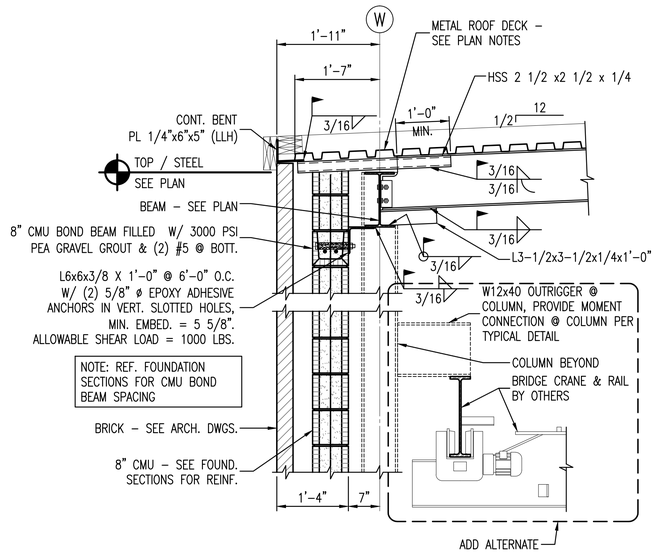
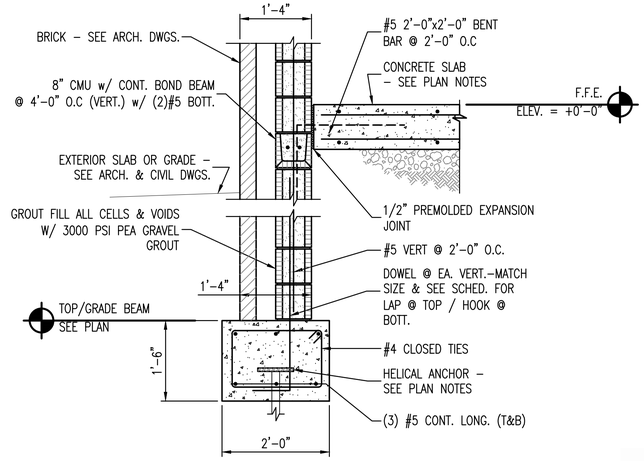
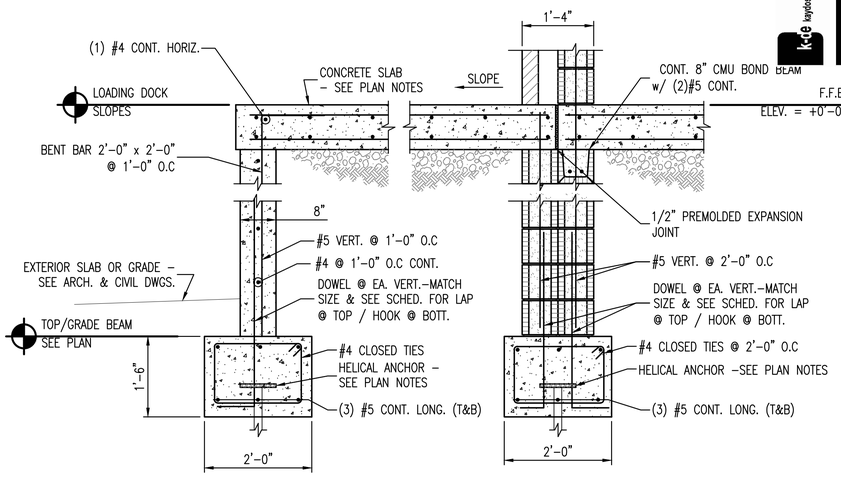


D3 SECTION
3/4" = 1'-0"



D5 SECTION
3/4" = 1'-0"



B5 SECTION
3/4" = 1'-0"

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

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A/E	EFD	
LGG		DESIGN
CCM		DRAWN
LGG		REVIEW
HON		QC
LGG		CHIEF ARCH./ ENGR.

PROJECT MANAGER
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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS AIR STATION, CHERRY POINT, N.C.

CONSTRUCT COMPOSITE SHOP ADDITION, BUILDING 4224

SECTIONS

STA. PROJ. NO. 6328570
SPEC. NO.
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12685637
SHEET 24 OF 45

S–103

100% Final Submittal

APPLICABLE BUILDING CODES

1.	IBC	INTERNATIONAL BUILDING CODE, 2012 (IBC)
2.	UFC 1-200-01	GENERAL BUILDING REQUIREMENTS, 1 SEPTEMBER 2013
3.	UFC 3-600-01	FIRE PROTECTION ENGINEERING FOR FACILITIES, 1 MARCH 2013
4.	UFC 3-600-10N	FIRE PROTECTION PROTECTION ENGINEERING, FINAL DRAFT, AUGUST 2007
5.	NFPA 10	STANDARD FOR PORTABLE FIRE EXTINGUISHERS, 2013
6.	NFPA 13	STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS, 2013
7.	NFPA 70	NATIONAL ELECTRIC CODE, 2014
8.	NFPA 72	NATIONAL FIRE ALARM & SIGNALING CODE, 2013
9.	NFPA 90A	INSTALLATION OF AIR-CONDITIONING AND VENTILATING SYSTEMS, 2012
10.	NFPA 101	LIFE SAFETY CODE, 2012 (LSC)
11.	UFAS	UNIFORM FEDERAL ACCESSIBILITY STANDARDS
12.	ABA	ARCHITECTURAL BARRIERS ACT

USE GROUP/OCCUPANCY

B	BUSINESS (IBC 304.1, LSC 6.1.11) – ORDINARY HAZARD (LSC 38.1.5)
S-1	INDUSTRIAL (IBC 311.2, LSC 6.1.12) – ORDINARY HAZARD (LSC 40.1.2.1.1)
A-2	ACCESSORY ASSEMBLY (IBC 303.3, LSC 6.1.2.1) – ORDINARY HAZARD (LSC 12.1.5)

FIRE PROTECTION SYSTEMS

WET PIPE SPRINKLER SYSTEM
FIRE ALARM SYSTEM

CONSTRUCTION TYPE

BUILDING 4224 — TYPE II-B

ALLOWABLE AREA & HEIGHT

UNLIMITED AREA TWO-STORY GROUPS B & S-1 BUILDING (IBC 507.4)

BASIC ALLOWABLE STORIES/HEIGHT (IBC TABLE 503):	2/55 FT.
INCREASE FOR AUTOMATIC SPRINKLERS (IBC 504.2):	1/20 FT.
TOTAL ALLOWABLE STORIES/HEIGHT:	3/75 FT.

ACTUAL AREA & HEIGHT

TOTAL FOOTPRINT FLOOR AREA	137,260 SQ. FT.
TOTAL BUILDING HEIGHT	2 STORY/49 FT.

FIRE RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS

(IBC TABLE 601, TYPE II-B CONSTRUCTION)

STRUCTURAL FRAME, INCL. COLUMNS, GIRDERS & TRUSSES	0 HR
BEARING WALLS, INTERIOR & EXTERIOR	0 HR
NON-BEARING WALLS, INTERIOR & EXTERIOR	0 HR
FLOOR CONSTRUCTION	0 HR
ROOF CONSTRUCTION	0 HR

EXTERIOR WALLS

EXTERIOR FIRE-RESISTANCE RATING BASED ON FIRE SEPARATION DISTANCE (TYPE II-B)

FIRE SEPARATION DISTANCE (FSD)	GROUP B	GROUP S-1
FSD < 5 FT.	1 HR.	2 HR.
5 FT. < FSD < 10 FT.	1 HR.	1 HR.
FSD > 10 FT.	0 HR.	0 HR.

THE BUILDING IS LOCATED MORE THAN 40-FEET FROM ANY SURROUNDING STRUCTURES; THEREFORE, NO EXTERIOR WALL RATINGS ARE REQUIRED BASED ON FIRE SEPARATION DISTANCE ARE REQUIRED.

INTERIOR FIRE RESISTANCE REQUIREMENTS

INCIDENTAL USE AREAS/SPECIAL HAZARD/TELECOMMUNICATIONS.

ROOM	REQUIRED SEPARATION
BOILER/FURNACE ROOMS	SPRINKLER W/SMOKE PARTITIONS (LSC 38.3.2.1)
GENERAL STORAGE ROOMS	SPRINKLER W/SMOKE PARTITIONS (LSC 38.3.2.1)

INTERIOR FINISH CLASSIFICATION

LIMITS (BASED ON ASSEMBLY OCCUPANCY WITH PERMITTED REDUCTION FOR SPRINKLERS):

EXITS (TABLE A.10.2.2)	MINIMUM CLASS B
EXIT ACCESS CORRIDORS (TABLE A.10.2.2)	MINIMUM CLASS C
OTHER SPACES (TABLE A.10.2.2)	MINIMUM CLASS C
FLOOR FINISH IN EXITS & EXIT ACCESS CORRIDORS	NO REQUIREMENT

MEANS OF EGRESS

MULTIPLE, MIXED OCCUPANCY PER LSC 6.1.14.1.1. MEANS OF EGRESS AND OTHER SAFEGUARDS SHALL COMPLY WITH THE MOST RESTRICTIVE REQUIREMENTS.

OCCUPANT LOADS (LSC TABLE 7.3.1.2)

BUSINESS	100 SQ. FT./PERSON
GENERAL INDUSTRIAL	100 SQ. FT./PERSON
ASSEMBLY (LESS CONCENTRATED)	15 SQ. FT./PERSON
KITCHEN	100 SQ. FT./PERSON
MEP/STORAGE	500 SQ. FT./PERSON

AREA	SPACE USE	APPROX. AREA (SQ. FT.)	OCCUPANT LOAD FACTOR (SQ. FT./PERSON)	OCCUPANT LOAD (PERSONS)
FIRST FLOOR				
OFFICE AREA	BUSINESS	3,073	100	31
LOUNGE	ASSEMBLY	600	15	40
SHOP AREA	GENERAL INDUSTRIAL	118,816	100	1,188
STORAGE	STORAGE	8,033	500	16
UTILITY ROOMS	MEP SPACE	6,738	500	22
	TOTAL	137,260	–	1,297
SECOND FLOOR				
OFFICE AREA	BUSINESS	11,496	100	115
CONFERENCE ROOM	ASSEMBLY	689	15	46
SHOP AREA	GENERAL INDUSTRIAL	18,548	100	185
KITCHEN	KITCHEN	400	100	4
CAFETERIA	ASSEMBLY	1,850	15	123
STORAGE	STORAGE	337	500	1
	TOTAL	31,955	–	474

TRAVEL DISTANCES

COMMON PATH OF TRAVEL (LSC TABLE A.7.6): (ASSEMBLY/BUSINESS/INDUSTRIAL):	20-75*/100/100 FT.
TOTAL TRAVEL DISTANCE (LSC TABLE A.7.6): (ASSEMBLY/BUSINESS/INDUSTRIAL):	250/300/250 FT.
DEAD END CORRIDOR (LSC TABLE A.7.6): (ASSEMBLY/BUSINESS/INDUSTRIAL):	20/50/50 FT.

*20 FT FOR > 50 PERSONS & 75 FT FOR < 50 PERSONS

THE MAXIMUM TRAVEL DISTANCE ON THE FIRST FLOOR IS 245-FT FROM THE MAIN SHOP AREA.

THE MAXIMUM COMMON PATH OF TRAVEL ON THE FIRST FLOOR IS 80-FT FROM THE NEW DISASSEMBLY SHOP.

CAPACITY OF EXITS

CAPACITY OF EXITS (LSC TABLE 7.3.3.1):

LEVEL COMPONENTS (WIDTH/PERSON)	0.2 IN/PERSON
STAIRS (WIDTH/PERSON)	0.3 IN/PERSON

NUMBER OF EXITS (LSC 7.4)

1 FOR ORDINARY HAZARD INDUSTRIAL OCCUPANCIES WHEN THE TRAVEL DISTANCE IS LESS THAN OR EQUAL TO THE COMMON PATH OF TRAVEL (LSC 40.2.4.1.2).
2 FOR OCCUPANT LOAD < 500
3 FOR OCCUPANT LOAD > 500 AND < 1,000
4 FOR OCCUPANT LOAD > 1,000

FLOOR LEVEL	REQUIRED EXIT CAPACITY	AVAILABLE EXIT CAPACITY	NUMBER OF EXITS REQUIRED	NUMBER OF EXITS PROVIDED
FIRST FLOOR	1,297	5,160 3 – 4'-0" WIDE STAIRS 22 – 3'-0" WIDE DOORS 2 – 6'-0" WIDE DOORS	4	27
SECOND FLOOR	474	588 4 – 3'-8" WIDE STAIRS	2	4

ADDITIONAL LIFE SAFETY CRITERIA

MEANS OF EGRESS SHALL BE ILLUMINATED. ARTIFICIAL LIGHTING SHALL BE PROVIDED.

EMERGENCY LIGHTING SYSTEMS SHALL BE PROVIDED WITH BATTERY PACK AT FIXTURE IN EVENT OF LOSS OF POWER.

EXIT SIGNS SHALL BE PROVIDED AT ALL EXIT DOORS AND WITHIN THE EXIT ACCESS TO DIRECT OCCUPANTS TO AN EXIT.

PORTABLE FIRE EXTINGUISHERS SHALL BE LOCATED AND INSTALLED PER NFPA 10 WITH 75 FOOT MAXIMUM TRAVEL DISTANCE TO AN EXTINGUISHER.

LEGEND

- XXX / XXX / XXX — ROOM AREA (SQ. FT) / OCCUPANT LOAD (SQ. FT/PERSON) / NUMBER OF OCCUPANTS (PERSONS)
- ## / ## — REQUIRED EGRESS CAPACITY / PROVIDED EGRESS CAPACITY
- TD = XX FT — TRAVEL DISTANCE
- CP = XX FT — COMMON PATH OF TRAVEL
- 3-HR FIRE-RESISTANCE RATING
- (FE) — NEW WALL-MOUNTED FIRE EXTINGUISHER
- (FE) — EXISTING TO REMAIN WALL-MOUNTED FIRE EXTINGUISHER

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PROJECT MANAGER
FIRE PROTECTION
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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS AIR STATION, CHERRY POINT, N.C.

CONSTRUCT COMPOSITE SHOP ADDITION, BUILDING 4224

BUILDING CODE AND LIFE SAFETY ANALYSIS

STA. PROJ. NO.	6328570
SPEC. NO.	
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	12685638
SHEET	25 OF 45

LS00

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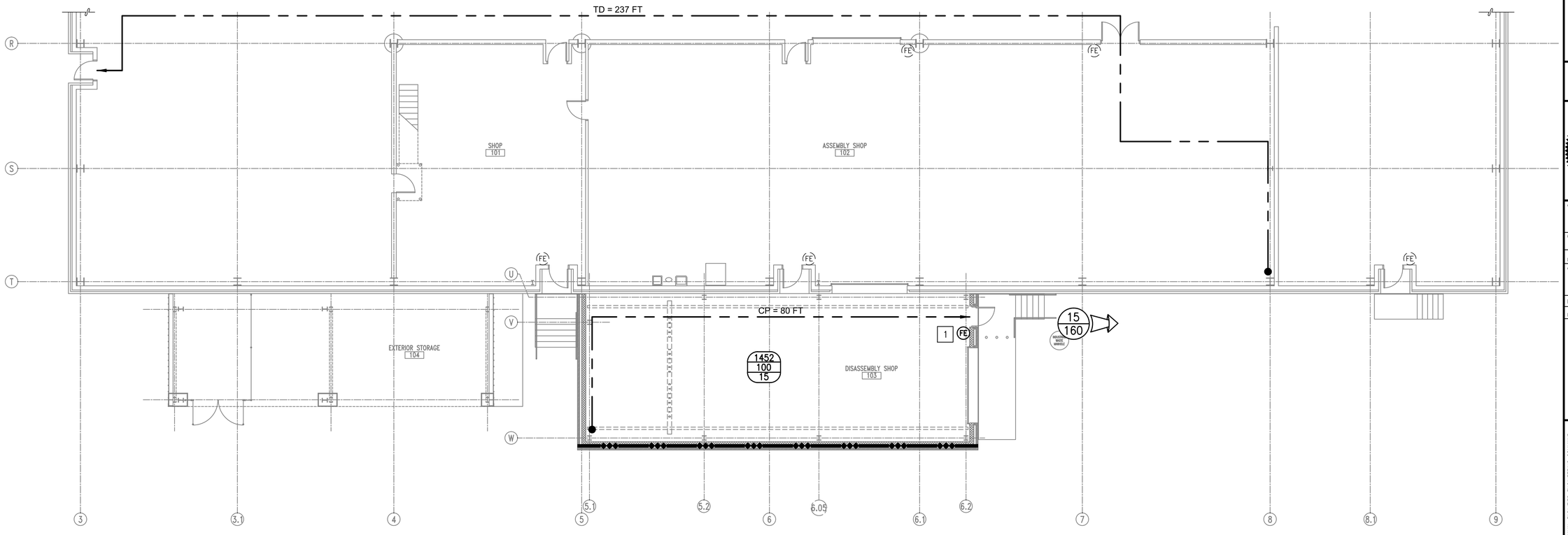
SHEET KEYNOTES

1. PROVIDE NEW WALL-HUNG FIRE EXTINGUISHER.



NORTH

1 / LS101 | LS101

PARTIAL FLOOR PLAN: LIFE SAFETY

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

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

8' 0 4' 8' 16'

NO.	DESCRIPTION	DATE	APPR.

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CONSTRUCT COMPOSITE SHOP ADDITION, BUILDING 4224

PARTIAL FLOOR PLAN - LIFE SAFETY

STA. PROJ. NO. 6328570

SPEC. NO.

CONSTR. CONTR. NO.

NAVFAC DRAWING NO. 12685639

SHEET 26 OF 45

LS-00

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FIRE ALARM SYSTEM GENERAL NOTES

1. GENERAL SCOPE – MODIFY THE EXISTING ADDRESSABLE FIRE ALARM SYSTEM IN BUILDING 4224 TO COORDINATE WITH THE ADDITION OF THE DISASSEMBLY SHOP. THE EXISTING FIRE ALARM CONTROL PANEL BY JCI IS LOCATED IN THE MAIN LOBBY.

2. APPLICABLE CODES:

UFC 1–200–01	GENERAL BUILDING REQUIREMENTS, 1 SEPTEMBER 2013.
UFC 3–600–01	FIRE PROTECTION ENGINEERING FOR FACILITIES, 1 MARCH 2013.
UFC 3–600–10N	FIRE PROTECTION ENGINEERING, AUGUST 2007
NFPA 70	NATIONAL ELECTRIC CODE (NEC), 2014.
NFPA 72	NATIONAL FIRE ALARM CODE, 2013.

3. NEW DEVICES SHALL BE UL LISTED.

4. SIGNALING LINE AND INITIATING DEVICE CIRCUITS SHALL MATCH EXISTING CLASS DESIGNATION.

5. ALL NEW CONDUIT AND BACK BOXES SHALL BE CONCEALED UNLESS OTHERWISE NOTED. ALL NEW JUNCTION BOXES AND COVERS SHALL BE PAINTED RED IN UNFINISHED AREAS. IN FINISHED ARES, CONDUIT AND JUNCTION BOXES SHALL BE PAINTED TO MATCH THE ROOM FINISH. ALL NEW JUNCTION BOXES SHALL HAVE A PERMANENT, MACHINE PRINTED LABEL READING "FIRE ALARM CIRCUIT" ON THE INSIDE COVER. ALL FIRE ALARM CONDUITS IN FINISHED AREAS SHALL BE MARKED WITH ¾–IN RED BANDS EVERY 10 FEET, AT EACH SIDE OF A FLOOR, WALL, OR CEILING PENETRATION.

6. ALL WIRING, CABLES, BOXES, TROUGHS AND OTHER RELATED EQUIPMENT SHALL BE INSTALLED IN STRICT COMPLIANCE WITH THE NATIONAL ELECTRICAL CODE (NEC).

7. ALL PENETRATIONS OF FIRE RESISTANCE RATED BARRIERS, WALLS, AND, SHAFT/ASSEMBLIES SHALL BE DRILLED AND THEN SEALED WITH AN APPROVED UL FIRE–RATED THROUGH–PENETRATION ASSEMBLY.

8. UL CLASSIFICATIONS AND MATERIAL PRODUCT DATA SHEETS FOR ALL FIRE STOPPING SYSTEMS SHALL BE SUBMITTED AND APPROVED BEFORE ANY FIRE STOPPING IS INSTALLED.

9. 25% SPARE CAPACITY SHALL BE PROVIDED ON NEW INDIVIDUAL CIRCUITS.

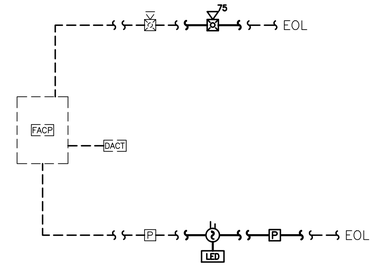
10. SECONDARY POWER SUPPLY SHALL BE VIA LEAD CALCIUM BATTERY CAPABLE OF OPERATING THE FIRE ALARM SYSTEM ON STANDBY FOR 48 HOURS FOLLOWED BY 10 MINUTES IN ALARM. CHARGING AND METERING SHALL BE PROVIDED IN ACCORDANCE WITH NFPA 72.

11. ALL DRAWINGS ARE CONCEPTUAL IN NATURE. THEY DO NOT SHOW THE EXACT LOCATIONS OF COMPONENTS NOR SHOW ALL SYSTEM COMPONENTS. CONTRACTOR SHALL PROVIDE ADDITIONAL COMPONENTS FOR A PROPERLY INSTALLED AND FUNCTIONAL SYSTEM IN ACCORDANCE WITH ALL APPLICABLE CODES.

12. DEDICATED BATTERY CABINETS SHALL BE MOUNTED NO MORE THAN 3 FEET FROM THE FINISHED FLOOR.

FIRE PROTECTION LEGEND

FACP	EXISTING TO REMAIN FIRE ALARM CONTROL PANEL
DACT	EXISTING TO REMAIN DIGITAL ALARM COMMUNICATOR TRANSMITTER
	EXISTING TO REMAIN WALL–MOUNT COMBINATION HORN/STROBE
	WALL–MOUNT COMBINATION HORN WITH CLEAR FIRE ALARM STROBE MARKED WITH "FIRE" (SUPERSCRIPT INDICATES CANDELA RATING)
	ADDRESSABLE MANUAL PULL STATION TO BE REMOVED AND RETAINED
P	EXISTING TO REMAIN ADDRESSABLE MANUAL PULL STATION
P	ADDRESSABLE MANUAL PULL STATION TO BE RELOCATED
	ADDRESSABLE DUCT SMOKE DETECTOR
LED	DUCT SMOKE DETECTOR REMOTE TEST STATIO WITH ALARM LED AND TEST SWITCH



NOTE: NOT ALL DEVICES ARE INDICATED IN THE DIAGRAM. SYMBOLS MAY REPRESENT MULTIPLE DEVICES, APPLIANCES AND CIRCUITS.

