AND TAG, STATION OR LOCATION NUMBER. ANNULAR MEASURING ELEMENT SHALL BE MADE OF STAINLESS STEEL. STATIONS SHALL BE EITHER NIPPLE SECTION OR WELD INSERT TYPE AND BE RATED TO 275 PSI AT 400 DEGREES F. ANNULAR MEASURING STATION SHALL BE ROTATABLE SENSING ELEMENTS SO THAT ALL PRESSURE SENSING PORTS CAN BE POINTED DOWNSTREAM WHEN STATION IS NOT IN USE. PERMANENT PRESSURE LOSS TO THE SYSTEM SHALL NOT EXCEED 5" H20 (0.42') OF HEAD ON SIZES OVER 1-1/2". ACCURACY OF THE FLOW MEASURING ELEMENTS SHALL BE +/-.55 TO +/-2.3%. AS VERIFIED BY INDEPENDENT LABORATORY TESTS.

RECORD DRAWING LETTER DATED 17 AUG 1993

M-8

HENDERSON ASSOCIATES, ARCHITECTS & PROFESSIONAL CORPORATION NORFOLK, VIRGINIA

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION NAVAL STATION NORFOLK, VA.

EFD DWG. NO 301218
JOB ORDER NO.
STA. PROJ. NO. P-129
DES. DKH DRWN AGB
PROJ. MGR DCS CH.ARCH/ENGR JBW
EFD RVD. FP
AE MGR DES DIR
APPROVED DATE

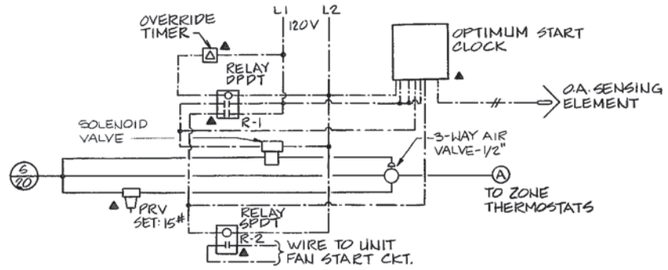
ACTIVITY- SATISFACTORY TO
APPROVED DATE 12-2-89
FOR EFD FOR COMMANDER NAVFAC

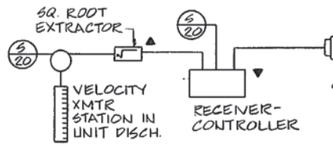
AVIATION MAINTENANCE TRAINING FACILITY

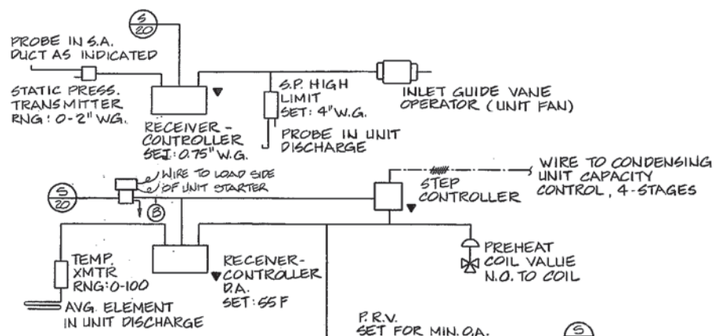
SCHEDULES AND EQUIPMENT LIST

SIZE F | CODE IDENT NO. 80091 | NAVFAC DRAWING NO. 4201218

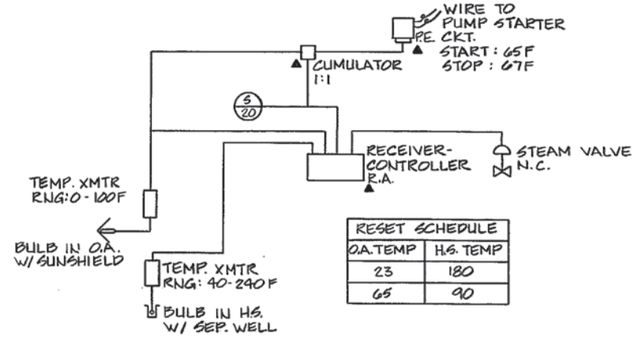
SCALE NONE | SPEC. 05-88-8154 | CONSTR. CONTR. NO. N62470-88-B-8154 | SHEET 36 OF 46





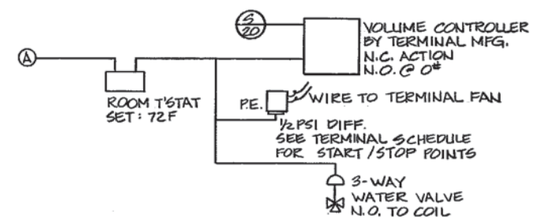


AHU 1 AND 2 CONTROL DIAGRAM

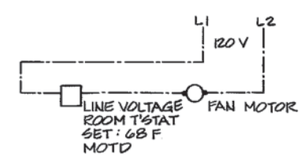


RESET SCHEDULE	
O.A. TEMP	H.S. TEMP
23	180
65	90

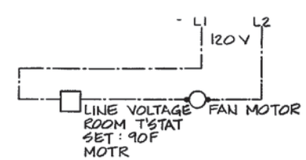
CONVERTOR CONTROL



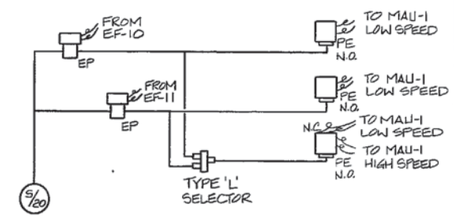
FAN-POWERED VAV TERMINAL CONTROL



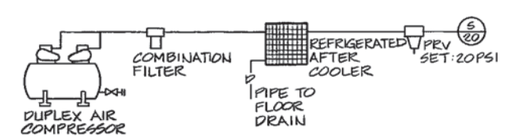
(CABINET) UNIT HEATER CONTROL



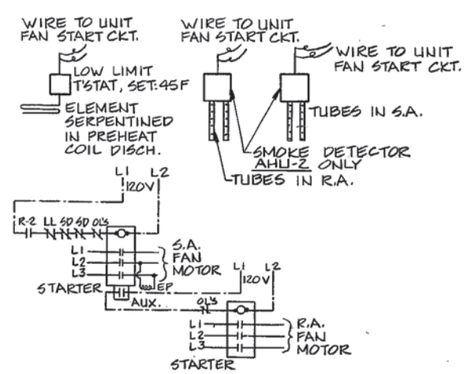
EXHAUST FAN EF-4 AND 6 CONTROL



EXHAUST FAN 10 AND 11 CONTROL



CONTROL AIR



ELEMENTARY WIRING DIAGRAM

CONTROL LEGEND

SYMBOL	DESCRIPTION
———	CONTROL AIR
- - - -	CONTROL WIRING
▲	PANEL MOUNTED
S.A.	SUPPLY AIR
R.A.	RETURN AIR
E.P.	ELECTRO-PNEUMATIC SWITCH
P.E.	PRESSURE-ELECTRIC SWITCH
T'STAT	THERMOSTAT
TEMP.	TEMPERATURE
RNG.	RANGE
D.A.	DIRECT ACTING
R.A.	REVERSE ACTING
XMTR	TRANSMITTER
HUM	HUMIDITY
DPDT	DOUBLE POLE, DOUBLE THROW
SPDT	SINGLE POLE, DOUBLE THROW
MOTD	MAKE ON TEMP. DROP
MOTR	MAKE ON TEMP. RISE
N.C.	NORMALLY CLOSED
N.O.	NORMALLY OPEN
PRV	PRESSURE REDUCING VALVE
AVG.	AVERAGING
DTC	DATA TERMINAL CABINET

REVISIONS

SYM.	DESCRIPTION	DATE	APPROVED

RECORD DRAWING LETTER DATED 17 FEB 1989

M-9

HENDERSON ASSOCIATES, ARCHITECTS & PROFESSIONAL CORPORATION
NORFOLK, VIRGINIA

EFD DWG. NO. 301219
JOB ORDER NO.
STA. PROJ. NO. P-123
DES. PLG. DRWN. JMW
PROJ. MGR. DCS CH. ARCH/ENGR. JBW
EFD RVD. EP
BR. MGR. DES. BR.
APPROVED DATE
ACTIVITY - SATISFACTORY TO
APPROVED DATE
FOR EFD FOR COMMANDER NAVFAC

COMMONWEALTH OF VIRGINIA
DAVID C. SPENCER
LICENSED PROFESSIONAL ENGINEER

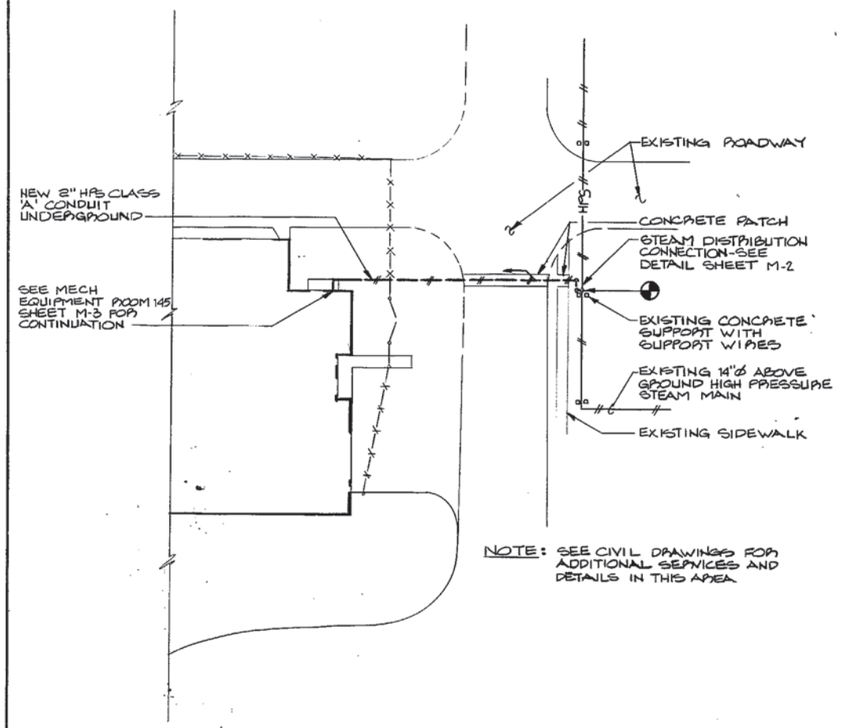
DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION — NORFOLK, VA.

AVIATION MAINTENANCE TRAINING FACILITY

CONTROL DIAGRAMS

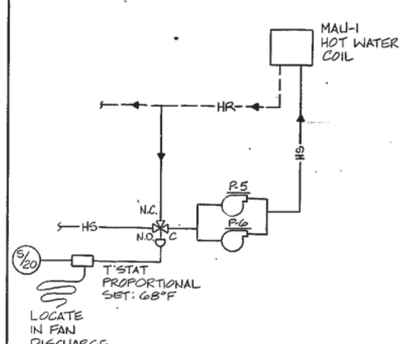
SIZE	CODE IDENT NO.	NAVFAC DRAWING NO.
F	80091	4201219

CONSTR. CONTR. NO. N62470-88-B-8154
SCALE NONE — SPEC. 05-88-8154 — SHEET 37 OF 46

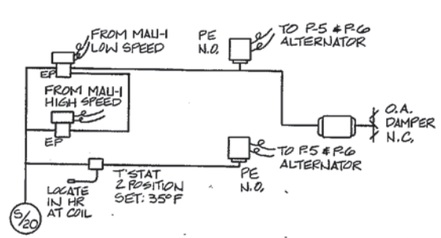


PARTIAL MECHANCAL SITE PLAN

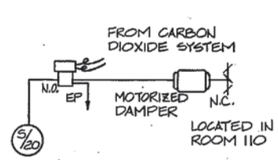
SCALE: 1"=25'-0"



MAU-1 H.W. COIL CONTROL



MAU-1 CONTROL



MOTORIZED DAMPER CONTROL

SEQUENCE OF CONTROL

AHU-1 & AHU-2

THE AIR HANDLING UNIT SHALL BE INDEXED TO THE OCCUPIED, WARM-UP, OR UNOCCUPIED MODE OF CONTROL BY THE OPTIMUM START CLOCK. THE OPTIMUM START CLOCK SHALL CALCULATE OPTIMUM START TIME FROM OUTSIDE AIR TEMPERATURE. WHEN INDEXED TO THE WARM-UP MODE, THE ZONE THERMOSTATS SHALL CHANGE TO THE OCCUPIED SETPOINT. THE AIR HANDLING UNIT SHALL START ON TIME FUNCTION.

WHEN THE AIR HANDLING UNIT IS ENERGIZED, THE SUPPLY AIR FAN SHALL START, THE RETURN AIR FAN SHALL START, AND THE OUTSIDE, RETURN, AND RELIEF AIR DAMPERS SHALL BE PLACED IN THE MINIMUM OUTSIDE AIR POSITION. WHEN THE SUPPLY AIR FAN IS STARTED, THE RETURN AIR FAN SHALL BE ENERGIZED THROUGH ELECTRICAL INTERLOCK.

ON A RISE IN DISCHARGE TEMPERATURE, A RECEIVER-CONTROLLER, WITH TRANSMITTER IN THE UNIT DISCHARGE, SHALL FIRST MODULATE THE PREHEAT COIL VALVE CLOSED TO THE COIL AND THEN MODULATE THE OUTSIDE, RETURN, AND RELIEF AIR DAMPERS TO ADMIT UP TO 100% OUTSIDE AIR. ON A CONTINUED RISE IN DISCHARGE AIR TEMPERATURE, THE CONDENSING UNIT SHALL BE ENERGIZED IN FOUR STAGES. ON A FALL IN DISCHARGE AIR TEMPERATURE, THE REVERSE SEQUENCE SHALL OCCUR. A TWO POSITION OUTSIDE AIR CONTROLLER SHALL OVERRIDE ECONOMIZER OPERATION AND RETURN THE DAMPERS TO MINIMUM OUTSIDE AIR POSITION WHEN OUTSIDE AIR TEMPERATURE RISES ABOVE A PREDETERMINED SETTING.

ON A RISE IN DOWN DUCT STATIC PRESSURE, A RECEIVER-CONTROLLER, WITH STATIC PRESSURE TRANSMITTER LOCATED IN THE SUPPLY DUCT, SHALL MODULATE THE FAN INLET GUIDE VANE CLOSED. ON A FALL IN STATIC PRESSURE, THE REVERSE OPERATION SHALL OCCUR. A HIGH LIMIT STATIC PRESSURE CONTROLLER SHALL LIMIT STATIC PRESSURE AT THE UNIT DISCHARGE TO 4.00 INCHES W.G.

A RECEIVER-CONTROLLER, WITH LINEARIZED VELOCITY PRESSURE TRANSMITTER LOCATED IN THE AIR HANDLING UNIT DISCHARGE, SHALL MODULATE THE RETURN AIR FAN INLET GUIDE VANE IN RESPONSE TO CAPACITY CHANGES IN THE SUPPLY FAN.

SMOKE DETECTORS (AHU-2 ONLY) IN THE RETURN AIR AND IN THE DISCHARGE AIR SHALL ACT TO DEENERGIZE THE UNIT FAN AND CLOSE THE OUTSIDE AIR DAMPER ON SENSING PARTICLES OF COMBUSTION.

A LOW LIMIT THERMOSTAT WITH SENSING ELEMENT IN THE PREHEAT COIL DISCHARGE SHALL ACT TO DEENERGIZE THE UNIT FAN AND CLOSE THE OUTSIDE AIR DAMPER ON SENSING A TEMPERATURE OF 45F.

WHEN INDEXED TO THE UNOCCUPIED CYCLE OF CONTROL BY THE OPTIMUM START CLOCK, THE UNIT SUPPLY AND RETURN AIR FANS

SHALL BE DEENERGIZED AND THE OUTSIDE AIR DAMPER SHALL CLOSE. THE ZONE THERMOSTATS SHALL BE SET TO THEIR NIGHT SETBACK SETPOINT. AN OVERRIDE TIMER SHALL OVERRIDE NIGHT SETBACK CONTROL TO START THE AIR HANDLING UNIT AND RETURN THE ZONE THERMOSTATS TO THEIR OCCUPIED SETPOINT.

FAN-POWERED VARIABLE AIR VOLUME TERMINAL CONTROL

ON A RISE IN SPACE TEMPERATURE, THE SPACE THERMOSTAT SHALL FIRST MODULATE THE HOT WATER VALVE CLOSED TO THE COIL AND THEN MODULATE THE PRIMARY AIR VALVE OPEN. THE UNIT FAN SHALL BE DEENERGIZED AT THE SCHEDULED POINT. ON A FALL IN SPACE TEMPERATURE, THE REVERSE SEQUENCE SHALL OCCUR.

CONV-1 CONTROL

ON A RISE IN HOT WATER SUPPLY TEMPERATURE, A RECEIVER-CONTROLLER WITH TEMPERATURE TRANSMITTER IN THE HOT WATER SUPPLY, SHALL MODULATE THE CONVERTOR STEAM VALVE CLOSED. ON A FALL IN HOT WATER SUPPLY TEMPERATURE, THE REVERSE OPERATION SHALL OCCUR. THE RECEIVER-CONTROLLER SETPOINT SHALL BE RESET BY A TEMPERATURE TRANSMITTER WITH SENSING ELEMENT IN THE OUTSIDE AIR.

ON A RISE IN OUTSIDE AIR TEMPERATURE TO 67F, THE HOT WATER PUMP SHALL BE DEENERGIZED. ON A FALL IN OUTSIDE AIR TEMPERATURE TO 65F, THE HOT WATER PUMP SHALL BE ENERGIZED.

(CABINET) UNIT HEATER CONTROL

A LINE VOLTAGE THERMOSTAT SHALL CYCLE THE UNIT FAN TO MAINTAIN SETPOINT.

EXHAUST FAN EF-4 AND EF-6

A LINE VOLTAGE THERMOSTAT SHALL CYCLE THE EXHAUST FAN TO MAINTAIN SETPOINT.

SEE SHEET M-7 FOR CONTINUATION.

REVISIONS

NO.	DESCRIPTION	DATE	APPROVED

GRAPHIC SCALE

1"=25'-0" 25 0 25 50

RECORD DRAWING
LETTER DATED

M-10

HENDERSON ASSOCIATES, ARCHITECTS & PROFESSIONAL CORPORATION
NORFOLK, VIRGINIA

EFD DWG. NO. 301220
JOB ORDER NO.
STA. PROJ. NO. P-125
DES. DKH DRWN. JMW
PROJ. MGR. DCS CH. ARCHITECT JBW
EFD RVD. EFP.
SR. MGR. DES. DIR.
APPROVED DATE
ACTIVITY - SATISFACTORY TO
APPROVED DATE 12-2-82
FOR EFD FOR COMMANDER, NAVFAC

COMMONWEALTH OF VIRGINIA
DALE C. SCHEIER
No. 14677
PROFESSIONAL ENGINEER

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VA.

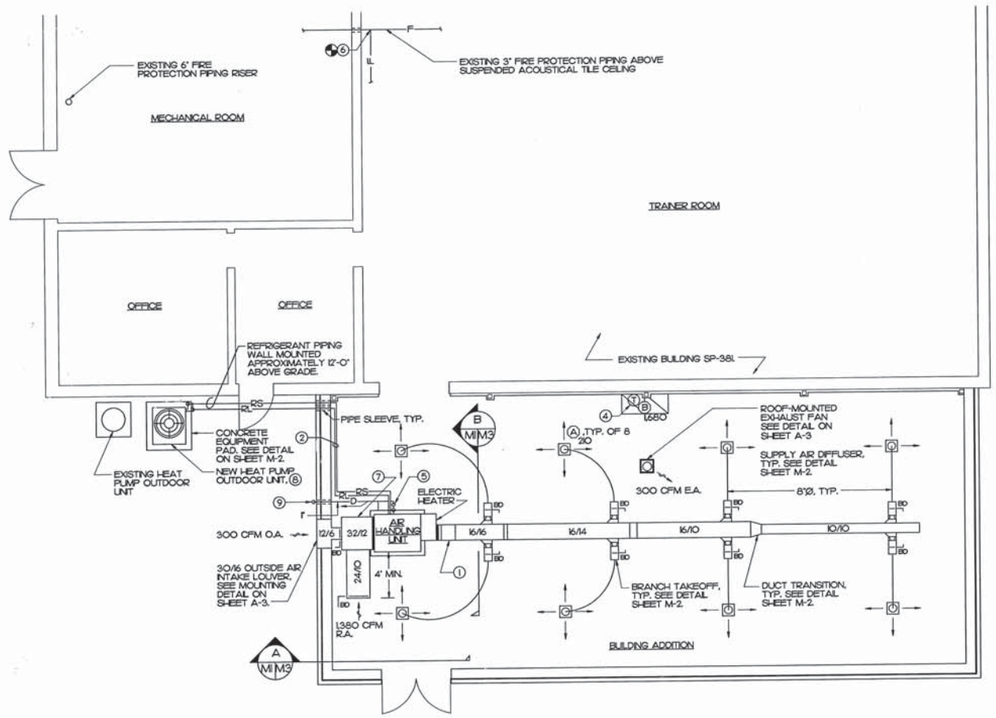
AVIATION MAINTENANCE TRAINING FACILITY

CONTROL DIAGRAMS

SIZE	CODE IDENT. NO.	NAVFAC DRAWING NO.
F	80091	4201220

CONSTR. CONTR. NO. N62470-88-B-8154

SCALE NONE SPEC. 05-88-8154 SHEET 38 OF 46



NORTH

NEW WORK - PLAN

SCALE = 1/4" = 1'-0"

DIFFUSER AND GRILLE SCHEDULE

MARK	NECK SIZE (IN)	QTY.	CFM	MAX. PD (IN. WG)	THROW (FT.)	TYPE	REMARKS
(A)	12 X 12	8	210	0.020	7	SQUARE SUPPLY, 4-WAY BLOW	2' X 2' LAY IN TYPE W/DAMPER
(B)	24 X 48	1	1650	0.020	N/A	EGG CRATE RETURN GRILLE	SEE NOTE 3, THIS SHEET

NOTES:
1. PROVIDE ALL DEVICES WITH AN OFF-WHITE ENAMEL FINISH.
2. THE MAX. NOISE CRITERIA LEVEL (NC VALUE) SHALL NOT EXCEED 25 FOR ANY DEVICE LISTED ABOVE.

GRAPHIC SCALE

1/4" = 1'-0"

REVISIONS

SYM	DESCRIPTION	DATE	SATISFACTORY	APPROVED BY

MECHANICAL LEGEND

—D—	DRAIN PAN PIPING
—F—	FIRE PROTECTION PIPING
—RS—	REFRIGERANT SUCTION PIPING
—RL—	REFRIGERANT LIQUID PIPING
—C—	PIPING DOWN
	DIRECTION OF DOWNWARD SLOPE
	NEW TO EXISTING CONNECTION
(4)	NOTE SYMBOL
(A) 210	DIFFUSER OR GRILLE MARK, CFM AS NOTED
(T)	THERMOSTAT
8"Ø	FLEXIBLE DUCT DIAMETER
BD	MANUAL BALANCING DAMPER
	SUPPLY DUCT
	RETURN DUCT
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
CFM	CUBIC FEET PER MINUTE
EA	EXHAUST AIR
HPOU	HEAT PUMP OUTDOOR UNIT
MIN	MINIMUM
OA	OUTSIDE AIR
RA	RETURN AIR
TYP	TYPICAL

MECHANICAL NEW WORK NOTES

1. PROVIDE TRANSITION AS NEEDED TO SUIT UNIT CONNECTION SIZE.
2. PROVIDE REFRIGERANT PIPING IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. PIPE SIZES SHALL BE FURNISHED BY THE MANUFACTURER (APPROXIMATE PIPE SIZES 1/2" RL, 1-1/8" RS). PROVIDE A FILTER DRIER, SIGHT GLASS AND ALL OTHER REFRIGERANT PIPING ACCESSORIES PER THE MANUFACTURER'S INSTRUCTIONS. INSTALL PIPING SO AS TO ALLOW SERVICING AT BOTH THE AIR HANDLING UNIT AND THE HEAT PUMP OUTDOOR UNIT.
3. RETURN AIR GRILLES SHALL BE PLASTIC 1/2" X 1/2" X 1/2" EGGCRATE, LAY-IN TYPE. SEE REFLECTED CEILING PLAN ON SHEET A-2 FOR LOCATION. CUT GRILLE TO FIT SIZE OF THE INDICATED OPENING.
4. MOUNT THERMOSTAT 5 FEET ABOVE FINISHED FLOOR.
5. PROVIDE MINIMUM 4" DEEP TRAP AND 2" DEEP SEAL IN CONDENSATE DRAIN AT AIR HANDLING UNIT. SLOPE DRAIN PAN PIPING IN DIRECTION OF FLOW A MINIMUM OF 1" PER FOOT.
6. EXTEND EXISTING BUILDING WET-PIPE SPRINKLING SYSTEM INTO NEW ADDITION. INSTALL HEADS PER ORDINARY HAZARD PIPE SCHEDULE.
7. RETURN AIR PLENUM DIMENSIONS TO MATCH UNIT CONNECTION SIZE.
8. RECOMMENDED CLEARANCES SHOULD BE MAINTAINED TO ENSURE ADEQUATE SERVICEABILITY.
9. DRAIN PAN PIPING DOWN TO FRENCH DRAIN. SEE DETAIL ON SHEET M-2.

GENERAL NEW WORK NOTE

DIFFUSER AND GRILLE LOCATIONS ARE APPROXIMATE. SEE ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATIONS.

M-1

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
NAVY PUBLIC WORKS CENTER
NAVAL STATION — NORFOLK, VIRGINIA
NAVAL AIR STATION — NORFOLK, VIRGINIA

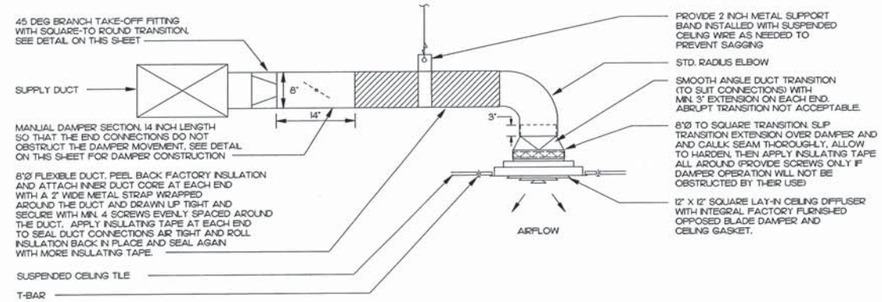
JOB ORDER NO. 920504
DES. GLS | DR. GLS | CHK. WBD
BID MGR. T. E. GALLAGHER, P.E.
SUBMITTED BY:
FIRM MEMBER / PRINCIPAL
BIC. SDM | P.P.
DIV. DIO. R. H. MIS
APPROVED: W. B. BURUS DATE: 2/12/93
SATISFACTORY TO SUBMIT:
APPROVED: DATE: 2/26/93
PE CO. CHAIRMAN, NAVFAC

BUILDING SP-381
BUILDING ADDITION

MECHANICAL NEW WORK PLAN

SIZE	CODE ID NO.	NAVFAC DRAWING NO.	PWC DRAWING NO.
D	80091	4,255,203	14,567 E
		CONSTR. CONTR. NO. N62470-90-B-4562	
SCALE: GRAPHIC		SPEC. 05-90-4562	SHEET 6 OF 10

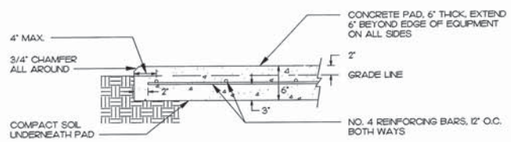
REVISIONS				
SYM	DESCRIPTION	DATE	SATISFACTORY	APPROVED BY



NOTE:
THE BRANCH TAKE-OFF FITTING AND DAMPER SECTION SIZE SHALL EQUAL THE FLEXIBLE DUCT SIZE.

DETAIL - TYPICAL SUPPLY AIR DIFFUSER

NOT TO SCALE

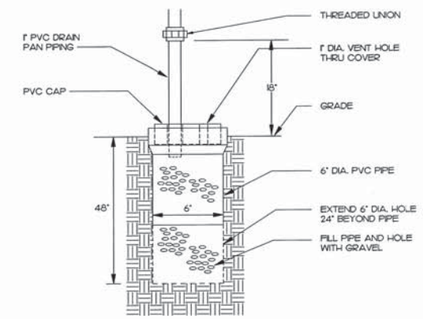


DETAIL - CONCRETE EQUIPMENT PAD ON GRADE

NOT TO SCALE

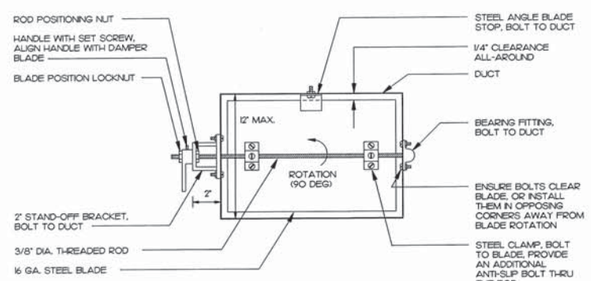
DETAIL - TYPICAL DUCT TRANSITIONS

NOT TO SCALE



DETAIL - FRENCH DRAIN

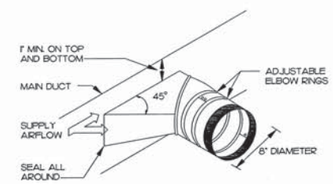
NOT TO SCALE



NOTES:
1. DAMPERS FOR ROUND DUCTS SHALL BE SIMILAR TO THE DAMPER SHOWN ABOVE.
2. ENSURE THAT FULL 90° DAMPER BLADE MOVEMENT IS UNOBSTRUCTED.

DETAIL - MANUAL DAMPER (ADJUSTABLE SINGLE-BLADE BALANCING TYPE)

NOT TO SCALE



DETAIL - TYPICAL BRANCH TAKE-OFF FITTING

NOT TO SCALE

M-2

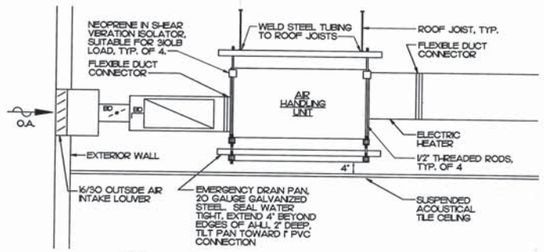
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
NAVY PUBLIC WORKS CENTER
NAVAL STATION NORFOLK, VIRGINIA

JOB ORDER NO. 5920504
DES. OLS | DR. OLS | CHK. WBC
ISO MGR. T. S. GALLAGHER, P.E.
SUBMITTED BY:
FIRM MEMBER / PRINCIPAL
ISC GOM P.P.
DIV. DIR. R. H. MIS
APPROVED: DATE: W.B.12UB 5/11/93
SATISFACTORY TO ACTIVITY
APPROVED: DATE: 7/26/93
FOR CO COMMANDER, NAVFAC

BUILDING SP-381
BUILDING ADDITION

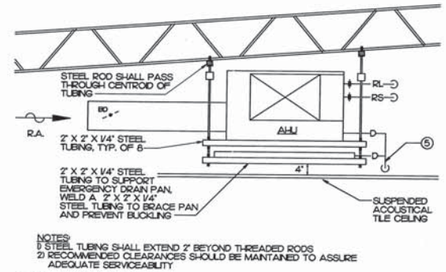
DETAILS

SIZE	CODE ID NO.	NAVFAC DRAWING NO.	PWC DRAWING NO.
D	80091	4,255,204	14,567 F
		CONSTR. CONTR. NO. N62470-90-B-4562	
SCALE: GRAPHIC		SPEC. 05-90-4562	SHEET 7 OF 10



NOTE:
UNIT HEIGHT SHALL NOT EXCEED 2, UNIT WEIGHT SHALL NOT EXCEED 350 LB

A M/M3 SECTION
SCALE: 3/4" = 1'-0"



NOTES:
1) STEEL TUBING SHALL EXTEND 2" BEYOND THREADED RODS
2) RECOMMENDED CLEARANCES SHOULD BE MAINTAINED TO ASSURE ADEQUATE SERVICEABILITY

B M/M3 SECTION
SCALE: 3/4" = 1'-0"

GRAPHIC SCALE

3/4" = 1'-0" 0 1' 2' 3' 4' 5'

REVISIONS

SYM	DESCRIPTION	DATE	SATISFACTORY	APPROVED BY

SEQUENCE OF OPERATION FOR AHU/HPOU

HVAC SYSTEM SHALL BE CONTROLLED BY THE SPACE THERMOSTAT. THE THERMOSTAT SHALL BE MANUAL CHANGEOVER WITH A "COOL-OFF-HEAT-EMERGENCY HEAT" SYSTEM SWITCH AND A "AUTO-ON" FAN SWITCH. WHEN THE SYSTEM IS ON, THE SUPPLY AIR FAN SHALL BE ENERGIZED AND SHALL RUN CONTINUOUSLY, AND POWER SHALL BE SUPPLIED TO THE ROOM THERMOSTAT. WHEN THE SYSTEM IS OFF, THE SUPPLY AIR FAN SHALL BE DE-ENERGIZED.

COOLING - WHEN THE SYSTEM IS INDEXED TO "COOLING," THE ELECTRIC HEATING COILS SHALL BE UNABLE TO OPERATE. WHEN THE SPACE TEMPERATURE (TEMP.) RISES ABOVE THE SPACE THERMOSTAT'S COOLING SETPOINT, THE COMPRESSOR SHALL BE ENERGIZED. ON A FALL IN SPACE TEMP. BELOW THE SETPOINT, THE COMPRESSOR SHALL BE DE-ENERGIZED.

HEATING - WHEN THE SYSTEM IS INDEXED TO "HEATING," AND THE SPACE TEMP. FALLS BELOW THE SPACE THERMOSTAT'S HEATING SETPOINT, THE FIRST STAGE OF HEATING SHALL BE ENERGIZED. ON A CONTINUED FALL IN SPACE TEMP., THE SECOND STAGE OF HEATING SHALL BE ENERGIZED. THE FIRST STAGE OF HEATING SHALL CONSIST OF THE AHU/HPOU REFRIGERATION SYSTEM. DURING THE SECOND STAGE OF HEATING, THE COMPRESSOR SHALL CONTINUE TO RUN AND IN ADDITION, THE SUPPLEMENTAL ELECTRIC HEATING COIL SHALL BE ENERGIZED. ON A RISE IN SPACE TEMP., THE REVERSE SHALL OCCUR.

DEFROST CYCLE - WHEN THE SYSTEM IS OPERATING IN THE HEATING MODE, MANUFACTURER'S INSTALLED CONTROLS SHALL INDEX THE SYSTEM TO OPERATE IN THE DEFROST MODE AS DETERMINED BY THE HPOU MANUFACTURER. IN THE DEFROST MODE, THE HPOU FAN SHALL BE DE-ENERGIZED, THE AHU/HPOU REFRIGERATION SYSTEM SHALL OPERATE IN THE COOLING MODE, AND THE AHU ELECTRIC SUPPLEMENTAL HEATING COIL SHALL BE ENERGIZED.

EMERGENCY HEAT - WHEN THE SYSTEM SELECTOR SWITCH IS INDEXED TO "EMERGENCY HEAT", THE AHU/HPOU REFRIGERATION SYSTEM SHALL BE DE-ENERGIZED. WHEN THE SPACE TEMP. FALLS BELOW THE SPACE THERMOSTAT'S HEATING SETPOINT, THE AHU FAN AND SUPPLEMENTAL ELECTRIC HEATING COIL SHALL BE ENERGIZED. THE SUPPLEMENTAL ELECTRIC HEATING COIL SHALL REMAIN ENERGIZED UNTIL THE SPACE TEMP. RISES ABOVE THE THERMOSTAT'S HEATING SETPOINT.

SEQUENCE OF OPERATION FOR EXHAUST FAN

WHEN THE SUPPLY FAN FOR THE AHU IS ENERGIZED, THE EXHAUST FAN SHALL BE ENERGIZED.

MECHANICAL EQUIPMENT

AHU/HPOU - MINIMUM 62,900 BTUH COOLING CAPACITY AND MINIMUM 48,200 BTUH SENSIBLE COOLING CAPACITY WHILE DELIVERING 1,680 CFM OF AIR AT 0.20" WG. ESP. (NOT INCLUDING THE SUPPLEMENTAL ELECTRIC HEATING COIL), 3/4 HP AHU FAN, AIR ENTERING AHU AT 84 DEG. F. DB/65.2 DEG. F. WB, AIR ENTERING HPOU AT 95 DEG. F., 208 V, 3 PH, 60 HZ, MINIMUM 28,860 BTUH HEATING CAPACITY WHILE DELIVERING 1,680 CFM AIR ENTERING AHU AT 59.1 DEG. F. DB, AIR ENTERING HPOU AT 0 DEG. F., (NOT INCLUDING SUPPLEMENTAL ELECTRIC HEATING COIL).

ELECTRIC HEATING COIL - MOUNTED TO AHU FAN DISCHARGE, 208 V, 3 PH, 60 HZ, 10 KW COIL.

EXHAUST FAN - 300 CFM AT 0.25" WG. ESP., 1/25 HP, 115 V, 1 PH, 60 HZ, ROOF-MOUNTED DIRECT DRIVE TYPE.

CADD MEANINGFUL DESIGN SYSTEM HPWC NORFOLK VA.

M-3

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
NAVY PUBLIC WORKS CENTER
NAVAL STATION NORFOLK, VIRGINIA
NAVAL AIR STATION NORFOLK, VIRGINIA

JOB ORDER NO. 1920504
DES. GLS | DR. GLS | CHK. WEC
IND. MGR. T. E. GALLAGHER, P.E.
SUBMITTED BY:
FIRM MEMBER / PRINCIPAL
SIC. GDM | P.P.
DIV. DIR. R. H. MIS

BUILDING SP-381
BUILDING ADDITION

MECHANICAL DETAILS

APPROVED: W. BAZUIN DATE: 25/11/93
SATISFACTORY TO ACTIVITY
APPROVED: [illegible] DATE: 7/25/93
PWC CO. COMMANDER NAVFAC

SIZE	CODE ID NO.	NAVFAC DRAWING NO.	PWC DRAWING NO.
D	80091	4,255,205	14,567 G
		CONSTR. CONTR. NO. N62470-90-B-4562	
SCALE: GRAPHIC		SPEC. 05-90-4562	SHEET 8 OF 10

V-53 Record Drawings

MECHANICAL LEGEND

NOTE:
LIGHT LINEWEIGHT SYMBOLS INDICATE EXISTING DEVICES, EQUIPMENT, PIPING, ETC. TO REMAIN. HEAVY LINEWEIGHT SYMBOLS INDICATES NEW DEVICES, EQUIPMENT, TO BE PROVIDED AND OR INSTALLED. HEAVY & DASHED LINEWEIGHT SYMBOLS INDICATE DEVICES, EQUIPMENT, PIPING, ETC. TO BE REMOVED.

- MANUAL BALANCING DAMPER WITH LOCKING QUADRANT
- FLEXIBLE DUCT CONNECTION
- M — MOTORIZED CONTROL DAMPER
- ELBOW WITH TURNING VANES
- 1 — DEMOLITION NOTE MARK
- 1 — NEW WORK NOTE MARK
- A 100 — GRILLE OR DIFFUSER MARK – SEE SCHEDULE SHEET M-602 OR SPECIFICATION (CFM NOTE)
- POINT OF CONNECTION–NEW TO EXISTING AND POINT OF DEMOLITION TERMINATION
- SUPPLY DUCT SECTION
- RETURN OR EXHAUST DUCT SECTION
- (AD) ACCESS DOOR
- DOOR LOUVER – SEE SCHEDULE / SEE ARCHITECTURAL PLANS FOR SIZES
- T AHU-1 — THERMOSTAT/SENSOR MOUNT 60" ABOVE FLOOR SUBSCRIPT INDICATES EQUIPMENT BEING CONTROLLED
- S — SMOKE DETECTOR
- AHU-1 — AIR HANDLING UNIT MARK – SEE SCHEDULE SHEET M-601
- AS-1 — AIR SEPARATOR UNIT MARK – SEE SCHEDULE SHEET M-603
- B-1 — BOILER UNIT MARK – SEE SCHEDULE SHEET M-602
- BBH-1 — BASEBOARD HEATER UNIT MARK – SEE SCHEDULE SHEET M-603
- C-1 — AIR COOLED CHILLER MARK – SEE SCHEDULE SHEET M-603
- CRAC-1 — COMPUTER ROOM AIR CONDITIONER – SEE SCHEDULE SHEET M-601
- EF-1 — EXHAUST FAN MARK – SEE SCHEDULE SHEET M-601
- ERV-1 — ENERGY RECOVERY VENTILATOR
- EXP-1 — EXPANSION TANK UNIT MARK – SEE SCHEDULE M-603
- FCU-1 — FAN COIL UNIT (INDOOR UNIT) – SEE SCHEDULE SHEET M-602
- L-1 — LOUVER – SEE SCHEDULE SHEET M-603
- MUA-1 — MAKE-UP AIR UNIT MARK – SEE SCHEDULE SHEET M-601
- MSI-1 — MINI SPLIT INDOOR UNIT – SEE SCHEDULE SHEET M-603
- MSO-1 — MINI SPLIT OUTDOOR UNIT – SEE SCHEDULE SHEET M-603
- P-1 — PUMP MARK – SEE SCHEDULE SHEET M-603
- RTU-1 — ROOFTOP UNIT MARK – SEE SCHEDULE SHEET M-601
- UH-1 — UNIT HEATER – SEE SCHEDULE SHEET M-601
- VAV-1 — VARIABLE AIR VOLUME TERMINAL UNIT – SEE SCHEDULE SHEET SHEET M-602
- V-1 — WATER CONTROL VALVE UNIT MARK – SEE SCHEDULE SHEET SHEET M-603
- DUCT TURNING DOWN
- H — HUMIDITY SENSOR MOUNTED 60" ABOVE FLOOR, SUBSCRIPT INDICATES EQUIPMENT BEING CONTROLED
- MOTORIZED DAMPER
- BALANCING DAMPER
- DUCT TURNS UP IN DIRECTION OF ARROW
- SUPPLY AIR DIFFUSER

- LPS — LOW PRESSURE STEAM PIPING
- CDR — LOW PRESSURE CONDENSATE RETURN PIPING
- HWS — HOT WATER SUPPLY PIPING
- HWR — HOT WATER RETURN PIPING
- CHS — CHILLED WATER SUPPLY PIPING
- CHR — CHILLED WATER RETURN PIPING
- CCWS — CONDENSER WATER SUPPLY PIPING
- CCWR — CONDENSER WATER RETURN PIPING
- CW — DOMESTIC COLD WATER
- DHW — DOMESTIC HOT WATER
- RL — REFRIGERANT LIQUID PIPING
- RS — REFRIGERANT SUCTION PIPING
- DTS — DUAL TEMPERATURE SUPPLY PIPING
- DTR — DUAL TEMPERATURE RETURN PIPING
- D — CONDENSATE DRAIN PIPING
- HPS — HIGH PRESSURE STEAM PIPING
- SRL — STEAM RELIEF LINE
- BALANCING VALVE (GLOBE VALVE/SQUARE HEAD COCK)
- GATE VALVE
- CHECK VALVE
- BUTTERFLY VALVE
- STRAINER WITH BLOWDOWN VALVE
- 3-WAY AUTO CONTROL VALVE
- 2-WAY AUTO CONTROL VALVE
- THERMOMETER
- FLEXIBLE PIPING CONNECTION
- PRESSURE GAUGE SHUT-OFF COCK
- AUTOMATIC AIR VENT
- UNION
- PIPE SLOPE (DOWN IN ARROW DIRECTION)
- FLOW CONTROL BALANCING VALVE WITH PRESSURE TAPS (GPM NOTED)
- RELIEF VALVE
- A — PIPE ANCHOR
- PIPE CAP
- PIPE GUIDE
- DIRECTION OF FLOW
- CONDENSATE TRAP ASSEMBLY
- STRAINER
- THERMOMETER WELL
- RELIEF VALVE
- TURN UP
- TURN DOWN
- ø — DIAMETER

ABBREVIATIONS

AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
APD	AIR PRESSURE DROP
APPROX	APPROXIMATELY
BD	BALANCING DAMPER
BDD	BACK DRAFT DAMPER
BTUH	BRITISH THERMAL UNIT PER HOUR
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CV	CONVECTOR
DN	DOWN
EAT	ENTERING AIR TEMPERATURE
EDB	ENTERING DRY BULB
EMD	END OF MAIN DRIP
EWB	ENTERING WET BULB
EWT	ENTERING WATER TEMPERATURE
ESP	EXTERNAL STATIC PRESSURE
EXIST	EXISTING
FD	FIRE DAMPER WITH ACCESS DOOR
FDB	DEGREE FAHRENHEIT DRY BULB
FF	FINISHED FLOOR
FPM	FEET PER MINUTE
FT	FEET
FWB	DEGREE FAHRENHEIT WET BULB
GA	GAUGE
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
"HG	INCHES OF MERCURY
HP	HORSE POWER
KW	KILOWATT
L	ANGLE
LAT	LEAVING AIR TEMPERATURE
LBS/HR	POUND PER HOUR
LDB	LEAVING DRY BULB
LWB	LEAVING WET BULB
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MIN	MINIMUM
MBH	THOUSAND BTU/HR
MCA	MINIMUM CIRCUIT AMPS
MFS	MAXIMUM FUSE SIZE
NOM	NOMINAL
OA	OUTSIDE AIR
OD	OUTSIDE DIAMETER
PD	PRESSURE DROP
PSIG	POUNDS PER SQUARE INCH GAGE
%RH	PERCENT RELATIVE HUMIDITY
PRV	PRESSURE RELIEF VALVE
RA	RETURN AIR
RLA	RATED LOAD AMPS
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SF	SQUARE FEET
SP	STATIC PRESSURE
TS	TIP SPEED
T'STAT	THERMOSTAT
TYP	TYPICAL
"WC	INCHES WATER COLUMN
WPD	WATER PRESSURE DROP
PH	PHASE

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

DES DFL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
LEGEND AND ABBREVIATIONS

BOWMAN, FOSTER & ASSOC.
CONSULTING ENGINEERS
#4 INTERSTATE CORP. CENTER
NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

CODE ID. NO. 80091	SIZE D
SCALE: NONE	
MAXIMO NO.	N/A
JOB ORDER NO.	
WORK ORDER NO.	539080
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12544706
SHEET 172 OF 349	

M-001

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-001 LEGEND AND ABBREVIATIONS.dwg Plot Date: Jul 08, 2009 – 10:25am Last Saved BY: bfunderwhite

GENERAL PROJECT NOTES

1. THIS PROJECT IS TO BE COORDINATED WITH BID OPTION 001. THE BOILERS FURNISHING HOT WATER FOR THIS PROJECT SHALL BE PROVIDED AND INSTALLED UNDER THAT OPTION AND SHALL BE COORDINATED TO PROVIDE UNINTERRUPTED HEAT TO THE BUILDING DURING CONSTRUCTION.

2. THE CHILLERS SPECIFIED FOR THIS PROJECT ARE OF SUFFICIENT CAPACITY FOR THE "SPAWAR" RENOVATION TO THE THIRD FLOOR AND THE STORAGE AREA OF THE SECOND FLOOR. THE SECOND FLOOR SWING SPACE AND APPROXIMATELY 30 TONS FOR THE AREAS OF THE BUILDING OUT SIDE THE BOUNDARIES OF THIS CONTRACT.

3. THE EXISTING CHILLED WATER AND DUAL TEMPERATURE WATER SYSTEM FURNISHING THE REMAINING PARTS OF BUILDING V-53 SHALL REMAIN INTACT AND OPERATING DURING CONSTRUCTION TO SERVE PARTS OF THE BUILDING THAT ARE NOT PART OF THIS PROJECT.

4. THE DEMOLITION DRAWINGS DEPICT THE INTENT TO MAINTAIN THE INTEGRITY OF THE EXISTING BUILDING SYSTEMS TO THE EXTENT POSSIBLE. DEMOLITION OF PIPING ASSOCIATED WITH EQUIPMENT TO BE REMOVED SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO DEMOLITION. CUTTING AND CAPPING PROCEDURES SHALL BE APPROVED BY THE CONTRACTING OFFICER PRIOR TO DEMOLITION WORK TO INSURE THE INTEGRITY OF THE EXISTING SYSTEMS.

5. THE DEMOLITION DRAWINGS ARE DIAGRAMMATIC ONLY AND NOT COMPREHENSIVE. THE DEMOLITION REQUIRED IS TO PROVIDE A "TO THE STRUCTURE" RENOVATION OF THE "SPAWAR" AREAS OF THIS BUILDING WHILE LEAVING THE PIPING SYSTEMS FOR THE REST OF THE BUILDING INTACT AND OPERATING.

6. THERE ARE NO MECHANICAL UPGRADES TO THE AIR HANDLING SYSTEMS CONDITIONING THE "NCTAMSLANT" AREA IN ROOM 240 ON THE SECOND FLOOR.

7. PHASING OF MECHANICAL WORK SHALL BE IN ACCORDANCE WITH ALL "PHASING NOTES" LISTED ON SHEET G-004, "SHEET INDEX AND PHASING NOTES". PHASING OF WORK SHALL FOLLOW APPLICABLE PHASES NUMBERED 1 THRU 6.

BID OPTION 001
GENERAL PROJECT NOTES

1. PROVIDE DEMOLITION OF ALL STEAM PIPING ON THE FIRST FLOOR AND ALL STEAM EQUIPMENT IN THE FIRST FLOOR MECHANICAL ROOM. SEE SHEETS MD101, MD102, MD103 AND MD104.

2. EXISTING HOT WATER SYSTEM SERVING ALL REST ROOMS AND STAIRWELLS SHALL REMAIN AND BE RECONNECTED TO NEW HOT WATER SERVICE.

3. PROVIDE NEW DOMESTIC HOT WATER HEATER AND CONNECT TO EXISTING DOMESTIC HOT WATER HEATER RECIRULATION LOOP SEE SHEETS P-402 FOR MORE INFORMATION.

4. PROVIDE NEW HOT WATER CIRCULATING PUMP AND CONNECTING PIPING INTO THE EXISTING HOT WATER PIPING ON THE FIRST FLOOR AND THE NEW DOMESTIC HOT WATER HEATER. SEE "ENLARGED MECHANICAL ROOM FIRST FLOOR-NEW WORK PLAN SHEET M-401.

5. PROVIDE 4" HWS AND HWR RISERS FROM THE FIRST FLOOR MECHANICAL ROOM UP TO THE THIRD FLOOR SEE SHEETS M-401, M-110 AND SHEET M-118 FOR ROUTING OF PIPING UTILIZING EXISTING FLOOR PENETRATIONS.

6. PROVIDE ALL 6" HWS, AND HWR MAIN PIPING SEE SHEETS M-118, M-121 AND SHEET M-122 AS WELL AS "ENLARGED BOILER ROOM MECHANICAL PLAN-NEW WORK SHEET M-401.

7. PROVIDE ALL HOT WATER SPECIALTIES AND SPECIALTIES PIPING INCLUDING DOMESTIC WATER FILL LINE, BACK FLOW PREVENTER, EXPANSION TANK, AIR SEPARATOR, AND SHOT FEEDER. SEE SHEETS M-121 AND M-401 FOR MORE INFORMATION.

8. PROVIDE BOILERS, BOILER WATER PIPING, HOT WATER PUMPS, GAS PIPING, GAS PRESSURE REGULATING VALVE, EMERGENCY GAS SHUTOFF VALVE, BOILER BREECHING AND STACK, SEALED COMBUSTION INTAKE SYSTEM, AND BOILER SAFETIES. SEE "ENLARGED BOILER ROOM MECHANICAL PLAN-NEW WORK" SHEET M-401 FOR MORE INFORMATION.

9. PROVIDE WELDED GAS SERVICE LINE FROM "GOVERNMENT PROVIDED" METER AT GROUND LEVEL TO THE PENTHOUSE. SEE SHEET M-121 FOR GAS LINE ROUTING AND OTHER INFORMATION.

10. PROVIDE BOILER CONTROLS, HOT WATER PUMP CONTROLS THAT SEAMLESSLY INTEGRATE WITH THE BUILDING DDC SYSTEM OF CHOICE.

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

DES DFL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

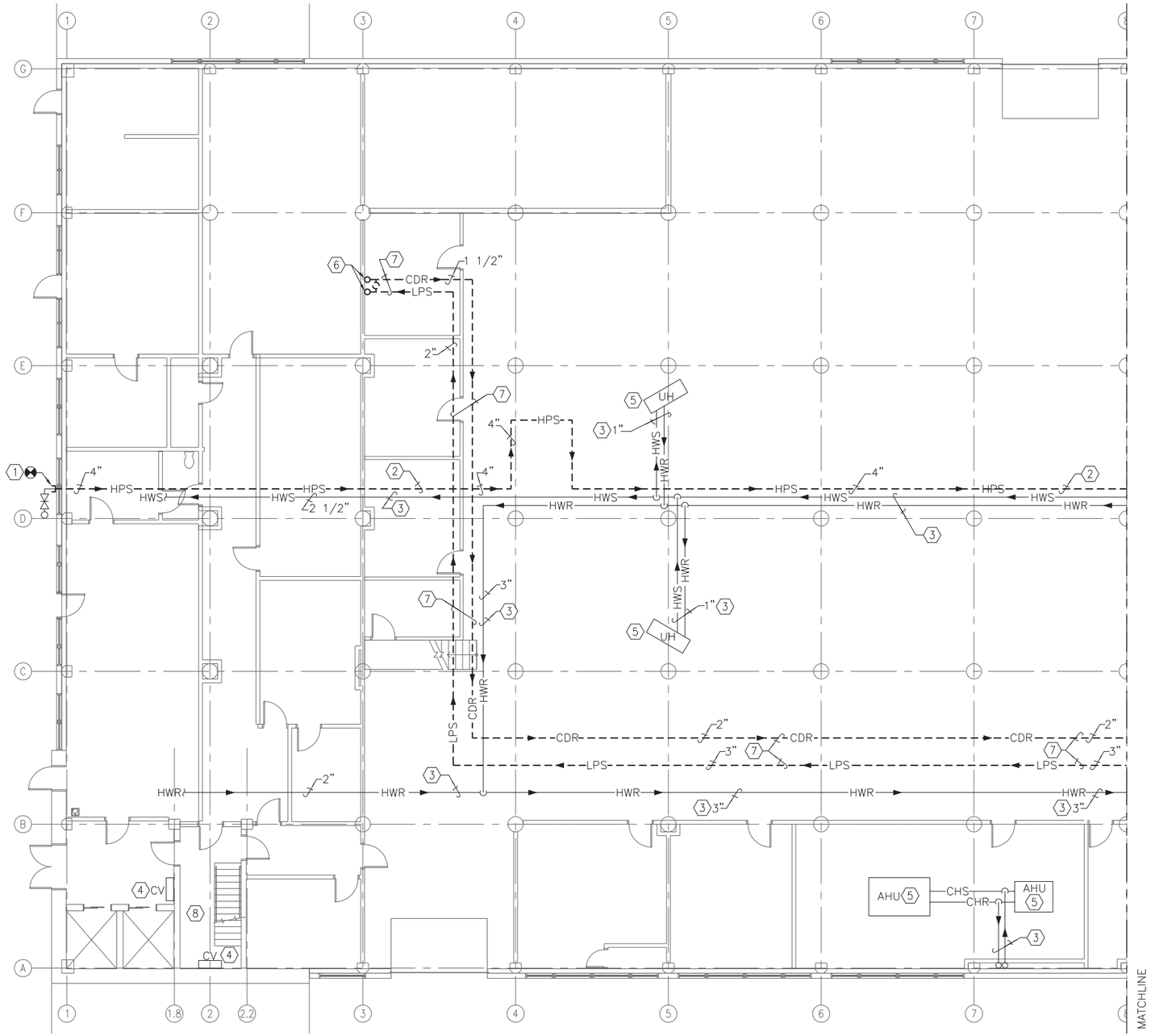
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
GENERAL PROJECT NOTES

BOWMAN, FOSTER & ASSOC.
CONSULTING ENGINEERS
#4 INTERSTATE CORP. CENTER
NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

CODE ID. NO. 80091	SIZE D
SCALE: NONE	
MAXIMO NO.	N/A
JOB ORDER NO.	
WORK ORDER NO.	539080
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12544707
SHEET 173 OF 349	
M-002	

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-002 GENERAL PROJECT NOTES.dwg Plot Date: Jul 08, 2009 - 10:26am Last Saved BY: bfunderwhite



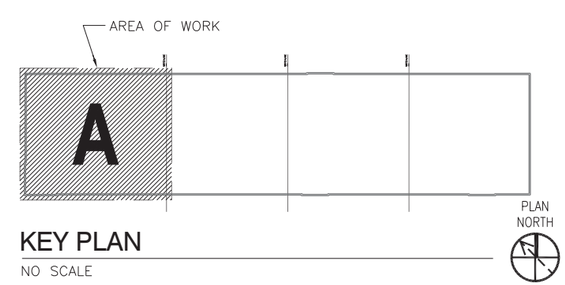
PARTIAL FIRST FLOOR DEMOLITION PLAN - A (9)

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

PLAN NORTH

DEMOLITION NOTES (THIS SHEET ONLY)

1. CLOSE ISOLATION VALVE AND CAP STEAM SUPPLY LINE OUTSIDE OF BUILDING.
2. REMOVE HPS PIPING, INCLUDING ALL HANGERS, STEAM SPECIALTIES AND INSULATION.
3. EXISTING PIPING TO REMAIN.
4. EXISTING CONVECTOR TO REMAIN.
5. EXISTING EQUIPMENT TO REMAIN.
6. REMOVE LPS AND CDR UP TO SECOND FLOOR MECHANICAL ROOM.
7. REMOVE LPS AND CDR PIPING, INCLUDING ALL HANGERS, STEAM SPECIALTIES AND INSULATION.
8. ALL STAIRWELLS CONTAIN MULTIPLE CONVECTORS AND PIPING WHICH WILL REMAIN AND BE REUSED.
9. ACCESS TO LOCKED STORAGE AREAS THROUGHOUT THE FIRST FLOOR MUST BE COORDINATED WITH THE PROJECT MANAGER.



KEY PLAN

NO SCALE

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

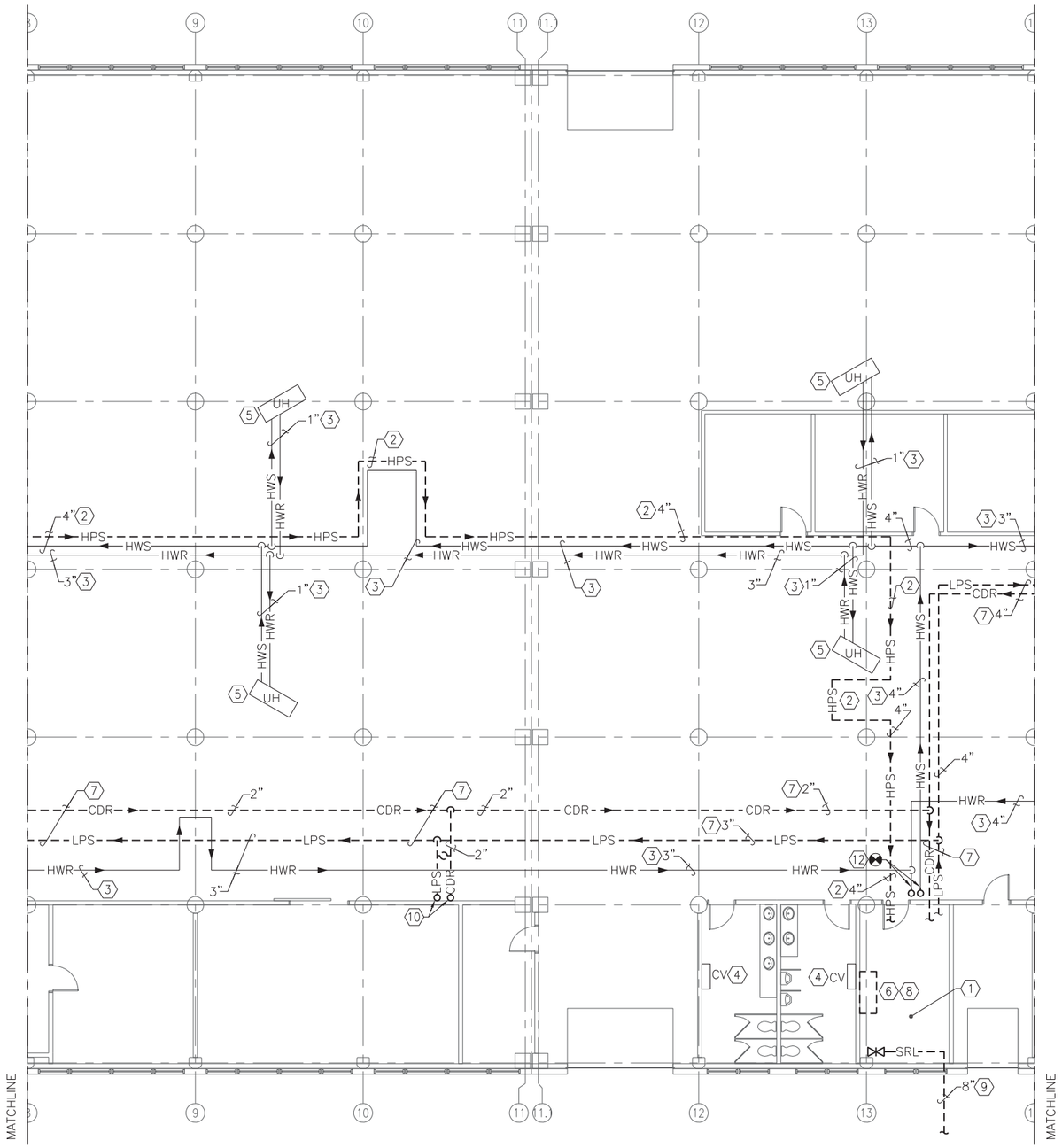
DES DEL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL FIRST FLOOR DEMOLITION PLAN - A

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544708
SHEET 174 OF 349
MD101

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\MD101 PARTIAL FIRST FLOOR DEMOLITION PLAN - A.dwg Plot Date: Jul 08, 2009 - 10:26am Last Saved BY: bfunderwhite



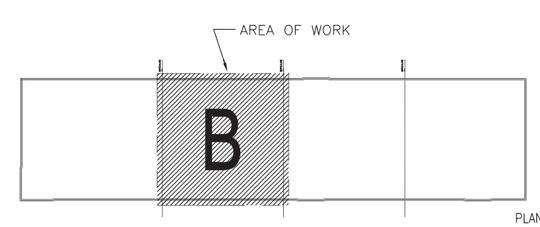
PARTIAL FIRST FLOOR DEMOLITION PLAN - B (11)

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

PLAN NORTH

DEMOLITION NOTES (THIS SHEET ONLY)

1. DEMOLITION WITHIN EQUIPMENT ROOM INCLUDES HVAC PIPING AND EQUIPMENT, SEE PLUMBING DEMOLITION SHEET PD401 FOR PLUMBING DEMOLITION.
2. REMOVE HPS PIPING, INCLUDING ALL HANGERS, STEAM SPECIALTIES AND INSULATION.
3. EXISTING PIPING TO REMAIN.
4. EXISTING CONVECTOR TO REMAIN.
5. EXISTING EQUIPMENT TO REMAIN.
6. REMOVE PACKAGED HEAT EXCHANGER AND PUMP ASSEMBLY..
7. REMOVE LPS AND CDR PIPING, INCLUDING ALL HANGERS, STEAM SPECIALTIES AND INSULATION.
8. REMOVE ALL HVAC STEAM PIPING, STEAM SPECIALTIES, PRESSURE REDUCING STATIONS AND RELIEF VALVES WITHIN EQUIPMENT ROOM.
9. REMOVE STEAM RELIEF VENT LINE.
10. REMOVE LPS AND CDR UP TO SECOND FLOOR INCLUDING HANGERS, STEAM SPECIALTIES AND INSULATION.
11. ACCESS TO LOCKED STORAGE AREAS THROUGHOUT THE FIRST FLOOR MUST BE COORDINATED WITH THE PROJECT MANAGER.
12. REMOVE HWS AND HWR RISERS UP TO SECOND FLOOR.



