

Utility Mitigation Plan

Millpond Crossing Development
1701 Chapel Drive
Philomath, Oregon

Prepared for:
MPC Builders, LLC and Millpond Crossing, LLC
2711 E Main Street
Puyallup, Washington 98372

October 2022
PBS Project 24159.000



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1 PROJECT BACKGROUND

The Millpond Crossing Development in Philomath, Oregon (site) is a residential affordable housing development currently being developed by Millpond Crossing, LLC, and constructed by MPC Builders, LLC (collectively, the Client). The site is a former lumber mill which included a small log pond and a large log pond that encompassed much of the site. A vicinity map showing the location of the site is found on Figure 1 and the larger Millpond project construction phasing is found on Figure 2.

The ponds were filled with clay, sand, and gravel mixed with wood debris and organic material. The decaying organic matter in the fill material is the suspected source of elevated methane and hydrogen sulfide (H₂S) concentrations that have been observed in the subsurface. Excavation and removal of the former large pond source material for Phase 2B, Phase 3 and Phase 4 is separately proposed in the Interim Remedial Action Measure Work Plan. The proposed Phase 2B, Phase 3 and Phase 4 utility mitigation measures are proposed to be completed prior to the former large pond source removal activities.

As a form of methane mitigation inside of the homes and utility worker protection, existing and future on-site utilities will be retrofitted with appropriate sealing material to prevent transmission of vapors. All underground electrical conduits at existing homes (Phase 1 and Phase 2) and future homes (Phase 2B, Phase 3, and Phase 4) will be sealed wherever they enter any accessible above- or belowground utility features or possible zones of methane accumulation (e.g., vaults, junction boxes, circuit breaker boxes, etc.). Any in-ground electrical or telecommunications conduits leaving the site will also be sealed to prevent off-site migration. Future utilities for Phase 2B, Phase 3 and Phase 4 of construction will include sealing as part of the original installation. In addition to conduit sealing, a utility trench dam and passive utility ventilation trench will be installed on the east side of 16th Street to prevent vapor accumulation and migration from the former small log pond to the future properties on the east side of 16th Street.

Trench dams are not proposed for each house as both sanitary sewer and water utility service enters the house by the crawl space and is protected by the crawl space engineering controls (crawl space vent fans). The other remaining utilities, including electrical and telecommunication, enter the house by exterior cabinets on the houses and are protected by conduit sealing as outlined in Section 2 below.

2 CONDUIT SEALS

PBS Engineering and Environmental (PBS) requested information from various utility companies, including Pacific Power, Comcast, and Pioneer Connect, to determine which aboveground and belowground features were installed, and the quantity of utility conduit connections installed at each home. Pacific Power provided figures regarding the different features they installed and the locations of each. Comcast and Pioneer Connect did not provide figures.

Based on the information provided by Pacific Power and visual observations conducted during PBS site visits, PBS was able to determine the following features were installed:

- Transformers
- Sectional cabinets
- Pull vaults
- Pedestals
- Light pole conduit connections
- Household utility conduit connections

The locations of these features and household utility conduit connections can be found on Figure 3 for Phases 1, 2 and 2B of the Mill Pond Project. At the time of this report, the utility locations for Phases 3 and 4 have not been developed and therefore are not shown on Figure 3.

Comcast and Pioneer Connect did not respond to our requests for utility feature details or locations; however, PBS observed that two houses generally shared an aboveground cable pedestal and a belowground phone vault near the sidewalk. It is assumed that supply lines enter and exit each pedestal, and that one supply line for each utility connects to the homes, for a total of four utility connections per box, or three utility conduit connections per home (including both cable and telephone).

Using this information, PBS was able to determine the number of term-a-ducts, annular conduit space, and conduit connections at each feature and household utility conduit connection point that would require sealing for Phases 1, 2, and 2B of the Millpond Crossing project, which is summarized in Table 1. Cut sheets of each feature can be found in Appendix A.

Table 1. Quantity of Features and Conduit Connections to be Sealed

Feature/Connections	Estimated Number of Term-A-Ducts/Annular Conduit Spaces/Conduit Connections	Estimated Total
Electrical Transformer (term-a-duct)	2	7
Electrical Sectional Cabinet (term-a-duct)	2	2
Electrical Pull Vault (term-a-duct)	2	1
Electrical Pedestal (annular conduit space)	4	36
Electrical Light Pole (conduit connection)	2	17
Aboveground cable pedestal (conduit connection)	4	32
Belowground phone vault (conduit connection)	4	32
Household Electric (conduit connection)	1	81
Household Phone (conduit connection)	1	81
Household Cable (conduit connection)	1	81

To prevent methane migration at the different features and connection points, PBS has identified a fiber, Chico X Fiber, and a sealing compound, Chico A, that when installed together restrict the passage of gases, vapors, or flames at the term-a-ducts, annular conduit spaces, and conduit connections. The Chico X Fiber is a mineral wool that packs easily, forming around its installation location (i.e., inside of the term-a duct, surrounding the conduit, at the annular conduit space). The fiber acts as a dam and is installed before and after the sealing compound, as shown in Figure 3. Chico A is a sealing compound that is a water-soluble powder. The powder is mixed with water and is used to form a seal around and between the electrical conductors to restrict the passage of gases, vapors, or flames at atmospheric pressure and normal ambient temperatures. It is also used inside of the sealing fitting. The sealing compound is placed between the Chico X Fiber and expands slightly when it hardens and bonds to the inner walls of the sealing fittings. The sealing compound is sold as Chico A, which is just the water-soluble powder, and as Chico A-P, which is an Intrapak containing pre-measured soluble powder and water that can be easily mixed and poured. Table 2 summarizes the fiber to be used and the sealing compound. More information regarding each product can be found in Appendix B.

Table 2. Fiber and Sealant Options

Material	Description	Creates Seal For			Hardening Time	Cure Time
		Class	Division	Group		
Fiber						
Chico X Fiber	Mineral wool that acts as dam for sealing compound	--	--	--	--	--
Sealing Compound						
Chico A or Chico A-P	Sealing compound that restricts the passage of gases, vapors or flames, water soluble powder that must be mixed with water	I	--	C, D	60–70 minutes	8 hours

Notes:

Class I: flammable gases or vapors may be present

Group C: ethylene, cyclopropane, and ethyl ether

Group D: acetone, ammonia, benzene, butane, ethanol, gasoline, hexane, methane, methanol, naphtha, natural gas, propane, and toluene

Using this information and the installation requirements found in Figure 3, the contractor can use the Chico X Fiber and Chico A to prevent methane migration and accumulation at the different features and household utility conduit connections in compliance with National Electrical Code Section 501.15. In the instance that some features and household utility conduit connections are sealed with a noncompliant material, the existing material must be removed and replaced with Chico X Fiber and Chico A. To ensure proper installation, a contractor mock-up demonstrating the correct installation of the Chico X Fiber and Chico A sealing compound will be provided prior to project installation to ensure MPC Builders, LLC knows how to properly mix and install the fiber and sealing compound.

Prior to conducting any of the work described above, isolation of power will be coordinated with Pacific Power. Given their low voltage, utility boxes for Comcast and Pioneer Connect will not require isolation. Locations and mapping of telecom and cable features will also be determined to ensure all features are accounted for. Additionally, a communication plan with residences regarding project timeline and blackout dates will be put in place. In the event a feature cannot be sealed, PBS will map the feature and location and provide a description of why the feature could not be mitigated and recommend alternative solutions.

3 UTILITY TRENCH DAM AND PASSIVE UTILITY VENTILATION TRENCH

Phases 1 and 2 of the Millpond Crossing Development have been constructed and are located on the former small log pond. Phases 2B, 3, and 4 have not yet been constructed and will be located on the former large log pond. Prior to constructing Phases 2B, 3, and 4, the former large log pond will be excavated to remove the clay, sand, and gravel mixed with wood debris and organic material, which are the suspected source of elevated methane concentrations. Prior to the construction of Phases 1 and 2, the small log pond was not excavated except for below the home footprints and in the stormwater tract.

