INDEX

ITEM #	SPEC NUMBER (DATE)	DESCRIPTION
1	Title Sheet of Drawings	Revision Information of Drawings
2	1-120.1 (12-13-93)	Conduit Termination Dead End
3	1-161 (01-06-83)	Conduit Line Offsets, 600V & 4.8kV Lines
4	1-166 (01-06-68)	Conduit Line Offsets, 34.5kV Lines
5	1-225 (11-15-84)	Baffle Board
6	1-802 (05-03-21)	Precast Vault Neck & Cover Details
7	1-802.1 (05-03-21)	Precast Neck Installation & Grade Rings
8	1-802.2 (05-03-21)	Maintenance Hole/Vault Cover W/Restraining System
9	1-824 (06-05-80)	Traffic Conditions for Vents
10	2-210 (08-25-22)	Duct Mandrels
11	2-361 (12-07-12)	Ladder Installation for Vault/Maintenance-Hole
12	2-361.2 (11-30-12)	Ladder Installation for Vault & Manholes (Neck greater than 4 feet)
13	C702-50 (01-30-13)	Concrete Mixtures
14	P721-00 thru -00.8 (04-01-21)	Transformer Pad General Requirements (Previously C721-01 thru -01.8)
15	C730-10 (02-13-19)	12” Standpipe Architectural Vents, Structures
16	E438 (10-01-84)	Precast Handhole
17	E459 (05-22-23)	Precast Handhole w/Deep Recess
18	E491 (05-07-21)	Precast Handhole w/Deep Recess
19	E492 (10-06-96)	Precast Handhole 2’-0”X 3’-0”X 24” Deep Bottomless
20	E541 (10-08-96)	Precast Handhole w/Deep Recess Intercepting Type
21	E617 (09-16-98)	Fiberglass Reinforced Polymer Handhole 24”X 36”X 36”
22	E619 (01-15-98)	Fiberglass Reinforced Polymer Handhole 30”X 48”X 36”
23	E621 (01-15-98)	Fiberglass Reinforced Polymer Handhole 36”X 60”X 48”
24	G284 (09-24-15)	Precast Vaults Rectangular
25	G286 (05-07-21)	Precast Vault Parkway Type 4’-0”X 6’-6”X 7’-0”
26	G292 (02-28-01)	Precast Vault 8’X 14’X 9’-4” Panel Type
27	G322 (03-13-97)	Precast Maintenance Hole 4’-0”X 6’-6” Rectangular
28	G328 (03-13-97)	Precast Station Entrance Maintenance Hole 4.8kV Cable Lines
29	G334 (07-23-18)	Precast Maintenance Hole Rectangular Panel Type
30	G353 (10-09-94)	Underground Transformer Silo
31	G354 (06-06-14)	Precast Maintenance Hole 5’-0”X 10’-6”X 7’-0”
32	G384 (07-15-02)	Precast Maintenance Hole 6’X 10’ Panel Type 34.5kV
33	H168 (01-14-08)	Residential UG Standard Structures Placement Conduit Trench Details
34	H171 (09-18-12)	Precast Vaults 4.8kV Commercial
35	H172 (09-24-15)	Precast Vault (Intercept Tunnel Type) 34.5kV & 4.8kV Commercial
36	H202 (12-18-23)	Precast Maintenance Hole 8’-0”X 16’-0” w/Terminations
37	H204 (05-26-21)	Precast Maintenance Hole Tunnel Type 6’-0”X 16’-0”X 9’-0”
38	H217 (10-31-96)	Precast Maintenance Hole Tub-Type 7’-0”X 14’-0”X 9’-0”
39	H242 (01-07-23)	Guidelines for UG Elec.Dist. Const. in Areas Where Soil Gas is Present
40	H244 (09-09-10)	Precast Maintenance Hole 7’-0” X 18’-0” W/Terminations
41	OA006-01 (08-13-12)	Power Line Clearances and Easement Drawing
42	UA730-01 (04-24-09)	12” Architectural Standpipe Vent (Polyethylene)
43	UB721-01 (11-08-22)	4’X 4’-6” Precast Pad w/Pull Box f/Padmount Transformer
44	UB721-02 (11-05-22)	4’X 7’ Precast Pad w/Handhole f/Padmount Transformer
45	UB721-03 (11-08-22)	6’X 8’ Precast Pad w/Handhole f/Padmount Transformer
46	UB721-07 (11-08-22)	8’X 10’ Precast Pad w/Handhole f/Padmount Transformer
47	UB721-08 (11-01-22)	9’X 15’ Precast Pad f/Padmount Transformer
48	UB721-09 (11-16-22)	5’X 7’ Precast Pad w/Handhole f/Padmount Tfr or Padmount SF6 Switchgear
49	UB721-10 (12-28-11)	7’X 13’ Precast Pad f/Single Line Padmount Switchgear
50	UB721-11 (12-28-11)	10’X 10’-6” Precast Pad w/7’-10”X 8’-6” Opening F/Dual Line Padmount Tfr.

INDEX

ITEM #	SPEC NUMBER (DATE)	DESCRIPTION
51	UB721-12 (04-27-23)	Customers Metallic Fence Post Grounding In Proximity to DWP Padmount Tfr. Installation
52	UB721-14 (11-17-22)	7’X 11’ Precast Pad f/Padmount SF6 Switch Gear
53	UB721-15 (11-22-22)	10’-6”X 10’-6” Precast Pad w/8’-9”X 1’-6” Opening f/Padmount SF6 Switchgear
54	UB721-16 (04-27-23)	Metal Fence Post Grounding f/Metal Perimeter Fence Installation f/Padmount Transformer
55	UB721-17 (06-05-23)	Separately Derived Supp. Ground Plane F/Transf. Pad Mtd. Constr. in Lieu of Water Pipe Conn.
56	UB721-19 (08-04-22)	9’-0”X 12’-0” Precast Tfr. Pad w/4’-0”X 3’-6”Wall Opening f/Corr. Precast Cable Trench
57	UB721-20 (05-20-11)	Precast Cable Trench Box f/Corr. 9’X 12’ Precast Tfr. Pad w/Handhole
58	UB721-21 (05-11-11)	Wall Mounted Three Hour Rated Fire Barrier 4000AMP & 5000AMP Serive (Crouse-Hinds)
59	UB721-22 (05-09-11)	Wall Mounted Three Hour Rated Fire Barrier 4000AMP & 5000AMP Serive (Nelson Firestop)
60	UB721-24 (10-28-14)	Precast Cable Transition Box and Roof Slab Det. f/Cable Ent. Cab.
61	UB721-26 (02-12-15)	Exploded View of Precast 9’X12’ PM TFR Pad/Cable Trench/Transition Box & Fire Barrier
62	UB721-27 (09-16-21)	Wall Mounted Three Hour Rated Fire Barrier 3000AMP Service (Crouse-Hinds)
63	UB721-28 (09-16-21)	Wall Mounted Three Hour Rated Fire Barrier 3000AMP Service (Nelson)
64	UB721-29 (06-21-22)	Minimum Overall Spatial Clearances F/Precast Padmount Construction
65	UB721-30 (11-28-22)	7’X11’ Precast Pad for Padmount Solar Vista 201 SF6 Switchgear
66	UB721-31 (12-02-22)	10’-6”X 10’-6” Precast Pad w/8’-9”X1’-6” Opening f/Padmount Solar Vista SF6 Switchgear
67	UB721-32 (09-07-12)	Clearance f/Water Facilities in the Vicinity of Pad-Mounted Equipment and Vaults
68	UB721-33 (08-03-23)	4’-6”X 5’-0” Precast Pad w/Pull Box f/Padmount Transformer
69	UB721-36 (07-17-15)	8’X 8’ Precast Pad W/Pull Box for Temporary Service Installation Only
70	UB730-01 (01-21-09)	General Standard Details f/Conduit Construction
71	UB730-02 (02-17-15)	Minimum Clearances F/Precast Vault Location on Private Property
72	UB745-01 (11-16-92)	Pole Riser Encased 2” Conduit Bend
73	UB745-02 (02-14-94)	Pole Riser 2” Galvanized Bend
74	UB745-03 (07-23-21)	Pole Riser Encased, 3” and Above Conduit Bends
75	UB745-04 (11-04-93)	Pole Riser Encased, 3” and Above Galvanized Bends
76	UB745-06 (07-22-21)	Pole Riser W/Standoff Bracket Encased, 3” and Above Conduit Bends
77	UB745-07 (06-30-11)	Pole Riser w/Standoff Bracket Galvanized, 3” and Above Conduit Bends
78	UB980-09 (01-09-23)	Grounding Festoon Grounding for Metallic Rolling Gates
79		
80		
81		
82		
83		
84		
85		
86		
87		
88		
89		
90		
91		
92		
93		
94		
95		
96		
97		
98		
99		
100		

INDEX

CITY OF LOSANGELES
DEPARTMENT OF WATER AND POWER
POWER DISTRIBUTION DIVISION

Commercial Service Construction
Standard Drawings

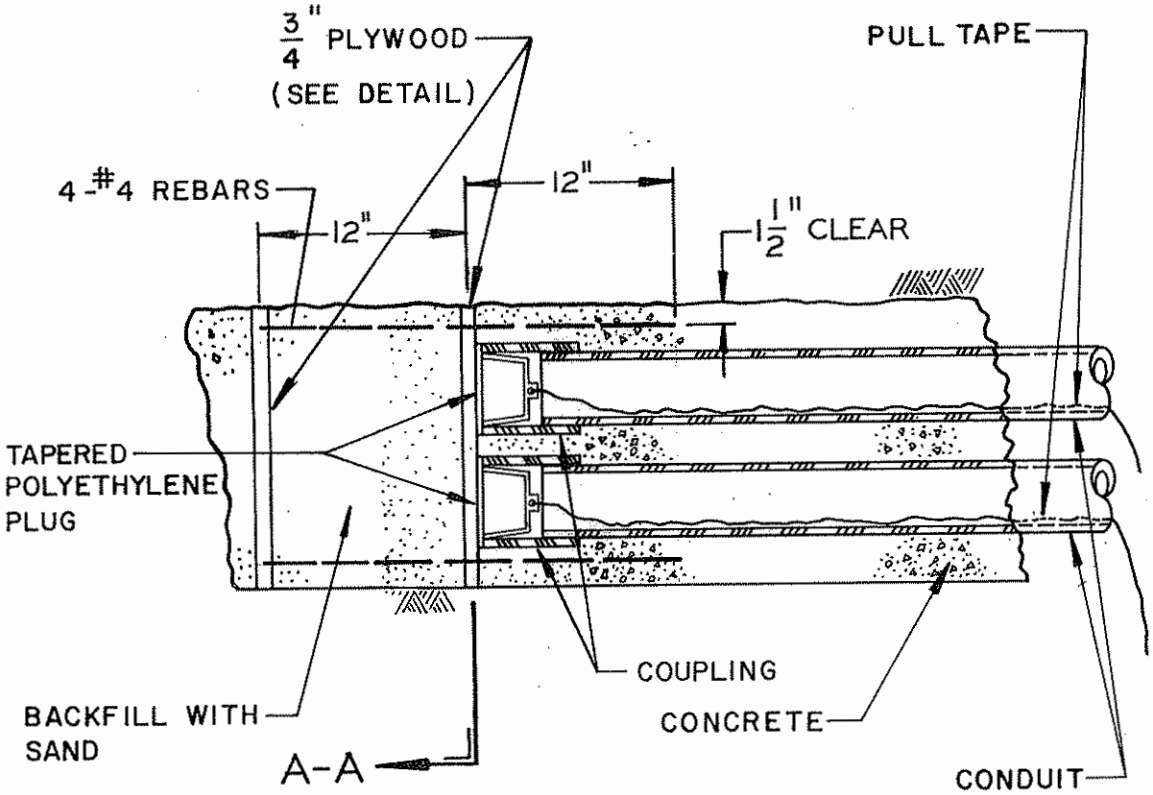
(REVISED 05/15/2024)

UNDERGROUND CONSTRUCTION STANDARDS — DEPARTMENT OF WATER & POWER — CITY OF LOS ANGELES

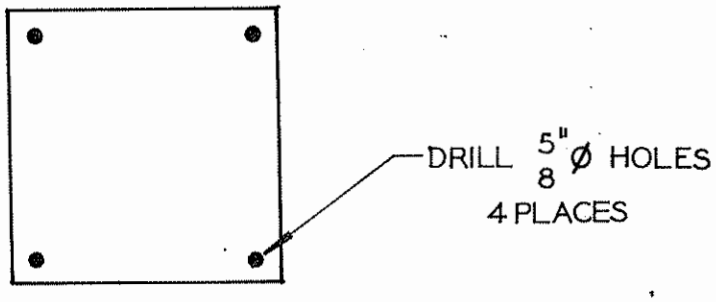
RECOMMENDED FOR APPROVAL
John O. McMahon CE #23960
UNDERGROUND DESIGN ENGINEER
S. Yamamoto
DISTRIBUTION ENGINEERING ENGR.

DESIGN ENGINEERS: D. TOM
DRAWN: A.E.G.
CHECKED:
APP'V'D.: S.P. S.P.

DATE	INT'L	REVISION
10-29-91	A.E.G.	RENAMED PULL COIL'D
6-29-92	A.E.G.	RELOCATE 3/4" PLYWOOD
12-10-92	A.E.G.	ADD NOTE



NOTE: DO NOT EXTEND PLYWOOD ABOVE CONCRETE ENCASEMENT



SECTION A-A

6-29-92

CONDUIT TERMINATION (DEAD END)
CUSTOMER REQUIRMENTS

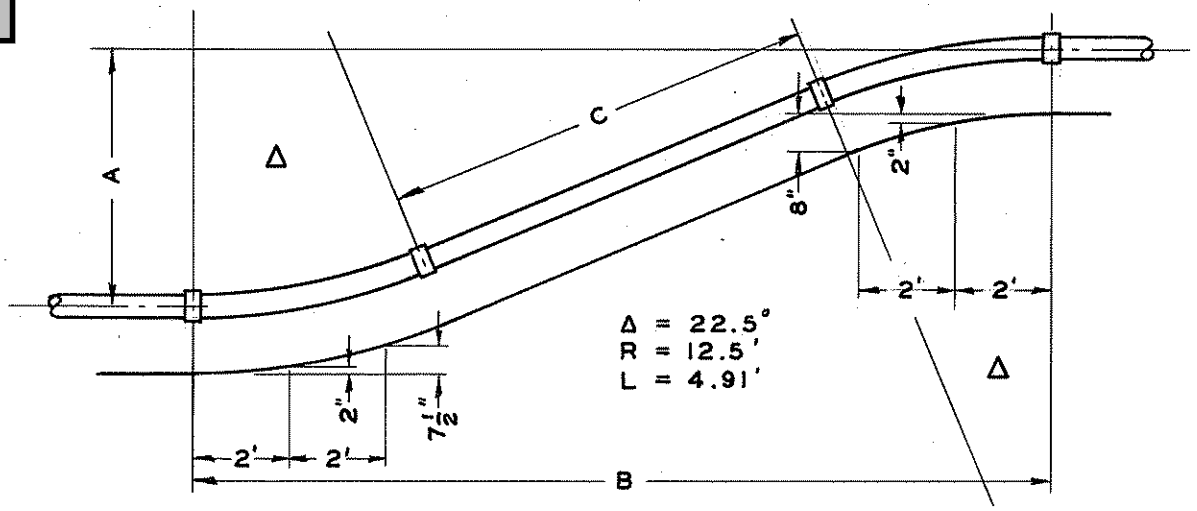


DIAGRAM OF CONDUIT OFFSET
SHOWING TRENCH CONTOUR AND DETAILS OF A TYPICAL DUCT

OFFSET	LENGTHS	
A	B	C
2.0'	9.8'	.3'
2.5'	11.0'	1.6'
3.0'	12.2'	2.9'
3.5'	13.4'	4.2'
4.0'	14.6'	5.5'
4.5'	15.8'	6.8'
5.0'	17.0'	8.1'
5.5'	18.2'	9.4'
6.0'	19.4'	10.7'
6.5'	20.6'	12.0'
7.0'	21.9'	13.3'
7.5'	23.1'	14.6'
8.0'	24.3'	15.9'
8.5'	25.5'	17.3'

OFFSET	LENGTHS	
A	B	C
9.0'	26.7'	18.6'
9.5'	27.9'	19.9'
10.0'	29.1'	21.2'
10.5'	30.3'	22.5'
11.0'	31.5'	23.8'
11.5'	32.7'	25.1'
12.0'	33.9'	26.4'
12.5'	35.1'	27.7'
13.0'	36.3'	29.0'
13.5'	37.5'	30.3'
14.0'	38.8'	31.6'
14.5'	40.0'	32.9'
15.0'	41.2'	34.2'
15.5'	42.4'	35.5'

CONDUIT OFFSETS - LOW VOLTAGE LINES
(USING 12.5' RADIUS CURVED PLASTIC)

BOTH VERTICAL AND HORIZONTAL OFFSETS ARE OCCASIONALLY REQUIRED IN LINE OR SERVICE CONDUITS TO PASS OBSTRUCTIONS, OR TO ENTER VAULTS OR MANHOLES BELOW THE NORMAL CONDUIT DEPTH AS IN THE CASE OF SIDE DUCTS TO AN INTERSECTION MANHOLE. AN OFFSET OF LESS THAN 2' SHALL BE MADE BY BENDING STRAIGHT CONDUIT WITH A MINIMUM RADIUS OF 65' FOR 5" AND 6" CONDUIT, 55' FOR 4" CONDUIT, AND 20' FOR 3" CONDUIT. LARGER OFFSETS SHALL BE MADE WITH A CURVED CONDUIT AT EACH END OF THE NECESSARY LENGTH OF STRAIGHT DUCT AS SHOWN IN THE ACCOMPANYING DIAGRAM AND TABLE.

THE REQUIRED TRENCH CONTOUR IS DEFINED BY OFFSET DIMENSIONS AT 2' INTERVALS FROM EACH END OF THE SECTION. FOR HORIZONTAL OFFSETS THESE CONTOUR DATA ARE NOT ESSENTIAL BUT MAY BE USED TO LAY OUT ONE EDGE OF TRENCH. THE TABLE SHOWS THE TOTAL LENGTH OF THE SECTION AND THE LENGTH OF STRAIGHT CONDUIT REQUIRED IN EACH DUCT FOR VARIOUS OFFSETS. FOR OFFSETS GREATER THAN 15.5', DIMENSIONS B AND C INCREASE BY 2.414' AND 2.613' RESPECTIVELY FOR EACH FOOT OF ADDITIONAL OFFSET.

INDEX

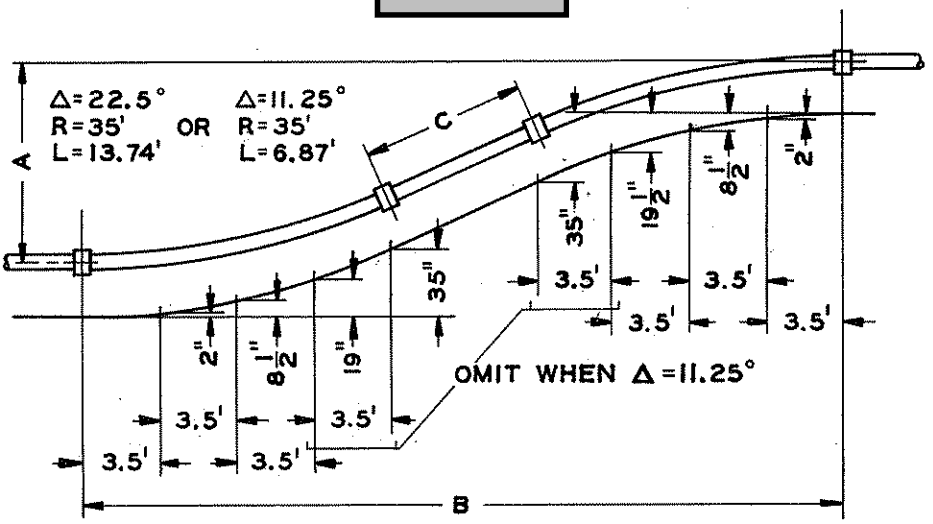


DIAGRAM OF CONDUIT OFFSET
SHOWING TRENCH CONTOUR AND DETAILS OF A TYPICAL DUCT

OFFSET A	BEND Δ	LENGTHS B	C
1.5'	11.25°	14.5'	0.8'
2.0'	"	17.0'	3.4'
2.5'	"	19.5'	6.0'
3.0'	"	22.0'	8.5'
3.5'	"	24.5'	11.1'
4.0'	"	27.0'	13.6'
4.5'	"	29.5'	16.2'
5.0'	11.25°	32.1'	18.8'
5.5'	22.5°	27.2'	0.4'
6.0'	"	28.4'	1.8'
6.5'	"	29.8'	3.1'
7.0'	"	30.8'	4.4'
7.5'	"	32.0'	5.7'
8.0'	"	33.2'	7.0'
8.5'	22.5°	34.4'	8.3'

OFFSET A	BEND Δ	LENGTHS B	C
9.0'	22.5°	35.6'	9.6'
9.5'	"	36.8'	10.9'
10.0'	"	38.0'	12.2'
10.5'	"	39.3'	13.5'
11.0'	"	40.5'	14.8'
11.5'	"	41.7'	16.2'
12.0'	"	42.9'	17.5'
12.5'	"	44.1'	18.8'
13.0'	"	45.3'	20.1'
13.5'	"	46.5'	21.4'
14.0'	"	47.7'	22.7'
14.5'	"	48.9'	24.0'
15.0'	"	50.1'	25.3'
15.5'	"	51.3'	26.6'
16.0'	22.5°	52.5'	27.9'

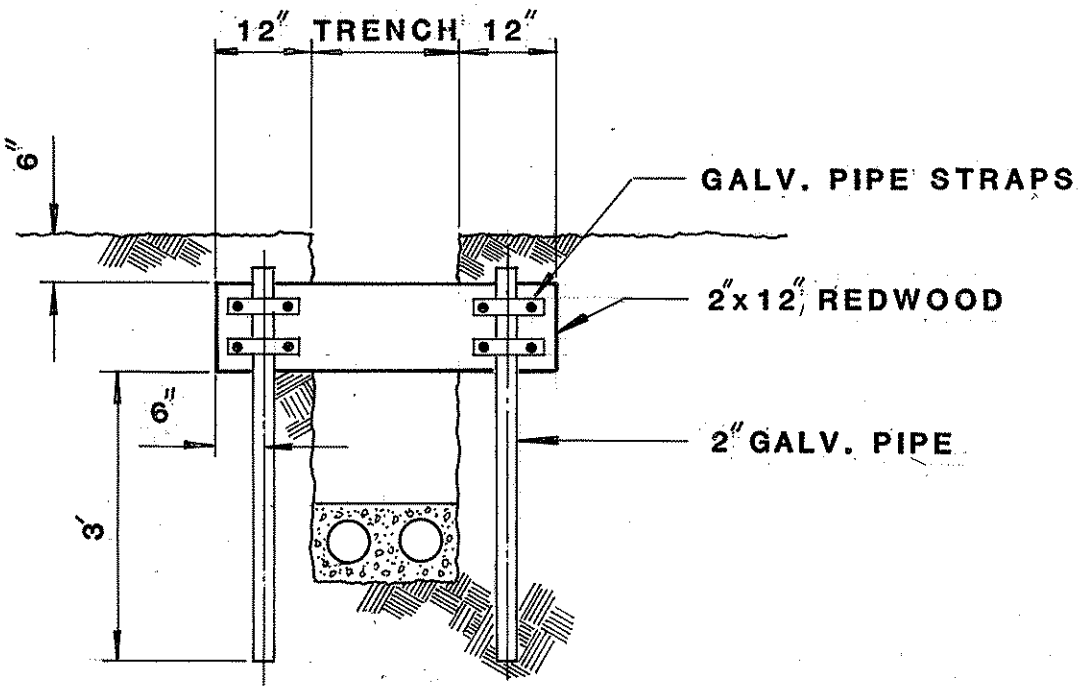
CONDUIT OFFSETS – HIGH VOLTAGE LINES
(USING 35' RADIUS CURVED PLASTIC)

AN OFFSET, A, OF LESS THAN 1.5' SHALL BE MADE BY BENDING STRAIGHT CONDUIT WITH A MINIMUM RADIUS OF 65' FOR 5" AND 6" CONDUIT, 55' FOR 4" CONDUIT, AND 20' FOR 3" CONDUIT.

TRENCH CONTOUR DIMENSIONS FOR VERTICAL OFFSETS ARE GIVEN FROM EACH END OF THE SECTION.

FOR OFFSETS OF LESS THAN 5.5' USE HALVED BEND SEGMENTS OF 11.25° IN THE SECTION.

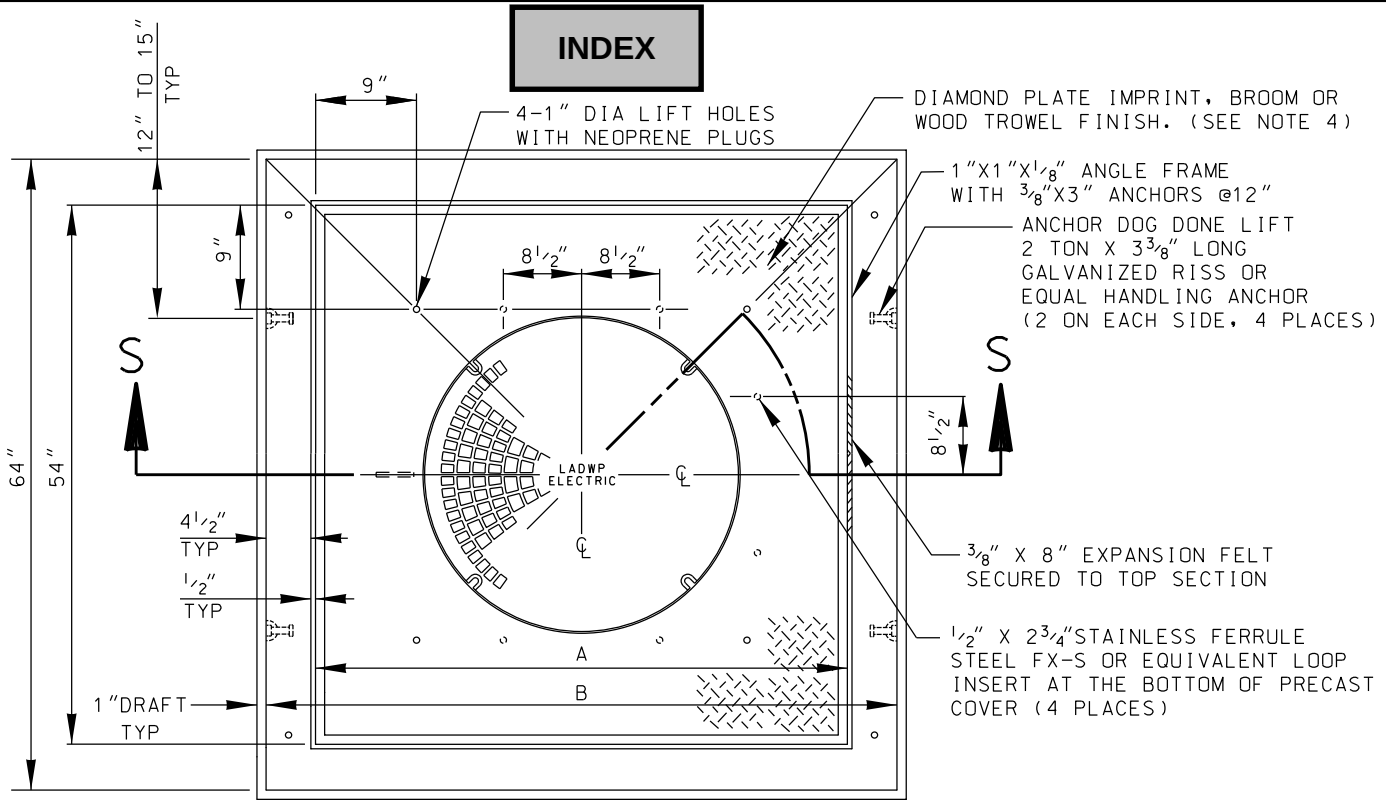
FOR OFFSETS GREATER THAN 16.0'. DIMENSIONS B AND C INCREASE 2.41' AND 2.62', RESPECTIVELY, FOR EACH ADDITIONAL FOOT OF OFFSET.



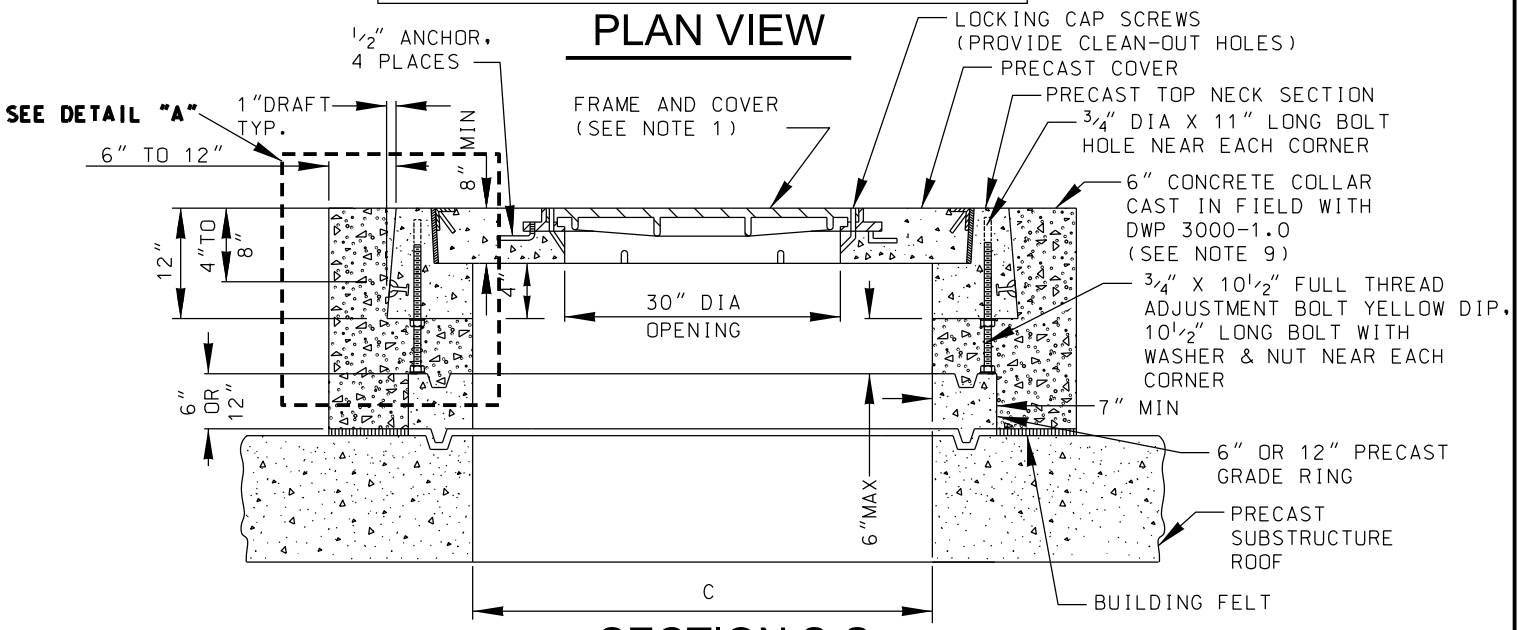
BAFFLES REQUIRED WHEN TRENCH EXCAVATED IN STEEP HILLSIDE.

BAFFLES SHALL BE INSTALLED AT 5 CENTERS

INDEX



PLAN VIEW



SECTION S-S

GROUP	HEAD SIZE	COVER SIZE	A	B	C	
~~1A~~	~~48"X48"~~	~~54"X54"~~	~~54"~~	~~64"~~	~~48"~~	*
1B	48"X48"	54"X54"	54"	64"	48"	
~~2A~~	~~48"X60"~~	~~54"X66"~~	~~66"~~	~~76"~~	~~60"~~	*
2B	48"X60"	54"X66"	66"	76"	60"	

* GROUP NO LONGER USED FOR NEW CONSTRUCTION

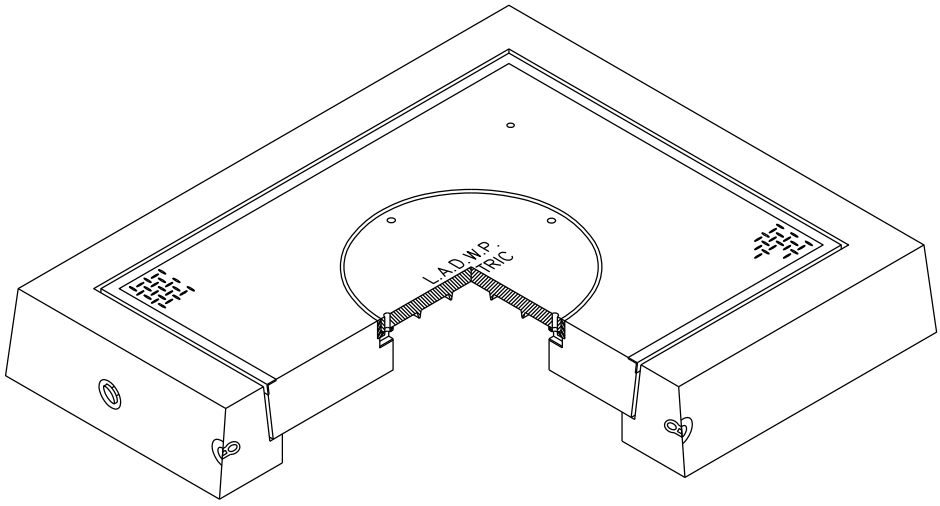
NOTES:

1. FRAME AND COVER PER UGCS 2-418 OR 2-419. REFER TO SUBSTRUCTURE STANDARD DRAWING.
2. PRECAST VAULT/MAINTENANCE HOLE NECK & COVER SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DWP STANDARD SPECIFICATIONS NO. P178, AS LAST REVISED.
3. FOR WEIGHT AND INSTALLATION INSTRUCTIONS, SEE PAGE 1-802.1
4. PRECAST VAULT/MAINTENANCE HOLE COVER SLIP AND SKID RESISTANCE SHALL BE IN ACCORDANCE WITH DWP STANDARD SPECIFICATIONS NO. P178, SECTION 4C, AS LAST REVISED.

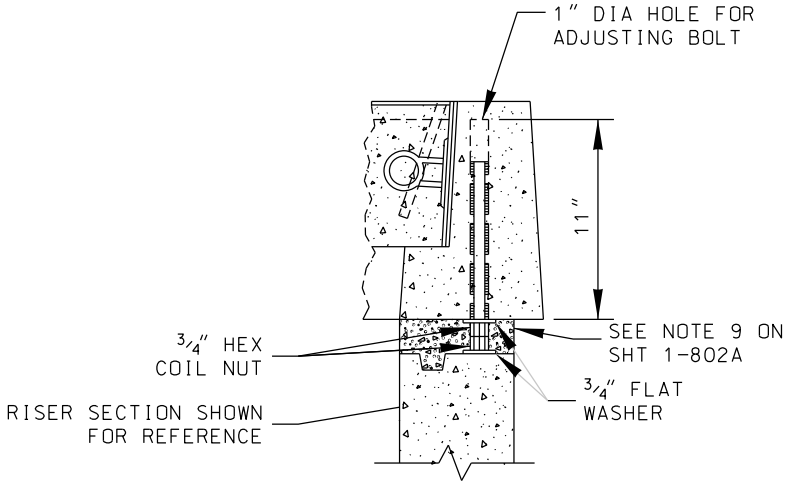
PRECAST VAULT/MAINTENANCE HOLE NECK & COVER

1-802

DR 05-03-21



ISO VIEW



DETAIL A

IF NEEDED, ADJUST
TO FINISH GRADE

PRECAST VAULT/MAINTENANCE HOLE NECK & COVER

1-802.1a

DR 05-03-21

PRECAST NECK

Necking

5. Use additional 6” or 12” grade rings where necessary to bring cover to street grade.

6. All grade ring joints shall be sealed with an approved mastic and shall be grouted for bearing.

7. All excess mastic shall be removed and shall be flush to inside surface of grade rings.

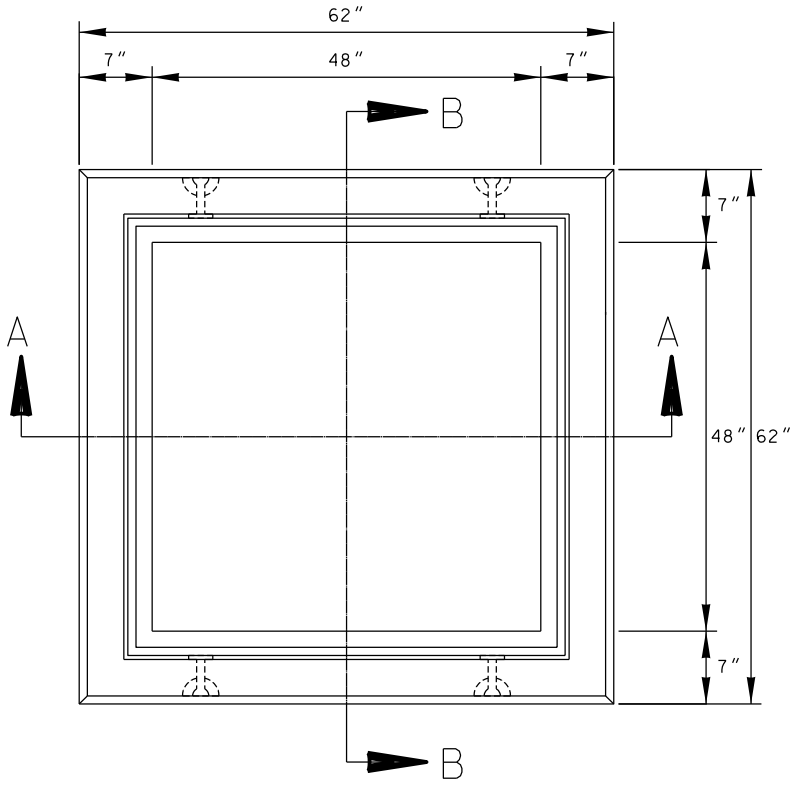
Cover

8. Adjust bolts to align cover with street surface. Department mix design number DWP 3000-1.0 concrete shall be used to fill in the gap between the precast grade ring and top section. Dry pack grout shall be used in lieu of DWP 3000-1.0 concrete to fill in gaps less than 1-1/2”. Grouting of all gaps shall terminate flush to the inside surface of precast grade ring(s). Trowel inside joint gaps to a smooth finish surface.

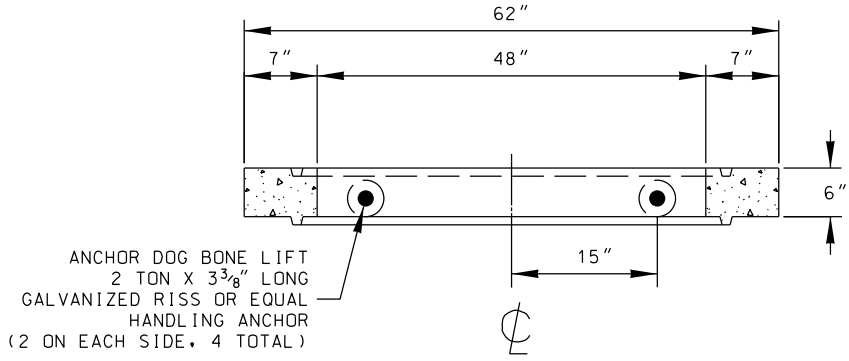
9. A minimum of 6” up to a maximum of 12” continuous wide concrete collar with DWP 3000-1.0 concrete shall be poured around the precast grade ring and top neck section to lock the precast concrete pieces together as shown on drawing. DO NOT encase below one precast grade ring. Vibrator shall be used in placing concrete collar around cover.

ITEM	WEIGHT(LBS) +/-5%
4’X4’ Cover & Top Neck Section, Including Cast Iron Frame and Cover	3600
4’X5’ Cover & Top Neck Section, Including Cast Iron Frame and Cover	4200
4’X4’ – 12” Neck Extension	1600
4’X4’ – 6” Neck Extension	800
4’X5’ – 12” Neck Extension	2400
4’X5’ – 6” Neck Extension	1200

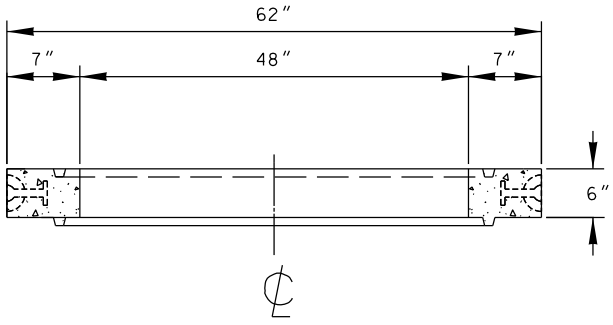
NOTE: WEIGHT MAY VARY WITH MANUFACTURER



PLAN VIEW



SECTION A-A

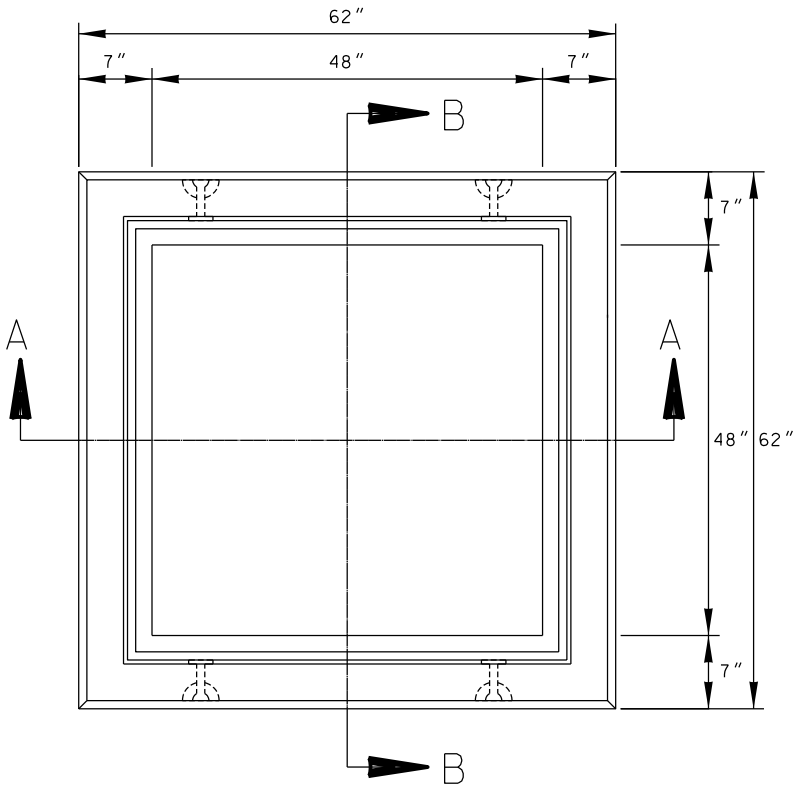


SECTION B-B

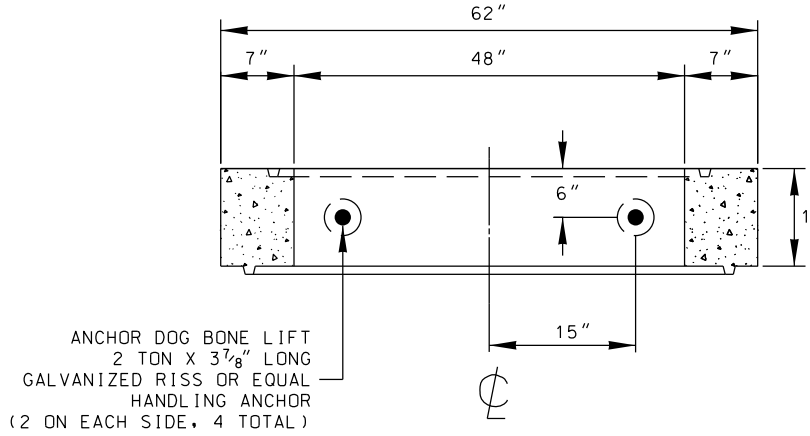
6" GRADE RING EXTENSION

1-802.1c

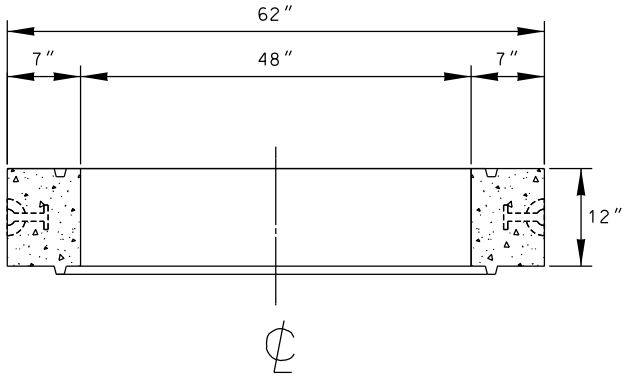
DR 05-03-21



PLAN VIEW



SECTION A-A

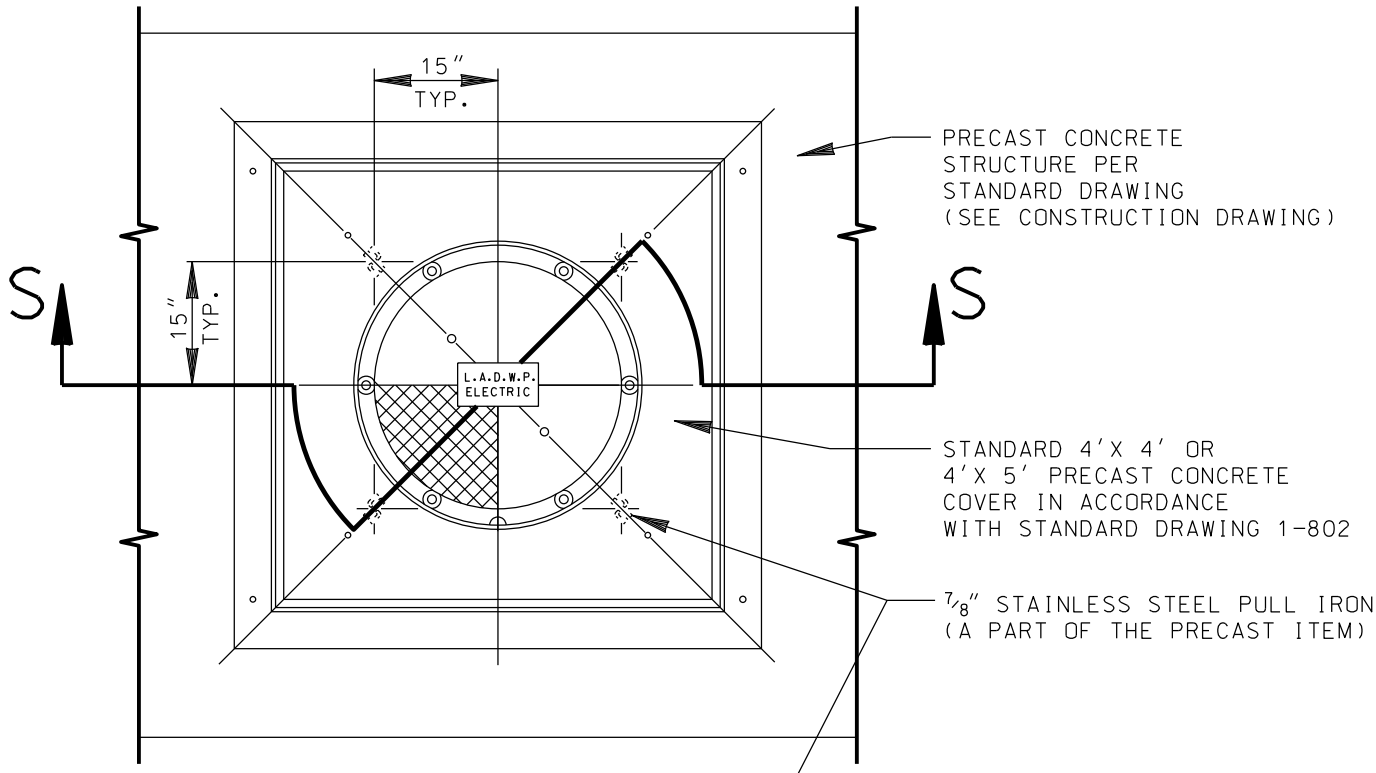


SECTION B-B

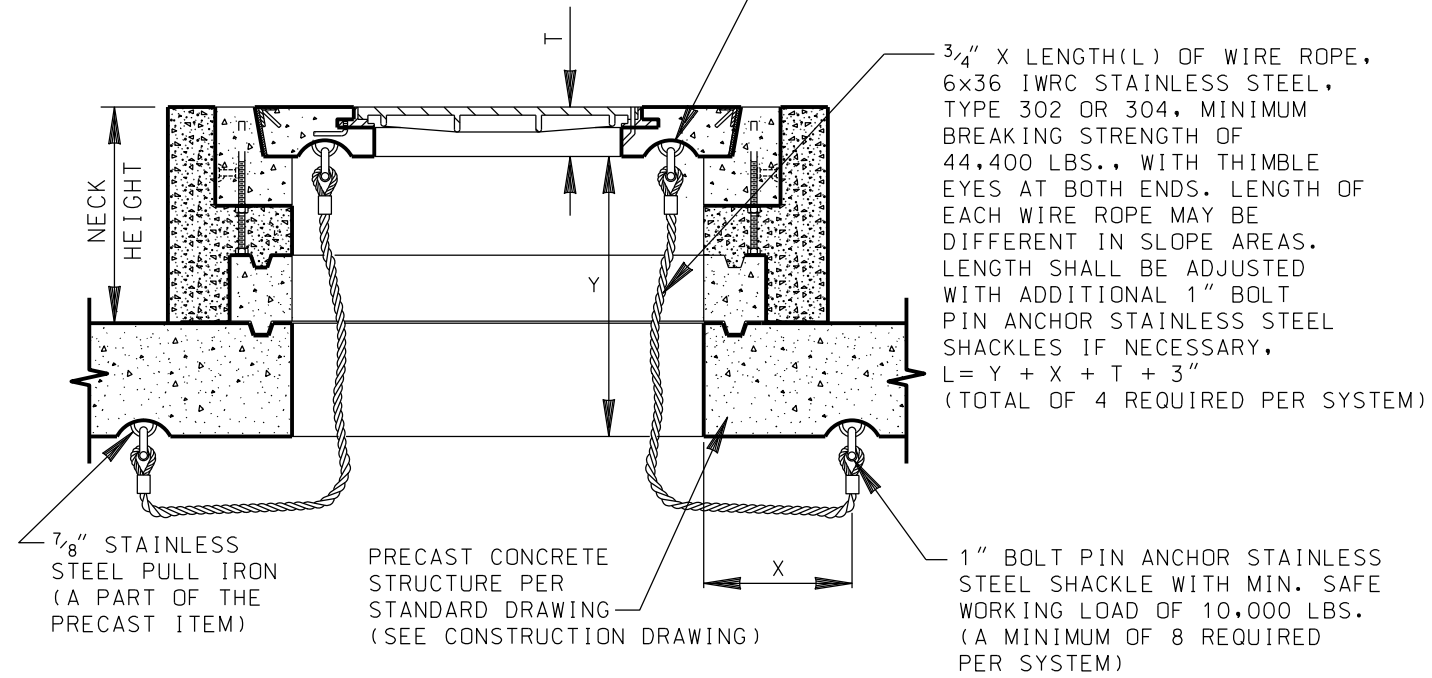
12" GRADE RING EXTENSION

1-802.1d

DR 05-03-21



PLAN VIEW



SECTION S-S

Note:

This standard shall be implemented in all underground vaults and maintenance holes to be installed in areas which have been identified by the Los Angeles Department of Building and Safety (LADBS) or the developer as "Methane Zones" and "Methane Buffer Zones", unless otherwise approved by the Department Standards Engineer.

MAINTENANCE HOLE/VAULT COVER WITH RESTRAINING SYSTEM

1-802.2

DR 05-03-21

INDEX

UNDERGROUND CONSTRUCTION STANDARDS — DEPARTMENT OF WATER & POWER — CITY OF LOS ANGELES

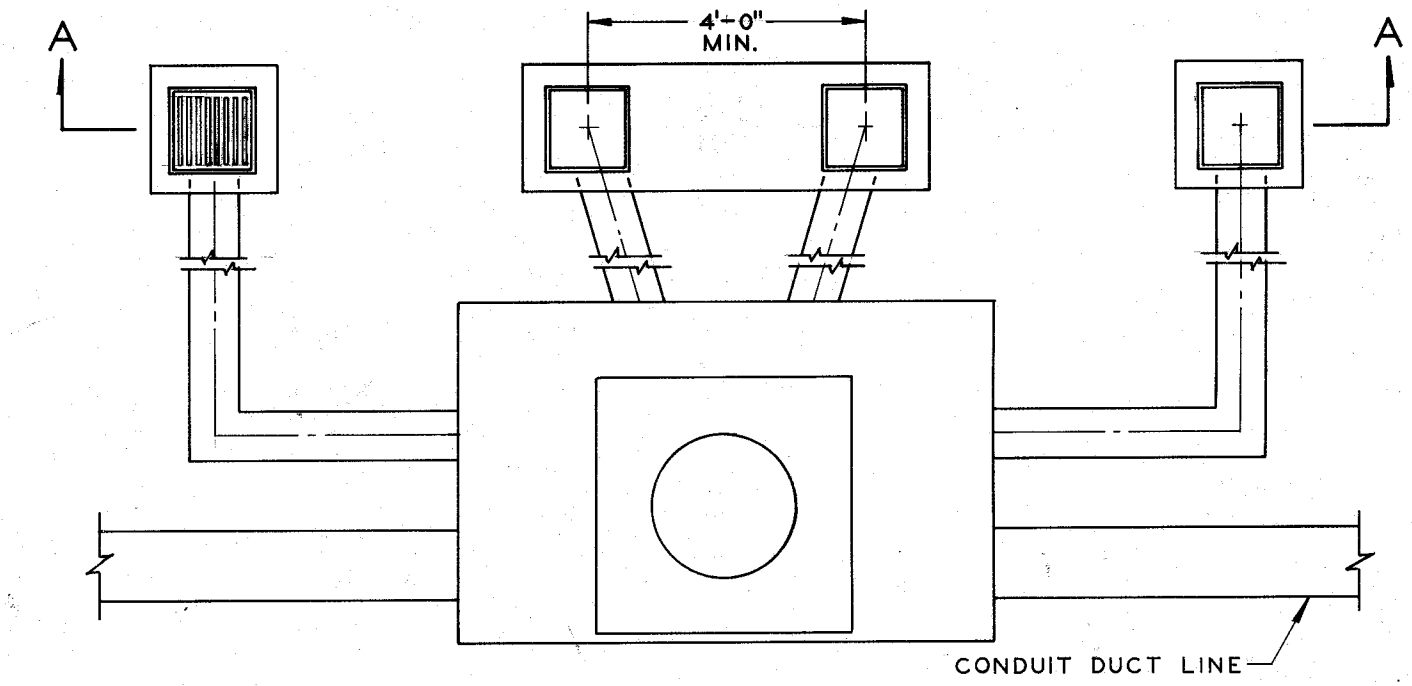
RECOMMENDED FOR APPROVAL
UNDERGROUND DESIGN ENGINEER
DISTRIBUTION & TRANSMISSION ENGR.

CHECKED 5-16-75
DESIGN ENGINEERS

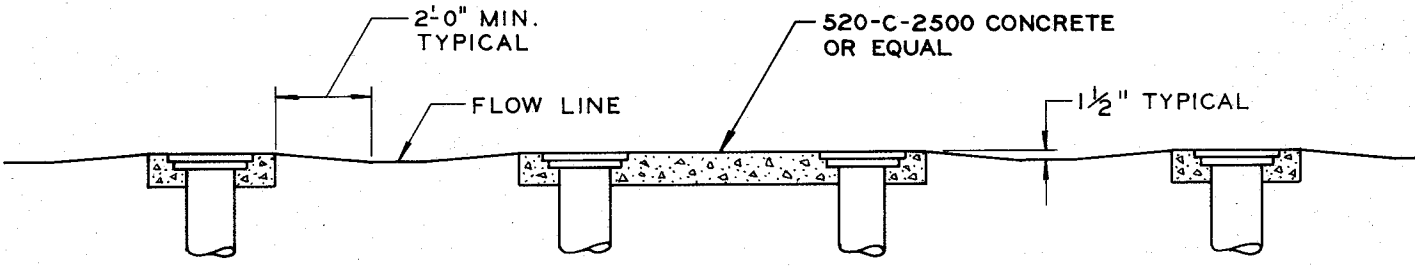
DRAWN A·R·A

APP'D.

DATE	INT'L.	REVISION
6-5-80	DHA	ADDED CONCRETE NOTE



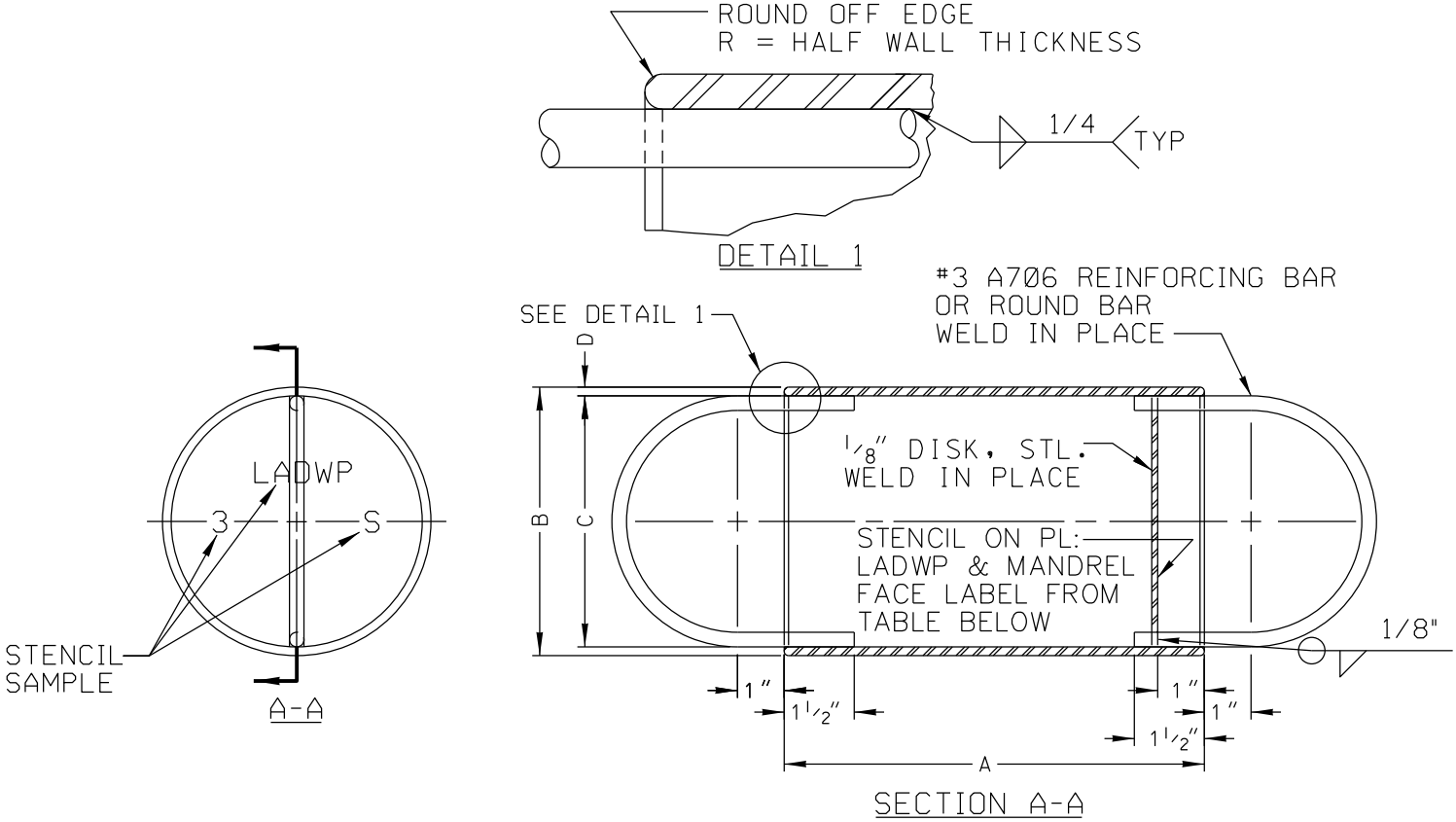
PLAN VIEW



SECTION A-A

NOTES:

1. KEEP VENT HEADS OUT OF FLOW LINES, DEPRESSIONS, AND TRAVELED AREAS IN PUBLIC STREETS.
2. TRAFFIC VENTS SHOULD NOT BE CALLED FOR IN ALLEYS OR PRIVATE DRIVEWAYS USED FOR THE INGRESS OR EGRESS TRAFFIC FOR CONDOMINIUMS, APARTMENTS, ETC., EXCEPT UNDER UNUSUAL CIRCUMSTANCES. DESIGNS CALLING FOR TRAFFIC VENTS IN ALLEYS OR DRIVEWAYS MUST BE APPROVED BY THE ENGINEER OF SUBSTRUCTURE DESIGN.
3. TRAFFIC VENTS SHOULD BE USED ONLY WHEN THE CONVENTIONAL VENT HEAD ASSEMBLY WOULD HAVE TO BE EXTENDED MORE THAN 30'-0" TO LOCATE VENT HEAD IN NON-TRAFFIC LOCATION. (SEE UGCS 1-821 & 1-821.1)



GROUP	DUCT		MANDREL					
	SIZE	RADIUS BEND	MATERIAL	DIMENSION †				LABEL ON MANDREL FACE
				A	B	C	D	
1	2"	2'	*	3"	1 3/4"	1 3/8"	3/16"	2S
2	3"	2'	*	4 1/2"	2 5/8"	2 1/4"	3/16"	3S
4	4"	3'	* FOR 3"G.C.	5 1/2"	3 1/2"	3"	1/4"	4S
5	5"	4'	* FOR 4"G.C.	6 1/2"	4 1/2"	4"	1/4"	5S
6	6"	5'	*	7"	5 1/2"	5 1/8"	3/16"	6S
7	8"	5'	* FOR SCH 40	7"	7 3/8"	7"	3/16"	8S
8	2"	10'	*	5"	1 3/4"	1 3/8"	3/16"	2L
9	3"	10'	*	6"	2 3/4"	2 3/8"	3/16"	3L
11	4"	10'	*	8"	3 3/4"	3 3/8"	3/16"	4L
12	5"	12.5'	*	8 1/2"	4 3/4"	4 3/8"	3/16"	5L
13	6"	12.5'	*	9"	5 3/4"	5 3/8"	3/16"	6L
14	8"	12.5'	* FOR SCH 40	9"	7 5/8"	7 1/4"	3/16"	8L

* SEAMLESS STEEL TUBING OR EQUIVALENT

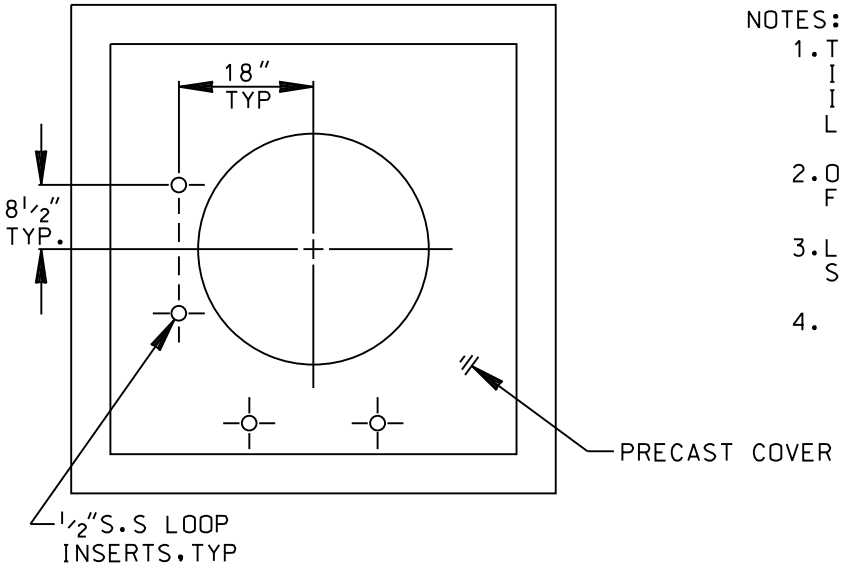
† TOLERANCE = ± 1/32"

REVISED 8/25/22

8-23-79

DUCT MANDRELS

2-210

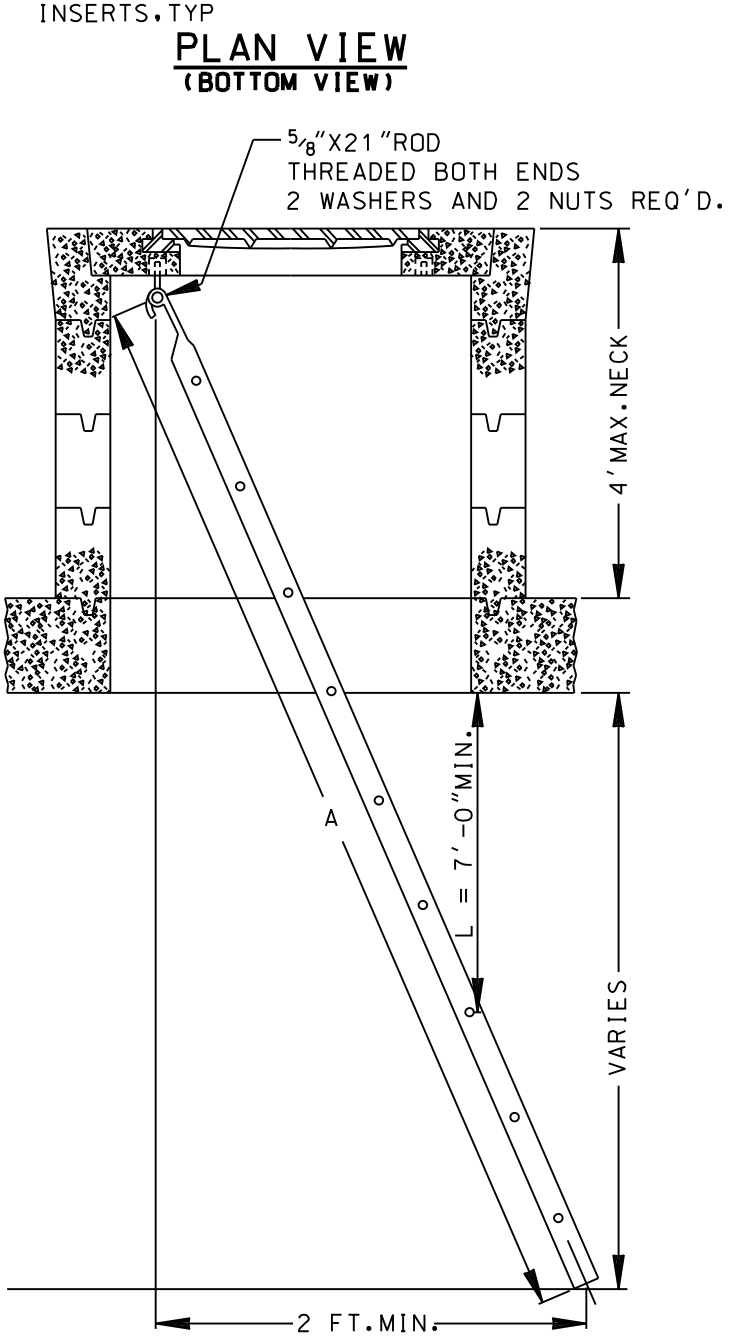


PLAN VIEW
(BOTTOM VIEW)

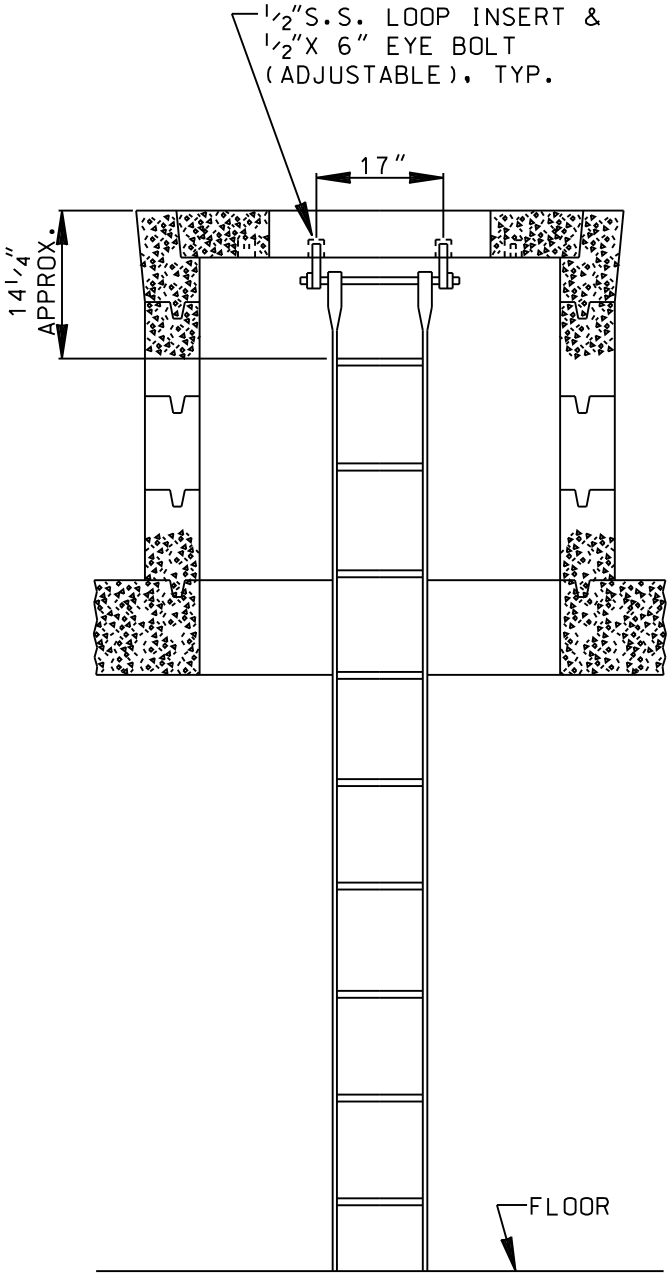
NOTES:

1. THIS DRAWING SHOWS THE STANDARD LADDER INSTALLATION WITH A 4 FOOT MAXIMUM NECK. IF THIS NECK DIMENSION EXCEEDS 4 FEET THEN LADDER SHOULD BE INSTALLED PER UGCS 2-361.2
2. OFFSET BASE OF LADDER 2 FEET MINIMUM FROM VERTICAL.
3. LADDER AND HANGING HARDWARE TO BE MILD STEEL, GALVANIZED AFTER FABRICATION.
4. SEE UGCS 2-362 FOR LADDER DETAILS.

INDEX



SIDE VIEW



FRONT VIEW

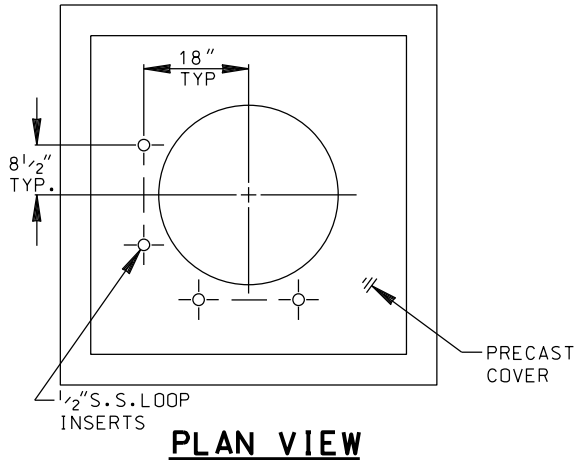
LADDER INSTALLATION FOR VAULTS/MANHOLES

NO SCALE

07/06/92
REVISED 12/07/12

2-361

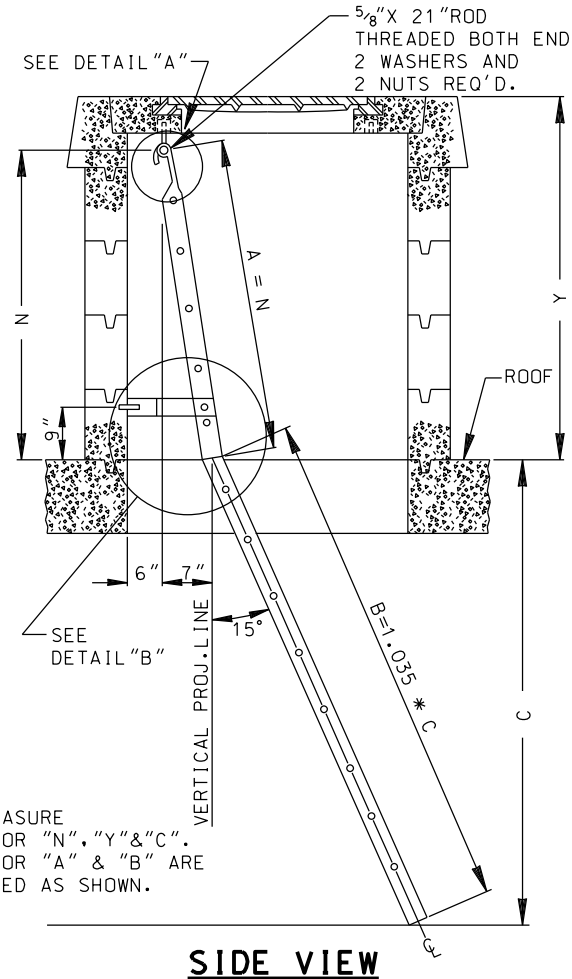
INDEX



PLAN VIEW
(BOTTOM VIEW)

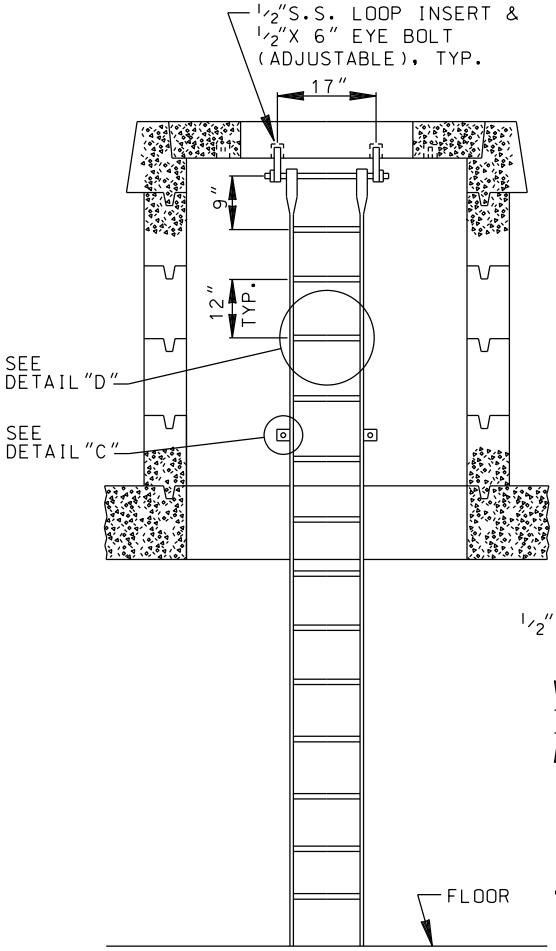
NOTES:

1. THIS LADDER INSTALLATION SHOULD BE USED WHEN DIMENSION "Y" EXCEEDS 48 INCHES (4 FT.). "Y" DIMENSION SHALL NOT BE GREATER THAN 72 INCHES (6 FT).
2. OFFSET BASE OF LADDER SHOULD BE AS CALCULATED, 24 INCHES (2 FT.) MINIMUM FROM VERTICAL.
3. LADDER AND HANGING HARDWARE TO BE MILD STEEL, GALVANIZED AFTER FABRICATION.

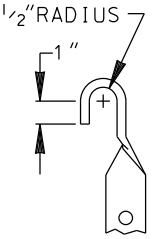


NOTE:
FIELD MEASURE VALUES FOR "N","Y"&"C". VALUES FOR "A" & "B" ARE CALCULATED AS SHOWN.

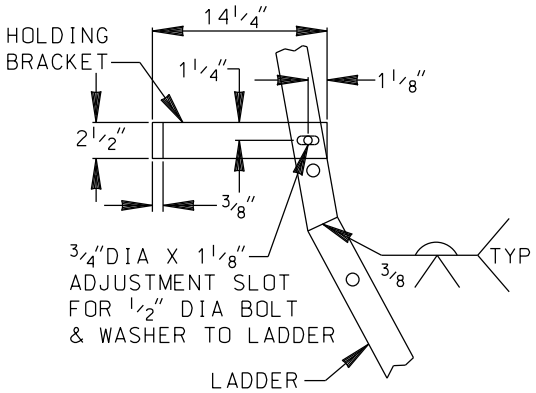
SIDE VIEW



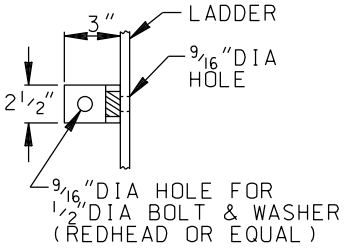
FRONT VIEW



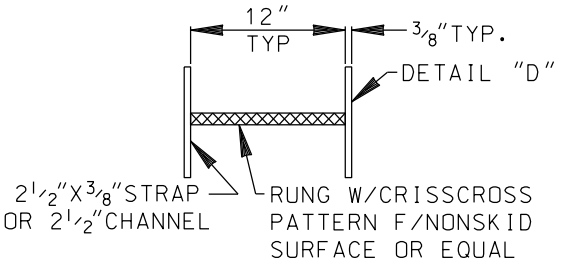
DETAIL A



DETAIL "B"



DETAIL "C"



DETAIL "D"

LADDER INSTALLATION FOR VAULTS/MANHOLES (NECK GREATER THAN 4 FEET)

NO SCALE

2-361.2
REV.0 (11/30/12)

Los Angeles Department of Water and Power

Underground Power Distribution Construction Standards

CONCRETE MIXTURES

UG

The following specification are for use in the underground conduit and maintenance hole system.

READY MIX CONCRETE

Application	**Department's Mix Designation**	**Minimum Compressive Strength** (PSI@ 28 Days)	**Maximum Size of Aggregate** (Inches)	**Maximum Slump** (Inches)	**Cement** (Minimum Pounds Per Cubic Yard)	**Combined Aggregate Grading** (SSPWC 201-1.3.2(A))
Pour-in-Place Structure Mix, Concrete Collar Around Structure and Fill Gap between Neck Rings > 1-1/2"	DWP 3000-1.0	3000	1	5	583	C
Conduit Encasement, Conduit Anchors and Barrier Posts	330-C-1700 or	1700	1	6	330	C
	420-D-1700	1700	3/8	6	420	D

CONCRETE MIXTURES AT JOB SITE

(For Small Repairs)

Application	**Minimum Compressive Strength** (PSI@ 28 Days)	**Proportion By Loose Dry Volume**				**Maximum Slump** (Inches)
		Portland Cement Type II (SSSPWC 201-1.2.1)	**Concrete Sand** (SSSPWC 200-1.5.5(A))	**Concrete Aggregate** (SSPWC 200-1.4(B))		
				No. 3	**No.4**	
Pour-in-Place Structure Mix, Concrete Collar Around Structure and Fill Gap between Neck Rings > 1-1/2"	3000	1	2-1/2	3-1/2		6
Conduit Encasement, Conduit Anchors and Barrier Posts	1700	1	3		5	8

The ingredients shall be accurately measured and shall be mixed with a minimum amount of water to produce a concrete having satisfactory workability. Each batch shall be mixed in a machine mixer for not less than 2 minutes after all ingredients are in the mixer.

Where small amounts of concrete are mixed without machine mixer, the ingredients must be thoroughly mixed dry. Then add a minimum amount of water and mix until thoroughly mixed to the workable consistency. This should only be done for small repair jobs or filling in recesses.

Formerly: 2-125

Issued Date: 01/05/87
Revised Date: 01/30/13

Approved by

C.E. LIC. 47565

J. M. A. S. P.

C702-50

C721-00

1. Purpose of General Requirements

These requirements apply to all padmounts, except as noted on the drawings, and not to Customer Station Design Group jobs. Installations that do not comply with these requirements may be presented to Power Distribution Standards engineering for review and consideration.

2. Pad Installation Requirements

The Department will provide a drawing giving the pad installation details.

3. Pad Layout

A. Pad Locations:

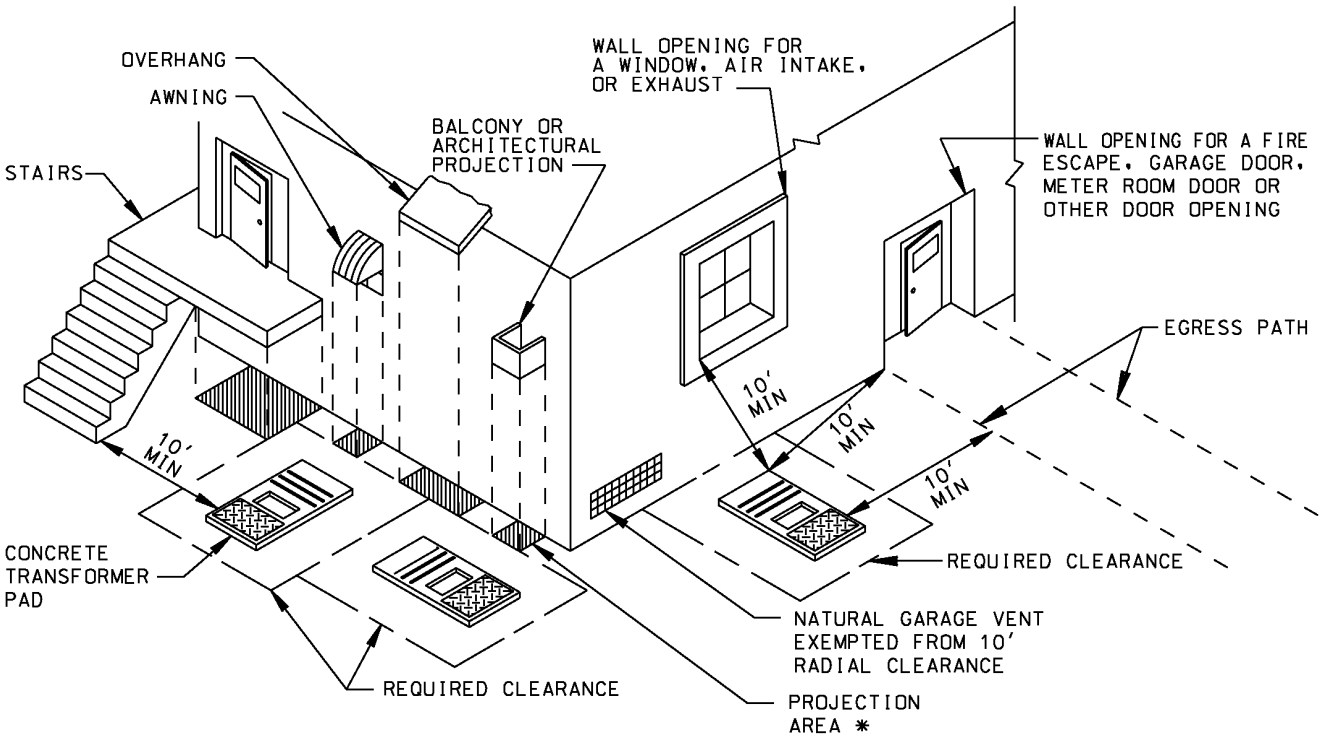
All pad shall be installed in an unobstructed and leveled location in accordance with the requirements as noted below. There shall be no building projection underneath the pad or the required clearance area, such as a subterranean parking structure, basements, or building footings. Additionally, there shall be no foreign pipes, structures, retaining wall, or fence footings in the required clearance area, above, or below grade.

B. Required Clearances:

1. Pads shall have a 3ft minimum workspace clearance as shown in Figure 1, except as otherwise noted. All clearances must be on the property served.
2. The footprint of architectural projections, such as awnings, overhangs and/or balconies shall be considered part of the buildings floor area. Pads, and the required clearance, shall be placed outside of these footprints. For minimum vertical clearance refer to Table 1 on page P721-0.5. Projections that are located above the minimum vertical clearance in Table 1 are exempt from these requirements.
3. Plantings, such as trees, plants, and shrubs, shall be outside of the required 3ft clearance on all sides of the pad and allow for access to the transformer or switch for maintenance. Trees shall be placed so their growth does not inhibit replacement of the transformer or switch during their lifetime. Light posts, meter pedestals, EV charging stations, parking signs and other above ground facilities shall not be in the required 3ft workspace, nor inhibit placement or maintenance of the transformer or switch.

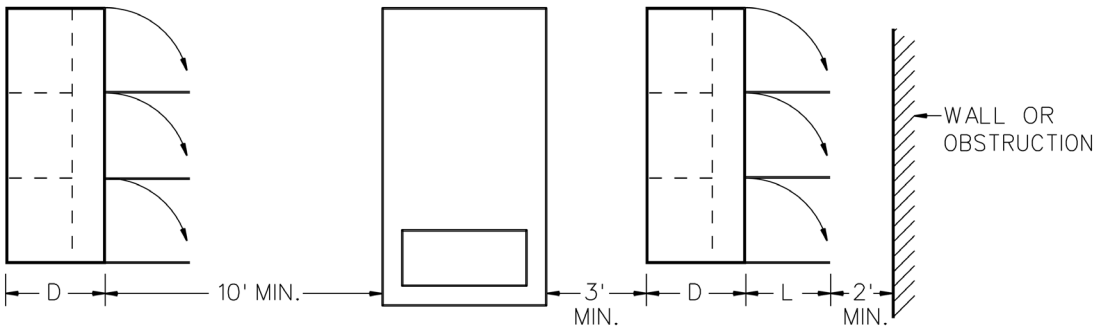
C. Minimum Clearance to Openings (Figure 1):

1. Pads shall be placed at least 10ft radially from all doors (including garage access, meter room door), windows (fixed or operable), fire escapes and egress paths. The intent is to provide a safe path of travel around and away from the transformer or switchgear. This measurement shall be taken from the closest perimeter of the opening to the closest edge of the pad at ground level. (Note: Recessing the window or door beyond the surface of the building does not mitigate the opening).
2. Forced air intakes and/or exhaust vents (such as, but not limited to garage ventilation) must also meet the 10ft clearance rule as stated above.
3. Exception: garage openings (excluding doors) with natural ventilation vents are not subject to the 10ft radial clearance.



* Projection to ground is considered as floor area. Use as reference for required clearance area.

FIGURE 1



Top view of switchgear, where "D" is depth of switchgear and "L" is length of exterior door.

FIGURE 2

D. Minimum Clearance to Switchgear (Figure 2):

Switchgear doors that may impede safe egress will require at least 2ft of space beyond the door swing as indicated. Consult with department design engineer or Electric Service Representative (ESR) for clarification.

E. Visibility Obstructions at Uncontrolled Intersections (Figure 3):

At uncontrolled intersections transformer pads shall be placed outside of the visibility triangles to ensure the safe operation of motor vehicles.

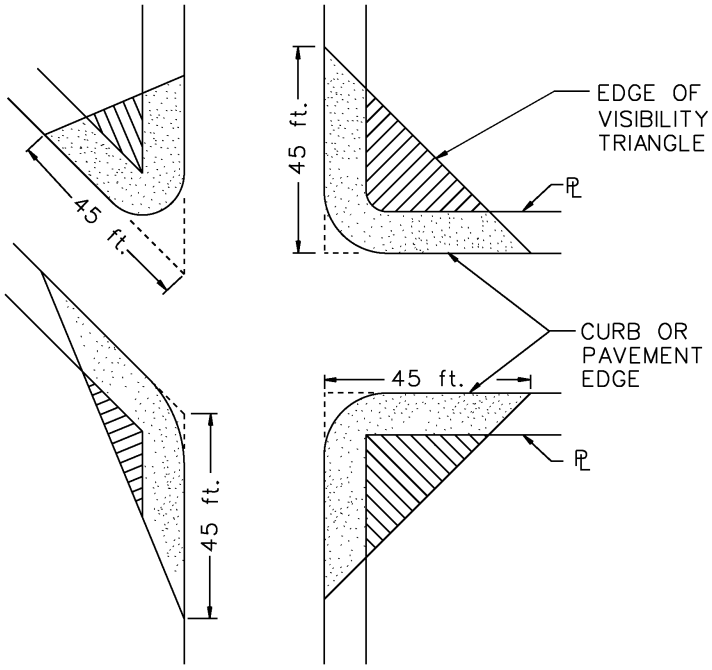
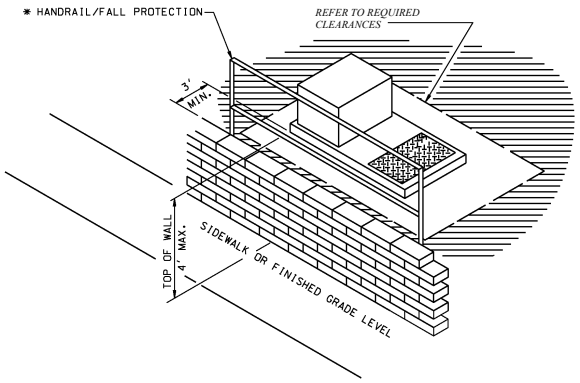


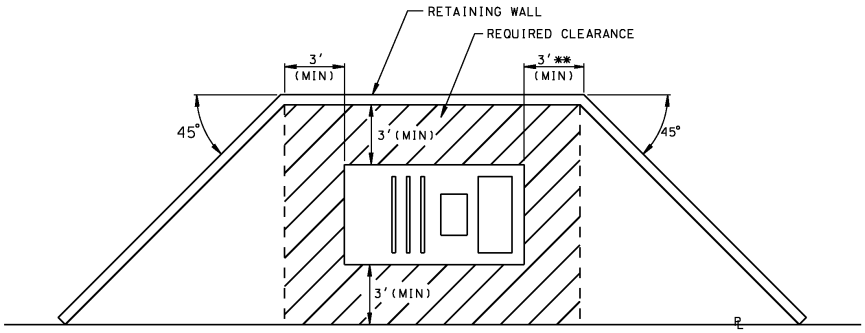
FIGURE 3

F. Padmounts Placed at or above Street Level in Proximity to Retaining Walls, Fences, and Buildings (Figures 4,5,6):



* Handrail shall be in compliance with the City of Los Angeles Handrail Standard S-463 latest revision and shall extend to the limits of the workspace.

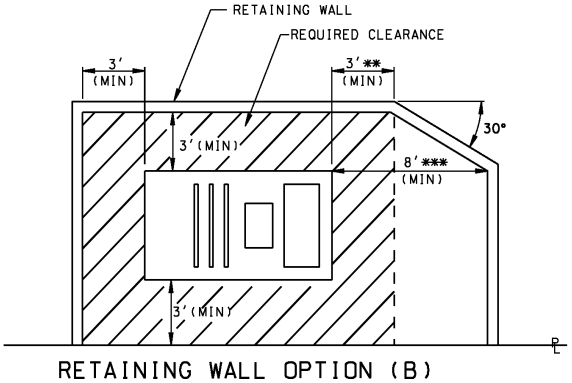
FIGURE 4



RETAINING WALL OPTION (A)

** A minimum 5′-0″ clearance is required when a 4′ x 5′-6″ precast pad is installed.

FIGURE 5



RETAINING WALL OPTION (B)

FIGURE 6

*** A minimum 8′-0″ operating clearance is required in front of pad.

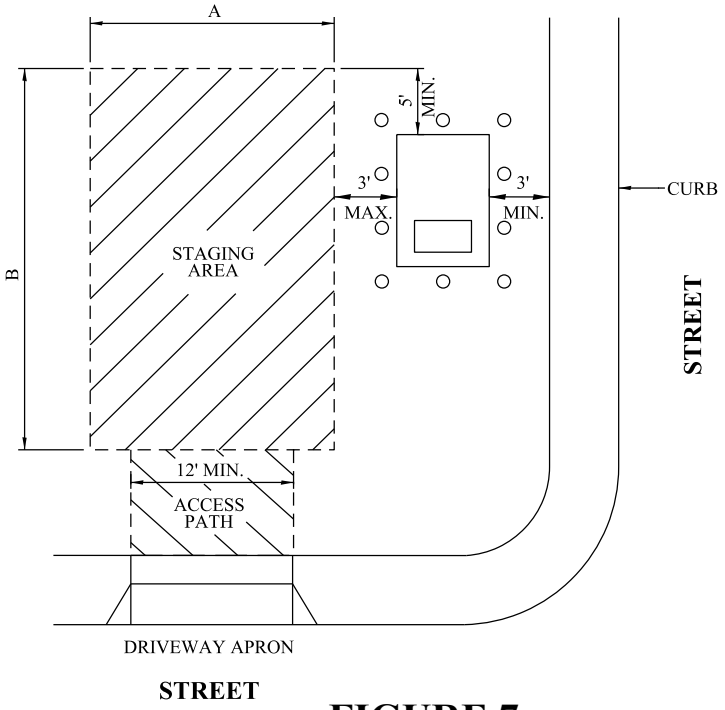
4. Pad Accessibility

A. Truck Accessibility:

Pad must be accessible to Department trucks by a permanent, clear and unobstructed path with a minimum 12ft in width and 14ft in height leading to a staging area along any side of the pad. If the path to the pad contains any turns or uneven terrain, the minimum requirements of 12ft and 14ft previously described may need to be increased. Consult the department engineer when such situations occur. Trucks must be able to approach the pad so the side of the truck will be no more than 3ft from any one edge.

B. Staging Area (Figure 7, Table 1)

1. A staging area, shall be provided for the department trucks to access the transformer or switch. The staging area shall meet the size specified in the design matrix provided.
2. The staging area, and access to it, must be maintained on the customer's private property.
3. There shall be no building projection underneath the staging area.
4. The path and the staging area shall be designed to withstand highway loading requirements. Any utility substructure or underground facility that is located under the path or the staging area shall be designed for a minimum crane and transformer weight, as shown in Table 1, with the loading being concentrated on 1 to 4 outriggers.



REVISION

FIGURE 7

INDEX

C721-00

* TRANSFORMER SIZE (kVA)	A (FEET)	B (FEET)	WEIGHT IN TONS (CRANE PLUS TRANSFORMER)	MINIMUM VERTICAL CLEARANCE (FEET)
UP TO 750	18	30	24 (MINIMUM)	70
1000 TO 2000	30	38	30 (MINIMUM)	100
2500 TO 3750	35	40	42 (MINIMUM)	100

*For Guidance only. Does not apply to all transformers and switches, refer to Department design engineer and marked print.

TABLE 1

C. Design:

To avoid design complications, the Department, at early stages of design, shall approve the preliminary location of the path and staging area. The following items shall be submitted to the Department prior to installation of any DWP equipment:

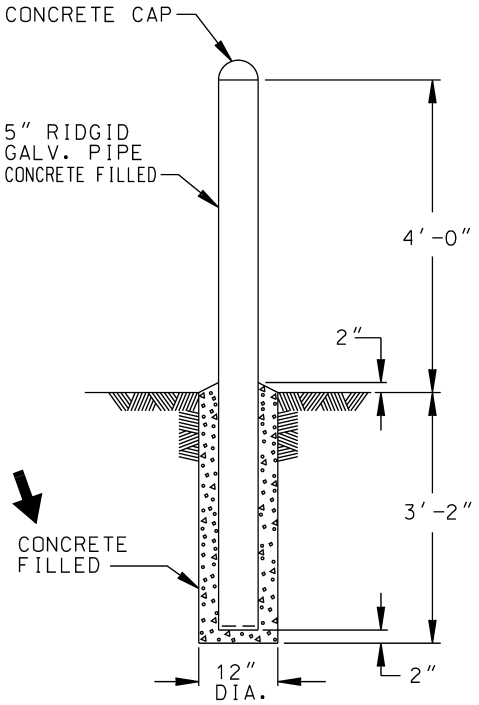
1. Three drawings (8-1/2" x 11") showing the path and staging area.
2. A letter releasing the DWP of all liability from any damages incurred to access path and/or staging area as a result of work done by DWP.
3. In the event there are underground utility substructures located under the path or staging area, a letter signed by the owner and a registered structural (civil) engineer accepting responsibility for the design shall also be submitted with the drawings.
4. Consider the probability of future upgrades to transformer size as this may affect staging area requirements.

REVISION

5. *Other Considerations*

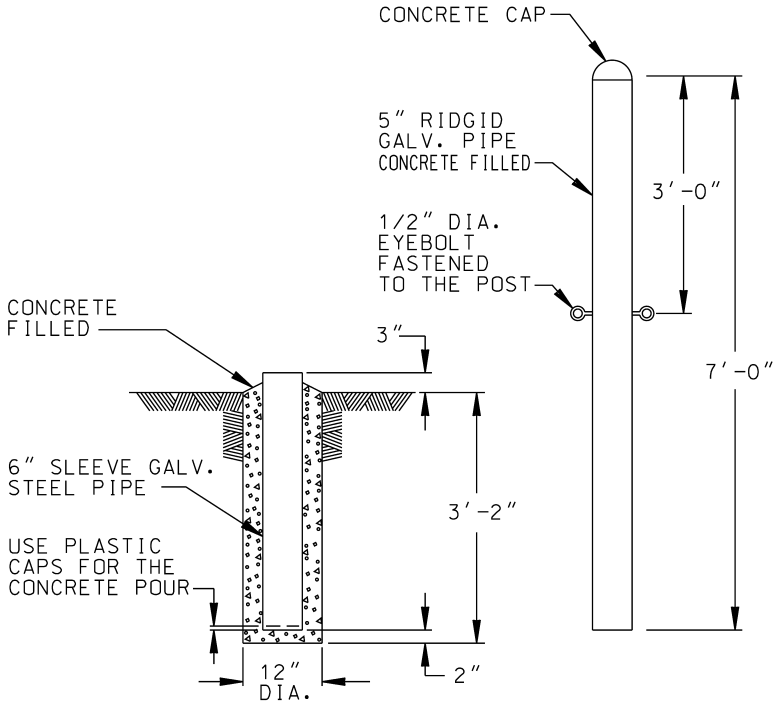
A. Protection (Figure 8,9):

All T.P.'s, especially when located near traffic or parking areas, shall be protected by non-removable barrier posts, unless otherwise specified by the Department design engineer. Field evaluation shall be made by the Department ESR for each installation. Unless approved by the Department ESR, walls may not be used in place of barrier posts. Refer to the figures below for barrier post construction details. For barrier post layout, see pad drawings. Use 330-C-1700 or 420-D-1700 or 520-C-2500 for concrete mix design for barrier post anchor and fill. See Underground Construction Standards Drawing 2-125 for equivalent strength hand mix specification.



NON-REMOVABLE BARRIER POST

FIGURE 8



REMOVABLE BARRIER POST

FIGURE 9

B. *Landscaping and Other Obstructions:*
Transformer Pad surroundings and screening are permitted with the compliance of required clearance and accessibility requirements. Plants, shrubs and other items shall not obstruct the required work space as shown in Figures 1, 4, 5, and 6, nor obstruct access to the pad. Plantings, that interfere with access or workspace may be removed without notice at the customers expense.

C. *Inspection:*
All material and workmanship are subject to inspection by the Department ESR. Notify the Department ESR two (2) business days in advance of construction. Inspection will be provided free of charge during normal working hours. Charges may be incurred for lost-time inspections.

D. *Excavation on Private or Public Property:*
Contractors shall notify Underground Service Alert (8-1-1) for substructure locating at least 48 hours prior to any excavation on private or public property.

E. *Hazardous Locations:*
The pad shall be placed outside of classified hazardous locations as defined in Chapter 5-Special Occupancies of the National Electric Code (NEC), Refer to NEC Article 514 and Table 2 for Gasoline Dispensing and Service Stations clearance requirements. Refer to NFPA 497, Chapter 5 for hydrogen fuel type.

Fuel Type	A/G Tank	U/G Tank	Dispenser	Fill Pipes	Generators, Self Contained	Piping	Pumps	Vents
CNG	5ft	10ft	5ft	5ft	10ft	20ft	20ft	5ft R
Diesel	5ft	10ft	5ft	5ft	10ft	20ft	20ft	5ft R
Gasoline	20ft	20ft	20ft	10ft	10ft	20ft	20ft	5ft R
Jet (JP-4)	50ft	50ft	50ft	50ft	50ft	50ft	50ft	50ft R
LNG	10ft	10ft	10ft	10ft	10ft	20ft	20ft	5ft R
LOX	50ft	50ft	50ft	50ft	50ft	50ft	50ft	50ft R
LH2	25ft	N/A	10ft	25ft	25ft	25ft	25ft	25ft R
H2	15ft	N/A	5ft	15ft	15ft	15ft	15ft	15ft R
Propane	20ft	20 - 50ft*	20 - 25ft**	10ft	10ft	20ft	20ft	5ft R

* For tanks over 2,000 gallons

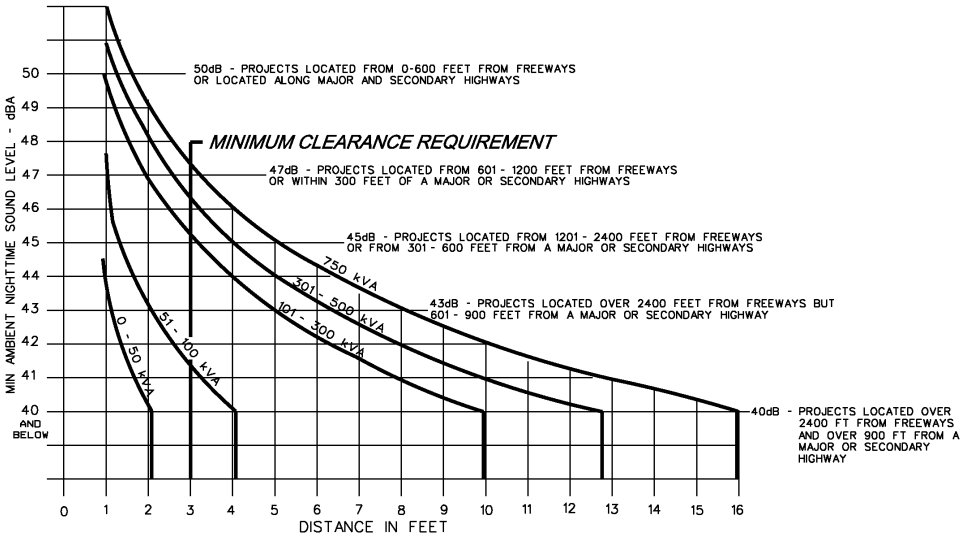
** Over 500 lbs. stored

TABLE 2

F. *Noise Considerations (Figure 10):*
Some transformer pad installations require additional clearance from the pad to adjacent residential property lines to comply with the Los Angeles City Noise Ordinance. Consult with Department design engineer for guidelines.

REVISION

C721-00



MINIMUM DISTANCE FROM PADMOUNT TRANSFORMER
TO ADJACENT RESIDENTIAL - ZONE PROPERTY

FIGURE 10

Instructions:

1. Determine the probable minimum ambient night-time sound level by using the typical location values on the chart.
2. Determine the size of the padmount transformer to be installed.
3. Locate the point on the curve where the appropriate horizontal ambient sound level line intersects the transformer curve and project downward to determine the minimum distance in feet from the transformer case to adjacent residential property line.
4. If the padmount transformer must be located nearer to an adjacent property then the minimum distance, additional noise mitigation measures may be needed including sound attenuating walls.

Notes:

1. Minimum distance refers to the distance to the nearest residential property not including the property where the padmount transformer is being installed.
2. As required, specified customer or Department-provided ambient sound level test may be used instead of the typical values shown.

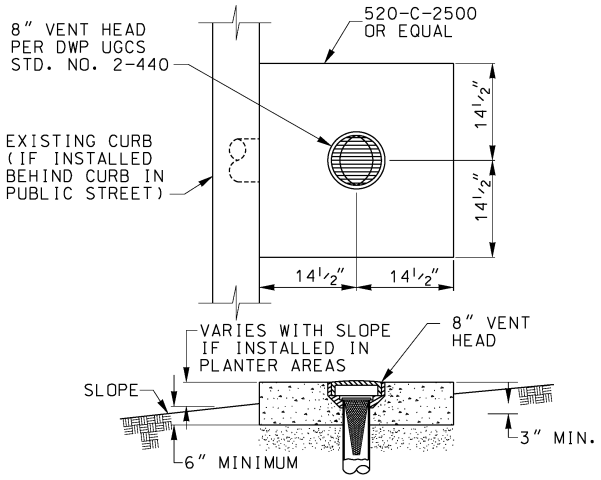
G. Other DWP Specifications:

- DWP 'P', 'H', or 'G' drawings and job construction details
- UB721-XX - Transformer Pad specification drawing
- UB721-XX Switch Pad specification drawing
- UB721-12, UB721-16, Fence Grounding Requirements
- H-242, Methane Area, UG construction guidelines
- H-168, specification drawing, UG residential structure placement and trench design
- Spec. 104, UG conduit and substructure specifications
- DWP Electric Service Requirements

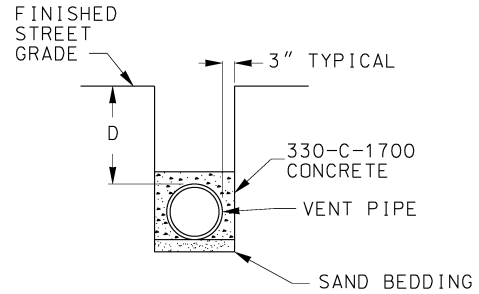
Los Angeles Department of Water and Power Underground Power Distribution Construction Standards	**8" & 12" SURFACE VENT DETAILS** **Vents, Structures**	**UG**

Design page: C730-04

INDEX



8" VENT ASSEMBLY
REFERENCE ONLY
(NOT TO BE USED FOR NEW INSTALLATIONS, SEE ALSO DWP UGCS STD. NO. 1-821 &1-823)



IF THE DIMENSION "D" IS LESS THAN 30" THE ENTIRE HORIZONTAL VENT PIPE SHALL BE ENCASED AS SHOWN.

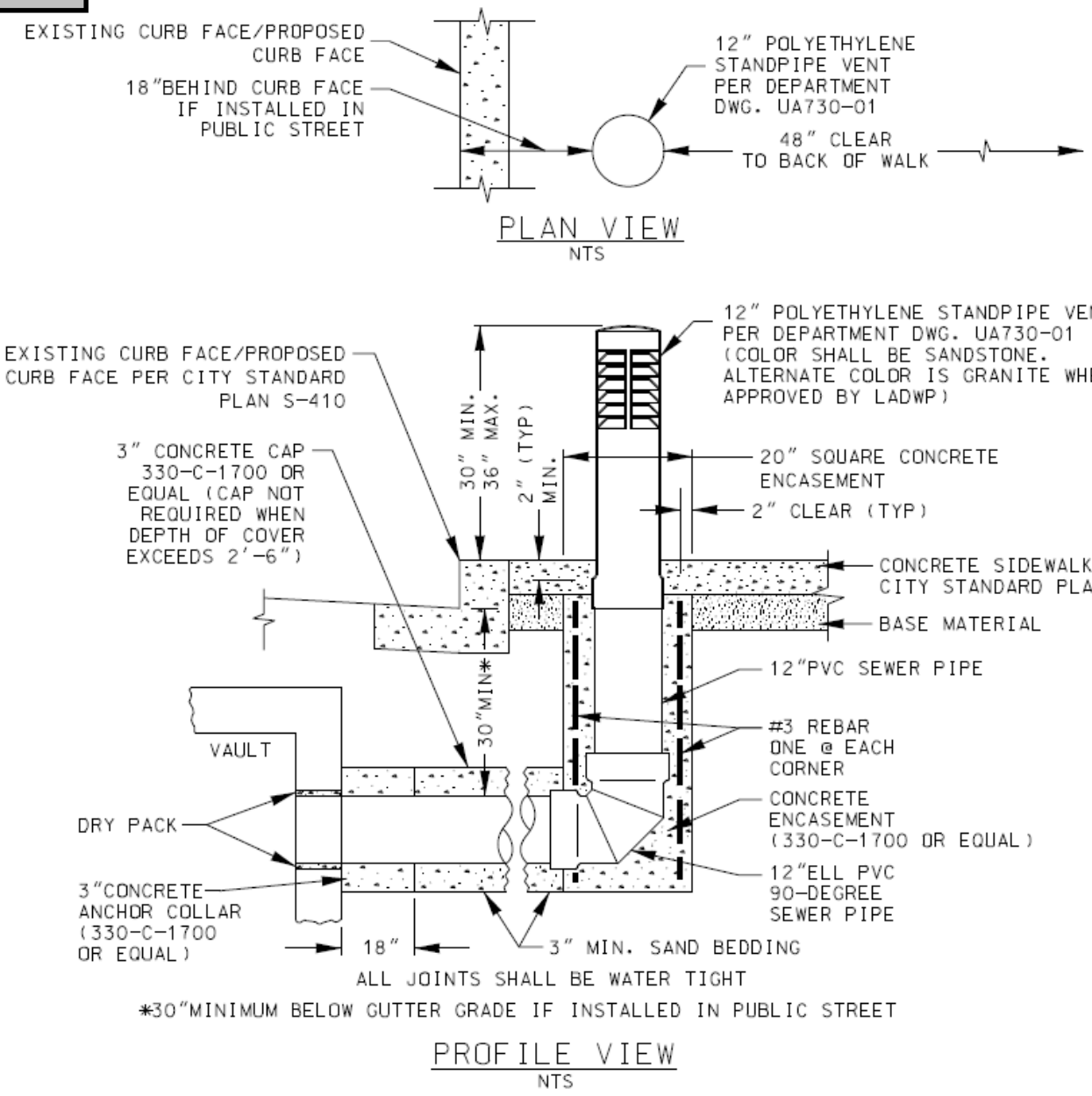
VENT PIPE ENCASEMENT
(IF REQUIRED)

NOTES:

1. Vent pipes and fittings shall be PVC sewer pipe manufactured in accordance with ASTM D3034 and the Departments standard specifications No. P-152. All pipes and fittings shall be joined using PVC primer and solvent cement and they shall be watertight.
2. Vents shall be located on Department construction drawings. Minimum center to center spacing of vent heads shall be 48". Any deviation from the location given on the construction drawings shall be approved by the standards engineer.

C730-09	Issued Date: Revised Date: 12/03/18	Approved by J. Fong P.E. LIC. CE-69632	C730-09

12" STANDPIPE DETAIL
Vents, Structures



12"ARCHITECTURAL STANDPIPE VENT ASSEMBLY

NOTES:

1. Vent pipes & fittings shall be PVC sewer pipe manufactured in accordance with ASTM D3034 and the Department's Standard Specification No.152. All pipes and fittings shall be joined using PVC primer & solvent cement and they shall be watertight.
2. Vents shall be located on Department construction drawings. The clear spacing between vent heads shall target 72 inches, with 48 inches minimum.

3. Vent outlets shall be located in the nearest sidewalk or planter area to the substructure. Piping for single vent should not exceed 30 feet in length. There shall not be more than one 90-degree bend in any single vent pipe installation, unless approved by the Department Representative.

4. Use 20 inch diameter Sonotube or equal for standpipe installations that require concrete forming. Install 4-#3 bars evenly spaced around the pipe. Provide 2 inch concrete cover to all reinforcing bars. Concrete encasement mix shall be 330-C-1700 or equal.

5. Restoration of roadway shall be in compliance with city standard plan S-477-1.

6. Standpipe shall be identified with a tag indicating "LADWP".

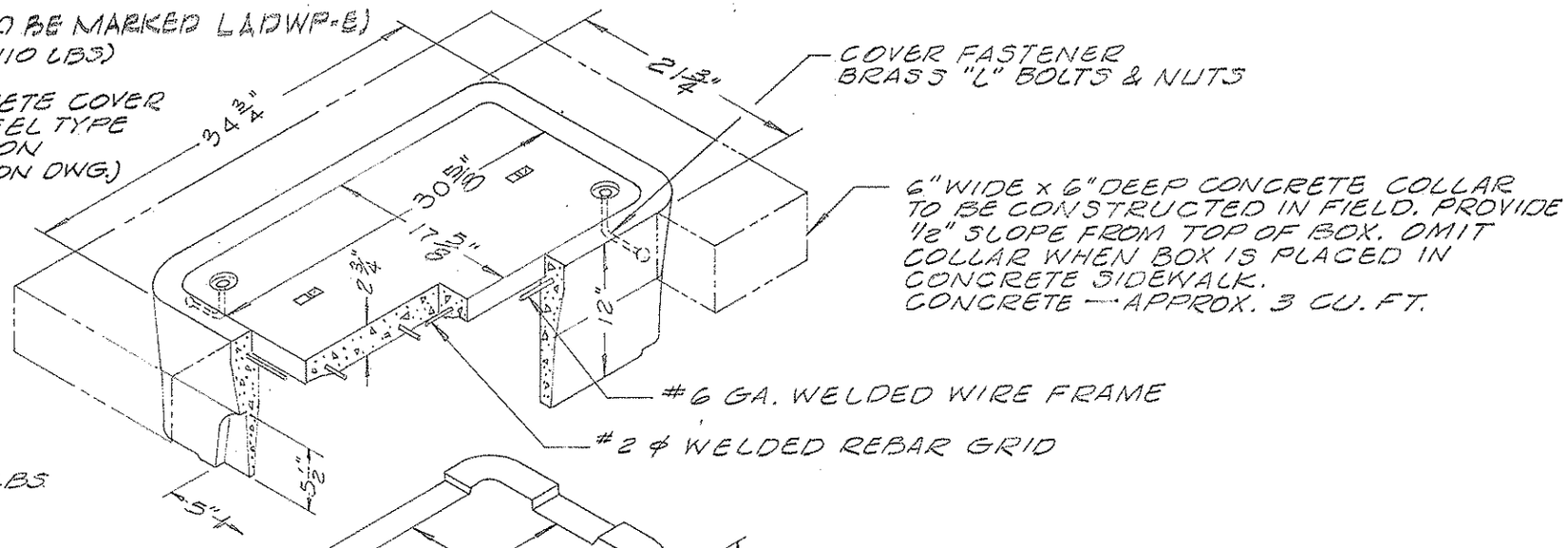
7. Standpipe vent replacement: when replacing standpipe where the concrete encasement is integral with the sidewalk, replace entire sidewalk panels connected up to nearest control joint, but not less than 2'-6" away.

8. Unless otherwise approved by the City Engineer, standpipe vent locations shall conform with the following:
   a. 48 inches clear minimum spacing shall be targeted, with 36 inches clear absolute minimum spacing between the standpipe vent and a tree well, parking meter, traffic sign or post, bike rack, bike zone, or utility facility and its access opening (except as noted herein).
   b. 48 inches clear minimum spacing between the standpipe vent and a street light, traffic signal or other utility pole.
   c. 60 inches clear minimum spacing between the standpipe and a fire hydrant or curb/access ramp including any sloped portion.
   d. 72 inches clear minimum spacing between the standpipe and a tree without a tree well or as approved by BSS, Urban Forestry Division.
   e. 72 inches clear minimum spacing shall be targeted, with 48 inches clear absolute minimum spacing between the standpipe vent and a driveway including any sloped portion.
   f. 25 feet away from an intersection curb radius (BCR/ECR) to the extent possible.
   g. Coordination with transit agencies regarding their clearance requirements.
   h. Standpipe installations shall not be located within sidewalk tile edge band when in downtown Los Angeles.

UGD-10
UGC-15
D-1-S-6
VUD-3
SPC-15
SPCV-15
B-3
Q-2
VOL. 4
U-2

INDEX

COVER (TO BE MARKED LADWP-E)
CONCRETE (110 LBS)
OR STEEL
(USE CONCRETE COVER
UNLESS STEEL TYPE
SPECIFIED ON
CONSTRUCTION DWG.)



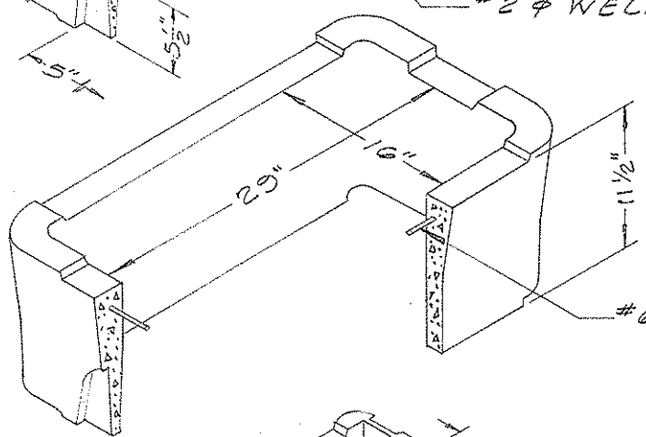
COVER FASTENER
BRASS "L" BOLTS & NUTS

6" WIDE x 6" DEEP CONCRETE COLLAR
TO BE CONSTRUCTED IN FIELD. PROVIDE
1/2" SLOPE FROM TOP OF BOX. OMIT
COLLAR WHEN BOX IS PLACED IN
CONCRETE SIDEWALK.
CONCRETE — APPROX. 3 CU. FT.

#6 GA. WELDED WIRE FRAME

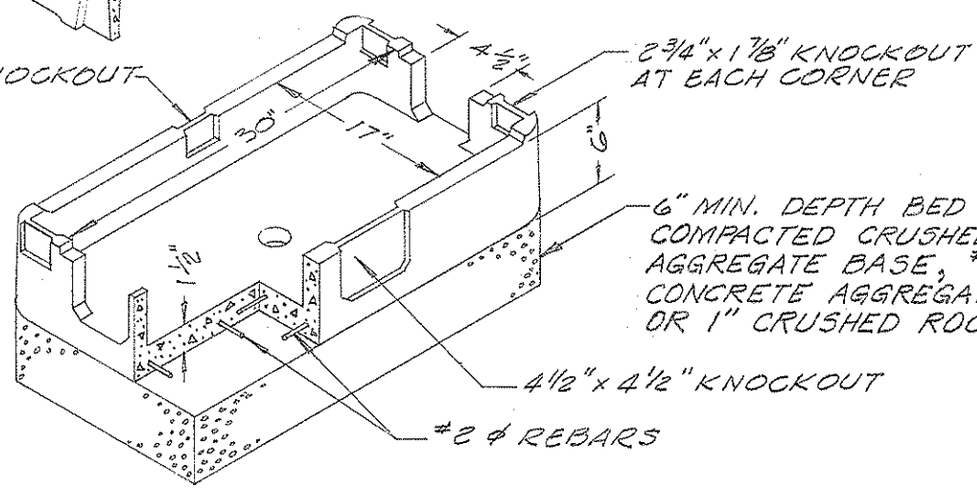
#2 ϕ WELDED REBAR GRID

BODY
WT. 160 LBS



EXTENSION
WT. 164 LBS.

#6 GA. WELDED WIRE FRAME



2 3/4" x 1 7/8" KNOCKOUT
AT EACH CORNER

6" MIN. DEPTH BED OF
COMPACTED CRUSHED
AGGREGATE BASE, #3
CONCRETE AGGREGATE,
OR 1" CRUSHED ROCK

4 1/2" x 4 1/2" KNOCKOUT

#2 ϕ REBARS

BASE
WT. 122 LBS.

89 44934 BX

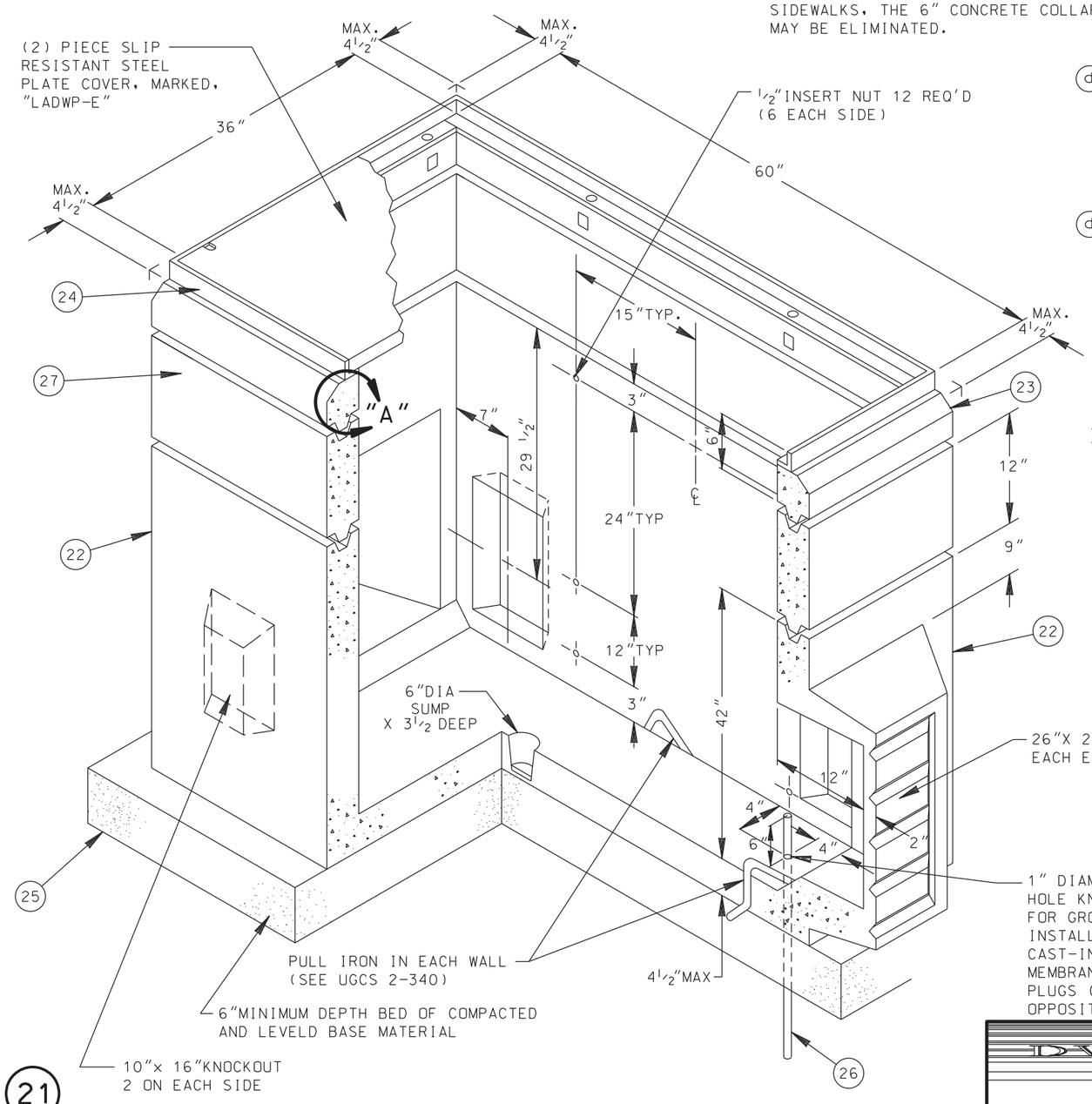
CITY OF LOS ANGELES
DEPARTMENT OF WATER & POWER
UNDERGROUND DESIGN SECTION

Precast Handhole

DESIGN	D.L. MORRIS	DRAFTING	ARA
O.K.		DATE	5-13-76
APPROVED	SR. ELEC. ENGINEER		E-438

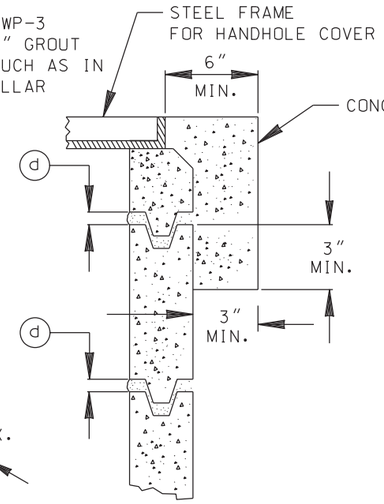
	DATE	INIT'L	REVISION	APP'V'D
(3)	5-19-80	DHA	BASE MAT. WAS PEA GRAVEL	
(2)	5-2-74	A.R.A	REDRAWN - NO REVISIONS	
(5)	10-1-84	CWN	ADDED UTILITY VLT.	
(4)	8-30-84	CWN	ADDED COVER MARKINGS	

INDEX



21

IF d IS GREATER THAN 2" USE DWP-3 CONCRETE. IF d IS LESS THAN 2" GROUT MAY BE USED. IN PAVED AREA, SUCH AS IN SIDEWALKS, THE 6" CONCRETE COLLAR MAY BE ELIMINATED.



HANDHOLE SETTING DETAIL IN AN UNPAVED AREA WHERE THERE ARE NO SIDEWALKS

G-1	PART	DESCRIPTION
X	21	ASSEMBLY
1	22	** BASE SECTION, MAX. WT= 4,870 LBS
1	23	** TOP SECTION, MAX. WT= 325 LBS
1	24	FRAME AND TWO SECTION COVER
1/2	25	* CUBIC YARD, BASE MATERIAL
1	26	* GROUND ROD 5/8" DIA X 8', 304 SST CLAD
1	27	12" GRADE RING 3660X12 RECT RISER
1	28	BOLT PENTA 1/2-13 UNC 0.875 HEAD 2.5L SS

18

* NOT A PART OF PRECAST ASSEMBLAGE
** TO BE CHECKED WITH MANUFACTURER

NOTES:

PT.21 - ASSEMBLY - HANDHOLE SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DWP SPECIFICATIONS P178, AS LAST REVISED.