1 FA001 FA001 FIRE ALARM RISER DIAGRAM
SCALE: NOT TO SCALE

FIRE ALARM INPUT	ACTIVATE AUDIBLE AND VISUAL FA EVACUATION	ALARM CONDITION AT FACP	SUPERVISORY CONDITION AT FACP	TROUBLE CONDITION AT FACP	TRANSMIT ALARM SIGNAL TO FIRE DEPT. VIA DACT	SHUT DOWN AIR HANDLING UNIT	ACTIVATION OF ELEVATOR RECALL TO PRIMARY LEVEL	ACTIVATION OF ELEVATOR RECALL TO SECONDARY LEVEL	ILLUMINATE FIREFIGHTER'S SERVICE SIGNAL (CONSTANT)	ILLUMINATE FIREFIGHTER'S SERVICE SIGNAL (FLASH)	SHUNT TRIP POWER TO ELEVATOR (NO TIME DELAY)
MANUAL PULL STATION	●	●			●						
AUTOMATIC SPRINKLER FLOW SWITCH	●	●			●						
AUTOMATIC SPRINKLER SYSTEM TAMPER SWITCH			●								
AREA SMOKE DETECTOR ACTIVATION	●	●			●						
DUCT SMOKE DETECTOR ACTIVATION			●			●					
FIRST FLOOR ELEVATOR LOBBY SMOKE DETECTOR ACTIVATION	●	●			●			●	●		
SECOND FLOOR ELEVATOR LOBBY SMOKE DETECTOR ACTIVATION	●	●			●		●		●		
ELEVATOR MACHINE ROOM SMOKE DETECTOR ACTIVATION	●	●			●		●			●	
ELEVATOR MACHINE ROOM WATER FLOW SWITCH	●	●			●						●
ELEVATOR SHUNT TRIP POWER FAILURE			●								
FACU CIRCUIT FAULT (OPEN, GROUND, SHORT)				●							
OTHER TROUBLE CONDITION				●							

2 FA001 FA001 FIRE ALARM SEQUENCE OF OPERATIONS
SCALE: NOT TO SCALE

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CONSTRUCT COMPOSITE SHOP ADDITION, BUILDING 4224

FIRE ALARM GENERAL NOTES AND LEGEND

STA. PROJ. NO. 6328570
SPEC. NO.
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12685640
SHEET 27 OF 45

FA001

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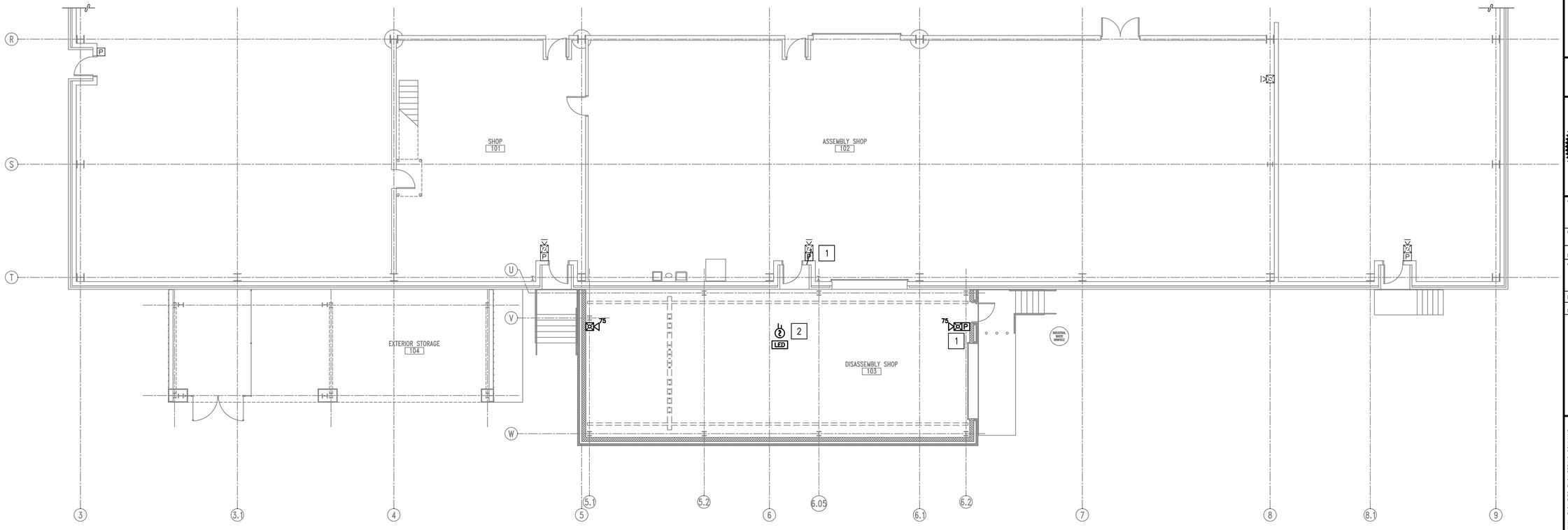
SHEET KEYNOTES

1. RELOCATE EXISTING MANUAL PULL STATION FROM ASSEMBLY SHOP 102 TO DISASSEMBLY SHOP 103.
2. PROVIDE DUCT SMOKE DETECTOR FOR AHU-1 ON ROOF. COORDINATE EXACT LOCATION WITH MECHANICAL CONTRACTOR.



NORTH

1 / FA101 FA101

PARTIAL FLOOR PLAN: FIRE ALARM

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

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

8' 0 4' 8' 16'

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CONSTRUCT COMPOSITE SHOP ADDITION, BUILDING 4224

PARTIAL FLOOR PLAN FIRE ALARM

STA. PROJ. NO. 6328570

SPEC. NO.

CONSTR. CONTR. NO.

NAVFAC DRAWING NO.
12685641

SHEET 28 OF 45

A0

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FIRE PROTECTION GENERAL NOTES

1. GENERAL SCOPE – EXTEND THE EXISTING SPRINKLER SYSTEM TO PROTECT THE DISASSEMBLY SHOP ADDITION.
2. APPLICABLE CODES:

UFC 1–200–01	GENERAL BUILDING REQUIREMENTS, 1 SEPTEMBER 2013.
UFC 3–600–01	FIRE PROTECTION ENGINEERING FOR FACILITIES, 1 MARCH 2013.
UFC 3–600–10N	FIRE PROTECTION ENGINEERING, AUGUST 2007
NFPA 13	INSTALLATION OF SPRINKLER SYSTEMS, 2013.

3. THE CONTRACTOR SHALL HAVE A DESIGNER WITH A NICET LEVEL III CERTIFICATION IN WATER–BASED FIRE PROTECTION SYSTEM LAYOUT OR A LICENSED PROFESSIONAL FIRE PROTECTION ENGINEER IN RESPONSIBLE CHARGE OF THE SYSTEM DESIGN.
4. WET PIPE SPRINKLER PIPE SHALL BE UL LISTED BLACK STEEL, MINIMUM SCHEDULE 40 FOR ALL PIPE DIAMETERS LESS THAN 2–INCH. WET PIPE SPRINKLER PIPE SHALL BE UL LISTED BLACK STEEL, MINIMUM SCHEDULE 10 FOR ALL PIPE DIAMETERS 2–INCH AND LARGER
5. THE DISASSEMBLY SHOP SHALL BE CLASSIFIED AS HAZARD CATEGORY 2.
6. SPRINKLERS SHALL HAVE A MINIMUM K FACTOR OF 8.0 IN HAZARD CATERGORY 2 AREAS.
7. UPRIGHT SPRINKLERS SHALL BE INSTALLED IN THE DISASSEMBLY SHOP.
8. PROVIDE QUICK–RESPONSE SPRINKLERS IN ALL SPACES.
9. PROVIDE A MINIMUM OF TWO SPARE SPRINKLERS OF EACH TYPE AND TEMPERATURE CLASSIFICATION.
10. SPRINKLER SYSTEM SHALL BE HYDRAULICALLY DESIGNED.
11. ALL PIPE PENETRATIONS THROUGH FIRE RATED BARRIERS SHALL BE PROVIDED WITH U.L. LISTED FIRE STOP SYSTEMS. THIS INCLUDES BUT IS NOT LIMITED TO STAIRS, FLOORS, CEILINGS AND SHAFTS.
12. UL CLASSIFICATIONS AND MATERIAL PRODUCT DATA SHEETS FOR ALL FIRE STOPPING SYSTEMS SHALL BE SUBMITTED AND APPROVED BEFORE ANY FIRE STOPPING IS INSTALLED.
13. AVAILABLE WATER SUPPLY TEST DATA IS AS FOLLOWS:

DATE TEST PERFORMED:	11/5/2014
STATIC PRESSURE (WFH–1009):	46 PSI
RESIDUAL PRESSURE (WFH–1002):	44 PSI
FLOW RATE:	1,015 GPM

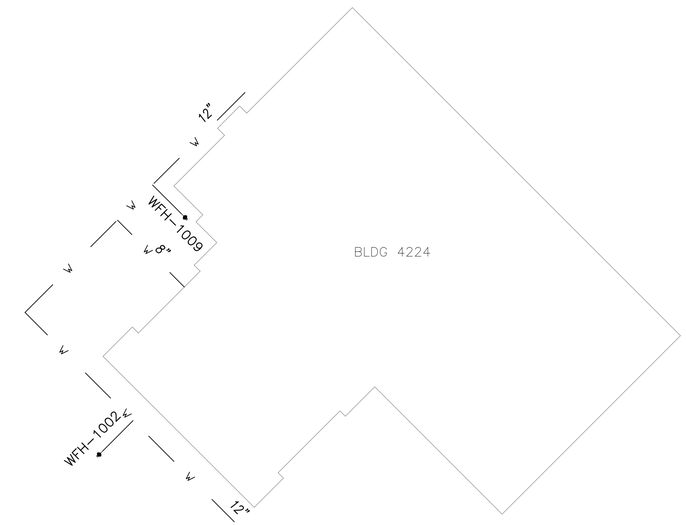
14. THESE DRAWINGS DEMONSTRATE THE CONFIGURATION OF MAJOR SYSTEM COMPONENTS. THEY ARE DIAGRAMMATIC IN NATURE AND ARE NOT INTENDED TO SHOW EXACT LOCATIONS. PIPE LENGTHS AND ELEVATIONS INDICATED ON THE DRAWINGS (IF SHOWN) ARE APPROXIMATE. COORDINATE FINAL INSTALLATION WITH ACTUAL FIELD CONDITIONS AND OTHER CONSTRUCTION TRADES. THE CONTRACTOR SHALL DESIGN THE SPRINKLER SYSTEM TO PROVIDE COMPLETE PROTECTION THROUGHOUT IN ACCORDANCE WITH NFPA13.

FIRE PROTECTION LEGEND

- EXISTING TO REMAIN SPRINKLER PIPING
- SPRINKLER PIPING
- EXTENT OF SPRINKLER WORK

OCCUPANCY HAZARD INFORMATION

THE DISASSEMBLY SHOP SHALL BE HAZARD CATEGORY 2. A MINIMUM DENSITY OF 0.20 GPM/SQ.FT. WITH A DESIGN AREA OF 2,500 SQ.FT. AND A HOSE ALLOWANCE OF 250 GPM SHALL BE USED. SPRINKLER LAYOUT SHALL BE IN ACCORDANCE WITH NFPA 13 ORDINARY HAZARD SPACING.



1 FX001 FX001 HYDRANT FLOW TEST SITE MAP
SCALE: NOT TO SCALE

APPR.	DATE	DESCRIPTION
CTR.		

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COMMONWEALTH OF VIRGINIA
Aaron P. Freid
AARON P. FREID
Lic. No. 044409
14 AUG 2015
PROFESSIONAL ENGINEER
SEAL

APPROVED
ACTIVITY – SATISFACTORY TO
DATE
APPROVED
FOR EFD FOR COMMANDER NAVFAC
DATE

A/E	EFD
APF	DESIGN
DEG	DRAWN
AJW	REVIEW
AJW	QC
AJW	CHIEF ARCH./ ENGR.

PROJECT MANAGER
FIRE PROTECTION
BRANCH MANAGER
DESIGN DIRECTOR

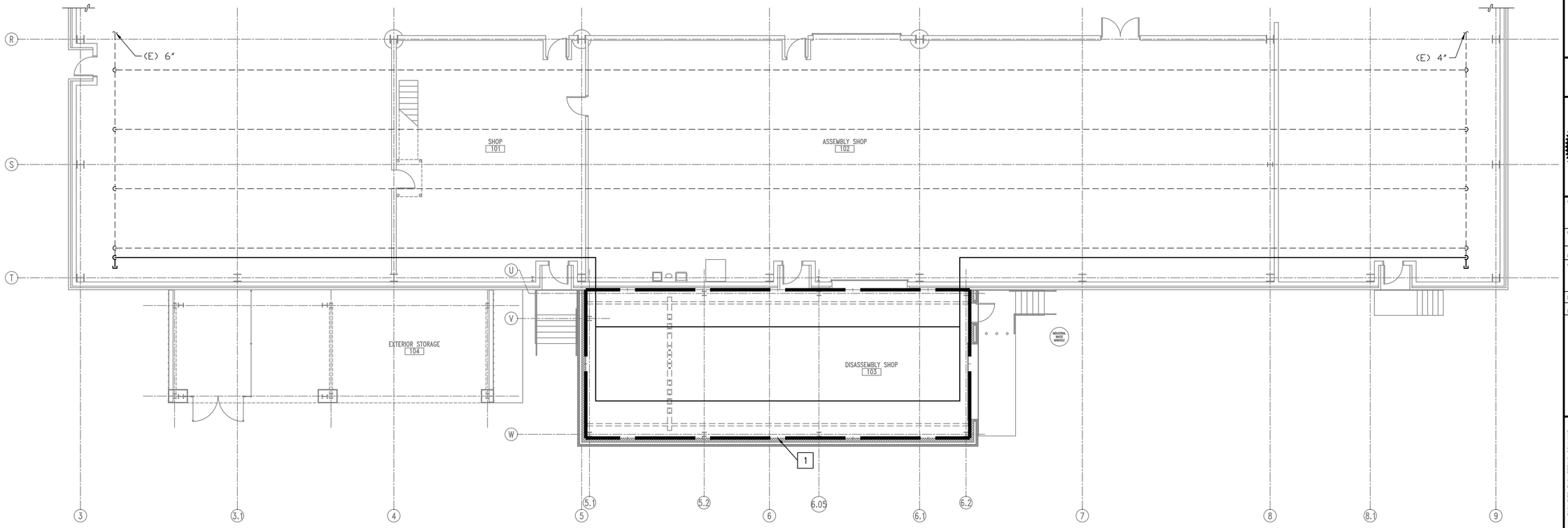
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS AIR STATION, CHERRY POINT, N.C.
CONSTRUCT COMPOSITE SHOP ADDITION, BUILDING 4224
FIRE PROTECTION GENERAL NOTES AND LEGEND

STA. PROJ. NO. 6328570
SPEC. NO.
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12685642
SHEET 29 OF 45
FX000

100% Final Submittal

SHEET KEYNOTES

1. PROVIDE SPRINKLER SYSTEM WITHIN THE OUTLINED AREA. EXTEND SPRINKLER SYSTEM TO THE ADDITION FROM EXISTING SYSTEM.



NORTH

1 FX101|FX101 PARTIAL FLOOR PLAN: FIRE PROTECTION

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

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

8' 0 4' 8' 16'

DEPARTMENT OF THE NAVY

MARINE CORPS AIR STATION, CHERRY POINT, N.C.

NAVAL FACILITIES ENGINEERING COMMAND

CONSTRUCT COMPOSITE SHOP ADDITION, BUILDING 4224

PARTIAL FLOOR PLAN FIRE PROTECTION

DESIGNED & ENGINEERED BY:

MBF Architects PA

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FIRE PROTECTION

BRANCH MANAGER

DESIGN DIRECTOR

DTM	DESCRIPTION	DATE	APPR

STA. PROJ. NO. 6328570

SPEC. NO.

CONSTR. CONTR. NO.

NAVFAC DRAWING NO. 12685643

SHEET 30 OF 45

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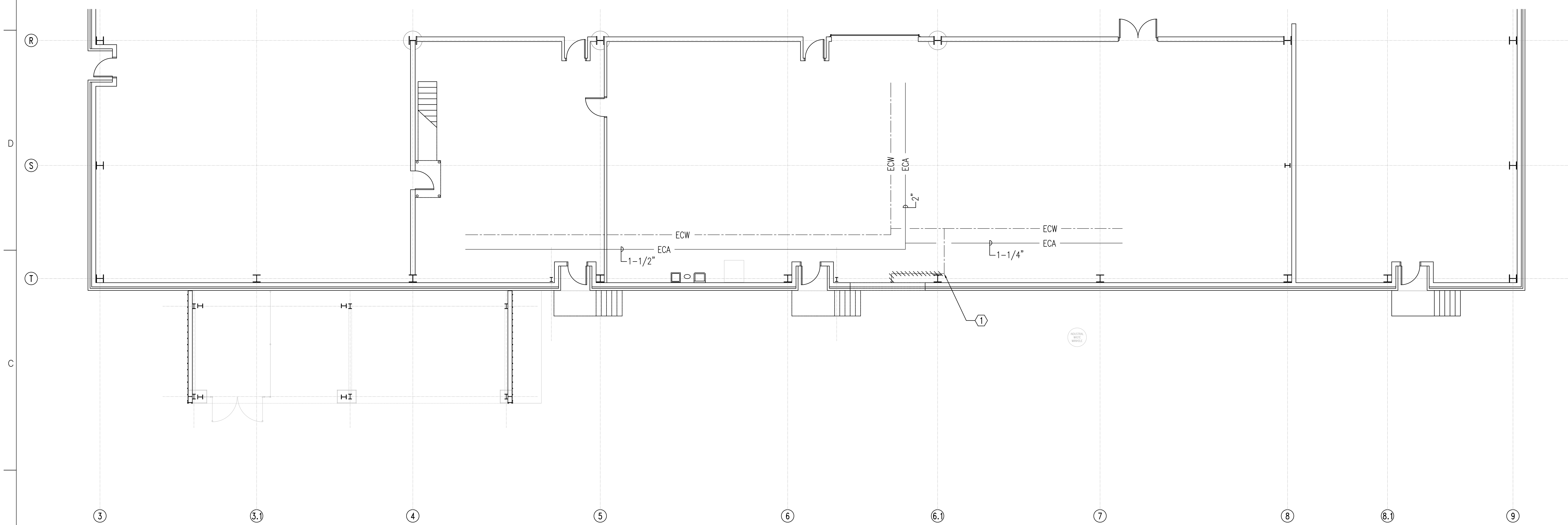

PARTIAL FLOOR PLAN – PLUMBING

1 P-101 P-101 DEMOLITION SCALE: 1/8"=1'-0"

PLUMBING LEGEND AND ABBREVIATIONS

—— CA ——	COMPRESSED AIR PIPING (CA)
—·— CW —·—	COLD WATER PIPING (CW)
—·— ECW —·—	EXISTING COLD WATER PIPING (ECW)
—— ECA ——	EXISTING COMPRESSED AIR PIPING (ECA)
—— EIW ——	EXISTING INDUSTRIAL WASTE PIPING (EIW)
——○	ELL TURNS UP
——◌	ELL TURNS DOWN
——⋈——	BALL VALVE
AFF	ABOVE FINISH FLOOR
◕	NEW TO EXISTING

PLAN NOTES:

1. REMOVE EXISTING 1/2" CW DROP TO THIS POINT. DROP NEEDS TO BE RELOCATED TO AVOID NEW OVERHEAD DOOR.

GRAPHIC SCALE: 1/8"=1'-0"
8' 0 4' 8' 16'

SYM.	DESCRIPTION	DATE	APPR

DESIGNED & ENGINEERED BY:

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NORTH CAROLINA PROFESSIONAL SEAL 19709 ENGINEER JAMES R. CRENSHAW, JR.
8-14-15
SEAL

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FIRE PROTECTION
BRANCH MANAGER
DESIGN DIRECTOR

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS AIR STATION, CHERRY POINT, N.C.

CONSTRUCT COMPOSITE SHOP
ADDITION, BUILDING 4224

PARTIAL □LOOR PLAN □PL□M□IN□ DEMOLITION

STA. PROJ. NO. 6328570
SPEC. NO.
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12685644
SHEET 31 OF 45

P-□0□

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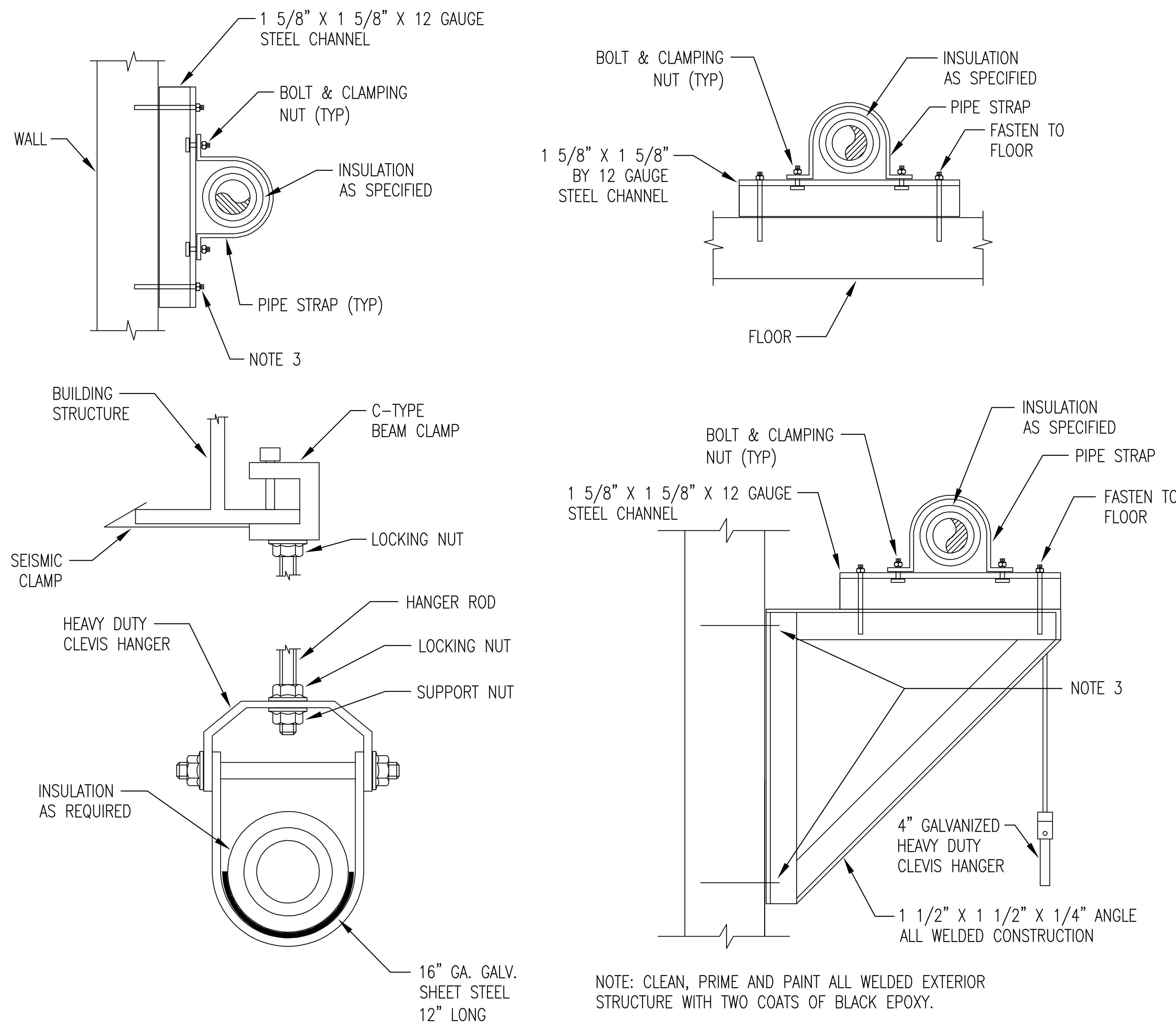


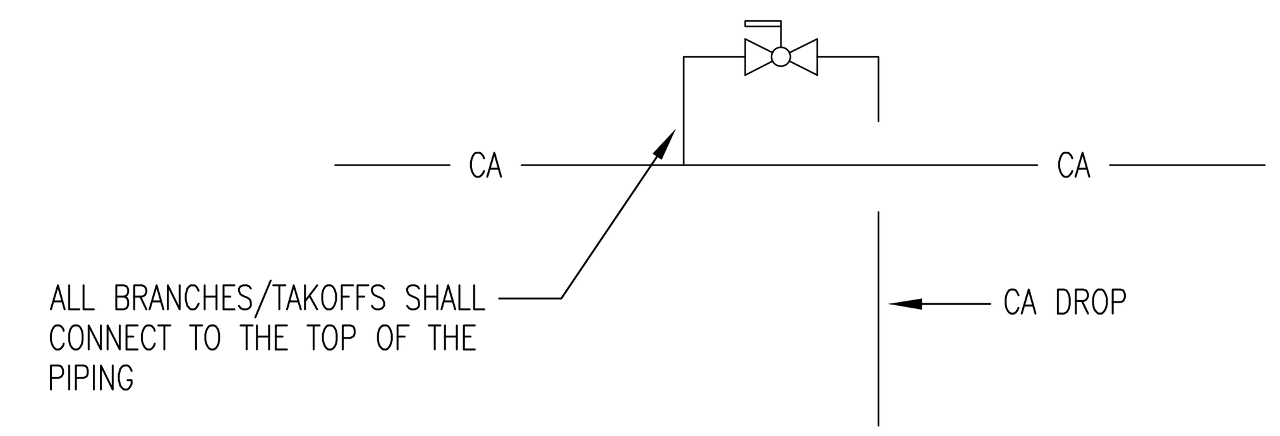
NOTE: CLEAN, PRIME AND PAINT ALL WELDED EXTERIOR STRUCTURE WITH TWO COATS OF BLACK EPOXY.

