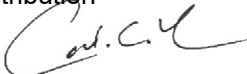
	SECONDARY ELECTRIC UNDERGROUND ENCLOSURES		028028
	Asset Type: Gas and Electric Distribution	Function: Design and Construction	
Issued by: Calvin Yu (CCY6) 	Date: 06-30-23		
Rev. #23: This document replaces PG&E Document 028028, Rev. #22. For a description of the changes, see Page 14.			

This document is also included in the following manual:

- [Electric and Gas Service Requirements Manual](#) (Greenbook)

Purpose and Scope

This document provides specifications, ordering information, illustrations, and application instructions for the various sizes of non-concrete and precast concrete enclosures used in PG&E electric underground secondary distribution.

General Information

1. The words boxes/enclosures have the same meaning and are used interchangeably.
2. The design loads for these subsurface enclosures are specified in [Engineering Material Specification No. 51, "Non-Concrete Enclosures"](#), and in [Engineering Material Specification No. 53, "Electric Underground Concrete Enclosures"](#)
3. Requirements for non-concrete, non-deliberate vehicular traffic enclosures and covers:
 - A. Non-concrete enclosures for incidental loading must meet the requirements of [Engineering Material Specification No. 51, "Non-Concrete Enclosures."](#)
 - B. The cover and exposed portions of a enclosure shall be of a concrete color. Enclosures may not be painted other colors.
 - C. Enclosures shall comply with this document concerning marking, security devices, and dimensions.
 - D. Enclosure covers must have PG&E identification. The enclosure body and cover must be labeled with the manufacturer's name, enclosure weight, and have the PG&E code number on inside surfaces.
 - E. The cover shall be made of polymer concrete and shall have a PG&E-approved high coefficient of friction (0.65 or better), slip-resistant surface.
 - F. Non-concrete parts shall be interchangeable.
4. Requirements for concrete enclosures, required when installing a secondary enclosure in an area subject to vehicular traffic.
 - A. Concrete enclosures for full-traffic must meet the requirements of the latest [ASTM C-857](#).
 - B. Enclosures shall also comply with this document's requirements, such as marking, security devices, and dimensions.
 - C. Concrete parts shall be interchangeable. Concrete joints shall be interchangeable with those shown in Figure 7 on Page 9, Figure 9 on Page 11, and Figure 11 on Page 13.
 - D. Covers shall have a PG&E-approved high coefficient of friction (0.65 or better), slip-resistant surface.
 - E. Enclosure covers must have PG&E identification. The enclosure body, cover, and extension must be labeled with the manufacturer's name, enclosure weight, and have the PG&E code number on inside surfaces.
5. Pedestals are no longer allowed for new construction. Replacement pedestal codes can be found in Table 19 of [Document 066205](#).

Application

6. Consider the following when selecting enclosure sizes:
 - A. Secondary non-concrete enclosures are the preferred method of terminating 600 V conductors in residential, small commercial applications and in areas where heavy, non-deliberate vehicular traffic is expected. Concrete secondary enclosures should be installed in areas where full-vehicular traffic is expected.
 - B. Ultimate required conductor size and number to serve the maximum service panel.
 - C. Location of duct entrances, cable layout, and minimum bending radius of cables.
7. The 26" deep enclosures are required for installations of conductors larger than 4/0.
8. When installing any secondary enclosure smaller than 36" x 60", adjust the enclosure to the anticipated natural grade. Install enclosures as level as practical. Do not exceed 2" per foot in any direction. If the maximum grade of 2" per foot cannot be met, the enclosure must be installed level and a retaining wall installed. Use grout or foam placed from the outside to seal around any side entering conduits if side entering conduits are required. Do not pave over the enclosure cover.
9. When installing a 36" x 60" secondary enclosure, install the enclosure as level as practical, but do not exceed 1/8" per foot in any direction. Use adjustment bolts in cover to adjust cover to meet needed final grade. Do not pave over enclosure.
10. Secondary enclosures shall not be used for primary cable.
11. Swedge reducers are necessary with conduit smaller than the terminators supplied (see [Document 062288](#)).
12. All conduits are to be stubbed 1-1/2" min. – 2-1/2" max. from ground level inside the subsurface enclosure. See Figure 5 on Page 7. End bells are required.
13. For new construction with both new enclosures and new conduits, conduit entry shall be as shown in Figure 5 and Figure 6 on Page 7 for splice boxes. Group conduits at one end of the box to achieve maximum cable length to avoid exceeding minimum cable bending radius.
14. For new construction, conduit entry into the #2 and #3 concrete enclosures shall also be as shown in Figure 5 and Figure 6 on Page 7.
15. For re-construction with either replacing an existing box or installing new conduits into an existing box, the conduits may only enter the knockouts or duct terminators when having 18" – 24" of cover at the entrance of the box. A minimum of 18" of conduit entering the side wall must be straight with no bends.
16. Conduits that do not terminate in a duct terminator must be fitted with an end bell.
17. Enclosures shall be set on a 6-inch thick layer of 3/4" crushed rock, mechanically compacted, or alternatively secondary enclosures other than #5 secondary concrete enclosure may be set on a 6-inch thick layer of 3/4" Class 2 Aggregate Base (AB).
18. See [Document 066205](#) for replacement parts for older style installations.

References

References	Location	Document
Connectors for Insulated Cables Underground		
Distribution Systems	UG-1: Connectors/Greenbook	015251
Multi-Tap Splice for 600-Volt Insulated Cables	UG-1: Splices	036640
Straight and Tap Splice for 600 Volt Insulated Cable	UG-1: Splices	051034
Identification Plates for Subsurface Enclosures	UG-1: Marking	051768
Primary Electric Underground Equipment Enclosures	UG-1: Enclosures/Greenbook	062000
Underground Conduits	UG-1: Conduits/Greenbook	062288
Enclosure Repair/Replacement Criteria and		
Replacement Materials	UG-1: Enclosures	066205
PG&E Approved Manufacturers	Greenbook	066211
Engineering Material Specification No. 51,		
"Non-Concrete Enclosures"	TIL	EMS51
Engineering Material Specification No. 53,		
"Electric Underground Concrete Enclosures"	TIL	EMS53

Secondary Electric Underground Enclosures

Table 1 Guide for Application of Splice Boxes in New Construction for Underground Secondary Using Multi-Tap Splices (see [Document 036640](#))¹

