

GENERAL NOTES:

- 1. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE DRAWINGS AND SPECIFICATIONS.
2. OPENING SIZES AND LOCATIONS WHEN INDICATED ON DRAWINGS ARE FOR INFORMATION ONLY AND SHALL BE VERIFIED WITH THE APPROPRIATE DRAWING AND/OR SUPPLIER BEFORE CONSTRUCTION.
3. THE STRUCTURAL DRAWINGS SHOW ONLY THE BASIC STRUCTURAL FRAME. REFER TO MECHANICAL, ELECTRICAL AND OTHER DRAWINGS FOR ORNAMENTS, GROOVES, CLIPS, GROUNDS, SLAB DEPRESSIONS, CURBS, EQUIPMENT PADS, PENETRATIONS, NON-BEARING WALLS AND OTHER NON-STRUCTURAL ITEMS.
4. GENERAL NOTES AND TYPICAL DETAILS SHALL BE USED WHERE APPLICABLE, UNLESS NOTED OTHERWISE.
5. ALL OMISSIONS AND/OR CONFLICTS BETWEEN VARIOUS ELEMENTS OF THE WORKING DRAWINGS AND/OR SPECIFICATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE CONTRACTING OFFICER IN WRITING BEFORE PROCEEDING WITH ANY WORK INVOLVED.
6. DIMENSIONS SHALL NOT BE SCALED FROM THE PLANS, SECTIONS AND/OR DETAILS OF THE STRUCTURAL DRAWINGS.
7. SEE ELECTRICAL DRAWINGS FOR LIGHTNING PROTECTION.
8. INTERNAL LOCKING DEVICE (ILD/BOLTWORK) SEE (MODULAR STORAGE MAGAZINE BOLTWORKS DRAWING B-100 SERIES DATED 6/15/2015).
9. ILD UNIT SHALL BE PROCURED TO REQUIRE TWO UNIQUE KEYS IN ORDER TO OPERATE THE LOCKWORKS.
10. FOR ADDITIONAL SUPPLEMENTAL INSTALLATION GUIDES AND INFORMATION FOR THE FABRICATION AND INSTALLATION OF THE DOOR AND LOCKING SYSTEM THE CONTRACTOR SHALL CONTACT THE NAVAL FACILITIES ENGINEERING AND EXPEDITIONARY WARFARE CENTER (NFEXWC).

DESIGN CRITERIA:

- 1. THE STRUCTURAL DESIGN AND CONSTRUCTION SHALL COMPLY WITH THE CURRENT APPROVED INTERNATIONAL BUILDING CODE (IBC) BY NAVFAC EXCEPT AS NOTED.
2. THE STRUCTURAL DESIGN AND CONSTRUCTION SHALL COMPLY WITH THE FOLLOWING GOVERNMENT STANDARDS:
3. DESIGN LOADS: THE FOLLOWING LOADS WERE USED AS BASIS OF DESIGN. IF THE LOCAL CONDITIONS REQUIRE MORE STRINGENT WIND AND/OR SEISMIC PARAMETERS THE STRUCTURE SHALL BE REVISED ACCORDINGLY.
4. WIND DESIGN DATA:
5. SEISMIC DESIGN DATA:

- E. SITE CLASS D
6. EXPLOSIVE SAFETY DESIGN LOADS:
A. EXPLOSIVE SAFETY DESIGN LOADS FOR DOOR AND ROOF OF MAGAZINES ARE PRESCRIBED BY DoD 6055.9-STD 2008.
B. FOR 7-BAR EARTH-COVERED MAGAZINES (ECMs) WITH A 2224 KN (500,000 LB) NET EXPLOSIVE WEIGHTS (NEW) OF HD 1.1 MATERIAL THE TRIANGULAR PULSE LOAD VALUES ARE:
C. APPROVED LOCATION AND STORAGE CAPACITY OF EACH ECM SHALL BE DETERMINED BY THE SAFETY OFFICER BASED ON ORIENTATION AND PROXIMITY RELATIVE TO NEARBY FACILITIES/MAGAZINES.
D. EQUIVALENT STATIC BLAST LOADS ON DOOR FRAME CONNECTIONS FOR FOUR EDGE SUPPORT 998.2kN/m(5700lb/in).

CONSTRUCTION PROCEDURES & SAFETY REQUIREMENTS:

- 1. THE CONTRACT STRUCTURAL DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHOD OF CONSTRUCTION.
2. ENGAGE PROPERLY QUALIFIED PERSONS TO DETERMINE WHERE AND HOW TEMPORARY PRECAUTIONARY MEASURES SHALL BE USED AND INSPECT SAME IN FIELD.
3. SUPERVISE AND DIRECT THE WORK SO AS TO MAINTAIN SOLE RESPONSIBILITY FOR COORDINATING THE WORK OF ALL TRADES AND THE CHECKING OF ALL DIMENSIONS.
4. COMPLY WITH ALL APPLICABLE CITY, COUNTY, STATE AND FEDERAL LAWS, INCLUDING THE OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA) AND REGULATIONS ADOPTED PURSUANT THERETO.
5. CONSTRUCTION LOADS INCLUDING MATERIALS SHALL NOT EXCEED THE DESIGN LIVE LOAD. PROVIDE ADEQUATE SHORING, RESHORING AND/OR BRACING WHERE REQUIRED.

FOUNDATIONS:

- 1. THE FOUNDATION DESIGN HAS BEEN PREPARED BASED ON THE FOLLOWING CRITERIA. THE CONTRACTOR SHALL PERFORM A GEOTECHNICAL INVESTIGATION ON SITE TO CONFIRM THE SOIL CONDITION PRIOR TO COMMENCING FOUNDATION WORK.
2. THE FOUNDATIONS HAVE BEEN DESIGNED USING THE FOLLOWING ALLOWABLE BEARING PRESSURES:
3. RETAINING WALLS HAVE BEEN DESIGNED USING THE FOLLOWING CRITERIA:
4. FOOTINGS SHALL HAVE A MINIMUM WIDTH OF 610 mm AND A MINIMUM BOTTOM DEPTH OF 610 mm BELOW ADJACENT GRADE.
5. STRUCTURAL DRAWINGS INDICATE GENERAL S.O.G. PREPARATION. SEE GEOTECHNICAL REPORT FOR SPECIFIC REQUIREMENTS.
6. ALL FILLING, BACKFILLING AND COMPACTING SHALL BE PER GEOTECHNICAL REPORT.
7. EXPANSIVE SOILS SHALL NOT BE USED FOR BACKFILL OR FILL. BACKFILL AT RETAINING WALLS SHALL BE GRANULAR SOIL.
8. ALL EXCAVATIONS SHALL BE PROPERLY BACKFILLED. DO NOT PLACE BACKFILL BEHIND RETAINING WALLS BEFORE CONCRETE HAS ATTAINED FULL DESIGN STRENGTH.

- 9. CONTRACTOR TO PROVIDE FOR DE-WATERING OF EXCAVATIONS FROM EITHER SURFACE, WATER, GROUND WATER OR SEEPAGE.
10. CONTRACTOR SHALL PROVIDE FOR DESIGN AND INSTALLATION OF ALL CRIBBING, SHEATHING, AND SHORING REQUIRED TO SAFELY RETAIN THE EARTH BANKS.
11. EXCAVATION FOR FOUNDATIONS SHALL BE APPROVED BY THE QC MANAGER PRIOR TO PLACING THE REINFORCING AND CONCRETE.
12. SHALLOW FOOTING FOUNDATIONS SHALL BE PLACED AND INSTALLED IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS, SPECIFICATIONS, AND GEOTECHNICAL REPORT PREPARED FOR THE PROJECT.
13. FOUNDATION BACKFILL AND UTILITY TRENCH BACKFILL WITHIN BUILDING AREA SHALL BE MECHANICALLY COMPACTED IN LAYERS TO THE APPROVAL OF THE QC MANAGER. FLOODING WILL NOT BE PERMITTED.
14. ALL ABANDONED FOOTINGS, UTILITIES, ETC. THAT INTERFERE WITH NEW CONSTRUCTION SHALL BE REMOVED. NEW FOUNDATIONS MUST EXTEND INTO UNDISTURBED SOILS.

REINFORCED CONCRETE:

- 1. THE DESIGN AND CONSTRUCTION OF REINFORCED CONCRETE SHALL CONFORM TO THE ACI BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE ACI 318 INCLUDING THE FOLLOWING:
A. CONCRETE MIXING ASTM C94
B. CONCRETE PLACEMENT ACI 304
A. PORTLAND CEMENT ASTM C150, TYPE I OR II OR JIS 5210, TYPE I
B. CONCRETE AGGREGATES ASTM C33
C. REINFORCING STEEL ASTM A615M (GRADE 420)
D. WELDED WIRE FABRIC ASTM A185M
3. CONCRETE SHALL ATTAIN THE FOLLOWING 28-DAY COMPRESSIVE STRENGTHS, UNLESS OTHERWISE INDICATED;
A. FOUNDATIONS 27.6 MPa
B. SLAB ON GRADE 27.6 MPa
C. TOPPING SLABS 34.5 MPa
D. SITE RETAINING WALLS 34.5 MPa
E. COLUMN AND HEADER BEAMS 34.5 MPa
F. LEAN CONCRETE 20.7 MPa
NO CHLORIDES OR CHLORIDE SALTS SHALL BE ALLOWED IN THE CONCRETE MIXES.

- 4. ALL REINFORCING STEEL DETAILING AND PLACEMENT SHALL CONFORM TO THE ACI DETAILING MANUAL - 2004 PUBLICATION SP-66. PROVIDE ADEQUATE BOLSTERS, HI-CHAIRS, SUPPORT BARS, ETC., TO MAINTAIN SPECIFIED COVER FOR THE ENTIRE LENGTH OF ALL REINFORCING. SECURE ALL REINFORCING BARS, ANCHOR BOLTS AND OTHER CONCRETE INSERTS IN POSITION PRIOR TO PLACING CONCRETE.
5. MINIMUM CONCRETE PROTECTION (COVER) FOR REINFORCEMENT SHALL BE PROVIDED AS FOLLOWS:

CAST-IN-PLACE CONCRETE

- 1. CONCRETE POURED AGAINST EARTH 75 mm
2. CONCRETE POURED AGAINST FORM AND LATER EXPOSED TO EARTH OR WEATHER. 50 mm
3. COLUMNS AND BEAMS (FROM TIE OR STIRRUP) 50 mm
4. SLAB EXPOSED TO WEATHER OR GROUND 50 mm
5. SLABS AND WALLS (NOT EXPOSED TO WEATHER OR GROUND) 19 mm

PRECAST CONCRETE

- 1. WALL PANEL EXPOSED TO EARTH OR WEATHER 25 mm
2. WALL AND SLAB NOT EXPOSED TO EARTH OR WEATHER 19 mm
3. OTHER MEMBERS 38 mm

NOTES TO DESIGNER - REMOVE NOTE #1 WHEN PREPARING CONSTRUCTION DRAWINGS FOR SITE ADAPTION FOR THIS DESIGN:
1. FOUNDATION MUST BE REVISED TO REFLECT SPECIFIC SITE SOIL CONDITIONS.
2. THE DESIGN AND DETAILING OF THE MODULAR STORAGE MAGAZINES FOR BLAST LOADING WAS PERFORMED BY, AND IS THE SOLE RESPONSIBILITY OF, THE GOVERNMENT.
3. ENGINEER OF RECORD FOR THE BLAST DOORS IS THE GOVERNMENT. THE GOVERNMENT PERFORMED THE ENGINEERING DESIGN OF THE FRONT ENTRY BLAST DOORS. DETAILS FOR CONSTRUCTION OF THE FRONT ENTRY BLAST DOORS WERE PREPARED BY THE GOVERNMENT.
4. EDIT UFGS 01 45 35 "SPECIAL INSPECTIONS" IN ACCORDANCE WITH UFC 3 301 01 "STRUCTURAL ENGINEERING" AND INCORPORATE ADDITIONAL ITEMS IDENTIFIED IN APPENDIX C OF UFC 4-420-01.
DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD (DDESB) APPROVAL NOTES:
1. ANY DEVIATION FROM THE STANDARD DRAWINGS, EXCEPT FOR FOUNDATION MODIFICATIONS, WITHOUT THE WRITTEN APPROVAL FROM THE DEPARTMENT OF DEFENSE EXPLOSIVE SAFETY BOARD (DDESB) MAY REQUIRE THE MAGAZINE TO BE CONSIDERED AN UNDEFINED MAGAZINE AND MAY SEVERELY RESTRICT THE ALLOWABLE STORAGE CAPACITY.

STRUCTURAL PRECAST CONCRETE:

- 1. ALL PRECAST ELEMENTS NOT DETAILED ON DRAWINGS SHALL BE DESIGNED FOR THE SPAN AND CONCRETE AND CONSTRUCTION LOADING CONDITIONS SHOWN ON THE DRAWINGS BY A LICENSED STRUCTURAL ENGINEER. ALL DESIGN CALCULATIONS, INCLUDING THE DESIGN OF ALL STRUCTURAL ELEMENTS AND LIFTING POINTS SHALL BE SUBMITTED TO THE CONTRACTING OFFICER FOR REVIEW PRIOR TO THE START OF FABRICATION.
2. DETAILED SHOP DRAWINGS SHOWING ALL STRUCTURAL ELEMENTS, DETAILS AND CONNECTIONS SHALL BE SUBMITTED TO THE CONTRACTING OFFICER FOR REVIEW PRIOR TO THE START OF FABRICATION.
3. PRECAST DRAWINGS AND CALCULATIONS SHALL BE STAMPED BY A STRUCTURAL ENGINEER REGISTERED IN THE UNITED STATES.
4. PROVIDE ALL INSERTS WHICH ARE SHOWN ON STRUCTURAL, AND MECHANICAL DRAWINGS WITH PROVISIONS FOR SUCH MADE IN THE DESIGN OF THE PRECAST UNIT.
5. THE PRECAST MANUFACTURER SHALL BE RESPONSIBLE FOR COORDINATION OF MECHANICAL AND ELECTRICAL DETAILS AS THEY AFFECT THE PRECAST ELEMENTS.
6. THERE SHALL BE NO FIELD CUTTING OF PRECAST ELEMENTS WITHOUT THE PRIOR APPROVAL OF THE CONTRACTING OFFICER.
7. ALL DETAILING, FABRICATION AND PLACING OF REINFORCING BARS SHALL CONFORM TO THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE", ACI 318 AND THE "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI-315, LATEST EDITION.
8. CONCRETE SHALL HAVE THE FOLLOWING MINIMUM COMPRESSIVE STRENGTHS AT TWENTY-EIGHT (28) DAYS: 34.5 MPa
9. ALL REINFORCING BARS SHALL CONFORM TO ASTM A615M, (GRADE 420).
10 ALL WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185M.
11. ALL GROUT SHALL BE NON-SHRINK, NON-FERROUS GROUT WITH f'c = 41.4 MPa.
12. ALL STEEL INSERTS SHALL BE GALVANIZED.

NAVFAC logo, project title 'MODULAR STORAGE MAGAZINE', drawing number '14063807', sheet '2 OF 53', and 'S-001'.

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STRUCTURAL STEEL FRAMING:

- STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE "AISC SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS," LATEST EDITION. STRUCTURAL STEEL SHOP DRAWINGS SHALL BE REVIEWED AND APPROVED BY THE CONTRACTOR PRIOR TO SUBMITTAL TO THE CONTRACTING OFFICER FOR REVIEW. FABRICATION SHALL NOT BEGIN PRIOR TO THE COMPLETION OF THE SHOP DRAWING REVIEW PROCESS.
- STRUCTURAL STEEL MATERIALS SHALL BE GALVANIZED AND CONFORM TO THE FOLLOWING STANDARD SPECIFICATIONS, LATEST EDITION:
 - A. STRUCTURAL STEEL WIDE FLANGE ASTM A992M
 - B. STRUCTURAL STEEL CHANNELS, ANGLES, S SHAPE, & PLATES ASTM A36M
 - C. HOLLOW STRUCTURAL SECTIONS (TUBE STEEL) ASTM A500M (GRADE B)
 - D. ANCHOR BOLTS ASTM F1554, GRADE 380
 - E. HIGH STRENGTH BOLTS ASTM A325M
- CONNECTIONS OF STRUCTURAL STEEL SHALL CONFORM TO THE LATEST EDITION OF THE AISC MANUAL OF STEEL CONSTRUCTION AND THE FOLLOWING:
 - A. BOLTED CONNECTIONS - ASTM A325M, GALVANIZED, UNLESS NOTED OTHERWISE.
 - B. WELDED CONNECTIONS - ALL WELDS SHALL USE MATCHING FILLER MATERIAL PER TABLE 3.1 AWS D1.1. USE ONLY LOW-HYDROGEN ELECTRODES ON ASTM A572M AND A992M STEEL.
 - C. TOUCH UP FIELD WELDS AND CONNECTIONS AS WELL AS ABRADED AND RUSTED SHOP PAINT WITH SAME PAINT USED IN SHOP.
 - D. WHERE NOT INDICATED ON DRAWINGS, ALL WELDS SHALL BE CONTINUOUS 5 mm FILLET WELDS, BUT NOT GREATER THAN THE AISC MAXIMUM OR LESS THEN THE AISC MINIMUM BASED ON THE THICKNESS OF THE PARTS JOINED.
 - E. ALL WELDINGS SHALL BE DONE BY AWS CERTIFIED WELDERS. ELECTRODES SHALL BE E49xx.
- THE SPLICING OF STRUCTURAL STEEL WHERE NOT INDICATED SHALL NOT BE ALLOWED.
- FIELD MODIFICATIONS OF STRUCTURAL STEEL SUCH AS THE BURNING OF HOLES OR CUTTING OF STEEL SHALL NOT BE ALLOWED.
- BOLT HOLES IN STEEL SHALL BE 1.6 mm LARGER DIAMETER THAN NOMINAL SIZE OF BOLT USED, EXCEPT AS NOTED.
- ALL STRUCTURAL STEEL SURFACES THAT ARE ENCASED IN CONCRETE SHALL BE LEFT UNPAINTED.
- ALL GROUT (OR DRYPACK) BELOW BASE PLATES SHALL BE NON-SHRINK WITH $f'_c = 27.9$ MPa.
- ALL EXTERIOR STRUCTURAL STEEL AND MISCELLANEOUS METAL SHALL BE HOT DIP GALVANIZED AFTER FABRICATION.
- ALL STRUCTURAL STEEL EXPOSED TO SOIL SHALL BE COATED WITH COAL TAR EPOXY.
- NO SUBSTITUTIONS OF STEEL SHAPES AND SIZES ARE PERMITTED.
- THE DOORS MUST NOT BE FABRICATED FROM DUAL GRADED ASTM A36 AND ASTM A575 GRADE 50 STRUCTURAL STEEL PLATES. THE YIELD STRESS (f_y) OF ALL STRUCTURAL STEEL PLATES USED IN THE DOORS MUST BE LESS THAN 50KSI. TO ENSURE SATISFACTION OF THIS REQUIREMENT, THE DOOR FABRICATOR MUST SUBMIT CERTIFIED MANUFACTURER'S MILL REPORTS FOR ALL STRUCTURAL STEEL PLATES USED IN THE DOORS.

NOTES:

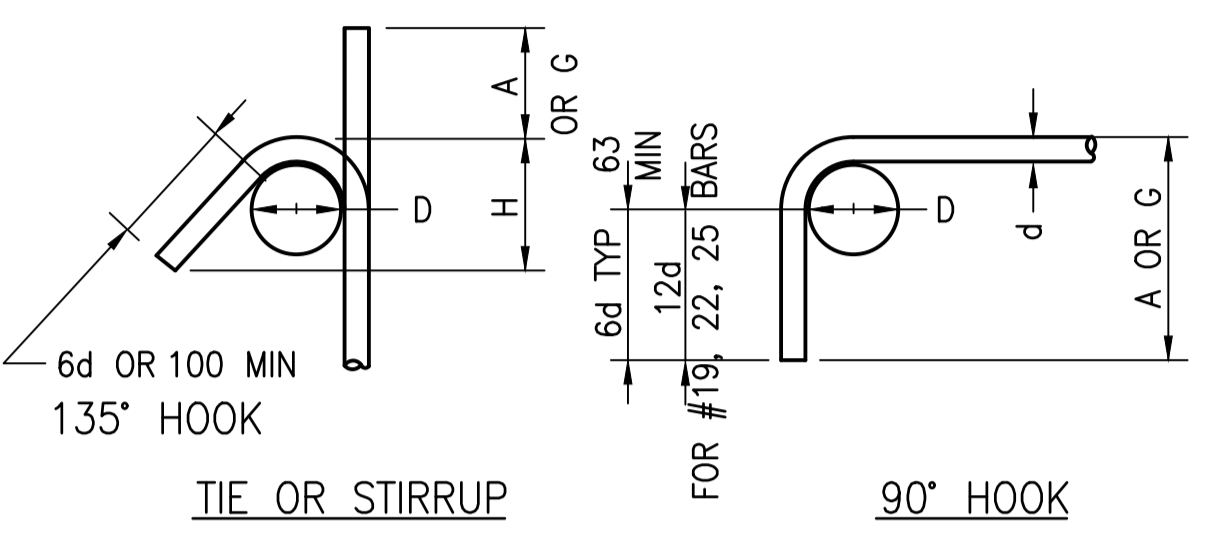
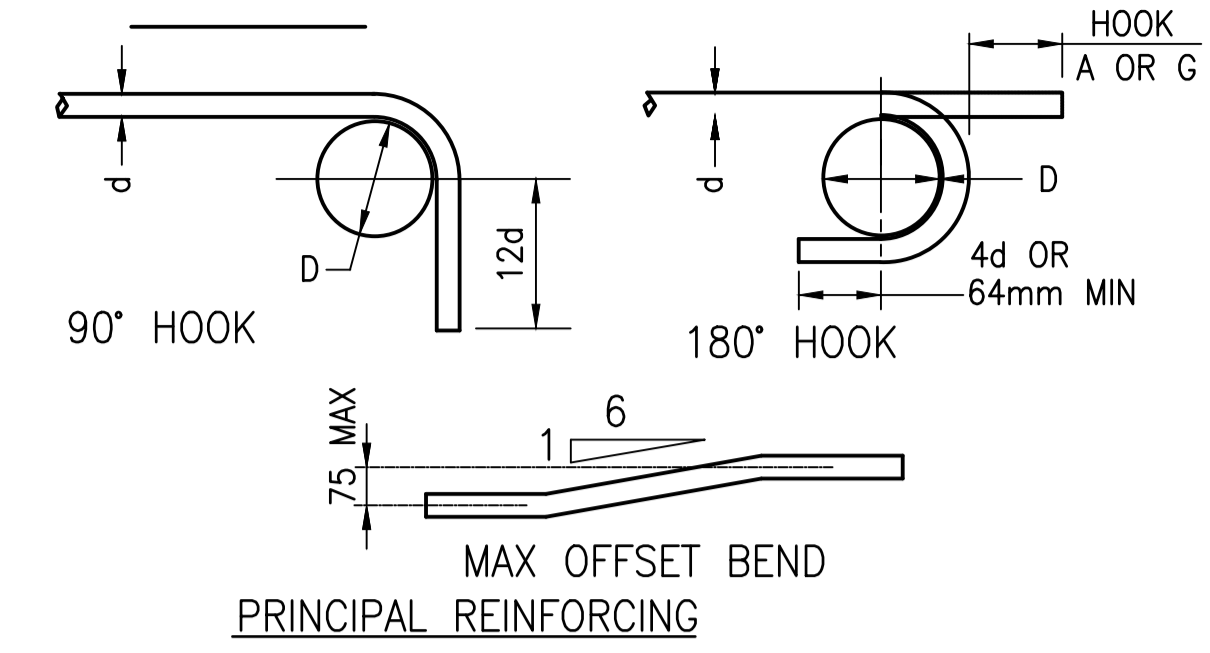
- IF CONCRETE COVER IS NOT GREATER THAN THE DIAMETER OF THE BAR OR THE CENTER TO CENTER SPACING IS NOT GREATER THAN (3) BAR DIAMETERS, THEN VALUES SHALL BE INCREASED BY 50%. ALL LAPS ARE TYPICAL TENSION LAP SPLICES U.N.O. ON PLANS OR DETAILS.
- "TOP BARS" ARE HORIZONTAL BARS WITH MORE THAN 305 mm DEPTH OF CONCRETE CAST BELOW THEM.
- IF CONCRETE COVER IS NOT GREATER THAN 63.5 mm AND THE END COVER OF HOOK IS NOT GREATER THAN 51 mm, THEN VALUES SHALL BE INCREASED BY 43%.

ELECTRICAL BONDING & GROUNDING

- ALL STEEL LOUVERS, VENTILATORS, DOORS AND FRAMES SHALL BE ELECTRICALLY BONDED TO THE MAGAZINE REINFORCING CAGE.
- ALL STRUCTURAL AND MISCELLANEOUS ITEMS EMBEDDED IN CONCRETE SHALL BE ELECTRICALLY BONDED TO THE REINFORCING CAGE BY WIRE TIES.
- THE REINFORCING CAGE MUST BE MADE ELECTRICALLY CONTINUOUS BY WIRE TIES AT A MINIMUM OF 1200mm ON CENTERS IN EVERY DIRECTION, REFER TO DETAIL 4 ON DRAWING E-312.
- ALL WALLS AND CONSTRUCTION JOINTS SHALL BE ELECTRICALLY BONDED. SEE THE ELECTRICAL DRAWINGS FOR DETAILS.

STRUCTURAL ABBREVIATIONS:

A.B. ADD'L.	ANCHOR BOLT	INFO. INTERM.	INFORMATION INTERMEDIATE
ALT. APPROX.	ADDITIONAL ALTERNATE	JT. LONG LEG VERTICAL	JOINT LONG LEG HORIZONTAL
ARCH.	APPROXIMATE ARCHITECTURAL	LLH	LONGITUDINAL MAXIMUM MECHANICAL MANUFACTURER MINIMUM MISCELLANEOUS NOT IN CONTRACT NEAR SIDE NOT TO SCALE ON CENTER OPPOSITE HAND OPENING PANEL JOINT PLATE PART NUMBER RADIUS REINFORCEMENT REQUIRED SCHEDULE SECTION SHEET SIMILAR SLAB-ON-GRADE SPACE SPECIFICATIONS SQUARE STANDARD STIFFENER STRUCTURAL TEMPERATURE STEEL THICK THROUGH TOP OF SLAB, TOP OF STEEL TYP. UNLESS NOTED OTHERWISE VERTICAL WITH
BM. BOT.	BEAM BOTTOM	LLV	LONGITUDINAL MINIMUM MISCELLANEOUS NOT IN CONTRACT NEAR SIDE NOT TO SCALE ON CENTER OPPOSITE HAND OPENING PANEL JOINT PLATE PART NUMBER RADIUS REINFORCEMENT REQUIRED SCHEDULE SECTION SHEET SIMILAR SLAB-ON-GRADE SPACE SPECIFICATIONS SQUARE STANDARD STIFFENER STRUCTURAL TEMPERATURE STEEL THICK THROUGH TOP OF SLAB, TOP OF STEEL TYP. UNLESS NOTED OTHERWISE VERTICAL WITH
C.I.P. C.J.	CAST-IN-PLACE CONSTRUCTION OR CONTROL JOINT	MANUF., MFR.	MANUFACTURER
CLR. C.M.U.	CLEAR (ANCE) CONCRETE MASONRY UNIT	MIN.	MINIMUM
COL. CONC.	COLUMN CONCRETE	MISC. N.I.C.	MISCELLANEOUS NOT IN CONTRACT NEAR SIDE NOT TO SCALE ON CENTER OPPOSITE HAND OPENING PANEL JOINT PLATE PART NUMBER RADIUS REINFORCEMENT REQUIRED SCHEDULE SECTION SHEET SIMILAR SLAB-ON-GRADE SPACE SPECIFICATIONS SQUARE STANDARD STIFFENER STRUCTURAL TEMPERATURE STEEL THICK THROUGH TOP OF SLAB, TOP OF STEEL TYP. UNLESS NOTED OTHERWISE VERTICAL WITH
CONN. C.P.	CONNECTION COMPLETE PENETRATION	N.S. N.T.S.	NEAR SIDE NOT TO SCALE ON CENTER OPPOSITE HAND OPENING PANEL JOINT PLATE PART NUMBER RADIUS REINFORCEMENT REQUIRED SCHEDULE SECTION SHEET SIMILAR SLAB-ON-GRADE SPACE SPECIFICATIONS SQUARE STANDARD STIFFENER STRUCTURAL TEMPERATURE STEEL THICK THROUGH TOP OF SLAB, TOP OF STEEL TYP. UNLESS NOTED OTHERWISE VERTICAL WITH
CONSTR. CONT.	CONSTRUCTION CONTINUOUS	O.C. O.F.	ON CENTER OPPOSITE HAND OPENING PANEL JOINT PLATE PART NUMBER RADIUS REINFORCEMENT REQUIRED SCHEDULE SECTION SHEET SIMILAR SLAB-ON-GRADE SPACE SPECIFICATIONS SQUARE STANDARD STIFFENER STRUCTURAL TEMPERATURE STEEL THICK THROUGH TOP OF SLAB, TOP OF STEEL TYP. UNLESS NOTED OTHERWISE VERTICAL WITH
DBA	DEFORMED BAR ANCHOR	OPNG.	OPENING
DBL	DOUBLE	P.J.	PANEL JOINT
DET.	DETAIL	PL	PLATE
DIA.	DIAMETER	PN	PART NUMBER
DIM.	DIMENSION	RAD.	RADIUS
DIST.	DISTANCE	REINF.	REINFORCEMENT
DWG.	DRAWING	REQ'D.	REQUIRED
EA.	EACH	SCHED.	SCHEDULE
E.F.	EACH FACE	SECT.	SECTION
E.J.	EXPANSION JOINT	SHT.	SHEET
EQ.	EQUAL	SIM.	SIMILAR
E.S.	EACH SIDE	S.O.G.	SLAB-ON-GRADE
EXT.	EXTERIOR	SPA.	SPACE
FL.	FLOOR	SPECS.	SPECIFICATIONS
FIN.	FINISH	SQ.	SQUARE
FIN. FL.	FINISH FLOOR	STD.	STANDARD
F.S.	FAR SIDE	STIFF.	STIFFENER
FT.	FOOT OR FEET	STRUCT.	STRUCTURAL
GA.	GAUGE	TEMP.	TEMPERATURE
HAS	HEADED ANCHOR STUD	THK	THICK
HORIZ., (H)	HORIZONTAL	THRU	THROUGH
HSS	HOLLOW STRUCTURAL SECTION	T.O.S.	TOP OF SLAB, TOP OF STEEL
I.F.	INSIDE FACE	TYP.	TYPICAL
		UNLESS NOTED OTHERWISE	UNLESS NOTED OTHERWISE
		VERT., (V)	VERTICAL
		W/	WITH



TIE OR STIRRUP
 NOTES:
 D = FINISHED INSIDE BEND DIAMETER
 d = BAR DIAMETER

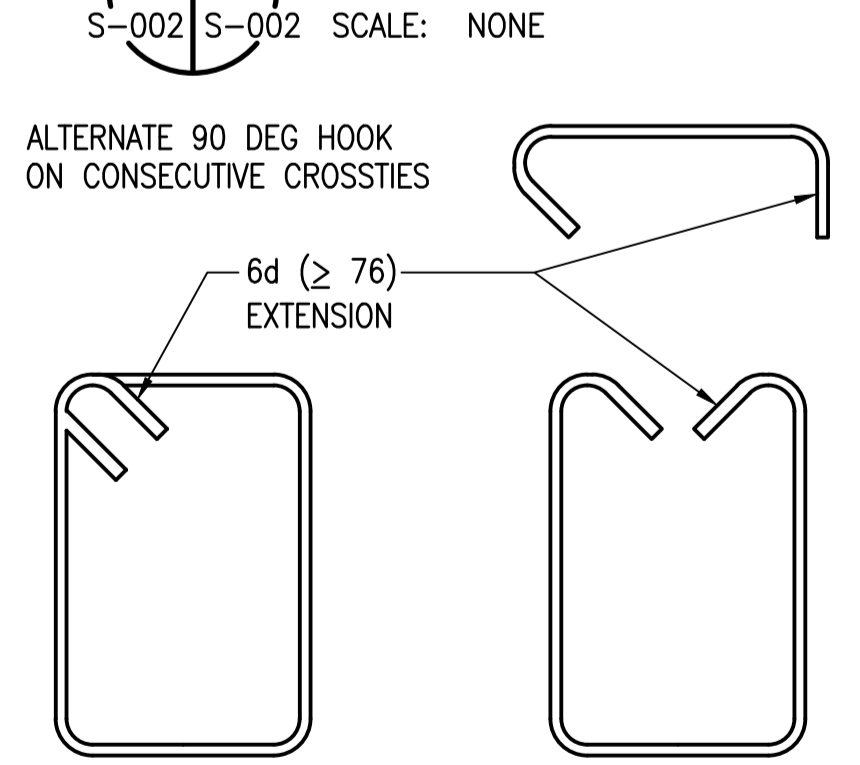
BAR SIZE	DIMENSIONS OF STANDARD 180-DEG HOOKS, ALL GRADE			DIMENSIONS OF STANDARD 90-DEG HOOKS, ALL GRADE	
	A OR G	J	D	A OR G	D
#10	127	76	57	152	57
#13	152	102	76	203	76
#16	178	127	96	254	96
#19	203	152	114	305	114
#22	254	178	133	356	133
#25	279	203	152	406	152
#29	381	298	241	483	241
#32	432	337	273	559	273
#36	483	375	305	610	305

STIRRUP HOOKS

135° SEISMIC HOOK			
BAR SIZE	D	A OR G	APPROX H
#10	38	102	64
#13	51	114	76
#16	64	140	95
#19	114	203	114
#22	133	229	133
#25	152	267	152

BAR SIZE	MINIMUM TENSION LAP SPLICE LENGTHS ("1.3 l _d ")		BAR SIZE	MINIMUM EMBEDMENT LENGTHS FOR STANDARD END HOOKS ("l _{dh} ")
	f' _c = 27.6 MPa			
	TOP BARS	OTHER BARS		
#10	610	483	#10	152
#13	813	635	#13	203
#16	1016	787	#16	229
#19	1219	940	#19	279
#22	1778	1372	#22	330
#25	2032	1575	#25	381
#29	2311	1778	#29	432
#32	2591	2007	#32	483
#36	2870	2210	#36	533

1 REINFORCEMENT SPLICE SCHEDULE



2 SEISMIC HOOP CLOSED TIE DETAIL

S-002 S-002 SCALE: NONE

3 STIRRUP AND TIE HOOK DIMENSIONS

S-002 S-002 SCALE: NONE

REBAR SIZE		REBAR SIZE	
U.S. UNITS	METRIC	U.S. UNITS	METRIC
#3	#10	#8	#25
#4	#13	#9	#29
#5	#16	#10	#32
#6	#19	#11	#36
#7	#22		

4 BAR SIZE CONVERSION TABLE

S-002 S-002 SCALE: NONE

THESE DRAWINGS ARE A MODIFIED VERSION OF A DEFINITIVE SET OF 36 STRUCTURAL SHEETS PREPARED BY THE GOVERNMENT INCLUDING GENERAL NOTES SHEETS S-001 AND S-002, PLAN SHEETS S-101 AND 102, ELEVATION SHEETS S-201, S-202 AND S-203, SECTIONS S-301 TO S-304, TYPICAL DETAILS S-401, DETAIL SHEETS S-501 TO S-504, PRECAST DETAIL SHEET S-601, AND DETAIL SHEETS S-701 TO S-716. THREE (3) SHEETS S-103 THROUGH S-105 HAVE BEEN ADDED BY SAIC ENERGY ENVIRONMENT AND INFRASTRUCTURE LLC, ST. LOUIS, MISSOURI, IN CONJUNCTION WITH THE DEPARTMENT OF THE NAVY, NAVY FACILITIES ENGINEERING COMMAND, ATLANTIC DIVISION.

AIR CONDITIONING ROOM (OPTIONAL)

STRUCTURAL SHEETS S-103 THROUGH S-105 HAVE BEEN ADDED FOR AN AIR CONDITIONING ROOM ANNEX AS REQUIRED BY NAVFAC ATLANTIC. PER DIRECTION OF NAVFAC ATLANTIC, THE AIR CONDITIONING ROOM DIMENSIONS, DETAILS AND DESIGN SHOWN ON THESE DRAWINGS HAVE BEEN COPIED FROM MAEK-GA ARCHITECTS ASSOCIATES, STANDARD DESIGN DRAWINGS FOR KOREA, DATED MARCH 2006. MINOR MODIFICATIONS HAVE BEEN MADE BY SAIC TO INTERFACE POURED IN PLACE CONCRETE A/C ROOM WITH MODULAR (PRECAST CONCRETE) STORAGE MAGAZINE.

APPROVED: _____ DATE: _____

FOR COMMANDER NAVFAC ATLANTIC

ACTIVITY: _____

SATISFACTORY TO: _____ DATE: _____

DES: <<CM/DM>> DRW LSG CHK LMM

BRANCH MANAGER: _____

SGN PRD DR WILLIAM FORBES, P.E.

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

MODULAR STORAGE MAGAZINE

STRUCTURAL GENERAL NOTES

SCALE: AS NOTED

PROJECT NO.: _____

CONSTR. CONTR. NO.: _____

NAVFAC DRAWING NO.: 14063808

SHEET 3 OF 53

S-002

NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017

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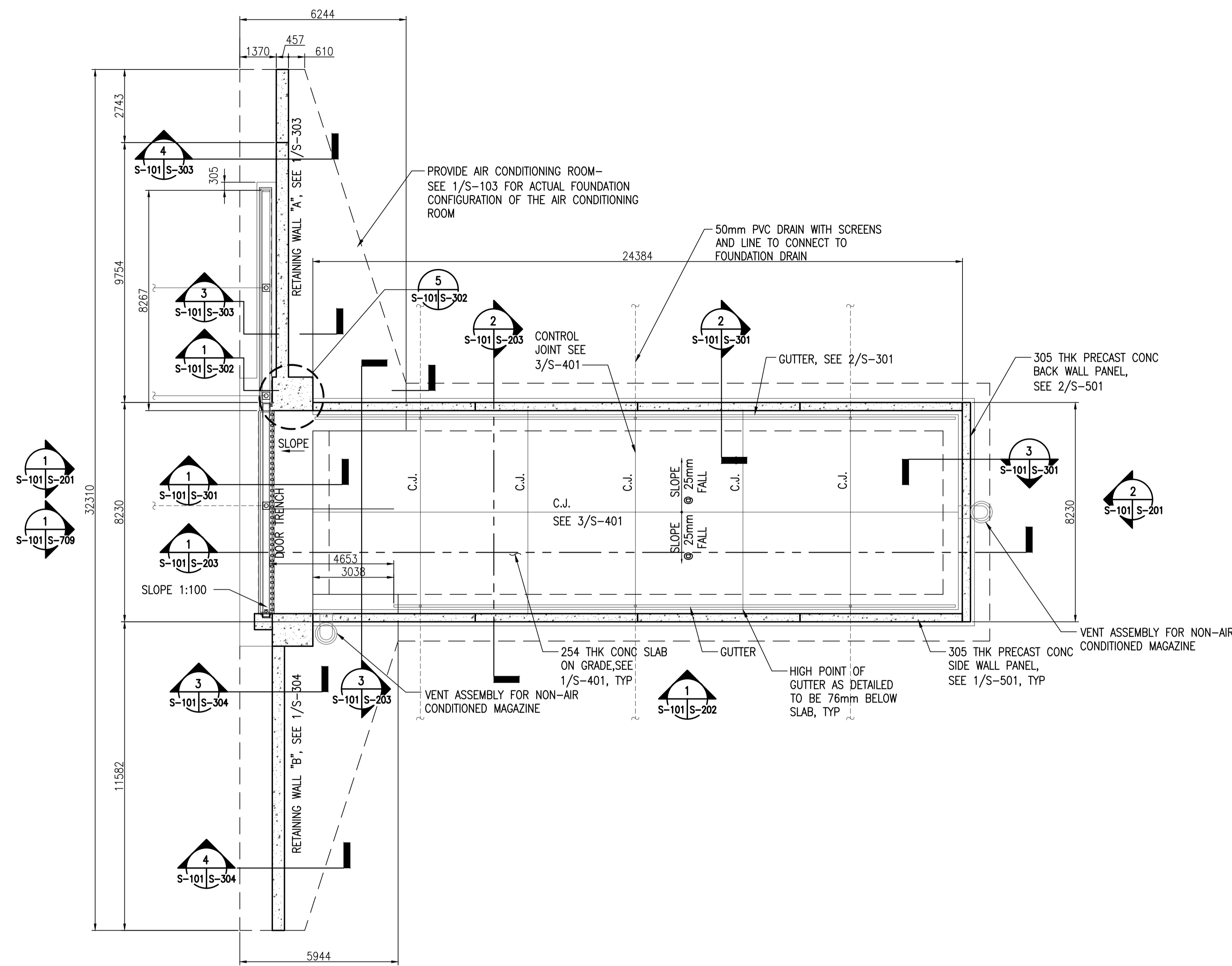
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B

A

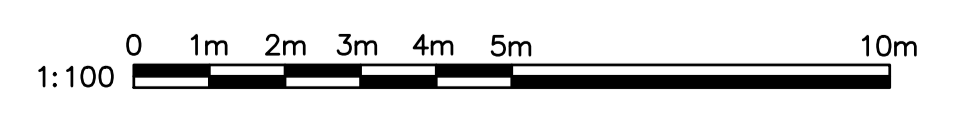
1 2 3 4 5




- FOUNDATION PLAN NOTES:**
- SEE SHEET S-001 AND S-002 FOR GENERAL NOTES.
 - SLAB-ON-GRADE SHALL BE 254 mm THICK REINFORCED WITH #16@305 OC TOP & BOT EACH WAY, SEE 1/S-401. PREPARE SUBGRADE IN ACCORDANCE WITH THE GEOTECHNICAL ENGINEER'S RECOMMENDATIONS.
 - C.J. INDICATES CONSTRUCTION OR CONTROL JOINT. SEE 2 OR 3/S-401.
 - SEE ELECTRICAL DRAWINGS FOR REINFORCING STEEL BONDING REQUIREMENTS.

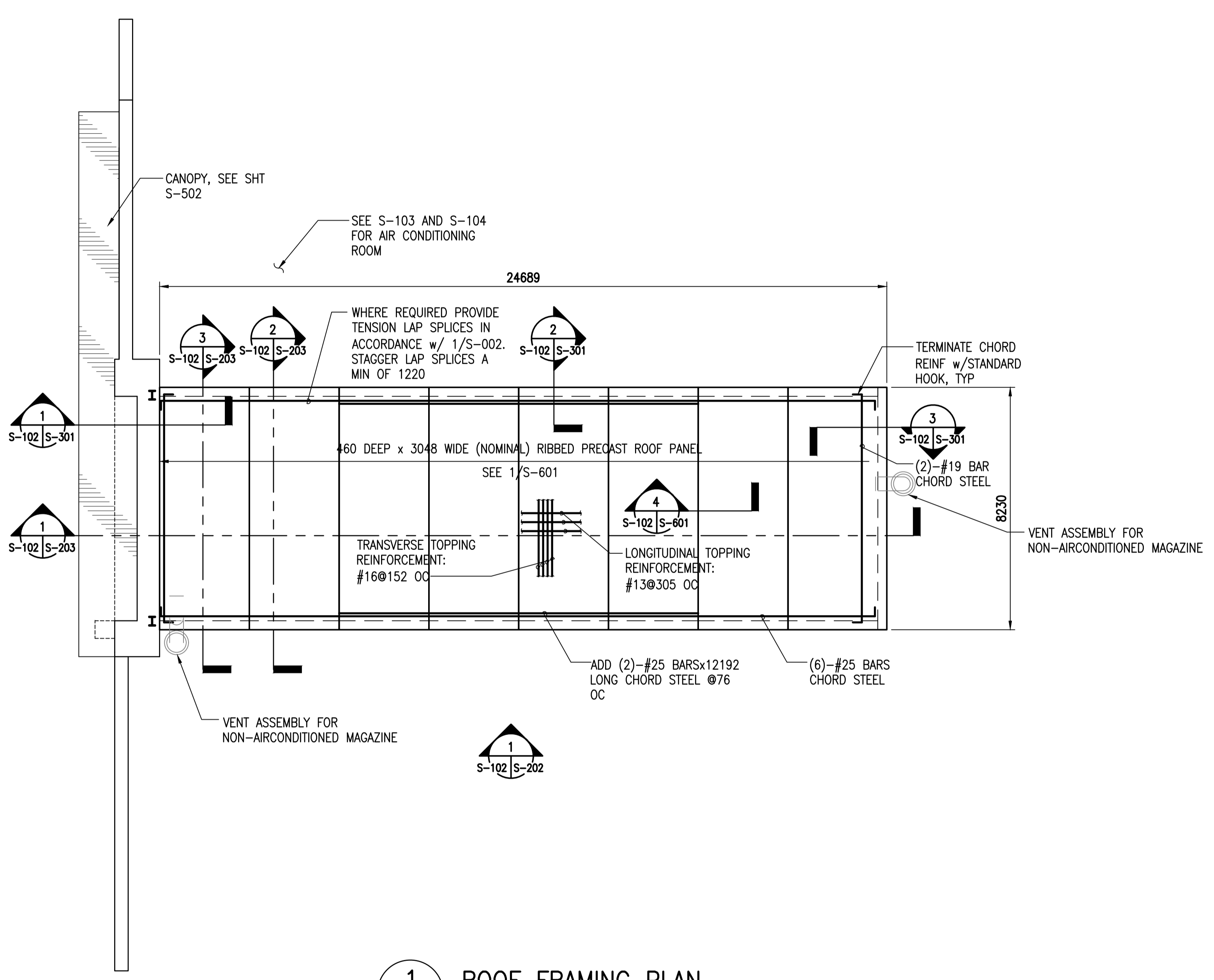
1 FOUNDATION AND FLOOR PLAN
S-101 S-101 SCALE: 1:100

GRAPHIC SCALES:



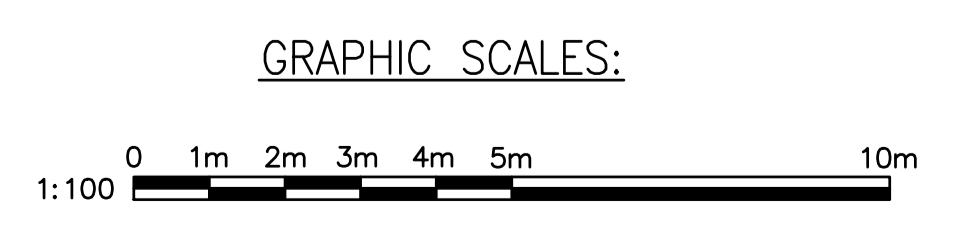
APPR	
DATE	
DESCRIPTION	
	
SEAL	
A/E RFD	
APPROVED	
FOR COMMANDER NAVFAC	
ACTIVITY	
SATISFACTORY TO DATE	
DES	DRW LSG CHK LMM
BRANCH MANAGER	
SGN PRD DR	WILLIAM FORBES, P.E.
DEPARTMENT OF THE NAVY	
NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC	
NAVAL STATION	
MODULAR STORAGE MAGAZINE	
FOUNDATION AND FLOOR PLAN	
SCALE:	AS NOTED
EPROJECT NO.:	
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	14063809
SHEET	4 OF 53
S-101	
NAVFAC METRIC DRAWFORM REVISION: 01 FEBRUARY 2017	


FILE NAME: c:\cse\magazine\NSM\Nav Standard\NSM Revisions 2018\CADD\S-102.dwg LAYOUT NAME: S-102 PLOTTED: Tuesday, July 02, 2019 - 2:17pm USER: louis.gud



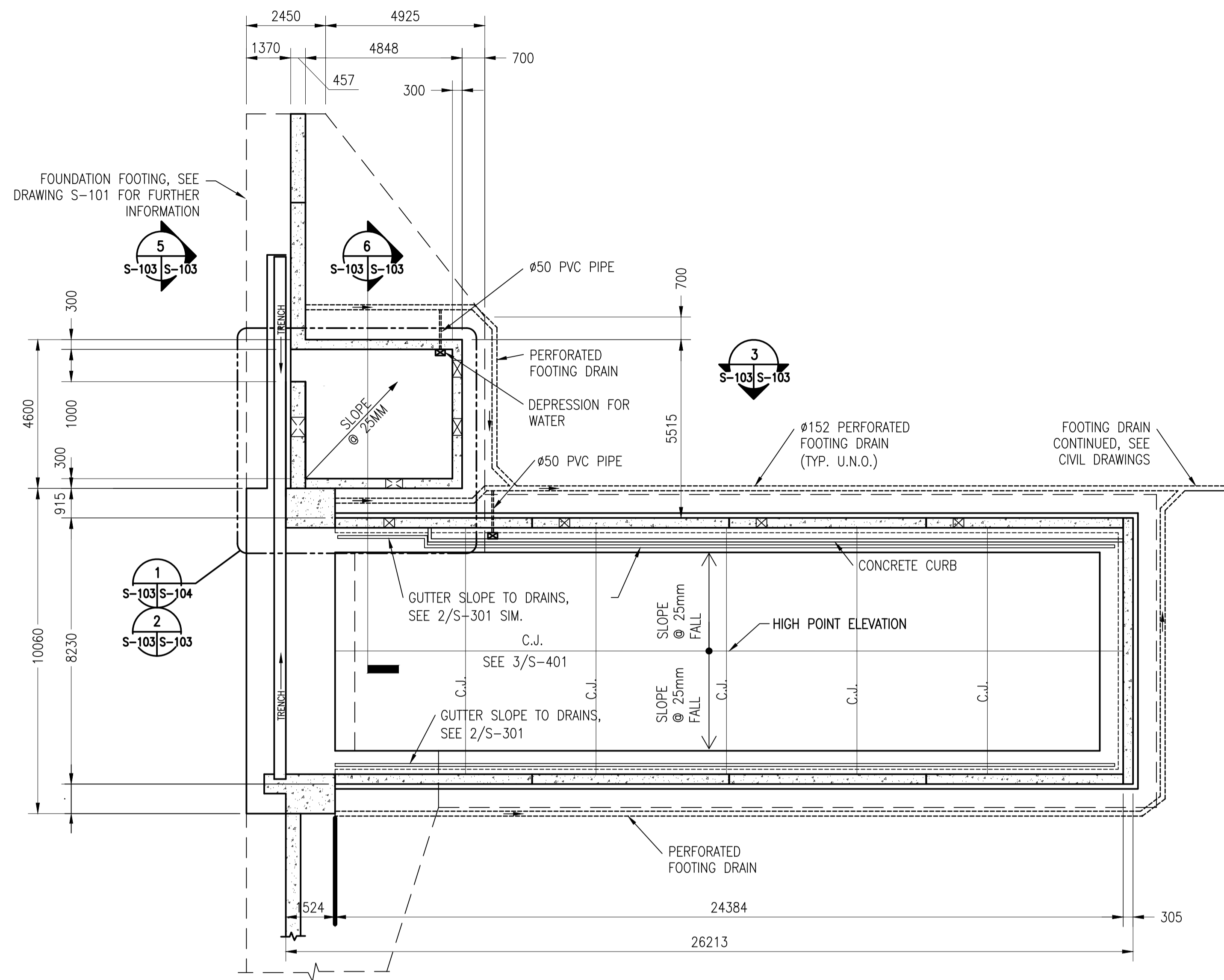
1 ROOF FRAMING PLAN
 S-301 S-102 S-102 SCALE: 1:100
 S-302

- ROOF FRAMING PLAN NOTES:**
1. SEE SHEET S-001 AND S-002 FOR GENERAL NOTES.
 2. U.N.O. TOPPING OVER PRECAST MEMBERS SHALL BE 102 THICK w/ REINF. AS INDICATED ON PLAN.
 3. SEE ELECTRICAL DRAWINGS FOR REINFORCING STEEL BONDING REQUIREMENTS.

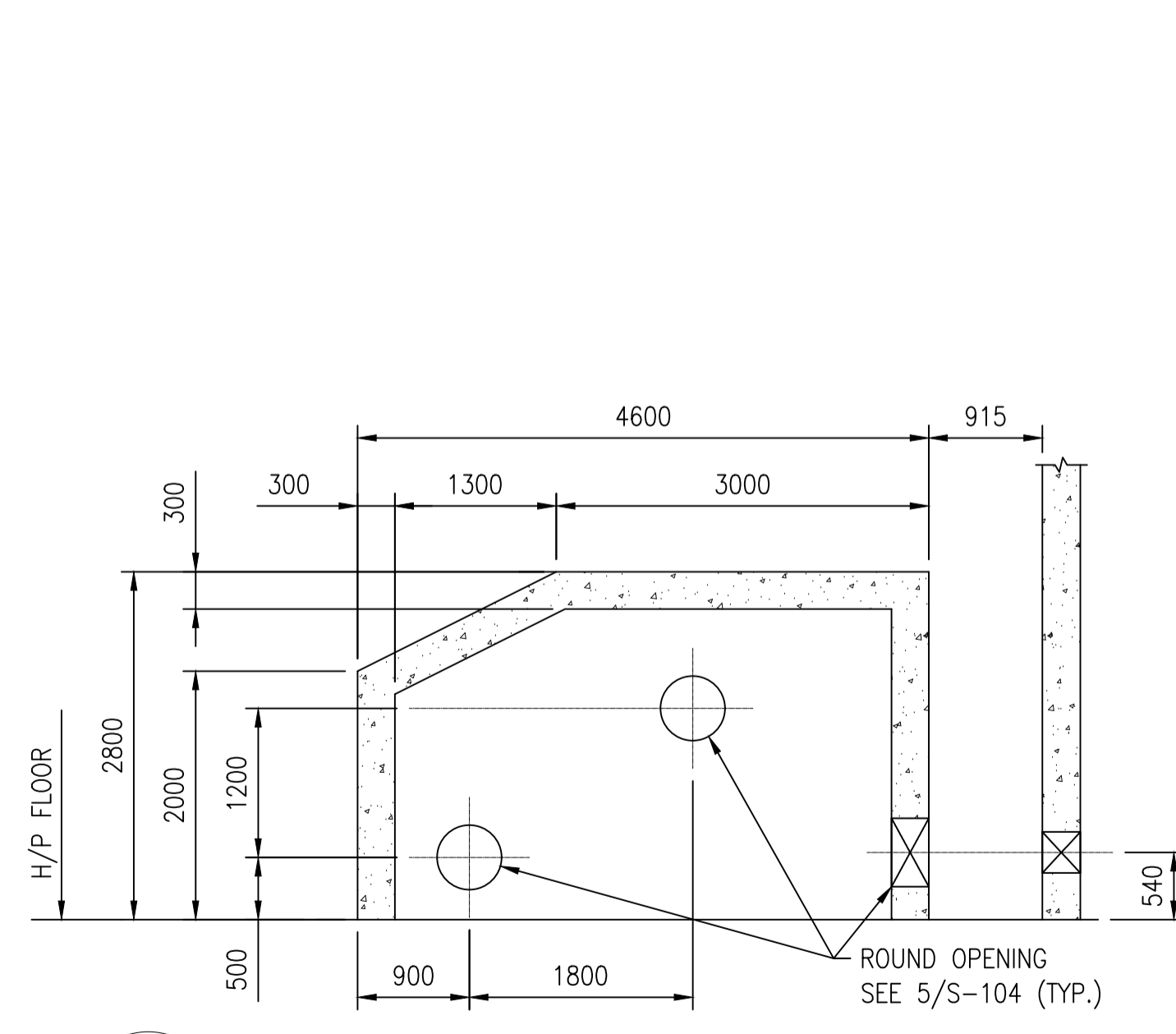


APPR	
DATE	
DESCRIPTION	
	
SEAL	
A/E RFD	
APPROVED	
FOR COMMANDER NAVFAC	
ACTIVITY	
SATISFACTORY TO DATE	
DES	DRW LSG CHK LMM
BRANCH MANAGER	
SGN PRD DR	WILLIAM FORBES, P.E.
DEPARTMENT OF THE NAVY	
NAVAL FACILITIES ENGINEERING COMMAND	
NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC	
NAVAL STATION	
MODULAR STORAGE MAGAZINE	
ROOF FRAMING PLAN	
SCALE:	AS NOTED
EPROJECT NO.:	
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	14063810
SHEET	5 OF 53
S-102	
NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017	

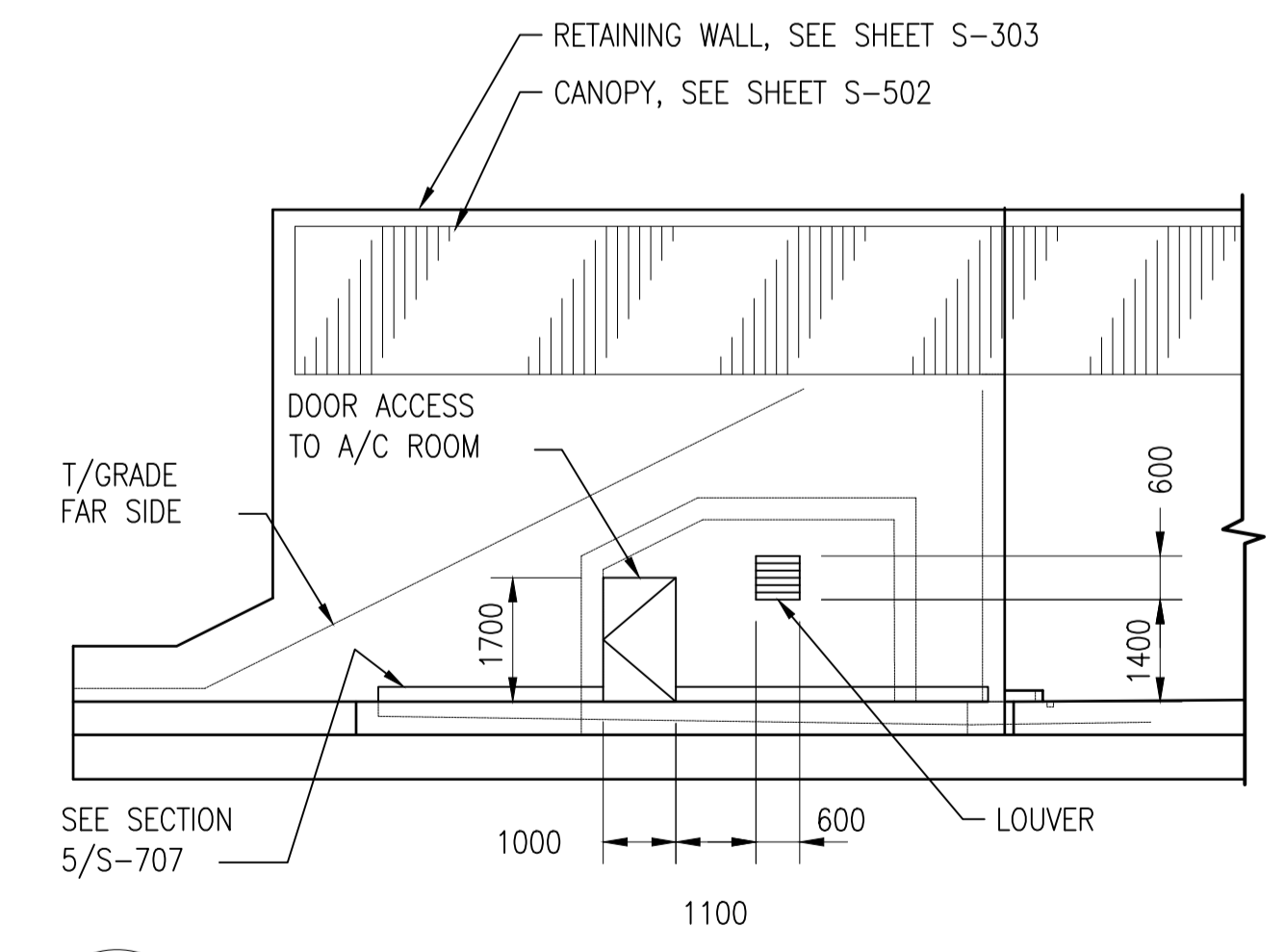
FILE NAME: J:\CSE\Magazine\NSM\Standard\NSM_Standard_2018\CAD\S-103.dwg LAYOUT NAME: S-103 - PLOTTED: Tuesday, July 02, 2019 - 2:17pm USER: louis.gud



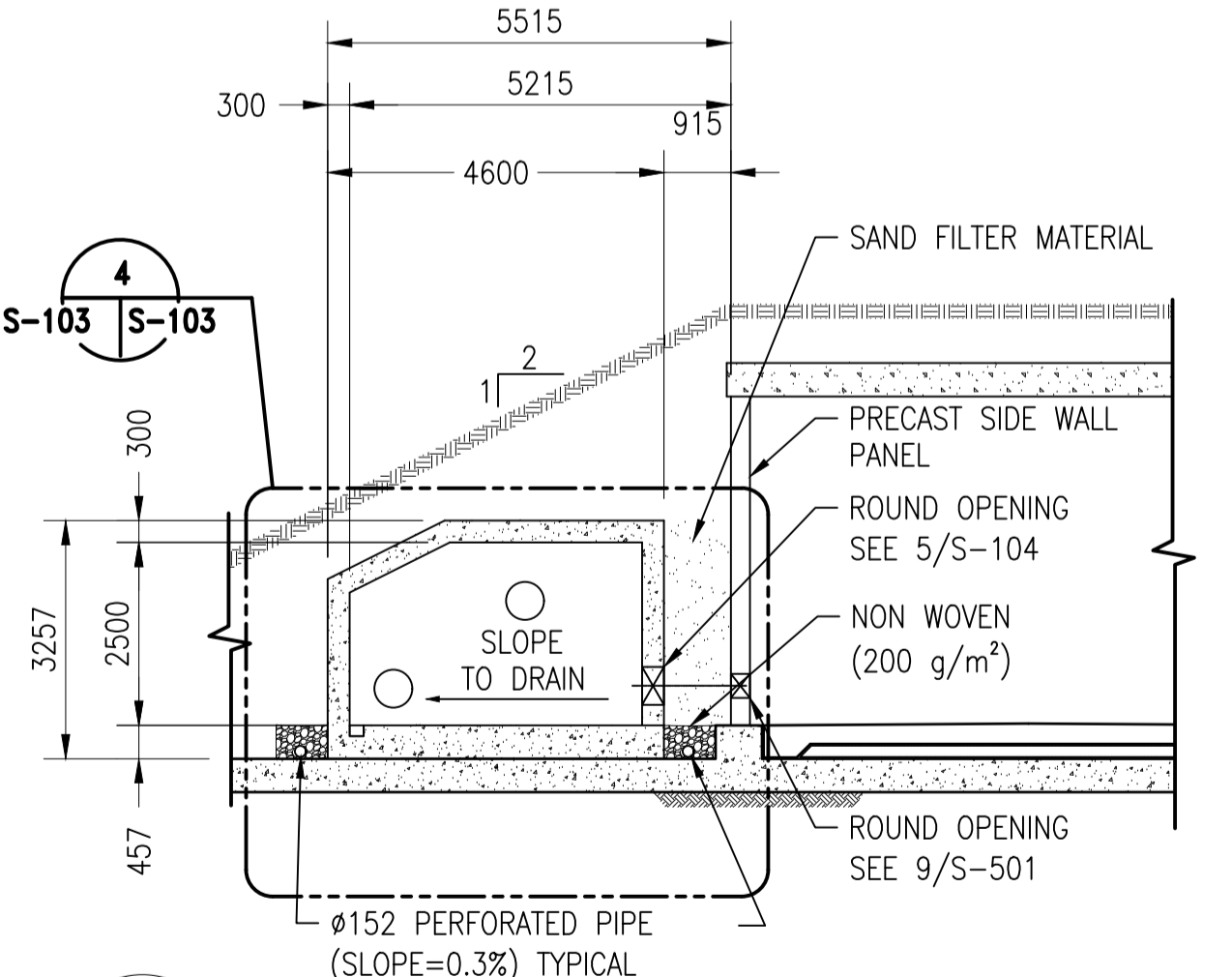
1 PARTIAL PLAN - WITH ALTERNATE AIR CONDITIONING ROOM
S-103 S-103 SCALE: 1:100 SEE DRAWING S-101 FOR REMAINDER OF FOUNDATION INFORMATION.