INSTALLATION - ALL HANDHOLES SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS OF DWP UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO. 104, AS LAST REVISED.

PT.23 - TOP SECTION - SHALL BE CAST WITH GALV FRAME PER UGCS 2-400.1.

PT.24 - COVER - SHALL BE REINFORCED PLASTIC MORTAR (RPM) UNLESS OTHERWISE SPECIFIED.

RPM - CONCRETE TEXTURED FOR NON-TRAFFIC USE ONLY, PER UGCS 2-401.1.

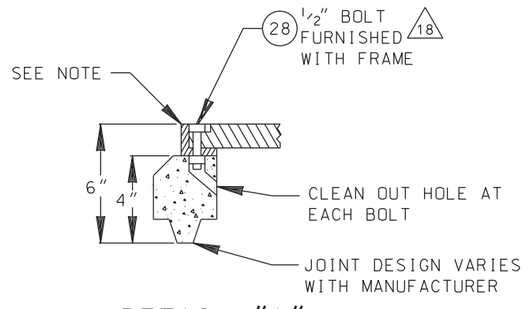
STEEL PARKWAY - FOR NON-TRAFFIC, NON-PEDESTRIAN AREAS ONLY, PER UGCS 2-409.

STEEL TRAFFIC - FOR AREAS SUBJECT TO VEHICULAR TRAFFIC, PER UGCS 2-408.

PT.25 - BASE MATERIAL SHALL BE CRUSHED AGGREGATE BASE, #3 CONCRETE AGGREGATE, OR 1" CRUSHED ROCK.

INSTALLATION - HANDHOLE TO BE PLACED ON A MIN. 6" CRUSHED AGGREGATE BASE.

PT.26 - THE INSTALLING CONTRACTOR SHALL INSTALL ONE GROUNDING ROD IN THE 1" DIA. FLOOR KNOCKOUT IN EITHER CORNER OF HANDHOLE UNLESS DIRECTED OTHERWISE BY THE DEPARTMENT ENGINEER OR REPRESENTATIVE. GROUND ROD TO BE GROUTED IN.



DETAIL "A"

REV.	DATE	INT'L	REVISION	APP'V'D
18	05/22/23	ERE	ADDED PART NO. 28 & NOTES ON DETAIL A	
17	05/10/21	JWW	ADDED PULL BOX 3660X12 RECT RISER	
16	12/15/20	DR	UPDATED STD. TO MANUFACTURER'S STD.	
15	10/5/07	JHG	RELOCATED INSERTS	
14	10/7/96	JHG	ADDED PT.26/REDRAWN IN CAD	

DWP

REGISTERED PROFESSIONAL ENGINEER RICHARD C. CHANG No. S5342 Exp 9/31/2024 STRUCTURAL STATE OF CALIFORNIA

SERVICE CENTER JOB LOCATION	SERVICE CENTER CONSTRUCTION	DWP W.O.				CONTRACT W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING SECTION

DESIGN	D.L.MORRIS	DRAFTING	J.GARCIA
OK	B.M.BOYCHUK	CHECKER	CAL
APPROVED	A.D.FRICHE	DATE	10/3/96

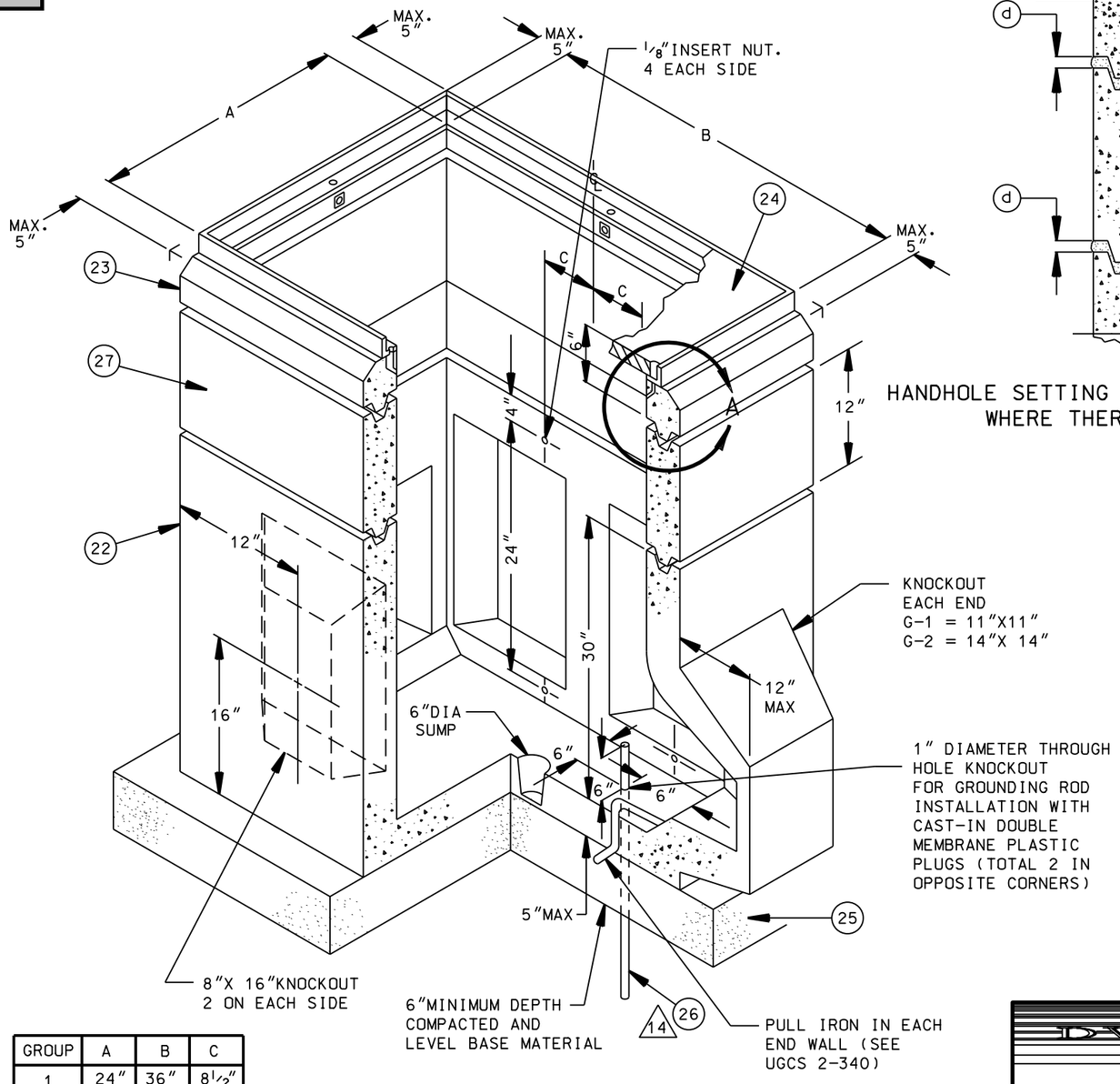
PRECAST HANDHOLE WITH DEEP RECESS

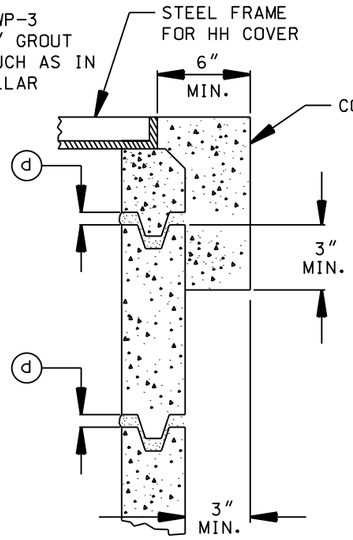
E-459

SHEET 1 OF 1

INDEX

IF d IS GREATER THAN 2" USE DWP-3 CONCRETE. IF d IS LESS THAN 2" GROUT MAY BE USED. IN PAVED AREA, SUCH AS IN SIDEWALKS, THE 6" CONCRETE COLLAR MAY BE ELIMINATED.





HANDHOLE SETTING DETAIL IN AN UNPAVED AREA WHERE THERE ARE NO SIDEWALKS

GROUP	A	B	C
1	24"	36"	8 1/2"
2	30"	48"	11"

G-2	G-1	PART	DESCRIPTION
X	X	21	ASSEMBLY
1	1	22	** BASE SECTION, MAX WT.(LBS):G-1=2070,G-2=3800
1	1	23	TOP SECTION (SEE NOTES)
1	1	24	COVER (SEE NOTES)
3/8	1/4	25	* CUBIC YARD, BASE MATERIAL (SEE NOTES)
1	1	26	* GROUND ROD 5/8"DIA X 8', 304 SST CLAD
1	1	27	2436 SERIES 12" GRADE RING EXTENSION

14

* NOT A PART OF PRECAST ASSEMBLAGE
** CHECK WITH MANUFACTURER

14 NOTES:

PT.21 – ASSEMBLY – HANDHOLE SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DWP SPECIFICATIONS P178, AS LAST REVISED.

INSTALLATION – ALL HANDHOLES SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS OF DWP UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO. 104, AS LAST REVISED.

PT.23 – TOP SECTION – SHALL BE CAST WITH RESPECTIVE SIZED FRAME PER UGCS 2-400.

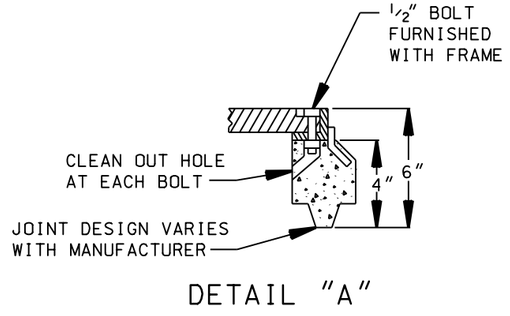
PT.24 – COVER – SHALL BE REINFORCED PLASTIC MORTAR (RPM) COVER UNLESS OTHERWISE SPECIFIED.
RPM – CONCRETE TEXTURED FOR NON-TRAFFIC USE ONLY, PER UGCS 2-401.

STEEL PARKWAY – FOR NON-TRAFFIC, NON-PEDESTRIAN AREAS ONLY, PER UGCS 2-402 FOR G-1 AND UGCS 2-403 FOR G-2.

STEEL TRAFFIC – FOR AREAS SUBJECT TO VEHICULAR TRAFFIC, PER UGCS 2-404 FOR G-1 AND UGCS 2-405 FOR G-2.

PT.25 – BASE MATERIAL SHALL BE CRUSHED AGGREGATE BASE, #3 CONCRETE AGGREGATE, OR 1" CRUSHED ROCK.

PT.26 – THE INSTALLING CONTRACTOR SHALL INSTALL ONE GROUNDING ROD IN THE 1" DIA. FLOOR KNOCKOUT IN EITHER CORNER OF HANDHOLE UNLESS DIRECTED OTHERWISE BY THE DEPARTMENT ENGINEER OR REPRESENTATIVE. GROUND ROD TO BE GROUTED IN.



DETAIL "A"

21

REV.	DATE	INT'L	REVISION	APP'V'D
15	05/7/21	JWW	ADDED 2436 SERIES 12" EXTENSION SECTION	
14	10/7/96	JHG	ADDED PT.26/REDRAWN IN CAD	

SERVICE CENTER JOB LOCATION	SERVICE CENTER CONSTRUCTION	DWP W.O.				CONTRACT W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING SECTION

PRECAST HANDHOLE WITH DEEP RECESS

DESIGN	D.L.MORRIS	DRAFTING	ARA / J.GARCIA
OK	B.M.BOYCHUK	CHECKER	C.L.
APPROVED	A.D.FRICKE	DATE	10/3/96

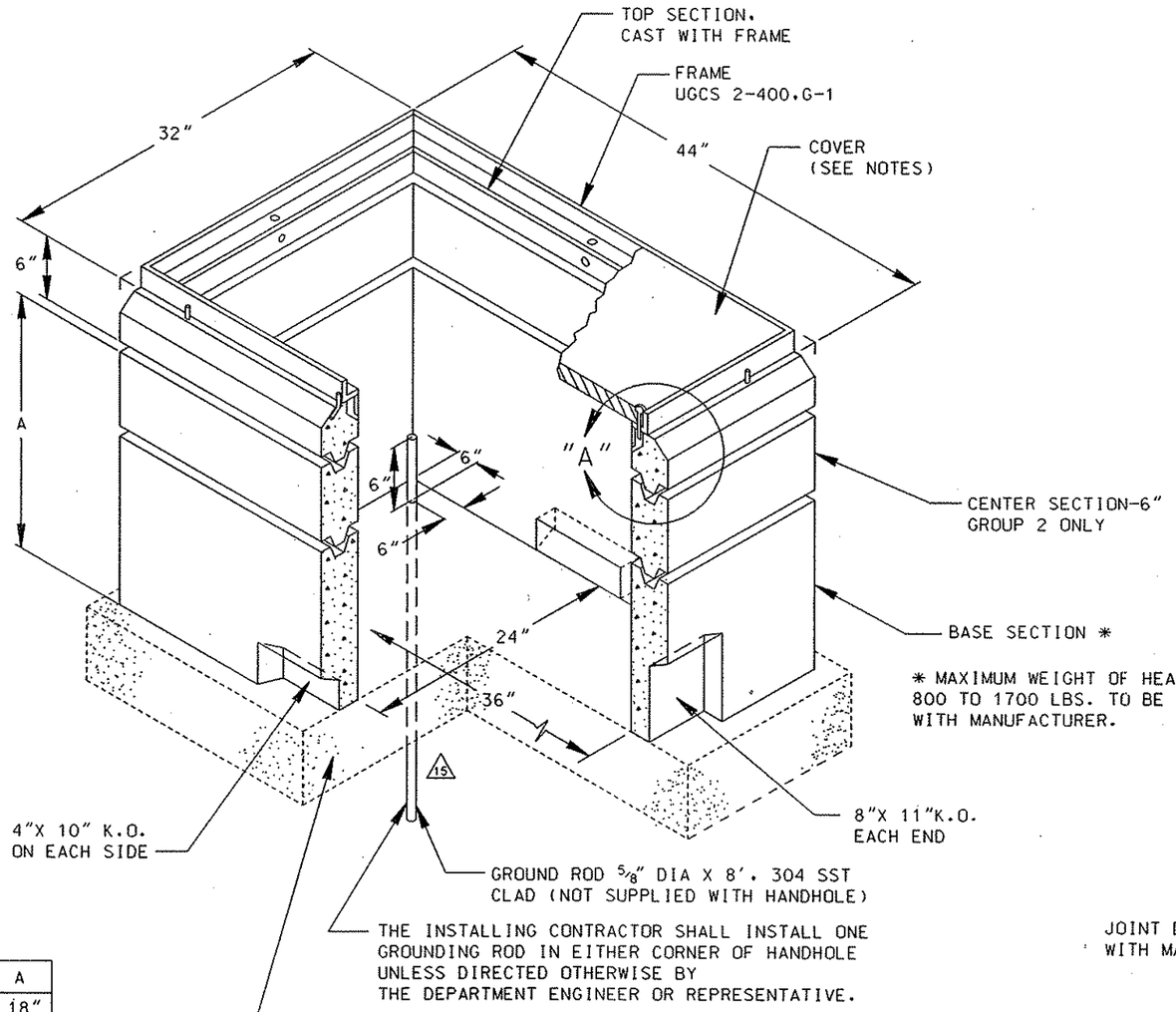
E-491

SHEET 1 OF 1

INDEX

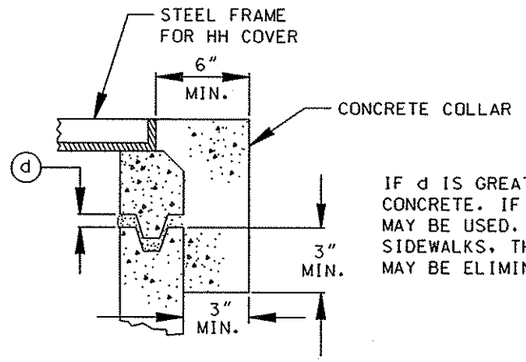
NOTES:

1. HANDHOLE SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DWP SPECIFICATIONS P178, AS LAST REVISED.
2. TOP SECTION - SHALL BE CAST WITH RESPECTIVE SIZED FRAME PER UGCS 2-400.
3. COVER - SHALL BE REINFORCED PLASTIC MORTAR (RPM) COVER UNLESS OTHERWISE SPECIFIED.
4. RPM - CONCRETE TEXTURED FOR NON-TRAFFIC USE ONLY. PER UGCS 2-401.
5. STEEL PARKWAY - FOR NON-TRAFFIC, NON-PEDESTRIAN AREAS ONLY, PER UGCS 2-402.
6. STEEL TRAFFIC - FOR AREAS SUBJECT TO VEHICULAR TRAFFIC, PER UGCS 2-404.
7. BASE MATERIAL - SHALL BE CRUSHED AGGREGATE BASE, #3 CONCRETE AGGREGATE, OR 1" CRUSHED ROCK.
8. (15) INSTALLATION - ALL HANDHOLES SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS OF DWP UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO. 104, AS LAST REVISED.



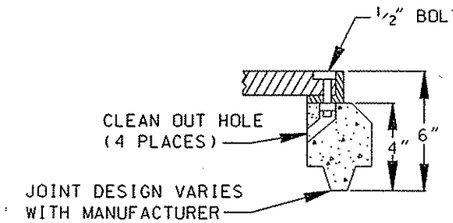
* MAXIMUM WEIGHT OF HEAVIEST SECTION: 800 TO 1700 LBS. TO BE CHECKED WITH MANUFACTURER.

GROUP	A
1	18"
2	24"



IF d IS GREATER THAN 2" USE DWP-3 CONCRETE. IF d IS LESS THAN 2" GROUT MAY BE USED. IN PAVED AREA, SUCH AS IN SIDEWALKS, THE 6" CONCRETE COLLAR MAY BE ELIMINATED.

HANDHOLE SETTING DETAIL IN AN UNPAVED AREA WHERE THERE ARE NO SIDEWALKS



DETAIL "A"

REV.	DATE	INT'L	REVISION	APP'V'D
(15)	10/6/96	JHG	ADDED GROUND ROD/REDRAWN IN CAD	S.Y.

SERVICE CENTER JOB LOCATION | SERVICE CENTER CONSTRUCTION | DWP W.O. | CONTRACT W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING SECTION

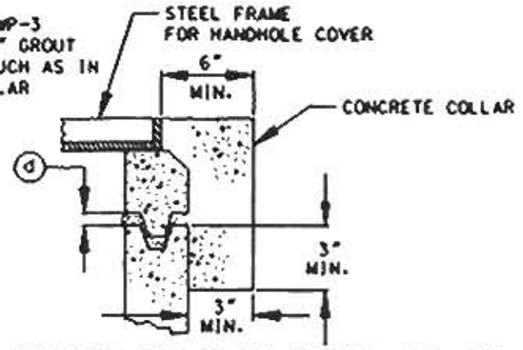
DESIGN	D.L. MORRIS	DRAFTING	ARA / GARCIA J.
OK	B.M. BOYCHUK	CHECKER	CAL
APPROVED	A.D. FRICKE	DATE	10/3/96

PRECAST HANDHOLE 2'-0"X 3'-0"X 24" DEEP BOTTOMLESS

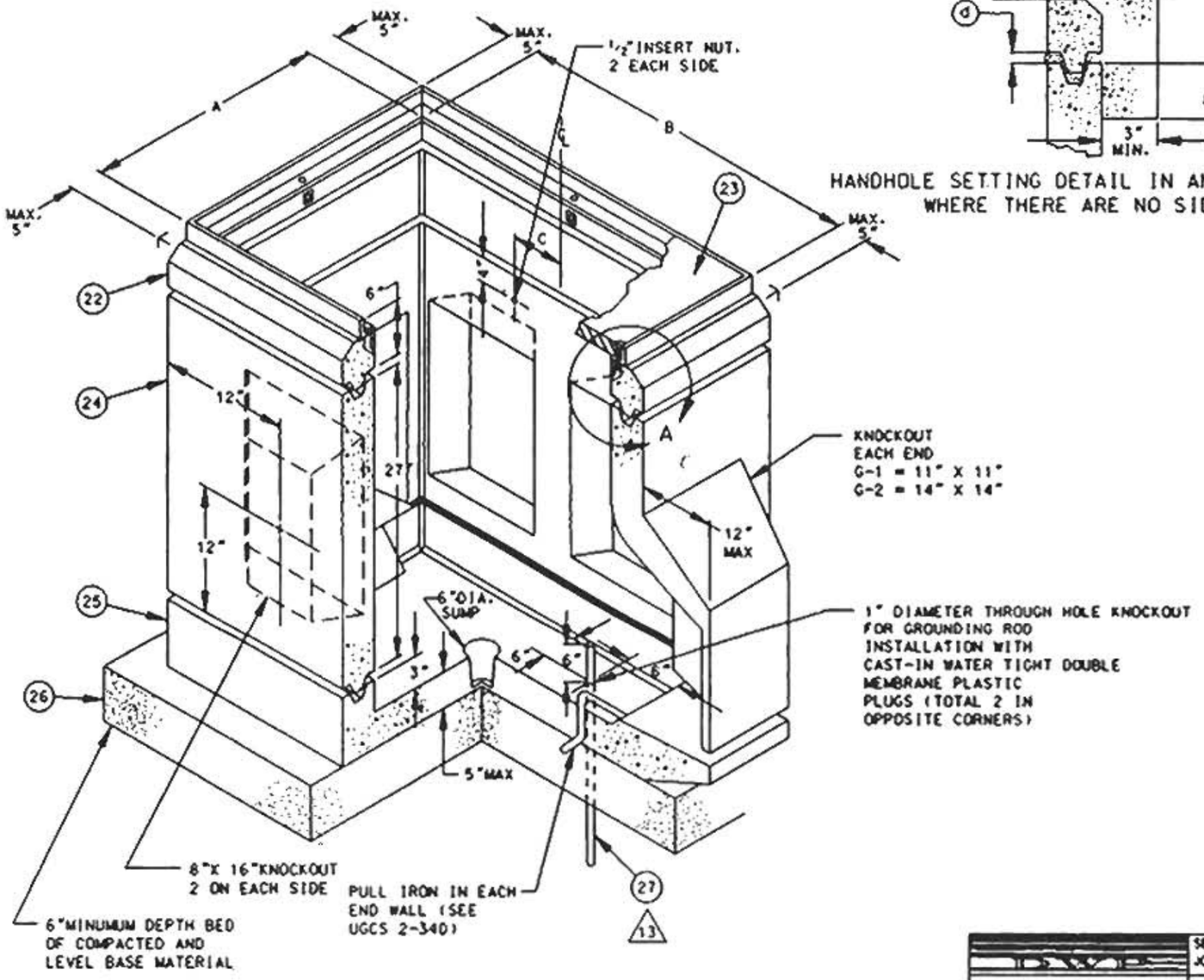
E-492

SHEET 1 OF 1

IF d IS GREATER THAN 2" USE DWP-3 CONCRETE. IF d IS LESS THAN 2" GROUT MAY BE USED. IN PAVED AREA, SUCH AS IN SIDEWALKS THE 6" CONCRETE COLLAR MAY BE ELIMINATED.



HANDHOLE SETTING DETAIL IN AN UNPAVED AREA WHERE THERE ARE NO SIDEWALKS



INDEX

G-2	G-1	PART	DESCRIPTION
X	X	21	ASSEMBLY
1	1	22	TOP SECTION (SEE NOTE)
1	1	23	COVER
1	1	24	WALL SECTION
1	1	25	BASE SECTION
⅔	¼	26	* CUBIC YARD. BASE MATERIAL
13 1	1	27	* GROUNDED ⅝" DIA.X 8'. 304 SST CLAD

* NOT A PART OF PRECAST ASSEMBLAGE

NOTES:

13 PT.21 - ASSEMBLY - HANDHOLE SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DWP SPECIFICATIONS P178. AS LAST REVISED.

INSTALLATION - ALL HANDHOLES SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS OF DWP UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO.104. AS LAST REVISED.

PT.22 - TOP SECTION - SHALL BE CAST WITH RESPECTIVE SIZED FRAME PER UGCS 2-400.

PT.23 - COVER - SHALL BE REINFORCED PLASTIC MORTAR (RPM) COVER UNLESS OTHERWISE SPECIFIED.

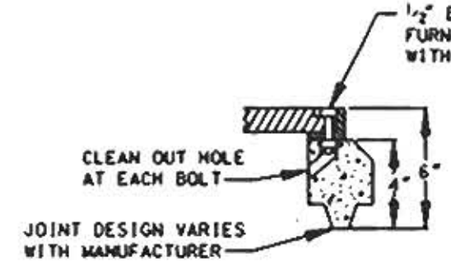
RPM - CONCRETE TEXTURED FOR NON-TRAFFIC USE ONLY. PER UGCS 2-401.

STEEL PARKWAY - FOR NON-TRAFFIC, NON-PEDESTRIAN AREAS ONLY. PER UGCS 2-402 FOR G-1 AND UGCS 2-403 FOR G-2.

STEEL TRAFFIC - FOR AREAS SUBJECT TO VEHICULAR TRAFFIC. PER UGCS 2-404 FOR G-1 AND UGCS 2-405 FOR G-2.

PT.26 - BASE MATERIAL SHALL BE CRUSHED AGGREGATE BASE. #3 CONCRETE AGGREGATE. OR 1" CRUSHED ROCK.

PT.27 - THE INSTALLING CONTRACTOR SHALL INSTALL ONE GROUNDING ROD IN THE 1" DIA. FLOOR KNOCKOUT IN EITHER CORNER OF HANDHOLE UNLESS DIRECTED OTHERWISE BY THE DEPARTMENT ENGINEER OR REPRESENTATIVE. GOURND ROD TO BE GROUTED IN.



DETAIL "A"

GROUP	A	B	C	* HEAVIEST SECTION WT.
1	24"	36"	8½"	1,000 LBS
2	30"	48"	11"	1,900 LBS

21 * CHECK WITH MANUFACTURER

REV.	DATE	INT'L	REVISION	APP'V'D
1	10/8/96	JMG	ADDED PART 27 REDRAWN IN CAD	G.B.

SERVICE CENTER JOB LOCATION	SERVICE CENTER CONSTRUCTION	DWP W.O.			CONTRACT W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING SECTION

PRECAST HANDHOLE WITH DEEP RECESS INTERCEPTING TYPE

DESIGN J.D.McMAHON	DRAFTING DHA / GARCIA J.		
OK C.A.COMBS	CHECKER CAL	E-541	SHEET 1 OF 1
APPROVED B.V.PALK	DATE 10/3/96		

INDEX

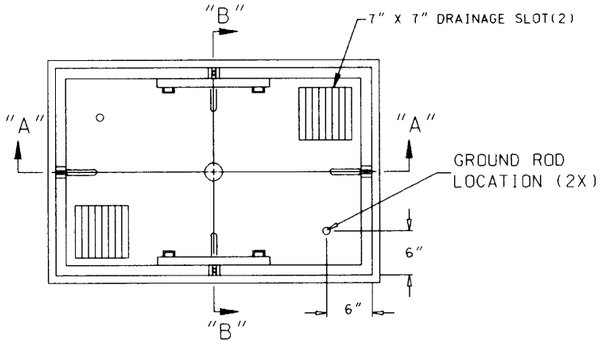
G-2	G-1	PART	DESCRIPTION
X	X	21	ASSEMBLY
1	1	22	** BASE SECTION, MAX. WT=
1	1	23	TOP SECTION (SEE NOTES)
1	1	24	** COVER SEE NOTES
3/8	1/4	25	* CUBIC YARD, BASE MATERIAL
1	1	26	* GROUND ROD 5/8" DIA X 8'. 304 SST CLAD
7	7	27	HOT DIP GALV. STEEL STRUT (FT)

* NOT A PART OF PRECAST ASSEMBLAGE
** TO BE CHECKED WITH MANUFACTURER

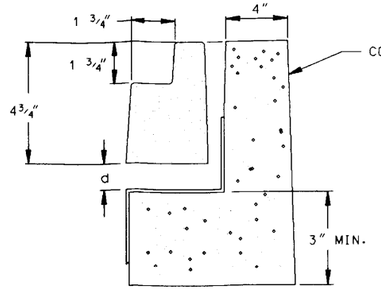
IF d IS GREATER THAN 2" USE DWP-3 CONCRETE. IF d IS LESS THAN 2" GROUT MAY BE USED. IN PAVED AREA, SUCH AS IN SIDEWALKS, THE 4" CONCRETE COLLAR MAY BE ELIMINATED.

APPROVED MANUFACTURER

ARMORCAST PRODUCTS CO.
1 PART # A6001975-DWP

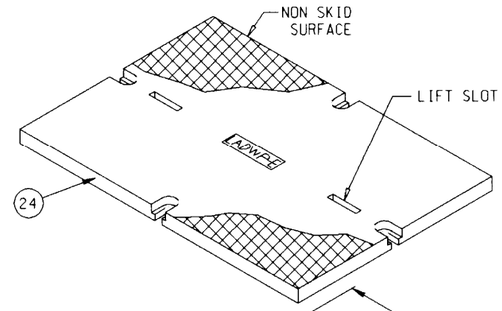


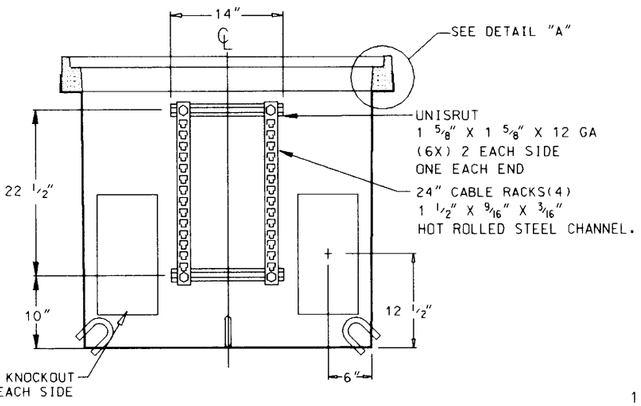
TOP VIEW



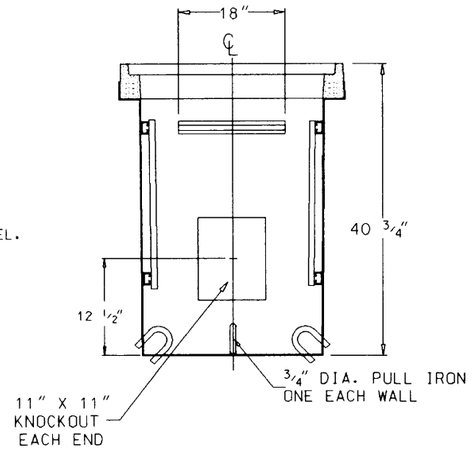
DETAIL A

HANDHOLE SETTING DETAIL IN AN UNPAVED AREA WHERE THERE ARE NO SIDEWALKS

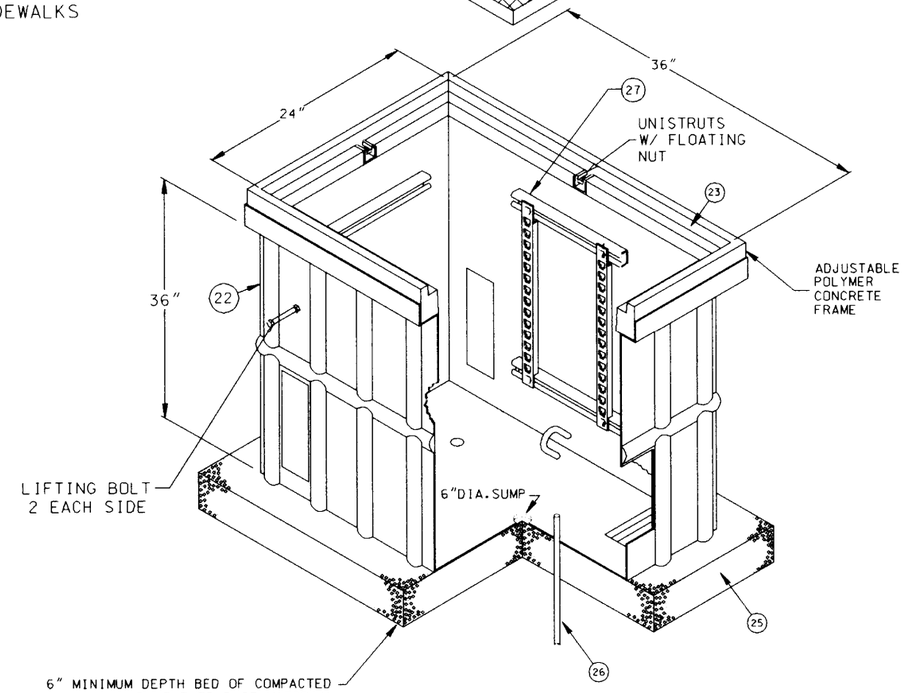




SECTION "A-A"



SECTION "B-B"



NOTES:

1. INSTALLATION - HANDHOLES SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS OF DWP UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO. 104, AS LAST REVISED.
2. NAME OF MANUFACTURER AND DATE OF MANUFACTURE SHALL BE STAMPED ON THE INSIDE OF BOX AND COVER.

PT.21 - ASSEMBLY - HANDHOLE SHALL BE FRP WITH RPM FRAME

PT.23 - TOP SECTION - SHALL BE RPM WITH BOLT LOCATIONS AS PER UGCS 2-400

PT.24 - COVER - SHALL BE REINFORCED PLASTIC MOTAR (RPM) COVER UNLESS OTHERWISE SPECIFIED.
RPM - CONCRETE TEXTURED FOR NON-TRAFFIC USE ONLY. PER UGCS 2-401
STEEL PARKWAY - FOR NON-TRAFFIC, NON PEDESTRIAN AREAS ONLY PER UGCS 2-402.
STEEL TRAFFIC - FOR AREAS SUBJECT TO VEHICULAR TRAFFIC, PER UGCS 2-404.

PT.25 - BASE MATERIAL SHALL BE 3/4" MAXIMUM CRUSHED AGGREGATE BASE.

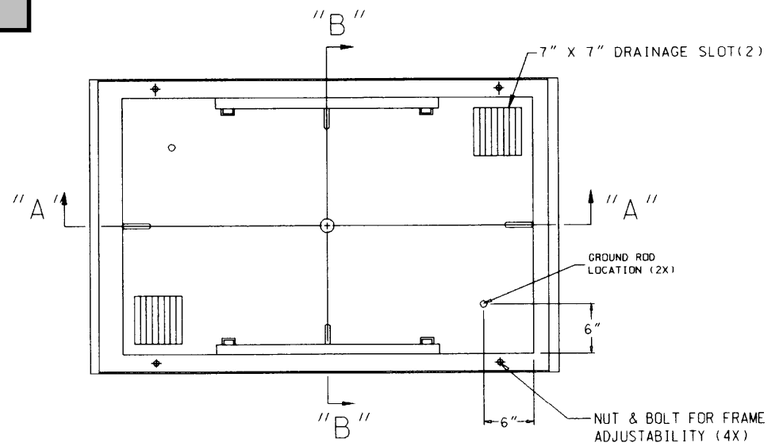
PT.26 - THE INSTALLING CONTRACTOR SHALL INSTALL ONE GROUNDING ROD IN THE IN EITHER CORNER OF HANDHOLE FLOOR AS SHOWN UNLESS DIRECTED OTHERWISE BY THE DEPARTMENT ENGINEER OR REPRESENTATIVE. GROUND ROD TO BE GROUTED IN.

(21)

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
1	9/16/98	JHG	REVISE MANUFACTURER PART NUMBER		

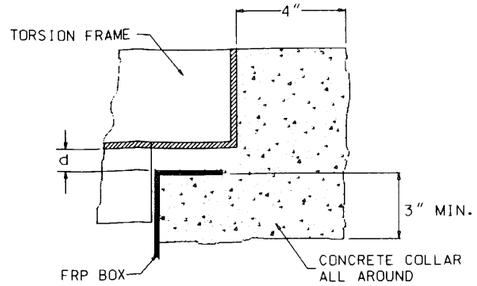
DISTRICT	CONTRACT W.O.	DWP W.O.	
CITY OF LOS ANGELES DEPARTMENT OF WATER AND POWER DISTRIBUTION ENGINEERING & SERVICES SECTION		FIBERGLASS REINFORCED POLYMER HANDHOLE 24" X 36" X 36"	
DESIGN SA'ID PODSTI	DRAFTING J.GARCIA		
OK	CHECKER		
APPROVED JOHN McMAHON	DATE 01/15/98	E-617	SHEET 1 OF 1

INDEX



TOP VIEW

IF d IS GREATER THAN 2" USE DWP-3 CONCRETE. IF d IS LESS THAN 2" GROUT MAT BE USED. IN PAVED AREA, SUCH AS IN SIDEWALKS, THE 4" CONCRETE COLLAR MAY BE ELIMINATED.



DETAIL D

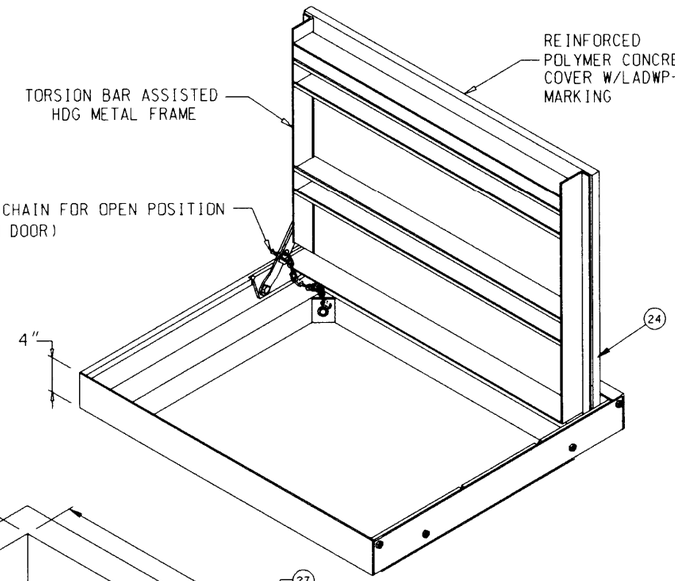
HANDHOLE SETTING DETAIL IN AN UNPAVED AREA WHERE THERE ARE NO SIDEWALKS

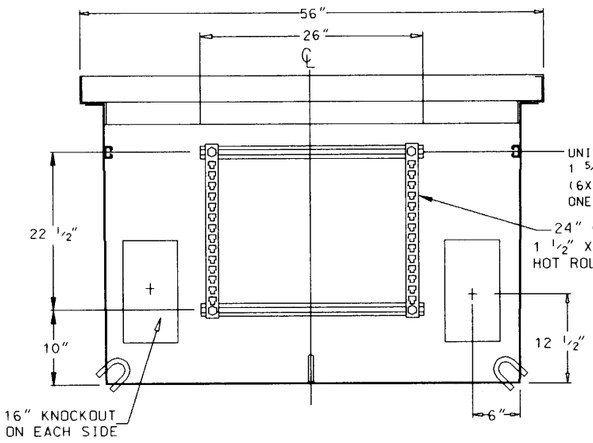
APPROVED MANUFACTURER

ARMORCAST PRODUCTS CO.
PART # A6001671A-DWP

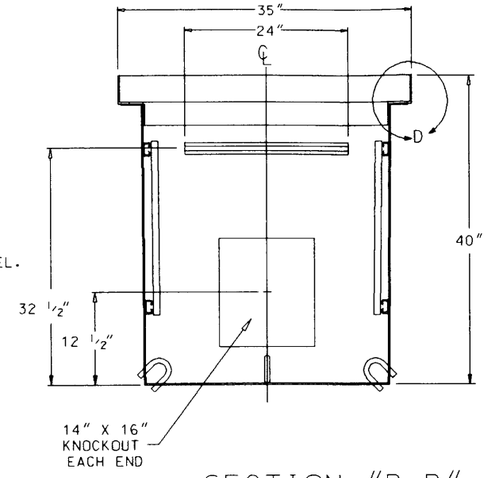
G-2	G-1	PART	DESCRIPTION
X	X	21	ASSEMBLY
1	1	22	** BASE SECTION, MAX. WT=
1	1	23	TOP SECTION (SEE NOTES)
1	1	24	** COVER SEE NOTES
3/8	1/4	25	* CUBIC YARD, BASE MATERIAL
1	1	26	* GROUND ROD 5/8" DIA X 8', 304 SST CLAD
13	13	27	HOT DIP GALV. STEEL STRUT (FT.)

* NOT A PART OF PRECAST ASSEMBLAGE
** TO BE CHECKED WITH MANUFACTURER

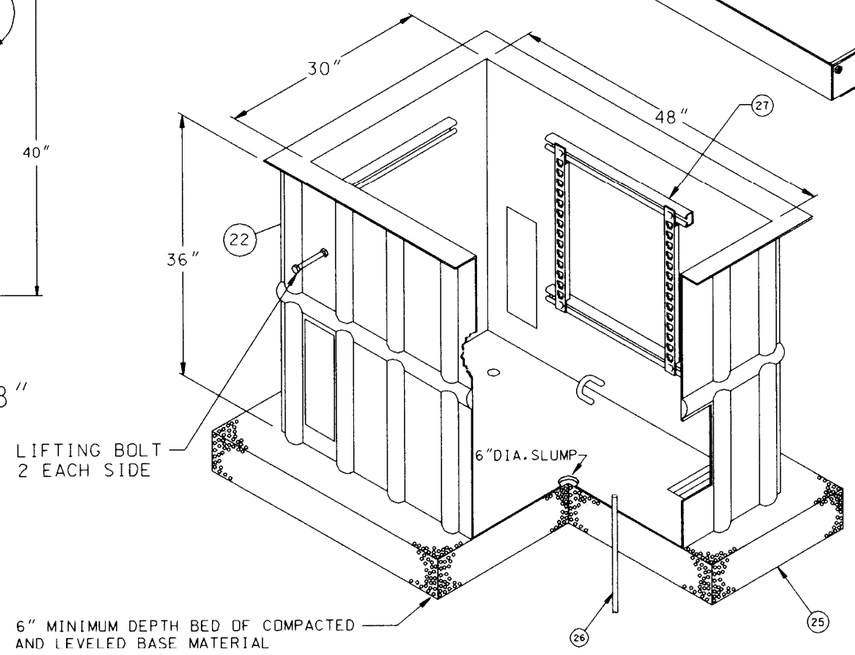




SECTION "A-A"



SECTION "B-B"



NOTES:

1. INSTALLATION - HANDHOLES SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS OF DWP UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO. 104, AS LAST REVISED.
2. NAME OF MANUFACTURER AND DATE OF MANUFACTURE SHALL BE STAMPED ON THE INSIDE OF BOX AND COVER.

PT.21 - ASSEMBLY - HANDHOLE SHALL BE FRP WITH STEEL TORSION FRAME AND POLYMERE CONCRETE COVER

PT.24 - COVER - SHALL BE REINFORCED PLASTIC MOTAR (RPM) COVER UNLESS OTHERWISE SPECIFIED.

RPM - CONCRETE TEXTURED FOR SIDEWALK AND DRIVEWAY TRAFFIC USE ONLY. PER PDCS UB709-01

STEEL TRAFFIC - FOR AREAS SUBJECT TO HEAVY VEHICULAR TRAFFIC PER PDCS UB709-03.

PT.25 - BASE MATERIAL SHALL BE 3/4" MAXIMUM CRUSHED AGGREGATE BASE.

PT.26 - THE INSTALLING CONTRACTOR SHALL INSTALL ONE GROUNDING ROD IN EITHER CORNER OF HANDHOLE FLOOR AS SHOWN UNLESS DIRECTED OTHERWISE BY THE DEPARTMENT ENGINEER OR REPRESENTATIVE. GROUND ROD TO BE GROUTED IN.

(21)

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.

DISTRICT | CONTRACT W.O. | DWP W.O.

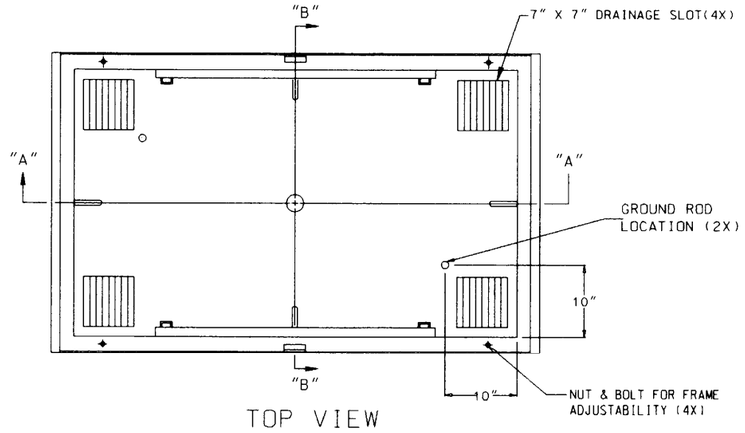
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN | DRAFTING J.GARCIA
OK | CHECKER
APPROVED | DATE 01/15/98

FIBERGLASS REINFORCED POLYMER HANDHOLE 30" X 48" X 36"

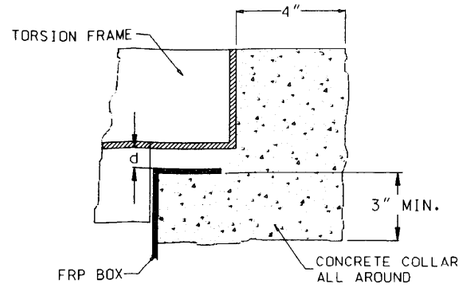
E-619 | SHEET 1 OF 1

INDEX



TOP VIEW

IF d IS GREATER THAN 2" USE DWP-3 CONCRETE. IF d IS LESS THAN 2" GROUT MAY BE USED. IN PAVED AREA SUCH AS IN SIDEWALKS, THE 4" CONCRETE COLLAR MAY BE ELIMINATED.



DETAIL D

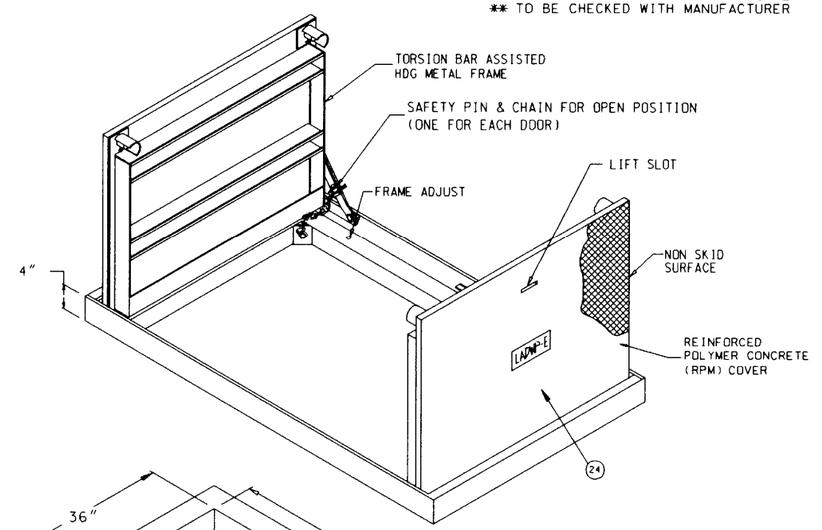
HANDHOLE SETTING DETAIL IN AN UNPAVED AREA WHERE THERE ARE NO SIDEWALKS

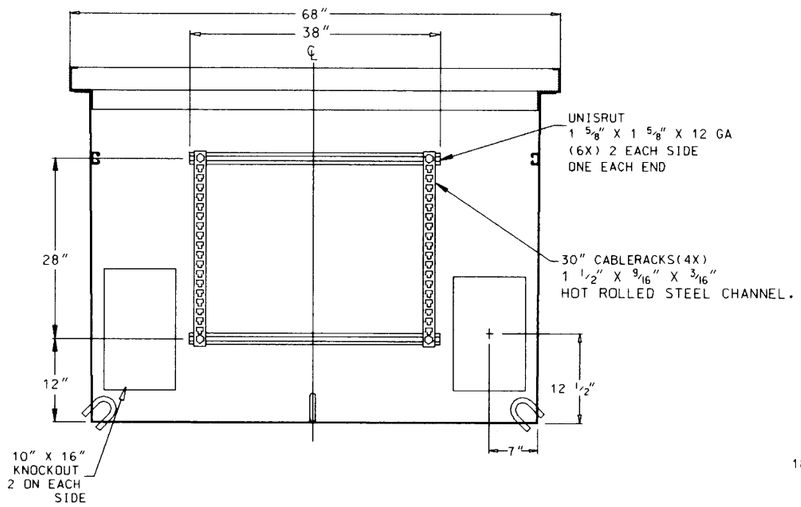
APPROVED MANUFACTURER

ARMORCAST PRODUCTS CO.
PART # A6001672A-DWP

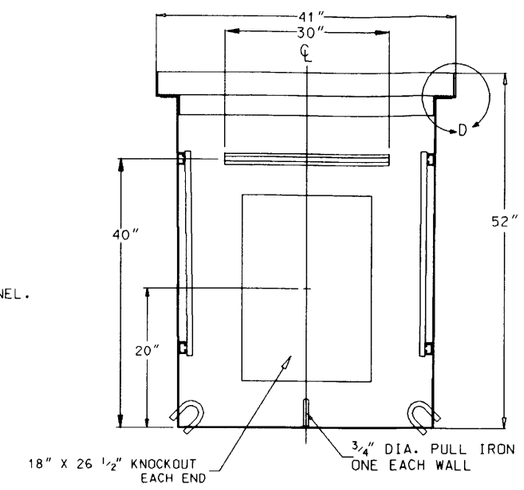
G-1	PART	DESCRIPTION
X	21	ASSEMBLY
1	22	** BASE SECTION, MAX. WT=
1	24	** COVER SEE NOTES
1/2	25	* CUBIC YARD, BASE MATERIAL
1	26	* GROUND ROD 5/8 " DIA X 8', 304 SST CLAD
18	27	HOT DIP GALV. STEEL STRUT (FT)

* NOT A PART OF PRECAST ASSEMBLAGE
** TO BE CHECKED WITH MANUFACTURER

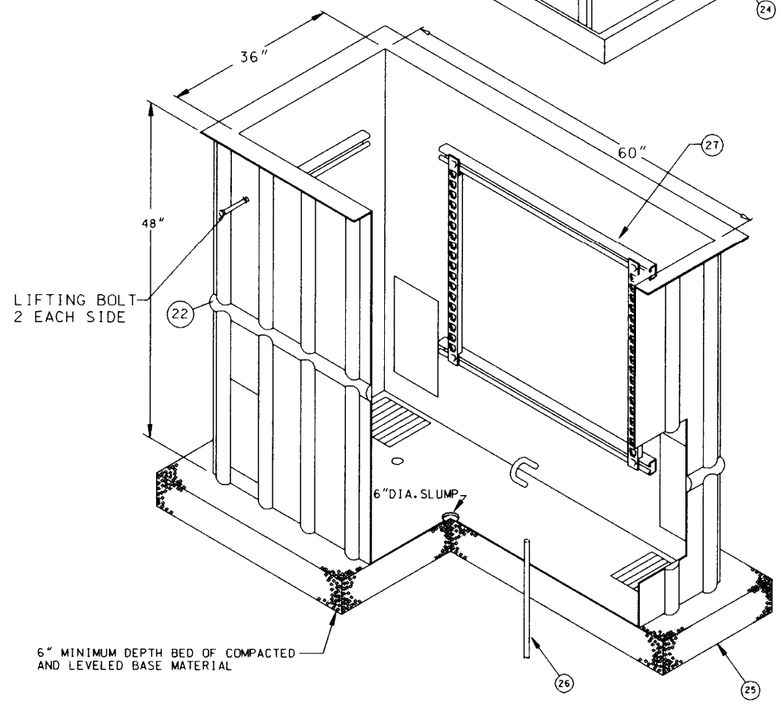




SECTION "A-A"



SECTION "B-B"



NOTES:

1. INSTALLATION - HANDHOLE SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS OF DWP UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO. 104, AS LAST REVISED.
2. NAME OF MANUFACTURER AND DATE OF MANUFACTURE SHALL BE STAMPED ON THE INSIDE OF BOX AND COVER.

PT.21 - ASSEMBLY - HANDHOLE SHALL BE FRP WITH STEEL TORSION FRAME AND POLYMER CONCRETE COVER

PT.24 - COVER SHALL BE REINFORCED PLASTIC MOTAR (RPM) UNLESS OTHERWISE SPECIFIED.

RPM - CONCRETE TEXTURED FOR PARKWAY AND DRIVEWAY TRAFFIC USE ONLY, PER PDCS UB709-02.

STEEL TRAFFIC - FOR AREAS SUBJECT TO HEAVY VEHICULAR TRAFFIC, PER PDCS UB709-04.

PT.25 - BASE MATERIAL SHALL BE 3/4" MAXIMUM CRUSHED AGGREGATE BASE.

PT.26 - THE INSTALLING CONTRACTOR SHALL INSTALL ONE GROUNDING ROD IN EITHER CORNER OF HANDHOLE FLOOR AS SHOWN. UNLESS DIRECTED OTHERWISE BY THE DEPARTMENT ENGINEER OR REPRESENTATIVE.

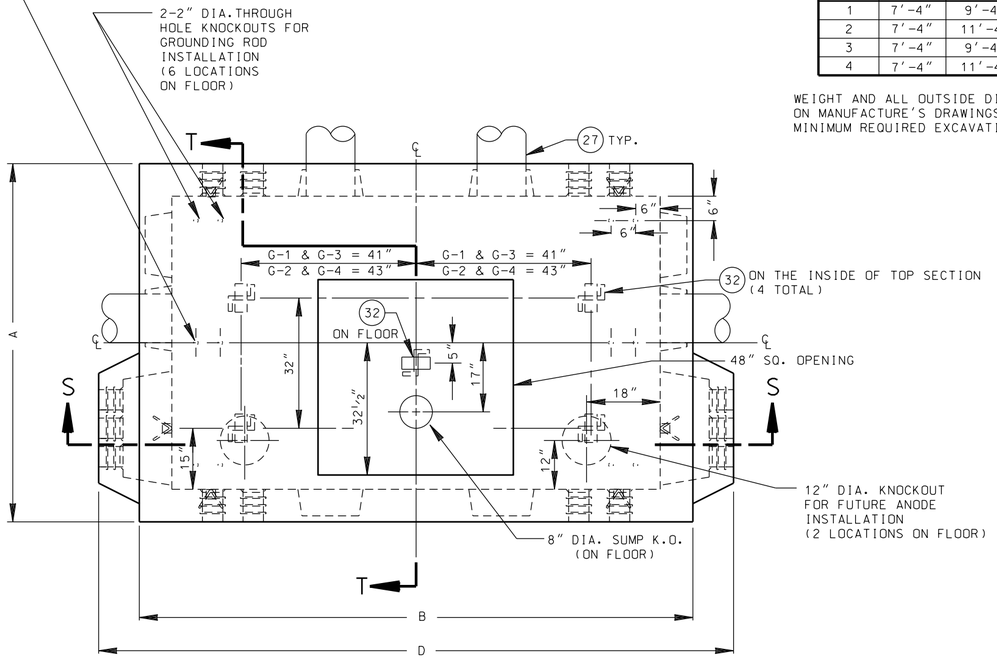
21

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.

DISTRICT	CONTRACT W.O.	DWP W.O.			
CITY OF LOS ANGELES DEPARTMENT OF WATER AND POWER DISTRIBUTION ENGINEERING & SERVICES SECTION		FIBERGLASS REINFORCED POLYMER HANDHOLE 36" X 60" X 48"			
DESIGN	DRAFTING J.GARCIA				
OK	CHECKER				
APPROVED	DATE 01/15/98	E-621		SHEET 1 OF 1	

INDEX

THE INSTALLING CONTRACTOR SHALL INSTALL GROUNDING RODS IN EACH 2" DIA. FLOOR KNOCKOUT NEAR THE MIDDLE OF EACH END WALL (TOTAL 4) UNLESS DIRECTED OTHERWISE BY THE DEPARTMENT ENGINEER OR REPRESENTATIVE. GROUND RODS TO BE GROUTED IN.



PLAN VIEW

PRECAST NECK, GRADE RING & COVER ASSEMBLY NOT SHOWN

29

29 GROUP	A	B	C	D	E	LADDER LENGTH	MAX.WT. HEAVIEST SECTION LBS
1	7'-4"	9'-4"	8'-6"	11'-0"	8"	10'-0"	23,000
2	7'-4"	11'-4"	8'-6"	13'-0"	8"	10'-0"	26,200
3	7'-4"	9'-4"	11'-0"	11'-0"	10"	12'-0"	23,000
4	7'-4"	11'-4"	11'-0"	13'-0"	10"	12'-0"	26,200

WEIGHT AND ALL OUTSIDE DIMENSIONS VARY WITH MANUFACTURER. VALUES GIVEN ARE LARGEST SHOWN ON MANUFACTURE'S DRAWINGS. PRIOR TO EXCAVATION, STRUCTURE INSTALLER SHALL OBTAIN THE MINIMUM REQUIRED EXCAVATION SIZE FROM THE MANUFACTURER SUPPLYING THE STRUCTURE.

	G-4	G-3	G-2	G-1	PART	DESCRIPTION	DRAWING OR CAT.NO.
	X	X	X	X	21	ASSEMBLY	
	X	X	X	X	22	INSERT NUT, 1/2"	
29	6	6	6	6	23	PULL IRON	1-825
	X	X	X	X	24	COIL INSERT, 1 1/2" SINGLE	TYPE S
	1	1	1	1	25	PRECAST NECK, GRADE RING & COVER ASS'Y.	1-802.G-1B
	1	1	1	1	26	LADDER & HANGING HARDWARE	2-361
29	X	X	X	X	27	*12"VENT ASSEMBLY (SEE NOTE)	
29	2	1 1/2	2	1 1/2	28	*CU.YD.CRUSHED AGGREGATE BASE	
29	X	X	X	X	29	*TONS SAND BACKFILL	
	4	4	4	4	30	*GROUND ROD 5/8" DIA.X 8' 304 SST.CLAD	
29	40	40	40	40	31	5"TERMINATORS	
	5	5	5	5	32	STAINLESS STEEL PULL IRON ASSEMBLY	1-825
29	X	X	X	X	33	CONTINUOUS GALVANIZED STEEL STRUT (SEE SECTION S-S AND DETAIL)	

*NOT A PART OF PRECAST ASSEMBLAGE

REQUIREMENTS FOR FABRICATION:

VAULT SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P STANDARD SPECIFICATIONS NO. P178, AS LAST REVISED.

VAULT SHALL BE SO FABRICATED AS TO PROVIDE A DRY AND WATER TIGHT INSTALLATION.

ALL 1/2" INSERTS SHALL BE MADE FROM PLASTIC AND SHALL WITHSTAND A MINIMUM PULL-OUT LOAD OF 150 LBS./INSERT, AND A MINIMUM SHEAR LOAD OF 300 LBS./INSERT.

ALL PULL IRONS SHALL BE SO PLACED AS TO WITHSTAND A WORKING LOAD OF 20,000 LBS.

LADDER AND HANGING HARDWARE TO BE INSTALLED WITH VAULT.

USE STEEL FRAME AND COVERS (TRAFFIC TYPE) PER UGCS 2-418, UNLESS DESIGN ENGINEER SPECIFIES REINFORCED PLASTIC MORTAR (RPM) PER UGCS 2-419.

STRUT AND BOLT INSTALLATION SHALL WITHSTAND A MINIMUM SHEARLOAD OF 300 LBS./LF AND A PULL-OUT LOAD OF 150 LBS./BOLT. MAXIMUM SPACING REQUIRED IS 16" O.C. AND 3" FROM EACH END OF STRUT. UNLESS OTHERWISE NOTED.

ALL KNOCKOUTS EXCEPT THE 2" DIA. FLOOR KNOCKOUTS SHALL BE 1 1/2" UNREINFORCED CONCRETE, UNLESS OTHERWISE NOTED. ALL 2" DIA. FLOOR KNOCKOUTS SHALL HAVE CAST-IN WATER TIGHT DOUBLE MEMBRANE PLASTIC PLUGS.

REQUIREMENTS FOR INSTALLATION:

MANUFACTURER TO DELIVER PREFABRICATED VAULT TO JOB SITE AND SUPPLY SPREADER BAR FOR UNLOADING. DW&P OR INSTALLING CONTRACTOR TO PROVIDE MEANS FOR UNLOADING AND SETTING PRECAST UNITS INTO EXCAVATION.

SELECT A LOCATION FREE OF SUBSTRUCTURES, CLEAR OF OVERHEAD OBSTRUCTIONS THAT WOULD INTERFERE WITH THE BOOM OF A LARGE CRANE AND HAVE AMPLE WORKING ROOM FOR A CRANE TO UNLOAD THE SECTION FROM A TRUCK INTO THE EXCAVATION.

DO NOT REMOVE ANY FLOOR KNOCKOUT.

VAULT SHALL BE SET ON A COMPACTED LEVEL BED OF CRUSHED AGGREGATE BASE.

VAULT SHALL BE REJECTED IF ANY PORTION OF KEYWAY, 12" OR LONGER, IS MISSING OR DAMAGED.

VAULT SECTIONS SHALL BE SET WITH SEALING COMPOUND APPROVED BY THE DW&P UNDERGROUND ENGINEER AND SUPPLIED WITH VAULT.

ALL MAIN LINE CONDUIT ENTERING VAULT SHALL TERMINATE FLUSH WITH INSIDE RECESS SURFACE. TERMINATION SHALL BE WITH END BELLS OR CAST-IN TERMINATORS FOR ALL CONDUIT EXCEPT SERVICE CONDUIT. EDGES SHALL BE ROUNDED AND SMOOTH. NO SHARP OR ROUGH EDGES WILL BE ACCEPTED.

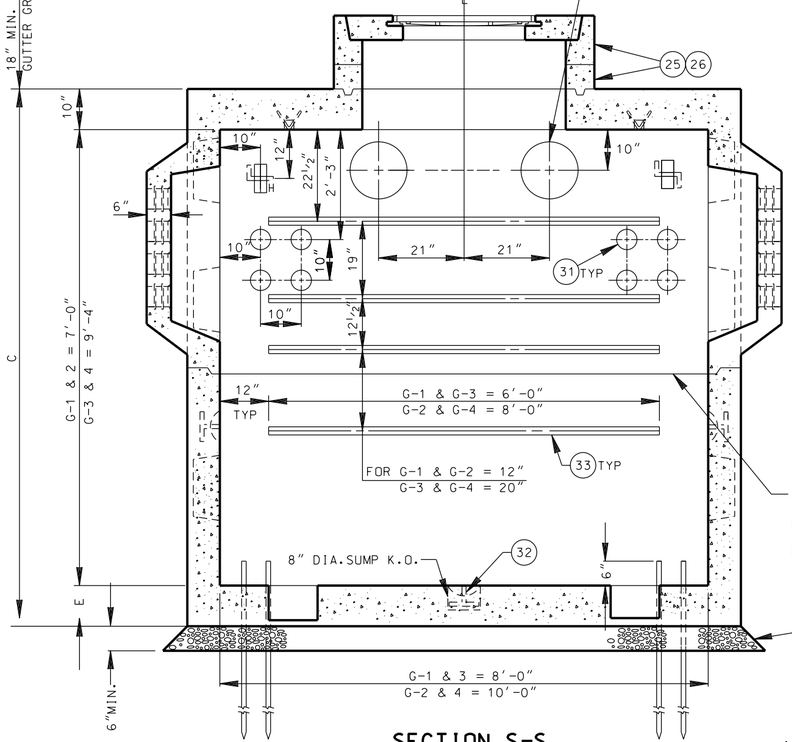
NECK, GRADE RING AND COVER SHALL BE SET AS PER UGCS 1-802, G-1B. CASTING RESTRAINT SYSTEM IF REQUIRED SHALL BE SUPPLIED BY PRECAST STRUCTURE MANUFACTURER. CONTRACTOR TO INSTALL CASTING RESTRAINT SYSTEM PER UGCS 1-802.2. SEE CONSTRUCTION DRAWING FOR REQUIREMENTS.

BACKFILL SHALL BE 100-E-100 SAND CEMENT SLURRY, OR AS SPECIFIED IN UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO.104, AS LAST REVISED.

VENT ASSEMBLY TO BE INSTALLED PER POWER DISTRIBUTION CONSTRUCTION STANDARD (PDCS) C730-10 UNLESS DESIGN ENGINEER SPECIFIES VENT ASSEMBLY PER (PDCS) C730-09. SEE CONSTRUCTION DRAWING FOR THE NUMBER OF VENTS.

THE LADDER LENGTHS GIVEN ARE DESIGNED TO ACCOMMODATE AN ADDITIONAL 6" OF GRADE RING BEYOND THE STANDARD 18" NECK. THE LADDER SHALL BE INCREASED ONE FOOT FOR EACH ADDITIONAL ONE FOOT INCREMENT OF GRADE RINGS THEREAFTER AS SHOWN ON UGCS 2-361. INSTALLATION PROCEDURE OF LADDER AND HANGING HARDWARE SHALL BE IN ACCORDANCE WITH UGCS 2-361 WHERE APPLICABLE.

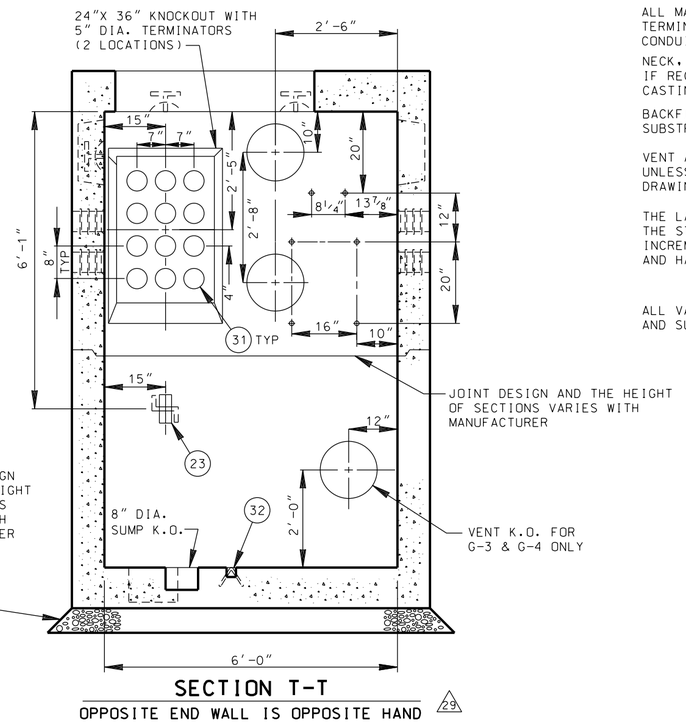
ALL VAULTS SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS OF DWP UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO.104, AS LAST REVISED.



SECTION S-S

OPPOSITE SIDE WALL IS IDENTICAL

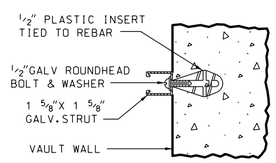
29



SECTION T-T

OPPOSITE END WALL IS OPPOSITE HAND

29



STRUT & BOLT DETAIL

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
29	09/24/15	EHP	REVISED WALL,ROOF,AND FLOOR THICKNESSES. KEY SECTION. REMOVED DUCT KO'S.ADDED TERMINATORS. VENTS. AND STRUTS. RELOCATED PULL IRONS AND INSERTS. REV. CALLOUTS.	J.M.A.	
28	06/13/12	EHP	REMOVED TWO PULL IRONS (PART #23)FROM CEILING. REVISED DIMENSIONS FOR PART #32 ON CEILING.	J.M.A.	
27	04/29/11	JD	ADDED PULL IRONS (PART #32). REVISED DIMENSIONS & NOTES.	J.M.A.	
26	10/15/96	JHG	ADDED PART #30 .CHANGED FLR. K.O./REDRAWN IN CAD		

DRAWING CIRCULATION: PRELIM. | FINAL

DISTRICT | CONTRACT W.O. | DWP W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

PRECAST VAULTS RECTANGULAR

DESIGN	J.D.McMAHON	DRAFTING	J.GARCIA/DHA
OK	C.MASUO	CHECKER	CAL
APPROVED	A.R.SHASKY	DATE	10/15/96

G-284 | SHEET 1 OF 1

21

INDEX

GROUP	A	B	C	D	MAX. WT. HEAVIEST SECTION LBS
1	5′-0″	7′-6″	8′-7″	8′-9″	9,625
2✱	5′-0″	7′-6″	10′-11″	8′-9″	10,150

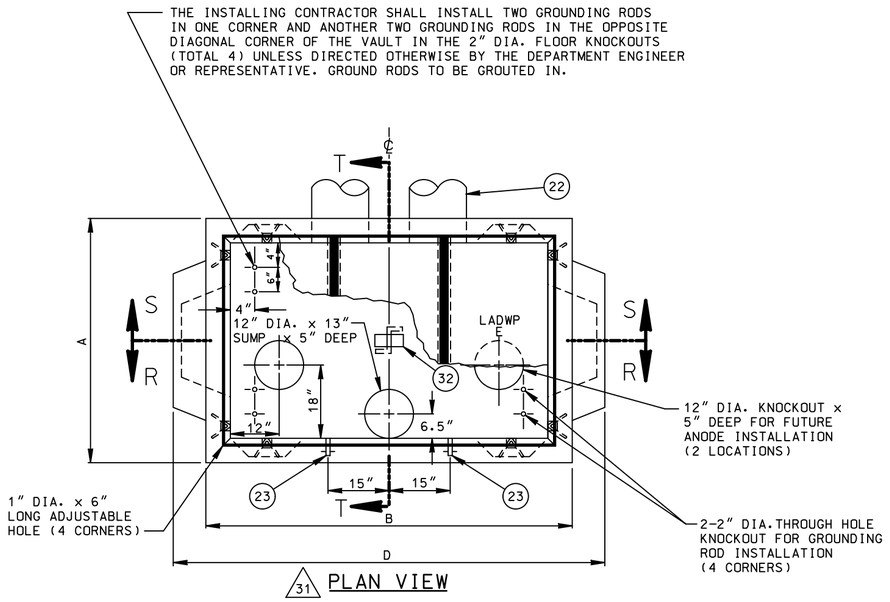
31

✱ GROUP 2 FOR REFERENCE ONLY. NO LONGER AVAILABLE DUE TO INACCESSIBILITY TO CABLE

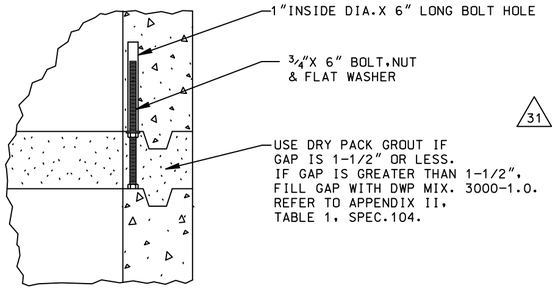
G-2	G-1	PART	DESCRIPTION	DRAWING OR CAT.NO.
X	X	21	ASSEMBLY (NOTE)	
X	X	22	✱12″ VENT ASSEMPLY	C730-10
6	6	23	1/2″ PLASTIC INSERTS	
9	9	24	7/8″ DIA. PULL IRON	1-825
4	4	25	ADJUSTABLE BOLT ASSEMBLY (DETAIL)	
		26	1/2″ PLASTIC INSERTS	
1	1	27	3 SECTION POLYMER CONCRETE COVER, FRAME, & HSS BEAM	E-628.2-431
		28		
24	17	29	✱TONS SAND BACKFILL	
1	1	30	✱CU YD. CRUSHER RUN BASE	
4	4	31	✱ GROUND ROD 5/8″ DIA. X 8′ 304 SST CLAD	
1	1	32	TYPE 304 STAINLESS STEEL PULL IRON	
1	1	33	12″ GRADE RING EXTENSION	

31

✱ NOT A PART OF PRECAST ASSEMBLAGE



31 PLAN VIEW



PT.25
ADJUSTABLE BOLT DETAIL FOR SETTING TOP SECTION TO FINISHED GRADE
(ONE EACH CORNER)

REQUIREMENTS FOR FABRICATION:

VAULT SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DWP STANDARD SPECIFICATIONS NO. P178, AS LAST REVISED.

VAULT SHALL BE SO FABRICATED AS TO PROVIDE A DRY AND WATER TIGHT INSTALLATION.

ALL 1/2″ INSERTS SHALL BE MADE FROM PLASTIC AND SHALL WITHSTAND A MINIMUM PULL-OUT LOAD OF 150 LBS./INSERT, AND A MINIMUM SHEAR LOAD OF 300LBS./INSERT.

ALL PULL IRONS PER UGCS 1-825.

31 COVER SHALL BE POLYMER CONCRETE COVER PER UGCS 2-431 UNLESS OTHERWISE SPECIFIED. COVER SHALL BE 3 SECTION (PT.27) CONCRETE TEXTURED. FRAME SHALL BE MANUFACTURED PER DWP DWG. E-628, AS LAST REVISED.

ALL KNOCKOUTS EXCEPT THE 2″ DIA. FLOOR KNOCKOUTS SHALL BE 1 1/2″ UNREINFORCED CONCRETE. ALL 2″ DIA. FLOOR KNOCKOUTS SHALL HAVE CAST-IN WATER TIGHT DOUBLE MEMBRANE PLASTIC PLUGS.

REQUIREMENTS FOR INSTALLATION:

MANUFACTURER TO DELIVER PREFABRICATED VAULT TO JOB SITE AND PROVIDE MEANS FOR UNLOADING AND SETTING SECTIONS INTO EXCAVATION.

SELECT A LOCATION FREE OF SUBSTRUCTURES, CLEAR OF OVERHEAD OBSTRUCTIONS THAT WOULD INTERFERE WITH THE BOOM OF A LARGE CRANE AND HAVE AMPLE WORKING ROOM FOR A CRANE TO UNLOAD THE SECTION FROM A TRUCK INTO THE EXCAVATION.

DO NOT REMOVE ANY FLOOR KNOCKOUT.

VAULT SHALL BE SET ON A COMPACTED LEVEL BED OF CRUSHED AGGREGATE BASE.

VAULT SHALL BE REJECTED IF ANY PORTION OF KEYWAY, 12″ OR LONGER, IS MISSING OR DAMAGED.

VAULT SECTIONS SHALL BE SET WITH SEALING COMPOUND APPROVED BY THE DW&P UNDERGROUND ENGINEER AND SUPPLIED WITH VAULT.

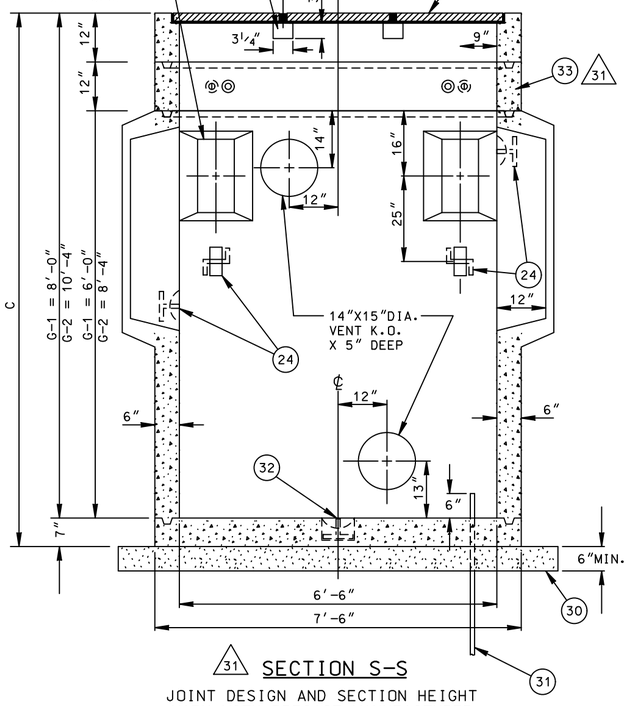
ALL MAIN LINE CONDUIT ENTERING VAULT SHALL TERMINATE FLUSH WITH INSIDE RECESS SURFACE. TERMINATION SHALL BE WITH END BELLS OR CAST-IN TERMINATORS FOR ALL CONDUIT EXCEPT SERVICE CONDUIT. EDGES SHALL BE ROUNDED AND SMOOTH. NO SHARP OR ROUGH EDGES WILL BE ACCEPTED.

BACKFILL SHALL BE 100-E-100 SAND CEMENT SLURRY, OR AS SPECIFIED IN UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO.104, AS LAST REVISED.

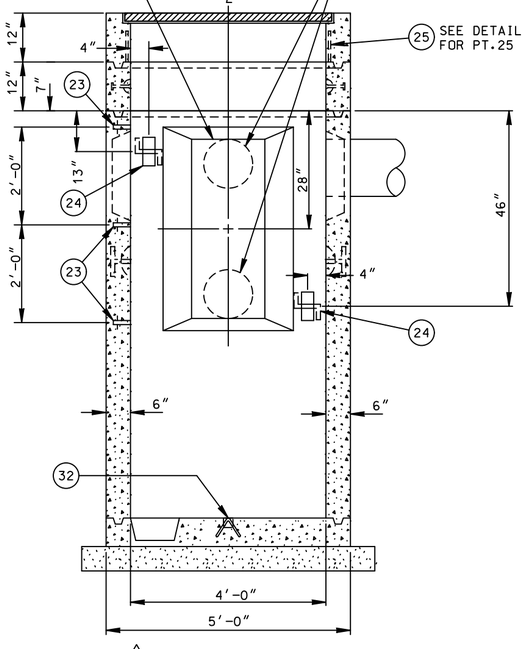
VENT ASSEMPLY TO BE INSTALLED PER POWER DISTRIBUTION CONSTRUCTION STANDARD (PDCS) C730-10 UNLESS DESIGN ENGINEER SPECIFIES VENT ASSEMPLY PER PDCS C730-09. SEE CONSTRUCTION DRAWING FOR THE NUMBER OF VENTS.

WEIGHT AND ALL OUTSIDE DIMENSIONS VARY WITH MANUFACTURER. VALUES GIVEN ARE LARGEST SHOWN ON MANUFACTURER'S DRAWINGS. PRIOR TO EXCAVATION STRUCTURE INSTALLER SHALL OBTAIN THE MINIMUM REQUIRED EXCAVATION SIZE FROM THE MANUFACTURER SUPPLYING THE STRUCTURE.

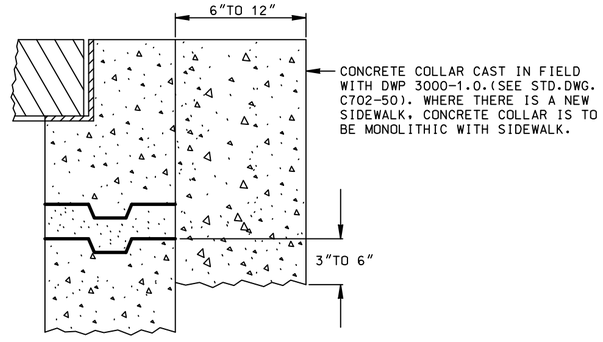
ALL VAULTS SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS OF DW&P UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO.104, AS LAST REVISED.



31 SECTION S-S
JOINT DESIGN AND SECTION HEIGHT VARY WITH PRECAST MANUFACTURER



31 SECTION T-T
NOTE: OPPOSITE END WALL LOOKS THE SAME



COLLAR DETAIL

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
31	05/07/21	DDW	REVISED PLAN VIEW, SECTIONS, DIMENSIONS & DETAILS, 12″ GRADE RING EXTENSION		Y21-0038
30	08/08/19	EAS	REVISED DIMENSIONS, CALLOUTS		
29	07/17/19	DQN	REVISED DIM, REVISED CALLOUTS REPLACED SECTION R-R ON SHEET 2	OEJ	
28	05/17/19	EJP	REVISED COVER, REVISED DIM, ADDED SHEET 2		
27	11/12/13	JHG	ADDED COLLAR DETAIL, REVISED CALLOUTS, DIMENSIONS AND NOTES.	JA	
26	10/17/96	JHG	ADDED PT.NO.31/REDRAWN IN CAD	JA	

DRAWING CIRCULATION: PRELIM. | FINAL

DISTRICT | CONTRACT W.O. | DWP W.O.

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

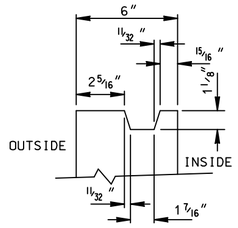
DESIGN D.L.MORRIS | DRAFTING ARA / J.GARCIA
OK B.BOYCHUK | CHECKER CAL
APPROVED ——— | DATE 10/17/96

PRECAST VAULT
PARKWAY TYPE
4′-0″X 6′-6″
WUC NO.450

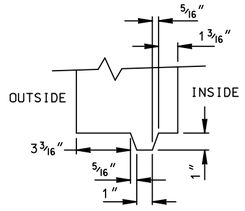
G-286 | SHEET 1 OF 2

	G-2	G-1	PART	DESCRIPTION	DRAWING OR CAT.NO.
	X	X	21	ASSEMBLY (NOTE)	
	X	X	22	✱12″ VENT ASSEMPLY	C730-10
	6	6	23	1/2″ PLASTIC INSERTS	
31	9	9	24	7/8″ DIA. PULL IRON	1-825
	4	4	25	ADJUSTABLE BOLT ASSEMBLY (DETAIL)	
			26	1/2″ PLASTIC INSERTS	
	1	1	27	3 SECTION POLYMER CONCRETE COVER, FRAME, & HSS BEAM	E-628.2-431
			28		
	24	17	29	✱TONS SAND BACKFILL	
	1	1	30	✱CU YD. CRUSHER RUN BASE	
	4	4	31	✱ GROUND ROD 5/8″ DIA. X 8′ 304 SST CLAD	
31	1	1	32	TYPE 304 STAINLESS STEEL PULL IRON	
31	1	1	33	12″ GRADE RING EXTENSION	

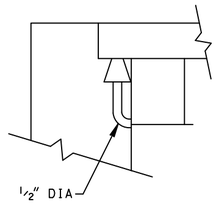
✱ NOT A PART OF PRECAST ASSEMBLAGE



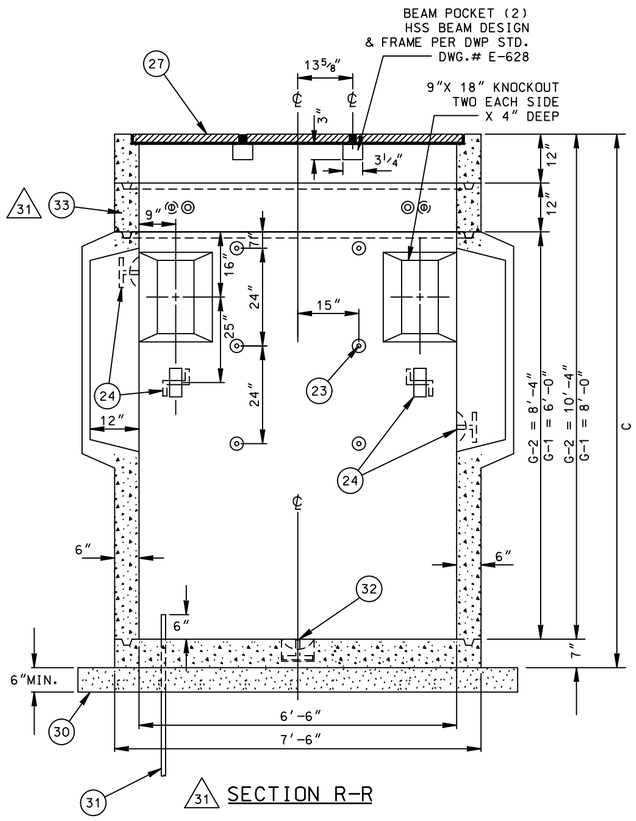
31 DETAIL A



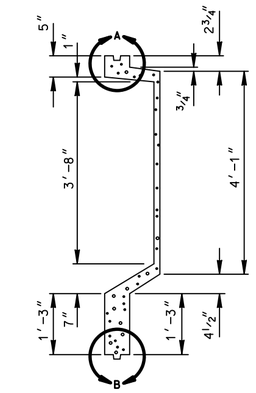
31 DETAIL B



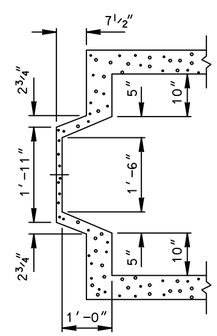
DETAIL CLEANOUT



31 SECTION R-R

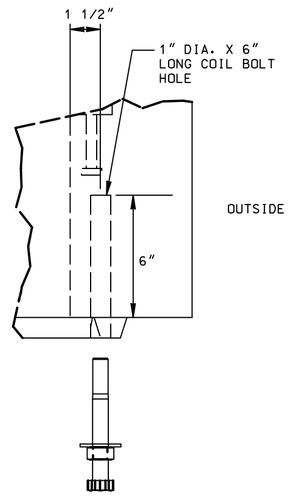


31 ELEVATION



PLAN

18″ X 44″ DEEP KNOCK OUT



31 DETAIL ADJUSTMENT BOLT

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
31	05/07/21	DDW	REVISED PLAN VIEW, SECTIONS, DIMENSIONS & DETAILS, 12″ GRADE RING EXTENSION		Y21-0038
30	08/08/19	EAS	REVISED DIMENSIONS, CALLOUTS		
29	07/17/19	DQN	REVISED DIM, REVISED CALLOUTS REPLACED SECTION R-R ON SHEET 2	OEJ	
28	05/17/19	EJP	REVISED COVER, REVISED DIM, ADDED SHEET 2		
27	11/12/13	JHG	ADDED COLLAR DETAIL, REVISED CALLOUTS, DIMENSIONS AND NOTES.	JA	
26	10/17/96	JHG	ADDED PT.NO.31/REDRAWN IN CAD	JA	

DRAWING CIRCULATION: PRELIM. | FINAL

DISTRICT | CONTRACT W.O. | DWP W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

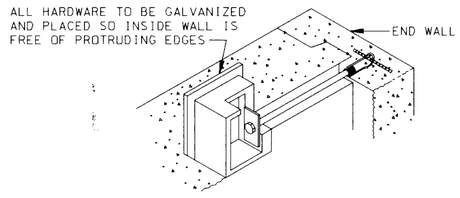
DESIGN D.L.MORRIS | DRAFTING ARA / J.GARCIA
OK B.BOYCHUK | CHECKER CAL
APPROVED | DATE 10/17/96

PRECAST VAULT PARKWAY TYPE 4′-0″X 6′-6″ WUC NO.450

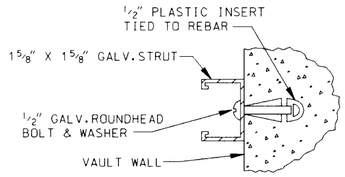
G-286 | SHEET 2 OF 2

DSD-10	SPCV-35
DCSV-3	B-3
DUS-15	Q-2
D-1-S-6	U-2
SPC-45	

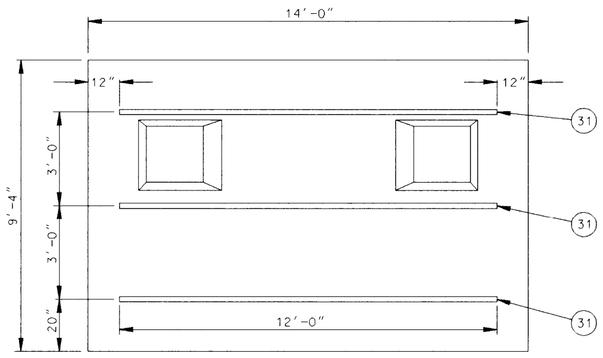
INDEX



DETAIL OF WALL FASTENER
8 REQUIRED-SUPPLIED WITH VAULT



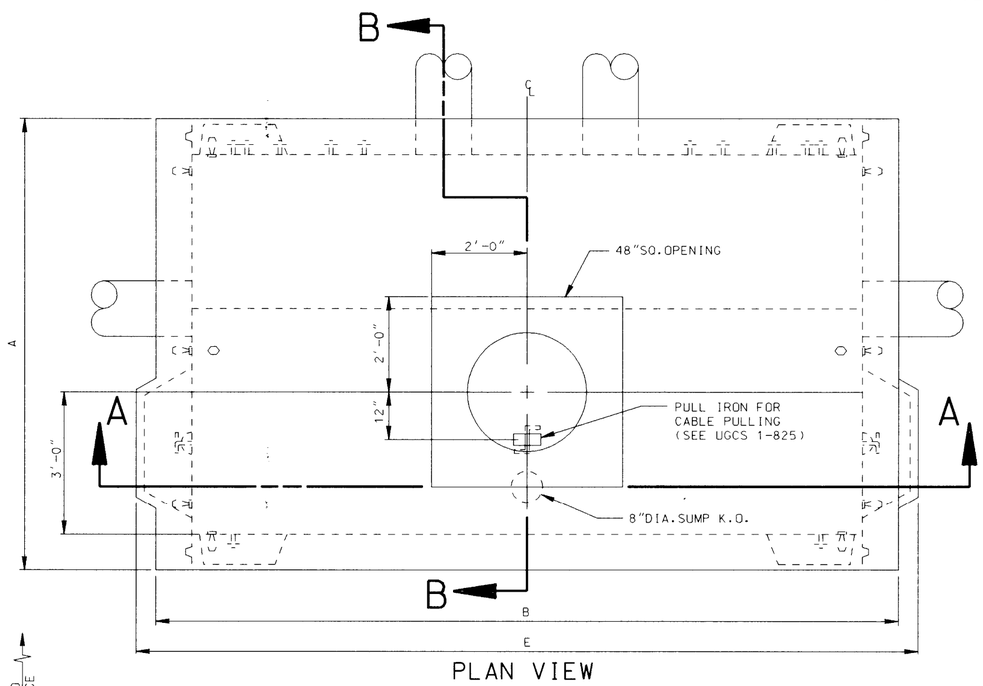
STRUT & BOLT DETAIL



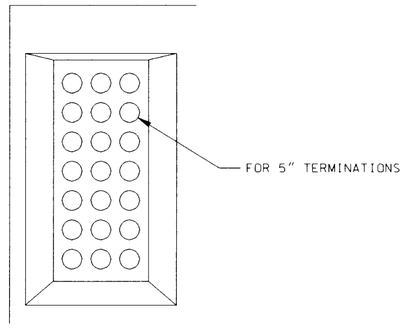
INSIDE VIEW OF FRONT WALL
SHOWING CONTINUOUS STRUT LOCATION

G-1	PART	DESCRIPTION	DRAWING OR CAT.NO.
X	21	ASSEMBLY	
1	22	PRECAST FLOOR	
1	23	PRECAST RIGHT END WALL	
1	24	PRECAST LEFT END WALL	
1	25	PRECAST FRONT WALL	
1	26	PRECAST REAR WALL	
1	27	PRECAST ROOF	
1	28	PRECAST NECK, GRADE RING & COVER ASSY.. 48"SQ.HD.	1-802.G-1B
2	29	* 12" VENT ASSEMBLY (SEE NOTE)	1-821.1
4	30	*CU YD. CRUSHER RUN BASE	
5	31	CONTINUOUS METAL STRUT	
1	32	LADDER AND HANGING HARDWARE	2-361
39	33	* TONS. SAND BACKFILL	
42	42	5" TERMINATORS	2-211
14	35	1/2" BRONZE INSERT W/BRONZE BOLT	

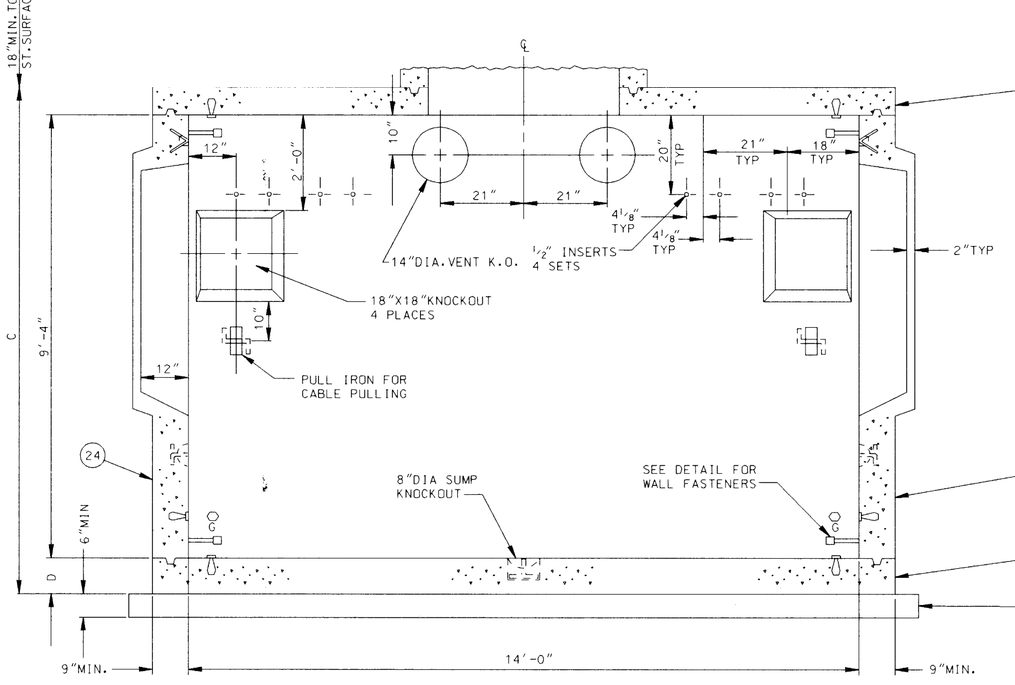
* NOT A PART OF PRECAST ASSEMBLAGE



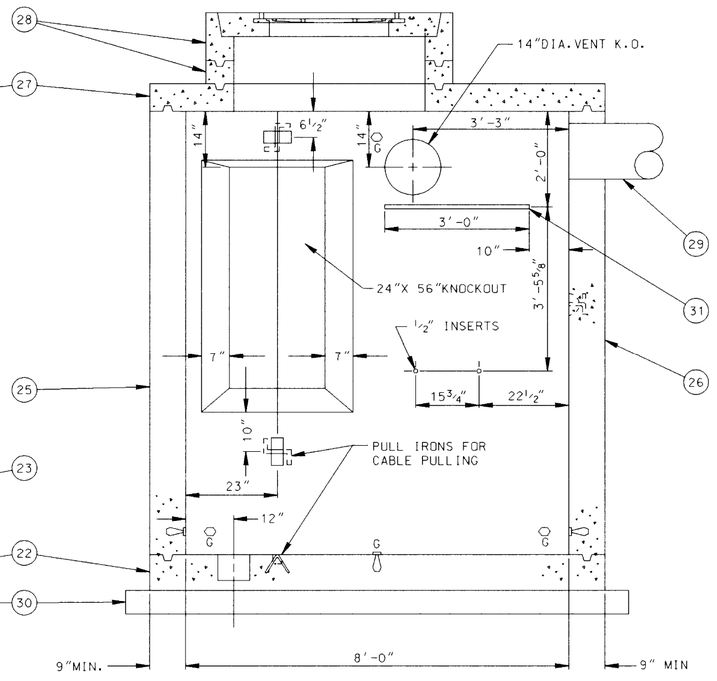
PLAN VIEW



OPTIONAL DUCT TERMINATOR DIAGRAM
EACH TERMINATOR MUST BE PLUGGED WHEN DELIVERED



SECTION A-A



SECTION B-B
OPPOSITE VIEW IS OPPOSITE HAND

REQUIREMENTS FOR FABRICATION

VAULT SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DWP STANDARD SPECIFICATIONS P-178, AS LAST REVISED.

VAULT SHALL BE SO FABRICATED AS TO PROVIDE A DRY AND WATER TIGHT INSTALLATION.

ALL 1/2" INSERTS SHALL BE MADE FROM PLASTIC AND SHALL HAVE A MINIMUM PULL-OUT AND SHEAR STRENGTH OF 150LBS./INSERT.

PULL IRONS PER UGCS 1-825. SHALL BE SO PLACED AS TO WITHSTAND A WORKING LOAD OF 20,000 LBS.

LADDER AND HANGING HARDWARE TO BE INSTALLED WITH VAULT.

USE STEEL FRAME AND COVERS (TRAFFIC TYPE) PER UGCS 2-418, UNLESS DESIGN ENGINEER SPECIFIES REINFORCED PLASTIC MORTAR (RPM) PER UGCS 2-419.

STRUT AND BOLT INSTALATION SHALL WITHSTAND A MINIMUM SHEAR LOAD OF 300 LBS./FT. AND A PULL-OUT LOAD OF 150 LBS./BOLT. MAXIMUM SPACING REQUIRED IS 16" O. C. AND 3" FROM EACH END OF STRUT.

ALL BRONZE GROUND INSERT SHALL BE WELDED TO THE STRUCTURAL REINFORCEMENT AND LOCATED WITH A 2-INCH SQUARE LETTER "G" CAST IN THE CONCRETE.

REQUIREMENTS FOR INSTALLATION

MANUFACTURER TO DELIVER PREFABRICATED VAULT TO JOB SITE AND SUPPLY SPREADER BAR FOR UNLOADING. DW&P OR INSTALLING CONTRACTOR TO PROVIDE MEANS FOR UNLOADING AND SETTING PRECAST UNITS.

SELECT A LOCATION FREE OF SUBSTRUCTURE, CLEAR OF OVERHEAD OBSTRUCTIONS THAT WOULD INTERFERE WITH THE BOOM OF A LARGE CRANE AND HAVE AMPLE WORKING ROOM FOR A CRANE TO UNLOAD THE SECTION FROM A TRUCK INTO THE EXCAVATION.

DO NOT REMOVE ANY SUMP KNOCKOUT.

VAULT SHALL BE SET ON A COMPACTED LEVEL BED OF CRUSHER RUN BASE.

VAULT SHALL BE REJECTED IF ANY PORTION OR KEYWAY, 12"OR LONGER,IS MISSING OR DAMAGED.

VAULT SECTIONS SHALL BE SET WITH SEALING COMPOUND APPROVED BY THE DWP UNDERGROUND ENGINEER AND SUPPLIED WITH VAULT.

ALL MAIN LINE CONDUIT ENTERING VAULT SHALL TERMINATE FLUSH WITH INSIDE RECESS SURFACE.

NECK, GRADE RING AND COVER SHALL BE SET AS PER UGCS 1-802.G-1B.

SAND BACKFILL SHALL BE REQUIRED.

VENT ASSEMBLY TO BE INSTALLED PER UGCS 1-821.1 UNLESS DESIGN ENGINEER SPECIFIES VENT ASSEMBLY PER UGCS 1-822 OR 1-822.1.

THE LADDER LENGHTS GIVEN ARE DESIGNED TO ACCOMMODATE AN ADDITIONAL 9" OF GRADE RINGS BEYOND THE STANDARD 18" NECK. THE LADDER SHALL BE INCREASED ONE FOOT FOR EACH ADDITIONAL ONE FOOT INCREMENT OF GRADE RINGS THEREAFTER AS SHOWN ON UGCS 2-361. IF THE NECK SECTIONS EXCEED 4' IN LENGTH, FIELD CUT LADDER TO FIT NECESSARY CONDITIONS. SEE UGCS 2-361.1 FOR INSTALLATION PROCEDURE. INSTALLATION PROCEDURE OF LADDER AND HANGING HARDWARE SHALL BE IN ACCORDANCE WITH UGCS 2-361 WHERE APPLICABLE.

A	B	C	D	E	MAX.WT. HEAVIEST SECTION LBS		
					BROOKS PRODUCTS	ASSOCIATED CONCRETE	UTILITY VAULT
9'-6"	15'-6"	10'-8"	9"	16'-6"	15,700	14,300	19,100

THESE DIMENSIONS VARY WITH MANUFACTURER. VALUES GIVEN ARE LARGEST SHOWN ON MANUFACTURERES DRAWINGS. PRIOR TO EXCAVATION STRUCTURE INSTALLER SHALL OBTAIN THE MINIMUM REQUIRED EXCAVATION SIZE FROM THE MANUFACTURER SUPPLYING THE STRUCTURE.

GROUP	LADDER LENGTH
1	12'-0"

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
2	2/28/01	JHG	REDRAWN IN CAD		

DRAWING CIRCULATION: PRELIM. | FINAL

DISTRICT | CONTRACT W.O. | DWP W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	D.K.TOM	DRAFTING	J.GARCIA
CK	B.M.BOYCHUK	CHECKER	W.YCEDO
APPROVED	A.D.FRICKY	DATE	02/28/01

PRECAST VAULT
8'X 14'X 9'-4"PANEL TYPE

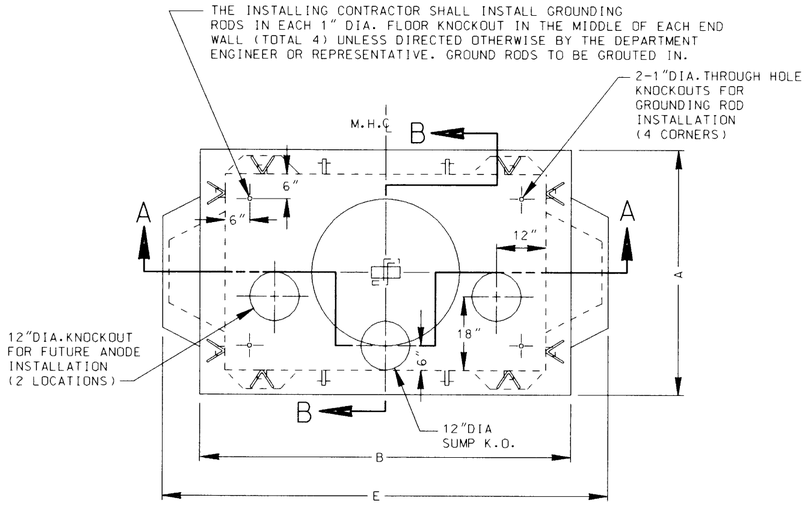
G-292 | SHEET 1 OF 1

INDEX

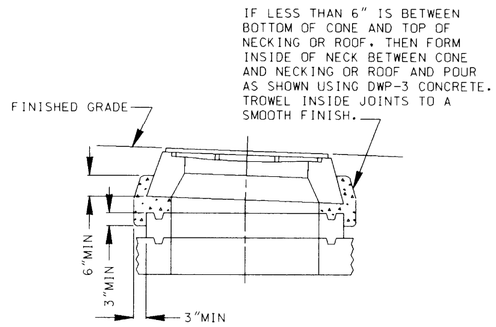
GROUP	A	B	C	D	E	MAX. WT. HEAVIEST SECTION LBS
1	5'-0"	7'-6"	6'-8"	7"	9'-0"	9,200
2	5'-0"	7'-6"	8'-2"	7"	9'-0"	10,100

G-2	G-1	PART	DESCRIPTION	DRAWING OR CAT.NO.
X	X	21	ASSEMBLY	
		22		
		23		
12	12	24	1/2" PLASTIC INSERTS	
9	9	25	PULL IRON	1-825
1	1	26	NECK RING	
1	1	27	REDUCING CONE	
1	1	28	FRAME & COVER	
1	1	29	*CU.YD.CRUSHER RUN BASE	
17	17	30	*TONS SAND-BACKFILL	
2	2	31	*GROUND ROD 5/8"DIA.X 8' 304 SST CLAD	

* NOT A PART OF PRECAST ASSEMBLACE



PLAN VIEW



ADJUSTMENT FOR GRADE

REQUIREMENTS FOR FABRICATION:

MAINTENANCE HOLE SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P STANDARD SPECIFICATIONS NO. P178, AS LAST REVISED.

MAINTENANCE HOLE SHALL BE SO FABRICATED AS TO PROVIDE A DRY AND WATER TIGHT INSTALLATION.

ALL 1/2" INSERTS SHALL BE MADE FROM PLASTIC AND SHALL WITHSTAND A MINIMUM PULL-OUT LOAD OF 150 LBS./INSERT, AND A MINIMUM SHEAR LOAD OF 300 LBS./INSERT.

ALL PULL IRONS PER UGCS 1-825 SHALL BE SO PLACED AS TO WITHSTAND A WORKING LOAD OF 20,000 LBS.

LADDER AND HANGING HARDWARE TO BE INSTALLED WITH MAINTENANCE HOLE.

USE STEEL FRAME AND COVERS (TRAFFIC TYPE) PER UGCS 2-418, UNLESS DESIGN ENGINEER SPECIFIES REINFORCED PLASTIC MORTAR (RPM) PER UGCS 2-419.

OPTIONAL DUCT AND VENT KNOCKOUTS SHALL BE PLACED IN THE LOCATIONS AS ORDERED BY THE DW&P UNDERGROUND ENGINEER.

ALL KNOCKOUTS EXCEPT THE 1" DIA. FLOOR KNOCKOUTS SHALL BE 1 1/2" UNREINFORCED CONCRETE. ALL 1" DIA. FLOOR KNOCKOUTS SHALL HAVE CAST-IN WATER TIGHT DOUBLE MEMBRANE PLASTIC PLUGS.

REQUIREMENTS FOR INSTALLATION:

MANUFACTURER TO DELIVER PREFABRICATED VAULT TO JOB SITE AND SUPPLY SPREADER BAR FOR UNLOADING. DW&P OR INSTALLING CONTRACTOR TO PROVIDE MEANS FOR UNLOADING AND SETTING PRECAST UNITS INTO EXCAVATION.

SELECT A LOCATION FREE OF SUBSTRUCTURES, CLEAR OF OVERHEAD OBSTRUCTIONS THAT WOULD INTERFERE WITH THE BOOM OF A LARGE CRANE AND HAVE AMPLE WORKING ROOM FOR A CRANE TO UNLOAD THE SECTION FROM A TRUCK INTO THE EXCAVATION.

DO NOT REMOVE ANY FLOOR KNOCKOUT.

MAINTENANCE HOLE SHALL BE SET ON A COMPACTED LEVEL BED OF CRUSHED AGGREGATE BASE.

MAINTENANCE HOLE SHALL BE REJECTED IF ANY PORTION OF KEYWAY, 12" OR LONGER, IS MISSING OR DAMAGED.

MAINTENANCE HOLE SECTIONS SHALL BE SET WITH SEALING COMPOUND APPROVED BY THE DW&P UNDERGROUND ENGINEER AND SUPPLIED WITH VAULT.

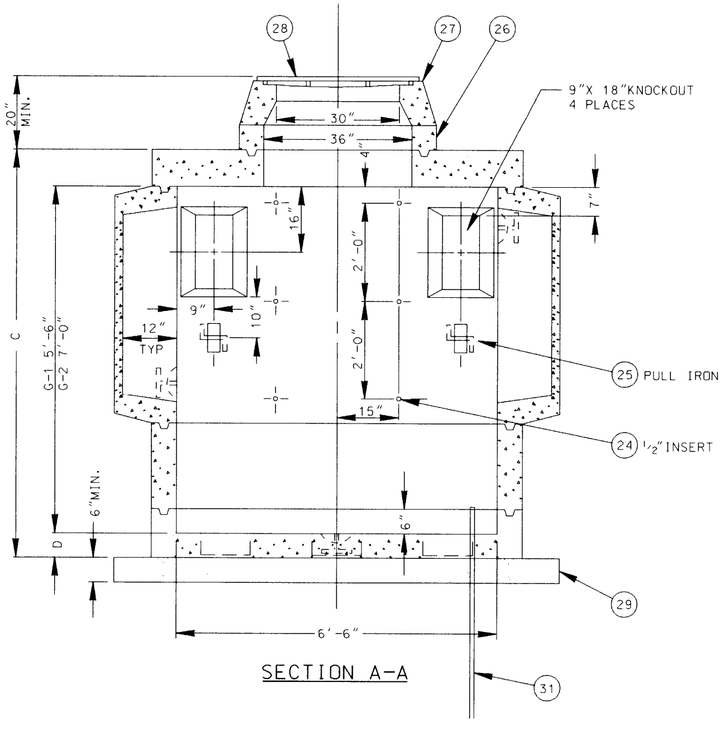
ALL MAIN LINE CONDUIT ENTERING MAINTENANCE HOLE SHALL TERMINATE FLUSH WITH INSIDE RECESS SURFACE. TERMINATION SHALL BE WITH END BELLS OR CAST-IN TERMINATORS FOR ALL CONDUIT EXCEPT SERVICE CONDUIT. EDGES SHALL BE ROUNDED AND SMOOTH. NO SHARP OR ROUGH EDGES WILL BE ACCEPTED.

NECK, REDUCING CONE AND COVER SHALL BE ADJUSTED AS REQUIRED TO RAISE COVER TO FINISHED STREET GRADE. (SEE DETAIL)

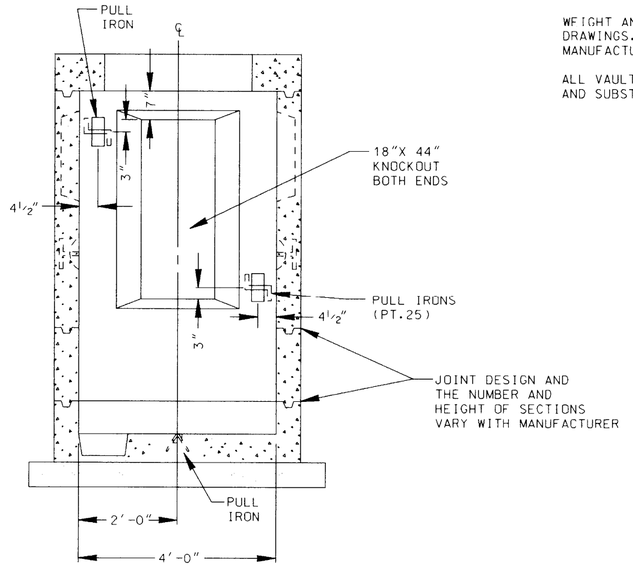
BACKFILL SHALL BE 100-E-100 SAND CEMENT SLURRY, OR AS SPECIFIED IN UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO.104, AS LAST REVISED

WEIGHT AND ALL OUTSIDE DIMENSIONS VARY WITH MANUFACTURER. VALUES GIVEN ARE LARGEST SHOWN ON MANUFACTURER'S DRAWINGS. PRIOR TO EXCAVATION STRUCTURE INSTALLER SHALL OBTAIN THE MINIMUM REQUIRED EXCAVATION SIZE FROM THE MANUFACTURER SUPPLYING THE STRUCTURE.

ALL VAULTS SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS OF DWP UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO.104, AS LAST REVISED.



SECTION A-A



SECTION B-B

SUPERSEDES E-433

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
18	3/13/97	JHG	REDRAWN IN CAD		

DRAWING CIRCULATION: PRELIM. | FINAL

DISTRICT | CONTRACT W.O. | DWP W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

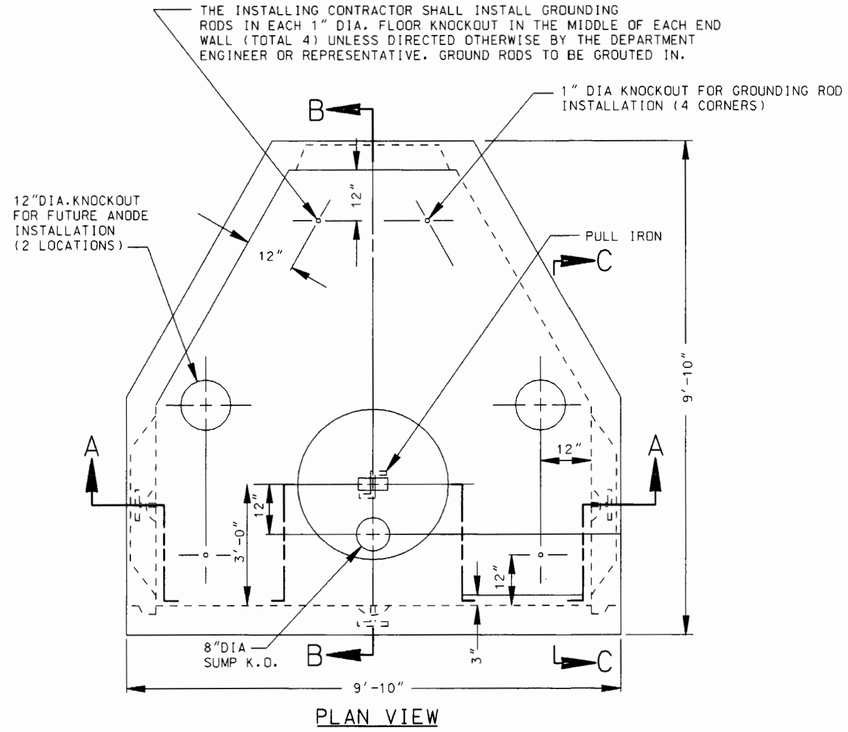
DESIGN	D.L.MORRIS	DRAFTING	J.GARCIA
CK	B.M.BOYCHUK	CHECKER	W.YCEDO
APPROVED	A.D.FRICKE	DATE	03/13/97

PRECAST MAINTENANCE HOLE
4'-0" X 6'-6" RECTANGULAR

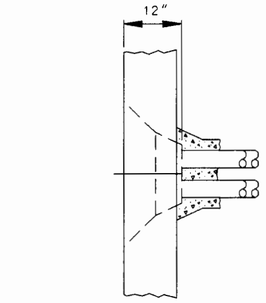
G-322 | SHEET 1 OF 1

21

INDEX

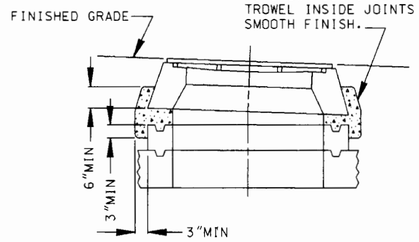


PLAN VIEW



TYPICAL
DEEP RECESS DETAIL

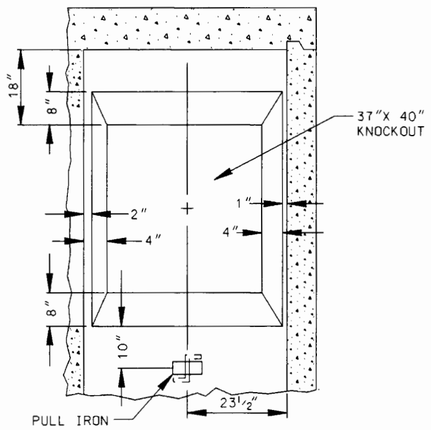
TO BE CONSTRUCTED BY DEPT. OR CONTRACTOR'S FIELD FORCES. WIDTH AND HEIGHT TO BE ADJUSTED TO SUIT CONDUIT CONDITIONS.



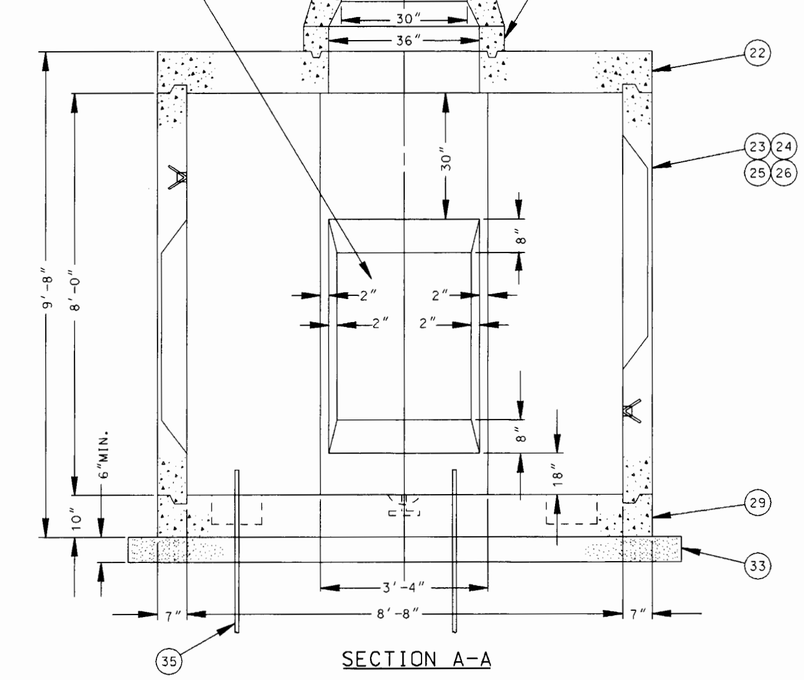
ADJUSTMENT FOR GRADE

G-4	G-3	G-2	G-1	PART	DESCRIPTION	DRAWING OR CAT.NO.
X	X	X	X	21	ASSEMBLY	
1	1	1	1	22	ROOF SECTION	
X	X	X	1	23	"U" WALL SECTION (HIGH-LOW POSITION KNOCKOUT)	
X	X	1	X	24	"U" WALL SECTION (LOW-HIGH POSITION KNOCKOUT)	
X	1	X	X	25	"U" WALL SECTION (LOW-LOW POSITION KNOCKOUT)	
1	X	X	X	26	"U" WALL SECTION (HIGH-HIGH POSITION KNOCKOUT)	
				27		
1	1	1	1	28	BACK WALL	
1	1	1	1	29	BASE SLAB	
1	1	1	1	30	NECK RING	
1	1	1	1	31	REDUCING CONE	
1	1	1	1	32	FRAME AND COVER	
2	2	2	2	33	* CU.YD. CRUSHER RUN BASE	
34	34	34	34	34	* TONS SAND-BACKFILL	
2	2	2	2	35	*GROUND ROD 5/8"DIA.X 8' 304 SST CLAD	

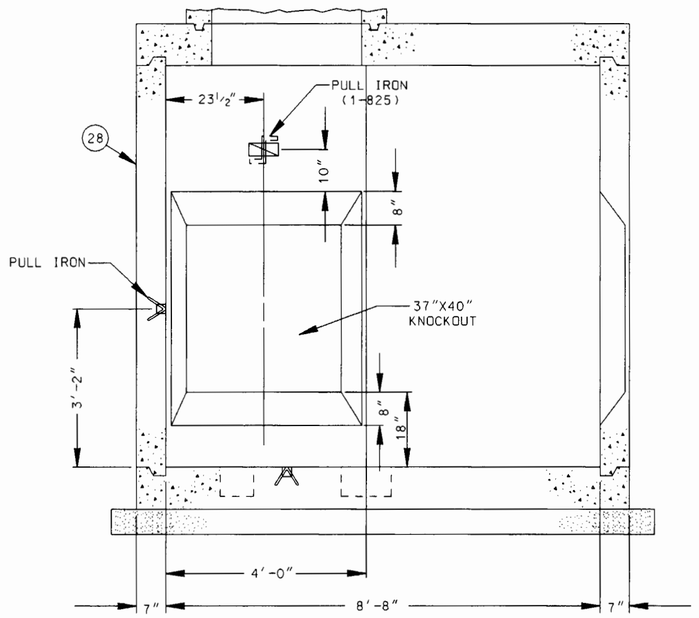
* NOT A PART OF PRECAST ASSEMBLACE
WEIGHT OF HEAVIEST SECTION 15180 LBS



SECTION C-C
HIGH POSITION KNOCKOUT



SECTION A-A



SECTION B-B
LOW POSITION KNOCKOUT

REQUIREMENTS FOR FABRICATION:

MAINTENANCE HOLE SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P STANDARD SPECIFICATIONS NO. P178, AS LAST REVISED.

MAINTENANCE HOLE SHALL BE SO FABRICATED AS TO PROVIDE A DRY AND WATER TIGHT INSTALLATION.

ALL 1/2" INSERTS SHALL BE MADE FROM PLASTIC AND SHALL WITHSTAND A MINIMUM PULL-OUT LOAD OF 150 LBS./INSERT, AND A MINIMUM SHEAR LOAD OF 300 LBS./INSERT.

ALL PULL IRONS PER UGCS 1-825 SHALL BE SO PLACED AS TO WITHSTAND A WORKING LOAD OF 20,000 LBS.

LADDER AND HANGING HARDWARE TO BE INSTALLED WITH MAINTENANCE HOLE.

USE STEEL FRAME AND COVERS (TRAFFIC TYPE) PER UGCS 2-418, UNLESS DESIGN ENGINEER SPECIFIES REINFORCED PLASTIC MORTAR (RPM) PER UGCS 2-419.

ALL 1 1/2"COIL INSERTS SHALL BE GALVANIZED SUPERIOR TYPE "D" OR EQUAL AND WITHSRAND A WORK LOAD OF 20,000 LBS

ALL KNOCKOUTS EXCEPT THE 1" DIA. FLOOR KNOCKOUTS SHALL BE 1 1/2" UNREINFORCED CONCRETE. ALL 1" DIA. FLOOR KNOCKOUTS SHALL HAVE CAST-IN WATER TIGHT DOUBLE MEMBRANE PLASTIC PLUGS.

REQUIREMENTS FOR INSTALLATION:

MANUFACTURER TO DELIVER PREFABRICATED MAINTENANCE HOLE TO JOB SITE AND SUPPLY SPREADER BAR FOR UNLOADING. DW&P OR INSTALLING CONTRACTOR TO PROVIDE MEANS FOR UNLOADING AND SETTING PRECAST UNITS INTO EXCAVATION.

SELECT A LOCATION FREE OF SUBSTRUCTURES, CLEAR OF OVERHEAD OBSTRUCTIONS THAT WOULD INTERFERE WITH THE BOOM OF A LARGE CRANE AND HAVE AMPLE WORKING ROOM FOR A CRANE TO UNLOAD THE SECTION FROM A TRUCK INTO THE EXCAVATION.

DO NOT REMOVE ANY FLOOR KNOCKOUT.

MAINTENANCE HOLE SHALL BE SET ON A COMPACTED LEVEL BED OF CRUSHED AGGREGATE BASE.

MAINTENANCE HOLE SHALL BE REJECTED IF ANY PORTION OF KEYWAY, 12" OR LONGER, IS MISSING OR DAMAGED.

MAINTENANCE HOLE SECTIONS SHALL BE SET WITH SEALING COMPOUND APPROVED BY THE DWP UNDERGROUND ENGINEER AND SUPPLIED WITH MAINTENANCE HOLE.

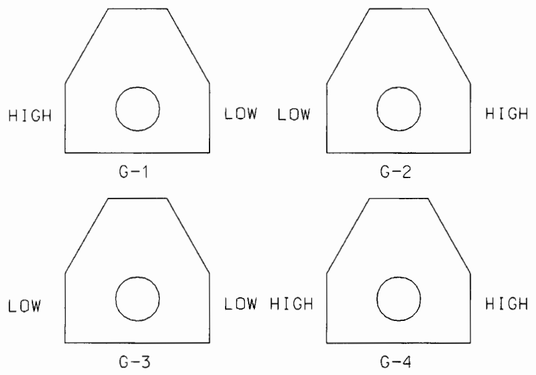
ALL MAIN LINE CONDUIT ENTERING MAINTENANCE HOLE SHALL TERMINATE FLUSH WITH INSIDE RECESS SURFACE. TERMINATION SHALL BE WITH END BELLS OR CAST-IN TERMINATORS FOR ALL CONDUIT EXCEPT SERVICE CONDUIT. EDGES SHALL BE ROUNDED AND SMOOTH. NO SHARP OR ROUGH EDGES WILL BE ACCEPTED.

NECK, REDUCING CONE AND COVER SHALL BE ADJUSTED AS REQUIRED TO RAISE COVER TO FINISHED STREET GRADE. (SEE DETAIL)

BACKFILL SHALL BE 100-E-100 SAND CEMENT SLURRY, OR AS SPECIFIED IN UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO.104, AS LAST REVISED

WEIGHT AND ALL OUTSIDE DIMENSIONS VARY WITH MANUFACTURER. VALUES GIVEN ARE LARGEST SHOWN ON MANUFACTURER'S DRAWINGS. PRIOR TO EXCAVATION STRUCTURE INSTALLER SHALL OBTAIN THE MINIMUM REQURED EXCAVATION SIZE FROM THE MANUFACTURER SUPPLYING THE STRUCTURE.

ALL MAINTENANCE HOLE SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS OF DWP UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO.104, AS LAST REVISED.



SIDE KNOCKOUT OPTIONS

SUPERSEDES ES-266

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
18	3/13/97	JHG	REDRAWN IN CAD		

DRAWING CIRCULATION: PRELIM. | FINAL

DISTRICT | CONTRACT W.O. | DWP W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

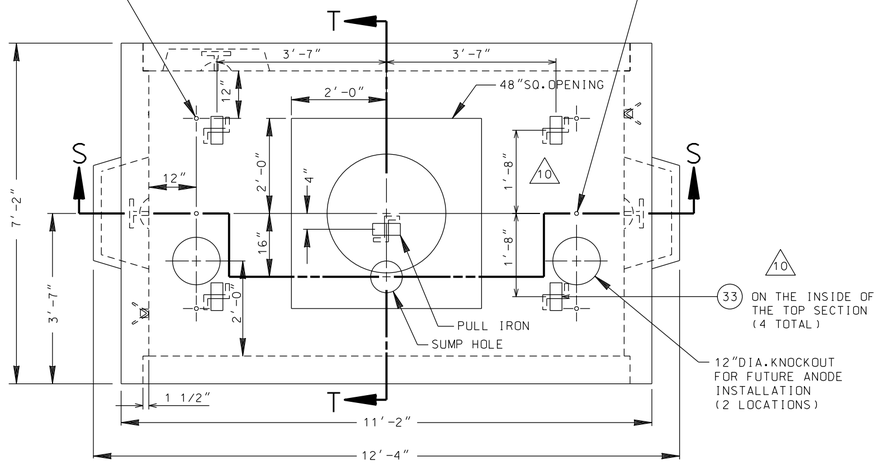
DESIGN	D.L.MORRIS	DRAFTING	J.GARCIA
OK	B.M.BOYCHUK	CHECKER	W.YCEDO
APPROVED	A.R.FRICKE	DATE	03/19/97

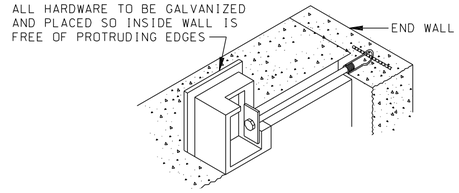
PRECAST STATION
ENTRANCE MAINTENANCE HOLE
4.8KV CABLE LINES

G-328 | SHEET 1 OF 1

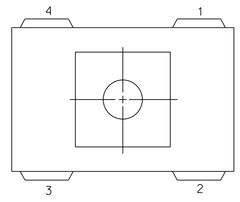
INDEX

THE INSTALLING CONTRACTOR SHALL INSTALL GROUNDING RODS IN EACH 1" DIA. FLOOR KNOCKOUT IN THE MIDDLE OF EACH END WALL (TOTAL 4) UNLESS DIRECTED OTHERWISE BY THE DEPARTMENT ENGINEER OR REPRESENTATIVE. GROUND RODS TO BE GROUTED IN.