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

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PROFESSIONAL ENGINEER

DES DEL | DRW KLB | CHK SGR

FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA

P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR

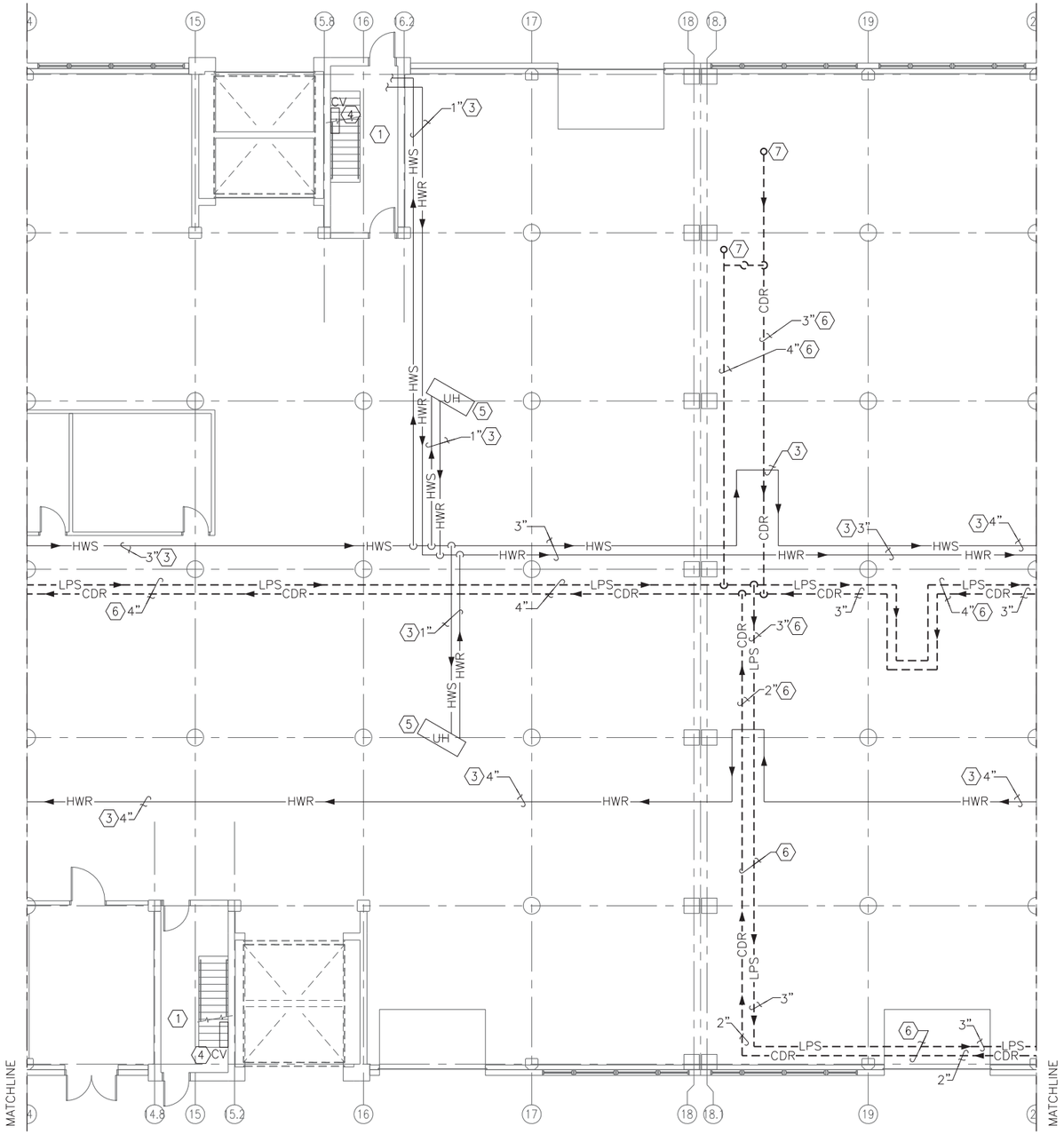
PARTIAL FIRST FLOOR DEMOLITION PLAN - B

CODE ID. NO. 80091 | SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544709
SHEET 175 OF 349

MD102

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\MD102 PARTIAL FIRST FLOOR DEMOLITION PLAN - B.dwg Plot Date: Jul 08, 2009 - 10:26am Last Saved BY: bfunderwhite



PARTIAL FIRST FLOOR DEMOLITION PLAN - C (2)

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

PLAN NORTH

DEMOLITION NOTES (THIS SHEET ONLY)

(1) ALL STAIRWELLS CONTAIN MULTIPLE CONVECTORS AND PIPING THAT SHALL REMAIN FOR REUSE.

(2) ACCESS TO LOCKED STORAGE AREAS THROUGHOUT THE FIRST FLOOR MUST BE COORDINATED WITH THE PROJECT MANAGER.

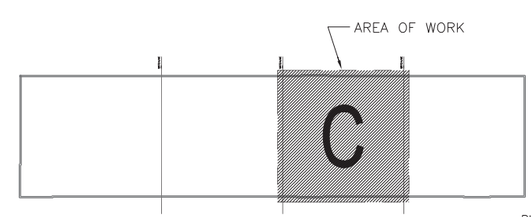
(3) EXISTING PIPING TO REMAIN.

(4) EXISTING CONVECTOR TO REMAIN.

(5) EXISTING EQUIPMENT TO REMAIN.

(6) REMOVE LPS AND CDR PIPING, INCLUDING ALL HANGERS, STEAM SPECIALTIES AND INSULATION.

(7) REMOVE LPS AND CDR UP TO SECOND FLOOR.



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

DES DEL DRW KLB CHK SGR

FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION NORFOLK, VIRGINIA

NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VA

NAVAL STATION NORFOLK
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR

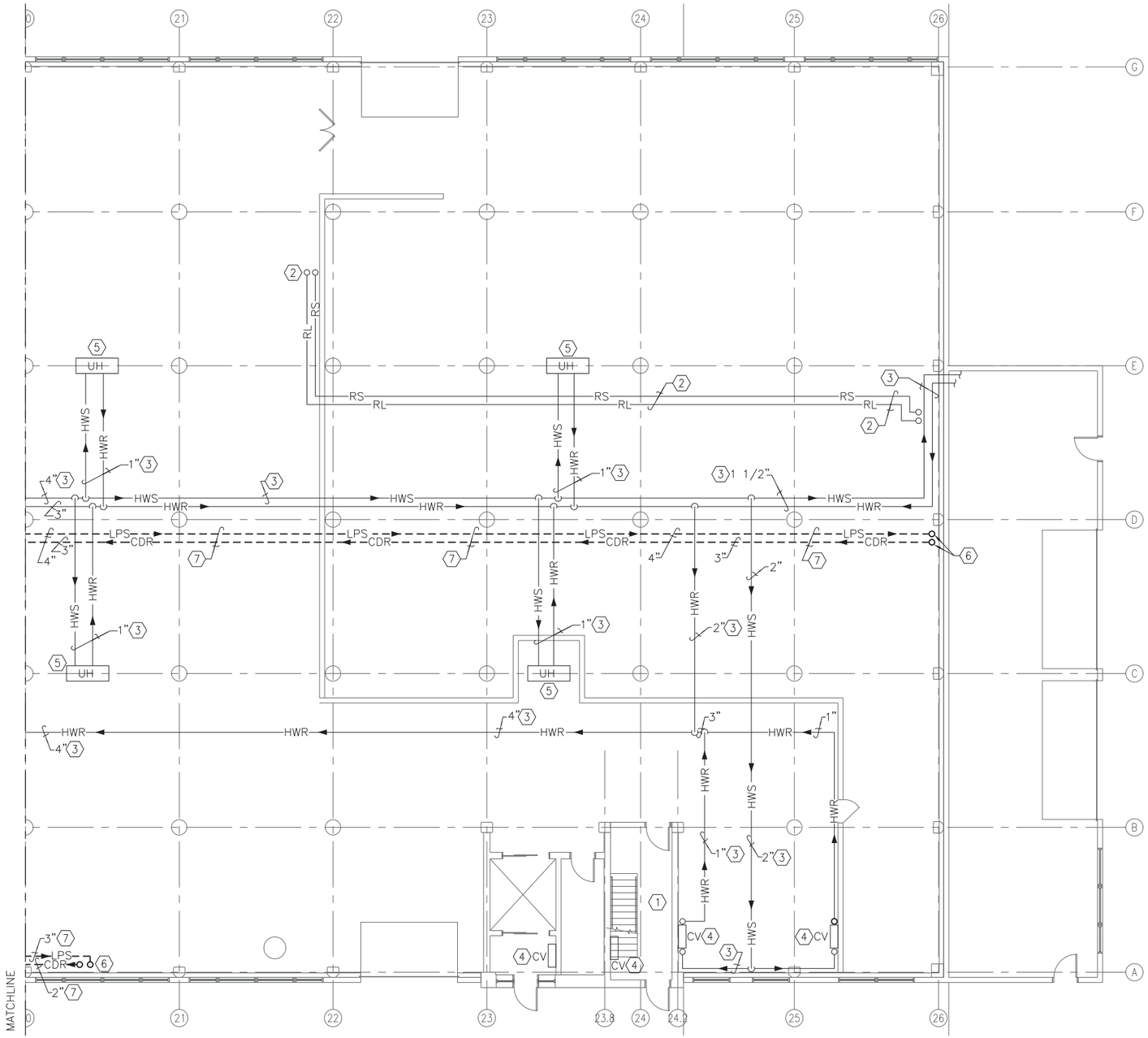
PARTIAL FIRST FLOOR DEMOLITION PLAN - C

CODE ID. NO. 80091 | SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544710
SHEET 176 OF 349

MD103

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\MD103 PARTIAL FIRST FLOOR DEMOLITION PLAN - C.dwg Plot Date: Jul 08, 2009 - 10:26am Last Saved BY: bfunderwhite



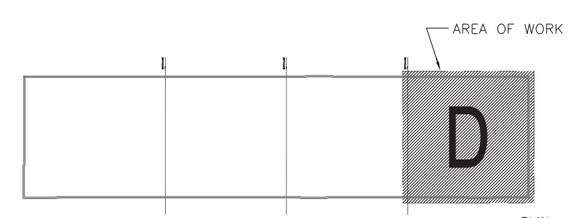
PARTIAL FIRST FLOOR DEMOLITION PLAN - D (8)

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

PLAN NORTH

DEMOLITION NOTES (THIS SHEET ONLY)

1. ALL STAIRWELLS CONTAIN MULTIPLE CONVECTORS AND PIPING THAT SHALL REMAIN FOR REUSE.
2. ABANDONED REFRIGERANT PIPING TO REMAIN.
3. EXISTING PIPING TO REMAIN.
4. EXISTING CONVECTOR TO REMAIN.
5. EXISTING EQUIPMENT TO REMAIN.
6. REMOVE LPS AND CDR UP TO SECOND FLOOR.
7. REMOVE LPS AND CDR PIPING, INCLUDING ALL HANGERS, STEAM SPECIALTIES AND INSULATION.
8. ACCESS TO LOCKED STORAGE AREAS THROUGHOUT THE FIRST FLOOR MUST BE COORDINATED WITH THE PROJECT MANAGER.



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

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FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

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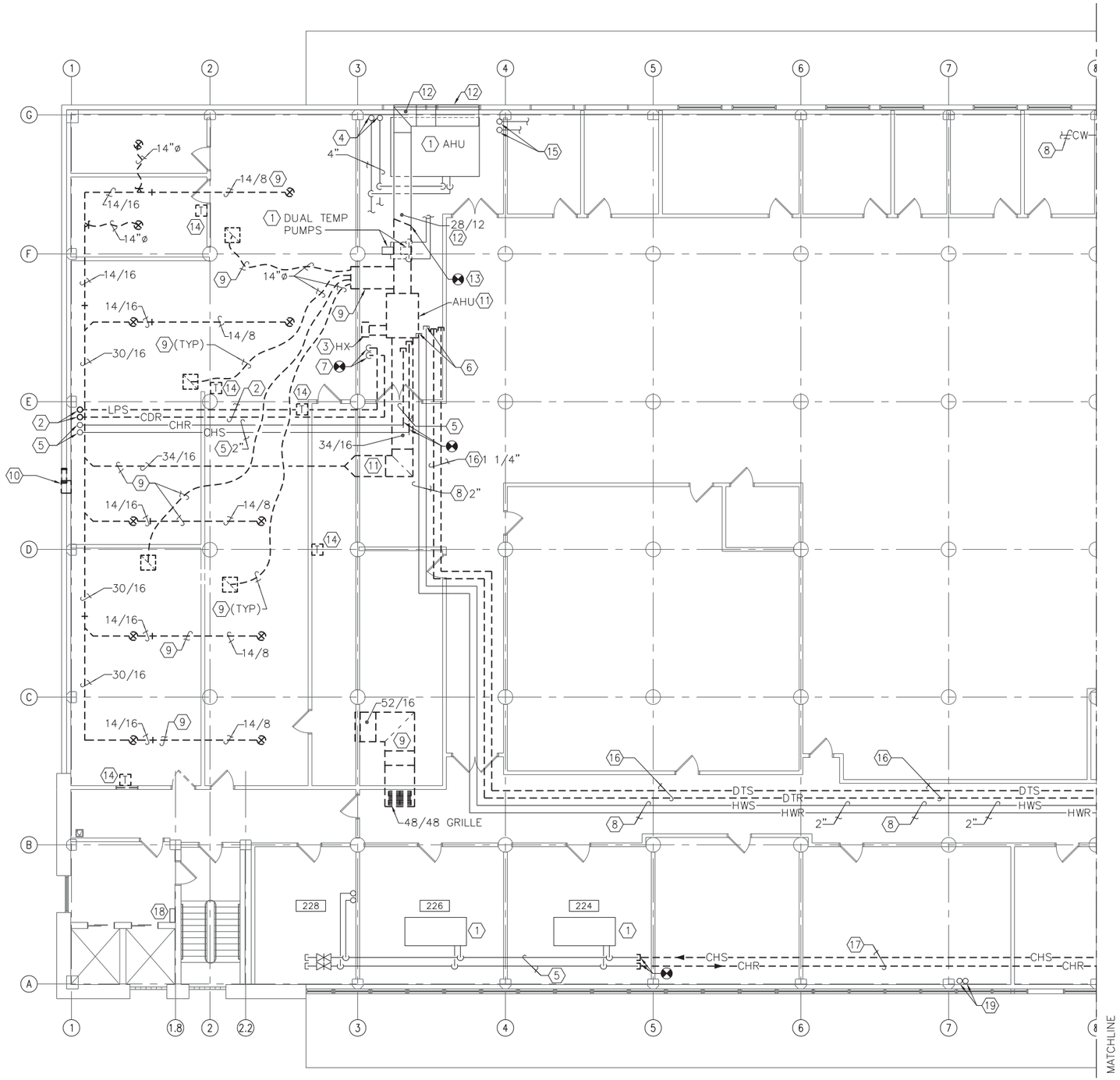
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL FIRST FLOOR DEMOLITION PLAN - D

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544711
SHEET 177 OF 349

MD104

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\MD104 PARTIAL FIRST FLOOR DEMOLITION PLAN - D.dwg Plot Date: Jul 08, 2009 - 10:27am Last Saved BY: bfunderwhite



PARTIAL SECOND FLOOR DEMOLITION PLAN - A

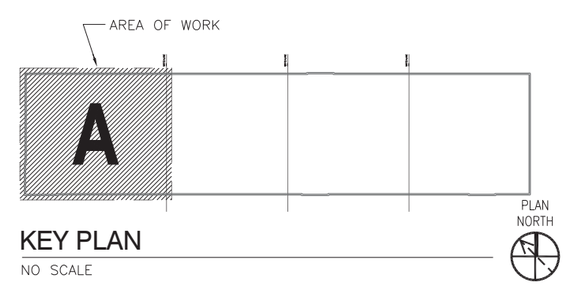
SCALE: 1/8" = 1'-0"

DEMOLITION NOTES (THIS SHEET ONLY)

1. EXISTING EQUIPMENT SHALL REMAIN. INCLUDING BUT NOT LIMITED TO PIPING, DUCTWORK AND CONTROLS. EQUIPMENT SHOWN TO REMAIN DOES NOT PROVIDE SERVICES TO THE AREAS BEING RENOVATED UNDER THIS CONTRACT.
2. REMOVE LPS AND CDR PIPING COMPLETE UP TO THIRD FLOOR. INCLUDING BUT NOT LIMITED TO HANGERS, SUPPORTS, AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF FLOOR.
3. REMOVE STEAM AND HOT WATER HEAT EXCHANGER COMPLETE. INCLUDING BUT NOT LIMITED TO PIPING, INSULATION, CONTROLS AND SUPPORTS.
4. EXISTING CHILLED WATER PIPING FROM CHILLER ON ROOF SHALL REMAIN. REFER TO SHEET MD109 FOR CONTINUATION OF PIPING.
5. EXISTING CHILLED WATER PIPING TO REMAIN, WILL BE REUSED AS DTS/DTR.
6. EXISTING CAPPED PIPING TO REMAIN.
7. REMOVE LPS, CDR PIPING AND ASSOCIATED APPEARANCES TO 1' ABOVE FLOOR CAP AND SUPPORT PIPING AT FLOOR PENETRATIONS.
8. EXISTING PIPING TO REMAIN, WILL BE REUSED AS DTS/DTR.
9. REMOVE DUCTWORK GRILLES, REGISTERS AND DIFFUSERS COMPLETE. INCLUDING BUT NOT LIMITED TO HANGERS, SUPPORTS AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING INTERIOR WALL PENETRATIONS.
10. REMOVE BRICK VENT COMPLETE. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF THE EXTERIOR WALL.
11. REMOVE AIR HANDLING UNIT COMPLETE. INCLUDING BUT NOT LIMITED TO DUCTWORK, SUPPORT BASE, INSULATION, PIPING AND CONTROLS.
12. EXISTING OUTSIDE AIR LOUVERS, OUTSIDE AIR PLENUM AND DUCTWORK SHALL REMAIN.
13. REMOVE OUTSIDE AIR DUCTWORK TO POINT INDICATED ON FLOOR PLAN. PROVIDE A TEMPORARY CAP FOR THE DUCTWORK.
14. REMOVE WALL MOUNTED THERMOSTAT COMPLETE. INCLUDING BUT NOT LIMITED TO WALL BRACKET AND CONTROL WIRING.
15. EXISTING HOT WATER PIPING TO BASEBOARD HEATERS IN NORTH OFFICES TO REMAIN.
16. REMOVE DTS AND DTR PIPING COMPLETE. INCLUDING BUT NOT LIMITED TO HANGERS SUPPORTS AND INSULATION.
17. REMOVE CHS AND CHR PIPING COMPLETE. INCLUDING BUT NOT LIMITED TO HANGERS SUPPORTS AND INSULATION.
18. EXISTING CONVECTOR AND PIPING TO REMAIN.
19. EXISTING CHILLED WATER PIPING TO REMAIN, WILL BE REUSED AS DTS/DTR.

GENERAL DEMOLITION NOTE:

REFER TO SHEET G-004 FOR "PHASING NOTES".



KEY PLAN

NO SCALE

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

DES DFL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL SECOND FLOOR DEMOLITION PLAN - A

CODE ID. NO. 80091 | SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544712
SHEET 178 OF 349
MD105

DRAWFORM REVISION: 6 AUG 2007

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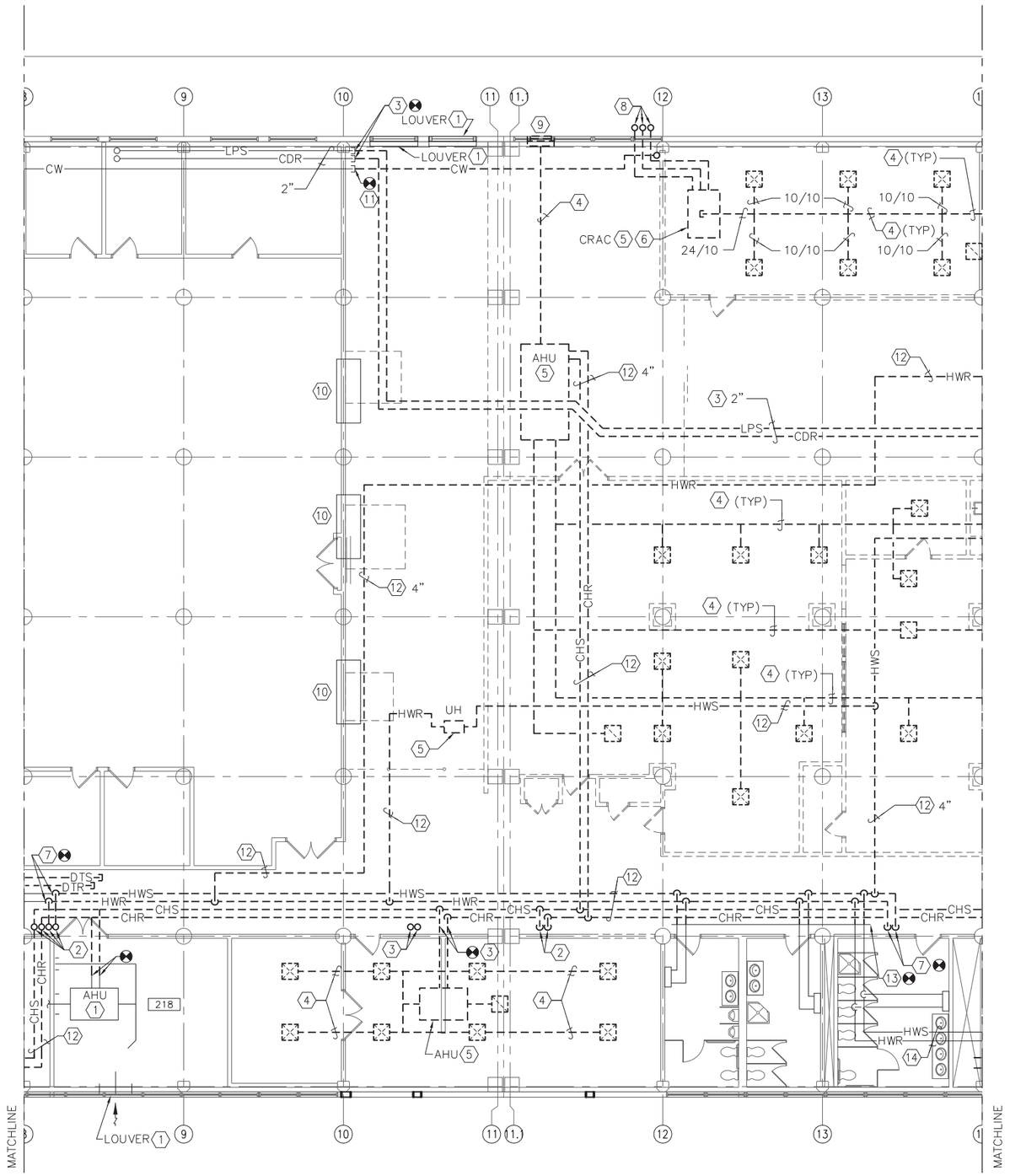


PARTIAL SECOND FLOOR DEMOLITION PLAN - B

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

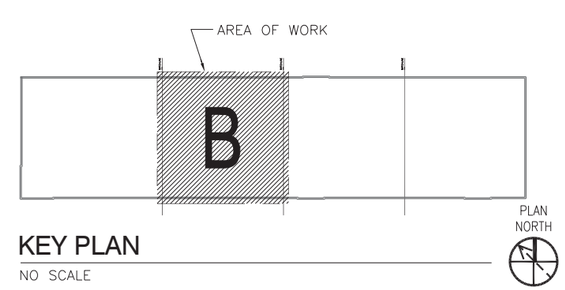
PLAN NORTH

DEMOLITION NOTES (THIS SHEET ONLY)

1. EXISTING EQUIPMENT SHALL REMAIN. INCLUDING BUT NOT LIMITED TO PIPING, DUCTWORK AND CONTROLS. EQUIPMENT SHOWN TO REMAIN DOES NOT PROVIDE SERVICES TO THE AREAS BEING RENOVATED UNDER THIS CONTRACT.
2. REMOVE CHS, CHR, HWS, AND HWR PIPING UP TO THIRD FLOOR.
3. REMOVE LPS AND CDR PIPING COMPLETE UP TO POINT INDICATED ON FLOOR PLAN. INCLUDING BUT NOT LIMITED TO HANGERS, SUPPORTS, AND INSULATION.
4. REMOVE DUCTWORK GRILLES, REGISTERS AND DIFFUSERS COMPLETE. INCLUDING BUT NOT LIMITED TO HANGERS, SUPPORTS AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING INTERIOR WALL PENETRATIONS.
5. REMOVE HVAC EQUIPMENT COMPLETE. INCLUDING BUT NOT LIMITED TO DUCTWORK, SUPPORT BASE, INSULATION, PIPING AND CONTROLS.
6. RECOVER REFRIGERANT (APPROXIMATELY 6.5 LBS OF R22) AND TURN OVER TO THE GOVERNMENT.
7. REMOVE HWS AND HWR PIPING TO POINT INDICATED ON FLOOR PLAN COMPLETE. INCLUDING BUT NOT LIMITED TO HANGERS, SUPPORTS, AND INSULATION. CAP AT FLOOR LEVEL.
8. REMOVE ABANDONED PIPING AND ASSOCIATED APPURTENANCES ON OUTSIDE OF BUILDING COMPLETE. INCLUDING BUT NOT LIMITED TO HANGERS, SUPPORTS, AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING WALL PENETRATIONS. CAP AT FLOOR LEVEL.
9. REMOVE LOUVER COMPLETE. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING WALL.
10. EXISTING AIR TRANSFER PLENUM TO REMAIN. EQUIPMENT SHOWN TO REMAIN DOES NOT PROVIDE SERVICES TO THE AREAS BEING RENOVATED UNDER THIS CONTRACT.
11. REMOVE 3/4" DOMESTIC WATER PIPING CAP AT POINT INDICATED ON FLOOR PLAN.
12. REMOVE CHS, CHR, HWS, AND HWR PIPING TO INDICATED ON FLOOR PLAN AND CAP. INCLUDING BUT NOT LIMITED TO SUPPORTS, HANGERS AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR INTERIOR WALL PATCHING.
13. CONVECTOR PIPING WITHIN REST ROOMS TO REMAIN.
14. EXISTING HWS AND HWR LINES TO STAIRWELL CONVECTORS TO REMAIN.

GENERAL DEMOLITION NOTE:

REFER TO SHEET G-004 FOR "PHASING NOTES".



KEY PLAN

NO SCALE

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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2424 26th ROAD SOUTH
ARLINGTON, VA 22206

MKS	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

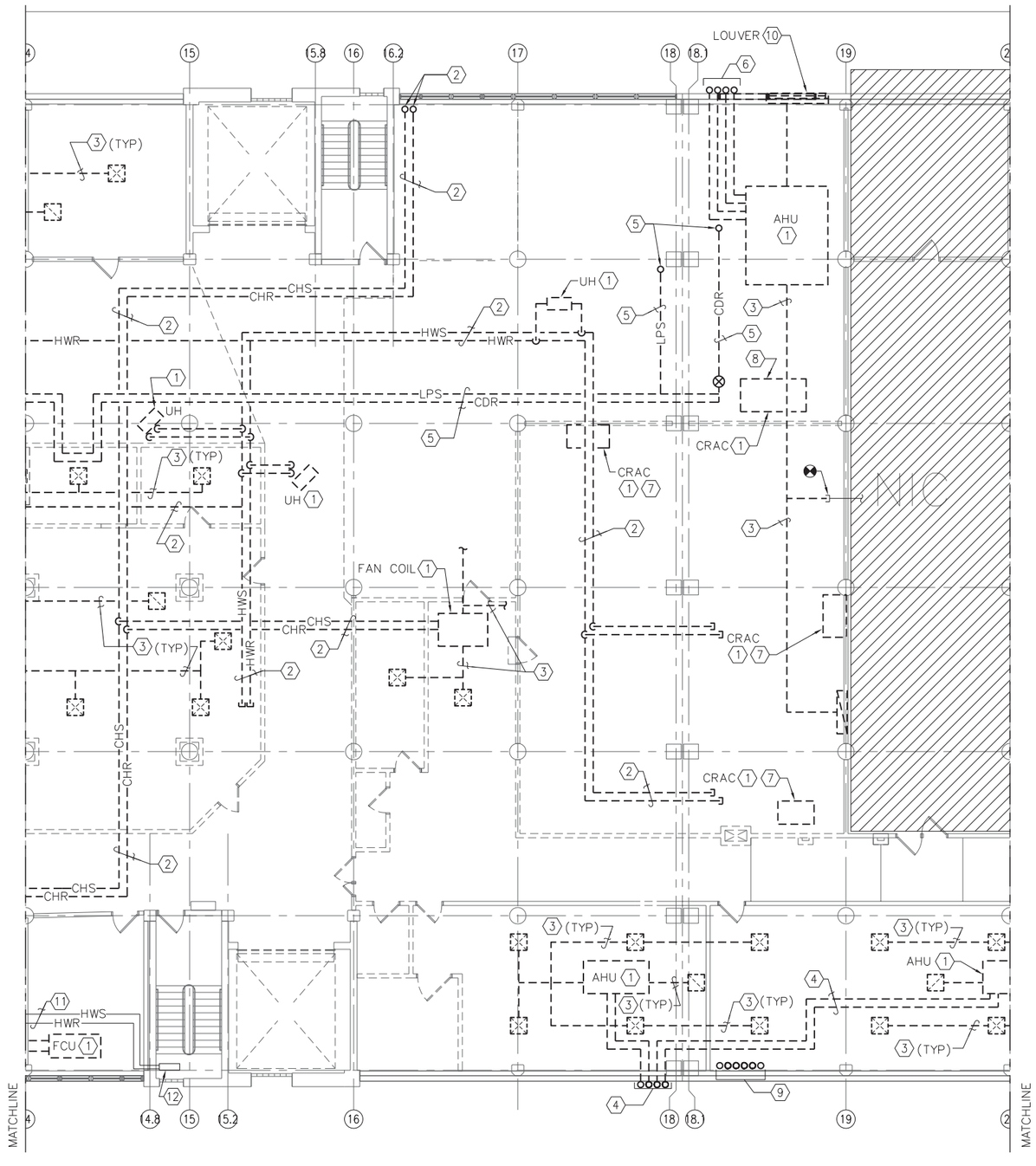
DES DFL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK, VA
NAVAL STATION NORFOLK
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL SECOND FLOOR DEMOLITION PLAN - B

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544713
SHEET 179 OF 349
MD106

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\MD106 PARTIAL SECOND FLOOR DEMOLITION PLAN - B.dwg Plot Date: Jul 08, 2009 - 10:27am Last Saved BY: bfunderwhite



PARTIAL SECOND FLOOR DEMOLITION PLAN - C

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

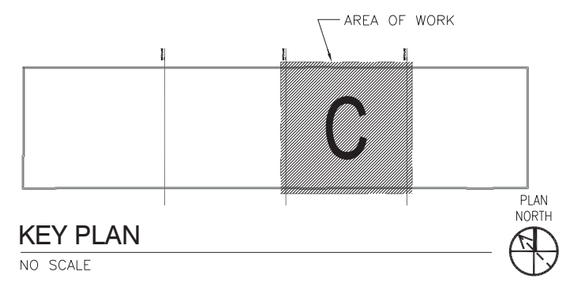
PLAN NORTH

DEMOLITION NOTES (THIS SHEET ONLY)

1. REMOVE HVAC EQUIPMENT COMPLETE. INCLUDING BUT NOT LIMITED TO DUCTWORK, SUPPORT BASE, INSULATION, PIPING AND CONTROLS.
2. REMOVE CHS, CHR, HWS, AND HWR PIPING COMPLETE. INCLUDING BUT NOT LIMITED TO SUPPORTS, HANGERS AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR INTERIOR WALL PATCHING.
3. REMOVE ALL GRILLES, REGISTERS, DIFFUSERS, DUCTWORK AND ASSOCIATED APPURTENANCES COMPLETE. REFER TO ARCHITECTURAL DRAWINGS FOR INTERIOR WALL PATCHING.
4. RECOVER REFRIGERANT (APPROXIMATELY 37 LBS OF R-22) FROM EACH UNIT ON ROOF. REMOVE ALL REFRIGERANT PIPING AND ASSOCIATED APPURTENANCES TO ROOF MOUNTED EQUIPMENT AND TURN OVER TO THE GOVERNMENT. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF EXTERIOR WALL.
5. REMOVE LPS AND CDR PIPING COMPLETE. INCLUDING BUT NOT LIMITED TO HANGERS, SUPPORTS, AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR INTERIOR WALL AND FLOOR PATCHING.
6. REMOVE ALL REFRIGERANT PIPING AND ASSOCIATED APPURTENANCES COMPLETE TO ROOF MOUNTED EQUIPMENT (NO REFRIGERANT IN ABANDONED PIPING). REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF EXTERIOR WALL.
7. RECOVER REFRIGERANT (APPROX 11.5 LBS OF R-22) FROM EACH UNIT AND TURN OVER TO GOVERNMENT.
8. RECOVER REFRIGERANT (APPROX 28.5 LBS OF R-22) AND TURN OVER TO GOVERNMENT.
9. REMOVE ABANDONED GLYCOL PIPING UP TO ROOFTOP COOLERS, RECOVER GLYCOL IN ACCORDANCE WITH EPA REGULATIONS IF RESIDUAL GLYCOL IS PRESENT IN EQUIPMENT OR PIPING. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF FLOOR, ROOF AND CEILINGS.
10. REMOVE LOUVER COMPLETE. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF EXTERIOR WALL.
11. EXISTING HWS, HWR PIPING TO REMAIN.
12. EXISTING CONVECTOR IN STAIRWELL TO REMAIN.

GENERAL DEMOLITION NOTE:

REFER TO SHEET G-004 FOR "PHASING NOTES".



KEY PLAN

NO SCALE

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

BOWMAN, FOSTER & ASSOC. CONSULTING ENGINEERS
#4 INTERSTATE CORP. CENTER
NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

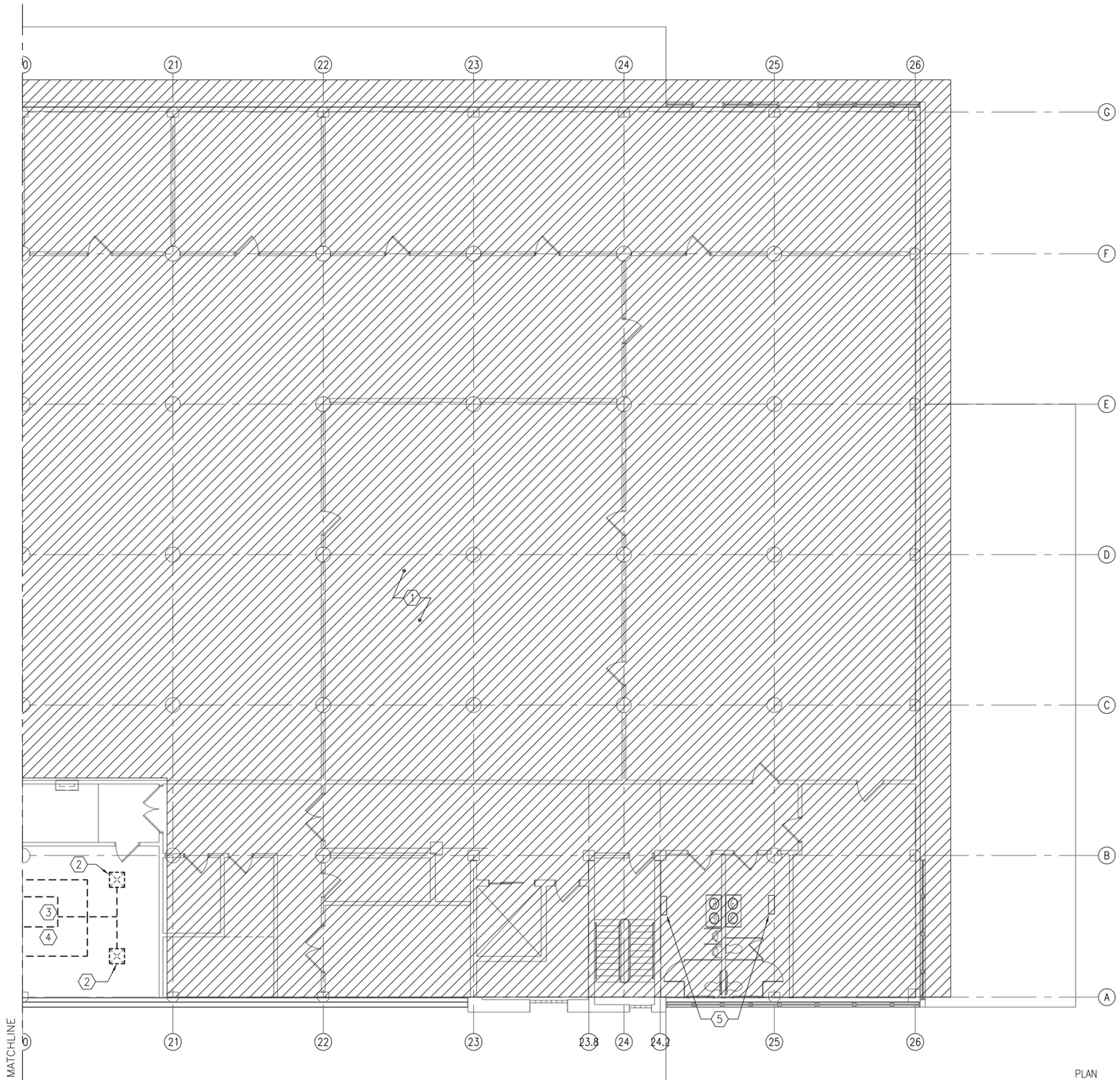
DES DEL DRW BWF CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NAVAL STATION NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL SECOND FLOOR DEMOLITION PLAN - C

CODE ID. NO. 80091 | SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544714
SHEET 180 OF 349
MD107

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\MD107 PARTIAL SECOND FLOOR DEMOLITION PLAN - C.dwg Plot Date: Jul 08, 2009 - 10:28am Last Saved BY: bfunderwhite



PARTIAL SECOND FLOOR DEMOLITION PLAN - D

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

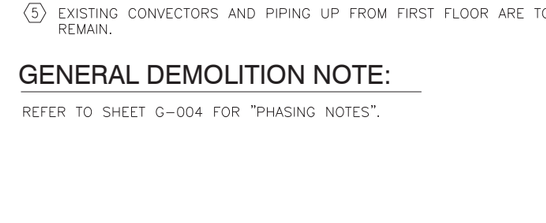
PLAN NORTH

DEMOLITION NOTES (THIS SHEET ONLY)

1. AREA NOT IN CONTRACT.
2. REMOVE ALL GRILLES, REGISTERS, DIFFUSERS, DUCTWORK AND ASSOCIATED APPURTENANCES COMPLETE. REFER TO ARCHITECTURAL DRAWINGS FOR INTERIOR WALL PATCHING.
3. REMOVE HVAC EQUIPMENT COMPLETE. INCLUDING BUT NOT LIMITED TO DUCTWORK, SUPPORT BASE, INSULATION, PIPING AND CONTROLS.
4. SEE MD107 FOR REFRIGERANT HANDLING INFORMATION.
5. EXISTING CONVECTORS AND PIPING UP FROM FIRST FLOOR ARE TO REMAIN.

GENERAL DEMOLITION NOTE:

REFER TO SHEET G-004 FOR "PHASING NOTES".



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

DES DEL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

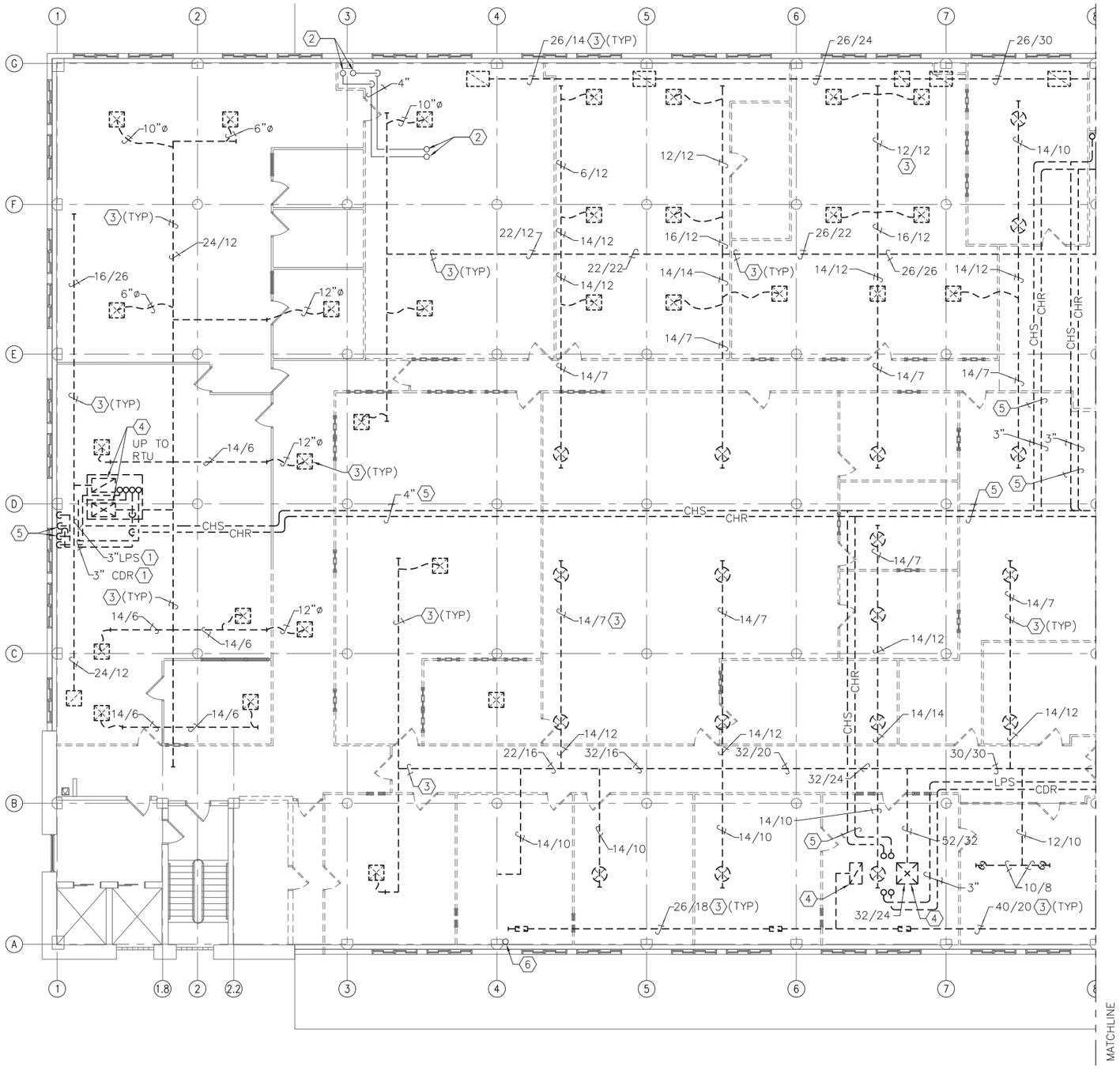
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION
NAVAL FACILITIES ENGINEERING COMMAND – MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL SECOND FLOOR DEMOLITION PLAN – D

CODE ID. NO. 80091	SIZE D
SCALE: AS NOTED	
MAXIMO NO.	N/A
JOB ORDER NO.	
WORK ORDER NO.	539080
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12544715
SHEET 181 OF 349	

MD108

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\MD108 PARTIAL SECOND FLOOR DEMOLITION PLAN - D.dwg Plot Date: Jul 08, 2009 - 10:28am Last Saved BY: bfunderwhite



PARTIAL THIRD FLOOR DEMOLITION PLAN - A

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

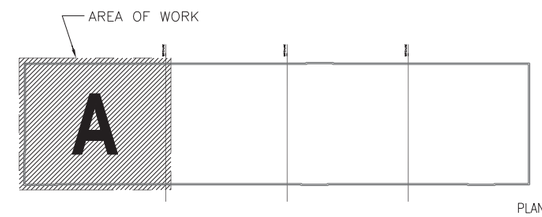
PLAN NORTH

DEMOLITION NOTES (THIS SHEET ONLY)

1. REMOVE LPS AND CDR PIPING COMPLETE. INCLUDING BUT NOT LIMITED TO HANGERS, SUPPORTS, AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF FLOOR AND ROOF.
2. EXISTING CWS AND CWR PIPING SHALL REMAIN.
3. REMOVE DUCTWORK GRILLES, REGISTERS AND DIFFUSERS COMPLETE. INCLUDING BUT NOT LIMITED TO HANGERS, SUPPORTS AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING INTERIOR WALL PENETRATIONS.
4. REMOVE DUCTWORK UP TO ROOFTOP UNIT COMPLETE REFER TO DRAWING M-121 FOR ROOF PENETRATIONS TO BE REUSED. REFER TO ARCHITECTURAL DRAWINGS FOR ROOF PENETRATIONS TO BE PATCHED.
5. REMOVE CWS AND CWR PIPING COMPLETE. INCLUDING BUT NOT LIMITED TO HANGERS, SUPPORTS, AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF FLOOR AND ROOF.
6. EXISTING ROOF DRAIN RISER TO REMAIN.

GENERAL DEMOLITION NOTE:

REFER TO SHEET G-004 FOR "PHASING NOTES".



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

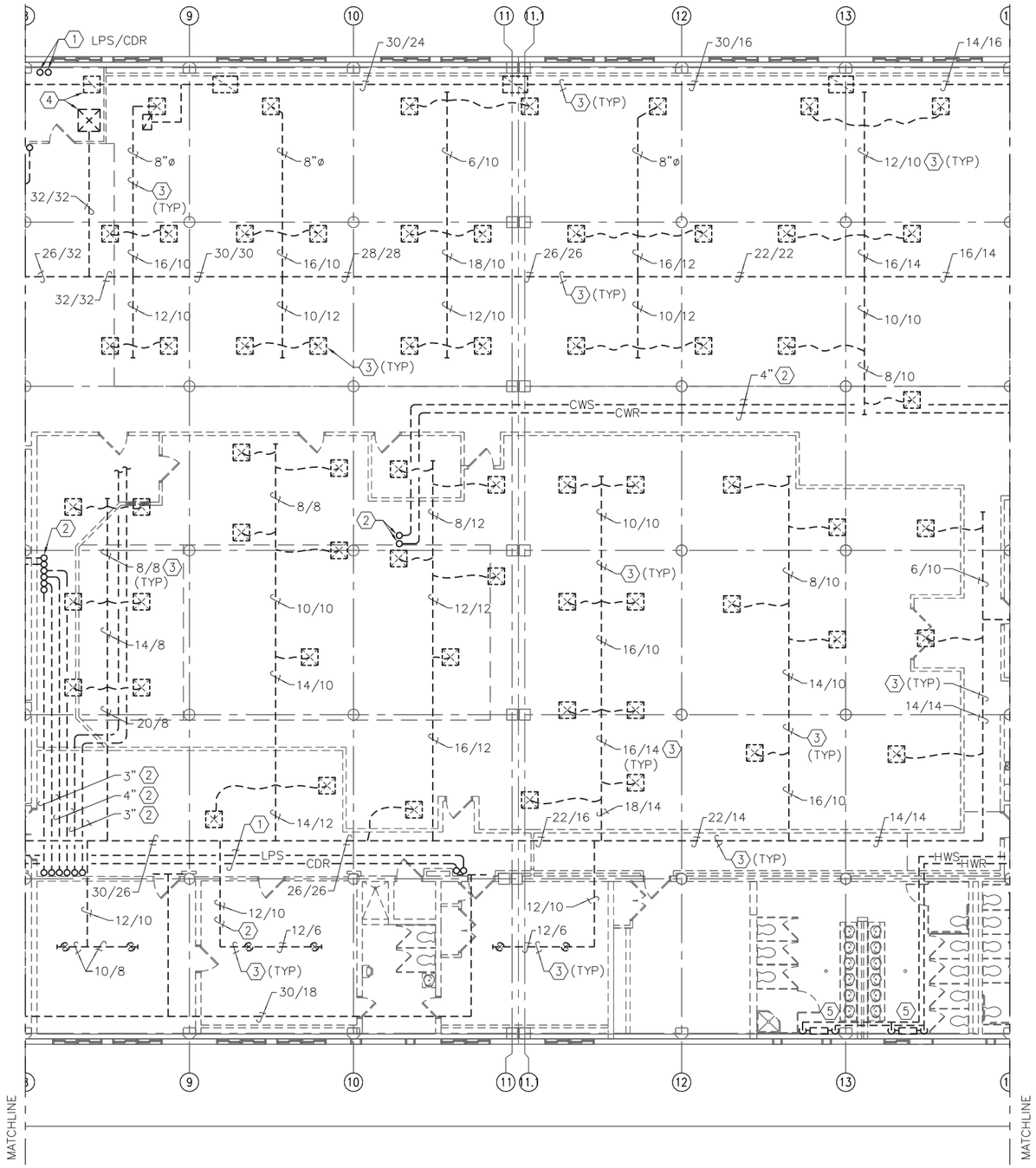
DES DEL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK, VA
NAVAL STATION NORFOLK
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL THIRD FLOOR DEMOLITION PLAN - A

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544716
SHEET 182 OF 349
MD109

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\MD109 PARTIAL THIRD FLOOR DEMOLITION PLAN - A.dwg Plot Date: Jul 08, 2009 - 10:28am Last Saved BY: bfunderwhite



PARTIAL THIRD FLOOR DEMOLITION PLAN - B

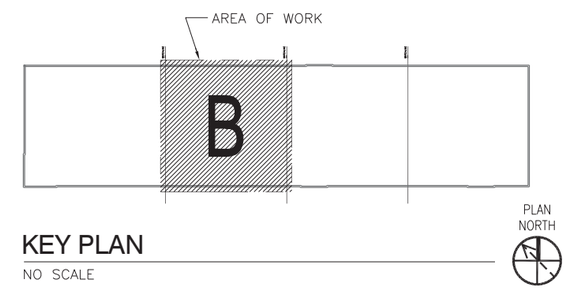
SCALE: 1/8" = 1'-0"

DEMOLITION NOTES (THIS SHEET ONLY)

1. REMOVE LPS AND CDR PIPING COMPLETE. INCLUDING BUT NOT LIMITED TO HANGERS, SUPPORTS, AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF WALLS, FLOOR AND ROOF.
2. REMOVE CWS AND CWR PIPING COMPLETE. INCLUDING BUT NOT LIMITED TO HANGERS, SUPPORTS, AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF WALLS, FLOOR AND ROOF.
3. REMOVE DUCTWORK GRILLES, REGISTERS AND DIFFUSERS COMPLETE. INCLUDING BUT NOT LIMITED TO HANGERS, SUPPORTS AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING INTERIOR WALL PENETRATIONS.
4. REMOVE DUCTWORK UP TO ROOFTOP UNIT COMPLETE REFER TO DRAWING M-122 FOR ROOF PENETRATIONS TO BE REUSED.
5. REMOVE CONVECTORS AND PIPING COMPLETE.

GENERAL DEMOLITION NOTE:

REFER TO SHEET G-004 FOR "PHASING NOTES".



KEY PLAN

NO SCALE

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
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PROFESSIONAL ENGINEER

DES DEL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION
NAVAL STATION NORFOLK
NORFOLK, VA

P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR

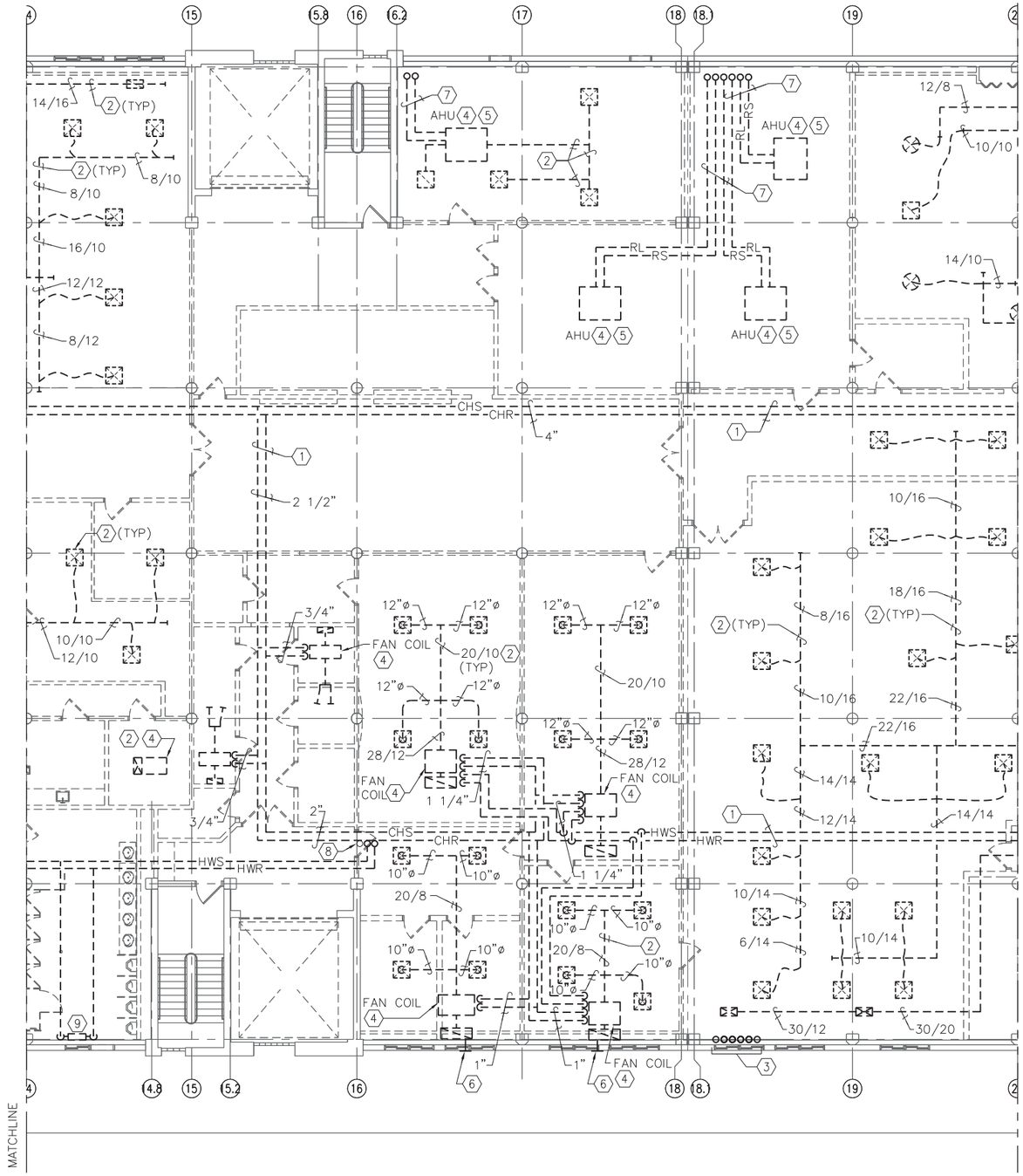
PARTIAL THIRD FLOOR DEMOLITION PLAN - B

CODE ID. NO. 80091 | SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544717
SHEET 183 OF 349

MD110

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\MD110 PARTIAL THIRD FLOOR DEMOLITION PLAN - B.dwg Plot Date: Jul 08, 2009 - 10:28am Last Saved BY: bfunderwhite



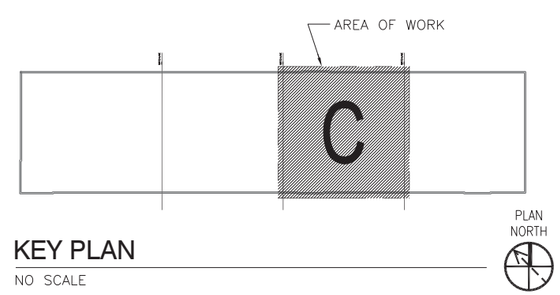
PARTIAL THIRD FLOOR DEMOLITION PLAN - C

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

PLAN NORTH

DEMOLITION NOTES (THIS SHEET ONLY)

1. REMOVE CHS, CHR, HWS, AND HWR PIPING TO INDICATED ON FLOOR PLAN AND CAP. INCLUDING BUT NOT LIMITED TO SUPPORTS, HANGERS AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR WALLS, ROOF AND FLOOR PATCHING.
2. REMOVE DUCTWORK GRILLES, REGISTERS AND DIFFUSERS COMPLETE. INCLUDING BUT NOT LIMITED TO HANGERS, SUPPORTS AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING INTERIOR WALL PENETRATIONS.
3. REMOVE GLYCOL PIPING COMPLETE, INCLUDING BUT NOT LIMITED TO HANGERS, SUPPORTS AND INSULATION. RECOVER GLYCOL IN ACCORDANCE WITH EPA REGULATIONS IF GLYCOL IS PRESENT. REFER TO ARCHITECTURAL DRAWINGS FOR FLOOR AND ROOF PATCHING.
4. REMOVE HVAC EQUIPMENT COMPLETE. INCLUDING BUT NOT LIMITED TO DUCTWORK, SUPPORT BASE, INSULATION, PIPING AND CONTROLS.
5. RECOVER REFRIGERANT (APPROX 8.5 LBS OF R-22 REFRIGERANT EACH UNIT) AND TURN OVER TO GOVERNMENT.
6. REMOVE LOUVER COMPLETE. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING WALL.
7. REMOVE RL AND RS PIPING COMPLETE. INCLUDING BUT NOT LIMITED TO HANGERS, SUPPORTS AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR WALL, CEILING AND ROOF PATCHING.
8. DOMESTIC COLD WATER PIPING TO REMAIN.
9. REMOVE CONVECTOR AND PIPING COMPLETE.



KEY PLAN

NO SCALE

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

DES DEL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

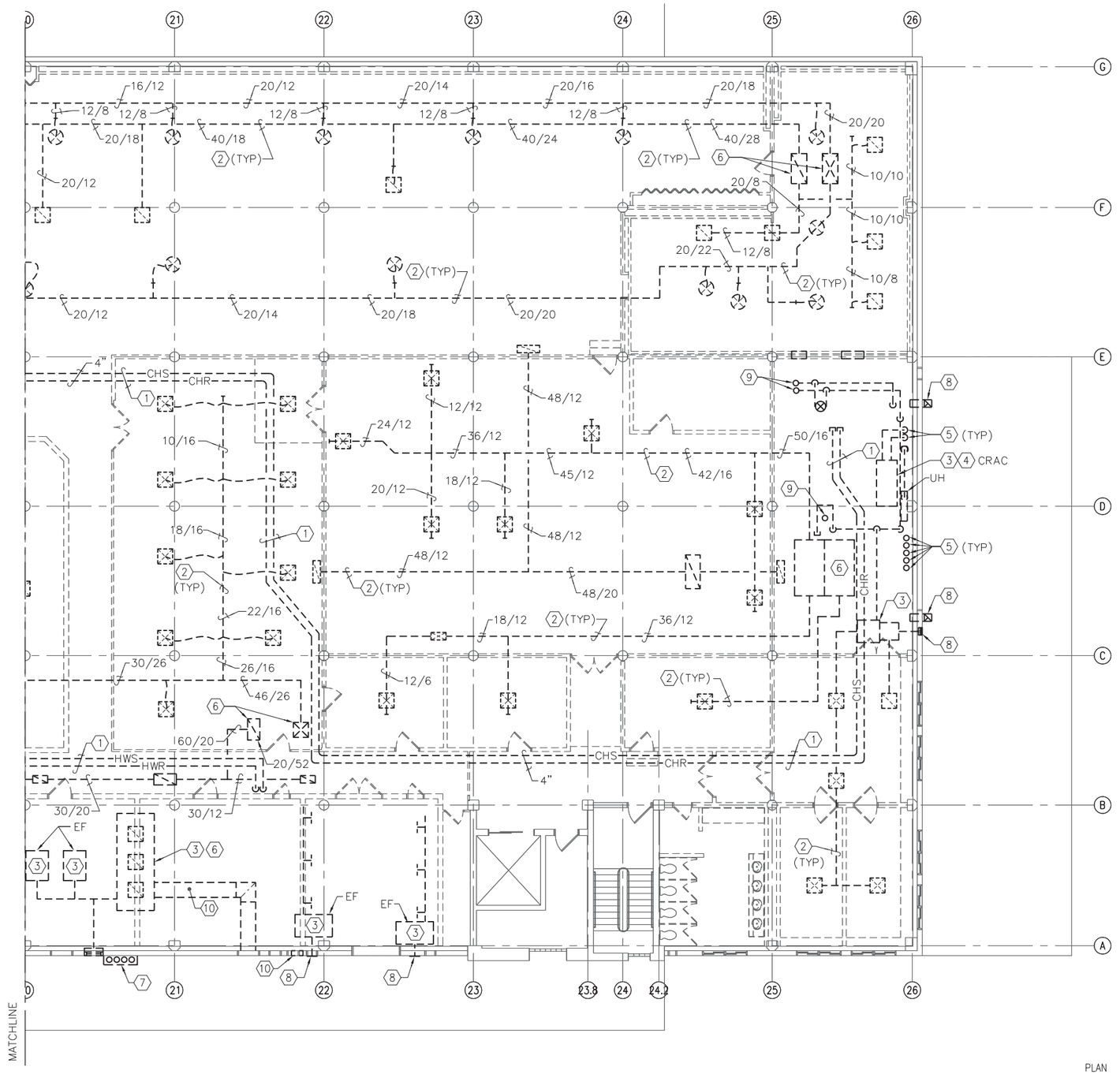
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION
NAVAL FACILITIES ENGINEERING COMMAND – MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL THIRD FLOOR DEMOLITION PLAN – C

CODE ID. NO. 80091	SIZE D
SCALE: AS NOTED	
MAXIMO NO.	N/A
JOB ORDER NO.	
WORK ORDER NO.	539080
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12544718
SHEET 184 OF 349	

MD111

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\MD111 PARTIAL THIRD FLOOR DEMOLITION PLAN - C.dwg Plot Date: Jul 08, 2009 - 10:29am Last Saved BY: bfunderwhite



PARTIAL THIRD FLOOR DEMOLITION PLAN - D

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

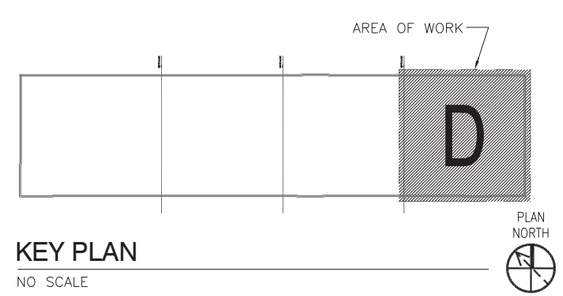
PLAN NORTH

DEMOLITION NOTES (THIS SHEET ONLY)

1. REMOVE CHS, CHR, HWS, AND HWR PIPING TO INDICATED ON FLOOR PLAN AND CAP. INCLUDING BUT NOT LIMITED TO SUPPORTS, HANGERS AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR WALLS, ROOF AND FLOOR PATCHING.
2. REMOVE DUCTWORK GRILLES, REGISTERS AND DIFFUSERS COMPLETE. INCLUDING BUT NOT LIMITED TO HANGERS, SUPPORTS AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING INTERIOR AND EXTERIOR WALLS PENETRATIONS.
3. REMOVE HVAC EQUIPMENT COMPLETE. INCLUDING BUT NOT LIMITED TO DUCTWORK, SUPPORT BASE, INSULATION, PIPING AND CONTROLS.
4. RECOVER REFRIGERANT (APPROXIMATELY 6.5 LBS OF R22) AND TURN OVER TO THE GOVERNMENT.
5. REMOVE PIPING FROM FIRST FLOOR. CAP, FIRESTOP AND SUPPORT PIPING WITHOUT DISTURBING SECOND FLOOR ACTIVITY.
6. REMOVE DUCTWORK UP TO ROOFTOP UNIT COMPLETE REFER TO DRAWING M-124 FOR ROOF PENETRATIONS TO BE REUSED. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING ROOF PENETRATIONS NOT BEING REUSED.
7. REMOVE ABANDONED PIPING FROM WALL COMPLETE. RECOVER GLYCOL OR REFRIGERANT AND TURN OVER TO GOVERNMENT IF PRESENT. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF EXTERIOR WALL.
8. REMOVE LOUVER COMPLETE. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING WALL.
9. REMOVE LPS AND CDR PIPING COMPLETE. INCLUDING BUT NOT LIMITED TO HANGERS, SUPPORTS, AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF WALLS, FLOOR AND ROOF.
10. REMOVE 24/48 DUCT AND WALL LOUVER.
11. REMOVE BOTH 24/24 WALL LOUVERS.

GENERAL DEMOLITION NOTE:

REFER TO SHEET G-004 FOR "PHASING NOTES".