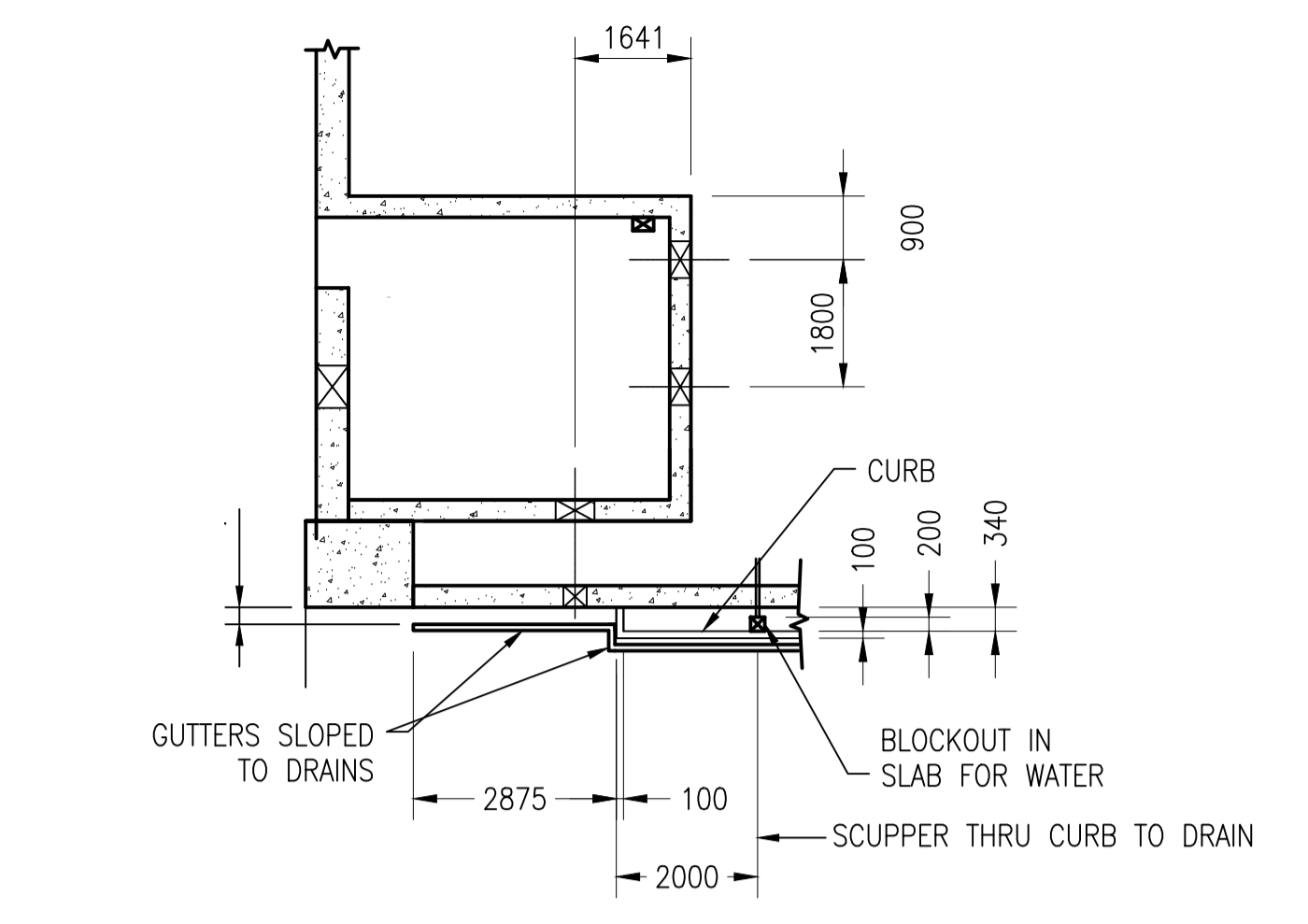
4 A/C ROOM WALL ELEVATION
S-103 S-103 SCALE: 1:50



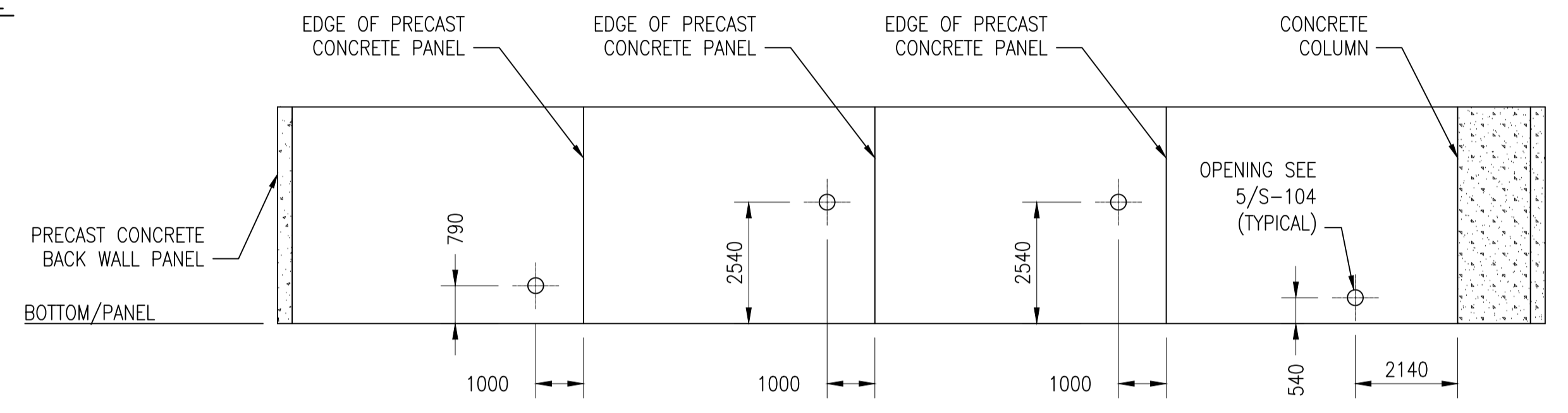
5 FRONT ELEVATION
S-103 S-103 SCALE: 1:100



6 AIR CONDITIONING ROOM SECTION
S-103 S-103 SCALE: 1:100



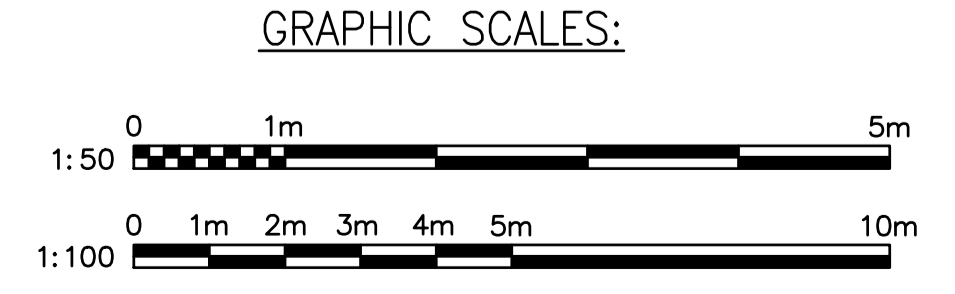
2 A/C ROOM DUCT PENETRATION PLAN
S-103 S-103 SCALE: 1:100



3 MAGAZINE WALL ELEVATION (OPENINGS REQUIRED FOR AIR CONDITIONED MAGAZINE)
S-103 S-103 SCALE: 1:100

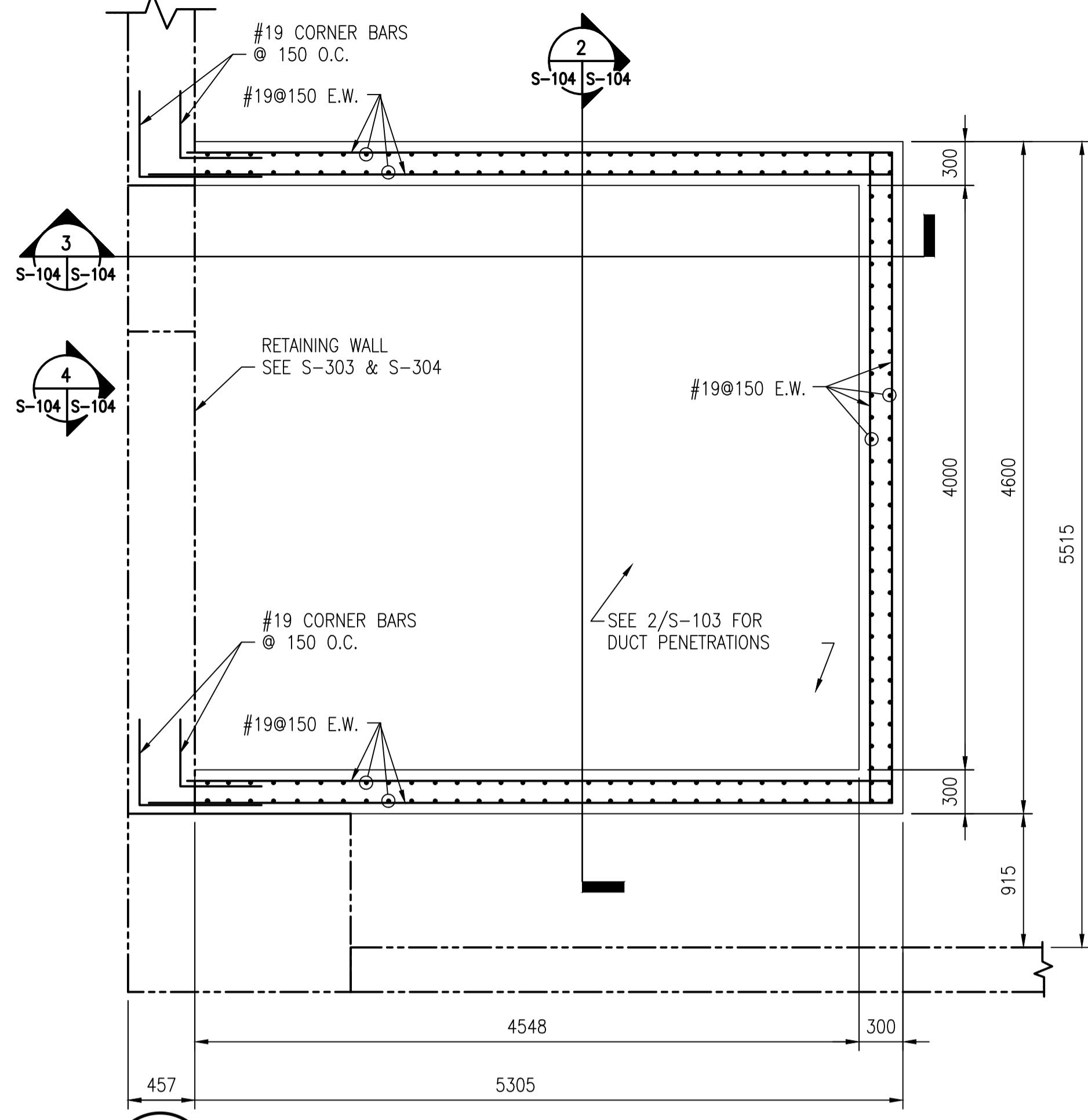
NOTES TO DESIGNER - REMOVE NOTES WHEN PREPARING CONSTRUCTION DRAWINGS:

1. INCLUDE SHEETS S-103 TO S-105 FOR AIR CONDITIONED MAGAZINES ONLY.
2. REMOVE VENT ASSEMBLIES ANNOTATED "FOR NON-AIR CONDITIONED MAGAZINE" THROUGHOUT THE SET.

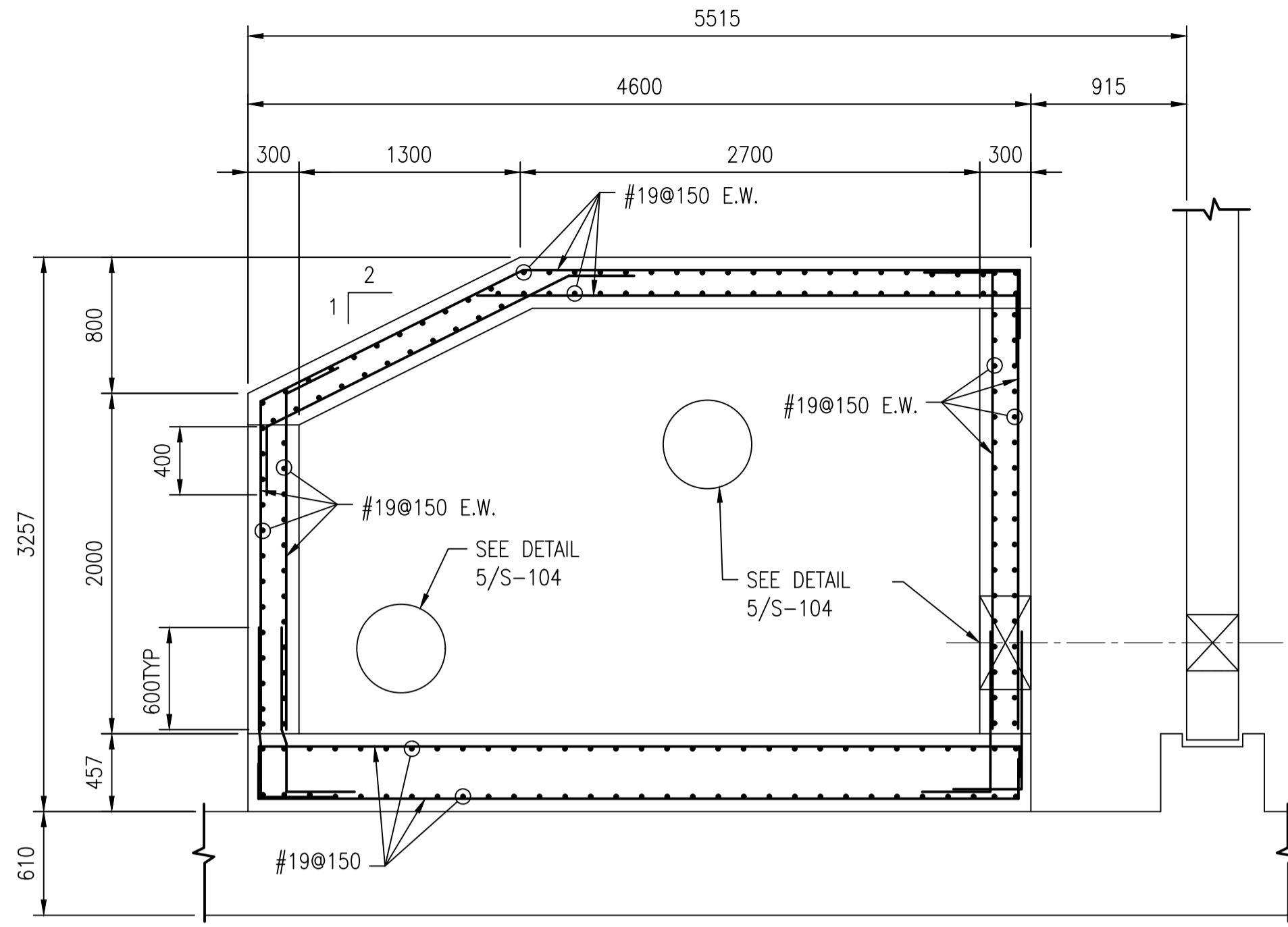


APPROVED	DATE	APP'R
FOR COMMANDER NAVFAC		
ACTIVITY		
SATISFACTORY TO: DATE		
DES: <<CM/DM>>	DRW: LSG	CHK: LMM
BRANCH MANAGER		
SGN PRD DR: WILLIAM FORBES, P.E.		
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC NORFOLK, VIRGINIA MODULAR STORAGE MAGAZINE FOUNDATION AND FLOOR PLAN		
SCALE: AS NOTED		
EPROJECT NO.:		
CONSTR. CONTR. NO.:		
NAVFAC DRAWING NO.:	14063811	
SHEET	6	OF 53
S-103		
NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017		

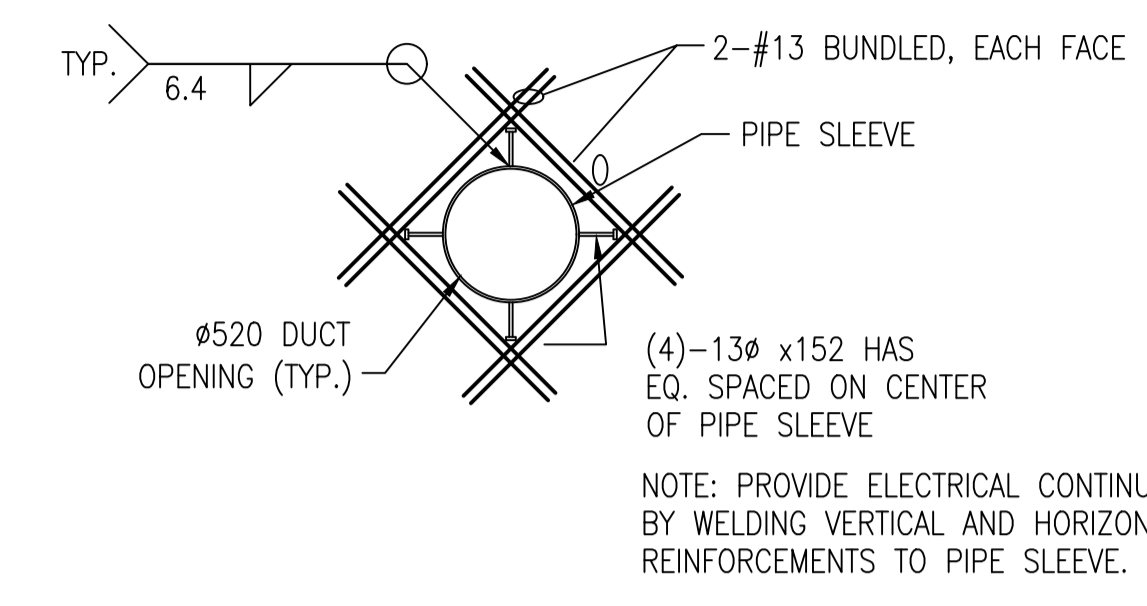
FILE NAME: J:\CSE\Magazine\NSM\Revisions 2018\NAVY STANDARD 2018\CADD\S-104.dwg PLOTTED: Tuesday, July 02, 2019 - 2:17pm USER: louis.gud



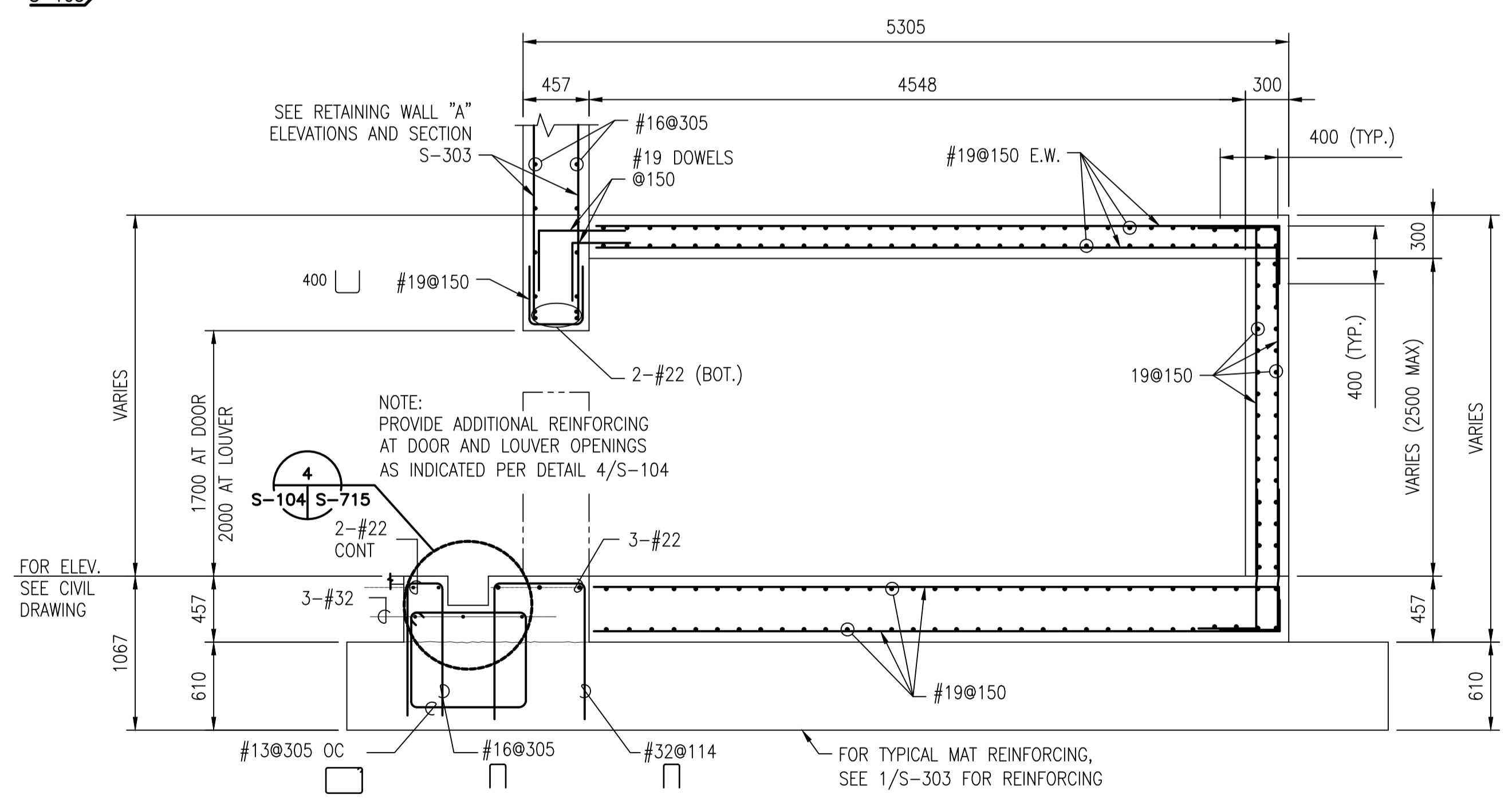
1 PLAN - AIR CONDITIONING ROOM
S-104 S-104 SCALE: 1:30(60)



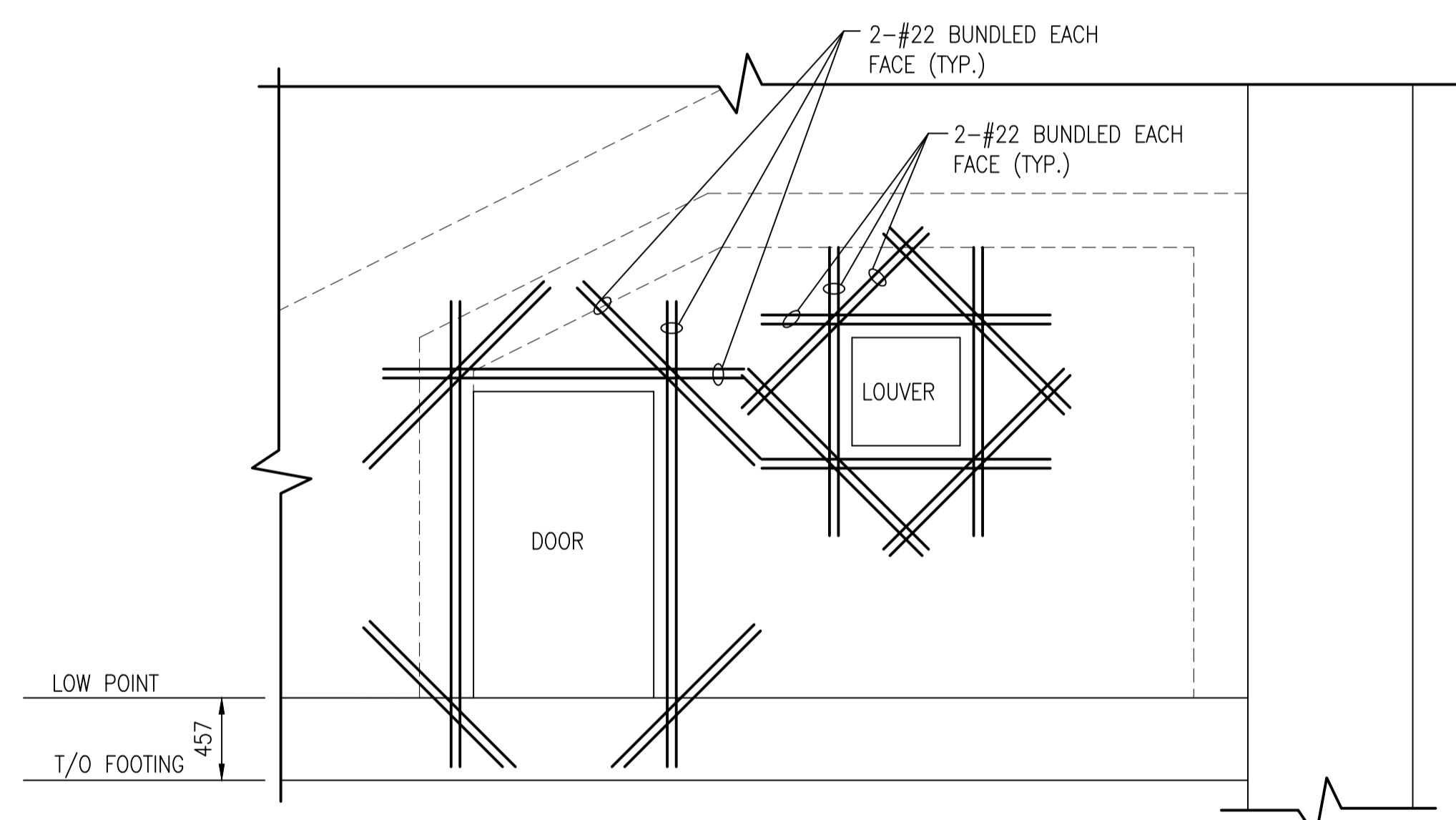
2 SECTION
S-104 S-104 SCALE: 1:30(60)



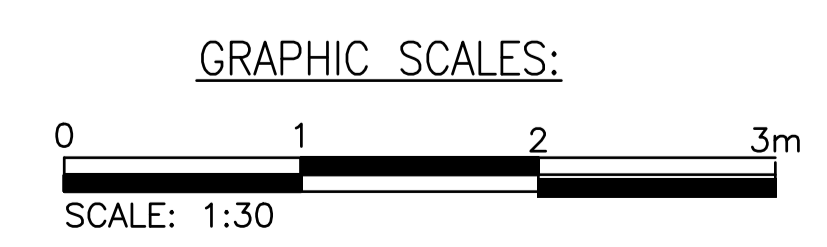
5 DETAIL - REINFORCING AT DUCT OPENING
S-104 S-104 SCALE: 1:30(60)




3 SECTION
S-104 S-104 SCALE: 1:30(60)

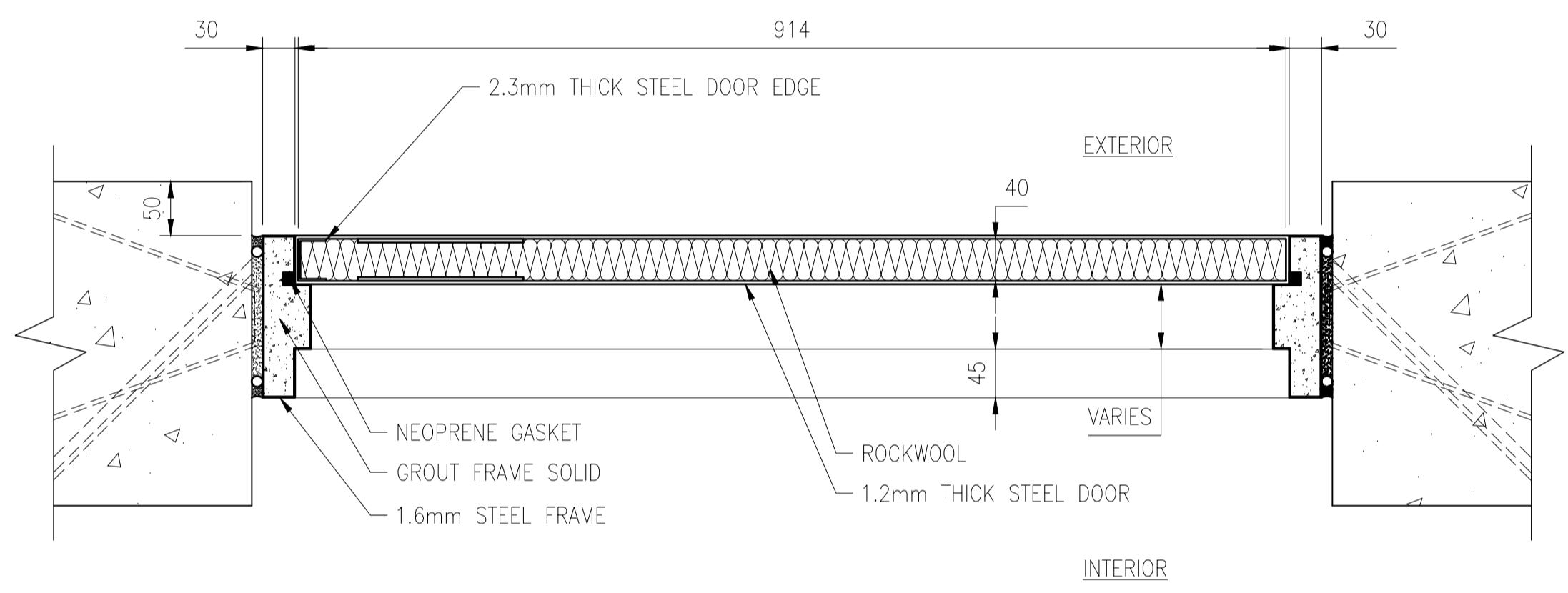


4 DETAIL
S-104 S-104 SCALE: 1:30(60)

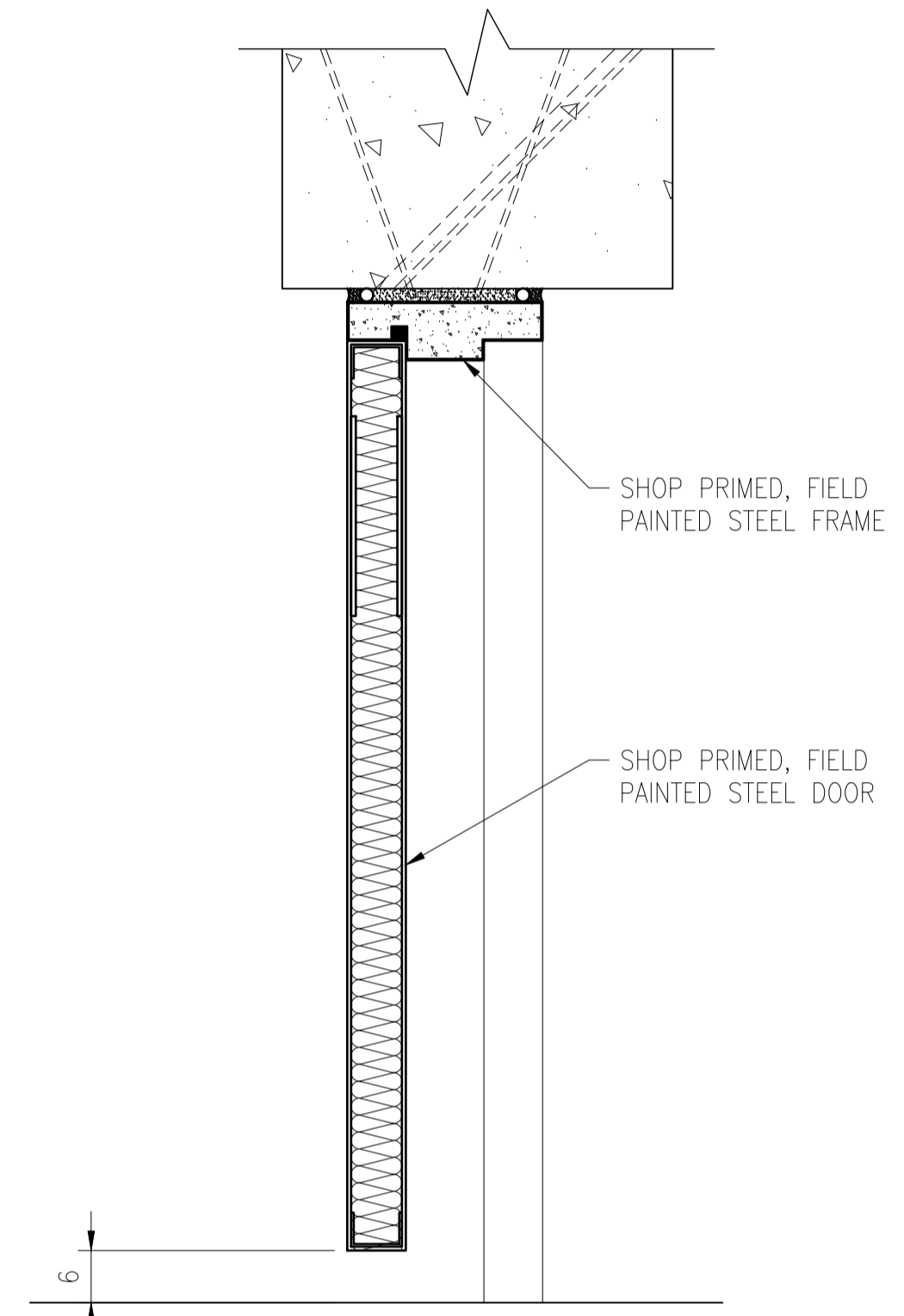


APPROVED	DATE	APP'R
DESCRIPTION	DATE	APP'R
		
MODULAR STORAGE MAGAZINE FOUNDATION AND FLOOR PLAN		
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC NORFOLK, VIRGINIA NAVAL STATION		
SCALE: AS NOTED EPROJECT NO.: CONSTR. CONTR. NO.: NAVFAC DRAWING NO.: 14063812 SHEET 7 OF 53		
AS NOTED 14063812 7 OF 53 S-104		
<small>NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017</small>		

FILE NAME: z:\CSE\Magazine\NSM\Revisions 2018\NAVY STANDARD 2018\CAD\S-105.dwg PLOTTED: Tuesday, July 02, 2019 - 2:17pm USER: louis.gud



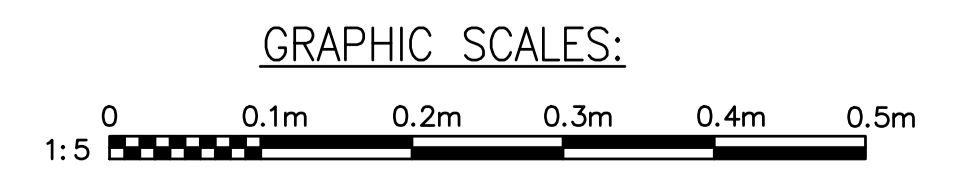
3 PLAN OF DOOR DETAIL
S-105 S-105 SCALE: 1:5



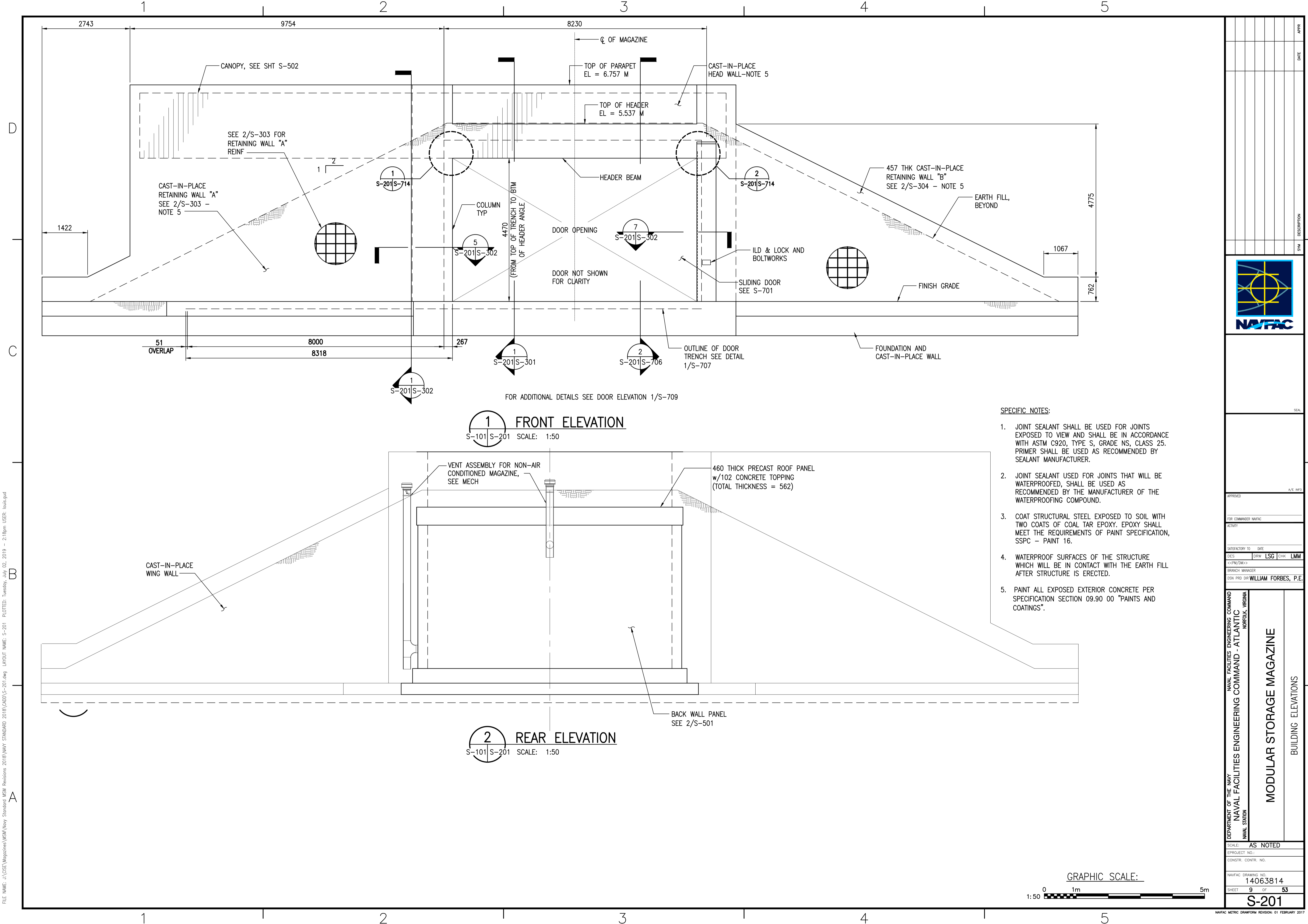
4 SECTION OF DOOR DETAIL
S-105 S-105 SCALE: 1:5

PLACE	DOOR IN AIR CONDITIONING ROOM
FORM	
DOOR	SHOP PRIMED STEEL
FRAME	SHOP PRIMED STEEL
FINISH	FIELD PAINTED, 2 COATS
HARDWARE	DOOR LOCK 1 SET, PIVOT HINGE 1 SET, DOOR STOP 1 SET

NOTES:
1. PROVIDE DOOR LOCK THAT MEETS OR EXCEEDS BASE SECURITY REQUIREMENTS.



APPR	
DATE	
DESCRIPTION	
MODULAR STORAGE MAGAZINE DETAILS OF A/C DOOR	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC NORFOLK, VIRGINIA NAVAL STATION	
SCALE:	AS NOTED
PROJECT NO.:	
CONSTR. CONTR. NO.:	
NAVFAC DRAWING NO.:	14063813
SHEET	8 OF 53
S-105	
<small>NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017</small>	



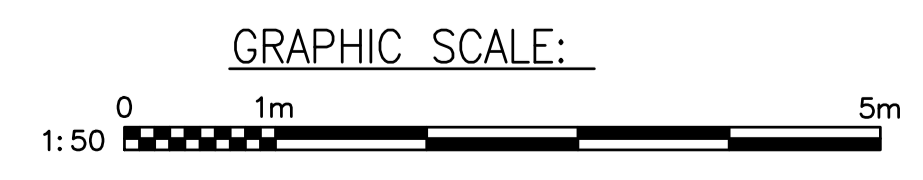
FILE NAME: c:\cse\magazine\NSM\Revisions 2018\NAVY STANDARD 2018\CAD\S-201.dwg LAYOUT NAME: S-201 PLOTTED: Tuesday, July 02, 2019 - 2:18pm USER: louis.gud

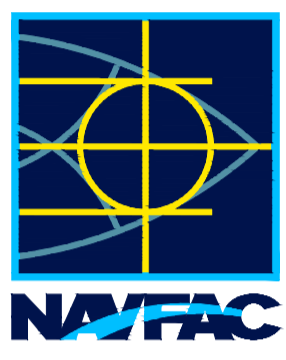
1 FRONT ELEVATION
S-101 S-201 SCALE: 1:50

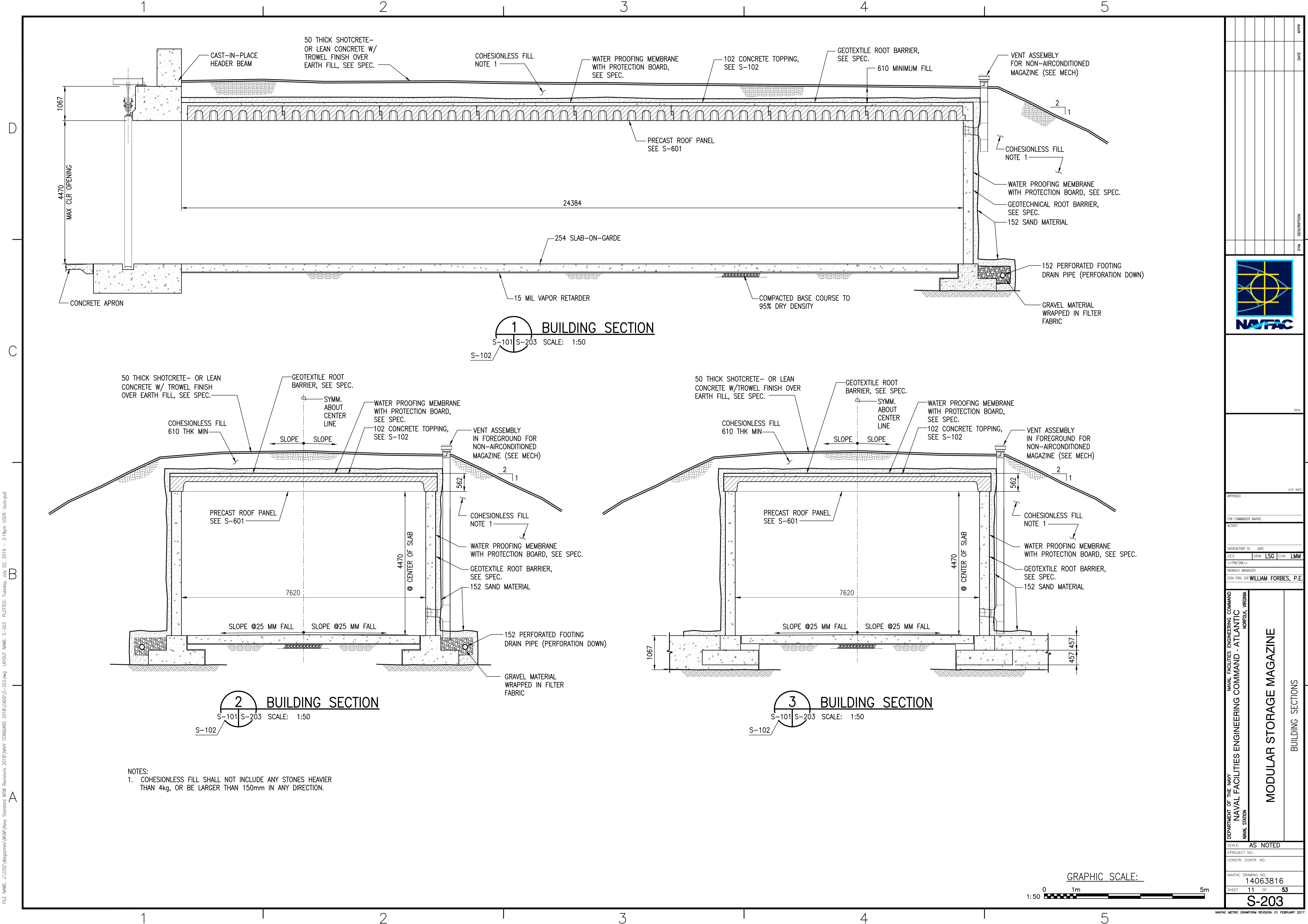
2 REAR ELEVATION
S-101 S-201 SCALE: 1:50

SPECIFIC NOTES:

1. JOINT SEALANT SHALL BE USED FOR JOINTS EXPOSED TO VIEW AND SHALL BE IN ACCORDANCE WITH ASTM C920, TYPE S, GRADE NS, CLASS 25. PRIMER SHALL BE USED AS RECOMMENDED BY SEALANT MANUFACTURER.
2. JOINT SEALANT USED FOR JOINTS THAT WILL BE WATERPROOFED, SHALL BE USED AS RECOMMENDED BY THE MANUFACTURER OF THE WATERPROOFING COMPOUND.
3. COAT STRUCTURAL STEEL EXPOSED TO SOIL WITH TWO COATS OF COAL TAR EPOXY. EPOXY SHALL MEET THE REQUIREMENTS OF PAINT SPECIFICATION, SSPC - PAINT 16.
4. WATERPROOF SURFACES OF THE STRUCTURE WHICH WILL BE IN CONTACT WITH THE EARTH FILL AFTER STRUCTURE IS ERECTED.
5. PAINT ALL EXPOSED EXTERIOR CONCRETE PER SPECIFICATION SECTION 09.90 00 "PAINTS AND COATINGS".



APPROVED	DATE
SYN	DESCRIPTION
	
MODULAR STORAGE MAGAZINE BUILDING ELEVATIONS	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC NAVAL STATION NORFOLK, VIRGINIA	
SCALE: AS NOTED EPROJECT NO.: CONSTR. CONTR. NO.: NAVFAC DRAWING NO.: 14063814 SHEET 9 OF 53 S-201	
<small>NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017</small>	

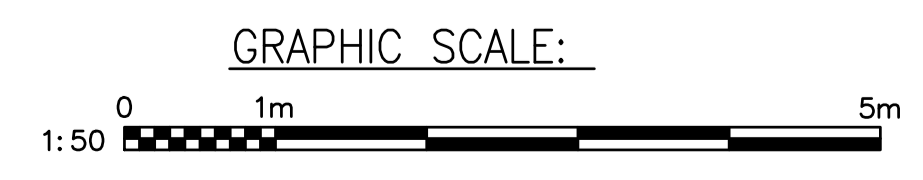


1 BUILDING SECTION
S-101 S-203 SCALE: 1:50

2 BUILDING SECTION
S-101 S-203 SCALE: 1:50

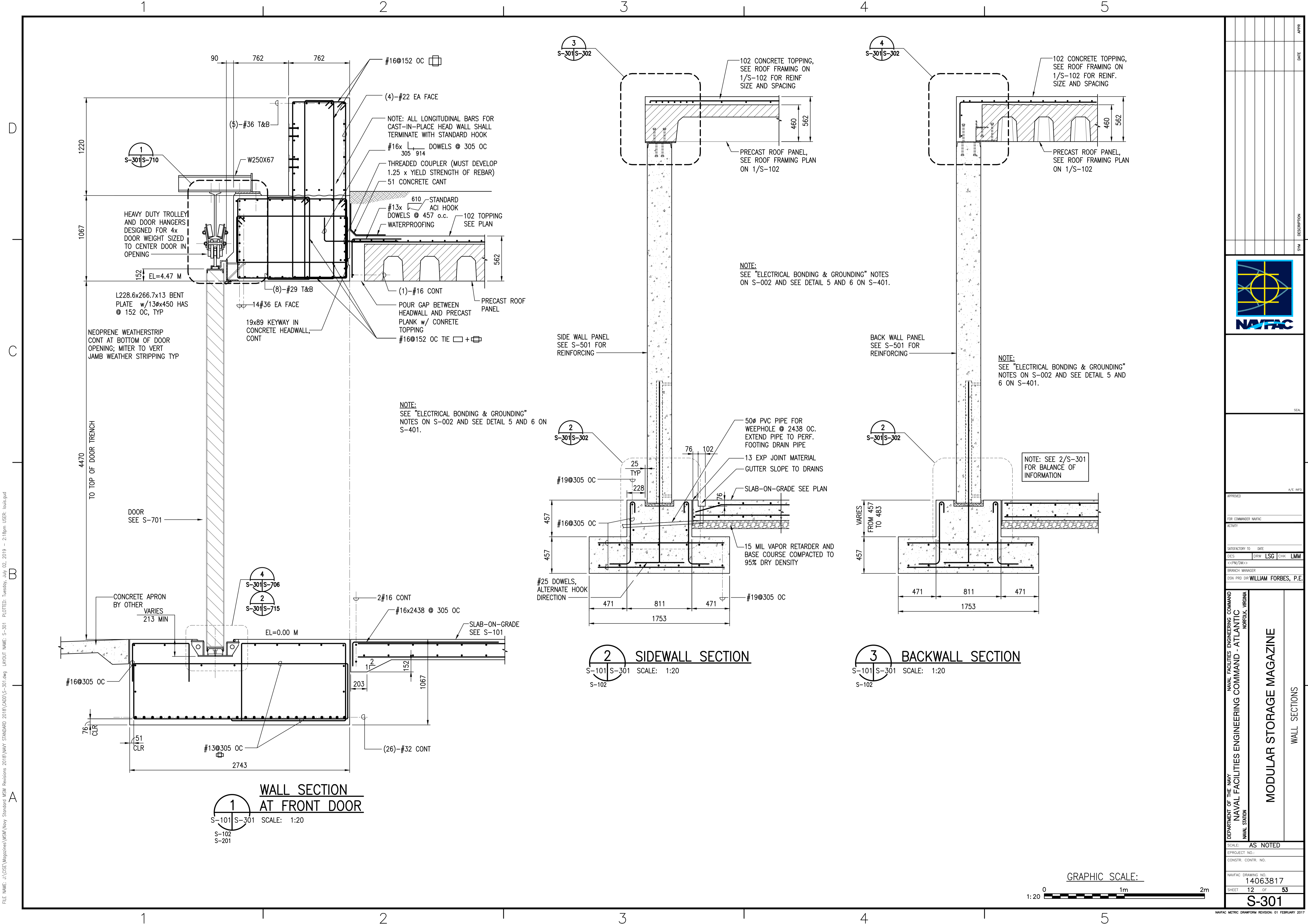
3 BUILDING SECTION
S-101 S-203 SCALE: 1:50

NOTES:
1. COHESIONLESS FILL SHALL NOT INCLUDE ANY STONES HEAVIER THAN 4kg, OR BE LARGER THAN 150mm IN ANY DIRECTION.



APPROVED	DATE	APP'R
FOR COMMANDER NAVFAC		
ACTIVITY		
SATISFACTORY TO DATE		
DES	DRW	LSG
CHK		LMM
BRANCH MANAGER		
SGN PRD DR	WILLIAM FORBES, P.E.	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC NORFOLK, VIRGINIA NAVAL STATION		
MODULAR STORAGE MAGAZINE BUILDING SECTIONS		
SCALE:	AS NOTED	
EPROJECT NO.:		
CONSTR. CONTR. NO.		
NAVFAC DRAWING NO.	14063816	
SHEET	11	OF 53
S-203		
NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017		

FILE NAME: j:\CSE\Magazines\NSM\Standard NSM Revisions 2018\CADD\S-203.dwg LAYOUT NAME: S-203 PLOTTED: Tuesday, July 02, 2019 - 2:18pm USER: louis.gud



1
S-301/S-710

3
S-301/S-302

4
S-301/S-302

4
S-301/S-706
2
S-301/S-715


2
S-301/S-302

2
S-301/S-302

1
S-101/S-301
S-102
S-201

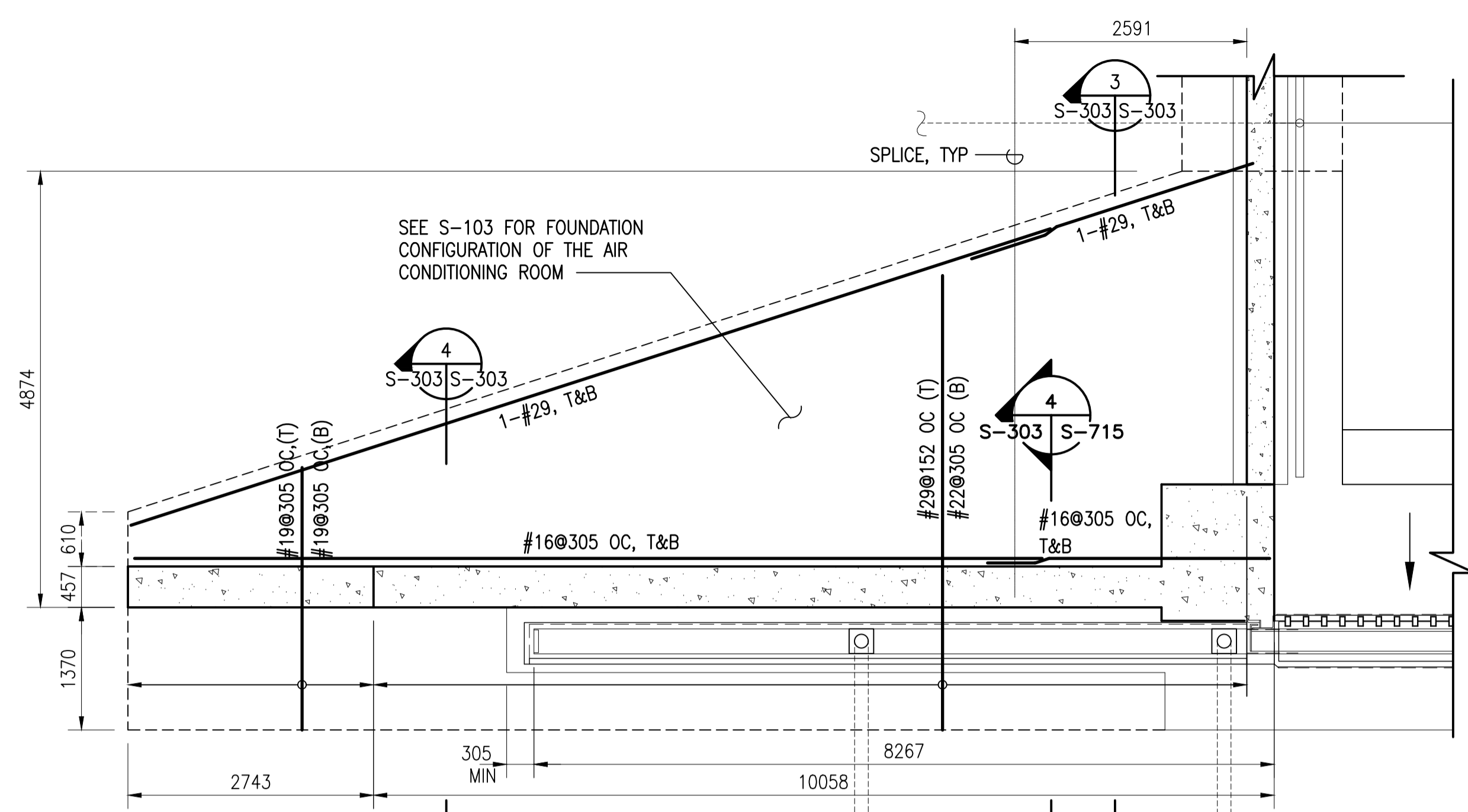
2
S-101/S-301
S-102

3
S-101/S-301
S-102

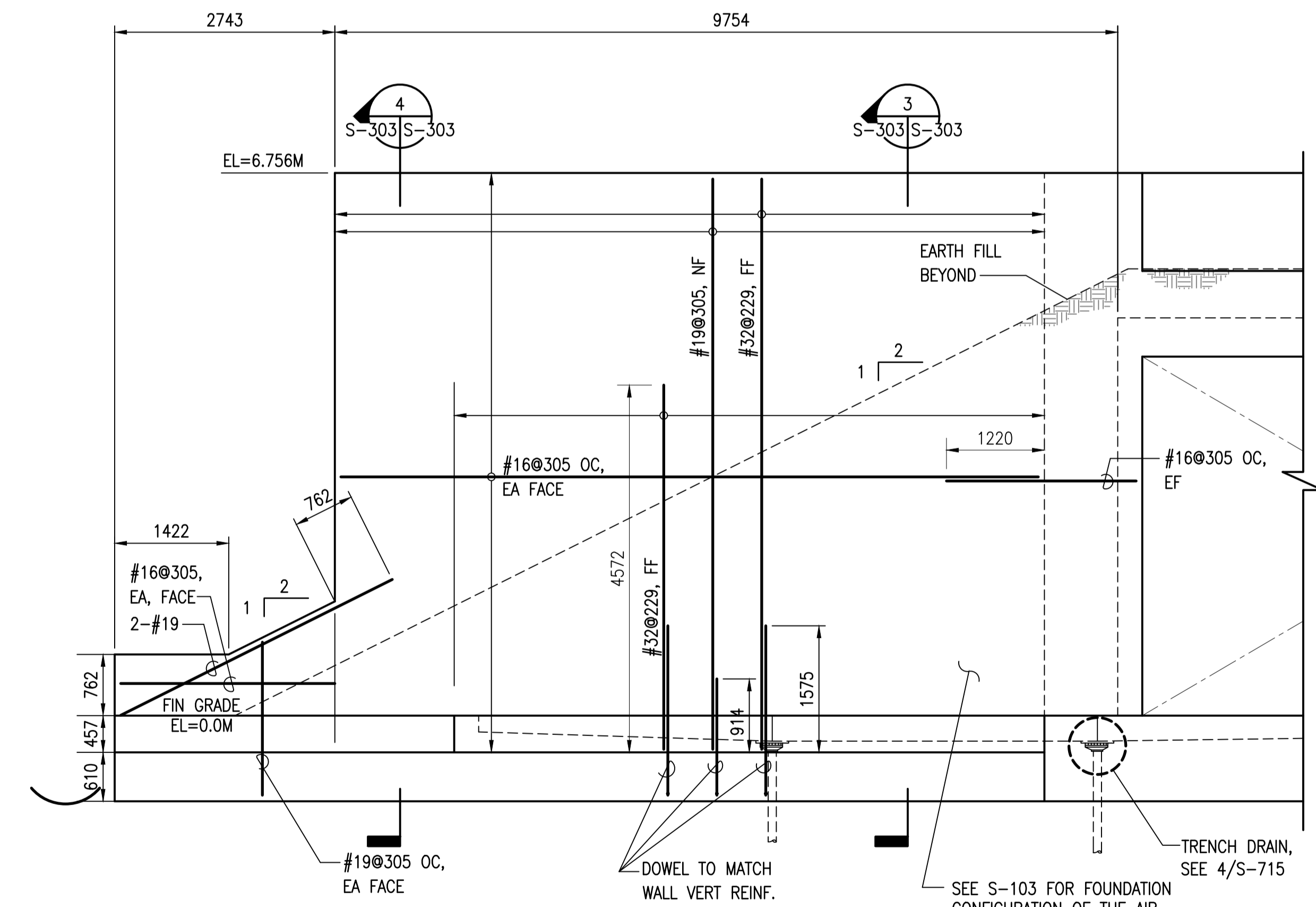
APPROVED	DATE	APP'R
SYN	DESCRIPTION	
		
SEAL		
A/E R/P/D		
APPROVED: _____ FOR COMMANDER NAVFAC		
ACTIVITY: _____		
SATISFACTORY TO: _____ DATE: _____		
DES: <<CM/DM>> DRW LSG CHK LMM		
BRANCH MANAGER: _____		
DGN PRD DR WILLIAM FORBES, P.E.		
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC NORFOLK, VIRGINIA NAVAL STATION		
MODULAR STORAGE MAGAZINE WALL SECTIONS		
SCALE: AS NOTED		
E/PROJECT NO.: _____		
CONSTR. CONTR. NO. _____		
NAVFAC DRAWING NO. 14063817		
SHEET 12 OF 53		
S-301		
<small>NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017</small>		



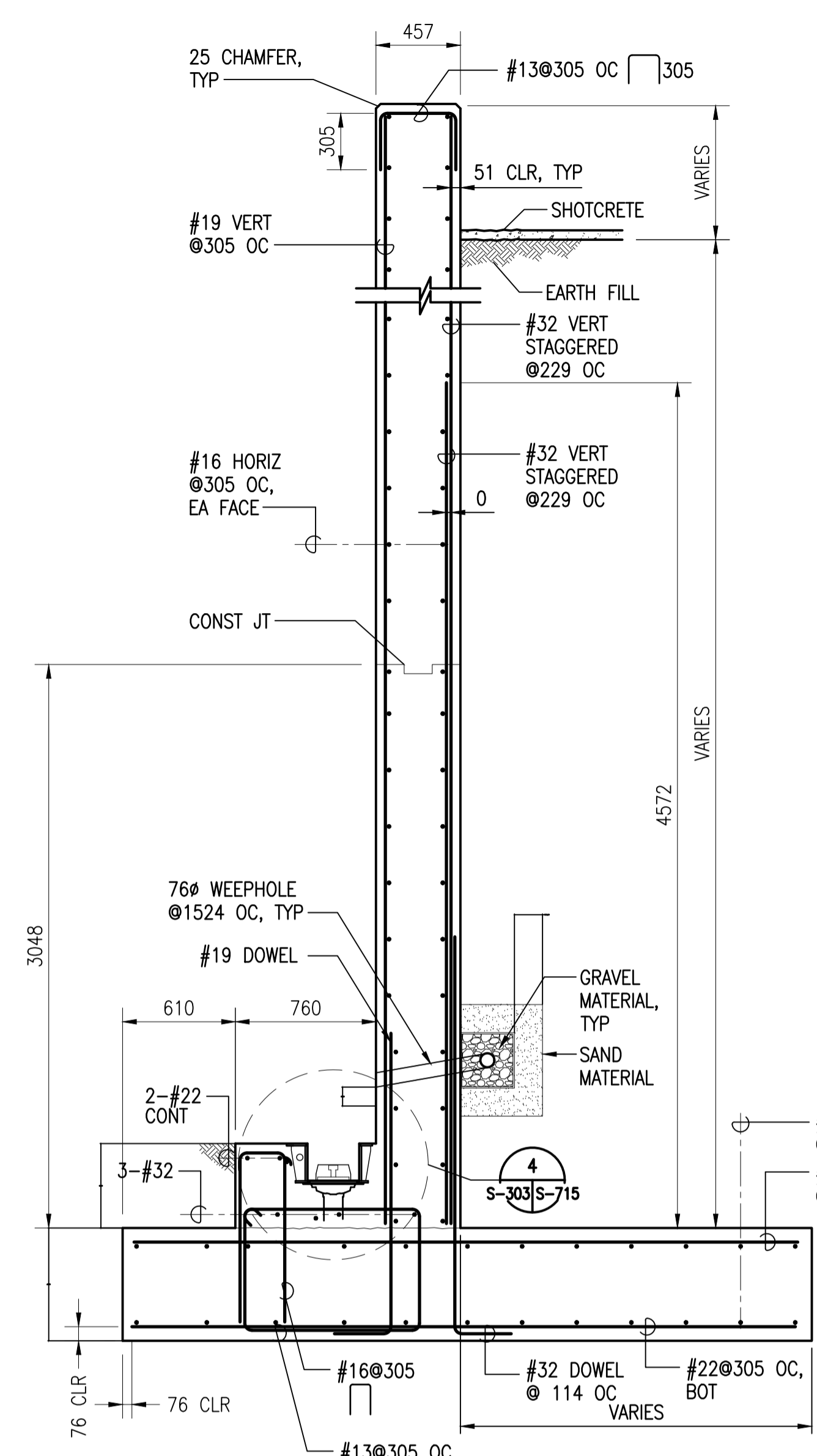
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1 RETAINING WALL "A" FOUNDATION PLAN
S-101 S-303 SCALE: 1:50

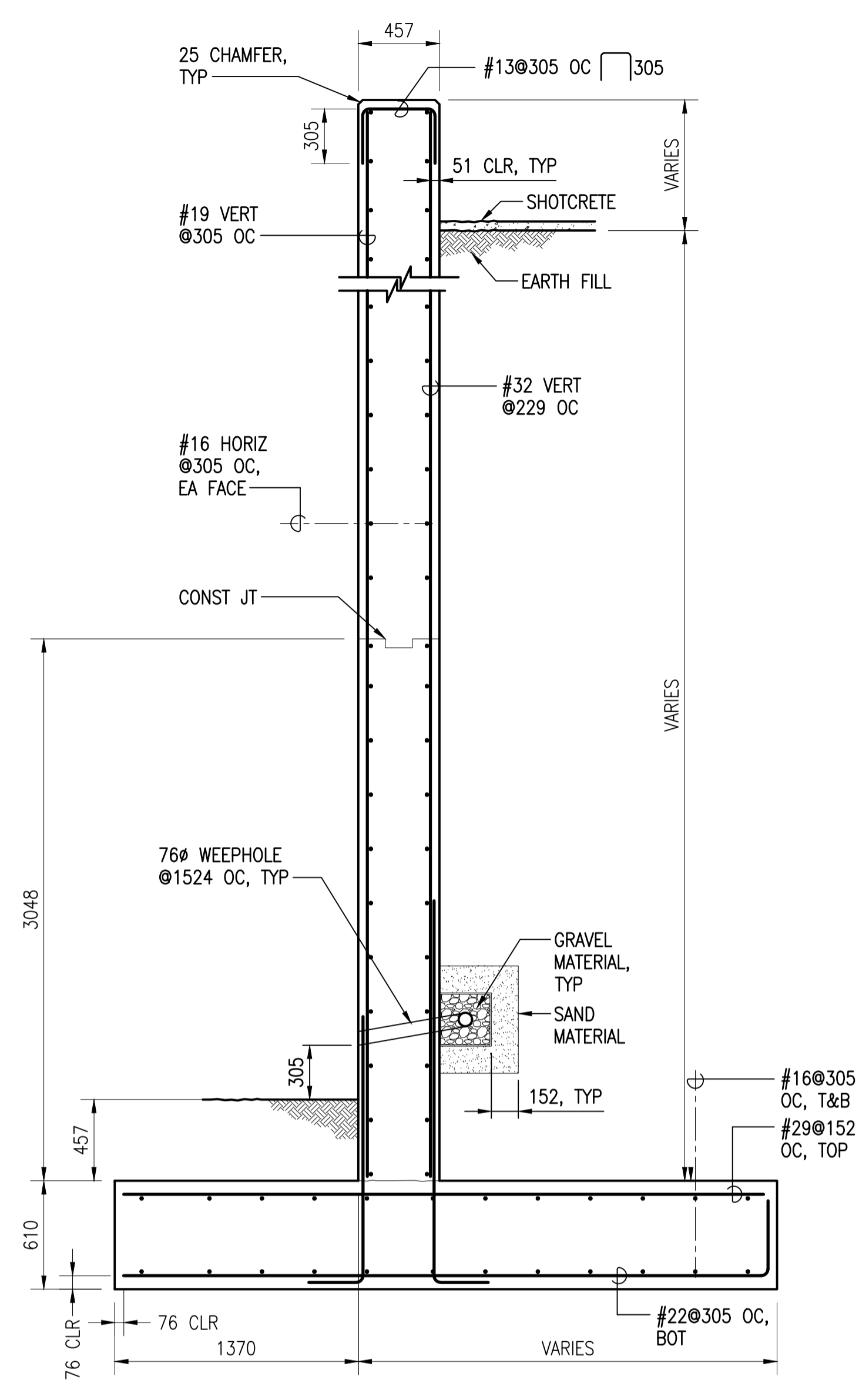


2 RETAINING WALL "A" ELEVATION
S-201 S-303 SCALE: 1:50

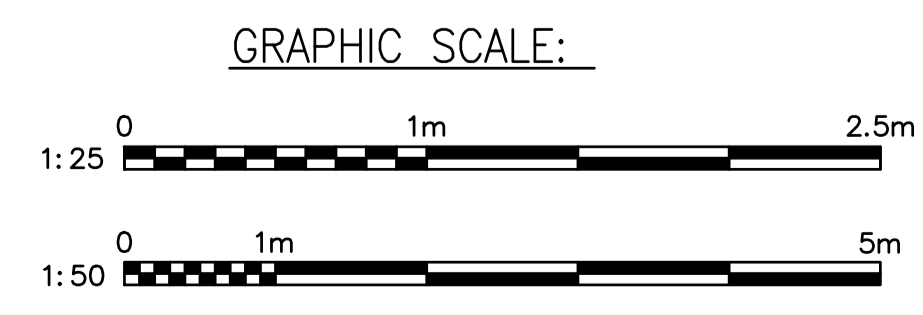


3 RETAINING WALL SECTION
S-101 S-303 SCALE: 1:25

NOTE:
SEE ELECTRICAL DRAWINGS FOR
REINFORCING STEEL BONDING
REQUIREMENTS.