DETAIL OF WALL FASTENER

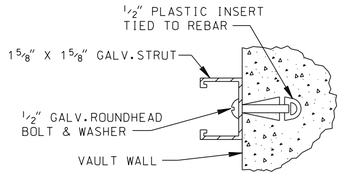


DUCT
KNOCKOUT ORDERING DIAGRAM

WHEN ORDERING SPECIFY DESIRED DUCT AND VENT LOCATIONS PER DIAGRAM NOTATIONS. DEEP RECESS IN POSITIONS 1,2,3 AND 4 ARE OPTIONAL.

G-1	PART	DESCRIPTION	DRAWING OR CAT.NO.
X	21	ASSEMBLY	
1	22	PRECAST BASE	
1	23	PRECAST END WALL	
	24		
1	25	PRECAST SIDE WALL	
	26		
1	27	PRECAST ROOF	
1	28	PRECAST NECK GRADE RING & COVER ASS'Y. 48"SQ.HD.	1-802.G-1B
1	29	LADDER & HANGING HARDWARE	2-361
2	30	* CUBIC YDS.CRUSHER RUN BASE	
32	31	*TONS SAND BACKFILL	
2	32	* GROUND ROD $5/8$"DIA.X 8'SST CLAD	
4	33	PULL IRON ASSEMBLY (STAINLESS STEEL)	1-825

* NOT A PART OF PRECAST ASSEMBLACE



STRUT & BOLT DETAIL

REQUIREMENTS FOR FABRICATION:

VAULT SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P STANDARD SPECIFICATIONS NO. P178, AS LAST REVISED.

VAULT SHALL BE SO FABRICATED AS TO PROVIDE A DRY AND WATER TIGHT INSTALLATION.

ALL 1/2" INSERTS SHALL BE MADE FROM PLASTIC AND SHALL WITHSTAND A MINIMUM PULL-OUT LOAD OF 150 LBS./INSERT, AND A MINIMUM SHEAR LOAD OF 300 LBS./INSERT.

ALL PULL IRONS PER UGCS 1-825 SHALL BE SO PLACED AS TO WITHSTAND A WORKING LOAD OF 20,000 LBS.

LADDER AND HANGING HARDWARE TO BE INSTALLED WITH VAULT.

USE STEEL FRAME AND COVERS (TRAFFIC TYPE) PER UGCS 2-418, UNLESS DESIGN ENGINEER SPECIFIES REINFORCED PLASTIC MORTAR (RPM) PER UGCS 2-419.

OPTIONAL DUCT AND VENT KNOCKOUTS SHALL BE PLACED IN THE LOCATIONS AS ORDERED BY THE DW&P.

STRUT AND BOLT INSTALLATION SHALL WITHSTAND A MINIMUM SHEAR LOAD OF 300 LBS./LF AND A PULL-OUT LOAD OF 150LBS./BOLT MAXIMUM SPACING REQUIRED IS 16"O.C.AND 3"FROM EACH END OF STRUT

ALL KNOCKOUTS EXCEPT THE 1" DIA. FLOOR KNOCKOUTS SHALL BE 1 1/2" UNREINFORCED CONCRETE. ALL 1" DIA. FLOOR KNOCKOUTS SHALL HAVE CAST-IN WATER TIGHT DOUBLE MEMBRANE PLASTIC PLUGS.

REQUIREMENTS FOR INSTALLATION:

MANUFACTURER TO DELIVER PREFABRICATED MAINENCE HOLE TO JOB SITE, AND PROVIDE MEANS FOR UNLOADING AND SETTING SECTIONS INTO EXCAVATION.

SELECT A LOCATION FREE OF SUBSTRUCTURES, CLEAR OF OVERHEAD OBSTRUCTIONS THAT WOULD INTERFERE WITH THE BOOM OF A LARGE CRANE AND HAVE AMPLE WORKING ROOM FOR A CRANE TO UNLOAD THE SECTION FROM A TRUCK INTO THE EXCAVATION.

DO NOT REMOVE ANY FLOOR KNOCKOUT.

MAINTENANCE HOLE SHALL BE SET ON A COMPACTED LEVEL BED OF CRUSHED AGGREGATE BASE. MAINTENANCE HOLE SHALL BE REJECTED IF ANY PORTION OF KEYWAY, 12" OR LONGER, IS MISSING OR DAMAGED.

MAINTENANCE HOLE SECTIONS SHALL BE SET WITH SEALING COMPOUND APPROVED BY THE DWP UNDERGROUND ENGINEER AND SUPPLIED WITH MAINTENANCE HOLE.

ALL MAIN LINE CONDUIT ENTERING VAULT SHALL TERMINATE FLUSH WITH INSIDE RECESS SURFACE. TERMINATION SHALL BE WITH END BELLS OR CAST-IN TERMINATORS FOR ALL CONDUIT EXCEPT SERVICE CONDUIT. EDGES SHALL BE ROUNDED AND SMOOTH. NO SHARP OR ROUGH EDGES WILL BE ACCEPTED.

NECK, REDUCING CONE AND COVER SHALL BE ADJUSTED AS REQUIRED TO RAISE COVER TO FINISHED STREET GRADE. (SEE DETAIL)

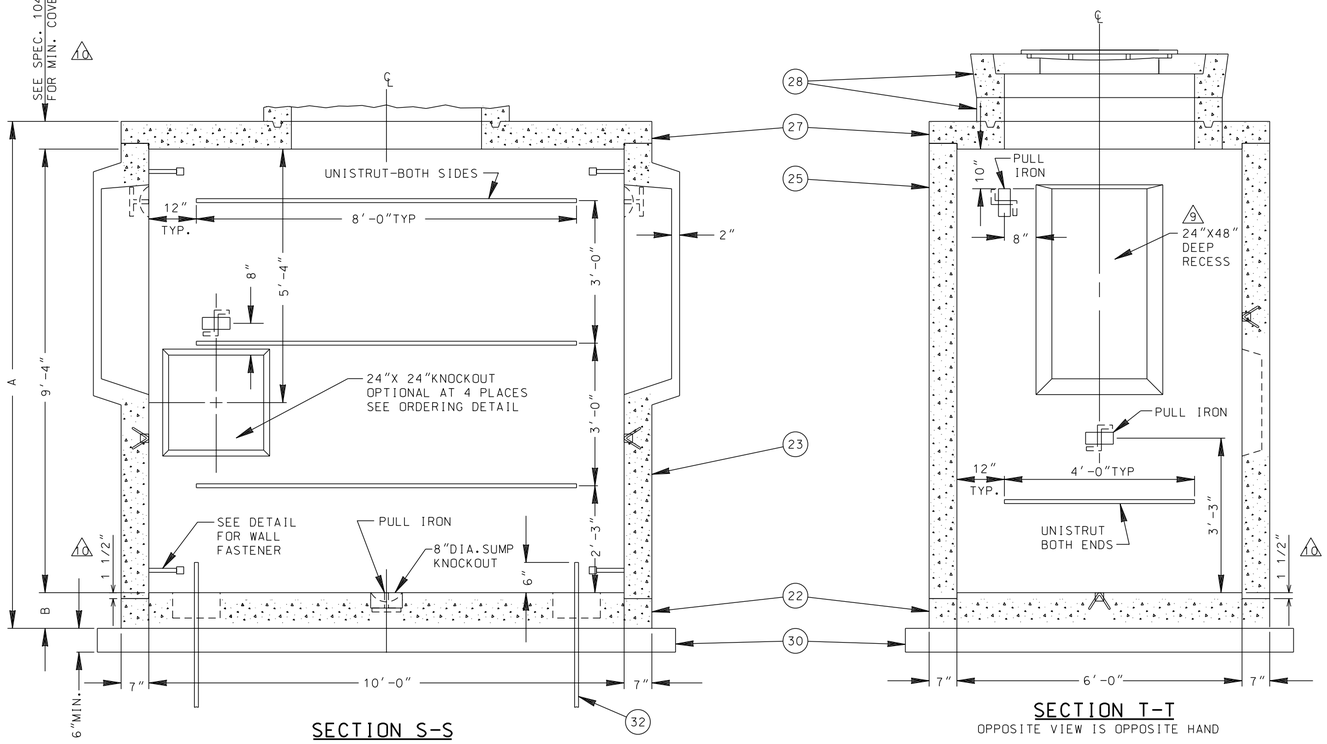
BACKFILL SHALL BE 100-E-100 SAND CEMENT SLURRY, OR AS SPECIFIED IN UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO.104, AS LAST REVISED

VENT ASSEMBLY TO BE INSTALLED PER UGCS 1-821.1 UNLESS DESIGN ENGINEER SPECIFIES VENT ASSEMBLY PER UGCS 1-822, OR 1-822.1.

THE LADDER LENGTHS GIVEN ARE DESIGNED TO ACCOMODATE AN ADDITIONAL 9 INCHES OF GRADE RINGS BEYOND THE STANDARD 18-INCH NECK. THE LADDER SHALL BE INCREASED ONE FOOT FOR EACH ADDITIONAL ONE FOOT INCREMENT OF GRADE RINGS THEREAFTER AS SHOWN ON UGCS 2-361. IF THE NECK SECTIONS EXCEED 4 FEET IN LENGTH, FIELD CUT LADDER TO FIT NECESSARY CONDITIONS. SEE UGCS 2-361.1 FOR INSTALLATION PROCEDURE. INSTALLATION PROCEDURE OF LADDER AND HANGING HARDWARE SHALL BE IN ACCORDANCE WITH UGCS 2-361 WHERE APPLICABLE.

WEIGHT AND ALL OUTSIDE DIMENSIONS VARY WITH MANUFACTURER. VALUES GIVEN ARE LARGEST SHOWN ON MANUFACTURER'S DRAWINGS. PRIOR TO EXCAVATION STRUCTURE INSTALLER SHALL OBTAIN THE MINIMUM REQUIRED EXCAVATION SIZE FROM THE MANUFACTURER SUPPLYING THE STRUCTURE.

ALL VAULTS SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS OF DWP UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO.104, AS LAST REVISED.



SECTION S-S

SECTION T-T
OPPOSITE VIEW IS OPPOSITE HAND

A	B	LADDER LENGTH	MAX.WT. HEAVIEST SECTION LBS
10'-10"	9"	12'-0"	9.080

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
10	07/23/18	DON	JOINT CHANGED FROM SHIP LAP TO A RECESS FLAT JOINT, ADDED PULL IRONS	OEJ	
9	04/27/05	JHG	END RECESS WAS 24"X 36"		
8	03/27/97	JHG	REDRAWN IN CAD		

DRAWING CIRCULATION: PRELIM. | FINAL

DISTRICT | CONTRACT W.O. | DWP W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

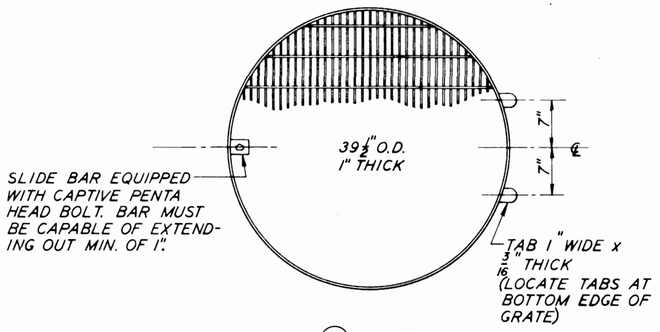
DESIGN	J.McMAHON	DRAFTING	J.GARCIA
CK	C.MASUO	CHECKER	W.YCEDO
APPROVED	A.R.SHASKY	DATE	03/27/97

PRECAST MAINTENANCE HOLE
RECTANGULAR PANEL TYPE

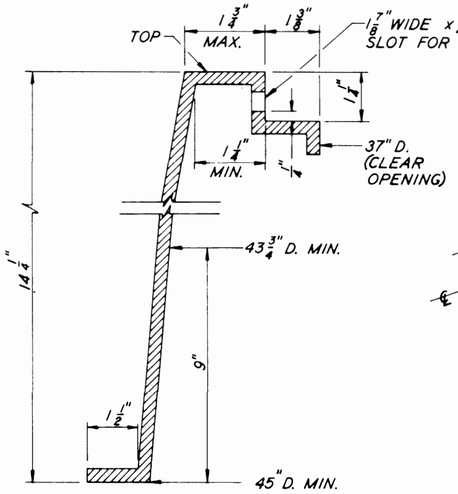
G-334 | SHEET 1 OF 1

UGD	-10
VUD	-3
OUS	-15
D-I-S	-6
SPC	-40
SPCV	-35
AP	-2
CI	-2
VOL. 4	

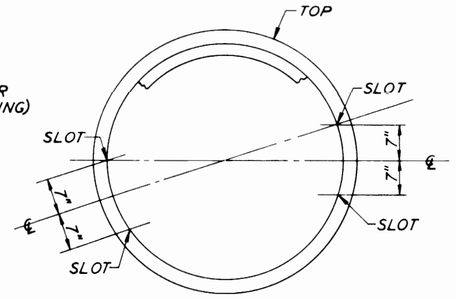
INDEX



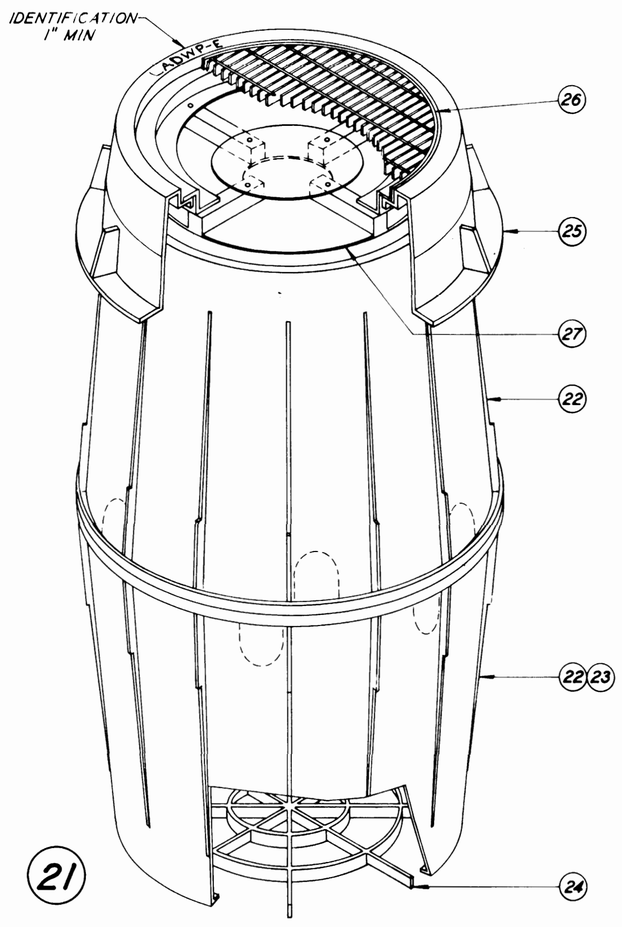
(26) GRATE

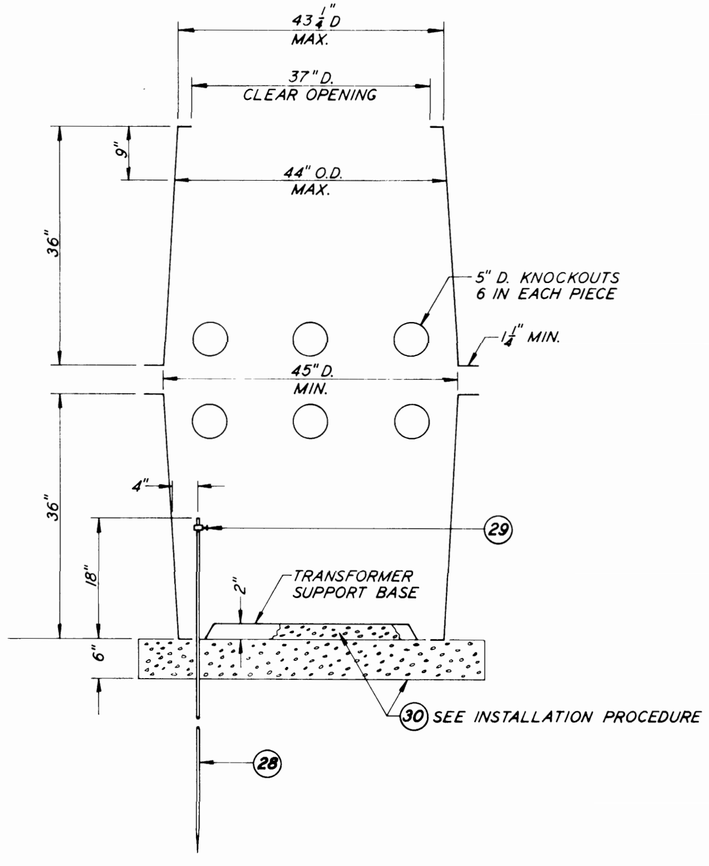


(25) TOP CAP SECTION



(25) SLOT LOCATIONS





	PART	DESCRIPTION	DRAWING OR CATALOG NO.
X	21	ASSEMBLY	
1	22	ENCLOSURE BODY	
1	23	" " WITH TRANSFORMER SUPPORT BASE MOLDED IN	
	24	TRANSFORMER SUPPORT BASE	
1	25	ADJUSTABLE TOP CAP	
1	26	GALVANIZED GRATE	
1	27	TAMPER VENT	
1	28	*GROUND ROD - TYPE 304 SST CLAD - 5/8" D. x 8'-0"	
1	29	* " " CLAMP	BURNDY GKP642
1/2	30	*CU. YD., CRUSHED AGG. BASE, #3 CONCRETE AGG., OR 1" CRUSHED ROCK	
X	31	*TON, SAND BACKFILL	

*TO BE PROVIDED BY DW&P OR INSTALLING CONTRACTOR

INSTALLATION PROCEDURE

1. Place 6 inches of crusher run base material in excavation and level.
2. Assemble transformer enclosure with transformer support. Lower assembly in excavation.
3. Place the top cap section of transformer enclosure and let it rest on the main body section.
4. Place backfill material (sand) up to within 3 inches of the bottom of the top cap section. (Backfill material must be placed and compacted evenly around the body section of the enclosure)
5. Place additional crusher run base material inside transformer enclosure and level to top of transformer support base.
6. Remove top cap section and place backfill material (sand) as to bring the top of top cap section 2 inches above the finished grade.
7. Install ground rod as shown.
8. This enclosure is for installation in non-traffic areas only.

REQUIREMENTS FOR FABRICATION

1. Body and top cap shall be constructed of lightweight, ultraviolet ray-resistant. Fiberglass reinforced plastic.
2. Tamper vent shall be constructed of nonmetallic, nonflammable material, puncture proof to a 1/4 inch wood dowel.
3. Body, top cap, tamper vent, and grating shall be permanently marked with the manufacturer's name or trademark.
4. Tamper shields and grates shall be dimensionally interchangeable between manufacturers.

PT.	APPROX. WT.
22	70 LBS.
23	80 "
24	10 "
25	41 "
26	50 "
27	20 "

SUPERSEDES DWG. E-588

	DATE	INIT'L	REVISION	APP'V'D
2	10 9 94	SYK	TITLE WAS U.G. TRANSFORMER ENCLOSURE	
1	10-3-88	AEG	CHG. FR. STRUCTURAL PLASTIC TO FIBERGLASS	

CITY OF LOS ANGELES
DEPARTMENT OF WATER & POWER
UNDERGROUND DESIGN SECTION

UNDERGROUND TRANSFORMER SILO

DESIGN J.D. MCMAHON	DRAFTING DHA
O.K.	DATE
APPROVED SR. ELEC. ENGINEER	G-353

SHEET 1 OF 1

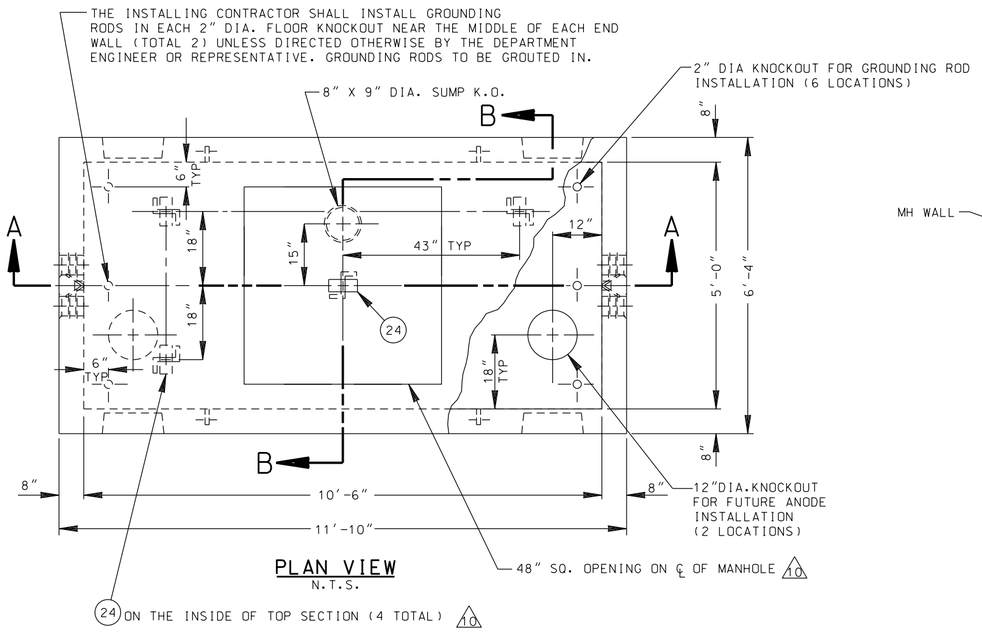
4/75 TELEDYNE POST 18JD-005

INDEX

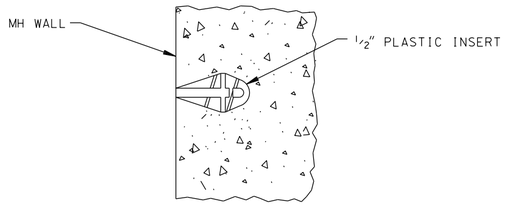
G-1	PART	DESCRIPTION	DRAWING OR CAT.NO.
X	21	ASSEMBLY	
1	22	PRECAST TOP SECTION WT. 23,200 LBS	
1	23	PRECAST BOTTOM SECTION WT. 18,000 LBS	
5	24	7/8" DIA. 316 STAINLESS STEEL PULL IRON	
1	25	PRECAST NECK, GRADE RING AND COVER ASSEMBLY	1-802, G1-B
1	26	LADDER & HANGING HARDWARE (SEE NOTES)	2-361
2	27	7/8" DIA. GALV PULL IRON	1-825
18	28	INSERT 1/2"	
2	29	✱ CU.YDS. CRUSHED AGGREGATE BASE	
	30	✱ TONS OF SAND-BACKFILL	
2	31	✱ GROUND ROD, 5/8" DIA. X 8' 304 SST CLAD	
16	32	6" DIA. TERMINATOR	

10

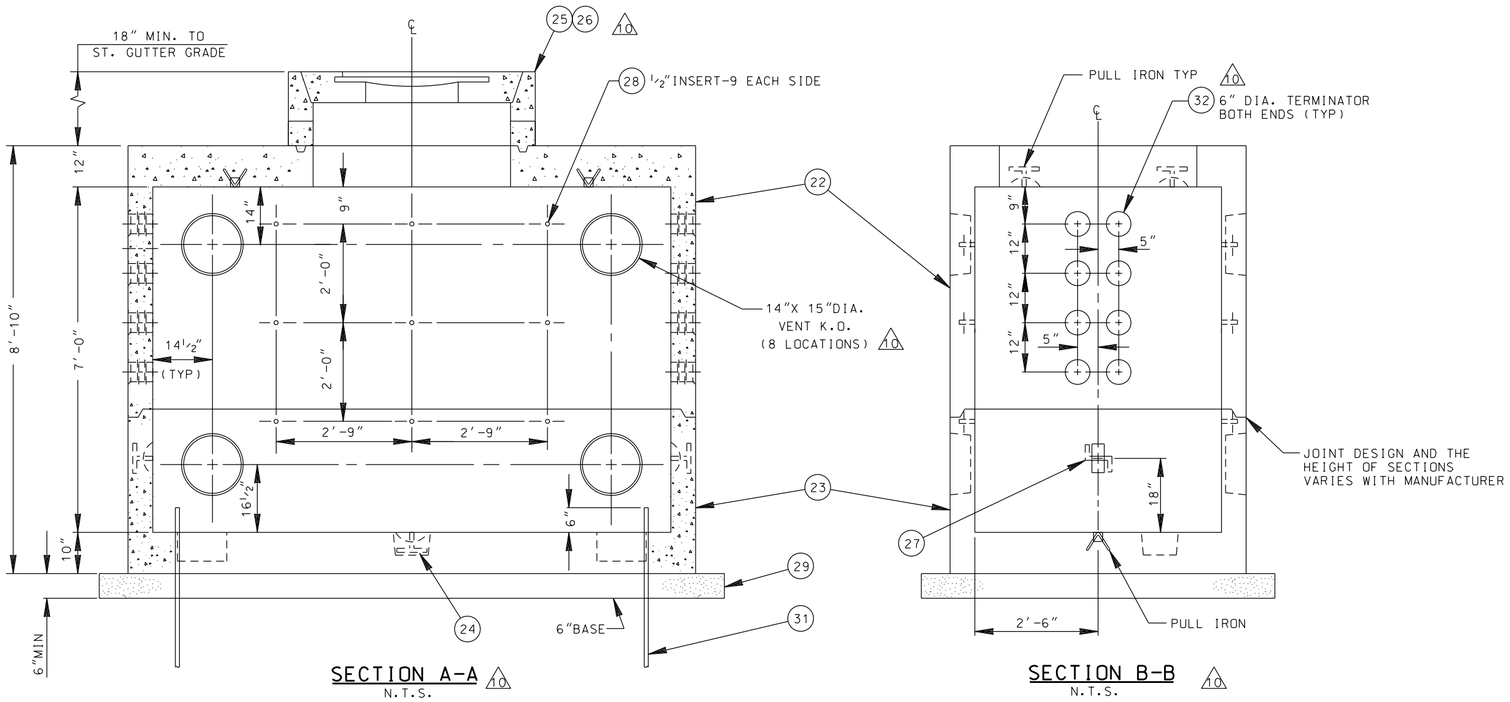
✱ NOT A PART OF PRECAST ASSEMBLACE



PLAN VIEW
N.T.S.



INSERT DETAIL 28 10
N.T.S.



SECTION A-A 10
N.T.S.

SECTION B-B 10
N.T.S.

10 REQUIREMENTS FOR FABRICATION:

MAINTENANCE HOLE SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P STANDARD SPECIFICATIONS NO. P178, AS LAST REVISED.

MAINTENANCE HOLE SHALL BE SO FABRICATED AS TO PROVIDE A DRY AND WATER TIGHT INSTALLATION.

ALL 1/2" INSERTS SHALL BE MADE FROM PLASTIC AND SHALL WITHSTAND A MINIMUM PULL-OUT LOAD OF 150 LBS./INSERT, AND A MINIMUM SHEAR LOAD OF 300 LBS./INSERT.

ALL PULL IRONS SHALL BE SO PLACED AS TO WITHSTAND A WORKING LOAD OF 20,000 LBS/PULL IRON.

LADDER AND HANGING HARDWARE TO BE INSTALLED WITH MAINTENANCE HOLE. LADDER LENGTH: 10'-0".

USE STEEL FRAME AND COVERS (TRAFFIC TYPE) PER UGCS 2-418, UNLESS DESIGN ENGINEER SPECIFIES REINFORCED PLASTIC MORTAR (RPM) PER UGCS 2-419.

ALL KNOCKOUTS EXCEPT THE 2" DIA. FLOOR KNOCKOUTS SHALL BE 1 1/2" UNREINFORCED CONCRETE. ALL 2" DIA. FLOOR KNOCKOUTS SHALL HAVE CAST-IN WATER TIGHT DOUBLE MEMBRANE PLASTIC PLUGS.

10 REQUIREMENTS FOR INSTALLATION:

MANUFACTURER TO DELIVER PREFABRICATED MAINTENANCE HOLE TO JOB SITE AND SHALL PROVIDE MEANS FOR UNLOADING AND SETTING SECTIONS INTO EXCAVATION.

SELECT A LOCATION FREE OF SUBSTRUCTURES, CLEAR OF OVERHEAD OBSTRUCTIONS THAT WOULD INTERFERE WITH THE BOOM OF A LARGE CRANE AND HAVE AMPLE WORKING ROOM FOR A CRANE TO UNLOAD THE SECTION FROM A TRUCK INTO THE EXCAVATION.

DO NOT REMOVE ANY FLOOR KNOCKOUT.

MAINTENANCE HOLE SHALL BE SET ON A COMPACTED LEVEL BED OF CRUSHED AGGREGATE BASE.

MAINTENANCE HOLE SHALL BE REJECTED IF ANY PORTION OF KEYWAY, 12" OR LONGER, IS MISSING OR DAMAGED.

MAINTENANCE HOLE SECTIONS SHALL BE SET WITH SEALING COMPOUND APPROVED BY THE DWP UNDERGROUND ENGINEER AND SUPPLIED WITH MAINTENANCE HOLE.

ALL MAIN LINE CONDUIT ENTERING MAINTENANCE HOLE SHALL TERMINATE FLUSH WITH INSIDE RECESS SURFACE. TERMINATION SHALL BE WITH END BELLS OR CAST-IN TERMINATORS FOR ALL CONDUIT EXCEPT SERVICE CONDUIT. EDGES SHALL BE ROUNDED AND SMOOTH. NO SHARP OR ROUGH EDGES WILL BE ACCEPTED.

NECK, GRADE RING(S) AND COVER SHALL BE SET AS PER UGCS 1-802, G-1B. CASTING RESTRAINT SYSTEM, IF REQUIRED, SHALL BE SUPPLIED BY PRECAST STRUCTURE MANUFACTURER. CONTRACTOR TO INSTALL CASTING RESTRAINT SYSTEM PER UGCS 1-802.2. SEE CONSTRUCTION DRAWING FOR REQUIREMENTS.

BACKFILL SHALL BE 100-E-100 SAND CEMENT SLURRY, OR AS SPECIFIED IN UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO.104, AS LAST REVISED.

VENT ASSEMBLY IF REQUIRED TO BE INSTALLED PER POWER DISTRIBUTION STANDARD (PDCS) C730-10 UNLESS DESIGN ENGINEER SPECIFIES VENT ASSEMBLY PER (PDCS) C730-09. SEE CONSTRUCTION DRAWING FOR THE NUMBER OF VENTS.

THE LADDER AND HANGING HARDWARE SHALL BE SUPPLIED WITH MAINTENANCE HOLE. THE LADDER LENGTH GIVEN IS DESIGNED TO ACCOMMODATE AN ADDITIONAL 6 INCHES OF GRADE RING BEYOND THE STANDARD 18 INCH NECK. THE LADDER SHALL BE INCREASED ONE FOOT FOR EACH ADDITIONAL ONE FOOT INCREMENT OF GRADE RING(S) THERE AFTER AS SHOWN ON UGCS 2-361. INSTALLATION PROCEDURE OF LADDER AND HANGING HARDWARE SHALL BE IN ACCORDANCE WITH UGCS 2-361 WHERE APPLICABLE.

WEIGHT AND ALL OUTSIDE DIMENSIONS VARY WITH MANUFACTURER. VALUES GIVEN ARE LARGEST SHOWN ON MANUFACTURERS DRAWINGS. PRIOR TO EXCAVATION, STRUCTURE INSTALLER SHALL OBTAIN THE MINIMUM REQUIRED EXCAVATION SIZE FROM THE MANUFACTURER SUPPLYING THE STRUCTURE.

ALL MAINTENACE HOLES SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS OF DWP UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO.104, AS LAST REVISED.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	PE NO.
10	06/06/14	EHP	REVISED MH OPENING FROM CIRCULAR TO SQUARE, INCREASED WALL ROOF THICKNESS, REMOVED 18X18 KO'S, ADDED 8 VENT KO'S, REMOVED 24X42 KO'S AND ADDED 16-6" TERMINATORS, ADDED PULL IRONS IN CEILING, REVISED NOTES & CALL OUTS.	J.M.A.	
9	04/27/05	JHG	KNOCKOUT WAS 24"X 32"& MOVED JOINT LINE 30"OFF FLOOR	SP	
8	06/11/01	JHG	REDRAWN IN CAD	WY	

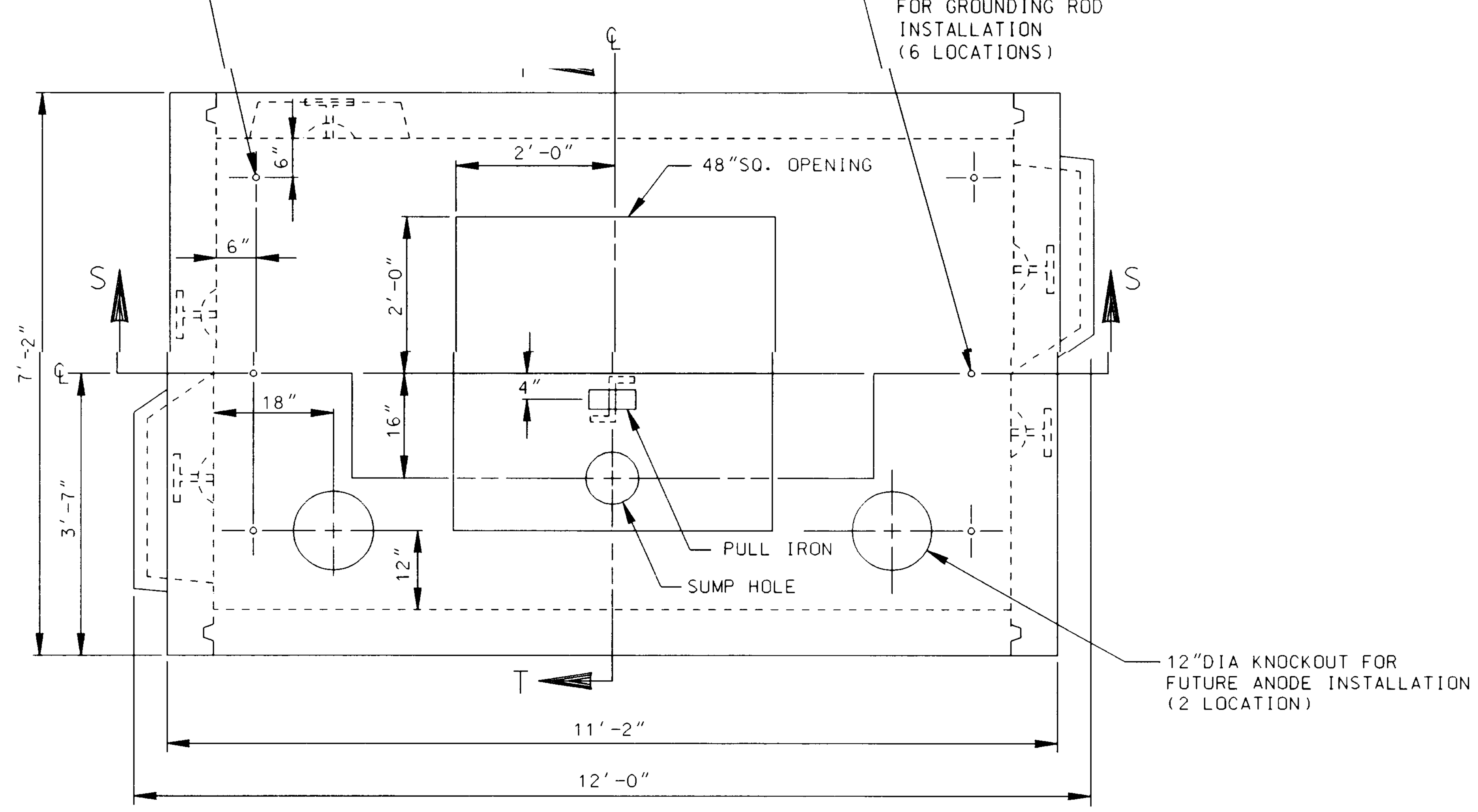
DRAWING CIRCULATION: PRELIM. | FINAL

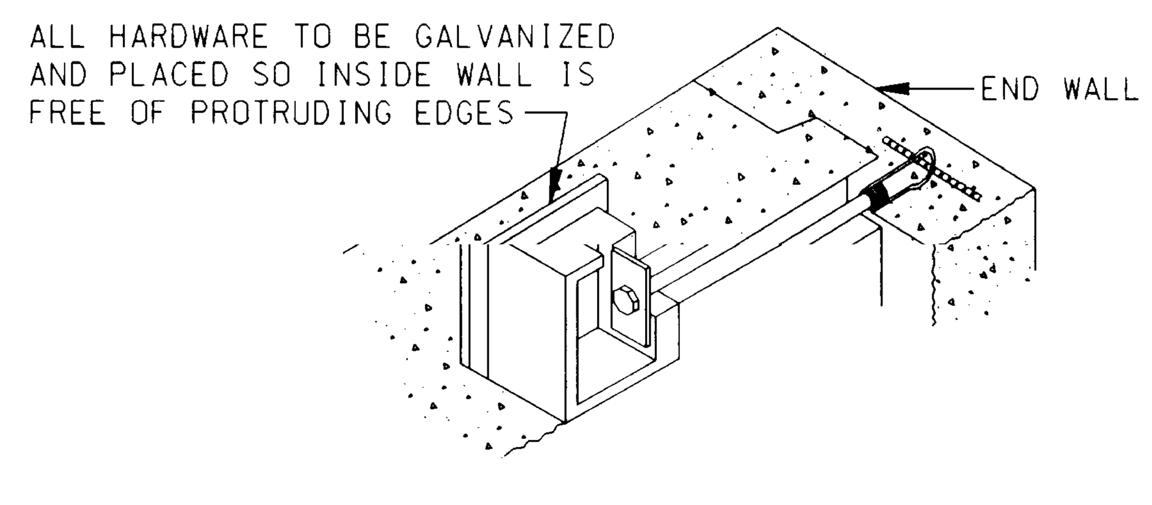
DISTRICT	CONTRACT W.O.	DWP W.O.	
CITY OF LOS ANGELES DEPARTMENT OF WATER AND POWER DISTRIBUTION ENGINEERING & SERVICES SECTION		PRECAST MAINTENANCE HOLE 5'-0" X 10'-6" X 7'-0"	
DESIGN J. McMAHON	DRAFTING J.GARCIA		
OK C.MASUO	CHECKER W.YCEDO		
APPROVED A.R.SHASKY	DATE 03/21/97	G-354	SHEET 1 OF 1

21

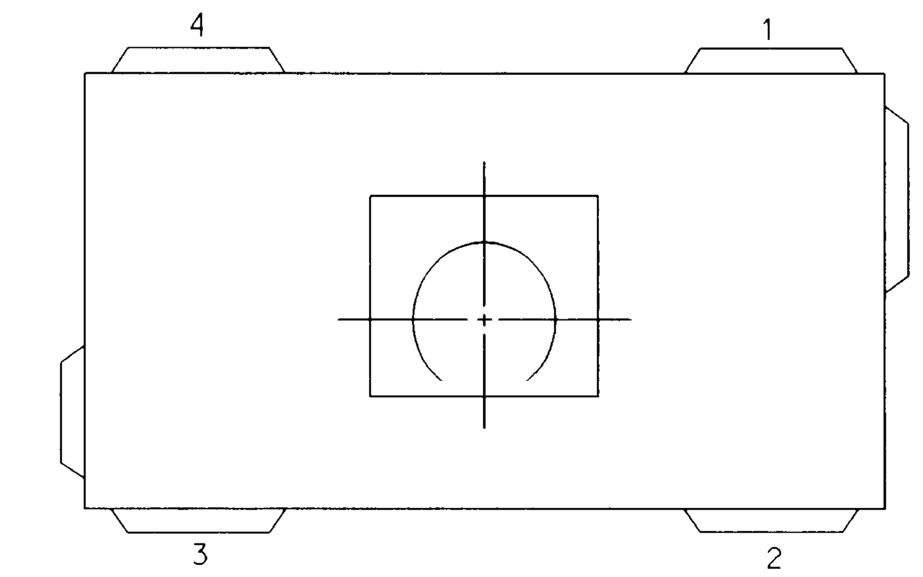
G354.dev

INDEX





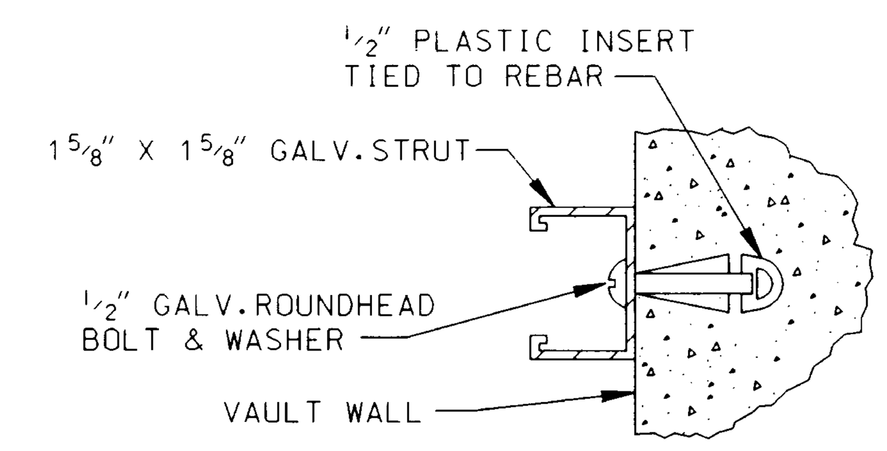
DETAIL OF WALL FASTENER
8 REQUIRED-SUPPLIED WITH VAULT



DUCT KNOCKOUT ORDERING DIAGRAM
WHEN ORDERING SPECIFY DESIRED DUCT LOCATIONS PER DIAGRAM NOTATIONS DEEP RECESS IN POSITIONS 1,2,3, AND 4 ARE OPTIONAL

	PART	DESCRIPTION	DRAWING OR CAT.NO.
X	21	ASSEMBLY	
1	22	PRECAST BASE	
1	23	PRECAST END WALL	
1	24	PRECAST SIDE WALL	
1	25	PRECAST ROOF	
1	26	PRECAST NECK GRADE RING & COVER ASSY.48"SQ.HD.	1-802,G-1B
64 / 1	23	CONTINOUS GALVANIZED STRUT (FT) / LADDER (12' LONG) & HANGING HARDWARE	2-361
2	29	* CUBIC YDS. CRUSHER RUN BASE	
32	30	* TONS SAND, BACKFILL	
2	31	* GROUND ROD 5/8" DIA. X 8' 304 SST CLAD	

* NOT A PART OF PRECAST ASSEMBLAGE
WEIGHT OF HEAVIEST SECTION=9080 LBS.



STRUT & BOLT DETAIL

REQUIREMENTS FOR FABRICATION

MAINTENANCE HOLE SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P STANDARD SPECIFICATIONS P-178, AS LAST REVISED.

MAINTENANCE HOLE SHALL BE SO FABRICATED AS TO PROVIDE A DRY AND WATER TIGHT INSTALLATION.

ALL 1/2" INSERTS SHALL BE MADE FROM PLASTIC AND SHALL WITHSTAND A MINIMUM PULL-OUT LOAD OF 150LBS./INSERT, AND A MINIMUM SHEAR LOAD OF 300LBS/INSERT.

ALL PULL IRONS PER UGCS 1-825, SHALL BE SO PLACED AS TO WITHSTAND A WORKING LOAD OF 20,000 LBS.

LADDER AND HANGING HARDWARE TO BE INSTALLED WITH MAINTENANCE HOLE.

USE STEEL FRAME AND COVERS (TRAFFIC TYPE) PER UGCS 2-418, UNLESS DESIGN ENGINEER SPECIFIES REINFORCED PLASTIC MORTAR (RPM) PER UGCS 2-419.

OPTIONAL DUCT AND VENT KNOCKOUTS SHALL BE PLACED IN THE LOCATIONS AS ORDERED BY THE DW&P UNDERGROUND ENGINEER.

STRUT AND BOLT INSTALLATION SHALL WITHSTAND A MINUMUM SHEAR LOAD OF 300 LBS. /LF AND A PULL-OUT LOAD OF 150 LBS./BOLT. MAXIMUM SPACING REQUIRED IS 16"O.C. AND 3" FROM EACH END OF STRUT.

ALL KNOCKOUTS EXCEPT THE 1" DIA. FLOOR KNOCKOUTS SHALL BE 1 1/2 " UNREINFORCED CONCRETE. ALL 1"DIA FLOOR KNOCKOUTS SHALL HAVE CAST-IN WATER TIGHT DOUBLE MEMBRANE PLASTIC PLUGS.

REQUIREMENTS FOR INSTALLATION

MANUFACTURER TO DELIVER PREFABRICATED MAINTENANCE HOLE TO JOB SITE, AND PROVIDE MEANS FOR UNLOADING AND SETTING SECTIONS INTO EXCAVATION.

SELECT A LOCATION FREE OF SUBSTRUCTURE, CLEAR OF OVERHEAD OBSTRUCTIONS THAT WOULD INTERFERE WITH THE BOOM OF A LARGE CRANE AND HAVE AMPLE WORKING ROOM FOR A CRANE TO UNLOAD THE SECTION FROM A TRUCK INTO THE EXCAVATION.

DO NOT REMOVE ANY FLOOR KNOCKOUT.

MAINTENANCE HOLE SHALL BE SET ON A COMPACTED LEVEL BED OF CRUSHED AGGREGATE BASE.

MAINTENANCE SHALL BE REJECTED IF ANY PORTION OR KEYWAY, 12"OR LONGER,IS MISSING OR DAMAGED.

MAINTENANCE HOLE SECTIONS ARE TO BE SET WITH SEALING COMPOUND APPROVED BY THE DWP UNDERGROUND ENGINEER AND SUPPLIED WITH MAINTENANCE HOLE.

ALL MAIN LINE CONDUIT ENTERING MAINTENANCE HOLE SHALL TERMINATE FLUSH WITH INSIDE RECESS SURFACE. TERMINATION SHALL BE WITH END BELLS OR CAST IN TERMINATORS FOR ALL CONDUIT EXCEPT SERVICE CONDUIT. EDGES SHALL BE ROUNDED AND SMOOTH. NO SHARP EDGES WILL BE ACCEPTED.

NECK, GRADE RING AND COVER SHALL BE SET AS PER UGCS 1-802,G-1B.

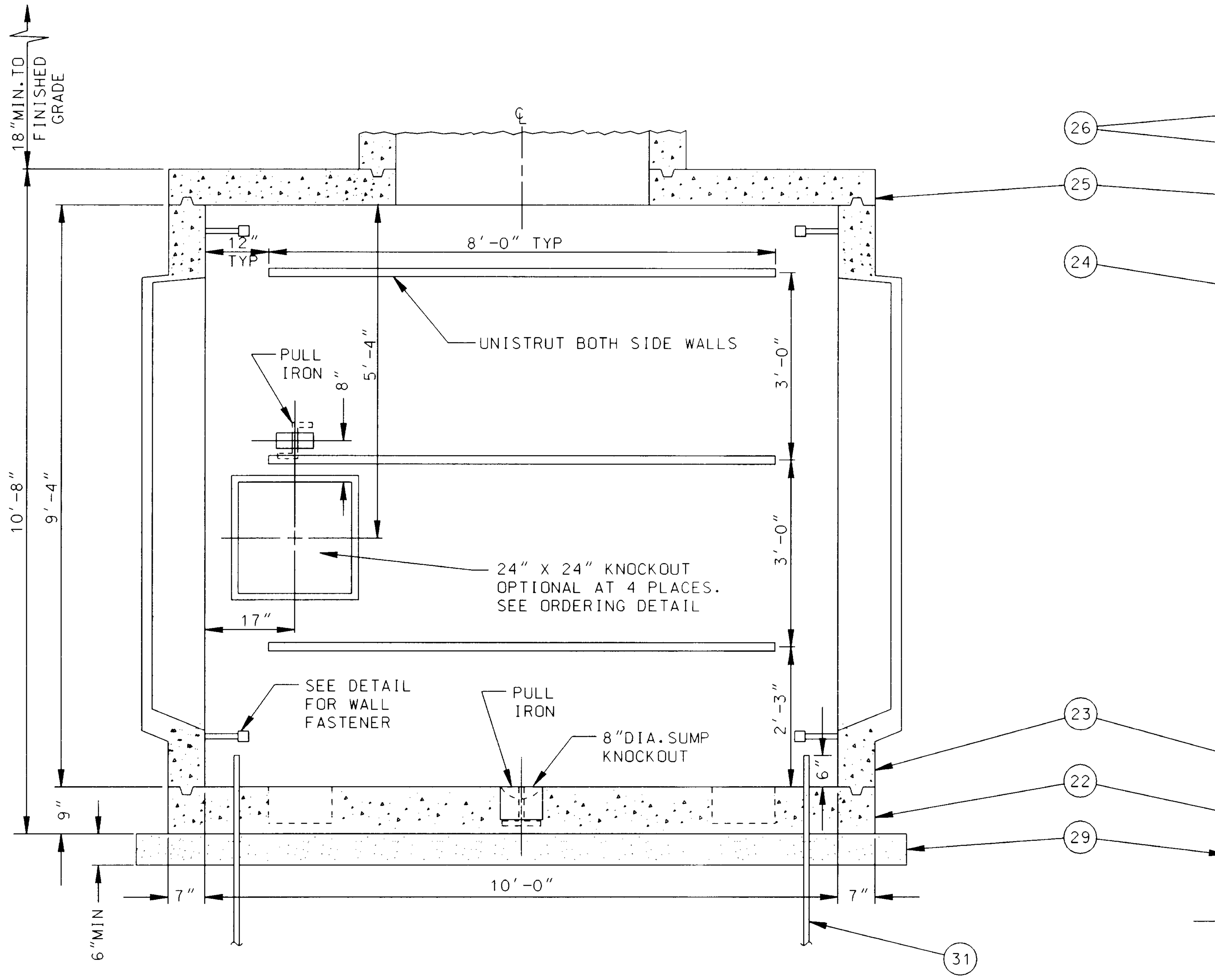
BACKFILL SHALL BE 100-E-100 SAND CEMENT SLURRY, OR AS SPECIFIED IN UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO. 104, AS LAST REVISED.

VENT ASSEMBLY TO BE INSTALLED PER UGCS 1-821.1 UNLESS DESIGN ENGINEER SPECIFIES VENT ASSEMBLY PER UGCS 1-822 OR 1-822.1.

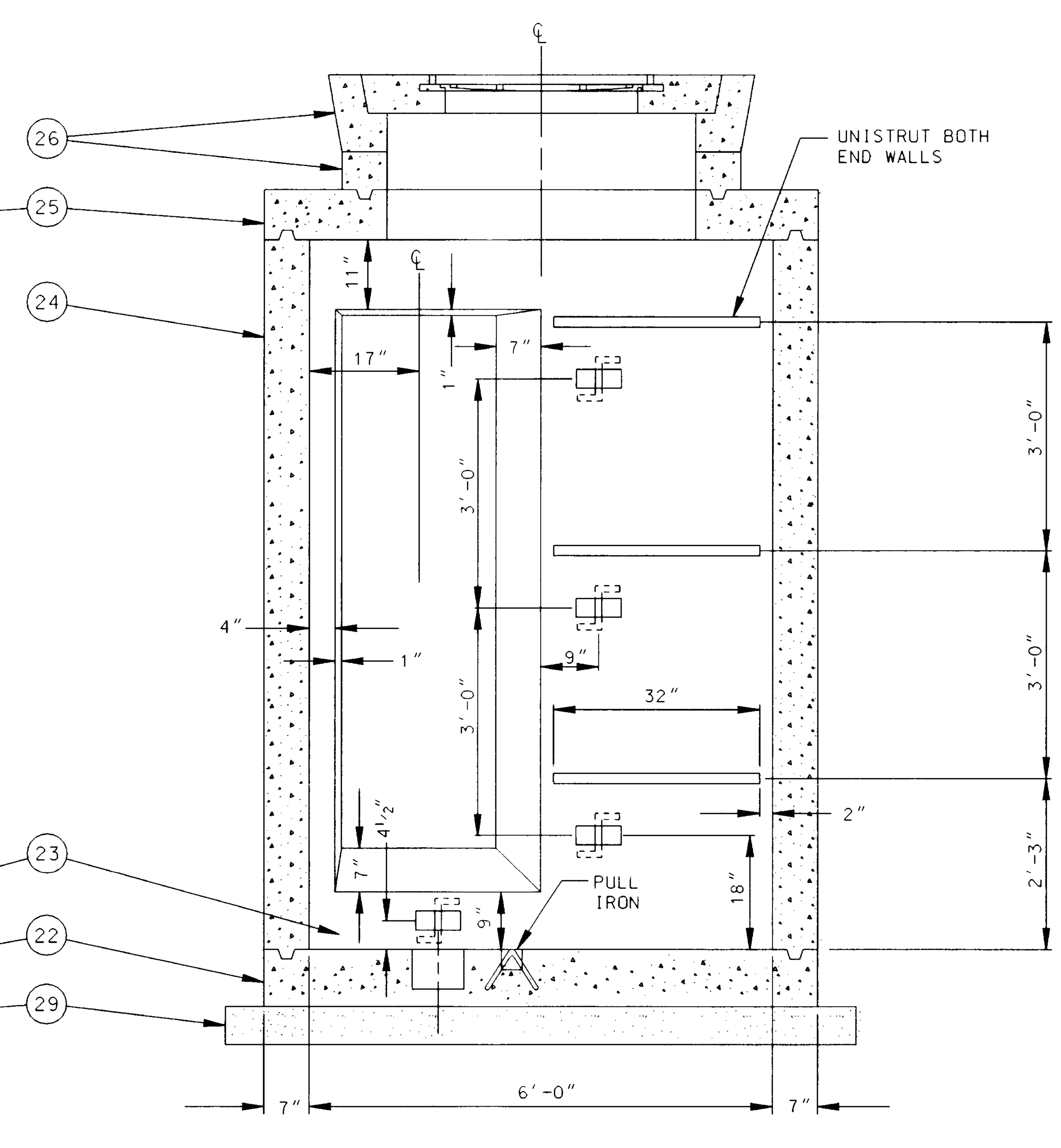
THE LADDER LENGHTS GIVEN ARE DESIGNED TO ACCOMMODATE AN ADDITIONAL 9" OF GRADE RINGS BEYOND THE STANDARD 18" NECK. THE LADDER SHALL BE INCREASED ONE FOOT FOR EACH ADDITIONAL ONE FOOT INCREMENT OF GRADE RINGS THEREAFTER AS SHOWN ON UGCS 2-361. IF THE NECK SECTIONS EXCEED 4' IN LENGTH, FIELD CUT LADDER TO FIT NECESSARY CONDITIONS. SEE UGCS 2-361.1 FOR INSTALLATION PROCEDURE. INSTALLATION PROCEDURE OF LADDER AND HANGING HARDWARE SHALL BE IN ACCORDANCE WITH UGCS 2-361 WHERE APPLICABLE.

WEIGHT AND ALL OUTSIDE DIMENSIONS VARY WITH MANUFACTURER. VALUES GIVEN ARE LARGEST SHOWN ON MANUFACTURER'S DRAWINGS. PRIOR TO EXCAVATION STRUCTURE INSTALLER SHALL OBTAIN THE MINIMUM REQUIRED EXCAVATION SIZE FROM THE MANUFACTURER SUPPLYING THE STRUCTURE.

ALL VAULTS AND MAINTENANCE HOLES SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS OF DWP UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO. 104, AS LAST REVISED



SECTION S-S



SECTION T-T
OPPOSITE VIEW IS OPPOSITE HAND

REV NO	REV DATE	INIT'L	REVISION DESCRIPTION	APP'V.	TAT NO.	DRAWING CIRCULATION PRELIM.	FINAL
△							

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

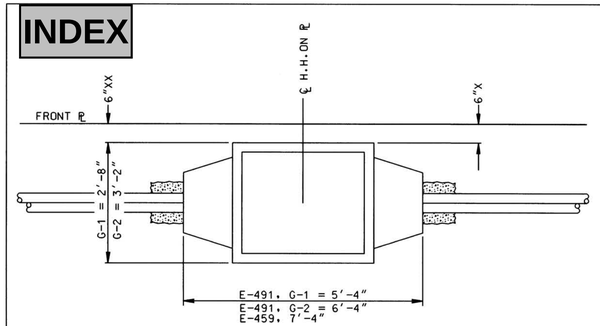
DRAFTING J.GARCIA
DATE 07/15/02

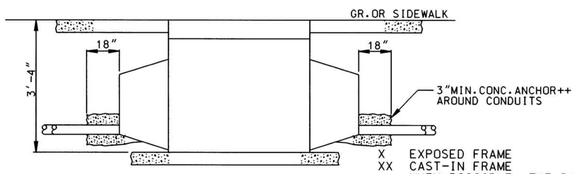
PRECAST MAINTENANCE HOLE
6' X 10' PANEL TYPE
34.5kV

G-384 SHEET 1 OF 1

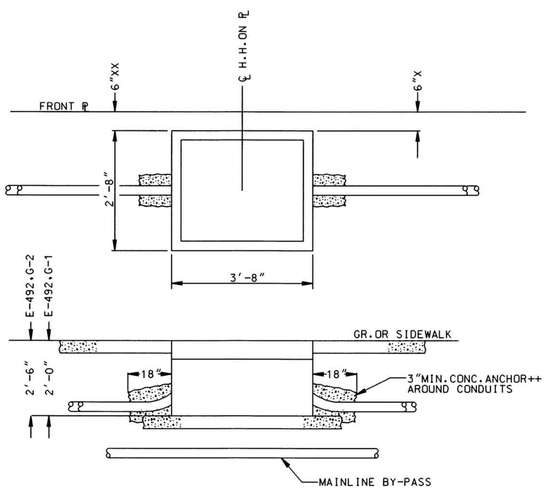
(21)

INDEX



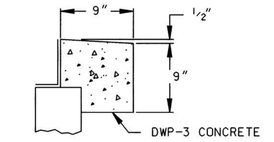


ELEVATION
E-491, G-1, G-2
& E-459

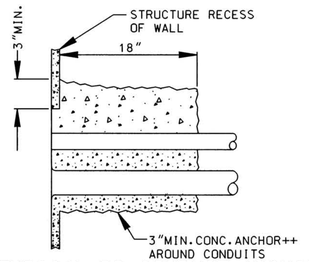


ELEVATION
HH: E-492 G-1 & G-2

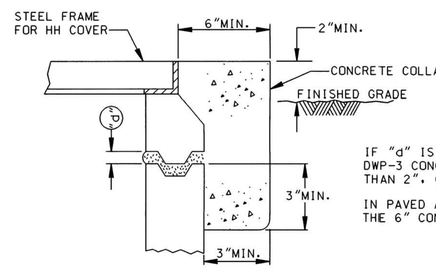
X EXPOSED FRAME
XX CAST-IN FRAME
WHEN POSSIBLE, THE BACK EDGE OF EXPOSED FRAMES OR THE BACK EDGE OF THE HANDHOLE FOR CAST-IN FRAMES SHALL BE IN LINE WITH THE EDGE OF THE SIDEWALK WHICH IS NORMALLY 6" FROM THE FRONT PROPERTY LINE
++ USE 330-C-1700 STANDARD CONCRETE MIX. (SEE ALSO 2-125)



CONCRETE COLLAR
TYPICAL DETAIL OF CONCRETE COLLAR FOR SURFACE OPERABLE TRANSFORMER ENCLOSURE



TYPICAL DB CONDUIT ANCHOR
ALL STRUCTURES

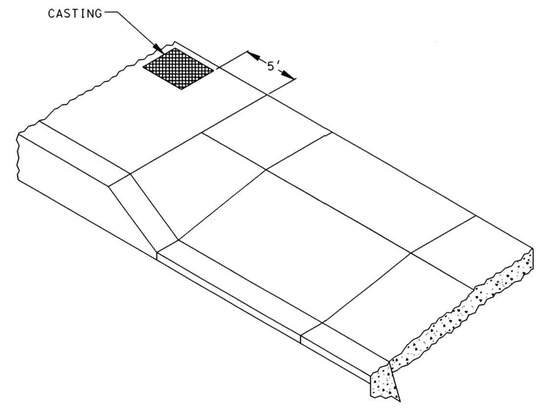


IF "d" IS GREATER THAN 2" USE DWP-3 CONCRETE, IF "d" IS LESS THAN 2", GROUT MAY BE USED.

IN PAVED AREA, SUCH AS IN SIDEWALKS, THE 6" CONCRETE COLLAR MAY BE ELIMINATED.

HANDHOLE SETTING DETAIL IN AN UNPAVED AREA
WHERE THERE ARE NO SIDEWALKS

STRUCTURES G-350 & G-286 AND NON-TRAFFIC RATED VENT ASSEMBLY MAY NOT BE PLACED WITHIN 5' OF DRIVEWAY APRON AS SHOWN IN DETAIL. ALL OTHERS MAY BE INSTALLED IN THIS RESTRICTED AREA WITH THE ADDITION OF AN APPROVED TRAFFIC RATED COVER.

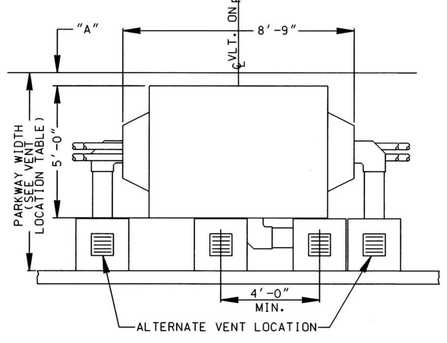


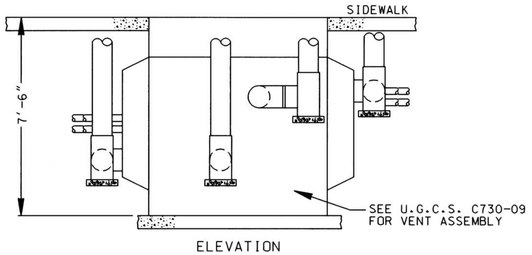
CASTING PLACEMENT DETAIL

VENT LOCATION TABLE

PKWY WIDTH	VENT LOCATION TO BE USED	DIMENSION "A" MIN. OFFSET FROM ℙ
7'-0"-8'-6"	ALTERNATE	6"
OVER 8'-6"	STANDARD	0"

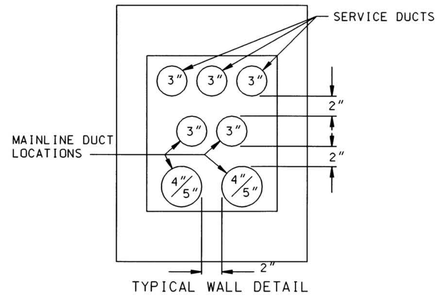
MIN. PARKWAY WIDTH FOR G-286 INSTALLATION IS 7'-0"





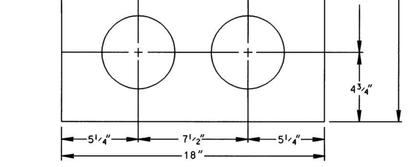
ELEVATION
TYPICAL VAULT VENT INSTALLATION
VLT: G-286

14" X 14" END WALL KNOCKOUT
2-4" & 6-3" CONDUITS
E-491, G2 (2'-6"X4'I.D.)
E-541, G2 (2'-6"X4") INTERCEPT

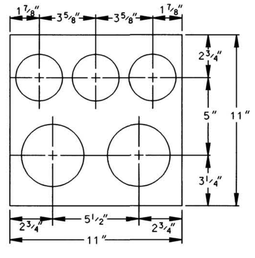


TYPICAL WALL DETAIL

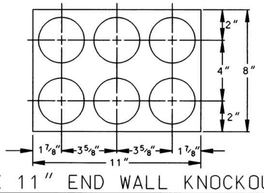
NOTES FOR INSTALLING CONDUITS IN WALL KNOCKOUTS
1. ALL CONDUIT, EXCEPT 1",2"& 3" SERVICE CONDUIT TERMINATING IN VAULTS, MAINTENANCE HOLES, HANDHOLES AND PAD HANDHOLES SHALL BE TERMINATED WITH END BELLS OR DUCT TERMINATORS.
2. ON END WALL KNOCKOUTS, IF TERMINATORS ARE REQUIRED OR REQUESTED BY THE CONTRACTOR OR DEVELOPER, THEY SHALL BE PLACED IN ACCORDANCE WITH THESE DETAILS. THE TERMINATOR DETAILS SHALL SPECIFY SIZE OF KNOCKOUTAND THE NUMBER OF CONDUITS REQUIRED.



18" X 26 1/2" END WALL KNOCKOUT
4-5", 3-4" & 4-3" CONDUITS
E-459 (3'X 5'X 3'-10"I.D.)



11" X 11" END WALL KNOCKOUT
2-4" & 3-3" CONDUITS
E-491, G1 (2'X 3'I.D.)
E-541, G1 (2'X3'I.D.) INTERCEPT



8" X 11" END WALL KNOCKOUT
6-3" CONDUITS
E-492 (2'X3'I.D.)BOTTOMLESS

NOTES:
1. ALL STRUCTURAL PLACEMENTS AND DETAILS ARE TYPICAL INSTALLATIONS, UNLESS OTHERWISE SPECIFIED ON CONSTRUCTION DRAWINGS.
2. SEE SPECIFICATION 104 AND APPENDIX I TO SPECIFICATION 104 FOR INSTALLATION INSTRUCTIONS ON UNDERGROUND SUBSTRUCTURES AND P.V.C. CONDUITS. ACTUAL NUMBER OF DUCTS IS SHOWN ON CONSTRUCTION DRAWING.
3. CITY OWNED OR PRIVATE STREET LIGHTING CONDUIT SYSTEM NOT ALLOWED IN JOINT TRENCH WITH UTILITIES.
4. ANY STRUCTURE OR VENT FRAME AND COVER LOCATED IN PARKWAY AREAS (OR AREAS ACCESSIBLE TO PEDESTRIAN TRAFFIC) SHALL BE ADJUSTED TO AN ELEVATION OF AN IMAGINARY LINE EXTENDED FROM THE CURB TO THE PROPERTY LINE.
5. ANY AREA LESS THAN 18 INCHES WIDE BETWEEN THE FINISHED SURFACE OF ANY STRUCTURE OR VENT FRAME AND COVER IN PLANTED PARKWAY AREAS AND ANY PAVED SURFACE SHALL BE PAVED BY 3 INCH CONCRETE SIDEWALK IN ACCORDANCE WITH THE SSPWC.

REV. NO.	REV. DATE	INIT'L	REVISION DESCRIPTION	APPV.	TAT NO.	DRAWING CIRCULATION PRELIM.	FINAL
21	01/14/08	JHG	REVISED DWG TO TWO PAGE LAYOUT	WY			
20	08/21/01	JHG	REVISED TRENCH DETAILS				
23	1/3/96	JHG	REVISED TRENCH DETAILS	S.J.B.			
22	4/18/95	JHG	REDRAWN ON CAD	S.P.			

DRAWN

DISTRICT | CONTRACT W.O. | DWP W.O. | SBE34

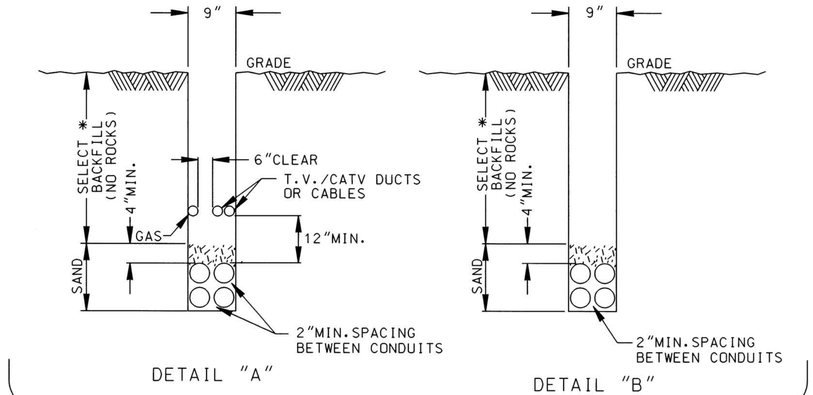
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

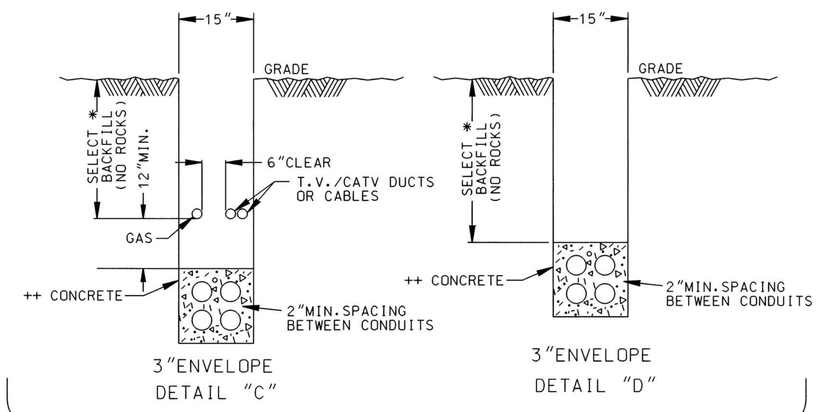
RESIDENTIAL UG STANDARD STRUCTURES PLACEMENT CONDUIT TRENCH DETAILS

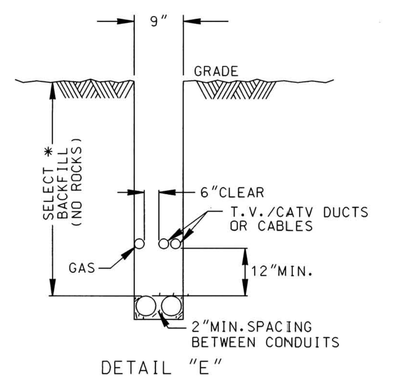
DESIGN	JCS	DRAFTING	J.GARCIA
OK		CHECKER	
APPROVED	J.L.MULLEY	DATE	4/18/67

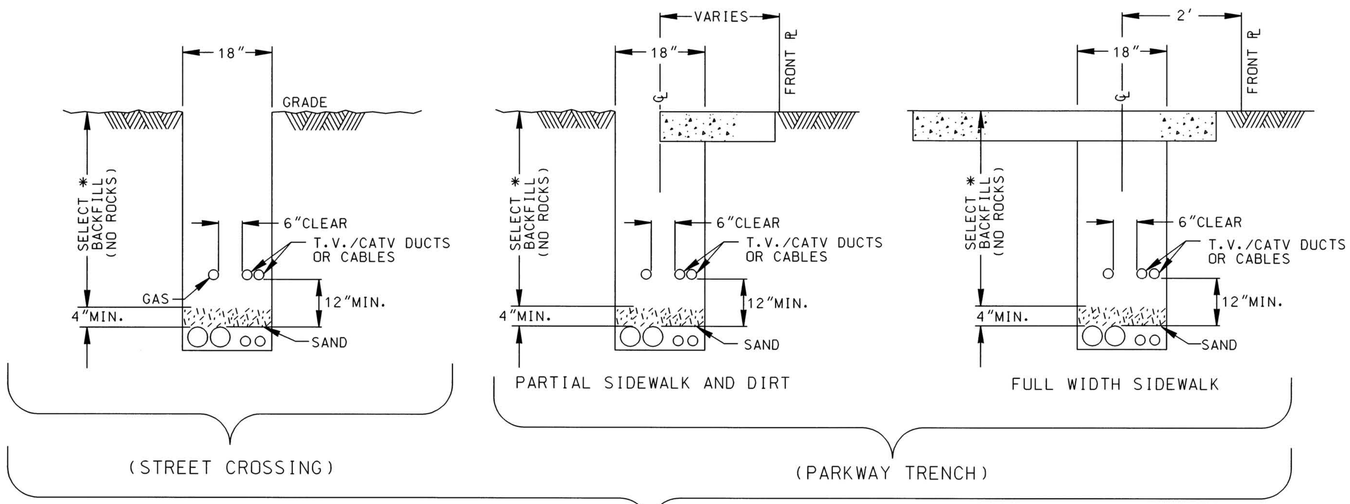
H-168 | SHEET 1 OF 2

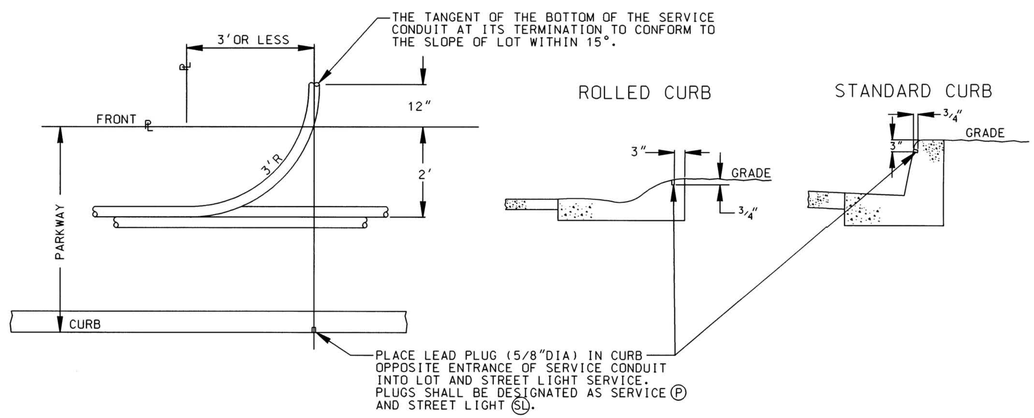
INDEX











SERVICE TERMINATION & CURB MARKER LOCATION

NOTES:

1. * SEE SPECIFICATION 104 FOR D.W.P. TRENCH DEPTH REQUIREMENTS. OTHER USERS OF A JOINT TRENCH SYSTEM MAY REQUIRE ADDITIONAL DEPTH FOR COVER AND SEPARATION.
2. ++ USE 330-C-1700 STANDARD CONCRETE MIX.
3. JOINT TRENCH CONSTRUCTION ALLOWED AT DISCRETION OF EACH UTILITY AND WITH MUTUAL AGREEMENT BETWEEN UTILITIES.
4. IN JOINT TRENCH THE GAS LINE SHALL BE PLACED ON THE SIDE CLOSER TO THE PROPERTY LINE.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.	DRAWING CIRCULATION PRELIM.	FINAL
31	01/14/08	JHG	REVISED DWG TO TWO PAGE LAYOUT	WY			
30	08/21/01	JHG	REVISED TRENCH DETAILS				
29	1/3/96	JHG	REVISED TRENCH DETAILS	S.J.B.			
28	4/18/95	JHG	REDRAWN ON CAD	S.P.			

DISTRICT | CONTRACT W.O. | DWP W.O. | SBE34

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	JCS	DRAFTING	J.GARCIA
QK	———	CHECKER	———
APPROVED	J.L.MULLEY	DATE	4/18/67

RESIDENTIAL UG STANDARD STRUCTURES PLACEMENT CONDUIT TRENCH DETAILS

H-168 | SHEET 2 OF 2

INDEX

△33	MANUFACTURER	B	C	D	E	F	G	H
	OLDCASTLE PRECAST	10′-10″	9′-8″	10″	10″	10″	4″	8″
	JENSEN PRECAST	10′-7″	9′-2″	8″	7″	7″	7″	7″

△33

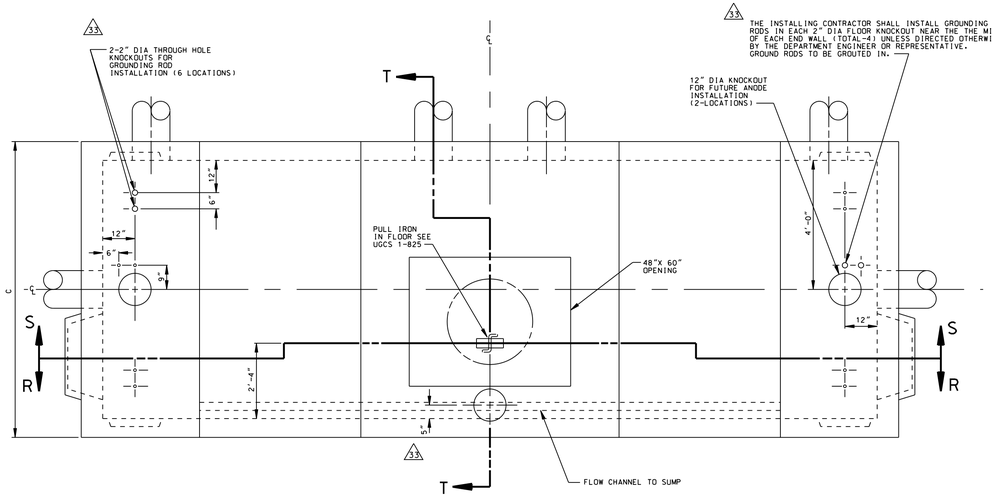
GROUP	A	CASTING OFFSET	MAX. WT. HEAVIEST SECTION LBS.		
			OLDCASTLE PRECAST	JENSEN PRECAST	LADDER LENGTH
1✱	12′-0″	0	VOID	VOID	12′-0″
1A	14′-0″	0	36,500	26,000	12′-0″
2	17′-0″	1′-6″	36,500	26,000	12′-0″
3A	19′-0″	2′-6″	36,500	26,000	12′-0″
4	22′-0″	1′-0″	36,500	26,000	12′-0″
5A	24′-0″	0	36,500	26,000	12′-0″
7	27′-0″	1′-6″	36,500	26,000	12′-0″
8A	29′-0″	2′-6″	36,500	26,000	12′-0″
9A	32′-0″	1′-0″	36,500	26,000	12′-0″

✱ THIS SIZE IS NO LONGER MANUFACTURED

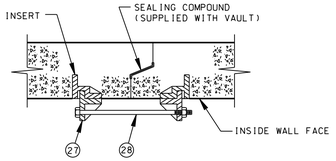
G-9A	G-8A	G-7	G-6A	G-5A	G-3	G-1A	G-1	PART	DESCRITION	DRAWING OR CAT.NO.
X	X	X	X	X	X	X	X	21	ASSEMBLY	
2	2	2	2	2	2	2	VOID	22	END SECTION	
1	1	1	1	1	1	1		23	ENTRANCE SECTION	
1		1		1				24	3′-0″ INTERMEDIATE SECTION	
3	3	2	2	1	1			25	5′-0″ INTERMEDIATE SECTION	
4	4	4	4	4	4	4	4	26	PULL IRON	1-825
48	40	40	32	32	24	24	16	16	27	CLASP
24	20	20	16	16	12	12	8	8	28	BOLT, 1′-8 NC X 14″ WITH HEX NUT
1	1	1	1	1	1	1	1	1	29	NECK,GRADE RING, & COVER ASSY. 48″ X 60″ HD.	1-802,G2B
X	X	X	X	X	X	X	X	X	30	✱ 12″ VENT ASSEMBLY	
7 1/4	8 1/4	6	5 1/4	5	4 3/4	4	3 1/2	3 1/2	31	✱ CU YD CRUSHER RUNBASE	
168	160	138	120	108	90	78	60	48	32	METAL STRUT	
67	63	59	55	52	47	45	39		33	✱ TONS SAND BACKFILL	
1	1	1	1	1	1	1	1	1	34	LADDER AND HANGING HARDWARE	2-361
60	60	60	60	60	60	60	60	60	35	5″ TERMINATOR	2-211
4	4	4	4	4	4	4	4	4	36	✱ GROUND ROD 5/8″ DIA X 8′ 304 SST CLAD	

✱ NOT A PART OF PRECAST ASSEMBLAGE
✱ SEE SECTION R-R & T-T FOR METAL FRAMING SIZES

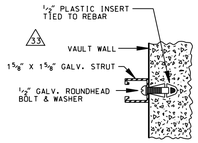
△33



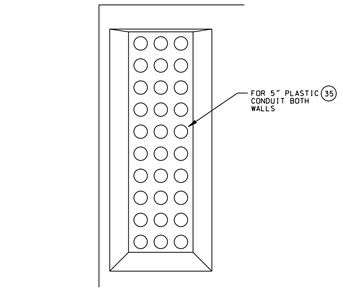
PLAN VIEW



DETAIL OF JOINT FASTENER
4 REQUIRED AT EACH JOINING SECTION



STRUT & BOLT DETAIL



OPTIONAL DUCT TERMINATOR DIAGRAM
EACH TERMINATOR MUST BE PLUGGED WHEN DELIVERED

REQUIREMENTS FOR FABRICATION

VAULT SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DWP STANDARD SPECIFICATIONS NO. P178, AS LAST REVISED.

VAULT SHALL BE SO FABRICATED AS TO PROVIDE A DRY AND WATER TIGHT INSTALLATION.

ALL 1/2″ INSERTS SHALL BE MADE FROM PLASTIC AND SHALL WITHSTAND A MINIMUM PULL-OUT LOAD OF 150 LBS/INSERT, AND A MINIMUM SHEAR LOAD OF 300 LBS/INSERT.

ALL 1 1/2″ SINGLE COIL INSERTS SHALL BE GALVANIZED SUPERIOR TYPE "S" OR EQUAL AND WITHSTAND A WORKING LOAD OF 13,000 LBS.

ALL PULL IRONS PER UGCS 1-825 SHALL BE SO PLACED AS TO WITHSTAND A WORKING LOAD OF 20,000 LBS.

LADDER AND HANGING HARDWARE TO BE INSTALLED WITH VAULT.

USE STEEL FRAME AND COVERS (TRAFFIC TYPE) PER UGCS 2-418, UNLESS DESIGH ENGINEER SPECIFIES REINFORCED PLASTIC MOTAR (RPM). PER UGCS 2-419.

OPTIONAL DUCT AND VENT KNOCKOUTS SHALL BE PLACED IN THE LOCATIONS AS ORDERED BY THE DWP UNDERGROUND ENGINEER.

STRUT AND BOLT INSTALLATION SHALL WITHSTAND A MINUMUM SHEAR LOAD OF 300 LBS/LF AND A PULL-OUT LOAD OF 150 LBS. / BOLT MAXIMUM SPACING REQUIRED IS 16" O.C. AND 3" FROM EACH END OF STRUT.

△33 ALL KNOCKOUTS EXCEPT THE 2" DIA. FLOOR KNOCKOUTS SHALL BE 1 1/2" UNREINFORCED CONCRETE. ALL 2" DIA FLOOR KNOCKOUTS SHALL HAVE CAST-IN WATER TIGHT DOUBLE MEMBRANE PLASTIC PLUGS.

REQUIRMENTS FOR INSTALLATION

MANUFACTURER TO DELIVER PREFABRICATED VAULT TO JOB SITE AND SUPPLY SPREADER BAR FOR UNLOADING. DWP OR INSTALLING CONTRACTOR SHALL PROVIDE MEANS FOR UNLOADING AND SETTING PRECAST UNITS.

△33 SELECT A LOCATION FREE OF SUBSTRUCTURES, CLEAR OF OVERHEAD OBSTRUCTIONS THAT WOULD INTERFERE WITH THE BOOM OF A LARGE CRANE AND HAVE AMPLE WORKING ROOM FOR A CRANE TO UNLOAD THE SECTION FROM A TRUCK INTO THE EXCAVATION.

DO NOT REMOVE ANY FLOOR KNOCKOUT.

VAULT SHALL BE SET ON A COMPACTED LEVEL BED OF CRUSHED AGGREGATE BASE.

VAULT SHALL BE REJECTED IF ANY PORTION OF KEYWAY, 12" OR LONGER, IS MISSING OR DAMAGED.

VAULT SECTION SHALL BE SET WITH SEALING COMPOUND APPROVED BY THE DWP UNDERGROUND ENGINEER AND SUPPLIED WITH VAULT.

ALL MAIN LINE CONDUIT ENTERING VAULT SHALL TERMINATE FLUSH WITH INSIDE RECESS SURFACE. TERMINATION SHALL BE WITH END BELLS. OR CAST-IN TERMINATIONS FOR ALL CONDUIT EXCEPT SERVICE CONDUIT. EDEGES SHALL BE ROUNDED AND SMOOTH. NO SHARP OR ROUGH EDGES WILL BE ACCEPTED.

NECK, GRADE RING AND COVER SHALL BE SET AS PER UGCS 1-802, G-2B.

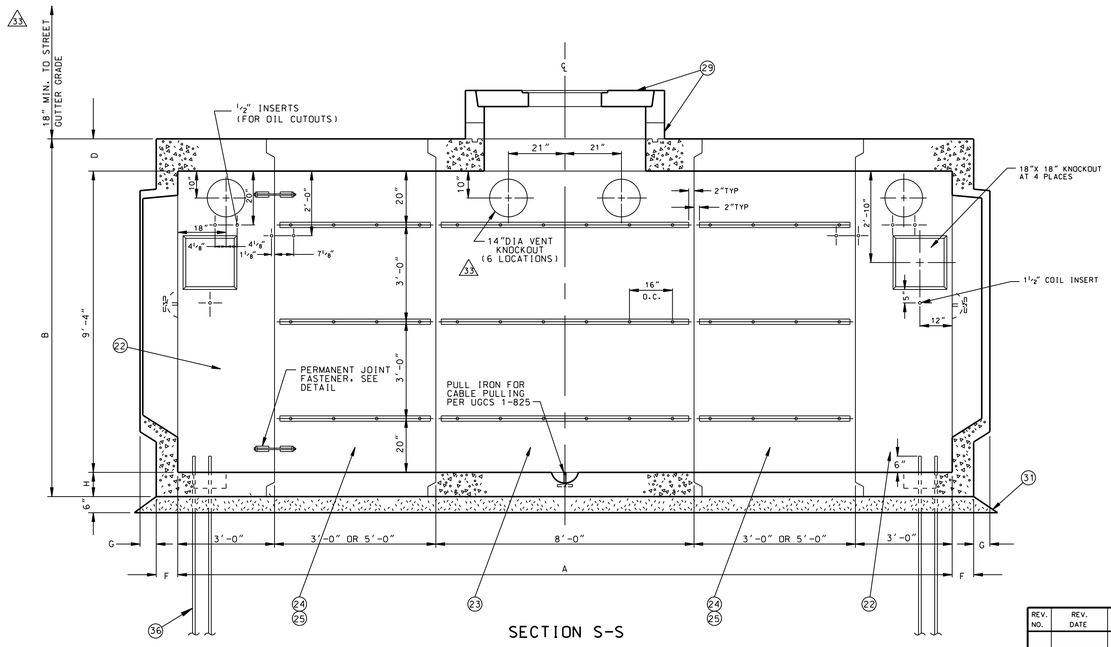
BACKFILL SHALL BE 100-E-100 SAND CEMENT SLURRY, OR AS SPECIFIED IN UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO. 104, AS LAST REVISED.

△33 VENT ASSEMBLY IF REQUIRED TO BE INSTALLED PER POWER DISTRIBUTION STANDARDS (PDCS) C730-10. UNLESS DESIGN ENGINEER SPECIFIES VENT ASSEMBLY PER (PDCS) C730-09. SEE CONSTRUCTION DRAWING FOR THE NUMBER OF VENTS TO BE INSTALLED.

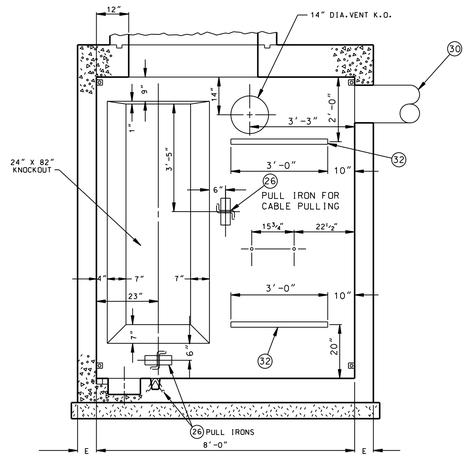
THE LADDER LENGTHS GIVEN ARE DESIGNED TO ACCOMODATE AN ADDITIONAL 9 INCHES OF GRADE RINGS BEYOND THE STANDARD 18-INCH NECK. THE LADDER SHALL BE INCREASED ONE FOOT FOR EACH ADDITIONAL ONE FOOT INCREMENT OF GRADE RINGS THEREAFTER AS SHOWN ON UGCS 2-361. IF THE NECK SECTIONS EXCEED 4 FEET IN LENGTH, FIELD CUT LADDER TO FIT NECESSARY CONDITIONS. SEE UGCS 2-361.1 FOR INSTALLATION PROCEDURE. INSTALLATION PROCEDURE OF LADDER AND HANGING HARDWARE SHALL BE IN ACCORDANCE WITH UGCS 2-361 WHERE APPLICABLE.

WEIGHT AND ALL OUTSIDE DIMESIONS VARY WITH MANUFACTURER. VALUES GIVEN ARE LARGEST SHOWN ON MANFACTURER'S DRAWINGS. PRIOR TO EXCAVATION, STRUCTURE INSTALLER SHALL OBTAIN THE MINIMUM REQUIRED EXCAVATION SIZE FROM THE MANUFACTURER SUPPLYING THE STRUCTURE.

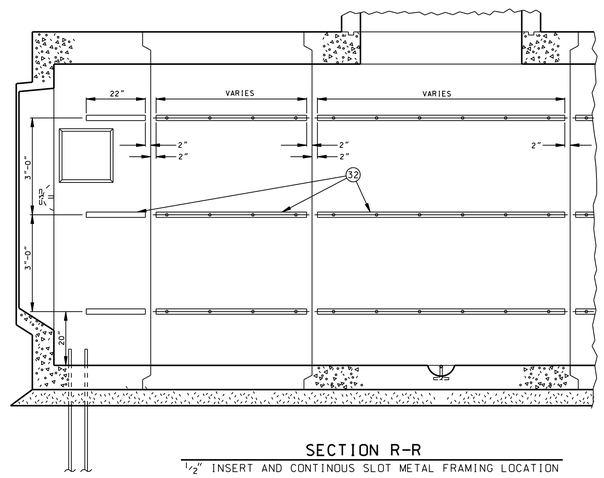
ALL VAULTS SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS OF DWP UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO.104. AS LAST REVISED.



SECTION S-S



SECTION T-T
OPPOSITE END WALL IS OPP.HAND



SECTION R-R
1/2" INSERT AND CONTINOUS SLOT METAL FRAMING LOCATION

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
△33	09/18/12	JD	REVISED NOTES, TABLES AND CALLOUTS	J.M.A.	C78074
△33	10/31/00	JHG	REDRAWN IN CAD, ORIGINAL LOST		

DRAWING CIRCULATION: PRELIM. | FINAL

SERVICE CENTER JOB LOCATION | SERVICE CENTER CONSTRUCTION | DWP W.O. | CONTRACT W.O.

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DISTRIBUTION ENGINEERING SECTION

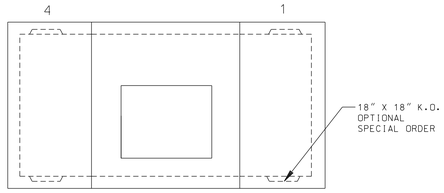
△33 PRECAST VAULT (TUNNEL TYPE) 4.8kV COMMERCIAL

DESIGN	P.C.SMITH	DRAFTING	J.GARCIA/OKADA
OK	D.S.	CHECKER	–
APPROVED	A.D.FRICKE	DATE	08/02/68

H-171 | SHEET 1 OF 1

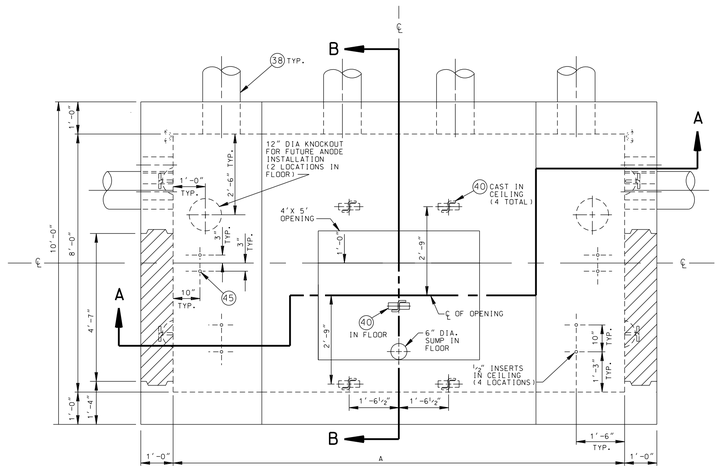
H171.dev 4/29/2013 11:02:28 AM

INDEX



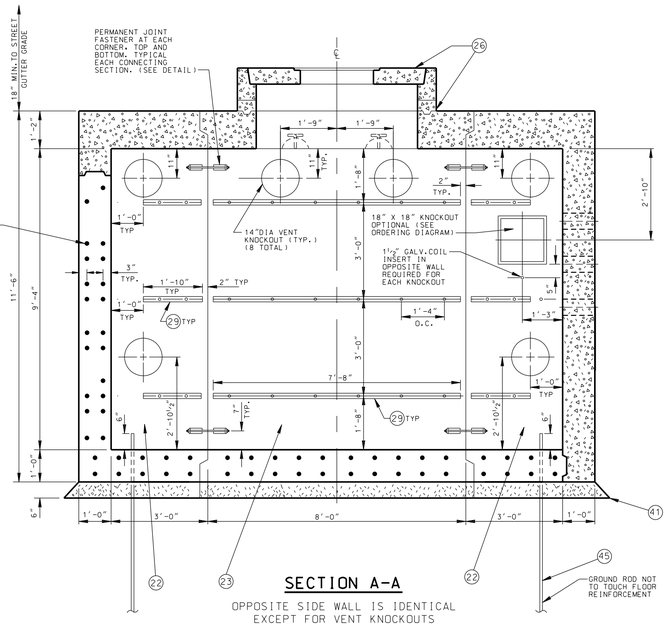
KNOCKOUT ORDERING DIAGRAM

WHEN ORDERING, SPECIFIY DESIRED KNOCKOUT LOCATIONS PER DIAGRAM NOTATIONS. OMIT KNOCKOUTS WHEN NOT ORDERING.



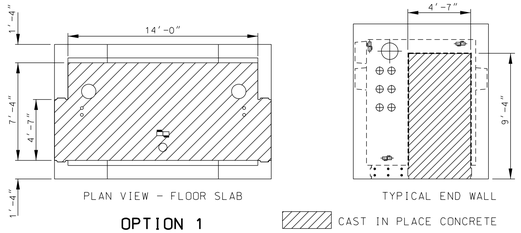
PLAN VIEW (OPTION 1)

PRECAST NECK, GRADE RING & COVER ASSEMBLY NOT SHOWN FOR CLARITY



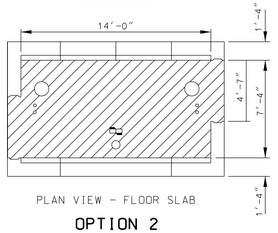
SECTION A-A

OPPOSITE SIDE WALL IS IDENTICAL EXCEPT FOR VENT KNOCKOUTS

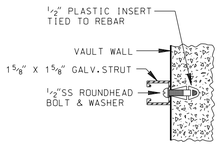


OPTION 1

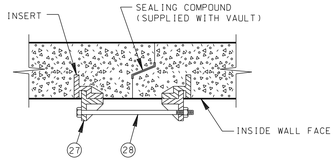
CAST IN PLACE CONCRETE



OPTION 2

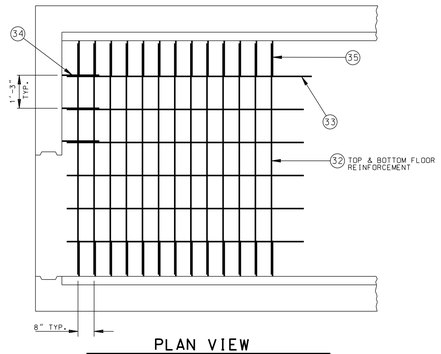


STRUT & BOLT DETAIL



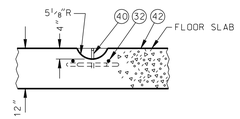
DETAIL OF JOINT FASTENER

4 REQUIRED AT EACH JOINING SECTION

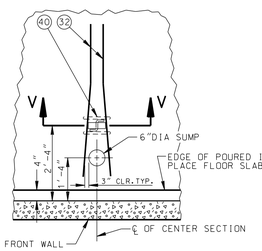


PLAN VIEW

FLOOR REINFORCING STEEL PLACEMENT

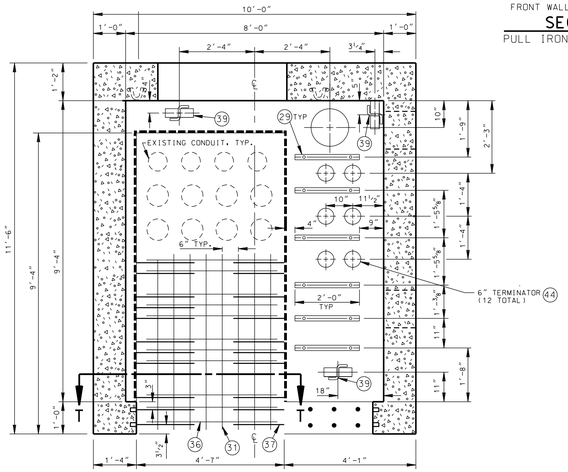


SECTION V-V



SECTION T-T

PULL IRON AND SUMP IN FLOOR



SECTION B-B

OPPOSITE VIEW IS OPPOSITE HAND

FLOOR REINFORCEMENT STEEL SCHEDULE

NO.	SIZE	SPACING	DESCRIPTION
32	#6	8" O.C.	STRAIGHT 7'-0" LONG
33	#4	15" O.C.	STRAIGHT LENGTH = (DIM. "A")-4"
34	#4	15" O.C.	DOWELS TO BE PROVIDED BY PRECAST MANUFACTURER
35	#6	8" O.C.	DOWELS TO BE PROVIDED BY PRECAST MANUFACTURER

G-9A	G-8A	G-7	G-5A	G-4	G-3A	G-2	G-1A	G-1	PART	DESCRITION	DRAWING OR CAT.NO.
X	X	X	X	X	X	X	X	X	21	ASSEMBLY	
↓	↓	↓	↓	↓	↓	↓	2	↓	22	END SECTION	
							1		23	ENTRANCE SECTION	
							–		24	3'-0" INTERMEDIATE SECTION	
							–		25	5'-0" INTERMEDIATE SECTION	
							1		26	NECK, GRADE RING & COVER ASSY..48"X 60"	1-802,G-2B
							16		27	CLASP	
							8		28	BOLT, 1'-8 NC X 14" WITH HEX NUT	
							109		29	** 1⅝" X 1⅝" GALV. CONT. METAL STRUT (SEE DETAIL)	
							1		30	LADDER AND HANGING HARDWARE	2-361
							20		31	REINFORCING STEEL, BAR SIZE #4 DIA.X 7'-0" LONG	
							38		32	REINFORCING STEEL, SEE FLOOR STEEL SCHEDULE	
							12		33	REINFORCING STEEL, SEE FLOOR STEEL SCHEDULE	
							–		34	#4 DOWELS (TO BE PROVIDED BY MANUFACTURER)	
							46		36	REINFORCING STEEL, BAR SIZE= #6, 49" LONG	
							–		37	#6 DOWELS (TO BE PROVIDED BY MANUFACTURER)	
							–		38	*12"VENT ASSEMBLY	
							6		39	7/8" GALV. PULL IRON	2-340
							5		40	7/8" STAINLESS STEEL 316 PULL IRON (LOOSE)	
							3½		41	* CU.YD.CRUSHER RUN BASE	
							4		42	* CU.YD.CONCRETE (DWP 3000-1.OP)	
							–		43	* TONS. SAND (BACKFILL)	
							12		44	6"TERMINATOR	2-211
							4		45	* GROUND ROD ⅝"DIA X 8'.304SST CLAD	

* NOT A PART OF PRECAST ASSEMBLAGE
** SEE SECTION A-A & B-B FOR METAL FRAMING SIZES

GROUP	A	CASTING OFFSET	LADDER LENGTH	MAX. WT. HEAVIEST SECTION LBS.
1	12'-0"	0	12'-0"	VOID
1A (OPT 1 & 2)	14'-0"	0	12'-0"	37.000
2	17'-0"	1'-6"	12'-0"	VOID
3A	19'-0"	2'-6"	12'-0"	VOID
4	22'-0"	1'-0"	12'-0"	VOID
5A	24'-0"	0	12'-0"	VOID
7	27'-0"	1'-6"	12'-0"	VOID
8A	29'-0"		12'-0"	VOID
9A	32'-0"	1'-0"	12'-0"	VOID

REQUIREMENTS FOR FABRICATION

VAULT SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DWP STANDARD SPECIFICATIONS NO. P178, AS LAST REVISED.

VAULT SHALL BE SO FABRICATED AS TO PROVIDE A DRY AND WATER TIGHT INSTALLATION.

ALL ½" INSERTS SHALL BE MADE FROM PLASTIC AND SHALL WITHSTAND A MINIMUM PULL-OUT LOAD OF 150 LBS/INSERT, AND A MINIMUM SHEAR LOAD OF 300 LBS/INSERT.

ALL ¾" INSERTS SHALL BE HOHMAN & BARNARD OR EQUAL.

ALL 1½" SINGLE COIL INSERTS SHALL BE GALVANIZED SUPERIOR TYPE "D" OR EQUAL AND WITHSTAND A WORKING LOAD OF 13.000 LBS.

ALL PULL IRONS PER UGCS 1-825 SHALL BE SO PLACED AS TO WITHSTAND A WORKING LOAD OF 20.000 LBS.

LADDER AND HANGING HARDWARE TO BE INSTALLED WITH VAULT.

FLOOR REINFORCING STEEL TO BE SUPPLIED WITH VAULT.

USE STEEL FRAME AND COVERS (TRAFFIC TYPE) PER UGCS 2-418, UNLESS DESIGN ENGINEER SPECIFIES REINFORCED PLASTIC MORTAR (RPM). PER UGCS 2-419.

OPTIONAL KNOCKOUTS SHALL BE PLACED IN THE LOCATIONS AS ORDERED BY THE DWP UNDERGROUND ENGINEER.

STRUT AND BOLT INSTALLATION SHALL WITHSTAND A MINIMUM SHEAR LOAD OF 300 LBS/LF AND A PULL-OUT LOAD OF 150 LBS. / BOLT. MAXIMUM SPACING REQUIRED IS 16" O.C. AND 3" FROM EACH END OF STRUT.

ALL KNOCKOUTS SHALL BE 1½" UNREINFORCED CONCRETE.

REQUIREMENTS FOR INSTALLATION

MANUFACTURER TO DELIVER PREFABRICATED VAULT TO JOB SITE AND SUPPLY SPREADER BAR FOR UNLOADING. DWP OR INSTALLING CONTRACTOR SHALL PROVIDE MEANS FOR UNLOADING AND SETTING PRECAST UNITS.

SELECT A LOCATION FREE OF SUBSTRUCTURES, CLEAR OF OVERHEAD OBSTRUCTIONS THAT WOULD INTERFERE WITH THE BOOM OF A LARGE CRANE AND HAVE AMPLE WORKING ROOM FOR A CRANE TO UNLOAD THE SECTION FROM A TRUCK INTO THE EXCAVATION.

VAULT SHALL BE SET ON A COMPACTED LEVEL BED OF CRUSHED AGGREGATE BASE.

VAULT SECTIONS SHALL BE REJECTED IF ANY PORTION OF KEYWAY, 12" OR LONGER, IS MISSING OR DAMAGED.

VAULT SECTIONS SHALL BE SET WITH SEALING COMPOUND APPROVED BY THE DWP UNDERGROUND ENGINEER AND SUPPLIED WITH VAULT.

ALL MAIN LINE CONDUIT ENTERING VAULT SHALL TERMINATE FLUSH WITH INSIDE RECESS SURFACE. TERMINATION SHALL BE WITH END BELLS OR CAST-IN TERMINATIONS FOR ALL CONDUIT EXCEPT SERVICE CONDUIT. EDGES SHALL BE ROUNDED AND SMOOTH. NO SHARP OR ROUGH EDGES WILL BE ACCEPTED.

NECK, GRADE RING AND COVER SHALL BE SET AS PER UGCS 1-802, G-2B. CASTING RESTRAINT SYSTEM IF REQUIRED SHALL BE SUPPLIED BY PRECAST STRUCTURE MANUFACTURER. CONTRACTOR TO INSTALL CASTING RESTRAINT SYSTEM PER UGCS 1-802.2. SEE CONSTRUCTION DRAWING FOR REQUIREMENTS.

BACKFILL SHALL BE 100-E-100 SAND CEMENT SLURRY, OR AS SPECIFIED IN UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO. 104, AS LAST REVISED.

VENT ASSEMBLY IF REQUIRED TO BE INSTALLED PER POWER DISTRIBUTION STANDARD (PDCS) C730-10, UNLESS DESIGN ENGINEER SPECIFIES VENT ASSEMBLY PER (PDCS) C730-09. SEE CONSTRUCTION DRAWING FOR THE NUMBER OF VENTS TO BE INSTALLED.

THE LADDER SHALL BE INCREASED ONE FOOT FOR EACH ADDITIONAL ONE FOOT INCREMENT OF GRADE RINGS THEREAFTER. INSTALLATION PROCEDURE OF LADDER AND HANGING HARDWARE SHALL BE IN ACCORDANCE WITH UGCS 2-361 WHERE APPLICABLE.

CONTACT DESIGN ENGINEER 48 HOURS PRIOR TO STEEL PLACEMENT.

PLACE DOWELS INTO INSERTS AS SHOWN AND AS REQUIRED.

REINFORCING STEEL SHALL BE TIED AT ALL CROSSING IN ACCORDANCE WITH THIS STANDARD. TOLERANCE ON ALL REBARS SHALL BE 0.25".

FLOOR REINFORCEMENT CLEARANCES SHALL BE 3" MINIMUM AROUND OPENINGS, SUMPS, AND KNOCKOUTS.

USE SUPERIOR REBAR SUPPORT (CHAIRS) TO OBTAIN THE SPECIFIED LOCATION OF REINFORCING STEEL.

FLOOR PULL IRON SHALL BE LOCATED AS SHOWN WITH REINFORCEMENT PLACED ON LEGS, CAPABLE OF WITHSTANDING A WORKING LOAD OF 20.000 LBS.

SETTLE CONCRETE IN SLOT AND FLOOR UNTIL FREE OF HONEYCOMB OR VOIDS.

SLOPE FLOOR (1/2 INCH PER 4 FEET) TOWARDS SUMP FROM BOTH ENDS.

WEIGHT AND ALL OUTSIDE DIMENSIONS VARY WITH MANUFACTURER. VALUES GIVEN ARE LARGEST SHOWN ON MANFACTURER'S DRAWINGS. PRIOR TO EXCAVATION, STRUCTURE INSTALLER SHALL OBTAIN THE MINIMUM REQUIRED EXCAVATION SIZE FROM THE MANUFACTURER SUPPLYING THE STRUCTURE.

ALL VAULTS SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS OF DWP UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO.104, AS LAST REVISED.

REV. NO.	REV. DATE	INIT'L	REVISION DESCRIPTION	APPV.	TAT NO.
16	09/24/15	EP	REVISED STRUCT. THICKNESS, NOTES, CALLOUTS AND AVAILABLE SIZES.	J.M.A.	C78074
15	09/18/12	JD	REVISED NOTES, TABLES AND CALLOUTS	J.M.A.	C78074
14	03/09/01	JHG	REDRAWN IN CAD		

DRAWING CIRCULATION: PRELIM. | FINAL

SERVICE CENTER JOB LOCATION | SERVICE CENTER CONSTRUCTION | DWP W.O. | CONTRACT W.O.

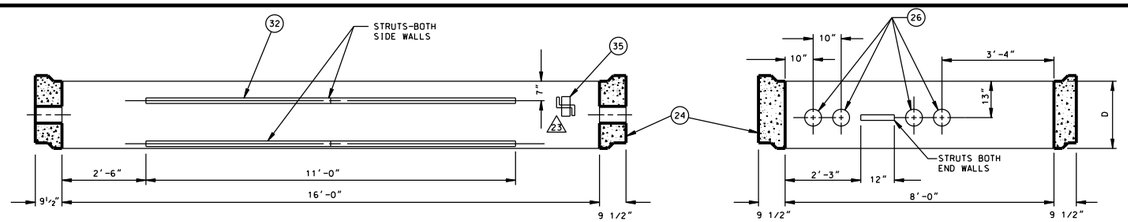
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING SECTION

DESIGN J. D. MCMAHON | DRAFTING J.GARCIA
CK C. A. COMBS | CHECKER W. YCEDO
APPROVED B. V. PALK | DATE 04/09/01

PRECAST VAULT (INTERCEPT TUNNEL TYPE) 34.5kV & 4.8kV COMMERCIAL

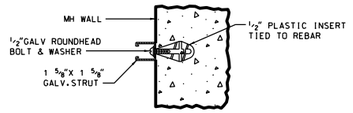
H-172 | SHEET 1 OF 1

INDEX



SIDE WALL
INTERMEDIATE SECTION (FOR G-3 ONLY)

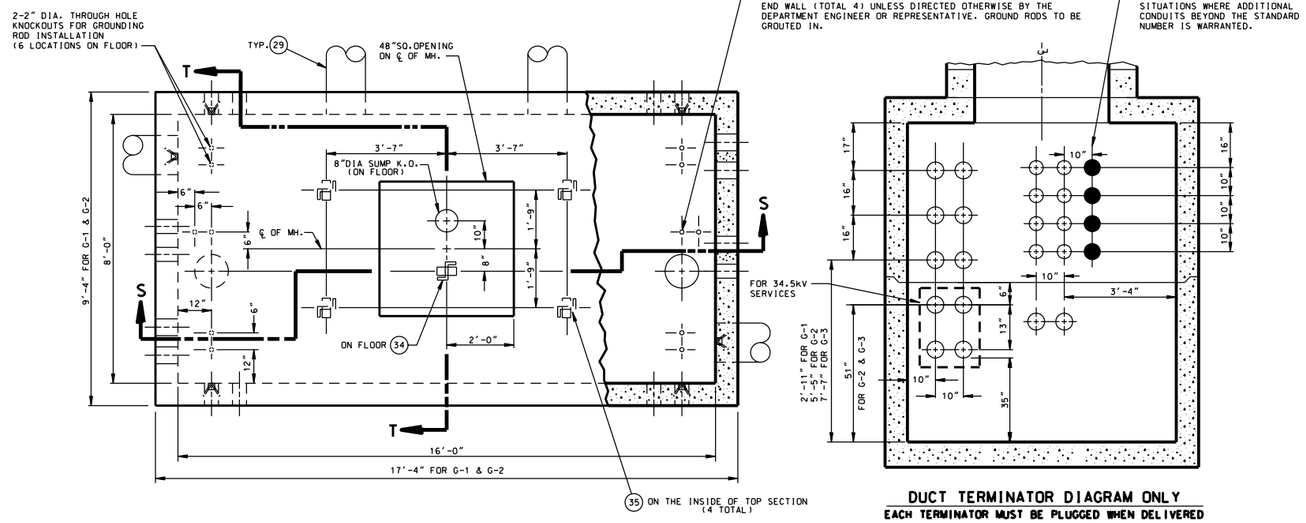
END WALL
INTERMEDIATE SECTION (FOR G-3 ONLY)



STRUT & BOLT DETAIL

G-3	G-2	G-1	PART	DESCRIPTION	DRAWING OR CAT.NO.
*	*	*	21	ASSEMBLY	-
1	1	1	22	PRECAST TOP SECTION WT.45.600 LBS	-
1	1	1	23	PRECAST BOTTOM SECTION (WT.47.900 LBS FOR G-2 & G-3)	-
1	0	0	24	PRECAST INTERMEDIATE SECTION WT.13.800 LBS	-
1	1	1	25	CAST IRON NECK RING & COVER	1-802, G1-B 1-804, G1-A 1-806, G1-A
28	20	12	26	6" DOUBLE MEMBRANE TERMINATORS	2-211
40	40	40	27	5" DOUBLE MEMBRANE TERMINATORS	2-211
4	4	4	28	* CUBIC YDS. CRUSHED AGGREGATE BASE	-
-	-	-	29	*12" VENT ASSEMBLY (SEE NOTE)	-
1	1	1	30	LADDER & HANGING HARDWARE (SEE NOTES)	2-361
-	-	-	31	* TONS OF SAND BACKFILL	-
144	120	120	32	CONTINUOUS GALVANIZED STEEL STRUT(FT.)	-
4	4	4	33	* GROUND ROD 5/8" DIA X 8' 304 SST CLAD	-
9	9	9	34	PULL IRON ASSEMBLY	1-825
4	4	4	35	PULL IRON ASSEMBLY (STAINLESS STEEL)	1-825

* NOT A PART OF PRECAST ASSEMBLAGE



PLAN VIEW
PRECAST NECK, GRADE RING & COVER ASSEMBLY NOT SHOWN

DUCT TERMINATOR DIAGRAM ONLY
EACH TERMINATOR MUST BE PLUGGED WHEN DELIVERED

GROUP	A	B	C	D	LADDER LENGTH
1	8'-10"	7'-0"	2'-3"	0'-0"	10'-0"
2	11'-4"	9'-6"	4'-9"	0'-0"	12'-6"
3	13'-6"	11'-8"	4'-9"	2'-2"	15'-0"

REQUIREMENTS FOR FABRICATION:

MAINTENANCE HOLE SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P STANDARD SPECIFICATIONS NO.P178. AS LAST REVISED.

MAINTENANCE HOLE SHALL BE SO FABRICATED AS TO PROVIDE A DRY AND WATER TIGHT INSTALLATION.

ALL 1/2" INSERTS SHALL BE MADE FROM PLASTIC AND SHALL WITHSTAND A MINIMUM PULL-OUT LOAD OF 150 LBS./INSERT. AND A MINIMUM SHEAR LOAD OF 300 LBS./INSERT.

ALL PULL IRONS PER UGCS 1-825 SHALL BE SO PLACED AS TO WITHSTAND A WORKING LOAD OF 20.000 LBS./ PULL IRON.

LADDER AND HANGING HARDWARE TO BE INSTALLED WITH MAINTENANCE HOLE.

USE STEEL FRAME AND COVERS (TRAFFIC TYPE) PER UGCS 2-418, UNLESS DESIGN ENGINEER SPECIFIES REINFORCED PLASTIC MORTAR (RPM) PER UGCS 2-419.

OPTIONAL DUCT AND VENT KNOCKOUTS SHALL BE PLACED IN THE LOCATIONS AS ORDERED BY THE DW&P UNDERGROUND ENGINEER.

STRUT AND BOLT INSTALLATION SHALL WITHSTAND A MINIMUM SHEAR LOAD OF 300 LBS./LF. AND A PULL-OUT LOAD OF 150 LBS/BOLT. MAXIMUM SPACING REQUIRED IS 16" O.C. AND 3" FROM EACH END OF STRUT. UNLESS OTHERWISE NOTED.

ALL KNOCKOUTS EXCEPT THE 2" DIA. FLOOR KNOCKOUTS SHALL BE 1 1/2" UNREINFORCED CONCRETE. ALL 2" DIA. FLOOR KNOCKOUTS SHALL HAVE CAST-IN WATER TIGHT DOUBLE MEMBRANE PLASTIC PLUGS.

REQUIREMENTS FOR INSTALLATION:

MANUFACTURER TO DELIVER PREFABRICATED MAINTENANCE HOLE TO JOB SITE AND SUPPLY SPREADER BAR FOR UNLOADING. DW&P OR INSTALLING CONTRACTOR TO PROVIDE MEANS FOR UNLOADING AND SETTING PRECAST UNITS.

SELECT A LOCATION FREE OF SUBSTRUCTURES. CLEAR OF OVERHEAD OBSTRUCTIONS THAT WOULD INTERFERE WITH THE BOOM OF A LARGE CRANE AND HAVE AMPLE WORKING ROOM FOR A CRANE TO UNLOAD THE SECTION FROM A TRUCK INTO THE EXCAVATION.

DO NOT REMOVE ANY FLOOR KNOCKOUT.

MAINTENANCE HOLE SHALL BE SET ON A COMPACTED LEVEL BED OF CRUSHED AGGREGATE BASE.

MAINTENANCE HOLE SHALL BE REJECTED IF ANY PORTION OF KEYWAY, 12" OR LONGER, IS MISSING OR DAMAGED.

MAINTENANCE HOLE SECTIONS SHALL BE SET WITH SEALING COMPOUND APPROVED BY THE DW&P UNDERGROUND ENGINEER AND SUPPLIED WITH MAINTENANCE HOLE.

ALL MAIN LINE CONDUIT ENTERING MAINTENANCE HOLE SHALL TERMINATE FLUSH WITH INSIDE SURFACE. TERMINATION SHALL BE WITH CAST-IN TERMINATIONS. EDGES SHALL BE ROUNDED AND SMOOTH. NO SHARP OR ROUGH EDGES WILL BE ACCEPTED.

NECK, GRADE RING(S) AND COVER SHALL BE SET AS PER UGCS 1-802, G-1B. CASTING RESTRAINT SYSTEM IF REQUIRED SHALL BE SUPPLIED BY PRECAST STRUCTURE MANUFACTURER. CONTRACTOR TO INSTALL CASTING RESTRAINT SYSTEM PER UGCS 1-802.2. SEE CONSTRUCTION DRAWING FOR REQUIREMENTS.

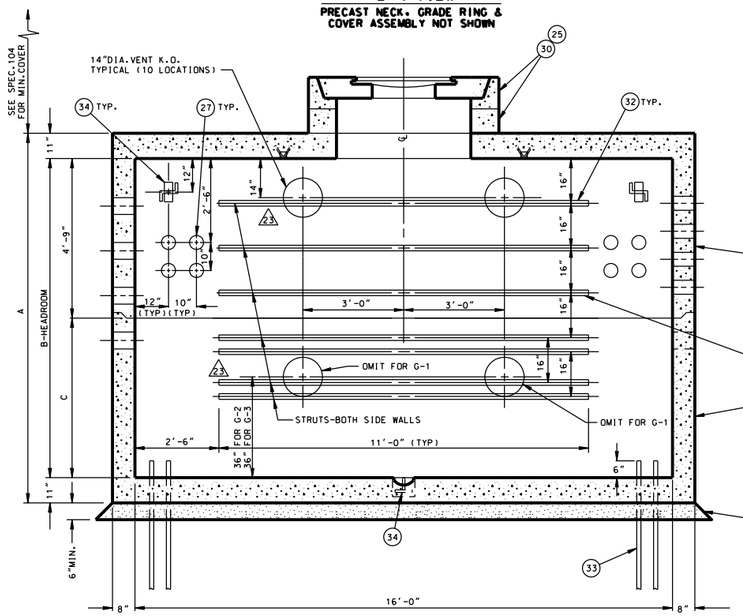
BACKFILL SHALL BE 100-E-100 SAND CEMENT SLURRY, OR AS SPECIFIED IN UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO.104. AS LAST REVISED.

VENT ASSEMBLY IF REQUIRED TO BE INSTALLED PER POWER DISTRIBUTION STANDARD (PDCS) C730-10 UNLESS DESIGN ENGINEER SPECIFIES VENT ASSEMBLY PER (PDCS) C730-09. SEE CONSTRUCTION DRAWING FOR THE NUMBER OF VENTS.

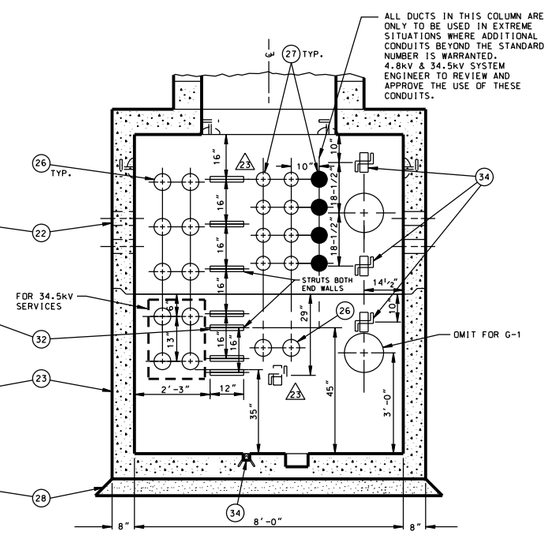
THE LADDER AND HANGING HARDWARE SHALL BE SUPPLIED WITH MAINTENANCE HOLE. THE LADDER LENGTH GIVEN IS DESIGNED TO ACCOMMODATE AN ADDITIONAL 6 INCHES OF GRADE RINGS BEYOND THE STANDARD 18 INCH NECK. THE LADDER SHALL BE INCREASED ONE FOOT FOR EACH ADDITIONAL ONE FOOT INCREMENT OF GRADE RINGS THEREAFTER AS SHOWN ON UGCS 2-361. INSTALLATION PROCEDURE OF LADDER AND HANGING HARDWARE SHALL BE IN ACCORDANCE WITH UGCS 2-361 WHERE APPLICABLE.

WEIGHT AND ALL OUTSIDE DIMENSIONS VARY WITH MANUFACTURER. VALUES GIVEN ARE LARGEST SHOWN ON MANUFACTURER'S DRAWINGS. PRIOR TO EXCAVATION STRUCTURE INSTALLER SHALL OBTAIN THE MINIMUM REQUIRED EXCAVATION SIZE FROM THE MANUFACTURER SUPPLYING THE STRUCTURE.

ALL MAINTENANCE HOLES SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS OF DW&P UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO.104. AS LAST REVISED.



SECTION S-S
OPPOSITE SIDE WALL IS IDENTICAL EXCEPT FOR VENT KNOCKOUTS



SECTION T-T
OPPOSITE END WALL IS IDENTICAL

IF VENTS ARE TO BE INSTALLED, A MINIMUM OF TWO-UPPER VENT K.O.'s SHALL BE USED. THE USE OF ANY LOWER VENT K.O.'s SHALL BE APPROVED BY LADWP REPRESENTATIVE.

REV. NO.	REV. DATE	INITL.	REVISION DESCRIPTION	APPV.	TAT NO.
23	12/18/23	JWW	EDITS TO UNISTRUT AND PULL IRON LOCATIONS	ERE	Y23-0115
22	2/11/22	DR	ADDDED TWO KNOCKOUT VENTS AND TWO STRUTS		
21	10/28/21	PSJ	MINOR EDITS TO DUCTS	---	
20	07/08/21	JJZ	MINOR EDITS TO DETAIL VIEWS	---	
19	12/30/20	JJZ	ADDED ADDITIONAL DUCTS FOR USE IN EXTREME CASES	---	
18	02/06/18	JHG	ADDED ADDITIONAL 6"TERMINATORS	GEJ	
17	06/14/13	EP	REVISED ROOF AND FLOOR THICKNESS. KEY SECTION. NOTES AND CALL OUTS.	J.M.A.	
16	04/29/11	JD	REVISED PULL IRON CONFIGURATION ON THE INSIDE OF TOP SECTION. REVISED VENT NOTES	J.M.A.	

