US Army Corps
of Engineers

Engineering and Support
Center, Huntsville

Magazine, Precast Concrete
Earth Covered
Standard Design 421-80-05

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MAGAZINE, PRECAST CONCRETE
EARTH COVERED
TechSpan® System
DRAWING INDEX AND COVER SHEET

U. S. ARMY ENGINEERING AND
SUPPORT CENTER, HUNTSVILLE
HUNTSVILLE, ALABAMA

Approved Functional Adequacy
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This project was designed by the U.S. Army Engineering and Support Center, Huntsville. The initials or signatures and registration designations of individuals appear on these documents within the scope of their employment as required by ER 1110-1-8152.

6951G1.Dgn

TAI
THE REINFORCED EARTH COMPANY
8614 Westwood Center Drive Suite 1100, Vienna, Virginia 22182 (703) 821-1175

GENERAL NOTES

1. THIS MAGAZINE SHALL BE CONSTRUCTED USING THE TECHSPAN PRECAST ARCH SYSTEM® THE TECHSPAN SYSTEM PROTECTED BY U.S. PATENT No. 4026639, APPLICATION No. 5212, AS DEVELOPED BY THE REINFORCED EARTH COMPANY.

2. THE TECHSPAN SYSTEM SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE RECOMMENDATTIONS OF THE PATENT HOLDER AND THE SPECIFICATIONS.

3. QUESTIONS ON ITEMS SHOWN ON DRAWINGS S1a, S1b, S1c, S1d, S2, S3, S3a, s3b, s3c s3d SHALL BE ADDRESSED TO THE REINFORCED EARTH COMPANY. FOR DRAWINGS S4 TO S7, E1 AND E2 CALL COE.

4. DIMENSIONS SHOWN IN BRACKETS ARE IN MILLIMETERS. ALL REBAR METRIC SIZES ARE IN MILLIMETERS.

GENERAL NOTES - TECHSPAN

1. DESIGN IS BASED ON:

   a. STATIC LOADS:

   SOIL DENSITY 120 PCF= 19.6 kN/m ^{3}
   SOIL ANGLE OF REPOSE 30 DEGREES
   LIVE LOAD SURCHARGE 100 PSF= 4.8 kPa

   b. OVERPRESSURE LOADS:

   OVERPRESSURE LOADS FOR HEADWALL, DOORS AND REAR WALL ARE FROM FRONT-TO-REAR SPACING OF 2.0 W $^{1/3}$ WHERE W IS THE NET EXPLOSIVE WEIGHT.

2. REINFORCED CONCRETE DESIGN METHOD; ULTIMATE STRENGTH DESIGN.

3. ARCH MAY BE ERECTED 7 DAYS AFTER FOOTING IS CAST. HOWEVER, BACKFILLING MAY NOT COMMENCE UNTIL 14 DAYS AFTER FOOTING IS CAST.

4. THE CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 P.S.I. @ 28 DAYS [28 MPa]. ALL ARCH SEGMENTS SHALL ATTAIN THE FULL 28 DAY COMPRESSIVE STRENGTH PRIOR TO INSTALLATION. REINFORCING STEEL SHALL BE ASTM A615 WITH THE FOLLOWING GRADES:

   TIES -GRADE 40
   ALL OTHERS -GRADE 60

5. FOR INFORMATION PERTAINING TO ARCH CONSTRUCTION PLEASE REFER TO THE TECHSPAN CONSTRUCTION AND QUALITY CONTROL MANUAL.

6. IN FROST AREAS PROVIDE NONFROST-SUSCEPTIBLE MATERIAL UNDER HEADWALL FOOTING, TO FULL DEPTH OF FROST PENETRATION, OR LOWER BOTTOM OF FOOTING TO FROST PENETRATION DEPTH.

7. NOTE TO CONTRACTORS

   ONLY THE FOLLOWING MATERIALS ARE SUPPLIED BY THE REINFORCED EARTH COMPANY:

   - TECHSPAN ARCH SEGMENTS
   - IMPERMEABLE MEMBRANE (FOR ARCH SEGMENTS ONLY)
   - ANY OTHER MATERIAL CALLED FOR IN THE CONTRACT PLANS OR SPECIFICATIONS ARE TO BE SUPPLIED BY THE CONTRACTOR.

REINFORCED EARTH NOTES

DESIGN CRITERIA

1. DESIGN IS BASED ON THE ASSUMPTION THAT THE MATERIAL WITHIN THE REINFORCED EARTH VOLUME, METHODS OF CONSTRUCTION AND QUALITY OF PREFABRICATED MATERIALS SHALL CONFORM TO THE CONTRACTING AGENCY'S TECHNICAL SPECIFICATIONS FOR REINFORCED EARTH WALLS.

2. SOILS CHARACTERISTICS ASSUMED FOR DESIGN:

   SELECT GRANULAR BACKFILL
   Ø = 34 degrees C = 0 p.s.f., =γ p.c.f. [19.6kN/m]^3

   RANDOM BACKFILL
   Ø = 30 degrees C = 0 p.s.f., =γ p.c.f. [19.6kN/m]^3

   FOUNDATION MATERIAL
   Ø = 30 degrees C = 0 p.s.f. [0.0 kN/m]^3

3. THE MAXIMUM APPLIED BEARING PRESSURE AT THE FOUNDATION LEVEL IS AS SHOWN ON THE WALL ELEVATIONS FOR EACH DESIGN CASE. IT IS THE RESPONSIBILITY OF THE OWNER TO DETERMINE THAT THIS APPLIED BEARING PRESSURE IS ALLOWABLE FOR THAT LOCATION.

4. ANY UNSUITABLE FOUNDATION MATERIAL BELOW THE REINFORCED EARTH VOLUME, AS DETERMINED BY THE ENGINEER, SHALL BE EXCAVATED AND REPLACED WITH SUITABLE MATERIAL OR OTHERWISE STABILIZED AS DIRECTED BY THE ENGINEER.

5. REINFORCING STRIPS FOR REINFORCED EARTH WALLS SHALL BE 50mm WIDE AND 4mm THICK, AND SHALL CONFORM TO THE PHYSICAL AND MECHANICAL PROPERTIES OF ASTM A-572 GRADE 65. GALVANIZATION SHALL BE APPLIED IN ACCORDANCE WITH ASTM A-123.

6. BACKFILL MATERIAL SHALL BE COMPACTED IN ACCORDANCE WITH THE SPECIFICATIONS FOR REINFORCED EARTH WALLS TO A LEVEL OF 2" (ε) [50] ABOVE THE TIE STRIPS EMBEDDED IN THE PANELS. INSTALLATION OF REINFORCING STRIPS SHALL BE PERMITTED ONLY AFTER PLACEMENT AND COMPACTION OF THE BACKFILL MATERIAL HAS REACHED THE REQUIRED LEVEL.

7. COMPACTION AND OPERATION EQUIPMENT SHALL BE KEPT A MINIMUM DISTANCE OF 3'-0" [1000] FROM THE BACK FACE OF THE REINFORCED EARTH PANELS. COMPACTION WITHIN 3'-0" [1000] OF THE REINFORCED EARTH PANELS SHALL BE ACHIEVED WITH AT LEAST THREE (3) PASSES OF A LIGHTWEIGHT MECHANICAL TAMPER, ROLLER OR VIBRATORY SYSTEM. NO COMPACTION DENSITY TESTS SHALL BE TAKEN WITHIN THE 3 FT. ZONE [1000].

8. IF EXISTING OR FUTURE STRUCTURES, PIPES, FOUNDATIONS OR GUARDRAIL POSTS WHICH ARE WITHIN THE REINFORCED EARTH VOLUME INTERFERE WITH THE NORMAL PLACEMENT OF REINFORCING STRIPS AND SPECIFIC DIRECTION HAS NOT BEEN PROVIDED ON THE PLANS, THE CONTRACTOR SHALL NOTIFY THE REINFORCED EARTH COMPANY TO DETERMINE WHAT COURSE OF ACTION SHOULD BE TAKEN.

9. ALL DETAILING AND CHECKING OF REINFORCING STEEL FOR ANY C.I.P. CONCRETE WORK IS THE RESPONSIBILITY OF THE CONTRACTOR.

10. FOR OTHER INFORMATION PERTAINING TO WALL CONSTRUCTION PLEASE REFER TO THE REINFORCED EARTH CONSTRUCTION MANUAL.

11. THE CONTRACTOR IS RESPONSIBLE FOR GRADUALLY DEFLECTING UPPER REINFORCING STRIPS DOWNWARD TO AVOID CONFLICTS WITH PAVING AND SUBGRADE PREPARATION. THE CONTRACTOR'S ATTENTION IS DIRECTED ESPECIALLY TO SITUATIONS WHERE ROADWAY SUPERELEVATION AND/OR SOIL MIXING ARE ANTICIPATED.

12. THE CONTRACTOR IS RESPONSIBLE FOR CONTROLLING STORM WATER DRAINAGE IN THE VICINITY OF THE WALL DURING CONSTRUCTION. STORM WATER RUNOFF IS TO BE COLLECTED AND DISCHARGED AWAY FROM THE WALL AND REINFORCED BACKFILL.

MATERIALS NOTES

13. NOMINAL STRIP LENGTHS

    THE REINFORCING STRIP LENGTHS SHOWN ON THE PLANS, MEASURED FROM BACK FACE OF PANEL, ARE THE NOMINAL LENGTHS REQUIRED BY CALCULATION. THE ACTUAL FABRICATED STRIP LENGTHS ARE OFTEN LONGER (UP TO 6" [150] DUE TO MANUFACTURING TOLERANCES. THE REQUIRED HORIZONTAL LIMIT OF GRANULAR BACKFILL IS EQUAL TO THE NOMINAL STRIP LENGTH. ADDITIONAL GRANULAR BACKFILL BEYOND THE NOMINAL STRIP LENGTH IS NOT REQUIRED BY CALCULATION.

14. SELECT BACKFILL QUANTITY

    THE SELECT BACKFILL QUANTITY INDICATED BY THE REINFORCED EARTH COMPANY IS CALCULATED BY MULTIPLYING THE NOMINAL STRIP LENGTHS SHOWN ON THE PLANS (PLUS 0 FT.) BY THEIR TRIBUTARY WALL SURFACE AREA AND CONVERTING THE RESULT TO A NEATLINE CUBIC YARD QUANTITY. THIS INFORMATION IS FURNISHED FOR THE CONTRACTOR'S INFORMATION ONLY AND IS NOT INTENDED TO REPRESENT THE ACTUAL QUANTITIES REQUIRED TO COMPLETE THE WORK. THE CONTRACTOR MUST CALCULATE HIS OWN EXCAVATION AND BACKFILL QUANTITIES BASED UPON THE SPECIFIC CONDITIONS OF THE PROJECT.

15. PANEL FINISH

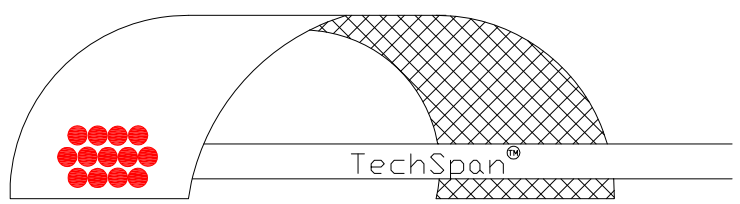
    THE PRECAST PANELS FOR THIS PROJECT SHALL HAVE A PLAIN FINISH UNLESS OTHERWISE SPECIFIED.

16. NOTE TO CONTRACTORS

    ONLY THE FOLLOWING MATERIALS ARE SUPPLIED BY THE REINFORCED EARTH COMPANY:

    - PRECAST CONCRETE FACING PANELS
    - REINFORCING STRIPS
    - BOLT SETS (FOR ATTACHING PANELS TO THE REINFORCING STRIPS)
    - BEARING BLOCKS
    - RUBBER SHIMS
    - FILTER CLOTH AND ADHESIVE (FOR PANEL JOINTS ONLY)

    ANY OTHER MATERIALS CALLED FOR IN THE CONTRACT PLANS OR SPECIFICATIONS ARE TO BE SUPPLIED BY THE CONTRACTOR. ANY JOINT MATERIALS SHOWN AT THE INTERFACE OF PRECAST PANELS AND CAST-IN-PLACE CONCRETE STRUCTURES ARE TO BE SUPPLIED BY THE ERECTION CONTRACTOR. ALL SANDBLASTING, PAINTING, SEALERS OR OTHER SPECIAL APPLIED COATINGS ARE ALSO SUPPLIED/INSTALLED BY THE CONTRACTOR IN THE FIELD FOLLOWING PANEL ERECTION.



US Army Corps of Engineers

Symbol	Description	Date	Approved	Symbol	Description	Date	Approved

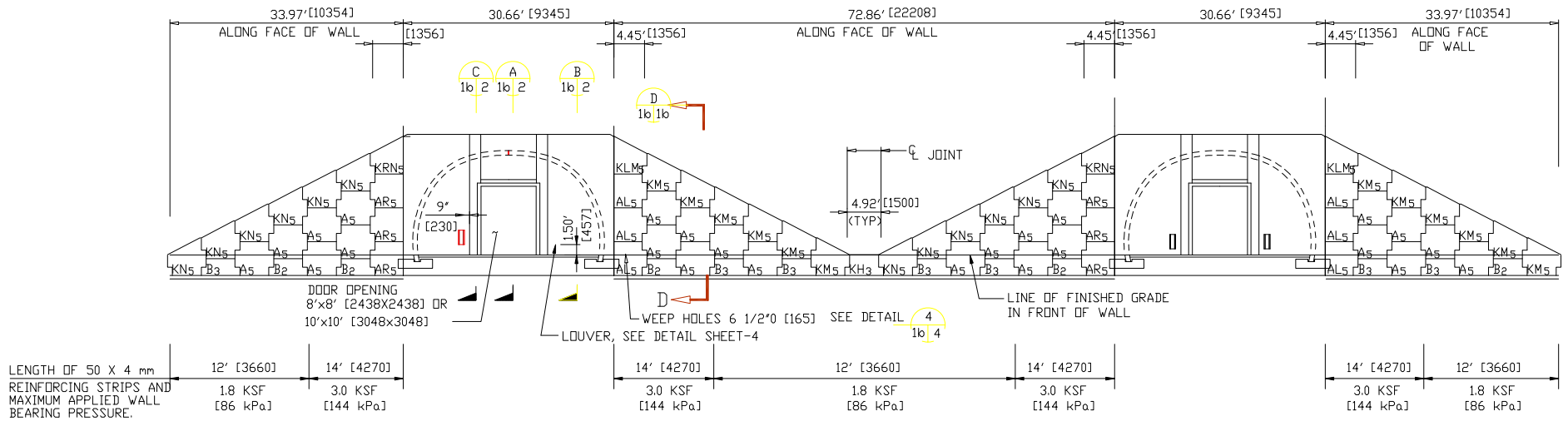
Designed by: Kim Truong | Date: July 98 | Rev.
Dwn by: DM/KC | Ckd by: KT | Design file no.: 8421
Reviewed by: KT | Drawing code: 421-80-05
Submitted by: KT | File name: 6951S1A.dgn
Plot date:
Plot scale:

U.S. ARMY ENGINEERING AND SUPPORT CENTER, HUNTSVILLE
HUNTSVILLE, ALABAMA

MAGAZINE, PRECAST CONCRETE EARTH COVERED TechSpan® System
GENERAL NOTES

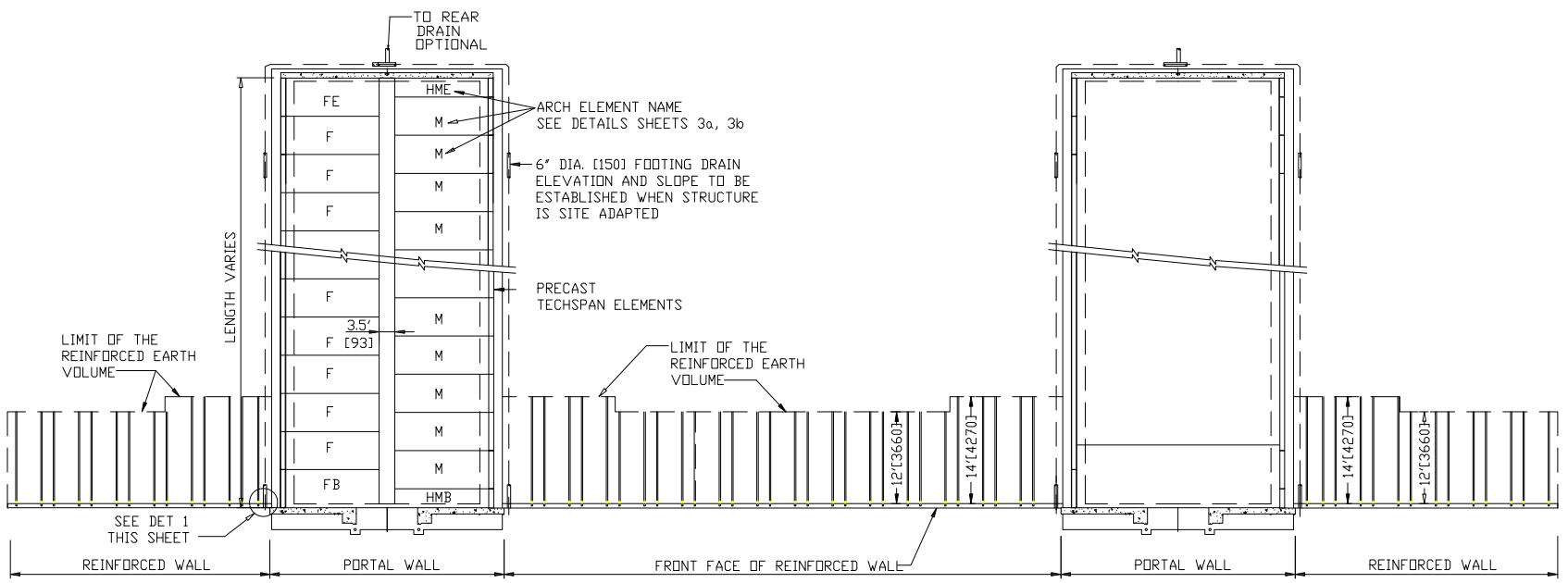
Sheet reference number: 421-80-05
Sheet S-1a

6951S1a.DGN



ELEVATION PORTAL WALLS & REINFORCED EARTH WING WALLS

SCALE : 1" = 10'

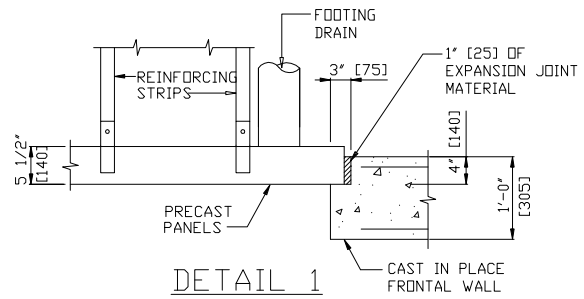


PLAN

SCALE: 1" = 10'

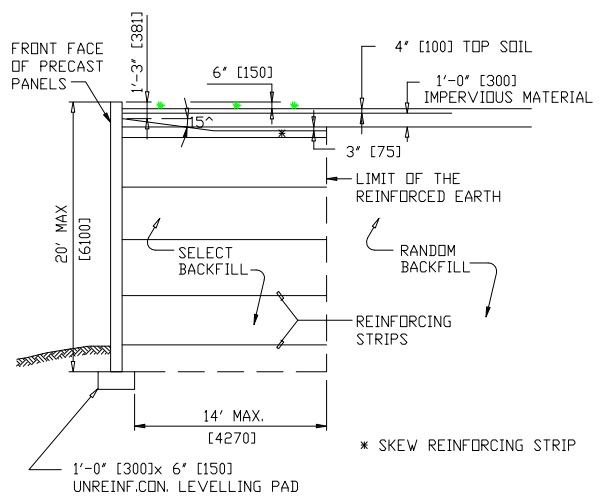
NOTE:

1. IF, AS A RESULT OF THE FOUNDATION INVESTIGATION OR LOCAL FROST CONDITIONS, IT IS DETERMINED THAT ANY OR ALL WALL FOOTING MUST BE LOWERED, THE APPROPRIATE WALL AND FOOTING DESIGNS MUST BE CHECKED AND ADJUSTED AS REQUIRED TO SUIT THESE CONDITIONS.
2. FOOTINGS ARE SIZED FOR A NET SOIL BEARING VALUE OF 3,000 P.S.F. [144 kPa] FOOTINGS MUST BE REDESIGNED IF THE SOILS INVESTIGATION DOES NOT CONFIRM THIS BEARING CAPACITY.
3. LOUVERS ARE OPTIONAL. THEIR NECESSITY AND SIZE SHALL BE DETERMINED DURING THE SITE-ADAPTION PROCESS BASED ON MATERIALS TO BE STORED AND GEOGRAPHICAL LOCATIONS. THE LOUVER WIDTH OF 6 INCHES [150] SHALL BE MAINTAINED. THE HEIGHT MAY BE VARIED AS NECESSARY.