To prevent methane migration from Phases 1 and 2 to Phases 2B, 3, and 4, a utility trench dam will be installed 16 feet directly east of 16th Street due to an existing utility corridor, as shown in Figure 4. The utility trench dam will be excavated approximately 1 foot deeper than the natural clay layer, which is at a varied depth but estimated to be approximately 10 to 12 feet deep. The utility trench dam will be 1 to 2 feet wide and backfilled with controlled densified fill (CDF).

Approximately five feet directly east of the utility trench dam, a 5-foot deep passive utility ventilation trench will be installed as an additional engineering control to further prevent methane accumulation east of 16th Street. At the bottom of the passive utility ventilation trench, a 6-inch diameter high density polyethylene (HDPE) corrugated, or perforated polyvinylchloride (PVC) pipe will be installed to convey soil gas. Underlying the soil gas collection piping, a 4-inch diameter corrugated HDPE drainage pipe will be installed to dewater the passive utility ventilation trench. The drainage pipe will daylight to the existing stormwater swale on the south side of the property along Chapel Drive. Along the length of the soil gas collection pipe, 6-inch solid steel pipe risers will be installed approximately every 200 feet. The 6-inch drainage pipe will be covered in 2 feet of clean $\frac{3}{4}$ -inch crushed rock, followed by a 10-millimeter Visqueen layer, 1 foot of CDF, and 2 feet of native soil, as shown in Figure 4. The perforated pipe will capture biogas production, which will be conveyed to the atmosphere via the passive 6-inch solid steel pipe or PVC risers. The pipe riser will be outfitted with a 6-inch weather head which will prevent water from entering the pipe. The pipe risers will either daylight along the driveways (steel pipe) or home (PVC pipe) of the Phase 2B homes and will have a vertical elevation of 10 feet above ground surface. The PVC risers will extend to a height so as it is 3 feet above the highest point of the roof within a 10-foot radius of the outlet. Both the PVC and steel risers will maintain a minimum of 4 feet horizontal distance from the property line and 5-feet distance from electrical devices.

Methane mitigation for Phase 1 and Phase 2 will be discussed in the Interim Remedial Measure Work Plan for West of 16th Street in a separate deliverable.

Soil excavated during the Utility Mitigation Plan will be managed in accordance with the site-specific Environmental Management Plan/Contaminated Media Management Plan and the site Erosion and Sediment Control Plan provided under separate cover to the State of Oregon Department of Environmental Quality (DEQ). Dewater fluid, if encountered, will be managed in accordance with the Environmental Management Plan provided under separate cover.

4 LIMITATIONS

PBS has prepared this report for the exclusive use of the client and is not intended to be relied upon by other parties. It is not to be photographed, photocopied, or similarly reproduced in total or in part without the express written consent of the client and PBS.

5 CERTIFICATION (REGISTERED PROFESSIONAL ENGINEER)

The undersigned registered professional engineer attests that the proposed engineering controls have been prepared in accordance with good engineering practice, including consideration of applicable industry standards; that procedures for required inspections and testing have been established; and that this plan is adequate for the facility.

Name: Craig J. Peterson, PE
Title: Environmental Engineer
Company: PBS Engineering and Environmental Inc.
Date: October 18, 2022



EXPIRES: DECEMBER 31, 2022

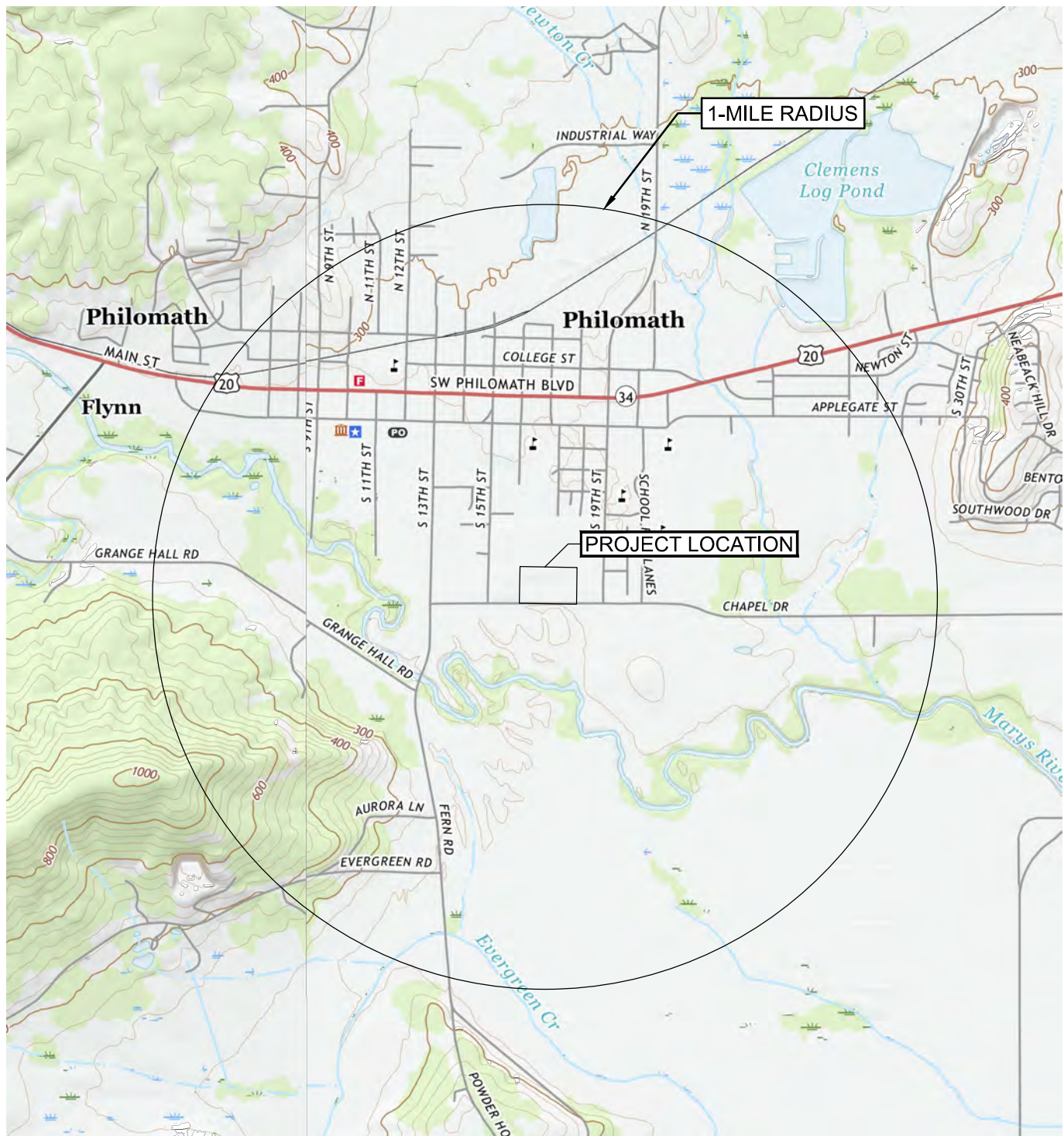
Figures

Figure 1. Vicinity Map

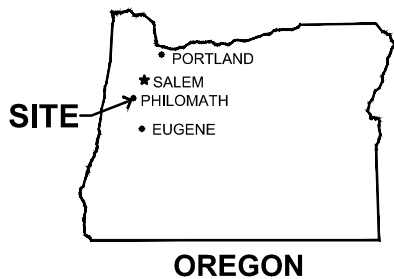
Figure 2. Millpond Construction Phasing

Figure 3. Feature and Conduit Sealing – Site Plan

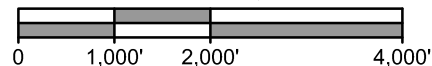
Figure 4. Utility Trench Dam and Passive Utility Ventilation Trench – Site Plan



SOURCE: USGS WREN, OR; CORVALLIS, OR QUADRANGLE 2020.