DRAWING CIRCULATION: PRELIM. | FINAL

DISTRICT | CONTRACT W.O. | DWP W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

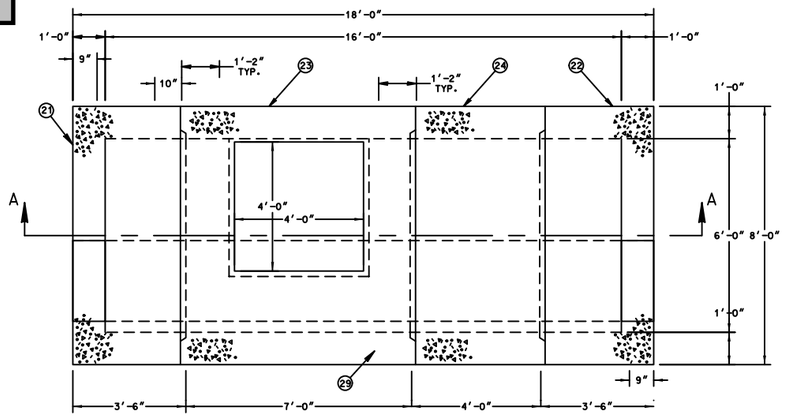
PRECAST MAINTENANCE HOLE
8'-0"X16'-0"
W/TERMINATIONS

DESIGN	D.TOM	DRAFTING	CWN / J.GARCIA
OK	JOHN McMAHON	CHECKER	N.T.
APPROVED	B.M.BOYCHUK	DATE	10/17/96

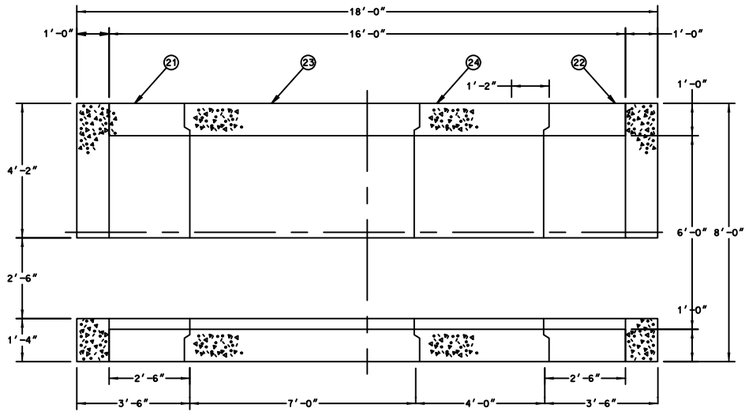
H-202 | SHEET 1 OF 1

H202.dgn

INDEX



PLAN VIEW



SECTION C-C

ISO VIEW

SECTION A-A

PART	DESCRITION	DRAWING OR CAT. NO.
21	30" END SECTION INTERCEPT WT. 21,050 LBS	-
22	30" END SECTION INTERCEPT WT. 21,050 LBS	-
23	84" CENTER SECTION W/ OPENING INTERCEPT WT. 31,400 LBS	-
24	48" EXTENSION SECTION INTERCEPT WT. 18,950 LBS	-
25	GALVANIZED TUNNEL VAULT BRACKET	
26	DOWEL LOCATIONS	-
27	1/4" DIA X 1 11/16" THREADED BRASS GROUND INSERT WELD TO REBAR. "GRD" TO BE STENCILED IN RED LETTERS	-
28	1/4" DIA X 1 1/2" NC P15T INSERT W/ 1/4"-20NC X 1" S.S. HEAD BOLT FOR BONDING RIBBON	-
29	8 TON X 13 3/8" FALV. DOGBONE ANCHOR FOR HANDLING	-
30	7/8" DIA. X 3 3/8" GALV. RECESSED PULL IRON	-
31	8 TON X 6 3/4" GALV. DOGBONE FOR HANDLING	-
32	CS-231 COSEAL. HIDROPHILIC 3/4" X 1" WATER STOP	-
33	1/2" DIA. X 3 1/4" NC IMPERIAL 15000 PLASTIC W/SNAP INSERT	-

REQUIREMENTS FOR FABRICATION

MAINTENANCE HOLE SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P STANDARD SPECIFICATIONS NO. P178, AS LAST REVISED.

MAINTENANCE HOLE SHALL BE SO FABRICATED AS TO PROVIDE A DRY AND WATER TIGHT INSTALLATION.

ALL 1/2" INSERTS SHALL BE MADE FROM PLASTIC AND SHALL WITHSTAND A MINIMUM PULL-OUT LOAD OF 150 LBS./INSERT, AND A MINIMUM SHEAR LOAD OF 300 LBS./INSERT.

ALL PULL IRONS PER UCGS 1-825 SHALL BE SO PLACED AS TO WITHSTAND A WORKING LOAD OF 20,000 LBS./ PULL IRON.

LADDER AND HANGING HARDWARE TO BE INSTALLED WITH MAINTENANCE HOLE.

USE STEEL FRAME AND COVERS (TRAFFIC TYPE) PER UGCS 2-418, UNLESS DESIGN ENGINEER SPECIFIES REINFORCED PLASTIC MORTAR (RPM) PER UGCS 2-419.

OPTIONAL DUCT AND VENT KNOCKOUTS SHALL BE PLACED IN THE LOCATIONS AS ORDERED BY THE DW&P UNDERGROUND ENGINEER.

STRUT AND BOLT INSTALLATION SHALL WITHSTAND A MINIMUM SHEAR LOAD OF 300 LBS./LF. AND A PULL-OUT LOAD OF 150 LBS/BOLT. MAXIMUM SPACING REQUIRED IS 16" O.C. AND 3" FROM EACH END OF STRUT, UNLESS OTHERWISE NOTED.

ALL KNOCKOUTS EXCEPT THE 2" DIA. FLOOR KONCKOUTS SHALL BE 1 1/2" UNREINFORCED CONCRETE.

ALL 2" DIA. FLOOR KNOCKOUTS SHALL HAVE CAST-IN WATER TIGHT DOUBLE MEMBRANE PLASTIC PLUGS.

REQUIRMENTS FOR INSTALLATION

MANUFACTURER TO DELIVER PREFABRICATED MAINTENANCE HOLE TO JOB SITE AND SUPPLY SPREADER BAR FOR UNLOADING. DW&P OR INSTALLING CONTRACTOR TO PROVIDE MEANS FOR UNLOADING AND SETTING PRECAST UNITS.

SELECT A LOCATION FREE OF SUBSTRUCTURES, CLEAR OF OVERHEAD OBSTRUCTIONS THAT WOULD INTERFERE WITH THE BOOM OF A LARGE CRANE AND HAVE AMPLE WORKING ROOM FOR A CRANE TO UNLOAD THE SECTION FROM A TRUCK INTO THE EXCAVATION.

DO NOT REMOVE ANY FLOOR KNOCKOUT.

MAINTENANCE HOLE SHALL BE SET ON A COMPACTED LEVEL BED OF CRUSHED AGGREGATE BASE.

MAINTENANCE HOLE SHALL BE REJECTED IF ANY PORTION OF KEYWAY, 12" OR LONGER, IS MISSING OR DAMAGED.

MAINTENANCE HOLE SECTIONS SHALL BE SET WITH A SEALING COMPOUND APPROVED BY THE DW&P UNDERGROUND ENGINEER AND SUPPLIED WITH MAINTENANCE HOLE.

ALL MAIN LINE CONDUIT ENTERING MAINTENANCE HOLE SHALL TERMINATE FLUSH WITH THE INSIDE SURFACE. TERMINATION SHALL BE WITH CAST-IN TERMINATIONS. EDGES SHALL BE ROUNDED AND SMOOTH. NO SHARP OR ROUGH EDGES WILL BE ACCEPTED.

NECK, GRADE RING(S) AND COVER SHALL BE SET AS PER UGCS 1-802, G-1B. CASTING RESTRAINT SYSTEM IF REQUIRED SHALL BE SUPPLIED BY PRECAST STRUCTURE MANUFACTURER. CONTRACTOR TO INSTALL CASTING RESTRAINT SYSTEM PER UGCS 1-802.2. SEE CONSTRUCTION DRAWING FOR REQUIREMENTS.

BACKFILL SHALL BE 100-E-100 SAND CEMENT SLURRY, OR AS SPECIFIED IN UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO. 104, AS LAST REVISED

VENT ASSEMBLY IF REQUIRED TO BE INSTALLED PER POWER DISTRIBUTION STANDARD (PDCS) C730-10 UNLESS DESIGN ENGINEER SPECIFIES VENT ASSEMBLY PER (PDCS) C730-09, SEE CONSTRUCTION DRAWING FOR THE NUMBER OF VENTS.

THE LADDER AND HANGING HARDWARE SHALL BE SUPPLIED WITH MAINTENANCE HOLE.
THE LADDER LENGTH GIVEN IS DESIGNED TO ACCOMMODATE AN ADDITIONAL 6 INCHES OF GRADE RINGS BEYOND THE STANDARD 18 INCH NECK. THE LADDER SHALL BE INCREASED ONE FOOT FOR EACH ADDITIONAL ONE FOOT INCREMENT OF GRADE RINGS THEREAFTER AS SHOWN ON UGCS 2-361. INSTALLATION PROCEDURE OF LADDER AND HANGING HARDWARE SHALL BE IN ACCORDANCE WITH UGCS 2-361 WHERE APPLICABLE.

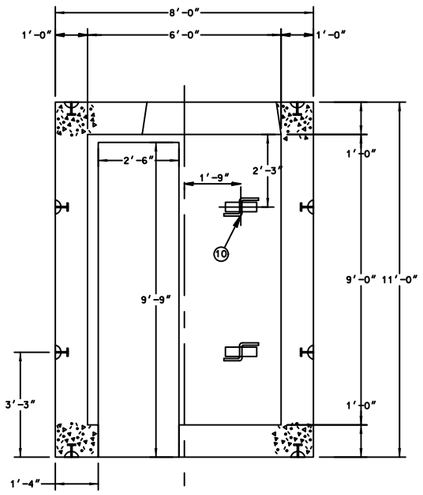
WEIGHT AND ALL OUTSIDE DIMENSIONS VARY WITH MANUFACTURER. VALUES GIVEN ARE LARGEST SHOWN ON MANUFACTURER'S DRAWINGS. PRIOR TO EXCAVATION STRUCTURE INSTALLER SHALL OBTAIN THE MINIMUM REQUIRED EXCAVATION SIZE FROM THE MANUFACTURER SUPPLYING THE STRUCTURE.

ALL MAINTENANCE HOLES SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS OF DW&P UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO. 104, AS LAST REVISED.

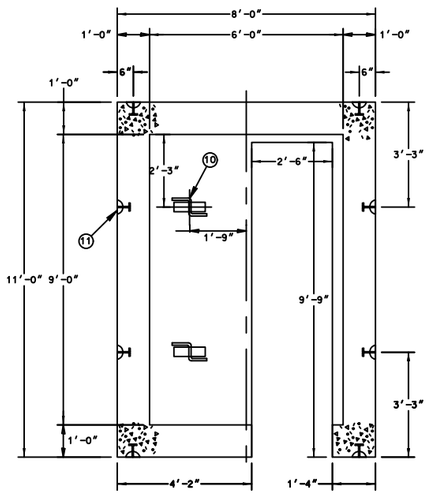
REV. NO.	REV. DATE	INIT'L	REVISION DESCRIPTION	APPV.	TAT NO.	DRAWING CIRCULATION PRELIM.			FINAL		

SERVICE CENTER JOB LOCATION	SERVICE CENTER CONSTRUCTION	DWP W.O.		CONTRACT W.O.
CITY OF LOS ANGELES DEPARTMENT OF WATER AND POWER DISTRIBUTION ENGINEERING SECTION			PRECAST VAULT (TUNNEL TYPE) 4.8kV COMMERCIAL	
DESIGN ---	DRAFTING JJZ			
OK ---	CHECKER ---			
APPROVED ---	DATE 5/26/21		H-204	SHEET 1 OF 2

PART	DESCRITION	DRAWING OR CAT. NO.
21	30" END SECTION INTERCEPT WT. 21,050 LBS	-
22	30" END SECTION INTERCEPT WT. 21,050 LBS	-
23	84" CENTER SECTION W/ OPENING INTERCEPT WT. 31,400 LBS	-
24	48" EXTENSION SECTION INTERCEPT WT. 18,950 LBS	-
25	GALVANIZED TUNNEL VAULT BRACKET	
26	DOWEL LOCATIONS	-
27	1/4" DIA X 1 11/16" THREADED BRASS GROUND INSERT WELD TO REBAR. "GRD" TO BE STENCILED IN RED LETTERS	-
28	1/4" DIA X 1 1/2" NC P15T INSERT W/ 1/4"-20NC X 1" S.S. HEAD BOLT FOR BONDING RIBBON	-
29	8 TON X 13 3/8" FALV. DOGBONE ANCHOR FOR HANDLING	-
30	7/8" DIA. X 3 3/8" GALV. RECESSED PULL IRON	-
31	8 TON X 6 3/4" GALV. DOGBONE FOR HANDLING	-
32	CS-231 COSEAL. HIDROPHILIC 3/4" X 1" WATER STOP	-
33	1/2" DIA. X 3 1/4" NC IMPERIAL 15000 PLASTIC W/SNAP INSERT	-



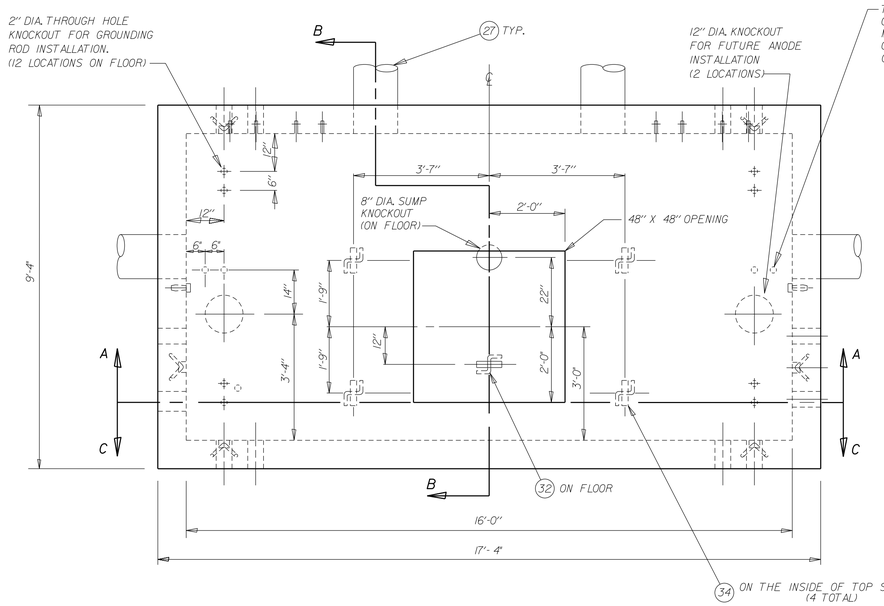
SECTION B-B



SECTION D-D

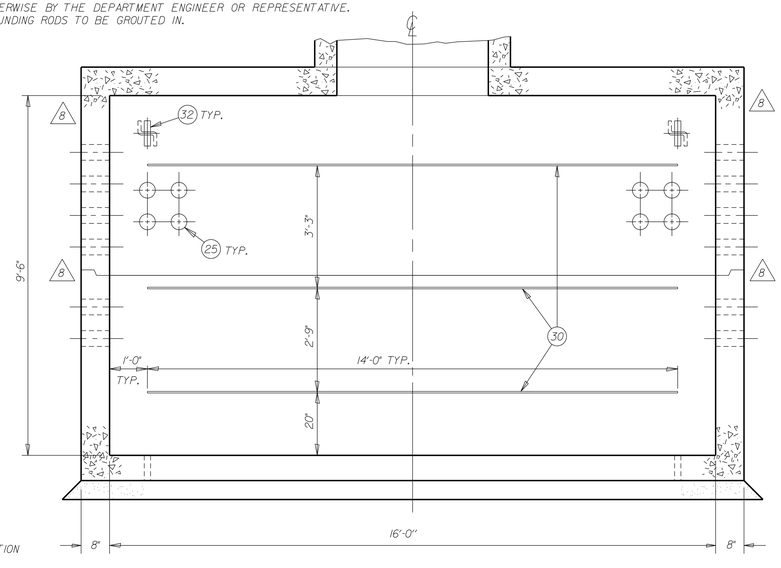
REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.	DRAWING CIRCULATION PRELIM.			FINAL		

SERVICE CENTER JOB LOCATION	SERVICE CENTER CONSTRUCTION	DWP W.O.	CONTRACT W.O.
CITY OF LOS ANGELES DEPARTMENT OF WATER AND POWER DISTRIBUTION ENGINEERING SECTION		PRECAST VAULT (TUNNEL TYPE) 4.8kV COMMERCIAL	
DESIGN ---	DRAFTING JJZ		
OK ---	CHECKER ---		
APPROVED ---	DATE 5/26/21	H-204	SHEET 2 OF 2



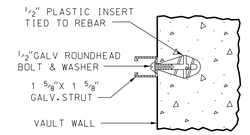
PLAN VIEW

PRECAST NECK, GRADE RING & COVER ASSEMBLY NOT SHOWN



SECTION C-C

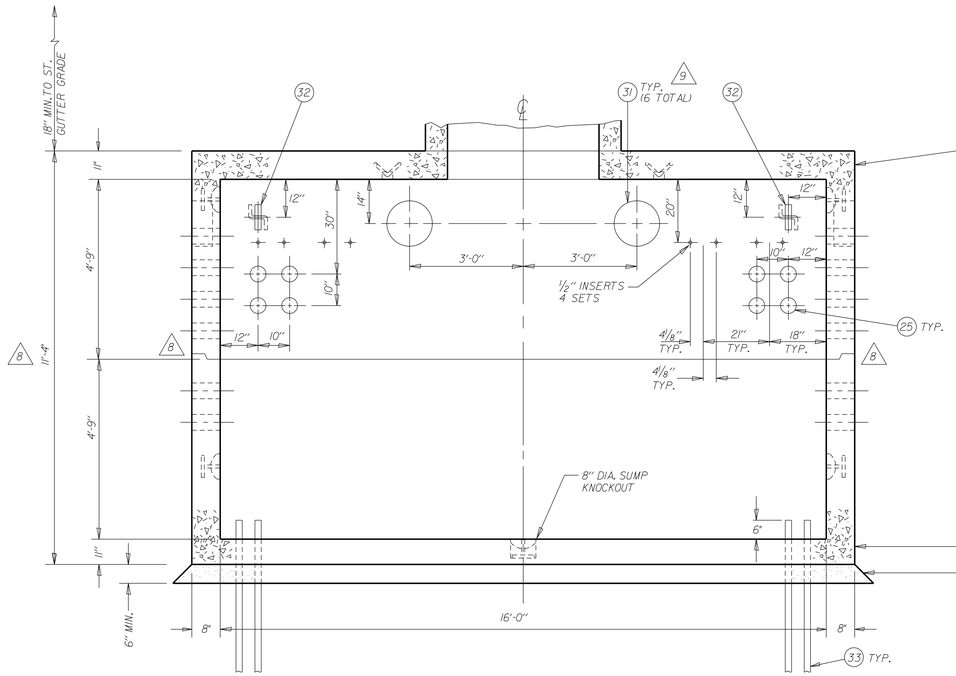
SHOWING CONTINUOUS STRUT LOCATIONS



STRUT & BOLT DETAIL

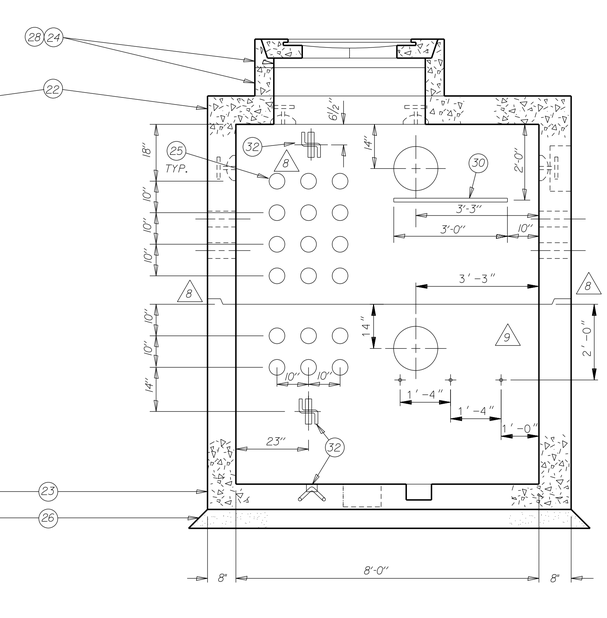
	PART	DESCRIPTION	DRAWING OR CAT.NO.
*	21	ASSEMBLY	–
1	22	PRECAST TOP SECTION WT. 45,300 LBS.	–
1	23	PRECAST BOTTOM SECTION WT. 47,500 LBS.	–
1	24	PRECAST NECK, GRADE RING AND COVER ASSY.	1-802, G-1B
52	25	5" DOUBLE MEMBRANE TERMINATORS	2-211
4	26	* CUBIC YARDS OF CRUSHED AGGREGATE BASE	–
–	27	* 12" VENT ASSEMBLY (SEE NOTE)	–
1	28	LADDER & HANGING HARDWARE (12'-6" LONG)	2-361
–	29	* TONS OF SAND BACKFILL	–
48	30	CONTINUOUS GALVANIZED STEEL STRUT (FT.)	–
6	31	14" DIA. VENT KNOCK OUT	–
9	32	PULL IRON ASSEMBLY	1-825
4	33	GROUND ROD 5/8" DIA. X 8' 304 SST CLAD	–
4	34	PULL IRON ASSEMBLY (STAINLESS STEEL)	1-825

* NOT A PART OF PRECAST ASSEMBLAGE



SECTION A-A

OPPOSITE SIDE WALL IS IDENTICAL EXCEPT FOR VENT KNOCKOUTS AND INSERTS



SECTION B-B

OPPOSITE END WALL IS OPPOSITE HAND

REQUIREMENTS FOR FABRICATION:

VAULT SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P STANDARD SPECIFICATIONS NO. P178, AS LAST REVISED.

VAULT SHALL BE SO FABRICATED AS TO PROVIDE A DRY AND WATER TIGHT INSTALLATION.

ALL 1/2" INSERTS SHALL BE MADE FROM PLASTIC AND SHALL WITHSTAND A MINIMUM PULL-OUT LOAD OF 150 LBS./INSERT, AND A MINIMUM SHEAR LOAD OF 300 LBS./INSERT.

ALL PULL IRONS PER UGCS 1-825 SHALL BE SO PLACED AS TO WITHSTAND A WORKING LOAD OF 20,000 LBS/PULL IRON.

LADDER AND HANGING HARDWARE TO BE INSTALLED WITH VAULT.

USE STEEL FRAME AND COVERS (TRAFFIC TYPE) PER UGCS 2-418, UNLESS DESIGN ENGINEER SPECIFIES REINFORCED PLASTIC MORTAR (RPM) PER UGCS 2-419.

STRUT AND BOLT INSTALLATION SHALL WITHSTAND A MINIMUM SHEAR LOAD OF 300 LBS./LF AND A PULL-OUT LOAD OF 150 LBS./BOLT. MAXIMUM SPACING REQUIRED IS 16" O.C. AND 3" FROM EACH END OF STRUT, UNLESS OTHERWISE NOTED.

ALL KNOCKOUTS EXCEPT THE 2" DIA. FLOOR KNOCKOUTS SHALL BE 1 1/2" UNREINFORCED CONCRETE. ALL 2" DIA. FLOOR KNOCKOUTS SHALL HAVE CAST-IN WATER TIGHT DOUBLE MEMBRANE PLASTIC PLUGS.

REQUIREMENTS FOR INSTALLATION:

MANUFACTURER TO DELIVER PREFABRICATED VAULT TO JOB SITE AND SUPPLY SPREADER BAR FOR UNLOADING. DW&P OR INSTALLING CONTRACTOR TO PROVIDE MEANS FOR UNLOADING AND SETTING PRECAST UNITS.

SELECT A LOCATION FREE OF SUBSTRUCTURES, CLEAR OF OVERHEAD OBSTRUCTIONS THAT WOULD INTERFERE WITH THE BOOM OF A LARGE CRANE AND HAVE AMPLE WORKING ROOM FOR A CRANE TO UNLOAD THE SECTION FROM A TRUCK INTO THE EXCAVATION.

DO NOT REMOVE ANY FLOOR KNOCKOUTS.

VAULT SHALL BE SET ON A COMPACTED LEVEL BED OF CRUSHED AGGREGATE BASE.

VAULT SHALL BE REJECTED IF ANY PORTION OF KEYWAY, 12" OR LONGER, IS MISSING OR DAMAGED.

VAULT SECTIONS SHALL BE SET WITH SEALING COMPOUND APPROVED BY THE DW&P UNDERGROUND ENGINEER AND SUPPLIED WITH VAULT.

ALL MAIN LINE CONDUIT ENTERING VAULT SHALL TERMINATE FLUSH WITH INSIDE SURFACE. TERMINATION SHALL BE WITH CAST-IN TERMINATORS. EDGES SHALL BE ROUNDED AND SMOOTH. NO SHARP OR ROUGH EDGES WILL BE ACCEPTED.

△8 NECK, GRADE RING(S) AND COVER SHALL BE SET AS PER UGCS 1-802, G-1B. CASTING RESTRAINT SYSTEM IF REQUIRED SHALL BE SUPPLIED BY PRECAST STRUCTURE MANUFACTURER. CONTRACTOR TO INSTALL CASTING RESTRAINT SYSTEM PER UGCS 1-802.2. SEE CONSTRUCTION DRAWING FOR REQUIREMENTS.

△8 BACKFILL SHALL BE DWP 100-E-100 SAND CEMENT SLURRY, OR AS SPECIFIED IN UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO. 104, AS LAST REVISED.

VENT ASSEMBLY TO BE INSTALLED PER POWER DISTRIBUTION CONSTRUCTION STANDARD (PDCS) C730-10 UNLESS DESIGN ENGINEER SPECIFIES VENT ASSEMBLY PER (PDCS) C730-09. SEE CONSTRUCTION DRAWING FOR THE NUMBER OF VENTS.

△8 THE LADDER LENGTH GIVEN IS DESIGNED TO ACCOMMODATE AN ADDITIONAL 6 INCHES OF GRADE RINGS BEYOND THE STANDARD 18" NECK. THE LADDER LENGTH SHALL BE INCREASED ONE FOOT FOR EACH ADDITIONAL ONE FOOT INCREMENT OF GRADE RINGS THEREAFTER AS SHOWN ON UGCS 2-361. INSTALLATION PROCEDURE OF LADDER AND HANGING HARDWARE SHALL BE IN ACCORDANCE WITH UGCS 2-361 WHERE APPLICABLE.

WEIGHT AND ALL OUTSIDE DIMENSIONS VARY WITH MANUFACTURER. VALUES GIVEN ARE LARGEST SHOWN ON MANUFACTURER'S DRAWINGS. PRIOR TO EXCAVATION STRUCTURE INSTALLER SHALL OBTAIN THE MINIMUM REQUIRED EXCAVATION SIZE FROM THE MANUFACTURER SUPPLYING THE STRUCTURE.

ALL VAULTS SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS OF DWP UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO. 104, AS LAST REVISED.

REV. NO.	REV. DATE	INIT'L	REVISION DESCRIPTION	APPV.	TAT NO.
1	04 AUG 92	AEG	RELOCATE SUMP K.O. AND SIDE WALL PULL IRONS	SP	X92-0634
2	01 APR 93	AEG	ADDED 1" & 2" FLOOR K.O.'S CHANGE NOTES	SP	X93-0125
3	20 SEP 93	AEG	ADDED 2 - 1" DIA. FLOOR K.O.S 4 CORNERS	SP	X94-0026
4	18 JAN 95	JHG	REMOVED PART #31 GROUNDING INSERT	SP	
5	10/31/96	JHG	ADD. PT. #33, FLR. K.O.,REV. NOTE & WALL THICKNESS	SP	
6	30 MAY 06	JHG	INSERTED PULL-IRON ASSEMBLIES & CHANGED DIMENSIONS		
7	04/29/11	JD	REVISED DIMENSIONS. REVISED VENT & COVER NOTES.	J.M.A.	

REV. NO.	REV. DATE	INIT'L	REVISION DESCRIPTION	APPV.	TAT NO.
8	06/14/13	EP	REVISED ROOF AND FLOOR THICKNESS, KEY SECTION, NOTES AND CALL OUTS.	J.M.A.	
9	09/01/18	DQN	ADDED ADDITIONAL 14" DIA. VENT KNOCKOUT	OEJ	

DRAWING CIRCULATION — PRELIM. | FINAL

SEE ORIGINAL FOR REGISTERED ENGINEER'S APPROVAL

SERVICE CENTER | CONTRACT W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING SECTION

DWP W.O. SBV47

PRECAST VAULT
TUB-TYPE
8' X 16' X 9'-6"

DESIGN	DRAFTING
S. POOSTI	A. GARCIA
ORIGINAL SIGNED BY J.D. Mc MAHON	CHECKER
ORIGINAL SIGNED BY	DATE 10-10-91

H-222 | SHEET 1 OF 1

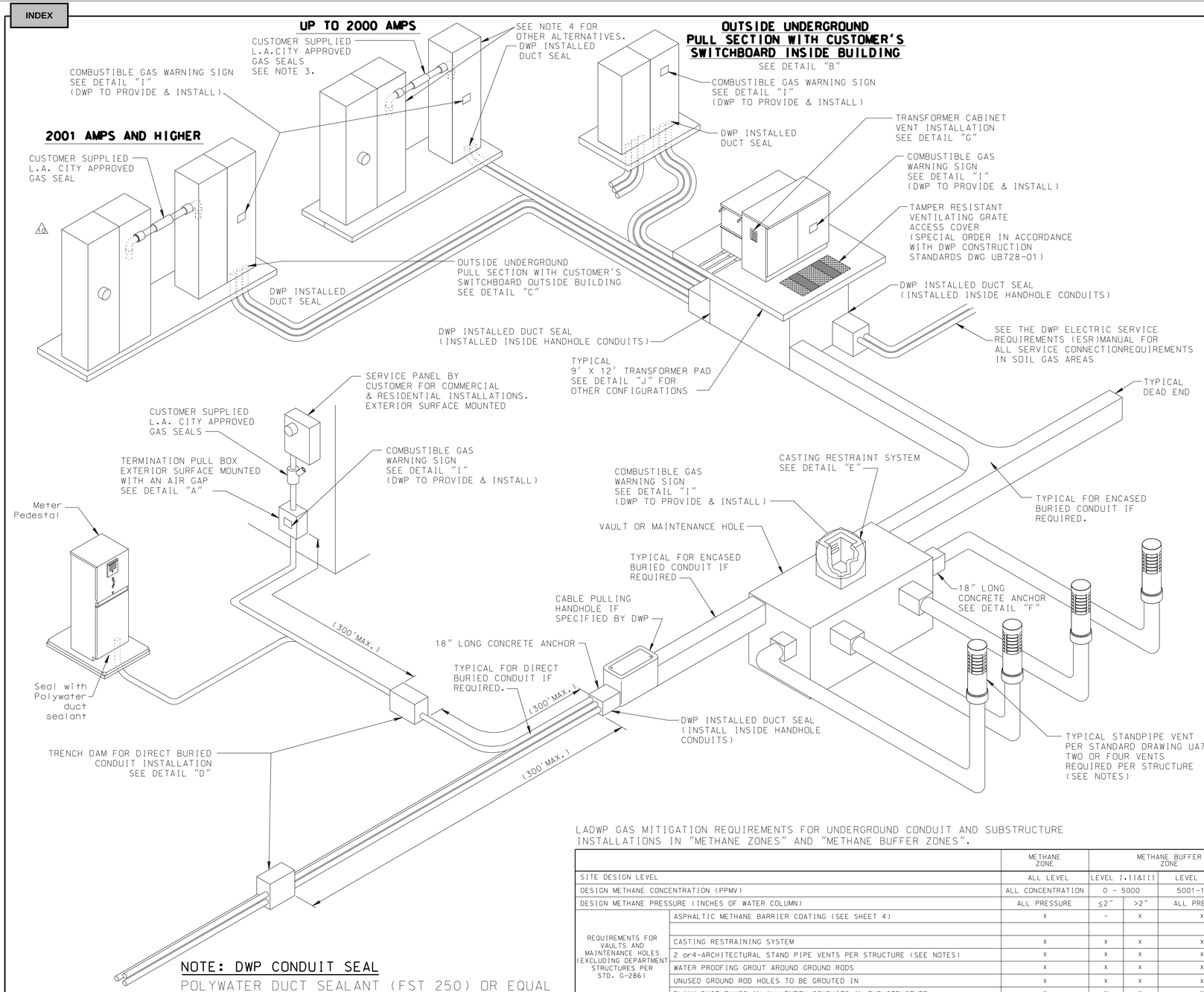
H222.dev

INDEX

DISTRIBUTION STANDARDS DWP

21

INDEX



NOTE: DWP CONDUIT SEAL

POLYWATER DUCT SEALANT (FST 250) OR EQUAL SHALL BE INSTALLED INSIDE ALL DWP CONDUITS WITH CABLES BY DEPARTMENT CREWS IN ALL DWP OPERATED FACILITIES (CABINETS, HANDHOLES, PADMOUNTS, VAULTS, ETC.). REFER TO DWP BULLETIN NO. 186. (MATERIAL TO BE SUPPLIED BY DWP, MATERIAL CODE 36-70-484)

LADWP GAS MITIGATION REQUIREMENTS FOR UNDERGROUND CONDUIT AND SUBSTRUCTURE INSTALLATIONS IN "METHANE ZONES" AND "METHANE BUFFER ZONES".

		METHANE ZONE	METHANE BUFFER ZONE		
SITE DESIGN LEVEL		ALL LEVEL	LEVEL I.II&III		LEVEL IV & V
DESIGN METHANE CONCENTRATION (PPMV)		ALL CONCENTRATION	0 - 5000		5001-12,500
DESIGN METHANE PRESSURE (INCHES OF WATER COLUMN)		ALL PRESSURE	≤2"	>2"	ALL PRESSURE
REQUIREMENTS FOR VAULTS AND MAINTENANCE HOLES (EXCLUDING DEPARTMENT STRUCTURES PER STD. G-286)	ASPHALTIC METHANE BARRIER COATING (SEE SHEET 4)	X	-	X	X
	CASTING RESTRAINING SYSTEM	X	X	X	X
	2 or4-ARCHITECTURAL STAND PIPE VENTS PER STRUCTURE (SEE NOTES)	X	X	X	X
	WATER PROOFING GROUT AROUND GROUND RODS	X	X	X	X
	UNUSED GROUND ROD HOLES TO BE GROUTED IN	X	X	X	X
	BLANK DUCT PLUGS IN ALL EMPTY CONDUITS IN THE STRUCTURE	X	X	X	X
OTHER GENERAL REQUIREMENTS	METAL GRATING ACCESS COVER FOR PAD-MOUNTS	X	X	X	X
	SURFACE MOUNTED PULL BOX FOR SMALL COMMERCIAL SERVICES	X	-	X	X
	OUTSIDE PULL SECTIONS FOR CUSTOMER'S SWITCHBOARD	X	-	X	X
	TRENCH DAM FOR DIRECT BURIED CONDUIT AT EVERY 300' MAX.	X	X	X	X
	18" CONCRETE ANCHOR FOR ANY CONDUIT OR VENT PIPE CONNECTED TO A STRUCTURE	X	X	X	X

MITIGATION COMPONENTS REQUIRED FOR THIS PROJECT ARE IDENTIFIED BY AN "X" IN THE ABOVE COLUMNS. LADWP CABLE CREWS WILL INSTALL TRANSFORMER CABINET VENTS, GAS WARNING SIGNS AND SOME DUCT SEALS FOR NEW CONSTRUCTION BY CUSTOMERS AS SHOWN IN THIS STANDARD DRAWING.

TABLE 1

NOTES:

THIS STANDARD SHALL BE USED WHEN CONSTRUCTING UNDERGROUND ELECTRIC DISTRIBUTION FACILITIES IN AREAS WHICH HAVE BEEN IDENTIFIED BY THE CITY OF LOS ANGELES AS METHANE ZONES OR METHANE BUFFER ZONES. THIS STANDARD ALSO APPLIES TO PROJECTS WHERE THE PRESENCE OF METHANE HAS BEEN IDENTIFIED BY THE DEVELOPER. IT IS THE CUSTOMER'S RESPONSIBILITY TO DETERMINE THE METHANE STATUS OF ANY PROPOSED PROJECT AND TO ADVISE THE LOS ANGELES DEPARTMENT OF WATER AND POWER (DEPARTMENT) OF THAT STATUS AT THE TIME THE CUSTOMER'S PLANS ARE SUBMITTED FOR REVIEW SINCE THE PRESENCE AND CONCENTRATION OF METHANE WILL DIRECTLY AFFECT THE SERVICE DESIGN REQUIREMENTS SPECIFIED BY THE DEPARTMENT'S SERVICE PLANNING OFFICE.

SITE INFORMATION FOR METHANE STATUS MAY BE FOUND ON THE CITY OF LOS ANGELES DEPARTMENT OF BUILDING AND SAFETY (LADBS) WEBSITE (www.ladbs.org/) UNDER ZONING INFORMATION OR THE CITY OF LOS ANGELES BUREAU OF ENGINEERING (LABOE) NAVIGATE LA WEBSITE (http://navigatela.lacity.org/) UNDER SPECIAL AREAS.

IF THE METHANE STATUS OF A SITE CHANGES AFTER THE SERVICE SUPPLY TERMINATION ENCLOSURE IS INSTALLED WITHIN A BUILDING OR BUILDING WALL AND REQUIRES THE INSTALLATION OF EXPLOSIVE GAS SEALS OR DEVICES, THE TERMINATION ENCLOSURE SHALL BE RELOCATED OUTSIDE OF THE BUILDING OR BUILDING WALL AND THE REQUIRED GAS MITIGATION SERVICES SHALL BE PROVIDED BETWEEN THE TERMINATING ENCLOSURE AND THE ASSOCIATED METERING SECTIONS.

THE DEPARTMENT UTILIZES MITIGATION PROCEDURES IN SOME SERVICE INSTALLATIONS TO INHIBIT THE INTRUSION OF EXPLOSIVE GASES AND VAPORS THAT MAY BE PRESENT IN THE DEPARTMENT'S UNDERGROUND DISTRIBUTION SYSTEM INTO THE CUSTOMER'S UNDERGROUND SERVICE TERMINATING ENCLOSURES. HOWEVER, THESE PROCEDURES HAVE NOT BEEN APPROVED BY THE LADBS OR OTHER PERMITTING AGENCIES AND CANNOT BE USED TO MEET THE MITIGATION REQUIREMENTS OF THE CUSTOMER'S BUILDING PERMIT. HAZARDOUS GAS MITIGATION PROCEDURES, WHEN REQUIRED UNDER THE CUSTOMER'S PERMIT, SHALL BE APPLIED BETWEEN THE SERVICE SUPPLY TERMINATING ENCLOSURE AND THE ASSOCIATED METERING EQUIPMENT. UNDER NO CIRCUMSTANCES SHALL CUSTOMER-OWNED HARDWARE, USED TO MITIGATE HAZARDOUS GAS, BE INSTALLED ON OR IN THE DEPARTMENT SERVICE SUPPLY CONDUITS OR THE DEPARTMENT UNDERGROUND SERVICE TERMINATING ENCLOSURE.

THE SOIL GAS MITIGATION MEASURES SHALL APPLY TO ALL NEW CONSTRUCTION AND IN CASES OF CUSTOMER REQUESTED ELECTRICAL MODIFICATIONS, IT MAY APPLY TO AFFECTED EXISTING SUBSTRUCTURES (SEE STANDARD UA-242). ALL RETROFITS OF ENERGIZED SUBSTRUCTURES SHALL BE DONE BY DEPARTMENT CREWS.

THESE PROVISIONS WILL ALSO APPLY TO ELECTRICAL EQUIPMENT SUBSTRUCTURES WITHIN AN "AREA OF CONCERN".

THE DEPARTMENT ALSO RESERVES THE RIGHT TO REQUIRE SOIL GAS MITIGATION MEASURES AT ANY OTHER LOCATION WHEN, IN THE OPINION OF THE DEPARTMENT, IT IS NECESSARY.

IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ARRANGE A MEETING WITH THE DEPARTMENT'S INSPECTOR TO DISCUSS DETAILED CONSTRUCTION INSTRUCTIONS AND APPLICABLE REQUIREMENTS OF THIS STANDARD.

DEFINITIONS & REQUIREMENTS:

METHANE GAS - A NATURALLY OCCURRING VOLATILE GAS THAT MAY BE PRESENT IN THE SOIL IN VARYING CONCENTRATIONS THROUGHOUT THE LOS ANGELES BASIN.

AREA OF CONCERN - THE AREA BEYOND THE SUBJECT PROPERTY THAT THE SOIL GAS MITIGATION MEASURES SHALL ALSO APPLY TO. THIS AREA EXTENDS 100-FEET IN ALL DIRECTIONS FROM THE PROPERTY LINES INTO OTHER AREAS BEING DEVELOPED OR IMPACTED BY THE NEW CONSTRUCTION. IT SHALL ALSO APPLY TO AN AREA WITHIN A 300-FOOT RADIUS FROM A "TEST LOCATION" WHERE METHANE GAS IS PRESENT.

TEST LOCATION - AN UNDERGROUND WELL THAT HAS BEEN CAPPED AND HAS A VALVE INSTALLED FOR THE PURPOSE OF EXTRACTING A SAMPLE OF THE BELOW GROUND GAS.

TRENCH DAM - A PORTION OF MAIN TRENCH OR SERVICE TRENCH WHICH IS BACKFILLED IN A MANNER TO PREVENT THE MIGRATION OF METHANE GAS THROUGH THE TRENCH IN ACCORDANCE WITH DETAIL "D".

VAPOR BARRIER - A GAS TIGHT MEMBRANE OR BARRIER SURROUNDING THE SUBSTRUCTURE WHICH SHALL BE APPROVED WITH THE CITY OF LOS ANGELES WITH A PUBLISHED LOS ANGELES RESEARCH REPORT (LARR). (HANDHOLES, TRANSFORMER PADS AND DEPARTMENT STRUCTURES PER G-286 ARE EXEMPT FROM REQUIRING A VAPOR BARRIER.) ADDITIONAL DETAILS AND NOTES ARE ON SHEET 4.

CASTING RESTRAINT SYSTEM - ALL UNDERGROUND MAINTENANCE HOLES OR VAULTS (DEPARTMENT STRUCTURES PER G-286 ARE EXEMPT) IN THE "AREA OF CONCERN", METHANE ZONE OR METHANE BUFFER ZONE SHALL HAVE CASTING RESTRAINT SYSTEMS IN ACCORDANCE WITH DETAIL "E" AND STANDARD DWG. 1-802.2.

UNUSED GROUND ROD KNOCKOUTS - FILL ALL UNUSED GROUND ROD KNOCKOUTS WITH AN EPOXY GROUT SEALANT AND PLACE WATER PROOFING MECHANICAL SEALANT SUCH AS LINK SEAL OR EQUIVALENT AROUND INSTALLED GROUND RODS (DEPARTMENT STRUCTURES PER G-286 AND HANDHOLES ARE EXEMPT).

PADMOUNTED STRUCTURES - ALL NEW CONCRETE PADS 6' X 8' AND LARGER SHALL BE INSTALLED WITH A TAMPER RESISTANT VENTILATING GRATE ON THE ACCESS OPENING IN ACCORDANCE WITH THE DEPARTMENT STANDARD UB728-01.

VAULTS AND MAINTENANCE HOLES (VAULTS) - ALL NEW VAULTS (EXCLUDING DEPARTMENT STRUCTURES PER G-286 STRUCTURES) SHALL BE INSTALLED WITH A VAPOR BARRIER, IF REQUIRED, AS INDICATED IN TABLE 1. THE INSTALLING CONTRACTOR SHALL PROPERLY SEAL ALL DUCTS WITH APPROVED MECHANICAL BLANK DUCT PLUGS (JACK MOON OR EQUAL) AND SHALL GROUT THE UNUSED GROUND ROD HOLES AND PLACE WATER PROOFING MECHANICAL SEALANT SUCH AS LINK SEAL AROUND INSTALLED GROUND RODS. THE VAULT SHALL HAVE A CASTING RESTRAINT SYSTEM AS DESCRIBED ABOVE. VAULTS SMALLER THAN 14' LONG (INSIDE DIMENSION) SHALL HAVE TWO-12" STANDPIPE VENTS, AND VAULTS 14' LONG (INSIDE DIMENSION) OR LONGER SHALL HAVE FOUR-12" STANDPIPE VENTS IN ACCORDANCE WITH DWP CONSTRUCTION STANDARD DRAWING NO. UA730-01 (MAT. CODE 39-01-312).

PRECAST CONCRETE VAULTS AND MAINTENANCE HOLES, IF REQUIRED, SHALL BE WATERPROOFED WITH A MOISTURE BARRIER WHICH SHALL BE APPROVED BY THE CITY OF LOS ANGELES WITH A PUBLISHED LARR. THE BARRIER SHALL BE APPLIED TO THE OUTSIDE SURFACE OF THE SUBSTRUCTURE AT THE MANUFACTURER'S PLANT AND TO THE JOINTS DURING FIELD INSTALLATION.

ALL WATERPROOFING SHALL BE APPLIED IN ACCORDANCE WITH THE WATERPROOFING MANUFACTURER'S RECOMMENDATIONS FOR THE FIELD CONDITIONS PRESENT AND SHALL BE PROTECTED FROM DAMAGE DUE TO BACKFILL.

THE LOS ANGELES DEPARTMENT OF WATER AND POWER ENGINEER SHALL APPROVE ALL MATERIALS AND METHODS PRIOR TO INSTALLATION.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
8	06/14/18	EJP	REV. NOTE 9 & DETAILS. ADDED NEW NOTE 13 ON SHT 4	JF	
9	06/20/19	DQN	REV. GENERAL REQ NOTES ON SHT 4	QEJ	
10	01/07/23	JWW	ADD NOTE 3. 4. 5 ON SHT 2./ REV. DETAIL ON SHT 1	YA	

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
1	02/14/02	JHG	REMOVED VENTS	S.P.	
2	11/03/04	JHG	CHANGED STANDPIPE VENTS AND NOTES	S.P.	
3	11/22/05	JHG	REVISED NOTES. ADDED NEW GAS SEALS & TABLE 1	S.P.	
4	01/16/07	JHG	REV. GEN. NOTES, & VARIOUS CALL OUT NOTES.	S.P.	
5	04/10/08	JHG	ADD COND. VENTING AT SERVICE HEAD	S.P.	
6	02/12/15	EHP	REV. GEN. NOTES, & VARIOUS CALL OUT NOTES.	J.M.A.	
7	03/28/18	JHG	REV. METHANE NOTES, & DETAILS.; ADDED SHEET 4	D.E.J.	

DRAWING CIRCULATION						
PRELIM.			FINAL			
			SI-1	PO	1	
			4.8 1	CSD	1	
			34.5 1	COE	1	
			TD 1			
			SP(V) 1			
			SP(M) 1			
			TL 1			

DRAWING

SERVICE CENTER JOB LOCATION

SERVICE CENTER CONSTRUCTION

DWP W.O.

CONTRACT W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING SECTION

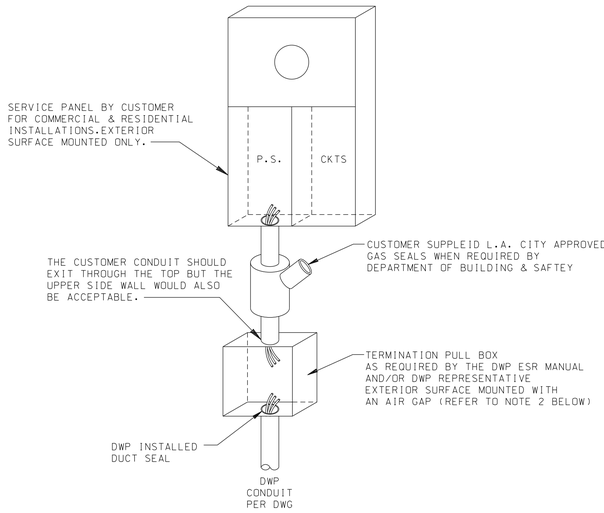
GUIDELINES FOR UNDERGROUND ELECTRIC DISTRIBUTION CONSTRUCTION IN AREAS WHERE SOIL GAS IS PRESENT

DESIGN	S.POOSTI	DRAFTING	J.GARCIA
QK	S.POOSTI	CHECKER	W.YCEDO
APPROVED	J.McMAHON	DATE	11/28/01

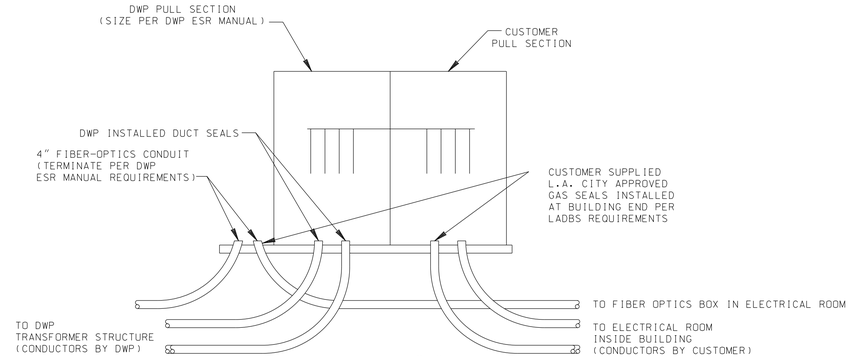
H-242

SHEET 1 OF 4

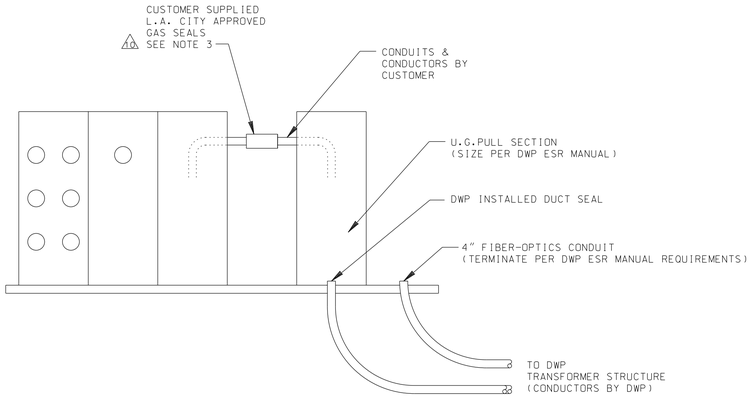
INDEX



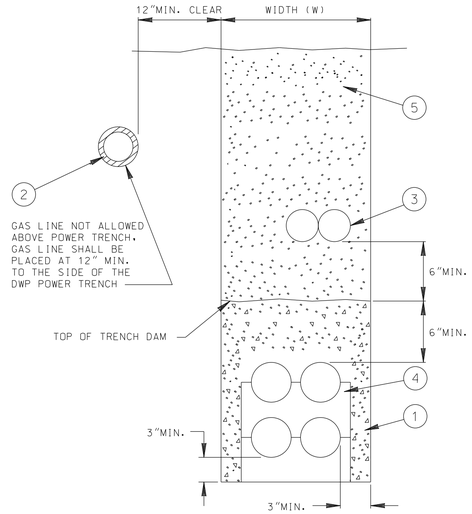
DETAIL "A"
SERVICE ENTRANCE
CONDUIT VENTING



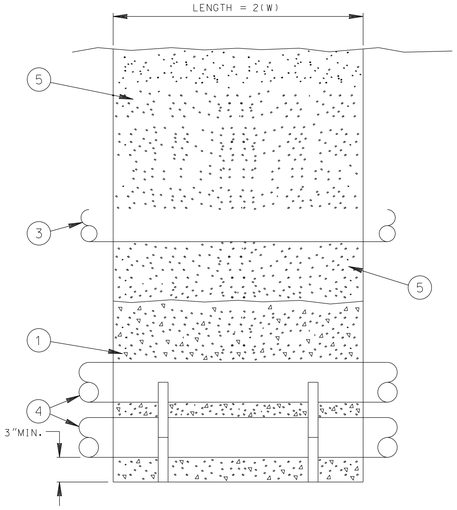
DETAIL "B"
OUTSIDE UNDERGROUND
PULL SECTION VENTING



DETAIL "C"
OUTSIDE UNDERGROUND
PULL SECTION VENTING



FRONT VIEW



SIDE VIEW

ITEM	DESCRIPTION	QUANTITY
1	CONCRETE MIX. PER UGCS C702-50, DWP MIX 330-C-1700	AS REQ'D
2	GAS MAIN LINE	AS REQ'D
3	COMMUNICATION CONDUITS	AS REQ'D
4	ELECTRIC CONDUIT & SPACERS	AS REQ'D
5	TRENCH BACKFILL	AS REQ'D

NOTES:

1. IF A BOND WIRE IS NECESSARY IN THE TERMINATION PULL BOX, THE WIRE SHOULD BE BONDED AS CLOSE TO THE CONDUIT AS FEASIBLE.
2. THE AIR GAP SHALL BE APPROXIMATELY 1 INCH ALL AROUND THE PULLBOX, INCLUDING THE SIDE WHERE THE PULL BOX IS BEING MOUNTED TO THE EXTERIOR SURFACE.
3. DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY. COORDINATE THE METHOD OF ENTRY WITH ELECTRIC SERVICE REPRESENTATIVE (ESR) PER FIELD CONDITIONS.
4. "TOP HAT" PULL CABINET EXTENSION IS ACCEPTABLE AS AN ALTERNATIVE.
5. NON-STANDARD PULL SECTION DESIGN REQUIRES ENGINEERING APPROVAL. EXTRA APPROVAL PROCESSES FOR NON-STANDARD METHODS COULD CONSIDERABLY EXTEND LEAD TIMES.

INSTALLATION:

A. TRENCH DAM SHALL BE CONCRETE PER UGCS C702-50, DWP MIX 330-C-1700.

B. TRENCH DAM LENGTH SHALL BE TWICE THE WIDTH OF THE TRENCH OR A MINIMUM OF 36 INCHES WHICHEVER IS GREATER.

C. TRENCH DAM SHALL EXTEND 3" BELOW AND A MINIMUM OF 3" (6" MAXIMUM) TO THE SIDE OF DWP CONDUIT.

D. TRENCH DAM SHALL EXTEND A MINIMUM OF 6" (9" MAXIMUM) ABOVE THE UPPERMOST DWP CONDUIT.

E. IN A JOINT UTILITY TRENCH, TRENCH DAM SHALL BE INSTALLED AT A POINT JUST BEFORE UTILITIES SPLIT TO THEIR FINAL SERVICE LOCATION.

D. TRENCH DAM TO BE PLACED AT EVERY 300' MAX CONTINUOUS UNENCASED LENGTH OF CONDUIT FROM ANY OTHER STRUCTURE OR PANEL.

DETAIL "D"
TRENCH DAM TO BE INSTALLED
OVER DIRECT BURIED CONDUIT ONLY

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
8	06/14/18	EJP	REV. NOTE 9 & DETAILS. ADDED NEW NOTE 13 ON SHT 4	JF	
9	06/20/19	DON	REV. GENERAL REQ NOTES ON SHT 4	DEV	
10	01/07/23	JWW	ADD NOTE 3, 4, 5 ON SHT 2./ REV. DETAIL ON SHT 1	YA	

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
1	02/14/02	JHG	REMOVED VENTS	S.P.	
2	11/03/04	JHG	CHANGED STANDPIPE VENTS AND NOTES	S.P.	
3	11/22/05	JHG	REVISED NOTES, ADDED NEW GAS SEALS & TABLE 1	S.P.	
4	01/16/07	JHG	REV. GEN. NOTES, & VARIOUS CALL OUT NOTES.	S.P.	
5	04/10/08	JHG	ADD COND. VENTING AT SERVICE HEAD	S.P.	
6	02/12/15	EHP	REV. GEN. NOTES, & VARIOUS CALL OUT NOTES.	J.M.A.	
7	03/28/18	JHG	REV. METHANE NOTES, & DETAILS.; ADDED SHEET 4	D.E.J.	

DRAWING CIRCULATION

PRELIM.			FINAL		
			SI-1	PQ 1	
			4.8 1	CSD 1	
			34.5 1	COE 1	
			TD 1		
			SP(V) 1		
			SP(M) 1		
			TL 1		

DRAFTER

SERVICE CENTER JOB LOCATION

SERVICE CENTER CONSTRUCTION

DWP W.O.

CONTRACT W.O.

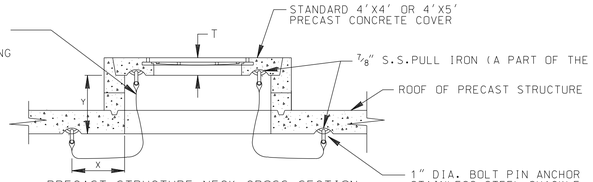
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING SECTION

GUIDELINES FOR UNDERGROUND ELECTRIC DISTRIBUTION CONSTRUCTION IN AREAS WHERE SOIL GAS IS PRESENT

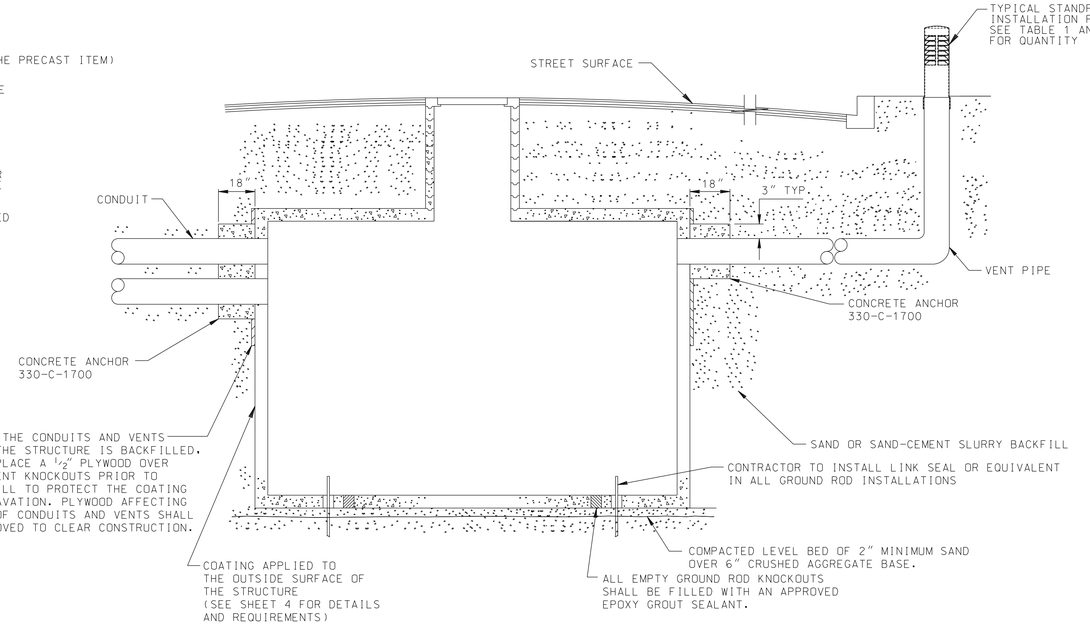
DESIGN	S.POOSTI	DRAFTING	J.GARCIA
QK	S.POOSTI	CHECKER	W.YCEDO
APPROVED	J.McMAHON	DATE	11/30/01

H-242

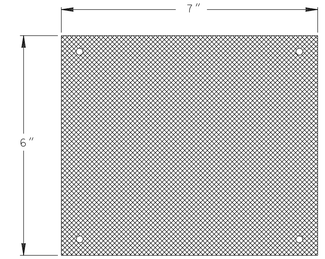
INDEX



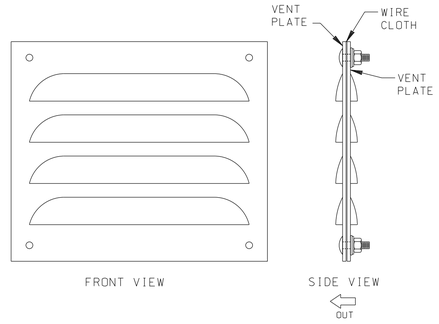
DETAIL "E"
CASTING RESTRAINT SYSTEM

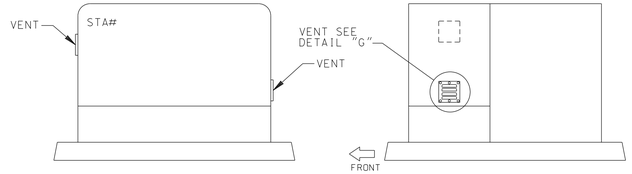


DETAIL "F"
COATING OF STRUCTURE IF REQUIRED
(SEE TABLE 1)

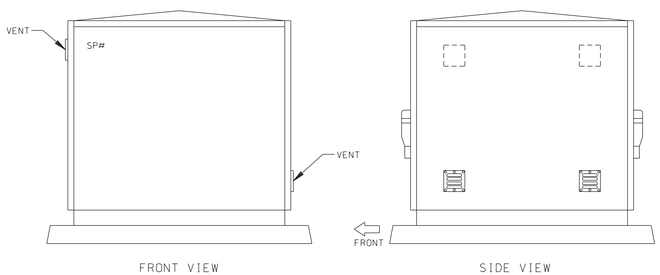


WIRE CLOTH
(CORROSION RESISTANT)
MATERIAL CODE
(39-01-569)





TYPICAL VENT INSTALLATION ON PAD-MOUNT WITH ONE AIR CABINET

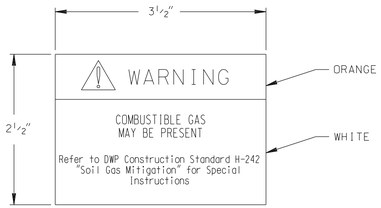


TYPICAL VENT INSTALLATION ON EQUIPMENT WITH TWO AIR CABINETS.

IMPORTANT
PRIOR TO INSTALLING EQUIPMENT VENTS MAKE SURE THAT THE BOLTS DO NOT CONFLICT WITH ANY EXPOSED ENERGIZED PARTS OR CONDUCTORS. ALSO MAKE SURE THAT PRIOR TO DRILLING ANY HOLES THE LOCATION OF THE EQUIPMENT VENT IS LOCATED IN THE AIR CABINET PORTION OF THE EQUIPMENT.

INSTALLATION
A. INSTALL A MINIMUM OF TWO VENTS PER AIR COMPARTMENT.
B. VENTS SHALL BE INSTALLED DIAGONALLY FROM EACH OTHER AS HIGH AS POSSIBLE ON THE AIR CABINET.
C. AFTER ALL PENETRATIONS IN THE AIR CABINET ARE COMPLETE APPLY A COAT OF AEROSOL PADMOUNT GREEN PAINT TO ALL EXPOSED METAL.
D. ALLOW THE PAINT TO FULLY DRY BEFORE INSTALLING EQUIPMENT VENT.
E. INSTALL EQUIPMENT VENT WITH THE LOUVERS DOWN ON THE OUTSIDE OF CABINET. DO NOT OVER TIGHTEN HARDWARE.

DETAIL "H"
TRANSFORMER CABINET VENT INSTALLATION



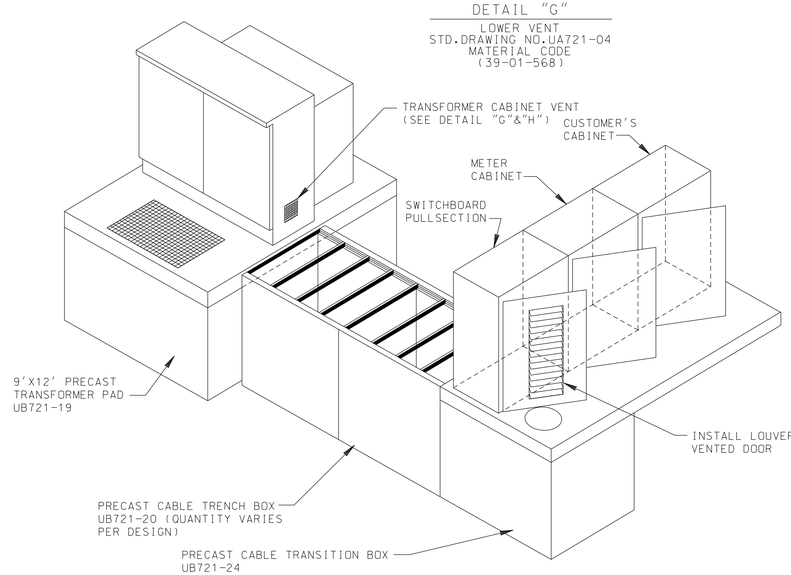
METALLIC SELF ADHESIVE SIGN
PER UA928-14

NOTES:

1. LOCATE THE WARNING SIGN IN THE NECK OF THE VAULT NEAR THE SURFACE OPENING BELOW THE ID TAG (NORTH OR WEST WALL SEE C704-10).
2. LOCATE THE WARNING SIGN ON THE INSIDE OF THE DOOR OF A PADMOUNTED TRANSFORMER, SWITCH, OR CABINET (SEE C704-12).
3. LOCATE THE WARNING SIGN ON THE INSIDE OF A HANDHOLE BELOW THE ID TAG (NORTH OR WEST WALL SEE C704-11).
4. LOCATE THE WARNING SIGN ON THE INSIDE OR OUTSIDE BASE OF THE PEDESTAL.

DETAIL "I"
GAS WARNING SIGN
PROVIDED & INSTALLED BY DWP FIELD CREWS
PER STD. DWG. UA928-14
MATERIAL CODE 57-31-696

DETAIL "G"
LOWER VENT
STD. DRAWING NO. UA721-04
MATERIAL CODE
(39-01-568)



DETAIL "J"
ISOMETRIC VIEW OF 9' X 12' TRANSFORMER PAD, CABLE TRENCH BOXES AND TRANSITION BOX ASSEMBLY

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
8	06/14/18	EJP	REV. NOTE 9 & DETAILS, ADDED NEW NOTE 13 ON SHT 4	JF	
9	06/20/19	DQN	REV. GENERAL REQ NOTES ON SHT 4	QEJ	
10	01/07/23	JWW	ADD NOTE 3, 4, 5 ON SHT 2./ REV. DETAIL ON SHT 1	YA	

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
1	02/14/02	JHG	REMOVED VENTS	S.P.	
2	11/03/04	JHG	CHANGED STANDPIPE VENTS AND NOTES	S.P.	
3	11/22/05	JHG	REVISED NOTES, ADDED NEW GAS SEALS & TABLE 1	S.P.	
4	01/16/07	JHG	REV. GEN. NOTES, & VARIOUS CALL OUT NOTES.	S.P.	
5	04/10/08	JHG	ADD COND. VENTING AT SERVICE HEAD	S.P.	
6	02/12/15	EHP	REV. GEN. NOTES, & VARIOUS CALL OUT NOTES.	J.M.A.	
7	03/28/18	JHG	REV. METHANE NOTES, & DETAILS.; ADDED SHEET 4	D.E.J.	

DRAWING CIRCULATION

PRELIM.			FINAL		
			SI-1	PO 1	
			4.8 1	CSD 1	
			34.5 1	COE 1	
			TD 1		
			SP(V) 1		
			SP(M) 1		
			TL 1		

DWP

SERVICE CENTER JOB LOCATION | SERVICE CENTER CONSTRUCTION | DWP W.O. | CONTRACT W.O.

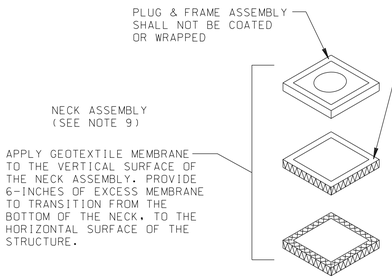
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING SECTION

DESIGN S.POOSTI | DRAFTING J.GARCIA
CK S.POOSTI | CHECKER W.YCEDO
APPROVED J.McMAHON | DATE 11/28/01

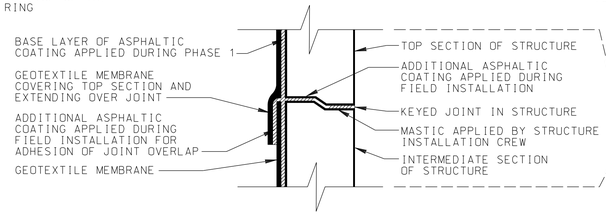
GUIDELINES FOR UNDERGROUND ELECTRIC DISTRIBUTION CONSTRUCTION IN AREAS WHERE SOIL GAS IS PRESENT

H-242 | SHEET 3 OF 4

INDEX

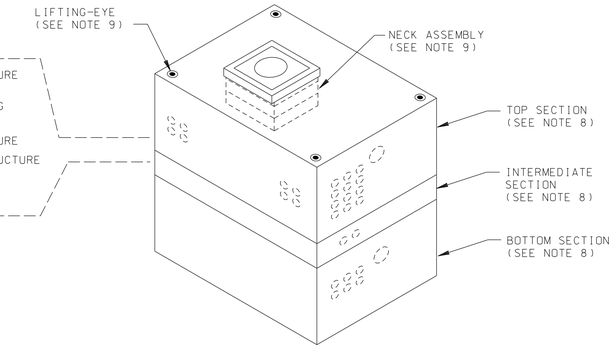


NECK ASSEMBLY

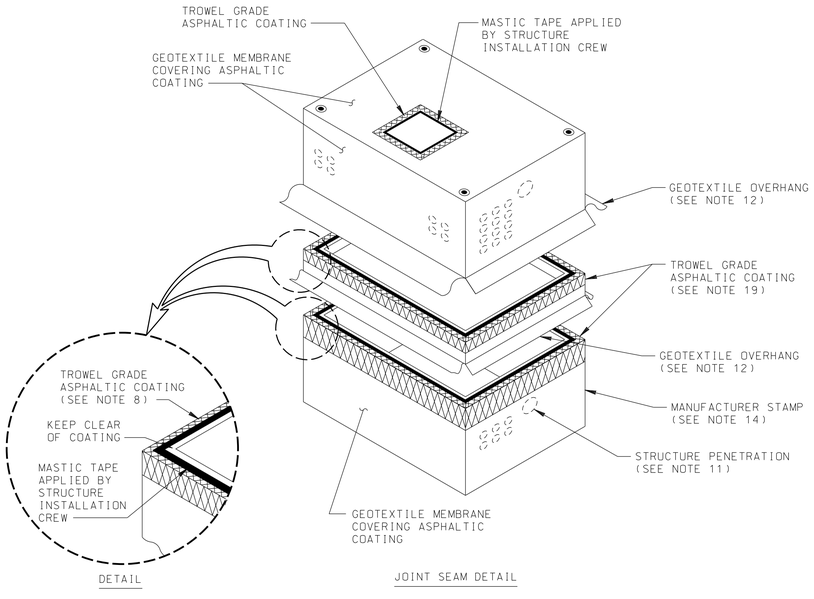


JOINT DETAIL

TYPICAL FOR ALL JOINTS BETWEEN TOP, BOTTOM, AND INTERMEDIATE SECTIONS

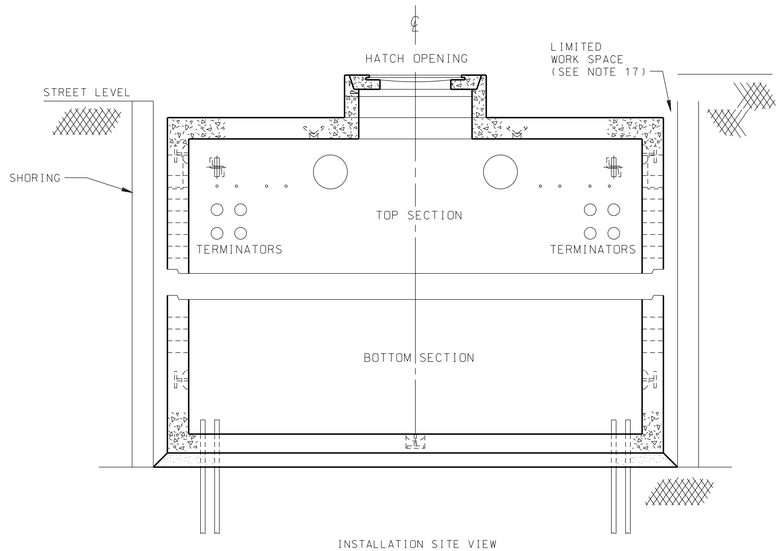


3-PIECE FINAL SUBSTRUCTURE ASSEMBLY



DETAIL

JOINT SEAM DETAIL



INSTALLATION SITE VIEW

GENERAL REQUIREMENTS:

1. THIS DRAWING REFERS TO THE APPLICATION REQUIREMENTS OF A METHANE AND MOISTURE BARRIER CONSISTING OF AN ASPHALTIC EMULSION TYPE COATING WITH AN ASSOCIATED GEOTEXTILE MEMBRANE LAYER. THIS BARRIER SHALL BE APPROVED WITH THE CITY OF LOS ANGELES WITH A PUBLISHED LOS ANGELES RESEARCH REPORT (LARR). THE APPLICATION METHOD, MINIMUM THICKNESS, AND REQUIRED MATERIALS SHALL BE USED AND APPLIED AS SPECIFIED IN THE LARR AND THIS DRAWING.
2. THIS STANDARD SHALL NOT BE USED FOR PANEL OR TUNNEL TYPE VAULTS LOCATED IN METHANE ZONES.
3. FOR OTHER BARRIERS WITH A PUBLISHED LARR THAT ARE NOT AN ASPHALTIC EMULSION TYPE, CONTACT LADWP ENGINEERING AND OBTAIN WRITTEN APPROVAL PRIOR TO USE.
4. INSTALLATION OF BARRIER COATING SHALL BE PERFORMED BY AN INSTALLER APPROVED BY THE COATING MANUFACTURER.
5. SUBSTRUCTURE SURFACE SHALL BE PREPARED BY THE COATING INSTALLER IN ACCORDANCE WITH THE LARR REQUIREMENTS PRIOR TO THE APPLICATION OF ASPHALTIC COATING.
6. THE PRECAST MANUFACTURER IS RESPONSIBLE TO COORDINATE WITH THE COATING INSTALLER TO BE ONSITE DURING FIELD INSTALLATION.
7. THE PROCESS SHALL BE PERFORMED IN TWO PHASES, ON SEPARATE DAYS.
   - PHASE 1 SHALL INCLUDE THE PREPARATION OF THE SUBSTRUCTURE SURFACE, APPLICATION OF COATING AND ASSOCIATED MEMBRANE, CURING TIME, AND PREPARATION FOR SHIPPING TO THE FIELD CONSTRUCTION SITE.
   - PHASE 2 SHALL INCLUDE ONSITE TOUCH UP OF ANY MINOR COATING DAMAGE THAT OCCURRED DURING TRANSPORTATION (SEE NOTE 15), THE APPLICATION OF COATING MATERIALS REQUIRED TO JOIN THE SUBSTRUCTURE SEAMS, AND THE APPLICATION OF THE COATING TO THE NECK ASSEMBLY.

REQUIREMENTS FOR PHASE 1 - SUBSTRUCTURE PREPARATION:

7. THE BARRIER SHALL BE APPLIED IN ADVANCE OF THE DELIVERY AND INSTALLATION DATE TO PROVIDE SUFFICIENT TIME FOR CURING, PER COATING MANUFACTURER'S REQUIREMENTS.
8. THE BARRIER SHALL BE APPLIED TO ALL EXTERIOR WALLS OF THE SUBSTRUCTURE WITH THE EXCEPTION OF THE NECK ASSEMBLY.
9. THE NECK ASSEMBLY IS COMPOSED OF GRADE RING(S), AND A PLUG & FRAME ASSEMBLY. THE GRADE RING(S) SHALL BE COATED DURING PHASE 2 AT THE FIELD INSTALLATION SITE USING A ROLLER TOOL. APPROVED INSTALLER SHALL HAVE SUFFICIENT TROWEL GRADE PRODUCT ON HAND AT THE INSTALLATION SITE, AS QUANTITY OF GRADE RINGS MAY VARY. THE TOP SECTION OF THE GRADE RING, THE PLUG & FRAME ASSEMBLY SHALL NOT BE COATED OR WRAPPED.
10. DUE TO SAFETY CONCERNS, IT MAY NOT BE FEASIBLE TO COAT THE BOTTOM OF THE SUBSTRUCTURE WHILE LIFTED BY A CRANE. ADDITIONALLY, ROTATING THE SUBSTRUCTURE DURING THE COATING PROCESS IS NOT FEASIBLE. TO FACILITATE COATING THE BOTTOM OF THE SUBSTRUCTURE, IT IS ACCEPTABLE TO FIRST COAT THE GEOTEXTILE MEMBRANE, AND USE THE CRANE TO PLACE THE SUBSTRUCTURE ON TOP OF THE COATED GEOTEXTILE MEMBRANE. CARE SHOULD BE TAKEN TO PROVIDE AN EVEN SURFACE TO PERFORM THIS OPERATION.
11. ALL SUBSTRUCTURE PENETRATIONS SHALL BE COVERED BY THE GEOTEXTILE MEMBRANE. WHEN REQUIRED FOR ACCESS, THE REMOVAL OF THE GEOTEXTILE MEMBRANE FROM THE PENETRATIONS WILL BE PERFORMED IN THE FIELD BY THE CONDUIT INSTALLER.
12. TWELVE INCHES OF EXCESS GEOTEXTILE MEMBRANE SHALL OVERHANG AT THE PERIMETER OF THE TOP SECTION OF THE SUBSTRUCTURE AND INTERMEDIATE SECTION IF PRESENT. THIS SHALL BE USED TO PROVIDE TRANSITION COVERAGE TO THE JOINING SEAMS BETWEEN THE SECTIONS. THE TROWEL GRADE COATING SHALL BE APPLIED TO THE UPPER PART OF THE BOTTOM SECTION AND INTERMEDIATE SECTION TO FACILITATE ADHESION OF GEOTEXTILE MEMBRANE.
13. ALL COMPONENTS OF THE APPLIED COATING SHALL WITHSTAND 90 DAYS OF OUTDOOR EXPOSURE IN DIRECT SUNLIGHT PRIOR TO SUBSTRUCTURE PLACEMENT IN THE GROUND. REPAIRS THAT MAY INCUR WITHIN THE 90 DAYS OF OUTDOOR EXPOSURE SHALL BE ADDRESSED BY THE APPROVED INSTALLER.

REQUIREMENTS FOR PHASE 2 - INSTALLATION:

14. THE PRECAST CONCRETE MANUFACTURER'S NAME AND DATE OF MANUFACTURING SHALL BE RE-STAMPED AND VISIBLE ON THE OUTSIDE OF THE SUBSTRUCTURE PRIOR TO SHIPPING.
15. THE GEOTEXTILE MEMBRANE SHALL BE SECURED TO WITHSTAND TRANSPORTATION TO THE INSTALLATION LOCATION.
16. TO MINIMIZE IMPACT ON ROAD CLOSURES, ONLY MINOR REPAIRS RESULTING FROM TRANSPORT SHALL BE ADDRESSED ONCE THE SUBSTRUCTURE ARRIVES. APPLICATION OF TROWEL GRADE COATING WITH THE ADDITION OF GEOTEXTILE MEMBRANE LAYER TO PATCH MINOR SURFACE DAMAGE DURING TRANSPORT IS ACCEPTABLE.
17. THE INSTALLATION SITE IS AN ACTIVE CONSTRUCTION SITE WITH LIMITED WORK SPACE. APPROXIMATELY 6 INCHES OF WORKSPACE MAY EXIST TO PERFORM THE MEMBRANE SEAM WHERE THE TOP AND BOTTOM STRUCTURES OR PANEL EDGES ARE JOINED. THE GEOTEXTILE OVERHANG SHOULD BE TEMPORARILY TAPED IN PLACE TO FACILITATE THE JOINING PROCESS.
18. NO SPRAYING OF THE ASPHALTIC COATING SHALL OCCUR AT THE SITE UNLESS IT IS PERFORMED BELOW GRADE AT THE JOINT SEAM LOCATION.
19. TROWEL GRADE ASPHALTIC COATING SHALL BE APPLIED AT THE JOINT SEAM AND IN THE VICINITY OF THE TWELVE-INCH OVERLAP LOCATION. DO NOT APPLY COATING TO THE INTERIOR WALLS.
20. THE LIFTING-EYES SHALL BE COATED AND COVERED BY THE GEOTEXTILE MEMBRANE AFTER THE TOP SECTION HAS BEEN SET AND WILL NO LONGER BE USED.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
8	06/14/18	EJP	REV. NOTE 9 & DETAILS. ADDED NEW NOTE 13 ON SHT 4	JF	
9	06/20/19	DQN	REV. GENERAL REQ NOTES ON SHT 4	OEJ	
10	01/07/23	JWW	ADD NOTE 3, 4, 5 ON SHT 2./ REV. DETAIL ON SHT 1	YA	

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
1	02/14/02	JHG	REMOVED VENTS	S.P.	
2	11/03/04	JHG	CHANGED STANDPIPE VENTS AND NOTES	S.P.	
3	11/22/05	JHG	REVISED NOTES. ADDED NEW GAS SEALS & TABLE 1	S.P.	
4	01/16/07	JHG	REV. GEN. NOTES, & VARIOUS CALL OUT NOTES.	S.P.	
5	04/10/08	JHG	ADD COND. VENTING AT SERVICE HEAD	S.P.	
6	02/12/15	EHP	REV. GEN. NOTES, & VARIOUS CALL OUT NOTES.	J.M.A.	
7	03/28/18	JHG	REV. METHANE NOTES, & DETAILS.: ADDED SHEET 4	O.E.J.	

DRAWING CIRCULATION

PRELIM.			FINAL		
			SI-1	PQ	1
			4.8 1	CSD	1
			34.5 1	COE	1
			TD 1		
			SP(V) 1		
			SP(M) 1		
			TL 1		

DWP

SERVICE CENTER / JOB LOCATION

SERVICE CENTER / CONSTRUCTION

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING SECTION

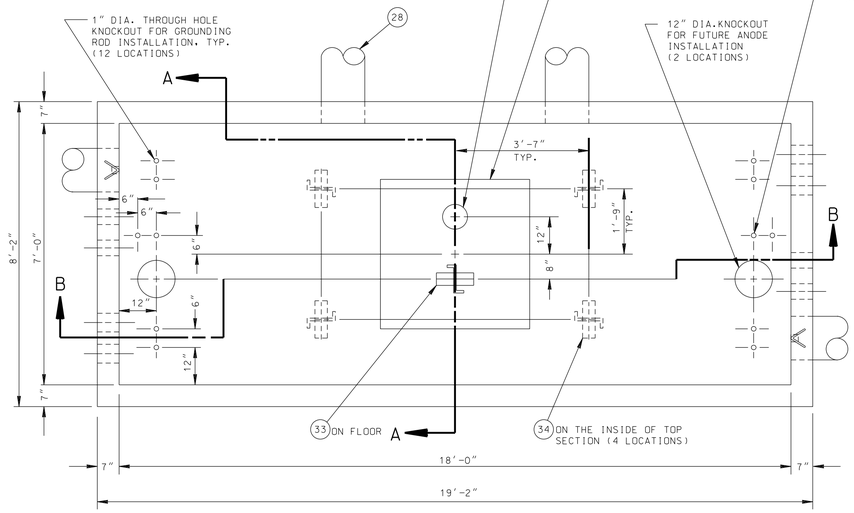
DESIGN	S.POOSTI	DRAFTING	J.GARCIA
CK	S.POOSTI	CHECKER	W.YCEDO
APPROVED	J.McMAHON	DATE	11/28/01

DWP W.O. | CONTRACT W.O.

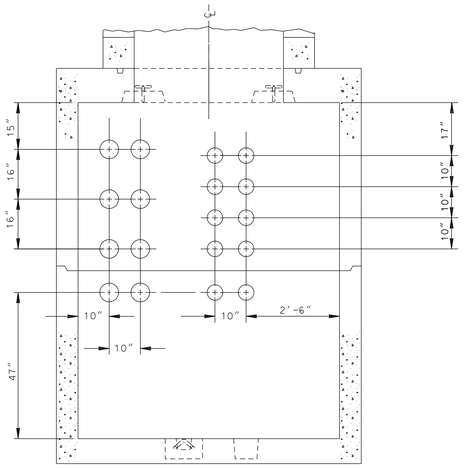
GUIDELINES FOR UNDERGROUND ELECTRIC DISTRIBUTION CONSTRUCTION IN AREAS WHERE SOIL GAS IS PRESENT

H-242

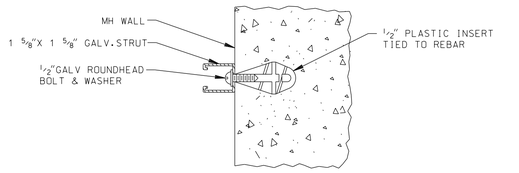
INDEX



PLAN VIEW



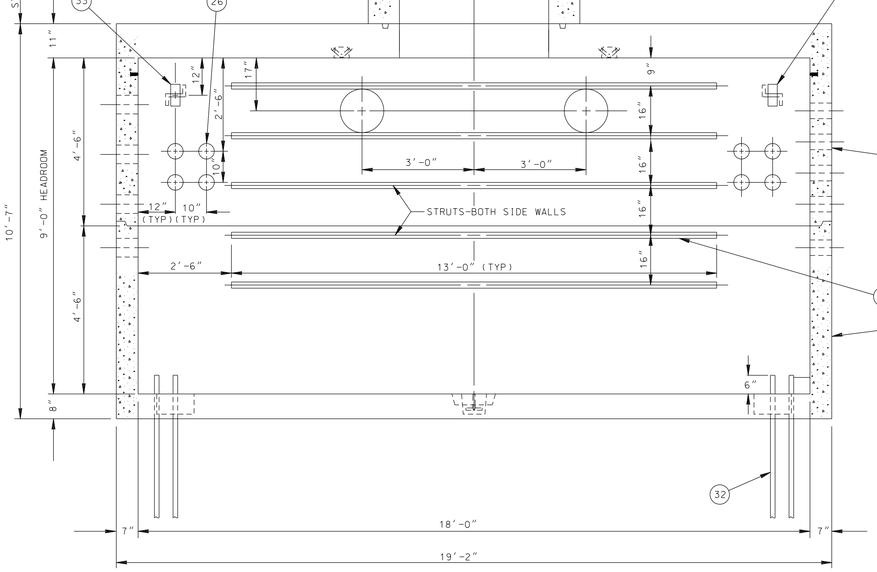
DUCT TERMINATOR DIAGRAM
EACH TERMINATOR MUST BE PLUGGED WHEN DELIVERED



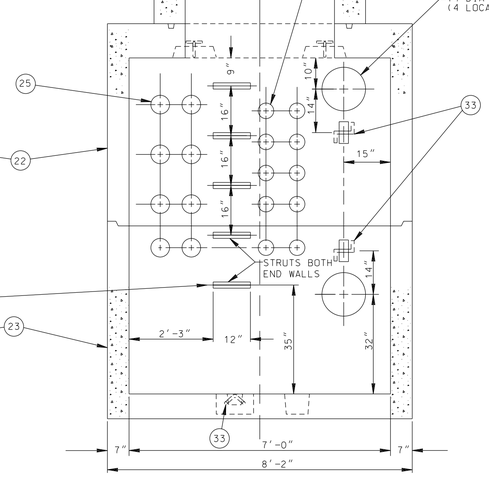
STRUT & BOLT DETAIL

	PART	DESCRIPTION	DRAWING OR CAT.NO.
*	21	ASSEMBLY	
1	22	PRECAST TOP SECTION WT. 35,975 LBS	
1	23	PRECAST BOTTOM SECTION WT. 36275 LBS	
1	24	PRECAST NECK,GRADE RING & COVER ASSY.	1-802.G1-B
16	25	6" DOUBLE MEMBRANE TERMINATORS	2-211
36	26	5" DOUBLE MEMBRANE TERMINATORS	2-211
3	27	*CUBIC YDS. CRUSHED AGGREGATE BASE	
	28	*12" VENT ASSEMBLY (SEE NOTE)	C-730-10
1	29	LADDER & HANGING HARDWARE(13'-0"LONG)	2-361
	30	*TONS OF SAND BACKFILL	
140	31	CONTINOUS GALVANIZED STEEL STRUT(FT.)	
4	32	*GROUND ROD 5/8" DIA X 8' 304 SST CLAD	
9	33	PULL IRON ASSEMBLY	1-825
4	34	PULL IRON ASSEMBLY (STAINLESS STEEL)	1-825

* NOT A PART OF THIS ASSEMBAGE



SECTION B-B
(OPPOSITE SIDE WALL IS IDENTICAL. EXCEPT FOR VENTS)



SECTION A-A
(OPPOSITE END WALL IS IDENTICAL)

REQUIREMENTS FOR FABRICATION:

MAINTENANCE HOLE SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P STANDARD SPECIFICATIONS NO.P178. AS LAST REVISED.

MAINTENANCE HOLE SHALL BE SO FABRICATED AS TO PROVIDE A DRY AND WATER TIGHT INSTALLATION.

ALL 1/2" INSERTS SHALL BE MADE FROM PLASTIC AND SHALL WITHSTAND A MINIMUM PULL-OUT LOAD OF 150 LBS./INSERT. AND A MINIMUM SHEAR LOAD OF 300 LBS./INSERT.

ALL PULL IRONS PER UGCS 1-825 SHALL BE SO PLACED AS TO WITHSTAND A WORKING LOAD OF 20,000 LBS.

LADDER AND HANGING HARDWARE TO BE INSTALLED WITH MAINTENANCE HOLE.

USE STEEL FRAME AND COVERS (TRAFFIC TYPE) PER UGCS 2-418. UNLESS DESIGN ENGINEER SPECIFIES REINFORCED PLASTIC MORTAR (RPM) PER UGCS 2-419.

OPTIONAL DUCT AND VENT KNOCKOUTS SHALL BE PLACED IN THE LOCATIONS AS ORDERED BY THE DW&P UNDERGROUND ENGINEER.

STRUT AND BOLT INSTALLATION SHALL WITHSTAND A MINIMUM SHEAR LOAD OF 300 LBS./LF. AND A PULL-OUT LOAD OF 150 LBS/BOLT. MAXIMUM SPACING REQUIRED IS 16" O.C. AND 3" FROM EACH END OF STRUT.

ALL KNOCKOUTS EXCEPT THE 1" DIA. FLOOR KNOCKOUTS SHALL BE 1 1/2" UNREINFORCED CONCRETE. ALL 1" DIA. FLOOR KNOCKOUTS SHALL HAVE CAST-IN WATER TIGHT DOUBLE MEMBRANE PLASTIC PLUGS.

REQUIREMENTS FOR INSTALLATION:

MANUFACTURER TO DELIVER PREFABRICATED MAINTENANCE HOLE TO JOB SITE AND SUPPLY SPREADER BAR FOR UNLOADING. DW&P OR INSTALLING CONTRACTOR TO PROVIDE MEANS FOR UNLOADING AND SETTING PRECAST UNITS.

SELECT A LOCATION FREE OF SUBSTRUCTURES. CLEAR OF OVERHEAD OBSTRUCTIONS THAT WOULD INTERFERE WITH THE BOOM OF A LARGE CRANE AND HAVE AMPLE WORKING ROOM FOR A CRANE TO UNLOAD THE SECTION FROM A TRUCK INTO THE EXCAVATION.

DO NOT REMOVE ANY FLOOR KNOCKOUTS.

MAINTENANCE HOLE SHALL BE SET ON A COMPACTED LEVEL BED OF CRUSHED AGGREGATE BASE.

MAINTENANCE HOLE SHALL BE REJECTED IF ANY PORTION OF KEYWAY, 12" OR LONGER, IS MISSING OR DAMAGED.

MAINTENANCE HOLE SECTIONS SHALL BE SET WITH SEALING COMPOUND APPROVED BY THE DW&P UNDERGROUND ENGINEER AND SUPPLIED WITH MAINTENANCE HOLE.

ALL MAIN LINE CONDUIT ENTERING MAINTENANCE HOLE SHALL TERMINATE FLUSH WITH INSIDE SURFACE. TERMINATION SHALL BE WITH CAST-IN TERMINATIONS. EDGES SHALL BE ROUNDED AND SMOOTH. NO SHARP OR ROUGH EDGES WILL BE ACCEPTED.

NECK, GRADE RING AND COVER SHALL BE SET AS PER UGCS 1-802. G-1B.

BACKFILL SHALL BE 100-E-100 SAND CEMENT SLURRY, OR AS SPECIFIED IN UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO.104. AS LAST REVISED.

VENT ASSEMBLY IF REQUIRED TO BE INSTALLED PER STANDARD C730-10. UNLESS DESIGN ENGINEER SPECIFIES VENT ASSEMBLY PER STANDARD C730-09.

THE LADDER LENGTHS GIVEN ARE DESIGNED TO ACCOMODATE AN ADDITIONAL 9 INCHES OF GRADE RINGS BEYOND THE STANDARD 18 INCH NECK. THE LADDER SHALL BE INCREASED ONE FOOT FOR EACH ADDITIONAL ONE FOOT INCREMENT OF GRADE RINGS THEREAFTER AS SHOWN ON UGCS 2-361. IF THE NECK SECTIONS EXCEED 4 FEET IN LENGTH, FIELD CUT LADDER TO FIT NECESSARY CONDITIONS. SEE UGCS 2-361.1 FOR INSTALLATION PROCEDURE. INSTALLATION PROCEDURE OF LADDER AND HANGING HARDWARE SHALL BE IN ACCORDANCE WITH UGCS 2-361 WHERE APPLICABLE.

WEIGHT AND ALL OUTSIDE DIMENSIONS VARY WITH MANUFACTURER. VALUES GIVEN ARE LARGEST SHOWN ON MANUFACTURE'S DRAWINGS. PRIOR TO EXCAVATION, INSTALLING CONTRACTOR SHALL OBTAIN THE MINIMUM REQUIRED EXCAVATION SIZE FROM THE MANUFACTURER SUPPLYING THE STRUCTURE.

ALL MAINTENANCE HOLES SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS OF DW&P UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO.104. AS LAST REVISED.

REV. NO.	REV. DATE	INIT'L	REVISION DESCRIPTION	APPV.	TAT NO.	DRAWING CIRCULATION PRELIM.			FINAL		

DISTRICT | CONTRACT W.O. | DWP W.O.

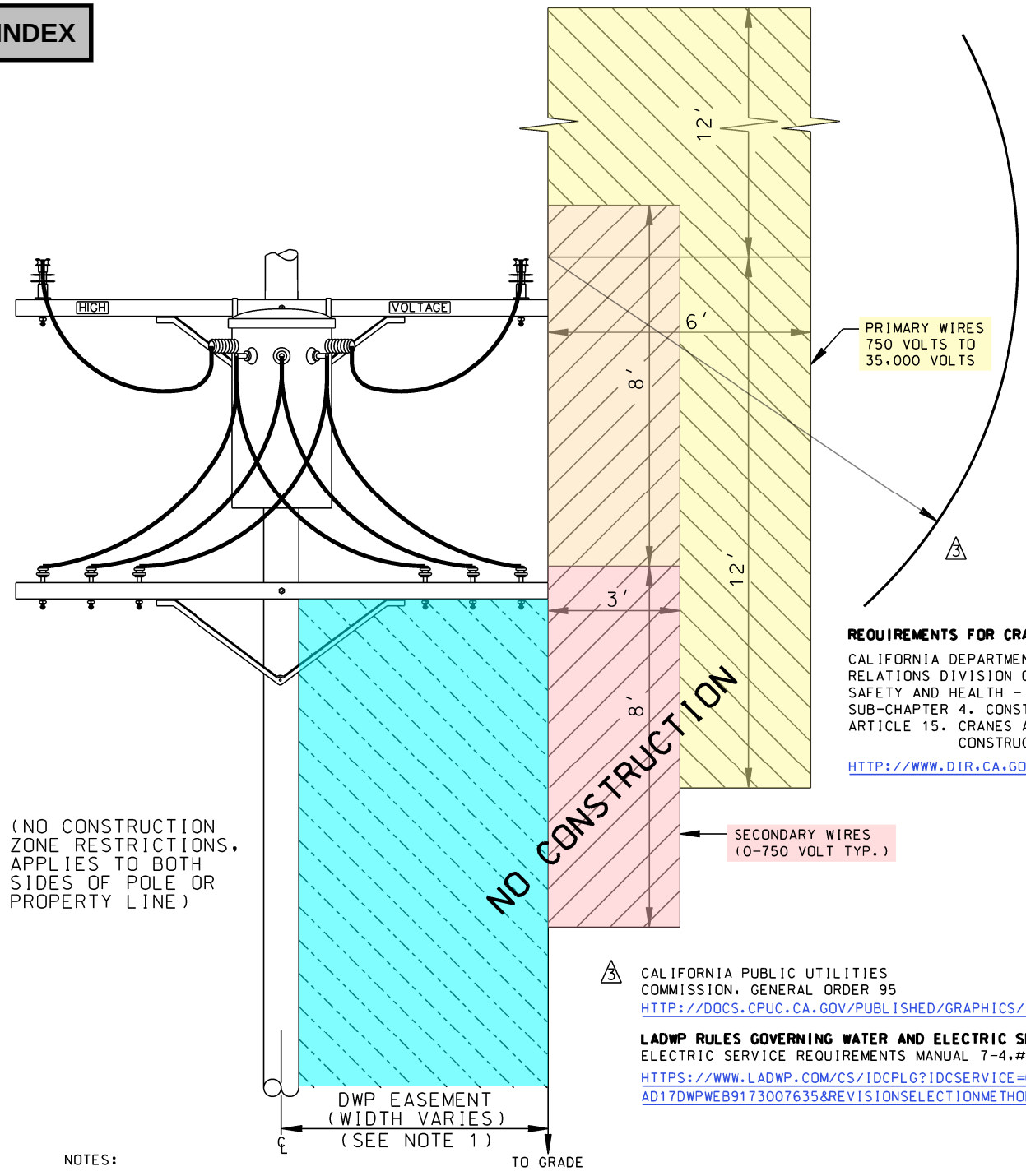
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	J. AVALOS	DRAFTING	J.GARCIA
QK	S. POOSTI	CHECKER	S. POOSTI
APPROVED	J. MAGULA	DATE	09/09/10

PRECAST MAINTENANCE HOLE
7'-0"X18'-0"
(FLAT WALL DESIGN)
W/TERMINATIONS

H-244 | SHEET 1 OF 1

INDEX



REQUIREMENTS FOR CRANE CLEARANCES

CALIFORNIA DEPARTMENT OF INDUSTRIAL RELATIONS DIVISION OF OCCUPATIONAL SAFETY AND HEALTH - TITLE 8 REGULATIONS SUB-CHAPTER 4. CONSTRUCTION SAFETY ORDERS ARTICLE 15. CRANES AND DERRICKS IN CONSTRUCTION

HTTP://WWW.DIR.CA.GOV/TITLE8/SB4A15.HTML

3 CALIFORNIA PUBLIC UTILITIES COMMISSION, GENERAL ORDER 95
HTTP://DOCS.CPUC.CA.GOV/PUBLISHED/GRAPHICS/13352.PDF

LADWP RULES GOVERNING WATER AND ELECTRIC SERVICE.
ELECTRIC SERVICE REQUIREMENTS MANUAL 7-4.#1.#2.#3(PAGE 218)
HTTPS://WWW.LADWP.COM/CS/IDCPLG?IDCSERVICE=GET_FILE&DDOCNAME=AD17DWPWEB9173007635&REVISIONSELECTIONMETHOD=LATESTRELEASED

NOTES:

1. OBTAIN APPROVAL IN ADVANCE FROM THE DEPARTMENT OF WATER AND POWER FOR CONSTRUCTION, BOTH PERMANENT AND TEMPORARY, (I.E.SCAFFOLDING, CRANES, PATIOS, STRUCTURES, POOLS, SPAS, ETC) WITHIN THE SHADED OR RADIAL CLEARANCE DESCRIBED ABOVE IN PROXIMITY TO POLES AND OVERHEAD WIRES.

2. POLES MAY BE LOCATED ON ADJACENT PROPERTIES WITH ONLY CONDUCTORS/WIRES OVERHANGING PROPERTY WHERE CONSTRUCTION IS TAKING PLACE.

3. OBTAIN APPROVAL IN ADVANCE FROM THE DEPARTMENT OF WATER AND POWER FOR CONSTRUCTION IN A POWER OR WATER UTILITY EASEMENT RIGHT-OF-WAY, BOTH RECORDED AND UNRECORDED.

4. INQUIRES SHOULD BE MADE TO:
   DEPARTMENT OF WATER & POWER
   REAL ESTATE BUISNESS UNIT - ROOM 1031 3
   111 NORTH HOPE ST.
   LOS ANGELES, CA. 90012
   (213)367-0562 REAL ESTATE RECORDS SECTION

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
3	08/13/12	JD	DELETED CALLOUT. REVISED NOTE 4. RELOCATED/ADDED LINKS AND COLORS	ARV	
2	06/12/12	JD	REVISED PUC CRANE CLEARANCES NOTE	ARV	
1	11/07/05	W. Y.	REVISED NOTES & ADDED NO CONSTRUCTION ZONE 12' ABOVE PRIMARY WIRES.	R. A.	

DISTRICT		CONTRACT W.O.	
DESIGN	ROBERT ALLEN	DRAFTING	J.GARCIA
OK	MARVIN MOON	CHECKER	WAYNE YCEDO
APPROVED	MARVIN MOON	DATE	09-26-05

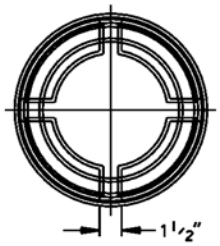
CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DWP W.O.

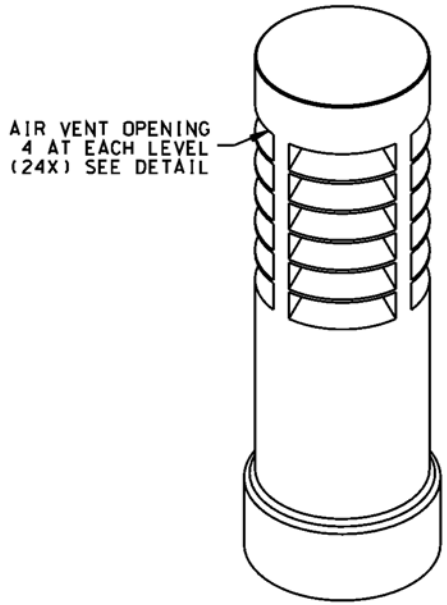
CONSTRUCTION IN PROXIMITY TO OVERHEAD POWER LINES

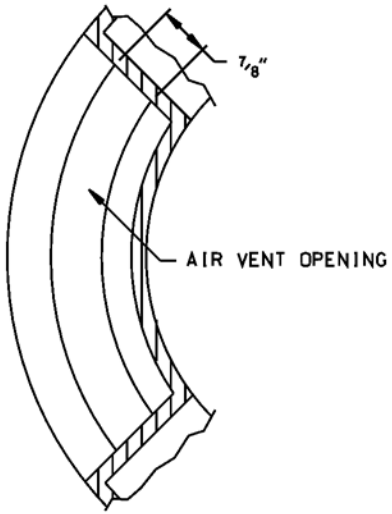
0A006-01 | **SHEET 1 OF 1**

INDEX

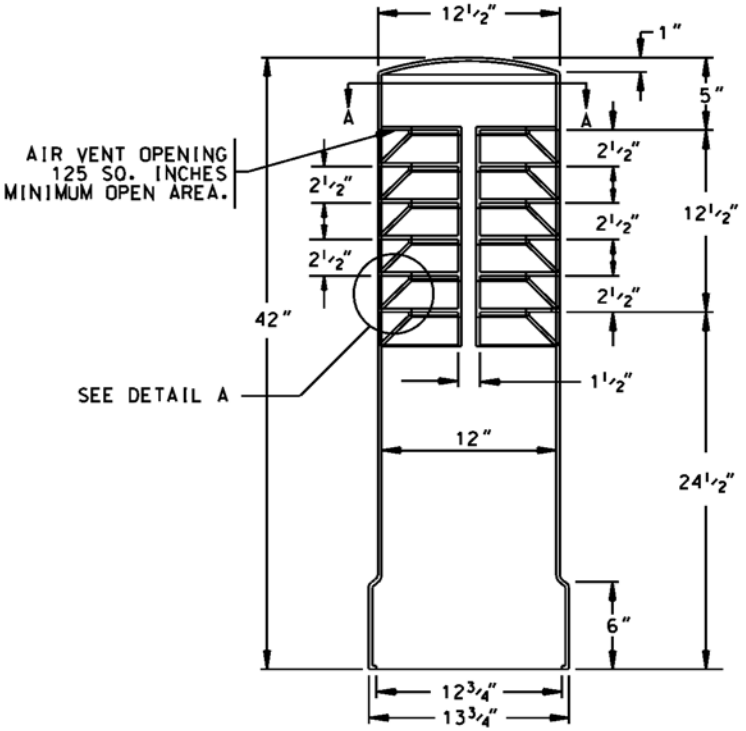


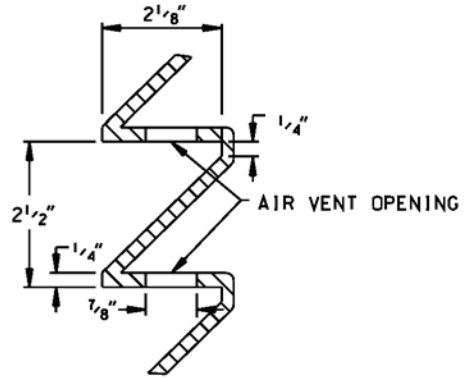
SECTION A-A





AIR VENT OPENING DETAIL





DETAIL A

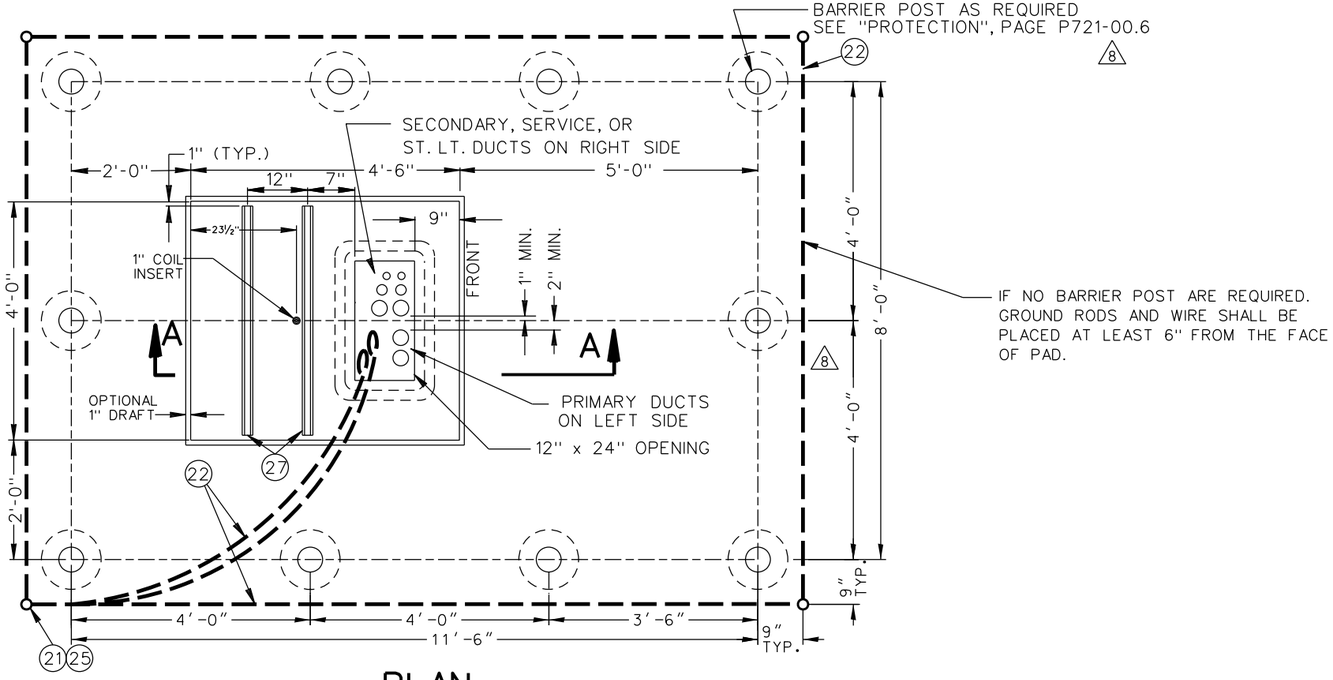
NOTES:
1. MATERIAL: POLYETHYLENE.
2. COLOR: SANDSTONE OR GRANITE.
3. DIMENSION TOLERANCE +/- 1/16".

△1 (ARMORCAST CATALOG NO. P6002712)

M.C. 39-01-312

REV. NO.	REV. DATE	DETL.	REVISION DESCRIPTION	APPV.	TAT NO.
△1	04/24/09	JHG	ADDED CATALOG NO.	WY	

DISTRICT		CONTRACT W.O.	DWP W.O.
CITY OF LOS ANGELES DEPARTMENT OF WATER AND POWER DISTRIBUTION ENGINEERING & SERVICES SECTION			12" ARCHITECTURAL STANDPIPE VENT (POLYETHYLENE)
DESIGN S. POOSTI	DRAFTING L.N. JIMENEZ		
CHECKER W. YCEDO			
OK APPROVED S. POOSTI	DATE 03/12/04	UA730-01	SHEET 1 OF 1



PLAN
NTS

NOTES:

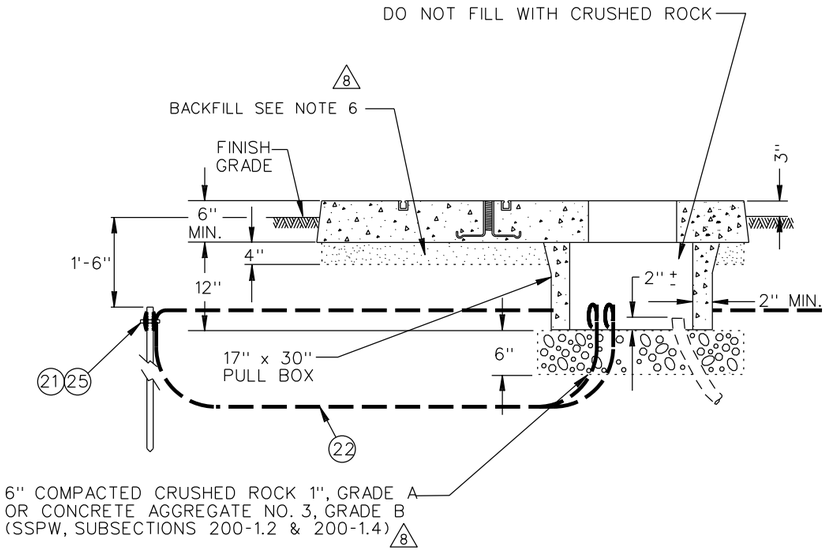
1. FOR GENERAL REQUIREMENTS, SEE UGCS STD. NO. P721-00 (ALL SHEETS). CONSTRUCTION DRAWING WILL SPECIFY THE LOCATION, TYPE, AND NUMBER OF CONDUITS TO BE INSTALLED IN HANDHOLE.
2. IF GALVANIZED CONDUIT IS USED, EXPOSED ENDS ARE TO BE THREADED AND FITTED WITH GROUND BUSHINGS.
3. TRANSFORMER PAD SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P SPECIFICATION NO. P-178 AS LAST REVISED, EXCEPT ARTICLE 4 FOR PAD HANDHOLE AND ARTICLE 3 (C) (1) AND ARTICLE 4 FOR PAD SLAB. MINIMUM REQUIRED DESIGN LOADING FOR PAD SLAB SHALL BE: LIVE LOAD = 100 lbs./ sq. ft.
   DEAD LOAD = 850 lbs./ sq. ft.
   IMPACT = NONE
4. ALL STRUTS SHALL BE HOT DIP GALVANIZED CONTINUOUS CONCRETE INSERTS AND SHALL BE FLUSH WITH CONCRETE SURFACE.
5. INSTALL ALL GROUND WIRE IN THE EARTH 1'-6" BELOW THE FINISH GRADE. CONNECT GROUND WIRE (PT. 22) TO GROUND RODS (PT. 21) EXTEND WIRE ENDS FROM A COMMON GROUND ROD INTO HANDHOLE THROUGH 2" DIA. SCH 40 PVC CONDUIT. GROUT HOLES WHERE WIRE ENTER HANDHOLE. COIL 9' OF EACH WIRE INTO THE HANDHOLE. ALL CONNECTIONS SHALL BE WELDED USING EXOTHERMIC WELDING (PT. 25), (CADWELD, THERMOWELD, OR EQUAL). 8
6. BACKFILL WITH NATURAL MATERIAL AND PERFORM 90% COMPACTION. AS AN ALTERNATIVE BACKFILL WITH SLURRY-CEMENT CLASS 100-E-100 BACKFILL. BACKFILL UNDER OVERHANG SHALL ONLY BE SLURRY-CEMENT.
7. EACH CONCRETE SECTION SHALL BE MARKED ON THE INSIDE & OUTSIDE WITH COMPANY NAME. THE DESIGNATION "DWP-FA-CN" OR "DWP/F-CN-SC" IF SCC MIX USED AND THE DATE OF POUR.

INDEX

MATERIAL LIST

QUANTITY	ITEM	DESCRIPTION
4 EA	21	GROUND ROD 5/8" D x 8', 304 SST
±60 EA	22	WIRE BARE TINNED 2/0 CU, SEE NOTE 5
5 EA	25	EXOTHERMIC WELD, SEE NOTE 5
7'-8"	27	1 5/8"X 1 5/8"X 12 GAUGE STRUT (UNISTRUT P3200 SERIES)

WEIGHT OF THE HEAVIEST SECTION 1,300LBS



SECTION A-A
NTS

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
8	11/8/22	DR	UPDATED BARRIER POST DIMS. SHT 1	RJT	20863
			REV. NOTE 5, ADDED NOTES 6,7. ADDED SHT 2		

DWP

DISTRICT	CONTRACT W.O.	DWP W.O.

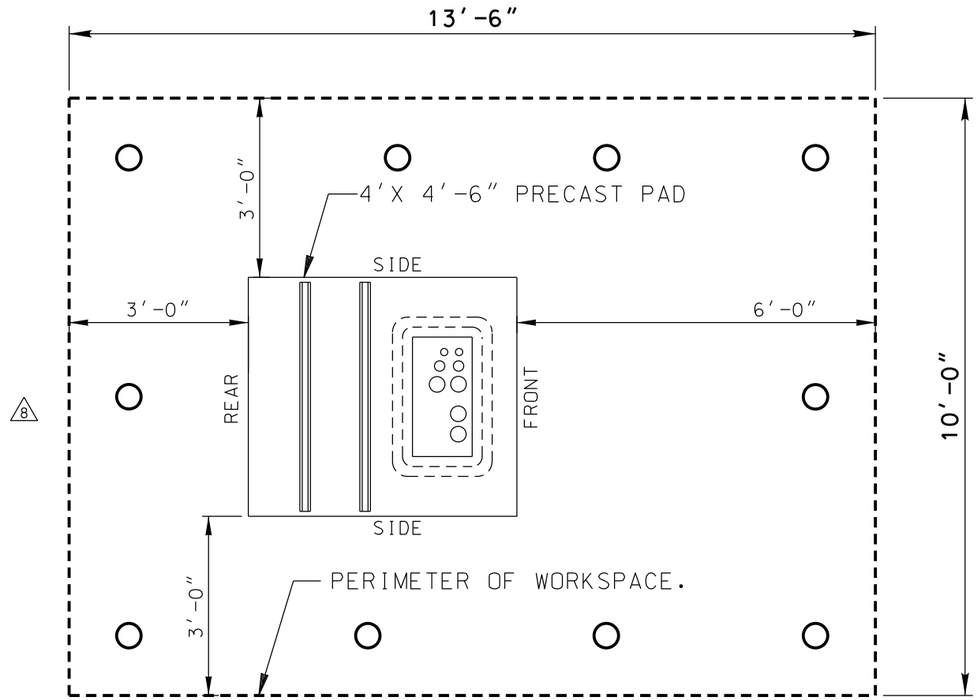
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	S. POOSTI	DRAFTING	S. TOVAR
OK		CHECKER	D. SANTIAGO
APPROVED	T.J. MC CARTHY	DATE	2-26-91

4' X 4'-6" PRECAST PAD WITH PULL BOX FOR PADMOUNT TRANSFORMER

UB721-01 | SHEET 1 OF 2

INDEX



△8

LAYOUT OF REQUIRED WORKSPACE PERIMETER

(FOR PADMOUNT EGRESS ORIENTATION, REFER TO UNDERGROUND STANDARD PAGE P721-03)

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
△8	11/8/22	DR	UPDATED BARRIER POST DIMS. SHT 1	*RJT*	*20863*
			REV. NOTE 5. ADDED NOTES 6.7. ADDED SHT 2		

DISTRICT | CONTRACT W.O. | DWP W.O.

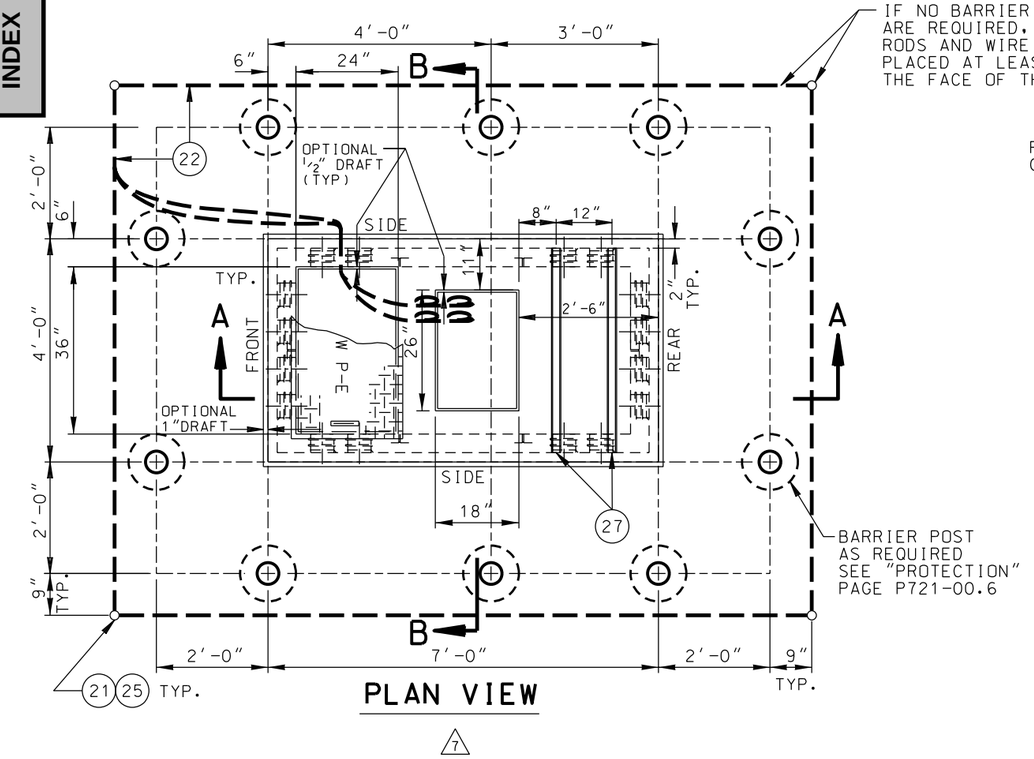
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN S. POOSTI | DRAFTING S. TOVAR
OK | CHECKER D. SANTIAGO
APPROVED T.J. MC CARTHY | DATE 2-26-91

4' X 4'-6" PRECAST PAD WITH PULL BOX FOR PADMOUNT TRANSFORMER

UB721-01 | SHEET 2 OF 2

INDEX

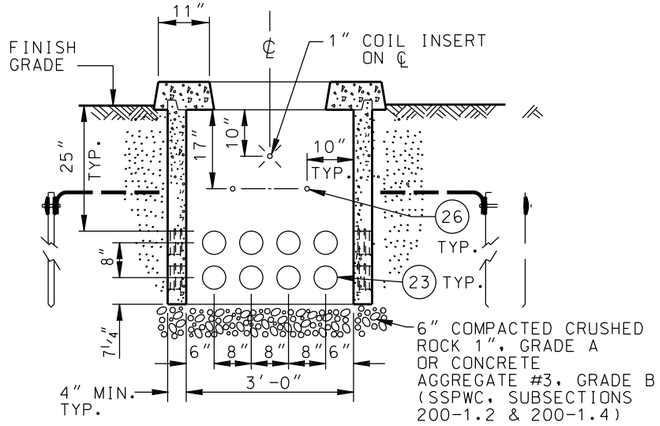


PLAN VIEW

△7

IF NO BARRIER POSTS ARE REQUIRED, GROUNDING RODS AND WIRE SHALL BE PLACED AT LEAST 6" FROM THE FACE OF THE PAD.

BARRIER POST AS REQUIRED SEE "PROTECTION" PAGE P721-00.6

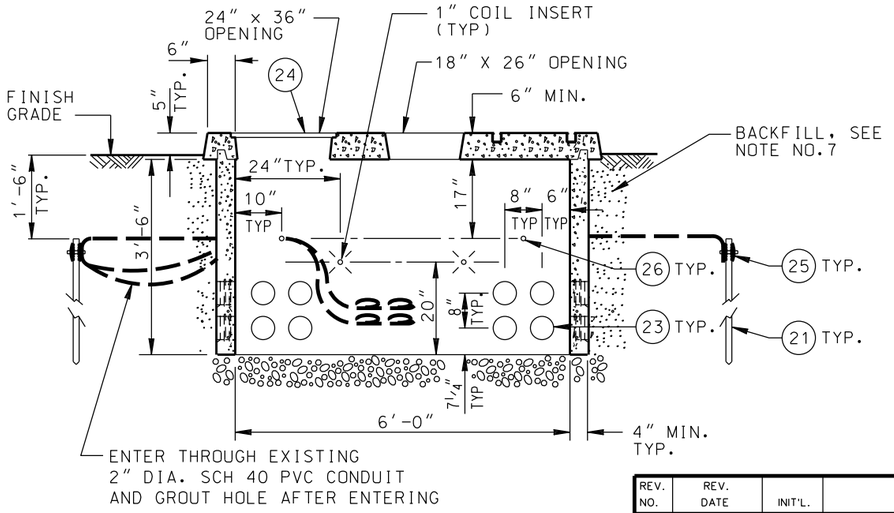


SECTION B-B

OPPOSITE SIDE WALL IS IDENTICAL

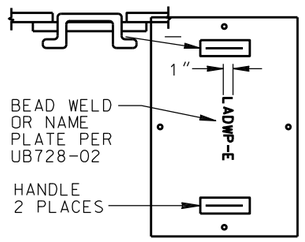
PARTS LIST		
NO.	QTY	DESCRIPTION
21	4	GROUND ROD 5/8" D X 8', 304 SST
22	60'±	WIRE BARE TINNED 2/0 CU, SEE NOTE 5
23	32	5" DIA. DOUBLE MEMBRANE TERMINATION
24	1	3/16" DIAMOND PLATE COVER, SEE NOTE 6
25	5	EXOTHERMIC WELD, SEE NOTE 5
26	8	2" DIA. SCH 40 PVC CONDUIT CAPPED AT OUTSIDE WALL
27	2	1 5/8"x 1 5/8"X 44" LONG 12 GAUGE STRUT (UNISTRUT P3200 SERIES)

WEIGHT OF THE HEAVIEST SECTION 3,100 LBS.



SECTION A-A

OPPOSITE SIDE WALL IS OPPOSITE HAND



HANDHOLE COVER DETAIL

NOTES:

1. FOR GENERAL REQUIREMENTS, SEE UGCS STD. NO. P721-00 (ALL SHEETS). CONSTRUCTION DRAWING WILL SPECIFY THE LOCATION, TYPE, AND NUMBER OF CONDUITS TO BE INSTALLED IN HANDHOLE.

△7 2. IF GALVANIZED CONDUIT IS USED, EXPOSED ENDS ARE TO BE THREADED AND FITTED WITH GROUND BUSHINGS.

3. TRANSFORMER PAD SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P SPECIFICATION NO. P-178 AS LAST REVISED EXCEPT ARTICLE 4 FOR PAD HANDHOLE AND ARTICLE 3(C)(1) AND ARTICLE 4 FOR PAD SLAB. MINIMUM REQUIRED DESIGN LOADING FOR PAD SLAB SHALL BE:
   LIVE LOAD= 100 LBS/SQ. FT.
   DEAD LOAD= 850 LBS/SQ. FT.
   IMPACT= NONE

4. ALL STRUTS SHALL BE HOT DIP GALVANIZED CONTINUOUS CONCRETE INSERTS AND SHALL BE FLUSH WITH CONCRETE SURFACE.

△7 5. INSTALL ALL GROUND WIRE IN THE EARTH 1'-6" BELOW THE FINISH GRADE. CONNECT GROUND WIRE (PT.22) TO 4 GROUND RODS (PT.21). EXTEND WIRE ENDS FROM A COMMON GROUND ROD INTO HANDHOLE THROUGH 2" DIA. SCH 40 PVC CONDUIT. GROUT HOLES WHERE WIRES ENTER HANDHOLE. COIL 9' OF EACH WIRE INTO THE HANDHOLE. ALL CONNECTIONS SHALL BE WELDED USING EXOTHERMIC WELDING (PT.25) (CADWELD, THERMOWELD, OR EQUAL).

6. A COVER SHALL BE PROVIDED WITH FOUR 1/2" NON-CORROSIVE PENTA HEAD BOLTS. PROVIDE 1/2"-13 METAL OPEN STAR P35T INSERTS WITH THROUGH HOLE OR CLEAN OUT. COVER AND BOLTS SHALL BE FLUSH WITH CONCRETE SURFACE. COVER SHALL BE HOT DIPPED GALVANIZED AFTER LADWP LOGO IS BEAD WELDED IN PLACE, IF APPLICABLE.

△7 7. BACKFILL WITH NATURAL MATERIAL AND PERFORM 90% COMPACTION. AS AN ALTERNATIVE BACKFILL WITH SLURRY-CEMENT CLASS 100-E-100 BACKFILL. BACKFILL UNDER OVERHANG SHALL ONLY BE SLURRY-CEMENT

△7 8. EACH CONCRETE SECTION SHAL BE MARKED ON THE INSIDE & OUTSIDE WITH COMPANY NAME THE DESIGNATION "DWP-FA-CN" OR "DWP/F-CN-SC" IF SCC MIX USED AND THE DATE OF POUR.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
△7	11/5/22	PSJ	REVISED BARRIER POST LOCATIONS AND NOTES	R/T	20863
△6	12/28/11	EHP	REVISED TERMINATOR SPACING, BARRIER POST LOCATIONS, DIMENSIONS TO PAD OPENING, TERMINATION DEPTHS,& BASE MATERIAL NOTE.	J.M.A.	
△5	05/05/11	JD	REVISED NOTES 1, 2 & 4. ADDED NOTE 5. REPLACED K.O'S W/ 5" DIA. TERMINATORS.	JHG JMA	
△4	11/29/09	JHG	REVISED PARTS LIST & JOINT LAYOUTS	S.P.	