NOTES:

1. DO NOT USE SPLIT RING HANGERS.
2. FOR ALL INSTALLED BEAM CLAMPS ENSURE SEISMIC CLAMP IS INSTALLED PER CURRENT INTERNATIONAL BUILDING CODE, INTERNATIONAL PLUMBING CODE AND THE INTERNATIONAL MECHANICAL CODE.
3. SECURE TO WALL WITH ANCHORS TYPICAL TOP AND BOTTOM FOR EACH SUPPORT. FOR PLYWOOD PANELING AND GYPSUM BOARD BOLTS FROM PULLING THROUGH WALL OVERSIZED WASHER SHALL BE USED IN ADDITION TO THE BACK BRACE ON THE THRU WALL FASTENER.

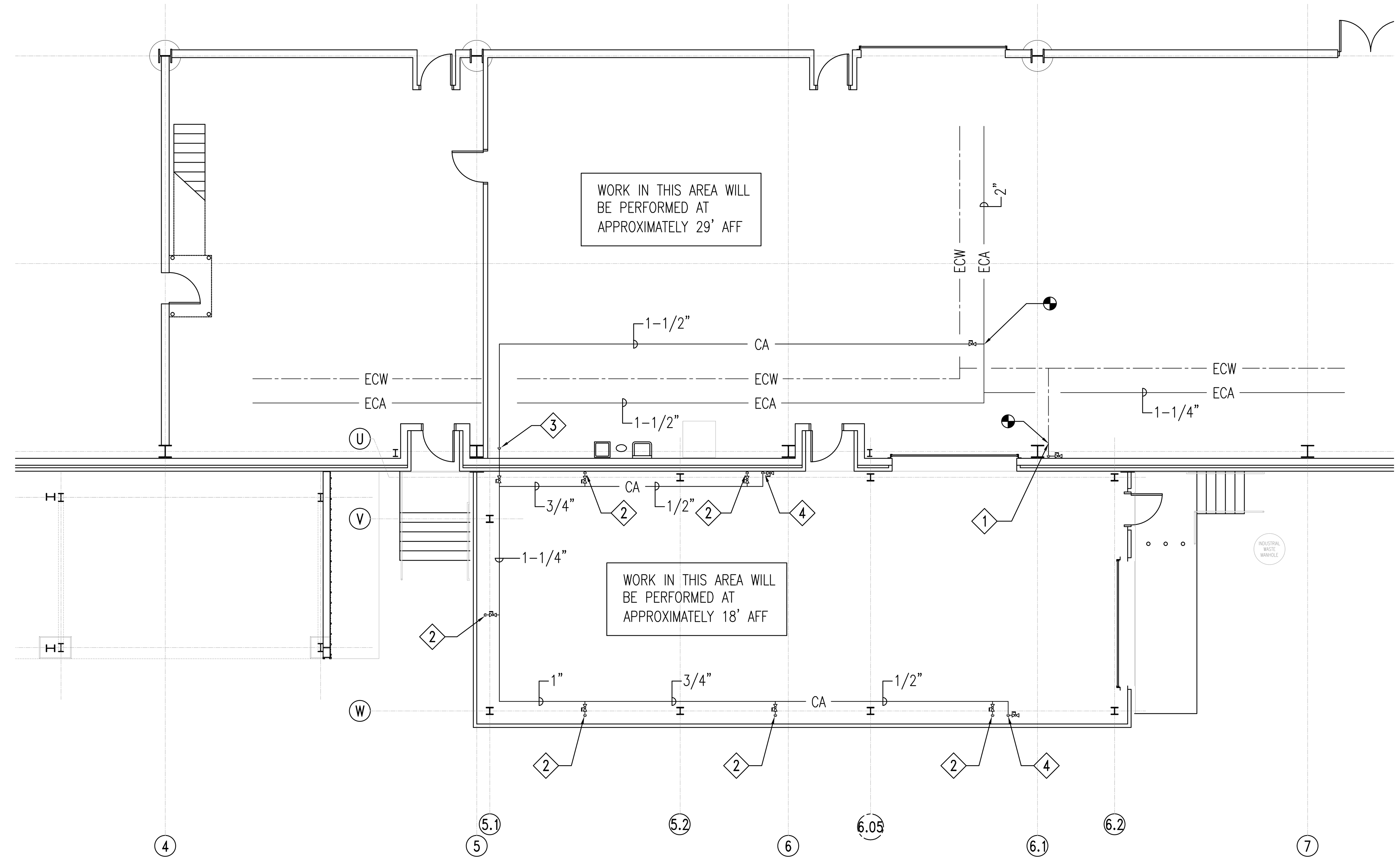
3 (P-102) DETAIL – TYPICAL PIPE SUPPORT

NTS



5 (P-102) TYPICAL BRANCH/TAKEOFF DETAIL

NTS

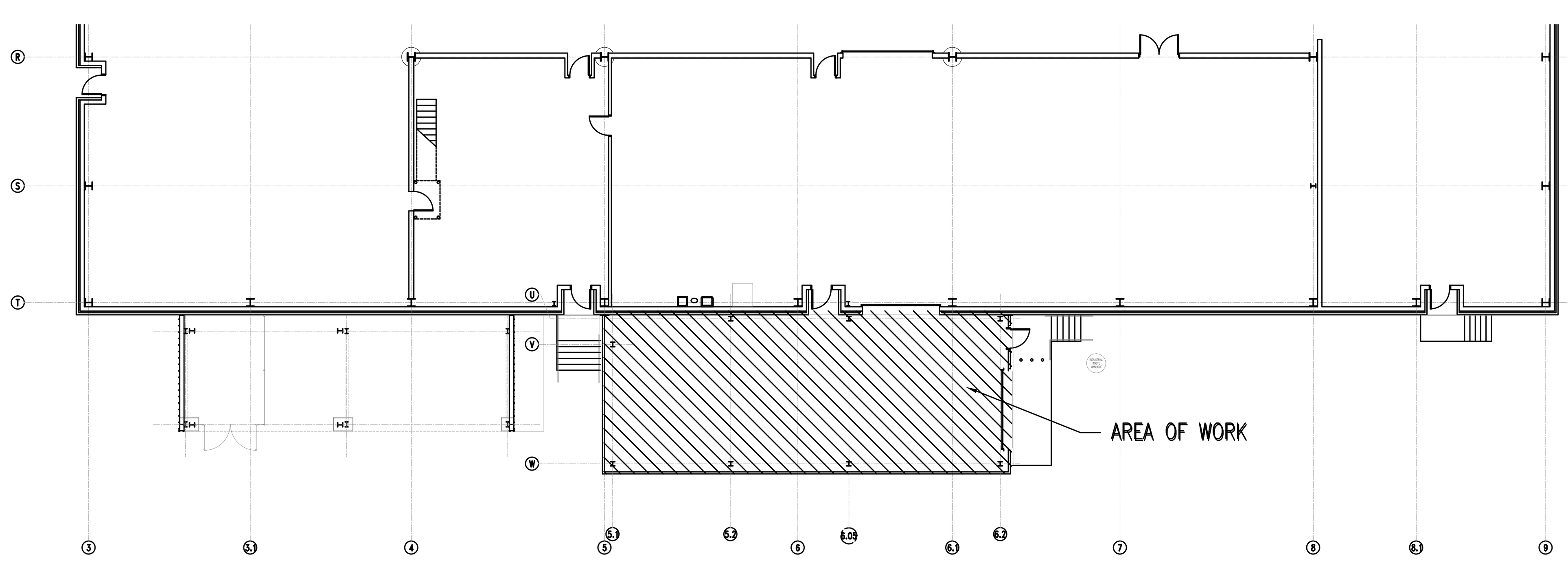


1 (P-102 P-102) PARTIAL FLOOR PLAN – PLUMBING

CONSTRUCTION

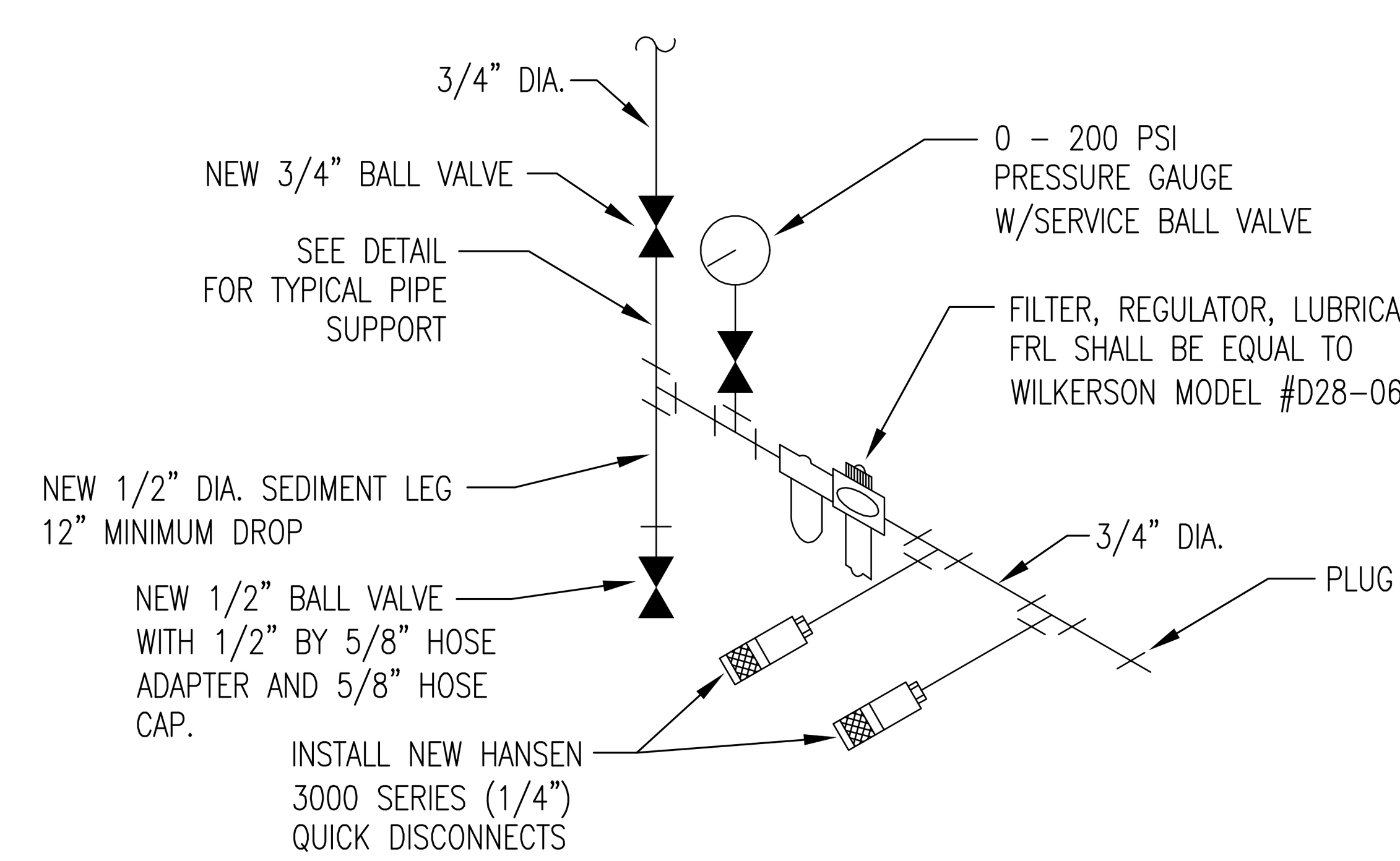
SCALE: 1/8"=1'-0"

ALL PIPE LABELING SHALL BE COMPLETED PER ASME A13.1 GUIDELINES



2 (P-102) KEY PLAN

NTS



4 (P-102) TYPICAL COMPRESSED AIR STATION

NTS

PLAN NOTES:

1. CONNECT TO EXISTING 1/2" CW DROP AT THIS POINT. PROVIDE NEW DROP AT LOCATION SHOWN. PROVIDE 1/2" BALL VALVE FOR DROP 48" AFF.
2. PROVIDE 1/2" COMPRESSED AIR DROP TO QUICK DISCONNECT COUPLING. TERMINATE AT 48" AFF.
3. TURN 1-1/2" COMPRESSED AIR LINE DOWN TO APPROXIMATELY 16' AFF AT THIS LOCATION IN ORDER TO ENTER ROOF STRUCTURE OF ADDITION.
4. PROVIDE DRAIN LEG TERMINATED WITH A 90° BALL VALVE AT THIS LOCATION.

GRAPHIC SCALE: 1/8"=1'-0"
8' 0 4' 8' 16'

SYM. | DESCRIPTION | DATE | APPR

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8-14-15
SEAL

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JRC	CHIEF ARCH./ ENGR.	
	PROJECT MANAGER	
	FIRE PROTECTION	
	BRANCH MANAGER	
	DESIGN DIRECTOR	

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS AIR STATION, CHERRY POINT, N.C.

CONSTRUCT COMPOSITE SHOP ADDITION, BUILDING 4224

PARTIAL FLOOR PLAN PLUMBING

STA. PROJ. NO. 6328570
SPEC. NO.
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12685645
SHEET 32 OF 45

P-102

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DRAWING LEGEND

	CEILING SUPPLY DIFFUSER
	SIDEWALL SUPPLY DIFFUSER
	CEILING RETURN GRILLE
	CEILING EXHAUST GRILLE
	SIDEWALL RETURN/EXHAUST GRILLE
WXH	RECTANGULAR DUCT (W = WIDTH, H = HEIGHT)
D"ø	ROUND DUCT (D = DIAMETER)
	EXISTING DUCT, DIFFUSER OR EQUIPMENT
	EXISTING DUCT, DIFFUSER OR EQUIPMENT TO BE DEMOLISHED
	SPIN-IN TAP WITH TRANSITION FROM HARD TO FLEXIBLE DUCT
	MANUAL VOLUME DAMPER
	RECTANGULAR DUCT TURNS DOWN
	RECTANGULAR DUCT TURNS UP
	ROUND DUCT TURNS DOWN
	ROUND DUCT TURNS UP
FD	FIRE DAMPER
M	MOTORIZED DAMPER
E	HVAC SYSTEM EMERGENCY SHUTDOWN SWITCH
SD	DUCT MOUNTED SMOKE DETECTOR
A / 150	DIFFUSER TAG — DIFFUSER TYPE / CFM
	PUMP (BASE-MOUNTED)

DRAWING LEGEND

	GATE VALVE
	BUTTERFLY VALVE
	BALL VALVE
	SWING CHECK VALVE
	BALANCING VALVE
	TWO WAY CONTROL VALVE
	THREE WAY CONTROL VALVE
TDV	TRIPLE DUTY VALVE
	STRAINER WITH BLOW OFF VALVE
FS	FLOW SWITCH
TT	TEMPERATURE TRANSMITTER
PT/PS	PRESSURE TRANSMITTER OR PRESSURE SWITCH
TH	THERMOMETER
	PRESSURE INDICATOR
	AUTOMATIC AIR VENT
	DIRECTION OF FLOW
	UNION - SCREWED OR FLANGED
	CONCENTRIC REDUCER
T	WALL MOUNTED THERMOSTAT
	TERMINATION POINT OF DEMOLITION
	CONNECT TO EXISTING

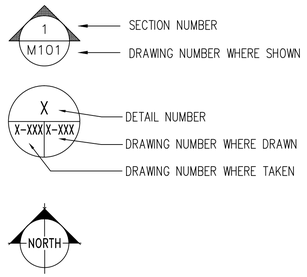
ABBREVIATIONS

AFC	ABOVE FINISHED CEILING
AFF	ABOVE FINISHED FLOOR
AFMS	AIR FLOW MONITORING STATION
BAS	BUILDING AUTOMATION SYSTEM
BFP	BACKFLOW PREVENTER
BTUH	BRITISH THERMAL UNIT PER HOUR
CFM	CUBIC FEET PER MINUTE
CHWR	CHILLED WATER RETURN
CHWRR	CHILLED WATER REVERSE RETURN
CHWS	CHILLED WATER SUPPLY
CU. FT.	CUBIC FEET
DB	DRY BULB
DDC	DIRECT DIGITAL CONTROL
EA, E/A	EXHAUST AIR FLOW
EAT	ENTERING AIR TEMPERATURE
ESP	EXTERNAL STATIC PRESSURE
W.G.	INCHES OF WATER GAUGE
EWT	ENTERING WATER TEMPERATURE
F	FAHRENHEIT
FD	FIRE DAMPER
FOT	FLAT ON TOP
HP	HORSEPOWER
HWR	HOT WATER RETURN
HWRR	HOT WATER REVERSE RETURN
HWS	HOT WATER SUPPLY
HZ	HERTZ
IN. WC	INCHES OF WATER COLUMN
KW	TOTAL POWER INPUT, KILOWATTS
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LRA	LOCKED ROTOR AMPS
LWT	LEAVING WATER TEMPERATURE
MC	MECHANICAL CONTRACTOR
MFG	MANUFACTURER
MCA	MINIMUM CIRCUIT AMPS
MOCP	MAXIMUM OVER CURRENT PROTECTION
MVD	MANUAL VOLUME DAMPER
OA, O/A	OUTSIDE AIR FLOW
PH	PHASE
PSI	POUNDS PER SQUARE INCH
RA, R/A	RETURN AIR FLOW
RLA	RATED LOAD AMPS
RPM	REVOLUTIONS PER MINUTE
SA, S/A	SUPPLY AIR FLOW
SP	STATIC PRESSURE
TA, T/A	TRANSFER AIR FLOW
TEMP	TEMPERATURE
TON	12,000 BTUH OF COOLING CAPACITY
TYP	TYPICAL
VFD	VARIABLE FREQUENCY DRIVE
WB	WET BULB TEMPERATURE

MARKS

AHU	AIR HANDLING UNIT
ST	SOUND TRAP
UH	UNIT HEATER

DRAWING SYMBOLS



GENERAL NOTES

1. CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL EQUIPMENT, PIPING, AND DUCTWORK UNDER THIS CONTRACT WITH THE BUILDING STRUCTURE. CONTRACTOR SHALL MAKE ADJUSTMENTS WHERE NECESSARY WITHOUT ADDITIONAL COST TO GOVERNMENT.
2. COORDINATE ALL SUPPLY, RETURN AND EXHAUST GRILLE LOCATIONS WITH STRUCTURAL PLANS AND ARCHITECTURAL REFLECTED CEILING PLANS.
3. INSTALL FIRE DAMPERS FOR ALL DUCTS PENETRATING RATED PARTITIONS.
4. VERIFY EXISTING PIPE SIZES, LOCATIONS, AND NEW PIPE ROUTING.
5. THERE SHALL BE A CONTROLS CONTRACTOR AS A SUB TO THE CONTRACTOR. TIE NEW EQUIPMENT INTO EXISTING CONTROLS SYSTEM. EXISTING CONTROLS PROVIDED BY JCI.
6. EQUIPMENT DESIGNATIONS ON THESE DRAWINGS MAY NOT INDICATE ACTUAL EQUIPMENT TAGS. CONTRACTOR SHALL VERIFY EXISTING EQUIPMENT MARKERS AND COORDINATE ALL NEW AND USED EQUIPMENT TAGS WITH ROICC.

APPR | DATE | DESCRIPTION | SYM

DESIGNED & ENGINEERED BY:

CRENSHAW CONSULTING GROUP, P.A.
NC LICENSE #C-1555

NORTH CAROLINA PROFESSIONAL SEAL 28374 ENGINEER JONATHAN D. LEWIS
8-11-15 SEAL

APPROVED

ACTIVITY - SATISFACTORY TO

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FIRE PROTECTION
BRANCH MANAGER
DESIGN DIRECTOR

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS AIR STATION, CHERRY POINT, N.C.

CONSTRUCT COMPOSITE SHOP ADDITION, BUILDING 4224

MECHANICAL NOTES □ LE□ENDS

STA. PROJ. NO. 6328570

SPEC. NO.

CONSTR. CONTR. NO.

NAVFAC DRAWING NO. 12685646

SHEET 33 OF 45

M-□00

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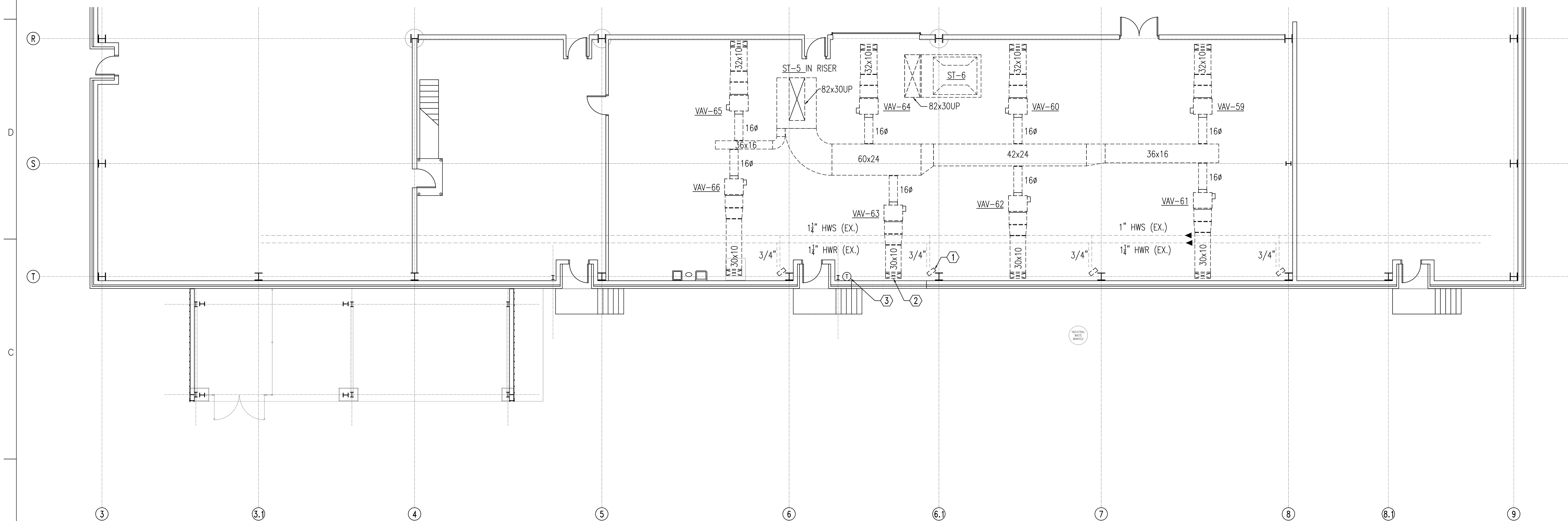

NORTH

1 M-101 | M-101

PARTIAL FLOOR PLAN – MECHANICAL

DEMOLITION

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

GENERAL NOTES:

1. PRIOR TO DEMOLITION, CONTRACTOR SHALL PERFORM AN AIR FLOW RATE VERIFICATION ON DUCTWORK FROM VAV 53 TO BE MODIFIED. DURING THE INSTALLATION PHASE, CONTRACTOR SHALL BALANCE VAV 53 TO ORIGINAL AIR FLOW RATE.

2. PRIOR TO DEMOLITION, THE CONTRACTOR SHALL PERFORM A WATER FLOW RATE VERIFICATION ON THE UNIT HEATER TO BE RELOCATED. DURING THE INSTALLATION PHASE, CONTRACTOR SHALL BALANCE THE WATER TO ORIGINAL FLOW RATE.

PLAN NOTES:

⟨1⟩ REMOVE EXISTING UNIT HEATER AND ASSOCIATED HW PIPING TO ALLOW NEW ROLLUP DOOR INSTALLATION. EXISTING UNIT HEATER TO BE CLEANED AND PREPARED FOR REINSTALLATION. SEE M-102 FOR REINSTALLATION NOTES.

⟨2⟩ REMOVE EXISTING SUPPLY GRILLE AND VERTICAL DUCTWORK TO ALLOW INSTALLATION OF NEW ROLLUP DOOR AND MOTOR ASSEMBLY. CLEAN EXISTING SUPPLY GRILLE AND PREPARE FOR REINSTALLATION. SEE M-102 FOR REINSTALLATION NOTES.

