Precast Concrete Products

Product Catalog

September 2023 Edition

Rogue Valley Precast

3-Sided Bridges

3-SIDED BRIDGE NOTES

GENERAL NOTES:

1. The following notes shall apply unless noted otherwise on the plans or specifications. In the case of conflict with the plans or specifications, the more restrictive requirements shall apply.

REFERENCE SPECIFICATIONS:

1. Design Criteria: AASHTO Bridge Design Specifications
2. Manufacture: ASTM C1504

MATERIALS:

1. Aggregate conforms to ASTM C33.
2. Portland cement conforms to ASTM C150.
3. Fly Ash conforms to ASTM C618.
4. All bar reinforcing steel conforms to ASTM A615 or A706 Grade 60.
5. Welded Wire Fabric conforms to ASTM A1064, Grade 70 or 80 KSI.
6. Admixtures conform to ASTM C494.
7. Air entraining admixtures conform to ASTM C260.
8. Concrete minimum compressive strength (at 28 days) 5000 PSI, unless greater strength is required.
9. Concrete minimum stripping strength is 2500 PSI.

DELIVERY AND INSTALLATION:

1. The contractor provides rigging and off loading at the job site.
2. The contractor provides all weld plates, shims and accessories which are not cast directly into the concrete.
3. Follow all installation procedures described in the project documents. More restrictive requirements outlined in the project documents or a corresponding geotechnical report take precedence.
4. The foundation and backfill sections of these notes provide basic installation criteria.

FOOTING PREPARATION:

1. All loose and disturbed soil shall be removed prior to placing precast footings.
2. Precast footings shall bear on either compacted structural fill or undisturbed native soils. Footings shall be underlain by at least 6" of screeded and compacted gravel.
3. If no project specifications apply, follow WSDOT Standard 7-02.3(6) A4.

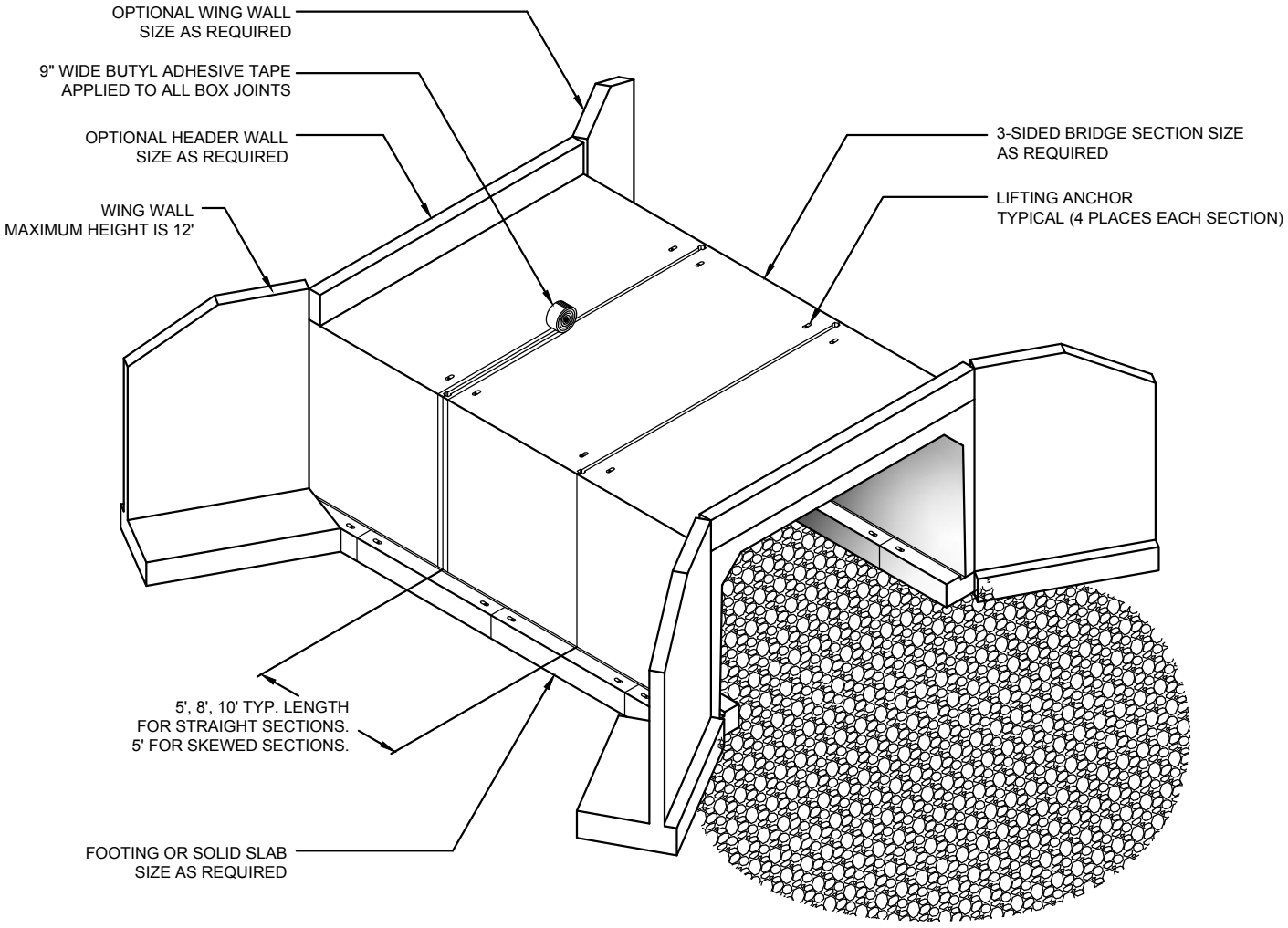
BRIDGE JOINTS:

1. Bridge units laid sequentially form a joint which requires grout or sealant to prevent soil infiltration. Where grout is required grout all joints with non-shrink grout.
2. The legs of the 3-sided bridge key into a footing. The footing key shall be cleaned of all debris. Shim plates are used in the keyway to collimate bridge units. The keyway shall be grouted to fix the bridge leg.
3. All bridge joints with gap greater than $\frac{1}{2}$" shall be filled for application of a wide non-curing extruded butyl adhesive tape. Use a non-shrink grout conforming to ASTM C1107 and butyl tape conforming to ASTM C877.

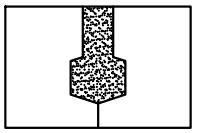
BACKFILL:

1. Backfill shall consist of well graded soil free of organics, large stones and deleterious material.
2. Backfill shall be placed in 12 inch lifts and compacted to a minimum of 90% modified proctor density.
3. Backfill shall not exceed 2' elevation difference from side to side.

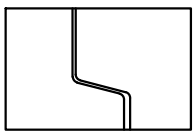
3-SIDED BRIDGE



8' MIN. TO 35' MAX. SPAN WITH 1' INCREMENTS

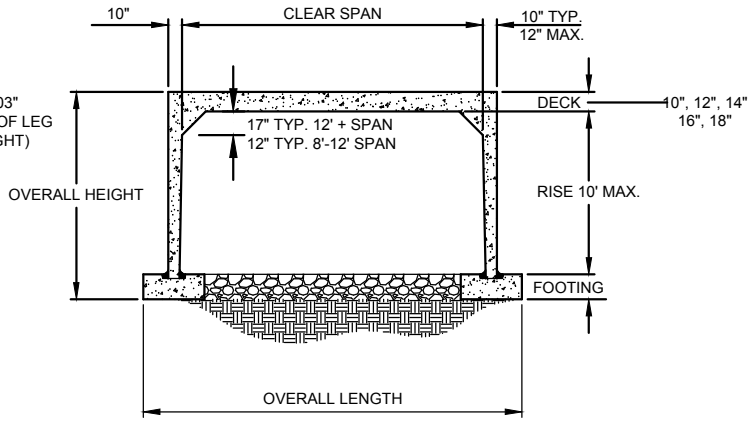


GROUT JOINT



SHIPLAP JOINT

NOTE:
TYPICAL, INSIDE LEG TAPERS 2" IN 103"
FROM BOTTOM OF HAUNCH TO BOTTOM OF LEG
(8" WIDE LEG AT BOTTOM FOR 10' HEIGHT)



SECTION VIEW

NOTES:

1. **FOOTING JOINTS TO BE STAGGERED IN RELATION TO BRIDGE JOINTS.**
2. **WHEN REQUIRED USE NON-SHRINK GROUT CONFORMING TO ASTM C1107.**
3. **EACH BRIDGE JOINT SHALL BE WRAPPED WITH 9" WIDE BUTYL ADHESIVE TAPE.**

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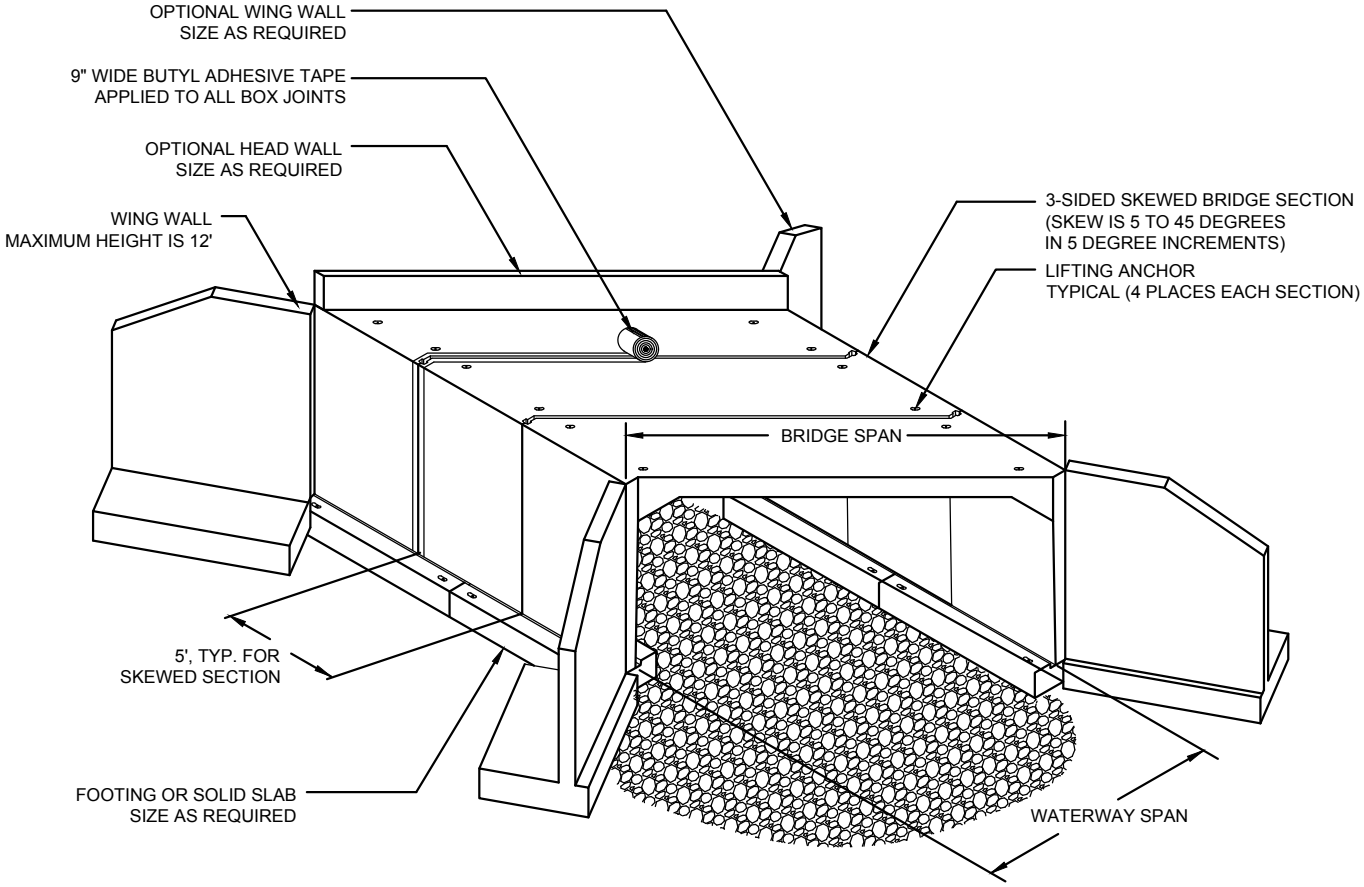
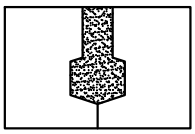
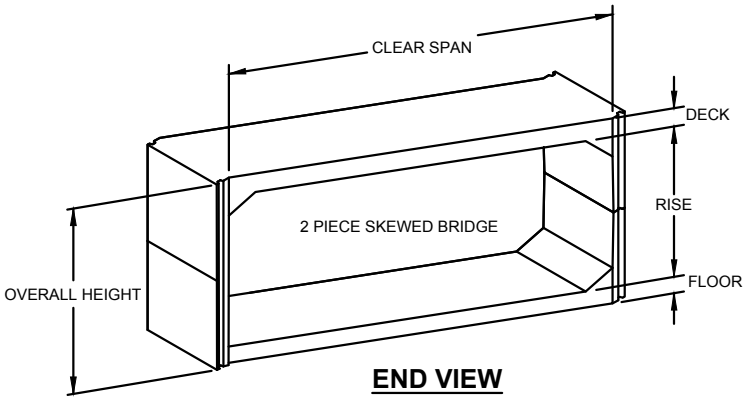
3-SIDED SKEWED BRIDGE

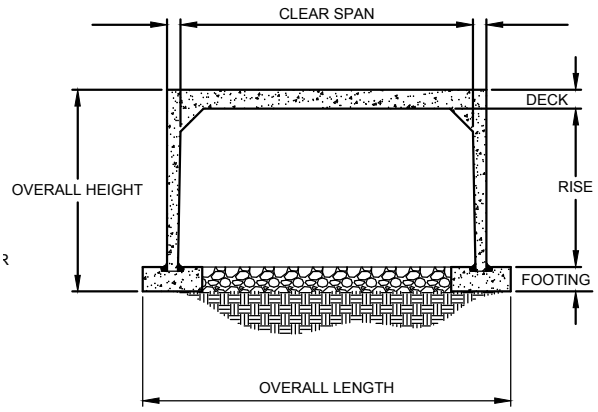




GROUT JOINT



END VIEW



SECTION VIEW

NOTES:

1. **FOOTING JOINTS TO BE STAGGERED IN RELATION TO BRIDGE JOINTS.**
2. **USE NON-SHRINK GROUT CONFORMING TO ASTM C1107. GROUT ALL JOINTS.**
3. **EACH BRIDGE JOINT SHALL BE WRAPPED WITH 9" WIDE BUTYL ADHESIVE TAPE.**
4. **SKEWED BRIDGE REQUIRES GROUT JOINT (NO SHIPLAP)**

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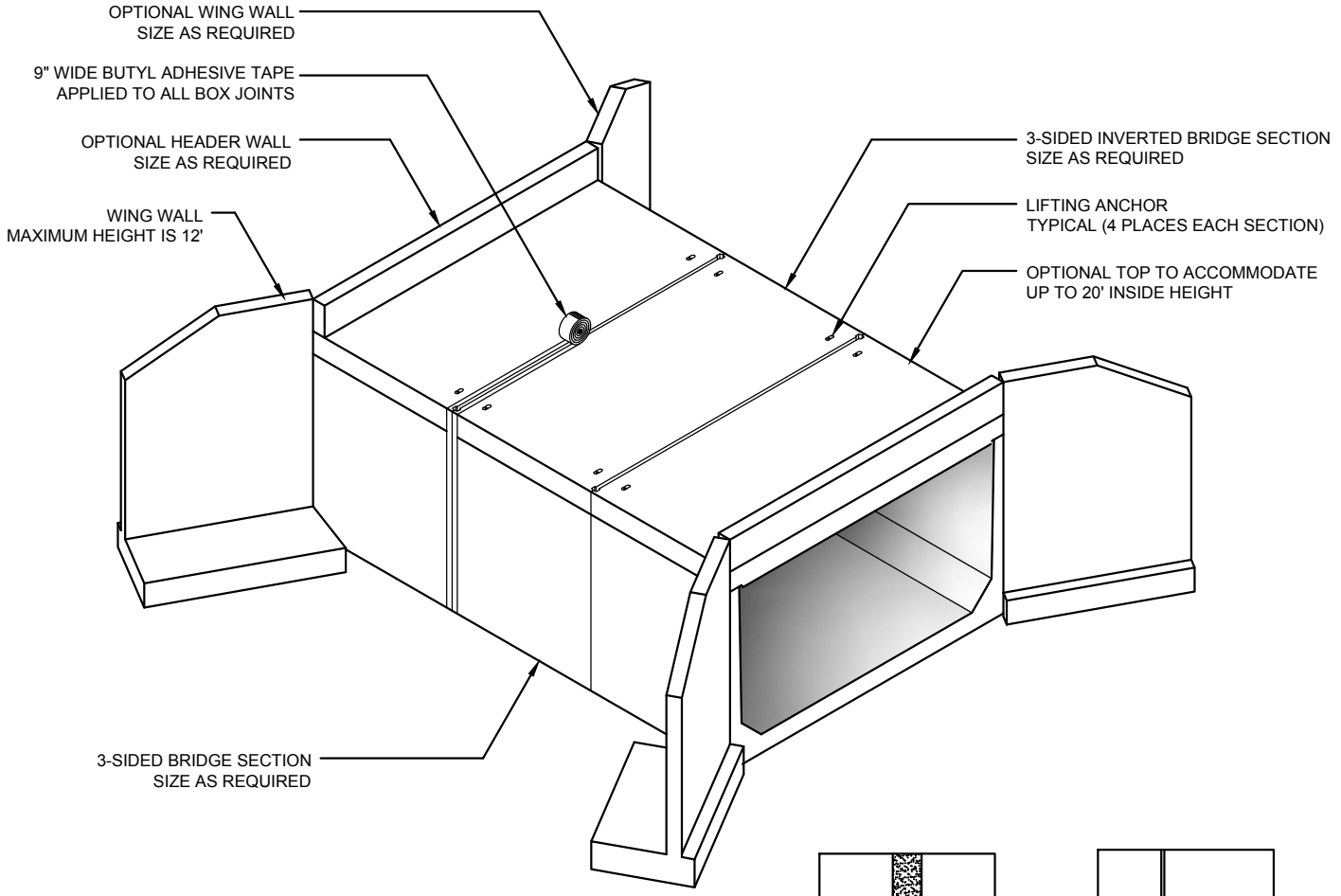
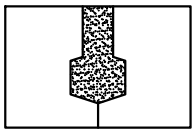
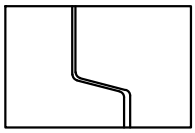
SPLIT BOX CULVERT

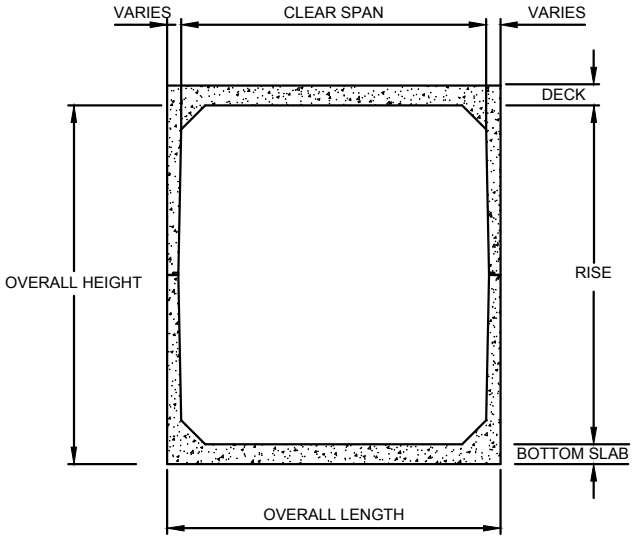




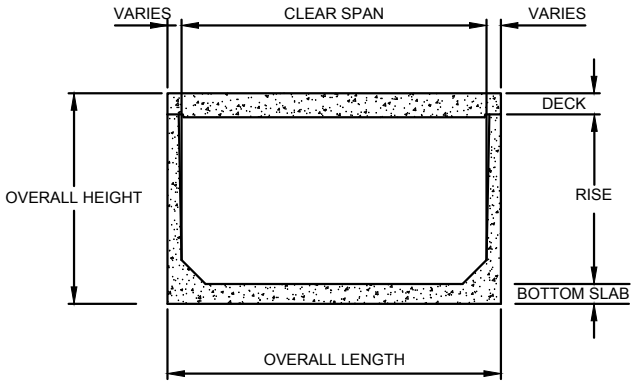
GROUT JOINT



SHIPLAP JOINT



SECTION VIEW



SECTION VIEW

NOTES:

1. **WHERE REQUIRED USE NON-SHRINK GROUT CONFORMING TO ASTM C1107.**
2. **EACH BRIDGE JOINT SHALL BE WRAPPED WITH 9" WIDE BUTYL ADHESIVE TAPE.**

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Box Culverts

BOX CULVERT - NOTES

GENERAL NOTES:

1. The following notes shall apply unless noted otherwise on the plans or specifications. In the case of conflict with the plans or specifications, the more restrictive requirements shall apply.

REFERENCE SPECIFICATIONS:

1. Design Criteria: LRFD Bridge Design Specifications
2. Manufacture: ASTM C1577

MATERIALS:

1. Aggregate conforms to ASTM C33.
2. Portland cement conforms to ASTM C150.
3. Fly Ash conforms to ASTM C618.
4. All bar reinforcing steel conforms to ASTM A615 Grade 60.
5. Welded Wire Fabric conforms to ASTM A1064, 70 or 80 KSI.
6. Admixtures conform to ASTM C494.
7. Concrete minimum compressive strength (at 28 days) 4000 PSI, unless greater strength is required.

DELIVERY AND INSTALLATION:

1. The contractor provides rigging and off loading at the job site.
2. The contractor provides all weld plates and accessories which are not cast directly into the concrete.
3. Follow any installtion procedures described in the project documents. More restrictive requirements outlined in the project documents or a corresponding geotechincal report take precedence.
4. The subgrade preparation and backfill sections of these notes provide basic installation criteria.

SUBGRADE PREPARATION:

1. All loose and disturbed soil shall be removed prior to placing box sections.
2. The box sections shall be underlain by at least 6 inches of screeded compacted gravel over compacted structural fill or undisturbed native soils.
3. If no project specifications apply, follow WSDOT Standard 7-02.3(6) A4.

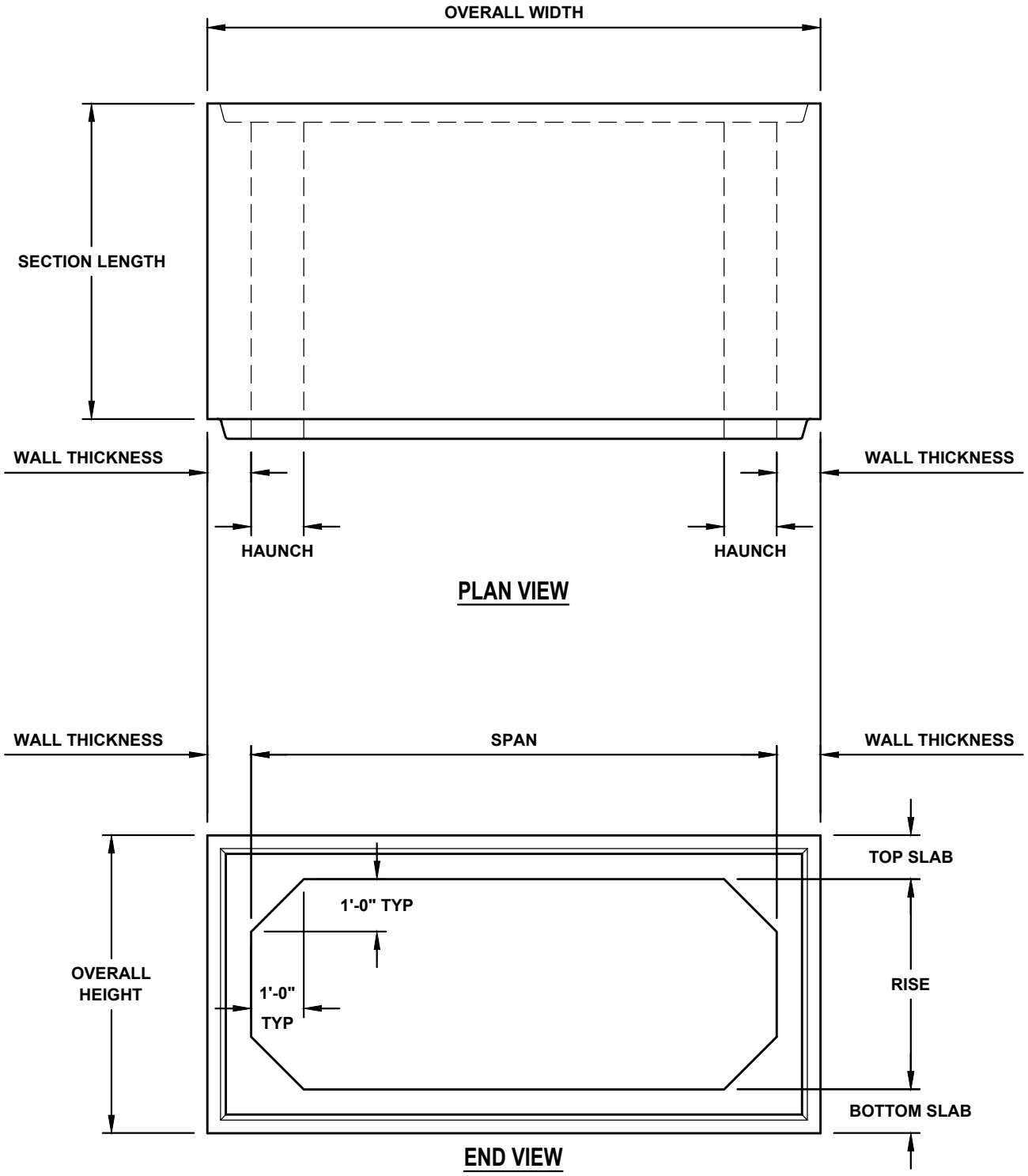
BOX JOINTS:

1. Box culverts are supplied with a joint mastic which prevents dirt from infiltrating the joint. This gasket is not water tight.
2. For projects requiring a watertight joint, prepare the joint as shown on page 4. After fitting the joint with the joint mastic gasket and adhesive tape, use a non-shrink grout conforming to ASTM C1107; mastic gasket conforming to ASTM C990, and butyl tape conforming to ASTM C877.

BACKFILL:

1. Backfill shall consist of well graded soil free of organics and deleterious material and large stones.
2. Backfill shall be placed in 12 inch lifts and compacted to a minimum of 90% modified proctor density.

BOX CULVERT - LAYOUT



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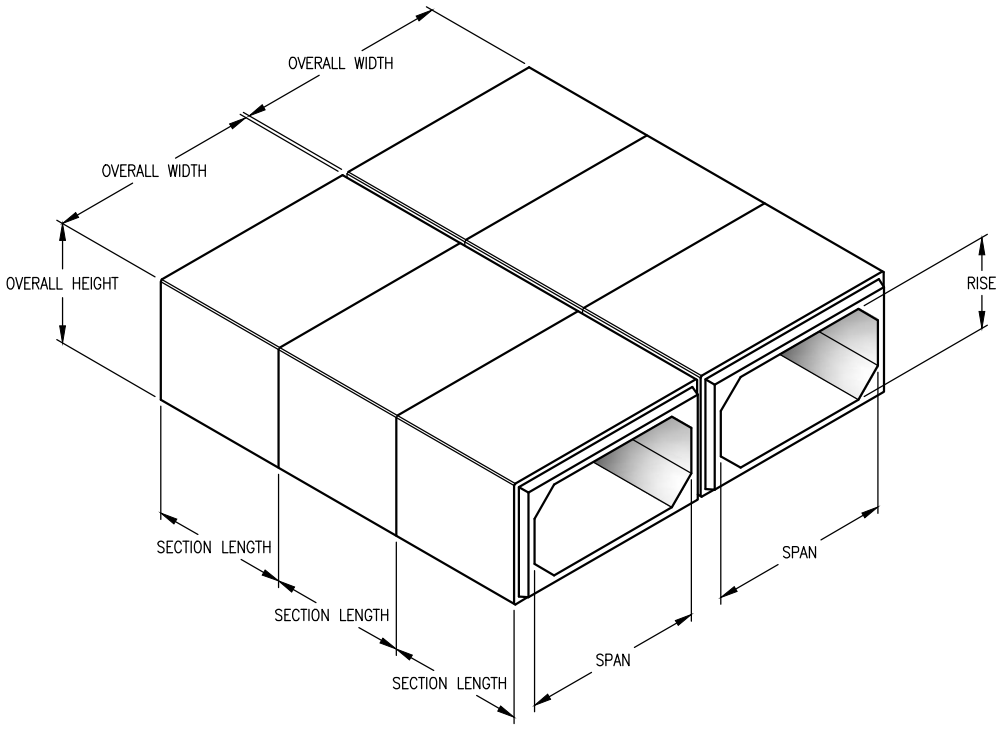
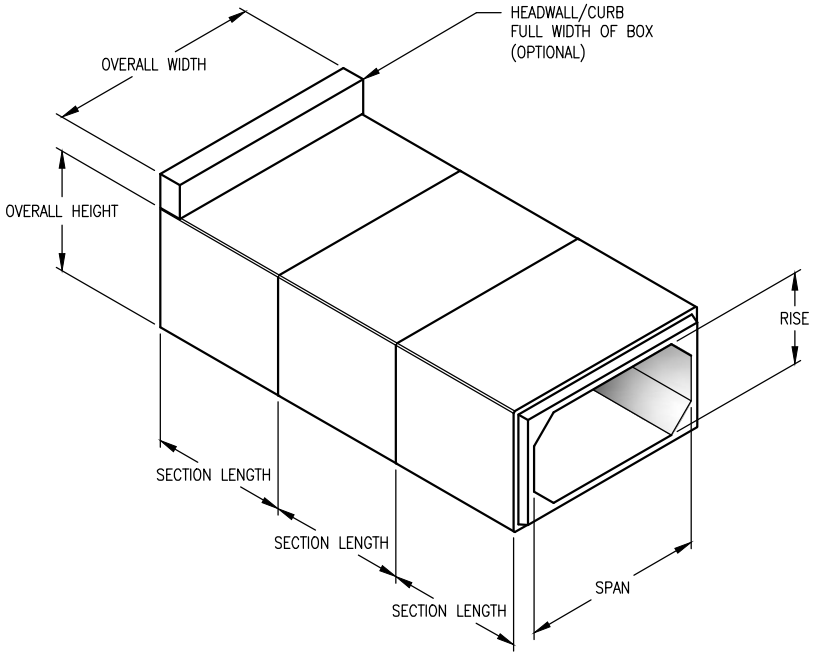
BOX CULVERT - OPTIONAL INSTALLATIONS

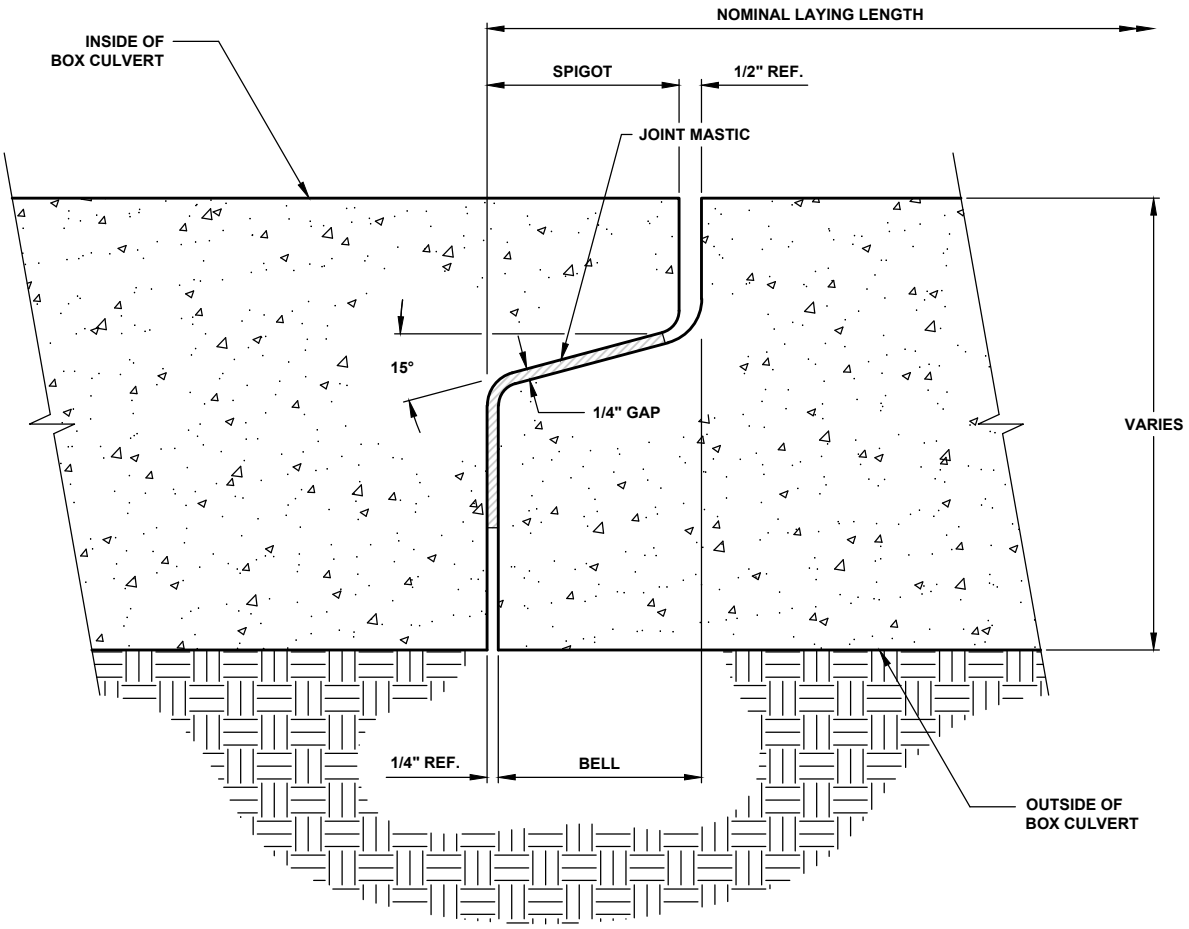


DOUBLE BARREL MULTIPLE UNIT INSTALLATION



MULTIPLE UNIT INSTALLATION

BOX CULVERT - STANDARD JOINT DETAIL



BOX JOINT SECTION

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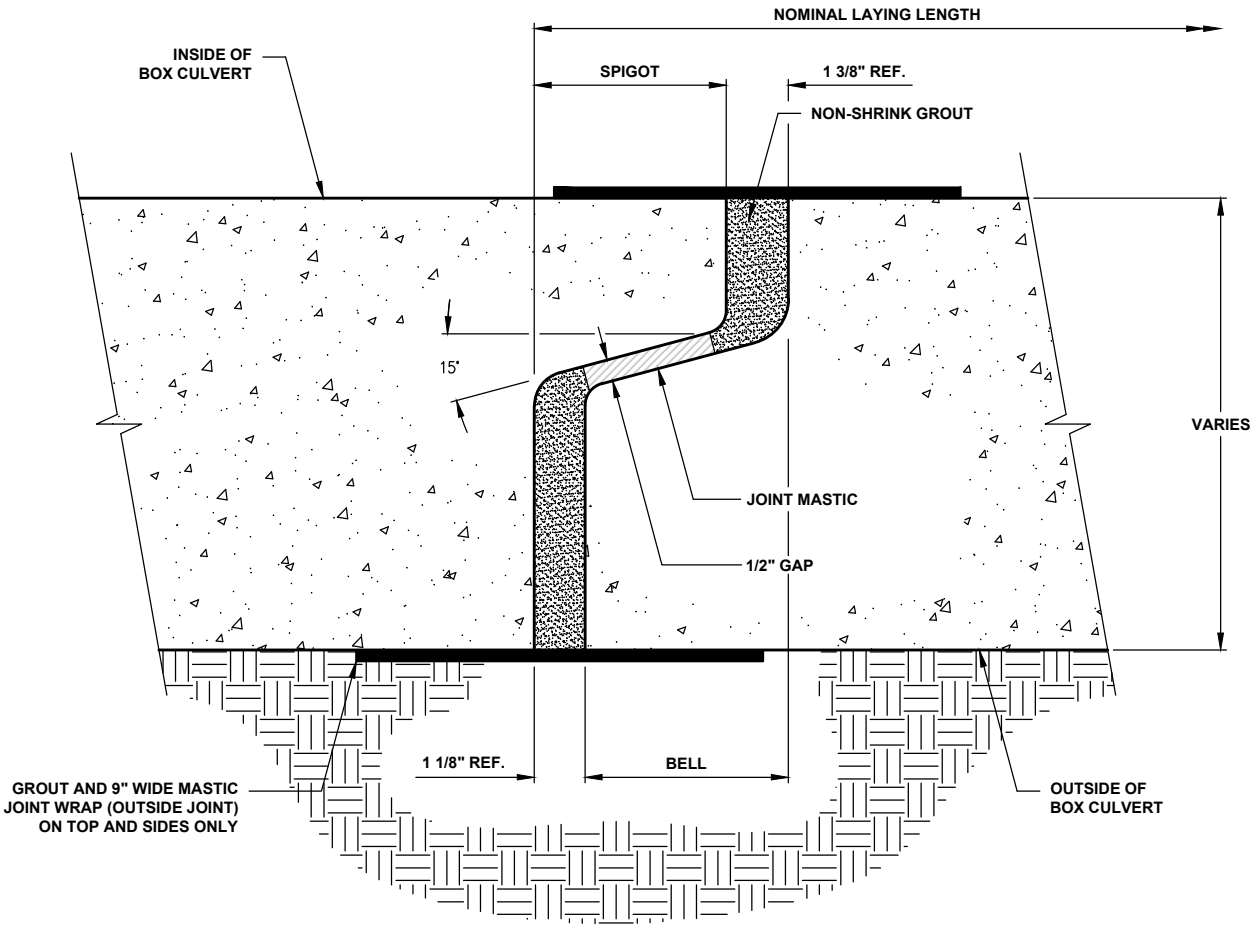
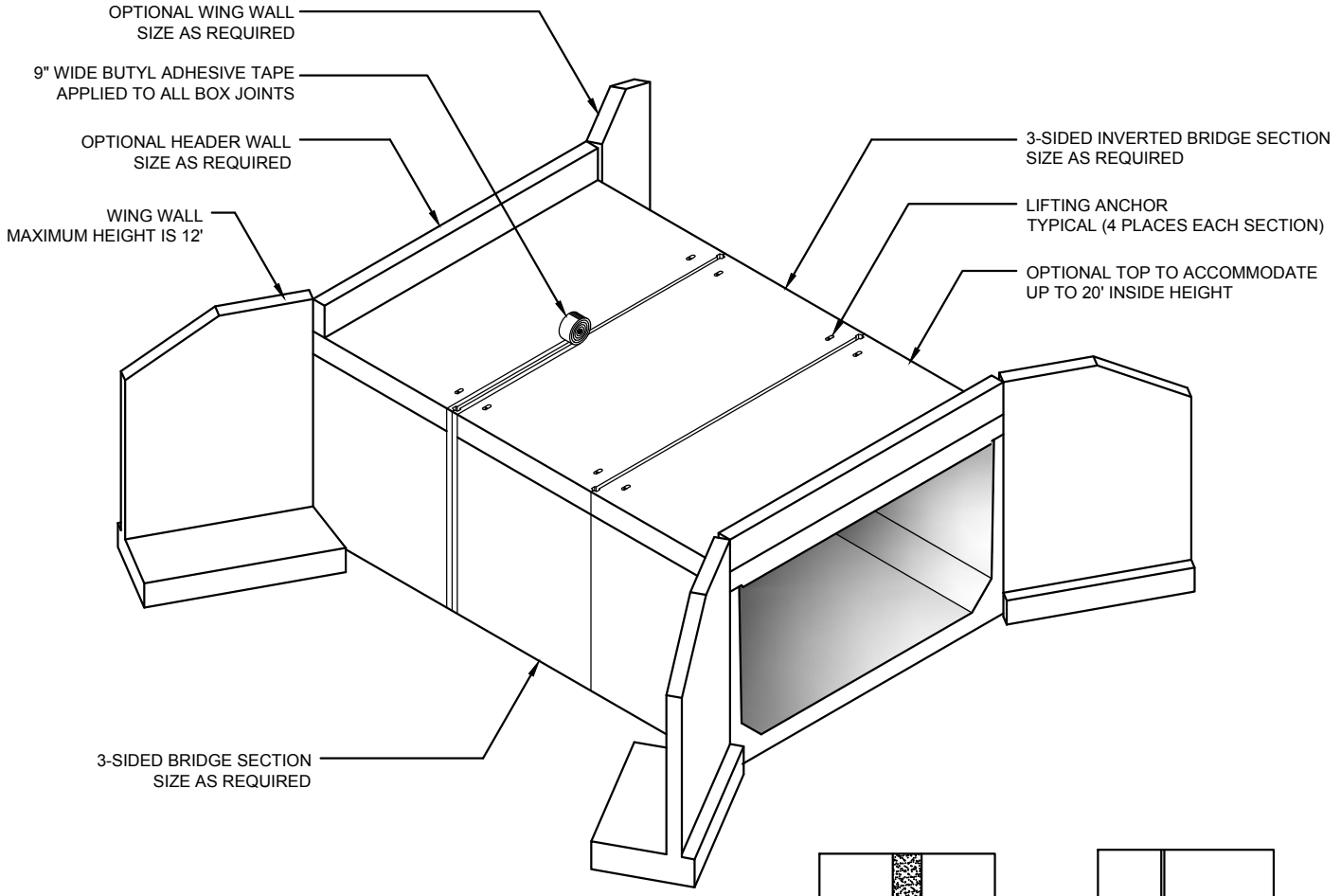
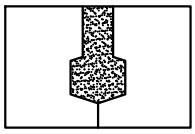
BOX CULVERT - WATERTIGHT JOINT DETAIL



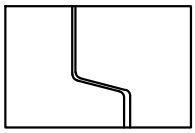
WATERTIGHT BOX JOINT SECTION

SPLIT BOX CULVERT

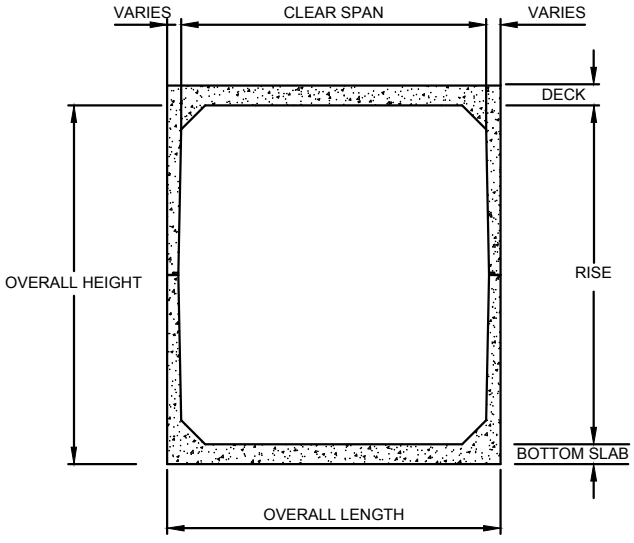




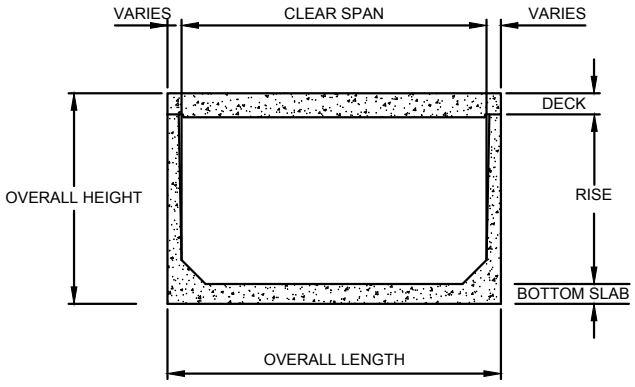
GROUT JOINT



SHIPLAP JOINT



SECTION VIEW



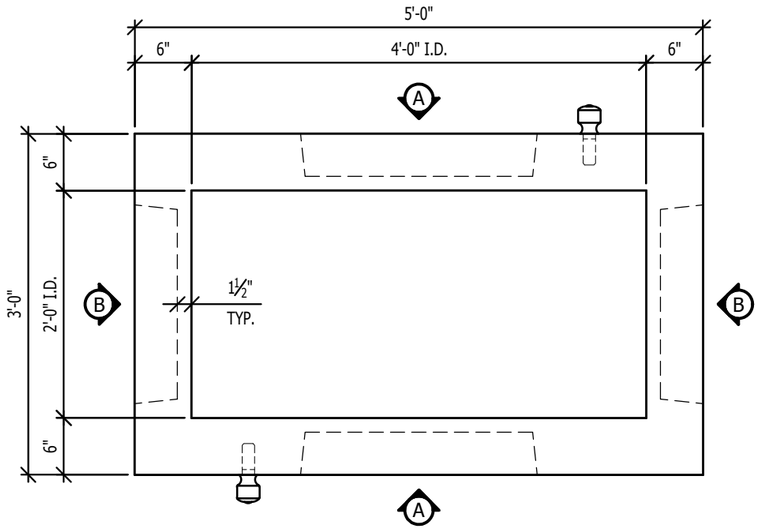
SECTION VIEW

NOTES:

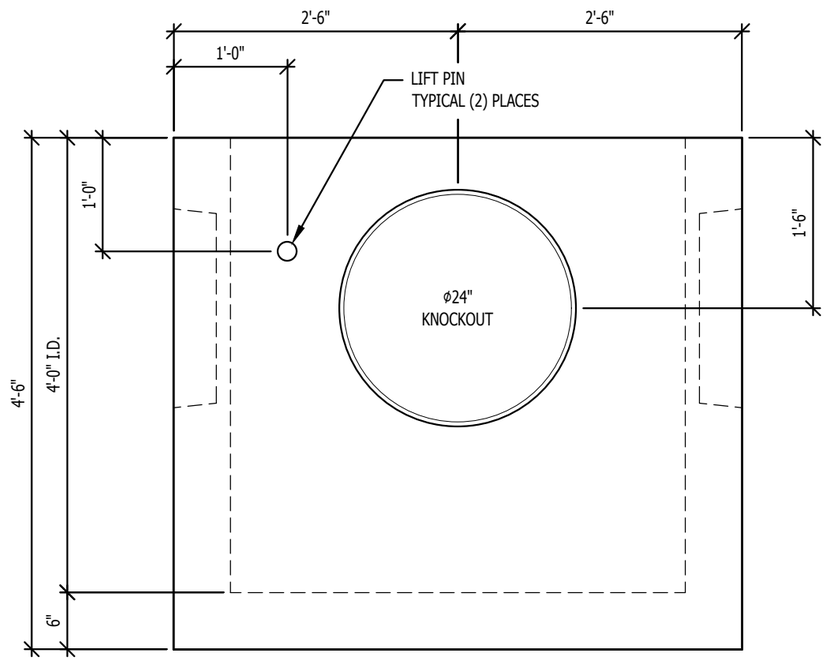
1. **WHERE REQUIRED USE NON-SHRINK GROUT CONFORMING TO ASTM C1107.**
2. **EACH BRIDGE JOINT SHALL BE WRAPPED WITH 9" WIDE BUTYL ADHESIVE TAPE.**

Rogue Valley Precast

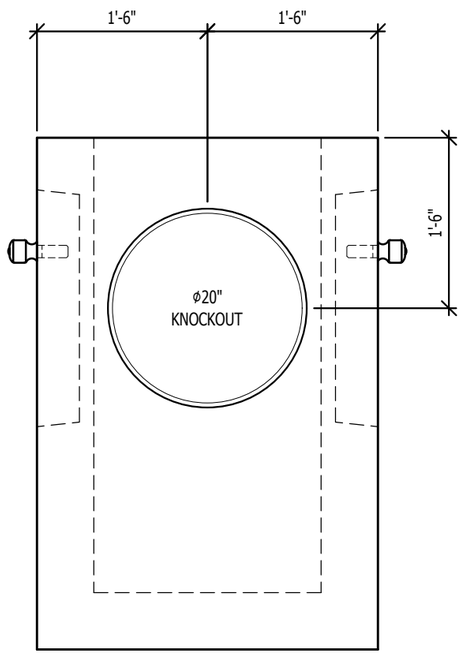
Catch Basins



PLAN VIEW



VIEW - A



VIEW - B

GENERAL NOTES:
1. INTERNAL PIPING/HARDWARE PROVIDED AND INSTALLED BY OTHERS.
2. INVERT PIPE CONNECTIONS PROVIDED AND INSTALLED BY OTHERS.
3. WEIGHTS LISTED ARE APPROXIMATE.

DESIGN NOTES:

CONCRETE:	28 DAY f'c = 4000 PSI
REINFORCING:	
	REBAR: ASTM A615 OR A-706 GRADE 60
	WWR: ASTM A1064 GRADE 65
LOADING:	PER ASTM C857
TRAFFIC:	AASHTO HS-20 (HL-93) WITH 16 KIP WHEEL LOAD
SURCHARGE:	80 PSF LATERAL TO 8' BELOW GRADE
SOIL:	120 PCF WITH 0'-3' SOIL COVER
	40 PCF EQUIVALENT LATERAL FLUID PRESSURE (DRY)
	82 PCF EQUIVALENT LATERAL FLUID PRESSURE (SATURATED)
WATER TABLE:	2' BELOW GRADE
DESIGN:	ACI 318-2014

BILL OF MATERIALS

ITEM	QTY	DESCRIPTION	WEIGHT (ea.)
A	1	Catch Basin - 4A	4,700 LBS

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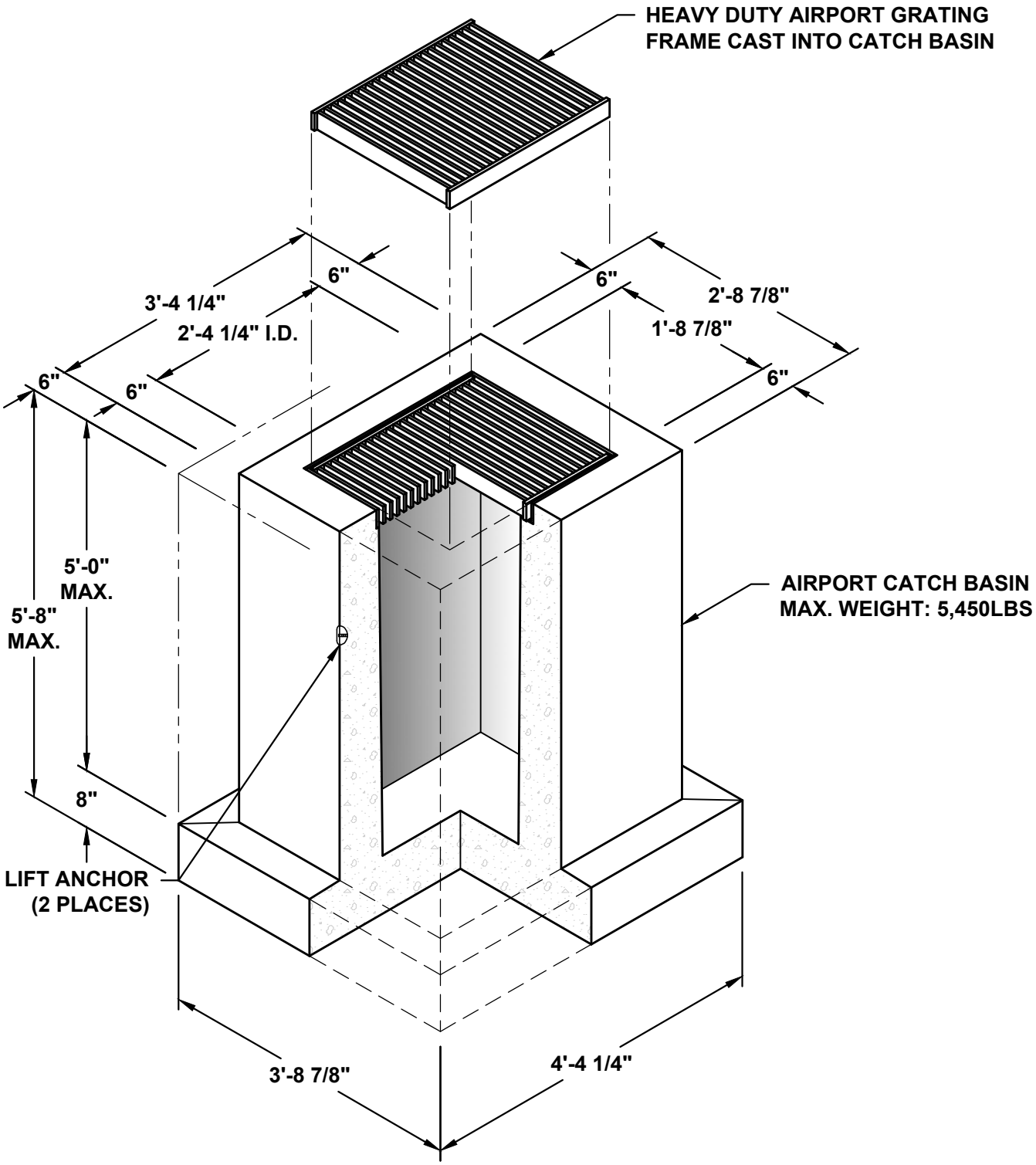
SALESMAN	DRAWN BY	DATE	SCALE
	JB	06/01/22	3/4" = 1'-0"

Type 4A - Catch Basin x 4' w/ Bottom

CUSTOMER

TITAN #	PAPER SIZE	SHEET
	11x17	1 OF 3

AIRPORT - CATCH BASIN - 100KIP



NOTES:
1. REFER TO SUBMITTAL DRAWING(S) FOR HOLE SIZES & LOCATIONS.
2. ALL DIMENSIONS SUBJECT TO ALLOWABLE TOLERANCES.

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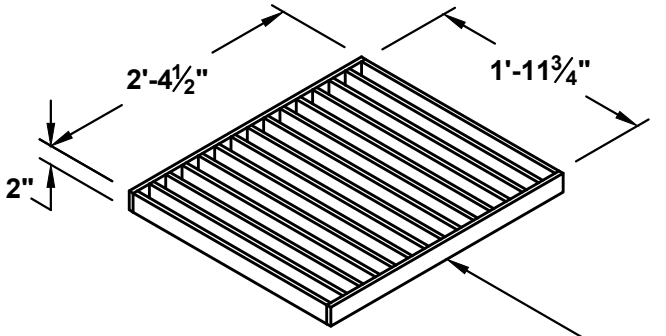
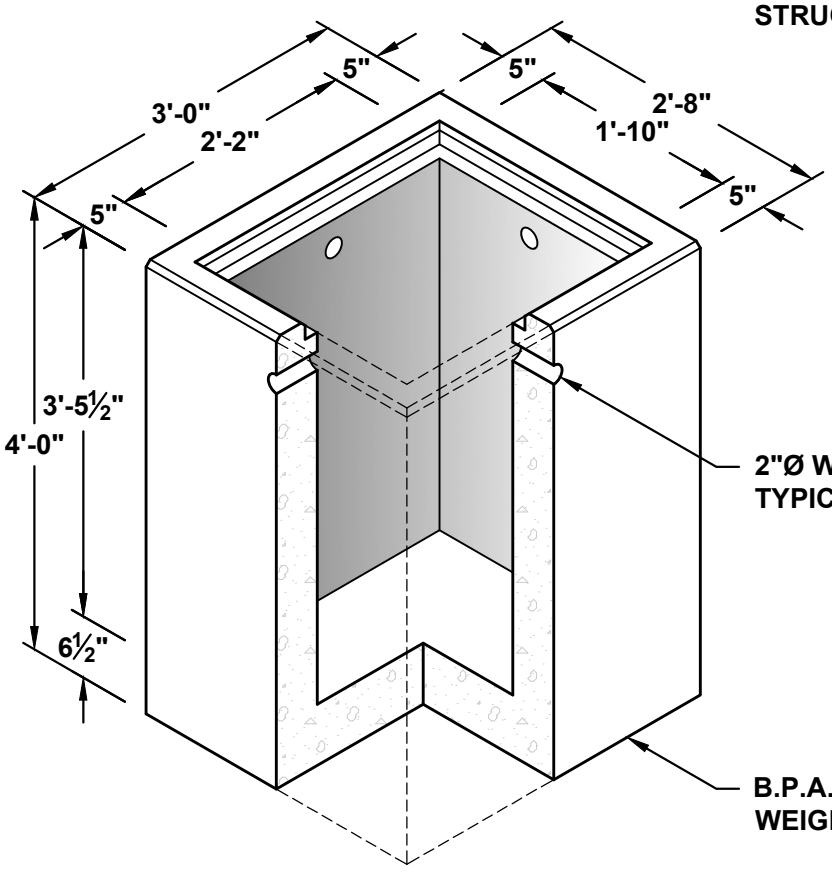
B.P.A. - CATCH BASIN



GRATE CONSTRUCTION
½" x 2" BARS @ 2" O.C.
STRUCTURAL STEEL A-36



2"Ø WEEP HOLE
TYPICAL (1) EACH WALL

B.P.A. CATCH BASIN
WEIGHT 2,765LBS

NOTES:
1. ALL DIMENSIONS SUBJECT TO ALLOWABLE TOLERANCES.

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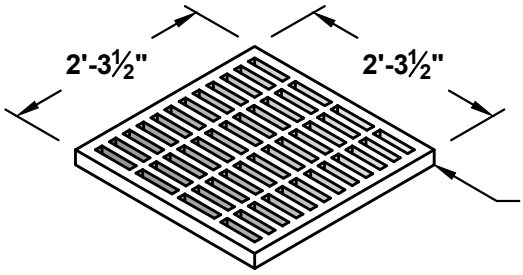
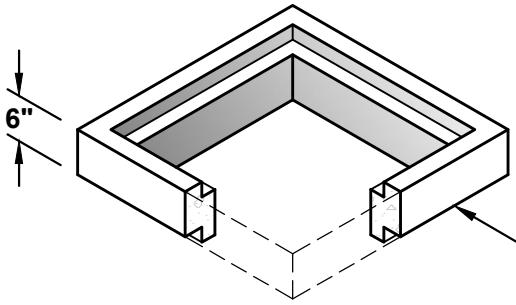
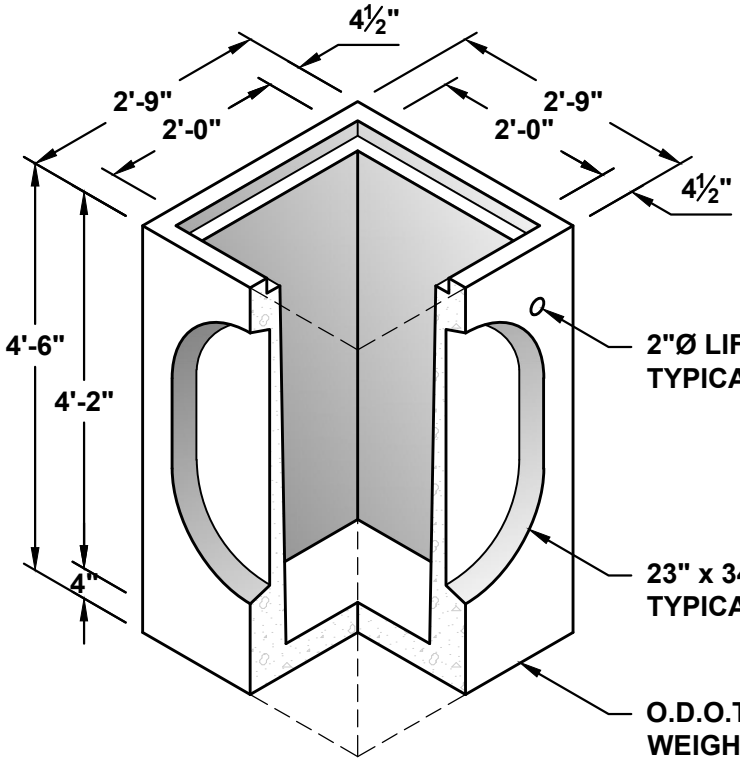
O.D.O.T. - TYPE 3 CATCH BASIN



TYPE 3 CATCH BASIN GRATE
WEIGHT 100LBS



ADJUSTMENT RISER AVAILABLE
IN: 4", 6" AND 12" HEIGHTS



2"Ø LIFTING HOLE
TYPICAL (2) PLACES

23" x 34" KNOCKOUT
TYPICAL (1) EACH WALL

O.D.O.T. TYPE 3 CATCH BASIN
WEIGHT 2,600LBS

NOTES:
1. MEETS OR EXCEEDS ODOT STANDARD DRAWING NO. RD378.
2. ALL DIMENSIONS SUBJECT TO ALLOWABLE TOLERANCES.

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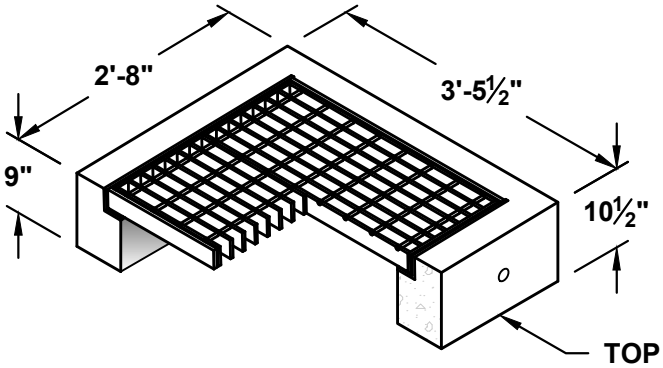
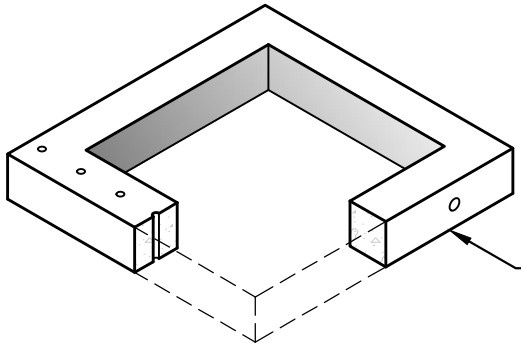
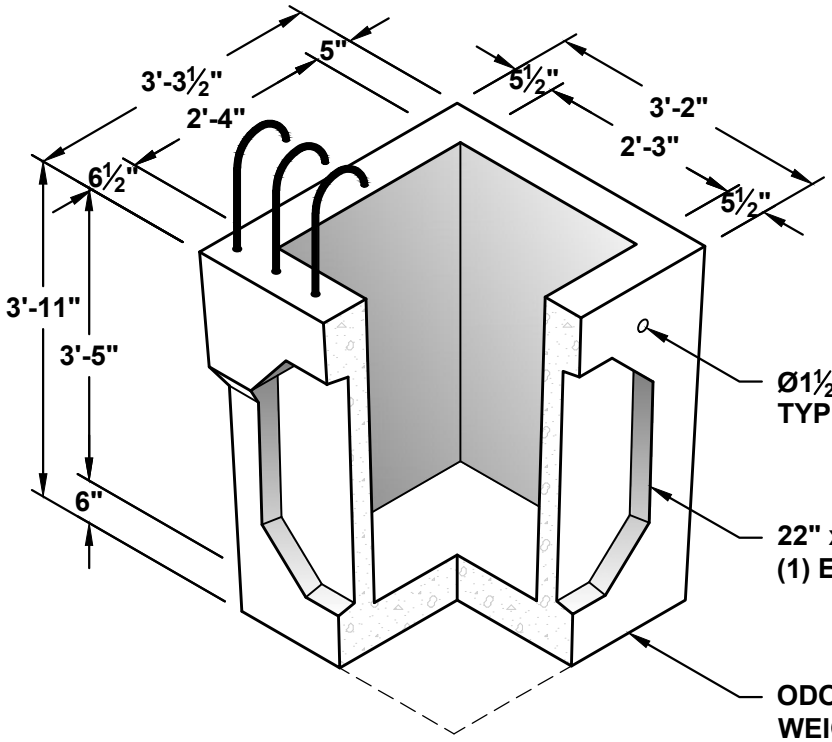
O.D.O.T. - TYPE CG2 CATCH BASIN



TOP UNIT PROVIDED WITH
O.S.H.D. TYPE 2 FRAME & GRATE
WEIGHT 550LBS



ADJUSTMENT RISER AVAILABLE
IN: 6" AND 12" HEIGHT



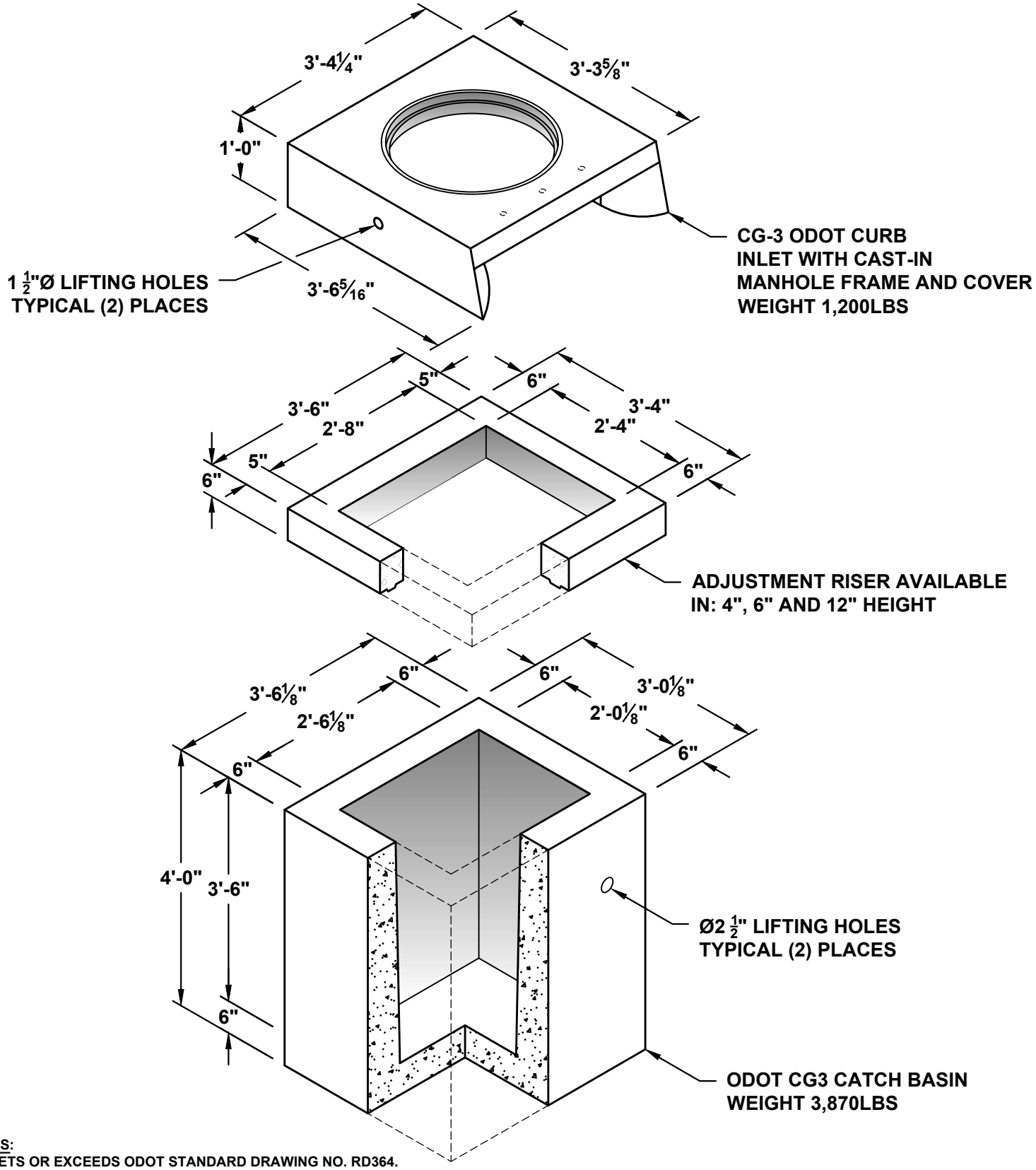
Ø1½" LIFTING HOLE
TYPICAL (2) PLACES

22" x 30" KNOCKOUT
(1) EACH WALL

ODOT CG2 CATCH BASIN
WEIGHT 2,900LBS

NOTES:
1. MEETS OR EXCEEDS ODOT STANDARD DRAWING NO. RD366.
2. ALL DIMENSIONS SUBJECT TO ALLOWABLE TOLERANCES.

O.D.O.T. - TYPE CG-3 CATCH BASIN



NOTES:
1. MEETS OR EXCEEDS ODOT STANDARD DRAWING NO. RD364.
2. ALL DIMENSIONS SUBJECT TO ALLOWABLE TOLERANCES.

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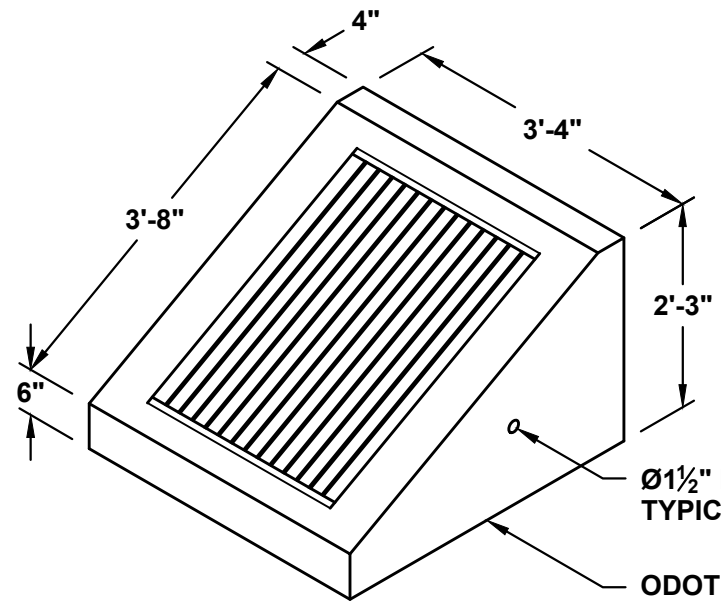
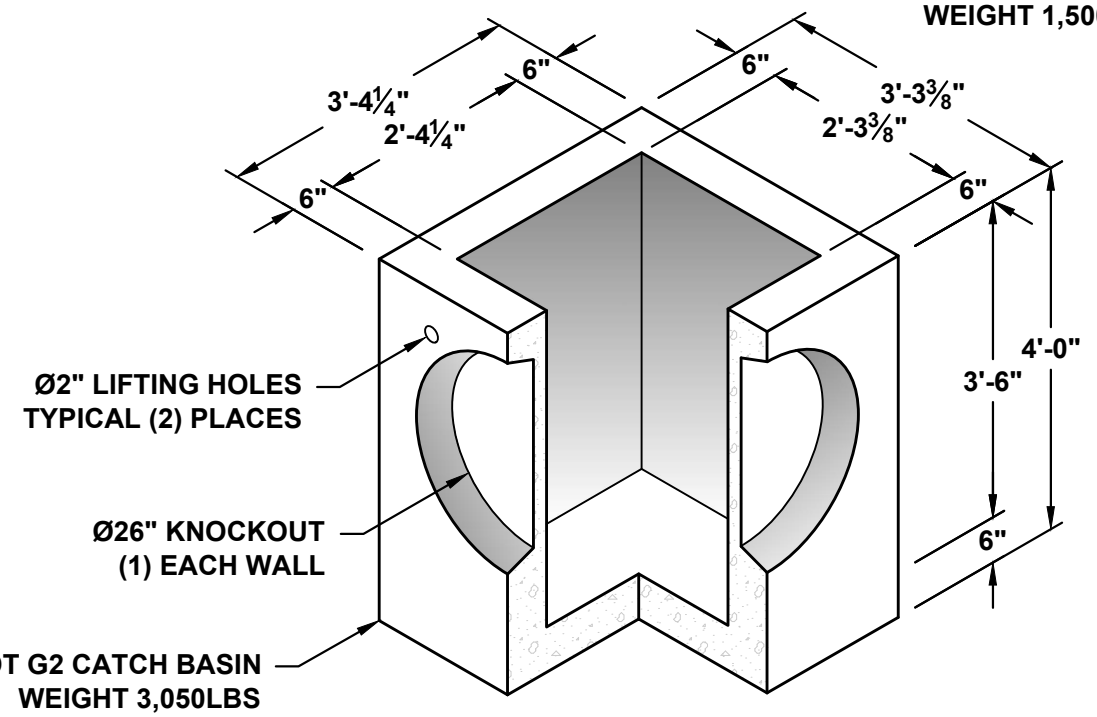
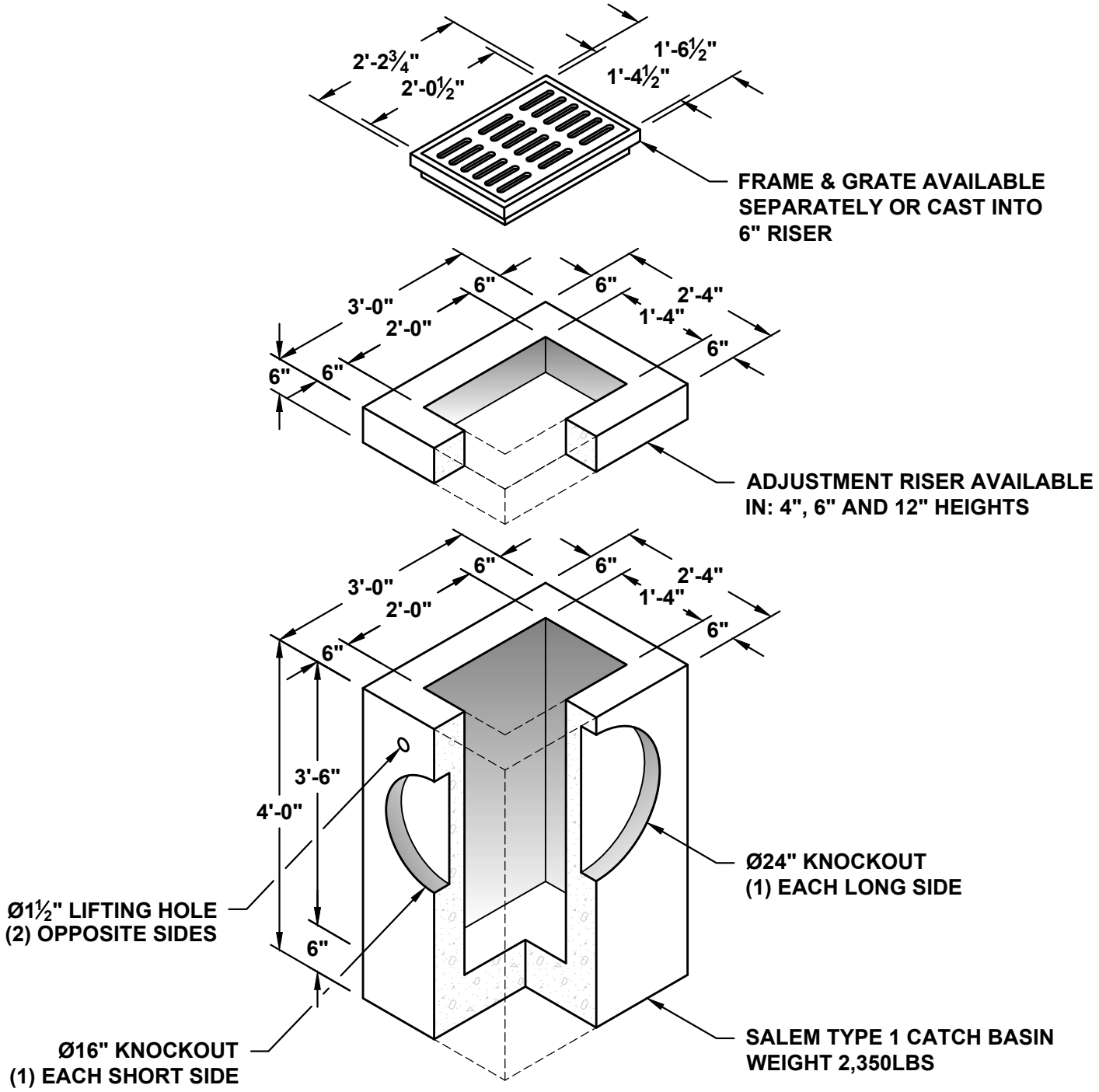
O.D.O.T. - G2 CATCH BASIN WITH DITCH INLET





NOTES:
1. MEETS OR EXCEEDS ODOT STANDARD DRAWING NO. RD370.
2. ALL DIMENSIONS SUBJECT TO ALLOWABLE TOLERANCES.

CITY OF SALEM - TYPE 1 CATCH BASIN



NOTES:
1. MEETS OR EXCEEDS CITY OF SALEM STANDARD DRAWING NO. 200.
2. ALL DIMENSIONS SUBJECT TO ALLOWABLE TOLERANCES.

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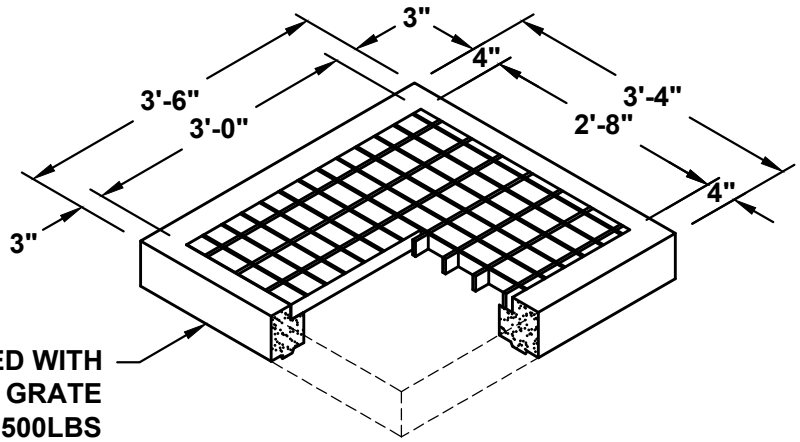
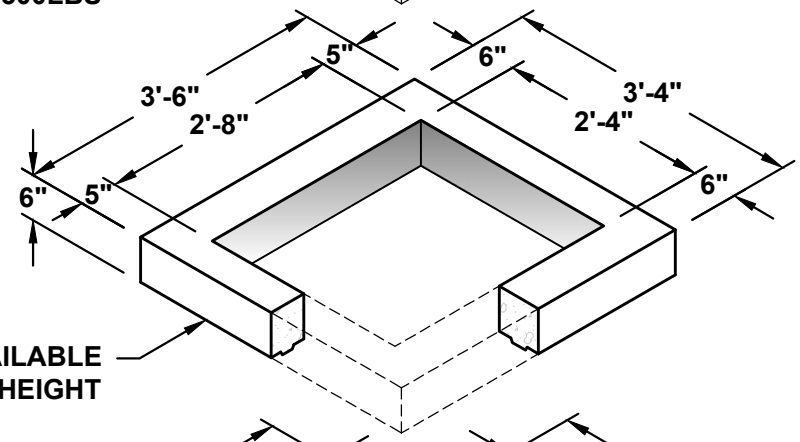
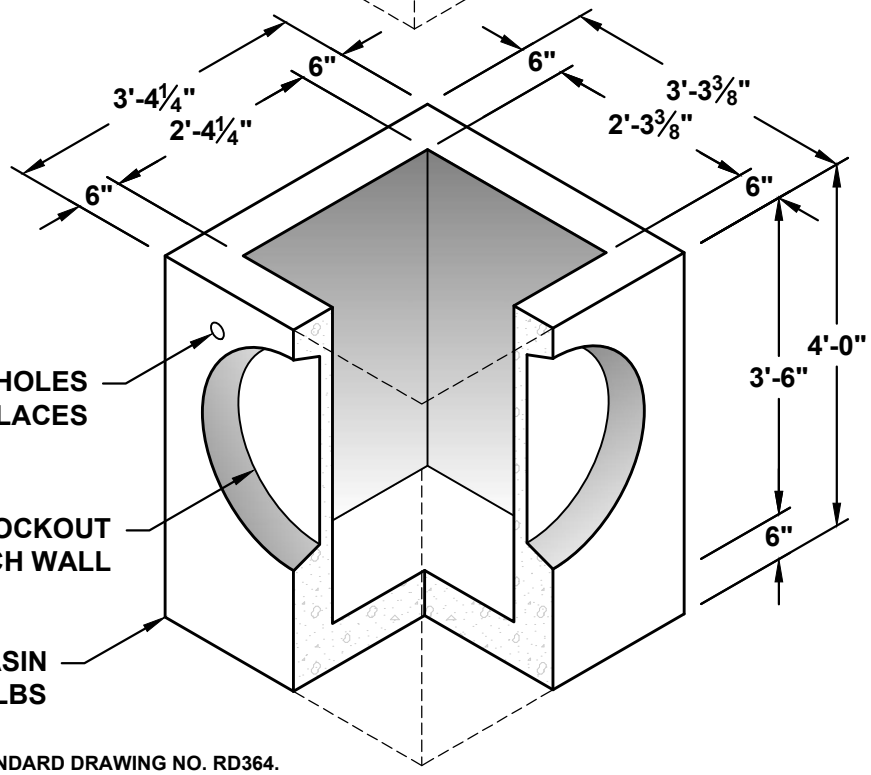
O.D.O.T. - TYPE G2 CATCH BASIN



TOP UNIT PROVIDED WITH
O.S.H.D. TYPE 2 FRAME & GRATE
WEIGHT 1,500LBS



ADJUSTMENT RISER AVAILABLE
IN: 4", 6" AND 12" HEIGHT



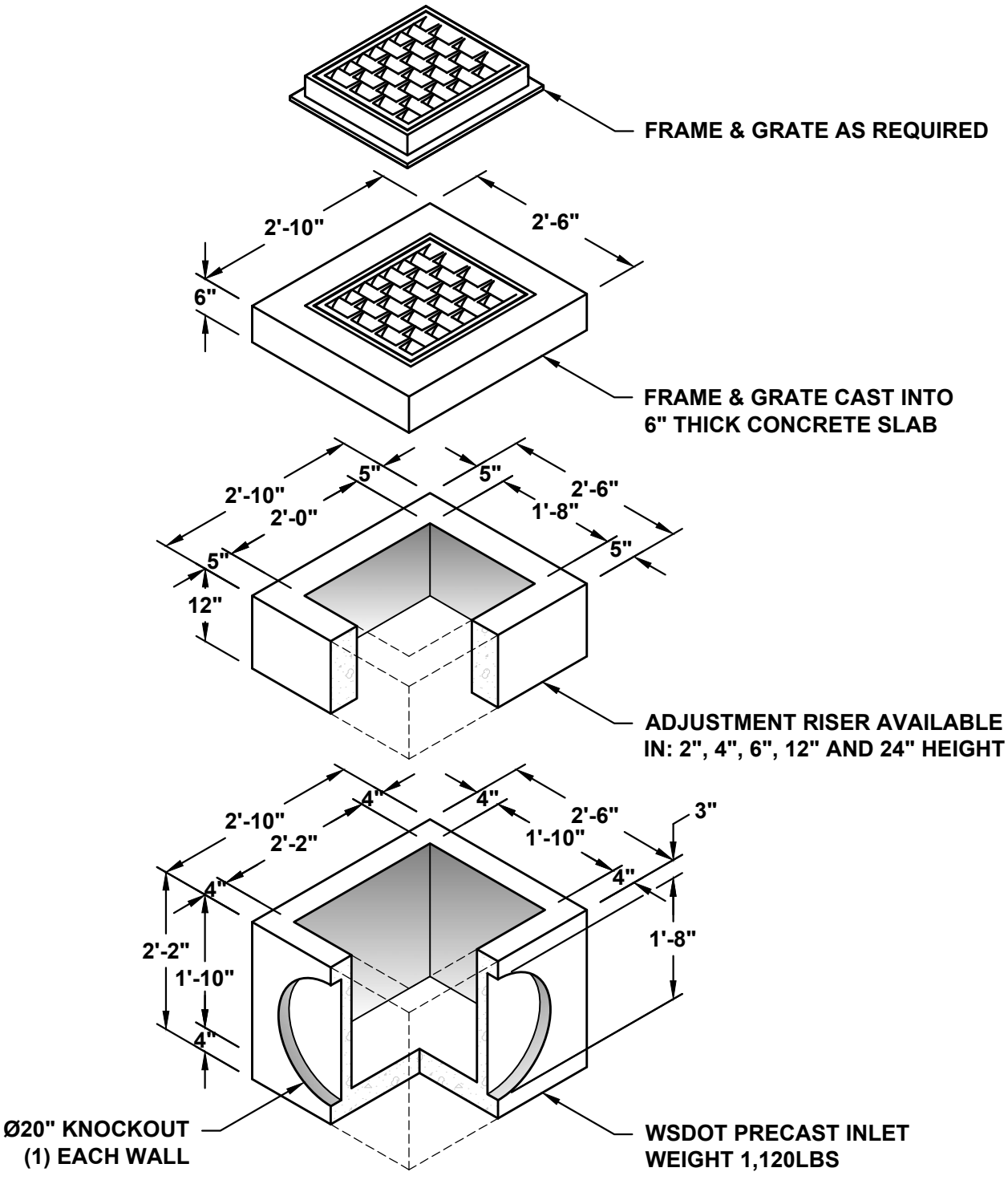
Ø2" LIFTING HOLES
TYPICAL (2) PLACES

Ø26" KNOCKOUT
(1) EACH WALL

ODOT G2 CATCH BASIN
WEIGHT 3,050LBS

NOTES:
1. MEETS OR EXCEEDS ODOT STANDARD DRAWING NO. RD364.
2. ALL DIMENSIONS SUBJECT TO ALLOWABLE TOLERANCES.

W.S.D.O.T. - TYPE 1 INLET



NOTES:
1. MEETS OR EXCEEDS WSDOT STANDARD PLAN B-5.20-02.
2. ALL DIMENSIONS SUBJECT TO ALLOWABLE TOLERANCES.