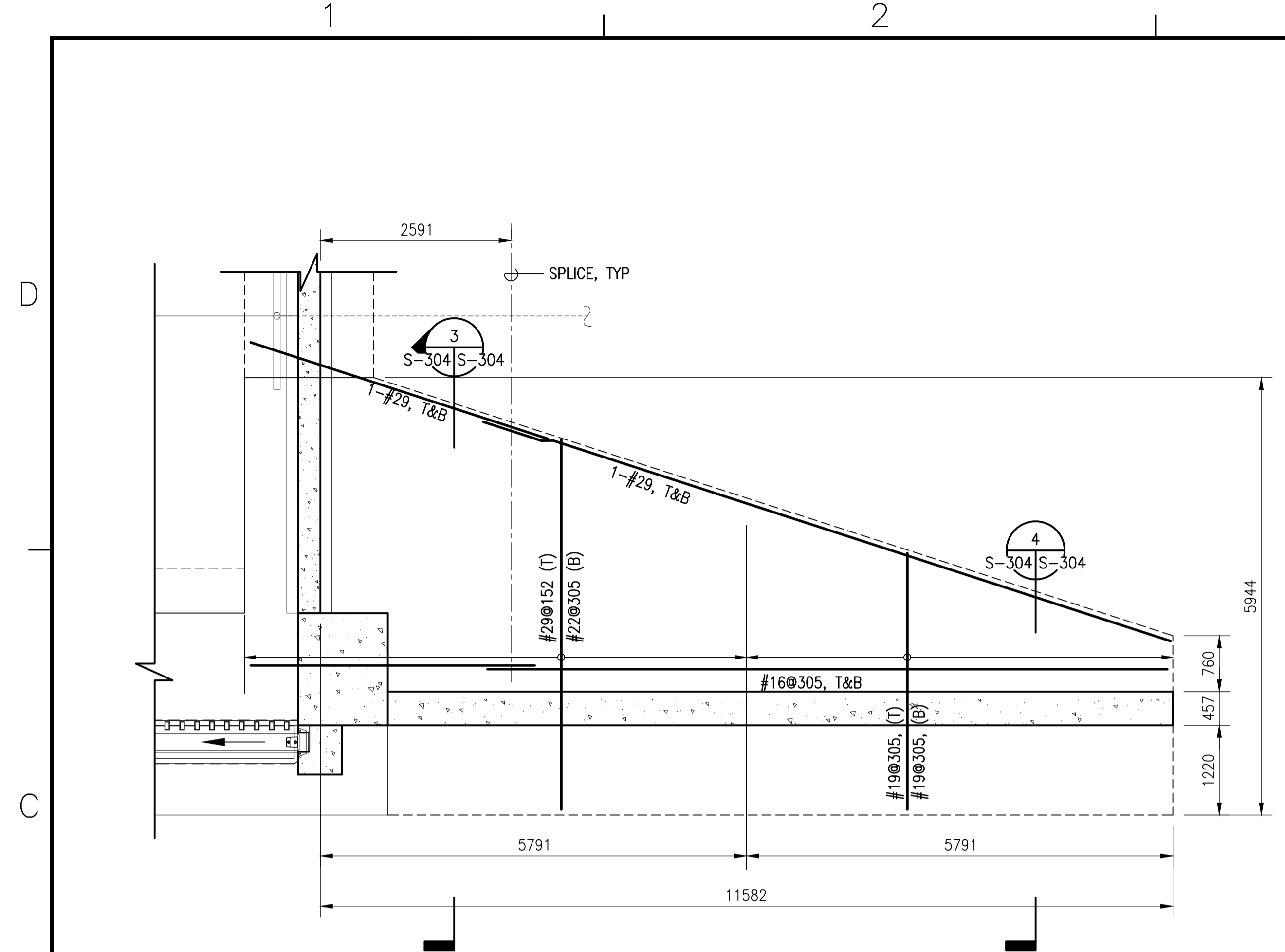


4 RETAINING WALL SECTION
S-101 S-303 SCALE: 1:25

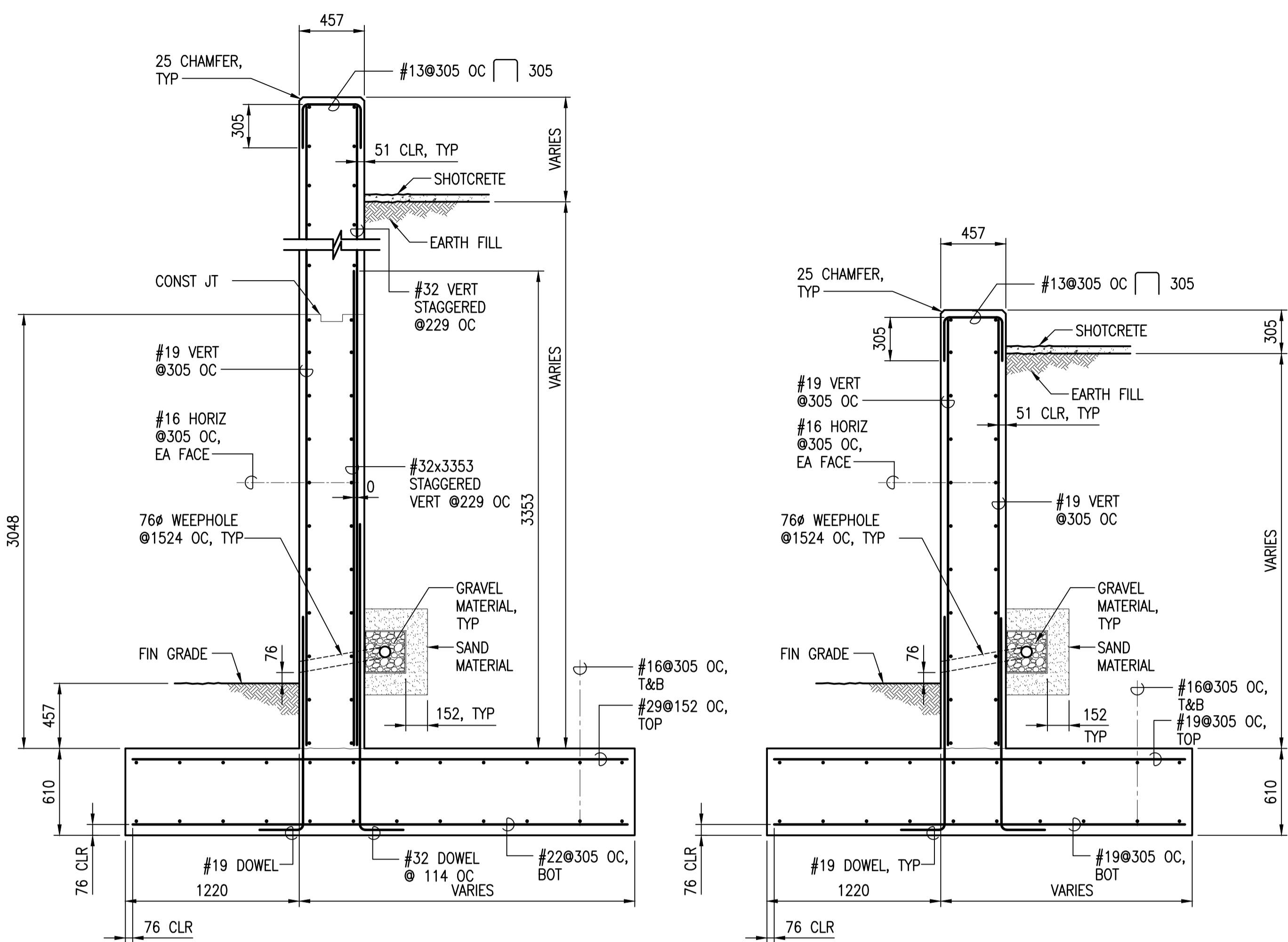


APPROVED	DATE	APP'R
DESCRIPTION	DATE	APP'R
MODULAR STORAGE MAGAZINE RETAINING WALL "A" FOUNDATION PLANS AND SECTIONS		
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC NORFOLK, VIRGINIA NAVAL STATION		
SCALE: AS NOTED EPROJECT NO.: CONSTR. CONTR. NO.: NAVFAC Drawing No. 14063819 SHEET 14 OF 53 S-303		
<small>NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017</small>		

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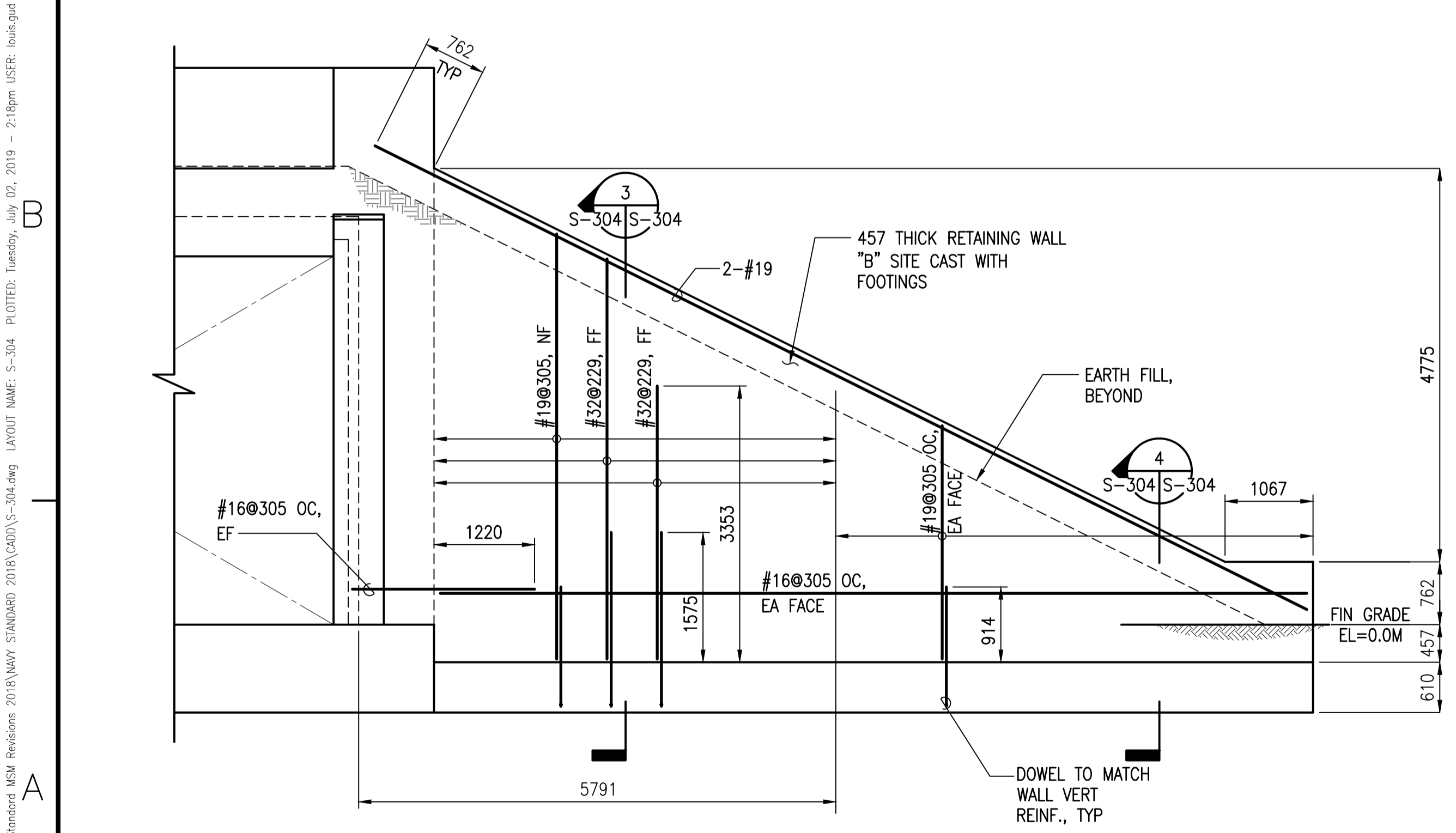
1 RETAINING WALL "B" FOUNDATION PLAN
S-101 S-304 SCALE: 1:50



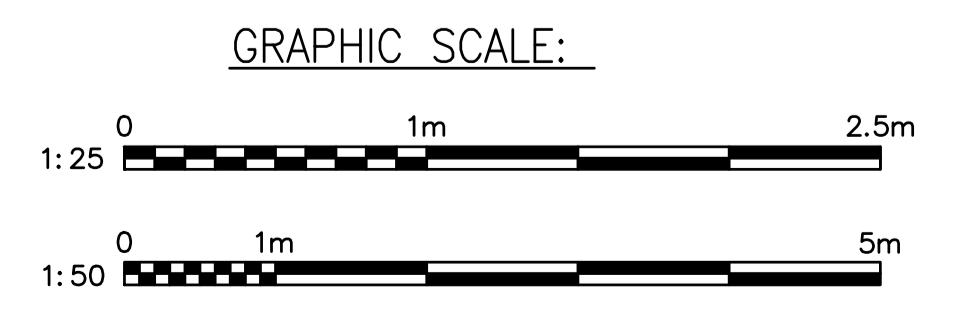
3 RETAINING WALL SECTION
S-304 S-304 SCALE: 1:25

4 RETAINING WALL SECTION
S-101 S-304 SCALE: 1:25

NOTE:
SEE ELECTRICAL DRAWINGS FOR
REINFORCING STEEL BONDING
REQUIREMENTS.



2 RETAINING WALL "B" ELEVATION
S-201 S-304 SCALE: 1:50

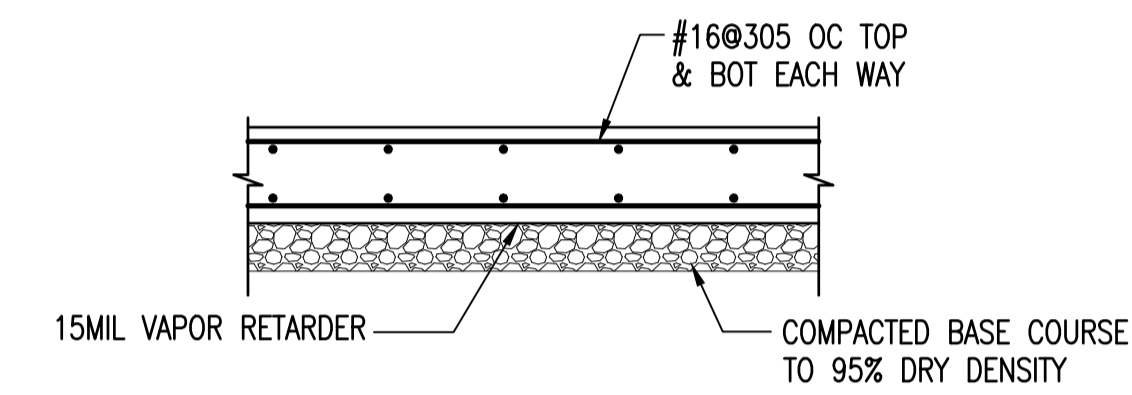


APPROVED	DATE	APP'R
FOR COMMANDER NAVFAC	ACTIVITY	DESCRIPTION
SATISFACTORY TO	DATE	SCALE
DES	DRW	LSG
CHK	LMM	
BRANCH MANAGER	SGN PRD DR WILLIAM FORBES, P.E.	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC NAVAL STATION NORFOLK, VIRGINIA		
MODULAR STORAGE MAGAZINE RETAINING WALL "B" FOUNDATION PLANS AND SECTIONS		
SCALE:	AS NOTED	
EPROJECT NO.:	14063820	
CONSTR. CONTR. NO.	SHEET 15 OF 53	
NAVFAC DRAWING NO.	S-304	
NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017		

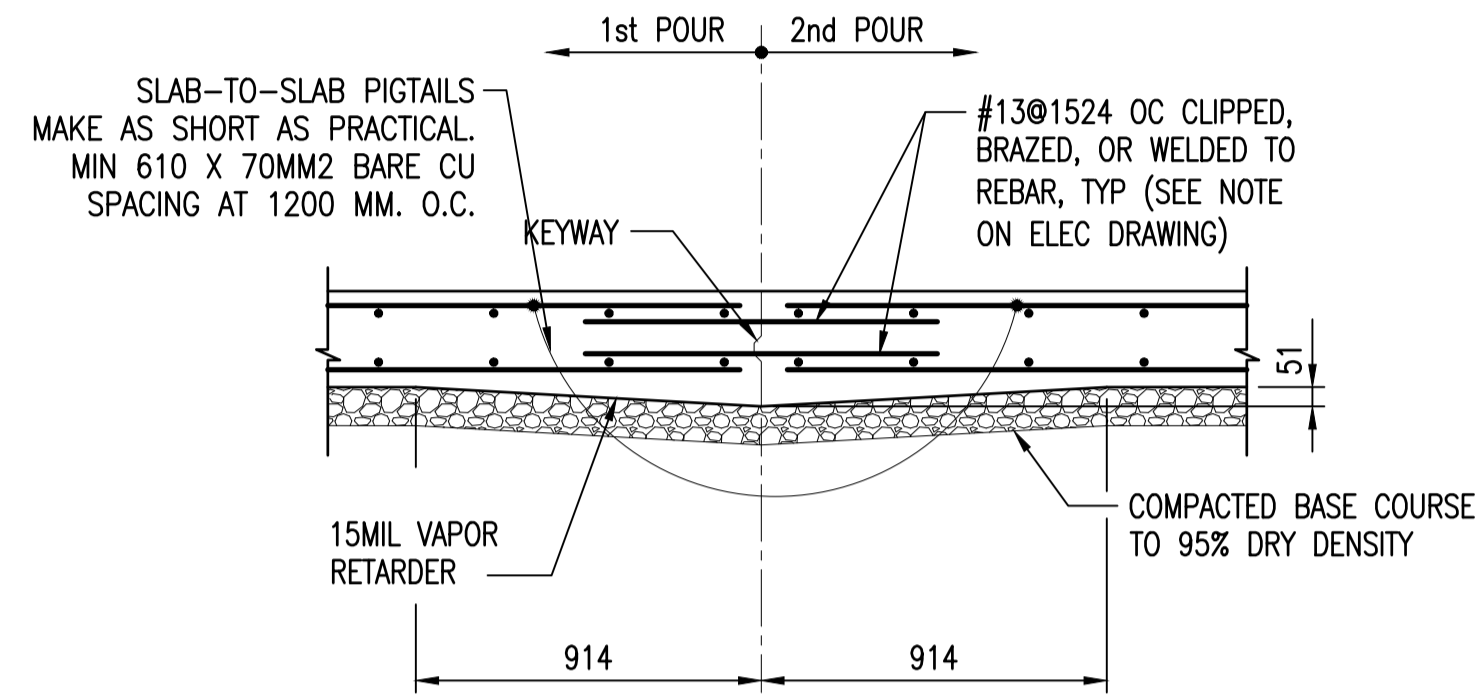
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SLAB ON GRADE JOINT NOTES:

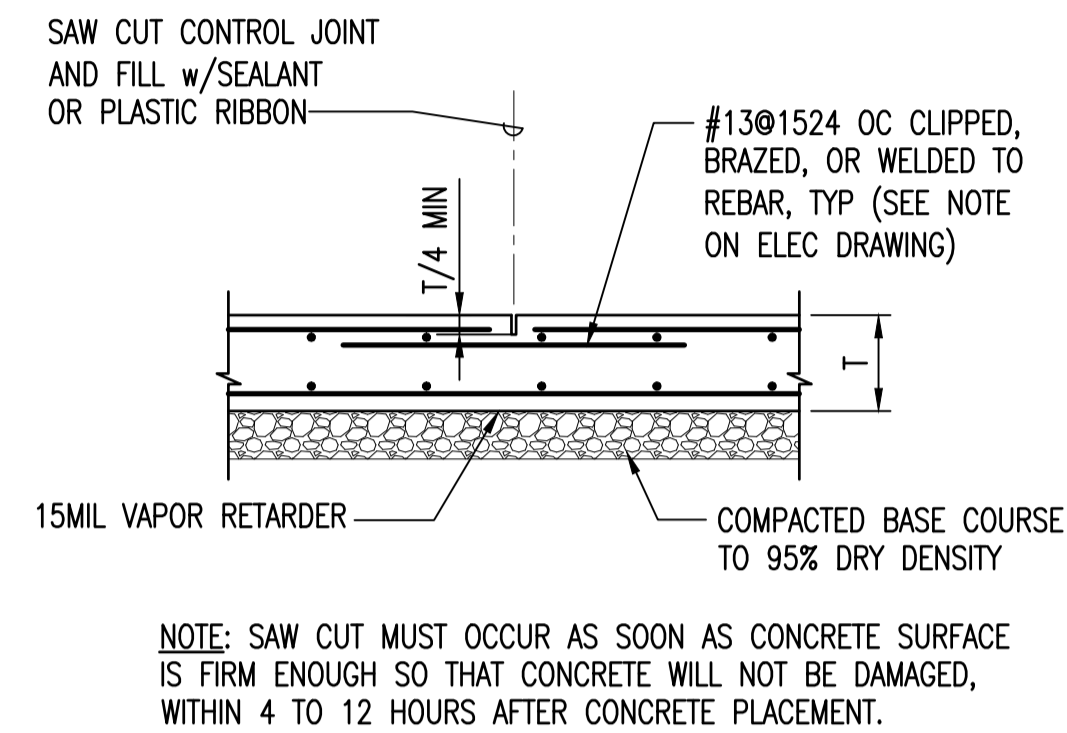
1. PROVIDE CURING COMPOUND & CONTROL JOINTS TO MINIMIZE SHRINKAGE CRACKS.
2. SPACING OF JOINTS SHALL BE AS INDICATED ON SHEET S-101.
3. CONTROL JOINTS MAY BE EITHER CONSTRUCTION JOINTS OR CONTRACTION CONTROL JOINTS.
4. SEE 2/S-401 & 3/S-401 FOR SLAB ON GRADE JOINT DETAILS.
5. SEE ELECTRICAL DRAWINGS FOR REINFORCING STEEL BONDING REQUIREMENTS.



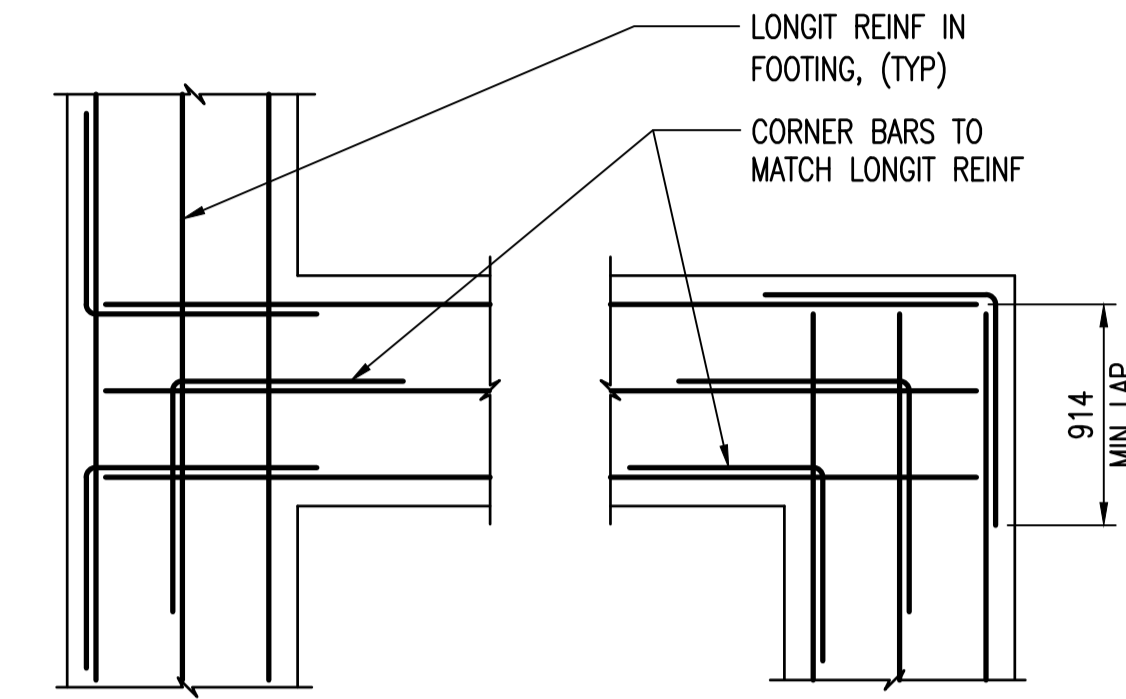
1 TYP SLAB-ON-GRADE DETAIL
S-101 S-401 SCALE: NONE



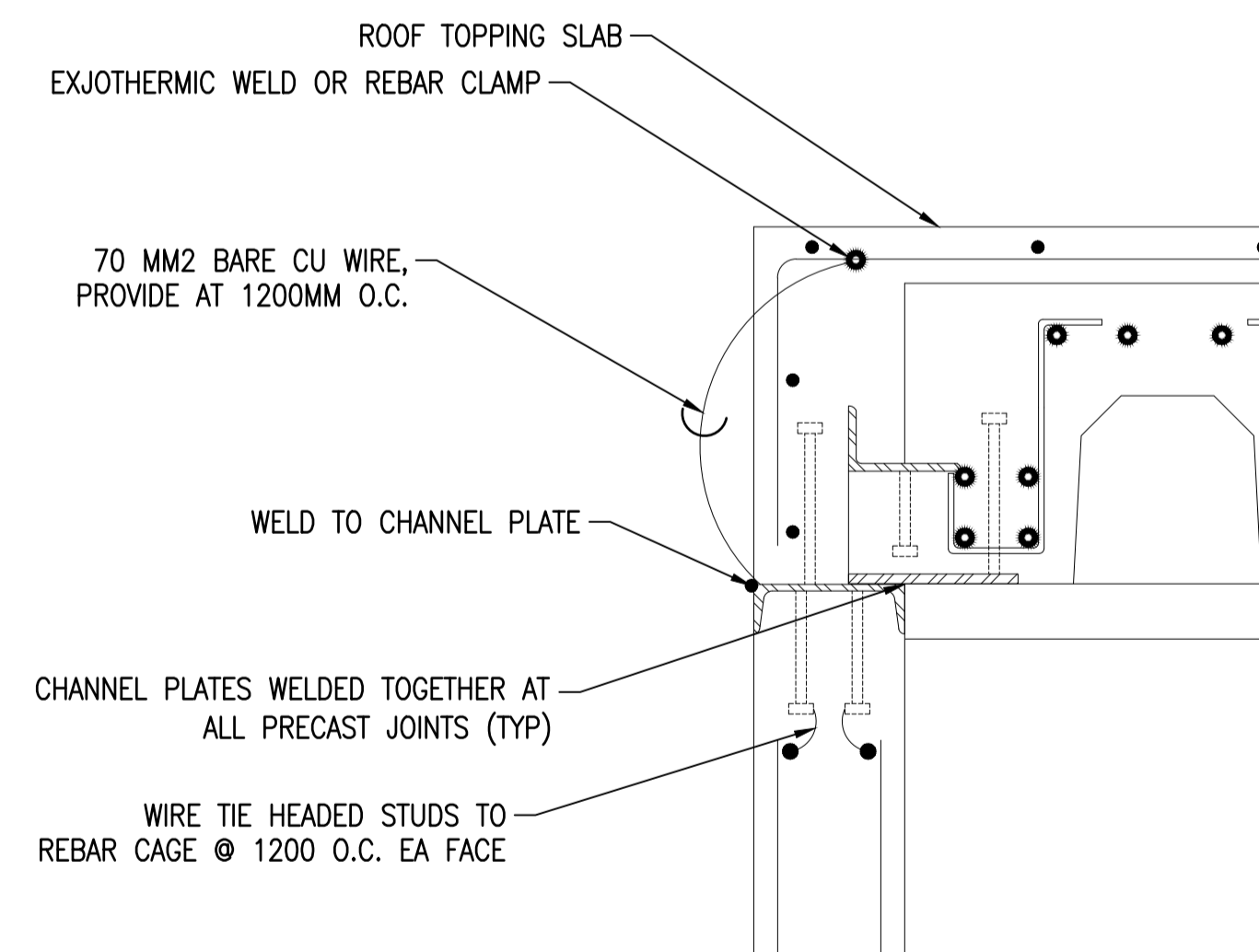
2 TYP SLAB-ON-GRADE CONSTRUCTION JOINT DETAIL
S-101 S-401 SCALE: NONE



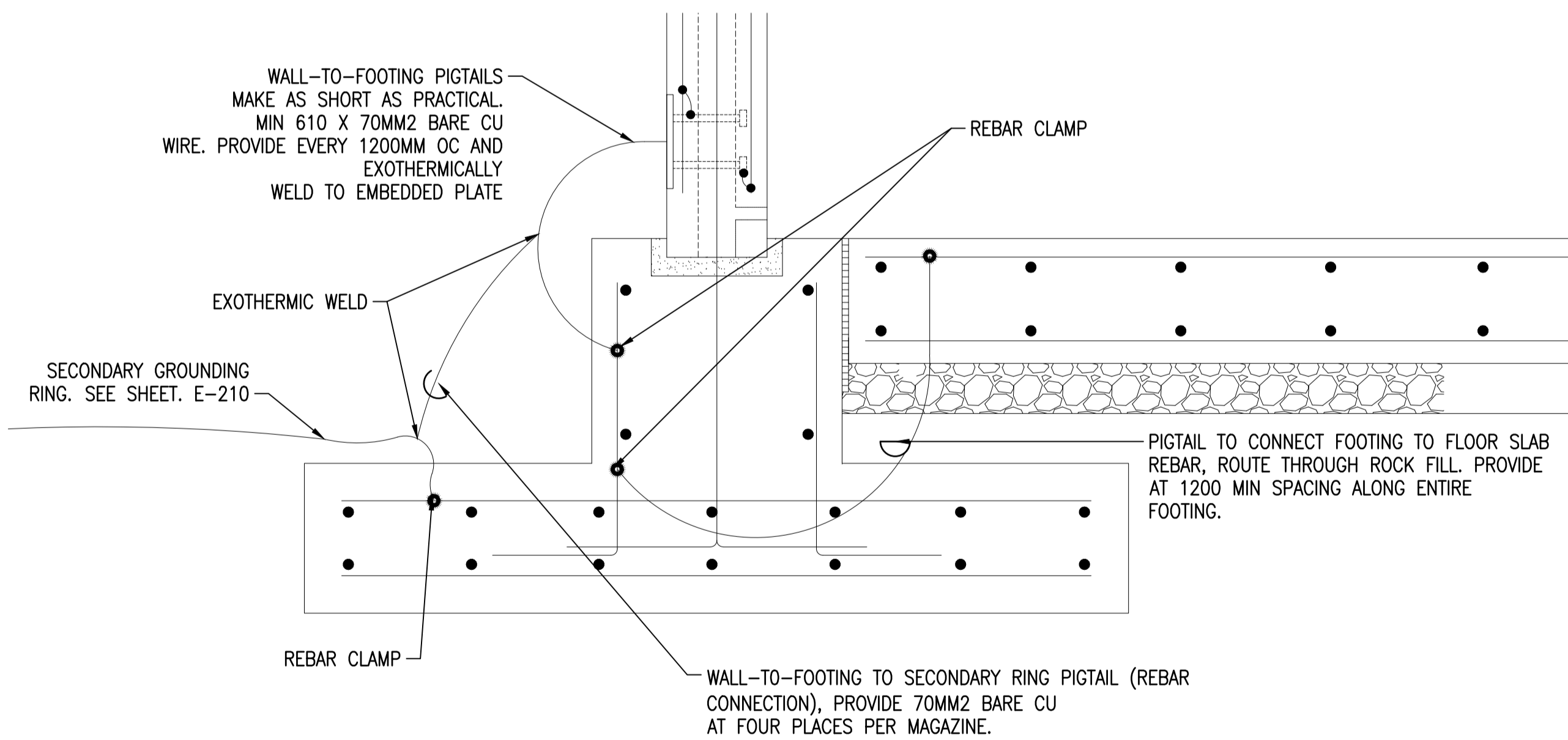
3 TYP SLAB-ON-GRADE CONTRACTION CONTROL JT DETAIL
S-101 S-401 SCALE: NONE



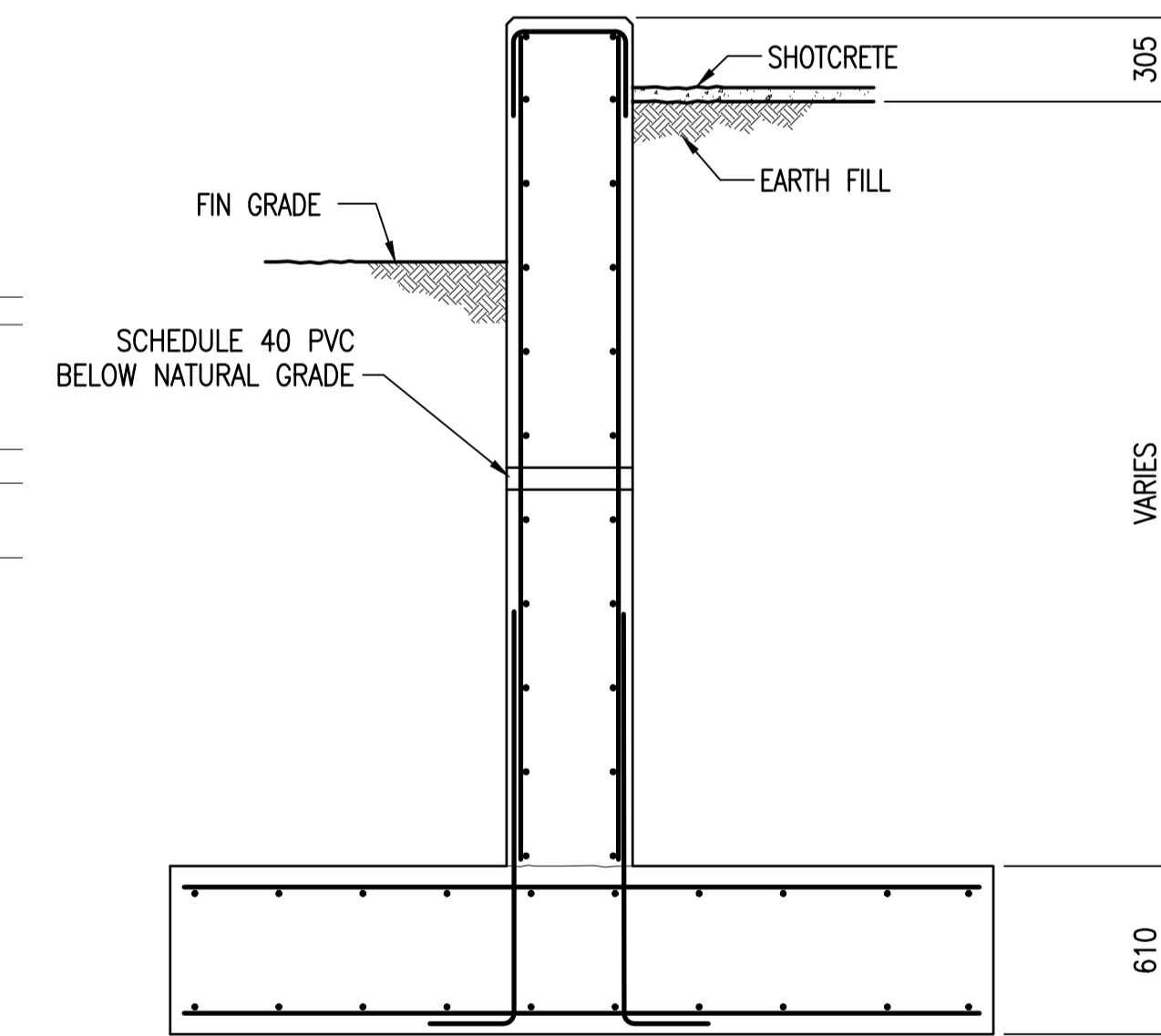
4 TYP FOOTING CORNER BAR DETAIL
S-401 S-401 SCALE: NONE



5 WALL/ROOF BONDING DETAIL
E-312 S-401 SCALE: 1:10

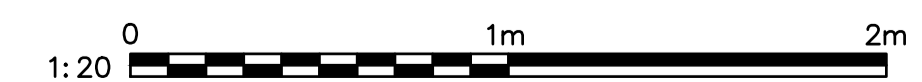


6 WALL/FOOTING BONDING DETAIL
E-312 S-401 SCALE: 1:10



7 RETAINING WALL SECTION
E-310 S-303 SCALE: 1:25

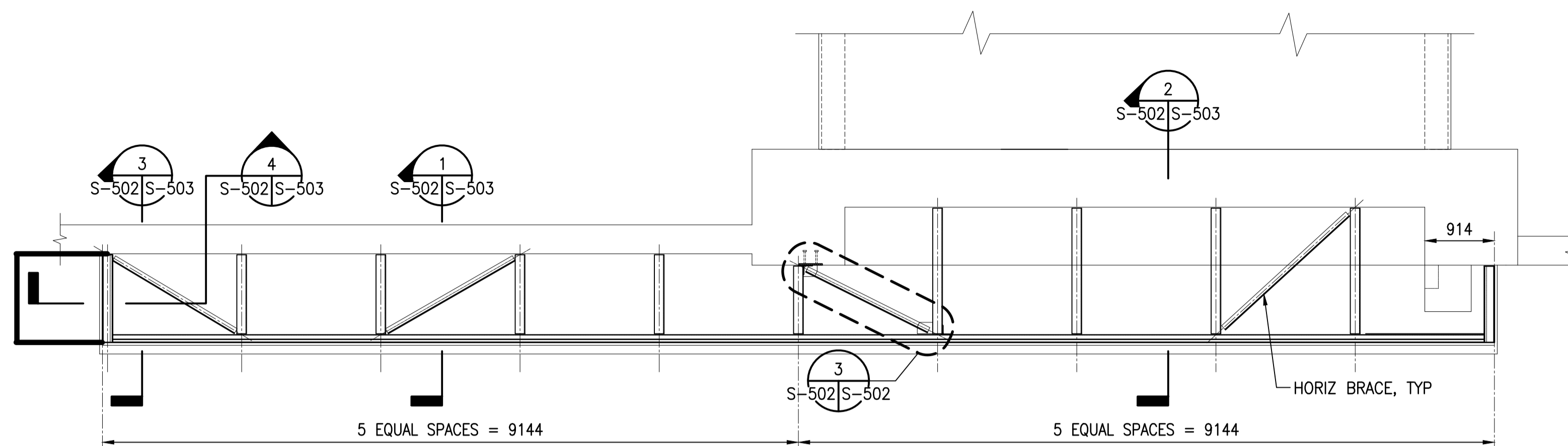
GRAPHIC SCALE:



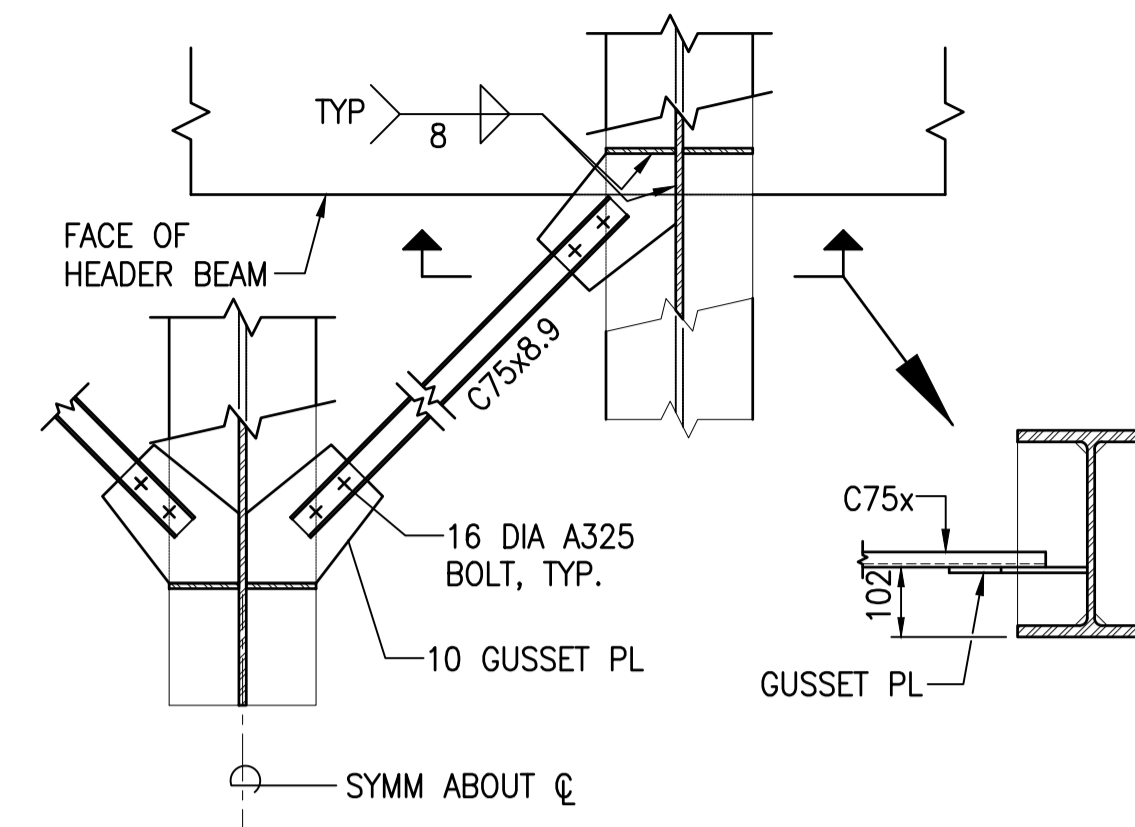
APPROVED	DATE	APP'R
FOR COMMANDER NAVFAC	ACTIVITY	DESCRIPTION
SATISFACTORY TO DATE	DESIGNER	DRW
DRW LSG	CHK LMM	
BRANCH MANAGER	EDN PRD DR	WILLIAM FORBES, P.E.
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC	NAVAL STATION
NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC	NOFOLK, VIRGINIA	
MODULAR STORAGE MAGAZINE		
FOUNDATION SECTIONS		
SCALE:	AS NOTED	
PROJECT NO.:	14063821	
CONSTR. CONTR. NO.	16 OF 53	
S-401		
NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017		

FILE NAME: z:\CSE\Magazine\NSM\New Standard NSM Revisions 2018\CADD\S-401.dwg LAYOUT NAME: S-401 PLOTTED: Tuesday, July 02, 2019 - 2:18pm USER: louis.gud

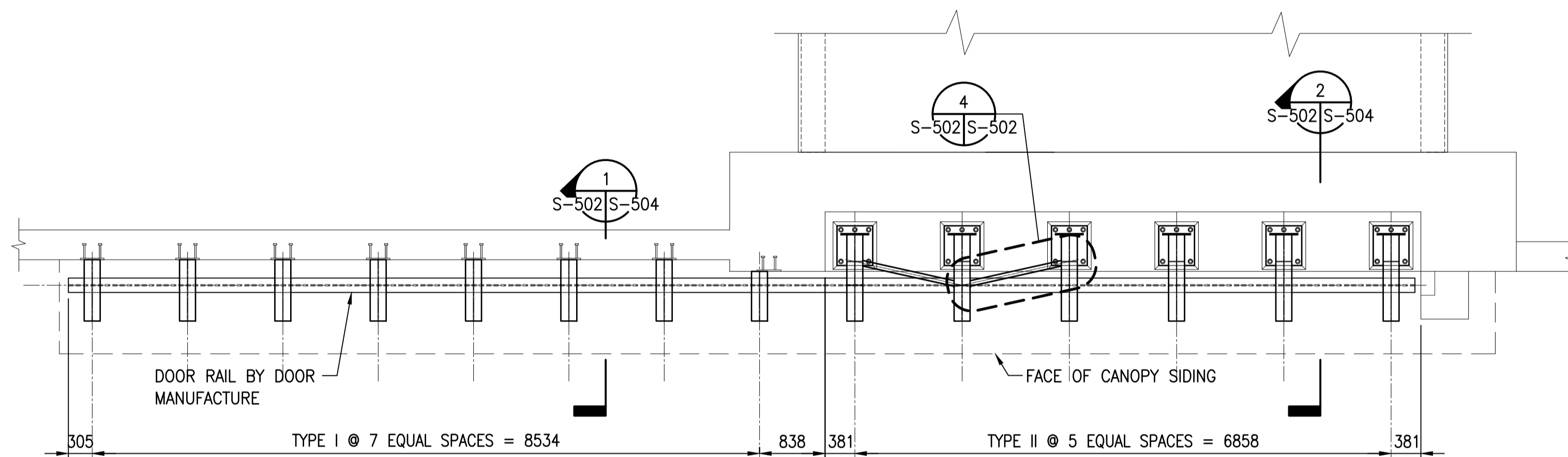
FILE NAME: J:\CSE\Magazine\NSM\Standards\NSM_Standards\2018\NAVY STANDARD 2018\CADD\S-502.dwg LAYOUT NAME: S-502 PLOTTED: Tuesday, July 02, 2019 - 2:18pm USER: louis.gud



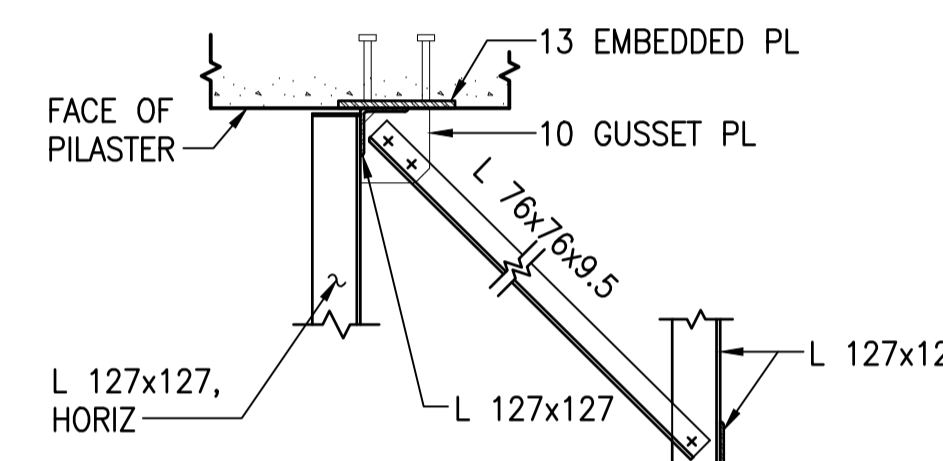
1 PARTIAL PLAN - CANOPY SUPPORT FRAMES
S-102 S-502 SCALE: 1:50



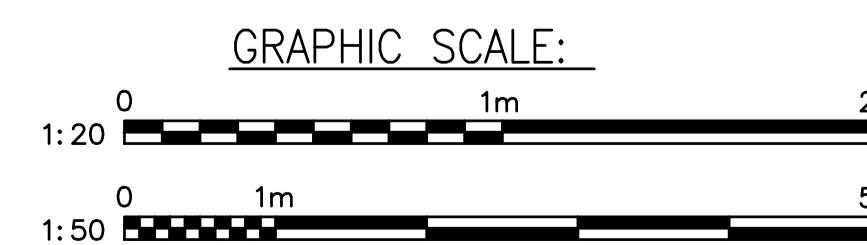
4 DETAIL
S-502 S-502 SCALE: 1:20



2 PARTIAL PLAN - DOOR RAIL SUPPORT BEAMS
S-502 S-502 SCALE: 1:50



NOTE: BOTTOM ELEVATION OF L76x BRACE = 5.979M
3 DETAIL
S-502 S-502 SCALE: 1:20



APPROVED	DATE	APP'R
FOR COMMANDER NAVFAC	ACTIVITY	DESCRIPTION
SATISFACTORY TO DATE	DATE	SCALE
DES <<CM/DM>>	DRW LSG	CHK LMM
BRANCH MANAGER	EGN PRD DR WILLIAM FORBES, P.E.	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC NORFOLK, VIRGINIA MODULAR STORAGE MAGAZINE CANOPY AND DOOR RAIL SUPPORT FRAMING PLANS AND DETAILS		
SCALE: AS NOTED		
EPROJECT NO.:		
CONSTR. CONTR. NO.:		
NAVFAC DRAWING NO. 14063823		
SHEET 18 OF 53		
S-502		
NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017		

1

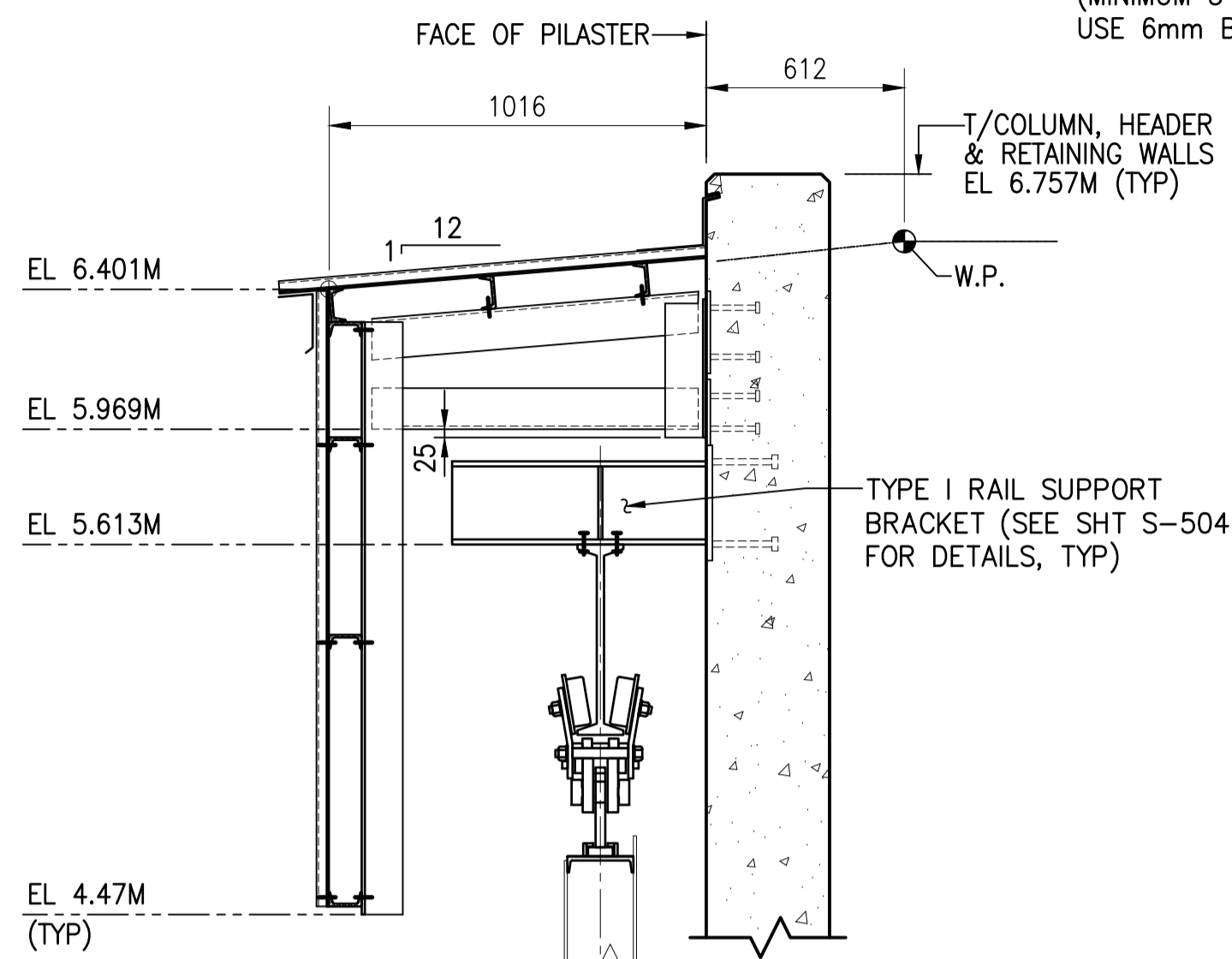
2

3

4

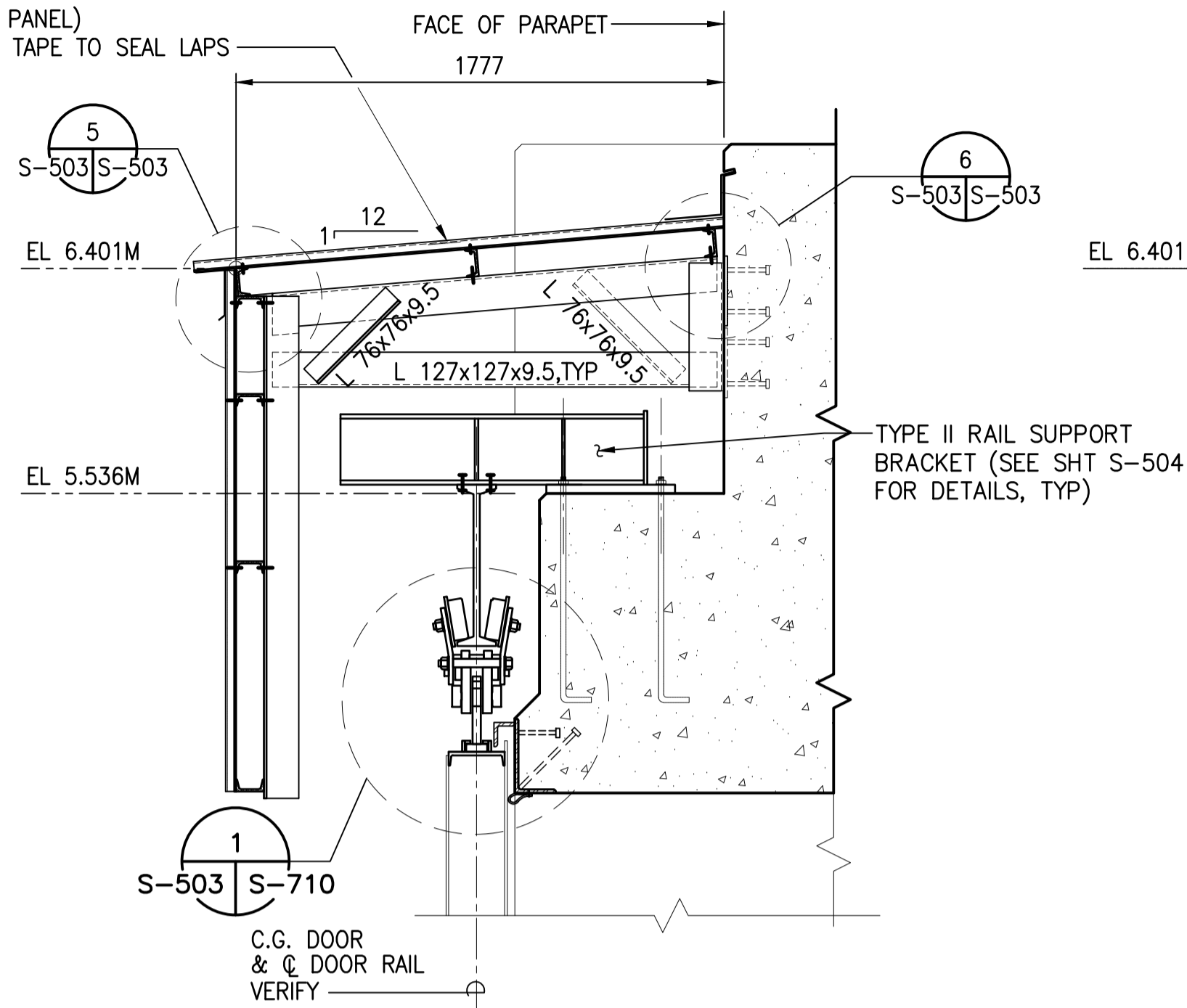
5

18 GAGE x 38 DEEP FACTORY FINISHED HI-RIB METAL ROOFING & SIDING FASTEN TO L's WITH #14 STAINLESS STEEL SCREWS & WASHERS AT EACH VALLEY (MINIMUM 5 PER PANEL) USE 6mm BUTYL TAPE TO SEAL LAPS

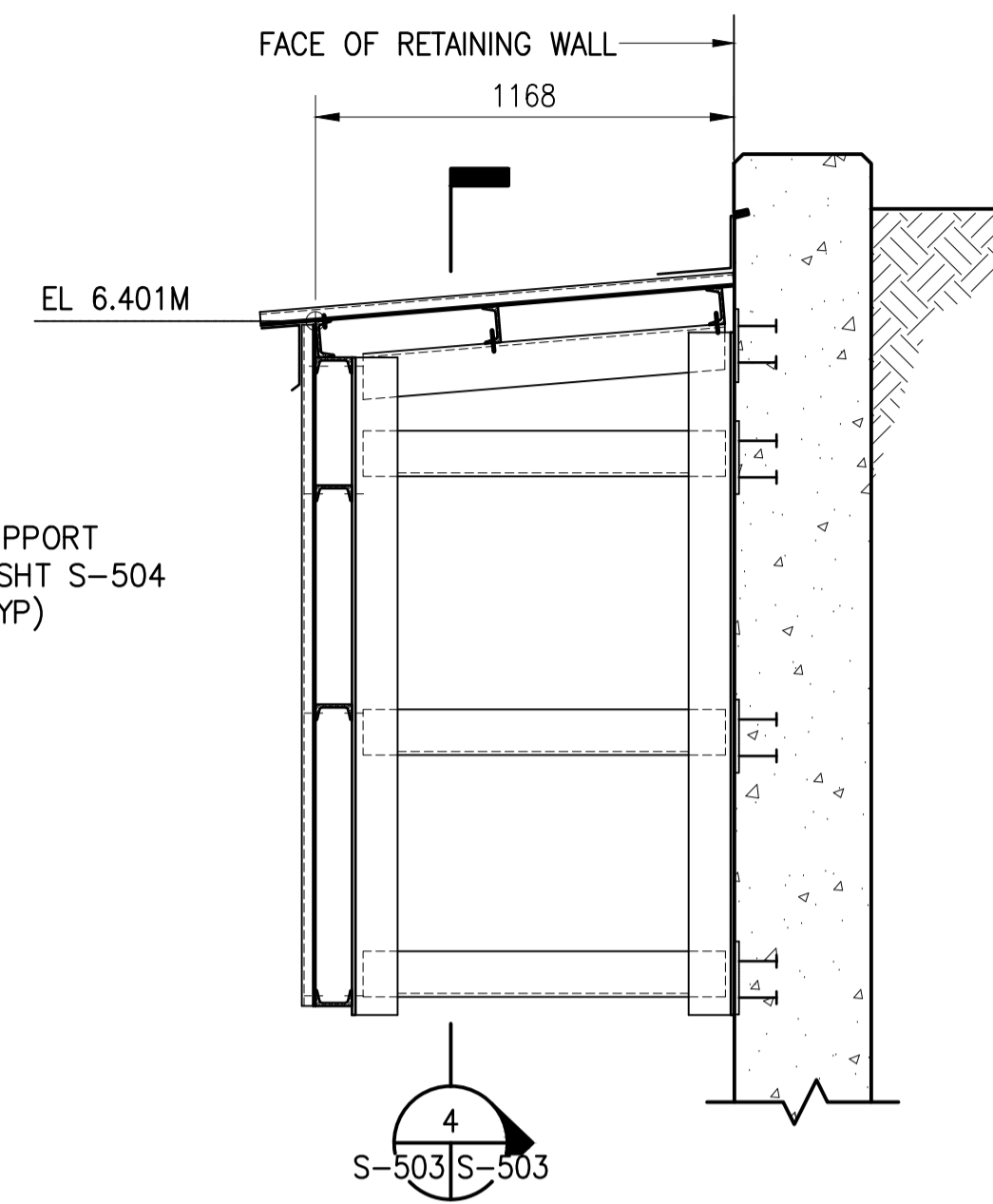


- NOTES:**
- ALL ANGLES TO BE 127x127x9.5, UNLESS NOTED OTHERWISE.
 - ALL PURLINS AND GIRTS TO BE C100x10.8, FASTENED TO ANGLES WITH TWO 16 DIAMETER, A325M BOLTS (TYP).
 - FOR SUPPORT BRACKET DETAILS, SEE DWG S-504.
 - THE DOOR MUST BE INSTALLED PLUMB FOR SMOOTH OPERATION.

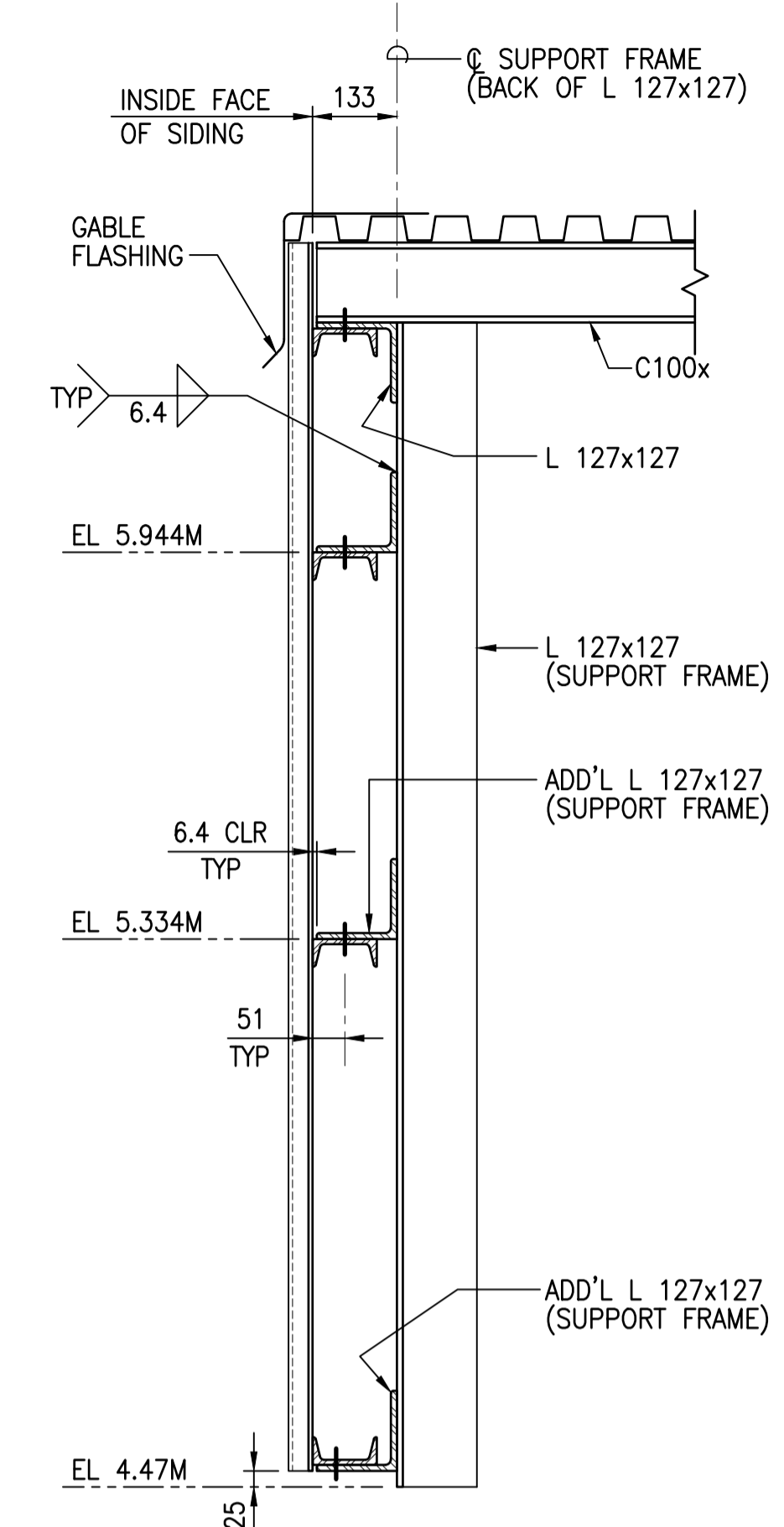
1 SECTION
S-502 | S-503 SCALE: 1:20



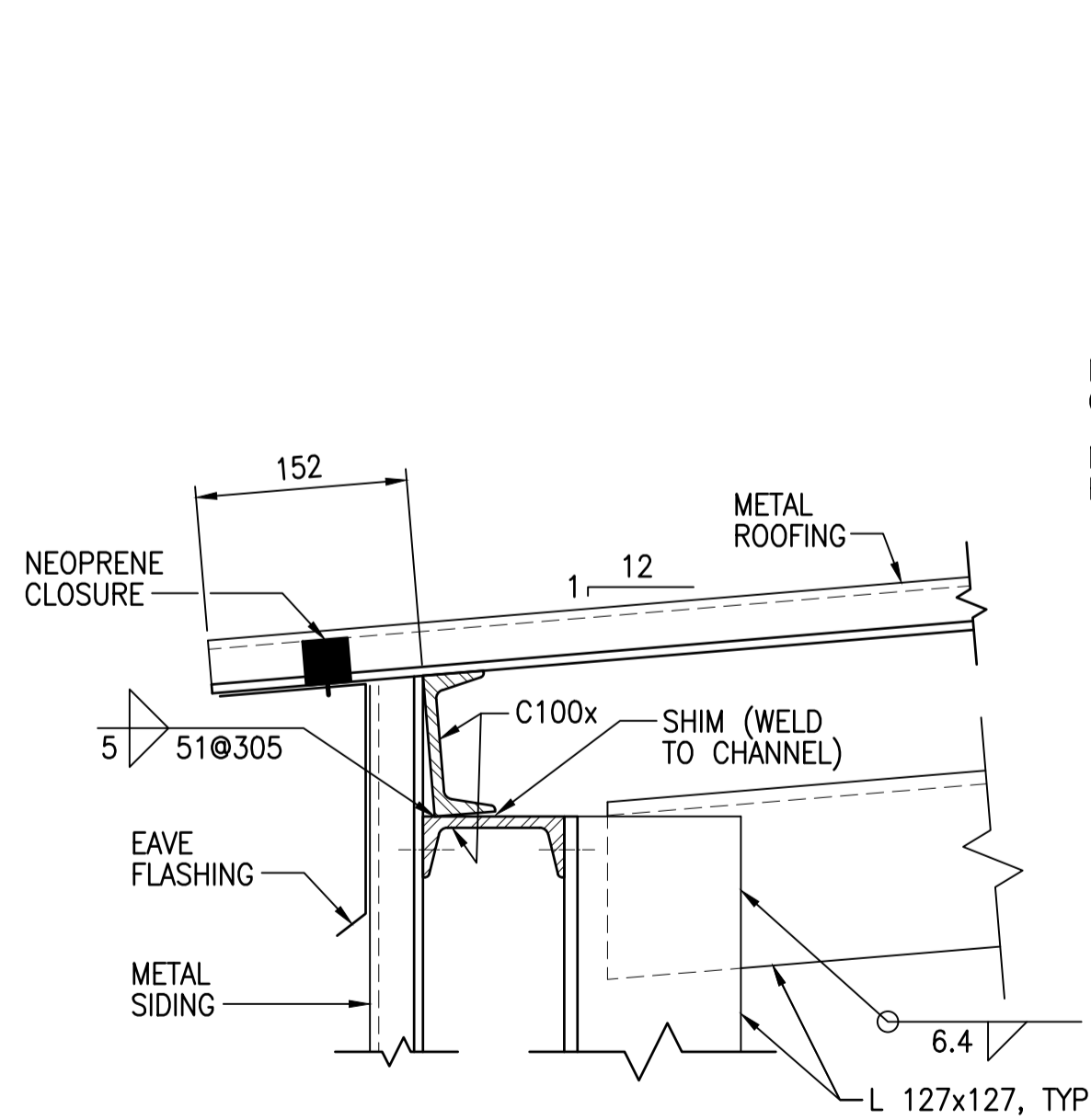
2 SECTION
S-502 | S-503 SCALE: 1:20



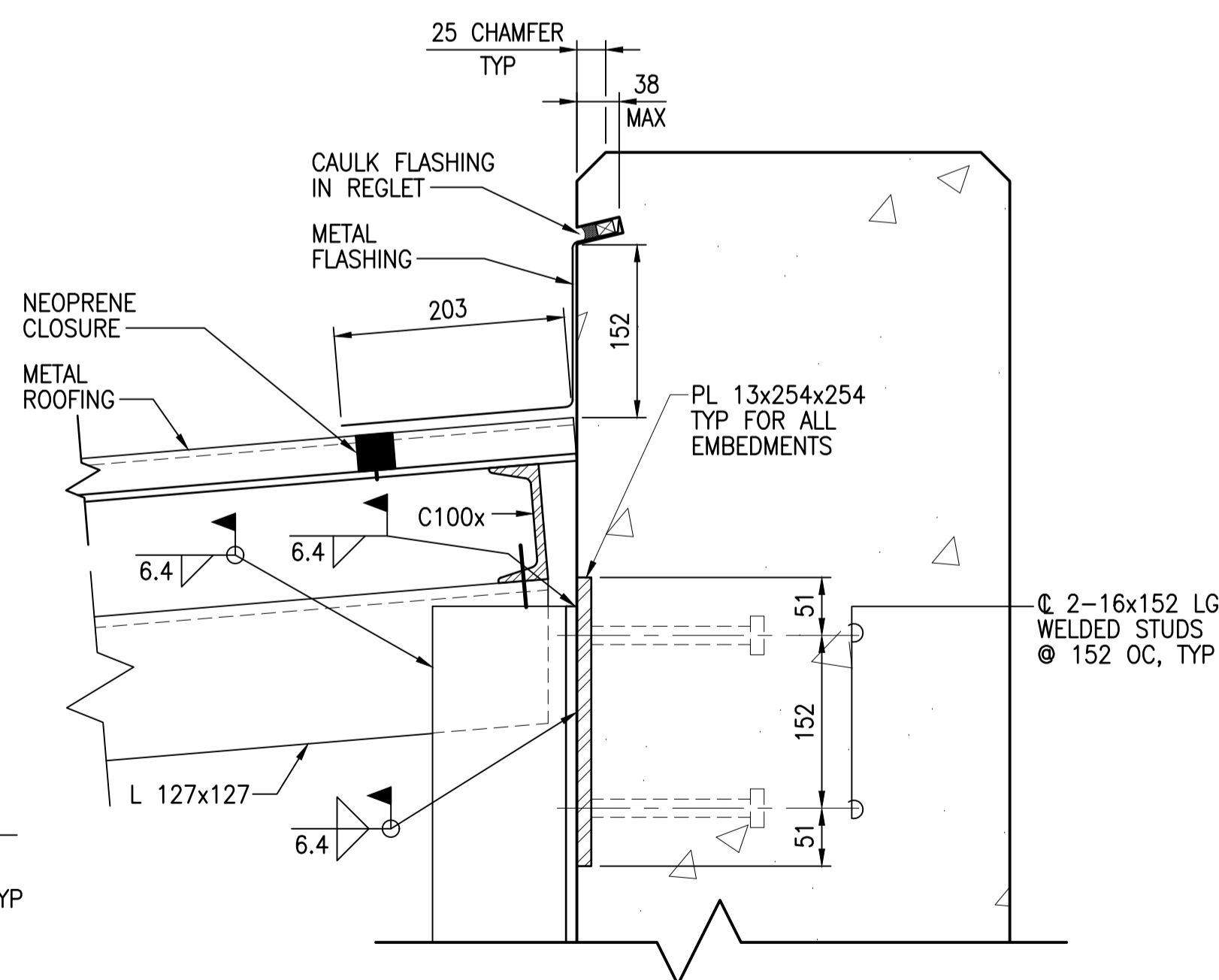
3 SECTION
S-502 | S-503 SCALE: 1:20



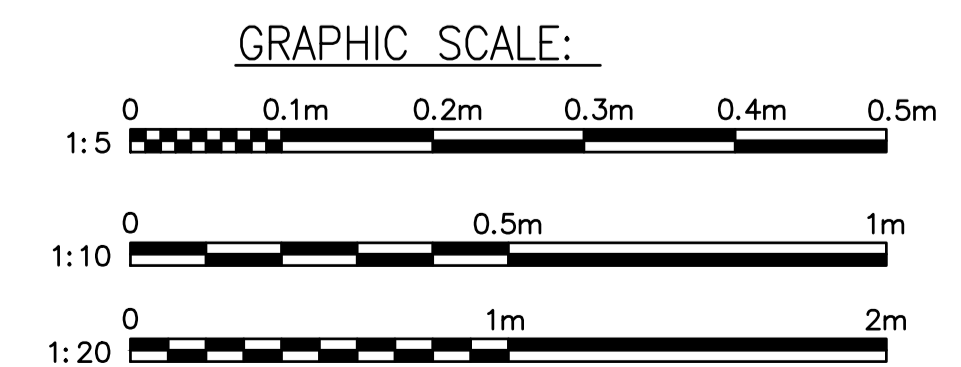
4 SECTION
S-503 | S-503 SCALE: 1:10



5 DETAIL
S-503 | S-503 SCALE: 1:5



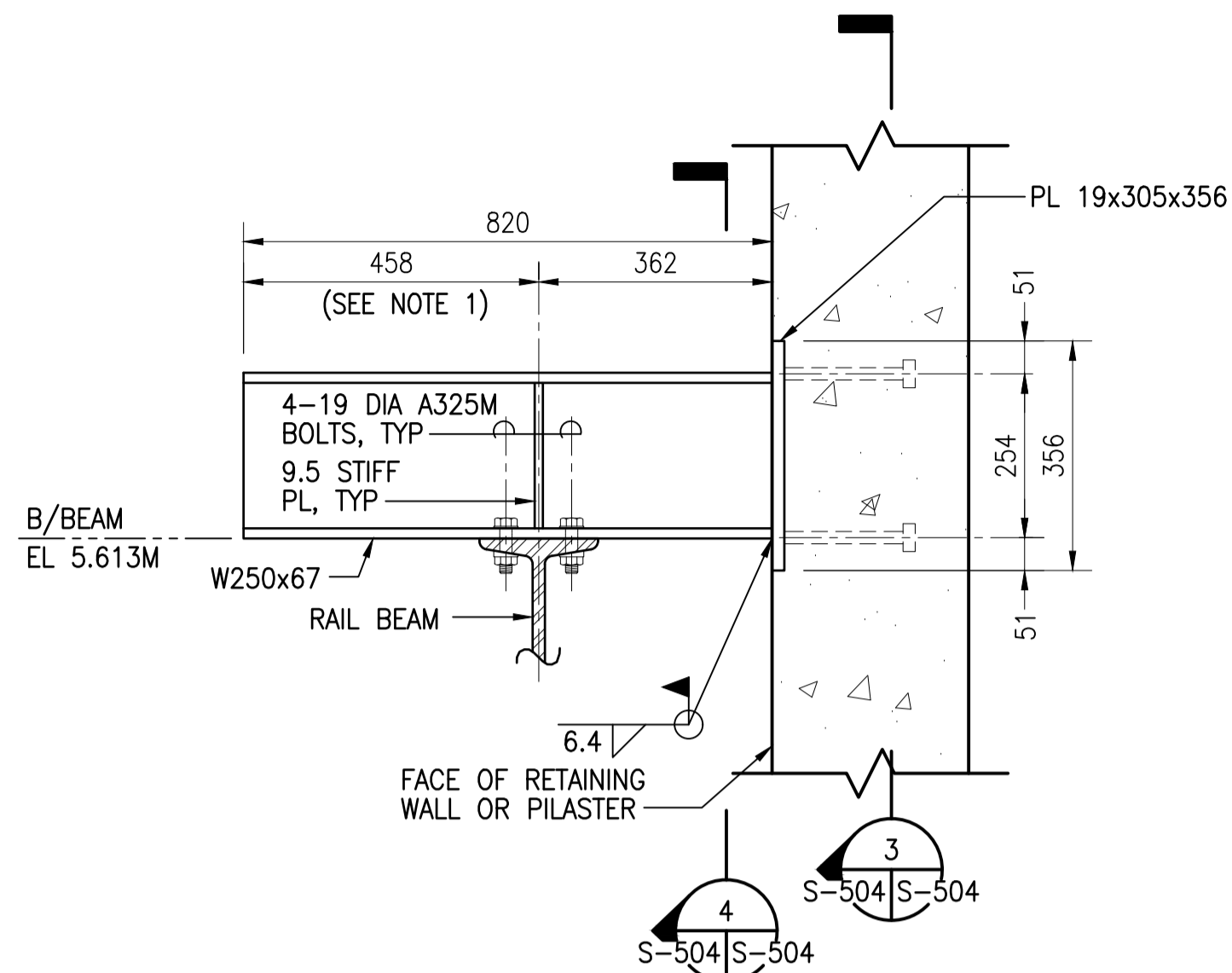
6 DETAIL
S-503 | S-503 SCALE: 1:5



APPROVED	DATE	APP'R
FOR COMMANDER NAVFAC		
ACTIVITY		
SATISFACTORY TO DATE		
DES	DRW	LSG
CHK		LMM
BRANCH MANAGER		
SGN PRD DR	WILLIAM FORBES, P.E.	
DEPARTMENT OF THE NAVY	NAVFAC	
NAVAL FACILITIES ENGINEERING COMMAND	ATLANTIC	
NAVAL STATION	NORFOLK, VIRGINIA	
MODULAR STORAGE MAGAZINE		
CANOPY SUPPORT DETAILS		
SCALE:	AS NOTED	
EPROJECT NO.:		
CONSTR. CONTR. NO.		
NAVFAC DRAWING NO.	14063824	
SHEET	19	OF 53
S-503		
NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017		

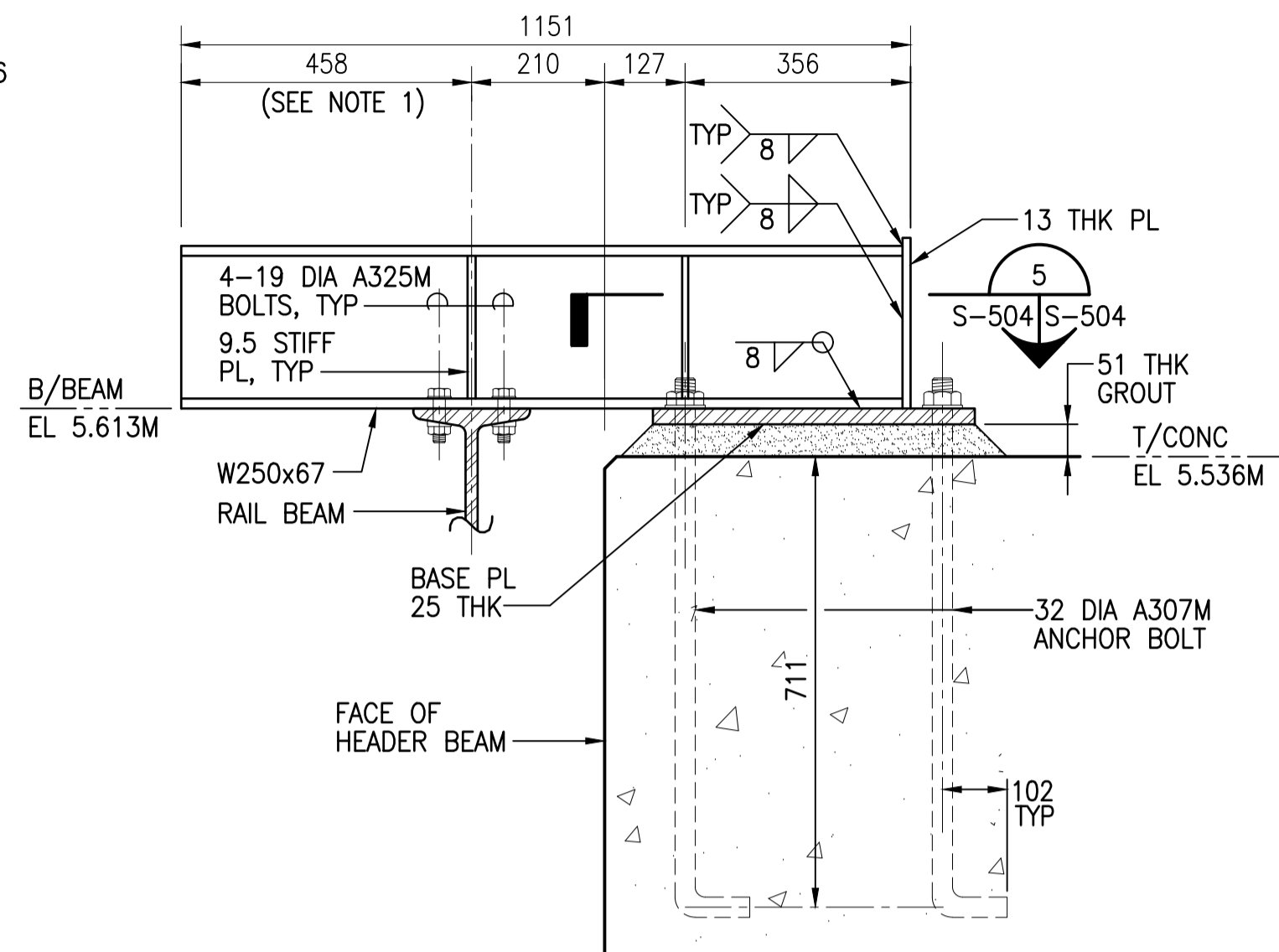
FILE NAME: J:\CSE\Magazine\NSM\Revisions 2018\NAVY STANDARD 2018\CADD\S-503.dwg LAYOUT NAME: S-503 PLOTTED: Tuesday, July 02, 2019 - 2:18pm USER: louis.gud

FILE NAME: z:\CSE\Magazine\NSM\Revisions 2018\NAVY STANDARD 2018\CADD\S-504.dwg LAYOUT NAME: S-504 PLOTTED: Tuesday, July 02, 2019 - 2:18pm USER: louis.gud



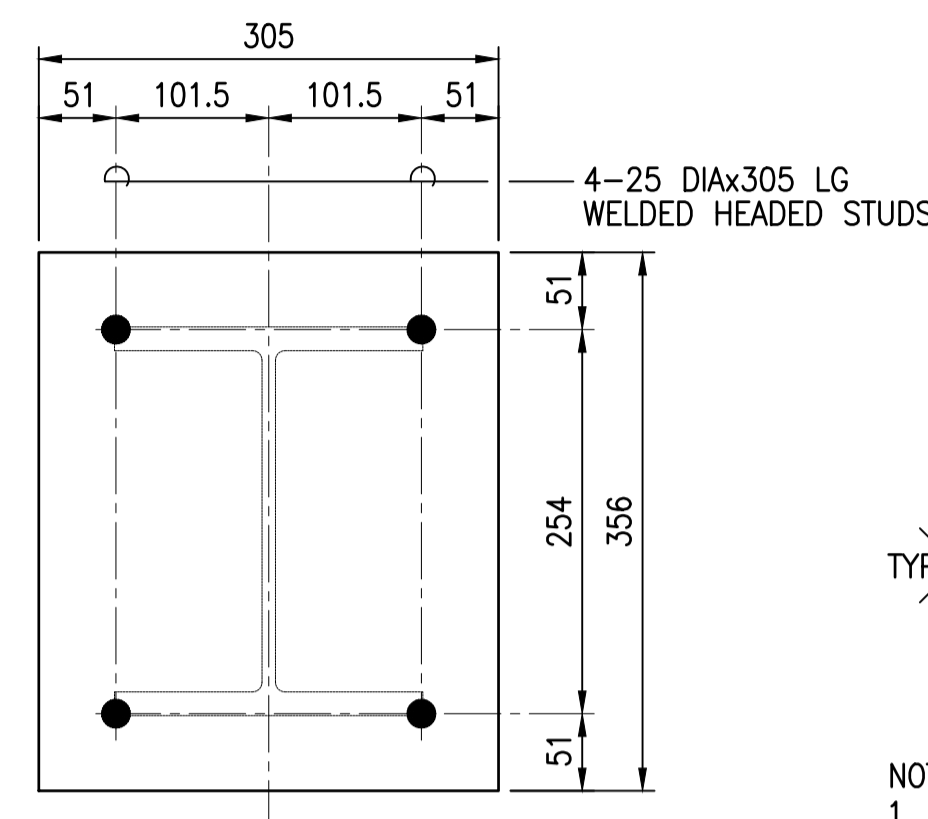
NOTE 1: LOCATION OF RAIL BEAM TO BE VERIFIED BY DOOR MANUFACTURER FOR CENTER OF GRAVITY AND DOOR CLEARANCES.