DETAIL 1

SCALE: 1"=1'-0"



SECTION D

N.T.S. 1b 1b

US Army Corps of Engineers

Symbol	Description	Date	Approved

Date: July 98
Design File no. 84212
Drawing code: 421-80-05
File name: 6951S1B.dgn
Plot date:
Plot scale:

Designed by: Kim Truong
Drawn by: DM/KC
Ckd by: KT
Reviewed by: KT
Submitted by: KT

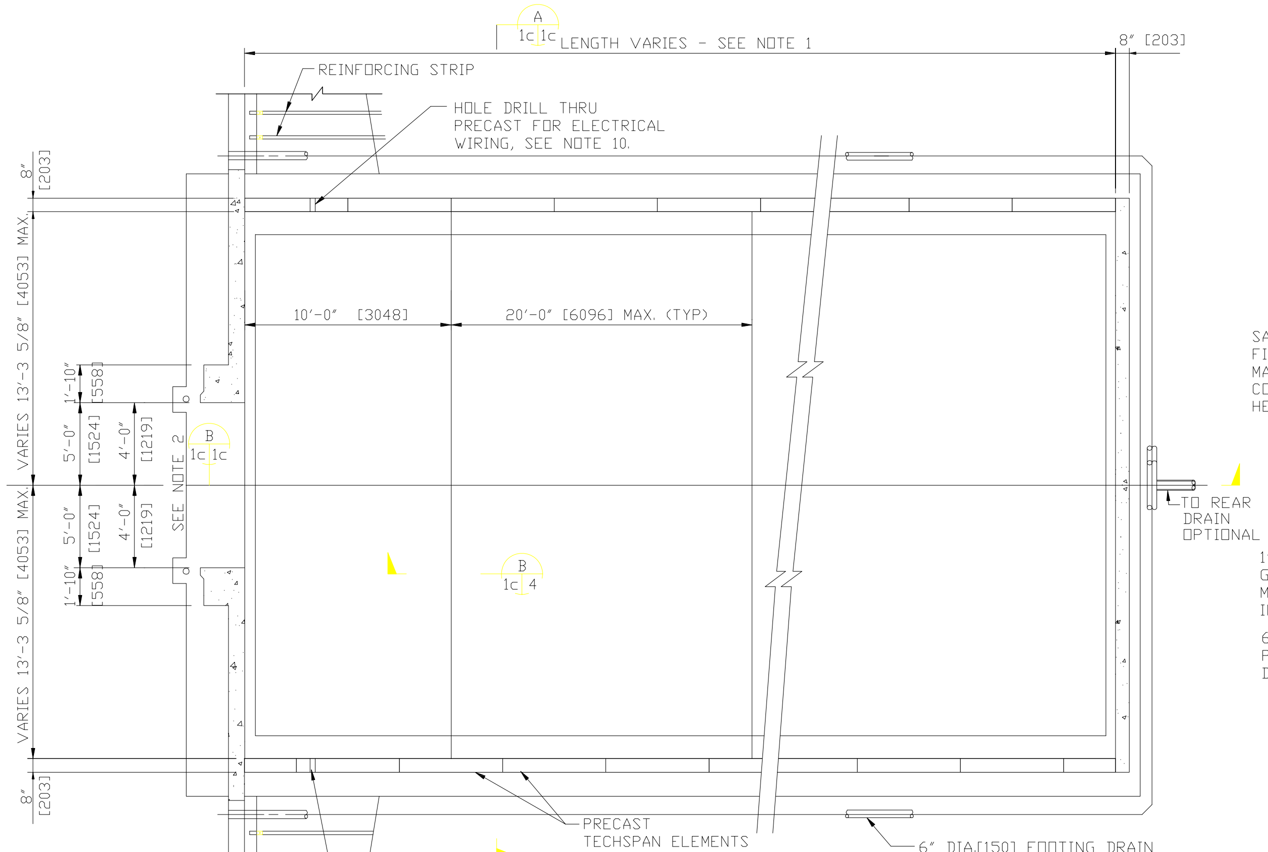
U. S. ARMY ENGINEERING AND SUPPORT CENTER, HUNTSVILLE
HUNTSVILLE, ALABAMA

MAGAZINE, PRECAST CONCRETE EARTH COVERED TechSpan® System PRECAST MAGAZINES AND REINFORCED EARTH WINGWALLS PLAN, ELEVATION, SECTION AND DETAIL

Sheet reference number: 421-80-05

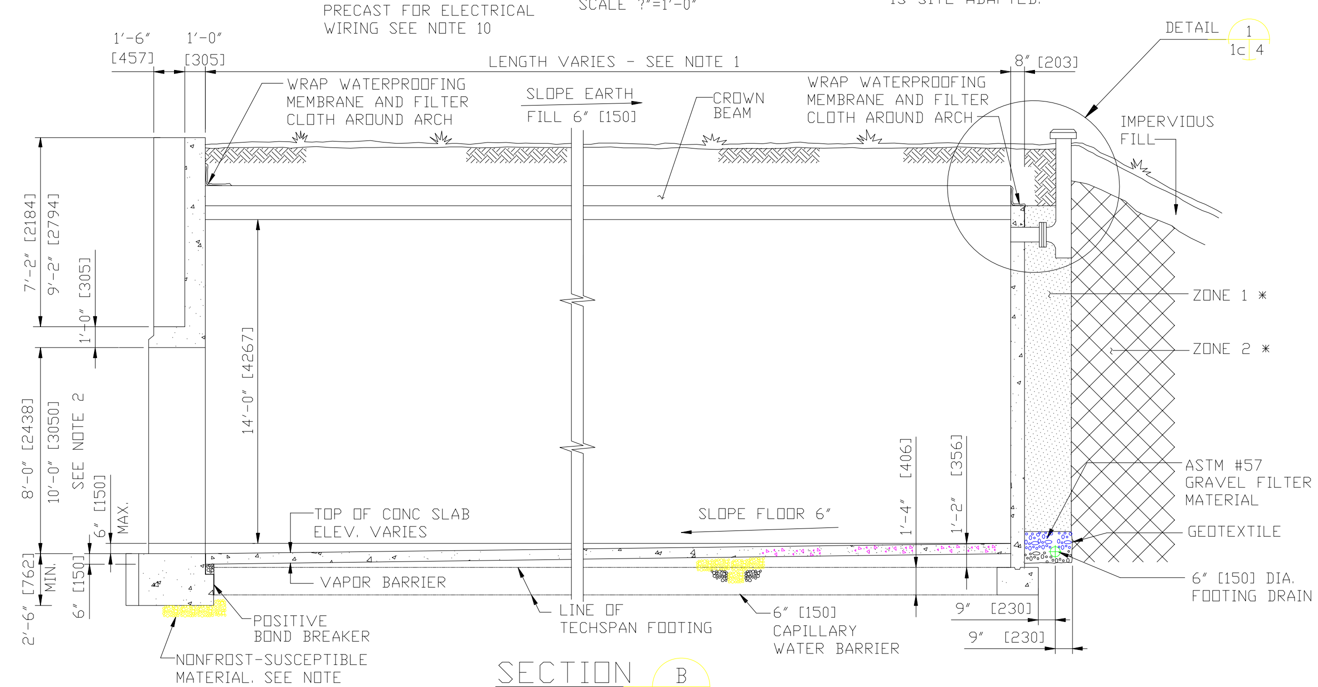
Sheet S-1b

6951S1b.DGN



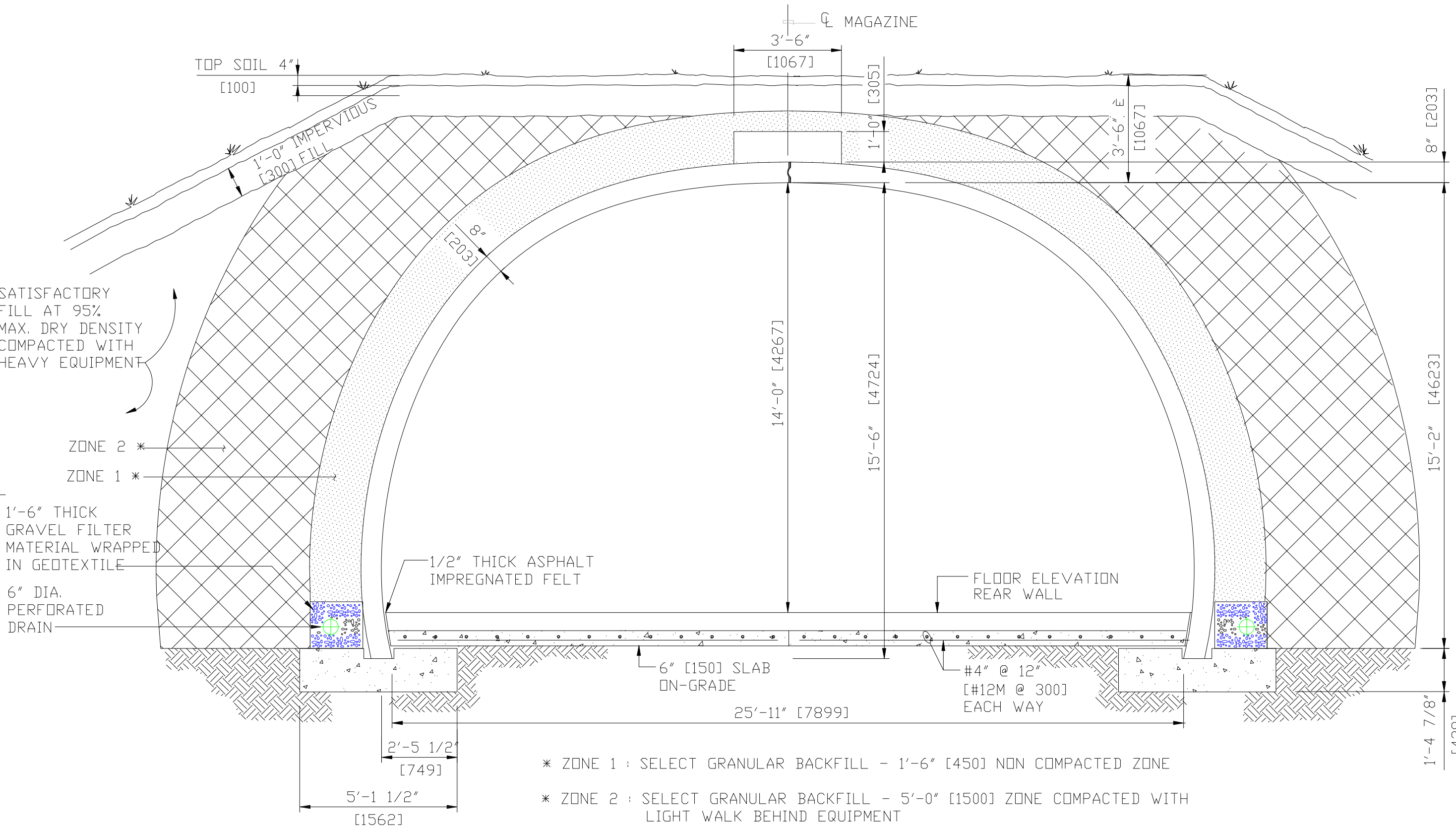
PLAN

SCALE ?″=1′-0″



SECTION B

SCALE ?″=1′-0″



∗ ZONE 1 : SELECT GRANULAR BACKFILL - 1′-6″ [450] NON COMPACTED ZONE

∗ ZONE 2 : SELECT GRANULAR BACKFILL - 5′-0″ [1500] ZONE COMPACTED WITH LIGHT WALK BEHIND EQUIPMENT FOR ELECTRICAL CONTINUITY SEE NOTE 7 THIS SHEET.

SECTION A

SCALE ?″=1′-0″

NOTES:

1. NORMALLY CONSTRUCTED IN 60′-0″ [18288] OR 80′-0″ [24384] LENGTHS. MAXIMUM LENGTH WITH FLOOR SLOPE: 90′-0″ [27432]
2. DOOR OPENING TO BE SIZED FOR OPTIONAL DOOR SIZE REQUIRED.
3. CONCRETE SHALL HAVE 28 DAY ULTIMATE STRENGTH (f′c) OF 4,000 P.S.I. [28MPa]
4. REINFORCING STEEL SHALL BE ASTM A615 WITH THE FOLLOWING GRADES:
   TIES -GRADE 40 [276 MPa]
   ALL OTHERS -GRADE 60 [414 MPa]
5. DIMENSIONS SHOWN IN BRACKETS ARE MILLIMETERS, THEY MAY BE ROUNDED TO THE NEAREST UNIT. ALL REBAR METRIC SIZES ARE IN MILLIMETERS.
6. DRAINS TO BE SITE ADAPTED TO DRAIN EITHER TO THE FRONT OR REAR OF THE MAGAZINE. ACCUMULATED DRAINAGE SHALL BE DIRECTED AWAY FROM THE MAGAZINE IN A CONTROLLED MANNER.
7. ALL METAL PARTS, TO INCLUDE REINFORCEMENT, LOUVERS, VENTILATOR, DOOR, DOOR FRAME, ETC, SHALL BE MADE ELECTRICALLY CONTINUOUS BY CLIPPING, BRAZING, OR WELDING. ELECTRICAL CONTINUITY SHALL BE PROVIDED ACROSS FLOOR CONSTRUCTION JOINTS AND ACROSS FLOOR ISOLATION JOINTS TO ARCH REINFORCEMENT AT 5 FEET [1524] INTERVALS. ACCEPTABLE ELECTRICAL CONTINUITY METHODS ARE REINFORCEMENT BARS, COOPER STRAPS, ETC.
8. IN FROST AREAS PROVIDE NONFROST-SUSCEPTIBLE MATERIAL UNDER HEADWALL FOOTING, TO FULL DEPTH OF FROST PENETRATION, OR LOWER BOTTOM OF FOOTING TO FROST PENETRATION DEPTH.
9. TOP OF MAGAZINE PORTAL FOOTING MUST BE MAINTAINED AT FINISHED FLOOR ELEVATION FOR THE FULL 2′-6″ [762] BEYOND FACE OF PORTAL TO MAINTAIN SLIDING DOOR OPERATION. DO NOT EXTEND DOCK OR RAMP SLABS UNDER DOOR.
10. NO REBARS IN PRECAST ARCH ELEMENTS SHALL BE PARTIALLY DAMAGED OR CUT BY THE DRILLING PROCESS.
11. WATERPROOFING TREATMENT ON THE OUTSIDE OF THE STRUCTURE IS NOT SUPPLIED BY THE REINFORCED EARTH COMPANY. IT MAY CONSTITUTE OF ELASTOMERIC MEMBRANES.

US Army Corps of Engineers

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U. S. ARMY ENGINEERING AND SUPPORT CENTER, HUNTSVILLE
HUNTSVILLE, ALABAMA

Designed by: Kim Truong	Date: July 98	Rev.
Dwn by: DM/KC / Ckd by: KT	Design file no. 84213	
Reviewed by: KT	Drawing code: 421-80-05	
Submitted by: KT	File name: 6951S1C.dgn Plot date: - - Plot scale:	

MAGAZINE, PRECAST CONCRETE EARTH COVERED

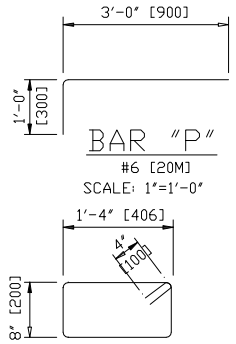
TechSpan® System

TECHSPAN MAGAZINES LONGITUDINAL AND TRANSVERSAL SECTION

Sheet reference number: 421-80-05

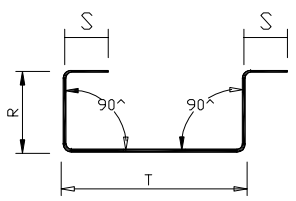
Sheet S-1c

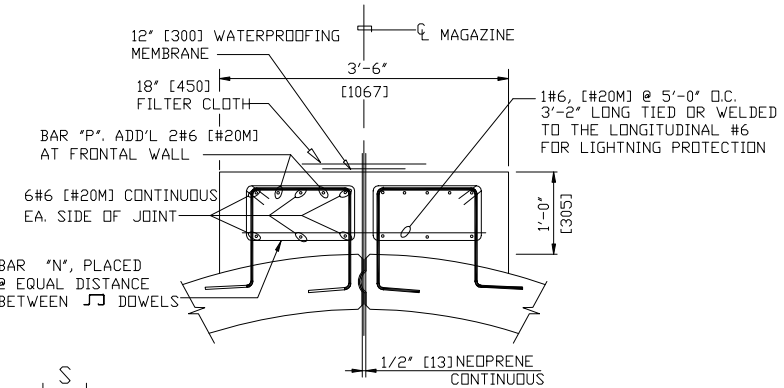
6951S1c.DGN



BAR "P"
#6 [20M]
SCALE: 1"=1'-0"

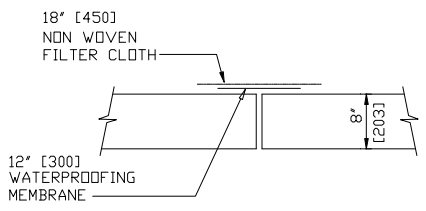
BAR "N"
#3 [10M]
SCALE: 1"=1'-0"



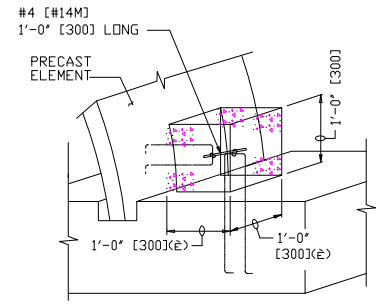


CROWN BEAM DETAIL
SCALE: 1"=1'-0"

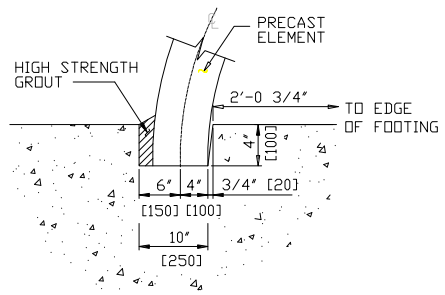
BAR TYPE	DIMENSION		
	T	R	S
C	1'-10" [560]	8" [200]	0
D	1'-8 3/4" [527]	8" [200]	0
F	4'-9 1/2" [1460]	8" [200]	0
M	6" [150]	1'-7" [483]	6" [150]



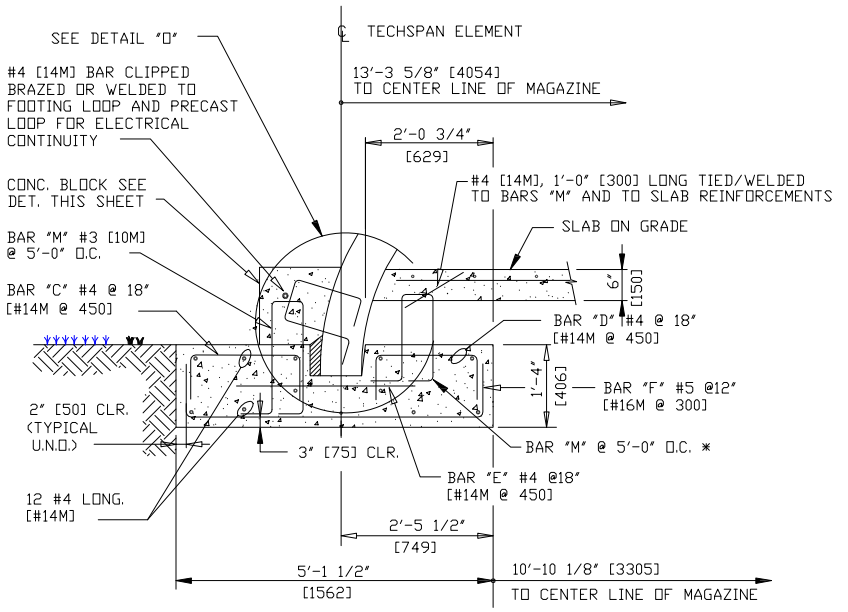
DETAIL OF WATERPROOFING MEMBRANE BETWEEN ARCH PIECES
SCALE: 1"=1'-0"



CONCRETE BLOCK DETAIL
SCALE: 3/4"=1'-0"



DETAIL "D"
SCALE: 1"=1'-0"

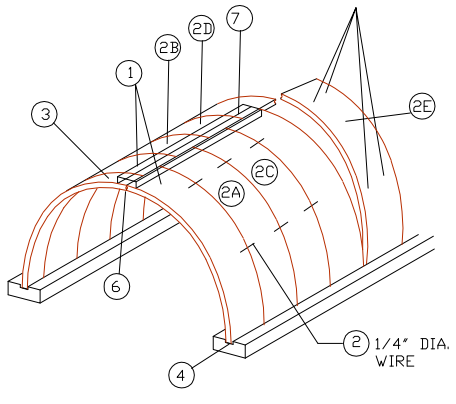


FOOTING SECTION
SCALE: 3/4"=1'-0"

NOTE :
ALL REBARS SHALL BE CLIPPED, BRAZED OR WELDED.
* BEND BARS "M" TO FIT INSIDE THE SLAB-ON-GRADE

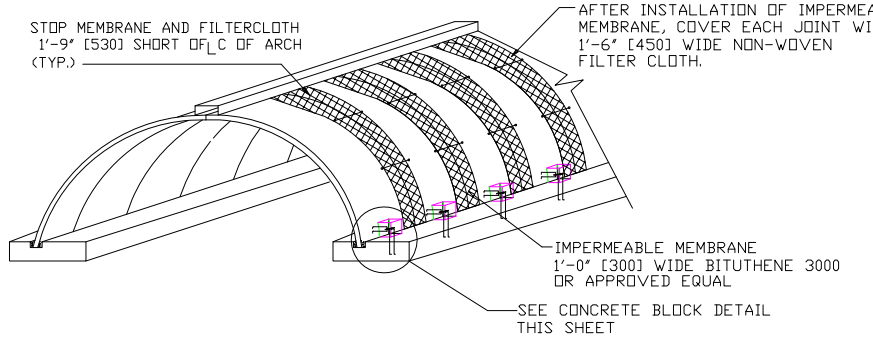
NOTES:

1. TECHSPAN ITEMS SUPPLIED BY 'THE REINFORCED EARTH COMPANY': PRECAST CONCRETE ELEMENTS AND ALL EMBEDDED HARDWARE
2. THE DESIGN OF THE TECHSPAN ARCH SYSTEM IS BASED ON THE ASSUMPTION THAT THE FOUNDATION IS ADEQUATE TO PROVIDE AN ALLOWABLE NET BEARING PRESSURE OF 3 ksf [144 kPa]. IT IS THE RESPONSIBILITY OF THE OWNER'S ENGINEER TO VERIFY THE FOUNDATION STABILITY AND TO NOTIFY THE REINFORCED EARTH COMPANY IF THE ASSUMED BEARING PRESSURE IS NOT MET
3. 1/4" [5] DIA. WIRE INSERTED THRU LIFTING INSERTS AND TIGHTENED IS TO FACILITATE ERECTION OF THE TECHSPAN ARCH. IT IS NOT INTENDED TO BE A STRUCTURAL COMPONENT OF THE TECHSPAN ARCH SYSTEM.

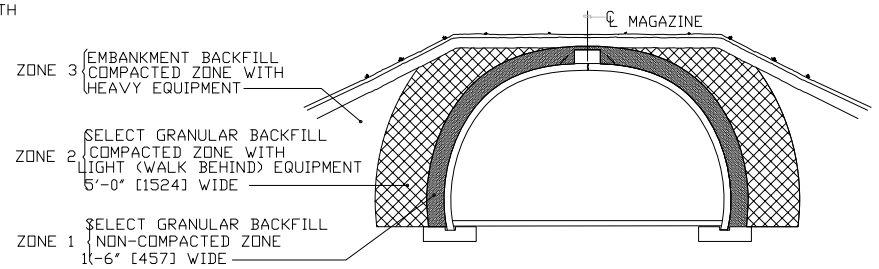


1. INSTALL 2 FULL SIZE ELEMENTS SIMULTANEOUSLY
2. INSTALL REMAINING FULL SIZE ELEMENTS INCLUDING INSERTION OF 1/4" [5] DIA. WIRE THROUGH HOLES IN LIFTING INSERTS AND TIGHTENING.
3. INSTALL HALF SIZE END ELEMENTS.
4. POUR GROUT AT FOOTING AND INSTALL GEOMEMBRANE AND FILTERCLOTH. STOP GEOMEMBRANE & FILTERCLOTH 1'-0" [300] SHORT OF ℄ OF ARCH
5. BACKFILL (ELEVATION DIFFERENTIAL OF BACKFILL ON OPPOSITE SIDES OF THE ARCH SHALL NOT EXCEED 18" [450])
6. POUR CROWN BEAM
7. INSTALL GEOMEMBRANE AND FILTERCLOTH OVER CROWN BEAM

SUGGESTED CONSTRUCTION PROCEDURE
NOT TO SCALE



JOINT COVER DETAIL
N.T.S.