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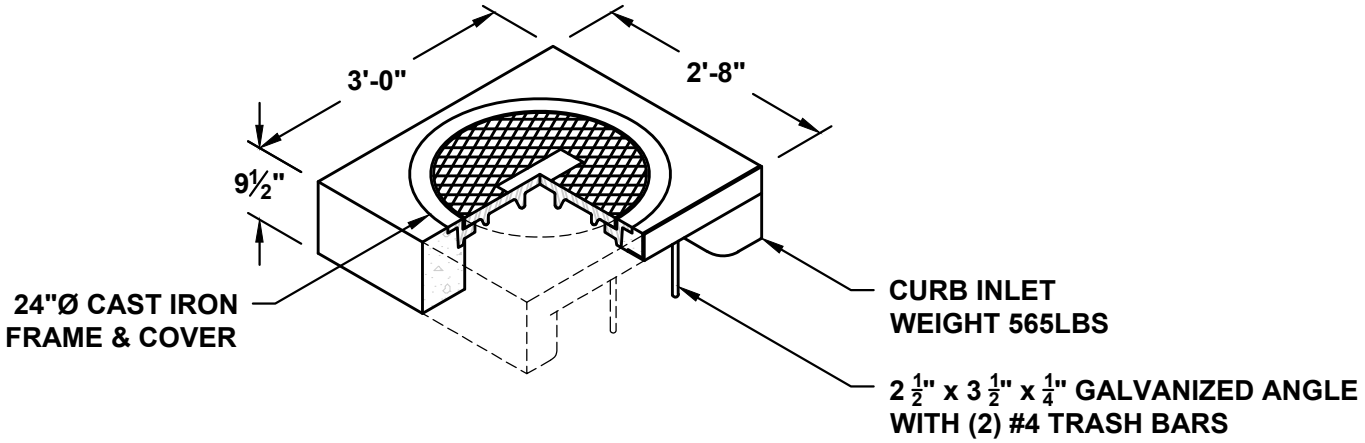
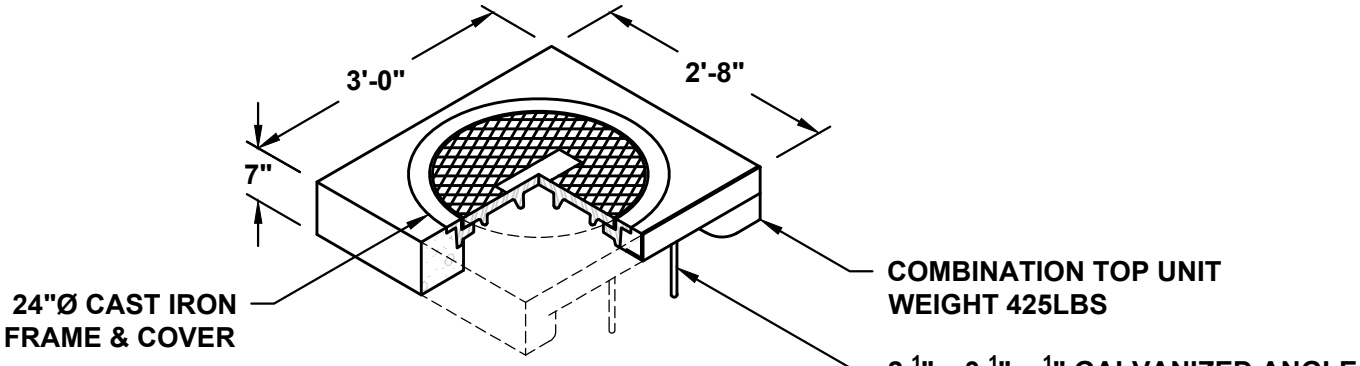
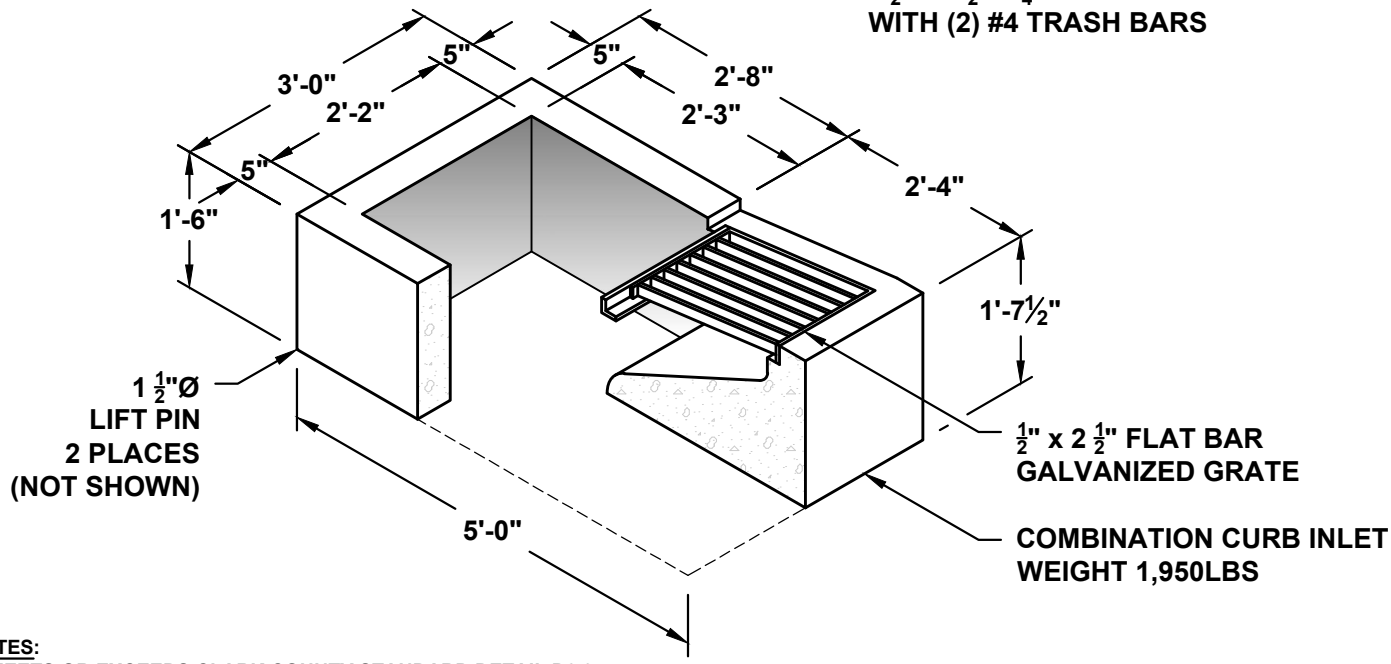
TYPE 1 CATCH BASIN - OPTIONAL CURB INLETS







NOTES:
1. MEETS OR EXCEEDS CLARK COUNTY STANDARD DETAIL D3.0.
2. ALL DIMENSIONS SUBJECT TO ALLOWABLE TOLERANCES.

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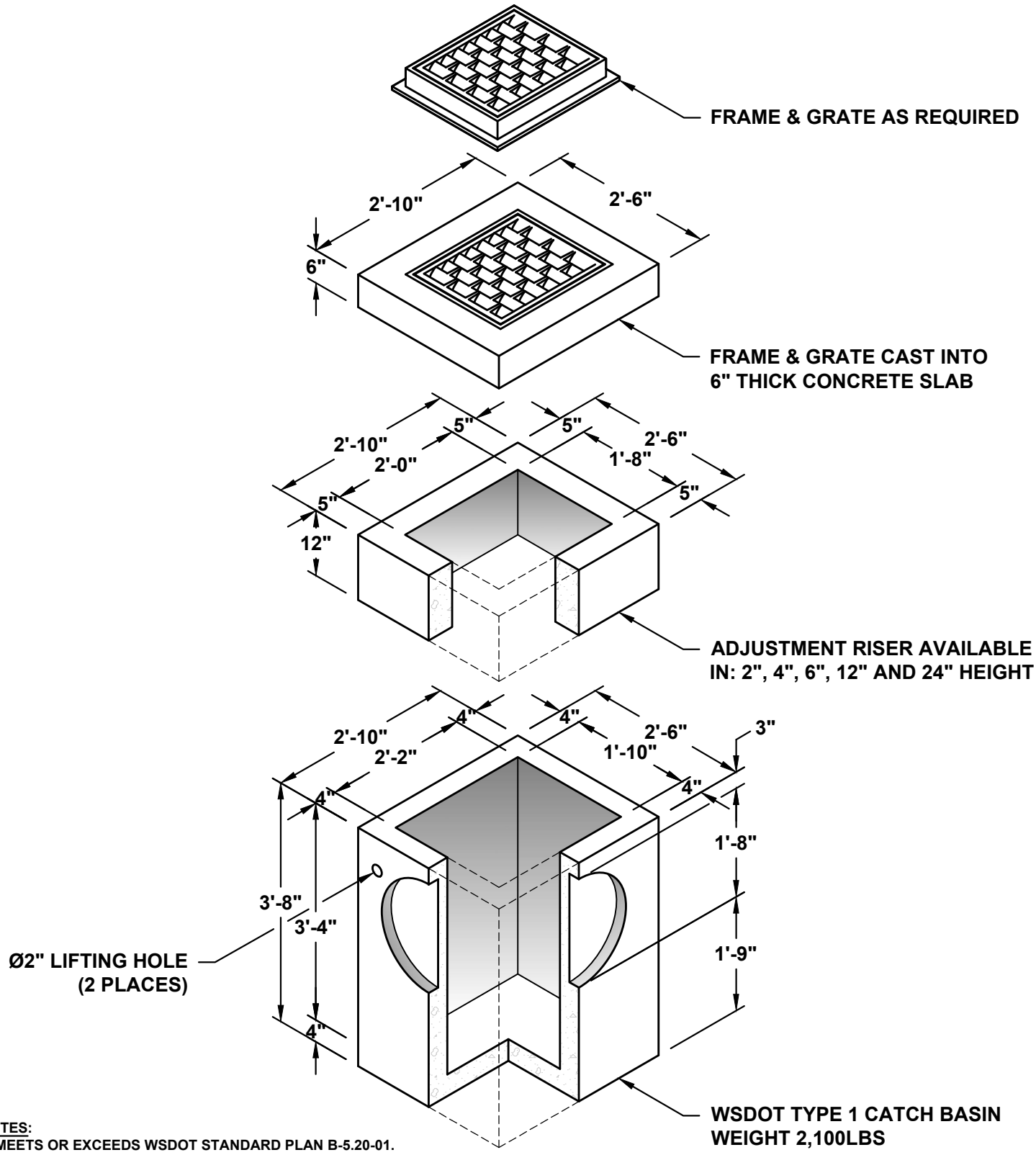
W.S.D.O.T. - TYPE 1 CATCH BASIN



NOTES:
1. MEETS OR EXCEEDS WSDOT STANDARD PLAN B-5.20-01.
2. ALL DIMENSIONS SUBJECT TO ALLOWABLE TOLERANCES.

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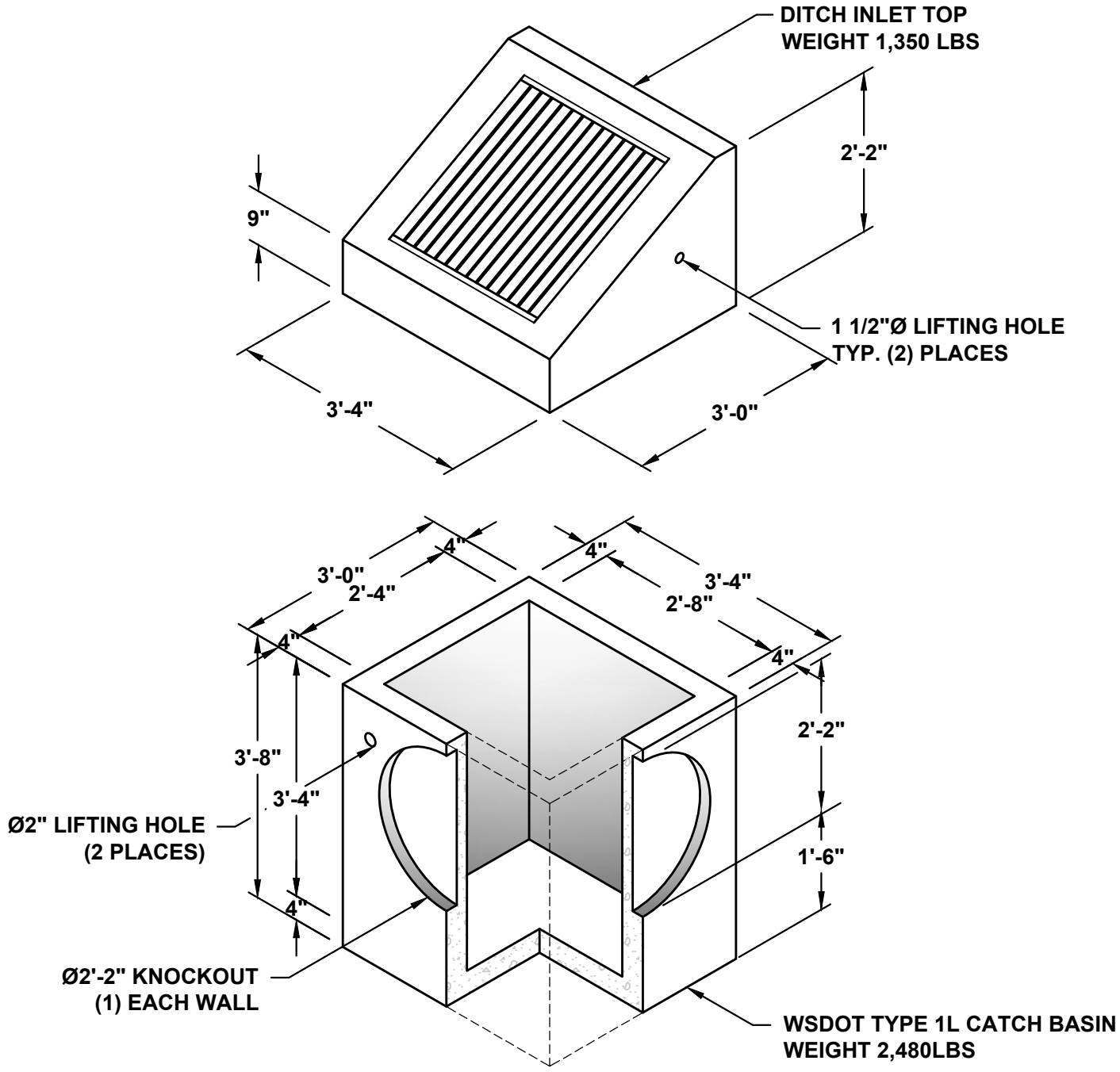
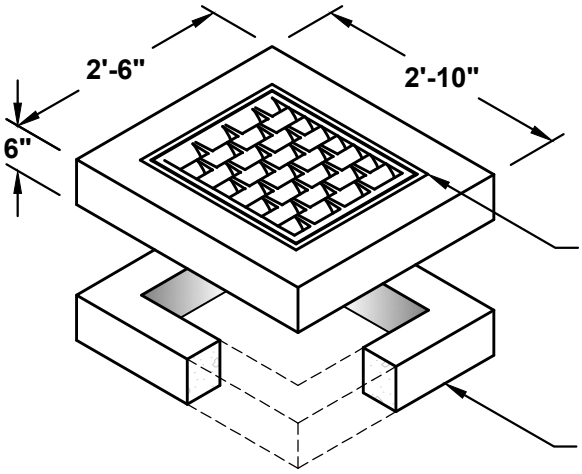
W.S.D.O.T. - TYPE 1L DITCH INLET TOP



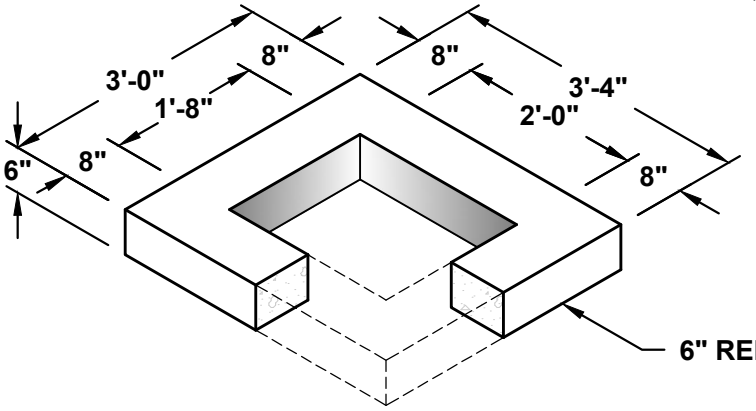
NOTES:
1. MEETS OR EXCEEDS WSDOT STANDARD PLAN B-5.40-02.
2. ALL DIMENSIONS SUBJECT TO ALLOWABLE TOLERANCES.

W.S.D.O.T. - TYPE 1L CATCH BASIN

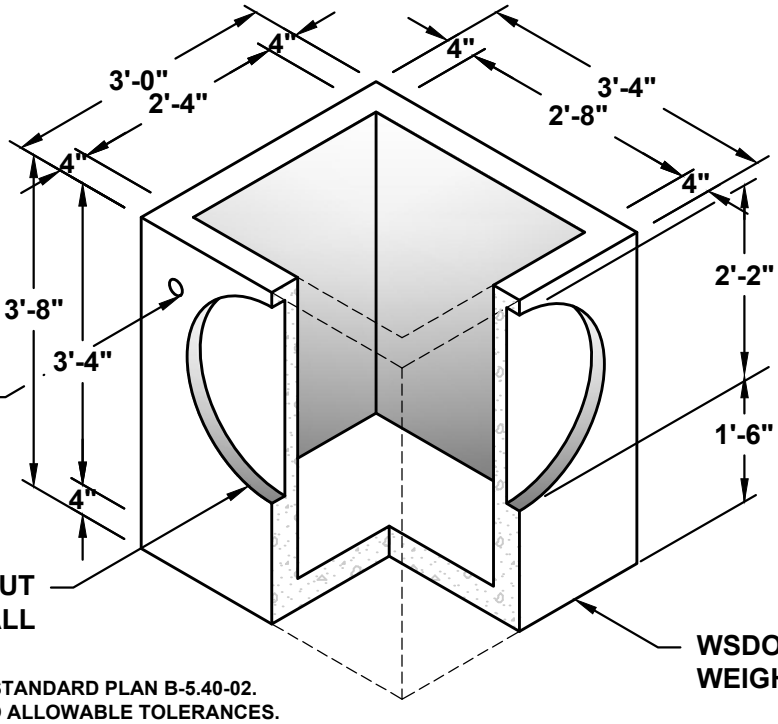


FRAME & GRATE AVAILABLE SEPARATELY OR CAST INTO 6" THICK CONCRETE SLAB

ADJUSTMENT RISERS AVAILABLE IN: 2", 4", 6", 12" AND 24" HEIGHT



6" REDUCING SLAB



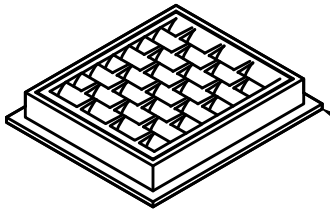
Ø2" LIFTING HOLE (2 PLACES)

Ø2'-2" KNOCKOUT (1) EACH WALL

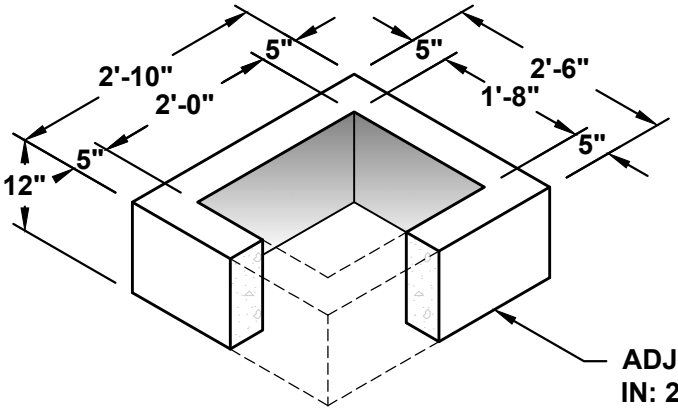
WSDOT TYPE 1L CATCH BASIN WEIGHT 2,480LBS

NOTES:
1. MEETS OR EXCEEDS WSDOT STANDARD PLAN B-5.40-02.
2. ALL DIMENSIONS SUBJECT TO ALLOWABLE TOLERANCES.

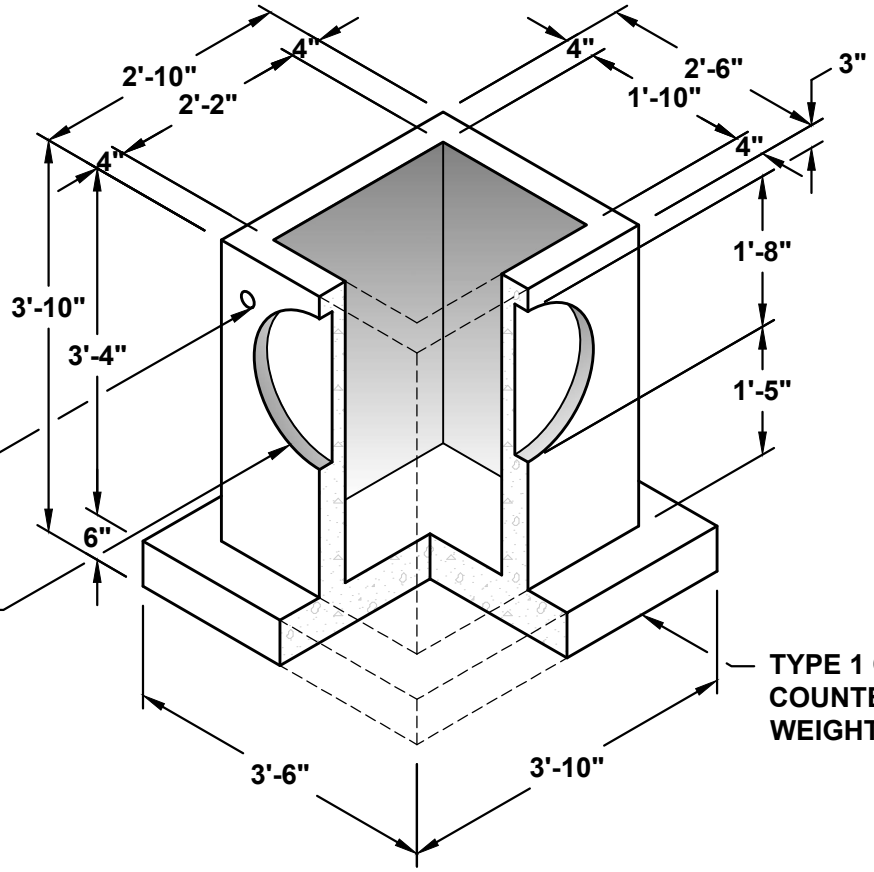
Type 1 Catch Basin with Counter Buoyancy Base



FRAME & GRATE AS REQUIRED



ADJUSTMENT RISER AVAILABLE
IN: 2", 4", 6", 12" AND 24" HEIGHT



Ø2" LIFTING HOLE
(2 PLACES)

Ø20" KNOCKOUT
(1) EACH WALL

TYPE 1 CATCH BASIN WITH
COUNTER BUOYANCY BASE
WEIGHT 2,615LBS

NOTES:
1. MEETS OR EXCEEDS WSDOT STANDARD PLAN B-5.20-02.
2. ALL DIMENSIONS SUBJECT TO ALLOWABLE TOLERANCES.

RVP Rogue Valley Precast

Manholes
Dry Wells
Wet Wells

MANHOLE NOTES

GENERAL NOTES:

1. The following notes shall apply unless noted otherwise on the plans or specifications. In the case of conflict with the plans or specifications, the more restrictive requirements shall apply.

REFERENCE SPECIFICATIONS:

1. Design Criteria: AASHTO Manhole Design Specifications
2. Manufacture: ASTM C478

MATERIALS:

1. Aggregate conforms to ASTM C33.
2. Portland cement conforms to ASTM C150.
3. Fly Ash conforms to ASTM C618.
4. All bar reinforcing steel conforms to ASTM A615 Grade 60.
5. Welded Wire Fabric conforms to ASTM A1064, 65 KSI.
6. Admixtures conform to ASTM C494.
7. Concrete minimum compressive strength (at 28 days) 4000 PSI, unless greater strength is required.

DELIVERY AND INSTALLATION:

1. The contractor provides rigging and off loading at the job site.
2. The contractor provides all weld plates and accessories which are not cast directly into the concrete.
3. Follow any installation procedures described in the project documents. More restrictive requirements outlined in the project documents or a corresponding geotechincal report take precedence. Refer to ASTM C1821 for installation methods.
4. The subgrade preparation and backfill sections of these notes provide basic installation criteria.

SUBGRADE PREPARATION:

1. All loose and disturbed soil shall be removed prior to placing manhole sections.
2. The manhole sections should be underlain by at least 4 inches of compacted gravel over compacted structural fill or undisturbed native soils.

MANHOLE JOINTS:

1. Joints using a mastic sealant use a material in compliance with ASTM C990.
2. Rubber gasketed joints conform to ASTM C443.

BACKFILL:

1. Backfill should consist of well graded soil free of organics and deleterious material.
2. Backfill should be placed in 12 inch lifts and compacted to a minimum of 90% modified proctor density.

MANHOLE HOLE SIZE DATA

MANHOLE - STANDARD HOLE SIZE DATA

ADS N-12 CORRUGATED POLYETHYLENE DRAINAGE PIPE					P.V.C. (SDR-35) SEWER PIPE				
NOMINAL SIZE (in.)	HOLE SIZE (in.)	BOOT NPC, Inc. MODEL #:	WALL THICKNESS (in.)	OUTSIDE DIAMETER (in.)	NOMINAL SIZE (in.)	HOLE SIZE (in.)	BOOT NPC, Inc. MODEL #:	WALL THICKNESS (in.)	OUTSIDE DIAMETER (in.)
4"	7"	–	0.020"	4.78"	4"	7"	S106-7S	0.120"	4.215"
6"	12"	–	0.020"	6.92"	6"	12"	S106-12B	0.180"	6.275"
8"	12"	–	0.025"	9.11"	8"	12"	S106-12A	0.240"	8.400"
10"	16"	–	0.025"	11.36"	10"	16"	S106-16B	0.300"	10.50"
12"	18"	–	0.035"	14.45"	12"	16"	S106-16A	0.360"	12.50"
15"	20"	–	0.035"	17.57"	15"	20"	S106-20B	0.437"	15.30"
18"	24"	–	0.050"	21.20"	18"	24"	S206-24A	0.536"	18.70"
21"	26"	–	0.050"	24.70"	21"	26"	S206-26	0.532"	22.05"
24"	32"	–	0.050"	27.80"	24"	28"	S206-28	0.711"	24.80"
30"	42"	–	0.050"	36.07"	27"	32"	S206-32	–	27.95"
36"	48"	–	0.050"	42.46"	30"	36"	S206-36	–	32.00"
42"	54"	–	0.050"	46.75"	36"	42"	S206-42	–	38.30"
48"	60"	–	0.050"	52.70"	–	–	–	–	–

MANHOLE - STANDARD HOLE SIZE DATA (cont'd.)

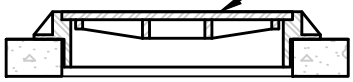
DUCTILE IRON PIPE (C-900 PVC, CMP, SDR 21 PVC)					REINFORCED CONCRETE PIPE				
NOMINAL SIZE (in.)	HOLE SIZE (in.)	BOOT NPC, Inc. MODEL #:	WALL THICKNESS (in.)	OUTSIDE DIAMETER (in.)	NOMINAL SIZE (in.)	HOLE SIZE (in.)	BOOT NPC, Inc. MODEL #:	WALL THICKNESS (in.)	OUTSIDE DIAMETER (in.)
4"	7"	S106-7S	0.260"	4.800"	6"	12"	S106-12A	1.00"	8.00"
6"	12"	S106-12B	0.280"	6.900"	8"	12"/14"	S106-14	1.25"	10.5"
8"	12"	S106-12	0.300"	9.050"	10"	16"	S106-16A	1.25"	12.5"
10"	16"	S106-16B	0.320"	11.10"	12"	20"	S106-20WP	2.50"	17.0"
12"	16"	S106-16	0.340"	13.20"	15"	24"	S206-24	2.50"	20.0"
14"	20"	S106-20B	0.360"	15.30"	18"	26"/28"	S206-26	2.50"	23.0"
16"	20"	S106-20A	0.340"	17.40"	21"	32"	S206-30	2.75"	26.5"
18"	24"	S206-24A	0.350"	19.50"	24"	36"	S206-34L	3.00"	30.0"
20"	24"	S206-24L	0.360"	21.60"	27"	38"	S206-38L	3.25"	33.5"
24"	28"	S206-28L	0.380"	25.80"	30"	42"	S206-42	3.50"	37.0"
30"	36"	S206-36	0.390"	32.00"	36"	48"	S206-48	4.00"	44.0"
36"	42"	S206-42	0.430"	38.30"	42"	54"/56"	S206-54L	4.50"	51.0"
42"	48"	S206-48	–	44.50"	48"	64"	–	5.00"	58.0"
48"	54"	S206-54L	–	50.80"	54"	72"	–	5.50"	65.0"
54"	60"	S206-60	–	57.56"	60"	78"	–	6.00"	72.0"
–	–	–	–	–	72"	92"	–	7.00"	86.0"

MANHOLE HOLE SIZE DATA

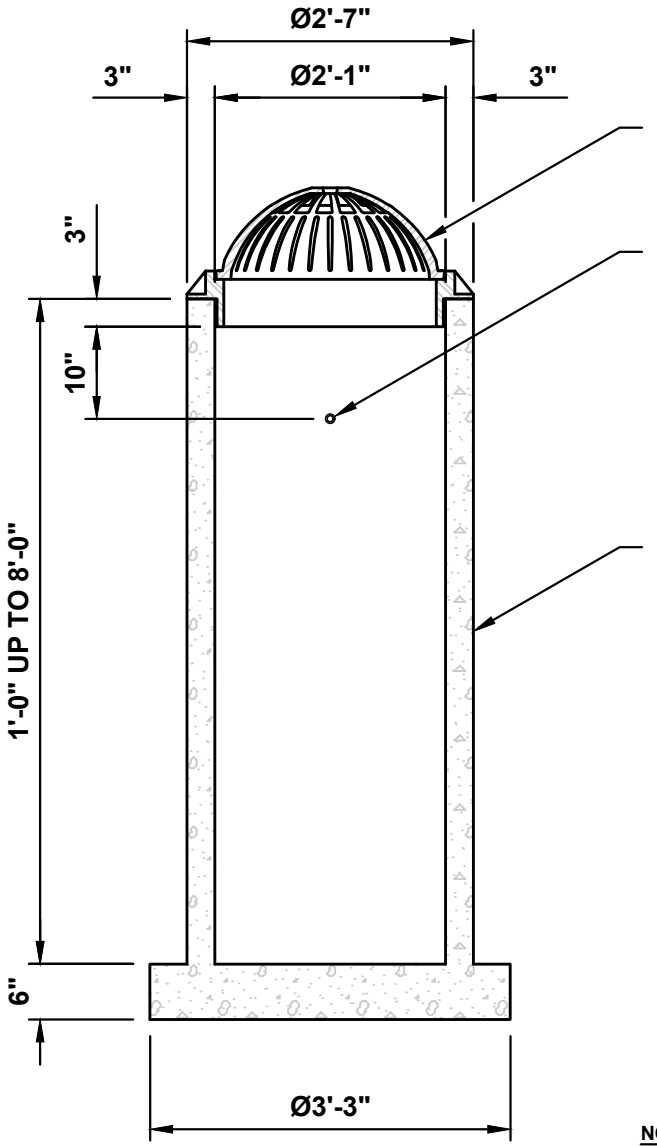
MANHOLE - MAXIMUM HOLE SIZE DATA

I.D.	Wall Thickness	O.D.	Max Hole Size	Min. Dist Between Holes	Max Hole Size @ 90°	Inches/Deg. I.D.	Inches/Deg. O.D.
48"	5"	58"	36"	8"	28"	0.419"	0.506"
60"	6"	72"	48"	8"	36"	0.524"	0.628"
72"	7"	86"	60"	12"	42"	0.628"	0.750"
84"	8"	100"	72"	12"	50"	0.733"	0.873"
96"	9"	114"	84"	12"	58"	0.838"	0.995"
120"	11"	142"	108"	12"	76"	1.047"	1.239"
144"	13"	170"	132"	12"	92"	1.257"	1.484"

Ø24" MANHOLE - MONO BASE



CAST IRON FRAMES AND COVERS ARE AVAILABLE IN SUBURBAN 3" HEIGHT AND STANDARD 7" HEIGHT (SUBURBAN 3" HEIGHT SHOWN)



OPTIONAL "BEEHIVE" GRATE WITH LOCKING CABLE TIE-DOWN AVAILABLE

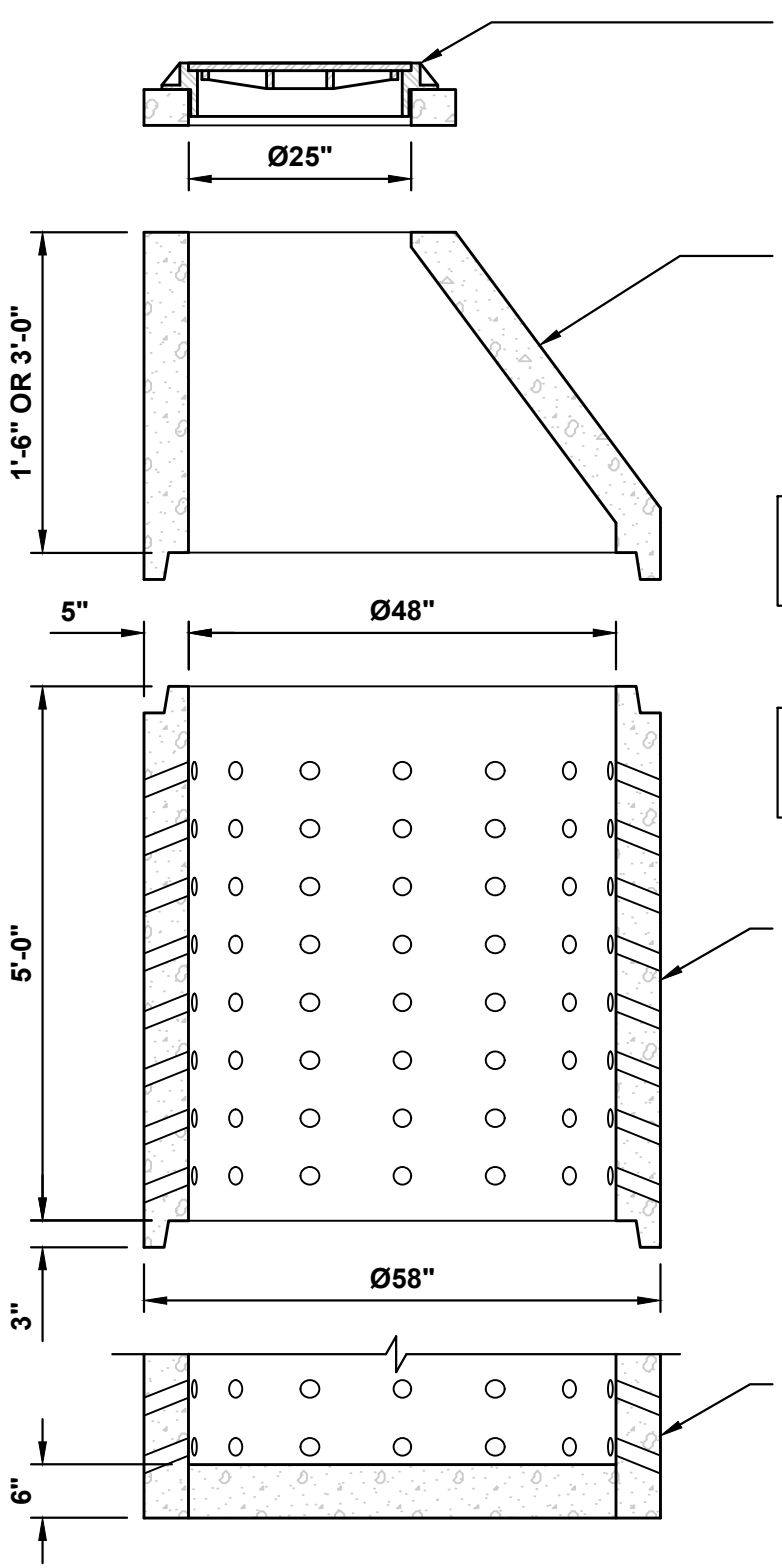
Ø$\frac{5}{8}$" NC FERRULE LOOP INSERT PROVIDED TO SECURE GRATE WITH CABLE TIE-DOWN (CONTRACTOR TO PROVIDE AND INSTALL CABLE)

Ø24" MANHOLE MONO BASE
(HOLES CORED TO ORDER)
1'-0" (915LBS)
2'-0" (1,195LBS)
3'-0" (1,475LBS)
4'-0" (1,760LBS)
5'-0" (2,040LBS)
6'-0" (2,320LBS)
7'-0" (2,600LBS)
8'-0" (2,880LBS)

SECTION VIEW

NOTES:
1. MANHOLE ASSEMBLY CONFORMS TO ASTM-C478.
2. HOLES CORED TO ORDER.
3. WEIGHTS LISTED ARE APPROXIMATE.
4. GRADE RINGS AVAILABLE AS NEEDED.

Ø48" DRYWELL - WITH ECCENTRIC CONE



CAST IRON FRAMES AND COVERS ARE AVAILABLE IN SUBURBAN 3" HEIGHT AND STANDARD 7" HEIGHT (SUBURBAN 3" HEIGHT SHOWN)

3'-0" ECCENTRIC CONE
WEIGHT 2,565LBS

1'-6" ECCENTRIC CONE
WEIGHT 1,300LBS

CITY OF PORTLAND DRYWELL IS MANUFACTURED WITH PERFORATIONS ANGLED UPWARD OUTSIDE

CLARK COUNTY DRYWELL IS MANUFACTURED WITH (4) 6"Ø DRAINAGE HOLES IN THE BASE SLAB

5'-0" DRYWELL SECTION
PERFORATED WITH (14) COLUMNS OF 2 $\frac{3}{8}$"Ø HOLES, (8) HOLES IN EACH COLUMN (112 TOTAL) WEIGHT 4,205LBS

5'-0" DRYWELL BASE
WEIGHT 5,270LBS

NOTES:
1. MANHOLE ASSEMBLY CONFORMS TO ASTM-C478.
2. HOLES CORED TO ORDER.
3. WEIGHTS LISTED ARE APPROXIMATE.
4. GRADE RINGS AVAILABLE AS NEEDED.

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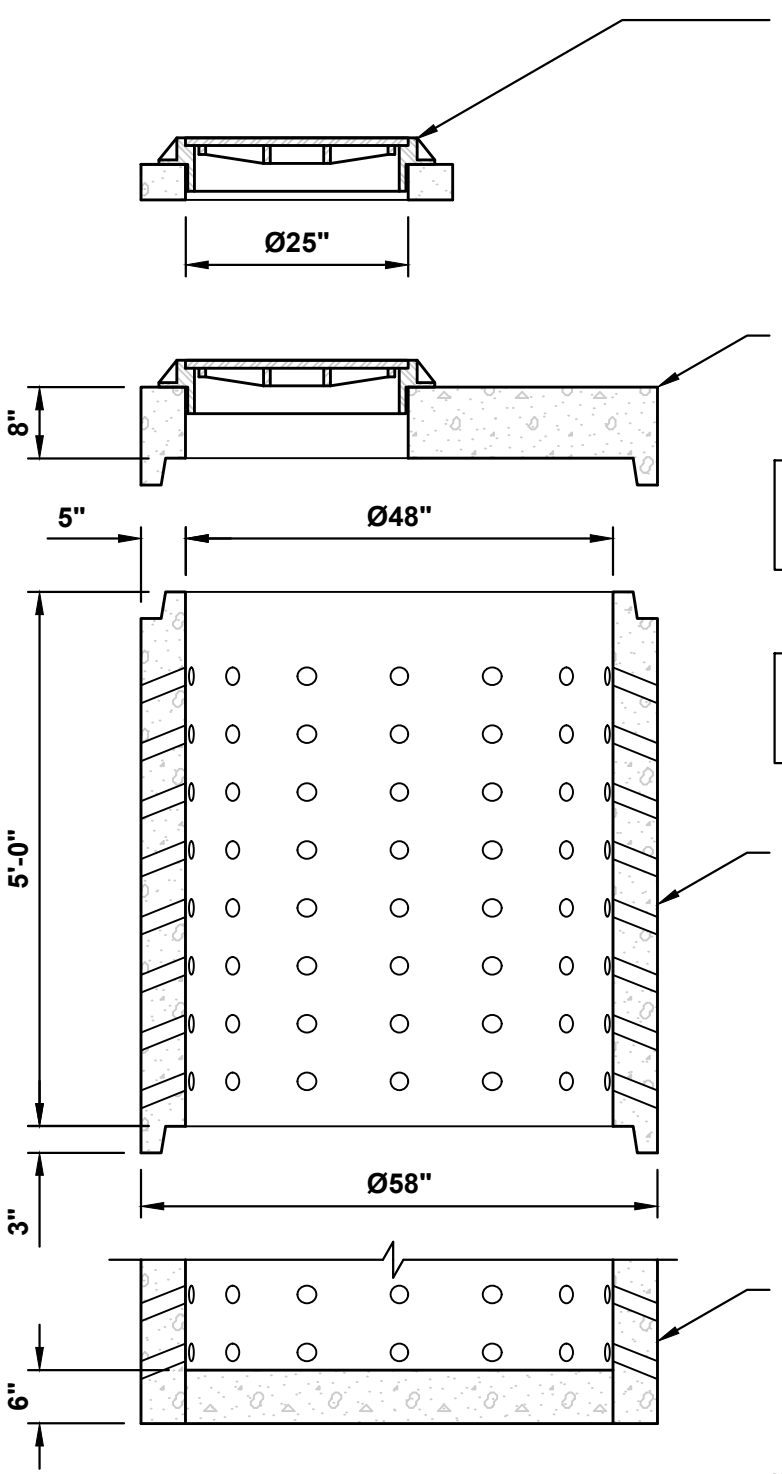
Ø48" DRYWELL - WITH FLAT TOP



CAST IRON FRAMES AND COVERS ARE AVAILABLE IN SUBURBAN 3" HEIGHT AND STANDARD 7" HEIGHT (SUBURBAN 3" HEIGHT SHOWN)

48"x25" FLAT TOP
WEIGHT 1,640LBS

CITY OF PORTLAND DRYWELL IS MANUFACTURED WITH PERFORATIONS ANGLED UPWARD OUTSIDE

CLARK COUNTY DRYWELL IS MANUFACTURED WITH (4) 6"Ø DRAINAGE HOLES IN THE BASE SLAB

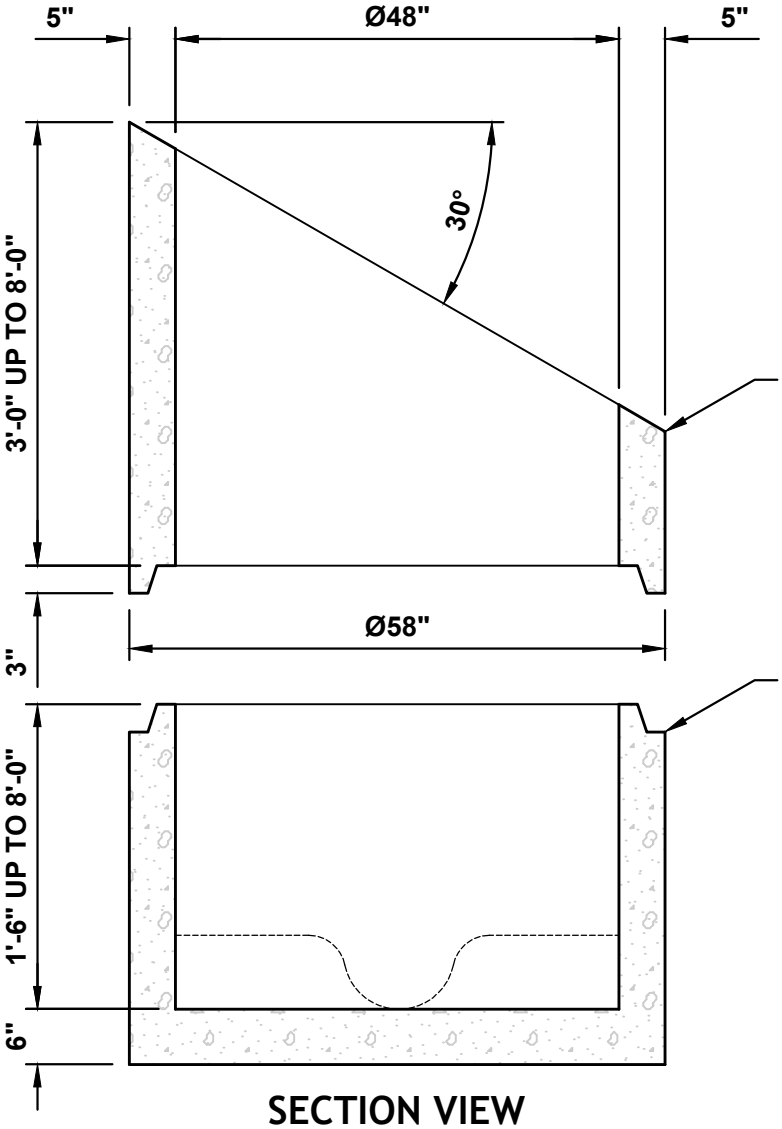
5'-0" DRYWELL SECTION
PERFORATED WITH (14) COLUMNS OF 2 3/8"Ø HOLES, (8) HOLES IN EACH COLUMN (112 TOTAL) WEIGHT 4,205LBS

5'-0" DRYWELL BASE
WEIGHT 5,270LBS

SECTION VIEW

NOTES:
1. MANHOLE ASSEMBLY CONFORMS TO ASTM-C478.
2. ALL MANHOLE JOINTS SEALED WITH MASTIC OR RUBBER GASKET.
3. WEIGHTS LISTED ARE APPROXIMATE.
4. GRADE RINGS AVAILABLE AS NEEDED.

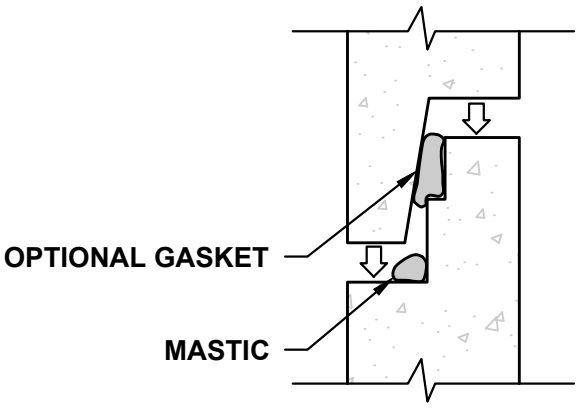
Ø48" MANHOLE - WITH 30° SLOPE



SECTION VIEW

Ø48" SLOPED SECTION
3'-0" (1,535LBS)
4'-0" (2,420LBS)
5'-0" (3,305LBS)
6'-0" (4,190LBS)

Ø48" MANHOLE MONO BASE
(PRECHANNEL OPTIONAL)
1'-6" (2,765LBS)
2'-0" (3,205LBS)
3'-0" (4,090LBS)
4'-0" (4,935LBS)
5'-0" (5,710LBS)
6'-0" (6,595LBS)
7'-0" (7,480LBS)
8'-0" (8,365LBS)



JOINT DETAIL

STANDARD JOINT SEALANT IS MASTIC.
RUBBER GASKET IS OPTIONAL.

NOTES:
1. MANHOLE ASSEMBLY CONFORMS TO ASTM-C478.
2. ALL MANHOLE JOINTS SEALED WITH MASTIC OR RUBBER GASKET.
3. WEIGHTS LISTED ARE APPROXIMATE.

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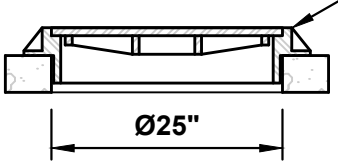
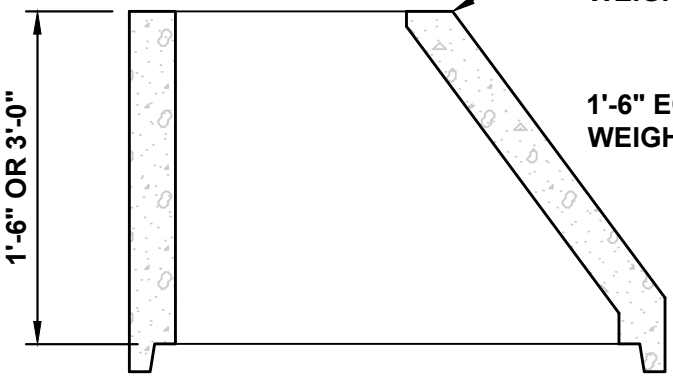
Ø48 MANHOLE - WITH ECCENTRIC CONE



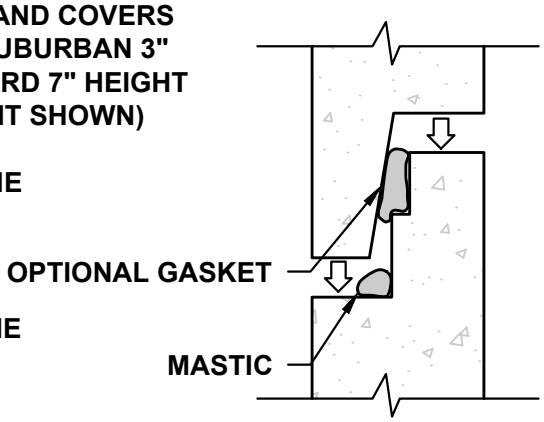
CAST IRON FRAMES AND COVERS ARE AVAILABLE IN SUBURBAN 3" HEIGHT AND STANDARD 7" HEIGHT (SUBURBAN 3" HEIGHT SHOWN)

Ø25"



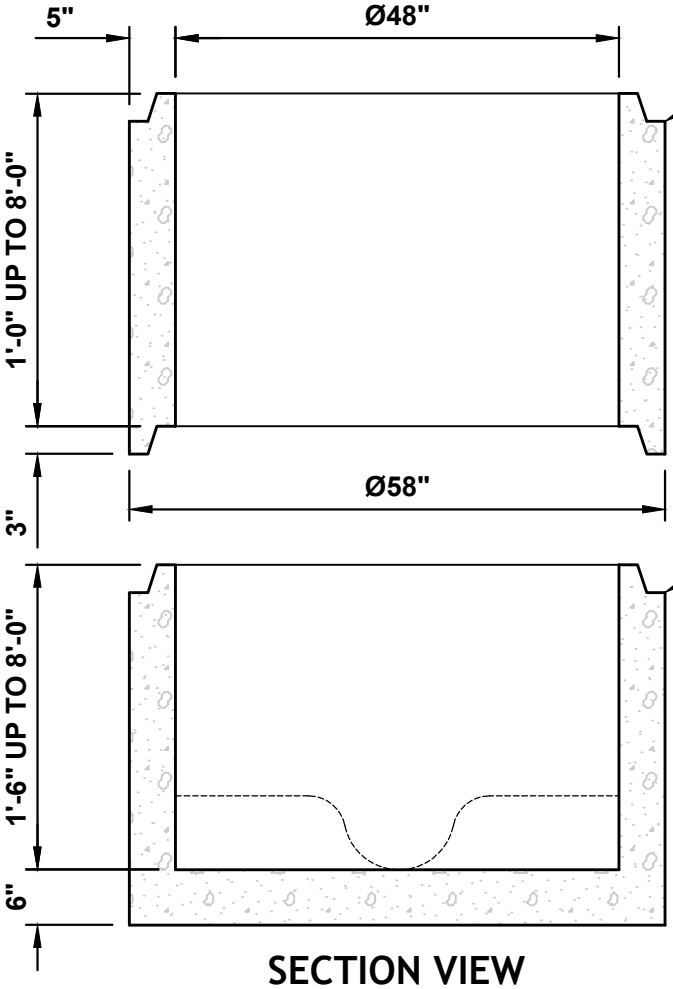
3'-0" ECCENTRIC CONE
WEIGHT 2,565LBS

1'-6" ECCENTRIC CONE
WEIGHT 1,300LBS



JOINT DETAIL

STANDARD JOINT SEALANT IS MASTIC.
RUBBER GASKET IS OPTIONAL.



Ø48" MANHOLE SECTION
1'-0" (885LBS)
2'-0" (1,770LBS)
3'-0" (2,655LBS)
4'-0" (3,540LBS)
5'-0" (4,425LBS)
6'-0" (5,310LBS)
7'-0" (6,195LBS)
8'-0" (7,080LBS)

Ø48" MANHOLE MONO BASE
(PRECHANNEL OPTIONAL)
1'-6" (2,765LBS)
2'-0" (3,205LBS)
3'-0" (4,090LBS)
4'-0" (4,935LBS)
5'-0" (5,710LBS)
6'-0" (6,595LBS)
7'-0" (7,480LBS)
8'-0" (8,365LBS)

SECTION VIEW

NOTES:
1. MANHOLE ASSEMBLY CONFORMS TO ASTM-C478.
2. ALL MANHOLE JOINTS SEALED WITH MASTIC OR RUBBER GASKET.
3. WEIGHTS LISTED ARE APPROXIMATE.
4. GRADE RINGS AVAILABLE AS NEEDED.

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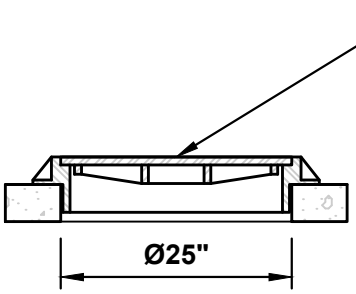
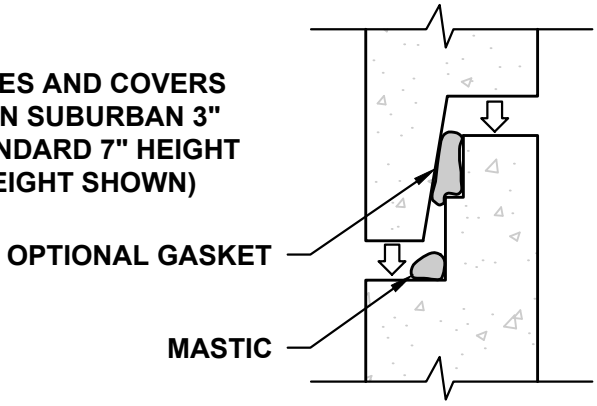
Ø48" MANHOLE - WITH FLAT TOP

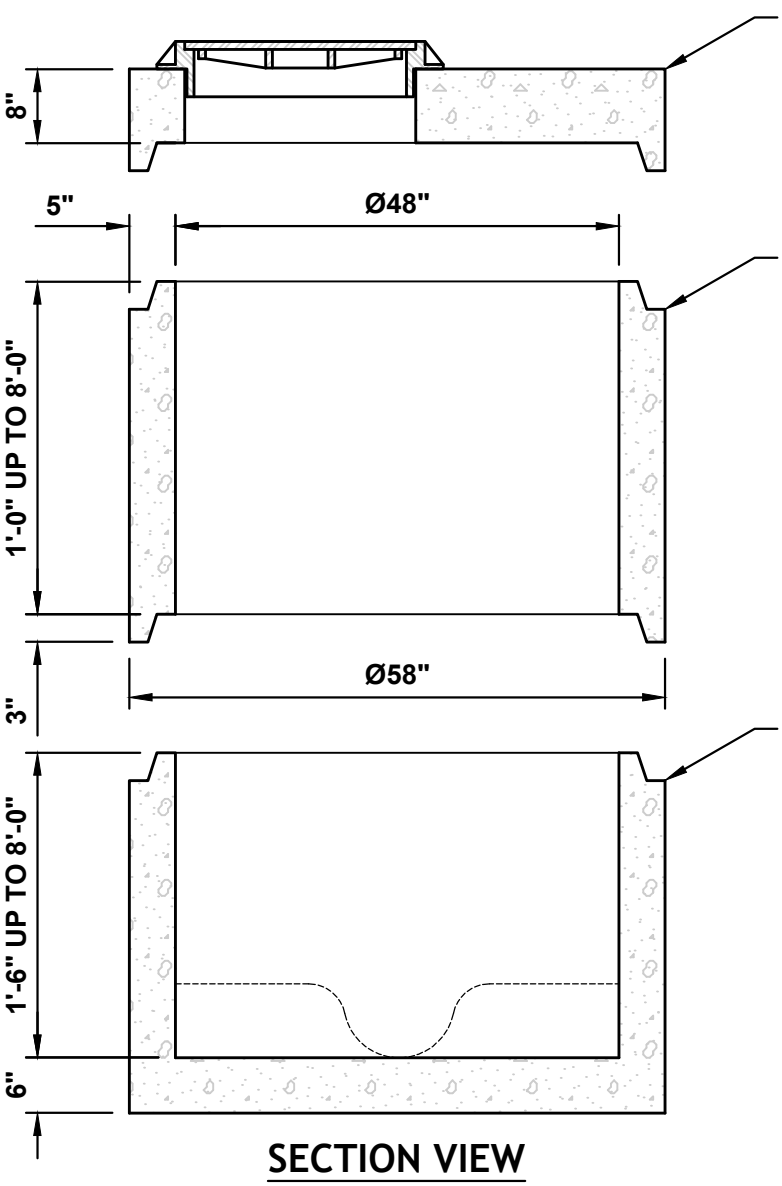


CAST IRON FRAMES AND COVERS ARE AVAILABLE IN SUBURBAN 3" HEIGHT AND STANDARD 7" HEIGHT (SUBURBAN 3" HEIGHT SHOWN)



JOINT DETAIL

STANDARD JOINT SEALANT IS MASTIC.
RUBBER GASKET IS OPTIONAL.



SECTION VIEW

NOTES:
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4. GRADE RINGS AVAILABLE AS NEEDED.

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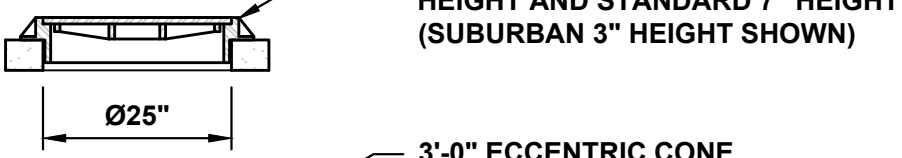
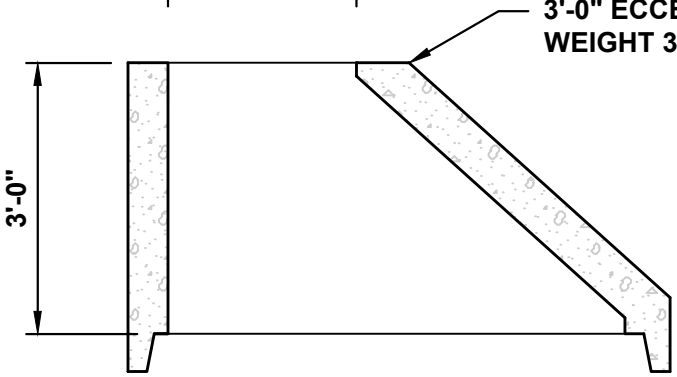
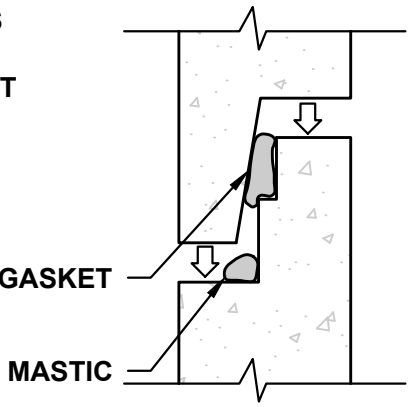
Ø60" MANHOLE - ECCENTRIC CONE

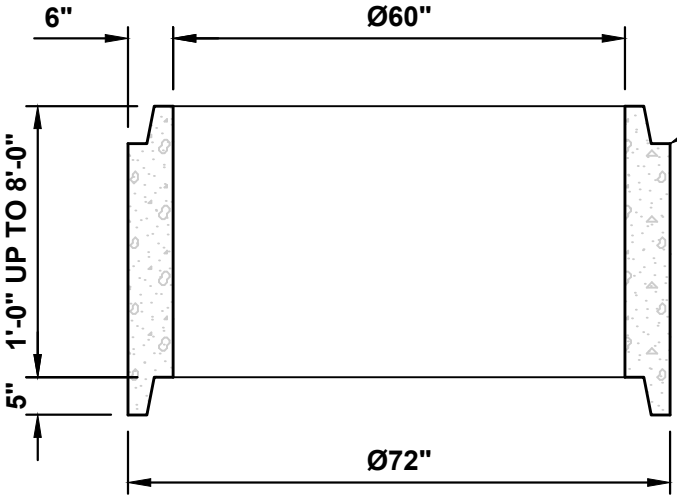




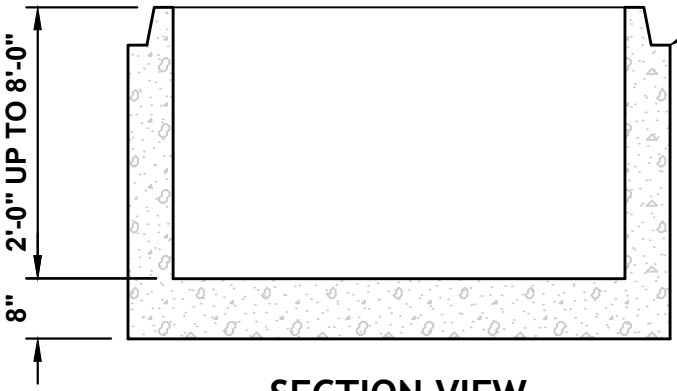


JOINT DETAIL

STANDARD JOINT SEALANT IS MASTIC.
RUBBER GASKET IS OPTIONAL.



Ø60" MANHOLE SECTION
1'-0" (3,125LBS)
2'-0" (2,645LBS)
3'-0" (3,965LBS)
4'-0" (5,290LBS)
5'-0" (6,610LBS)
6'-0" (7,930LBS)
7'-0" (9,255LBS)



Ø60" MANHOLE BASE
2'-0" (5,130LBS)
3'-0" (6,455LBS)
4'-0" (7,775LBS)
5'-0" (9,095LBS)
6'-0" (10,420LBS)
7'-0" (11,740LBS)
8'-0" (13,060LBS)

SECTION VIEW

NOTES:
1. MANHOLE ASSEMBLY CONFORMS TO ASTM-C478.
2. ALL MANHOLE JOINTS SEALED WITH MASTIC OR RUBBER GASKET.
3. WEIGHTS LISTED ARE APPROXIMATE.
4. GRADE RINGS AVAILABLE AS NEEDED.

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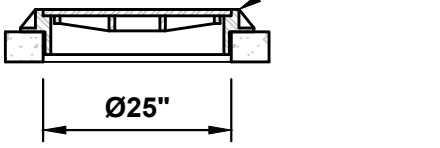
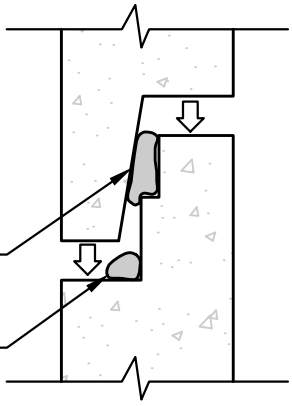
Ø60" MANHOLE - WITH FLAT TOP

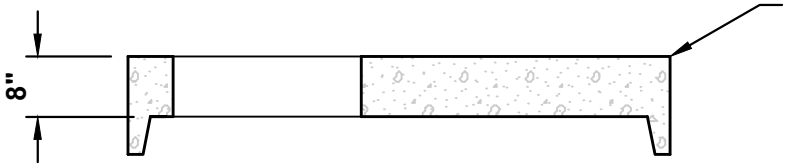


CAST IRON FRAMES AND COVERS ARE AVAILABLE IN SUBURBAN 3" HEIGHT AND STANDARD 7" HEIGHT (SUBURBAN 3" HEIGHT SHOWN)

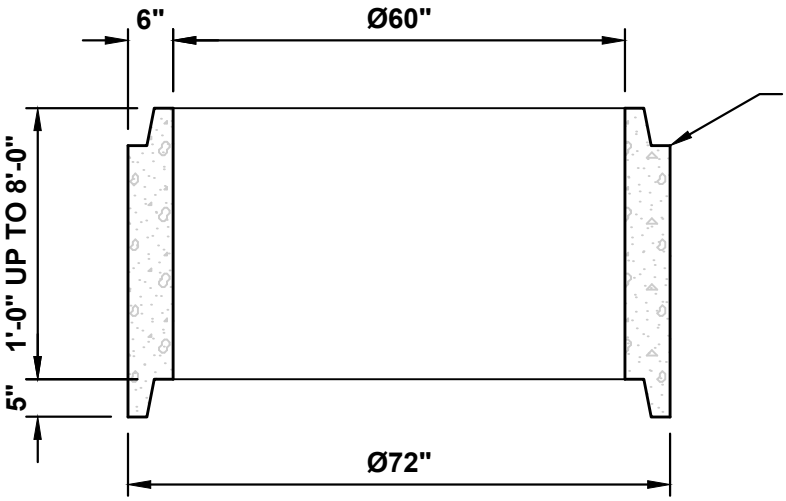


JOINT DETAIL

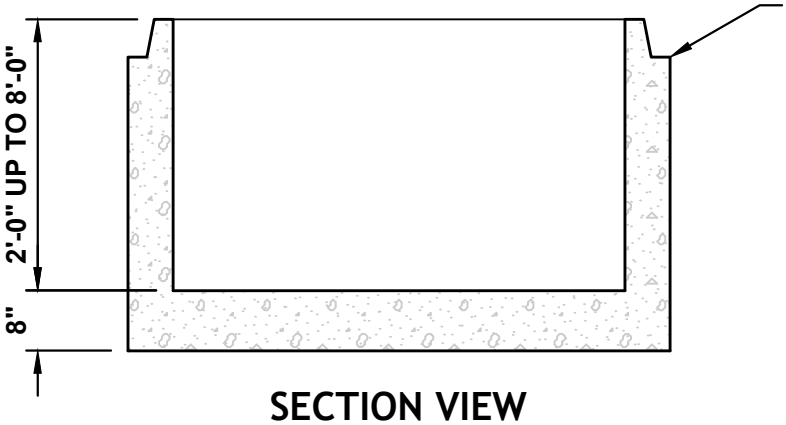
STANDARD JOINT SEALANT IS MASTIC.
RUBBER GASKET IS OPTIONAL.



60"x25" FLAT TOP
WEIGHT 2,615LBS



Ø60" MANHOLE SECTION
1'-0" (3,125LBS)
2'-0" (2,645LBS)
3'-0" (3,965LBS)
4'-0" (5,290LBS)
5'-0" (6,610LBS)
6'-0" (7,930LBS)
7'-0" (9,255LBS)



Ø60" MANHOLE BASE
2'-0" (5,130LBS)
3'-0" (6,455LBS)
4'-0" (7,775LBS)
5'-0" (9,095LBS)
6'-0" (10,420LBS)
7'-0" (11,740LBS)
8'-0" (13,060LBS)

SECTION VIEW

NOTES:
1. MANHOLE ASSEMBLY CONFORMS TO ASTM-C478.
2. ALL MANHOLE JOINTS SEALED WITH MASTIC OR RUBBER GASKET.
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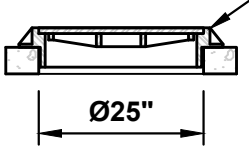
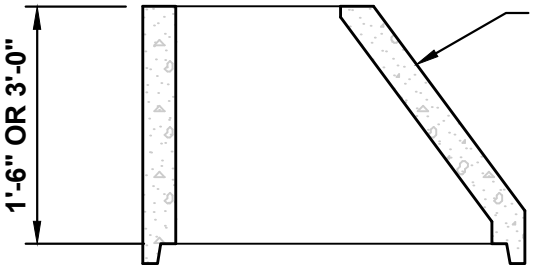
Ø72" MANHOLE - WITH ECCENTRIC CONE

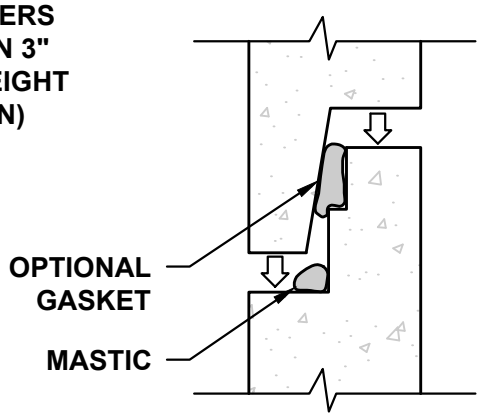


CAST IRON FRAMES AND COVERS ARE AVAILABLE IN SUBURBAN 3" HEIGHT AND STANDARD 7" HEIGHT (SUBURBAN 3" HEIGHT SHOWN)



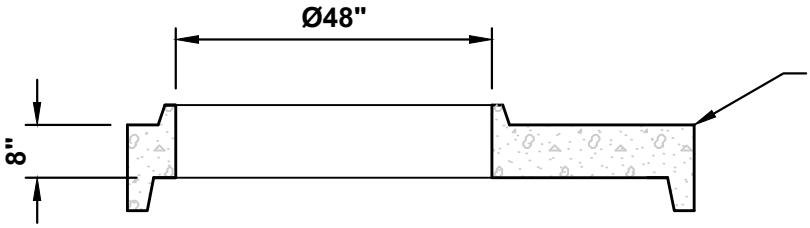
3'-0" ECCENTRIC CONE
WEIGHT 2,565LBS

1'-6" ECCENTRIC CONE
WEIGHT 1,300LBS

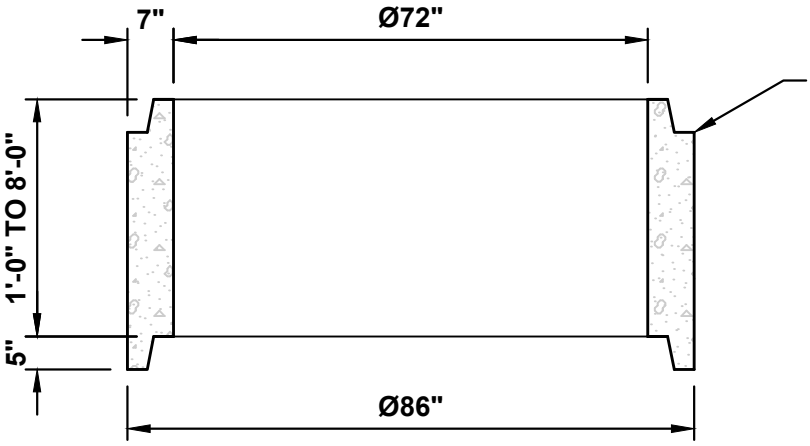


JOINT DETAIL

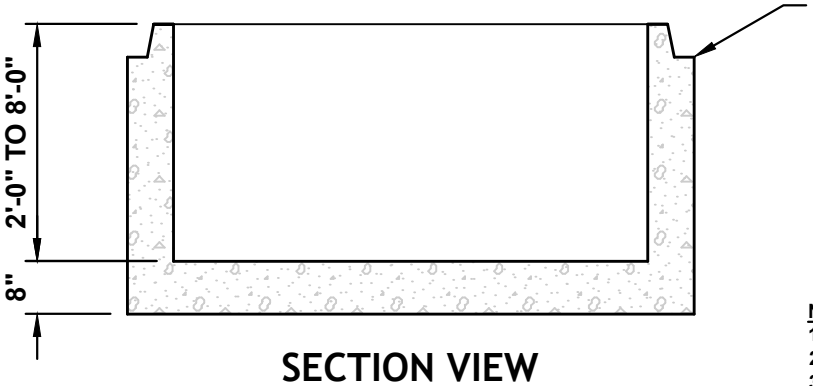
STANDARD JOINT SEALANT IS MASTIC.
RUBBER GASKET IS OPTIONAL.



72" x 48"
REDUCING SLAB
WEIGHT (3,260LBS)



Ø72" MANHOLE SECTION
1'-0" (1,850LBS)
2'-0" (3,695LBS)
3'-0" (5,540LBS)
4'-0" (7,385LBS)
5'-0" (9,230LBS)
6'-0" (11,075LBS)
7'-0" (12,925LBS)
8'-0" (14,770LBS)



Ø72" MANHOLE BASE
2'-0" (7,405LBS)
3'-0" (9,250LBS)
4'-0" (11,100LBS)
5'-0" (12,945LBS)
6'-0" (14,790LBS)
7'-0" (16,635LBS)
8'-0" (18,480LBS)

SECTION VIEW

NOTES:
1. MANHOLE ASSEMBLY CONFORMS TO ASTM-C478.
2. ALL MANHOLE JOINTS SEALED WITH MASTIC OR RUBBER GASKET.
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4. GRADE RINGS AVAILABLE AS NEEDED.

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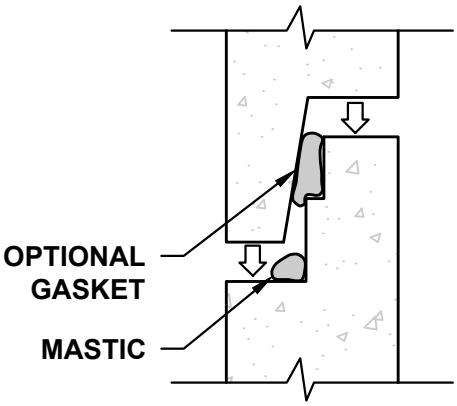
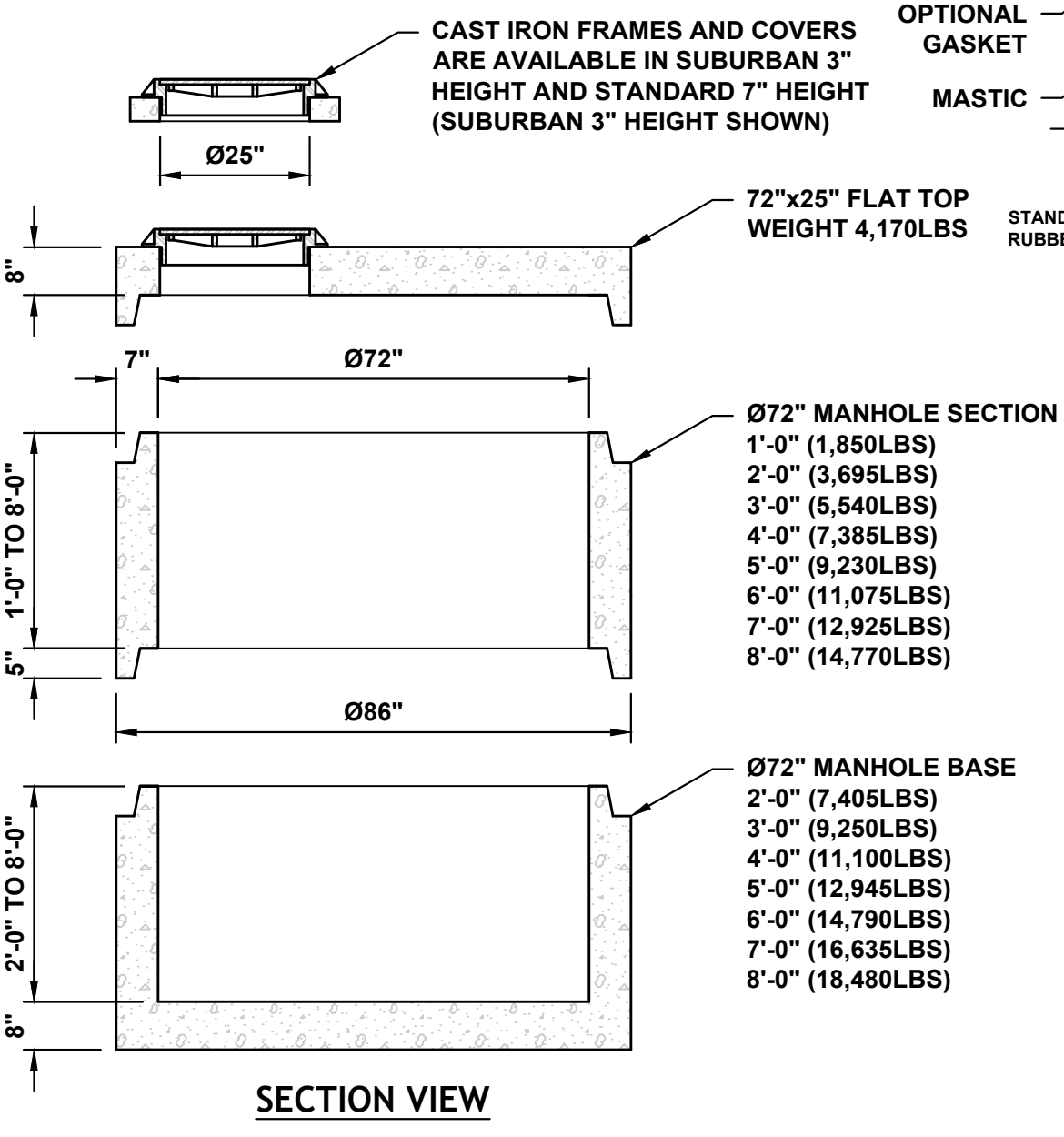
Ø72" MANHOLE - FLAT TOP



JOINT DETAIL

STANDARD JOINT SEALANT IS MASTIC.
RUBBER GASKET IS OPTIONAL.



SECTION VIEW

NOTES:
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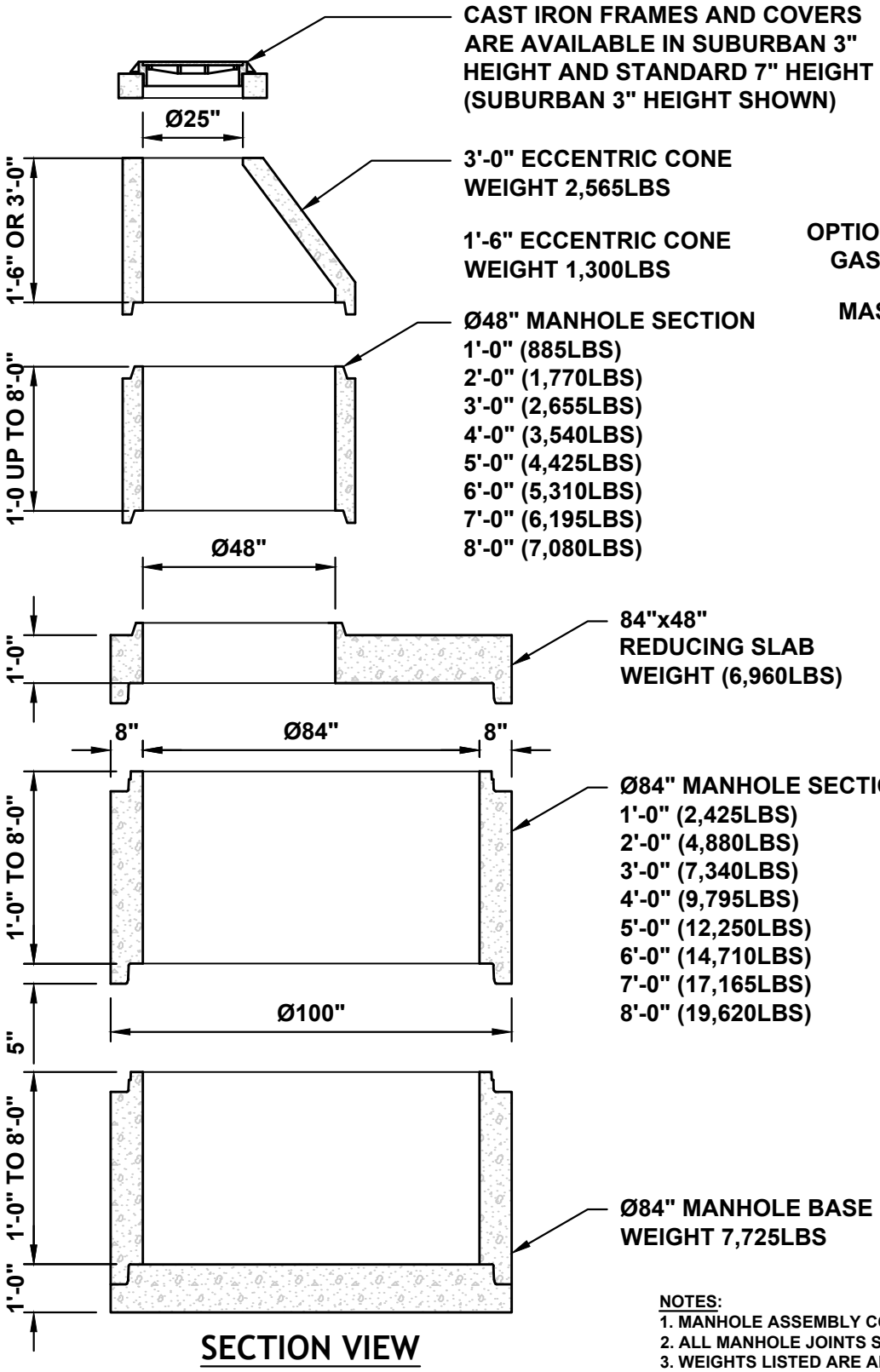
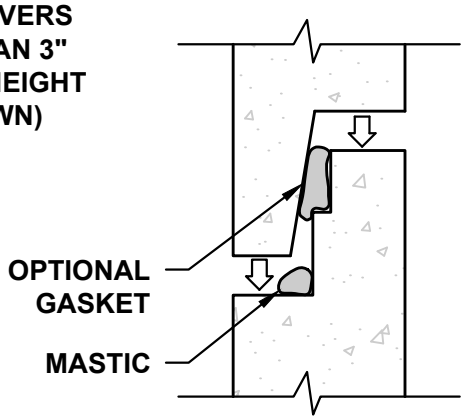
Ø84" MANHOLE - WITH REDUCING SLAB



SECTION VIEW



JOINT DETAIL

STANDARD JOINT SEALANT IS MASTIC.
RUBBER GASKET IS OPTIONAL.

NOTES:

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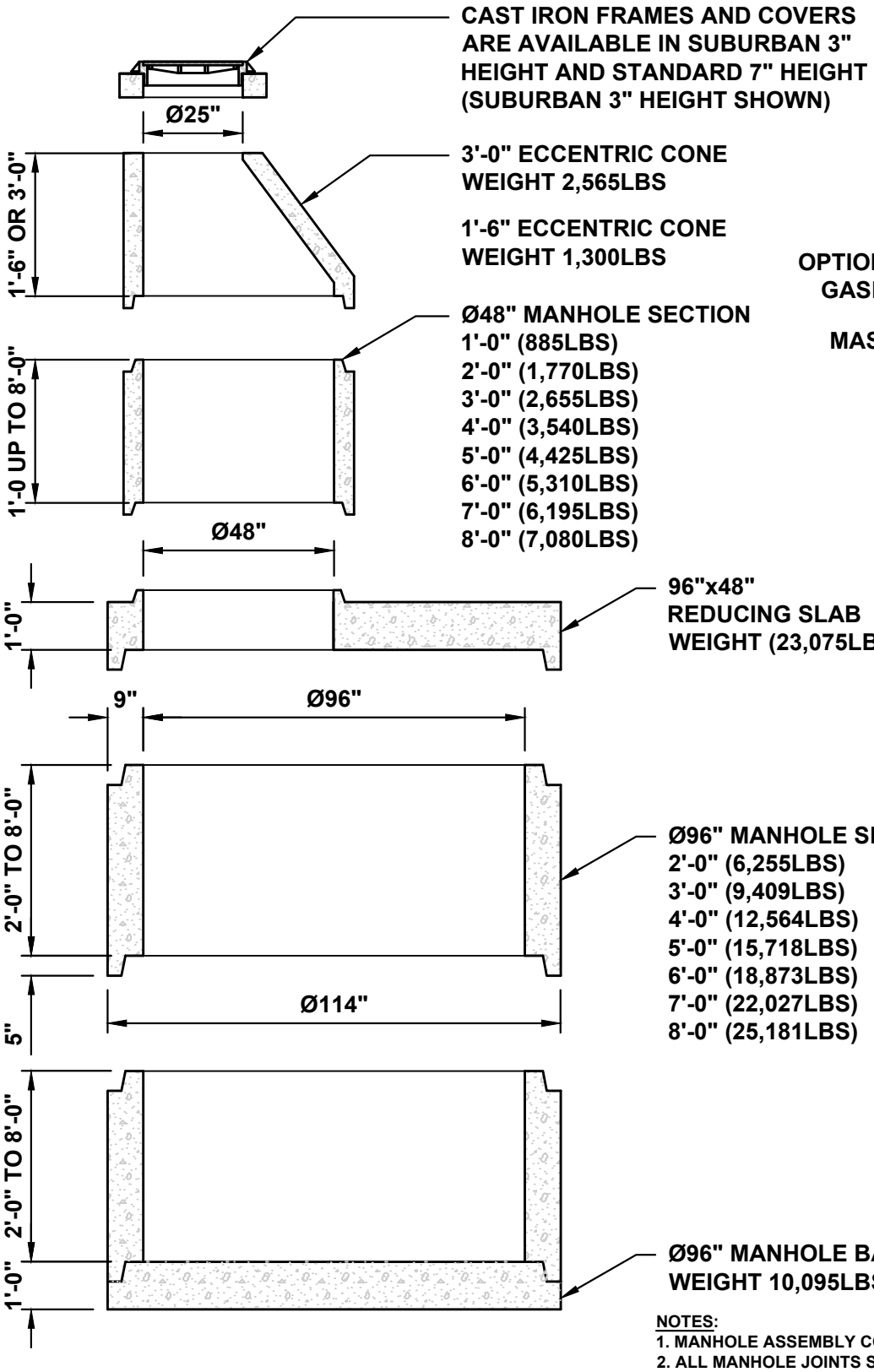
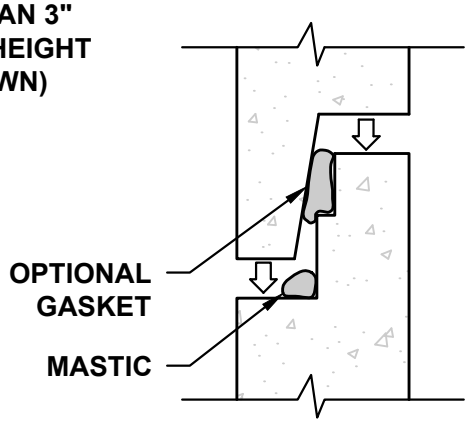
Ø96" MANHOLE - WITH REDUCING SLAB



SECTION VIEW



JOINT DETAIL

STANDARD JOINT SEALANT IS MASTIC.
RUBBER GASKET IS OPTIONAL.