DWP

DISTRICT | CONTRACT W.O. | DWP W.O.

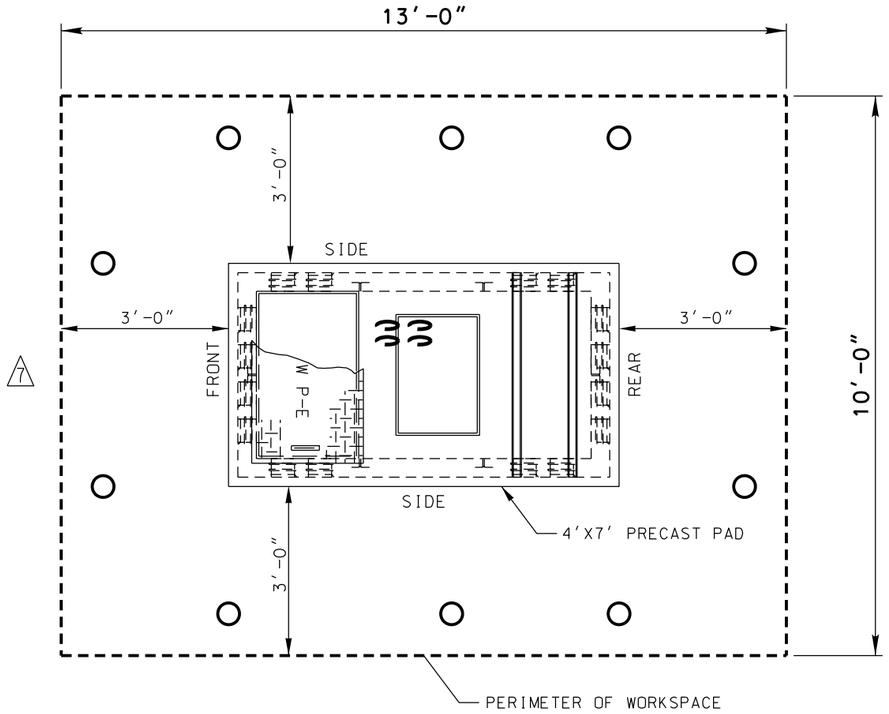
CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	S. POOSTI	DRAFTING	G. MAGEE
OK		CHECKER	D. SANTIAGO
APPROVED	T. Mc CARTHY	DATE	11/29/09

4' X 7' PRECAST PAD WITH HANDHOLE FOR PADMOUNT TRANSFORMER

UB721-02 | SHEET 1 OF 2

INDEX



7

LAYOUT OF REQUIRED WORKSPACE PERIMETER

(FOR PADMOUNT EGRESS ORIENTATION. REFER TO UNDERGROUND STANDARD PAGE P721-03)

NOTES:

FOR MINIMUM OVERALL SPATIAL CLEARANCES SEE STANDARD DRAWING UB721-29.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
7	11/5/22	PSJ	REVISED BARRIER POST LOCATIONS AND NOTES	*R/T*	*20863*
6	12/28/11	EHP	REVISED TERMINATOR SPACING, BARRIER POST LOCATIONS, DIMENSIONS TO PAD OPENING, TERMINATION DEPTHS,& BASE MATERIAL NOTE.	*J.M.A.*	
5	05/05/11	JD	REVISED NOTES 1, 2 & 4. ADDED NOTE 5. REPLACED K.O'S W/ 5" DIA. TERMINATORS.	*JHG JMA*	
4	11/29/09	JHG	REVISED PARTS LIST & JOINT LAYOUTS	*S.P.*	

DISTRICT | CONTRACT W.O. | DWP W.O.

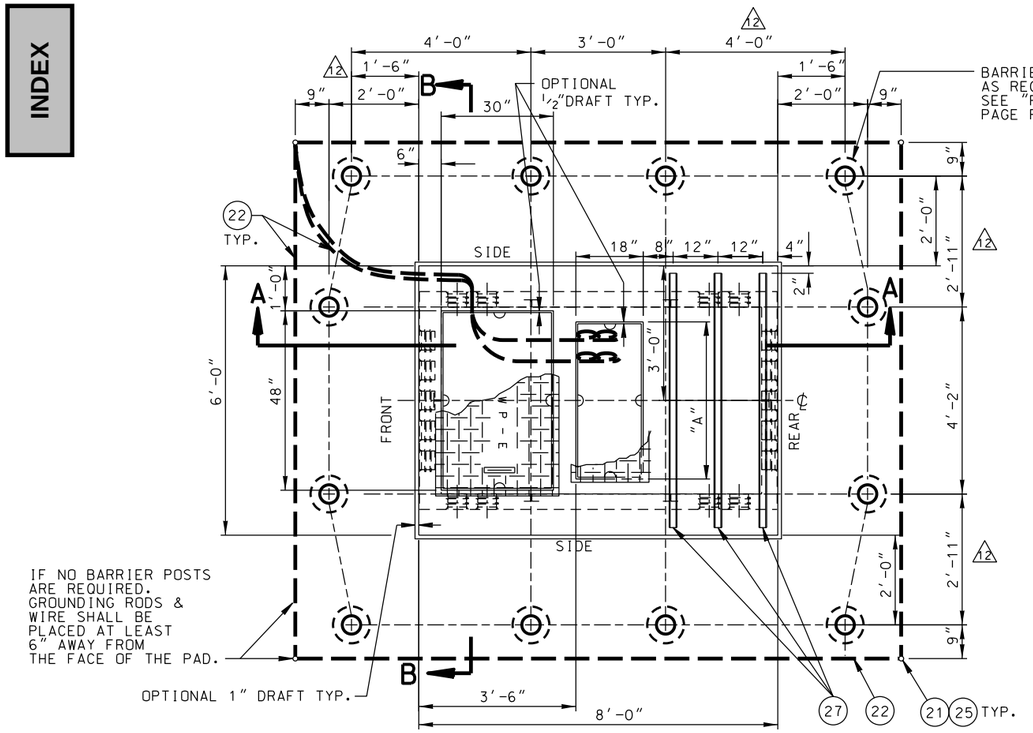
CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	S. POOSTI	DRAFTING	G. MAGEE
OK		CHECKER	D. SANTIAGO
APPROVED	T. Mc CARTHY	DATE	11/29/09

4′ X 7′ PRECAST PAD WITH HANDHOLE FOR PADMOUNT TRANSFORMER

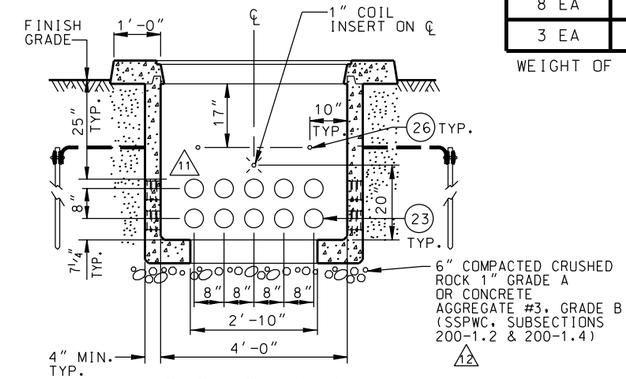
UB721-02 | **SHEET 2 OF 2**

INDEX



PLAN VIEW

DIMENSION CHART	
GROUP	A
1	48"
2	42"



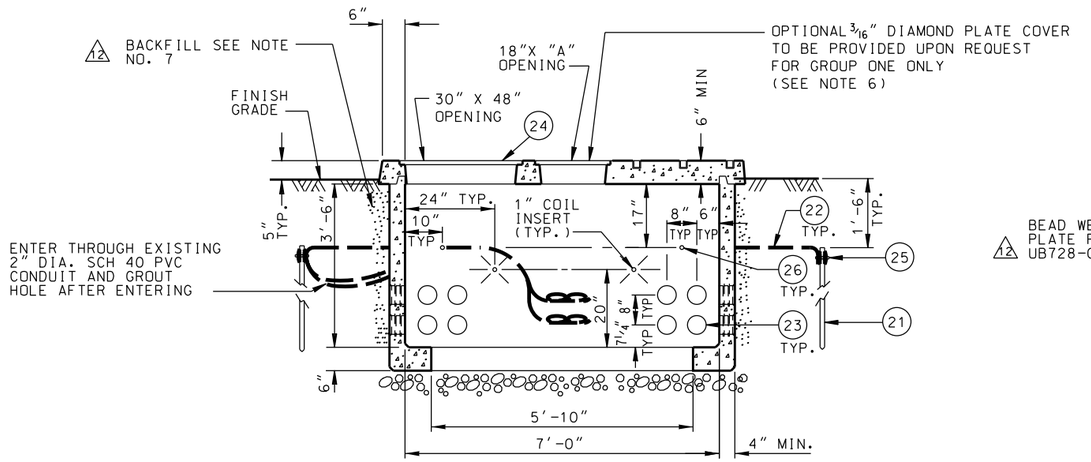
SECTION B-B

OPPOSITE SIDE WALL IS IDENTICAL

MATERIAL LIST

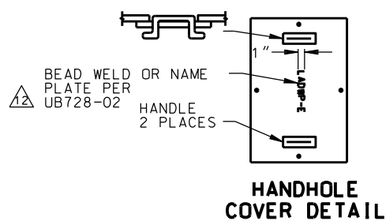
QUANTITY	ITEM	DESCRIPTION
4 EA	21	GROUND ROD 5/8" D x 8', 304 SST
±80 EA	22	WIRE BARE TINNED 2/0 CU, SEE NOTE 5
36 EA	23	5" DIA. DOUBLE MEMBRANE TERMINATION
1 EA	24	3/16" DIAMOND PLATE COVER, SEE NOTE 6
5 EA	25	EXOTHERMIC WELD. SEE NOTE 5
8 EA	26	2" DIA. SCH 40 PVC CONDUIT CAPPED AT OUTSIDE WALL
3 EA	27	1 5/8"X 1 5/8"X 68" LONG 12 GAUGE STRUT (UNISTRUT P3200 SERIES)

WEIGHT OF THE HEAVIEST SECTION 6,400LBS



SECTION A-A

OPPOSITE SIDE WALL IS OPPOSITE HAND



HANDHOLE COVER DETAIL

NOTES:

1. FOR GENERAL REQUIREMENTS, SEE UGCS STD. NO. P721-00(ALL SHEETS). CONSTRUCTION DRAWING WILL SPECIFY THE LOCATION, TYPE, AND NUMBER OF CONDUITS TO BE INSTALLED IN HANDHOLE.
2. IF GALVANIZED CONDUIT IS USED, EXPOSED ENDS ARE TO BE THREADED AND FITTED WITH GROUND BUSHINGS.
3. TRANSFORMER PAD SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P SPECIFICATION NO.P-178 AS LAST REVISED EXCEPT ARTICLE 4 FOR PAD HANDHOLE AND ARTICLE 3(C)(1) AND ARTICLE 4 FOR PAD SLAB. MINIMUM REQUIRED DESIGN LOADING FOR PAD SLAB SHALL BE:
   LIVE LOAD= 100 LBS/SQ. FT.
   DEAD LOAD= 850 LBS/SQ. FT.
   IMPACT= NONE
4. ALL STRUTS SHALL BE HOT DIP GALVANIZED CONTINUOUS CONCRETE INSERTS AND SHALL BE FLUSH WITH CONCRETE SURFACE.
12 5. INSTALL ALL GROUND WIRE IN THE EARTH 1'-6" BELOW THE FINISH GRADE. CONNECT GROUND WIRE (PT.22) TO 4 GROUND RODS (PT. 21). EXTEND WIRE ENDS FROM A COMMON GROUND ROD TO HANDHOLE THROUGH 2" DIA. SCH 40 PVC CONDUIT. GROUT HOLES WHERE WIRES ENTER HANDHOLE. COIL 9' OF EACH WIRE INTO THE HANDHOLE. ALL CONNECTIONS SHALL BE WELDED USING EXOTHERMIC WELDING (PT. 25), (CADWELD, THERMOWELD, OR EQUAL).
12 6. A COVER SHALL BE PROVIDED WITH FOUR 1/2" NON-CORROSIVE PENTA HEAD BOLTS. PROVIDE 1/2-13 METAL OPEN STAR P35T INSERTS WITH THROUGH HOLE OR CLEAN OUT. COVER AND BOLTS SHALL BE FLUSH WITH CONCRETE SURFACE. COVER SHALL BE HOT DIPPED GALVANIZED AFTER LADWP LOGO IS BEAD WELDED IN PLACE, IF APPLICABLE.
7. BACKFILL WITH NATURAL MATERIAL AND PERFORM 90% COMPACTION. AS AN ALTERNATIVE BACKFILL WITH SLURRY-CEMENT CLASS 100-E-100 BACKFILL. BACKFILL UNDER OVERHANG SHALL ONLY BE SLURRY-CEMENT.
8. EACH CONCRETE SECTION SHALL BE MARKED ON THE INSIDE & OUTSIDE WITH COMPANY NAME THE DESIGNATION "DWP-FA-CN" OR "DWP/F-CN-SC" IF SCC MIX USED AND THE DATE OF POUR.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
12	11/8/22	DR	REVISED BARRIER POST LOCATIONS, NOTES	RJT	20863
			ADDED SHEET 2		

DWP

DISTRICT	CONTRACT W.O.	DWP W.O.

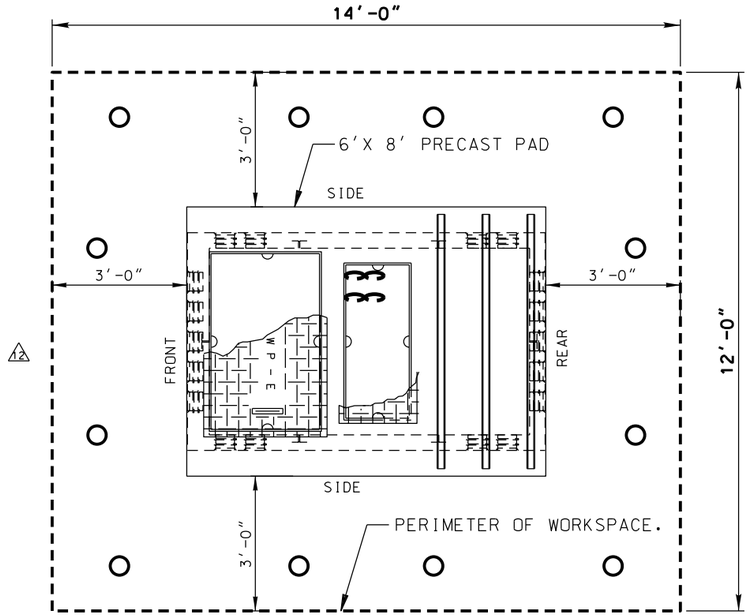
CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	S. POOSTI	DRAFTING	P. MARSHALL
OK		CHECKER	D. SANTIAGO
APPROVED	J.D. MC MAHON	DATE	4-15-91

6' x 8' PRECAST PAD WITH HANDHOLE FOR PADMOUNT TRANSFORMER

UB721-03 | SHEET 1 OF 2

INDEX



LAYOUT OF REQUIRED WORKSPACE PERIMETER

(FOR PADMOUNT EGRESS ORIENTATION. REFER TO UNDERGROUND STANDARD PAGE P721-03)

NOTE:
FOR MINIMUM OVERALL SPATIAL CLEARANCES
SEE STANDARD DRAWING UB721-29.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
2	11/8/22	DR	REVISED BARRIER POST LOCATIONS.NOTES	RJT	20863
			ADDED SHEET 2		

DWP

DISTRICT	CONTRACT W.O.	DWP W.O.

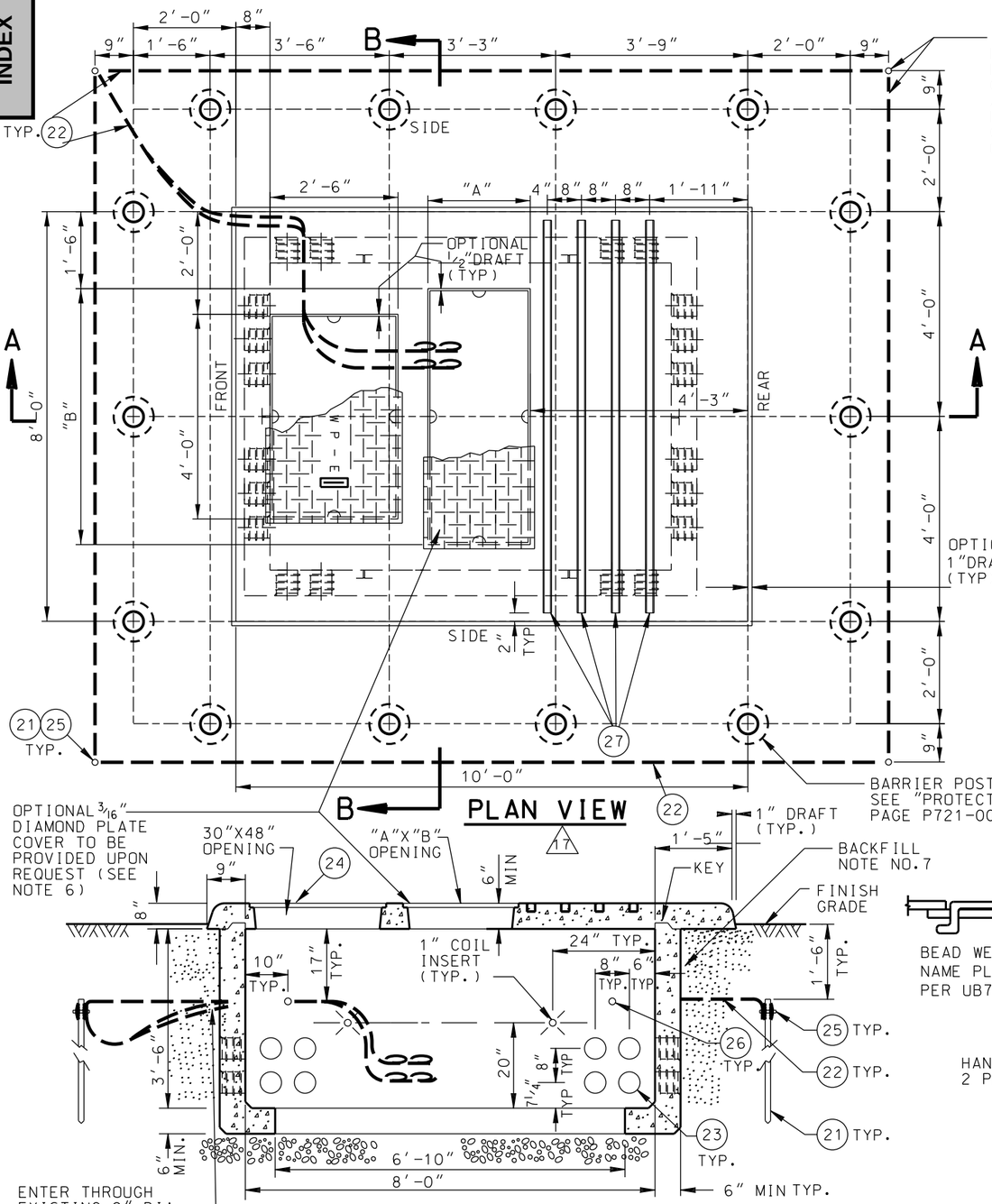
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	S. POOSTI	DRAFTING	P. MARSHALL
OK		CHECKER	D. SANTIAGO
APPROVED	J.D. MC MAHON	DATE	4-15-91

6' X 8' PRECAST PAD WITH HANDHOLE FOR PADMOUNT TRANSFORMER

UB721-03 | SHEET 2 OF 2

INDEX

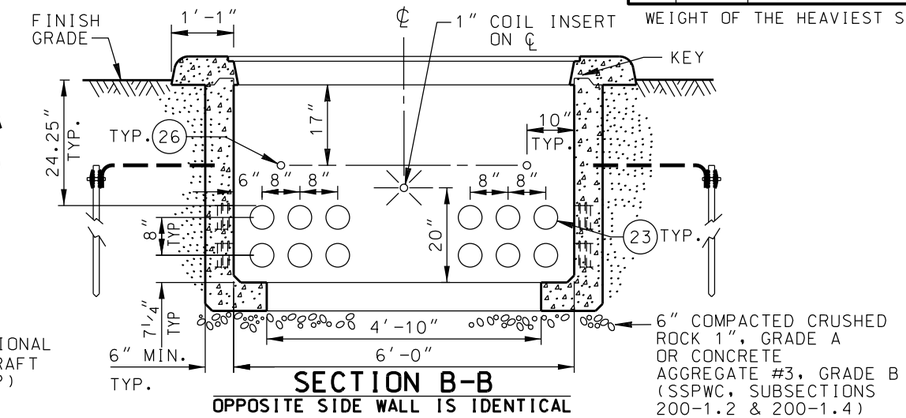


SECTION A-A
OPPOSITE SIDE WALL IS OPPOSITE HAND

DIMENSION CHART		
GROUP	A	B
1	18"	48"
2	24"	60"

PARTS LIST		
NO.	QTY	DESCRIPTION
21	4	GROUND ROD 5/8" D X 8', 304 SST
22	90'±	WIRE BARE TINNED 2/0 CU, SEE NOTE 5
23	40	5" DIA. DOUBLE MEMBRANE TERMINATION
24	1	3/16" DIAMOND PLATE COVER, SEE NOTE 6
25	5	EXOTHERMIC WELD, SEE NOTE 5
26	8	2" DIA. SCH 40 PVC CONDUIT CAPPED AT OUTSIDE WALL
27	4	1 5/8"x 1 5/8"X 92" LONG 12 GAUGE STRUT (UNISTRUT P3200 SERIES)

WEIGHT OF THE HEAVIEST SECTION 9,100 LBS.



SECTION B-B
OPPOSITE SIDE WALL IS IDENTICAL

NOTES:

1. FOR GENERAL REQUIREMENTS, SEE UGCS STD. NO. P721-00 (ALL SHEETS). CONSTRUCTION DRAWING WILL SPECIFY THE LOCATION, TYPE AND NUMBER OF CONDUITS TO BE INSTALLED IN HANDHOLE.

△17 2. IF GALVANIZED CONDUIT IS USED, EXPOSED ENDS ARE TO BE THREADED AND FITTED WITH GROUND BUSHINGS.

3. TRANSFORMER PAD SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P SPECIFICATION NO.P-178 AS LAST REVISED EXCEPT ARTICLE 4 FOR PAD HANDHOLE AND ARTICLE 3(C)(1) AND ARTICLE 4 FOR PAD SLAB. MINIMUM REQUIRED DESIGN LOADING FOR PAD SLAB SHALL BE;
   LIVE LOAD= 100 LBS/SQ. FT.
   DEAD LOAD= 1600 LBS/SQ. FT.
   IMPACT= NONE

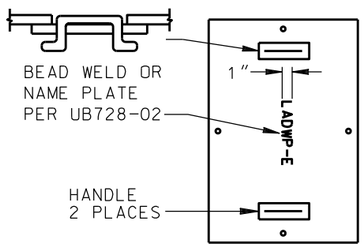
4. ALL STRUTS SHALL BE HOT DIP GALVANIZED CONTINUOUS CONCRETE INSERTS AND SHALL BE FLUSH WITH CONCRETE SURFACE.

5. INSTALL ALL GROUND WIRE IN THE EARTH 1'-6" BELOW THE FINISH GRADE. CONNECT GROUND WIRE (PT.22) TO 4 GROUND RODS (PT.21). EXTEND WIRE ENDS FROM A COMMON GROUND ROD INTO HANDHOLE THROUGH 2" DIA. SCH 40 PVC CONDUIT. GROUT HOLES WHERE WIRES ENTER HANDHOLE. COIL 9' OF EACH WIRE INTO THE HANDHOLE. ALL CONNECTIONS SHALL BE WELDED USING EXOTHERMIC WELDING (PT.25), (CADWELD, THERMOWELD, OR EQUAL).

6. A COVER SHALL BE PROVIDED WITH FOUR 1/2" NON-CORROSIVE PENTA HEAD BOLTS. PROVIDE 1/2-13 METAL OPEN STAR P35T INSERTS WITH THROUGH HOLE OR CLEAN OUT. COVER AND BOLTS SHALL BE FLUSH WITH CONCRETE SURFACE. COVER SHALL BE HOT DIPPED GALVANIZED AFTER LADWP LOGO IS BEAD WELDED IN PLACE, IF APPLICABLE.

7. BACKFILL WITH NATURAL MATERIAL AND PERFORM 90% COMPACTION. AS AN ALTERNATIVE BACKFILL WITH SLURRY-CEMENT CLASS 100-E-100 BACKFILL. BACKFILL UNDER OVERHANG SHALL ONLY BE SLURRY-CEMENT.

8. EACH CONCRETE SECTION SHAL BE MARKED ON THE INSIDE & OUTSIDE WITH COMPANY NAME THE DESIGNATION "DWP-FA-CN" OR DWP/F-CN-SC" IF SCC MIX USED AND THE DATE OF POUR.



HANDHOLE COVER DETAIL

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
△17	11/08/22	PSJ	REVISED BARRIER POST LOCATIONS AND NOTES	RJT	20863
△16	09/10/19	EAS	REVISED KEY ORIENTATION, ADDED KEY CALLOUT	DS	
△15	12/26/17	RPS	REVISED DIMENSIONS & ADDED DIMENSION CHART & ADDED GROUP	JA	
△14	10/27/15	MS	REVISED BARRIER POST LOCATIONS AND DIMENSIONS.	JMA/EM	
△13	10/28/14	EHP	REV UNISTRUT QUANT. & LOCATIONS, HANDHOLE INCREASED FROM 4'X7' TO 6'X8'. CABLE PULLING ACCESS ENLARGED FROM 18"X48" TO 24"X60"	JMA/VB	
△12	11/08/22	EHP	REVISED TERMINATOR SPACING, BARRIER POST LOCATIONS, DIMENSIONS TO PAD OPENING, TERMINATION DEPTHS, & BASE MATERIAL NOTE.	JHG/JMA	

DWP

DISTRICT	CONTRACT W.O.	DWP W.O.

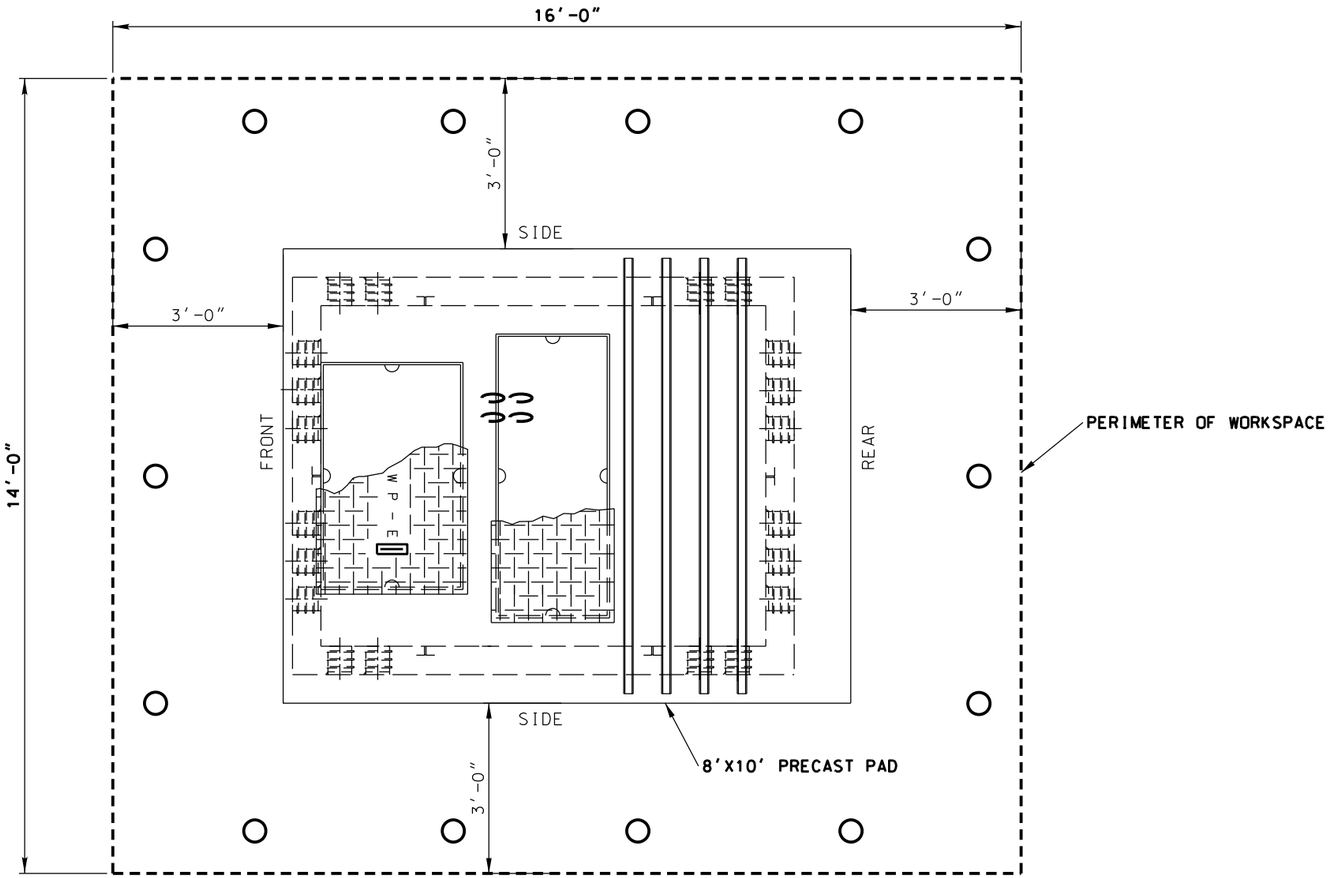
CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	S. POOSTI	DRAFTING	G. MAGEE
OK		CHECKER	D. SANTIAGO
APPROVED	J.D. Mc MAHON	DATE	03/06/91

8' X 10' PRECAST PAD WITH HANDHOLE FOR PADMOUNT TRANSFORMER

UB721-07 | SHEET 1 OF 2

INDEX



LAYOUT OF REQURED WORKSPACE PERIMETER

(FOR PADMOUNT EGRESS ORIENTATION, REFER TO UNDERGROUND STANDARD PAGE P721-03)

17

NOTE:
FOR MINIMUM OVERALL SPATIAL CLEARANCES
SEE STANDARD DRAWING UB721-29.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
17	11/08/22	PSJ	REVISED BARRIER POST LOCATIONS AND NOTES	RJT	20863
16	09/10/19	EAS	REVISED KEY ORIENTATION, ADDED KEY CALLOUT	DS	
15	12/26/17	RPS	REVISED DIMENSIONS & ADDED DIMENSION CHART & ADDED GROUP	JA	
14	10/27/15	MS	REVISED BARRIER POST LOCATIONS AND DIMENSIONS.	JMA/EM	
13	10/28/14	EHP	REV UNISTRUT QUANT. & LOCATIONS. HANDHOLE INCREASED FROM 4'X7' TO 6'X8'. CABLE PULLING ACCESS ENLARGED FROM 18"X48" TO 24"X60"	JMA/VB	
12	11/08/22	EHP	REVISED TERMINATOR SPACING, BARRIER POST LOCATIONS, DIMENSIONS TO PAD OPENING, TERMINATION DEPTHS, & BASE MATERIAL NOTE.	JHG/JMA	

DWP

DISTRICT	CONTRACT W.O.	DWP W.O.			

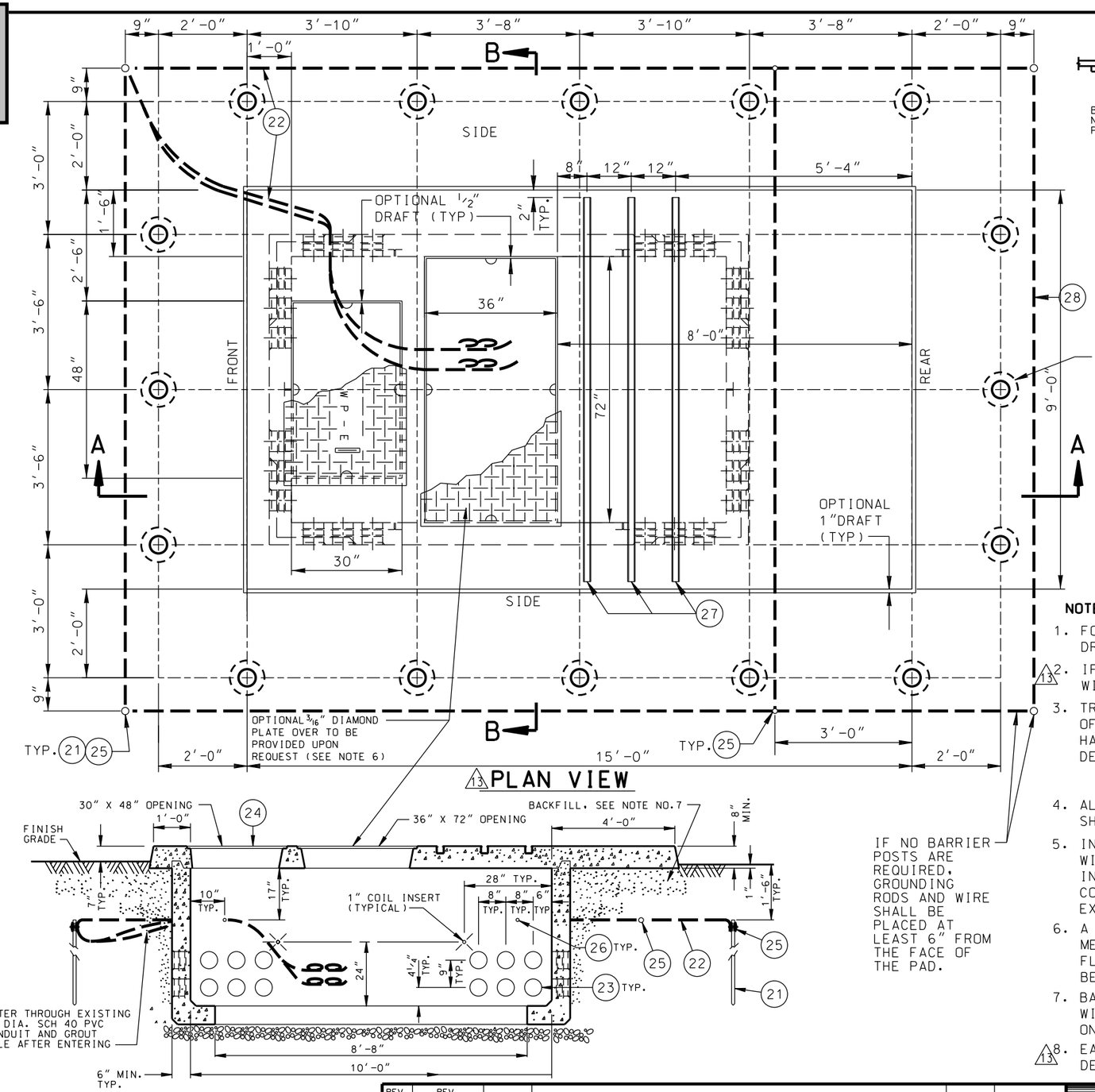
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	S. POOSTI	DRAFTING	G. MAGEE
OK		CHECKER	D. SANTIAGO
APPROVED	J.D. Mc MAHON	DATE	03/06/91

8' X 10' PRECAST PAD WITH HANDHOLE FOR PADMOUNT TRANSFORMER

UB721-07 | SHEET 2 OF 2

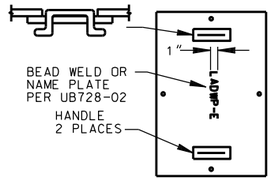
INDEX



13 PLAN VIEW

SECTION A-A
OPPOSITE SIDE WALL IS OPPOSITE HAND
NTS

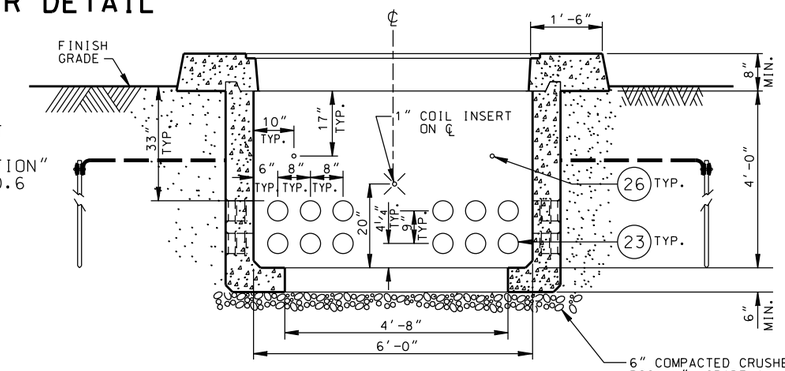
IF NO BARRIER POSTS ARE REQUIRED, GROUNDING RODS AND WIRE SHALL BE PLACED AT LEAST 6" FROM THE FACE OF THE PAD.



HANDHOLE COVER DETAIL

PARTS LIST		
NO.	QTY	DESCRIPTION
21	4	GROUND ROD 5/8" D X 8', 304 SST
22	110'±	500 KCMIL BARE CU. WIRE, SEE NOTE 5
23	48	5" DIA. DOUBLE MEMBRANE TERMINATION
24	1	3/16" DIAMOND PLATE COVER, SEE NOTE 6
25	7	EXOTHERMIC WELD, SEE NOTE 5
26	8	2" DIA. SCH 40 PVC CONDUIT CAPPED AT OUTSIDE WALL
27	3	1 5/8"x 1 5/8"X 104" LONG 12 GAUGE STRUT (UNISTRUT P3200 SERIES)

WEIGHT OF THE HEAVIEST SECTION 12,600 LBS.



SECTION B-B
OPPOSITE SIDE WALL IS IDENTICAL
NTS

NOTES:

1. FOR GENERAL REQUIREMENTS, SEE UGCS STD. NO. P721-00 (ALL SHEETS). CONSTRUCTION DRAWING WILL SPECIFY THE LOCATION, TYPE AND NUMBER OF CONDUITS TO BE INSTALLED IN HANDHOLE.
2. 13 IF GALVANIZED CONDUIT IS USED, EXPOSED ENDS ARE TO BE THREADED AND FITTED WITH GROUND BUSHINGS.
3. TRANSFORMER PAD SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P SPECIFICATION NO. P-178 AS LAST REVISED EXCEPT ARTICLE 4 FOR PAD HANDHOLE AND ARTICLE 3 (C) (1) AND ARTICLE 4 FOR PAD SLAB. MINIMUM REQUIRED DESIGN LOADING FOR PAD SLAB SHALL BE: LIVE LOAD = 100 LBS/SQ. FT.
   DEAD LOAD = 1600 LBS/SQ. FT.
   IMPACT = NONE
4. ALL STRUTS SHALL BE HOT DIP GALVANIZED CONTINUOUS CONCRETE INSERTS AND SHALL BE FLUSH WITH CONCRETE SURFACE.
5. INSTALL ALL GROUND WIRE IN THE EARTH 1'-6" BELOW THE FINISH GRADE. CONNECT GROUND WIRE (PT. 22) TO 4 GROUND RODS (PT. 21). EXTEND WIRE ENDS FROM A COMMON GROUND ROD INTO HANDHOLE THROUGH 2" DIA. SCH 40 PVC CONDUIT. GROUT HOLES WHERE WIRES ENTER HANDHOLE. COIL 12' OF EACH WIRE INTO THE HANDHOLE. ALL CONNECTIONS SHALL BE WELDED USING EXOTHERMIC WELDING (PT.25)(CADWELD, THERMOWELD, OR EQUAL).
6. A COVER SHALL BE PROVIDED WITH FOUR 1/2" NON-CORROSIVE PENTA HEAD BOLTS. PROVIDE 1/2"-13 METAL OPEN STAR P35T INSERTS WITH THROUGH HOLE OR CLEAN OUT. COVER AND BOLTS SHALL BE FLUSH WITH CONCRETE SURFACE. COVER SHALL BE HOT DIPPED GALVANIZED AFTER LADWP LOGO IS BEAD WELDED IN PLACE, IF APPLICABLE.
7. BACKFILL WITH NATURAL MATERIAL AND PERFORM 90% COMPACTION. AS AN ALTERNATIVE BACKFILL WITH SLURRY-CEMENT CONCRETE CLASS 100-E-100 BACKFILL. BACKFILL UNDER OVERHANG SHALL ONLY BE SLURRY-CEMENT.
8. 13 EACH CONCRETE SECTION SHALL BE MARKED ON THE INSIDE & OUTSIED WITH COMPANY NAME THE DESIGNATION "DWP-FA-CN" OR "DWP/F-CN-SC" IF SCC MIX USED AND THE DATE OF POUR.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
13	11/01/22	PSJ	REVISED BARRIOR POST LOCATIONS AND NOTES.	RJT	20863
12	12/28/11	EHP	REV. DIMENSIONS TO PAD OPENINGS & TERMINATOR DEPTHS, LOCATION OF 1" COIL INSERTS ON SECTION "A-A",& BARRIER POST LOCATIONS.	JMA	
11	05/05/11	JD	REPLACED K.O'S W/ 5" DIA. TERMINATORS. REVISED NOTES 1 & 2.	JHG JMA	
10	03/20/09	JHG	REV PART LIST#22 & NOTE#6	WY	

DISTRICT | CONTRACT W.O. | DWP W.O.

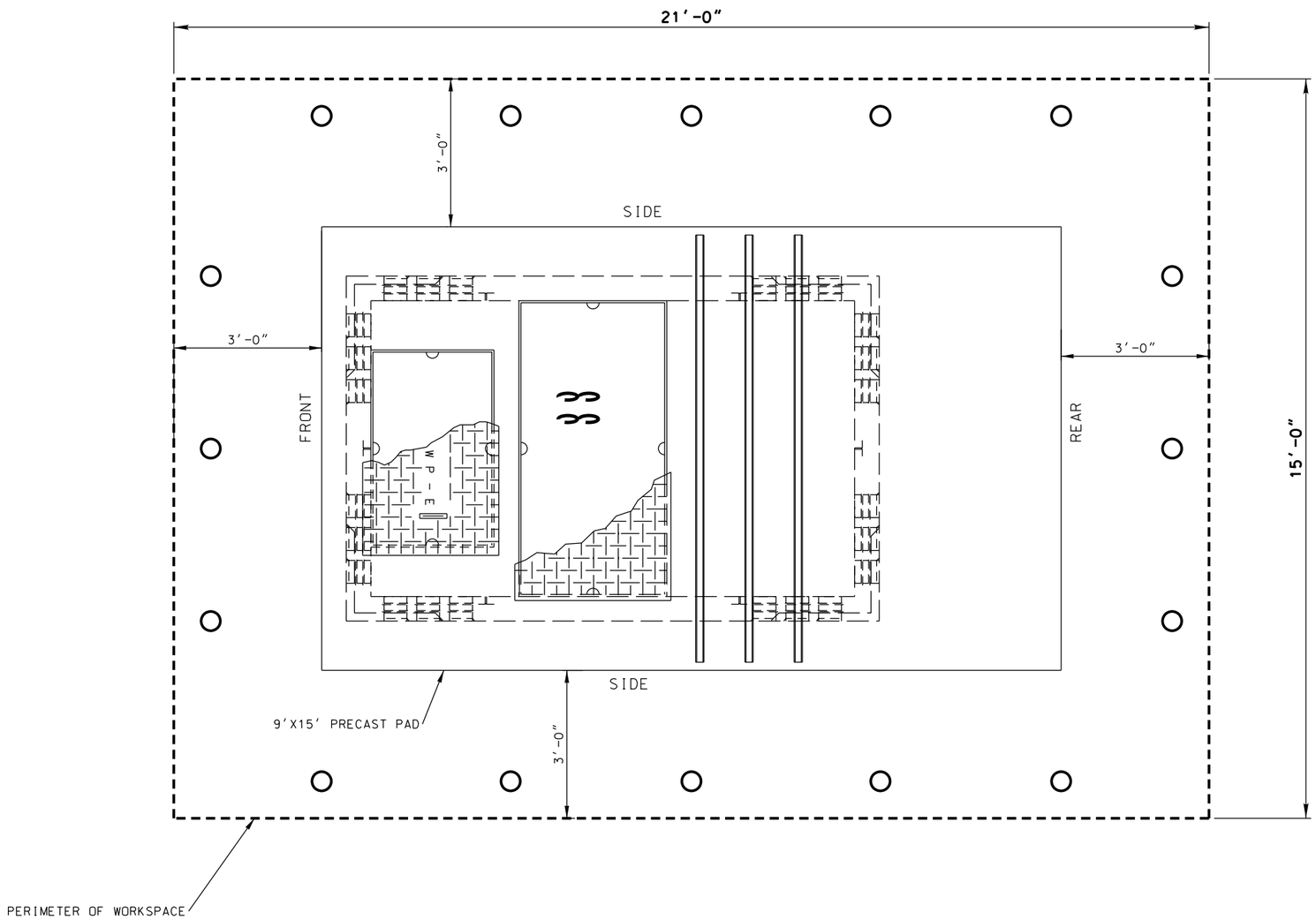
CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	S. POOSTI	DRAFTING	SYK
OK		CHECKER	D. SANTIAGO
APPROVED	T. Mc CARTHY	DATE	3/4/91

9'X15' PRECAST PAD FOR PADMOUNT TRANSFORMER

UB721-08 | SHEET 1 OF 2

INDEX



13 LAYOUT OF REQUIRED WORKSPACE PERIMETER

(FOR PADMOUNT EGRESS ORIENTATION. REFER TO UNDERGROUND STANDARD PAGE P721-03)

NOTE:
FOR MINIMUM OVERALL SPATIAL CLEARNCES, SEE STANDARD DRAWING UB721-29.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
13	11/01/22	PSJ	REVISED BARRIOR POST LOCATIONS AND NOTES.	RJT	20863
12	12/28/11	EHP	REV. DIMENSIONS TO PAD OPENINGS & TERMINATOR DEPTHS, LOCATION OF 1" COIL INSERTS ON SECTION "A-A",& BARRIER POST LOCATIONS.	JMA	
11	05/05/11	JD	REPLACED K.O'S W/ 5" DIA. TERMINATORS. REVISED NOTES 1 & 2.	JHG JMA	
10	03/20/09	JHG	REV PART LIST#22 & NOTE#6	WY	

DWP

DISTRICT	CONTRACT W.O.
DWP W.O.	

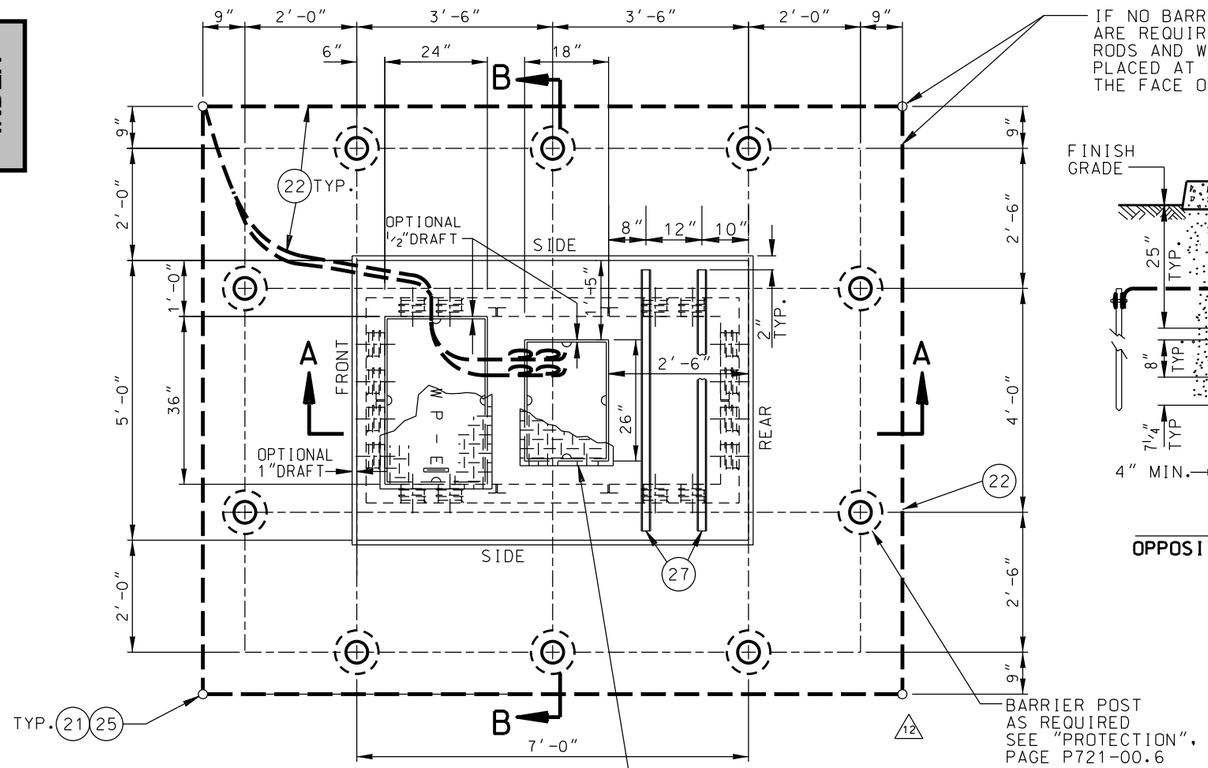
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	S. POOSTI	DRAFTING	SYK
OK		CHECKER	D. SANTIAGO
APPROVED	T. Mc CARTHY	DATE	3/4/91

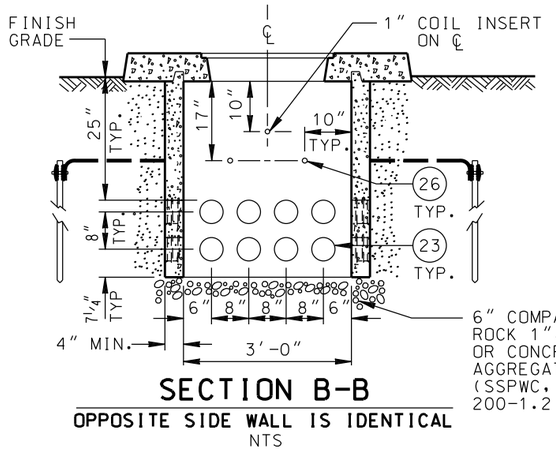
9'X15'PRECAST PAD FOR PADMOUNT TRANSFORMER

UB721-08 | SHEET 2 OF 2

INDEX



PLAN VIEW



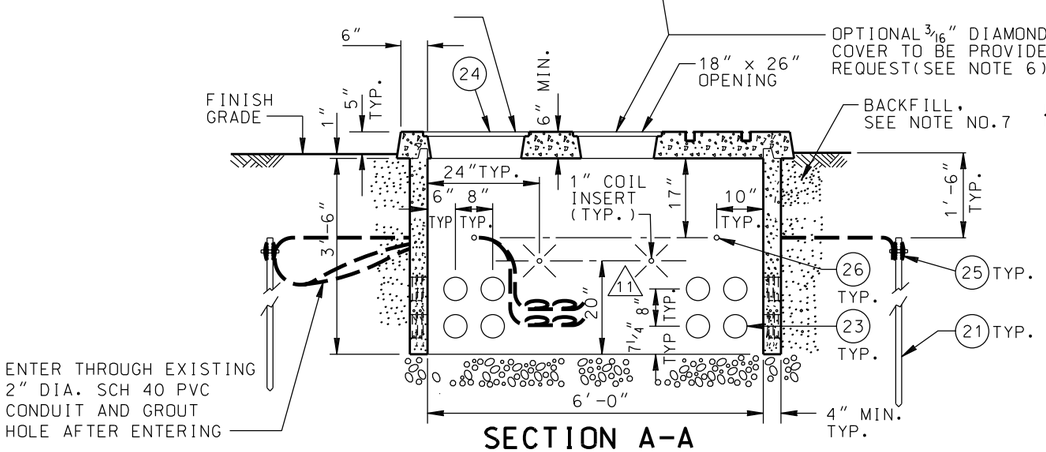
SECTION B-B

OPPOSITE SIDE WALL IS IDENTICAL

NTS

PARTS LIST		
NO.	QTY	DESCRIPTION
21	4	GROUND ROD 5/8" DIA. X 8', 304 SST
22	60 ±	WIRE BARE TINNED 2/0 CU, SEE NOTE 5
23	32	5" DIA. DOUBLE MEMBRANE TERMINATION
24	1	3/16" DIAMOND PLATE COVER, SEE NOTE 6
25	1	EXOTHERMIC WELD, SEE NOTE 5
26	8	2" DIA. SCH 40 PVC CONDUIT CAPPED AT OUTSIDE WALL
27	2	1 5/8" x 1 5/8" x 56" LONG 12 GAUGE STRUT (UNISTRUT P3200 SERIES)

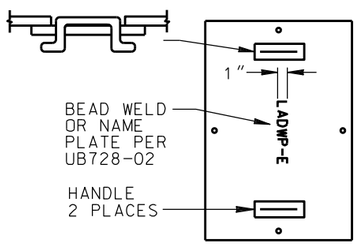
WEIGHT OF THE HEAVIEST SECTION 3,100 LBS.



SECTION A-A

OPPOSITE SIDE WALL IS OPPOSITE HAND

NTS



HANDHOLE COVER DETAIL

NOTES:

1. FOR GENERAL REQUIREMENTS, SEE UGCS STD. NO. P721-00 (ALL SHEETS). CONSTRUCTION DRAWING WILL SPECIFY THE LOCATION, TYPE, AND NUMBER OF CONDUITS TO BE INSTALLED IN HANDHOLE.
2. IF GALVANIZED CONDUIT IS USED, EXPOSED ENDS ARE TO BE THREADED AND FITTED WITH GROUND BUSHINGS.
3. TRANSFORMER PAD SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P SPECIFICATION NO.P-178 AS LAST REVISED EXCEPT ARTICLE 4 FOR PAD HANDHOLE AND ARTICLE 3(C)(1) AND ARTICLE 4 FOR PAD SLAB. MINIMUM REQUIRED DESIGN LOADING FOR PAD SLAB SHALL BE:
   LIVE LOAD= 100 LBS/SQ. FT.
   DEAD LOAD= 850 LBS/SQ. FT.
   IMPACT= NONE
4. ALL STRUTS SHALL BE HOT DIP GALVANIZED CONTINUOUS CONCRETE INSERTS AND SHALL BE FLUSH WITH CONCRETE SURFACE.
5. INSTALL ALL GROUND WIRE IN THE EARTH 1'-6" BELOW THE FINISH GRADE. CONNECT GROUND WIRE (PT.22) TO 4 GROUND RODS (PT.21). EXTEND WIRE ENDS FROM A COMMON GROUND ROD INTO HANDHOLE THROUGH 2" DIA. SCH 40 PVC CONDUIT. GROUT HOLES WHERE WIRES ENTER HANDHOLE. COIL 9' OF EACH WIRE INTO THE HANDHOLE. ALL CONNECTIONS SHALL BE WELDED USING EXOTHERMIC WELDING (PT.25) (CADWELD, THERMOWELD, OR EQUAL).
6. A COVER SHALL BE PROVIDED WITH FOUR 1/2" NON-CORROSIVE PENTA HEAD BOLTS. PROVIDE 1/2-13 METAL OPEN STAR P35T INSERTS WITH THROUGH HOLE OR CLEAN OUT. COVER AND BOLTS SHALL BE FLUSH WITH CONCRETE SURFACE. COVER SHALL BE HOT DIPPED GALVANIZED AFTER LADWP LOGO IS BEAD WELDED IN PLACE, IF APPLICABLE.
7. BACKFILL WITH NATURAL MATERIAL AND PERFORM 90% COMPACTION. AS AN ALTERNATIVE BACKFILL WITH SLURRY-CEMENT CONCRETE CLASS 100-E-100 BACKFILL.
12. EACH CONCRETE SECTION SHALL BE MARKED ON THE INSIDE & OUTSIDE WITH COMPANY NAME THE DESIGNATION "DWP-FA-CN" OR "DWP/F-CN-SC" IF SCC MIX USED AND THE DATE OF POUR.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
12	11/16/22	PSJ	REVISED BARRIER POST LOCATIONS AND NOTES.	RJT	20863
11	12/28/11	EHP	REVISED TERMINATOR SPACING, BARRIER POST LOCATIONS, DIMENSIONS TO PAD OPENING, TERMINATION DEPTHS,& BASE MATERIAL NOTE.	JMA	
10	05/05/11	JD	REPLACED K.O'S W/ 5" DIA. TERMINATORS. REVISED NOTES 1, 5, & 6.	JHG JMA	

DISTRICT | CONTRACT W.O. | DWP W.O.

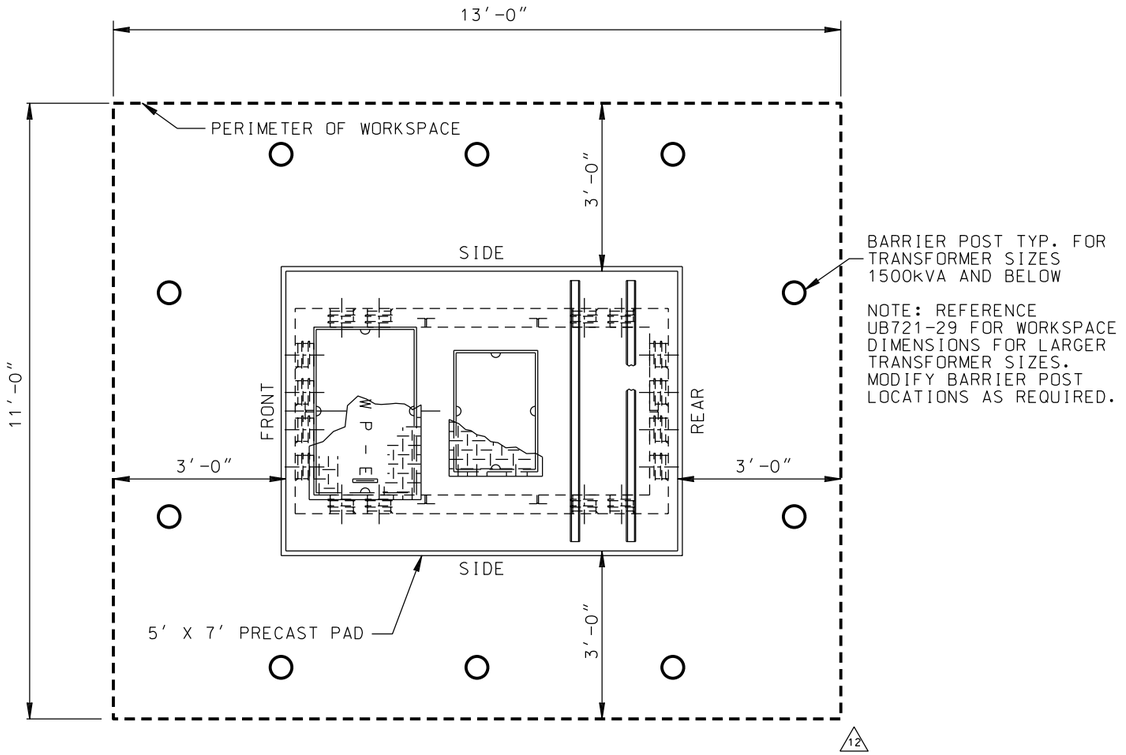
CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN | DRAFTING
OK | CHECKER
APPROVED | DATE

5'X7' PRECAST PAD WITH HANDHOLE FOR PADMOUNT TRANSFORMER

UB721-09 | SHEET 1 OF 2

INDEX



LAYOUT OF REQUIRED WORKSPACE PERIMETER

(FOR PADMOUNT EGRESS ORIENTATION. REFER TO UNDERGROUND STANDARD PAGE P721-03)

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
12	11/16/22	PSJ	REVISED BARRIER POST LOCATIONS AND NOTES.	*RJT*	*20863*
11	12/28/11	EHP	REVISED TERMINATOR SPACING, BARRIER POST LOCATIONS, DIMENSIONS TO PAD OPENING, TERMINATION DEPTHS,& BASE MATERIAL NOTE.	*JMA*	

DWP

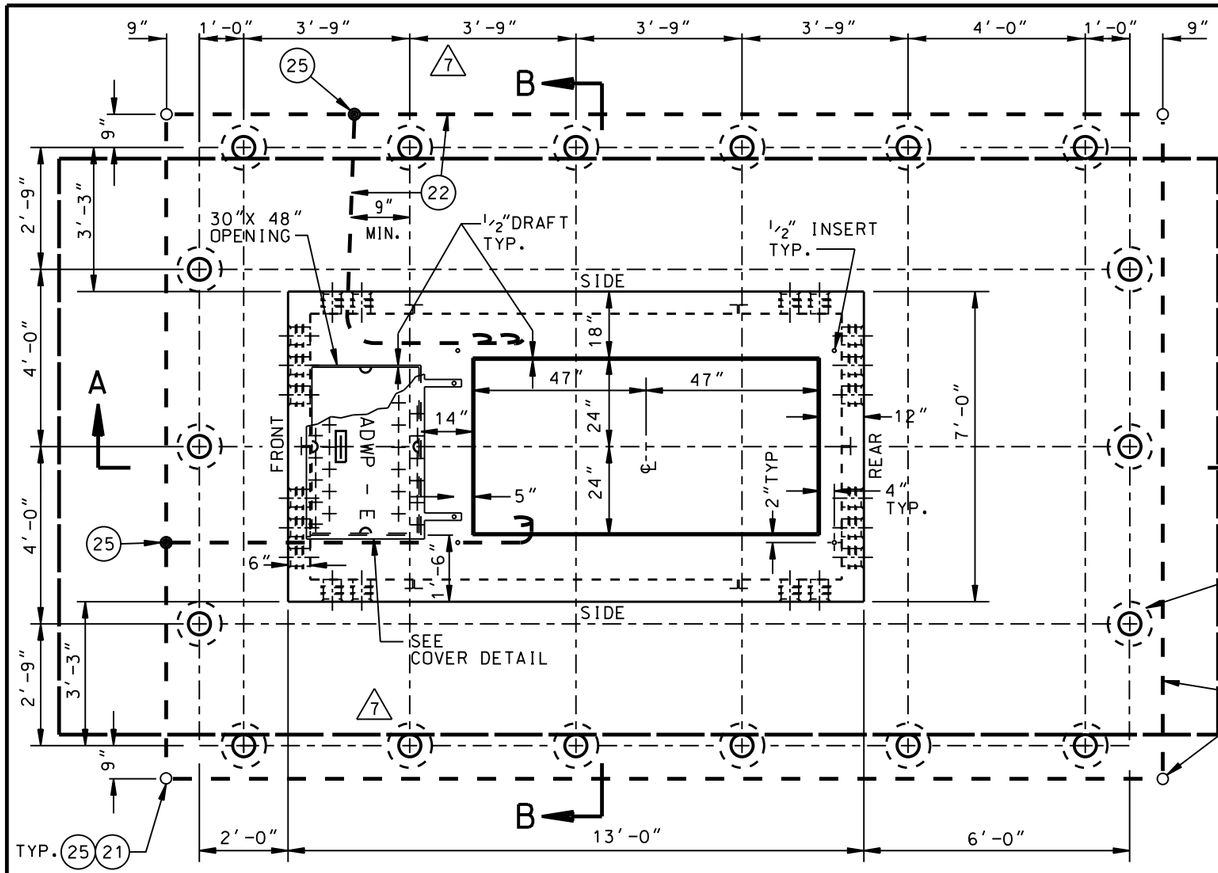
DISTRICT	CONTRACT W.O.	DWP W.O.			

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

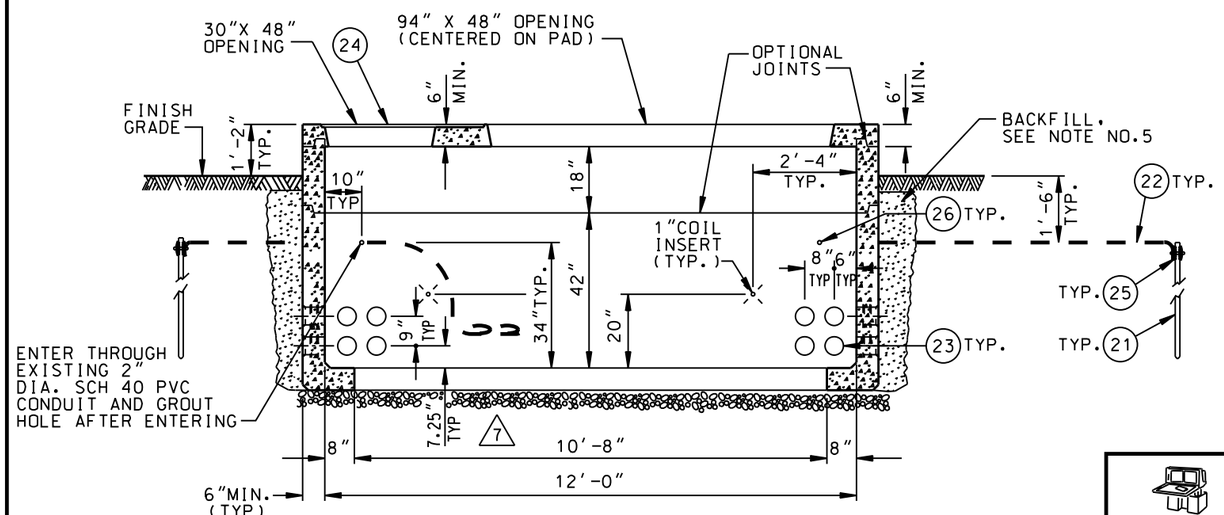
DESIGN	DRAFTING
OK	CHECKER
APPROVED	DATE

5′X7′ PRECAST PAD WITH HANDHOLE FOR PADMOUNT TRANSFORMER

UB721-09 | SHEET 2 OF 2

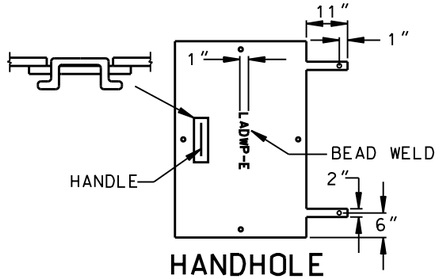


PLAN



SECTION A-A

OPPOSITE SIDE WALL IS OPPOSITE HAND

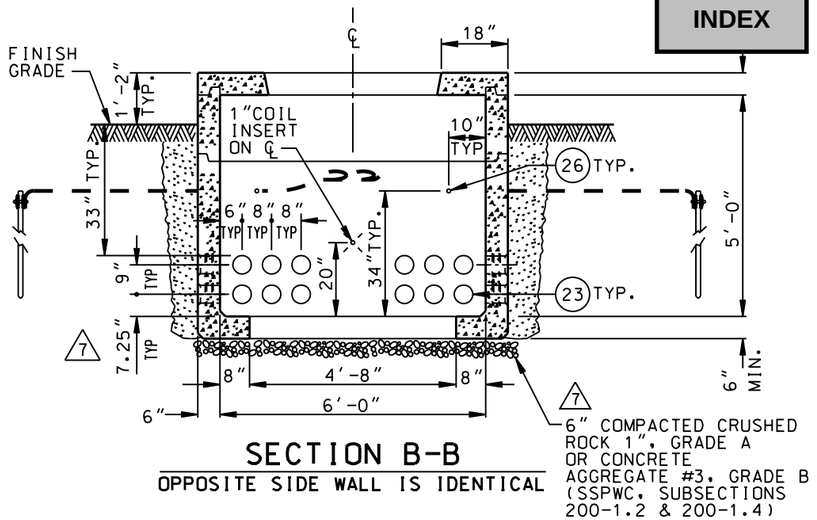


HANDHOLE COVER DETAIL

PARTS LIST		
NO.	QTY	DESCRIPTION
21	4	GROUND ROD 5/8" D X 8'. 304 SST CLAD
22	110 ±	WIRE BARE TINNED 2/0 CU. SEE NOTE 2
23	40	5" DIA. DOUBLE MEMBRANE TERMINATION
24	1	3/16" DIAMOND PLATE COVER. SEE NOTE 3
25	6	EXOTHERMIC WELD. SEE NOTE 2
26	8	2" DIA. SCH 40 PVC CONDUIT CAPPED AT OUTSIDE WALL

WEIGHT OF THE HEAVIEST SECTION 16,600 LBS

INDEX



SECTION B-B

OPPOSITE SIDE WALL IS IDENTICAL

7 6" COMPACTED CRUSHED ROCK 1", GRADE A OR CONCRETE AGGREGATE #3, GRADE B (SSPWC, SUBSECTIONS 200-1.2 & 200-1.4)

NOTES:

1. FOR GENERAL REQUIREMENTS, SEE UGCS STD. NO. C721-01(ALL SHEETS). CONSTRUCTION DRAWING WILL SPECIFY THE LOCATION, TYPE, AND NUMBER OF CONDUITS TO BE INSTALLED IN HANDHOLE.
2. INSTALL ALL GROUND WIRE IN THE EARTH 1'-6" BELOW THE FINISH GRADE. CONNECT GROUND WIRE (PT. 22) TO 4 GROUND RODS (PT. 21). EXTEND WIRE ENDS FROM CADWELD TEE CONNECTION (PT.25) INTO HANDHOLE THROUGH 2" DIA. SCH 40 PVC CONDUIT. GROUT HOLES WHERE WIRES ENTER HANDHOLE. COIL 12' OF EACH WIRE INTO THE HANDHOLE. ALL CONNECTIONS SHALL BE WELDED USING EXOTHERMIC WELDING (PT.25)(CADWELD, THERMOWELD, OR EQUAL).
3. COVER SHALL BE PROVIDED WITH 6-1/2" NON-CORROSIVE PENTA HEAD BOLTS. PROVIDE 1/2" OPEN END PLASTIC INSERTS WITH THROUGH HOLE OR CLEAN OUT FOR EACH BOLT. COVER AND BOLTS SHALL BE FLUSH WITH CONCRETE SURFACE. COVER SHALL BE HOT DIP GALVANIZED AFTER LADWP LOGO IS BEADWELDED IN PLACE.
4. SWITCHGEAR PAD SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P SPECIFICATION NO. P-178 AS LAST REVISED EXCEPT ARTICLE 4 FOR PAD HANDHOLE AND ARTICLE 3(C)(1) AND ARTICLE 4 FOR PAD SLAB. MINIMUM REQUIRED DESIGN LOADING FOR PAD SLAB SHALL BE:
   LIVE LOAD = 100 LBS/SQ. FT.
   DEAD LOAD = 400 LBS/SQ. FT.
   IMPACT = NONE
5. BACKFILL WITH NATURAL MATERIAL AND PERFORM 90% COMPACTION. AS AN ALTERNATIVE BACKFILL WITH SLURRY-CEMENT CONCRETE CLASS 100-E-100 BACKFILL.

REV. NO	REVISION DESCRIPTION	REV. DATE	INIT'L	APPV.
7	REVISED TERMINATOR SPACING, BARRIER POST LOCATIONS, DIMENSIONS TO TERMINATOR DEPTHS AND BASE MATERIAL NOTE.	12/28/11	EHP	J.M.A. C78074
6	REVISED BARRIER POST LOCATIONS. REPLACED K.O'S W/ 5" DIA. TERMINATORS. REVISED NOTES 1 & 2.	05/05/11	JD	JHG J.M.A.

REV NO	DRN.	CKD.	DATE
5	JHG	WY	03/20/09
DRN.	G.MAGEE		03/15/93
CKD.	W. YCEDO		03/16/93
DES.ENGR.	S. S. POOSTI		
APPD.	TOM Mc CARTHY		

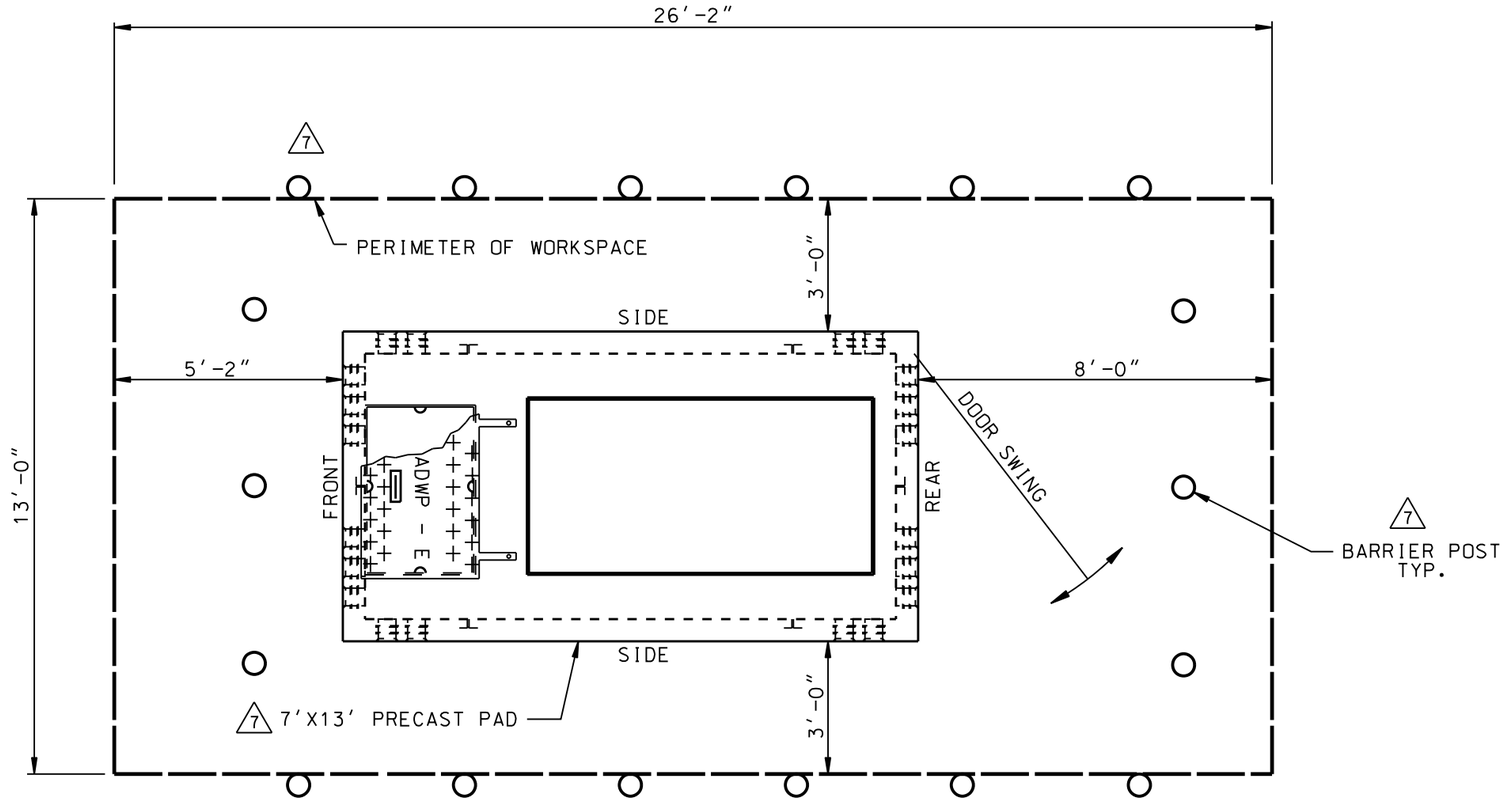
SCALE: NTS

7' X 13' PRECAST PAD FOR SINGLE LINE PADMOUNT SWITCHGEAR

POWER DISTRIBUTION DESIGN STANDARDS
DEPARTMENT OF WATER AND POWER
CITY OF LOS ANGELES

DRAWING NUMBER
UB721-10

INDEX



LAYOUT OF REQUIRED WORKSPACE PERIMETER

(FOR PADMOUNT EGRESS ORIENTATION, REFER TO UNDERGROUND STANDARD PAGE C721-07)

REV. NO	REVISION DESCRIPTION	REV. DATE	INIT'L	APPV.
7	REVISED BARRIER POST LOCATIONS. ADDED PAD & BARRIER POST CALLOUTS.	12/28/11	EHP	J.M.A. C78074
6	REVISED BARRIER POST LOCATIONS. REPLACED K.O'S W/ 5" DIA. TERMINATORS.	05/05/11	JD	JHG J.M.A.

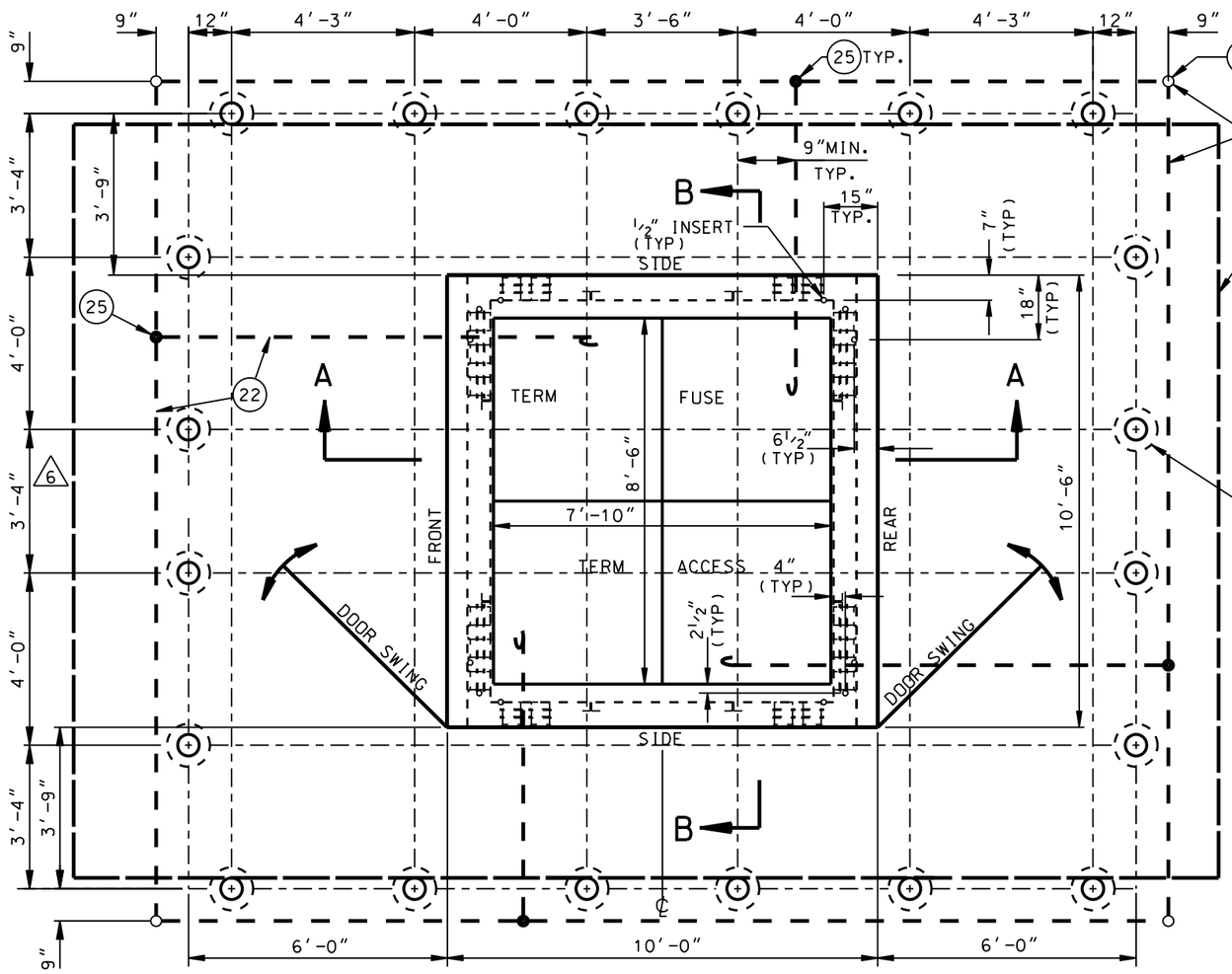
REV NO	DRN.	CKD.	DATE
5	JHG	WY	03/20/09
DRN.	G.MAGEE		03/15/93
CKD.	W. YCEDO		03/16/93
DES.ENGR.	S. S. POOSTI		
APPD.	TOM Mc CARTHY		

SCALE: NTS

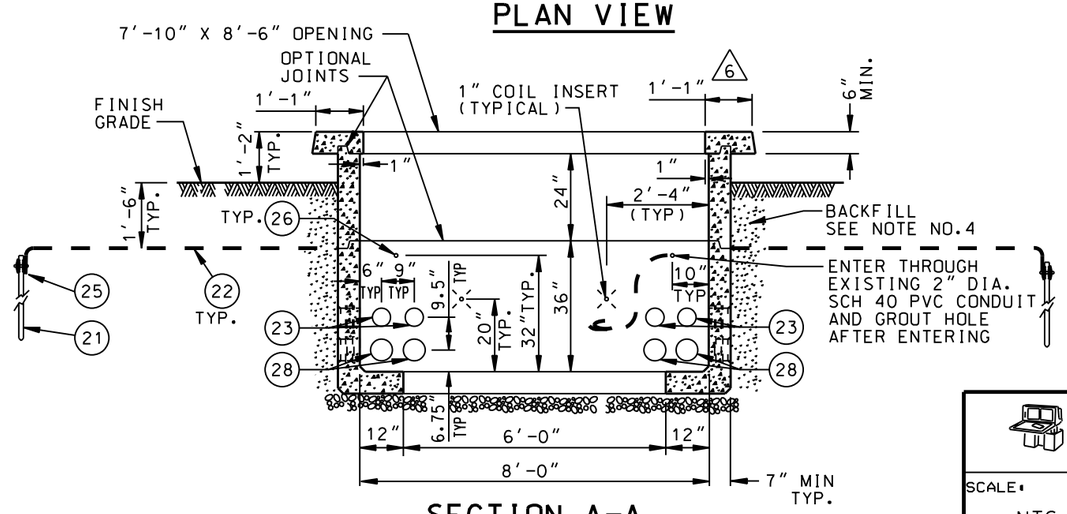
7′ X 13′ PRECAST PAD FOR SINGLE LINE PADMOUNT SWITCHGEAR

POWER DISTRIBUTION DESIGN STANDARDS
DEPARTMENT OF WATER AND POWER
CITY OF LOS ANGELES

DRAWING NUMBER
UB721-10



PLAN VIEW



SECTION A-A

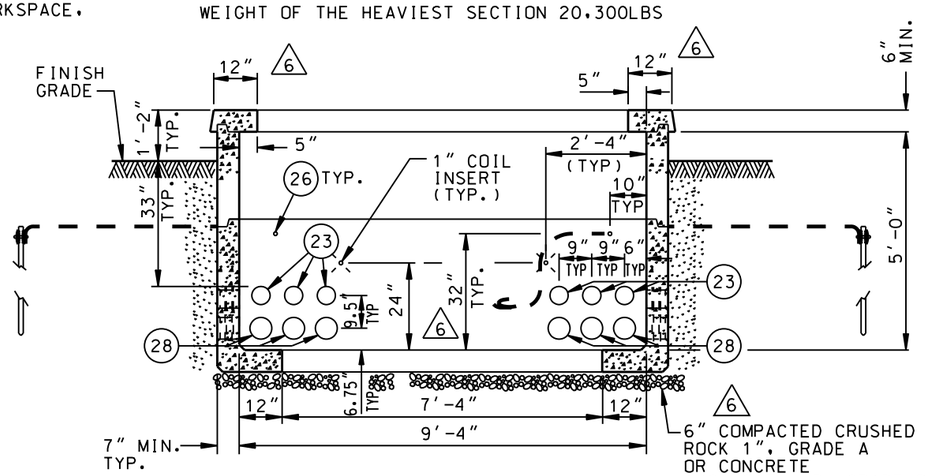
OPPOSITE SIDE WALL IS OPPOSITE HAND

INDEX

PARTS LIST

NO.	QTY	DESCRIPTION
21	4	GROUND ROD 5/8" D X 8', 304 SST CLAD
22	155'±	WIRE BARE TINNED 2/0 CU. SEE NOTE 2
23	20	5" DIA. DOUBLE MEMBRANE TERMINATION
25	10	EXOTHERMIC WELD. SEE NOTE 2
26	8	2" DIA. SCH 40 PVC CONDUIT CAPPED AT OUTSIDE WALL
28	20	6" DIA. DOUBLE MEMBRANE TERMINATION

WEIGHT OF THE HEAVIEST SECTION 20,300LBS



SECTION B-B

OPPOSITE SIDE WALL IS IDENTICAL

NOTES:

1. FOR GENERAL REQUIREMENTS, SEE UGCS STD. NO. C721-01(ALL SHEETS). CONSTRUCTION DRAWING WILL SPECIFY THE LOCATION, TYPE, AND NUMBER OF CONDUITS TO BE INSTALLED IN HANDHOLE.
2. INSTALL ALL GROUND WIRE IN THE EARTH 1'-6" BELOW THE FINISH GRADE. CONNECT GROUND WIRE (PT. 22) TO 4 GROUND RODS (PT. 21). EXTEND WIRES FROM CADWELD TEE CONNECTION (PT.25) INTO HANDHOLE THROUGH 2" DIA. SCH 40 PVC CONDUIT. GROUT HOLES WHERE WIRES ENTER HANDHOLE. COIL 12' OF EACH WIRE INTO THE HANDHOLE. ALL CONNECTIONS SHALL BE WELDED USING EXOTHERMIC WELDING (PT.25) (CADWELD, THERMOWELD, OR EQUAL).
3. TRANSFORMER PAD SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P SPECIFICATION NO. P-178 AS LAST REVISED EXCEPT ARTICLE 4 FOR PAD HANDHOLE AND ARTICLE 3(C)(1) AND ARTICLE 4 FOR PAD SLAB. MINIMUM REQUIRED DESIGN LOADING FOR PAD SLAB SHALL BE:
   LIVE LOAD = 100 LBS/SQ. FT.
   DEAD LOAD = 400 LBS/SQ. FT.
   IMPACT = NONE
4. BACKFILL WITH NATURAL MATERIAL AND PERFORM 90% COMPACTION. AS AN ALTERNATIVE BACKFILL WITH SLURRY-CEMENT CONCRETE CLASS 100-E-100 BACKFILL.

REV NO	REVISION DESCRIPTION	REV. DATE	INIT'L	APPV.	P.E. NO.
6	REV. PAD & TERMINATOR DIM., LOCATION OF 1" COIL INSERTS ON SECTION "B-B", BARRIER POST LOCATIONS & BASE MATERIAL NOTE.	12/28/11	EHP	J.M.A.	C78074
5	REPLACED K.O'S W/ 5" & 6" DIA. TERMINATORS. REVISED BARRIER POST LOCATIONS & NOTES 1 & 2.	05/05/11	JD	JHG / J.M.A.	
4	REVISED PART LIST #22 AND ADDED NOTE #4	09/03/08	JHG	WY	
3	REVISED PART LIST, DRAWING & NOTES	05/31/07	JHG	WY	
2	ADDED INSERTS FOR SHALLBETTER SWITCH	6/17/98	JHG	WY	

REV NO	DRN.	CKD.	DATE
1	JHG	WY	09/18/96

DRN. J.GARCIA

CKD. WAYNE YCEDO 07/15/93

DES.ENGR. SAID POOSTI

APPD. JOHN McMAHON

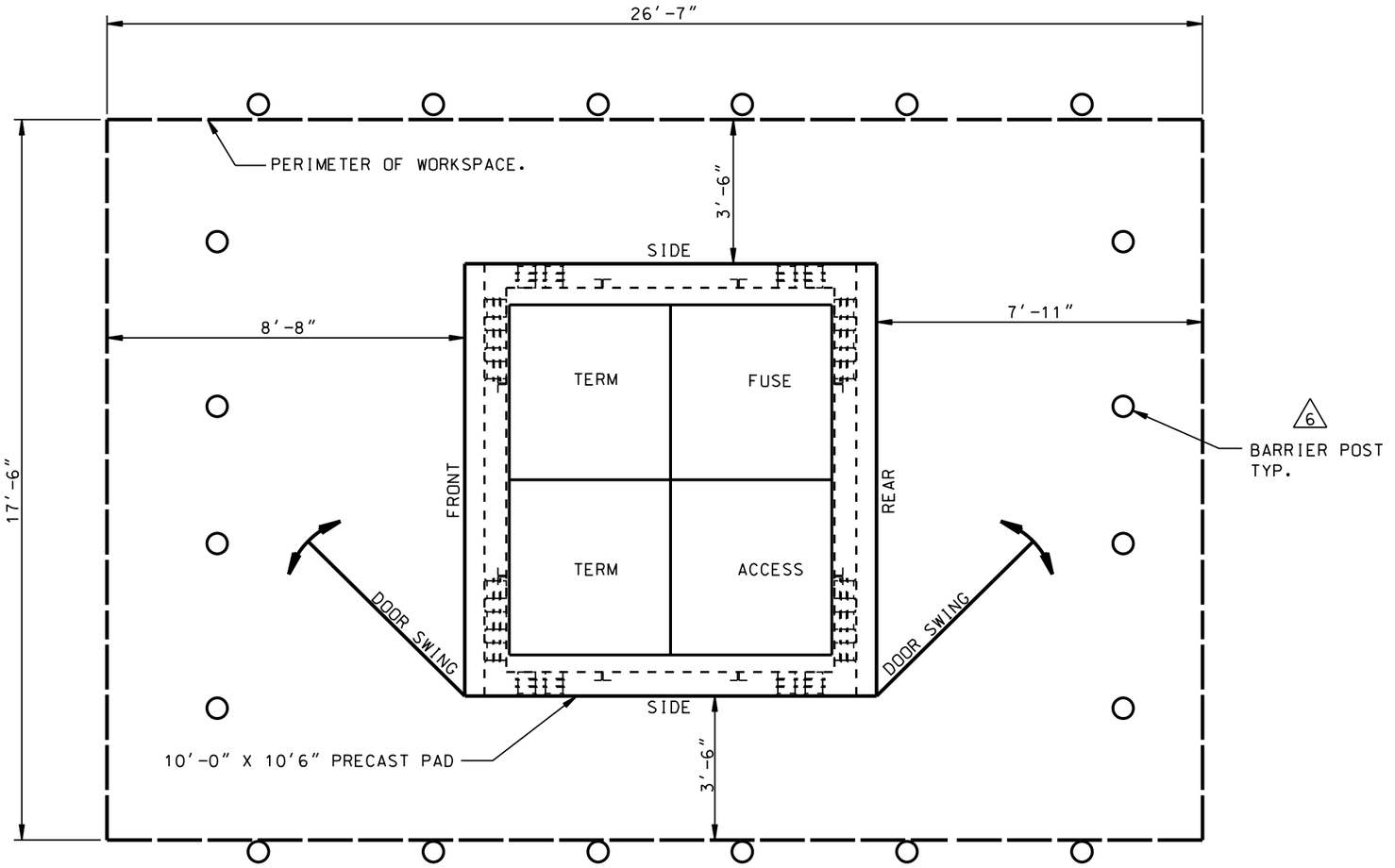
SCALE: NTS

10' X 10'-6" PRECAST PAD WITH 7'-10" X 8'-6" OPENING FOR DUAL LINE PADMOUNT SWITCHGEAR

POWER DISTRIBUTION DESIGN STANDARDS
DEPARTMENT OF WATER AND POWER
CITY OF LOS ANGELES

DRAWING NUMBER
UB721-11

INDEX



LAYOUT OF REQUIRED WORKSPACE PERIMETER

(FOR PADMOUNT EGRESS ORIENTATION, REFER TO UNDERGROUND STANDARD PAGE C721-08)

REV NO	REVISION DESCRIPTION	REV. DATE	INIT'L	APPV.	P.E. NO.
6	REVISED BARRIER POST LOCATIONS.	12/28/11	EHP	J.M.A.	C78074
5	REPLACED K.O'S W/ 5″ & 6″ DIA. TERMINATORS. REVISED BARRIER POST LOCATIONS.	05/05/11	JD	JHG / J.M.A.	
4	REVISED PART LIST #22 AND ADDED NOTE #4	09/03/08	JHG	WY	
3	REVISED PART LIST, DRAWING & NOTES	05/31/07	JHG	WY	
2	ADDED INSERTS FOR SHALLBETTER SWITCH	6/17/98	JHG	WY	

REV NO	DRN.	CKD.	DATE
1	JHG	WY	09/18/96

DRN. J.GARCIA

CKD. WAYNE YCEDO 07/15/93

DES.ENGR. SAID POOSTI

APPD. JOHN McMAHON

SCALE: NTS

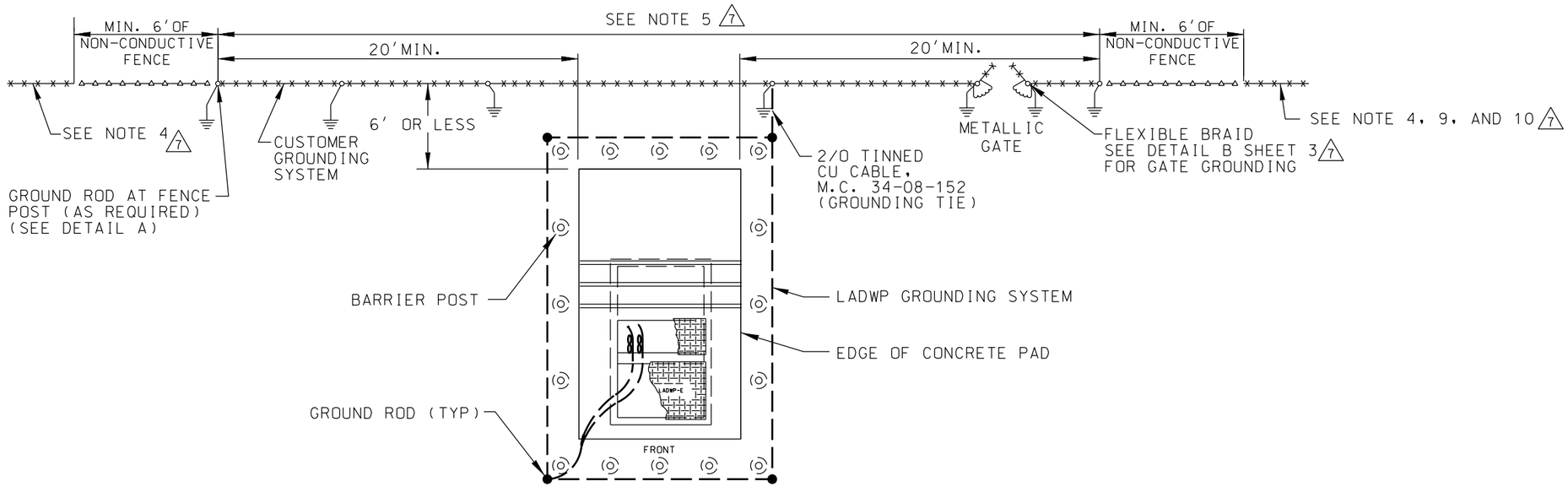
10′ X 10′- 6″ PRECAST PAD WITH 7′-10″ X 8′-6″ OPENING FOR DUAL LINE PADMOUNT SWITCHGEAR

POWER DISTRIBUTION DESIGN STANDARDS
DEPARTMENT OF WATER AND POWER
CITY OF LOS ANGELES

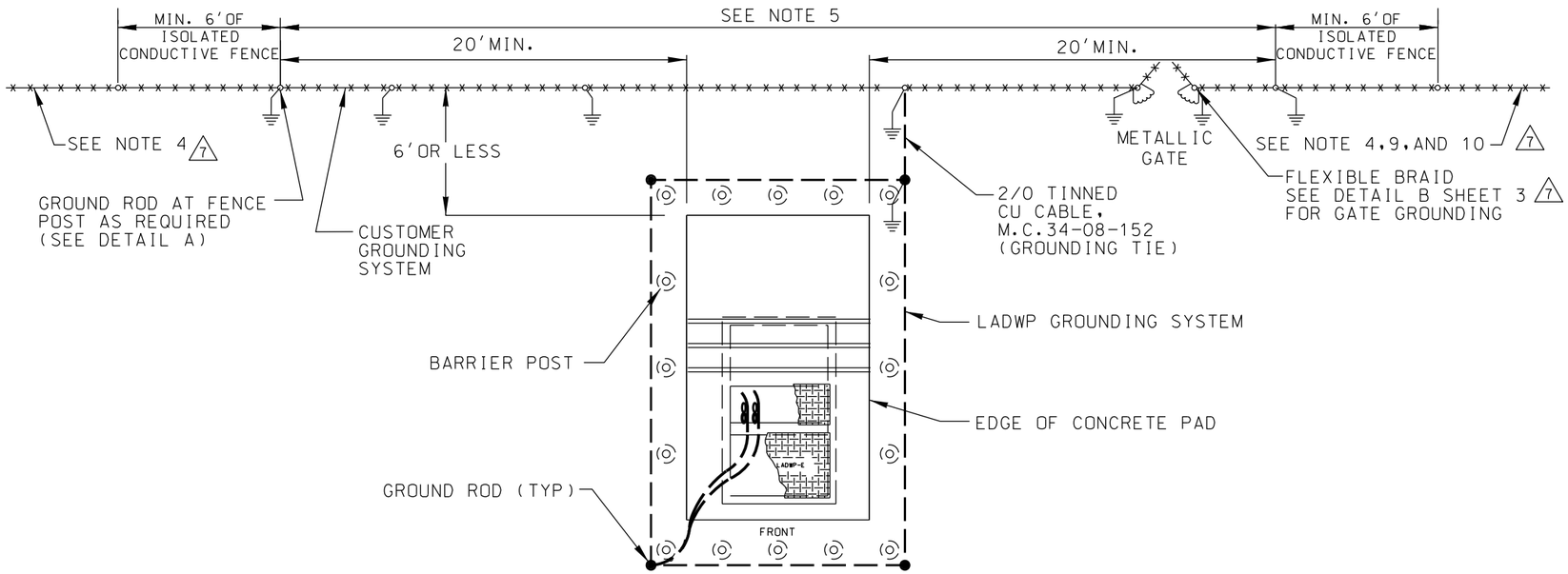
DRAWING NUMBER

UB721-11

INDEX



METALLIC FENCE WITH CONNECTED GROUNDING SYSTEM AND NON-CONDUCTIVE FENCE SECTION (CASE 1A)



METALLIC FENCE WITH CONNECTED GROUNDING SYSTEM AND ISOLATED FENCE SECTION (CASE 1B)

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
1	10/05/98	JHG	REVISED GRD. WIRE NOTE/CALL-OUT	WY	
2	01/29/07	JHG	REV.CONC.PAD DRAWING, NOTES & TITLE	WY/JA	
3	08/26/09	EHP	REVISED PLAN DRAWING & ADDED SHEET 2	WY/JA	
4	01/16/15	JHG	REVISED NOTE 6	VB	20215
5	03/10/15	EHP	ADDED PREFERRED METHOD TO DETAIL A	VB	
6	06/13/15	JHG	REVISED CASE 1A & 1B, ADDED NOTES	VB	20215
7	04/27/23	PSJ	REVISED NOTES	RJT	20863

DWP

DISTRICT	CONTRACT W.O.	DWP W.O.			

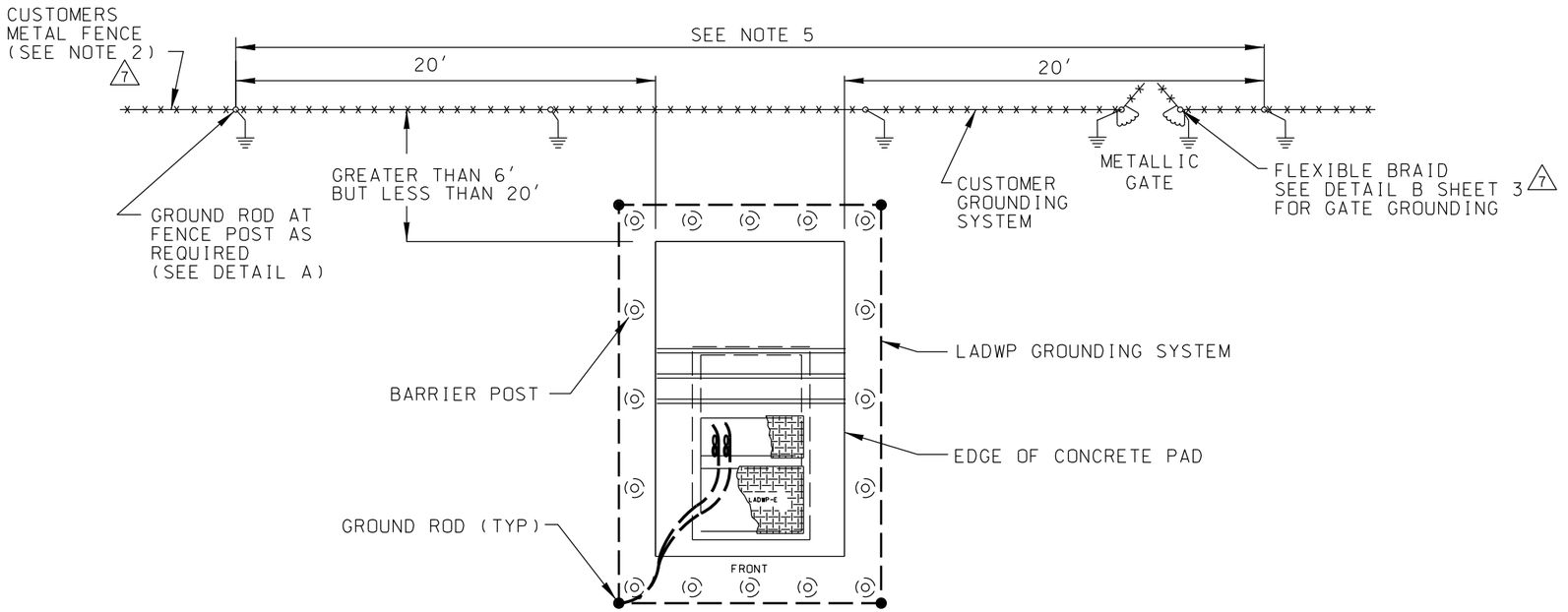
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	C.ANCHETA	DRAFTING	J.GARCIA
OK	C.ANCHETA	CHECKER	W.WYCEDO
APPROVED	T.McCARTHY	DATE	02/22/96

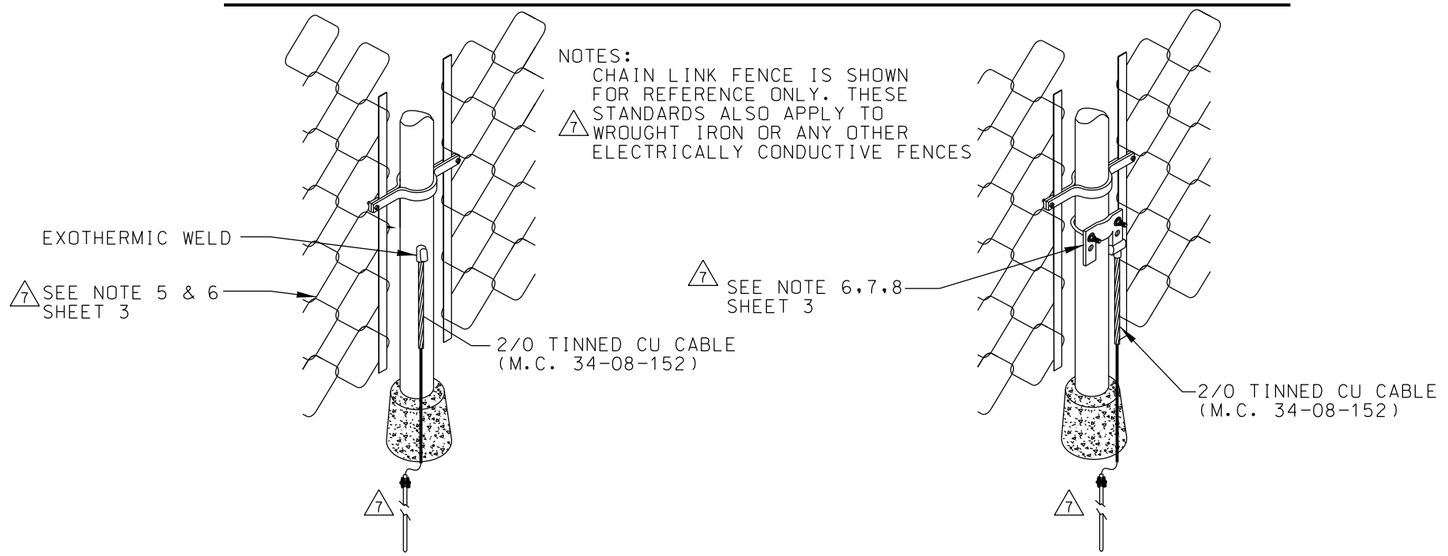
CUSTOMERS METALLIC FENCE POST GROUNDING IN PROXIMITY TO DWP PADMOUNT EQUIPMENT INSTALLATION

UB721-12 | SHEET 1 OF 3

INDEX



METALLIC FENCE WITH SEPARATE GROUNDING SYSTEMS (CASE 2)



PREFERRED METHOD OF POST GROUNDING

ALTERNATIVE METHOD OF POST GROUNDING

DETAIL A

FENCE POST GROUNDING

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
△1	10/05/98	JHG	REVISED GRD. WIRE NOTE/CALL-OUT	WY	
△2	01/29/07	JHG	REV.CONC.PAD DRAWING, NOTES & TITLE	WY/JA	
△3	08/26/09	EHP	REVISED PLAN DRAWING & ADDED SHEET 2	WY/JA	
△4	01/16/15	JHG	REVISED NOTE 6	VB	20215
△5	03/10/15	EHP	ADDED PREFERRED METHOD TO DETAIL A	VB	
△6	06/13/15	JHG	TRANSFERRED INFO FROM PAGE 1 TO PAGE 2	VB	20215
△7	04/27/23	PSJ	REVISED NOTES	RJT	20863

DWP

DISTRICT	CONTRACT W.O.	DWP W.O.	

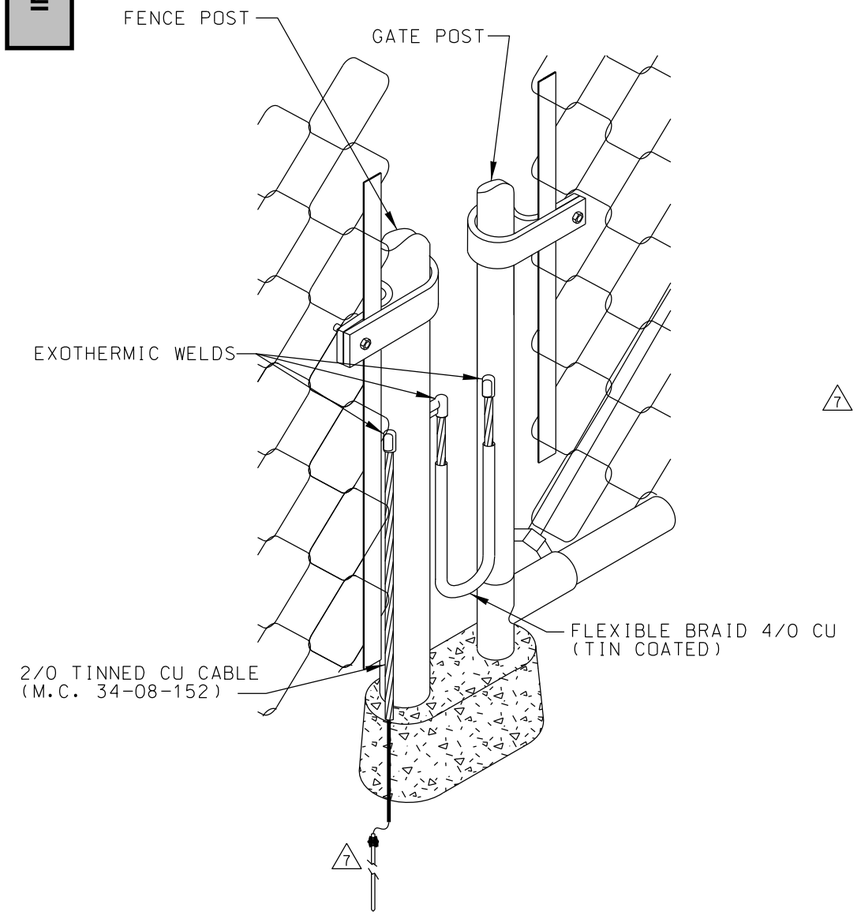
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN C.ANCHETA		DRAFTING J.GARCIA	
OK C.ANCHETA		CHECKER W.WYCEDO	
APPROVED T.McCARTHY		DATE 02/22/96	

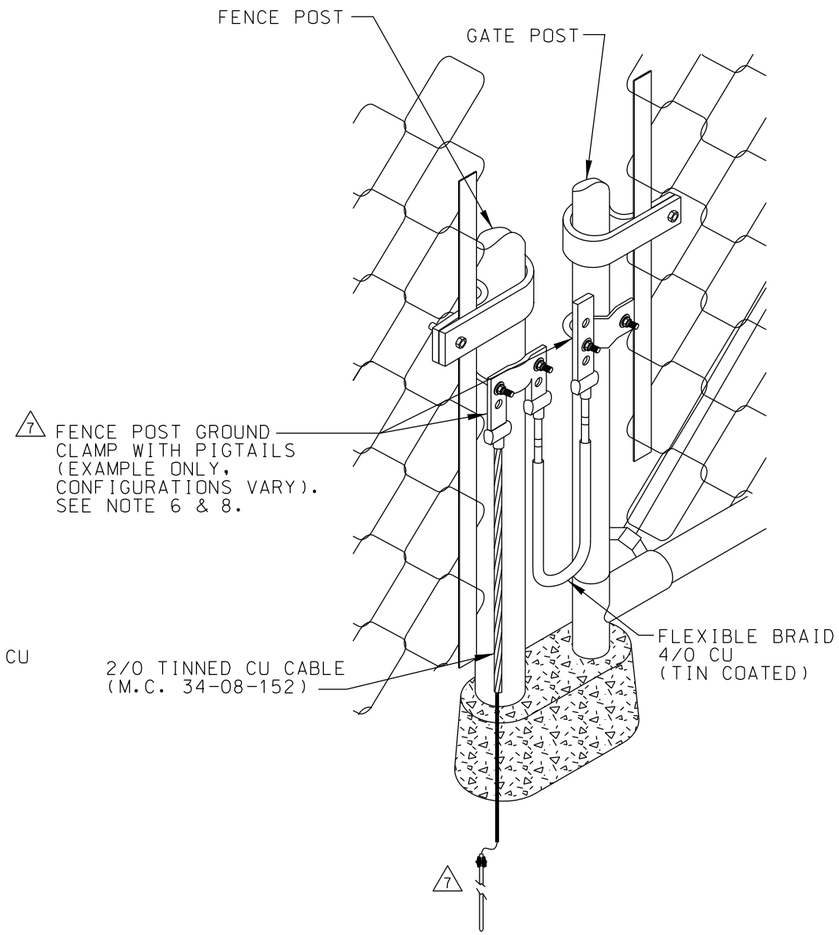
CUSTOMERS METALLIC FENCE
POST GROUNDING
IN PROXIMITY TO DWP PADMOUNT
EQUIPMENT INSTALLATION

UB721-12 | SHEET 2 OF 3

INDEX



PREFERRED METHOD 5



ALTERNATIVE METHOD

NOTES:

7 1. THE CUSTOMER'S FENCE SHALL BE CONNECTED TO THE DWP TRANSFORMER PAD GROUNDING SYSTEM IF THE SHORTEST DISTANCE FROM THE TRANSFORMER/SWITCH PAD TO THE FENCE IS 6 FEET OR LESS, (CASE 1).

7 2. THE CUSTOMER'S FENCE GROUNDING SYSTEM SHALL BE SEPARATE FROM THE DWP TRANSFORMER/SWITCH PAD GROUNDING SYSTEM IF THE SHORTEST DISTANCE FROM THE TRANSFORMER/SWITCH PAD TO THE FENCE IS MORE THAN 6 FEET BUT NOT MORE THAN 20 FEET, (CASE 2).

3. IF THE SHORTEST DISTANCE FROM THE DWP TRANSFORMER/SWITCH PAD TO THE CUSTOMER'S FENCE IS MORE THAN 20 FEET, THE CUSTOMER'S FENCE IS NOT REQUIRED TO BE GROUNDED.

4. THE CUSTOMERS FENCE OUTSIDE THE PRESCRIBED AREA IS NOT REQUIRED TO BE GROUNDED.

5. THE CUSTOMER SHALL INSTALL A GROUND ROD EVERY 15 FEET ALONG THE PERIMETER FENCE IN THE PRESCRIBED AREA.

6. THE PREFERRED METHOD OF CONNECTING THE FLEXIBLE BRAID TO THE GATE POSTS IS BY MAKING EXOTHERMIC CONNECTIONS. ONLY WHEN THE WALLS OF GATE POSTS ARE TOO THIN TO ALLOW EXOTHERMIC CONNECTION, THEN USE SUITABLE GROUND CLAMPS MADE OF TINNED ELECTROLYTIC COPPER. THE CLAMPS SHALL BE PREFABRICATED WITH JUMPERS AND PIGTAILS, OR PIGTAILS ONLY, EXOTHERMICALLY WELDED DIRECTLY TO THE LUGS.

7. FOR PRECAST CONCRETE PAD AND BARRIER POST INSTALLATION, REFER TO THE APPROPRIATE UB721 SERIES DRAWING.

7 8. ASSURE METAL-TO-METAL CONTACT BETWEEN THE GROUND CLAMP AND THE METAL POST BY REMOVING ANY PAINT OR NON-CONDUCTIVE COATING. PAINT COATING CAN BE APPLIED AFTER ASSEMBLY.

9. NON-CONDUCTIVE FENCE MATERIAL CAN CONSIST OF VINYL, FIBERGLASS, COMPOSITE, PVC OR OTHER INSULATING MEDIUM.

ISOLATED FENCE SECTION SHALL BE UNGROUNDED AND MUST BE ISOLATED FROM FENCE POSTS AND FROM ANYTHING GROUNDED SUCH AS FENCE FOOTING. ISOLATION TO BE PROVIDED BY EITHER A PROPER INSULATOR OR A MINIMUM 4"AIR GAP.

10. A PROPER INSULATOR SHALL PROVIDE THE NECESSARY MECHANICAL SUPPORT OF THE ISOLATED FENCE SECTION AND SHALL HAVE THE FOLLOWING MINIMUM ELECTRICAL PROPERTIES:
DRY FLASHOVER: 25KV FOR 1 MINUTE
WET FLASHOVER: 15KV (HORZ.) 12KV (VERT) FOR 10 SECONDS
FOR EXAMPLE: IMPULSE NC LLC, CATALOG NO. 022482-2000

11. SEE UB721-12 FOR ENCLOSED PAD FENCE GROUNDING

12. SEE UB980-09 FOR ROLLING FENCE GROUNDING.

DETAIL B

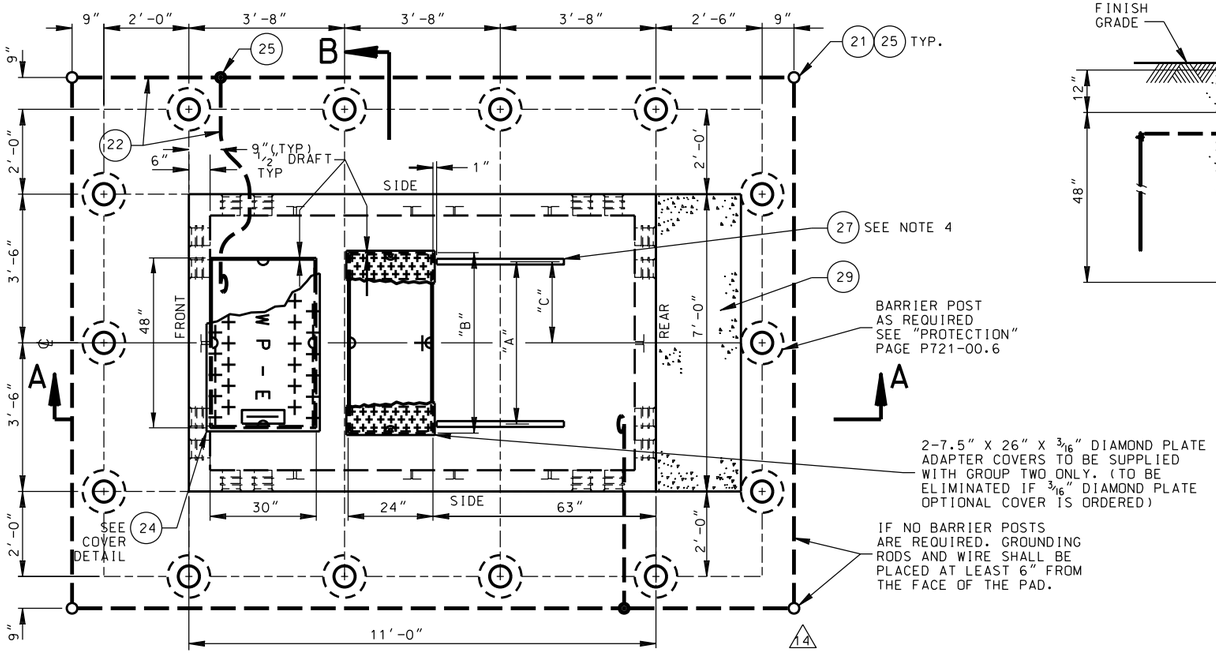
FENCE POST & GATE GROUNDING
(SEE NOTE 6)
7

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
1	10/05/98	JHG	REVISED GRD. WIRE NOTE/CALL-OUT	WY	
2	01/29/07	JHG	REV.CONC.PAD DRAWING, NOTES & TITLE	WY/JA	
3	08/26/09	EHP	REVISED PLAN DRAWING & ADDED SHEET 2	WY/JA	
4	01/16/15	JHG	REVISED NOTE 6	VB	20215
5	03/10/15	EHP	ADDED PREFERRED METHOD TO DETAIL B	VB	
6	06/13/15	JHG	ADDED PAGE 3 OR 3, TRANSFERRED INFO FROM PAGE 2 TO PAGE 3	VB	20215
7	04/27/23	PSJ	REVISED NOTES	RJT	20863

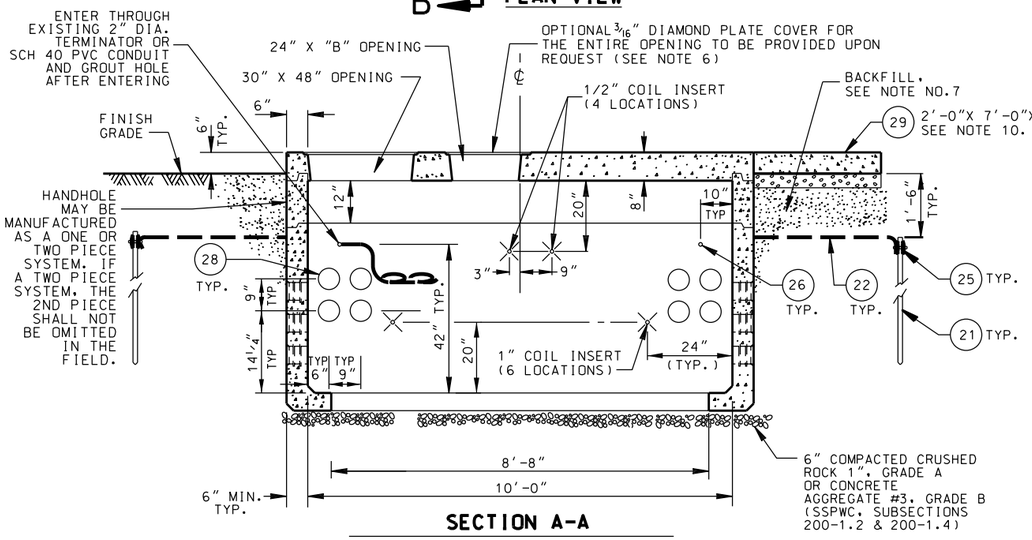
DWP

DISTRICT	CONTRACT W.O.	DWP W.O.	
CITY OF LOS ANGELES DEPARTMENT OF WATER AND POWER DISTRIBUTION ENGINEERING & SERVICES SECTION		CUSTOMERS METALLIC FENCE POST GROUNDING IN PROXIMITY TO DWP PADMOUNT EQUIPMENT INSTALLATION	
DESIGN C.ANCHETA	DRAFTING J.GARCIA		
OK C.ANCHETA	CHECKER W.WYCEDO		
APPROVED T.McCARTHY	DATE 02/22/96	UB721-12	SHEET 3 OF 3

INDEX

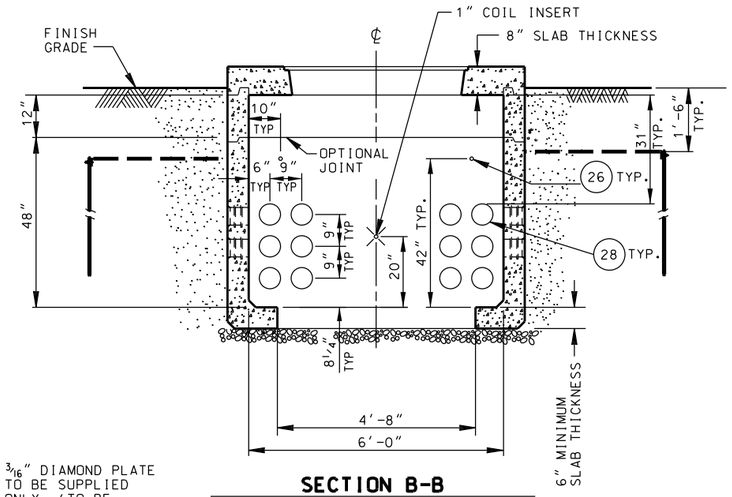


B ← **PLAN VIEW**



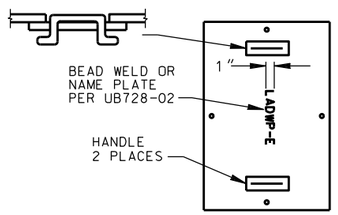
SECTION A-A

OPPOSITE SIDE WALL IS OPPOSITE HAND (BARRIER POSTS NOT SHOWN FOR CLARITY)



SECTION B-B

OPPOSITE SIDE WALL IS IDENTICAL (BARRIER POSTS NOT SHOWN FOR CLARITY)



HANDHOLE COVER DETAIL

PARTS LIST		
NO.	QTY.	DESCRIPTION
21	4	GROUND ROD, 5/8" DIA. X 8', 304 SST
22	96'±	WIRE BARE TINNED 2/0 CU. SEE NOTE 5
24	1	3/16" DIAMOND PLATE COVER. SEE NOTE 6
25	6	EXOTHERMIC WELD, SEE NOTE 5
26	8	2" DIA. TERM. OR SCH 40 PVC CONDUIT CAPPED AT OUTSIDE WALL
27	2	1 5/8" X 1 5/8" X 36" LONG 12 GA STRUT (UNISTRUT P3200 SERIES)
28	20	6" DIA. DOUBLE MEMBRANE TERMINATION
29	1	2'-0"X 7'-0"X 6"THICK PRECAST PAD

WEIGHT OF THE HEAVIEST SECTION 17,100 LBS.

* DIMENSION "A" IS FROM CENTER LINE OF UNISTRUT TO CENTER LINE OF UNISTRUT.