KEY PLAN

NO SCALE

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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#4 INTERSTATE CORP. CENTER
NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

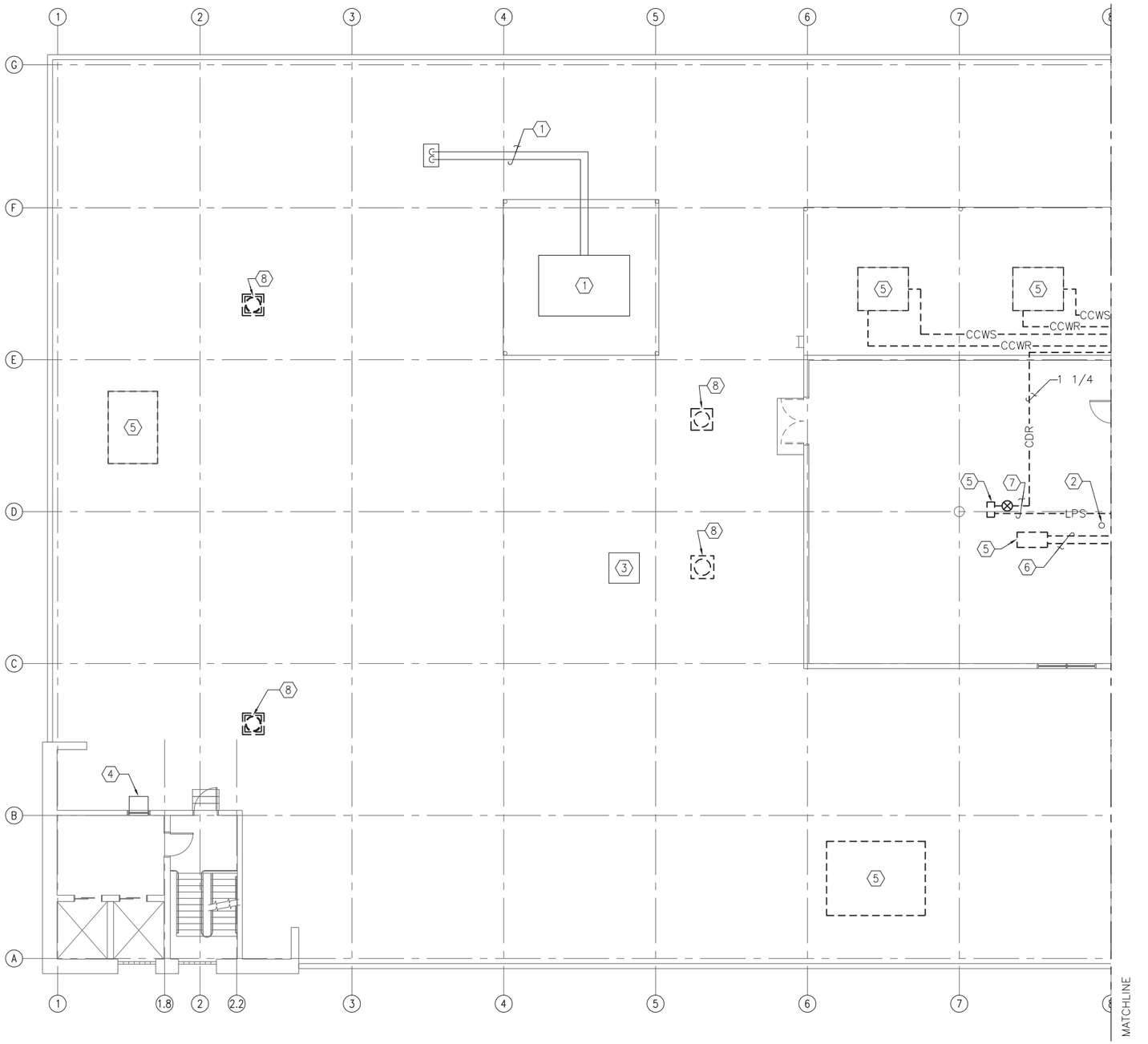
DES DFL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION NORFOLK, VIRGINIA
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NAVAL STATION NORFOLK NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL THIRD FLOOR DEMOLITION PLAN - D

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544719
SHEET 185 OF 349
MD112

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\MD112 PARTIAL THIRD FLOOR DEMOLITION PLAN - D.dwg Plot Date: Jul 08, 2009 - 10:29am Last Saved BY: bfunderwhite

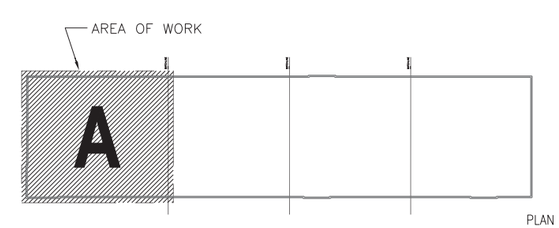


PARTIAL ROOF DEMOLITION PLAN - A

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

DEMOLITION NOTES (THIS SHEET ONLY)

1. EXISTING AIR COOLED CHILLER SHALL REMAIN. INCLUDING BUT NOT LIMITED TO PIPING CONTROLS AND SUPPORTS.
2. EXISTING DRAIN PIPING SHALL REMAIN.
3. EXISTING ROOF CAP SHALL REMAIN.
4. EXISTING WINDOW A/C UNIT SHALL REMAIN.
5. REMOVE HVAC EQUIPMENT COMPLETE. INCLUDING BUT NOT LIMITED TO PIPING, CONTROLS DUCTWORK, SUPPORT STRUCTURES, ROOF CURB AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF ROOF.
6. REMOVE HWS AND HWR PIPING COMPLETE. INCLUDING HANGERS, SUPPORTS AND INSULATION.
7. REMOVE LPS AND CDR PIPING COMPLETE. INCLUDING HANGERS, SUPPORTS AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF WALLS AND ROOF.
8. REMOVE EXHAUST FAN COMPLETE. INCLUDING BUT NOT LIMITED TO CONTROLS AND DUCTWORK. REFER TO ARCHITECTURAL DRAWINGS FOR ROOF CURB CAPPING DETAIL.



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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#4 INTERSTATE CORP. CENTER
NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

MIS	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

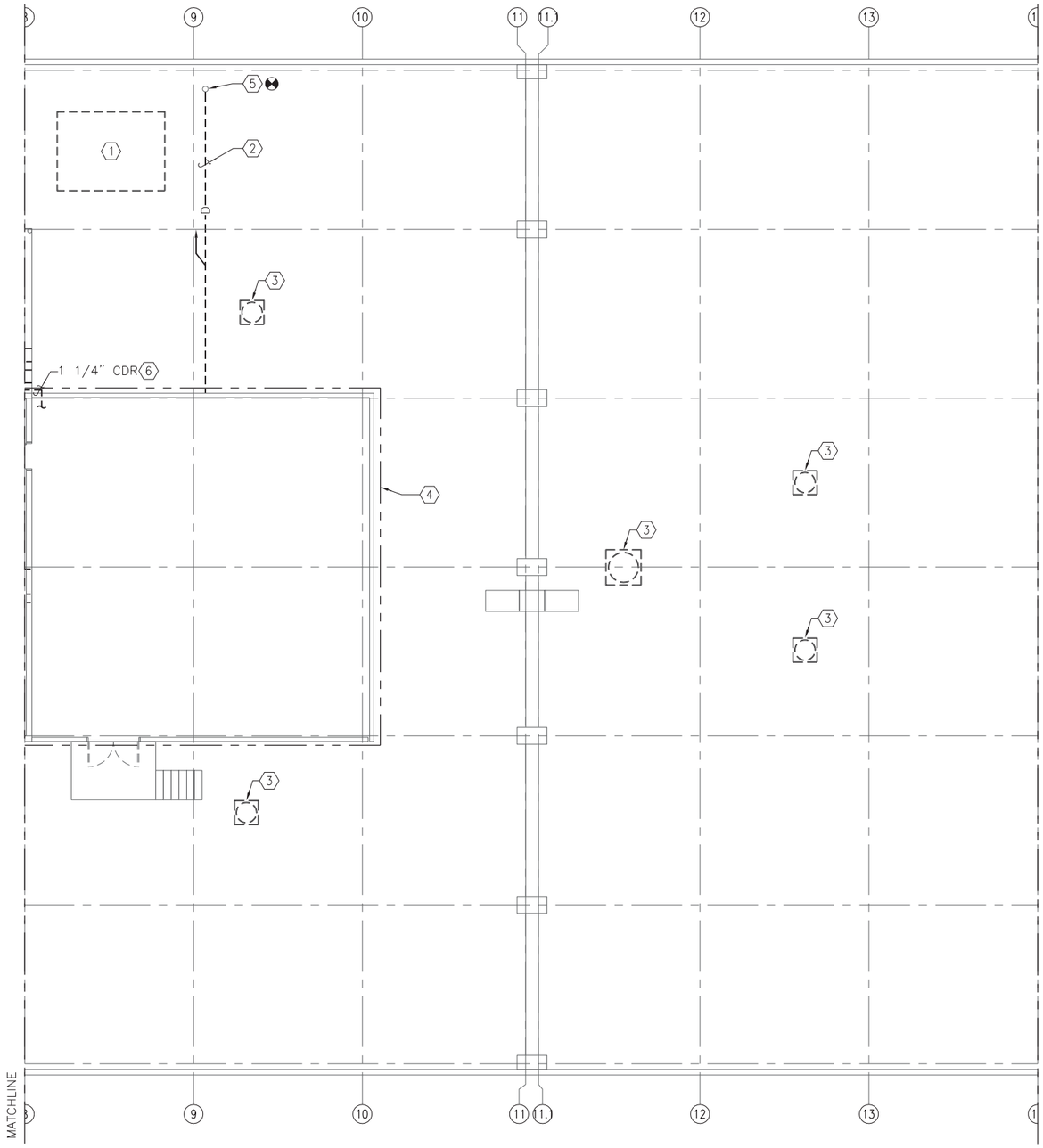
DES DEL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL ROOF DEMOLITION PLAN – A

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544720
SHEET 186 OF 349
MD113

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\MD113 PARTIAL ROOF DEMOLITION PLAN - A.dwg Plot Date: Jul 08, 2009 - 10:29am Last Saved BY: bfunderwhite

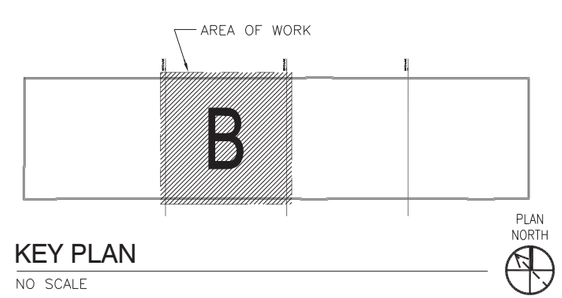


PARTIAL ROOF DEMOLITION PLAN - B

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

DEMOLITION NOTES (THIS SHEET ONLY)

1. REMOVE HVAC EQUIPMENT COMPLETE. INCLUDING BUT NOT LIMITED TO PIPING, CONTROLS DUCTWORK, SUPPORT STRUCTURES, ROOF CURB AND INSULATION. ROOF PENETRATION SHALL REMAIN AND BE REUSED. REFER TO DRAWING SHEET M-122 FOR ADDITIONAL INFORMATION.
2. REMOVE 2" CONDENSATE DRAIN LINE TO ROOF DRAIN.
3. REMOVE EXHAUST FAN COMPLETE. INCLUDING BUT NOT LIMITED TO CONTROLS AND DUCTWORK. REFER TO ARCHITECTURAL DRAWINGS FOR ROOF CURB CAPPING DETAIL.
4. EAST HALF OF EXISTING MECHANICAL ROOM TO REMAIN IN OPERATION DURING RENOVATION. REFER TO SHEET MD401 "ENLARGED MECHANICAL ROOM ROOF PLAN – DEMOLITION" FOR ADDITIONAL INFORMATION ALSO SEE SHEET G-0004 FOR "PHASING NOTES".
5. EXISTING ROOF DRAIN TO REMAIN.
6. REMOVE CDR PIPING COMPLETE AND PATCH WALL.



KEY PLAN

NO SCALE

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
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FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

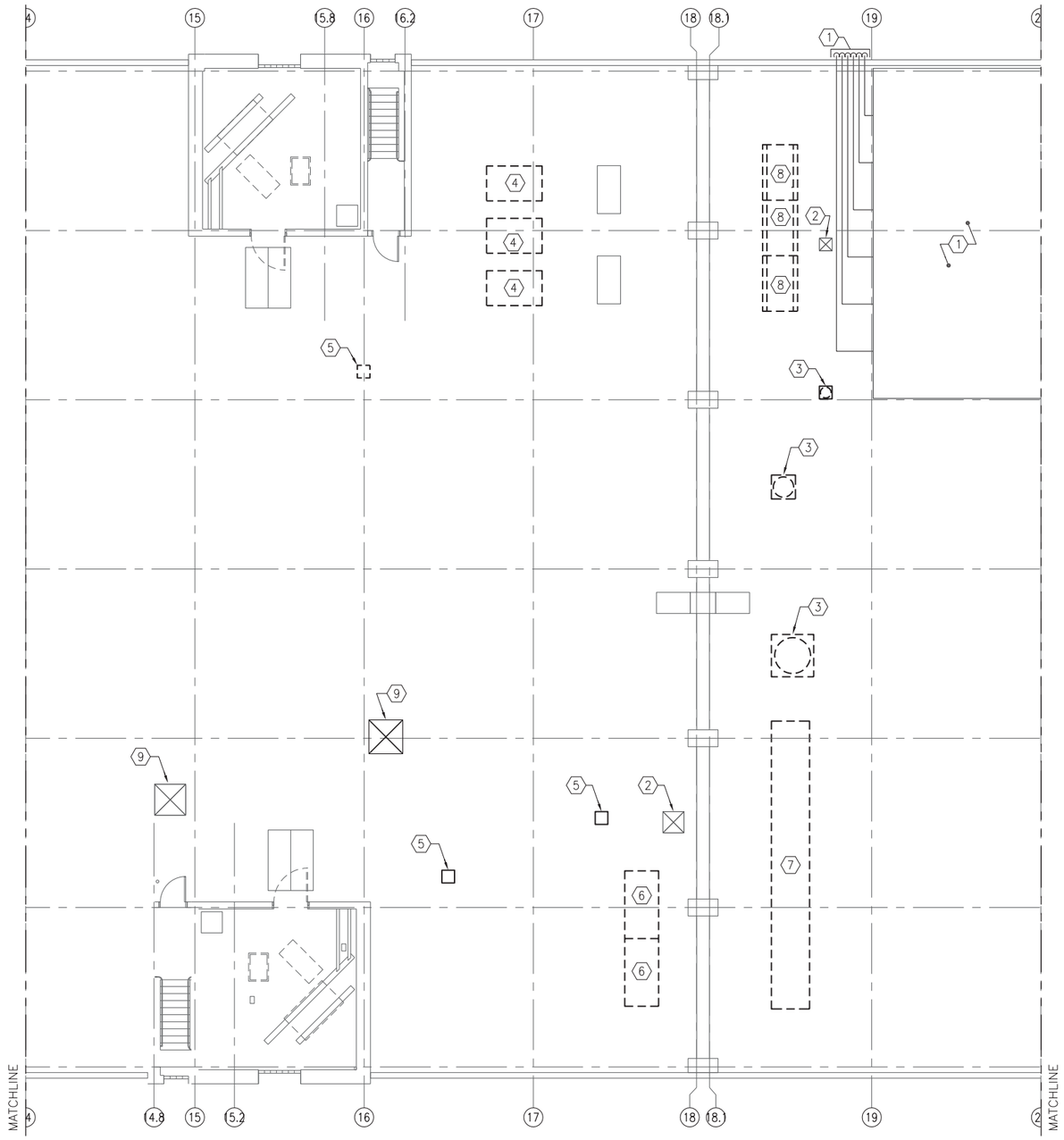
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NAVAL STATION NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL ROOF DEMOLITION PLAN – B

BOWMAN, FOSTER & ASSOC.
CONSULTING ENGINEERS
#4 INTERSTATE CORP. CENTER
NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544721
SHEET 187 OF 349
MD114

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\MD114 PARTIAL ROOF DEMOLITION PLAN - B.dwg Plot Date: Jul 08, 2009 - 10:30am Last Saved BY: bfunderwhite

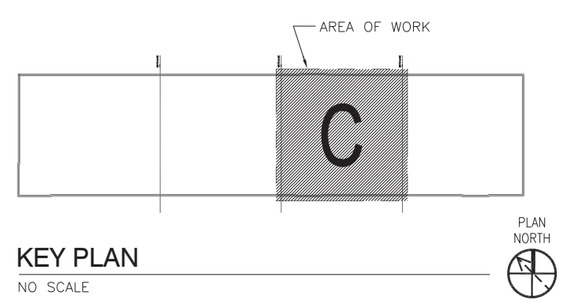


PARTIAL ROOF DEMOLITION PLAN - C

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

DEMOLITION NOTES (THIS SHEET ONLY)

1. EXISTING HVAC EQUIPMENT IN THIS AREA AND PIPING SERVING NEMIAS AREA SHALL REMAIN.
2. EXISTING ROOF CAP TO REMAIN.
3. REMOVE EXHAUST FAN COMPLETE. INCLUDING BUT NOT LIMITED TO CONTROLS AND DUCTWORK. REFER TO ARCHITECTURAL DRAWINGS FOR ROOF CURB CAPPING DETAIL. REFER TO SHEET G-004 FOR "PHASING NOTES".
4. REMOVE DUCTLESS MINISPLIT OUTDOOR UNIT SERVING ROOM 356 COMPLETE. INCLUDING BUT NOT LIMITED TO CONTROLS, PIPING, INSULATION AND SUPPORTS. SEE MD111 FOR REFRIGERANT HANDLING INFORMATION. REFER TO ARCHITECTURAL FOR PATACHING ROOF STRUCTURE.
5. REMOVE GOOSENECK VENT AND ASSOCIATED APPURTENANCES COMPLETE. INSTALL ROOF CURB OVER PENETRATION.
6. REMOVE AIR COOLED CONDENSING UNIT SERVING AIR HANDLING UNITS IN ROOM 205B COMPLETE. INCLUDING BUT NOT LIMITED TO CONTROLS, PIPING, INSULATION AND SUPPORTS. REFER TO DRAWING SHEET MD111 FOR REFRIGERANT HANDLING INFORMATION. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF ROOF STRUCTURE.
7. REMOVE ABANDONED GYCOOLERS COMPLETE. INCLUDING BUT NOT LIMITED TO SUPPORTS, PIPING, CONTROLS, AND INSULATION. REMOVE GLYCOL IN ACCORDANCE WITH EPA REGULATIONS. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF ROOF STRUCTURE.
8. REMOVE ABANDONED EQUIPMENT RACK COMPLETE. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF ROOF STRUCTURE.
9. EXISTING ROOF PENETRATION SHALL REMAIN FOR REUSE. REFER TO DRAWINGS SHEET M-115 FOR ADDITIONAL INFORMATION.



KEY PLAN

NO SCALE

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
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Lic. No.10424
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BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
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NAVAL STATION NORFOLK
NORFOLK, VA

P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR

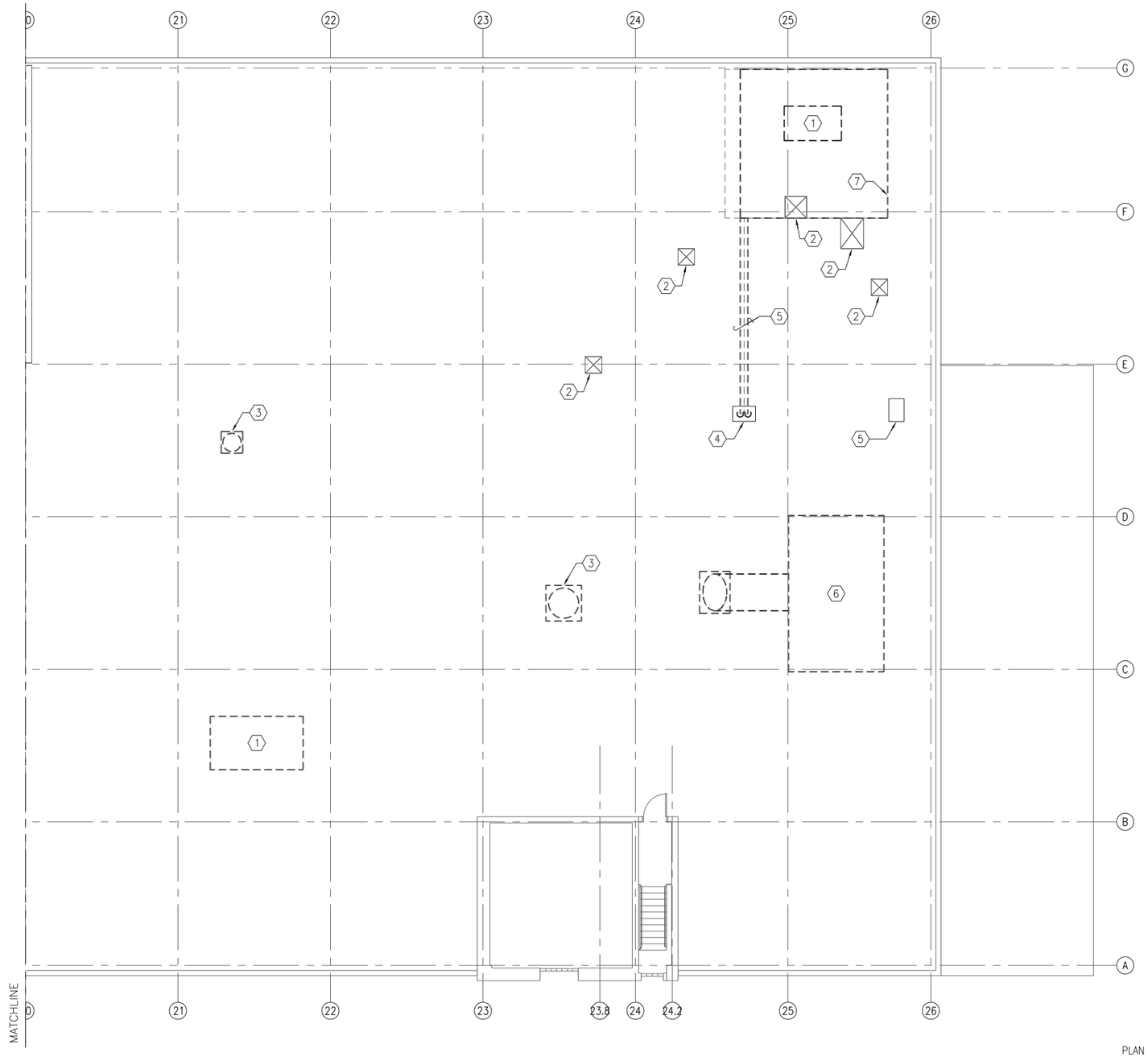
PARTIAL ROOF DEMOLITION PLAN - C

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544722
SHEET 188 OF 349

MD115

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\MD115 PARTIAL ROOF DEMOLITION PLAN - C.dwg Plot Date: Jul 08, 2009 - 10:30am Last Saved BY: bfunderwhite

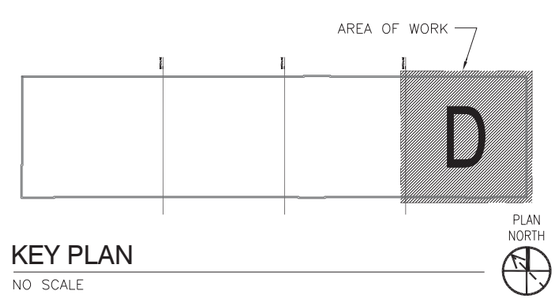


PARTIAL ROOF DEMOLITION PLAN - D

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

DEMOLITION NOTES (THIS SHEET ONLY)

1. REMOVE AIR HANDLING UNIT COMPLETE. INCLUDING BUT NOT LIMITED TO PIPING, DUCTWORK, CONTROLS, CURB, AND INSULATION. REFER TO ARCHITECTURAL DRAWINGS FOR INFORMATION TO PATCH ROOF STRUCTURE. RECOVER REFRIGERANT APPROXIMATE 26.5 LBS. REFER TO SHEET G-004 FOR "PHASING NOTES".
2. EXISTING ROOF CAP TO REMAIN.
3. REMOVE EXHAUST FAN COMPLETE. INCLUDING BUT NOT LIMITED TO CONTROLS AND DUCTWORK. REFER TO ARCHITECTURAL DRAWINGS FOR ROOF CURB CAPPING DETAIL.
4. REMOVE LPS/CDR PIPING AND CONDUIT COMPLETE. INCLUDING BUT NOT LIMITED TO SUPPORTS. REFER TO ARCHITECTURAL DRAWINGS FOR CAPPING THE EXISTING PITCH POCKET.
5. EXISTING PITCH POCKET SHALL REMAIN. REMOVE PIPING AND CONDUIT COMPLETE. REFER TO ARCHITECTURAL DRAWINGS FOR CAPPING INFORMATION.
6. REMOVE AIR HANDLING UNIT COMPLETE. INCLUDING BUT NOT LIMITED TO PIPING, DUCTWORK, CONTROLS, CURB, AND INSULATION. EXISTING ROOF PENETRATION SHALL REMAIN AND BE REUSED REFER TO DRAWING M-124 FOR ADDITIONAL INFORMATION. REFER TO ARCHITECTURAL DRAWINGS FOR INFORMATION TO PATCH ROOF.
7. REMOVE ROOF PLATFORM STRUCTURE COMPLETE.



KEY PLAN

NO SCALE

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

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PROFESSIONAL ENGINEER

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FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

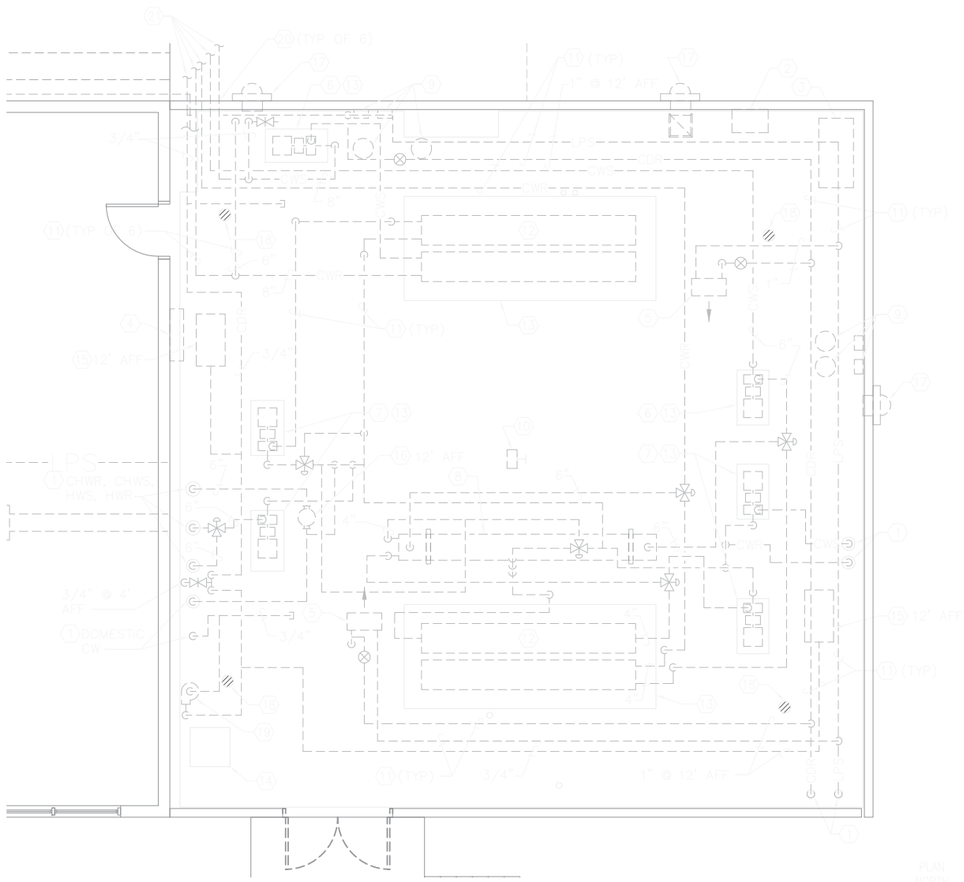
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION NORFOLK
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL ROOF DEMOLITION PLAN - D

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544723
SHEET 189 OF 349

MD116

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\MD116 PARTIAL ROOF DEMOLITION PLAN - D.dwg Plot Date: Jul 08, 2009 - 10:30am Last Saved BY: bfunderwhite



ENLARGED MECHANICAL ROOM ROOF PLAN - DEMOLITION

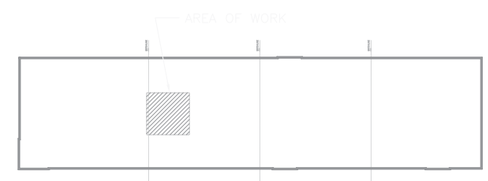
SCALE: 1/4" = 1'-0"

DEMOLITION NOTES (THIS SHEET ONLY)

1. EXISTING FLOOR PENETRATION TO REMAIN.
2. REMOVE AIR COMPRESSOR SERVING PNEUMATIC CONTROLS AND ASSOCIATED APPURTENANCES COMPLETE.
3. REMOVE REFRIGERATED AIR DRYER SERVING COMPRESSOR AND ASSOCIATED APPURTENANCES COMPLETE.
4. REMOVE HVAC EQUIPMENT CONTROL PANEL AND ASSOCIATED APPURTENANCES COMPLETE.
5. REMOVE STEAM UNIT HEATER ±12' AFF, INCLUDING PIPING, CONTROLS AND ASSOCIATED APPURTENANCES COMPLETE.
6. REMOVE CONDENSER WATER PUMP, PIPING, CONTROLS AND ASSOCIATED APPURTENANCES COMPLETE.
7. REMOVE CHILLED WATER PUMP, PIPING, CONTROLS AND ASSOCIATED APPURTENANCES COMPLETE.
8. REMOVE CONDENSER WATER ECONOMIZER, SUPPORTS, PIPING AND ASSOCIATED APPURTENANCES COMPLETE.
9. REMOVE CHEMICAL FEED SYSTEM FOR CONDENSER WATER INCLUDING 5 GALLON CHEMICAL CONTAINERS, PUMPS, TUBING, WALL MOUNTED CONTROLS AND ASSOCIATED APPURTENANCES COMPLETE.
10. REMOVE COLUMN MOUNTED REFRIGERANT MONITOR AND ASSOCIATED APPURTENANCES COMPLETE.
11. REMOVE PIPING, HANGERS AND ASSOCIATED APPURTENANCES COMPLETE.
12. REMOVE 150 TON WATER COOLED CHILLER, PIPING, CONTROLS AND ASSOCIATED APPURTENANCES COMPLETE.
13. REMOVE 4" EQUIPMENT MOUNTED CONCRETE PAD COMPLETE DOWN TO FINISHED FLOOR.
14. EXISTING MECHANICAL ROOM CRAWL SPACE ACCESS TO REMAIN.
15. REMOVE EXPANSION TANK, PIPING AND ASSOCIATED APPURTENANCES COMPLETE.
16. REMOVE AIR SEPARATOR, PIPING AND ASSOCIATED APPURTENANCES COMPLETE.
17. REMOVE EXHAUST DUCT, EXHAUST FAN, CONTROLS AND ASSOCIATED APPURTENANCES COMPLETE.
18. EXISTING FLOOR DRAINS TO REMAIN.
19. REMOVE MAKE-UP WATER RECIRCULATING PUMP COMPLETE.
20. PATCH WALL PENETRATIONS TO MATCH EXISTING.
21. PIPING TO COOLING TOWERS. SEE "PARTIAL ROOF DEMOLITION PLAN-A" SHEET MD-113 FOR CONTINUATION.

GENERAL DEMOLITION NOTE:

REFER TO SHEET G-004 FOR "PHASING NOTES".



KEY PLAN

NO SCALE

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/4"=1'-0" 10' 5' 0' 10' 20'

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
J. Roberts
Lic. No 10424

NAVAL FACILITIES ENGINEERING COMMAND - MID-ATLANTIC
NAVAL STATION NORFOLK, VIRGINIA

P211V BUILDING V53 BRAC RENOVATIONS FOR SPAWAR

ENLARGED MECHANICAL ROOM ROOF PLAN - DEMOLITION

SCALE: AS NOTED

DATE: 10/6

DRAWN BY: MJK

CHECKED BY: KJMMC

DATE: 10/08/09

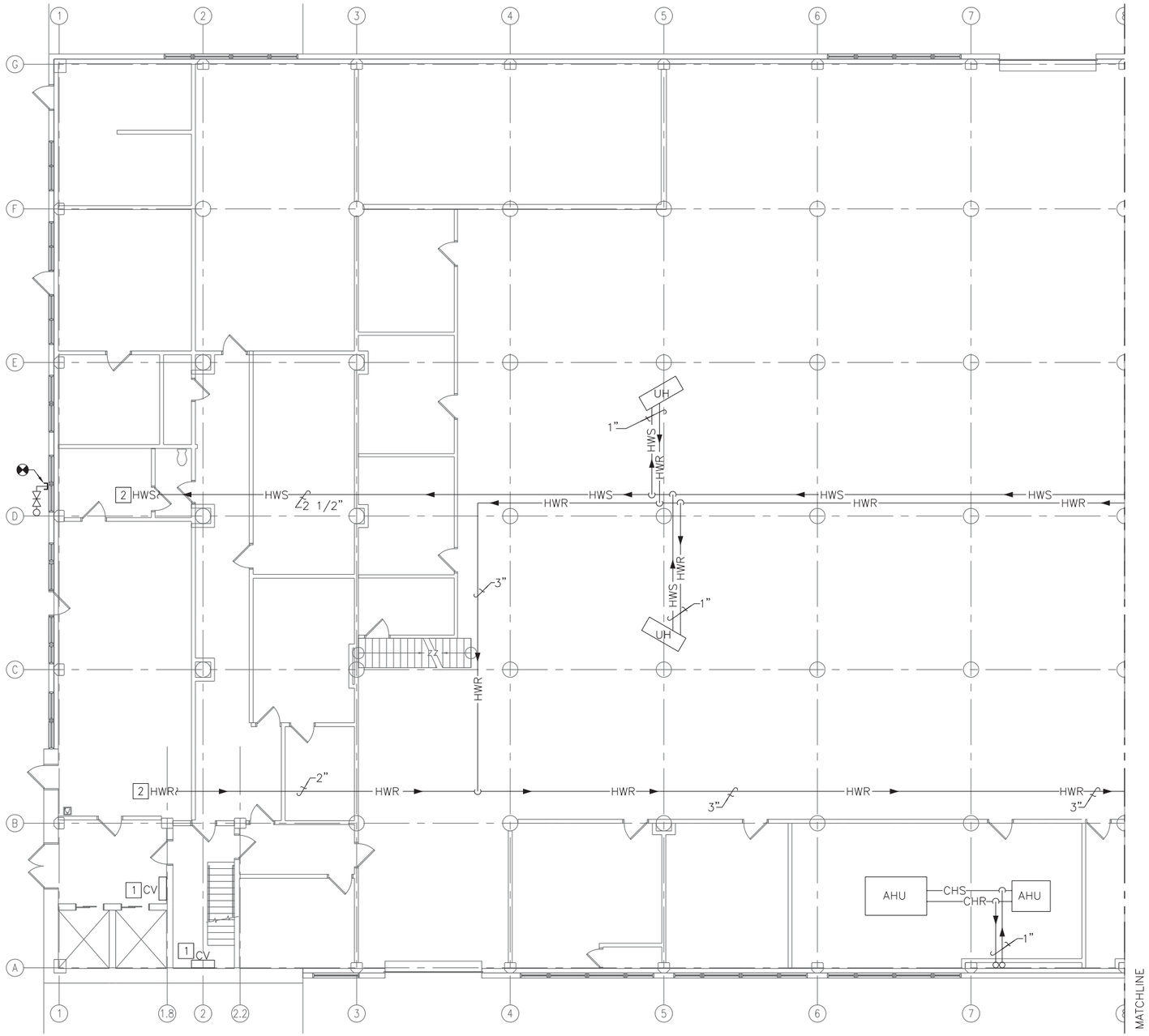
CONTRACT NO. 12544724

PAGE: 190 OF 329

BOWMAN, FOWER & ASSOC.
CIVIL ENGINEERS
A. WEEDON DRIVE, SUITE 1
NORFOLK, VA 23502
(757) 226-1000 FAX: 226-1001
PORTSMOUTH, VA 23704

MD401

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\MD401 ENLARGED MECHANICAL ROOM ROOF PLAN - DEMOLITION.dwg Plot Date: Jul 08, 2009 - 10:30am Last Saved BY: bfunderwhite



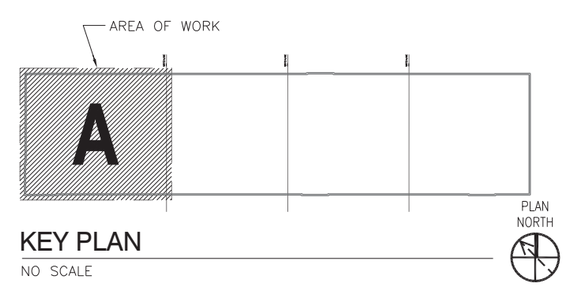
PARTIAL FIRST FLOOR NEW WORK PIPING PLAN - A

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

PLAN NORTH

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. EXISTING CONVECTORS AND PIPING.
2. EXISTING HWS AND HWR TO GALLEY.



KEY PLAN

NO SCALE

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GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

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S. G. Roberts
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PROFESSIONAL ENGINEER

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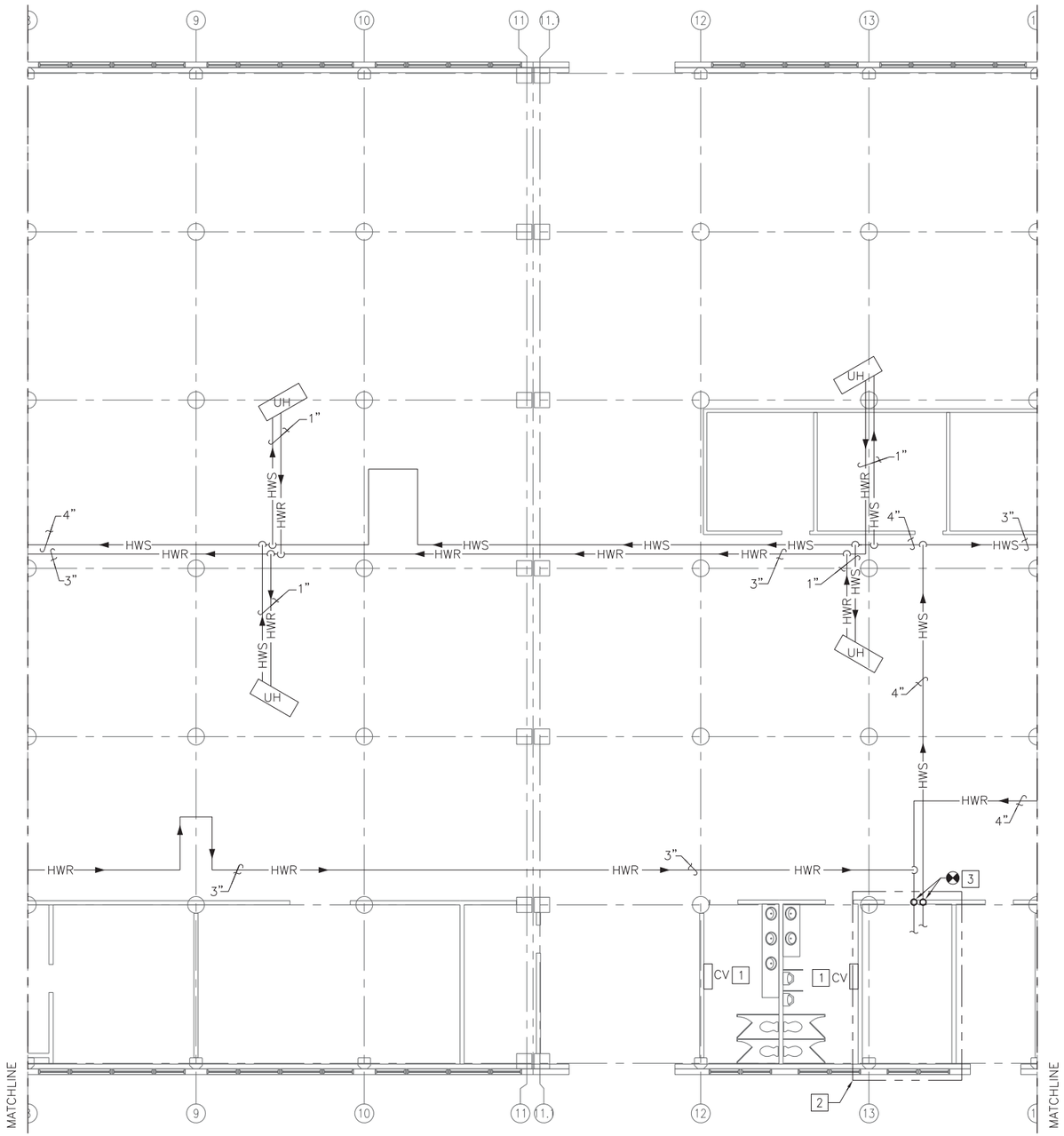
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL FIRST FLOOR NEW WORK PIPING PLAN - A

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544725
SHEET 191 OF 349

M-101

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-101 PARTIAL FIRST FLOOR NEW WORK PIPING PLAN - A.dwg Plot Date: Jul 08, 2009 - 10:31am Last Saved BY: bfunderwhite



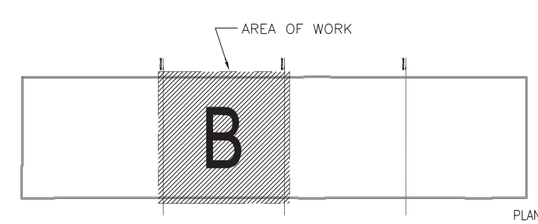
PARTIAL FIRST FLOOR NEW WORK PIPING PLAN - B

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

PLAN NORTH

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. EXISTING CONVECTORS AND PIPING.
2. FOR WORK IN THIS AREA SEE "ENLARGED MECHANICAL ROOM FIRST FLOOR-NEW WORK" SHEET M-401.
3. PROVIDE NEW 4" HWS, HWR RISERS IN EXISTING CORE DRILLED PENETRATIONS FIRE STOP AT EACH FLOOR LEVEL.



KEY PLAN

NO SCALE

PLAN NORTH

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GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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ARLINGTON, VA 22206

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NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
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FIRE PROTECTION
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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
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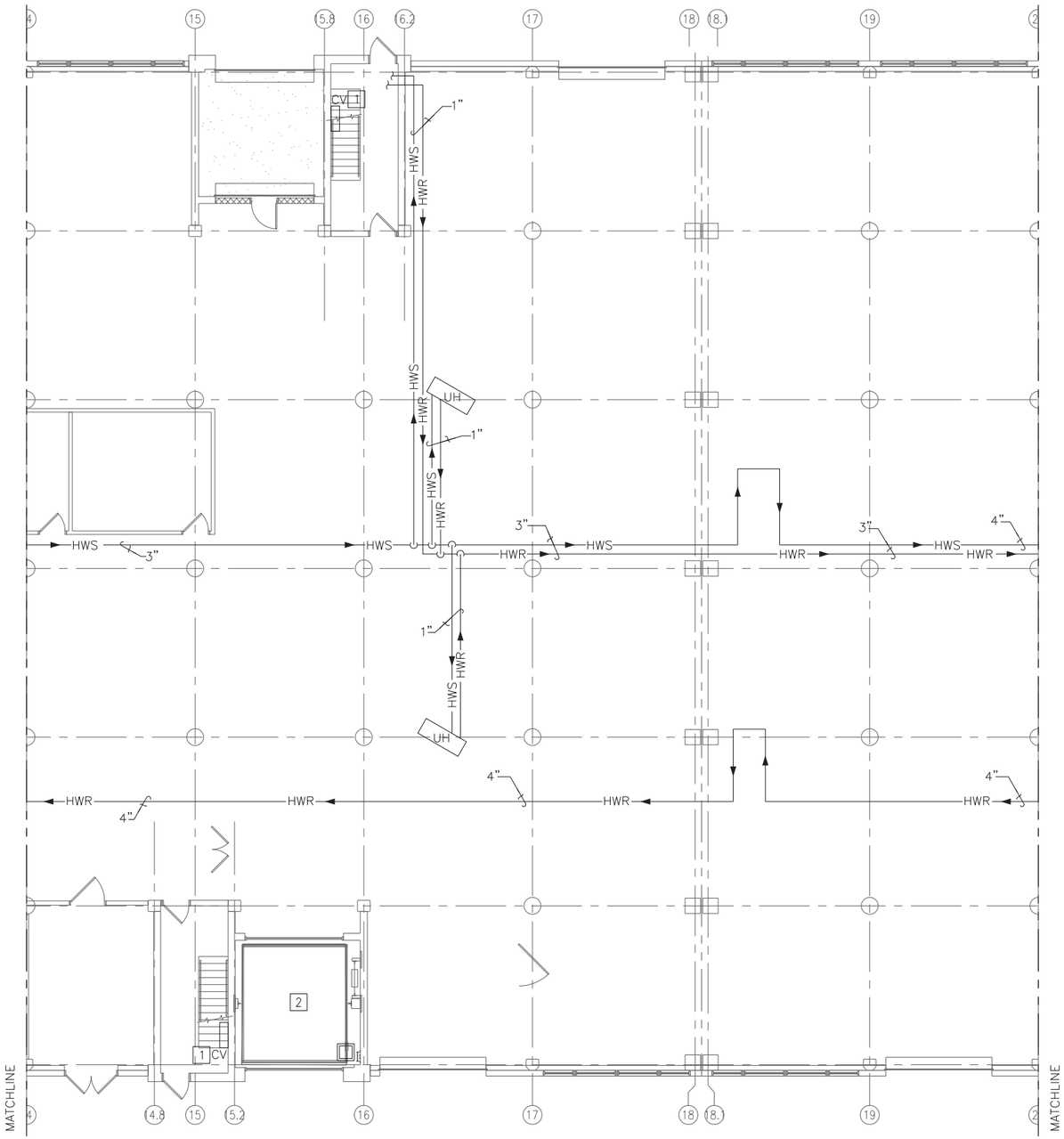
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL FIRST FLOOR NEW WORK PIPING PLAN - B

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544726
SHEET 192 OF 349

M-102

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-102 PARTIAL FIRST FLOOR NEW WORK PIPING PLAN - B.dwg Plot Date: Jul 08, 2009 - 10:31am Last Saved BY: bfunderwhite



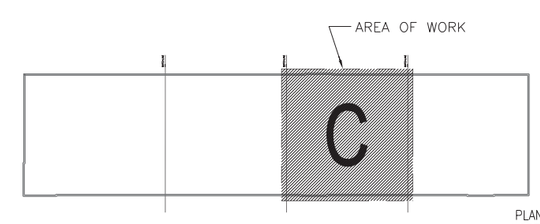
PARTIAL FIRST FLOOR NEW WORK PIPING PLAN - C

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

PLAN NORTH

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. EXISTING CONVECTORS AND PIPING.
2. FOR WORK IN THIS AREA SEE "ENLARGED ELEVATOR PIT PLAN-NEW WORK" SHEET M-404 AND "ELEVATOR PIT SECTION C3" SHEET M-303.



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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ARLINGTON, VA 22206

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NAVFAC

RRMM ARCHITECTS

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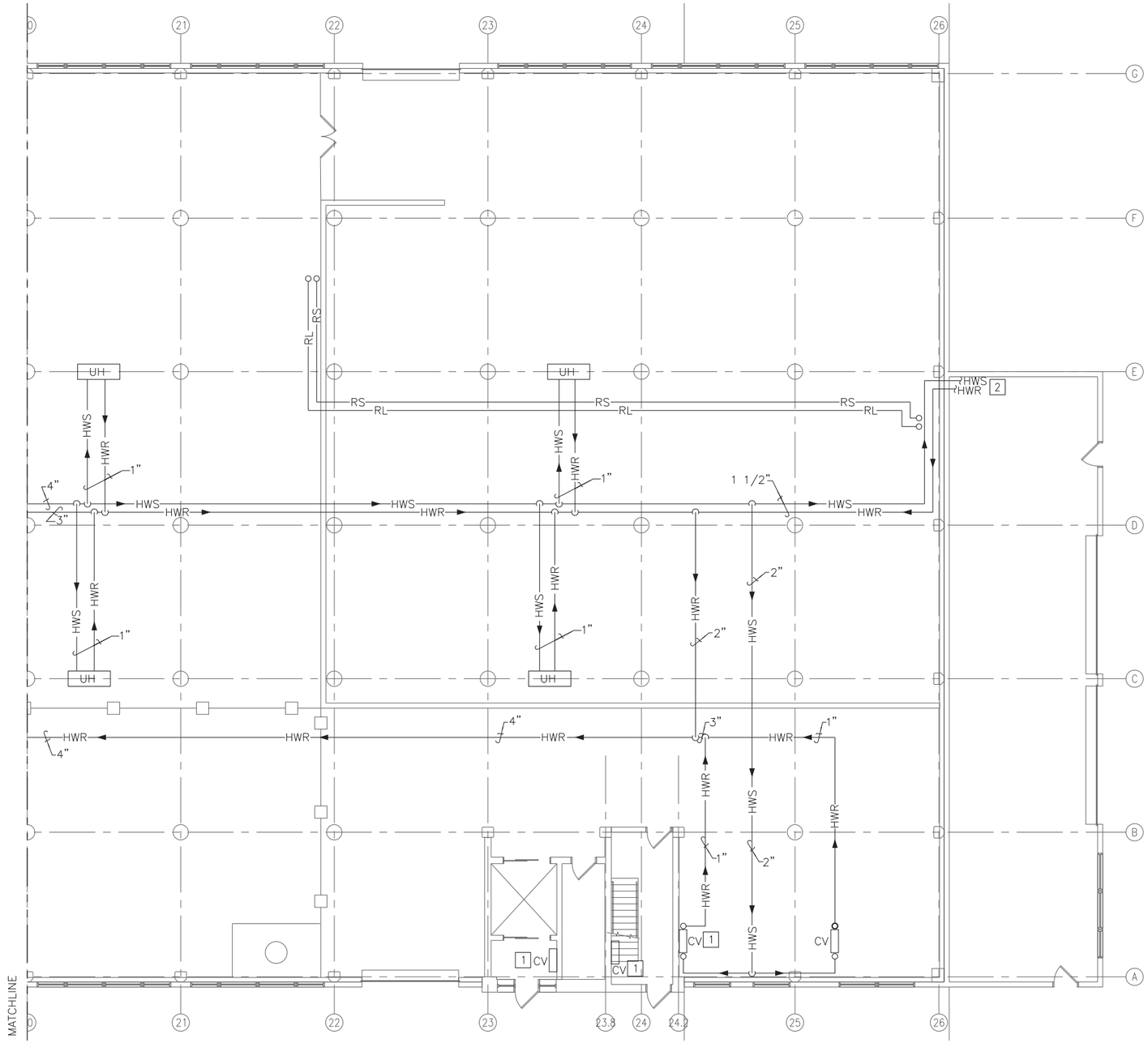
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION NORFOLK, VIRGINIA
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VA
NAVAL STATION NORFOLK
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL FIRST FLOOR NEW WORK PIPING PLAN - C

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544727
SHEET 193 OF 349

M-103

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-103 PARTIAL FIRST FLOOR NEW WORK PIPING PLAN - C.dwg Plot Date: Jul 08, 2009 - 10:31am Last Saved BY: bfunderwhite



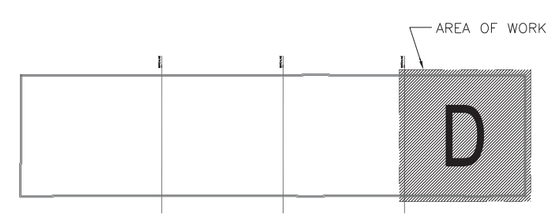
PARTIAL FIRST FLOOR NEW WORK PIPING PLAN - D

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

PLAN NORTH

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. EXISTING CONVECTORS AND PIPING.
2. TO EXISTING HEATING EQUIPMENT.



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

DES DEL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

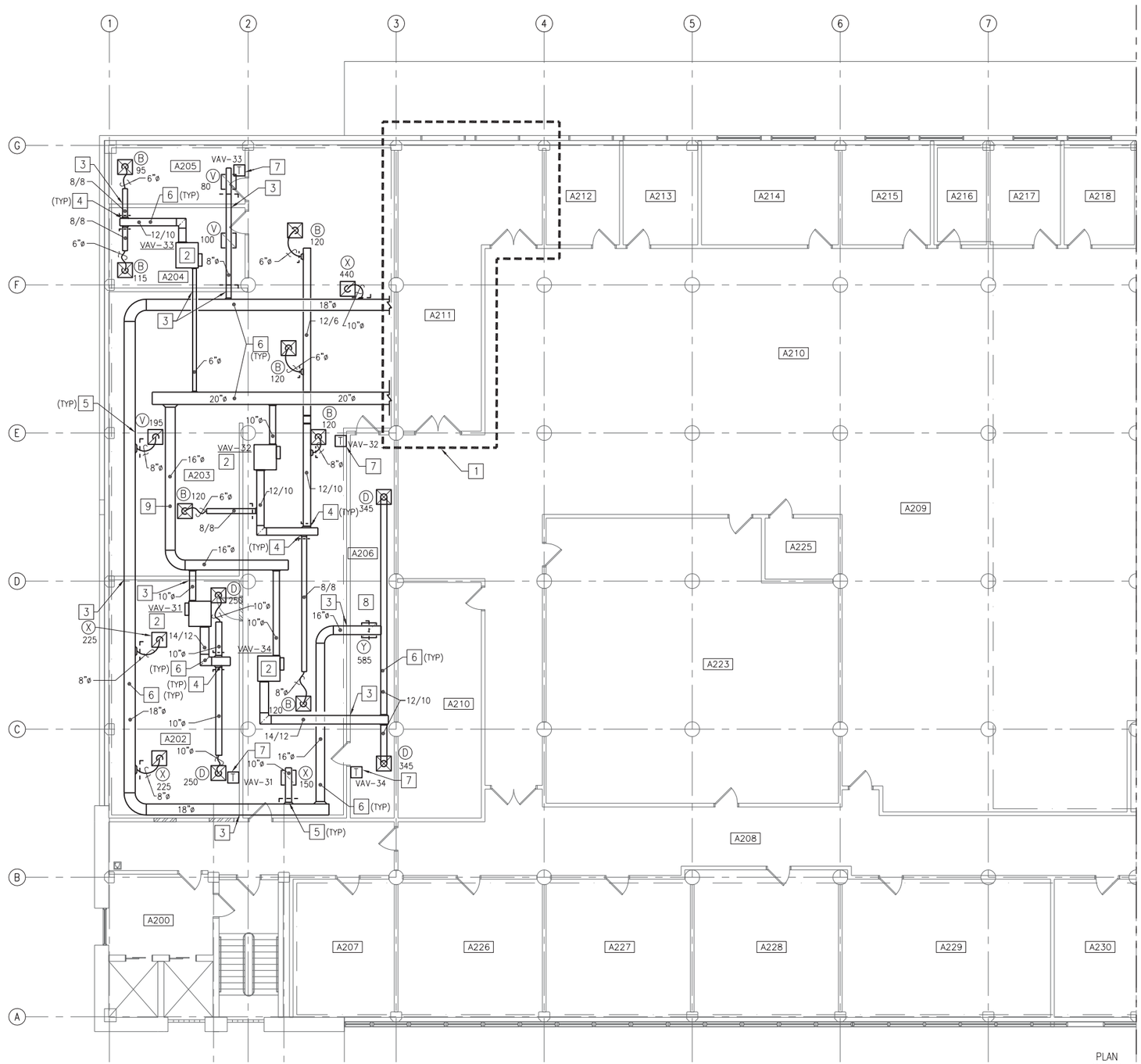
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL FIRST FLOOR NEW WORK PIPING PLAN - D

BOWMAN, FOSTER & ASSOC.
CONSULTING ENGINEERS
#4 INTERSTATE CORP. CENTER
NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

CODE ID. NO. 80091	SIZE D
SCALE: AS NOTED	
MAXIMO NO.	N/A
JOB ORDER NO.	
WORK ORDER NO.	539080
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12544728
SHEET 194 OF 349	
M-104	

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-104 PARTIAL FIRST FLOOR NEW WORK PIPING PLAN - D.dwg Plot Date: Jul 08, 2009 - 10:31am Last Saved BY: bfunderwhite



PARTIAL SECOND FLOOR NEW WORK DUCTWORK PLAN - A

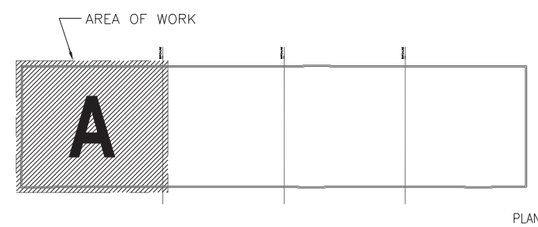
SCALE: 1/8" = 1'-0"

GENERAL NOTES (THIS SHEET ONLY)

1. SUPPLY AIR DUCTWORK SHALL BE INSULATED.

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. REFER TO "ENLARGED MECHANICAL ROOM SECOND FLOOR – NEW WORK" ON SHEET M-402 FOR ADDITIONAL INFORMATION.
2. FAN POWERED VAV TERMINAL. REFER TO "SERIIES FAN POWERED VAV TERMINAL UNIT DETAIL" B2/M-504 FOR ADDITIONAL INFORMATION. VAV TERMINAL SHALL UTILIZE PLENUM AREA FOR THE RETURN AIR.
3. DUCTWORK PENETRATIONS. REFER TO "DUCTWORK WALL SLEEVE DETAIL" B4/M-503 FOR ADDITIONAL INFORMATION.
4. SUPPLY AIR BRANCH CONNECTION. REFER TO "TYPICAL BRANCH CONNECTION DETAIL" B2/M-503 FOR ADDITIONAL INFORMATION.
5. RETURN AIR BRANCH CONNECTION. REFER TO "TYPICAL BRANCH CONNECTION DETAIL" B2/M-503 FOR ADDITIONAL INFORMATION.
6. DUCTWORK RUN TIGHT TO UNDER SIDE OF CONCRETE DECK. REFER TO "RETURN/SUPPLY AIR GRILLE/DIFFUSER DUCTWORK DETAIL" A4/M-503 FOR ADDITIONAL INFORMATION.
7. WALL MOUNT THERMOSTAT.
8. GRILLES AND REGISTERS SHALL BE HARD DUCTED IN THIS AREA.
9. PROVIDE STATIC PRESSURE SENOR LOCATION TO CONTROL THE VFD IN AHU-5.
10. PROVIDE RIGID SUPPLY DUCT TO PRIMARY AIR INLET CONNECTIONS ON ALL FAN POWERED VAV UNITS.



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

DES DEL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

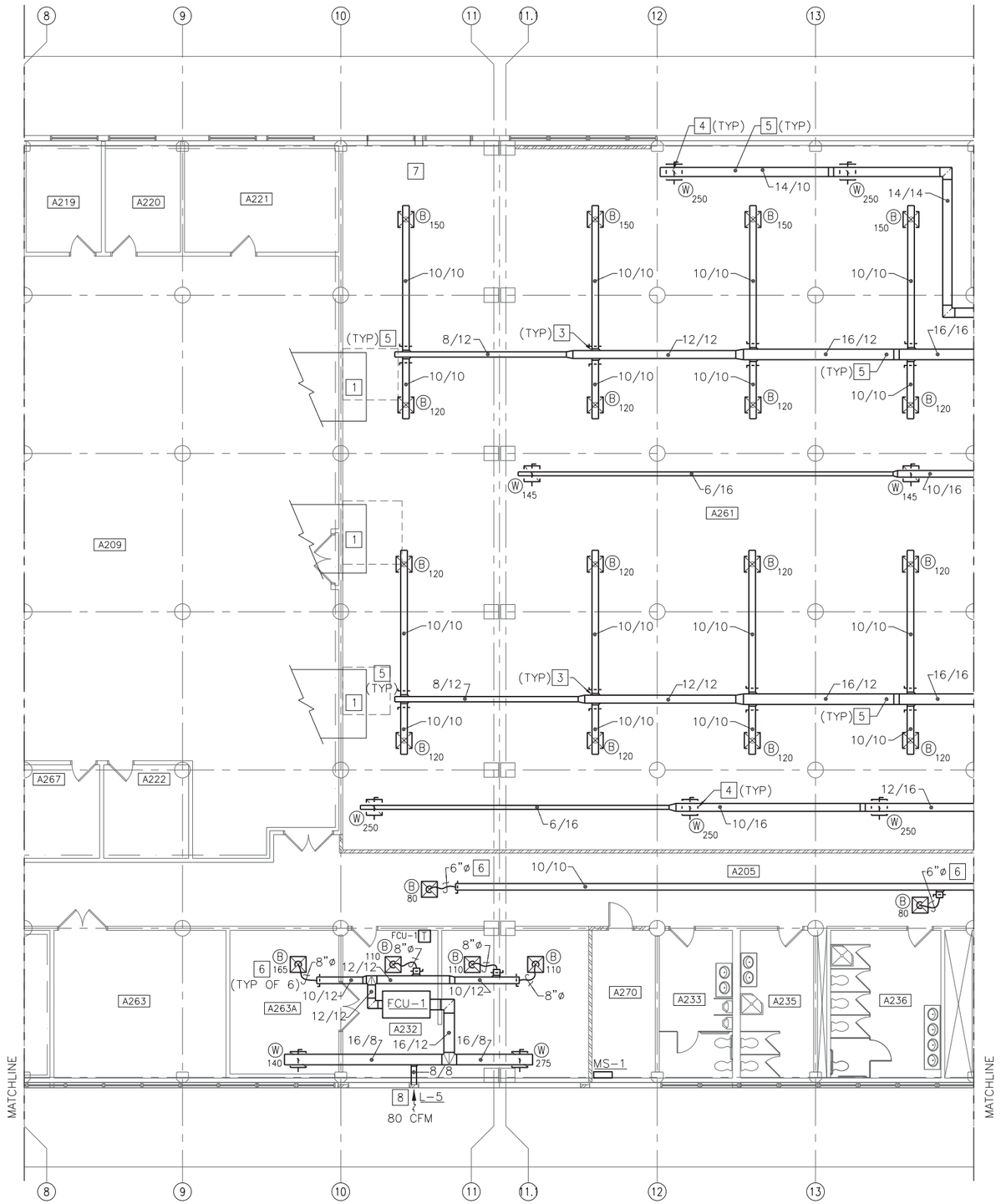
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL SECOND FLOOR NEW WORK DUCTWORK PLAN – A

CODE ID. NO. 80091 | SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544729
SHEET 195 OF 349

M-105

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-105 PARTIAL SECOND FLOOR NEW WORK DUCTWORK PLAN - A.dwg Plot Date: Jul 08, 2009 - 10:32am Last Saved BY: bfunderwhite



PARTIAL SECOND FLOOR NEW WORK DUCTWORK PLAN - B

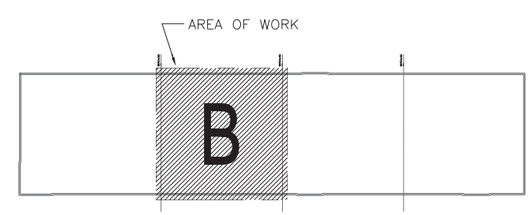
SCALE: 1/8" = 1'-0"

GENERAL NOTES (THIS SHEET ONLY)

1. SUPPLY AIR DUCTWORK SHALL BE INSULATED.
2. RETURN AIR DUCTWORK DOES NOT REQUIRE INSULATION.

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. EXISTING AIR RELIEF DUCTS AND EXHAUST LOUVERS FOR AIR PRESSURE RELIEF OF NCTAMSLANT AREA TO REMAIN.
2. DUCTWORK PENETRATIONS. REFER TO "DUCTWORK WALL SLEEVE DETAIL" B4/M-503 FOR ADDITIONAL INFORMATION.
3. SUPPLY AIR BRANCH CONNECTION. REFER TO "TYPICAL BRANCH CONNECTION DETAIL" B2/M-503 FOR ADDITIONAL INFORMATION.
4. RETURN AIR BRANCH CONNECTION. REFER TO "TYPICAL BRANCH CONNECTION DETAIL" B2/M-503 FOR ADDITIONAL INFORMATION.
5. DUCTWORK RUN TIGHT TO UNDER SIDE OF CONCRETE DECK. REFER TO "RETURN/SUPPLY AIR GRILLE/DIFFUSER DUCTWORK DETAIL" A4/M-503 FOR ADDITIONAL INFORMATION.
6. PROVIDE LAY IN TYPE DIFFUSER AND FLEX DUCT FOR SUSPENDED CEILING INSTALLATION.
7. EXISTING RELIEF AIR LOUVERS FOR NCTAMSLANT AREA AND NEW STORAGE AREA.
8. USE EXISTING WALL PENETRATION FOR FRESH AIR INTAKE.