NOTES:

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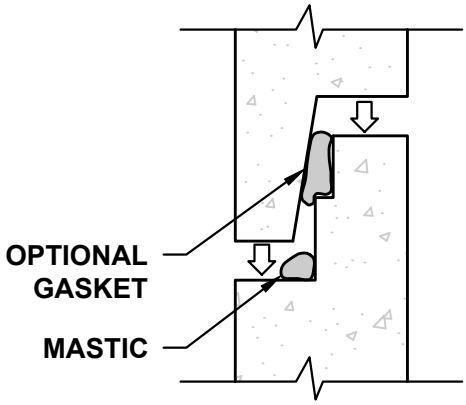
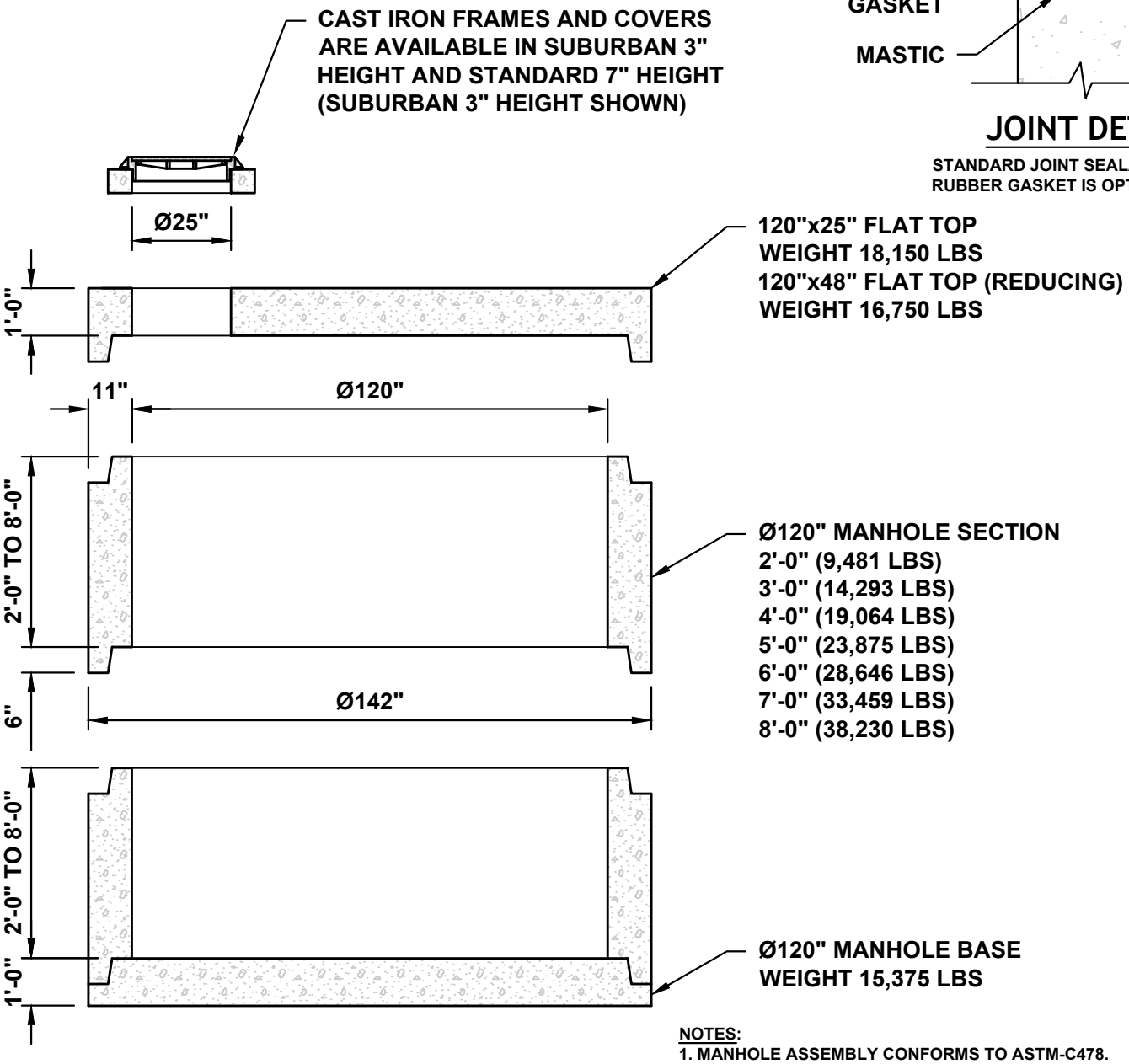
Ø120" MANHOLE - WITH FLAT TOP



JOINT DETAIL

STANDARD JOINT SEALANT IS MASTIC.
RUBBER GASKET IS OPTIONAL.



SECTION VIEW

NOTES:
1. MANHOLE ASSEMBLY CONFORMS TO ASTM-C478.
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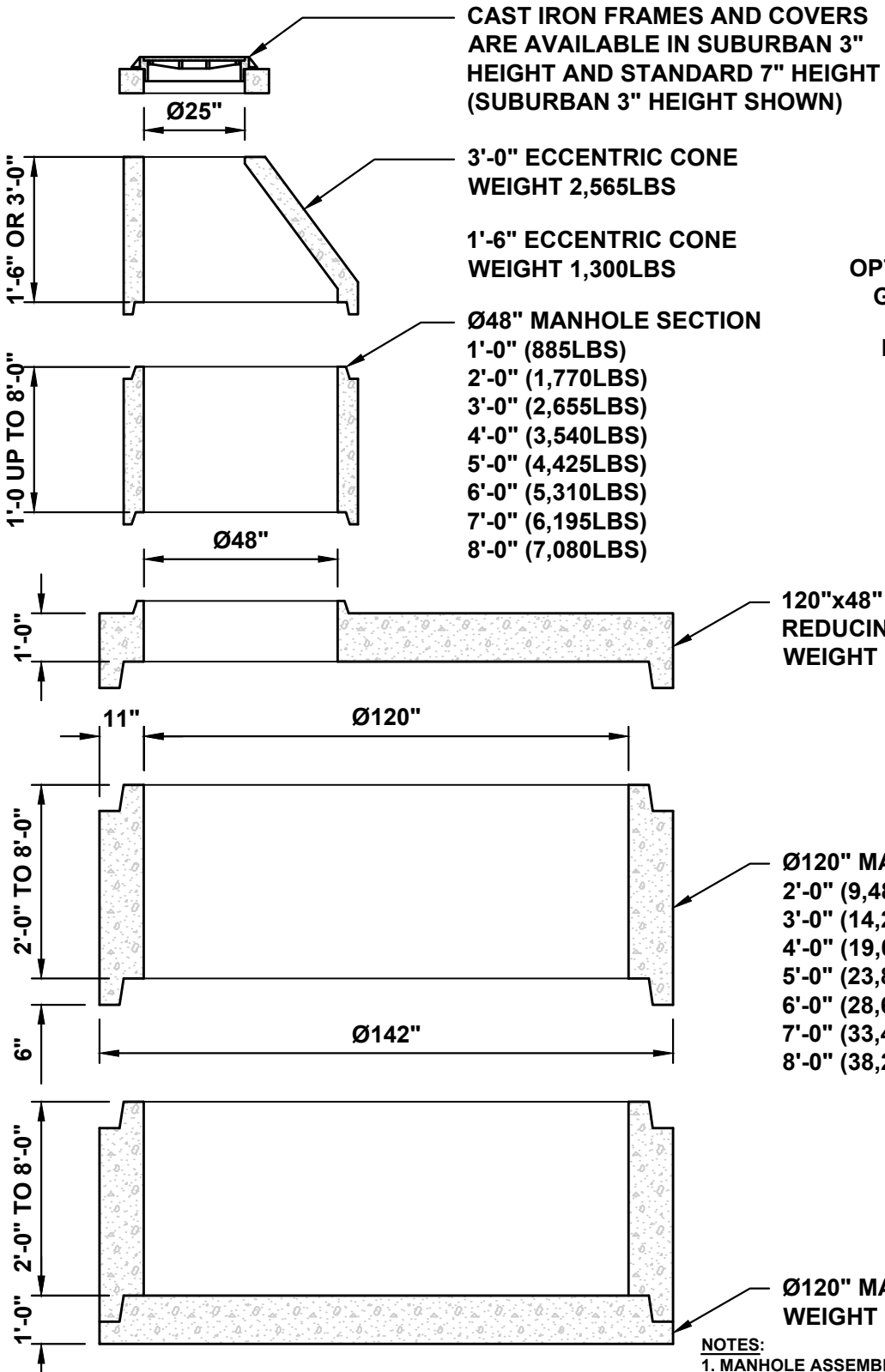
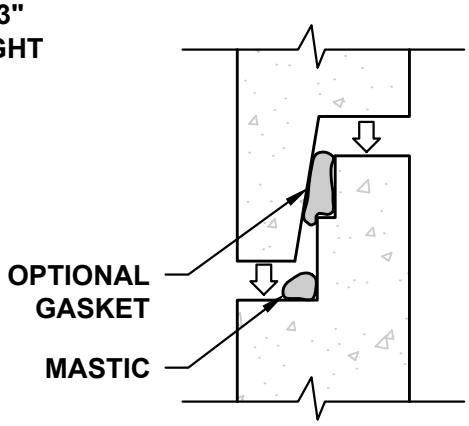
Ø120" MANHOLE - WITH REDUCING SLAB



SECTION VIEW



JOINT DETAIL

STANDARD JOINT SEALANT IS MASTIC.
RUBBER GASKET IS OPTIONAL.

NOTES:

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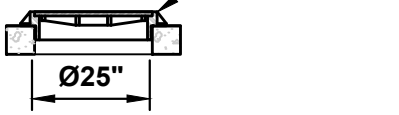
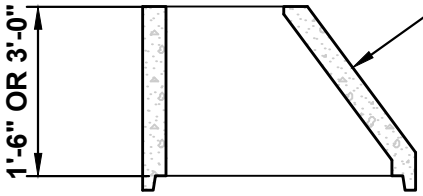
Ø144" MANHOLES - WITH REDUCING SLAB

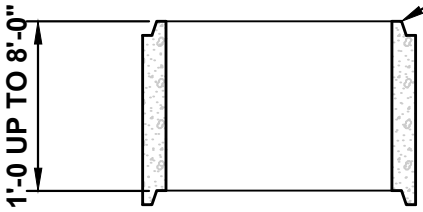


CAST IRON FRAMES AND COVERS ARE AVAILABLE IN SUBURBAN 3" HEIGHT AND STANDARD 7" HEIGHT (SUBURBAN 3" HEIGHT SHOWN)

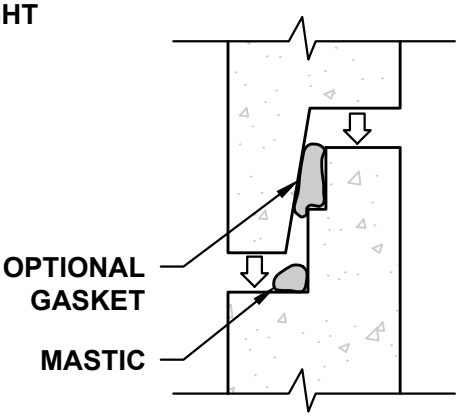


3'-0" ECCENTRIC CONE
WEIGHT 2,565LBS

1'-6" ECCENTRIC CONE
WEIGHT 1,300LBS

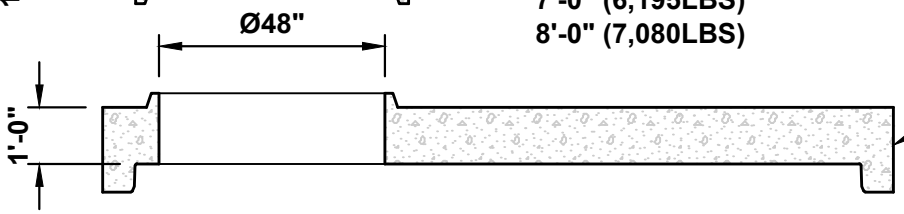


Ø48" MANHOLE SECTION
1'-0" (885LBS)
2'-0" (1,770LBS)
3'-0" (2,655LBS)
4'-0" (3,540LBS)
5'-0" (4,425LBS)
6'-0" (5,310LBS)
7'-0" (6,195LBS)
8'-0" (7,080LBS)

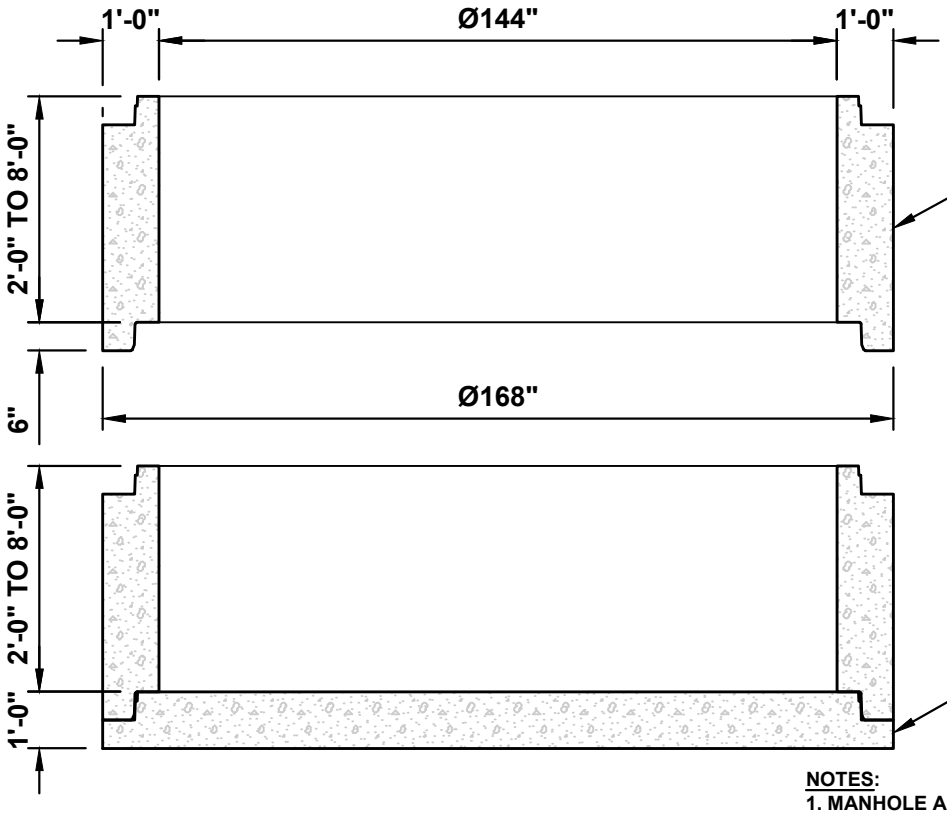


JOINT DETAIL

STANDARD JOINT SEALANT IS MASTIC.
RUBBER GASKET IS OPTIONAL.



144"x48"
REDUCING SLAB
WEIGHT (9,435LBS)



Ø144" MANHOLE SECTION
2'-0" (12,300LBS)
3'-0" (18,544LBS)
4'-0" (24,747LBS)
5'-0" (30,990LBS)
6'-0" (37,194LBS)
7'-0" (43,397LBS)
8'-0" (49,600LBS)

Ø144" MANHOLE BASE
WEIGHT 21,900LBS

SECTION VIEW

NOTES:
1. MANHOLE ASSEMBLY CONFORMS TO ASTM-C478.
2. ALL MANHOLE JOINTS SEALED WITH MASTIC OR RUBBER GASKET.
3. WEIGHTS LISTED ARE APPROXIMATE.
4. GRADE RINGS AVAILABLE AS NEEDED.

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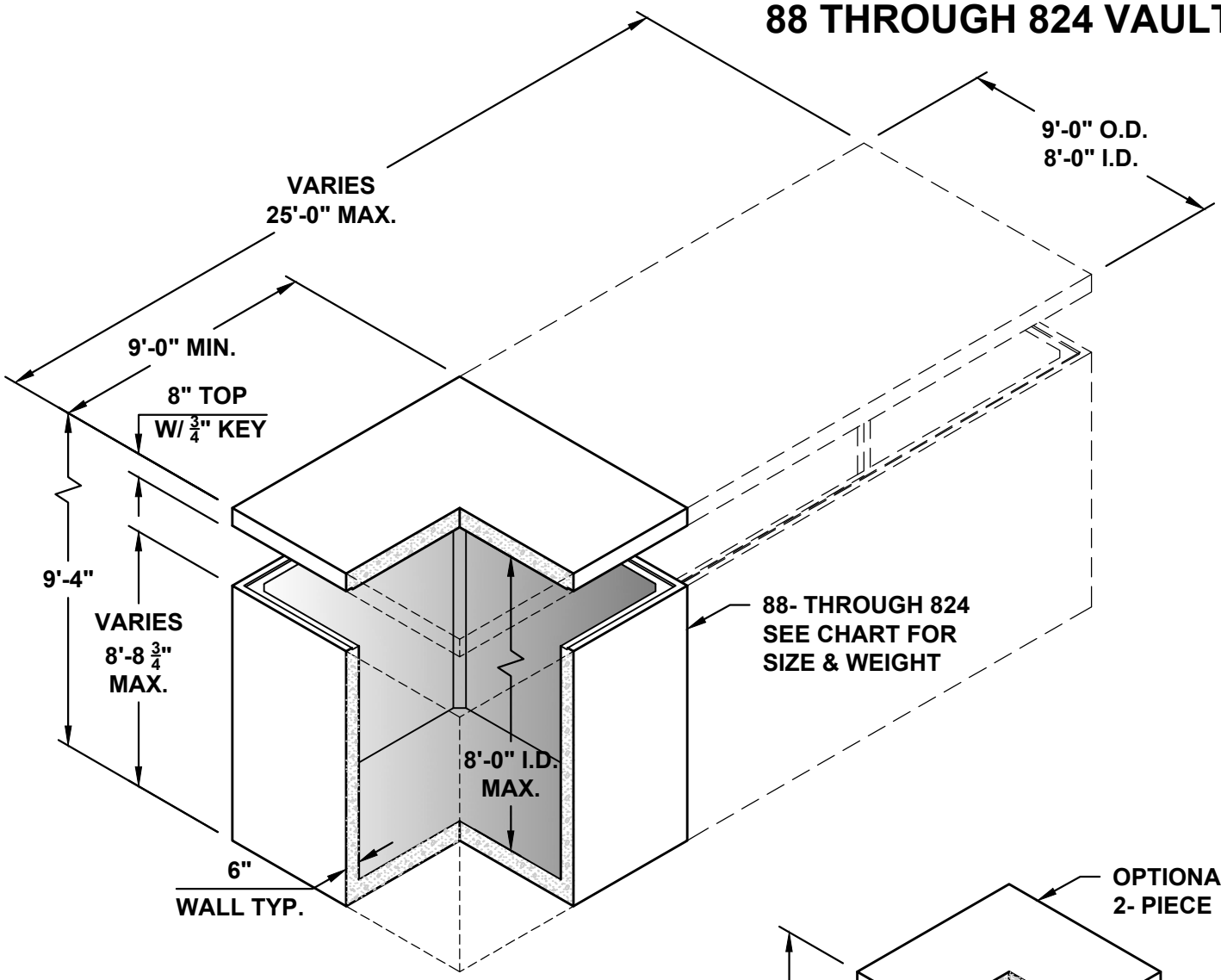
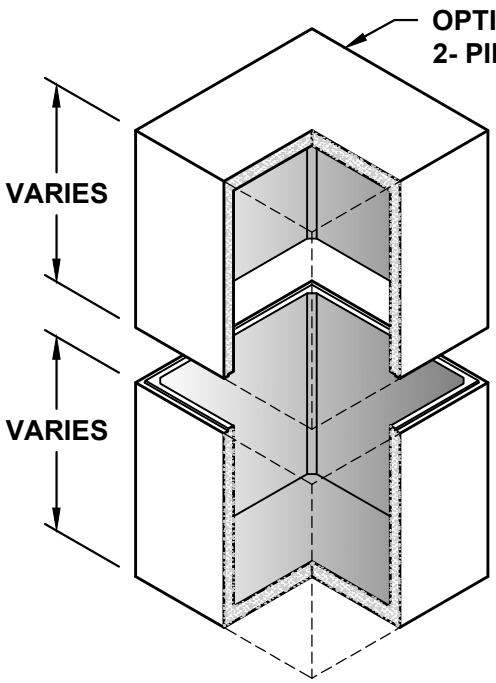
Standard Vaults

88 THROUGH 824 VAULTS



88 THROUGH 824 IN 2FT. INCREMENTS					
VAULT	WIDTH I.D.	LENGTH I.D.	HEIGHT I.D.	TOP WEIGHT	BASE WEIGHT
88	8'-0"	8'-0"	8'-0"	8,020 LBS	28,730 LBS
810	8'-0"	10'-0"	8'-0"	9,810 LBS	28,930 LBS
812	8'-0"	12'-0"	8'-0"	11,600 LBS	37,150 LBS
814	8'-0"	14'-0"	8'-0"	13,400 LBS	41,350 LBS
816	8'-0"	16'-0"	8'-0"	15,190 LBS	45,560 LBS
818	8'-0"	18'-0"	6'-0"	17,010 LBS	41,770 LBS
820	8'-0"	20'-0"	6'-0"	18,770 LBS	45,390 LBS
822	8'-0"	22'-0"	6'-0"	20,560 LBS	49,000 LBS
824	8'-0"	24'-0"	6'-0"	22,350 LBS	52,580 LBS

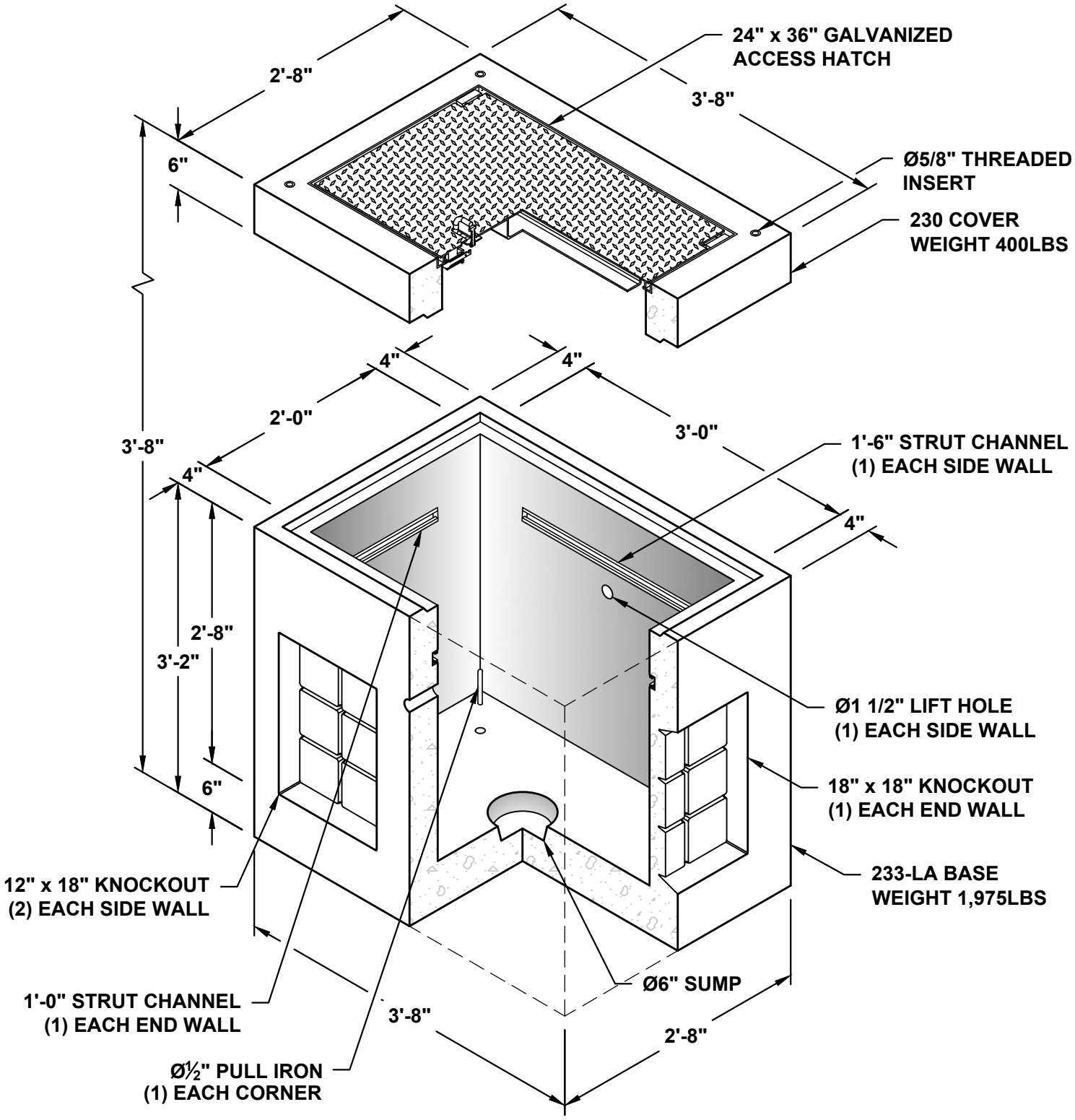
NOTE:
WEIGHTS BASED ON 8" FLOOR AND 8" TOP SLAB



88-2 VAULT

NOTE:
HEIGHT OF BASE AND TOP ADJUSTABLE, 8'-0" I.D. MAX EACH SECTION, BASE FLOOR AND TOP DECK THICKNESS AS REQUIRED.
OPTIONAL TOP ACCESS, MANHOLE FRAME & COVERS, AND HATCHES AS NEEDED.
VARIOUS SIZES AVAILABLE.
OPTIONAL ACCESSORIES: STRUT CHANNEL, SUMPS, INSERTS, LADDERS, ETC.

233 LA-2436 VAULT



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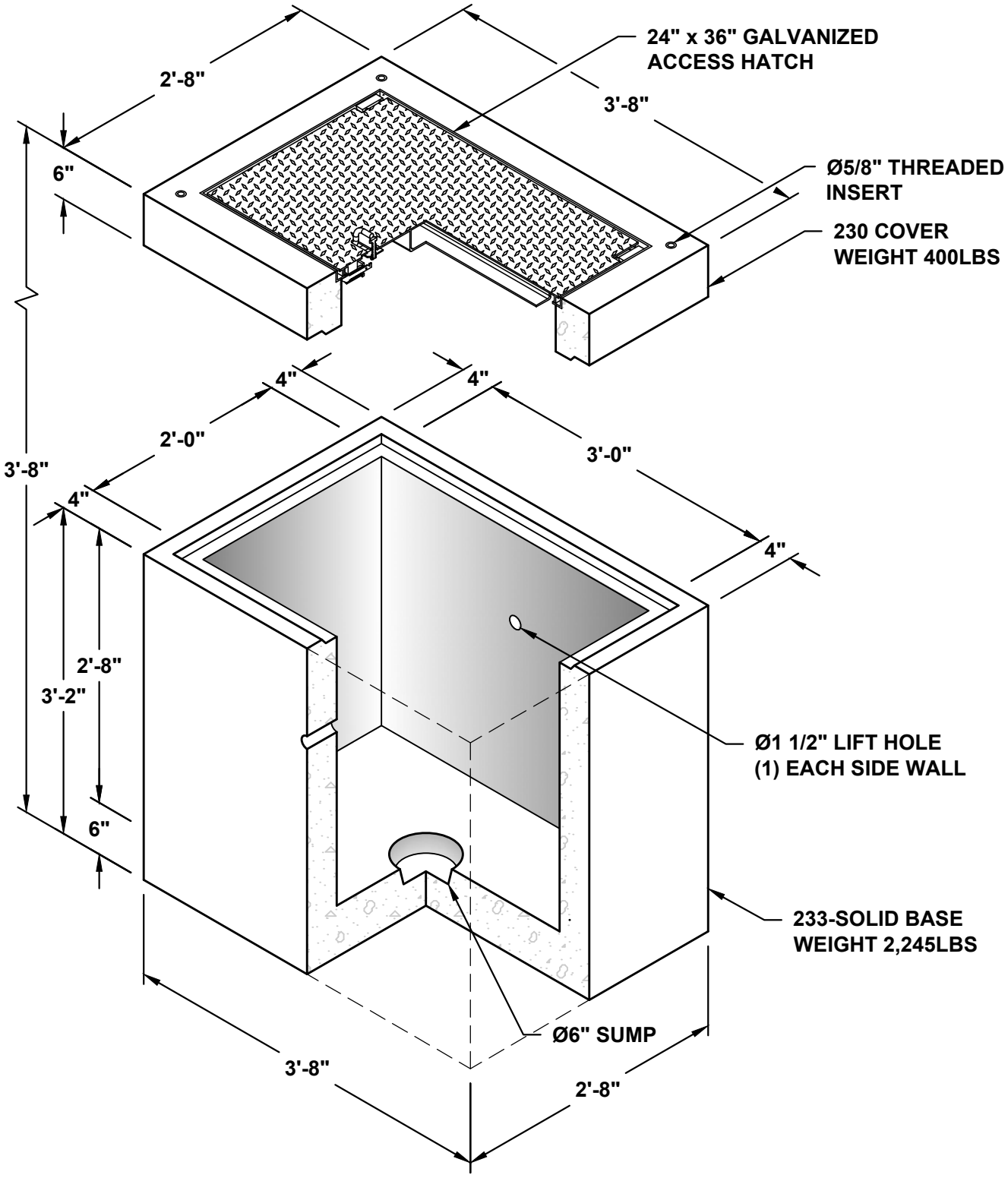
233 SOLID-2436 VAULT



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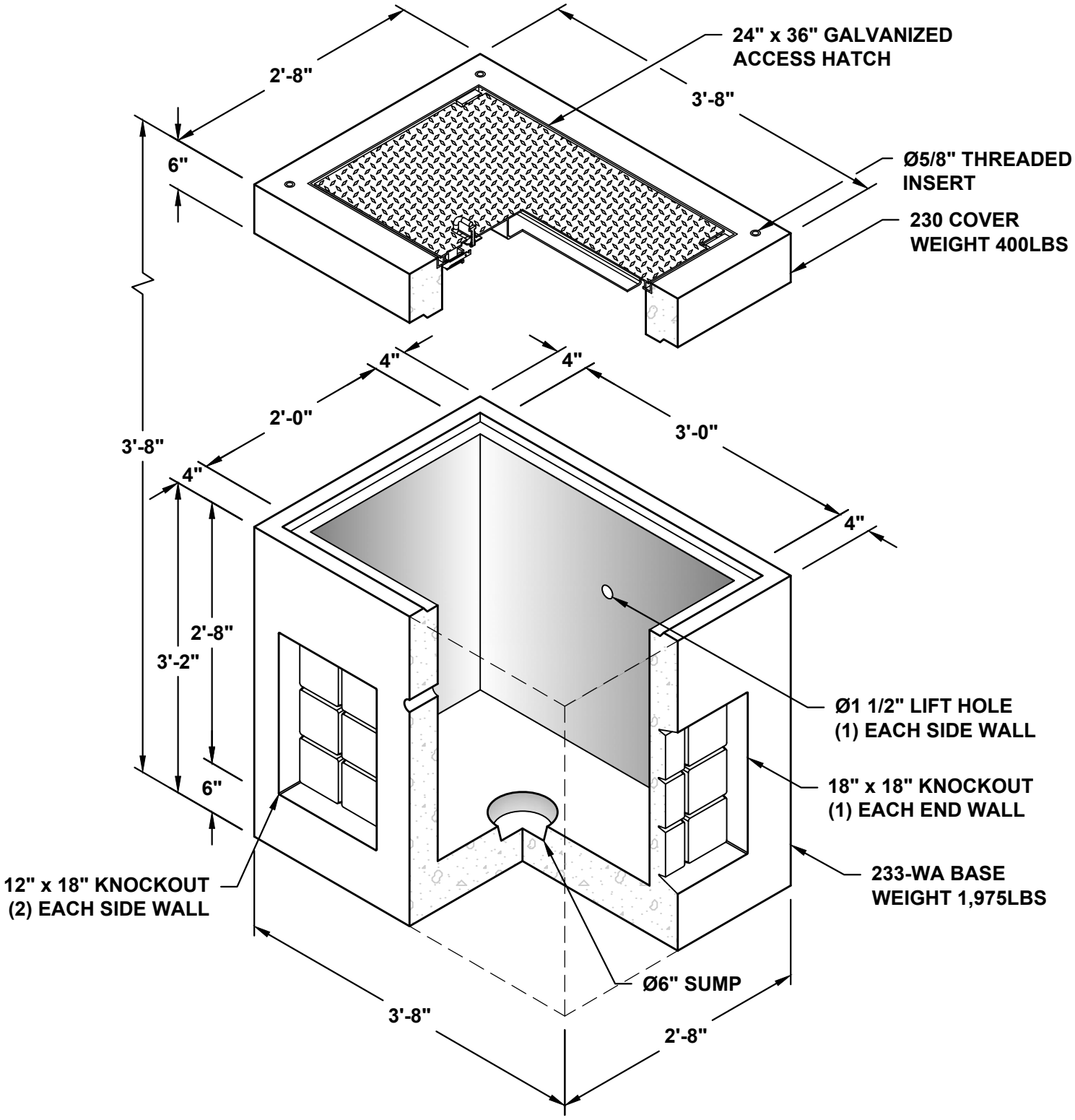
233 WA-2436 VAULT



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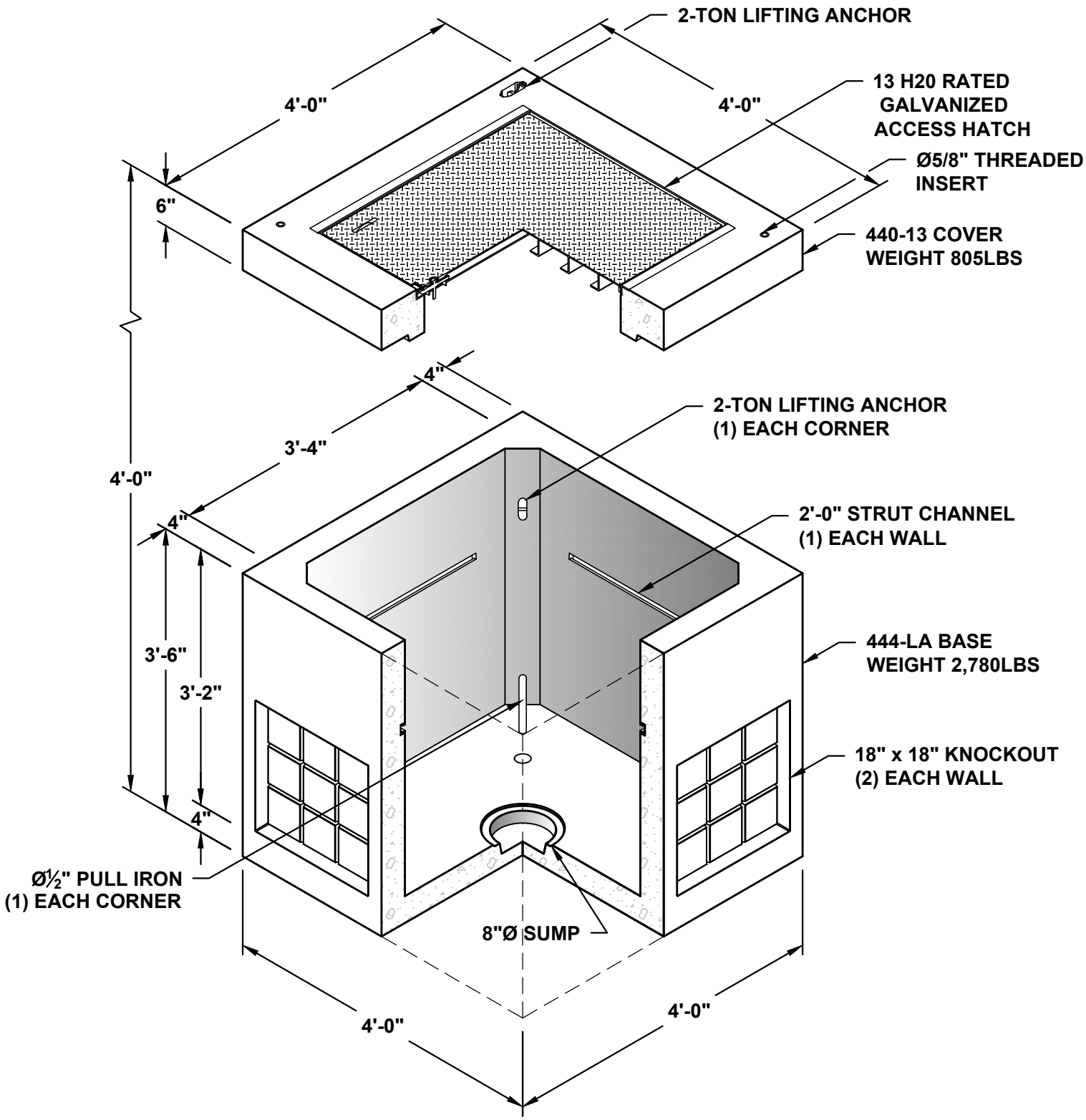
444 LA-13 VAULT



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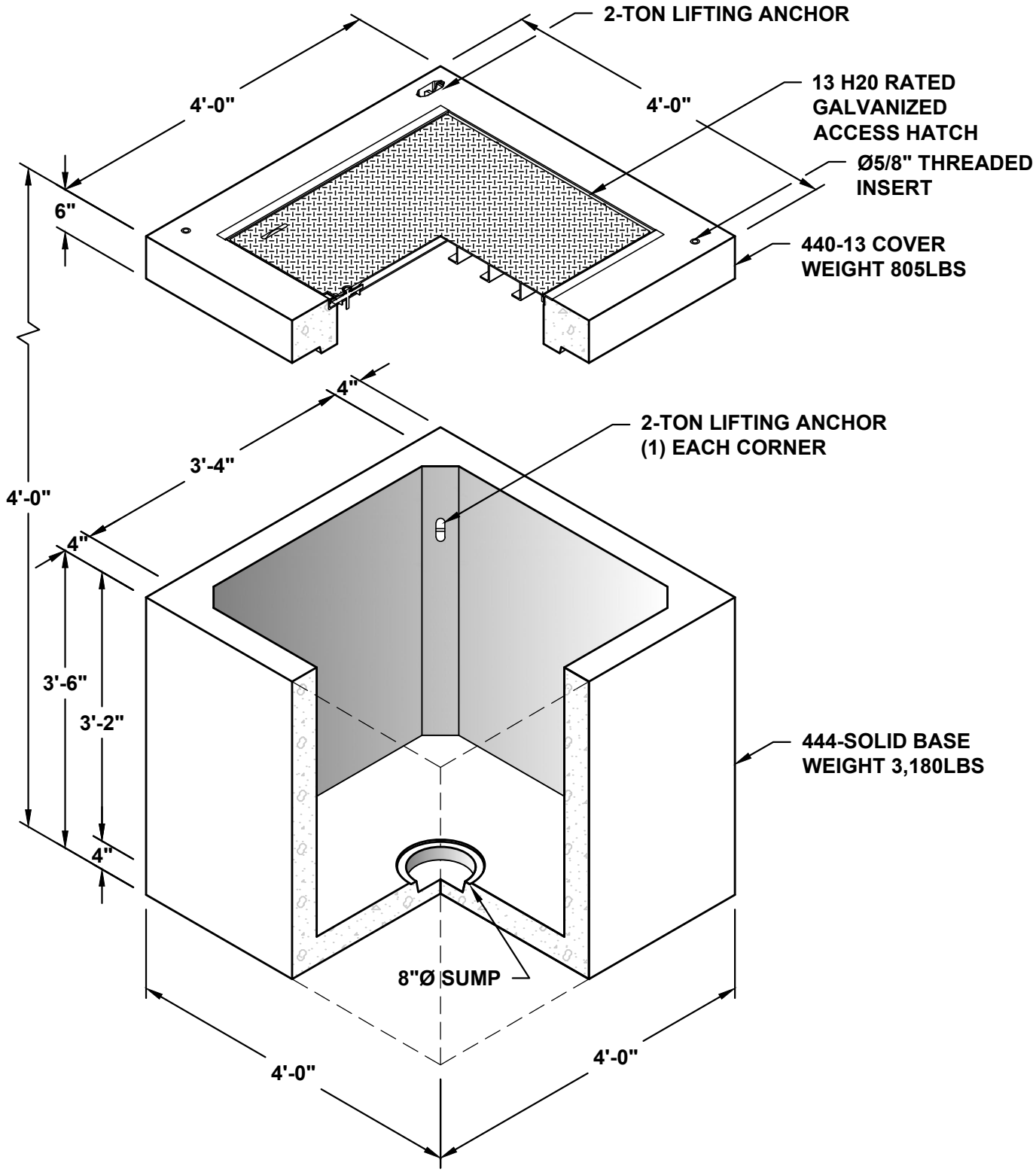

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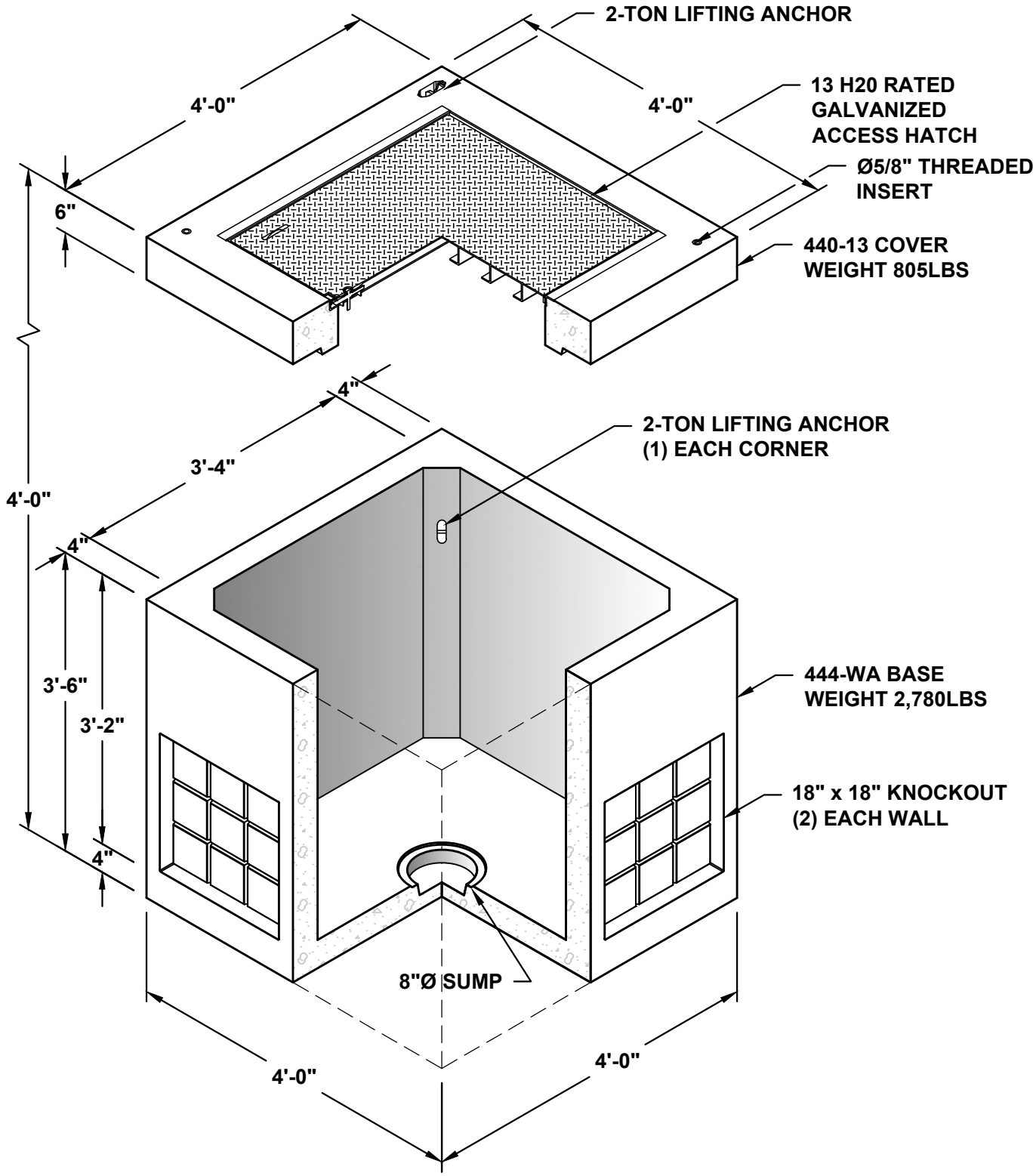
444 WA-13 VAULT



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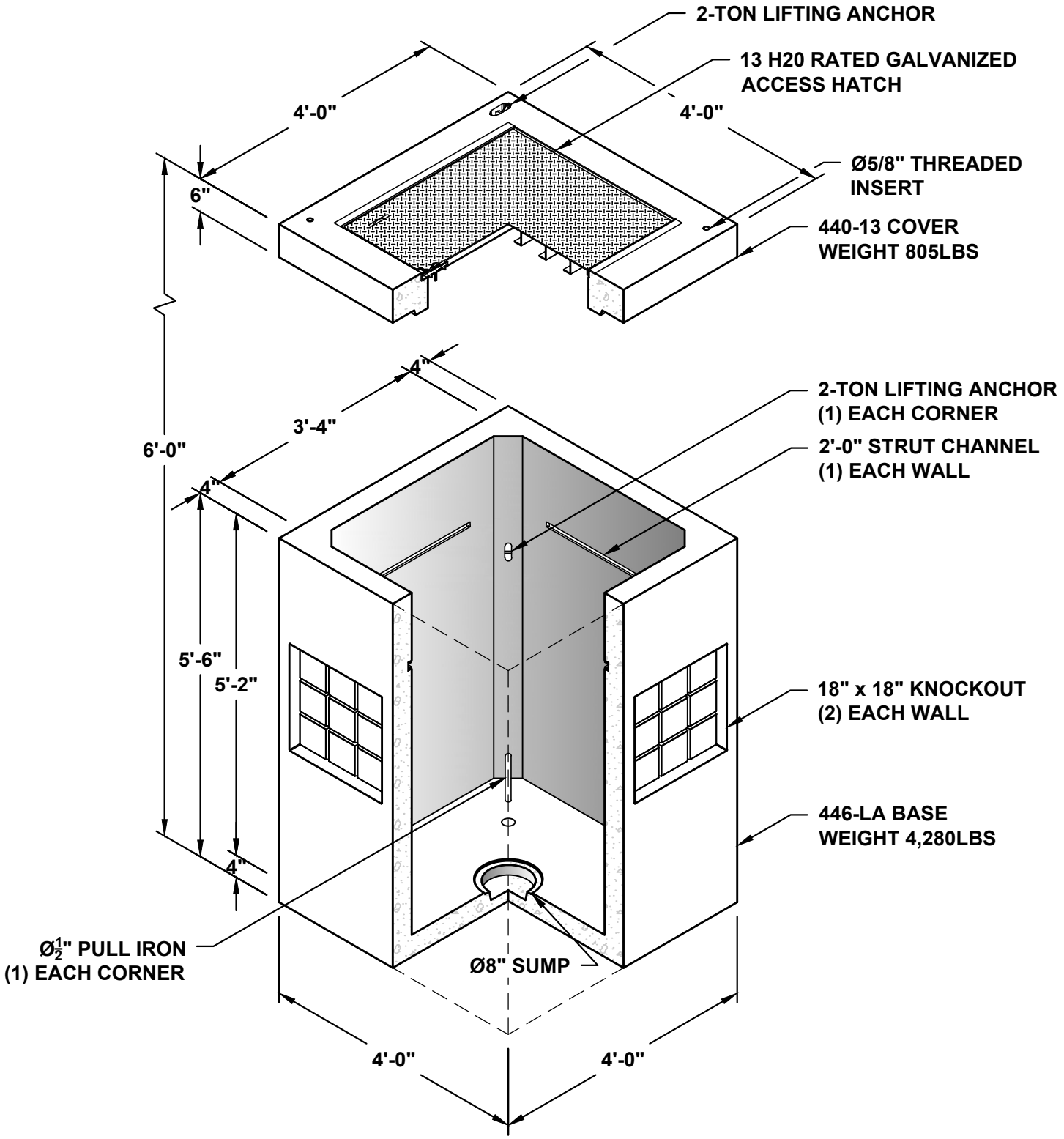
446 LA-13 VAULT



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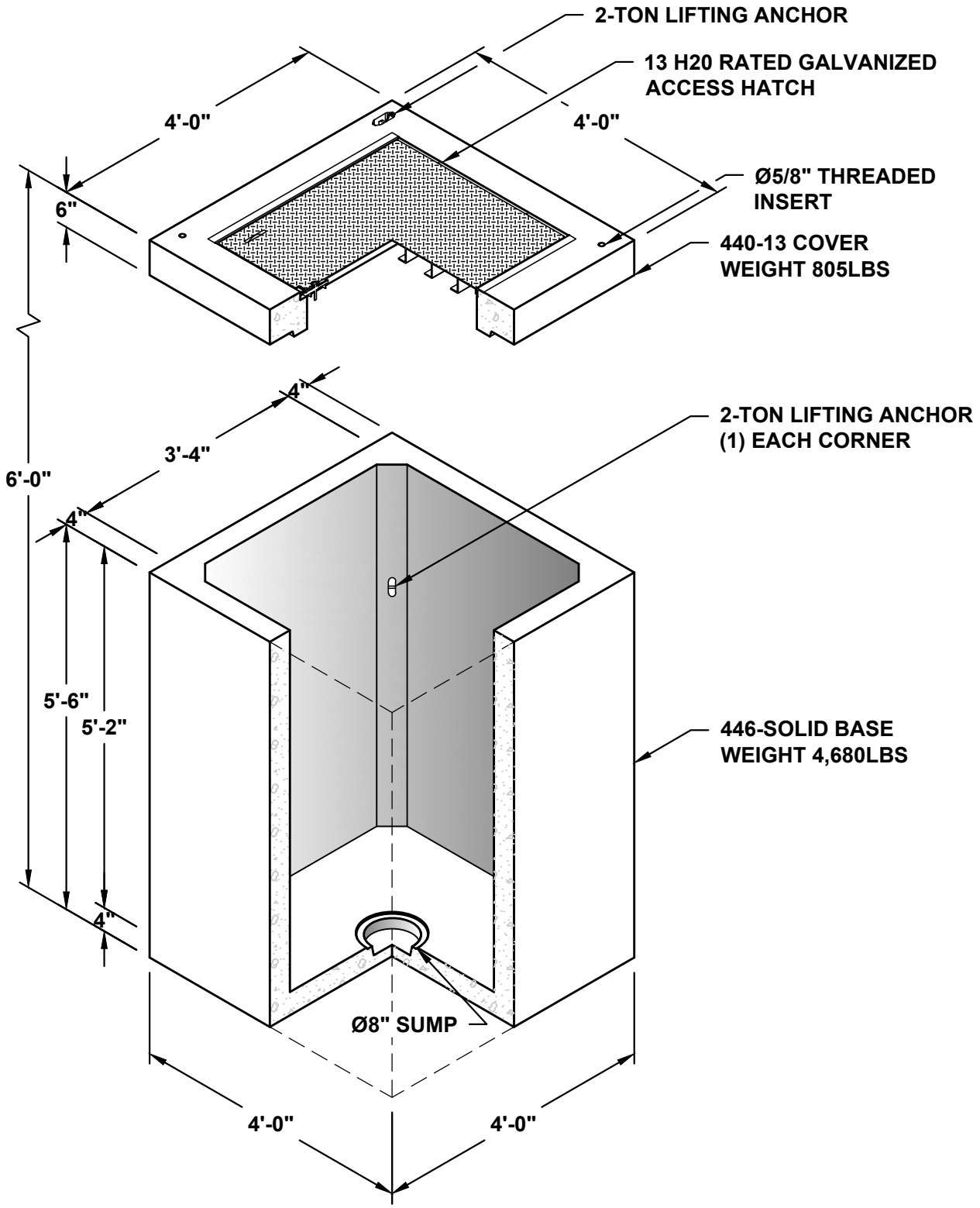
446 SOLID-13 VAULT



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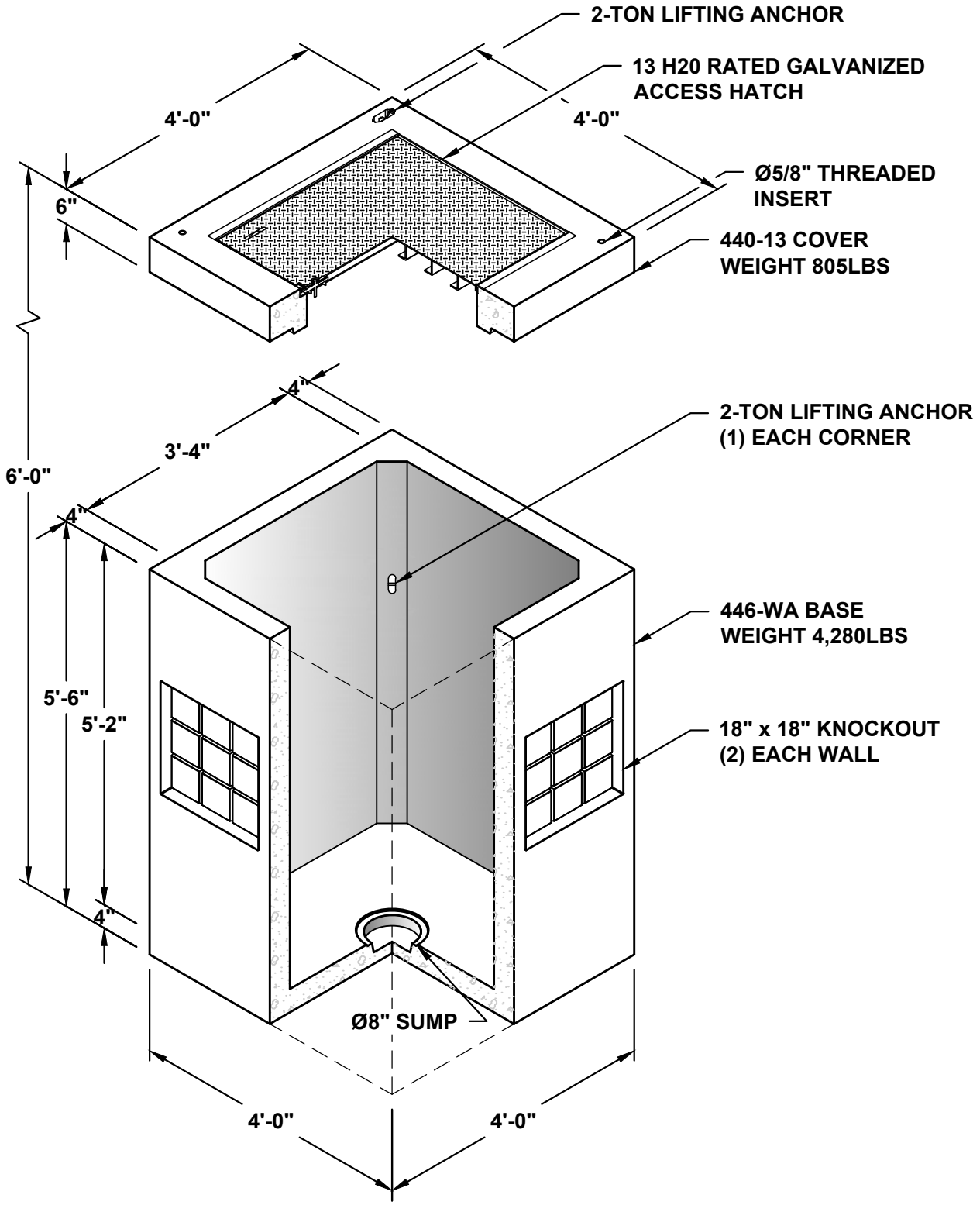
446 WA-13 VAULT



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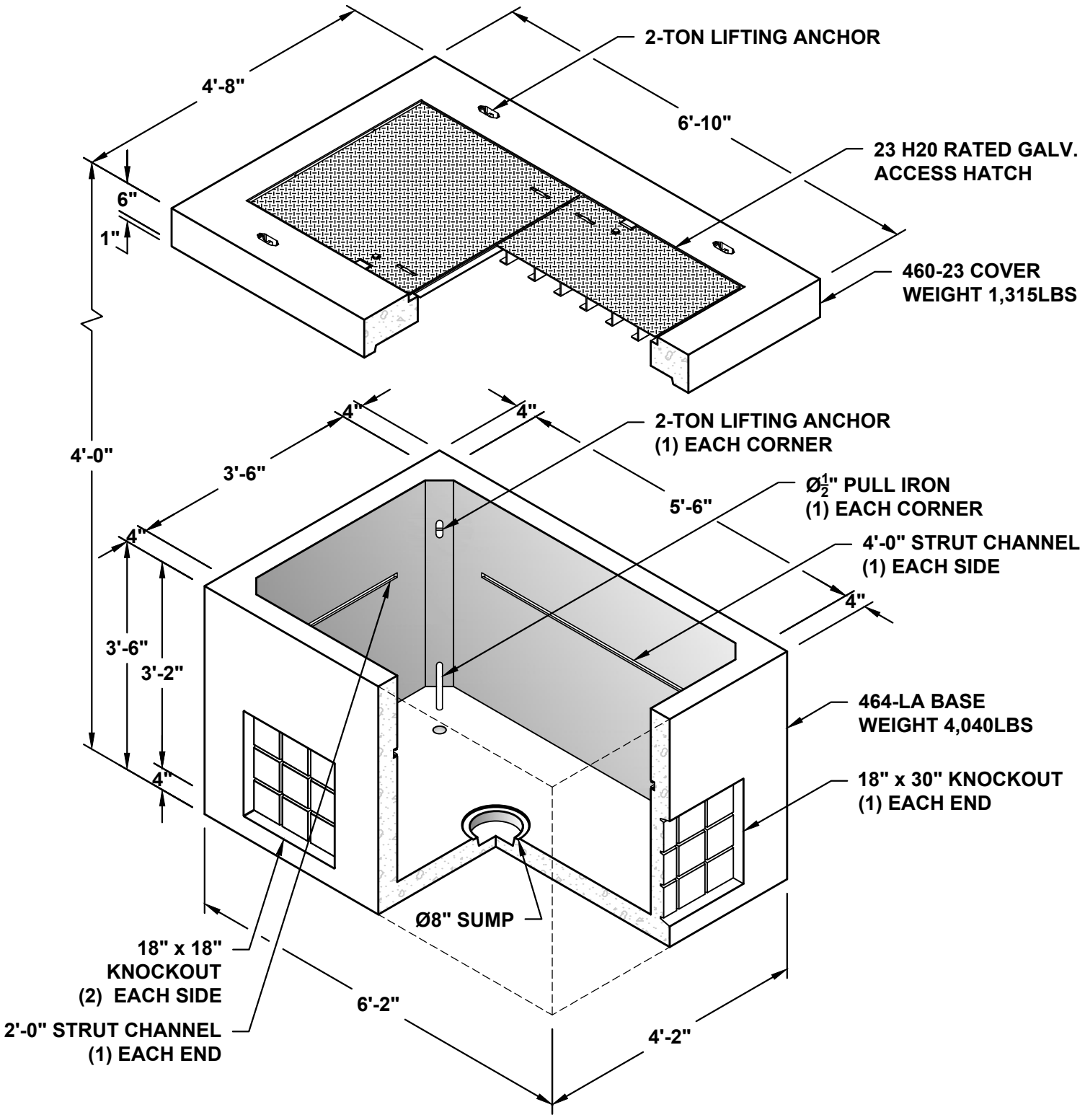
464 LA-23 VAULT



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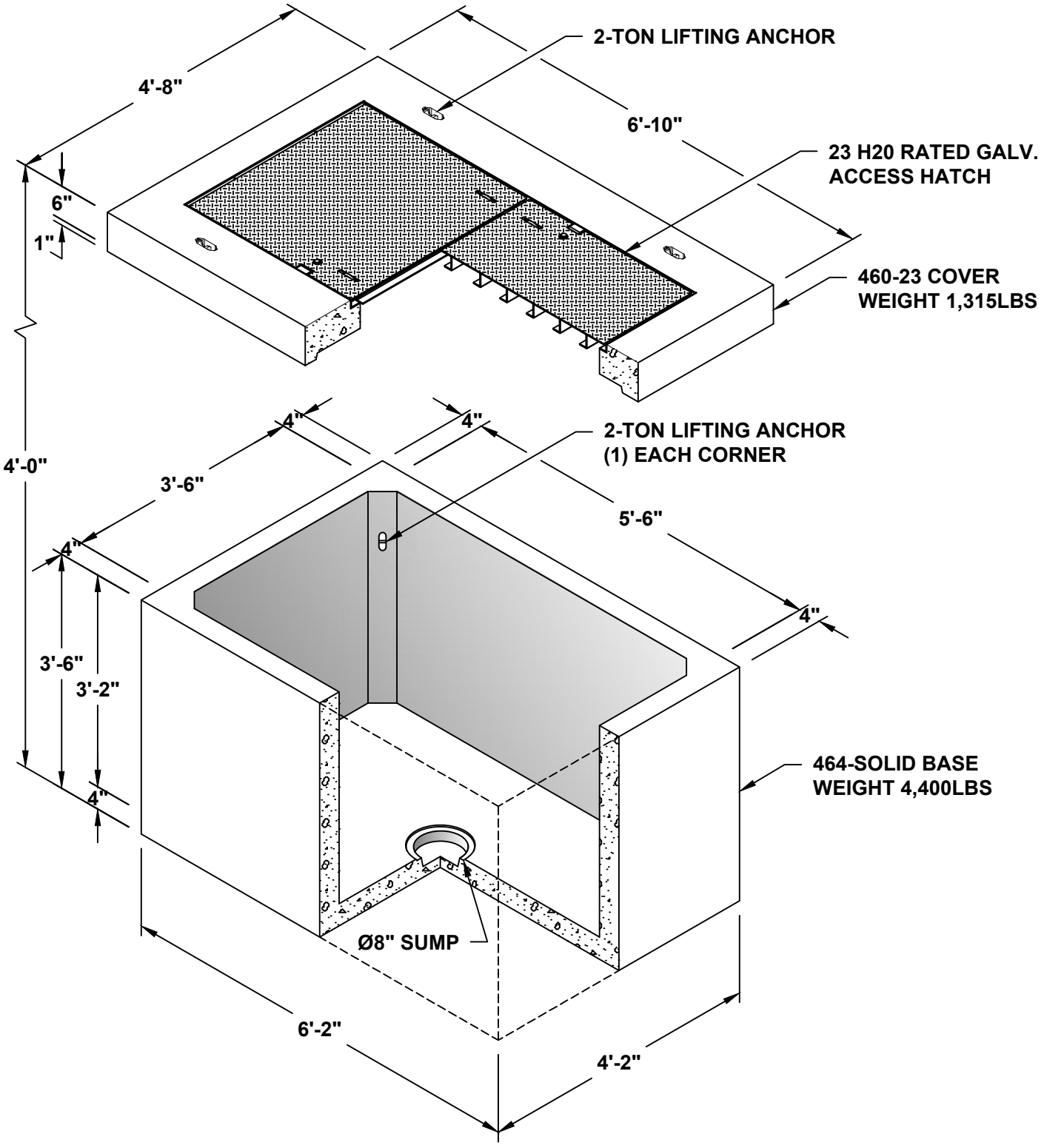

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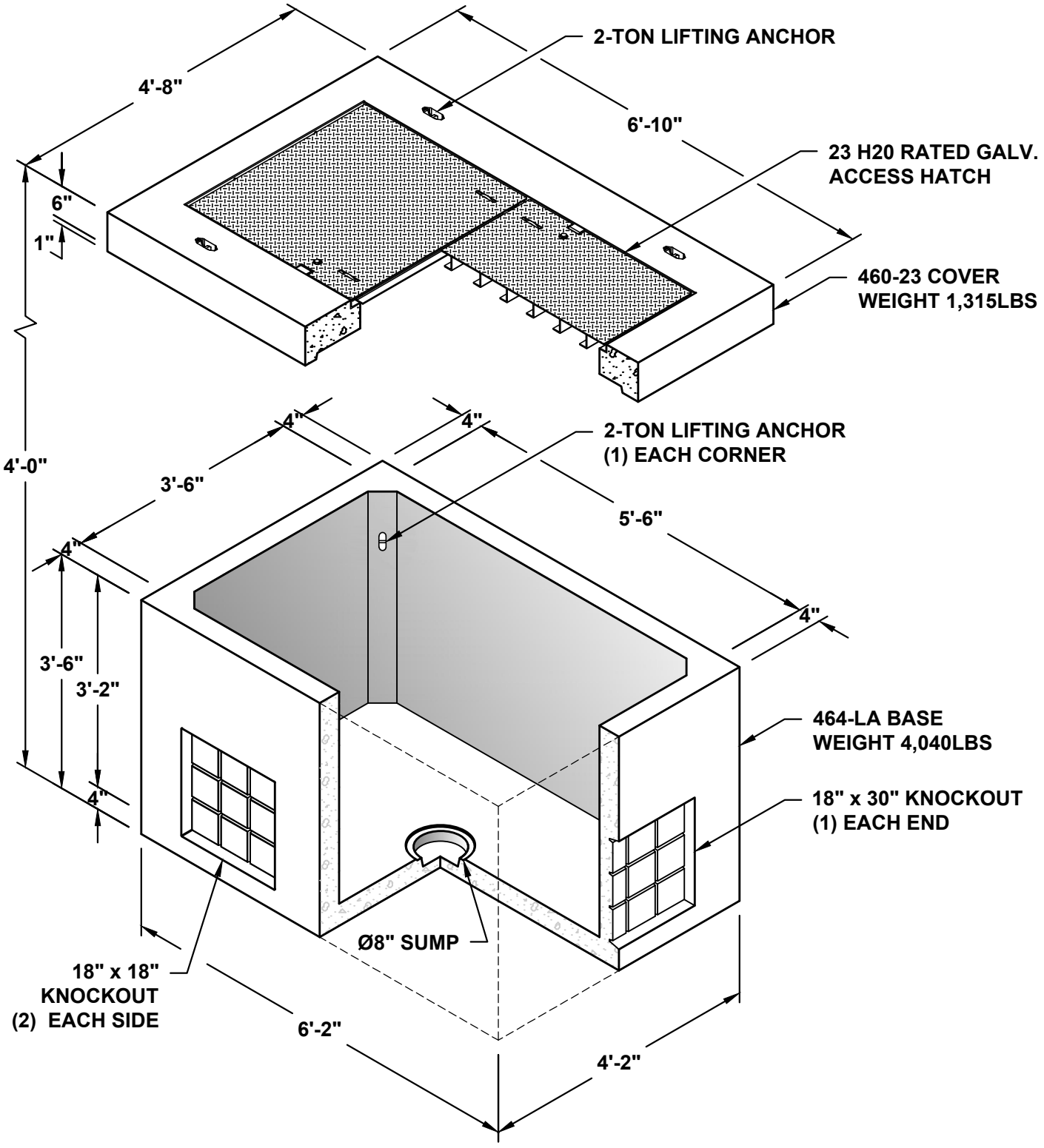

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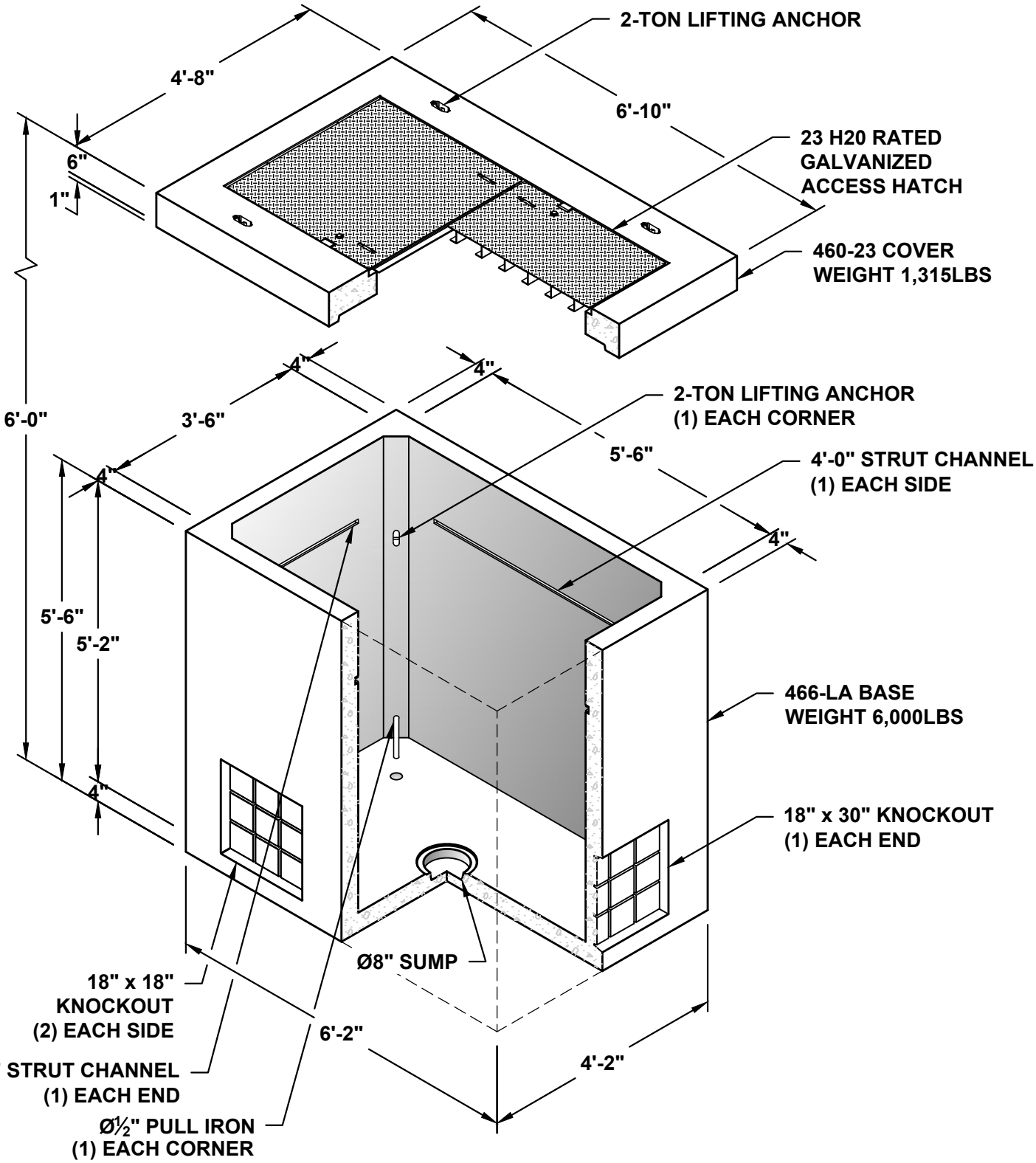
466 LA-23 VAULT



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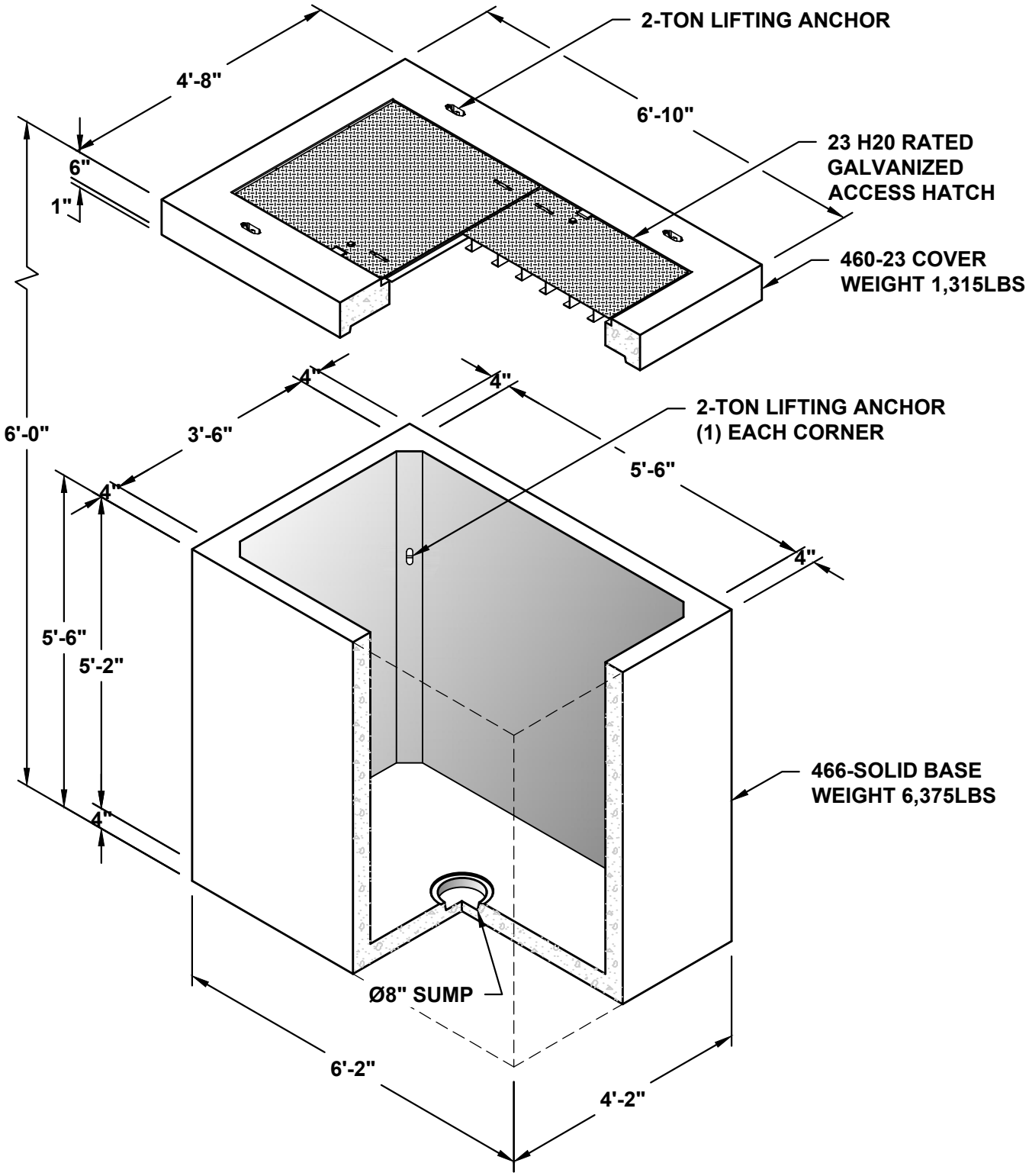

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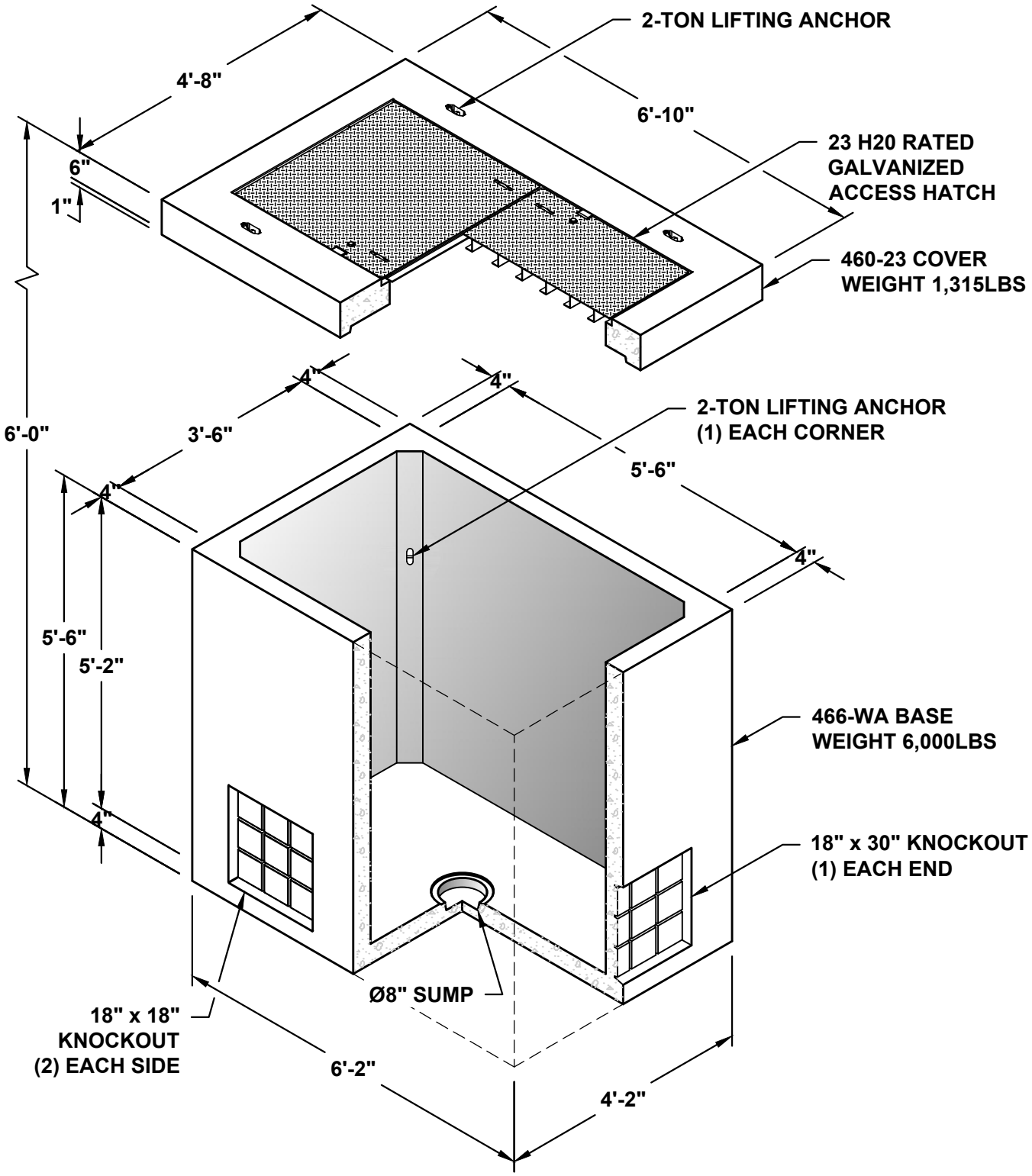

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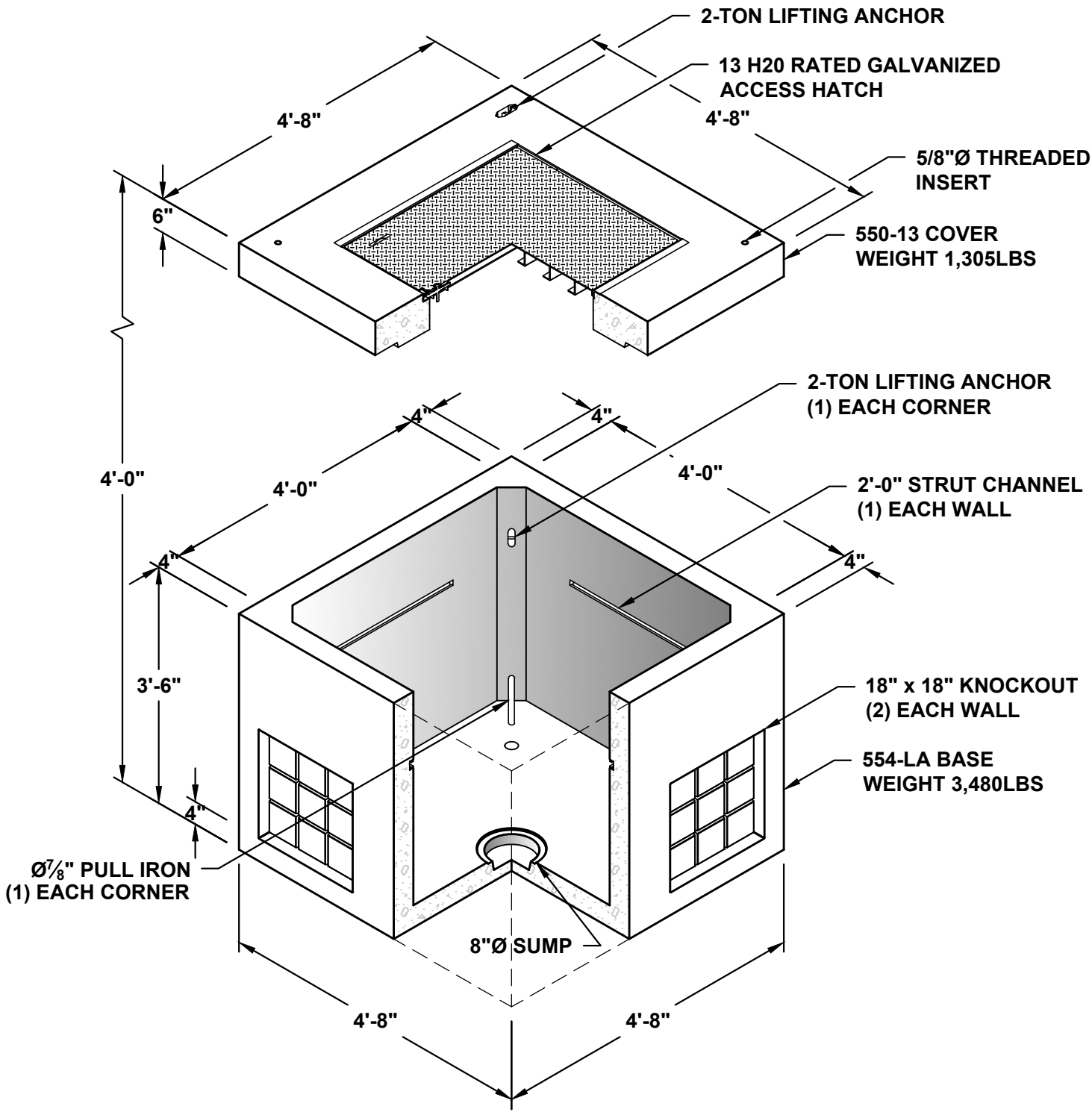
554 LA-13 VAULT



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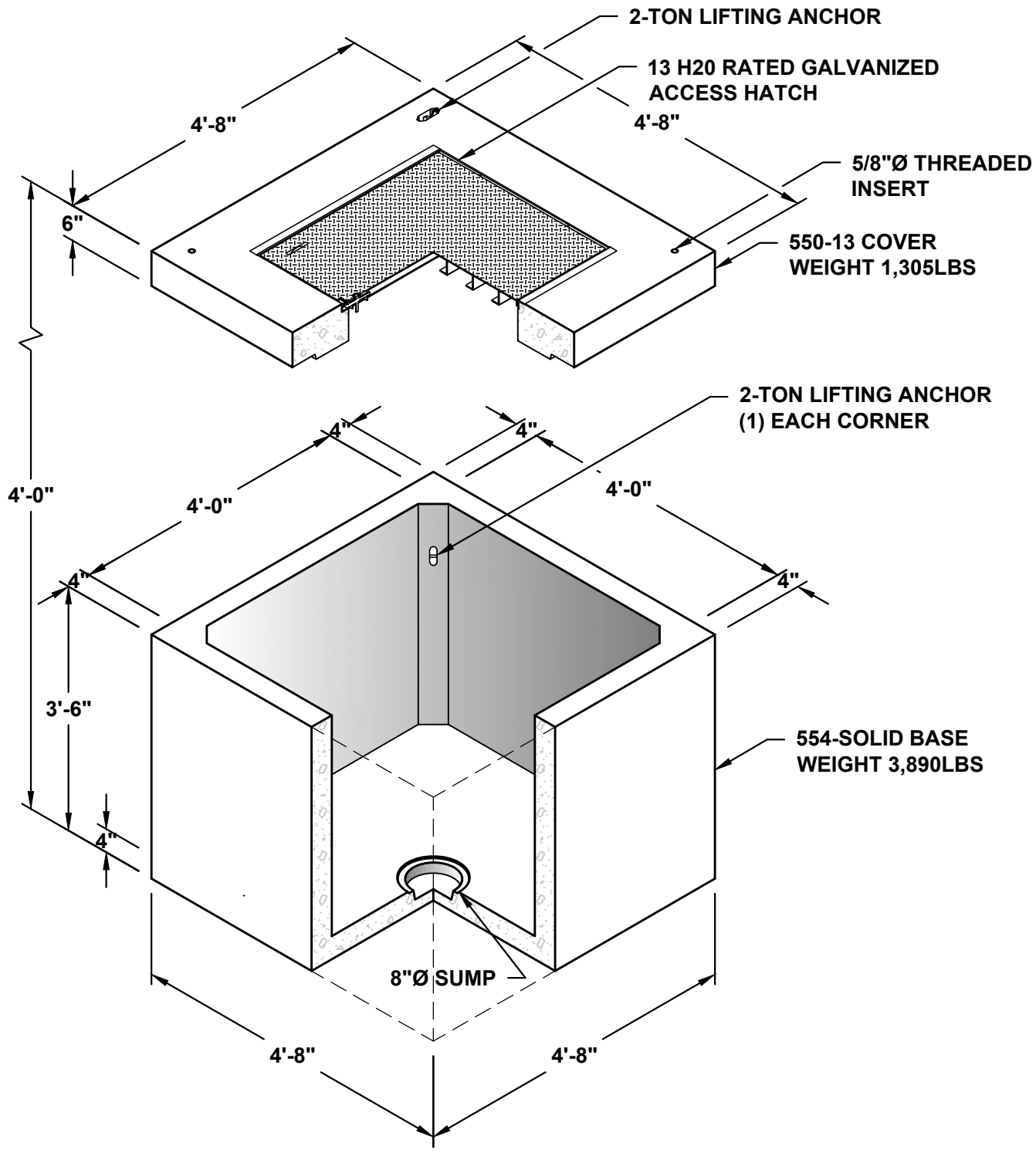

