CPWS

Columbia Power & Water Systems

Your Municipally Owned Systems

CPWS Electrical Service Practices and Requirements

January 1, 2016

Revised July 1, 2018

Revised January 1, 2021

Overview

CPWS would like to take the opportunity to remind you that the CPWS Electrical Service Practices and Requirements require you to meet with CPWS engineering on the site of electrical work that you undertake on the CPWS system. At this meeting we can discuss the requirements of the service installation and fees to be paid before service will be provided at the site. A meeting of this sort will provide us with site and load information to help us in sizing the necessary facilities; and, help you by allowing us to input data in our computer system, thereby allowing us to service you more efficiently.

The State of Tennessee adopted the National Electric Code (NEC) 2017 with enforcement of this code to begin on October 1, 2018. Prior to the 2017 NEC, the State adopted was 2008 NEC with an effective date of January 28, 2009. The NEC is the electrical code by which new residential, commercial, and industrial installations are to be wired. It also covers upgrades to these type installations.

The National Electrical Safety Code (NESC) is the standard by which utilities must build their distribution facilities. The State of Tennessee adopted the NESC 2017 with enforcement of this code to begin on January 1, 2018. The NESC rules are for the purpose of safeguarding the employees of electrical and communication utilities during the installation, operations, and maintenance of their respective facilities.

TABLE OF CONTENTS

PAGE

A. Requirements for Applications, Inspection Permits, and Issuing of Meter Bases. Rules and Regulations M.5 and M.6

Applications: A complete application for service must be obtained from the Customer or his electrician. The application is to consist of the following information:

- Customer Name
- Service Address
- Route and Folio Number of Existing Customer
- Breakdown of Electrical Load
- Desired Service Entrance Size
- Date of Application
- Name of Electrician
- Telephone Number of Customer and/or Electrician

Inspection Permits: All permits are to be completed and all fees paid before service is provided to installation.

Whenever wiring changes or new installations are made, electrical service cannot be provided until the State Inspector has found the site to be in compliance with the National Electrical Code and CPWS Electrical Practices and Requirements.

1. Storm damage or related type interruptions of service may be reconnected without purchase of permits; but permits must be purchased and inspection of completed wiring inspected within seven (7) days of reconnection.

2. Services disconnected due to fire shall be inspected before service is reconnected.

3. Smoke detectors are required on all new construction and shall be hardwired, supplied from a service panel. Smoke detectors are required for rewire, remodel, fire damage repair, etc. on existing services/structures, yet these may be battery powered. Smoke detectors are required in each

bedroom and outside of bedroom groups and on each level of the structure.

4. Residential and commercial services de-energized for more than twelve (12) months shall be reinspected before service is supplied to the structure.

5. A rough-in inspection shall be required prior to the installation of any covering and/or any insulation on all new construction including additions to existing structures. Additions shall include heating system, dryer circuits, plug circuits, air conditioning circuits, etc.

6. When the initial structure wiring rough-in permit is applied for, the electrical contractor shall be specifically responsible for:

    a. Thermostat wire rough-in

    b. HVAC power wiring

    c. HVAC final connections

If the electrical contractor declines responsibility for a, b, or c, the HVAC contractor must take out appropriate permits.

Inspection Requests: Inspection will be made on request by customer or his/her electrician. To allow orderly dispatching of the inspector and CPWS crews, twenty-four (24) hour notice will be required to schedule an inspection, service disconnection, or service reconnection.

B. Minimum Standards for Electrical Work

All electrical work shall be done in accordance with, and shall conform to the standards, requirements, and provisions of the current adopted edition of the NEC, laws and regulations of the State of Tennessee, CPWS Electrical Service Practices and Requirements, and requirements as directed by Columbia Power and Water Systems' engineers.

All houses, buildings, structures, or customer service poles shall be wired in accordance with the NEC and any state or local regulations which may apply. Before CPWS will connect electric power service, all installations must pass the

appropriate safety inspection(s) conducted by the Tennessee State Deputy Electrical Inspector.

C. Definitions

Electrical Work: The term "electrical work" includes installing, erecting, altering, rebuilding, reworking, and repairing of wires, conduits, molding, ducts, raceways, sockets, motors, equipment, or other electrical devices, apparatus, or systems for the reception, transmission, or the use of electricity.

Qualified Electrician: The phrase "qualified electrician" means a person holding a valid Tennessee Electrical Registration Certificate. The Registration Certificate must be brought to CPWS offices to ensure permits are issued only to "qualified electricians."

D. Columbia Power and Water Systems Electrical Requirements

1. As a minimum, all electrical work shall comply with the current adopted edition of the NEC and the State of Tennessee Regulation 0780-2-1 as amended; and CPWS Electrical Service Practices and Requirements.

2. No wiring will be started until CPWS' Engineering Department has determined the location of all metering equipment and the service point of attachment, overhead or underground.

3. The weatherhead shall be installed so as to ensure a minimum attachment height of sixteen (16) feet clearance above final grade or as directed by the CPWS Engineering Department. See appendix, Page 21.

4. All meter pole installations requiring services over fifty (50) feet shall have a minimum three thousand (3,000) pound strength guy wire and anchor assembly installed in line with the service drop conductors. NOTE: See drawing MH-OHP, T-OH.

5. Rigid metal conduit, minimum size two (2) inches, will be required on service entrances that extend above roof. Conduit must extend at least thirty (30) inches above roof. Roof flange must be properly installed. NOTE: See drawing MB-1PR and MH-OHT.

6. Rigid metal conduit extending more than three (3) feet above roof shall be guyed and secured with minimum of one-fourth (1/4) inch fasteners to wall with stand-off type support using minimum of one-fourth (1/4) inch lag anchor, lag bolt, and/or toggle bolt. Further, rigid metal conduit extending more than three (3) feet above roof or wall shall be guyed and anchored with a minimum three thousand (3,000) pound guy wire and anchor assembly. NOTE: See drawing MB-1PR, MH-OHP, MB-1P-1, MB-320, MB-3P-Y, MB-3P-D, and MH-OHT.

7. A complete metal conduit raceway without LBs or other junction type boxes shall be installed from the weatherhead to the meter base. Where service entrances in conduit extend more than ten (10) feet above the meter base, the upper ten (10) feet shall be a continuous length of conduit. Metal conduit shall be installed from meter base to service entrance equipment. Underground service entrances require rigid metal conduit for all exposed conduits and shall be installed as directed by the CPWS Engineering Department. NOTE: See drawing MB-1PR, MB-1P-1, MB-320, MB-3P-Y, MB-3P-D, MH-OHT, T-OH, T-UG, UG-P1, UG-P2, UG-S1, UG-S2, and UG-D1.

8. It shall be the responsibility of the qualified electrician to install a means of attaching CPWS service wire to the building or structure. The service attachment shall be located six (6) inches below the top of the weatherhead and shall be secured to the framework of the building. The point of attachment on any structure shall be placed so as to maintain all clearances as required by the NEC, NESC and/or as directed by the CPWS Engineering Department. NOTE: See drawing MB-1PR, MH-OHP, and MH-OHT.

9. Service entrance conductors including the drip loop shall have a minimum clearance per NESC Rule 234 above the floor level of sundecks, balconies, etc. that are placed beneath the conductors. See appendix, Page 21.

10. An overhead service entrance drop to an above roof riser exceeding one hundred (100) feet in length shall be supported as described in #6 above. Other service drops of less than one hundred (100) feet may need to be anchored and/or braced and/or supported as determined by the CPWS Engineering Department. NOTE: See drawing MB-1PR and MH-OHT.

11. All meter base sockets, other than those furnished by CPWS, shall be approved by CPWS before installation. All meter bases shall contain built-in grounding

lugs and bypass capability. Meter bases shall not be field altered without prior approval of the CPWS Engineering Department or Technical Services Department.

12. On all new and replacement service installations, an approved corrosion inhibitor shall be properly applied to all electrical mechanical connections (copper or aluminum) in the customer's meter socket and the connections (copper or aluminum) at the terminals of the customer's service equipment. All conductors shall be properly cleaned before application of the corrosion inhibitor. The corrosion inhibitor shall be readily identifiable and not of a clear or transparent material.

13. The service disconnecting means shall be installed either inside or outside of a building or other structure at a readily accessible location nearest this point of entrance. No more than twenty-four (24) inches of service entrance conductors measured vertically or horizontally, or any combination of these dimensions from outside wall surface to metallic enclosure service entrance equipment shall be allowed.

14. The electric meter shall be placed between five feet and six feet above final grade on the outside of the structure at a location accessible to CPWS personnel, as specified by the CPWS' Engineering Department.

15. Meter bases shall not be located under an existing roofed area which will cause CPWS conductors to overhang that roof by a distance of four (4) feet or more. Further, electric meters shall not be installed under roofs, awnings or canopies, or have these placed over them without prior approval of the CPWS Engineering Department. A minimum clearance of 10 foot above grade shall be maintained above the meter for a 36 square foot (6' x 6') area in front of the meter. Electrical meters and other electrical switch gear shall not be located directly over gas meters, and/or other fixed objects. Should modifications be made to the structure supporting the customer's service entrance equipment that infringe upon proper clearances of any electrical lines, the point of attachment of the service entrance equipment shall be relocated at the customer's expense.

16. A driven ground rod shall be installed on all services. A grounding electrode conductor shall be run unbroken from the neutral lug in the meter base to the ground rod; then, unbroken-uncut, connected to any metallic water pipe and steel building structure. In cases of larger commercial/industrial entrances,

not utilizing self-contained meters, all bonding shall originate from service entrance equipment. The point where the conductor attaches to the metallic water pipe shall be readily accessible for inspection and not located in a remote area of crawl space or attic, typically within the first five feet of the water line entering the structure. Splices of ground/bond conductors should be avoided. Splicing of these conductors shall be accomplished with irreversible type connectors. NOTE: See drawing MB-1PR, MB-1P-1, MB-320, MB-3P-Y, MB-3P-D, MB-EG, MH-OHP, MH-OHT, T-OH and UG-S2.

With the adoption of the 2008 NEC, the State of Tennessee will enforce NEC Article 250.52(A3) (3), which addresses footer or foundation grounding. This article applies to foundations with steel reinforcing rebar in the concrete. The NEC allows three possible options to accomplish this requirement. All turn outs of the foundation should be in the proximity of the service entrance equipment.

1) *A 20 feet length of 4 AWG copper conductor (minimum) can be laid in the foundation and turned out of the foundation.*
2) *4 AWG copper conductor (minimum) can be bonded to a 20 feet continuous section of rebar and turned out the foundation. Bonding is to be accomplished with a mechanical, compression or welding type connector suitable for direct burial.*
3) *A 20 feet continuous section of rebar can be turned out the foundation. This is the preferred method to accomplish foundation grounding per the State of Tennessee.*

Foundation or footer grounding is in addition to the grounding and bonding stated in Item 16 above.

In addition to the foundation grounding the State of Tennessee is enforcing NEC 250.94 which has a requirement for an equipment grounding terminal bar to allow communication providers a location to properly establish a grounding bond to the electrical grounding system at new and rebuilt locations. CPWS' preferred method to install the equipment grounding terminal bar is to run the vertical grounding conductor thru one of the available spaces of the terminal bar and mount the terminal bar to the building exterior within six inches of the bottom of a self-contained meter base.

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19. Dedicated circuits, 120 V or 240 V, that are reserved for equipment such as, but not limited to, electric water heaters, heater plugs, and window-type air conditioner plugs, shall be wired in accordance to the current adopted NEC per the equipment's nameplate values. Circuits shall be mechanically protected where not connected to a dedicated outlet for appliance.

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22. Electric clothes dryers shall be wired in accordance to the current adopted NEC and by the appliances' nameplate rating. Receptacles for dryers shall have a minimum capacity of 30 amps.

23. All cooking equipment such as, but not limited to, electric ranges, cook tops and ovens, shall be wired in accordance to the current adopted NEC. Residential and commercial cooking equipment will follow their respective sections in the current adopted NEC. Drop-in cook tops and separate wall ovens shall be wired on individual circuits.

24. Swimming pools and the decks and platforms adjacent to pools, shall not be located under overhead wiring or over underground facilities. Further, these installations must meet NEC and NESC clearance requirement.

25. Customer service entrance equipment shall not be installed on CPWS distribution poles except with the prior permission of the CPWS Engineering Department.

26. No structures shall be located underneath CPWS' high voltage primary conductors.

27. In any residential application, only one means of disconnect up to and including 225 amp capacity shall be permitted. In any commercial application only, one means of disconnect up to and including 125 amp capacity shall be permitted. A weatherproof main breaker panel may be installed outside to serve (a) HVAC equipment (b) outbuildings (c) other equipment located outside the structure-supporting meter. See appendix, Page 21.

28. Switch protective equipment with easily exposed live parts shall not be located nearer than thirty-six (36) inches from floor or grade level. Disconnect switch with dead-front type switch may be set at level of the top of equipment being controlled. (i.e., outside central air conditioners or other power equipment)
NOTE: Disconnect switch shall not be located over equipment being disconnected.

29. Meter bases shall not be installed on mobile homes, mobile office trailers, or temporary offices unless the units are factory prepared for such installation. The use of temporary service sawpoles shall be limited to an extension cord for portable power tools and for temporary lighting during the construction of permanent structures only. Portable offices and construction offices shall be of permanent wiring. Wiring methods for underneath mobile homes and portable offices shall be of metal conduit and of weatherproof materials. PVC conduit, unless buried, shall not be permitted under mobile home chassis between the meter base and service panel inside mobile home. No unprotected Schedule 40 or 80 PVC conduit will be permitted above earth outside. Temporary wire shall be removed upon completion of the structure.
NOTE: See drawing MH-OHP, MH-OHT, T-OH, T-UG, UG-S2 and UG-D1.

30. In any structure and/or single and/or multi-family dwelling units, branch circuit panels and branch circuit overcurrent protection shall be located inside each unit and shall be readily accessible to the occupants of that unit. Overcurrent protection including fuses and breakers shall not be permitted inside clothes closet room or bathroom of any structure. In addition, any circuit panel installed shall be thirty-six (36) inches from floor to the bottom edge of the enclosure unless physical size of panel prohibits. Areas accessible only through outside bomb-bay doors or vertical ladders may not be considered readily accessible.

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32. Transformers for door-bells, intercom systems, or similar equipment shall not be installed in attics or other areas of poor ventilation. Minimum wire size shall be No. 18 copper conductor.

33. Thermostat wire shall be minimum No. 18 copper conductor and shall be mechanically protected with weatherproof equipment when used outside.

34. All conduit, meter bases, switches, disconnects, panels and boards shall be secured with a fastener, using a minimum one-fourth (1/4) inch diameter shank, cadmium plated. If conduit does not lie flat against surface, metal support must be provided (strut, thru-bolt, etc.). If the structural capabilities of the exterior wall surface is in doubt, (vinyl, aluminum, masonite siding, etc.) – the entire service entrance must be backed with a minimum one-half (1/2)

inch, exterior plywood or metal structural components spanning two (2) studs. See appendix, Page 22.

35. Only rigid metal conduit shall be installed on CPWS distribution poles. Customer service entrance equipment shall not be installed on CPWS poles except with the prior permission of CPWS. Underground service entrance shall be installed as directed by the CPWS Engineering Department. NOTE: See drawing UG-P1, UG-PS and UG-S1.

36. On all pole services, except temporary services, the weatherhead shall extend to the top of the pole. There shall not be any foreign apparatus mounted on the pole except CPWS lines, telephone lines, cable TV lines, or lines to other structures. The point of attachment shall be six (6) inches below the weatherhead. NOTE: See drawing MH-OHP.

37. Wire color coding, when identifying neutral, ground, high-leg delta, and any parallel service entrance conductors, shall be continuous from bushing to lugs of service entrance equipment and from weatherhead to end of wire. High-leg delta shall be marked orange and neutral shall be marked white. Parallel phase conductors shall be clearly and permanently color coded with tape. NOTE: See drawing MB-1P-1, MB-320, MB-3P-Y, MB-3P-D.

Standard CPWS color coding of service conductors in meter bases, service entrance equipment, electrical panels, etc. are indicated in this table:

Phase	***Wire***	***Voltage***	***Left***	***Middle***	***Right***	***Neutral***
1	*3*	*120/240*	*Black*		*Blue*	*White*
3	*4*	*120/208*	*Black*	*Red*	*Blue*	*White*
3	*4*	*277/480*	*Black*	*Brown*	*Yellow*	*White*
3	*4*	*120/240 delta*	*Black*	*Blue*	*Orange**	*White*

**on a 120/240 volt, delta, 3 phase, 4 wire service, the Orange conductor is to be installed on the right side in meter base and in the center phase /middle lug position of the service entrance equipment. This phase conductor is to be marked orange throughout the installation. Phase to ground voltage of this conductor is 208 volts.*

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44. Due to a possible safety hazard, enclosed circuit breakers applied indoors and outdoors, shall have the main or line conductors connected to the top of the breaker – unless manufacturer's diagram affixed to the enclosure at factory indicates otherwise.

45. Service release/entrance inspections only will be allowed on new residential services in accordance with the current edition of TCA Section 0780-2-1-.11 (3), provided builder/owner pays a deposit to guarantee that no one will occupy residence until after final inspection approval. Only circuits clearly designated will be energized and service release/entrance only inspection shall be valid for a period of forty-five (45) days only. If residence is occupied prior to final inspection, deposit will be forfeited.

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47. Working space for electrical distribution panels shall be illuminated and have a minimum six feet six inches (6'6") of head clearance. 3 feet x 3 feet area in front of panel shall be kept clear. See appendix, Page 22.

E. Minimum Requirements for Entrance Conductors and Conduit Sizes

*Minimum Conductor Size (Min. 75 C)
Refer to NEC Table 310-16
Underground conductors shall be 600 MCM or smaller on applications for connecting to CPWS owned equipment.

1. RESIDENTIAL

	*MINIMUM CONDUCTOR SIZE	
	COPPER	ALUMINUM
100 Amp. Entrance	#2	#1
110 Amp. Entrance	#2	#1/0
125 Amp. Entrance	#1	#2/0
150 Amp. Entrance	#1/0	#3/0
175 Amp. Entrance	#2/0	#4/0
200 Amp. Entrance	#3/0	250 KCMIL
225 Amp. Entrance	#4/0	300 KCMIL
250 Amp. Entrance	250 KCMIL	350 KCMIL
300 Amp. Entrance	350 KCMIL	500 KCMIL
350 Amp. Entrance	500 KCMIL	
400 Amp. Entrance	500 KCMIL	

2. RESIDENTIAL GROUNDED NEUTRAL SIZES

	*MINIMUM CONDUCTOR SIZE	
	COPPER	ALUMINUM
100 Amp. Entrance	#4	#2
110 Amp. Entrance	#4	#2
125 Amp. Entrance	#3	#1
150 Amp. Entrance	#2	#1/0
175 Amp. Entrance	#1	#2/0
200 Amp. Entrance	#2/0	#4/0
225 Amp. Entrance	#3/0	250 KCMIL
250 Amp. Entrance	#4/0	300 KCMIL
300 Amp. Entrance	300 KCMIL	400 KCMIL
350 Amp. Entrance	350 KCMIL	500 KCMIL
400 Amp. Entrance	350 KCMIL	500 KCMIL

3. COMMERCIAL-SINGLE & POLYPHASE

	*MINIMUM CONDUCTOR SIZE	
	COPPER	ALUMINUM
60 Amp. Entrance	#6	#2
100 Amp. Entrance	#2	#1
110 Amp. Entrance	#2	#1/0
125 Amp. Entrance	#1	#2/0
150 Amp. Entrance	#1/0	#3/0
200 Amp. Entrance	#3/0	250 KCMIL
225 Amp. Entrance	#4/0	300 KCMIL
250 Amp. Entrance	250 KCMIL	350 KCMIL
300 Amp. Entrance	350 KCMIL	500 KCMIL
350 Amp. Entrance	500 KCMIL	
400 Amp. Entrance	500 KCMIL	
	Paralleled	Paralleled
500 Amp. Entrance	250 KCMIL	350 KCMIL
600 Amp. Entrance	350 KCMIL	500 KCMIL
800 Amp. Entrance	500 KCMIL	

4. COMMERCIAL GROUNDED NEUTRAL CONDUCTORS

	*MINIMUM CONDUCTOR SIZE	
	COPPER	ALUMINUM
60 Amp. Entrance	#6	#2
100 Amp. Entrance	#4	#2
110 Amp. Entrance	#4	#2
125 Amp. Entrance	#3	#1
150 Amp. Entrance	#2	#1/0
200 Amp. Entrance	#2/0	#4/0
225 Amp. Entrance	#3/0	250 KCMIL
250 Amp. Entrance	#4/0	300 KCMIL
300 Amp. Entrance	300 KCMIL	400 KCMIL
350 Amp. Entrance	350 KCMIL	
400 Amp. Entrance	350 KCMIL	
	Paralleled	Paralleled
500 Amp. Entrance	#4/0	300 KCMIL
600 Amp. Entrance	300 KCMIL	400 KCMIL
800 Amp. Entrance	350 KCMIL	

5. MINIMUM CONDUIT SIZE-SINGLE PHASE

	MINIMUM CONDUIT SIZE - THWN	
	COPPER	ALUMINUM
60 Amp. Entrance	1 inch	1 inch
100 Amp. Entrance	1 ¼ inch	1 ¼ inch
200 Amp. Entrance	2 inch	2 ½ inch
400 Amp. Entrance	3 inch	3 ½ inch
800 Amp. Entrance	2-3 ½ inch	2-4 inch

6. MINIMUM CONDUIT SIZE-POLYPHASE

	MINIMUM CONDUIT SIZE - THWN	
	COPPER	ALUMINUM
60 Amp. Entrance	1 inch	1 ¼ inch
100 Amp. Entrance	1 ¼ inch	2 inch
200 Amp. Entrance	2 inch	2 ½ inch
400 Amp. Entrance	3 inch	4 inch
800 Amp. Entrance	2-3 ½ inch	2-4 inch

7. GROUNDING ELECTRODE MINIMUM CONDUCTOR SIZE FOR SERVICES USING CURRENT TRANSFORMER

Service Entrance Conductor	**Service Size**	**Service Equipment To Metal Water Pipe, Metal Building Structure & Foundation**	**Service Equipment To Driven Ground Electrode**
Copper	**Amps**	**Copper**	**Copper**
12 to 3/0	100-200	#4	#4
3/0 to 350 MCM	225-300	#2	#4
350 to 600 MCM	325-400	#1/0	#4
600 to 1100 MCM	450-600	#2/0	#4
Over 1100 MCM	Over 600	#3/0	#4

Note: When current transformer meter base is mounted on building a No. 4 grounding conductor shall also be connected between the driven CT meter base and the driven ground rod. Reference paragraph D.16 for grounding and bonding requirements.