SCALE: 1" = 2,000'



PREPARED FOR: MPC BUILDERS, LLC



VICINITY MAP **1701 CHAPEL DRIVE** PHILOMATH, OREGON

AUG 2022
 24159.000

FIGURE

1

Appendix A

Features Installed

644-TRANS-PCORP (Transformers)

575-SECT-PCORP (Sectional Cabinet)

776-MH-PCORP (Pull Vault)

PEDESTAL SPECIFICATIONS

CULVERT SPECS FIBERGLASS STREETLIGHTS (Light Pole Conduit Connections)

644-TRANS-PCORP

4 x 6, Single Phase 25-167 KVATransformer Padvault, Stock Item 7992977

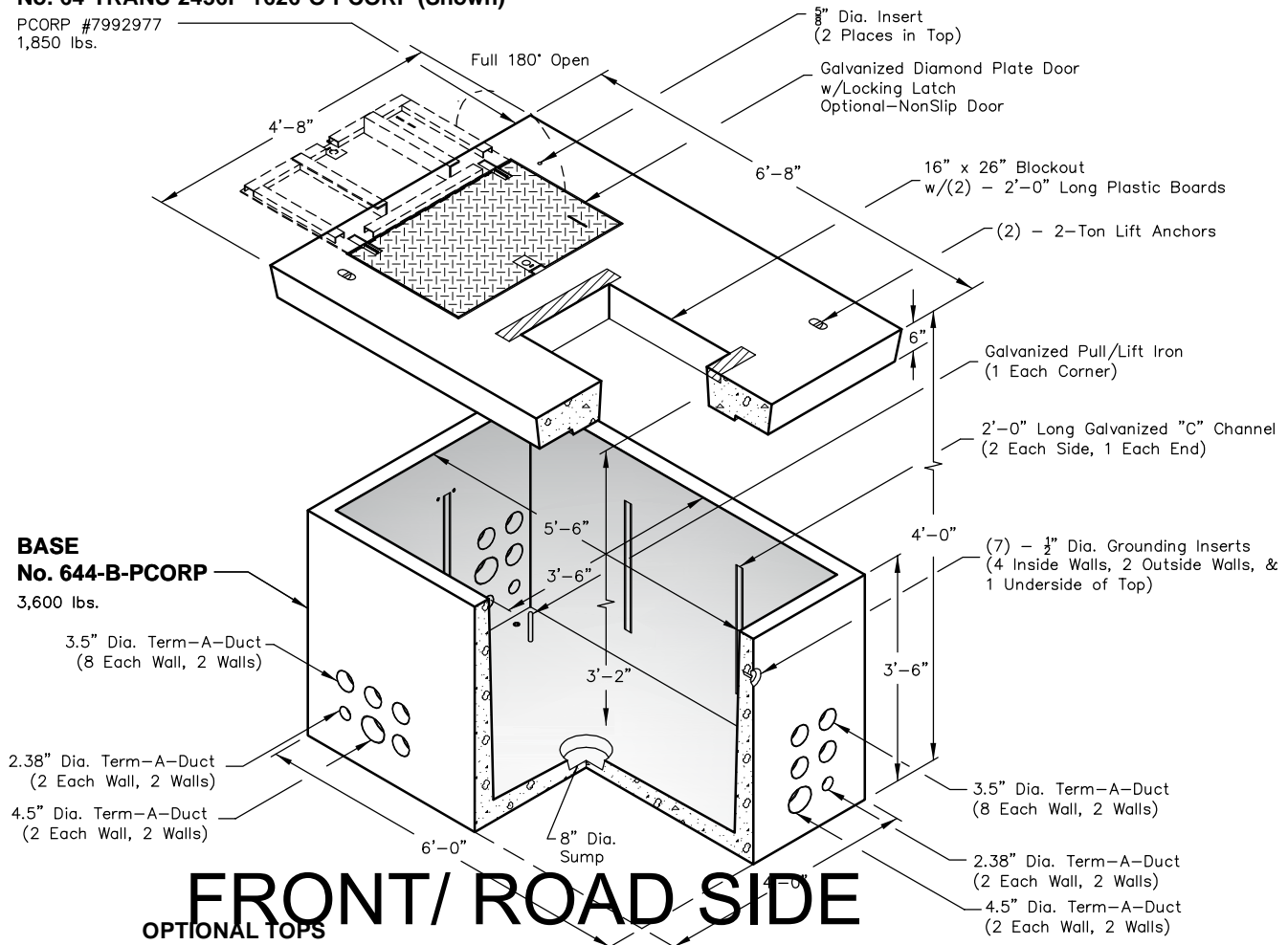
4 x 6, Single Phase 25-167 KVATransformer Padvault, Stock Item 7999352

TOP

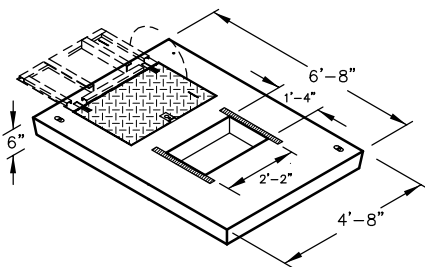
SINGLE PHASE TRANSFORMER

No. 64-TRANS-2436P-1626-O PCORP (Shown)

PCORP #7992977
1,850 lbs.



FRONT/ ROAD SIDE
OPTIONAL TOPS



SINGLE PHASE TRANSFORMER
No. 64-TRANS-2436P-1626-C
PCORP #7999352 1,850 lbs.

Note: Designed for 0 to 5'-0" of Cover

PCORP ZG616 11-1-13



PO Box 323, Wilsonville, Oregon 97070-0323
Tel: (503) 682-2844 Fax: (503) 682-2657