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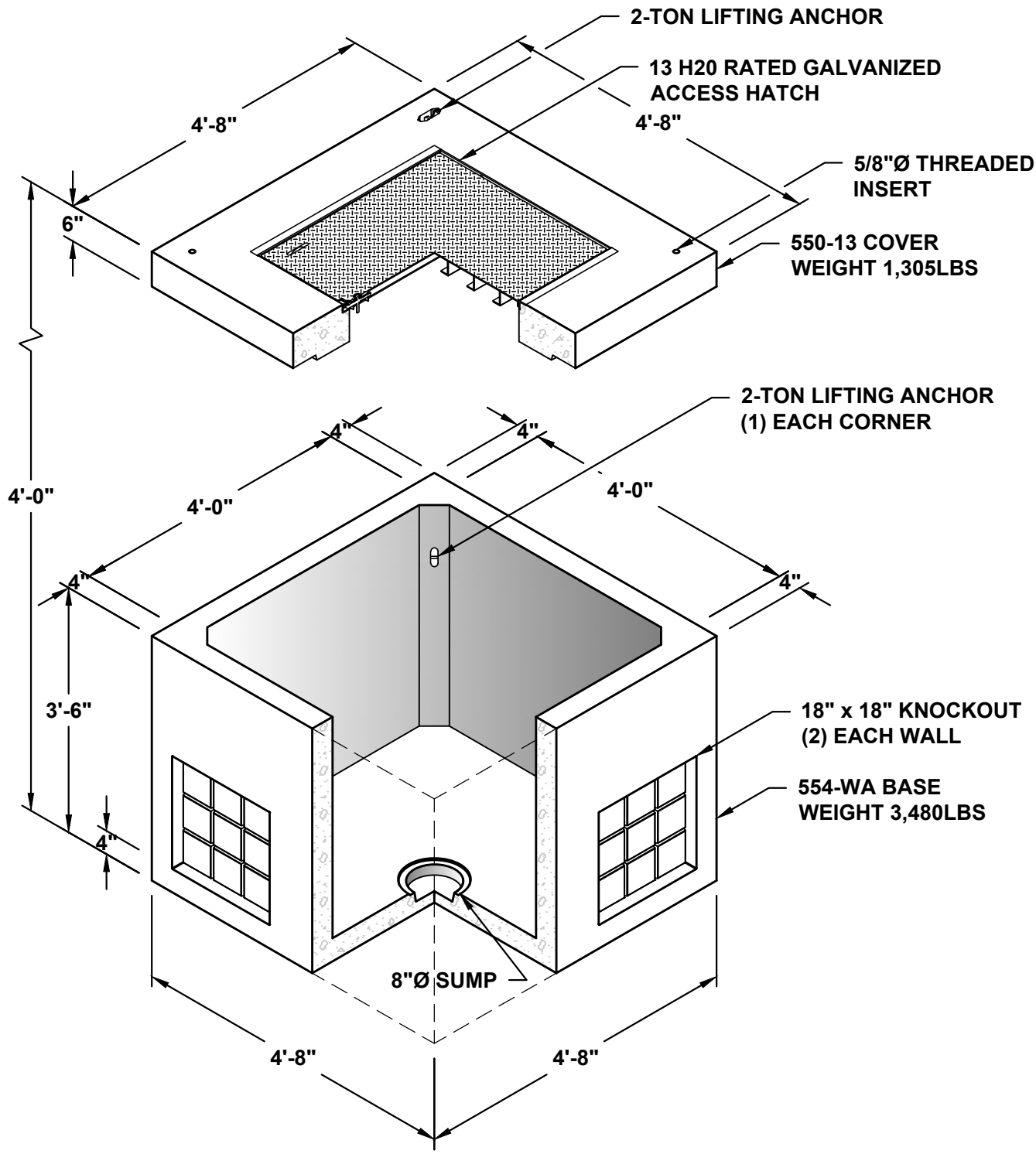

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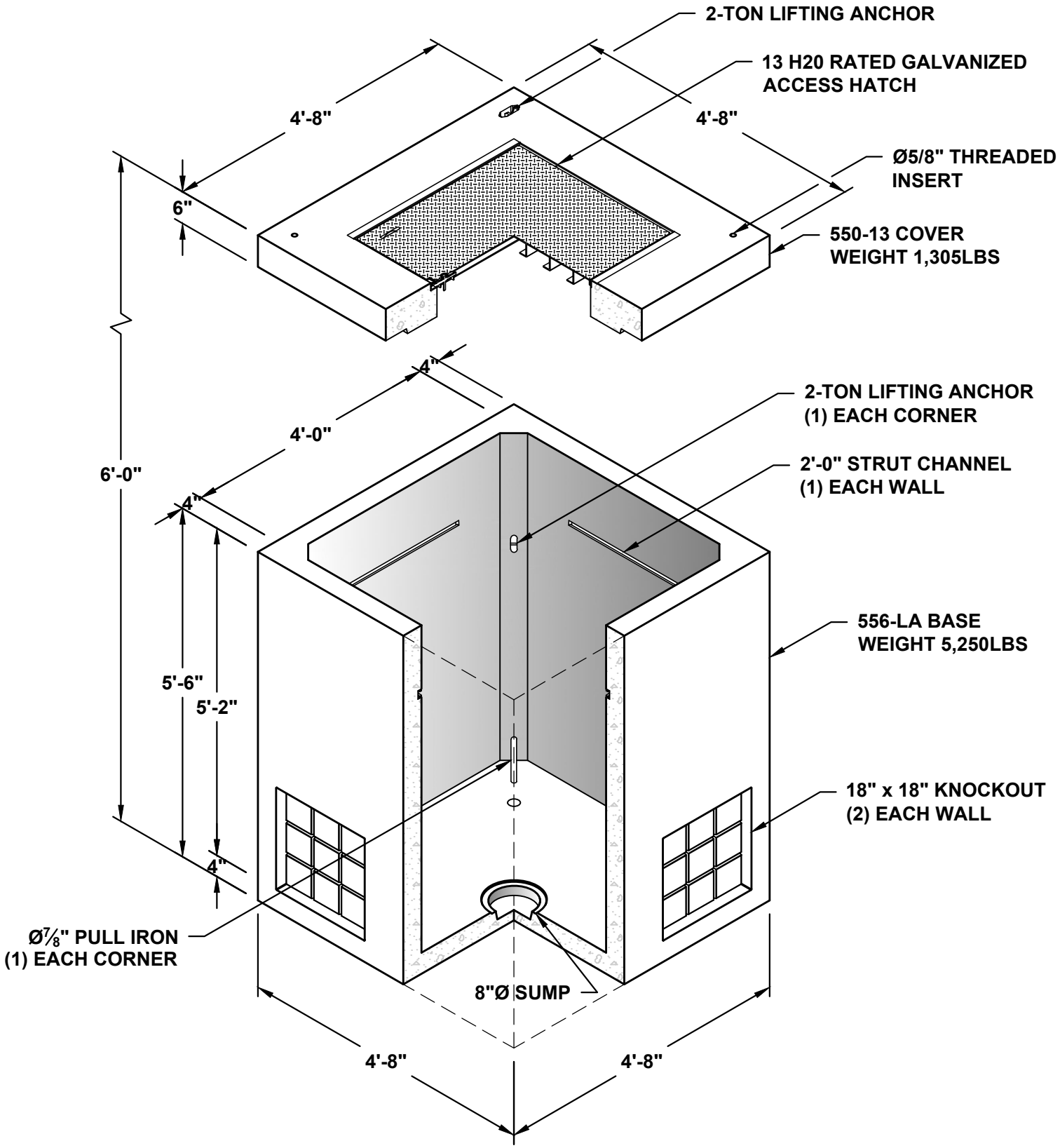
556 LA-13 VAULT



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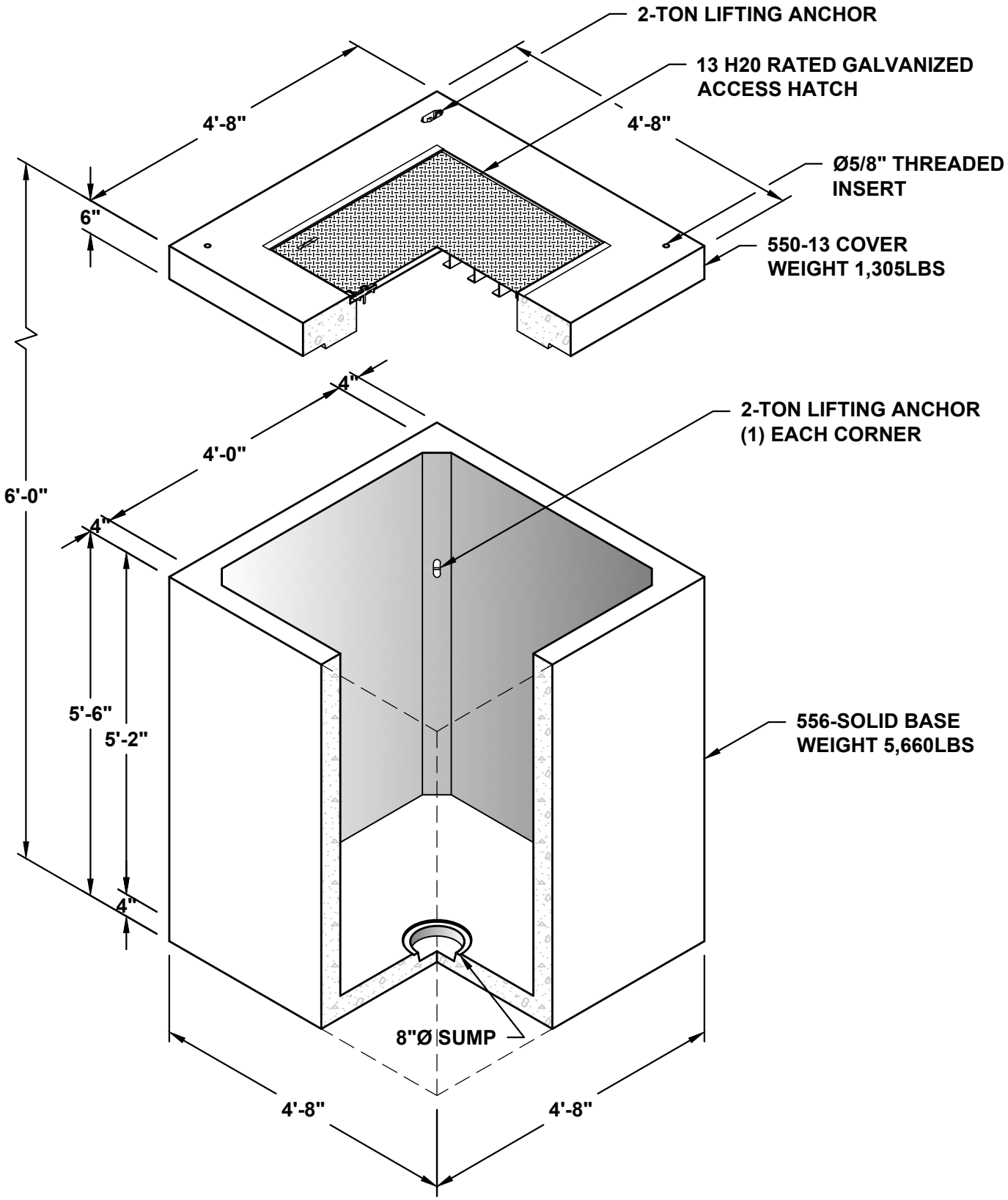
556 SOLID-13 VAULT



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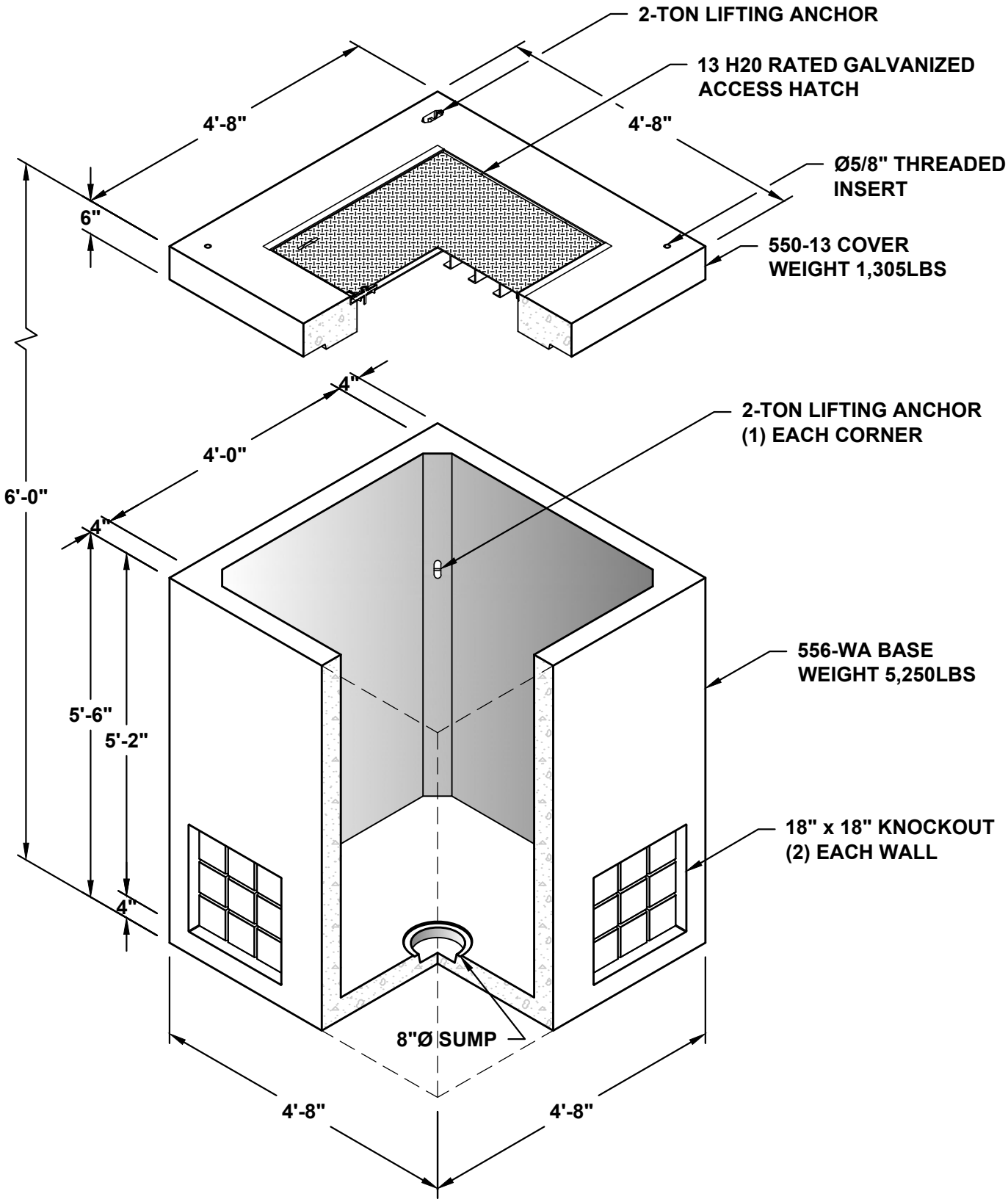
556 WA-13 VAULT



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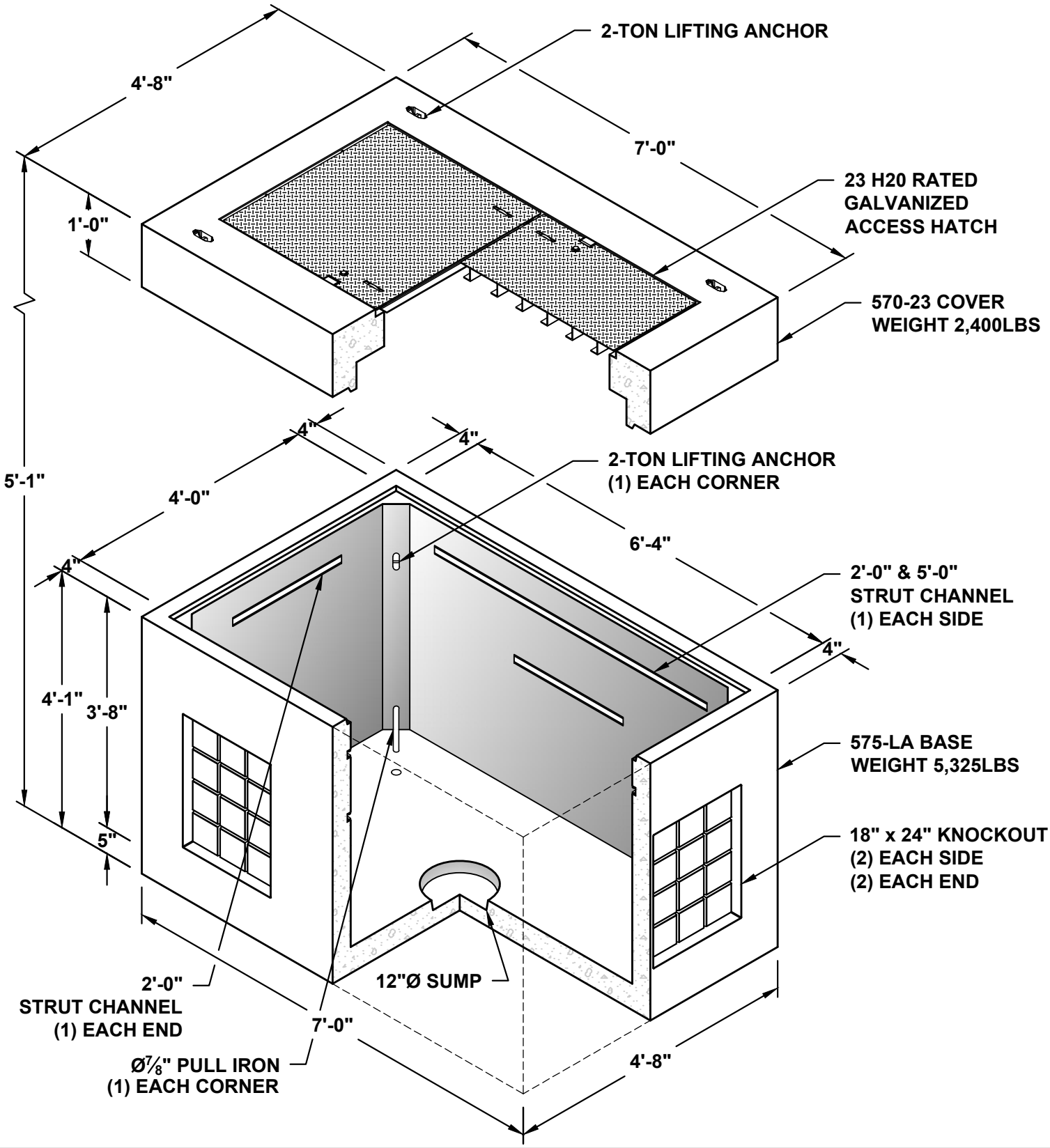
575 LA-23 VAULT



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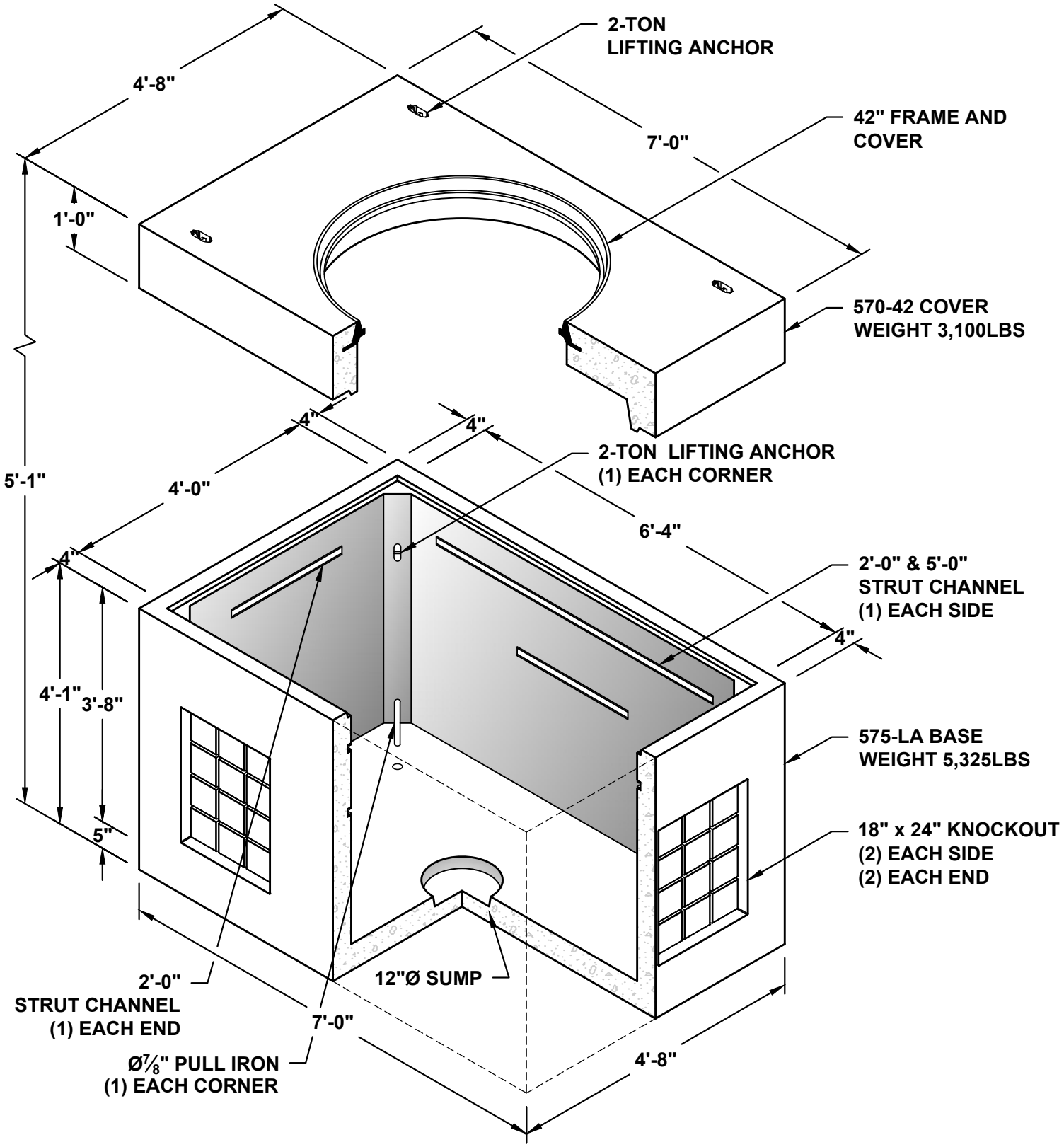
575 LA-42 VAULT



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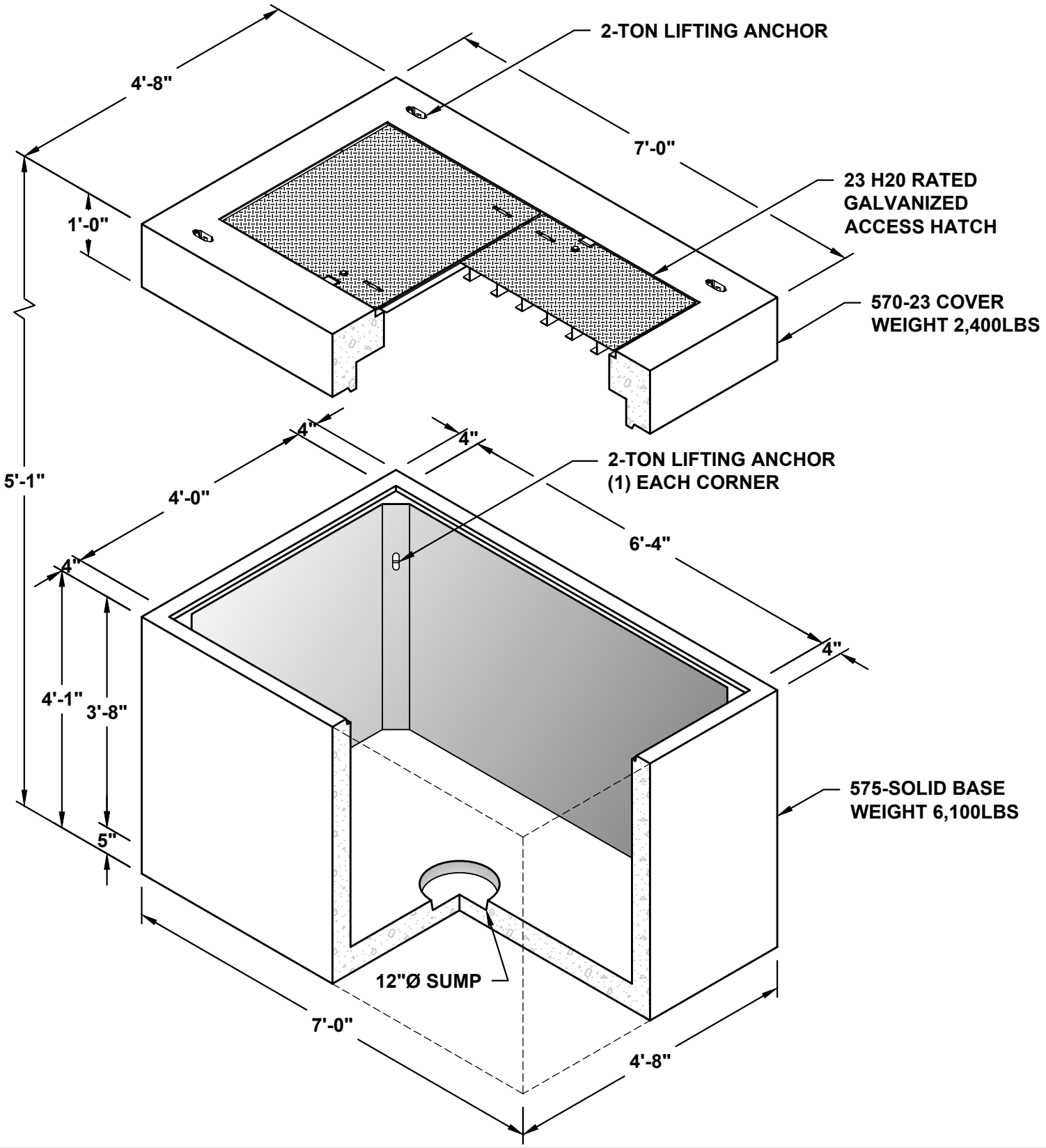
575 SOLID-23 VAULT



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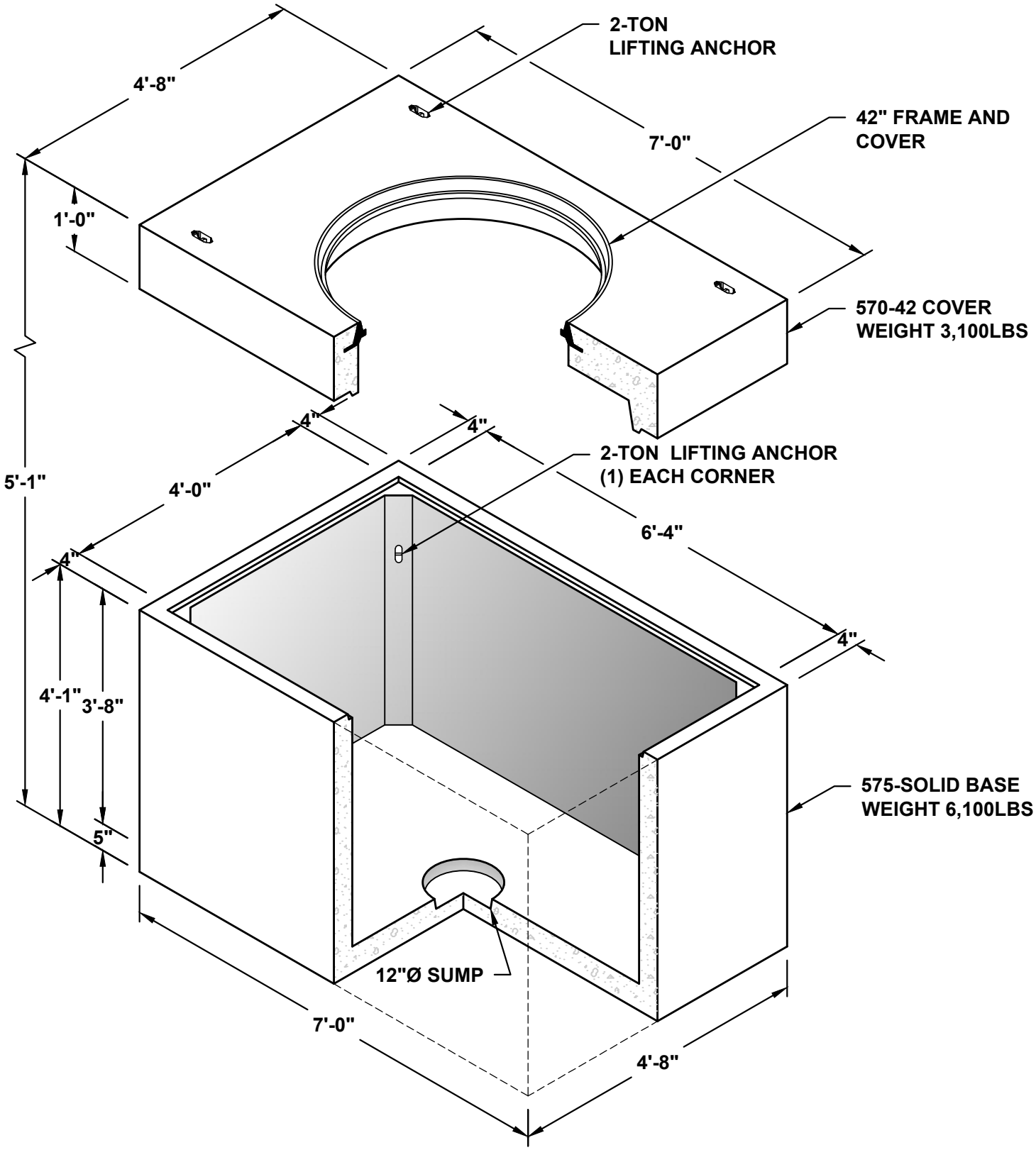

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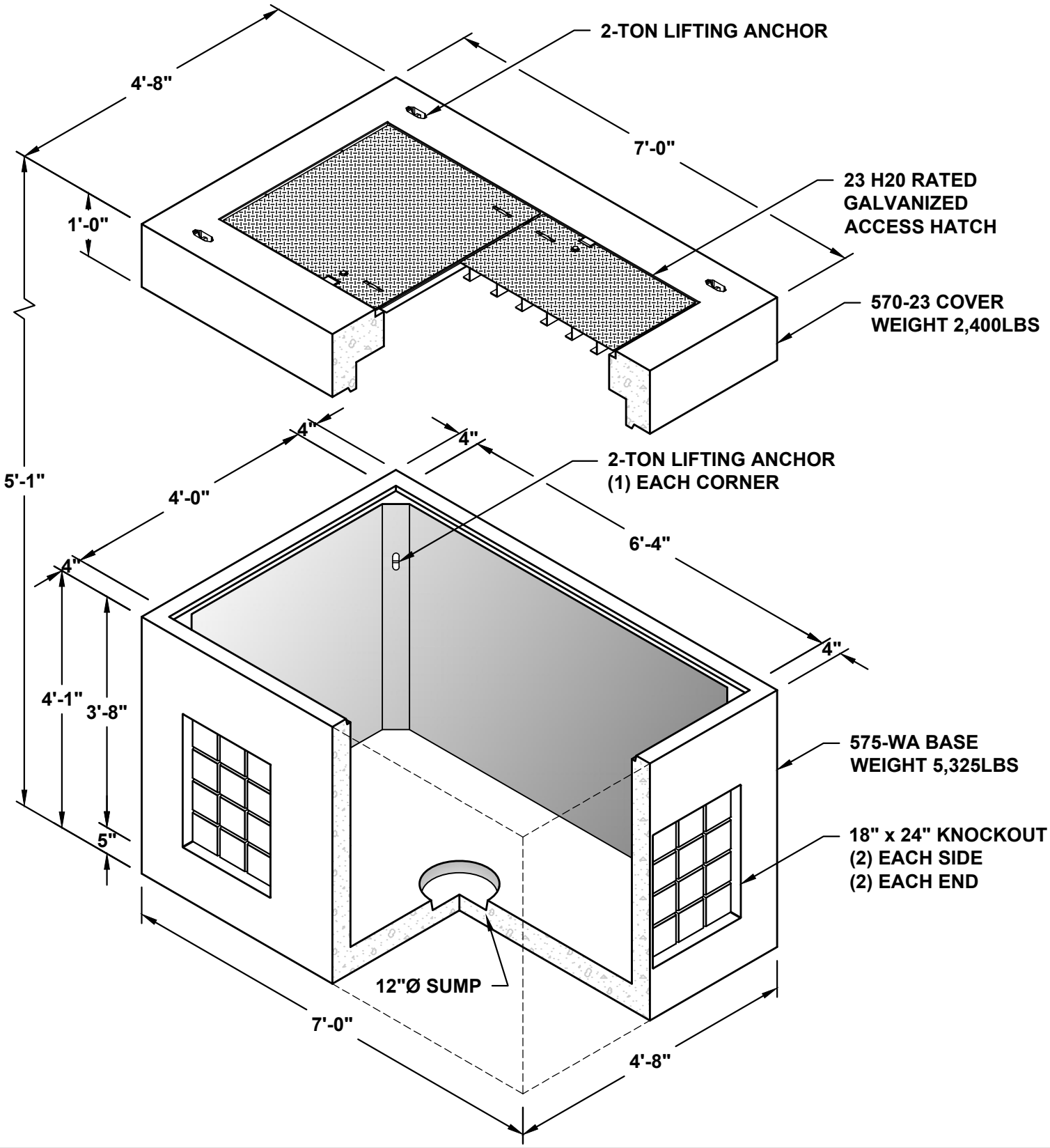
575 WA-23 VAULT



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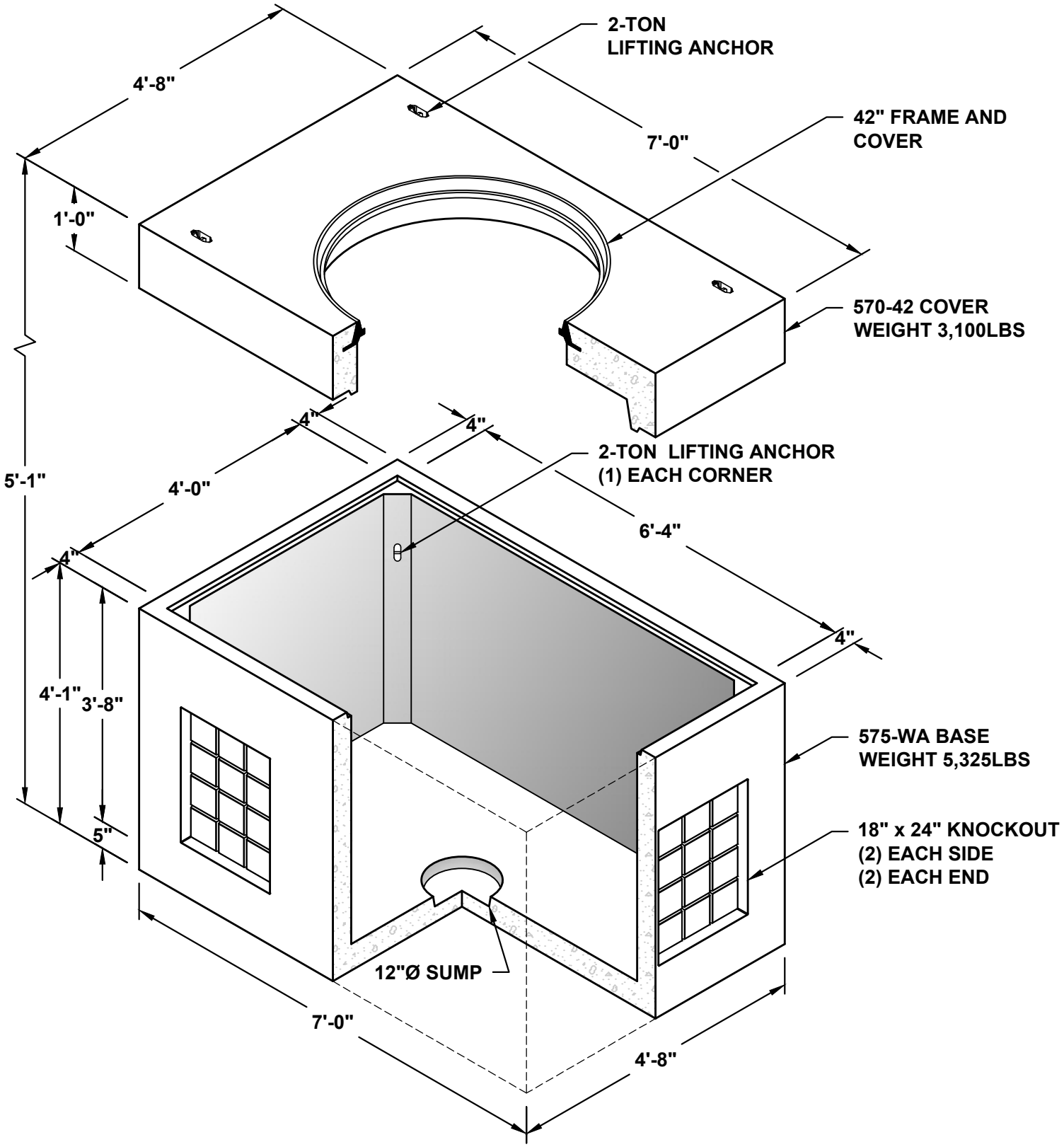
575 WA-42 VAULT



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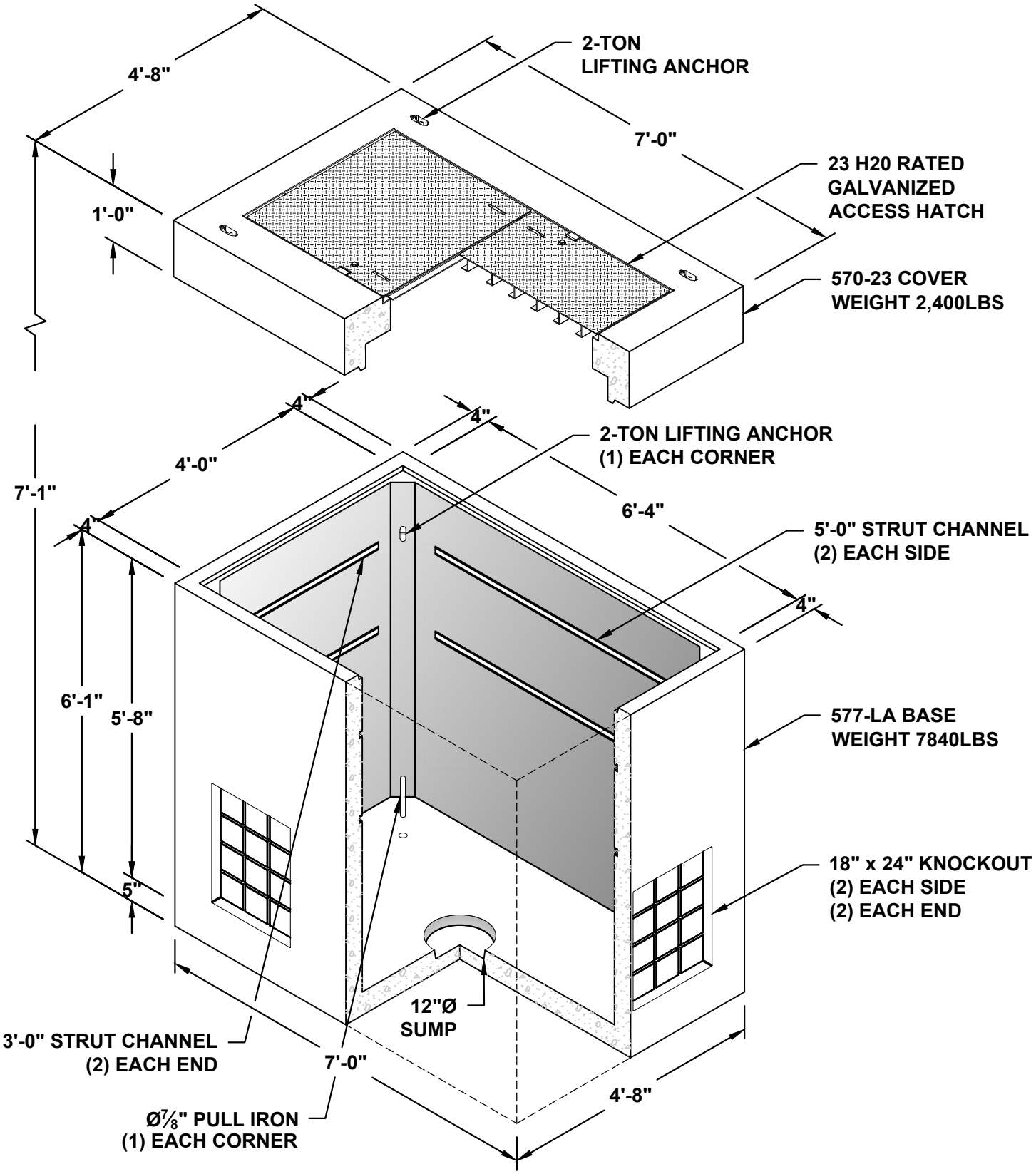
577 LA-23 VAULT



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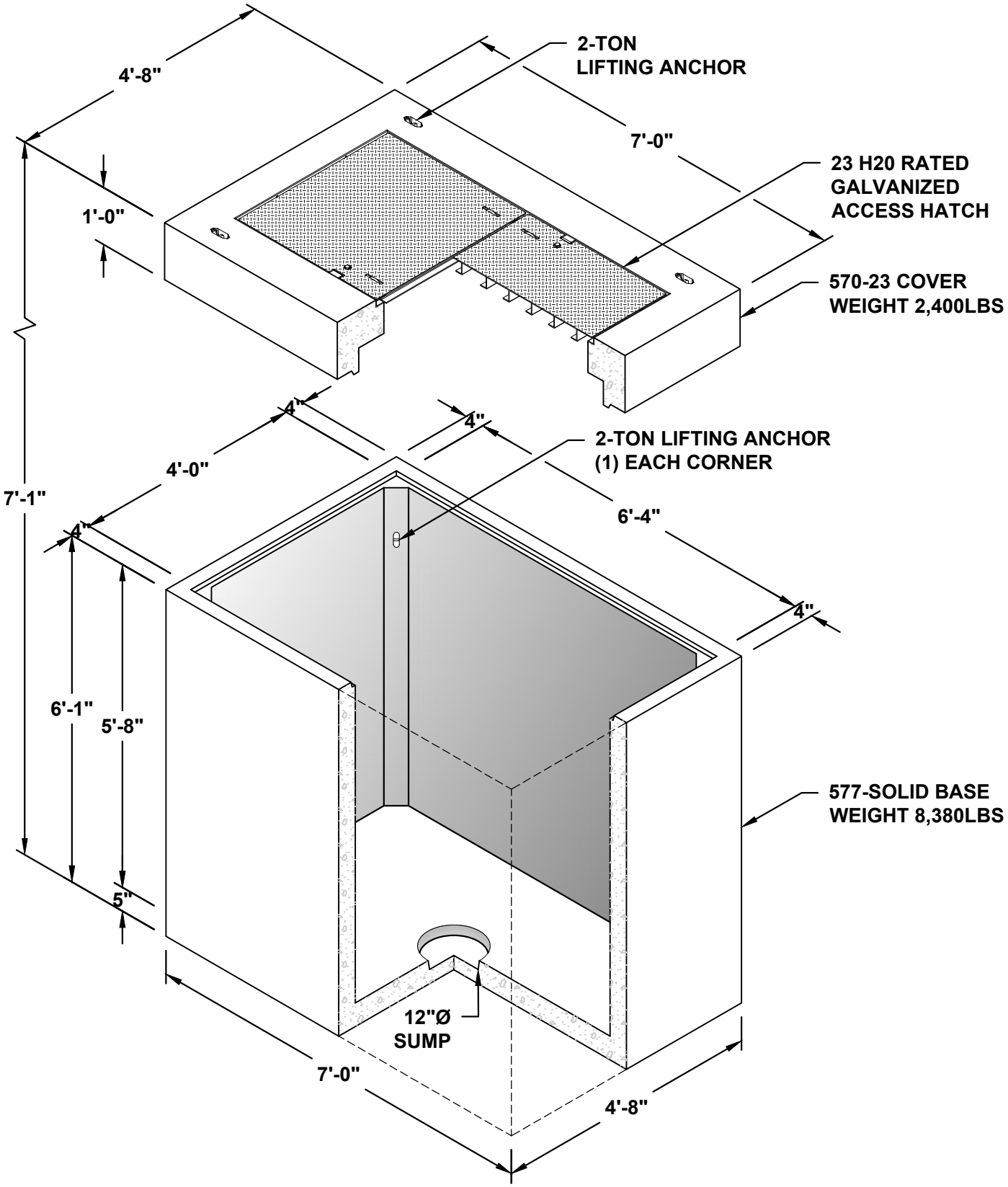
577 SOLID-23 VAULT



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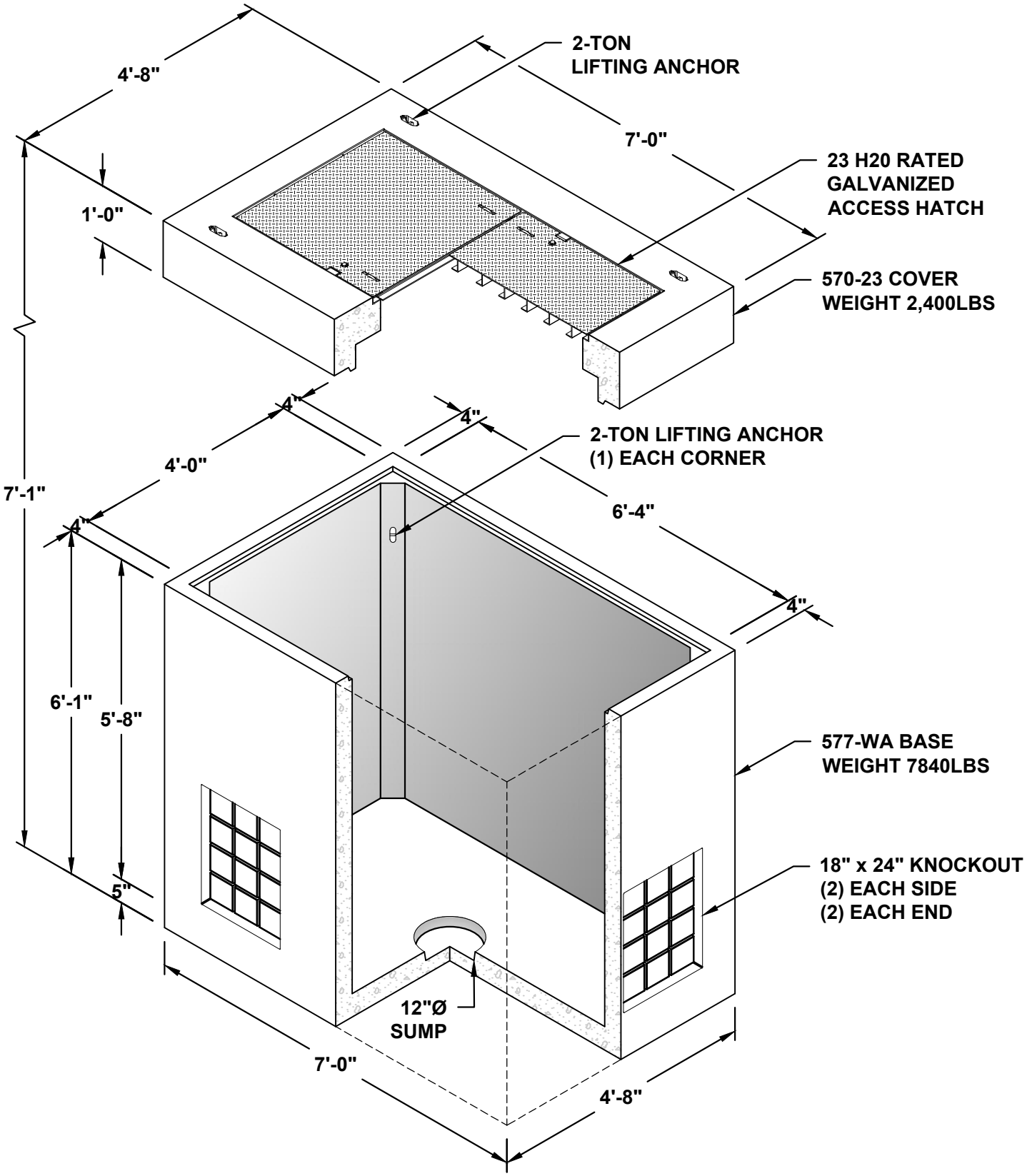
577 WA-23 VAULT



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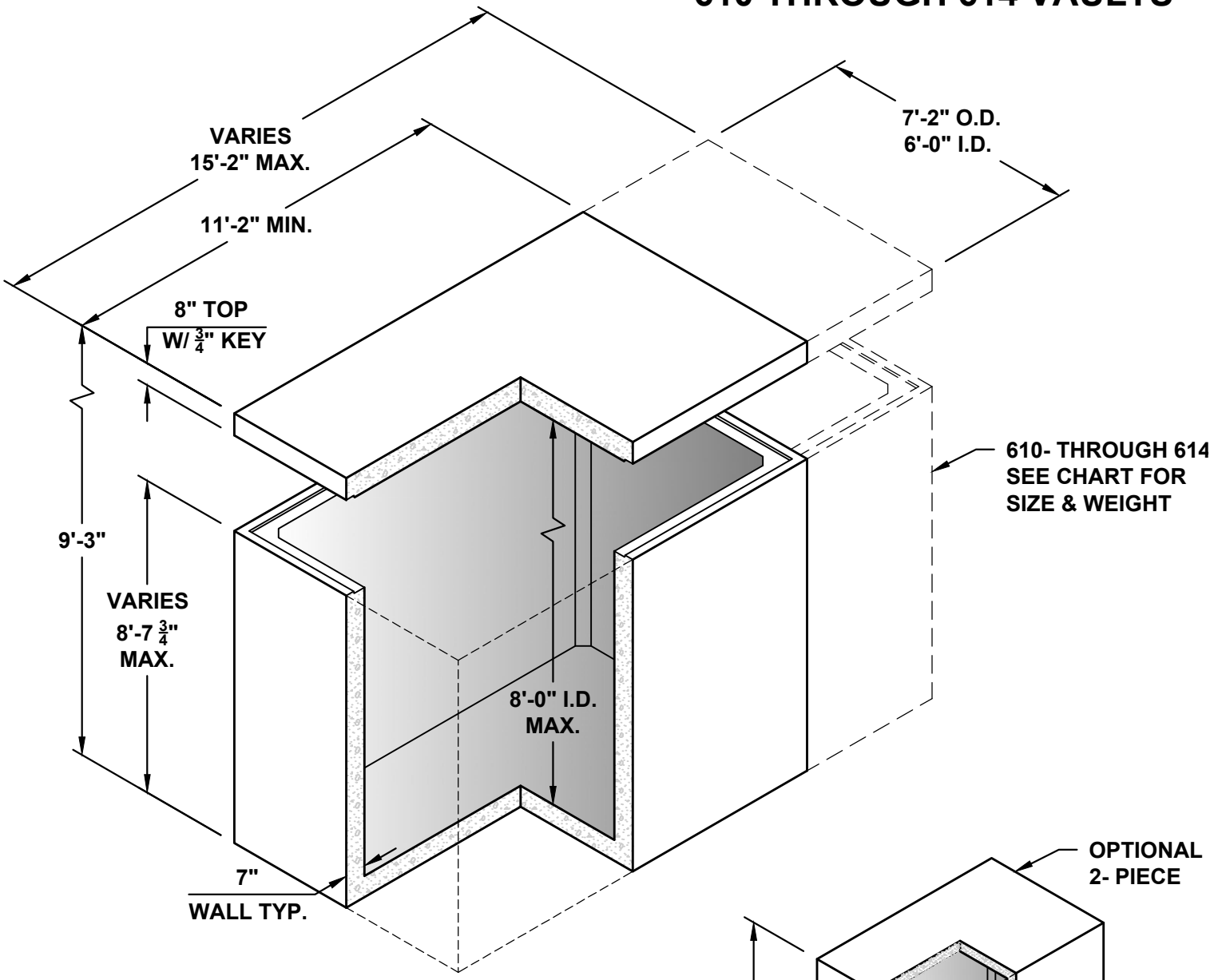
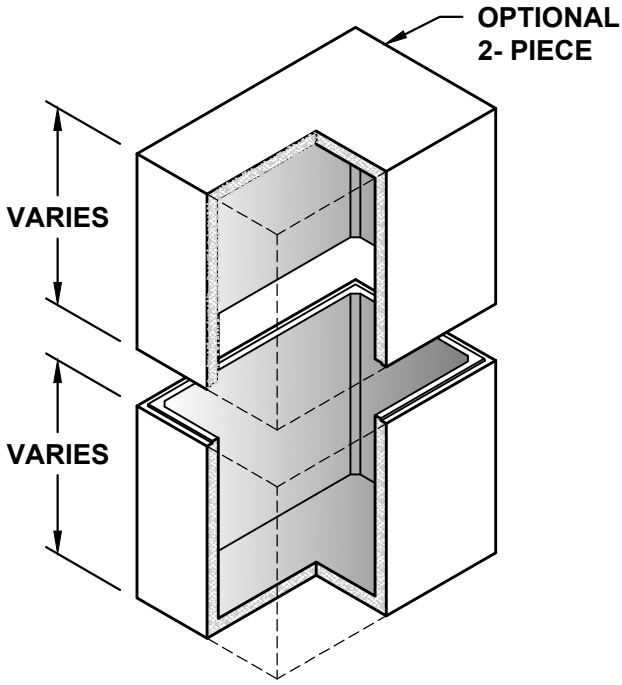
610 THROUGH 614 VAULTS





610 THROUGH 614 IN 2FT. INCREMENTS					
VAULT	WIDTH I.D.	LENGTH I.D.	HEIGHT I.D.	TOP WEIGHT	BASE WEIGHT
610	6'-0"	10'-0"	8'-0"	7,920 LBS	31,270 LBS
612	6'-0"	12'-0"	8'-0"	9,340 LBS	35,320 LBS
614	6'-0"	14'-0"	8'-0"	10,750 LBS	39,380 LBS

NOTE:
WEIGHTS BASED ON 7" FLOOR AND 8" TOP SLAB

NOTE:
HEIGHT OF BASE AND TOP ADJUSTABLE, 8'-0" I.D. MAX EACH SECTION, BASE FLOOR AND TOP DECK THICKNESS AS REQUIRED.
OPTIONAL TOP ACCESS, MANHOLE FRAME & COVERS, AND HATCHES AS NEEDED.
VARIOUS SIZES AVAILABLE.
OPTIONAL ACCESSORIES: STRUT CHANNEL, SUMPS, INSERTS, LADDERS, ETC.

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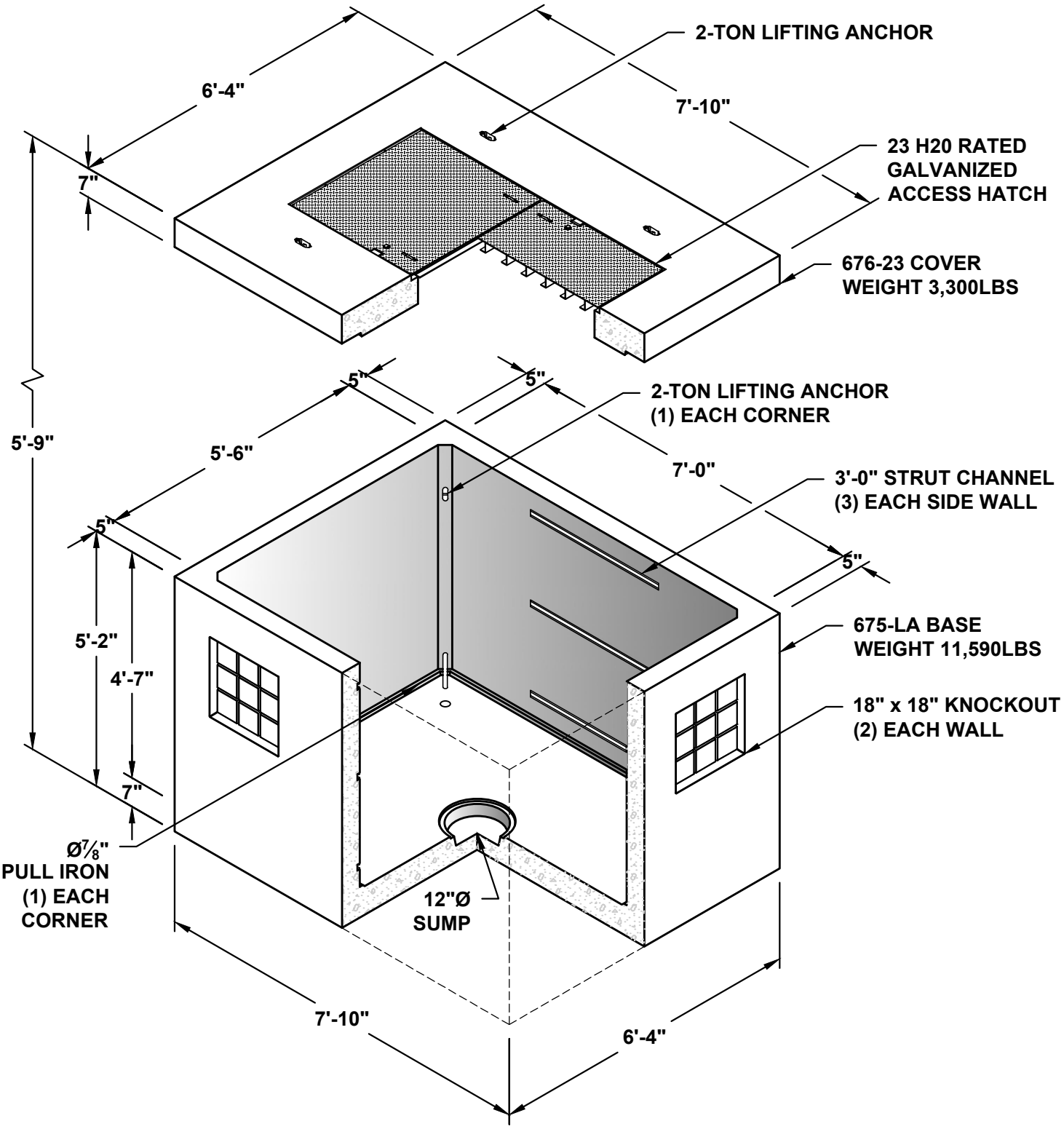
675 LA-23 VAULT



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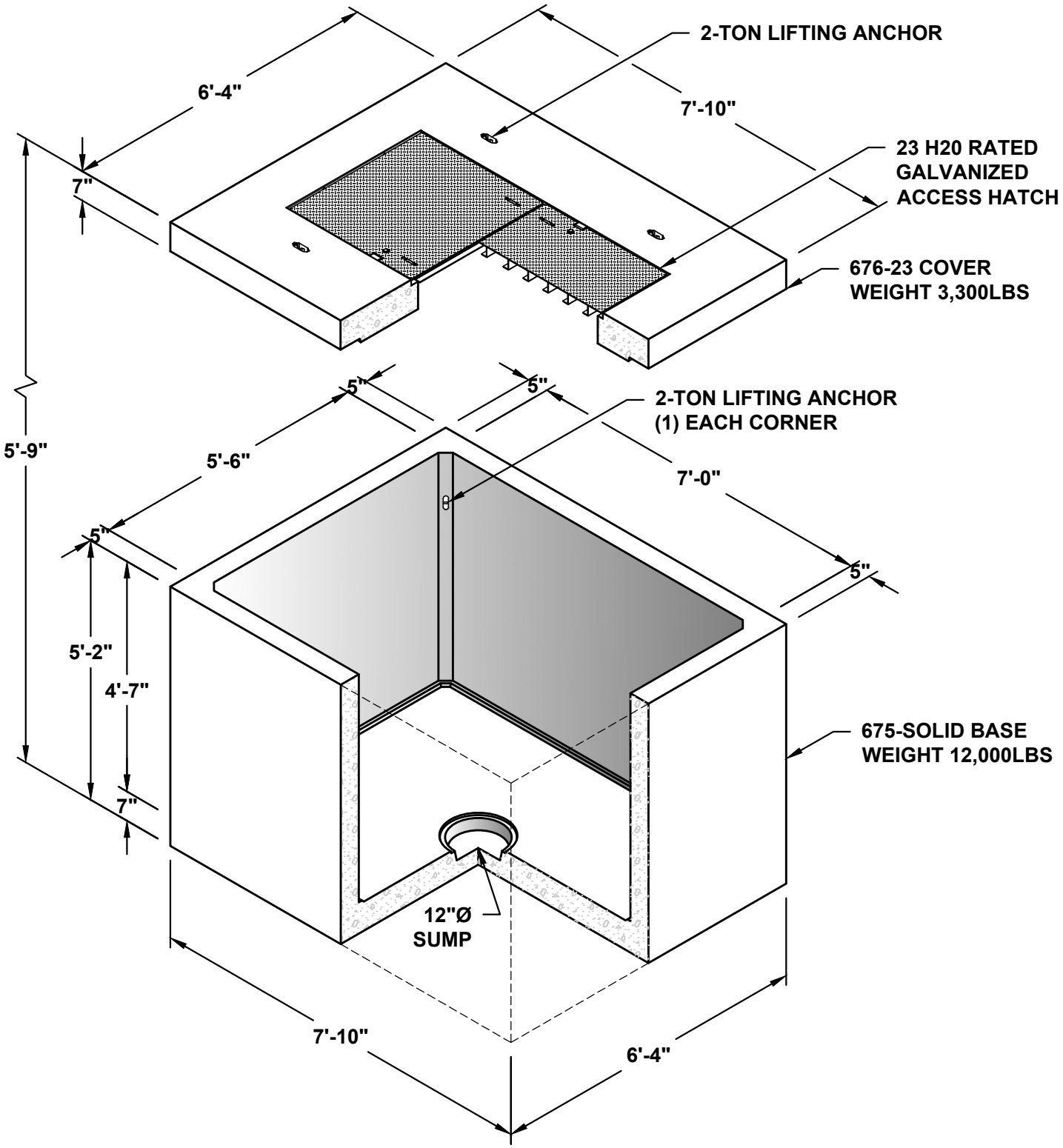
675 SOLID-23 VAULT



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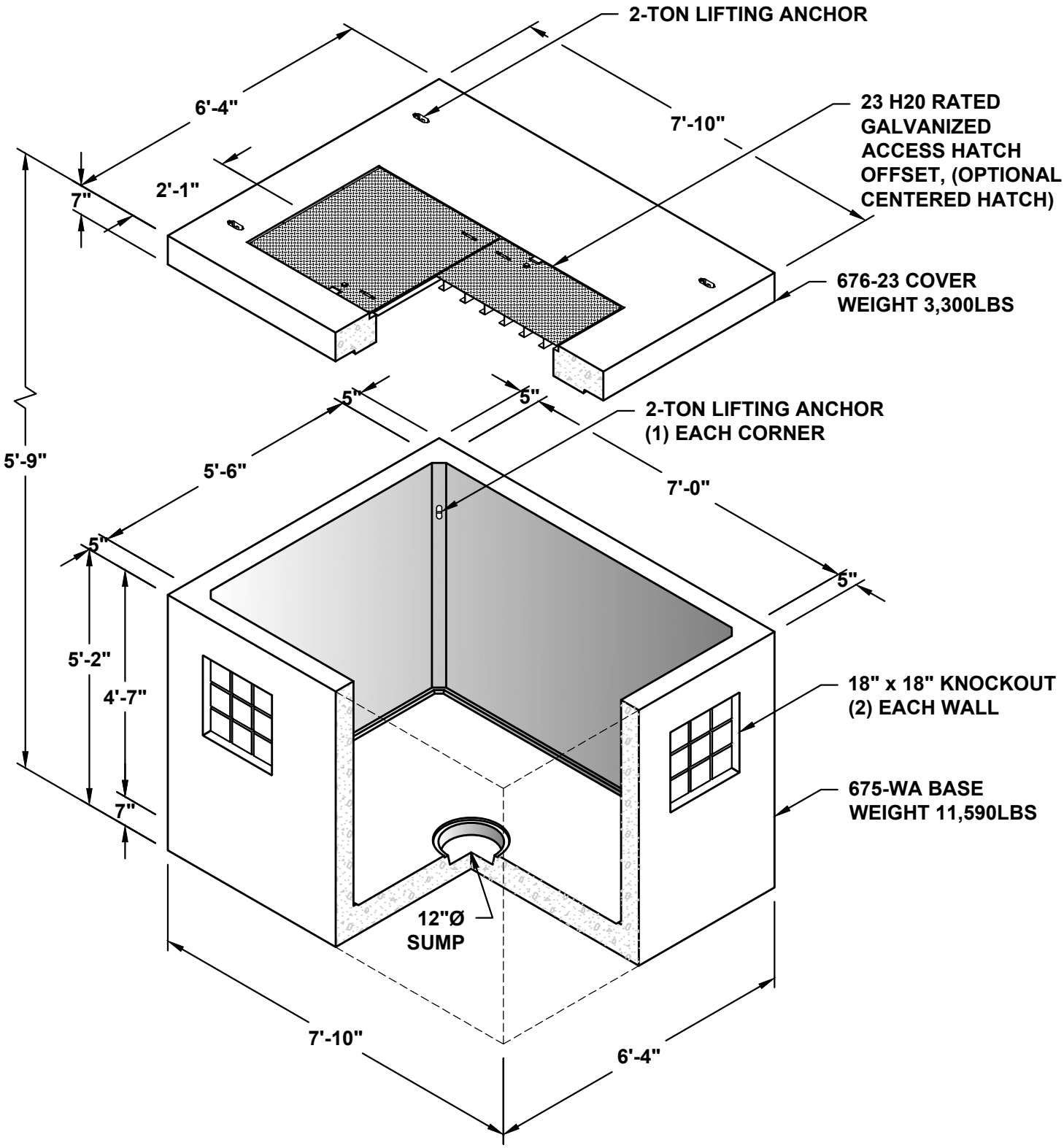
675 WA-23 VAULT



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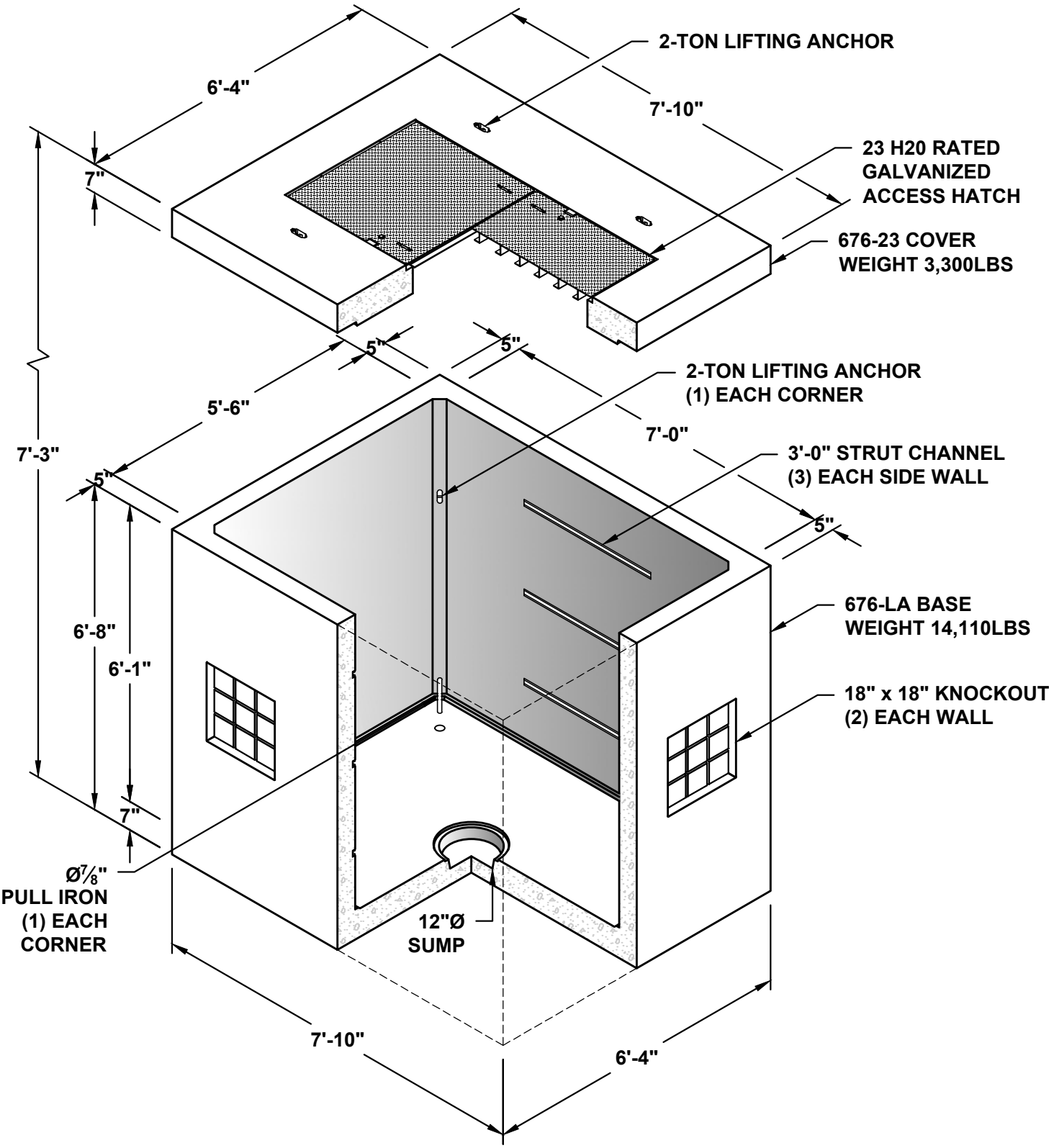
676 LA-23 VAULT



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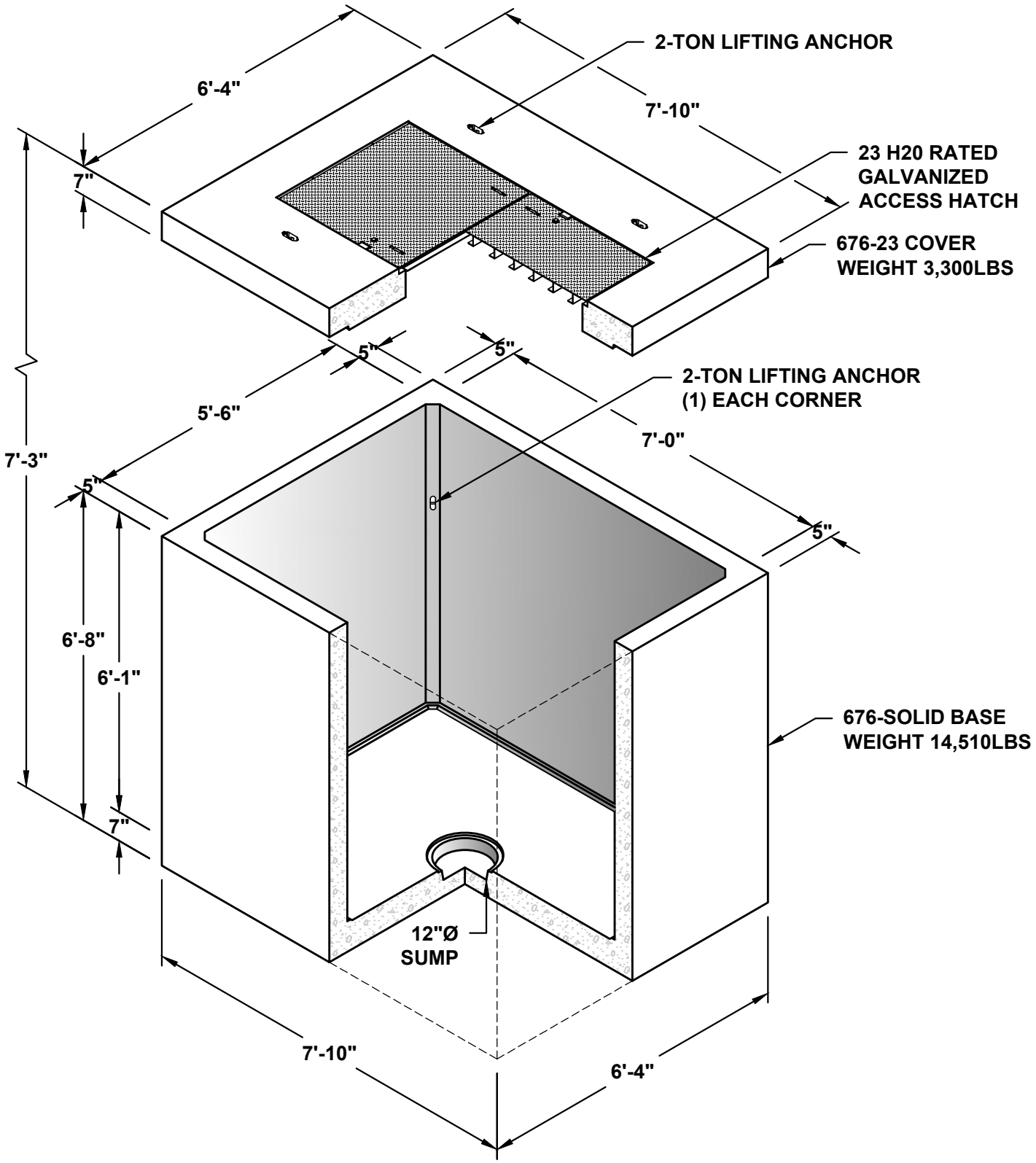
676 SOLID-23 VAULT



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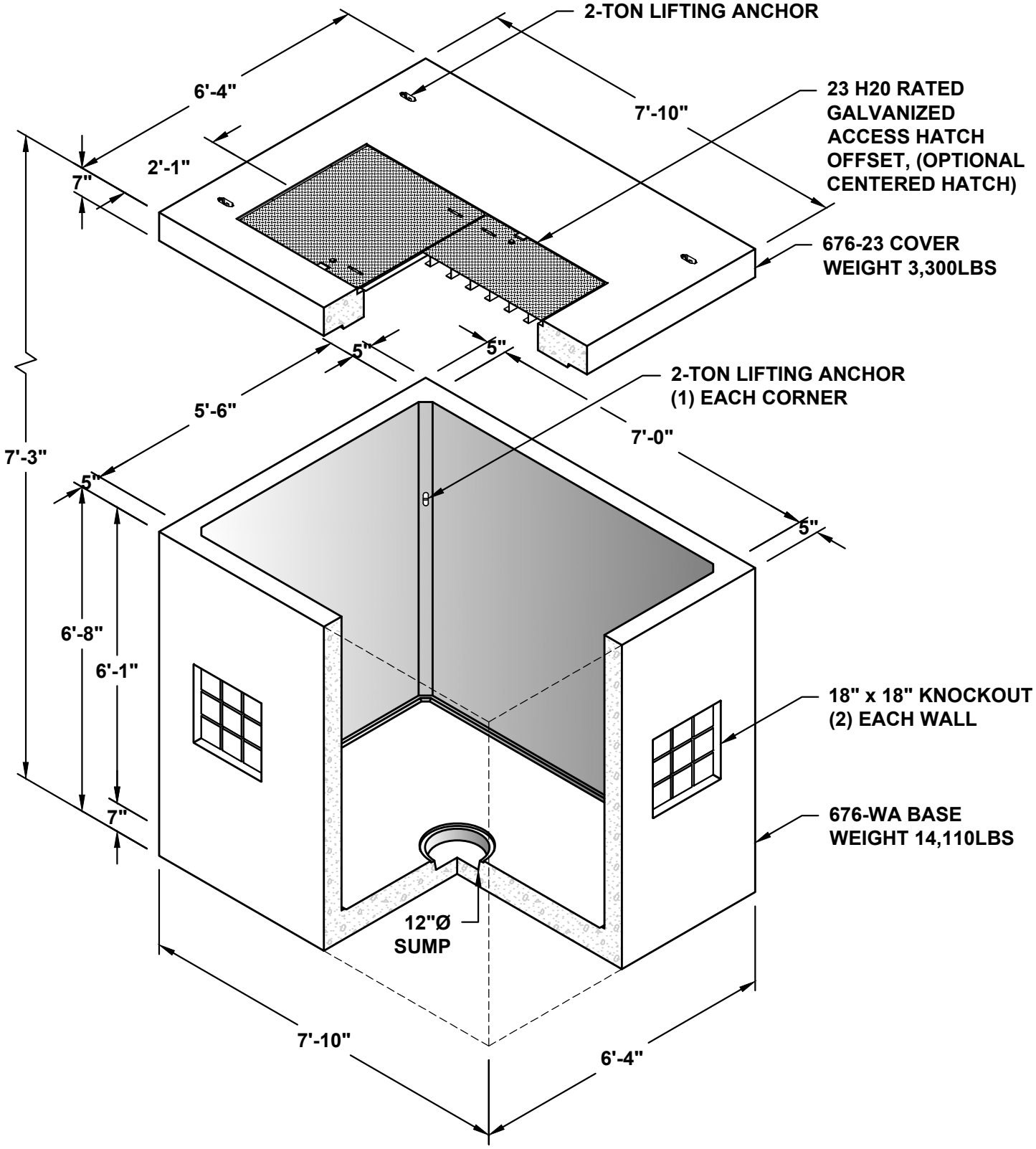
676 WA-23 VAULT



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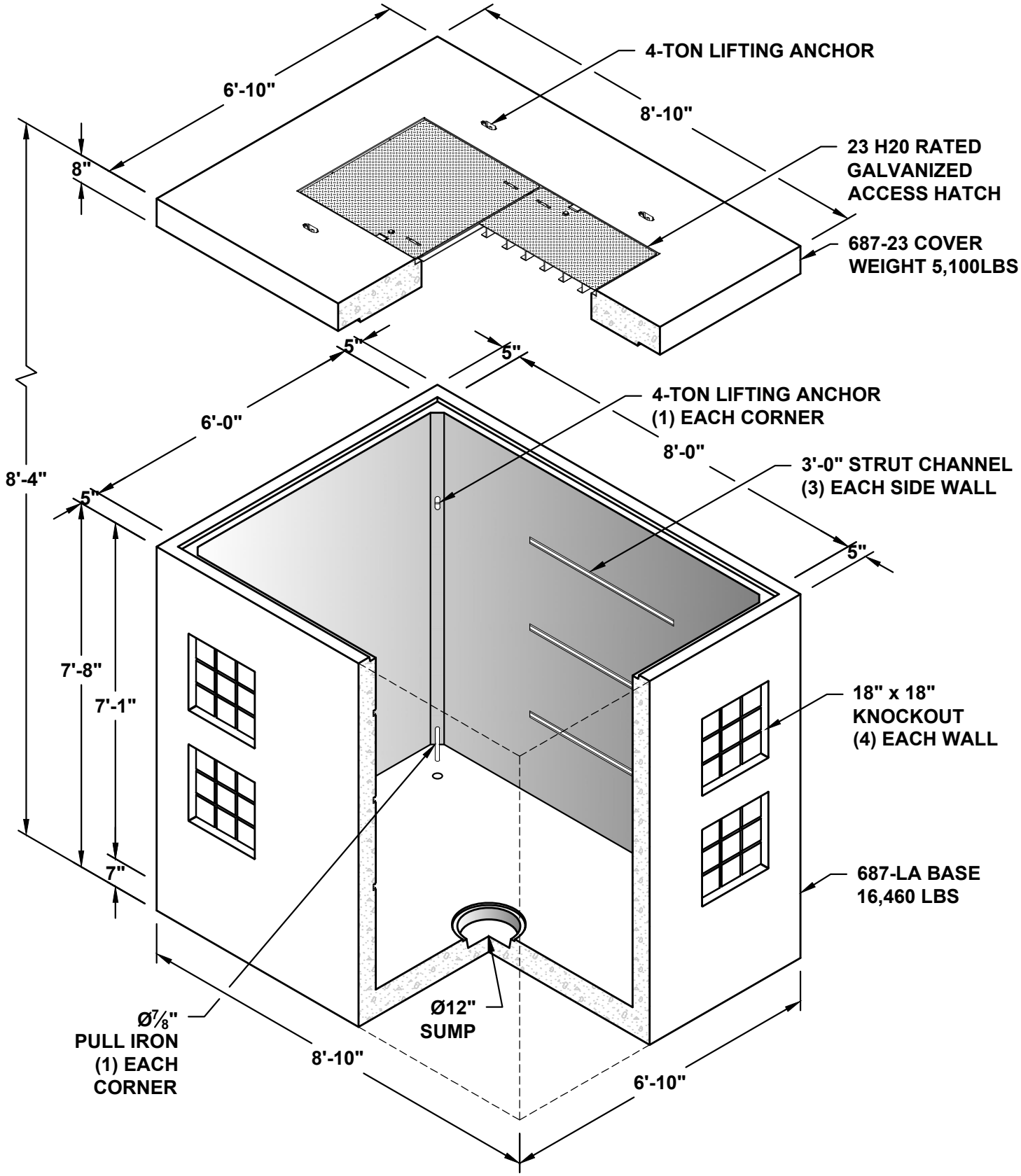
Email: sales@rvpor.com

Web: rvpor.com

687 LA-23 VAULT



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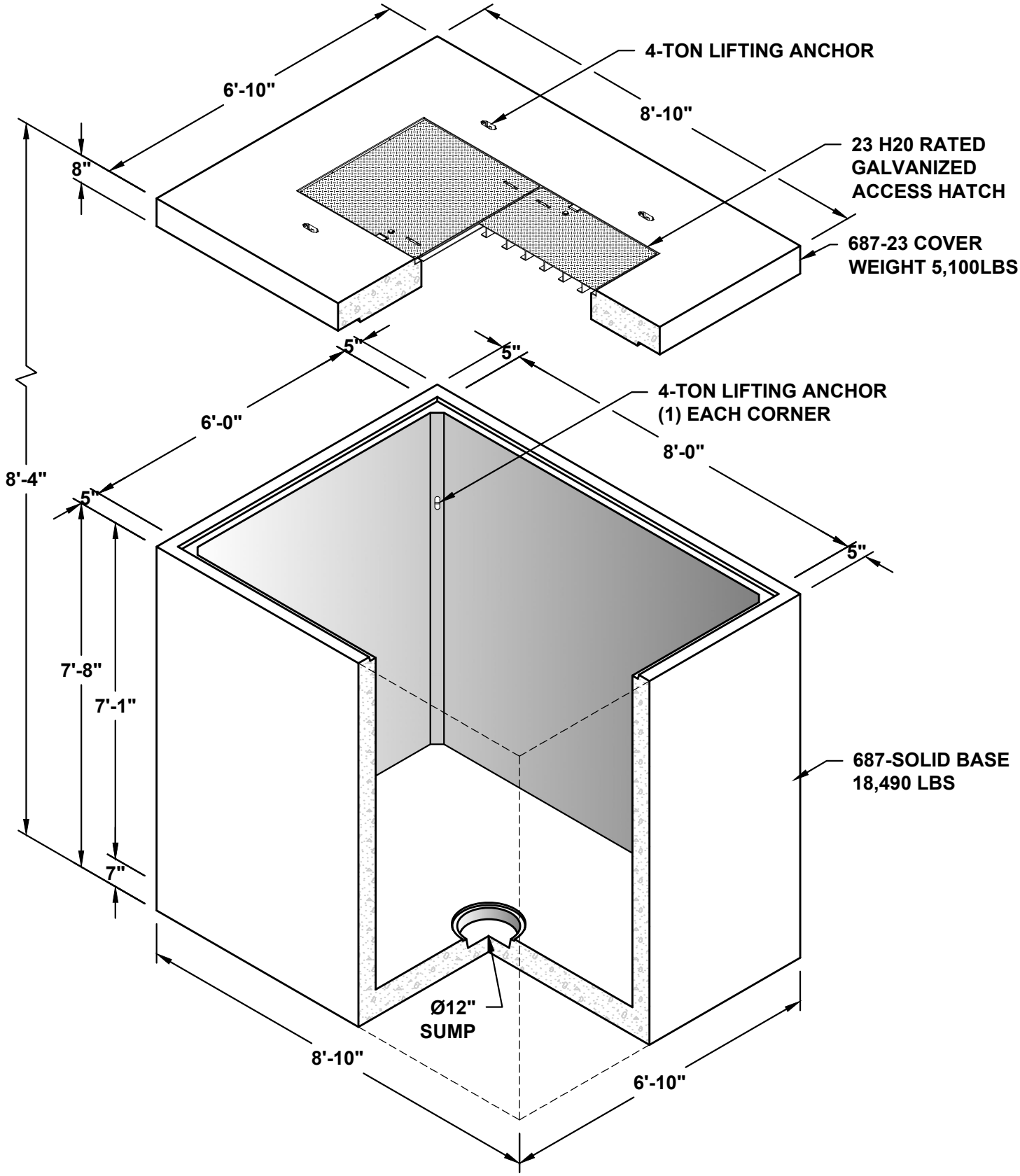
Web: rvpor.com

687 SOLID-23 VAULT



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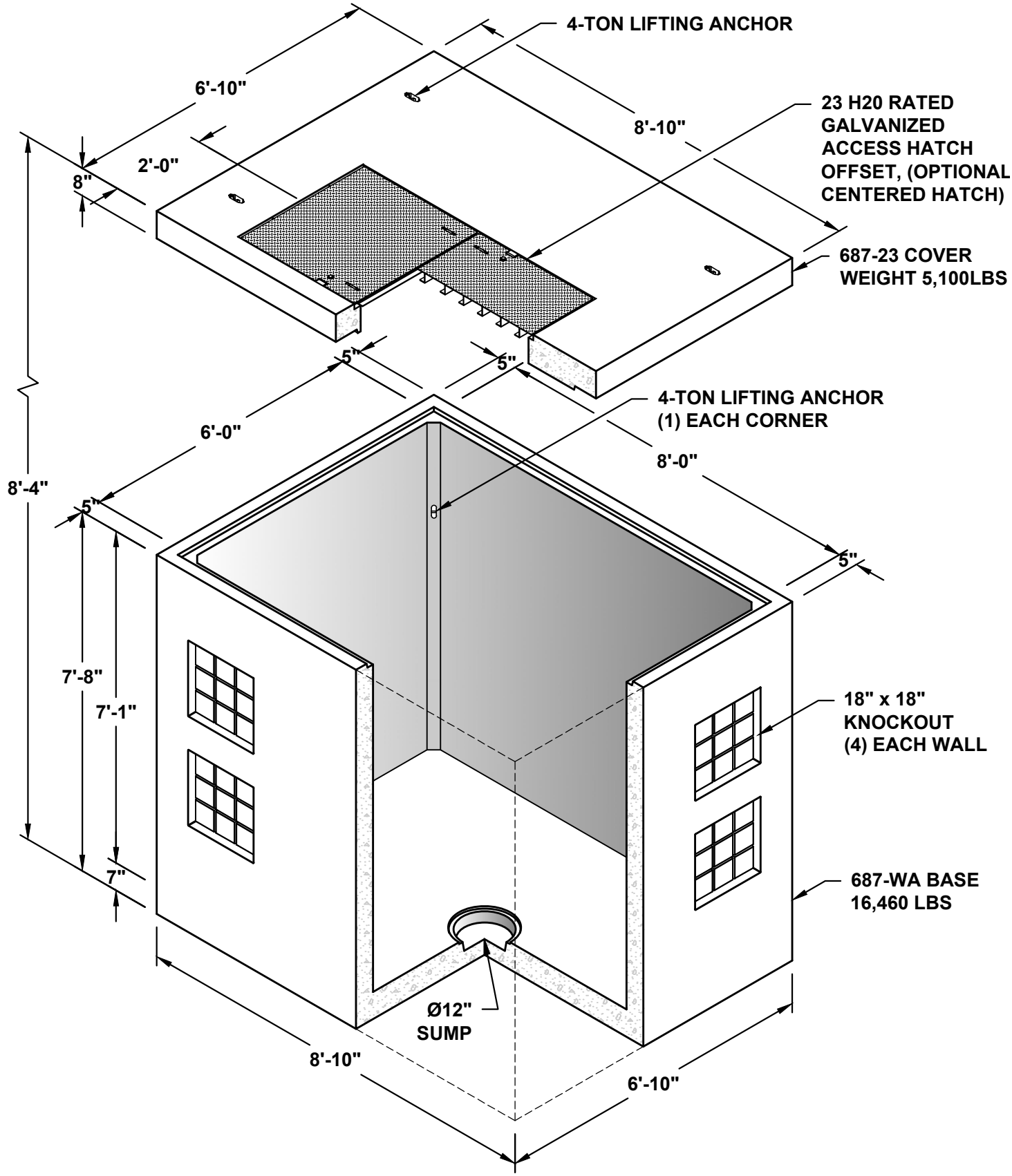
687 WA-23 VAULT



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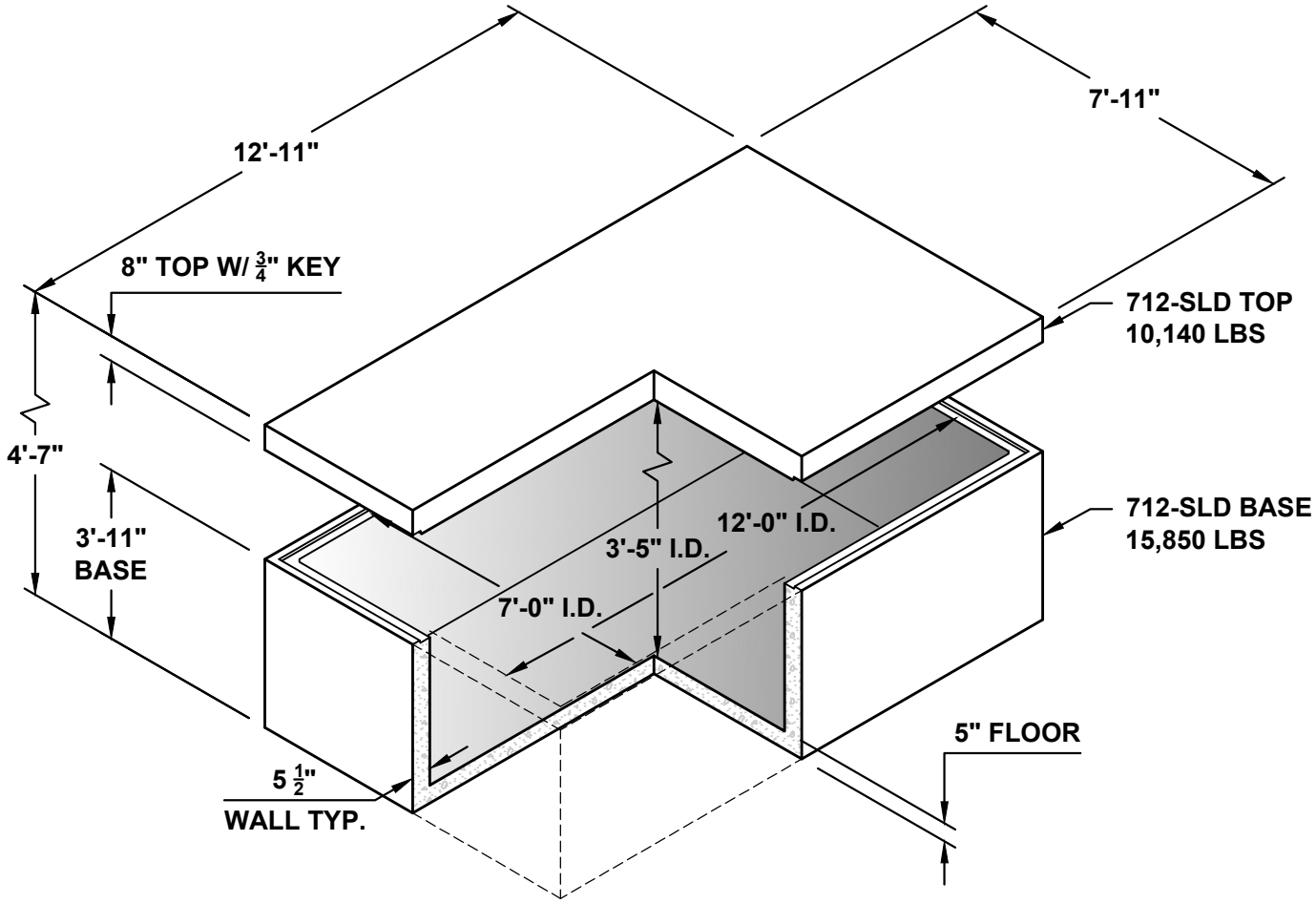
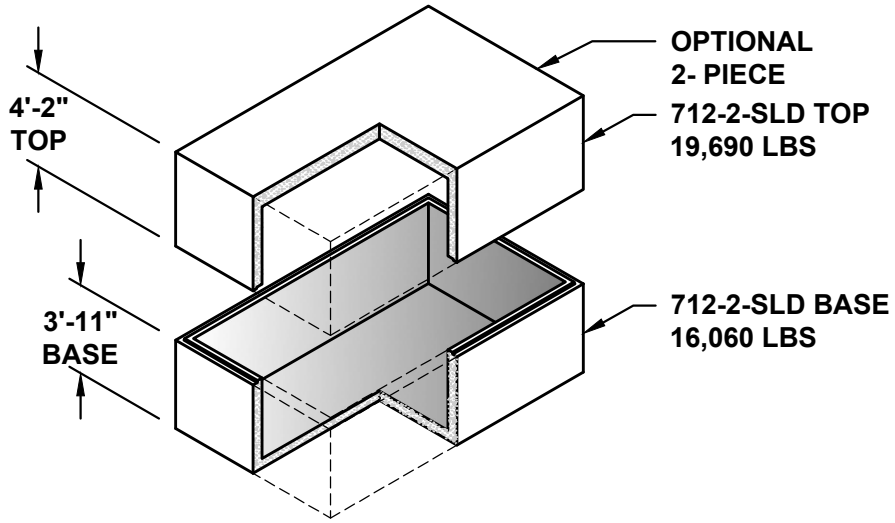
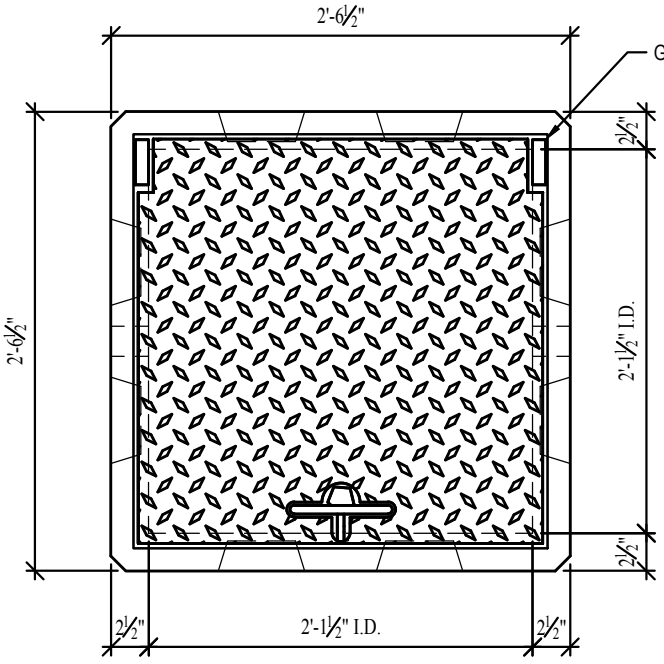
712 - VAULT



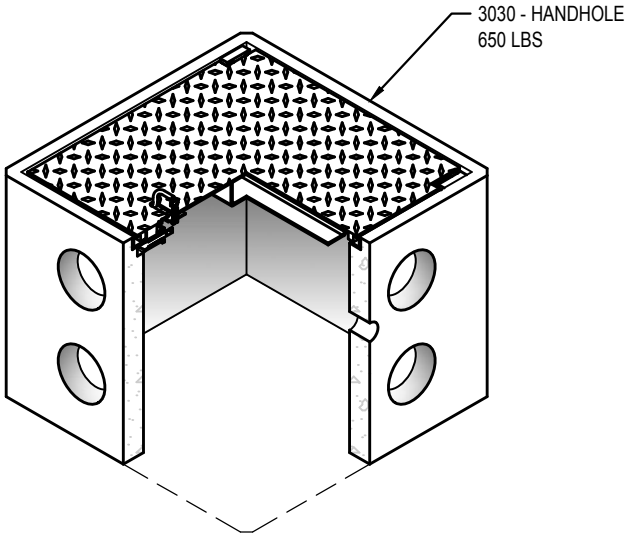


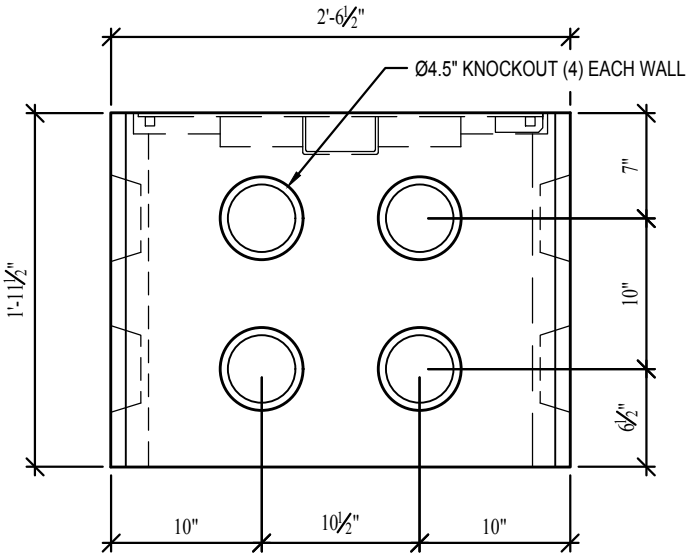
NOTE:
HEIGHT OF BASE & TOP ADJUSTABLE AS REQURIED.
OPTIONAL TOP ACCESS, MANHOLE FRAME & COVERS, & HATCHES AS NEEDED. VARIES SIZES AVAILABLE.
OPTIONAL ACCESSORIES: STRUT CHANNEL, SUMPS, INSERTS, LADDERS, ETC.