BACKFILL AND COMPACTION
(SYMMETRICAL ABOUT CENTER LINE)

US Army Corps of Engineers

Symbol	Description	Date Approved	Symbol	Date Approved

Date: July 98
Design File no. 84214
Drawing code: 421-80-05
File name: 6951S1d.dgn
Plot date:
Plot scale:
Rev.

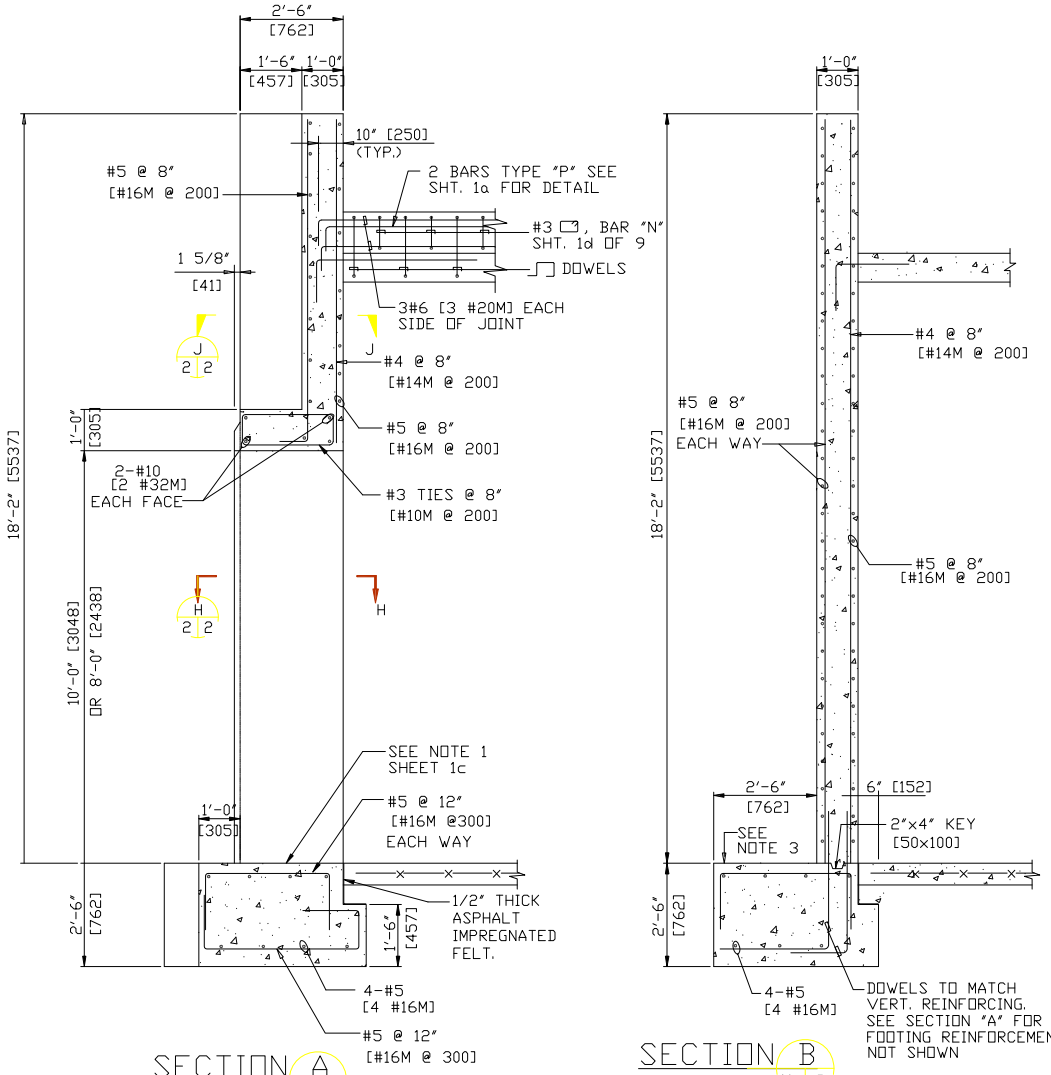
Designed by: Kim Truong
Dwn. by: BM/KC
Ckd by: KT
Reviewed by: KT
Submitted by: KT

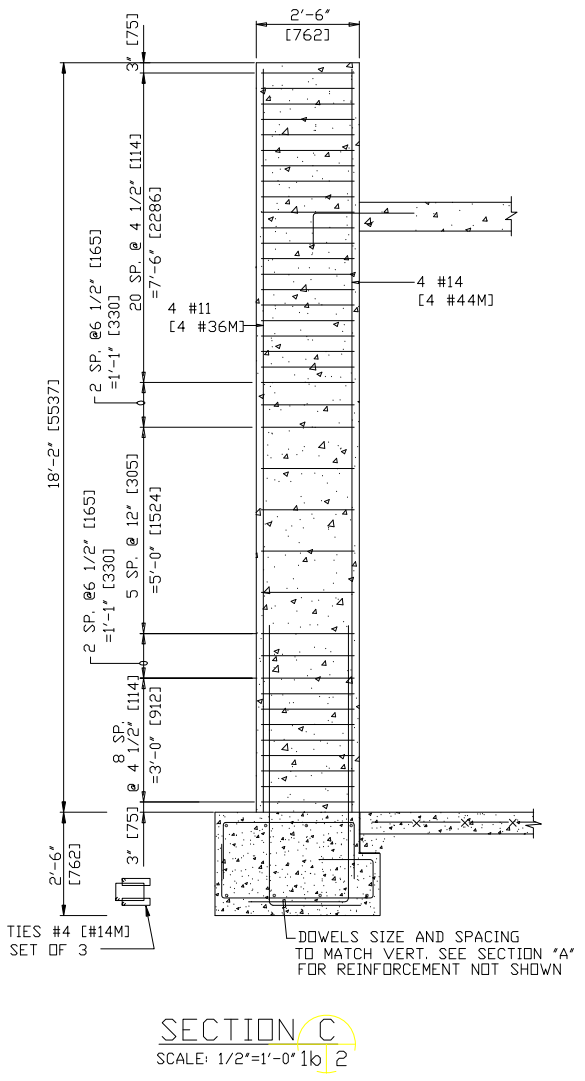
U. S. ARMY ENGINEERING AND SUPPORT CENTER, HUNTSVILLE HUNTSVILLE, ALABAMA

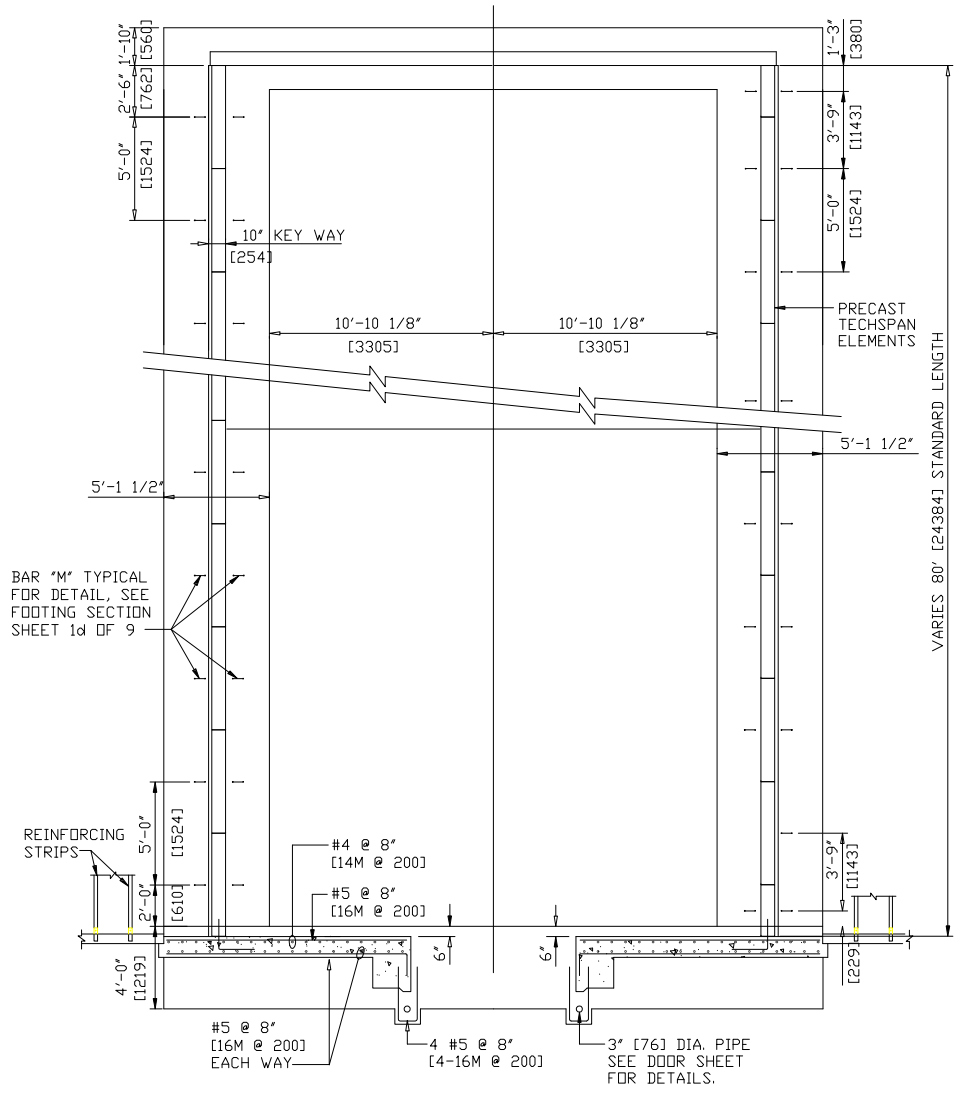
MAGAZINE PRECAST CONCRETE EARTH COVERED TechSpan® System CROWN BEAM, FOOTING AND ERECTION SEQUENCES

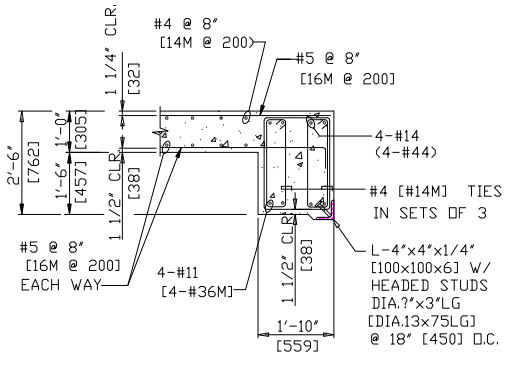
Sheet reference number: 421-80-05
Sheet S-1d

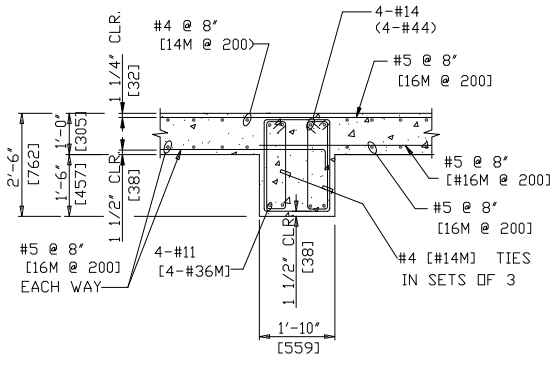
6951S1d.DGN











US Army Corps of Engineers

Symbol	Description	Date	Approved	Description	Date	Approved

Designed by: Kim Truong	Date: July 98	Rev.
Dwn by: DW/KC	Design File no. 84215	
Ckd by: KT	Drawing code: 421-80-05	
Reviewed by: KT	File name: 6951S2.dgn	
Submitted by: KT	Plot date:	
	Plot scale:	

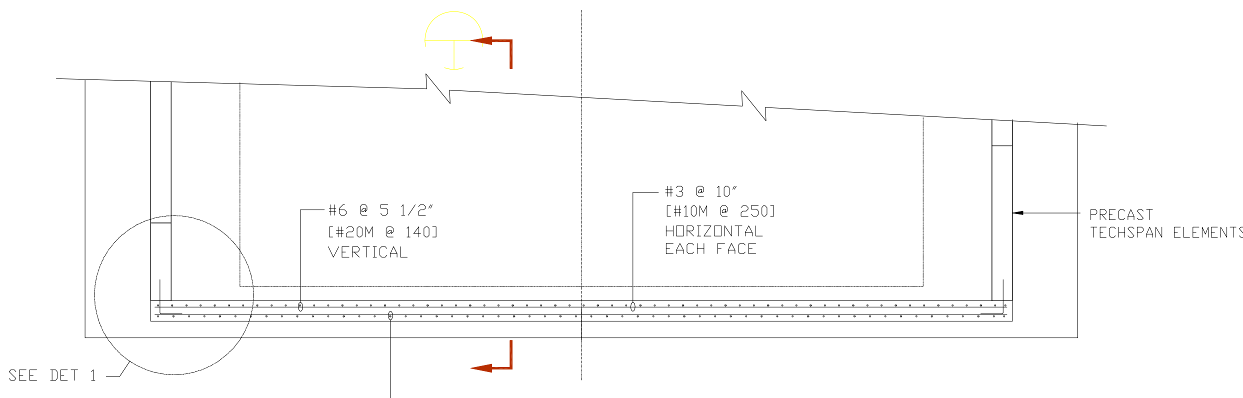
U. S. ARMY ENGINEERING AND SUPPORT CENTER, HUNTSVILLE HUNTSVILLE, ALABAMA

MAGAZINE, PRECAST CONCRETE EARTH COVERED TechSpan® System PORTAL WALL DETAIL AND CONNECTION TO TECHSPAN PRECAST ELEMENTS

Sheet reference number: 421-80-05

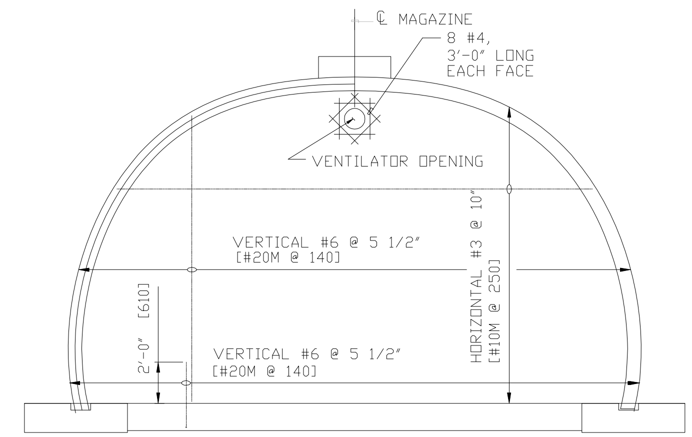
Sheet S-2

6951S2.DGN



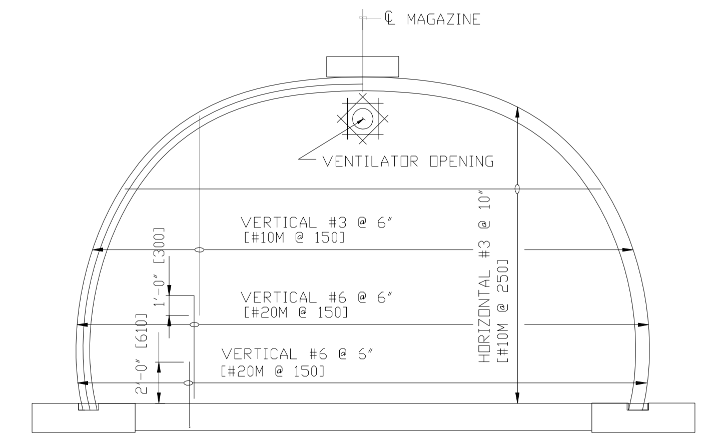
PLAN REAR WALL

SCALE 3/8"=1'-0"



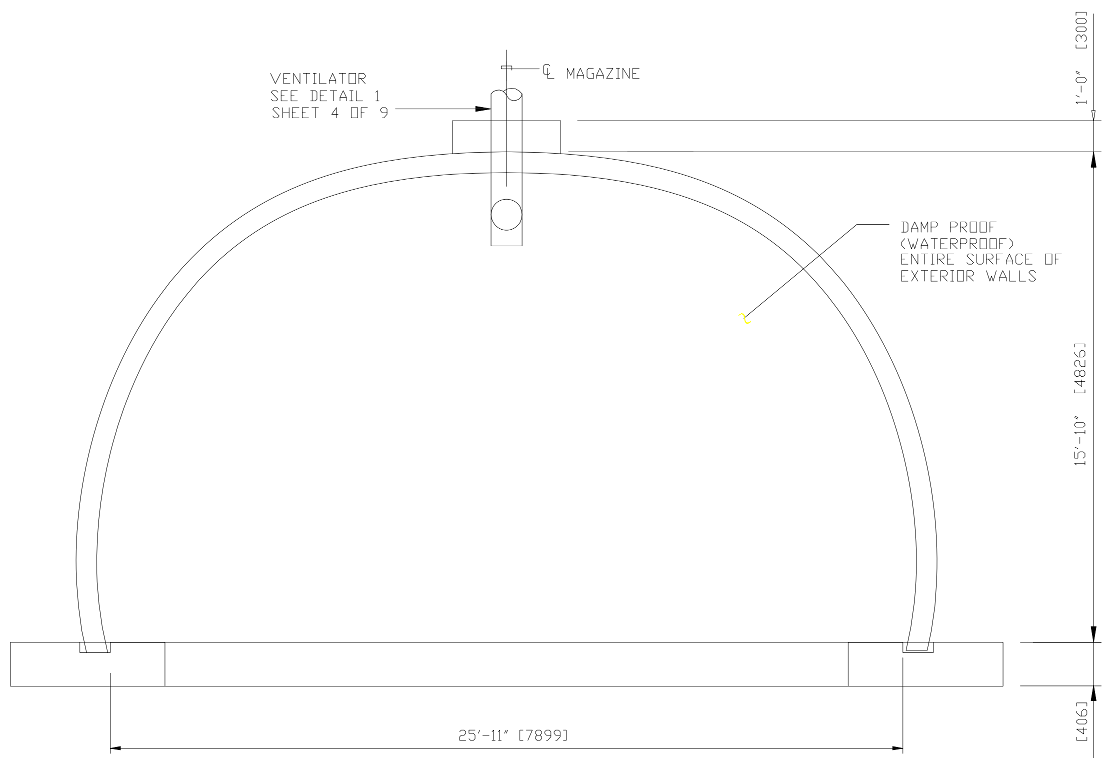
REAR WALL
INTERIOR REINFORCEMENT

SCALE 1/4"=1'-0"



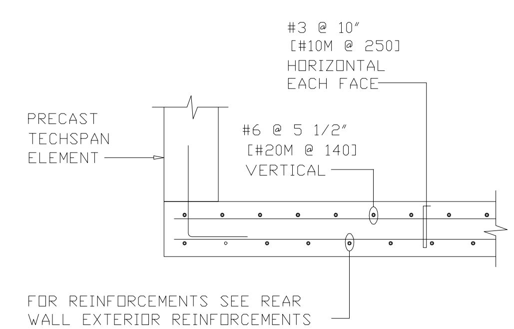
REAR WALL
EXTERIOR REINFORCEMENT

SCALE 1/4"=1'-0"



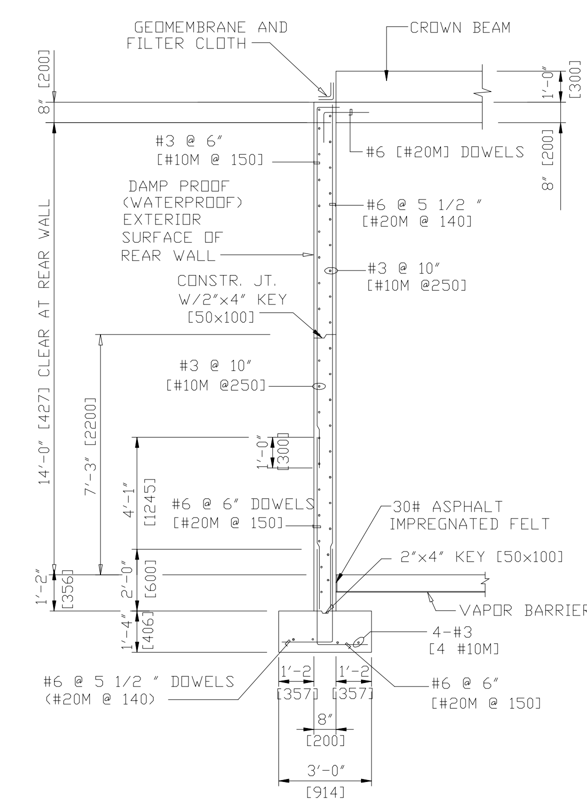
ELEVATION REAR WALL

SCALE 1/4"=1'-0"



DETAIL 1

SCALE: 1"=1'-0"



SECTION A

SCALE: 3/8"=1'-0"

US Army Corps
of Engineers

Symbol	Description	Date	Approved	Symbol	Description	Date	Approved

U. S. ARMY ENGINEERING AND SUPPORT CENTER, HUNTSVILLE HUNTSVILLE, ALABAMA	Designed by: Kim Truong	Date: July 98	Rev.
	Dwn by: DM/KC — Ckd by: KT	Design file no. 84216	
	Reviewed by: KT	Drawing code: 421-80-05	
	Submitted by: KT	File name: 6951S3.dgn Plot date: - - Plot scale:	

MAGAZINE, PRECAST CONCRETE
EARTH COVERED

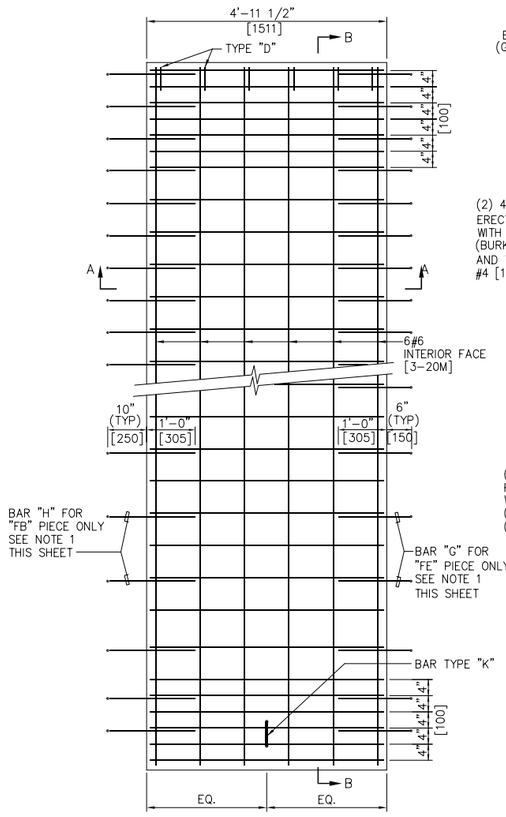
TechSpan® System

CAST IN PLACE REAR WALL
PLAN ELEVATION AND DETAILS

Sheet reference number: 421-80-05

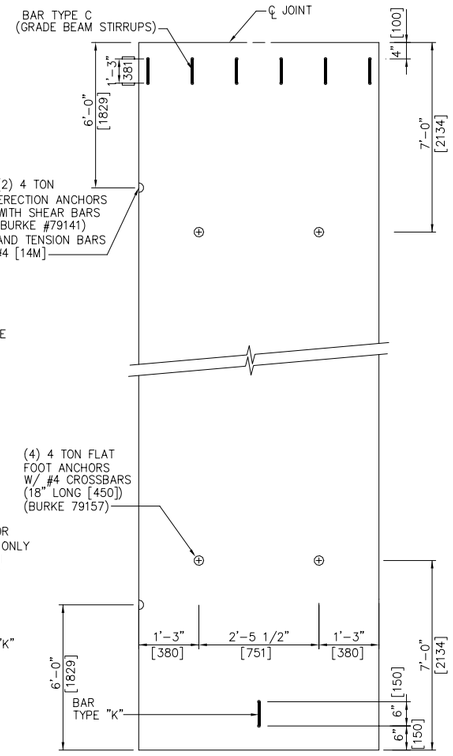
Sheet S-3

6951S3.DGN



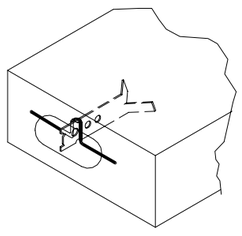
INSIDE FACE
FOR "F" & "M" PIECES

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



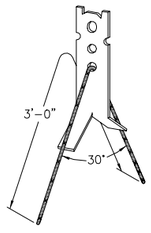
UNFOLDED OUTSIDE FACE
FOR "F" & "M" PIECES

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



ERECTION ANCHOR W/
SHEAR BAR

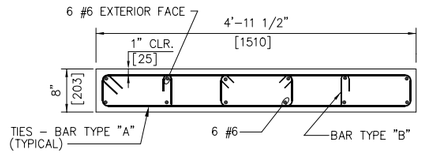
N.T.S.