**DIMENSION "C" IS FROM CENTER LINE OF PAD MOUNT TO CENTERLINE OF UNISTRUT.

DIMENSION CHART			
	A*	B	C**
G-1	47 1/2"	52"	23 3/4"
G-2	61"	67"	30 1/2"

NOTES:

1. FOR GENERAL REQUIREMENTS, SEE UGCS STD. NO. P721-00 (ALL SHEETS). CONSTRUCTION DRAWING WILL SPECIFY THE LOCATION, TYPE, AND NUMBER OF CONDUITS TO BE INSTALLED IN HANDHOLE.
2. (14) IF GALVANIZED CONDUIT IS USED, EXPOSED ENDS ARE TO BE THREADED AND FITTED WITH GROUND BUSHINGS.
3. SWITCHGEAR PAD SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P SPECIFICATION NO. P-178 AS LAST REVISED EXCEPT ARTICLE 4 FOR PAD HANDHOLE AND ARTICLE 3(C)(1) AND ARTICLE 4 FOR PAD SLAB. MINIMUM REQUIRED DESIGN LOADING FOR PAD SLAB SHALL BE:
   LIVE LOAD = 100 LBS/SQ. FT.
   DEAD LOAD = 400 LBS/SQ. FT.
   IMPACT = NONE
4. ALL STRUTS SHALL BE HOT DIP GALVANIZED CONTINUOUS CONCRETE INSERTS AND SHALL BE FLUSH WITH CONCRETE SURFACE.
5. (14) INSTALL ALL GROUND WIRE IN THE EARTH 1'-6" BELOW THE FINISH GRADE. CONNECT GROUND WIRE (PT.22) TO 4 GROUND RODS (PT.21). EXTEND WIRE ENDS FROM A COMMON GROUND ROD INTO HANDHOLE THROUGH 2" DIA. SCH 40 PVC CONDUIT. GROUT HOLES WHERE WIRES ENTER HANDHOLE. COIL 9' OF EACH WIRE INTO THE HANDHOLE. ALL CONNECTIONS SHALL BE WELDED USING EXOTHERMIC WELDING (PT.25), (CADWELD, THERMOWELD, OR EQUAL).
6. COVER SHALL BE PROVIDED WITH FOUR 1/2" NON-CORROSIVE PENTA HEAD BOLTS. PROVIDE 1/2-13 METAL OPEN STAR P35T INSERTS WITH THROUGH HOLE OR CLEAN OUT. COVER AND BOLTS SHALL BE FLUSH WITH CONCRETE SURFACE. COVER SHALL BE HOT DIP GALVANIZED AFTER LADWP LOGO IS BEAD WELDED IN PLACE, IF APPLICABLE.
7. BACKFILL WITH NATURAL MATERIAL AND PERFORM 90% COMPACTION. AS AN ALTERNATIVE, BACKFILL WITH SLURRY-CEMENT CONCRETE CLASS 100-E-100 BACKFILL.
8. (14) EACH CONCRETE SECTION SHALL BE MARKED ON THE INSIDE & OUTSIDE WITH COMPANY NAME THE DESIGNATION "DWP-FA-CN" OR "DWP/F-CN-SC" IF SCC MIX USED AND THE DATE OF POUR.
9. WEIGHT AND DIMENSIONS VARY WITH MANUFACTURER. PRIOR TO EXCAVATION, STRUCTURE INSTALLER SHALL OBTAIN THE MINIMUM EXCAVATION SIZE FROM THE MANUFACTURER SUPPLYING THE STRUCTURE.
10. 2'-0"X 7'-0"X 6" THICK PRECAST PAD IS A PART OF THE PRECAST ASSEMBLAGE. INSTALL PRECAST PAD FLUSH TO TOP OF PRECAST SWITCH PAD. PAD SHALL BE SET ON 4" MIN. COMPACTED LEVEL BED OF NATURAL MATERIAL OR CRUSHED AGGREGATE BASE, UNLESS OTHERWISE APPROVED BY THE DEPARTMENT REPRESENTATIVE.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
(14)	11/17/22	PSJ	REVISED BARRIER POST LOCATIONS AND NOTES	R. J. T.	20863
(13)	11/19/21	CQS	REVISED TERMINATORS TO ALL 6" DIA. MOVED SECTION A-A TERMINATORS UP 6"		
(12)	10/28/14	EHP	REVISED NOTE 7.		
(11)	06/26/14	JHG/EHP	REVISED BARRIER POST & TERM. LOCATIONS, ADDED 3'-0"X 7'-0"X 6"PAD	J.M.A.	V.B.
(10)	12/28/11	EHP	REV. DIM. FOR PAD OPENINGS, BARRIER POST LOCATIONS, TERMINATORS, & BASE MATERIAL NOTE.	J.M.A.	C78074
(9)	05/05/11	JD	REVISED 5" DIA. TERMINATORS. ADDED 6" DIA. TERMINATORS. REVISED NOTES 1 & 2	J.M.A.	

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.
(8)	03/07/11	JD	DOUBLE MEMBRANE TERMINATION, REMOVED KNOCKOUTS.	JA
			REVISED LOCATION OF BARRIER POST, DIMENSIONS AND NOTES. ADDED 5" DIA.	
(7)	09/03/08	JHG	REVISED PART LIST #22, WORKSPACE PERIMETER	WY
(6)	02/09/07	JHG	REV. GROUND GRID, NOTES & PART LIST	WY
(5)	12/13/04	JHG	REVISED DIMENSIONS, MODIFIED BOTTOM & ADDED ADAPTER PLATES	SP
(4)	6/11/99	JHG	ADDED DIMENSION CHART	RB
(3)	4/19/99	JHG	ADDED MINUMUM SLAB THICKNESS NOTE	CD

DWP

DISTRICT	CONTRACT W.O.	DWP W.O.			

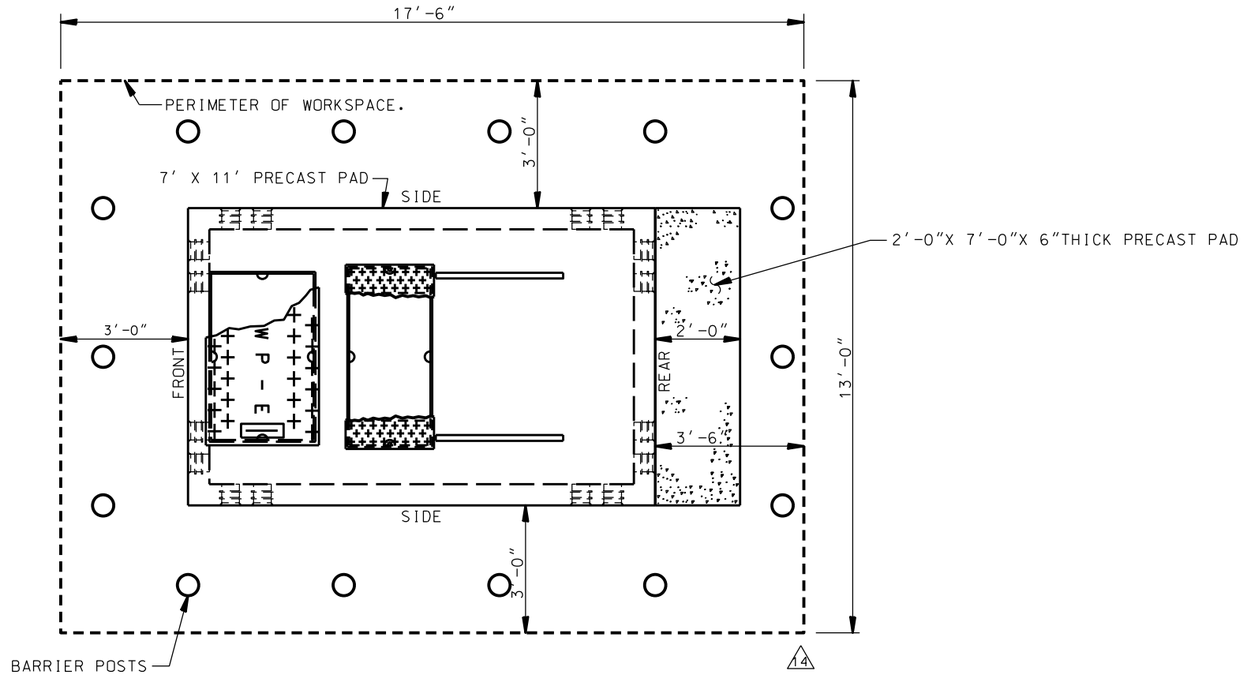
CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	C. DUNN	DRAFTING	J.GARCIA
OK	CHARLES DUNN	CHECKER	W. YCEDO
APPROVED	JOHN MC MAHON	DATE	08/26/97

7' X 11' PRECAST PAD FOR PADMOUNT SF_6 SWITCH GEAR

UB721-14 | **SHEET 1 OF 2**

INDEX



LAYOUT OF REQUIRED WORKSPACE PERIMETER

(FOR PADMOUNT EGRESS ORIENTATION, REFER TO UNDERGROUND STANDARD PAGE P721-03

NOTE:
FOR MINIMUM OVERALL SPATIAL CLEARANCES, SEE STANDARD DRAWING UB721-29.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
14	11/17/22	PSJ	REVISED BARRIER POST LOCATIONS AND NOTES	*R. J. T.*	*20863*
13	11/19/21	CQS	REVISED TERMINATORS TO ALL 6″ DIA. MOVED SECTION A-A TERMINATORS UP 6″		
12	10/28/14	EHP	REVISED NOTE 7.		
11	06/26/14	JHG/EHP	REVISED BARRIER POST & TERM. LOCATIONS, ADDED 3′-0″X 7′-0″X 6″PAD	*J.M.A.*	*V.B.*
10	12/28/11	EHP	REV. DIM. FOR PAD OPENINGS, BARRIER POST LOCATIONS, TERMINATORS, & BASE MATERIAL NOTE.	*J.M.A.*	*C78074*
9	05/05/11	JD	REVISED 5″ DIA. TERMINATORS. ADDED 6″ DIA. TERMINATORS. REVISED NOTES 1 & 2	*J.M.A.*	

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.
8	03/07/11	JD	DOUBLE MEMBRANE TERMINATION, REMOVED KNOCKOUTS.	JA
			REVISED LOCATION OF BARRIER POST, DIMENSIONS AND NOTES. ADDED 5″ DIA.	
7	09/03/08	JHG	REVISED PART LIST #22. WORKSPACE PERIMETER	WY
6	02/09/07	JHG	REV. GROUND GRID, NOTES & PART LIST	WY
5	12/13/04	JHG	REVISED DIMENSIONS. MODIFIED BOTTOM & ADDED ADAPTER PLATES	SP
4	6/11/99	JHG	ADDED DIMENSION CHART	RB
3	4/19/99	JHG	ADDED MINUMUM SLAB THICKNESS NOTE	CD

DWP

DISTRICT	CONTRACT W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	C. DUNN	DRAFTING	J.GARCIA
OK	CHARLES DUNN	CHECKER	W. YCEDO
APPROVED	JOHN MC MAHON	DATE	08/26/97

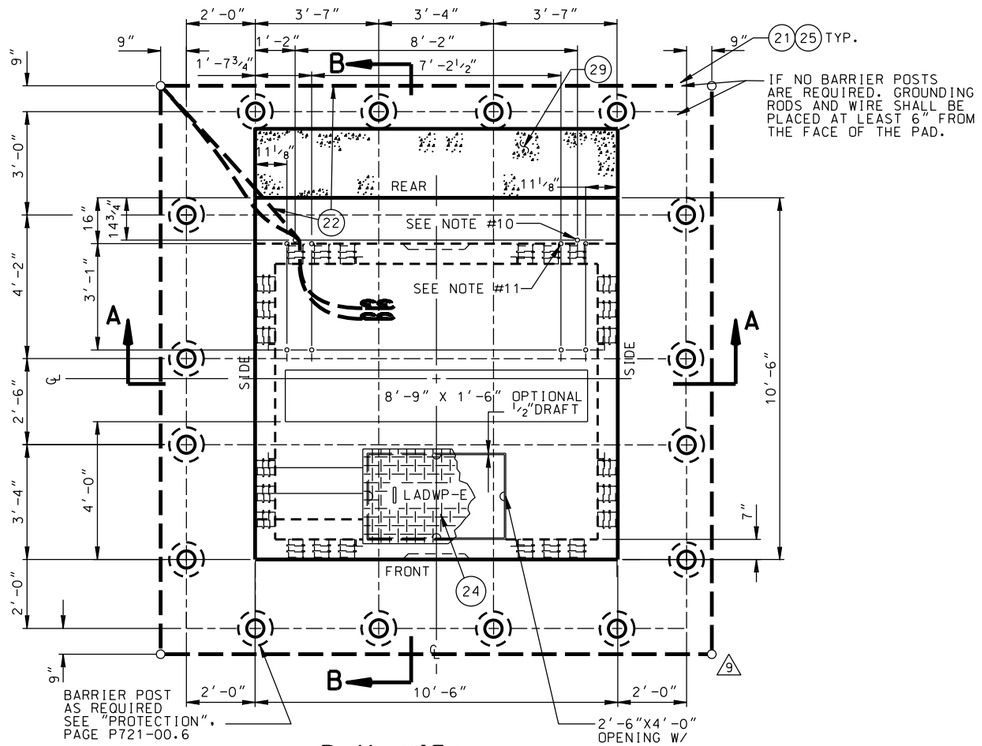
DWP W.O.			

7′ X 11′ PRECAST PAD FOR PADMOUNT SF_6 SWITCH GEAR

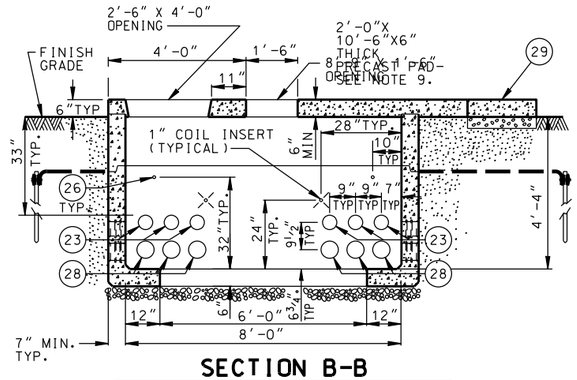
UB721-14

SHEET 2 OF 2

INDEX

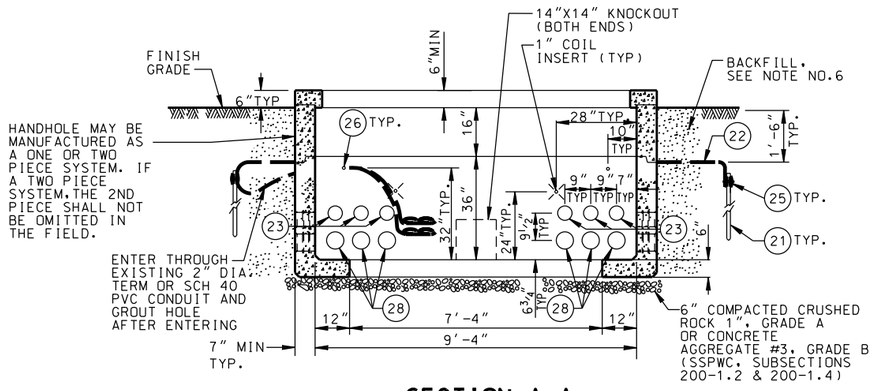


PLAN VIEW



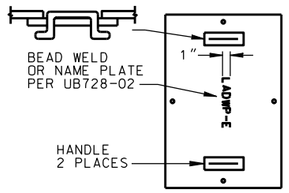
SECTION B-B

OPPOSITE SIDE WALL IS OPPOSITE HAND
(BARRIER POSTS NOT SHOWN FOR CLARITY)



SECTION A-A

OPPOSITE SIDE WALL IS IDENTICAL
(BARRIER POSTS NOT SHOWN FOR CLARITY)



HANDHOLE COVER DETAIL

PARTS LIST		
NO.	QTY	DESCRIPTION
21	4	GROUND ROD, 5/8" DIA.X 8', 304 SST
22	100±	WIRE BARE TINNED 2/0 CU, SEE NOTE 4
23	24	5" DIA. DOUBLE MEMBRANE TERMINATION
24	1	3/16" DIAMOND PLATE COVER SEE NOTE 5
25	7	EXOTHERMIC WELD, SEE NOTE 4
26	8	2" DIA. TERMINATOR OR SCH 40 PVC CONDUIT CAPPED AT OUTSIDE WALL
28	24	6" DIA. DOUBLE MEMBRANE TERMINATION
29	1	2'-0"X 10'-6"X 6"THICK PRECAST PAD

WEIGHT OF THE HEAVIEST SECTION 20,300 LBS

NOTES:

1. FOR GENERAL REQUIREMENTS, SEE UGCS STD. NO. P721-00 (ALL SHEETS). CONSTRUCTION DRAWING WILL SPECIFY THE LOCATION, TYPE, AND NUMBER OF CONDUITS TO BE INSTALLED IN HANDHOLE.
2. IF GALVANIZED CONDUIT IS USED, EXPOSED ENDS ARE TO BE THREADED AND FITTED WITH GROUND BUSHINGS.
3. SWITCHGEAR PAD SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P SPECIFICATION NO. P-178 AS LAST REVISED EXCEPT ARTICLE 4 FOR PAD HANDHOLE AND ARTICLE 3(C)(1) AND ARTICLE 4 FOR PAD SLAB. MINIMUM REQUIRED DESIGN LOADING FOR PAD SLAB SHALL BE: LIVE LOAD = 100 LBS/SQ. FT. DEAD LOAD = 400 LBS/SQ. FT. IMPACT = NONE
4. (9) INSTALL ALL GROUND WIRE IN THE EARTH 1'-6" BELOW THE FINISH GRADE. CONNECT GROUND WIRE (PT. 22) TO 4 GROUND RODS (PT.21). EXTEND WIRE ENDS FROM A COMMON GROUND ROD INTO HANDHOLE THROUGH 2" DIA. SCH 40 PVC CONDUIT. GROUT HOLES WHERE WIRES ENTER HANDHOLE. COIL 9' OF EACH WIRE INTO THE HANDHOLE. ALL CONNECTIONS SHALL BE WELDED USING EXOTHERMIC WELDING (PT.25). (CADWELD, THERMOWELD, OR EQUAL).
5. COVER SHALL BE PROVIDED WITH FOUR 1/2" NON-CORROSIVE PENTA HEAD BOLTS. PROVIDE 1/2-13 METAL OPEN STAR P35T INSERTS WITH THROUGH HOLE OR CLEAN OUT. COVER AND BOLTS SHALL BE FLUSH WITH CONCRETE SURFACE. COVER SHALL BE HOT DIP GALVANIZED AFTER LADWP LOGO IS BEAD WELDED IN PLACE, IF APPLICABLE.
6. BACKFILL WITH NATURAL MATERIAL AND PERFORM 90% COMPACTION. AS AN ALTERNATIVE, BACKFILL WITH SLURRY-CEMENT CONCRETE CLASS 100-E-100 BACKFILL. BACKFILL UNDER OVERHANG SHALL ONLY BE SLURRY-CEMENT.
7. EACH CONCRETE SECTION SHALL BE MARKED ON THE INSIDE & OUTSIDE WITH COMPANY NAME THE DESIGNATION "DWP-FA-CN" OR "DWP/F-CN-SC" IF SCC MIX USED AND THE DATE OF POUR.
8. WEIGHT AND DIMENSIONS VARY WITH MANUFACTURER.PRIOR TO EXCAVATION, STRUCTURE INSTALLER SHALL OBTAIN THE MINIMUM EXCAVATION SIZE FROM THE ,MANUFACTURER SUPPLYING THE STRUCTURE.
9. 2'-0"X 10'-6"X6"THICK PRECAST PAD IS A PART OF THE PRECAST ASSEMBLAGE. INSTALL PRECAST PAD FLUSH TO TOP OF PRECAST SWITCH PAD. PAD SHALL BE SET ON 4" MIN. COMPACTED LEVEL BED OF NATURAL MATERIAL OR CRUSHED AGGREGATE BASE, UNLESS OTHERWISE APPROVED BY THE DEPARTMENT REPRESENTATIVE.
10. 5/8" DIA THREADED IMBED FOR CABINET ANCHOR BOLTS TYPICAL 2 LOCATIONS.
11. 5/8" DIA THREADED IMBED FOR SWITCH ANCHOR BOLTS TYPICAL 8 LOCATIONS.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
9	11/22/22	PSJ	REVISED BARRIER POST LOCATIONS AND NOTES.	R.J.T.	20863
8	10/28/14	EHP	SEE SHEET 1 FOR REVISIONS.	J.M.A.	
7	06/26/14	JHG/EHP	REV.BARRIER POST LOC.& WORKSPACE PERIMETER.ADDED 2'-0"X 10'-6"X6"PAD	J.M.A.	
6	12/28/11	EH	REVISED BARRIER POST LOCATIONS.	J.M.A.	
5	05/05/11	JD	REPLACED CORNER K.O'S W/ 5" & 6" DIA. TERMINATORS.	JHG J.M.A.	

DWP

DISTRICT	CONTRACT W.O.	DWP W.O.			

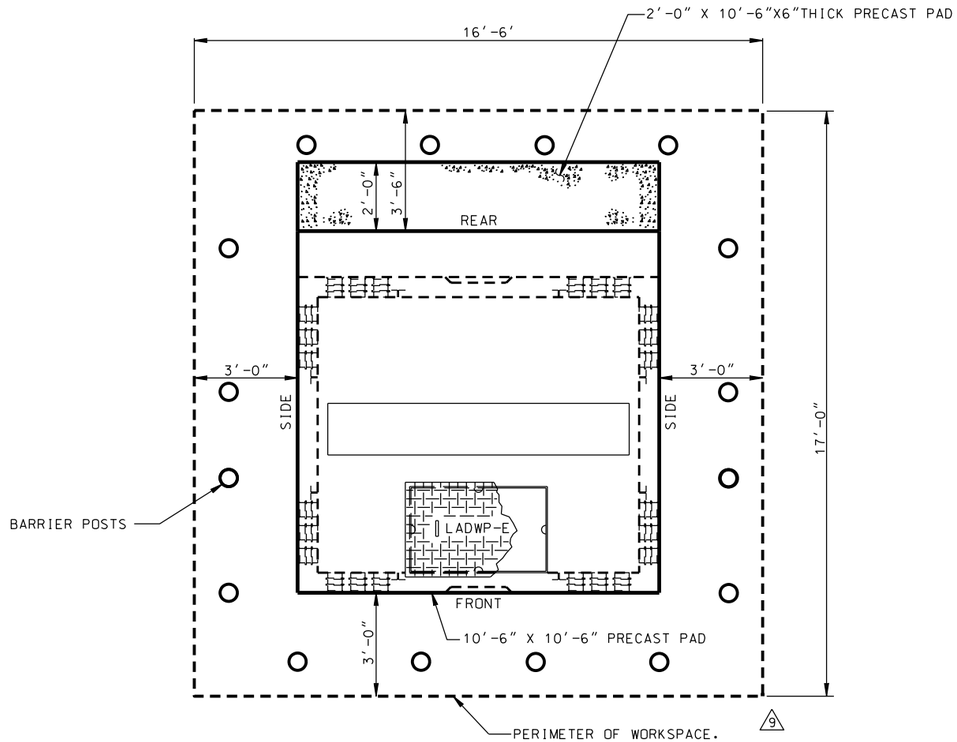
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	DRAFTING
OK	CHECKER
APPROVED	DATE

10'-6' X 10'-6' PRECAST PAD WITH 8'-9" X 1'-6" OPENING FOR PADMOUNT SF6 SWITCHGEAR

UB721-15 | SHEET 1 OF 2

INDEX



LAYOUT OF REQUIRED WORKSPACE PERIMETER

(FOR PADMOUNT EGRESS ORIENTATION. REFER TO UNDERGROUND STANDARD PAGE P721-03)

NOTE:
FOR MINIMUM OVERALL SPATIAL CLEARANCES SEE STANDARD DRAWING UB721-29.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
9	11/22/22	PSJ	REVISED BARRIER POST LOCATIONS AND NOTES.	R. J. T.	20863
8	10/28/14	EHP	SEE SHEET 1 FOR REVISIONS.	J.M.A.	
7	06/26/14	JHG/EHP	REV.BARRIER POST LOC.& WORKSPACE PERIMETER.ADDED 2'-0"X 10'-6"X6"PAD	J.M.A.	
6	12/28/11	EH	REVISED BARRIER POST LOCATIONS.	J.M.A.	
5	05/05/11	JD	REPLACED CORNER K.O'S W/ 5" & 6" DIA. TERMINATORS.	JHG J.M.A.	

DWP

DISTRICT	CONTRACT W.O.	DWP W.O.			

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

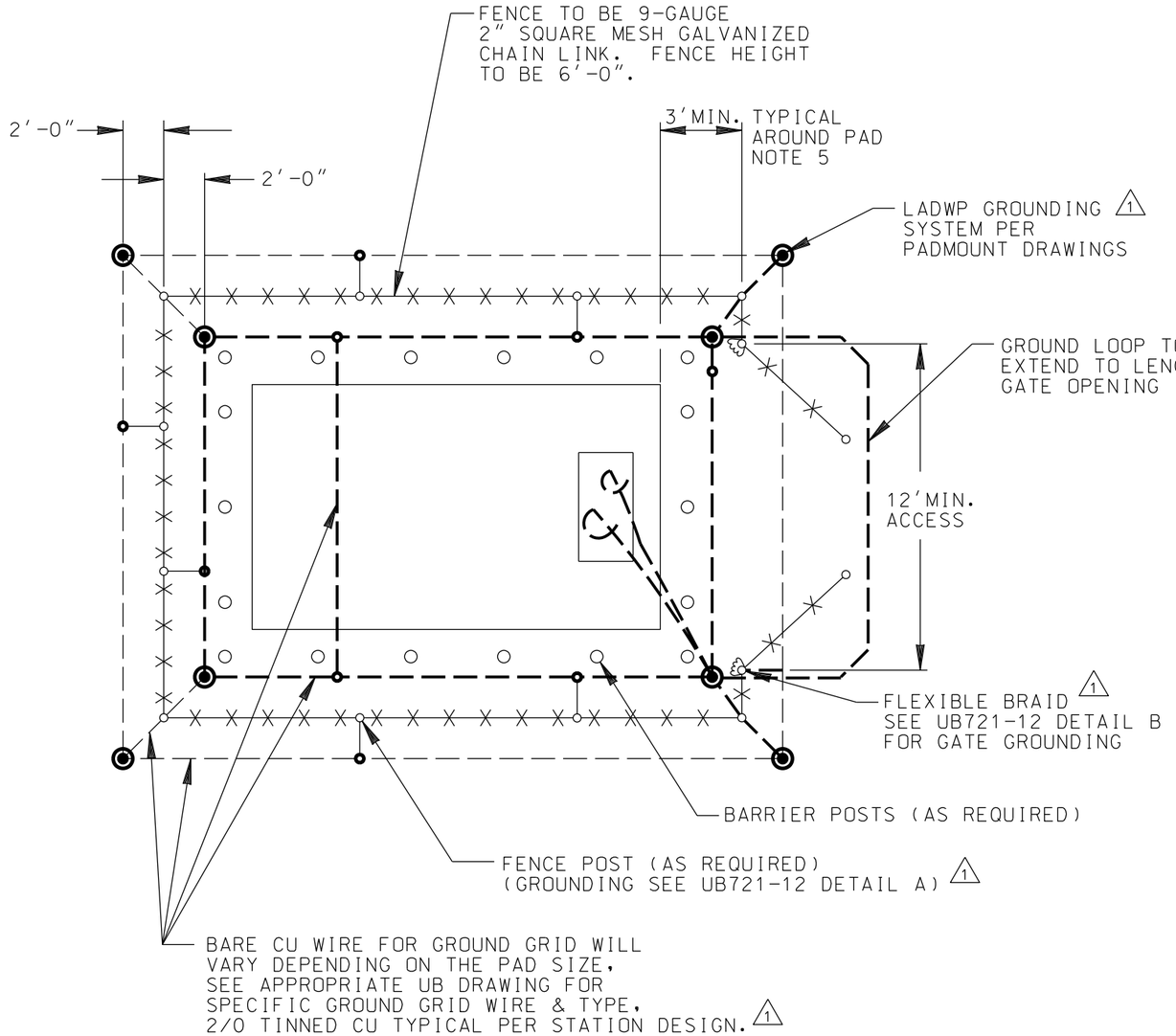
DESIGN	DRAFTING
OK	CHECKER
APPROVED	DATE

10'-6' X 10'-6' PRECAST PAD WITH 8'-9" X 1'-6" OPENING FOR PADMOUNT SF6 SWITCHGEAR

UB721-15

SHEET 2 OF 2

INDEX



1 NOTES:

1. REFERENCE UB721-12 FOR ENCLOSED PAD FENCE GROUNDING AND UB980-09 FOR ROLLING FENCE GROUNDING.

2. THE PREFERRED METHOD OF CONNECTING THE FLEXIBLE BRAID TO THE GATE POSTS IS BY MAKING EXOTHERMIC CONNECTIONS. ONLY WHEN THE WALLS OF GATE POSTS ARE TOO THIN TO ALLOW EXOTHERMIC CONNECTION, THEN USE SUITABLE GROUND CLAMPS MADE OF TINNED ELECTROLYTIC COPPER. THE CLAMPS SHALL BE PREFABRICATED WITH JUMPERS AND PIGTAILS, OR PIGTAILS ONLY, EXOTHERMICALLY WELDED DIRECTLY TO THE LUGS.

3. FOR PRECAST CONCRETE PAD AND BARRIER POST INSTALLATION, REFER TO THE APPROPRIATE UB721 SERIES DRAWING.

4. ASSURE METAL-TO-METAL CONTACT BETWEEN THE GROUND CLAMP AND THE METAL POST BY REMOVING ANY PAINT OR NON-CONDUCTIVE COATING. PAINT COATING CAN BE APPLIED AFTER ASSEMBLY.

5. PADMOUNT PERIMETER FENCE WITH A MINIMUM 3'-0" DISTANCE FROM EDGE OF PAD AND UP TO A 6'-0" DISTANCE SHALL BE GROUNDED TO PADMOUNT GROUNDING GRID. REFERENCE UB721-12

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
1	04/27/23	PSJ	REVISED NOTES	RJT	20863

DWP

DISTRICT	CONTRACT W.O.	DWP W.O.

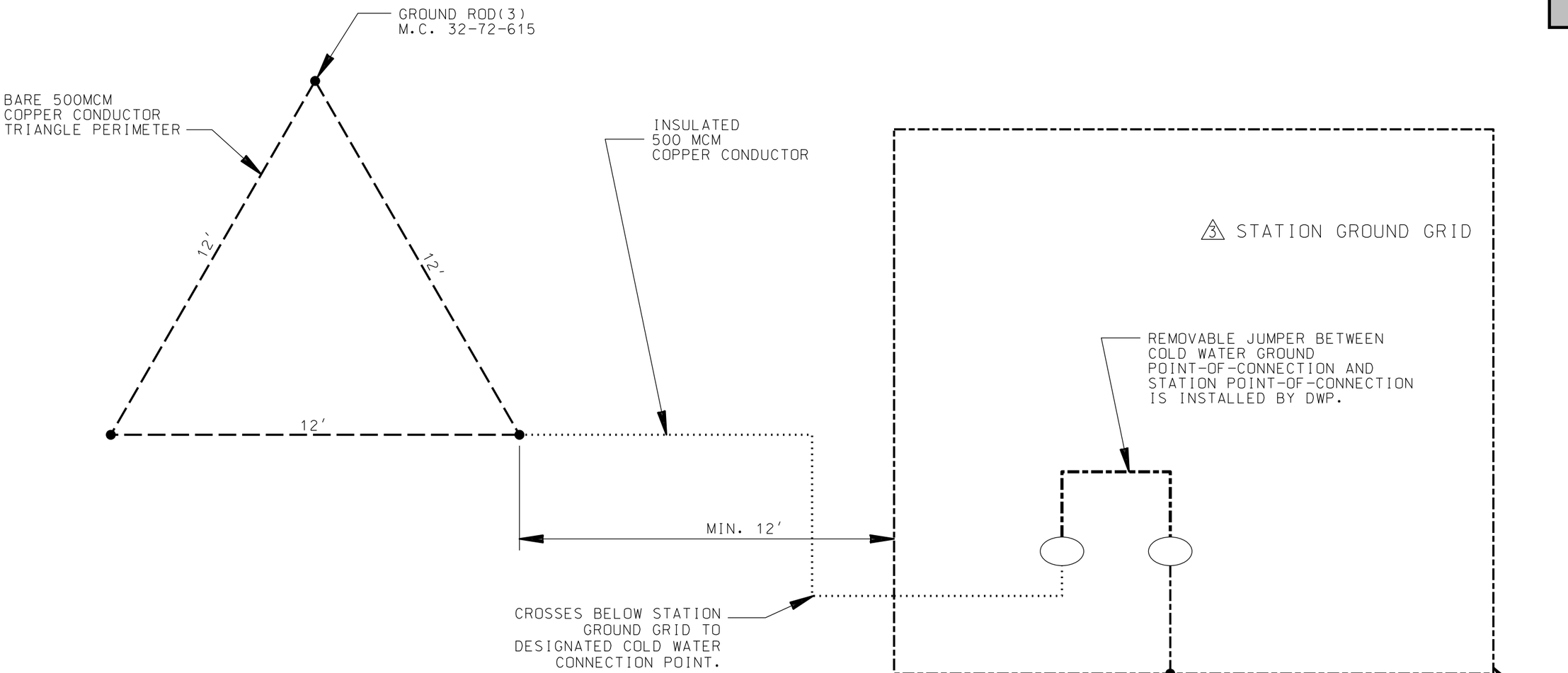
CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	J.ASIAIN	DRAFTING	J.GARCIA
OK	J.ASIAIN	CHECKER	W.YCEDO
APPROVED	K.GARRITY	DATE	01/26/07

METAL FENCE POST GROUNDING FOR METAL PERIMETER FENCE FOR DWP PADMOUNT INSTALLATION

UB721-16 | **SHEET 1 OF 1**

INDEX



OPTION 1, TRIANGULAR CONFIGURATION

SUGGESTED CONFIGURATIONS OF SEPARATELY DERIVED SUPPLEMENTAL GROUND GRID

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	PE. NO.
3	06/05/23	JWW	REVISED WORDING LINEAR TO RECTANGULAR AND UPDATED/ADDED NOTES.	RJT	20863
2	05/10/18	EP	REVISED WORDING"TRIANGLE" TO "RECTANGLE" & UPDATED NOTE 2. & CORRECTED SPELLING	KP	E21857
1	05/27/14	EHP	REVISED CONNECTION, CALLOUTS,& ADDED RECTANGULAR CONFIGURATION SHEET 2	V.B.	E20215

DWP

DISTRICT		CONTRACT W.O.	
DWP W.O.			

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

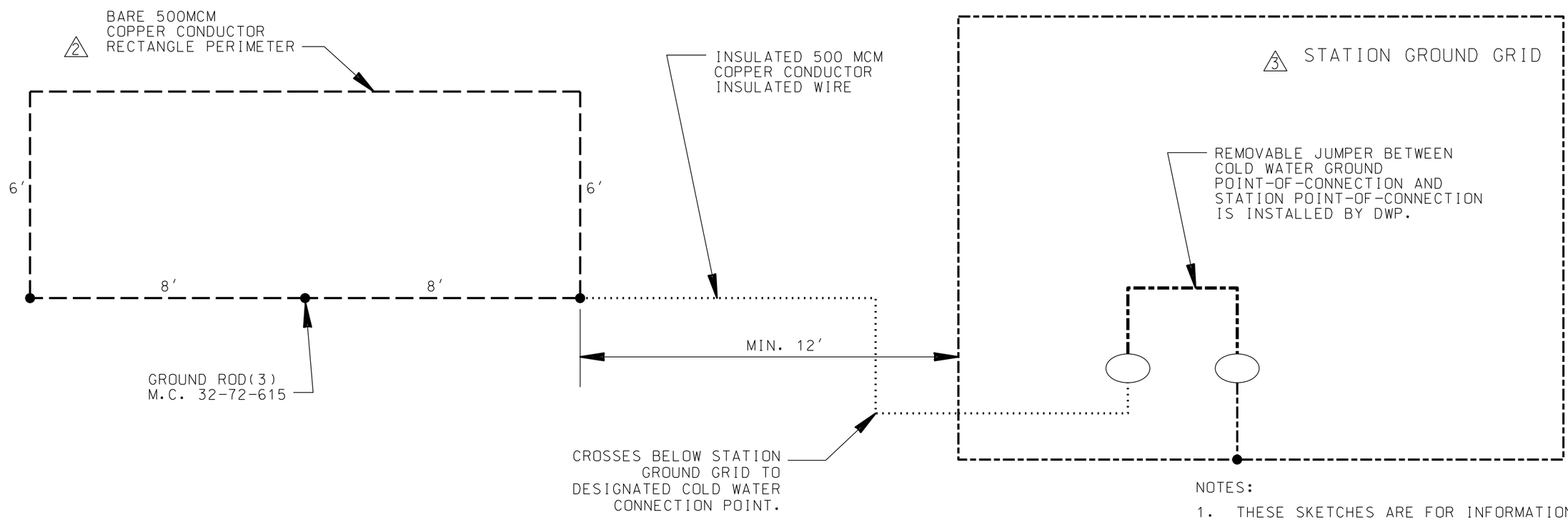
DESIGN	–	DRAFTING	J.GARCIA
OK	–	CHECKER	–
APPROVED	–	DATE	03/18/08

SEPARATELY DERIVED
SUPPLEMENTAL GROUND PLANE
FOR PAD MOUNTED CONSTRUCTION
IN LIEU OF WATER PIPE CONNECTION

UB721-17

SHEET 1 OF 2

INDEX



OPTION 2, RECTANGULAR CONFIGURATION

SUGGESTED CONFIGURATIONS OF SEPARATELY DERIVED SUPPLEMENTAL GROUND GRID

NOTES:

1. THESE SKETCHES ARE FOR INFORMATION ONLY. THE CONTRACTOR SHALL FURNISH A COMPLETE SET OF DRAWINGS OF THE CONSTRUCTION TO DWP.
2. PROVIDE THREE GROUND ELECTRODES EACH TO BE $^{5}/_{8}$"X8' CU ROD, $^{3}/_{4}$"X8' CU PIPE, $^{5}/_{8}$"X8' CU ELECTROPLATED ROD, OR $^{5}/_{8}$"X8' CU CLAD STEEL ROD.
3. INSTALL ALL GROUND CABLES IN THE EARTH, 1'-6" MINIMUM BELOW THE GRADE OR CONCRETE SLAB OR ASPHALT, AND CONNECT TO THE GROUND RODS. MAKE ALL CONNECTIONS USING EXOTHERMIC WELDING (CADWELD, THERMOWELD OR EQUIVALENT).
4. THE SEPARATELY DERIVED SUPPLEMENTAL GROUND GRID AND THE CONNECTION TO IT WILL BE GIVEN PRELIMINARY APPROVAL PENDING FINAL APPROVAL BASED ON ACCEPTABLE RESISTANCE MEASUREMENTS OF 5 OHMS OR LESS TAKEN BY DWP.

△3 5. CONSTRUCTING SUPPLEMENTAL GROUND GRID PER SUGGESTED CONFIGURATIONS SHOWN ABOVE DOES NOT GUARANTEE THAT THE RESISTANCE OF SUCH SUPPLEMENTAL GRID WILL BE LESS THAN 5 OHMS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ASSURE FINAL RESISTANCE OF 5 OHMS OR LESS. ADDITIONAL METHODS OF GROUNDING ENHANCEMENTS MAY BE EMPLOYED TO MEET THE 5 OHMS REQUIREMENT, SUCH AS BACKFILLING THE AREAS AROUND GROUND RODS WITH BENTONITE OR OTHER NON-CORROSIVE BACKFILL MATERIAL APPROVED BY A DWP DESIGN ENGINEER.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	PE. NO.
△3	06/05/23	JWW	REVISED WORDING LINEAR TO RECTANGULAR AND UPDATED/ADDED NOTES.	RJT	20863
△2	05/10/18	EP	REVISED WORDING "TRIANGLE" TO "RECTANGLE" & UPDATED NOTE 2. & CORRECTED SPELLING	KP	E21857
△1	05/27/14	EHP	REVISED CONNECTION, CALLOUTS,& ADDED RECTANGULAR CONFIGURATION SHEET 2	V.B.	E20215

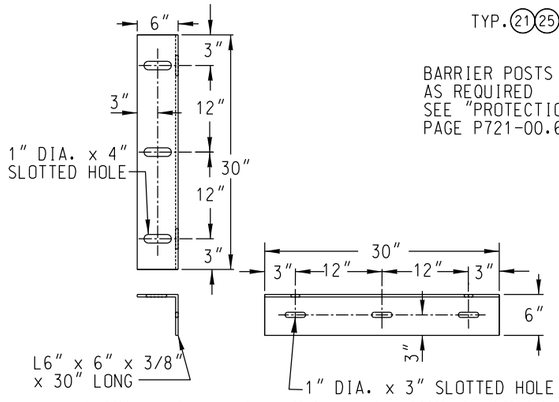
DISTRICT | CONTRACT W.O. | DWP W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	–	DRAFTING	J.GARCIA
OK	–	CHECKER	–
APPROVED	–	DATE	03/18/08

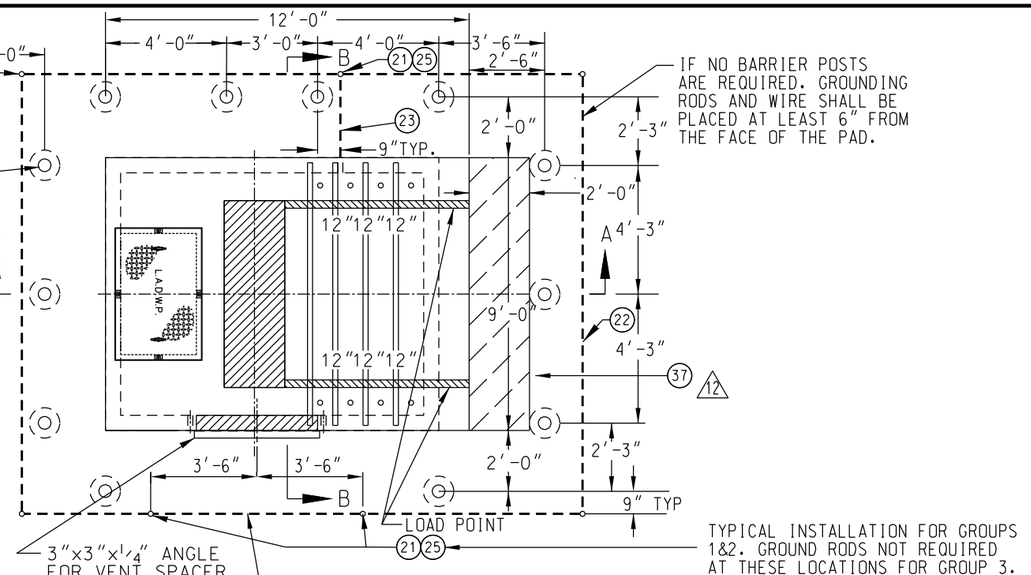
SEPARATELY DERIVED
SUPPLEMENTAL GROUND PLANE
FOR PAD MOUNTED CONSTRUCTION
IN LIEU OF WATER PIPE CONNECTION

UB721-17 | SHEET 2 OF 2



ANGLE DETAIL FOR TFR. HOLD-DOWN

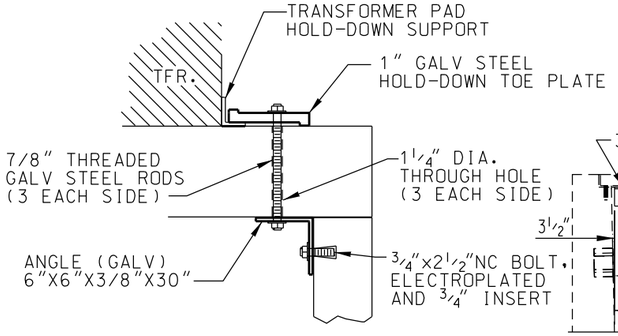
GALVANIZE AFTER FABRICATION



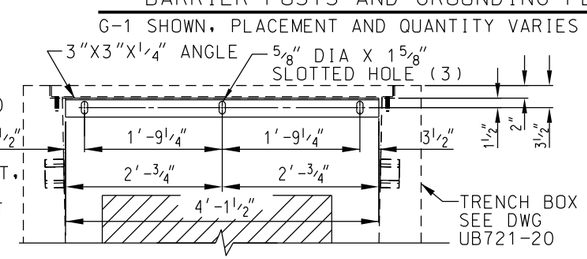
BARRIER POSTS AND GROUNDING PLACEMENT

G-1 SHOWN, PLACEMENT AND QUANTITY VARIES FOR G-2 & G-3.

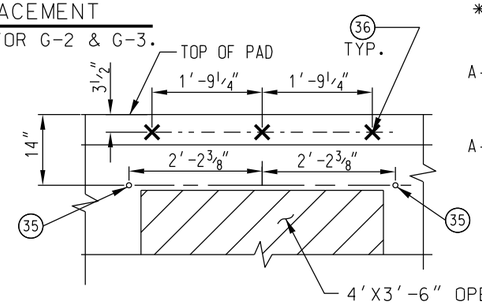
PARTS LIST		
NO.	QTY	DESCRIPTION
1	1	PRECAST PAD TOP SECTION WT 10,000 LBS
2	2	PRECAST HANDHOLE BOTTOM SECTION WT 16,500 LBS
21	5-7	GROUND ROD, 5/8" DIA. X 8' LONG, 304 SST
22	*	BARE STRANDED COPPER WIRE 4/0, SEE NOTE NO.8
23	*	500 KCMIL INSULATED CU CABLE, SEE NOTE NO. 8
24	1	3/16" GALV. DIAMOND PLATE COVER, SEE NOTE 3
25	*	EXOTHERMIC WELD, SEE NOTE 8
26	30	5" DOUBLE MEMBRANE TERMINATION
27	2	1 5/8" X 1 5/8" X 72" LONG 12 GA STRUT (UNISTRUT P1000)
28	2-4	GROUNDING PLATE CAST-IN CONCRETE, SEE NOTE 8
29	6	3/4" DIA. NC THREADED INSERT P-56T
30	6	PULL IRON ASSEMBLY
31	2	3/4" X 5" GALV. COIL INSERT
32	4	1 5/8"X1 5/8"X8'-8" LONG 12 GA STRUT (UNISTRUT P1000)
35	2	2" DIA. PVC TUBE X 6" LONG (THROUGH HOLE)
36	3	1/2" DIA INSERT FOR 3"X3"X1/4" ANGLE SUPPORT
12 37	1	2'-0" x 9'-0" x 6" THICK PRECAST PAD



TFR. HOLD-DOWN DETAIL

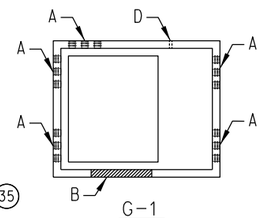


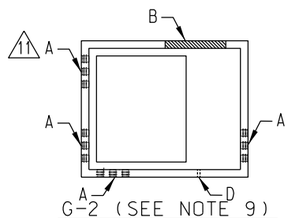
3"X3"X1/4"X49 1/2" LONG ANGLE DETAIL

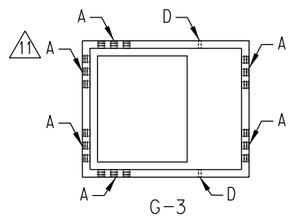


INSERT AND THROUGH HOLE LOCATIONS @ TRENCH OPENING

* NOT A PART OF PRECAST ASSEMBLAGE 11

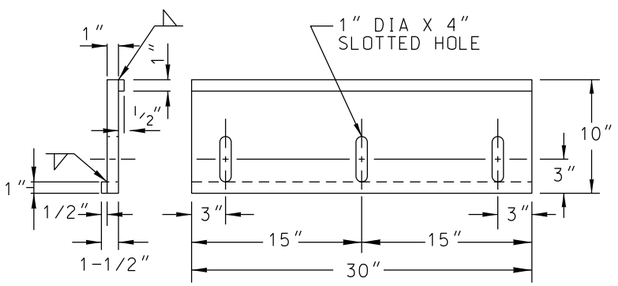






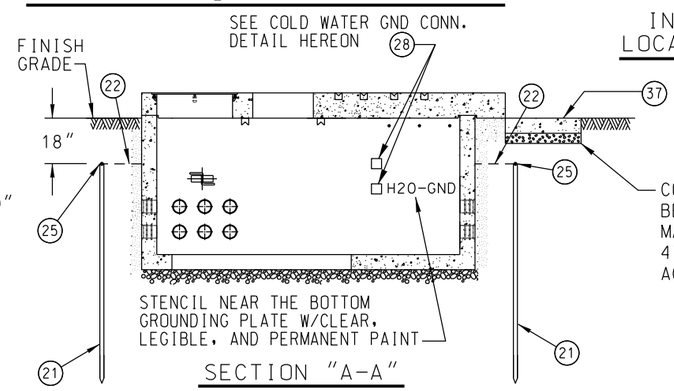
ORDERING DIAGRAM (HH ONLY)

11 LOCATION A - 6-5" DUCT TERMINATORS.
LOCATION B - 48"X42" TRENCH OPENING.
LOCATION D - 2-GROUNDING PLATES.



TFR. HOLD-DOWN TOE PLATE DETAIL

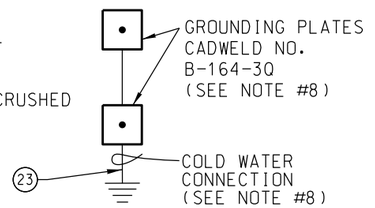
GALVANIZE AFTER FABRICATION



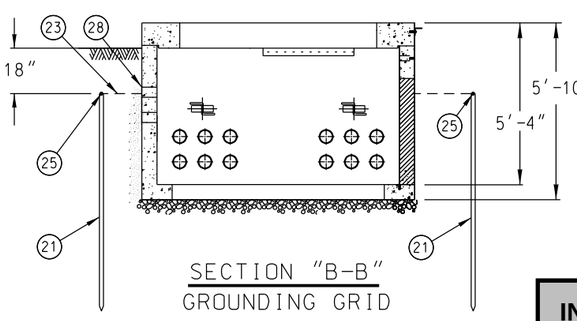
SECTION "A-A"

GROUNDING GRID

V.B.



COLD WATER GND CONN.



SECTION "B-B"

GROUNDING GRID

INDEX

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	PE NO.
12	08/04/22	DR	UPDATED LOCATION OF BARRIER POSTS. ADDED NO.37 TO PARTS LIST. REVISED NOTES 2,7	RJT	E20863
11	06/11/22	JJZ	UPDATED AVAILABLE FIRE BARRIER MANUFACTURERS/ UPDATED TERMINATORS IN ORDERING DIAGRAM REVISED NOTES 1, 6, 9, AND 10.	BLD	E23691
10	11/23/21	CQS	ADDED 2 HOLES 12" APART		
9	07/16/18	EHP/ EJP	REVISED NOTES 9 & 10. REM. NOTE 11. REPLACED 4" HOLES W/GROUNDING PLATES CAST-IN CONCRETE. REV. BARRIER POST LOCATIONS.	KP	E21857
8	10/28/14	EHP	REV. CABLE ACCESS WIDTH OPENING FROM 36" TO 24". REV. UNISTRUT QUANT. & LOCATIONS.	J.M.A	
7	03/06/13	EHP	REVISED TFR. HOLD-DOWN PLT. DETAIL	J.M.A	
6	08/18/11	EHP	ADDED STENCIL "H2O-GRD" TO BOTTOM 4" DIA. HOLE FOR GROUNDING PLATE	J.M.A	
5	06/27/11	JHG	REVISED LOCATION OF 4"DIA.HOLES FOR GROUND PLATE INSTALLATION.	J.M.A	
4	05/19/11	JD/EHP	REVISED PART 33	J.M.A	
3	04/20/11	JD	REVISED PARTS 21, 22, 23, 27 & 32.ADDED NOTE FOR COLD WATER GRD.CONN.	J.M.A	
2	03/04/11	EHP	REMOVED TRENCH BOX.ADDED 3/4"THREADED COIL INSERTS. 3"X3"ANGLE DETAIL.INSERT & THRU HOLE DETAIL	J.A.	
1	07/19/10	EHP	ADDED ADAPTER PLATE, ORDERING DIAGRAM & UNISTRUTS	J.A.	

12-21-11
CE 47565 JM

DISTRICT	CONTRACT W.O.	DWP W.O.	

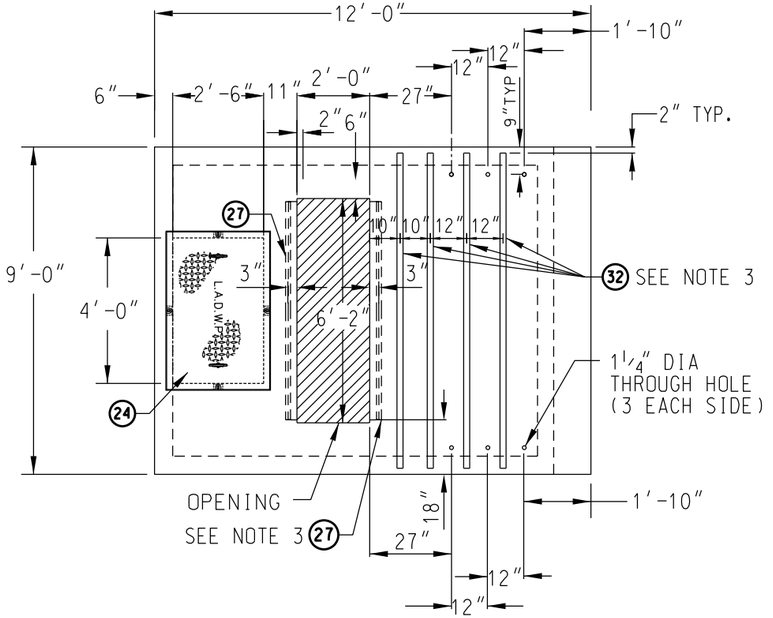
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	SA'ID POOSTI	DRAFTING	E.PERDOMO
OK	6-23-10	CHECKER	W. YCEDO
APPROVED	JAMES MAGULA	DATE	04/15/09

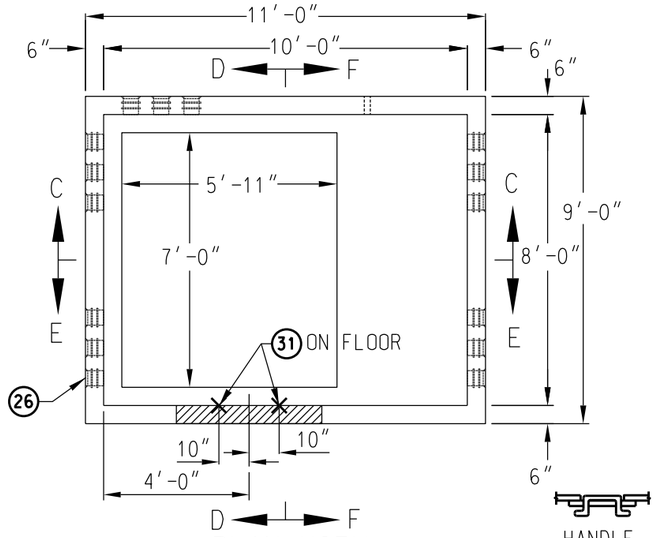
9'-0"X 12'-0" PRECAST TRANSFORMER PAD WITH 4'-0"X3'-6" WALL OPENING FOR CORRESPONDING PRECAST CABLE TRENCH

UB721-19 | SHEET 1 OF 4

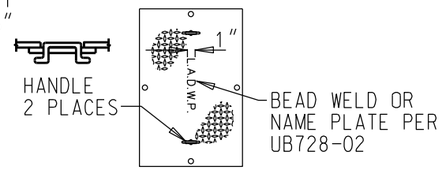
INDEX

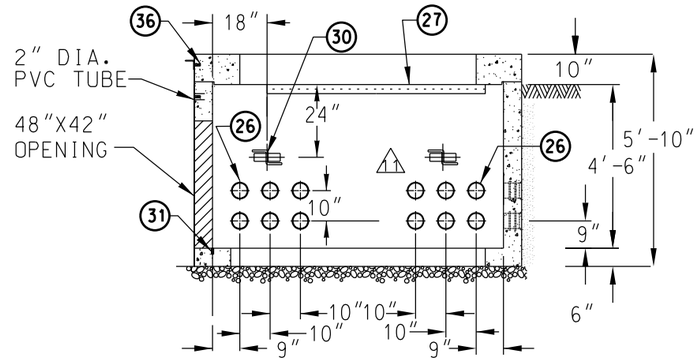


PLAN VIEW OF TRANSFORMER PAD



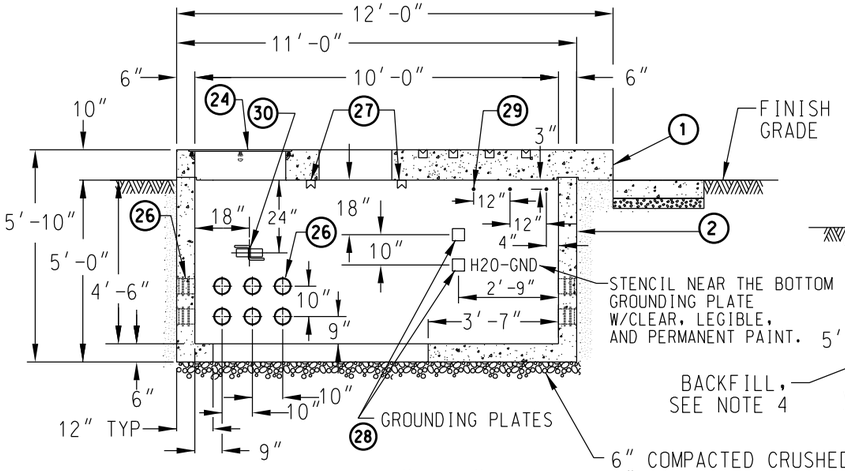
PLAN VIEW
(HH FOR G-1)



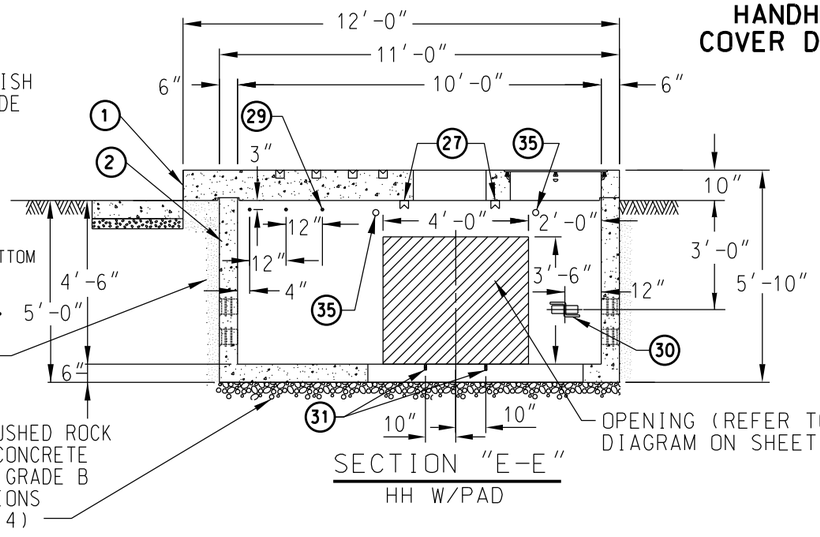


SECTION "D-D"
HH W/PAD

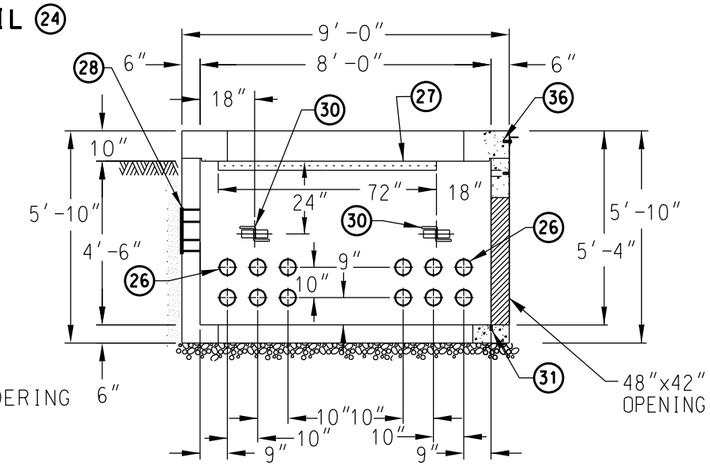
HANDHOLE COVER DETAIL (24)



SECTION "C-C"
HH W/PAD



SECTION "E-E"
HH W/PAD



SECTION "F-F"
HH W/PAD

V.B.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	PE NO.
12	08/04/22	DR	UPDATED LOCATION OF BARRIER POSTS. ADDED NO.37 TO PARTS LIST. REVISED NOTES 2,7	RJT	E20863
11	06/11/22	JJZ	UPDATED AVAILABLE FIRE BARRIER MANUFACTURERS/ UPDATED TERMINATORS IN ORDERING DIAGRAM REVISED NOTES 1, 6, 9, AND 10.	BLD	E23691
10	11/23/21	CQS	ADDED 2 HOLES 12" APART		
9	07/16/18	EHP/ EJP	REVISED NOTES 9 & 10. REM. NOTE 11. REPLACED 4" HOLES W/GROUNDING PLATES CAST-IN CONCRETE. REV. BARRIER POST LOCATIONS.	KP	E21857
8	10/28/14	EHP	REV. CABLE ACCESS WIDTH OPENING FROM 36" TO 24". REV. UNISTRUT QUANT. & LOCATIONS.	J.M.A	

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	PE NO.
7	03/06/13	EHP	SEE SHEET 1 & 3 FOR REVISIONS.	J.M.A	
6	08/18/11	EHP	ADDED STENCIL "H2O-GRD" TO BOTTOM 4" DIA. HOLE FOR GROUNDING PLATE	J.M.A	
5	06/27/11	JHG	REVISED LOCATION OF 4"DIA.HOLES FOR GROUND PLATE INSTALLATION.	J.M.A	
4	05/19/11	JD/EHP	ADDED COVER DIMENSION. REVISED ADAPTER PLATE & BOLT DETAIL	J.M.A	
3	04/20/11	JD	REVISED UNISTRUT LENGTH (PT.32)	J.M.A	
2	03/04/11	EHP	ADDED 3/4"THREADED COIL INSERTS & 2"DIA PVC TUBES. REV. ADAPTER PLATE DETAIL	J.A.	
1	07/19/10	EHP	ADDED ADAPTER PLATE, 1/2" INSERT & UNISTRUT	J.A.	

12-21-11
CE 47565 JM

DWP

DISTRICT	CONTRACT W.O.	DWP W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	SA'ID POOSTI	DRAFTING	E.PERDOMO
OK	6-23-10	CHECKER	W. YCEDO
APPROVED	JAMES MAGULA	DATE	04/15/09

9′-0″X 12′-0″ PRECAST TRANSFORMER PAD WITH 4′-0″X3′-6″ WALL OPENING FOR CORRESPONDING PRECAST CABLE TRENCH

UB721-19

GENERAL INFORMATION:

1 THE DEPARTMENT OF WATER AND POWER (DWP) WILL NOT EQUIP THE TRANSFORMER PAD UNTIL THE REQUIREMENTS OF THESE DRAWINGS HAVE BEEN COMPLETED AND APPROVED BY A DWP DESIGN ENGINEER AND INSPECTOR.

2 / 12 FOR GENERAL REQUIREMENTS, SEE UGCS STD. NO P721-00 (ALL SHEETS). CONSTRUCTRUCTION DRAWING WILL SPECIFY THE LOCATION, TYPE, AND NUMBER OF CONDUITS TO BE INSTALLED IN HANDHOLE.

REQUIREMENTS FOR FABRICATION:

3 TRANSFORMER PAD SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P SPECIFICATION NO. P-178 AS LAST REVISED EXCEPT ARTICLE 4 FOR PAD HANDHOLE AND ARTICLE 3 (C)(1) AND ARTICLE 4 FOR PAD SLAB. MINIMUM REQUIRED DESIGN LOADING FOR PAD SLAB SHALL BE:

LIVE LOAD = 300 LBS/SQ FT
DEAD LOAD = 4000 LBS/LF @ LOAD POINTS
IMPACT= NONE

ALL PULL IRONS PER UGCS 1-825 SHALL BE SO PLACED AS TO WITHSTAND A WORKING LOAD OF 20,000 LBS./PULL IRON.

STRUT AND BOLT INSTALLATION SHALL WITHSTAND A MINIMUM SHEAR LOAD OF 300 LBS/LF AND A PULL-OUT LOAD OF 150 LBS/BOLT. MAXIMUM SPACING REQUIRED IS 16" O.C. AND 3" FROM EACH END OF STRUT, UNLESS OTHERWISE NOTED. STRUTS SHALL BE HOT GALVANIZED CONTINUOUS CONCRETE INSERTS AND SHALL BE FLUSH WITH CONCRETE SURFACE.

MANUFACTURER TO DELIVER PREFABRICATED TRANSFORMER PAD TO JOB SITE AND SUPPLY SPREADER BAR FOR UNLOADING. DWP OR INSTALLING CONTRACTOR TO PROVIDE MEANS FOR UNLOADING AND SETTING PRECAST UNITS.

EACH CONCRETE SECTION SHALL BE MARKED ON THE INSIDE & OUTSIDE WITH COMPANY NAME AND DESIGNATION "DWP-FA-CN" OR "DWP/F-CN-SC" IF SCC MIX USED AND THE DATE OF POUR.

COVERS SHALL BE PROVIDED WITH FOUR 1/2" NON-CORROSIVE PENTA HEAD BOLTS. COVERS SHALL BE HOT DIP GALVANIZED. COVERS AND BOLTS SHALL BE FLUSH WITH CONCRETE SURFACE. THE FRONT COVER SHALL BE GALVANIZED AFTER LADWP LOGO IS BEADWELDED IN PLACE, PROVIDE 1/2"-13 METAL OPEN STAR P35T INSERTS WITH THROUGH HOLE OR CLEAN OUT.

4 SELECT A LOCATION FREE OF SUBSTRUCTURES, CLEAR OF OVERHEAD OBSTRUCTIONS THAT WOULD INTERFERE WITH THE BOOM OF A LARGE CRANE AND HAVE AMPLE WORKING ROOM FOR A CRANE TO UNLOAD THE SECTION FROM A TRUCK INTO THE EXCAVATION.

ALL MAIN LINE CONDUIT ENTERING HANDHOLE SHALL TERMINATE FLUSH WITH INSIDE SURFACE. TERMINATION SHALL BE WITH CAST-IN TERMINATIONS. EDGES SHALL BE ROUNDED AND SMOOTH. NO SHARP OR ROUGH EDGES WILL BE ACCEPTED.IF GALVANIZED CONDUIT IS USED, EXPOSED ENDS ARE TO BE THREADED AND FITTED WITH GROUND BUSHINGS.

WEIGHT AND ALL OUTSIDE DIMENSIONS VARY WITH MANUFACTURER. VALUES GIVEN ARE LARGEST SHOWN ON MANUFACTURE'S DRAWINGS. PRIOR TO EXCAVATION, STRUCTURE INSTALLER SHALL OBTAIN THE MINIMUM REQUIRED EXCAVATION SIZE FROM THE MANUFACTURER SUPPLYING THE STRUCTURE.

BACKFILL WITH NATURAL MATERIAL AND PERFORM 90% COMPACTION. AS AN ALTERNATIVE BACKFILL WITH SLURRY-CEMENT CONCRETE CLASS 100-E-100. BACKFILL UNDER OVERHANG SHALL ONLY BE SLURRY-CEMENT.

REQUIREMENTS FOR INSTALLATION:

5 THE WALL OF ANY BUILDING ADJACENT TO THE ENCLOSURE SHALL BE OF REINFORCED CONCRETE, BRICK, OR CONCRETE BLOCK WITH A MINIMUM FIRE RESISTANCE OF THREE HOURS AND SHALL HAVE NO OPENINGS ABOVE THE ENCLOSURE OR WITHIN TEN FEET OF THE ENCLOSURE.

6 THE ENCLOSURE SHALL BE PROTECTED BY BARRIER POSTS (IF APPLICABLE). REFERENCE CONST STD P721, STD DWG UA721, AND ESR PG 5-15. LOCATE THE BARRIER POSTS AS SHOWN ON THE DRAWING, OR AS DIRECTED BY DEPARTMENT REPRESENTATIVE.

7 / 12 FOR THE ACCESS PATH TO THE TRANSFORMER PAD AND THE CRANE STAGING AREA REQUIRMENTS SEE P721-00.4 AND P721-00.5 AS LAST REVISED.

8 GROUP 1 AND 2 STRUCTURES REQUIRE TWO GROUND PLATES, WHILE GROUP 3 STRUCTURES REQUIRE A TOTAL OF FOUR. GROUND PLATES (CADWELD NO. B-164-3Q) ARE CAST-IN CONCRETE WITH THE FLAT-TAPPED SURFACES SET FLUSH WITH THE INSIDE WALL FACE AND A WELDED 500 KCMIL INSULATED COPPER CABLE (3 FT LONG TAIL). ELECTRICALLY ISOLATE CABLE FROM CONCRETE REINFORCING BARS.

4/0 BARE STRANDED COPPER WIRE (PT. 22) SHALL BE USED THROUGHOUT THE GROUND GRID EXCEPT 500 KCMIL INSULATED STRANDED COPPER CABLE (PT. 23) SHALL BE USED TO CONNECT THE GROUND PLATES (PT. 28) TO THE 4/0 GROUND GRID (PT. 22) AND THE COLD WATER CONNECTION (PT. 23).

LADWP SHALL BOND THE STAINLESS STEEL FIRE BARRIER MOUNTING PLATE FROM THE TRANSITION BOX TO THE METALLIC STRUT BRACKET HARDWARE IN THE CABLE TRENCH, THEN FROM THE CABLE TRENCH TO THE METALLIC HARDWARE OF THE PRECAST TRANSFORMER PAD. BONDING WIRE SHALL CONSIST OF EITHER 1-4/0 BARE STRANDED COPPER WIRE (M.C. 34-08-154) OR 2-2/0 BARE STRANDED COPPER WIRES (M.C. 34-08-152).

INSTALL ALL GROUND WIRES IN THE EARTH 1'-6" BELOW THE FINISH GRADE. CONNECT TO THE GROUND PLATE (PT. 28) AND GROUND RODS (PT. 21). ALL CONNECTIONS SHALL BE WELDED USING EXOTHERMIC WELDING (PT. 25). ANY ADJOINING FENCE MUST BE ISOLATED FROM THE PADMOUNT GROUNDING SYSTEM BY AN 18" GAP.

THE GROUNDING GRID AND CONNECTION TO COLD WATER WILL BE GIVEN PRELIMINARY APPROVAL PENDING FINAL APPROVAL BASED ON ACCEPTABLE RESISTANCE MEASUREMENTS OF 5 OHMS OR LESS TAKEN BY DWP TEST LAB.

CONNECT 500 KCMIL INSULATED STRANDED COPPER CABLE (PT. 23) TO A CONTINUOUS METALLIC UNDERGROUND COLD WATER PIPING SYSTEM MAIN, 2" MINIMUM, OR GROUND SUBSTITUTE SPECIFIED BY A DWP DESIGN ENGINEER. IN THE ABSENCE OF COLD WATER PIPING SYSTEM CONNECT A SEPARATELY DERIVED GROUNDING SYSTEM TO THE LOWER GROUNDING PLATE ACCORDING TO THE DRAWING UB721-17. ELECTRICALLY ISOLATE CABLE FROM OTHER GROUNDS, METALS, AND CONCRETE REINFORCING NETWORKS. DO NOT USE THIS CABLE TO GROUND ANY EQUIPMENT OUTSIDE OF THE STATION.

9 FURNISH A 3-HOUR FIRE-RATED CABLE SEALING DEVICE FOR THE APPROPRIATE SERVICE SIZE. SELECT FROM ONE OF THE FOLLOWING APPROVED MANUFACTURERS AND RELATED DRAWINGS:

A. CROUSE HINDS, UB721-21(4000A & 5000A) & UB721-27 (3000A).
B. NELSON, UB721-22 (4000A & 5000A) & UB721-28 (3000A).
C. ROXTEC, UB721-41 (4000A & 5000A) & UB721-43 (3000A).

THE CUSTOMER SHALL PURCHASE, OWN, AND MAINTAIN THE CABLE SEALING DEVICE(S).

THE CABLE SEALING DEVICE OR DEVICES SHALL BE FOR OUTDOOR INSTALLATION (G-1 & G-2) AND SHALL INCLUDE ALL NECESSARY FITTINGS AND WALL FLANGES THAT ARE IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL FIRE PROTECTION ASSOCIATION FOR CLASS 'A' OPENINGS, SUPPORTING STRUCTURES, AND MISCELLANEOUS PARTS REQUIRED TO MAKE A COMPLETE INSTALLATION. THE CONDUCTORS FOR THIS SYSTEM WILL BE FURNISHED AND INSTALLED BY THE DWP AND WILL CONSIST OF A MAXIMUM OF TWENTY-ONE COPPER EPR/CPE CONDUCTORS CONSISTING OF 929KCMIL CABLE, EIGHTEEN CONDUCTORS FOR SIX SETS OF THREE PHASE APPLICATION AND THREE CONDUCTORS FOR NEUTRAL APPLICATION, WITH A MAXIMUM CONDUCTOR JACKET O.D. DIAMETER OF 1.67".

OPTION G-2 WINDOW IS OFFSET TO AVOID CABLE CROSSOVER. THIS OPTION IS THE LEAST DESIRABLE OF THE THREE GROUPS AS IT REQUIRES MORE RACKING THAN THE OTHERS.

10 FOR CORRESPONDING PRECAST CABLE TRENCH, REFER TO UB721-20 AND FOR PRECAST CABLE TRANSITION BOX REFER TO UB721-24. FOR EXPLODED VIEW, REFER TO UB721-26

INDEX

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	PE NO.
12	08/04/22	DR	UPDATED LOCATION OF BARRIER POSTS. ADDED NO.37 TO PARTS LIST. REVISED NOTES 2,7	RJT	E20863
11	06/11/22	JJZ	UPDATED AVAILABLE FIRE BARRIER MANUFACTURERS/ UPDATED TERMINATORS IN ORDERING DIAGRAM REVISED NOTES 1, 6, 9, AND 10.	BLD	E23691
10	11/23/21	CQS	ADDED 2 HOLES 12" APART		
9	07/16/18	EHP/ EJP	REVISED NOTES 9 & 10. REM. NOTE 11. REPLACED 4" HOLES W/GROUNDING PLATES CAST-IN CONCRETE. REV. BARRIER POST LOCATIONS.	KP	E21857
8	10/28/14	EHP	REV. CABLE ACCESS WIDTH OPENING FROM 36" TO 24". REV. UNISTRUT QUANT. & LOCATIONS.	J.M.A	

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	PE NO.
7	03/06/13	EHP	REVISED NOTE 11.	J.M.A	
6	08/18/11	EHP	SEE SHT'S 1 & 2 FOR REVISION	J.M.A	
5	06/27/11	JHG	SEE SHT'S 1 & 2 FOR REVISION	J.M.A	
4	05/19/11	JD/EHP	ADDED INSTRUCTIONS TO NOTE 8	J.M.A	
3	04/20/11	JD	REVISED NOTE #8	J.M.A	
2	03/04/11	EHP	REVISED NOTES & ADDED NOTE #12	J.A.	
1	07/19/10	EHP	REVISED NOTE 9 & ADDED NOTE #11	J.A.	

DWP

12-21-11
CE 47565 JM

DISTRICT | CONTRACT W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

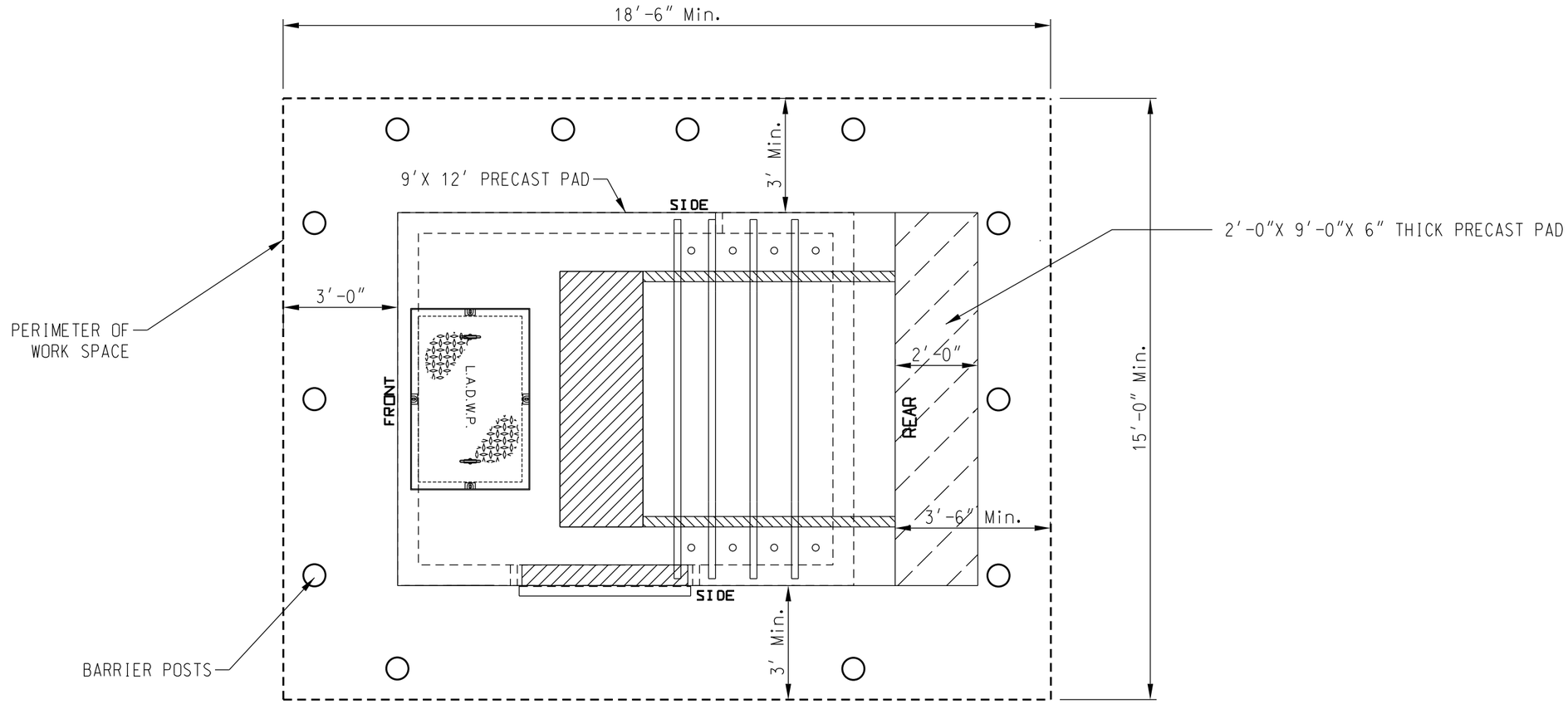
DESIGN SA'ID POOSTI | DRAFTING E.PERDOMO
OK 6-23-10 | CHECKER W. YCEDO
APPROVED JAMES MAGULA | DATE 04/15/09

DWP W.O.

9'-0"X 12'-0" PRECAST TRANSFORMER PAD WITH 4'-0"X3'-6" WALL OPENING FOR CORRESPONDING PRECAST CABLE TRENCH

UB721-19 | SHEET 3 OF 4

INDEX



LAYOUT OF REQUIRED WORKSPACE PERIMETER

(FOR PADMOUNT EGRESS ORIENTATION, REFER TO UNDERGROUND STANDARD PAGE P721-03)

NOTE:
1. WORKSPACE DIMENSIONS ARE FOR TRANSFORMER SIZES 1500kVA AND BELOW.

2. FOR WORKSPACE DIMENSIONS OF LARGER TRANSFORMER SIZES, REFERENCE UB721-29. MODIFY BARRIER POST LOCATIONS AS REQUIRED.

3. FOR MINIMUM OVERALL SPATIAL CLEARANCES, SEE STANDARD DRAWING UB721-29.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	PE NO.
12	08/04/22	DR	UPDATED LOCATION OF BARRIER POSTS. ADDED NO.37 TO PARTS LIST. REVISED NOTES 2,7	RJT	E20863
11	06/11/22	JJZ	UPDATED AVAILABLE FIRE BARRIER MANUFACTURERS/ UPDATED TERMINATORS IN ORDERING DIAGRAM REVISED NOTES 1, 6, 9, AND 10.	BLD	E23691
10	11/23/21	CQS	ADDED 2 HOLES 12" APART		
9	07/16/18	EHP/ EJP	REVISED NOTES 9 & 10. REM. NOTE 11. REPLACED 4" HOLES W/GROUNDING PLATES CAST-IN CONCRETE. REV. BARRIER POST LOCATIONS.	KP	E21857
8	10/28/14	EHP	REV. CABLE ACCESS WIDTH OPENING FROM 36" TO 24". REV. UNISTRUT QUANT. & LOCATIONS.	J.M.A	

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	PE NO.
7	03/06/13	EHP	REVISED NOTE 11.	J.M.A	
6	08/18/11	EHP	SEE SHT'S 1 & 2 FOR REVISION	J.M.A	
5	06/27/11	JHG	SEE SHT'S 1 & 2 FOR REVISION	J.M.A	
4	05/19/11	JD/EHP	ADDED INSTRUCTIONS TO NOTE 8	J.M.A	
3	04/20/11	JD	REVISED NOTE #8	J.M.A	
2	03/04/11	EHP	REVISED NOTES & ADDED NOTE #12	J.A.	
1	07/19/10	EHP	REVISED NOTE 9 & ADDED NOTE #11	J.A.	

12-21-11
CE 47565 JM

DISTRICT | CONTRACT W.O. | DWP W.O.

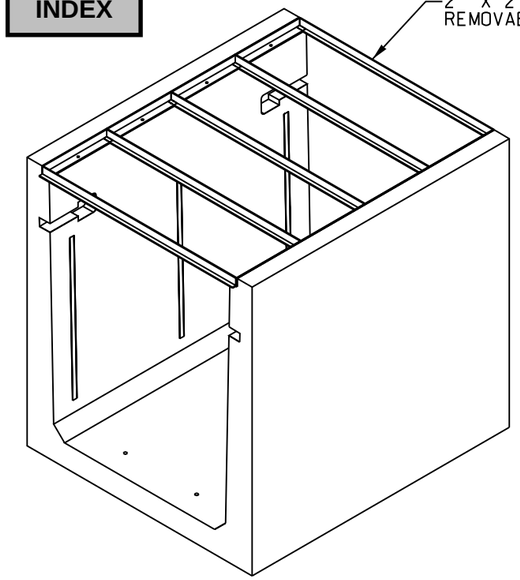
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN SA'ID POOSTI | DRAFTING E.PERDOMO
OK 6-23-10 | CHECKER W.YCEDO
APPROVED JAMES MAGULA | DATE 04/15/09

9′-0″X 12′-0″ PRECAST TRANSFORMER PAD WITH 4′-0″X3′-6″ WALL OPENING FOR CORRESPONDING PRECAST CABLE TRENCH

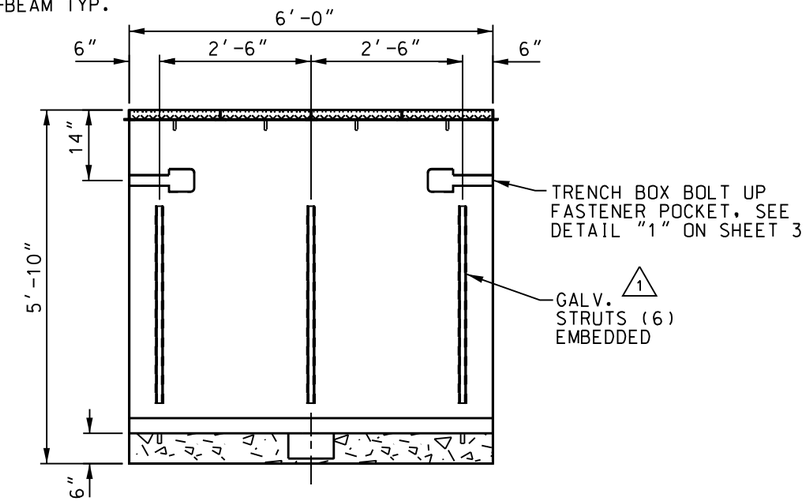
UB721-19 | SHEET 4 OF 4

INDEX



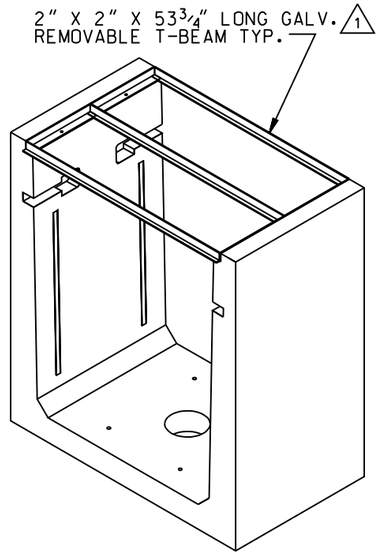
6'STRAIGHT ASSEMBLY

1 GROUP 1



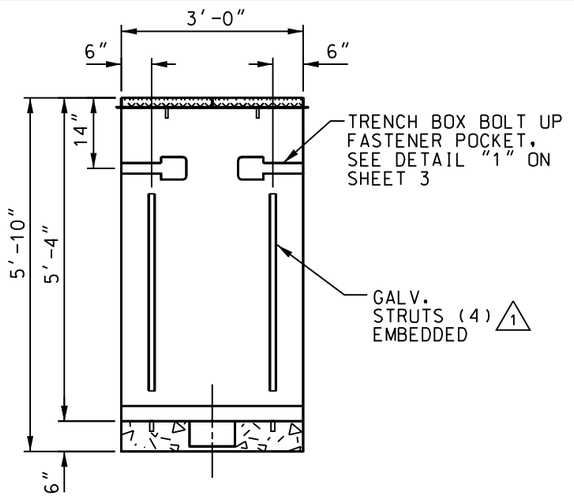
SECTION "B-B"

OPPOSITE SIDE WALL IS IDENTICAL



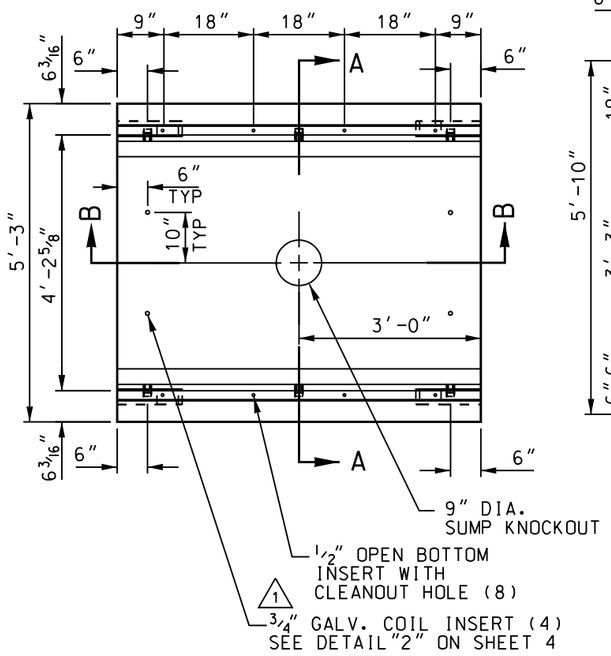
3'STRAIGHT ASSEMBLY

1 GROUP 2

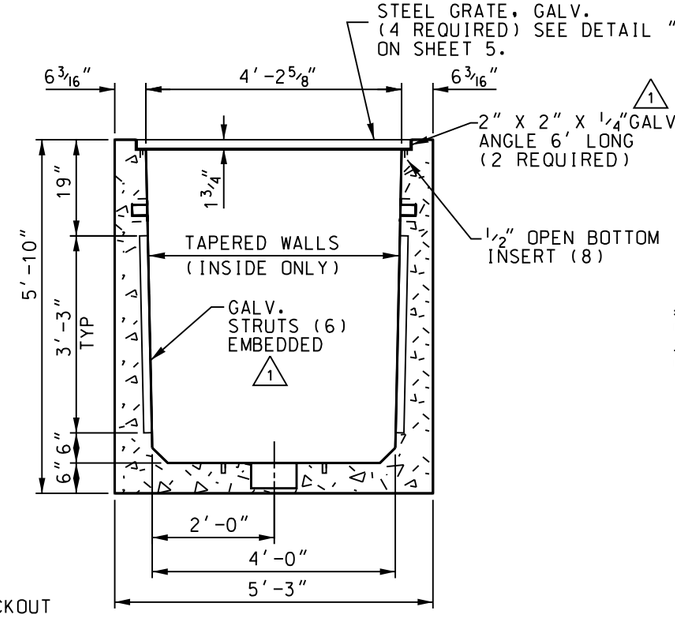


SECTION "D-D"

OPPOSITE SIDE WALL IS IDENTICAL

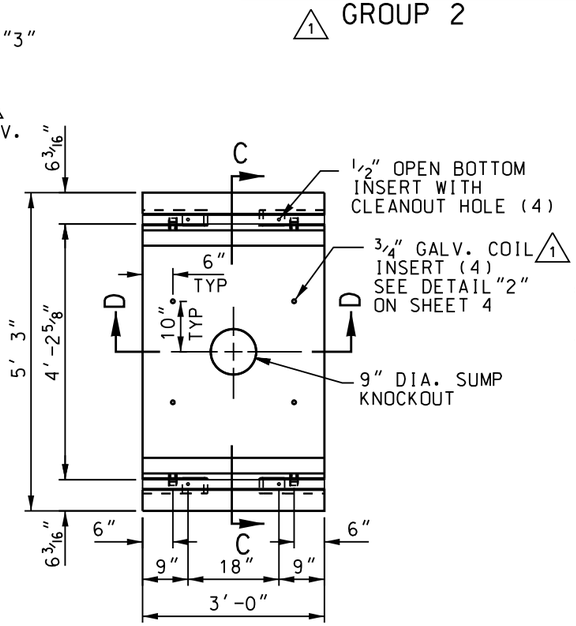


PLAN VIEW
6'STRAIGHT ASSEMBLY

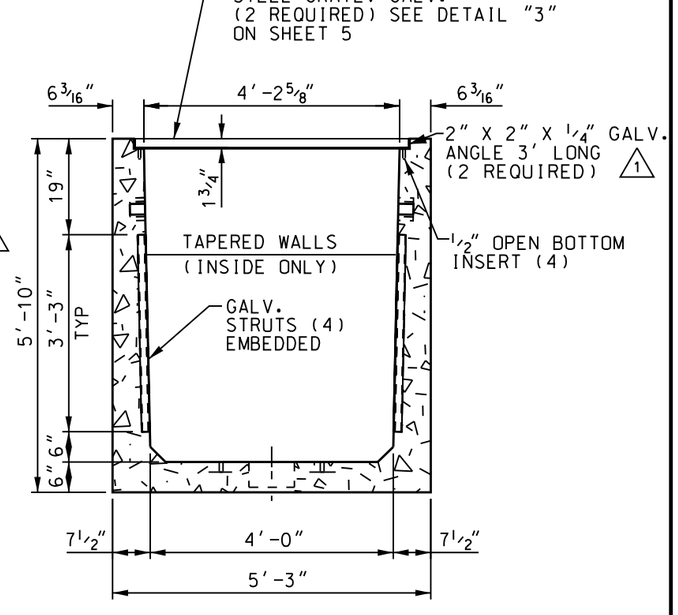


SECTION "A-A"

OPPOSITE DIRECTION IS IDENTICAL



PLAN VIEW
3'STRAIGHT ASSEMBLY



SECTION "C-C"

OPPOSITE DIRECTION IS IDENTICAL

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
1	05/20/11	EHP	ADDED "GALV." TO STRUTS, T-BEAMS, ANGLES & COIL CALL OUTS. ADDED GROUP #'S.	J.M.A.	

CE47565
4-1-11

DISTRICT | CONTRACT W.O. | DWP W.O.

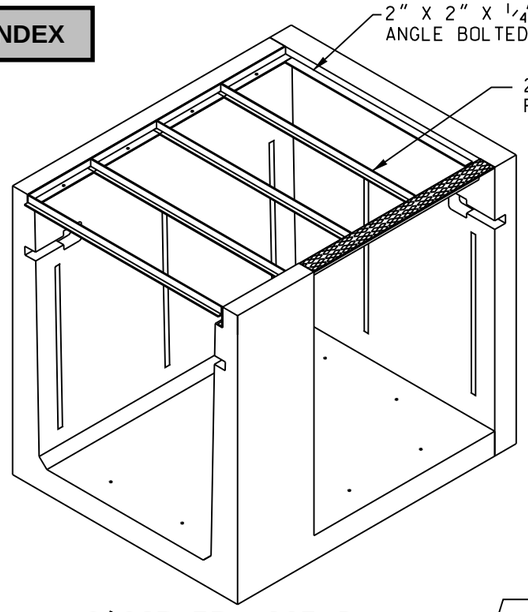
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN JUAN AVALOS | DRAFTING E.H.PERDOMO
OK | CHECKER
APPROVED JIM MAGULA | DATE 03/10/11

PRECAST CABLE TRENCH BOX (VARIOUS SIZE AND TYPE) FOR CORRESPONDING 9'X12' PRECAST TRANSFORMER PAD W/HANDHOLE

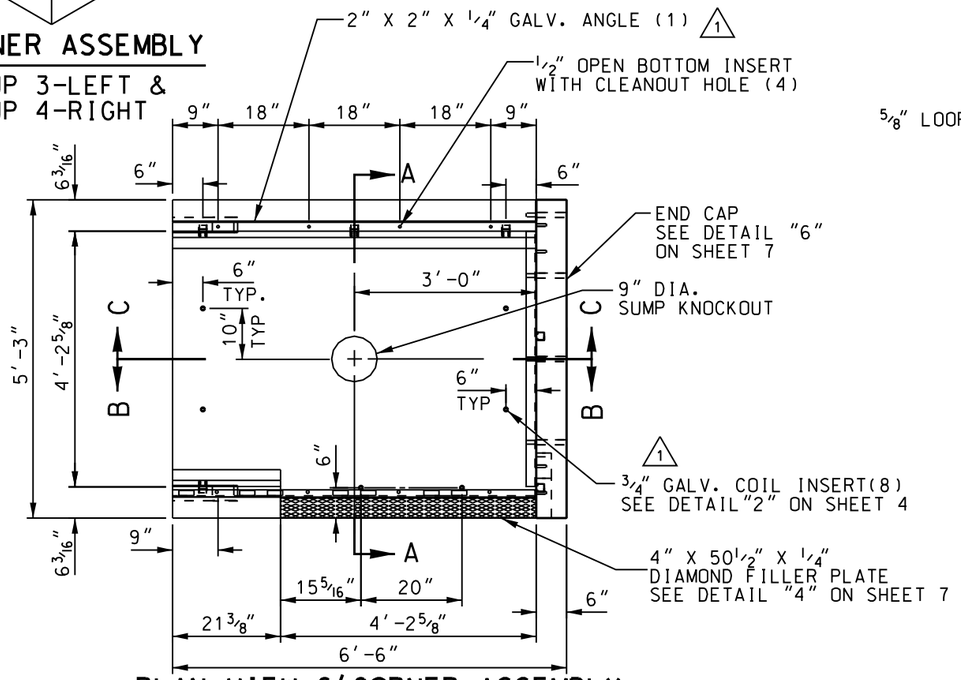
UB721-20 | SHEET 1 OF 7

INDEX



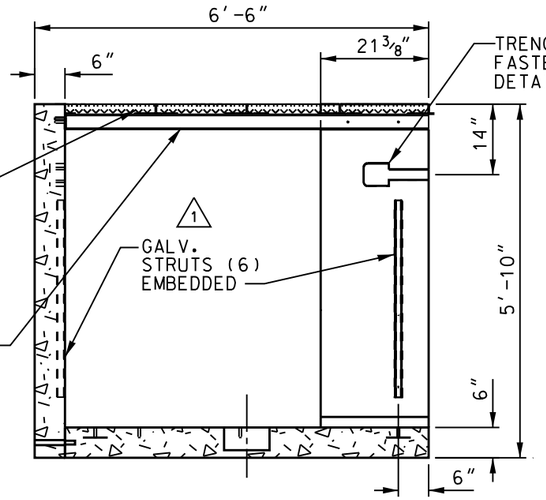
6'CORNER ASSEMBLY

1 GROUP 3-LEFT & GROUP 4-RIGHT

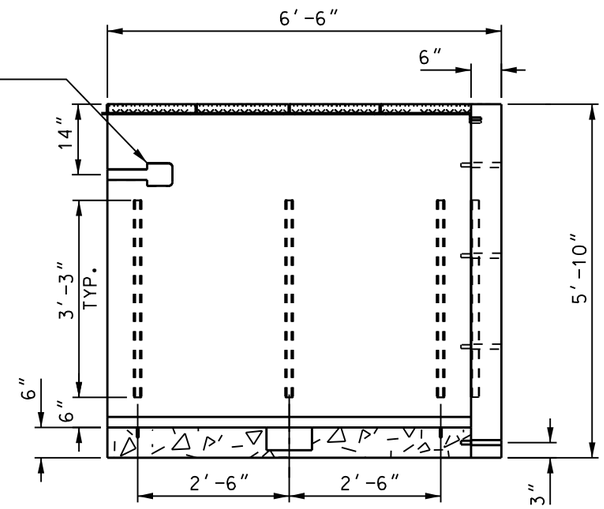


PLAN VIEW 6'CORNER ASSEMBLY

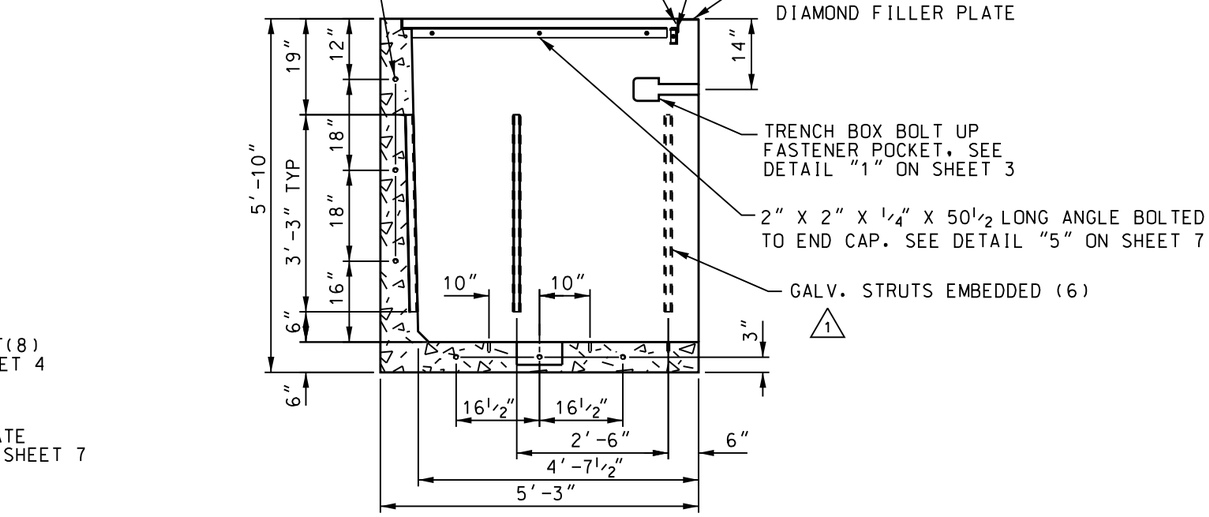
(LEFT ASSEMBLY IS A MIRROR IMAGE)



SECTION "B-B"



SECTION "C-C"



SECTION "A-A"

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
1	05/20/11	EHP	ADDED "GALV." TO STRUTS. T-BEAM, & COIL CALL OUTS. INCLUDED 2"X2"X1/4"	J.M.A.	
			GALV. ANGLE CALL OUT. ADDED GROUP #'S.		

CE47565

4-1-11

DISTRICT	CONTRACT W.O.	DWP W.O.	

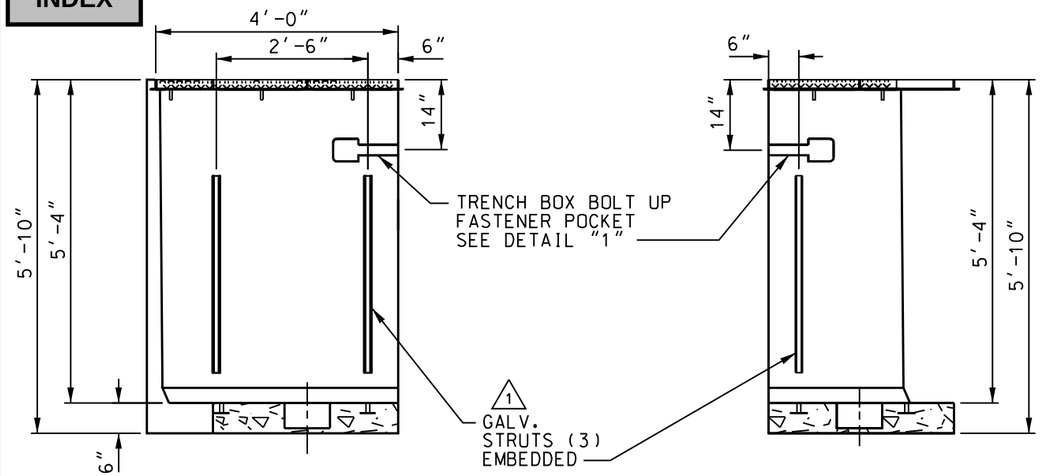
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN JUAN AVALOS	DRAFTING E.H.PERDOMO		
OK	CHECKER		
APPROVED JIM MAGULA	DATE 03/10/11		

PRECAST CABLE TRENCH BOX (VARIOUS SIZE AND TYPE) FOR CORRESPONDING 9'X12' PRECAST TRANSFORMER PAD W/HANDHOLE

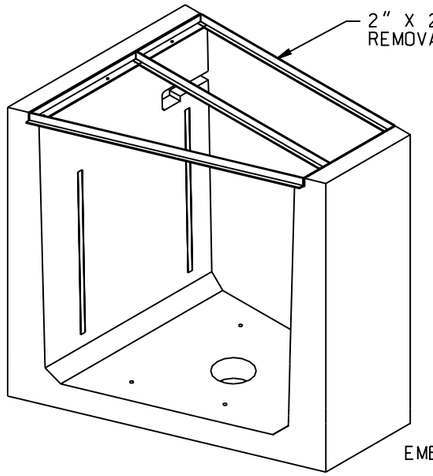
UB721-20 | SHEET 2 OF 7

INDEX



SECTION "A-A"

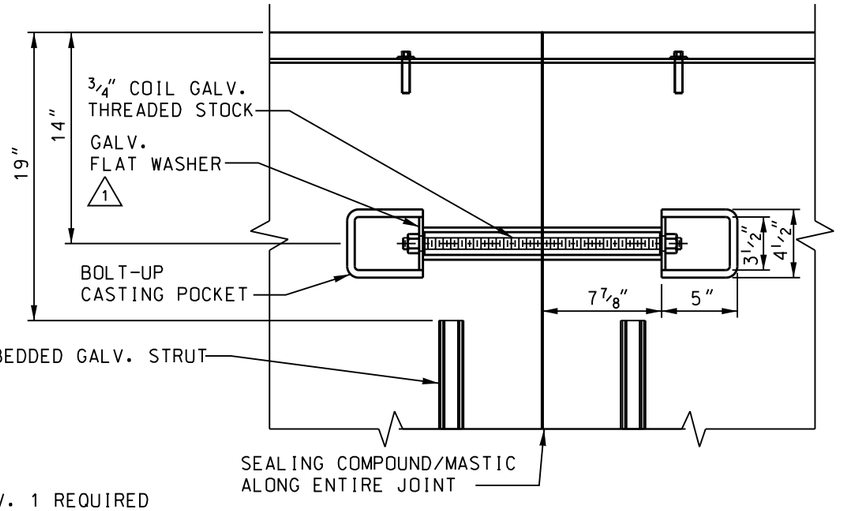
SECTION "C-C"



DIAGONAL LEFT ASSEMBLY

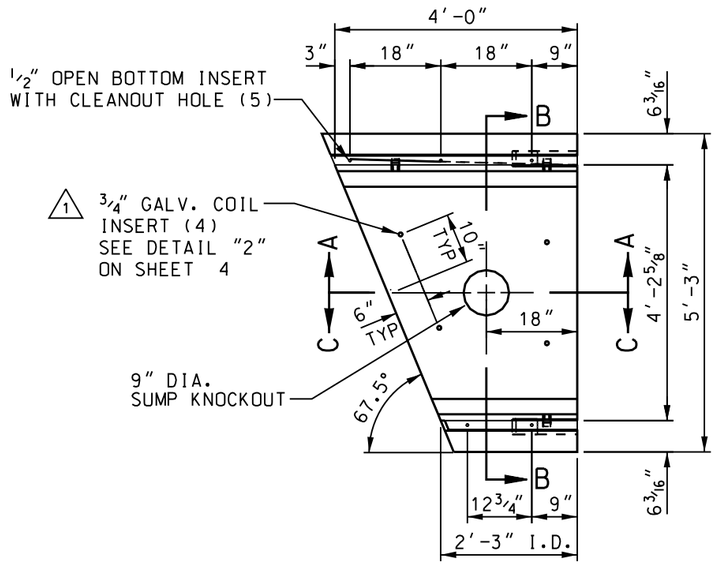
(RIGHT ASSEMBLY IS A MIRROR IMAGE)

1 GROUP 5-LEFT & GROUP 6-RIGHT



DETAIL "1"

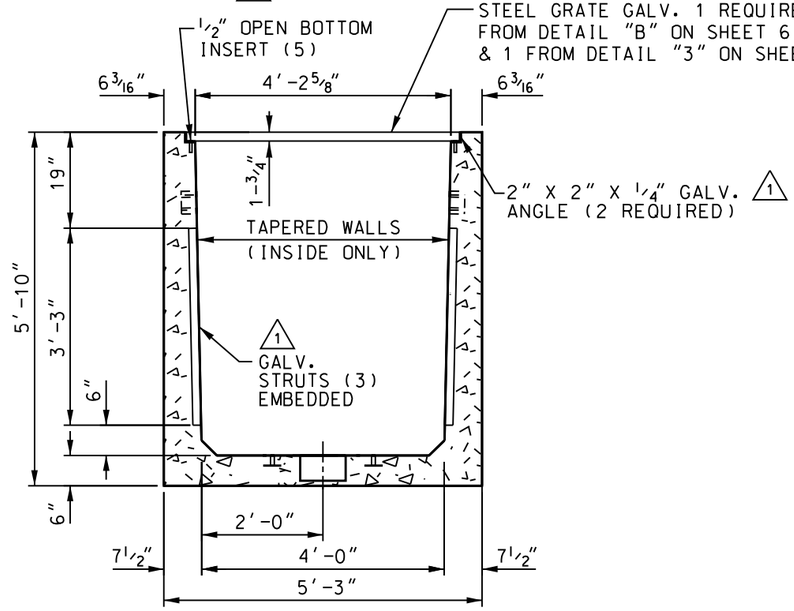
SIDE WALL TO SIDE WALL



PLAN VIEW

DIAGONAL LEFT ASSEMBLY

(RIGHT ASSEMBLY IS A MIRROR IMAGE)



SECTION "B-B"

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
1	05/20/11	EHP	ADDED "GALV." TO STRUTS. T-BEAM, ANGLE & COIL CALL OUTS. ADDED GROUP #'S.	J.M.A.	

CE47565

4-1-11

DISTRICT	CONTRACT W.O.	DWP W.O.			

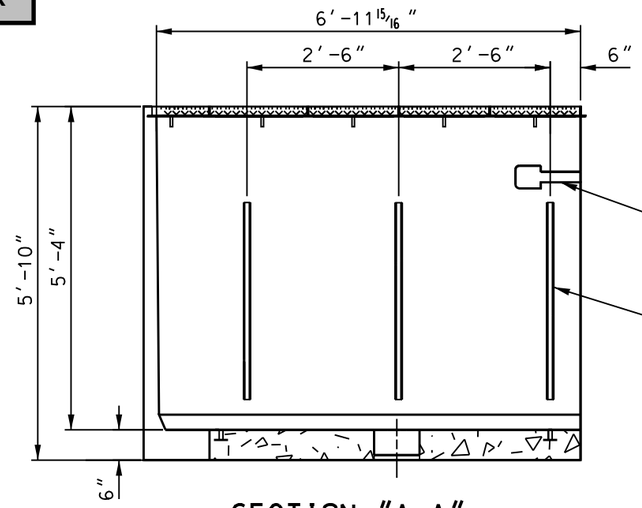
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	DRAFTING
JUAN AVALOS	E.H.PERDOMO
OK	CHECKER
APPROVED JIM MAGULA	DATE 03/10/11

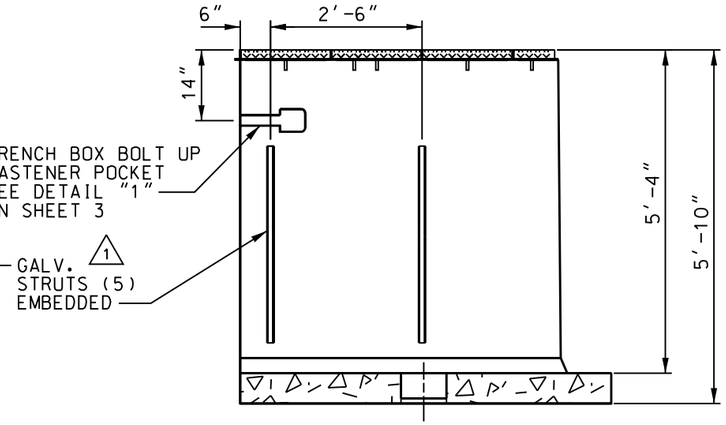
PRECAST CABLE TRENCH BOX
(VARIOUS SIZE AND TYPE)
FOR CORRESPONDING 9'X12'
PRECAST TRANSFORMER PAD
W/HANDHOLE

UB721-20 | SHEET 3 OF 7

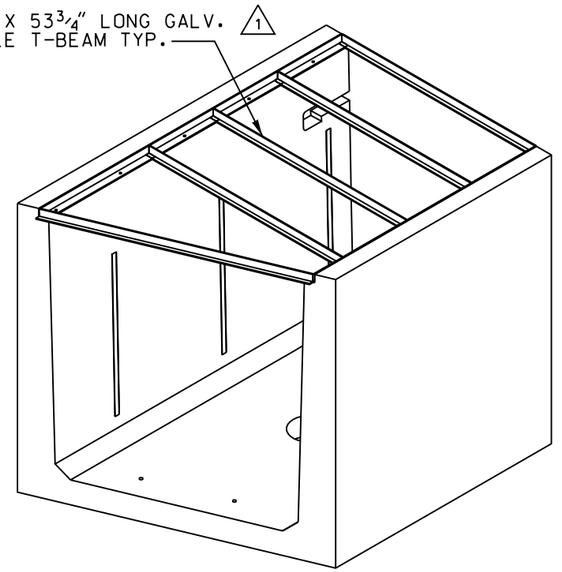
INDEX



SECTION "A-A"



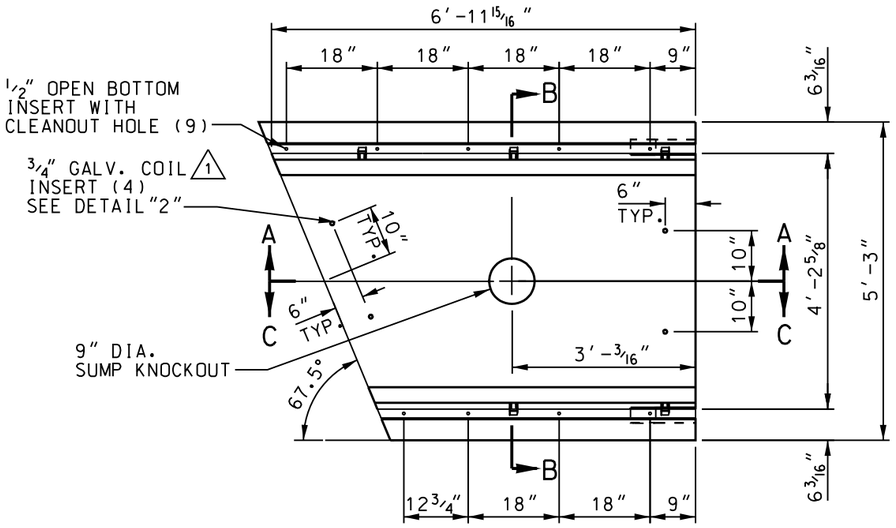
SECTION "C-C"



DIAGONAL LEFT 7′ ASSEMBLY

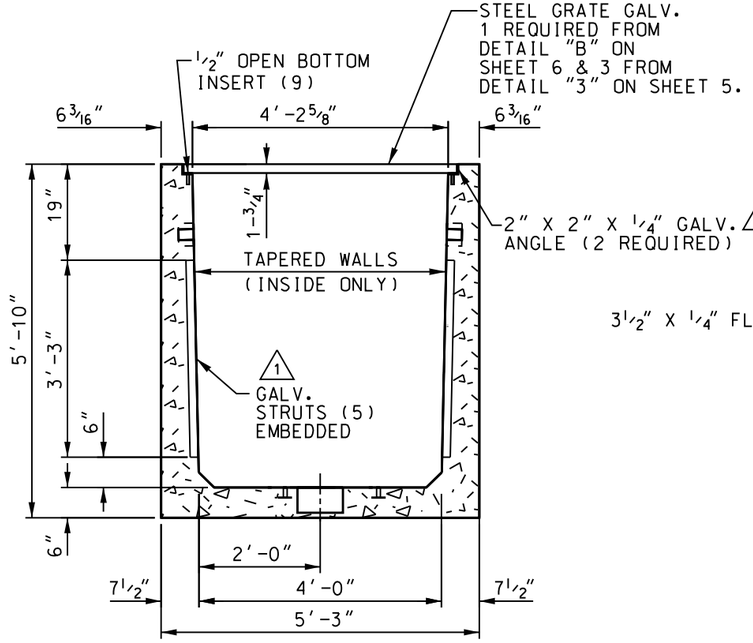
(RIGHT ASSEMBLY IS A MIRROR IMAGE)

1 GROUP 7-LEFT & GROUP 8-RIGHT

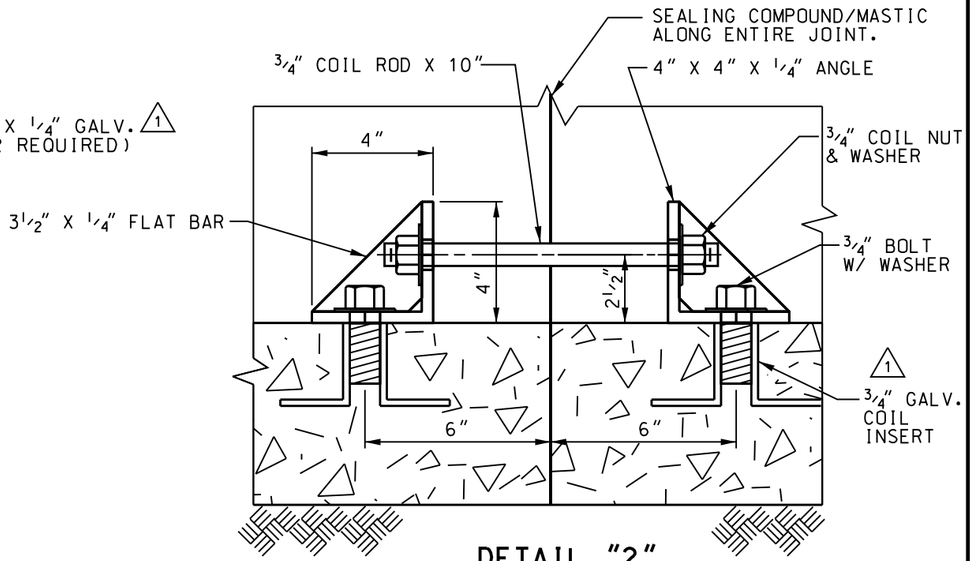


PLAN VIEW 7′
DIAGONAL LEFT ASSEMBLY

(RIGHT ASSEMBLY IS A MIRROR IMAGE)



SECTION "B-B"



DETAIL "2"

INSTALLATION GUSSET BOLT-UP WITH 3/4″ COIL INSERTS. (GUSSET TO BE REMOVED AFTER FINAL PLACEMENT OF TRENCH COMPONENTS)

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
1	05/20/11	EHP	ADDED "GALV." TO STRUTS, T-BEAMS, ANGLES & COIL CALL OUTS. ADDED GROUP #'S.	J.M.A.	

CE47565

4-1-11

DISTRICT	CONTRACT W.O.	DWP W.O.

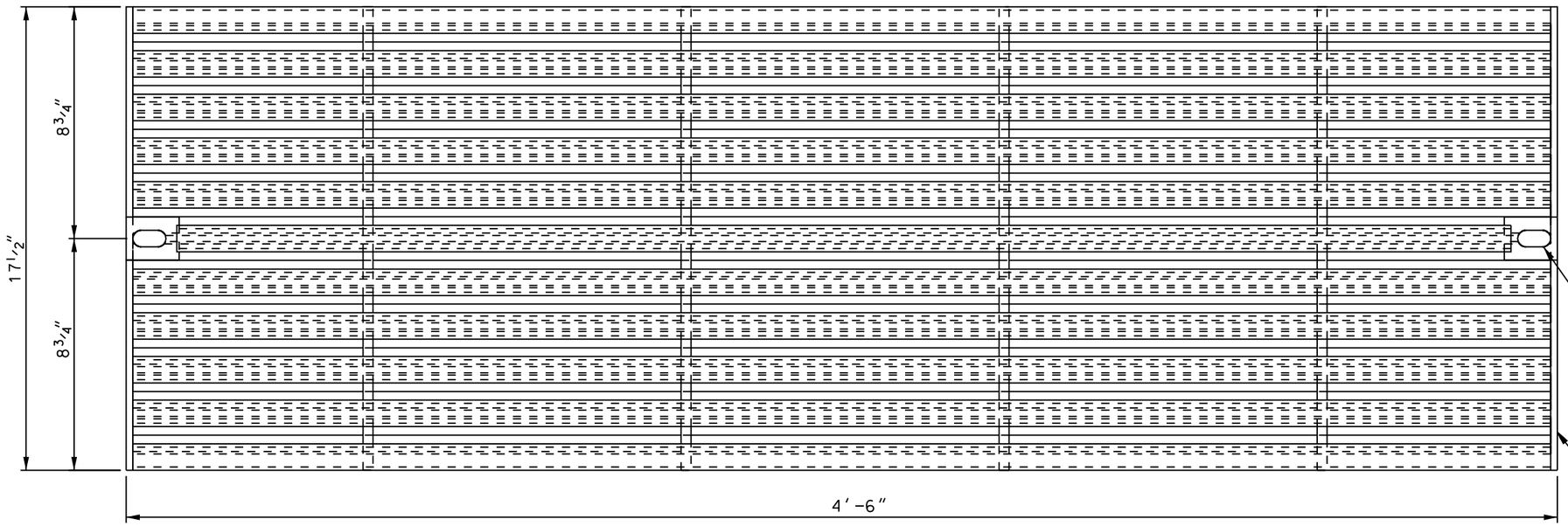
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

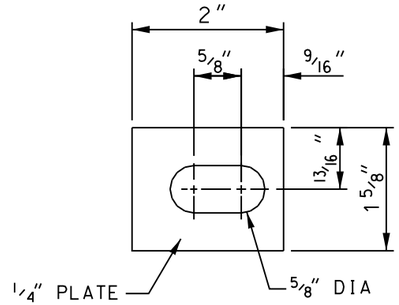
DESIGN	DRAFTING
JUAN AVALOS	E.H.PERDOMO
OK	CHECKER
APPROVED JIM MAGULA	DATE 03/10/11

PRECAST CABLE TRENCH BOX (VARIOUS SIZE AND TYPE) FOR CORRESPONDING 9′X12′ PRECAST TRANSFORMER PAD W/HANDHOLE

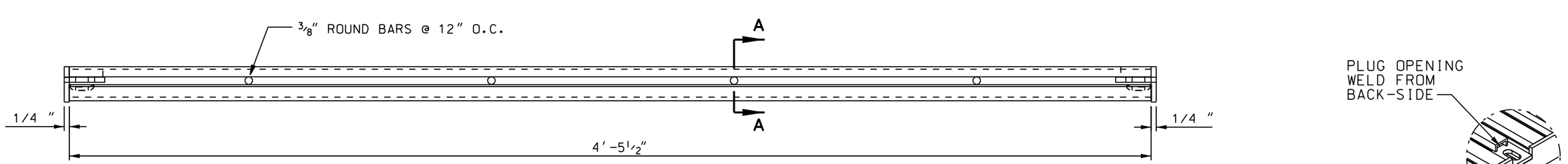
UB721-20

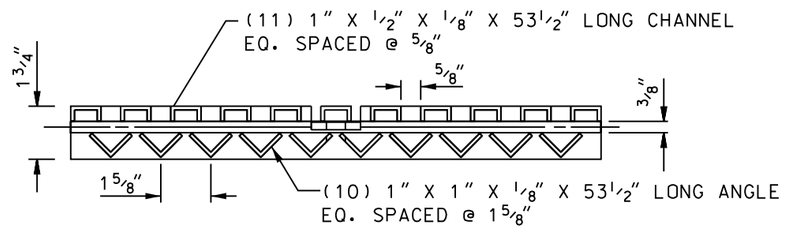
INDEX





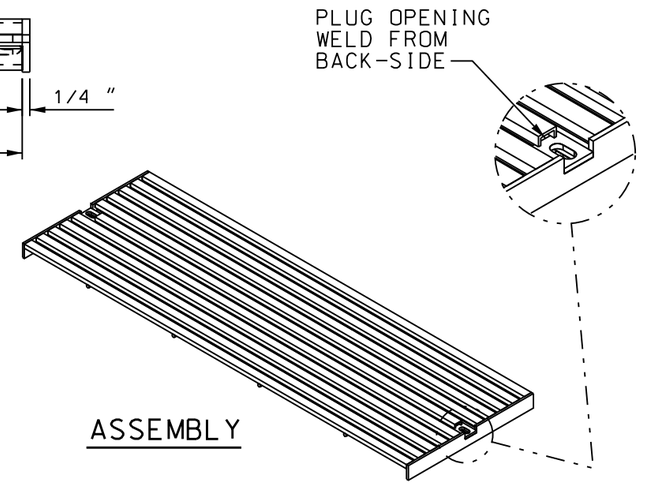
DETAIL "C"





SECTION "A-A"

DETAIL "3"
CABLE TRENCH BOX GRATE
(TO BE GALVANIZED AFTER FABRICATION)



ASSEMBLY

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
1	05/20/11	EHP	SEE SHTS. 1.2.3.4.&7 FOR REVISIONS	J.M.A.	

CE47565
4-1-11

DISTRICT | CONTRACT W.O. | DWP W.O.