⟨3⟩ REMOVE EXISTING VAV THERMOSTAT AND PREPARE FOR REINSTALLATION. SEE M-102 FOR REINSTALLATION NOTES.

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

8' 0 4' 8' 16'

SYM.	DESCRIPTION	DATE	APPR

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MARINE CORPS AIR STATION, CHERRY POINT, N.C.

CONSTRUCT COMPOSITE SHOP ADDITION, BUILDING 4224

PARTIAL □LOOR PLAN □MECHANICAL DEMOLITION

STA. PROJ. NO. 6328570

SPEC. NO.

CONSTR. CONTR. NO.

NAVFAC DRAWING NO. 12685647

SHEET 34 OF 45

M-□0□

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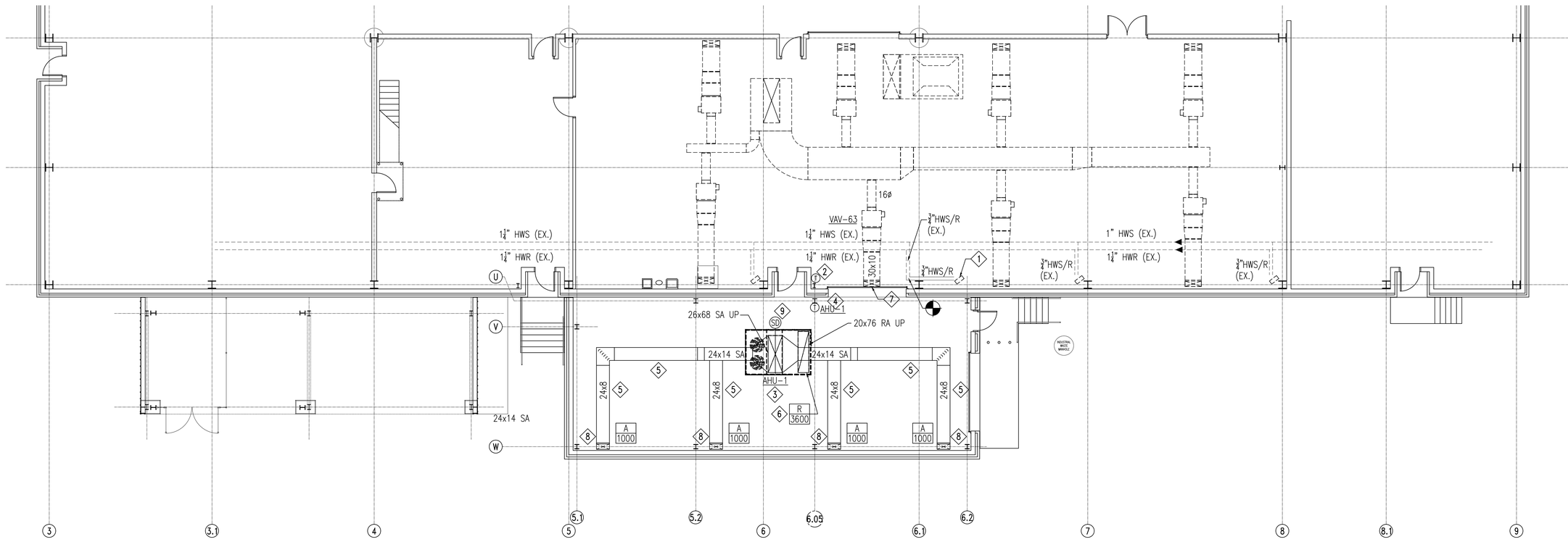
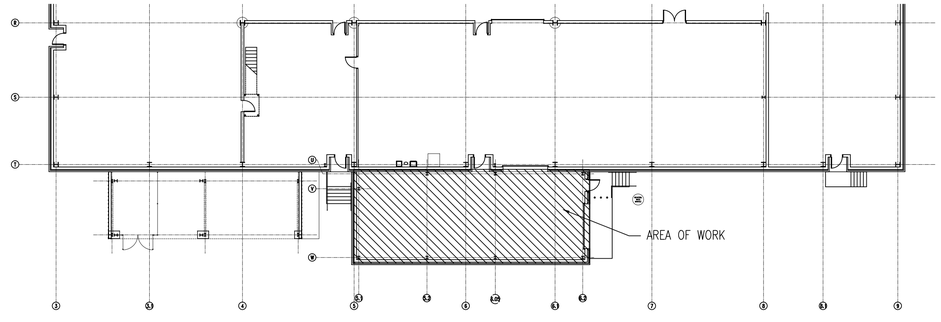


1 M-102 M-102 PARTIAL FLOOR PLAN – MECHANICAL
CONSTRUCTION SCALE: 1/8"=1'-0"



2 M-102 KEY PLAN
NTS

PLAN NOTES:

1. REINSTALL EXISTING UNIT HEATER. CONNECT NEW HWS/R PIPING TO EXISTING HWS/R PIPING AS SHOWN. ROUTE NEW HWS/R PIPE TO RELOCATED UNIT HEATER.
2. REINSTALL EXISTING VAV THERMOSTAT AS SHOWN.
3. INSTALL NEW ROOFTOP HEAT PUMP, AHU-1, ON ROOF. ROUTE NEW HWS/R PIPING UP TO AHU-1 THROUGH ROOF CURB PROVIDED WITH AHU. COORDINATE UNIT DIMENSIONS, WEIGHT, AND DUCT OPENINGS WITH STRUCTURAL. PROVIDE 4'-0" (MIN) CLEARANCE BETWEEN AHU-1 AND FACE OF EXISTING EXTERIOR WALL. UNIT SHALL BE ROTATED SO THAT CONTROL PANEL AND MAINTENANCE ACCESS DOORS ARE FACING EXISTING EXTERIOR WALL. ROUTE CONDENSATE PIPE FROM AHU-1 TO GUTTER.
4. INSTALL NEW THERMOSTAT 44" A.F.F.
5. ROUTE DUCTWORK AS HIGH AS POSSIBLE TO ALLOW PASSAGE OF FUTURE CRANE THROUGHOUT SPACE. SEE 2/M501 FOR SECTION.
6. PROVIDE LOUVERED RETURN GRILLE ON END OF RETURN DUCT. INSTALL AS HIGH AS POSSIBLE TO ALLOW PASSAGE OF SUPPLY DUCTWORK BELOW. SEE 2/M501 FOR SECTION.
7. REINSTALL EXISTING SUPPLY GRILLE IN EXISTING 30x10 DUCTWORK. BOTTOM OF GRILLE/DUCTWORK TO BE 19'-0" A.F.F. PROVIDE NEW 30x10 INSULATED END CAP FOR DUCTWORK.
8. ROUTE DUCTWORK DOWN AND TERMINATE 8'-0" A.F.F. PROVIDE LOUVERED SUPPLY GRILLE PER SCHEDULE. PROVIDE MANUAL VOLUME DAMPER IN DUCTWORK AT SUPPLY GRILLE.
9. PROVIDE DUCT-MOUNTED SMOKE DETECTOR IN VERTICAL SUPPLY DUCT. PROVIDE ACCESS DOOR IN DUCT.

GRAPHIC SCALE: 1/8"=1'-0"
8' 0 4' 8' 16'

SYM.	DESCRIPTION	DATE	APPR.

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CONSTRUCT COMPOSITE SHOP ADDITION, BUILDING 4224

PARTIAL FLOOR PLAN - MECHANICAL

STA. PROJ. NO. 6328570
SPEC. NO.
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NAVFAC DRAWING NO. 12685648
SHEET 35 OF 45

M-102

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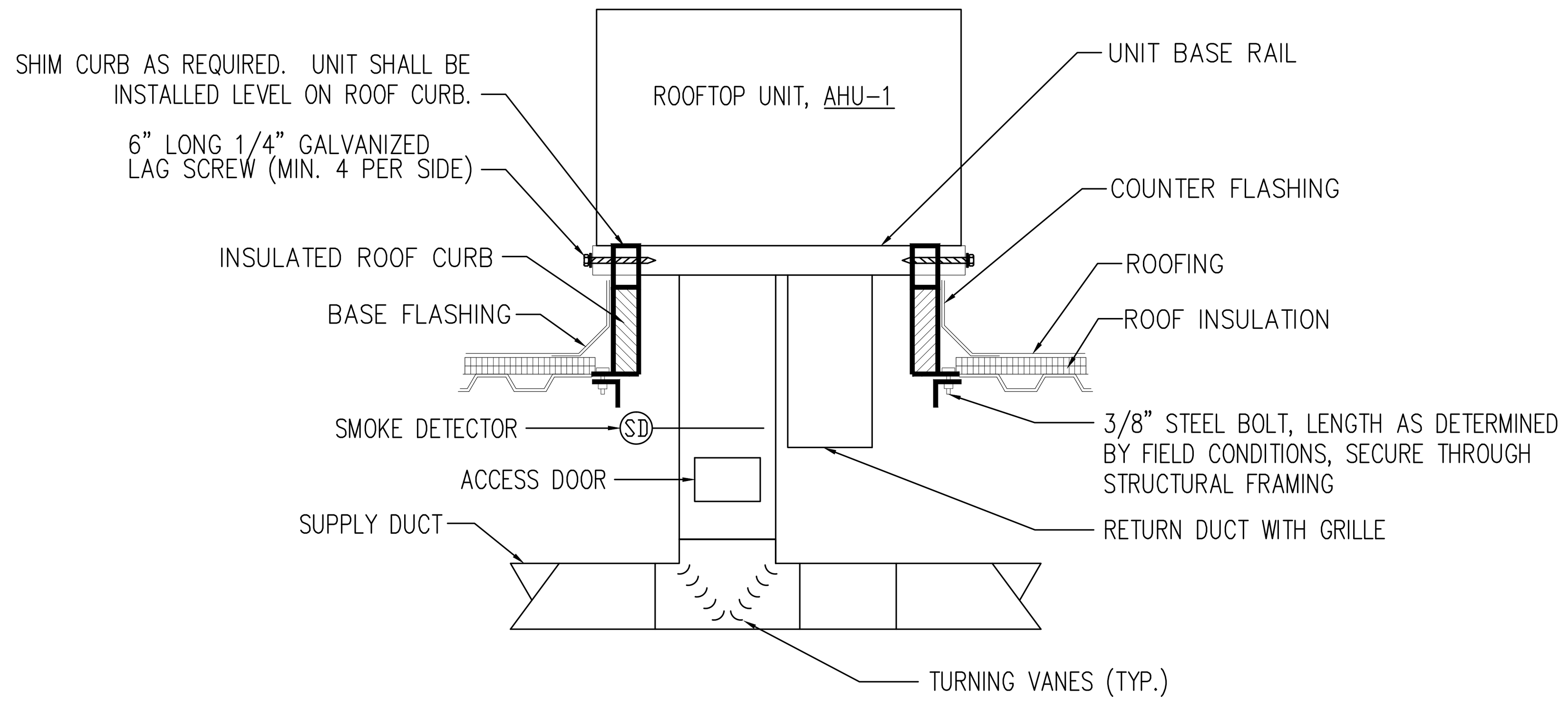
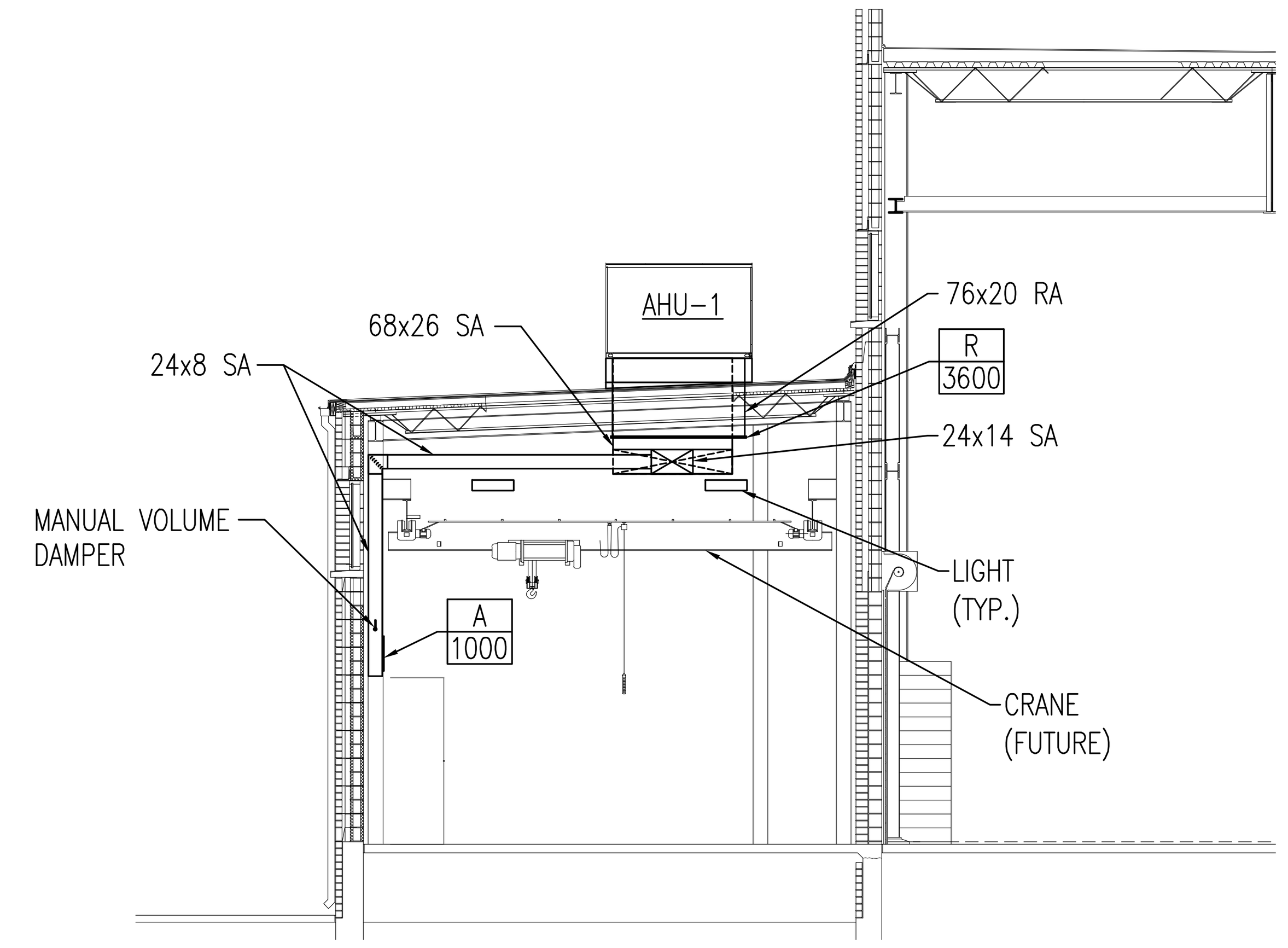
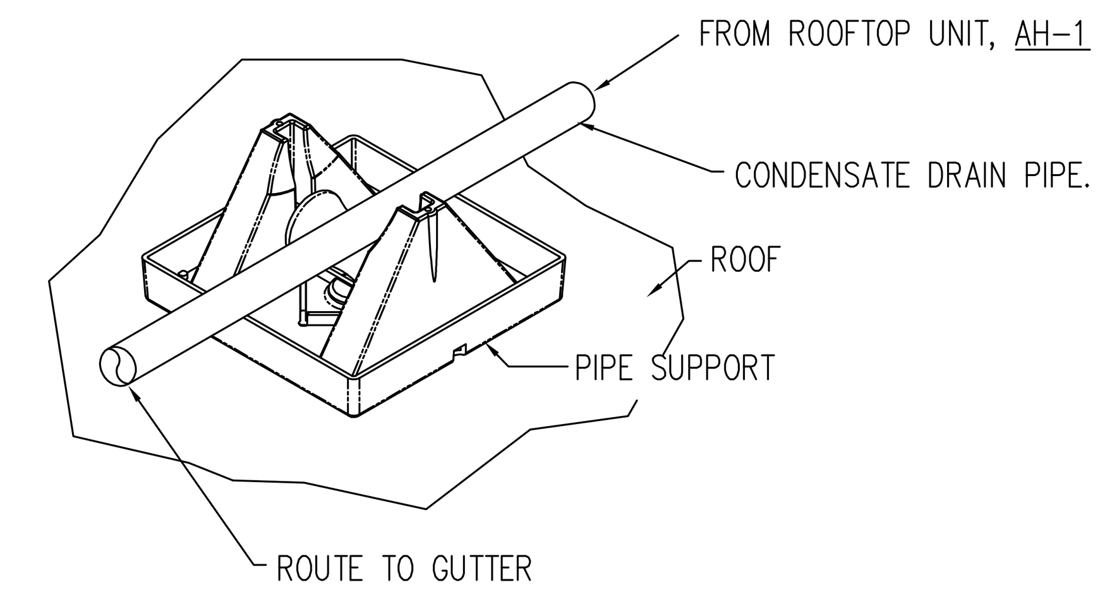


NOTES:
PROVIDE WITH MANUFACTURER'S ACCESSORY ROOF CURB ADAPTER. ROOF DECKING TO BE LEFT INTACT INSIDE THE ROOF CURB. CUT OPENINGS IN ROOF DECK LARGE ENOUGH TO ACCOMMODATE THE SUPPLY AND RETURN OPENINGS ON THE UNIT. FILL VOID SPACE IN CURB WITH TWO LAYERS OF 5/8" SHEETROCK WITH OVERLAPPING JOINTS. COVER SHEETROCK WITH 6" OF BATT INSULATION. PROVIDE FLEXIBLE CANVAS DUCT CONNECTOR ON SUPPLY AND RETURN DUCT. CONTRACTOR SHALL PERFORM ALL WORK IN A MANNER TO MAINTAIN ROOF WARRANTY.

1 M-501 ROOFTOP UNIT INSTALLATION DETAIL
NTS

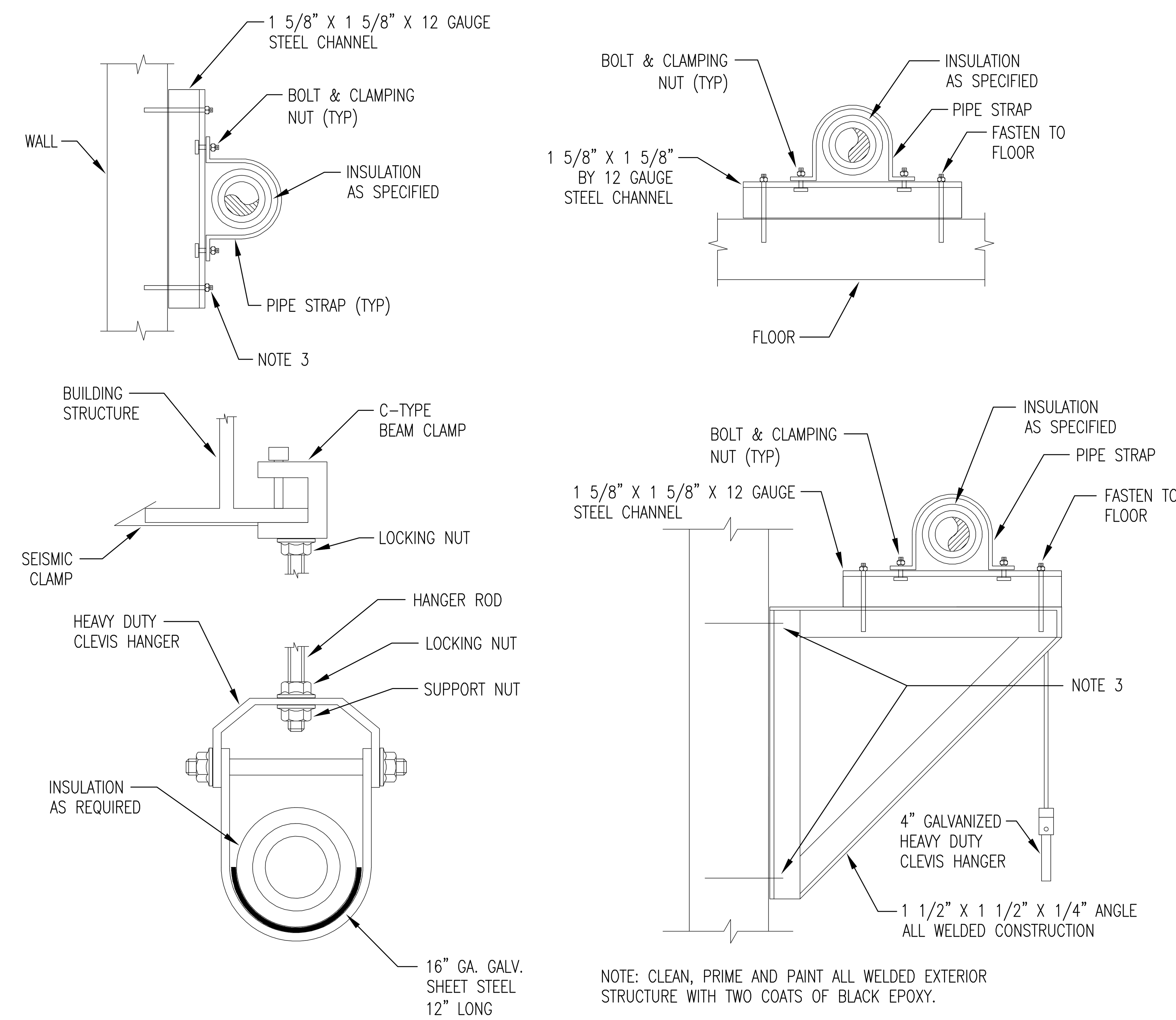


2 M-501 SECTION AT AIR HANDLING UNIT
NTS



NOTE: PROVIDE ACCESSORY PIPESTRAPS AND SUPPORT PAD AT EACH PIPE STAND. INSTALL AND SPACE PER MANUFACTURER'S RECOMMENDATIONS.

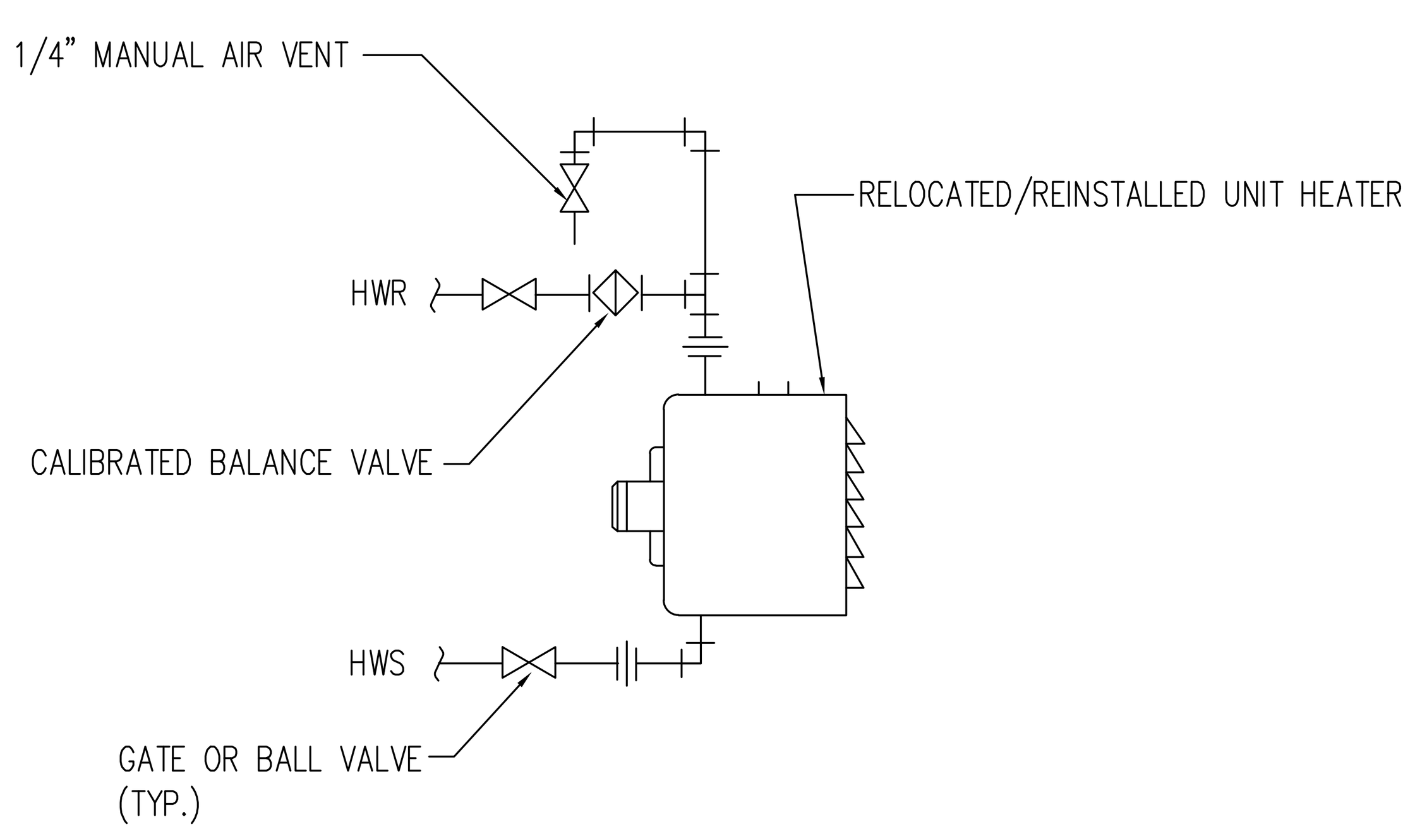
5 M-501 CONDENSATE SUPPORT DETAIL
NTS



NOTE: CLEAN, PRIME AND PAINT ALL WELDED EXTERIOR STRUCTURE WITH TWO COATS OF BLACK EPOXY.