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
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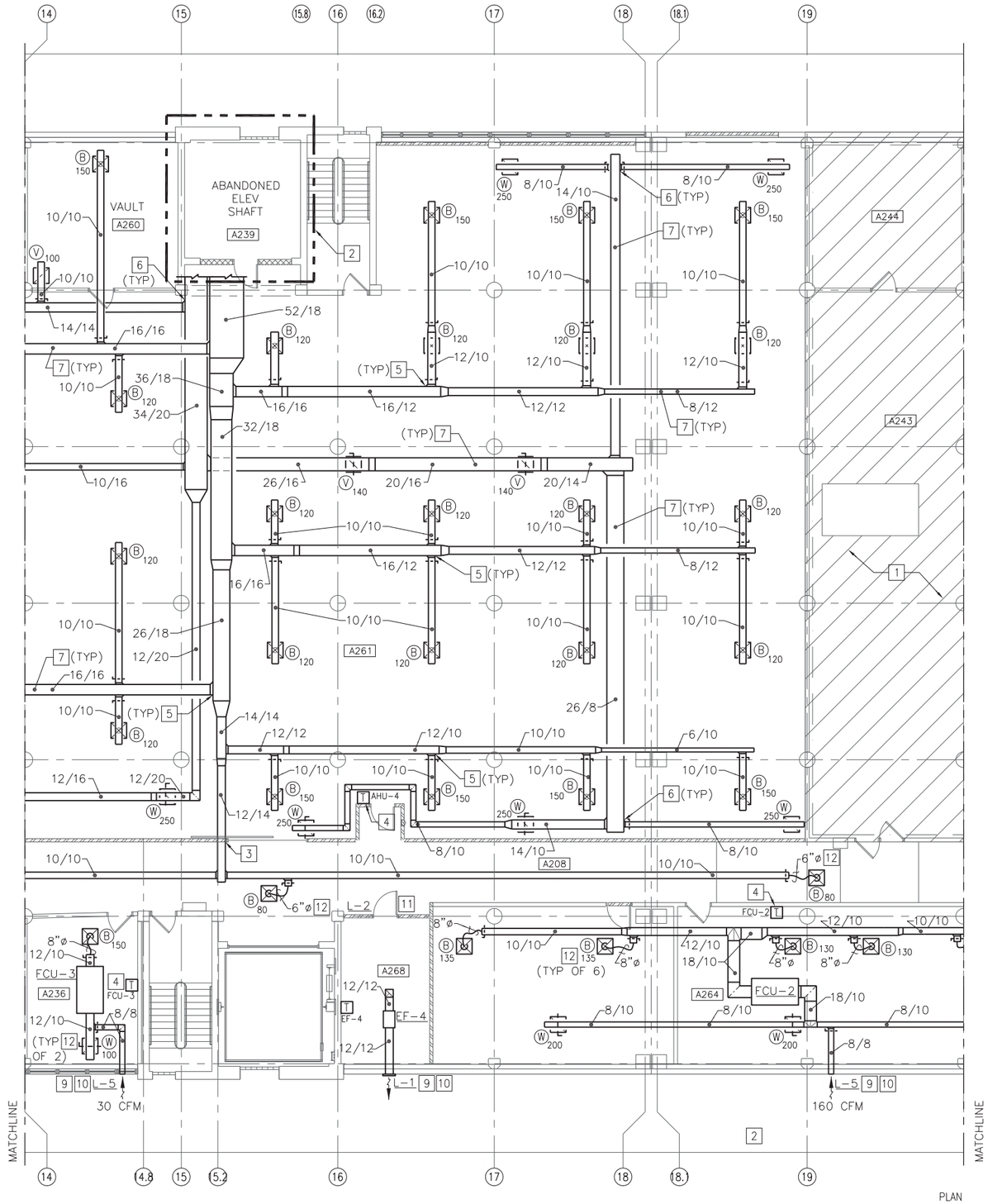
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION
NAVAL FACILITIES ENGINEERING COMMAND – MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL SECOND FLOOR NEW WORK DUCTWORK PLAN – B

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544730
SHEET 196 OF 349
M-106

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-106 PARTIAL SECOND FLOOR NEW WORK DUCTWORK PLAN - B.dwg Plot Date: Jul 08, 2009 - 10:32am Last Saved BY: bfunderwhite



PARTIAL SECOND FLOOR NEW WORK DUCTWORK PLAN - C

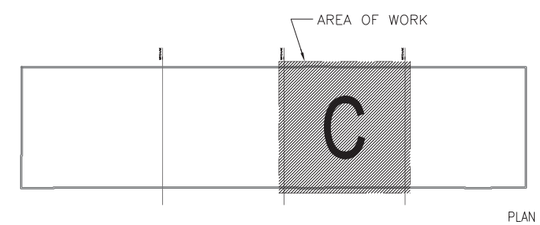
SCALE: 1/8" = 1'-0"

GENERAL NOTES (THIS SHEET ONLY)

1. SUPPLY AIR DUCTWORK SHALL BE INSULATED.
2. RETURN AIR DUCTWORK DOES NOT REQUIRE INSULATION.

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. AREA NOT IN CONTRACT.
2. REFER TO "ENLARGED MECHANICAL ROOM SECOND FLOOR ABANDONED ELEVATOR SHAFT – NEW WORK" SHEET M–402 FOR ADDITIONAL INFORMATION.
3. DUCTWORK PENETRATIONS. REFER TO "DUCTWORK WALL SLEEVE DETAIL" B4/M–503 FOR ADDITIONAL INFORMATION.
4. WALL MOUNT THERMOSTAT.
5. SUPPLY AIR BRANCH CONNECTION. REFER TO "TYPICAL BRANCH CONNECTION DETAIL" B2/M–503 FOR ADDITIONAL INFORMATION.
6. RETURN AIR BRANCH CONNECTION. REFER TO "TYPICAL BRANCH CONNECTION DETAIL" B2/M–503 FOR ADDITIONAL INFORMATION.
7. DUCTWORK RUN TIGHT TO UNDER SIDE OF CONCRETE DECK. REFER TO "RETURN/SUPPLY AIR GRILLE/DIFFUSER DUCTWORK DETAIL" A4/M–503 FOR ADDITIONAL INFORMATION.
8. PROVIDE INLINE EXHAUST FAN HUNG TIGHT TO CEILING WITH CONNECTING DUCTWORK TO WALL MOUNTED LOUVER AND BACK DRAFT DAMPER. FURNISH EXHAUST FAN WITH LINE VOLTAGE THERMOSTAT.
9. SEE "TYPICAL LOUVER DETAIL" SHEET A2/M–506.
10. SEE SCHEDULE SHEET M–603 FOR LOUVER DESCRIPTION.
11. PROVIDE LOUVER L–2 IN DOOR SEE SCHEDULE SHEET M–603.
12. PROVIDE LAY IN TYPE DIFFUSER AND FLEX DUCT FOR SUSPENDED CEILING INSTALLATION.



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

DES DEL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NAVAL STATION NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL SECOND FLOOR NEW WORK DUCTWORK PLAN – C

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544731
SHEET 197 OF 349
M-107

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-107 PARTIAL SECOND FLOOR NEW WORK DUCTWORK PLAN - C.dwg Plot Date: Jul 08, 2009 - 10:32am Last Saved BY: bfunderwhite

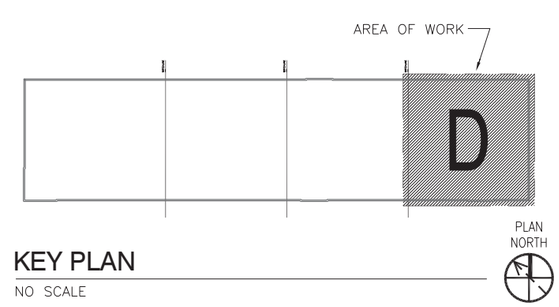
PARTIAL SECOND FLOOR NEW WORK DUCTWORK PLAN - D

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

PLAN NORTH

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. PROVIDE LAY TYPE DIFFUSER AND FLEX DUCT FOR SUSPENDED CEILING INSTALLATION.



KEY PLAN

NO SCALE

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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CONSULTING ENGINEERS
#4 INTERSTATE CORP. CENTER
NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

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RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
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PROFESSIONAL ENGINEER

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BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA

P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR

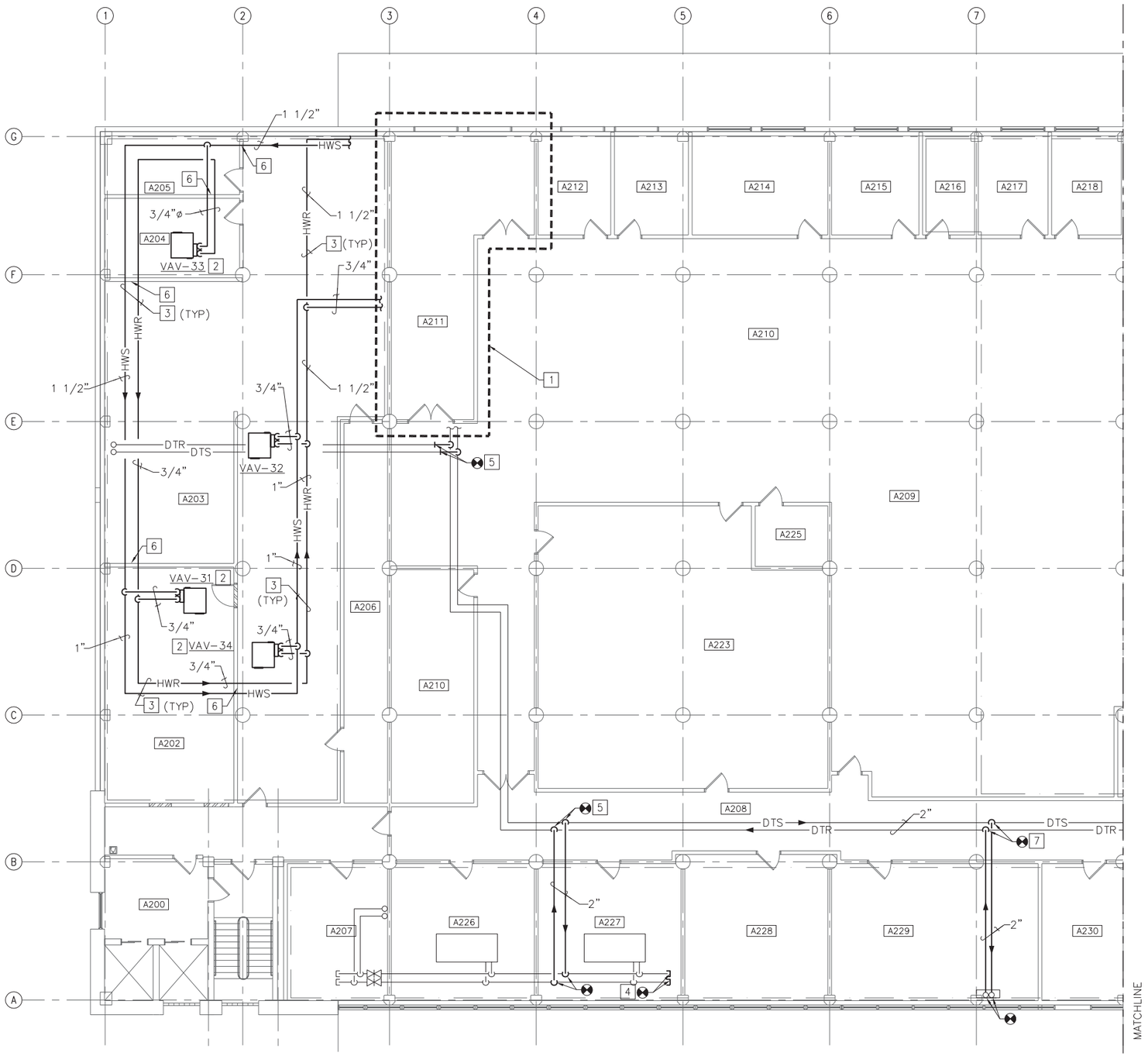
PARTIAL SECOND FLOOR NEW WORK DUCTWORK PLAN - D

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544732
SHEET 198 OF 349

M-108

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-108 PARTIAL SECOND FLOOR NEW WORK DUCTWORK PLAN - D.dwg Plot Date: Jul 08, 2009 - 10:32am Last Saved BY: bfunderwhite



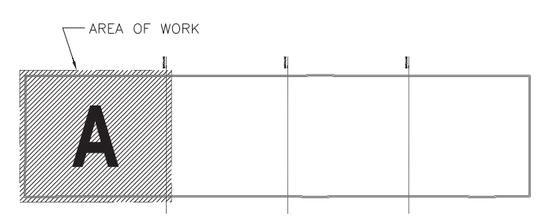
PARTIAL SECOND FLOOR NEW WORK PIPING PLAN - A

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

PLAN NORTH

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. REFER TO "ENLARGED MECHANICAL ROOM SECOND FLOOR – NEW WORK" SHEET M-402 FOR ADDITIONAL INFORMATION.
2. HOT WATER SUPPLY AND RETURN PIPING TO VAV TERMINALS. REFER TO "SERIES FAN POWERED VAV TERMINAL PIPING DETAIL" C2/M-504 FOR ADDITIONAL INFORMATION.
3. PIPING SUPPORT REFER TO "PIPE HANGER DETAIL" C5/M-505 FOR ADDITIONAL INFORMATION.
4. CAP PIPING.
5. CONNECT EXISTING SYSTEM TO NEW DUAL TEMPERATURE PIPING SYSTEM.
6. PIPE PENETRATIONS THRU WALL. REFER TO "PIPE SLEEVE INTERIOR WALL" C5/M-504.
7. PROVIDE DUAL TEMP WATER PIPING TO EXISTING RISER IN WALL SERVING FAN COIL UNITS ON THE FIRST FLOOR.



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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CONSULTING ENGINEERS
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NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

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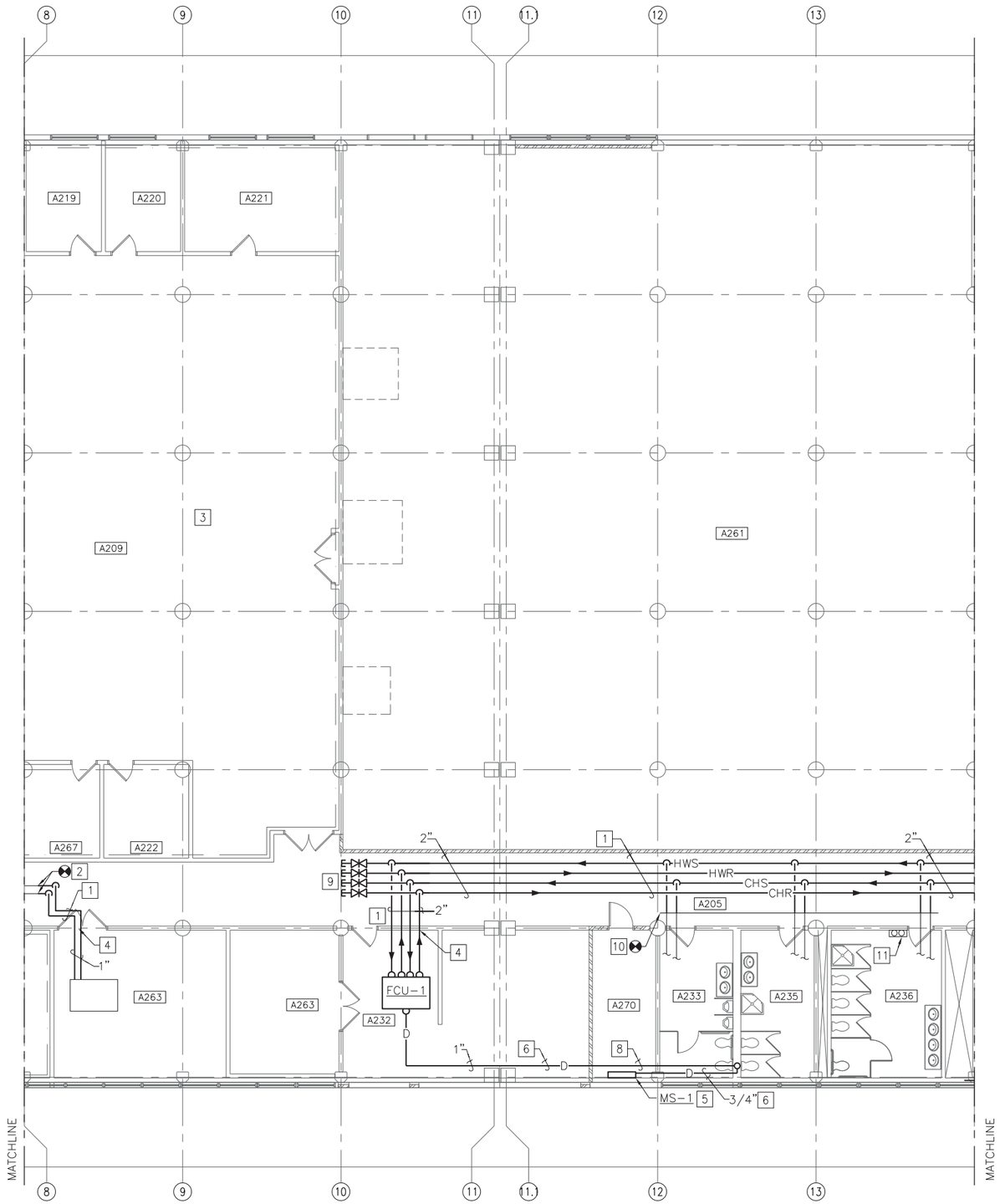
DES DEL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NAVAL STATION NORFOLK, VIRGINIA
NAVAL STATION NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL SECOND FLOOR NEW WORK PIPING PLAN – A

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544733
SHEET 199 OF 349
M-109

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-109 PARTIAL SECOND FLOOR NEW WORK PIPING PLAN - A.dwg Plot Date: Jul 08, 2009 - 10:33am Last Saved BY: bfunderwhite



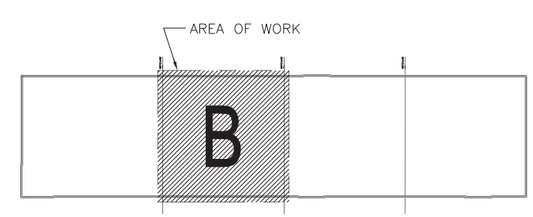
PARTIAL SECOND FLOOR NEW WORK PIPING PLAN - B

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

PLAN NORTH

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. PIPING SUPPORT REFER TO "PIPE HANGER DETAIL" C5/M-505 FOR ADDITIONAL INFORMATION.
2. CONNECT EXISTING SYSTEM TO DUAL TEMPERATURE PIPING SYSTEM.
3. AREA NOT IN CONTRACT.
4. PIPE PENETRATIONS THRU WALL. REFER TO "PIPE SLEEVE INTERIOR WALL" C5/M-504.
5. DUCTLESS SPLIT SYSTEM. REFER TO "DUCTLESS SPLIT SYSTEM DETAIL" B2/M-506 FOR ADDITIONAL INFORMATION,
6. RUN CONDENSATE LINE TO VENT LINE IN REST ROOM. PITCH HORIZONTAL RUN 1" PER 10' TOWARDS VENT LINE.
7. SEE "FAN COIL UNIT PIPING DETAIL-COOLING" SHEET C5/M-507 AND "FAN COIL UNIT PIPING-HEATING" SHEET A2/M-507 FOR REQUIRED SPECIALTIES.
8. ROUTE CONDENSATE LINE NEAR WALL, DO NOT RUN DIRECTLY OVER ELECTRICAL OR COMMUNICATIONS GEAR.
9. PROVIDE ISOLATION VALVES AND PIPE CAPS.
10. CONNECT EXISTING CONVECTOR PIPING FOR REST ROOM AND STAIRWELL CONVECTORS TO NEW HWS, HWR MAINS.
11. 4" HWS, AND HWR RISERS DOWN TO FIRST FLOOR, CONTRACTOR TO VERIFY LOCATION OF EXISTING PENETRATIONS AND COORDINATE FRAMING OF NEW CHASE.



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

SYM	DESCRIPTION	DATE	APPR

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RRMM ARCHITECTS

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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL SECOND FLOOR NEW WORK PIPNG PLAN - B

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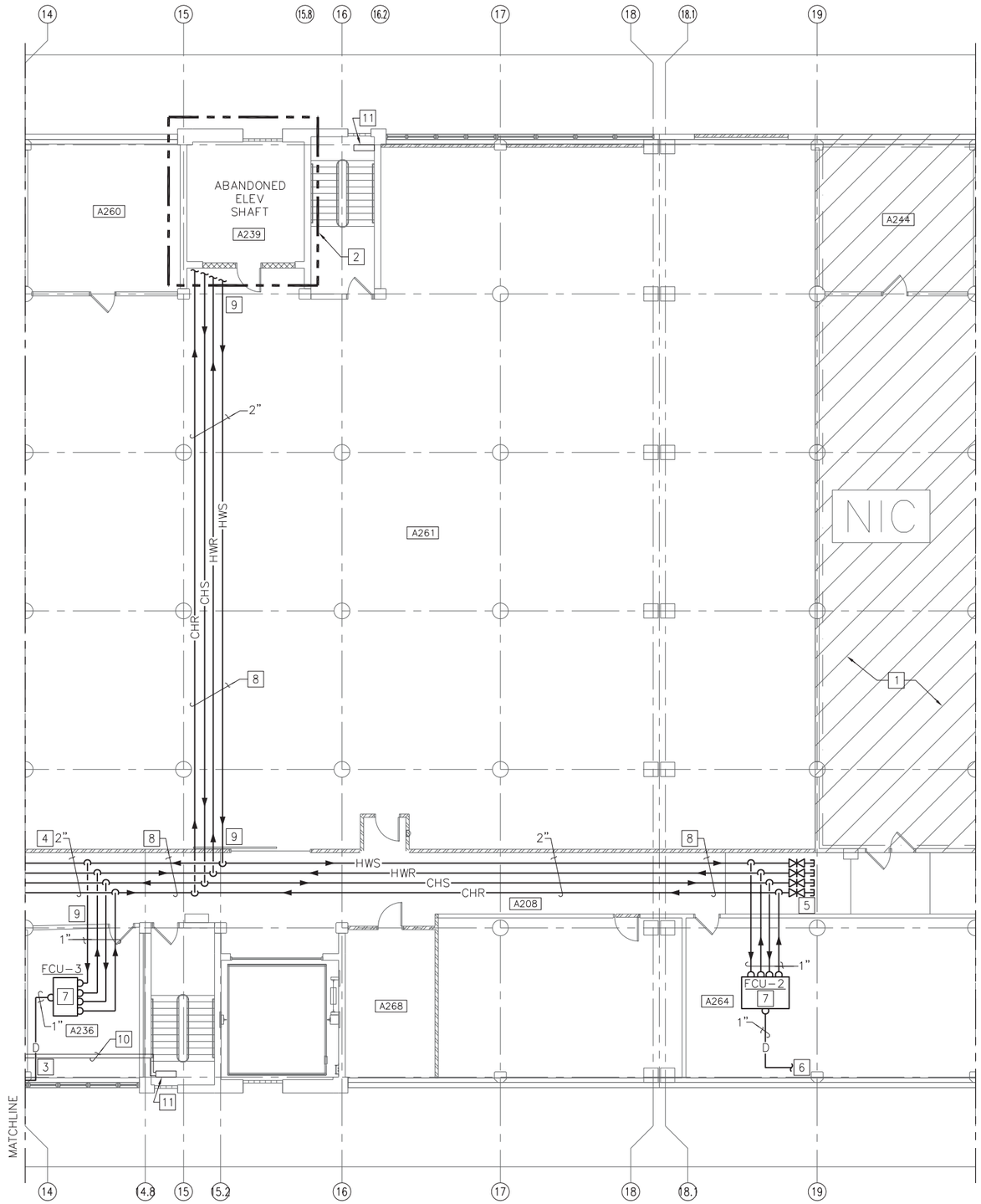
CONSULTING ENGINEERS
#4 INTERSTATE CORP. CENTER
NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544734
SHEET 200 OF 349

M-110

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-110 PARTIAL SECOND FLOOR NEW WORK PIPNG PLAN - B.dwg Plot Date: Jul 08, 2009 - 10:33am Last Saved BY: bfunderwhite



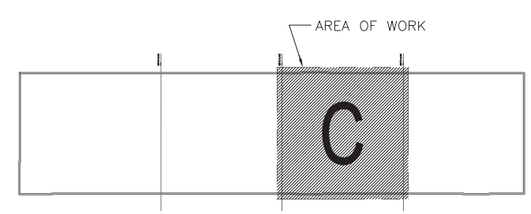
PARTIAL SECOND FLOOR NEW WORK PIPING PLAN - C

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

PLAN NORTH

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. AREA NOT IN CONTRACT.
2. REFER TO "ENLARGED MECHANICAL ROOM SECOND FLOOR ABANDONED ELEVATOR SHAFT – NEW WORK" SHEET M-402 FOR ADDITIONAL INFORMATION.
3. RUN CONDENSATE TO NEAREST DRAIN IN ADJACENT REST ROOM PITCH HORIZONTAL RUNS 1" PER 10' OF RUN TOWARDS DRAIN.
4. CHS, CHR HWS, HWR PIPING TO FCU-1 SEE SHEET M-110 FOR LOCATION.
5. PROVIDE ISOLATION VALVES AND PIPE CAPS.
6. RUN CONDENSATE LINE TO NEAREST ROOF DRAIN RISER, PITCH 1" PER 10' TOWARDS ROOF DRAIN RISER.
7. SEE "FAN COIL UNIT PIPING DETAIL-COOLING" SHEET C5/M-507 AND "FAN COIL UNIT PIPING DETAIL-HEATING" SHEET A2/M-507 FOR REQUIRED SPECIALTIES.
8. SEE "PIPE HANGER DETAIL" SHEET C5/M-505.
9. SEE "PIPE SLEEVE INTERIOR WALL" DETAIL SHEET C5/M-504.
10. EXISTING CONVECTOR PIPING TO STAIRWELL.
11. EXISTING CONNECTORS IN STAIRWELL.



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

BOWMAN, FOSTER & ASSOC.
CONSULTING ENGINEERS
#4 INTERSTATE CORP. CENTER
NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

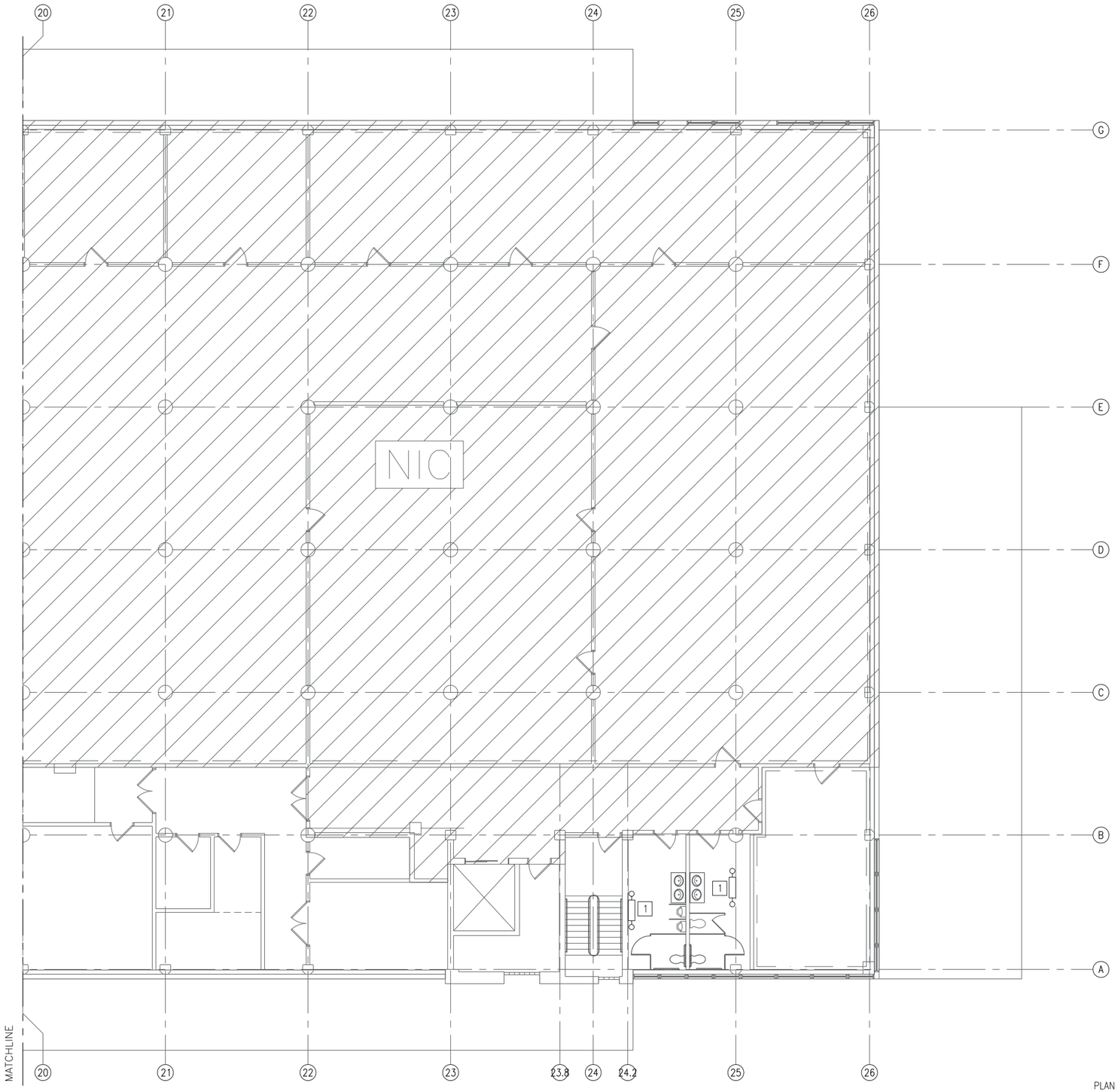
DES DEL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION NORFOLK
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL SECOND FLOOR NEW WORK PIPING PLAN – C

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544735
SHEET 201 OF 349
M-111

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-111 PARTIAL SECOND FLOOR NEW WORK PIPING PLAN - C.dwg Plot Date: Jul 08, 2009 - 10:33am Last Saved BY: bfunderwhite



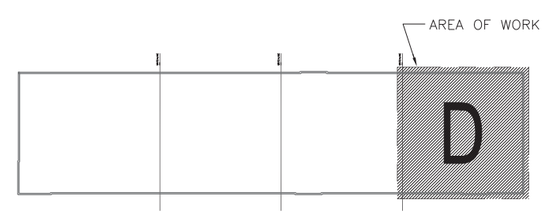
PARTIAL SECOND FLOOR NEW WORK PIPING PLAN - D

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

PLAN NORTH

CONSTRUCTION NOTES (THIS SHEET ONLY)

1 EXISTING CONVECTORS AND PIPING UP FROM FIRST FLOOR.



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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#4 INTERSTATE CORP. CENTER
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2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

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RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
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BRANCH MANAGER
CHIEF ENG/ARCH

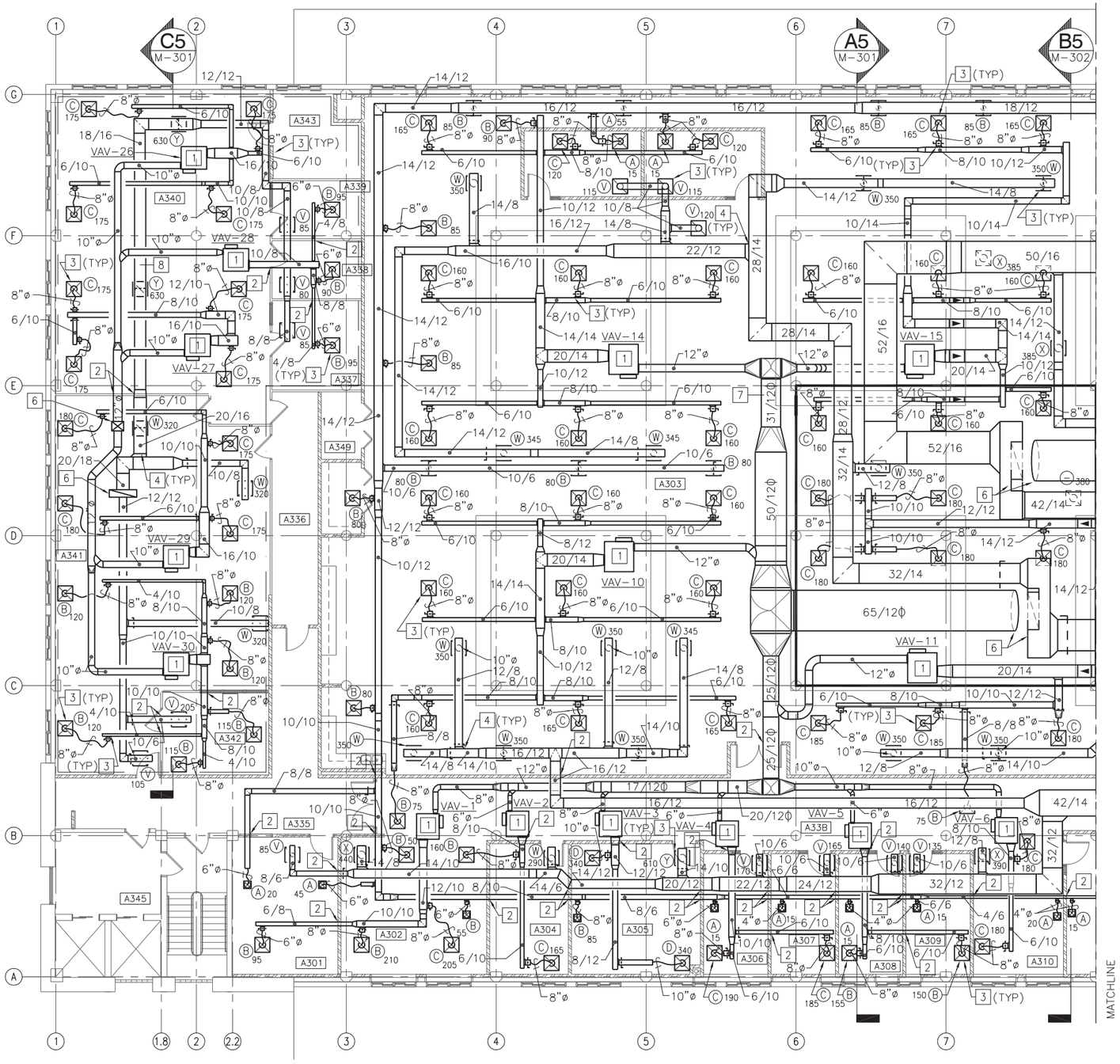
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL SECOND FLOOR NEW WORK PIPING PLAN - D

CODE ID. NO. 80091	SIZE D
SCALE: AS NOTED	
MAXIMO NO.	N/A
JOB ORDER NO.	
WORK ORDER NO.	539080
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12544736
SHEET 202 OF 349	

M-112

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-112 PARTIAL SECOND FLOOR NEW WORK PIPING PLAN - D.dwg Plot Date: Jul 08, 2009 - 10:34am Last Saved BY: bfunderwhite



PARTIAL THIRD FLOOR NEW WORK DUCTWORK PLAN - A

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

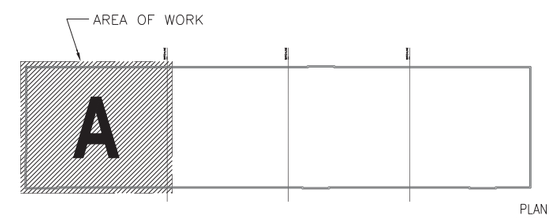
PLAN NORTH

GENERAL NOTES (THIS SHEET ONLY)

1. SUPPLY AIR DUCTWORK SHALL BE INSULATED.
2. RETURN AIR DUCTWORK SHALL BE UNINSULATED.

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. FAN POWERED VAV TERMINAL. REFER TO "SERIES FAN POWERED VAV TERMINAL UNIT DETAIL" B2/M-504 FOR ADDITIONAL INFORMATION. VAV TERMINAL SHALL UTILIZE PLENUM AREA FOR THE RETURN AIR.
2. DUCTWORK PENETRATIONS. REFER TO "DUCTWORK WALL SLEEVE DETAIL" B4/M-503 FOR ADDITIONAL INFORMATION.
3. SUPPLY AIR BRANCH CONNECTION. REFER TO "TYPICAL BRANCH CONNECTION DETAIL" B2/M-503 FOR ADDITIONAL INFORMATION.
4. RETURN AIR BRANCH CONNECTION. REFER TO "TYPICAL BRANCH CONNECTION DETAIL" B2/M-503 FOR ADDITIONAL INFORMATION.
5. DUCTWORK RUN TIGHT TO UNDER SIDE OF CONCRETE DECK. REFER TO "RETURN/SUPPLY AIR GRILLE/DIFFUSER DUCTWORK DETAIL" A4/M-503 FOR ADDITIONAL INFORMATION.
6. SUPPLY AND RETURN AIR DUCTWORK FROM HVAC EQUIPMENT ON ROOF ABOVE. REFER TO DRAWING SHEET M-121 FOR CONTINUATION.
7. PROVIDE STATIC PRESSURE SENSOR LOCATION TO CONTROL VFD IN AHU-1.
8. PROVIDE STATIC PRESSURE SENSOR LOCATION TO CONTROL VFD IN RTU-1.



KEY PLAN

NO SCALE

PLAN NORTH

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GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

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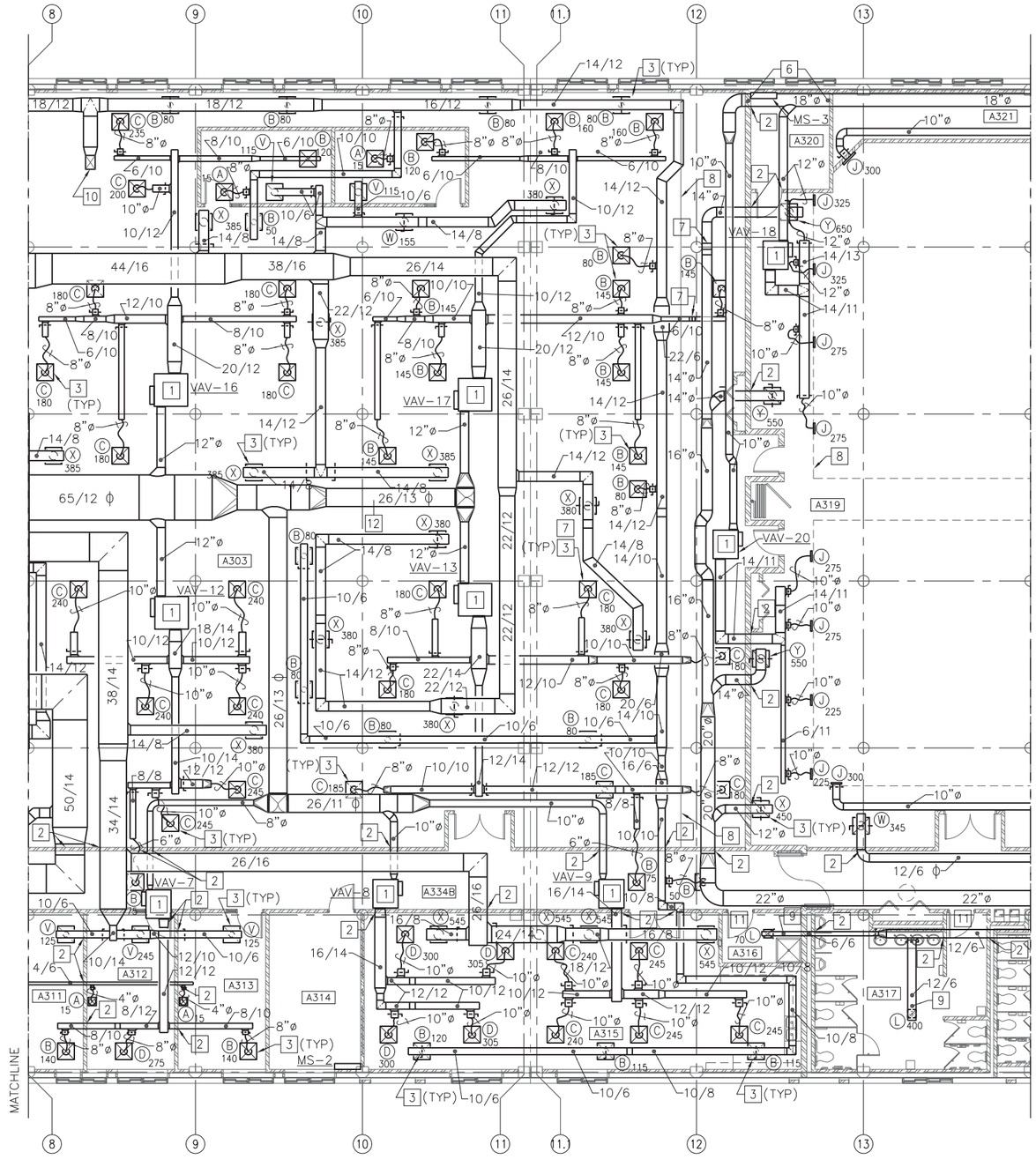
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND – MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL THIRD FLOOR NEW WORK DUCTWORK PLAN – A

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544737
SHEET 203 OF 349
M-113

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-113 PARTIAL THIRD FLOOR NEW WORK DUCTWORK PLAN - A.dwg Plot Date: Jul 08, 2009 - 10:34am Last Saved BY: bfunderwhite



PARTIAL THIRD FLOOR NEW WORK DUCTWORK PLAN - B

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

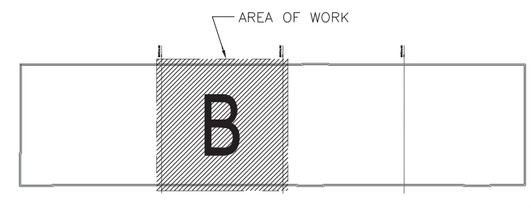
PLAN NORTH

GENERAL NOTES (THIS SHEET ONLY)

1. SUPPLY AIR DUCTWORK SHALL BE INSULATED.
2. RETURN AIR DUCTWORK SHALL BE UNINSULATED.
3. EXHAUST AIR DUCTWORK DOES NOT REQUIRE INSULATION.
4. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING HEIGHTS ALL AREAS.

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. FAN POWERED VAV TERMINAL. REFER TO "SERIES FAN POWERED VAV TERMINAL UNIT DETAIL" B2/M-504 FOR ADDITIONAL INFORMATION. VAV TERMINAL SHALL UTILIZE PLENUM AREA FOR THE RETURN AIR.
2. DUCTWORK PENETRATIONS. REFER TO "DUCTWORK WALL SLEEVE DETAIL" B4/M-503 FOR ADDITIONAL INFORMATION.
3. SUPPLY AIR BRANCH CONNECTION. REFER TO "TYPICAL BRANCH CONNECTION DETAIL" B2/M-503 FOR ADDITIONAL INFORMATION.
4. RETURN AIR BRANCH CONNECTION. REFER TO "TYPICAL BRANCH CONNECTION DETAIL" B2/M-503 FOR ADDITIONAL INFORMATION.
5. DUCTWORK RUN TIGHT TO UNDER SIDE OF CONCRETE DECK. REFER TO "RETURN/SUPPLY AIR GRILLE/DIFFUSER DUCTWORK DETAIL" A4/M-503 FOR ADDITIONAL INFORMATION.
6. PROVIDE SECURITY BARS IN DUCTWORK REFER TO "TYPICAL SECURITY BARS INSTALLATION DETAIL" C4/M-504 FOR ADDITIONAL INFORMATION.
7. PROVIDE TWO 45° ELBOWS TO ALLOW TRANSITION OF DUCTWORK TO PROPER ELEVATION.
8. INSTALL AND ROUTE MECHANICAL SYSTEMS IN THIS AREA IN DROP SOFFIT REFER TO ARCHITECTURAL DRAWINGS FOR SOFFIT DETAILS.
9. EXHAUST DUCTWORK FROM JANITORS CLOSET AND RESTROOM. MOUNT DUCTWORK AS HIGH AS POSSIBLE TO UNDERSIDE OF CONCRETE DECK.
10. SUPPLY AIR DUCTWORK FROM HVAC EQUIPMENT ON ROOF. REFER TO DRAWING SHEET M-122 FOR CONTINUATION.
11. PROVIDE DOOR LOUVER L-2 IN DOOR SEE SCHEDULE SHEET M-603.
12. PROVIDE STATIC PRESSURE SENSOR LOCATION TO CONTROL VFD IN AHU-2.



KEY PLAN

NO SCALE

PLAN NORTH

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GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

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RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

DES DEL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION

NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA

NAVAL STATION NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR

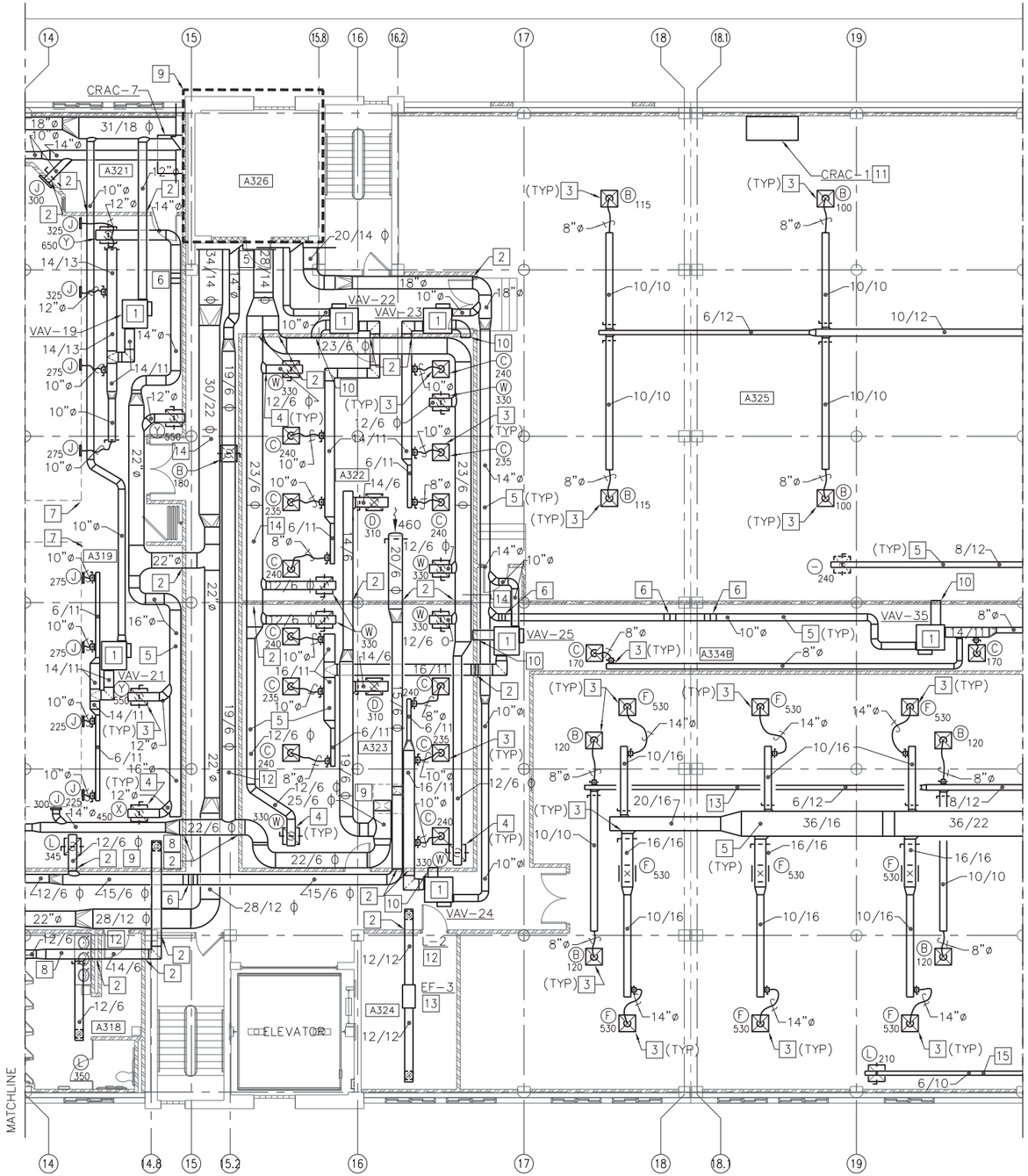
PARTIAL THIRD FLOOR NEW WORK DUCTWORK PLAN - B

CODE ID. NO. 80091 | SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544738
SHEET 204 OF 349

M-114

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-114 PARTIAL THIRD FLOOR NEW WORK DUCTWORK PLAN - B.dwg Plot Date: Jul 08, 2009 - 10:34am Last Saved BY: bfunderwhite



PARTIAL THIRD FLOOR NEW WORK DUCTWORK PLAN - C

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

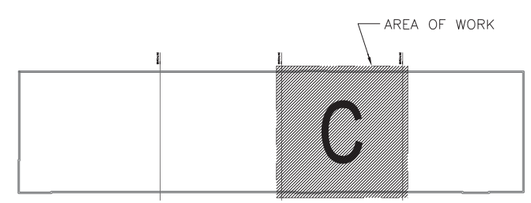
PLAN NORTH

GENERAL NOTES (THIS SHEET ONLY)

1. SUPPLY AIR DUCTWORK SHALL BE INSULATED.
2. RETURN AIR DUCTWORK SHALL BE UNINSULATED.
3. EXHAUST AIR DUCT WORK DOES NOT REQUIRE INSULATION.
4. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING HEIGHTS ALL AREAS.

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. FAN POWERED VAV TERMINAL. REFER TO "SERIES FAN POWERED VAV TERMINAL UNIT DETAIL" B2/M-504 FOR ADDITIONAL INFORMATION. VAV TERMINAL SHALL UTILIZE PLENUM AREA FOR THE RETURN AIR.
2. DUCTWORK PENETRATIONS. REFER TO "DUCTWORK WALL SLEEVE DETAIL" B4/M-503 FOR ADDITIONAL INFORMATION.
3. SUPPLY AIR BRANCH CONNECTION. REFER TO "TYPICAL BRANCH CONNECTION DETAIL" B2/M-503 FOR ADDITIONAL INFORMATION.
4. RETURN AIR BRANCH CONNECTION. REFER TO "TYPICAL BRANCH CONNECTION DETAIL" B2/M-503 FOR ADDITIONAL INFORMATION.
5. DUCTWORK RUN TIGHT TO UNDER SIDE OF CONCRETE DECK. REFER TO "RETURN/SUPPLY AIR GRILLE/DIFFUSER DUCTWORK DETAIL" A4/M-503 FOR ADDITIONAL INFORMATION.
6. PROVIDE TWO 45° ELBOWS TO ALLOW TRANSITION OF DUCTWORK TO PROPER ELEVATION ELEVATION.
7. INSTALL AND ROUTE ALL MECHANICAL SYSTEMS IN THIS AREA IN DROP SOFFIT. REFER TO ARCHITECTURAL DRAWINGS FOR SOFFIT DETAILS.
8. EXHAUST DUCTWORK FROM JANITORS CLOSET AND RESTROOM. MOUNT DUCTWORK AS HIGH AS POSSIBLE TO UNDERSIDE OF CONCRETE DECK.
9. REFER TO SHEET M-403 "ENLARGED MECHANICAL ROOM THIRD FLOOR ABANDONED ELEVATOR SHAFT – NEW WORK" FOR ADDITIONAL INFORMATION.
10. RETURN AIR TO VAV BOX FROM SPACE. RETURN AIR SHALL NOT BE USED FROM CORRIDOR.
11. DOWN FLOW COMPUTER ROOM AIR CONDITIONING UNIT. REFER TO "COMPUTER ROOM UNIT PIPING DETAIL" B5/M-503 FOR ADDITIONAL INFORMATION.
12. PROVIDE DOOR LOUVER L-2 IN DOOR SEE SCHEDULE SHEET M-603.
13. PROVIDE IN LINE EXHAUST FAN AND DUCTWORK UP TO GOOSENECK ON ROOF SEE "TYPICAL GOOSENECK AIR INTAKE/EXHAUST DETAIL" SHEET C5/M-503. FURNISH WITH LINE VOLTAGE THERMOSTAT AND BACK DRAFT DAMPER.
14. PROVIDE STATIC PRESSURE SENSOR LOCATION TO CONTROL VFD IN AHU-3.



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

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RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

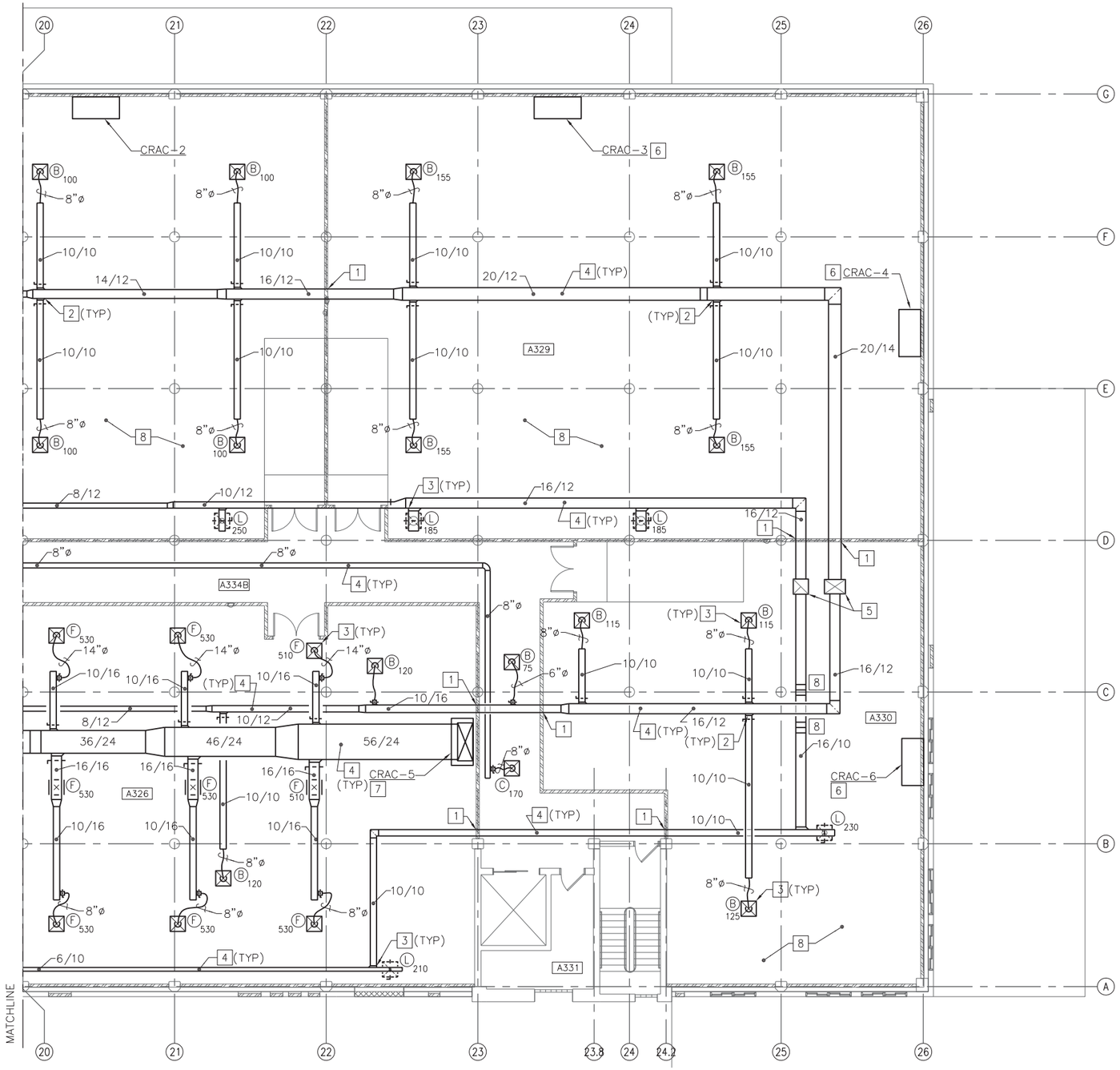
DES DEL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION
NAVAL FACILITIES ENGINEERING COMMAND – MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL THIRD FLOOR NEW WORK DUCTWORK PLAN – C

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544739
SHEET 205 OF 349
M-115

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-115 PARTIAL THIRD FLOOR NEW WORK DUCTWORK PLAN - C.dwg Plot Date: Jul 08, 2009 - 10:35am Last Saved BY: bfunderwhite



PHASE 1 PARTIAL THIRD FLOOR NEW WORK DUCTWORK PLAN - D

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

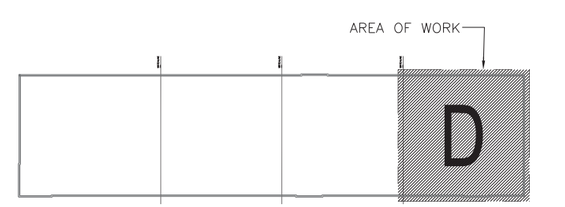
PLAN NORTH

GENERAL NOTES (THIS SHEET ONLY)

1. SUPPLY AIR DUCTWORK SHALL BE INSULATED.
2. RETURN AIR DUCTWORK SHALL BE UNINSULATED.
3. EXHAUST AIR DUCTWORK DOES NOT REQUIRE INSULATION.
4. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING HEIGHTS ALL AREAS.

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. DUCTWORK PENETRATIONS. REFER TO "DUCTWORK WALL SLEEVE DETAIL" B4/M-503 FOR ADDITIONAL INFORMATION.
2. SUPPLY AIR BRANCH CONNECTION. REFER TO "TYPICAL BRANCH CONNECTION DETAIL" B2/M-503 FOR ADDITIONAL INFORMATION.
3. RETURN AIR BRANCH CONNECTION. REFER TO "TYPICAL BRANCH CONNECTION DETAIL" B2/M-503 FOR ADDITIONAL INFORMATION.
4. DUCTWORK RUN TIGHT TO UNDER SIDE OF CONCRETE DECK. REFER TO "RETURN/SUPPLY AIR GRILLE/DIFFUSER DUCTWORK DETAIL" A4/M-503 FOR ADDITIONAL INFORMATION.
5. SUPPLY AND RETURN AIR DUCTWORK FROM HVAC EQUIPMENT ON ROOF REFER TO DRAWING SHEET M-124 FOR CONTINUATION. SIZE DUCT TO FIT WITIN ADAPT-A-CURB.
6. DOWN FLOW COMPUTER ROOM AIR CONDITIONING UNIT. REFER TO "COMPUTER ROOM UNIT PIPING DETAIL" B5/M-503 FOR ADDITIONAL INFORMATION.
7. UP FLOW COMPUTER ROOM AIR CONDITIONING UNIT. REFER TO "COMPUTER ROOM UNIT PIPING DETAIL" B5/M-505 FOR ADDITIONAL INFORMATION.
8. PROVIDE PERFORATED FLOOR TILES SEE "GRILLE, REGISTER & DIFFUSER SCHEDULE" SHEET M-602 FOR QUANTITIES AND SUPPLY AIR FLOWS.



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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2424 26th ROAD SOUTH
ARLINGTON, VA 22206

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S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

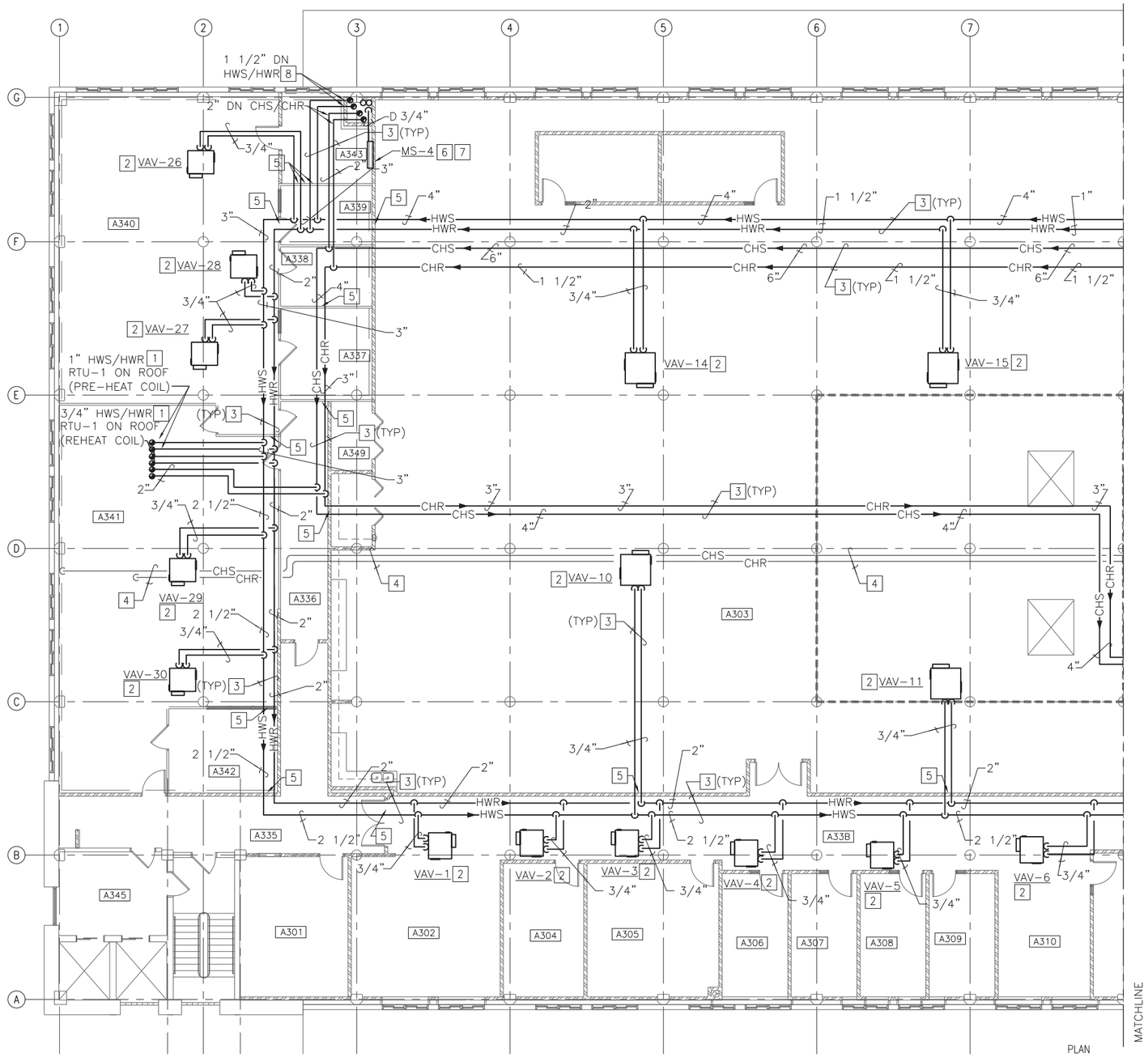
DES DFL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL THIRD FLOOR NEW WORK DUCTWORK PLAN - D

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544740
SHEET 206 OF 349
M-116

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-116 PARTIAL THIRD FLOOR NEW WORK DUCTWORK PLAN - D.dwg Plot Date: Jul 08, 2009 - 10:35am Last Saved BY: bfunderwhite

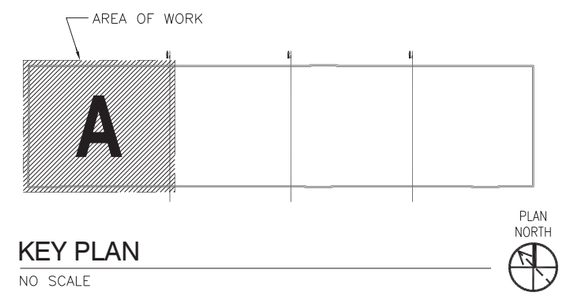


PARTIAL THIRD FLOOR NEW WORK PIPING PLAN - A

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

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. CHILLED WATER AND HOT WATER SUPPLY/RETURN PIPING TO HVAC EQUIPMENT ON ROOF. REFER TO "COOLING/COIL PIPING DETAIL" C3/M-501 AND "HOT WATER HEATING COIL DETAIL" B5/M-506 FOR ADDITIONAL INFORMATION. REFER TO DRAWINGS SHEET M-121 FOR CONTINUATION OF PIPING.
2. HOT WATER PIPING SUPPLY AND RETURN PIPING TO VAV TERMINALS. REFER TO "SERIES FAN POWERED VAV TERMINAL PIPING DETAIL" C2/M-504 FOR ADDITIONAL INFORMATION.
3. PIPING SUPPORT REFER TO "PIPE HANGER DETAIL" C5/M-505 FOR ADDITIONAL INFORMATION.
4. EXISTING PIPING SHALL REMAIN. PROTECT PIPING FROM DAMAGE DURING CONSTRUCTION.
5. PIPE PENETRATIONS THRU WALL. REFER TO "PIPE SLEEVE INTERIOR WALL" C5/M-504.
6. DUCTLESS SPLIT SYSTEM. REFER TO "DUCTLESS SPLIT SYSTEM DETAIL" B2/M-506 FOR ADDITIONAL INFORMATION,
7. RUN 3/4" CONDENSATE LINE FROM MS-4 TO DRAIN IN MECHANICAL ROOM BELOW.
8. CHS, CHR, HWS, HWR DOWN TO SECOND FLOOR MECHANICAL ROOM, SEE "ENLARGED MECHANICAL ROOM SECOND FLOOR-NEW WORK" SHEET M-402 FOR CONTINUATION OF PIPING.