1 TYPE I RAIL SUPPORT BEAM
S-502 S-504 SCALE: 1:10

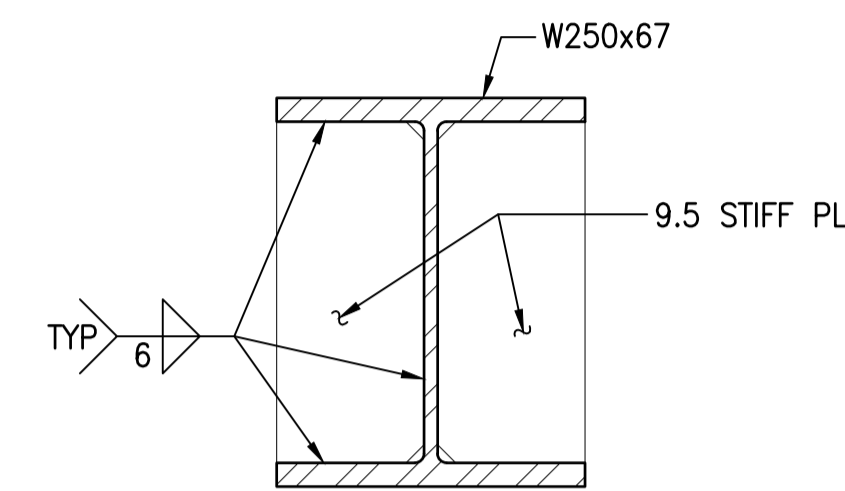


NOTE 1: LOCATION OF RAIL BEAM TO BE VERIFIED BY DOOR MANUFACTURER FOR CENTER OF GRAVITY AND DOOR CLEARANCES.

2 TYPE II RAIL SUPPORT BEAM
S-502 S-504 SCALE: 1:10

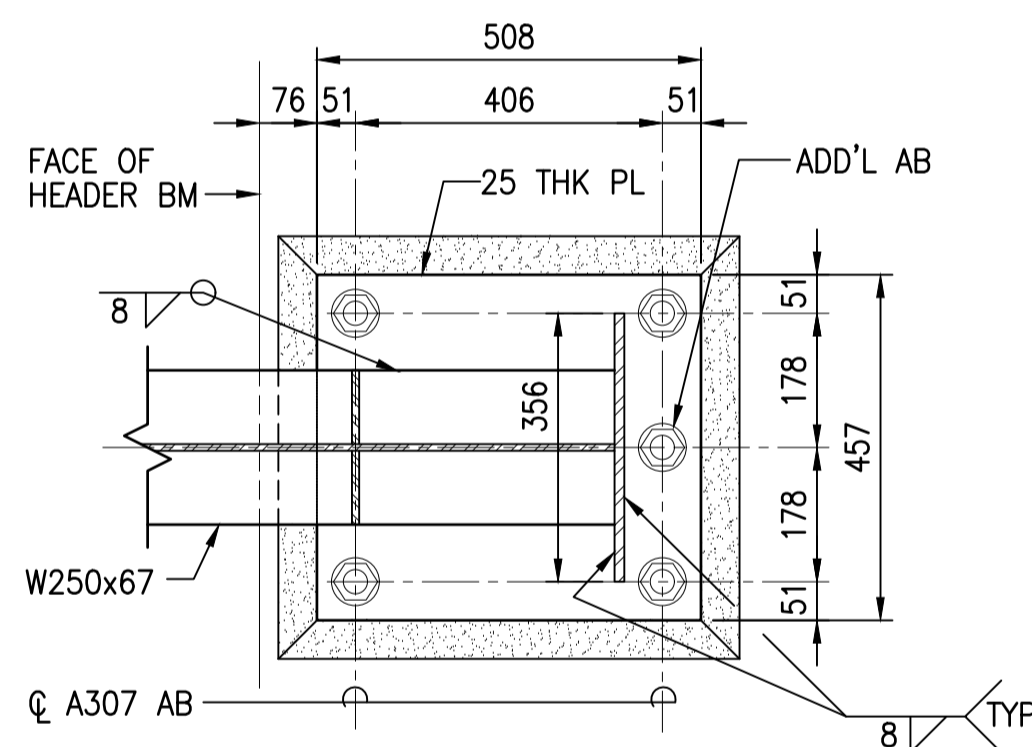


3 SECTION
S-504 S-504 SCALE: 1:5



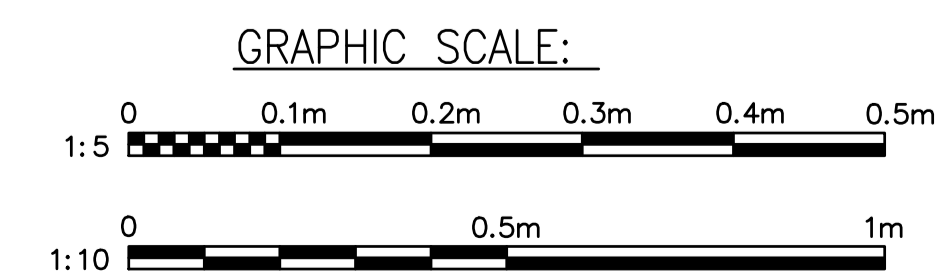
- NOTES:
- TROLLEY BEAM AND TROLLEY SUPPORT BOLT HOLES SHALL BE SLOTTED FOR ADJUSTMENT, ALL BOLTS SHALL BE A325 WITH LOCK & BEVEL WASHERS. COORDINATE WITH TROLLEY MANUFACTURER'S SPECS.
 - WELD TRACK BEAM AND SHIMS IN PLACE AFTER NECESSARY ADJUSTMENTS HAVE BEEN MADE USING BOLTS IN SLOTTED HOLES.
 - TRACK BEAM SUPPORT BRACKETS, BOLTS AND ANCHOR BOLT PROJECTIONS SHALL BE GALVANIZED.

4 SECTION
S-504 S-504 SCALE: 1:5

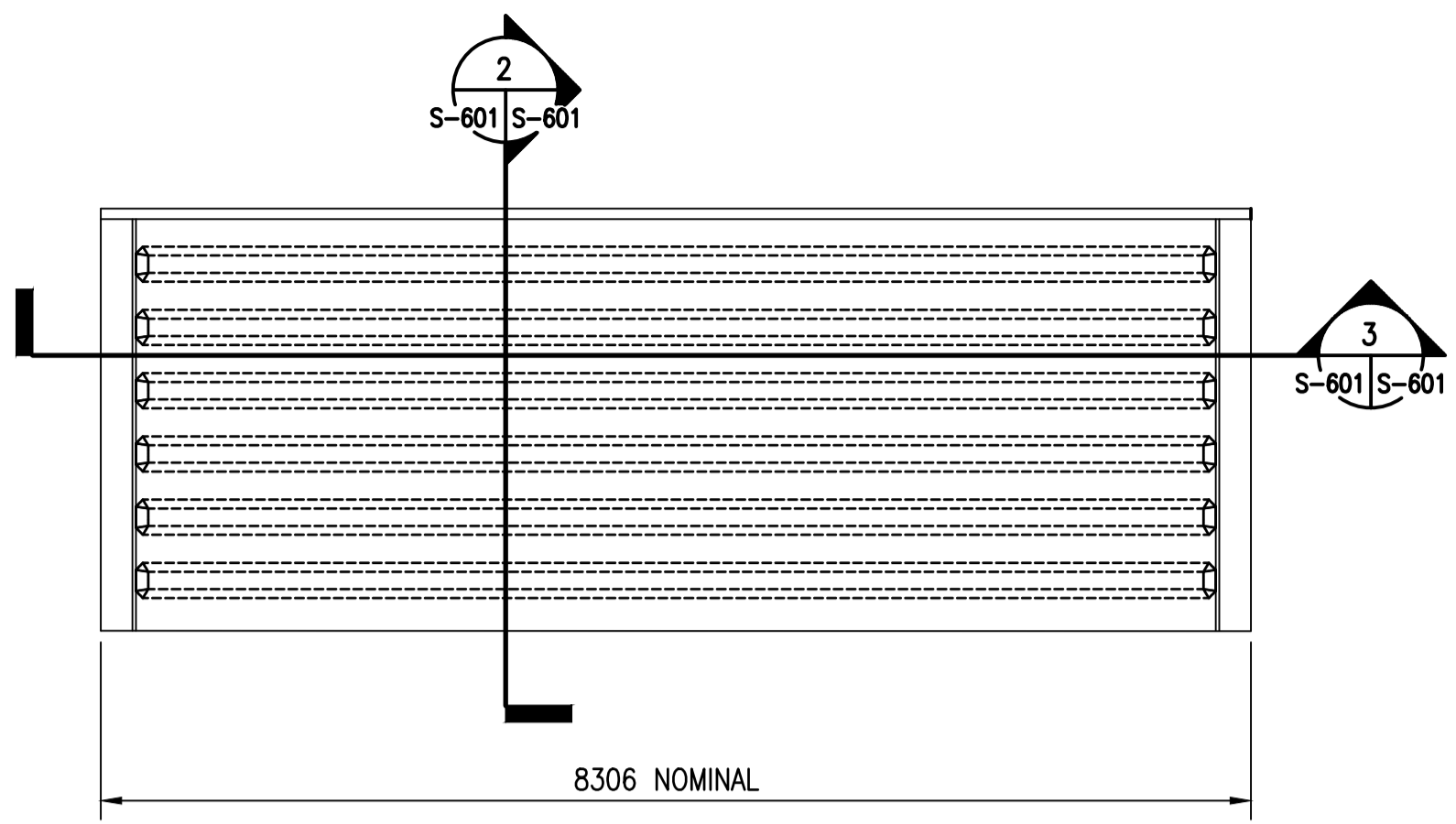


5 SECTION
S-504 S-504 SCALE: 1:10

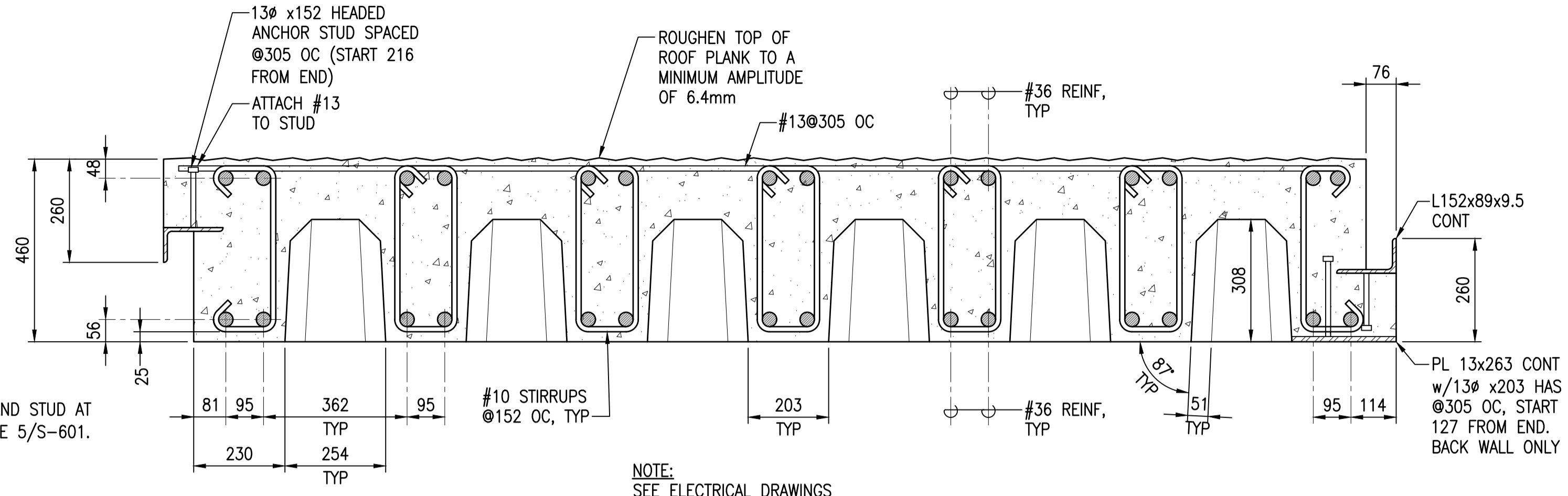
- NOTES:
- BOND ANCHOR BOLTS TO REINFORCING STEEL. SEE "ELECTRICAL BONDING & GROUNDING" NOTES ON S-002 AND SEE S-401 FOR THE REINFORCING STEEL BONDING REQUIREMENTS.
 - TROLLEY RAIL SUPPORT CANTILEVER CALC. FOR INFORMATION ONLY CONTRACTOR TO VERIFY $1/2$ OF DOOR WIDTH $222.25\text{mm}/2 = 111.125\text{mm}$ MINUS 19mm OFFSET TO BACK SIDE OF DOOR = 92mm (TO BE VERIFIED, DOOR CENTER OF GRAVITY OFFSET) PLUS 28mm DOOR GAP = 120mm PLUS 90mm BUMP OUT @ HEADWALL = 210mm PLUS 150mm RETAINING WALL OFFSET = 360mm (TROLLEY RAIL SUPPORT CANTILEVER SHALL NOT EXCEED 361.95mm)
 - AT HEAD WALL AND LEFT COLUMN CONDITION = $360\text{mm} - 150\text{mm} = 210\text{mm}$
 - TROLLEY BEAM AND TROLLEY SUPPORTS BOLT HOLES MUST BE SLOTTED FOR ADJUSTMENT, ALL BOLTS MUST BE A325 WITH LOCK & BEVEL WASHERS. COORDINATE WITH TROLLEY MANUFACTURER'S SPECS.
 - WELD TRACK BEAM AND SHIMS IN PLACE AFTER NECESSARY ADJUSTMENTS HAVE BEEN MADE USING BOLTS IN SLOTTED HOLES
 - TRACK BEAM, SUPPORT BRACKETS, BOLTS, AND ANCHOR BOLT PROJECTIONS MUST BE GALVANIZED.



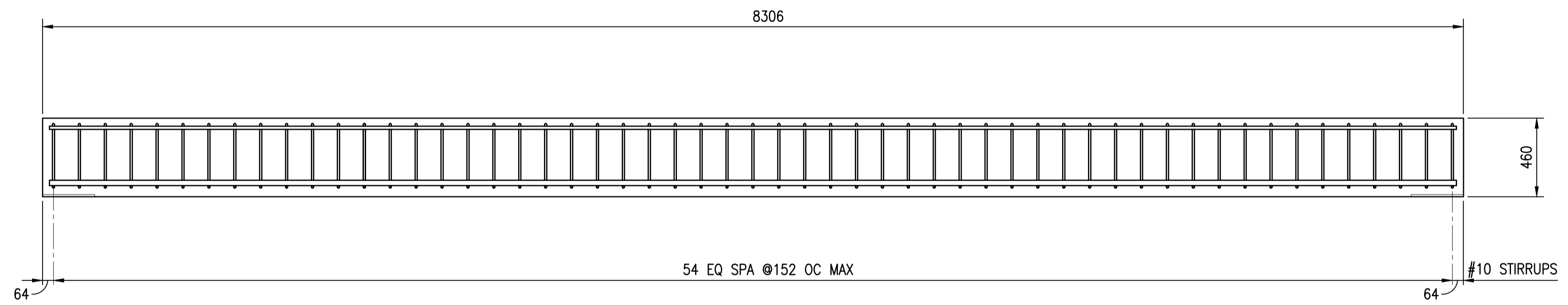
APPROVED	DATE	APP'R
FOR COMMANDER NAVFAC	ACTIVITY	DESCRIPTION
SATISFACTORY TO DATE	DESIGNER	CHK
DRW	LSG	LMM
BRANCH MANAGER	SGN PRD DIR	WILLIAM FORBES, P.E.
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC NORFOLK, VIRGINIA MODULAR STORAGE MAGAZINE DOOR RAIL SUPPORT DETAILS		
SCALE:	AS NOTED	
EPROJECT NO.:		
CONSTR. CONTR. NO.:		
NAVFAC DRAWING NO.:	14063825	
SHEET	20	OF 53
S-504		
NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017		



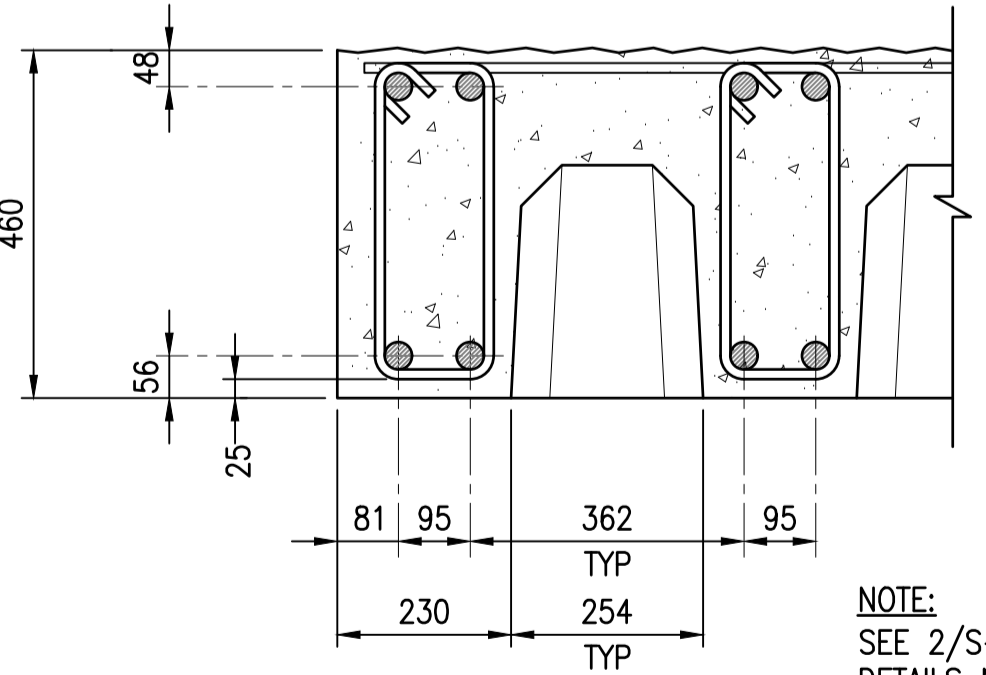
1 ROOF PANEL PLAN
S-102/S-601 SCALE: 1:50



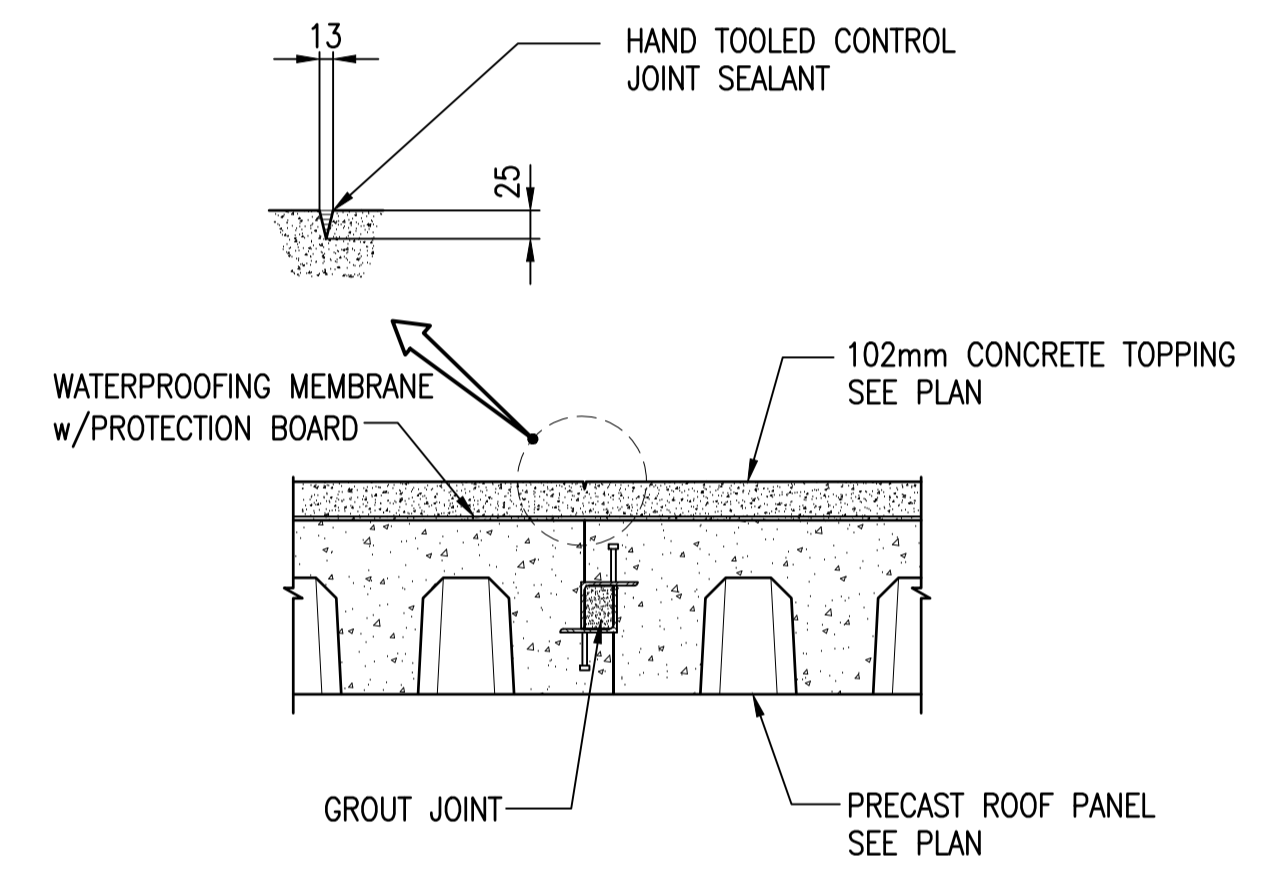
2 ROOF PANEL SECTION
S-601/S-601 SCALE: 1:10



3 ROOF PANEL SECTION
S-601/S-601 SCALE: 1:20

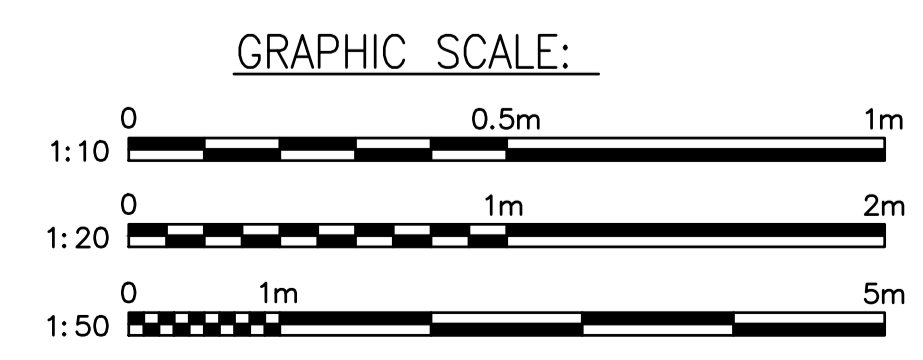


5 ROOF PANEL AT HEADWALL
S-601/S-601 SCALE: 1:10



4 ROOF PANEL JOINT SECTION
S-102/S-601 SCALE: 1:20

- GENERAL NOTES:**
- PANELS MAY BE PRECAST BY A MANUFACTURER SPECIALIZING IN PRECAST PRODUCTS OR PRECAST AT THE JOB SITE.
 - WIRE TIE REINFORCING BAR AS NEEDED, USING NO. 13 WIRE.
 - A CLASS C FINISH IS REQUIRED FOR EXPOSED FORMED SURFACES OF ROOF PANELS. A CLASS D FINISH IS REQUIRED FOR SURFACES WHICH WILL BE BELOW GRADE OR NOT EXPOSED TO VIEW AFTER FINAL ASSEMBLY. ROUGHEN TOP OF ROOF PLANK TO A MINIMUM AMPLITUDE OF 6.4MM.
 - SIZE, LOCATION, AND QUANTITY OF LIFTING INSERTS TO BE DETERMINED BY CONTRACTOR.
 - VERIFY LIGHTNING PROTECTION REQUIREMENTS w/ ELECTRICAL DRAWINGS.



APPROVED	DATE	APP'R
DESCRIPTION	DATE	APP'R
MODULAR STORAGE MAGAZINE PRECAST ROOF PANEL DETAILS		
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC NORFOLK, VIRGINIA NAVAL STATION		
SCALE: AS NOTED EPROJECT NO.: CONSTR. CONTR. NO.: NAVFAC DRAWING NO.: 14063826 SHEET 21 OF 53 S-601		
<small>NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017</small>		

FILE NAME: J:\CSE\Magazine\NSM\Revisions 2018\NAVY STANDARD 2018\CADD\S-601.dwg LAYOUT NAME: S-601 PLOTTED: Tuesday, July 02, 2019 - 2:18pm USER: louis.gud

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DOOR AND MISC METAL PAINT SPEC:

ALL PAINTING SHALL COMPLY WITH UFGS 09.97.13.27
SHOP PAINTING: SSPC QP3
FIELD PAINTING: SSP QP1 + QS1
COLOR: LIGHT GRAY

- A. PREPARATION:
 1. SLAG REMOVAL FROM ALL WELDING PRIOR TO CLEANING PER SP 0178
 2. SOLVENT CLEAN TO SSPC SP1
 3. BLAST CLEAN TO SSPC SP10

- B. PAINT SYSTEM: SYSTEM DRY FILM THICKNESS TO BE 12 MILS MINIMUM
GALVANIZED METALS:
 1. PRIMER: MPI 101
 2. EPOXY INTERMEDIATE COAT: MPI 108
 3. POLYURETHANE TOP COAT: MPI 72

- NON-GALVANIZED METALS:
 1. PRIMER: MPI 20
 2. EPOXY INTERMEDIATE COAT: MPI 108
 3. POLYURETHANE TOP COAT: MPI 72

- C. SOLVENT CLEAN SURFACE TO BE COATED PRIOR TO ABRASIVE BLASTING IN ACCORDANCE WITH SSPC-SP1.

- D. DRY ABRASIVE BLAST TO NEAR WHITE FINISH IN ACCORDANCE WITH SSPC-SP10. BLAST PROFILE SHALL BE 1-3 MILS TOOTH HEIGHT.

- E. PRIMER COAT: ABRASION RESISTANT INORGANIC ZINC SILICATE PRIMER (3-5 MILS). SSPC PAINT 20, TYPE IC, LEVEL 1, WITH AT LEAST 85% ZINC IN DRY FILM.

- F. INTERMEDIATE COAT: HIGH SOLIDS EPOXY COATING (3-5 MILS). MPI #108

- G. TOP COAT HIGH SOLIDS POLYURETHANE COATING (3-5 MILS) MPI #72

- H. TOTAL COATING DRY FILM THICKNESS (DFT): 12 MILS

ALL SURFACES OF ALL DOOR COMPONENTS SHALL BE SOLVENT CLEANED, DRY ABRASIVE BLASTED, AND ZINC RICH PRIMER COATED. PRIOR TO FULLY ASSEMBLING OR FABRICATING DOOR, CLEAN AND PRIMER SURFACES THAT WILL BECOME INACCESSIBLE AFTER DOOR IS FULLY ASSEMBLED. EPOXY INTERMEDIATE AND TOP COATS NEED ONLY BE APPLIED TO THE EXTERIOR SURFACES OF THE FULLY ASSEMBLED DOOR.

NOTES:

1. UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN MILLIMETERS.
2. INTERPRET WELDING SYMBOLS PER ANSI/AWS A2.4. ALL WELDING SHALL BE PER ANSI/AWS D1.1.
3. PLATES, ITEMS 1 AND 2 MAY BE SIZED DIFFERENTLY TO REDUCE THE NUMBER OF SEAMS, 3 SEAMS MAXIMUM SHOWN. ALL SEAMS SHALL BE CENTERED OVER VERTICAL STIFFENERS.
4. FINISH: TREAT ALL SURFACE TO RECEIVE PAINT. APPLY ONE COAT OF POLYURETHANE BASED TOP COAT.
SEE DOOR AND MISC METAL PAINT SPEC THIS SHEET
5. DOOR SHALL BE FILLED WITH 50.8 (2.0") LIGHTWEIGHT CONCRETE.
6. DOOR WITH CONCRETE FILL: 14,586kg (32,157LBS). DOOR MANUFACTURER TO VERIFY DOOR WEIGHT, CENTER OF GRAVITY AND TROLLEY HANGER SUPPORT OFFSET.
7. THESE DOOR DRAWINGS HAVE BEEN APPROVED BY THE DDESB FOR CONSTRUCTION. THERE SHALL BE NO DEVIATION FROM THESE DOOR DRAWINGS. ANY REVISION AND OR CHANGES MUST BE REVIEWED AND APPROVED BY THE CONTRACTING OFFICER AND MAY RESULT IN THE REVIEW AND APPROVAL BY THE DDESB.
8. THE DOOR MANUFACTURER SHALL BE RESPONSIBLE FOR THE MANUFACTURING OF SLIDING STEEL SECURITY DOORS, SUPPORTS, TROLLEY, TRENCH, PILASTER POCKET AND OPERATING SYSTEMS AND SHALL FABRICATE THE DOOR FROM START TO FINISH IN A CONTROLLED ENVIRONMENT GUARANTEEING QUALITY CONTROL WITHIN SPECIFICATIONS AND TOLERANCES PROVIDED AND THE ABILITY TO SHIP THE DOORS TO DESIRED LOCATION IN ONE COMPLETE PIECE WITHOUT DAMAGE.
9. THE DOOR MANUFACTURER SHALL BE RESPONSIBLE FOR THE FABRICATION AND INSTALLATION OF THE SLIDING STEEL SECURITY DOORS, SUPPORTS, TROLLEY, TRENCH AND OPERATING SYSTEMS.
10. THE DOOR MANUFACTURER SHALL INSTALL THE DOOR PER THE DOOR INSTALLATION GUIDELINES TO READY FOR THE INSTALLATION OF THE BOLTWORKS LOCKING SYSTEM.
11. THE DOOR MANUFACTURER SHALL BE RESPONSIBLE FOR FIXING AND DAMAGE IN SHIPPING AND/OR INSTALLATION AND WHEN DOOR INSTALLATION IS COMPLETED SHALL TOUCH UP ANY DEFICIENCIES IN THE PAINT COATING TO GUARANTEE THE PROTECTION OF ALL METAL COMPONENTS FROM THE ELEMENTS.
12. FABRICATION OF DOORS SHALL CONFORM TO AISC 360 AND AISC 303. THE ASSEMBLED DOOR SHALL BE FABRICATED TO WITHIN 6mm FLATNESS IN EITHER DIRECTION.

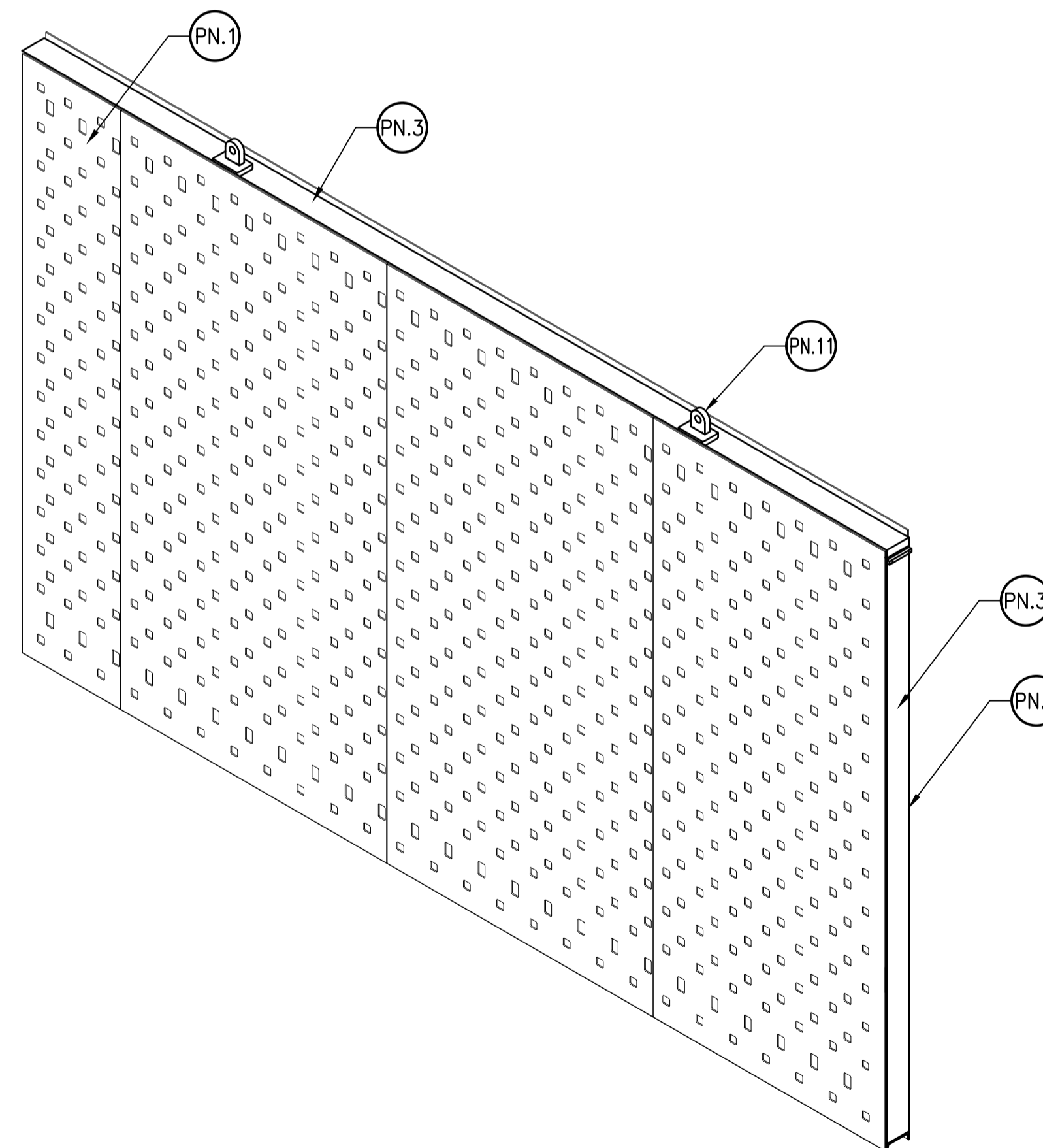
HIGH SECURITY DOOR LIGHTWEIGHT CONCRETE FILL				
MATERIAL	AMOUNT	UNITS	SPECIFIC GRAVITY	ASTM
LIGHTWEIGHT AGGREGATE	694	kg	1.38	C331/C331M
CEMENT TYPE II	327	kg	3.15	C150
WATER	143	kg	1	C1602
SILICA FUME	37	kg	2.2	C1240
SUPER PLASTICIZER - TYPE A	202	g*	1.27	C494/C494M
POLYETHYLENE FIBERS - TYPE III	0.16	kg	0.855	C1116/C1116M
CARBON FIBERS - TYPE III	0.16	kg	0.855	C116/C116M
TOTAL VOLUME	0.76	m ³	m ³	
*g/45.4 kg OF CEMENTITIOUS MATERIAL				

CONCRETE MATERIAL CHARACTERIZATION REQUIREMENTS				
SLUMP	50+6	kg	-	C143/C143M
DENSITY - UNIT WEIGHT	602-762	kg/m ³	-	C138/C138M
STRENGTH (28 DAY MINIMUM)	27.6	MPa	-	C78

LIGHTWEIGHT CONCRETE NOTES:

1. LIGHTWEIGHT AGGREGATES SHOULD BE DRY.
2. ADJUST WATER AMOUNT TO +/- 10 kg SO THAT MIX HOLDS SHAPE WHEN FORMED INTO A BALL IN THE HAND.
3. MIX CAN BE SPLIT, DOUBLED, ETC. FOR VOLUME NEEDED.
4. MIX PROCEDURE:
 - A. WEIGH OUT ALL MATERIALS.
 - B. IN A SEPARATE CONTAINER, COMBINE AND MIX HALF OF WATER, PLASTICIZER AND ALL FIBERS.
 - C. IN ANOTHER SEPARATE CONTAINER, COMBINE AND MIX SILICA FUME AND CEMENT.
 - D. POUR WATER WITH PLASTICIZER AND ALL FIBERS INTO MIXER.
 - E. POUR LIGHTWEIGHT FINE AGGREGATE INTO MIXER.
 - F. SLOWLY ADD SILICA FUME AND CEMENT TO MIXER.
 - G. ADD REMAINING WATER ADJUSTING AS NECESSARY (NOTE 2).
 - H. ALLOW TO MIX FOR AT LEAST 10 MINUTES.
 - I. WHEN MIX IS READY, POUR IN TO DOOR CAVITIES OVER REBAR, TO PRESCRIBED DEPTH. ENSURE MIX FILLS ALL AREAS BEHIND REBAR, VIBRATE AS NECESSARY, NO VOIDS ALLOWED.
5. ALLOW CONCRETE TO CURE FOR 14 DAYS BEFORE MOVING DOOR AND 28 DAYS BEFORE WELDING FRONT PANELS ONTO DOOR.
6. QUESTIONS CAN BE REFERRED TO NAVFAC EXWC DOD LOCK PROGRAM, AND SECURITY ENGINEERING DIV CI-8.

DOOR PARTS LIST				
PART NO. (PN)	QUANTITY	DESCRIPTION	MATERIAL	
1	4	FRONT PLATE 9.5mm THICK	A36 LOW CARBON STEEL	
2	4	REAR PLATE 9.5mm THICK	A36 LOW CARBON STEEL	
3	4	C CHANNEL C200x27.9	A36 LOW CARBON STEEL	
4	25	VERTICAL STIFFENER 9.5mm THICK	A36 LOW CARBON STEEL	
5	15	HORIZONTAL STIFFENER 9.5mm THICK	A36 LOW CARBON STEEL	
6	690	TAB, 82.5x82.5x19.05x88.9mm LONG ANGLE	A36 LOW CARBON STEEL	
7	50	TAB, 82.5x82.5x19.05x127mm LONG ANGLE	A36 LOW CARBON STEEL	
8	1196	#3 (9.5mm) REBAR, VARIOUS LENGTHS	A615 LOW CARBON STEEL	
11	2	LIFT PADEYE	A572 GRADE 50 PLATE	



**DOOR ISOMETRIC WITH
INTERNAL REBAR/CONCRETE**

1
S-701 S-701 SCALE: NONE

APPROVED	DATE
FOR COMMANDER NAVFAC	
ACTIVITY	
SATISFACTORY TO	DATE
DES	DRW LSG CHK LMM
BRANCH MANAGER	
SGN PRD DR	WILLIAM FORBES, P.E.
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC NORFOLK, VIRGINIA NAVAL STATION	
MODULAR STORAGE MAGAZINE DOOR ELEVATION, NOTES AND SCHEDULES	
SCALE:	AS NOTED
EPROJECT NO.:	
CONSTR. CONTR. NO.:	
NAVFAC DRAWING NO.:	14063827
SHEET	22 OF 53
S-701	

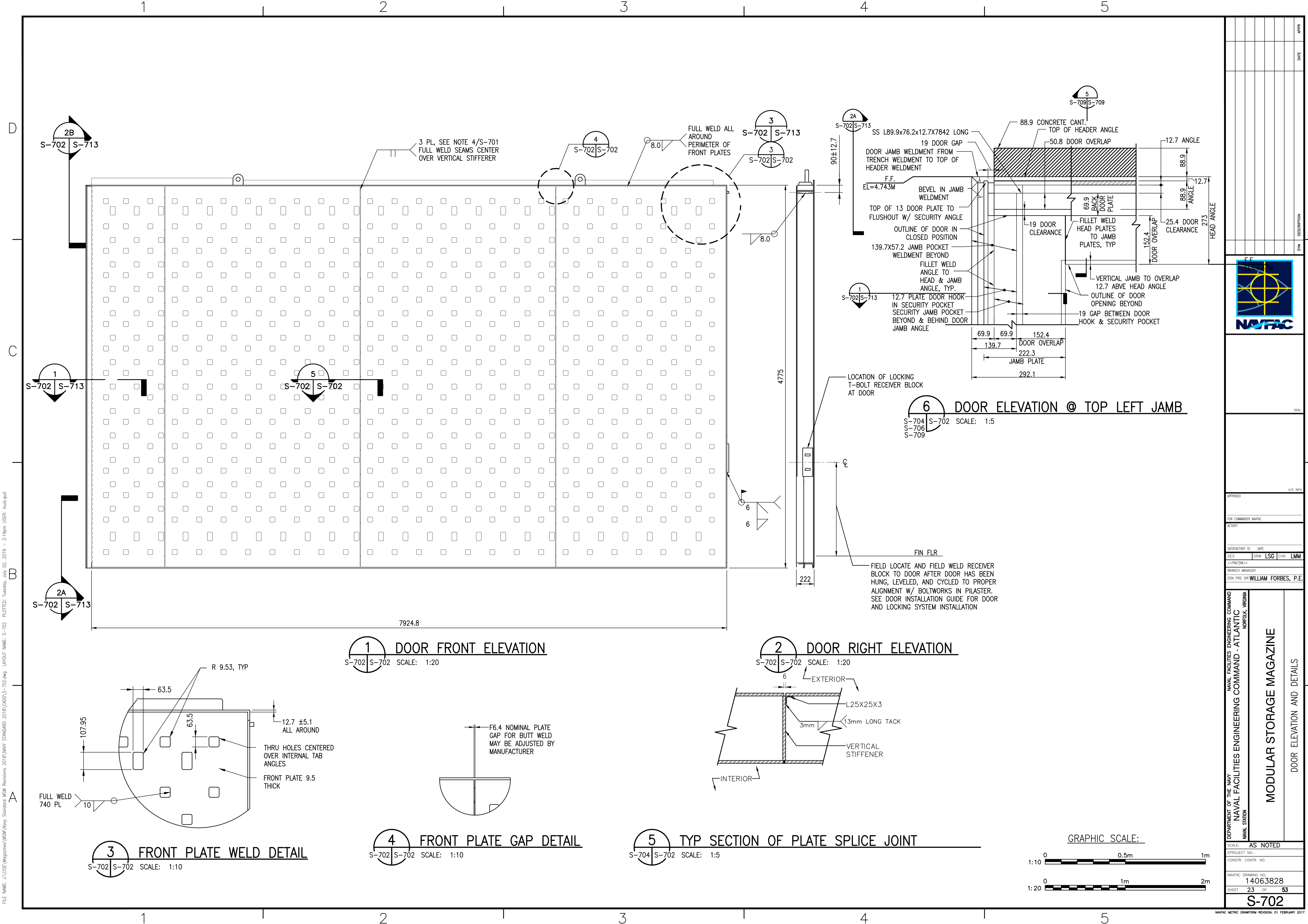
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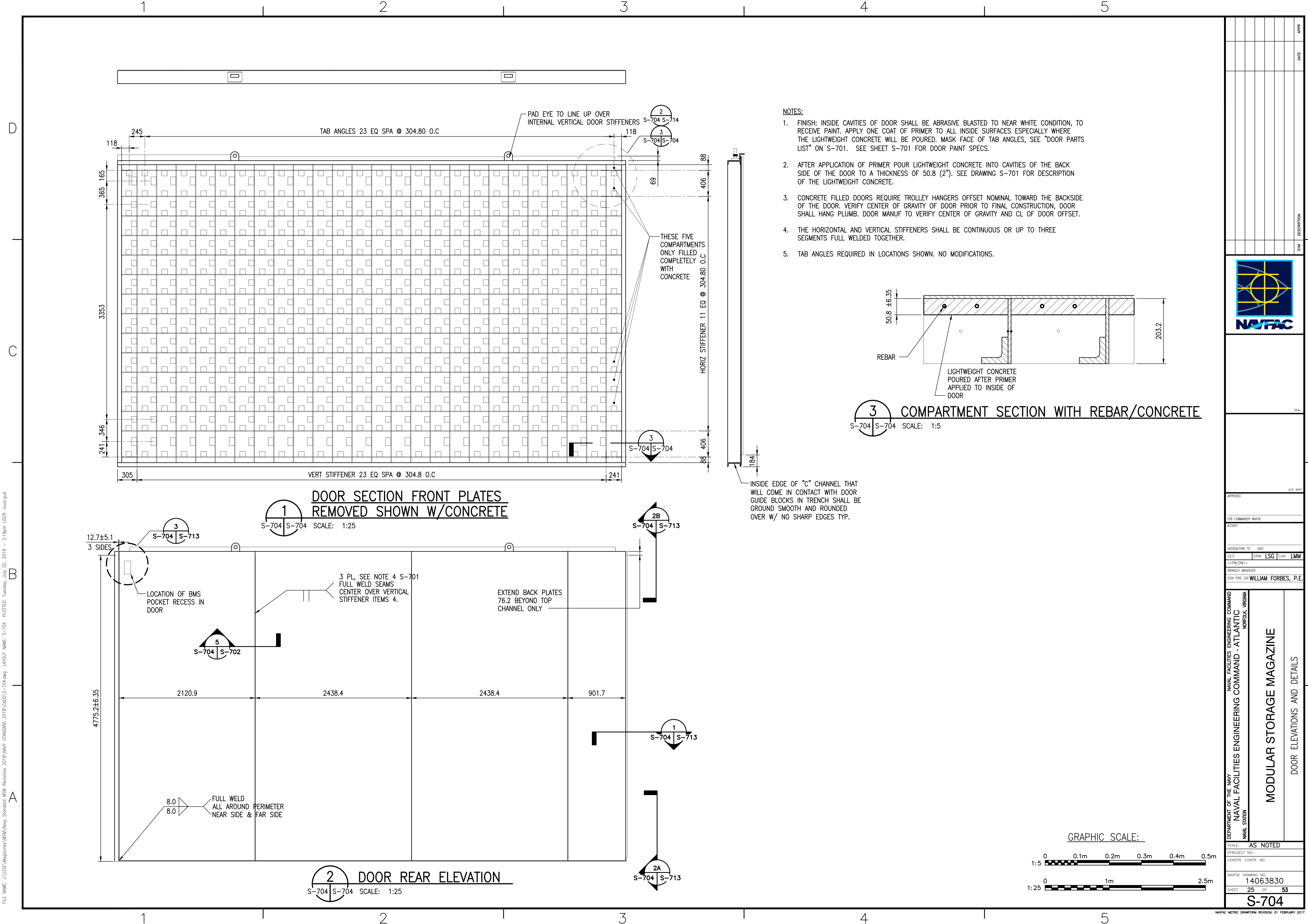
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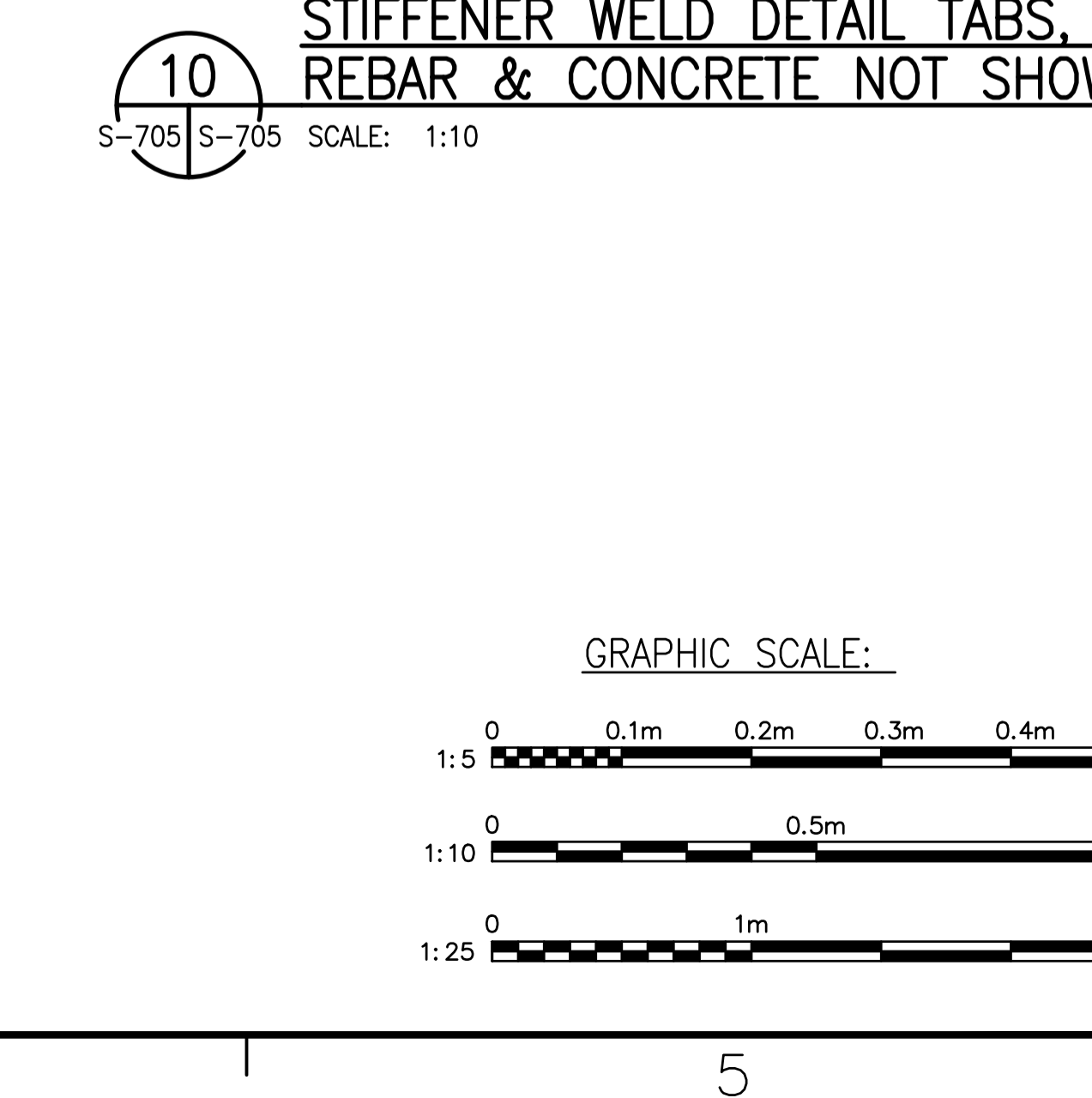
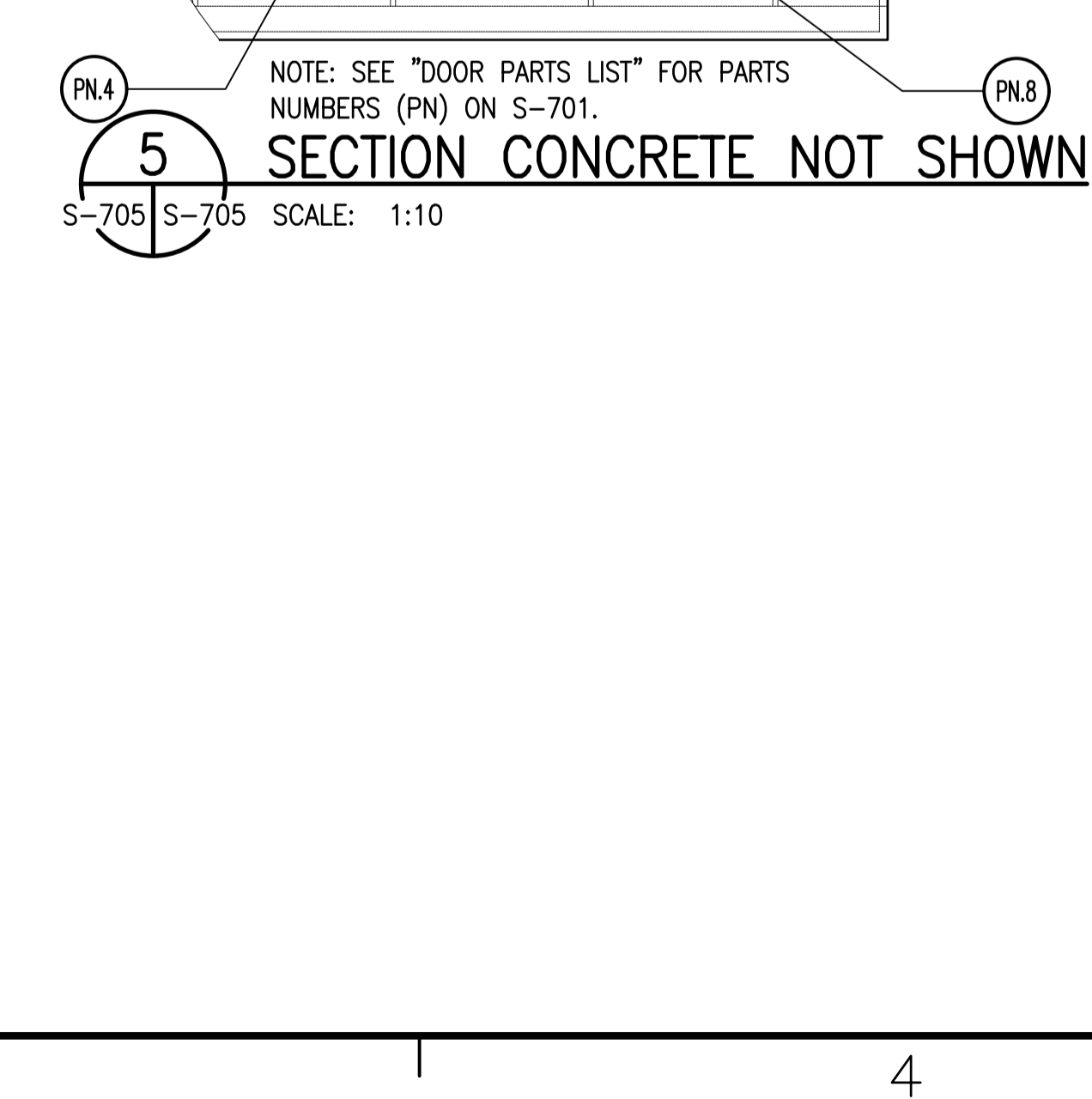
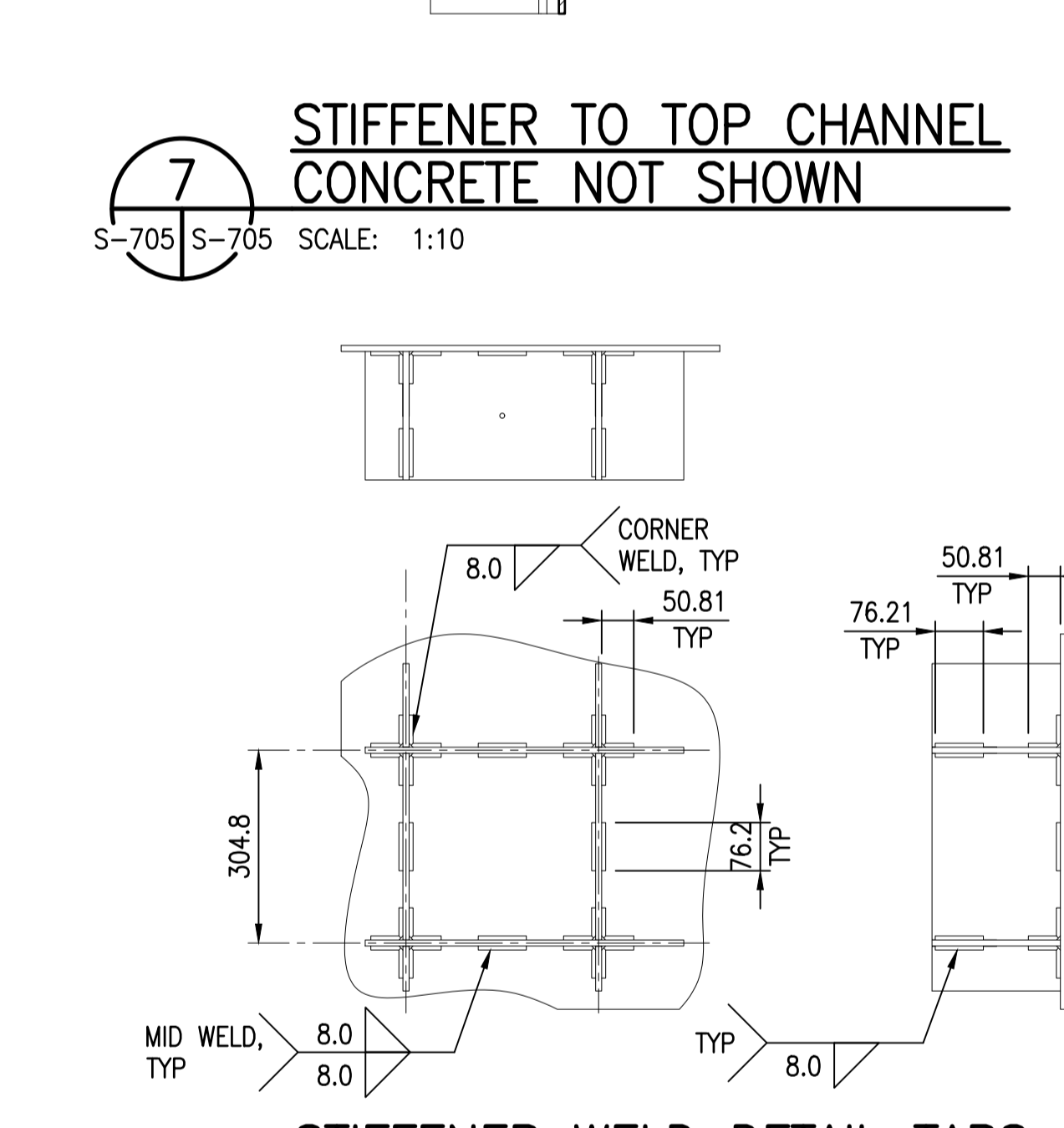
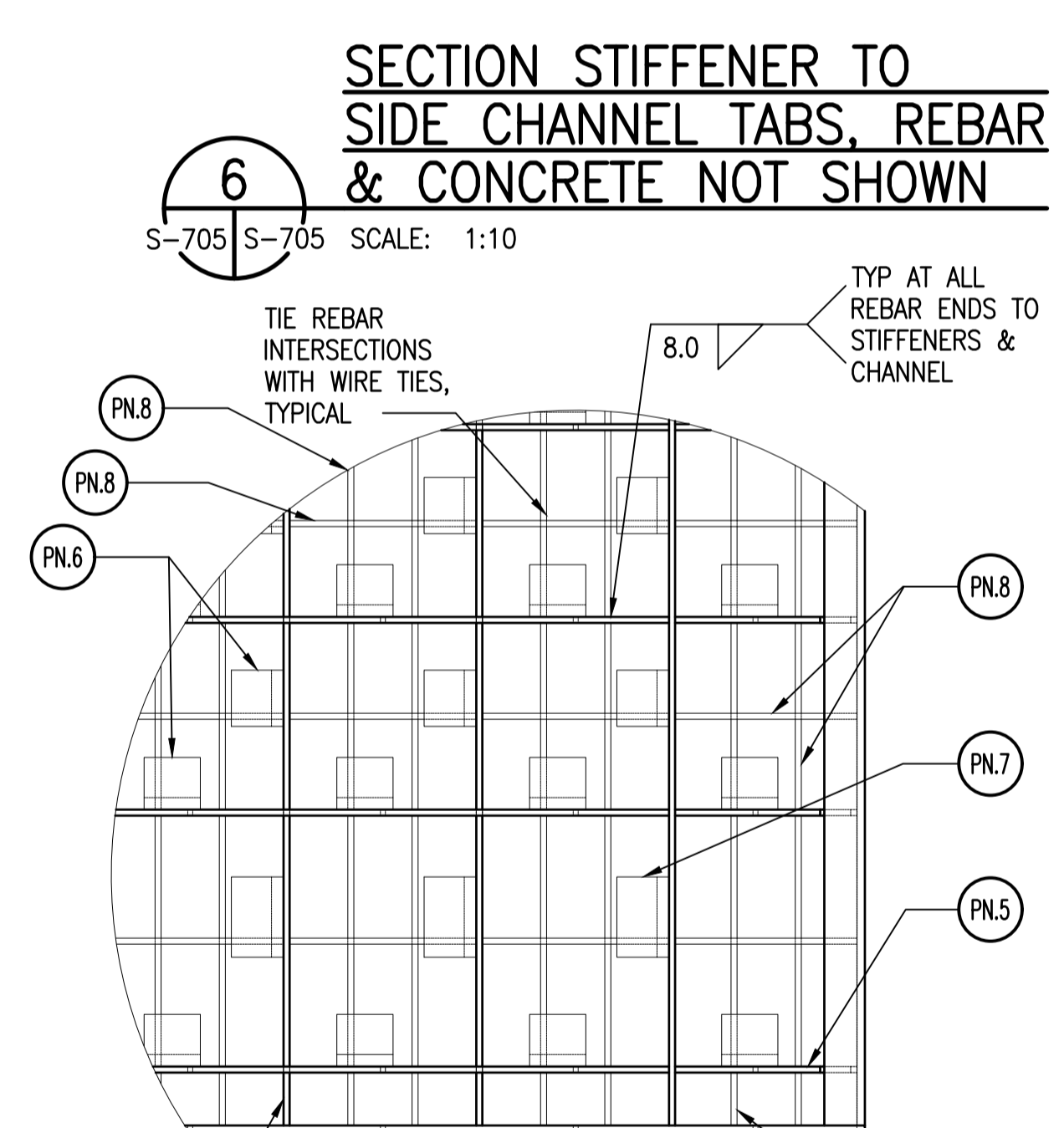
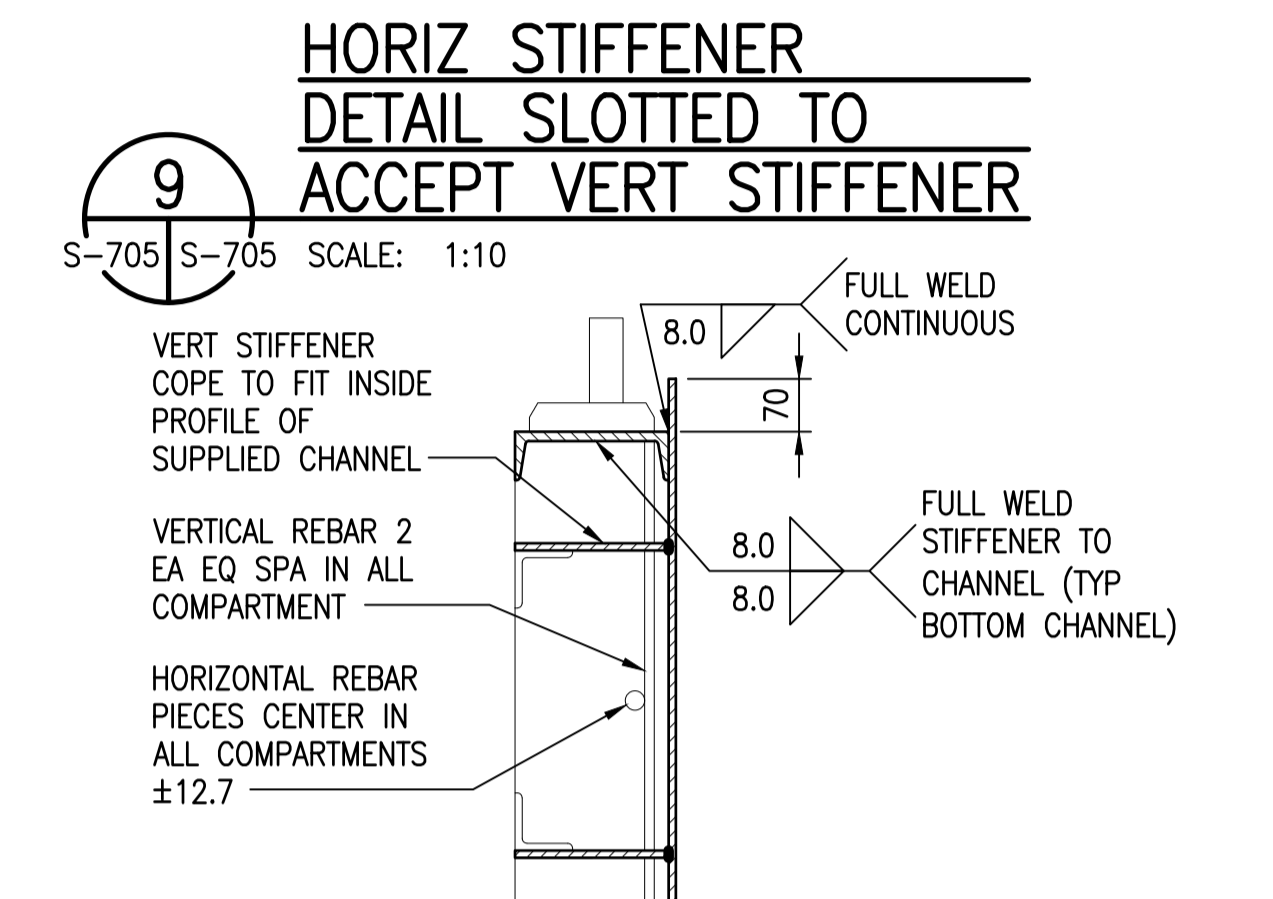
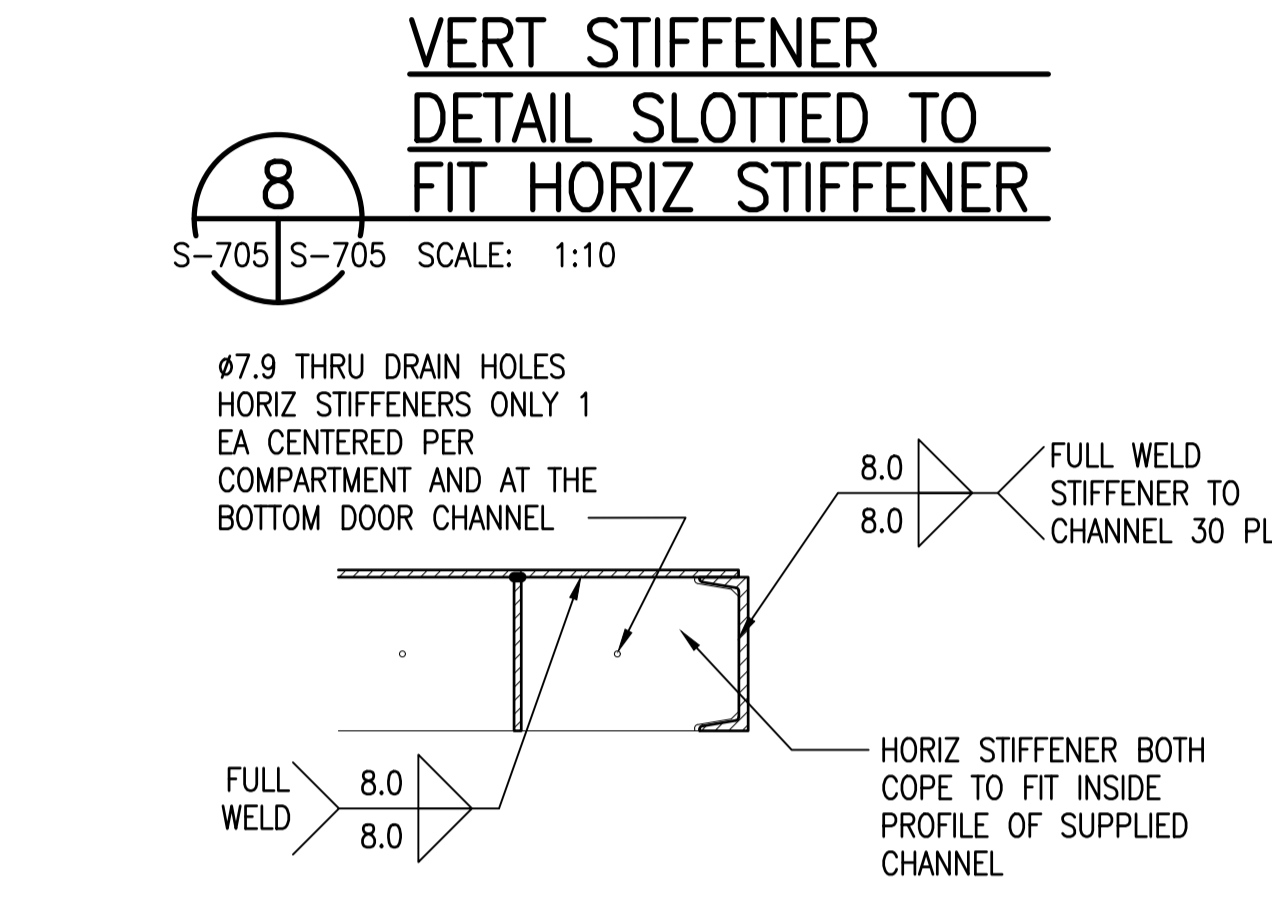
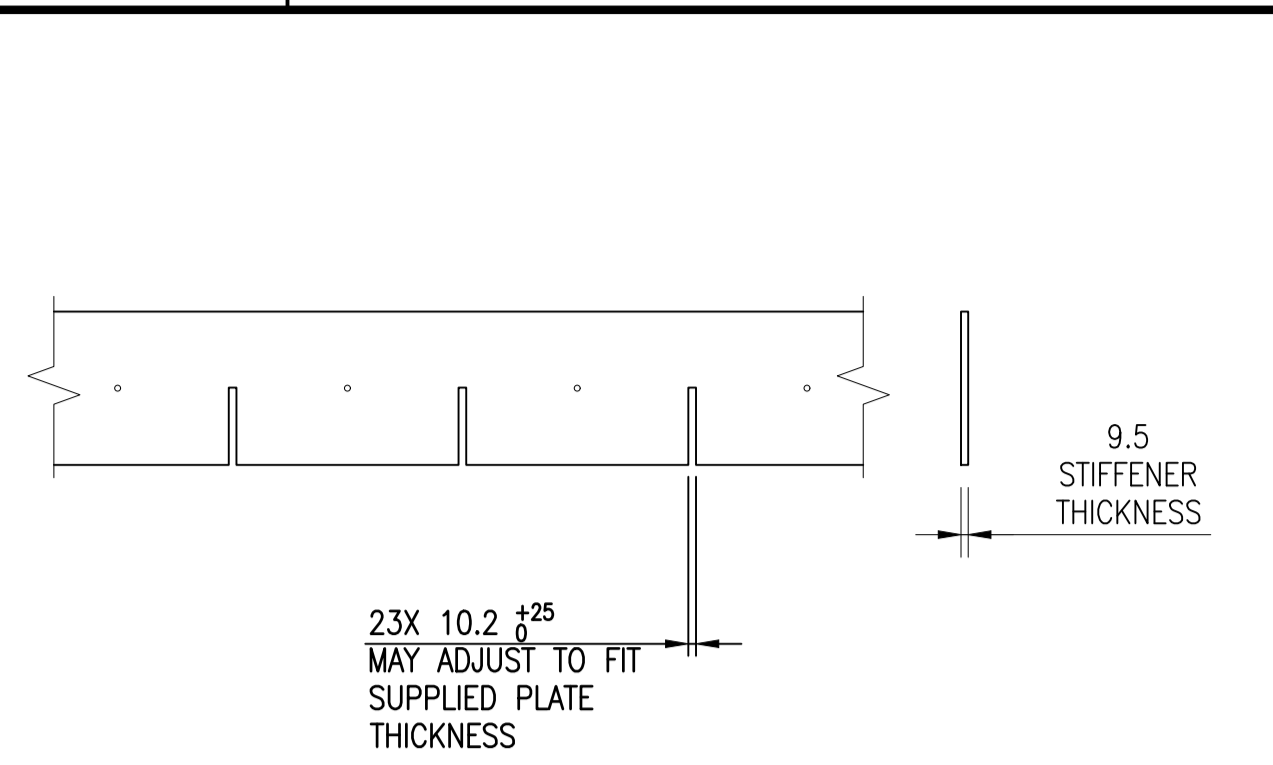
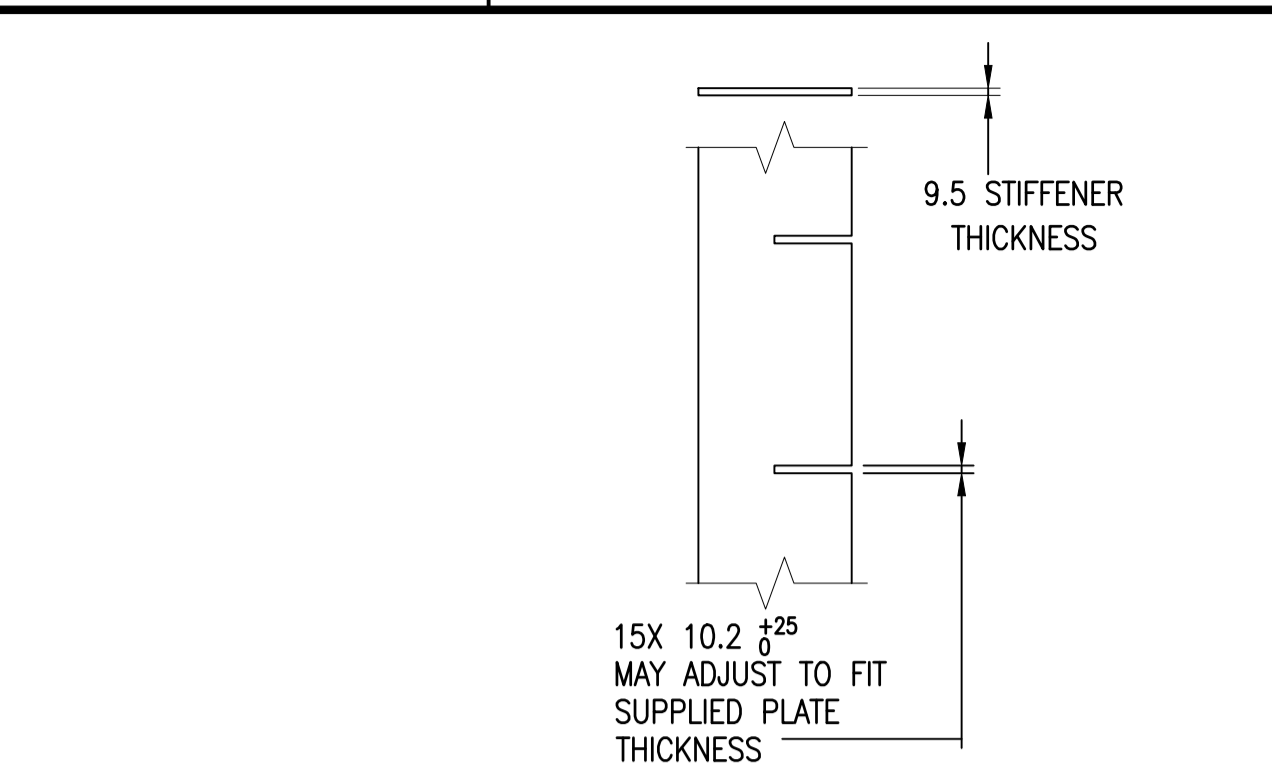
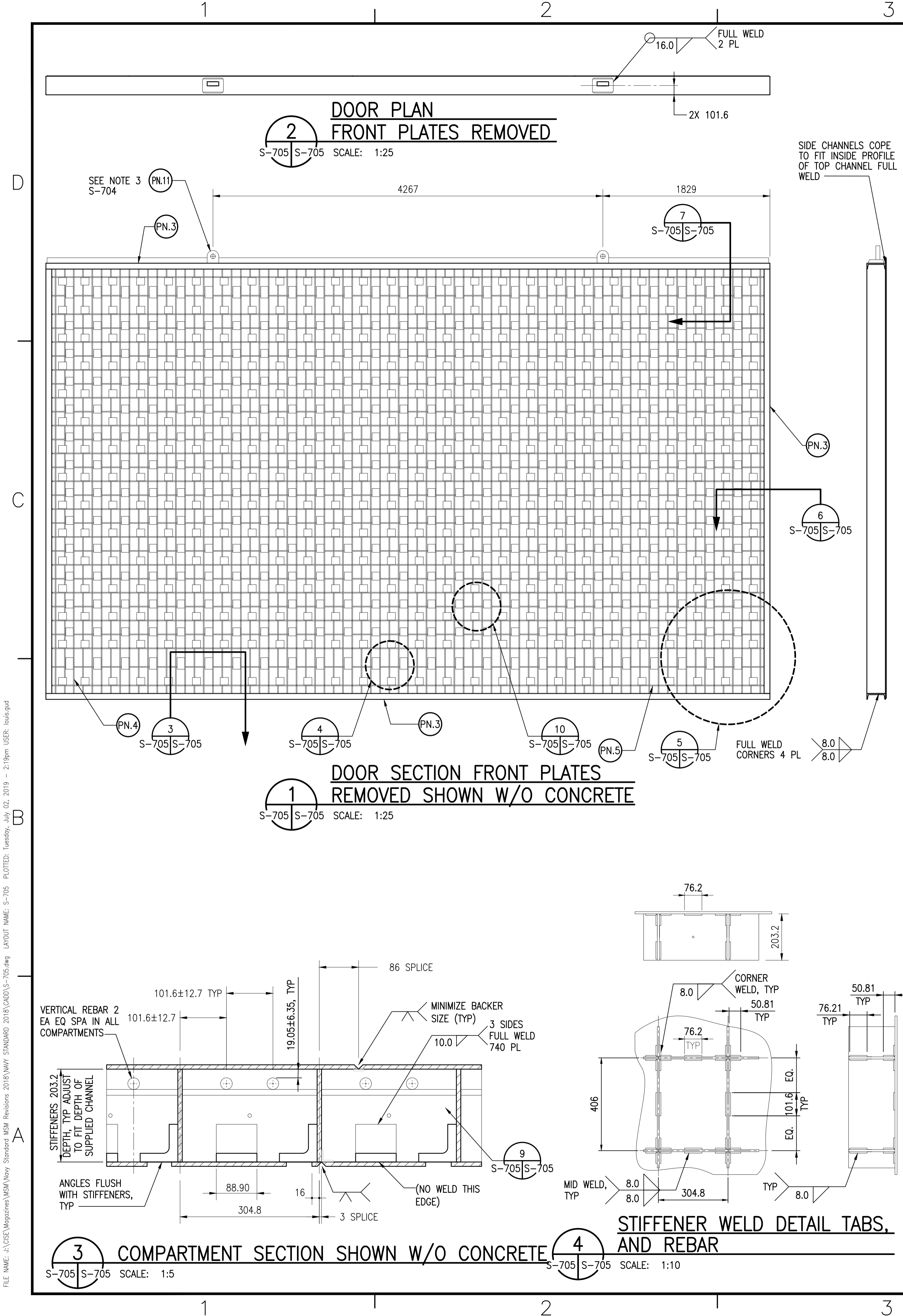
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APPROVED	DATE	APP'R
FOR COMMANDER NAVFAC		
ACTIVITY		
SATISFACTORY TO DATE		
DES	DRW	LSG
CHK		LMM
BRANCH MANAGER		
SGN PRD DR	WILLIAM FORBES, P.E.	
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC	
NAVAL STATION	NORFOLK, VIRGINIA	
MODULAR STORAGE MAGAZINE		
DOOR ELEVATION AND DETAILS		
SCALE:	AS NOTED	
PROJECT NO.:	14063828	
CONSTR. CONTR. NO.:	23 OF 53	
NAVFAC DRAWING NO.:	14063828	
SHEET	23 OF 53	
S-702		
<small>NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017</small>		