ERECTION ANCHOR W/
TENSION BAR

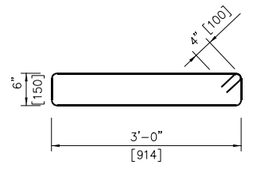
N.T.S.

WEIGHT OF AN "F" OR "M" ELEMENT=12,160# [5,528kg]



SECTION A-A

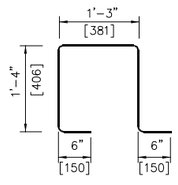
SCALE: 1"=1'-0"



TYPE A

#3 [10M] REBAR

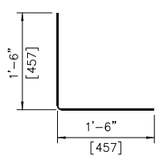
SCALE: 1"=1'-0"



TYPE C

#3 [10M] REBAR

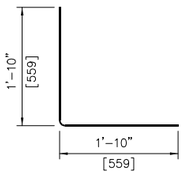
SCALE: 1"=1'-0"



TYPE G

#6 [20M] REBAR

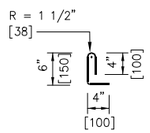
SCALE: 1"=1'-0"



TYPE H

#6 [20M] REBAR

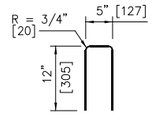
SCALE: 1"=1'-0"



TYPE B

#3 [10M] REBAR

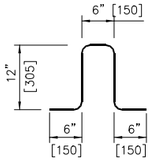
SCALE: 1"=1'-0"



TYPE D

#3 [10M] REBAR

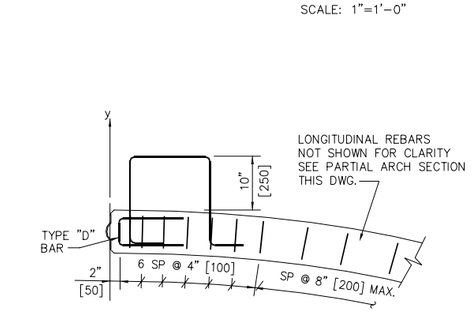
SCALE: 1"=1'-0"



TYPE K

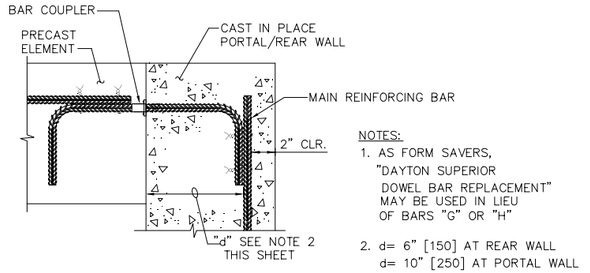
#4 [14M] REBAR

SCALE: 1"=1'-0"



CROWN BEAM DETAIL

SCALE: 1"=1'-0"



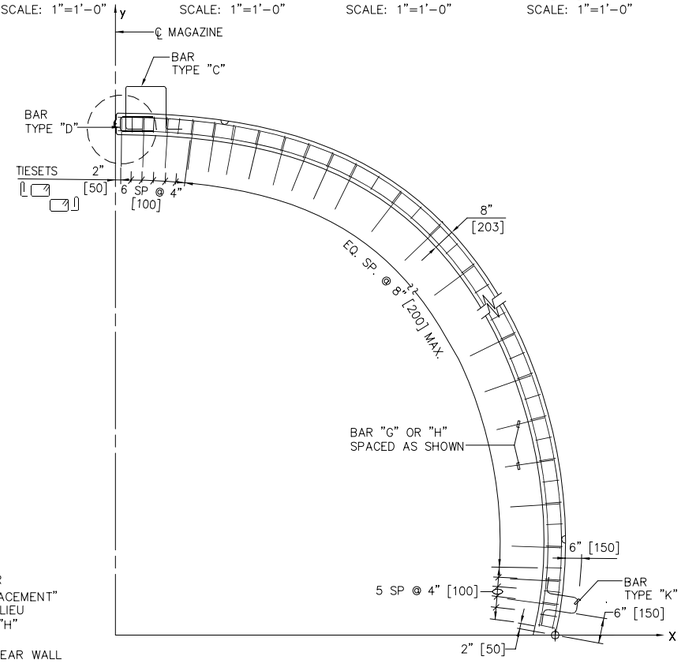
NOTES:

1. AS FORM SAVERS,
"DAYTON SUPERIOR
DOWEL BAR REPLACEMENT"
MAY BE USED IN LIEU
OF BARS "G" OR "H"

2. d= 6" [150] AT REAR WALL
d= 10" [250] AT PORTAL WALL

DOWEL BAR REPLACEMENT DETAIL

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



ARCH SECTION - "M" PIECE

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

US Army Corps of Engineers

Symbol	Description	Date Approved

Symbol	Description	Date Approved

Date: July 98 | Rev.
Design File no. 98 - 421-80-05
Drawing code: 421-80-05
File name: -.dgn
Plot scale -
Plot scale -

Designed by: Kin Truong | Cad by: KT
Dsn. by: DM/KC | Reviewed by: KT
Submitted by: KT

U. S. ARMY ENGINEERING AND SUPPORT CENTER, HUNTSVILLE HUNTSVILLE, ALABAMA

MAGAZINE, PRECAST CONCRETE EARTH COVERED

TechSpan® System

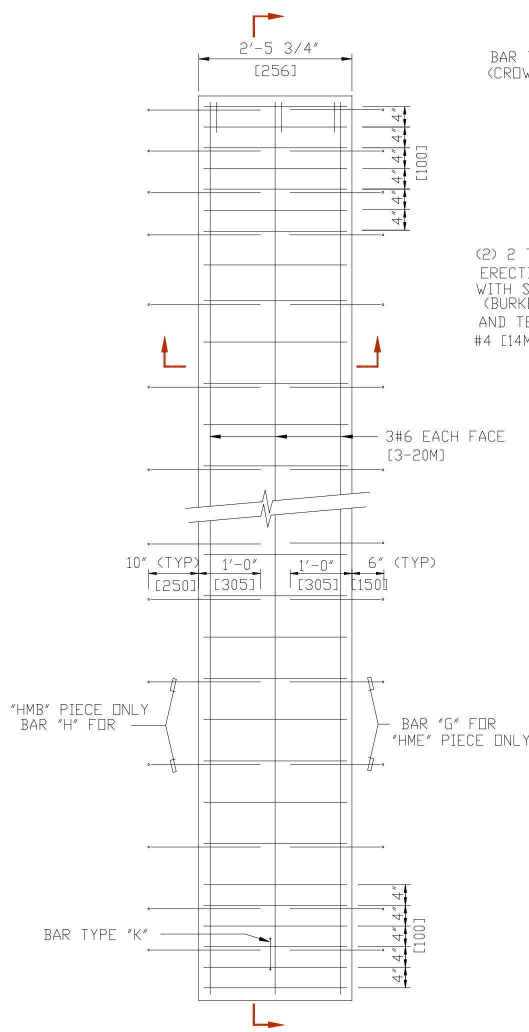
PRECAST ELEMENTS "F" & "M"
FABRICATION DETAILS

Sheet reference number:
421-80-05

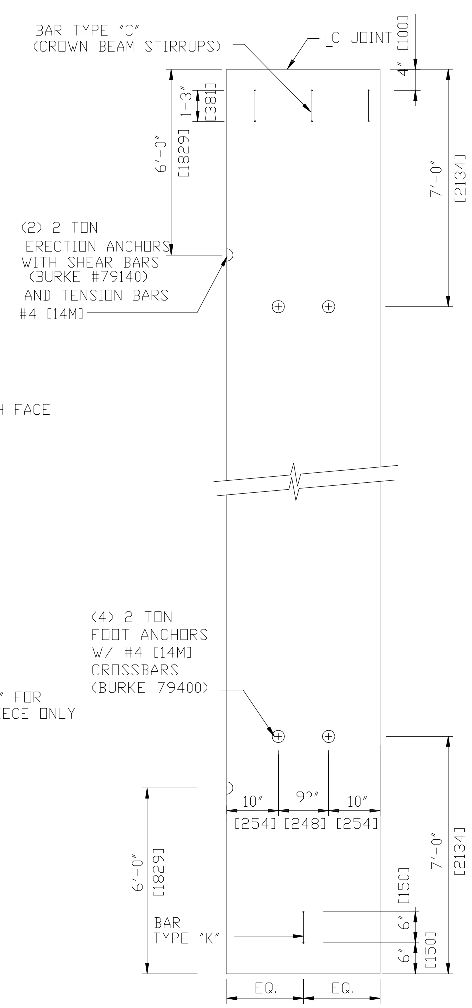
Sheet S-3a

6951-S3a.DWG

WEIGHT OF AN "HM" ELEMENT=12,200# [5,500kg]

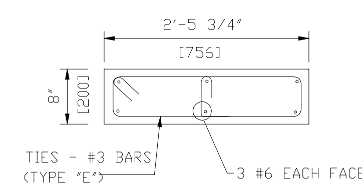


INSIDE FACE
FOR "HMB" & "HMF" PIECES
SCALE:?"=1'-0"

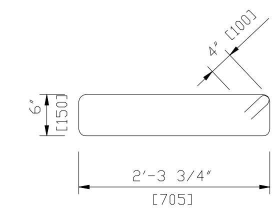


OUTSIDE FACE
"HM" PIECES
SCALE:?"=1'-0"

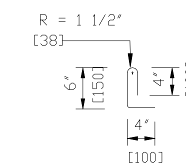
NOTE : BARS "G" AND "H" MAY BE REPLACED BY THE DOWEL BAR REPLACEMENT DEVICE, SEE DETAIL SHEET 3a.



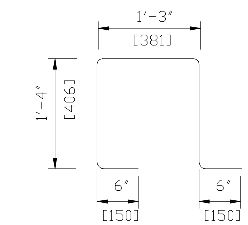
SECTION A-A
SCALE: 1"=1'-0"



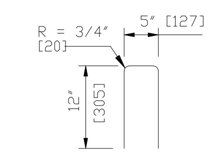
TYPE E
#3 [10M] REBAR
SCALE: 1"=1'-0"



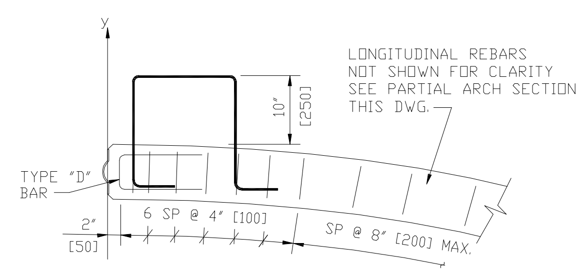
TYPE B
#3 [10M] REBAR
SCALE: 1"=1'-0"



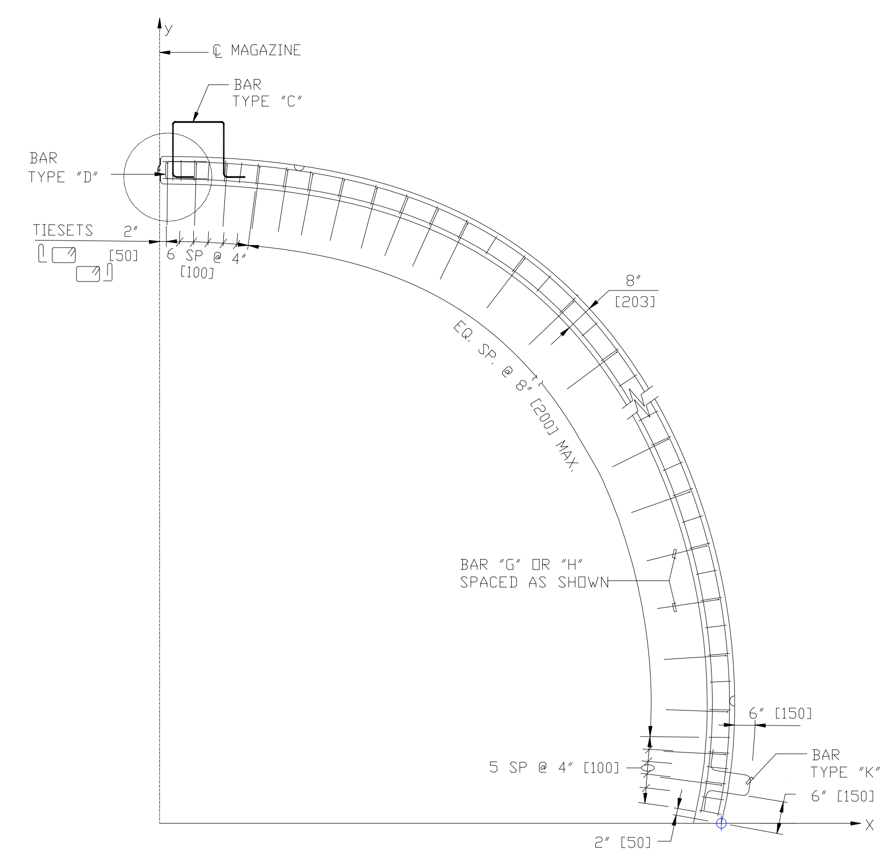
TYPE C
#3 [10M] REBAR
SCALE: 1"=1'-0"



TYPE D
#3 [10M] REBAR
SCALE: 1"=1'-0"



CROWN BEAM DETAIL



ARCH SECTION - "M" PIECE
SCALE:?"=1'-0"

US Army Corps of Engineers

Symbol	Description	Date	Approved	Symbol	Description	Date	Approved

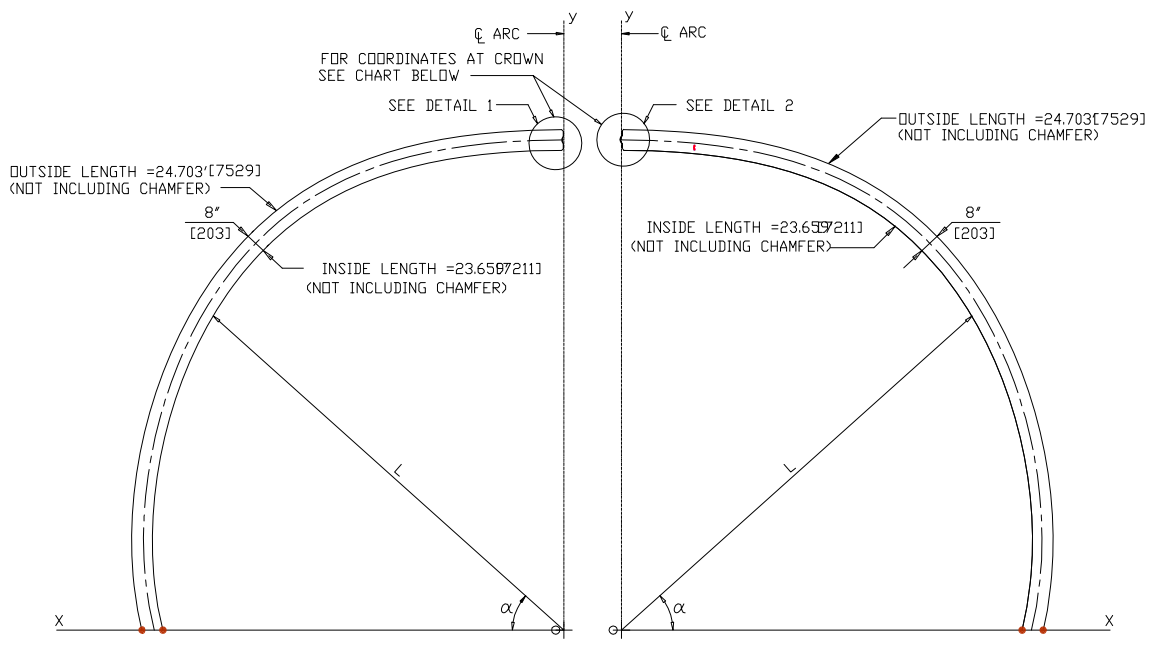
U. S. ARMY ENGINEERING AND SUPPORT CENTER, HUNTSVILLE
HUNTSVILLE, ALABAMA

Designed by: Kim Truong		Date: July 98	Rev.
Dwn by: DM/KC	Ckd by: KT	Design file no. 98 - 421-80-05	
Reviewed by: KT		Drawing code: 84218	
Submitted by: KT		File name: 6951S3B.dgn Plot date: - - Plot scale:	

MAGAZINE, PRECAST CONCRETE
EARTH COVERED
TechSpan® System
PRECAST ELEMENTS "HMB" & "HME".
FABRICATION DETAILS

Sheet reference number:
421-80-05
Sheet S-3b

6951S3b.DGN



ARCH SECTION - "F" PIECE

SCALE:?"=1'-0"

ARCH SECTION - "M" PIECE

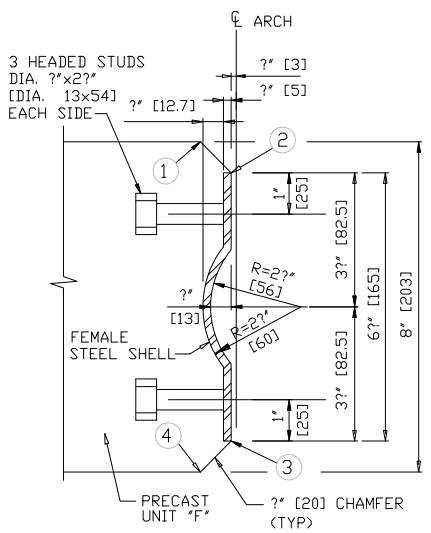
SCALE:?"=1'-0"

POINTS ALONG INSIDE FACE OF ARCH

ENGLISH UNITS (ft, deg.)				METRIC UNITS (mm, deg.)			
X (ft)	Y (ft)	α (deg.)	L	X	Y	α (deg.)	L
0	15.511	90	15.511	0	4728	90	4729
0.999	15.492	86.311	15.524	305	4722	86.311	4732
1.717	15.454	83.661	15.549	523	4710	83.661	4739
2.402	15.397	81.134	15.584	732	4693	81.134	4750
3.059	15.322	78.711	15.624	932	4670	78.711	4762
3.688	15.227	76.386	15.667	1124	4641	76.386	4775
4.289	15.114	74.158	15.710	1307	4606	74.158	4788
4.862	14.981	72.019	15.751	1482	4566	72.019	4801
5.409	14.830	69.961	15.786	1649	4520	69.961	4811
5.931	14.660	67.974	15.814	1808	4468	67.974	4820
6.429	14.471	66.046	15.834	1959	4410	66.046	4826
6.904	14.262	64.168	15.846	2104	4347	64.168	4830
7.359	14.035	62.330	15.848	2243	4278	62.330	4830
7.795	13.790	60.523	15.840	2376	4203	60.523	4828
8.211	13.525	58.736	15.822	2503	4122	58.736	4822
8.611	13.241	56.964	15.795	2625	4036	56.964	4814
8.994	12.938	55.196	15.757	2741	3943	55.196	4803
9.361	12.617	53.428	15.710	2853	3845	53.428	4788
9.712	12.276	51.651	15.654	2960	3742	51.651	4771
10.049	11.917	49.860	15.588	3063	3632	49.860	4751
10.371	11.539	48.050	15.515	3161	3517	48.050	4729
10.679	11.141	46.214	15.433	3255	3396	46.214	4704
10.973	10.725	44.347	15.344	3344	3269	44.347	4677
11.252	10.290	42.444	15.248	3429	3136	42.444	4647
11.517	9.836	40.500	15.145	3510	2998	40.500	4616
11.766	9.363	38.511	15.037	3586	2854	38.511	4583
12.001	8.871	36.472	14.924	3658	2704	36.472	4549
12.220	8.361	34.379	14.807	3725	2548	34.379	4513
12.423	7.831	32.227	14.685	3786	2387	32.227	4476
12.608	7.283	30.012	14.560	3843	2220	30.012	4438
12.775	6.715	27.729	14.432	3894	2047	27.729	4399
12.922	6.129	25.375	14.301	3938	1868	25.375	4359
13.048	5.523	22.944	14.169	3977	1684	22.944	4318
13.151	4.899	20.432	14.034	4008	1493	20.432	4277
13.229	4.256	17.835	13.896	4032	1297	17.835	4235
13.278	3.594	15.145	13.756	4047	1095	15.145	4193
13.297	2.913	12.357	13.613	4053	888	12.357	4149
13.281	2.213	9.461	13.464	4048	675	9.461	4104
13.224	1.494	6.447	13.308	4030	455	6.447	4056
13.120	0.757	3.301	13.141	3999	231	3.301	4005
12.960	0	0	12.960	3950	0	0	3950