644-TRANS-PCORP

File Name: 020-644TRANS-PCORP

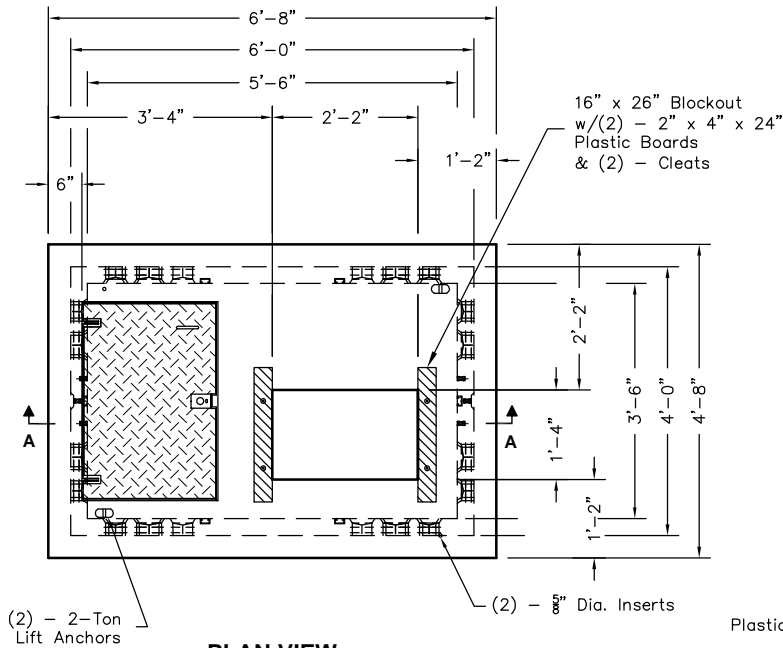
Issue Date: 2016

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644-TRANS-PCORP

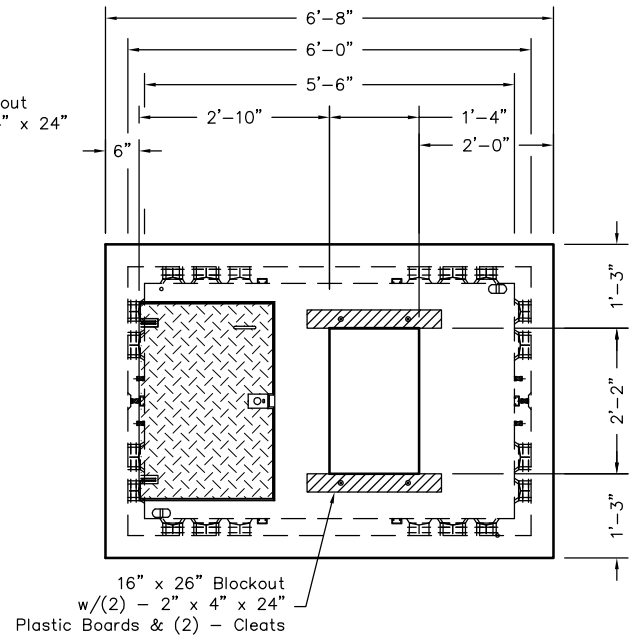
4 x 6
PACIFICORP

644-TRANS-PCORP



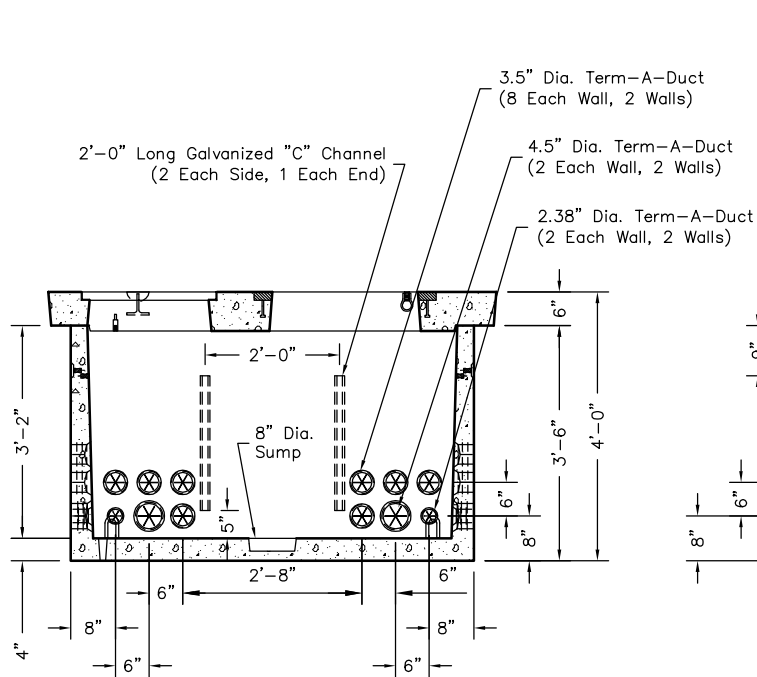
PLAN VIEW

No. 64-TRANS-2436P-1626-0
 PCORP #7992977

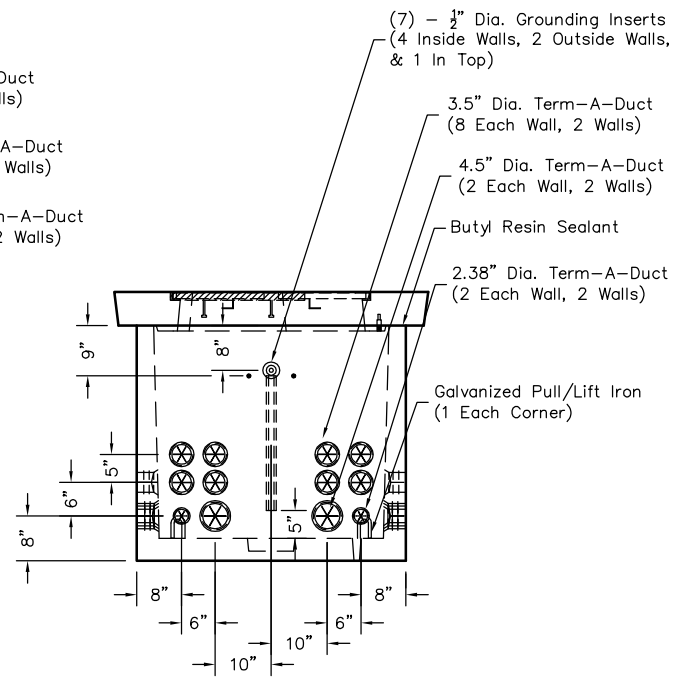


PLAN VIEW

No. 64-TRANS-2436P-1626
 PCORP #7999352



SECTION AA



END VIEW

PCORP ZG616 11-1-13



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644-TRANS-PCORP

File Name: 020-644TRANS-PCORP

Issue Date: 2016

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644-TRANS-PCORP

4 x 6

PACIFICORP

575-SECT-PCORP

~~5 x 7, 15 kV, 3-Phase Sectionalizing Cabinet Padvault, Stock Item 7992605~~
5 x 7, 25 kV, 3-Phase Sectionalizing Cabinet Padvault, Stock Item 7992606
~~5 x 7, 35 kV, 3-Phase Sectionalizing Cabinet Padvault, Stock Item 7992607~~

TOP

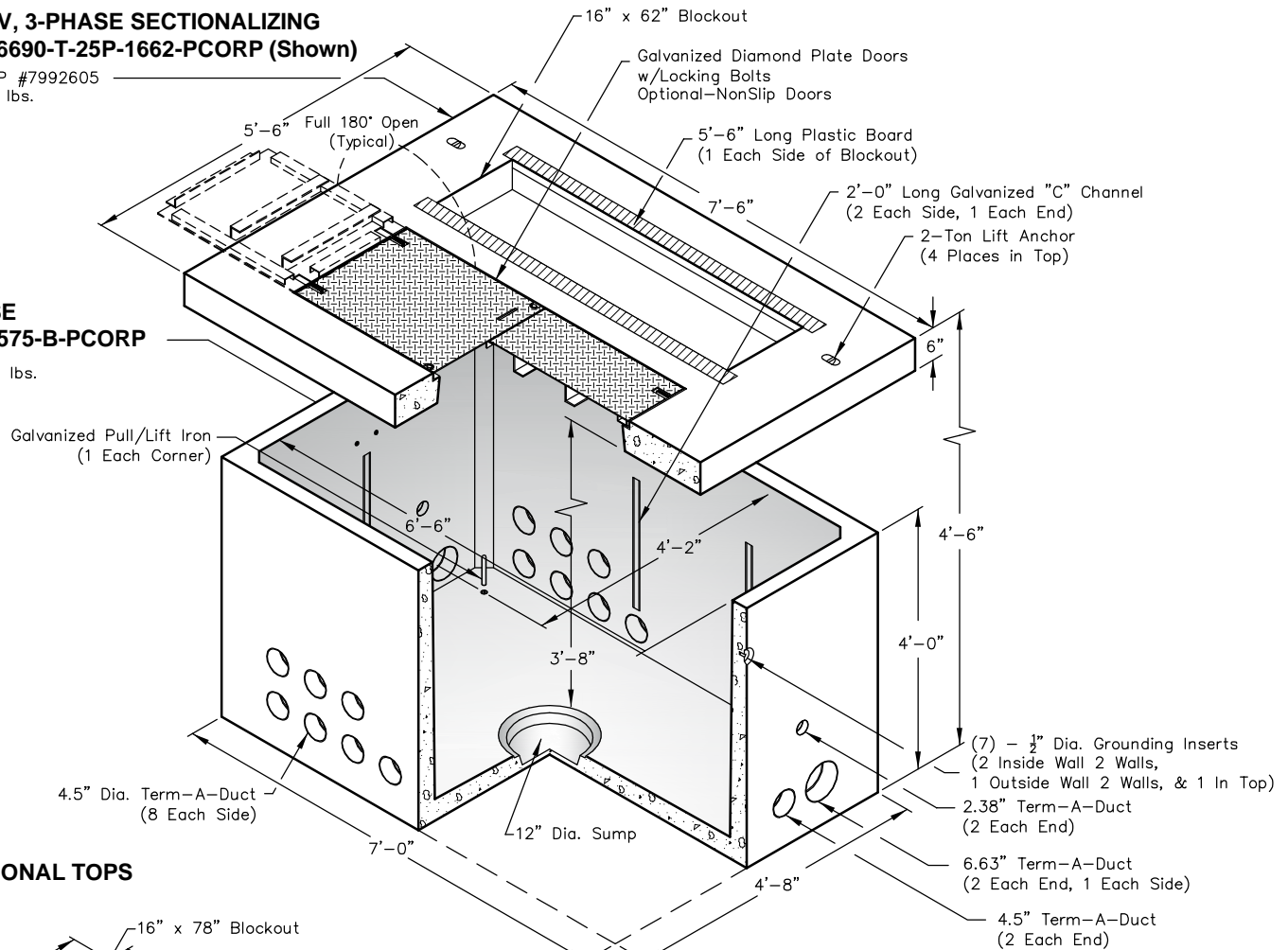
15 kV, 3-PHASE SECTIONALIZING No. 6690-T-25P-1662-PCORP (Shown)

PCORP #7992605
2,148 lbs.