3030 - HANDHOLE

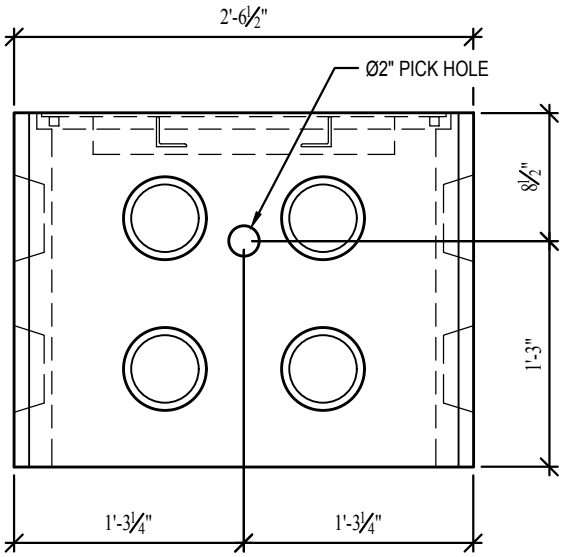


PLAN VIEW





SIDE VIEW



END VIEW

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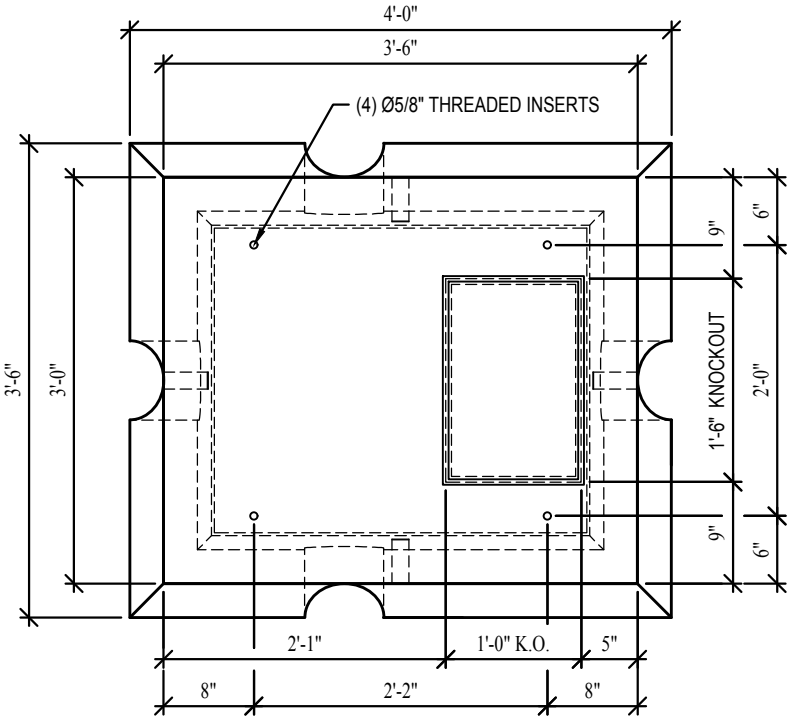
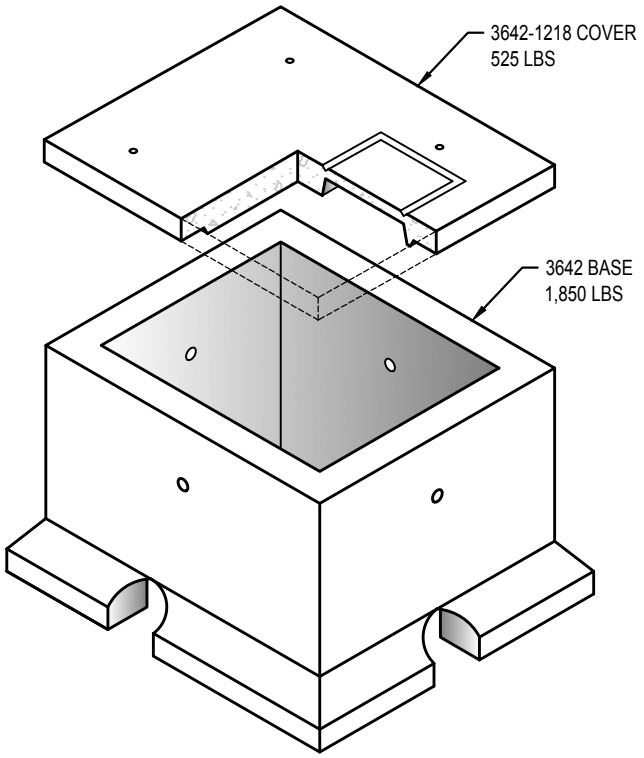
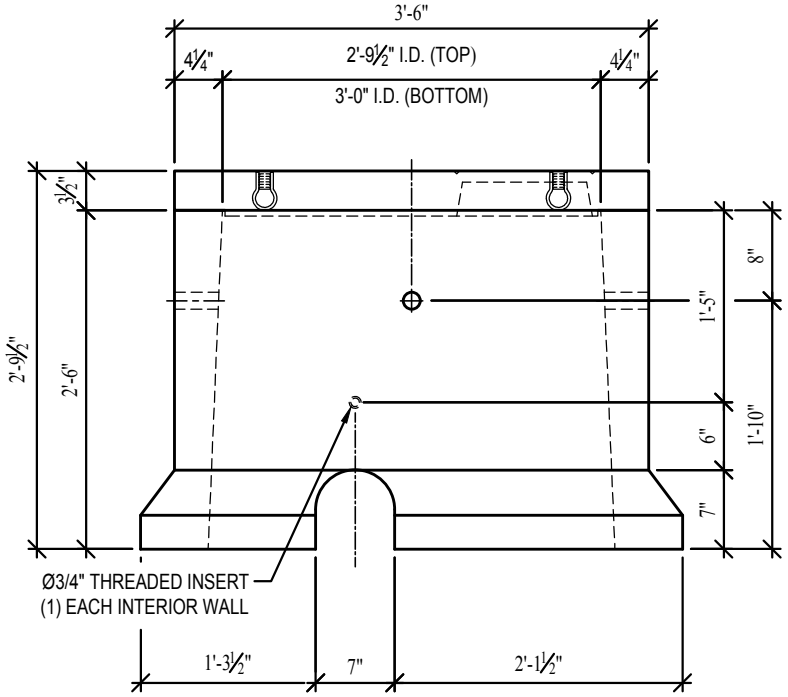
3642 - HANDHOLE

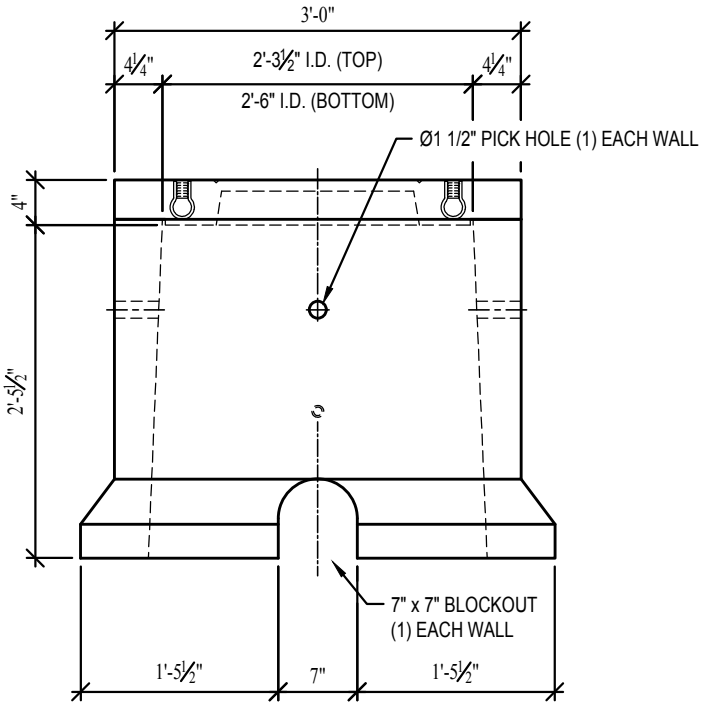


PLAN VIEW





SIDE VIEW



END VIEW

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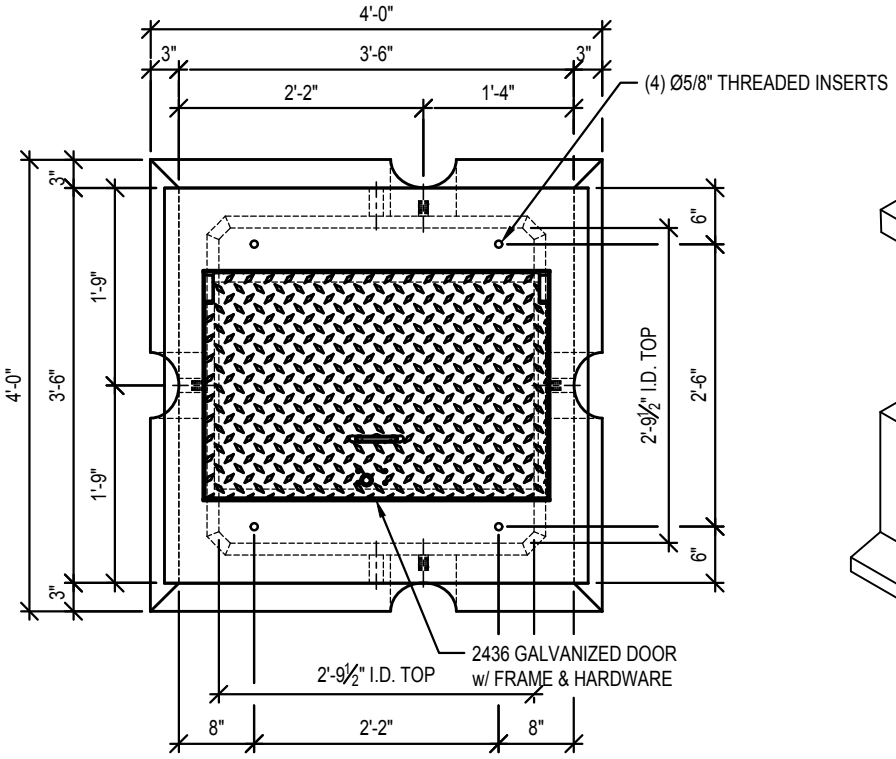
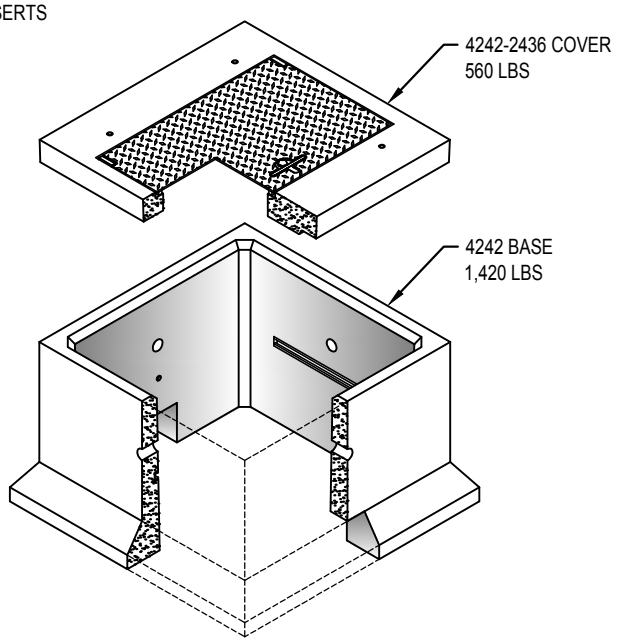
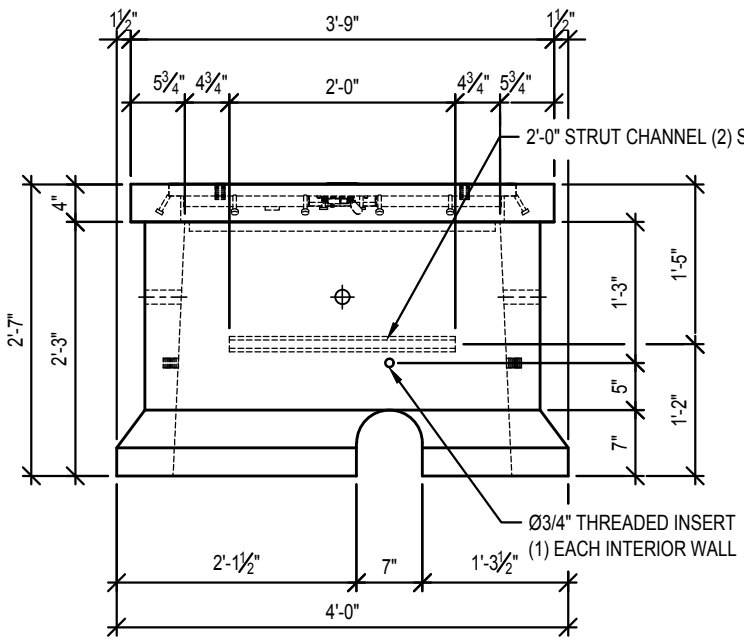
4242 - HANDHOLE

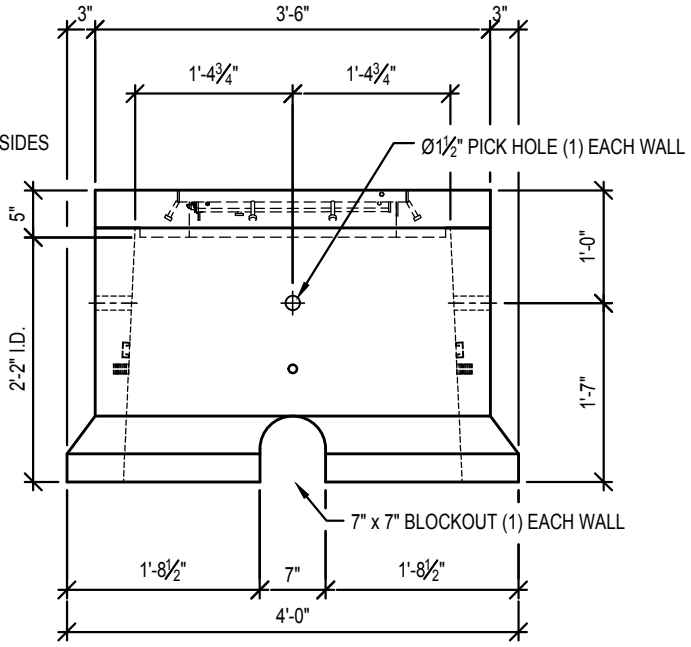




PLAN VIEW

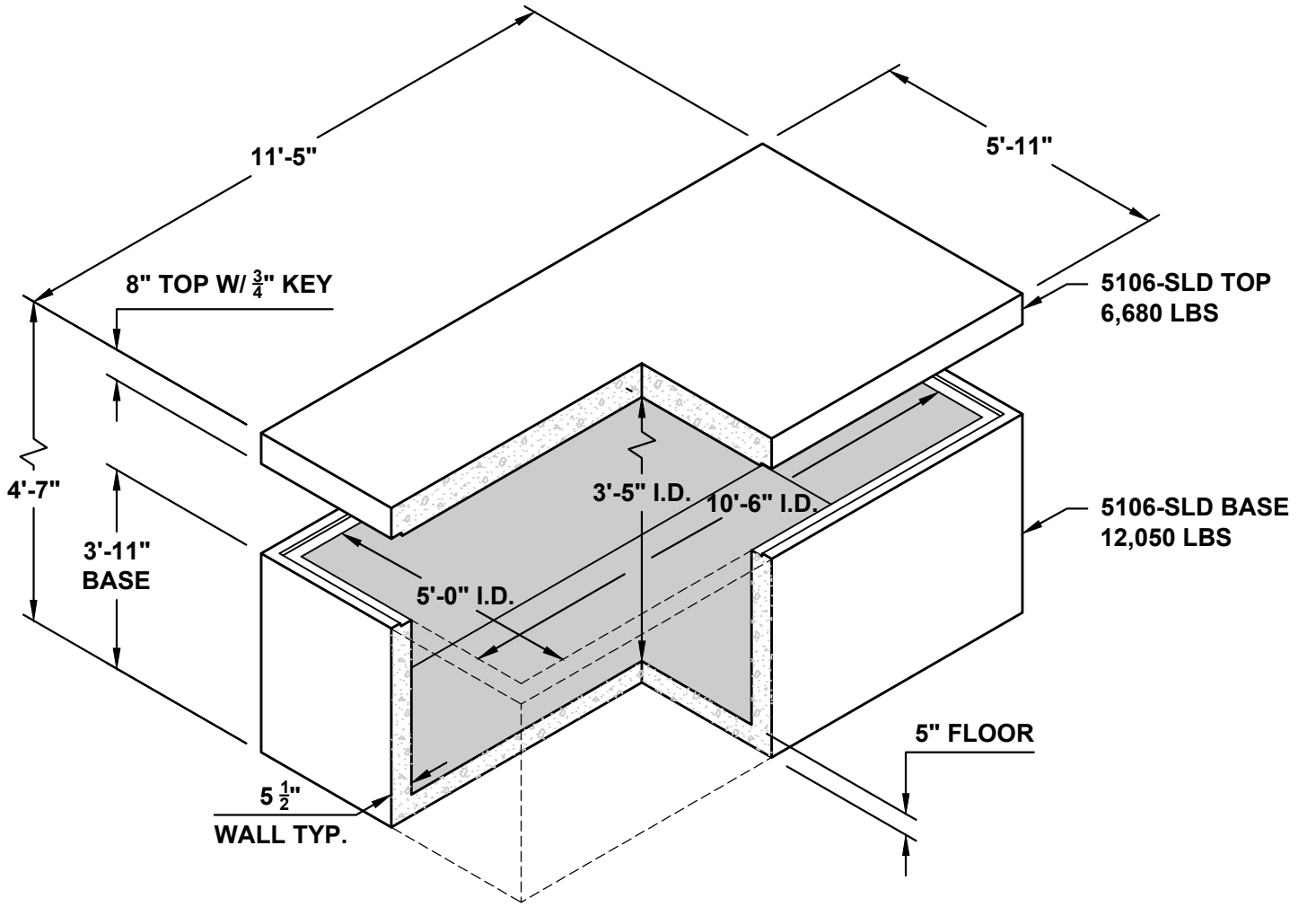


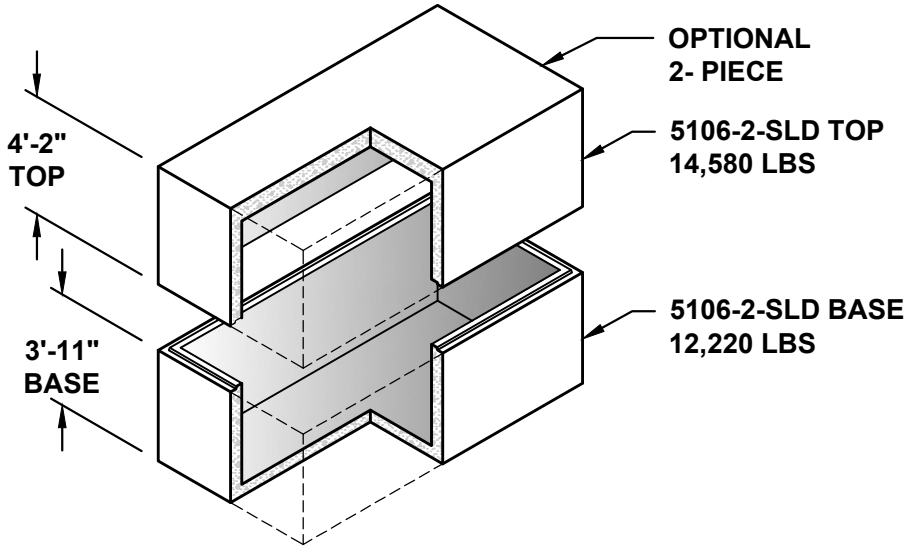
SIDE VIEW



END VIEW

5106 - VAULT





NOTE:
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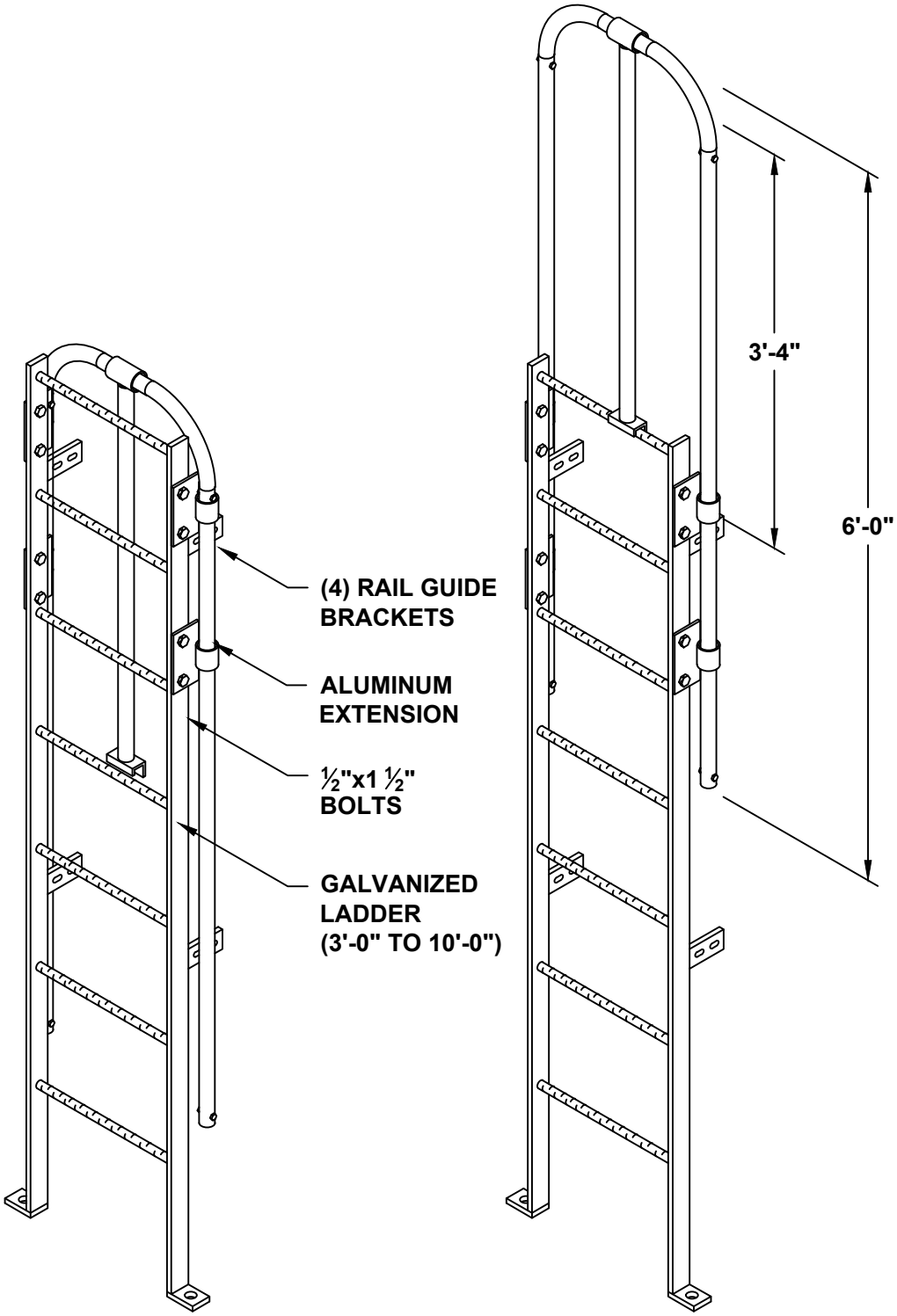
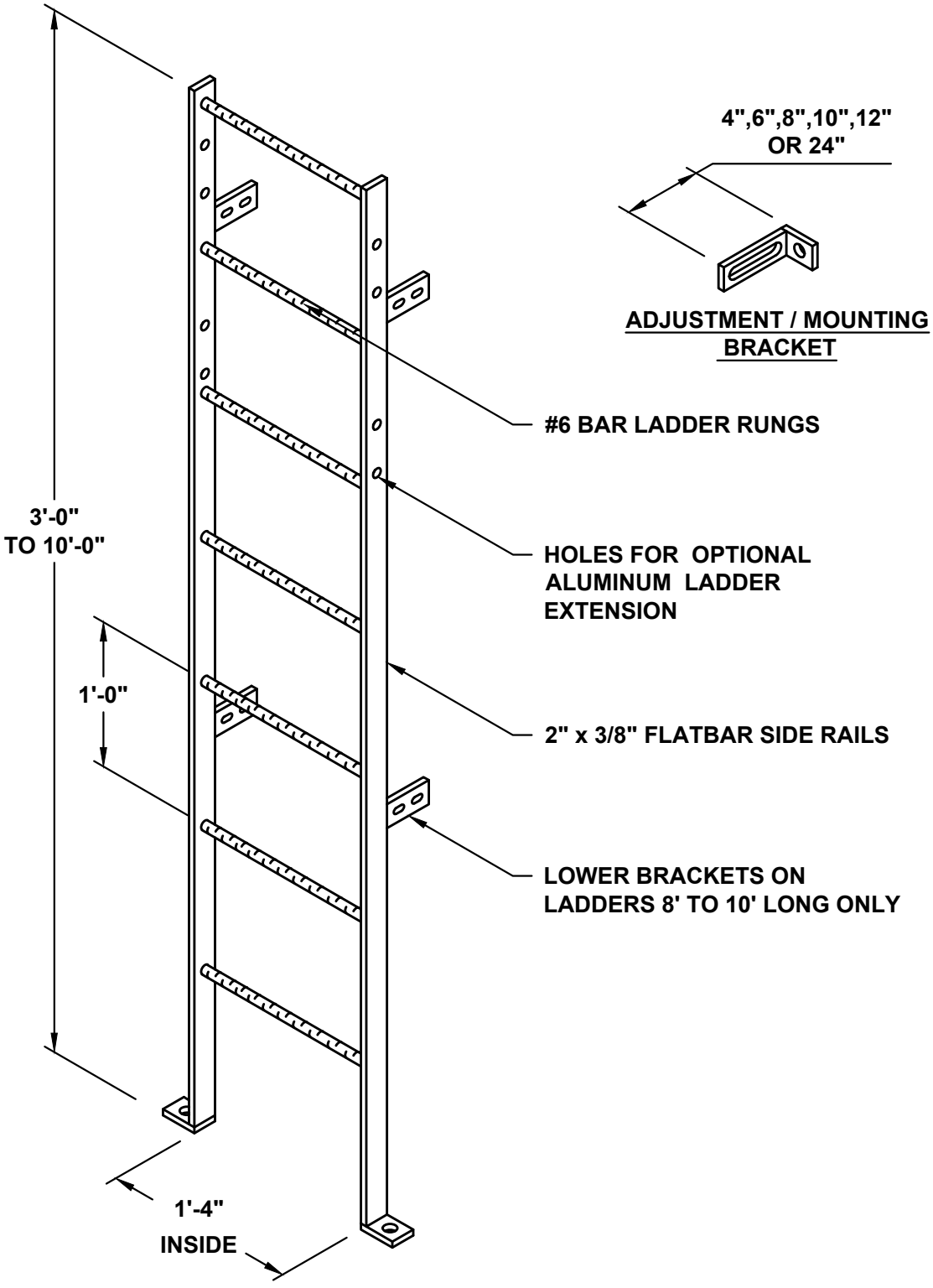
GALVANIZED VAULT LADDER W/ ALUMIN. EXTENSION



CLOSED POSITION **EXTENDED POSITION**

GALVANIZED VAULT LADDER



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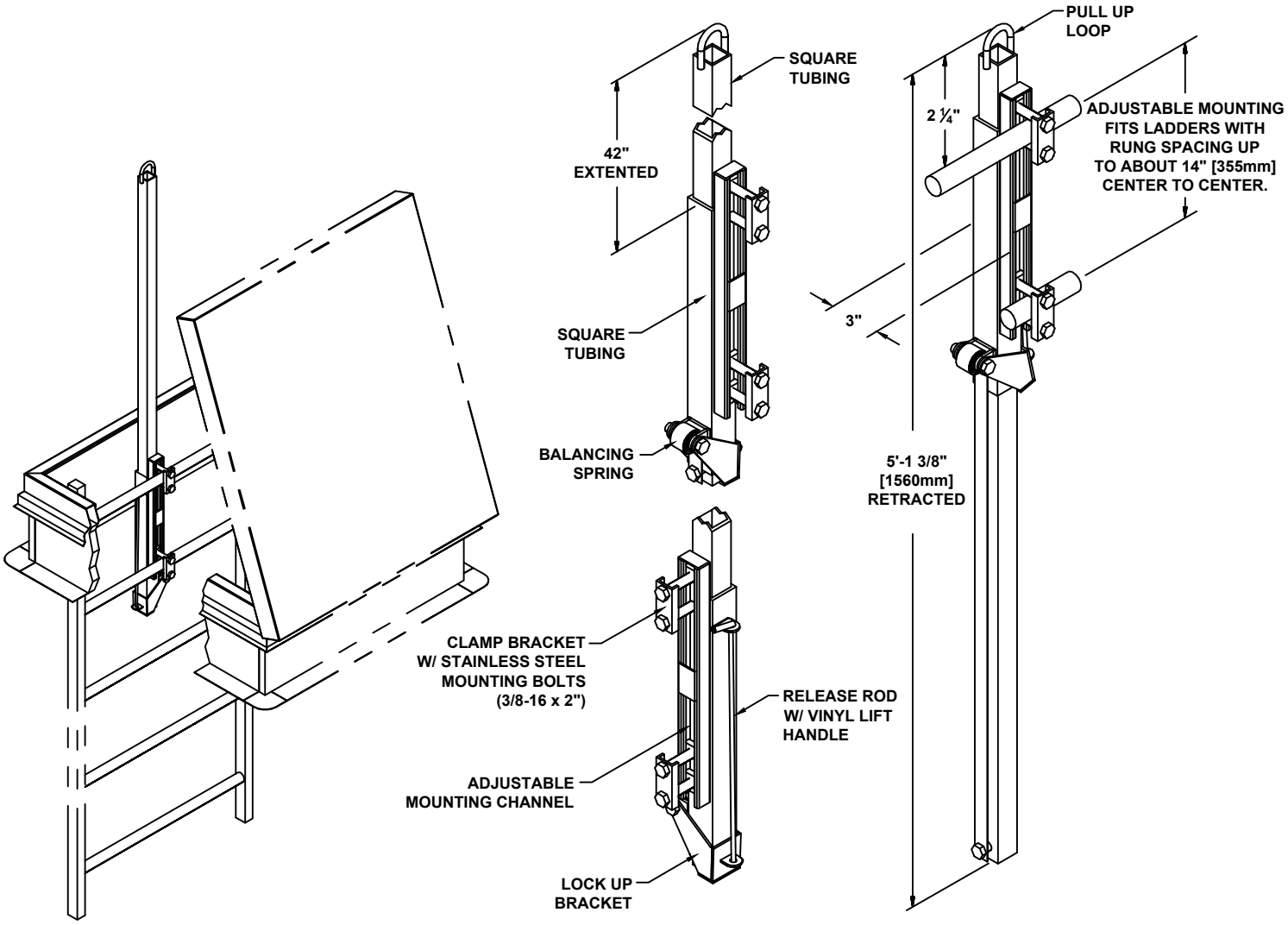
LADDER UP SAFETY POST

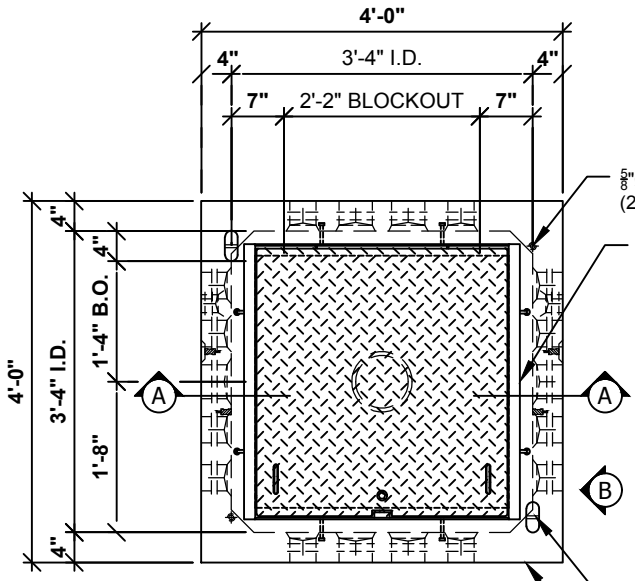


CLAMP BRACKET MAY BE REVERSED TO ACCOMMODATE RUNG SIZES OF 3/4" TO 1 1/4" WITH STANDARD 2" BOLTS FURNISHED. LARGER RUNGS WILL REQUIRE LONGER BOLTS.

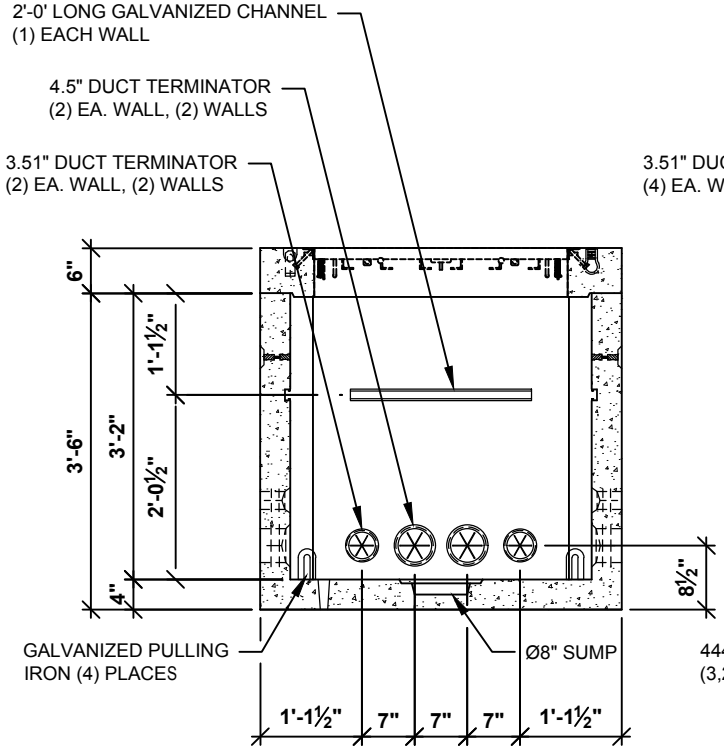
Rogue Valley Precast

PacifiCorp Vaults

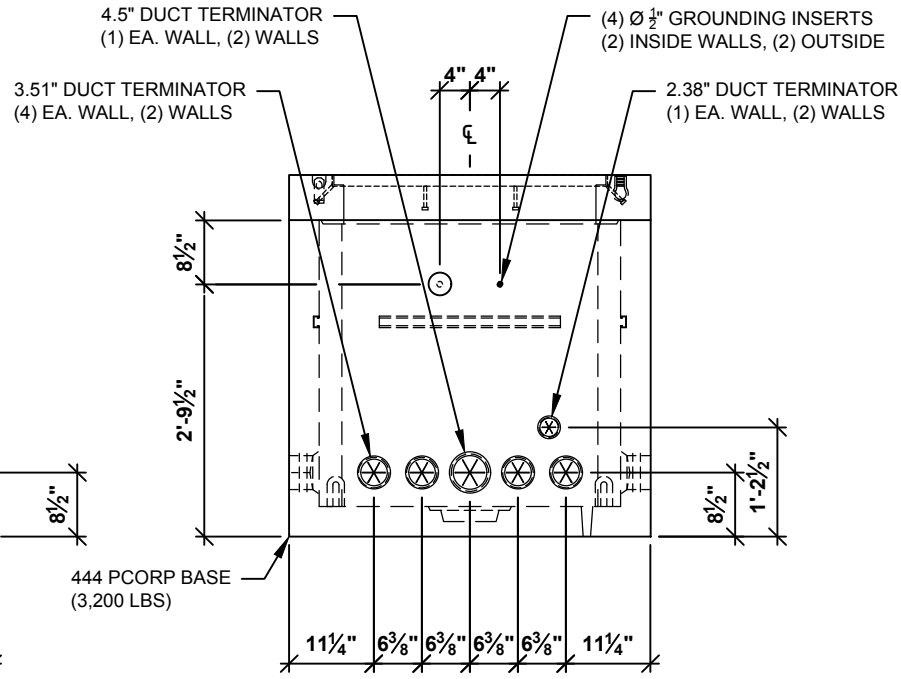
PACIFIC CORP 444 #7992878



PLAN VIEW



SECTION A-A



VIEW - B

NOTES:
1. WEIGHTS LISTED ARE APPROXIMATE.

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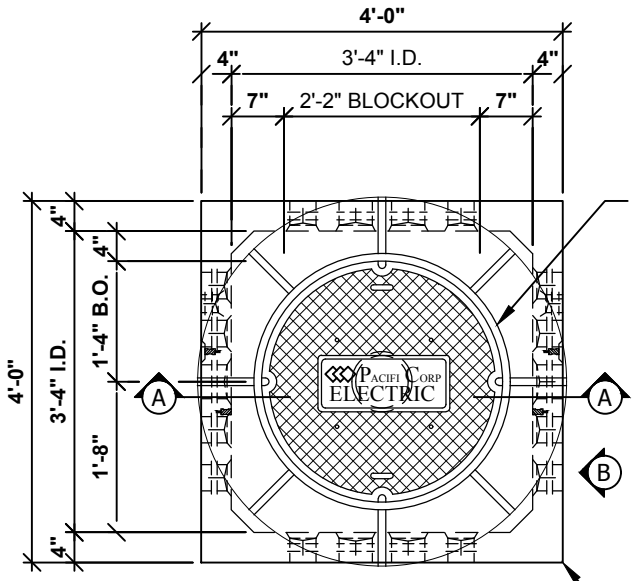
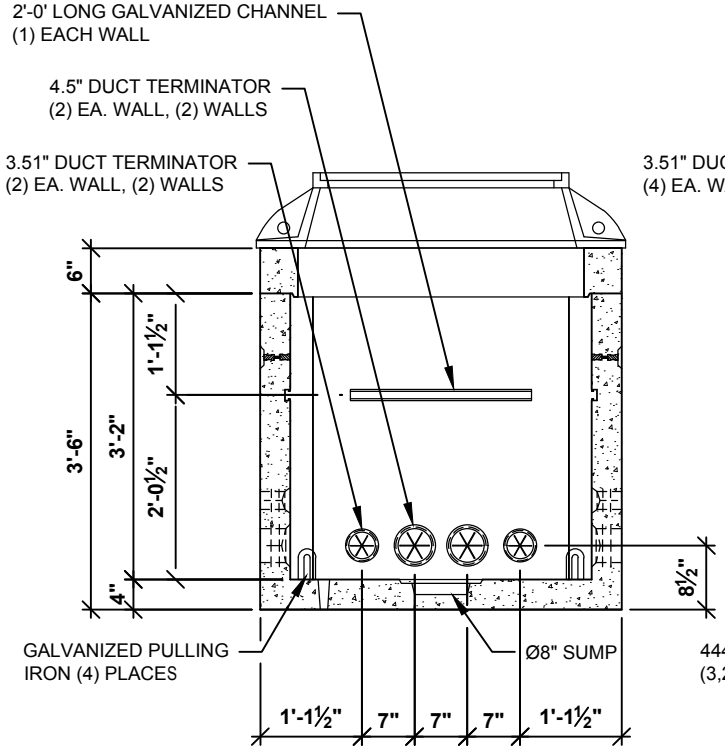
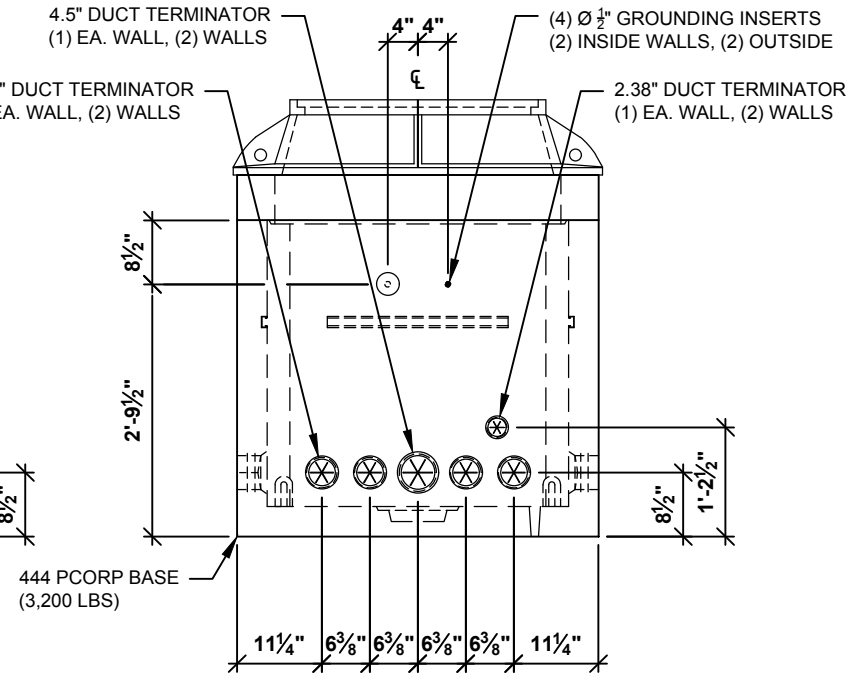
PACIFIC CORP 444 #7992879



PLAN VIEW



SECTION A-A



VIEW - B

NOTES:
1. WEIGHTS LISTED ARE APPROXIMATE.

PCORP ZG501 06-13-13

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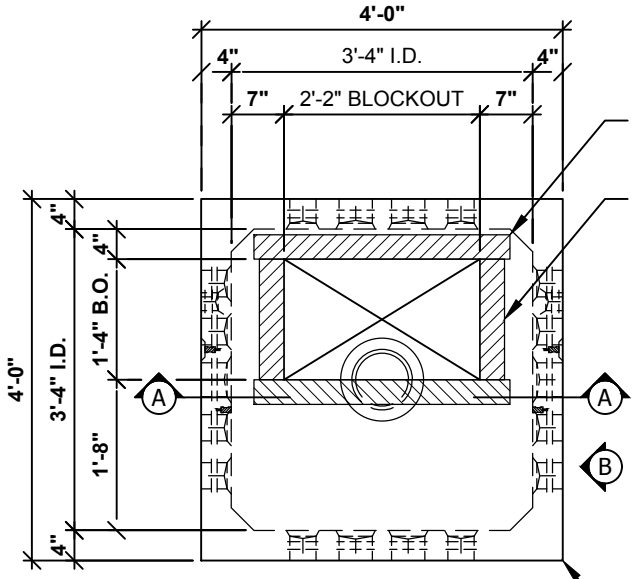
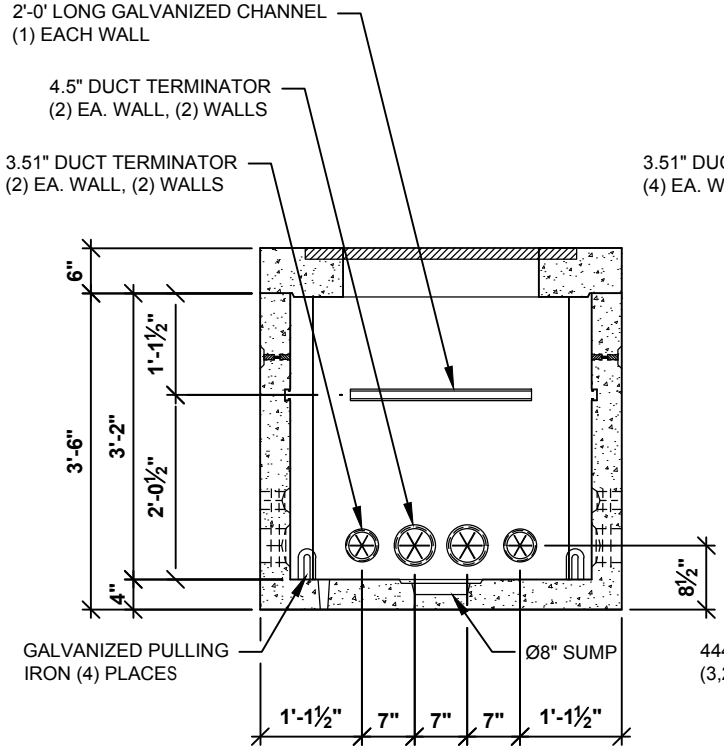
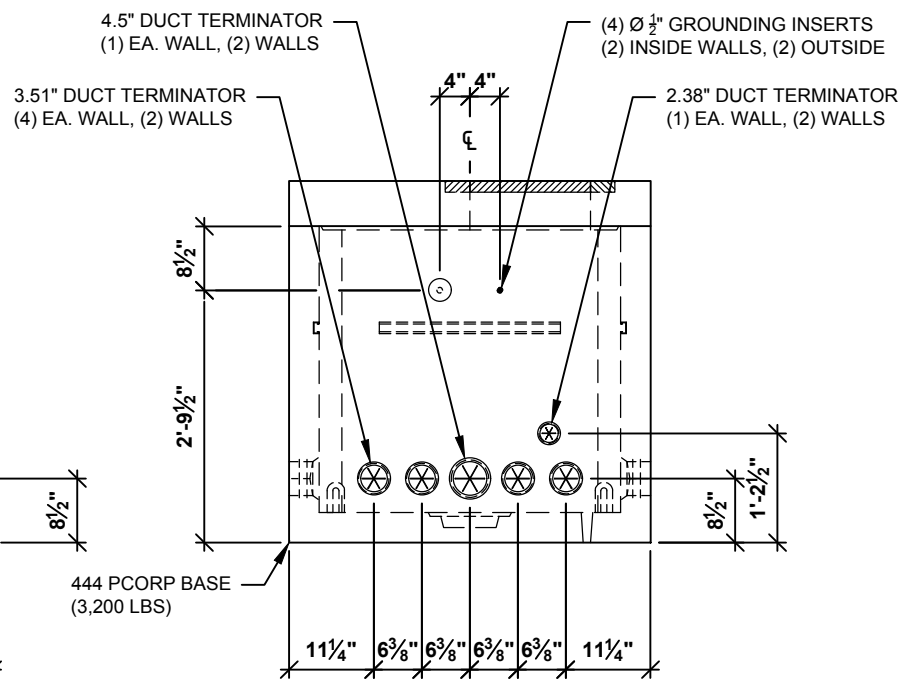
PACIFIC CORP 444 #7999607



PLAN VIEW



SECTION A-A



VIEW - B

NOTES:
1. WEIGHTS LISTED ARE APPROXIMATE.

PCORP ZG501 06-13-13

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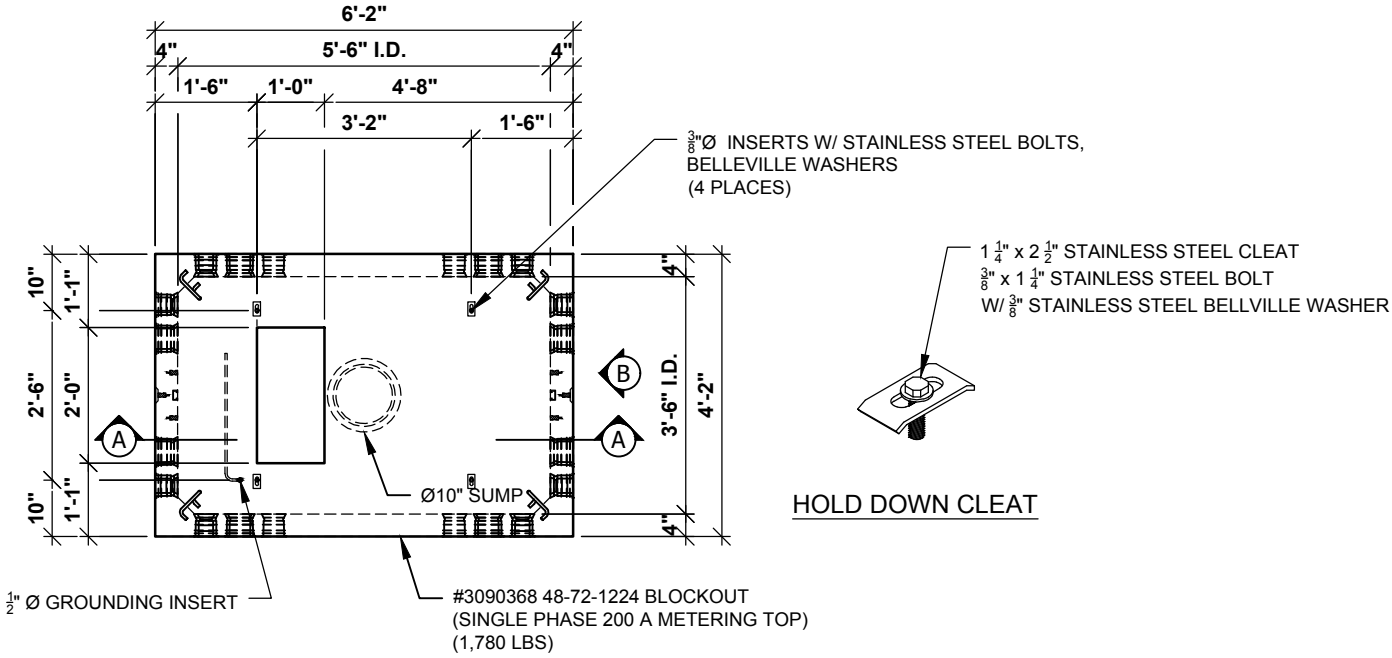
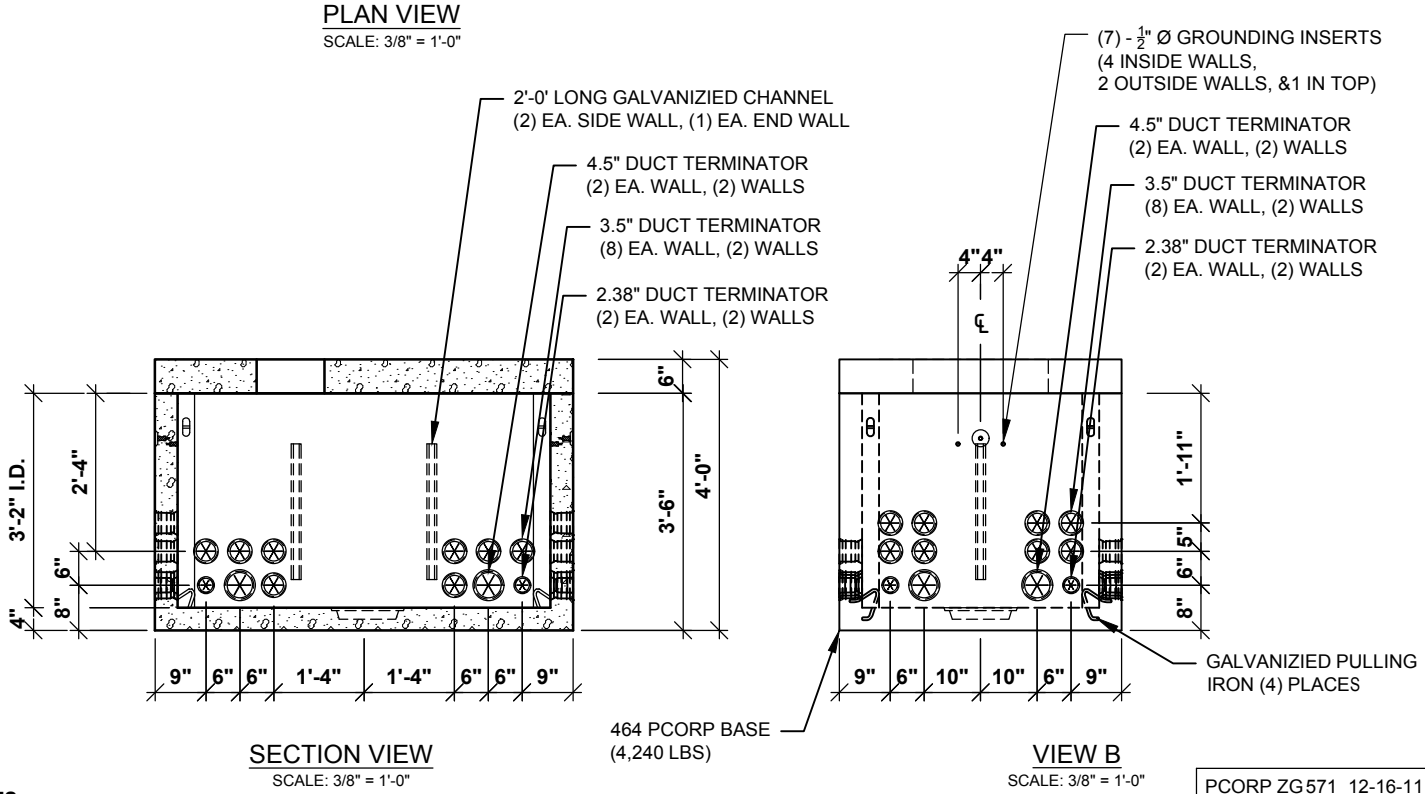
PACIFIC CORP 464 METER #3090368





NOTES:
1. WEIGHTS LISTED ARE APPROXIMATE.

PCORP ZG571 12-16-11
PCORP ZG616 05-19-15

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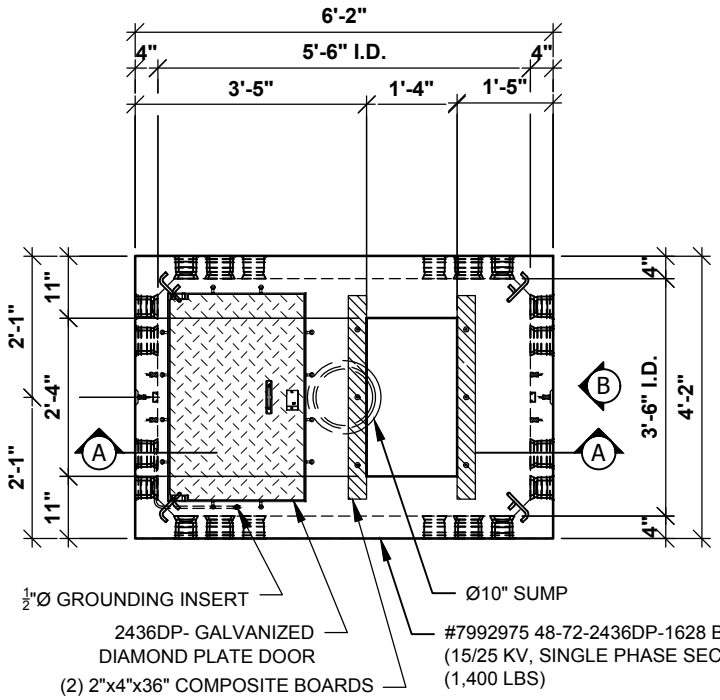
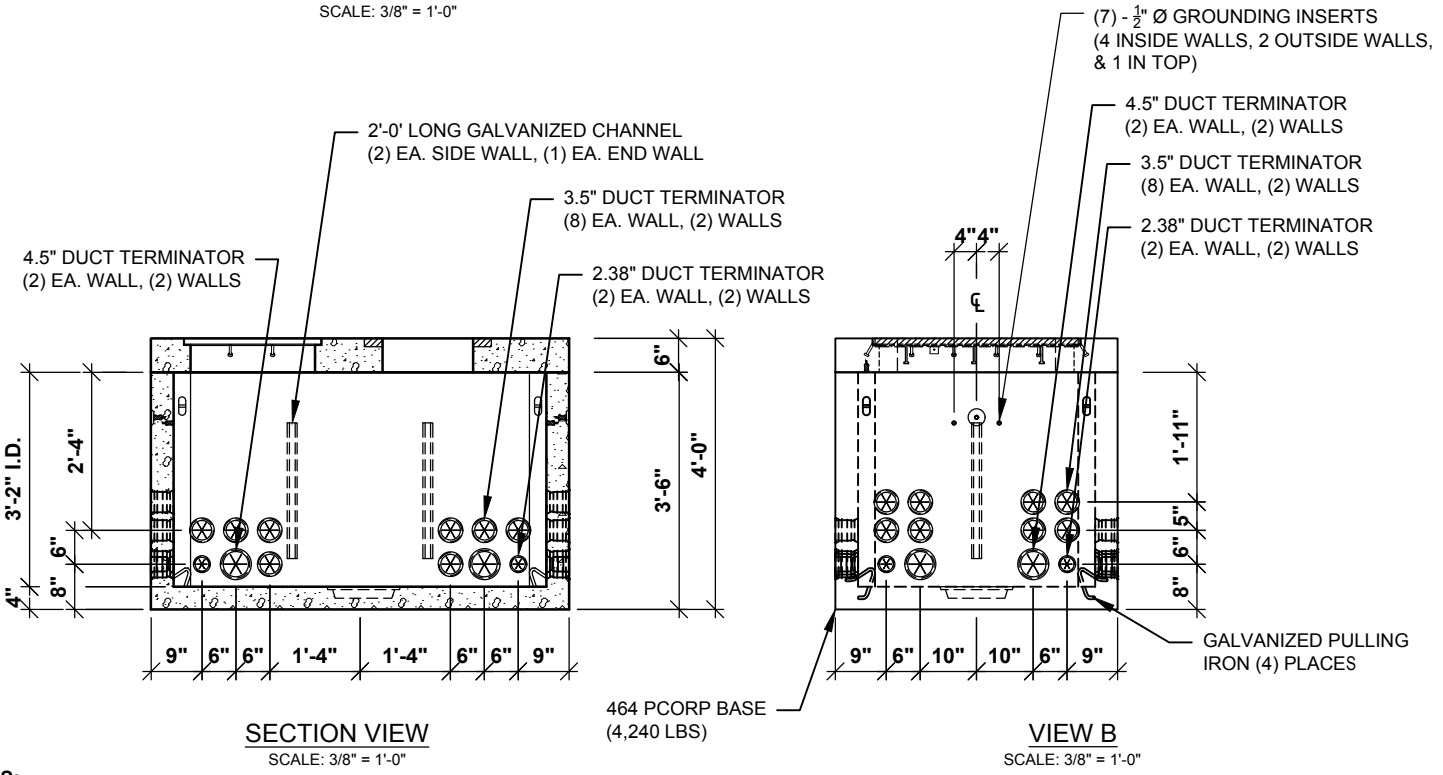
PACIFIC CORP 464 SECT #7992975



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



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

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

NOTES:
1. WEIGHTS LISTED ARE APPROXIMATE.

PCORP ZG616 05-19-15

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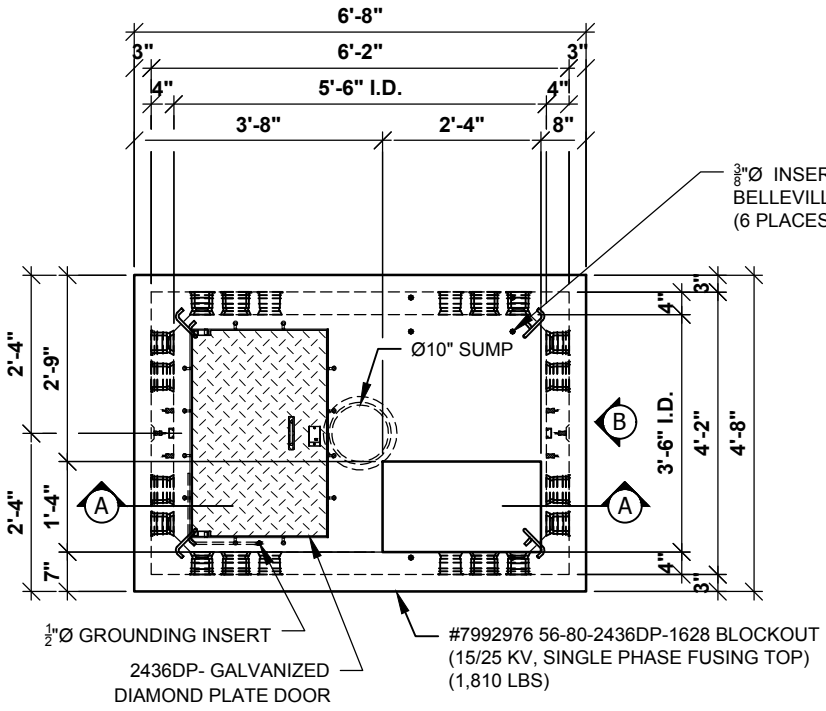
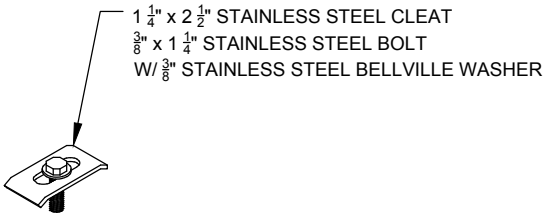
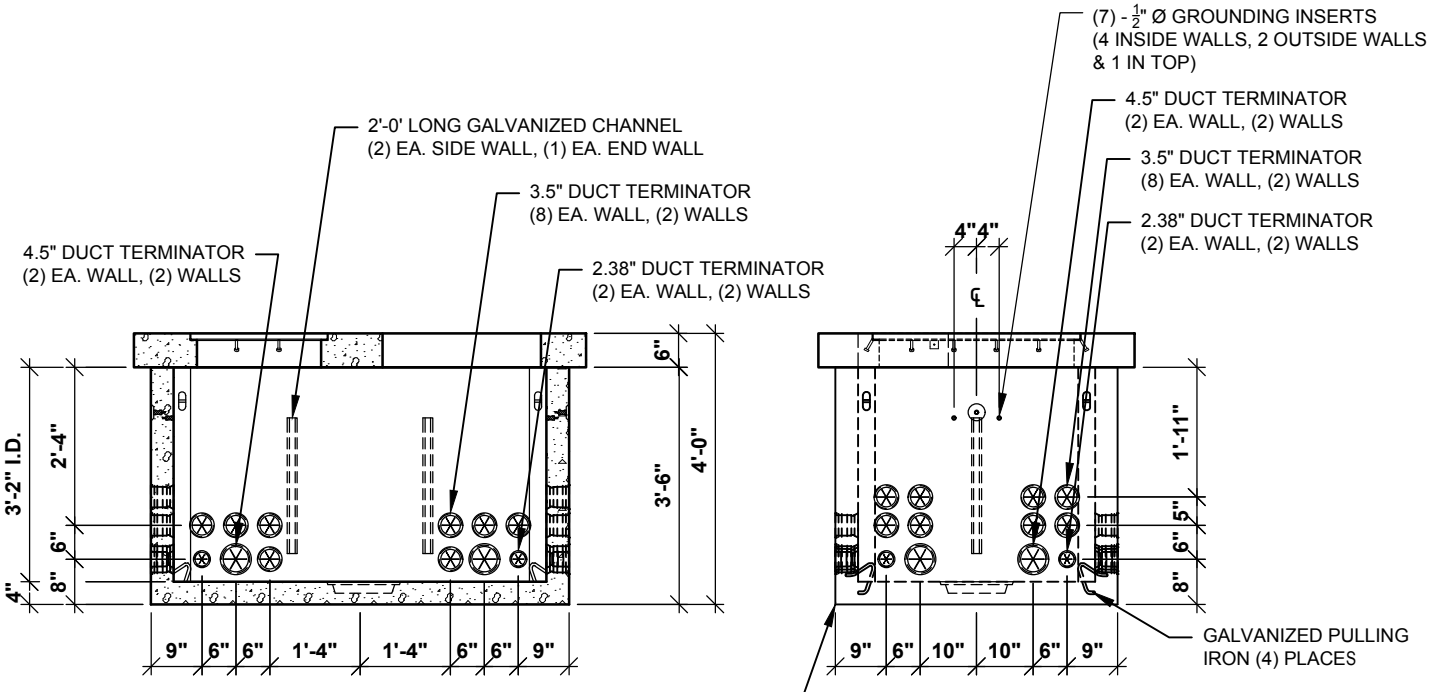
PACIFIC CORP 464 FUSE #7992976



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



HOLD DOWN CLEAT



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

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

NOTES:
1. WEIGHTS LISTED ARE APPROXIMATE.

PCORP ZG541 07-07-10
PCORP ZG616 05-19-15

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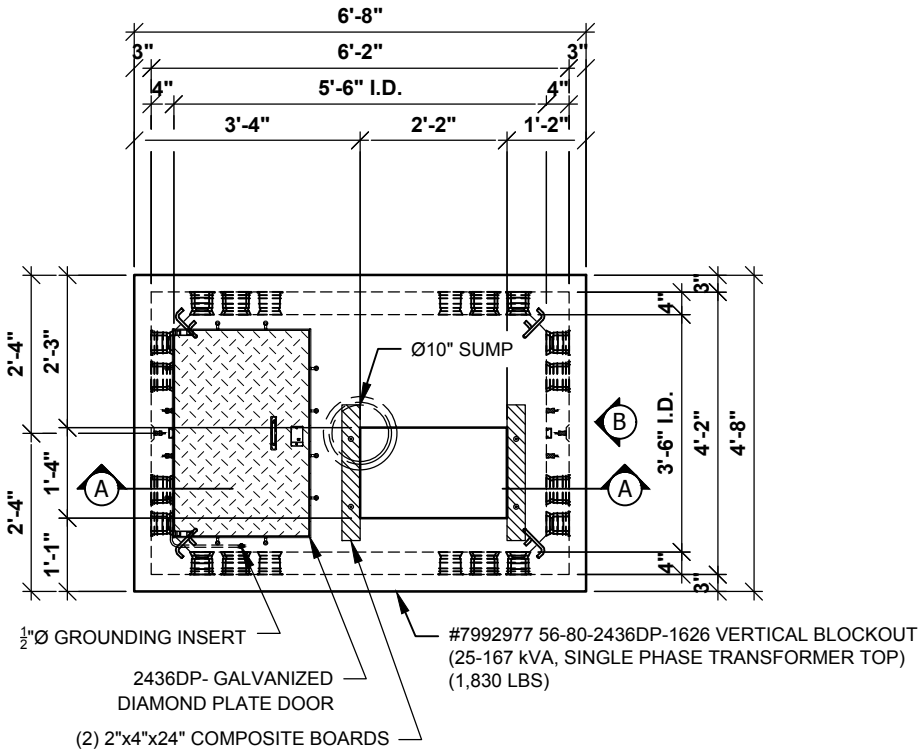
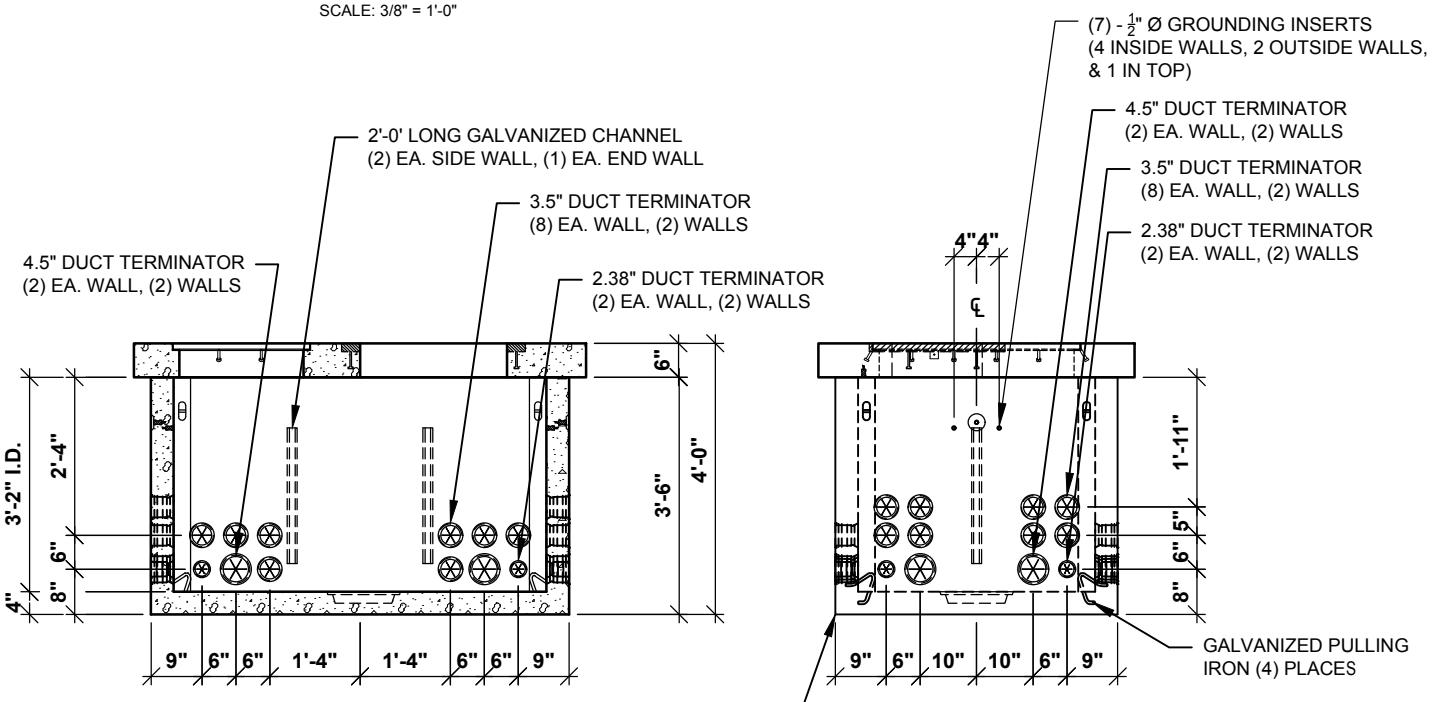
PACIFIC CORP 464 TRANS #7992977



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



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

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

NOTES:
1. WEIGHTS LISTED ARE APPROXIMATE.

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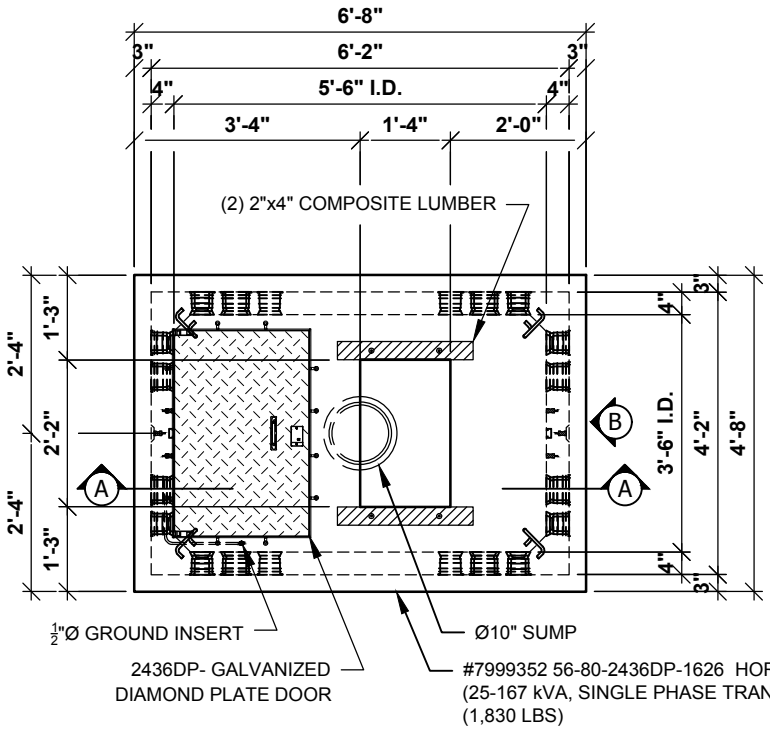
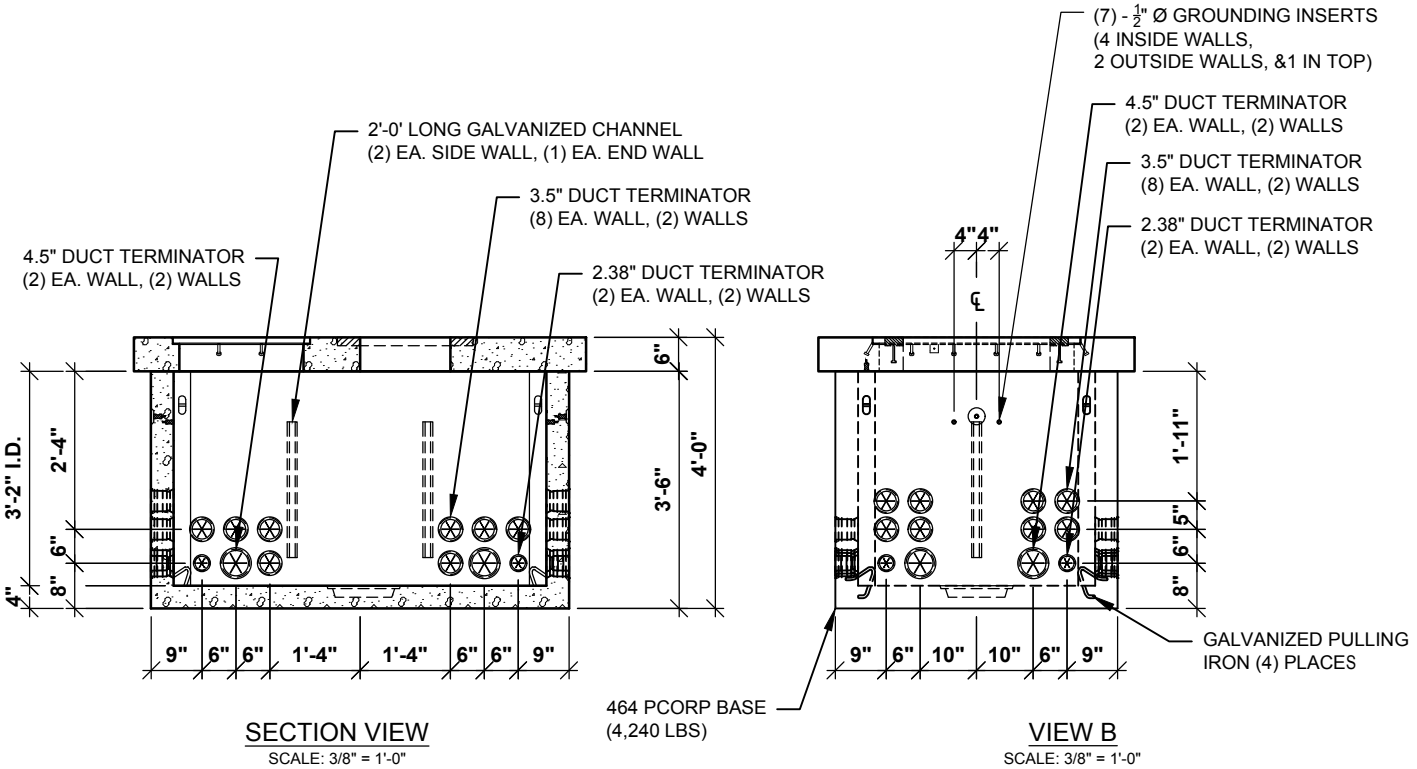
PACIFIC CORP 464 TRANS #7999352



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



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

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

NOTES:
1. WEIGHTS LISTED ARE APPROXIMATE.