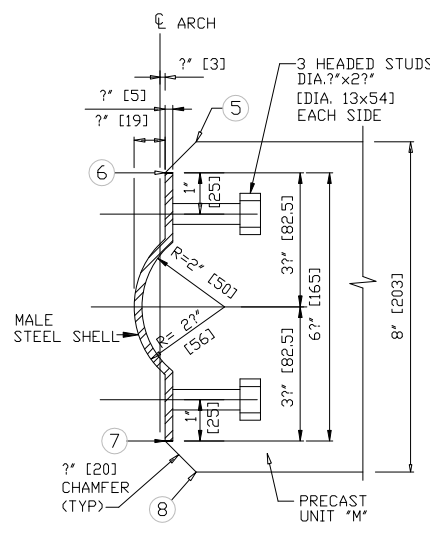
POINTS ALONG OUTSIDE FACE OF ARCH

ENGLISH UNITS (ft, deg.)				METRIC UNITS (mm, deg.)			
X	Y	α (deg.)	L	X	Y	α (deg.)	L
0	16.178	90	16.178	0	4931	90	4931
1.012	16.159	86.418	16.190	308	4925	86.418	4935
1.752	16.120	83.797	16.215	534	4913	83.797	4942
2.457	16.062	81.304	16.249	749	4895	81.304	4952
3.135	15.985	78.904	16.289	955	4872	78.904	4965
3.787	15.887	76.593	16.332	1154	4842	76.593	4978
4.412	15.769	74.368	16.375	1345	4806	74.368	4991
5.012	15.631	72.221	16.415	1528	4764	72.221	5003
5.587	15.473	70.146	16.450	1703	4716	70.146	5014
6.138	15.294	68.134	16.479	1871	4661	68.134	5023
6.666	15.094	66.174	16.500	2032	4600	66.174	5030
7.172	14.873	64.258	16.512	2186	4533	64.258	5033
7.657	14.632	62.377	16.514	2334	4460	62.377	5033
8.123	14.370	60.523	16.507	2476	4380	60.523	5031
8.569	14.088	58.689	16.489	2612	4294	58.689	5026
8.997	13.785	56.868	16.461	2742	4201	56.868	5017
9.407	13.461	55.053	16.423	2867	4103	55.053	5005
9.800	13.118	53.238	16.375	2987	3998	53.238	4991
10.176	12.755	51.418	16.317	3102	3888	51.418	4973
10.536	12.373	49.585	16.251	3211	3771	49.585	4953
10.879	11.971	47.736	16.176	3316	3649	47.736	4930
11.206	11.550	45.865	16.093	3416	3520	45.865	4905
11.517	11.110	43.967	16.002	3510	3386	43.967	4877
11.813	10.650	42.037	15.905	3600	3246	42.037	4848
12.093	10.172	40.070	15.802	3686	3100	40.070	4816
12.356	9.675	38.061	15.693	3766	2949	38.061	4783
12.603	9.159	36.006	15.579	3841	2791	36.006	4748
12.833	8.624	33.900	15.461	3911	2628	33.900	4712
13.045	8.069	31.739	15.339	3976	2459	31.739	4675
13.239	7.496	29.517	15.214	4035	2285	29.517	4637
13.414	6.903	27.231	15.086	4089	2104	27.231	4598
13.568	6.291	24.875	14.956	4135	1917	24.875	4558
13.700	5.659	22.444	14.823	4176	1725	22.444	4518
13.809	5.008	19.933	14.689	4209	1526	19.933	4477
13.890	4.336	17.337	14.551	4234	1322	17.337	4435
13.943	3.644	14.647	14.412	4250	1111	14.647	4392
13.964	2.931	11.856	14.268	4256	893	11.856	4349
13.947	2.197	8.953	14.119	4251	670	8.953	4303
13.888	1.442	5.926	13.963	4233	439	5.926	4256
13.780	0.664	2.757	13.796	4200	202	2.757	4205
13.641	0	0	13.641	4158	0	0	4158



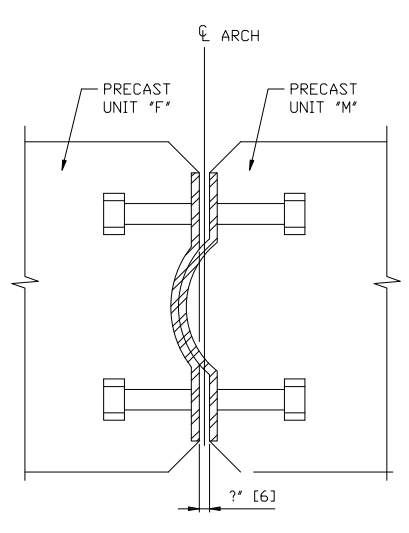
DETAIL 1

SCALE: 1:2



DETAIL 2

SCALE: 1:2

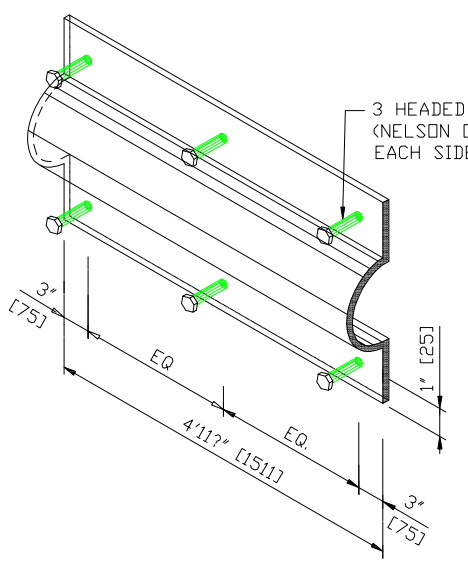


ARCH JOINT DETAIL

SCALE: 1:2

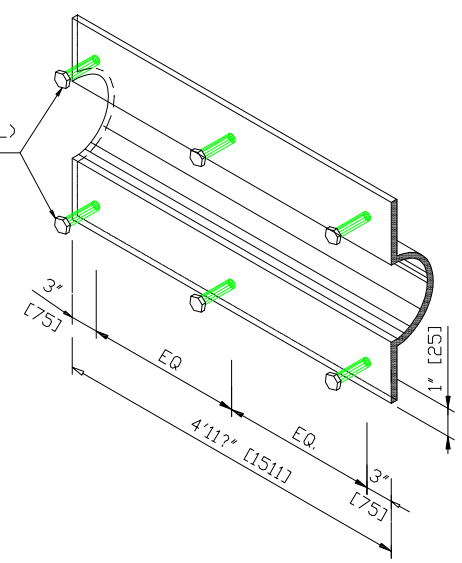
COORDINATES

POINTS	X (FT) [mm]	Y (FT) [mm]
①	-0.073 [-22]	16.176 [4931]
②	-0.010 [-3]	16.115 [4912]
③	-0.010 [-3]	15.574 [4747]
④	-0.073 [-22]	15.510 [4727]
⑤	0.073 [22]	16.176 [4931]
⑥	0.010 [3]	16.115 [4912]
⑦	0.010 [3]	15.574 [4747]
⑧	0.073 [22]	15.510 [4727]



FEMALE SHELL DETAIL

N.T.S.



MALE SHELL DETAIL

N.T.S.

US Army Corps of Engineers

Symbol	Description	Date	Approved

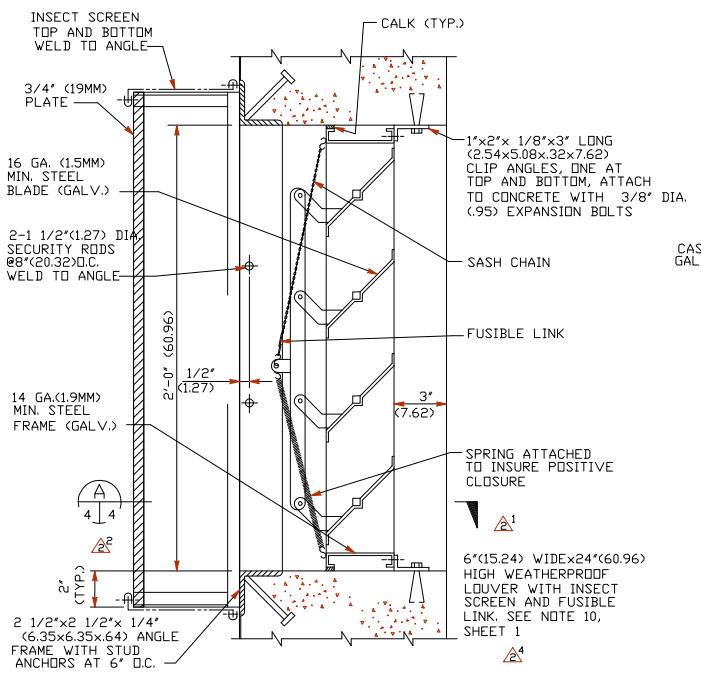
Designed by: Kim Truong
Date: July 98
Rev.
Drawn by: DW/KC
Ckd by: KT
Reviewed by: KT
Submitted by: KT
Design file no. 98 - 421-80-05
Drawing code: DETAIL
File name: 6951s3c.dgn
Plot date:
Plot scale:1

U. S. ARMY ENGINEERING AND SUPPORT CENTER, HUNTSVILLE
HUNTSVILLE, ALABAMA

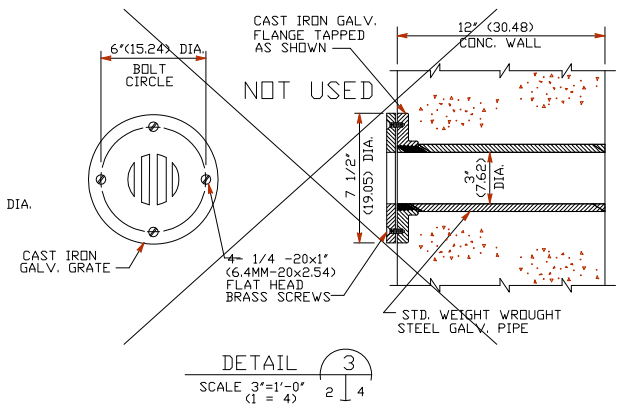
MAGAZINE, PRECAST CONCRETE EARTH COVERED
TechSpan® System
PRECAST ELEMENT
GEOMETRY AND DETAILS

Sheet reference number:
421-80-05
Sheet S-3c

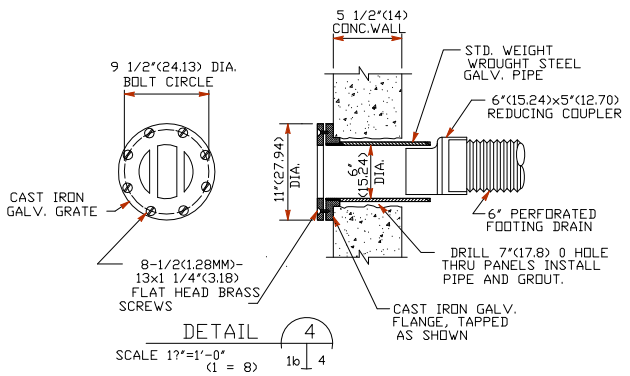
6951S3C.Dgn



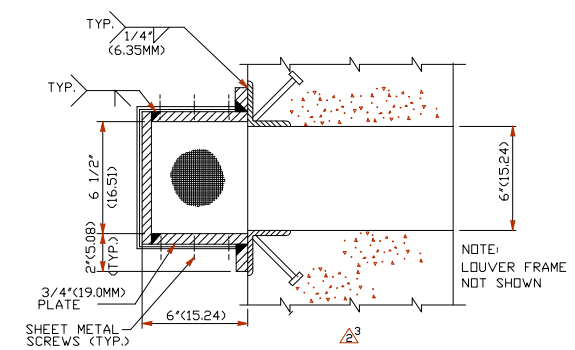
LOUVER DETAIL
SCALE 3"=1'-0" (1 = 4)



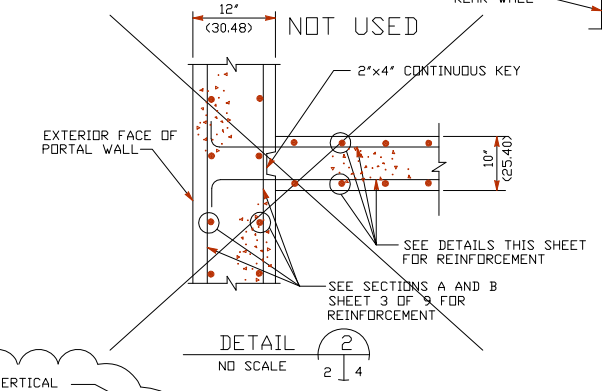
DETAIL 3
SCALE 3"=1'-0" (1 = 4)



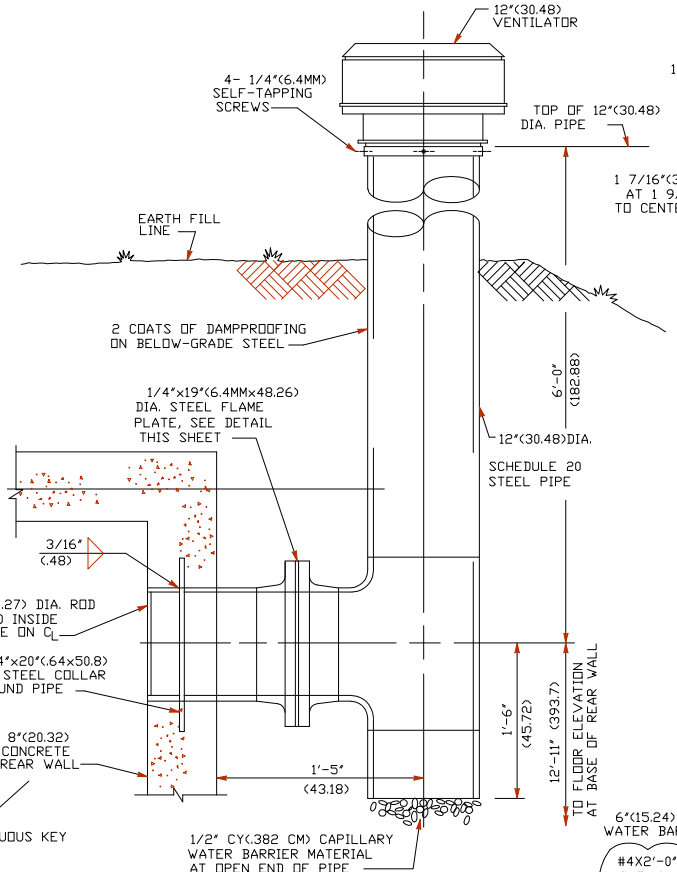
DETAIL 4
SCALE 1?"=1'-0" (1 = 8)



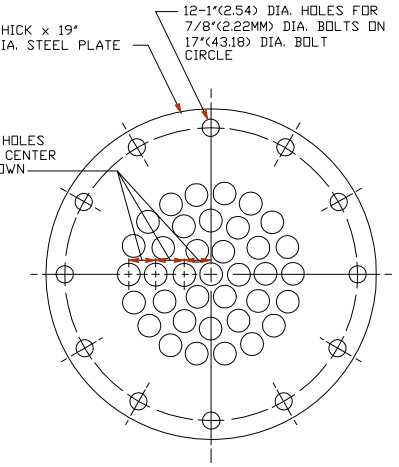
SECTION A
SCALE 3"=1'-0" (1 = 4)



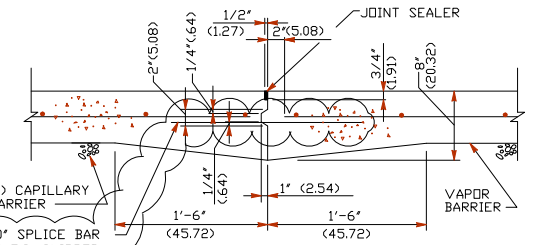
DETAIL 2
NO SCALE



VENTILATOR DETAIL 1
SCALE 1?"=1'-0" (1 = 8)

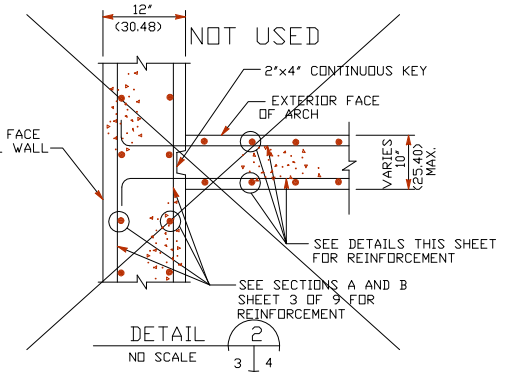


VENTILATOR FLAME PLATE DETAIL
SCALE 3"=1'-0" (1 = 4)



FLOOR CONSTRUCTION JOINT

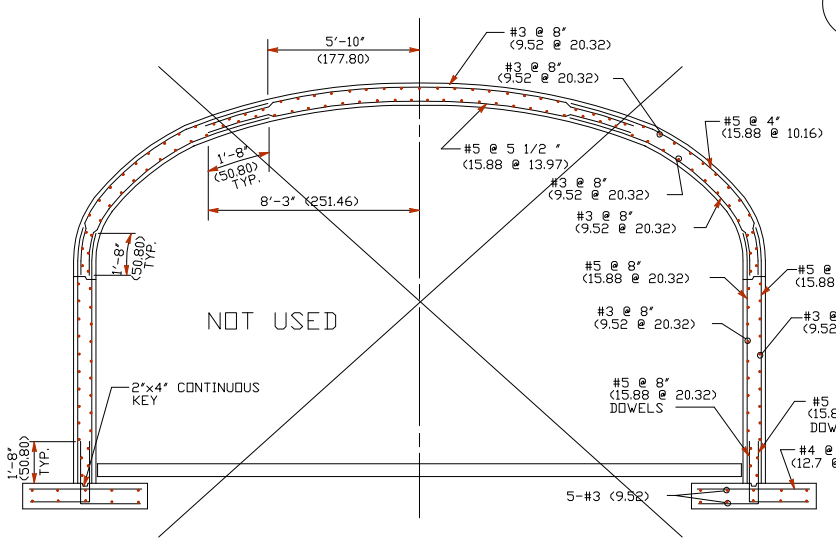
SECTION B 4
NO SCALE



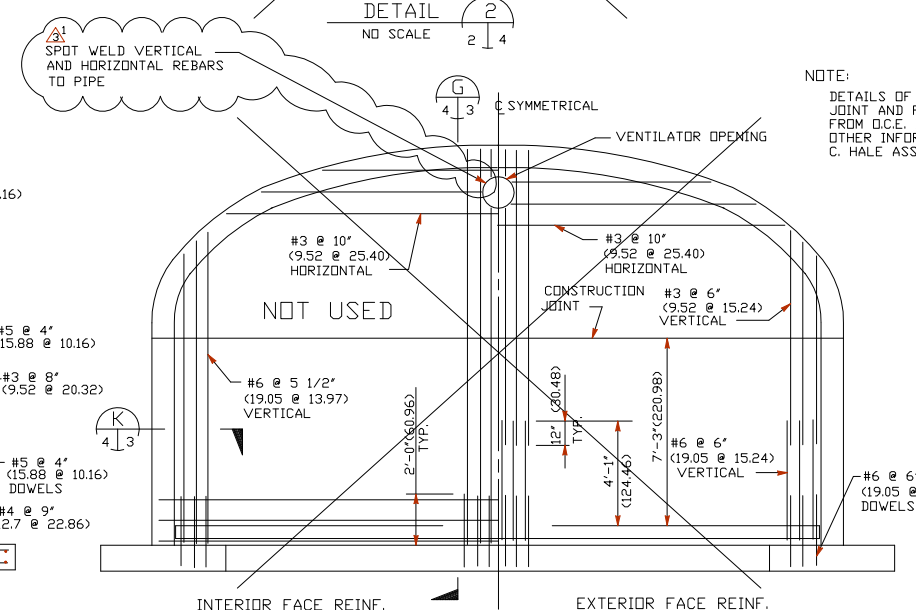
DETAIL 2
NO SCALE

THE METRIC DIMENSIONS (BETWEEN THE PARENTHESIS) ARE IN CENTIMETERS ON THIS DRAWING.

NOTE:
DETAILS OF LOUVER, FRAME PLATE, CONSTRUCTION JOINT AND FOOTING DRAIN TRANSFERRED INTACT FROM O.C.E. DRAWING NO. 33-15-73, SHEET S4. OTHER INFORMATION ADDED OR REVISED BY NATHAN C. HALE ASSOCIATES TO DEPICT CONCRETE ARCH.



TYPICAL ARCH REINFORCEMENT
SCALE:?"=1'-0" (1 = 32)



ELEVATION REAR WALL REINFORCEMENT
SCALE:?"=1'-0" (1 = 32)

GRAPHIC SCALES:

3" = 1'-0" 1'0 1'2' 3' 4' 5' 6' 7' 8' 9' 10' 11'
1 1/2 " = 1'-0" 12' 9' 6' 3' 0 1'
1/2 " = 1'-0" 12'6"0 1' 2' 3' 4' 5'
3/8 " = 1'-0" 12'6"0 1' 2' 3' 4' 5' 6' 7'

SYMBOL	DESCRIPTION	DATE	APPROVAL
3 2	GENERAL REVISION FOR LIGHTNING PROTECTION	11JUN98	WAW
2 4	GENERAL REVISION	30JUN90	AF
1	GENERAL REVISION/SIMONS-EASTERN CO.	19JUL84	JYM

BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MISSOURI

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
MILITARY CONSTRUCTION - ENGINEERING DIVISION
WASHINGTON, D.C.

DRAWN BY: G.I.C.
TRACED BY: G.I.C.
CHECKED BY: H.D.L.
SUBMITTED BY: W.V. HILL
APPROVED: D.F.M.
CHIEF ADV. TECH. BR.
APPROVED FOR:

MAGAZINE, PRECAST CONCRETE, EARTH COVERED
MISCELLANEOUS DETAILS

APPROVED: LEE S. GARRETTE DATE: 11APR79
CHIEF ENGINEERING DIVISION MIL. PROGR., O.C.E.