		Enclosure Size				
Description	–	11-1/2”	13” x 24”	17” x 30”	24” x 36”	36”x60” ²
4 Terminal	#6 Str. – 350kcmil	For Streetlight Applications Only (see Note 2 on Page 5)	For Service Runs and Non-Bus Bar Splices (4/0 max)	x ³	–	–
6 Terminal	#6 Str. – 350 kcmil			x ³	–	–
8 Terminal	#6 Str. – 350 kcmil			–	x ³	–
4 Terminal	4/0 – 1,000 kcmil			–	x ^{3, 4}	x
6 Terminal	4/0 – 1,000 kcmil			–	x ^{3, 4}	x
6 Terminal	(4) #6 – 350, (2) 4/0 – 1,000 kcmil			–	x ^{3, 4}	x
8 Terminal	(4) #6 – 350, (4) 4/0 – 1,000 kcmil			–	x ^{3, 4}	x
8 Terminal (one-way configuration)	4/0 – 1,000 kcmil			–	–	x
8 Terminal (two-way configuration)				–	–	x
16 Terminal (two-way configuration)				–	–	x

¹ For approved suppliers, see [Document 066211](#).

² If using splices, 36” x 60” enclosure can accommodate up to 14 runs (7 in and 7 out or combination) of 1,000 kcmil or smaller wires.

³ 350 kcmil and larger conductor installations require a 26-inch deep non-concrete enclosure or a 12-inch extension with a concrete enclosure.

⁴ The maximum number of runs of 750 kcmil and 1,000 kcmil conductors will be limited to a total of 2 runs (1 in and 1 out) not including or limiting other smaller conductors in the enclosure; otherwise a 36” x 60” enclosure is needed.

Installation of Enclosures in Special-Finish Sidewalks

Notes

1. Frequently the customer or city (or other public entity) installs special-finish sidewalks (brick, tile, terrazzo, etc.). When required with enclosures through 3' x 5', the enclosure and standard cover shall be installed 2-inch below the final grade, and the customer or city shall furnish and install the special-finish cover as illustrated in Figure 1 on Page 4
2. The requirements for this cover shall be as follows:
 - A. No single section of cover shall exceed 125 pounds.
 - B. Provisions for removal shall be provided.
 - C. The special-finish cover shall be identified by the letter "E" to indicate the location of the PG&E splice enclosure.
 - D. This type of enclosure shall not be installed in locations where vehicular traffic is expected.
 - E. **Caution:** PG&E cover design allows for a maximum of 1/2-inch deflection under an 8,000-pound or 12,000-pound design load, depending on the specified cover.

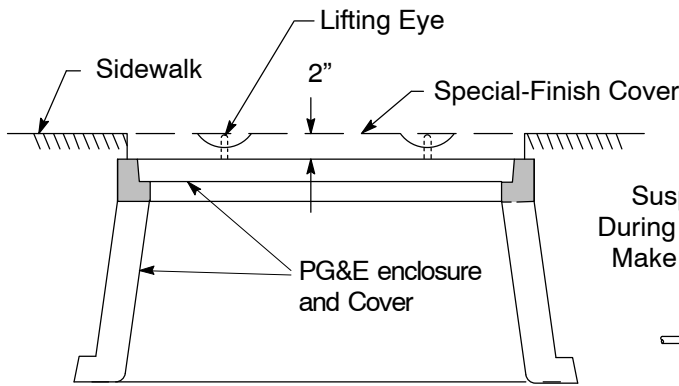


Figure 1
Installation of Enclosures in
Special-Finish Sidewalks

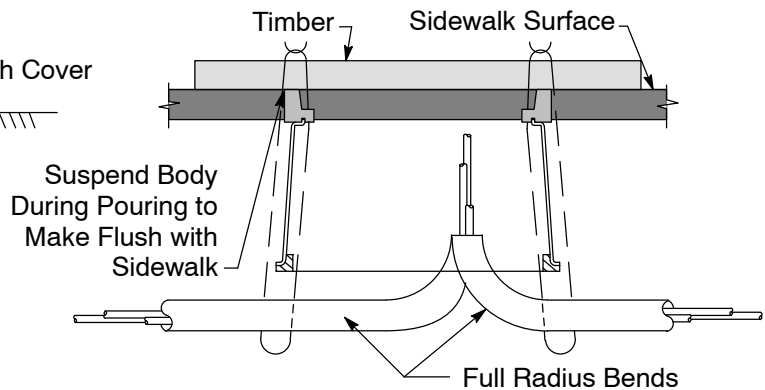


Figure 2
Installation of Non-Concrete Enclosures
in Sidewalks

Secondary Electric Underground Enclosures

Streetlight Enclosure Assembly

Notes

1. In conduit systems, enter the bottom of the box with 90° sweeps.
2. Do not connect more than two streetlights per enclosure.
3. Three is the maximum number of conduits allowed.
4. For streetlight applications only (see Table 1 on Page 3).