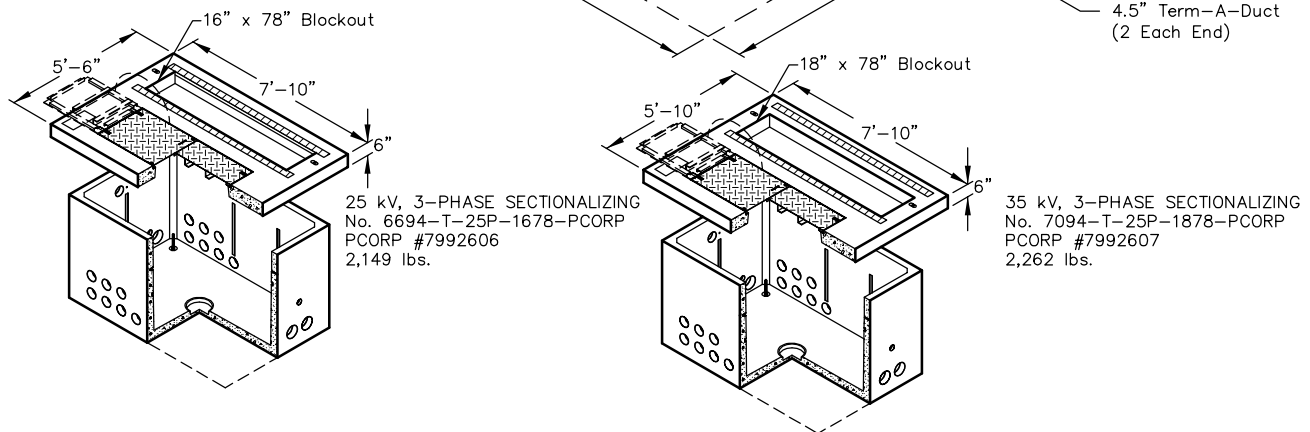
BASE

No. 575-B-PCORP

4,800 lbs.



OPTIONAL TOPS



Note: Designed for 0 to 5'-0\" of Cover

PCORP ZG621 6-13-13



PO Box 323, Wilsonville, Oregon 97070-0323
Tel: (503) 682-2844 Fax: (503) 682-2657

575-SECT-PCORP

File Name: 020-575SECT

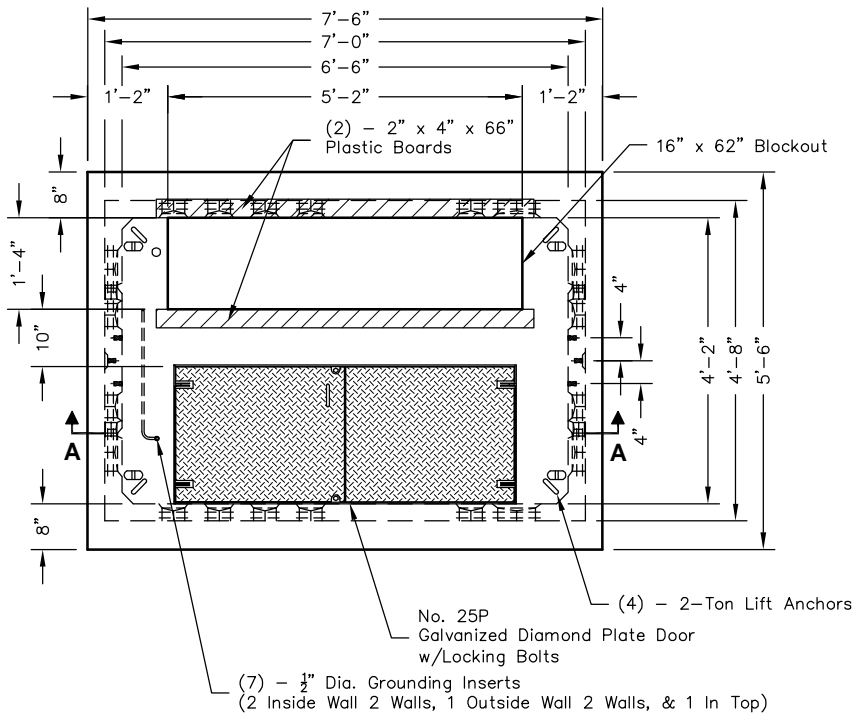
Issue Date: 2018

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575-SECT-PCORP

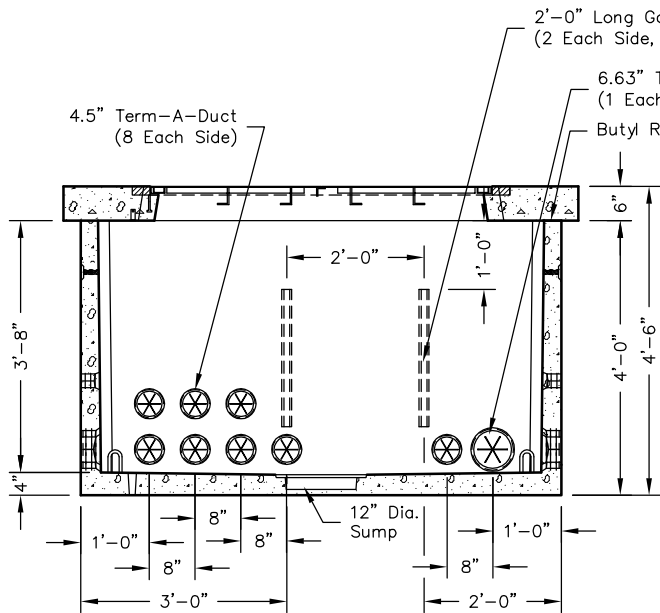
**5 x 7
PACIFICORP**

575-SECT-PCORP

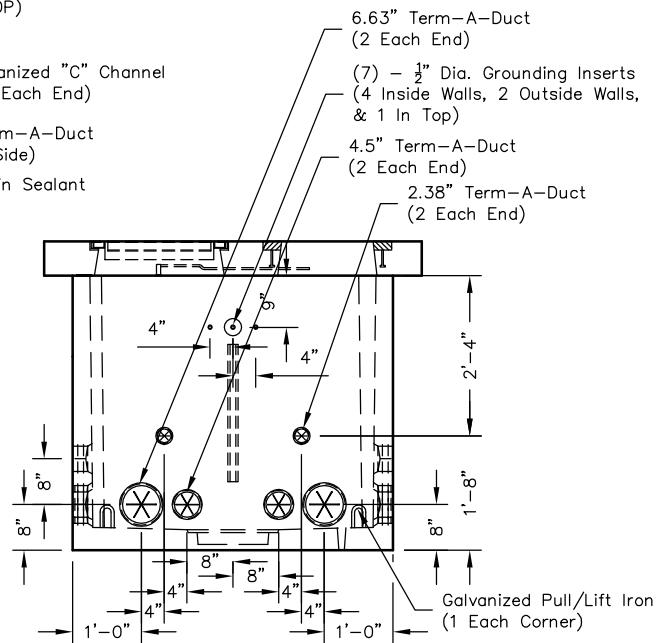


PLAN VIEW


No. 6690-T-25P-1662-PCORP (15 kV, 3-PHASE SECTIONALIZING TOP)
PCORP #7992605



SECTION AA



END VIEW


CABINET
HOLD-DOWN CLEAT
(6) - REQUIRED

1 1/4" x 2 1/2" Stainless Steel Hold-Down Cleat
1/2" x 2" Galvanized Lag Screw
2" Stainless Steel Bellville Washer