Design File no. 84220 File name: 6951s4.dgn

DRAWING NUMBER 421-80-05
SHEET 4

APPROVED BY _____ FOR THE DEPARTMENT OF THE NAVY DATE _____

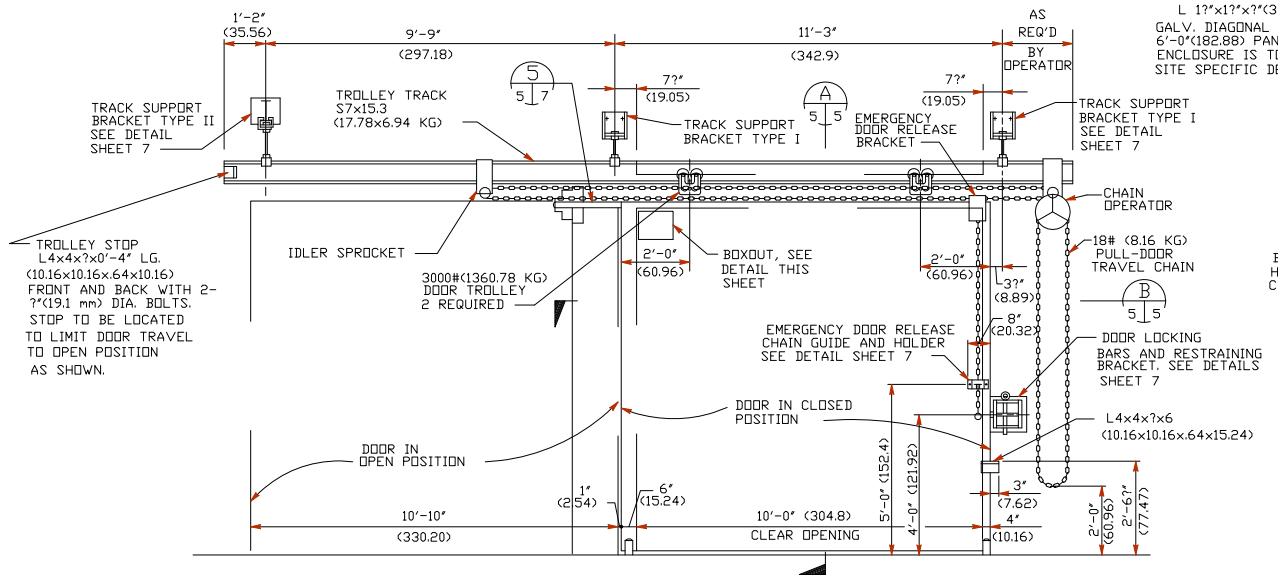
APPROVED BY _____ FOR THE DEPARTMENT OF THE AIR FORCE DATE _____

CONSULTING ENGINEERS
FALLS CHURCH, INDIANA

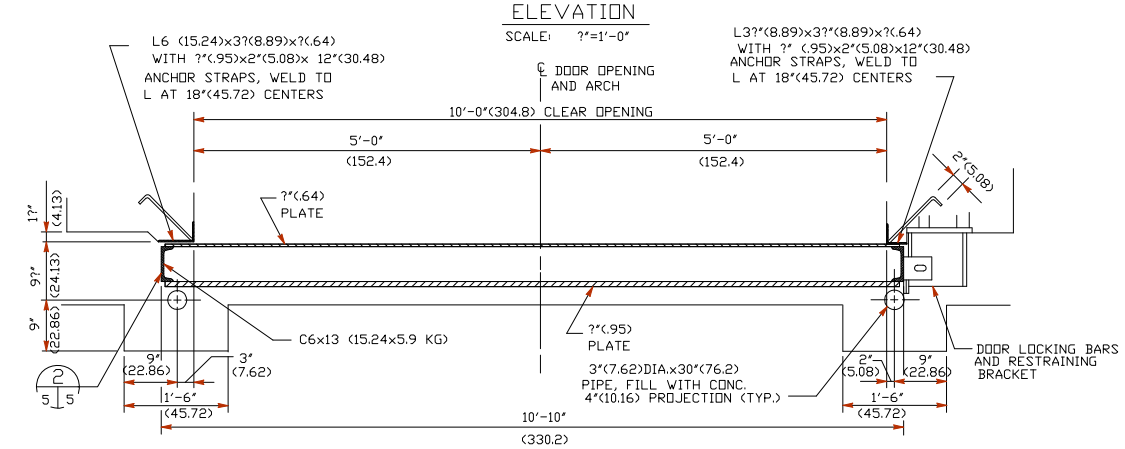
6951S4.DGN

THIS SHEET TRANSFERRED FROM 33-15-74

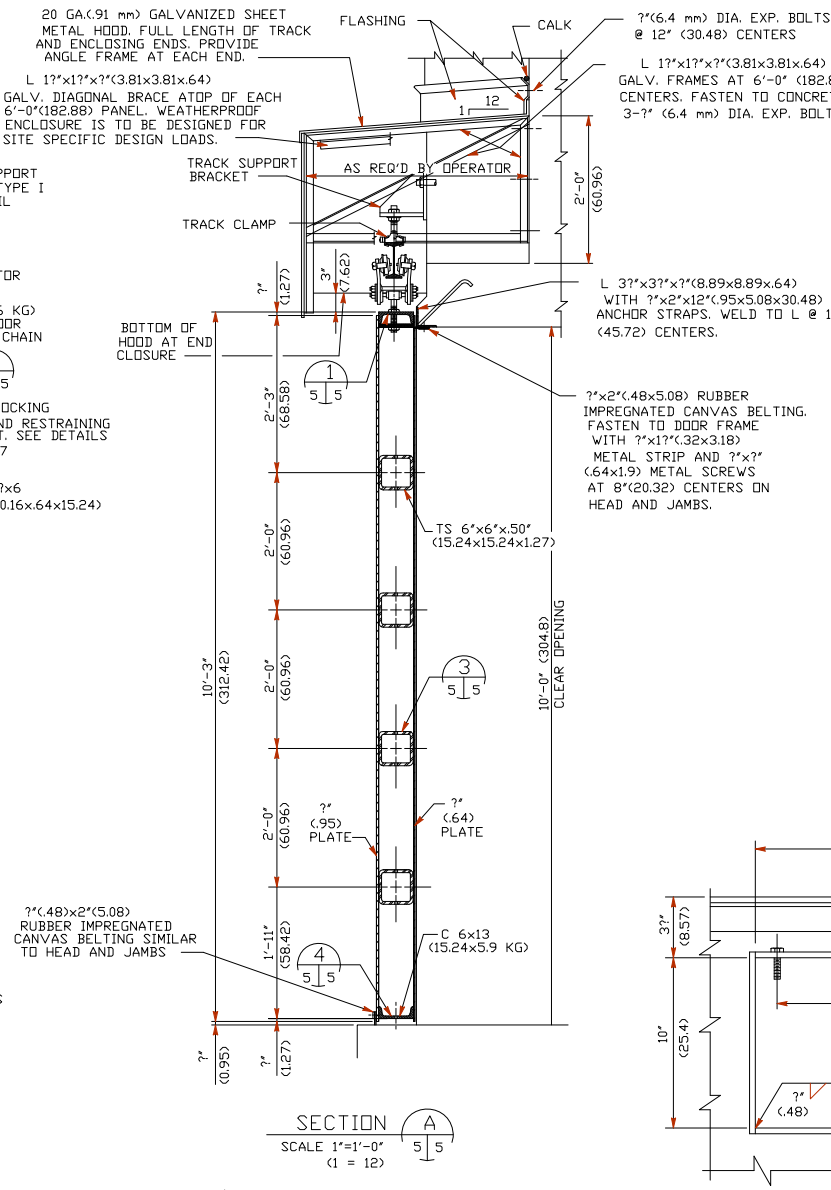
CORPS OF ENGINEERS U.S. ARMY



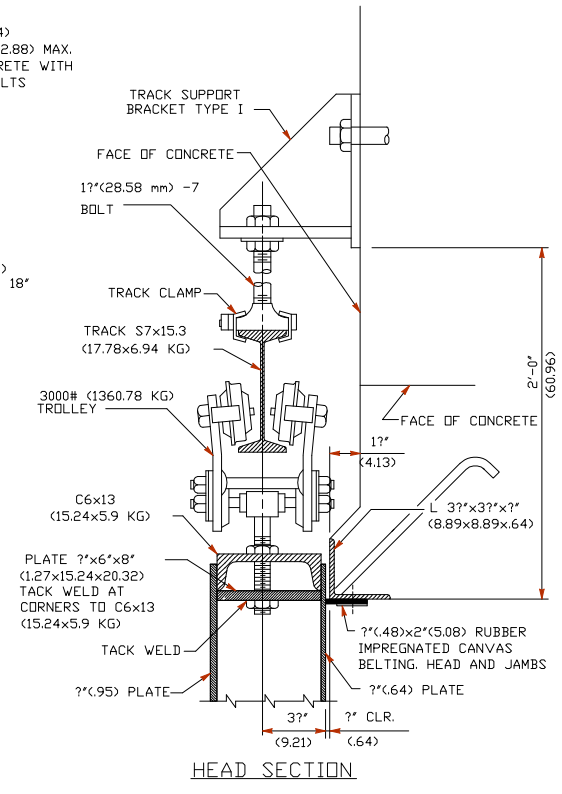
ELEVATION
SCALE: ?"=1'-0"



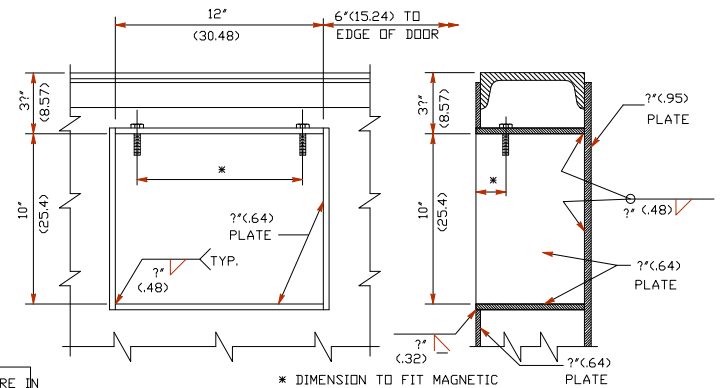
SECTION B
SCALE 1"=1'-0" (1 = 12)



SECTION A
SCALE 1"=1'-0" (1 = 12)

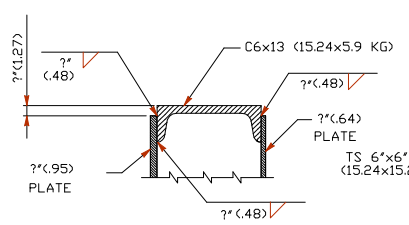


HEAD SECTION

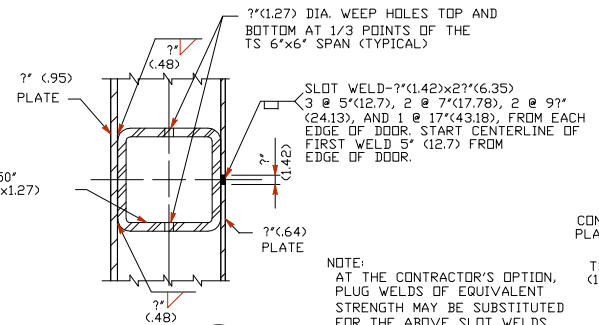


INSIDE ELEVATION SECTION

BOXOUT DETAILS
SCALE 3"=1'-0" (1 = 4)

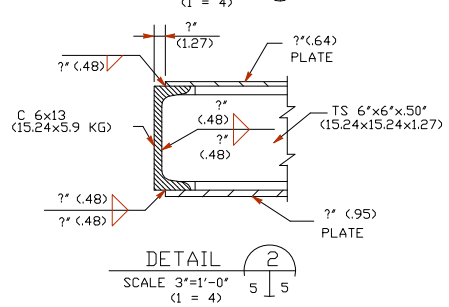


DETAIL 1
SCALE 3"=1'-0" (1 = 4)

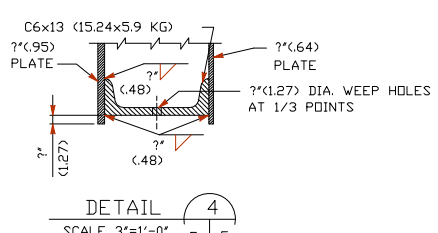


DETAIL 3
SCALE 3"=1'-0" (1 = 4)

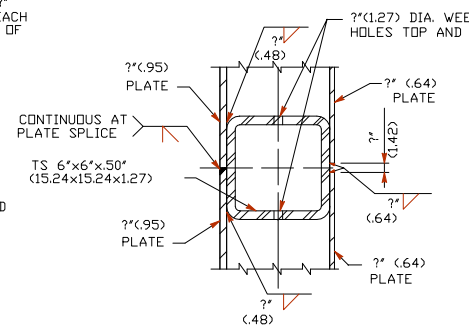
NOTE:
AT THE CONTRACTOR'S OPTION, PLUG WELDS OF EQUIVALENT STRENGTH MAY BE SUBSTITUTED FOR THE ABOVE SLOT WELDS.



DETAIL 2
SCALE 3"=1'-0" (1 = 4)



DETAIL 4
SCALE 3"=1'-0" (1 = 4)



NOTE:
COVER PLATES SHALL BE SPLICED ONLY AS REQUIRED BY THE SIZE OF PLATES AVAILABLE. LOCATION OF SPLICE(S) SHALL BE DETERMINED BY THE CONTRACTOR AND THE SPLICE SHALL CONFORM TO THIS DETAIL.

COVER PLATE SPLICE DETAIL
SCALE 3"=1'-0" (1 = 4)

THE METRIC DIMENSIONS (BETWEEN THE PARENTHESIS) ARE IN CENTIMETERS ON THIS DRAWING, UNLESS OTHERWISE NOTED.

NOTE:
TITLE BLOCK CHANGED BY NATHAN C. HALE ASSOCIATES TO DEPICT CONCRETE ARCH. REMAINING INFORMATION TRANSFERRED INTACT FROM O.C.E. DRAWING NO. 33-15-73 SHEET S5.

GRAPHIC SCALES:

?" = 1'-0" 12"6"3"0 1' 2' 3' 4' 5'
1" = 1'-0" 12"6"3"0 1' 2'
3" = 1'-0" 1"0 1'2" 3' 4' 5' 6' 7'8" 9' 10' 11'

SYMBOL	DESCRIPTION	DATE	APPROVAL
1	GENERAL REVISIONS/SIMONS-EASTERN CO.	19JUL84	JYM

BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MISSOURI

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
MILITARY CONSTRUCTION - ENGINEERING DIVISION
WASHINGTON, D.C.

DRAWN BY: G.I.C.
TRACED BY: G.I.C.
CHECKED BY: H.D.L.
SUBMITTED BY: W.V. HILL
APPROVED: O.F.M.
CHIEF ADV. TECH. BR.

MAGAZINE, PRECAST CONCRETE EARTH COVERED 10'-0" BLAST DOOR

APPROVED: LEE S. GARRETTE DATE: 11APR79
CHIEF ENGINEERING DIVISION MIL. PROGR., O.C.E.

APPROVED BY _____ FOR THE DEPARTMENT OF THE NAVY
DATE _____

APPROVED BY _____ FOR THE DEPARTMENT OF THE AIR FORCE
DATE _____

CONSULTING ENGINEERS
FALLS CHURCH, INDIANA

APPROVED FOR:
DATE:

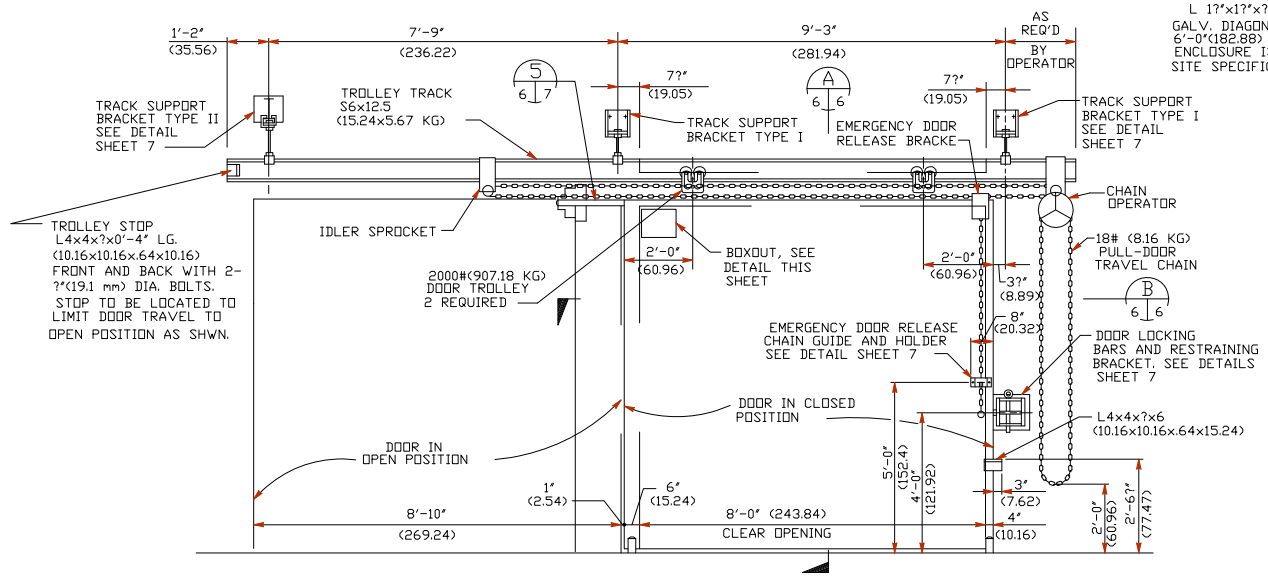
Design file number 84221
File name: 6951s5.dgn

DRAWING NUMBER 421-80-05
SHEET S-5

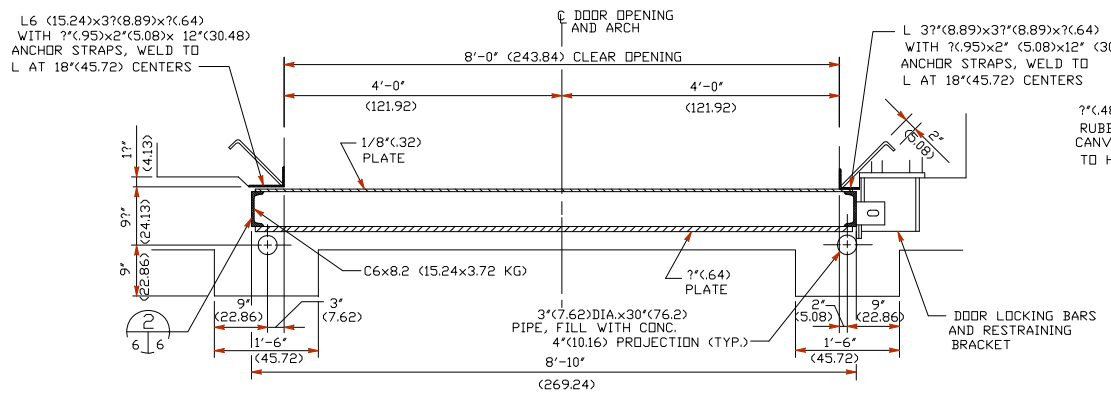
6951S5.Dgn

THIS SHEET TRANSFERRED FORM 33-15-74

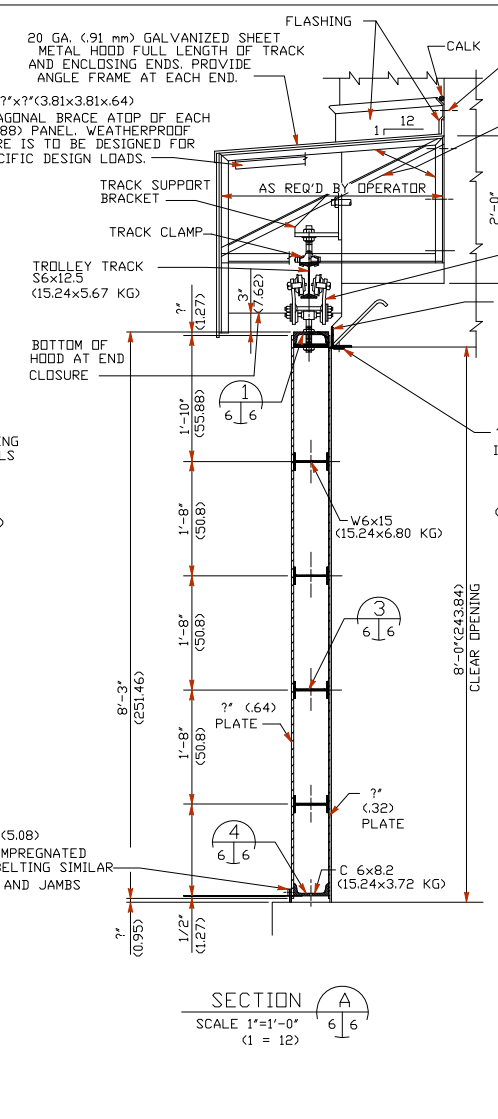
CORPS OF ENGINEERS U.S. ARMY



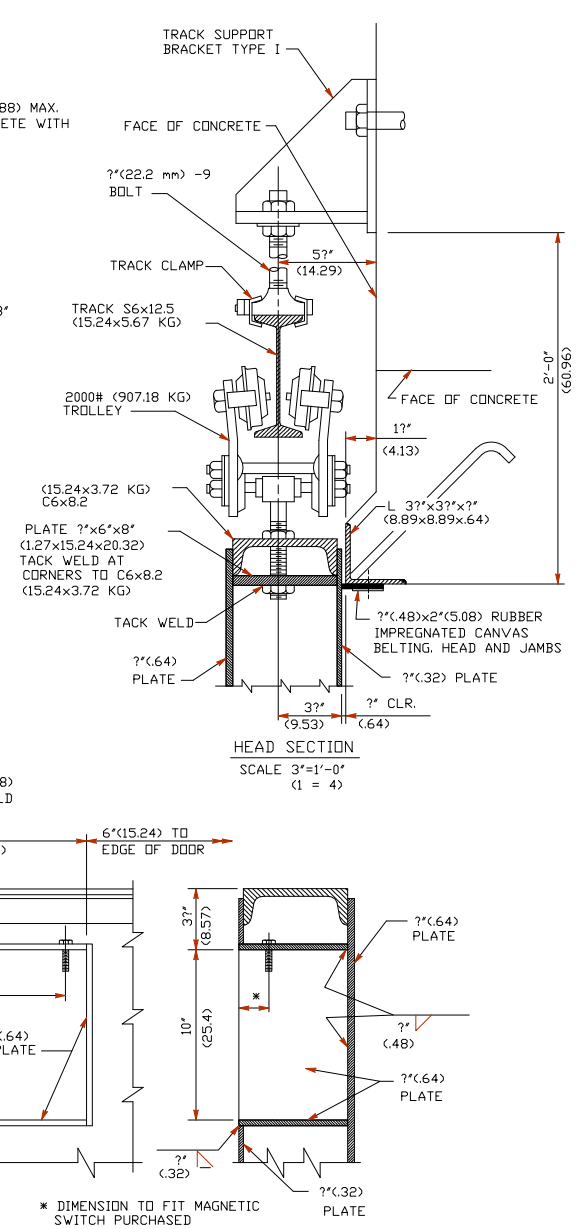
ELEVATION
SCALE ?"=1'-0"
(1 = 16)



SECTION B
SCALE 1"=1'-0"
(1 = 24)



SECTION A
SCALE 1"=1'-0"
(1 = 12)



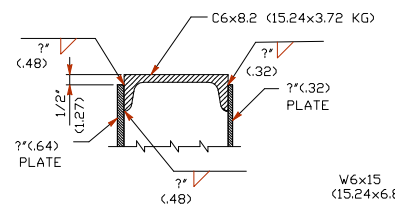
HEAD SECTION
SCALE 3"=1'-0"
(1 = 4)

INSIDE ELEVATION

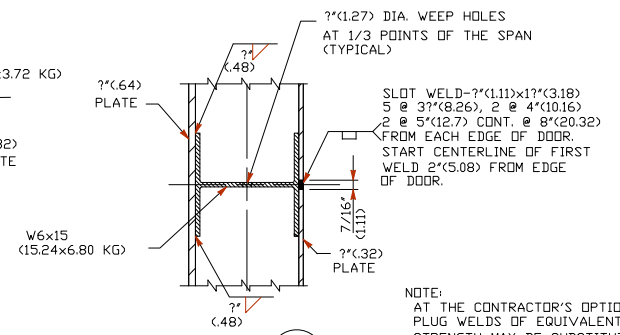
BOXOUT DETAILS
SCALE 3"=1'-0"
(1 = 4)

SECTION

THE METRIC DIMENSIONS (BETWEEN THE PARENTHESIS) ARE IN CENTIMETERS ON THIS DRAWING, UNLESS OTHERWISE NOTED.