F. CPWS Power Line Relocations and Extensions. Rules and Regulations M.7, M. 24

The following policy is designed and the Board of Public Utilities adopted to allow Columbia Power & Water Systems (CPWS) to serve the electric power needs in its service area, while helping to maintain the system in a sound financial position.

Existing customers should be protected from the costs of providing service to new customers. Toward that end, each relocation or extension must be evaluated to ensure it will repay the system's investment during the life of the facilities. If not, the system will require the party desiring the relocation or extension to pay part or all the costs involved.

Such payments may be in the form of a facilities repayment contract paid in equal monthly installments. This contract may extend over a period of sixty (60) months, provided that the monthly payment is not less than twenty-five ($25) dollars. CPWS may recover its costs through a cash contribution in aid of construction. The following sections of this policy describe the circumstances under which these charges would be imposed.

Relocations of Systems Facilities:

Relocations will be made at the expense of the customer if such relocation is at his/her request and is not necessary or beneficial to CPWS operations. CPWS may from time to time relocate its own facilities at its own expense when such relocation is deemed necessary for improving the efficiency or flexibility of operations. In such situations, existing customers will be saved whole as to existing level of service provided.

Overhead Extensions to Individual Permanently Constructed Residences:

CPWS will extend its lines up to 750 feet (3-250 feet spans, typically) with no facilities repayment contract and with no required contribution in aid of construction. Extensions between 750 feet and 1,500 feet will require a facilities repayment contract based on the cost of the line over 750 feet but less than 1,500 feet. Prior to making an extension longer than 1,500 feet, CPWS will require a facilities repayment contract as above and a contribution in aid of construction to immediately recover the additional cost of extending the line more than 1,500 feet.

Overhead Extensions to Individual Residential Mobile Homes:
CPWS will extend its lines up to 250 feet (1 span) with no facilities repayment contract and with no required contribution in aid of construction. Extensions between 250 feet and 750 feet will require a facilities repayment contract based on the cost of the line over 250 feet but less than 750 feet. Prior to making an extension longer than 750 feet, CPWS will require a facilities repayment contract as above and a contribution in aid of construction to immediately recover the additional cost of extending the line more than 750 feet.

Extensions for Miscellaneous Small Services (barns, pumps, billboards, etc.):
CPWS will not extend its lines for these small loads without a facilities repayment contract or a contribution in aid of construction. Extensions up to 500 feet will require a facilities repayment contract based on the cost of the line up to 500 feet. Prior to making an extension longer than 500 feet, CPWS will require a facilities repayment contract as above and a contribution in aid of construction to immediately recover the additional cost of extending the line more than 500 feet.

Extensions to Temporary or Seasonal Installations:
CPWS will require firm payment arrangements be made to cover all costs of installations and removal, less estimated salvage value, as a contribution in aid of construction prior to performing the work.

Extensions to Commercial and Industrial Customers:
CPWS will build necessary facilities according to individual contracts based on load, type of service required, necessary equipment, and expected revenue. CPWS may require a facilities repayment contract and a contribution in aid of construction, depending upon the factors noted above.

Requests for three phase service will be evaluated according to the same factors to determine whether repayment of costs will be required.

Extensions to Subdivisions, Multi-Family Developments or Mobile Home Parks:
CPWS investments in labor, overhead, materials, equipment, or other facilities to serve new residential developments must be amortized within a period of ten (10) years based upon expected revenue, wholesale power cost, and operating expenses as calculated by the CPWS Engineering Department.

The developer (customer) will be required to make a cash contribution in aid of construction to offset any CPWS investment, which will not be amortized through electric revenues as outlined above.

Procedures

1. CPWS will measure all distances along the route established by its Engineering Department as the best, most practical means of providing the requested service. For purposes of this policy, distance will not include the length of service conductors.

2. The customer requesting service will be responsible for obtaining all necessary easements at no cost to CPWS, and for clearing trees from the right-of-way as directed by CPWS' Engineering Department.

3. Any required contracts must be signed by the customer, the property owner, and by the system's Executive Director or his representative. All signing parties will receive an executed copy of the contract. Contracts should include a lien on the property to be served or other security (performance bond, escrow account, etc.), sufficient to guarantee recovery of CPWS' costs.

4. Cost figures used in facilities repayment contracts or contributions in aid of construction shall include direct labor, standard overhead costs, and the cost of materials less any estimated salvage value. Standard costs may be used in these calculations provided that these standard costs are periodically reviewed for accuracy. For residential installations, the total installed cost of a properly sized transformer, related equipment, and one service drop will not be included in the above cost figures.

5. Should a customer discontinue service during the term of a facilities repayment contract, the outstanding amount of the contract becomes due and payable. This requirement may be waived if another customer signs a contract guaranteeing continued payment for the remainder of the original contract term.

6. Whenever contribution in aid of construction is required, firm, final payment arrangements must be made before construction work is started.

7. To avoid potential direct confrontations with a customer's future plans, CPWS must require facilities repayment contracts or contributions in aid of construction based upon the original use of line extensions. However, when a line extension originally serving a mobile home, miscellaneous small service, or a seasonal load is later used to provide service for a permanent residence at that location – the customer may receive a refund of that part of a contribution in aid of construction made for extensions under 1,500 feet. An existing facilities repayment contract will not be affected by such a change in facilities use.

8. Any extra expense due to a customer's request for a special installation or equipment (underground service, extra service pole, etc.) shall be paid in advance as a contribution in aid of construction.

9. No payments made by a customer to CPWS as facilities charges, service fees, or contributions in aid of construction shall entitle that customer to ownership rights, rights of exclusive use, rights to restrict access by CPWS' employees in the performance of their duties, the right to alter the facilities, or the right to hinder CPWS from serving other customers via those facilities.

10. All houses, buildings, structures, or customer service poles shall be wired in accordance with the National Electrical Code and any state or local regulations which may apply. Before CPWS will connect electric power service, all installations must pass the appropriate electrical/safety inspection(s) conducted by the Tennessee State Deputy Electrical Inspector.

G. Appendix:

CPWS Electrical Service Practices and Requirements, Section D. Columbia Power and Water Systems Electrical Requirements: Item 3.

Previously required: The weatherhead shall be installed so as to ensure a minimum of twelve (12) feet, six (6) inches clearance above final grade.

CPWS conductors are required to meet NESC Rule 232. NESC Rule 232 addresses Vertical Clearance of Wires, Conductors, Cables and Equipment above Ground, Roadways, Rail and Water Surfaces. Table 232-1, shows for supply cables meeting NESC Rule 230C3 (duplex, triplex and quadruplex conductors) a minimum clearance of sixteen (16) feet must be maintained. This clearance is for crossing roads, streets, driveways, parking lots, alleyways and other areas that can be traversed by vehicles. NESC Table 232-1 note 9 defines a space or way – subject to pedestrian or restricted traffic only as an area where riders on horseback or other large animals, vehicles or other mobile units that exceed a total height of eight (8) feet are prohibited by regulation or permanent terrain configurations, or are otherwise not normally encountered nor reasonably anticipated. Also, the clearances stated in NESC are to be expected under worst case conditions (i.e., not initial sag of the service conductor). ***New service entrance installations shall be required to meet this code clearance requirement of sixteen (16) feet.*** *Rebuilt / reworked service entrance installations may also need to be brought up to this level. This will depend on the situation and may require a decision based on a review of the NESC allowable exceptions. Customer-owned conductors are required to meet NEC clearance requirements.*

CPWS Electrical Service Practices and Requirements, Section D. Columbia Power and Water Systems Electrical Requirements: Item 9.

Previously required: Service entrance conductors shall have a minimum clearance of ten (10) feet above the floor level of sundeck, balconies, etc. that are placed beneath the conductors.

NESC Rule 234 addresses Clearance of Wires, Conductors, Cables and Equipment from Buildings, Bridges, Railcars, Swimming Pools and Other Installations. Table 234-1, shows for supply cables meeting NESC Rule 230C3 (duplex, triplex and quadruplex conductors) a minimum vertical clearance of eleven (11) feet is required. This clearance is for conductors that are crossing over or under balconies and/or roofs readily accessible to pedestrians. A sundeck is normally accessible to pedestrians or occupants by either a doorway or stairway. Also in determining the necessary clearances, built-in seating, furniture and deck railings should be considered. In order to maintain public safety CPWS shall require this eleven (11) feet clearance.

CPWS Electrical Service Practices and Requirements, Section D. Columbia Power and Water Systems Electrical Requirements: Item 27.

To clarify the meaning of Item 27: On residential services of 225 amps or less, there is to be only one means of main disconnect. On residential service larger than 225 amps, the NEC article 230.71 or the "six disconnect rule" can be applied. Similarly on commercial service of 125 amps or less, there is to be only one means of main disconnect. For commercial service larger than 125 amps, the NEC article 230.71 or the "six disconnect rule" can be applied.

CPWS Electrical Service Practices and Requirements, Section D. Columbia Power and Water Systems Electrical Requirements: Item 34.

This item refers to support materials for the secure installation of service entrance equipment. It mentions a ***minerallac strap*** *being an allowable type of support for a conduit. This type strap is not capable of withstanding the applied forces and exposure for the possible life of the installation and therefore will not be accepted on permanent service entrance installations.*

CPWS Electrical Service Practices and Requirements, Section D. Columbia Power and Water Systems Electrical Requirements: Item 47.

Previously required: Working space for electrical distribution panels shall be illuminated and have a minimum six (6) feet three (3) inches of head clearance. *2002 NEC Article 110.26.E gives a headroom clearance of six (6) feet six (6) inches. Headroom clearance is the floor to ceiling measurement. Illumination of the distribution panel may be a keyless type with a bulb but must be activated by a wall switch.*

This addresses the use of Schedule 40 PVC conduit in the ground and above ground. As stated "no unprotected Schedule 40 PVC conduit will be permitted above earth outside." CPWS requires exposed conduits to be rigid steel conduit. This includes pole risers and risers below URD meter bases. For secondary/service raceways, the sweeps are to be schedule 80 PVC or rigid steel while the in-ditch conduit raceway may be schedule 40 PVC. Primary voltage raceways require rigid steel conduit sweeps.

Effective February 1, 2004, the enforcement of the "tie down" inspection was removed from the Tennessee State Deputy Electrical Inspector and turned over to the State Manufactured Housing Inspector. An installation permit decal must be purchased by the manufactured home installer from the Maury County Clerk and affixed inside the electrical panel box cover. The Deputy Electrical Inspector cannot approve the installation nor can CPWS supply power to the installation until this decal is placed on the panel box. This is per Tennessee Code Annotated § 68-126-406. This applies to residential manufactured housing only. Not applicable on commercial/construction units.

CPWS Electrical Service Practices and Requirements, Section D. Columbia Power and Water Systems Electrical Requirements: Item 7, 16 and 34.

The State of Tennessee allows a governing body to have more stringent requirements than adopted by Tennessee Code, but that governing body cannot allow less stringent requirements. CPWS views a service entrance (residential or commercial), much like a pole installation or a substation with a life of 30 to 40 years. Because of the life of the service installations and to provide safe, proper and adequate service to the customers we serve, CPWS enforces those requirements.

CPWS does require rigid metal conduit for overhead risers where there is a service attachment on the riser. Where the service attachment is an eyebolt, screwknob, etc. and our service entrance conductor is not pulling on the riser, we do allow thin wall metal conduit.

We require all exposed conduit on a primary or secondary underground installation to be rigid steel. This would include the riser on a pole and at the meter base. Further, the rigid conduit on an underground meter base shall be a single piece from the PVC female coupling to the meterbase. This is to ensure proper bonding for the safety of the customers and their belongings. On primary installations we also require the sweeps to be rigid, but we do allow the short radius sweeps. On

secondary or services we will allow Schedule 80 PVC sweeps. The in-ditch raceway can be Schedule 40 PVC.

Proper grounding and bond of equipment of the electrical entrance to ground is to allow the minimum distance to earth ground should an electrical fault occur. This, in essence, results in a safer electrical entrance for the customer and their property. Grounding conductors are required to be of sufficient length to connect to the ground electrode. Therefore, Item 16 references this conductor to be unbroken. Improper connections of this conductor adds resistance to the conductor resulting in a less effective grounding system. Similarly, bonding conductors should also avoid splices. If splices are required, they shall be made with an irreversible connection, either compression or cad weld type. These connections require the conductor to be cleaned properly and the connector becomes a part of the conductor.

The NEC does not address the attachment hardware required to install electrical equipment. From a structural standpoint, for the longevity of the service entrance, CPWS requires mounting hardware to be a minimum of ¼" shank.

The ultimate goal of these requirements are for the protection and safety of our customers.

<u>CPWS Electrical Service Practices and Requirements, Section D. Columbia Power and Water Systems Electrical Requirements: Item 12, 17, 18, 19, 22 and 23.</u>

The State of Tennessee has determined that CPWS is not allowed to restrict the use of conductor type. The numbered paragraphs below are removed from our requirements yet memorialized in this section. The descriptive language below these paragraphs were/are or reasoning for having these paragraphs. While phrased for understand by trades groups, the intent was to size conductors based on acceptable amperage and electrical equipment readily found in and around Columbia.

17. Minimum wiring conductor size for all wiring shall be No. 12 CU except that No. 14 CU will be permitted on switch legs controlling lighting fixtures up to 200 watts maximum and on remote circuits. This wattage rating shall be based on fixture installed – not illumination type.

18. Aluminum conductors of No. 4 or smaller shall not be installed.

19. Dedicated circuits, 120 V or 240 V, that are reserved for equipment such as, but not limited to, electric water heaters, heater plugs, and window-type air conditioner plugs, shall be wired ~~*utilizing copper conductor and*~~ in accordance to the current adopted NEC per the equipment's nameplate values. Circuits shall be mechanically protected where not connected to a dedicated outlet for appliance.

22. Electric clothes dryers shall be wired in accordance to the current adopted NEC and by the appliances' nameplate rating. Receptacles for dryers shall have a minimum capacity of 30 amps. ~~*All conductors shall be copper conductor.*~~

~~23.~~ All cooking equipment such as, but not limited to, electric ranges, cook tops and ovens, shall be wired in accordance to the current adopted NEC. Residential and commercial cooking equipment will follow their respective sections in the current adopted NEC. Drop-in cook tops and separate wall ovens shall be wired on individual circuits. ~~*All conductors for cooking appliances shall be copper conductor.*~~

The State of Tennessee allows a governing body to have more stringent requirements than adopted by Tennessee Code, but that governing body cannot allow less stringent requirements. These paragraphs speak to requiring copper conductors on appliance circuits and conductor type and size of standard house wiring. These requirements date back to the days when many structural fires were deemed to be electrical in origin. During that time, under sized copper conductors and aluminum conductors were installed in these structures. It was determined by the City of Columbia and CPWS, in an effort to protect the citizens and customers, adequate conductor size and type should be established. CPWS feels this has improved the integrity and safety of the customer's individual electrical installations. Inhibitor is a product that is used to prevent oxidation of conductors. This product further assists in maintaining the integrity of the made connection. While typically used on aluminum conductors due to those conductors reaction to heating, CPWS requires this product to be utilized for copper or aluminum conductors in meter bases and service entrance equipment.

It has been determined that aluminum conductors larger than #4 AWG are not as prone to issues caused by heating and cooling of those conductors due to loading. This heating and cooling can cause deterioration of connections involving smaller conductors, resulting in hazardous situations for the structures and customers using them.

CPWS Electrical Service Practices and Requirements, Section D. Columbia Power and Water Systems Electrical Requirements: Item 13 and 15.

The State of Tennessee allows a governing body to have more stringent requirements than adopted by Tennessee Code, but that governing body cannot allow less stringent requirements. The NEC does not provide a maximum or minimum safe distance for un-fused conductors to enter a structure. CPWS requires that no more than 24 inches or 2 feet of un-fused conductor be used to supply electricity to a structure. This measurement is from the point the conductor penetrates the exterior of the structure until it enters the metal "can" of the service entrance equipment. This will typically allow the conductor to go from the exterior mounted meter base through the wall into a service panel mounted inside the structure behind the meter base. Should the distance be any further, an outside disconnect is required. This again is to protect the customers we serve from damage that may occur to the un-fused service entrance conductor. By this conductor being un-fused, should a fault occur – the only protection for the customer and the property is our transformer fuse. Typically, faults of this nature would ignite a fire that would damage the property.

CPWS must be able to maintain access to our meters at all locations. Previously, we have had customers build over the meter installation after a meter was originally installed. This can jeopardize safety clearance requirements if our service is overhead. Typically underground service conductors are owned by CPWS. Should the service be underground, we must maintain adequate clearance over the meterbase to replace the underground conductor when it fails.

CPWS Electrical Service Practices and Requirements, Section D. Columbia Power and Water Systems Electrical Requirements: Item 45.

The State of Tennessee allows a structure to have a service release inspection allowing the structure to receive electricity for a period of 45 days without additional inspections. The structure is not to be used as a dwelling or operation of a business while electricity is supplied on a service release. CPWS established a $400 fee on residential installation in an effort to prevent the customer from moving in on a sole service release inspection. Once the dwelling has received an approved final inspection and they have not moved in prior to the final inspection, the $400 fee is refunded.