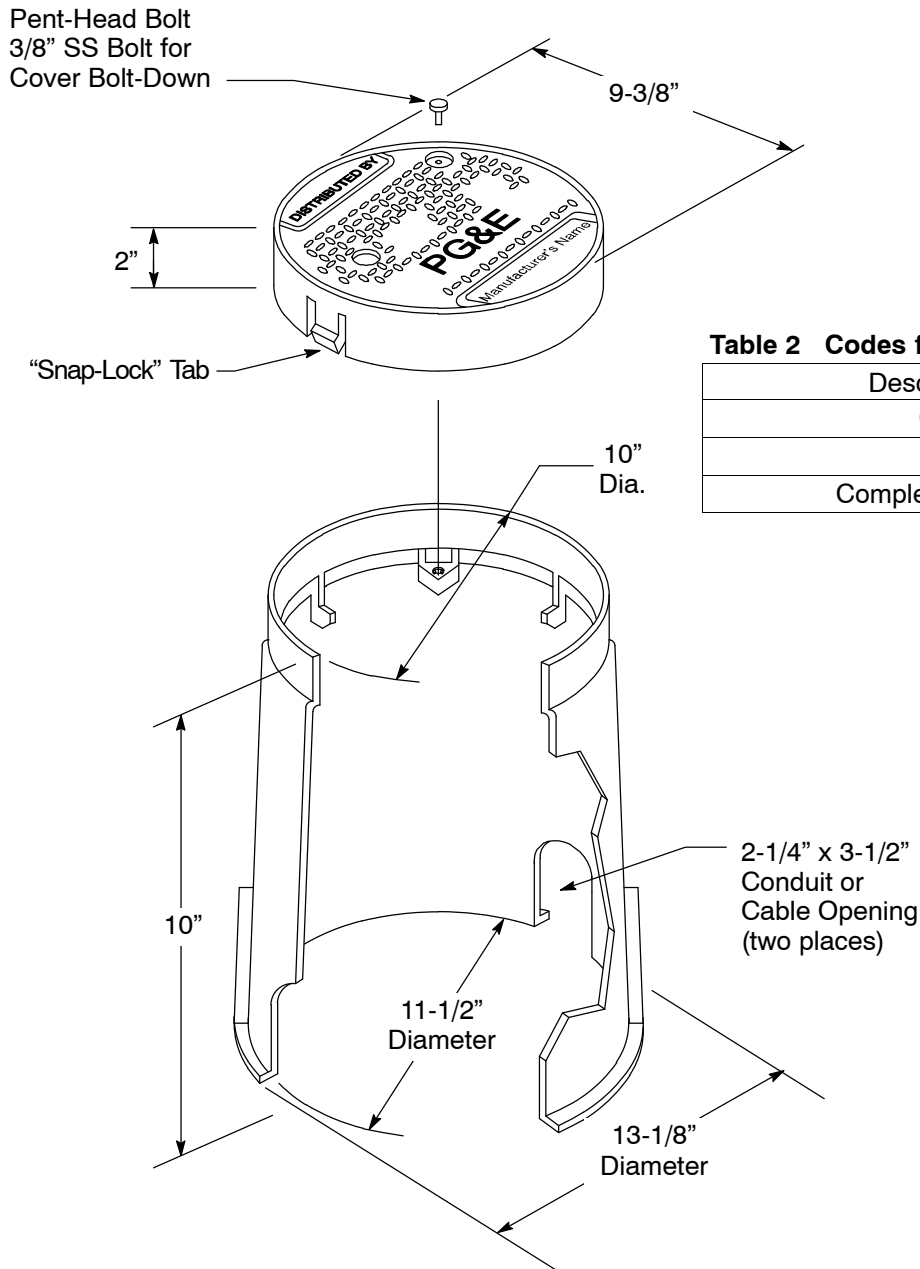


Table 2 Codes for Streetlight Box Components

Description	Code
Cover	032509
Body	032510
Complete Assembly	032511

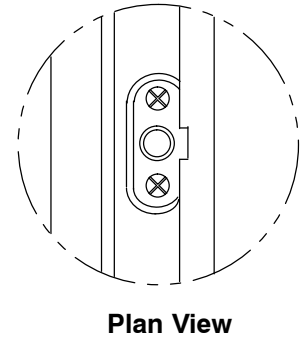
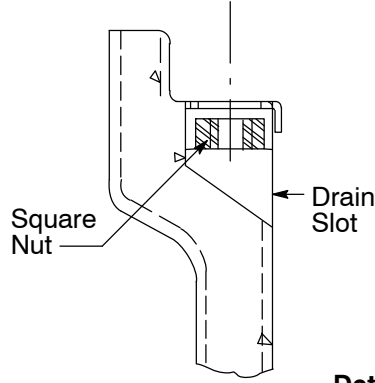
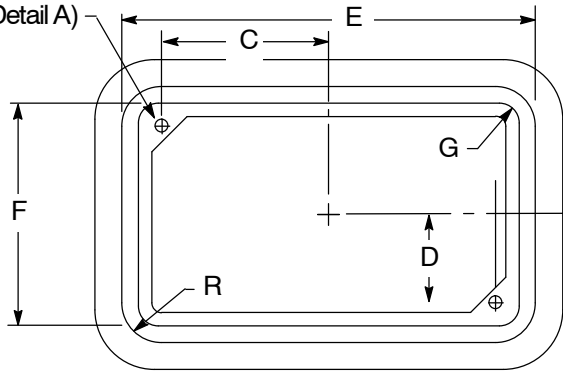
**Figure 3
Streetlight
Enclosure**

Non-Concrete Enclosure for Incidental Traffic

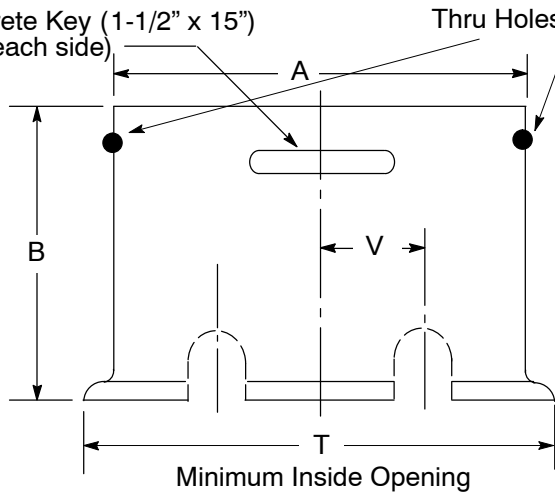
Note

1. See Table 3 on Page 7 and Table 4 on Page 8 for box dimensions.

Bolt-Down Feature, Pent-Head, Coil Thread,
1/2" x Length as Required, 1/2" Nut, Two Locations
(see Detail A)

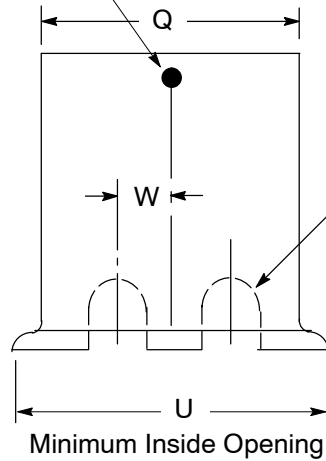


Concrete Key (1-1/2" x 15")
(one each side)



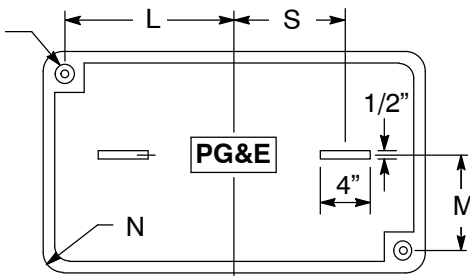
Thru Holes for Lifting Eye Bolts

(two lifting eye bolts on the
13" x 24" box,
17" x 30" box and four
on the 24" x 36" box)