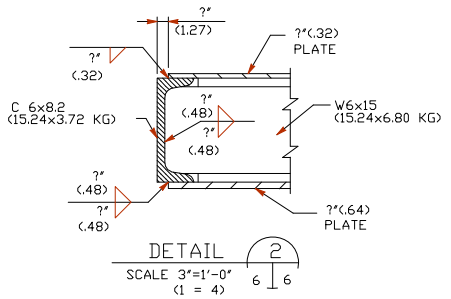


DETAIL 1
SCALE 3"=1'-0"
(1 = 4)

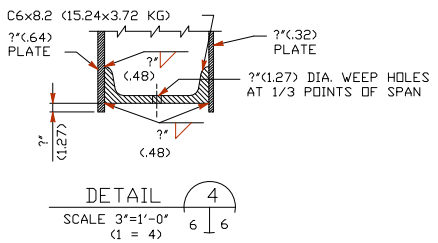


DETAIL 3
SCALE 3"=1'-0"
(1 = 4)

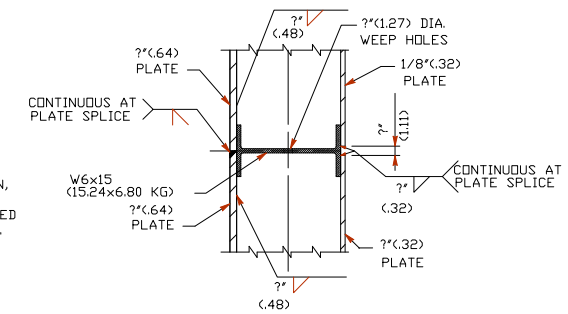
NOTE:
AT THE CONTRACTOR'S OPTION, PLUG WELDS OF EQUIVALENT STRENGTH MAY BE SUBSTITUTED FOR THE ABOVE SLOT WELDS.



DETAIL 2
SCALE 3"=1'-0"
(1 = 4)



DETAIL 4
SCALE 3"=1'-0"
(1 = 4)



NOTE:
COVER PLATES SHALL BE SPLICED ONLY AS REQUIRED BY THE SIZE OF PLATES AVAILABLE. LOCATION OF SPLICE(S) SHALL BE DETERMINED BY THE CONTRACTOR AND THE SPLICE SHALL CONFORM TO THIS DETAIL.

COVER PLATE SPLICE DETAIL
SCALE 3"=1'-0"
(1 = 4)

GRAPHIC SCALES :

3/4" = 1'-0" 12" 6" 0 1' 2' 3'

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

SYMBOL	DESCRIPTION	DATE	APPROVAL
1	GENERAL REVISION/SIMONS-EASTERN CO.	19JUL84	JYM

BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MISSOURI

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
MILITARY CONSTRUCTION - ENGINEERING DIVISION
WASHINGTON, D.C.

DRAWN BY: G.I.C.
TRACED BY: G.I.C.
CHECKED BY: H.D.L.
SUBMITTED BY: W.V. HILL
APPROVED: D.F.M.
CHIEF ADV. TECH. BR.

MAGAZINE, PRECAST CONCRETE EARTH COVERED 8'-0" BLAST DOOR

APPROVED: LEE S. GARRETTE DATE: 11APR79
CHIEF ENGINEERING DIVISION MIL. PROGR., O.C.E.

APPROVED FOR:

File design number: 84225
File name: 6951s6.dgn

DRAWING NUMBER 421-80-05
SHEET S-6

APPROVED BY _____ FOR THE DEPARTMENT OF THE NAVY
DATE _____

APPROVED BY _____ FOR THE DEPARTMENT OF THE AIR FORCE
DATE _____

CONSULTING ENGINEERS
FALLS CHURCH, INDIANA

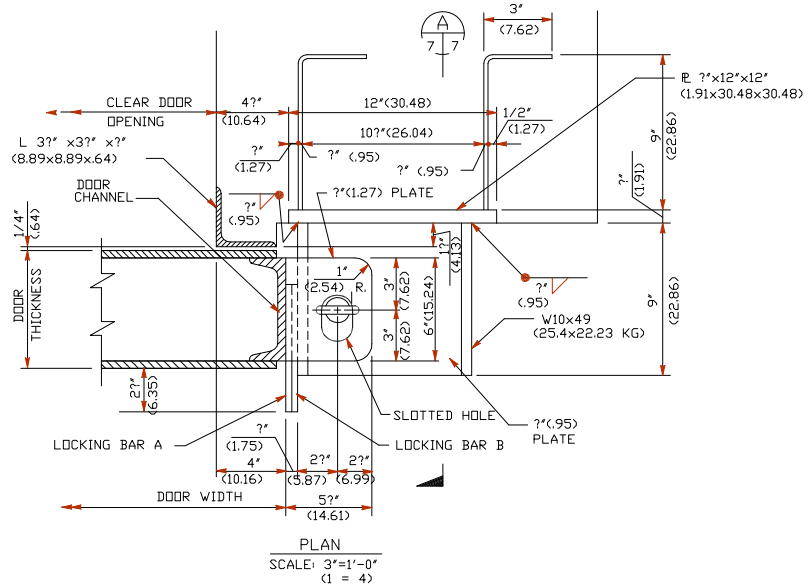
DATE: _____

6951S6.Dgn

THIS SHEET TRANSFERRED FROM 33-15-74

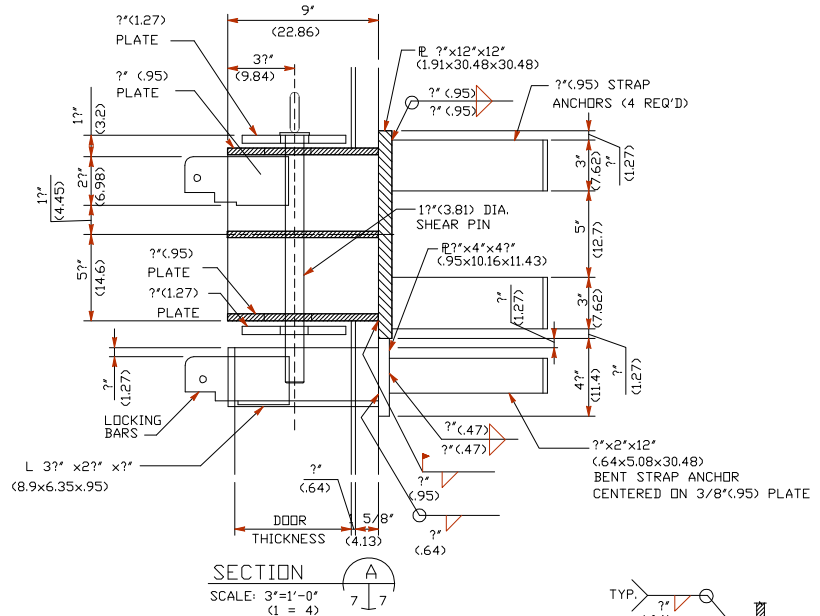
CORPS OF ENGINEERS

U.S. ARMY



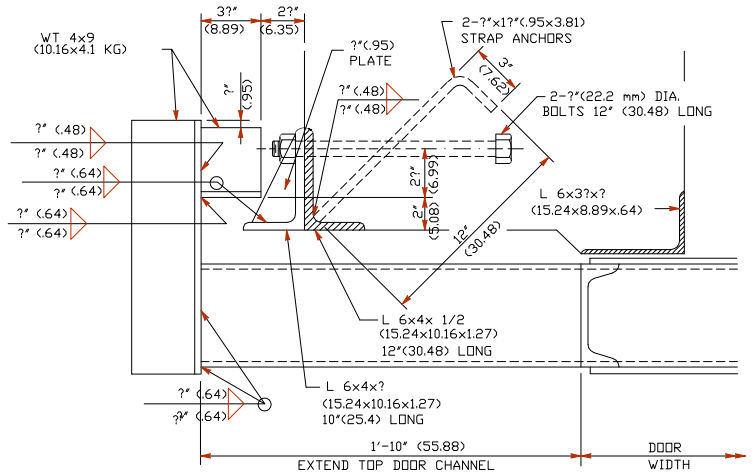
PLAN

SCALE: 3"=1'-0"
(1 = 4)

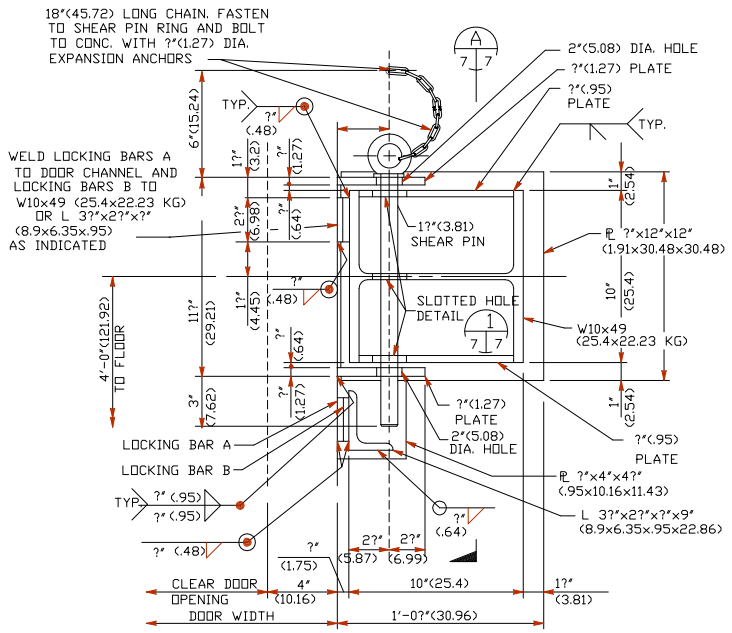


SECTION A

SCALE: 3"=1'-0"
(1 = 4)

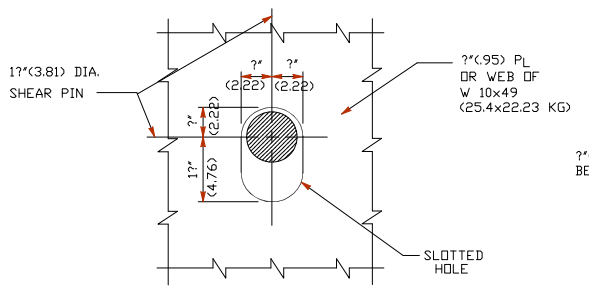


PLAN



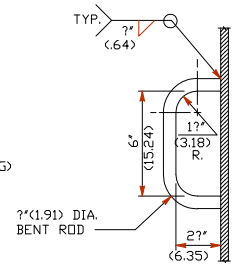
ELEVATION

SCALE: 3"=1'-0"
(1 = 4)

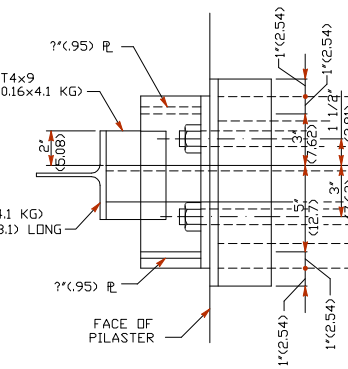


DETAIL 1

NO SCALE



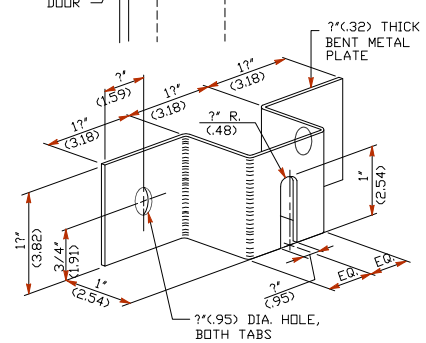
SCALE: 3"=1'-0"
(1 = 4)



ELEVATION

DETAIL 5

SCALE: 3"=1'-0"
(1 = 4)

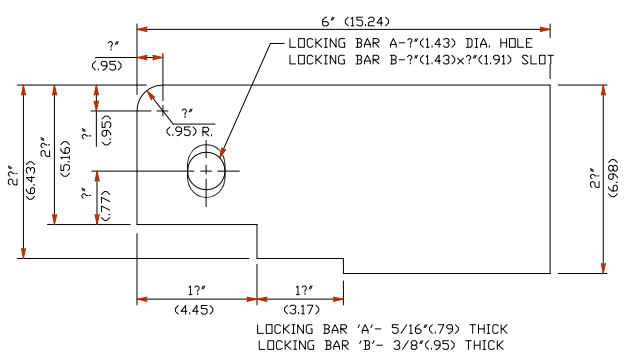


CHAIN GUIDE AND HOLDER

NO SCALE

THE METRIC DIMENSIONS (BETWEEN THE PARENTHESIS) ARE IN CENTIMETERS ON THIS DRAWING, UNLESS OTHERWISE NOTED.

NOTE:
TITLE BLOCK CHANGED BY NATHAN C. HALE ASSOCIATES TO DEPICT CONCRETE ARCH. REMAINING INFORMATION TRANSFERRED INTACT FROM O.C.E. DRAWING NO.33-15-73 SHEET S7.

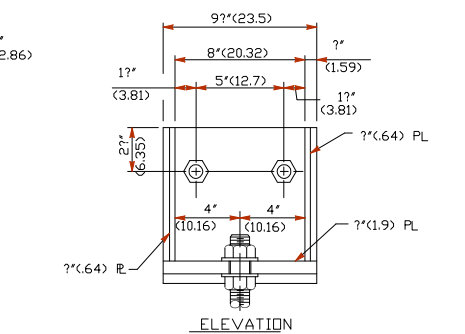


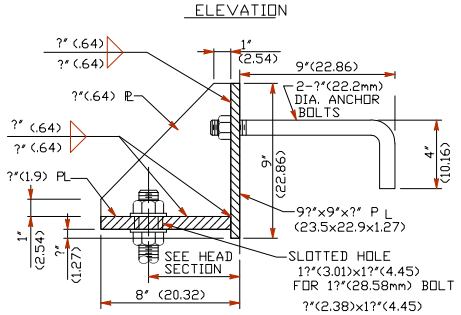
LOCKING BARS

NO SCALE

LOCKING BARS TO CONFORM TO MILITARY SPECIFICATION MIL-H-43905A

RESTRAINING BRACKET DETAILS

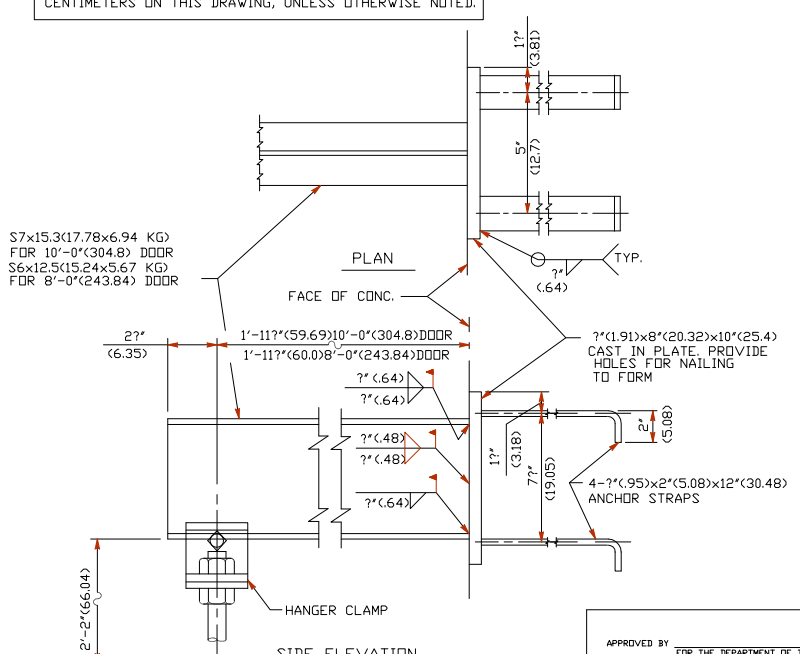




TRACK SUPPORT BRACKET

TYPE I

SCALE: 3"=1'-0"
(1 = 4)



SIDE ELEVATION

TRACK SUPPORT BRACKET

TYPE II

SCALE: 3"=1'-0"
(1 = 4)

SYMBOL	DESCRIPTION	DATE	APPROVAL
1	GENERAL REVISION/SIMONS-EASTERN CO.	19JUL84	JYM

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CONSULTING ENGINEERS
KANSAS CITY, MISSOURI

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
MILITARY CONSTRUCTION - ENGINEERING DIVISION
WASHINGTON, D.C.

CONSULTING ENGINEERS
FALLS CHURCH, INDIANA

DRAWN BY: G.I.C.
TRACED BY: G.I.C.
CHECKED BY: H.D.L.
SUBMITTED BY: W.V. HILL
APPROVED: D.F.M.
CHIEF ADV. TECH. BR.

MAGAZINE, PRECAST CONCRETE, EARTH COVERED MISCELLANEOUS BLAST DOOR DETAILS

APPROVED BY _____ FOR THE DEPARTMENT OF THE NAVY
DATE _____

APPROVED BY _____ FOR THE DEPARTMENT OF THE AIR FORCE
DATE _____

APPROVED: LEE S. GARRETTE DATE: 11APR79
CHIEF ENGINEERING DIVISION MIL. PROGR., O.C.E.

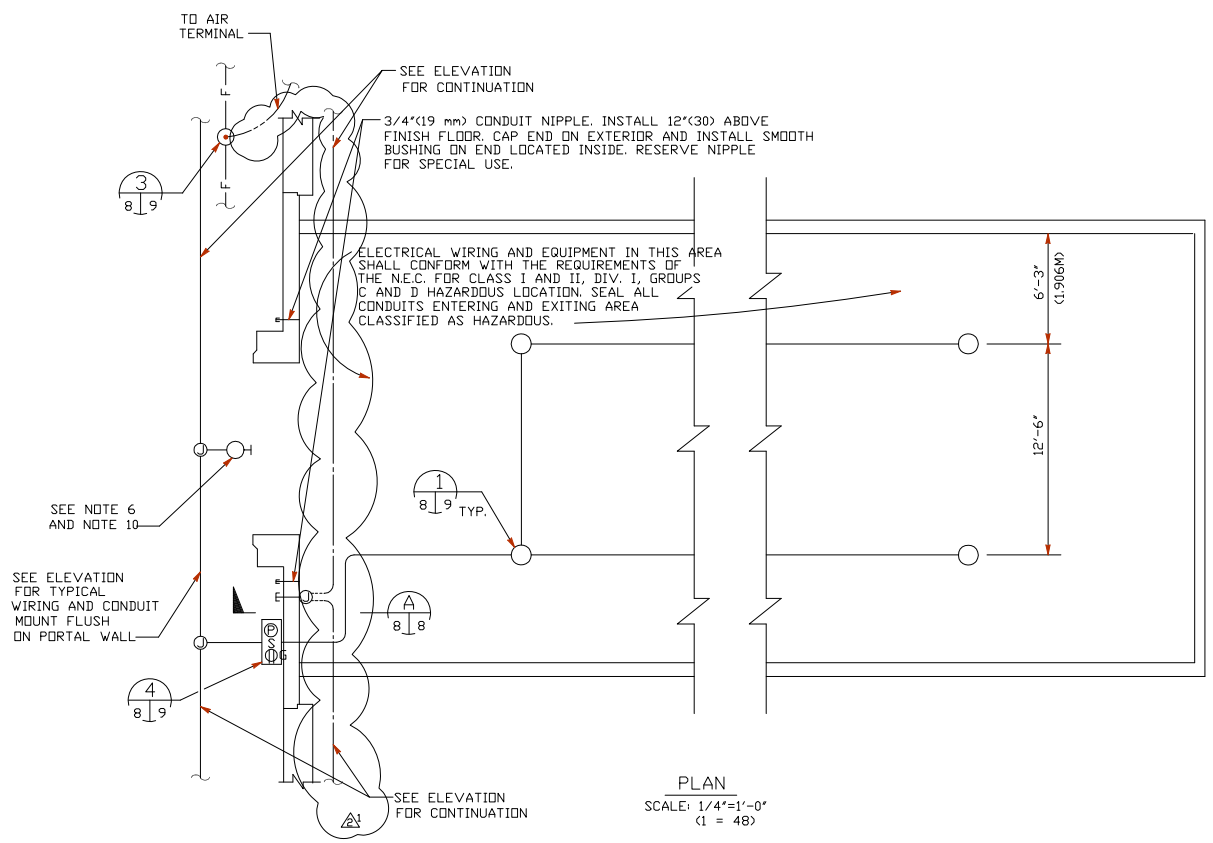
APPROVED FOR: _____
DATE: _____

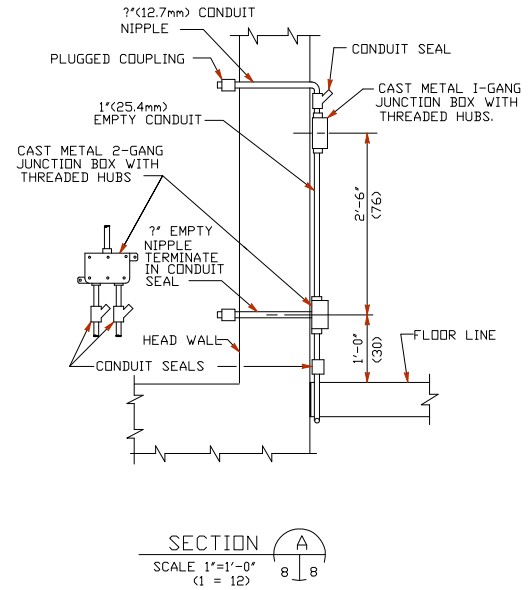
File design number: 84203
File name: 6951s7.dgn

DRAWING NUMBER 421-80-05
SHEET S-7

6951S7.Dgn

THIS SHEET TRANSFERRED FROM 33-15-74





SECTION A
SCALE 1"=1'-0"
(1 = 12)

LEGEND (FOR SHEETS E-1 AND E-2)

- WALL MOUNTED EXTERIOR LIGHTING FIXTURE. SEE NOTE 6.
- CEILING MOUNTED LIGHTING FIXTURE. SEE DETAIL 1/8|9
- 3-GANG OUTLET BOX WITH SINGLE GANG COVER FOR PILOT LAMP, SINGLE POLE SWITCH AND DUPLEX CONVENIENCE OUTLET WITH GROUND FAULT INTERRUPTER ALL SUITABLE FOR USE OUTDOORS.
- JUNCTION BOX, CAST METAL WITH THREADED WALLS OR HUBS.
- CONDUIT RUN CONCEALED BELOW GRADE OR FLOOR SLAB. NOTE: ANY CONDUIT RUN NOT OTHERWISE INDICATED SHALL BE ?"(12.7 mm) AND CONTAIN THREE NO.12 AWG.(3.3 SQ.mm) WIRES. A GREATER NUMBER OF WIRES ARE SHOWN WITH CROSS LINES AS FOLLOWS: G — GROUND CONDUCTOR
  THE LONG CROSS LINE INDICATES THE IDENTIFIED GROUNDED NEUTRAL CONDUCTOR AND THE SHORT CROSS LINES INDICATES THE PHASE CONDUCTORS. UNLESS OTHERWISE INDICATED, ALL CONDUCTORS ARE NO. 12 AWG (3.3SQ.mm)
- CONDUIT RUN INSTALLED EXPOSED ON WALLS OR CEILING. WIRING SHALL BE SAME AS IN NOTE FOR CONCEALED COINDUIT RUN.
- AUXILIARY EMPTY CONDUIT RUN CONCEALED BELOW GRADE OR FLOOR SLAB SIZED AS INDICATED.
- CONDUIT TERMINATED WITH A PLUGGED COUPLING.
- VALVE TYPE SECONDARY SURGE ARRESTER (L.A.)
- LIGHTNING AIR TERMINAL. EXTEND 4'-0"(61) ABOVE PROTECTED OBJECT.
- GROUND ROD
- —F— FACILITY COUNTERPOISE SYSTEM, NO.1/0 AWG.(53.5 SQ.mm) BARE COPPER WIRE.
- DOWN CONDUCTOR FROM AIR TERMINAL, NO. 2 AWG. (33.6 SQ.mm) BARE COPPER WIRE.
- 2'-6" (76.2) UNLESS OTHERWISE INDICATED, THE PARENTHETIC METRIC DIMENSIONS SHOWN ARE IN CENTIMETERS AND ARE MINIMUM ACCEPTABLE.