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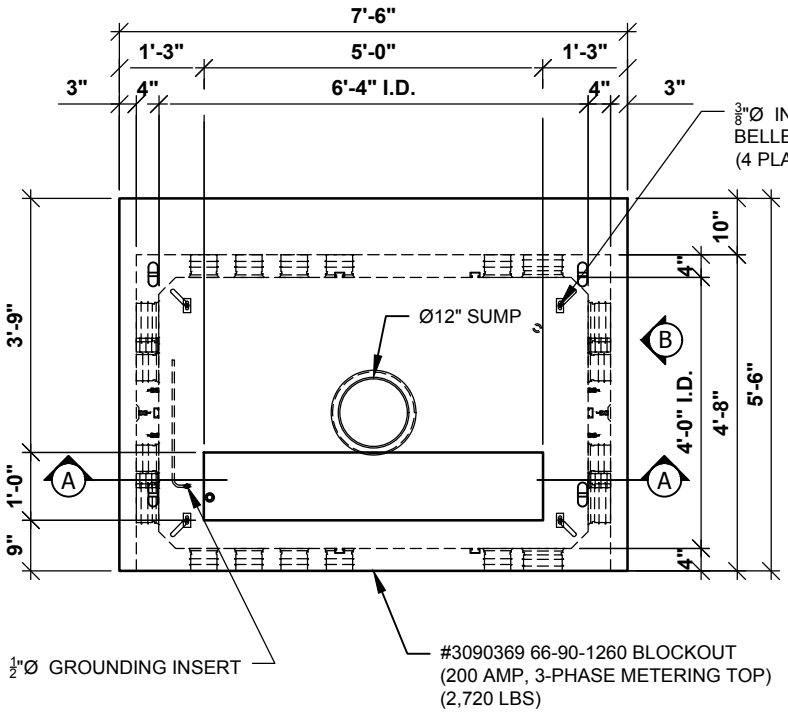
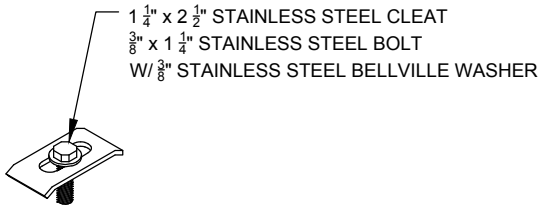
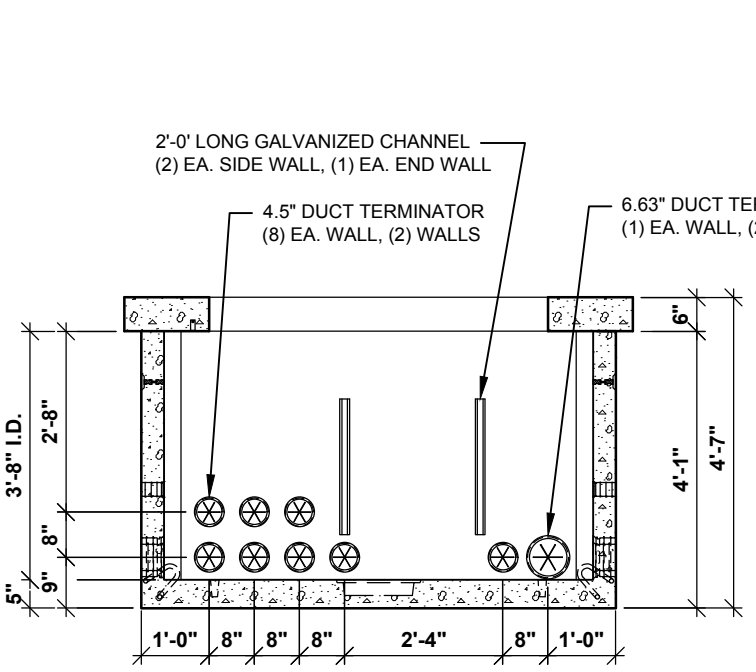
PACIFIC CORP 575 METER #3090369



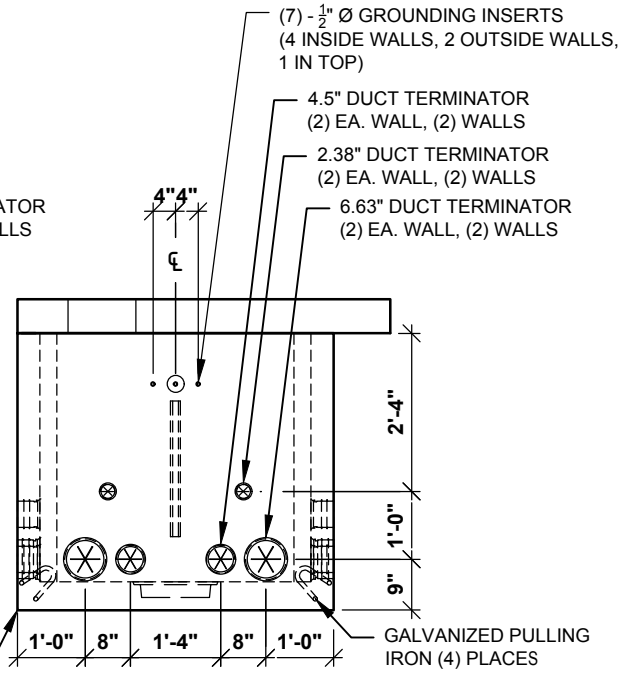
PLAN VIEW
SCALE: 3/8" = 1'-0"



HOLD DOWN CLEAT



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



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

NOTES:
1. WEIGHTS LISTED ARE APPROXIMATE.

PCORP ZG571 12-16-11
PCORP ZG621 06-13-13

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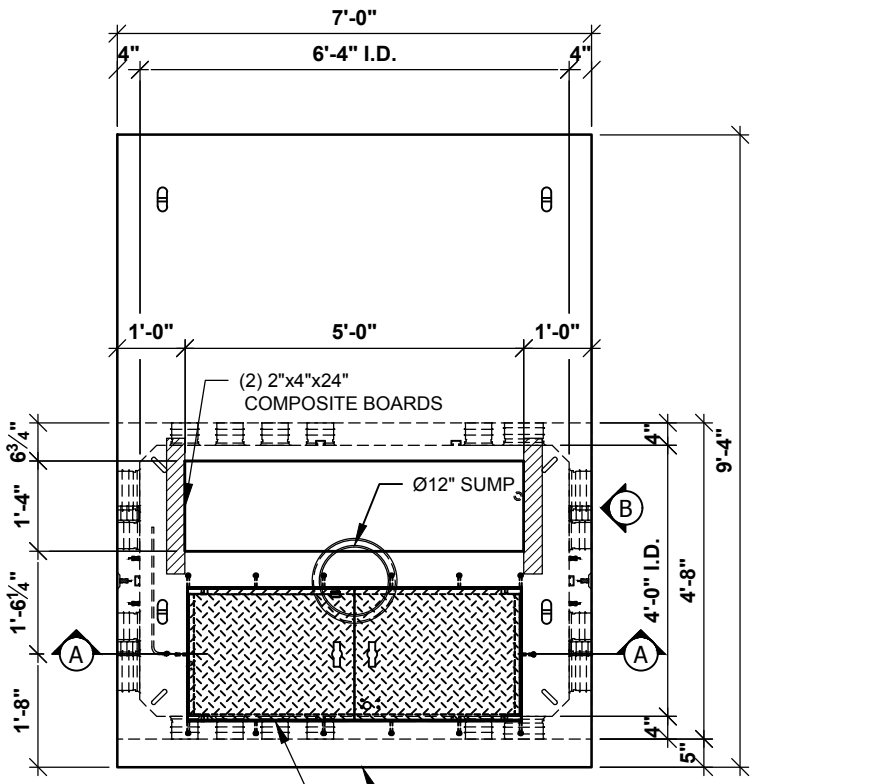
PACIFIC CORP 575 TRANS #7992600



PLAN VIEW
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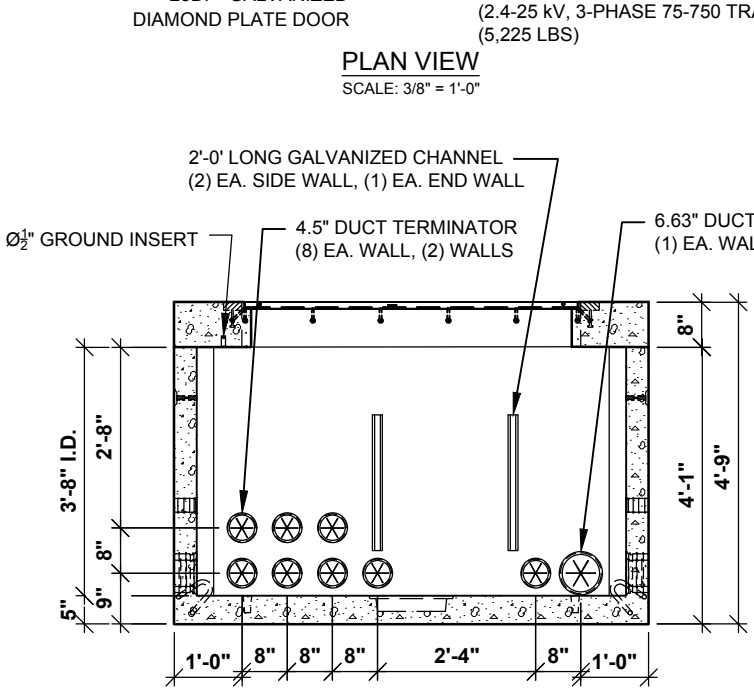

SECTION VIEW
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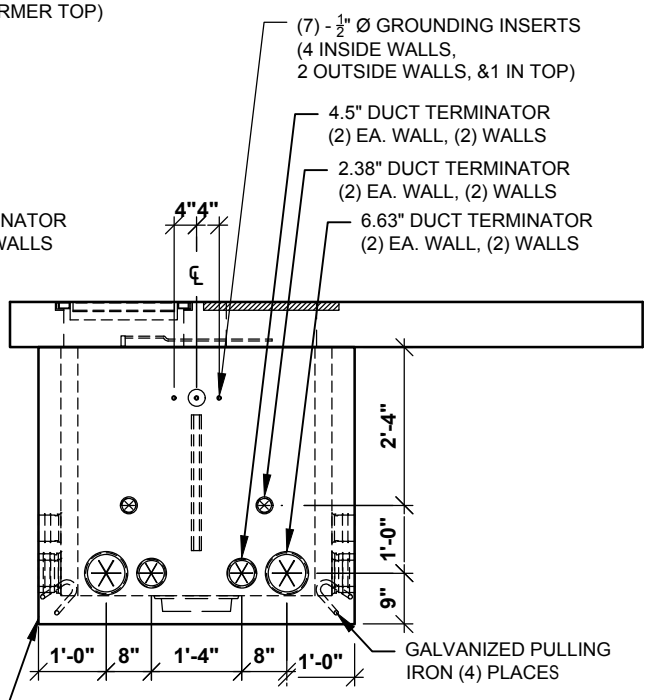

VIEW B
SCALE: 3/8" = 1'-0"

NOTES:
1. WEIGHTS LISTED ARE APPROXIMATE.

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PCORP ZG621	06-13-13

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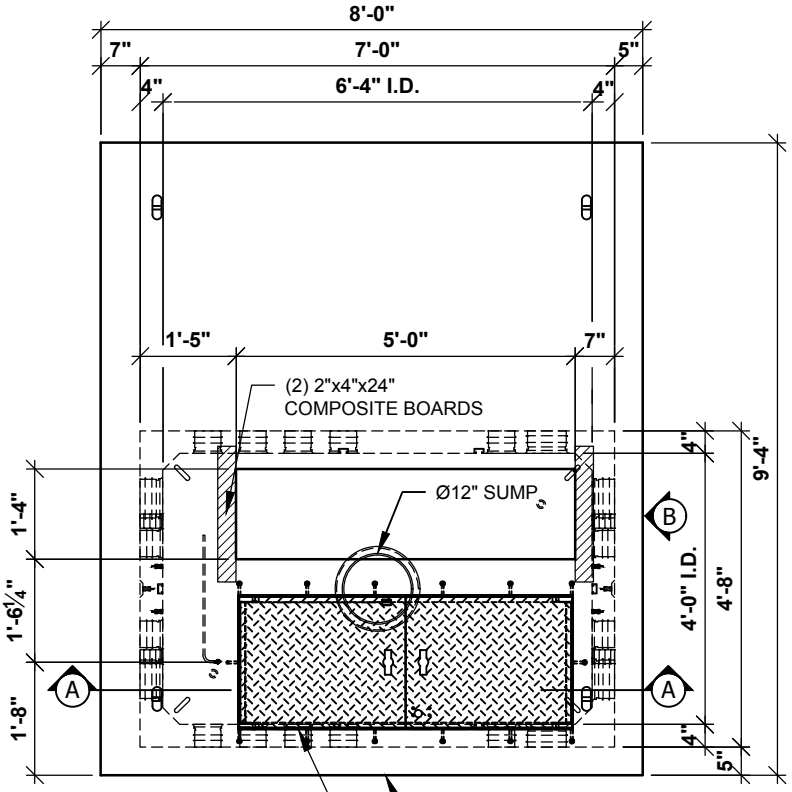
PACIFIC CORP 575 TRANS #7992602



PLAN VIEW
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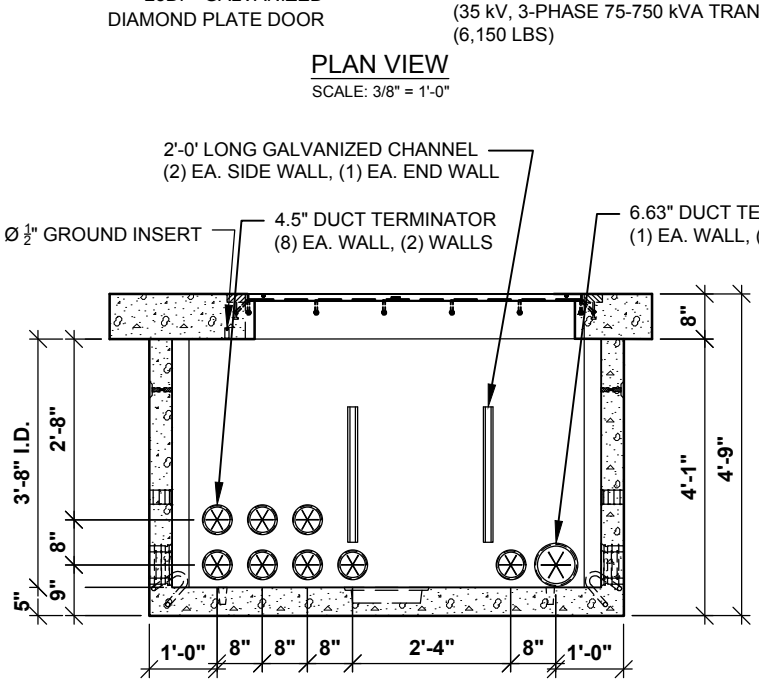

SECTION VIEW
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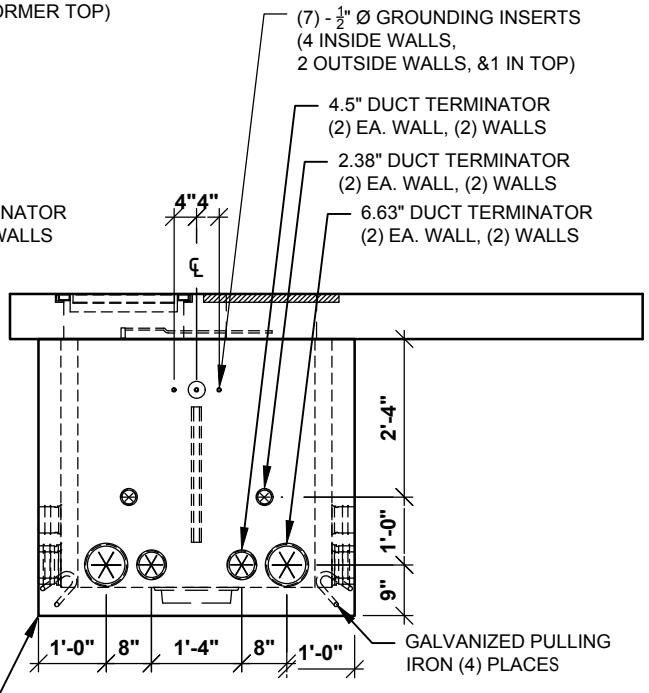

VIEW B
SCALE: 3/8" = 1'-0"

NOTES:
1. WEIGHTS LISTED ARE APPROXIMATE.

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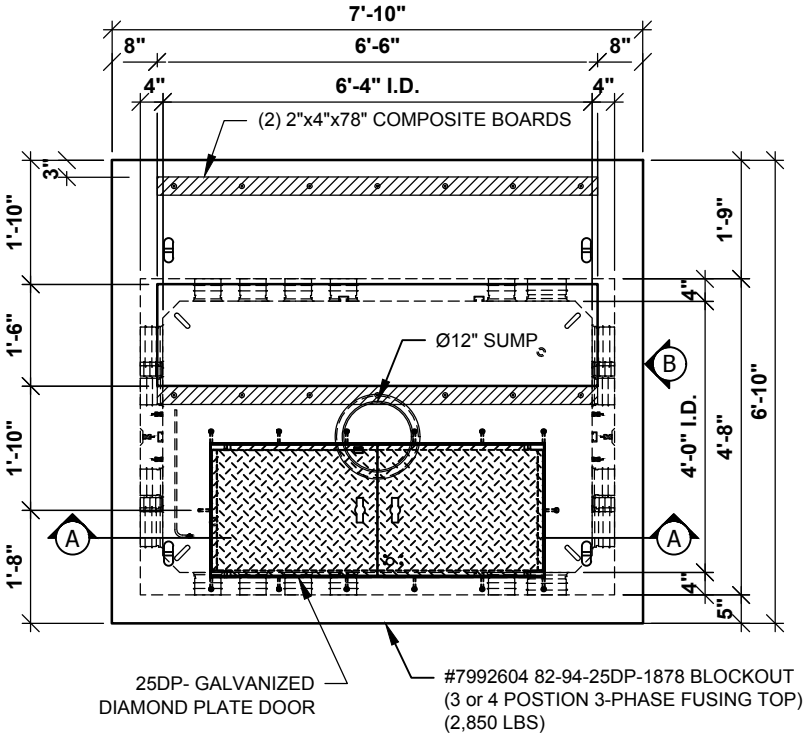
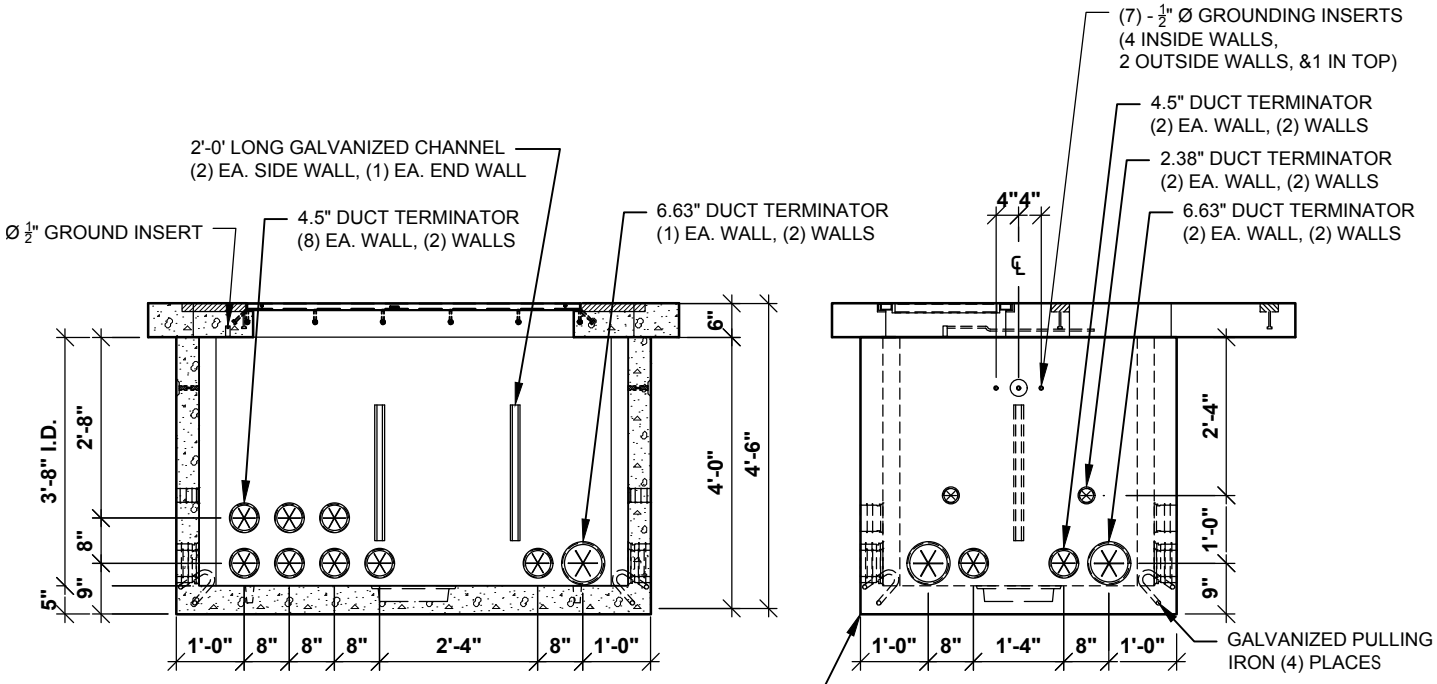
PACIFIC CORP 575 FUSE #7992604



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



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

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

NOTES:
1. WEIGHTS LISTED ARE APPROXIMATE.

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PCORP ZG621 06-13-13

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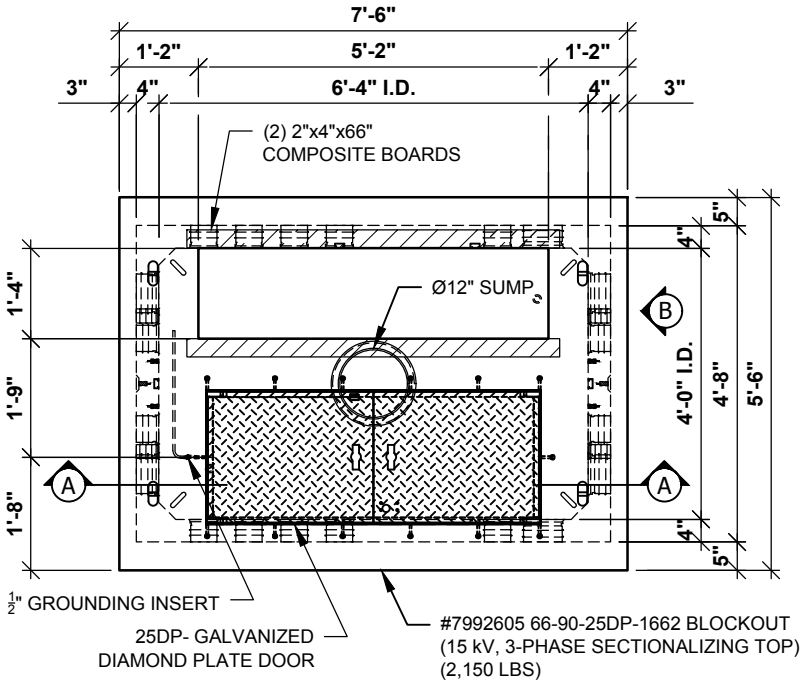
PACIFIC CORP 575 SECT #7992605



PLAN VIEW
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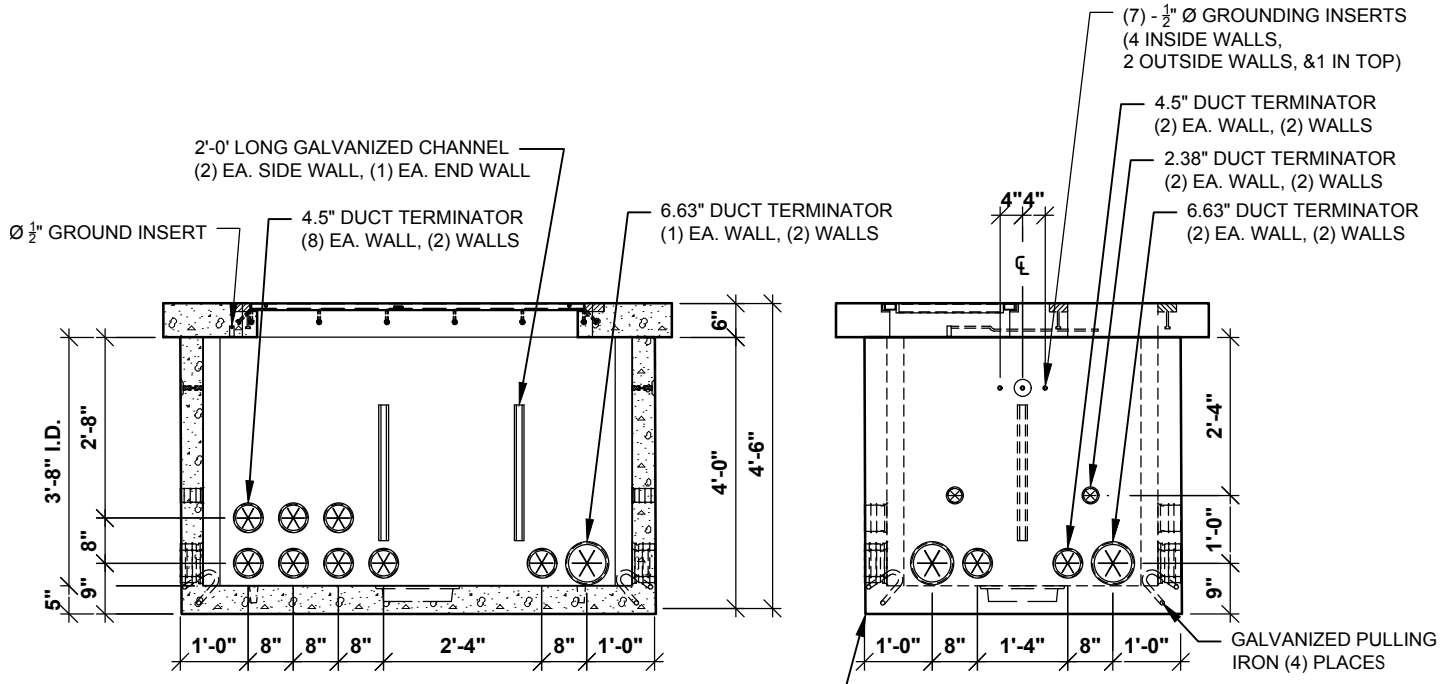

SECTION VIEW
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VIEW B
SCALE: 3/8" = 1'-0"

NOTES:
1. WEIGHTS LISTED ARE APPROXIMATE.

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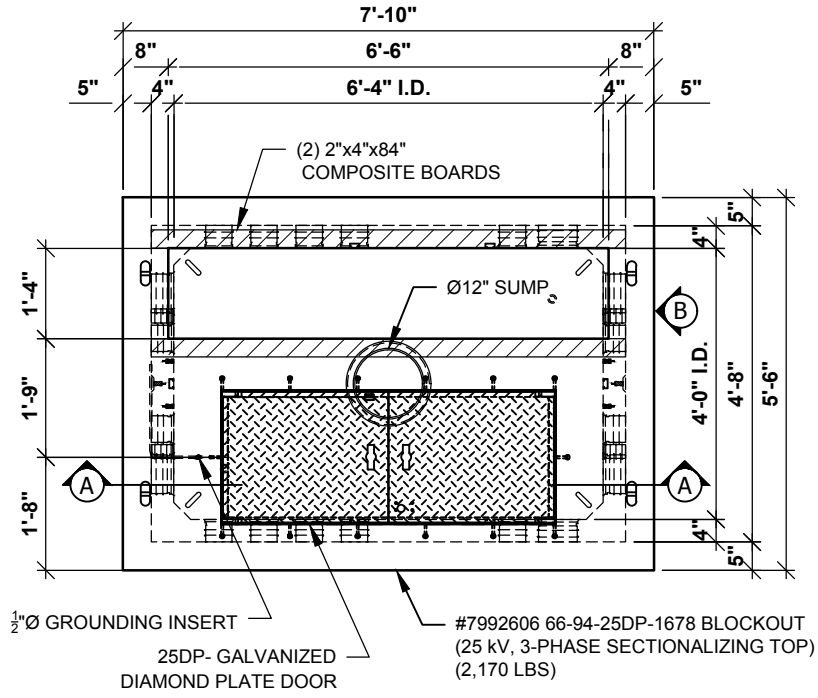
PACIFIC CORP 575 SECT #7992606



PLAN VIEW
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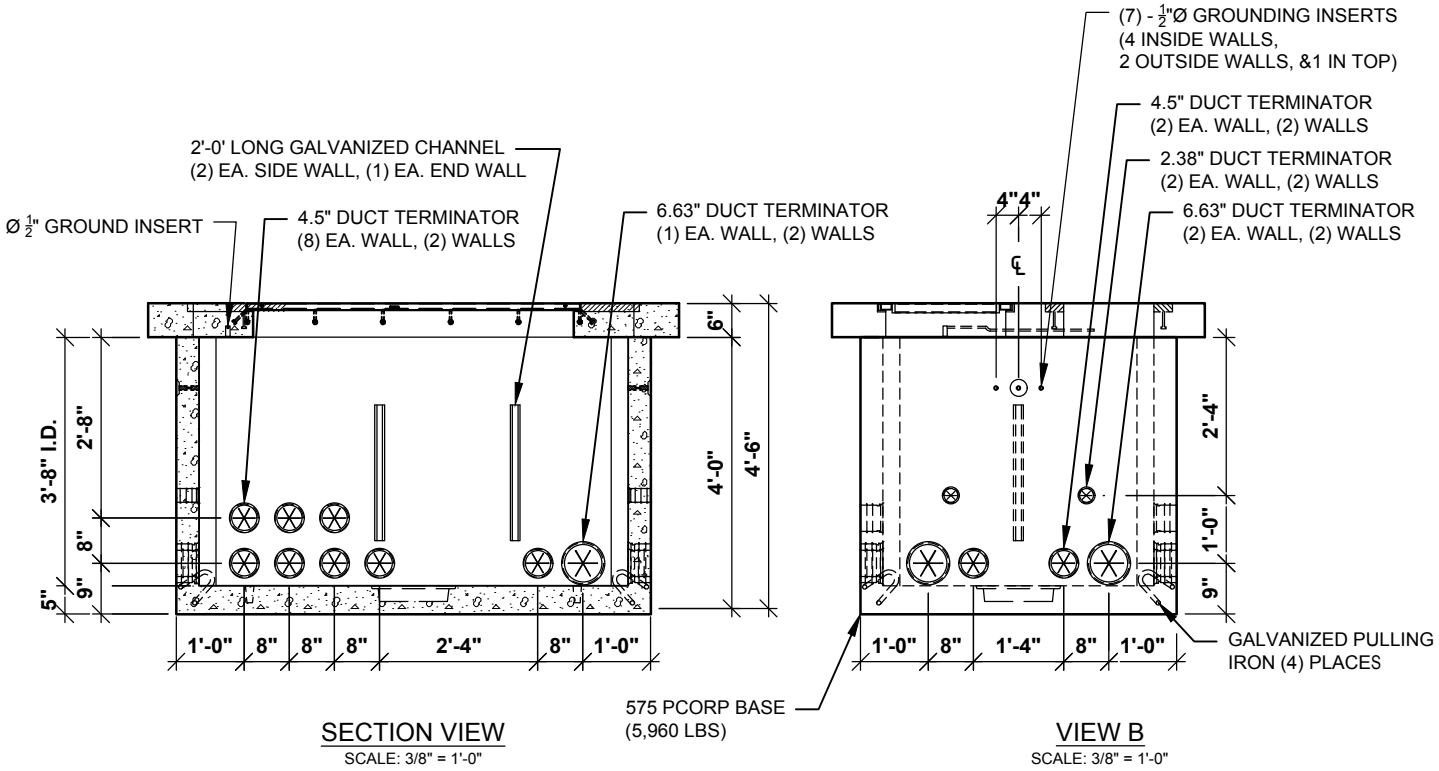

SECTION VIEW
SCALE: 3/8" = 1'-0"

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

NOTES:
1. WEIGHTS LISTED ARE APPROXIMATE.

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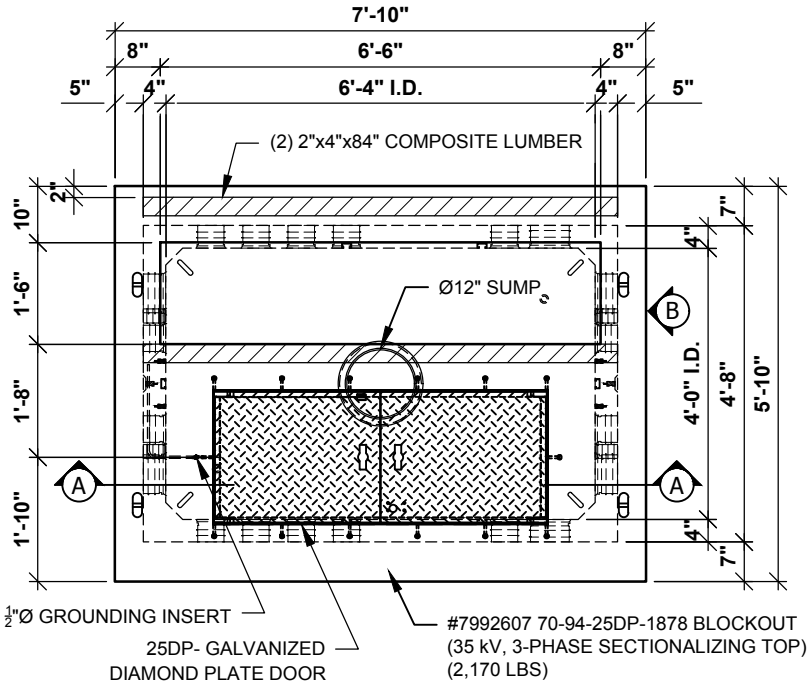
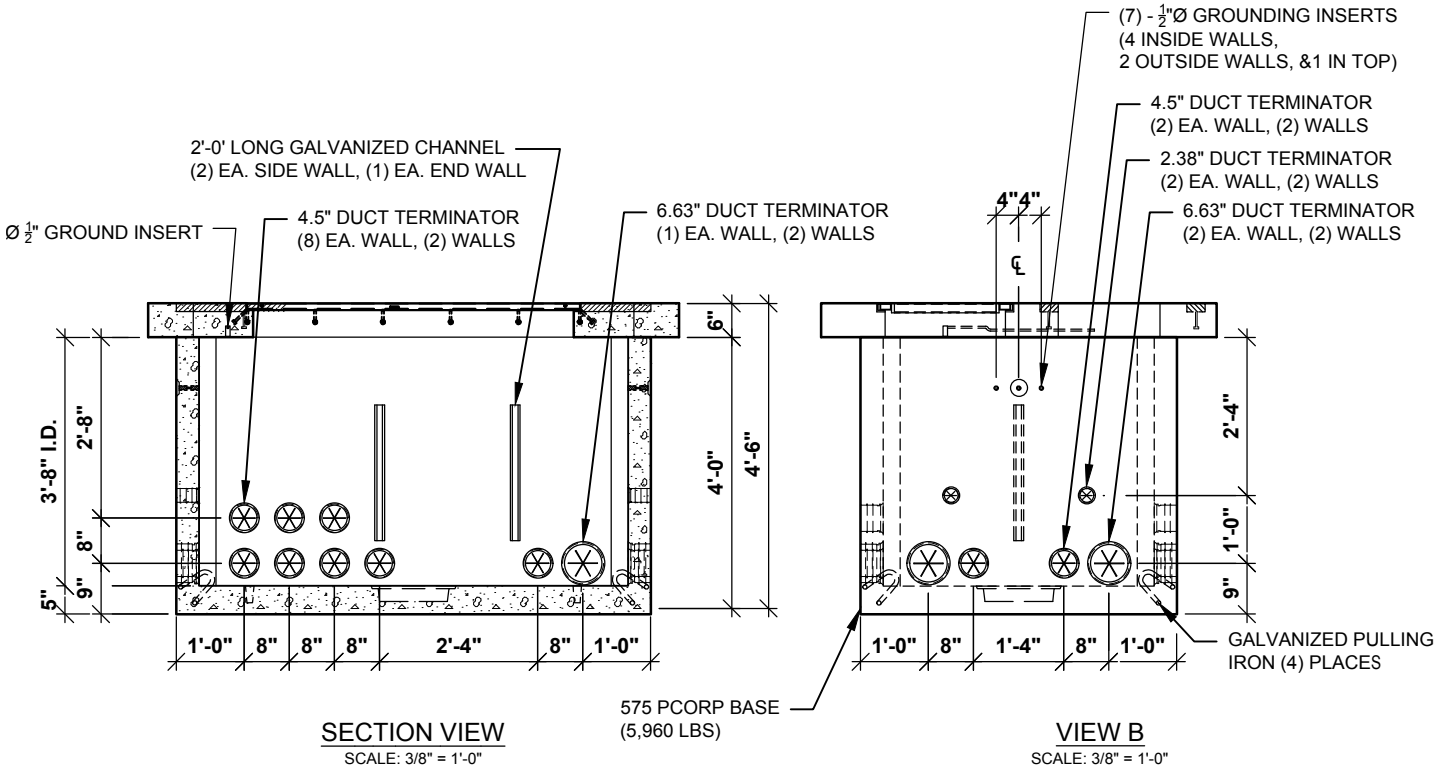
PACIFIC CORP 575 SECT #7992607



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



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

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

NOTES:
1. WEIGHTS LISTED ARE APPROXIMATE.

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ZG 311 Concrete Requirements

1. Scope

This specification outlines the minimum material requirements for concrete equipment bases and enclosures to be used in conjunction with company owned primary-rated equipment. The specification applies whether the equipment base or enclosure is to be installed by company personnel, contractors, customer, or the supplier.

2. Applicable Documents

The latest revisions of the documents listed below, in effect on the date of invitation to bid, apply to the extent specified herein.

2.1. Company Documents

ZG 301 *General Equipment Base and Enclosure Requirements*
ZG 501 *Padvault—Single-Phase Residential, 4' × 4' (48" × 48")*
ZG 521 *Padvault—Three-Phase Transformer*
ZG 531 *Padvault—Three-Phase Sectionalizing Cabinet*
ZG 532 *Flat Pad—Three-Phase Transformer*
ZG 541 *Single-Phase Fusing Cabinet Padvaults*
ZG 551 *Padvault—Three-Phase Fusing Cabinet*
ZG 562 *Padvault—7' × 12 ' (94" × 155"), for 600-Amp, Dead-Front Switchgear*
ZG 571 *Padvault—Metering Cabinet Lid*
ZG 616 *Padvault—4' × 6' (48" × 72")*
ZG 621 *Padvault—5' × 7' (56" × 84"), for Three-Phase Sectionalizing Cabinets and Metering Equipment*
ZG 622 *Padvault—7' × 9' (84" × 108"), for Three-Phase 15 kV Pad-Mounted Switchgear*
ZG 631 *Manhole—7' × 7' (84" × 84")*
ZG 641 *Padvault—Shallow, 7' × 7' (84" × 84")*
ZG 701 *Manhole—7' × 12' (94" × 155")*
ZG 711 *Vault—Shallow, 7' × 12' (94" × 155")*
ZG 715 *Sleeve—15, 25 and 35 kV, 600-Amp, Dead-Front Switchgear, Padvault*
ZG 811 *Full Traffic Cover and Frame Assembly*

2.2. Codes and Standards

Western Underground Committee Guide 2.13 *Security for Padmounted Equipment Enclosures*
Western Underground Committee Guide 2.15 *Flat Single Phase Transformer Pads*
ANSI/SCTE 77, 2007 *Specification for Underground Enclosure Integrity* (Greater side wall strength may be specified for some projects.)
ASTM C33 *Standard Specification for Concrete Aggregates*

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ASTM C150 *Standard Specification for Portland Cement*

ASTM A 615 *Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement*

ACI 211 *Standard Practice for Selecting Proportions for Normal Heavyweight,and Mass Concrete*

ACI 212 *Report on Chemical Admixtures for Concrete*

ACI 237 *Self-Consolidationg Concrete*

ACI 304 *Guide for Measuring, Mixing, Transporting, and Placing Concrete*

ACI 305 *Guide to Hot Weather Concreting*

ACI 306 *Guide to Cold Weather Concreting*

ACI 318 *Building Code Requirements for Structural Concrete*

ACI 347 *Guide to Formwork for Concrete*

AWS D1.4 *Structural Welding Code—Steel Reinforcing Bars*

3. Definition

Company refers to PacifiCorp.

PacifiCorp refers to Pacific Power and Rocky Mountain Power.

4. General

This specification states material and construction requirements which are applicable only to all concrete equipment bases or enclosures.

5. Design and Manufacturing Requirements

The purpose of a concrete equipment base is to support the weight of primary-rated pad-mount equipment. Enclosure are used to contain primary rated equipment below grade or provide an area for cable pulling or splicing.

5.1. Concrete Materials

Cement used shall be a standard brand of Portland cement, Type II or III conforming to ASTM C150, latest edition. Aggregates shall consist of natural sands and gravels, crushed rock, crushed slag, or other inert materials having clean, uncoated grains of strong durable material that conforms to ASTM C33 and ACI 318-89.

Concrete strength at twenty-eight days shall be at least 4000 lbs. per square inch.

5.2. Forms

Forms may be of wood or metal selected to produce a smooth surface finish They shall be constructed sufficiently tight to prevent leakage of concrete, and securely braced and shored to prevent displacement and safely support construction loads. Forms shall be removed in a manner and at a time which will ensure the complete safety of the structure.

5.3. Cold Weather Requirements

When the ambient air temperature is below forty degrees Fahrenheit, concrete shall be at least sixty (60) degrees Fahrenheit when poured, and shall be maintained at least a minimum of fifty (50) degrees Fahrenheit for seventy-two (72) hours. All forms shall be frost free.

5.4. Surfaces

The finished surface shall be flat and free of aggregate pockets and honeycomb. Where minor defects occur, they shall be painted with cement grout, patched with a one-to-one cement / sand mixture, and finished to match adjacent surfaces while the concrete is still green.

5.5. Curing

All concrete shall be cured for not less than seven (7) days by keeping the surface wet by sprinkling. Membrane compound may be used in lieu of water curing. The component parts must be poured at least seven (7) days prior to shipment to stores or installation at the site, as required in individual equipment base and enclosure specifications.

5.6. Air Entrainment

Approved air entraining agents shall be used to provide an air content at 6 %, + or – 1.5%.

5.7. Reinforcement

The supplier shall determine the proper placement of steel reinforcement to ensure compliance with strength requirements. Reinforcement shall consist of 4 × 4 - 6/6 steel reinforcing mesh and #4 through #6 steel rebar, placed as required to meet the load requirements of individual equipment base and enclosure specifications. Mesh shall meet the requirements of ASTM A-185. Rebar shall be Grade 60, and shall meet the requirements of ASTM A-615.

The supplier shall ensure that the holding strength of pulling eyes and irons meets the requirements description in each of the company's specifications.

Some pads require a plastic board (or boards) for securing the cabinet onto the pad. Plastic boards shall have a holding strength of 1000 lbs. per linear foot.

5.8. Concrete Test Reports

The company has the right to request certified concrete compressed air test reports.

5.9. Certifying Suppliers Quality Assurance Program

The vendor shall be required to provide details of their Quality Compliance program before being added as a qualified supplier. Included in the audit will be documents showing that the vault designs are certified by a Licensed Professional Engineer.

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5.10. Vault Manufacturing Inspection

Observation by a company representative of the vault manufacturer, including inspection of the facility, testing and/or a vault tear-down, is the option of company.

5.11. Marking

The manufacturer shall provide the following marking on an internal wall:

1. Manufacturer's name.
2. Date of construction (showing month and year).

5.12. Grounding Grid

Each vault shall be constructed with an encased electrode meeting NESC 094.B.6. The ⅜″ steel rebar shall be 20 continuous feet in length, embedded in concrete at least 24" below finished grade when the vault is set. The grounding system shall be attached to a connection insert of high-strength bronze alloy, threaded to ½″ 13 UNC. The vertical rebar attaching to the bronze connection shall be welded or connected by a minimum of a copper-clad ⅝″ ground clamp.

Each padvault shall have five grounding inserts: two on opposite side walls and one at the cover. Two inserts on opposite side walls shall be available for connection on the inside and outside of the vault. The outside grounding inserts shall be centered on the side walls. The inside inserts shall be centered on the side wall or located no less than 6″ from diagonal corners. The cover pad grounding insert shall be accessible from inside the vault.

The company may request the viewing of the ground grid prior to the vendor's acceptance as a supplier. The viewing may be a visit to the plant to see the different steps in the manufacturing process. Alternative to a plant visit are electronic pictures of the reinforcing cage, showing how the grounding grid is integrated into the structure, and a Licensed Professional Engineer's stamp on the design documents.

5.13. "C"-Channel Material

C-channels shall be galvanized or fiberglass $1^{5}/_{8}$″ x $^{13}/_{16}$″. See the vault specification for length and rotation.

5.14. Composite Board Lumber

The composite board lumber shall be 2″ x 4″ winchester gray color with high-quality and 200 psi or higher shear strength design value. The composite plate shall be attached to the concrete by using the $^{5}/_{16}$″ x 4″ zinc bolts. The attachments shall be strong enough to have a solid bond with concrete and shouldn't be pulled off when installing enclosures to the composite board.

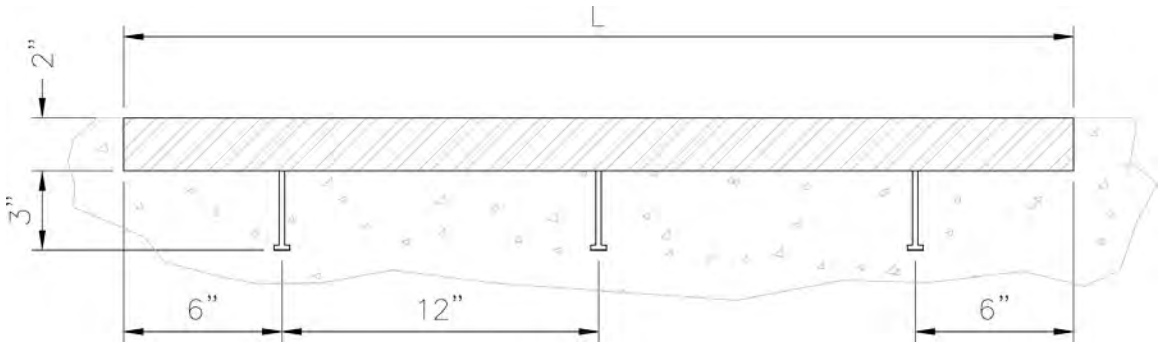

Figure 1—Composite Board Lumber

6. Material Specification Issuing Department

The T&D standards engineering department of PacifiCorp wrote this material specification. This material specification shall be used and duplicated only in support of company projects.

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Padvault — Three-Phase Fusing Cabinet

1 Scope

This specification outlines the minimum requirements for padvaults to be used in conjunction with PacifiCorp-owned three-phase fusing cabinets. The specification applies whether the padvault is to be installed by company personnel, contractor, customer, or the supplier.

2 Applicable Documents

The latest revisions of the documents, standards, codes and requirements listed in 2.1, *PacifiCorp Material Specifications*, and 2.2, Codes and Standards, in effect on the date of invitation to bid apply to the extent specified herein.

2.1 PacifiCorp Material Specifications

ZG 301, *General Equipment Base and Enclosure Requirements*

ZG 311, *Concrete Requirements*

ZG 621, *Padvault — 5-Foot by 7-Foot (56″ ×84″), for Three-Phase, Sectionalizing Cabinets and Metering*

ZG 562, *Padvault — 7′×12′(94″ ×155″) for 600-Amp, Dead-Front Switchgear*

ZG 821, *Incidental-Traffic Cover For Padvaults*

2.2 Codes and Standards

ANSI/SCTE 77 2007, Tier 8

3 General

3.1 Application Information

This specification states material and construction requirements which are applicable only to all three-phase fusing cabinet padvaults.

3.2 Authorized Material Specification

This material specification shall not be considered valid until each page contains the approval signature or initials of the persons named in the title blocks.

4 Applicable Stock Item Numbers

Materials being submitted for the following PacifiCorp stock item numbers are subject to evaluation in accordance with the requirements in this specification.

4.1 Stock Item Numbers

7992604, PADVAULT, FUSE CABINET, 3-PHASE, 15/25 KV, 3–4 POSITION
7992881, PADVAULT, FUSE CABINET, 3-PHASE, 15/25 KV, 5 POSITION

5 Design and Manufacturing Requirements

The purpose of a three-phase fusing cabinet padvault is to support a three-phase fusing cabinet.

5.1 Padvault Layout

Unless otherwise approved by PacifiCorp Engineering, all dimensions and placement of hardware shall conform to those shown in Figure 1 or Figure 2, shown below. The pads found in this specification are unique to the fusing cabinets used by PacifiCorp.

5.2 Inserts and Mounting Hardware

For three- or four-position fusing cabinet padvaults, the supplier shall provide:

- two $2'' \times 4'' \times 78''$ composite boards, cast flush with the top of the padvault lid, at the locations specified in Figure 2.

For five-position fusing cabinet padvaults, the supplier shall provide:

- two $2'' \times 4'' \times 114''$ composite boards, cast flush with the top of the padvault lid, at the locations specified in Figure 1.

Hardware to fasten the fusing cabinet to the composite boards shall be provided:

by PacifiCorp:

- six $^1/_2'' \times 2''$ hot-dip galvanized lag screws (SI# 7992810)
- six $^1/_2''$ stainless steel belleville washers

by the Supplier:

- six $1\ ^1/_4'' \times 2\ ^1/_2''$ stainless steel hold-down cleats with $^1/_4''$lift and $^9/_{16}'' \times 1\ ^1/_2''$ holes.

All loose hardware shall be packaged, and the package shall be attached to one of the padvault walls.

5.3 Pulling Attachments

Descriptions of cable-pulling attachments are found in ZG 621 and ZG 711. Pulling attachments shall be rated for 4000 lbs. of pulling tension.

5.4 Conduit Entrances

TERM-A-DUCTS are used for the conduit entrances. The layout of TERM-A-DUCTS can be found in ZG 621 and ZG 562.

5.5 Lifting Attachments

Enough lifting attachments shall be provided to ensure safe installation of all pieces at the site.

5.6 Grounding Grid

The enclosure for the fusing cabinet padvault comes with an internal grounding grid. The details of the grounding grid may be found in ZG 621 and ZG 562.

5.7 Access Panel

The access panel for the fusing cabinet padvaults may not be larger than 24″ × 60″. For a detailed outline of access panels, refer to ZG 821.

5.8 Installation

This unit shall be installed at the site by the supplier or contractor. There shall be a 6″ base of $^{3}/_{4}$″-minus gravel compacted to 90% of dry density under the padvault and leveledto within 2% slope before setting the padvault. All joints between concrete sections shall be sealed using tar or mastic. The top of the pad should be two to four inches above final grade, when installed in a non-pedestrian area. The pad shall be flush with final grade in pedestrian areas.

5.9 Grounding

The pad shall have one insert grounding as described in ZG 621 and ZG 562.

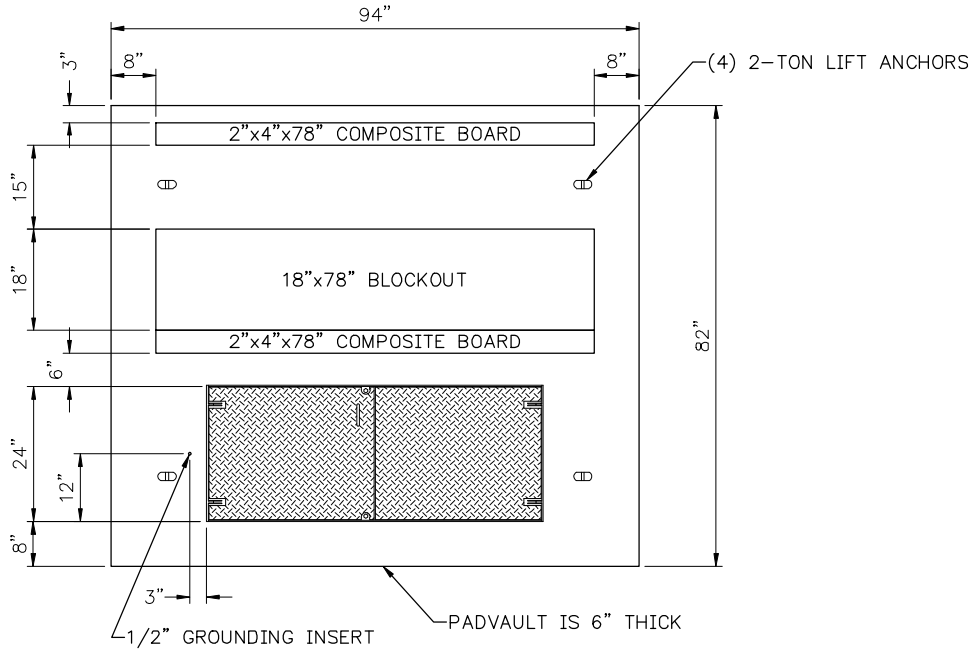

Figure 1—3- or 4-Position Three-Phase Fusing Cabinet Padvault (SI# 7992604)

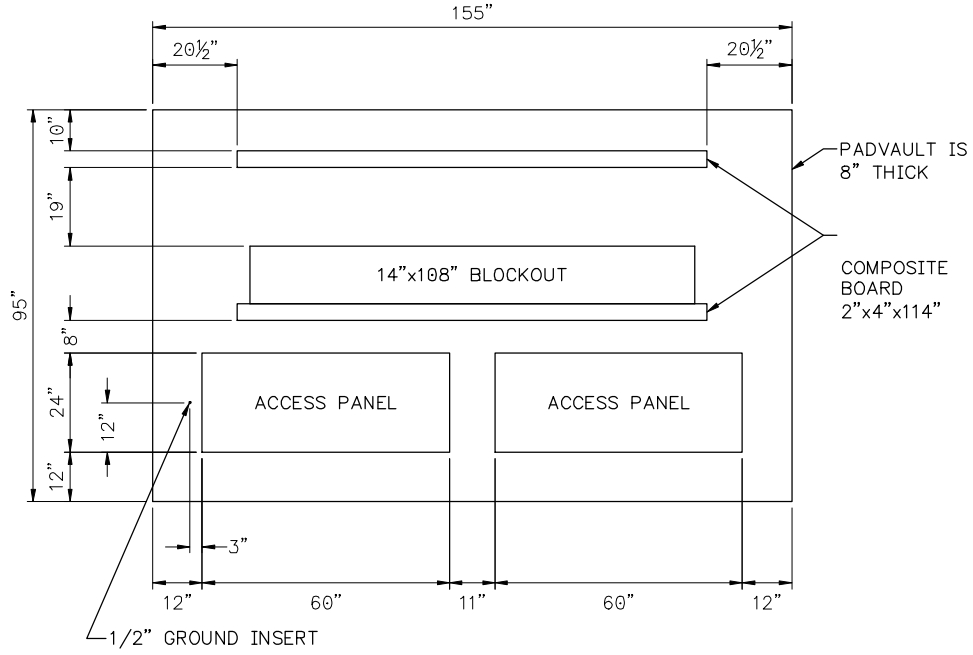

Figure 2—5-Position Three-Phase Fusing Cabinet Padvault (SI# 7992881)

6 Testing

6.1 Test Compliance

Padvaults submitted under this specification shall meet all tests and requirements contained in ZG 301, *General Equipment Base and Enclosure Requirements*; ZG 311, *Concrete Requirements*; and this specification. Padvaults shall also comply with requirements in applicable national standards.

6.2 Security Test

Fusing cabinet padvaults must be designed and tested to ensure that padmount equipment is not compromised by uneven pad setting. And, with the appropriate fusing cabinet mounted, attempt to pass a #14 AWG soft-drawn copper wire through the interface between the cabinet and pad. If the wire can be passed through the interface, the padvault has failed the test and will be rejected by PacifiCorp.

7 Issuing Department

The Engineering Documentation department of PacifiCorp published this document. Questions regarding editing, revision history and document output may be directed to the lead editor at (503) 813–5293. Technical questions and comments may be directed to Ehsan Maleki, Standards Engineering, (503) 813–7089.

This document shall be used and duplicated only in support of PacifiCorp projects. This document is considered a valid publication when the signature blocks below have been signed by the authoring engineer and standards manager.

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Engineer (E. Maleki): AEM
Standards Manager (D. Asgharian): DDA

Padvault — 5′ × 7′ (56″ × 84″), for Three-Phase Sectionalizing Cabinets and Metering Equipment

1 Scope

This specification outlines the minimum requirements for 5′ × 7′ (56″ × 84″) vaults to be used for three-phase sectionalizing cabinets and metering equipment. This specification applies to all 5′ × 7′ (56″ × 84″) vaults installed by PacifiCorp or its contractors, customers or suppliers.

2 Applicable Documents

The latest revisions of the documents, standards, codes and requirements listed in 2.1, PacifiCorp, and 2.2, Codes and Standards, in effect on the date of invitation to bid apply to the extent specified herein.

2.1 PacifiCorp

ZG 301, *General Equipment Base and Enclosure Requirements*
ZG 311, *Concrete Requirements*
ZG 821, *Incidental-Traffic Cover For Padvaults*

2.2 Codes and Standards

ASTM C857 A–16
AASHTO H–20 (for vaults beneath roadways)
ASTM C857 A–8 (for vaults beneath incidental light truck traffic)

3 General

3.1 Applicability

Material and construction requirements stated in this material specification are applicable only to 5′ × 7′ (56″ × 84″) vaults.

3.2 Authorization

This material specification shall not be considered valid unless each page contains the approval signature or initials of the persons named in the title blocks.

4 Applicable Stock Item Numbers

Materials being submitted for the following PacifiCorp stock item numbers are subject to evaluation according to the requirements in this specification.

4.1 Stock Item Numbers

ZG 521 Padvault — Three-Phase Transformer
7992604, PADVAULT, FUSING CABINET, 3-PHASE, 15/25KV, 3–4 POSITION
7992605, PADVAULT, SECTIONALIZING CABINET, 3-PHASE, 15 KV
7992606, PADVAULT, SECTIONALIZING CABINET, 3-PHASE, 25 KV
7992607, PADVAULT, SECTIONALIZING CABINET, 3-PHASE, 35 KV
3090369, VAULT, METERING, 3–PHASE, 200A (refer to Figures 1, 2, & 3)

5 Design and Manufacturing Requirements

The purpose of a 5′ × 7′ (56″ × 84″) vault is to provide an enclosure for cable pulling for three-phase transformers, three-phase sectionalizing cabinets, and three-phase fusing cabinets.

5.1 Vault Layout

Figure 1 and Figure 2 show the assembled 5′ × 7′ (56″ × 84″) vault layout with dimensions. Unless otherwise approved by PacifiCorp engineering, all dimensions and placement of hardware shall conform to those shown in Figure 1 and Figure 2. Vault enclosures shall be constructed to ASTM C857 A–16, and to the holding strengths of the pulling eyes or irons.

5.2 Lifting Attachments

Enough lifting attachments shall be provided to ensure safe installation of all pieces at the site.

5.3 Pulling Attachments

Cable pulling attachments shall be installed in the corners of the vault. Pulling attachments shall have a minimum pullout strength of 6000 pounds. Attachments shall allow the attachment of a clevis with a one-inch diameter through-bolt. Pulling attachments may be designed by the manufacturer to meet these requirements. (Pulling irons shall not block the front of the terminal duct entrances.)

5.4 Conduit Entrances

The padvault shall be constructed with TERM-A-DUCT or equivalent conduit entrances compatible with PVC, polyethylene (PE), or fiberglass 90°C-rated electrical-grade conduit. The standard conduit entrance locations are as follows, and are also shown in Figure 2:

Entrances at each end wall: Two 6.63″ entrances, two 4.5″ entrances, and two 2.38″ entrances.

Entrances at each side wall: Eight 4.5″ entrances and one 6.63″ entrance.

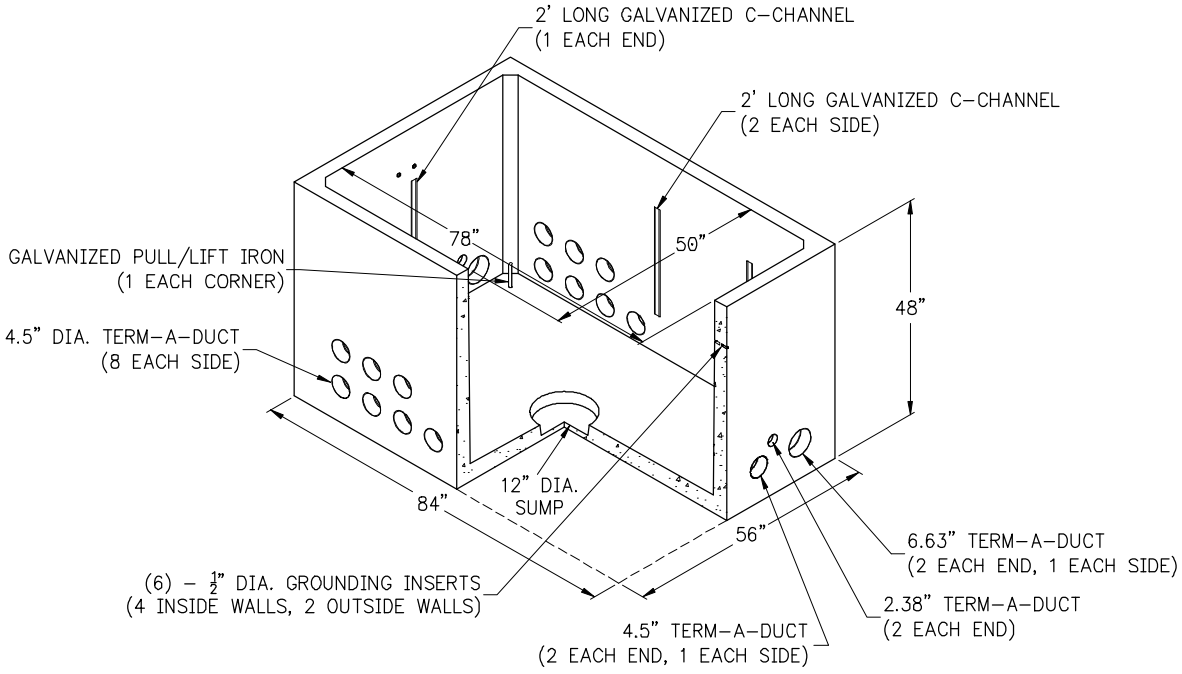

Figure 1—5′ × 7′ (56″ × 84″) Vault, Cutaway View

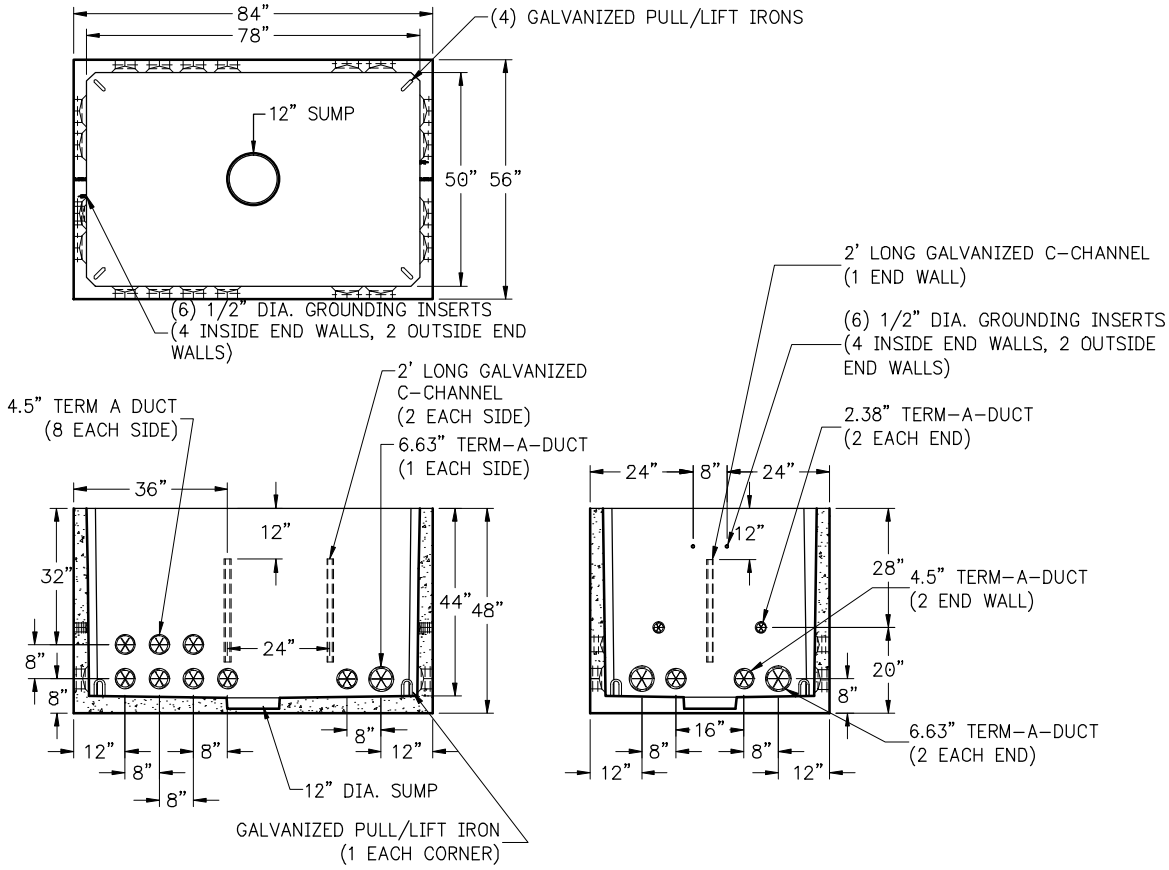

Figure 2—5′ × 7′ (56″ × 84″) Vault Enclosure Layout

5.5 Grounding Grid

The vault shall be equipped with an internal, encased electrode in the vault enclosure meeting NESC 094.B.6. The electrode shall be 3/8″ steel rebar. The electrode shall be encased horizontally and run continuously around vault. The vault electrode shall be a minimum of 24″ from the top of the vault. The grounding system shall attach to "connection" inserts, made of high-bronze alloy and threaded to 0.5″–13UNC. All inserts shall have caps or plugs installed. All padvaults shall have seven grounding inserts: two on the inside of each end wall, one on the outside of each end wall, and one on the bottom of the cover (near the access door). Refer to Figure 3 for layout details.

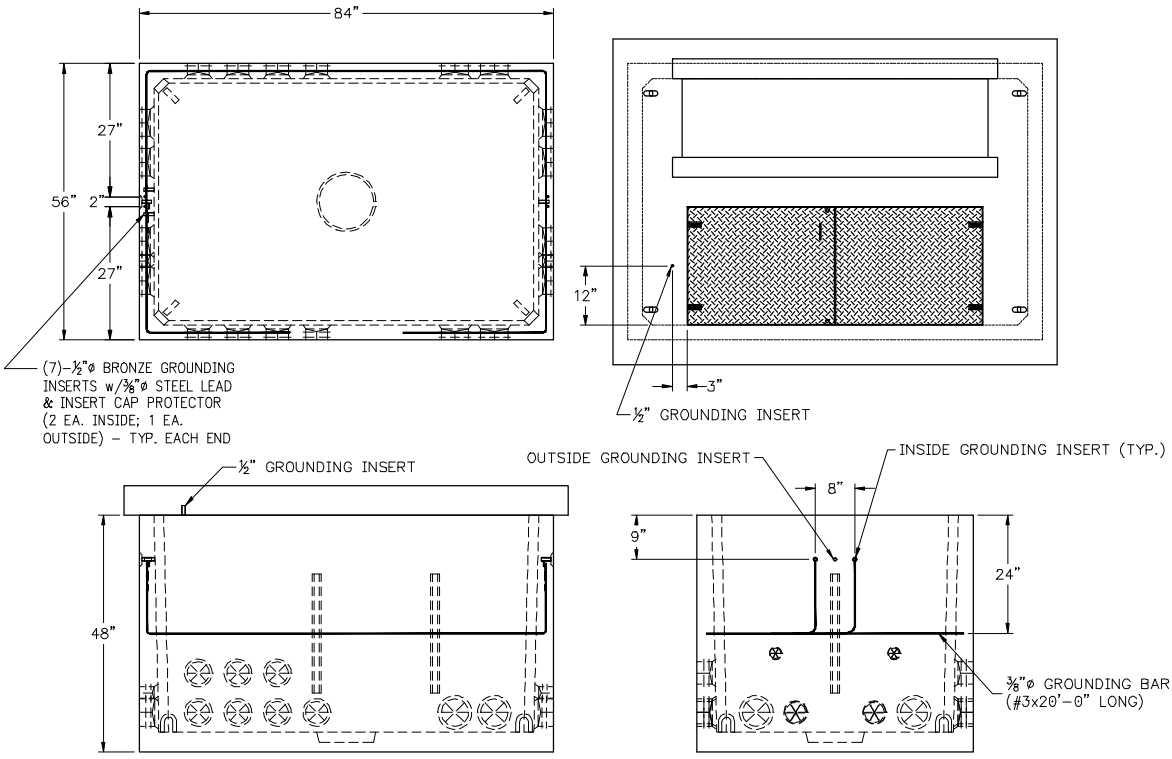

Figure 3—5′ × 7′ (56″ × 84″) Vault Ground Grid Layout

5.6 Installation

This unit shall be set at the site by the supplier. The contractor shall be responsible to ensure that all earth under the vault is compacted and leveled to no more than 2% slope prior to setting the vault. A clean gravel base under the padvault may be necessary in areas where drainage is poor. The interface between the pad and the enclosure shall be sealed using a waterproof substance, such as tar or mastic. The top of the frame should be flush with the final grade in pedestrian areas. Setting depth shall be determined by the local regulatory authority for full-traffic areas.

6 Padvault for Three-Phase Sectionalizing Cabinets

6.1 Padvault Layout

The 5′ × 7′ (56″ × 84″) vault is common for the three voltage classes of sectionalizing cabinets. However, the pads are unique for each voltage (15 kV, 25 kV, and 35 kV). See Figure 4, Figure 5, and Figure 6 for dimensions.

6.2 Inserts and Mounting Hardware

The supplier shall provide:

- Two 2″ × 4″ × 66″ composite boards for a 15 kV three-phase sectionalizing cabinet (padvault SI# 7992605), or
- Two 2″ × 4″ × 84″ composite boards for a 25 kV (padvault SI# 7992606), or a 35 kV three-phase sectionalizing cabinet (padvault SI# 7992607).

Boards shall be case flush with the top of the padvault lid at the locations specified in Figure 4 through Figure 6.

The following hardware to fasten the sectionalizing cabinet to the composite boards shall be provided by the supplier:

- Six 1-1/4″ × 2-1/2″ stainless steel hold-down cleats with 1/4″lift and 9/16″ × 1-1/2″ holes.

6.3 Access Panel

All three-phase sectionalizing padvaults shall be equipped with one access panel, as described in material specification ZG 821, *Incidental-Traffic Cover For Padvaults*. The access panel size shall not exceed 24″ × 60″.

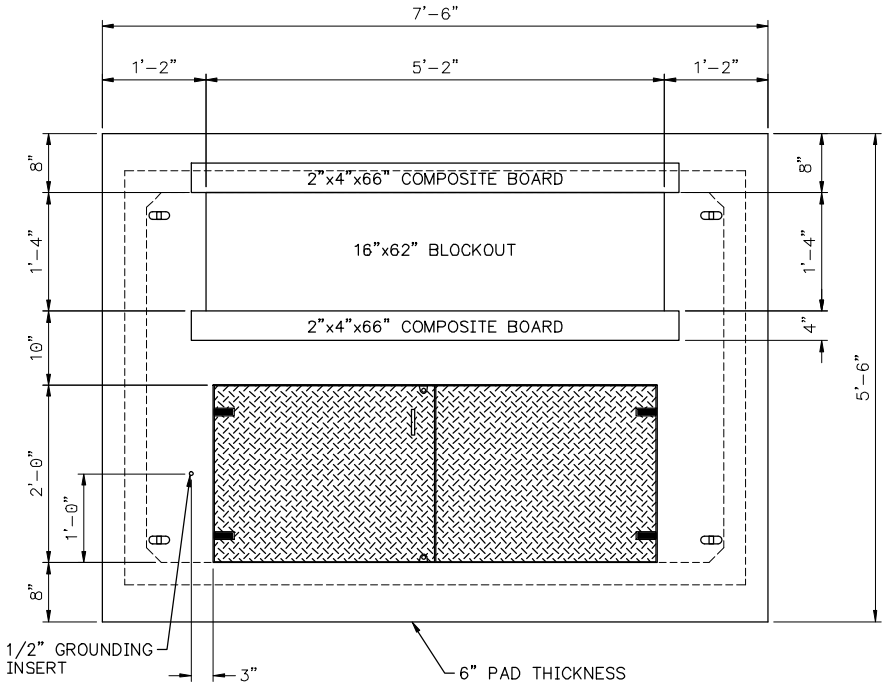

Figure 4—15 kV Three-Phase Sectionalizing Cabinet Pad (SI# 7992605)

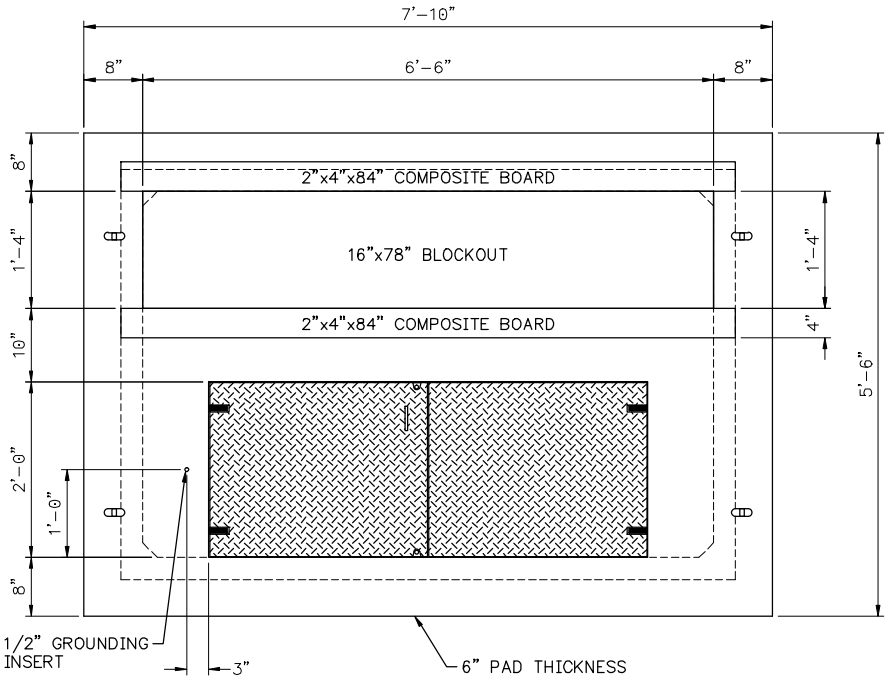

Figure 5—25 kV Three-Phase Sectionalizing Cabinet Pad (SI# 7992606)

Engineer (E. Maleki): AEM
T&D Stds Mgr (J. Jones):

Padvault — 5′ × 7′ (56″ × 84″), for Three-Phase Sectionalizing Cabinets and Metering Equipment

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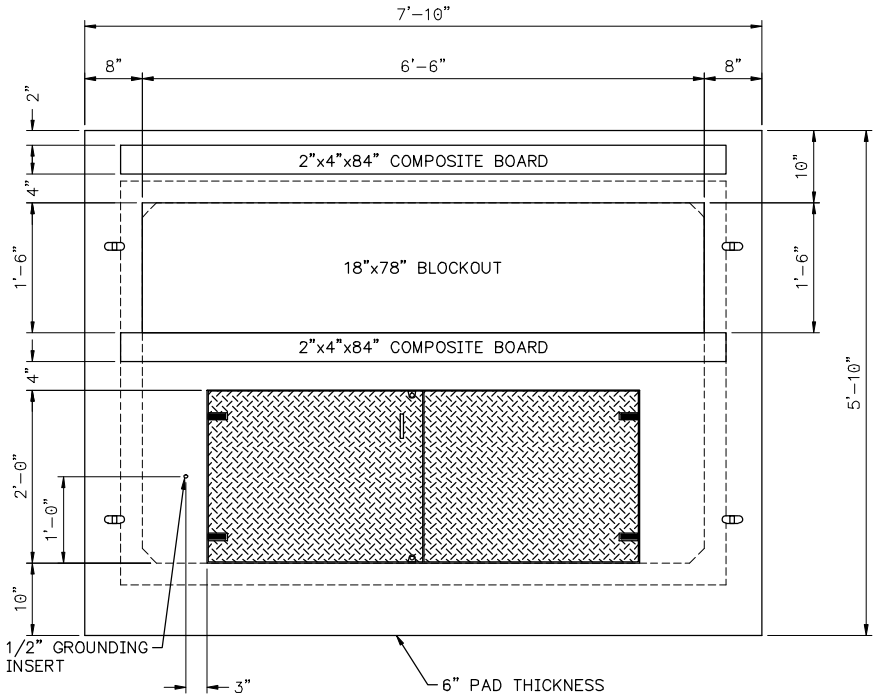

Figure 6—35 kV Three-Phase Sectionalizing Cabinet Pad (SI# 7992607)

7 Testing

7.1 Test Compliance

Vaults submitted under this specification shall meet all tests and requirements contained in material specifications ZG 301, *General Equipment Base and Enclosure Requirements*, ZG 311, *Concrete Requirements*, and this specification. Vaults shall also comply with requirements in applicable national standards.

8 Issuing Department

The engineering publications department of PacifiCorp published this document. Questions regarding editing, revision history and document output may be directed to the lead editor at (503) 813–5293. Technical questions and comments may be directed to Ehsan Maleki, standards engineering, (503) 813–7089.