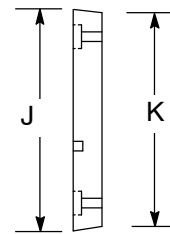


Single Knockout on
13" x 24" x 26" Box
4-3/4" x 4-3/4"

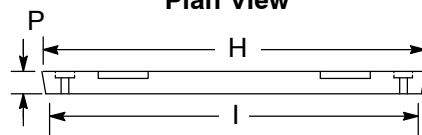
Hole for 1/2" Bolt With
Recess for Head
(see Detail A)



Plan View



End View



Side View

**Figure 4
Cover**

Secondary Electric Underground Enclosures

Non-Concrete Enclosures for Incidental Traffic (continued)

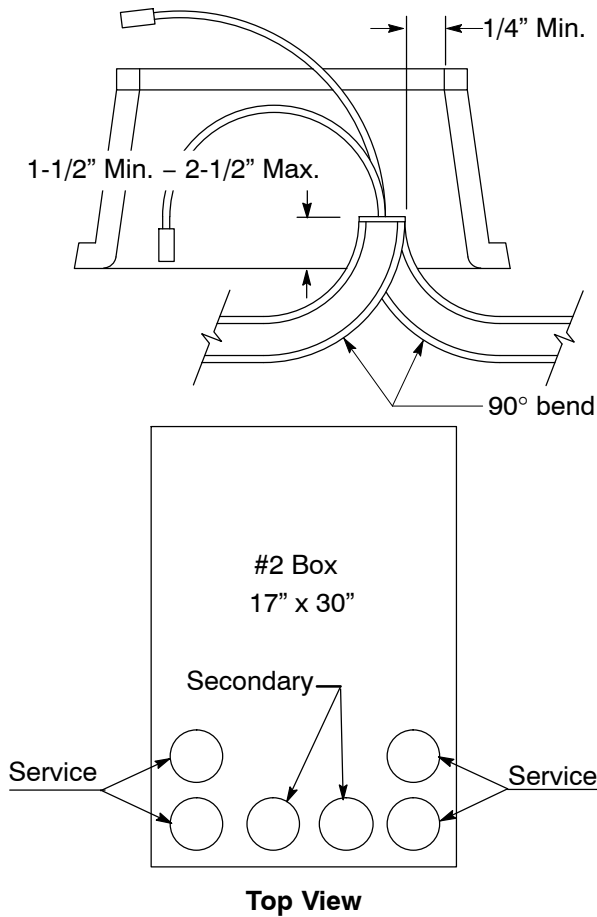


Figure 5
Location of Conduits Entering 17" x 30" Splice Box

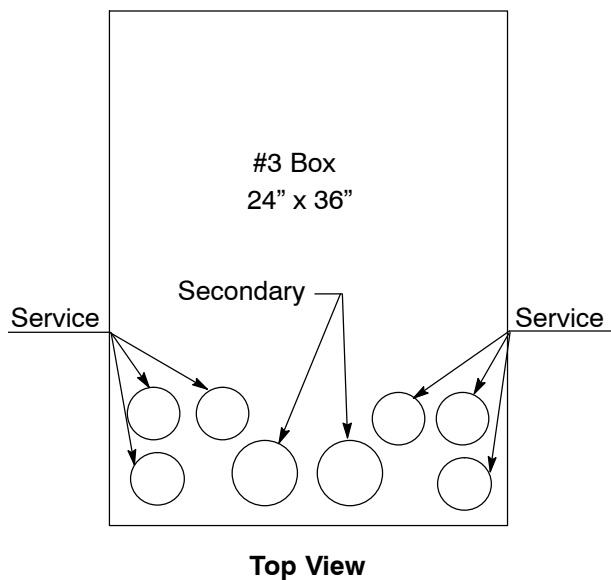


Figure 6
Location of Conduits Entering 24" x 36" Splice Box

Table 3 Codes for Enclosure Components and Assemblies

Enclosure		Description	Code	
Size (inches)	Depth (inches)			
13 x 24	18	Body	040931	
	18	Assembly ¹	040933	
	26	Body	040920	
	26	Assembly ¹	040935	
	8,000 lb Cover			043716
	-			-
17 x 30 ²	18	Body	040928	
	18	Assembly ¹	040936	
	26	Body	040929	
	26	Assembly ¹	040937	
	8,000 lb Cover			043720
	-			-
24 x 36	18	Body	040930	
	18	Assembly ¹	040940	
	26	Body	040919	
	26	Assembly ¹	040942	
	8,000 lb Cover			043724
	-			-
All	Pent-Head Bolt Coil Thread 1/2" x	2-1/2"	192853	
		3-1/2"	017488	
		4-1/2"	017489	

¹ Includes cover and body.

² Only six conduits allowed in 17" x 30" boxes.

Non-Concrete Enclosures for Incidental Traffic (continued)

Table 4 Dimensions of Non-Concrete Enclosures

Enclosure Size (inches)	Dimensions (inches)									
	A	B	C	D	E	F	G	H	I	J
13 x 24 x 18	25-1/4	18	9-7/8	5-1/8	23-1/2	14	1-1/2	-	-	-
-	-	-	-	-	-	-	-	-	-	-
13 x 24 x 26	25-1/4	26	-	-	29-1/4	19-3/4	-	-	-	-
13 x 24 Cover	-	-	-	-	-	-	-	23-1/4	23	13-3/4
17 x 30 x 18	32-1/2	18	13-1/4	6-3/4	30-3/4	17-3/4	1-1/2	-	-	-
-	-	-	-	-	-	-	-	-	-	-
17 x 30 x 26	32-1/2	26	-	-	30-3/4	17-3/4	-	-	-	-
17 x 30 Cover	-	-	-	-	-	-	-	30-1/2	30-1/4	17-1/2
24 x 36 x 18	37-7/8	18	15-9/16	9-3/4	35-7/8	24-1/4	5-1/8	-	-	-
-	-	-	-	-	-	-	-	-	-	-
24 x 36 x 26	37-7/8	26	15-9/16	9-3/4	35-7/8	24-1/4	5-1/8	-	-	-
24 x 36 Cover	-	-	-	-	-	-	-	35-5/8	35-1/8	24
Enclosure Size (inches)	Dimensions (inches)									
	K	L	M	N	P	Q	R	S	T	U
13 x 24 x 18	-	-	-	-	-	15-3/4	4-5/8	-	24-7/8	15-3/8
-	-	-	-	-	-	-	-	-	-	-
13 x 24 x 26	-	-	-	-	-	15-3/4	4-1/2	-	25-3/16	15-5/8
13 x 24 Cover	13-1/2	9-7/8	5-1/8	1-3/8	2	-	-	8	-	-
17 x 30 x 18	-	-	-	-	-	19-1/2	4-5/8	-	32-1/8	19-1/8
-	-	-	-	-	-	-	-	-	-	-
17 x 30 x 26	-	-	-	-	-	19-1/2	4-1/2	-	32-3/8	19-3/8
17 x 30 Cover	17-1/4	13-1/4	6-3/4	1-3/8	2	-	-	9	-	-
24 x 36 x 18	-	-	-	-	-	26	6	-	37-1/4	25-5/8
-	-	-	-	-	-	-	-	-	-	-
24 x 36 x 26	-	-	-	-	-	26	6	-	37-9/16	25-15/16
24 x 36 Cover	23-1/2	15-9/16	9-3/4	5	3	-	-	11	-	-