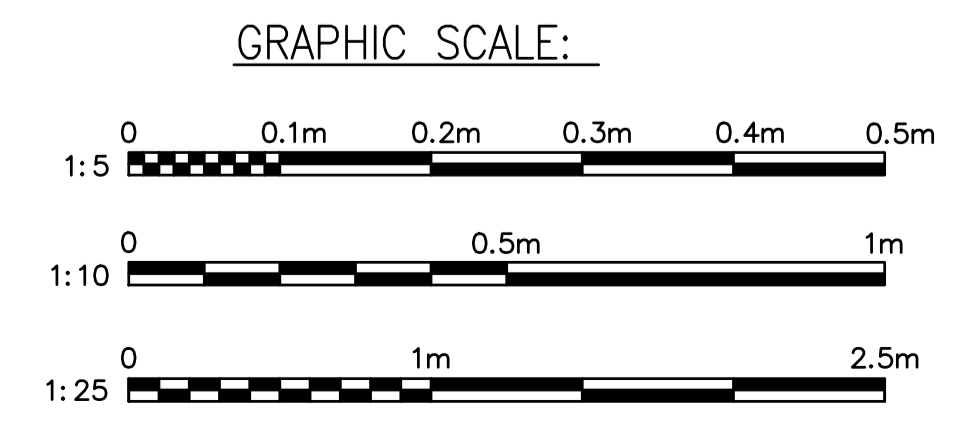
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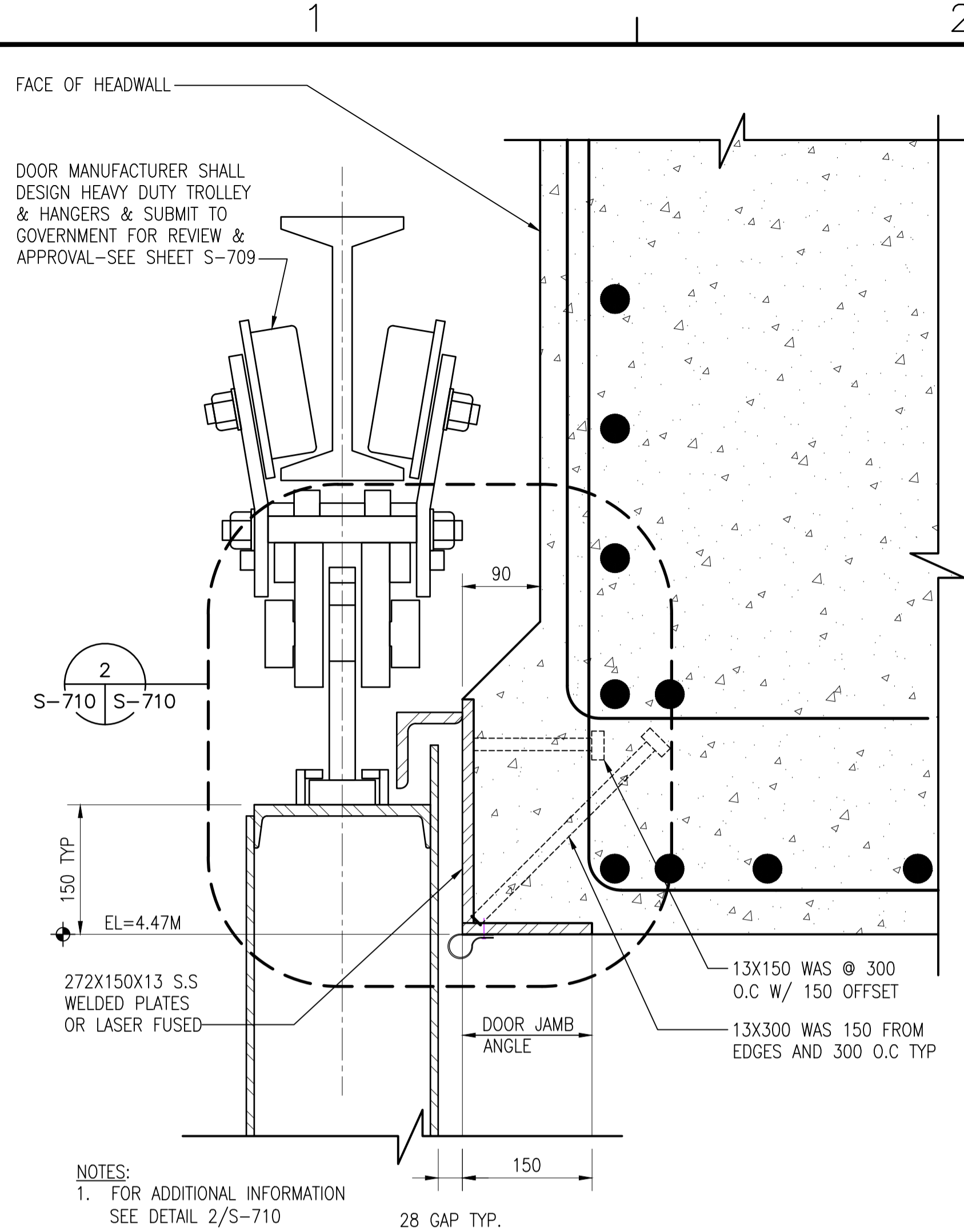
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FOR COMMANDER NAVFAC	ACTIVITY	DESCRIPTION
SATISFACTORY TO: DATE	DES: DRW LSG CHK LMM	SEAL
BRANCH MANAGER	EGN PRD DR WILLIAM FORBES, P.E.	A/E RFD
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC NAVFAC NORFOLK, VIRGINIA MODULAR STORAGE MAGAZINE DOOR ELEVATIONS AND DETAILS		
SCALE: AS NOTED	PROJECT NO.:	
CONSTR. CONTR. NO.:	NAVFAC DRAWING NO. 14063830	
	SHEET 25 OF 53	
S-704		
NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017		



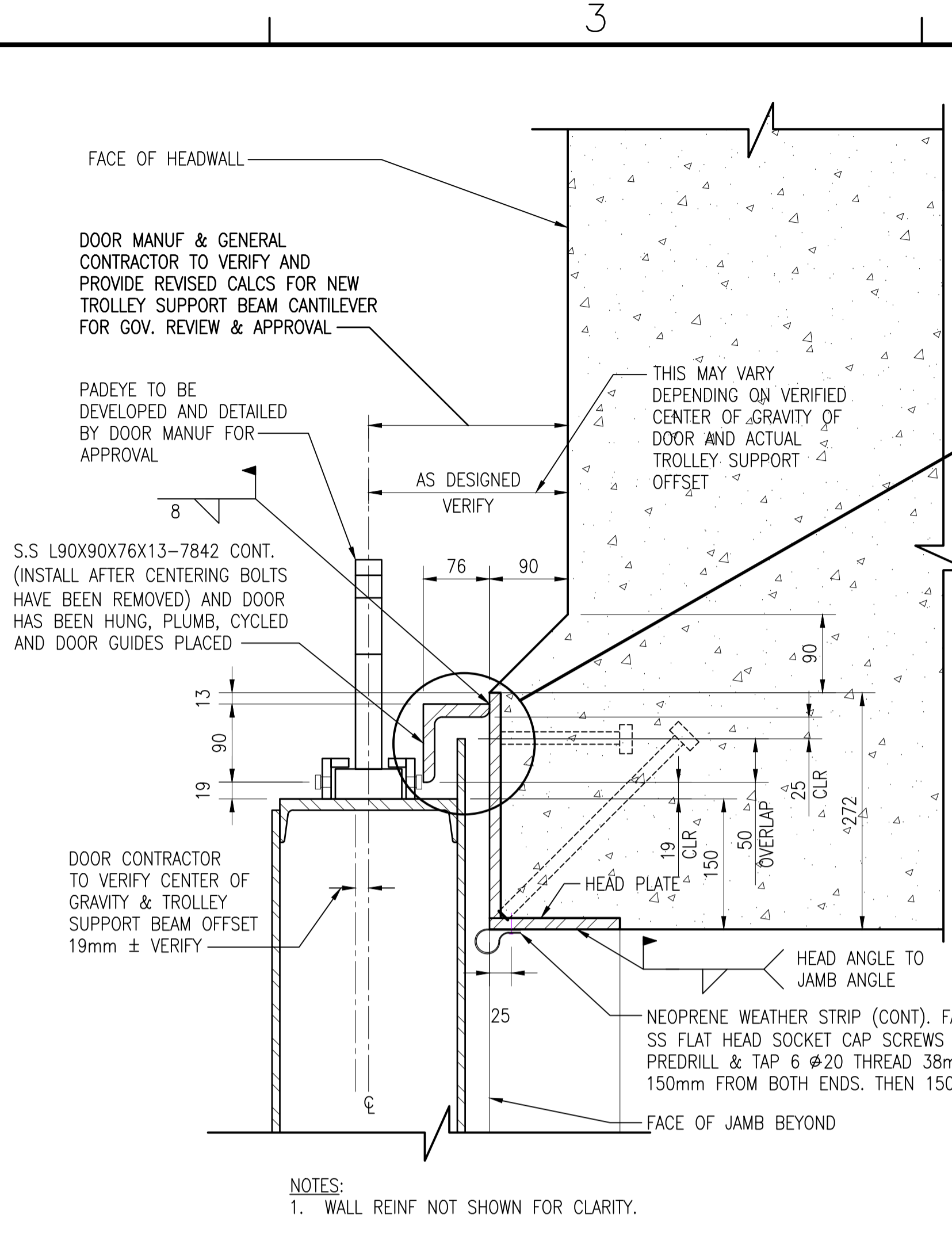
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APPROVED	DATE	APP'R
DESCRIPTION	DATE	APP'R
MODULAR STORAGE MAGAZINE DOOR ELEVATION AND STIFFENER DETAILS		
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC NORFOLK, VIRGINIA NAVAL STATION		
SCALE: AS NOTED EPROJECT NO.: CONSTR. CONTR. NO.: NAVFAC DRAWING NO. 14063831 SHEET 26 OF 53 S-705		
NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017		

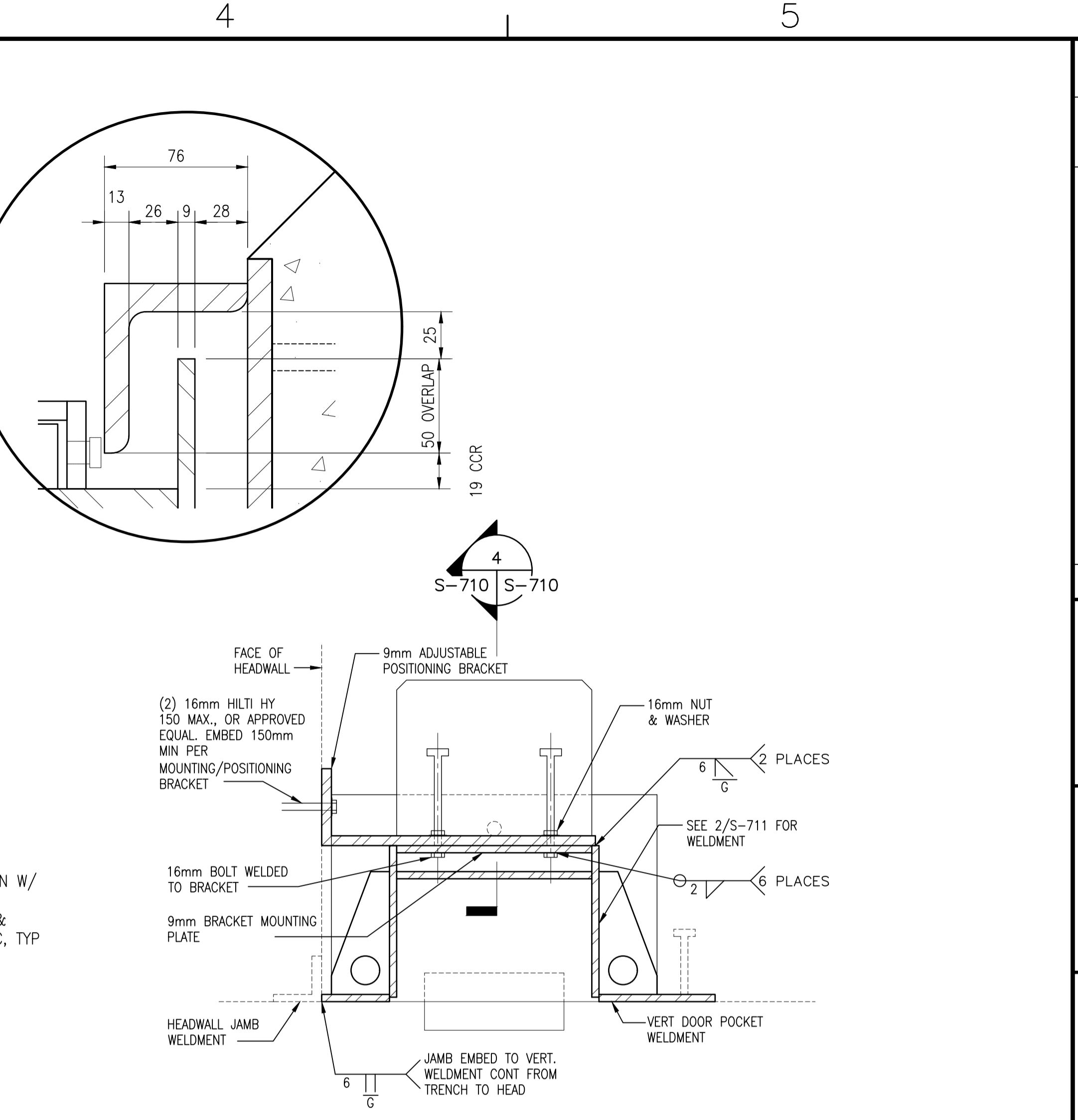




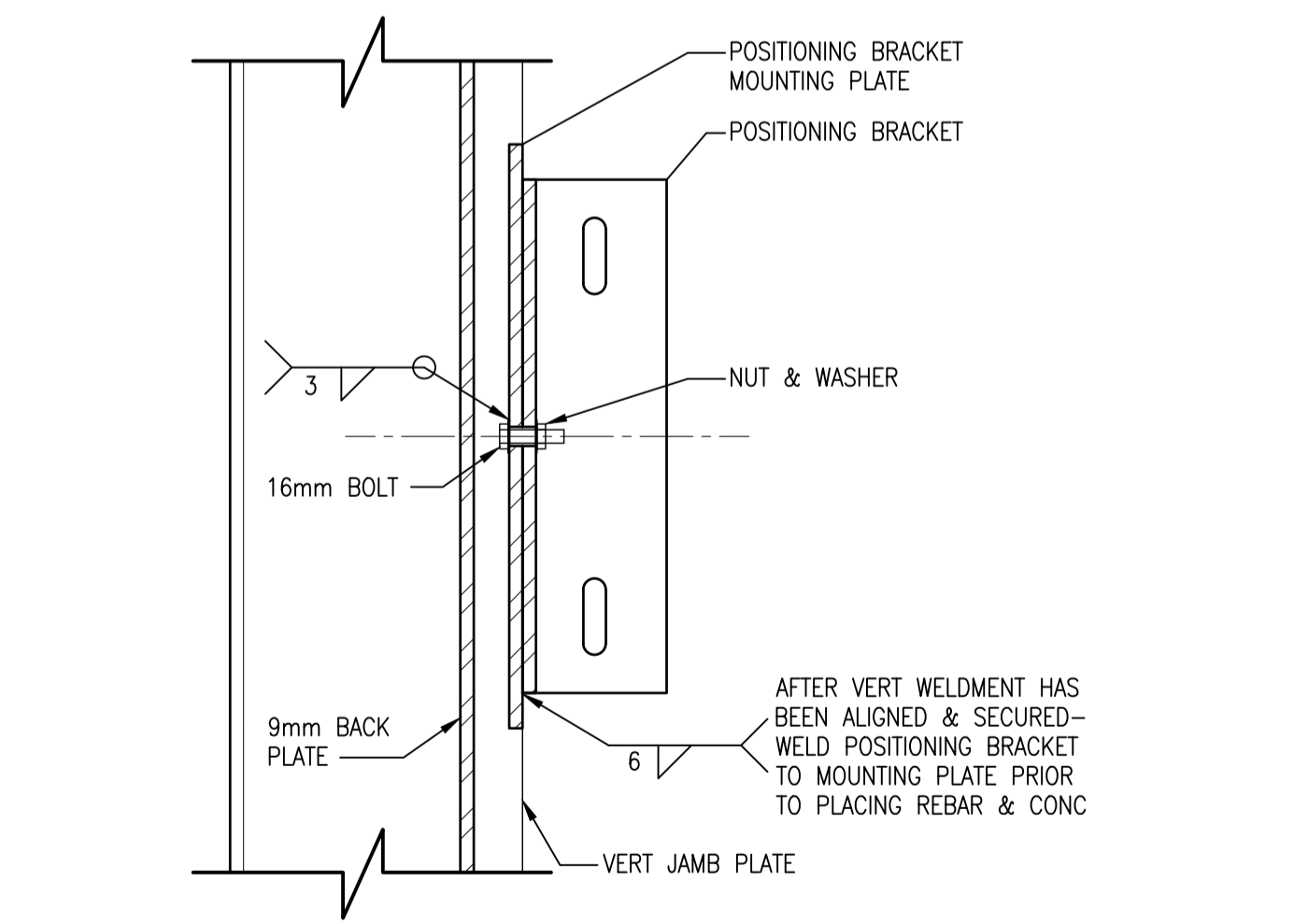
1 DOOR TROLLEY & HEAD DETAIL
 S-301 S-710 SCALE: 1:5
 S-503



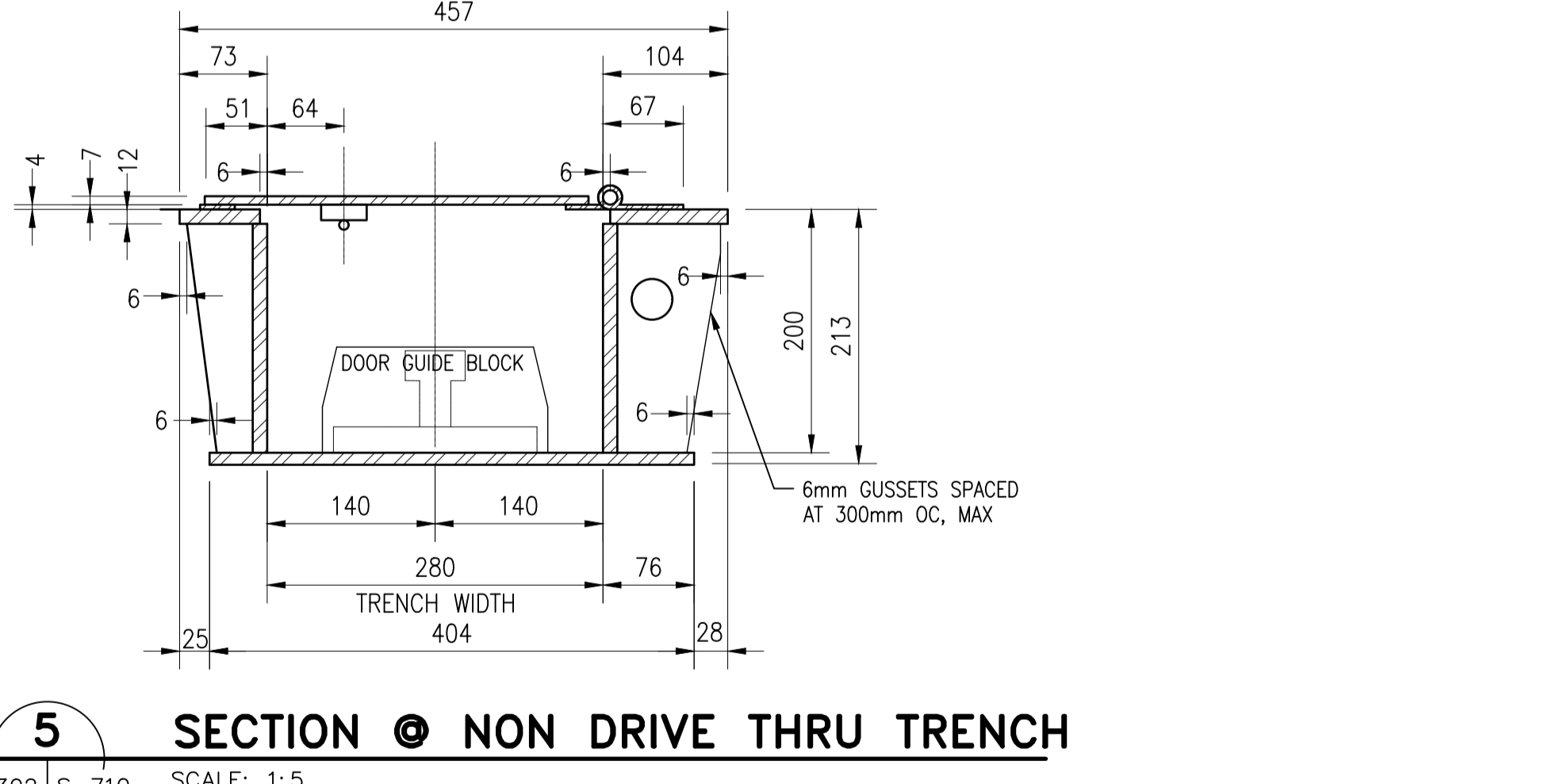
2 DOOR AND HEADER CORNER DETAIL
 S-709, S-706 S-710 SCALE: 1:5
 S-714, S-710



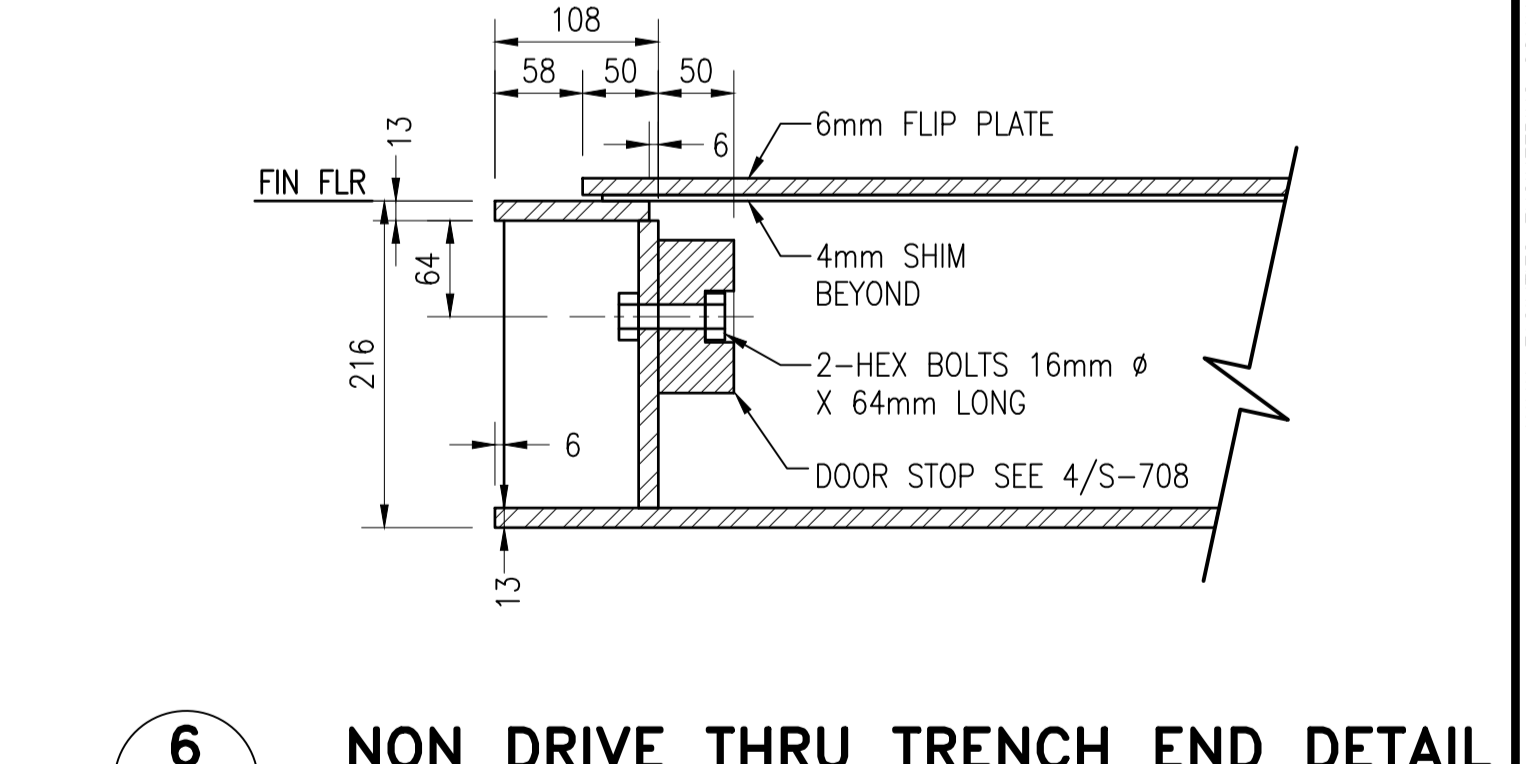
3 VERT WELDMENT POSITIONING BRACKET & HEADWALL ATTACHMENT
 S-706 S-710 SCALE: 1:5



4 VERT WELDMENT POSITIONING BRACKET DETAIL (TYP OF 3)
 S-710 S-710 SCALE: 1:5

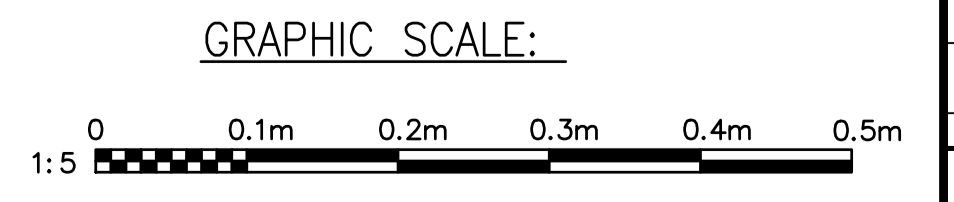


5 SECTION @ NON DRIVE THRU TRENCH
 S-302 S-710 SCALE: 1:5



6 NON DRIVE THRU TRENCH END DETAIL
 S-715 S-710 SCALE: 1:5

APPROVED	DATE	APP'R
FOR COMMANDER NAVFAC	ACTIVITY	DESCRIPTION
SATISFACTORY TO: DATE	DESIGNER: LSG	CHECKER: LMM
BRANCH MANAGER	SGN PRD DR WILLIAM FORBES, P.E.	
DEPARTMENT OF THE NAVY	NAVFACILITIES ENGINEERING COMMAND - ATLANTIC	
NAVAL STATION	NORFOLK, VIRGINIA	
MODULAR STORAGE MAGAZINE		
SECTIONS/ DETAILS		
SCALE: AS NOTED	PROJECT NO.: 14063836	
CONSTR. CONTR. NO.	NAVFAC DRAWING NO. 14063836	
SHEET 31 OF 53		
S-710		
NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017		



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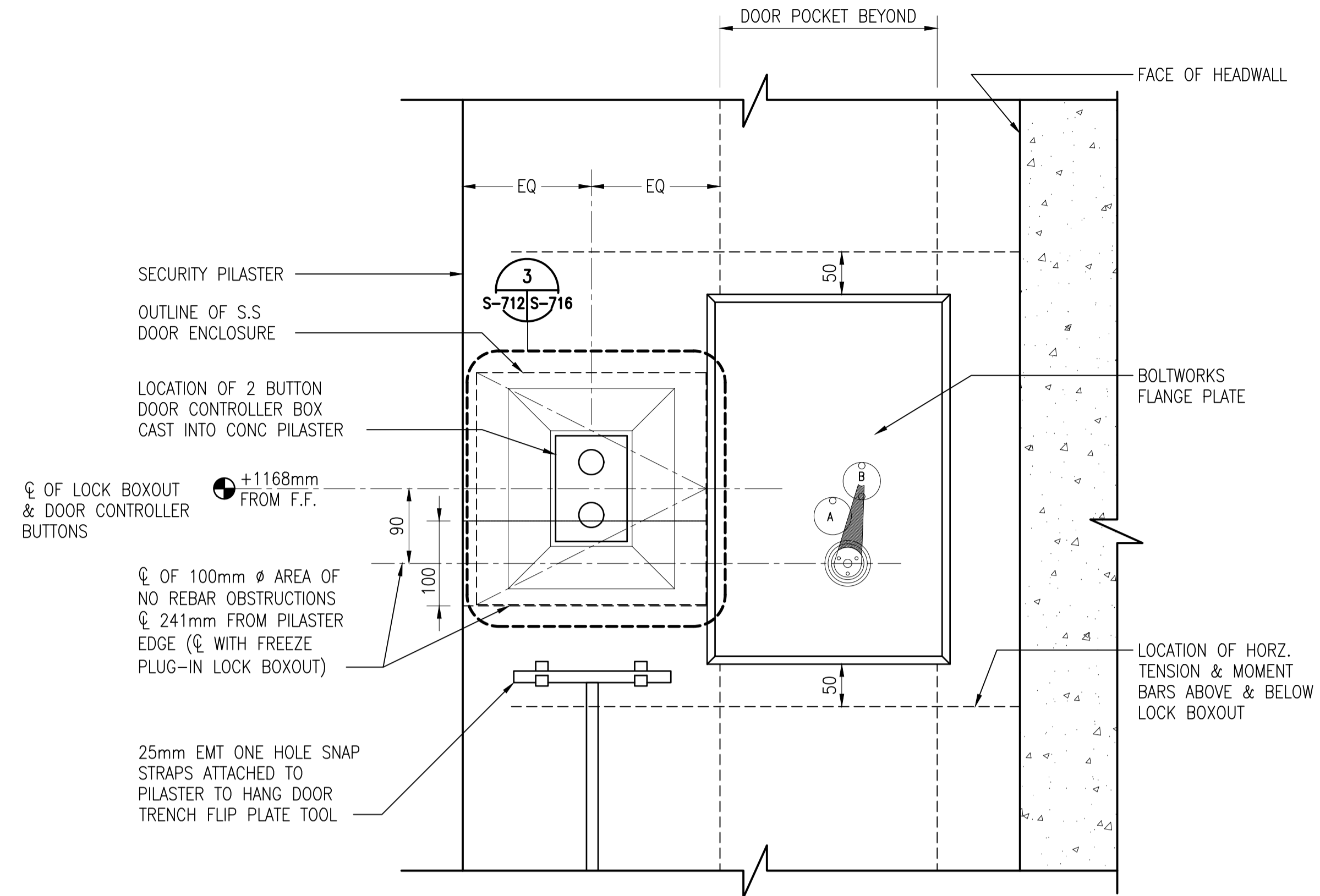
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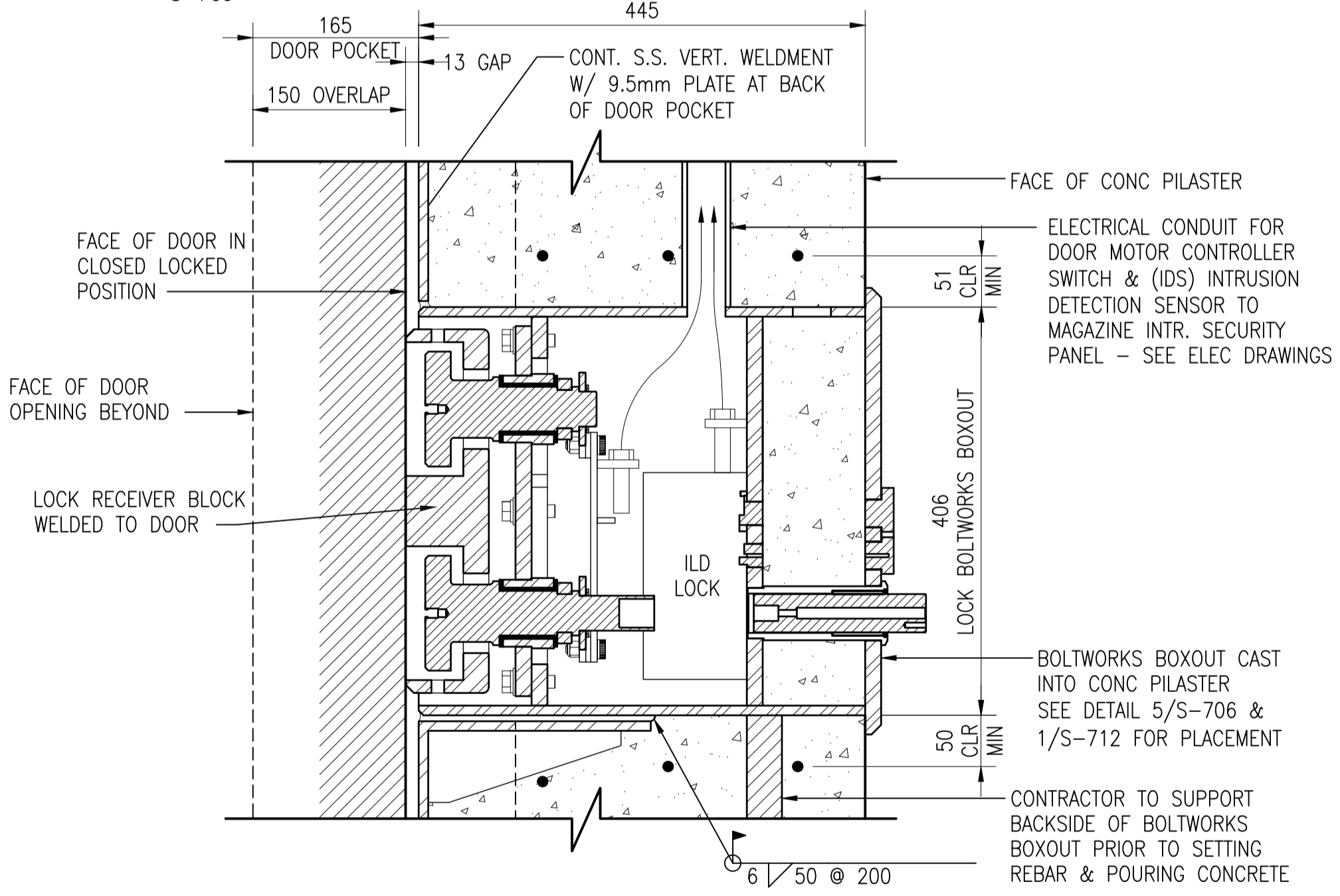
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A



1 SECURITY PILASTER LOCK ELEVATION

S-706 S-712 SCALE: 1:5
S-709

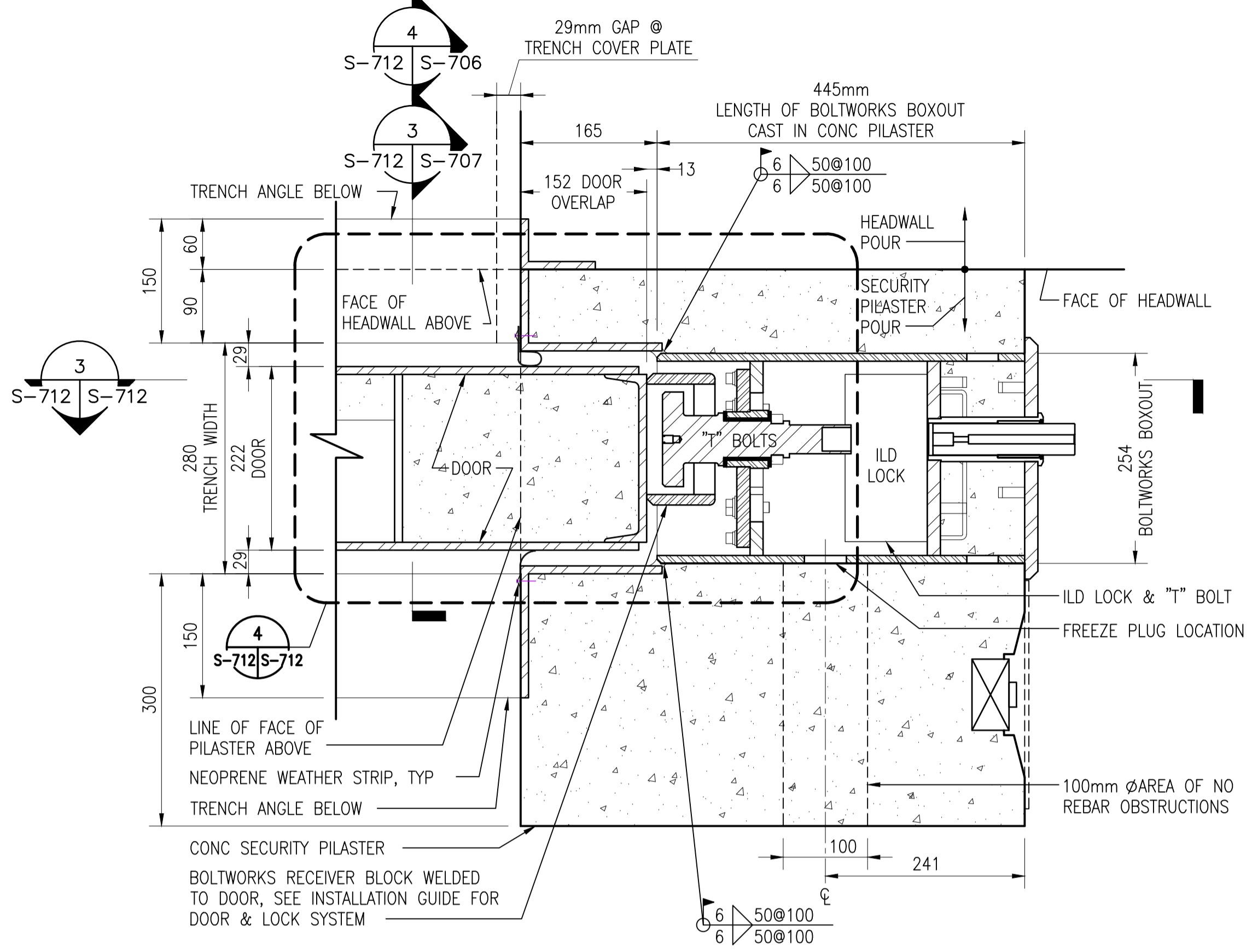


3 PILASTER SECTION @ DOOR & BOLTWORKS

S-706 S-712 SCALE: 1:5
S-712 S-711

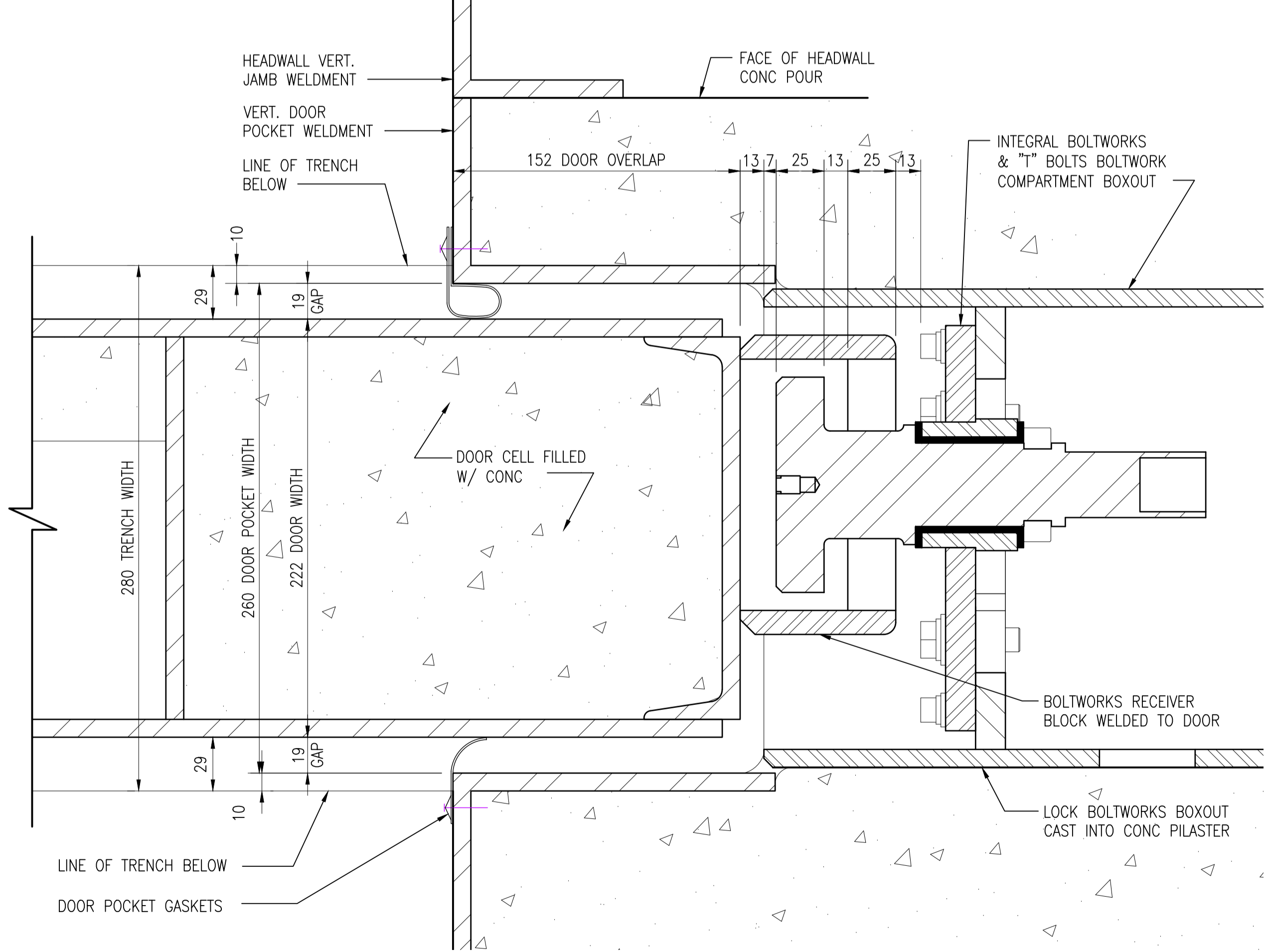
NOTE: DOOR MOTOR CONTROL SWITCH IN LOCK COMPARTMENT TO DOOR CONTROL PANEL @ INTR. OF MAGAZINE THEN TO DOOR CONTROL BUTTON IN PILASTER.

- NOTES:
- PROTECT & COVER BOLTWORKS BOXOUT OPENING IN PILASTER DOOR POCKET DURING CONSTRUCTION. KEEP CLEAN & FREE OF DEBRIS.
 - BOLTWORKS TO BE PLACED @ CL OF DOOR POCKET & TRENCH AS SHOWN. LEVEL & PLUMB TO HEADWALL & DOOR.