NOTES:
1. DO NOT USE SPLIT RING HANGERS.
2. FOR ALL INSTALLED BEAM CLAMPS ENSURE SEISMIC CLAMP IS INSTALLED PER CURRENT INTERNATIONAL BUILDING CODE, INTERNATIONAL PLUMBING CODE AND THE INTERNATIONAL MECHANICAL CODE.
3. SECURE TO WALL WITH ANCHORS TYPICAL TOP AND BOTTOM FOR EACH SUPPORT. FOR PLYWOOD PANELING AND GYPSUM BOARD BOLTS FROM PULLING THROUGH WALL OVERSIZED WASHER SHALL BE USED IN ADDITION TO THE BACK BRACE ON THE THRU WALL FASTENER.

4 M-501 TYPICAL PIPING SUPPORT DETAIL
NTS



3 M-501 HOT WATER UNIT HEATER PIPING DETAIL
NTS

SYM.	DESCRIPTION	DATE	APPR

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NC LICENSE #C-1156 · www.crenshawconsulting.com · 3516 Bush Street, Suite 200 · Raleigh, North Carolina 27609 · 919-871-1070 · Fax 871-5620

NORTH CAROLINA PROFESSIONAL SEAL 28374 ENGINEER JONATHAN D. LEHMAN
8-19-15
SEAL

APPROVED
ACTIVITY - SATISFACTORY TO
DATE
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FOR EFD FOR COMMANDER NAVFAC
DATE

A/E		EFD
JDL	DESIGN	
LHR	DRAWN	
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JRC	CHIEF ARCH./ ENGR.	

PROJECT MANAGER
FIRE PROTECTION
BRANCH MANAGER
DESIGN DIRECTOR

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS AIR STATION, CHERRY POINT, N.C.
CONSTRUCT COMPOSITE SHOP ADDITION, BUILDING 4224
MECHANICAL DETAILS

STA. PROJ. NO. 6328570
SPEC. NO.
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12685649
SHEET 36 OF 45
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PACKAGED ROOFTOP UNIT SCHEDULE

MARK	LOCATION	MANUFACTURER MODEL	SUPPLY AIR (CFM)	OUTSIDE AIR (CFM)	SUPPLY FAN				DX COOLING							ELECTRIC HEAT			PREFILTER	ELECTRICAL			WEIGHT (LBS)	NOTES
					CFM	E.S.P. "W.C.	BHP	HP	TOTAL MBH	SENS. MBH	EAT (°F)		LAT (°F)		EER	KW	EAT (°F)	LAT (°F)		MCA	MOCP	VOLT/PH/Hz		
											DB	WB	DB	WB										
AHU-1	ROOF	TRANE WSC120	4,000	400	4,000	1.0	1.7	3.0	143.2	92.9	80.0	67.0	58.8	55.4	9.8	36	70.0	104.0	2"	87.0	90	480/3/60	2000	1,2,3,4,5

NOTES:

1. PROVIDE WITH MERV 8 PREFILTER.
2. PROVIDE WITH SINGLE POINT ELECTRICAL CONNECTION.
3. PROVIDE WITH ROOF CURB SUITABLE FOR SLOPED ROOF.
4. PROVIDE WITH 120V/1 CONVENIENCE OUTLET, POWERED VIA UNIT SINGLE POINT CONNECTION PER NOTE 2 ABOVE.
5. PROVIDE SUPPLEMENTAL ELECTRIC HEAT WITH SCR CONTROL.

AIR DISTRIBUTION SCHEDULE

MARK	DESCRIPTION	NECK SIZE	PANEL SIZE	TYPE	DISCHARGE PATTERN	NOTES
A	STEEL REGISTER, LOUVERED FACE, 0° DEFLECTION	20x20	20x20	SUPPLY	1-WAY	1
R1	ALUMINUM, EGG CRATE	76x20	76x20	RETURN	N/A	1

NOTES:

1. PROVIDE WITH WHITE, BAKED ENAMEL FINISH.

OUTSIDE AIR CALCULATION (2009 IMC)

UNIT MARK	FLOOR AREA (SQ.FT.)	ASHRAE CLASSIFICATION	PEOPLE PER 1000 SF	TOTAL PEOPLE	CFM PER PERSON	CFM PER SQ. FT.	REQUIRED CFM	TOTAL REQUIRED CFM	TOTAL PROVIDED CFM	NOTES
AHU-1	1,452	GENERAL MANUFACTURING	10	15	5	0.18	334	334	400	1
							TOTAL	334	400	

NOTES:

1. PER ASHRAE 62.1-2010.

SYM. DESCRIPTION DATE APPR

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CONSTRUCT COMPOSITE SHOP
ADDITION, BUILDING 4224

MECHANICAL SCHED[illegible]LES

STA. PROJ. NO. 6328570
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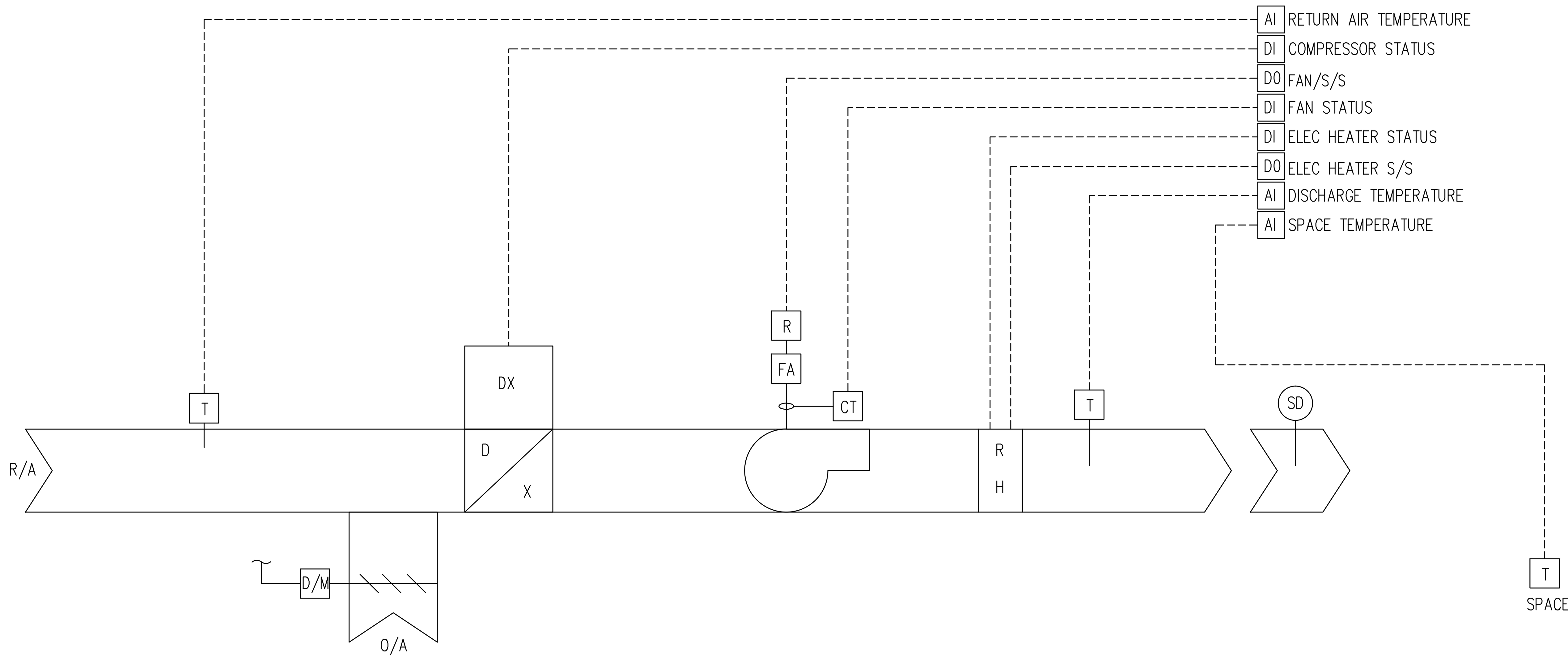

ROOFTOP PACKAGED UNIT CONTROL (RTU-1):

SCHEDULE AND TEMPERATURE SETPOINTS SHALL BE CONNECTED TO AND CONTROLLED BY THE BAS.

OCCUPIED: THE HEAT PUMP SUPPLY FAN WILL RUN CONTINUOUSLY DURING OCCUPIED TIMES. THE MINIMUM OUTSIDE AIR DAMPER WILL OPEN DURING OCCUPIED TIMES. THE SPACE SENSOR IS PROVIDED WITH A DISPLAY AND AN OVERRIDE FEATURE. THE HEAT PUMP WILL OPERATE FROM ITS OWN INTERNAL CONTROL TO MAINTAIN THE SPACE TEMPERATURE AND HUMIDITY SETPOINTS. OCCUPIED SETPOINTS ARE 75°F DB (SUMMER) / 70°F (WINTER).

UNOCCUPIED: THE HEAT PUMP WILL REMAIN OFF IF THE SPACE TEMPERATURE IS BELOW/ABOVE A PREDETERMINED TEMPERATURE. IF THE SPACE TEMPERATURE EXCEEDS THESE TEMPERATURES, THE HEAT PUMP WILL START AND REMAIN ON UNTIL THE SPACE TEMPERATURE IS WITHIN THE SETPOINT RANGE. THE MINIMUM OUTSIDE AIR DAMPER WILL REMAIN CLOSED DURING THE UNOCCUPIED PERIOD. UNOCCUPIED SETPOINTS ARE 80°F DB (SUMMER) / 60°F (WINTER).

MORNING WARMUP: THE HEAT PUMP WILL BE PROVIDED WITH AN OPTIMUM START SCHEDULE TO ALLOW THE SPACE TEMPERATURE TO BE AT SETPOINT WHEN THE NORMAL OCCUPIED TIME OCCURS. THE MINIMUM OUTSIDE AIR DAMPER IS CLOSED DURING MORNING WARMUP.

SHUTDOWN: UPON SIGNAL FROM BAS, THE HEAT PUMP UNIT SHALL SHUTDOWN AND MINIMUM OUTSIDE AIR DAMPER WILL CLOSE.

BAS SHALL INITIATE HEAT PUMP UNIT SHUTDOWN ON THE FOLLOWING:
- SMOKE DETECTION AND ACTIVATION OF THE FIRE ALARM SYSTEM
- SHUTDOWN COMMAND FROM EXISTING DDC SYSTEM.

NOTIFY THE BAS OF ANY ALARM OR FAILURE

NOTE: REFER TO SPECIFICATION 23 09 23.13 20 – DIRECT DIGITAL CONTROL SYSTEMS FOR HVAC, PARAGRAPH 1.4 FOR REQUIREMENTS OF CONNECTING NEW EQUIPMENT TO EXISTING BUILDING DDC SYSTEM.

1 / M-602 AHU CONTROL SCHEMATIC
NTS

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GENERAL NOTES AND REQUIREMENTS.

1. WORKMANSHIP SHALL CONFORM TO NECA PUBLICATION "STANDARDS OF INSTALLATION."
2. INSTALLATION SHALL COMPLY WITH NATIONAL ELECTRICAL CODE, STATE BUILDING CODE, AND ALL REQUIREMENTS OF THE LOCAL INSPECTOR (FURNISH INSPECTION CERTIFICATE). ALL WORK SHALL BE BY LICENSED ELECTRICAL CONTRACTOR.
3. THE CONTRACTOR SHALL REFER TO THE ARCHITECTURAL PLANS FOR FLOOR PLAN DIMENSIONS. DO NOT SCALE THESE DRAWINGS.
4. THE CONTRACTOR SHALL COORDINATE ANY AND ALL WORK WITH OTHER TRADES INVOLVED IN THE PROJECT, PRIOR TO INSTALLATION OF ELEC. EQUIPMENT, SO AS TO AVOID CONFLICTS DURING CONSTRUCTION AND TO ALLOW FOR OPTIMUM MAINTENANCE AND WORKING SPACE.
5. ALL BRANCH CIRCUITS SHALL BE IN ZINC-COATED EMT OR RIGID CONDUIT AS PERMITTED OR REQUIRED BY THE NATIONAL ELECTRICAL CODE. SCHEDULE 40 PVC CONDUIT MAY BE USED ONLY FOR THE SECONDARY UNDERGROUND SERVICE, THE UNDERGROUND TELEPHONE SERVICE CONDUIT, AND BRANCH CIRCUIT TELEPHONE SYSTEM CONDUITS LOCATED BELOW THE FLOOR SLAB ON GRADE OR BURIED ON THE EXTERIOR OF THE BUILDING, OR IN CONCRETE BLOCK WALLS. ALL CONDUIT SHALL BE 3/4" MINIMUM SIZE EMT FITTINGS SHALL BE STEEL COMPRESSION OR SET SCREW TYPE.
6. ALL CONDUCTORS SHALL BE COPPER TYPE THHN OR THWN, SOLID FOR #10 AWG OR #12 AWG, AND STRANDED FOR ALL LARGER SIZES. MINIMUM CONDUCTOR SIZE SHALL BE #12.
7. ALL WIRE AND CONDUIT SIZES ARE BASED ON 75° C THHN WIRE UNLESS OTHERWISE NOTED. ALL TERMINATIONS & DEVICES SHALL BE RATED FOR 75°C.
8. CONDUITS MAY BE RUN EXPOSED IN MECHANICAL AREAS. CONDUITS SHALL BE RUN PARALLEL OR PERPENDICULAR TO STRUCTURAL ELEMENTS AND SHALL BE RUN IN GROUPS. SEAL ALL PENETRATIONS AIR TIGHT AROUND ALL CONDUITS WHEN PASSING INTO MECHANICAL ROOMS.
9. ALL LIGHT FIXTURES SHALL BE SUPPORTED INDEPENDENTLY OF THE SUSPENDED CEILING SYSTEM.
10. WHERE FIRST OUTLET ON BRANCH CIRCUIT IS GREATER THAN 65 FEET FROM THE PANELBOARD, SEE VOLTAGE DROP SCHEDULE.
11. ALL MOUNTING HEIGHTS ARE GIVEN TO THE BOTTOM OF THE DEVICE UNLESS NOTED OTHERWISE.
12. THE LOCATION OF ALL WALL MOUNTED DEVICES, INCLUDING MOUNTING HEIGHTS, SHALL BE FIELD VERIFIED PRIOR TO INSTALLATION.
13. ALL FUSES, DISCONNECT SWITCHES, AND BREAKER SIZES, SHOWN FOR MECHANICAL EQUIPMENT, SHALL BE VERIFIED BEFORE THE PURCHASE OR INSTALLATION OF SAID EQUIPMENT, WITH THE EQUIPMENT SUPPLIER AND THE CONTRACTOR.
14. ALL DISCONNECT SWITCHES ARE TO BE FUSIBLE TYPE. FUSE IN ACCORDANCE WITH NAMEPLATE DATA WITH DUAL ELEMENT TYPE FUSES.
15. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY DISCONNECTS, SWITCHES, AND RECEPTACLES UNDER THE BID AND SHALL INCLUDE ALL NECESSARY CIRCUITS TO AND FINAL CONNECTIONS TO THE EQUIPMENT PROVIDED BY ALL SUPPLIERS, UNLESS NOTED OTHERWISE BY OTHER DISCIPLINES. COORDINATE CLOSELY.
16. ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED SO THAT ALL CODE-REQUIRED AND MANUFACTURER-RECOMMENDED SERVICING CLEARANCES ARE MAINTAINED. INSTALLATIONS SHALL FULLY COMPLY WITH NEC 110.26 AND NEC 408.18 FOR CLEARANCE REQUIREMENTS.
17. COORDINATE LOCATIONS OF ALL LIGHT FIXTURES WITH THE REFLECTED CEILING PLANS. LIGHT FIXTURES INSTALLED IN MECHANICAL AREAS SHALL AVOID MECHANICAL PIPING, EQUIPMENT, DUCTWORK, ETC.
18. PROVIDE GROUNDING CONDUCTOR FOR ALL CIRCUITS PER N.E.C. AND BUILDING GROUND SHALL MEET ALL REQUIREMENTS OF NEC 250.
19. GROUND TELEPHONE EQUIPMENT PER J-607 STD AND TIA REQUIREMENTS.
20. THE CONTRACTOR SHALL PATCH ANY WALL, CEILING, OR FLOOR OPENINGS AND PENETRATIONS RESULTING FROM DEMOLITION OR NEW WORK IN EXISTING AREAS.
21. ALL MULTIWIRE BRANCH CIRCUITS SHALL HAVE MULTIPOLE BREAKERS AS REQUIRED BY NEC 210.4(B).
22. ALL CIRCUITS SHALL BE TESTED WITH 500 VOLT TESTER PRIOR TO ENERGIZING.
23. PROVIDE PULL WIRE IN ALL EMPTY CONDUIT FOR FUTURE SYSTEMS.
24. CONDUIT SHALL BE LABELED EVERY TEN FEET.
25. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY DISPOSING OF ALL WASTE MATERIALS, DEMO MATERIALS AND OTHER TRASH. THIS INCLUDES BUT IS NOT LIMITED TO PROPER DISPOSAL OF MERCURY CONTAINING LAMPS, RECYCLABLE MATERIALS ETC.
26. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE W/ ALL OTHER TRADES REGARDING VOLTAGES, LOADS, CIRCUIT BREAKERS, ETC. PRIOR TO BEGINNING ANY WORK.
27. AS USED ON THESE DOCUMENTS, THE WORD "PROVIDE" SHALL MEAN TO FURNISH AND INSTALL THE ITEM OR EQUIPMENT AND MAKE THE FINAL CONNECTION AS REQUIRED.
28. CONTRACTOR IS RESPONSIBLE TO COMPLY WITH ALL REQUIREMENTS OF THE 2012 INTERNATIONAL BUILDING CODE, ACCESSIBILITY CODE WHICH ARE APPLICABLE TO THIS PROJECT REGARDLESS OF WHETHER ALL DETAILS ARE INDICATED ON PLANS.
29. IT IS NOTED THAT IF TELEPHONE SERVICE IS NOT LOCATED WITHIN 20' OF ELECTRICAL SERVICE, THEN PROVIDE SEPARATE GROUNDING ELECTRODE AS REQUIRED PER NEC 800.
30. CONTRACTOR SHALL VERIFY ALL AREAS THAT ARE USED AS A RETURN PLENUM AND PROVIDE PLENUM RATED CABLE FOR ALL CABLES. ALL CABLES IN A PLENUM SHALL BE RUN IN METAL CONDUIT. THIS INCLUDES ALL TELECOMMUNICATIONS, FIRE ALARM, OR CONTROL WIRING ABOVE CEILING.
31. PROVIDE 3"W x 5"L HARD PLASTIC PLACARD WITH BLACK LETTERING ENGRAVED ON A WHITE BACKGROUND FOR PANEL, ALL DISCONNECT SWITCHES, AND EQUIPMENT CONTROLLER. PLACARD SHALL BE ATTACHED WITH RIVETS TO THE COVER IN PLAIN VIEW AS TO NOT CAUSE INTERNAL DAMAGE (i.e. PANEL NAME, VOLT, AMPERE, PHASE, AND SOURCE POWER FED FROM, ETC.)
32. ALL NEW RECEPTACLES, SWITCHES, AND LIGHTING CIRCUITS SHALL HAVE A PERMANENT, MACHINE PRINTED LABEL FOR POWER SOURCE AND BRANCH CIRCUIT NUMBER ON THE DEVICE/BOX COVER.

ELECTRICAL LEGEND

PLANS

SYMBOLS SHOWN BELOW ARE TO INDICATE NEW DEVICES OR NEW LOCATIONS OF EXISTING DEVICES. SEE LINETYPE LEGEND FOR DISTINCTION OF EXISTING DEVICES TO REMAIN AND DEMOLITION DEVICES.

HOME RUN TO PANEL
BRANCH CIRCUIT
MINIMUM SIZE PER CKT BKR

$ SINGLE POLE WALL SWITCH
$3 3-WAY WALL SWITCH
$4 4-WAY WALL SWITCH
44" A.F.F. OR AS NOTED
$S SEE MOTION SENSOR LEGEND FOR THIS AND OTHER SWITCH TYPES.

ALL DUPLEX AND QUAD RECEPTACLES SHALL BE NEMA 5-20R UNLESS NOTED OTHERWISE.

DUPLEX RECEPTACLE
ISOLATED GROUND DUPLEX
POWER RECEPTACLE
QUAD RECEPTACLE
16" A.F.F. OR AS NOTED

TELECOMMUNICATIONS WALL OUTLET – 18" A.F.F. OR AS NOTED (RUN 1-1 1/4" EMT HOMERUN TO TELECOMMUNICATIONS ROOM ON THIS FLOOR.) PROVIDE 2-CAT6, PLENUM-RATED CABLES AND CONDUIT BUSHINGS.

SIPRNET OUTLET

TV — TELEVISION WALL OUTLET – 16" A.F.F. RUN RG6 IN 3/4" EMT TO TELEPHONE BACKBOARD OR AS INDICATED ON PLANS.

J — JUNCTION BOX

T — TELEPHONE BACKBOARD – 4'x8'x3/4" FIRE-TREATED PLYWOOD. PAINT GRAY – PULL #6 GROUND WIRE AND TERMINATE WITH 1/4"x4"x12" GROUND BAR WITH HOLES EVERY 1". MOUNT TO BACKBOARD WITH STAND-OFF INSULATORS.

DISCONNECT SWITCH – FUSIBLE

$M MOTOR SWITCH

$D SLIDE TYPE DIMMER SWITCH APPROPRIATE FOR LOAD SERVED – 44" AFF

ELECTRICAL TRANSFORMER

ELECTRICAL PANEL

OVERHEAD FIXTURE OR AS NOTED. SEE FIXTURE SCHEDULE

DOWNLIGHT / PENDANT STYLE. SEE FIXTURE SCHEDULE.

WALL MOUNT. SEE FIXTURE SCHEDULE.

FLOOD / TRACK HEAD STYLE. SEE FIXTURE SCHEDULE.

POLE FIXTURE. SEE FIXTURE SCHEDULE.

EXIT SIGN, FACES AND ARROWS AS INDICATED. SEE FIXTURE SCHEDULE.

EMERGENCY FIXTURE. SEE FIXTURE SCHEDULE.

COMBO EMERGENCY / EXIT FIXTURE. SEE FIXTURE SCHEDULE.

SLASHES OR HALF SHADING INDICATE FIXTURES CONNECTED AHEAD OF ALL SWITCHING TO OPERATE AS NIGHT LIGHTS (FIXTURES WILL BE ON 24/7)

DETAILS

A — ELECTRICAL PANEL OR AS NOTED

C.T. — C.T. CABINET

M — METER BASE AND METER

200/3 ← FRAME SIZE
200A ← FUSE SIZE
FUSIBLE DISCONNECT, FRAME AND FUSE SIZE AS INDICATED.

T_ ← DESIGNATION
112.5 ← KVA RATING
TRANSFORMER, SIZE AND DESIGNATION AS NOTED. PRIMARY VOLTAGE AS NOTED FOR PRIMARY FEED. SECONDARY VOLTAGE AS NOTED FOR LOAD SUPPLIED.