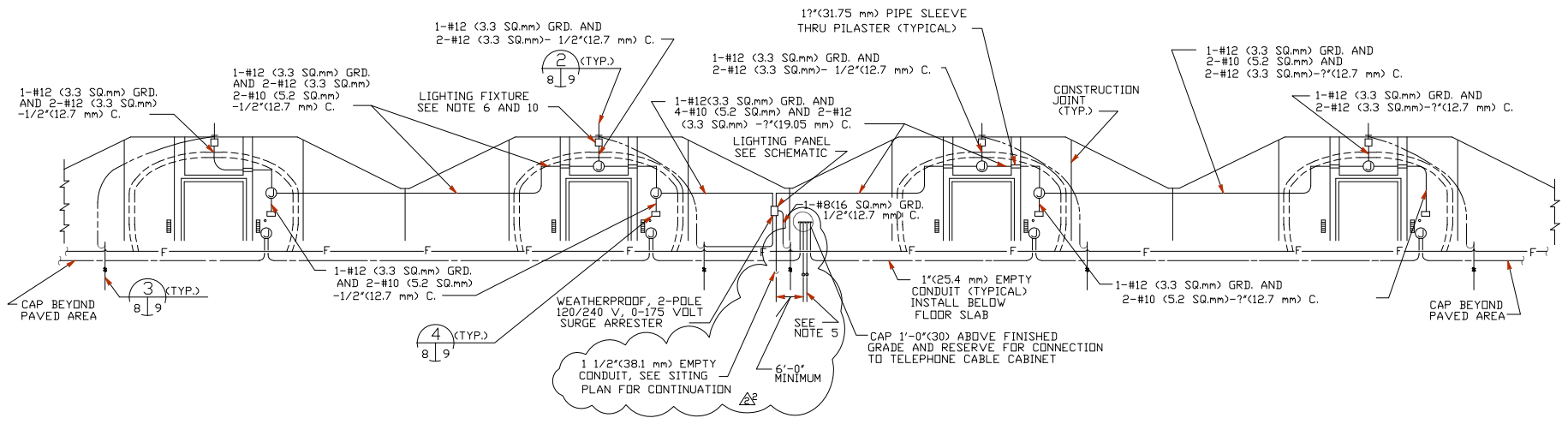
NOTES: (FOR SHEETS E-1 AND E-2)

1. HOLES SHALL NOT BE MADE IN CONCRETE ARCH ROOFING FOR INSTALLATION OF ELECTRICAL WORK.
2. THE CONDUIT SYSTEM ON THE FRONT OF STRUCTURE IS TO HAVE SUPPORTS SPACED NOT MORE THAN 8'-0"(243.8). SUPPORTS ON EACH SIDE OF CONSTRUCTION JOINTS SHALL NOT EXCEED 5'-0"(152).
3. RUNNING THREAD COUPLING CONNECTIONS ARE NOT PERMITTED FOR THE RIGID CONDUIT SYSTEMS.
4. FOR THE 120/240 VOLT, SINGLE PHASE, 3-WIRE SERVICE, INSTALL A 1?" (38.1 mm) EMPTY CONDUIT 2'-0"(61) BELOW FINISHED GRADE AND TERMINATE WITH A PLUGGED COUPLING NOT LESS THAN 5'-0"(152) BEYOND PAVED AREA.
5. FOR THE INSTALLATION BY OTHERS OF A TELEPHONE TYPE CABLE, INSTALL 2 1?"(38.1 mm) CONDUITS WITH PULL WIRE, 2'-0"(61) BELOW FINISHED GRADE AND TERMINATE WITH A PLUGGED COUPLING NOT LESS THAN 5'-0"(152) BEYOND PAVED AREA. (△3)
6. THE LIGHTING FIXTURE SHOULD BE INCANDESCENT TYPE WBTH-414. ALL EXTERIOR LIGHTS SHALL BE CONNECTED ON THE SAME CIRCUIT TO FACILITATE CONTROL AT THE PANEL BOARD. HOWEVER, NOT MORE THAN EIGHT FIXTURES SHALL BE CONNECTED TO ANY ONE 20 AMP CIRCUIT.
7. THE NUMBER OF INTERIOR LIGHTING FIXTURES VARIES, DEPENDING ON INTERNAL LENGTH OF MAGAZINE, AS FOLLOWS:

LENGTH OF MAGAZINE	NO. OF FIXTURES
20'-24' (6.1-7.3 M)	4
25'-36' (7.6-11 M)	4
37'-48' (11.3-14.6 M)	4
49'-60' (14.9-18.3 M)	6
61'-89'(18.6-27.1 M)	8

8. INSTALL AN INTERMEDIATE AIR TERMINAL OVER STRUCTURE WHERE INTERIOR LENGTH OF MAGAZINE EXCEEDS 48 FEET (SEE SHEET E-2).
9. SHEETS E-1 AND E-2 HAVE BEEN ADAPTED FROM O.C.E. DWG. NO. 33-15-74, SHEETS E-1 AND E-2 SHOWING ELECTRICAL PROVISIONS FOR SIMILAR STEEL ARCH STEEL ARCH MAGAZINE. NOTES 7 THRU 9 ARE NEW, AS ARE FIXTURE MOUNTING, GROUND FAULT INTERRUPTER AND AIR TERMINAL PROVISIONS (FOR MAGAZINES LONGER THAN 50 FT.).
10. BRACKET LIGHT FIXTURE AWAY FROM FRONT WALL TO PROVIDE LIGHT ON MAGAZINE DOOR.

THE METRIC DIMENSIONS (BETWEEN THE PARENTHESIS) ARE IN IN CENTIMETERS ON THIS DRAWING, UNLESS OTHERWISE NOTED.



ELEVATION
NOT TO SCALE

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

SYMBOL	DESCRIPTION	DATE	APPROVAL
△3	GENERAL REVISION/LIGHTNING PROTECTION	11JUN98	WLS
△1	GENERAL REVISION/SIMONS-EASTERN CO.	19JUL84	JYM

APPROVED BY _____ FOR THE DEPARTMENT OF THE NAVY
DATE _____

APPROVED BY _____ FOR THE DEPARTMENT OF THE AIR FORCE
DATE _____

CONSULTING ENGINEERS FALLS CHURCH, INDIANA

BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MISSOURI

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
MILITARY CONSTRUCTION - ENGINEERING DIVISION
WASHINGTON, D.C.

DRAWN BY: P.Z.
TRACED BY: P.Z.
CHECKED BY: N.J.A.
SUBMITTED BY: W.V. HILL
APPROVED: D.F.M.
CHIEF ADV. TECH. BR.

MAGAZINE, PRECAST CONCRETE, EARTH COVERED ELECTRICAL PLAN AND SECTIONS

APPROVED: LEE S. GARRETTE DATE: 11APR79
CHIEF ENGINEERING DIVISION MIL PROGR., O.C.E.

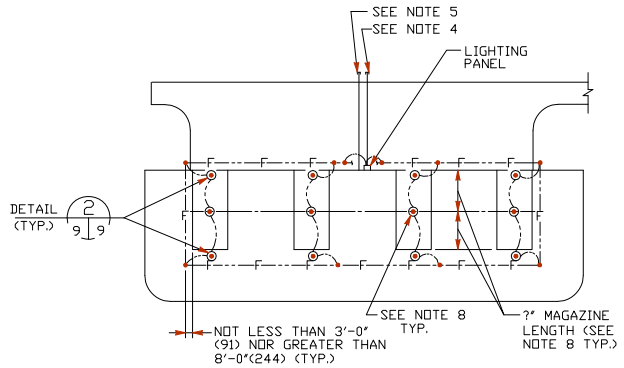
APPROVED FOR: _____
DATE: _____

Design file no: 84224
File name: 6951e1dgn

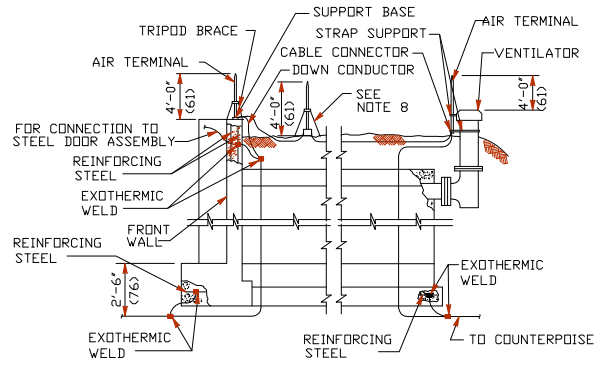
DRAWING NUMBER 421-80-05
SHEET E-1

THIS SHEET TRANSFERRED FROM 33-15-74

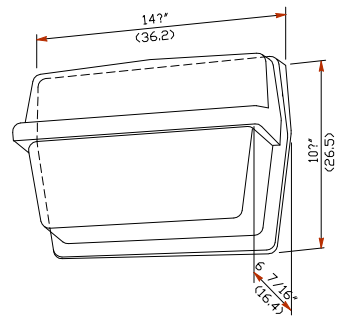
6951E1.DGN



SITING PLAN
NOT TO SCALE



DETAIL 2
NOT TO SCALE 8 | 9



FIXTURE TYPE WBTH-414
(SEE NOTE 10)

WEATHERPROOF INCANDESCENT WALL MOUNTING FIXTURE CONSISTING OF A THERMAL SHOCK-RESISTING, CRYSTAL PRISMATIC GLASS, ASYmmETRIC ALZAK REFLECTOR AND A DIECAST ALUMINUM HOUSING. THE FIXTURE SHALL BE PREWIRED AND EQUIPPED WITH A DOUBLE CONTACT BAYONET BASE SOCKET FOR A 250 WATT IODINE-QUARTZ, SINGLE ENDED LAMP. THE FIXTURE SHALL BE SUITABLE FOR MOUNTING DIRECTLY ON A WALL WITH CONDUIT ENTRY ON EACH SIDE OR TO A RECESSED OUTLET BOX STUD.

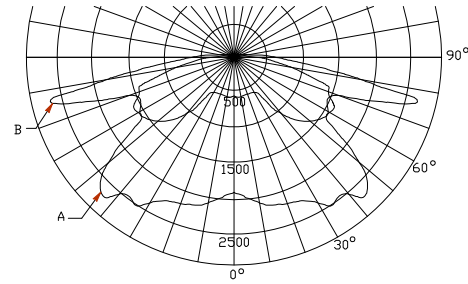
THE FIXTURE SHALL REQUIRE NO TOOLS FOR LAMP REPLACEMENT.

THE CANDLEPOWER VALUES INDICATED ARE TO BE CONSIDERED MINIMUM VALUES OBTAINED WITH STANDARD LAMPS AT RATED VOLTAGE.

PHOTOMETRIC DISTRIBUTION
STANDARD FIXTURE POSITION

A = LATERAL DISTRIBUTION IN 97 CONE
B = VERTICAL DISTRIBUTION THROUGH 45 LATERAL

LAMP : 250 Q/CL QUARTZ IODINE
LUMENS : 5000
WATTS : 250
BULB : T-4
VOLTS : 120
TEST DISTANCE: 25 FEET (762)

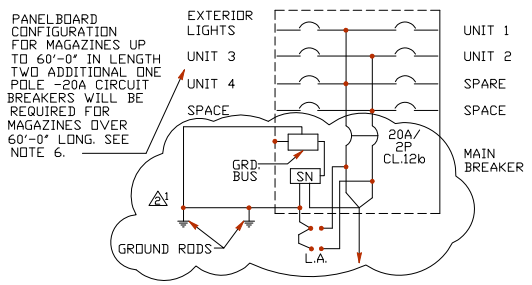


DISTRIBUTION DATA		
ANGLE DEGREES	CANDLEPOWER A	B
0	1900	480
5	1945	540
10	–	540
15	2190	535
20	–	560
25	2255	560
30	–	565
35	2550	580
40	2500	770
45	2715	1150
50	2460	1325
55	1965	1425
60	1550	1550
65	1610	1475
70	1435	1500
75	1435	2450
77	–	2715
80	920	2020
85	720	770
90	425	440
95	315	310
105	160	220
115	110	–
125	80	–
135	50	–
145	30	–
155	20	–
165	10	–
175	10	–
180	10	–

CONNECTED LOAD PER UNIT			
LIGHTING (WATTS)		RECEPTACLES (WATTS)	TOTAL (WATTS) ① ②
EXTERIOR	INTERIOR		
250	806	200	1256

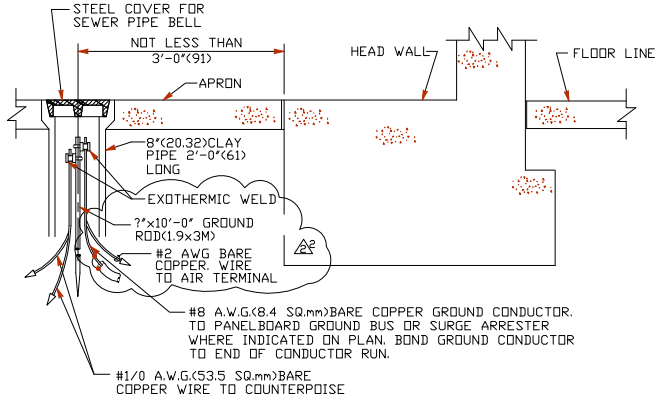
① ASSUMING A 60 FT. (1829) MAGAZINE

② MAX. LOAD - 4 BAYS - 90 FT. (2745) MAGAZINE : 2.81 KVA

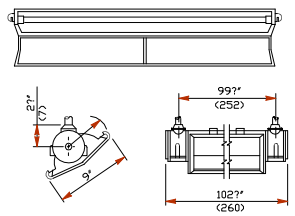


120/240V.-10-3W.WITH GROUND BUS, SURFACE MOUNTED IN WEATHERPROOF ENCLOSURE WITH A. MAINS. ALL C/B'S RATED 20A.-1P.CL. 12a EXCEPT AS NOTED OTHERWISE. SOLID NEUTRAL BUS SHALL BE CONNECTED TO THE GROUND BUS ONLY IN THE PANELBOARD. BOND PANELBOARD ENCLOSURE TO GROUND BUS.

LIGHTING PANELBOARD
SCHEMATIC



DETAIL 3
NOT TO SCALE 8 | 9



FIXTURE TYPE WBF-SL-96
(SEE NOTE 10)

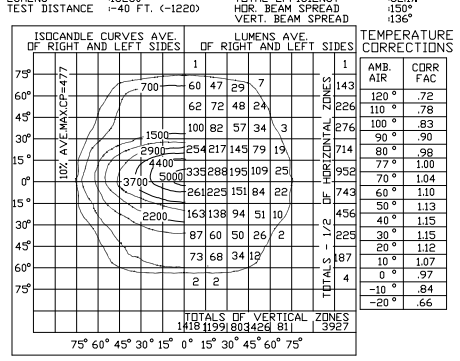
THE METRIC DIMENSIONS (BETWEEN THE PARENTHESIS) ARE IN CENTIMETERS ON THIS DRAWING, UNLESS OTHERWISE NOTED.

NOMINAL LAMP DATA

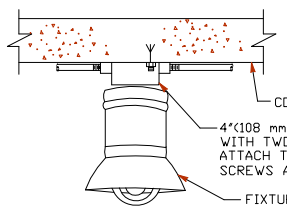
LAMP	F96T12/CW/SHO
WATTS	212
CURRENT	1.5 AMPS
LUMENS	13250
TEST DISTANCE	40 FT. (1220)

TEST RESULTS

AVG. MAX. CANDLEPOWER	4779
BEAM LUMENS	7854
BEAM EFFICIENCY	59.3%
TOTAL EFFICIENCY	62.1%
HOR. BEAM SPREAD	150°
VERT. BEAM SPREAD	136°

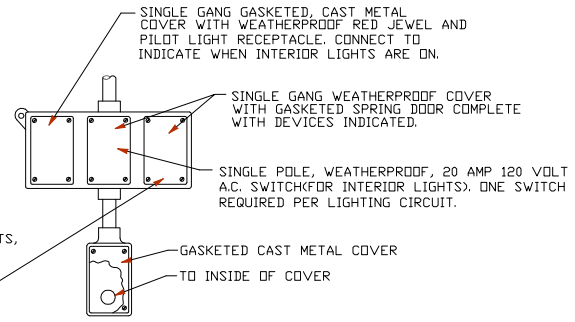


TEMPERATURE CORRECTIONS	
AMB. AIR	CORR FAC
120 °	.72
110 °	.78
100 °	.83
90 °	.90
80 °	.98
77 °	1.00
70 °	1.04
60 °	1.10
50 °	1.13
40 °	1.15
30 °	1.15
20 °	1.12
10 °	1.07
0 °	.97
-10 °	.84
-20 °	.66



DETAIL 1
NOT TO SCALE 8 | 9

GROUNDING TYPE DUPLEX RECEPTACLE, EQUIPPED WITH GROUND FAULT CIRCUIT ITERRUPTION PROVISIONS, SHALL BE PROVIDED. THE AMPERE AND VOLTAGE RATING SHALL BE SUITABLE FOR THE MAXIMUM AMPERE DEMAND CALCULATED AND THE VOLTAGE RATING OF THE SERVICE AVAILABLE AT THE SPECIFIC MAGAZINE. GENERALLY THE RECEPTACLE SHALL BE RATED AT NOT LESS THAN 20 AMPERES AT 125 VOLTS, ALTERNATING CURRENT AND RATED TO TRIP WHEN A GROUND-FAULT CURRENT EXCEEDS 20 MILLIAMP.



DETAIL 4
NOT TO SCALE 8 | 9

FLUORESCENT FLOODLIGHT FIXTURE SUITABLE FOR OUTDOOR INSTALLATION SHALL UTILIZE A 96 INCH (244) RAPID START 1500 MA LAMP (F96T12/CW/SHO). THE FIXTURE SHALL CONSIST OF AN ALZAK ALUMINUM REFLECTOR WITH SPECULAR FINISH, SPRING LOADED PLUNGER TYPE SILVERPLATED CONTACT SOCKETS WITH NEOPRENE BOOTS AND SHALL HAVE PROVISION FOR AIMING THROUGHOUT 360 DEGREES ROTATION WITH GRADUATED AIMING DIAL. DOOR ASSEMBLY SHALL CONSIST OF A STAINLESS STEEL FRAME WITH A CLEAR ACRYLIC PLASTIC COVER, SPONGE NEOPRENE WEATHERPROOF GASKET WITH STAINLESS STEEL HINGES AND LATCHES. HOUSING SHALL BE FINISHED WITH GREEN ACRYLIC BAKED ENAMEL PAINT OR OTHER APPROVED COLOR. THE FIXTURE SHALL BE EQUIPPED WITH A MOUNTING HUB ASSEMBLY AT EACH END. A THERMALLY PROTECTED WEATHERPROOF BALLAST, NOT INTEGRAL WITH THE FIXTURE SHALL BE PROVIDED. THE BALLAST SHALL BE RATED FOR -20° F (-29C) STARTING IN COLD WEATHER OPERATION. THE CANDLEPOWER VALUES INDICATED ARE TO BE CONSIDERED MINIMUM VALUES OBTAINED WITH STANDARD LAMPS AT RATED VOLTAGE.

NOTE:
REFER TO SHEET E-1 FOR NOTES AND LEGEND.

SYMBOL	DESCRIPTION	DATE	APPROVAL
2 2	GENERAL REVISION/LIGHTNING PROTECTION	1 JUN 98	WLS
1	GENERAL REVISION/SIMONS-EASTERN CO.	19 JUL 84	JYM

BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MISSOURI

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
MILITARY CONSTRUCTION - ENGINEERING DIVISION
WASHINGTON, D.C.

DRAWN BY: S.M.C.
TRACED BY: S.M.C.
CHECKED BY: N.J.A.
SUBMITTED BY: W.V. HILL
APPROVED: D.F.M.
CHIEF ADV. TECH. BR.

MAGAZINE, PRECAST CONCRETE, EARTH COVERED
ELECTRICAL DETAILS

APPROVED: LEE S. GARRETTE DATE: 11APR79
CHIEF ENGINEERING DIVISION MIL. PROGR., O.C.E.

APPROVED FOR:
DATE:

Design file no: 84225
File name: 6951e2.dgn

DRAWING NUMBER 421-80-05
SHEET E-2

APPROVED BY _____ FOR THE DEPARTMENT OF THE NAVY
DATE _____

APPROVED BY _____ FOR THE DEPARTMENT OF THE AIR FORCE
DATE _____

CONSULTING ENGINEERS
FALLS CHURCH, INDIANA

6951E2.dgn

THIS SHEET TRANSFERRED FROM 33-15-74