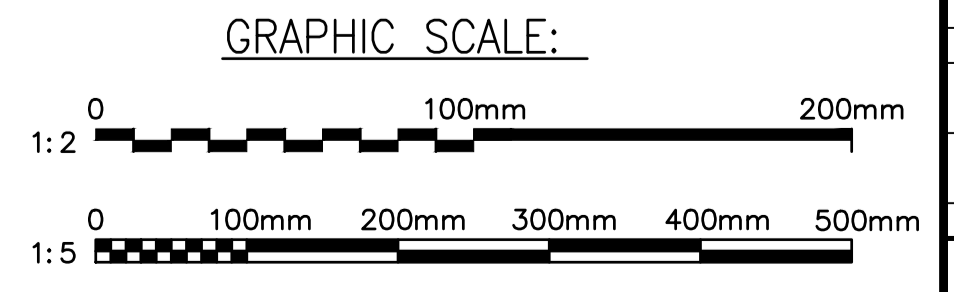
2 PILASTER SECTION @ DOOR & BOLTWORKS

S-706 S-712 SCALE: 1:5
S-709, S-711



4 DOOR & BOLTWORKS CLEARANCES

S-712 S-712 SCALE: 1:2



APPROVED	DATE	APP'R
FOR COMMANDER NAVFAC		
ACTIVITY		
SATISFACTORY TO DATE		
DES	DRW	LSG
CHK	LMM	
BRANCH MANAGER		
SGN PRD DR	WILLIAM FORBES, P.E.	
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING COMMAND	ATLANTIC
NAVAL STATION	INNOVATION	WIRFOLK, VIRGINIA
MODULAR STORAGE MAGAZINE		
SECTIONS/ DETAILS		
SCALE:	AS NOTED	
PROJECT NO.:	14063838	
CONSTR. CONTR. NO.		
NAVFAC DRAWING NO.	14063838	
SHEET	33	OF 53
S-712		
NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017		

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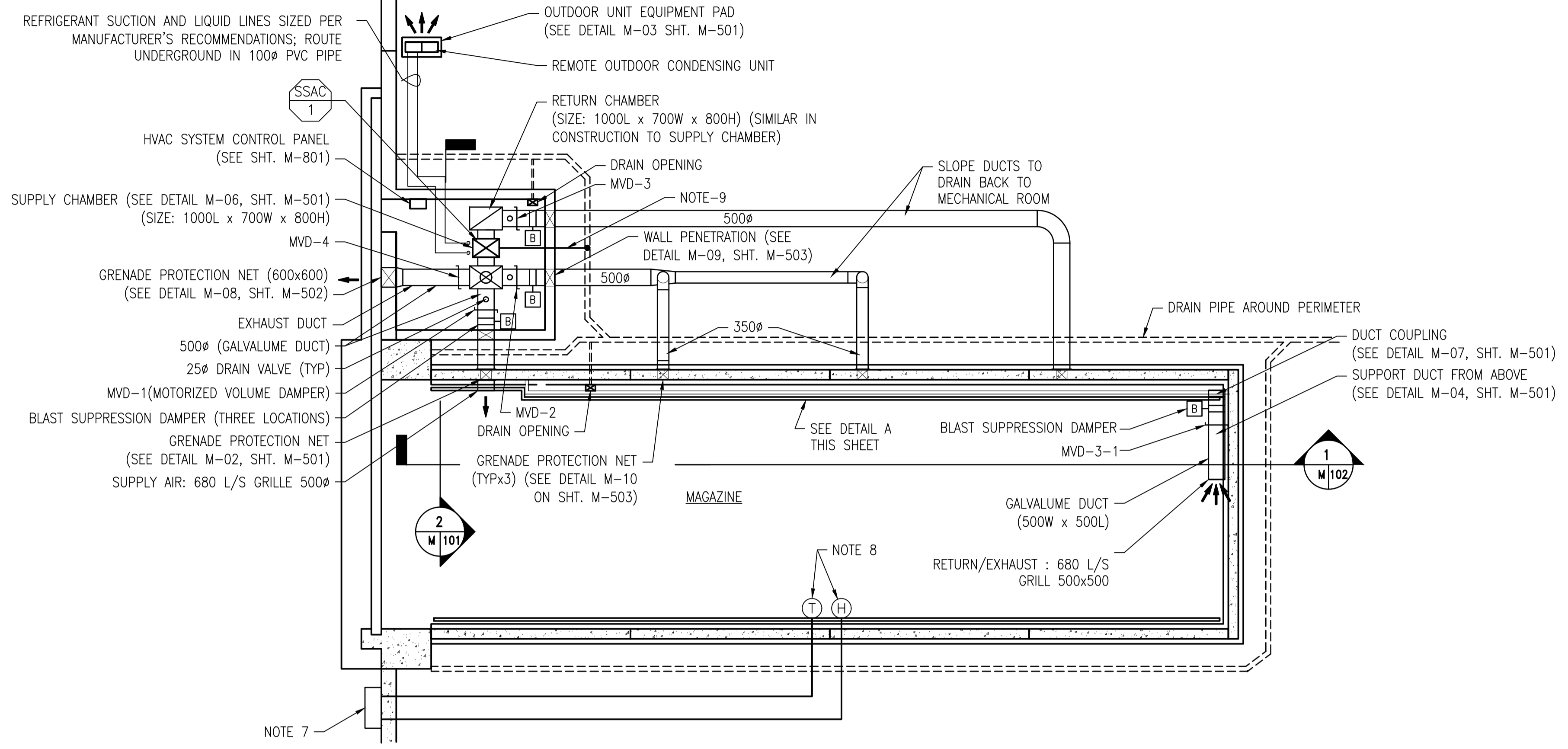
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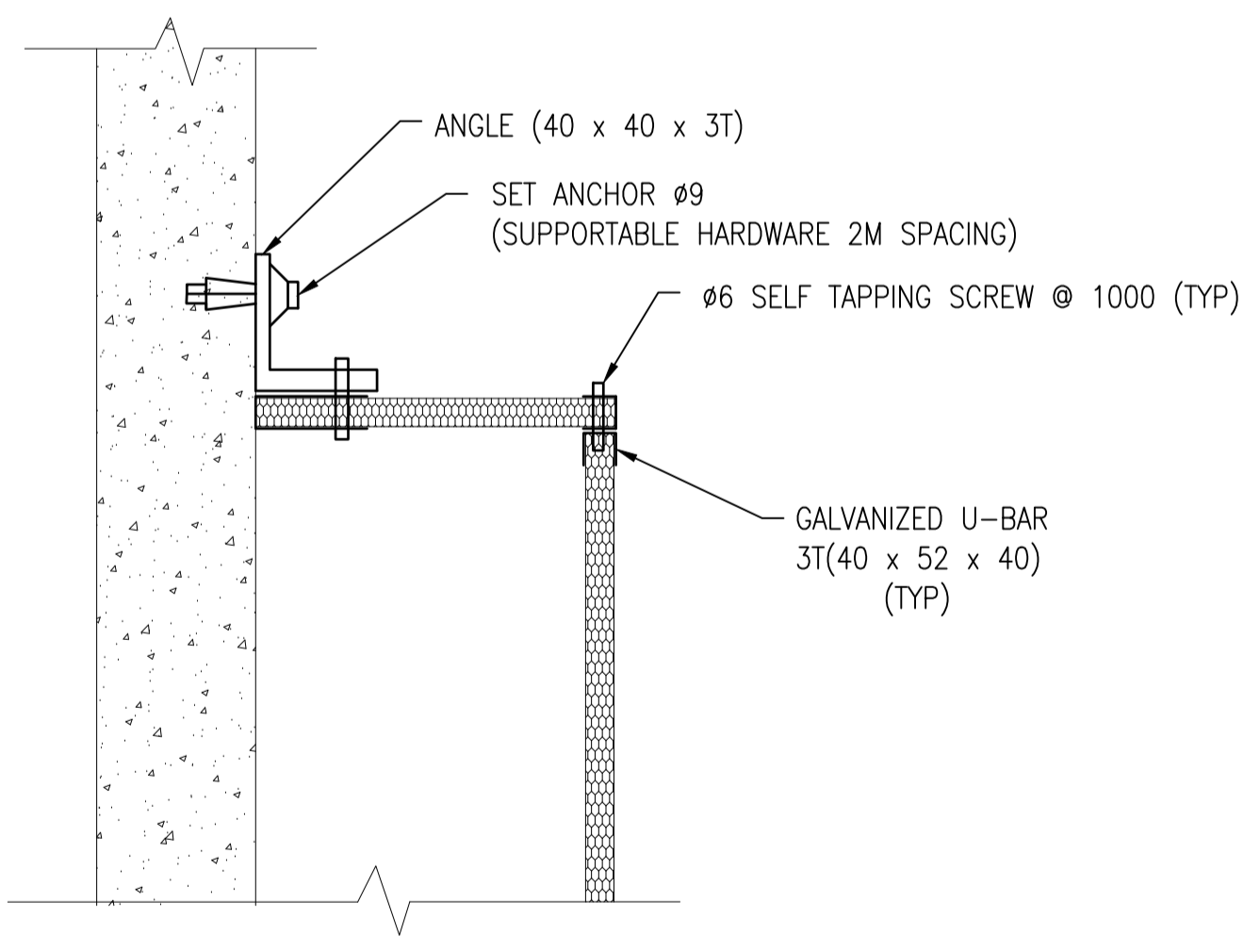
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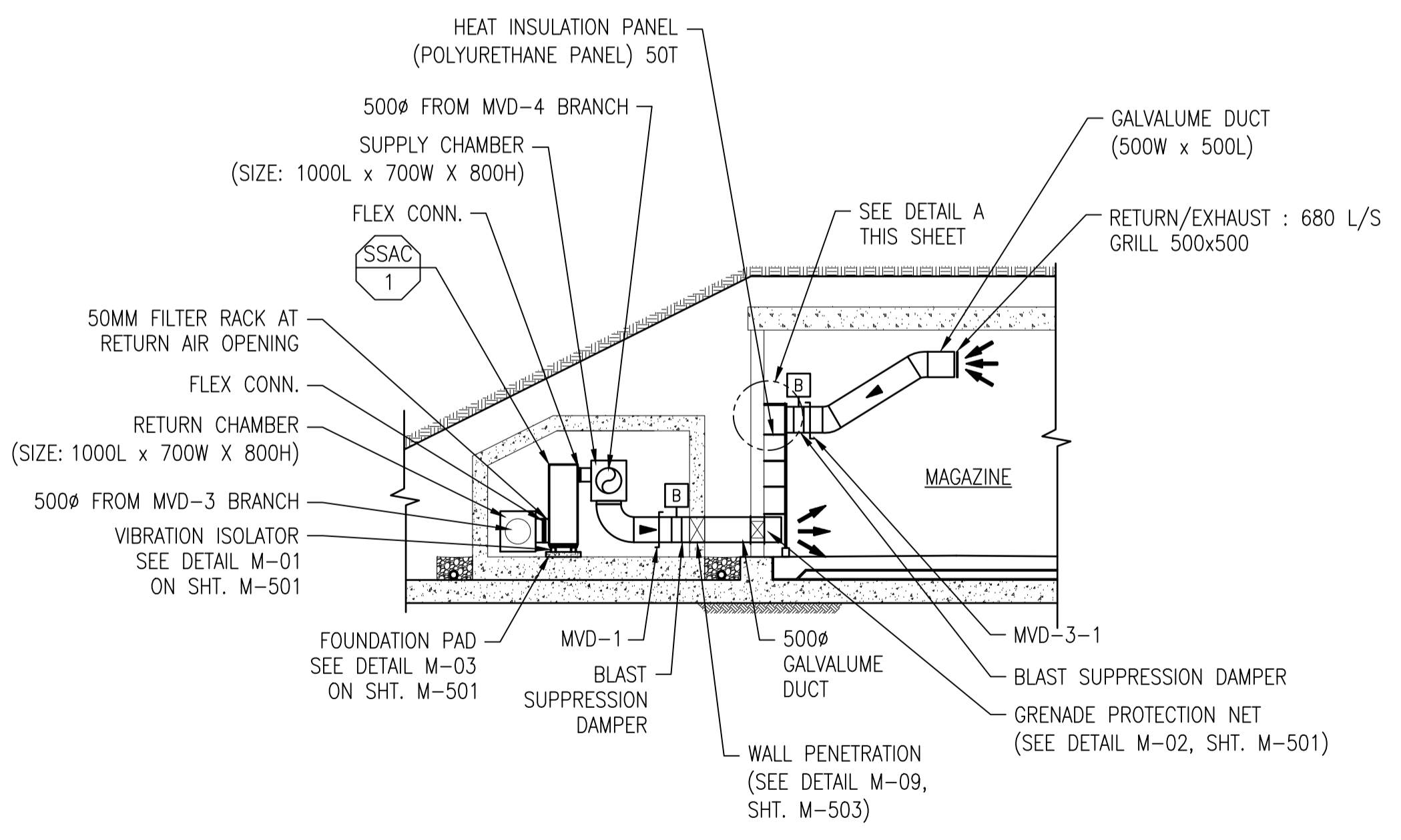
GENERAL NOTES

1. DUCTWORK BETWEEN THE EXTERIOR MECHANICAL ROOM WALL AND THE EXTERIOR MAGAZINE WALL SHALL BE PVC COATED GALVANIZED STEEL DUCTWORK ENCASED IN CONCRETE. SEE DETAIL M-11 ON SHT. M-503.
2. SSAC MECHANICAL DETAILS AND SCHEDULE ARE SHOWN ON SHEET M-102.
3. ALL DUCTWORK, SUPPLY CHAMBER AND EXHAUST CHAMBER LOCATED IN THE AIR CONDITIONING ROOM SHALL BE INSULATED WITH 38mm ELASTOMERIC INSULATION.
4. ACTUAL SIZE OF SSAC-1 AND ASSOCIATED REMOTE CONDENSING UNIT SHALL BE CONFIRMED WITH CERTIFIED SHOP DRAWINGS PRIOR TO INSTALLATION OF EQUIPMENT FOUNDATION CONCRETE PADS.
5. ROUTE CONDENSATE DRAIN FROM SSAC-1 TO TERMINATE OVER DRAIN OPENING IN FLOOR IN CORNER OF ROOM.
6. REFRIGERANT PIPING RUNS SHALL BE LESS THAN 15 METERS UNLESS LONGER RUNS ARE ALLOWED BY EQUIPMENT MANUFACTURER.
7. THE MECHANICAL EQUIPMENT, DUCTWORK AND INSULATED PANEL SYSTEMS SHOWN ON SHEETS M-101, M-102, M-501, M-502 AND M-503.
8. MOUNT TWO DIGITAL DISPLAYS VISIBLE FROM FACE OF WEATHERPROOF ENCLOSURE - ONE FOR TEMPERATURE AND ONE FOR RELATIVE HUMIDITY.
9. TEMPERATURE AND RELATIVE HUMIDITY TRANSMITTERS. LOCATE NEAR CENTER OF MAGAZINE.
10. CONDENSATE DRAIN, PROVIDE AIR GAP IN MECH RM.
11. ELECTRICALLY BOND ALL DUCT ENTERING THE MAGAZINE PER DETAIL 5 ON SHEET S-104.

1 AIR CONDITIONING DUCT PLAN
M-101 M-101 SCALE: 1:100

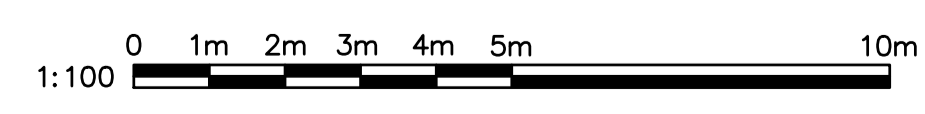


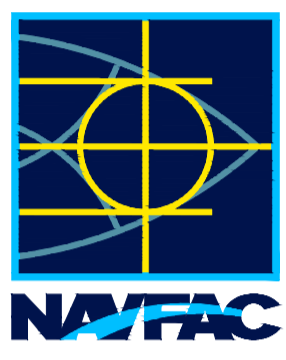
A DETAIL "A"
M-101 M-101 SCALE: NONE



2 AIR CONDITIONING ROOM SECTION
M-101 M-101 SCALE: 1:100

GRAPHIC SCALES:



APPROVED	DATE	APP'R
DESCRIPTION	DATE	APP'R
 NAVFAC		
SEAL		
A/E R/P/D		
APPROVED: _____ FOR COMMANDER NAVFAC		
ACTIVITY: _____		
SATISFACTORY TO: _____ DATE: _____		
DES	DRW	DBC
CHK	RCK	
BRANCH MANAGER: _____		
DGN PRD DR WILLIAM FORBES, P.E.		
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC NORFOLK, VIRGINIA NAVAL STATION		
MODULAR STORAGE MAGAZINE SSAC MECHANICAL PLAN		
SCALE: AS NOTED		
E/PROJECT NO.: _____		
CONSTR. CONTR. NO. _____		
NAVFAC DRAWING NO. 14063844		
SHEET 39 OF 53		
M-101		
<small>NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017</small>		

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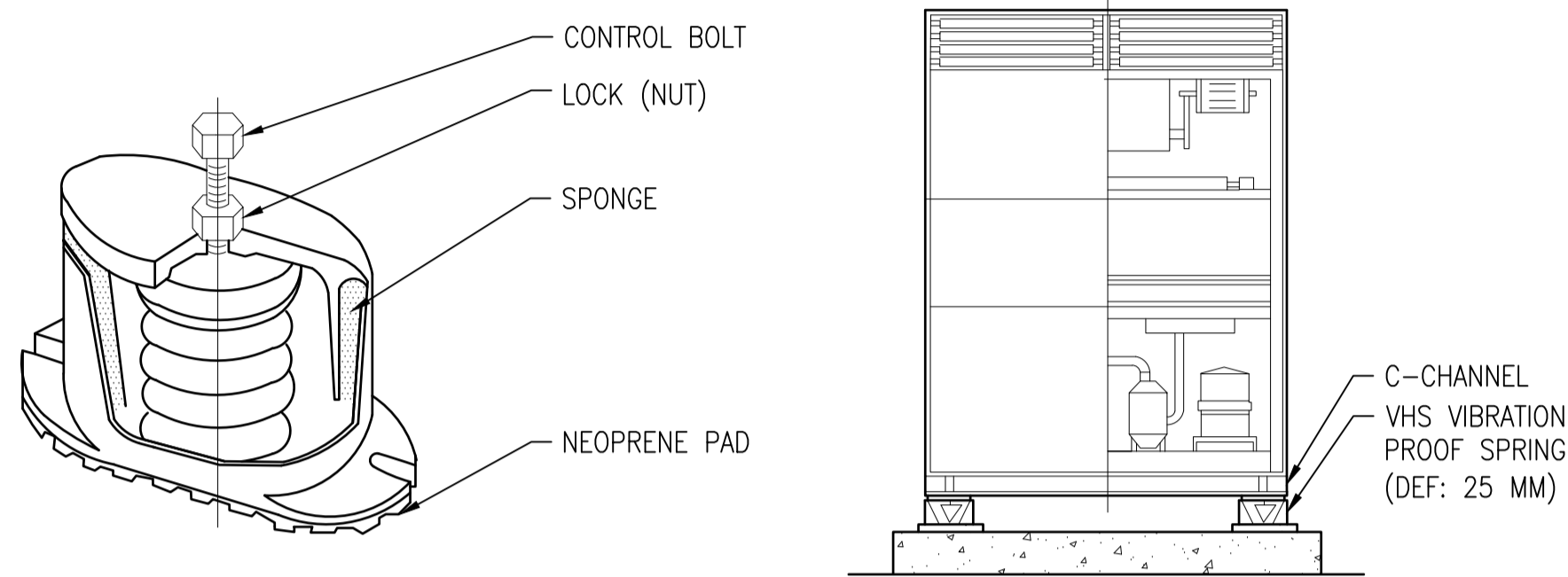
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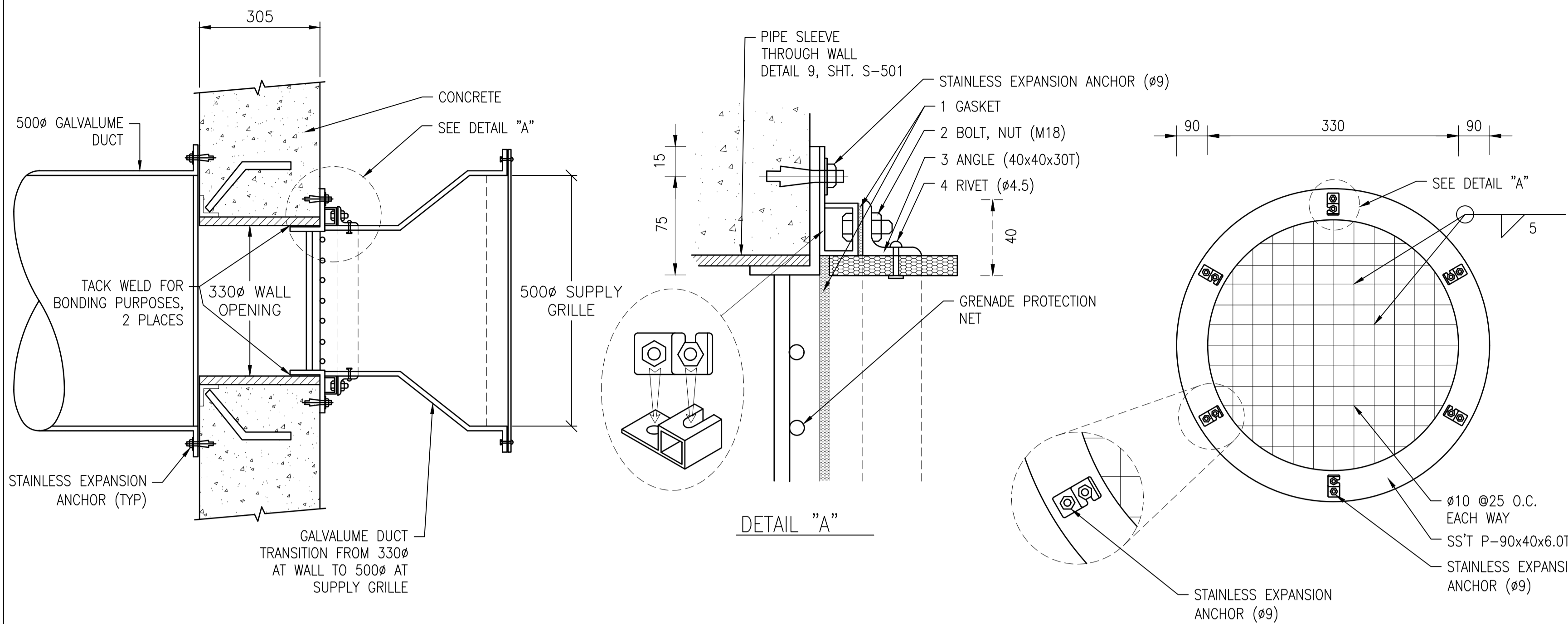
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VIBRATION ISOLATOR SYSTEM					
EQUIP. NO.	QTY	ISOLATOR TYPE	DEF. (MM)	QTY/UNIT (EA)	REMARK
SSAC-1	1	RESTRAINED SPRING	25	4	



VIBRATION ISOLATOR

VIBRATION ISOLATION- AIR COND. UNIT

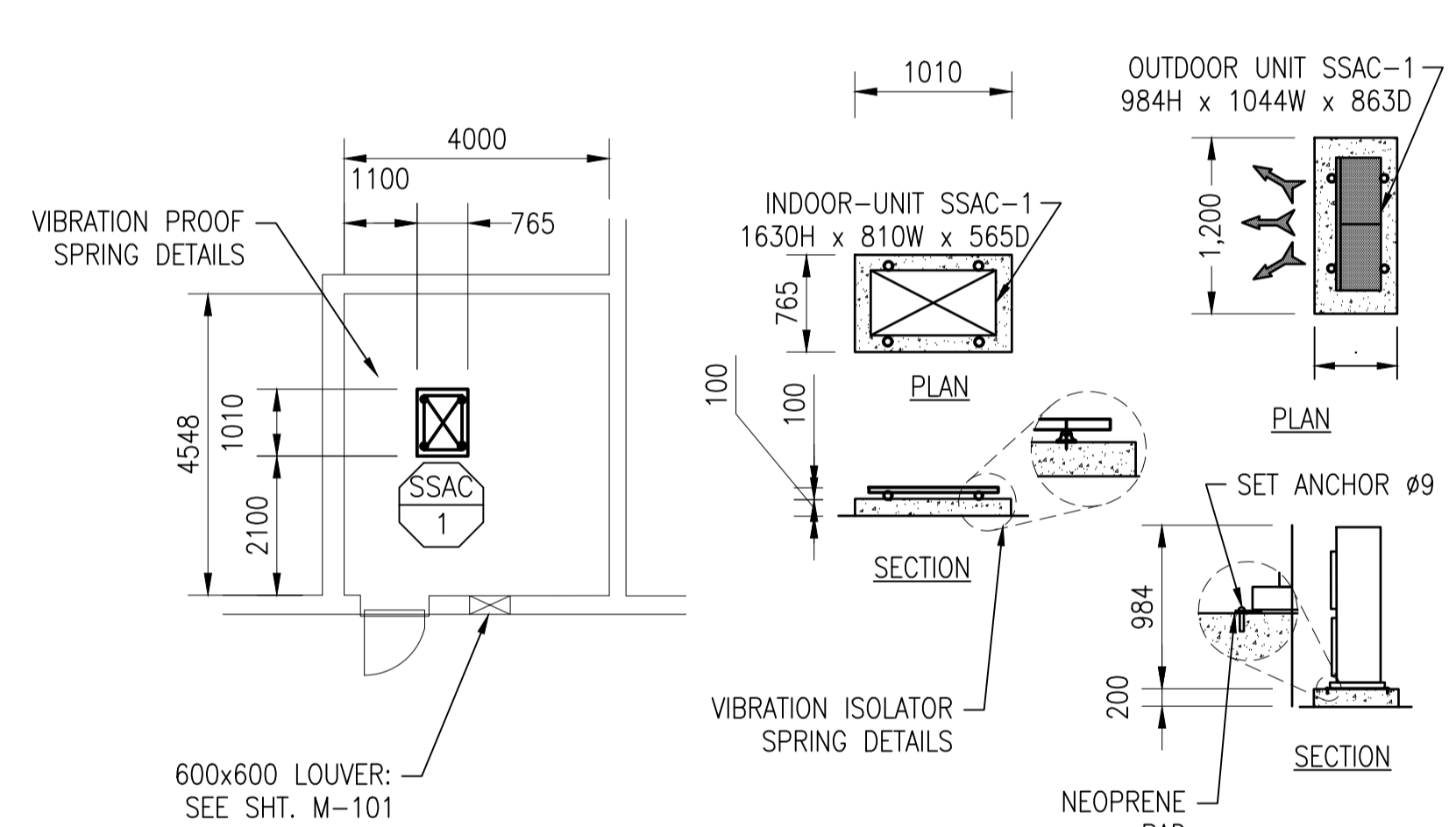


DETAIL "A"

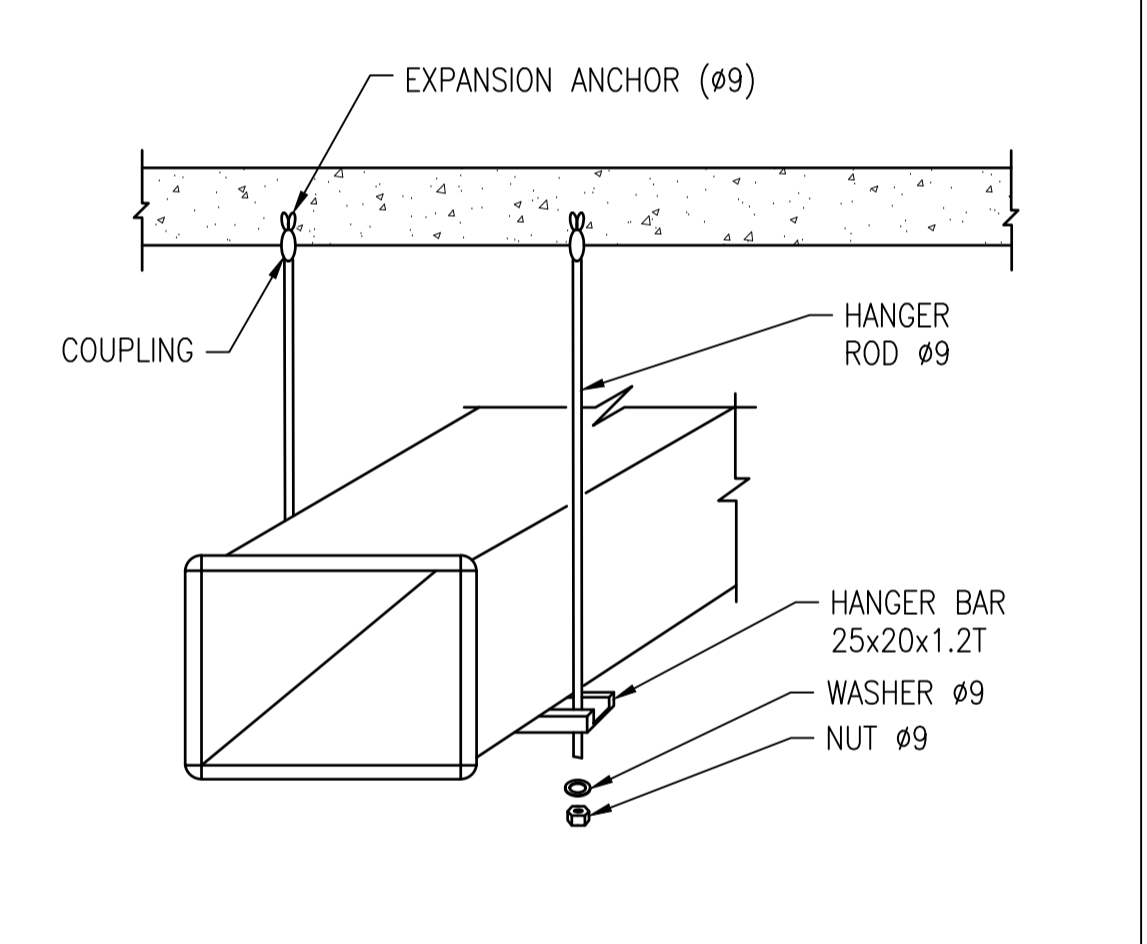
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M-01 VIBRATION ISOLATOR SCHEDULE

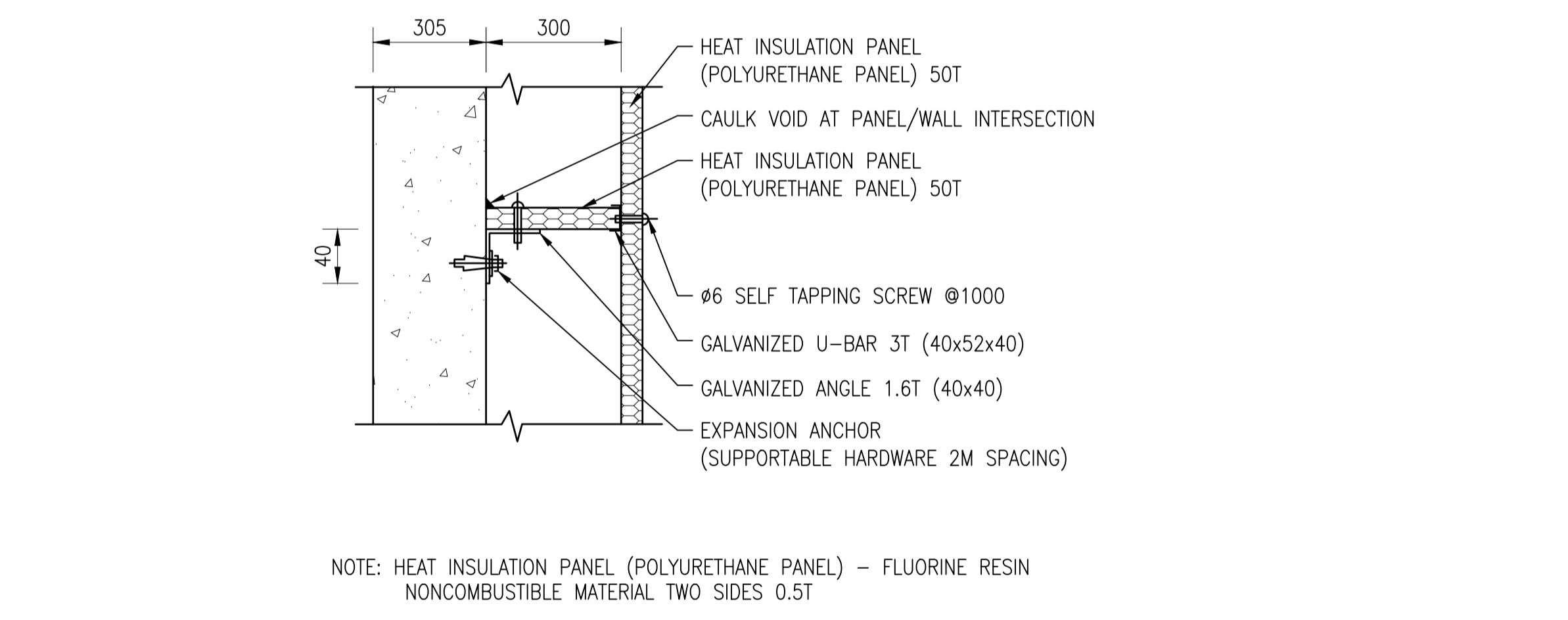
M-02 DUCT THROUGH MAGAZINE WALL DETAIL (MVD-1 DUCT BRANCH)



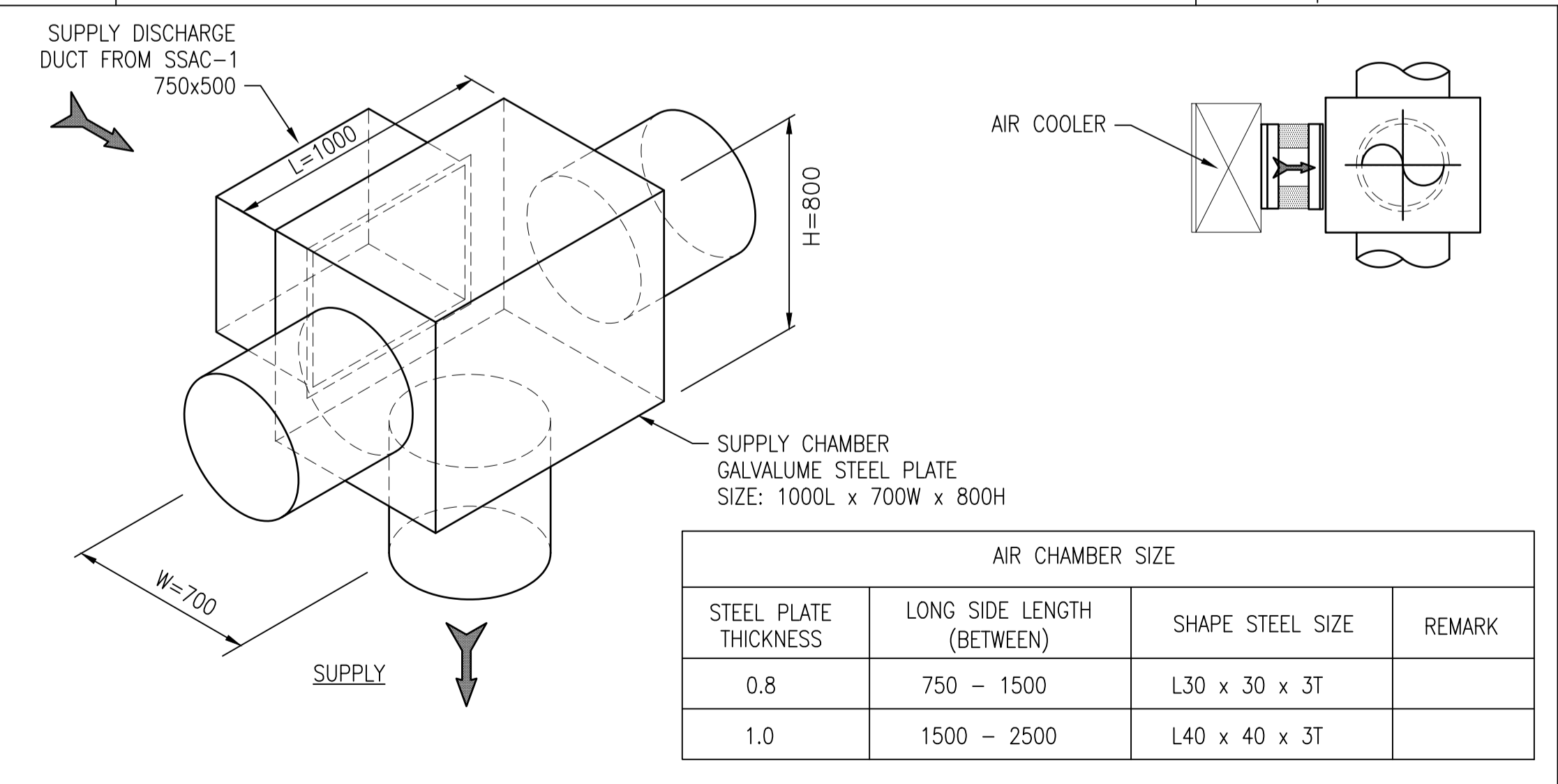
M-03 AIR CONDITIONER AND CONDENSER FOUNDATION PAD DETAIL



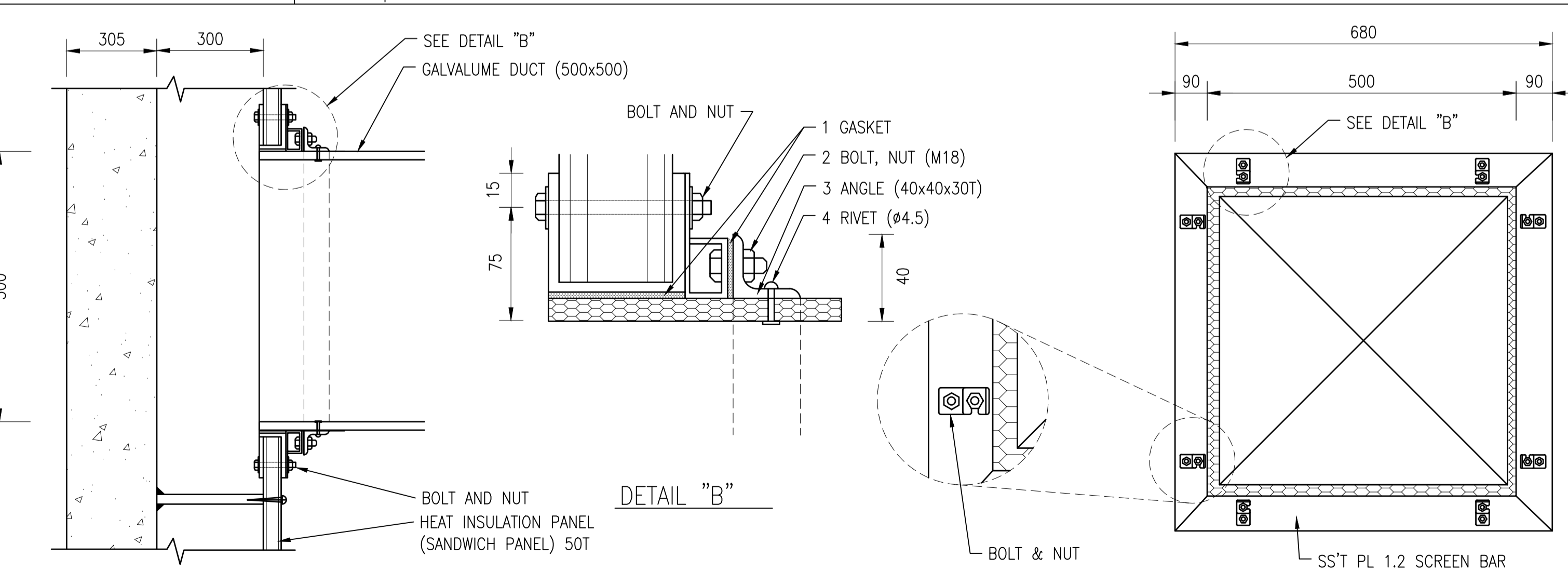
M-04 DUCT HANGER DETAIL



M-05 HEAT INSULATION PANEL (POLYURETHANE PANEL)



M-06 SUPPLY CHAMBER DETAIL



M-07 HEAT INSULATION PANEL - DUCT COUPLING DETAIL (MVD-3-1 DUCT BRANCH)

APPROVED: _____ DATE: _____

FOR COMMANDER NAIFAC: _____

ACTIVITY: _____

SATISFACTORY TO: _____ DATE: _____

DES: <<CM/DM>> DRW: DBC CHK: RCK

BRANCH MANAGER: _____

SGN PRD DR: WILLIAM FORBES, P.E.

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC
NAIFAC
NAIFAC STATION

MODULAR STORAGE MAGAZINE
SSAC MECHANICAL DETAILS

SCALE: AS NOTED

EPROJECT NO.: _____

CONSTR. CONTR. NO.: _____

NAIFAC DRAWING NO.: 14063846

SHEET 41 OF 53

M-501

NAIFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017

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FILE NAME: J:\CSE\Magazines\New Standard MSN Revisions 2018\CADD\M-501.dwg LAYOUT NAME: M-501 PLOTTED: Tuesday, July 02, 2019 - 2:20pm USER: kous.gud

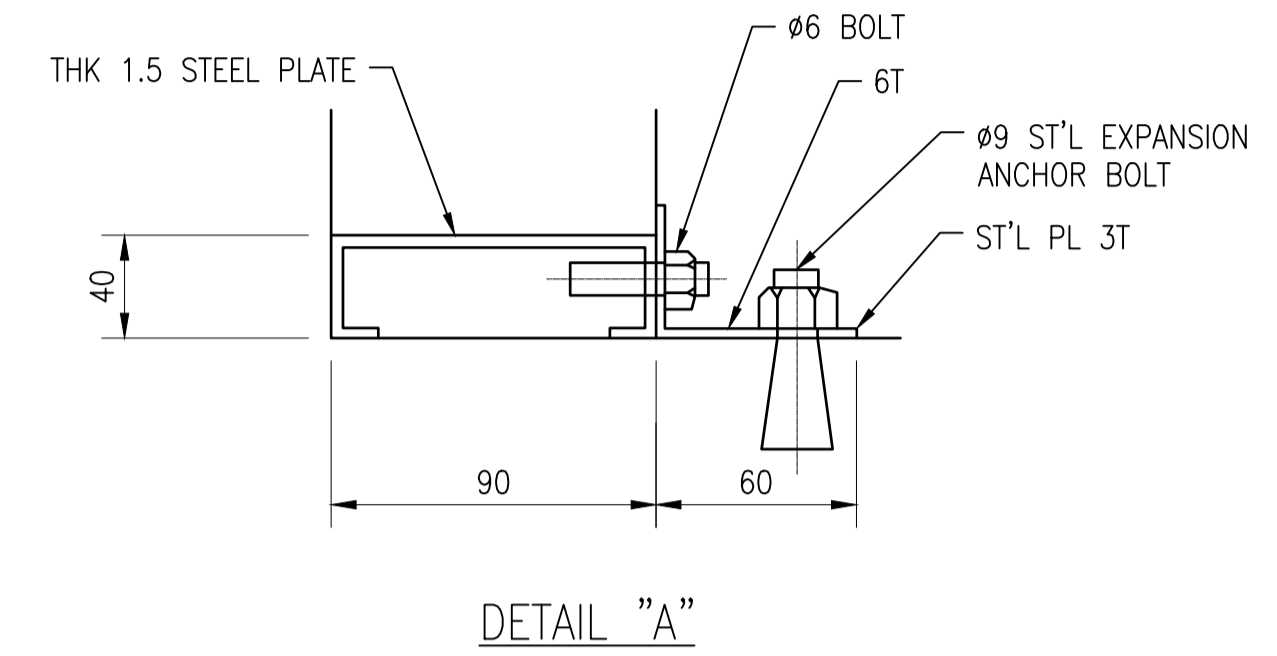
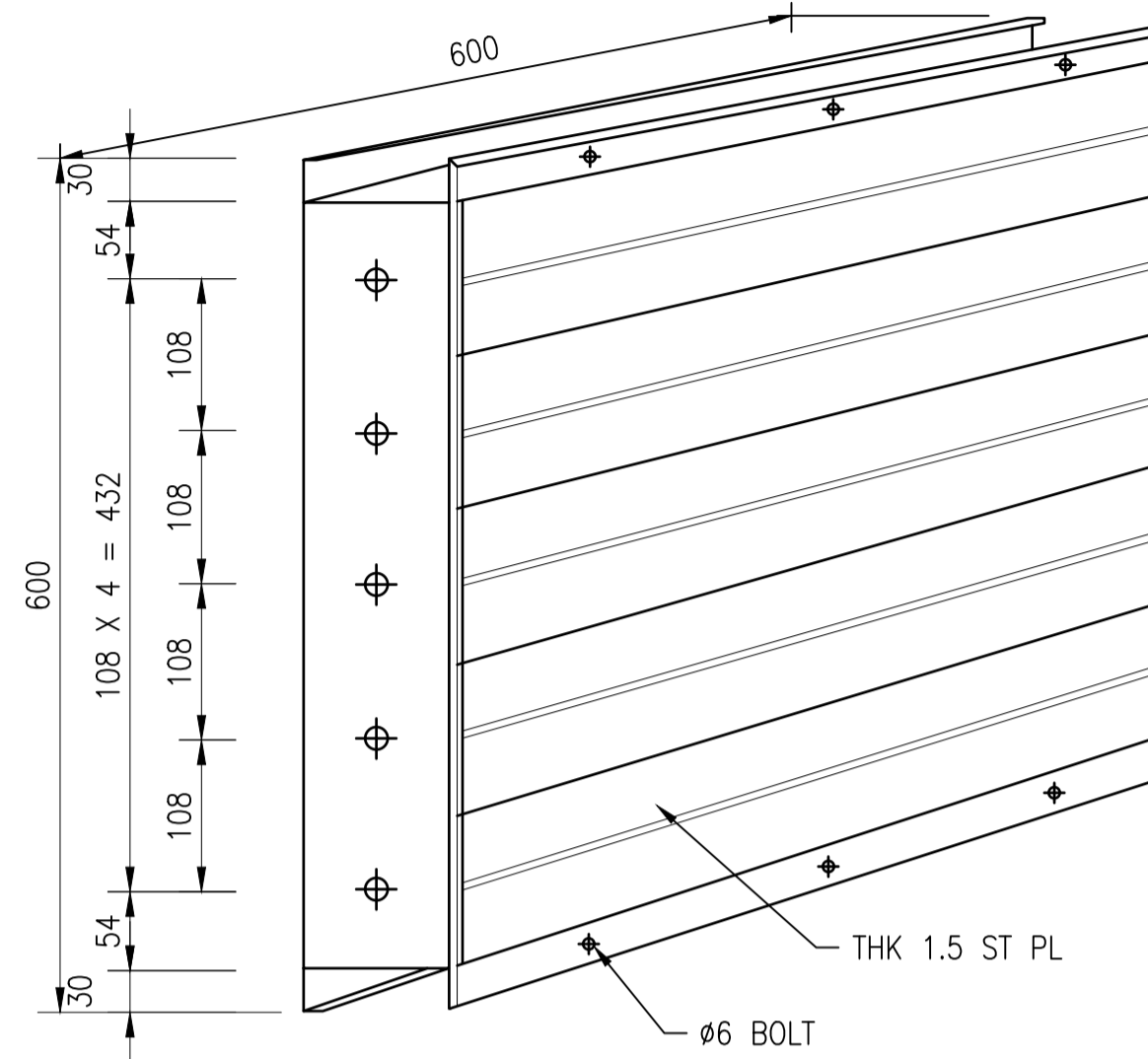
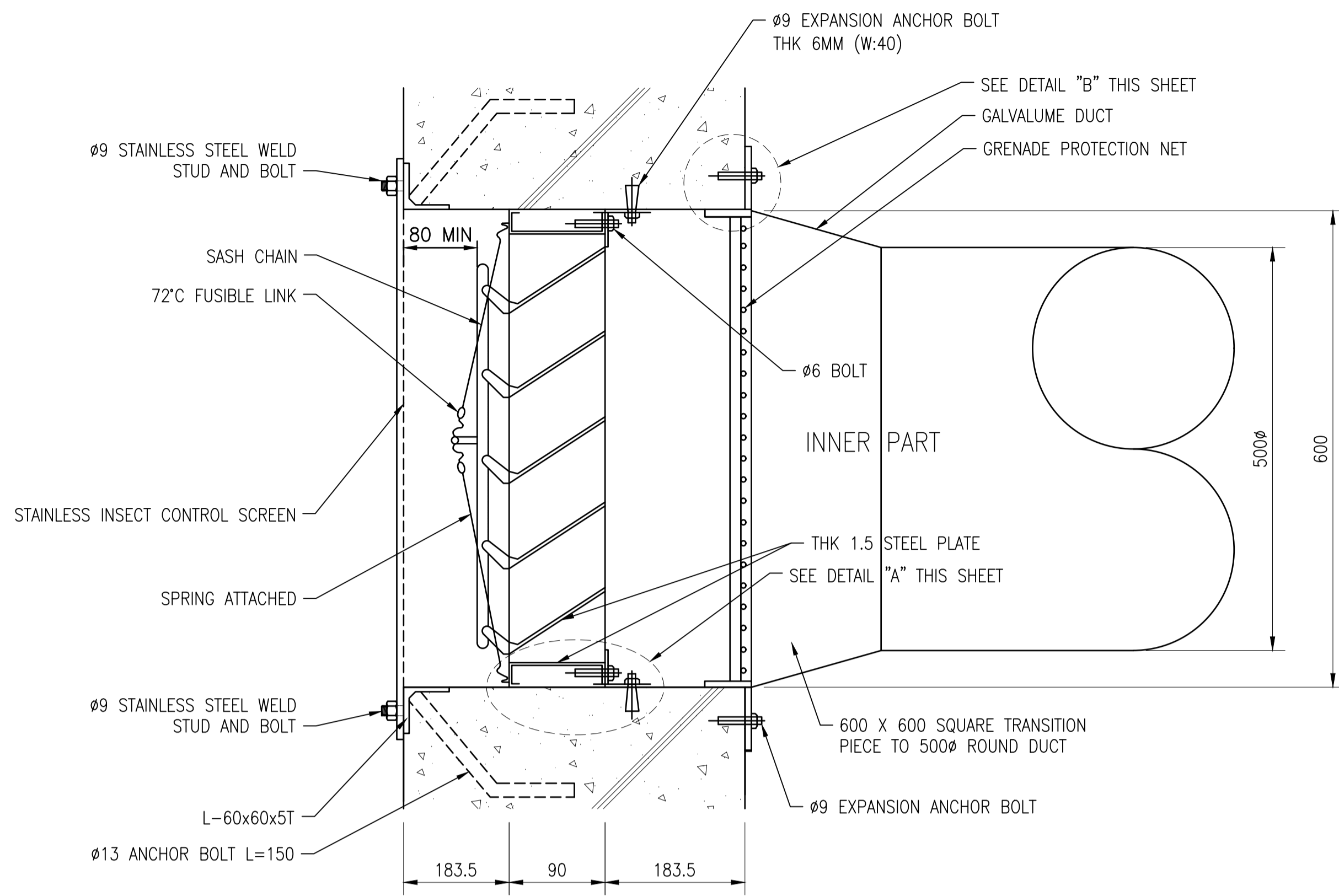
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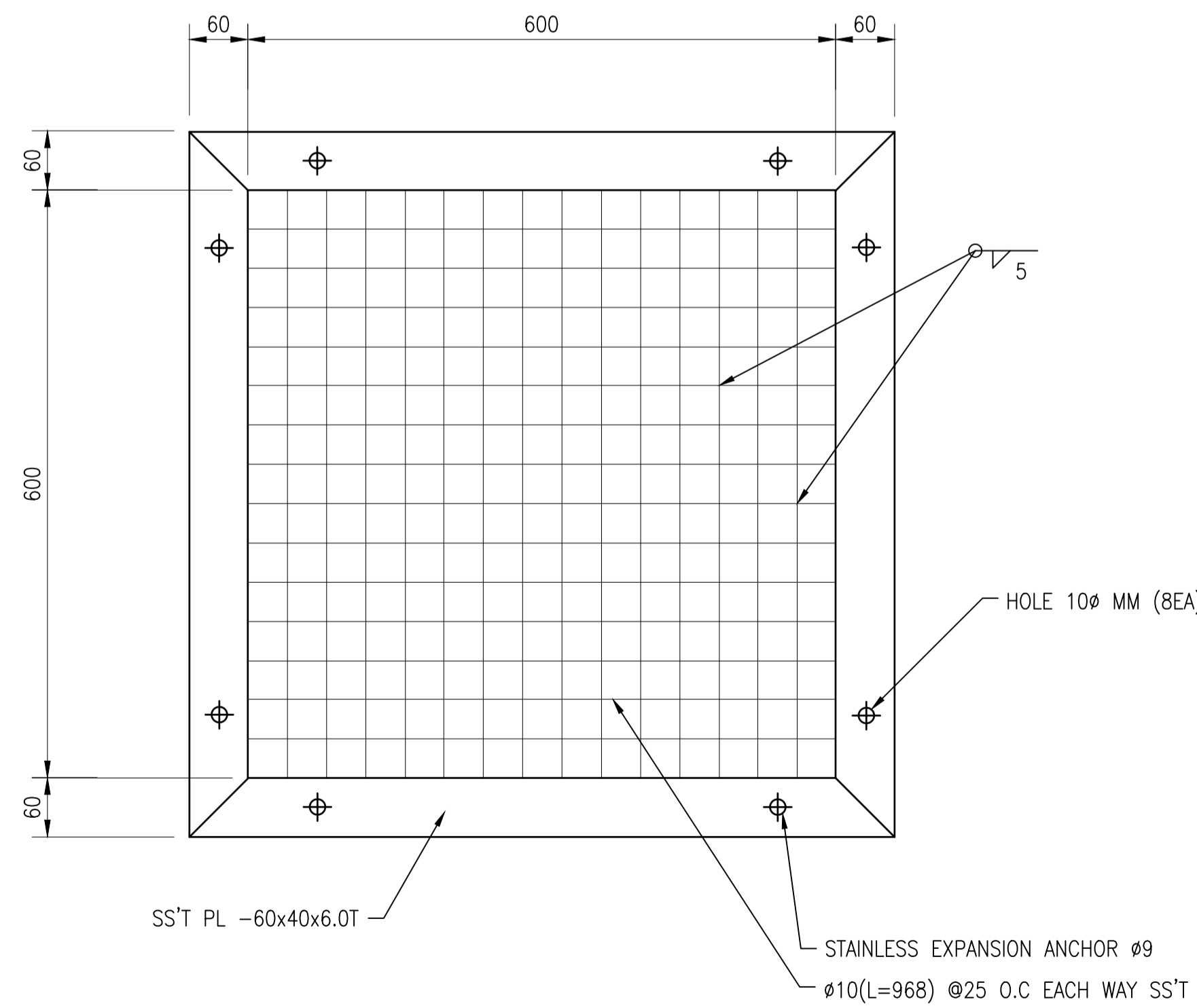
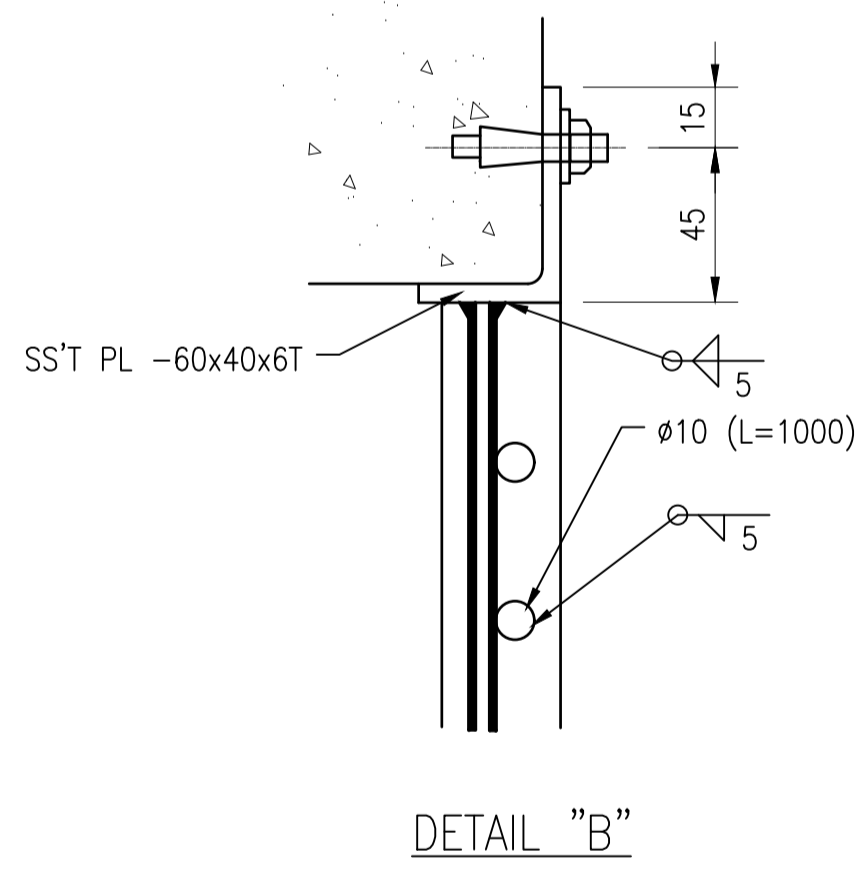
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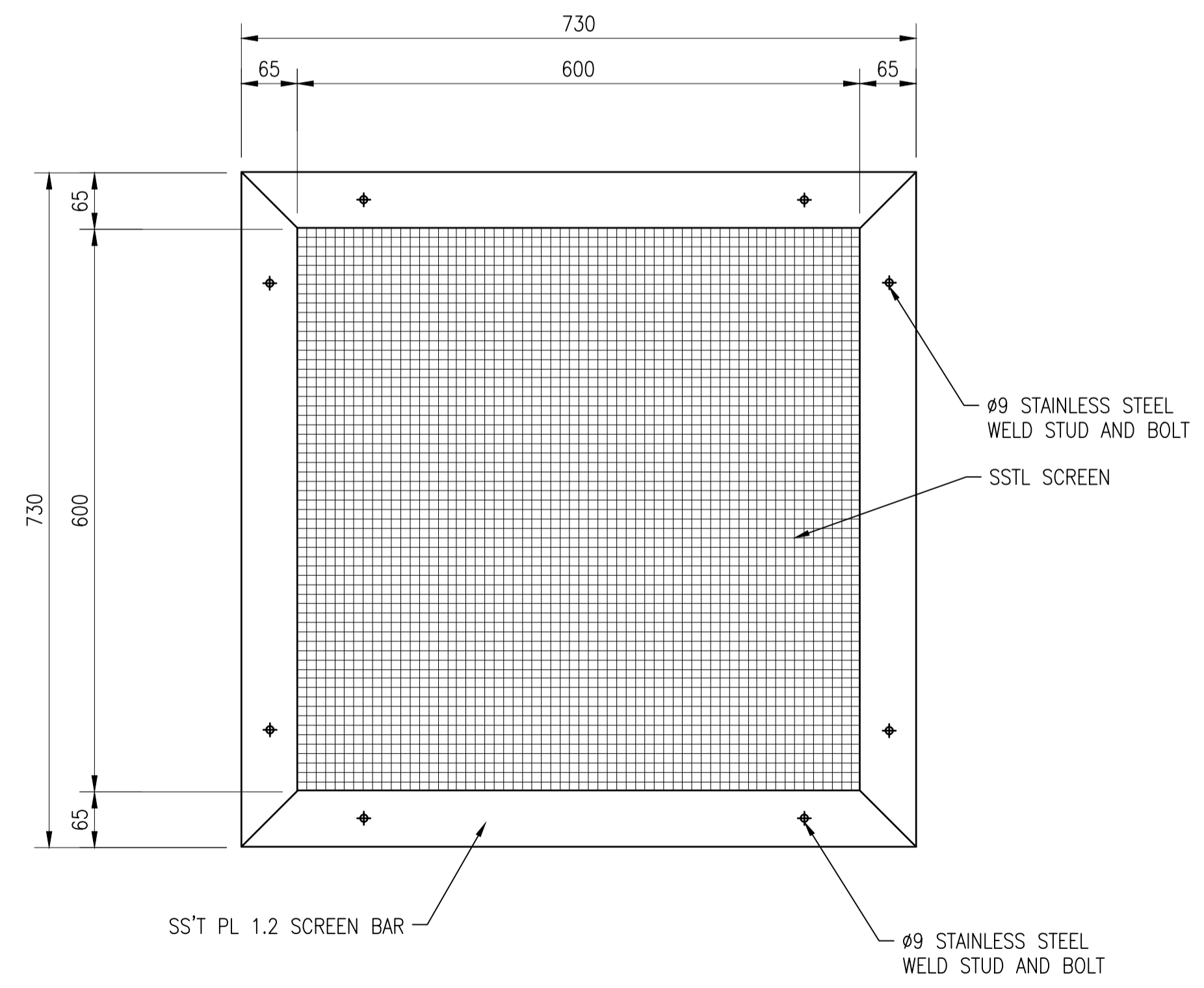
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OPERABLE FIRE DAMPER/LOUVER
 NOTE: PROVIDE LOUVER AND SEPARATE FIRE DAMPER IF UNABLE TO LOCATE OPERABLE FIRE DAMPER/LOUVER.



GRENADe PROTECTION NET



STAINLESS INSECT CONTROL SCREEN

M-08

VENT HOLE, LOUVER, AND GRENADE PROTECTION NET DETAILS (MVD-4 DUCT BRANCH)

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FILE NAME: J:\CSE\Magazines\NSM\Standards\NSM Revisions 2018\NAVFAC STANDARD 2018\CADD\M-502.dwg PLOTTED: Tuesday, July 02, 2019 - 2:20pm USER: kous.gud

NO.	DESCRIPTION	DATE	APPR.



APPROVED: _____
 FOR COMMANDER NAVFAC
 ACTIVITY
 SATISFACTORY TO: _____ DATE
 DES: <<CM/DM>> DRW: DBC CHK: RCK
 BRANCH MANAGER
 EGN: PRD DR: WILLIAM FORBES, P.E.

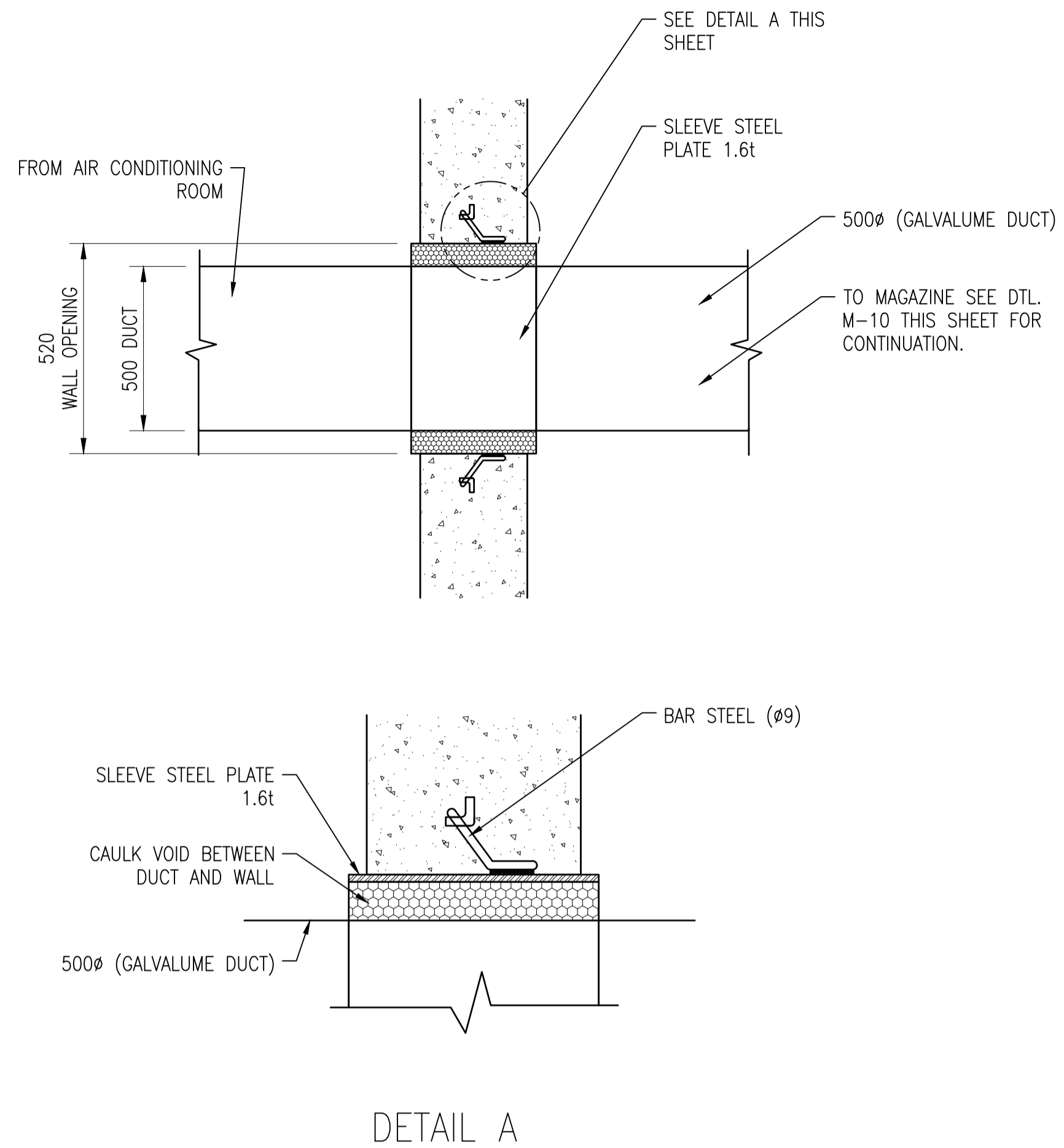
DEPARTMENT OF THE NAVY
 NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC
 NAVAL STATION
 NORFOLK, VIRGINIA

MODULAR STORAGE MAGAZINE
 SSAC MECHANICAL DETAILS

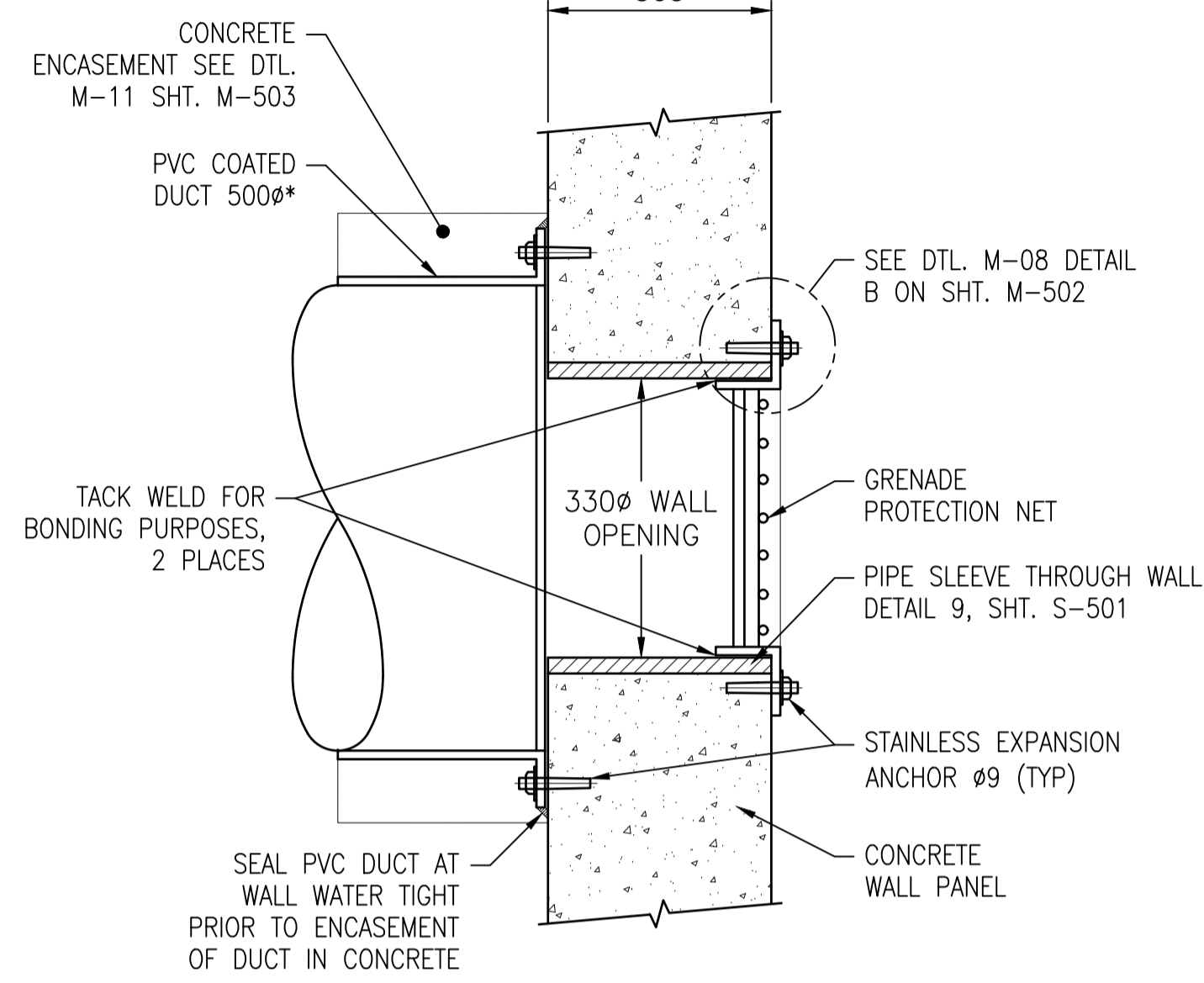
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 CONSTR. CONTR. NO.
 NAVFAC DRAWING NO.: 14063847
 SHEET 42 OF 53
M-502

NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017

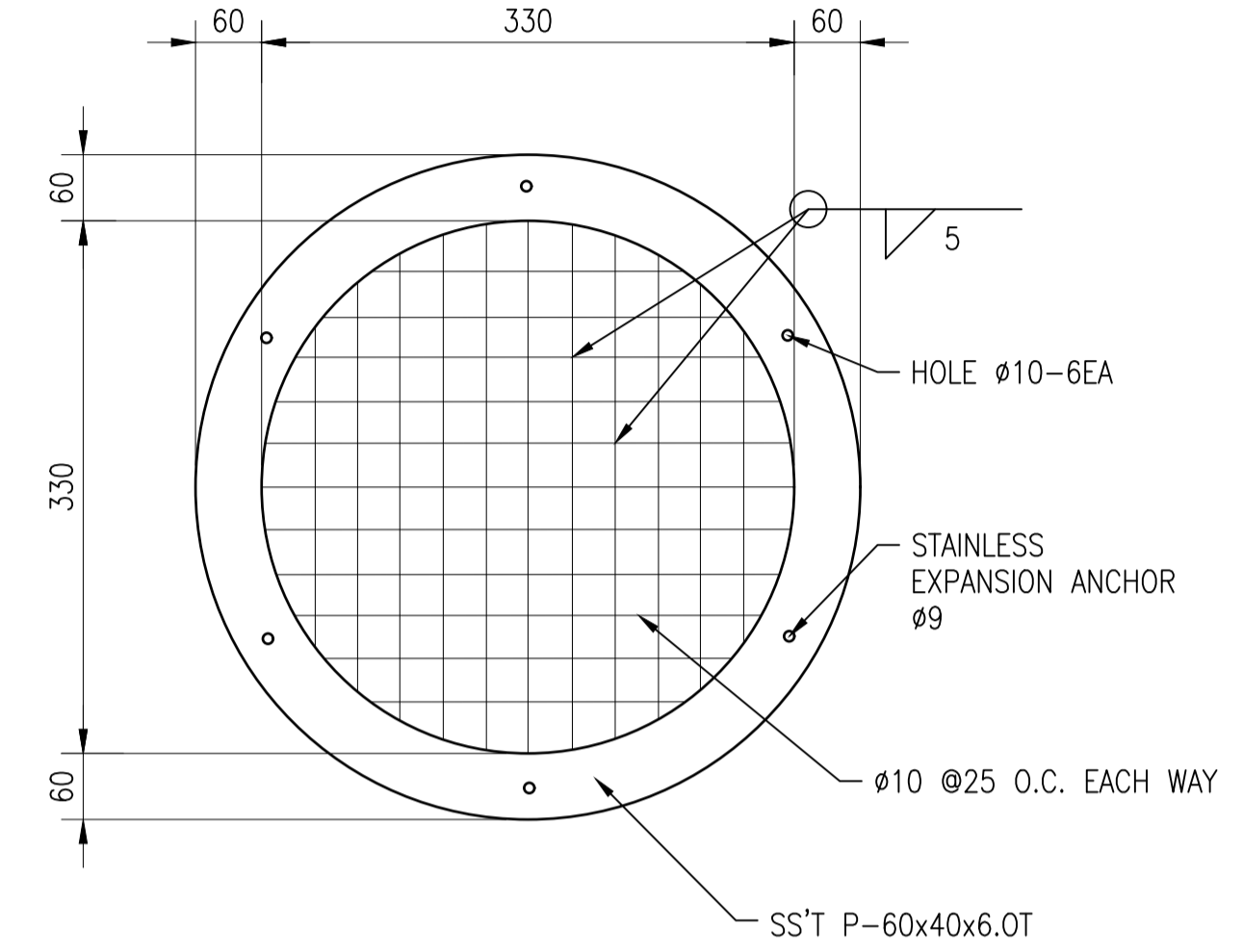
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DETAIL A



* THE RETURN/ EXHAUST BRANCH TO MVD-3 IS 500ø AND THE TWO GROUND COOLING MODE SUPPLY CONNECTIONS ARE 350ø.