KEY PLAN

NO SCALE

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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2424 26th ROAD SOUTH
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NAVFAC

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FIRE PROTECTION
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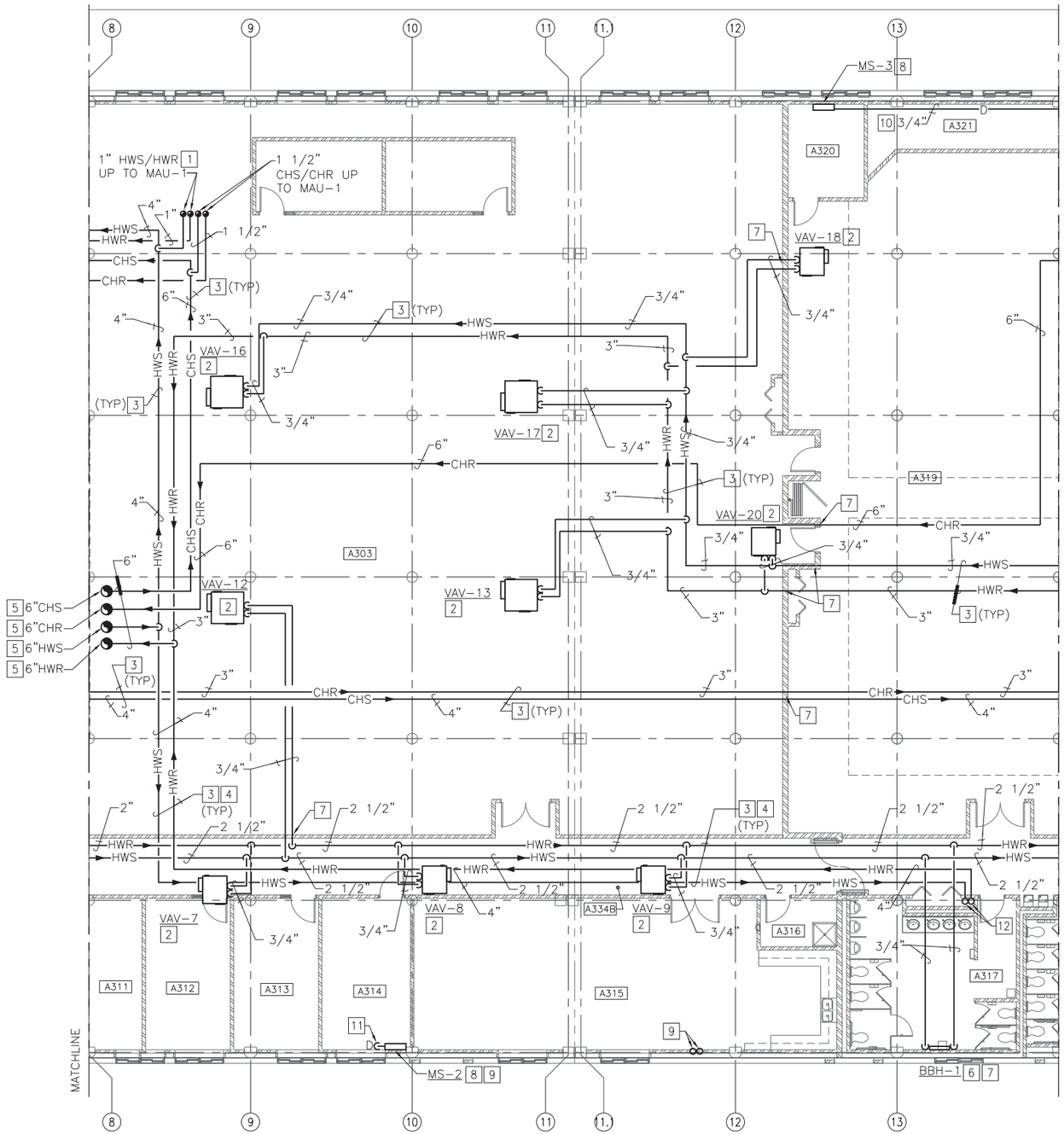
NAVAL FACILITIES ENGINEERING COMMAND – MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL THIRD FLOOR NEW WORK PIPING PLAN – A

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544741
SHEET 207 OF 349
M-117

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-117 PARTIAL THIRD FLOOR NEW WORK PIPING PLAN - A.dwg Plot Date: Jul 08, 2009 - 10:35am Last Saved BY: bfunderwhite



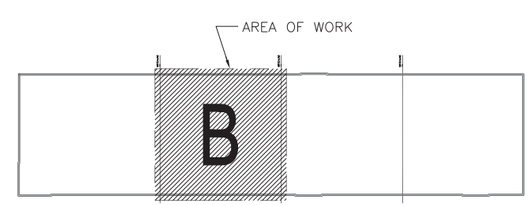
PARTIAL THIRD FLOOR NEW WORK PIPING PLAN - B

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

PLAN NORTH

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. CHILLED WATER AND HOT WATER SUPPLY/RETURN PIPING TO HVAC EQUIPMENT ON ROOF. REFER TO "COOLING/HEATING COIL PIPING DETAIL" C3/M-501 AND B5/M-506 FOR ADDITIONAL INFORMATION. REFER TO DRAWINGS SHEET M-122 FOR CONTINUATION OF PIPING.
2. HOT WATER PIPING SUPPLY AND RETURN PIPING TO VAV TERMINALS. REFER TO "SERIES FAN POWERED VAV TERMINAL PIPING DETAIL" C2/M-504 FOR ADDITIONAL INFORMATION.
3. PIPING SUPPORT REFER TO "PIPE HANGER DETAIL" C5/M-505 FOR ADDITIONAL INFORMATION.
4. RUN PIPING TIGHT TO CONCRETE DECK ABOVE FENCE AREA DUE TO CEILING HEIGHT SEE ARCHITECTURAL SHEETS.
5. CHS, CHR, HWS, HWR MAIN PIPING DOWN FROM PENTHOUSE REFER TO DRAWING SHEET M-122 FOR CONTINUATION. USE EXISTING PENETRATIONS.
6. HYDRONIC BASE BOARD HEATER. REFER TO "FIN TUBE RADIATOR DETAIL" A2/M-505 FOR ADDITIONAL INFORMATION.
7. PIPE PENETRATIONS THRU WALL. REFER TO "PIPE SLEEVE INTERIOR WALL" C5/M-504.
8. DUCTLESS SPLIT SYSTEM. REFER TO "DUCTLESS SPLIT SYSTEM DETAIL" B2/M-506 FOR ADDITIONAL INFORMATION,
9. RUN REFRIGERANT LINES IN STUD WALL FROM ROOM A270 TO ACCU-1 ON ROOF.
10. RUN CONDENSATE LINE TO CRAC-7 CONDENSATE CONNECTION IN A321.
11. RUN CONDENSATE LINE DOWN THRU WALL AND ACROSS UNDERSIDE OF DECK ABOVE ROOM A-232, COMBINE WITH CONDENSATE LINE FROM MS-I IN ROOM A-270 AND RUN TO SANITARY DRAIN IN ADJACENT REST ROOM A-253.
12. RUN HWS AND HWR PIPING DOWN TO SECOND FLOOR IN EXISTING FLOOR PENETRATIONS AND "FIRE STOP" AROUND PIPING. CONTRACTOR TO VERIFY EXISTING PENETRATIONS AND COORDINATE FRAMED CHASE IF REQUIRED.



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

BOWMAN, FOSTER & ASSOC.
CONSULTING ENGINEERS
#4 INTERSTATE CORP. CENTER
NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

MKS	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

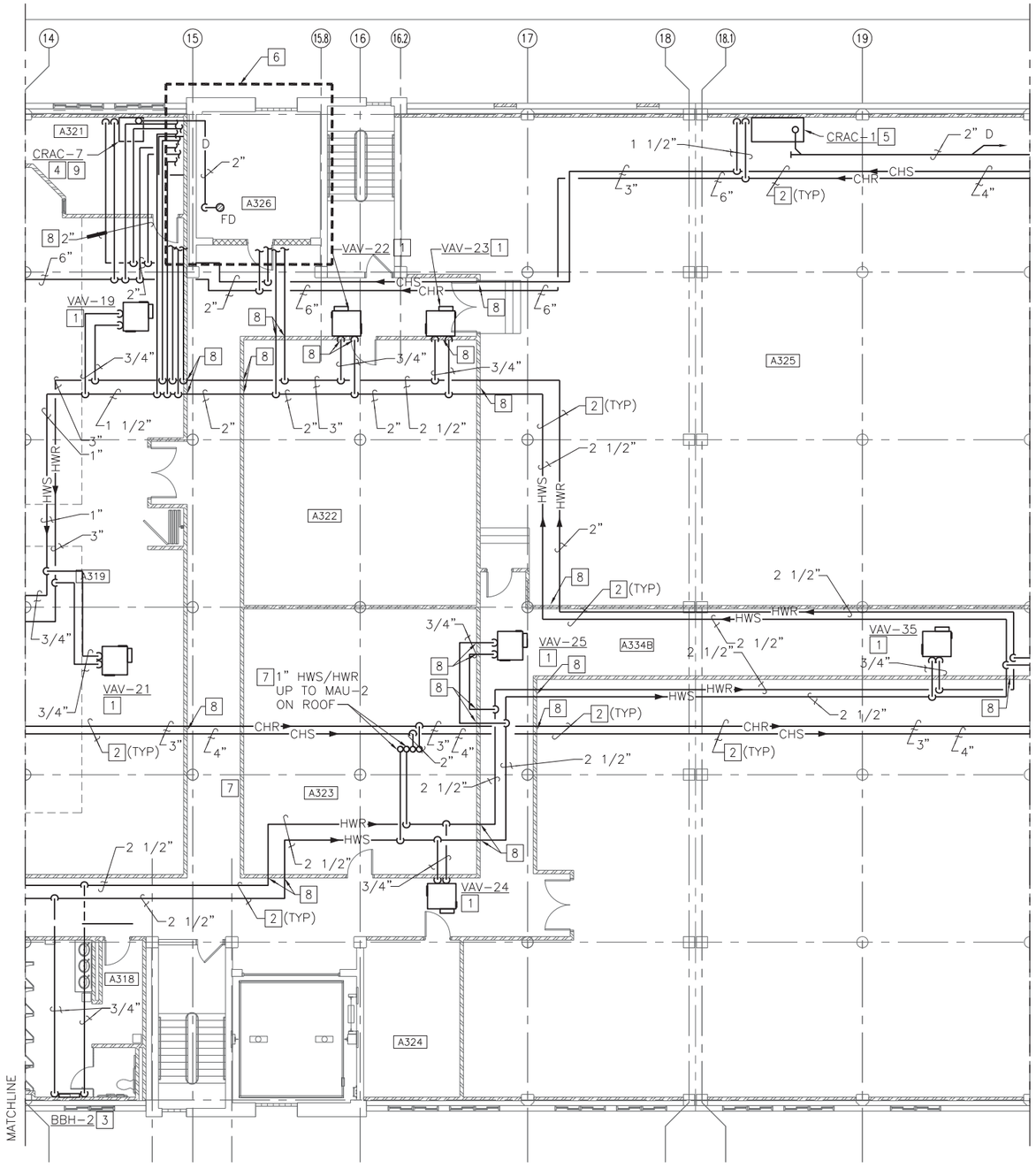
DES DEL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL THIRD FLOOR NEW WORK PIPING PLAN - B

CODE ID. NO. 80091 | SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544742
SHEET 208 OF 349
M-118

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-118 PARTIAL THIRD FLOOR NEW WORK PIPING PLAN - B.dwg Plot Date: Jul 08, 2009 - 10:35am Last Saved BY: bfunderwhite



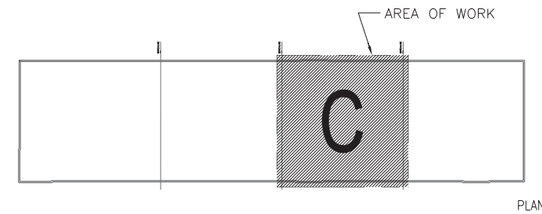
PARTIAL THIRD FLOOR NEW WORK PIPING PLAN - C

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

PLAN NORTH

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. HOT WATER PIPING SUPPLY AND RETURN PIPING TO VAV TERMINALS. REFER TO "SERIES FAN POWERED VAV TERIMINAL PIPING DETAIL" C2/M-504 FOR ADDITIONAL INFORMATION.
2. PIPING SUPPORT REFER TO "PIPE HANGER DETAIL" C5/M-505 FOR ADDITIONAL INFORMATION.
3. HYDRONIC BASE BOARD HEATER. REFER TO "FIN TUBE RADIATOR DETAIL" A2/M-505 FOR ADDITIONAL INFORMATION.
4. UP FLOW COMPUTER ROOM AIR CONDITIONING UNIT. REFER TO "COMPUTER ROOM UNIT PIPING DETAIL" B5/M-505 FOR ADDITIONAL INFORMATION.
5. DOWN FLOW COMPUTER ROOM AIR CONDITIONING UNIT. REFER TO "COMPUTER ROOM UNIT PIPING DETAIL" B5/M-503 FOR ADDITIONAL INFORMATION.
6. REFER TO SHEET M-403 "ENLARGED MECHANICAL ROOM THIRD FLOOR ABANDONED ELEVATOR SHAFT - NEW WORK" FOR ADDITIONAL INFORMATION.
7. CHILLED WATER AND HOT WATER SUPPLY/RETURN PIPING TO HVAC EQUIPMENT ON ROOF. REFER TO "COOLING/COIL PIPING DETAIL" C3/M-501 AND "HOT WATER HEATING COIL DETAIL" B5/M-506 FOR ADDITIONAL INFORMATION REFER TO DRAWING SHEETR M-123 FOR CONTINUATION OF PIPING.
8. PIPE PENETRATIONS THRU WALL. REFER TO "PIPE SLEEVE INTERIOR WALL" C5/M-504.
9. RUN CONDENSATE LINE FROM CRAC-7 TO FLOOR DRAIN IN ADJACENT MECHANICAL ROOM.



KEY PLAN

NO SCALE

PLAN NORTH

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1/8"=1'-0" 0' 5' 10' 20' 30'

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2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

DES DEL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
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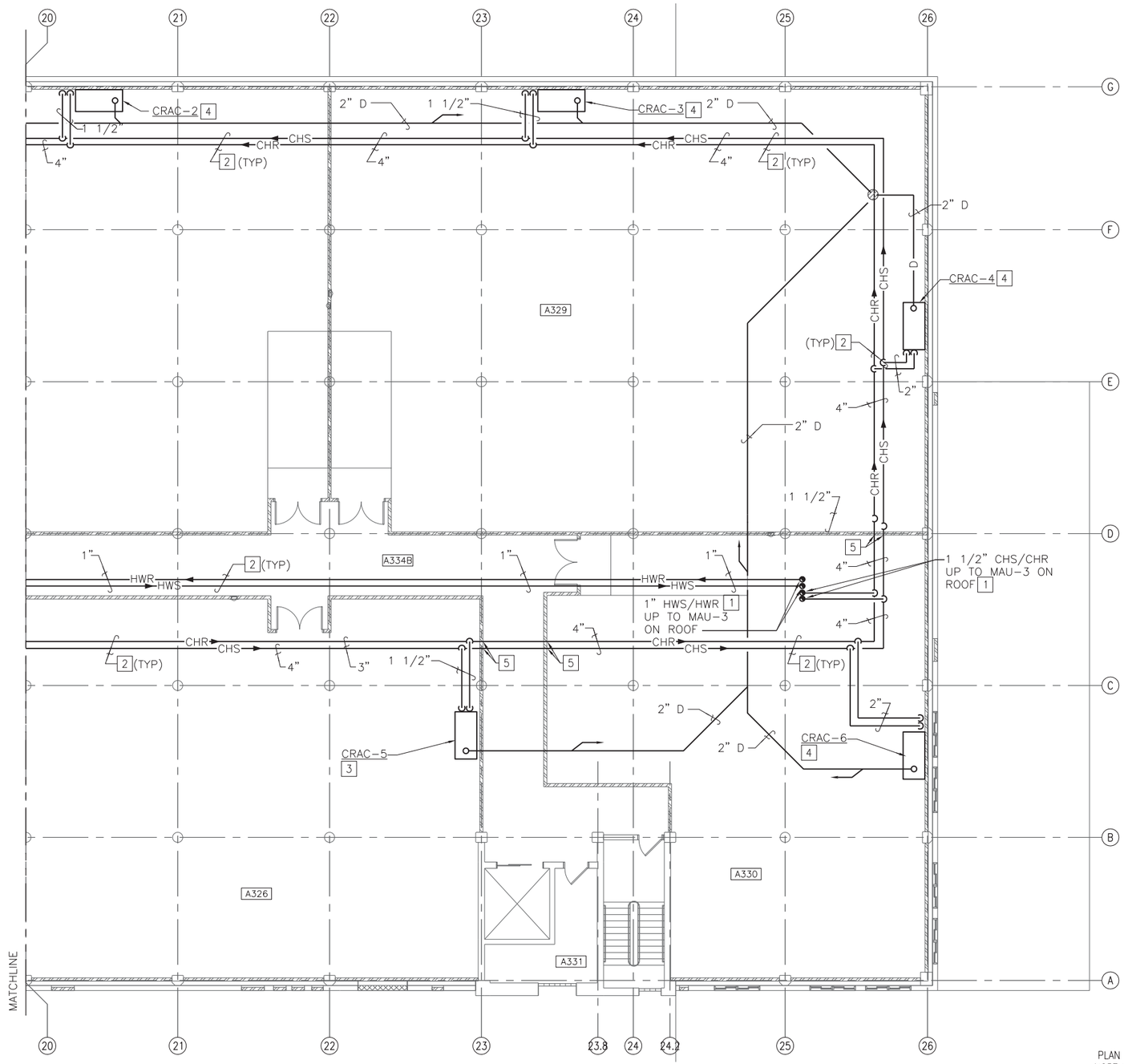
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK, VA
NAVAL STATION NORFOLK
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL THIRD FLOOR NEW WORK PIPING PLAN - C

CODE ID. NO. 80091	SIZE D
SCALE: AS NOTED	
MAXIMO NO.	N/A
JOB ORDER NO.	
WORK ORDER NO.	539080
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12544743
SHEET 209 OF 349	

M-119

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-119 PARTIAL THIRD FLOOR NEW WORK PIPING PLAN - C.dwg Plot Date: Jul 08, 2009 - 10:36am Last Saved BY: bfunderwhite

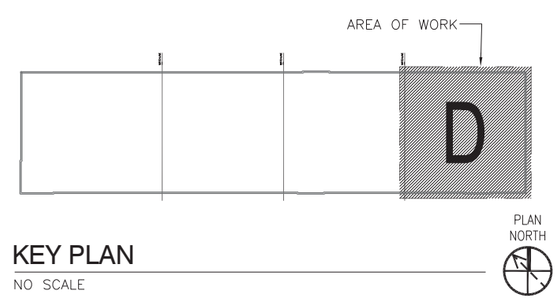


PARTIAL THIRD FLOOR NEW WORK PIPING PLAN - D

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

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. CHILLED WATER AND HOT WATER SUPPLY/RETURN PIPING TO HVAC EQUIPMENT ON ROOF. REFER TO "COOLING/COIL PIPING DETAIL" C3/M-501 AND "HOT WATER HEATING COIL DETAIL" B5/M-506 FOR ADDITIONAL INFORMATION REFER TO DRAWINGS SHEET M-124 FOR CONTINUATION OF PIPING.
2. PIPING SUPPORT REFER TO "PIPE HANGER DETAIL" C5/M-505 FOR ADDITIONAL INFORMATION.
3. UP FLOW COMPUTER ROOM AIR CONDITIONING UNIT. REFER TO "COMPUTER ROOM UNIT PIPING DETAIL" B5/M-505 FOR ADDITIONAL INFORMATION.
4. DOWN FLOW COMPUTER ROOM AIR CONDITIONING UNIT. REFER TO "COMPUTER ROOM UNIT PIPING DETAIL" B5/M-503 FOR ADDITIONAL INFORMATION.
5. PIPE PENETRATIONS THRU WALL. REFER TO "PIPE SLEEVE INTERIOR WALL" C5/M-504.



KEY PLAN

NO SCALE

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GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

DES DFL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL THIRD FLOOR NEW WORK PIPING PLAN - D

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544744
SHEET 210 OF 349
M-120

DRAWFORM REVISION: 6 AUG 2007

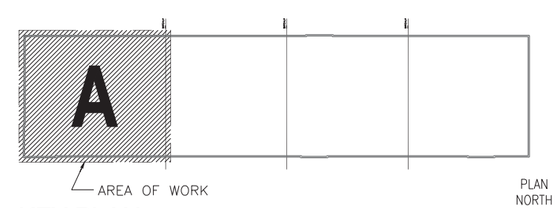
BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-120 PARTIAL THIRD FLOOR NEW WORK PIPING PLAN - D.dwg Plot Date: Jul 08, 2009 - 10:36am Last Saved BY: bfunderwhite

PARTIAL ROOF NEW WORK PLAN - A

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

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. CHILLED WATER AND HOT WATER SUPPLY/RETURN PIPING FROM THIRD FLOOR CEILING SPACE TO HVAC EQUIPMENT. REFER TO "COOLING/COIL PIPING DETAIL" C3/M-501 AND "HOT WATER HEATING COIL DETAIL" B5/M-506 FOR ADDITIONAL INFORMATION REFER TO DRAWINGS SHEET M-117 FOR CONTINUATION OF PIPING.
2. HOT WATER SUPPLY AND RETURN PIPING FROM BOILER ROOM IN MECHANICAL PENTHOUSE.
3. HOT WATER UNIT HEATER. REFER TO " HOT WATER UNIT HEATER PIPING DETAIL" A5/M-502 AND "UNIT HEATER MOUNTING DETAIL" C2/M-505 FOR ADDITIONAL INFORMATION.
4. AIR COOLED CHILLER. REFER TO "AIR COOLED CHILLER PIPING DETAIL" A3/M-501 FOR ADDITIONAL INFORMATION.
5. BASE MOUNTED PUMP. REFER TO "PUMP DETAIL – END SUCTION TYPE" C5/M-501 FOR ADDITIONAL INFORMATION.
6. PROVIDE ADAPT-A-CURB FOR REUSE OF EXISTING ROOF PENETRATIONS. REFER TO "ROOF CURB DETAIL" A5/M-501. FOR ADDITIONAL INFORMATION.
7. CHILLED WATER AND HOT WATER SUPPLY/RETURN PIPING TO AIR HANDLING UNITS. REFER TO "COOLING/COIL PIPING DETAIL" C3/M-501 AND "HOT WATER HEATING COIL DETAIL" B5/M-506 FOR ADDITIONAL INFORMATION.
8. PIPING SUPPORT REFER TO "PIPE HANGER DETAIL" C5/M-505 FOR ADDITIONAL INFORMATION.
9. EXISTING EQUIPMENT SHALL REMAIN. PROTECT EQUIPMENT AND PIPING FROM DAMAGE DURING CONSTRUCTION.
10. DECOUPLER FABRICATION REFER TO "DECOUPLER PIPING DETAIL" A4/M-505 FOR ADDITIONAL INFORMATION.
11. VERTICAL EXPANSION TANK. REFER TO "EXPANSION TANK/AIR SEPARATOR SEE DETAIL" C3/M-502 FOR ADDITIONAL INFORMATION.
12. AIR SEPARATOR. REFER TO "EXPANSION TANK/AIR SEPARATION DETAIL" C3/M-502 FOR ADDITIONAL INFORMATION.
13. EXPANSION TANK SHALL BE MOUNTED ON EQUIPMENT PAD. REFER TO "CONCRETE PAD DETAIL" C5/M-502 FOR ADDITIONAL INFORMATION.
14. CHEMICAL SHOT FEEDER FOR WATER TREATMENT. REFER TO "SHOT FEEDER DETAIL" C2/M-503 FOR ADDITIONAL INFORMATION.
15. MOUNT SHOT FEEDER ON CONCRETE PAD. REFER TO "CONCRETE PAD DETAIL" C5/M-502 FOR ADDITIONAL INFORMATION.
16. HEAT TRACE TAPE ON EXTERIOR CHS/CHR PIPING. REFER TO "HEAT TRACING DETAILS" A5/M-504 FOR ADDITIONAL INFORMATION.
17. PIPE WALL PENETRATION. REFER TO "PIPE SLEEVE EXTERIOR WALL" B2/M-505 FOR ADDITIONAL INFORMATION.
18. DUCTLESS SPLIT SYSTEM. REFER TO "DUCTLESS SPLIT SYSTEM DETAIL" B2/M-506 FOR ADDITIONAL INFORMATION, MAINTAIN 10'-0" FROM EDGE OF ROOF TO AIR COOLED CONDENSING UINT.
19. REFRIGERENT LINES SIZE PER MANUFACTURERS RECOMMENDATIONS. REFER TO "REFRIGERANT LINES THROUGH ROOF DETAIL" C4/M-505 FOR ADDITIONAL INFORMATION.
20. REFER TO "ENLARGED BOILER ROOM MECHANICAL PLAN – NEW WORK" SHEET M-401 FOR WORK IN THIS AREA.



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

CONSTRUCTION NOTES (CONTINUED)

21. REFER TO "TYPICAL CONDENSATE TRAP DETAIL" SHEET B4/M-505 FOR ADDITIONAL INFORMATION.
22. ROUTE CONDENSATE PIPING FROM AHU'S TO NEAREST FLOOR DRAIN.
23. PROVIDE WELDED NATURAL GAS PIPING FROM UTILITY PROVIDED METER AT GRADE. SUPPORT VERTICAL RUN TO OUTSIDE BUILDING WALL, SUPPORT HORIZONTAL RUN WITH BLOCKING AND HANGERS UNDER CHILLER STRUCTURE, PROVIDE PITCHING AND DIRT LEGS IN ACCORDANCE WITH "NATIONAL FUEL CODE GAS HANDBOOK" REQUIREMENTS.
24. SEE "RISER SUPPORT DETAIL" SHEET A5/M-507.

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

DES DEL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
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NORFOLK, VIRGINIA
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NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL ROOF NEW WORK PLAN – A

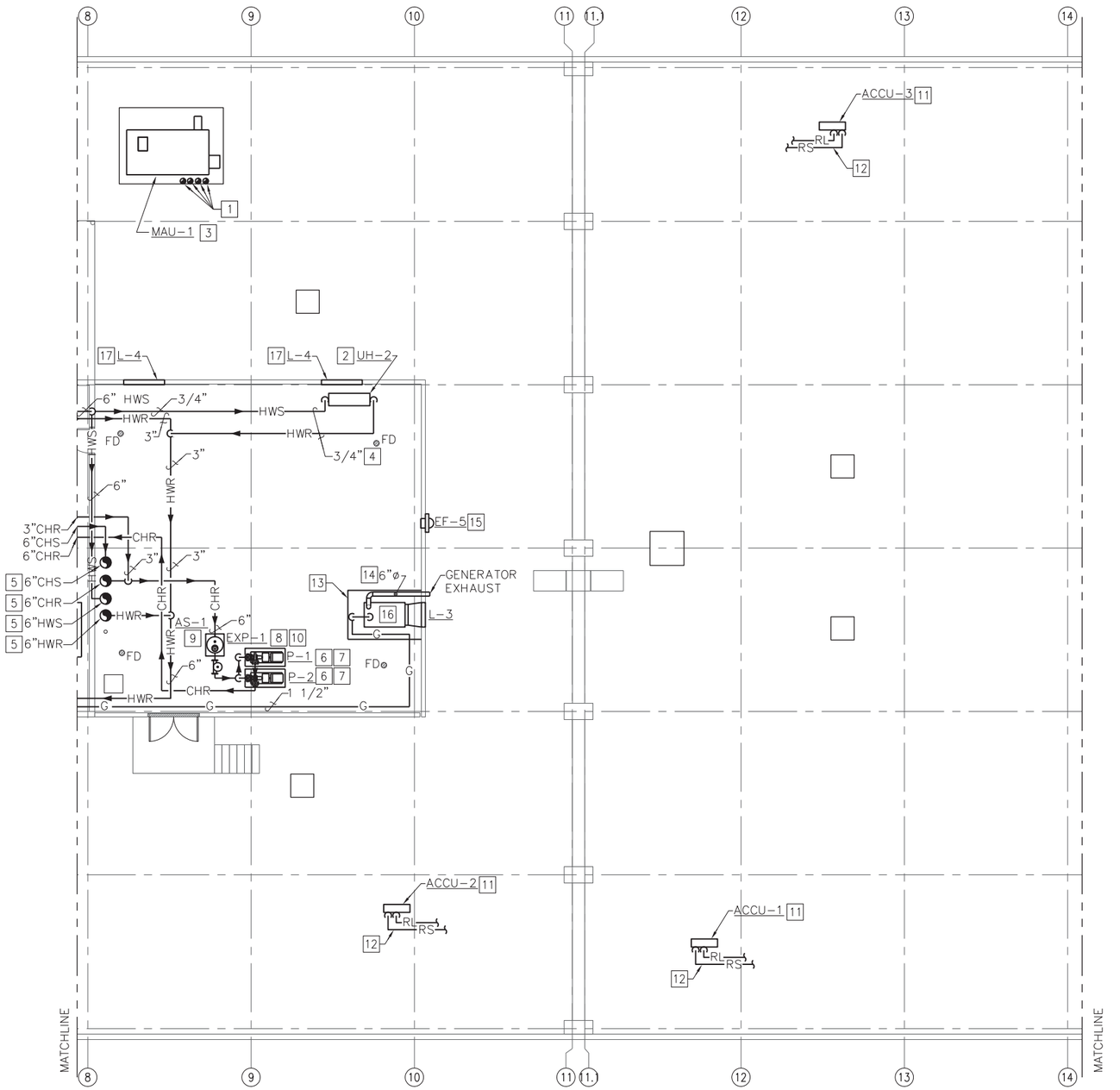
BOWMAN, FOSTER & ASSOC.
CONSULTING ENGINEERS
#4 INTERSTATE CORP. CENTER
NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

CODE ID. NO. 80091	SIZE D
SCALE: AS NOTED	
MAXIMO NO.	N/A
JOB ORDER NO.	
WORK ORDER NO.	539080
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12544745
SHEET 211 OF 349	

M-121

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-121 PARTIAL ROOF NEW WORK PLAN - A.dwg Plot Date: Jul 08, 2009 - 10:36am Last Saved BY: bfunderwhite



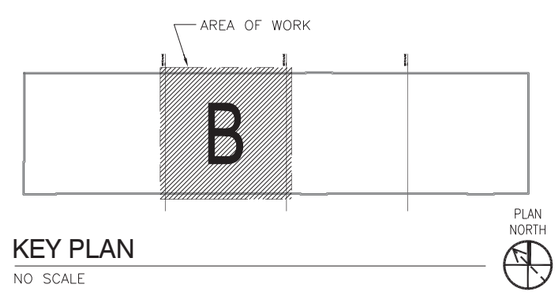
PARTIAL ROOF NEW WORK PLAN - B

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

PLAN NORTH

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. CHILLED WATER AND HOT WATER SUPPLY/RETURN PIPING FROM THIRD FLOOR CEILING SPACE TO HVAC EQUIPMENT. REFER TO "COOLING/COIL PIPING DETAIL" C3/M-501 AND "HOT WATER HEATING COIL DETAIL" B5/M-506 FOR ADDITIONAL INFORMATION. REFER TO DRAWINGS SHEET M-118 FOR CONTINUATION OF PIPING.
2. HOT WATER UNIT HEATER. REFER TO " HOT WATER UNIT HEATER PIPING DETAIL" A5/M-502 AND "UNIT HEATER MOUNTING DETAIL" C2/M-505 FOR ADDITIONAL INFORMATION.
3. PROVIDE ADAPT-A-CURB FOR REUSE OF EXISTING ROOF PENETRATIONS. REFER TO "ROOF CURB DETAIL" A5/M-501.
4. PIPING SUPPORT REFER TO "PIPE HANGER DETAIL" C5/M-505 FOR ADDITIONAL INFORMATION.
5. CHILLED WATER AND HOT WATER PIPING DOWN TO THIRD FLOOR CEILING SPACE. USE EXISTING FLOOR PENETRATIONS.
6. BASE MOUNTED PUMP. REFER TO "PUMP DETAIL-END SUCTION TYPE" C5/M-501 FOR ADDITIONAL INFORMATION.
7. MOUNT PUMP ON CONCRETE EQUIPMENT PAD. REFER TO "CONCRETE PAD DETAIL" C5/M-502 FOR ADDITIONAL INFORMATION.
8. VERTICAL EXPANSION TANK. REFER TO "EXPANSION TANK/AIR SEPARATOR SEE DETAIL" C3/M-502 FOR ADDITIONAL INFORMATION.
9. AIR SEPARATOR. REFER TO "EXPANSION TANK/AIR SEPARATION DETAIL" C3/M-502 FOR ADDITIONAL INFORMATION.
10. EXPANSION TANK SHALL BE MOUNTED ON EQUIPMENT PAD. REFER TO "CONCRETE PAD DETAIL" C5/M-502 FOR ADDITIONAL INFORMATION.
11. DUCTLESS SPLIT SYSTEM. REFER TO "DUCTLESS SPLIT SYSTEM DETAIL" B2/M-506 FOR ADDITIONAL INFORMATION, MAINTAIN 10'-0" FROM EDGE OF ROOF TO AIR COOLED CONDENSING UNIT.
12. REFRIGERANT LINES SIZE PER MANUFACTURERS RECOMMENDATIONS. REFER TO "REFRIGERANT LINES THROUGH ROOF DETAIL" C4/M-505 FOR ADDITIONAL INFORMATION.
13. PROVIDE CONCRETE PAD FOR EMERGENCY GENERATOR, INSTALL EXHAUST SYSTEM, GAS TRAIN AND COOLING DUCTWORK FOR RADIATOR. REFER TO "CONCRETE PAD DETAIL" SHEET C5/M-502 FOR ADDITIONAL INFORMATION.
14. RUN EXHAUST SYSTEM TIGHT TO ROOF AND PENETRATE EAST WALL. EXHAUST SHALL BE INSTALLED AND INSULATED PER GENERATOR MANUFACTURERS RECOMMENDATIONS.
15. INSTALL EF-5 IN EXISTING PENETRATION, EXPAND OPENING AS NEEDED FOR A CORRECT INSTALLATION.
16. EMERGENCY GENERATOR FURNISHED BY ELECTRICAL CONTRACTOR, INSTALLED BY MECHANICAL CONTRACTOR.
17. MOUNT LOUVERS 10' ABOVE ROOF LINE, EXPAND EXISTING PENETRATIONS TO FIT NEW LOUVER L-4.



KEY PLAN

NO SCALE

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GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
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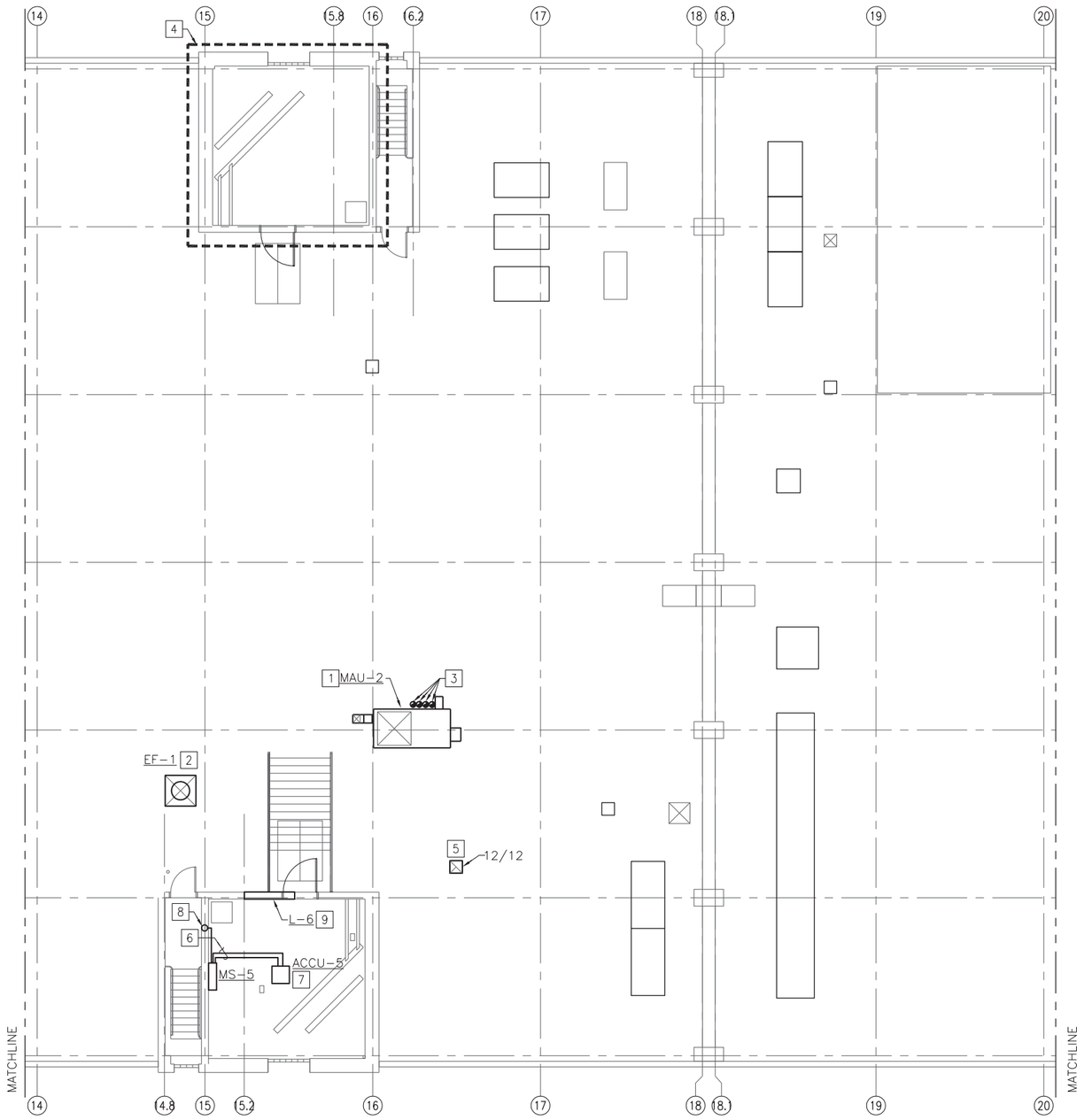
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL ROOF NEW WORK PLAN - B

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544746
SHEET 212 OF 349
M-122

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-122 PARTIAL ROOF NEW WORK PLAN - B.dwg Plot Date: Jul 08, 2009 - 10:36am Last Saved BY: bfunderwhite



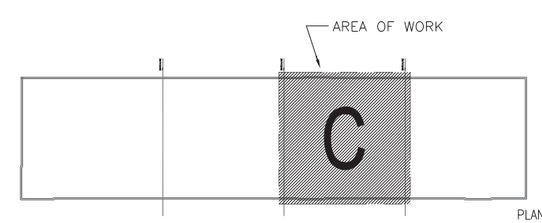
PARTIAL ROOF NEW WORK PLAN - C

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

PLAN NORTH

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. LOCATE MAU-2 ON NEW ROOF CURB AND USE EXISTING ROOF PENETRATION FOR PIPING, DUCTWORK AND WIRING. PROVIDE ADAPT-A-CURB FOR REUSE OF EXISTING ROUGH PENETRATIONS. REFER TO "ROOF CURB DETAIL" A5/M-501.
2. LOCATE EF-1 ON NEW ROOF CURB AND USE EXISTING ROOF PENETRATION FOR DUCTWORK AND WIRING. PROVIDE ADAPT-A-CURB FOR REUSE OF EXISTING ROUGH PENETRATIONS. REFER TO "EXHAUST FAN DETAIL" C4/M-503 FOR ADDITIONAL INFORMATION. REFER TO "ROOF CURB DETAIL" A5/M-501.
3. CHILLED WATER AND HOT WATER SUPPLY/RETURN PIPING FROM THIRD FLOOR CEILING SPACE TO HVAC EQUIPMENT. REFER TO "COOLING/COIL PIPING DETAIL" C3/M-501 AND "HOT WATER HEATING COIL DETAIL" B5/M-506 FOR ADDITIONAL INFORMATION. REFER TO DRAWINGS SHEET M-119 FOR CONTINUATION OF PIPING.
4. REFER TO SHEET M-403 "ENLARGED MECHANICAL ROOM ROOF ABANDONED ELEVATOR SHAFT - NEW WORK" FOR ADDITIONAL INFORMATION.
5. PROVIDE GOOSENECK EXHAUST DUCT. SEE "TYPICAL GOOSENECK AIR INTAKE/EXHAUST DETAIL" SHEET C5/M-503.
6. REFRIGERANT PIPING SHALL BE SIZED BY THE MANUFACTURER OF THE UNIT AND PROVIDED BY MECHANICAL CONTRACTOR.
7. LOCATE AIR COOLED CONDENSING UNIT ON ROOF USE EXISTING ROOF PENETRATION FOR REFRIGERANT PIPING AND CONTROL WIRING. SEE "REFRIGERANT LINES THRU ROOF DETAIL " SHEET C4/M-505.
8. RUN CONDENSATE LINE TO NEAREST ROOF DRAIN.
9. PROVIDE SMOKE REMOVAL LOUVER L-6 FOR ELEVATOR SHAFT. MOUNT LOUVER TIGHT TO TOP SHAFT DECK, UNDER ACCESS STAIRS. COORDINATE LOCATION WITH STRUCTURAL ELEVATION SHEET. SEE "TYPICAL LOUVER DETAIL" SHEET A2/M-506.



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

BOWMAN, FOSTER & ASSOC.
CONSULTING ENGINEERS
#4 INTERSTATE CORP. CENTER
NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

DES DEL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

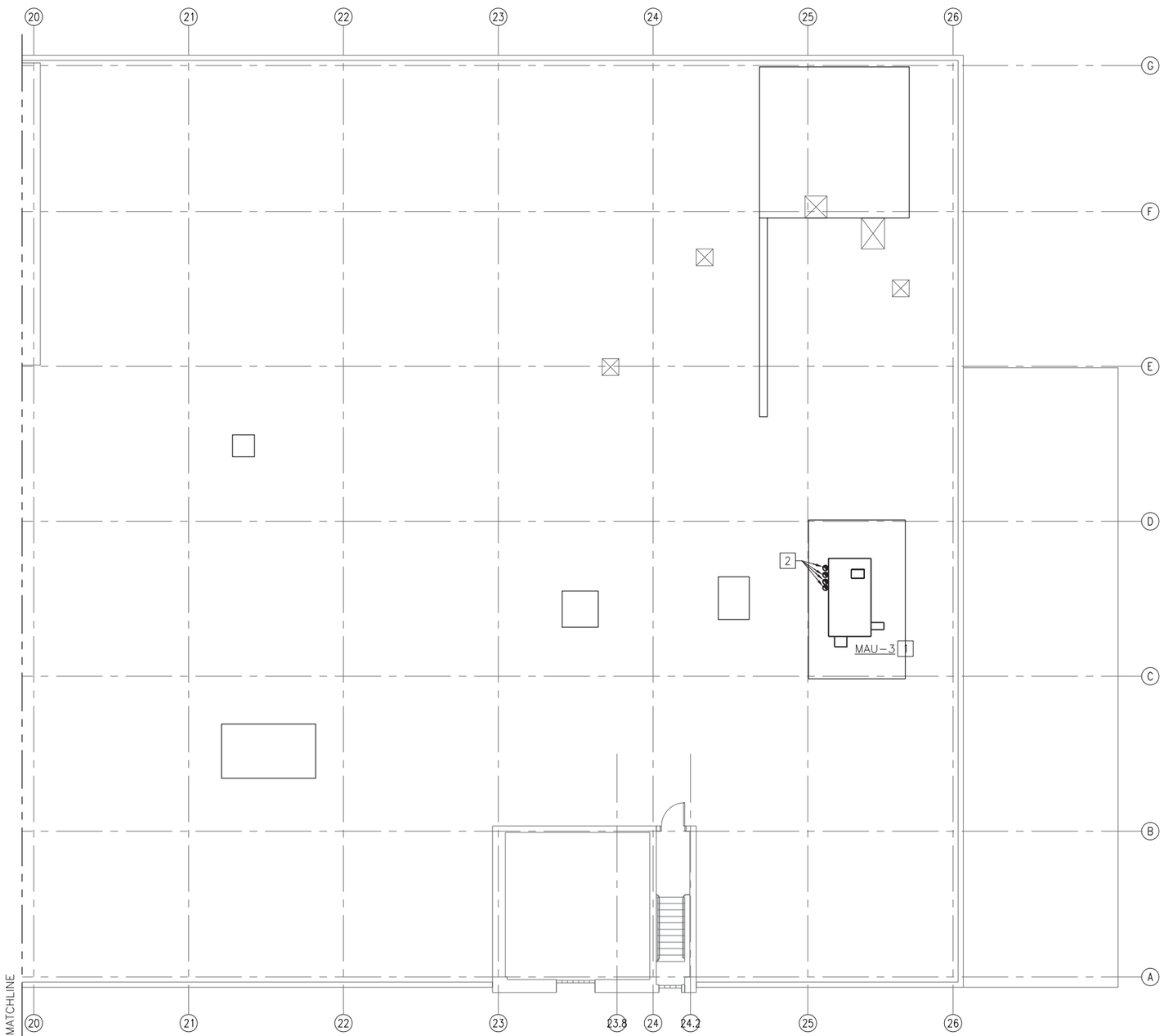
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION NORFOLK
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL ROOF NEW WORK PLAN - C

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544747
SHEET 213 OF 349

M-123

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-123 PARTIAL ROOF NEW WORK PLAN - C.dwg Plot Date: Jul 08, 2009 - 10:37am Last Saved BY: bfunderwhite

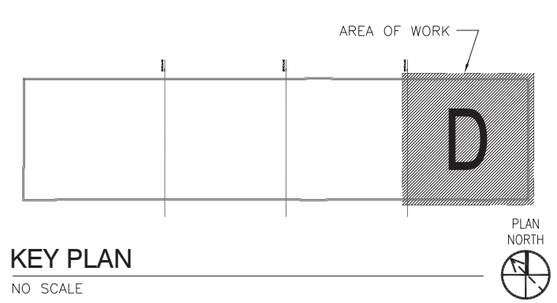


PARTIAL ROOF NEW WORK PLAN - D

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

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. LOCATE MAU-3 ON NEW ROOF CURB AND USE EXISTING ROOF PENETRATION FOR PIPING, DUCTWORK AND WIRING. PROVIDE ADAPT-A-CURB FOR REUSE OF EXISTING ROOF PENETRATIONS. REFER TO "ROOF CURB DETAIL" A5/M-501.
2. CHILLED WATER AND HOT WATER SUPPLY/RETURN PIPING FROM THIRD FLOOR CEILING SPACE TO HVAC EQUIPMENT. REFER TO "COOLING/COIL PIPING DETAIL" C3/M-501 AND "HOT WATER HEATING COIL DETAIL" B5/M-506 FOR ADDITIONAL INFORMATION. REFER TO DRAWINGS SHEET M-120 FOR CONTINUATION OF PIPING.



KEY PLAN

NO SCALE

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
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DES DEL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

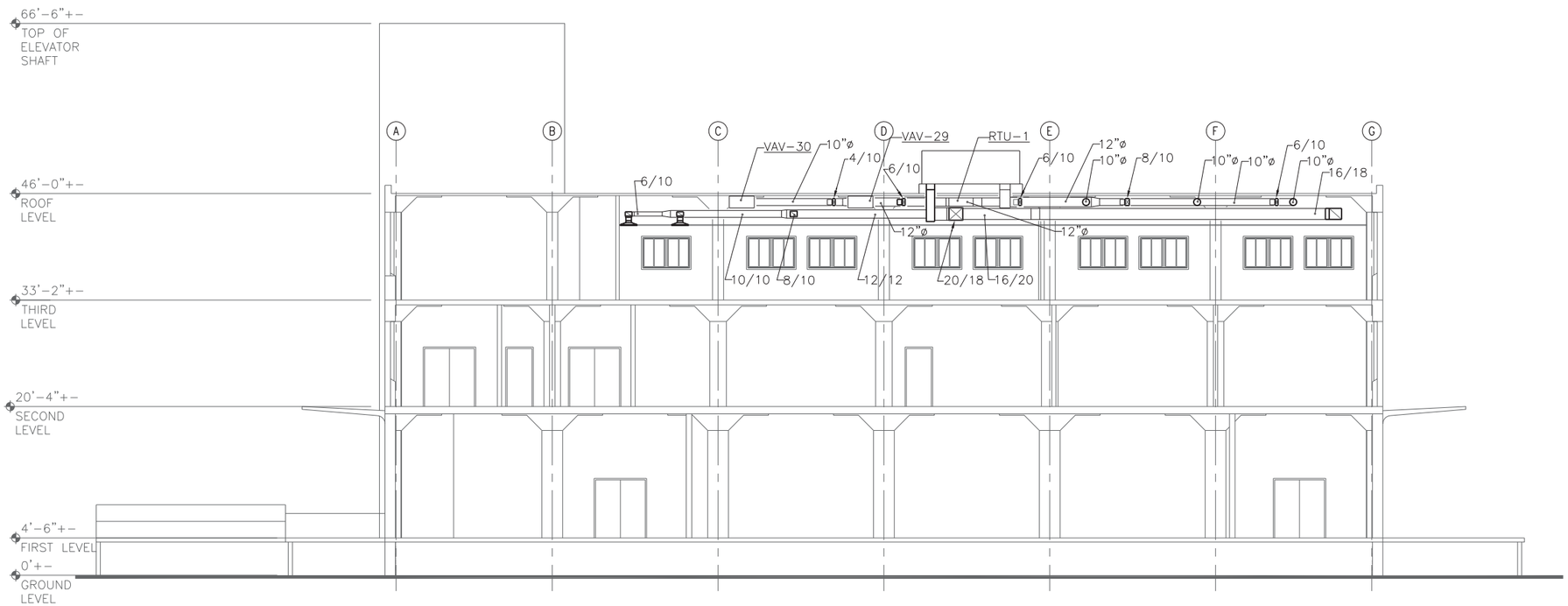
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NAVAL STATION NORFOLK, VIRGINIA
NAVAL STATION NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
PARTIAL ROOF NEW WORK PLAN - D

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544748
SHEET 214 OF 349

M-124

DRAWFORM REVISION: 6 AUG 2007

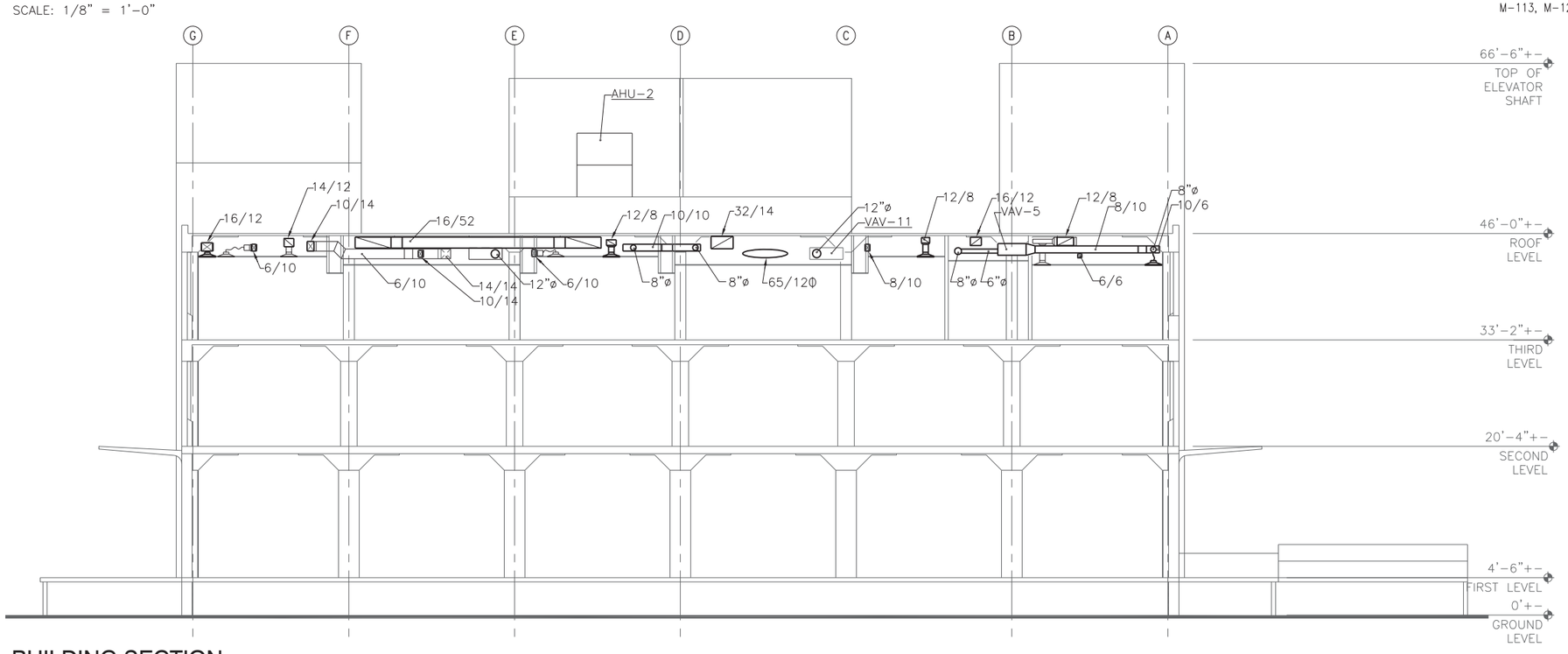
BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-124 PARTIAL ROOF NEW WORK PLAN - D.dwg Plot Date: Jul 08, 2009 - 10:37am Last Saved BY: bfunderwhite



BUILDING SECTION

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

M-113, M-121 C5



NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

BUILDING SECTION

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

M-113, M-121 A5

SYM	DESCRIPTION	DATE	APPR

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NAVAL STATION NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
MECHANICAL BUILDING SECTIONS

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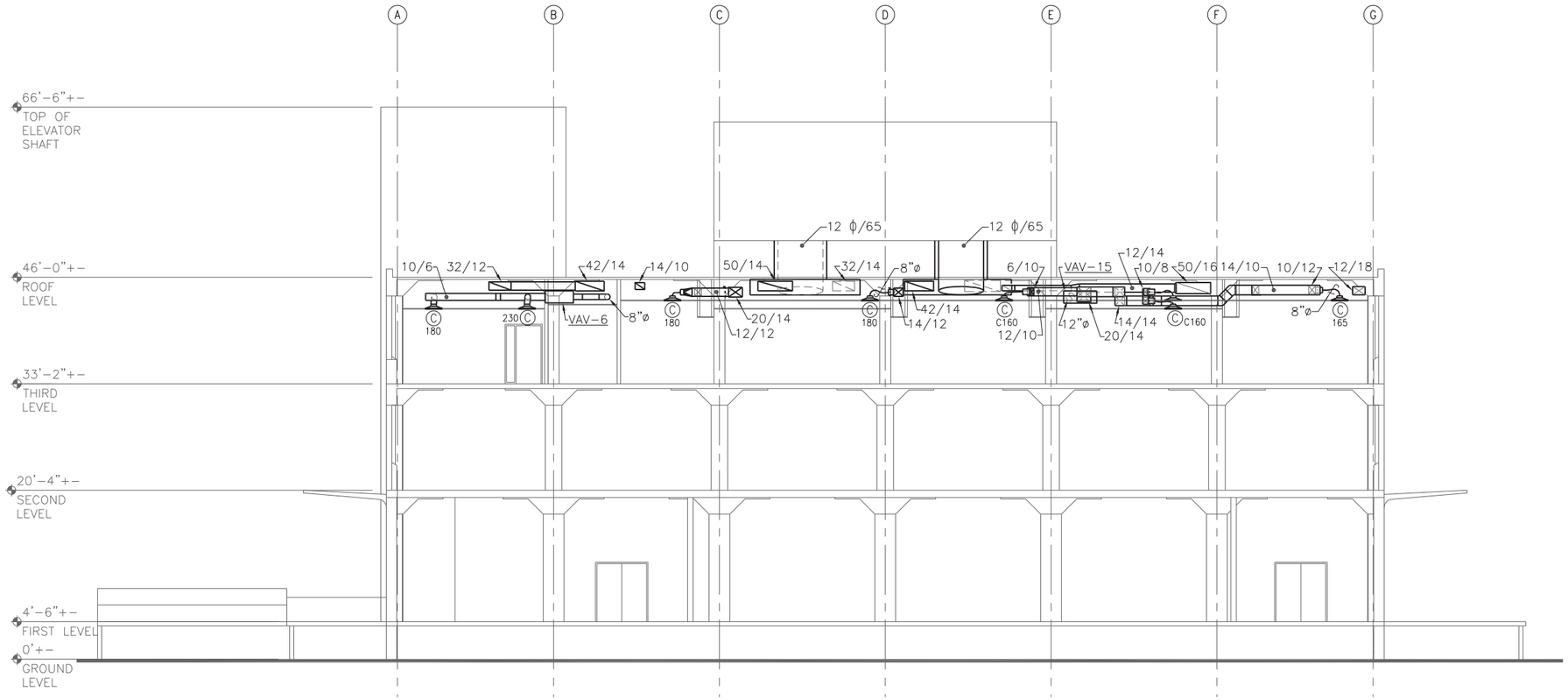
CONSULTING ENGINEERS
#4 INTERSTATE CORP. CENTER
NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

CODE ID. NO. 80091	SIZE D
SCALE: AS NOTED	
MAXIMO NO.	N/A
JOB ORDER NO.	
WORK ORDER NO.	539080
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12544749
SHEET 215 OF 349	

M-301

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-301 MECHANICAL BUILDING SECTIONS.dwg Plot Date: Jul 08, 2009 - 10:37am Last Saved BY: bfunderwhite



BUILDING SECTION

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

M-113, M-121 B5

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/8"=1'-0" 0' 5' 10' 20' 30'

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ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

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RRMM ARCHITECTS

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FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

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NAVAL STATION
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA

P211V BUILDING V53 BRAC RENOVATIONS FOR SPAWAR

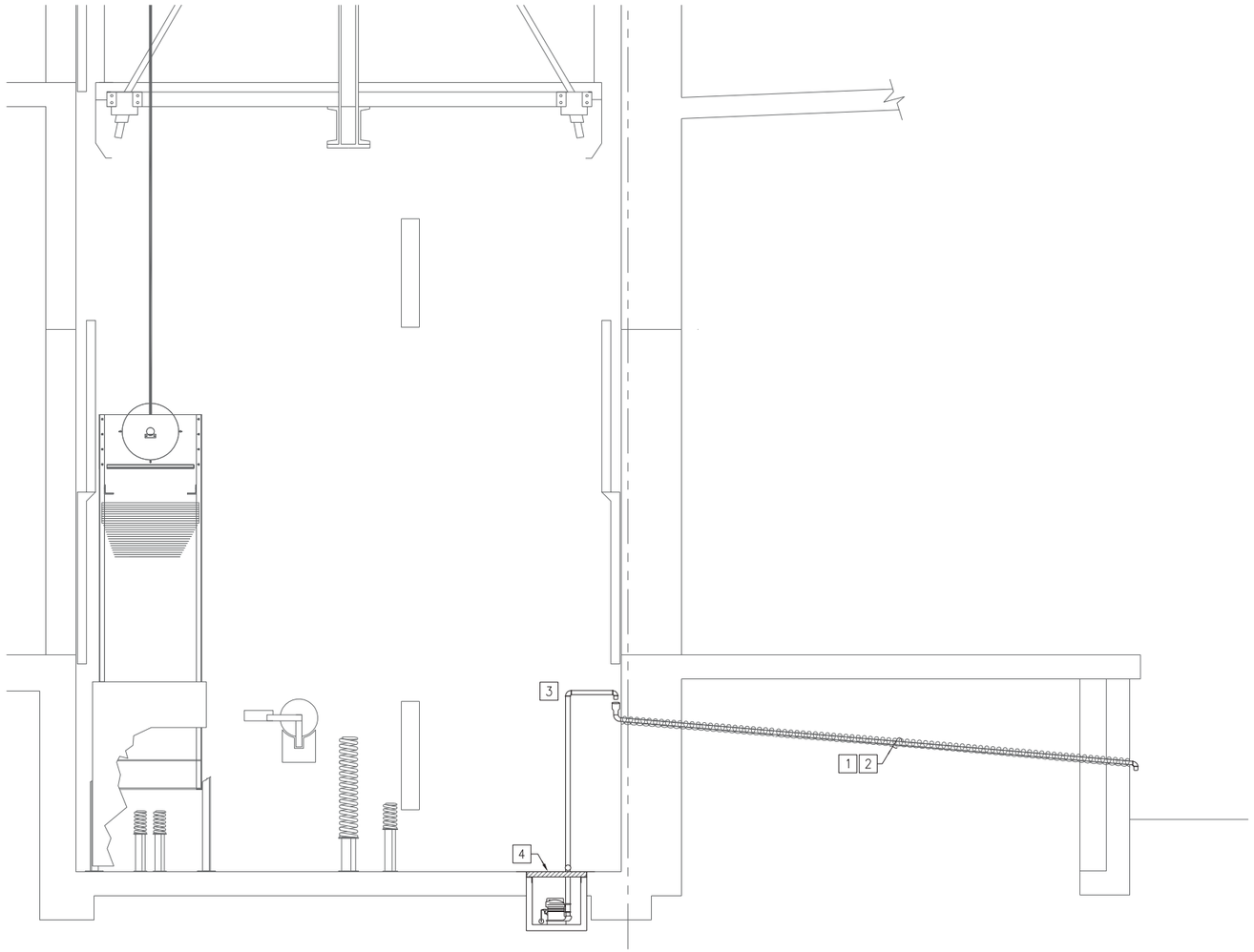
MECHANICAL BUILDING SECTIONS

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544750
SHEET 216 OF 349

M-302

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-302 MECHANICAL BUILDING SECTIONS.dwg Plot Date: Jul 08, 2009 - 10:37am Last Saved BY: bfunderwhite



ELEVATOR PIT SECTION

SCALE: 1/2" = 1'-0"

M-103, M-404 B3

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. PROVIDE HEAT TRACE TAPE AT 5 WATTS/FOOT.
2. PITCH 1"/10' RUN TOWARDS PARKING LOT.
3. RUN PIPING CLEAR OF DOORS AND ELEVATOR CAB.
4. PROVIDE STEEL REMOVABLE GRATING.