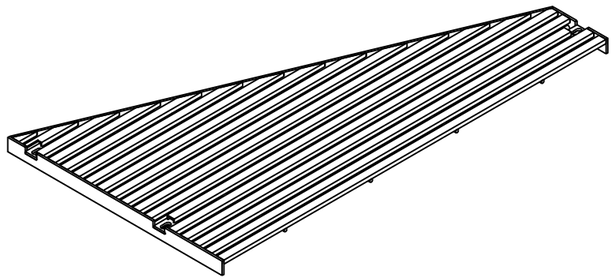
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN JUAN AVALOS | DRAFTING E.H.PERDOMO
OK | CHECKER
APPROVED JIM MAGULA | DATE 03/10/11

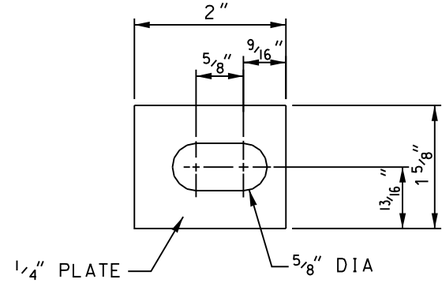
PRECAST CABLE TRENCH BOX (VARIOUS SIZE AND TYPE) FOR CORRESPONDING 9'X12' PRECAST TRANSFORMER PAD W/HANDHOLE

UB721-20 | SHEET 5 OF 7

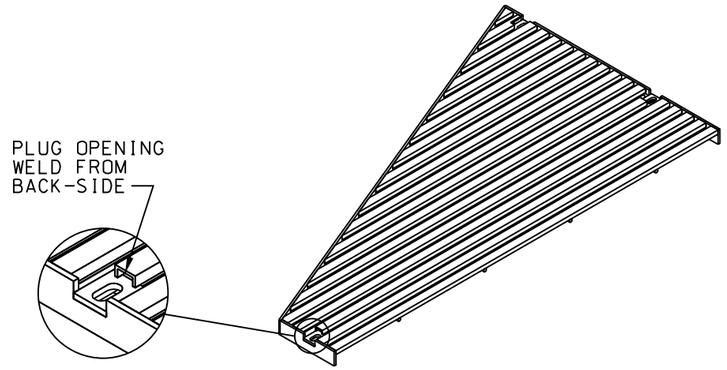
INDEX



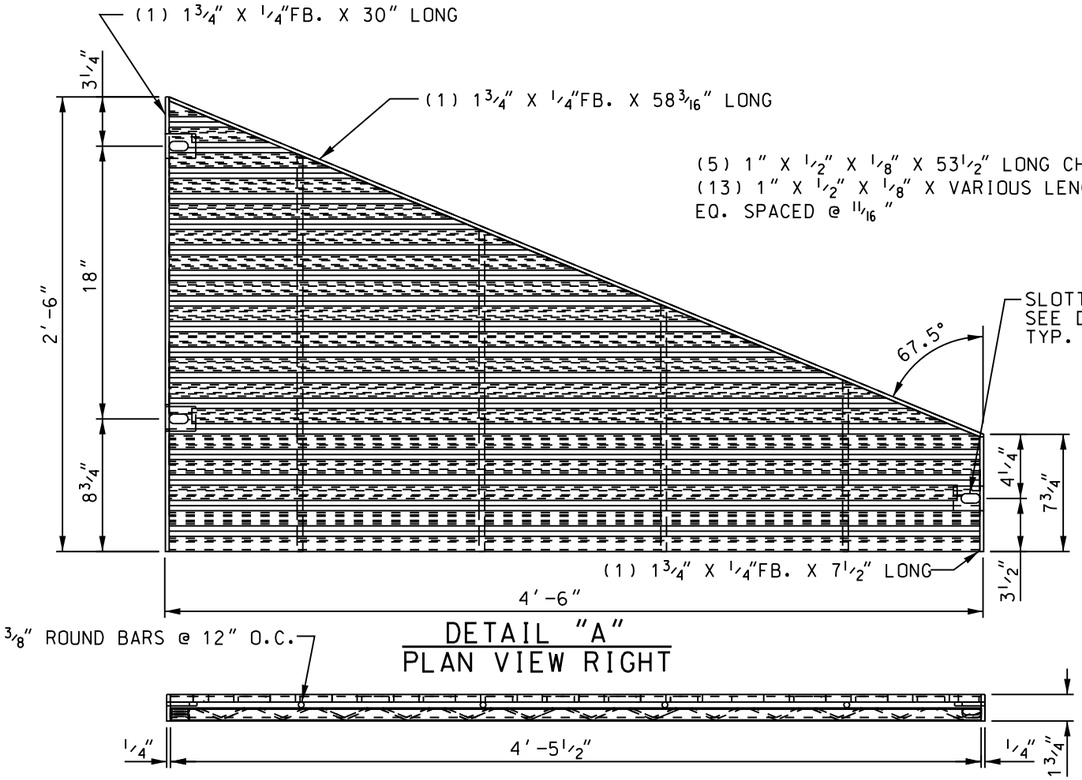
RIGHT ASSEMBLY



DETAIL "C"

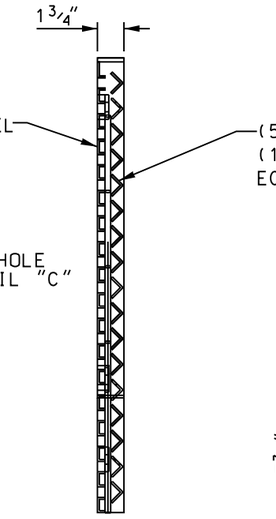


LEFT ASSEMBLY



DETAIL "A"
PLAN VIEW RIGHT

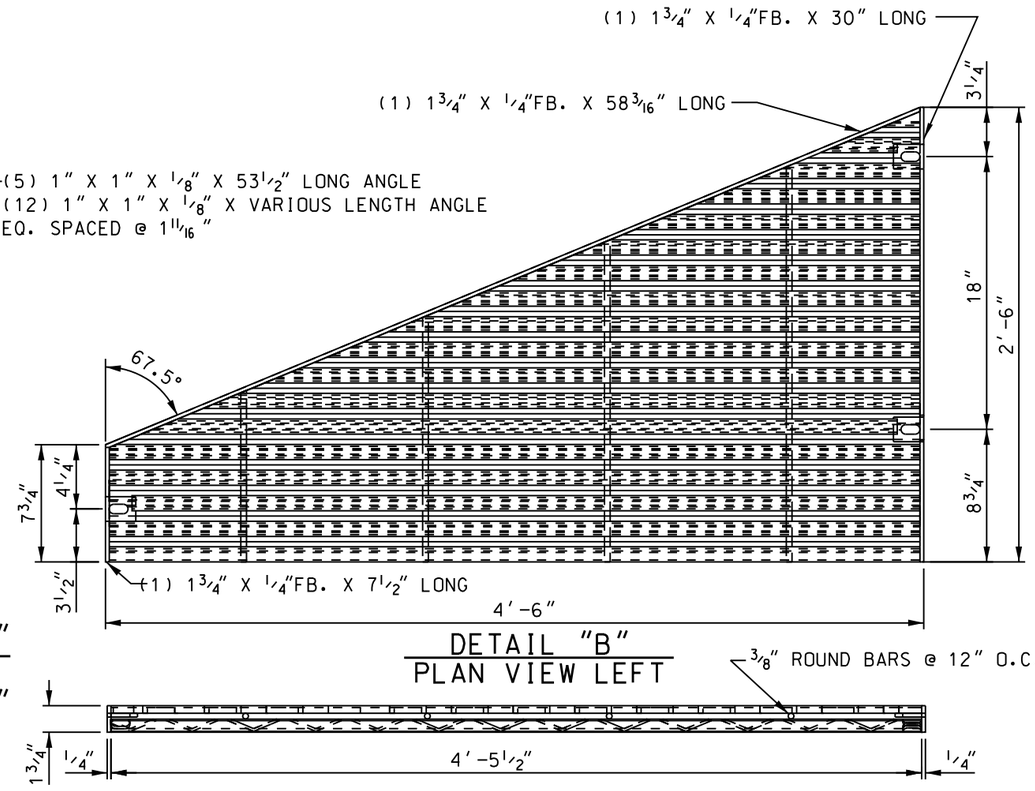
SIDE VIEW



(5) 1" X 1/2" X 1/8" X 53 1/2" LONG CHANNEL
(13) 1" X 1/2" X 1/8" X VARIOUS LENGTH
EQ. SPACED @ 11/16"

(5) 1" X 1" X 1/8" X 53 1/2" LONG ANGLE
(12) 1" X 1" X 1/8" X VARIOUS LENGTH ANGLE
EQ. SPACED @ 1 11/16"

END VIEW
FOR DETAIL "A"
MIRROR IMAGE
FOR DETAIL "B"



DETAIL "B"
PLAN VIEW LEFT

SIDE VIEW

ANGLED CABLE TRENCH BOX GRATE

(TO BE GALVANIZED AFTER FABRICATION)

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
1	05/20/11	EHP	SEE SHTS. 1,2,3,4,&7 FOR REVISIONS	J.M.A.	

CE47565
4-1-11

DISTRICT	CONTRACT W.O.	DWP W.O.	

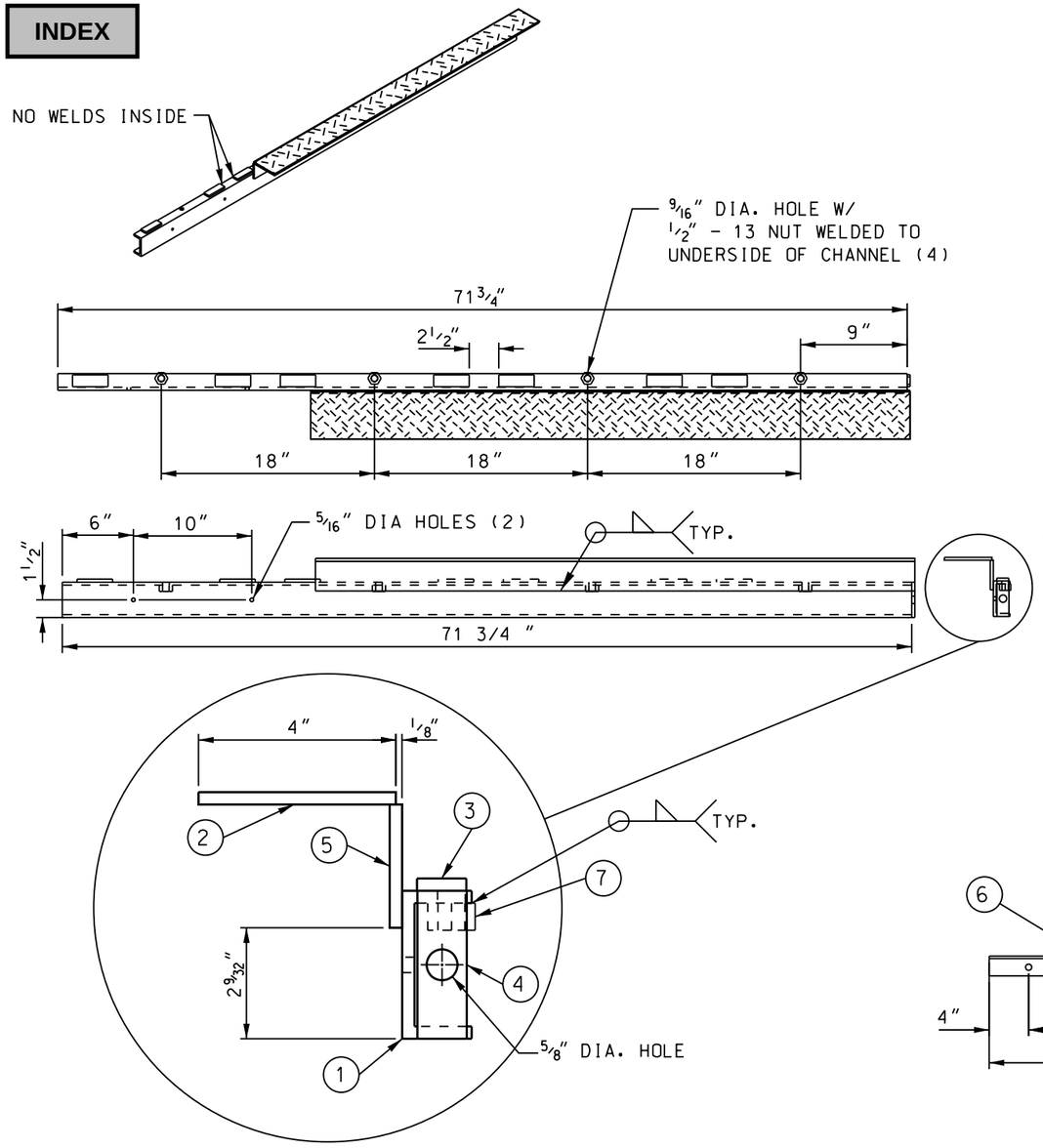
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN JUAN AVALOS	DRAFTING E.H.PERDOMO		
OK	CHECKER		
APPROVED JIM MAGULA	DATE 03/10/11		

PRECAST CABLE TRENCH BOX
(VARIOUS SIZE AND TYPE)
FOR CORRESPONDING 9'X12'
PRECAST TRANSFORMER PAD
W/HANDHOLE

UB721-20 | SHEET 6 OF 7

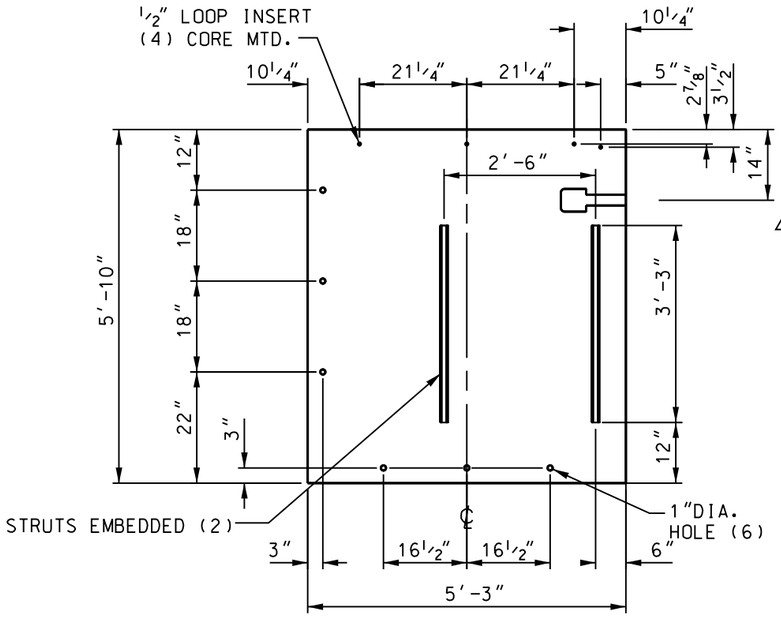
INDEX



DETAIL "4"

REMOVABLE BEAM ASSEMBLY

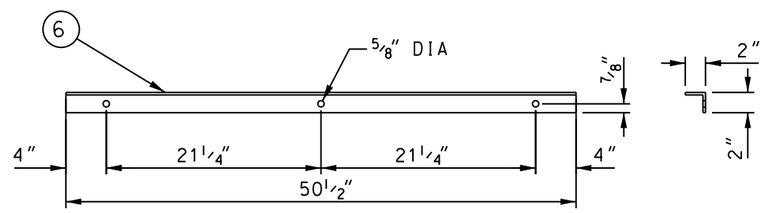
(RIGHT BEAM SHOWN. LEFT BEAM IS MIRROR IMAGE.
1 GALVANIZE AFTER FABRICATION.
TO BE INSTALLED FOR SHIPMENT)



DETAIL "6"

END CAP BOLT ON

(LEFT ASSEMBLY IS A MIRROR IMAGE)



DETAIL "5"

ANGLE BOLTED TO END CAP

1 (TO BE GALVANIZED AFTER FABRICATION)

REQUIREMENTS FOR FABRICATION AND INSTALLATION

TRENCH BOX SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DWP STANDARD SPECIFICATIONS NO. P178, AS LAST REVISED AND AS MODIFIED HERE ON.

STRUT AND BOLT INSTALLATION SHALL WITHSTAND A MINIMUM SHEAR LOAD OF 300 LBS/LF AND A PULL OUT LOAD OF 150 LBS/BOLT. MAXIMUM SPACING REQUIRED IS 16" O.C. AND 3" FROM EACH END OF STRUT, UNLESS OTHERWISE NOTED.

1 ALL STRUTS SHALL BE HOT DIP GALVANIZED CONTINUOUS CONCRETE INSERTS AND SHALL BE FLUSH WITH CONCRETE SURFACE. ALL STRUTS SHALL BE OF SIZE 1 5/8"X1 5/8" 12 GAUGE (UNISTRUT P3200 SERIES).

MANUFACTURER TO DELIVER PREFABRICATED TRENCH BOX TO JOB SITE AND SUPPLY SPREADER BAR FOR UNLOADING. DWP OR INSTALLING CONTRACTOR SHALL PROVIDE MEANS FOR UNLOADING AND SETTING PRECAST UNITS.

SELECT A LOCATION FREE OF SUBSTRUCTURES, CLEAR OF OVERHEAD OBSTRUCTIONS THAT WOULD INTERFERE WITH THE BOOM OF A CRANE AND HAVE AMPLE WORKING ROOM FOR A CRANE TO UNLOAD THE SECTION FROM A TRUCK INTO THE EXCAVATION.

DO NOT REMOVE ANY FLOOR KNOCKOUT.

TRENCH BOX SHALL BE SET ON A COMPACTED LEVEL BED OF CRUSHED AGGREGATE BASE.

TRENCH BOX SHALL BE REJECTED IF ANY PORTION OR KEY WAY, 12" OR LONGER, IS MISSING OR DAMAGED.

TRENCH BOX SECTIONS SHALL BE SET WITH SEALING COMPOUND APPROVED BY THE DWP UNDERGROUND ENGINEER AND SUPPLIED WITH TRENCH BOX.

BACKFILL SHALL BE NATURAL MATERIAL COMPACTED TO 90%. AS AN ALTERNATIVE, BACKFILL SHALL BE 100-E-100 SAND CEMENT SLURRY, OR AS SPECIFIED IN DWP UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO. 104, AS LAST REVISED.

WEIGHT AND ALL OUTSIDE DIMENSIONS VARY WITH MANUFACTURER. VALUES GIVEN ARE LARGEST SHOWN ON MANUFACTURER'S DRAWINGS. PRIOR TO EXCAVATION, STRUCTURE INSTALLER SHALL OBTAIN THE MINIMUM REQUIRED EXCAVATION SIZE FROM THE MANUFACTURER SUPPLYING THE STRUCTURE.

ALL TRENCH BOXES SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS FOR DWP UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO. 104, AS LAST REVISED.

1 LADWP SHALL BOND THE STAINLESS STEEL FIRE BARRIER MOUNTING PLATE FROM THE TRANSITION BOX TO THE METALLIC STRUT BRACKET HARDWARE IN THE CABLE TRENCH, THEN FROM THE CABLE TRENCH TO THE METALLIC HARDWARE OF THE PRECAST TRANSFORMER PAD. BONDING WIRE SHALL CONSIST OF EITHER 1-4/0 BARE STRANDED COPPER WIRE (M.C. 34-08-154) OR 2-2/0 BARE STRANDED COPPER WIRES (M.C. 34-08-152).

NOTES:

1. C3 X 4.1 STEEL CHANNEL X 71 3/4" LONG.
2. 4" X 50 1/2" X 1/4" DIAMOND PLATE.
3. (7) 3" X 1" X 1/4" FB.
4. (1) 1" X 3" X 1/4" FB. (1) 5/8" CENTER HOLE.
5. (1) 2 1/2" X 50 1/2" X 1/4" FB.
6. 2" X 2" X 1/4" ANGLE X 50 1/2" LONG.
7. 1/2"-13 NUT WELDED TO UNDERSIDE OF CHANNEL. (4)

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
1	05/20/11	EHP	ADDED "GALV." STRUT NOTES TO DETAILS "4" AND "5". INCLUDED GALV. STRUT SIZE NOTE.	J.M.A.	
			ADDED INSTRUCTIONS ON REQ F/FAB & INSTALL.		

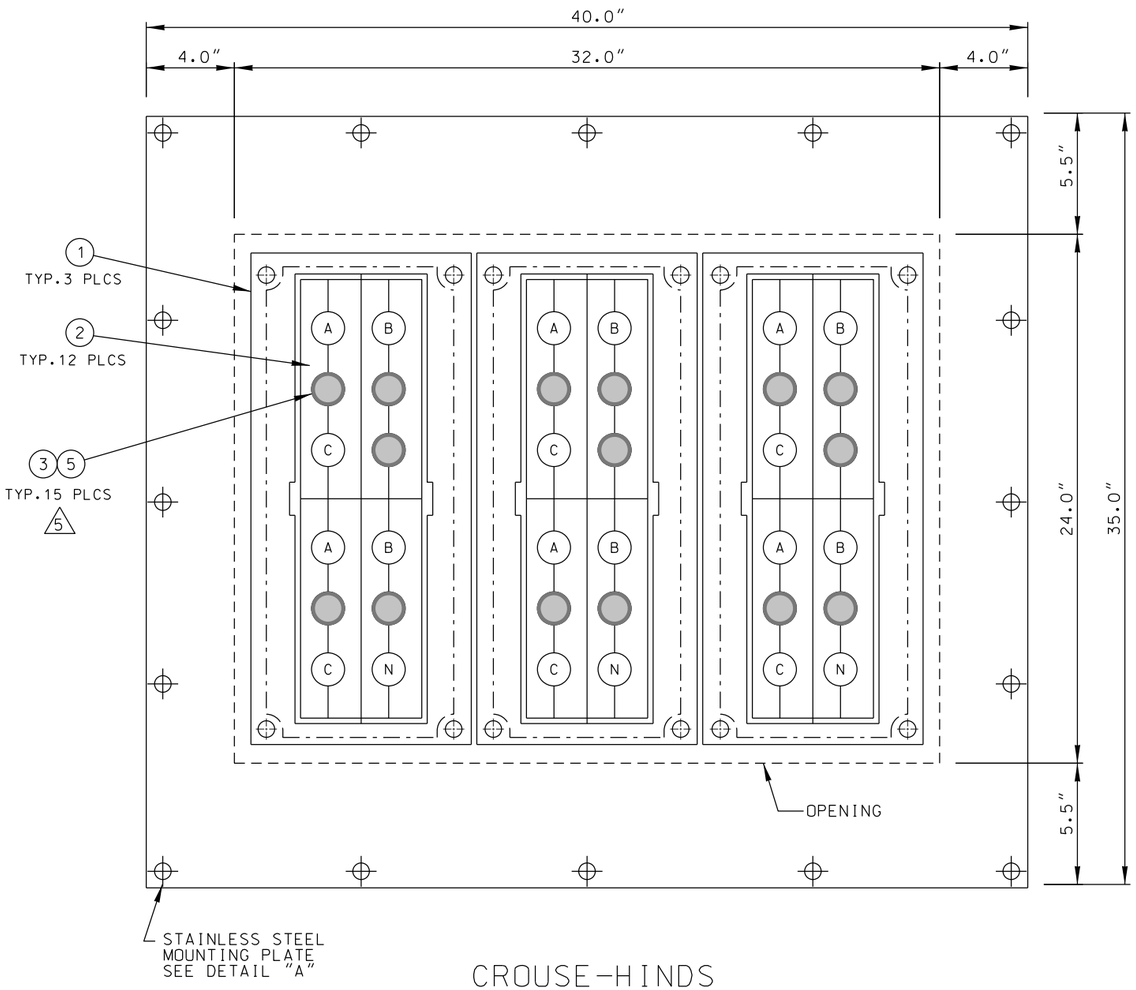
DWP

CE47565
4-1-11

DISTRICT	CONTRACT W.O.	DWP W.O.	
CITY OF LOS ANGELES DEPARTMENT OF WATER AND POWER DISTRIBUTION ENGINEERING & SERVICES SECTION		PRECAST CABLE TRENCH BOX (VARIOUS SIZE AND TYPE) FOR CORRESPONDING 9'X12' PRECAST TRANSFORMER PAD W/HANDHOLE	
DESIGN JUAN AVALOS	DRAFTING E.H.PERDOMO		
OK	CHECKER		
APPROVED JIM MAGULA	DATE 03/10/11	UB721-20	SHEET 7 OF 7

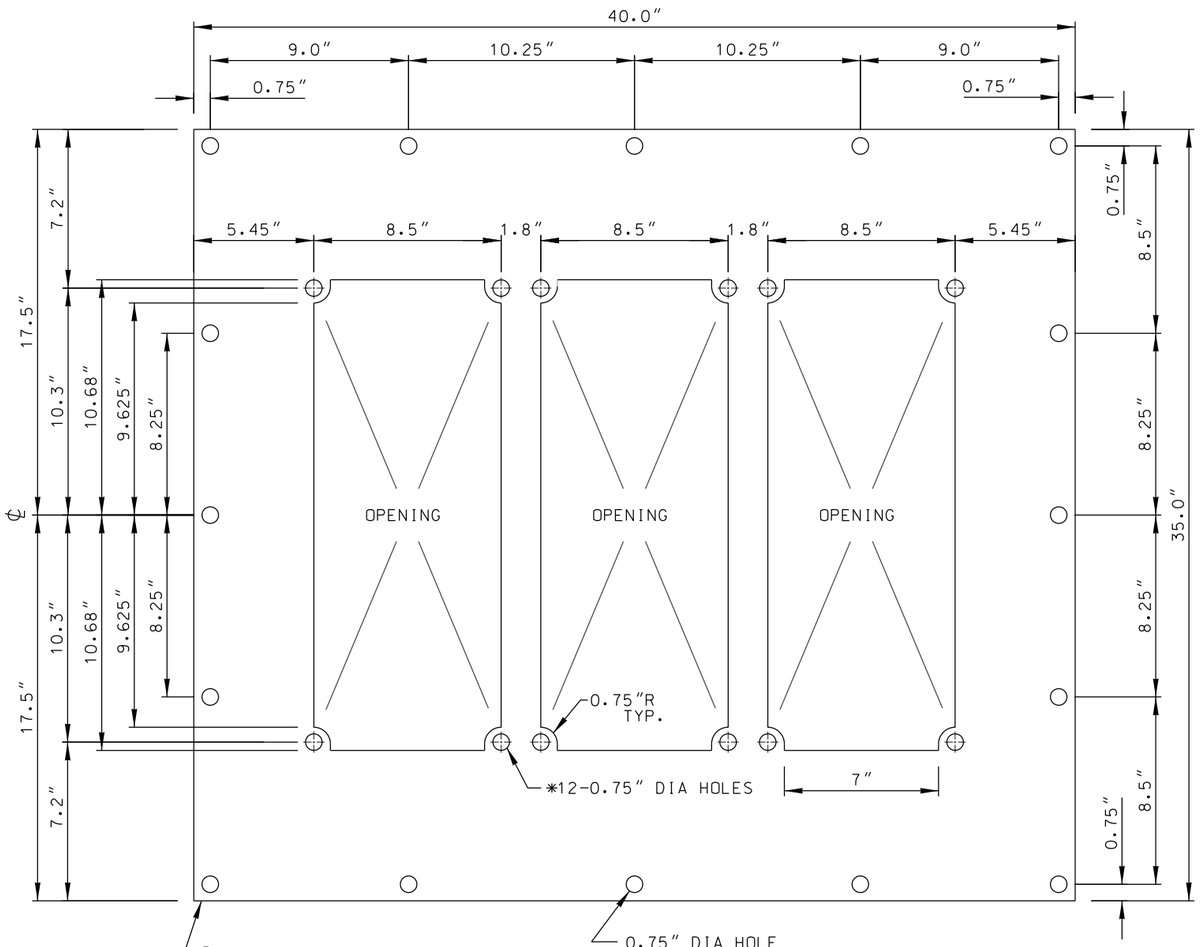
INDEX

MATERIAL LIST				
ITEM	QTY.	DESCRIPTION	PART NO.	MANUFACTURER
1	3	MOUNTING FRAME	TWF12	CROUSE-HINDS
2	12	SEAL BLOCKING ASSY. SET	TWB30355	CROUSE-HINDS
3	15	PLUG	TWP5	CROUSE-HINDS
4	24	GASKET, TECRON, ROLL	AA0235	NELSON
△5	5	15	REDUCER	TWR55	CROUSE-HINDS



CROUSE-HINDS

TW SERIES THRU-WALL BARRIER
4000 AND 5000 A SERVICE



SST MOUNTING PLATE "A"

PLATE "A", DIMENSION TOLERANCE ±1/32"
△5 SEE NOTE 11 ON SHEET 3.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
△5	08/28/19	EAS	REVISED DIMENSIONS & ADDED REDUCER	KP	
△4	05/11/11	EHP	ADDED NOTE 12 ON SHEET 3	JG	
△3	08/13/10	EHP	REV PART LIST, ASSEMBLY, & NOTES	JA	
WY △2	07/12/10	EHP	REV OPENING & DIM. AND ADDED NOTE #10	JA	
△1	06/18/10	EHP	REVISED DIMENSIONS	JA	

DWP

DISTRICT	CONTRACT W.O.	DWP W.O.

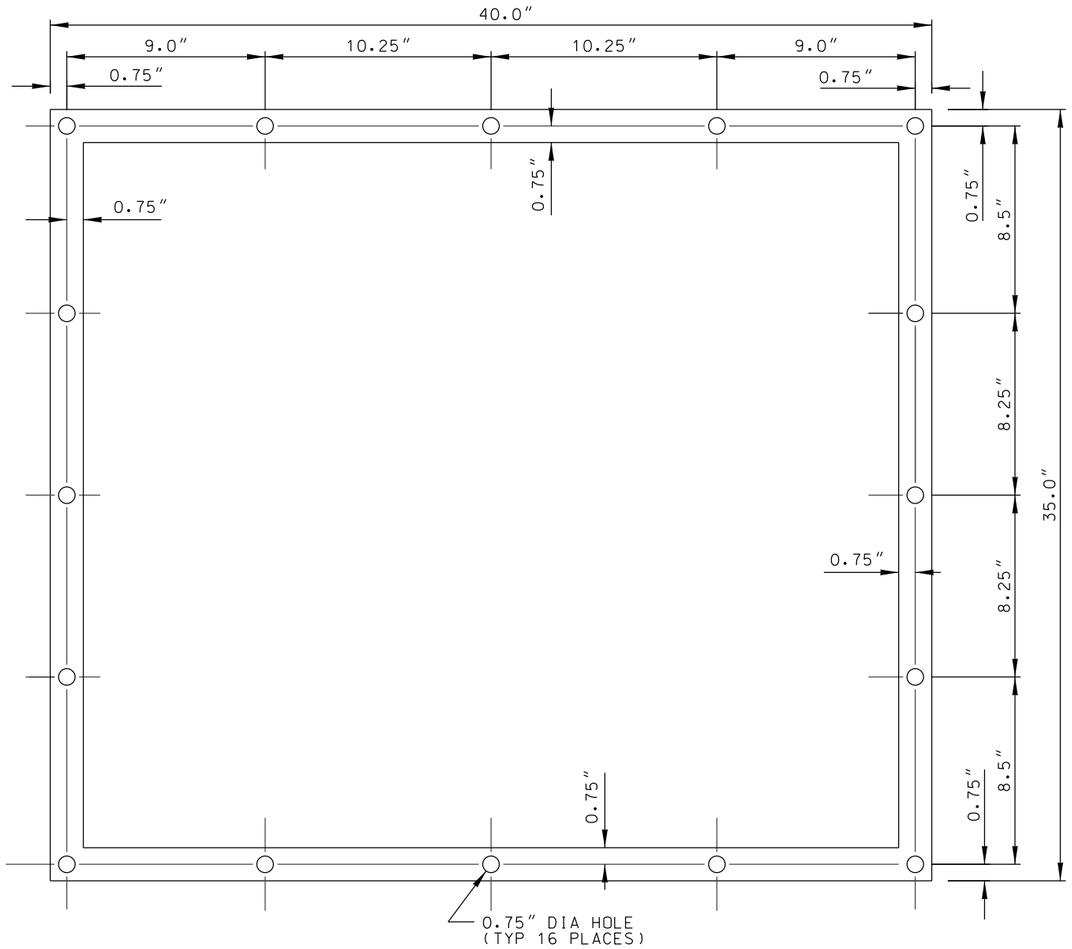
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN JESUS ASIAIN	DRAFTING J.GARCIA
OK JESUS ASIAIN	CHECKER W. YCEDO
JESUS ASIAIN E-012446 APPROVED	DATE 09/17/2009

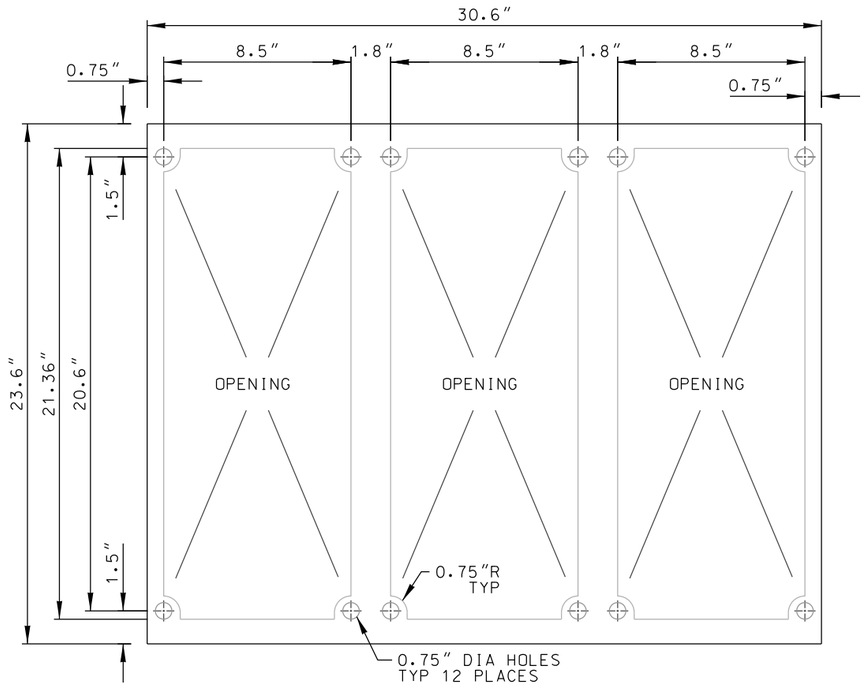
WALL MOUNTED
THREE HOUR RATED
FIRE BARRIER
(CROUSE-HINDS)
4000A AND 5000A SERVICE

UB721-21 | SHEET 1 OF 3

INDEX



GASKET#1 DETAIL



GASKET#2 DETAIL

△5

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
△5	08/28/19	EAS	REVISED DIMENSIONS & ADDED REDUCER	KP	
△4	05/11/11	EHP	ADDED NOTE 12 ON SHEET 3	JG	
△3	08/13/10	EHP	REV PART LIST, ASSEMBLY, & NOTES	JA	
△2	07/12/10	EHP	REV OPENING & DIM. AND ADDED NOTE #10	JA	
△1	06/18/10	EHP	REVISED DIMENSIONS	JA	

DWG

DISTRICT | CONTRACT W.O. | DWP W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN JESUS ASIAIN | DRAFTING J.GARCIA
OK JESUS ASIAIN | CHECKER W. YCEDO
JESUS ASIAIN E-012446 APPROVED | DATE 09/17/2009

WALL MOUNTED
THREE HOUR RATED
FIRE BARRIER
(CROUSE-HINDS)
4000A AND 5000A SERVICE

UB721-21 | SHEET 2 OF 3

INDEX

NOTES;

1. THE CUSTOMER SHALL FURNISH A 3-HOUR FIRE-RATED CABLE SEALING DEVICE OR DEVICES.

2. THE CABLE SEALING DEVICE OR DEVICES SHALL INCLUDE ALL NECESSARY FITTINGS AND WALL FLANGES THAT ARE IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL FIRE PROTECTION ASSOCIATION FOR CLASS"A" OPENINGS. ADDITIONALLY, ALL SUPPORTING STRUCTURES AND MISCELLANEOUS PARTS REQUIRED TO MAKE A COMPLETE INSTALLATION SHALL BE PROVIDED.

3. THE CUSTOMER SHALL INSTALL THE MOUNTING PLATE, GASKET #1 AND GASKET #2. SEE NOTES 9 AND 10.

4. DWP SHALL INSTALL THE CABLE SEALING DEVICE FROM PARTS PROVIDED BY THE CUSTOMER.

5. THE CUSTOMER SHALL PURCHASE, OWN, AND MAINTAIN THE CABLE SEALING DEVICE OR DEVICES.

6. THE CONDUCTORS FOR THIS POWER SYSTEM WILL BE FURNISHED AND INSTALLED BY DWP AND WILL CONSIST OF A MAXIMUM OF SIX 929 kCMIL COPPER CONDUCTORS PER PHASE AND THREE 929 kCMIL COPPER CONDUCTORS FOR THE NEUTRAL. THE CONDUCTORS SHALL HAVE RHH/RHW INSULATION. THE MAXIMUM DIAMETER FOR THE PHASE AND NEUTRAL CONDUCTORS SHALL BE 1.68".

7. ALL DWP CONDUCTORS SHALL TERMINATE IN A LISTED AND APPROVED 5000 AMPERE BUSSED TERMINATING ENCLOSURE.

8. THE CUSTOMER'S WALL OPENING SHALL ALIGN WITH THE 24"H X 32"W OPENING ON THE LAST MODULAR TRENCH. SEE DRAWING UB721-20.

9. INSTALL GASKET #1 BETWEEN THE 3-HOUR FIRE-RATED WALL AND THE STAINLESS STEEL MOUNTING PLATE. SEE SHEET 2 FOR GASKET DETAILS. FABRICATE THE GASKET FROM THE NELSON CATALOG #AA0235 "TECHRON" ROLLS.

10. INSTALL GASKET #2 BETWEEN THE MOUNTING PLATE AND EACH CROUSE-HINDS TWF12 FRAME.

11. ANY PROCESS USED WHETHER WATER JET, PLASMA, LASER OR EQUIVALENT PROCESSES SHALL NOT PRODUCE A TOTAL PLANAR DISTORTION OF 1/16 INCH ON THE LENGTH AND WIDTH OF THE MOUNTING PLATE. IN ADDITION, ALL CUTS SHALL BE SMOOTH AND FREE OF BURRS.

△4 12. LADWP SHALL BOND THE STAINLESS STEEL FIRE BARRIER MOUNTING PLATE FROM THE TRANSITION BOX TO THE METALLIC STRUT BRACKET HARDWARE IN THE CABLE TRENCH, THEN FROM THE CABLE TRENCH TO THE METALLIC HARDWARE OF THE PRECAST TRANSFORMER PAD. BONDING WIRE SHALL CONSIST OF EITHER 1-4/0 BARE STRANDED COPPER WIRE (M.C. 34-08-154) OR 2-2/0 BARE STRANDED COPPER WIRES (M.C. 34-08-152).

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
△5	08/28/19	EAS	REVISED DIMENSIONS & ADDED REDUCER	KP	
△4	05/11/11	EHP	ADDED NOTE 12 ON SHEET 3	JG	
△3	08/13/10	EHP	REV PART LIST, ASSEMBLY, & NOTES	JA	
△2	07/12/10	EHP	REV OPENING & DIM. AND ADDED NOTE #10	JA	
△1	06/18/10	EHP	REVISED DIMENSIONS	JA	

DWP

DISTRICT | CONTRACT W.O. | DWP W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN JESUS ASIAIN | DRAFTING J.GARCIA
OK JESUS ASIAIN | CHECKER W. YCEDO
JESUS ASIAIN E-012446 APPROVED | DATE 09/17/2009

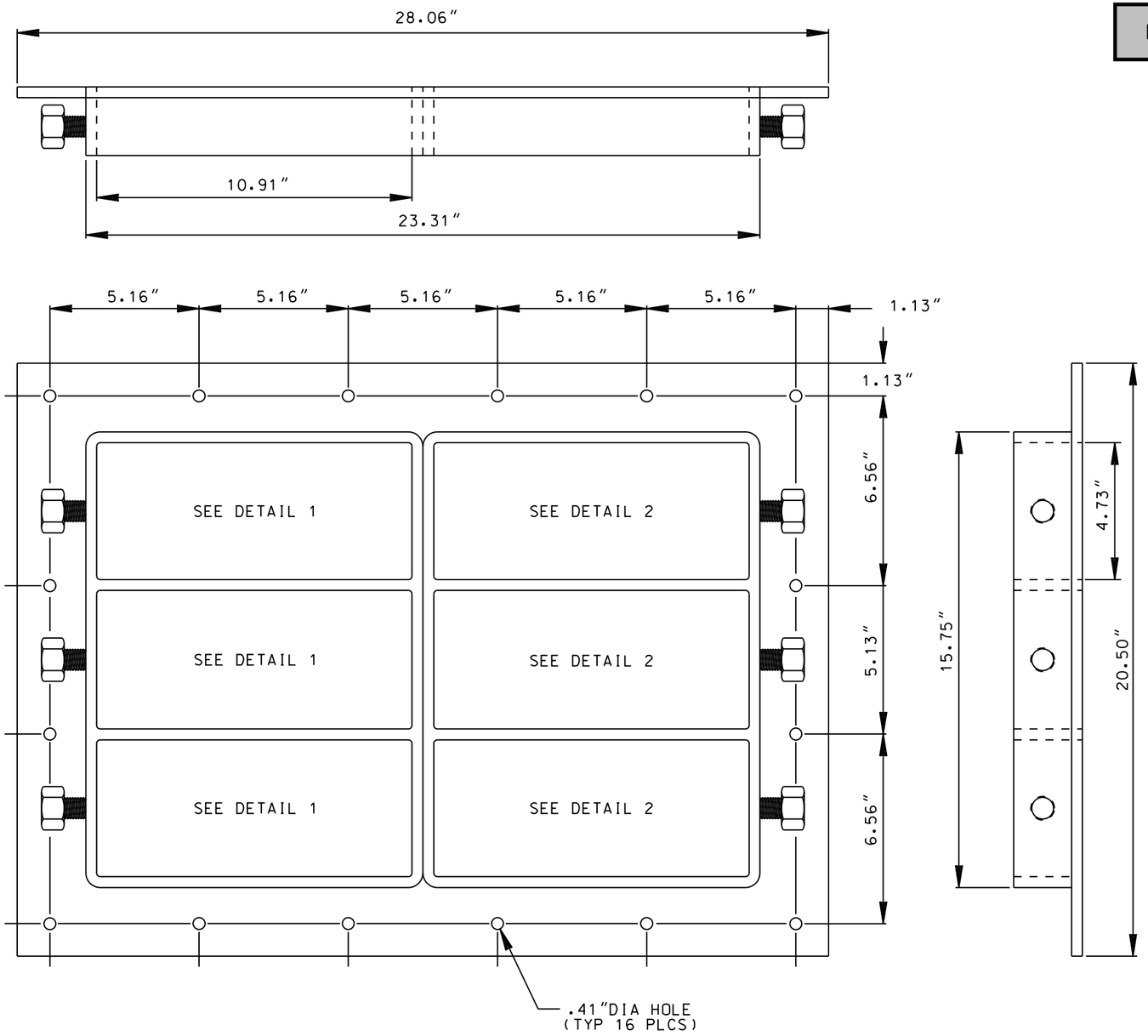
WALL MOUNTED THREE HOUR RATED FIRE BARRIER (CROUSE-HINDS) 4000A AND 5000A SERVICE

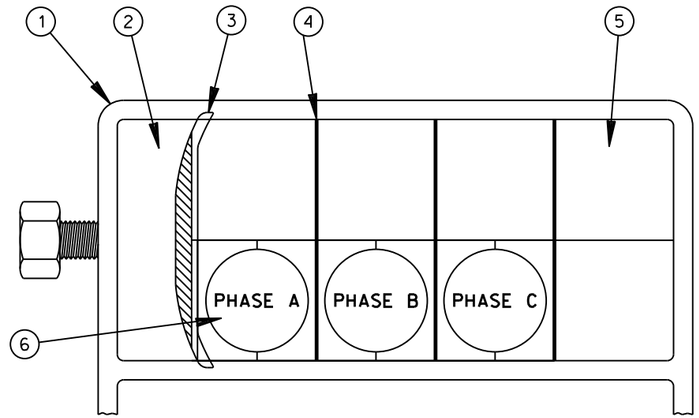
UB721-21 | SHEET 3 OF 3

INDEX

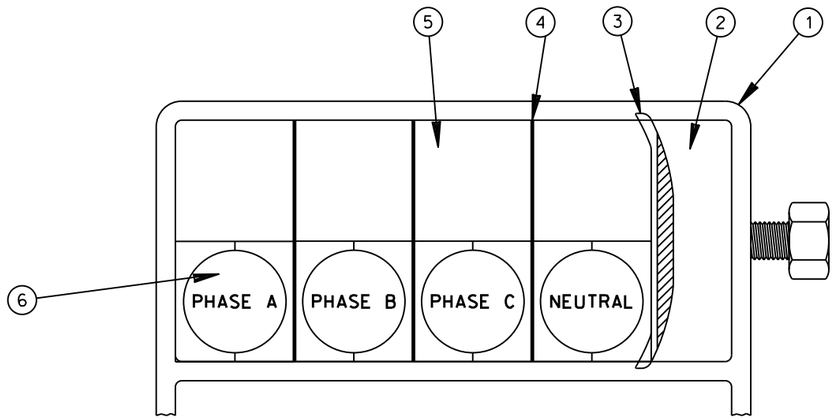
MATERIAL LIST				
ITEM	QTY.	DESCRIPTION	PART NO.	MANUFACTURER
1	1	FRAME	RGMBX3T	NELSON
2	6	END PACKING HARDWARE	AA0147	NELSON
3	6	COMPRESSION PLATE	AA126112	NELSON
4	18	STAY PLATE, ALUMINUM	AA0127	NELSON
5	27	MODULE, BLANK 60MM	60/0	NELSON
6	21	MODULE, CABLE HOLDING	60/42	NELSON
*7	16	GASKET, TECRON, ROLL	AA0235	NELSON

* SEE NOTES 9, 10 AND 11 ON SHEET 3





MULTI-CABLE TRANSIT DETAIL "1"



MULTI-CABLE TRANSIT DETAIL "2"

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
4	05/09/11	EHP	SEE SHT. 3 FOR REVISION	JG	
3	08/13/10	EHP	ADDED NEW DETAIL#2.REV.DETAIL#1.	JA	
			MATERIAL LIST. & NOTES.		
2	07/12/10	EHP	ADDED NOTE 12 ON SHEET 3.	JA	
1	06/17/10	EHP	REVISED DIMENSIONS ON SHT. 2	JA	

DISTRICT | W.O. | W.O.

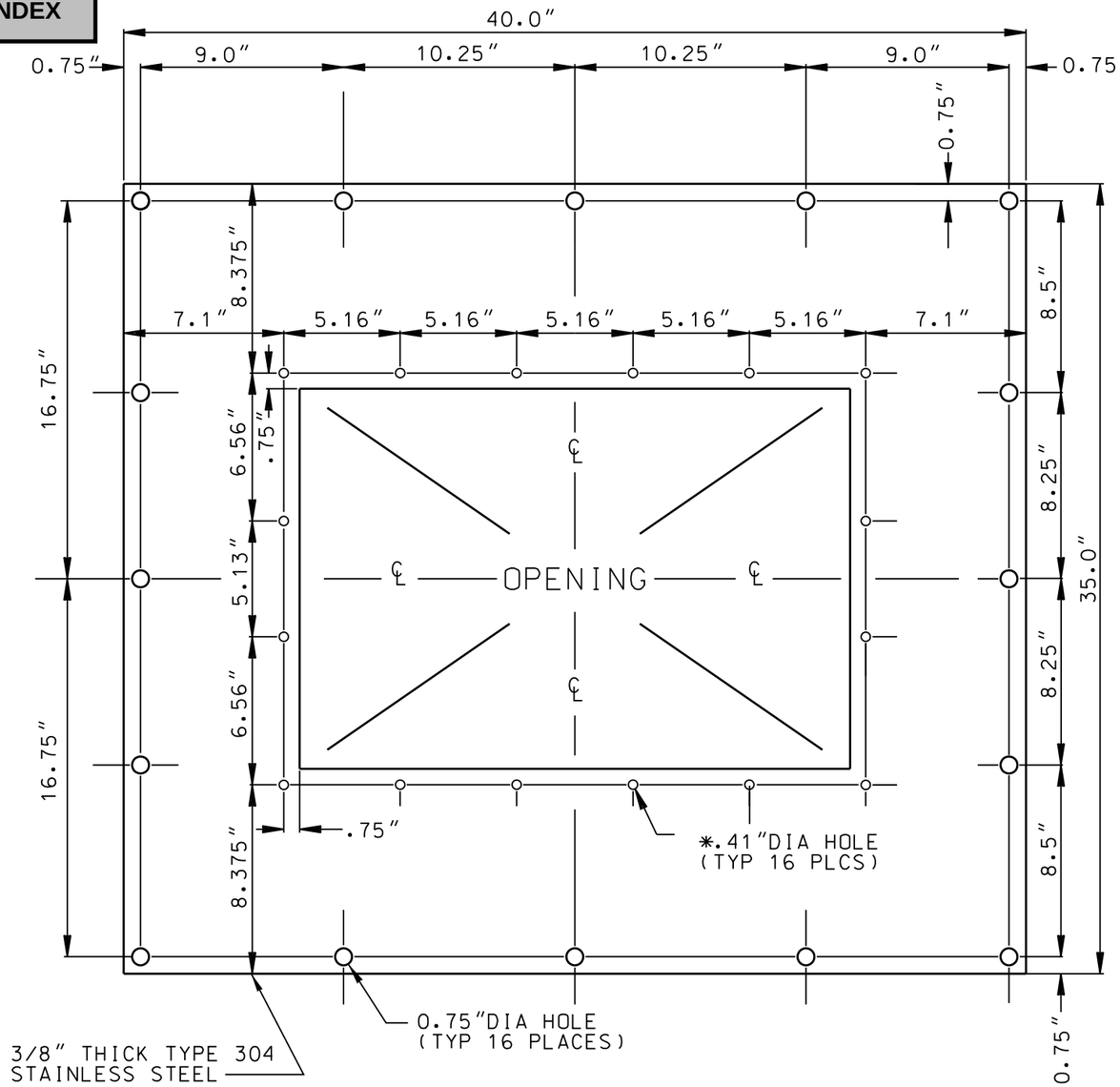
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN JESUS ASIAIN | DRAFTING J.GARCIA/E.PERDOMO
OK JESUS ASIAIN | CHECKER W. YCEDO
APPROVED JESUS ASIAIN E-012446 | DATE SEPT. 17.2009

WALL MOUNTED THREE HOUR RATED FIRE BARRIER (NELSON FIRESTOP) 4000A AND 5000A SERVICE

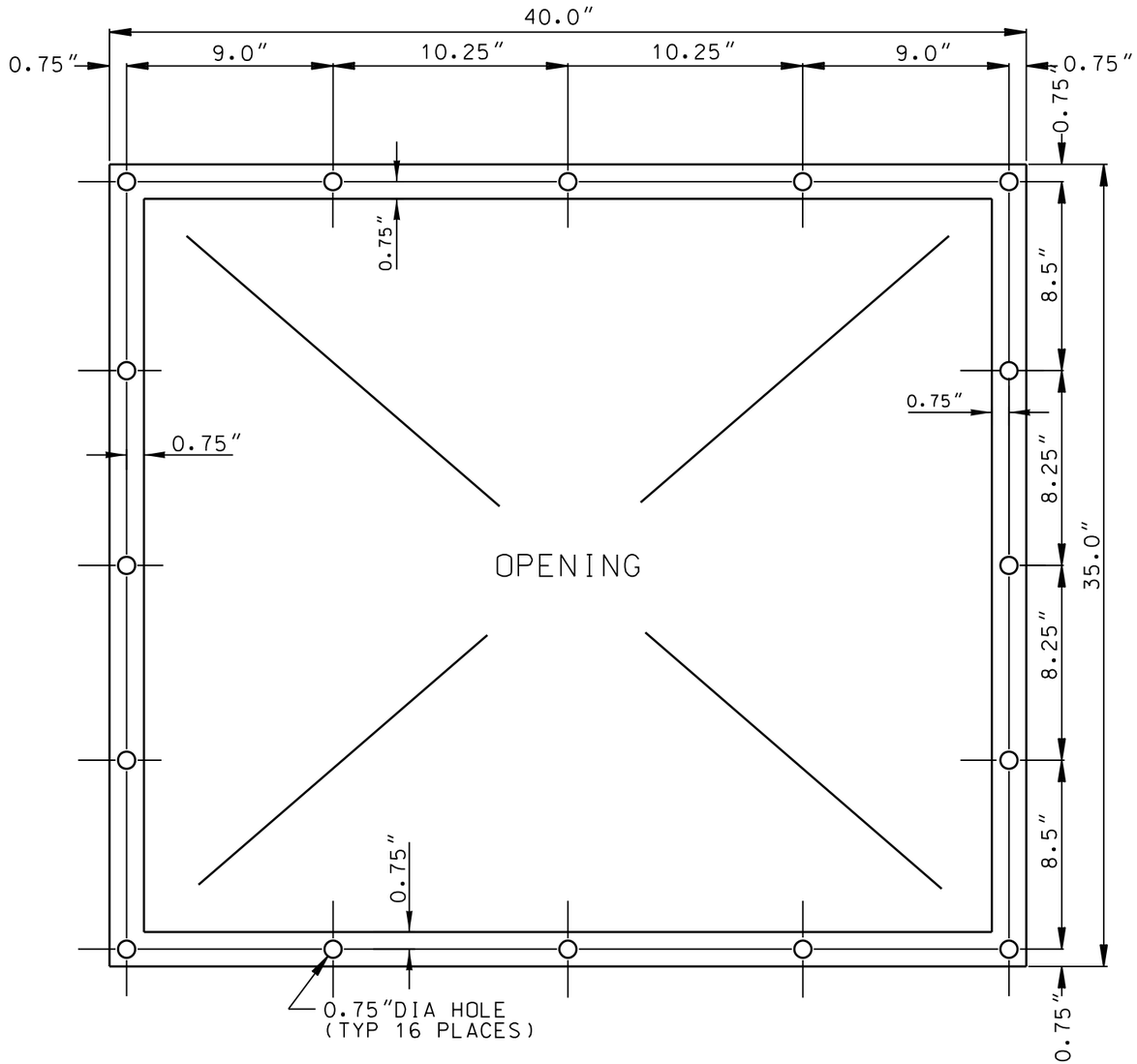
UB721-22 | SHEET 1 OF 3

INDEX



SST STEEL MOUNTING PLATE "B"

PLATE "B" DIMENSION TOLERANCE +1/32"
SEE NOTE 12 ON SHEET 3.



GASKET#1 (NELSON)

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
4	05/09/11	EHP	SEE SHT. 3 FOR REVISION	JG	
3	08/13/10	EHP	ADDED NEW DETAIL#2.REV.DETAIL#1.	JA	
			MATERIAL LIST. & NOTE #5.		
2	07/12/10	EHP	ADDED NOTE 12 ON SHEET 3.	JA	
1	06/17/10	EHP	REVISED DIMENSIONS	JA	

DRAWING

DISTRICT | CONTRACT W.O. | DWP W.O.

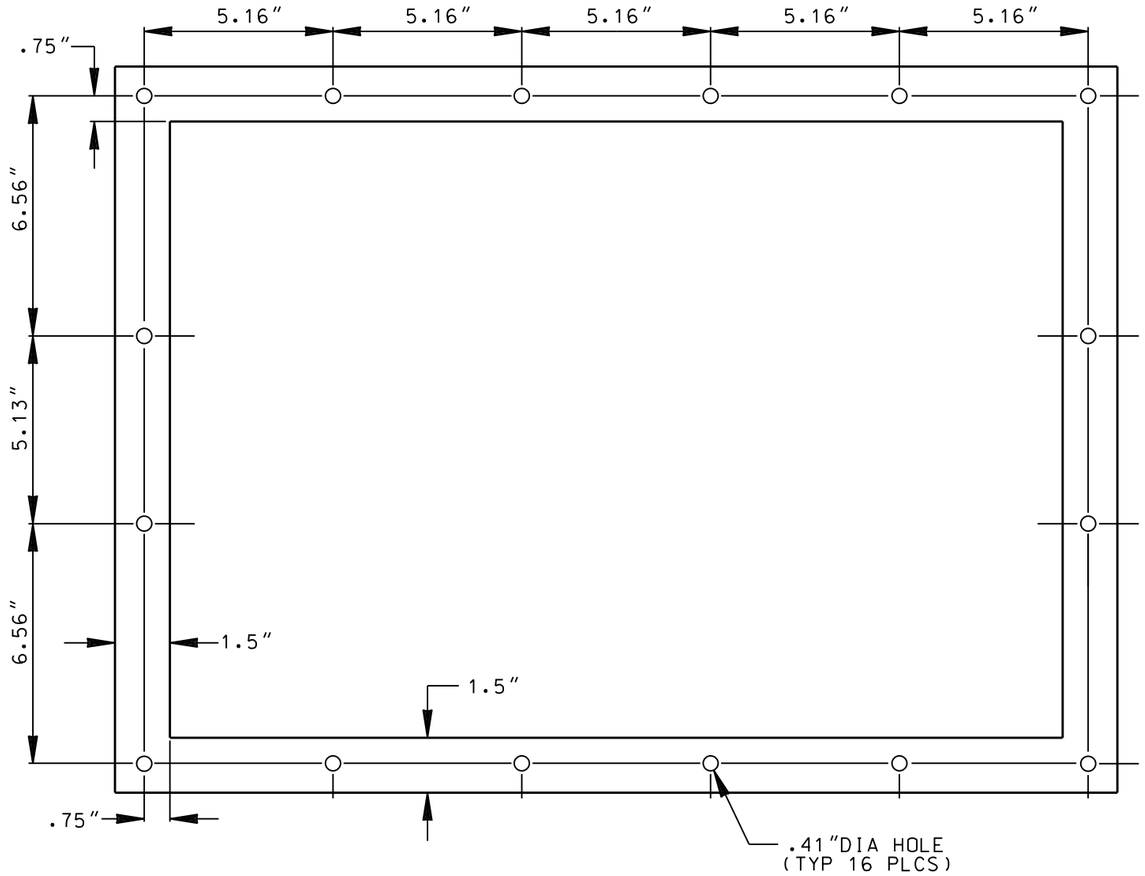
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN JESUS ASIAIN | DRAFTING J.GARCIA/E.PERDOMO
OK JESUS ASIAIN | CHECKER W. YCEDO
APPROVED JESUS ASIAIN E-012446 | DATE SEPT. 17.2009

WALL MOUNTED THREE HOUR RATED FIRE BARRIER (NELSON FIRESTOP) 4000A AND 5000A SERVICE

UB721-22 | SHEET 2 OF 3

INDEX



NELSON GASKET #2

NOTES:

1. THE CUSTOMER SHALL FURNISH A 3-HOUR FIRE-RATED CABLE SEALING DEVICE OR DEVICES.
2. THE CABLE SEALING DEVICE OR DEVICES SHALL INCLUDE ALL NECESSARY FITTINGS AND WALL FLANGES THAT ARE IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL FIRE PROTECTION ASSOCIATION FOR CLASS"A" OPENINGS. ADDITIONALLY, ALL SUPPORTING STRUCTURES AND MISCELLANEOUS PARTS REQUIRED TO MAKE A COMPLETE INSTALLATION SHALL BE PROVIDED.
3. THE CUSTOMER SHALL INSTALL THE MOUNTING PLATE, GASKET #1 AND GASKET #2. SEE NOTES 9, 10, AND 11.
4. DWP WILL INSTALL THE CABLE SEALING DEVICE FROM PARTS PROVIDED BY THE CUSTOMER.
5. THE CUSTOMER SHALL PURCHASE, OWN, AND MAINTAIN THE CABLE SEALING DEVICE OR DEVICES.
6. THE CONDUCTORS FOR THIS POWER SYSTEM WILL BE FURNISHED AND INSTALLED BY DWP AND WILL CONSIST OF A MAXIMUM OF SIX 929 kCMIL COPPER CONDUCTORS PER PHASE AND THREE 929 kCMIL COPPER CONDUCTORS FOR THE NEUTRAL. THE CONDUCTORS SHALL HAVE RHH/RHW INSULATION. THE MAXIMUM DIAMETER FOR THE PHASE AND NEUTRAL CONDUCTORS SHALL BE 1.68".
7. ALL DWP CONDUCTORS SHALL TERMINATE IN A LISTED AND APPROVED 5000 AMPERE BUSSED TERMINATING ENCLOSURE.
8. THE CUSTOMER'S WALL OPENING SHALL ALIGN WITH THE 24"H X 32"W OPENING ON THE LAST MODULAR TRENCH. SEE DRAWING UB721-20.
9. ITEM #7 ON THE MATERIAL LIST SHALL BE FABRICATED TO FORM GASKETS 1 AND 2.
10. INSTALL GASKET #1 BETWEEN THE 3-HOUR FIRE-RATED WALL AND THE STAINLESS STEEL MOUNTING PLATE. SEE SHEET 2 FOR GASKET DETAIL.
11. INSTALL GASKET #2 BETWEEN THE MOUNTING PLATE AND THE NELSON RGM8X3T FRAME.
12. ANY PROCESS USED WHETHER WATER JET, PLASMA, LASER OR EQUIVALENT PROCESSES SHALL NOT PRODUCE A TOTAL PLANAR DISTORTION OF 1/16 INCH ON THE LENGTH AND WIDTH OF THE MOUNTING PLATE, IN ADDITION, ALL CUTS SHALL BE SMOOTH AND FREE OF BURRS.
13. (4) LADWP SHALL BOND THE STAINLESS STEEL FIRE BARRIER MOUNTING PLATE FROM THE TRANSITION BOX TO THE METALLIC STRUT BRACKET HARDWARE IN THE CABLE TRENCH, THEN FROM THE CABLE TRENCH TO THE METALLIC HARDWARE OF THE PRECAST TRANSFORMER PAD. BONDING WIRE SHALL CONSIST OF EITHER 1-4/0 BARE STRANDED COPPER WIRE (M.C. 34-08-154) OR 2-2/0 BARE STRANDED COPPER WIRES (M.C. 34-08-152).

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
4	05/09/11	EHP	ADDED NOTE 13	JG	
3	08/13/10	EHP	ADDED NEW DETAIL#2,REV.DETAIL#1,	JA	
			MATERIAL LIST, & NOTES.		
2	07/12/10	EHP	ADDED NOTE 12	JA	
1	06/17/10	EHP	REVISED DIMENSIONS ON SHT. 2	JA	

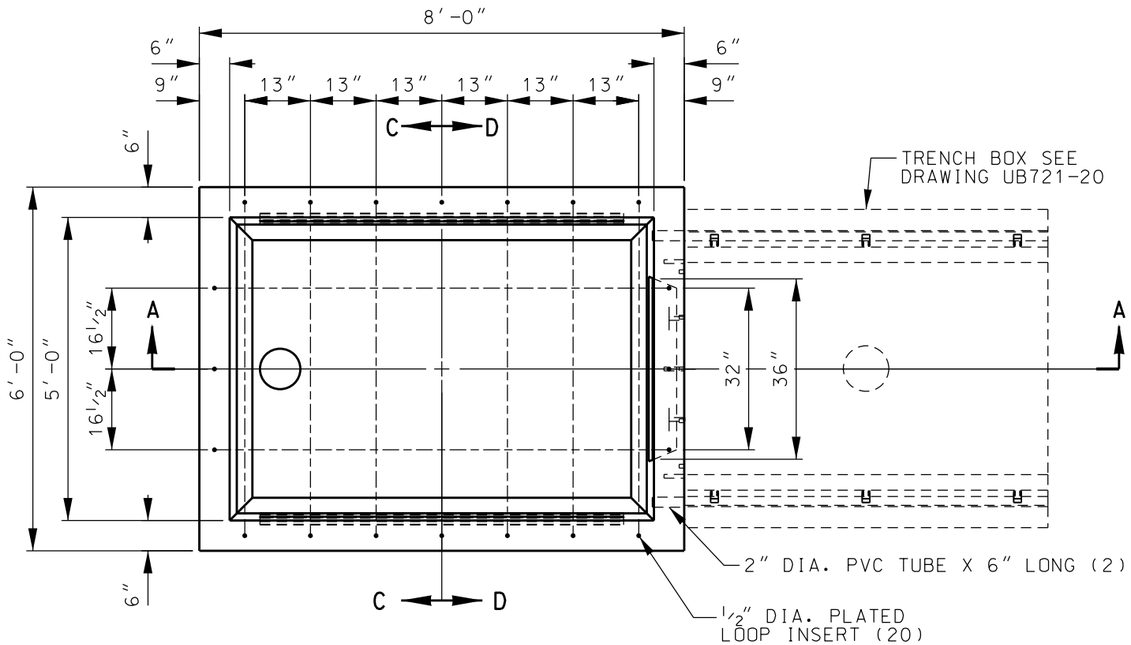
DISTRICT | CONTRACT W.O. | DWP W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

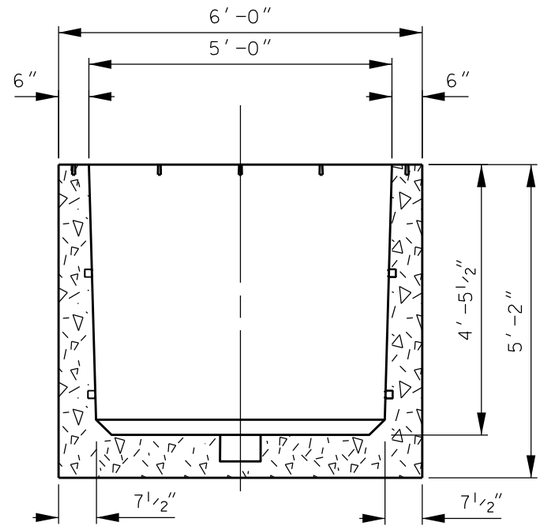
DESIGN JESUS ASIAIN | DRAFTING J.GARCIA/E.PERDOMO
OK JESUS ASIAIN | CHECKER W. YCEDO
JESUS ASIAIN E-012446 APPROVED | DATE SEPT. 17,2009

WALL MOUNTED
THREE HOUR RATED
FIRE BARRIER
(NELSON FIRESTOP)
4000A AND 5000A SERVICE

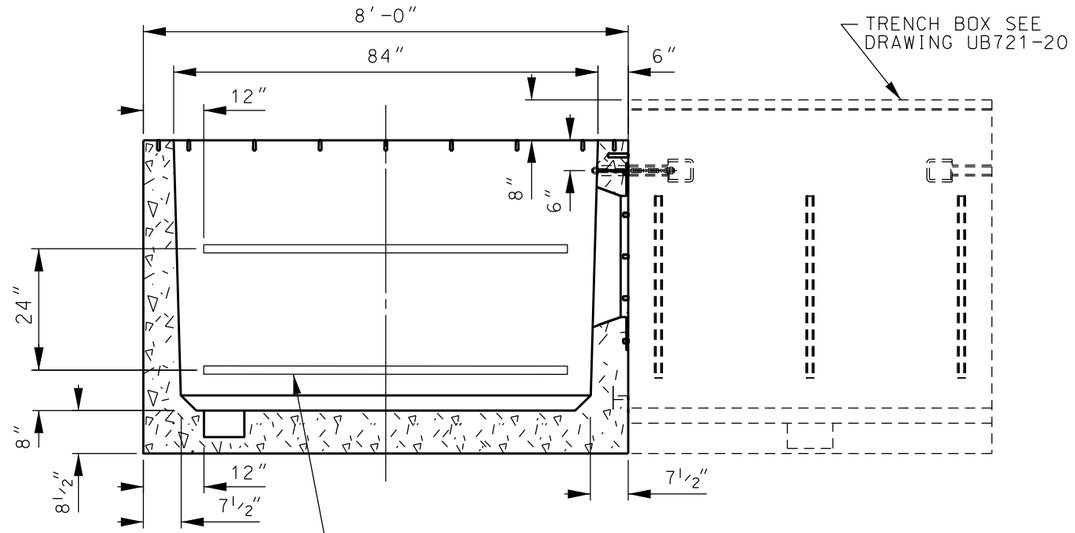
UB721-22 | SHEET 3 OF 3



PLAN VIEW
TRANSITION BOX ONLY
NTS



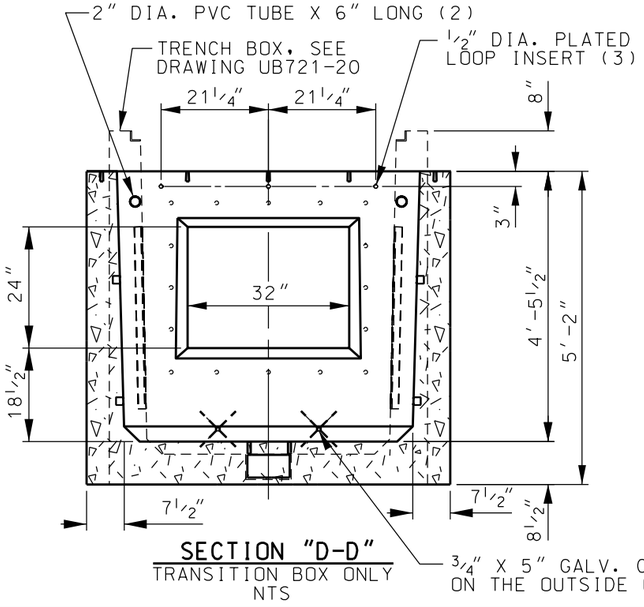
SECTION "C-C"
TRANSITION BOX ONLY
NTS



$1\frac{5}{8}$″ X $1\frac{5}{8}$″ X 72″ LONG
12 GAUGE GALV. STRUT,
CAST IN FLUSH (4)
(OPTIONAL SURFACE MOUNTED)

SECTION "A-A"
TRANSITION BOX ONLY
NTS

NOTE: TRENCH BOX IS SHOWN FOR ILLUSTRATION ONLY, REFER TO DRAWING UB721-20 FOR TRENCH BOX INFORMATION.



SECTION "D-D"
TRANSITION BOX ONLY
NTS

INDEX

REQUIREMENTS FOR FABRICATION AND INSTALLATION

TRANSITION BOX SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DWP STANDARD SPECIFICATIONS NO. P178, AS LAST REVISED AND AS MODIFIED HERE ON.

ALL 1/2" INSERTS SHALL BE MADE FROM PLASTIC AND SHALL WITHSTAND A MINIMUM PULL-OUT LOAD OF 150 LBS/INSERT, AND A MINIMUM SHEAR LOAD OF 300 LBS/INSERT, UNLESS OTHERWISE NOTED.

STRUT AND BOLT INSTALLATION SHALL WITHSTAND A MINIMUM SHEAR LOAD OF 300 LBS/LF AND A PULL-OUT LOAD OF 150 LBS./BOLT. MAXIMUM SPACING REQUIRED IF SURFACE MOUNTED IS 16" O.C. AND 3" FROM EACH END OF STRUT, UNLESS OTHERWISE NOTED. ALL STRUTS SHALL BE CONTINUOUS HOT DIP GALVANIZED STEEL.

MANUFACTURER TO DELIVER PREFABRICATED TRANSITION BOX TO JOB SITE AND SUPPLY SPREADER BAR FOR UNLOADING. DWP OR INSTALLING CONTRACTOR SHALL PROVIDE MEANS FOR UNLOADING AND SETTING PRECAST UNITS.

SELECT A LOCATION FREE OF SUBSTRUCTURES, CLEAR OF OVERHEAD OBSTRUCTIONS THAT WOULD INTERFERE WITH THE BOOM OF A CRANE AND HAVE AMPLE WORKING ROOM FOR A CRANE TO UNLOAD THE SECTION FROM A TRUCK INTO THE EXCAVATION.

TRANSITION BOX SHALL BE SET ON A COMPACTED LEVEL BED OF CRUSHED AGGREGATE BASE.

TRANSITION BOX SHALL BE REJECTED IF ANY PORTION OR KEYWAY, 12" OR LONGER, IS MISSING OR DAMAGED.

TRANSITION BOX SECTIONS SHALL BE SET WITH SEALING COMPOUND APPROVED BY THE DWP UNDERGROUND ENGINEER AND SUPPLIED WITH TRANSITION BOX.

BACKFILL SHALL BE NATURAL MATERIAL COMPACTED TO 90%. AS AN ALTERNATIVE, BACKFILL SHALL BE 100-E-100 SAND CEMENT SLURRY, OR AS SPECIFIED IN DWP UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO. 104, AS LAST REVISED.

WEIGHT AND ALL OUTSIDE DIMENSIONS VARY WITH MANUFACTURER. PRIOR TO EXCAVATION, STRUCTURE INSTALLER SHALL OBTAIN THE MINIMUM REQUIRED EXCAVATION SIZE FROM THE MANUFACTURER SUPPLYING THE STRUCTURE.

ALL TRANSITION BOXES SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS FOR DWP UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO. 104, AS LAST REVISED.

LADWP SHALL BOND THE STAINLESS STEEL FIRE BARRIER MOUNTING PLATE FROM THE TRANSITION BOX TO THE METALLIC STRUT BRACKET HARDWARE IN THE CABLE TRENCH, THEN FROM THE CABLE TRENCH TO THE METALLIC HARDWARE OF THE PRECAST TRANSFORMER PAD. BONDING WIRE SHALL CONSIST OF EITHER 1-4/0 BARE STRANDED COPPER WIRE (M.C. 34-08-154) OR 2-2/0 BARE STRANDED COPPER WIRES (M.C. 34-08-152).

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
3	10/28/14	EHP	REVISED BOX SIZE, & QUANTITIES AND LOC. OF 1/2" LOOP INSERTS.	J.M.A	
2	08/16/11	EHP	RAISED OPENING 12". REV. UNISTRUT CALLOUT AND NOTE. REV. LOC. OF 1/2"	J.M.A	
			LOOP INSERTS.		
1	05/20/11	JD/EH	REV. TRANS. BOX SIZE, UNISTRUT LENGTHS & NOTES	J.M.A	

CE47565

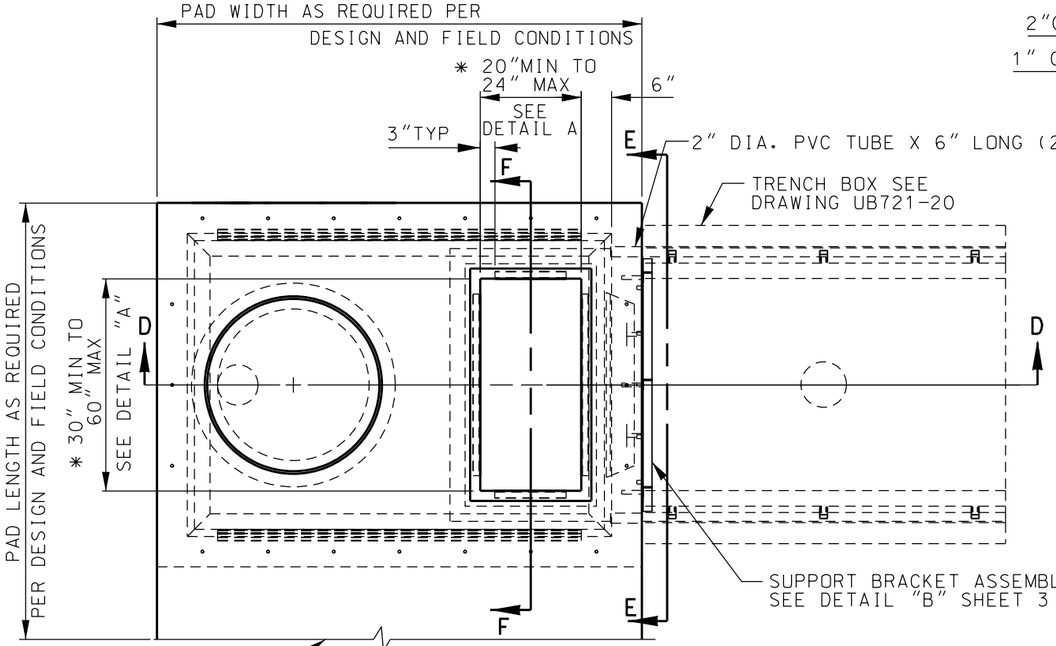
DISTRICT | CONTRACT W.O. | DWP W.O.

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

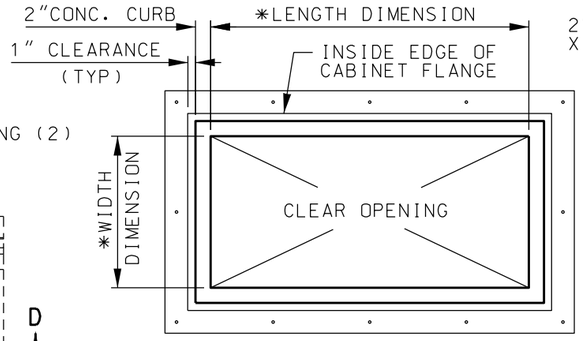
DESIGN	JUAN AVALOS	DRAFTING	E.H.PERDOMO
OK	SAID POOSTI	CHECKER	
APPROVED	JIM MAGULA	DATE	4-1-11

PRECAST CABLE TRANSITION BOX AND ROOF SLAB DETAIL FOR CABLE ENTRANCE CABINET

UB721-24 | SHEET 1 OF 3

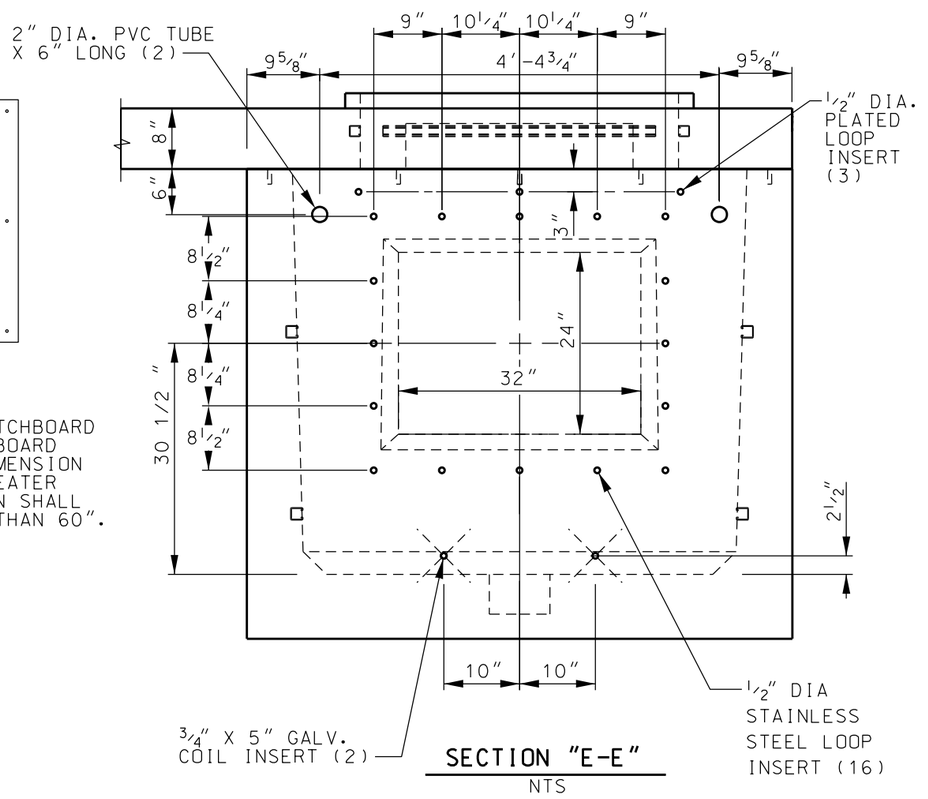


PLAN VIEW
NTS

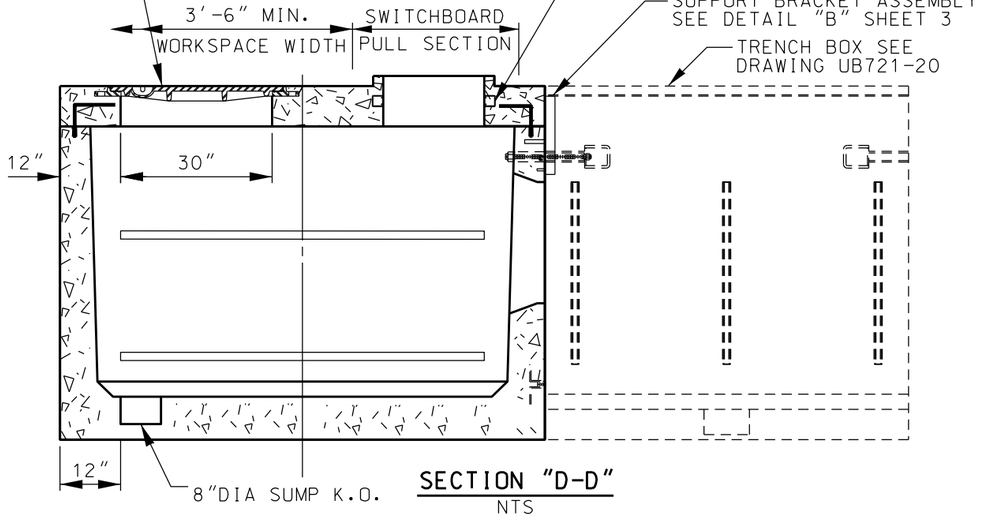


DETAIL "A"
NTS

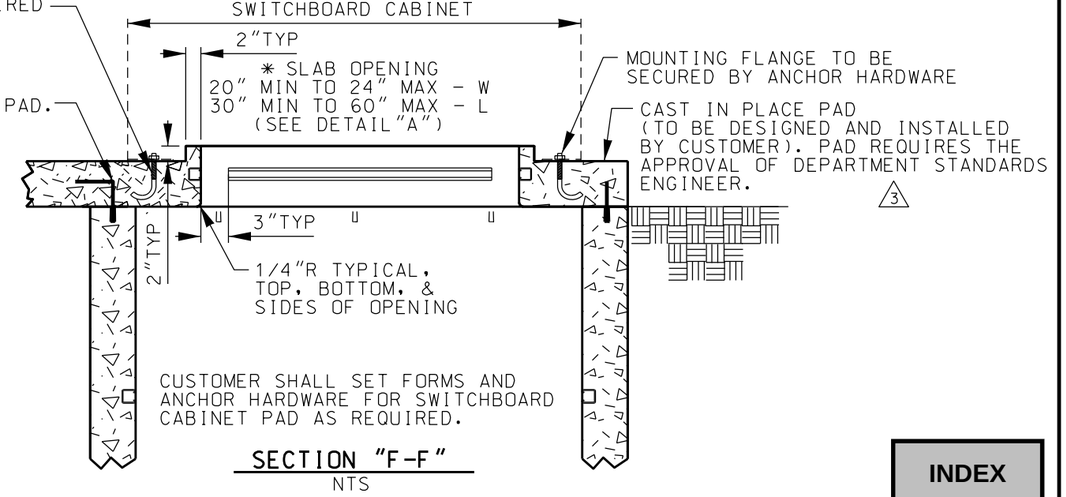
* OPENING SHALL BE DETERMINED PER SWITCHBOARD INSIDE PERIMETER DIMENSIONS OF SWITCHBOARD MOUNTING FLANGE. THE MINIMUM WIDTH DIMENSION SHALL NOT BE LESS THAN 20" AND NOT GREATER THAN 24". THE MINIMUM LENGTH DIMENSION SHALL NOT BE LESS THAN 30" AND NOT GREATER THAN 60".



SECTION "E-E"
NTS



SECTION "D-D"
NTS



SECTION "F-F"
NTS

INDEX

NOTE: TRENCH BOX IS SHOWN FOR ILLUSTRATION ONLY, REFER TO DRAWING UB721-20 FOR TRENCH BOX INFORMATION.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
3	10/28/14	EHP	REVISED TRANS. BOX SIZE AND SLAB.	J.M.A.	
2	08/16/11	EHP	RAISED OPENING 12". REV. UNISTRUT CALLOUT AND NOTE. REV. LOC. OF 1/2" LOOP INSERTS.	J.M.A.	
1	05/20/11	JD/EHP	REVISED BOLT-UP CONNECTION, TRANS. BOX SIZE, SLAB OPENING LOCATION & CAST IN PLACE PAD CALL OUT.	J.M.A.	

CE47565

DISTRICT | CONTRACT W.O. | DWP W.O.

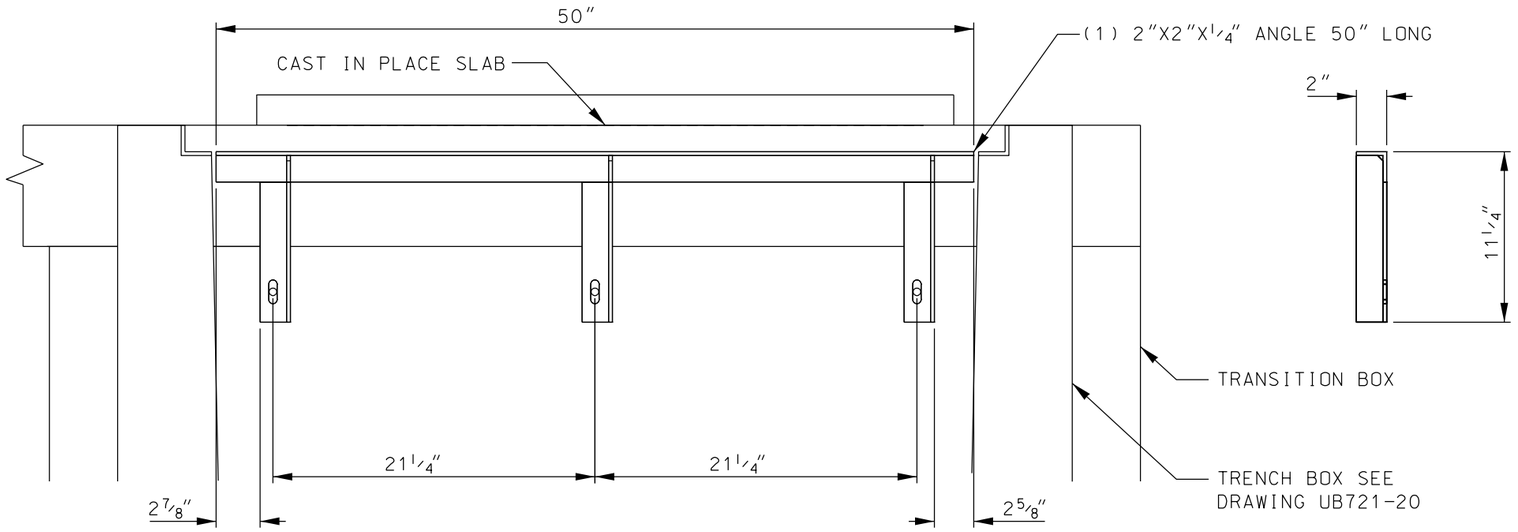
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

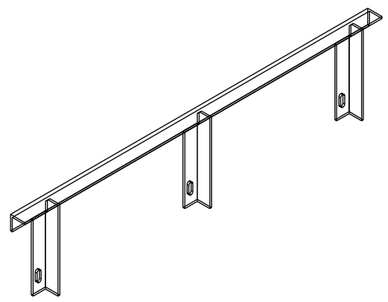
DESIGN	JUAN AVALOS	DRAFTING	E.H.PERDOMO
OK	SAID POOSTI	CHECKER	
APPROVED	JIM MAGULA	DATE	4-1-11

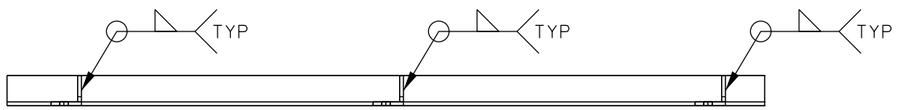
PRECAST CABLE TRANSITION BOX AND ROOF SLAB DETAIL FOR CABLE ENTRANCE CABINET

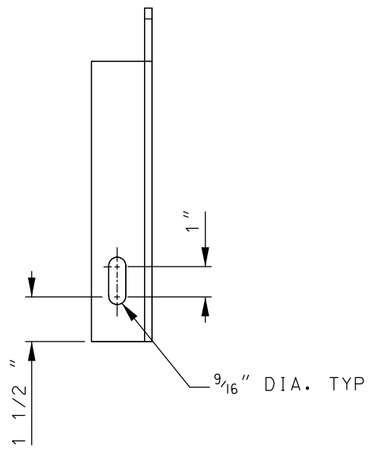
UB721-24 | SHEET 2 OF 3

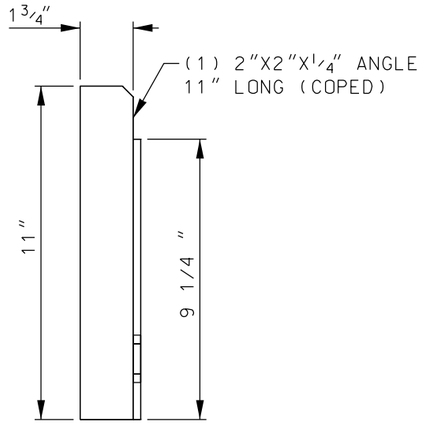
INDEX











NOTE: GALVANIZE AFTER FABRICATION

DETAIL "B" - SUPPORT BRACKET FOR LAST GRATE
(TO BE INSTALLED FOR SHIPMENT)

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
3	10/28/14	EHP	SEE SHEETS 1 & 2 FOR REVISION.	J.M.A.	
2	08/16/11	EHP	SEE SHEETS 1 & 2 FOR REVISION.	J.M.A.	
1	05/20/11	JD	REMOVED SECURE ANGLE CALL OUT.	J.M.A.	

CE47565

DISTRICT | CONTRACT W.O. | DWP W.O.

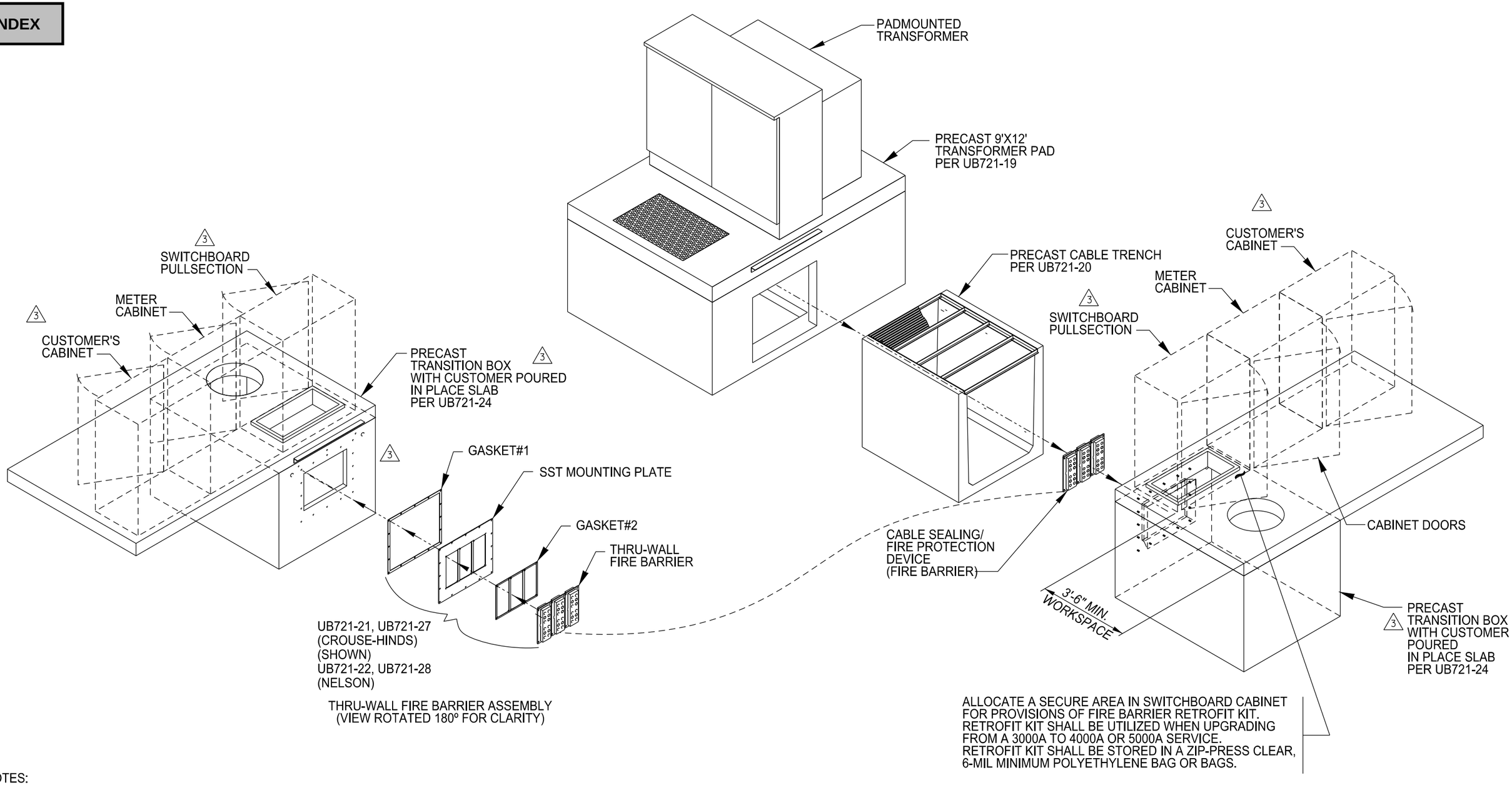
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	JUAN AVALOS	DRAFTING	E.H.PERDOMO
OK	SAID POOSTI	CHECKER	
APPROVED	JIM MAGULA	DATE	4-1-11

PRECAST CABLE TRANSITION BOX AND ROOF SLAB DETAIL FOR CABLE ENTRANCE CABINET

UB721-24 | SHEET 3 OF 3

INDEX



THRU-WALL FIRE BARRIER ASSEMBLY
(VIEW ROTATED 180° FOR CLARITY)

ALLOCATE A SECURE AREA IN SWITCHBOARD CABINET FOR PROVISIONS OF FIRE BARRIER RETROFIT KIT. RETROFIT KIT SHALL BE UTILIZED WHEN UPGRADING FROM A 3000A TO 4000A OR 5000A SERVICE. RETROFIT KIT SHALL BE STORED IN A ZIP-PRESS CLEAR, 6-MIL MINIMUM POLYETHYLENE BAG OR BAGS.

NOTES:

1. LADWP SHALL BOND THE STAINLESS STEEL FIRE BARRIER MOUNTING PLATE FROM THE TRANSITION BOX TO THE METALLIC STRUT BRACKET HARDWARE IN THE CABLE TRENCH, THEN FROM THE CABLE TRENCH TO THE METALLIC HARDWARE OF THE PRECAST TRANSFORMER PAD. BONDING WIRE SHALL CONSIST OF EITHER 1-4/0 BARE STRANDED COPPER WIRE (M.C. 34-08-154) OR 2-2/0 BARE STRANDED COPPER WIRES (M.C. 34-08-152).

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
3	02/12/15	EHP	REV. TRANS. BOX SIZE FROM 3'x5' to 5'x7', ADDED CIRCULAR OPENING	V.B.	20215
2	8/11/11	EHP	RAISED OPENING IN TRANSITION BOX.	JA	
1	5/05/11	EHP	REVISED TOP OPENING IN SLAB & MOVED CABINETS	JA	
			AND ADDED NOTE 1.		

DWP

DISTRICT	CONTRACT W.O.	DWP W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

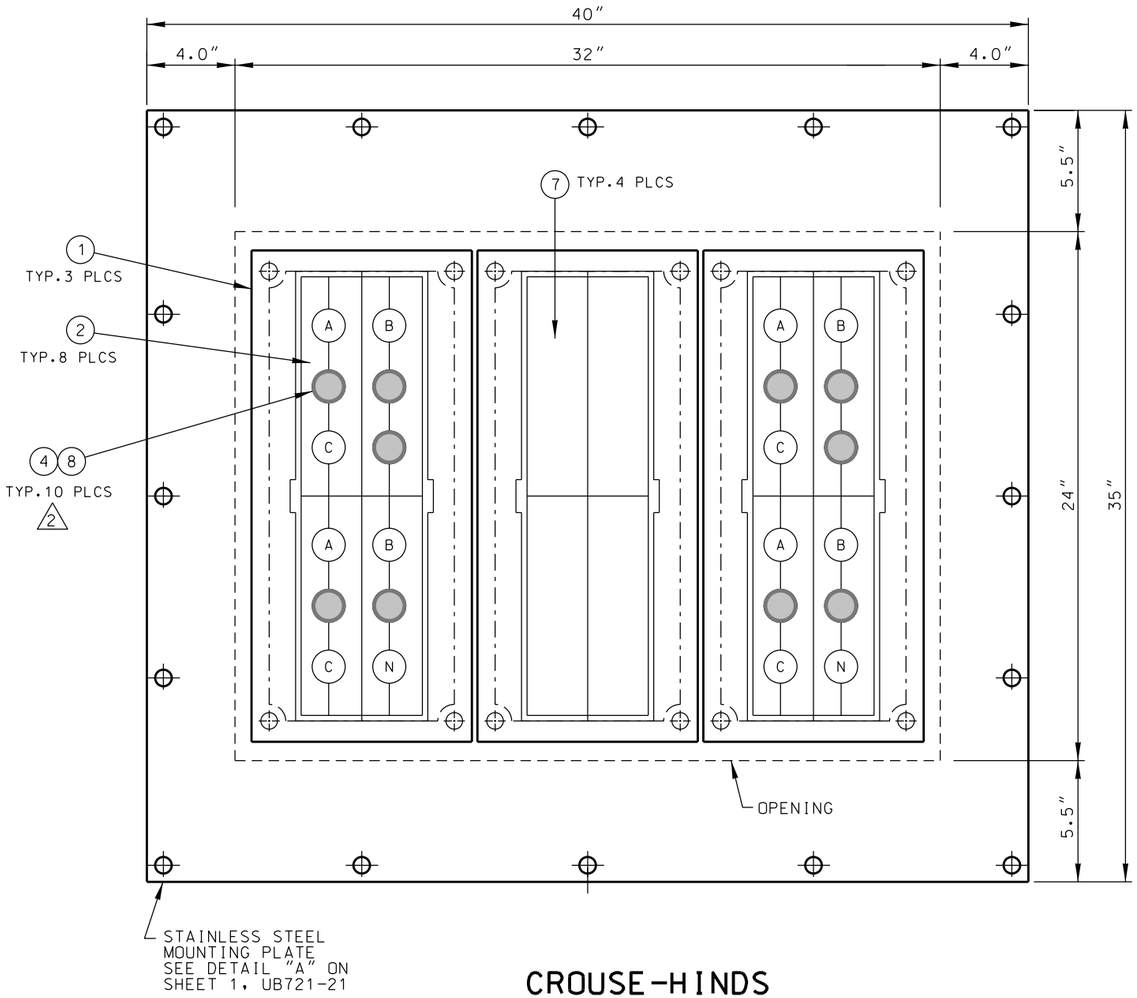
DESIGN	W. YCEDO	DRAFTING	E.H.PERDOMO
OK	J. ASIAIN	CHECKER	W. YCEDO
APPROVED	S.K. VOHRA	DATE	

EXPLODED VIEW OF PRECAST 9'X12' PM TFR PAD/ CABLE TRENCH/ TRANSITION BOX AND FIRE BARRIER

UB721-26

SHEET 1 OF 1

INDEX



CROUSE-HINDS
TW SERIES THRU-WALL BARRIER 3000 A SERVICE

MATERIAL LIST

ITEM	QTY.	DESCRIPTION	PART NO.	MANUFACTURER
1	3	MOUNTING FRAME	TWF12	CROUSE-HINDS
2	8	SEAL BLOCKING ASSY. SET (SBA)	TWB30355	CROUSE-HINDS
3	4	SBA (SEE NOTE 12)	TWB30355	CROUSE-HINDS
4	10	PLUG	TWP5	CROUSE-HINDS
5	5	PLUG (SEE NOTE 12)	TWP5	CROUSE-HINDS
6	24	GASKET, TECRON, ROLL	AA0235	NELSON
7	4	BLANK	TWB3	CROUSE-HINDS
8	10	REDUCER	TWR55	CROUSE-HINDS
9	5	REDUCER (SEE NOTE 12)	TWR55	CROUSE-HINDS
△3 10	1	GASKET #1, RUBBER	S1557738	ROXTEC
11	1	GASKET #2, RUBBER	S1557747	ROXTEC

NOTES:

1. THE CUSTOMER SHALL FURNISH A 3-HOUR FIRE-RATED CABLE SEALING DEVICE OR DEVICES.
2. THE CABLE SEALING DEVICE OR DEVICES SHALL INCLUDE ALL NECESSARY FITTINGS AND WALL FLANGES THAT ARE IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL FIRE PROTECTION ASSOCIATION FOR CLASS"A" OPENINGS. ADDITIONALLY, ALL SUPPORTING STRUCTURES AND MISCELLANEOUS PARTS REQUIRED TO MAKE A COMPLETE INSTALLATION SHALL BE PROVIDED.
3. △3 CUSTOMER MAY USE EITHER NELSON OR ROXTEC FOR GASKET #1 AND GASKET #2. OTHER GASKETS SHALL REQUIRE LADWP ENGINEERING APPROVAL PRIOR TO USE. SEE SHEETS 1 & 2 OF DRAWING UB721-21.
4. THE CUSTOMER SHALL INSTALL THE MOUNTING PLATE, GASKET #1 AND GASKET #2. SEE NOTES 10 AND 11.
5. DWP SHALL INSTALL THE CABLE SEALING DEVICE FROM PARTS PROVIDED BY THE CUSTOMER.
6. THE CUSTOMER SHALL PURCHASE, OWN, AND MAINTAIN THE CABLE SEALING DEVICE OR DEVICES.
7. THE CONDUCTORS FOR THIS POWER SYSTEM WILL BE FURNISHED AND INSTALLED BY DWP AND WILL CONSIST OF A MAXIMUM OF FOUR 929 kCMIL COPPER CONDUCTORS PER PHASE AND TWO 929 kCMIL COPPER CONDUCTORS FOR THE NEUTRAL. THE CONDUCTORS SHALL HAVE RHH/RHW INSULATION. THE MAXIMUM DIAMETER FOR THE PHASE AND NEUTRAL CONDUCTORS SHALL BE 1.68".
8. ALL DWP CONDUCTORS SHALL TERMINATE IN A LISTED AND APPROVED 3000 AMPERE BUSSED TERMINATING ENCLOSURE.
9. THE CUSTOMER'S WALL OPENING SHALL ALIGN WITH THE 24"H X 32"W OPENING ON THE LAST MODULAR TRENCH. SEE DRAWING UB721-20.
10. INSTALL GASKET #1 BETWEEN THE 3-HOUR FIRE-RATED WALL AND THE STAINLESS STEEL MOUNTING PLATE. FABRICATE THE GASKET FROM THE NELSON CATALOG #AA0235 "TECHRON" ROLLS OR USE ROXTEC CATALOG #S1557738 GASKET. SEE SHEETS 1 & 2 OF DRAWING UB721-21.
11. INSTALL GASKET #2 BETWEEN THE MOUNTING PLATE AND EACH CROUSE-HINDS TWF12 FRAME. SEE SHEETS 1 & 2 OF DRAWING UB721-21.
12. ITEMS 3, 5 AND 9 ARE SPARES INTENDED FOR FUTURE UPGRADE TO 5000 AMPERE SERVICE. ITEMS 3 AND 5 SHALL BE BAGGED AND PLACED INSIDE THE SWITCHBOARD INCOMING SECTION.
13. LADWP SHALL BOND THE STAINLESS STEEL FIRE BARRIER MOUNTING PLATE FROM THE TRANSITION BOX TO THE METALLIC STRUT BRACKET HARDWARE IN THE CABLE TRENCH, THEN FROM THE CABLE TRENCH TO THE METALLIC HARDWARE OF THE PRECAST TRANSFORMER PAD. BONDING WIRE SHALL CONSIST OF EITHER 1-4/0 BARE STRANDED COPPER WIRE (M.C. 34-08-154) OR 2-2/0 BARE STRANDED COPPER WIRES (M.C. 34-08-152).

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
△3	09/16/21	BLD	REVISED PARTS LIST AND ADDED NOTE #3	BLD	
△2	09/10/19	EAS	ADDED REDUCER	KP	
△1	06/18/10	EHP	ADDED NOTE 12	JG	

DISTRICT | CONTRACT W.O. | DWP W.O.

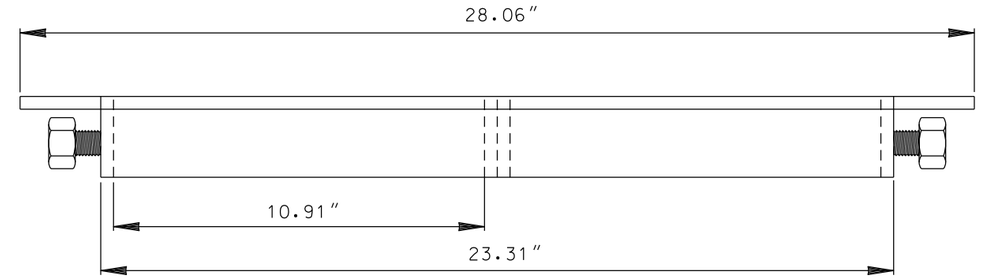
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

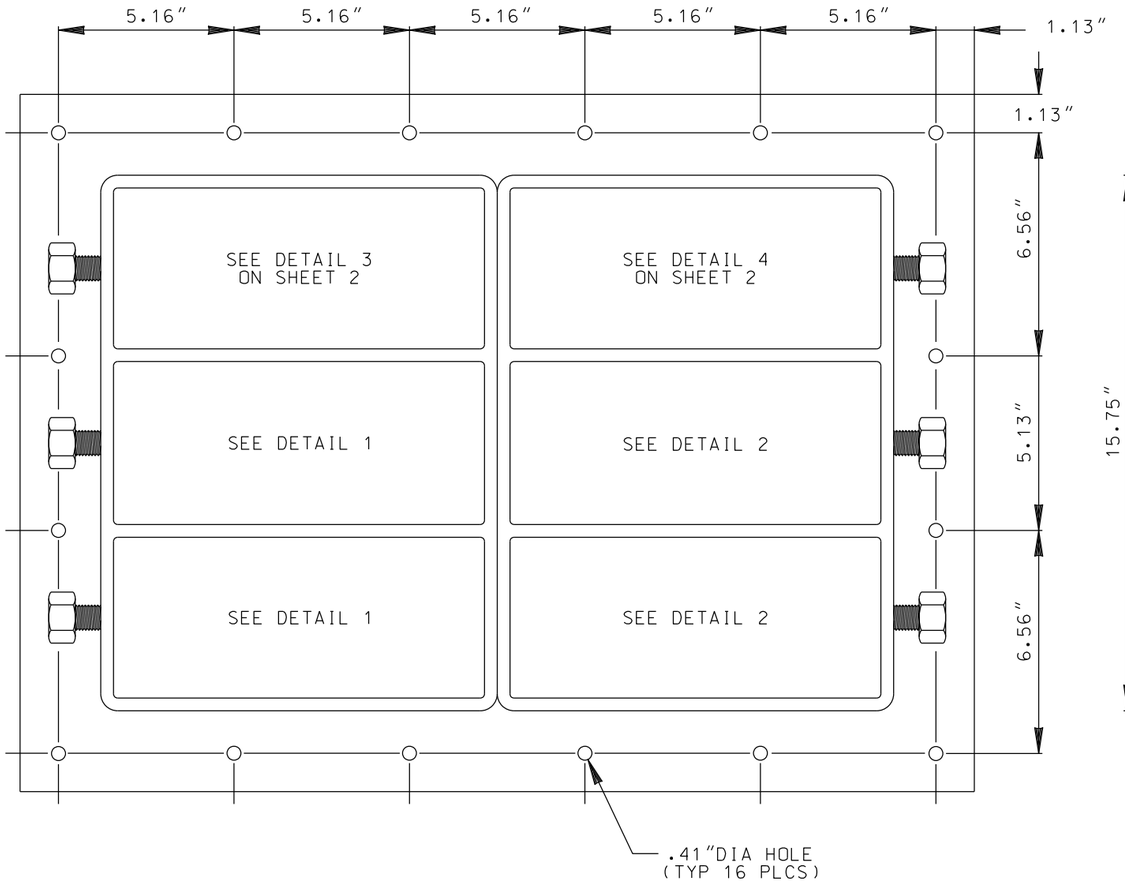
DESIGN	JESUS ASIAIN	DRAFTING	E.PERDOMO
OK	JESUS ASIAIN	CHECKER	W. YCEDO
APPROVED	JESUS ASIAIN E-012446	DATE	10/14/2009

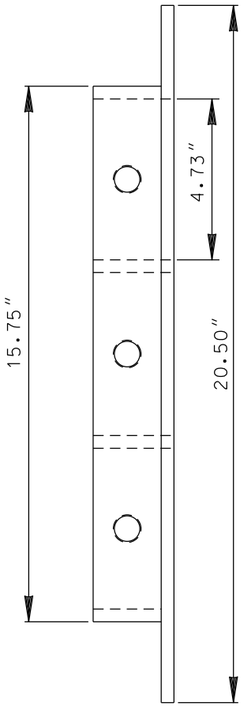
WALL MOUNTED
FIRE BARRIER FOR
3000 AMPERE SERVICE
(CROUSE-HINDS)

UB721-27 | SHEET 1 OF 1

INDEX



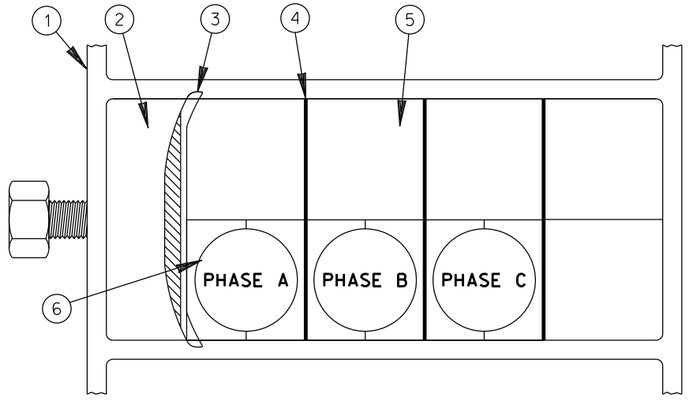




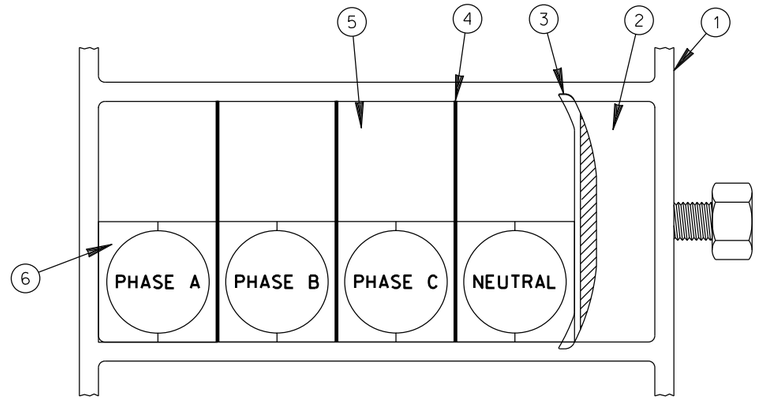
MATERIAL LIST				
ITEM	QTY.	DESCRIPTION	PART NO.	MANUFACTURER
1	1	FRAME	RGMBX3T	NELSON
2	6	END PACKING HARDWARE	AA0147	NELSON
3	6	COMPRESSION PLATE	AA126112	NELSON
4	18	STAY PLATE, ALUMINUM	AA0127	NELSON
5	34	MODULE, BLANK 60MM	60/0	NELSON
6	14	MODULE, CABLE HOLDING	60/42	NELSON
**7	7	MODULE, CABLE HOLDING	60/42	NELSON
*8	16	GASKET, TECRON, ROLL 30"	AA0235	NELSON
2 △9	1	GASKET #1, RUBBER	S1557738	ROXTEC
10	1	GASKET #2, RUBBER	S1557739	ROXTEC

* SEE NOTES 10 & 11 ON SHEET 2

** SEE NOTE 12 ON SHEET 2



MULTI-CABLE TRANSIT DETAIL "1"



MULTI-CABLE TRANSIT DETAIL "2"

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
2	09/16/21	BLD	REVISED PARTS LIST AND ADDED NOTE #3	BLD	
1	05/09/11	EHP	ADDED NOTE 12 TO SHT 2	JG	

DWP

DISTRICT | W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

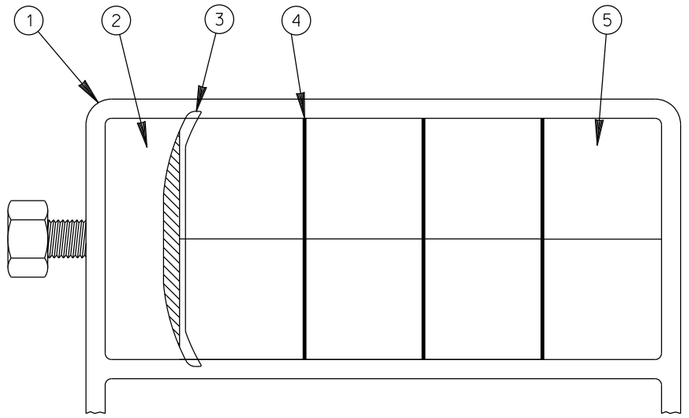
DESIGN	JESUS ASIAIN	DRAFTING	E.PERDOMO
OK	JESUS ASIAIN	CHECKER	W.YCEDO
APPROVED	JESUS ASIAIN E-012446	DATE	10/04/10

W.O.

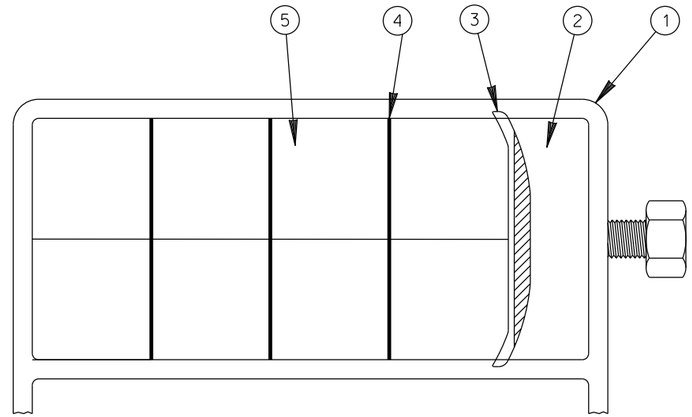
WALL MOUNTED FIRE BARRIER FOR 3000 AMPERE SERVICE (NELSON)

UB721-28 | SHEET 1 OF 2

INDEX



MULTI-CABLE TRANSIT DETAIL "3"



MULTI-CABLE TRANSIT DETAIL "4"

NOTES:

1. THE CUSTOMER SHALL FURNISH A 3-HOUR FIRE-RATED CABLE SEALING DEVICE OR DEVICES.
2. THE CABLE SEALING DEVICE OR DEVICES AND SHALL INCLUDE ALL NECESSARY FITTINGS AND WALL FLANGES THAT ARE IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL FIRE PROTECTION ASSOCIATION FOR CLASS"A" OPENINGS. ADDITIONALLY, ALL SUPPORTING STRUCTURES AND MISCELLANEOUS PARTS REQUIRED TO MAKE A COMPLETE INSTALLATION SHALL BE PROVIDED.
3. (2) CUSTOMER MAY USE EITHER NELSON OR ROXTEC FOR GASKET #1 AND GASKET #2. OTHER GASKETS SHALL REQUIRE LADWP ENGINEERING APPROVAL PRIOR TO USE. SEE SHEET 2 & 3 OF DRAWING UB721-22.
4. THE CUSTOMER SHALL INSTALL THE MOUNTING PLATE, GASKET #1, AND GASKET #2. SEE NOTES 10 AND 11.
5. DWP SHALL INSTALL THE CABLE SEALING DEVICE FROM PARTS PROVIDED BY THE CUSTOMER.
6. THE CUSTOMER SHALL PURCHASE, OWN, AND MAINTAIN THE CABLE SEALING DEVICE OR DEVICES.
7. THE CONDUCTORS FOR THIS POWER SYSTEM WILL BE FURNISHED AND INSTALLED BY DWP AND WILL CONSIST OF A MAXIMUM OF FOUR 929 KCMIL COPPER CONDUCTORS PER PHASE AND TWO 929 KCMIL COPPER CONDUCTORS FOR THE NEUTRAL. THE CONDUCTORS SHALL HAVE RHH/RHW INSULATION. THE MAXIMUM DIAMETER FOR THE PHASE AND NEUTRAL CONDUCTORS SHALL BE 1.68".
8. ALL DWP CONDUCTORS SHALL TERMINATE IN A LISTED AND APPROVED 3000 AMPERE BUSSED TERMINATING ENCLOSURE.
9. THE CUSTOMER'S WALL OPENING SHALL ALIGN WITH THE 24"H X 32"W OPENING ON THE LAST MODULAR TRENCH. SEE DRAWING UB721-20.
10. INSTALL GASKET #1 BETWEEN THE 3-HOUR FIRE-RATED WALL AND THE STAINLESS STEEL MOUNTING PLATE. FABRICATE THE GASKET FROM THE NELSON CATALOG #AA0235 "TECHRON" ROLLS OR USE ROXTEC CATALOG #S1557738. SEE DRAWING UB721-22, SHEET 2.
11. INSTALL GASKET #2 BETWEEN THE MOUNTING PLATE AND THE NELSON RGMBX3T FRAME. SEE DRAWING UB721-22, SHEET 3.
12. ITEM 7 ON THE MATERIAL LIST IS THE CABLE HOLDING MODULE INTENDED FOR FUTURE UPGRADE TO 5000A SERVICE. THE CABLE HOLDING MODULES SHALL BE BAGGED, LABELED AND PLACED INSIDE THE SWITCHBOARD INCOMING SECTION.
13. LADWP SHALL BOND THE STAINLESS STEEL FIRE BARRIER MOUNTING PLATE FROM THE TRANSITION BOX TO THE METALLIC STRUT BRACKET HARDWARE IN THE CABLE TRENCH, THEN FROM THE CABLE TRENCH TO THE METALLIC HARDWARE OF THE PRECAST TRANSFORMER PAD. BONDING WIRE SHALL CONSIST OF EITHER 1-4/0 BARE STRANDED COPPER WIRE (M.C. 34-08-154) OR 2-2/0 BARE STRANDED COPPER WIRES (M.C. 34-08-152).

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
(2)	09/16/21	BLD	REVISED PARTS LIST AND ADDED NOTE #3	BLD	
(1)	05/09/11	EHP	ADDED NOTE 12	JG	

DISTRICT | W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

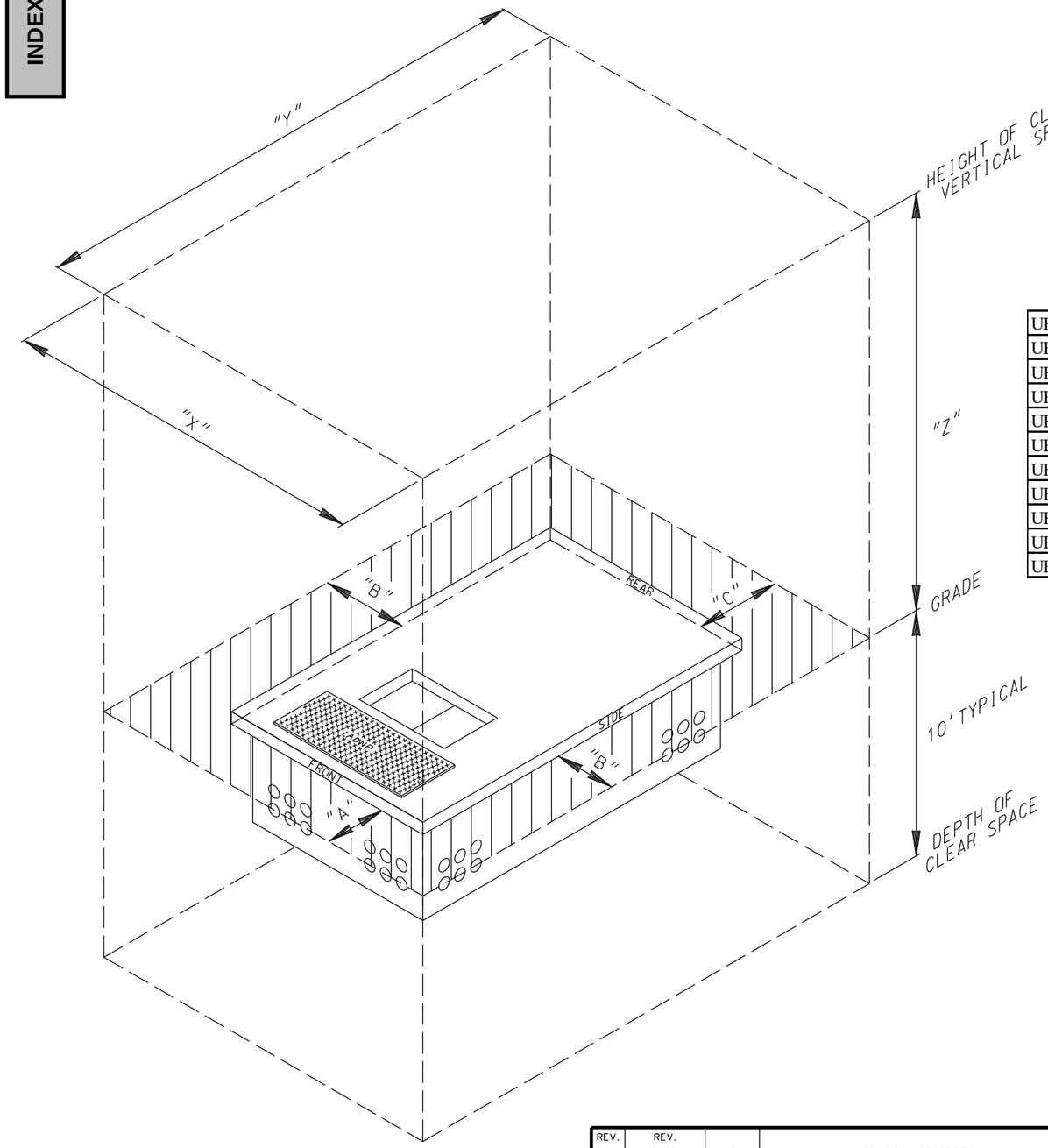
DESIGN	JESUS ASIAIN	DRAFTING	E.PERDOMO
OK	JESUS ASIAIN	CHECKER	W. YCEDO
APPROVED	JESUS ASIAIN E-012446	DATE	10/04/10

W.O.

WALL MOUNTED
FIRE BARRIER FOR
3000 AMPERE SERVICE
(NELSON)

UB721-28 | SHEET 2 OF 2

INDEX



△3

	PADMOUNT CLEARANCE TABLE						
	Minimum DWP Required Clearances Beyond Pad			Overall Clear Space			
	Structure Sizes	Front 'A'	Sides 'B'	Rear 'C'	Length 'Y'	Width 'X'	Height 'Z'
UB721-01	4' X 4'-6"	6' *	3'	3'	13.5'	10'	70'
UB721-02	4' X 7'	3' *	3'	3'	13'	10'	70'
UB721-03	6' X 8'	3' *	3'	3'	14'	12'	70'
UB721-07	8' X 10'	3' *	3'	3'	16'	14'	**
UB721-08	9' X 15'	3' *	3'	3'	21'	15'	100'
UB721-09	5' X 7'	3' *	3'	3'	13'	11'	70'
UB721-14	7' X 11'	3'	3'	3.5' §	17'	13'	70'
UB721-15	10'-6" X 10'-6"	3'	3'	3.5' §	17'	16.5'	100'
UB721-19	9" X 12'	3' *	3' †	‡	‡	15' †	100'
UB721-30	7' X 11'	3'	5.5'	3.5' §	17.5'	18'	70'
UB721-31	10'-6" X 10'-6"	3'	5.5'	3.5' §	17'	21.5'	100'

NOTES: * REFERENCE P721 FOR ADDITIONAL CLEARANCE INFORMATION. THIS TABLE DOES NOT NEGATE CLEARANCES SET FORTH BY STANDARD P721

** 70' IF 750KVA AND BELOW OR 100' IF OVER 750KVA

† MODIFY AS REQUIRED FOR USE WITH CABLE TRENCH UB721-20

‡

Xfrm Size	Rear Clearance	Overall Clear Space (Length)
1500KVA and below	3.5'	18.5'
2000KVA or 2500KVA	5.5'	20.5'
3750KVA	6.5'	21.5'

§ USE 6' CLEARANCE WHERE A FIXED OBSTRUCTION EXISTS, SUCH AS A WALL OR FENCE.

NON-STANDARD DESIGNS (ENCLOSED STATIONS: FENCED/WALLED; OR DECK STATIONS) ARE CONSIDERED CUSTOM AND WILL BE HANDLED BY THE CUSTOMER STATION DESIGN GROUP AND SUBJECT TO THEIR DESIGN GUIDELINES.

MODIFY AS REQUIRED FOR TRUCK BOLLARDS

OK V.B.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	PE NO.
△3	06/21/22	PSJ	NOTES AND VALUES MODIFIED	RJT	E20863
△2	09/23/21	JJZ	VARIOUS VALUE CHANGES IN TABLE	RJT	E20863
△1	09/18/12	EHP	ADDED UB721-30 & UB721-31 TO TABLE	SKV	E9751

DWP

DISTRICT | CONTRACT W.O. | DWP W.O.

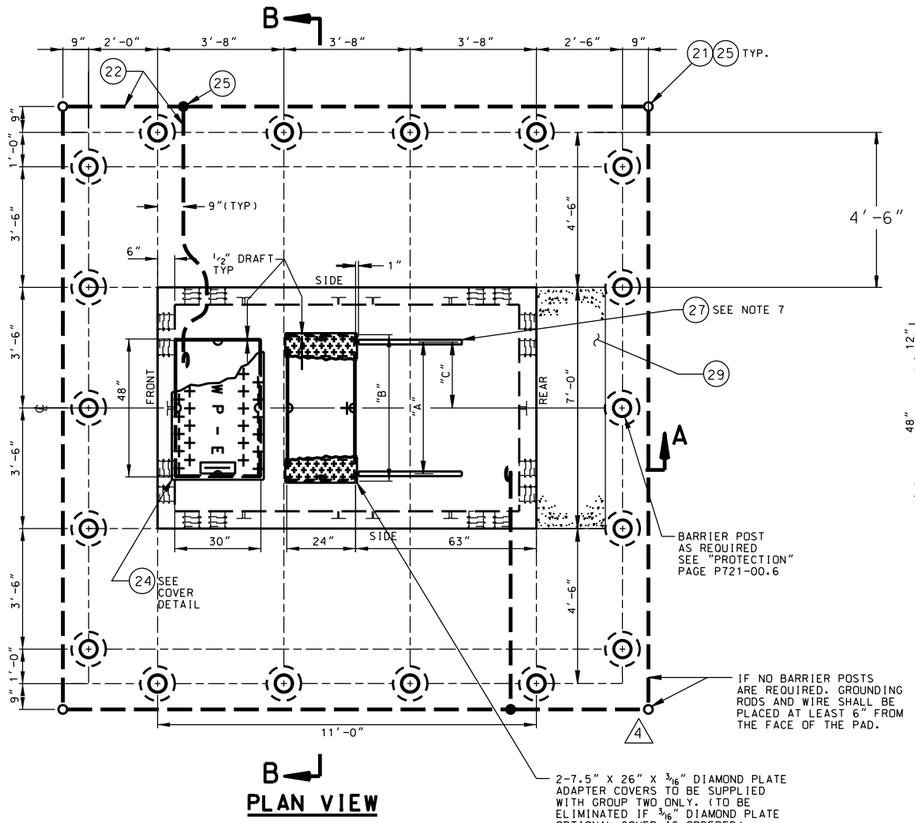
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN W.PUNCHES | DRAFTING J.GARCIA
OK W.HINKSON | CHECKER W.YCEDO
APPROVED | DATE 07/08/11

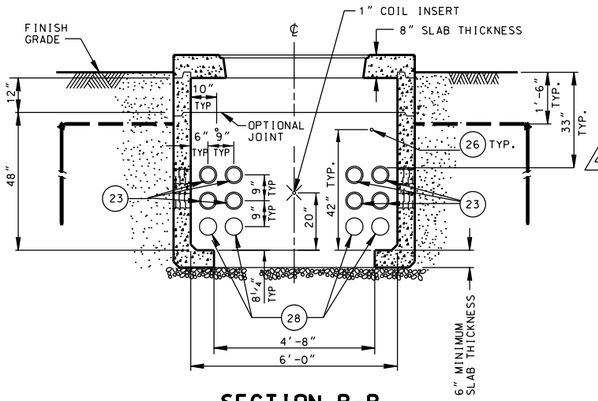
MINIMUM OVERALL SPATIAL CLEARANCES FOR PRECAST PADMOUNT CONSTRUCTION

UB721-29 | SHEET 1 OF 1

INDEX

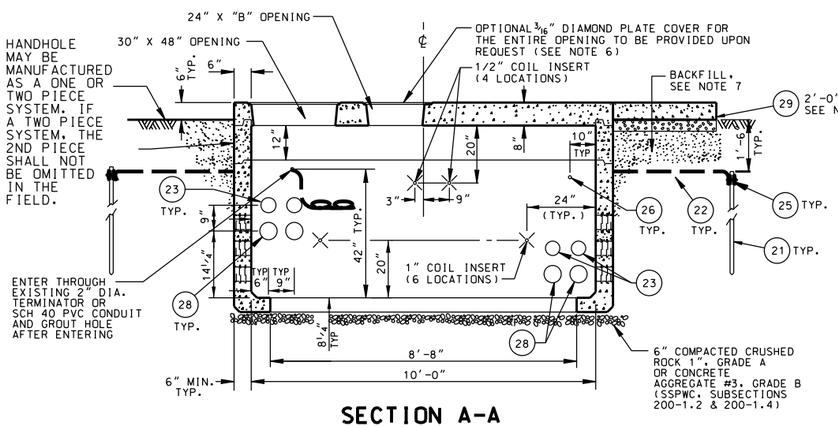


PLAN VIEW



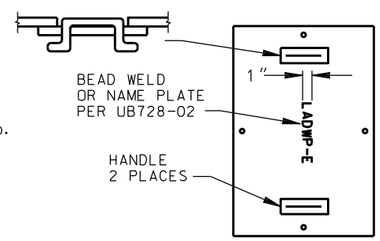
SECTION B-B

OPPOSITE SIDE WALL IS IDENTICAL
(BARRIER POSTS NOT SHOWN FOR CLARITY)



SECTION A-A

OPPOSITE SIDE WALL IS IS OPPOSITE HAND
(BARRIER POSTS NOT SHOWN FOR CLARITY)



HANDHOLE COVER DETAIL

* DIMENSION "A" IS FROM CENTER LINE OF UNISTRUT TO CENTER LINE OF UNISTRUT.