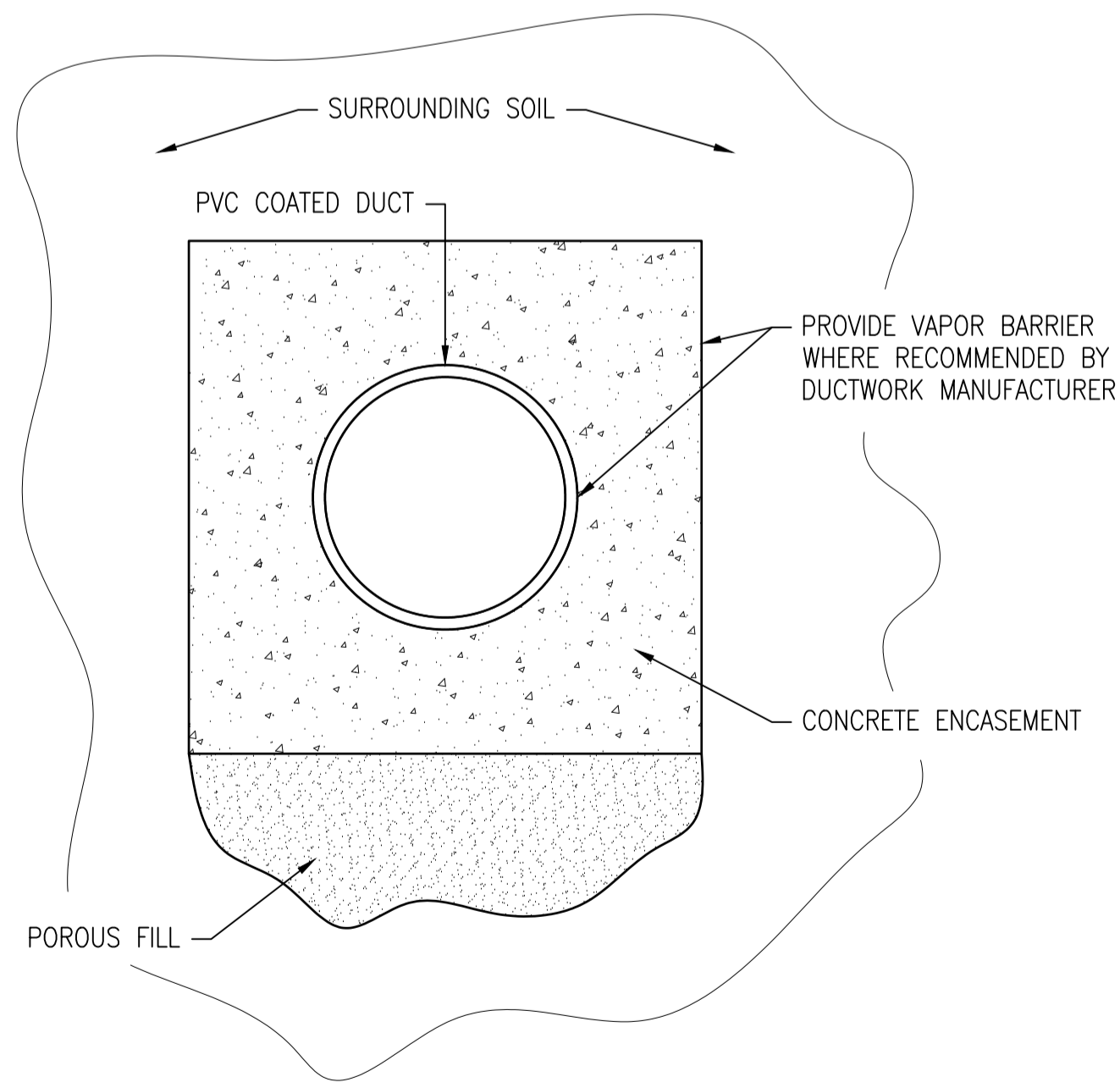


M-09 DUCT THROUGH MECHANICAL ROOM WALL DETAIL (MVD-1, MVD-2 & MVD-3 DUCT BRANCH)

M-10 GRENADE PROTECTION NET DETAIL AT MAGAZINE WALL (MVD-2 & MVD-3 DUCT BRANCH)

NOTES:

1. DUCTWORK AND FITTINGS INSTALLED UNDERGROUND SHALL BE GALVANIZED STEEL WITH A POLYVINYL CHLORIDE (PVC) PLASTIC COATING THAT HAS BEEN SPECIALLY DEVELOPED TO RESIST CORROSION IN UNDERGROUND AND CONCRETE ENCASED UNDERGROUND DUCTWORK APPLICATIONS.
2. INSTALL DUCTWORK AND FITTINGS IN ACCORDANCE WITH DUCTWORK MANUFACTURERS RECOMMENDATIONS.
3. TRENCHES SHALL BE PITCHED TO PREVENT THE BUILDUP OF WATER AROUND THE DUCTWORK.
4. DUCTWORK SHALL BE TIED DOWN TO AVOID FLOATING DURING POURING OF CONCRETE ENCASEMENT.
5. WATER BASED DUCT SEALANTS SHALL NOT BE USED IN UNDERGROUND APPLICATIONS.
6. CONCRETE MUST NOT BE POURED DIRECTLY ONTO THE DUCTWORK. IT SHALL BE POURED IN SUCCESSIVE LAYERS AND TAMPED FIRMLY AROUND THE DUCTWORK. POURING FILL OR CONCRETE DIRECTLY ONTO THE DUCTWORK WILL CAUSE DENTING OR COLLAPSE.



M-11 CONCRETE ENCASED DUCTWORK

DUCT CONSTRUCTION / LEAK TEST SCHEDULE				
SYSTEM	PRESSURE CLASS (Pa)	SEAL CLASS	LEAK CLASS	TEST TYPE
SSAC-1 SUPPLY, RETURN AND EXHAUST AIR	+500/-500	A	12/6	NOTE 1
NOTE: 1. TEST PER SMACNA HVAC AIR DUCT LEAKAGE MANUAL.				

M-12 DUCT CONSTRUCTION / LEAK TEST SCHEDULE

APPR	DATE						
SYN	DESCRIPTION						
MODULAR STORAGE MAGAZINE SSAC MECHANICAL DETAILS							
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC NORFOLK, VIRGINIA NAVAL STATION							
SCALE: AS NOTED EPROJECT NO.: CONSTR. CONTR. NO.:							
NAVFAC DRAWING NO.: 14063848 SHEET 43 OF 53							
M-503							
<small>NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017</small>							

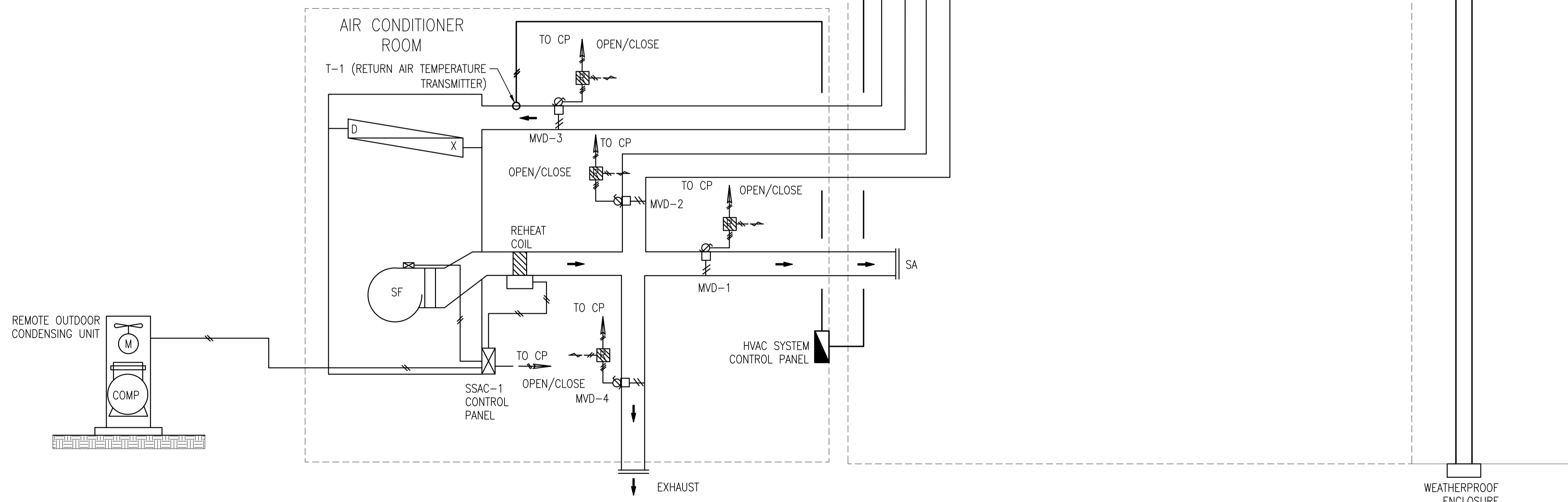
FILE NAME: c:\cse\magazine\NSM\Nav Standard\NSM Revisions 2018\CADD\M-801.dwg LAYOUT NAME: M-801 PLOTTED: Tuesday, July 02, 2019 - 2:20pm USER: kuis.gud

SEQUENCE OF OPERATION

1. PLACING SYSTEM "ON-OFF" SWITCH AT THE HVAC SYSTEM CONTROL PANEL IN THE "ON" POSITION SHALL ENERGIZE SYSTEM AND START SUPPLY FAN.
2. POSITION OF DAMPER MODE SWITCH AT HVAC SYSTEM CONTROL PANEL SHALL DETERMINE WHICH MODE SYSTEM IS IN AND SHALL POSITION THE DAMPERS ACCORDINGLY. THE THREE MODES OF OPERATION ARE AS DESCRIBED BELOW:
 MODE 1: MAGAZINE COOLING MODE
 MODE 2: GROUND HEAT STORAGE COOLING MODE
 MODE 3: EXHAUST MODE
 DAMPER POSITION FOR THE THREE DIFFERENT MODES SHALL BE AS INDICATED ON THE FOLLOWING TABLE:

	MODE-1	MODE-2	MODE-3	REMARK
MVD-1	0	X	X	
MVD-2	X	0	X	
MVD-3	0	0	0	
MVD-3-1	0	X	0	
MVD-4	X	X	0	

3. RETURN AIR DUCT MOUNTED TEMPERATURE TRANSMITTER SHALL ENABLE THE COOLING SYSTEM TO CYCLE AS REQUIRED TO MAINTAIN MAGAZINE TEMPERATURE AT OR BELOW 30°C (ADJUSTABLE). TEMPERATURE CONTROL POTENTIOMETER SHALL BE PROVIDED AT HVAC SYSTEM CONTROL PANEL FOR ADJUSTMENT OF SYSTEM CONTROL TEMPERATURE.
4. MAGAZINE LOCATED DEWPOINT TEMPERATURE TRANSMITTER SHALL OVERRIDE THE TEMPERATURE CONTROLLER AND COOLING FUNCTION OF SSAC-1 AS REQUIRED TO MAINTAIN DEWPOINT TEMPERATURE OF MAGAZINE AT OR BELOW 15.5°C (ADJUSTABLE). THE COOLING SHALL CONTINUE TO BE ENABLED UNTIL THE SPACE DEWPOINT TEMPERATURE HAS BEEN LOWERED TO THE SETPOINT. REHEAT COIL SHALL BE ENERGIZED WHEN COOLING SYSTEM IS IN OVERRIDE DEHUMIDIFICATION MODE AND SHALL STAGE (4 STEPS) AS REQUIRED TO MAINTAIN RETURN AIR TEMPERATURE AT OR ABOVE 30°C. DEWPOINT TEMPERATURE CONTROL POTENTIOMETER SHALL BE PROVIDED AT HVAC SYSTEM CONTROL PANEL FOR ADJUSTMENT OF SYSTEM CONTROL DEWPOINT TEMPERATURE. DEWPOINT TEMPERATURE TRANSMITTER AND TEMPERATURE AND HUMIDITY SENSORS LOCATED IN MAGAZINE SHALL BE COMPATIBLE FOR INSTALLATION IN HAZARDOUS AREA, WITH CLASSIFICATIONS OF CLASS 1, DIVISION 1, AND CLASS 1, DIVISION 2, GROUPS C AND D.
5. INDICATOR LAMPS SHALL BE PROVIDED AT THE HVAC SYSTEM CONTROL PANEL FOR SYSTEM ON (GREEN), SYSTEM OFF (AMBER), DAMPER MODE POSITION (GREEN (3)), COOLING ON (GREEN), COOLING OFF (AMBER), REHEAT ON (GREEN), REHEAT OFF (AMBER), AND SYSTEM MALFUNCTION (RED).
6. MONITOR MAGAZINE TEMPERATURE AND RELATIVE HUMIDITY.



NO.	DATE	APPR.



SEAL
A/E INFO

APPROVED
FOR COMMANDER NAVFAC
ACTIVITY

SATISFACTORY TO DATE
DES <<CM/DM>>
DRW DBC CHK RCK
BRANCH MANAGER
SGN PRD DR WILLIAM FORBES, P.E.

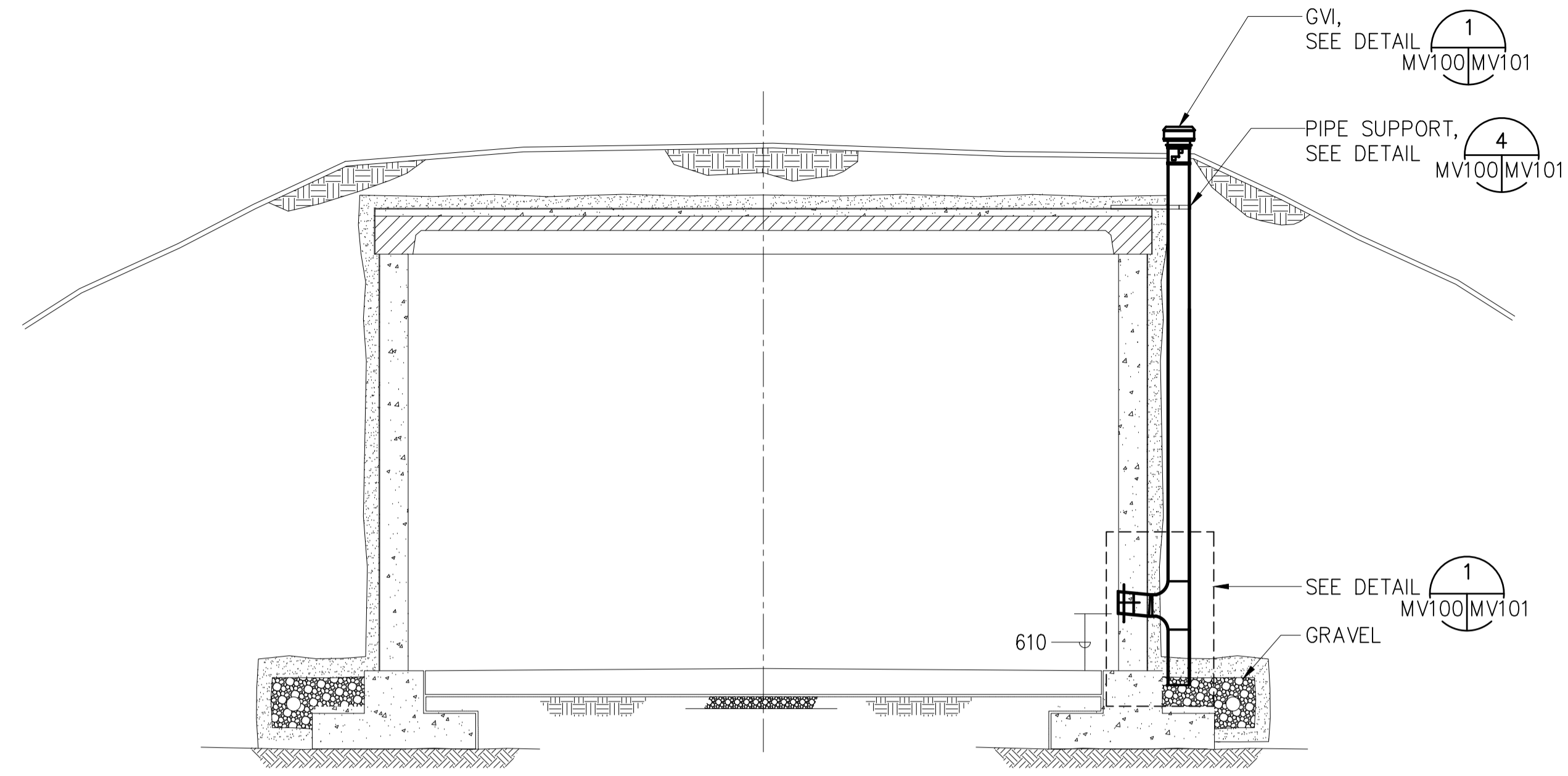
DEPARTMENT OF THE NAVY
 NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC
 NORFOLK, VIRGINIA
MODULAR STORAGE MAGAZINE
 AIR CONDITIONING MECHANICAL CONTROL DIAGRAM

SCALE: AS NOTED
E/PROJECT NO.:
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 14063849
SHEET 44 OF 53
M-801

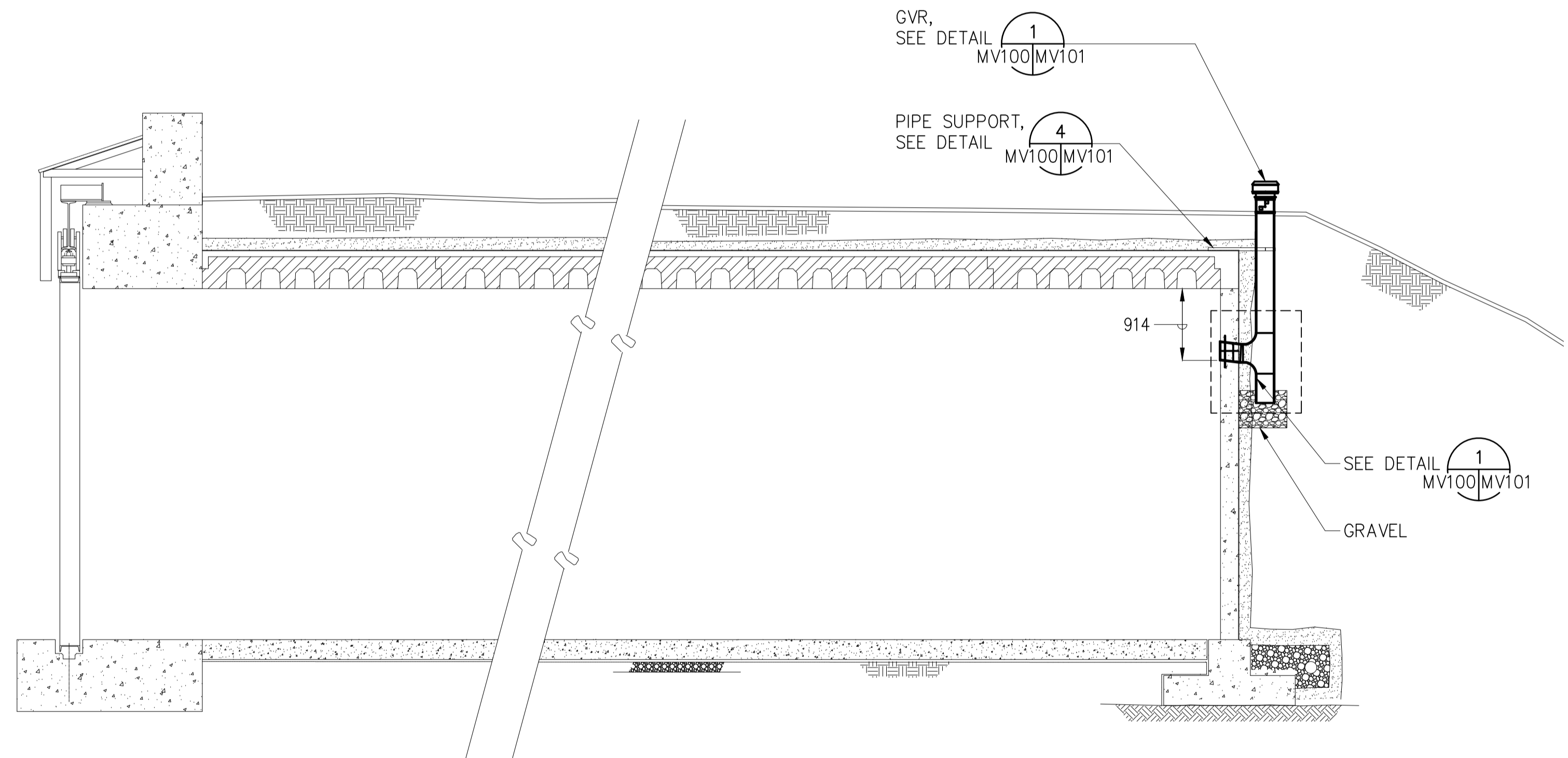
NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017

VENTILATORS

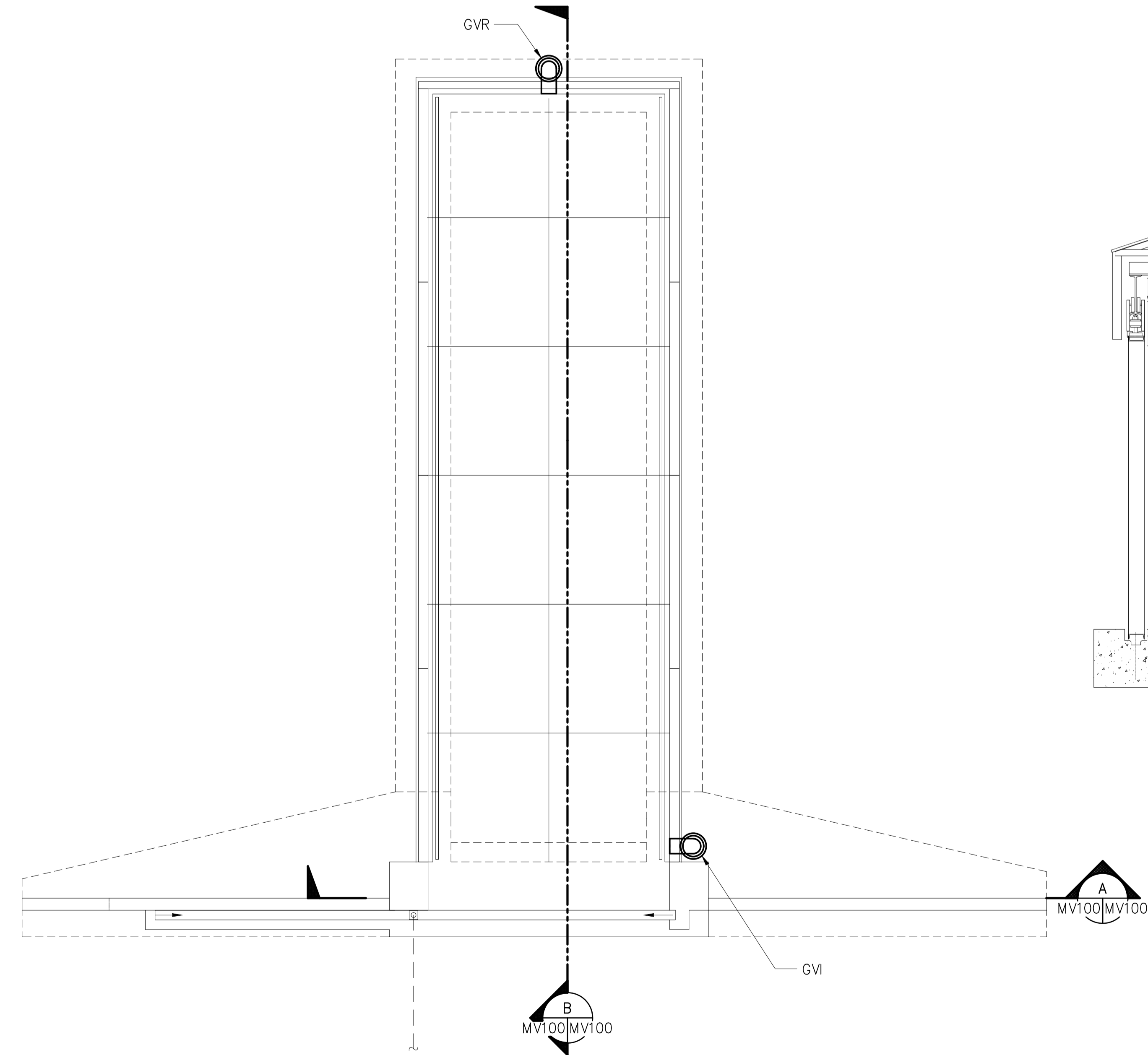
MARK	LOCATION/SERVICE	TYPE	REMARKS
GVR	MUNITION MSM/ VENTILATION	GRAVITY VENTILATOR (RELIEF)	STAINLESS STEEL GRAVITY VENTILATOR FABRICATED AS SHOWN IN PLAN OR APPROVED EQUAL
GVI	MUNITION MSM/ VENTILATION	GRAVITY VENTILATOR (INTAKE)	STAINLESS STEEL GRAVITY VENTILATOR FABRICATED AS SHOWN IN PLAN OR APPROVED EQUAL



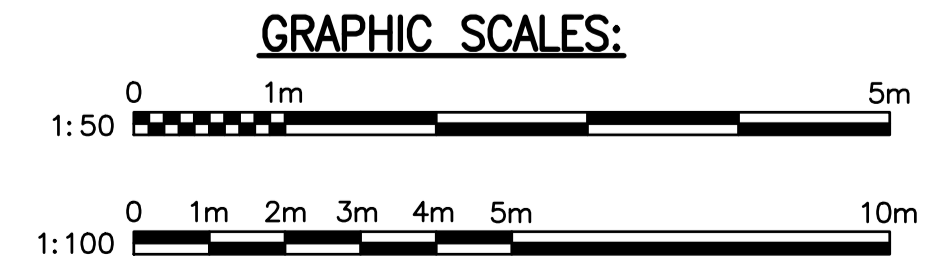
A SECTION
MV100 MV100 SCALE: 1:50



B SECTION
MV100 MV100 SCALE: 1:50



PLAN
SCALE: 1:100



NO.	DESCRIPTION	DATE	APPR.



APPROVED	A/E RFD
FOR COMMANDER NAVFAC	ACTIVITY
SATISFACTORY TO DATE	DATE
DES	DRW DBC CHK RCK
BRANCH MANAGER	EGN PRD DR WILLIAM FORBES, P.E.

DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC	NAVAL STATION
RENOVA, VIRGINIA	RENOVA, VIRGINIA

MODULAR STORAGE MAGAZINE
VENTILATION PLAN AND SECTION FOR NON-AIR CONDITIONING

SCALE:	AS NOTED
PROJECT NO.:	
CONSTR. CONTR. NO.:	
NAVFAC DRAWING NO.:	14063850
SHEET	45 OF 53

FILE NAME: z:\CSE\Waggoner\NSM\Standard MSM Revisions 2018\CADD\MV100.dwg LAYOUT NAME: MV100 PLOTTED: Tuesday, July 02, 2019 - 2:20pm USER: louis.gud

* ABBREVIATIONS

A	AMPS, AMPERES
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
APPROX.	APPROXIMATELY
ATS	AUTOMATIC TRANSFER SWITCH
BC	BARE COPPER
BFG	BELOW FINISHED GRADE
BLDG	BUILDING
BMS	BALANCED MAGNETIC SWITCH
CHH	COMMUNICATIONS HANDHOLE
C	CONDUIT
CKT	CIRCUIT
CONC	CONCRETE
CU	COPPER
DIA	DIAMETER
DWGS	DRAWINGS
EC	EMPTY CONDUIT
EHH	ELECTRICAL HANDHOLE
EU	EUROPEAN
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
G,GND	GROUND
GRSC	GALVANIZED RIGID STEEL CONDUIT
HH	HANDHOLE
HID	HIGH INTENSITY DISCHARGE
HOA	HAND-OFF-AUTO-SWITCH
HPS	HIGH-PRESSURE SODIUM
HT	HEIGHT
HZ	HERTZ
IDS	INTRUSION DETECTION SYSTEM
KAIC	THOUSAND AMPERES INTERRUPTING CAPACITY
KCMIL	THOUSAND CIRCULAR MILS
KV	KILOVOLTS
KVA	KILOVOLTS-AMPERES
KW	KILOWATT
MCB	MOLDED CASE CIRCUIT BREAKER; MAIN CIRCUIT BREAKER
MDP	MAIN DISTRIBUTION PANEL
MIN	MINIMUM
MOV	METAL-OXIDE VARISTOR
MTD	MOUNTED
MTG	MOUNTING
N	NEUTRAL
NTS	NOT TO SCALE
OC	ON CENTER
PC	PHOTOCONTROL
PE	PHOTOELECTRIC
PH	PHASE
PIR	PASSIVE INFRARED
PVC	POLYVINYL CHLORIDE
SDBC	SOFT DRAWN BARE COPPER
SCH	SCHEDULE
SPD	SURGE PROTECTIVE DEVICE
STD	STANDARD
TYP	TYPICAL
UG	UNDERGROUND
UGN	UNGROUNDING NEUTRAL
UON	UNLESS OTHERWISE NOTED
V	VOLT
VA	VOLT-AMPERE(S)
VAC	VOLTS ALTERNATING CURRENT
W	WIRE, WATTS
WP	WEATHERPROOF
XFMR	TRANSFORMER
XPLE	CROSSLINKED POLYETHYLENE
&	AND

*EXTERIOR LEGEND (UNDERGROUND)

— US —	UNDERGROUND SECONDARY CIRCUIT, RUN IN CONDUIT, CONCRETE ENCASED (UON). CIRCUITRY VARIES. SEE RESPECTIVE POWER RISER DIAGRAMS OR SITE PLANS.
— UT —	UNDERGROUND TELEPHONE CIRCUIT, RUN IN CONDUIT, DIRECT BURIED, 50mm, UON. TELEPHONE CABLES PROVIDED BY GOVERNMENT UON. PROVIDE PULL WIRE.
— USC —	UNDERGROUND SECURITY SYSTEM CIRCUIT, RUN IN CONDUIT, DIRECT BURIED, 25mm UNLESS OTHERWISE NOTED. SECURITY CABLES PROVIDED BY GOVERNMENT. PROVIDE PULL WIRE.
— UG —	UNDERGROUND GROUNDING CONDUCTOR, 70mm ² (UON) BARE COPPER, DIRECT BURIED.
— SG —	SECONDARY GROUND RING - UNDERGROUND GROUNDING CONDUCTOR, 70mm ² (UON) BARE COPPER, DIRECT BURIED 1.0 METER BELOW FINISH GRADE (UON)
— G —	GROUNDING CONDUCTOR, 70mm ² (UON) BARE COPPER, RUN EXPOSED ON STRUCTURE
— UG —	CONNECTION OF GROUNDING CONDUCTOR(S). TYPICAL FOR UNDERGROUND CONDUCTORS AND ABOVE GROUND CONDUCTORS. PROVIDE EXOTHERMAL TYPE CONNECTIONS UNLESS OTHERWISE NOTED.

* PLAN LEGEND

	LIGHTING FIXTURE TYPE SYMBOL, SEE LIGHTING FIXTURE SCHEDULE ON SHEET E-313.
	SURGE PROTECTIVE DEVICE
	BRANCH CIRCUIT OR FEEDER WIRING IN CONDUIT.
	BRANCH CIRCUIT OR FEEDER WIRING IN CONDUIT. NO TICK MARKS INDICATE 2 #12 CONDUCTORS & 1 #12 GND. IN 16 mm CONDUIT UON. TICK MARKS, WHEN SHOWN, INDICATE NUMBER OF #12 CONDUCTORS IF OTHER THAN THREE; (✓) INDICATES GROUND. CONDUIT LARGER THAN 16 mm & WIRE LARGER THAN #12 SHALL BE AS INDICATED.
	HOME RUN TO PANEL. PANEL AND CIRCUIT DESIGNATIONS AS INDICATED.
	INDICATES CONDUIT RUN CONCEALED IN CEILING, WALL, OR FLOOR.
	EXPOSED CONDUIT OR DUCT
	ELECTRICAL PANELBOARD
	DUPLEX CONVENIENCE RECEPTACLE WITH INTERNAL GROUND FAULT PROTECTION. 20A., 125 VAC. MOUNT 460 mm AFF UON
	JUNCTION BOX
	SWITCH, MTG HT 1220
	HAND-OFF-AUTO SWITCH
	GROUND CONNECTION
	COPPER-CLAD STEEL GROUND ROD - 19mm x 3050mm (3/4" x 10')
	GROUND TEST WELL
	LIGHTNING PROTECTION AIR TERMINAL
	LED LUMINAIRE
	LED LUMINAIRE WITH BATTERY BACK-UP
	WALL MOUNTED LED LUMINAIRE
	SINGLE POINT GROUND BAR (SPGB)
	MOTOR
	MOTOR WITH DISCONNECT SWITCH, 60=SWITCH RATING, 40=FUSE RATING (NF=NON-FUSIBLE)
	MANUAL TRANSFER SWITCH, 3-POLE, 30-AMP, HEAVY DUTY
	PORTABLE GENERATOR RECEPTACLE
	TELEPHONE CABINET

GENERAL NOTES

1. UNLESS OTHERWISE INDICATED, ALL ELECTRICAL WORK AND MATERIAL IS NEW AND SHALL BE PROVIDED BY THE CONTRACTOR.
2. PROVIDE SURGE PROTECTION FOR ALL CONDUCTORS (ENTERING AND EXITING THE MAGAZINE) IN ACCORDANCE WITH NFPA 780. CONNECT ALL SURGE PROTECTION GROUNDING CONDUCTORS TO THE SECONDARY GROUND RING.
3. IF THE MAGAZINE SPACE IS DETERMINED TO BE A HAZARDOUS (CLASSIFIED) LOCATION, THEN EXTENSIVE REDESIGN IS REQUIRED TO MEET NFPA 70, ARTICLE 500.
4. ALL CONDUIT ENTERING AND INSIDE THE MAGAZINE SHALL BE RGS CONDUIT.

NOTES TO DESIGNER

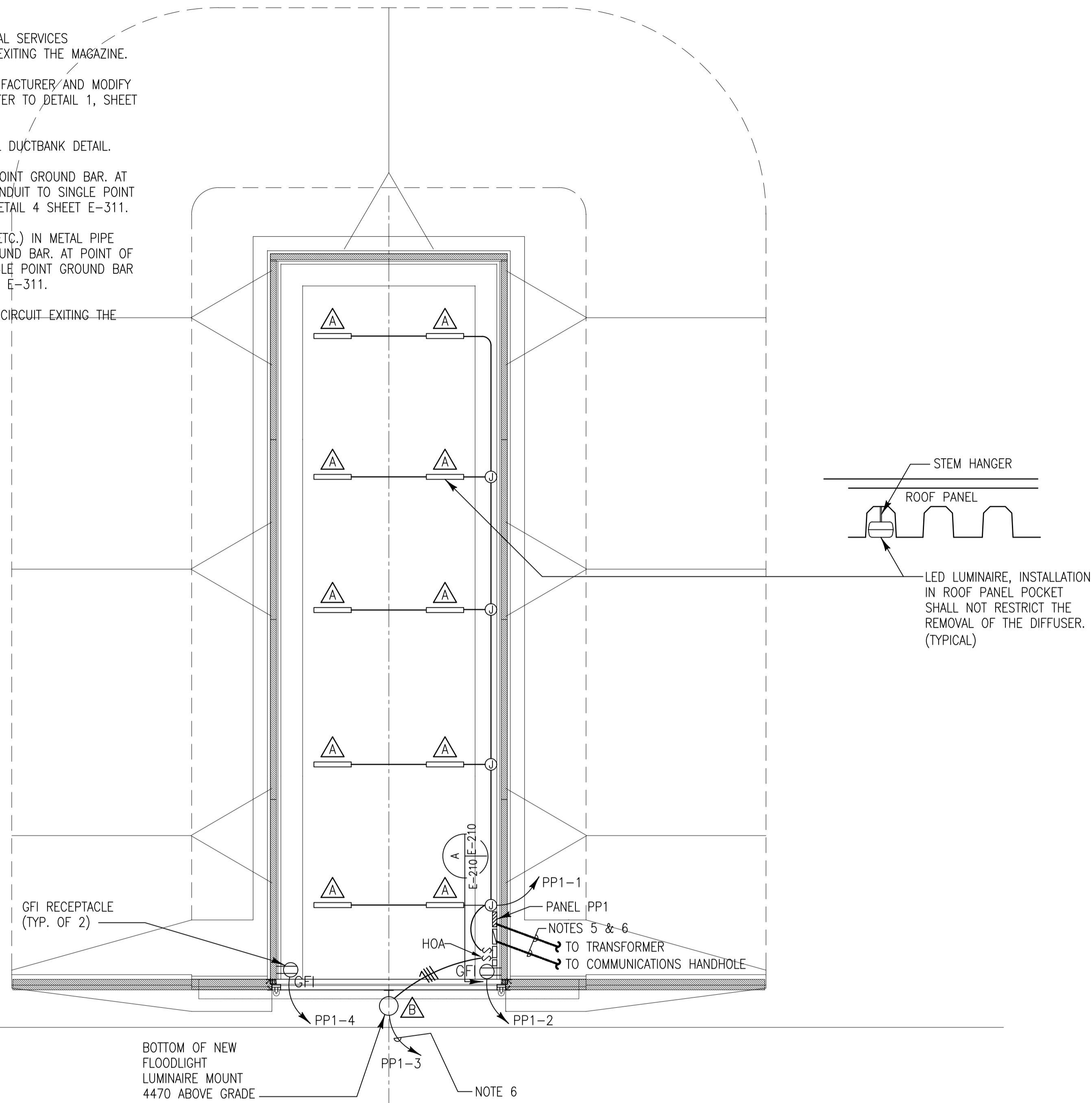
1. A SIGNIFICANT CHANGE MADE TO THE STANDARD DRAWINGS DURING THIS UPDATE IS THAT "THE REQUIREMENT TO CONSIDER ORDNANCE STORAGE MAGAZINES AS HAZARDOUS ELECTRICAL SPACES HAS BEEN DETERMINED BY NOSSA TO NOT BE REQUIRED FOR GENERAL PURPOSE ORDNANCE FACILITIES". THE ONLY PLACE WHERE HAZARDOUS ELECTRICAL EQUIPMENT IS REQUIRED IS IN LOCATIONS WHERE AN EXPLOSIVE ATMOSPHERE (DUST, GASES, VAPORS, ETC PER NFPA 70, ARTICLE 500) MIGHT BE PRESENT, SUCH AS AT AN EXPLOSIVE PRODUCTION FACILITY. THE ORIGINAL OLDER STANDARD DESIGNS FOR THE MAGAZINES INCLUDED THE REQUIREMENT FOR HAZARDOUS ELECTRICAL FIXTURES UNNECESSARILY.
2. THREE FEET WORKING CLEARANCE MUST BE MAINTAINED FOR THE PANELBOARD PER NFPA 70. WHERE MAXIMUM STORAGE SPACE IN THE MAGAZINE IS CRITICAL, PANELBOARD AND SURGE PROTECTIVE DEVICES (SPD) MAY BE LOCATED EXTERIOR OF MAGAZINE. COORDINATE WITH ACTIVITY, AND MODIFY DRAWINGS AND PANELBOARD ENCLOSURE ACCORDINGLY.
3. SINGLE PHASE SYSTEMS IDENTIFIED WILL BE APPROPRIATE FOR MOST MAGAZINES. IF AIR CONDITIONING OR LARGER DOOR MOTORS ARE USED, DESIGNER SHOULD CHOOSE THE MAGAZINE PLAN WITH AIR CONDITIONING AND INCORPORATE APPROPRIATE, MORE EXPENSIVE, THREE PHASE SYSTEM.
4. IF THE PROJECT SITE IS IN A COLD WEATHER CLIMATE, HEAT TRACING MAY BE REQUIRED FOR THE DOOR TRENCH. TYPICAL DETAILS ON HEAT TRACING ARE AVAILABLE AT [HTTP://WWW.WBDG.ORG/FCC/NAVY-NAVFAAC/CAD/ELECTRICAL-DETAILS-MAGAZINE](http://www.wbdg.org/fcc/navy-navfac/cad/electrical-details-magazine)
5. (X) INFORMATION SHOWN IN "ABBREVIATIONS" AND "LEGENDS" IS BASED ON A COMPLETE PROJECT WITH SITE SPECIFIC REQUIREMENTS. COORDINATE (ADD TO / REMOVE) ITEMS THAT ARE NOT APPLICABLE TO THE SPECIFIC PROJECT.
6. DETERMINE ACTUAL ELECTRICAL RATINGS OF THE LOCAL ELECTRICAL PRIMARY DISTRIBUTION SYSTEM.
7. PROVIDE THE ELECTRICAL SYSTEMS IN ACCORDANCE WITH NAVSEA OP 5, VOL 1 : AMMUNITION AND EXPLOSIVES ASHORE SAFETY REGULATIONS FOR HANDLING, STORING, PRODUCTION, RENOVATION AND SHIPPING. AMONG OTHER REQUIREMENTS, ENSURE ALL RESPECTIVE ELECTRICAL SERVICES (POWER, TELEPHONE, SECURITY, ETC.) ARE RUN UNDERGROUND FOR THE LAST 15 METERS. ALSO, ENSURE THE ELECTRICAL SERVICE GROUND IS CONNECTED TO THE SECONDARY GROUND RING.
8. DETERMINE WHICH SPECIALTY SYSTEMS (TELEPHONE, SECURITY, IDS, FIRE ALARM, ETC.) ARE REQUIRED FOR EACH SPECIFIC PROJECT. COORDINATE WITH BOTH THE USING ACTIVITY AND THE REVIEWING FEC TO DETERMINE WHICH ELEMENTS (IF ANY) THE GOVERNMENT DESIRES TO PROVIDE. SYSTEM'S INTERIOR ELEMENTS VERSUS THEIR RESPECTIVE EXTERIOR ELEMENTS ARE SEPARATE ISSUES AND ARE REQUIRED TO BE RESOLVED SEPARATELY.
9. SOME USING ACTIVITIES PREFER ELECTRICAL CONDUITS TO BE RUN EXPOSED, MAXIMIZING THE USE OF THE PORTAL WALL'S OUTDOOR SURFACE. CONFIRM RACEWAY ROUTING PREFERENCES WITH BOTH THE USING ACTIVITY AND THE REVIEWING FEC.

NOTE:
TYPICAL DIMENSIONS AND SPECIFICATIONS ARE PROVIDED. CONSULT WITH ACTIVITY TO DETERMINE REQUIREMENTS BEYOND THOSE SHOWN ON THE DRAWINGS, INCLUDING BUT NOT LIMITED TO WHEEL LOAD RATINGS, BACKFILL REQUIREMENTS, AND HANDHOLE SIZES.

DATE				
DESCRIPTION				
SYN				
APPR				
SEAL				
A/E RPTD				
APPROVED				
FOR COMMANDER NAVFAAC				
ACTIVITY				
SATISFACTORY TO: DATE				
DES: <<CM/DM>> DRW: DBC CHK: RCK				
BRANCH MANAGER				
SGN PRD DIR: WILLIAM FORBES, P.E.				
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC NORFOLK, VIRGINIA NAVAL STATION				
MODULAR STORAGE MAGAZINE				
ELECTRICAL LEGEND, SYMBOLS, ABBREVIATIONS AND GENERAL NOTES				
SCALE: AS NOTED				
EPROJECT NO.:				
CONSTR. CONTR. NO.				
NAVFAAC DRAWING NO. 14063852				
SHEET 47 OF 53				
E-101				
NAVFAAC METRIC DRAWING REVISION: 01 FEBRUARY 2017				

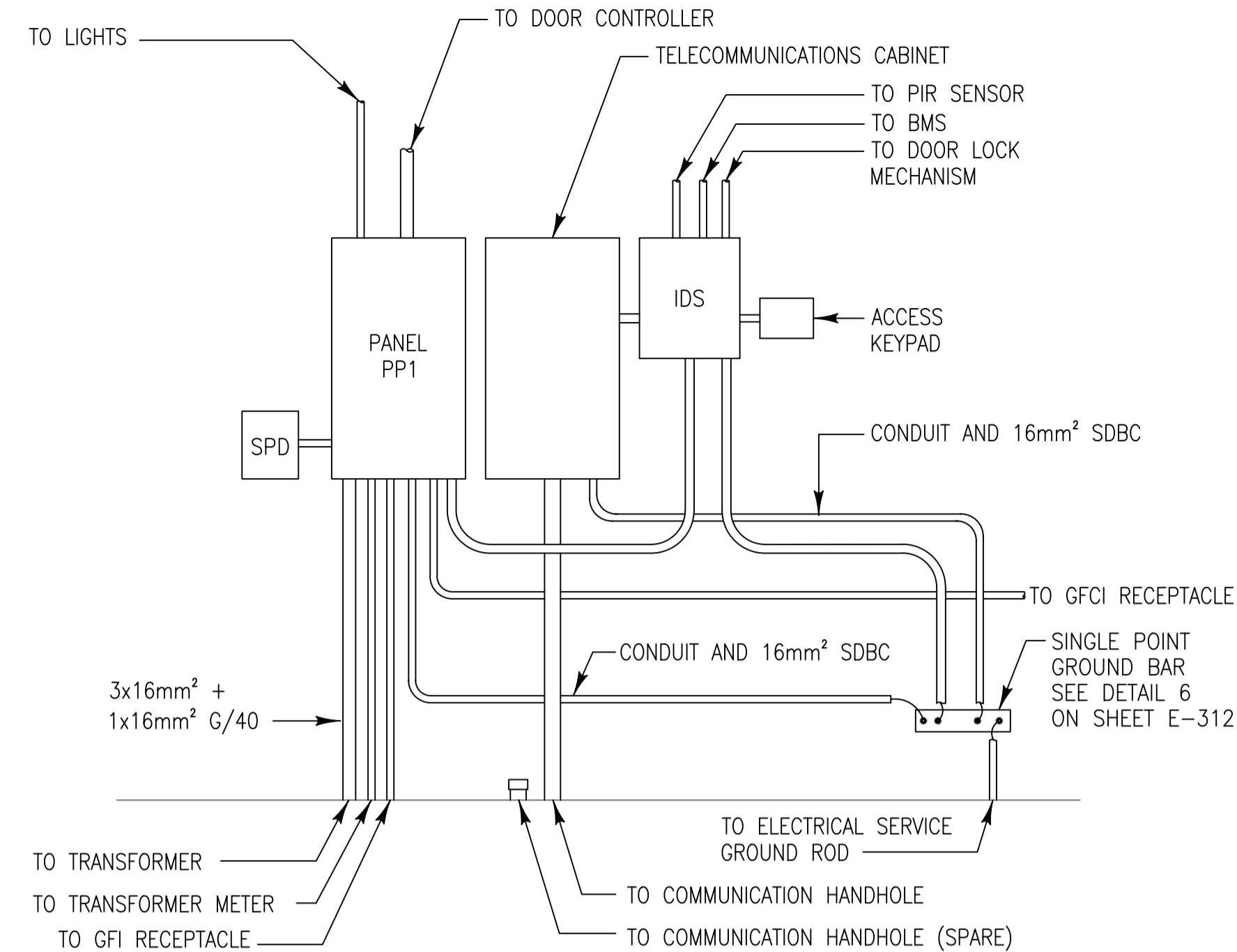
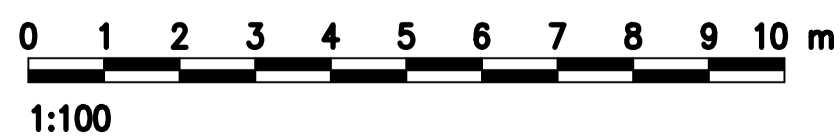
NOTES:

1. PROVIDE ELECTRICAL AND COMMUNICATIONS HANDHOLE DIMENSIONS 1220x1830x1220 MINIMUM AND WITH H-20 WHEEL LOAD RATING.
2. ALL INTERIOR CONDUITS, EXTERIOR FLOODLIGHT CONDUITS AND THE LAST 15 METERS OF UNDERGROUND CONDUITS ENTERING THE MAGAZINE SHALL BE RIGID METAL CONDUIT.
3. PROVIDE SURGE PROTECTION FOR ALL ELECTRICAL SERVICES (COMMUNICATIONS AND POWER) ENTERING AND EXITING THE MAGAZINE.
4. VERIFY POWER REQUIREMENTS WITH DOOR MANUFACTURER AND MODIFY PANELBOARD AND CIRCUITING AS REQUIRED. REFER TO DETAIL 1, SHEET E-313 FOR DOOR CONTROL DIAGRAM.
5. REFER TO DETAIL 2, SHEET E-313 FOR TYPICAL DUCTBANK DETAIL.
6. CONDUIT MUST ENTER VIA WALL NEAR SINGLE POINT GROUND BAR. AT POINT OF ENTRY INTO THE MAGAZINE, BOND CONDUIT TO SINGLE POINT GROUND BAR WITH #2/0 BARE COPPER. SEE DETAIL 4 SHEET E-311.
7. ALL UTILITIES (WATER, FIRE, INSTRUMENTATION, ETC.) IN METAL PIPE MUST ENTER VIA WALL NEAR SINGLE POINT GROUND BAR. AT POINT OF ENTRY INTO THE MAGAZINE, BOND PIPE TO SINGLE POINT GROUND BAR WITH #2/0 BARE COPPER. SEE DETAIL 4 SHEET E-311.
8. PROVIDE SURGE PROTECTION FOR ANY BRANCH CIRCUIT EXITING THE MAGAZINE, SUCH AS EXTERIOR LIGHTING.



MAGAZINE ELECTRICAL PLAN
SCALE = 1:100

GRAPHIC SCALE



A PANEL ELEVATION
E-210/E-210 NTS

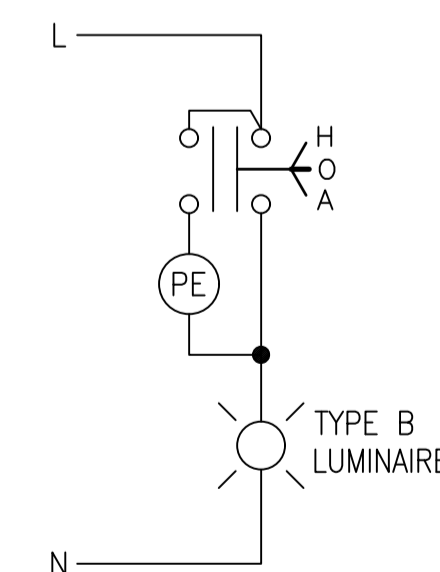
PANELBOARD "PP1" SCHEDULE

100A W/40A MCB, 120/240V, 1 PHASE, 3 WIRE, 10KAIC MINIMUM, SURFACE MOUNT, SERVICE ENTRANCE RATED

LOAD SERVED	LOAD (AMPS)		BKR TRIP	WIRE SIZE	CKT. NO.	PHASE		CKT. NO.	WIRE SIZE	BKR TRIP	LOAD (AMPS)		LOAD SERVED
	A	B				A	B				A	B	
INTERIOR LIGHTING	6.3		20	12	1			2	12	20	1.5		RECEPTACLE
EXTERIOR LIGHTING	2.1		20	12	3			4	12	20	1.5		RECEPTACLE
IDS PANEL	1.9		20	12	5			6	--	20	0		SPARE
SPARE	0		20	--	7			8	12	20	7.5		DOOR CONTROLLER (NOTE 4)
SURGE PROTECTIVE DEVICE	0.2		20	12	9			12	--	--	7.5		SPACE ONLY
TOTAL	8.4	2.3									9	9	TOTAL

TOTAL CONNECTED AMPS A: 17.4 B: 11.3

PANELBOARD SCHEDULE
NTS



FLOODLIGHT CONTROL
NTS

APPR. DATE

SYN. DESCRIPTION

SEAL

A/E RPTD

APPROVED

FOR COMMANDER NAVAFAC

ACTIVITY

SATISFACTORY TO DATE

DES. DRW DBC CHK. RCK

BRANCH MANAGER

SGN PRD DIR WILLIAM FORBES, P.E.

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC
NAVFAC
NAVFAC STATION

MODULAR STORAGE MAGAZINE

MAGAZINE ELECTRICAL PLAN WITHOUT AIR CONDITIONING

SCALE: AS NOTED

PROJECT NO.:

CONSTR. CONTR. NO.

NAVFAC DRAWING NO. 14063853

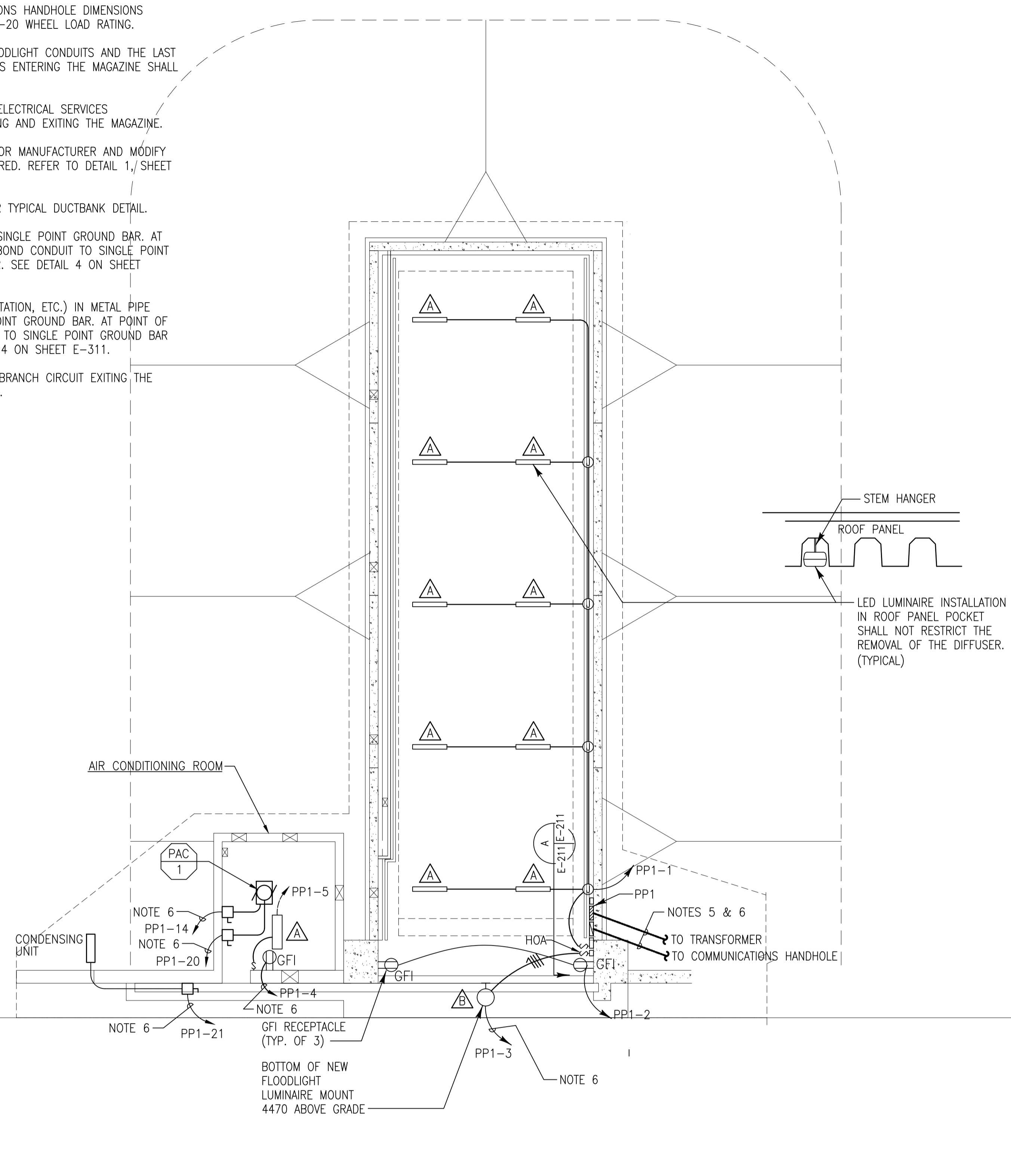
SHEET 48 OF 53

E-210

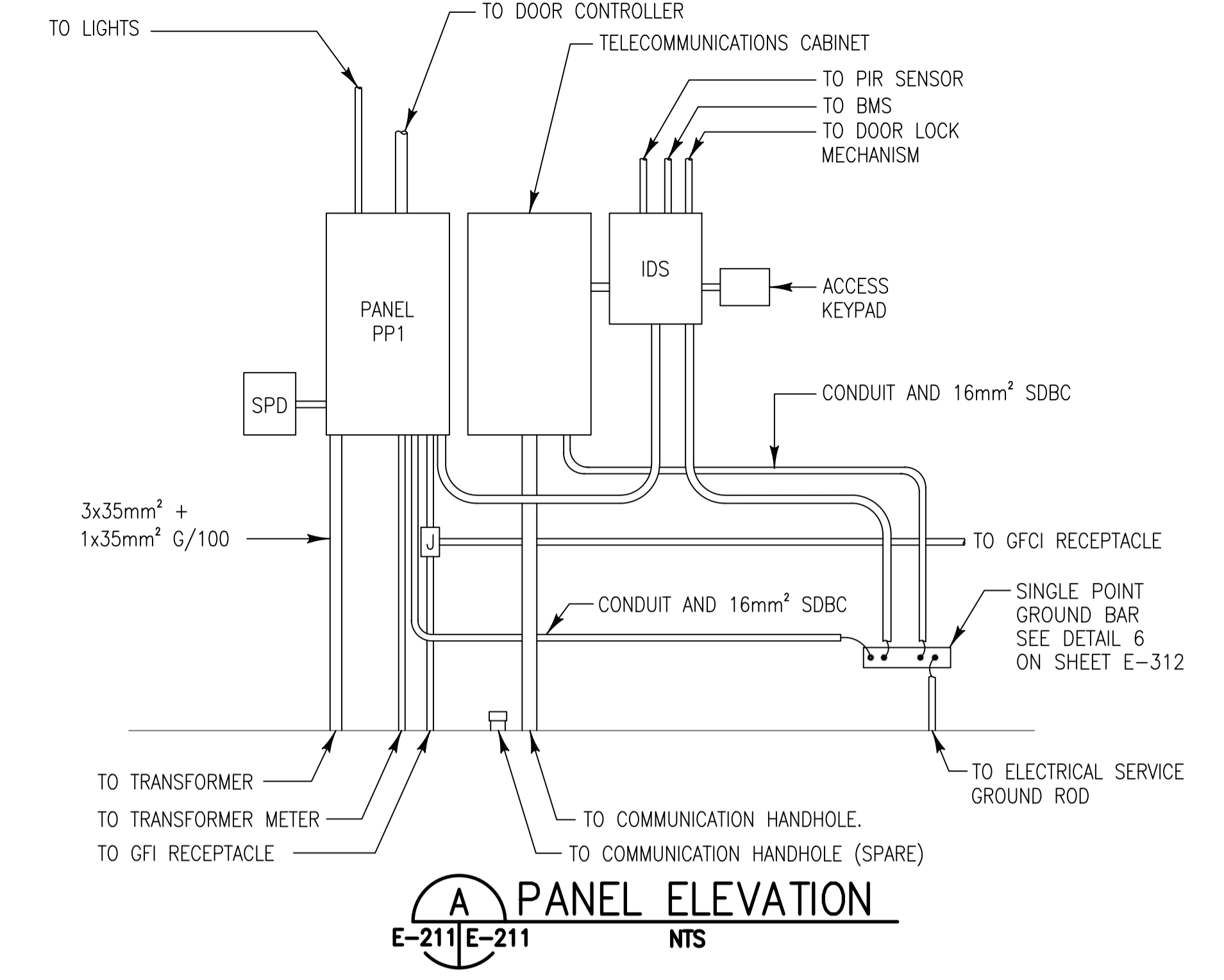
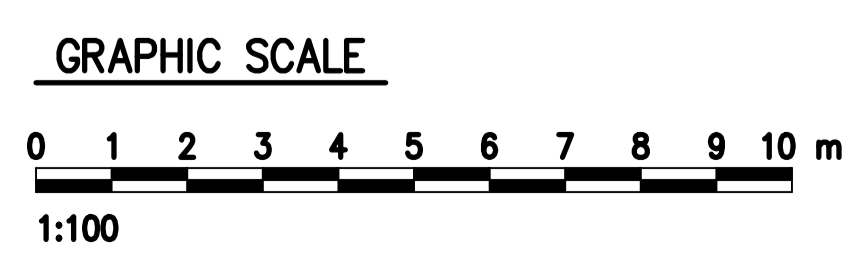
NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017

NOTES:

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8. PROVIDE SURGE PROTECTION FOR ANY BRANCH CIRCUIT EXITING THE MAGAZINE, SUCH AS EXTERIOR LIGHTING.

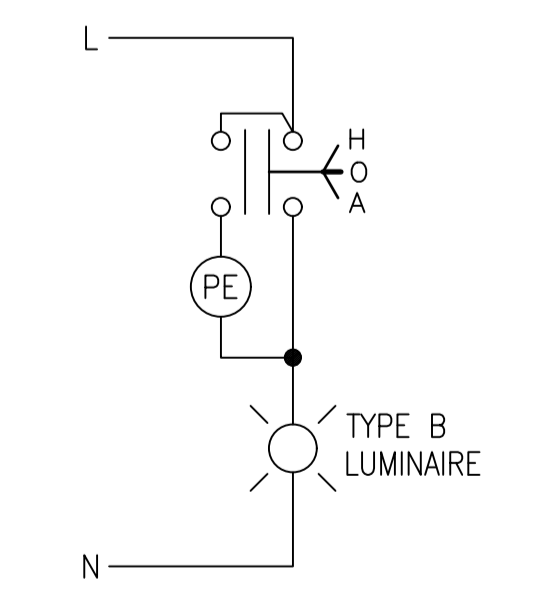


MAGAZINE ELECTRICAL PLAN
SCALE = 1:100



PANELBOARD "PP1" SCHEDULE																
100A W/100A MCB, 208Y/120V, 3 PHASE, 4 WIRE, 10KAIC MINIMUM, SURFACE MOUNT, SERVICE ENTRANCE RATED																
LOAD SERVED	LOAD (AMPS)			BKR TRIP	WIRE SIZE	CKT. NO.	PHASE			CKT. NO.	WIRE SIZE	BKR TRIP	LOAD (AMPS)			
	A	B	C				A	B	C				A	B	C	
INTERIOR LIGHTING	6.3			20	12	1				2	12	20	3.0			RECEPTACLES - MAGAZINE
EXTERIOR LIGHTING		2.1		20	12	3				4	12	20	1.5			RECEPTACLE - A/C RM
LIGHTING - A/C RM			0.6	20	12	5				6	12	20			8.6	DOOR OPERATOR (NOTE 4)
IDS PANEL	1.9			20	12	7							8.6			
SPACE						9				10	--	20	0			SPARE
SPACE						11				12	--	20	0			SPARE
SURGE PROTECTIVE DEVICE	0.2			50	6	13				14	8	40	27.9			
		0.2											27.9			PAC-1 REHEAT COIL
SPARE	0			20	--	19				20	10	30	20.2			
CONDENSING UNIT		5.9		20	12	21							20.2			PAC-1 AC
SPARE			0	20	--	23							20.2			
TOTAL	8.4	8.2	0.8										59.7	49.6	56.7	TOTAL
TOTAL CONNECTED AMPS A: 68.1 B: 57.8 C: 57.5																

PANELBOARD SCHEDULE
NTS

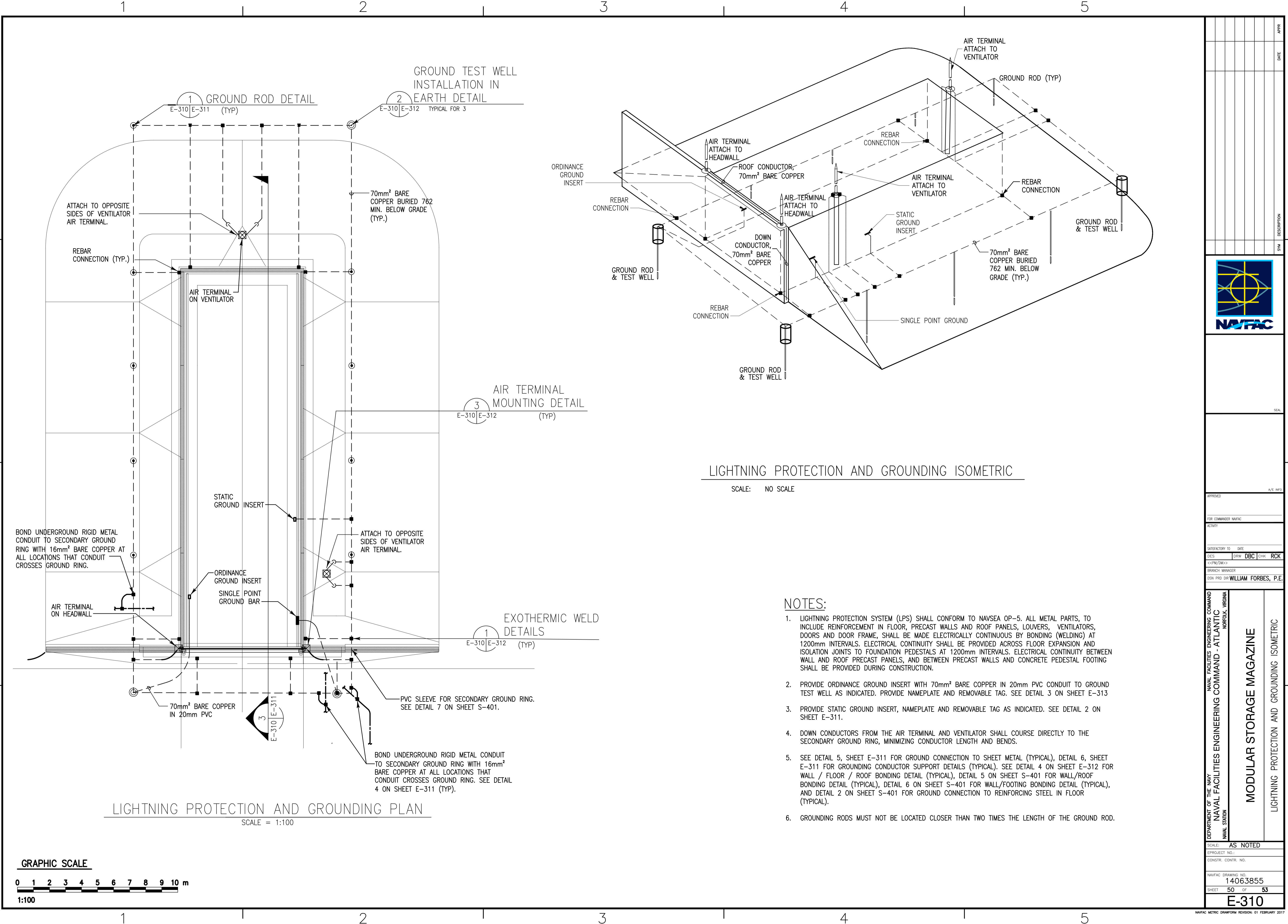


FLOODLIGHT CONTROL
NTS

<p>APPROVED</p> <p>FOR COMMANDER NAVFAC</p> <p>ACTIVITY</p> <p>SATISFACTORY TO: DATE</p> <p>DES: <<P/DMP>></p> <p>BRANCH MANAGER</p> <p>SGN PROJ DIR WILLIAM FORBES, P.E.</p>	<p>DATE</p> <p>DESCRIPTION</p> <p>APPROVED</p> <p>FOR COMMANDER NAVFAC</p> <p>ACTIVITY</p> <p>SATISFACTORY TO: DATE</p> <p>DES: <<P/DMP>></p> <p>BRANCH MANAGER</p> <p>SGN PROJ DIR WILLIAM FORBES, P.E.</p>
<p>DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC NORFOLK, VIRGINIA</p>	
<p>MODULAR STORAGE MAGAZINE</p> <p>MAGAZINE ELECTRICAL PLAN WITH AIR CONDITIONING</p>	
<p>SCALE: AS NOTED</p> <p>EPROJECT NO.:</p> <p>CONSTR. CONTR. NO.:</p> <p>NAVFAC DRAWING NO. 14063854</p> <p>SHEET 49 OF 53</p> <p>E-211</p>	

FILE NAME: j:\CSSE\Magazine\NSM\Standard NSM Revisions 2018\CADD\E-211.dwg LAYOUT NAME: E-211 PLOTTED: Tuesday, July 02, 2019 - 2:21pm USER: leus.gud

FILE NAME: z:\CASE\Magnolia\NSM\Standards\NSM_Standards\2018\NAVY STANDARD 2018\CADD\E-310.dwg LAYOUT NAME: E-310 PLOTTED: Tuesday, July 02, 2019 - 2:21pm USER: louis.gud

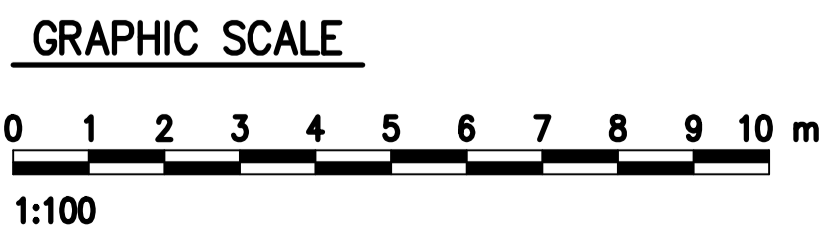


LIGHTNING PROTECTION AND GROUNDING PLAN
SCALE = 1:100

LIGHTNING PROTECTION AND GROUNDING ISOMETRIC
SCALE: NO SCALE

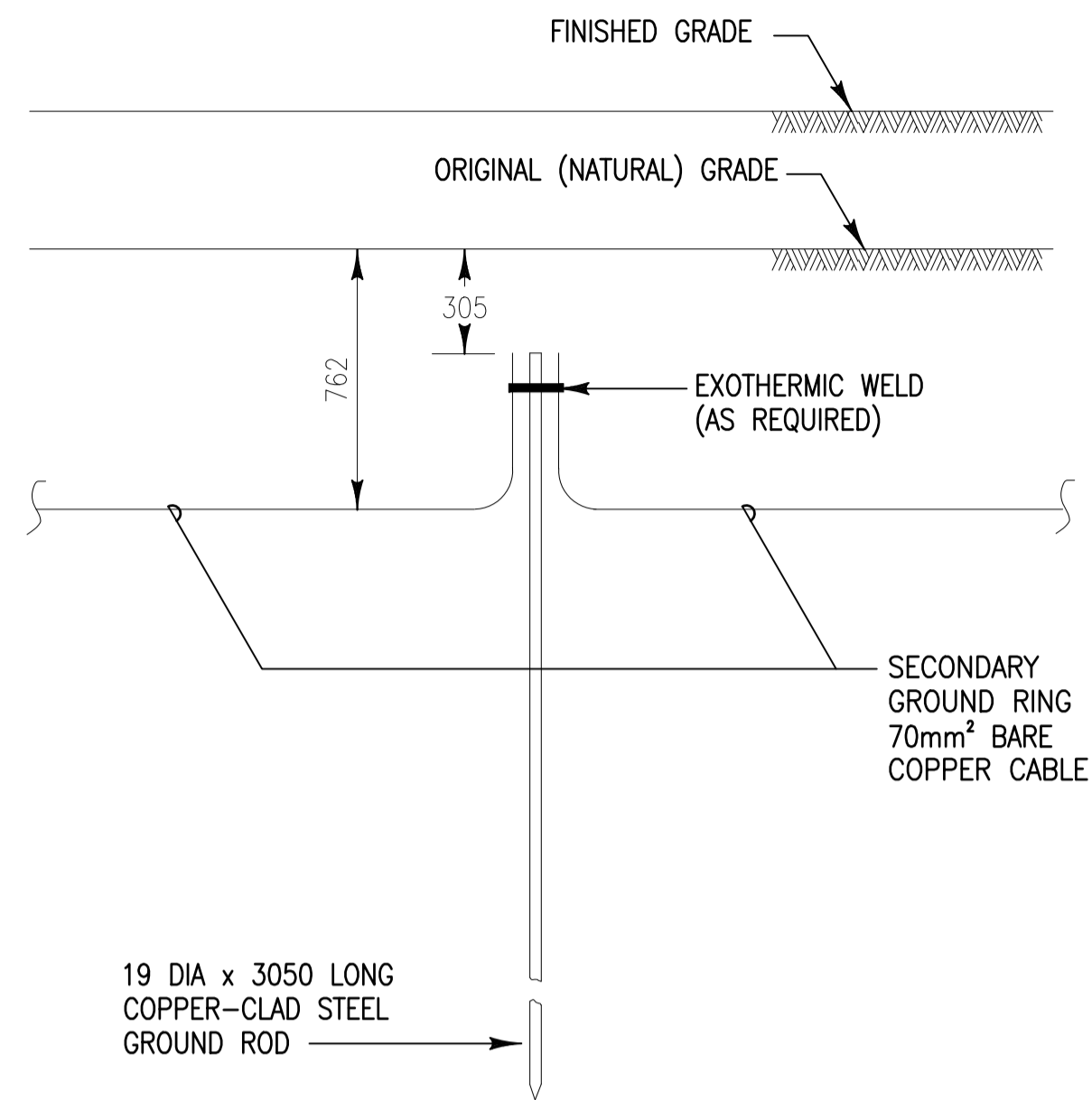
NOTES:

1. LIGHTNING PROTECTION SYSTEM (LPS) SHALL CONFORM TO NAVSEA OP-5. ALL METAL PARTS, TO INCLUDE REINFORCEMENT IN FLOOR, PRECAST WALLS AND ROOF PANELS, LOUVERS, VENTILATORS, DOORS AND DOOR FRAME, SHALL BE MADE ELECTRICALLY CONTINUOUS BY BONDING (WELDING) AT 1200mm INTERVALS. ELECTRICAL CONTINUITY SHALL BE PROVIDED ACROSS FLOOR EXPANSION AND ISOLATION JOINTS TO FOUNDATION PEDESTALS AT 1200mm INTERVALS. ELECTRICAL CONTINUITY BETWEEN WALL AND ROOF PRECAST PANELS, AND BETWEEN PRECAST WALLS AND CONCRETE PEDESTAL FOOTING SHALL BE PROVIDED DURING CONSTRUCTION.
2. PROVIDE ORDINANCE GROUND INSERT WITH 70mm² BARE COPPER IN 20mm PVC CONDUIT TO GROUND TEST WELL AS INDICATED. PROVIDE NAMEPLATE AND REMOVABLE TAG. SEE DETAIL 3 ON SHEET E-313
3. PROVIDE STATIC GROUND INSERT, NAMEPLATE AND REMOVABLE TAG AS INDICATED. SEE DETAIL 2 ON SHEET E-311.
4. DOWN CONDUCTORS FROM THE AIR TERMINAL AND VENTILATOR SHALL COURSE DIRECTLY TO THE SECONDARY GROUND RING, MINIMIZING CONDUCTOR LENGTH AND BENDS.
5. SEE DETAIL 5, SHEET E-311 FOR GROUND CONNECTION TO SHEET METAL (TYPICAL), DETAIL 6, SHEET E-311 FOR GROUNDING CONDUCTOR SUPPORT DETAILS (TYPICAL). SEE DETAIL 4 ON SHEET E-312 FOR WALL / FLOOR / ROOF BONDING DETAIL (TYPICAL), DETAIL 5 ON SHEET S-401 FOR WALL/ROOF BONDING DETAIL (TYPICAL), DETAIL 6 ON SHEET S-401 FOR WALL/FOOTING BONDING DETAIL (TYPICAL), AND DETAIL 2 ON SHEET S-401 FOR GROUND CONNECTION TO REINFORCING STEEL IN FLOOR (TYPICAL).
6. GROUNDING RODS MUST NOT BE LOCATED CLOSER THAN TWO TIMES THE LENGTH OF THE GROUND ROD.