H. References:

National Electrical Code NFPA 70
Published by the National Fire Protection Association

State of Tennessee
Department of Insurance
Division of Fire Protection
Third Floor Electrical Section
500 James Robertson Parkway
Nashville, TN 37219-9956
Section 0780-2-1 for Electrical Installations

CPWS
Columbia Power & Water Systems

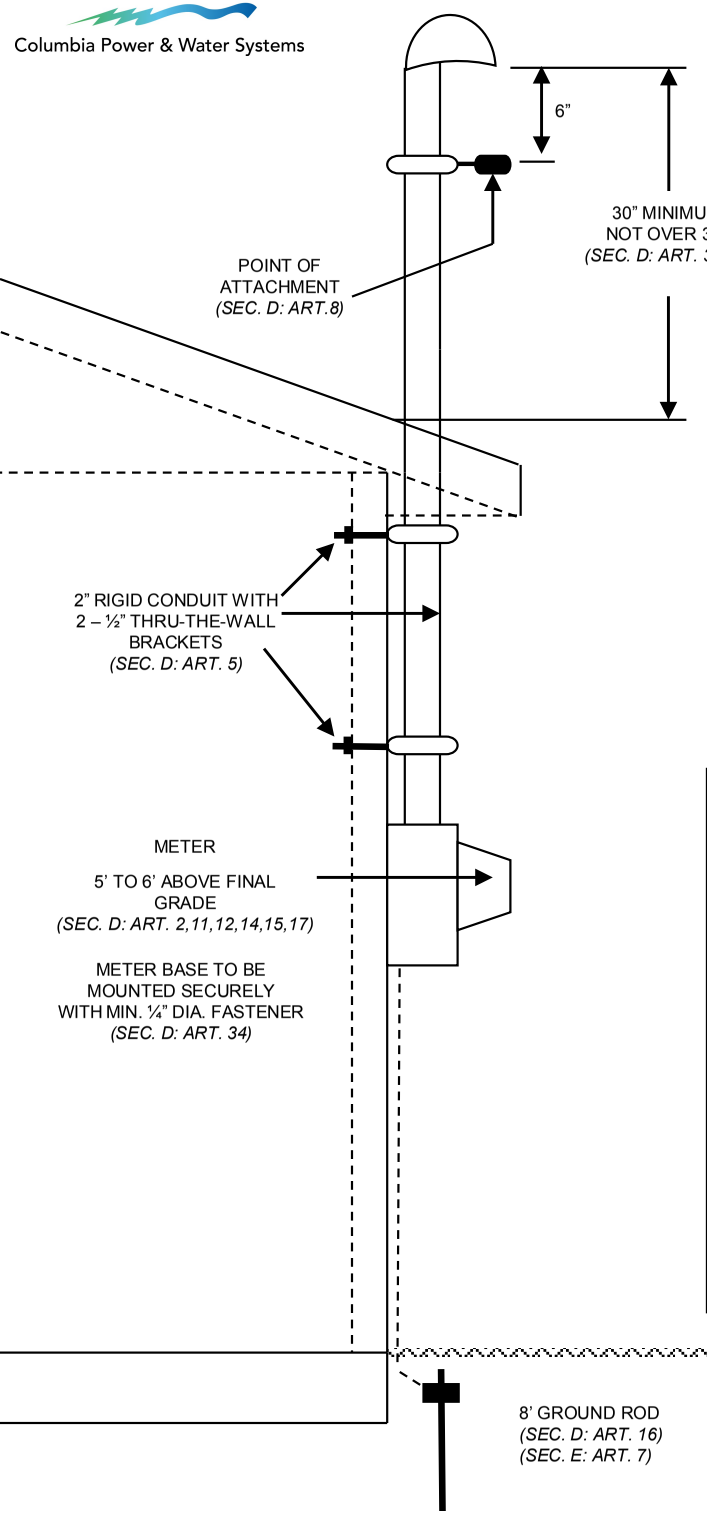
TABLE OF CONTENTS

CPWS
Columbia Power & Water Systems

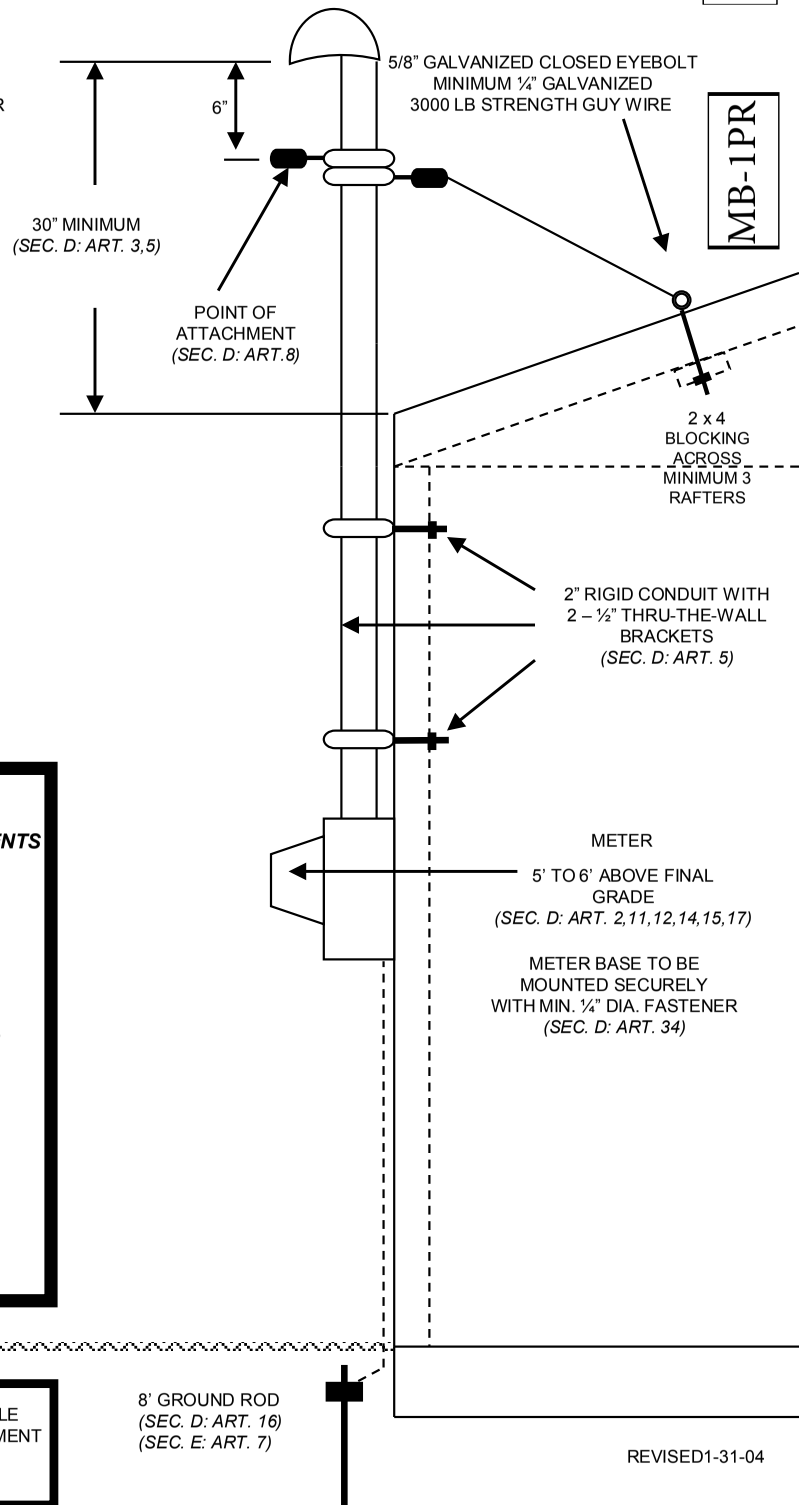
OVERHEAD SERVICE SPECIFICATIONS FOR ABOVE ROOF ATTACHMENT

MB-1PR

WITH EAVE



WITHOUT EAVE



NOTE
-METER LOCATION TO BE DETERMINED BY CPWS ENGINEER *(SEC.D : ART. 2)*
-CONDUCTORS SHALL EXTEND A MIN. OF 24" OUT OF WEATHERHEAD OR LONGER IF REQUIRED TO REACH CPWS SERVICE CONDUCTORS *(SEC. D: ART . 37)*

GUYING REQUIREMENTS
IF OVER 100' FROM
CPWS POLE, ABOVE 36",
OR NO EAVE**
(SEC. D: ART. 6, 10)

GUY WIRE
MINIMUM ¼" GALVANIZED
3000 LB STRENGTH – ASTM A475A
5/8" GALVANIZED CLOSED EYEBOLT AS
ANCHOR POINT *(SEC. D: ART. 4)*

GUY TO BE IN LINE
WITH SERVICE DROP

***** CPWS ENGINEERING MAY MODIFY GUYING REQUIREMENTS AS NEEDED SUCH AS, BUT NOT LIMITED TO USING LARGER SIZE CONDUIT IN CERTAIN CASES.***

IMPORTANT INFORMATION

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3. INSTALLATION MUST MEET LATEST APPROVED EDITION OF NATIONAL ELECTRIC CODE, NATIONAL ELECTRIC SAFETY CODE, AND CPWS ELECTRICAL SERVICE PRACTICES AND REQUIREMENTS.
CPWS ENGINEERING MAY MODIFY DRAWING AS DEEMED NECESSARY TO MEET ABOVE MENTIONED CODES & TO SAFELY AND EFFICENTLY SERVE ITS CUSTOMERS!

*** ON REPLACEMENT OF EXISTING SERVICES, RIGID 1 OR 2 HOLE STRAPS AND UNI-STRUT WILL BE ACCEPTED AS CONDUIT ATTACHMENT DEVICES *(SEC. D: ART. 34)*

REVISED1-31-04

CPWS
Columbia Power & Water Systems

SINGLE PHASE METERBASE
ISSUED FOR SINGLE PHASE-120/240V OR 120/208V SERVICE

MB-1P-1

SINGLE PHASE SERVICE
120/240V

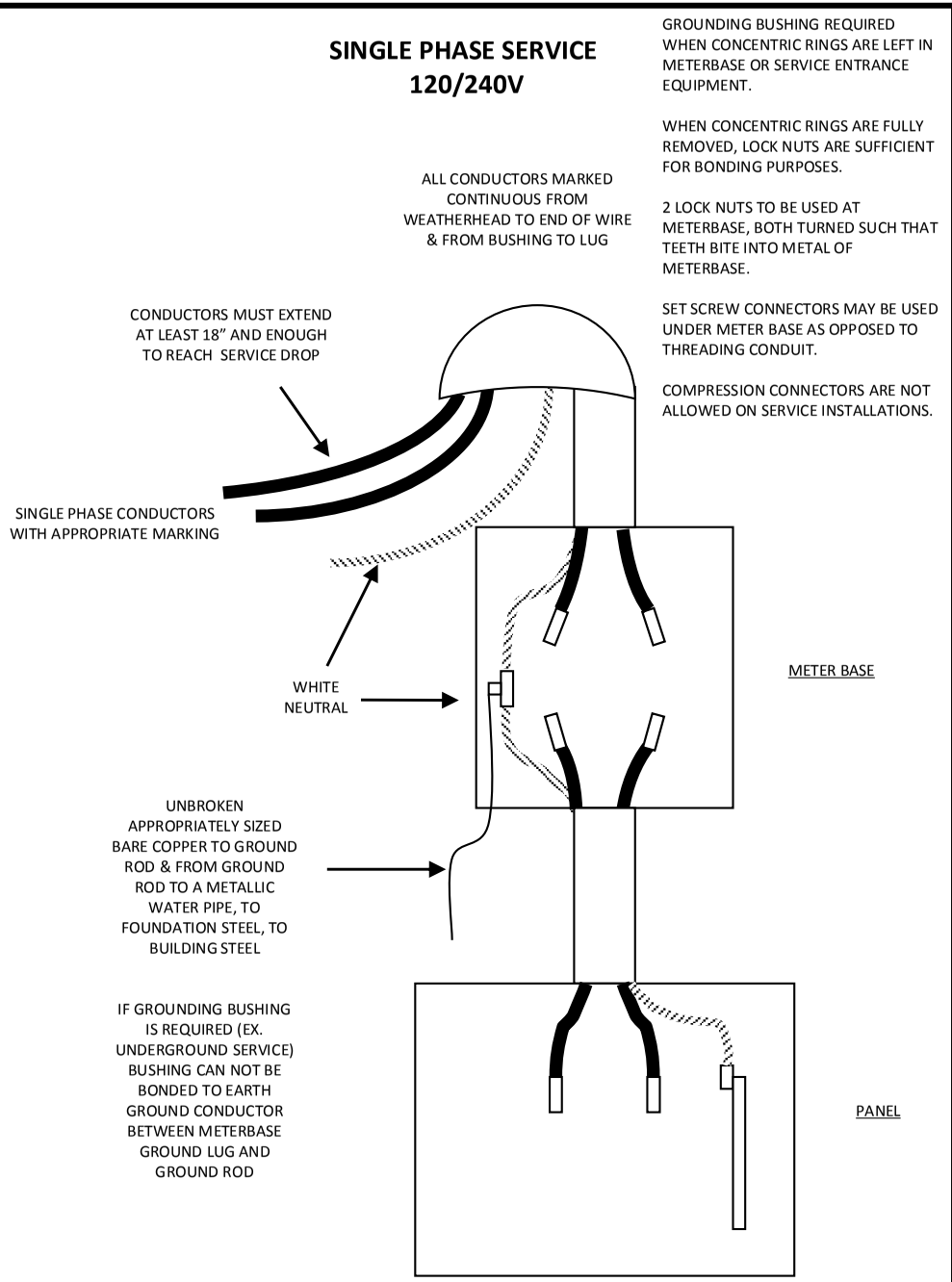
GROUNDING BUSHING REQUIRED WHEN CONCENTRIC RINGS ARE LEFT IN METERBASE OR SERVICE ENTRANCE EQUIPMENT.

WHEN CONCENTRIC RINGS ARE FULLY REMOVED, LOCK NUTS ARE SUFFICIENT FOR BONDING PURPOSES.

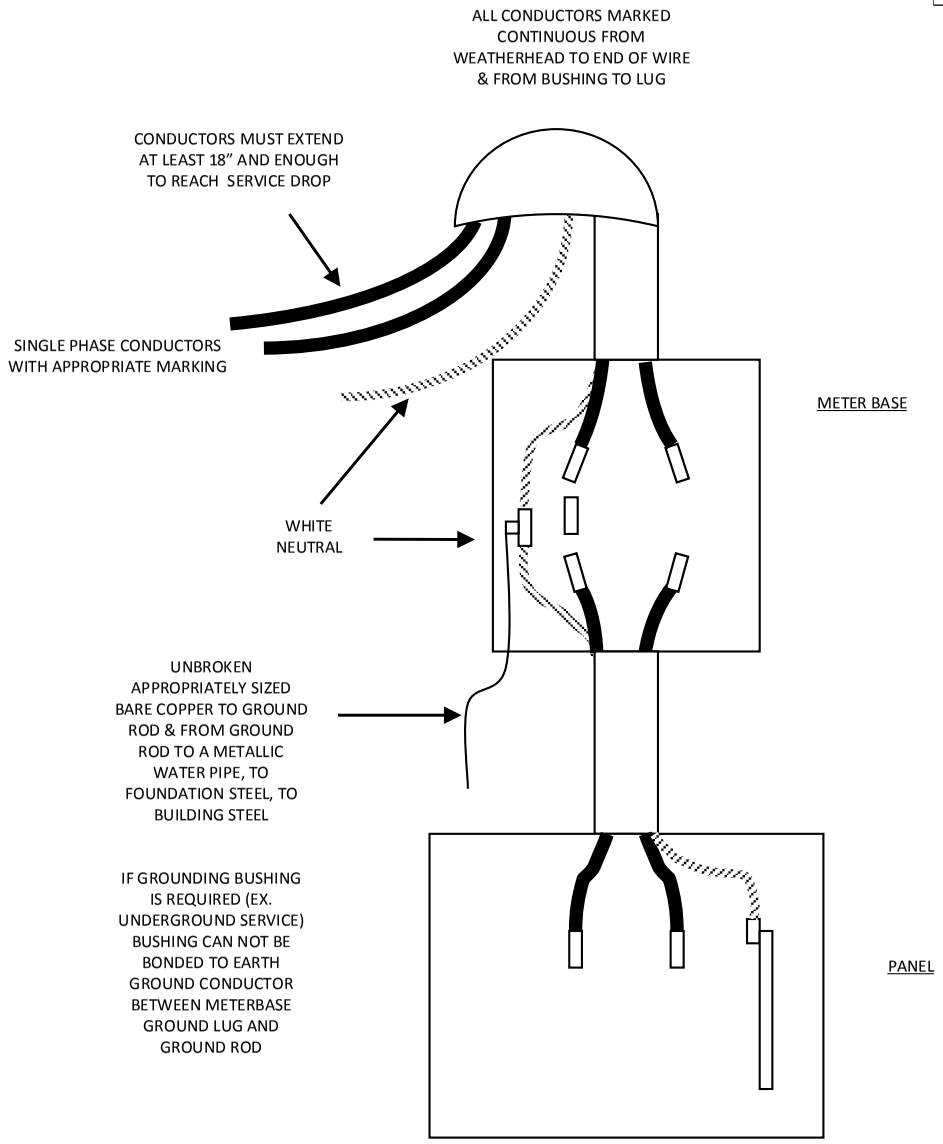
2 LOCK NUTS TO BE USED AT METERBASE, BOTH TURNED SUCH THAT TEETH BITE INTO METAL OF METERBASE.

SET SCREW CONNECTORS MAY BE USED UNDER METER BASE AS OPPOSED TO THREADING CONDUIT.

COMPRESSION CONNECTORS ARE NOT ALLOWED ON SERVICE INSTALLATIONS.



SINGLE PHASE SERVICE
120/208V



CPWS
Columbia Power & Water Systems

320 AMP METERBASE

ISSUED FOR 400 AMP SINGLE PHASE-120/240V OR THREE PHASE-120/208-240V SERVICE

MB-320

SINGLE PHASE 400A SERVICE 120/240V

GROUNDING BUSHING REQUIRED WHEN CONCENTRIC RINGS ARE LEFT IN METERBASE OR SERVICE ENTRANCE EQUIPMENT.

WHEN CONCENTRIC RINGS ARE FULLY REMOVED, LOCK NUTS ARE SUFFICIENT FOR BONDING PURPOSES.

2 LOCK NUTS TO BE USED AT METERBASE, BOTH TURNED SUCH THAT TEETH BITE INTO METAL OF METERBASE.

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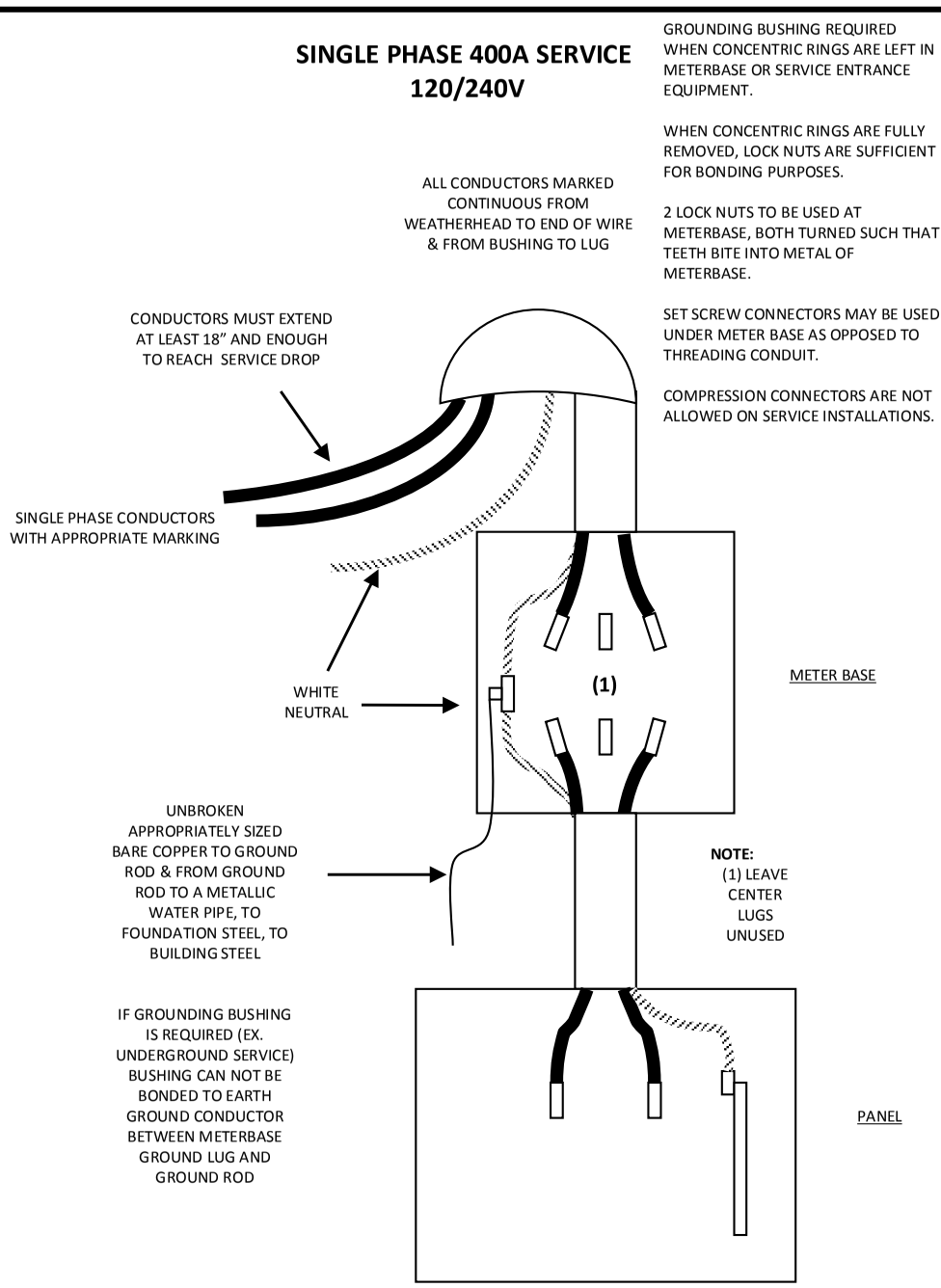
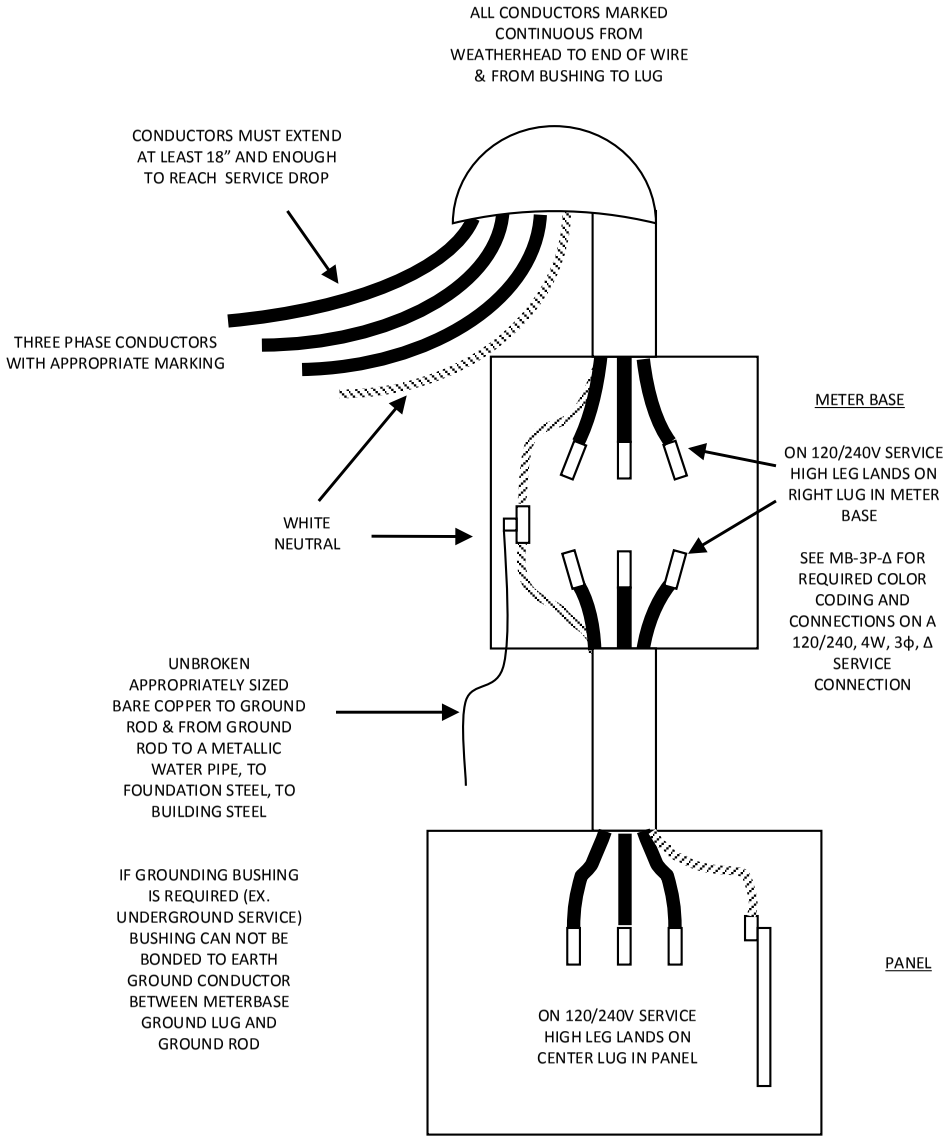