Table 5 Knockout Dimensions from Center of Wall of Non-Concrete Enclosures

Enclosure Size ¹	Dimensions (inches)		Number of Knockouts
	V	W	
13" x 24" x 26"	7-1/2	0	6
17" x 30" x 26"	10-1/2	5	8
24" x 36" x 26"	11	5-1/2	8

¹ Knockouts in 26" deep enclosures only.

Secondary Electric Underground Enclosures

17" x 30" (#2) Concrete Enclosures for Full-Vehicular Traffic

Notes

1. Grade adjustment, when required, shall be made between the box and the extension or top section.
2. Enclosure is designed as open bottom for new conduit entry per Figure 5. A base is not required.
3. All concrete parts shall be permanently identified as to the manufacturer on the inside surface. The weight shall be stenciled on the outside of all concrete parts.
4. All concrete parts shall be provided with four 7/8-inch diameter, 1-3/4-inch minimum deep inserts with UNC Class 2A threads.
5. Joints must be interchangeable with those shown in Detail B.
6. Install mastic sealant provided with enclosure assembly for all concrete-to-concrete joints below surface level.
7. The identification plate is an integral part of the cover and should be included by the manufacturer.
8. For new construction conduits shall enter the enclosure using 90 degree elbows rising into the enclosure. Refer to Figure 5 and Figure 6 on Page 7.

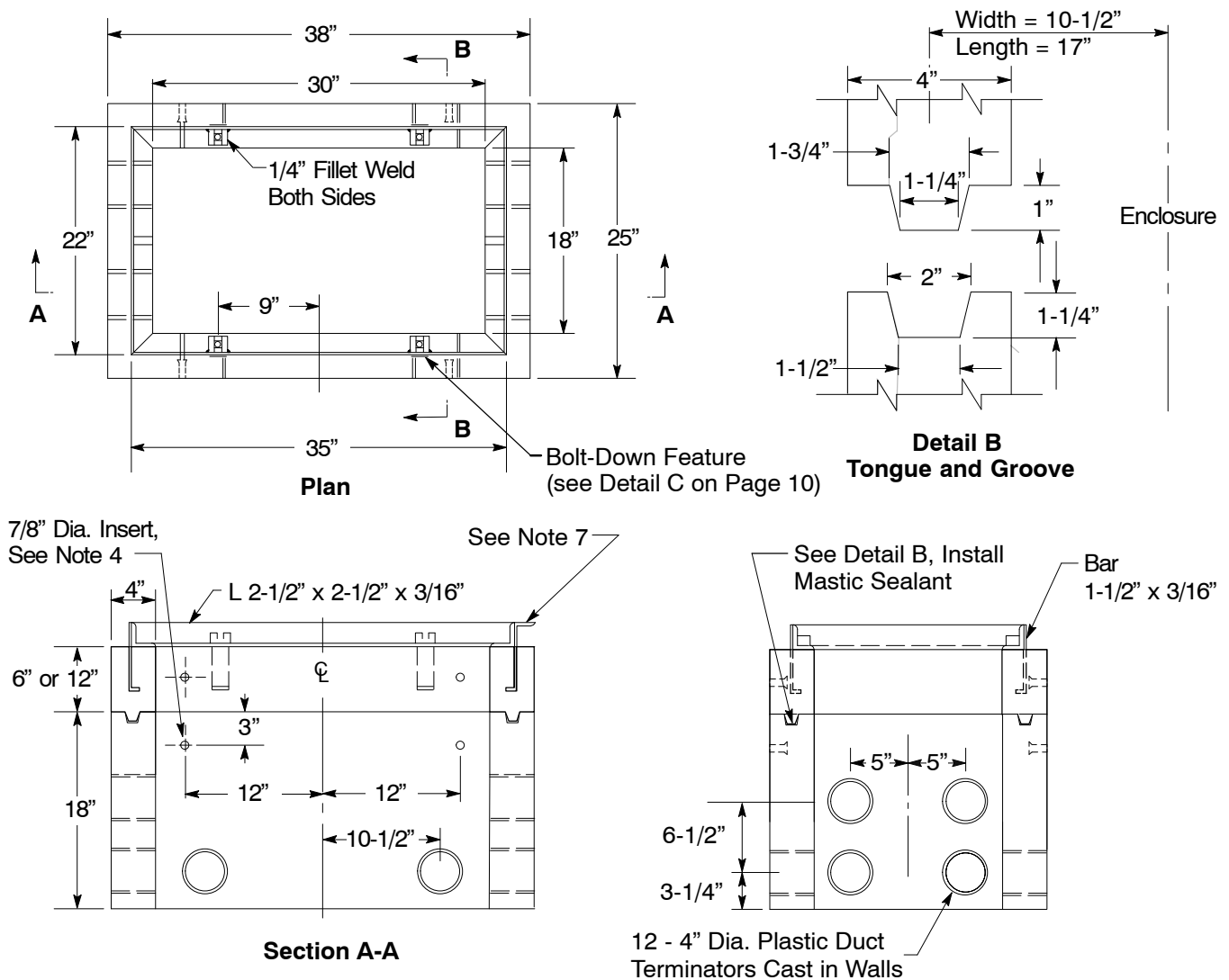
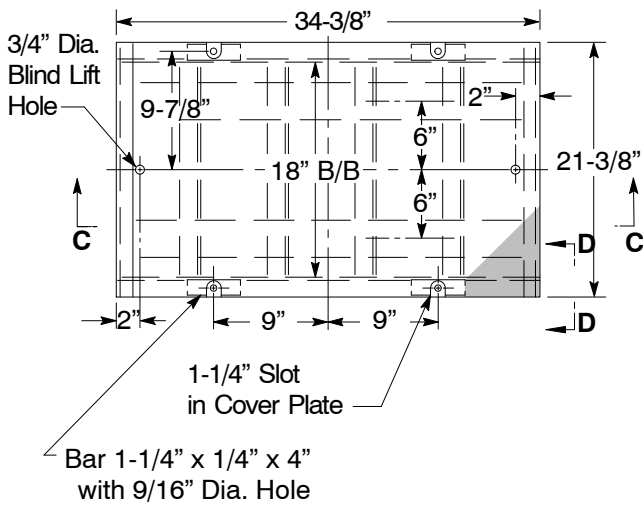
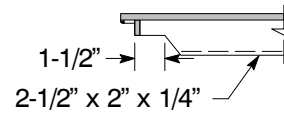