PCORP ZG621 6-13-13



PO Box 323, Wilsonville, Oregon 97070-0323
Tel: (503) 682-2844 Fax: (503) 682-2657

575-SECT-PCORP

File Name: 020-575SECT

Issue Date: 2018

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575-SECT-PCORP

**5 x 7
PACIFICORP**

776-MH-PCORP

7 x 7, Manhole Incidental Traffic Vault, Stock Item 7992594

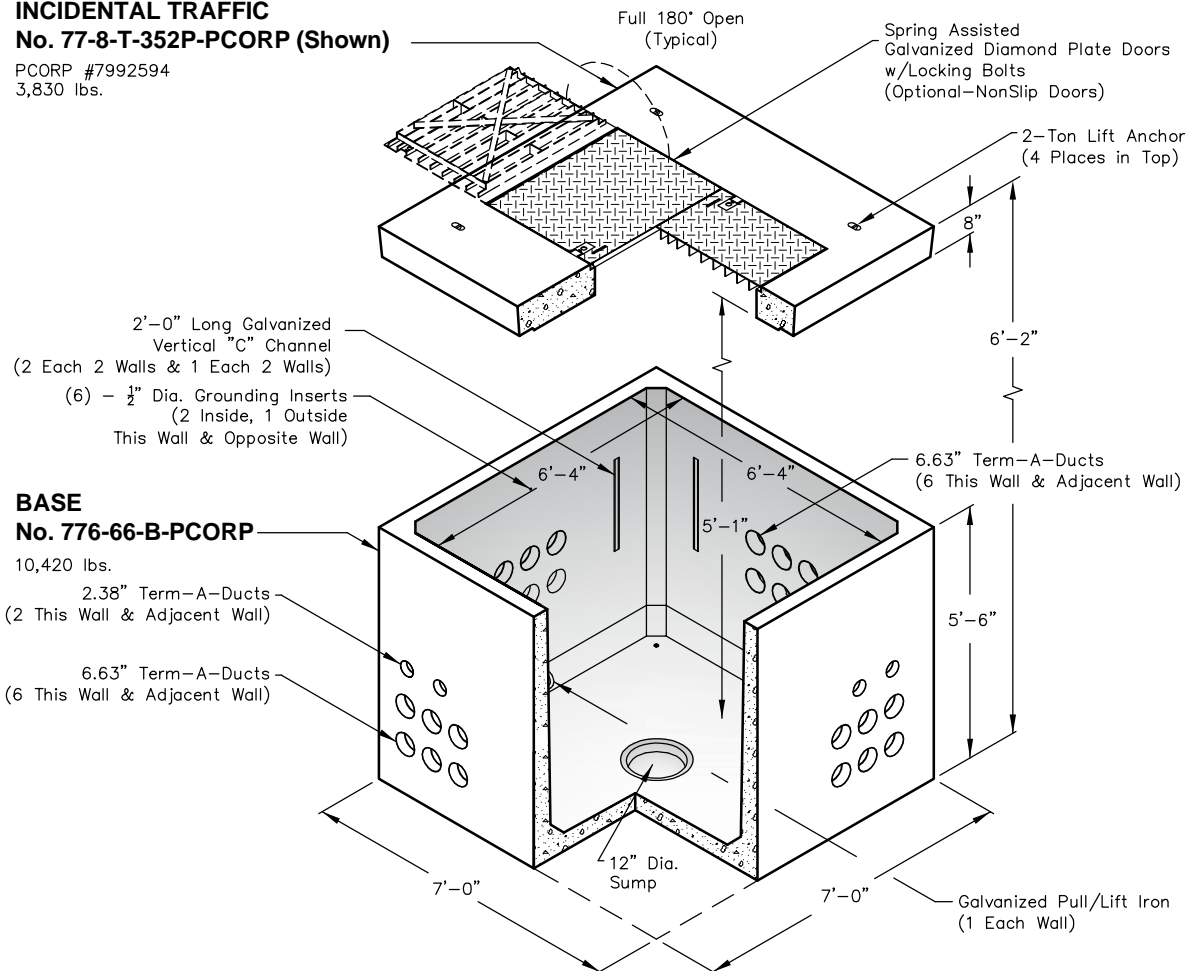
7 x 7, Manhole Full Traffic Vault, Stock Item 7992595

TOP

INCIDENTAL TRAFFIC

No. 77-8-T-352P-PCORP (Shown)

PCORP #7992594
3,830 lbs.



BASE

No. 776-66-B-PCORP

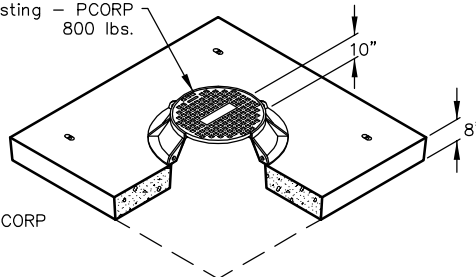
10,420 lbs.

2.38" Term-A-Ducts
(2 This Wall & Adjacent Wall)

6.63" Term-A-Ducts
(6 This Wall & Adjacent Wall)

OPTIONAL TOP

No. 30" x 10" Casting - PCORP
800 lbs.



FULL TRAFFIC
No. 77-8-T-38C-PCORP
PCORP #7992595
4,450 lbs.

Note: Designed for 0 to 5'-0" of Cover

PCORP ZG631 11-1-13



PO Box 323, Wilsonville, Oregon 97070-0323
Tel: (503) 682-2844 Fax: (503) 682-2657

776-MH-PCORP

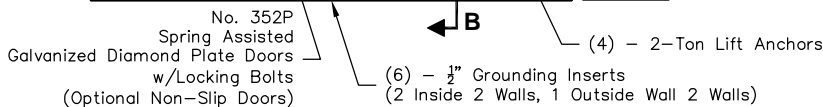
File Name: 020-776-MH-PCORP

Issue Date: 2018

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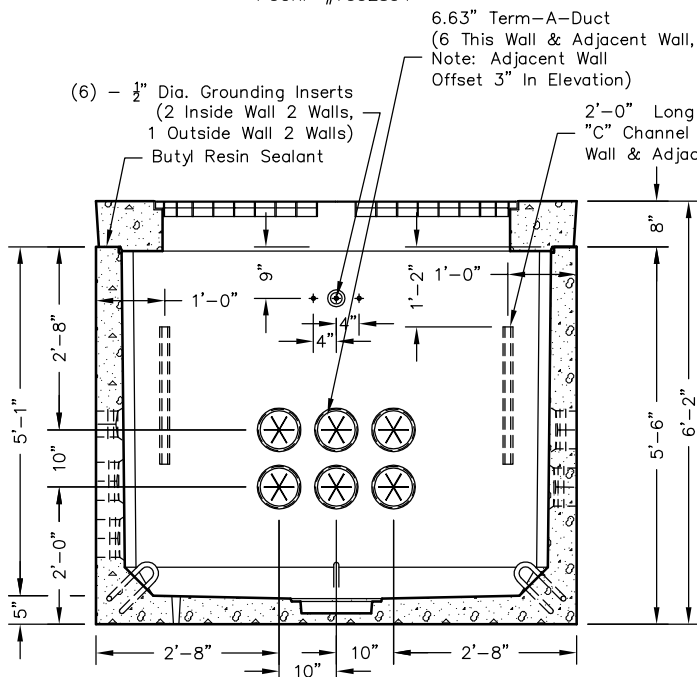
776-MH-PCORP 7 x 7 PACIFICORP