THREE PHASE 400A SERVICE 120/208V OR 120/240V



CPWS
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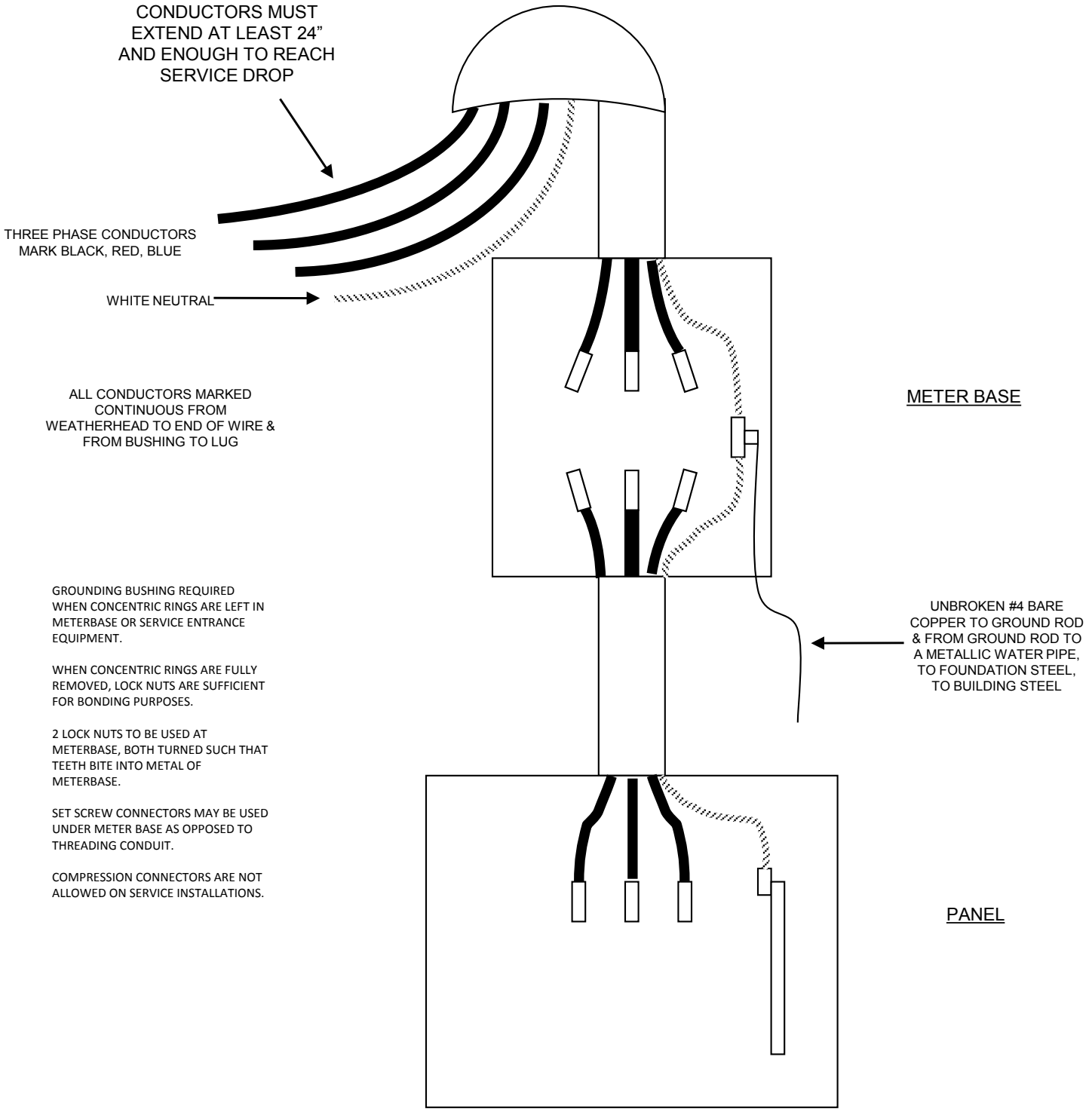
THREE PHASE SERVICE
120/208V

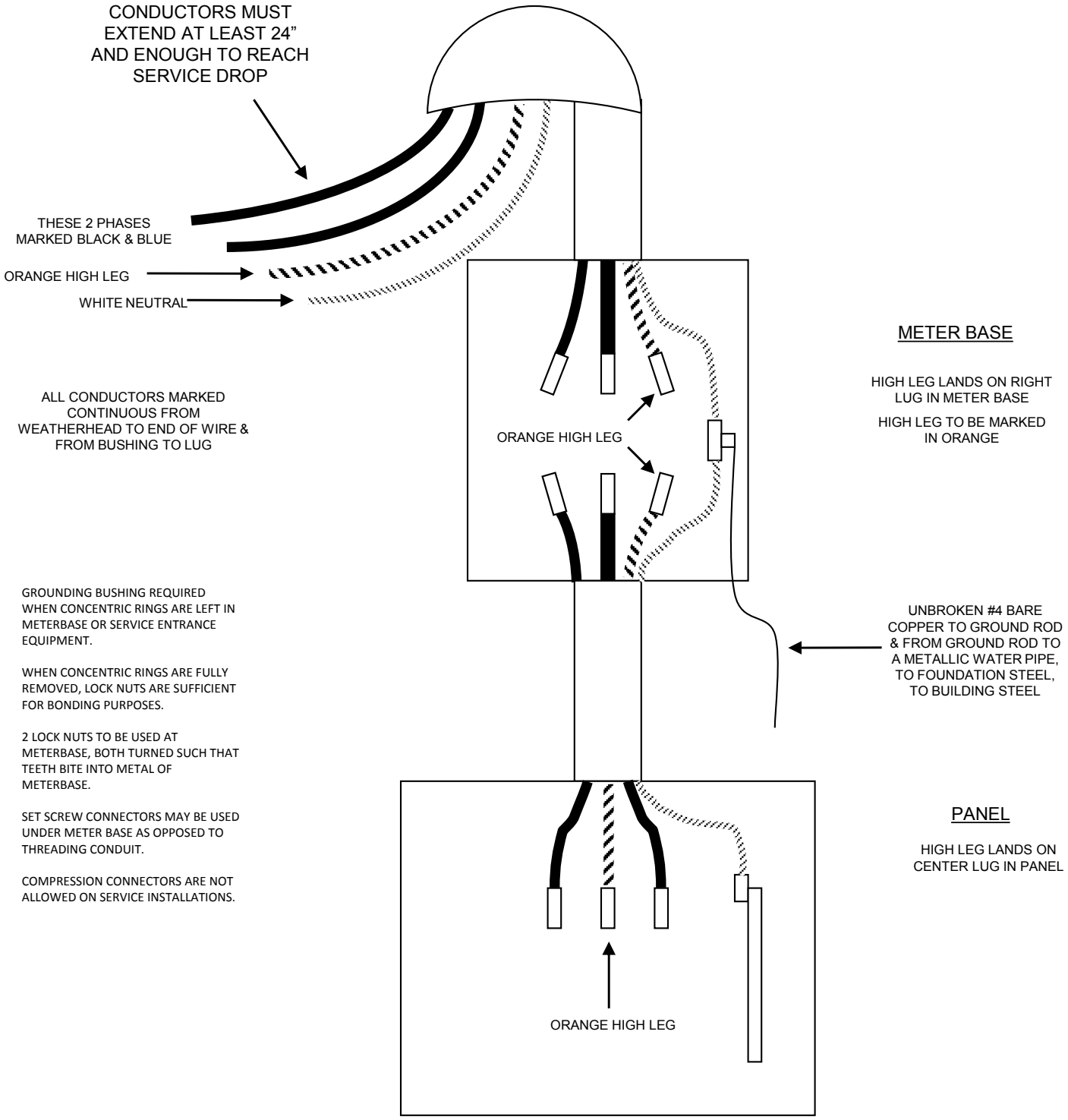


CONDUCTOR SIZES FOR VARIOUS SERVICES

	COPPER		ALUMINUM	
AMPS	PHASES	NEUTRAL	PHASES	NEUTRAL
100A	#2	#4	#1	#2
200A	#3/0	#2/0	250KCMIL	#4/0
300A	350KCMIL	300KCMIL	500KCMIL	400KCMIL
400A	500KCMIL	350KCMIL		

CPWS
Columbia Power & Water Systems

THREE PHASE SERVICE
120/240V DELTA (HIGH LEG)

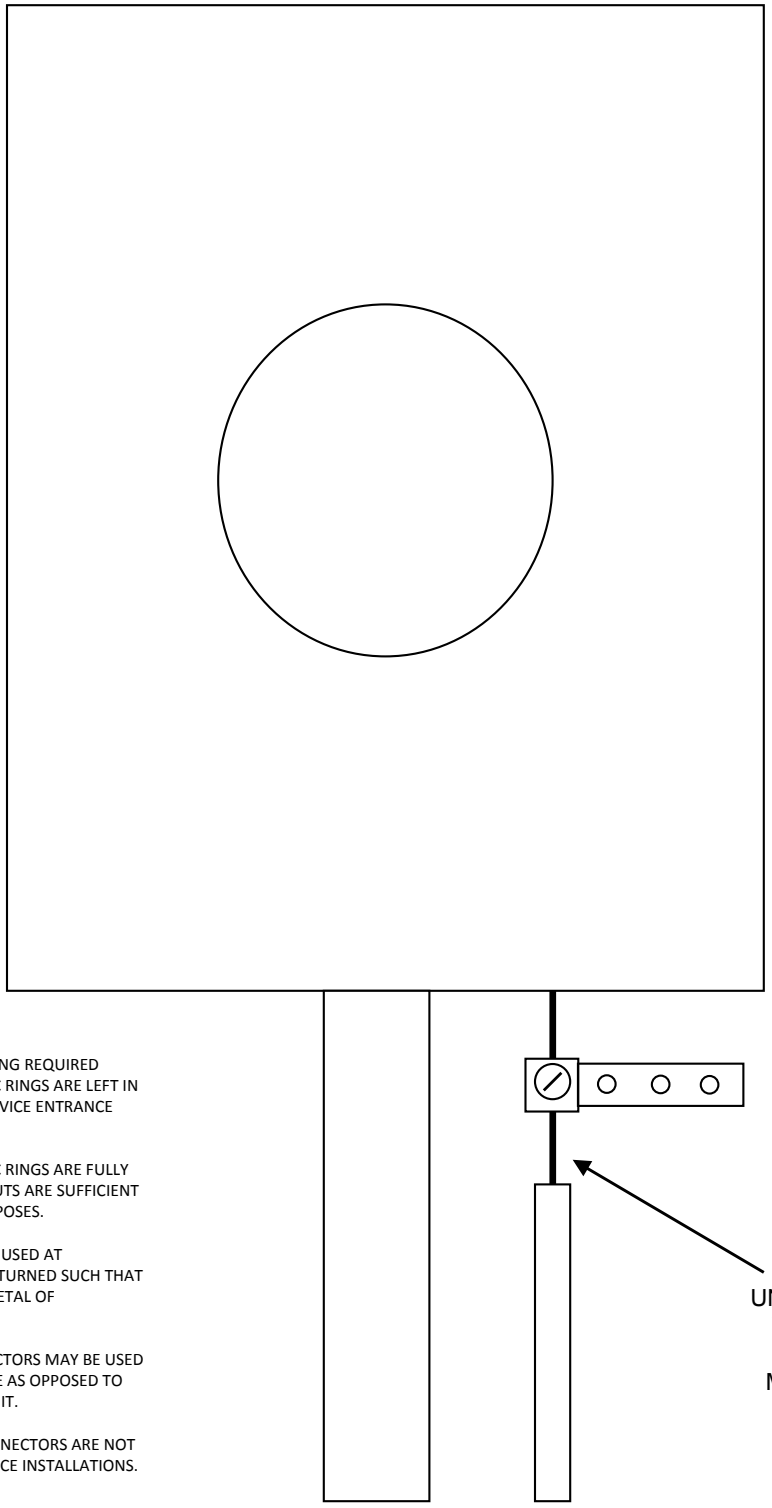


CONDUCTOR SIZES FOR VARIOUS SERVICES

	COPPER		ALUMINUM	
AMPS	PHASES	NEUTRAL	PHASES	NEUTRAL
100A	#2	#4	#1	#2
200A	#3/0	#2/0	250KCMIL	#4/0
300A	350KCMIL	300KCMIL	500KCMIL	400KCMIL
400A	500KCMIL	350KCMIL		

CPWS
Columbia Power & Water Systems

EQUIPMENT GROUNDING TERMINAL BAR



METER BASE

GROUNDING TERNIMAL BAR TO BE MOUNTED WITHIN 6" OF METER BASE AND HAVE AT LEAST 3 TERMINATION POINTS

UNBROKEN #4 BARE COPPER TO GROUND ROD & FROM GROUND ROD TO A METALLIC WATER PIPE, TO FOUNDATION STEEL, TO BUILDING STEEL

GROUNDING BUSHING REQUIRED WHEN CONCENTRIC RINGS ARE LEFT IN METERBASE OR SERVICE ENTRANCE EQUIPMENT.

WHEN CONCENTRIC RINGS ARE FULLY REMOVED, LOCK NUTS ARE SUFFICIENT FOR BONDING PURPOSES.

2 LOCK NUTS TO BE USED AT METERBASE, BOTH TURNED SUCH THAT TEETH BITE INTO METAL OF METERBASE.

SET SCREW CONNECTORS MAY BE USED UNDER METER BASE AS OPPOSED TO THREADING CONDUIT.

COMPRESSION CONNECTORS ARE NOT ALLOWED ON SERVICE INSTALLATIONS.

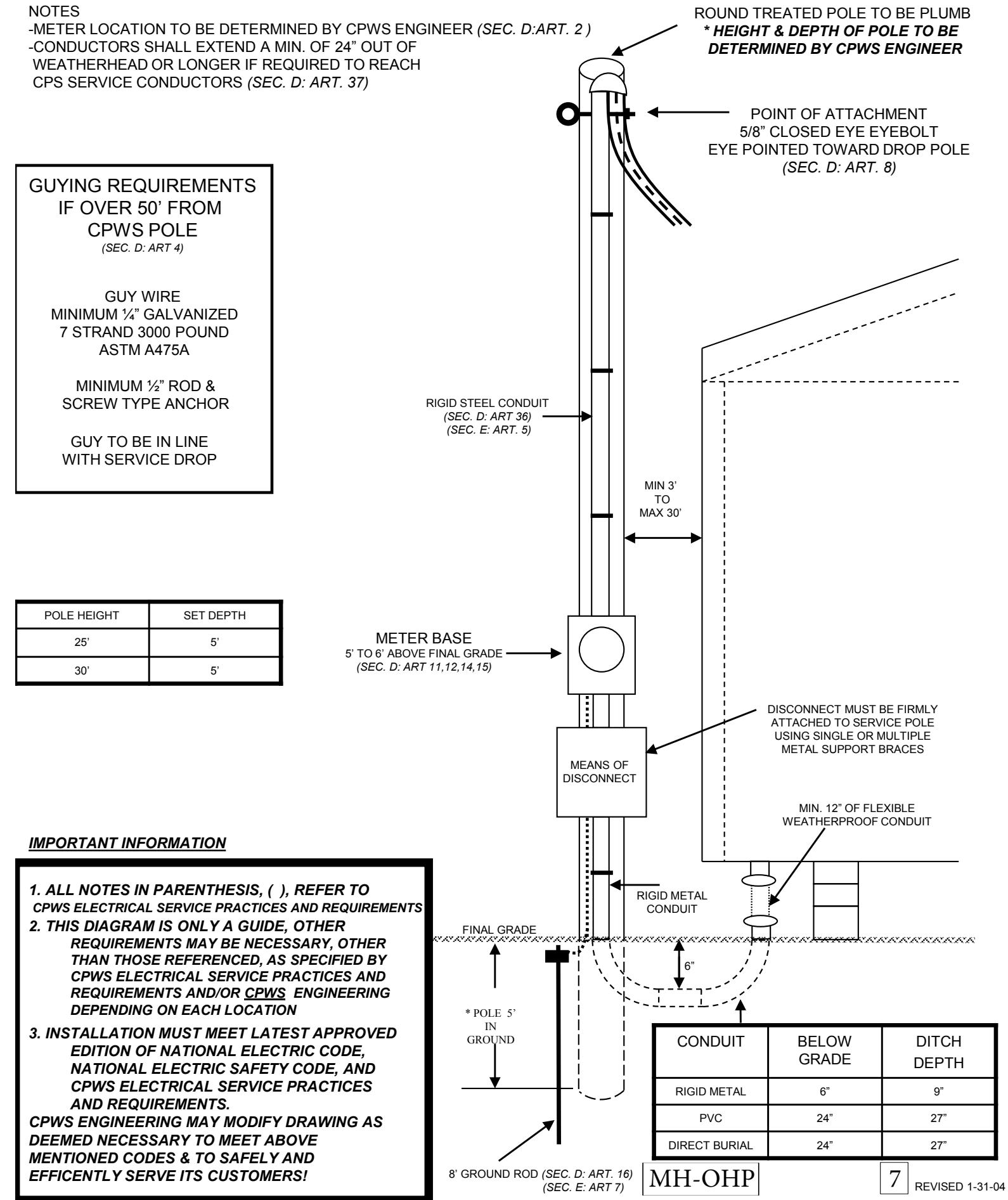
CPWS
Columbia Power & Water Systems

MOBILE HOME METER POLE SPECIFICATIONS

OBTAIN A COPY OF CPWS ELECTRICAL SERVICE PRACTICES AND REQUIREMENTS TO CHECK REFERENCES

CPWS REQUIRES THAT ALL MOBILE HOMES HAVE AN ANCHOR INSTALLATION DECAL IN COMPLIANCE WITH TENN. CODE. ANN. F 68-126-406 BEFORE ELECTRIC SERVICE WILL BE ATTACHED **(EFFECTIVE 2-1-04)**

NOTES
-METER LOCATION TO BE DETERMINED BY CPWS ENGINEER *(SEC. D:ART. 2)*
-CONDUCTORS SHALL EXTEND A MIN. OF 24" OUT OF WEATHERHEAD OR LONGER IF REQUIRED TO REACH CPS SERVICE CONDUCTORS *(SEC. D: ART. 37)*



GUYING REQUIREMENTS IF OVER 50' FROM CPWS POLE

(SEC. D: ART 4)

GUY WIRE
MINIMUM ¼" GALVANIZED
7 STRAND 3000 POUND
ASTM A475A

MINIMUM ½" ROD &
SCREW TYPE ANCHOR

GUY TO BE IN LINE
WITH SERVICE DROP

POLE HEIGHT	SET DEPTH
25'	5'
30'	5'

CONDUIT	BELOW GRADE	DITCH DEPTH
RIGID METAL	6"	9"
PVC	24"	27"
DIRECT BURIAL	24"	27"

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CPWS ENGINEERING MAY MODIFY DRAWING AS DEEMED NECESSARY TO MEET ABOVE MENTIONED CODES & TO SAFELY AND EFFICENTLY SERVE ITS CUSTOMERS!