20/4 — CONTACTOR, AMPACITY / POLES AS INDICATED

T.C. — TIMECLOCK

SPD — SURGE PROTECTIVE DEVICE

SERVICE GROUND

LINETYPES

NEW DEVICE OR RELOCATED EXISTING DEVICE.
EXISTING DEVICE TO REMAIN.
EXISTING DEVICE TO BE REMOVED OR RELOCATED.

NEW UNDERGROUND OR UNDERSLAB CONNECTION. EXISTING AND DEMO UNDERGROUND IS NOTED WITH EXISTING OR DEMO LINETYPE. NEW CONNECTIONS NOT SPECIFICALLY SHOWN WITH UNDERGROUND LINETYPE ARE NOT NECESSARILY REQUIRED TO BE RUN OVERHEAD UNLESS NOTED AS SUCH.

SEE WALL RATING LEGEND FOR WALL TYPES AND SYMBOLS.

EXAMPLES OF EXISTING AND DEMO SYMBOLS USING LINETYPES ABOVE

EXISTING DUPLEX RECEPTACLE TO REMAIN.
EXISTING QUAD RECEPTACLE TO REMAIN.
EXISTING TELECOMMUNICATIONS OUTLET TO REMAIN.
EXISTING PANEL TO REMAIN.
XR — EXISTING FLUORESCENT FIXTURE TO REMAIN.
EXISTING SWITCH TO REMAIN.
EXISTING DUPLEX RECEPTACLE TO BE REMOVED.
EXISTING DATA OUTLET TO BE REMOVED.
EXISTING PANEL TO BE REMOVED.
XM — EXISTING FLUORESCENT FIXTURE TO BE MOVED.
XD — EXISTING FLUORESCENT FIXTURE TO BE REMOVED.
EXISTING SWITCH TO BE REMOVED.

VOLTAGE DROP SCHEDULE

120 VOLT BRANCH CIRCUITS UP TO 8 AMPS (<1.0 KVA)

RUN DISTANCE IN FEET	WIRE SIZE AWG
1' – 120'	#12
121' – 190'	#10
191' – 300'	#8
301' – 470'	#6

120 VOLT BRANCH CIRCUITS 9 AMPS TO 14 AMPS (1–1.7 KVA)

RUN DISTANCE IN FEET	WIRE SIZE AWG
1' – 65'	#12
66' – 110'	#10
111' – 170'	#8
171' – 270'	#6

277 VOLT BRANCH CIRCUITS UP TO 14 AMPS (<3.9 KVA)

RUN DISTANCE IN FEET	WIRE SIZE AWG
1' – 160'	#12
161' – 250'	#10
251' – 390'	#8
391' – 620'	#6

WIRE SIZES INDICATED IN GENERAL NOTES AND CONNECTIONS SCHEDULES ARE MINIMUM WIRE SIZES. CONTRACTOR SHALL UPSIZE WIRES BASED ON LOAD AND LENGTH OF RUN AS INDICATED IN SCHEDULE ABOVE.

ELECTRICAL ABBREVIATIONS

A	INDICATES A DEVICE IS TO BE MOUNTED WITH BOTTOM OF BOX 1 1/2" ABOVE BACKSPLASH UNLESS NOTED OTHERWISE.
AFF	ABOVE FINISHED FLOOR
AG	COMBINATION OF 'A' AND 'G'
ARCH	ARCHITECT
C	INDICATES A DEVICE IS TO BE FLUSH MOUNTED IN CEILING TILE.
EX.	EXISTING
EXT.	EXTERIOR
FAH	FAHRENHEIT
FURN	FURNITURE
G	INDICATES A DEVICE WITH INTEGRAL GROUND FAULT INTERRUPTER (GFI) PROTECTION.
GFI	SAME AS 'G'
IG	DEVICE SHALL HAVE ISOLATED GROUND AND WILL REQUIRE ISOLATED GROUND CIRCUITRY.
J.B.	JUNCTION BOX
NTS	NOT TO SCALE
OC	ON CENTER
PROV	PROVIDED BY
S	INDICATES DEVICE IS TO BE SURFACE MOUNTED.
W/	WITH
WP	INDICATES A DEVICE THAT IS WEATHER-PROOF AND RATED FOR EXTERIOR TEMPERATURES.

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ELECTRICAL NOTES LEENDS

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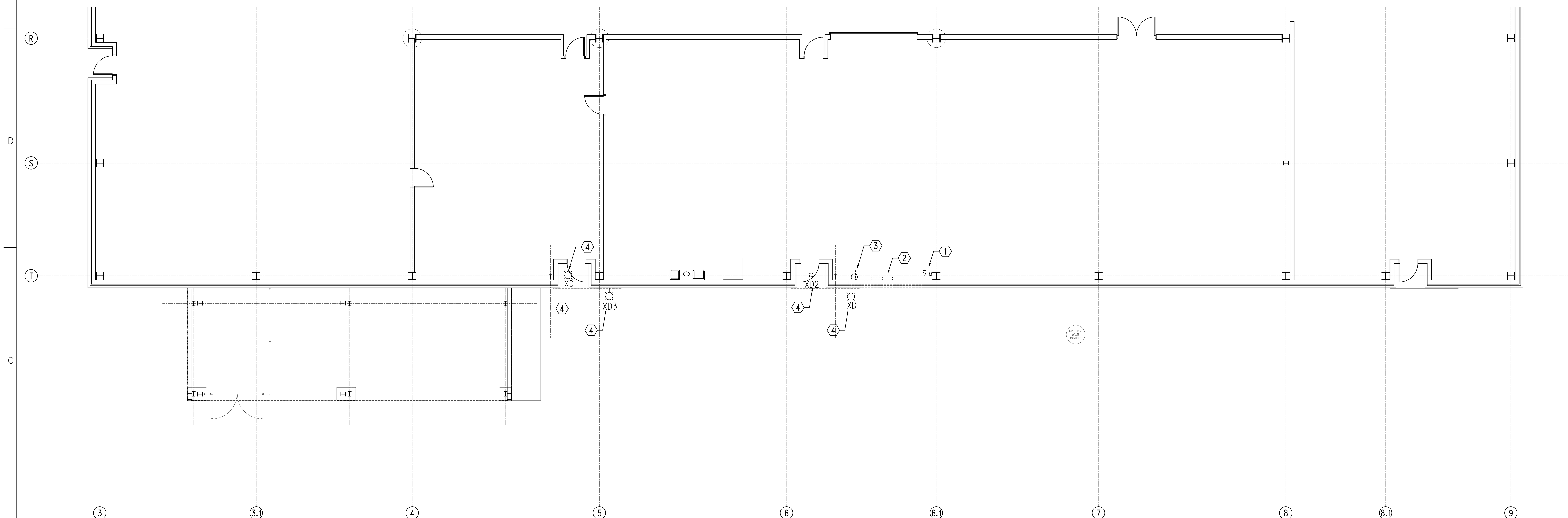

PARTIAL FLOOR PLAN – ELECTRICAL

1 E-101 E-101

DEMOLITION

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

PLAN NOTES:

1. DISCONNECT EXISTING ELECTRICAL FOR UNIT HEATER, RELOCATE EXISTING CONNECTION, AND RECONNECT TO UNIT HEATER. SEE MECHANICAL DRAWINGS FOR UNIT HEATER LOCATION.
2. REMOVE EXISTING EMPTY WALL ENCLOSURES AND ALL ASSOCIATED CONDUIT CONNECTED TO THESE ENCLOSURES.
3. REMOVE EXISTING DUPLEX, ALONG WITH RESPECTIVE WIRING AND CONDUIT. EXISTING RECEPTACLE CIRCUIT SHALL BE RECONNECTED SUCH THAT OTHER DEVICES ON THIS CIRCUIT REMAIN IN OPERATION.
4. REMOVE EXISTING LIGHT FIXTURE. EXISTING LIGHTING CIRCUIT SHALL BE RECONNECTED SUCH THAT OTHER DEVICES ON THIS REMAIN IN OPERATION.

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

8' 0 4' 8' 16'

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DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND

MARINE CORPS AIR STATION, CHERRY POINT, N.C.

CONSTRUCT COMPOSITE SHOP ADDITION, BUILDING 4224

PARTIAL FLOOR PLAN ELECTRICAL DEMOLITION

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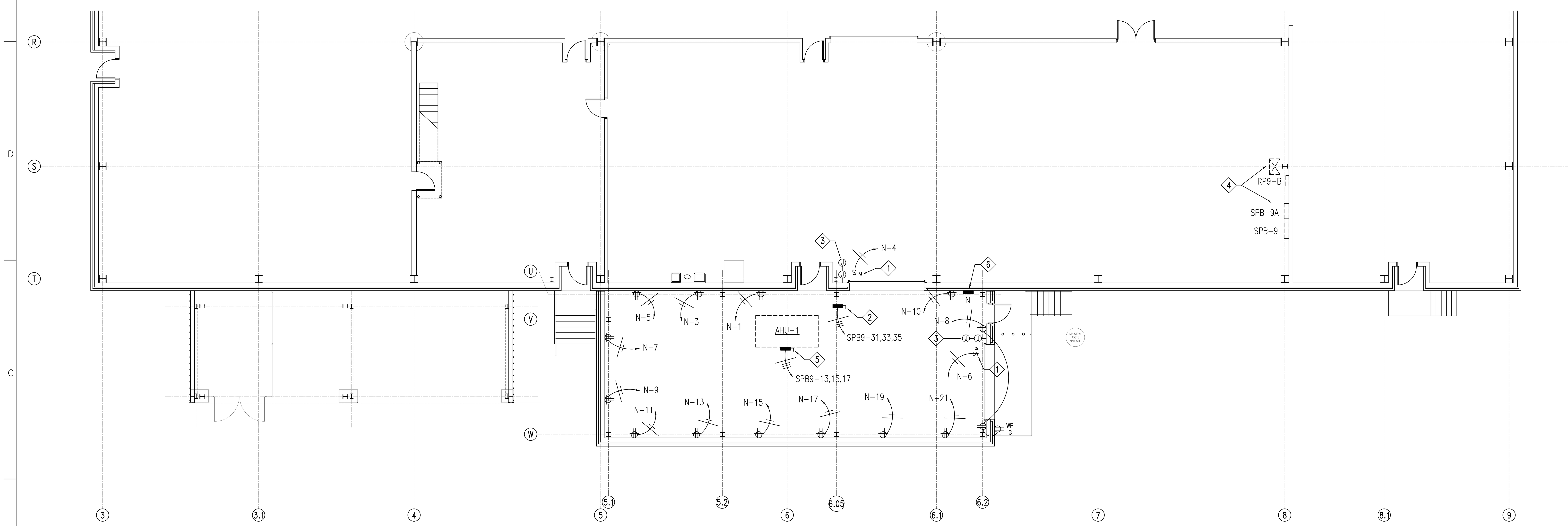
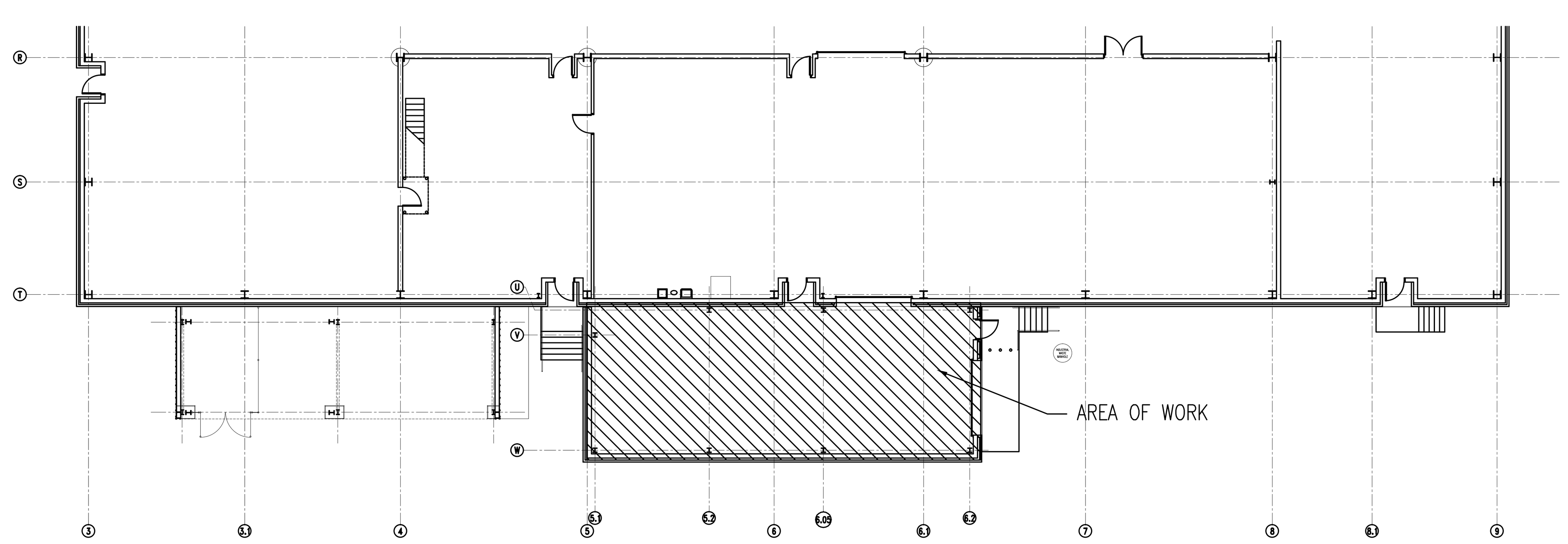


PARTIAL FLOOR PLAN – POWER

1 E-102 | E-102 CONSTRUCTION SCALE: 1/8"=1'-0"



KEY PLAN

2 E-102 NTS

PLAN NOTES:

1. CONNECT MOTORIZED ROLL–UP DOOR. PROVIDE MOTOR SWITCH, WIRING, AND CONDUIT COMPLETE. COORDINATE WITH EQUIPMENT SUPPLIER.
2. CONNECT OVERHEAD CRANE. PROVIDE DISCONNECT, WIRING, AND CONDUIT COMPLETE. COORDINATE WITH EQUIPMENT SUPPLIER.
3. PROVIDE JUNCTION BOXES WITH 3/4" CONDUIT FOR DOOR CONTROLS. MOUNT ONE J.B. AT HALF THE DOOR HEIGHT AND THE OTHER J.B. AT 48" A.F.F. TO THE BOTTOM OF THE BOX FOR THE CONTROLLER. PROVIDE 8–WIRE LOW VOLTAGE CABLING IN CONDUIT FROM THE RSX OPERATOR TO THE FIRST JUNCTION BOX AND 4–WIRE LOW VOLTAGE CABLING IN CONDUIT FROM THAT J.B. TO THE CONTROLLER. COORDINATE WITH EQUIPMENT SUPPLIER.
4. EXISTING ELECTRICAL PANELS AND TRANSFORMER TO REMAIN.
5. CONNECT ROOF TOP AIR HANDLER. PROVIDE DISCONNECT, WIRING, AND CONDUIT COMPLETE. COORDINATE WITH EQUIPMENT SUPPLIER.
6. PROVIDE NEW MAIN BREAKER PANEL. SEE RISER DIAGRAM. PROVIDE LABELING REQUIREMENTS AS INDICATED ON SHEET E–100, NOTE #31.

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

8' 0 4' 8' 16'

SYM.	DESCRIPTION	DATE	APPR

DESIGNED & ENGINEERED BY:

CRENSHAW CONSULTING engineers

NC LICENSE #C-1156

www.crenshawconsulting.com 3516 Bush Street, Suite 200 Raleigh, North Carolina 27609 919-871-1070 Fax 871-5620

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 34954 JEFFERY T. ROSEMAN 8-14-15

SEAL

APPROVED

ACTIVITY – SATISFACTORY TO

DATE

APPROVED

FOR EFD FOR COMMANDER NAVFAC

DATE

A/E		EFD
JTR	DESIGN	
JTR	DRAWN	
JTR	REVIEW	
JRC	QC	
JRC	CHIEF ARCH./ ENGR.	
	PROJECT MANAGER	
	FIRE PROTECTION	
	BRANCH MANAGER	
	DESIGN DIRECTOR	

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND

MARINE CORPS AIR STATION, CHERRY POINT, N.C.

CONSTRUCT COMPOSITE SHOP ADDITION, BUILDING 4224

PARTIAL FLOOR PLAN POWER

STA. PROJ. NO. 6328570

SPEC. NO.

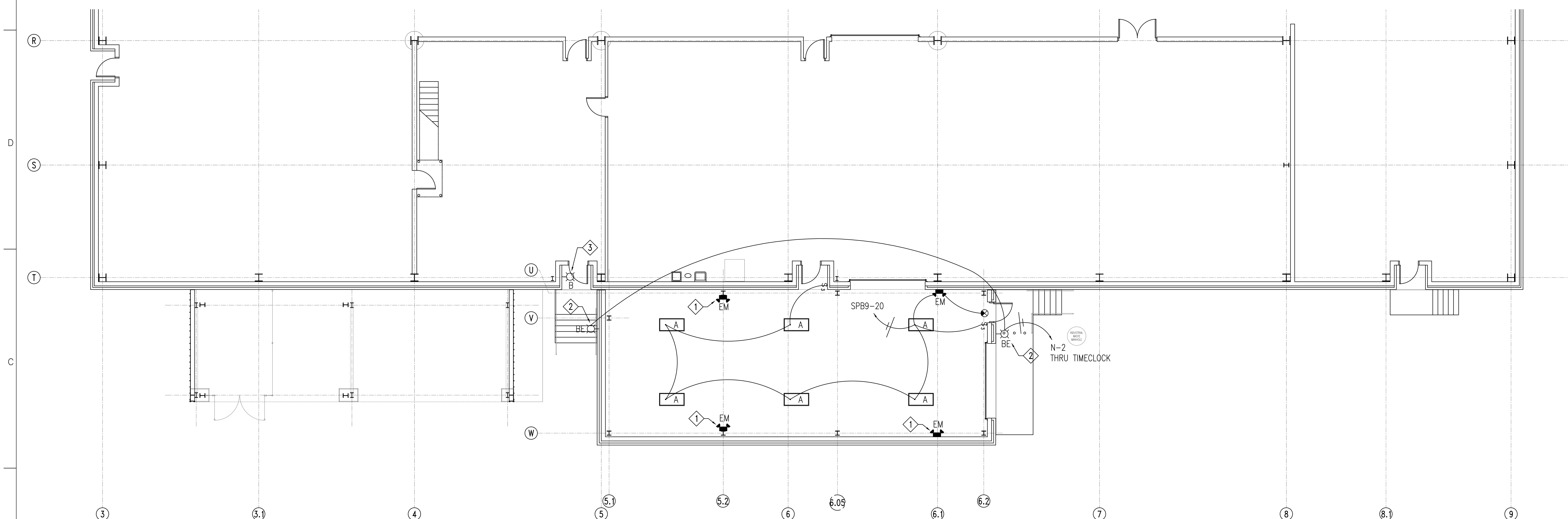
CONSTR. CONTR. NO.

NAVFAC DRAWING NO. 12685654

SHEET 41 OF 45

E-102

100% Final Submittal



PARTIAL FLOOR PLAN – LIGHTING

1 E-103 | E-103 CONSTRUCTION — SCALE: 1/8"=1'-0"

NORTH

PLAN NOTES:

1. CONNECT EMERGENCY AND EXIT LIGHTS AHEAD OF LOCAL SWITCH AS REQUIRED. (TOTAL FIXTURE UNSWITCHED)
2. FOR THIS FIXTURE, REMOTE BATTERY SHALL BE INSIDE BUILDING AND EXTERIOR EMERGENCY LAMPS ARE INTEGRAL TO EXTERIOR LIGHT MOUNTED ON BUILDING. EMERGENCY LAMPS SHALL ONLY COME ON IN THE EVENT OF POWER LOSS. CONTRACTOR SHALL CONNECT BATTERY AHEAD OF EXTERIOR LIGHTING CONTACTOR (TOTAL FIXTURE UNSWITCHED).
3. CONNECT NEW FIXTURE AT SAME LOCATION AS REMOVED FIXTURE, AND TO EXISTING LIGHTING CIRCUIT CURRENTLY SERVING THAT FIXTURE.

LIGHTING NOTES:

1. LINEAR HIGH BAY FIXTURES, TYPE 'A', SHALL BE MOUNTED SUCH THAT THE BOTTOM OF THE FIXTURE IS AT 17 FEET A.F.F.
2. EMERGENCY WALLPACK FIXTURES, TYPE 'EM', SHALL BE MOUNTED AT 12 FEET A.F.F.
3. EXTERIOR WALLPACK FIXTURES, TYPE 'BE', SHALL BE MOUNTED AT 12 FEET A.F.F.
4. LINEAR HIGH BAY FIXTURES, TYPE 'A', SHALL BE PROVIDED WITH WIRE GUARDS.

GRAPHIC SCALE: 1/8"=1'-0"
8' 0 4' 8' 16'

SYM.	DESCRIPTION	DATE	APPR

DESIGNED & ENGINEERED BY:

CRENSHAW CONSULTING engineers
NC LICENSE #C-1156 — www.crenshawconsulting.com — 3516 Bush Street, Suite 200, Raleigh, North Carolina 27609 — 919-871-1070 Fax 871-5620

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 34954 JEFFERY T. ROSEMAN 8-14-15

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A/E		EFD
JTR	DESIGN	
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	PROJECT MANAGER	
	FIRE PROTECTION	
	BRANCH MANAGER	
	DESIGN DIRECTOR	

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND

MARINE CORPS AIR STATION, CHERRY POINT, N.C.

CONSTRUCT COMPOSITE SHOP ADDITION, BUILDING 4224

PARTIAL □LOOR PLAN □LI□HTIN□

STA. PROJ. NO. 6328570

SPEC. NO.

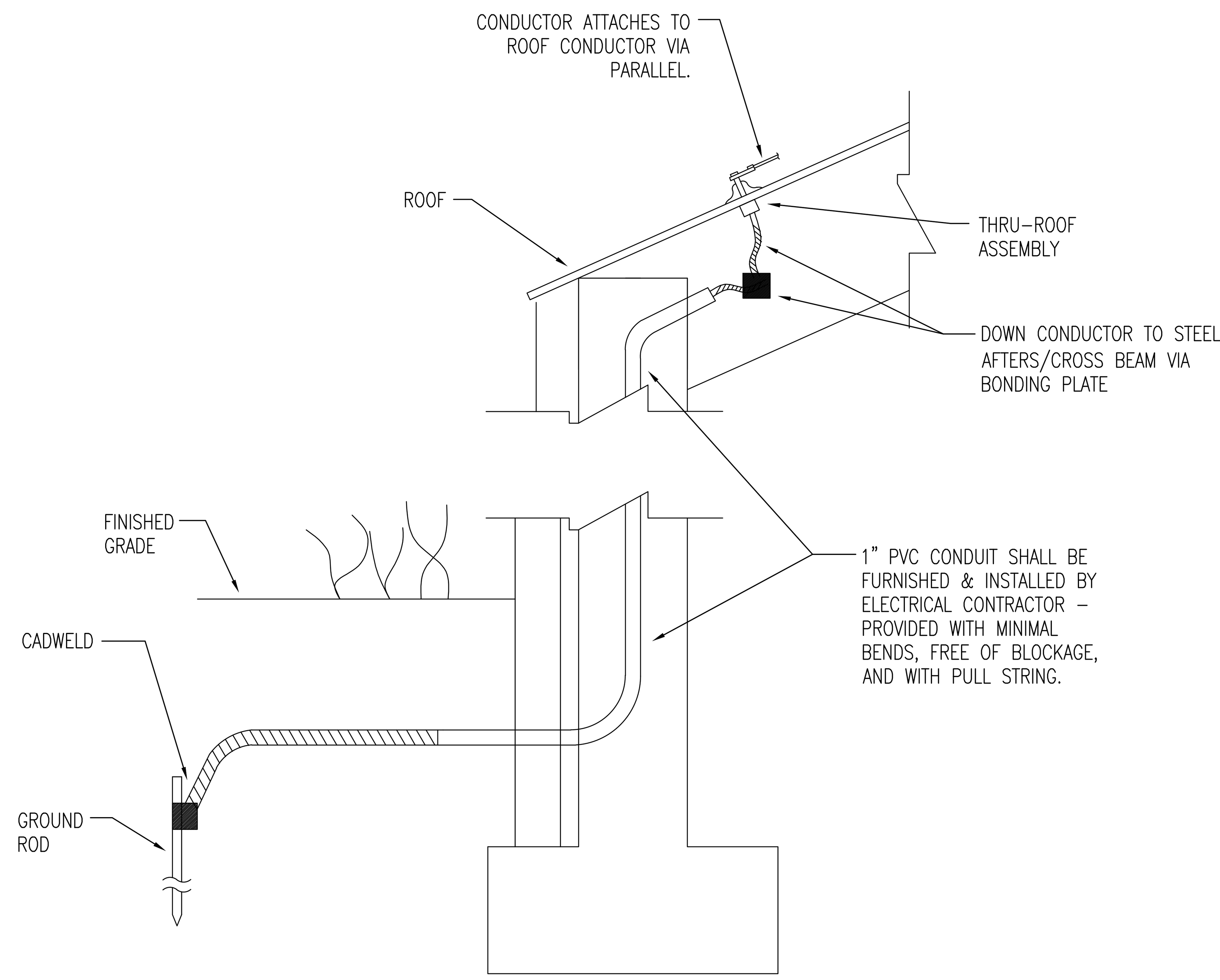
CONSTR. CONTR. NO.