** DIMENSION "C" IS FROM CENTER LINE OF PAD MOUNT TO CENTERLINE OF UNISTRUT.

DIMENSION CHART			
	A *	B	C **
G-1	47 1/2"	52"	23 3/4"
G-2	61"	67"	30 1/2"

PARTS LIST		
NO.	QTY.	DESCRIPTION
21	4	GROUND ROD, 5/8" DIA. X 8', 304 SST
22	109'±	WIRE BARE TINNED 2/0 CU, SEE NOTE 5
23	24	5" DIA. DOUBLE MEMBRANE TERMINATION
24	1	3/16" DIAMOND PLATE COVER, SEE NOTE 6
25	6	EXOTHERMIC WELD, SEE NOTE 5
26	8	2" DIA. TERMINATOR OR SCH 40 PVC CONDUIT CAPPED AT OUTSIDE WALL
27	2	1 5/8" X 1 5/8" X 36" LONG 12 GA STRUT (UNISTRUT P3200 SERIES)
28	16	6" DIA. DOUBLE MEMBRANE TERMINATION
29	1	2'-0" X 7'-0" X 6" THICK PRECAST PAD.

WEIGHT OF THE HEAVIEST SECTION 17,100 LBS.

NOTES:

1. FOR GENERAL REQUIREMENTS, SEE UGCS STD. NO. P721-00 (ALL SHEETS). CONSTRUCTION DRAWING WILL SPECIFY THE LOCATION, TYPE, AND NUMBER OF CONDUITS TO BE INSTALLED IN HANDHOLE.
4. 2. IF GALVANIZED CONDUIT IS USED, EXPOSED ENDS ARE TO BE THREADED AND FITTED WITH GROUND BUSHINGS.
3. SWITCHGEAR PAD SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P SPECIFICATION NO. P-178 AS LAST REVISED EXCEPT ARTICLE 4 FOR PAD HANDHOLE AND ARTICLE 3(C)(1) AND ARTICLE 4 FOR PAD SLAB. MINIMUM REQUIRED DESIGN LOADING FOR PAD SLAB SHALL BE:
   LIVE LOAD = 100 LBS/SQ. FT.
   DEAD LOAD = 400 LBS/SQ. FT.
   IMPACT = NONE
4. ALL STRUTS SHALL BE HOT DIP GALVANIZED CONTINUOUS CONCRETE INSERTS AND SHALL BE FLUSH WITH CONCRETE SURFACE.
4. 5. INSTALL GROUND WIRE IN THE EARTH 1'-6" BELOW THE FINISH GRADE. CONNECT GROUND WIRE (PT. 22) TO 4 GROUND RODS (PT. 21). EXTEND WIRE ENDS FROM A COMMON GROUND ROD INTO HANDHOLE THROUGH 2" DIA. SCH 40 PVC CONDUIT. GROUT HOLES WHERE WIRES ENTER HANDHOLE. COIL 9' OF EACH WIRE INTO THE HANDHOLE. ALL CONNECTIONS SHALL BE WELDED USING EXOTHERMIC WELDING (PT.25), (CADWELD, THERMOWELD, OR EQUAL).
6. COVER SHALL BE PROVIDED WITH FOUR 1/2" NON-CORROSIVE PENTA HEAD BOLTS. PROVIDE 1/2-13 METAL OPEN STAR P35T INSERTS WITH THROUGH HOLE OR CLEAN OUT. COVER AND BOLTS SHALL BE FLUSH WITH CONCRETE SURFACE. COVER SHALL BE HOT DIP GALVANIZED AFTER LADWP LOGO IS BEAD WELDED IN PLACE, IF APPLICABLE.
7. BACKFILL WITH NATURAL MATERIAL AND PERFORM 90% COMPACTION. AS AN ALTERNATIVE, BACKFILL WITH SLURRY-CEMENT CONCRETE CLASS 100-E-100 BACKFILL.
4. 8. EACH CONCRETE SECTION SHALL BE MARKED ON THE INSIDE AND OUTSIDE WITH COMPANY NAME THE DESIGNATION "DWP-FA-CN" OR "DWP/F-CN-SC" IF SCC MIX USED AND THE DATE OF POUR.
9. WEIGHT AND DIMENSIONS VARY WITH MANUFACTURER. PRIOR TO EXCAVATION, STRUCTURE INSTALLER SHALL OBTAIN THE MINIMUM EXCAVATION SIZE FROM THE MANUFACTURERS SUPPLYING THE STRUCTURE.
10. 2'-0"X 7'-0"X 6" THICK PRECAST PAD IS A PART OF THE PRECAST ASSEMBLAGE. INSTALL PRECAST PAD FLUSH TO TOP OF PRECAST SWITCH PAD. PAD SHALL BE SET ON 4" MIN COMPACTED LEVEL BED OF NATURAL MATERIAL OR CRUSHED AGGREGATE BASE, UNLESS OTHERWISE APPROVED BY THE DEPARTMENT REPRESENTATIVE.
4. 11. A MINIMUM OF TWO 2" DB, SCH 40 PVC CONDUITS ARE REQURED FOR 120VAC AND COMMUNICATIONS. LOCATION TO BE DETERMINED BY DESIGN ENGINEER.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	PE NO.
4	11/28/22	PSJ	REVISED BARRIER POST LOCATIONS AND NOTES.	RJT	20863
3	10/28/14	EHP	REVISED NOTE 7.	JMA	
2	06/26/14	EP/EHP	REVISED BARRIER POST & TERM. LOCATIONS, ADDED 3'-0" X 7'-0" X 6" PAD.	JMA	VB
1	09/18/12	EHP	REVISED PERIMETER OF WORKSPACE & LOCATION OF BARRIER POSTS	SKV	E9751

OK VB

DISTRICT | CONTRACT W.O. | DWP W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN | DRAFTING

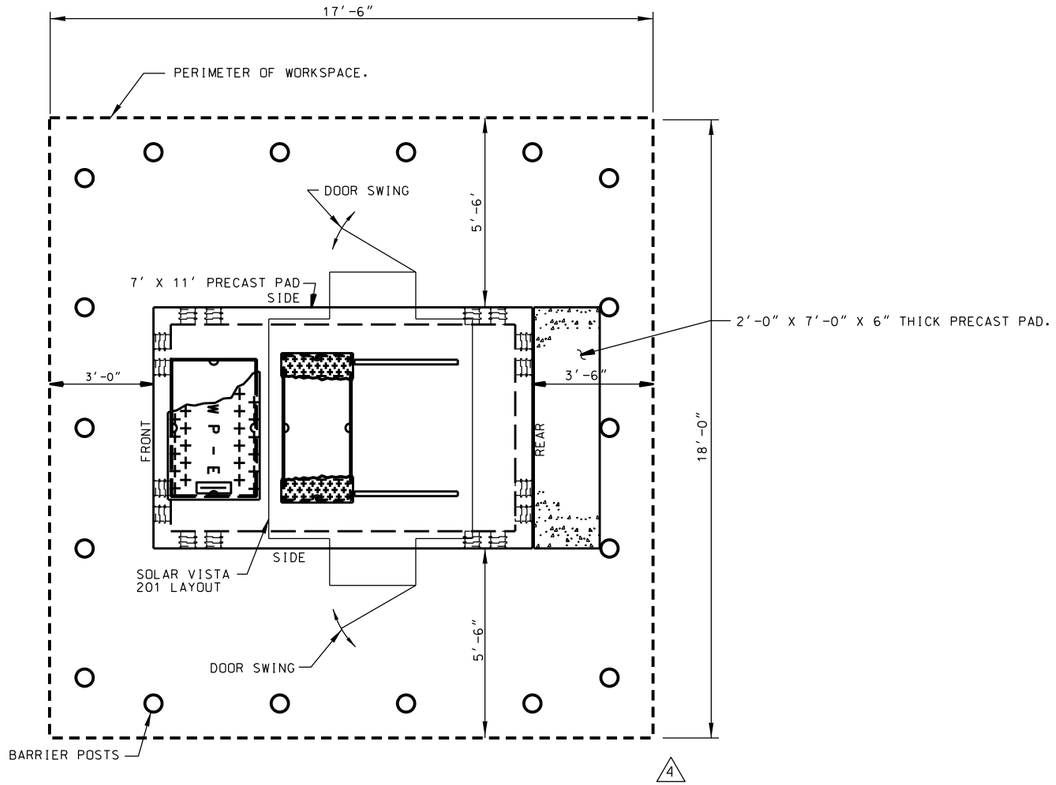
OK | CHECKER

APPROVED | DATE

7' X 11' PRECAST PAD FOR PADMOUNT SOLAR VISTA 201 SF_6 SWITCHGEAR

UB721-30 | SHEET 1 OF 2

INDEX



LAYOUT OF REQUIRED WORKSPACE PERIMETER

(FOR PADMOUNT EGRESS ORIENTATION, REFER TO UNDERGROUND STANDARD PAGE P721-03)

NOTE:
FOR MINIMUM OVERALL SPATIAL CLEARANCES,
SEE STANDARD DRAWING UB721-29.

OK VB

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
4	11/28/22	PSJ	REVISED BARRIER POST LOCATIONS AND NOTES.	RJT	20863
3	10/28/14	EHP	SEE SHEET 1 FOR REVISION	JMA	
2	06/26/14	EP/EHP	REVISED BARRIER POST LOCATIONS. ADDED 3′-0″ X 7′-0″ X 6″ PAD	JMA	VB
1	09/18/12	EHP	REVISED PERIMETER OF WORKSPACE AND ADDED NOTE	SKV	E9751

DWP

DISTRICT | CONTRACT W.O. | DWP W.O.

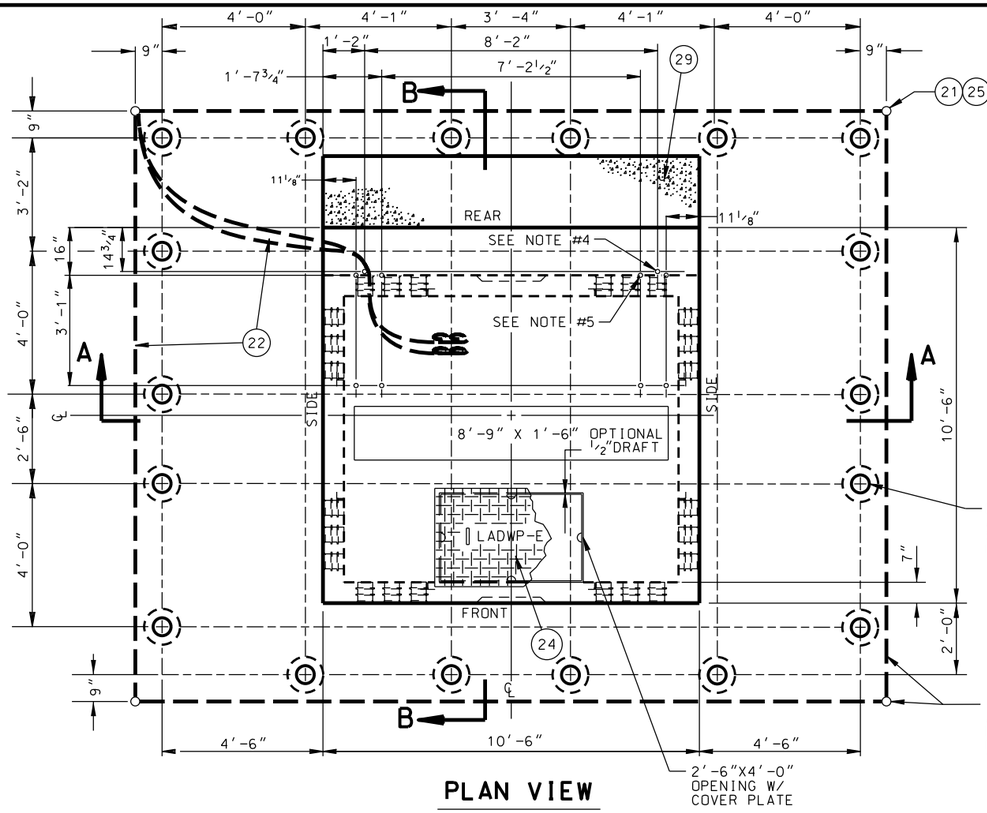
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN | DRAFTING
OK | CHECKER
APPROVED | DATE

7′ X 11′ PRECAST PAD FOR PADMOUNT SOLAR VISTA 201 SF_6 SWITCHGEAR

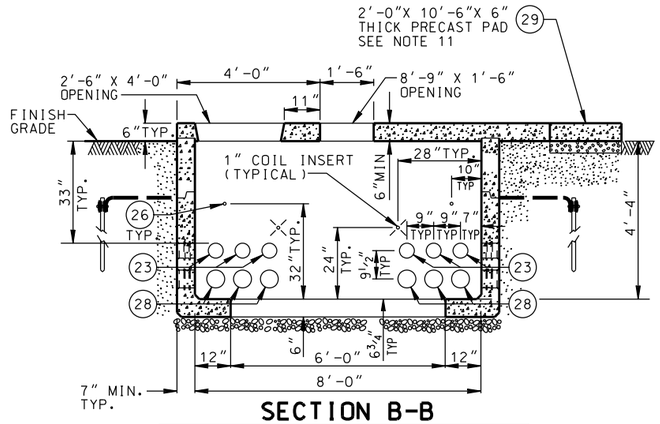
UB721-30 | SHEET 2 OF 2

INDEX



PLAN VIEW

4

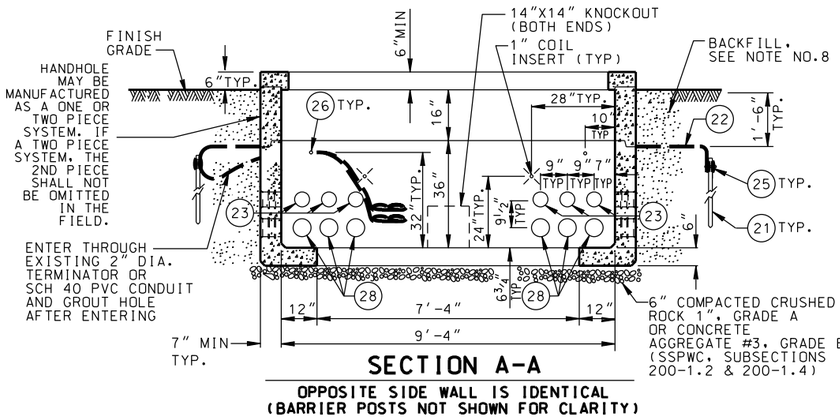


SECTION B-B

OPPOSITE SIDE WALL IS OPPOSITE HAND (BARRIER POSTS NOT SHOWN FOR CLARITY)

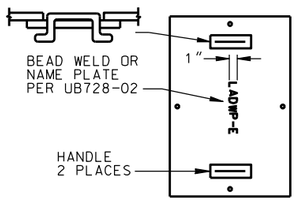
PARTS LIST		
NO.	QTY.	DESCRIPTION
21	4	GROUND ROD, 5/8" DIA. X 8', 304 SST
22	100±	WIRE BARE TINNED 2/0 CU, SEE NOTE 6
23	24	5" DIA. DOUBLE MEMBRANE TERMINATION
24	1	3/16" DIAMOND PLATE COVER SEE NOTE 7
25	7	EXOTHERMIC WELD, SEE NOTE 6
26	8	2" DIA. TERMINATOR OR SCH 40 PVC CONDUIT CAPPED AT OUTSIDE WALL
28	24	6" DIA. DOUBLE MEMBRANE TERMINATION
29	1	2'-0"X 10'-6"X 6"THICK PRECAST PAD

WEIGHT OF THE HEAVIEST SECTION 20,300 LBS



SECTION A-A

OPPOSITE SIDE WALL IS IDENTICAL (BARRIER POSTS NOT SHOWN FOR CLARITY)



HANDHOLE COVER DETAIL

NOTES:

1. FOR GENERAL REQUIREMENTS, SEE UGCS STD. NO. P721-00 (ALL SHEETS). CONSTRUCTION DRAWING WILL SPECIFY THE LOCATION, TYPE, AND NUMBER OF CONDUITS TO BE INSTALLED IN HANDHOLE.
2. (4) IF GALVANIZED CONDUIT IS USED, EXPOSED ENDS ARE TO BE THREADED AND FITTED WITH GROUND BUSHINGS.
3. SWITCHGEAR PAD SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P SPECIFICATION NO. P-178 AS LAST REVISED EXCEPT ARTICLE 4 FOR PAD HANDHOLE AND ARTICLE 3(C)(1) AND ARTICLE 4 FOR PAD SLAB. MINIMUM REQUIRED DESIGN LOADING FOR PAD SLAB SHALL BE: LIVE LOAD = 100 LBS/SQ. FT. DEAD LOAD = 400 LBS/SQ. FT. IMPACT = NONE
4. 5/8" DIA THREADED IMBED FOR CABINET ANCHOR BOLTS TYPICAL 2 LOCATIONS.
5. 5/8" DIA THREADED IMBED FOR SWITCH ANCHOR BOLTS TYPICAL 8 LOCATIONS.
6. (4) INSTALL ALL GROUND WIRE IN THE EARTH 1'-6" BELOW THE FINISH GRADE. CONNECT GROUND WIRE (PT.22) TO 4 GROUND RODS (PT.21). EXTEND WIRE ENDS FROM A COMMON GROUND ROD INTO HANDHOLE THROUGH 2" DIA. SCH 40 PVC CONDUIT. GROUT HOLES WHERE WIRES ENTER HANDHOLE. COIL 9' OF EACH WIRE INTO THE HANDHOLE. ALL CONNECTIONS SHALL BE WELDED USING EXOTHERMIC WELDING (PT.25), (CADWELD, THERMOWELD, OR EQUAL).
7. COVER SHALL BE PROVIDED WITH FOUR 1/2" NON-CORROSIVE PENTA HEAD BOLTS. PROVIDE 1/2-13 METAL OPEN STAR P35T INSERTS WITH THROUGH HOLE OR CLEAN OUT. COVER AND BOLTS SHALL BE FLUSH WITH CONCRETE SURFACE. COVER SHALL BE HOT DIP GALVANIZED AFTER LADWP LOGO IS BEAD WELDED IN PLACE, IF APPLICABLE.
8. BACKFILL WITH NATURAL MATERIAL AND PERFORM 90% COMPACTION, AS AN ALTERNATIVE BACKFILL WITH SLURRY-CEMENT CONCRETE CLASS 100-E-100 BACKFILL. BACKFILL UNDER OVERHANG SHALL ONLY BE SLURRY-CEMENT.
9. (4) EACH CONCRETE SECTION SHALL BE MARKED ON THE INSIDE AND OUTSIDE WITH COMPANY NAME THE DESIGNATION "DWP-FA-CN" OR "DWP/F-CN-SC" IF SCC MIX USED AND THE DATE OF POUR.
10. WEIGHT AND DIMENSIONS VARY WITH MANUFACTURER. PRIOR TO EXCAVATION, STRUCTURE INSTALLER SHALL OBTAIN THE MINIMUM EXCAVATION SIZE FROM THE MANUFACTURER SUPPLYING THE STRUCTURE.
11. 2'-0"X 10'-6"X 6"THICK PRECAST PAD IS A PART OF THE PRECAST ASSEMBLAGE. INSTALL PRECAST PAD FLUSH TO TOP OF PRECAST TRANSFORMER PAD. PAD SHALL BE SET ON 4" MIN. COMPACTED LEVEL BED OF NATURAL MATERIAL OR CRUSHED AGGREGATE BASE, UNLESS OTHERWISE APPROVED BY THE DEPARTMENT REPRESENTATIVE.
12. (4) A MINIMUM OF TWO 2" DB, SCH 40 PVC CONDUITS ARE REQUIRED FOR 120VAC AND COMMUNICATIONS. LOCATION TO BE DETERMINED BY DESIGN ENGINEER.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	PE NO.
4	12/2/22	PSJ	REVISED BARRIER POST LOCATIONS AND NOTES.	RJT	20863
3	10/28/14	EHP	REVISED NOTES 7 & 8.	JMA	
2	06/24/14	EHP	REV. BARRIER POST LOC. & DIMENSIONS, ADDED 2'-0"X 10'-6"X 6"PAD	JMA	VB
1	09/18/12	EHP	SEE SHEET 2 FOR REVISION	SKV	E9751

OK VB

DWP

DISTRICT | CONTRACT W.O. | DWP W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

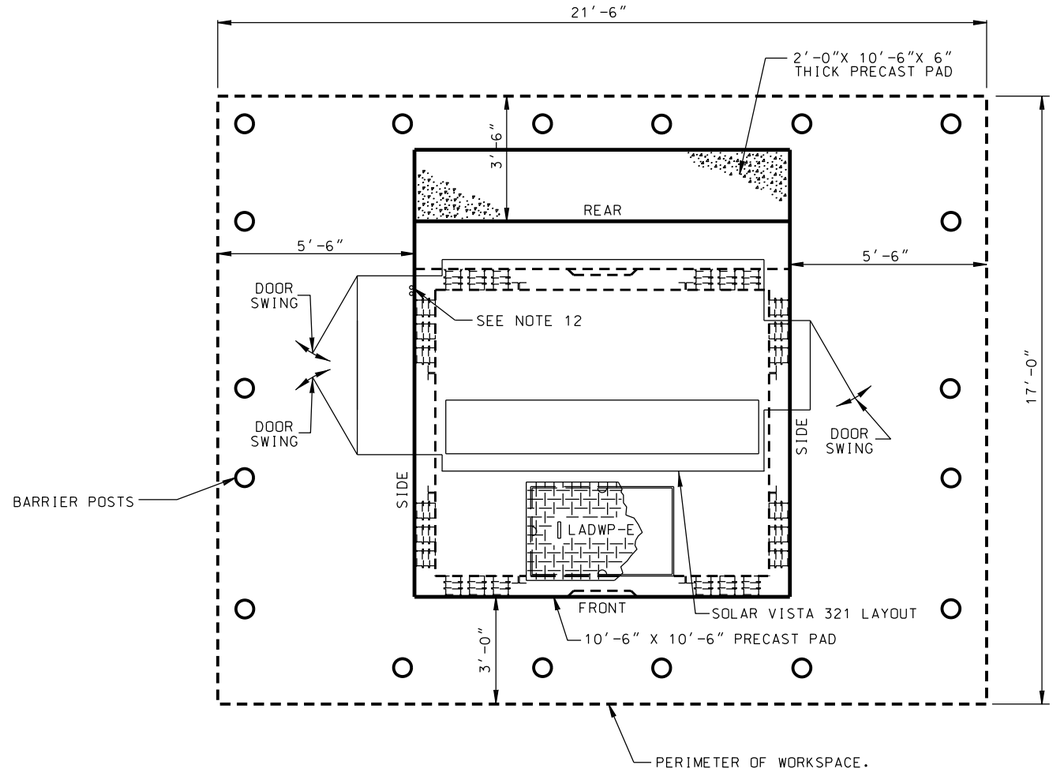
DESIGN JUAN AVALOS | DRAFTING E.H.PERDOMO

OK JAMES MAGULA
APPROVED CE 47565 12-31-13 | CHECKER | DATE 07/19/12

10'-6" X 10'-6" PRECAST PAD WITH 8'-9" X 1'-6" OPENING FOR PADMOUNT SOLAR VISTA 321 SF_6 SWITCHGEAR

UB721-31 | SHEET 1 OF 2

INDEX



LAYOUT OF REQUIRED WORKSPACE PERIMETER

(FOR PADMOUNT EGRESS ORIENTATION, REFER TO UNDERGROUND STANDARD PAGE P721-03)

△4

NOTE:
FOR MINIMUM OVERALL SPATIAL CLEARANCES
SEE STANDARD DRAWING UB721-29.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	PE NO.
△4	12/2/22	PSJ	REVISED BARRIER POST LOCATIONS AND NOTES.	RJT	20863
△3	10/28/14	EHP	REVISED NOTES 7 & 8.	JMA	
△2	06/24/14	EHP	REV.BARRIER POST LOC.& DIMENSIONS, ADDED 2′-0″X 10′-6″X 6″PAD	JMA	VB
OK VB △1	09/18/12	EHP	SEE SHEET 2 FOR REVISION	SKV	E9751

DWP

DISTRICT | CONTRACT W.O. | DWP W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

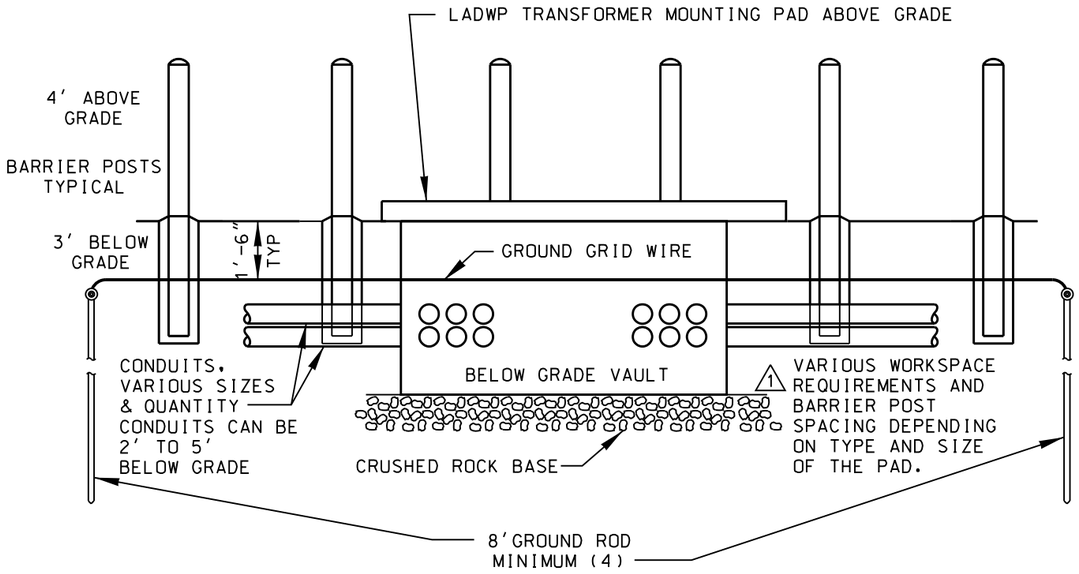
DESIGN JUAN AVALOS | DRAFTING E.H.PERDOMO

OK JAMES MAGULA
APPROVED CE 47565 12-31-13 | CHECKER | DATE 07/19/12

10′-6″ X 10′-6″
PRECAST PAD WITH
8′-9″ X 1′-6″
OPENING FOR PADMOUNT
SOLAR VISTA 321 SF_6
SWITCHGEAR

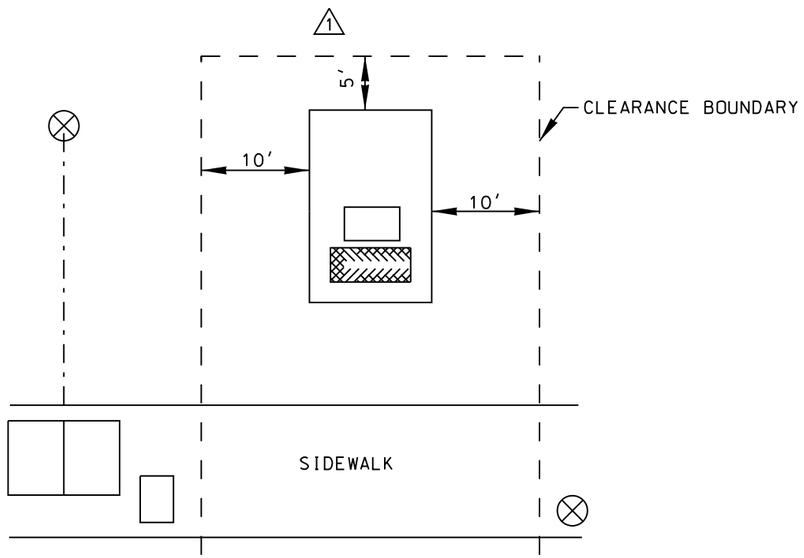
UB721-31 | SHEET 2 OF 2

INDEX

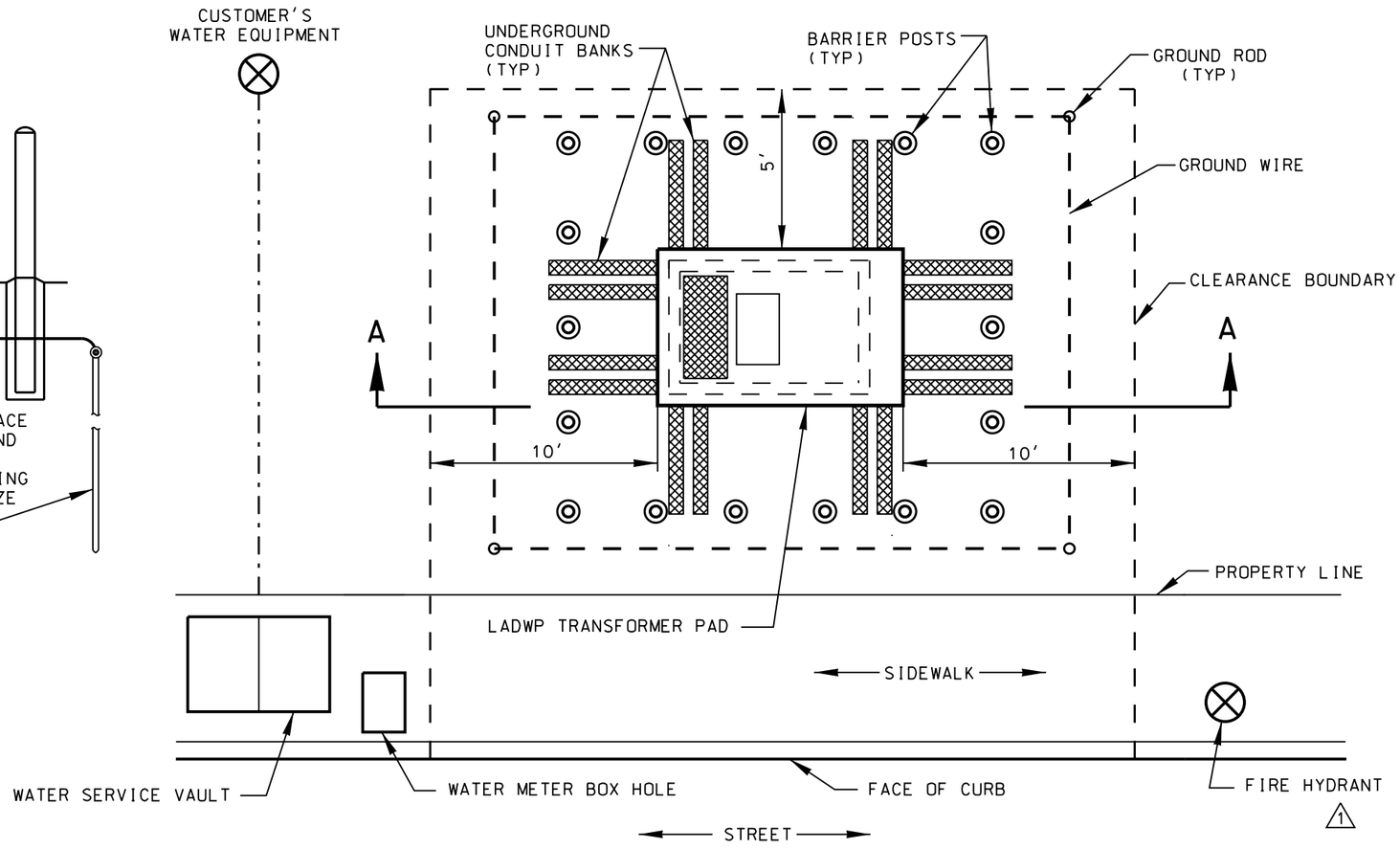


SECTION "A-A"

(VIEW OF BELOW GRADE OBSTRUCTIONS)



ALTERNATE PAD ORIENTATION



TYPICAL PLAN VIEW

NOTES:
1. CLEARANCES SHOWN ARE FOR GENERAL INSTALLATIONS. CONSULT WITH ELECTRICAL DESIGN ENGINEER TO OPTIMIZE ACTUAL CLEARANCES.
2. WATER FACILITIES MUST BE CONSTRUCTED OUTSIDE OF THE CLEARANCE ZONE. WATER PIPES MUST BE PLACED BELOW THE CONDUIT BANKS.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	PE NO.
1	09/07/12	EHP	CORRECTED SPELLING		

DISTRICT | CONTRACT W.O. | DWP W.O.

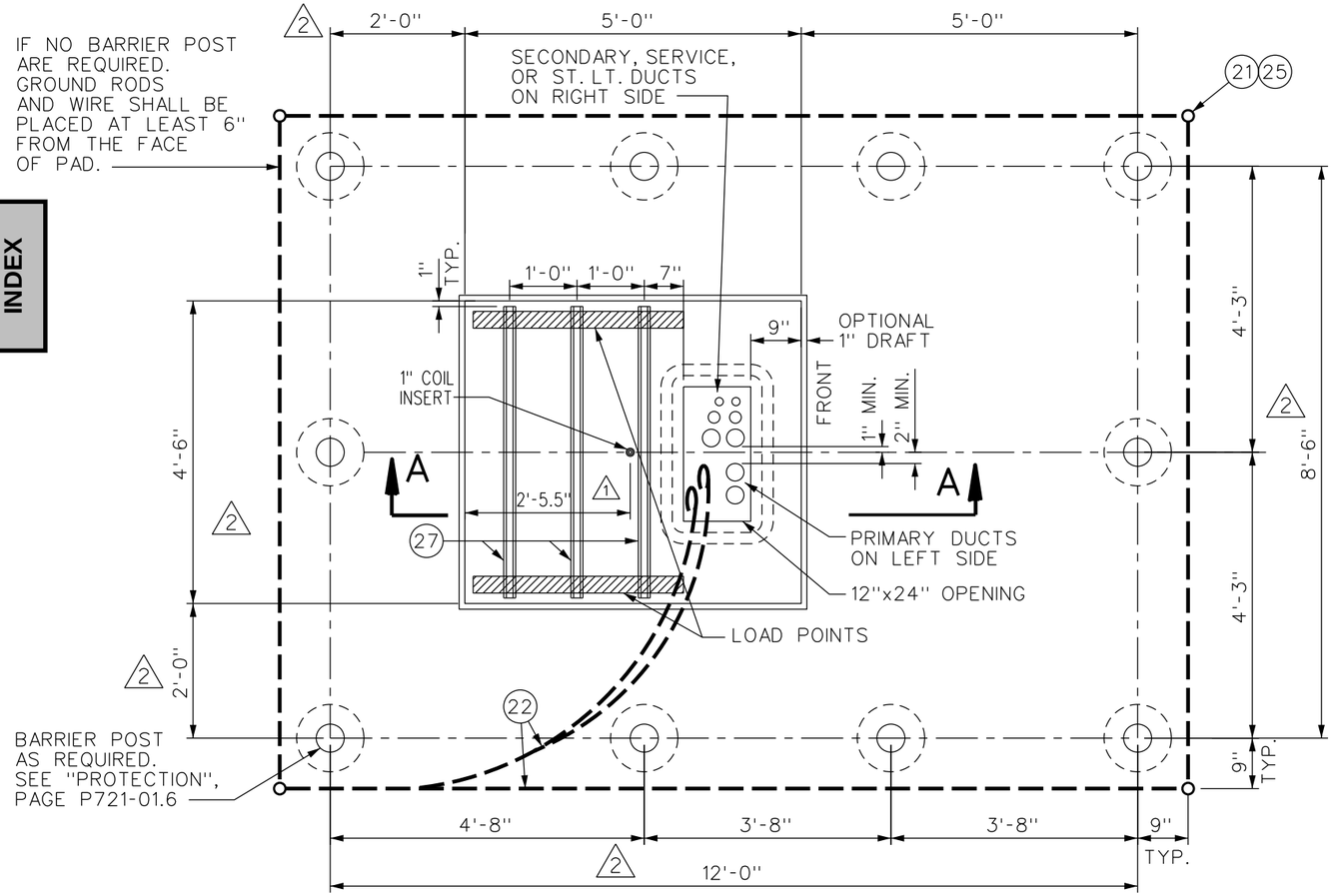
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN VAHAN BARSEGHIAN | DRAFTING E.H.PERDOMO
OK VAHAN BARSEGHIAN | CHECKER
APPROVED SK VOHRA E9751 | DATE 08/01/12

CLEARANCE FOR WATER FACILITIES IN THE VICINITY OF PAD-MOUNTED EQUIPMENT AND VAULTS

UB721-32 | SHEET 1 OF 1

INDEX

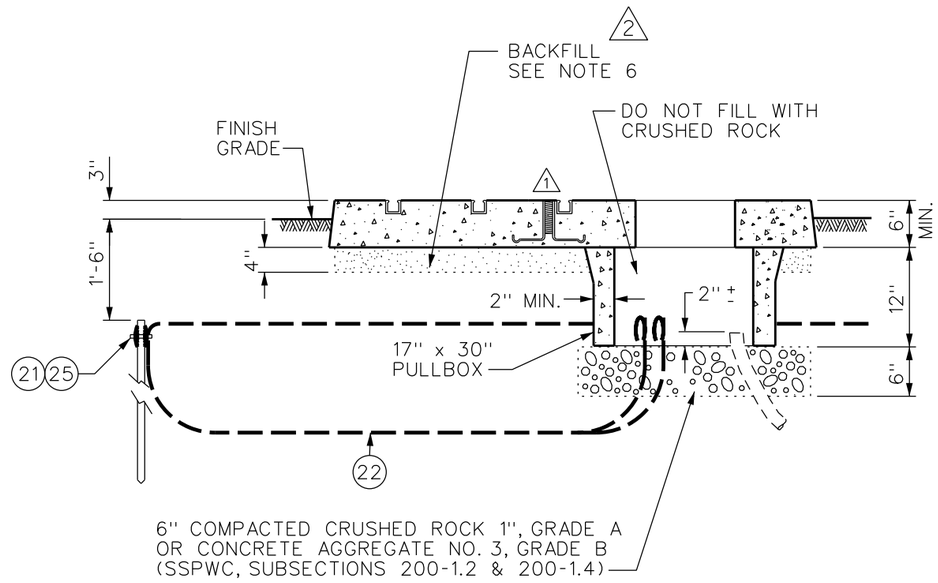


PLAN

NTS

NO.	QTY.	DESCRIPTION
21	4	GROUND ROD 5/8" D x 8', 304 SST
22	60+/-	WIRE BARE TINNED 2/0 CU, SEE NOTE 5
25	5	EXOTHERMIC WELD, SEE NOTE 5
27	3	1 5/8" x 1 5/8" x 4'-4" LONG 12 GAUGE STRUT (UNISTRUT P3200 SERIES)

WEIGHT OF THE HEAVIEST SECTION 1,550 lbs.



SECTION A-A

NTS

NOTES:

1. FOR GENERAL REQUIREMENTS, SEE UGCS STD. NO. C721-01 (ALL SHEETS). CONSTRUCTION DRAWING WILL SPECIFY THE LOCATION, TYPE, AND SIZE OF CONDUITS ENTERING HANDHOLE.
2. IF GALVANIZED CONDUIT IS USED, EXPOSED ENDS ARE TO BE THREADED AND FITTED WITH GROUND BUSHINGS.
3. TRANSFORMER PAD SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P SPECIFICATION NO. P-178 AS LAST REVISED, EXCEPT ARTICLE 4 FOR PAD HANDHOLE AND ARTICLE 3 (C) (1) AND ARTICLE 4 FOR PAD SLAB. MINIMUM REQUIRED DESIGN LOADING FOR PAD SLAB SHALL BE:

   LIVE LOAD = 100 lbs./sq. ft.
   DEAD LOAD = 600 lbs./lf. @ LOAD POINTS.
   IMPACT = NONE

4. ALL STRUTS SHALL BE HOT DIP GALVANIZED CONTINUOUS CONCRETE INSERTS AND SHALL BE FLUSH WITH CONCRETE SURFACE.
5. INSTALL ALL GROUND WIRE IN THE EARTH 1'-6" BELOW THE FINISH GRADE. CONNECT GROUND WIRE (PT.22) TO 4 GROUND RODS (PT.21). EXTEND WIRE ENDS FROM A COMMON GROUND ROD INTO HANDHOLE FROM BOTTOM. COIL 9' OF EACH WIRE INTO THE HANDHOLE. ALL CONNECTIONS SHALL BE WELDED USING EXOTHERMIC WELDING (PT.25) (CADWELD, THERMOWELD, OR EQUAL).
6. BACKFILL WITH NATURAL MATERIAL AND PERFORM 90% COMPACTION. AS AN ALTERNATIVE BACKFILL WITH SLURRY-CEMENT CLASS 100-E-100 BACKFILL. BACKFILL UNDER OVERHANG SHALL ONLY BE SLURRY-CEMENT.
7. EACH CONCRETE SECTION SHALL BE MARKED ON THE INSIDE & OUTSIDE WITH COMPANY NAME. THE DESIGNATION "DWP-FA-CN" OR "DWP/F-CN-SC" IF SCC MIX USED AND THE DATE OF POUR.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
2	08/03/23	JWW	UPDATED DIMENSIONS, NOTES, AND PG. 2	RJT	E20863
1	11/14/12	JHG	REVISED 1"COIL INSERT LOCATION	JMA	C78074

CE47565 12/13

DISTRICT | CONTRACT W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

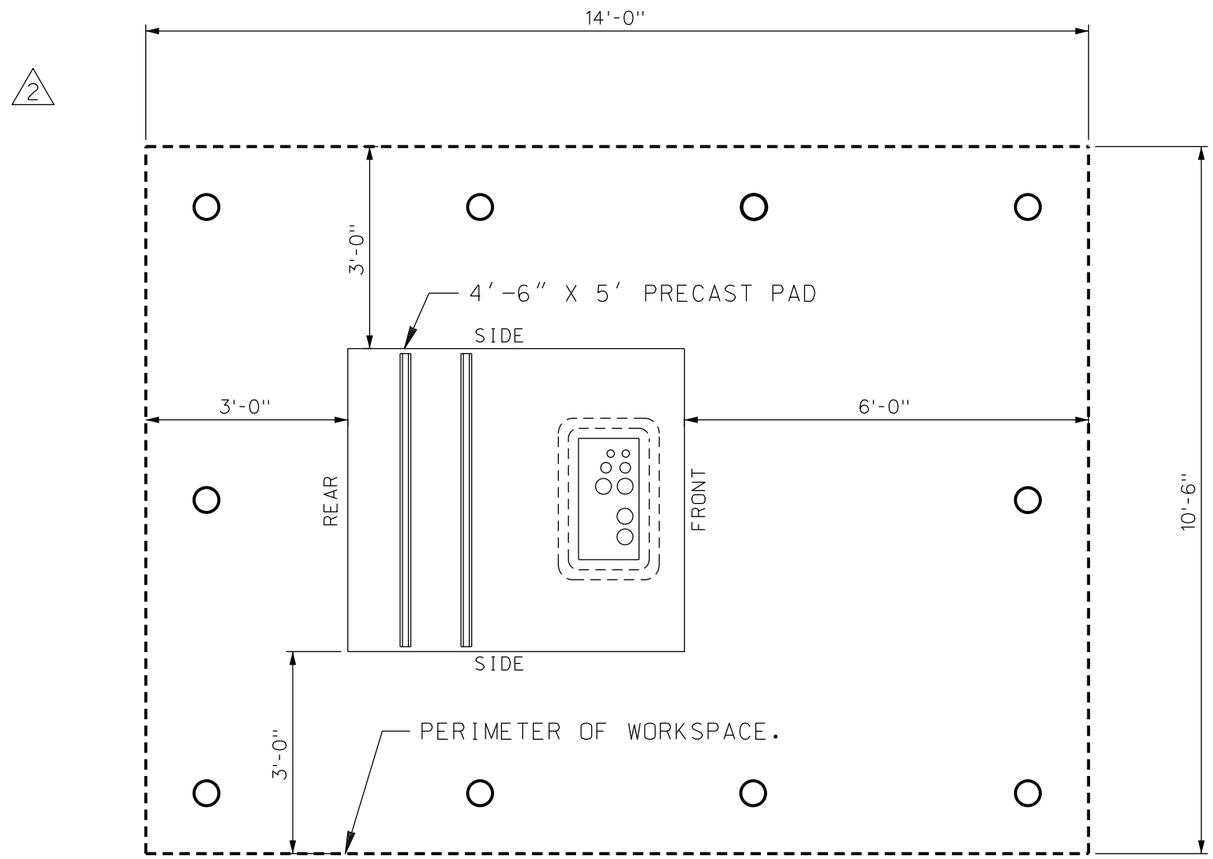
DESIGN JUAN AVALOS | DRAFTING J DUMINDIN
OK SAID POOSTI | CHECKER
APPROVED JAMES MAGULA | DATE 10/12/12

DWP W.O.

4'-6" x 5'-0" PRECAST PAD WITH PULLBOX FOR PADMOUNT TRANSFORMER

UB721-33 | SHEET 1 OF 2

INDEX



LAYOUT OF REQUIRED WORKSPACE PERIMETER

(FOR PADMOUNT EGRESS ORIENTATION, REFER TO UNDERGROUND STANDARD PAGE P721-03)

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	P.E. NO.
2	08/03/23	JWW	UPDATED DIMENSIONS, NOTES, AND PG. 2	RJT	E20863
1	11/14/12	JHG	REVISED 1"COIL INSERT LOCATION	JMA	C78074

CE47565 12/13

DISTRICT | CONTRACT W.O.

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	JUAN AVALOS	DRAFTING	J. WONG
OK	SAID POOSTI	CHECKER	W. SUNDY
APPROVED	JAMES MAGULA	DATE	08/03/23

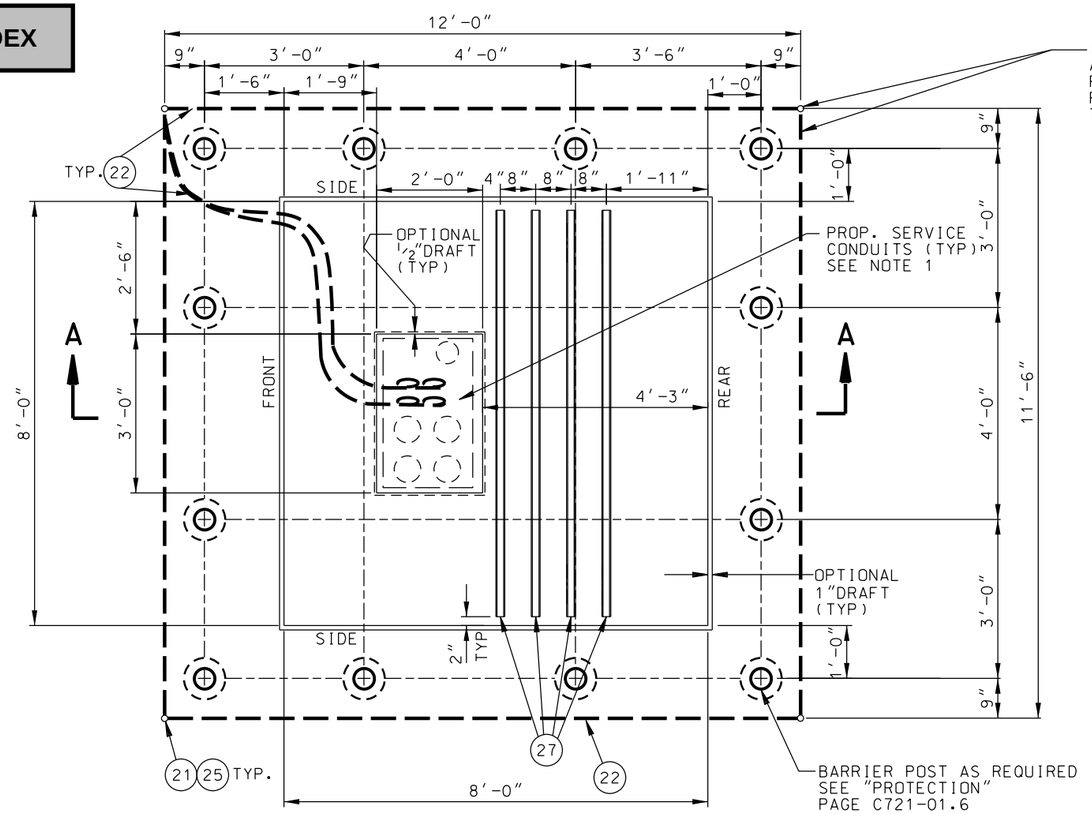
DWP W.O.

4'-6" x 5'-0" PRECAST PAD WITH PULLBOX FOR PADMOUNT TRANSFORMER

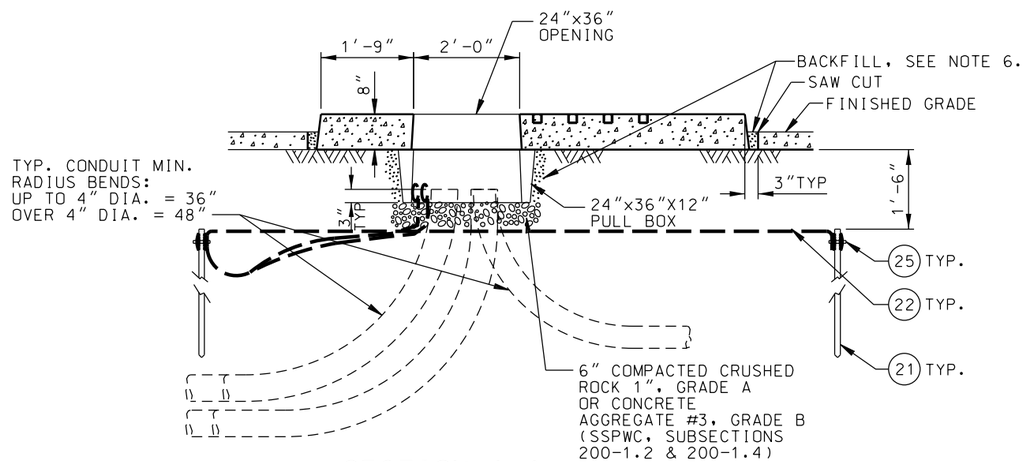
UB721-33

SHEET 2 OF 2

INDEX



PLAN VIEW



SECTION A-A

NTS

PARTS LIST		
NO.	QTY	DESCRIPTION
21	4	GROUND ROD 5/8″ D X 8′, 304 SST CLAD
22	80′±	WIRE BARE TINNED 2/0 CU, SEE NOTE 4
25	5	EXOTHERMIC WELD, SEE NOTE 5
27	4	1 5/8″x 1 5/8″X 92″ LONG 12 GAUGE STRUT (UNISTRUT P3200 SERIES)

WEIGHT OF THE HEAVIEST SECTION 6,000 LBS.

NOTES:

1. FOR GENERAL REQUIREMENTS, SEE UGCS STD. NO. C721-01 (ALL SHEETS). CONSTRUCTION DRAWING WILL SPECIFY THE LOCATION, TYPE AND NUMBER OF CONDUITS TO BE INSTALLED IN HANDHOLE.
2. TRANSFORMER PAD SHALL BE REINFORCED CONCRETE AND SHALL MEET THE REQUIREMENTS OF DW&P SPECIFICATION NO.P-178 AS LAST REVISED EXCEPT ARTICLE 4 FOR PAD HANDHOLE AND ARTICLE 3(C)(1) AND ARTICLE 4 FOR PAD SLAB. MINIMUM REQUIRED DESIGN LOADING FOR PAD SLAB SHALL BE:
   LIVE LOAD= 100 LBS/SQ. FT.
   DEAD LOAD= 1600 LBS/SQ. FT.
   IMPACT= NONE
3. ALL STRUTS SHALL BE HOT DIP GALVANIZED CONTINUOUS CONCRETE INSERTS AND SHALL BE FLUSH WITH CONCRETE SURFACE.
4. INSTALL ALL GROUND WIRE IN THE EARTH 1′-6″ BELOW THE FINISH GRADE. CONNECT GROUND WIRE (PT.22) TO 4 GROUND RODS (PT.21). EXTEND WIRE ENDS FROM A COMMON GROUND ROD INTO THE BOTTOM OF THE PULL BOX. COIL 5 FT. OF EACH WIRE INTO THE PULL BOX. ALL CONNECTIONS SHALL BE WELDED USING EXOTHERMIC WELDING (PT.25), (CADWELD, THERMOWELD, OR EQUAL) OR AS NOTED OTHERWISE ON CONSTRUCTION DRAWING.
5. TRANSFORMER PRECAST PAD SHALL BE SET ON A 90% COMPACTED LEVEL BED OF SOIL OR OTHER APPROVED BASE MATERIAL. THE TRANSFORMER PRECAST PAD PULL BOX SHALL BE SET ON A WELL COMPACTED SOIL WITH 6-INCH DEPTH COMPACTED CRUSHED ROCK 1", GRADE A OR CONCRETE AGGREGATE #3, GRADE B, UNLESS OTHERWISE APPROVED.
6. BACKFILL WITH NATURAL MATERIAL AND PERFORM 90% COMPACTION, AS AN ALTERNATIVE BACKFILL WITH SLURRY-CEMENT CLASS 100-E-100, UNLESS APPROVED OTHERWISE.

*7. IF PRECAST PAD IS TO BE INSTALLED IN A PUBLIC SIDEWALK, THE FOLLOWING REQUIREMENTS ARE APPLICABLE:
   A. THE CONTRACTOR SHALL OBTAIN BUILDING MATERIALS PERMIT FROM THE CITY LOS ANGELES BUREAU OF STREET SERVICES (BSS). PERMIT MUST PROVIDE LANGUAGE SPECIFIC TO LADWP SPECIAL CONDITIONS.
   B. THE CONTRACTOR SHALL ONLY INSTALL THE PRECAST PAD WITHIN THE DESIGNATED ENCLOSED AREA AS OUTLINED BY THE CITY OF LOS ANGELES DEPARTMENT OF TRANSPORTION (LADOT) APPROVED PERMIT (APPROVED K-RAIL CLOSURE).
   C. THE ABOVE MENTIONED PERMITS FROM BSS AND LADOT SHALL BE INCLUDED TO THE EXCAVATION (U) PERMIT APPLICATION ASSOCIATED WITH PROPOSED UNDERGROUND (UG) POWER SYSTEM DESIGN.

*8. AT THE END OF THE LIFE OF TEMPORARY SERVICE, THE CONTRACTOR MUST REMOVE TRANSFOMER PRECAST PAD AND ALL ASSOCIATED EQUIPMENT/MATERIALS PRIOR TO THE REMOVAL OF THE K-RAIL ENCLOSURE.

*9. CONTRACTOR MUST REMOVE ALL CONDUITS FROM THE TEMPORARY SERVICE PAD DURING DECOMMISSION. ALL CONDUIT RISERS MUST BE REMOVED, CUT AND PLUG 30-INCHES MINIMUM BELOW FINISHED GRADE.

10. INSTALLATION OF THE TRANSFORMER PRECAST PAD SHALL MEET THE ADDITIONAL INSTALLATION REQUIREMENTS OF THE DWP UNDERGROUND CONDUIT AND SUBSTRUCTURE SPECIFICATION NO. 104, AS LAST REVISED AND AS APPLICABLE.

* INCLUDE NOTES 7, 8 & 9 TO CONSTRUCTION DRAWING.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.

DISTRICT | CONTRACT W.O. | DWP W.O.

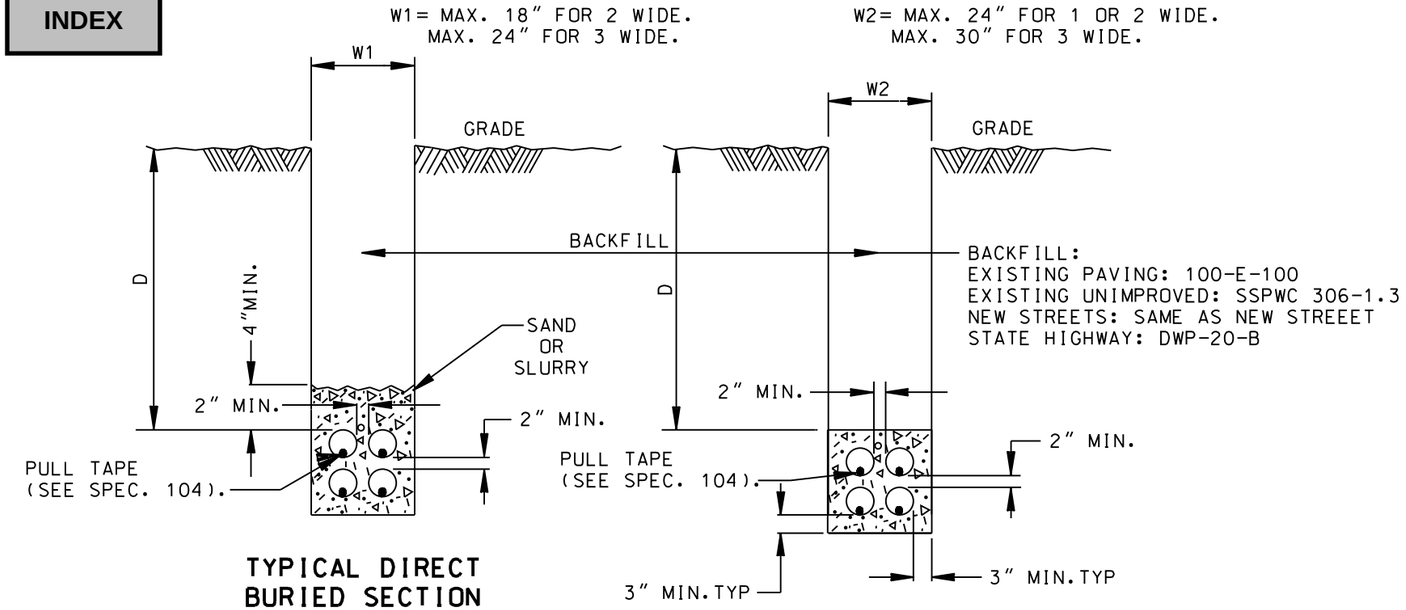
CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	S. SWEENEY/J. AVALOS	DRAFTING	J. GARCIA
OK	E. MERCADO	CHECKER	J. GARCIA
APPROVED	E. MERCADO	DATE	07/17/15

8′X 8′ PRECAST PAD W/PULL BOX FOR TEMPORARY SERVICE INSTALLATIONS ONLY

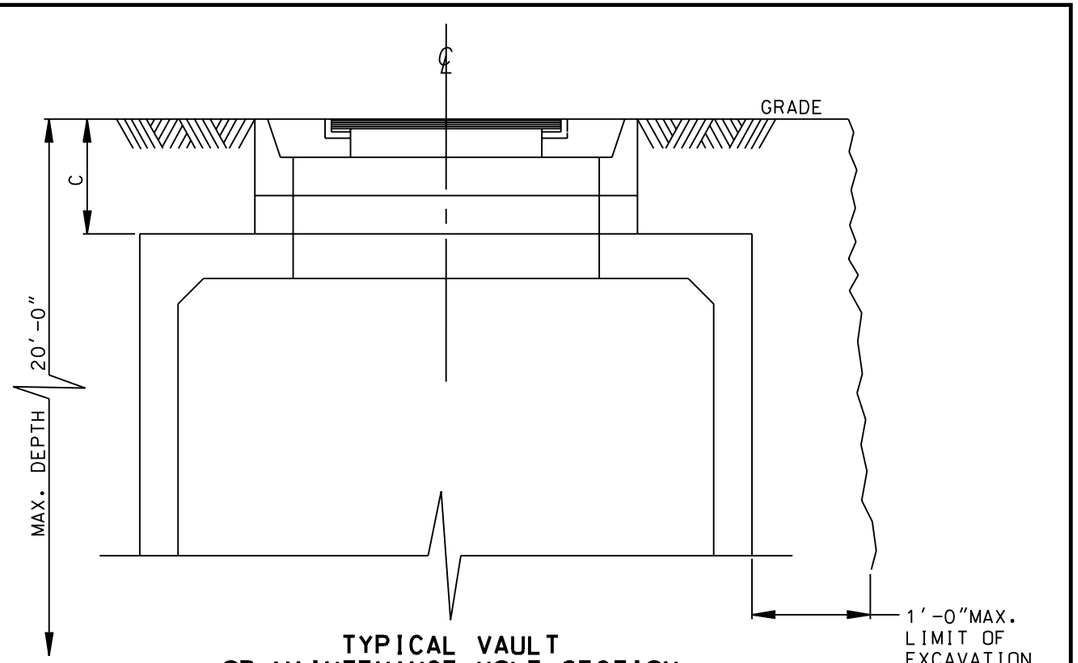
UB721-36 | SHEET 1 OF 1

INDEX



TYPICAL DIRECT BURIED SECTION
(SEE CONSTRUCTION PLAN FOR QUANTITIES).

TYPICAL ENCASED CONDUIT SECTION
(SEE CONSTRUCTION PLAN FOR QUANTITIES).

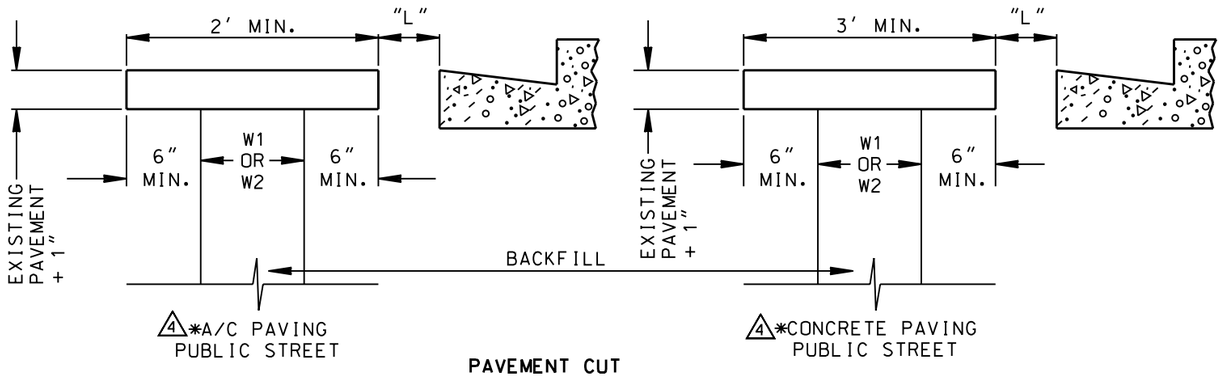


TYPICAL VAULT OR MAINTENANCE HOLE SECTION

C=18"MIN.BELOW GUTTER GRADE IN PAVEMENT AREA AND 48" BELOW FINISHED SURFACE IF PLACED IN SIDEWALK AREA. (42"MIN.BELOW FINISHED SURFACE IN STATE HIGHWAY)

IN PUBLIC PROPERTY (UNLESS OTHERWISE NOTED ON PLAN):
D=30" MIN. BELOW GUTTER GRADE.
(42" MIN. BELOW FINISHED SURFACE IN STATE HIGHWAY).

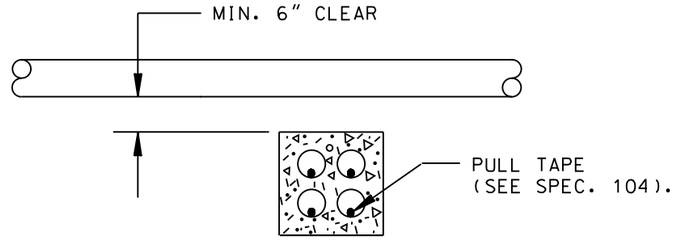
IN PRIVATE PROPERY:
D=24" MIN. FOR PRIMARY CONDUIT AND ALL SECONDARY CONDUITS IN PAVED AREAS.
36" MIN. FOR PRIMARY CONDUIT IN LANDSCAPED OR UNIMPROVED AREAS.



PAVEMENT CUT
UNLESS OTHERWISE NOTED ON PLAN

4 *NEW PAVEMENT TO MATCH THE SAME MATERIAL AND THICKNESS OF THE EXISTING PAVEMENT

DIMENSION "L":
IF DIMENSION "L" IS LESS THAN 2'-0", THE ENTIRE PAVEMENT IN THE SPACE BETWEEN EXISTING GUTTER OR CURBLINE (IF NO GUTTER IS PRESENT) HAS TO BE REMOVED AND RECONSTRUCTED.



CROSSING OTHER UTILITIES

NOTES:

1. EXCAVATION/SHORING SHALL COMPLY WITH THE REQUIREMENTS OF "CAL-OSHA" EXCAVATION TRENCHES EARTHWORKS, CONSTRUCTION SAFETY ORDERS, SECTION 1504, 1539-1543 LATEST ADDITION. DEPTH OF EXCAVATION SHALL NOT EXCEED 20 FEET.
2. THE SIZE OF THE STRUCTURES SHOWN ON THE CONSTRUCTION DRAWINGS ARE THE OUTSIDE DIMENSIONS. THE SIZE OF EXCAVATION IS APPROXIMATELY 2' LARGER TO ACCOMMODATE THE SHORING INSTALLATION.
3. POWER POLES ARE NOT A PART OF THE UTILITY PERMIT AND ARE PERMIT EXEMPT PER LAMC.
4. TUNNEL UNDER EXISTING CURBS, GUTTERS & DRIVEWAYS WHERE POSSIBLE, SUBJECT TO PUBLIC WORKS INSPECTORS APPROVAL.

TRAFFIC CONTROL:
WATCH MANUAL SHALL BE USED FOR TRAFFIC CONTROL UNLESS OTHERWISE NOTED ON THE PERMIT REQUIREMENTS.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
1	03/15/05	JHG	ADDED PAVING AND ADDITIONAL NOTES	SP	
2	04/01/05	JHG	ADDED GUTTER DETAILS & EXCAV.LIMIT	SP	
3	05/16/05	W.Y.	REVISED EXCAVATION LIMIT	SP	
4	01/21/09	W.Y.	ADDED PAVEMENT NOTE	SP	

DISTRICT | CONTRACT W.O. | DWP W.O.

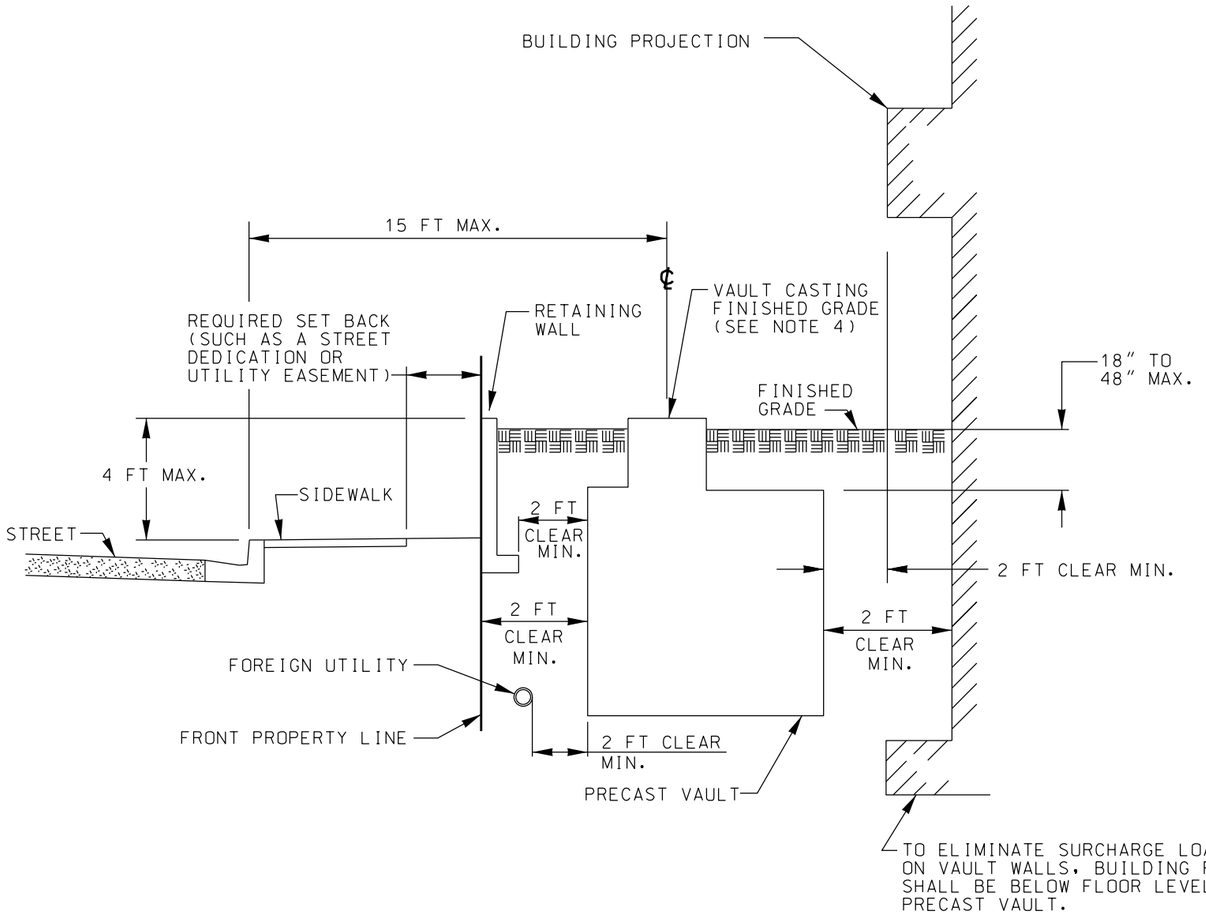
CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	S.POOSTI	DRAFTING	J.GARCIA
OK	S.POOSTI	CHECKER	W.YCEDO
APPROVED	S.POOSTI	DATE	05/10/04

GENERAL STANDARD DETAILS FOR CONDUIT CONSTRUCTION

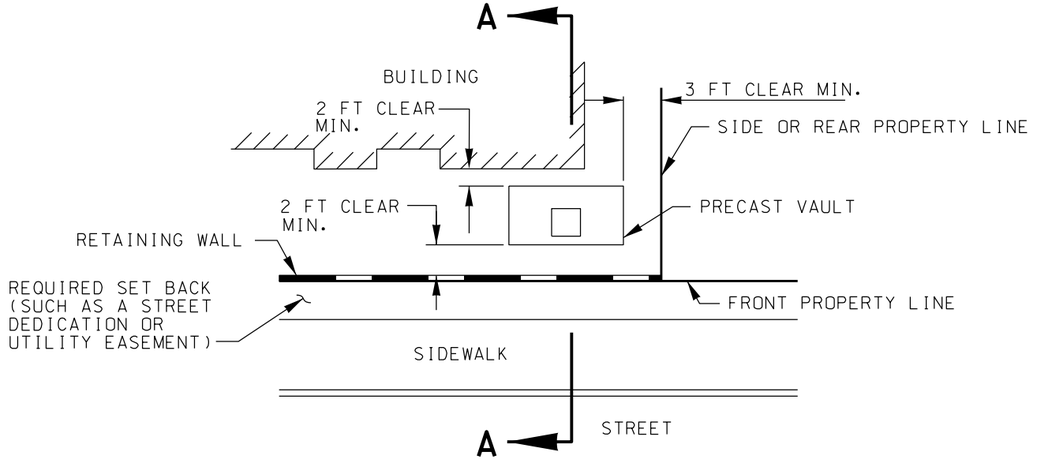
UB730-01 | SHEET 1 OF 1

INDEX



SECTION "A-A" ⚠2

N.T.S.



PLAN VIEW

N.T.S.

NOTES:

⚠2 1. THE PRECAST VAULT (VAULT) SHALL BE INSTALLED IN AN UNOBSTRUCTED LOCATION IN ACCORDANCE TO THE REQUIREMENTS NOTED HEREON AND AS SPECIFIED IN THE DEPARTMENT OF WATER AND POWER (LADWP) SPECIFICATIONS NO.104, AS LAST REVISED.THE VAULT LOCATION MUST BE CLEAR FROM FOREIGN PIPES, STRUCTURES, RETAINING WALLS, OR FENCE FOOTINGS.SUBTERRANEAN PARKING STRUCTURES, BASEMENTS, OR BUILDING FOOTINGS, ABOVE OR BELOW GRADE. THE LOCATION MUST ALSO BE CLEAR OF OVERHEAD OBSTRUCTIONS THAT WOULD INTERFERE WITH THE BOOM OF A LARGE CRANE USED TO UNLOAD THE VAULT SECTIONS FROM A TRUCK INTO THE EXCAVATION.THE VAULT LOCATION AND ACCESS TO IT MUST REMAIN CLEAR OF OBSTRUCTIONS TO FACILITATE INITIAL TRANSFORMER INSTALLATION AND FUTURE VAULT MAINTENANCE.

2. THE VAULT SHALL NOT BE INSTALLED OVER ANY EXISTING FOREIGN UTILITY OR STRUCTURE.

3. CLEARANCES SHOWN ABOVE ARE MINIMUM, EXCEPT AS OTHERWISE NOTED. PROPOSED INSTALLATIONS THAT DO NOT COMPLY WITH THESE REQUIREMENTS MAY BE PRESENTED TO THE POWER DISTRIBUTION STANDARDS ENGINEER FOR REVIEW AND CONSIDERATION.

⚠2 4. VAULT CASTING FINISHED GRADE SHALL BE 4 FEET MAXIMUM FROM THE SIDEWALK FINISHED GRADE AND SHALL COMPLY WITH THE REQUIREMENTS SPECIFIED IN THE LADWP SPECIFICATIONS NO.104.

5. PLANTINGS SUCH AS TREES, PLANTS AND SHRUBS SHALL BE AT LEAST 5 FEET CLEAR TO ALL SIDES OF THE VAULT AND ALLOW ACCESS TO THE VAULT FOR MAINTENANCE.TREES SHALL BE PLACED SO THAT THEIR GROWTH DOES NOT INHIBIT REPLACEMENT OR REPAIRS OF THE VAULT. PLANTING AREA(S) THAT INTERFERE WITH THE CLEARANCE STATED ABOVE OR THE VAULT ACCESS AREA MAY BE REMOVED WITHOUT NOTICE AT THE CUSTOMER'S EXPENSE.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
⚠2	02/17/15	JHG	REV. CALLOUTS & NOTES	J.M.A.	
⚠1	12/20/11	EHP	REV. DIMENSIONS, NOTES & TITLE	J.M.A.	C78074

C47565
EXP 12-31-11

DISTRICT	CONTRACT W.O.	DWP W.O.			

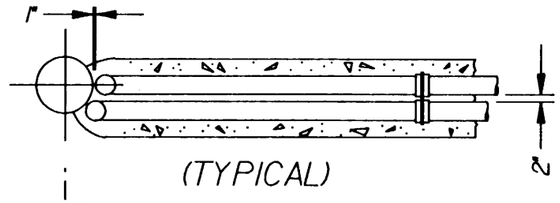
CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

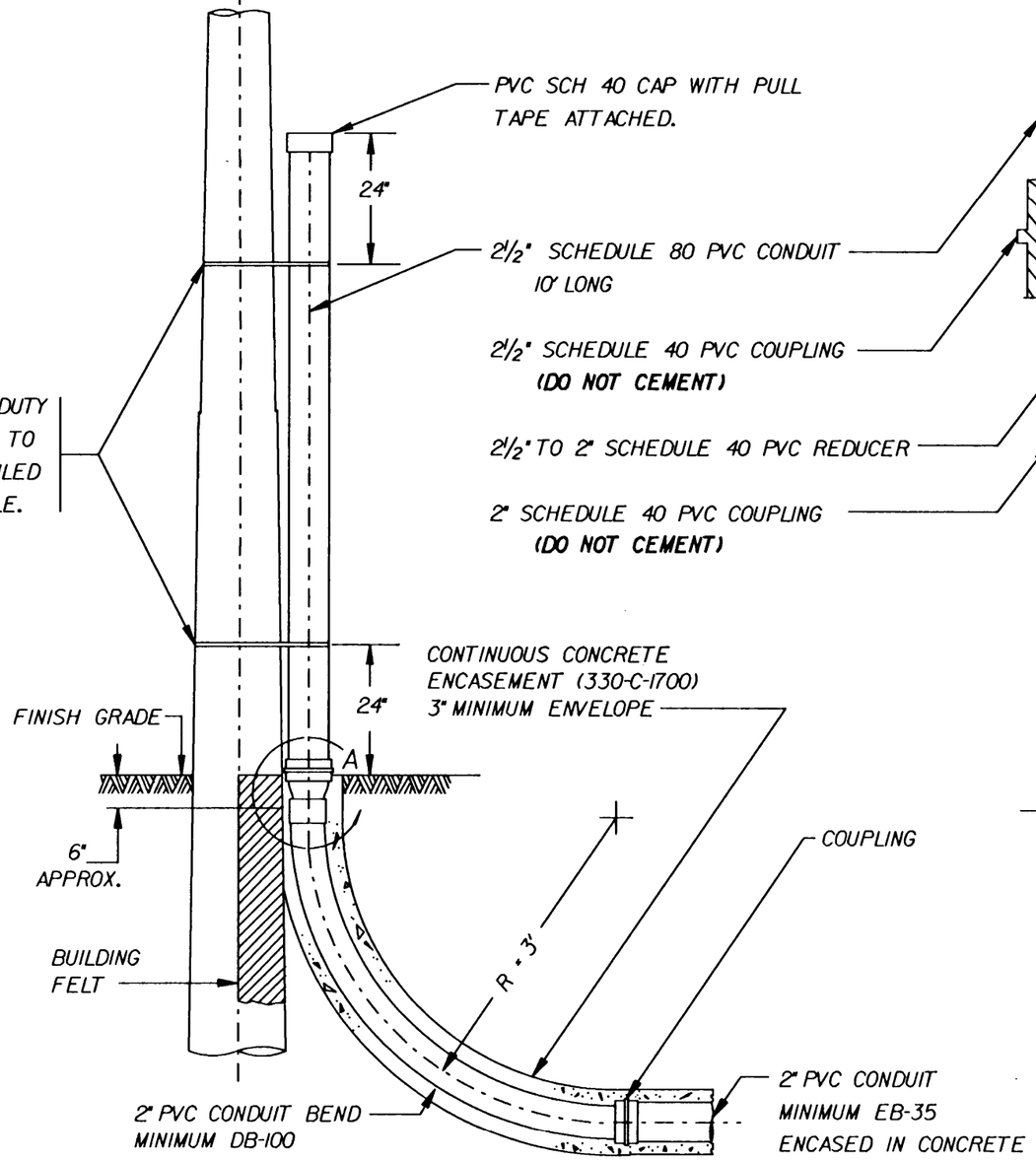
DESIGN	DRAFTING
JUAN AVALOS	E.H.PERDOMO
OK	CHECKER
APPROVED JAMES MAGULA	DATE 10/26/11

MINIMUM CLEARANCES FOR PRECAST VAULT LOCATION ON PRIVATE PROPERTY

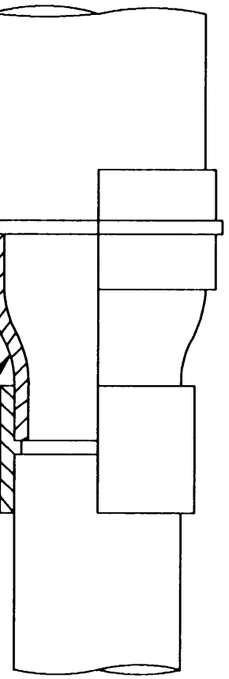
UB730-02 | **SHEET 1 OF 1**

INDEX





ELEVATION



DETAIL 'A'

NOTES:

Ⓐ FOR CONCRETE ENCASED, 3" AND ABOVE, CONDUIT BENDS, SEE D.W.P. POLE RISER DRAWING NO. UB745-03.

Ⓑ DRAWING SHOWS TYPICAL DUCT ARRANGEMENT.

Ⓒ VERIFY EXACT LOCATION OF CONDUIT AT BASE OF POLE WITH THE D.W.P. INSPECTOR BEFORE CONSTRUCTING.

Ⓓ DO NOT CONSTRUCT CONDUIT TO POLE PRIOR TO INSTALLATION OF NEW POLE.

Ⓔ RADIUS OF CONDUIT BEND IS AS STIPULATED UNLESS SPECIFIED BY DESIGN ENGINEER ON DESIGN DOCUMENTS.

SCALE: NTS

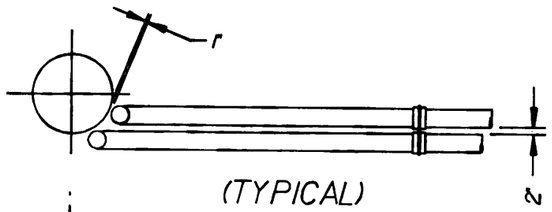
REV NO	DRN.	CKD.	DATE
DRN. G. K. MAGEE			11/16/92
CKD. W. YCEDO W.Y.			11/16/92
DES.ENGR. S. POOSTI S.P.			
APPD			

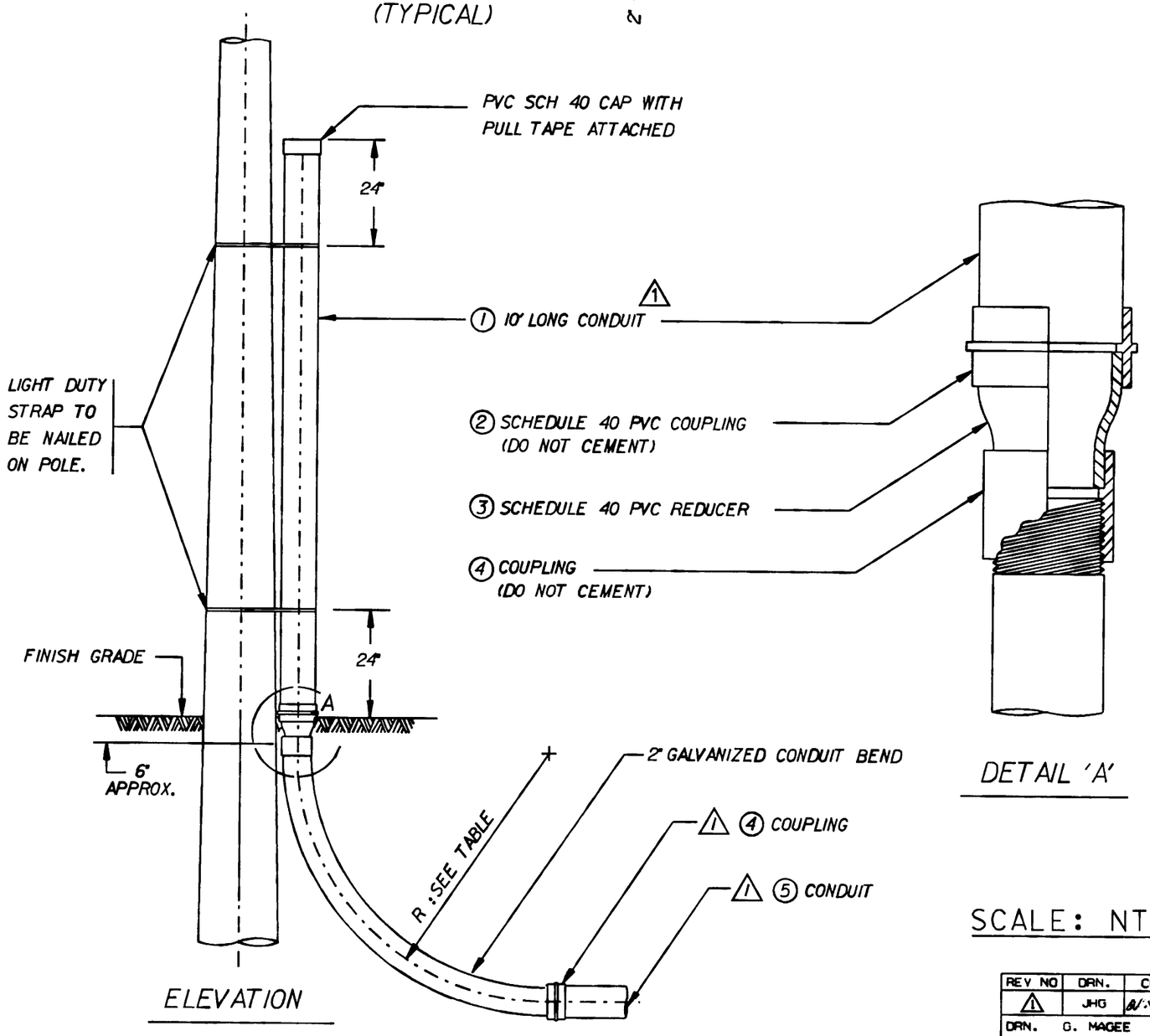
POLE RISER ENCASED, 2" CONDUIT BEND

POWER DISTRIBUTION DESIGN STANDARDS
DEPARTMENT OF WATER AND POWER
CITY OF LOS ANGELES

DRAWING NUMBER
UB745-01

INDEX





ELEVATION

DETAIL 'A'

SCALE: NTS

GALVANIZED CONDUIT BEND			
		2" STREET LIGHT	2"
	RADIUS R	3'-0"	3'-0"
1	① 10' LONG CONDUIT	2" GALVANIZED	2½" SCH. 80
	② SCH 40 PVC COUPLING	NOT REQUIRED	2½"
	③ SCH 40 PVC REDUCER	NOT REQUIRED	2½" TO 2"
	④ COUPLING	2" GALVANIZED TO GALVANIZED	2" SCH 40 PVC TO GALVANIZED
1	⑤ CONDUIT	2" GALVANIZED	2" PVC MINIMUM DB100

NOTES:

Ⓐ FOR 3" AND ABOVE GALVANIZED BENDS, SEE D.W.P. POLE RISER DRAWING NO. UB745-04.

Ⓑ DRAWING SHOWS TYPICAL DUCT ARRANGEMENT.

Ⓒ VERIFY EXACT LOCATION OF CONDUIT AT BASE OF POLE WITH THE D.W.P. INSPECTOR BEFORE CONSTRUCTING.

Ⓓ DO NOT CONSTRUCT CONDUIT TO POLE PRIOR TO INSTALLATION OF NEW POLE.

Ⓔ RADIUS OF CONDUIT BEND IS AS STIPULATED UNLESS SPECIFIED BY DESIGN ENGINEER ON DESIGN DOCUMENTS.

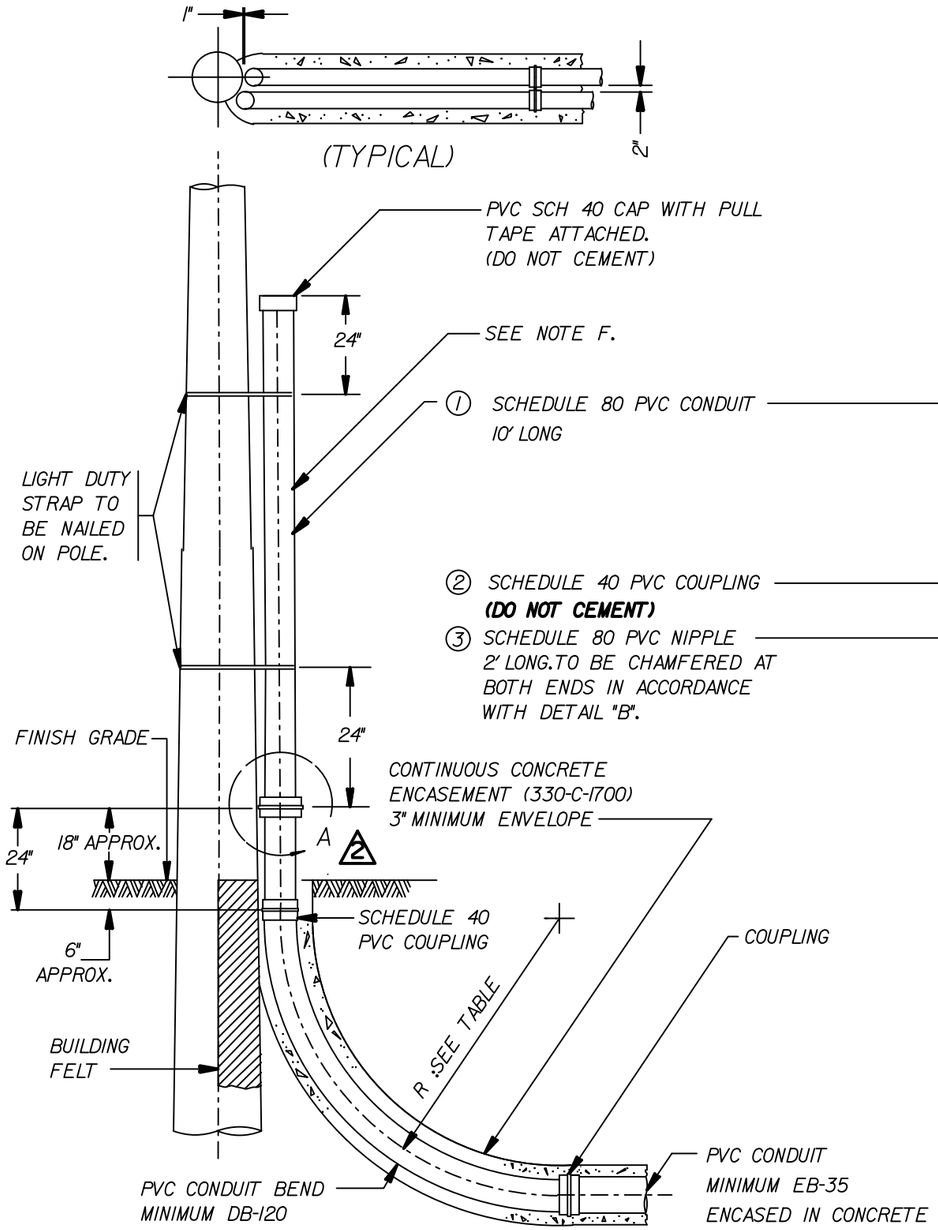
REV NO	DRN.	CKD.	DATE
1	JHG	W.Y	2/14/94
DRN. G. MAGEE			11-16-92
CKD. W. YCEDO			11-16-92
DES.ENGR. S. POOSTI			SP
APPD.			

POLE RISER
2" GALVANIZED BEND

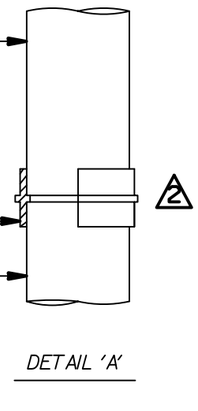
POWER DISTRIBUTION DESIGN STANDARDS
DEPARTMENT OF WATER AND POWER
CITY OF LOS ANGELES

DRAWING NUMBER
UB 745-02

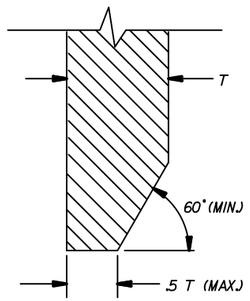
INDEX



ELEVATION



DETAIL 'A'



DETAIL 'B'

	CONDUIT BEND						
2	3"	4" WITH REDUCER	4"	5" WITH REDUCER	5"	6" WITH REDUCER	6"
RADIUS R	3'-0"	3'-0"	3'-0"	5'-0"	5'-0"	5'-0"	5'-0"
① SCH 80 - 10' LONG	3"	3"	4"	4"	5"	5"	6"
② SCH 40 PVC COUPLING	3"	4"	4"	5"	5"	6"	6"
③ SCH 80 PVC NIPPLE - 2' LONG	3"	4"	4"	5"	5"	6"	6"

NOTES:

Ⓐ FOR CONCRETE ENCASED 2" CONDUIT BENDS, SEE D.W.P. POLE RISER DRAWING NO. UB745-01.

Ⓑ DRAWING SHOWS TYPICAL DUCT ARRANGEMENT. ACTUAL SIZE OF CONDUIT WILL BE SHOWN ON DESIGN DOCUMENTS.

Ⓒ VERIFY EXACT LOCATION OF CONDUIT AT BASE OF POLE WITH THE D.W.P. INSPECTOR BEFORE CONSTRUCTING.

Ⓓ DO NOT CONSTRUCT CONDUIT TO POLE PRIOR TO INSTALLATION OF NEW POLE.

Ⓔ RADIUS OF CONDUIT BEND IS AS STIPULATED UNLESS SPECIFIED BY DESIGN ENGINEER ON DESIGN DOCUMENTS.

Ⓕ WHEN MORE THAN ONE CONDUIT RISER IS ON THE POLE, EACH RISER SHALL HAVE A 10' LENGTH PVC SCH 80 CONDUIT INSTALLED. AFTER INSPECTION AND APPROVAL BY THE DEPARTMENT'S REPRESENTATIVE, ANY SPARE CONDUITS SHALL HAVE THE 10' PVC REMOVED AND REPLACED WITH A PVC SCH 40 CAP. THIS CAP IS ALSO SUBJECT TO APPROVAL BY THE DEPARTMENT'S REPRESENTATIVE. (PULL TAPE SHALL BE ATTACHED AND PVC CAP SHALL NOT BE GLUED).

SCALE: NTS

REV NO	DATE	INIT'L	REVISION	APPV'D
2	07-23-21	JJZ	REVISED DETAIL 'A' AND CONDUIT TABLE	---
1	11-4-93	A. F.	CHANGED NOTE (F) AND CONDUIT TABLE	S. P.

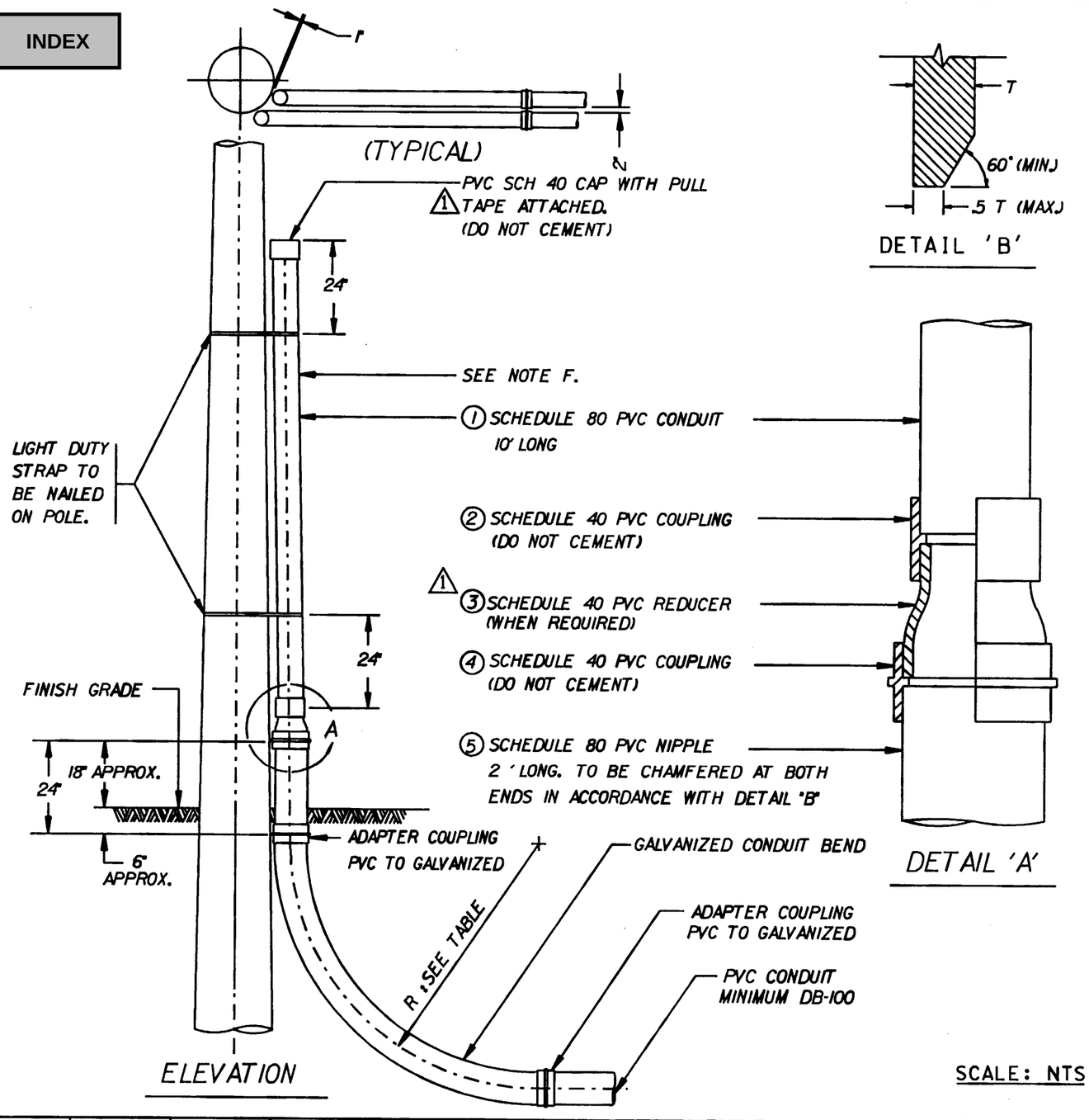
DRN. A. F.	11-04-92
CKD. W. YCEDO	11-04-92
DES.ENGR. S. POOSTI	
APPD. J. D. MCMAHON	

POLE RISER ENCASED, 3" AND ABOVE, CONDUIT BENDS

POWER DISTRIBUTION DESIGN STANDARDS
DEPARTMENT OF WATER AND POWER
CITY OF LOS ANGELES

DRAWING NUMBER
UB745-03

INDEX



1	GALVANIZED CONDUIT BEND						
	3"	4" WITH REDUCER	4"	5" WITH REDUCER	5"	6" WITH REDUCER	6"
RADIUS R	3'-0"	3'-0"	3'-0"	5'-0"	5'-0"	5'-0"	5'-0"
(1) SCH 80 - 10' LONG	3"	3"	4"	4"	5"	5"	6"
(2) SCH 40 PVC COUPLING	NOT REQUIRED	3"	NOT REQUIRED	4"	NOT REQUIRED	5"	NOT REQUIRED
(3) SCH 40 PVC REDUCER	NOT REQUIRED	4" TO 3"	NOT REQUIRED	5" TO 4"	NOT REQUIRED	6" TO 5"	NOT REQUIRED
(4) SCH 40 PVC COUPLING	3"	4"	4"	5"	5"	6"	6"
(5) SCH 80 PVC NIPPLE - 2' LONG	3"	4"	4"	5"	5"	6"	6"

NOTES:

(A) FOR 2" GALVANIZED BENDS, SEE D.W.P. POLE RISER DRAWING NO. UB745-02

(B) DRAWING SHOWS TYPICAL DUCT ARRANGEMENT. ACTUAL SIZE OF CONDUIT WILL BE SHOWN ON DESIGN DOCUMENTS.

(C) VERIFY EXACT LOCATION OF CONDUIT AT BASE OF POLE WITH THE D.W.P. INSPECTOR BEFORE CONSTRUCTING.

(D) DO NOT CONSTRUCT CONDUIT TO POLE PRIOR TO INSTALLATION OF NEW POLE.

(E) RADIUS OF CONDUIT BEND IS AS STIPULATED UNLESS SPECIFIED BY DESIGN ENGINEER ON DESIGN DOCUMENTS.

1 (F) WHEN MORE THAN ONE CONDUIT RISER IS ON THE POLE, EACH RISER SHALL HAVE A 10' LENGTH PVC SCH 80 CONDUIT INSTALLED. AFTER INSPECTION AND APPROVAL BY THE DEPARTMENT'S REPRESENTATIVE, ANY SPARE CONDUITS SHALL HAVE THE 10' PVC REMOVED AND REPLACED WITH A PVC SCH 40 CAP. THIS CAP IS ALSO SUBJECT TO APPROVAL BY THE DEPARTMENT'S REPRESENTATIVE. (PULL TAPE SHALL BE ATTACHED AND PVC CAP SHALL NOT BE GLUED).

SCALE: NTS

REV. NO.	DATE	INIT'L	REVISION	APPV'D
1	11-4-93	A. F.	CHANGED NOTE (F) AND CONDUIT TABLE	

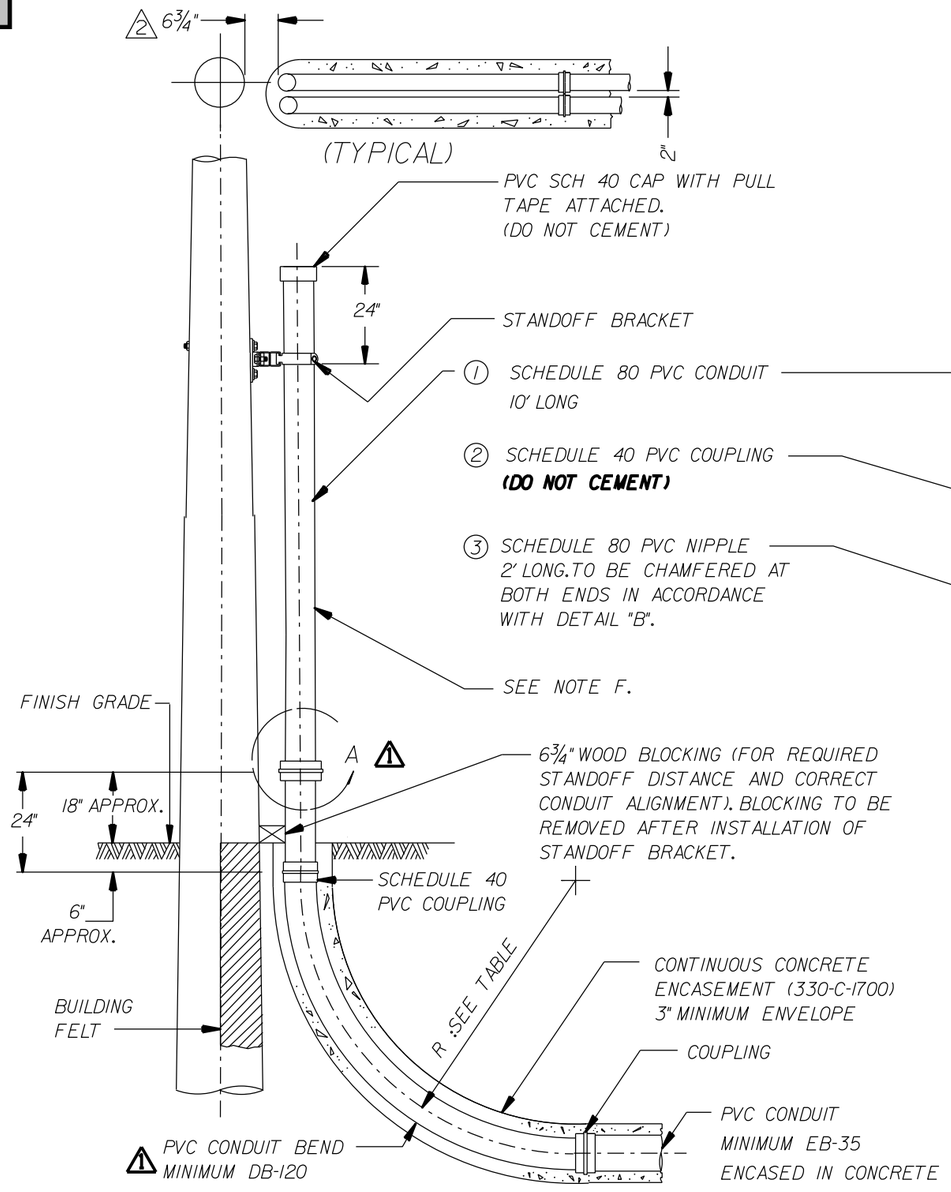
DRN. A. F. 11-04-92
CKD. W. YCEDO 11-04-92
DES.ENGR. S. POOSTI
APPD. J. D. MCMAHON

POLE RISER
3" AND ABOVE GALVANIZED BENDS

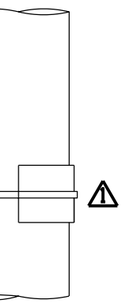
POWER DISTRIBUTION DESIGN STANDARDS
DEPARTMENT OF WATER AND POWER
CITY OF LOS ANGELES

DRAWING NUMBER
UB 745-04

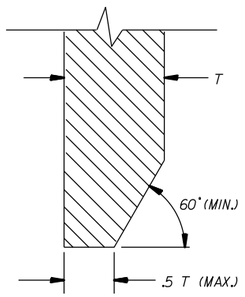
INDEX



ELEVATION



DETAIL 'A'



DETAIL 'B'

SCALE: NTS

	CONDUIT BEND						
⚠	3"	4" WITH REDUCER	4"	5" WITH REDUCER	5"	6" WITH REDUCER	6"
RADIUS R	3'-0"	3'-0"	3'-0"	5'-0"	5'-0"	5'-0"	5'-0"
(1) SCH 80 - 10' LONG	3"	3"	4"	4"	5"	5"	6"
(2) SCH 40 PVC COUPLING	3"	4"	4"	5"	5"	6"	6"
(3) SCH 80 PVC NIPPLE - 2' LONG	3"	4"	4"	5"	5"	6"	6"

NOTES:

(A) FOR CONCRETE ENCASED 2" CONDUIT BENDS, SEE D.W.P. POLE RISER DRAWING NO. UB745-01.

(B) DRAWING SHOWS TYPICAL DUCT ARRANGEMENT. ACTUAL SIZE OF CONDUIT WILL BE SHOWN ON DESIGN DOCUMENTS.

(C) VERIFY EXACT LOCATION OF CONDUIT AT BASE OF POLE WITH THE D.W.P. INSPECTOR BEFORE CONSTRUCTING.

(D) DO NOT CONSTRUCT CONDUIT TO POLE PRIOR TO INSTALLATION OF NEW POLE.

(E) RADIUS OF CONDUIT BEND IS AS STIPULATED UNLESS SPECIFIED BY DESIGN ENGINEER ON DESIGN DOCUMENTS.

(F) WHEN MORE THAN ONE CONDUIT RISER IS ON THE POLE, EACH RISER SHALL HAVE A 10' LENGTH PVC SCH 80 CONDUIT INSTALLED. AFTER INSPECTION AND APPROVAL BY THE DEPARTMENT'S REPRESENTATIVE, ANY SPARE CONDUITS SHALL HAVE THE 10' PVC REMOVED AND REPLACED WITH A PVC SCH 40 CAP. THIS CAP IS ALSO SUBJECT TO APPROVAL BY THE DEPARTMENT'S REPRESENTATIVE. (PULL TAPE SHALL BE ATTACHED AND PVC CAP SHALL NOT BE GLUED).

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
1	07/22/21	JJZ	REVISED DETAIL "A" AND CONDIUT TABLE		

DWP

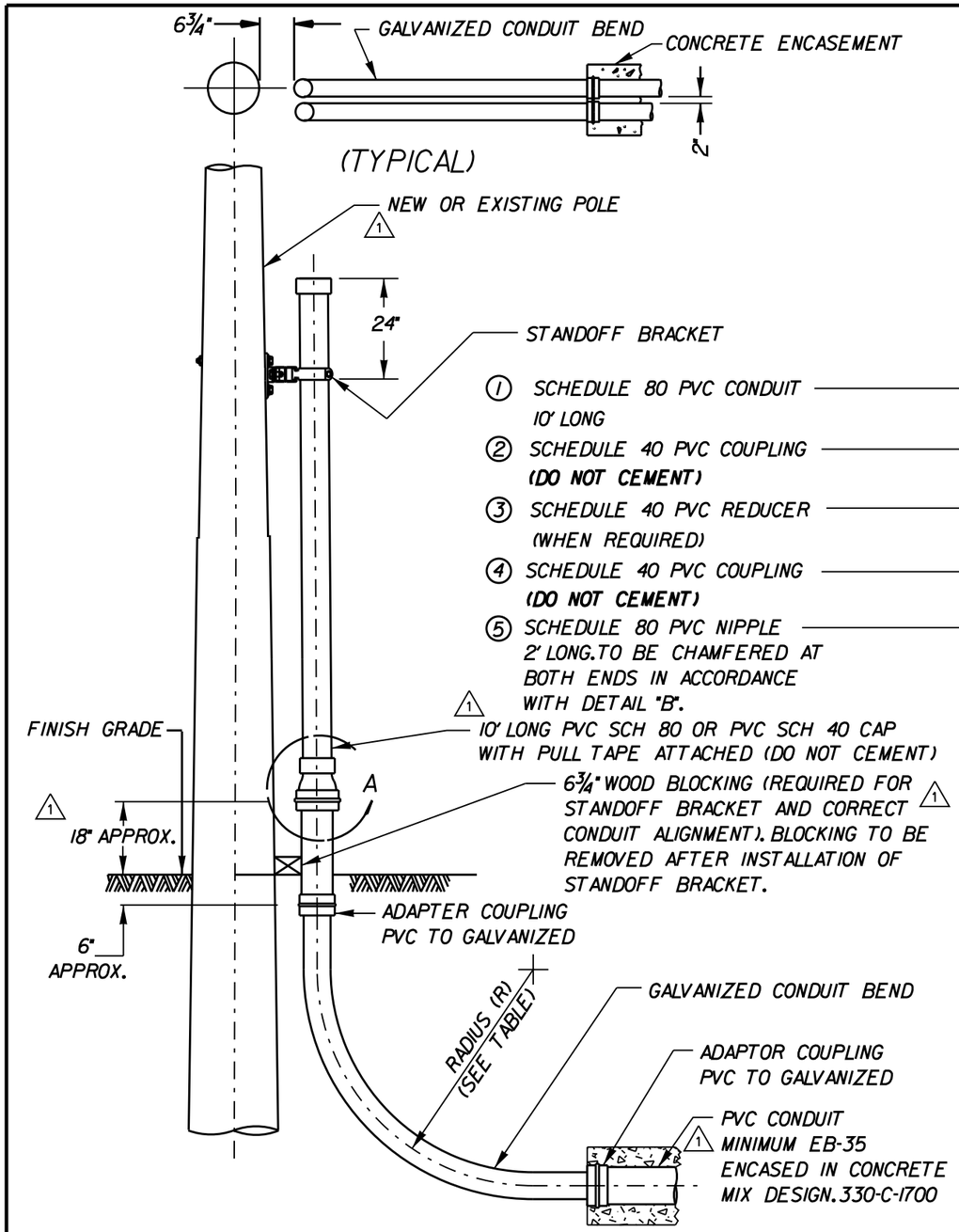
DISTRICT	CONTRACT W.O.	DWP W.O.

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

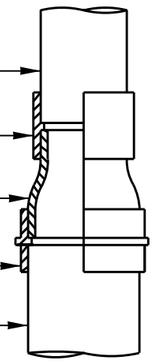
DESIGN	DRAFTING J. JIMENEZ
OK	CHECKER E. ESTRADA
APPROVED	DATE 07/22/09

POLE RISER WITH STANDOFF BRACKET ENCASED, 3" AND ABOVE CONDUIT BENDS

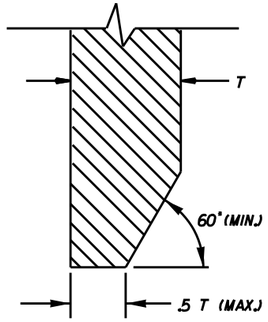
UB745-06 | SHEET 1 OF 1



ELEVATION



DETAIL 'A'



DETAIL 'B'

INDEX

	CONDUIT BEND						
	3"	4" WITH REDUCER	4"	5" WITH REDUCER	5"	6" WITH REDUCER	6"
RADIUS R	3'-0"	3'-0"	3'-0"	5'-0"	5'-0"	5'-0"	5'-0"
① SCH 80 - 10' LONG	3"	3"	4"	4"	5"	5"	6"
② SCH 40 PVC COUPLING	NOT REQUIRED	3"	NOT REQUIRED	4"	NOT REQUIRED	5"	NOT REQUIRED
③ SCH 40 PVC REDUCER	NOT REQUIRED	4" TO 3"	NOT REQUIRED	5" TO 4"	NOT REQUIRED	6" TO 5"	NOT REQUIRED
④ SCH 40 PVC COUPLING	3"	4"	4"	5"	5"	6"	6"
⑤ SCH 80 PVC NIPPLE - 2' LONG	3"	4"	4"	5"	5"	6"	6"

NOTES:

Ⓐ FOR 2" GALVANIZED BENDS. SEE D.W.P. POLE RISER DRAWING NO. UB745-01.

Ⓑ DRAWING SHOWS TYPICAL DUCT ARRANGEMENT. ACTUAL SIZE OF CONDUIT WILL BE SHOWN ON DESIGN DOCUMENTS.

Ⓒ VERIFY EXACT LOCATION OF CONDUIT AT BASE OF POLE WITH THE D.W.P. INSPECTOR BEFORE CONSTRUCTING.

Ⓓ DO NOT CONSTRUCT CONDUIT TO POLE PRIOR TO INSTALLATION OF NEW POLE.

Ⓔ RADIUS OF CONDUIT BEND IS AS STIPULATED UNLESS SPECIFIED BY DESIGN ENGINEER ON DESIGN DOCUMENTS.

Ⓕ WHEN MORE THAN ONE CONDUIT RISER IS ON THE POLE. EACH RISER SHALL HAVE A 10'LENGTH PVC SCH 80 CONDUIT INSTALLED. AFTER INSPECTION AND APPROVAL BY THE DEPARTMENT'S REPRESENTATIVE. ANY SPARE CONDUITS SHALL HAVE THE 10' PVC REMOVED AND REPLACED WITH A PVC SCH 40 CAP. THIS CAP IS ALSO SUBJECT TO APPROVAL BY THE DEPARTMENT'S REPRESENTATIVE. (PULL TAPE SHALL BE ATTACHED AND PVC CAP SHALL NOT BE GLUED).

Ⓖ THE STANDOFF BRACKET SHOULD BE PLACED AWAY FROM THE CURB FACE AND TRAFFIC.

SCALE: NTS

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	TAT NO.
1	06/30/11	EHP	REV. GALV. COND. BEND DETAIL	J.M.A.	

DISTRICT | CONTRACT W.O. | DWP W.O.

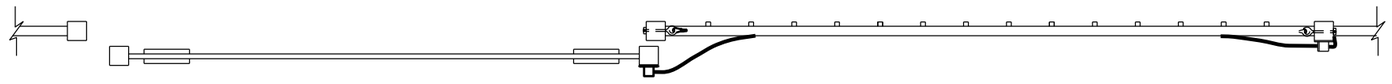
CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN | DRAFTING J.GARCIA
OK | CHECKER
APPROVED S.POOSTI | DATE 07/22/09

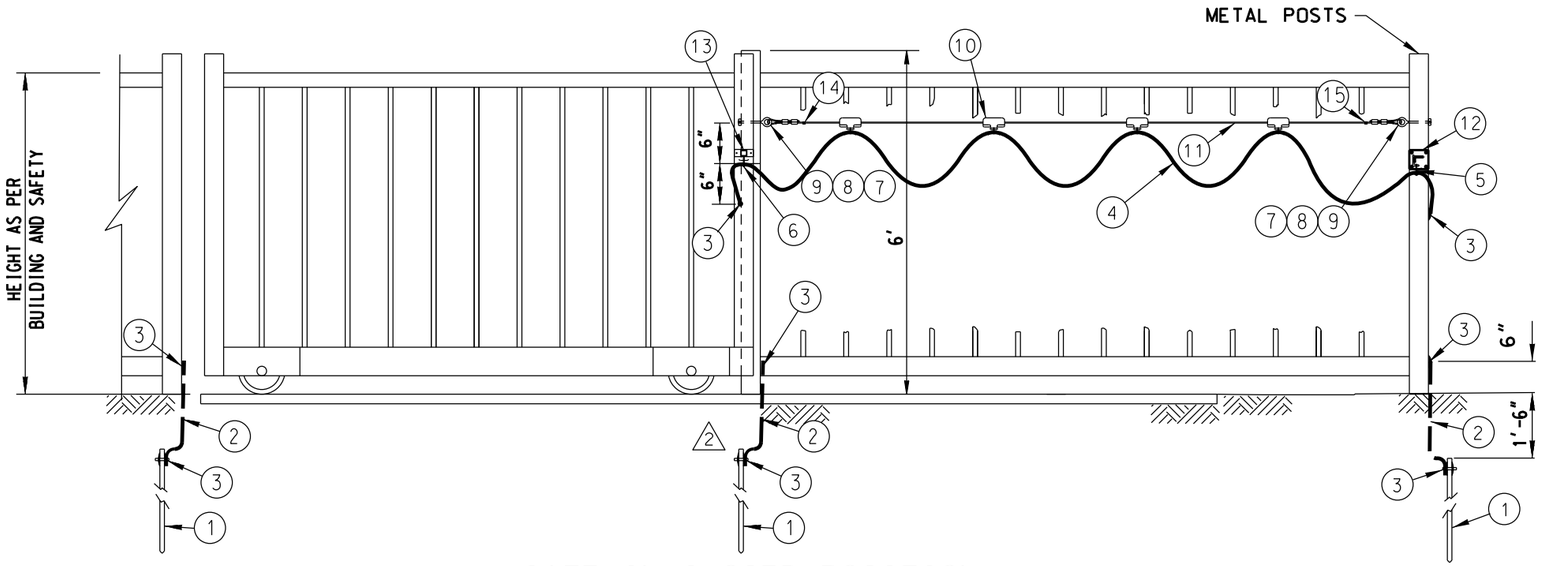
POLE RISER WITH STANDOFF BRACKET GALVANIZED. 3"AND ABOVE CONDUIT BENDS

UB745-07 | SHEET 1 OF 1

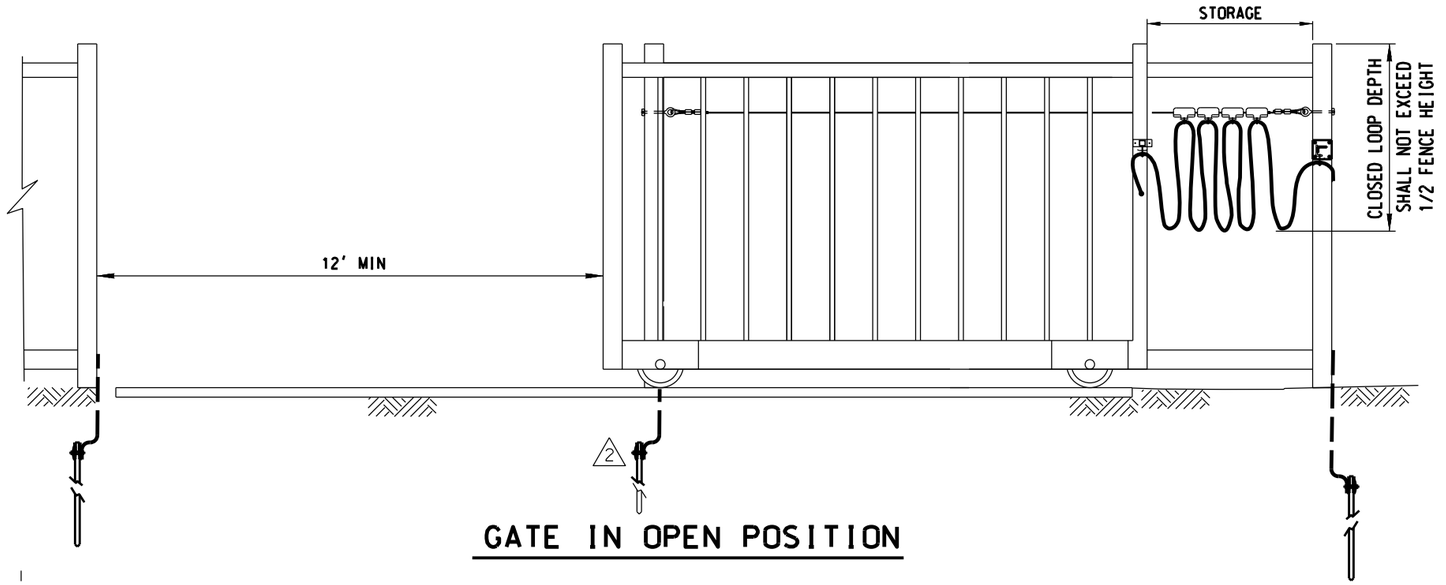
INDEX



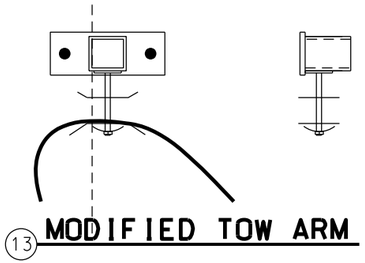
PLAN



GATE IN CLOSED POSITION

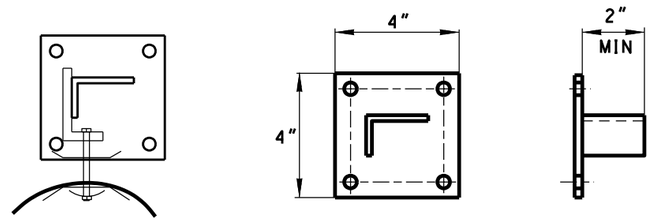


GATE IN OPEN POSITION



13 MODIFIED TOW ARM

PARTS LIST		
NO.	QTY	DESCRIPTION
1	3	GROUND ROD 5/8" D X 8', 304 SST
2	*	WIRE, BARE, TINNED 2/0 COPPER
3	8	EXOTHERMIC WELD,
4	**	CABLE, ELECTRICAL, COPPER 2/0 EXTRA FLEXIBLE WELDING CABLE
5	1	END CLAMP FOR ROUND CABLE
6	1	TOW CLAMP FOR ROUND CABLE
7	2	ROPE THIMBLE, STANDARD PATTERN SST
8	4	OVAL SLEEVE, GALVANIZED OR SST
9	2	3/8" EYEBOLT, GALVANIZED OR SST, W/FLAT WASHER AND LOCKING NUT
10	4	CABLE TROLLEY FOR ROUND CABLE
11	***	3/16" DIA WIRE ROPE, GALVANIZED STEEL OR SST (NYLON COATED TO 1/4" DIA)
12	1	MODIFIED TENSION BRACKET
13	1	MODIFIED TOW ARM
14	2	RUBBER STOPS



12 MODIFIED TENSION BRACKET

NOTES:

1. * LENGTH TO BE DETERMINED BY HEIGHT OF FENCE AND LOCATION OF FESTOONING.
2. ** "MINIMUM CABLE REQUIRED" IS BASED ON A 36" LOOP DEPTH BETWEEN TROLLEYS PLUS AN ADDITIONAL 15 FEET FOR CONNECTING TO GROUNDING.
3. *** LENGTH TO BE DETERMIND BY WIDTH OF GATE BEING USED.
4. INSTALL ALL GROUND WIRE IN THE EARTH 1'-6" BELOW THE FINISH GRADE. CONNECT GROUND WIRE (PT.2) TO 2 GROUND RODS (PT.1) USING EXOTHERMIC WELDING (PT.3). (CADWED, THERMOWELD, OR EQUAL).
5. WIRE ROPE FESTOON KIT BY McMASTER-CARR TO BE USED OR EQUIVALENT.
6. TENSION BRACKET TO BE MODIFIED PER DETAILS THIS SHEET.
7. TOW ARM TO BE MODIFIED. CUT DOWN FROM 18" TO 2" MIN OR AS REQUIRED.

REV. NO.	REV. DATE	INIT'L.	REVISION DESCRIPTION	APPV.	PE. NO.
2	1/9/23	ERE	REVISED GROUNDING & PARTS LIST	R. T.	E20863
1	2/25/15	EHP	ADDED DETAILS & REVISED GROUNDING	V.B.	E20215

DWP

DISTRICT	CONTRACT W.O.	DWP W.O.			

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DISTRIBUTION ENGINEERING & SERVICES SECTION

DESIGN	Jesus C. Asiain	DRAFTING	E.H.PERDOMO
OK	Jesus C. Asiain	CHECKER	W.G. Ycedo
APPROVED	Jesus C. Asiain	DATE	12/03/08

GROUNDING FESTOON GROUNDING FOR METALLIC ROLLING GATES

UB980-09

SHEET 1 OF 1