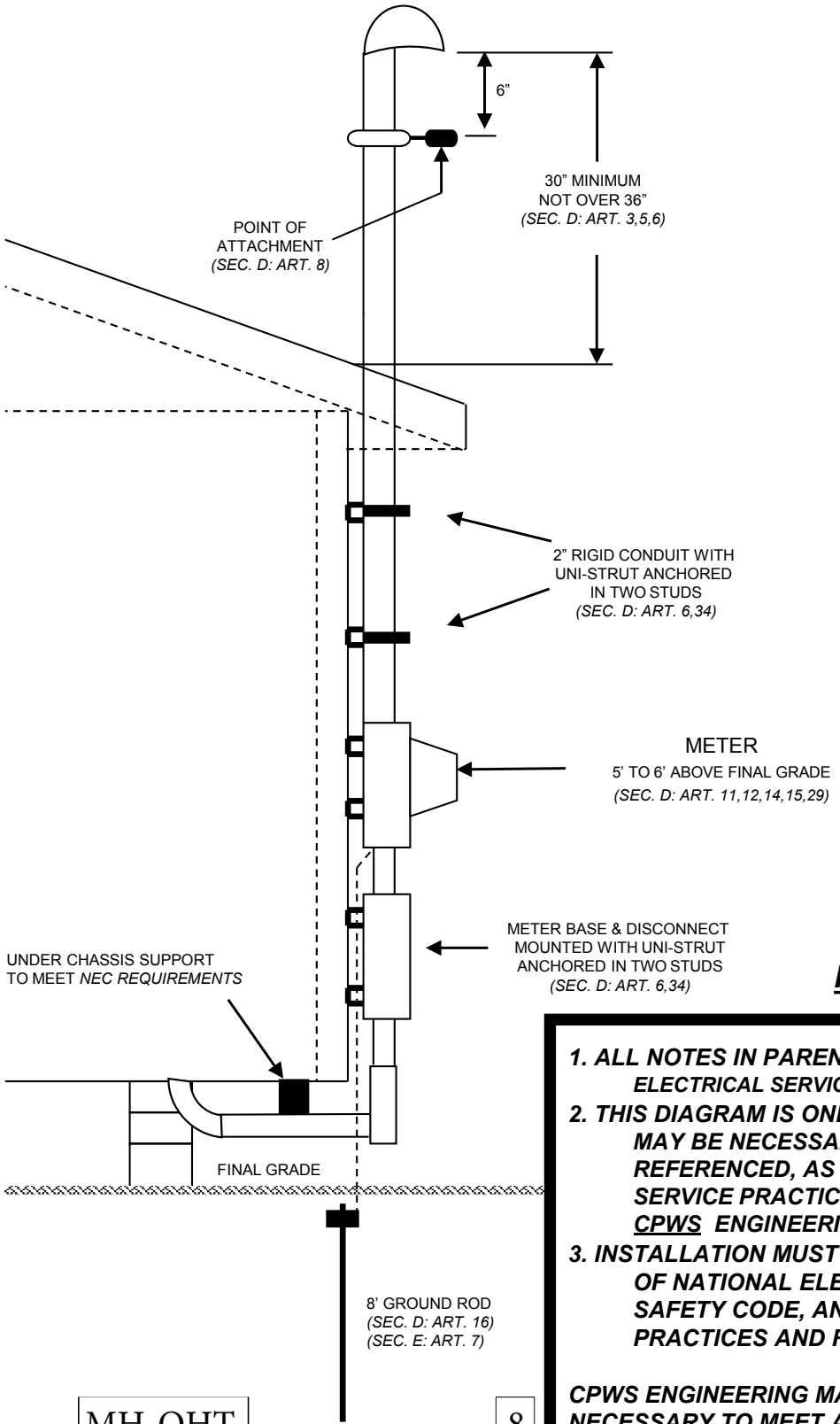
CPWS
Columbia Power & Water Systems

OVERHEAD SERVICE SPECIFICATIONS FOR MOBILE HOMES WITH METER ON HOME

OBTAIN A COPY OF CPWS ELECTRIC SERVICE PRACTICES AND REQUIREMENTS TO CHECK REFERENCES

CPWS REQUIRES THAT ALL MOBILE HOMES HAVE AN ANCHOR INSTALLATION DECAL IN COMPLIANCE WITH TENN. CODE. ANN. Φ 68–126–406 BEFORE ELECTRIC SERVICE WILL BE ATTACHED (EFFECTIVE 2-1-04)

NOTES:
- METER LOCATION TO BE DETERMINED BY CPWS ENGINEER *(SEC. D: ART. 2)*
- CONDUCTORS SHALL EXTEND A MIN. OF 24" OUT OF WEATHERHEAD OR LONGER IF REQUIRED TO REACH CPWS SERVICE CONDUCTORS *(SEC. D: ART. 39)*
- MIN. ¼" DIAMETER HARDWARE TO BE USED TO ATTACH EQUIPMENT TO UNI-STRUT *(SEC. D: ART. 34)*
- ALL GUYING OF RISERS ON MOBILE HOMES MUST BE APPROVED BY CPWS ENGINEERING *(SEC. D: ART 10)*



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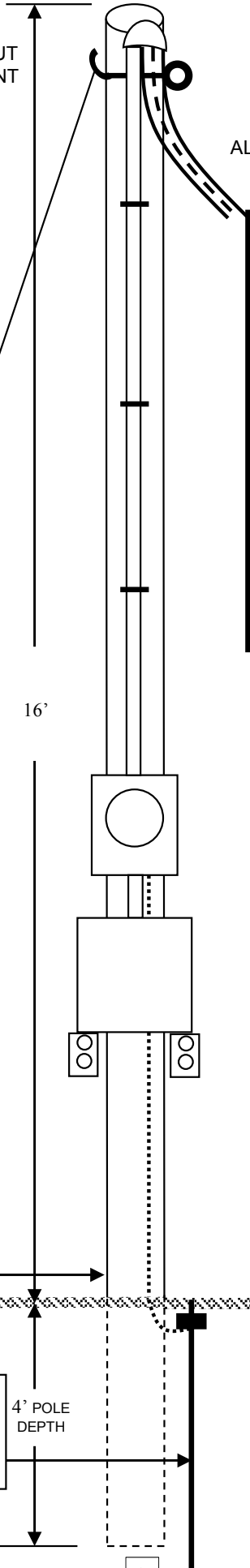
CPWS ENGINEERING MAY MODIFY DRAWING AS DEEMED NECESSARY TO MEET ABOVE MENTIONED CODES & TO SAFELY AND EFFICENTLY SERVE ITS CUSTOMERS!

CPWS
Columbia Power & Water Systems

TEMPORARY SERVICE POLE (SEC. D: ART. 29)

CONSTRUCTION USE ONLY



GALVANIZED EYE NUT OR GUY ATTACHMENT

MINIMUM 20' TREATED ROUND POLE (HEIGHT & DEPTH OF POLE TO BE DETERMINED BY CPWS ENGINEER)

COLUMBIA POWER ENGINEERING TO SPOT POLE LOCATIONS *(SEC. D: ART. 2)*

ALL MATERIALS MUST BE U.L. APPROVED AND FURNISHED BY CUSTOMER

POLE MUST BE INSPECTED & PASSED BY STATE ELECTRICAL INSPECTOR BEFORE SERVICE IS CONNECTED

WEATHER HEAD FLUSH WITH TOP OF POLE WITH A MINIMUM 20' POLE *(SEC. D:ART. 36)*

5/8" X 10" CLOSED EYE GALVANIZED EYEBOLT PLACED 6" BELOW WEATHER HEAD

ALLOW 3' OF WIRE TO EXTEND OUT OF WEATHER HEAD

IMPORTANT INFORMATION

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CPWS ENGINEERING MAY MODIFY DRAWING AS DEEMED NECESSARY TO MEET ABOVE MENTIONED CODES & TO SAFELY AND EFFICENTLY SERVE ITS CUSTOMERS!

MINIMUM REQUIREMENTS *(SEC.E:ART. 5)*
60 AMP - #6 COPPER WIRE – 1" CONDUIT
100 AMP - #2 COPPER WIRE – 1 ¼" CONDUIT
200 AMP - #3/0 COPPER WIRE – 2" CONDUIT
CONDUIT MAY BE RIGID OR EMT
AT LEAST 3 CONDUIT STRAPS REQUIRED

CENTER OF METER BASE TO BE BETWEEN 5' & 6' ABOVE GRADE *(SEC. D.:ART. 2,11,12,14)*

60, 100, OR 200 AMP PANEL ALL BRANCH CIRCUITS MUST BE GROUND FAULT PROTECTED

MINIMUM 2-120 VOLT RECEPTACLES INSTALLED IN WEATHER PROOF BOXES

#4 GROUND WIRE FROM METER BASE TO GROUND ROD

POLE HOLE MUST BE ROUND, OPENED TO BETWEEN 10" & 12" IN DIAMETER
POLE MUST BE PROPERLY BACKFILLED AND TAMPED

FINAL GRADE

GUYING REQUIREMENTS IF OVER 50' FROM CPWS POLE
(SEC. D: ART 4)

GUY WIRE
MINIMUM ¼" GALVANIZED
7 STRAND 3000 POUND
ASTM A475A

MINIMUM ½" ROD & SCREW TYPE ANCHOR

GUY TO BE IN LINE WITH SERVICE DROP

MINIMUM ½" ROD & SCREW TYPE ANCHOR

5/8" x 8' GALVANIZED GROUND ROD WITH APPROVED GROUND CLAMP
(SEC. D:ART. 16)
(SEC. E:ART. 7)

SPECIAL NOTE

**IN CERTAIN CASES, CPWS ENGINEER MAY MODIFY POLE HEIGHT, DEPTH, ANCHORING, OR BRACING IN ORDER TO PROVIDE SAFE AND EFFICIENT POWER FOR TEMPORARY SERVICE

REVISED 1-31-04

CPWS
Columbia Power & Water Systems

TEMPORARY URD SERVICE POST (SEC. D: ART. 29)

CONSTRUCTION USE ONLY

TEMPORARY POLE MUST BE LEFT
BETWEEN PROPOSED HOME & ROAD

COLUMBIA POWER WILL SET &
CONNECT TEMPORARY AFTER
IT PASSES INSPECTION

IMPORTANT INFORMATION

1. ALL NOTES IN PARENTHESIS, ( ), REFER TO CPWS ELECTRIC SERVICE PRACTICES AND REQUIREMENTS
2. THIS DIAGRAM IS ONLY A GUIDE, OTHER REQUIREMENTS MAY BE NECESSARY, OTHER THAN THOSE REFERENCED, AS SPECIFIED BY CPWS ELECTRIC SERVICE PRACTICES AND REQUIREMENTS AND/OR CPWS ENGINEERING DEPENDING ON EACH LOCATION
3. INSTALLATION MUST MEET LATEST APPROVED EDITION OF NATIONAL ELECTRIC CODE, NATIONAL ELECTRIC SAFETY CODE, AND CPWS ELECTRICAL SERVICE PRACTICES AND REQUIREMENTS.
CPWS ENGINEERING MAY MODIFY DRAWING AS DEEMED NECESSARY TO MEET ABOVE MENTIONED CODES & TO SAFELY AND EFFICENTLY SERVE ITS CUSTOMERS!

60, 100, OR 200 AMP PANEL
ALL BRANCH CIRCUITS MUST
BE GROUND FAULT PROTECTED

MINIMUM 2-120 VOLT RECEPTACLES
INSTALLED IN WEATHER PROOF BOXES

MINIMUM REQUIREMENTS *(SEC.E:ART. 5)*
60 AMP - #6 COPPER WIRE – 1" CONDUIT
100 AMP - #2 COPPER WIRE – 1 ¼" CONDUIT
200AMP - #3/0 COPPER WIRE – 2" CONDUIT

CONDUIT MUST BE RIGID
AT LEAST 2 CONDUIT STRAPS REQUIRED

CONDUIT WITH BUSHING TO STOP
6" FROM BOTTOM OF POST

#4 BARE CU GROUND WIRE FROM
METER BASE STAPLED TO POST
BESIDE CONDUIT *(SEC. E:ART. 7)*

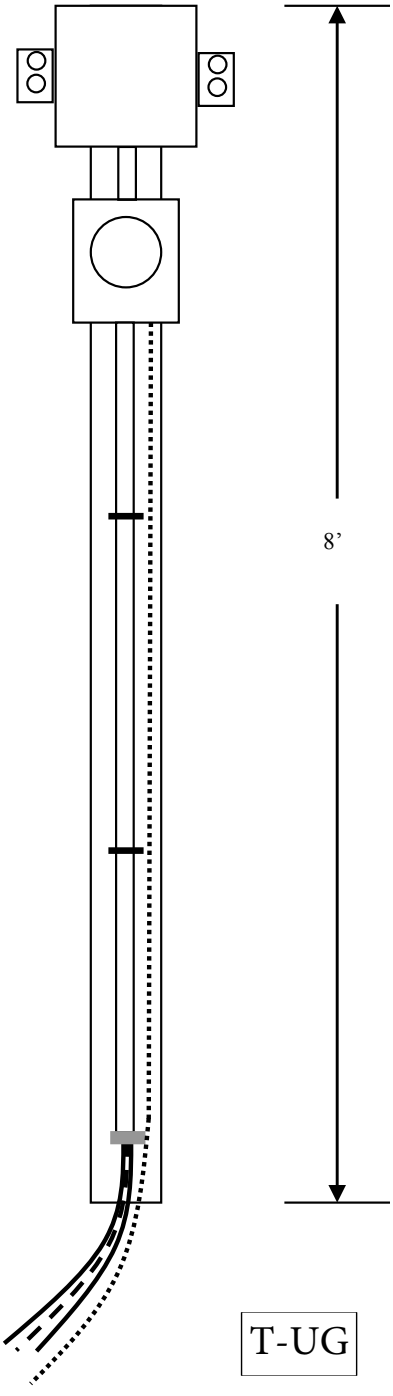
ALLOW 6' OF CONDUCTORS INCLUDING
GROUND WIRE TO EXTEND PAST CONDUIT

4" x 4" x 8' TREATED SQUARE POST

COLUMBIA POWER ENGINEERING TO
SPOT POLE LOCATIONS
(SEC. D: ART. 2)

ALL MATERIALS MUST BE U.L. APPROVED
AND FURNISHED BY CUSTOMER

POLE MUST BE INSPECTED & PASSED BY
STATE ELECTRICAL INSPECTOR BEFORE
SERVICE IS CONNECTED



MINIMUM UNDERGROUND PRIMARY REQUIREMENTS

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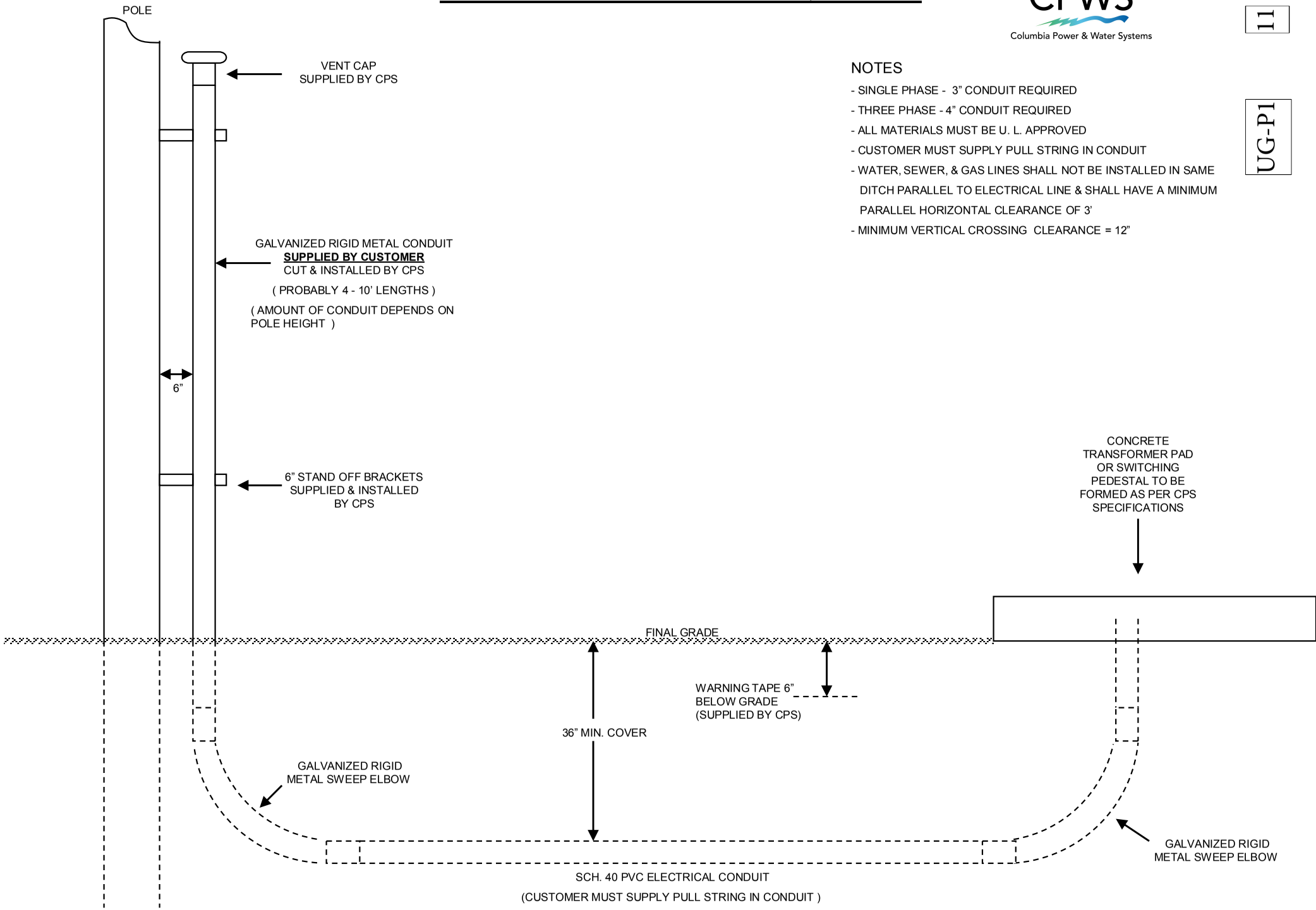
11

UG-P1



NOTES

- SINGLE PHASE - 3" CONDUIT REQUIRED
- THREE PHASE - 4" CONDUIT REQUIRED
- ALL MATERIALS MUST BE U. L. APPROVED
- CUSTOMER MUST SUPPLY PULL STRING IN CONDUIT
- WATER, SEWER, & GAS LINES SHALL NOT BE INSTALLED IN SAME DITCH PARALLEL TO ELECTRICAL LINE & SHALL HAVE A MINIMUM PARALLEL HORIZONTAL CLEARANCE OF 3'
- MINIMUM VERTICAL CROSSING CLEARANCE = 12"

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MINIMUM UNDERGROUND PRIMARY REQUIREMENTS

NOTES

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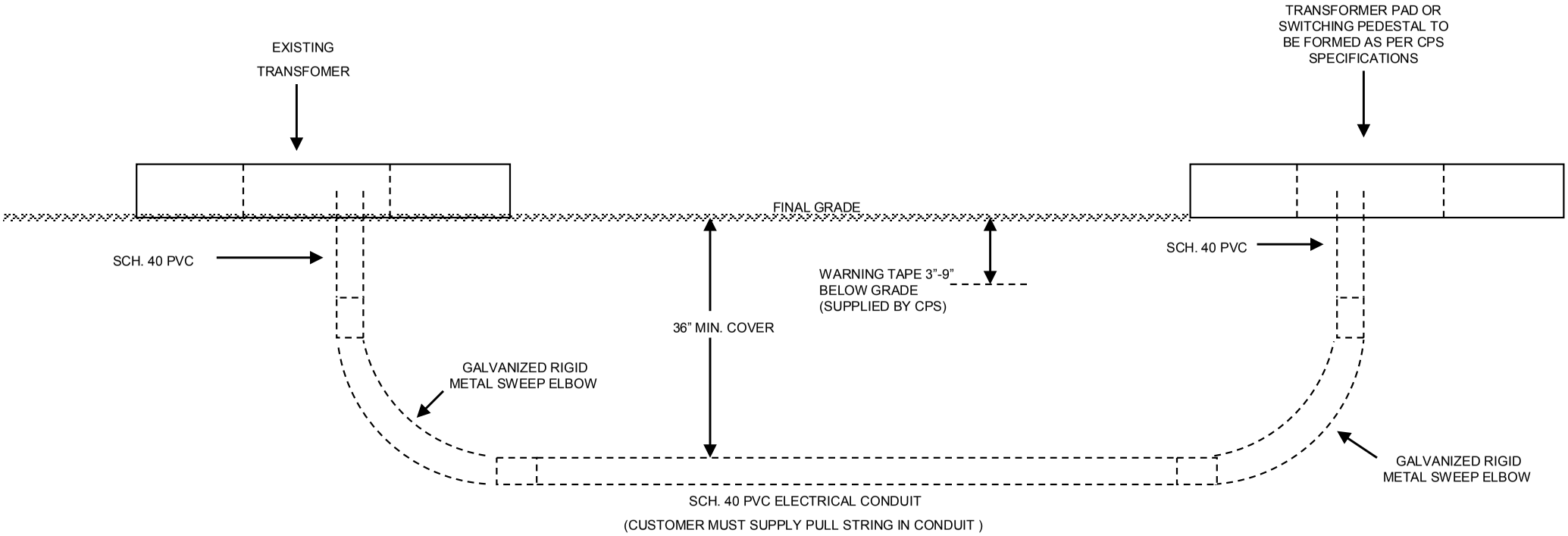