NAVFAC DRAWING NO. 12685655

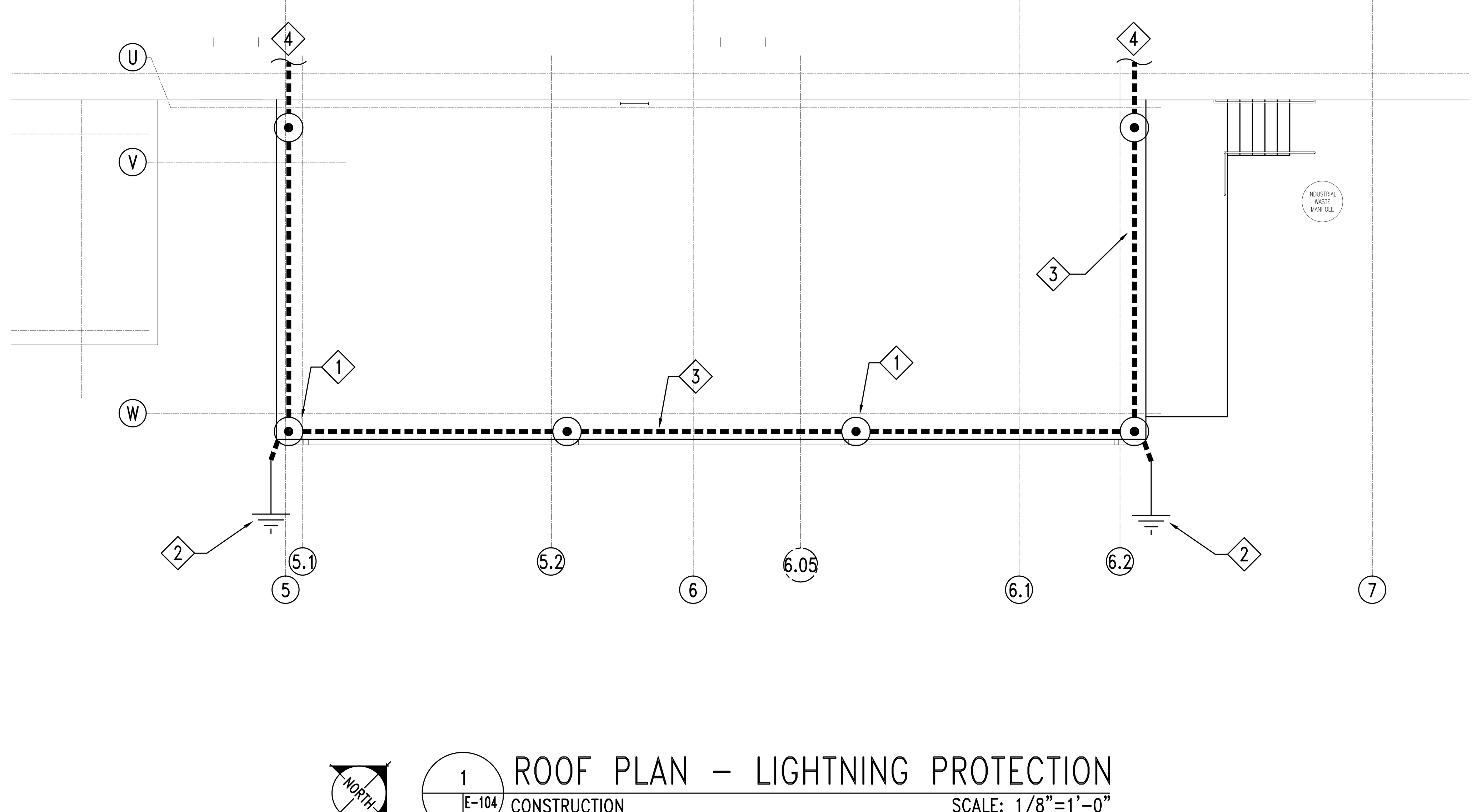
SHEET 42 OF 45

E-□0□

100% Final Submittal



2 E-104 LIGHTNING PROTECTION GROUNDING DETAIL
Scale: NTS



1 E-104 ROOF PLAN – LIGHTNING PROTECTION
CONSTRUCTION
SCALE: 1/8"=1'-0"

COMPATIBLE MATERIALS NOTE:

THE MATERIALS SECTION OF U.L. 96A (SECTION 5) REQUIRES THAT METALS SHALL BE USED IN COMBINATIONS THAT ARE GALVANICALLY COMPATIBLE. THEREFORE, ALUMINUM COMPONENTS SHALL NOT BE INSTALLED IN DIRECT CONTACT WITH BARE COPPER ROOFING MATERIALS/SURFACES, AND COPPER COMPONENTS SHALL NOT BE INSTALLED IN DIRECT CONTACT WITH BARE ALUMINUM ROOFING MATERIALS/SURFACES. METALS ACCEPTABLE FOR USE WITH COPPER AND ALUMINUM ARE AS FOLLOWS:

METALS ACCEPTABLE FOR USE WITH COPPER:
NICKEL, BRASS, TIN, LEAD, STAINLESS STEEL, AND MONEL.

METALS ACCEPTABLE FOR USE WITH ALUMINUM:
MAGNESIUM, ZINC, GALVANIZED STEEL, STAINLESS STEEL, LEAD, AND WROUGHT IRON.

PAINT IS NOT CONSIDERED ACCEPTABLE BETWEEN GALVANICALLY INCOMPATIBLE ROOFING, FLASHING, AND OTHER MATERIALS OR SURFACES.

PLAN NOTES:

1. CLASS I AIR TERMINAL, 12 INCHES IN HEIGHT/LENGTH. USE 3/8 INCH DIAMETER FOR COPPER. AIR TERMINAL MATERIAL SHALL MATCH AND BE COMPATIBLE WITH MATERIAL USED FOR CONDUCTORS. TYPICAL.
2. DOWN LEAD CONDUCTOR CONNECTED TO GROUND ROD. PROVIDE PVC SCHEDULE 40 TO PROTECT CONDUCTOR FROM PHYSICAL DAMAGE. USE 3/4 INCH BY 10 FOOT COPPERCLAD GROUND ROD BY EXOTHERMIC CONNECTION. SEE GROUNDING DETAIL.
3. CLASS I CONDUCTORS SHALL BE #17 AWG, 29 STRAND COPPER. TYPICAL.
4. CONNECT TO EXISTING LIGHTNING PROTECTION SYSTEM CONDUCTORS IN EXISTING PORTION OF BUILDING.

GENERAL NOTES:

1. SEE SHEET E–100 FOR ELECTRICAL GENERAL NOTES AND LEGEND.
2. JOB CONDITIONS MAY NECESSITATE SLIGHT VARIATION IN LOCATION OF DOWN LEADS AND AIR TERMINALS.
3. INSTALLATION SHALL BE IN ACCORDANCE WITH U.L. REQUIREMENTS AND RECEIVE THE U.L. LIGHTNING PROTECTION INSPECTION CERTIFICATE. INSTALLATION SHALL BE PROVIDED BY A U.L. MASTER INSTALLER.
4. BOND ALL BODIES OF CONDUCTANCE AND BODIES OF INDUCTANCE LOCATED WITHIN 6 FEET OF MAIN CONDUCTOR AS REQUIRED.
5. CONDUCTOR SHALL BE FASTENED A MAXIMUM OF 3 FEET ON CENTER.
6. ALL CONDUCTOR BENDS SHALL BE A MINIMUM OF 90 DEGREES WITH A MINIMUM 8 INCH RADIUS.
7. INSTALLATION TO BE PERFORMED IN A NEAT AND ORDERLY MANNER, AND SHALL BE DONE AS INCONSPICUOUSLY AS POSSIBLE.
8. VERIFY ELECTRICAL GROUND, WATER LINE, AND OTHER UNDERGROUND PIPING IS COMMON WITH THE LIGHTNING PROTECTION GROUNDING.
9. A SURGE PROTECTIVE DEVICE OR UNIT SHALL BE PROVIDED ON EACH ELECTRICAL AND TELECOMMUNICATIONS SERVICE ENTRANCE, ALONG WITH EACH RADIO AND TELEVISION LEAD–IN BY THE ELECTRICAL CONTRACTOR OR RESPECTIVE SYSTEM INSTALLER.
10. ALL MATERIALS SHALL BE U.L. LISTED.
11. INSTALLATION IS BASED UPON ALL ROOF–MOUNTED LIGHTNING PROTECTION COMPONENTS BEING ADHERED DIRECTLY TO ROOF SURFACE. ANY VARIANCE OR SPECIAL PROVISIONS SHALL BE RESPONSIBILITY OF THE ROOFING OR GENERAL CONTRACTOR.
12. ALUMINUM MATERIALS SHALL BE USED ON ALUMINUM SURFACES.
13. THE LIGHTNING PROTECTION SYSTEM IS DESIGNED AND DETAILED PER THE CURRENT NFPA 780 AND U.L. 96A CODES. THE U.L. 96A MASTER LABEL CERTIFICATION WILL BE ISSUED PRIOR TO BUILDING ACCEPTANCE.
14. THE GROUNDING ROD RESISTANCE SHALL NOT BE MORE THAN 25 OHMS. VERIFY AND SUBMIT RESISTANCE READING REPORT.
15. CONDUCTOR RADIUS CANNOT BE MORE THAN 90 DEGREES AND CANNOT BE LESS THAN AN 8 INCH RADIUS.

GRAPHIC SCALE: 1/8"=1'-0"
8' 0 4' 8' 16'

SYM.	DESCRIPTION	DATE	APPR

DESIGNED & ENGINEERED BY:

CRENSHAW CONSULTING engineers
NC LICENSE #C-1156
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NORTH CAROLINA PROFESSIONAL SEAL 34954 ENGINEER JERRY T. ROSEMAN
8-14-15
SEAL

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A/E		EFD
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	PROJECT MANAGER	
	FIRE PROTECTION	
	BRANCH MANAGER	
	DESIGN DIRECTOR	

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS AIR STATION, CHERRY POINT, N.C.

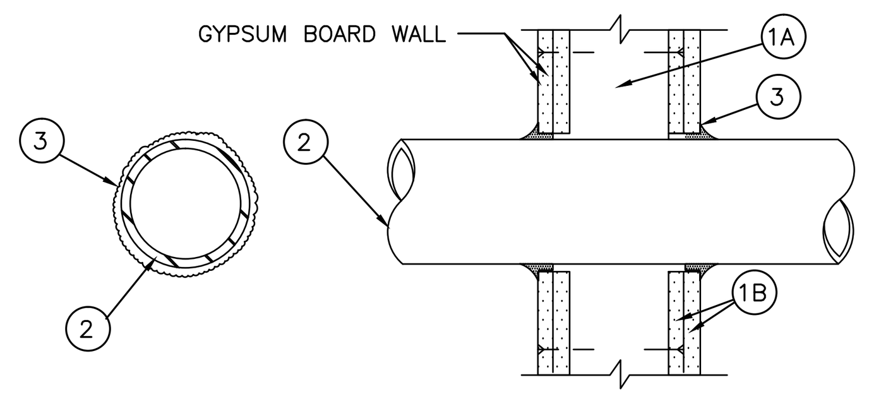
CONSTRUCT COMPOSITE SHOP ADDITION, BUILDING 4224

ROOF PLAN LIGHTNING PROTECTION

STA. PROJ. NO. 6328570
SPEC. NO.
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 12685656
SHEET 43 OF 45

E-104

100% Final Submittal



System No. W-L-1001

June 15, 2005

F Ratings — 1, 2, 3 and 4 Hr (See Items 2 and 3)
T Ratings — 0, 1, 2, 3, and 4 Hr (See Item 3)
L Rating At Ambient — less than 1 CFM/sq ft
L Rating At 400 F — less than 1 CFM/sq ft

1. Wall Assembly — The 1, 2, 3 or 4 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300 or U400 Series Wall or Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. Studs — Wall framing may consist of either wood studs (max 2 h fire rated assemblies) or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC with nom 2 by 4 in. (51 by 102 mm) lumber end plates and cross braces. Steel studs to be min 3-5/8 in. (92 mm) wide by 1-3/8 in. (35 mm) deep channels spaced max 24 in. (610 mm) OC.

B. Gypsum Board* — Nom 1/2 or 5/8 in. (13 or 16 mm) thick, 4 ft. (122 cm) wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 26 in. (660 mm).

2. Through-Penetrant — One metallic pipe, conduit or tubing installed either concentrically or eccentrically within the firestop system. The annular space between pipe, conduit or tubing and periphery of opening shall be min of 0 in / (0 mm). (point contact) to max 2 in. (51 mm) Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:

A. Steel Pipe — Nom 24 in. (610 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
B. Iron Pipe — Nom 24 in. (610 mm) diam (or smaller) service weight (or heavier) cast iron soil pipe, nom 12 in (305 mm) diam (or smaller) or Class 50 (or heavier) ductile iron pressure pipe.
C. Conduit — Nom 6 in. (152 mm) diam (or smaller) steel conduit or nom 4 in (102 mm) diam (or smaller) steel electrical metallic tubing
D. Copper Tubing — Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing
E. Copper Pipe — Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.
F. Through Penetrating Product* — Flexible Metal Piping The following types of steel flexible metal gas piping may be used:

1. Nom 2 in. (51 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.

OMEGA FLEX INC

2. Nom 1 in. (25 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.

GASTITE, DIV OF TITEFLEX

3. Nom 1 in. (25 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.

WARD MFG L L C

3. Fill, Void or Cavity Material* — Caulk or Sealant — Min 5/8. , 1-1/4,1-7/8 and 2-1/2 in. (16, 32, 48 and 64 mm) thickness of caulk for 1, 2, 3 and 4 hr rated assemblies, respectively, applied within annulus, flush with both surfaces of wall. Min 1/4 in. (6 mm) diam bead of caulk applied to gypsum board/penetrant interface at point contact location on both sides of wall. The hourly F Rating of the firestop system is dependent upon the hourly fire rating of the wall assembly in which it is installed, as shown in the following table. The hourly T Rating of the firestop system is dependent upon the type or size of the pipe or conduit and the hourly fire rating of the wall assembly in which it is installed, as tabulated below:

Max Pipe or Conduit Diam, In (mm)	F Rating, Hr	T Rating, Hr
1 (25)	1 or 2	0+, 1 or 2
1 (25)	3 or 4	3 or 4
4 (102)	1 or 2	0
6 (152)	3 or 4	0
12 (305)	1 or 2	0

+When copper pipe is used, T Rating is 0 h.

3M COMPANY — CP 25WB+ or FB-3000 WT.

*Bearing the UL Classification Mark

FOR FRAMED WALLS ONLY 1,2,3, OR 4 HOUR PENETRATION FIRESTOP FOR METALLIC PIPE, CONDUIT, OR TUBING

2 / E201 SCALE: NONE

Panel: SPB-9

800 AMP MAIN LUGS ONLY — Poles: 42 Voltage: 277/480 Phase: 3 Wires: 4

LOAD SERVED	KVA	BRKR.		ø		BRKR.	KVA	LOAD SERVED
SPARE		50/3	1	A	2	50/3		SPARE
			3	B	4			
			5	C	6			
SPARE		50/3	7	A	8	30/3	5.3	EX. FORK LIFT
			9	B	10		5.3	
			11	C	12		5.3	
AHU-1	**24.1**	**90/3**	13	A	14	70/3		SPARE
	24.1		15	B	16			
	24.1		17	C	18			
SPARE		100/3	19	A	20	**20/1**	**1.9**	**DISASSEMBLY SHOP LIGHTING**
			21	B	22	SPACE		SPACE
			23	C	24	SPACE		SPACE
SPARE		70/3	25	A	26	110/3		SPARE
			27	B	28			
			29	C	30			
CRANE	**1.3**	**15/3**	31	A	32	175/3	31.0	EXISTING
	1.3		33	B	34		31.0	
	1.3		35	C	36		31.0	
SPACE		SPACE	37	A	38	200/3	35.4	EXISTING
SPACE		SPACE	39	B	40		35.4	
SPACE		SPACE	41	C	42		35.4	

Demand Load Summary:

Lighting: 1.9 KVA	@ 125%	2.4 KVA	Phase A:	99.4 KVA	359.0 Amps
Largest Motor: 0.0 KVA	@ 125%	0.0 KVA	Phase B:	97.1 KVA	350.4 Amps
Gen Receptacles: 0.0 KVA	@ 100%	0.0 KVA	Phase C:	97.1 KVA	350.4 Amps
All Other: 291.2 KVA	@ 100%	291.2 KVA	Total Panel Load:	293.6 KVA	353.1 Amps

- [X] GROUND BAR
- [X] SEPARATE NEUTRAL BAR
- [ ] U.L. S.E. RATED
- [X] SURFACE MOUNTED
- [ ] NEMA 3R
- [X] FEED THRU LUGS
- [X] EXISTING PANEL

1. MATCH EXISTING AIC.

Panel: RP9B

225/3 MAIN BREAKER — Poles: 42 Voltage: 120/208 Phase: 3 Wires: 4

LOAD SERVED	KVA	BRKR.		ø		BRKR.	KVA	LOAD SERVED
EX. PRESS	1.5	20/3	1	A	2	20/1		SPARE
	1.5		3	B	4	20/1	1.5	EX. WORKBENCH
	1.5		5	C	6	20/1	1.5	EX. WORKBENCH
EX. ROTATION STAND	1.5	20/1	7	A	8	20/1	1.5	EX. WORKBENCH
EX. QA RECEPT.	1.0	20/1	9	B	10	20/2		SPARE
EX. WORK BENCH	1.5	20/1	11	C	12			
EX. COMPUTER RECEPTS.	1.0	20/1	13	A	14	20/1	1.5	EX. ROTATING STAND
EX. LTS & PRINTER RECEPT.	1.2	20/1	15	B	16	SPACE		SPACE
EX. COMPUTER RECEPT.	1.0	20/1	17	C	18	20/1		SPARE
SPARE		60/3	19	A	20	20/1		SPARE
			21	B	22	SPACE		SPACE
			23	C	24	20/2	1.5	EX. FREEZER
SPARE		20/2	25	A	26		1.5	
			27	B	28	20/1	1.5	EX. WORKBENCH
SPACE		SPACE	29	C	30	20/1	1.5	EX. WORKBENCH
SPACE		SPACE	31	A	32	20/1	1.0	EX. QA RECEPTS.
SPACE		SPACE	33	B	34	SPACE		SPACE
SPACE		SPACE	35	C	36	SPACE		SPACE
SPACE		SPACE	37	A	38	**100/3**	**6.0**	**NEW PANEL 'N'**
SPACE		SPACE	39	B	40		**7.4**	
SPACE		SPACE	41	C	42		**5.4**	

Demand Load Summary:

Lighting: 0.0 KVA	@ 125%	0.0 KVA	Phase A:	15.5 KVA	129.2 Amps
Largest Motor: 0.0 KVA	@ 125%	0.0 KVA	Phase B:	14.1 KVA	117.5 Amps
Gen Receptacles: 0.0 KVA	@ 100%	0.0 KVA	Phase C:	13.9 KVA	115.8 Amps
All Other: 43.5 KVA	@ 100%	43.5 KVA	Total Panel Load:	43.5 KVA	120.7 Amps

- [X] GROUND BAR
- [X] SEPARATE NEUTRAL BAR
- [ ] U.L. S.E. RATED
- [X] SURFACE MOUNTED
- [ ] NEMA 3R
- [ ] FEED THRU LUGS
- [X] EXISTING PANEL

1. MATCH EXISTING AIC.

PANEL SCHEDULE NOTES:

* SEE EQUIPMENT CONNECTION SCHEDULE FOR CIRCUIT BREAKER SIZES.

*** FOR RECEPTACLE LOADS SHOWN OVER 10.0 KVA, A 100% DIVERSITY FACTOR WAS USED FOR THE FIRST 10.0 KVA, AND A 50% DIVERSITY FACTOR WAS USED FOR THE LOAD OVER 10.0 KVA

1. VALUES FOR DEMAND LOADS INCLUDE ALL CODE FACTORS SUCH AS 125% FOR CONTINUOUS LOADS, 125% LARGEST MOTOR, ETC.
2. CIRCUIT BREAKERS USED FOR HVAC EQUIPMENT SHALL BE "HACR" TYPE.
3. ALL PANEL DIRECTORIES SHALL BE COMPLETED IN ACCORDANCE WITH NEC 408.4.
4. CONTRACTOR SHALL PROVIDE MULTIPOLE BREAKERS IN LIEU OF ALL SINGLE POLE BREAKERS SHOWN WHEN MULTIWIRE BRANCH CIRCUITS ARE INSTALLED PER NEC 210.4(B).
5. CONTRACTOR SHALL LABEL ALL BREAKERS FEEDING EMERGENCY AND EXIT LIGHTING PER NEC 700.12(F).
6. CONTRACTOR SHALL PROVIDE IDENTIFICATION FOR NEW FEEDERS AND ANY NEW BRANCH CIRCUITS PER NEC 200.6, 210.5, AND 215.12.
7. BREAKERS INDICATED AS (L) SHALL HAVE A BREAKER LOCK PROVIDED. I.E. 20/1(L) SHALL BE A 20 AMP SINGLE POLE BREAKER WITH LOCK.
8. BOLDED TEXT INDICATES A NEW OR CHANGED CIRCUIT ON AN EXISTING PANEL, BOLDED BREAKERS ARE NEW OR RELOCATED TO LOCATION SHOWN.
9. ENGINEER HAS SHOWN NEW CIRCUITS IN LOCATIONS DETERMINED TO BE SPARE OR SPACE BASED ON PANEL DIRECTORIES AND OTHER AVAILABLE INFORMATION. CONTRACTOR SHALL VERIFY THAT PLACEMENT SHOWN DOES NOT INTERFERE WITH EXISTING CIRCUITS TO REMAIN. VERIFY AVAILABLE CIRCUITS BASED ON NEW AND DEMO PLANS AND CONTACT ENGINEER WITH ANY CONFLICTS.