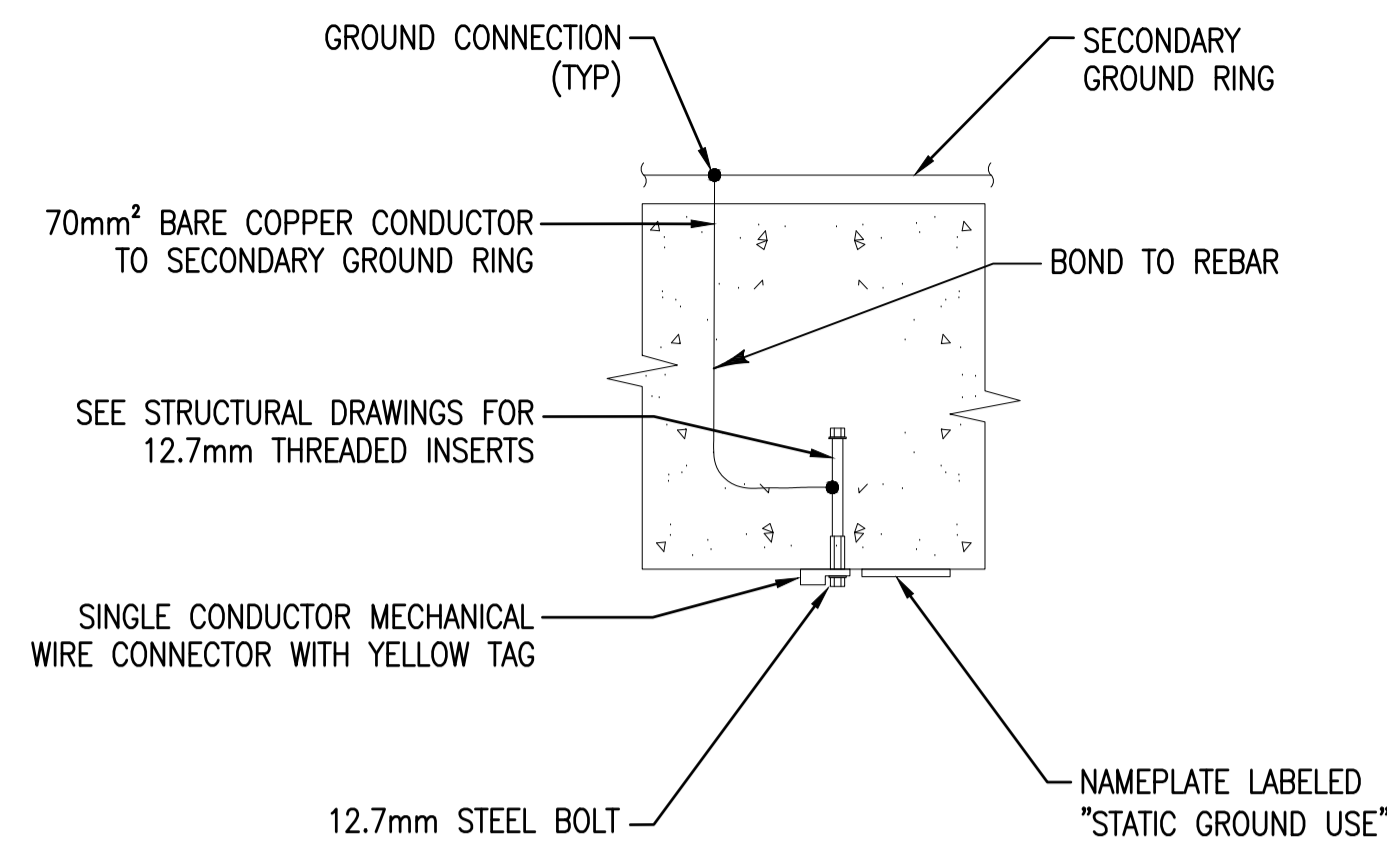


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FOR COMMANDER NAVFAC		
ACTIVITY		
SATISFACTORY TO DATE		
DES	DRW DBC	CHK RCK
BRANCH MANAGER		
DDN PROJ DIR WILLIAM FORBES, P.E.		
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC NORFOLK, VIRGINIA NAVAL STATION		
MODULAR STORAGE MAGAZINE LIGHTNING PROTECTION AND GROUNDING ISOMETRIC		
SCALE: AS NOTED		
EPROJECT NO.:		
CONSTR. CONTR. NO.:		
NAVFAC DRAWING NO. 14063855		
SHEET 50 OF 53		
E-310		
NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017		

FILE NAME: J:\CSE\Magazine\NSA\Navy Standard\NSM Revisions 2018\NAVFAC E-311.dwg LAYOUT NAME: E-311 PLOTTED: Tuesday, July 02, 2019 - 2:21pm USER: louis.gud



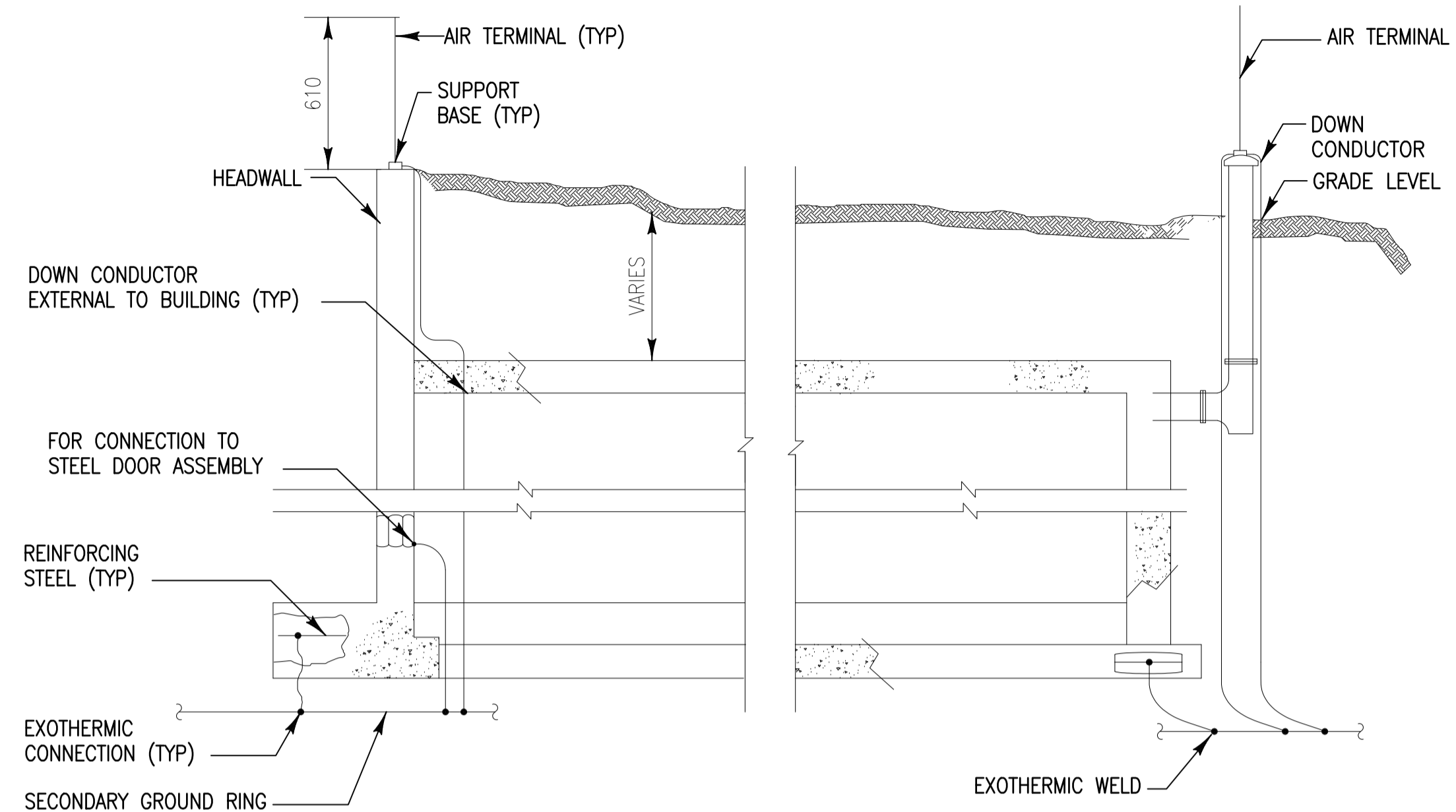
1 GROUND ROD DETAIL
E-310 | E-311 NTS



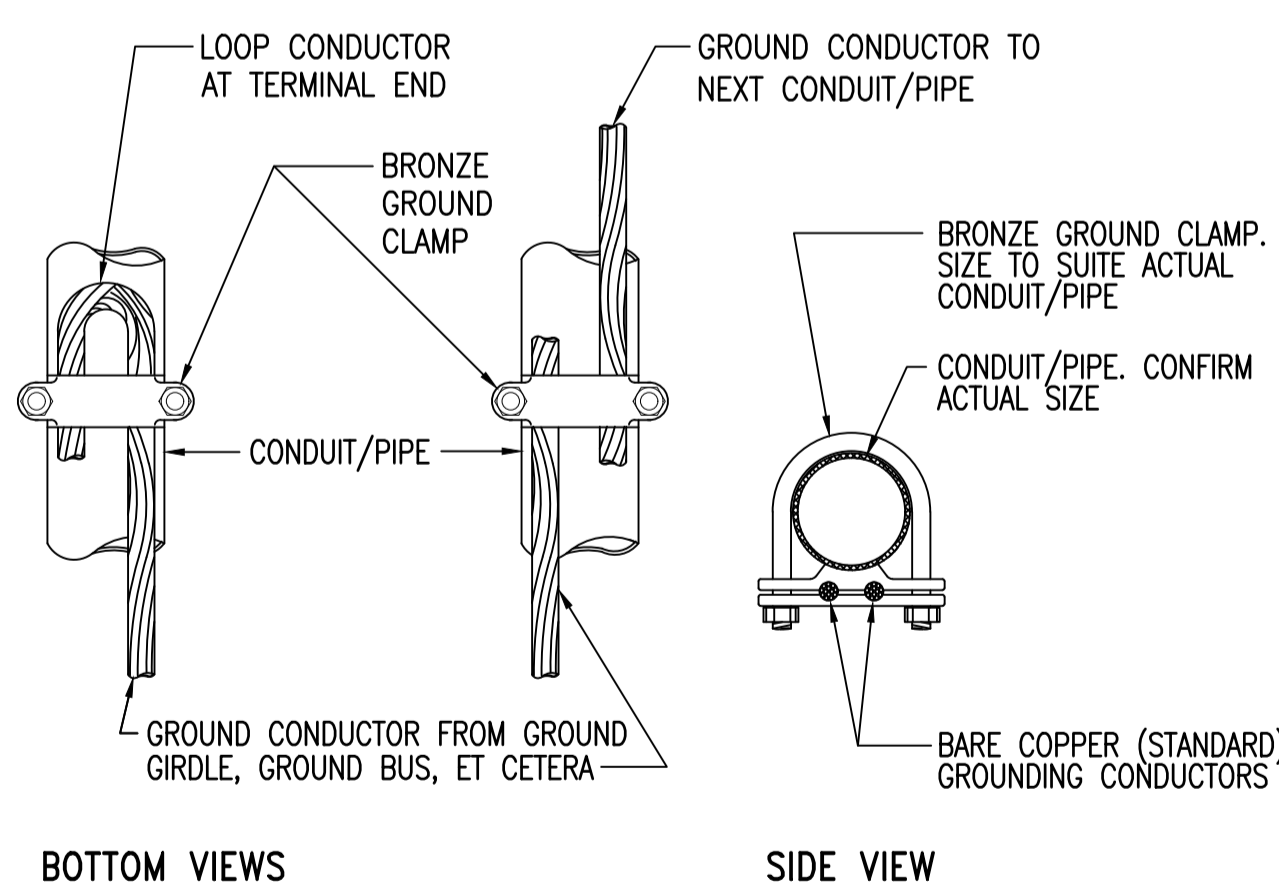
STATIC GROUND INSERT DETAIL NOTES:

1. PROVIDE A REMOVABLE YELLOW MELAMINE PLASTIC TAG THAT ATTACHES TO THE STATIC GROUND INSERT. THE TAG SHALL INCLUDE THE FOLLOWING INFORMATION:
"NOT IN SERVICE. NO MAINTENANCE REQUIRED.
INSTALLATION MEETS STATIC/FACILITY GROUND REQUIREMENT PER NAVSEA OP-5. ACTIVITY SHALL PERFORM TESTING PER NAVSEA OP-5 AND ENACT MAINTENANCE SCHEDULE WHEN THE STATIC/FACILITY GROUND INSERT IS PLACED IN SERVICE.
RETAIN THIS TAG TO REATTACH WHEN REMOVED FROM SERVICE."

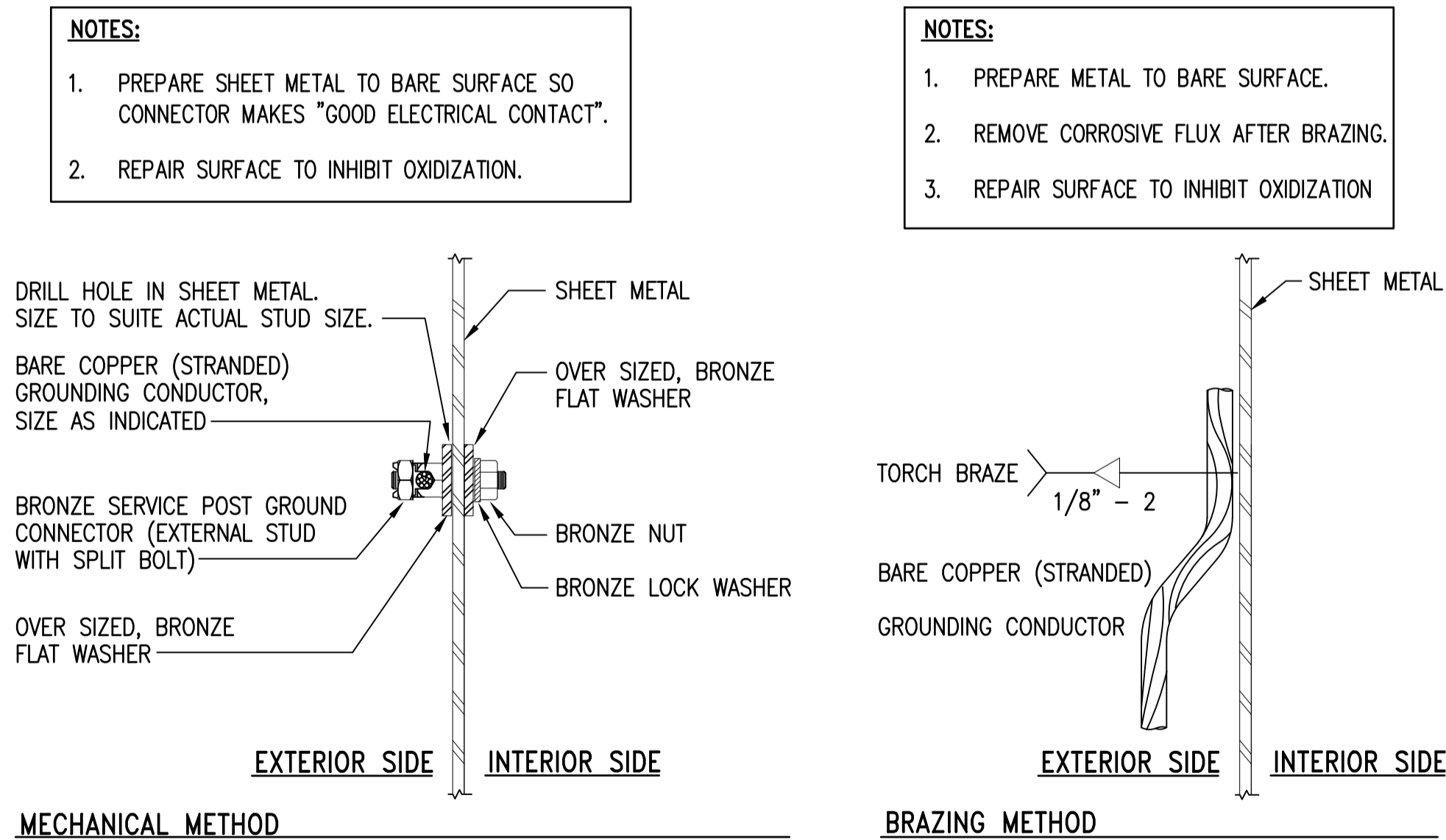
2 STATIC GROUND INSERT DETAIL
E-310 | E-311 NTS



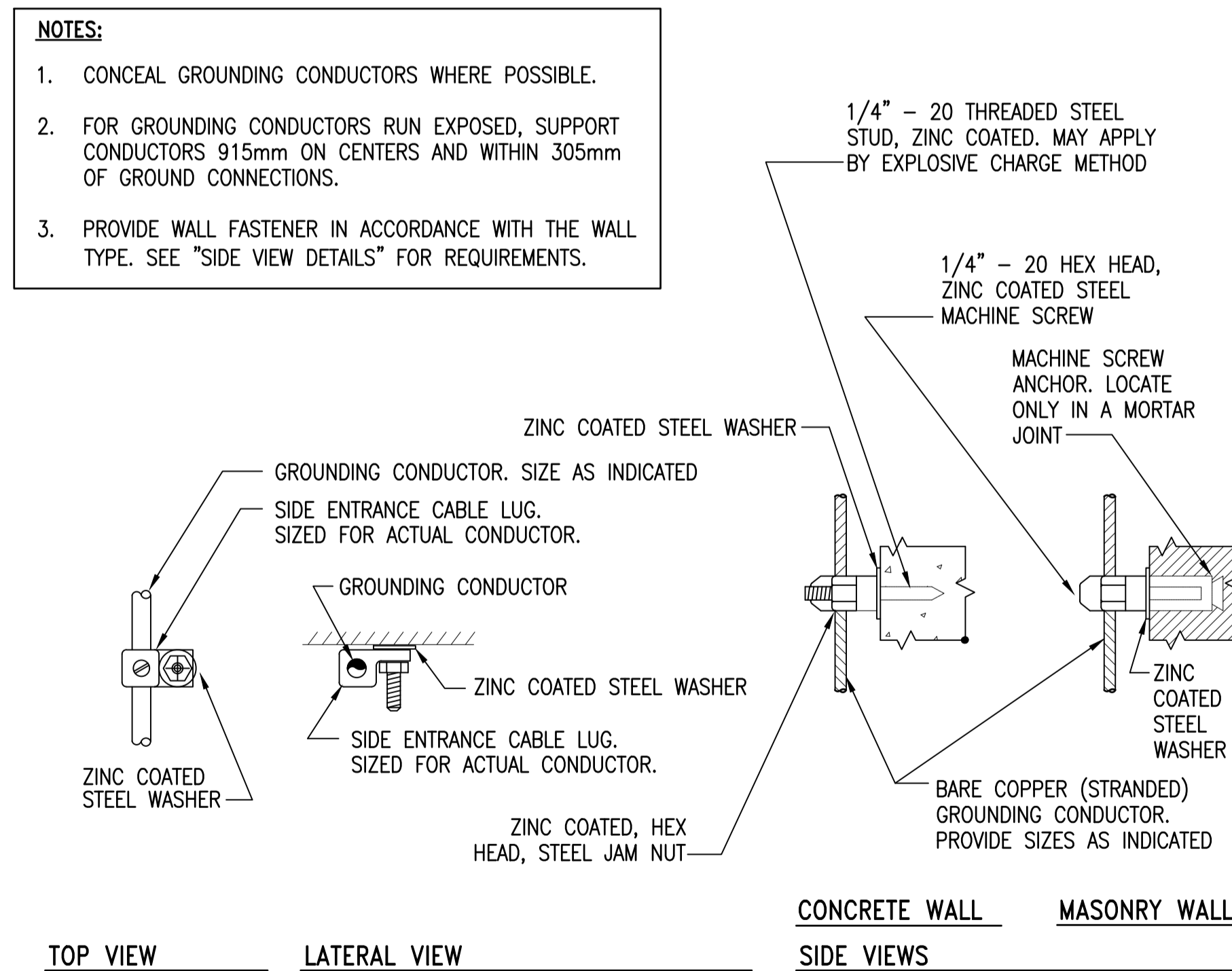
3 GROUND SECTION
E-310 | E-311 NTS



4 CONDUIT/PIPE GROUND CONNECTION
E-310 | E-311 NTS



5 GROUND CONNECTION TO SHEET METAL (TYPICAL)
E-310 | E-311 NTS



6 GROUNDING CONDUCTOR SUPPORT DETAILS (TYPICAL FOR EXPOSED CONDUCTORS)
E-310 | E-311 NTS

APPROVED	DATE	APP'R
FOR COMMANDER NAVFAC		
ACTIVITY		
SATISFACTORY TO	DATE	
DES	DRW	DBC
CHK	RCK	
BRANCH MANAGER		
SGN PRD DR	WILLIAM FORBES, P.E.	
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING COMMAND	ATLANTIC
NAVAL STATION	INNOVATION	WIRING
MODULAR STORAGE MAGAZINE		
LIGHTNING PROTECTION AND GROUNDING DETAILS		
SCALE:	AS NOTED	
EPROJECT NO.:		
CONSTR. CONTR. NO.		
NAVFAC DRAWING NO.	14063856	
SHEET	51	OF 53
E-311		
NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017		

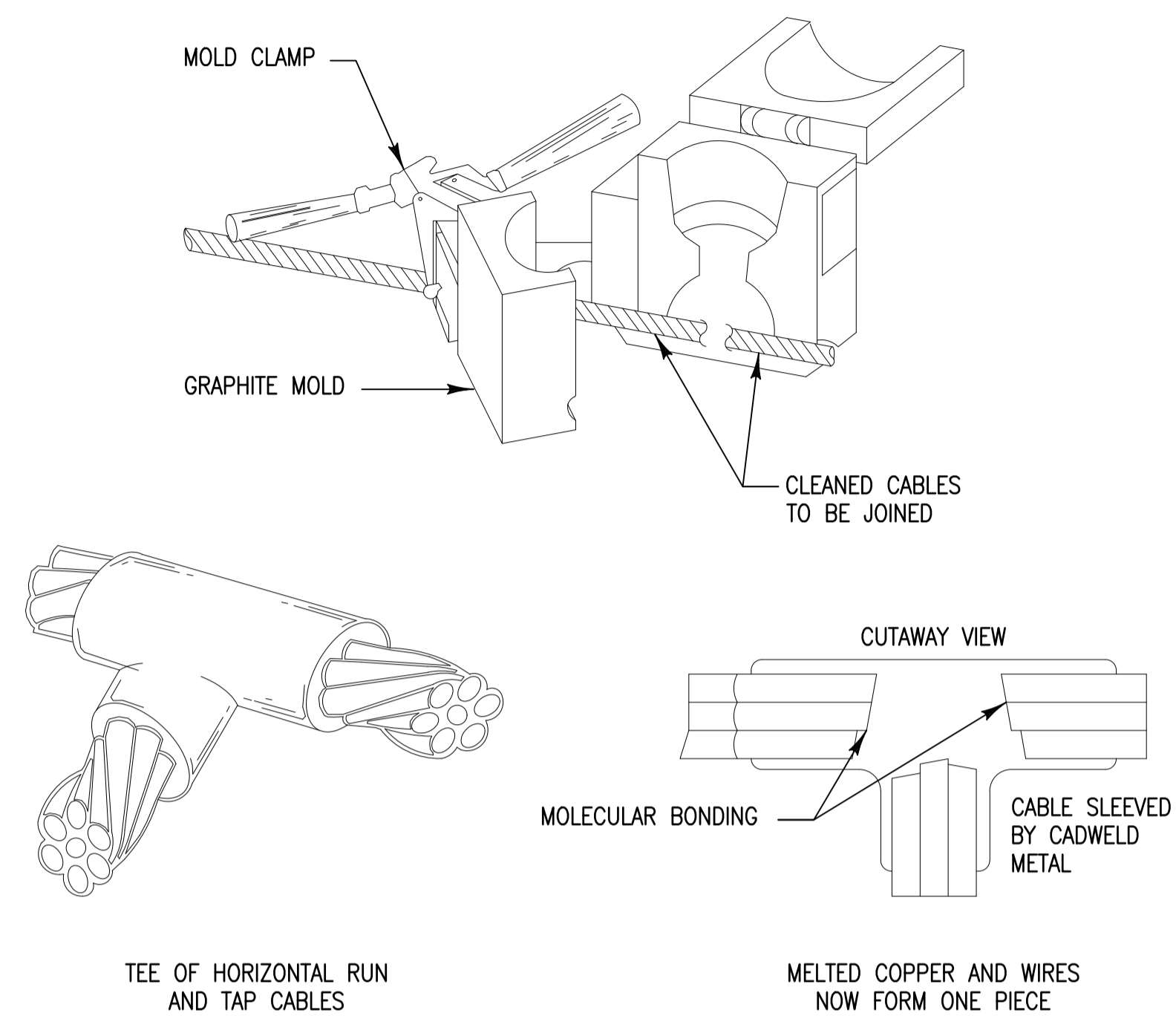
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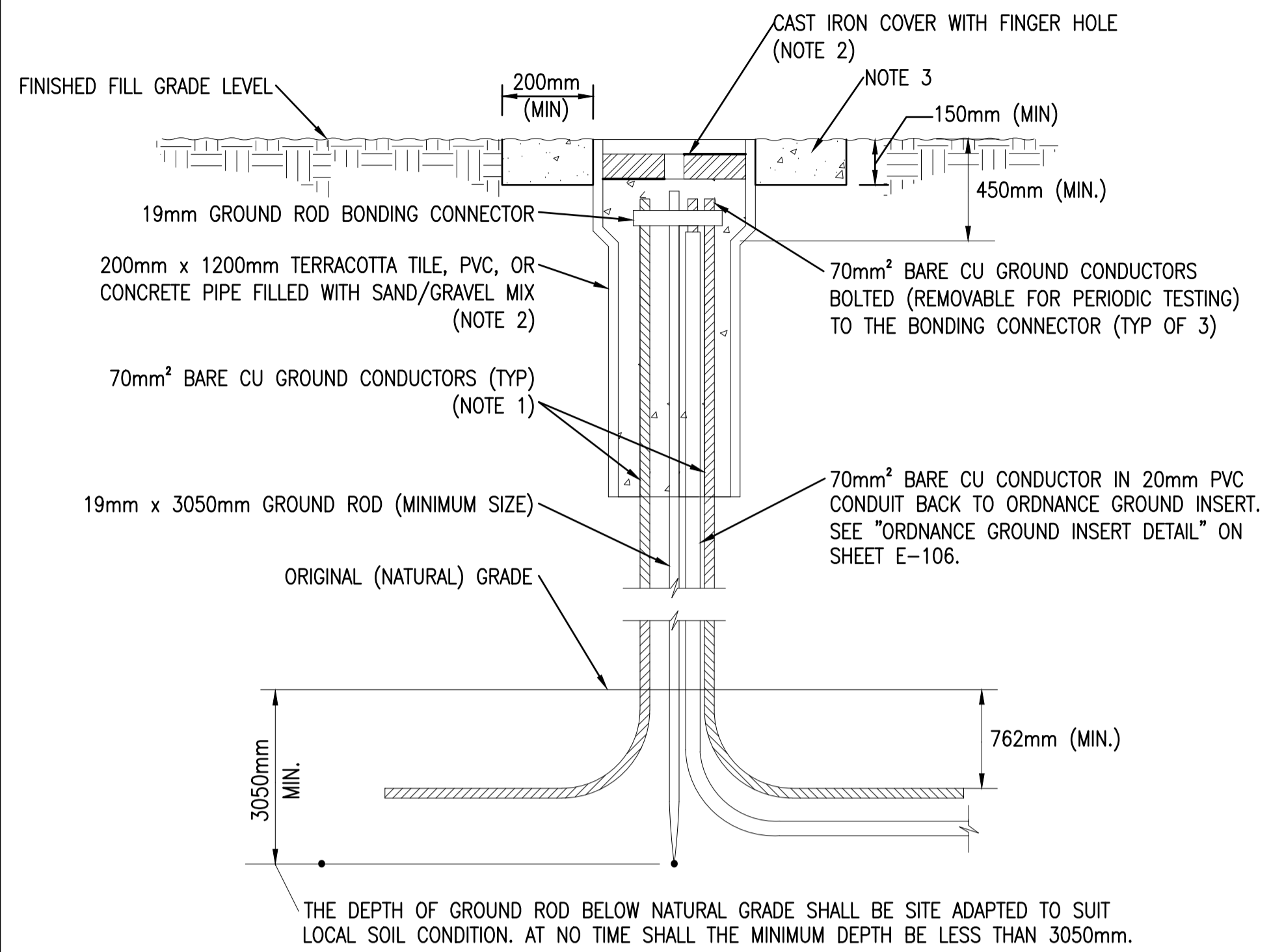
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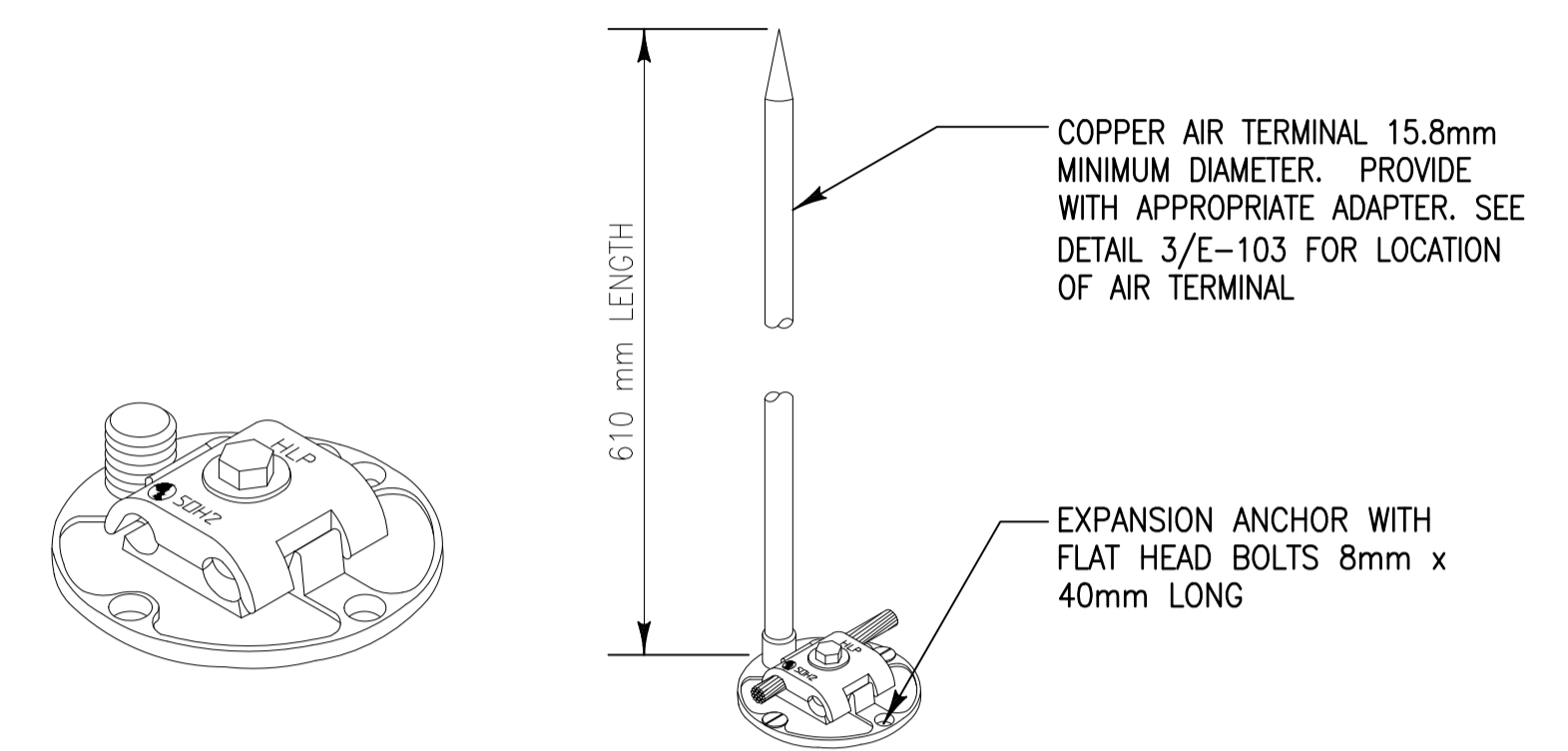
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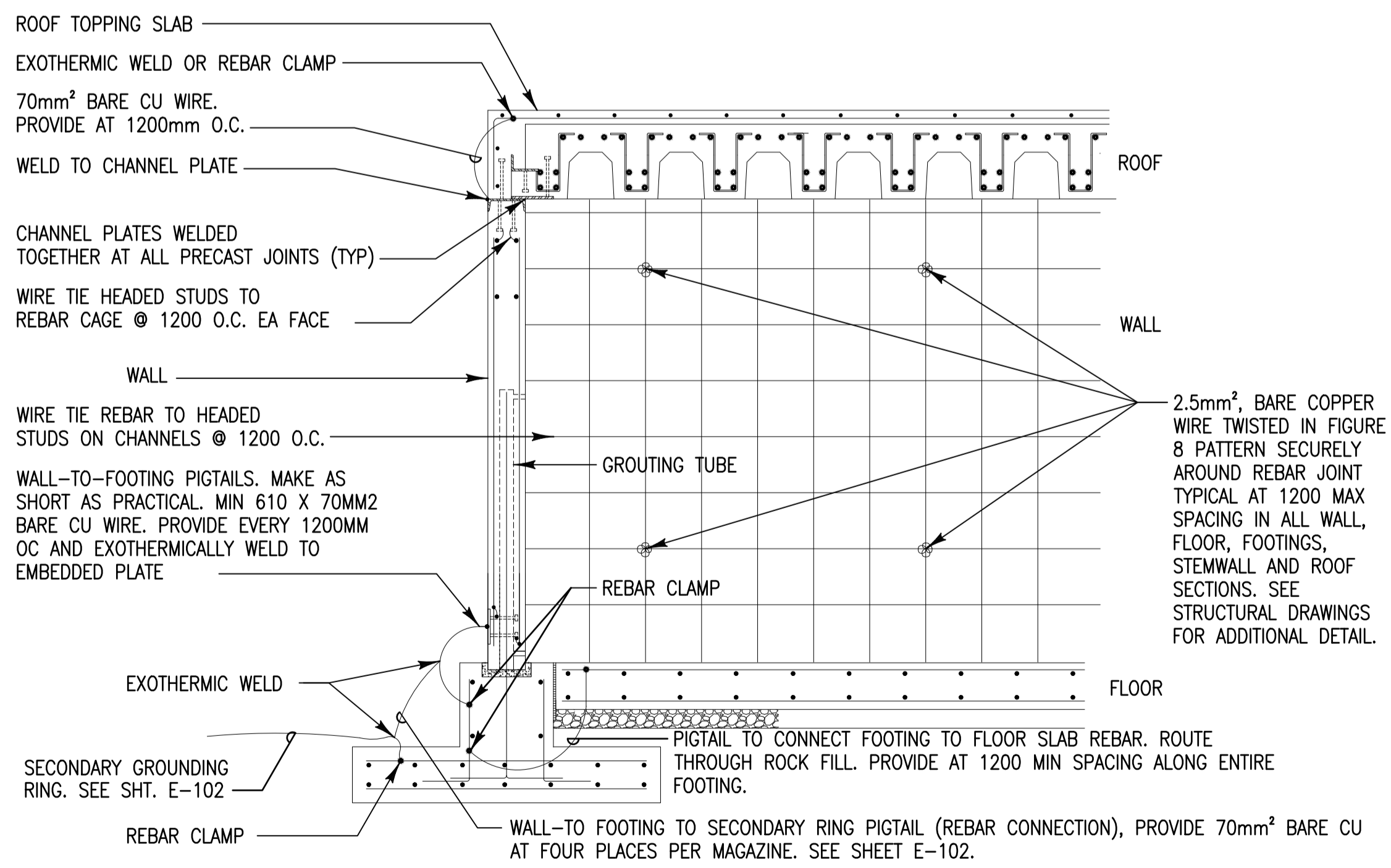
1 EXOTHERMIC WELD DETAILS
E-310/E-312 NTS



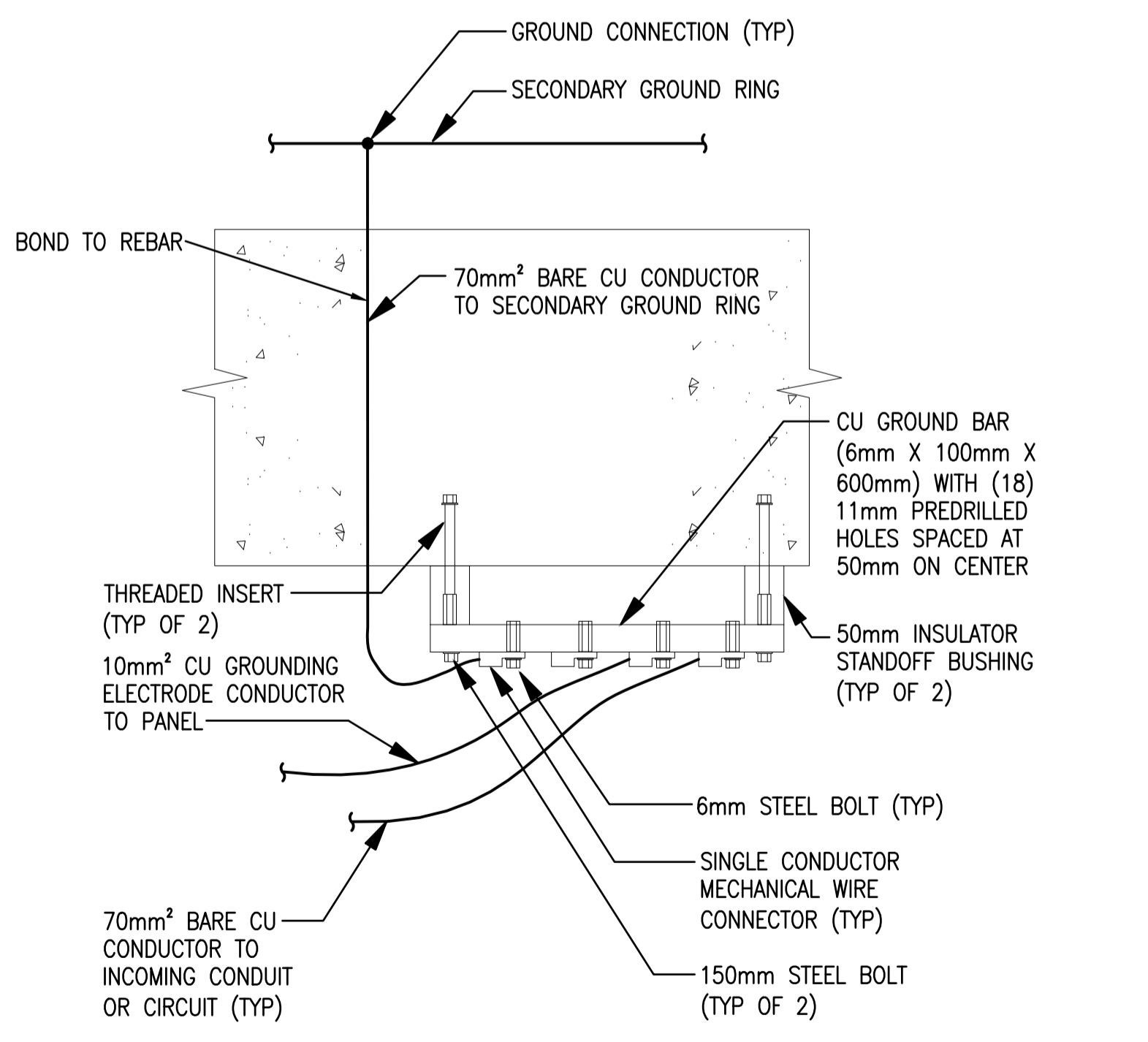
2 GROUND TEST WELL INSTALLATION IN EARTH DETAIL
E-310/E-312 NTS



3 AIR TERMINAL MOUNTING DETAIL
E-310/E-312 NTS



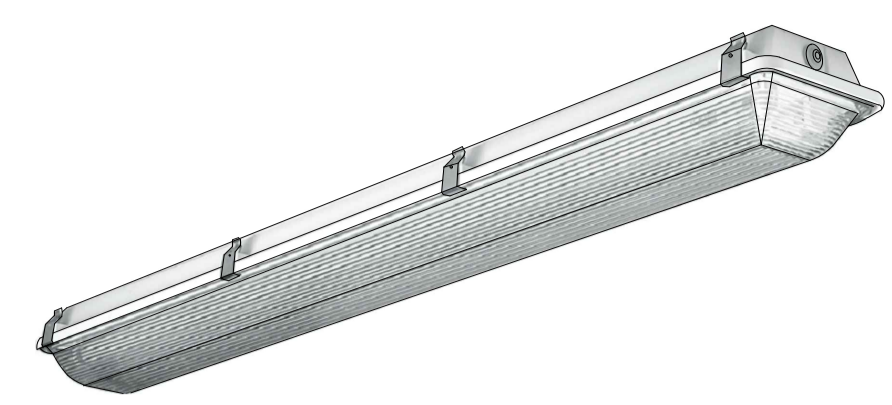
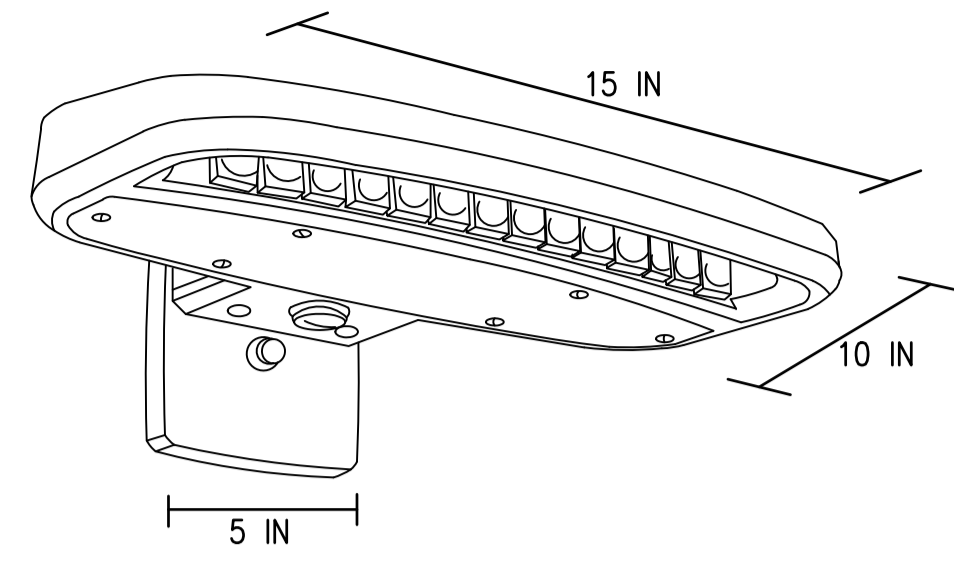
4 WALL/FLOOR/ROOF BONDING DETAIL (TYPICAL)
E-310/E-312 NTS



6 SINGLE POINT GROUND BAR DETAIL
E-310/E-312 NTS

APPROVED	DATE	APPR.
FOR COMMANDER NAIFAC		
ACTIVITY		
SATISFACTORY TO DATE		
DES	DRW	DBC
CHK	RCK	
BRANCH MANAGER		
SGN PRD DR	WILLIAM FORBES, P.E.	
DEPARTMENT OF THE NAVY		
NAVAL FACILITIES ENGINEERING COMMAND - ATLANTIC		
NAVSTATION		
NAVAL FACILITIES ENGINEERING COMMAND - NORFOLK, VIRGINIA		
MODULAR STORAGE MAGAZINE		
LIGHTNING PROTECTION AND GROUNDING DETAILS		
SCALE:	AS NOTED	
EPROJECT NO.:		
CONSTR. CONTR. NO.		
NAIFAC Drawing No.	14063857	
SHEET	52	OF 53
E-312		
NAIFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017		

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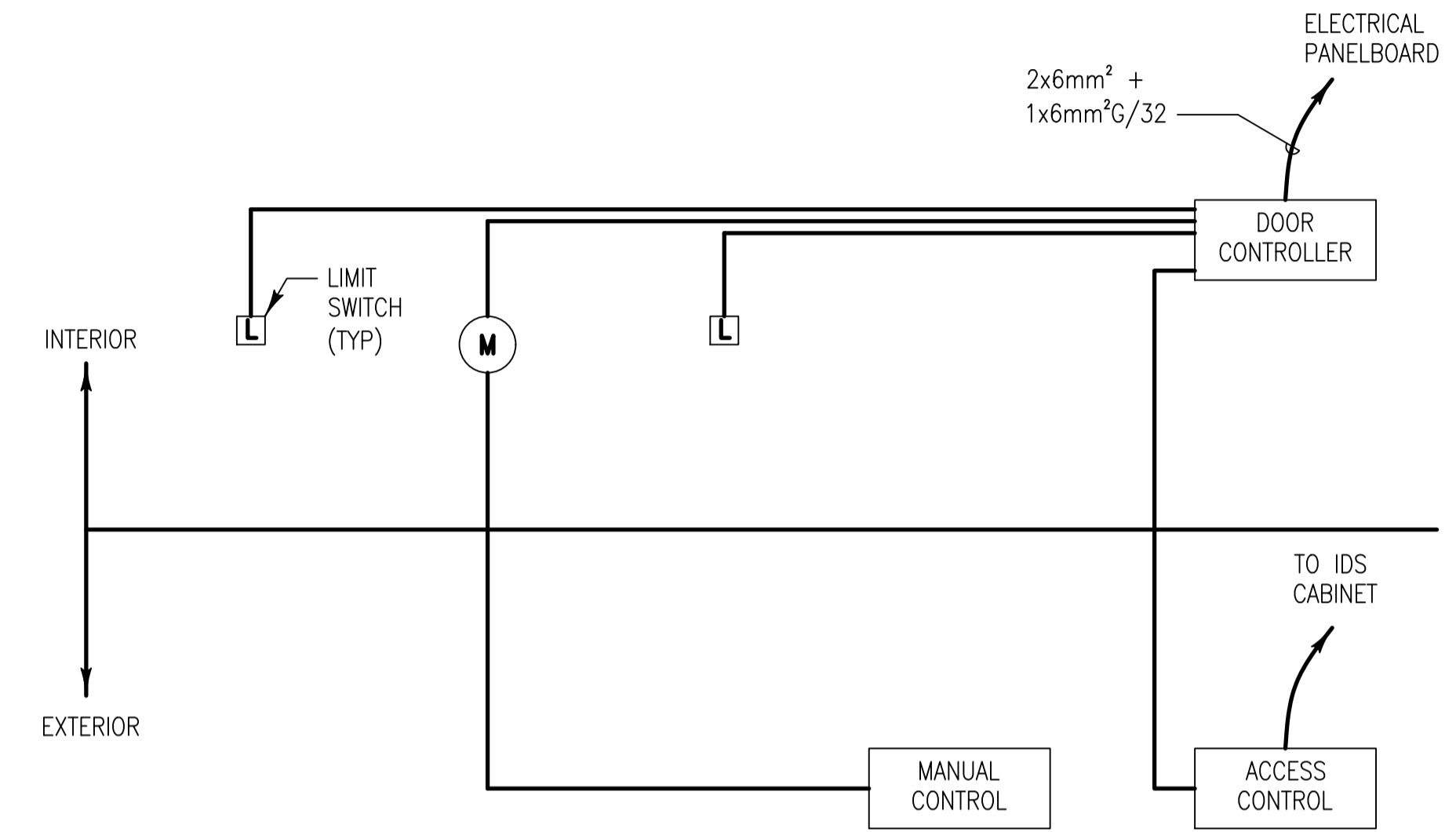


LUMINAIRE REQUIREMENTS:

- HOUSING – DIE-CAST OR EXTRUDED ALUMINUM WITH INTEGRAL PASSIVE COOLING MECHANISM. HEAT SINK SHALL BE INCORPORATED DIRECTLY INTO HOUSING OR DRIVER COMPARTMENT TO ENSURE MAXIMUM HEAT TRANSFER AND DISSIPATION.
- FINISH – MULTI-STAGE PRE-TREATMENT, FINISHED WITH BAKED-ON POLYESTER POWDER COAT. FINISH SHALL PASS 2500 HOUR SALT SPRAY TEST PER ASTM B117. STANDARD FINISH IS DARK BRONZE, WITH OTHER CUSTOM COLORS AVAILABLE.
- POWER SUPPLY/LED DRIVER – CLASS 1 DRIVER SHALL OPERATE AT 120/277 VOLTS, 50/60 HZ, WITH OTHER VOLTAGES OPTIONAL; POWER FACTOR GREATER THAN 0.9 AND THD LESS THAN 20% AT FULL LOAD. MINIMUM EFFICACY SHALL BE 60 LM/W AT MAXIMUM 600mA OPERATING CURRENT.
- LED OPTICAL ASSEMBLY – PRECISION MOLDED ACRYLIC LENS PROVIDED FOR MULTIPLE HIGH-POWERED LEDS PRODUCING NEMA TYPE III DISTRIBUTION OR AS OTHERWISE INDICATED. BUG UPLIGHT RATING OF U0, WITH GLARE RATING AS DETERMINED BY LIGHTING ZONE INSTALLED. MINIMUM COLOR RENDERING INDEX (CRI) SHALL BE 70 FOR CORRELATED COLOR TEMPERATURE (CCT) OF 4000-4500 DEGREES K.
- CERTIFICATION – UL AND/OR ETL LISTED FOR DAMP OR WET LOCATIONS AS INDICATED, AND ROHS COMPLIANT.
- OPTIONS – VARIOUS LUMEN OUTPUT RATING AS INDICATED, PHOTOCELL, AND 0-10 VOLT DIMMING DRIVER.
- OTHER – THE ABOVE SKETCH IS A NON-PROPRIETARY GRAPHIC REPRESENTATION OF A LUMINAIRE THAT MAY MEET THE SPECIFICATION REQUIREMENTS AND IS NOT INTENDED TO INDICATE A CERTAIN MANUFACTURER'S PREFERENCE. ALL DIMENSIONS ARE NOMINAL AND VARY PER MANUFACTURER.

LUMINAIRE REQUIREMENTS:

- HOUSING – FIBERGLASS OR FIBERGLASS-REINFORCED POLYESTER OUTER HOUSING, WITH ALUMINUM COMPONENT TRAY AND HEAT SINK. OPTIONAL LENGTHS OF 4FT OR 8FT.
- LENS – IMPACT-RESISTANT ACRYLIC OR OPTIONAL POLYCARBONATE, WITH CONTINUOUS CLOSED-CELL POLYURETHANE GASKET, SECURED WITH STAINLESS STEEL OR POLYCARBONATE LATCHES.
- LIGHT SOURCE – SOLID STATE LEDS WITH MINIMUM 50K HOURS RATED LIFE AT L70, 3500K CCT UON, MINIMUM 80 CRI, MAXIMUM 4-STEP MCADAM ELLIPSE BINNING TOLERANCE FOR COLOR CONSISTENCY, AND MINIMUM EFFICACY OF 100 LUMENS/WATT. INITIAL LUMEN OUTPUT AS INDICATED IN LUMINAIRE SCHEDULE.
- DRIVER – REPLACEABLE, INTEGRAL, HIGH-EFFICIENCY DRIVER WITH MINIMUM 0.9 PF, OPERATING VOLTAGE OF 120-277V, THERMAL MANAGEMENT, < 20% TOTAL HARMONIC DISTORTION. ON-OFF CONTROL, STEP-DIMMABLE OR FULLY DIMMABLE AS INDICATED.
- CERTIFICATION – UL 1598, WET LOCATION (IP65, IP66, IP67), DLC QUALIFIED, AND ROHS COMPLIANT. COMPLIES WITH LM79, LM80 AND TM21 TESTING STANDARDS. UL 924 WHEN EQUIPPED WITH EMERGENCY BATTERY BACK-UP.
- MOUNTING – SURFACE-MOUNTED OR SUSPENDED FROM CEILING.
- OPTIONS – POWER CORD, INTEGRAL MOTION SENSOR, EMERGENCY BACK-UP.
- THIS SKETCH IS A NON-PROPRIETARY GRAPHIC REPRESENTATION OF A LUMINAIRE THAT MAY MEET THE SPECIFICATION REQUIREMENTS. IT IS NOT INTENDED TO INDICATE A CERTAIN MANUFACTURER OR PREFERENCE.



NOTE:

- VERIFY FIELD WIRING WITH DOOR MANUFACTURER.
- USE IDS INPUT FOR AUTOMATIC DOOR CONTROL.

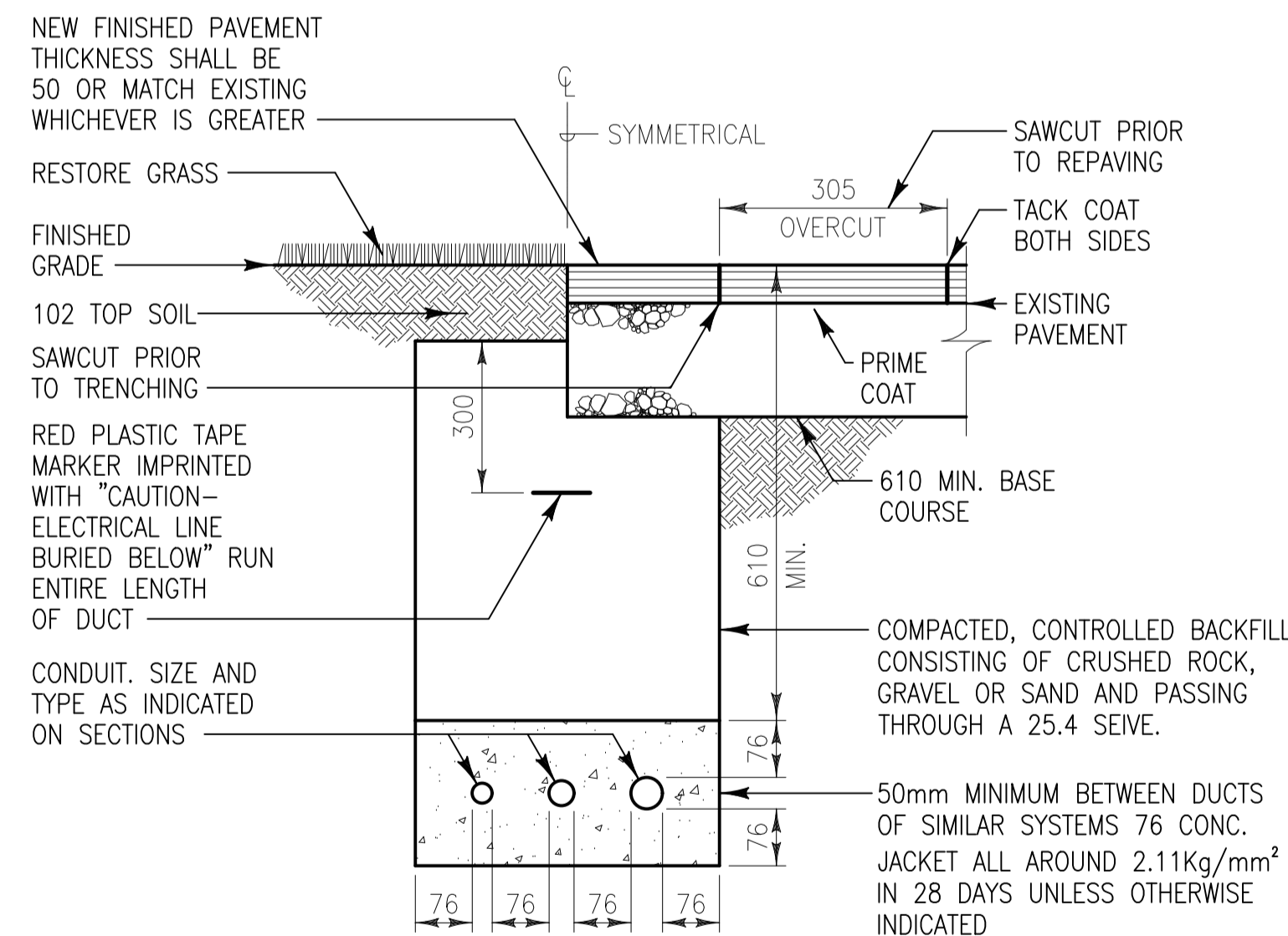
1 DOOR CONTROL DIAGRAM
E-210|E-313 NTS

LED WALL PACK

REVISED: MARCH 2013 LUMINAIRE PLATE: XL-17

LED ENCLOSED AND GASKETED

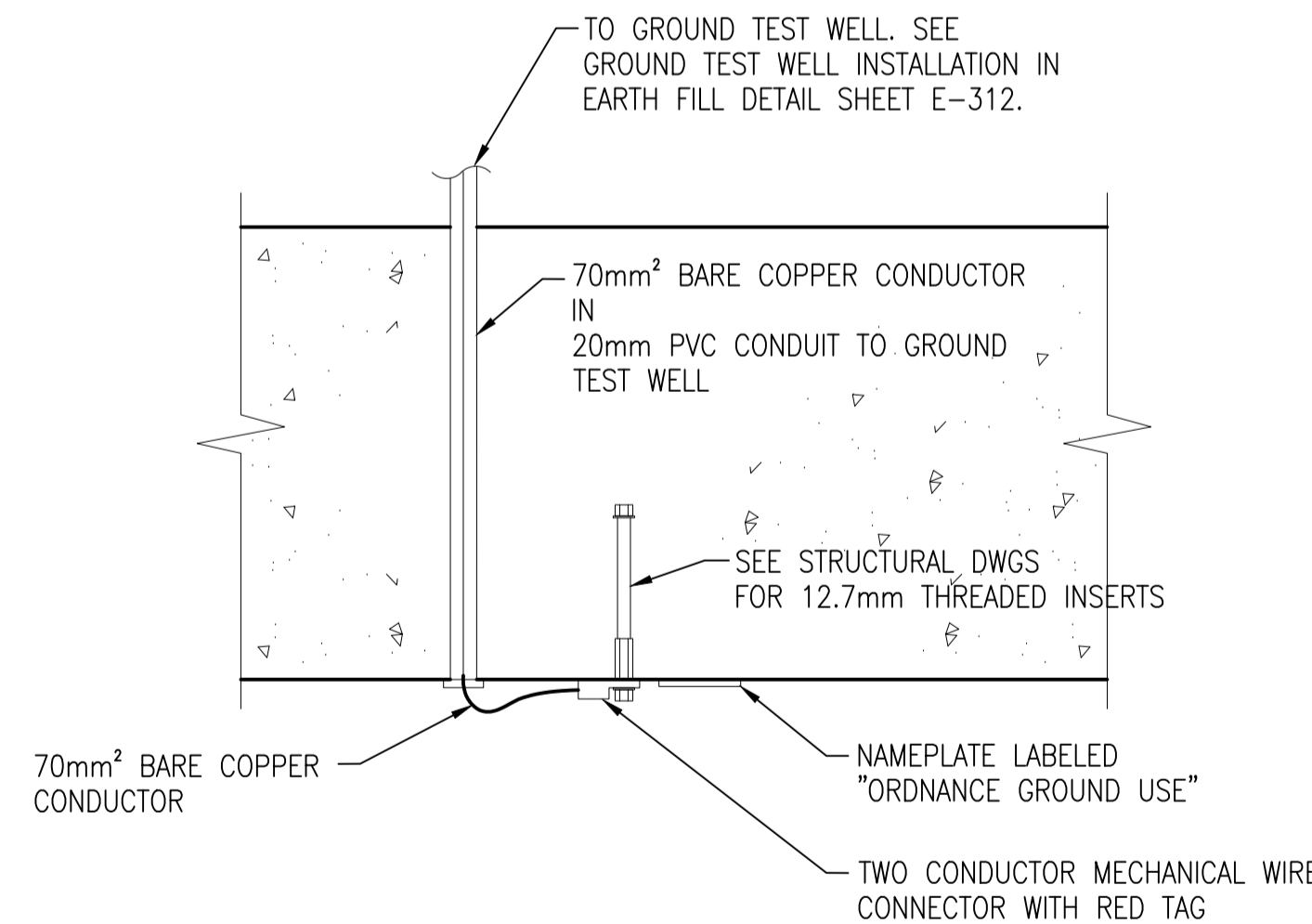
REVISED: APRIL 2016 LIGHTING PLATE: NL-11



DUCT SECTION NOTES:

- 50mm MINIMUM SEPARATION BETWEEN DUCTS OF SIMILAR SYSTEMS (I.E. ELECTRIC-ELECTRIC).
- ALL DIMENSIONS, COVER REQUIREMENTS, ETC. TYPICAL UNLESS OTHERWISE NOTED.
- PAVEMENT REPAIRS
 - BASE COURSE: CRUSHED GRAVEL OR STONE.
 - BITUMINOUS PRIME COAT: ASTM D977, TYPE SS-1
 - BITUMINOUS TACK COAT: ASTM D977, TYPE SS-1
 - ASPHALTIC CONCRETE: ASTM 3515 TABLE II, TYPE II, 100% PASSING 13 SIEVE, AR 8000 VISCOSITY GRADE ASPHALT CONCRETE, ROLL AND COMPACT NOT LESS THAN 95% OF MAXIMUM DENSITY PER ASTM D2041.

2 TYPICAL DUCT SECTION
E-210|E-313 NTS



ORDNANCE GROUND INSERT DETAIL NOTES:

- PROVIDE A REMOVABLE RED MELAMINE PLASTIC TAG THAT ATTACHES TO THE ORDNANCE GROUND INSERT. THE TAG SHALL INCLUDE THE FOLLOWING INFORMATION:
"NOT IN SERVICE. NO MAINTENANCE REQUIRED.
INSTALLATION MEETS ORDNANCE GROUND REQUIREMENT PER NAVSEA OP-5. ACTIVITY SHALL PERFORM TESTING PER NAVSEA OP-5 AND ENACT MAINTENANCE SCHEDULE WHEN THE ORDNANCE GROUND INSERT IS PLACED IN SERVICE.
RETAIN THIS TAG TO REATTACH WHEN REMOVED FROM SERVICE."
- MAINTAIN THREADED INSERT ISOLATION. DO NOT ALLOW THE THREADED INSERT TO TOUCH REBAR OR OTHER METALLIC OBJECTS IN THE WALL.

3 ORDNANCE GROUND INSERT DETAIL
E-310|E-313

LUMINAIRE SCHEDULE

LUMINAIRE TYPE	LIGHTING PLATE NO.	LIGHT SOURCE	VOLTAGE	MOUNTING	NOTES	LUMEN OUTPUT
△	NL-11	LED	120	SURFACE CEILING MOUNTED, UON	1	12000
⊠	XL-17	LED	120	SURFACE-MOUNTED 4270 mm AFG, UON	2	3600

LUMINAIRE SCHEDULE NOTES

- INCLUDE OPTIONAL NON-DIMMING DRIVER, 3500K COLOR TEMP, STAINLESS STEEL LATCHES AND MOUNTING BRACKET, AND FROSTED, IMPACT-RESISTANT ACRYLIC LENS.
- INCLUDE OPTIONAL NON-DIMMING DRIVER, WET LOCATION RATING, 4000K COLOR TEMP, AND DARK BRONZE FINISH.

APPROVED: _____ DATE: _____

FOR COMMANDER NAVFAC: _____

ACTIVITY: _____

SATISFACTORY TO: _____ DATE: _____

DES: <<CM/DM>> DRW: DBC CHK: RCK

BRANCH MANAGER: _____

SGN: PRD DIR: WILLIAM FORBES, P.E.

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

MODULAR STORAGE MAGAZINE
ELECTRICAL DETAILS, LUMINAIRE SCHEDULE

SCALE: AS NOTED

EPROJECT NO.: _____

CONSTR. CONTR. NO.: _____

NAVFAC DRAWING NO.: 14063858

SHEET 53 OF 53

E-313

NAVFAC METRIC DRAWING REVISION: 01 FEBRUARY 2017

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