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/2"=1'-0" 1' 0' 1' 2' 3' 4' 5'

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
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NORFOLK, VIRGINIA
NAVAL STATION NORFOLK NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
ELEVATOR PIT SECTION

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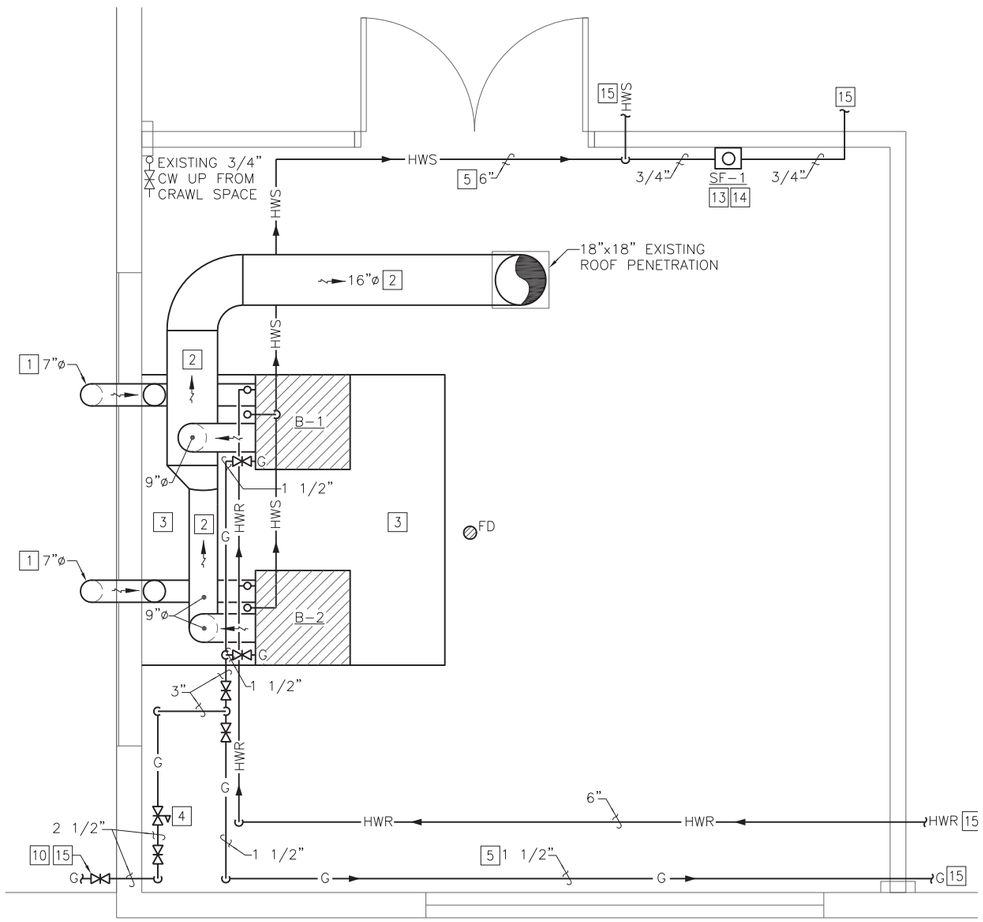
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

CODE ID. NO. 80091	SIZE D
SCALE: AS NOTED	
MAXIMO NO.	N/A
JOB ORDER NO.	
WORK ORDER NO.	539080
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12544751
SHEET 217 OF 349	
M-303	

DRAWFORM REVISION: 6 AUG 2007

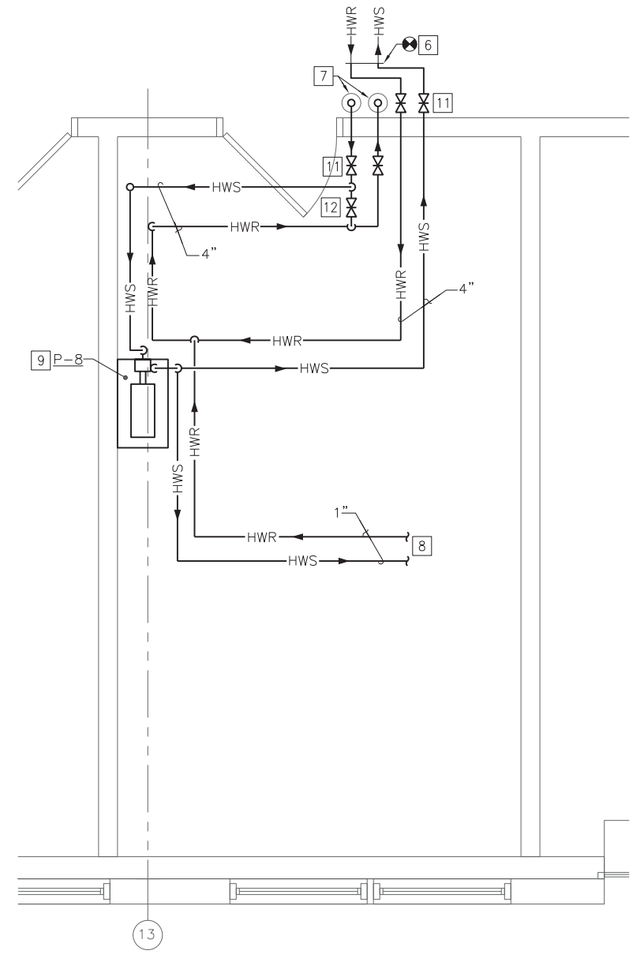
BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-303 ELEVATOR PIT SECTION.dwg Plot Date: Jul 08, 2009 - 10:37am Last Saved BY: bfunderwhite



ENLARGED BOILER ROOM MECHANICAL PLAN - NEW WORK

SCALE: 1/2" = 1'-0"

PLAN NORTH



ENLARGED MECHANICAL ROOM FIRST FLOOR - NEW WORK

SCALE: 1/2" = 1'-0"

PLAN NORTH

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. PVC SEALED COMBUSTION BOILER AIR INTAKE, RUN THROUGH INFILL PORTION OF WALL AND PROVIDE DOWNTURN SNORKEL WITH BIRD SCREEN PER MANUFACTURERS RECOMMENDATIONS.
2. PROVIDE STAINLESS STEEL BOILER EXHAUST BREECHING PER MANUFACTURERS RECOMMENDATIONS AND USE EXISTING ROOF PENETRATIONS FOR STACK.
3. PROVIDE 4" CONCRETE HOUSEKEEPING PAD. SEE "CONRETE PAD DETAIL" SHEET C5/M-502.
4. PROVIDE GAS PRESSURE REGULATING VALVE, INLET PRESSURE IS 2PSI, OUTLET PRESSURE IS 10"WC FLOW IS BASED ON 3660 CFH.
5. RUN PIPING TIGHT TO ROOF.
6. CONNECT TO EXISTING FIRST FLOOR HWS AND HWR.
7. HWS AND HWR RISERS FROM THIRD FLOOR IN EXISTING CORE DRILLED HOLES.
8. TO DOMESTIC HOT WATER HEATER/TANK SEE P-401 FOR LOCATION AND PIPING SPECIALTIES.
9. SEE "PUMP DETAIL-END SUCTION TYPE" SHEET C5/M-501.
10. PROVIDE EMERGENCY GAS SHUTOFF VALVE.
11. PROVIDE ISOLATION VALVES.
12. PROVIDE BUTTERFLY VALVE WITH MEMORY STOPS FOR BYPASS BALANCING.
13. PROVIDE CHEMICAL SHOT FEEDER FOR WATER TREATMENT, SEE "SHOT FEEDER DETAIL" SHEET C2/M-503. FOR MORE INFORMATION.
14. MOUNT SHOT FEEDER ON CONCRETE PAD, SEE "CONCRETE PAD DETAIL" SHEET C5/ M-502 FOR MORE INFORMATION.
15. SEE M-121 FOR CONTINUATION OF PIPING.

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/2"=1'-0" 1' 0' 1' 2' 3' 4' 5'

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NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
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Lic. No.10424
PROFESSIONAL ENGINEER

DES DEL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

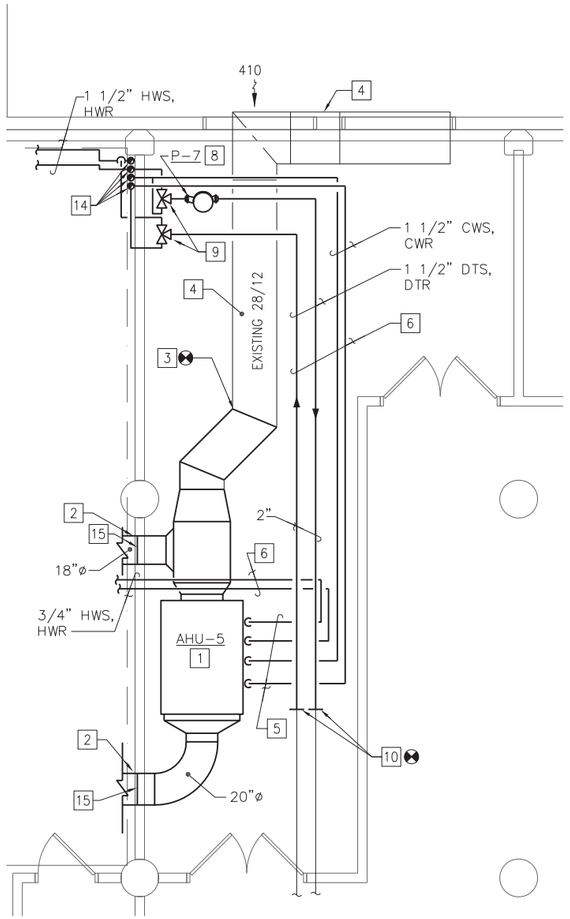
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
ENLARGED MECHANICAL ROOM FIRST FLOOR - NEW WORK

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544752
SHEET 218 OF 349

M-401

DRAWFORM REVISION: 6 AUG 2007

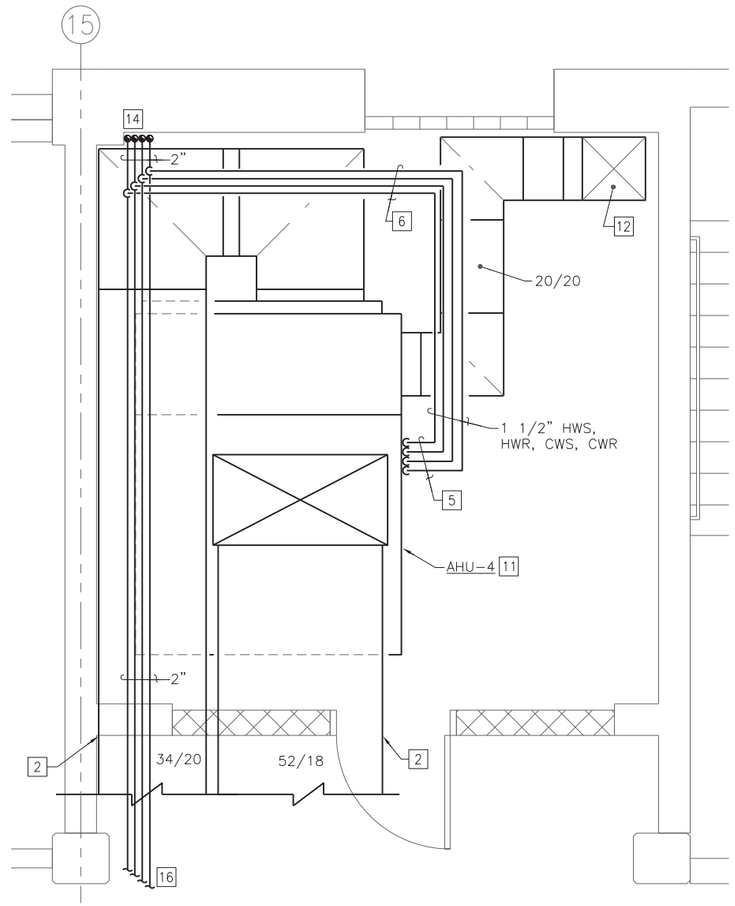
BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-401 ENLARGED MECHANICAL ROOM FIRST FLOOR - NEW WORK.dwg Plot Date: Jul 08, 2009 - 10:38am Last Saved BY: bfunderwhite



ENLARGED MECHANICAL ROOM SECOND FLOOR - NEW WORK

SCALE: 1/4" = 1'-0"

PLAN NORTH



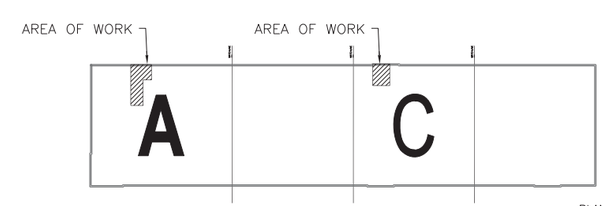
ENLARGED MECHANICAL ROOM SECOND FLOOR ABANDONED ELEVATOR SHAFT- NEW WORK

SCALE: 1/2" = 1'-0"

PLAN NORTH

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. AHU-5 IN THE EXISTING MECHANICAL ROOM. MOUNT ON EXISTING EQUIPMENT PAD.
2. DUCTWORK PENETRATIONS. REFER TO "DUCTWORK WALL SLEEVE DETAIL" B4/M-503 FOR ADDITIONAL INFORMATION.
3. CONNECT MIXED AIR PLENUM OF AHU-5 TO EXISTING OUTSIDE AIR DUCTWORK. MODIFY DUCTWORK AS REQUIRED TO ALLOW TRANSITION.
4. EXISTING OUTSIDE AIR DUCTWORK PLENUM AND LOUVERS SHALL REMAIN.
5. CHILLED WATER AND HOT WATER SUPPLY/RETURN PIPING TO AIR HANDLING UNIT. REFER TO "COOLING/COIL PIPING DETAIL" C3/M-501 AND "HOT WATER HEATING COIL DETAIL" B5/M-506 FOR ADDITIONAL INFORMATION.
6. PIPING SUPPORT REFER TO "PIPE HANGER DETAIL" C5/M-505 FOR ADDITIONAL INFORMATION.
7. CONDENSATE DRAIN FOR AHU-5. ROUTE TO EXISTING FLOOR DRAIN IN MECHANICAL ROOM. REFER TO TYPICAL CONDENSATE DRAIN TRAP DETAIL" B4/M-505 FOR ADDITIONAL INFORMATION.
8. IN LINE PUMP FOR DUAL TEMPERATURE SYSTEM. REFER TO "INLINE CENTRIFUGAL PUMP" B4/M-504 FOR ADDITIONAL INFORMATION.
9. 3-WAY VALVES FOR SWITCH OVER OF DUAL TEMPERATURE SYSTEM.
10. CONNECT EXISTING PIPING TO DUAL TEMPERATURE SYSTEM PIPING.
11. AHU-4 IN THE EXISTING ELEVATOR SHAFT. INSTALL AHU-4 ON CONCRETE EQUIPMENT PAD. REFER TO "CONCRETE PAD DETAIL" C5/M-502 FOR ADDITIONAL INFORMATION. REFER TO ARCHITECTURAL DRAWINGS FOR ELEVATOR SHAFT MODIFICATION.
12. OUTSIDE AIR DUCTWORK DOWN FROM MAU-4 IN MECHANICAL ROOM ON ROOF.
13. CONDENSATE DRAIN FOR AHU-4. ROUTE TO FLOOR DRAIN. REFER TO TYPICAL CONDENSATE DRAIN TRAP DETAIL" B4/M-505 FOR ADDITIONAL INFORMATION.
14. CWS, CWR, HWS, HWR PIPING DOWN FROM THIRD FLOOR.
15. PROVIDE SECURITY BARS IN DUCT. SEE "TYPICAL SECURITY BAR INSTALLATION DETAIL" SHEET C4/M-504.
16. PIPING SERVING FAN COIL UNITS IN SOUTH OFFICES.



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/2"=1'-0" 1' 0' 1' 2' 3' 4' 5'

1/4"=1'-0" 1' 0' 1' 5' 10' 15'

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#4 INTERSTATE CORP. CENTER
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2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

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RRMM ARCHITECTS

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FIRE PROTECTION
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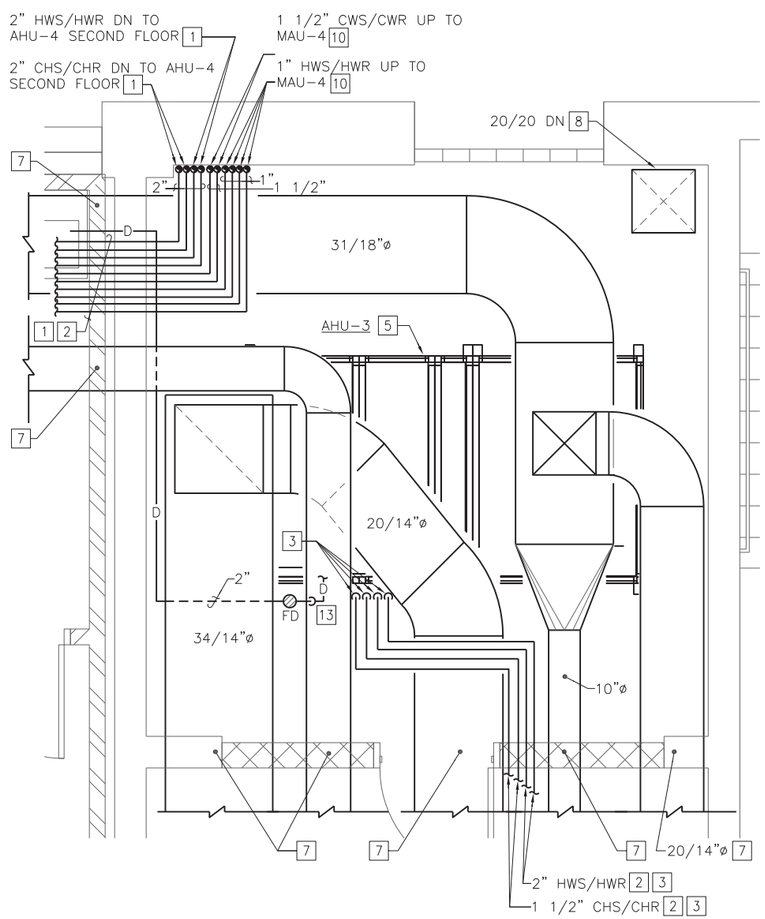
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
ENLARGED PLANS - NEW WORK

CODE ID. NO. 80091 | SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544753
SHEET 219 OF 349

M-402

DRAWFORM REVISION: 6 AUG 2007

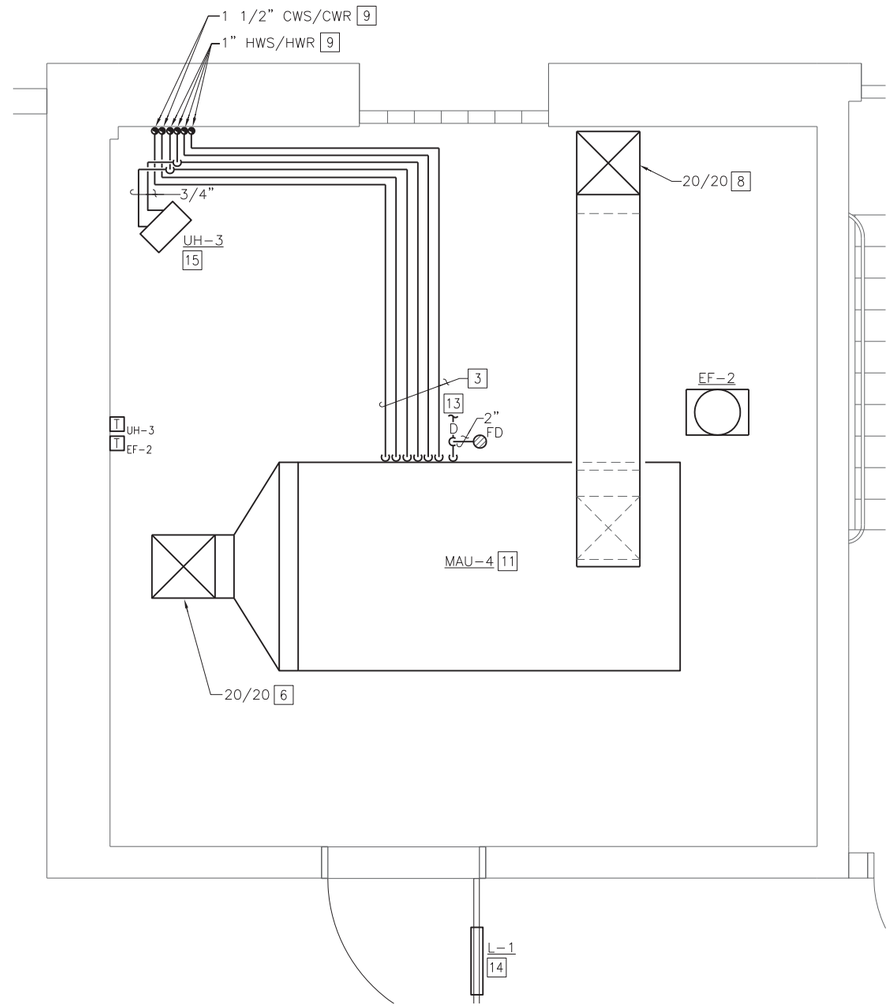
BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-402 ENLARGED PLANS - NEW WORK.dwg Plot Date: Jul 08, 2009 - 10:36am Last Saved BY: bfunderwhite



ENLARGED MECHANICAL ROOM THIRD FLOOR ABANDONED ELEVATOR SHAFT- NEW WORK

SCALE: 1/2" = 1'-0"

PLAN NORTH



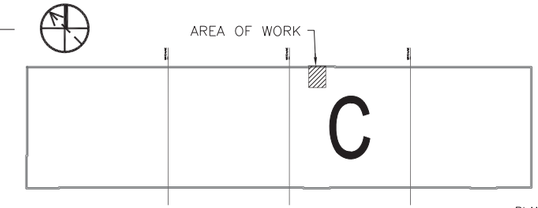
ENLARGED MECHANICAL ROOM ROOF, ABANDONED ELEVATOR SHAFT- NEW WORK

SCALE: 1/2" = 1'-0"

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. CHS/CHR, HWS/HWR PIPING DOWN TO THIRD FLOOR TO AHU-4.
2. PIPING SUPPORT REFER TO "PIPE HANGER DETAIL" C5/M-505 FOR ADDITIONAL INFORMATION.
3. CHILLED WATER AND HOT WATER SUPPLY/RETURN PIPING TO HVAC EQUIPMENT IN ELEVATOR SHAFT. REFER TO "COOLING/COIL PIPING DETAIL" C3/M-501 AND "HOT WATER HEATING COIL DETAIL" B5/M506 FOR ADDITIONAL INFORMATION.
4. CONDENSATE DRAIN FOR AHU-4. ROUTE TO FLOOR DRAIN. REFER TO "TYPICAL CONDENSATE DRAIN TRAP DETAIL" A4/M-505 FOR ADDITIONAL INFORMATION.
5. AHU-3 IN THE EXISTING ELEVATOR SHAFT. INSTALL AHU-3 ON CONCRETE EQUIPMENT PAD. REFER TO "CONCRETE PAD DETAIL" C5/M-502 FOR ADDITIONAL INFORMATION. REFER TO ARCHITECTURAL DRAWINGS FOR ELEVATOR SHAFT MODIFICATION.
6. OUTSIDE AIR DUCTWORK UP THRU ROOF. REFER TO "TYPICAL GOOSENECK AIR INTAKE/EXHAUST DETAIL" C5/M-503 USE EXISTING PENETRATIONS.
7. DUCTWORK PENETRATIONS. REFER TO "DUCTWORK WALL SLEEVE DETAIL" B4/M-503 FOR ADDITIONAL INFORMATION.
8. OUTSIDE AIR DUCTWORK DOWN TO SECOND FLOOR TO AHU-4.
9. CHS/CHR, HWS/HWR PIPING UP FROM THIRD FLOOR TO MAU-4.
10. CHS/CHR, HWS/HWR PIPING UP TO ROOF TO MAU-4.
11. MAU-4 IN THE EXISTING ELEVATOR MECHANICAL ROOM. INSTALL MAU-4 ON CONCRETE EQUIPMENT PAD. REFER TO "CONCRETE PAD DETAIL" C5/M-502 FOR ADDITIONAL INFORMATION. REFER TO ARCHITECTURAL DRAWINGS FOR ELEVATOR SHAFT MODIFICATION.
12. 2" CONDENSATE LINE FROM CRAC-7 IN ADJACENT SPACE.
13. RUN CONDENSATE LINE FROM AHU-3 TO NEAREST FLOOR DRAIN. SEE "TYPICAL CONDENSATE DRAIN TRAP" DETAIL SHEET B4/M-505.
14. PROVIDE L-1 IN EXISTING DOOR.
15. HOT WATER UNIT HEATER, SEE "HOT WATER UNIT HEATER PIPING DETAIL" SHEET A5/M-502 AND "UNIT HEATER MOUNTING DETAIL" SHEET C2/M-505 FOR ADDITIONAL INFORMATION.

PLAN NORTH



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/2"=1'-0" 1' 0' 1' 2' 3' 4' 5'

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CONSULTING ENGINEERS
#4 INTERSTATE CORP. CENTER
NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
Lic. No.10424
PROFESSIONAL ENGINEER

DES DEL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

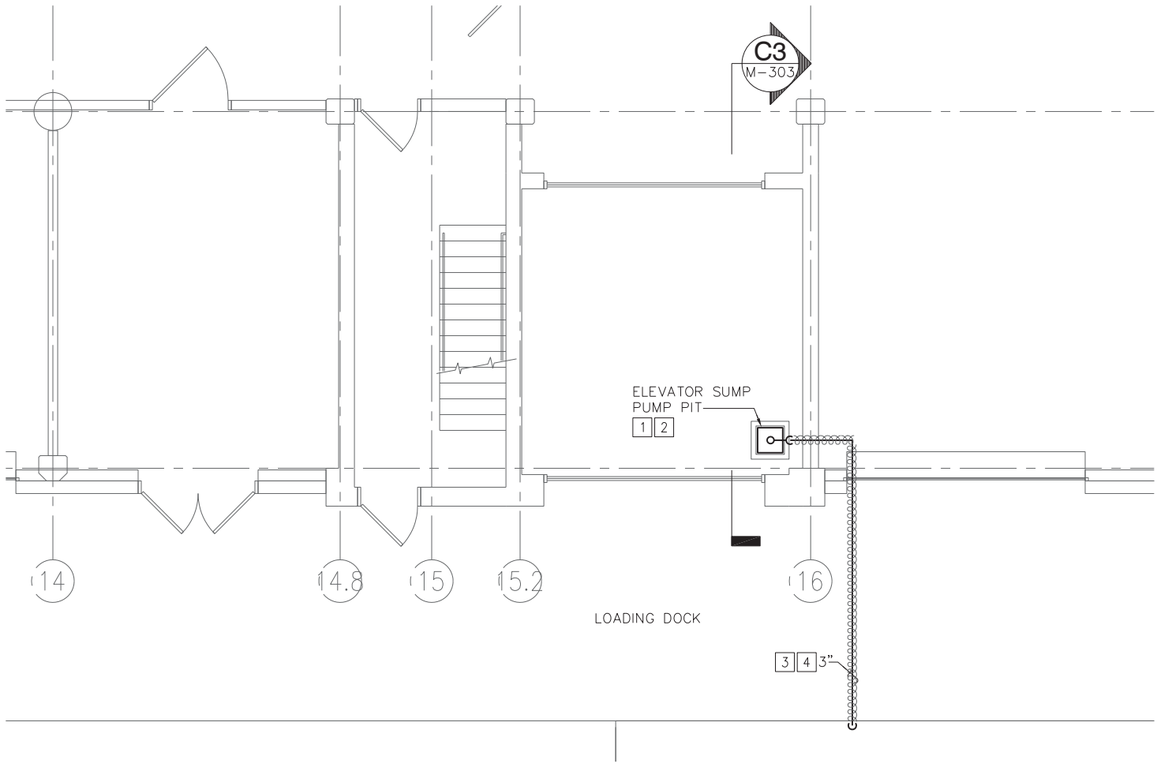
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
ENLARGED PLANS - NEW WORK

CODE ID. NO. 80091	SIZE D
SCALE: AS NOTED	
MAXIMO NO.	N/A
JOB ORDER NO.	
WORK ORDER NO.	539080
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12544754
SHEET 220 OF 349	

M-403

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-403 ENLARGED PLANS - NEW WORK.dwg Plot Date: Jul 08, 2009 - 10:36am Last Saved BY: bfunderwhite



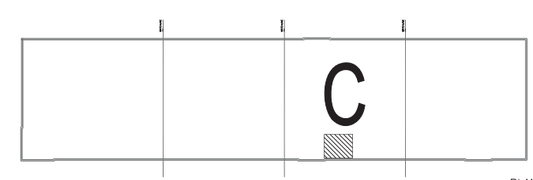
ENLARGED ELEVATOR PIT PLAN - NEW WORK 5

SCALE: 1/4" = 1'-0"

PLAN NORTH

CONSTRUCTION NOTES (THIS SHEET ONLY)

1. PROVIDE ELEVATOR SUMP PUMP WITH FLOAT SWITCH SEE "SUMP PUMP DETAIL" SHEET M-507.
2. PROVIDE SUMP PIT WITH STEEL GRATE COVER.
3. PITCH PIPE 1"/10' TOWARDS PARKING LOT.
4. PROVIDE HEAT TAPE ON PIPING UNDER LOADING DOCK, SIZE TAPE AT 5 WATTS/FOOT SEE "HEAT TRACING DETAILS" A5/M-504.
5. RUN ALL PIPING CLEAR OF ELEVATOR AND ELEVATOR EQUIPMENT.



KEY PLAN

NO SCALE

PLAN NORTH

NOTE: IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

GRAPHIC SCALE:

1/4"=1'-0" 1' 0' 1' 5' 10' 15'

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ARLINGTON, VA 22206

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
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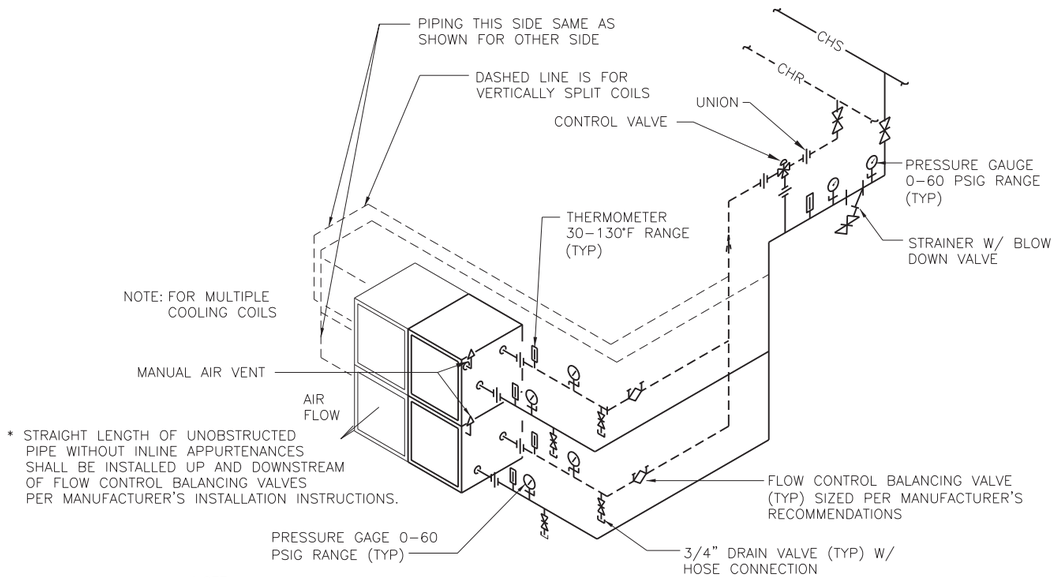
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
ENLARGED ELEVATOR PIT PLAN - NEW WORK

CODE ID. NO. 80091 SIZE D
SCALE: AS NOTED
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544755
SHEET 221 OF 349

M-404

DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-404 ENLARGED ELEVATOR PIT PLAN - NEW WORK.dwg Plot Date: Jul 08, 2009 - 10:38am Last Saved BY: bfunderwhite



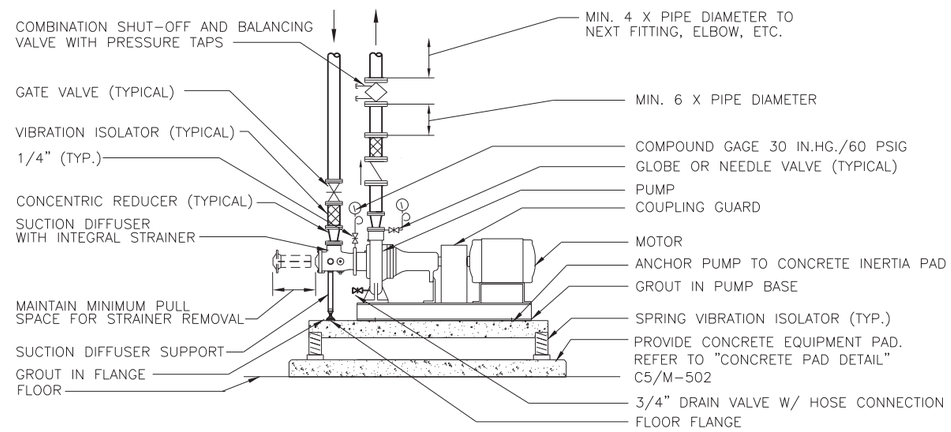
NOTE:

1. WHERE COIL IS SPLIT INTO (2) OR MORE SECTIONS, EACH SECTION SHALL BE PIPED SEPARATELY.
2. CHS/CHR SHALL ENTER AHU AND MAU INSULATED PIPE VESTIBULE FROM CEILING SPACE BELOW. ALL CONTROL VALVES, GAUGES, THERMOSTATES ETC. SHALL BE LOCATED IN PIPING VESTIBULE.

COOLING / COIL PIPING DETAIL

NO SCALE

M-117, M-119, M-120, M-121, M-122, M-123, M-124, M-402, M-403 **C3**

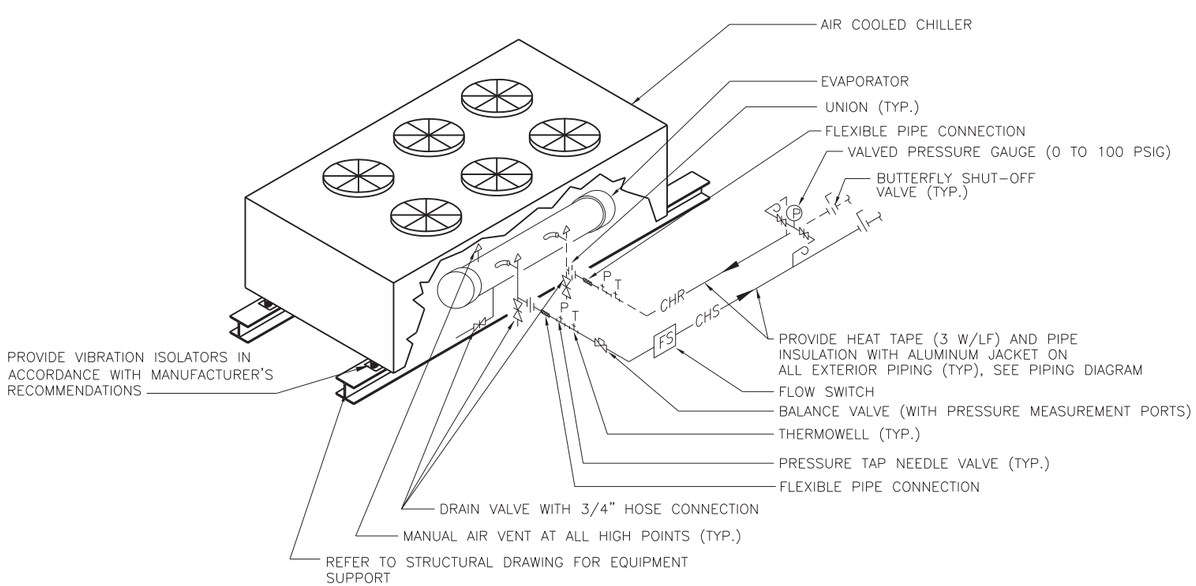


NOTE: 1. SIZE SUCTION DIFFUSER IN ACCORDANCE WITH APPROVED PUMP MANUFACTURER'S RECOMMENDATIONS BASED ON SYSTEM FLOW REQUIREMENTS AND PUMP CONFIGURATION

PUMP DETAIL - END SUCTION TYPE

NO SCALE

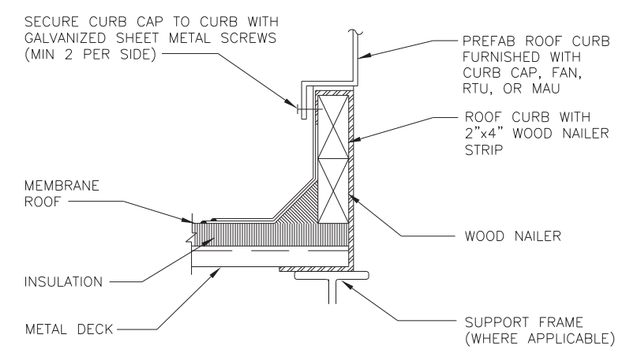
M-121, M-122, M-401 **C5**



AIR-COOLED CHILLER PIPING DETAIL

NO SCALE

M-121 **A3**



NOTE:

1. INSTALL CURB LEVEL, PROVIDE SLOPED ROOF CURB WHERE NECESSARY.
2. REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION.
3. SEE STRUCTURAL DRAWINGS FOR ADDITIONAL INFORMATION.
4. ALL DUCTWORK PIPING AND WIRING SHALL BE CONFINED WITHIN THE ROOF CURB.

ROOF CURB DETAIL

NO SCALE

M-121, M-122, M-123, M-124 **A5**

SYM	DESCRIPTION	DATE	APPR

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RRMM ARCHITECTS

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NAVAL FACILITIES ENGINEERING COMMAND
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NORFOLK, VA
P211V BUILDING V53 BRAC RENOVATIONS FOR SPAWAR
DETAILS

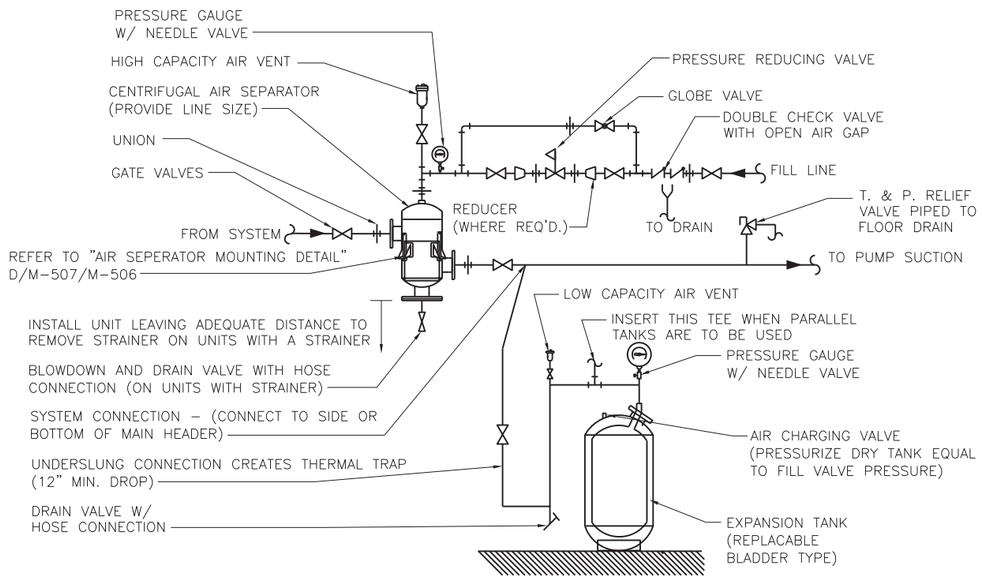
BOWMAN, FOSTER & ASSOC.
CONSULTING ENGINEERS
#4 INTERSTATE CORP. CENTER
NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

CODE ID. NO. 80091	SIZE D
SCALE: NONE	
MAXIMO NO.	N/A
JOB ORDER NO.	
WORK ORDER NO.	539080
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12544756
SHEET 222 OF 349	

M-501

DRAWFORM REVISION: 6 AUG 2007

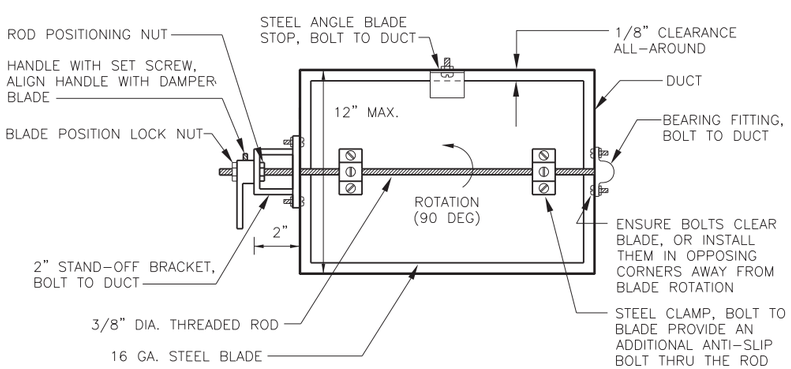
BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-501 DETAILS.dwg Plot Date: Jul 08, 2009 - 10:39am Last Saved BY: bfunderwhite



EXPANSION TANK/AIR SEPARATOR DETAIL

NO SCALE

M-121, M-122 **C3**

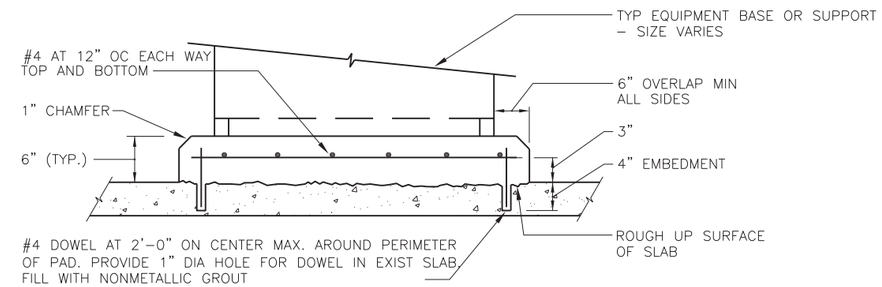


NOTES: 1. DAMPERS FOR ROUND DUCTS SHALL BE SIMILAR TO THE DAMPER SHOWN ABOVE.
2. ENSURE THAT FULL 90° DAMPER BLADE MOVEMENT IS UNOBSTRUCTED.
3. FOR DUCT HEIGHTS MORE THAN 12", PROVIDE FACTORY-FABRICATED OPPOSED BLADE DAMPERS

MANUAL DAMPER DETAIL

NO SCALE

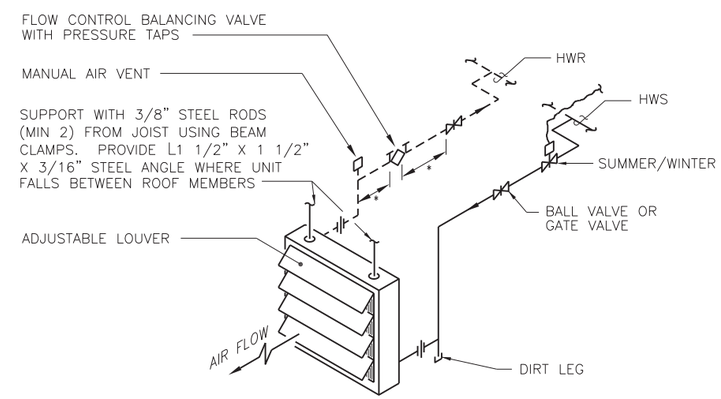
M-503 **A3**



CONCRETE PAD DETAIL

NO SCALE

M-121, M-122, M-401, M-402, M-403, M-501, M-503 **C5**



* THE FLOW CONTROL BALANCING VALVES SHALL BE INSTALLED BY THE CONTRACTOR IN CONFORMANCE WITH VALVE MANUFACTURER'S RECOMMENDED SPACING UP/DOWNSTREAM FROM PIPE CHANGES IN DIRECTION AND/OR OTHER VALVES/COMPONENTS IN THE PIPING.

HOT WATER UNIT HEATER PIPING DETAIL

NO SCALE

M-121, M-122, M-403 **A5**

SYM	DESCRIPTION	DATE	APPR

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BOWMAN, FOSTER & ASSOC.
CONSULTING ENGINEERS
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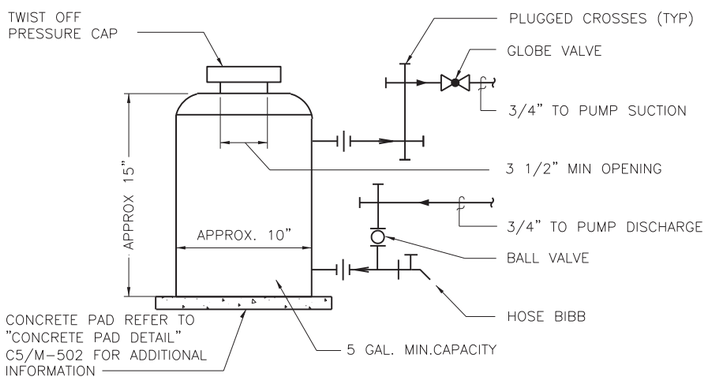
NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

CODE ID. NO. 80091	SIZE D
SCALE: NONE	
MAXIMO NO.	N/A
JOB ORDER NO.	
WORK ORDER NO.	539080
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12544757
SHEET 223 OF 349	

M-502

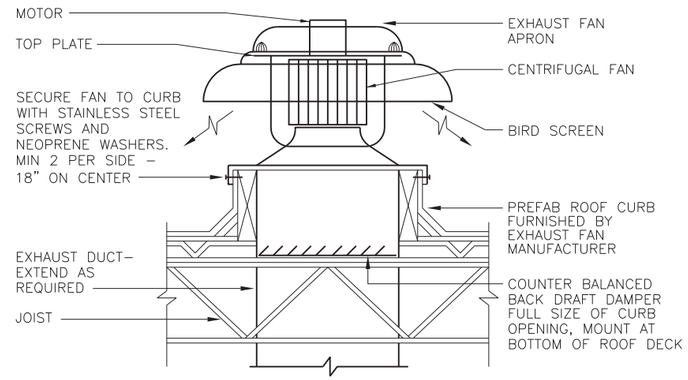
DRAWFORM REVISION: 6 AUG 2007

BFA Filename G:\2007\07-021E P211V SPAWAR\NAVIGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-502 DETAILS.dwg Plot Date: Jul 08, 2009 – 10:39am Last Saved BY: bfunderwhite



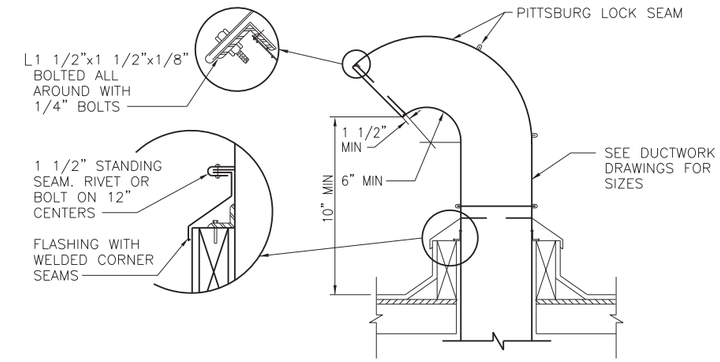
SHOT FEEDER DETAIL (C2)

NO SCALE — M-121, M-401



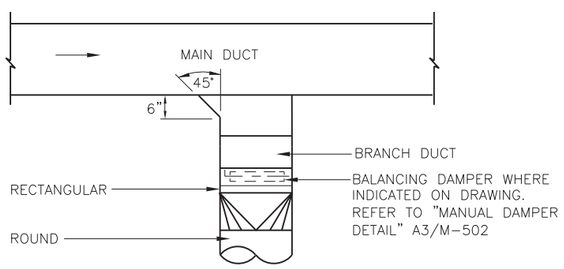
EXHAUST FAN DETAIL (C4)

NO SCALE — M-123



TYPICAL GOOSENECK AIR INTAKE/EXHAUST DETAIL (C5)

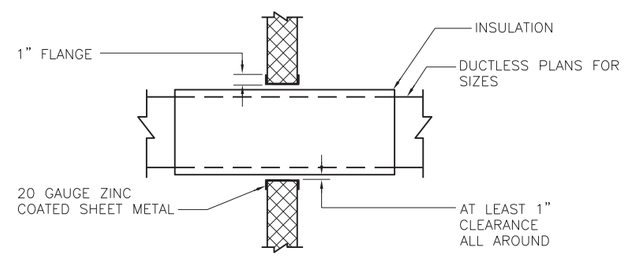
NO SCALE — M-115, M-123, M-403



USE ONLY AT LAST TAKE-OFF BEFORE OUTLET & THEN ONLY WHERE RECTANGULAR RUNOUTS ARE INDICATED ON DRAWINGS.

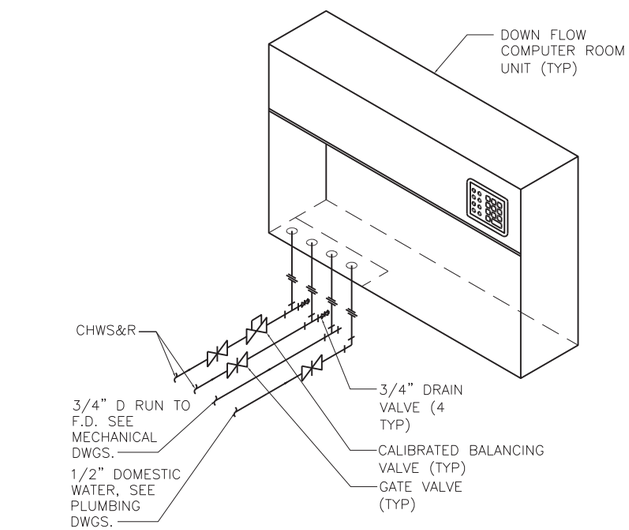
TYPICAL BRANCH CONNECTION DETAIL (B2)

NO SCALE — M-105, M-106, M-107, M-113, M-114, M-115, M-116, M-503



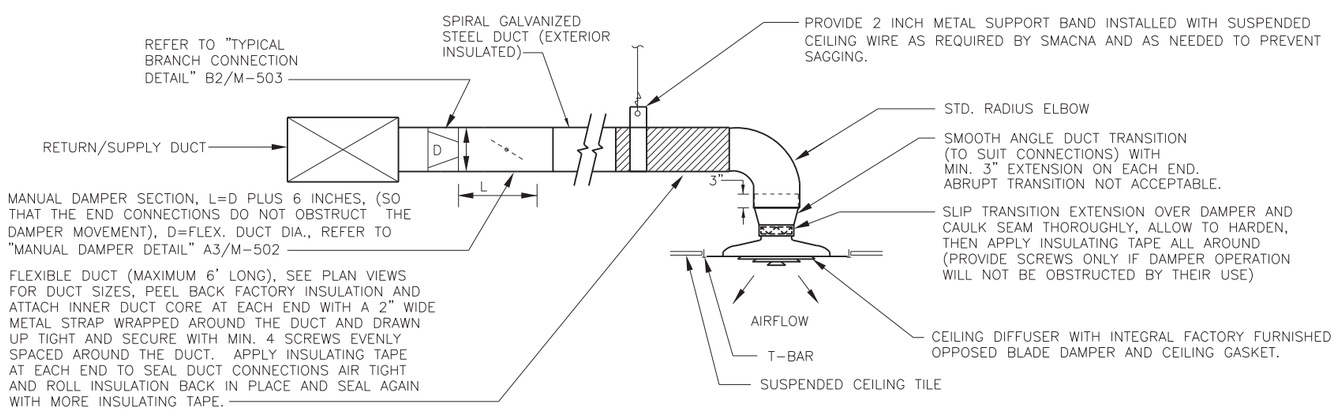
DUCTWORK WALL SLEEVE DETAIL (B4)

NO SCALE — M-105, M-106, M-107, M-113, M-114, M-115 M-116, M-402, M-403



COMPUTER ROOM UNIT PIPING DETAIL (B5)

NO SCALE — M-115, M-116, M-119, M-120



NOTE:

1. THE BRANCH TAKE-OFF FITTING AND DAMPER SECTION SIZES SHALL BE EQUAL THE FLEX DUCT SIZE.
2. DETAIL SIMILAR FOR EXPOSED DUCTWORK INSTALLATION EXCEPT DELETE FLEXIBLE DUCTWORK AND PROVIDE RIGID DUCTWORK

RETURN/SUPPLY AIR GRILLE/DIFFUSER DUCTWORK DETAIL (A4)

NO SCALE — M-105, M-106, M-107, M-113, M-114, M-115, M-116

SYM	DESCRIPTION	DATE	APPR

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RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA — S. G. Roberts — Lic. No.10424 — PROFESSIONAL ENGINEER

DES DEL DRW KLB CHK SGR
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BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC RENOVATIONS FOR SPAWAR
DETAILS

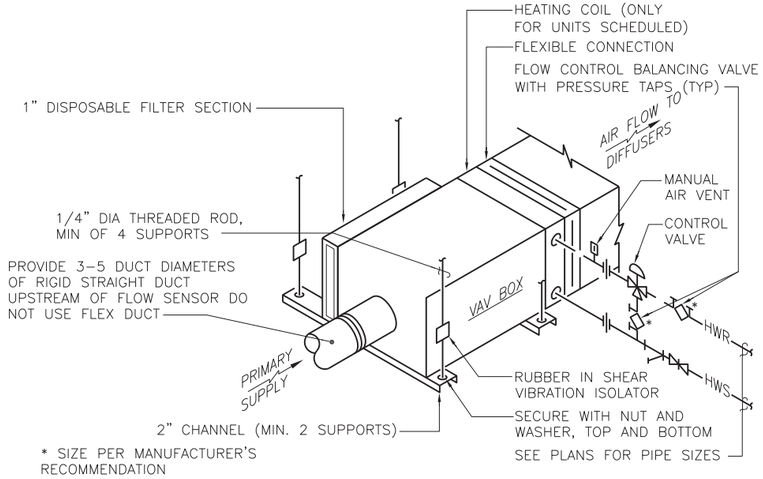
BOWMAN, FOSTER & ASSOC. CONSULTING ENGINEERS
#4 INTERSTATE CORP. CENTER
NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

CODE ID. NO. 80091	SIZE D
SCALE: NONE	
MAXIMO NO.	N/A
JOB ORDER NO.	
WORK ORDER NO.	539080
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12544758
SHEET 224 OF 349	

M-503

DRAWFORM REVISION: 6 AUG 2007

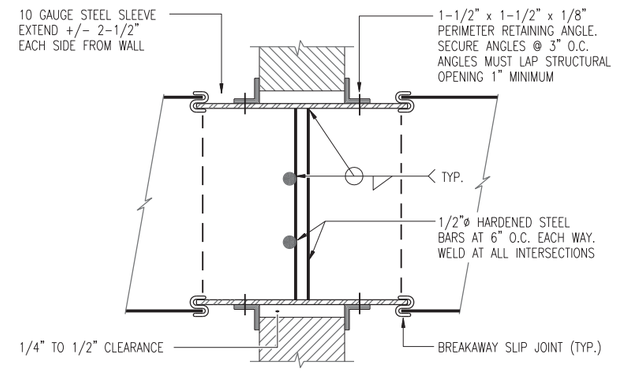
BFA Filename G:\2007\07-021E P211V SPAWAR\NAVGATOR\P-211V BRAC V53 RENOVATIONS\Sheets\M-503 DETAILS.dwg Plot Date: Jul 08, 2009 – 10:39am Last Saved BY: bfunderwhite



SERIES FAN POWERED VAV TERMINAL PIPING DETAIL

NO SCALE

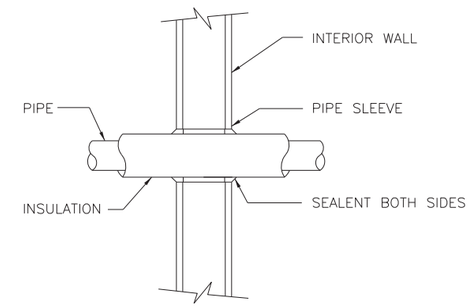
M-109, M-117, M-118, M-119 **C2**



TYPICAL SECURITY BARS INSTALLATION DETAIL

NO SCALE

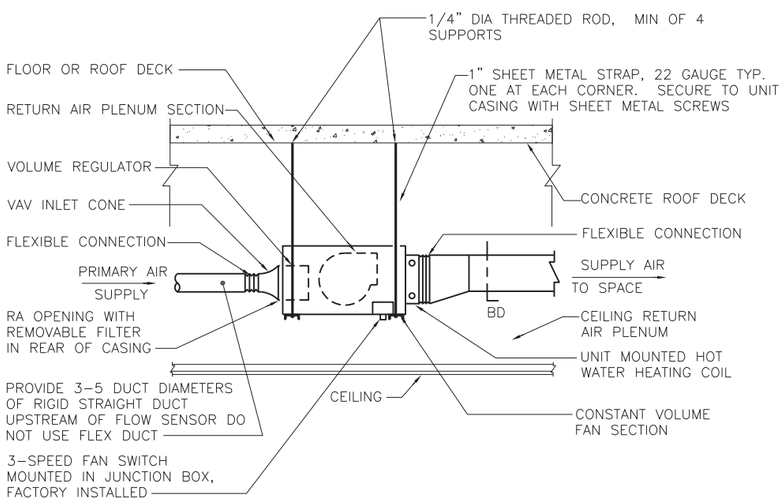
M-114, M-402 **C4**



PIPE SLEEVE INTERIOR WALL

NO SCALE

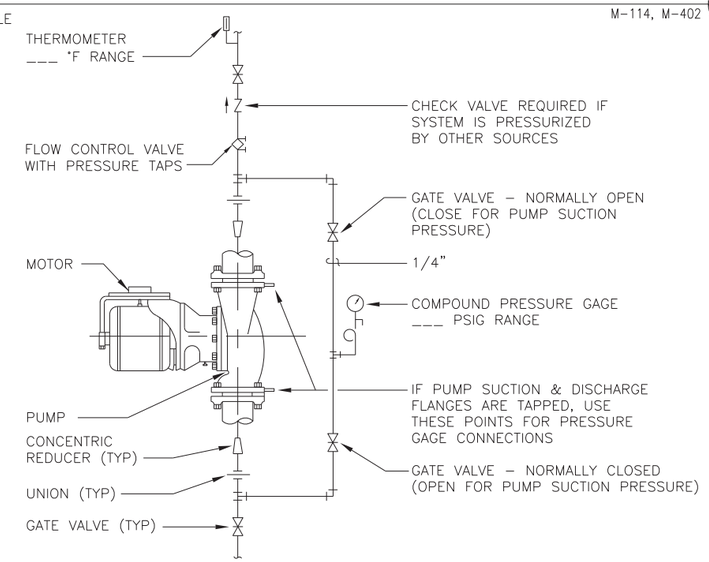
M-109, M-110, M-111, M-117, M-118, M-119, M-120 **C5**



SERIES FAN POWERED VAV TERMINAL UNIT DETAIL

NO SCALE

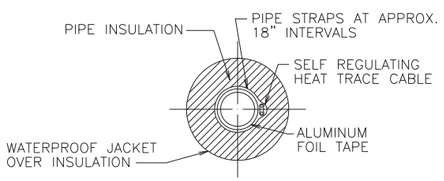
M-105, M-113, M-114, M-115 **B2**



INLINE CENTRIFUGAL PUMP

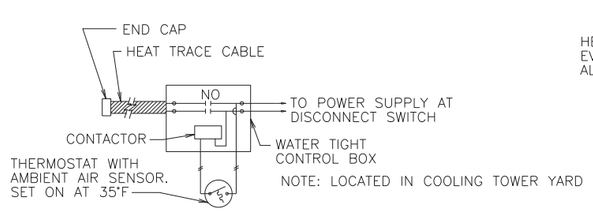
NO SCALE

M-402 **B4**



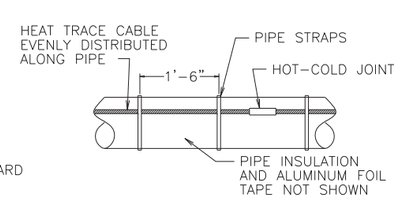
SECTION THRU PIPE

NO SCALE



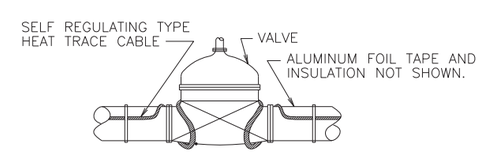
HEAT TRACE CONTROL BOX DIAGRAM

NO SCALE



INSTALLATION DETAIL

NO SCALE



INSTALLATION AT VALVES

NO SCALE

NOTES: (1) PROVIDE WEATHER RESISTANT LABELING ON EXTERIOR OF JACKET IDENTIFYING VOLTAGE INDICATED.

HEAT TRACING DETAILS

NO SCALE

M-121, M-404 **A5**

SYM	DESCRIPTION	DATE	APPR

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2424 26th ROAD SOUTH
ARLINGTON, VA 22206

CODE ID. NO. 80091	SIZE D
SCALE: NONE	
MAXIMO NO.	N/A
JOB ORDER NO.	
WORK ORDER NO.	539080
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12544759
SHEET 225 OF 349	

M-504

DRAWFORM REVISION: 6 AUG 2007

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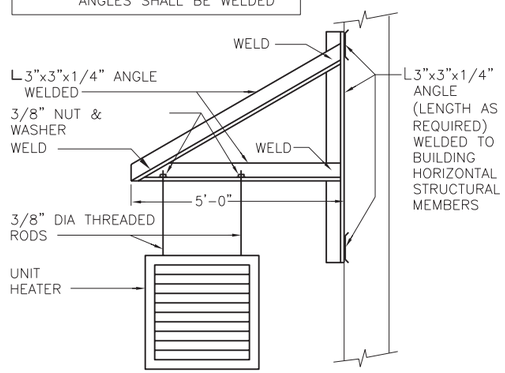
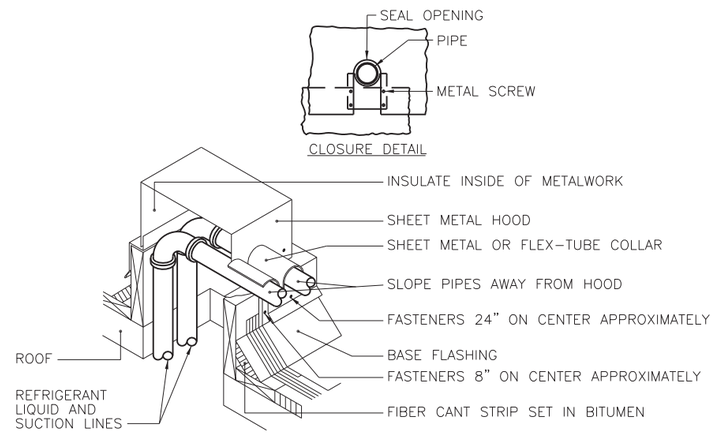
NOTE: ALL JOINTS OF ASSEMBLED ANGLES SHALL BE WELDED



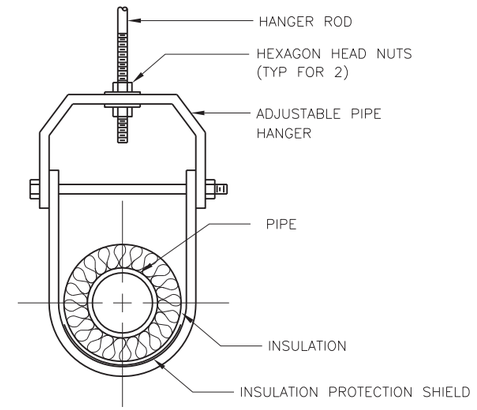
UNIT HEATER MOUNTING DETAIL (C2)

NO SCALE — M-121, M-122, M-403



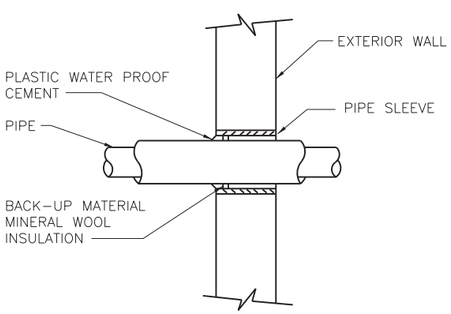
REFRIGERANT LINES THROUGH ROOF DETAIL (C4)

NO SCALE — M-121, M-122, M-123



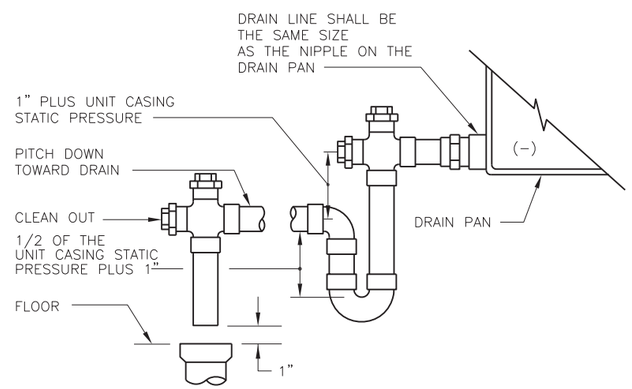
PIPE HANGER DETAIL (C5)

NO SCALE — M-109, M-110, M-111, M-117, M-118, M-119, M-120, M-121, M-122, M-402, M-403



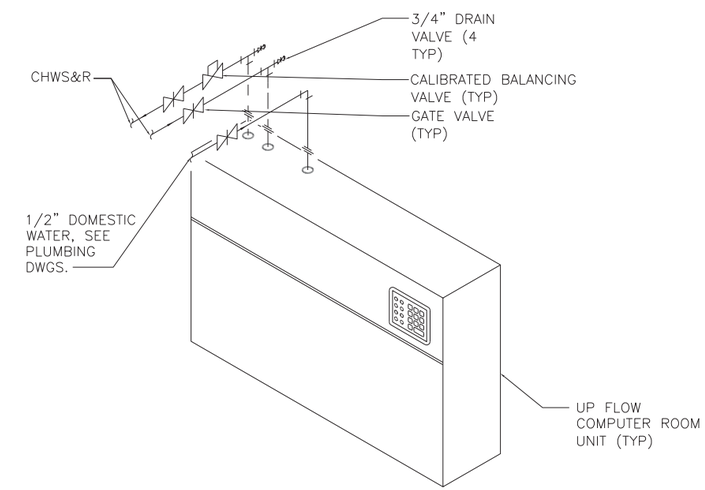
PIPE SLEEVE EXTERIOR WALL (B2)

NO SCALE — M-121



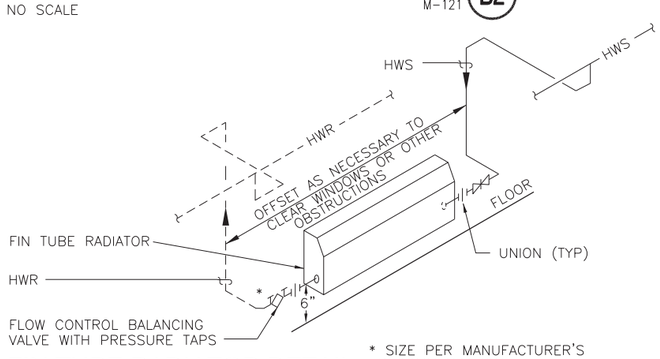
TYPICAL CONDENSATE DRAIN TRAP DETAIL (B4)

NO SCALE — M-121, M-402, M-403, M-506



COMPUTER ROOM UNIT PIPING DETAIL (B5)

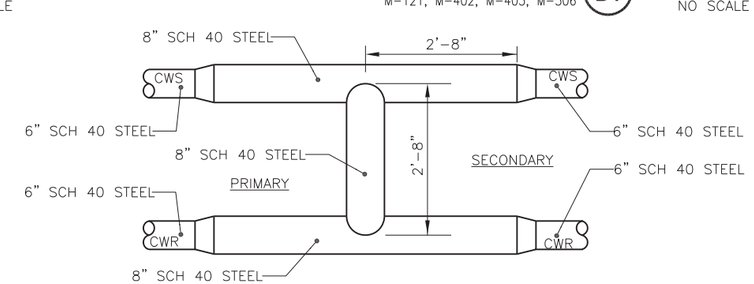
NO SCALE — M-116, M-119, M-120



* SIZE PER MANUFACTURER'S RECOMMENDATION

FIN TUBE RADIATOR DETAIL (A2)

NO SCALE — M-118, M-119



DECOUPLER PIPING DETAIL (A4)

NO SCALE — M-121

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FIRE PROTECTION	
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NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NAVAL STATION NORFOLK, VIRGINIA
NAVAL STATION NORFOLK, VA
P211V BUILDING V53 BRAC RENOVATIONS FOR SPAWAR
DETAILS

CODE ID. NO. 80091	SIZE D
SCALE: NONE	
MAXIMO NO.	N/A
JOB ORDER NO.	
WORK ORDER NO.	539080
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12544760
SHEET 226 OF 349	

M-505

DRAWFORM REVISION: 6 AUG 2007

SYM	DESCRIPTION	DATE	APPR

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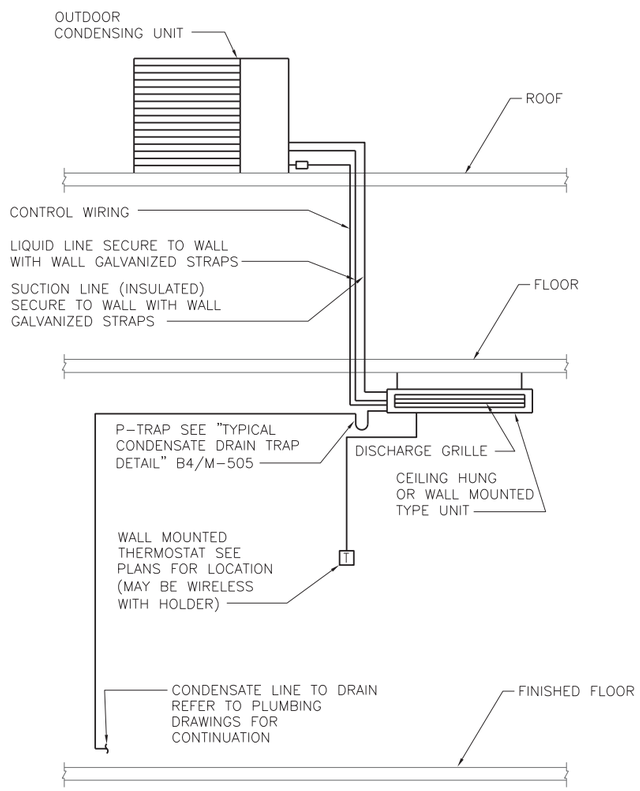


DUCTLESS SPLIT SYSTEM DETAIL

NO SCALE

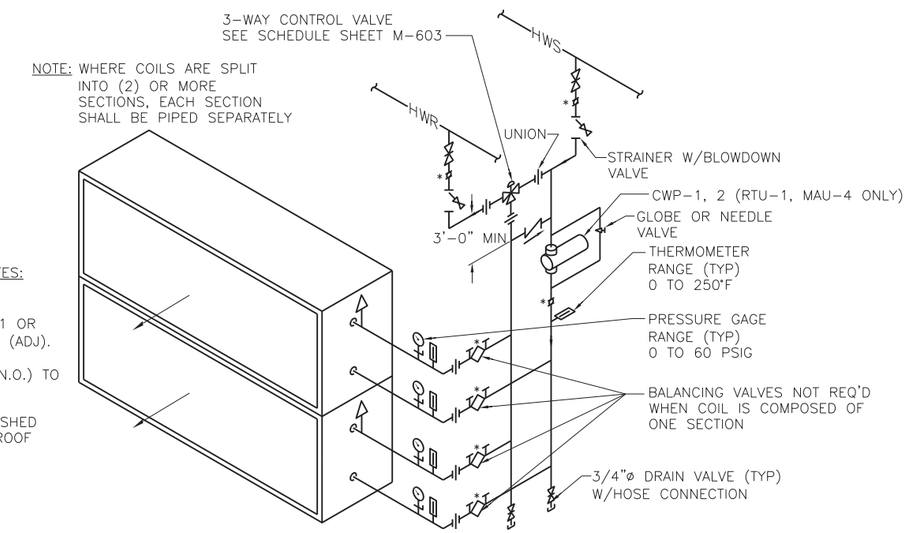
M-110, M-117, M-118, M-121, M-122, M-123 **B2**

RTU-1, MAU-4 PREHEAT COIL W/CIRCULATOR PUMP NOTES:

(1) ALL MODES- IN LINE CIRCULATOR PUMP OPERATES WHENEVER THERE IS A CALL FOR HEAT AT THE RTU-1 OR MAU-4 IF THE OUTSIDE AIR TEMP IS LESS THAN 40°F (ADJ).