MINIMUM UNDERGROUND DIP TO SECONDARY PEDESTAL REQUIREMENTS

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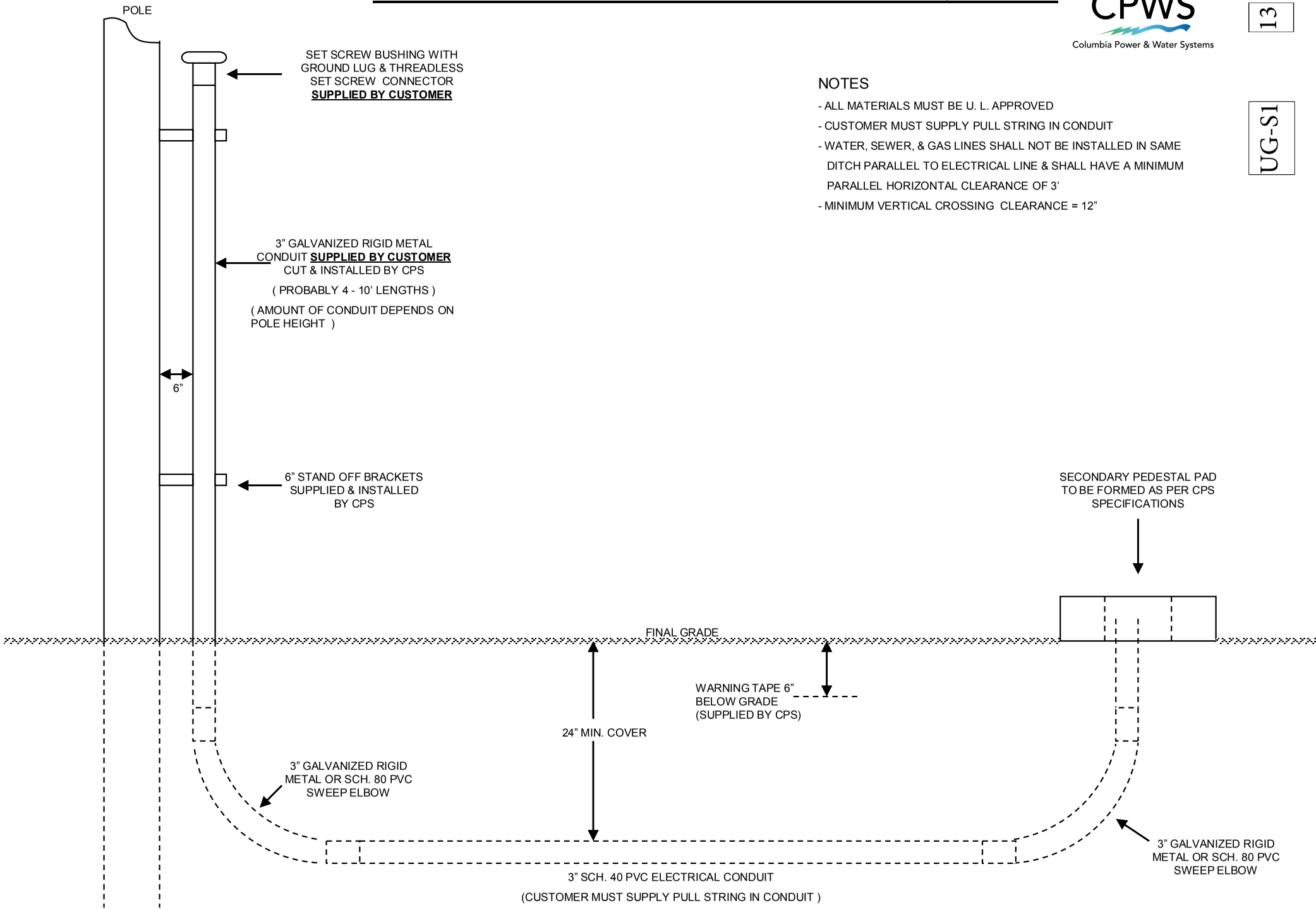
UG-S1



NOTES

- ALL MATERIALS MUST BE U. L. APPROVED
- CUSTOMER MUST SUPPLY PULL STRING IN CONDUIT
- WATER, SEWER, & GAS LINES SHALL NOT BE INSTALLED IN SAME DITCH PARALLEL TO ELECTRICAL LINE & SHALL HAVE A MINIMUM PARALLEL HORIZONTAL CLEARANCE OF 3'
- MINIMUM VERTICAL CROSSING CLEARANCE = 12"

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MINIMUM UNDERGROUND SERVICE REQUIREMENTS FROM SECONDARY PEDESTAL

OBTAIN A COPY OF CPWS ELECTRICAL SERVICE PRACTICES AND REQUIREMENTS TO CHECK REFERENCES

UG-S2

GROUNDING BUSHING REQUIRED WHEN CONCENTRIC RINGS ARE LEFT IN METERBASE OR SERVICE ENTRANCE EQUIPMENT.

WHEN CONCENTRIC RINGS ARE FULLY REMOVED, LOCK NUTS ARE SUFFICIENT FOR BONDING PURPOSES.

2 LOCK NUTS TO BE USED AT METERBASE, BOTH TURNED SUCH THAT TEETH BITE INTO METAL OF METERBASE.

SET SCREW CONNECTORS MAY BE USED UNDER METER BASE AS OPPOSED TO THREADING CONDUIT.

COMPRESSION CONNECTORS ARE NOT ALLOWED ON SERVICE INSTALLATIONS.

IMPORTANT INFORMATION

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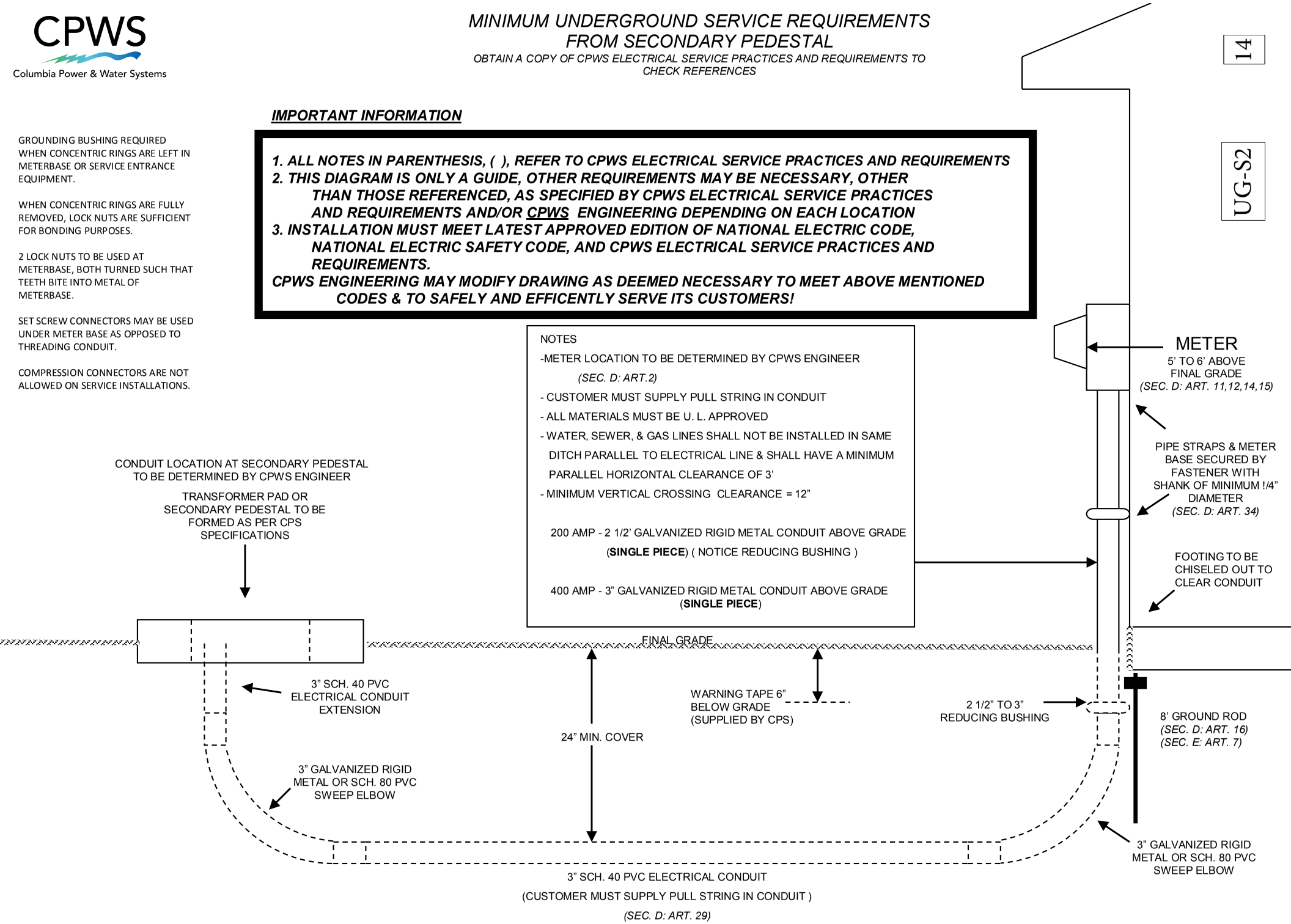
3. INSTALLATION MUST MEET LATEST APPROVED EDITION OF NATIONAL ELECTRIC CODE, NATIONAL ELECTRIC SAFETY CODE, AND CPWS ELECTRICAL SERVICE PRACTICES AND REQUIREMENTS.
CPWS ENGINEERING MAY MODIFY DRAWING AS DEEMED NECESSARY TO MEET ABOVE MENTIONED CODES & TO SAFELY AND EFFICENTLY SERVE ITS CUSTOMERS!

NOTES
-METER LOCATION TO BE DETERMINED BY CPWS ENGINEER *(SEC. D: ART.2)*
- CUSTOMER MUST SUPPLY PULL STRING IN CONDUIT
- ALL MATERIALS MUST BE U. L. APPROVED
- WATER, SEWER, & GAS LINES SHALL NOT BE INSTALLED IN SAME DITCH PARALLEL TO ELECTRICAL LINE & SHALL HAVE A MINIMUM PARALLEL HORIZONTAL CLEARANCE OF 3'
- MINIMUM VERTICAL CROSSING CLEARANCE = 12"

200 AMP - 2 1/2' GALVANIZED RIGID METAL CONDUIT ABOVE GRADE (**SINGLE PIECE**) (NOTICE REDUCING BUSHING)

400 AMP - 3" GALVANIZED RIGID METAL CONDUIT ABOVE GRADE (**SINGLE PIECE**)

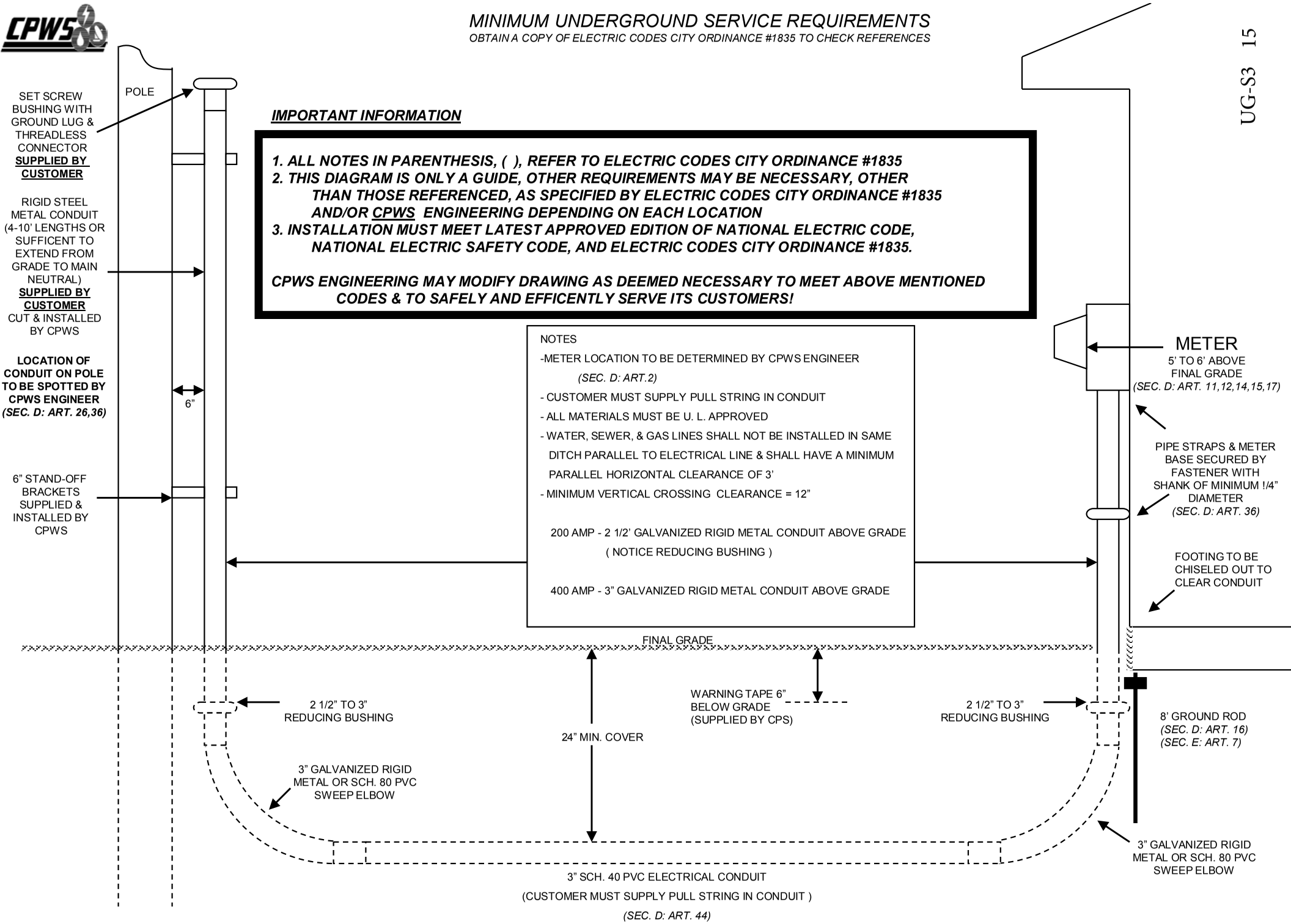


REVISED 3-8-05

MINIMUM UNDERGROUND SERVICE REQUIREMENTS

OBTAIN A COPY OF ELECTRIC CODES CITY ORDINANCE #1835 TO CHECK REFERENCES

UG-S3 15



REVISED 3-8-05

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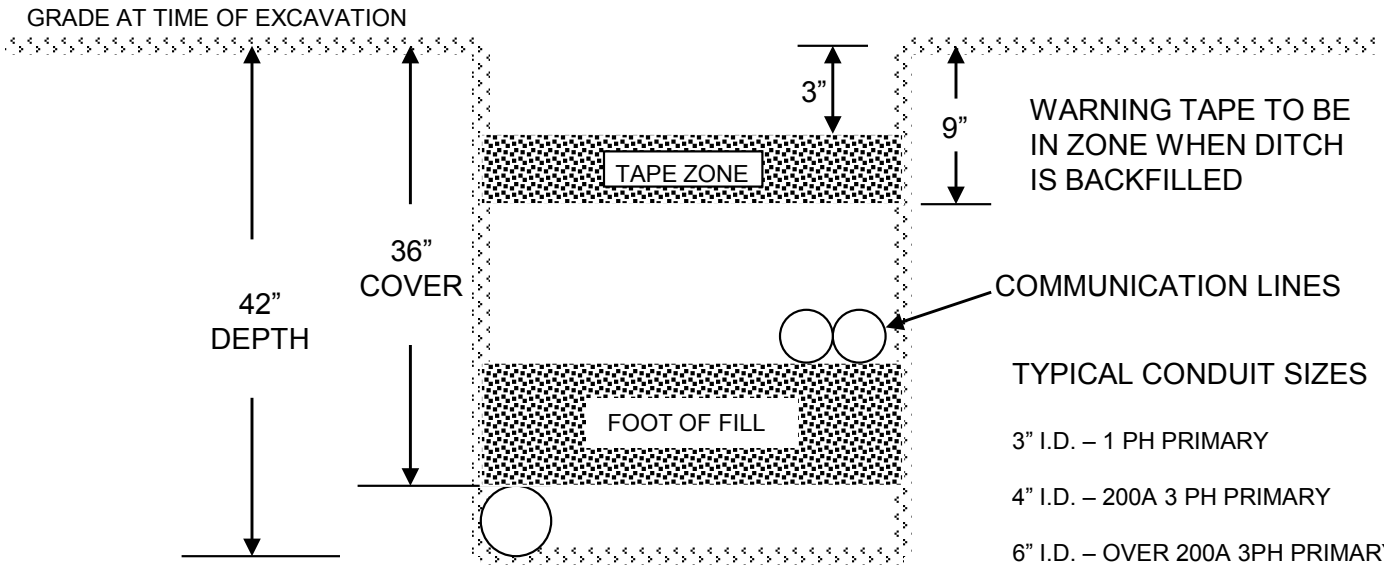
8-12-13