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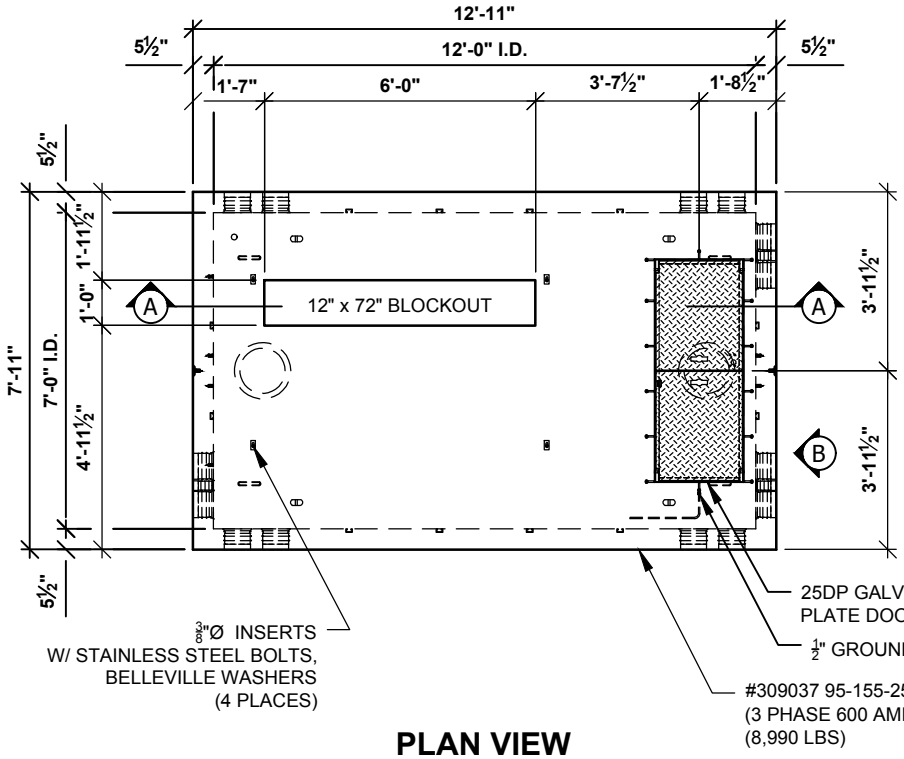
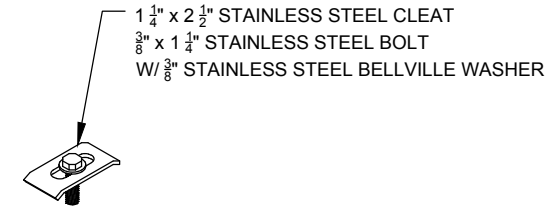


PLAN VIEW



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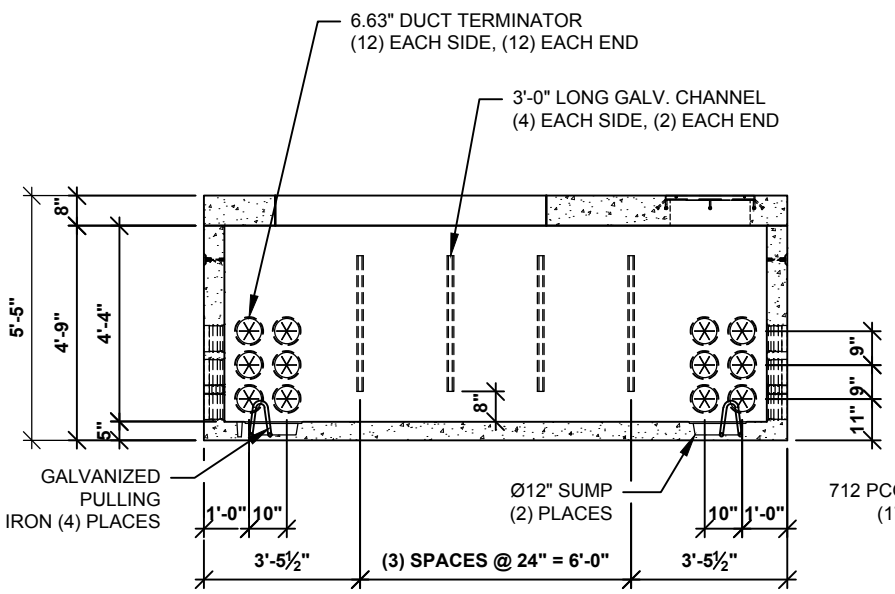

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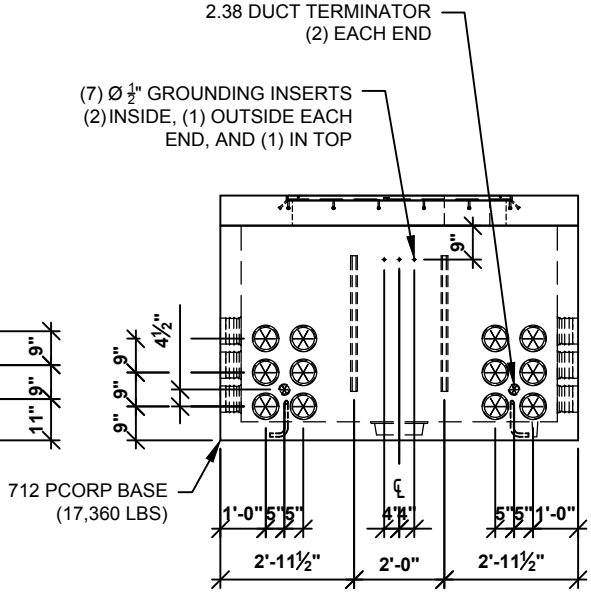

VIEW - B

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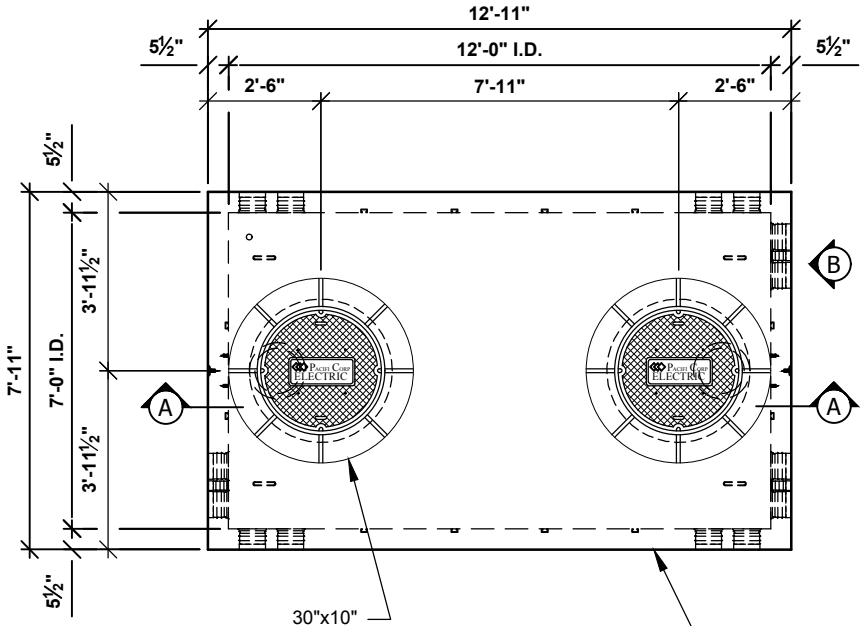
PACIFIC CORP 712 FULL TRAFFIC #7992596



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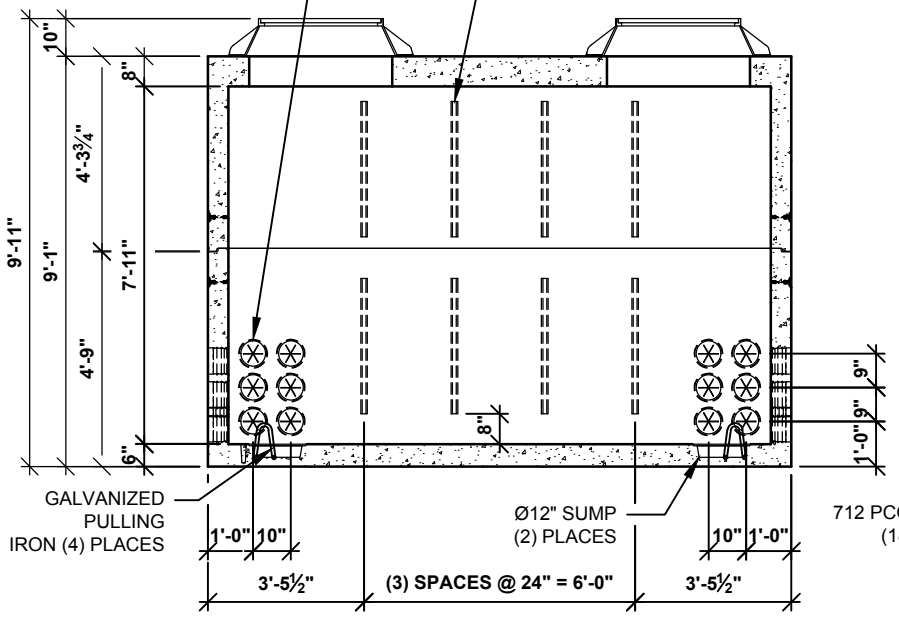

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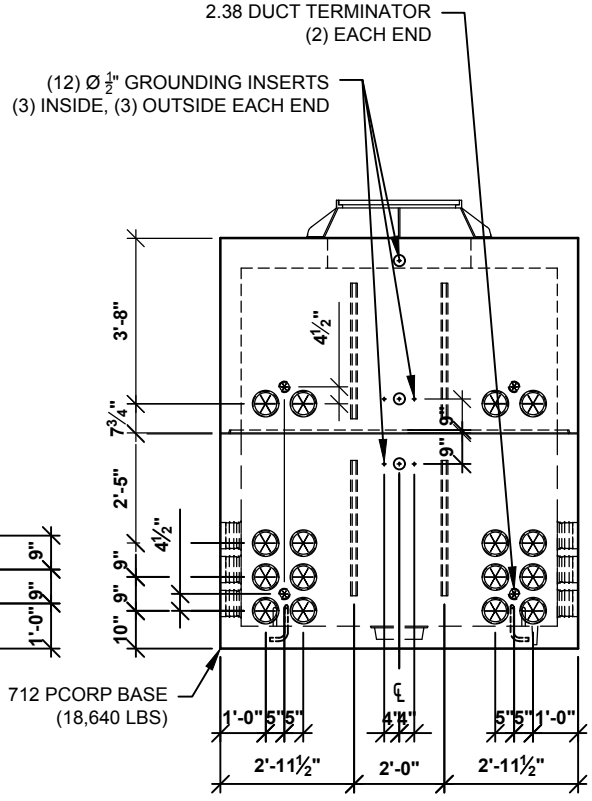

VIEW - B

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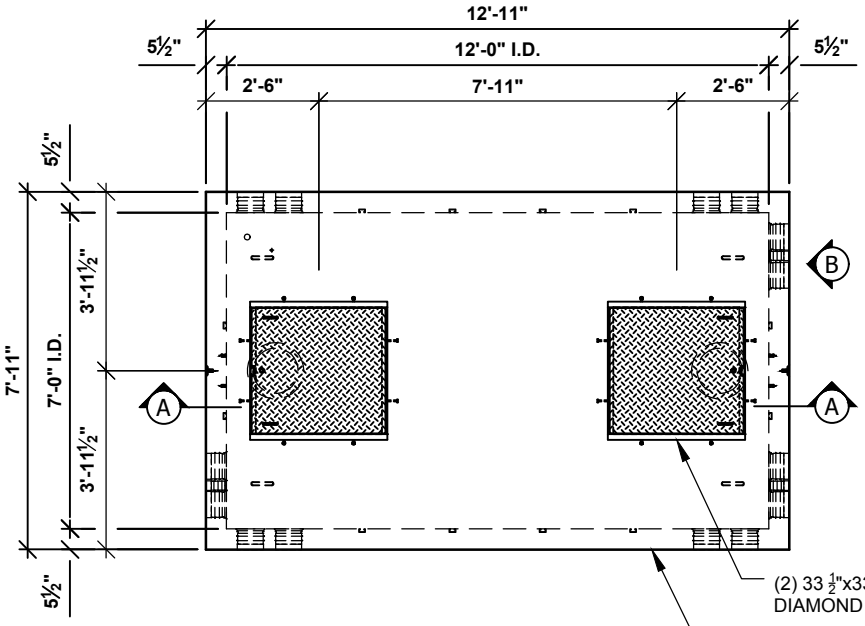

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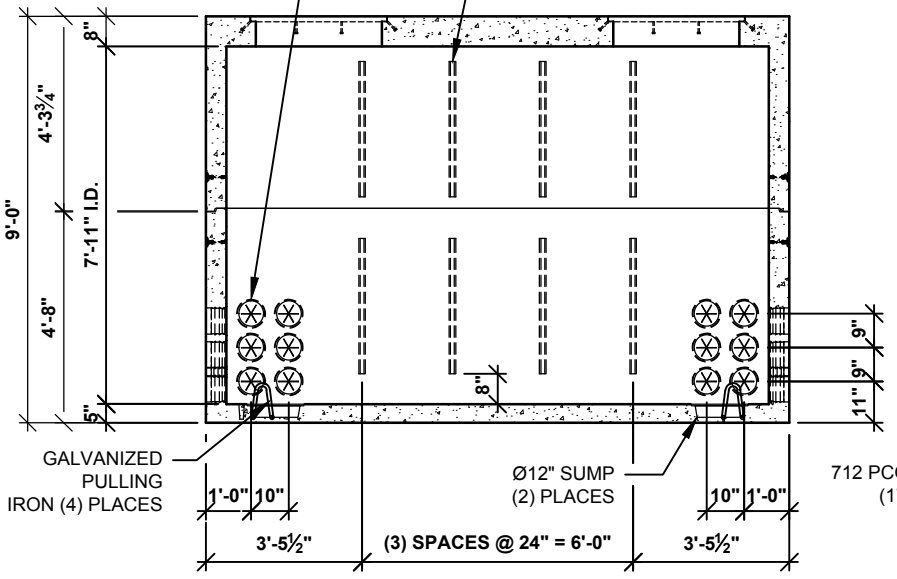

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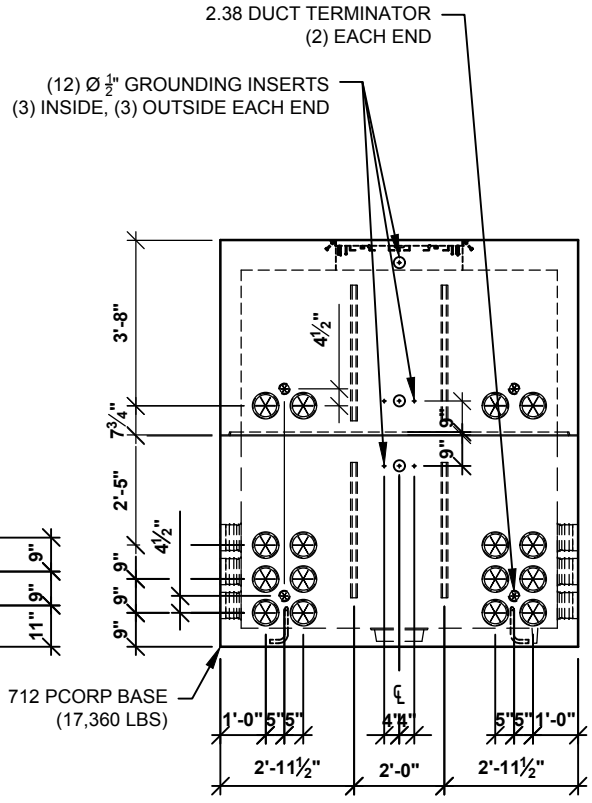

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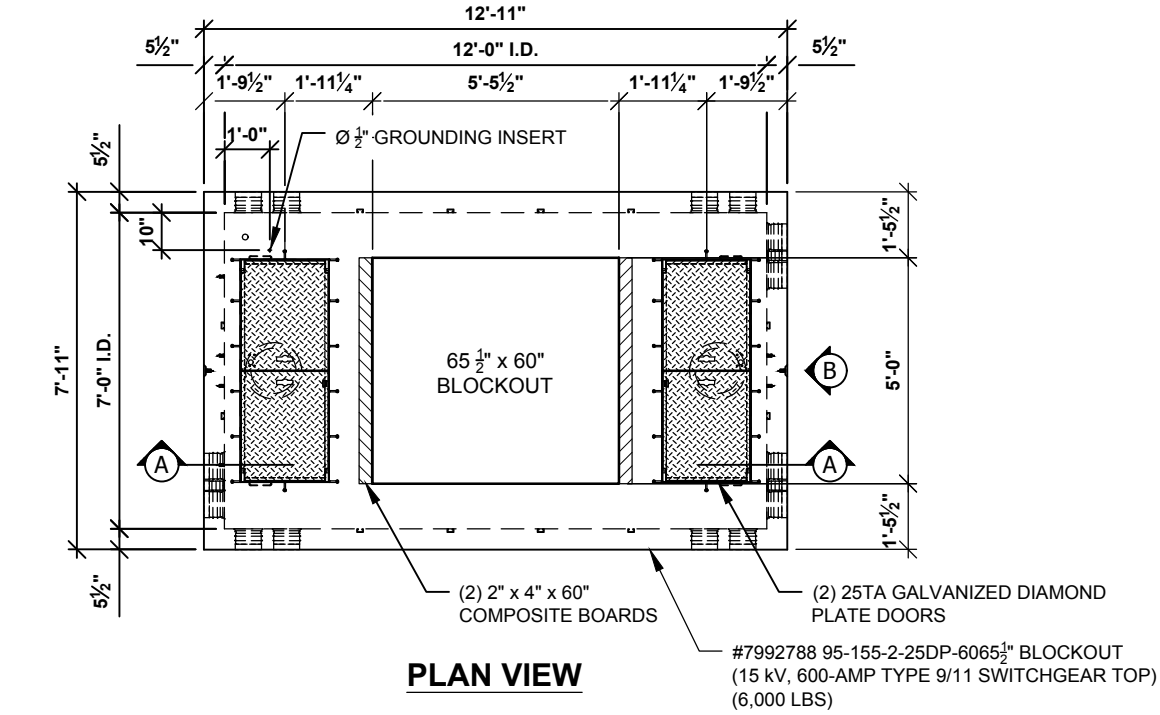

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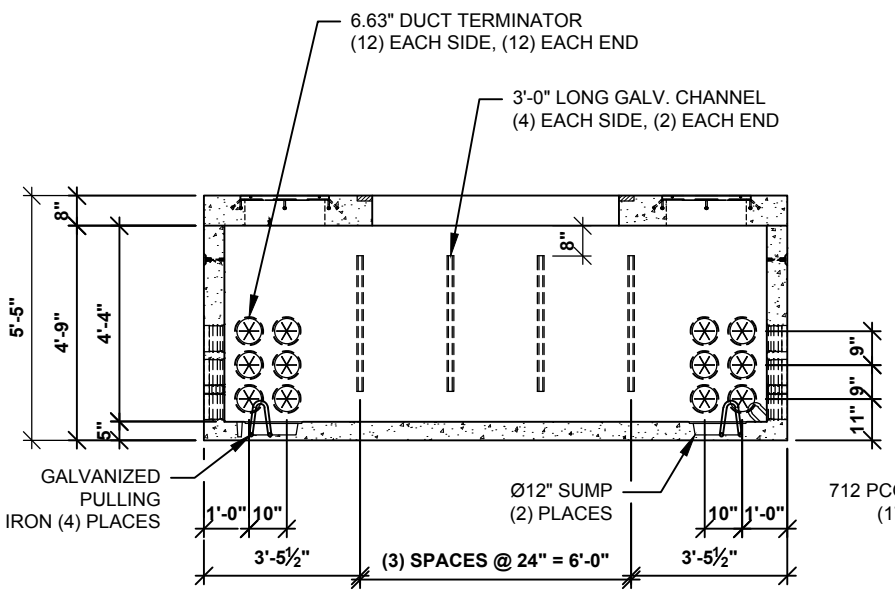

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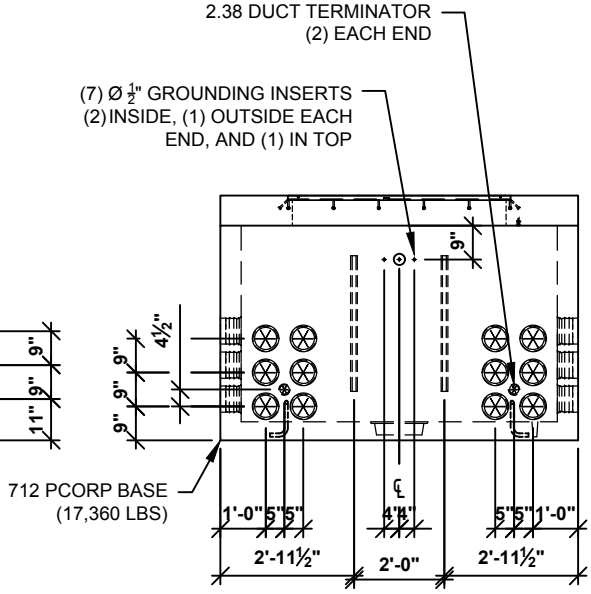

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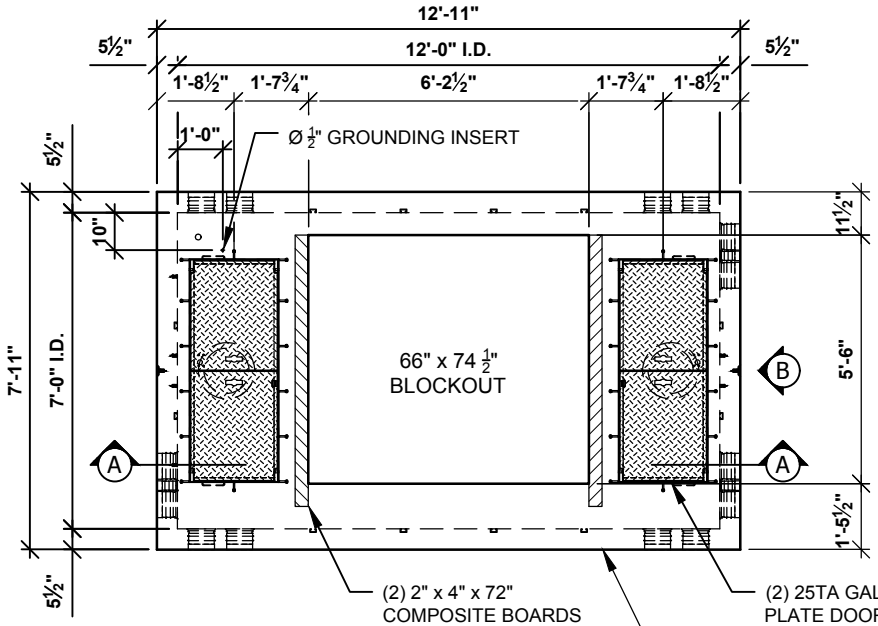

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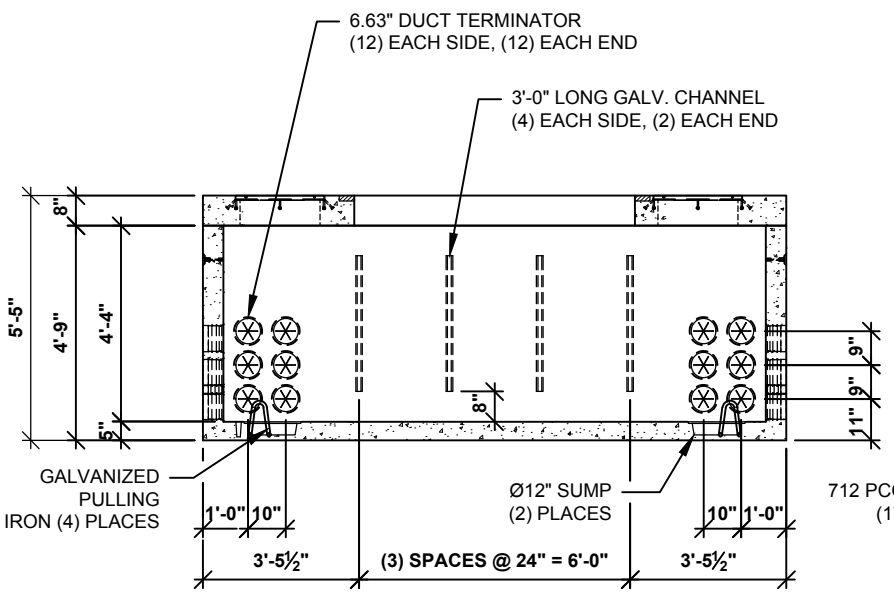

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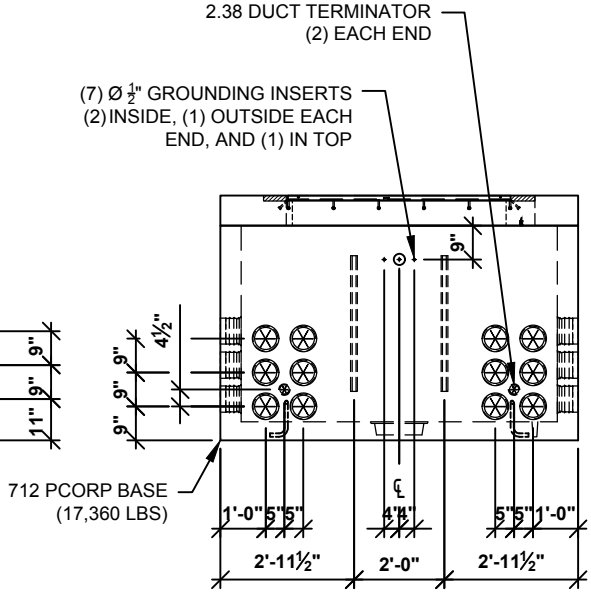

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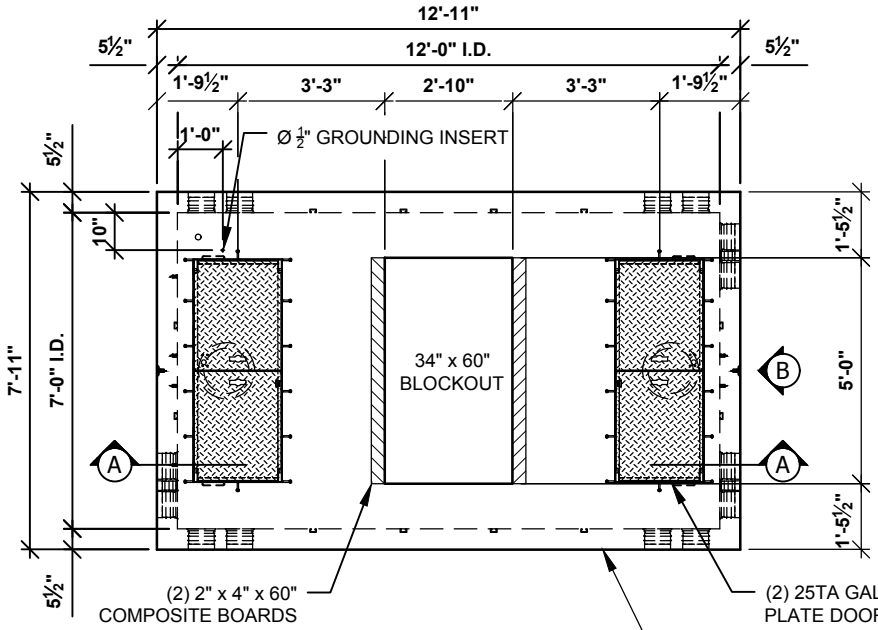
PACIFIC CORP 712 SWGEAR #7992790



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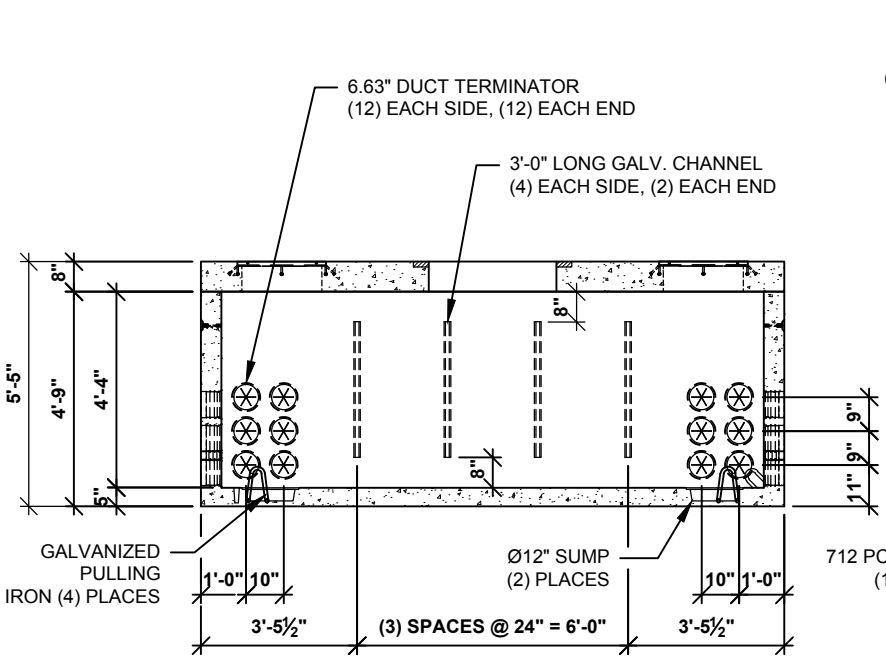

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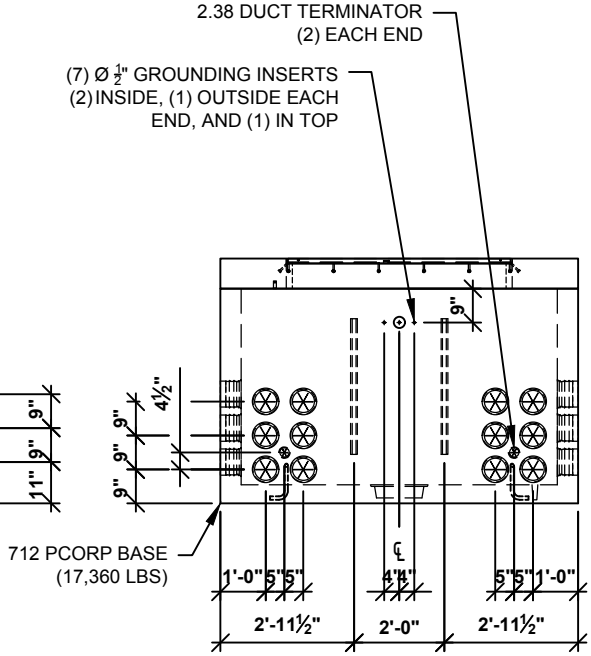

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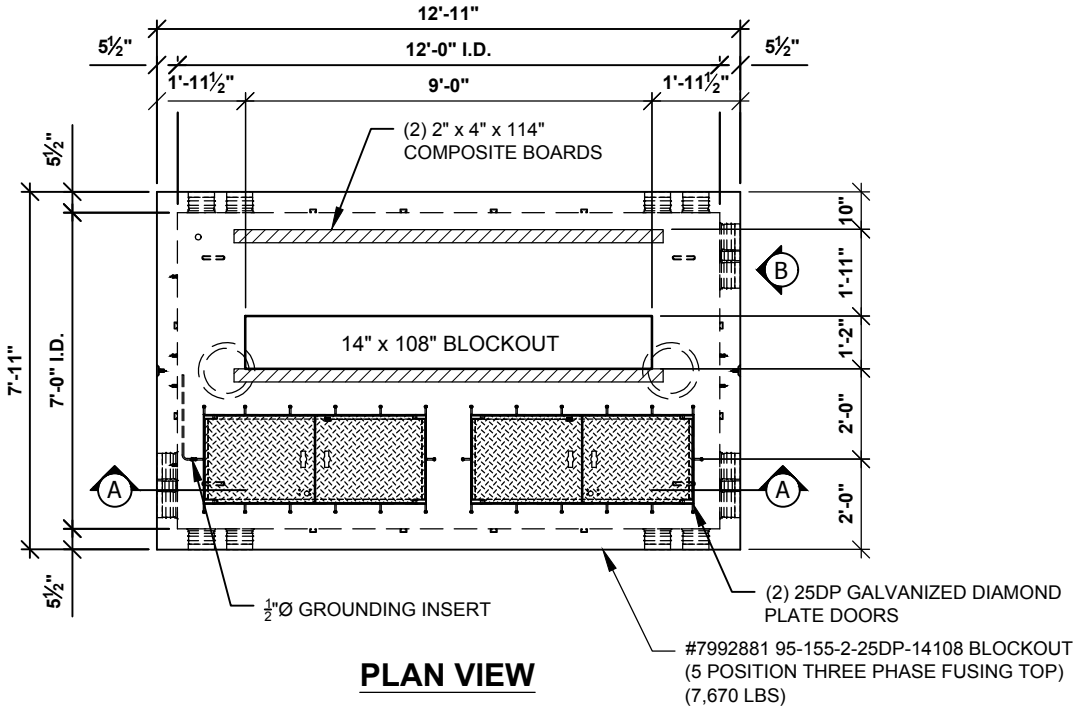

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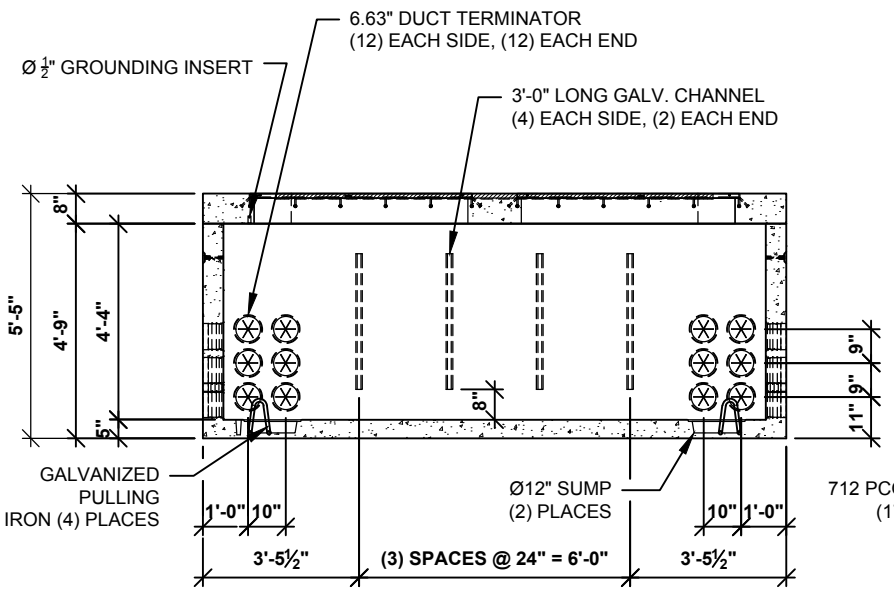

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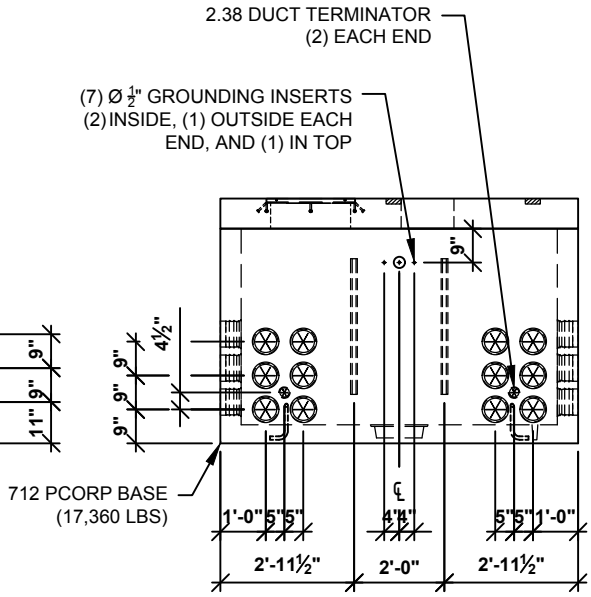

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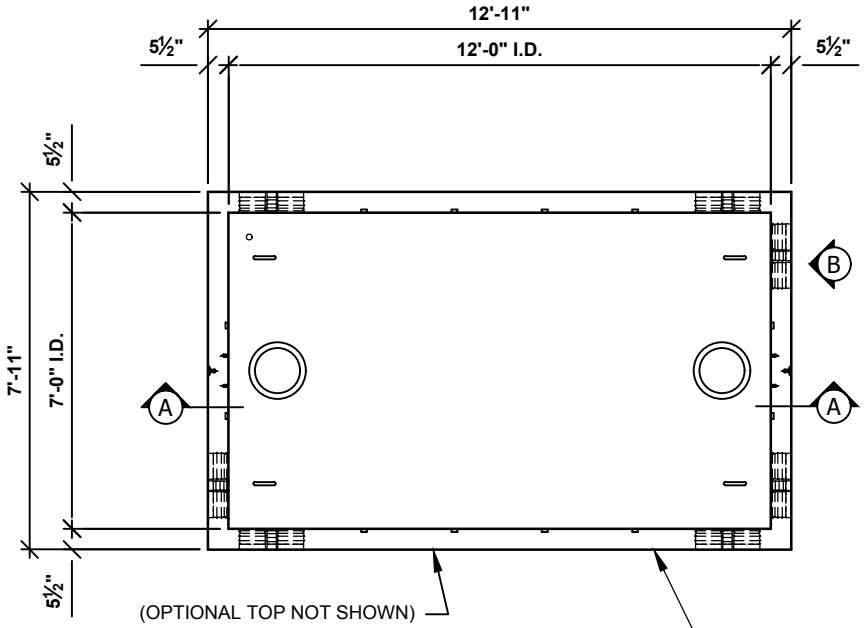

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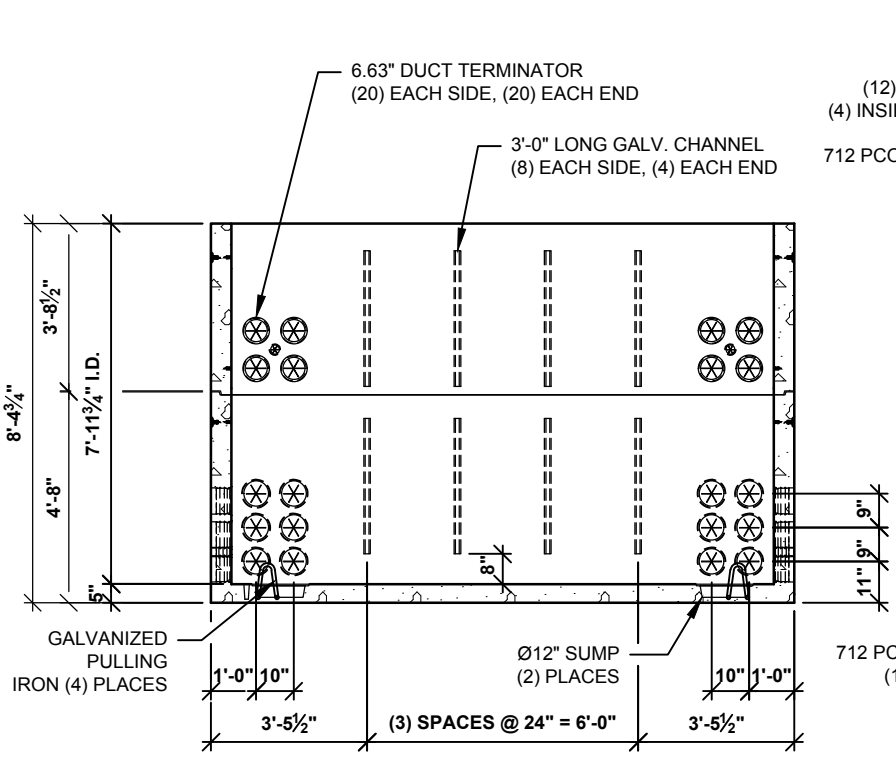

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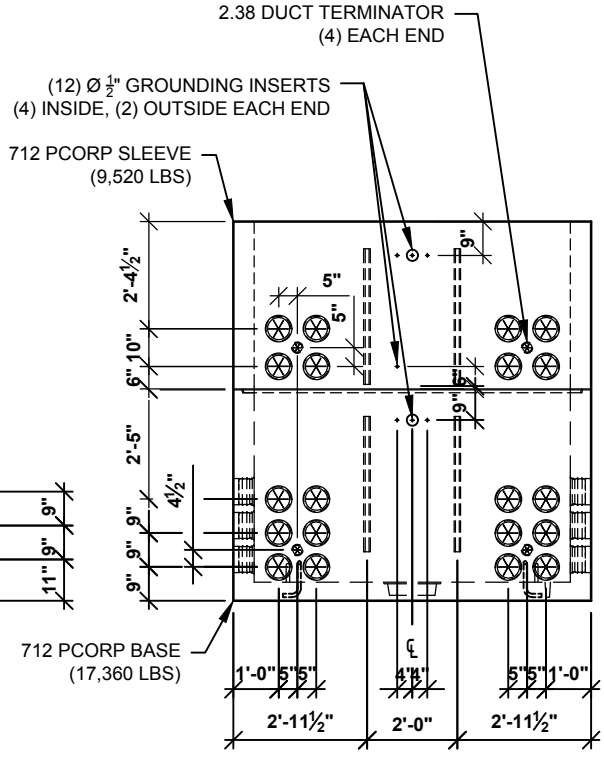

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Padvault — 7′ × 12′ (94″ × 155″) for 600-Amp, Deadfront Switchgear

1 Scope

This specification outlines the minimum requirements for the construction of padvaults to be used in conjunction with conduit on 15 and 25 kV, 600-amp electrical systems. The specification applies whether the padvault is to be installed by company personnel, contractor, customer, or supplier.

2 Approval

This material specification is not considered valid unless each page contains the approval signature (or initials) of the person named in the title blocks.

3 Related Standards

Except as specified within this document, padvaults shall comply with the latest revisions of the following PacifiCorp and industry standards:

ZG 301, *General Equipment Base and Enclosure Requirements*
ZG 311, *Concrete Requirements*
ZG 821, *Incidental-Traffic Cover For Padvaults*
Applicable codes
ANSI standards
NEMA standards
IEEE standards

4 General

4.1 Application Information

All padvaults are based on two common vault bases and a lid that is designed to fit the specific equipment. Refer to Figure 6 for dimensions. Padvaults shall have personnel access provided by two access covers. Equipment openings in the padvault are sized for PacifiCorp′s 600-amp deadfront switchgear. Padvaults shall have an internal grounding system with internal and external bushings for connecting ground conductors. Padvaults shall also have “TERM-A-DUCT” entrances to simplify conduit connections.

5 Padvault/Switchgear Stock Item Number Cross-Reference

Table 1, below, shows the padvault Stock Item Numbers (SI#) associated with the air-insulated switchgear:

Table 1—Padvault / Switchgear SI# Cross-Reference

Padvault SI#	Switchgear SI#	Switchgear Description
7992790	7992692	15kV, Type 3, when 1000kcmil cable is used
7992788	7992693	15kV, Type 9
7992788	7992694	15kV, Type 11
7992790	7992695	25kV, Type 3,when 1000kcmil cable is used
7992789	7992696	25kV, Type 9
7992789	7992697	25kV, Type 11

6 Padvault Design and Layout

6.1 Padvault Layout

Figure 1 shows the general layout of padvaults defined in this specification.

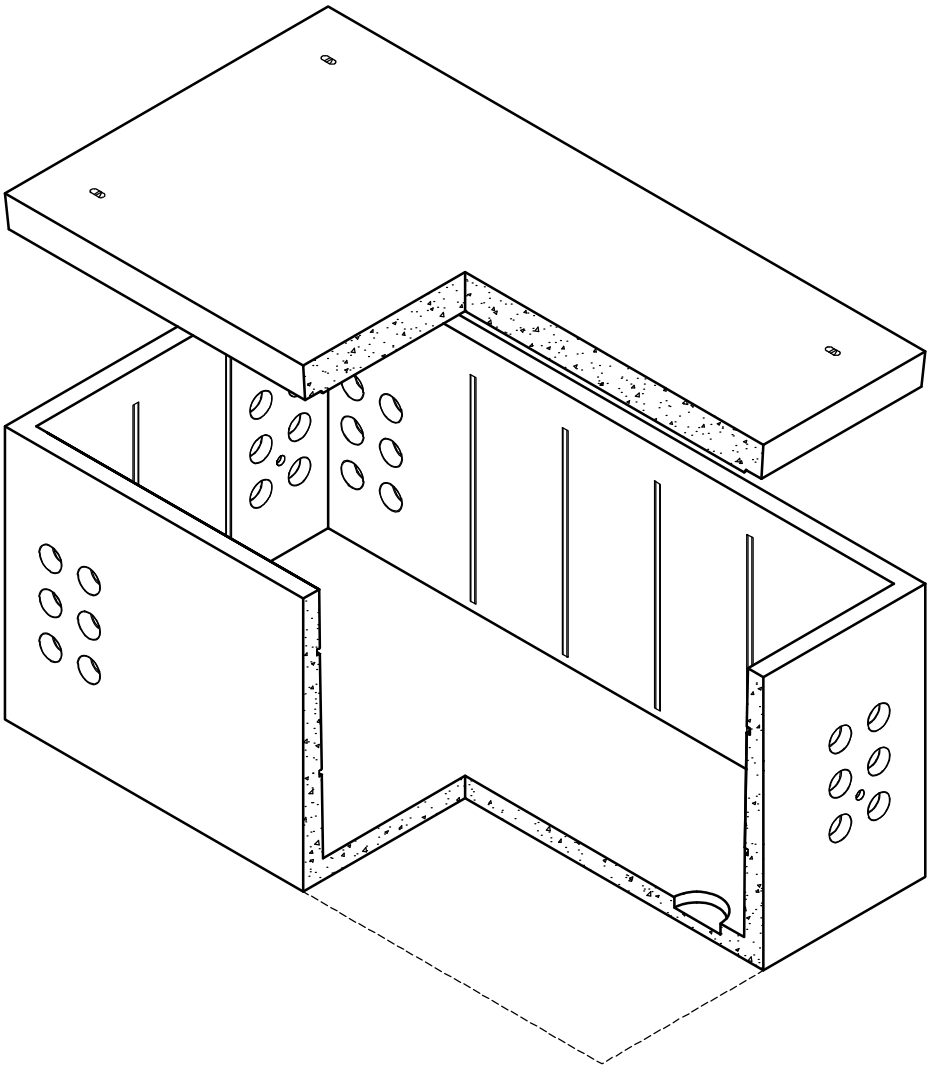

Figure 1—A typical 7′ × 12′ (94″ × 155″) Padvault Layout

6.2 Padvault Top Layouts for Each Switchgear Type

Figure 2 through Figure 4 show the layouts of the padvault lids defined in this specification.

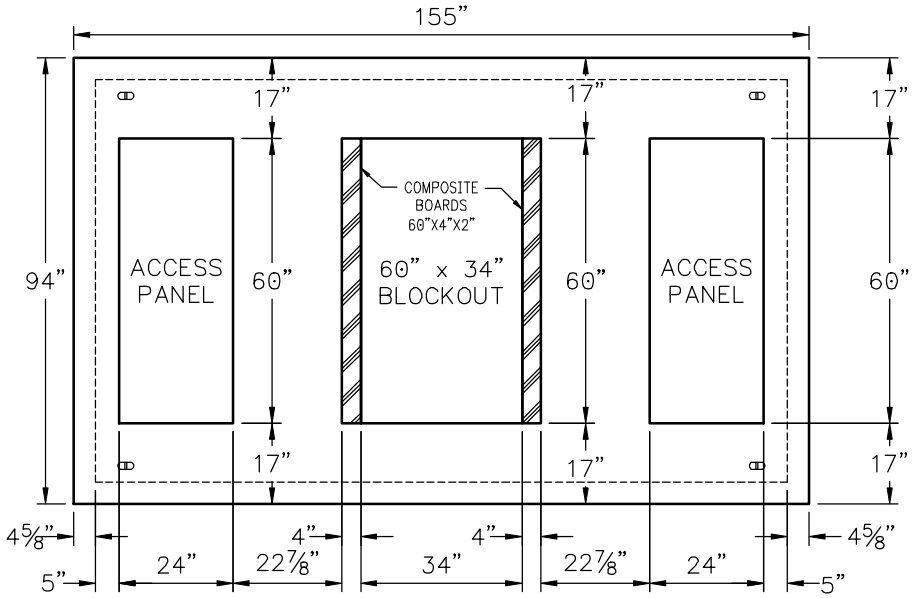

Figure 2—Padvault Pad Layout (SI# 7992790) for 15/25 kV, 600-Amp Type-3 Switchgear with 1000kcmil cable

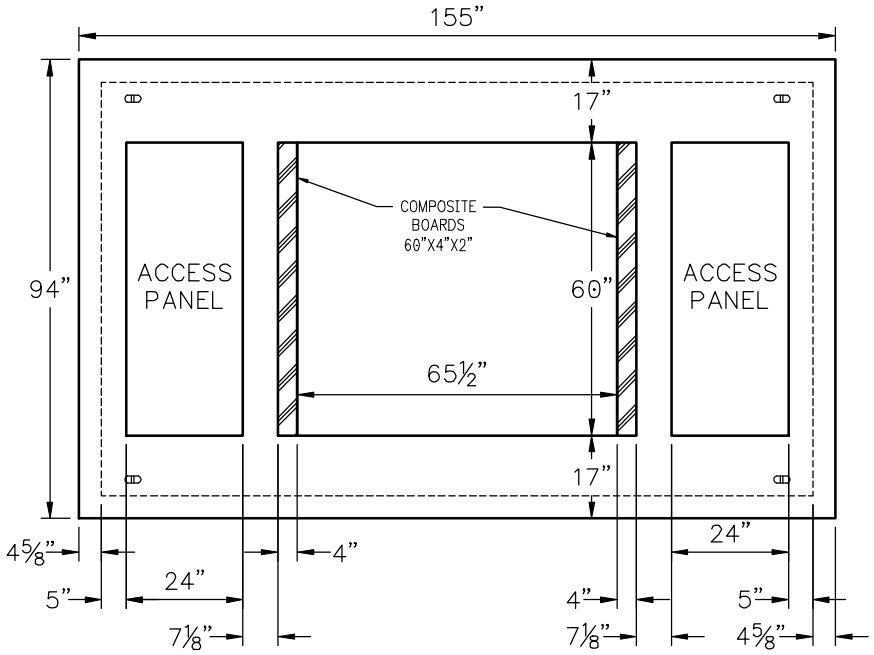

Figure 3—Padvault Pad Layout (SI# 7992788) for 15 kV, 600-Amp Type-9/11 Switchgear

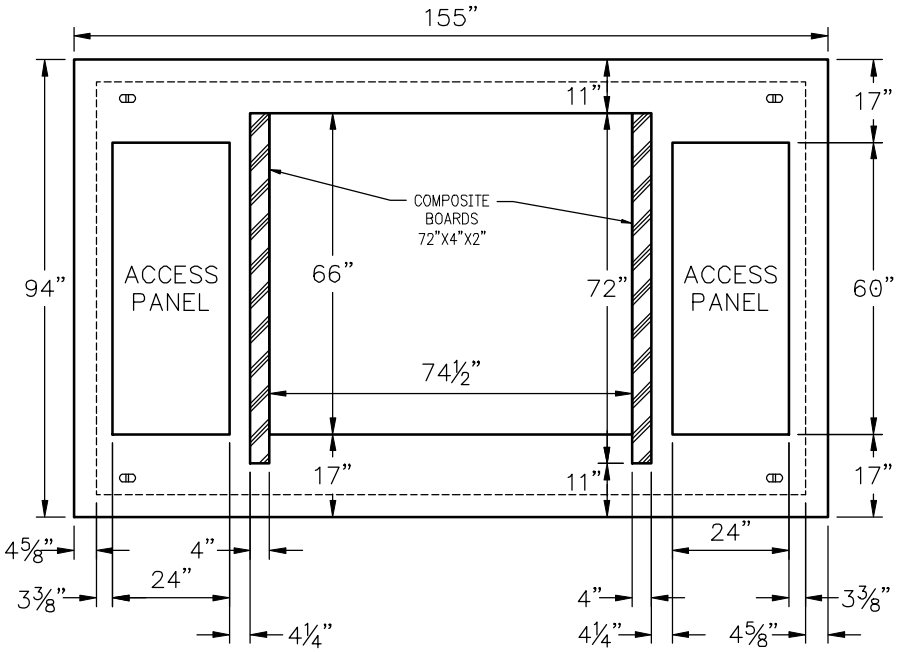

Figure 4—Padvault Pad Layout (SI# 7992789) for 25 kV, 600-Amp Type–9/11 Switchgear

6.3 Switchgear Attachment to Padvault

The padvault supplier shall provide two (2) $2'' \times 4''$ (actual size no less than $1.5'' \times 3.5''$) composite boards for dead front switchgears such as PME or PSE. Boards shall be cast flush with the top of the padvault lid at locations specified in Figure 2 through Figure 4. Hardware to fasten the switchgear to the composite board shall be provided as follows:

By PacifiCorp:

1. four (4) $^1/_2'' \times 2''$ hot-dip-galvanized lag screws
2. four (4) $^1/_2''$ stainless steel flat washers

By vault provider:

1. four (4) hold-down cleats

6.4 Pulling Attachments

The padvault shall contain four (4) galvanized steel cable-pulling attachments. The pulling attachments shall be rated at a minimum pullout strength of 6000 pounds. The cable pulling attachments shall allow the attachment of a clevis with a one-inch diameter through-bolt. One pulling attachment shall be installed in the floor of the padvault at each corner. Pulling attachments may be designed by the manufacturer to meet these requirements.

6.5 Lifting Attachments

Enough lifting attachments shall be provided to ensure safe installation at the site. All lifting attachments shall be galvanized.

6.6 Sump

The padvault shall be supplied with a twelve-inch (12″) diameter sump, located below an access panel and centered under the access panel opening. No drain hole is accepted.

6.7 "C"-Channels

The 7′ × 12′ (94″ × 155″) padvault shall have hot-dip-galvanized "C"-channels cast in flush with each vault wall.

"C"-channels shall consist of four (4) three-foot (3′) sections on each long wall and two (2) three-foot (3′) sections on each short wall, as shown in Figure 5.

6.8 TERM-A-DUCT Conduit Entrances

The padvault shall be constructed with TERM-A-DUCT conduit entrances compatible with PVC, Polyethylene (PE), or fiberglass 90°C-rated electrical-grade conduit. TERM-A-DUCT entrance requirements are as follows:

Each end (short) wall: Two (2) banks of six (6) 6.63″ TERM-A-DUCTS and two (2) 2.38″ TERM-A-DUCTS, as shown in Figure 5.

Each side (long) wall: Two (2) banks of six (6) 6.63″ TERM-A-DUCTS, as shown in Figure 5.

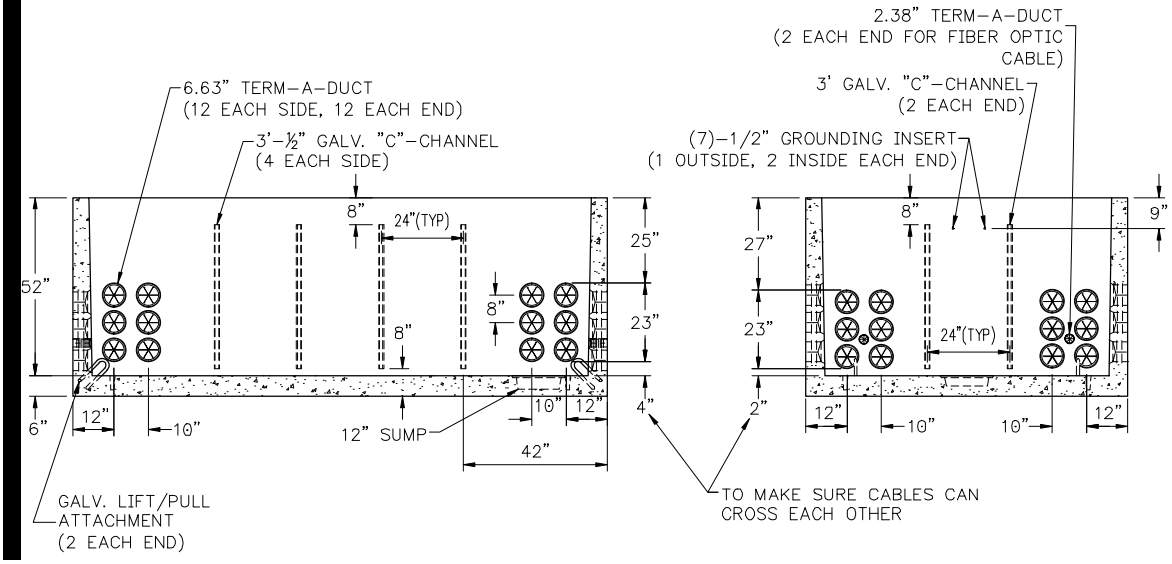

Figure 5—TERM-A-DUCT and "C″-Channel Requirements Detail for 7′ × 12′ (94″ × 155″) Padvault

6.9 Grounding Grid

The padvault shall be built with an internal, encased electrode in the base of the padvault meeting NESC 094.B.6 and consisting of $^{3}/_{8}''$ steel rebar. The electrode in the base shall be encased horizontally and run continuously around the vault base. The grounding system shall attach to connection inserts made of high-bronze alloy and threaded to 0.5″-13UNC. Each end (short) wall shall have two (2) inserts inside and one (1) insert outside, as shown in Figure 6. One (1) additional grounding insert shall be located on the lid, close to the access door. All inserts shall have caps or plugs installed.

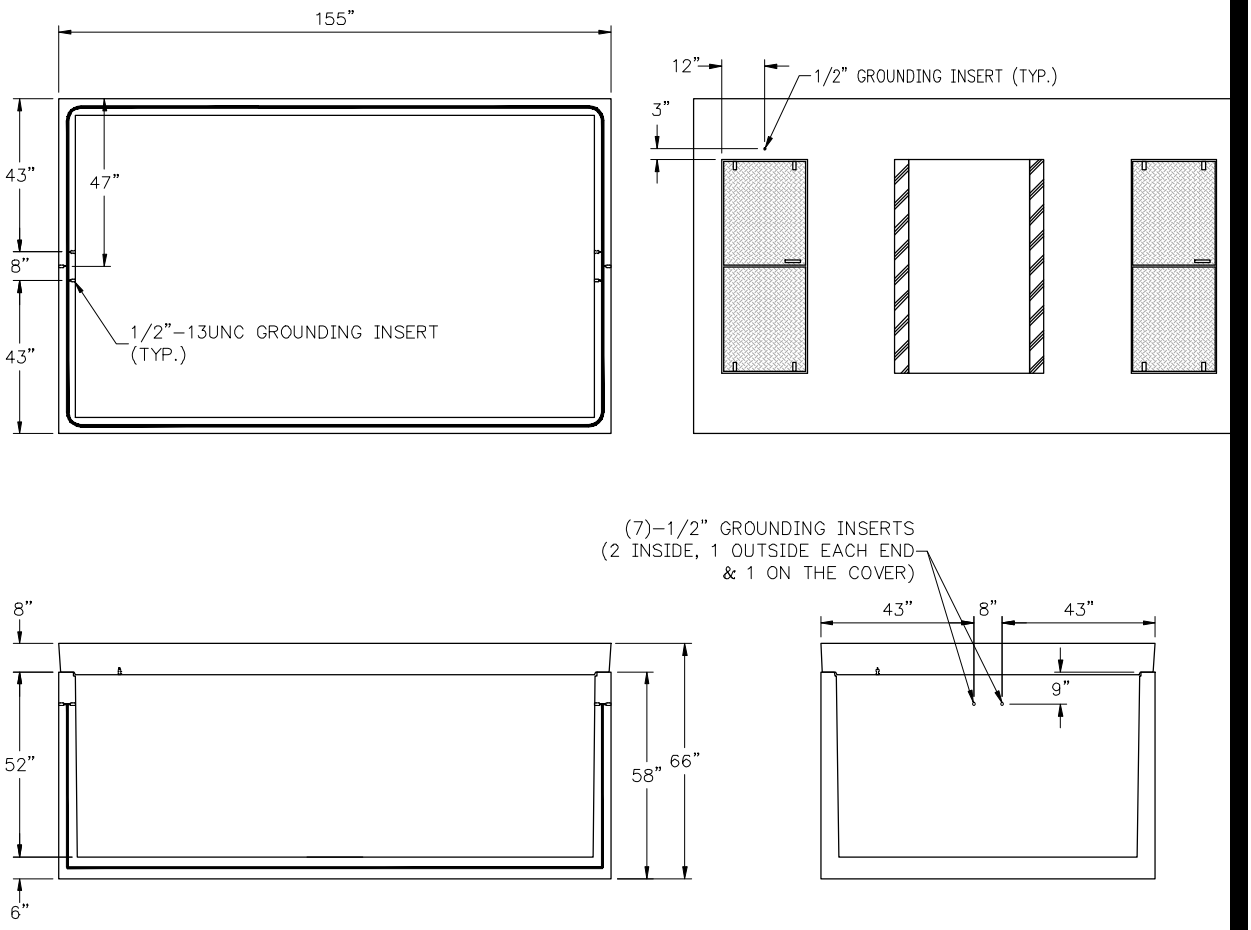

Figure 6—Grounding Grid for 7′ × 12′ (94″ × 155″) Padvault

6.10 Access Panels

The 7′ × 12′ (94″ × 155″) padvault shall have two access doors. The access door openings, as measured between opposite inside walls of the frame assembly, shall not

exceed 24″ × 60″. For further details, refer to Material Specification ZG 821, *Incidental-Traffic Cover For Padvaults*.

6.11 Installation

The padvault shall be off-loaded and set by the padvault supplier to maintain warranties, unless there are extenuating circumstances. Site preparation and excavation shall be performed by PacifiCorp, contractor, customer or supplier, as necessary to ensure proper placement. Beneath the padvault shall be a layer of gravel, compacted, and graded level, to final thickness of six inches (6″). The joint between the two padvault sections shall be sealed with the gasket and sealant provided by the padvault supplier.

7 Testing

7.1 Compliance

Padvaults submitted under this specification shall meet all tests and requirements contained in ZG 301, *General Equipment Base and Enclosure Requirements*, ZG 311, *Concrete Requirements*, and this specification. Padvaults shall also comply with requirements in applicable national standards.

7.2 Security Test

With appropriate switchgear mounted, attempt to pass a #14 AWG soft-drawn copper wire through the interface between the cabinet and pad. If the wire can be passed through, the padvault has failed the test and is not acceptable.

8 Issuing Department

The Engineering and Asset Management Documentation department of PacifiCorp published this document. Questions regarding editing, revision history and document output may be directed to the lead editor at (503) 813–5293. Technical questions and comments may be directed to Ehsan Maleki, Standards Engineering, (503) 813–7089.

This document shall be used and duplicated only in support of PacifiCorp projects. This document is considered a valid publication when the signature blocks below have been signed by the authoring engineer and standards manager.

Manhole — 7′ × 12′ (94″ × 155″)

1 Scope

This specification outlines the minimum requirements for 7′ × 12′ (94″ × 155″) manholes to be used in full and incidental traffic areas. The specification applies regardless of whether the customer, contractor, supplier, or PacifiCorp installs the manhole.

2 Applicable Documents

The latest revisions of the documents, standards, codes and requirements listed in 2.1, *PacifiCorp Material Specifications*, and 2.2, Codes and Standards, in effect on the date of invitation to bid apply to the extent specified herein.

2.1 PacifiCorp Material Specifications

ZG 301, *General Equipment Base and Enclosure Requirements*
ZG 311, *Concrete Requirements*
ZG 811, *Full-Traffic Cover and Frame Assembly*
ZG 821, *Incidental-Traffic Cover For Padvaults*

2.2 Codes and Standards

Applicable codes
ANSI standards
IEEE standards
NEMA standards
AASHTO standards

3 General

3.1 Application Information

This specification states material and construction requirements which are applicable only to 7′ × 12′ (94″ × 155″) manholes.

3.2 Authorized Material Specification

This material specification shall not be considered valid until each page contains the approval signature or initials of the persons named in the title blocks.

4 Applicable Stock Item Numbers

Materials being submitted for the following PacifiCorp stock item numbers are subject to evaluation in accordance with requirements in this specification.

4.1 Stock Item Numbers

7992596, MANHOLE, CONCRETE, 7′ × 12′ (94″ × 155″), FULL TRAFFIC, WITH GROUND GRID

7992597, MANHOLE, CONCRETE, 7′ × 12′ (94″ × 155″), INCIDENTAL TRAFFIC, WITH GROUND GRID

5 Design and Manufacturing Requirements

The purpose of a 7′ × 12′ (94″ × 155″) manhole is to provide an enclosure for cable pulling, splicing, and single-phase switching.

5.1 Manhole Layout

Figure 3 below shows the assembled 7′ × 12′ (94″ × 155″) manholes with dimensions. The manhole is made up of an enclosure with two built in cover assemblies. Unless otherwise approved by PacifiCorp Engineering, all dimensions and placement of hardware shall conform to those shown in Figure 1, Figure 2, Figure 3 and Figure 4 below. All manhole enclosures shall be constructed to AASHTO H-20 (full-traffic) standards, regardless of the cover and frame assembly used.

5.2 Lifting Attachments

Enough lifting attachments shall be provided to ensure safe installation of all pieces at the site.

5.3 Pulling Attachments

Cable pulling attachments shall be installed in the bottom corners of the enclosure such that blocks may be attached for a straight cable pull. Pulling attachments shall be made of galvanized steel and have a minimum pullout strength of 6000 pounds. Cable pulling attachments shall accommodate attachment of a clevis with a one-inch-diameter through-bolt. Pulling attachments may be designed by the manufacturer to meet these requirements.

5.4 Conduit Entrances

The top portion of the enclosure shall have four 6″ TERM-A-DUCT entrances on each end, spaced 10 inches center-to-center. For TERM-A-DUCT layout in the top portion, refer to Figure 3. For TERM-A-DUCT layout in the bottom portion, refer to ZG 562.

5.5 Full Traffic Access Cover (SI# 7992596)

Two full traffic rated access covers, as specified in ZG 811, shall be included with the assembly as shown in Figure 1 below. Additional rings may be used to bring to grade; see ZG 811 for grade rings.

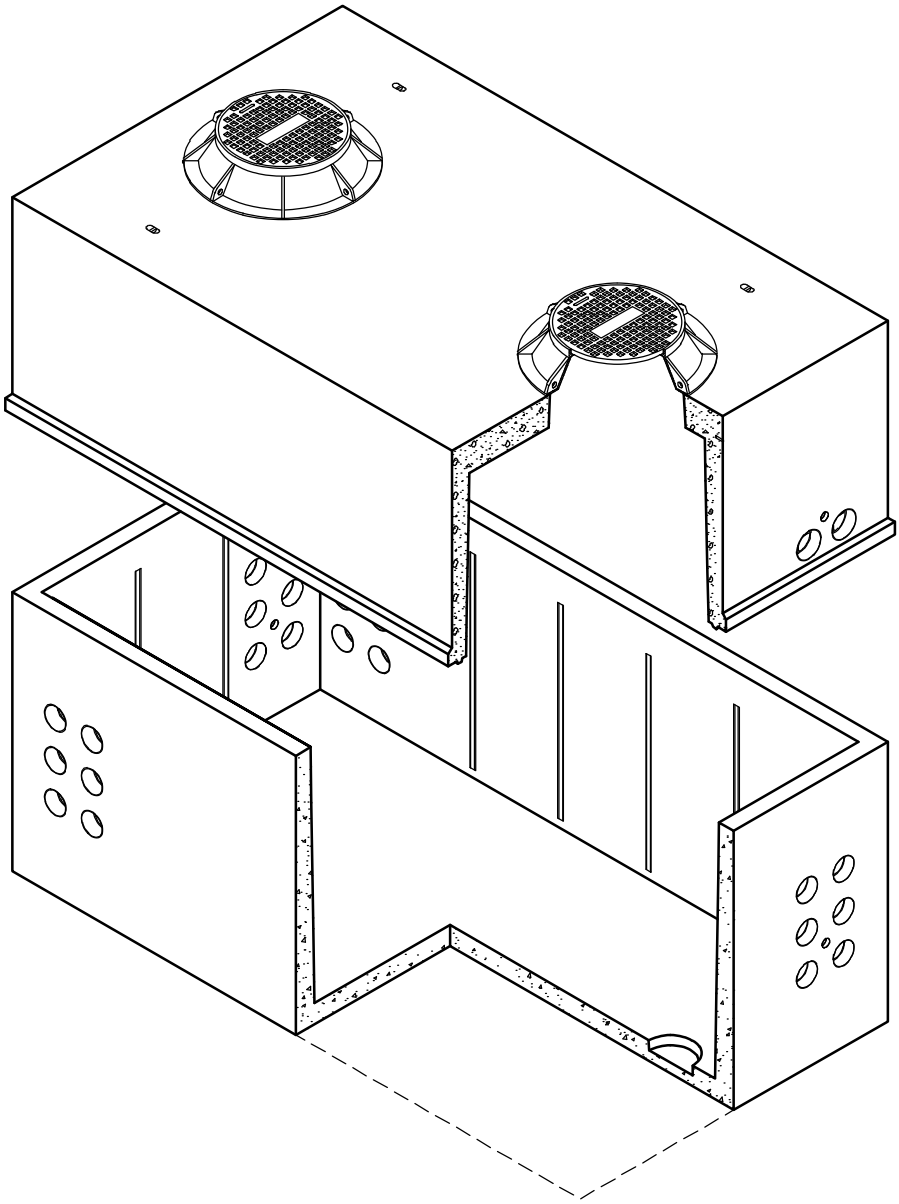

Figure 1—7′ × 12′ (94″ × 155″) Manhole with Full-Traffic Covers (SI# 7992596)

5.6 Incidental Traffic Access Door (SI# 7992597)

Two incidental traffic rated doors no larger than 36″ × 36″, as specified in ZG 821, shall be included with the assembly as shown in Figure 2 below.

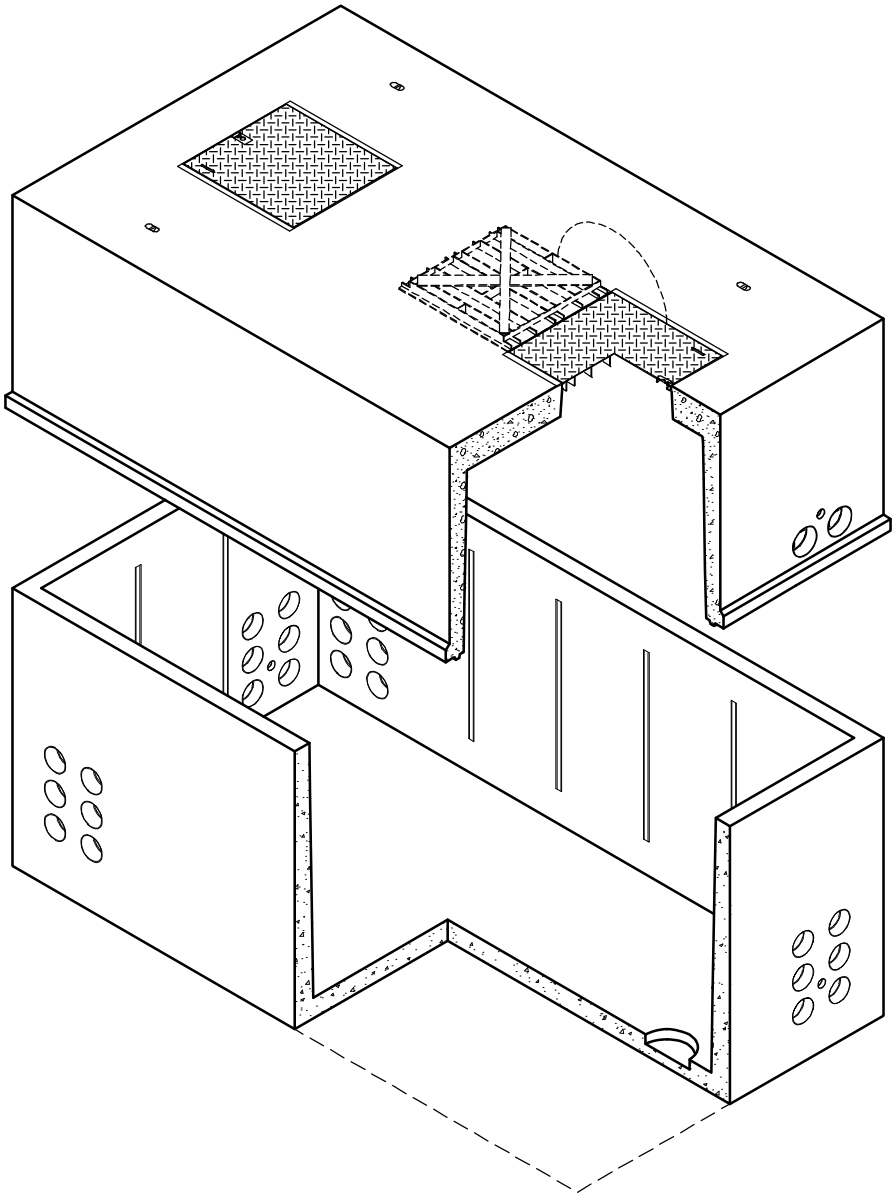

Figure 2—7′ × 12′ (94″ × 155″) Manhole with Incidental-Traffic Covers (SI# 7992597)

5.7 "C" Channels

Galvanized or fiberglass "C"-channels $1\ ^{5}/_{8}''$ wide $\times\ ^{13}/_{16}''$ deep shall be cast into the side walls of the manhole. The top portion shall have four 3′ long "C"-channels on each side wall, and two 3′ long "C"-channels on each end wall. For layout of "C"-channels in top portion, see Figure 3. For layout of the bottom portion, refer to ZG 562.

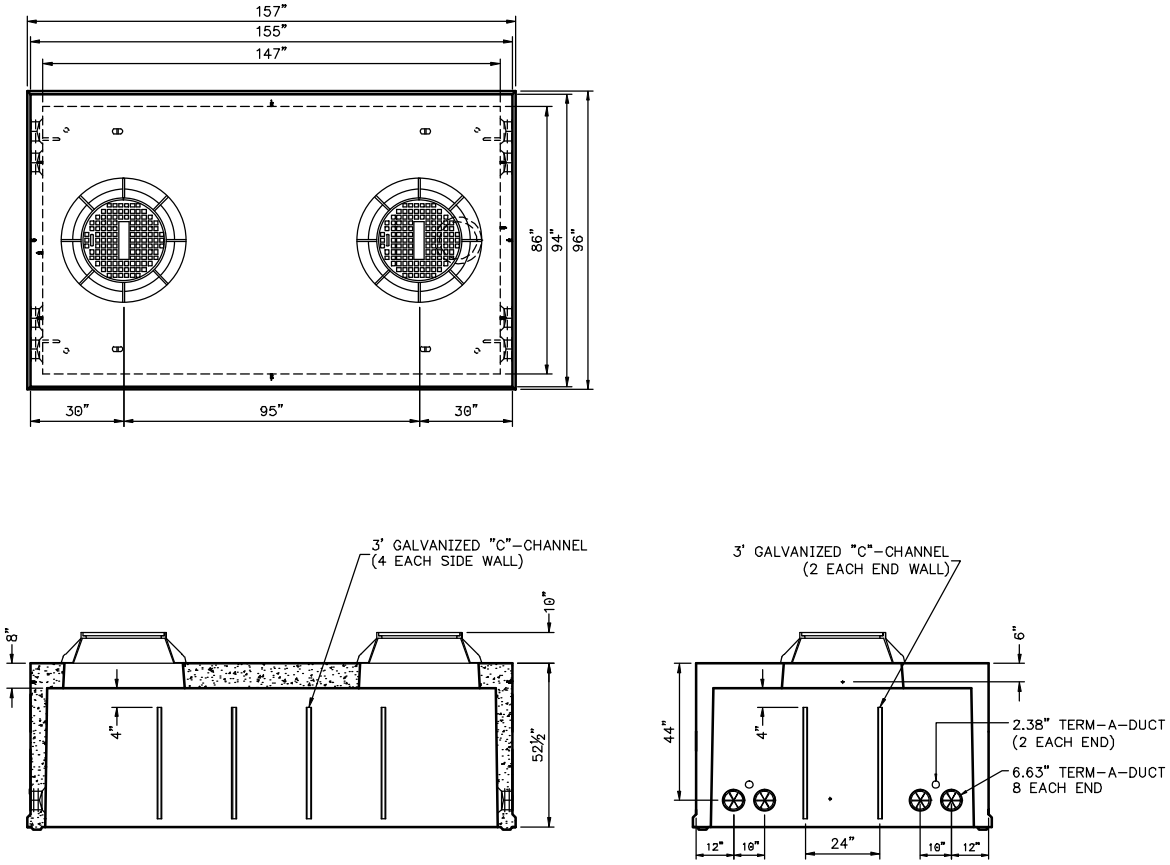

Figure 3—7′ × 12′ (94″ × 155″) Manhole Top Layout

Engineer (E. Maleki): AEM
Standards Manager (D. Asgharian): DDA

Manhole — 7′ × 12′ (94″ × 155″)

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A MIDAMERICAN ENERGY HOLDINGS COMPANY

5.8 Grounding Grid

Each section of the 7' × 12' (94″ × 155″) manhole shall be constructed with an encased electrode meeting NESC 094.B.6. The $^{3}/_{8}$″ steel rebar shall be 20 continuous feet in length (except for a 12″ break in the loop). The grounding system shall attach to a connection insert of high-strength bronze alloy, threaded to $^{1}/_{2}$″ 13UNC. The vertical rebar attaching to the bronze insert shall be welded or connected by a copper-clad $^{5}/_{8}$″ ground clamp to the $^{3}/_{8}$″ steel rebar grounding loop.

The $^{3}/_{8}$″ steel rebar loops of the top and bottom portions must be connected at each end by a piece of bare 4/0 copper wire, connected to the two internal grounding inserts found on each end. For the layout of the top section's ground grid, refer to Figure 4. For the bottom section, refer to ZG 562.

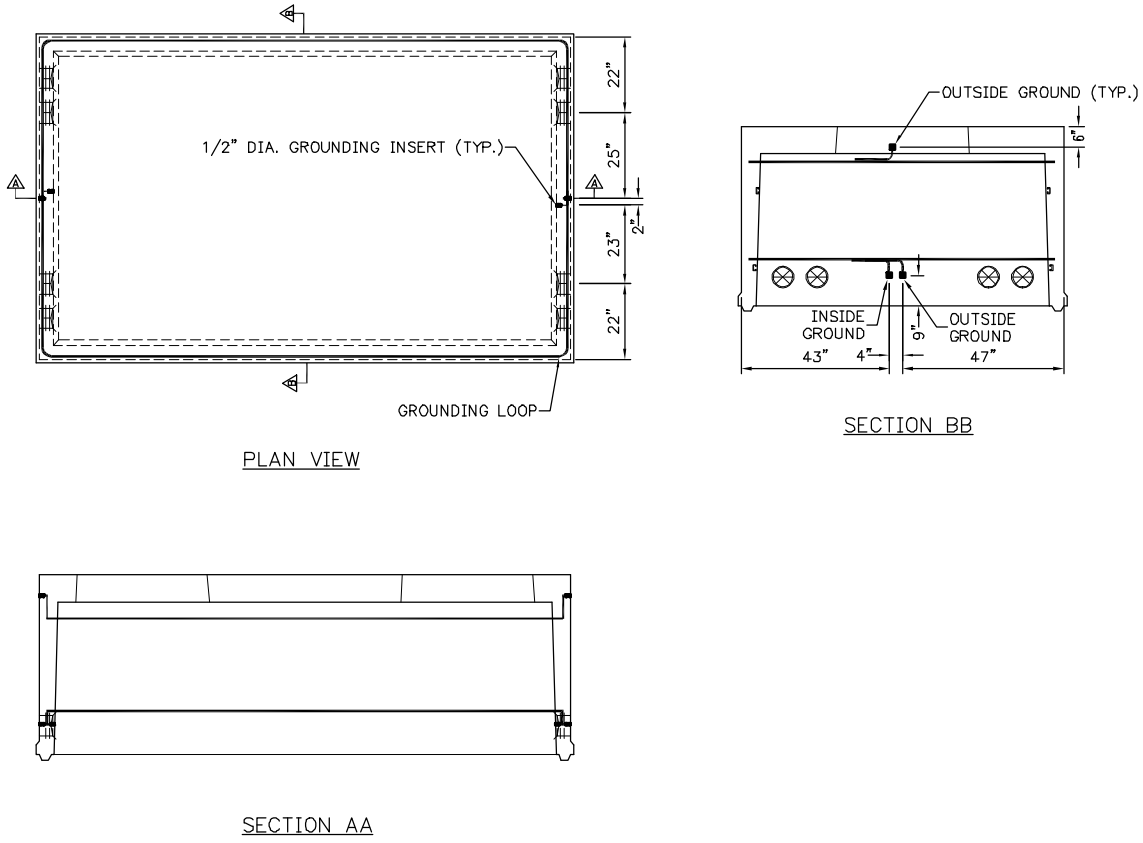

Figure 4—7′ × 12′ (94″ × 155″) Manhole Top Section Ground Grid

5.9 Installation

This unit shall be set at the site by the supplier. The contractor shall be responsible to ensure that a 6″ base of $^{3}/_{4}$″-minus gravel, compacted to 90% of dry density is supplied, and shall be no more than 2% off level prior to setting the manhole. The interface between the cover and frame assembly and the enclosure shall be sealed using a waterproof substance, such as tar or mastic. The top of the access cover shall be flush with the final grade. Setting depth shall be determined by the local regulatory authority for full-traffic areas.

6 Testing

6.1 Test Compliance

Manholes submitted under this specification shall meet all tests and requirements contained in ZG 301 – *General Equipment Base and Enclosure Requirements*, ZG 311 – *Concrete Requirements*, and this specification. Manholes shall also comply with requirements in applicable national standards.

7 Issuing Department

The Engineering Documentation department of PacifiCorp published this document. Questions regarding editing, revision history and document output may be directed to the lead editor at (503) 813–5293. Technical questions and comments may be directed to Ehsan Maleki, Standards Engineering, (503) 813–7089.

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Vault — Shallow, 7′ × 12′ (94″ × 155″)

1 Scope

This specification outlines the minimum requirements for shallow 7′ × 12′ (94″ × 155″) vaults to be used for pad-mounted equipment. The specification applies to all shallow 7′ × 12′ (94″ × 155″) vaults installed by PacifiCorp, contractors, customers, or suppliers.

2 Applicable Documents

The latest revisions of the documents, standards, codes and requirements listed in 2.1, *PacifiCorp Material Specifications*, and 2.2, Codes and Standards, in effect on the date of invitation to bid apply to the extent specified herein.

2.1 PacifiCorp Material Specifications

ZG 301, *General Equipment Base and Enclosure Requirements*
ZG 311, *Concrete Requirements*
ZG 821, *Incidental-Traffic Cover For Padvaults*

2.2 Codes and Standards

Western Underground Committee guide
ASTM C857 A-16
AASHTO H-20 (for vaults beneath roadways)
ASTM C857 A-8 (for vaults beneath incidental light truck traffic)

3 General

3.1 Application Information

This specification states material and construction requirements which are applicable only to 7′ × 12′ (94″ × 155″) manholes.

3.2 Authorized Material Specification

This material specification shall not be considered valid until each page contains the approval signature or initials of the persons named in the title blocks.

4 Applicable Stock Item Numbers

Materials being submitted for the following PacifiCorp stock item numbers are subject to evaluation according to the requirements in this specification.

4.1 Stock Item Numbers

7992788, PADVAULT, SWGEAR, 7′ × 12′ (94″ × 155″), TYPE 9&11, 15kV, DF
7992789, PADVAULT, SWGEAR, 7′ × 12′ (94″ × 155″), TYPE 9&11, 25kV, DF
7992790, PADVAULT, SWGEAR, 7′ × 12′ (94″ × 155″), TYPE 3, 15&25kV, 1000KCMIL
7992596, MANHOLE, CONCRETE, 7′ × 12′ (94″ × 155″), FULL TRAFFIC, GG
7992597, MANHOLE, CONCRETE, 7′ × 12′ (94″ × 155″), INCIDENTAL TRAFFIC, GG
3090370, PADVAULT, METERING, 7′ × 12′ (94″ × 155″), 3-PHASE, 600A
7992881, PADVAULT, FUSE CABINET, 7′ × 12′ (94″ × 155″), 15 POSITION

5 Design and Manufacturing Requirements

The purpose of a shallow 7′ × 12′ (94″ × 155″) vault is to provide an enclosure for cable pulling and padmounted switching.

5.1 Vault Layout

Figure 1 and Figure 2, below, show the assembled shallow 7′ × 12′ (94″ × 155″) vault layout with dimensions. Unless otherwise approved by PacifiCorp engineering, all dimensions and placement of hardware shall conform to those shown in Figure 1 and Figure 2. All vault enclosures shall be constructed to AASHTO H-20 (full-traffic) standards, regardless of the cover and frame assembly used.

5.2 Lifting Attachments

Enough lifting attachments shall be provided to ensure safe installation of all pieces at the site.

5.3 Pulling Attachments

Cable pulling attachments shall be installed opposite each set of TERM-A-DUCT banks, such that blocks may be attached for a straight cable pull. Pulling attachments shall have a minimum pullout strength of 6000 pounds. Attachments shall allow the attachment of a clevis with a one-inch diameter through-bolt. Pulling attachments may be designed by the manufacturer to meet these requirements.

5.4 Conduit Entrances

Each end wall: Two (2) banks of six (6) 6.63″, and two (2) 2.38″, TERM-A-DUCTS at each side, as shown in Figure 2

Each side wall: Two (2) banks of six (6) 6.63″ TERM-A-DUCTS at each end, as shown in Figure 2.

5.5 Incidental Traffic Access Panels

Two access panels, each with an opening no greater than 24″ × 60″, as specified in ZG 821, shall be included with the assembly.

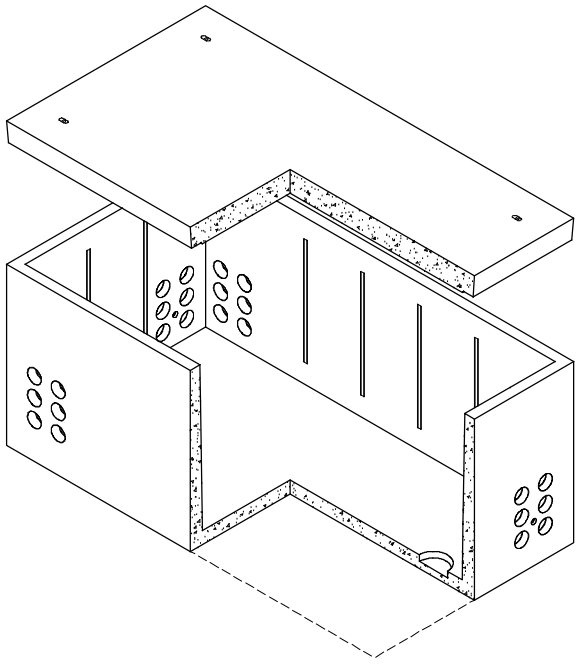

Figure 1—7′ × 12′ (94″ × 155″) Shallow Vault, Cutaway View

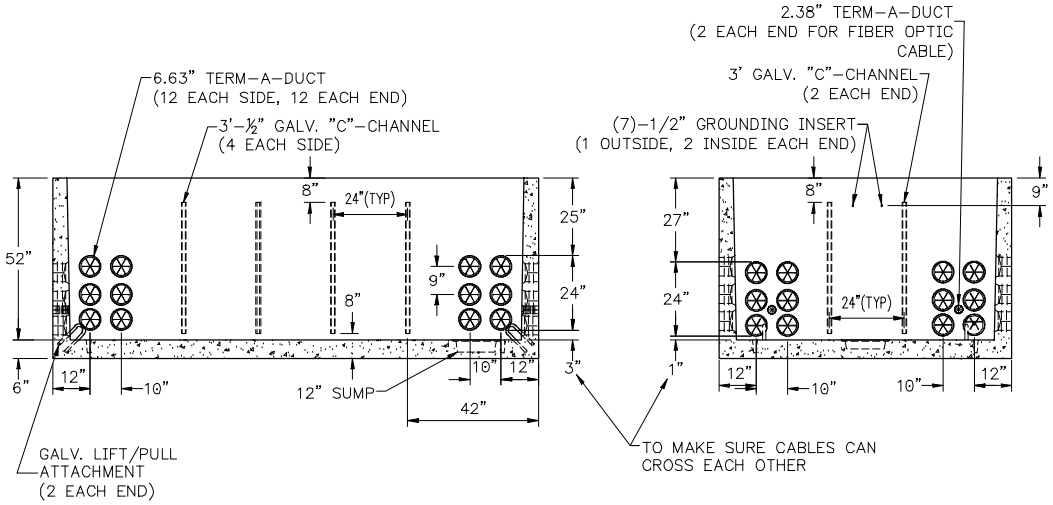

Figure 2—7′ × 12′ (94″ × 155″) Shallow Vault Enclosure Layout

5.6 Ground Grid

The padvault shall be built with an internal, encased electrode in the base of the padvault meeting NESC 094.B.6 and consisting of $^{3}/_{8}''$ steel rebar. The electrode in the base shall be encased horizontally and run continuously around the vault base. The grounding system shall attach to connection inserts made of high-bronze alloy and threaded to 0.5″-13UNC. Each end (short) wall shall have two (2) inserts inside and one (1) insert outside, as shown in Figure 3. One (1) additional grounding insert shall be located on the lid, close to the access door. All inserts shall have caps or plugs installed.

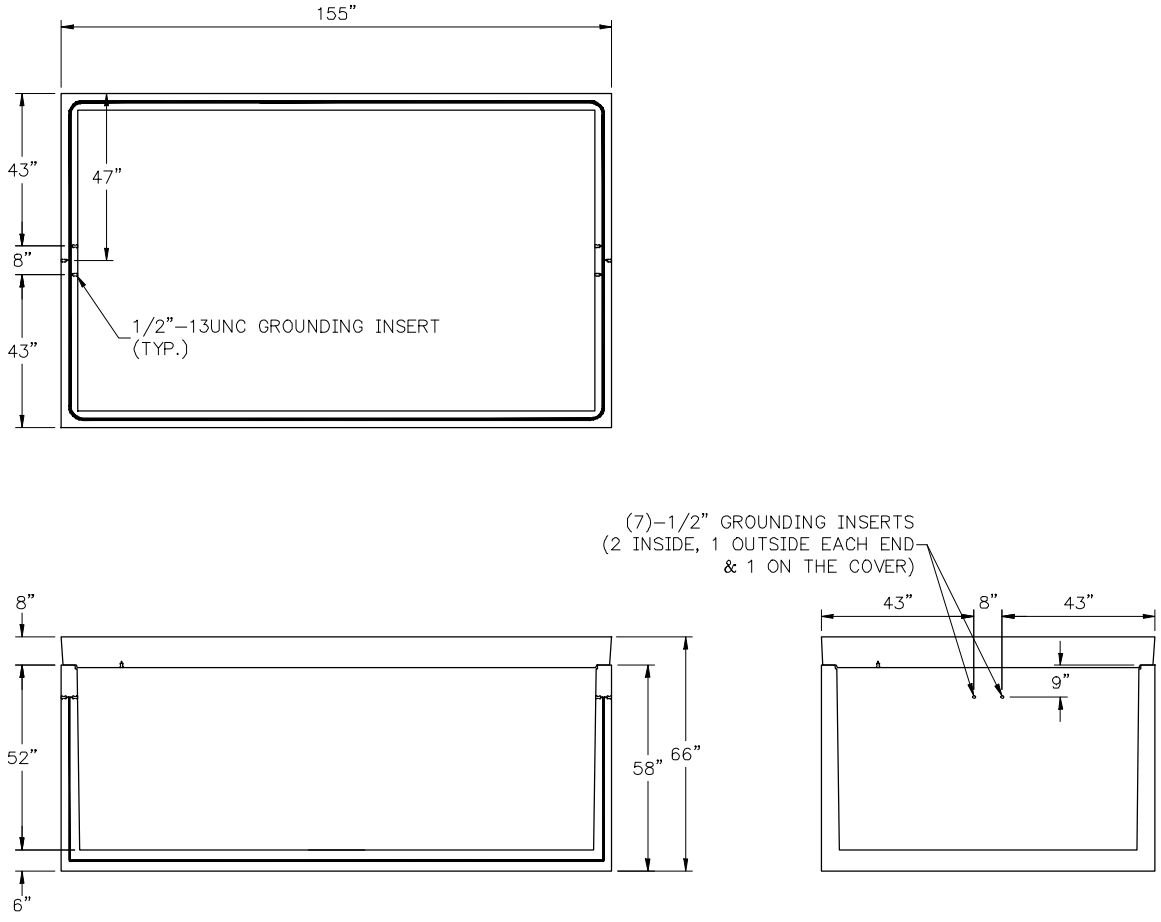

Figure 3—7′ × 12′ (94″ × 155″)Shallow Vault Ground Grid Layout

5.7 Installation

This unit shall be set at the site by the supplier. The contractor is responsible to ensure that all earth under the vault is compacted and leveled to no more than 2% slope prior to setting the vault. A clean gravel base under the pad may be necessary in areas where drainage is poor. The interface between the cover/frame assembly and the enclosure should be sealed using a waterproof substance, such as tar or mastic. The top of the frame should be flush with final grade in pedestrian areas. Setting depth shall be determined by the local regulatory authority for full-traffic areas.

6 Testing

6.1 Test Compliance

Vaults submitted under this specification shall meet all tests and requirements contained in ZG 301 - *General Equipment Base and Enclosure Requirements*, ZG 311 - *Concrete Requirements*, and this specification. Vaults shall also comply with requirements in applicable national standards.

7 Issuing Department

The engineering standards and technical services department of PacifiCorp published this document. Questions regarding editing, revision history and document output may be directed to the lead editor at (503) 813-5293. Technical questions and comments may be directed to Ehsan Maleki, Standards Engineering, (503) 813-7089.

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Material Specification

Sleeve—15, 25, and 35 kV, 600-Amp, Deadfront Switchgear, Padvault

Standards Engineering Department

Date: 13 Jul 12

Contents

Sleeve—15, 25, and 35 kV, 600-Amp, Deadfront Switchgear, Padvault

1 Scope

This specification outlines the minimum requirements for the construction of the padvault sleeve to be used in conjunction with conduit on 15, 25, and 35 kV 600-amp switchgear padvaults. The sleeves are specifically designed to work with the padvaults as foundations for PacifiCorp's 600-amp deadfront switchgear. This specification applies whether the sleeve is to be installed by company personnel, contractor, customer, or the supplier.