Panel: SPB-9A

800 AMP MAIN LUGS ONLY — Poles: 42 Voltage: 277/480 Phase: 3 Wires: 4

LOAD SERVED	KVA	BRKR.		ø		BRKR.	KVA	LOAD SERVED
SPARE		20/3	1	A	2	20/3		SPARE
			3	B	4			
			5	C	6			
SPARE		20/3	7	A	8	20/3	3.5	EX. HOOD
			9	B	10		3.5	
			11	C	12		3.5	
EX. OVEN	5.3	30/3	13	A	14	SPACE		SPACE
	5.3		15	B	16	SPACE		SPACE
	5.3		17	C	18	SPACE		SPACE
SPACE		SPACE	19	A	20	40/3		SPARE
SPACE		SPACE	21	B	22			
SPACE		SPACE	23	C	24			
SPARE		40/3	25	A	26	40/3		SPARE
			27	B	28			
			29	C	30			
SPARE		40/3	31	A	32	40/3		SPARE
			33	B	34			
			35	C	36			
SPARE		50/3	37	A	38	SPACE		SPACE
			39	B	40	SPACE		SPACE
			41	C	42	SPACE		SPACE
EX. TRANSFORMER	22.1	100/3	43	A	44	SPACE		SPACE
	22.1		45	B	46	SPACE		SPACE
	22.1		47	C	48	SPACE		SPACE

Demand Load Summary:

Lighting: 0.0 KVA	@ 125%	0.0 KVA	Phase A:	30.9 KVA	111.6 Amps
Largest Motor: 0.0 KVA	@ 125%	0.0 KVA	Phase B:	30.9 KVA	111.6 Amps
Gen Receptacles: 0.0 KVA	@ 100%	0.0 KVA	Phase C:	30.9 KVA	111.6 Amps
All Other: 92.7 KVA	@ 100%	92.7 KVA	Total Panel Load:	92.7 KVA	111.5 Amps

- [X] GROUND BAR
- [X] SEPARATE NEUTRAL BAR
- [ ] U.L. S.E. RATED
- [X] SURFACE MOUNTED
- [ ] NEMA 3R
- [ ] FEED THRU LUGS
- [X] EXISTING PANEL

1. MATCH EXISTING AIC.

Panel: N

100/3 MAIN BREAKER — Poles: 30 Voltage: 120/208 Phase: 3 Wires: 4

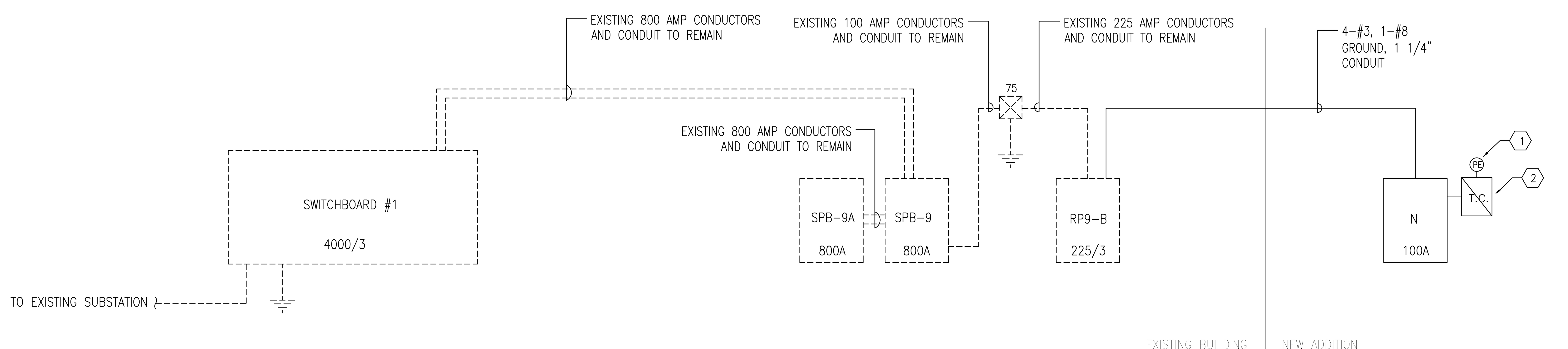
LOAD SERVED	KVA	BRKR.		ø		BRKR.	KVA	LOAD SERVED
DED. QUAD RECEPT.	1.0	20/1	1	A	2	20/1	0.1	EXTERIOR WALLPACK LIGHTS
DED. QUAD RECEPT.	1.0	20/1	3	B	4	20/1	1.1	MOTORIZED DOOR
DED. QUAD RECEPT.	1.0	20/1	5	C	6	20/1	1.1	MOTORIZED DOOR
DED. QUAD RECEPT.	1.0	20/1	7	A	8	20/1	0.6	RECEPTACLES
DED. QUAD RECEPT.	1.0	20/1	9	B	10	20/1	1.0	DED. QUAD RECEPT.
DED. QUAD RECEPT.	1.0	20/1	11	C	12	20/1		SPARE
DED. QUAD RECEPT.	1.0	20/1	13	A	14	20/1		SPARE
DED. QUAD RECEPT.	1.0	20/1	15	B	16	20/1		SPARE
DED. QUAD RECEPT.	1.0	20/1	17	C	18	20/1		SPARE
DED. QUAD RECEPT.	1.0	20/1	19	A	20	20/1		SPARE
DED. QUAD RECEPT.	1.0	20/1	21	B	22	20/1		SPARE
SPARE		20/1	23	C	24	SPACE		SPACE
SPACE		SPACE	25	A	26	SPACE		SPACE
SPACE		SPACE	27	B	28	SPACE		SPACE
SPACE		SPACE	29	C	30	SPACE		SPACE

Demand Load Summary:

Lighting: 0.1 KVA	@ 125%	0.1 KVA	Phase A:	4.7 KVA	39.4 Amps
Largest Motor: 0.0 KVA	@ 125%	0.0 KVA	Phase B:	6.1 KVA	50.8 Amps
Gen Receptacles: 0.0 KVA	NOTE 2	0.0 KVA	Phase C:	4.1 KVA	34.2 Amps
All Other: 14.8 KVA	@ 100%	14.8 KVA	Total Panel Load:	14.9 KVA	41.4 Amps

- [X] GROUND BAR
- [X] SEPARATE NEUTRAL BAR
- [ ] U.L. S.E. RATED
- [X] SURFACE MOUNTED
- [ ] NEMA 3R
- [ ] FEED THRU LUGS
- [ ] EXISTING PANEL

1. ALL BREAKERS SHALL BE RATED AT 10,000 AIC.



PARTIAL EXISTING ELECTRICAL RISER DIAGRAM

1 / E-201 Scale: NTS

RISER KEY NOTES:

1. PHOTOCELL ON ROOF FACING NORTH TO TURN LIGHTS ON. ADJUST SENSITIVITY AS REQUIRED FOR PROPER OPERATION.
2. 7-DAY PROGRAMMABLE TIME CLOCK TO TURN LIGHTS OFF W/ SEASONABLE DAYLIGHT SCHEDULE ADJUSTMENT AND 4 HOUR BATTERY BACKUP.

SYM. | DESCRIPTION | DATE | APPR

DESIGNED & ENGINEERED BY:

CRENSHAW CONSULTING ENGINEERS — www.crenshawconsulting.com — NC LICENSE #C-1156 — 3516 Bush Street, Suite 200, Raleigh, North Carolina 27609 — 919-871-1070 Fax 871-5620

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 34954 JERRY T. ROSEMAN — 8/14/15

SEAL

APPROVED

ACTIVITY - SATISFACTORY TO

DATE

APPROVED

FOR EFD FOR COMMANDER NAVFAC

DATE

A/E		EFD
JTR	DESIGN	
JTR	DRAWN	
JTR	REVIEW	
JRC	QC	
JRC	CHIEF ARCH./ ENGR.	

PROJECT MANAGER
FIRE PROTECTION
BRANCH MANAGER
DESIGN DIRECTOR

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND

MARINE CORPS AIR STATION, CHERRY POINT, N.C.

CONSTRUCT COMPOSITE SHOP ADDITION, BUILDING 4224

ELECTRICAL DETAILS

STA. PROJ. NO. 6328570

SPEC. NO.

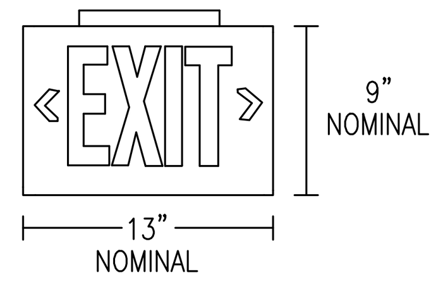
CONSTR. CONTR. NO.

NAVFAC DRAWING NO. 12685657

SHEET 44 OF 45

E-20[illegible]

100% Final Submittal

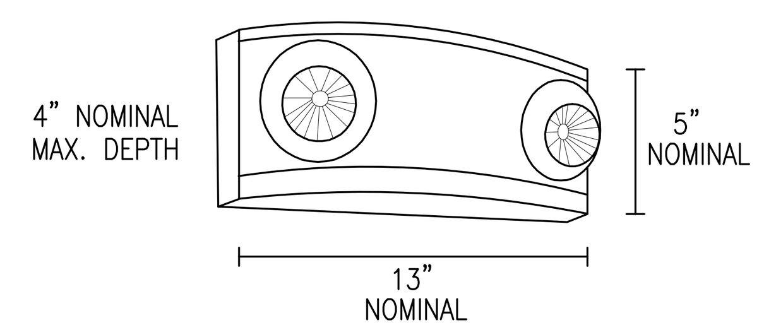


LUMINAIRE REQUIREMENTS:

1. HOUSING – DIE-CAST ALUMINUM OR HIGH-IMPACT, UV-STABILIZED, INJECTION-MOLDED THERMOPLASTIC. SINGLE OR DOUBLE-FACED AS INDICATED.
2. FINISH (ON CAST ALUMINUM HOUSING ONLY) – TEXTURED POWDER COAT FINISH OPTIONS INCLUDE WHITE, WHITE WITH BRUSHED ALUMINUM FACE, BLACK, OR BLACK WITH BRUSHED ALUMINUM FACE.
3. LETTERS/CHEVRONS – MINIMUM 6" HIGH WITH 3/4" STROKE. RED OR GREEN LETTERS AS INDICATED. PROVIDE CHEVRONS AS INDICATED EITHER LEFT, RIGHT OR BOTH DIRECTIONS AS INDICATED. CHEVRONS PUNCHED OUT THROUGH HOUSING AS REQUIRED.
4. EMERGENCY PACK – SOLID-STATE, CONSTANT-CURRENT TYPE BATTERY CHARGER WITH MAINTENANCE-FREE, NICKEL-CADMIUM BATTERY, AC-ON INDICATOR LAMP AND TEST SWITCH.
5. MOUNTING – UNIVERSAL MOUNTING KIT FOR CEILING, WALL OR END-OF-FIXTURE MOUNTING.
6. ILLUMINATION – PROVIDED BY RED, GREEN OR WHITE HIGH-OUTPUT LEDS INSIDE OF FIXTURE HOUSING. PROVIDE POLYSTYRENE DIFFUSER IN COLOR INDICATED WITH FREQUENCY-MATCHED SILKSCREEN COATING FOR MAXIMUM LED LIGHT OUTPUT.
7. CERTIFICATION – UL LISTED AND CERTIFIED FOR DAMP LOCATIONS.

LED EXIT SIGN

REVISED: AUGUST 2004 | LIGHTING PLATE: NL–63

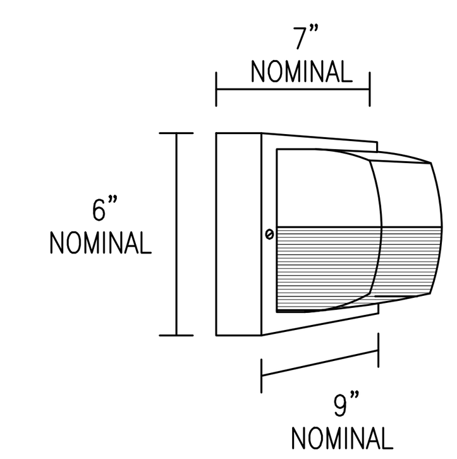


LUMINAIRE REQUIREMENTS:

1. HOUSING – UV STABLE, FLAME-RATED, HIGH-IMPACT THERMOPLASTIC IN WHITE OR BLACK TEXTURED FINISH.
2. INTERNAL COMPONENTS – FULLY AUTOMATIC, SOLID STATE, CONSTANT VOLTAGE, CURRENT-LIMITED BATTERY CHARGER; MAINTENANCE-FREE LEAD-ACID BATTERY; AND BUILT-IN OVERLOAD AND LOW-VOLTAGE BATTERY PROTECTION.
3. EXTERIOR HOUSING INDICATORS – LED AC-ON INDICATOR AND INTEGRAL TEST SWITCH.
4. LAMP HEADS – UV STABLE, FLAME RATED POLYCARBONATE THERMOPLASTIC. MR16 HALOGEN LAMPS SHALL BE 5 WATTS, HIGH-OUTPUT OR AS INDICATED IN LIGHTING FIXTURE SCHEDULE.
5. MOUNTING – DIRECTLY TO 4" OCTAGONAL OR SQUARE OUTLET BOX.
6. CERTIFICATION – UL LISTED AND LABELED. COMPLIES WITH UL 924 AND NFPA 101 REQUIREMENTS. LISTED FOR DAMP LOCATIONS.
7. OPTIONS – VOLTMETER, VANDEL-RESISTANT SHIELD, SELF-DIAGNOSTIC/TESTING ELECTRONICS AND WIRE GUARD.

DECORATIVE EMERGENCY LIGHTING UNIT

REVISED: AUGUST 2004 | LIGHTING PLATE: NL–67

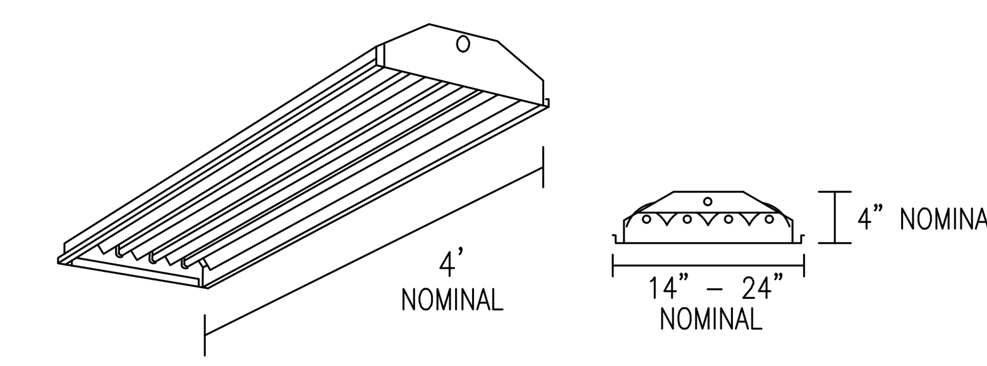


LUMINAIRE REQUIREMENTS:

1. HOUSING – ONE-PIECE, DIE-CAST ALUMINUM WITH BAKED-ON POLYESTER POWDER COAT FINISH IN BLACK.
2. DIFFUSER – CLEAR PRISMATIC, UV-STABILIZED, INJECTION-MOLDED POLYCARBONATE WITH MINIMUM 1/8" THICKNESS. DIFFUSER SECURED WITH TAMPER-RESISTANT STAINLESS STEEL SCREWS. BLACK HORIZONTAL FRONT EYELID FOR CUTOFF.
3. GASKET – ONE-PIECE, CLOSED-CELL NEOPRENE TO DISCOURAGE MOISTURE, INSECTS AND DEBRIS.
4. BALLAST – CLASS P, HIGH POWER FACTOR ($\geq$.95), PROGRAMMED RAPID START ELECTRONIC TYPE WITH $\leq$10% TOTAL HARMONIC DISTORTION FOR COMPACT FLUORESCENT LAMPS.
5. LAMPS – MULTI-TUBE COMPACT FLUORESCENT WITH 4-PIN BASE OR INCANDESCENT. PROVIDE WITH WATTAGES AS INDICATED. SEE LIGHTING FIXTURE SCHEDULE.
6. CERTIFICATION – UL LISTED AND LABELED FOR WET LOCATIONS.

WALL-MOUNTED HIGH ABUSE FIXTURE

REVISED: AUGUST 2004 | LIGHTING PLATE: NL–48



LUMINAIRE REQUIREMENTS:

1. HOUSING – DIE-FORMED, COLD-ROLLED STEEL, OR .05" DIE-FORMED ALUMINUM WITH REINFORCEMENT RIBS FOR RIGIDITY. ENDCAPS SECURED WITH TABS, SCREWS OR RIVETS. FIXTURE SHALL NOT PERMANENTLY DEFORM OUT OF "SQUARE" WHEN PICKED UP FROM ANY CORNER. HOUSING SHALL HAVE OPTION FOR SOLID TOP OR INTEGRATED UPLIGHT COMPONENT (APPROX. 15%). INDICATE IN LIGHTING FIXTURE SCHEDULE.
2. FINISH – MULTI-STAGE PHOSPHATE BONDING TREATMENT FINISHED WITH HIGH REFLECTANCE (MINIMUM 85%), BAKED WHITE ENAMEL FINISH.
3. REFLECTOR – HIGHLY SPECULAR ANODIZED ALUMINUM.
4. LAMPS – LINEAR FLUORESCENT T5HO TYPICALLY, WITH WATTAGES AS INDICATED. SEE LIGHITNG FIXTURE SCHEDULE.
5. BALLAST – CLASS P, THERMALLY-PROTECTED, HIGH POWER FACTOR ($\geq$.95), ELECTRONIC TYPE WITH SOUND RATING A. SEE SPECIFICATION OR LIGHTING FIXTURE SCHEDULE FOR BALLAST OPTIONS AND SPECIFICS.
6. CERTIFICATION – UL LISTED AND LABELED.
7. MOUNTING – UNIVERSAL HANGER FOR CHAIN, TONG OR CRADLE SYSTEM.
8. PHOTOMETRICS – MINIMUM VALUE OF COEFFICIENT OF UTILIZATION (CU) AND EFFICIENCY, GIVEN INTERIOR CAVITY REFLECTANCES OF 80–50–20:

TYPE A – 4 LAMP

RCR	CU
1	102
2	90
3	80
4	71

EFFICIENCY – 96%

TYPE B – 6 LAMP

RCR	CU
1	95
2	82
3	72
4	64

EFFICIENCY – 91%

ENCLOSED FLUORESCENT HIGH-BAY

REVISED: AUGUST 2004 | LIGHTING PLATE: NL–30

MECHANICAL EQUIPMENT CONNECTION SCHEDULE

SYMBOL	REMARKS	FURN. BY	KVA	HP	VOLTS	F.L.A.	M.C.A.	DISC. SW. SIZE	DISC. SW. NEMA	DISC. SW. PROV.	CIR. BKR. OR FUSE SIZE	AWG SIZE	GND. WIRE SIZE	CONDUIT SIZE
AHU–1	AIR HANDLER UNIT	MECH.	72.3	–	480/3	–	87.0	100/3	3R	ELEC.	90/3	4–#3	#8	1 1/4"
–	CRANE	OTHERS	3.8	–	480/3	4.6	–	30/3	1	ELEC.	15/3	4–#12	#12	3/4"

BREAKER SIZES FOR ALL EQUIPMENT SIZED AT MOCP WHERE APPLICABLE.
ALL DISCONNECTS FOR EQUIPMENT SHALL BE OF FUSIBLE TYPE AND SHALL BE FUSED AS INDICATED.

ELECTRICAL SYSTEM AND EQUIPMENT

METHOD OF COMPLIANCE: Prescriptive

Total Interior Wattage Specified VS Allowed: **2,238 V/S 2,257**

See Exterior Lighting Summary for exterior energy code calculations.

See Light Fixture Schedule for Lamp Type, Quantity, Ballast, Total Wattage and other information.

DESIGNER STATEMENT:

To the best of my knowledge and belief, the design of this building complies with the electrical system and equipment requirements of the North Carolina State Building Code, 2012 International Energy Conservation Code.

Name: JEFFERY T. ROSEMAN

Title: PROFESSIONAL ENGINEER

LIGHT FIXTURE SCHEDULE

DESIGNATION	TEMPLATE	DESCRIPTION	VOLTAGE	BALLAST TYPE/ QUANTITY	NUMBER/TYPE LAMPS	TOTAL WATTS
A	NL–30 (WITH WIREGUARD)	FLUOR. LINEAR HIGH BAY	277/1	1–ELECTRONIC	6–F54T5HO/41K	324
B	NL–48	EXTERIOR WALLPACK	120/1	1–ELECTRONIC	1–42W TRT	45
BE	SAME AS 'B' WITH BATTERY BACKUP	EXT. WALLPACK W/ BATTERY	120/1	1–ELECTRONIC	1–42W TRT	45
XD	EXISTING FIXTURE TO BE DEMOLISHED	EXTERIOR WALLPACK	EXISTING	EXISTING	1–35W HPS	50
XD2	EXISTING FIXTURE TO BE DEMOLISHED	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING
XD3	EXISTING FIXTURE TO BE DEMOLISHED	EXT. EMERGENCY REMOTE HEAD	EXISTING	–	–	–
EM	NL–67	EMERGENCY WALLPACK (BATTERY)	120/277/1	–	–	–
⊗	NL–63	EMERGENCY EXIT LIGHT (BATTERY)	120/277/1	–	–	–

NOTES:

1. ALL BALLASTS SHALL COMPLY WITH INTERNATIONAL BUILDING CODE, 2012 INTERNATIONAL ENERGY CONSERVATION CODE AND SHALL BE UL LISTED. ALL T8 BALLASTS SHALL BE INSTANT START, HIGH-PERFORMANCE ELECTRONIC WITH NORMAL BALLAST FACTOR (0.88) UNLESS OTHERWISE NOTED.
2. ALL FIXTURES NOTED AS EMERGENCY SHALL HAVE EMERGENCY ILLUMINATION FUNCTIONALITY AS DESCRIBED BELOW. IN ALL CASES, BATTERIES MUST BE RATED FOR THE ENVIRONMENT IN WHICH THEY ARE INSTALLED.
   - INTERIOR FLUORESCENT FIXTURES SHALL HAVE 1,100 LUMEN (MINIMUM) OUTPUT, 90 MINUTE BATTERY PACK.
   - EXTERIOR EMERGENCY LIGHTS SHALL HAVE AN INTEGRAL EXTERIOR RATED (0° F) OR REMOTE MOUNTED 1,100 LUMEN OUTPUT 90 MINUTE BATTERY.
   - TEST SWITCHES FOR EMERGENCY BATTERIES SHALL BE INTEGRAL TO THE FIXTURE SERVED BY THE BATTERY.
   - EMERGENCY FIXTURES SHALL OPERATE ONE LAMP WHERE MULTIPLE EMERGENCY FIXTURES ARE TO BE INSTALLED IN AN AREA, AND SHALL OPERATE TWO LAMPS WHERE THE LOSS OF A SINGLE LAMP WOULD RENDER THE SPACE IN TOTAL DARKNESS DURING EMERGENCY OPERATION.
   - WHERE EMERGENCY LIGHTS PROVIDE EMERGENCY ILLUMINATION IN AREAS NORMALLY LIT BY METAL HALIDE FIXTURES (OR SIMILAR SOURCES) WITH RESTRIKE DELAY, THE EMERGENCY BATTERY SHALL BE PROVIDED WITH A TIME DELAY TO MAINTAIN BATTERY ILLUMINATION FOR 15 MINUTES AFTER THE RESTORATION OF NORMAL POWER.
   - EMERGENCY LIGHTING DESIGN IS BASED ON EXISTING FIXTURES WITH 1,100 LUMEN OUTPUT BATTERIES. CONTRACTOR SHALL VERIFY ANY EXISTING EMERGENCY FIXTURE BATTERIES ARE 1,100 LUMEN OUTPUT MINIMUM AND SHALL REPLACE ANY BATTERIES RATED LESS THAN 1,100 LUMENS.
   - EMERGENCY LIGHTING UNITS WITH DEDICATED EMERGENCY HEADS SHALL PROVIDE 1 F.C. FOR AT LEAST 25' FOR A MINIMUM OF 90 MINUTES.
3. ALL FIXTURES ARE INTENDED TO BE A BASIS OF DESIGN AND EQUALS ARE ACCEPTED.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING THE PROPER LAMP(S) FOR EACH FIXTURE, AS RECOMMENDED BY THE FIXTURE MANUFACTURER AND FIXTURE SCHEDULE.

SYM. | DESCRIPTION | DATE | APPR

DESIGNED & ENGINEERED BY:

CRENSHAW CONSULTING engineers
www.crenshawconsulting.com
NC LICENSE #C-1156
3516 Bush Street, Suite 200
Raleigh, North Carolina 27609
919-871-1070 Fax 871-5620

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 34954 JEFFERY T. ROSEMAN

SEAL

APPROVED

ACTIVITY – SATISFACTORY TO

DATE

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FOR EFD FOR COMMANDER NAVFAC

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A/E		EFD
JTR	DESIGN	
JTR	DRAWN	
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PROJECT MANAGER
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MARINE CORPS AIR STATION, CHERRY POINT, N.C.

CONSTRUCT COMPOSITE SHOP ADDITION, BUILDING 4224

ELECTRICAL DETAILS

STA. PROJ. NO. 6328570

SPEC. NO.

CONSTR. CONTR. NO.

NAVFAC DRAWING NO. 12685658

SHEET 45 OF 45

E-202

100% Final Submittal