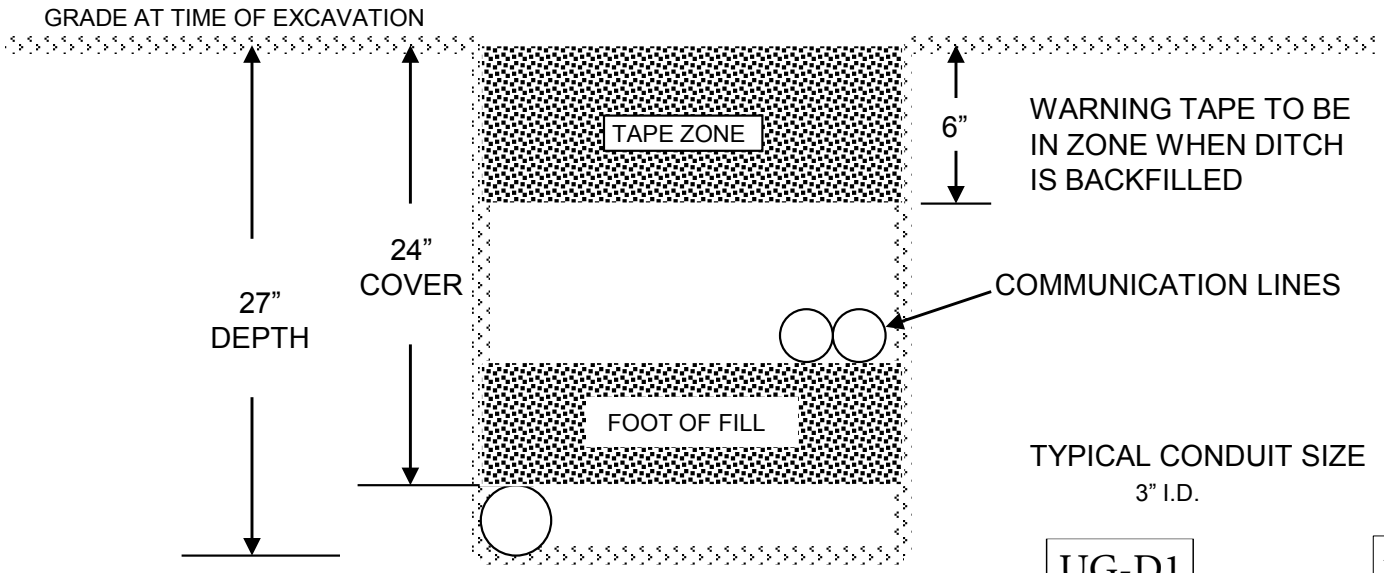
PRIMARY VOLTAGE DITCH PROFILE

36” COVERAGE REQUIRED OVER PRIMARY CONDUIT



SECONDARY OR SERVICE VOLTAGE DITCH PROFILE

24” COVERAGE REQUIRED OVER CONDUIT FOR 600V OR LESS



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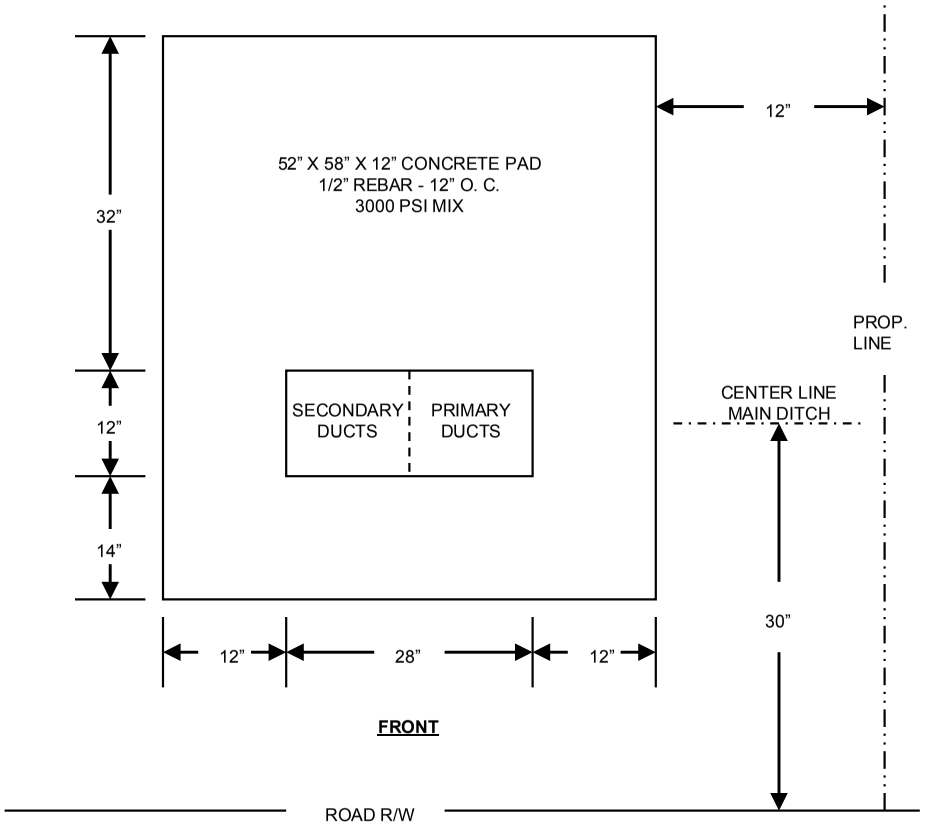
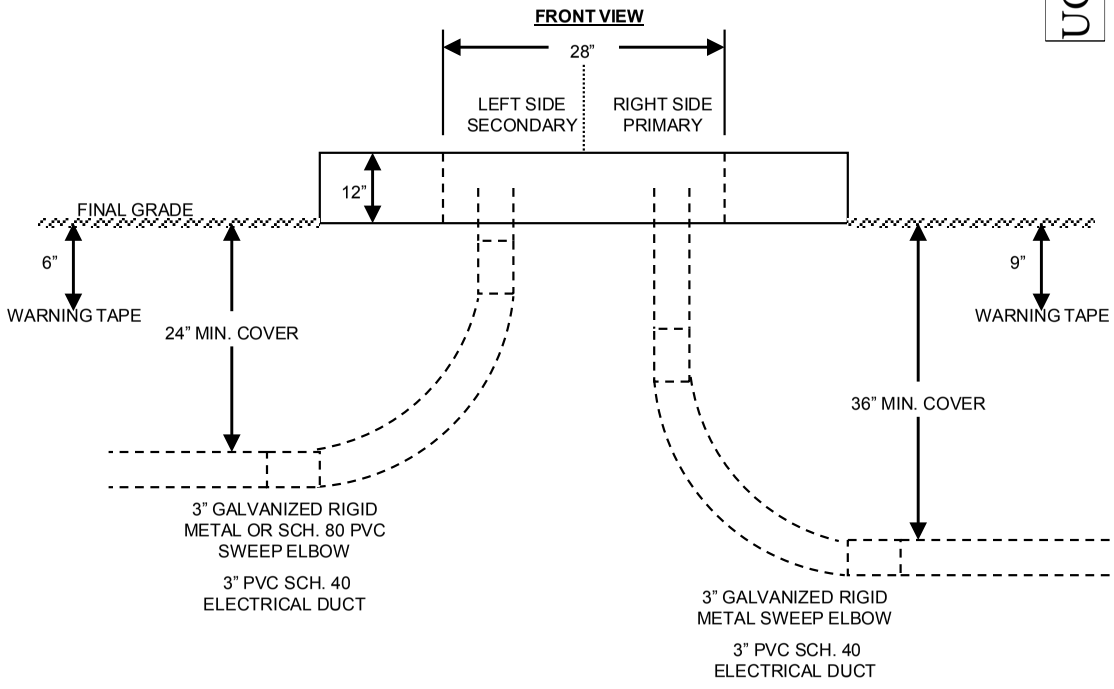
SINGLE PHASE TRANSFORMER CONCRETE PAD DETAIL

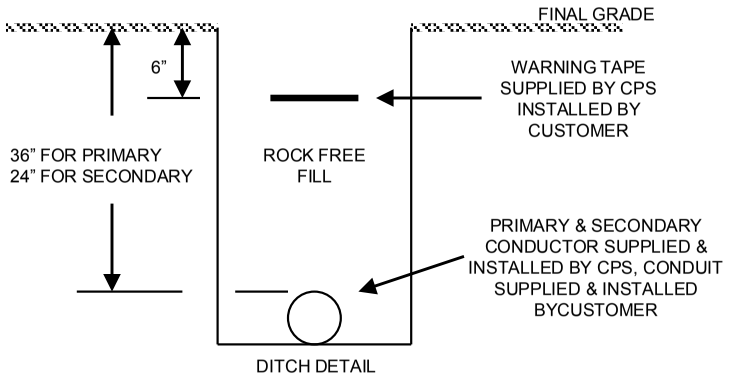
UG-1P-D1

NOTES

- ALL MATERIALS MUST BE U. L. APPROVED
- CUSTOMER MUST SUPPLY PULL STRING IN CONDUIT
- NUMBER OF CONDUITS MAY VARY DEPENDING ON SPECIFIC LOCATION







STREET LIGHT STUBOUT DETAIL

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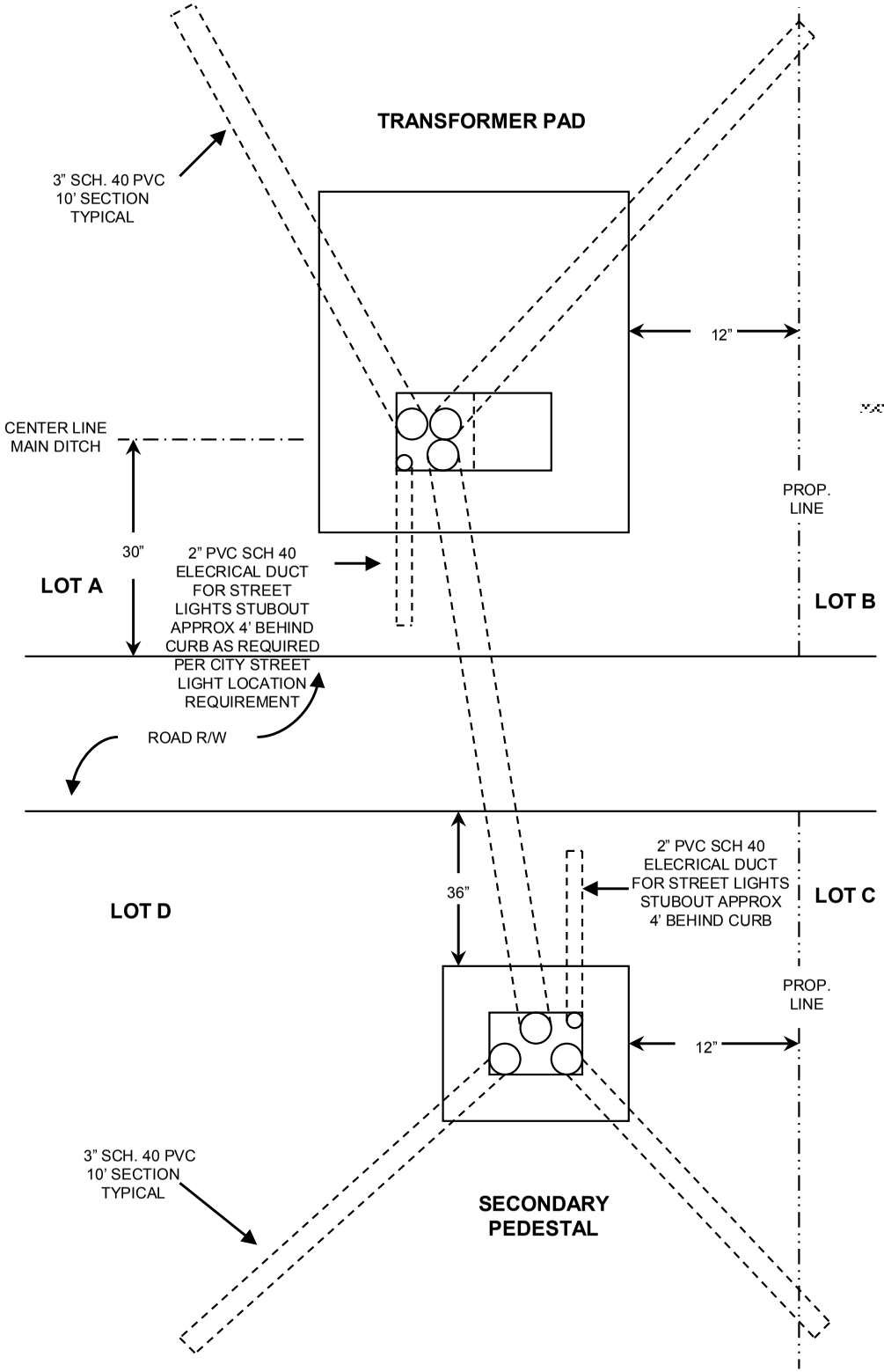
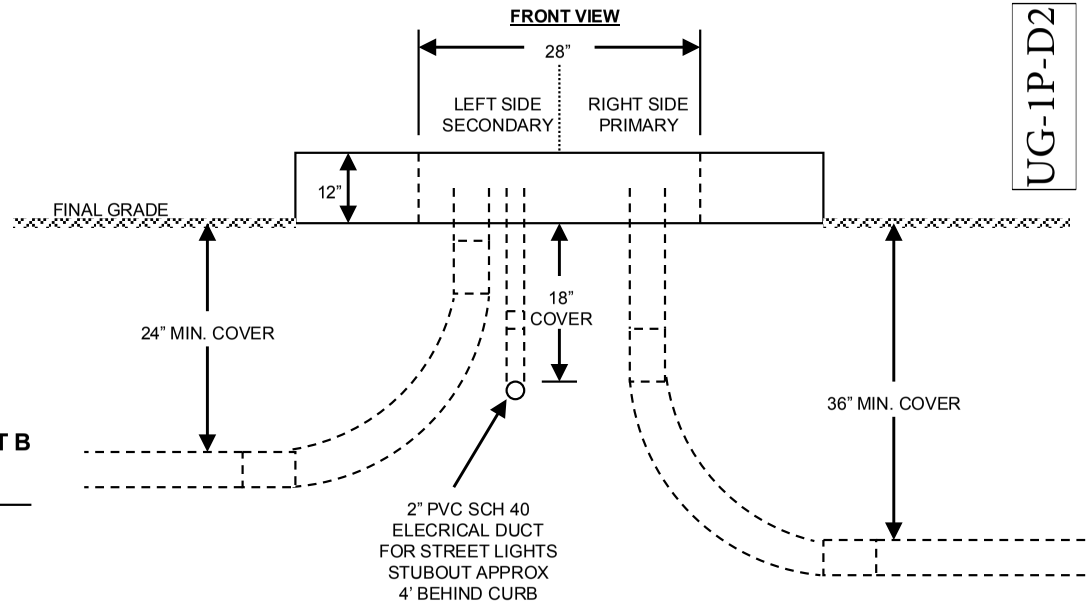
UG-1P-D2



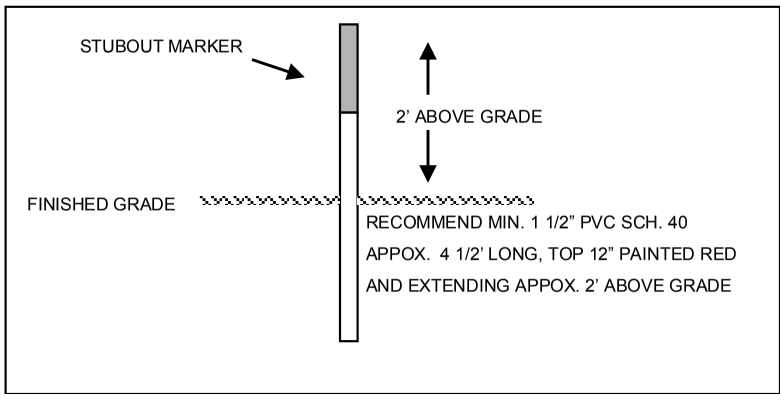
NOTES

- ALL MATERIALS MUST BE U. L. APPROVED
- CUSTOMER MUST SUPPLY PULL STRING IN CONDUIT
- NUMBER OF CONDUITS MAY VARY DEPENDING ON SPECIFIC LOCATION
- ALL PAD TO BE LOCATED WITHIN UTILITY EASEMENT



NOTES

- CONTRACTOR TO SUPPLY PULL STRING IN STUBOUTS (TIE OFF AT EACH END)
- CAP END OF ALL CONDUITS WITH DUCT TAPE
- ATTACH RED STUBOUT MARKER TO THE END OF EACH STUBOUT



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SINGLE PHASE PRIMARY SWITCHING ENCLOSURE CONCRETE PAD DETAIL

UG-1P-PSP

NOTES

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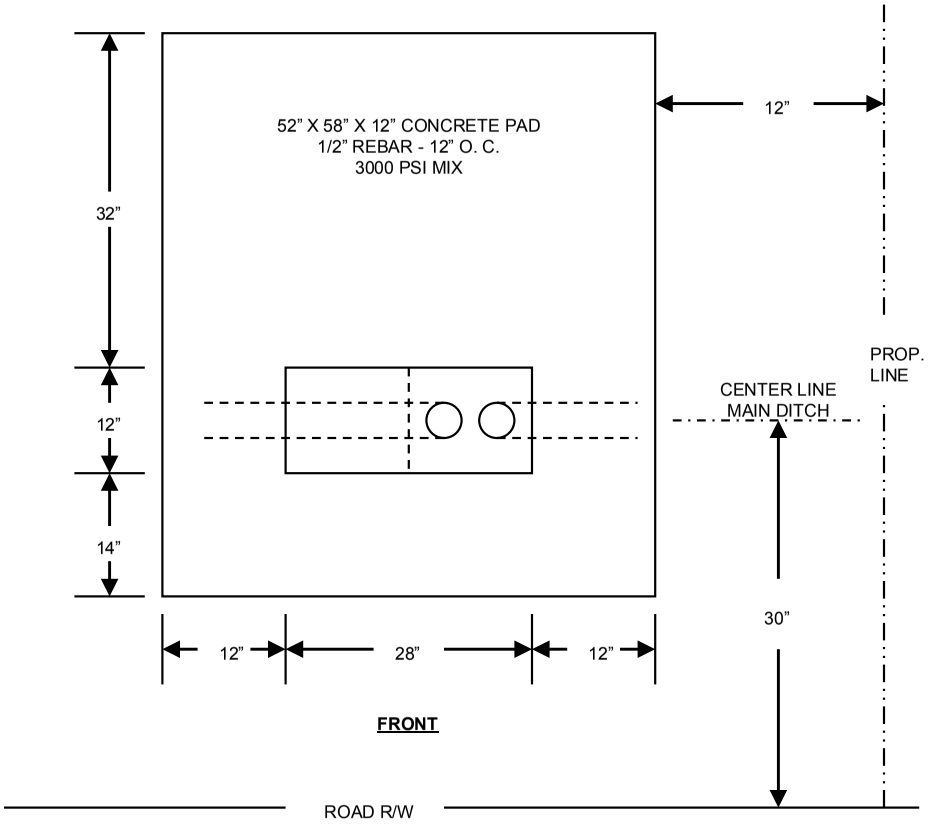
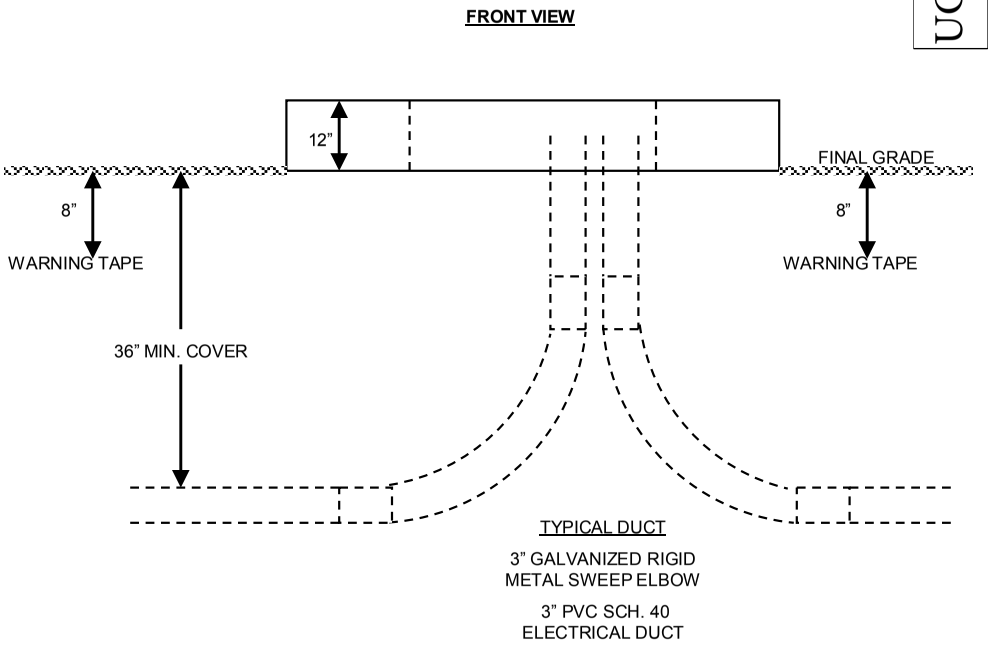
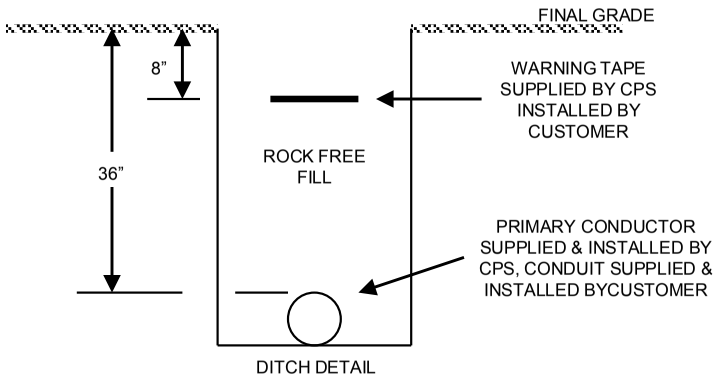
- CUSTOMER MUST SUPPLY PULL STRING IN CONDUIT
- NUMBER OF CONDUITS MAY VARY DEPENDING ON SPECIFIC LOCATION







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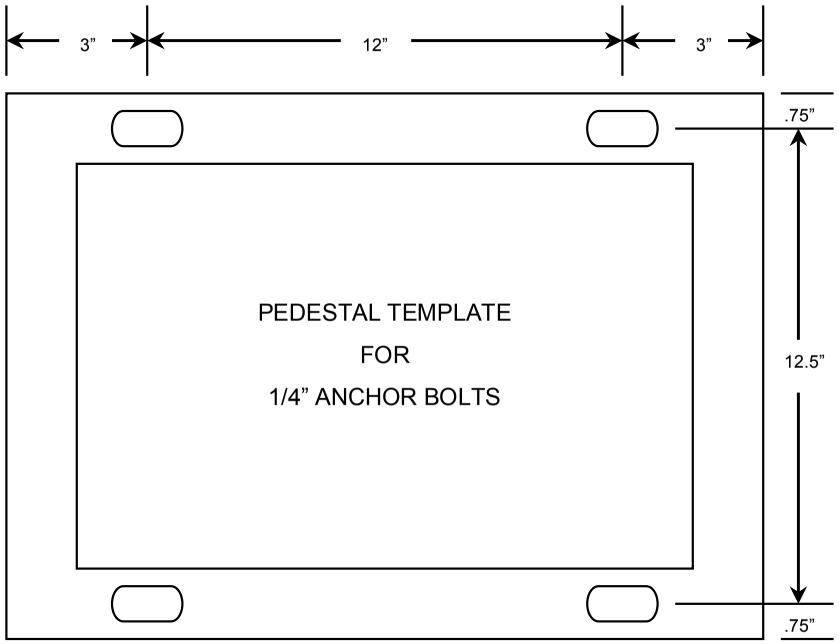
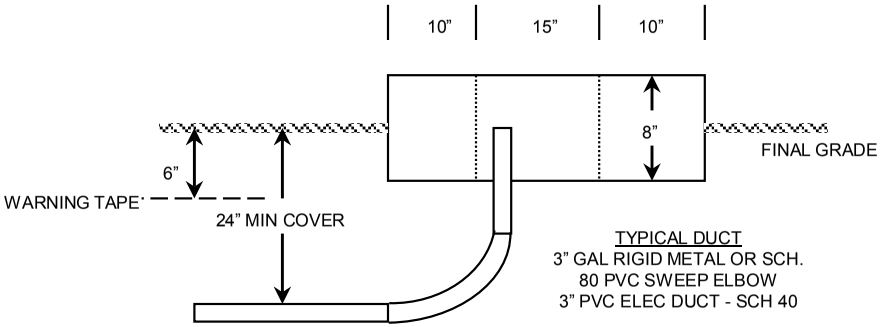
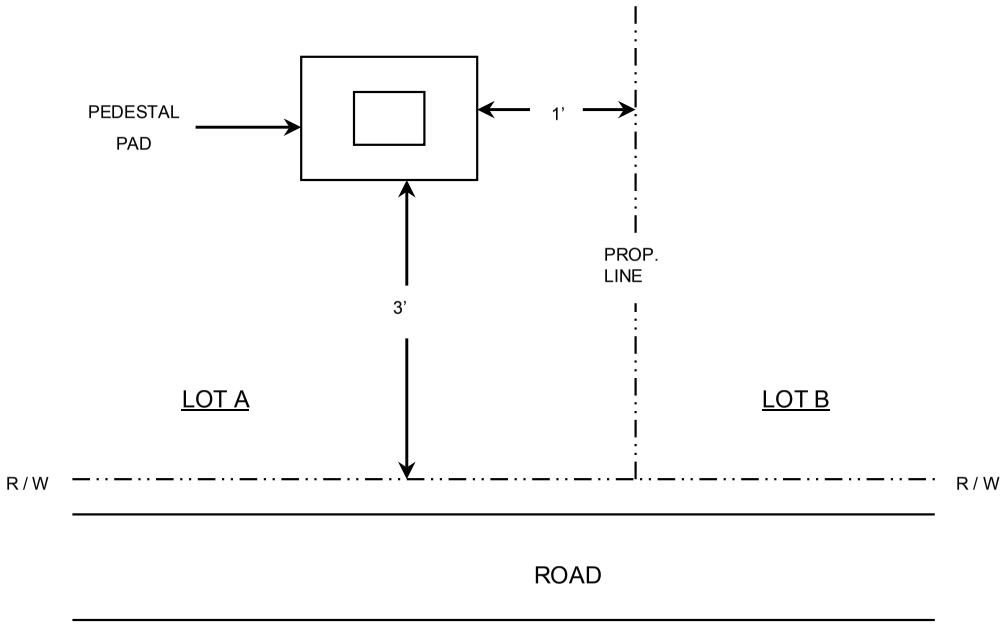
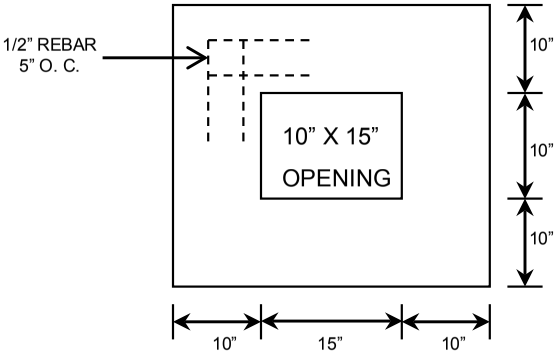
TYPICAL SECONDARY PEDESTAL
CONCRETE PAD DETAIL