2 Applicable Documents

The latest revisions of the documents, standards, codes and requirements listed in 2.1, *PacifiCorp Material Specifications*, and 2.2, Codes and Standards, in effect on the date of invitation to bid apply to the extent specified herein.

2.1 PacifiCorp Material Specifications

ZG 301, *General Equipment Base and Enclosure Requirements*
ZG 311, *Concrete Requirements*
ZG 562, *Padvault — 7′ × 12′ (94″ × 155″) for 600-Amp, Deadfront Switchgear*

2.2 Codes and Standards

Applicable codes
ANSI standards
IEEE standards
NEMA standards

3 General

3.1 Application Information

This specification states material and construction requirements that are applicable only to padvault sleeve for 15, 25, and 35 kV, 600-amp, deadfront switchgears.

4 Applicable Stock Item Numbers

Materials being submitted for the following PacifiCorp stock item numbers are subject to evaluation in accordance with requirements in this specification.

4.1 Stock Item Numbers

7999125, SLEEVE, PADVAULT, CONCRETE, 7′ × 12′ × 3.5′

5 Design and Manufacturing Requirements

5.1 Padvault Design and Sleeve Layout

The sleeve shall be designed to fit between the switchgear padvault base and the flat lid, see Figure 1. The padvault sleeve shall have an internal grounding system with internal and external bushings for connecting grounding conductors. Figure 1 below shows the general layout of the padvault sleeve.

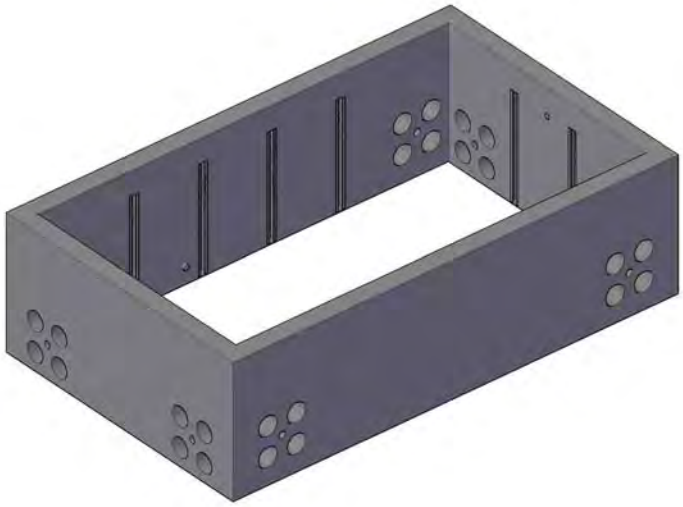

Figure 1—Padvault Sleeve

5.2 Conduit Entrances

The padvault sleeve shall also have TERM–A–DUCT entrances to simplify conduit connections as follows:

Each end wall: Two banks of four 6.63″ and two 2.38″ TERM–A–DUCTS located as shown in Figure 2.

Each side wall: Two banks of four 6.63″ and two 2.38″ TERM–A–DUCTS located as shown in Figure 2.

5.3 Lifting Attachments

Enough lifting attachments shall be provided to ensure safe installation at the site. All lifting attachments shall be galvanized.

5.4 "C"-Channels

The padvault sleeve shall have 1 $^{5}/_{8}$″ × $^{13}/_{16}$″ "C"-Channels embedded into the sleeve walls as described below:

Each side wall: Four 3′ sections on each long wall as shown in Figure 2.

Each end wall: Two 3′ sections on each short wall as shown in Figure 2.

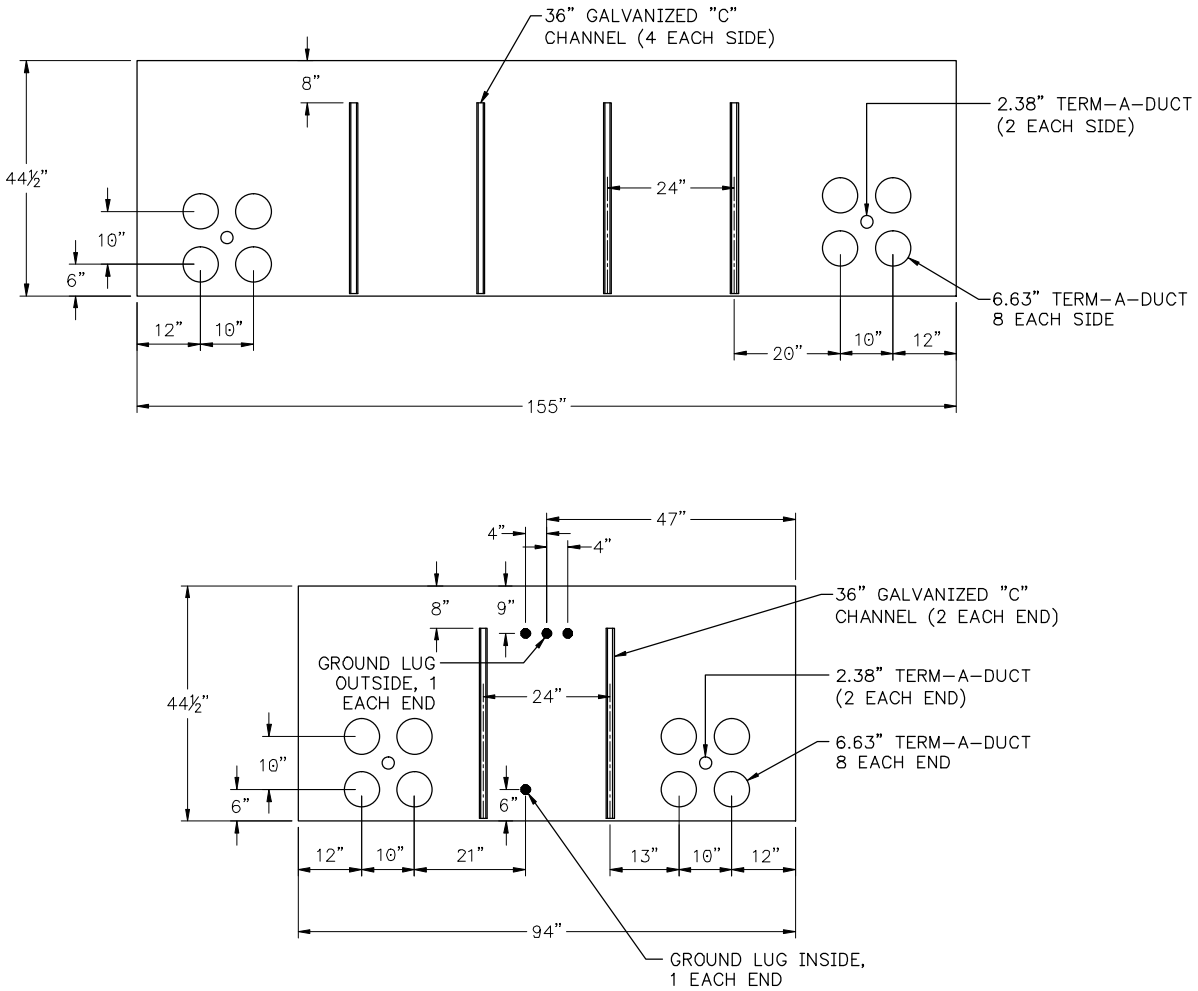

Figure 2—Sleeve TERM–A–DUCT and "C"-Channel Requirement Detail

5.5 Grounding Grid

The sleeve shall be built with an internal, encased electrode in the middle of the sleeve meeting NESC 094.B.6. The electrode shall be $^{3}/_{8}$″ steel rebar. The electrode in the sleeve shall be encased horizontally and run continuously around the sleeve. The grounding system shall attach to connection inserts made of high-bronze alloy and threaded to 0.5″–13UNC. All inserts shall have caps or plugs installed. The sleeve

shall have three ground lugs on the upper section of each end wall, and one ground lug on the lower section of each end wall, for a total of eight ground lugs. Refer to Figure 3 for specific layouts.

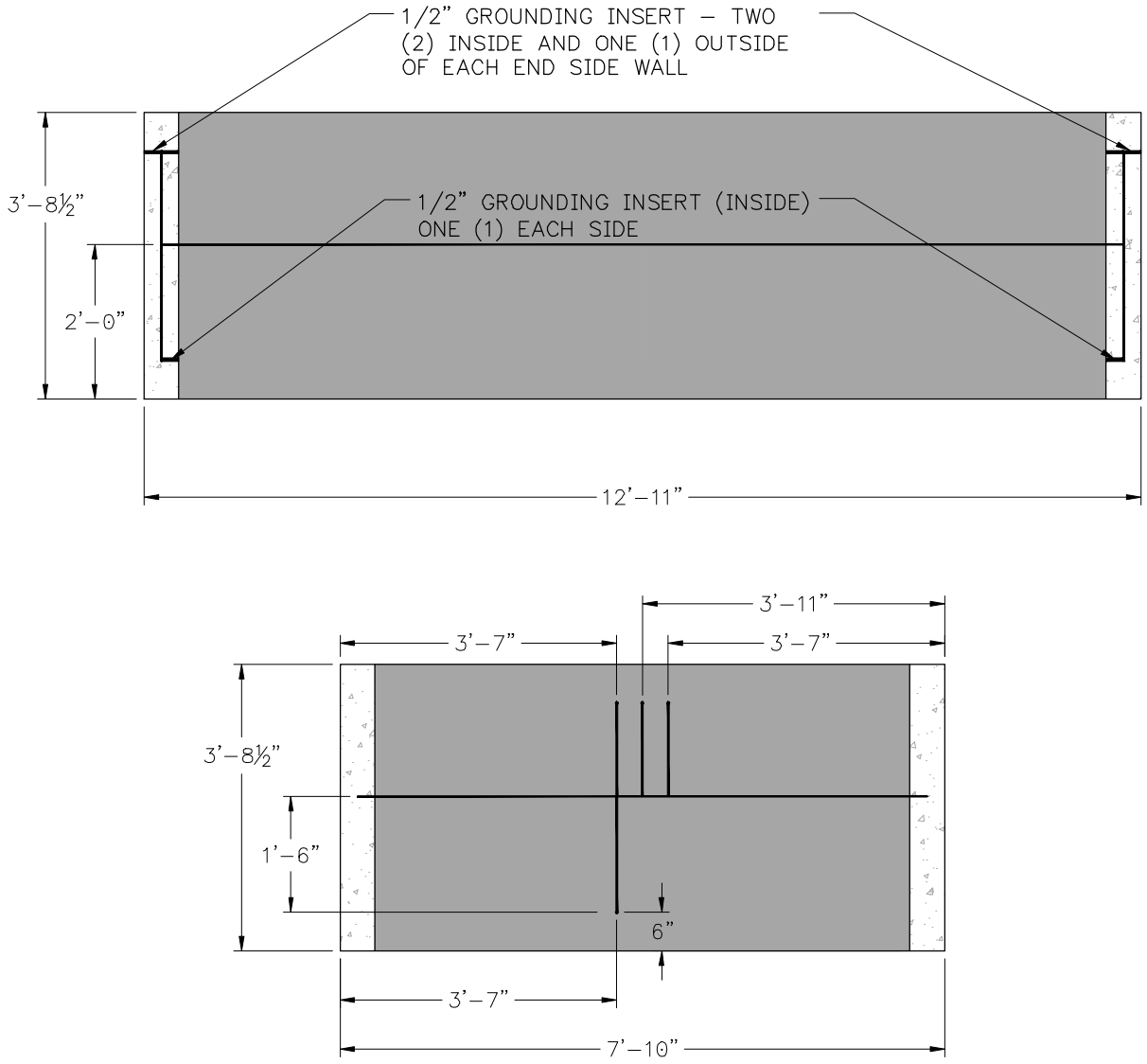

Figure 3—Sleeve Grounding Grid

5.6 Installation

The padvault sleeve shall be off-loaded and set by the padvault supplier to maintain warranties, unless there are extenuating circumstances. Site and excavation conditions shall be as required by the padvault supplier to ensure proper placement. The excavation for the padvault shall include six inches of compacted gravel, graded level. The joint between the vault pad, sleeve, and the enclosure shall be sealed with the gasket and sealant provided by the padvault supplier.

6 Testing

6.1 Test Compliance

Padvaults submitted under this specification shall meet all tests and requirements contained in ZG 301, *General Equipment Base and Enclosure Requirements*; ZG 311, *Concrete Requirements;* and this specification. Padvaults shall also comply with requirements in applicable national standards.

7 Issuing Department

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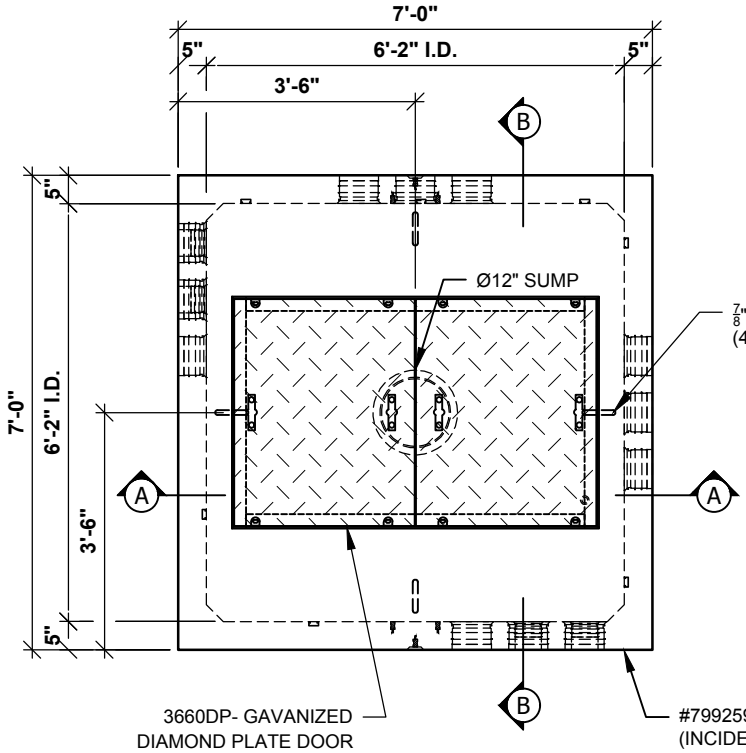
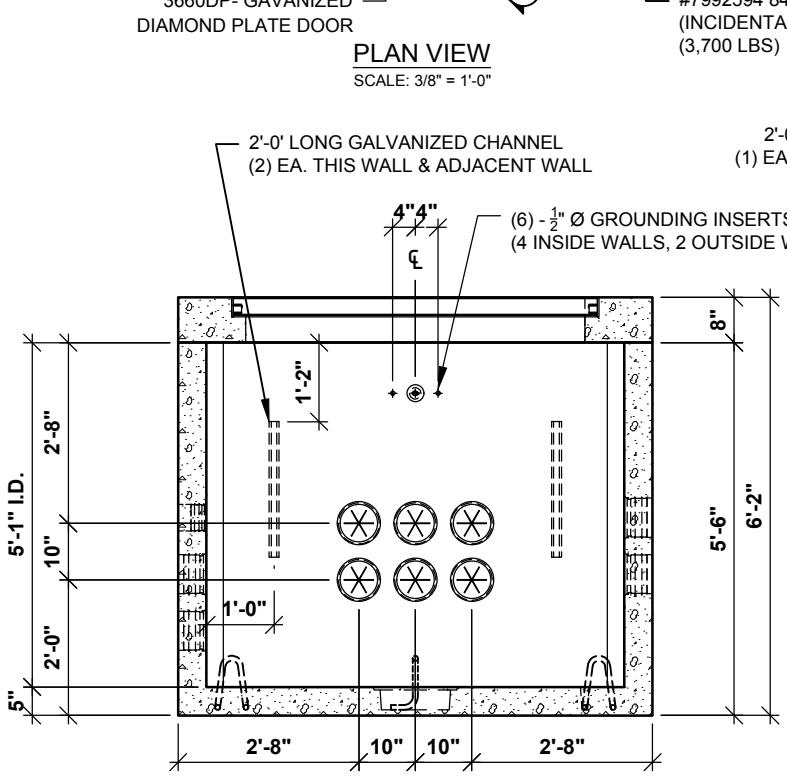
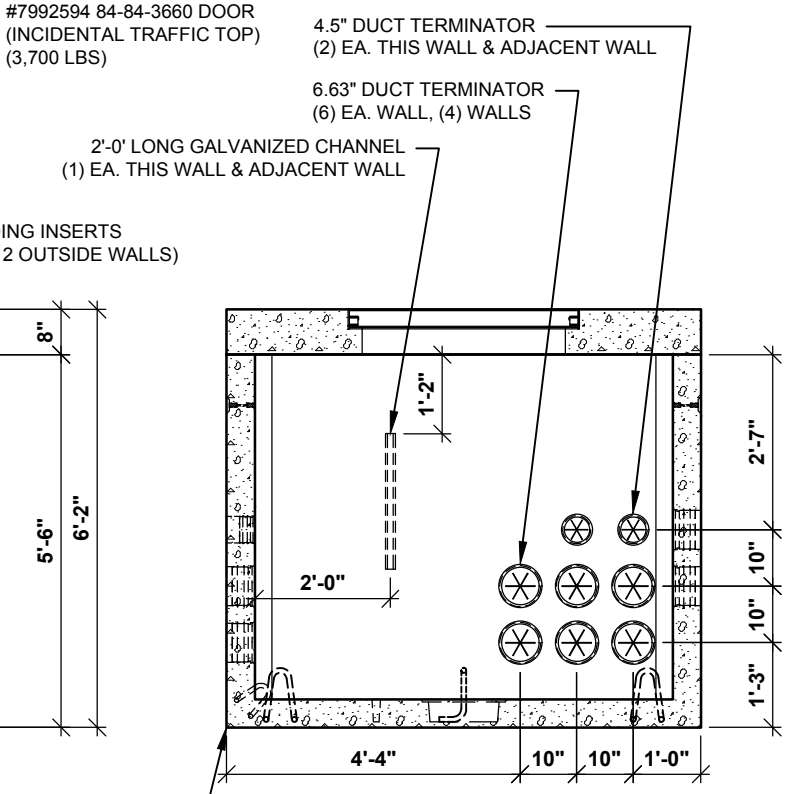
PACIFIC CORP 775 INC. TRAFFIC #7992594



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



SECTION VIEW A-A
SCALE: 3/8" = 1'-0"



SECTION VIEW B-B
SCALE: 3/8" = 1'-0"

NOTES:
1. WEIGHTS LISTED ARE APPROXIMATE.

PCORP ZG631 11-01-13

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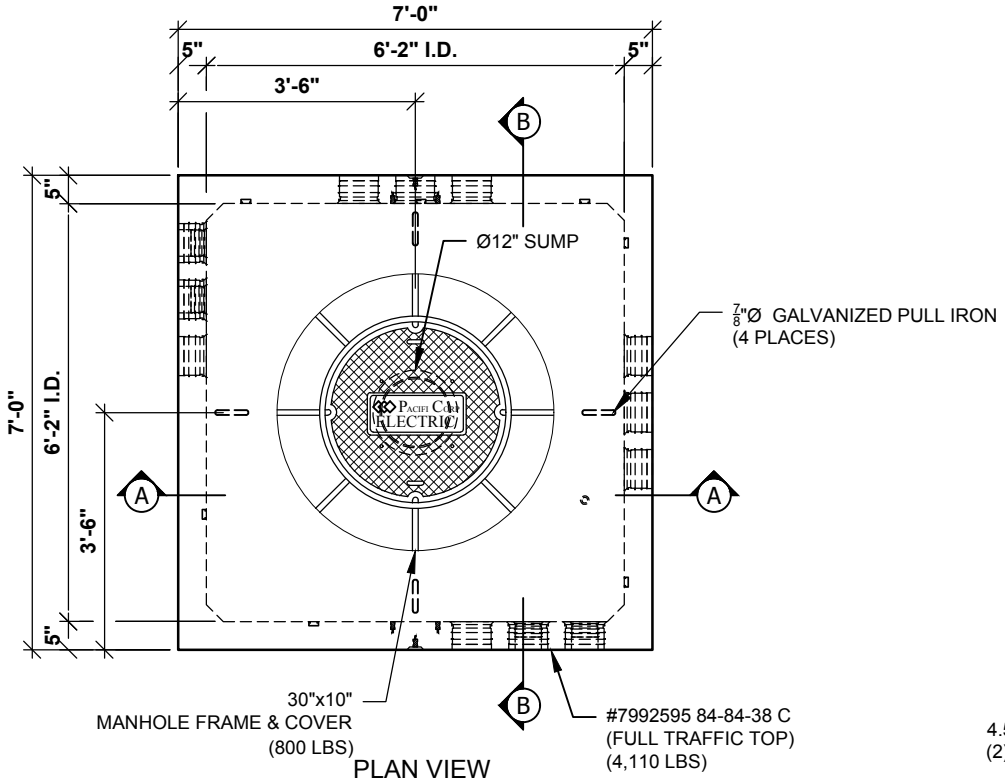
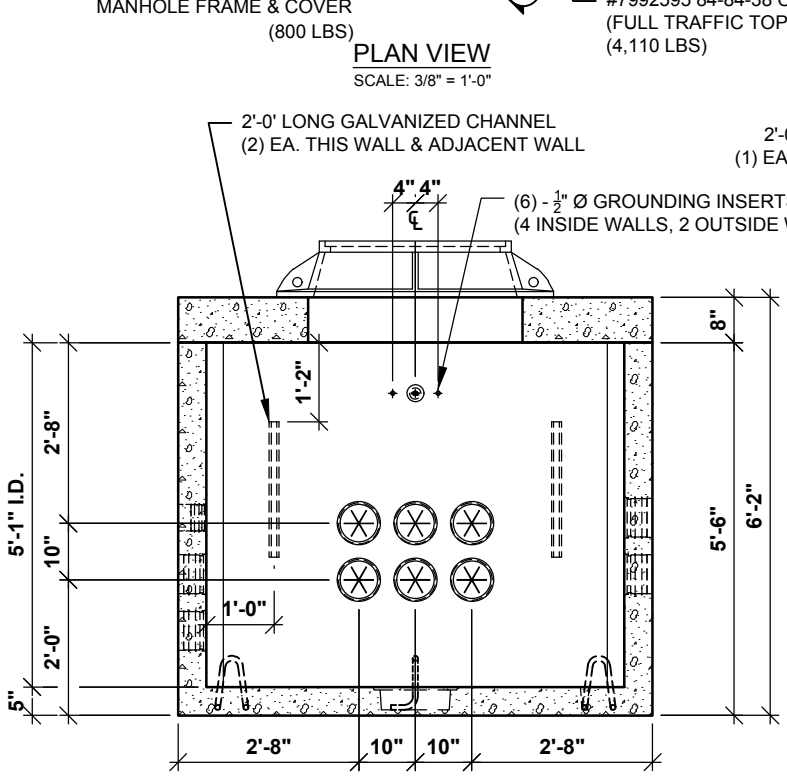
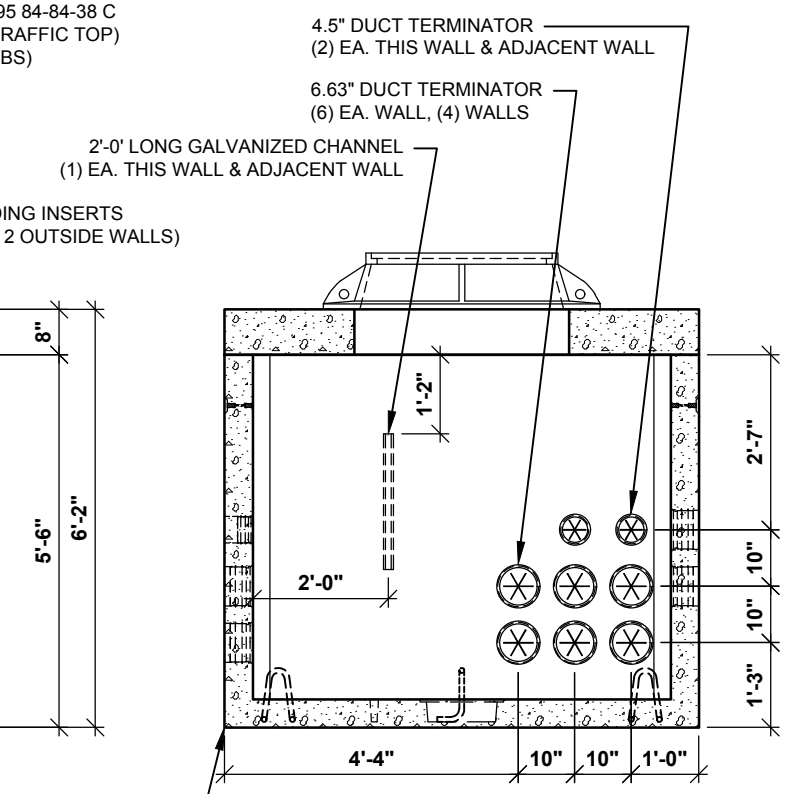
PACIFIC CORP 775 FULL TRAFFIC #7992595



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



SECTION VIEW A-A
SCALE: 3/8" = 1'-0"



SECTION VIEW B-B
SCALE: 3/8" = 1'-0"

NOTES:
1. WEIGHTS LISTED ARE APPROXIMATE.

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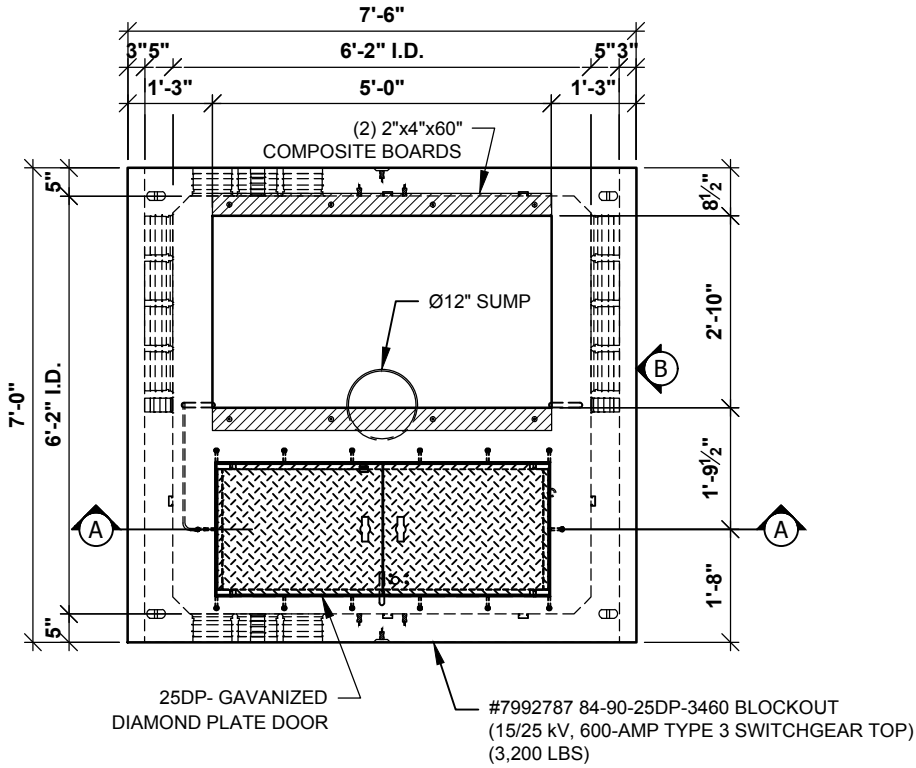
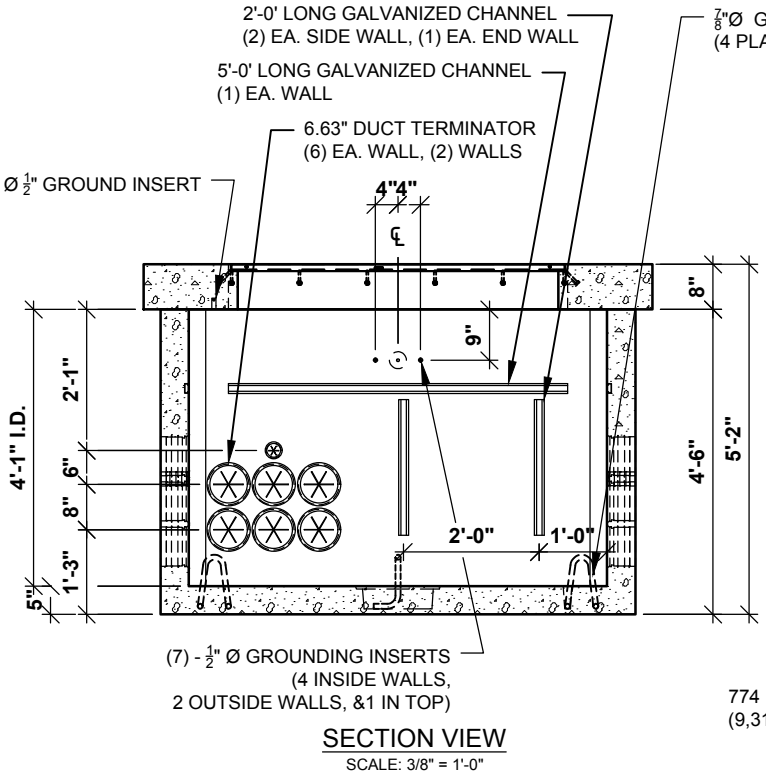
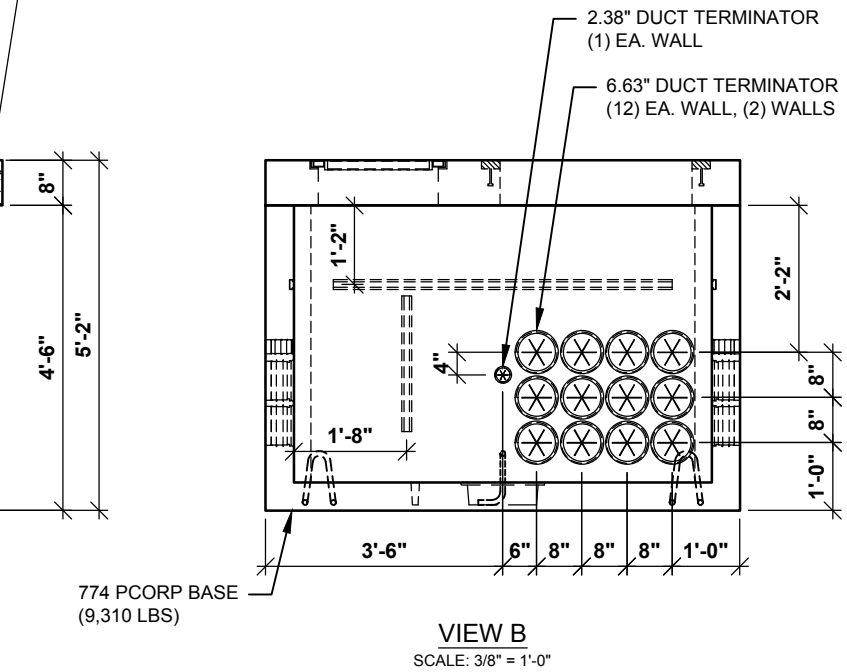
PACIFIC CORP 774 SWGEAR #7992787



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



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



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

NOTES:
1. WEIGHTS LISTED ARE APPROXIMATE.

PCORP ZG641 04-03-13

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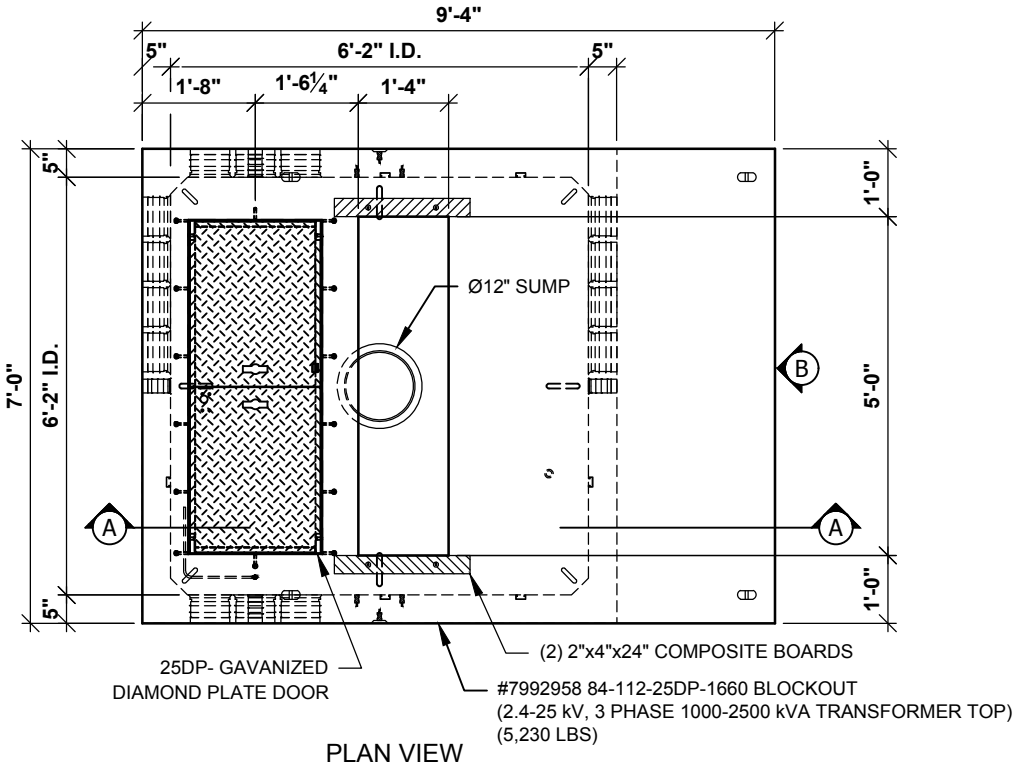
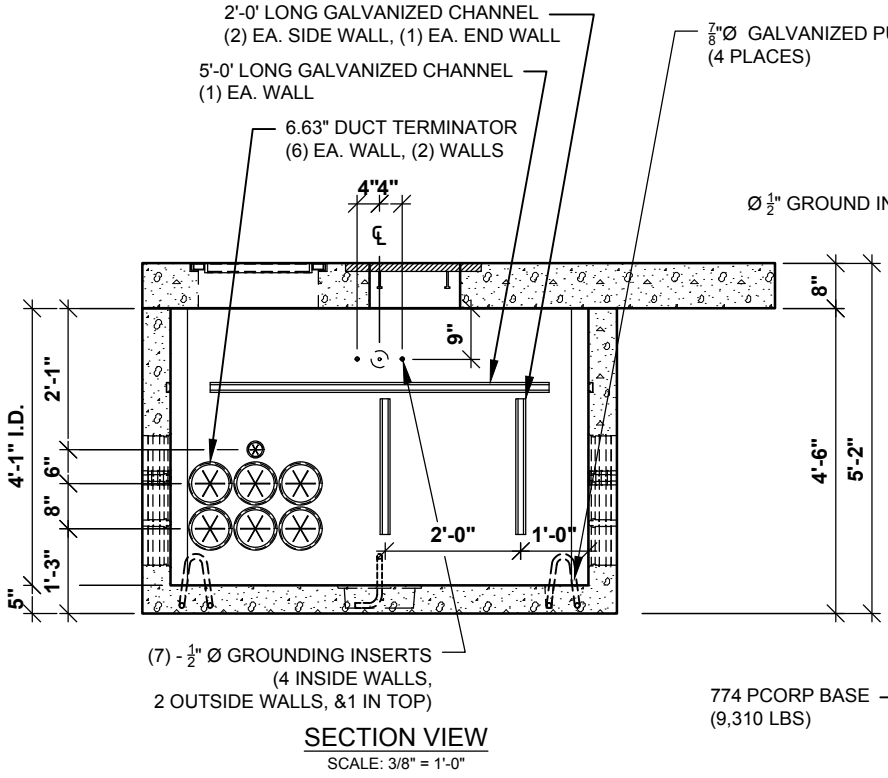
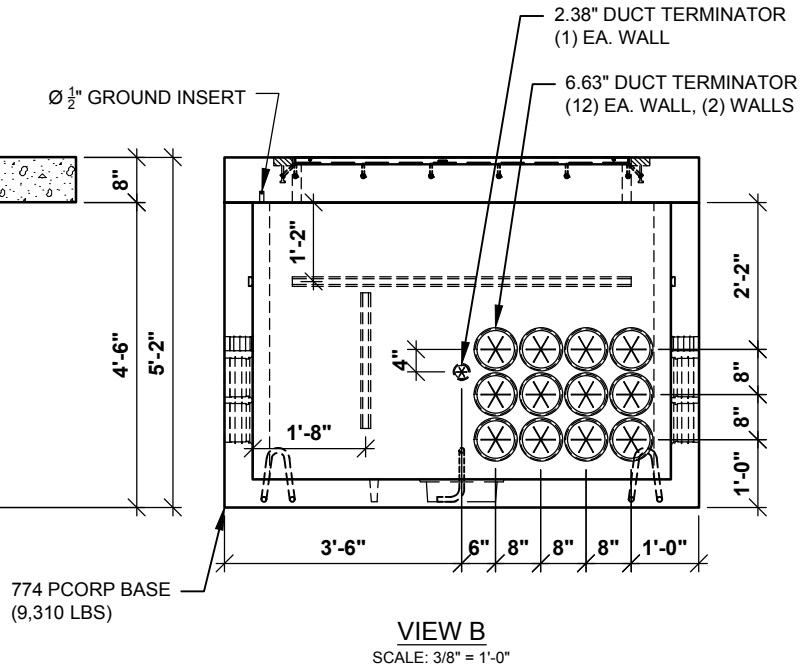
PACIFIC CORP 774 TRANS #7992958



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



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



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

NOTES:
1. WEIGHTS LISTED ARE APPROXIMATE.

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PCORP ZG641 04-03-13

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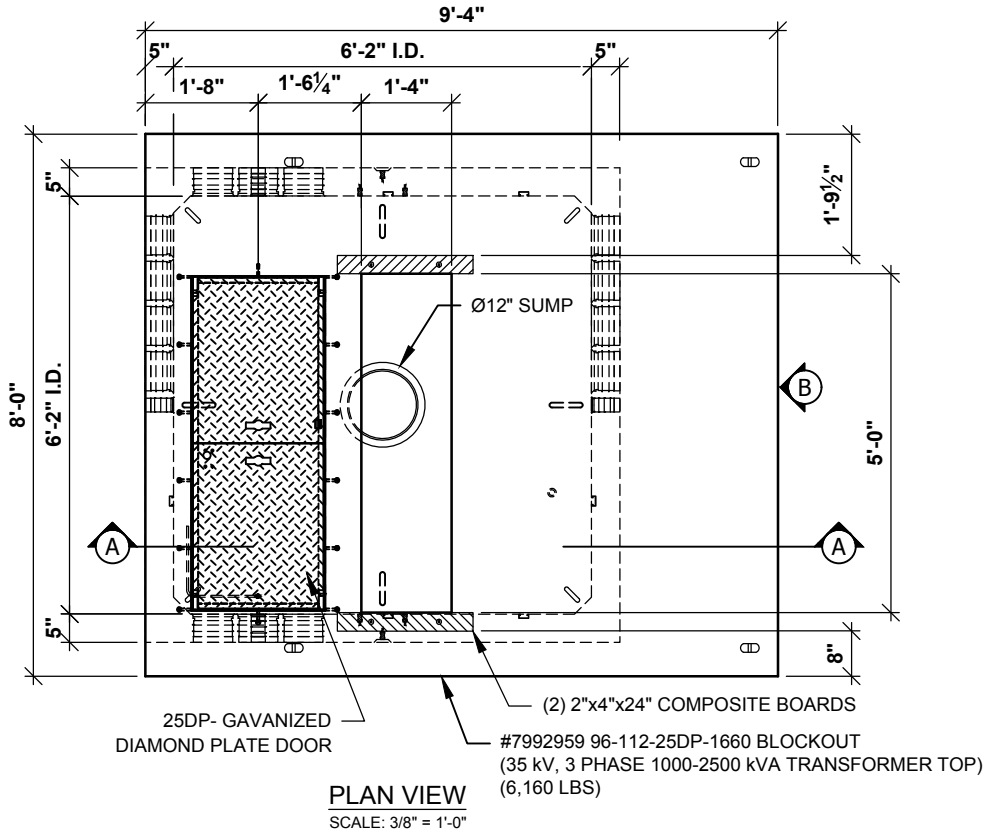
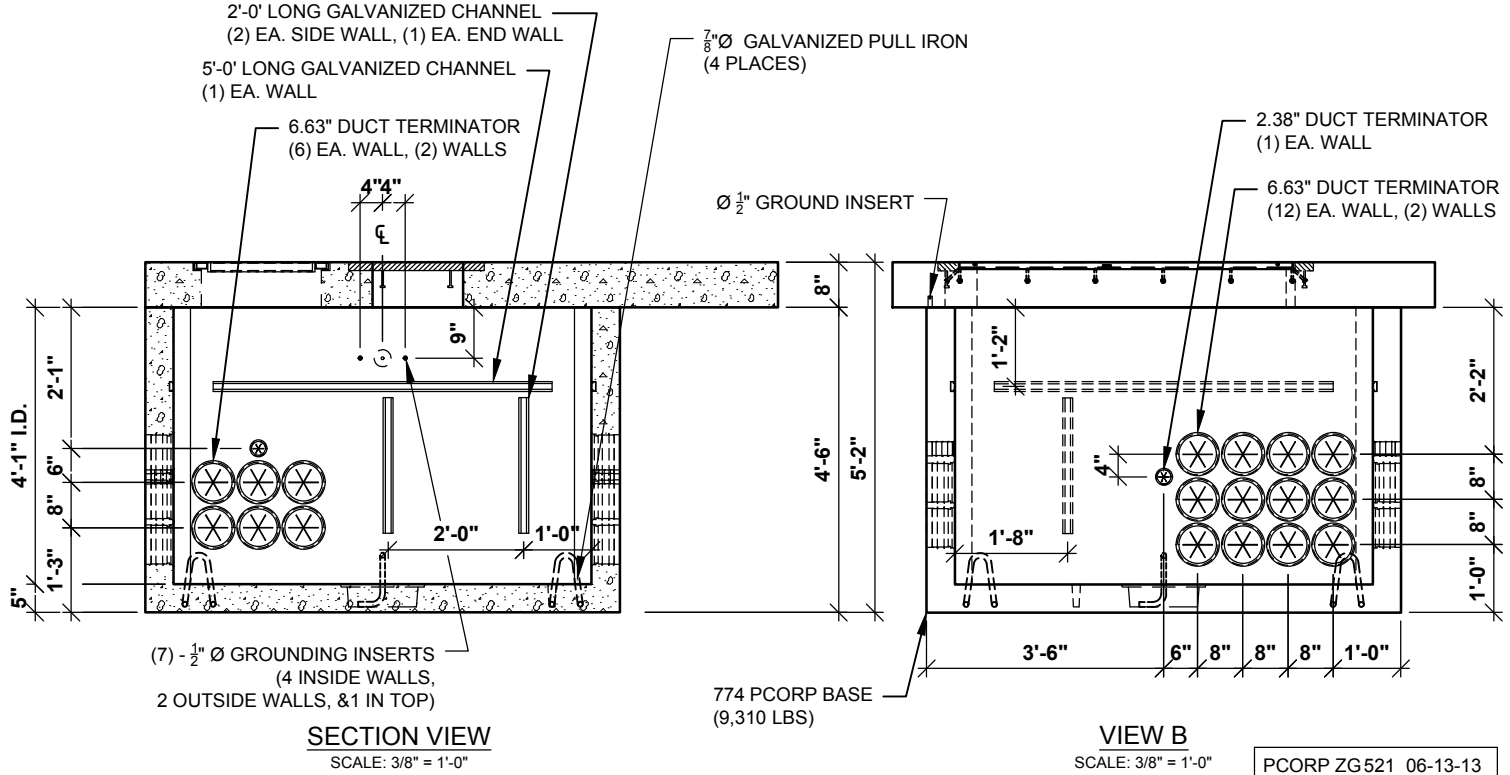
PACIFIC CORP 774 TRANS #7992959



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



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

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

NOTES:
1. WEIGHTS LISTED ARE APPROXIMATE.

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ZG 631 Manhole—7' × 7' (84" × 84")

1. Scope

This specification outlines the minimum requirements for 7' x 7' manholes to be used in full-traffic or incidental traffic areas. The specification applies regardless of whether the manhole is installed by the customer, contractor, supplier or company personnel.

2. Applicable Documents

The latest revisions of the documents, standards, codes and requirements listed in 2.1, Company Material Specifications, and 2.2, Codes and Standards, in effect on the date of invitation to bid apply to the extent specified herein.

2.1. Company Material Specifications

ZG 301, General Equipment Base and Enclosure Requirements
ZG 311, Concrete Requirements
ZG 811, Full-Traffic Cover and Frame Assembly

2.2. Codes and Standards

AASHTO H-20 (for manholes beneath roadways)
ASTM C857 A-8 (for manholes beneath incidental light truck traffic)

3. General

This specification states material and construction requirements which are applicable only to 7' x 7' manholes.

4. Design and Manufacturing Requirements

The purpose of a 7' x 7' manhole is to provide an enclosure for cable pulling, splicing, and single-phase switching.

4.1. Manhole Layout

Figure 1 and Figure 2 show the assembled 7' x 7' manhole with dimensions. The manhole is made up of an enclosure, and a cover and frame assembly. Unless otherwise approved by company engineering, all dimensions and placement of hardware shall conform to those shown in Figure 1, Figure 2, and Figure 3, shown below. See Figure 3 for enclosure layout. All manhole enclosures shall be constructed to AASHTO H-20 (full-traffic) standards, regardless of the cover and frame assembly used.

4.2. Lifting Attachments

Enough lifting attachments shall be provided to ensure safe installation of all pieces at the site.

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4.3. Pulling Attachments

Cable pulling attachments shall be installed in each corner of the enclosure such that blocks may be attached for a straight cable pull. Pulling attachments shall have a minimum pullout strength of 6,000 pounds. Attachments shall allow the attachment of a clevis with a one-inch diameter through-bolt. Pulling attachments may be designed by the manufacturer to meet these requirements. See Figure 3 for location of pulling attachments.

4.4. Incidental Traffic Access Cover (SI# 7992594 only)

An incidental-traffic-rated access cover, as specified in ZG 811, shall be included with the assembly. The incidental-traffic-rated cover shall be no smaller than 36" x 60" and no larger than 48" x 60".

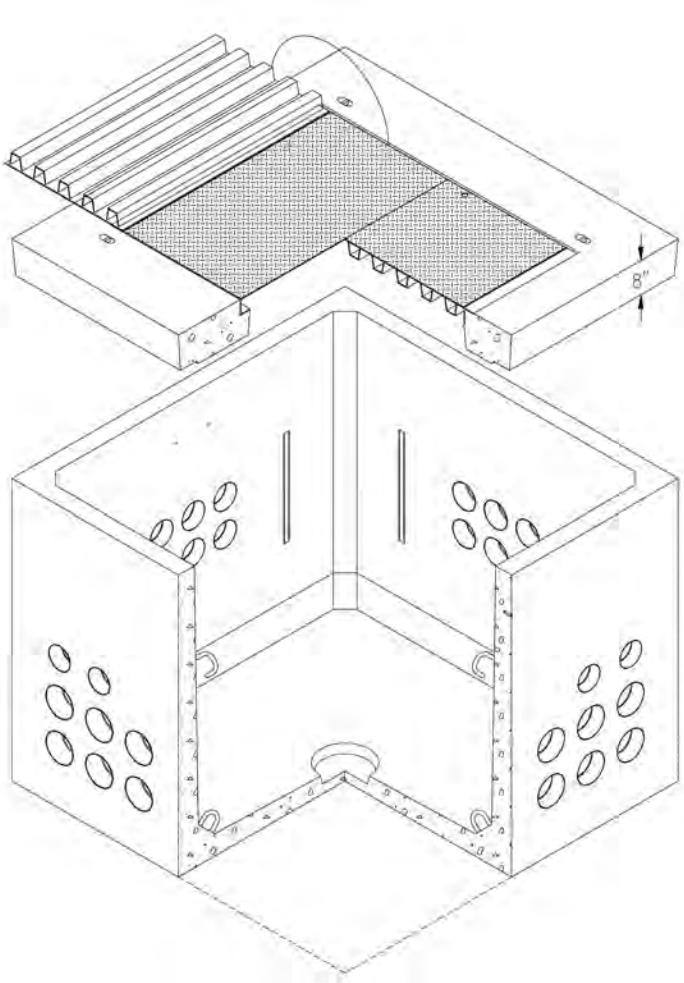

Figure 1 — 7′ x 7′ Manhole with Incidental Traffic Cover (SI# 7992594)

4.5. Full Traffic Access Cover (SI# 7992595 only)

A full-traffic-rated access cover, as specified in ZG 811, shall be included with the assembly as shown in Figure 2 below. Additional rings may be used to bring to grade. (See ZG 811 for grade rings.)

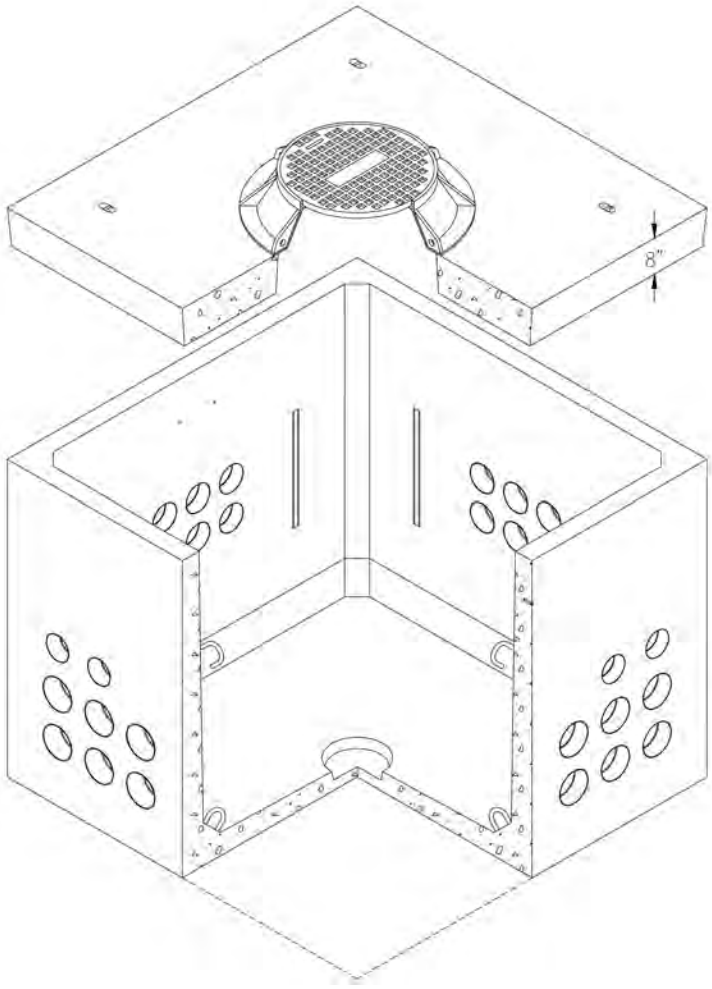

Figure 2 — 7′ x 7 Manhole with Full Traffic Cover (SI# 7992595)

4.6. Conduit Entrances

These units shall include Term-A-Duct or equivalent conduit entrances compatible with PVC, Polyethylene (PE), and Fiberglass 90°C-rated electrical-grade conduit. The Term-A-Duct entrances shall be positioned as follows:

- two adjacent walls (A&B walls): six 6.63" Term-A-Ducts as shown in Figure 3
- two adjacent walls (C&D walls): six 6.63" Term-A-Ducts, and two 4.5" Term-A-Ducts as shown in Figure 3

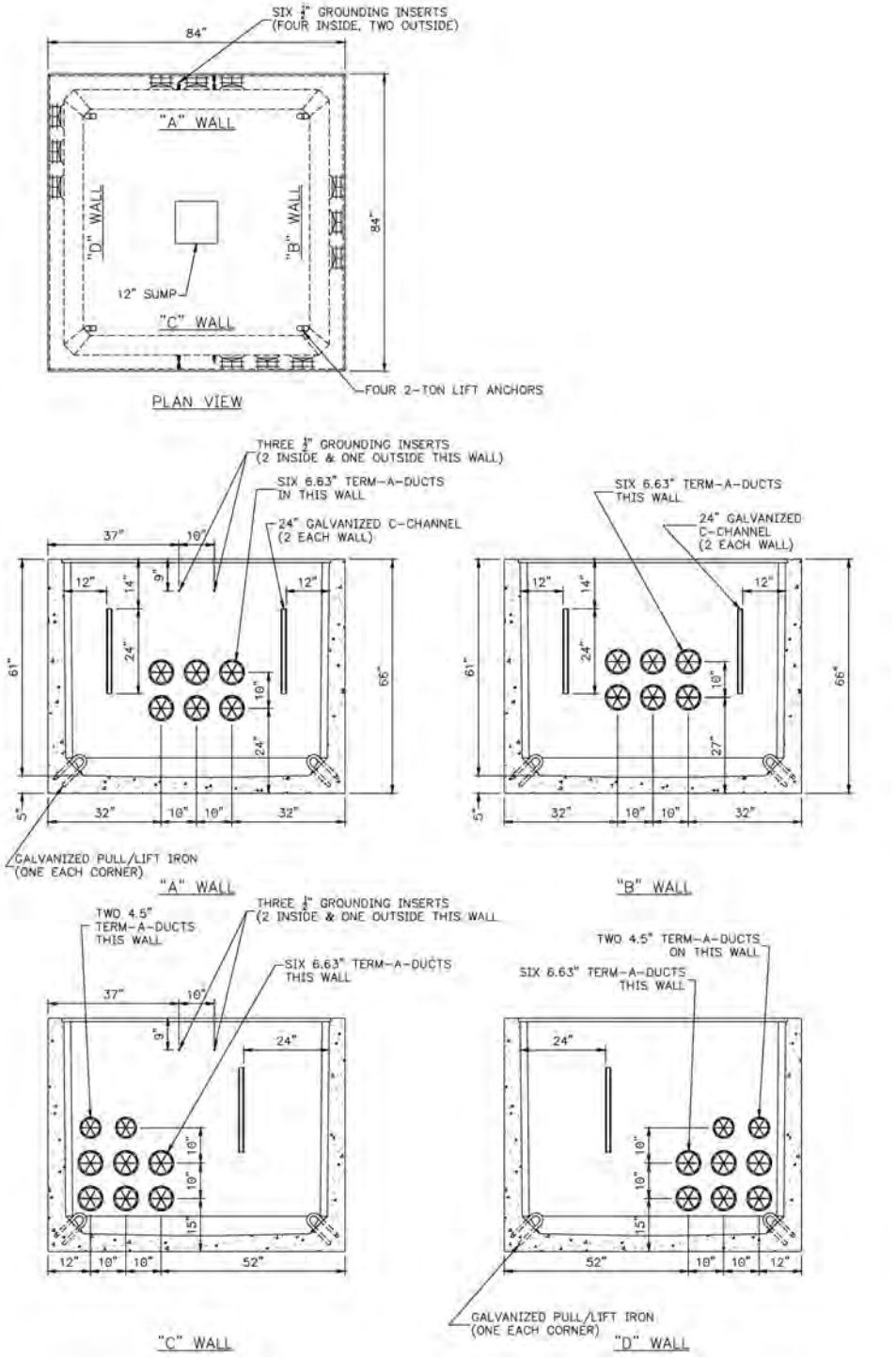

Figure 3 — 7′ x 7 Manhole Enclosure Layout

4.7. Ground Grid

Each manhole shall be constructed with an encased electrode meeting NESC 094.B.6. The ⅜" steel rebar shall be 20 continuous feet in length and imbedded in concrete at least 24" below finished grade (see Figure 4). The grounding system shall attach to a connection insert of high-strength bronze alloy, threaded to ½" 13UNC. The vertical rebar attaching to the bronze insert shall be welded or connected by a minimum of a ⅝" copper clad ground clamp to the ⅜" steel rebar grounding loop. Two inserts, centered on opposite side walls, shall be available for connection on the inside and outside of the enclosure.

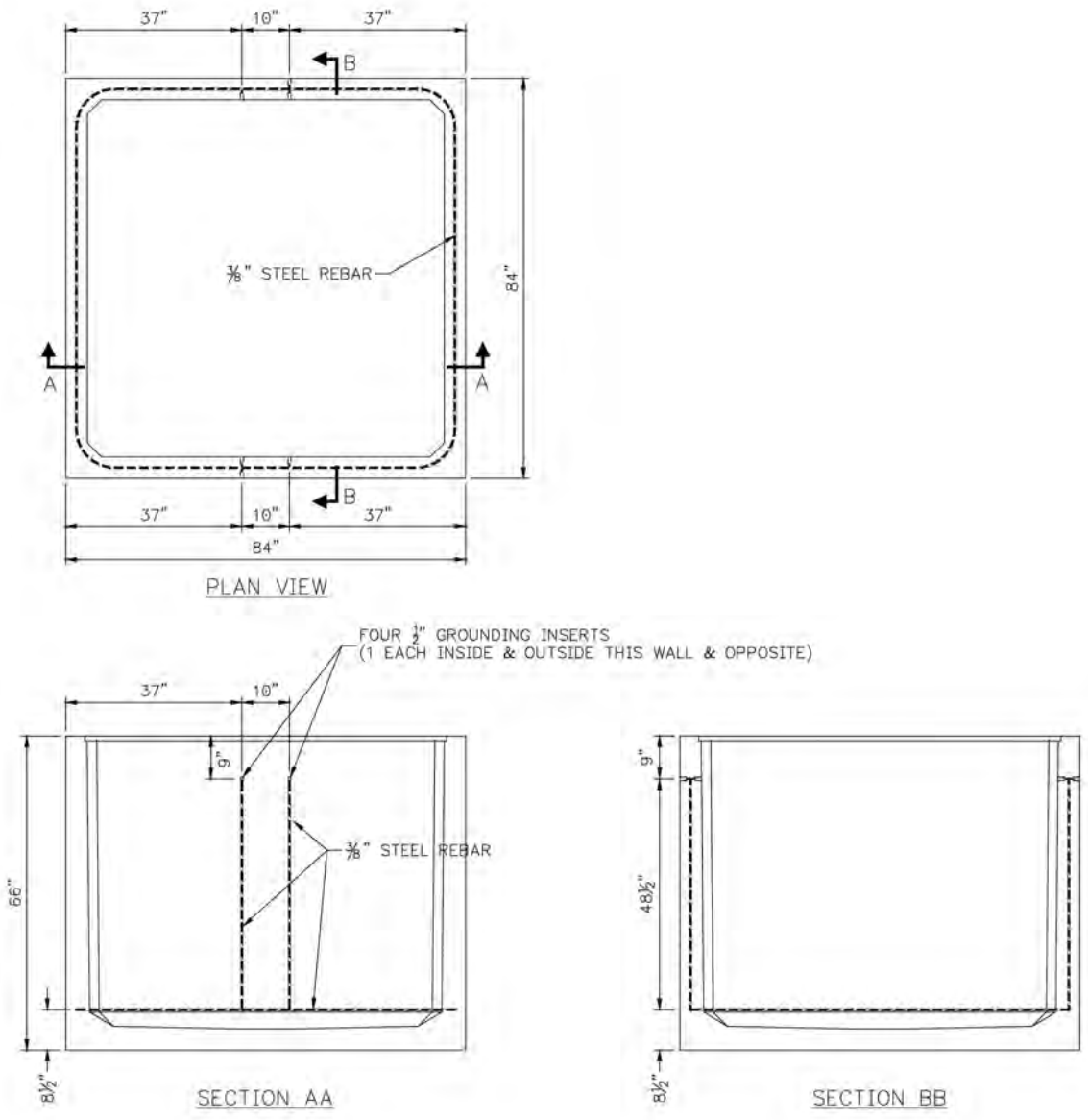

Figure 4 — 7′ x 7 Manhole Ground Grid

4.8. "C"-Channels

Each enclosure wall shall have two 2-foot-long galvanized or fiberglass 1⅝" x $^{13}/_{16}$" "C"-channels. See Figure 3 for details.

4.9. Installation

This unit shall be set at the site by the supplier. The contractor is responsible to ensure that all earth under the manhole is compacted to within 2% slope prior to setting the manhole. Where requested by the company, a clean 6-inch base of ¾"-minus gravel shall be provided under the enclosure, and must be compacted to 90% of dry density. The interface between the cover/frame assembly and the enclosure shall be sealed using a waterproof substance such as tar or mastic. The top of the pad shall be two to four inches above final grade in non-pedestrian areas, or flush with grade in pedestrian areas. Setting depth shall be determined by the local regulatory authority for full-traffic areas.

5. Testing & Compliance

Manholes submitted under this specification shall meet all tests and requirements contained in ZG 301, ZG 311, and this specification. Manholes shall also comply with requirements in applicable national standards.

6. Issuing Department

The engineering standards and technical services department of PacifiCorp published this material specification. This material specification shall be used and duplicated only in support of company projects.

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ZG 641 Padvault—Shallow, 7' × 7' (84" × 84")

1. Scope

This specification outlines the minimum requirements for shallow 7′ × 7′ (84″ × 84″) vault to be used for pad mounted equipment when there is no potential for the use of 1000 kcmil cable. The specification applies to all shallow 7′ × 7′ (84″ × 84″) vaults installed by the company, contractors, customers, or suppliers.

2. Applicable Documents

The latest revisions of the documents, standards, codes and requirements listed in Section 2.1, Company Material Specifications, and 2.2, Codes and Standards, in effect on the date of invitation to bid apply to the extent specified herein.

2.1. Company Material Specifications

ZG 301 *General Equipment Base and Enclosure Requirements*
ZG 311 *Concrete Requirements*
ZG 811 *Full Traffic Cover and Frame Assembly*

2.2. Codes and Standards

ASTM C857 A-16 (2007)
AASHTO H-20 (for vaults beneath roadways)
ASTM C857 A-8 (for vaults beneath incidental light truck traffic)
IEEEC2, *National Electric Safety Code (NESC)*

3. Definitions

Company. Refers to PacifiCorp

PacifiCorp. Refers to Pacific Power and Rocky Mountain Power.

4. General

4.1. Application Information

This specification states material and construction requirements which are applicable only to shallow 7′ × 7′ (84″ × 84″) padvaults.

5. Applicable Stock Item Numbers

Materials being submitted for the following company stock item numbers are subject to evaluation according to the requirements in this specification.

5.1. Stock Item Numbers

7992787, PADVAULT, 7′×7′ (84″×84″), FOR TYPE-3, 15 & 25KV, DF SWITCHGEAR

7992958, PADVAULT, 7′×7′ (84″×84″) , FOR 2.4-25 kV, 1000-2500 kVA TRANSFORMER

7992959, PADVAULT, 7′×7′ (84″×84″), FOR 35 kV, 1000-2500 kVA TRANSFORMER

6. Design and Manufacturing Requirements

The purpose of a shallow 7′×7′ (84″×84″) vault is to provide an enclosure for cable pulling, large transformers, three-phase metering, and pad-mounted switching.

6.1. Vault Layout

Figure 1 and Figure 2 below show the assembled shallow 7′×7′ (84″×84″) vault layout with dimensions. Unless otherwise approved by company engineering, all dimensions and placement of hardware shall conform to those shown in Figure 1 and Figure 2.

6.2. Lifting Attachments

Enough lifting attachments shall be provided to ensure safe installation of all pieces at the site.

6.3. Pulling Attachments

Cable pulling attachments shall be installed opposite each set of TERM-A-DUCT banks, such that blocks may be attached for a straight cable pull. Pulling attachments shall have a minimum pullout strength of 6000 pounds. Attachments shall allow the attachment of a clevis with a one-inch diameter through-bolt. Pulling attachments may be designed by the manufacturer to meet these requirements.

6.4. Conduit Entrances

There must be six 6.63″ and one 2.38″ TERM-A-DUCT on opposite walls and twelve 6.63″ and one 2.38″ TERM-A-DUCT on the other opposite walls, as shown in Figure 2.

6.5. Incidental Traffic Access Door

One access door with an opening no greater than 24′×60′ , as specified in ZG 811, shall be included with the assembly.

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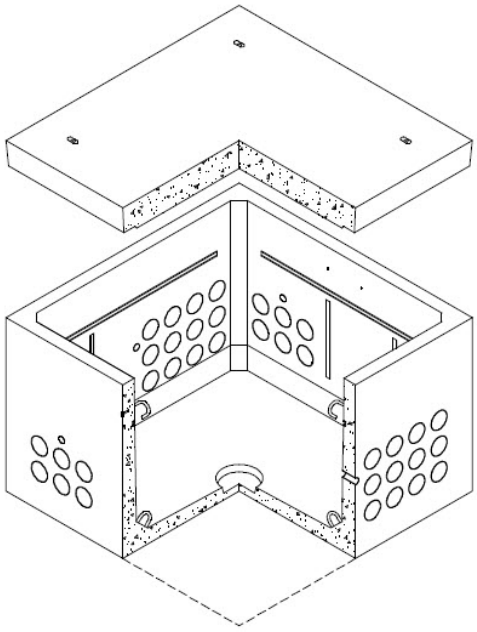

Figure 1—7′ × 7′ (84″× 84″) Shallow Vault, Cutaway View

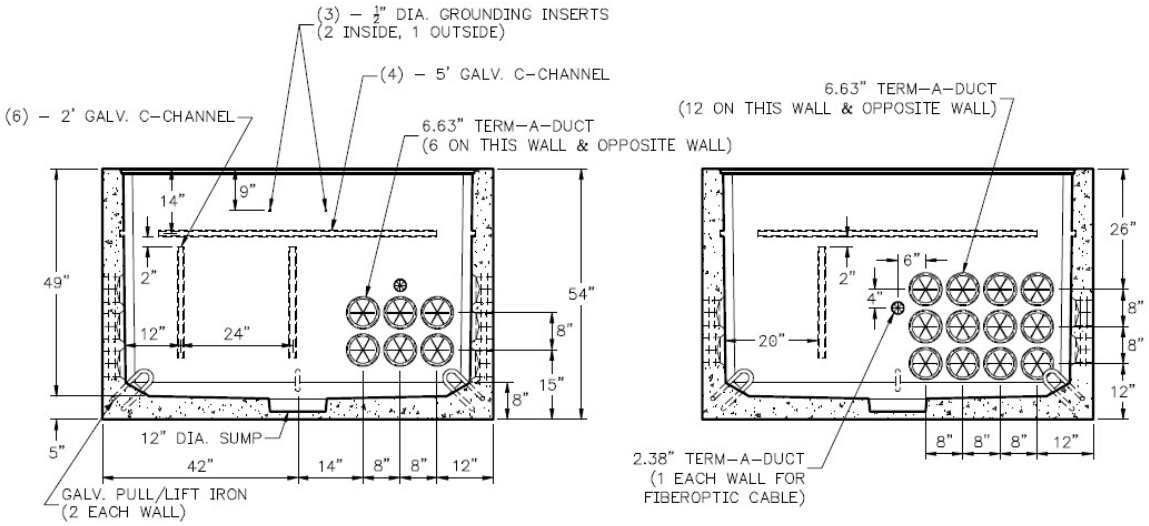

Figure 2—7′ × 7′ (84″× 84″) Shallow Vault Layout

6.6. Padvault Top Layout for Type-3 Switchgear

Figure 3 shows the layout of the padvault lid for Type-3 switchgear.

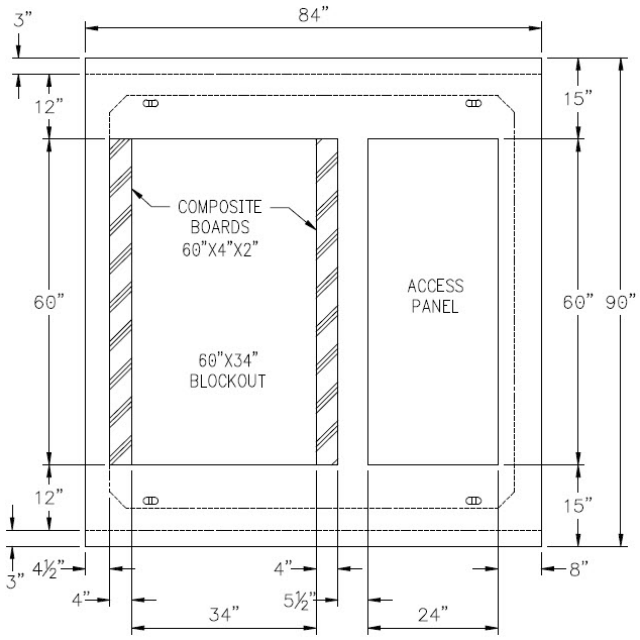

Figure 3—Padvault Pad Layout (SI# 7992787) for 15/25 kV, 600-Amp Type-3 Switchgear

6.7. Ground Grid

The vault shall be built with an internal, encased electrode in the vault enclosure meeting NESC 094.B.5. The electrodes shall be $^{3}/_{8}$″ steel rebar. The electrode shall be encased horizontally and run continuously around the vault section. The grounding system of the vault enclosure shall attach to "connection" inserts, made of high-bronze alloy and threaded to 0.5″ × 13UNC. All grounding inserts shall have caps or plugs installed. The shallow 7′ × 7′ (84″ × 84″) vault shall have two grounding inserts outside and four grounding inserts inside. The grounding inserts shall be located nine inches (9″) from the top on the outside of the vault. One additional grounding insert shall be installed on the lid, close to the access door. See Figure 4 for the ground grid layout.

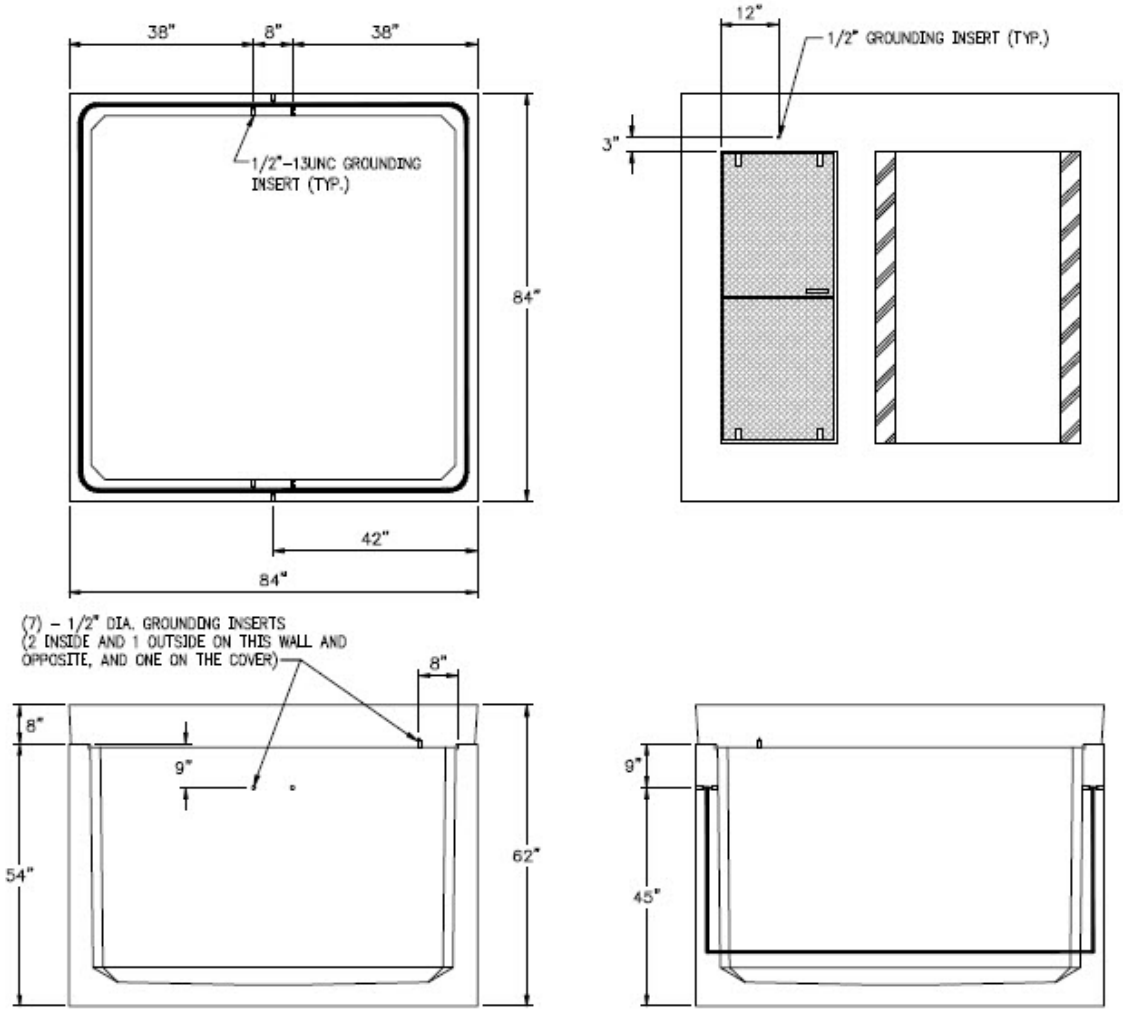

Figure 4—Ground Grid Layout for 7′ × 7′ (84″× 84″) Shallow Vault

6.8. Installation

This unit shall be set at the site by the supplier. The contractor is responsible to ensure that all earth under the vault is compacted and leveled to no more than 2% slope prior to setting the vault. A clean gravel base under the pad may be necessary in areas where drainage is poor. The interface between the cover/frame assembly and the base should be sealed using a waterproof substance, such as tar or mastic. The top of the frame should be flush with final grade in pedestrian areas. Setting depth shall be determined by the local regulatory authority for full-traffic areas.

7. Testing

7.1. Test Compliance

Vaults submitted under this specification shall meet all tests and requirements contained in ZG 301 *General Equipment Base and Enclosure Requirements*, ZG 311 *Concrete Requirements*, and this specification. Vaults shall also comply with requirements in applicable national standards.

8. Issuing Department

The engineering standards and technical services department of PacifiCorp published this material specification. This material specification shall be used and duplicated only in support of company projects.

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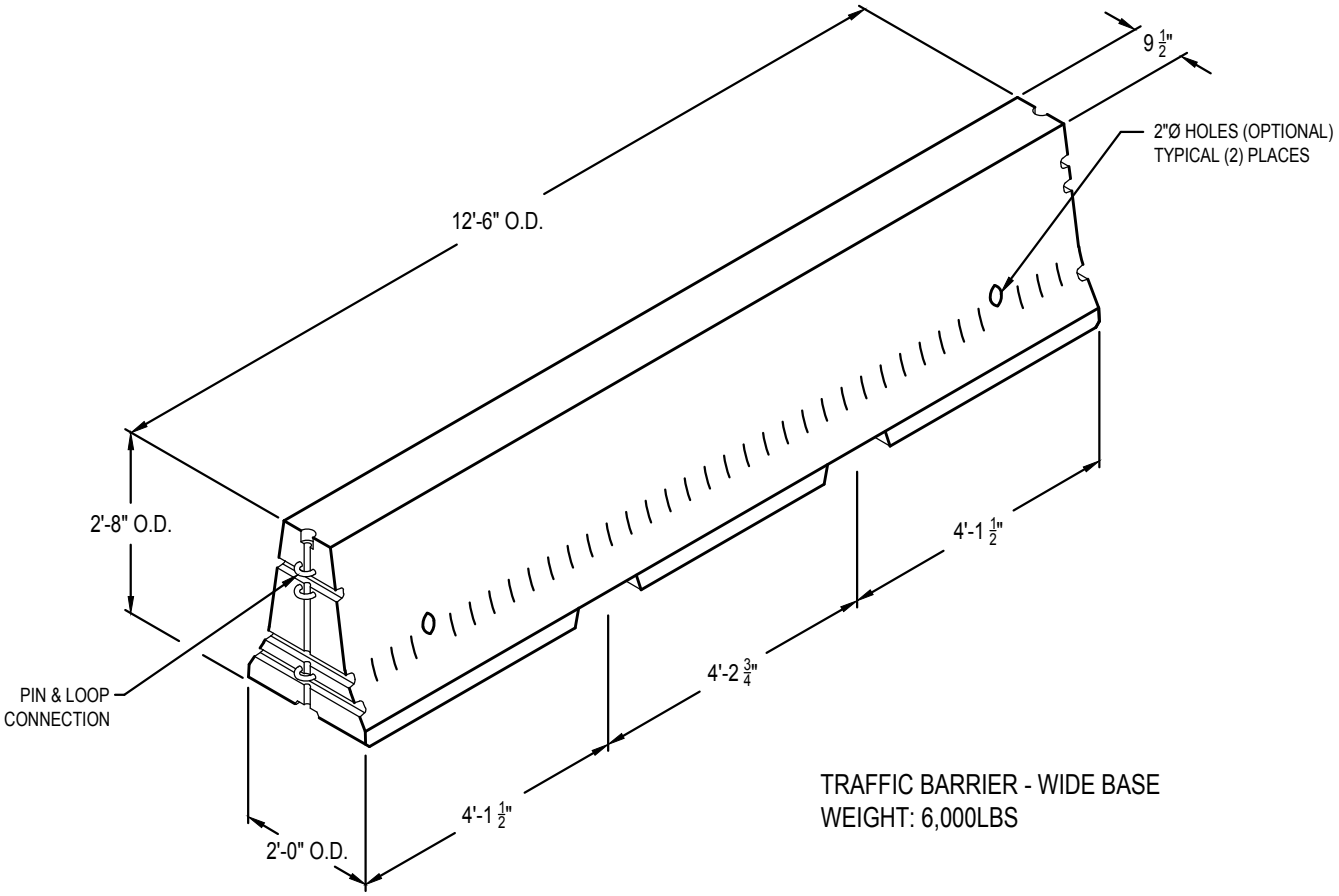
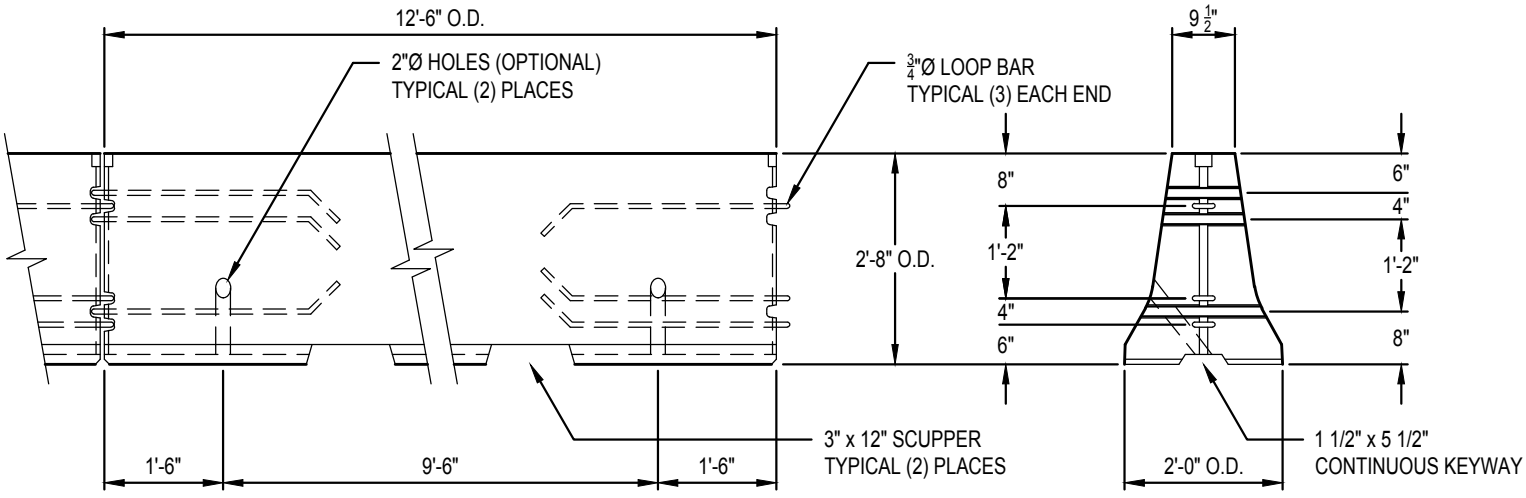
Traffic Barriers

ODOT RD500 BARRIER



TRAFFIC BARRIER - WIDE BASE
WEIGHT: 6,000LBS



SIDE VIEW **END VIEW**

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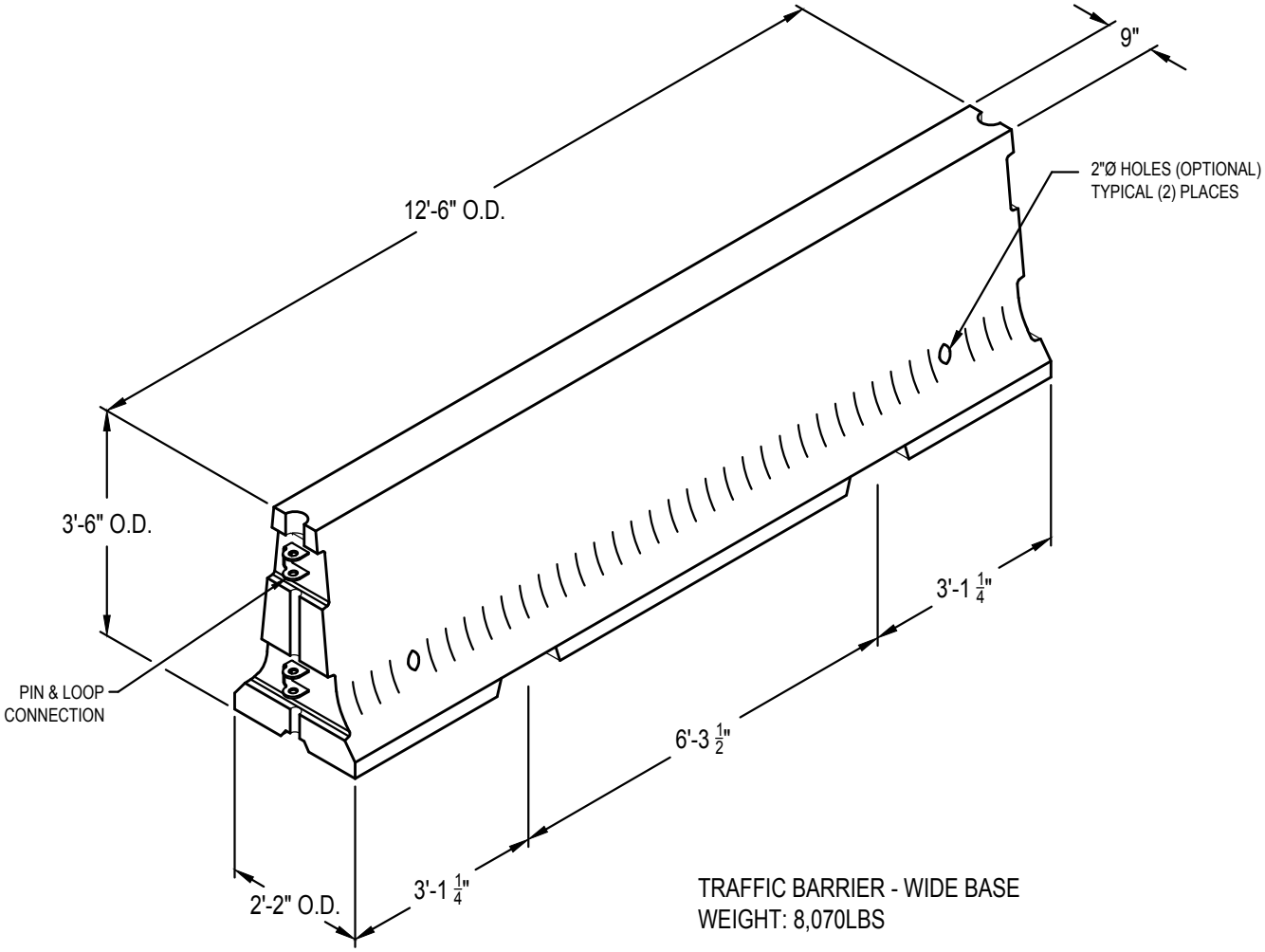
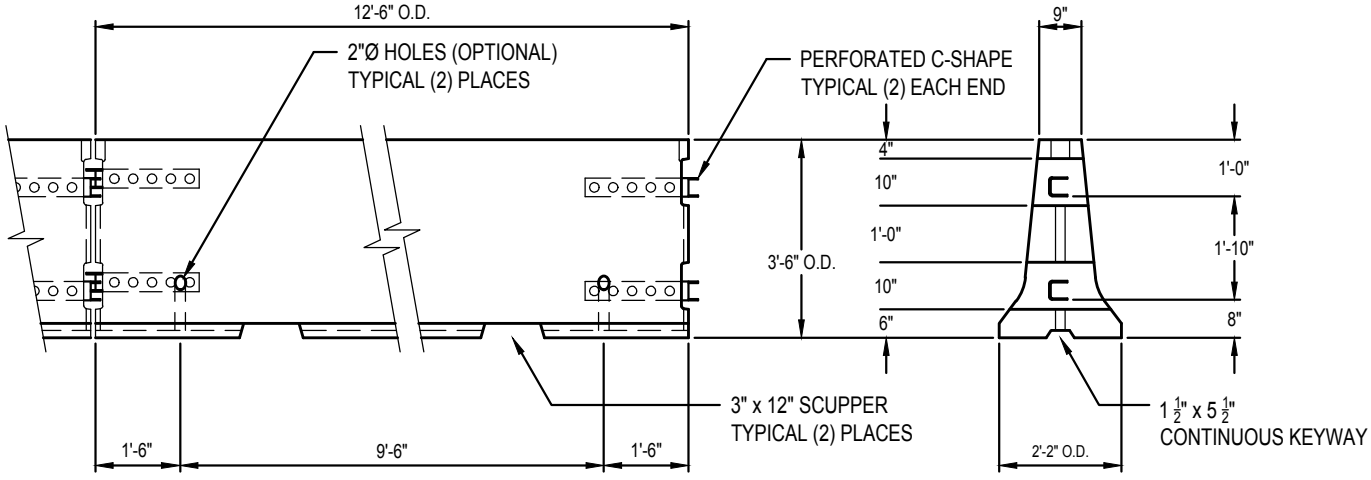
ODOT RD545 BARRIER



TRAFFIC BARRIER - WIDE BASE
WEIGHT: 8,070LBS



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