Figure 7
Concrete Enclosure

17" x 30" (#2) Concrete Boxes for Full-Vehicular Traffic (continued)



Cover

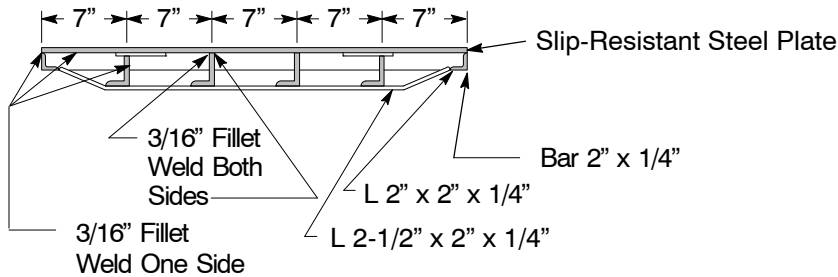


Section D-D

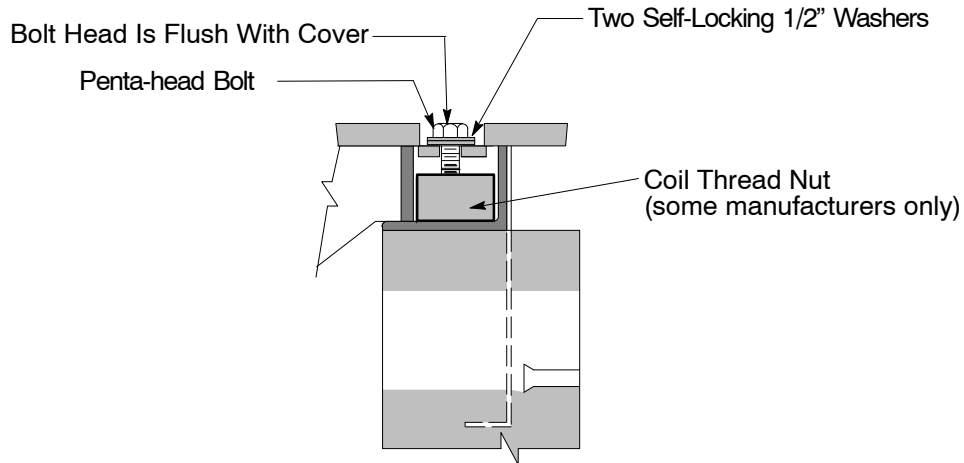
Table 6 Codes for Complete 17" x 30" Concrete Box Assemblies

Box		Code ¹
Type	Depth	
Full-Vehicular-Traffic With Slip-Resistant Cover	24"	019588
	30"	019597
Extension	6"	043517

¹ PG&E assembly code includes body with a 6" or 12" top section with cast-in frame and a cover. If more depth is required, order the 6" extension.