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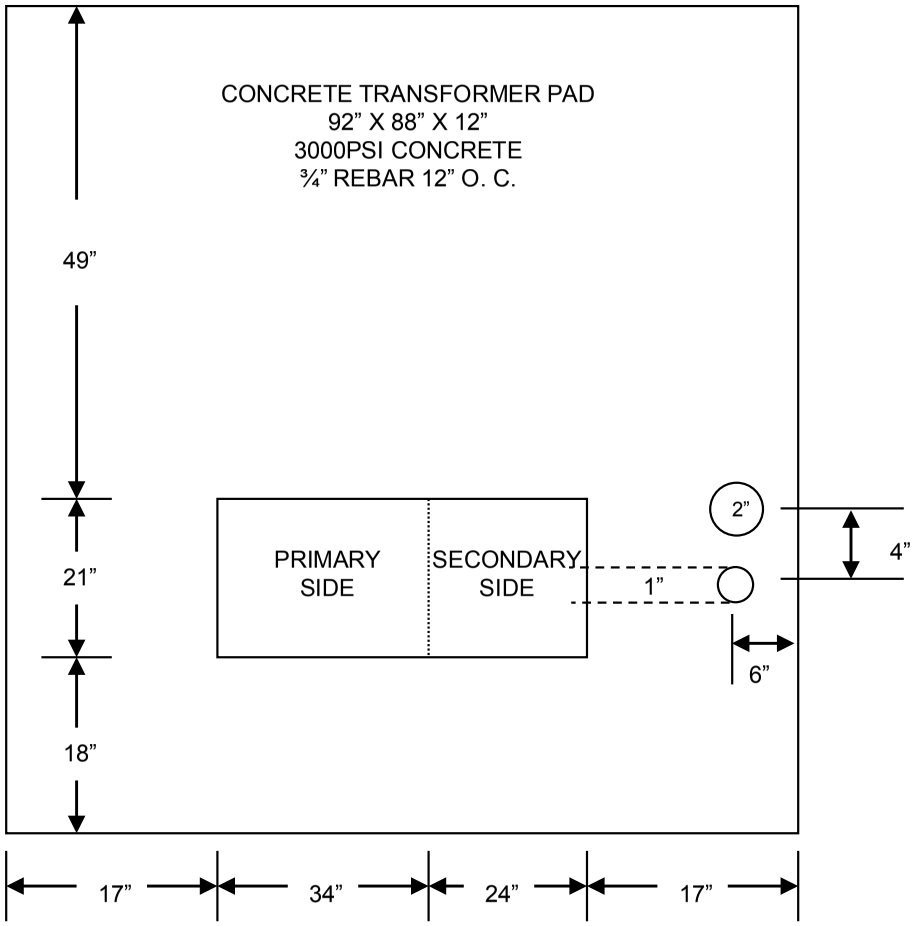
CT METER BASE ON PAD MOUNT TRANSFORMER DETAIL

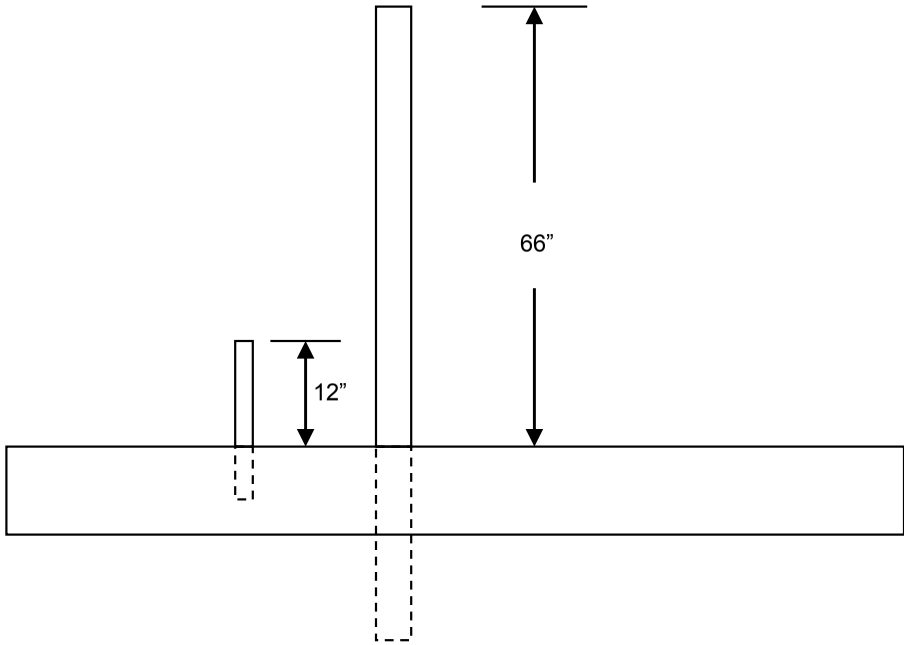
TYPICAL NOT FOR CONSTRUCTION

-INSTALL 1-2” RIGID METAL CONDUITS FOR METER BASE INSTALLATION
-INSTALL 1- 1” RIGID METAL CONDUIT FOR METER WIRING
-ALL METERING CONDUITS MUST BE THREADED ON TOP
-2” CONDUIT MUST BE CAPPED

OVERHEAD VIEW



PROFILE VIEW



CPWS
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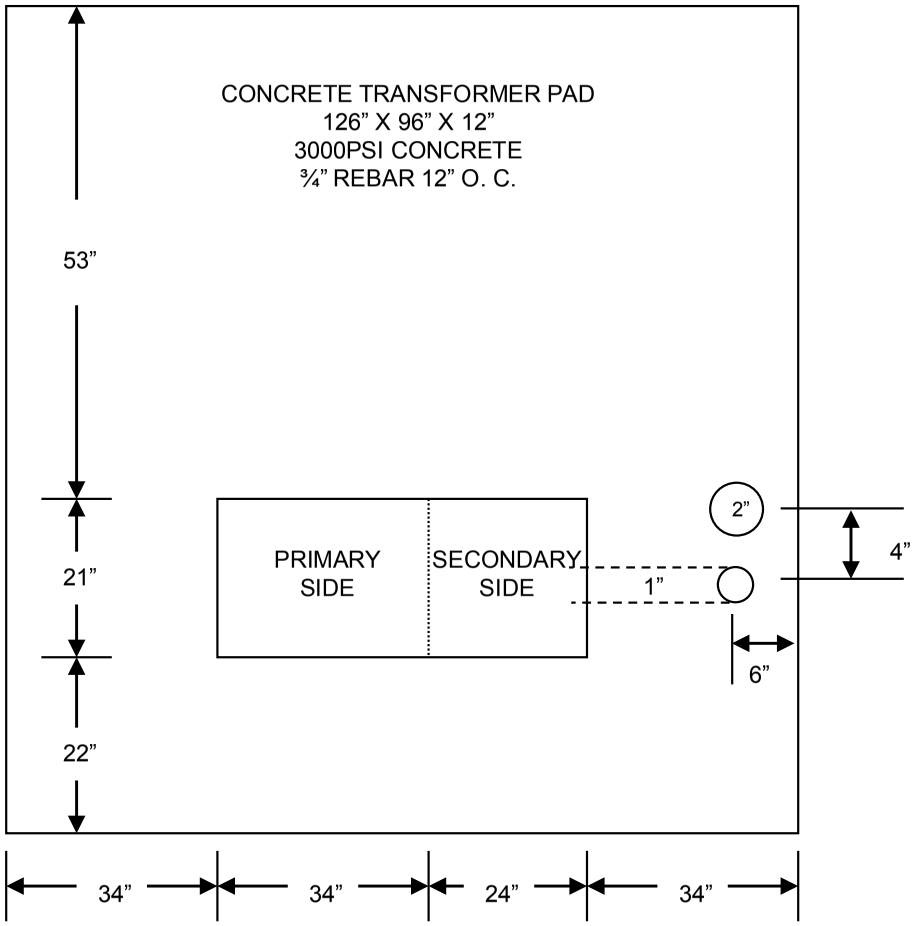
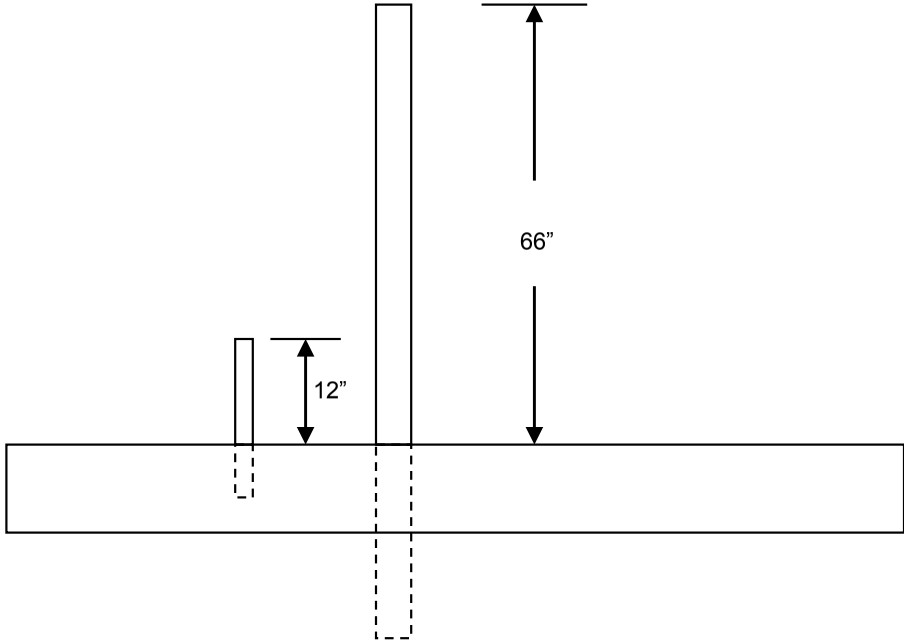
TYPICAL NOT FOR CONSTRUCTION

OVERHEAD VIEW



PROFILE VIEW



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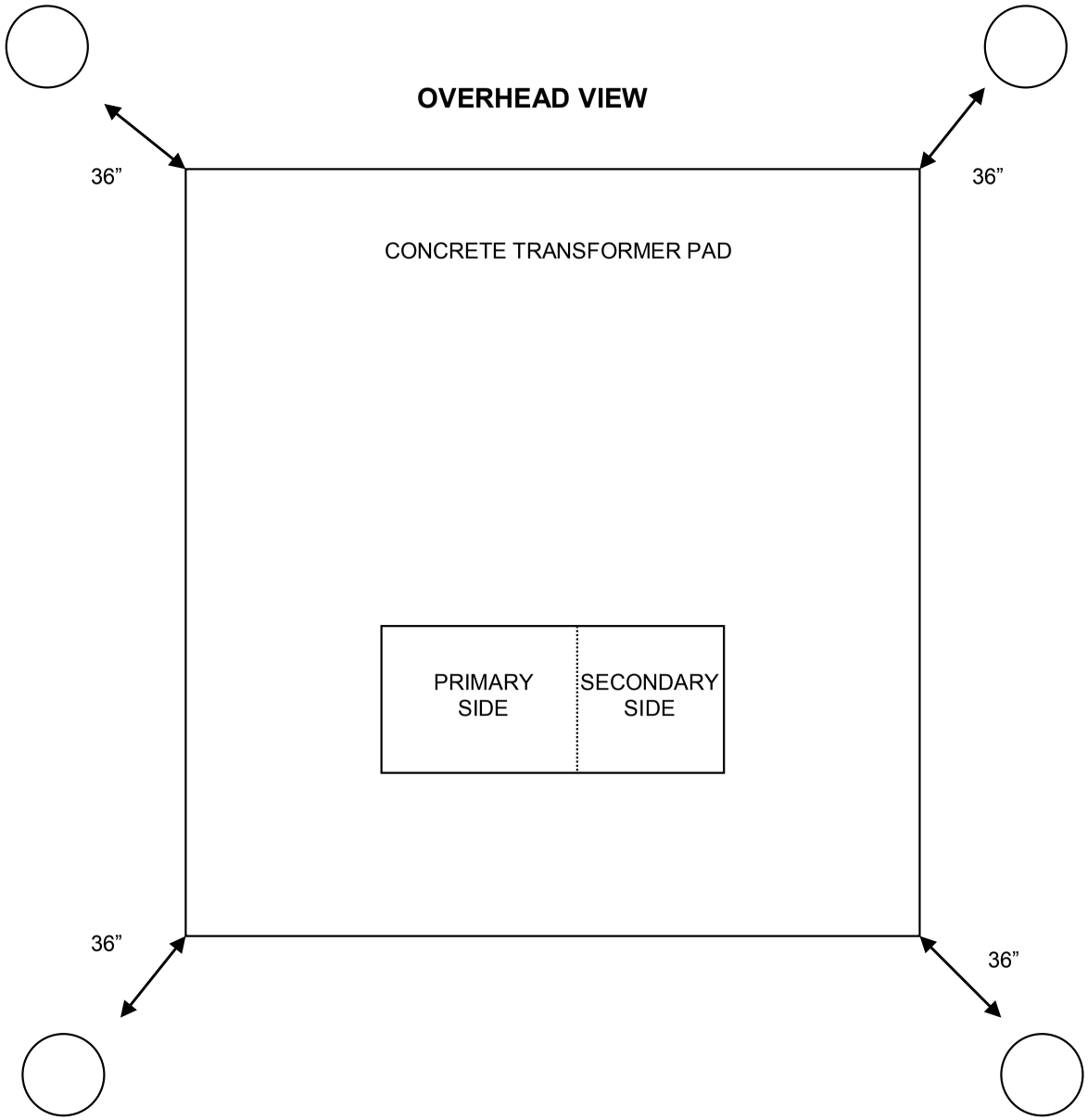
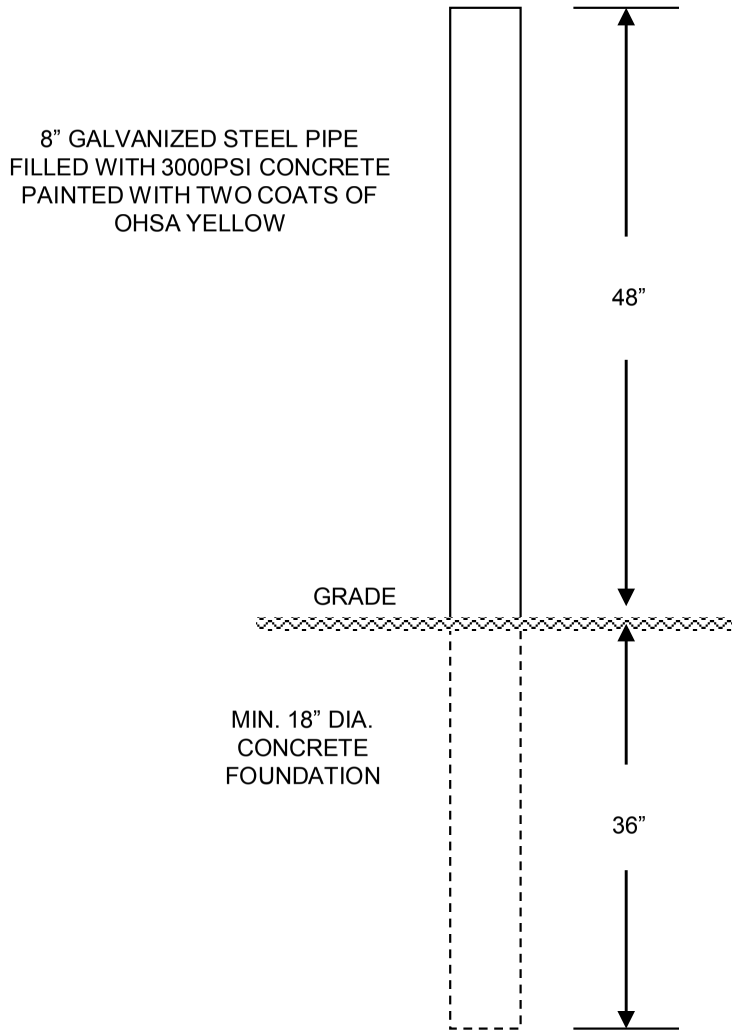
BOLLARD DETAIL

UG-3P-B





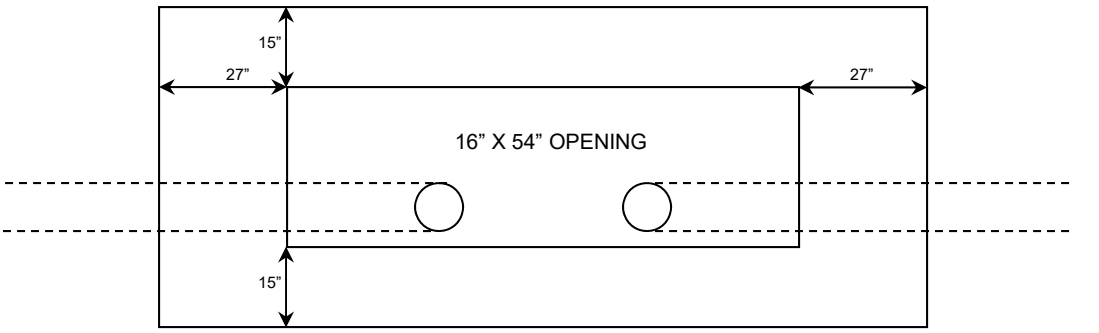
CPWS

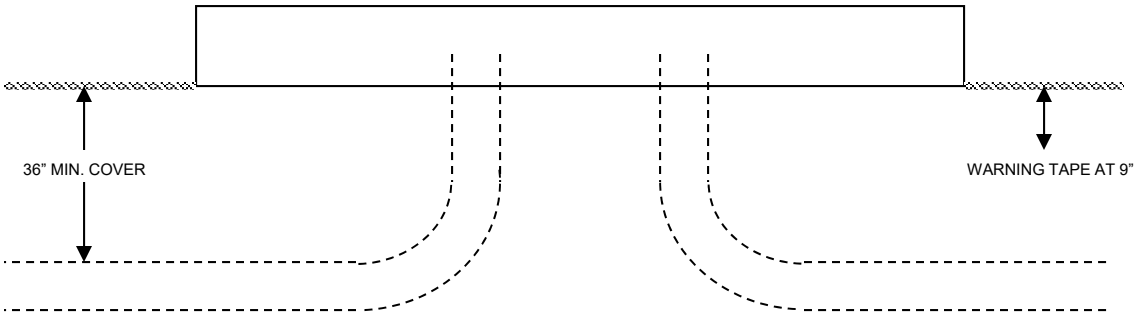
THREE PHASE
PRIMARY SWITCH PAD

108” X 46” X 12” CONCRETE PAD

1/2” REBAR - 12” O. C.

3000 PSI CONCRETE MIX





TYPICAL DUCT

4” GALVANIZED RIGID METAL SWEEP ELBOWS

4” PVC ELECTRICAL DUCT SCH. 40

GROUNDING BUSHING

NOTE : NUMBER & SIZE OF CONDUITS MAY VARY DEPENDING ON SPECIFIC LOCATION