(2) THE 3-WAY CONTROL VALVE FAILS NORMALLY OPEN (N.O.) TO THE HOT WATER COIL.

(3) RTU-1 SYSTEM SHALL FIT IN PIPING VESTIBULE FURNISHED WITH UNIT. ALL PIPING SHALL BE CONTAINED WITHIN ROOF CURB.

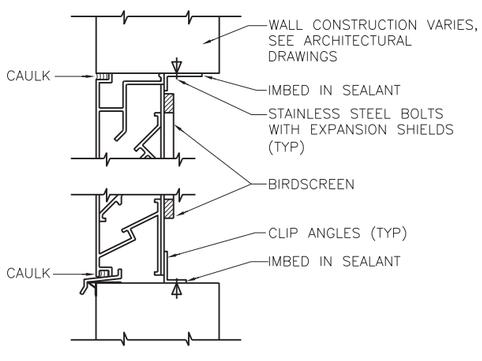


* STRAIGHT LENGTHS OF UNOBSTRUCTED PIPE WITHOUT APPURTENANCES SHALL BE INSTALLED UP AND DOWNSTREAM OF FLOW CONTROL BALANCING VALVES PER MANUFACTURE INSTALLATION INSTRUCTIONS.

HOT WATER HEATING COIL DETAIL

NO SCALE

M-117, M-119, M-120, M-121, M-122, M-123, M-124, M-402, M-403 **B5**



TYPICAL LOUVER DETAIL

NO SCALE

M-107, M-123 **A2**

SYM	DESCRIPTION	DATE	APPR

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RENOVATIONS FOR SPAWAR
DETAILS

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CONSULTING ENGINEERS
#4 INTERSTATE CORP. CENTER
NORFOLK, VA 23502
2424 26th ROAD SOUTH
ARLINGTON, VA 22206

CODE ID. NO. 80091	SIZE D
SCALE: NONE	
MAXIMO NO.	N/A
JOB ORDER NO.	
WORK ORDER NO.	539080
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12544761
SHEET 227 OF 349	

M-506

DRAWFORM REVISION: 6 AUG 2007

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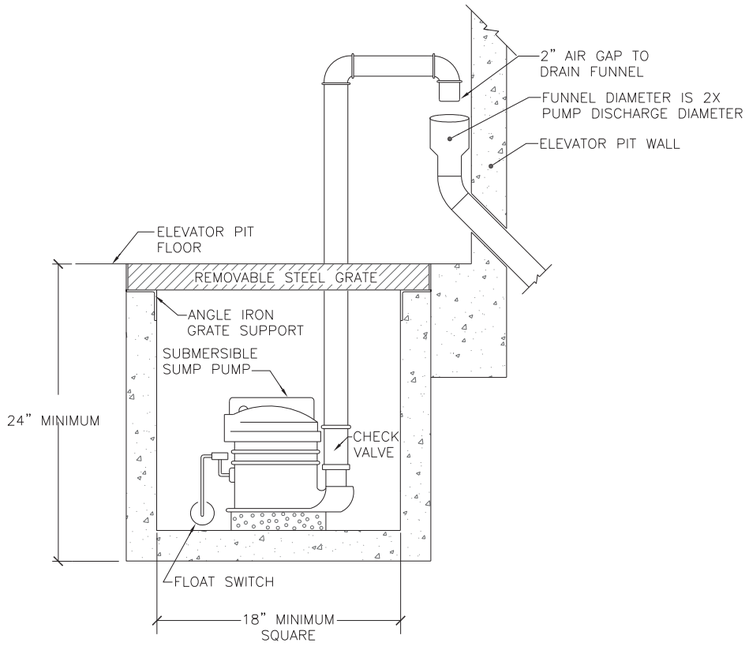
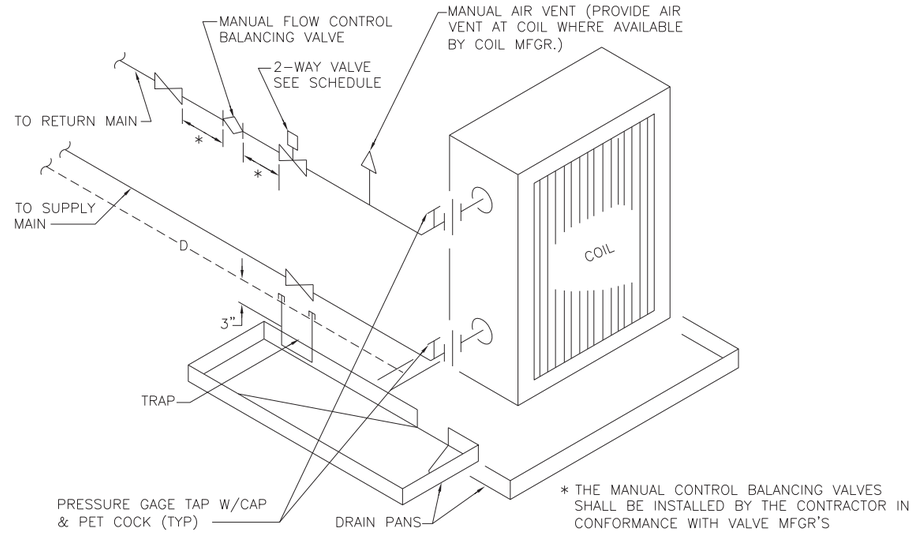


SUMP PUMP DETAIL

NO SCALE

M-404 C2



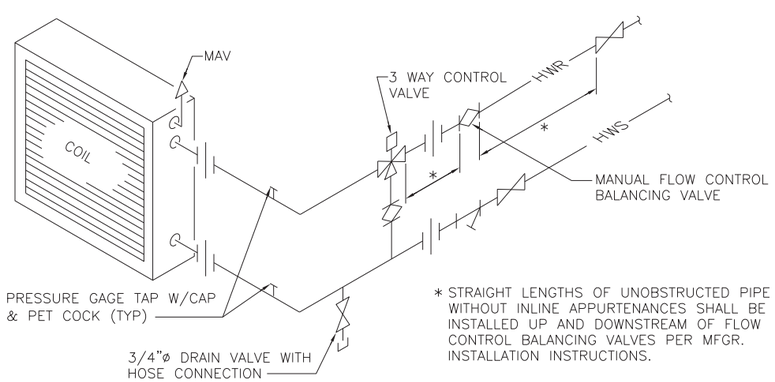
* THE MANUAL CONTROL BALANCING VALVES SHALL BE INSTALLED BY THE CONTRACTOR IN CONFORMANCE WITH VALVE MFGR'S RECOMMENDED SPACING UP/DOWNSTREAM FROM PIPE CHANGES IN DIRECTION AND/OR OTHER VALVES/COMPONENTS IN THE PIPING.

2-WAY VALVE PIPING CONFIGURATION

FAN COIL UNIT PIPING DETAIL-COOLING

NO SCALE

M-110, M-111 C5

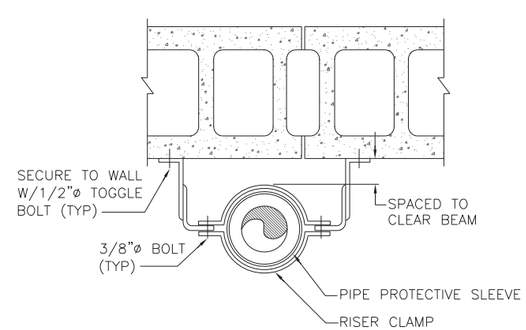


* STRAIGHT LENGTHS OF UNOBSTRUCTED PIPE WITHOUT INLINE APPURTENANCES SHALL BE INSTALLED UP AND DOWNSTREAM OF FLOW CONTROL BALANCING VALVES PER MFGR. INSTALLATION INSTRUCTIONS.

FAN COIL UNIT PIPING DETAIL-HEATING

NO SCALE

M-110, M-111 A2



RISER SUPPORT DETAIL

NO SCALE

M-121 A5

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NORFOLK, VIRGINIA
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NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
DETAILS

CODE ID. NO. 80091 | SIZE D
SCALE: NONE
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544762
SHEET 228 OF 349
M-507

DRAWFORM REVISION: 6 AUG 2007

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AIR HANDLING UNIT SCHEDULE

MARK	FAN DATA: AIR FLOW CFM	OUTSIDE AIR CFM	MOTOR HP	FAN RPM	ESP "WC	COOLING COIL DATA – CHILLED WATER (42 DEG. F. EWT): TOTAL MBH	SENSIBLE MBH	EAT DEG. FDB	EAT DEG. FWB	LAT DEG. FDB	LAT DEG. FWB	APD "WC	WPD FT	WATER FLOW GPM	HEATING COIL DATA – HOT WATER (180 DEG. F. EWT): COIL POSITION	TOTAL MBH	EAT DEG. FDB	LAT DEG. FWB.	APD "WC	WPD FT	WATER FLOW GPM	FILTER DATA: FILTER TYPE INCHES	APD "WC CLEAN	APD "WC DIRTY	ELECTRICAL DATA: VOLTS	PH	MOTOR STARTER: SIZE	TYPE	NOTES
AHU–1	8540	--	15	2340	4.9	260.1	212.9	75.4	62.3	52.6	51.6	0.65	5.5	50.7	REHEAT	209.3	53.7	76.1	0.11	2.4	19.9	2	0.54	1	460	3	NA	NEMA	1.2.3.4.5,8
AHU–2	8540	--	15	2340	4.9	260.1	212.9	75.4	62.3	52.6	51.6	0.65	5.5	50.7	REHEAT	209.3	53.7	76.1	0.11	2.4	19.9	2	0.54	1	460	3	NA	NEMA	1.2.3.4.5,8
AHU–3	7550	--	15	2877	3.5	265	202.8	75.4	62.7	50.8	50.3	0.5	6.1	51.9	REHEAT	199.7	52	76.2	0.07	2.2	19	2	0.54	1	460	3	NA	NEMA	1.2.3.4.5.8
AHU–4	5360	--	7.5	1018	1.5	153.5	99.2	68.2	61.1	51.3	50.9	0.74	9.8	30.2	REHEAT	176.3	60	90.1	0.12	4.4	17.6	2	0.56	1	460	3	1	NEMA	1,3,4,5,8
AHU–5	2000	410	2	1721	2	98.3	61.8	78.5	66.6	50.2	50	0.33	5.8	19.4	REHEAT	68.1	59.2	90.4	0.06	0.5	6.7	2	0.55	1	208	3	NA	NEMA	1,2,3,4,5,8
RTU–1	2750	370	5	1846	2	99.6	72	77.4	64.9	53.5	52.7	0.63	5.3	19.5	PREHEAT	87.2	22	51	0.12	0.7	8.4	2	0.53	1	460	3	NA	NEMA	1 THROUGH 11
RTU–1															REHEAT	69.4	53.5	76.6	0.13	0.5	6.8								

NOTES:
1. UNIT SHALL HAVE ARI 410 CERTIFIED COILS
2. PROVIDE INVERTOR DUTY MOTOR AND VARIABLE FREQUENCY DRIVE WITH BYPASS
3. FILTER SHALL BE MERV RATED
4. PROVIDE SPRING ISOLATION FOR FAN
5. PROVIDE DUAL PITCH STAINLESS STEEL DRAIN PAN
6. PROVIDE WITH LOW LEAK DAMPERS
7. PROVIDE ACCESS SECTION FOR FREEZSTAT
8. PROVIDE ADDITIONAL SET OF FIXED FAN SHEAVES AND BELTS FOR FINAL AIR BALANCE
9. PROVIDE WEATHERPROOF ROOF TOP UNIT WITH ADAPTABLE ROOF CURB
10. PROVIDE ACCESS SECTION FOR VFD AND CONTROLS
11. PROVIDE COIL PIPING VESTIBULE

MAKE UP AIR HANDLING UNIT SCHEDULE

MARK	SUPPLY FAN DATA: AIR FLOW CFM	MOTOR HP	FAN RPM	ESP "WC	EXHAUST FAN DATA: AIR FLOW CFM	MOTOR HP	FAN RPM	ESP "WC	PRE–HEAT – HOT WATER: TOTAL MBH	EAT DEG. FDB	LAT DEG. FDB	APD "WC	WPD FT	WATER FLOW GPM	COOLING COIL DATA – (CHILLED WATER): TOTAL MBH	EAT DEG. FDB	EAT DEG. FWB	LAT DEG. FDB	LAT DEG. FWB	APD "WC	WPD FT	WATER FLOW GPM	HEATING COIL DATA – HOT WATER: TOTAL MBH	EAT DEG. FDB	LAT DEG. FDB	APD "WC	WPD FT	WATER FLOW GPM	ENERGY WHEEL: SUMMER LAT FDB	SUMMER FWB	WINTER LAT FDB	WINTER FWB	EFFICIENCY	NOTES
MAU–1	2575	7.5	2043	1.5	1480	1.5	1361	1	--	--	--	--	--	--	143.9	79.1	71	54.0	53.7	0.6	10.5	28.4	123.2	46.5	90.3	0.13	2.7	12.2	79.3	71.4	45.6	37.8	80%	1 THROUGH 9
MAU–2	2000	5.0	1951	1.5	1130	1.5	1309	1	--	--	--	--	--	--	112.1	79.1	71	54.0	53.7	0.5	12.2	22.1	99.1	46.4	91.8	0.11	2.8	9.5	79.1	71	46.4	38.5	80%	1 THROUGH 9
MAU–3	2600	5.0	2048	1.5	1500	1.5	1194	1	--	--	--	--	--	--	130.1	77.4	69.4	53.8	53.5	0.6	8.7	25.5	124.1	46.5	90.1	0.13	2.7	12.4	77.6	69.8	45.6	37.7	80%	1 THROUGH 9
MAU–4	1940	5.0	1725	1.5	--	--	--	--	73.5	22	56.7	0.1	0.8	7.0	166.0	83	77.8	53.7	53.5	0.6	7.0	32.7	56.9	54.2	80.1	0.1	0.5	5.5	--	--	--	--	---	4,6,7,8,9,10

NOTES:
1. UNIT HAS 0.5 HP MOTOR TO ROTATE ENERGY WHEEL
2. PROVIDE UNIT WITH FROST PROTECTION CONTROL FOR ENERGY WHEEL
3. ENTERING WHEEL CONDITIONS ARE 83.0 DEG FDB AND 77.7 DEG FWB IN SUMMER AND 33 DEG FDB AND 16DEG FWB IN WINTER
4. UNITS ARE 460V/3PH/60 HZ
5. PROVIDE WITH WEATHER PROOF ENCLOSURE PIPING VESTIBULE AND ADAPTABLE ROOF CURB TO FIT EXISTING ROOF PENITRATIONS
6. PROVIDE WITH 30% EFFICIENT FILTERS
7. PROVIDE WITH CONTROL INTERFACE CARD FOR BACNET IP
8. ENTERING CHILLED WATER TEMPERATURE IS 42 DEG F, HEATING WATER IS 180 DEG F
9. PROVIDE WITH UNIT MOUNTED STARTERS AND SINGLE POINT ELECTRICAL CONNECTION
10. UNIT IS INDOOR CENTRAL STATION TYPE

COMPUTER ROOM AIR-CONDITIONING (CRAC) UNIT SCHEDULE

MARK	LOCATION	FAN DATA: SUPPLY CFM	ESP "WC	MOTOR HP	CHILLED WATER COIL (SEE NOTE 1): TOTAL MBH	SENSIBLE MBH	EAT DEG. FDB	EAT DEG. FWB	LAT DEG. FDB	LAT DEG. FWB	WPD FT	WATER FLOW GPM	ELECTRIC REHEAT COIL: KW	ELECTRICAL DATA: VOLTS	PH	FLA	MCA	MFS	NOTES
CRAC–1	LAB–A325	9000	0.5	10.0	193.80	185.3	72	58.9	52.9	51.0	14.3	35.9	22.5	460	3	42.2	52.8	60	1,2,3,4,5,6,7
CRAC–2	LAB–A325	9000	0.5	10.0	193.80	185.3	72	58.9	52.9	51.0	14.3	35.9	22.5	460	3	42.2	52.8	60	1,2,3,4,5,6,7
CRAC–3	LAB–A329	5500	0.5	7.5	151.2	140.3	72	58.9	48.5	48.4	9.5	28.0	15	460	3	28.9	36.2	40	1,2,3,4,5,6,7
CRAC–4	LAB–A329	5500	0.5	7.5	151.2	140.3	72	58.9	48.5	48.4	9.5	28.0	15	460	3	28.9	36.2	40	1,2,3,4,5,6,7
CRAC–5	INTEG LAB A–326	9500	0.9	7.5	225.4	204.4	72	59.3	52.44	50.62	19.6	42.0	22.5	460	3	38.4	48	50	1,2,3,4,5,8
CRAC–6	SERVER LAB A–330	10000	0.5	10.0	254.4	242.2	72	58.4	56.15	56.0	12.0	47.7	22.5	460	3	42.3	52.8	60	1,2,3,4,5,6,7
CRAC–7	VIDEO CONTROL ROOM (FNCE)	2500	0.5	2.0	49.1	43.6	75	62.6	52.6	51.9	10.8	11.0	12.0	460	3	18	23	25	1,2,3,4,5,8

NOTES:
1. ENTERING WATER TEMPERATURE IS 42 DEG F
2. PROVIDE WITH ETHERNET CARD FOR BACNET IP ADDRESS
3. PROVIDE WITH UNIT DISCONNECT
4. PROVIDE WITH 2–WAY CHILLED WATER CONTROL VALVES
5. PROVIDE WITH UNIT MOUNTED CONDENSATE PUMP
6. PROVIDE WITH FLOOR STAND
7. PROVIDE DOWNFLOW UNIT
8. PROVIDE UPFLOW UNIT WITH MANUFACTURERS DISCHARGE PLENUM INCLUDING SOUND INSULATION AND LOUVERS ON FRONT AND RIGHT SIDES.

EXHAUST FAN SCHEDULE

MARK	TYPE	AIR–FLOW CFM	ESP "WC	MOTOR HP	FAN RPM	NOTES: VOLTS	PH	MOTOR STARTER: SIZE	TYPE	AREA SERVED	DRIVE	NOTES
EF–1	ROOF MOUNTED	825	0.5	1/4	1725	115	1	0.00	NEMA	A317,A318	BELT	1,2
EF–2	ROOF MOUNTED	285	0.1	1/30	1725	115	1	0.00	NEMA	MAU–4	DIRECT	1,2,4
EF–3	INLINE	400	0.25	1/12	1550	115	1	0.00	NEMA	A324	DIRECT	3
EF–4	INLINE	400	0.25	1/12	1550	115	1	0.00	NEMA	A–268	DIRECT	3
EF–5	WALL MOUNTED	1710	0.25	1/6	1160	115	1	0.00	NEMA	GENERATOR	DIRECT	

NOTES
1 PROVIDE WITH ADAPTABLE ROOF CURB TO USE EXISTING ROOF OPNING
2 PROVIDE WITH SPUN ALUMINUM COVER AND BIRDSCREEN
3 PROVIDE WITH VIBRATION ISOLATORS, LINE VOLTAGE THERMOSTAT AND BACKDRAFT DAMPER
4 PROVIDE WITH LINE VOLTAGE THERMOSTAT

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RRMM ARCHITECTS

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NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
SCHEDULES

CODE ID. NO. 80091 SIZE D
SCALE: NONE
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544763
SHEET 229 OF 349
M-601

DRAWFORM REVISION: 6 AUG 2007

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VARIABLE AIR VOLUME (VAV) TERMINAL UNIT SCHEDULE

MARK	INLET IN	(IN X IN)	PRIMARY AIR DATA: MAX. FLOW (CFM)	MIN. FLOW (CFM)	REMARKS: INLET (IN.WG)	DOWN (IN.WG)	MIN. (IN.WG)	NC LEVELS: RAD.	DIS	FAN DATA: CFM	ESP (IN.WG)	ELECTRICAL DATA: HP	FLA	V/PH	HOT WATER COIL DATA: MBH	E.A.T. (DEG.F.)	L.A.T (DEG.F.)	EWT (DEG.F.)	WATER FLOW (GPM)	APD (IN.WG)	WPD (FT)	NOTES
VAV-1	8	14 X 11	510	230	1.0	0.50	0.11	31	29	510	0.50	0.17	1.3	277/1	14.0	66	91	180	1.0	0.03	0.1	1
VAV-2	6	14 X 11	325	165	1.0	0.50	0.11	26	24	325	0.50	0.17	1.3	277/1	12.5	65	101	180	1.0	0.01	0.1	1
VAV-3	8	14 X 11	680	340	1.0	0.50	0.19	31	20	680	0.50	0.17	1.3	277/1	15.2	66	86	180	1.0	0.05	0.1	1
VAV-4	6	14 X 11	375	190	1.0	0.50	0.14	27	25	375	0.50	0.17	1.3	277/1	13.0	65	97	180	1.0	0.02	0.1	1
VAV-5	6	14 X 11	305	155	1.0	0.50	0.09	25	24	305	0.50	0.17	1.3	277/1	12.2	65	102	180	1.0	0.01	0.1	1
VAV-6	6	14 X 11	360	180	1.0	0.50	0.13	27	25	360	0.50	0.17	1.3	277/1	12.8	66	98	180	1.0	0.01	0.1	1
VAV-7	8	14 X 11	555	280	1.0	0.50	0.12	32	31	555	0.50	0.17	1.3	277/1	14.2	65	89	180	1.0	0.03	0.1	1
VAV-8	10	16.5 X 14.5	1210	605	1.0	0.50	0.29	36	25	1210	0.50	0.25	2.4	277/1	25.5	66	85	180	1.0	0.05	0.2	1
VAV-9	10	16.5 X 14.5	1215	605	1.0	0.50	0.29	36	27	1215	0.50	0.25	2.4	277/1	25.6	66	85	180	1.0	0.05	0.3	1
VAV-10	12	16.5 X 14.5	1525	765	1.0	0.50	0.46	36	27	1525	0.50	0.75	5.4	277/1	32.1	66	85	180	1.1	0.07	0.5	1
VAV-11	12	16.5 X 14.5	1525	765	1.0	0.50	0.46	36	27	1525	0.50	0.75	5.4	277/1	32.1	66	85	180	1.1	0.07	0.5	1
VAV-12	12	16.5 X 14.5	1525	765	1.0	0.50	0.46	36	27	1525	0.50	0.75	5.4	277/1	32.1	66	85	180	1.1	0.07	0.5	1
VAV-13	12	16.5 X 14.5	1525	765	1.0	0.50	0.46	36	27	1525	0.50	0.75	5.4	277/1	32.1	66	85	180	1.1	0.07	0.5	1
VAV-14	12	16.5 X 14.5	1455	730	1.0	0.50	0.42	36	25	1455	0.50	0.75	5.4	277/1	30.6	66	85	180	1.1	0.07	0.4	1
VAV-15	12	16.5 X 14.5	1455	730	1.0	0.50	0.42	36	25	1455	0.50	0.75	5.4	277/1	30.6	66	85	180	1.1	0.07	0.4	1
VAV-16	12	16.5 X 14.5	1455	730	1.0	0.50	0.42	36	25	1455	0.50	0.75	5.4	277/1	30.6	66	85	180	1.1	0.07	0.4	1
VAV-17	12	16.5 X 14.5	1455	730	1.0	0.50	0.42	36	25	1455	0.50	0.75	5.4	277/1	30.6	66	85	180	1.1	0.07	0.4	1
VAV-18	10	16.5 X 14.5	1200	600	1.0	0.50	0.29	36	23	1200	0.50	0.33	2.4	277/1	25.3	66	85	180	1.0	0.05	0.2	1
VAV-19	10	16.5 X 14.5	1200	600	1.0	0.50	0.29	36	23	1200	0.50	0.33	2.4	277/1	25.3	66	85	180	1.0	0.05	0.2	1
VAV-20	10	14 X 11	1000	500	1.0	0.50	0.20	33	23	1000	0.50	0.25	2.4	277/1	21.0	66	85	180	1.0	0.09	0.3	1
VAV-21	10	14 X 11	1000	500	1.0	0.50	0.20	33	23	1000	0.50	0.25	2.4	277/1	21.0	66	85	180	1.0	0.09	0.3	1
VAV-22	8	14 X 11	715	360	1.0	0.50	0.21	31	22	715	0.50	0.25	2.4	277/1	15.4	65	85	180	1.0	0.05	0.1	1
VAV-23	8	14 X 11	715	360	1.0	0.50	0.21	31	22	715	0.50	0.25	2.4	277/1	15.4	65	85	180	1.0	0.05	0.1	1
VAV-24	8	14 X 11	715	360	1.0	0.50	0.21	31	22	715	0.50	0.25	2.4	277/1	15.4	65	85	180	1.0	0.05	0.1	1
VAV-25	8	14 X 11	715	360	1.0	0.50	0.21	31	22	715	0.50	0.25	2.4	277/1	15.4	65	85	180	1.0	0.05	0.1	1
VAV-26	8	14 X 11	700	350	1.0	0.50	0.20	31	22	700	0.50	0.25	2.4	277/1	15.3	66	86	180	1.0	0.05	0.1	1
VAV-27	8	14 X 11	700	350	1.0	0.50	0.20	31	22	700	0.50	0.25	2.4	277/1	15.3	66	86	180	1.0	0.05	0.1	1
VAV-28	8	14 X 11	280	140	1.0	0.50	0.08	24	23	280	0.50	0.17	1.3	277/1	11.9	66	105	180	1.0	0.01	0.1	1
VAV-29	8	14 X 11	710	355	1.0	0.50	0.20	31	22	710	0.50	0.25	2.4	277/1	15.4	66	86	180	1.0	0.05	0.1	1
VAV-30	8	14 X 11	710	355	1.0	0.50	0.20	31	22	710	0.50	0.25	2.4	277/1	15.4	66	86	180	1.0	0.05	0.1	1
VAV-31	10	14 X 11	500	275	1.0	0.50	0.25	31	29	500	0.50	0.17	1.3	277/1	14.4	62	88	180	1.0	0.03	0.1	1
VAV-32	10	14 X 11	600	305	1.0	0.50	0.50	32	31	600	0.50	0.17	1.3	277/1	14.4	62	87	180	1.0	0.03	0.1	1
VAV-33	6	14 X 11	210	115	1.0	0.50	0.04	20	23	210	0.50	0.17	1.3	277/1	11.1	62	111	180	1.0	0.01	0.1	1
VAV-34	10	14 X 11	690	405	1.0	0.50	0.22	32	19	690	0.50	0.25	2.4	277/1	18.5	62	85	180	1.0	0.05	0.2	1
VAV-35	8	14 X 11	510	255	1.0	0.50	0.11	31	29	510	0.50	0.17	1.3	227/1	14.0	66	91	180	1.0	0.03	0.1	1

NOTES:
1. SEE CONTROL VALVE SCHEDULE SHEET M-603.

HVAC DESIGN CONDITIONS

INDOOR: SUMMER FDB	SUMMER % RH	WINTER FDB	OUTDOOR: SUMMER FDB	SUMMER MEAN COINCIDENT FWB	WINTER FDB	NOTES
75	50	68	92	77	22	1, 3
72	50	68	92	77	22	2, 3

1. CONDITIONS FOR OFFICES, MEETING ROOMS AND CORRIDORS.
2. CONDITIONS FOR LAB AREAS.
3. CONDITIONS FOR OUTSIDE AIRE ARE BASED ON ASHRAE DEHUMIDIFICATION DATA OF 83 DB, 76DP RESULTING IN SLIGHTLY HIGHER TOTAL ENTHALPY THAN DB/MCFWB DATA.

GAS FIRED BOILER SCHEDULE

MARK	BTU/HR INLET	BTU/HR OUTPUT	FLOW (GPM)	LWT°F	WPD "WC	VOLTS	PHASE	FLA	NOTES
B-1	1,500,000	1,409,000	141	180	11.0	115	1	13	1 THROUGH 8
B-2	1,500,000	1,409,000	141	180	11.0	115	1	13	1 THROUGH 8

NOTES:
1. PROVIDE WITH UNIT CONTROLS AND DDC INTERFACE CAPABILITY.
2. PROVIDE WITH SEALED COMBUSTION CAPABILITY.
3. UNITS ARE NATURAL GAS FIRED.
4. PROVIDE EXHAUST BREECHING PER MANUFACTURERS RECOMMENDATIONS.
5. PROVIDE MANUFACTURERS RECOMMENDED CLEARANCES.
6. PROVIDE WITH MANUFACTURERS RECOMMENDED RELIEF VALVE.
7. PROVIDE RELIEF VALVE PIPING PIPING TO NEAREST FLOOR DRAIN.
8. PROVIDE 20:1 TURN DOWN CAPABILITY BURNER.

FAN COIL UNIT SCHEDULE

MARK	FAN DATA: NOMINAL CFM	DESIGN CFM	ESP "WC	OA CFM	MOTOR FLA	COOLING COIL DATA (42 DEG. F. EWT): TOTAL MBH	SENSIBLE MBH	EAT F. DB	EAT F. WB	LAT F. DB	LAT F. WB	WPD	GPM	HEATING COIL DATA (180 DEG. F. EWT): TOTAL MBH	EAT F. DB	LAT F. WB	WPD FT	WATER FLOW GPM	ELECTRICAL SERVICE: VOLTS	PHASE	NOTES
FCU-1	800	495	0.25	80	2.5	19.4	12.0	78.7	67.4	58.4	54.7	2.8	3.9	33.4	58.2	110	1.8	3.4	115	1	1, 2
FCU-2	1200	805	0.25	160	3.6	31.6	19.6	78.9	67.8	56.2	55.4	7.2	6.3	58.6	57.7	110	5.2	6.0	115	1	1, 2
FCU-3	200	150	0.25	30	0.70	6.8	4.0	77.8	67.0	52.7	52.2	3.5	1.3	11.2	59.0	110	2	1.1	115	1	1, 2

NOTES
1. HORIZONTAL CONCEILED TYPE.
2. PROVIDE VIBRATION ISOLATORS.

GRILLE, REGISTER & DIFFUSER SCHEDULE

MARK	SIZE	TYPE	SERVICE	CFM LOW - HIGH	NECK SIZE INCHES	NC MAX	APD "WC	NOTES
A	12 X 12	4-WAY	SUPPLY	10 - 45	4	32	0.012	1
B	24 X 24	4-WAY	SUPPLY	50 - 160	6	32	0.115	1
C	24 X 24	4-WAY	SUPPLY	165 - 245	8	30	0.098	1
D	24 X 24	4-WAY	SUPPLY	250 - 385				
					` x 10	32	0.130	2
U	24 X 24	PERFORATED	TRANSFER	- - 600	22 X 22	14	0.02	1
V	24 X 24	4-WAY	RETURN	50 - 235	6	31	0.09	1
W	24 X 24	4-WAY	RETURN	240 - 350	8	30	0.06	1
X	24 X 24	4-WAY	RETURN	355 - 545	10	32	0.06	1
Y	24 X 24	4-WAY	RETURN	550 - 785	12	32	0.06	1,2

NOTES
1. FOR USE WITH SUSPENDED CEILING GRID
2. FOR USE WITH HARD CEILING
3. WALL REGISTER WITH DOUBLE DEFLECTION VANES
4. PROVIDE 20 PANELS FOR LAB A-325, 16 PANELS FOR LAB A-329 AND 15 PANELS FOR LAB A-330

BOWMAN, FOSTER & ASSOC.
CONSULTING ENGINEERS
#4 INTERSTATE CORP. CENTER
NORFOLK, VA 23502
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APPR | DATE | DESCRIPTION | SYM

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
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PROFESSIONAL ENGINEER

DES DEL DRW KLB CHK SGR
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
SCHEDULES

CODE ID. NO. 80091 | SIZE D
SCALE: NONE
MAXIMO NO. N/A
JOB ORDER NO.
WORK ORDER NO. 539080
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12544764
SHEET 230 OF 349
M-602

DRAWFORM REVISION: 6 AUG 2007

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PUMP SCHEDULE

MARK	LOCATION (SYSTEM)	TYPE	SYSTEM SERVED	WATER FLOW GPM	HEAD FT	MOTOR HP	MOTOR VOLTS	MOTOR PHASE	MOTOR RPM	MOTOR EFF.	MOTOR STARTER SIZE	MOTOR STARTER TYPE	NOTES
P-1	PENTHOUSE (SECONDARY)	END SUCTION	CHILLED WATER	640.0	110	25	460	3	3500	77.08	NA	NA	1
P-2	PENTHOUSE (SECONDARY)	END SUCTION	CHILLED WATER	640.0	110	25	460	3	3500	77.08	NA	NA	1
P-3	PENTHOUSE	END SUCTION	HOT WATER	295.0	95	15	460	3	3500	75.28	2	NEMA	
P-4	PENTHOUSE	END SUCTION	HOT WATER	295.0	95	15	460	3	3500	75.28	2	NEMA	
P-5	PENTHOUSE (C-1)	END SUCTION	CHILLED WATER	320.0	35.6	7.5	460	3	1750	68.19	1	NEMA	
P-6	PENTHOUSE (C-2)	END SUCTION	CHILLED WATER	320.0	35.6	7.5	460	3	1750	68.19	1	NEMA	
P-7	2ND FLOOR MECHANICAL ROOM	IN-LINE	DUAL TEMP WATER	72.0	50	2	208	3	3450	57.37	0	NEMA	
P-8	1ST FLOOR MECHANICAL ROOM	END SUCTION	EXIST HOT WATER	144.0	60	5	208	3	1750	67.76	1	NEMA	
CWP-1	PPREHEAT COIL RTU-1	IN-LINE	HOT WATER	6.8	1.5	1/40	120	1	3250	NA	0	NEMA	
CWP-2	PREHEAT COIL MAU-4	IN-LINE	HOT WATER	10	1.8	1/40	120	1	3250	NA	0	NEMA	
SUMP PUMP	ELEVATOR PIT	SUBMERSIBLE	SUMP DRAINAGE	50	20.0	1/2	120	1	1750	NA	0	NEMA	2

NOTES:
1.PROVIDE PUMP WITH A VARIABLE FREQUENCY DRIVE.
2.PROVIDE WITH FLOAT SWITCH AND CORD WITH PLUG.

AIR COOLED CHILLER SCHEDULE

MARK	CAPACITY TONS	WATER FLOW GPM	EWT DEG. F	LWT DEG. F	WPD FT	OA TEMP DEG. F	UNLOADING STEPS %	ELECTRICAL SERVICE MCA	MFS	VOLTS	PH	REFRIGERANT TYPE	NOTES
C-1	140	320	52.5	42	8.5	95	100, 75, 50, 25	298	400	460	3	R-134A	1, 2, 3, 4, 5
C-2	140	320	52.5	42	8.5	95	100, 75, 50, 25	298	400	460	3	R-134A	1, 2, 3, 4, 5

NOTES
1.PROVIDE CHILLERS WITH LOW AMBIENT CONTROL TO 0 DEG. F.
2.PROVIDE CHIILERS WITH DUAL COMPRESSORS AND INDEPENDENT REFRIGERANT CIRCUITS.
3.PROVIDE CHILLERS WITH BACNET INTERFACE CARD.
4.PROVIDE HEAT TRACE ON EVAPORATOR.
5.PROVIDE CORROSION PROTECTION ON CONDENSER COILS.

HOT WATER UNIT HEATER SCHEDULE

MARK	AIR FLOW CFM	MOTOR HP	RPM	COIL CAPACITY (160 DEG.F. EWT) MBH	EAT DEG. FDB	LAT DEG. FDB	WPD FT	WATER FLOW GPM	MIN AIR THROW FT	MOUNTING HEIGHT FT	ELECTRICAL SERVICES VOLTS	PH	NOTES
UH-1	1560	1/3	1075	109.7	50	115	6.6	11.8	23	12	115	1	1, 2, 3
UH-2	1560	1/3	1075	109.7	50	115	6.6	11.8	23	12	115	1	1, 2, 3
UH-3	550	15WATT	1075	25	50	91.8	0.09	2.7	18	12	115	1	1, 2, 3

NOTES:
1.PROVIDE WITH FAN CONTROL THERMOSTAT (LINE VOLTAGE) AND DISCONNECT SWITCH.
2.PROVIDE WITH ISOLATION VALVES.
3.PROVIDE WITH MOUNTING BRACKETS AND DOUBLE DEFLECTION LOUVERS.

BASEBOARD HEATER SCHEDULE

MARK	TOTAL CAPACITY (BTUH)	E.A.T. (DEG.F.)	E.W.T. (DEG.F.)	WPD (FT)	WATER FLOW (GPM)	DIMENSIONS LENGTH (INCHES)	DEPTH (INCHES)	HEIGHT (INCHES)	NOTES
BBH-1	5600	68	180	0.8	1	24	4	6	1, 2
BBH-2	5100	68	180	0.8	1	24	4	6	1, 3

NOTES:
1.PROVIDE WITH SLOPED TOP ENCLOUSURE WITH ACCESS SECTION FOR CONTROL VALVE.
2.LOCATED IN MENS ROOM.
3.LOCATED IN WOMENS ROOM.

EXPANSION TANK SCHEDULE

MARK	SERVICE	TYPE	SIZE (IN.) DIAMETER	LENGTH	VOLUME (GALLONS) TANK	ACCEPTANCE	NOTES
EXP-1	CHILLED WATER	VERTICAL EXPANSION	30"	60.5"	159	56	1
EXP-2	HOT WATER	VERTICAL EXPANSION	30"	60.5"	159	56	1

NOTES: 1. VERTICAL TANK MOUNTED ON CONCRETE EQUIPMENT PAD.

AIR SEPARATOR SCHEDULE

MARK	SERVICE	FLOW (GPM)	CONNECTION SIZE (IN.)	MAX. PRESSURE DROP (FT)	NOTES
AS-1	CHILLED WATER	700	6	0.272	1
AS-2	HOT WATER	300	6	0.005	1

NOTES: 1. PROVIDE SEPARATOR WITH INTEGRAL STRAINER

WATER CONTROL VALVE SCHEDULE

MARK	EQUIPMENT SERVED	GPM	NOMINAL VALVE SIZE INCHES	Cv	TYPE	SPRING FAIL POSITION	NOTES 1,2
V-1	AHU-1 CHR	50.7	2	31.97	3 WAY	NC	
V-2	AHU-2 CHR	50.7	2	31.97	3 WAY	NC	
V-3	AHU-3 CHR	51.9	2	31.15	3 WAY	NC	
V-4	AHU-4 CHR	30.2	1	4.68	3 WAY	NC	
V-5	AHU-5 CHR	19.4	1	3.56	2 WAY	NC	
V-6	RTU-1 CHR	19.5	1	3.40	3 WAY	NC	
V-7	AHU-1 HWR	19.9	1 1/2	18.39	3 WAY	NO	REHEAT
V-8	AHU-2 HWR	19.9	1 1/2	18.39	3 WAY	NO	REHEAT
V-9	AHU-3 HWR	19	1 1/2	18.25	3 WAY	NO	REHEAT
V-10	AHU-4 HWR	17.6	1 1/2	14.43	3 WAY	NO	REHEAT
V-11	AHU-5 HWR	6.7	3/4	11.37	3 WAY	NO	REHEAT
V-12	RTU-1 HWR	8.4	3/4	12.75	3 WAY	NO	PREHEAT
V-13	RTU-1 HWR	6.8	3/4	11.54	3 WAY	NO	REHEAT
V-14	MAU-1 CHR	28.4	1 1/2	13.12	2 WAY	NC	
V-15	MAU-2 CHR	22.1	1 1/2	9.49	2 WAY	NC	
V-16	MAU-3 CHR	25.5	1 1/2	12.90	2 WAY	NC	
V-17	MAU-4 CHR	32.7	2	25.57	2 WAY	NC	
V-18	MAU-4 HWR	7.0	3/4	14.04	3 WAY	NO	PREHEAT
V-19	MAU-1 HWR	12.2	3/4	10.52	3 WAY	NO	REHEAT
V-20	MAU-2 HWR	9.5	3/4	8.06	3 WAY	NO	REHEAT
V-21	MAU-3 HWR	12.4	3/4	9.22	3 WAY	NO	REHEAT
V-22	MAU-4 HWR	5.5	3/4	12.90	3 WAY	NO	REHEAT
V-23	VAV 1-7,22-33,35	1	3/4	2.77	3 WAY	NO	
V-24	VAV 8, 18, 19, 34	1	3/4	2.40	3 WAY	NO	
V-25	VAV 9, 20, 21	1	3/4	2.14	3 WAY	NO	
V-26	VAV 14-17	1.1	3/4	2.15	3 WAY	NO	
V-27	VAV 10-13	1.1	3/4	1.99	3 WAY	NO	
V-28	BBH-1	1	3/4	1.69	2 WAY	NO	
V-29	BBH-2	1	3/4	1.69	2 WAY	NO	
V-30	FCU-1 HWR	3.4	3/4	2.6	3 WAY	NO	
V-31	FCU-1 CWR	3.9	3/4	2.4	2 WAY	NC	
V-32	FCU-2 HWR	6.0	3/4	11.2	3 WAY	NO	
V-33	FCU-2 CWR	6.3	3/4	11.2	2 WAY	NC	
V-34	FCU-3 HWR	1.2	3/4	1.1	3 WAY	NO	
V-35	FCU-3 CWR	1.3	3/4	1.0	2 WAY	NC	
V-36	HOT WATER HEATER	6.0	3/4	11.6	3 WAY	NO	
V-37	DTS	72.0	2	100	3 WAY	NA	3
V-38	DTR	72.0	2	100	3 WAY	NA	3

NOTES
1. PROVIDE WITH REDUCERS TO MATCH COIL PIPING
2. SEE CONTROL DIAGRAMS AND SEQUENCES
3. 2 POSITION CHANGEOVER VALVES

LOUVER SCHEDULE

MARK	TYPE	SIZE WxH	MAX NECK VELOCITY	AREA SERVED	NOTES
L-1	EXTERIOR	12"x12"	300 FPM	ELECTRICAL ROOM A-268, MAU-4	1, 2, 4
L-2	DOOR TRANSFER	18"x12"	300 FPM	ELECTRICAL ROOMS, REST ROOMS & JANITOR CLOSET	3
L-3	EXTERIOR	42"x42"	1000 FPM	GENERATOR COOLING EXHAUST	1, 2, 4
L-4	EXTERIOR	60"x36"	550 FPM	GENERATOR ROOM MAKE UP AIR	1, 2, 4
L-5	EXTERIOR	8"x8"	550 FPM	OUTSIDE AIR SOUTH OFFICES SECOND FLOOR	1, 2
L-6	EXTERIOR	72"x36"	NA	SMOKE REMOVAL TOP OF ELEVATOR SHAFT	

NOTES
1 MATCH EXISTING LOUVER FINISH ON EXPOSED WALL.
2 PROVIDE WITH BIRD SCREEN.
3 COORDINATE WITH DOOR SUPPLIER FOR DOOR THICKNESS AND FINISH.
4. PROVIDE WITH DAMPER.

DUCTLESS SPLIT SYSTEM HEAT PUMP UNIT SCHEDULE

MARK	FAN DATA CFM	ELECTRICAL SERVICE (OUTDOOR) FLA	MCA	VOLTS	PH	COOLING CAPACITY TOTAL MBH	SENSIBLE MBH	EAT DEG. FDB	EAT DEG. FWB	LAT DEG. FDB	LAT DEG. FWB	HEATING CAPACITY TOTAL MBH	EAT DEG. FDB.	LAT DEG. FDB.	ELECTRICAL HEATER KW	MBH	NO. STAGES	ELECTRICAL DATA TOTAL FLA	MFS	VOLTS	PH	FILTER TYPE	AREA SERVED	NOTES
MS-1	327	11	12	115	1	8.22	6.51	75	62.5	56.6	53.9	9.4	68	93	–	–	–	–	–	–	–	PERM	A270	1, 6, 7
MS-2	875	6.3	8.3	460.0	3	31.3	23.9	75	62.5	50.0	49	32.4	68	101.0	3.0	10.2	1.0	12.5	20	208/230	1	PERM	A314	2, 6, 7
MS-3	327	11	12	115	1	8.22	6.51	75	62.5	56.6	53.9	9.4	68	93	–	–	–	–	–	–	–	PERM	A320	3, 6, 7
MS-4	327	11	12	115	1	8.22	6.51	75	62.5	56.6	53.9	9.4	68	93	–	–	–	–	–	–	–	PERM	A343	4, 6, 7
MS-5	875	6.3	8.3	460	3	31.3	23.9	75	62.5	50	49	32.4	68	101.0	3.0	10.2	1.0	12.5	20	208/230	1	PERM	ELEVATOR 1	5, 6, 7

NOTES:
1.ACCU-1 IS LOCATED ON ROOF AND IS ASSOCIATED TO MS-1.
2.ACCU-2 IS LOCATED ON ROOF AND IS ASSOCIATED TO MS-2.
3.ACCU-3 IS LOCATED ON ROOF AND IS ASSOCIATED TO MS-3.
4.ACCU-4 IS LOCATED ON ROOF AND IS ASSOCIATED TO MS-4.
5.ACCU-5 IS LOCATED ON ROOF AND IS ASSOCIATED TO MS-5.
6.PROVIDE WITH INTERNAL CONDENSATE PUMP.
7.PROVIDE CORROSION PROTECTION ON OUTDOOR COILS.

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SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

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NAVAL STATION NORFOLK
NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
SCHEDULES

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SCALE: NONE
MAXIMO NO. N/A
JOB ORDER NO.
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SHEET 231 OF 349
M-603
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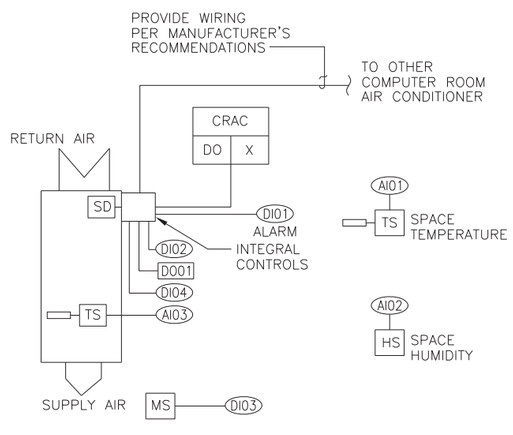
CONTROLS LEGEND (ALL CONTROL SHEETS)

AI	ANALOG INPUT TO DDC
DI	DIGITAL INPUT TO DDC
DO	DIGITAL OUTPUT FROM DDC
DDC	DIRECT DIGITAL CONTROL
DTC	DATA TERMINAL CABINET
AI9 DI9	DDC INPUT POINT (ANALOG, DIGITAL)
AO1 DO1	DDC OUTPUT POINT (ANALOG, DIGITAL)
BYP	BYPASS SWITCH (MANUAL)
CC	COMPRESSOR CONTROL
CR	CURRENT RELAY
DM	DAMPER MOTOR
DPT	DIFFERENTIAL PRESSURE TRANSMITTER
FS	FLOW SWITCH
FZ	FREEZ STAT
H O A	HOA SWITCH
HS	HUMIDITY SENOR
FM	FLOW METER
M	MOTORIZED OPERATOR
	MOTOR STARTER
C	COMMON
HWS	HOT WATER SUPPLY
HWR	HOT WATER RETURN
NO	NORMALLY OPEN
NC	NORMALLY CLOSED
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION
PCHS	PRIMARY CHILLED WATER SUPPLY
PCHR	PRIMARY CHILLED WATER RETURN
CHS	CHILLED WATER SUPPLY
CHR	CHILLED WATER RETURN
MS	MOISTURE SENSOR
PB	PUSH BUTTON
SD	SMOKE DETECTOR
SP	STATIC PRESSURE
SL	STATIC LIMIT
	OPPOSED BLADE LOW LEAK DAMPERS
	AVERAGING SENSOR
	2-WAY VALVE WITH ACTUATOR
	3-WAY VALVE WITH ACTUATOR
TS	TEMPERATURE SENSOR
LS	LIMIT SWITCH



CRAC-1 THRU CRAC-7 CONTROL DIAGRAM

NTS

DDC GENERAL NOTES (ALL CONTROL SHEETS)

1. THE BUILDING DDC SYSTEM SHALL CONTROL ALL AIR SIDE AND WATER SIDE OPERATIONS OF THE HVAC EQUIPMENT AND SYSTEMS PROVIDED UNDER THIS CONTRACT AND BID OPTION 001 TO PROVIDE A COMFORTABLE AND PRODUCTIVE ENVIRONMENT IN WHICH TO WORK. THE SYSTEM SHALL BE INSTALLED FOR EASE OF MAINTENANCE AND RELIABILITY.
2. THE HVAC CONTROL SYSTEM SHALL BE WEB ACCESSIBLE DDC SYSTEM AND SHALL PROVIDE A COMMUNICATION LINK FOR REMOTE COMMUNICATION. THE SYSTEM SHALL PROVIDE THE ABILITY FOR MONITORING ALL PARAMETERS OF THE CHILLERS THROUGH THE DDC BUILDING SYSTEM. THE SYSTEM SHALL HAVE THE ABILITY TO CHANGE THE POINTS ON THE CHILLERS INCLUDING LEAVING WATER TEMPERATURE AND LEAD LAG CONTROL.
3. PROVIDE DDC INTERFACE CONTROLS FOR ANY UNITARY CONTROL SYSTEM TO MAKE IT COMPATIBLE WITH DDC CONTROLS SYSTEM, DOWN TO THE DEVICE LEVEL.
4. LOW VOLTAGE WIRING (24 OR LESS) SHALL NOT BE RUN IN THE SAME CONDUIT WITH LINE VOLTAGE (120V AND ABOVE).
5. ALL FIELD ACTUATORS AND SENSORS SHALL BE COMPATIBLE WITH THE DDC/EMCS SYSTEM.
6. REFER TO SPECIFICATION SECTION 23 09 23.13 "BAC NET DIRECT DIGITAL CONTROL SYSTEMS FOR HVAC", FOR ADDITIONAL INFORMATION.
7. SMOKE DETECTORS SHALL BE BY CONTROLS CONTRACTOR AND INSTALLED BY MECHANICAL CONTRACTOR.
8. SYSTEM RESTART AFTER A POWER FAILURE SHALL RESTART ALL THE EQUIPMENT UNITARY COMPONENTS AND SUB SYSTEMS SEAMLESSLY.
9. THE BUILDING SYSTEM SHALL MANAGE AND CONTROL ALL HVAC SEQUENCES FROM A CENTRAL WORK STATION LOCATED IN ROOM 211. TIE IN CABLES SHALL RUN TO ROOM 240 FOR MODEM CONNECTION TO BASE WIDE SYSTEM.
10. CONTROL OF THE FORCENET AREA ON THE THIRD FLOOR AS WELL AS THE TEMPORARY FORCENET AREA IN ROOM 239 SHALL BECOME INTEGRAL PARTS OF THE BUILDING SYSTEM.
11. ALL SEQUENCE SET POINTS, CAPTURE RATES, TIME INTERVALS AND SCHEDULES DESIGNATED AS "ADJUSTABLE" SHALL BE DIRECTLY ACCESSIBLE AND CHANGEABLE FROM THE OPERATOR WORK STATION.
12. THE CONTROL DIAGRAMS ARE DIAGRAMMATIC AND DO NOT INDICATE ALL CONTROLLERS, RELAYS, CONTRACTORS, ETC. THE CONTRACTOR SHALL PROVIDE ALL CONTROLLERS, RELAYS, CONTRACTORS, CONDUIT, WIRE, ETC. NECESSARY TO PROVIDE A COMPLETE DDC AND EMCS CONTROL SYSTEM.

SEQUENCE OF OPERATION FOR CRAC UNITS

COMPUTER ROOM AIR CONDITIONING UNIT (TYPICAL OF CRAC-1 THRU CRAC-7)

RUN CONDITIONS :

THE DDC SYSTEM SHALL MONITOR SPACE TEMPERATURE AND HUMIDITY. CRAC UNIT INTERNAL CONTROLS SHALL CONTROL ALL UNIT FUNCTIONS EXCEPT HUMIDIFICATION.

DUCT SMOKE DETECTORS SHALL SHUT DOWN UNITS UPON SENSING PRODUCTS OF COMBUSTION AND SEND AN ALARM TO THE FIRE ALARM PANEL.

COMPUTER ROOM A/C SYSTEM		
LOCAL DDC CONTROLLER		
INPUTS		
ANALOG	AI01	SPACE TEMPERATURE
	AI02	SPACE HUMIDITY
	AI03	CRAC TEMPERATURE (SPACE)
DIGITAL	DI01	FAN ALARM
	DI02	CHILLED WATER ALARM
	DI03	WATER UNDER FLOOR ALARM
	DI04	SMOKE DETECTOR
DIGITAL	DO01	CRAC ENABLED

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P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
SEQUENCE OF OPERATION

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SHEET 232 OF 349
M-701

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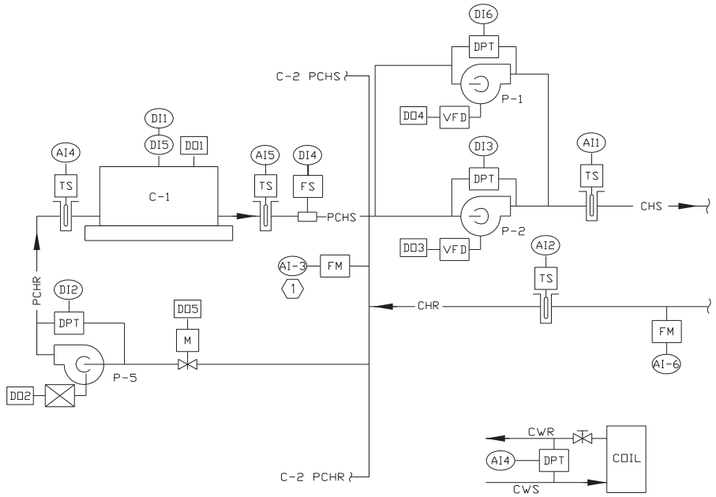
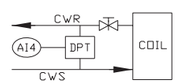
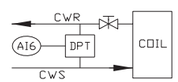




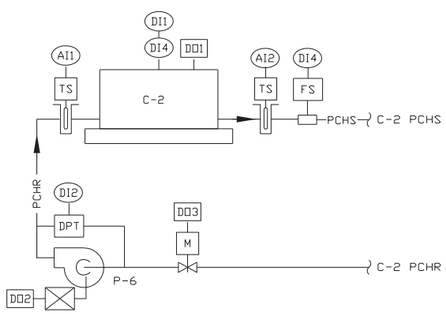
AHU-4

NO SCALE



CRAC-6

NO SCALE

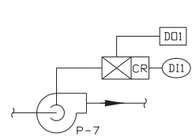


CHILLER C-1		
LOCAL DDC CONTROLLER		
INPUTS		
ANALOG	AI1	CHS TEMP
	AI2	CHR TEMP
	AI3	DECOUPLER FLOW
	AI4	PCHR TEMP
	AI5	PCHR TEMP
	AI6	SECONDARY FLOW
	AI7	PUMP SPEED
	AI8	PUMP SPEED
DIGITAL	DI1	CHILLER STATUS
	DI2	PCHS PUMP STATUS
	DI3	CHS PUMP STATUS
	DI4	FLOW SWITCH
	DI5	CHILLER ALARM
	DI6	CHS PUMP STATUS
	DI7	VFD STATUS
	DI8	VFD STATUS
OUTPUTS		
ANALOG	AO1	PUMP SPEED SETPOINT
	AO2	PUMP SPEED SETPOINT
DIGITAL	DO1	CHILLER ENABLE
	DO2	PCHS PUMP START
	DO3	CHS PUMP START
	DO4	CHS PUMP START
	DO5	CHILLER VALVE

CHILLER C-2		
LOCAL DDC CONTROLLER		
INPUTS		
ANALOG	AI1	PCHR TEMP
	AI2	PCHS TEMP
DIGITAL	DI1	CHILLER STATUS
	DI2	PCHS PUMP STATUS
	DI3	FLOW SWITCH
	DI4	CHILLER ALARM
OUTPUTS		
DIGITAL	DO1	CHILLER ENABLE
	DO2	PCWS PUMP START
	DO3	CHILLER VALUE

PRIMARY/SECONDARY CHILLED WATER CONTROL DIAGRAM

NO SCALE



DUAL TEMPERATURE PUMP		
LOCAL DDC CONTROLLER		
INPUTS		
DIGITAL	DI1	PUMP P-7 STAYS
OUTPUTS		
DIGITAL	DO1	PUMP P-7 ENABLED

DUAL TEMPERATURE WATER CONTROL DIAGRAM

NO SCALE

SEQUENCE OF OPERATION FOR PRIMARY/SECONDARY CHILLED WATER SYSTEM

SYSTEM DESCRIPTION

THE PRIMARY SYSTEM CONSISTS OF TWO CHILLERS C-1 AND C-2 OF THE SAME CAPACITY. PRIMARY PUMPS P-5 AND P-6 ARE CONSTANT SPEED TYPE. PRIMARY PUMP P-5 DEDICATED TO CHILLER C-1 AND PUMP P-6 IS DEDICATED TO CHILLER C-2. THE CHILLERS SHALL BE PROVIDED WITH AUTOMATIC SHUT OFF VALVES AND FLOW PROVING SWITCHES. BOTH CHILLERS SHALL BE SELECTABLE FOR LEAD AND LAG OPERATION WITH THEIR CORRESPONDING PRIMARY PUMPS.

THE SECONDARY SYSTEM CONSISTS OF VARIABLE SPEED PUMPS P-1 AND P-2. THESE PUMPS ARE PIPED IN PARALLEL TO PROVIDE SECONDARY CHILLED WATER TO THE BUILDING. THERE IS COMMON DECOUPLER PIPING CONNECTING FOR THE PRIMARY AND SECONDARY LOOPS. THE DECOUPLER PIPING SHALL INCLUDE A BI-DIRECTIONAL FLOW METER. THE SECONDARY PIPING RUNS THROUGHOUT THE BUILDING AND CONSISTS OF TWO WAY CONTROL VALVES AS WELL AS THREE WAY CONTROL VALVES AT THE BRANCH ENDS. DIFFERENTIAL PRESSURE SENSORS SHALL BE PROVIDED AT SELECTED POINTS IN THE SECONDARY BRANCH PIPING, (SEE DRAWINGS FOR LOCATIONS). A FLOW METER SHALL INDICATE THE SECONDARY FLOW THROUGH THE PUMPS, (SEE DRAWINGS FOR LOCATION). THE SECONDARY LOOP SHALL ALSO INCLUDE SUPPLY AND RETURN WATER TEMPERATURE SENSORS.

SYSTEM OPERATION, (PRIMARY LOOP)

THE SYSTEM SHALL BE STARTED THROUGH THE BUILDING CONTROL DDC SYSTEM. IN AUTOMATIC MODE THE CHILLERS ARE STARTED WHENEVER THERE IS A CALL FOR CHILLED WATER. THE LEAD SECONDARY PUMP SHALL BE STARTED UPON A CALL FOR CHILLED WATER. WHEN THE LEAD SECONDARY PUMP IS STARTED, THE LEAD PRIMARY CHILLER SYSTEM IS ACTIVATED BY OPENING ITS AUTOMATIC SHUTOFF VALVE. UPON FULL OPENING OF THE VALVE, THE PRIMARY PUMP IS STARTED. WHEN CHILLED WATER FLOW IS PROVEN BY THE FLOW SWITCH, THE CHILLER IS ENABLED TO RUN. EACH CHILLER OPERATES UNDER ITS OWN CONTROL SEQUENCE TO SUPPLY CHILLED WATER AT 42 DEGREES (ADJUSTABLE). THE LEAD AND LAG CHILLERS ARE STARTED IN THE SAME MANNER EXCEPT THEIR ASSOCIATED PUMPS ARE STARTED PRIOR TO THE OPENING OF THE AUTOMATIC SHUT OFF VALVES TO ENSURE THAT PRIMARY SYSTEM WATER PRESSURE IS MAINTAINED.