Section C-C



Detail C
Bolt-Down Feature

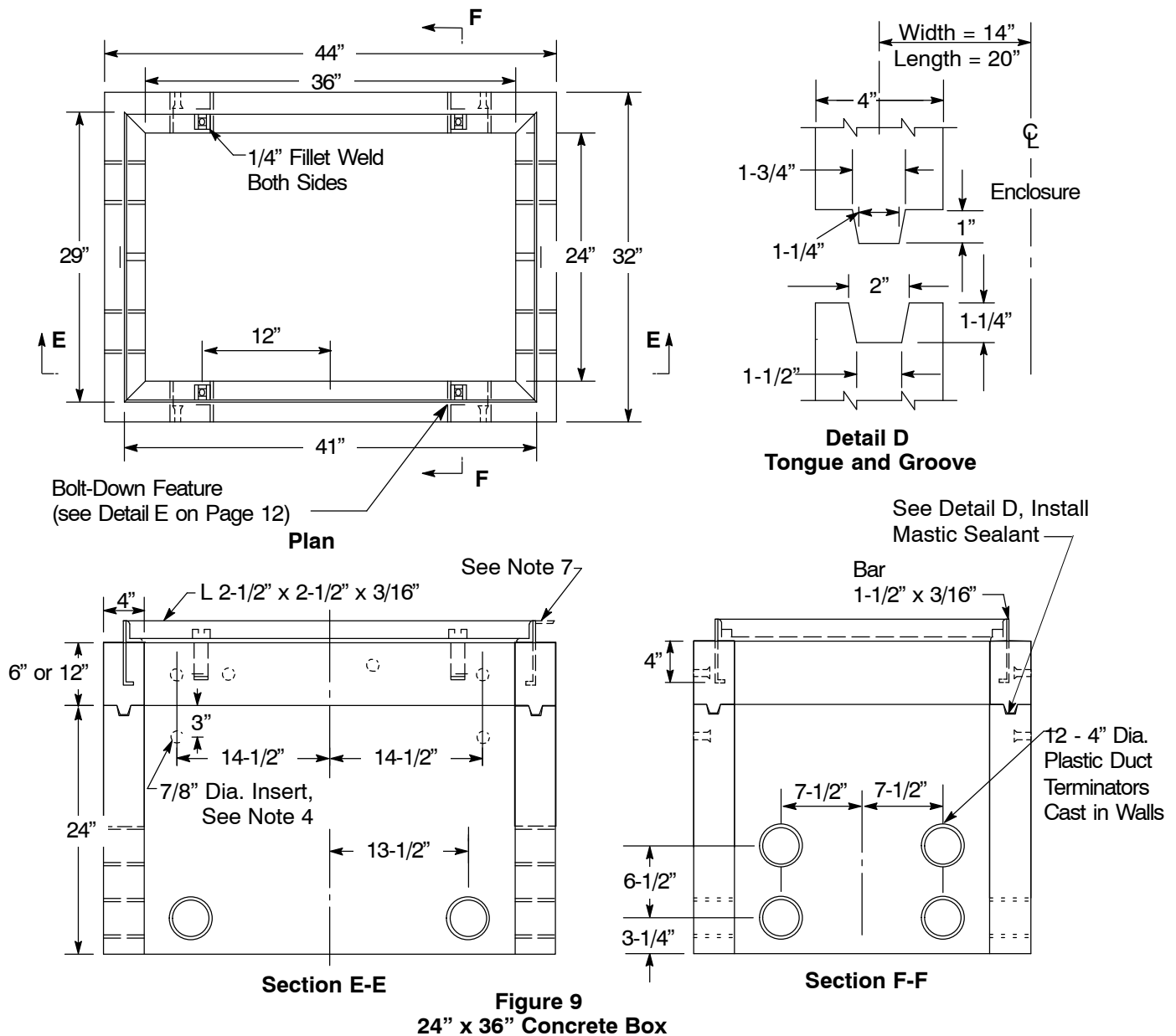
Figure 8
17" x 30" Cover

Secondary Electric Underground Enclosures

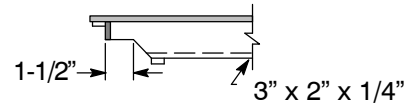
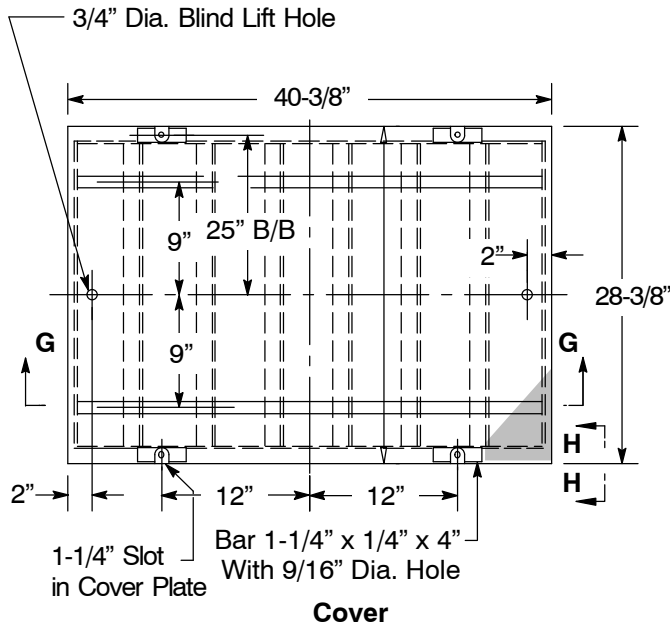
24" x 36" (#3) Concrete Boxes for Full-Vehicular Traffic

Notes

1. Grade adjustment, when required, shall be made between the box and the extension or top section.
2. Enclosure is designed as open bottom for new conduit entry per Figure 5. A base is not required.
3. All concrete parts shall be permanently identified as to the manufacturer on the inside surface. The weight shall be stenciled on the outside of all concrete parts.
4. All concrete parts shall be provided with four 7/8-inch diameter, 1-3/4-inch minimum deep inserts with UNC Class 2A threads.
5. Joint must be interchangeable with those shown in Detail D.
6. Install mastic sealant provided with enclosure assembly for all concrete-to-concrete joints below surface level.
7. The identification plate is an integral part of the cover and should be included by the manufacturer.
8. For new construction conduits shall enter the enclosure using 90 degree elbows rising into the enclosure. Refer to Figure 5 and Figure 6 on Page 7.



24" x 36" (#3) Concrete Boxes for Full-Vehicular Traffic (continued)

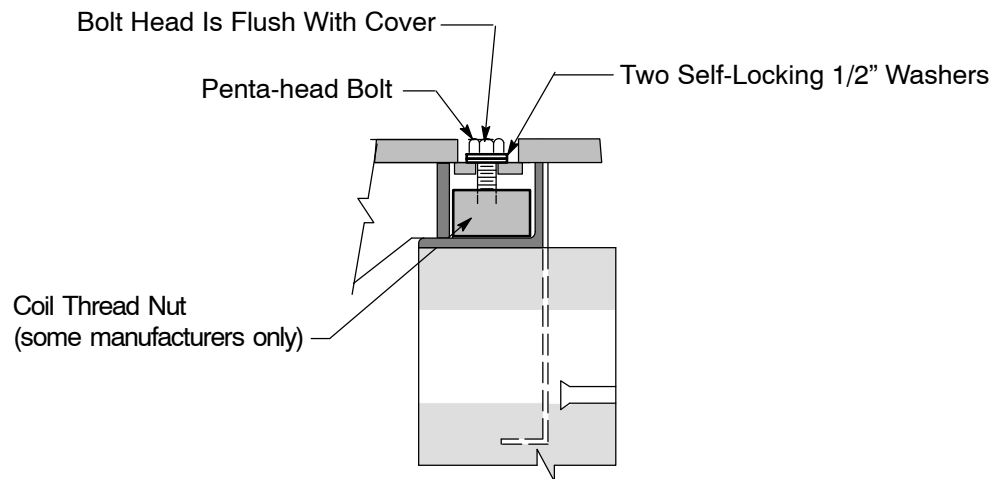
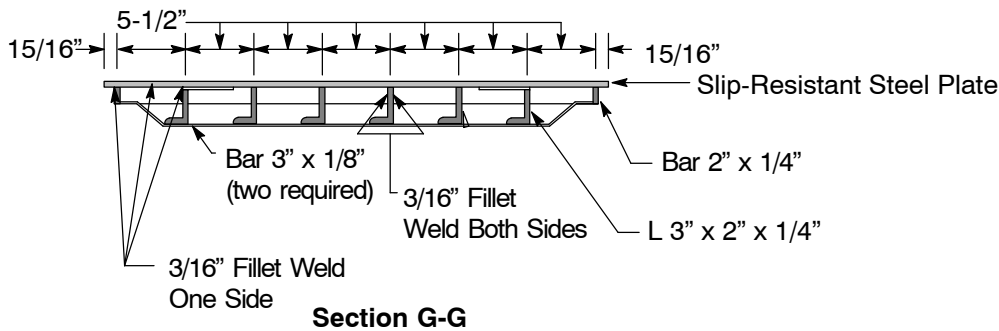


Section H-H

Table 7 Codes for Complete 24" x 36" Concrete Box Assemblies

Box		Code ¹
Type	Depth	
Full-Vehicular-Traffic With Slip-Resistant Cover	30"	019598
	36"	019599
Extension	6"	043521

¹ PG&E assembly code includes body, 6" or 12" top section with cast-in frame and cover. If more depth is required, order a 6" extension.