776-MH-PCORP

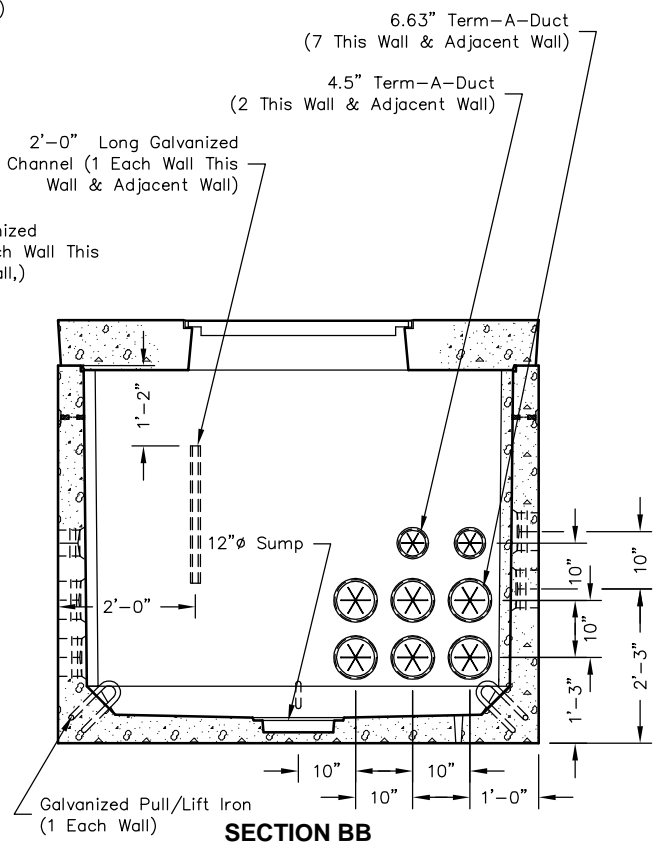


PLAN VIEW

No. 77-8-T-352P-PCORP (INCIDENTAL TRAFFIC TOP)
PCORP #7992594



SECTION AA



SECTION BB

PCORP ZG 631 11-1-13



PO Box 323, Wilsonville, Oregon 97070-0323
Tel: (503) 682-2844 Fax: (503) 682-2657

776-MH-PCORP

File Name: 020-776-MH-PCORP

Issue Date: 2018

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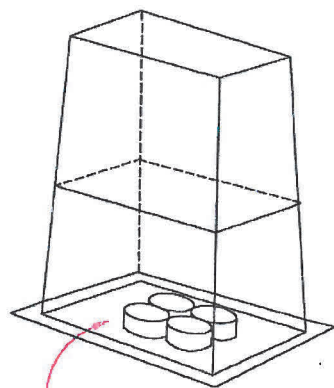
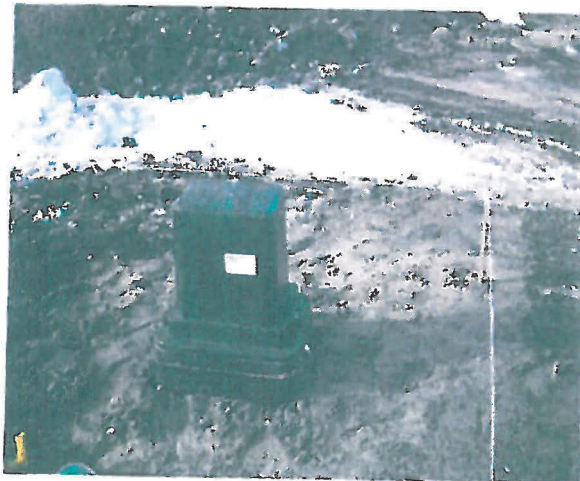
776-MH-PCORP

7 x 7

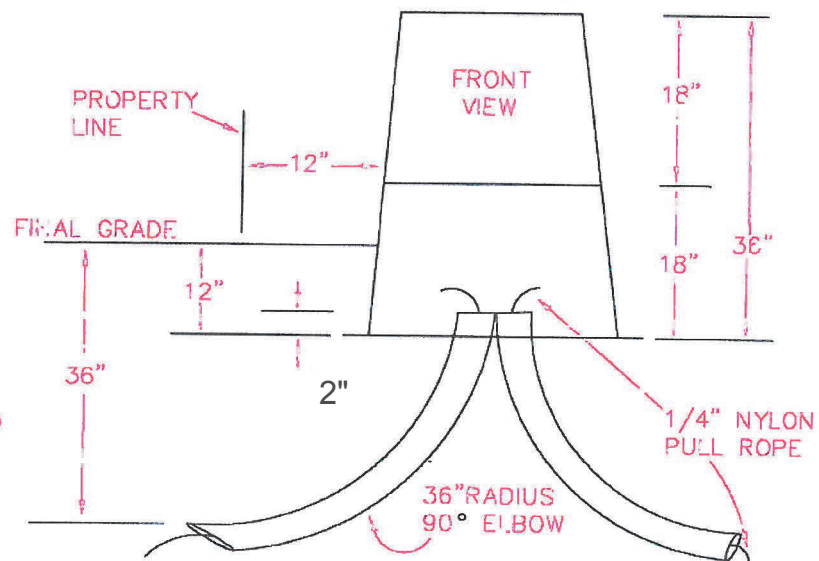
PACIFICORP

PEDESTAL SPECIFICATIONS

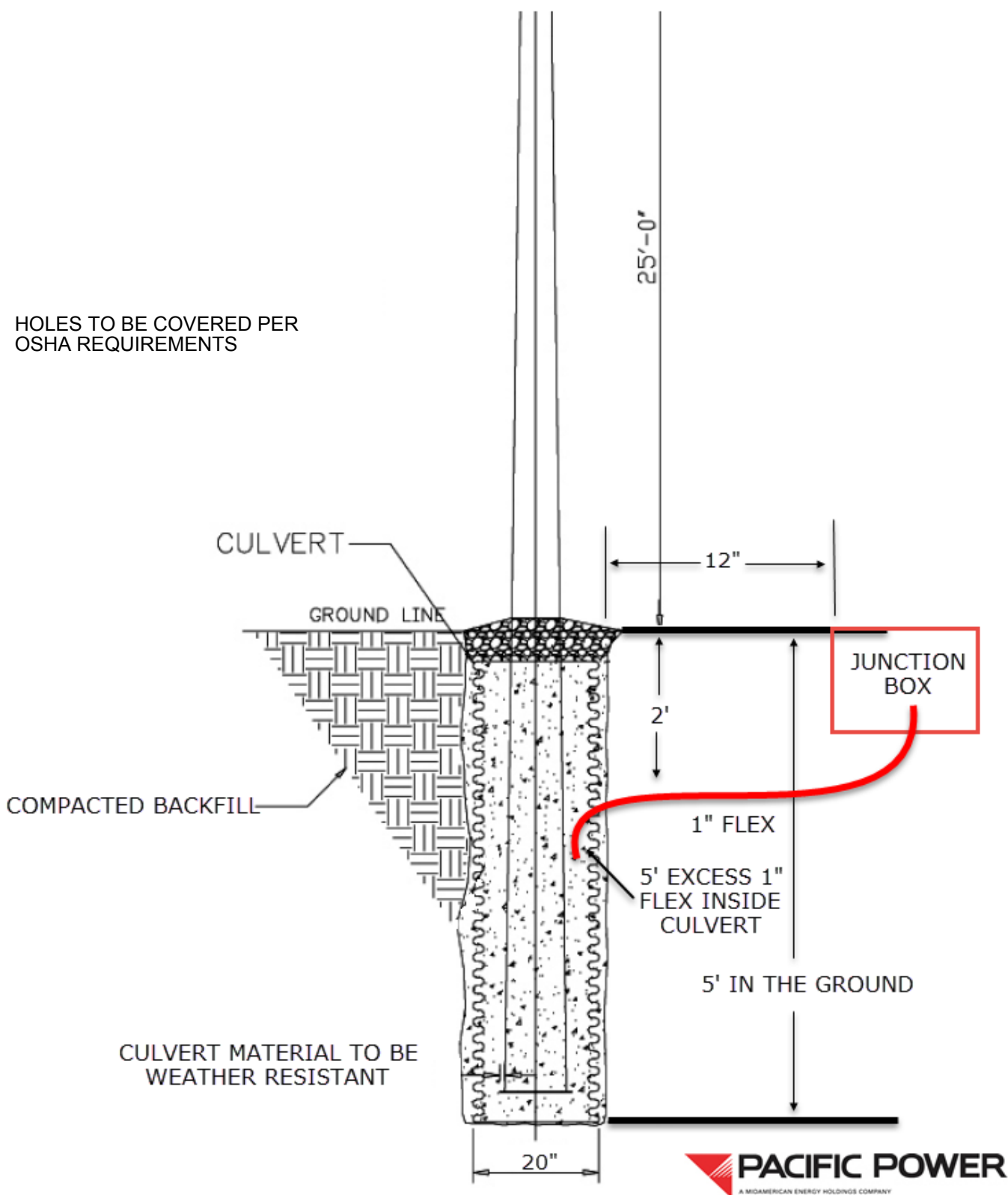
Secondary boxes, shown below, are used as the base for secondary pedestals which provide service to multiple customers (typically homes). Secondary boxes should be installed on compacted soil, and the equipment base should be about three inches above final grade.