SYSTEM OPERATION, (SECONDARY LOOP)

THE VFDS ON THE SECONDARY PUMPS ARE MODULATED BY THE DDC SYSTEM TO MAINTAIN REQUIRED SECONDARY DIFFERENTIAL PRESSURE. THIS PRESSURE WILL BE DETERMINED THROUGH TAB PROCEDURES FOR REQUIRED FLOW. IN OPERATION, THE DIFFERENTIAL PRESSURE SENSOR INDICATING THE LEAST AMOUNT OF DIFFERENTIAL PRESSURE WILL CONTROL THE VFD. IF DIFFERENTIAL PRESSURE CAN NOT BE MAINTAINED DUE TO REQUIRED FLOW, THE LAG SECONDARY PUMP SHALL START. UPON SOFT START OF THE LAG PUMP, THE LEAD PUMP SHALL DECREASE IN SPEED. THE TWO PUMPS SHALL THEN OPERATE IN UNISON TO MAINTAIN FLOW AND DIFFERENTIAL PRESSURE. WHEN THE SECONDARY FLOW METER INDICATES A FLOW OF LESS THAN 500 GPM, (ADJUSTABLE) THROUGH THE SECONDARY LOOP, (A VALUE OF APPROXIMATELY 80% OF A SINGLE SECONDARY PUMP CAPACITY), THE LAG PUMP SHALL STOP. THE DDC SOFTWARE SHALL INCLUDE AN ADJUSTABLE TIME DELAY TO PREVENT SHORT CYCLING OF THE PUMPS AS WELL AS WEEKLY SWITCHING OF LEAD AND LAG PUMP DESIGNATION.

CHILLER CAPACITY CONTROL, (DECOUPLER LOOP)

THE COMMON PIPE BETWEEN THE PRIMARY AND SECONDARY LOOPS IS DESIGNATED AS THE DECOUPLER. THE FLOW IN THIS PIPE INDICATES THE BALANCE BETWEEN LOAD REQUIREMENTS OF THE BUILDING AND PRODUCTION OF THE CHILLER PRIMARY LOOP PLANT. EQUAL LOAD AND PRODUCTION WILL BALANCE AND THERE WILL BE NO FLOW IN THE DECOUPLER. THE FLOW METER SHALL BE SET UP TO INDICATE POSITIVE AND NEGATIVE FLOW. POSITIVE FLOW INDICATES THAT THE BUILDING LOAD IS SMALLER THAN THE CHILLER PLANT OUTPUT. NEGATIVE FLOW INDICATES THAT THE BUILDING LOAD IS LARGER THAN THE CHILLER PLANT OUTPUT. THE MAGNITUDE OF THIS FLOW SHALL STAGE AND DE-STAGE THE TWO CHILLERS. AS BUILDING LOAD INCREASES, WITHIN THE CAPACITY RANGE OF THE LEAD CHILLER, THE SECONDARY LEAVING WATER TEMPERATURE IS MAINTAINED AT SET POINT. AS FURTHER LOAD IS REALIZED, THE FLOW IN THE SECONDARY LOOP IS INCREASED AND THE SECONDARY LEAVING WATER TEMPERATURE RISES. NEGATIVE FLOW IS REALIZED IN THE DECOUPLER PIPE WHICH INDICATES THE LARGE BUILDING LOAD AND SMALLER CHILLED WATER PLANT PRODUCTION. THE SECONDARY LOOP SUPPLY TEMPERATURE SHALL NOT EXCEED MORE THAN 2 DEGREES F., (ADJUSTABLE) ABOVE SET POINT IN ORDER TO MAINTAIN BUILDING HUMIDITY CONTROL. BASED UPON THE MAGNITUDE OF THE DECOUPLER FLOW THE LAG CHILLER IS ENABLED. THE DDC ALGORITHM SHALL PROVIDE OPTIMUM STAGING AND DE-STAGING OF CHILLERS WITHIN THE LIMITATIONS OF THE SECONDARY SUPPLY TEMPERATURE DEAD BAND. (42 DEG. F. ±2 DEG. F. (ADJUSTABLE))

CHILLED WATER SYSTEM (CHILLER C-1, C-2)

UPON A CALL FOR CHILLED WATER, AND WHEN THE OUTDOOR AIR TEMPERATURE IS ABOVE 0 DEG. F., AS SENSED BY THE OUTDOOR AIR TEMPERATURE SENSOR, THE SCHEDULED CHILLED WATER PUMP SHALL BE STARTED. UPON PROOF OF CHILLED WATER FLOW, AS SENSED BY FLOW SWITCH, CHILLER (C-1) SHALL BE ENABLED AND OPERATE THROUGH THE FACTORY INSTALLED PACKAGED MICROPROCESSOR BASED CONTROLS TO MAINTAIN 42 DEG. F. CHILLED WATER SUPPLY. ANY CHILLER ALARM OR FAILURE TO MAINTAIN CHILLED WATER SUPPLY TEMPERATURE SHALL INITIATE AN ALARM AT THE LOCAL DDC CONTROL PANEL. UPON A FAILURE OF THE CHILLER PUMP AS SENSED BY CURRENT RELAY, THE CHILLER PUMP SHALL BE SHUT DOWN AND INITIATE AN ALARM AT THE LOCAL DDC CONTROL PANEL.

CHILLER ALARMS SHALL REQUIRE MANUAL RESET AT THE CHILLER CONTROLLER.

THE DDC SHALL ALTERNATE LEAD-LAG PUMPS BASED ON A WEEKLY SCHEDULE

SEQUENCE OF OPERATION FOR DUAL TEMPERATURE PUMP

PUMP P-7 LOCATED IN THE SECOND FLOOR MECHANICAL ROOM SHALL RUN WHENEVER THE SECONDARY CHILLED WATER PUMPS OR THE PRIMARY HOT WATER PUMPS ARE ENERGIZED.

SYM	DESCRIPTION	DATE	APPR

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NAVFAC DRAWING NO.	12544767
SHEET 233 OF 349	
M-702	

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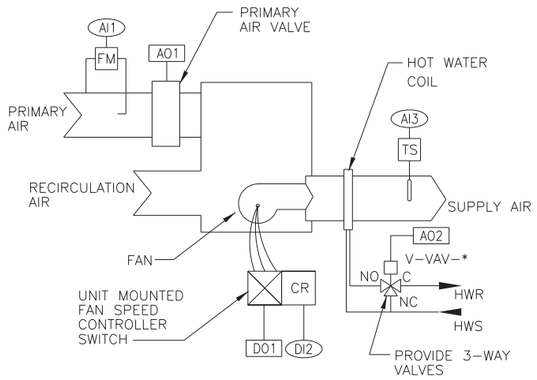
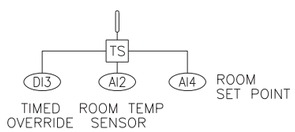
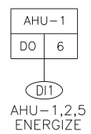






VAV TERMINAL UNIT FAN-POWERED SERIES TYPE WITH HEAT		
LOCAL DDC CONTROLLER		
INPUTS		
ANALOG	AI1	PRIMARY AIR VELOCITY
	AI2	ROOM TEMP
	AI3	SUPPLY AIR TEMPERATURE
	AI4	ROOM SET POINT
DIGITAL	DI1	UNIT ENERGIZE
	DI2	FAN STATUS
	DI3	TIMED OVERRIDE
OUTPUTS		
ANALOG	AO1	AIR VALVE POSITION
	AO2	HW VALVE POSITION
DIGITAL	DO1	FAN ENERGIZE

* VALVE NUMBER SHALL MATCH VALVE SCHEDULE

VAV TERMINAL UNIT CONTROL DIAGRAM - SERIES FAN POWERED

NO SCALE

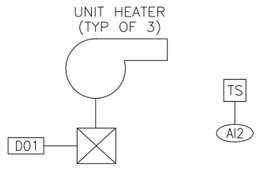
CONTROL SET POINTS

POINT DESCRIPTION	SETTING
SPACE TEMP. – HEATING – OCCUPIED	68 DEG. F.
SPACE TEMP. – COOLING – OCCUPIED	75 DEG. F. (LABORATORIES ARE 72 DEG. F.)
SPACE TEMP. – HEATING – UNOCCUPIED	55 DEG. F. (LABORATORIES ARE 68 DEG. F.)
TIMED OVERRIDE	2 HOURS
DUCTLESS SPLIT SYSTEM HEAT PUMPS COOLING	75 DEG. F.
DUCTLESS SPLIT SYSTEM HEAT PUMPS HEATING	68 DEG. F.
UNIT HEATER	55 DEG. F.
BASEBOARD HEATER	55 DEG. F.
HEATING WATER SUPPLY TEMP	180 DEG. F. @ 23 DEG. F. OA TEMP.
	120 DEG. F. @ 50 DEG. F. OA TEMP

NOTE:
1. CONTROL SET POINTS SHALL BE SOFTWARE ADJUSTABLE POINTS.
2. SET POINTS ARE FOR SYSTEM START-UP AND SHALL BE FIELD VERIFIED AND ADJUSTED AT SYSTEM START-UP.

EMERGENCY KILL SWITCH

NO SCALE



UNIT HEATER

NO SCALE

SEQUENCE OF OPERATION

SECURITY CONTROLS

EMERGENCY KILL SWITCH SHUT DOWN AIR HANDLING UNITS

UPON A SIGNAL FROM THE MANUAL KILL SWITCH LOCATED ON MAIN ROUTE OF EGRESS THE AIR HANDLING UNITS AND ASSOCIATED FANS SHALL BE DE-ENERGIZED, WITH DAMPERS SET FOR UNOCCUPIED MODE. RESTARTING SYSTEM SHALL REQUIRE MANUAL RESET WITH APPROPRIATE SECURITY PROTOCOL.

VAV TERMINAL UNITS (VAV-1 THRU VAV-35)

FAN POWERED SERIES TYPE WITH HOT WATER HEATING

OCCUPIED MODE – THE VAV BOX FAN SHALL BE ENERGIZED FROM A DDC PANEL OUTPUT SIGNAL CONFIRMING HVAC FAN OPERATION. A SPACE TEMPERATURE SENSING ELEMENT, LOCATED AS SHOWN, ACTING THROUGH A MICROPROCESSOR-BASED CONTROLLER, SHALL MODULATE THE SUPPLY AIR CONTROL DAMPER, MIXING THE PRIMARY SUPPLY AIR AND RE-CIRCULATED ROOM AIR TO PROVIDE A VARIABLE TEMPERATURE, CONSTANT VOLUME OF AIR TO THE SPACE.

WHEN THE SPACE TEMPERATURE CALLS FOR HEAT AFTER THE PRIMARY SUPPLY AIR DAMPER HAS CLOSED TO ITS MINIMUM POSITION (THE VAV BOX IS IN MAXIMUM RE-CIRCULATION) AND AFTER A DROP OF SPACE TEMPERATURE 2 DEGREES (ADJUSTABLE) BELOW SPACE SET POINT, THE VAV TERMINAL UNIT HOT WATER HEATING COIL CONTROL VALVE SHALL MODULATE FLOW OF HOT WATER TO THE HEATING COIL TO MAINTAIN THE SPACE TEMPERATURE SET POINT.

UNOCCUPIED MODE – IN THE COOLING MODE, THE AIR HANDLING UNIT SUPPLY FAN SHALL BE OFF. ON A CALL FOR COOLING THE AIR HANDLING UNIT SUPPLY FAN SHALL START. THE VAV TERMINAL SHALL INDEX TO COOLING MODE AND SHUT THE HOT WATER VALVE. THE VAV TERMINAL PRIMARY DAMPER SHALL MODULATE TO SATISFY THE UNOCCUPIED COOLING SETPOINT (ADJUSTABLE).

UNOCCUPIED MODE – IN THE HEATING MODE THE AIR HANDLING UNIT SUPPLY FAN SHALL BE DE-ENERGIZED. THE PRIMARY AIR VALVE SHALL BE CLOSED AND THE VAV TERMINAL FAN SHALL BE OFF. ON A FALL IN SPACE TEMPERATURE BELOW THE UNOCCUPIED SET POINT (ADJUSTABLE) THE FAN SHALL BE ENERGIZED AND THE HOT WATER VALVE SHALL OPEN. ON A RISE IN SPACE TEMPERATURE ABOVE THE UNOCCUPIED SET POINT THE FAN SHALL BE DE-ENERGIZED AND THE HOT WATER VALVE SHALL CLOSE.

MORNING WARM-UP- BASED ON INPUT FROM THE OPTIMIZATION SOFTWARE, THE MORNING WARM UP SHALL BE ENABLED. THE PRIMARY AIR VALVE SHALL BE CLOSED AND THE VAV TERMINAL FAN SHALL BE ENERGIZED. THE HOT WATER VALVE SHALL OPEN TO HEAT THE SPACE TO THE OCCUPIED SET POINT (ADJUSTABLE). ONCE THE SPACE HAS REACHED THE OCCUPIED SET POINT THE THE SYSTEM SHALL GO INTO THE OCCUPIED MODE.

UNIT HEATERS (UH-1, UH-2, UH-3)

UNIT HEATER FAN BE ENERGIZED UPON A FALL IN SPACE TEMPERATURE BELOW SET POINT AND DE-ENERGIZE THE FAN UPON TEMPERATURE RISE ABOVE SET POINT.

DUCTLESS SPLIT SYSTEM HEAT PUMP UNITS (MS-1, MS-2, MS-3, MS-4, MS-5)

PROVIDE MANUFACTURER'S UNIT MOUNTED CONTROLS TO MAINTAIN ROOM COOLING SETPOINT. PROVIDE TEMPERATURE SENSOR TO ALARM DDC SYSTEM IN THE EVENT OF HIGH OR LOW TEMPERATURE.

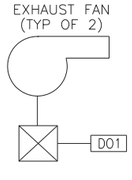
BASEBOARD HEATERS (BB-1, BB-2)

UNIT CONTROL VALVE SHALL OPEN ON A FALL IN SPACE TEMPERATURE BELOW ROOM SETPOINT AND CLOSE ON A RISE ABOVE SPACE TEMPERATURE SETPOINT.

EXHAUST FANS (EF-1, EF-2)

EXHAUST FANS IN REST ROOMS SHALL RUN DURING OCCUPIED HOURS. A SIGNAL FROM THE DDC SYSTEM SHALL DETERMINE THE OCCUPIED HOURS (ADJUSTABLE).

EXHAUST FANS EF-3 AND EF-4 SHALL BE CONTROLLED BY LINE VOLTAGE THERMOSTATS (STAND ALONE)



EXHAUST FAN

NO SCALE

SYM	DESCRIPTION	DATE	APPR

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RENOVATIONS FOR SPAWAR
CONTROL DIAGRAMS

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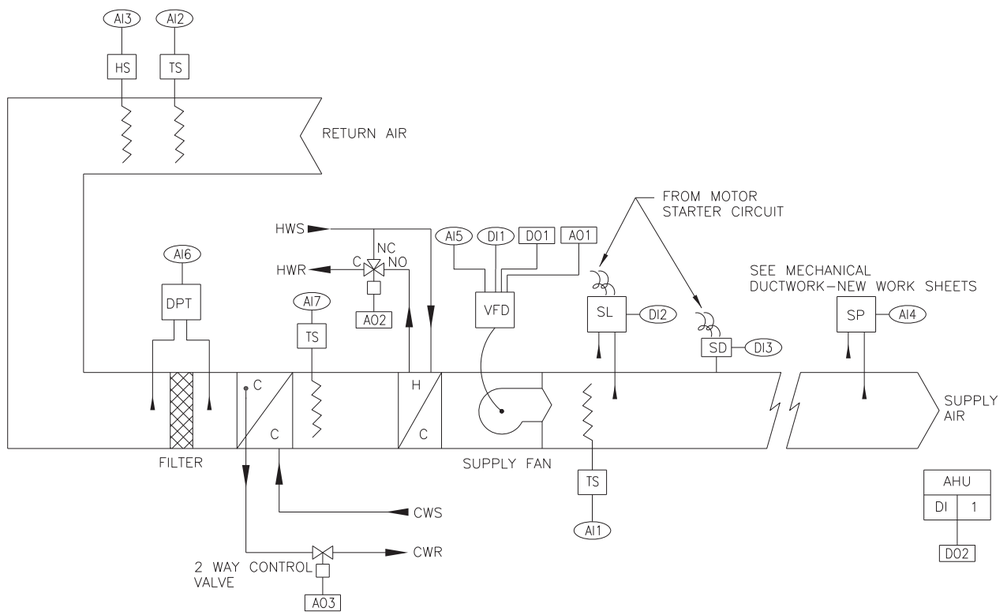

AIR-HANDLING UNIT AHU-1, 2, 3, 5 CONTROL DIAGRAM

NOT TO SCALE

VAV AIR HANDLING UNIT – AHU–1, AHU–2, AHU–3, AHU–5					
LOCAL DDC CONTROLLER					
INPUTS			OUTPUTS		
ANALOG	AI1	SUPPLY AIR TEMP	ANALOG	AO1	SA FAN VFD CONTROL SET POINT
	AI2	RETURN AIR TEMP		AO2	HWR VALVE POSITION
	AI3	RA HUMIDITY		AO3	CHR VALVE POSITION
	AI4	SA DUCT SYSTEM STATIC PRESSURE			
	AI5	SA FAN % SPEED			
	AI6	FILTER DIFFERENTIAL PRESSURE			
	AI7	COILING COIL DISCHARGE DETECTOR			
DIGITAL	DI1	SUPPLY AIR VFD ALARM	DIGITAL	DO1	SUPPLY AIR FAN ENERGIZE
	DI2	SUPPLY AIR STATIC PRESSURE LIMIT		DO2	AHU ENERGIZE
	DI3	SUPPLY AIR SMOKE DETECTOR			

SEQUENCE OF OPERATION

VAV AIR HANDLING UNIT (AHU-1, AHU-2, AND AHU-3, AHU-5)

COOLING/HEATING COILS:

OCCUPIED MODE – THE DDC CONTROLS SHALL MODULATE CHILLED WATER VALVE TO MAINTAIN COIL DISCHARGE TEMPERATURE BASED ON THE SIGNAL OF A TEMPERATURE SENSING ELEMENT LOCATED IN THE COOLING COIL DISCHARGE AIR PATH. THE HOT WATER REHEAT COIL CONTROL VALVE SHALL MODULATE HOT WATER FLOW TO MAINTAIN THE HEATING COIL DISCHARGE AIR TEMPERATURE.

MORNING WARM–UP MODE – BASED ON INPUT FROM THE OPTIMIZATION SOFTWARE, THE MORNING WARM–UP MODE SHALL BE ENABLED. THE COOLING SHALL BE DISABLED AND THE HEATING COIL CONTROL VALVE SHALL MODULATE FLOW OF HOT WATER TO THE HEATING COIL TO MAINTAIN THE HEATING COIL MORNING WARM–UP DISCHARGE AIR TEMPERATURE.

UNOCCUPIED MODE – THE AHU SHALL BE DISABLED. A SIGNAL FOR ANY ASSOCIATED VAV ZONE DOWNSTREAM OF AHU SHALL START THE AHU IN THE OCCUPIED MODE FOR A SOFTWARE ADJUSTABLE PERIOD. UPON A RISE IN SPACE TEMPERATURE ABOVE SPACE COOLING TEMPERATURE SET POINT BY VAV TERMINAL UNIT SPACE TEMPERATURE SENSORS, AHU SHALL BE ENERGIZED AND OPERATE IN OCCUPIED MODE EXCEPT OUTDOOR AIR INTAKE DAMPERS SHALL REMAIN CLOSED.

SUPPLY AIR RESET TEMPERATURE:

PROVIDE A GRAPHIC DISPLAY OF SUPPLY DISCHARGE TEMPERATURE AND ASSOCIATED ZONE SPACE TEMPERATURES. THE SCREEN SHALL INCLUDE RETURN AIR HUMIDITY DATA FOR THE DEHUMIDIFICATION OVERRIDE SAFTY SEQUENCE. RESET THE DISCHARGE TEMPERATURE BASED UPON EITHER OF THE TWO FOLLOWING SEQUENCES:

a) DEVIATION FROM SET POINT BY REQUEST METHOD - A COOLING REQUEST IS GENERATED WHENEVER A ZONE TEMPERATURE EXCEEDS ITS SET POINT BY 1° F (ADJUSTABLE). IF AN AIR HANDLER ACCUMULATES 4 COOLING REQUESTS (ADJUSTABLE) THE DISCHARGE SET POINT SHALL BE LOWERED BY 1° F (ADJUSTABLE) EACH ADDITIONAL GROUP OF 4 REQUESTS SHALL LOWER THE DISCHARGE AN ADDITIONAL 1° F (ADJUSTABLE).
b) CREATE A RESET SCHEDULE BASED ON THE HIGHEST ZONE TEMPERATURES, WITH RESPECT TO THE DEVIATION AT ZONE TEMPERATURE FROM DISCHARGE TEMPERATURE. AT THIS POINT THE SEQUENCE WILL DRIVE AT LEAST ONE ZONE UP TO COOLING SET POINT. PROGRAM THE SEQUENCE TO UTILIZE THE MAXIMUM ZONE OR AN AVERAGE OF FIVE MAXIMUM ZONES FOR RESET.

THE CONTRACTOR MAY UTILIZE EITHER METHOD DESCRIBED ABOVE, BUT MUST COORDINATE THE EXACT METHODOLOGY WITH THE COMMISSIONING AUTHORITY.

DEHUMIDIFICATION OVERRIDE SAFETY SEQUENCE:

THIS SEQUENCE SHALL TREND THE CHANGES IN RETURN AIR RELATIVE HUMIDITY SIMULTANEOUSLY DURING DISCHARGE AIR RESET. RETURN RELATIVE HUMIDITY DATA SHALL BE CAPTURED EVERY 10 MINUTES (ADJUSTABLE) AND SHALL OVERRIDE THE RESET SEQUENCE SHOULD THE RELATIVE HUMIDITY INCREASE BY 2% (ADJUSTABLE) OR GREATER BETWEEN CAPTURES, WITHIN THE RANGE OF 50%–55% (ADJUSTABLE) RELATIVE OF THIS SEQUENCE WILL BE ACCOMPLISHED THROUGH COMMISSIONING HUMIDITY TUNING TODETERMINE THE ANTICIPATED GRADUAL ACTIONS REQUIRED TO RETURN TO DISCHARGE COOLING CYCLESET POINT.

SUPPLY DUCT PRESSURE CONTROL:

UPON A SIGNAL FROM THE DDC, THE SUPPLY SHALL START AND THE DDC SYSTEM SHALL MODULATE THE FAN VARIABLE FREQUENCY DRIVE CONTROLLERS FROM THE SIGNAL OF A DUCT MOUNTED STATIC PRESSURE SENSING ELEMENT AND TRANSMITTER TO MODULATE FAN SPEED TO MAINTAIN THE STATIC PRESSURE SET POINT. A HIGH LIMIT STATIC PRESSURE SWITCH IN THE FAN DISCHARGE SHALL STOP THE SUPPLY FAN AND INITIATE A "HIGH STATIC" ALARM WHEN THE STATIC PRESSURE EXCEEDS THE ALARM SET POINT.

FILTERS:

A DIFFERENTIAL PRESSURE SENSOR ACROSS THE FILTER SHALL INITIATE A FILTER ALARM, AT THE SOFTWARE ADJUSTABLE POINT, WHEN THE PRESSURE DROP ACROSS THE FILTER RISES ABOVE THE SET POINT.

SMOKE DETECTOR CONTROL:

UPON ACTIVATION OF SMOKE ALARM BY SMOKE DETECTOR IN THE SUPPLY AIR DUCTWORK (AND RETURN AIR DUCTWORK WHERE INDICATED), THE SUPPLY FAN SHALL BE DE–ENERGIZED. RESTARTING FANS SHALL REQUIRE MANUAL RESET AT THE SMOKE DETECTOR. FOR FIRE ALARM CONTROL SIGNAL REQUIREMENTS SEE FIRE ALARM SHEETS.

SYM	DESCRIPTION	DATE	APPR

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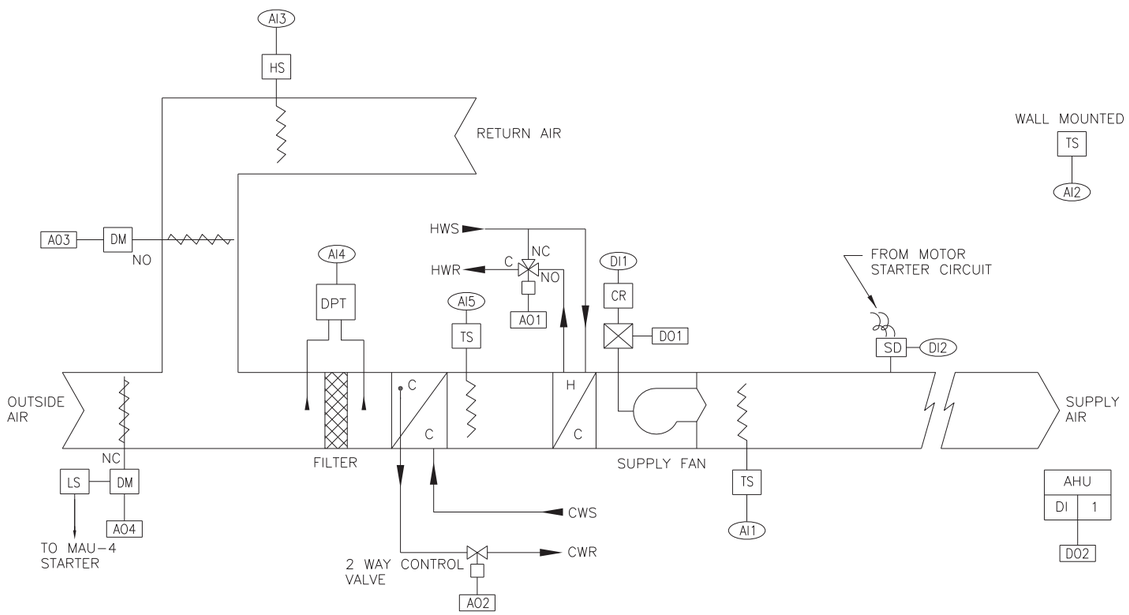

AIR-HANDLING UNIT AHU-4 CONTROL DIAGRAM

NOT TO SCALE

AIR HANDLING UNIT – AHU-4					
LOCAL DDC CONTROLLER					
INPUTS			OUTPUTS		
ANALOG	AI1	SUPPLY AIR TEMP	ANALOG	A01	HWR VALVE POSITION
	AI2	ROOM TEMP		A02	CHR VALVE POSITION
	AI3	RA HUMIDITY		A03	RETURN AIR DAMPER POSITION
	AI4	FILTER DIFFERENTIAL PRESSURE		A04	OUTSIDE AIR DAMPER POSITION
	AI5	COOLING COIL DISCHARGE TEMPERATURE			
DIGITAL	DI1	SUPPLY AIR ALARM	DIGITAL	D01	SUPPLY AIR FAN ENERGIZE
	DI2	SUPPLY AIR SMOKE DETECTOR		D02	AHU ENERGIZE

SEQUENCE OF OPERATION

AIR HANDLING UNIT (AHU-4)

SUPPLY FAN CONTROL:

SUPPLY FAN START/STOP: THE AHU SUPPLY FAN SHALL BE STARTED AND STOPPED THROUGH THE EMS SYSTEM.

COOLING/HEATING COILS:

OCCUPIED MODE THE WALL THERMOSTAT SHALL DETERMINE THE POSITION OF THE CHILLED AND HOT WATER VALVES – THE DDC CONTROLS SHALL MODULATE CHILLED WATER VALVE TO MAINTAIN COIL DISCHARGE TEMPERATURE BASED ON THE SIGNAL OF A TEMPERATURE SENSING ELEMENT LOCATED IN THE COOLING COIL DISCHARGE AIR PATH. THE HOT WATER REHEAT COIL CONTROL VALVE SHALL MODULATE HOT WATER FLOW TO MAINTAIN THE HEATING COIL DISCHARGE AIR TEMPERATURE.

MORNING WARM-UP MODE – BASED ON INPUT FROM THE OPTIMIZATION SOFTWARE, AND THE WALL THERMOSTAT THE MORNING WARM-UP MODE SHALL BE ENABLED. THE COOLING SHALL BE DISABLED AND THE HEATING COIL CONTROL VALVE SHALL MODULATE FLOW OF HOT WATER TO THE HEATING COIL TO MAINTAIN THE HEATING COIL MORNING WARM-UP DISCHARGE AIR TEMPERATURE.

UNOCCUPIED MODE – THE AHU SHALL BE CONTROLLED TO THE UNOCCUPIED SET POINTS AND DAMPER POSITIONS.

OUTDOOR AIR AND RETURN AIR DAMPER: (INTERLOCK WITH MAU-4)

OCCUPIED MODE – THE OUTDOOR AIR DAMPER SHALL OPEN TO THE POSITION NECESSARY TO MAINTAIN THE INDICATED CFM FROM MAU-4 WHEN THE INTERLOCK STARTS MAU-4 SUPPLY FAN.

MORNING WARM-UP MODE – MAU-4 IS DEENERGIZED THE OUTDOOR AIR DAMPER SHALL CLOSE AND RETURN AIR DAMPER SHALL OPEN.

UNOCCUPIED MODE – MAU-4 IS DEENERGIZED THE OUTDOOR AIR DAMPER SHALL CLOSE AND RETURN AIR DAMPER SHALL OPEN.

DEHUMIDIFICATION OVERRIDE SAFETY SEQUENCE:

THIS SEQUENCE SHALL TREND THE CHANGES IN RETURN AIR RELATIVE HUMIDITY SIMULTANEOUSLY DURING COOLING MODE. RETURN RELATIVE HUMIDITY DATA SHALL BE CAPTURED EVERY 10 MINUTES (ADJUSTABLE) AND SHALL OVERRIDE THE SEQUENCE SHOULD THE RELATIVE HUMIDITY INCREASE BY 2% (ADJUSTABLE) OR GREATER BETWEEN CAPTURES, WITHIN THE RANGE OF 50%-55% (ADJUSTABLE) RELATIVE OF THIS SEQUENCE WILL BE ACCOMPLISHED THROUGH COMMISSIONING HUMIDITY TUNING TO DETERMINE THE ANTICIPATED GRADUAL ACTIONS REQUIRED TO RETURN TO DISCHARGE COOLING CYCLE SET POINT.

FILTERS:

A DIFFERENTIAL PRESSURE SENSOR ACROSS THE FILTER SHALL INITIATE A FILTER ALARM, AT THE SOFTWARE ADJUSTABLE POINT, WHEN THE PRESSURE DROP ACROSS THE FILTER RISES ABOVE THE SET POINT.

SMOKE DETECTOR CONTROL:

UPON ACTIVATION OF SMOKE ALARM BY SMOKE DETECTOR IN THE SUPPLY AIR DUCTWORK (AND RETURN AIR DUCTWORK WHERE INDICATED), THE SUPPLY FAN SHALL BE DE-ENERGIZED. RESTARTING FANS SHALL REQUIRE MANUAL RESET AT THE SMOKE DETECTOR. FOR FIRE ALARM CONTROL SIGNAL REQUIREMENTS SEE FIRE ALARM SHEETS.

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RRMM ARCHITECTS

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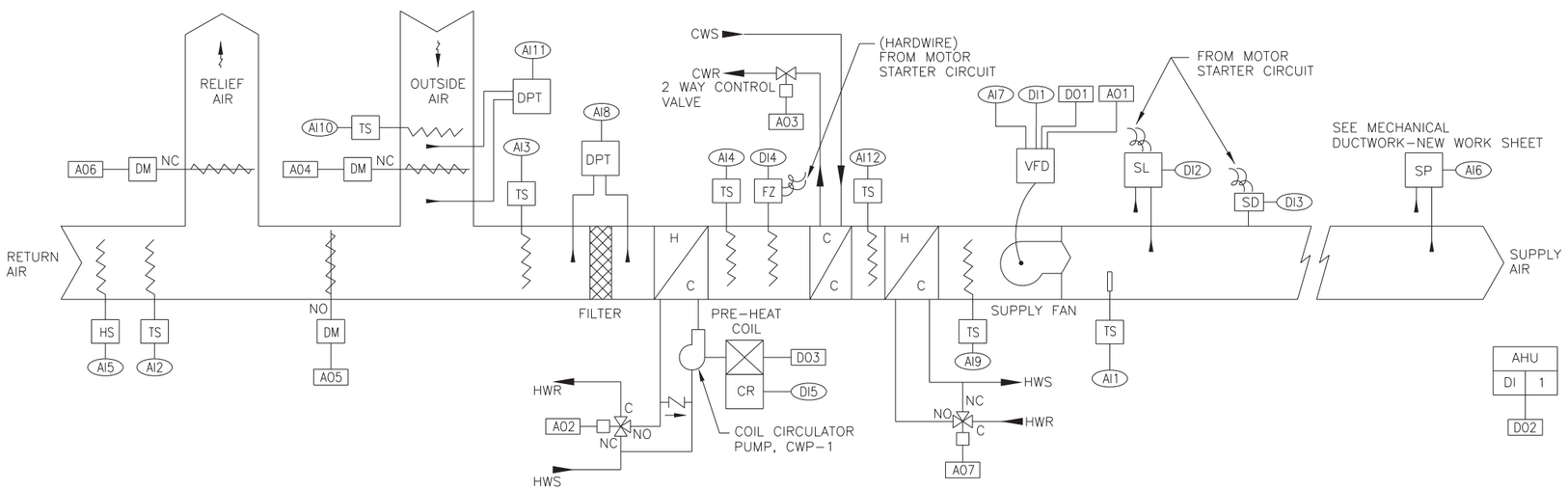

VAV AIR HANDLING UNIT RTU-1 CONTROL DIAGRAM

NOT TO SCALE

VAV AIR HANDLING UNIT – RTU–1					
LOCAL DDC CONTROLLER					
INPUTS			OUTPUTS		
ANALOG	AI1	SUPPLY AIR TEMP	ANALOG	AO1	SA FAN VFD CONTROL SET POINT
	AI2	RETURN AIR TEMP		AO2	PREHEAT HWR VALVE POSITION
	AI3	MIXED AIR TEMP		AO3	CWR VALVE POSITION
	AI4	PREHEAT COIL DISCHARGE TEMPERATURE		AO4	OUTDOOR AIR DAMPER SET POINT
	AI5	RA HUMIDITY		AO5	RETURN AIR DAMPER SET POINT
	AI6	SA DUCT SYSTEM STATIC PRESSURE		AO6	RELIEF AIR DAMPER SET POINT
	AI7	SA FAN % SPEED		AO7	REHEAT HWR VALVE POSITION
	AI8	FILTER DIFFERENTIAL PRESSURE			
	AI9	REHEAT COIL DISCHARGE TEMPERATURE			
	AI10	OUTSIDE AIR TEMPERATURE			
	AI11	OUTSIDE AIR DIFFERENTIAL PRESSURE			
	AI12	COOLING COIL DISCHARGE TEMPERATURE			
DIGITAL	DI1	SUPPLY AIR VFD ALARM	DIGITAL	DO1	SUPPLY AIR FAN ENERGIZE
	DI2	SUPPLY AIR STATIC PRESSURE LIMIT		DO2	AHU ENERGIZE
	DI3	SUPPLY AIR SMOKE DETECTOR		DO3	PREHEAT PUMP ENERGIZE, CWP–1
	DI4	FREEZE STAT			
	DI5	PREHEAT PUMP, CWP–1			

SEQUENCE OF OPERATION

AIR HANDLING UNIT (RTU-1)

SUPPLY FAN CONTROL:

SUPPLY FAN START/STOP: THE AHU SUPPLY FAN SHALL BE STARTED AND STOPPED THROUGH THE EMS SYSTEM.

COOLING/HEATING COILS:

OCCUPIED MODE – THE DDC CONTROLS SHALL MODULATE CHILLED WATER VALVE TO MAINTAIN COIL DISCHARGE TEMPERATURE BASED ON THE SIGNAL OF A TEMPERATURE SENSING ELEMENT LOCATED IN THE COOLING COIL DISCHARGE AIR PATH. THE HOT WATER REHEAT COIL CONTROL VALVES SHALL MODULATE HOT WATER FLOW TO MAINTAIN THE HEATING COILS DISCHARGE AIR TEMPERATURE.

SEQUENCE OF OPERATION

AIR HANDLING UNIT (RTU-1)

SUPPLY FAN CONTROL:
MORNING WARM–UP MODE – BASED ON INPUT FROM THE OPTIMIZATION SOFTWARE, THE MORNING WARM–UP MODE SHALL BE ENABLED. THE COOLING SHALL BE DISABLED AND THE HEATING COIL CONTROL VALVE SHALL MODULATE FLOW OF HOT WATER TO THE HEATING COIL TO MAINTAIN THE HEATING COIL MORNING WARM–UP DISCHARGE AIR TEMPERATURE.

UNOCCUPIED MODE – THE AHU SHALL BE DISABLED. A SIGNAL FOR ANY ASSOCIATED VAV ZONE DOWNSTREAM OF AHU SHALL START THE AHU IN THE OCCUPIED MODE FOR A SOFTWARE ADJUSTABLE PERIOD. UPON A RISE IN SPACE TEMPERATURE ABOVE SPACE COOLING TEMPERATURE SET POINT BY VAV TERMINAL UNIT SPACE TEMPERATURE SENSORS, AHU SHALL BE ENERGIZED AND OPERATE IN OCCUPIED MODE EXCEPT OUTDOOR AIR INTAKE DAMPERS SHALL REMAIN CLOSED.

OUTDOOR AIR AND RETURN AIR DAMPER:

OCCUPIED MODE – THE OUTDOOR AIR DAMPER SHALL OPEN TO THE POSITION NECESSARY TO MAINTAIN THE INDICATED CFM WHEN THE SUPPLY FAN IS ENABLED AND SHALL CLOSE WHEN THE SUPPLY AIR FAN IS DISABLED. THE OUTDOOR AIR DAMPER MINIMUM POSITION SHALL BE SET WITH THE RETURN AIR DAMPER FULL OPEN AND THE SUPPLY AIR FAN DELIVERING DESIGN AIR FLOW. AT THIS POINT THE RELIEF AIR DAMPER SHALL MODULATE TO MAINTAINSPACE PRESSURIZATION AT 0.01" WC TO 0.05" WC (INSIDE POSITIVE) WITH ALL EXHAUST FANS IN OPERATION. AT THIS POINT THE OUTSIDE AIR DIFFERENTIAL SETPOINT NECESSARY TO MAINTAIN THE INDICATED CFM SHALL BE ESTABLISHED. AS THE SUPPLY AIR FAN REDUCES AIR FLOW, THE DIFFERENTIAL PRESSURE SENSOR SHALL SENSE A DROP IN PRESSURE. THE DDC SYSTEM SHALL MODULATE THE OUTDOOR AIR DAMPER AND THE RETURN AIR DAMPER TO MAINTAIN THE REQUIRED FLOW THROUGH THE OUTDOOR AIR DAMPER BASED ON THE DIFFERENTIAL PRESSURE MEASUREMENT.

MORNING WARM–UP MODE – THE OUTDOOR AIR DAMPER SHALL CLOSE AND RETURN AIR DAMPER SHALL OPEN.

UNOCCUPIED MODE – THE OUTDOOR AIR DAMPER SHALL CLOSE AND RETURN AIR DAMPER SHALL OPEN.

SUPPLY AIR RESET TEMPERATURE:

PROVIDE A GRAPHIC DISPLAY OF SUPPLY DISCHARGE TEMPERATURE AND ASSOCIATED ZONE SPACE TEMPERATURES. THE SCREEN SHALL INCLUDE RETURN AIR HUMIDITY DATA FOR THE DEHUMIDIFICATION OVERRIDE SAFTY SEQUENCE. RESET THE DISCHARGE TEMPERATURE BASED UPON EITHER OF THE TWO FOLLOWING SEQUENCES:

a) DEVIATION FROM SET POINT BY REQUEST METHOD - A COOLING REQUEST IS GENERATED WHENEVER A ZONE TEMPERATURE EXCEEDS ITS SET POINT BY 1° F (ADJUSTABLE). IF AN AIR HANDLER ACCUMULATES 4 COOLING REQUESTS (ADJUSTABLE) THE DISCHARGE SET POINT SHALL BE LOWERED BY 1° F (ADJUSTABLE) EACH ADDITIONAL GROUP OF 4 REQUESTS SHALL LOWER THE DISCHARGE AN ADDITIONAL 1° F (ADJUSTABLE).

b) CREATE A RESET SCHEDULE BASED ON THE HIGHEST ZONE TEMPERATURES, WITH RESPECT TO THE DEVIATION AT ZONE TEMPERATURE FROM DISCHARGE TEMPERATURE. AT THIS POINT THE SEQUENCE WILL DRIVE AT LEAST ONE ZONE UP TO COOLING SET POINT. PROGRAM THE SEQUENCE TO UTILIZE THE MAXIMUM ZONE OR AN AVERAGE OF FIVE MAXIMUM ZONES FOR RESET.

THE CONTRACTOR MAY UTILIZE EITHER METHOD DESCRIBED ABOVE, BUT MUST COORDINATE THE EXACT METHODOLOGY WITH THE COMMISSIONING AUTHORITY.

DEHUMIDIFICATION OVERRIDE SAFETY SEQUENCE:

THIS SEQUENCE SHALL TREND THE CHANGES IN RETURN AIR RELATIVE HUMIDITY SIMULTANEOUSLY DURING DISCHARGE AIR RESET. RETURN RELATIVE HUMIDITY DATA SHALL BE CAPTURED EVERY 10 MINUTES (ADJUSTABLE) AND SHALL OVERRIDE THE RESET SEQUENCE SHOULD THE RELATIVE HUMIDITY INCREASE BY 2% (ADJUSTABLE) OR GREATER BETWEEN CAPTURES, WITHIN THE RANGE OF 50%–55% (ADJUSTABLE) RELATIVE OF THIS SEQUENCE WILL BE ACCOMPLISHED THROUGH COMMISSIONING HUMIDITY TUNING TO DETERMINE THE ANTICIPATED GRADUAL ACTIONS REQUIRED TO RETURN TO DISCHARGE COOLING CYCLESET POINT.

REHEAT COIL CIRCULATOR:

ALL MODES – IN–LINE PUMP CIRCULATOR PUMP OPERATES WHENEVER THERE IS A CALL FOR HEAT. OR IF THE OUTSIDE AIR TEMPERATURE IS LESS THAN 40 DEG. F. (ADJUSTABLE).

THE 3–WAY CONTROL VALVE FAILS NORMALLY OPEN (N.O.) TO THE HOT WATER COIL.

FILTERS:

A DIFFERENTIAL PRESSURE SENSOR ACROSS THE FILTER SHALL INITIATE A FILTER ALARM, AT THE SOFTWARE ADJUSTABLE POINT, WHEN THE PRESSURE DROP ACROSS THE FILTER RISES ABOVE THE SET POINT.

SMOKE DETECTOR CONTROL:

UPON ACTIVATION OF SMOKE ALARM BY SMOKE DETECTOR IN THE SUPPLY AIR DUCTWORK (AND RETURN AIR DUCTWORK WHERE INDICATED), THE SUPPLY FAN SHALL BE DE–ENERGIZED. RESTARTING FANS SHALL REQUIRE MANUAL RESET AT THE SMOKE DETECTOR. FOR FIRE ALARM CONTROL SIGNAL REQUIREMENTS SEE FIRE ALARM SHEETS.

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M-706

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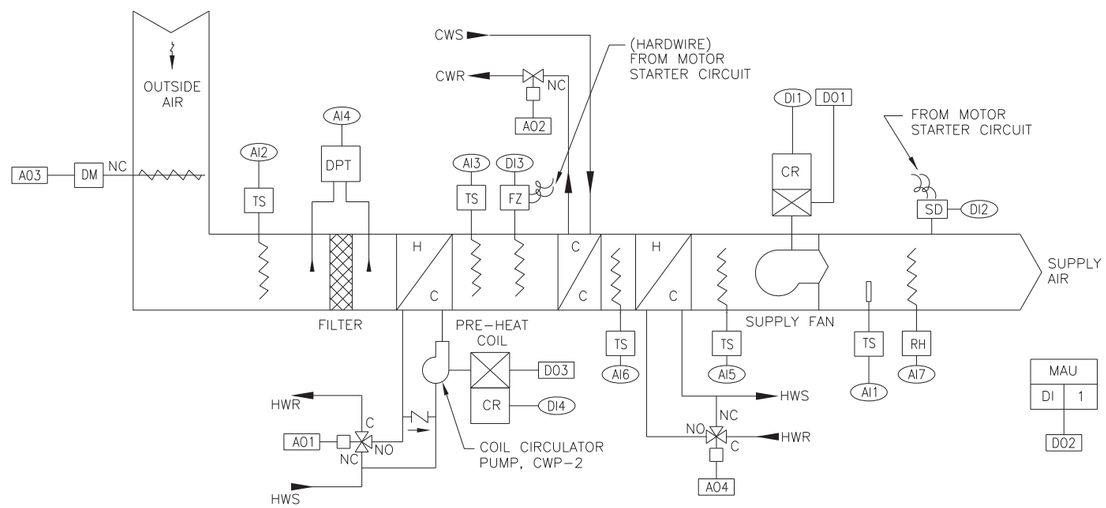

MAKE UP AIR UNIT MAU-4 CONTROL DIAGRAM

NOT TO SCALE

MAKE UP AIR UNIT (MAU-4)					
LOCAL DDC CONTROLLER					
INPUTS			OUTPUTS		
ANALOG	AI1	SUPPLY AIR TEMP	ANALOG	A01	PREHEAT HWR VALVE POSITION
	AI2	OUTSIDE AIR TEMPERATURE		A02	CWR VALVE POSITION
	AI3	PREHEAT COIL DISCHARGE TEMPERATURE		A03	OUTDOOR AIR DAMPER SET POINT
	AI4	FILTER DIFFERENTIAL PRESSURE		A04	REHEAT HWR VALVE POSITION
	AI5	REHEAT COIL DISCHARGE TEMPERATURE			
	AI6	COOLING COIL DISCHARGE TEMPERATURE			
	AI7	DISCHARGE RELATIVE HUMIDITY			
DIGITAL	DI1	SUPPLY AIR ALARM	DIGITAL	D01	SUPPLY AIR FAN ENERGIZE
	DI2	SUPPLY AIR SMOKE DETECTOR		D02	MAU ENERGIZE
	DI3	FREEZE STAT		D03	PREHEAT PUMP ENERGIZE, CWP-2
	DI4	PREHEAT PUMP, CWP-2			

SEQUENCE OF OPERATION

MAKE-UP AIR HANDLING UNIT (MAU-4)

COOLING/HEATING COILS:

OCCUPIED MODE – THE DDC CONTROLS SHALL MODULATE CHILLED WATER VALVE TO MAINTAIN COIL DISCHARGE TEMPERATURE BASED ON THE SIGNAL OF A TEMPERATURE SENSING ELEMENT LOCATED IN THE COOLING COIL DISCHARGE AIR PATH. THE HOT WATER PREHEAT AND REHEAT COIL CONTROL VALVES SHALL MODULATE HOT WATER FLOW TO MAINTAIN THE HEATING COIL DISCHARGE AIR TEMPERATURE.

DURING DEHUMIDIFICATION MODE THE RELATIVE HUMIDITY SENSOR IN THE DISCHARGE AIR STREAM SHALL CAUSE THE DDC TO ENABLE FURTHER COOLING (BELOW OCCUPIED COOLING COIL DISCHARGE TEMPERATURE) AND IN THE REHEAT COIL CONTROL VALVE TO MAINTAIN UNIT DISCHARGE TEMPERATURE.

FAN AND DAMPER:

UPON A CALL FOR OUTSIDE AIR IN THE OCCUPIED MODE THE OUTSIDE AIR DAMPER SHALL OPEN. WHEN THE DAMPER IS FULLY OPEN THE SUPPLY FAN SHALL START. UPON A STOP COMMAND THE REVERSE WILL OCCUR.

MORINING WARM UP – THIS UNIT IS DEENERGIZED.

UNOCCUPIED MODE – THIS UNIT IS DEENERGIZED.

FILTERS:

A DIFFERENTIAL PRESSURE SENSOR ACROSS THE FILTER SHALL INITIATE A FILTER ALARM, AT THE SOFTWARE ADJUSTABLE POINT, WHEN THE PRESSURE DROP ACROSS THE FILTER RISES ABOVE THE SET POINT.

SMOKE DETECTOR CONTROL:

UPON ACTIVATION OF SMOKE ALARM BY SMOKE DETECTOR IN THE SUPPLY AIR DUCTWORK (AND RETURN AIR DUCTWORK WHERE INDICATED), THE SUPPLY FAN SHALL BE DE-ENERGIZED. RESTARTING FANS SHALL REQUIRE MANUAL RESET AT THE SMOKE DETECTOR. FOR FIRE ALARM CONTROL SIGNAL REQUIREMENTS SEE FIRE ALARM SHEETS.

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
S. G. Roberts
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DEPARTMENT OF THE NAVY
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NAVAL STATION
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NORFOLK, VA
P211V BUILDING V53 BRAC
RENOVATIONS FOR SPAWAR
CONTROL DIAGRAM

BOWMAN, FOSTER & ASSOC.
CONSULTING ENGINEERS
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CODE ID. NO. 80091	SIZE D
SCALE: NONE	
MAXIMO NO.	N/A
JOB ORDER NO.	
WORK ORDER NO.	539080
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12544772
SHEET 238 OF 349	
M-707	

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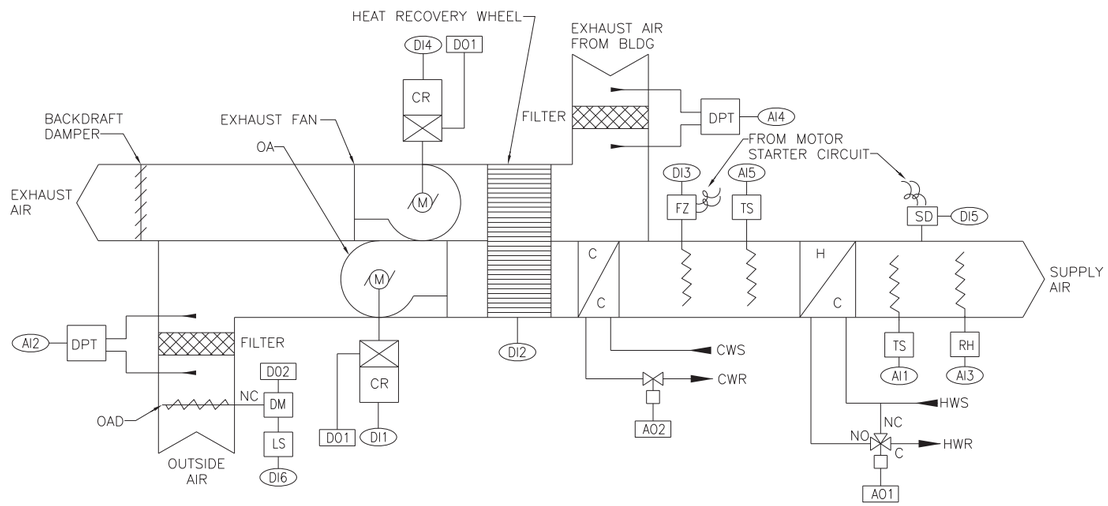

MAKE UP AIR UNIT CONTROL DIAGRAM (MAU-1, 2, 3)

NOT TO SCALE

MAKE UP AIR UNIT (MAU-1, 2, 3)					
LOCAL DDC CONTROLLER					
INPUTS			OUTPUTS		
ANALOG	AI1	SA TEMPERATURE	ANALOG	AO1	HWR VALVE POSITION
	AI2	DIRTY FILTER (OA)		AO2	CWR VALVE POSITION
	AI3	SA RELATIVE HUMIDITY			
	AI4	DIRTY FILTER (EA)			
	AI5	COOLING COIL TEMPERATURE			
DIGITAL	DI1	OA FAN STATUS	DIGITAL	DO1	EX & OA FAN START
	DI2	WHEEL ROTATION STATUS		DO2	OAD OPEN
	DI3	FREEZE STAT			
	DI4	EXHAUST FAN STSTUS			
	DI5	SMOKE DETECTOR			
	DI6	OA DAMPER CLOSED			

SEQUENCE OF OPERATION

MAKE-UP AIR HANDLING UNIT (MAU-1, MAU-2, MAU-3)

COOLING/HEATING COILS:

OCCUPIED MODE – THE DDC CONTROLS SHALL MODULATE CHILLED WATER VALVE TO MAINTAIN COIL DISCHARGE TEMPERATURE BASED ON THE SIGNAL OF A TEMPERATURE SENSING ELEMENT LOCATED IN THE COOLING COIL DISCHARGE AIR PATH. THE HOT WATER PREHEAT AND REHEAT COIL CONTROL VALVES SHALL MODULATE HOT WATER FLOW TO MAINTAIN THE HEATING COIL DISCHARGE AIR TEMPERATURE.

DURING DEHUMIDIFICATION MODE THE RELATIVE HUMIDITY SENSOR IN THE DISCHARGE AIR STREAM SHALL CAUSE THE DDC TO ENABLE FURTHER COOLING (BELOW OCCUPIED COOLING COIL DISCHARGE TEMPERATURE) AND IN THE REHEAT COIL CONTROL VALVE TO MAINTAIN UNIT DISCHARGE TEMPERATURE.

INITIATE THE REHEAT COIL CONTROL VALVE TO MAINTAIN UNIT DISCHARGE TEMPERATURE.

FAN AND DAMPER:

UPON A CALL FOR OUTSIDE AIR IN THE OCCUPIED MODE THE OUTSIDE AIR DAMPER AND THE EXHAUST DAMPER SHALL OPEN. WHEN THE DAMPERS ARE FULLY OPEN THE SUPPLY FAN AND THE EXHAUST FAN SHALL START. UPON A STOP COMMAND THE REVERSE WILL OCCUR.

MORINING WARM UP – THIS UNIT IS DEENERGIZED.

UNOCCUPIED MODE – THIS UNIT IS DEENERGIZED.

FILTERS:

A DIFFERENTIAL PRESSURE SENSOR ACROSS THE FILTER SHALL INITIATE A FILTER ALARM, AT THE SOFTWARE ADJUSTABLE POINT, WHEN THE PRESSURE DROP ACROSS THE FILTER RISES ABOVE THE SET POINT.

SMOKE DETECTOR CONTROL:

UPON ACTIVATION OF SMOKE ALARM BY SMOKE DETECTOR IN THE SUPPLY AIR DUCTWORK (AND RETURN AIR DUCTWORK WHERE INDICATED), THE SUPPLY FAN SHALL BE DE–ENERGIZED. RESTARTING FANS SHALL REQUIRE MANUAL RESET AT THE SMOKE DETECTOR. FOR FIRE ALARM CONTROL SIGNAL REQUIREMENTS SEE FIRE ALARM SHEETS.

ENERGY RECOVERY WHEEL:

THE ENERGY WHEEL SHALL ROTATE DURING FAN OPERATION TO TRANFER SENSIBLE AND LATENT HEAT BETWEEN THE SUPPLY AND THE EXHAUST AIR STREAMS. THE WHEEL SPEED SHALL BE OPTIMIZED TO TRANSFER THE MAXINMUM AMOUNT OF HEAT. THE WHEEL SHALL ALSO BE CONTROLLED TO AVOID FROST BUILD UP DURING WINTER OPERATION.

SYM	DESCRIPTION	DATE	APPR

NAVFAC

RRMM ARCHITECTS

COMMONWEALTH OF VIRGINIA
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DEPARTMENT OF THE NAVY
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NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NORFOLK, VIRGINIA
NAVAL STATION NORFOLK
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2424 26th ROAD SOUTH
ARLINGTON, VA 22206

CODE ID. NO. 80091	SIZE D
SCALE: NONE	
MAXIMO NO.	N/A
JOB ORDER NO.	
WORK ORDER NO.	539080
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12544773
SHEET 239 OF 349	
M-708	

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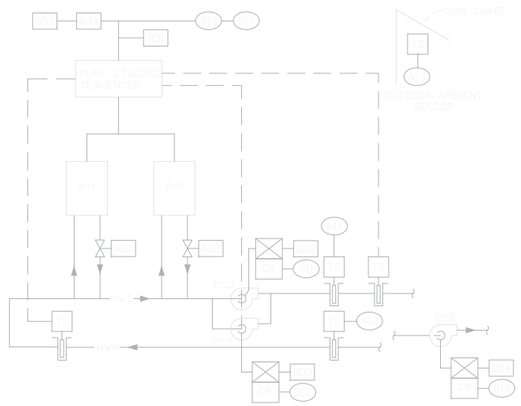
SEQUENCE OF OPERATION

BOILER STAGING SEQUENCER

RUN CONDITIONS: THE SEQUENCER SHALL CONTROL THE FLOW OF WATER TO THE BOILERS IN RESPONSE TO BUILDING LOAD AS INDICATED BY THE DIFFERENTIAL TEMPERATURES OF HWS AND HWR SENSOR INPUTS. THE SEQUENCER SHALL STAGE BOILERS B-1 AND B-2 AND THEIR RESPECTIVE PUMPS P-3 AND P-4. PUMP P-8 SHALL RUN ANY TIME EITHER P-3 OR P-4 ARE RUNNING. THE BOILERS SHALL CONTROL THEIR FIRING RATE BY THEIR OWN INTERNAL CONTROLS.

THE BOILERS SHALL BE CAPABLE OF RE SETTING THEIR LEAVING WATER TEMPERATURE IN RESPONSE TO CHANGING AMBIENT TEMPERATURES AS SENSED BY THE OUTDOOR AMBIENT SENSOR. SEE "CONTROL SET POINTS" SCHEDULE SHEET M-703.

BOILER STAGING SEQUENCER	
LOCAL DDC CONTROLLER	
INPUTS	
AI	HWS TEMP
AI	HWR TEMP
AI	OUTDOOR AMBIENT TEMP
DI	PUMP P-3 STATUS
DI	PUMP P-4 STATUS
DI	BOILER B-1 STATUS
DI	BOILER B-2 STATUS
DI	PUMP P-8 STATUS
OUTPUTS	
AO	B-1 VALVE POSITION
AO	B-2 VALVE POSITION
DO	B-1 ENABLE
DO	B-2 ENABLE
DO	STAGING SEQUENCER ENABLE
DO	PUMP P-3 ENABLE
DO	PUMP P-4 ENABLE
DO	PUMP P-8 ENABLE



BOILER STAGING SEQUENCER CONTROL DIAGRAM

NO SCALE

SEQUENCE OF OPERATION

FAN COIL UNITS (FCU-1, FCU-2, FCU-3)

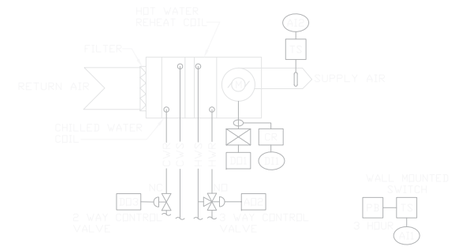
THE FAN COIL UNIT SUPPLY FANS SHALL BE ENERGIZED DURING THE OCCUPIED HOURS BY THE DDC SYSTEM. FOR OPERATION DURING UNOCCUPIED HOURS THE UNITS MAY BE STARTED BY A WALL MOUNTED PUSH BUTTON THAT OPERATES THE UNITS FOR THREE ADDITIONAL HOURS.

ON A RISE IN SPACE TEMPERATURE THE CHILLED WATER VALVE SHALL OPEN TO MAINTAIN SET POINT. ON A FALL IN SPACE TEMPERATURE THE REVERSE SHALL OCCUR.

ON A FURTHER FALL IN SPACE TEMPERATURE THE HOT WATER VALVE SHALL OPEN TO MAINTAIN SET POINT. ON A RISE IN SPACE TEMPERATURE THE REVERSE SHALL OCCUR.

THE SEQUENCE SHALL HAVE AN 8 DEGREE F (ADJUSTABLE) DEAD BAND BETWEEN HEATING AND COOLING SEQUENCES.

FCU-1, FCU-2, FCU-3	
LOCAL DDC CONTROLLER	
INPUTS	
ANALOG	AI ROOM TEMP
	AI CW TEMP
DIGITAL	DI SA FAN STATUS
OUTPUTS	
ANALOG	AO CW VALVE POSITION
	AO HW VALVE POSITION
DIGITAL	DO SA FAN START



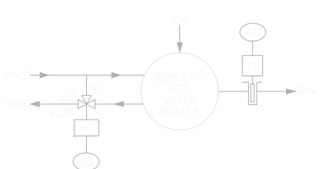
FAN COIL UNIT CONTROL DIAGRAM (FCU-1, FCU-2, FCU-3)

NO SCALE

SEQUENCE OF OPERATION

(V-36)

VALVE V-36 SHALL MODULATE THE FLOW OF HWS TO MAINTAIN THE REQUIRED DHW DISCHARGE TEMPERATURE.



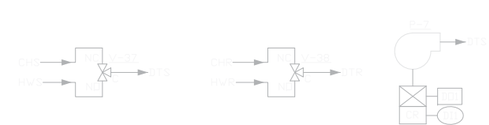
DOMESTIC HOT WATER HEATER CONTROL DIAGRAM (V-36)

NO SCALE

SEQUENCE OF OPERATION

(V-37, V-38, P-7)

PUMP P-7 SHALL BE ENERGIZED TO RUN CONTINUOUSLY BY THE BUILDING DDC SYSTEM. CHANGEOVER VALVES SHALL BE ACTIVATED SEASONALLY (ADJUSTABLE DATE CRITERIA) TO PROVIDE EITHER HOT WATER OR CHILLED WATER TO THE SYSTEM.



DUAL TEMPERATURE WATER CONTROL DIAGRAM (V-37, V-38, P-7)

NO SCALE

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NAVAL STATION NORFOLK

P211V BUILDING V53 BRAC RENOVATIONS FOR SPAWAR

CONTROL DIAGRAM

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12544774

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M-709

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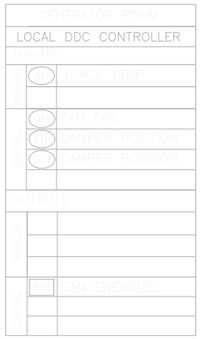
SEQUENCE OF OPERATION

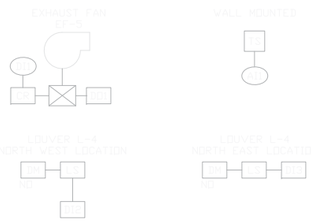
GENERATOR ROOM FAN

DAMPERS ASSOCIATED WITH LOUVERS L-4 SHALL REMAIN CLOSED IN WINTER. EXHAUST FAN EF-5 SHALL ENERGIZE ON A RISE IN SPACE TEMPERATURE ABOVE 85° F AS SENSED BY THE WALL THERMOSTAT. LOUVER L-4 NORTH WEST DAMPER SHALL OPEN TO PROVIDE CROSS FLOW VENTILATION FOR THE SPACE.

SHOULD THE EMERGENCY GENERATOR START, BOTH DAMPERS ASSOCIATED WITH LOUVERS L-4 SHALL OPEN FULLY AND EF-5 SHALL BE DE ENERGIZED.

AN INTERLOCK SHALL BE PROVIDED TO PREVENT OPENING OF THE L-4 DAMPERS DURING UNIT HEATER OPERATION.





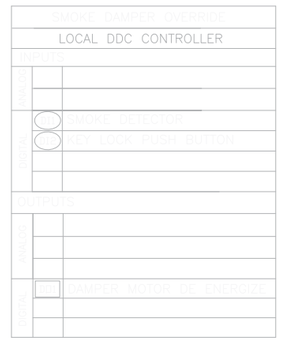
GENERATOR ROOM FAN DIAGRAM

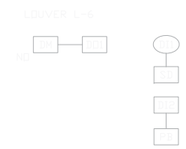
NO SCALE

SEQUENCE OF OPERATION

SMOKE DAMPER OVERRIDE

THE LOUVER L-6 SHALL BE FURNISHED WITH A SPRING RETURN OPERATOR TO KEEP THE LOUVER DAMPER CLOSED UNDER NORMAL OPERATING CONDITIONS. UPON SENSING SMOKE IN THE ELEVATOR SHAFT, THE MOTORIZED DAMPER SHALL BE ENERGIZE AND THE DAMPER SHALL OPEN. THE PUSH BUTTON SWITCH IN THE ELEVATOR LOBBY SHALL BE CONTROLLED BY A FIRE DEPARTMENT KEY LOCK TO MANUALLY OVERRIDE THE SYSTEM AND OPEN THE LOUVER DAMPER.





SMOKE DAMPER OVERRIDE DIAGRAM

NO SCALE

NAVFAC

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NAVAL FACILITIES ENGINEERING COMMAND - MID-ATLANTIC

P211V BUILDING V53 BRAC RENOVATIONS FOR SPAWAR

CONTROL DIAGRAM

AS NOTED

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M-710

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