Detail E
Bolt-Down Feature

Figure 10
24" x 36" Steel Cover

Secondary Electric Underground Enclosures

36" x 60" (#5) Incidental, Full-Vehicular Traffic and Heavy Full-Vehicular Traffic Concrete Boxes

Notes

1. Joints must be interchangeable with those shown in Detail F.
2. Install mastic sealant included with the enclosure assembly for all concrete-to-concrete joints below surface level.
3. Pulling irons shall be designed for 20,000 pounds ultimate, with a safety factor of 2 (40,000 pounds).
4. Boxes shall be lifted using pulling irons in the floor.
5. For new construction, a 12" extension is required.
6. Install Full-Vehicular Traffic (FVT) enclosure assembly with quick-release covers in locations not subject to high-density traffic with speeds exceeding 25 mph. Typical allowable locations are alley, residential driveways and parking strips.

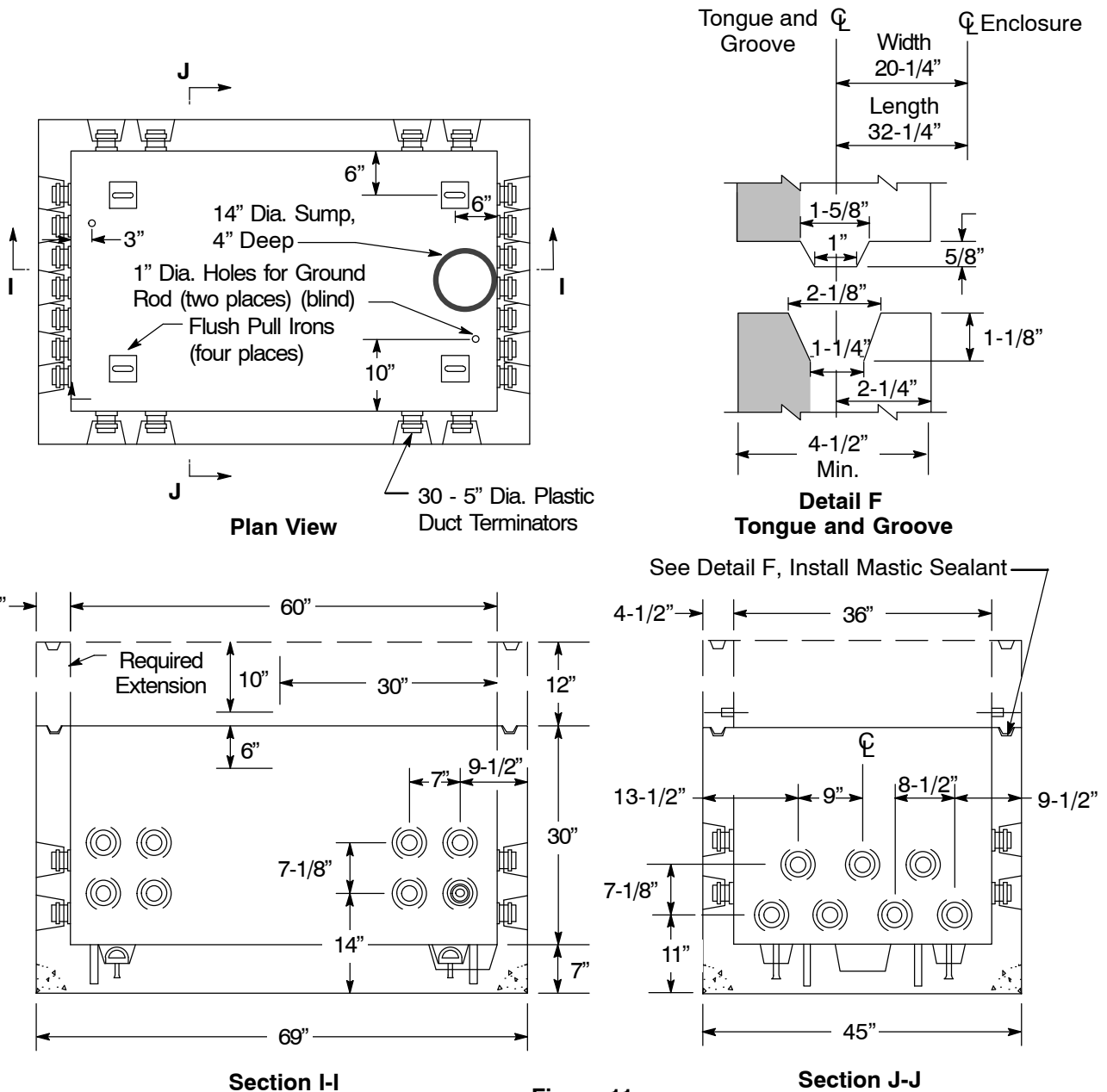


Figure 11
36" x 60" Concrete Box

36" x 60" (#5) Incidental, Full-Vehicular Traffic and Heavy Full-Vehicular Traffic Concrete Boxes (continued)

Table 8 Codes for 36" x 60" Concrete Box

Box		Code
Type	Depth	
Incidental-Traffic Assembly	30"	032506
Full-Traffic Assembly		042019
Heavy Full-Traffic Assembly		032507 ¹
Body		032508
Extension	12"	043362

¹ This code includes a 12" extension to accommodate the heavy full-traffic cover.

Revision Notes

Revision 23 has the following changes:

1. Clarify Note 13 with the term "new construction".
2. Clarify Note 15 with the term "re-construction".
3. Update Note 17 on Page 2 to use 3/4" crushed rock in lieu of 1" drain rock.
4. Clarify Note 2 on Pages 9 and 11 with open bottom design for conduit entry.
5. Fix Figure 7 Section A-A dimension callout.
6. Fix Figure 9 Section E-E dimension callout.