CONDUITS TO BE INSTALLED
TOUCHING EACH OTHER IN
CENTER OF PEDESTAL



CULVERT SPECS FIBERGLASS STREETLIGHTS



Appendix B

Fiber and Sealant Options

Chico A, Chico A-P Sealing Compound, and Chico X Fiber Information Sheet

Chico A and Chico A-P sealing compound, Chico X fiber and ~~Chico SpeedSeal~~

For sealing fittings and hubs

Applications:

Chico® A sealing compound:

- Forms a seal around each electrical conductor and between them, and inside of the sealing fitting to restrict the passage of gases, vapors or flames through the sealing fitting at atmospheric pressure and at normal ambient temperatures

Chico X fiber:

- Forms a dam between the integral bushing of the sealing fitting and the end of the conduit and around the electrical conductors entering the hub

~~Chico SpeedSeal™ compound:~~

- ~~Designed to separate and form an explosionproof seal around each electrical conductor in Eaton's Crouse-Hinds series EYS and EYD sealing fittings~~
- ~~Restricts the passage of gases, vapors or flames through the sealing fitting~~
- ~~Creates a seal for Class I, Division 1, Groups C, D and Class II, Division 1, Groups E, F, G hazardous areas~~

Features:

Chico A sealing compound:

- A water soluble powder that can be easily mixed and poured; the compound, unusually dense, expands slightly when hardening and bonds to inner walls of sealing fittings; compound hardens in 60-70 minutes
- Cure time is 8 hours for Class I, Groups C and D applications and 72 hours for Class I, Group A and B applications
- 1 year shelf life from date of manufacture
- Ambient temperature range (after curing) is -40°F to +165°F

Chico A-P Intrapak®:

- Packaged in two compartment plastic pouch with precise amount of water for mixing; no mixing or measuring implements required
- A hard squeeze of the water compartment forces the water into the compartment containing the Chico compound; mixing is completed by kneading the pouch for one minute
- Mixed sealing compound is poured directly into the sealing fitting – no funnel required; the package label indicates the size and quantity of sealing fittings each pouch will properly fill; compound hardens in 60-70 minutes

Chico X fiber:

- A mineral wool that packs easily, forming around each conductor

~~Chico SpeedSeal compound:~~

- ~~Installs a reliable seal in five minutes – every time~~
- ~~Hardens to a dense, strong mass that is suitable for Class I, Division 1, Groups C, D and Class II, Division 1, Groups E, F, G hazardous applications~~
- ~~UL and cUL Listed for use with 1/2" to 2" Eaton's Crouse-Hinds series sealing fittings only~~
- ~~Packaged in a 2 oz. or 6 oz. pre-measured cartridge, eliminating the need for measuring before mixing~~
- ~~Packaged with a screw-on nozzle for accurate dispensing~~
- ~~Expands in the sealing fitting, eliminating the need to separate the individual conductors with Chico X fiber~~
- ~~Chico X fiber dams are not required in horizontal applications, reducing installation times~~
- ~~Completely hardens in 20 minutes, simplifying use for OEMs~~
- ~~Suitable for cold temperature environments without the costly need to build a temporary shelter around sealing fittings; all ice crystals must be removed from inside the conduit seal before dispensing Chico SpeedSeal compound; the compound should be kept above 10°C (50°F) and below 85°F (29°C) prior to mixing; the sealing fitting must be kept at or above 4°C (40°F) during the 4 to 10 minute expansion/gel time of the compound~~
- ~~18 month shelf life~~

Size ranges:

- Chico A compound – 1 lb. to 5 lbs. (provides 23-115 cubic inches of compound)
- Chico X fiber – 2 oz. to 1 lb.
- Chico A-P compound (5 pouches per carton) – provides 25 and 55 cubic inches of compound
- ~~Chico SpeedSeal – 2 oz. or 6 oz. cartridge~~

Ordering information:

Chico A



Net weight	Volume in cu. in. [ⓑ]	Cat. #
1 lb.	23	Chico A3
1 lb. [Ⓐ]	23	Chico A4
5 lbs.	115	Chico A05
200 lbs.	4,600	Chico A200

Chico A-P Intrapak



Cu. in. fill per pouch [ⓑ]	No. of pouches per carton	Cat. #
5	5	Chico A19 PX [Ⓒ]
11	5	Chico A39 PX [Ⓒ]

Sealing fittings are approved for use in hazardous locations only when Chico X fiber and Chico A sealing compound or Chico SpeedSeal are used to make the seal.

[Ⓐ] Includes 1 oz. Chico X fiber.

[ⓑ] Number of cubic inches this amount will fill when set. See internal volume requirements for EYS, EZS, EYD, EZD and EYSR sealing fittings and ES sealing hubs (see product pages for details).

[Ⓒ] A sixth pouch, containing an appropriate quantity of Chico X fiber, is included in these cartons.

Chico A and Chico A-P sealing compound, Chico X fiber and Chico SpeedSeal

For sealing fittings and hubs

5F
5F

Ordering information (continued):

Chico X fiber



Net weight	Cat. #
2 oz.	Chico X4
8 oz.	Chico X6
1 lb.	Chico X7

Chart for approximate amount of fiber per hub

Hub size	Ounces required
1/2"	1/32
3/4"	1/16
1"	1/8
1 1/4"	1/4
1 1/2"	1/2
2"	1
2 1/2"	1 1/2
3"	2
3 1/2"	3
4"	4 1/2
5"	7
6"	10

Chico SpeedSeal

(Class I, Div. 1, Groups C, D and Class II, Div. 1, Groups E, F, G)



CHICO SS2



CHICO SS6

Cat. # Sealing fitting	Amount of SpeedSeal material needed (in ounces) per fitting	Suggested SpeedSeal Cat. #	Required cartridge quantity
EYS1, EYS16, EYS11, EYS116 EYD1, EYD16, EYD11, EYD116 EYS2, EYS26, EYS21, EYS216 EYD2, EYD26, EYD21, EYD216 EYSX11, EYDX11	1	CHICO SS2 (2 oz. cartridge)	1
EYS3, EYS36, EYS31, EYS316 EYD3, EYD36, EYD31, EYD316 EYSX21, EYDX21	2	CHICO SS2 (2 oz. cartridge)	1
EYS41, EYS416, EYS4, EYS46 EYD4, EYD46, EYD41, EYD416 EYSX31, EYDX31	3	CHICO SS6 (6 oz. cartridge)	1
EYSX41, EYDX41 EYD5, EYD56, EYD51, EYD516 EYS51, EYS516 EYS61, EYS616, EYS6, EYS66 EYD6, EYD66, EYD61, EYD616 EYSX51, EYDX51	6	CHICO SS6 (6 oz. cartridge)	1

Note: Safety Data Sheets (SDS) are available at www.eaton.com (Support > Tools > Crouse-Hinds series installation & maintenance sheets and MSDS documents).