



# Electric Service Policy

**Kerrville Public  
Utility Board**



*Safety. Our Way of Life.*

**Effective: March 2019**



March 1, 2019

Kerrville Public Utility Board (KPUB) internal company motto is “Safety. Our Way of Life.” We feel that safety is the cornerstone for everything we do in providing our customers safe, cost-effective, reliable service. In establishing safety as our way of life, we believe that clear communication is a core component. In order to provide clear communications with our customers, KPUB has revised our Electrical Service Standards. We hope you are able to use the service standards contained herein to help us achieve this goal as we serve you and our other customers.

No matter the size of your project, KPUB is here to provide assistance in a guiding and supportive manner. In aiming to provide clear communication to our customers, we decided it was time to revisit our electric service standards. We identified the need to provide our customers with a document that everyone could understand. We also wanted to ensure that all the necessary requirements for establishing electric service were successfully communicated in a clear manner. To facilitate both of these priorities, we reformatted, reorganized, and clarified our prior electrical service standards.

We acknowledge that establishing new electric service can be a daunting process. Our intent is to help simplify the process by providing written requirements for our customers, developers, electricians, contractors, KPUB employees, and any others that may be involved. By providing clear requirements, KPUB aspires to creating a trusting and lasting relationship between everyone involved. The revision of our electrical service standards is one of many planned methods KPUB is pursuing to achieve this goal.

Respectfully,



Tommy Nylec, P.E.

Chief Engineer

Kerrville Public Utility Board

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## Revision Summary

Edition	Date Effective	Summary of Major Changes
1.0	September 3, 2004	Original
2.0	March 1, 2019	Creation of revision summary; Adjustments to available service voltages and meter forms; Change to customer provided meter sockets; Establish limits for overhead transformer sizes; Updates to Outdoor Lighting; Reductions in trench width; Updates customer ground requirements; Removal of Foreign Attachment Section; Clarification of easement requirements; Disallow line tap connections for DG installations.





## Introduction

### **Scope and Purpose**

The Electric Service Policy is issued by the Kerrville Public Utility Board ("KPUB") for use by its customers and their agents.

The policy is to be used as a guide in planning the installation of electrical equipment and methods of receiving electrical power from the distribution system of KPUB. The service policy is comprehensive but cannot cover all situations that may be encountered. If service methods other than those in this book are required, the Customer shall obtain written KPUB approval to any conditions not covered in this policy. Additionally, the information presented herein will be revised periodically to reflect changes as deemed necessary by KPUB.

This policy outlines the service requirements that must be met in order to receive electric service from the KPUB distribution system. If a customer should be disconnected for anything other than non-payment, the customer will be required to bring service entrance to meet the current service policy requirements.

## General

### **Service Area**

KPUB will supply electric service to any Customer within the service area boundaries as certified to KPUB by the Public Utility Commission of Texas. Maps defining KPUB service area are available upon request and can also be found on our website. KPUB Engineering can determine if a defined location is within the KPUB service area and provide an Electric Service Availability Letter upon request.

### **Application for Service**

Customer must make written application for electric service and pay all deposits and fees as required by KPUB Service Regulations and Tariffs.

Customers may inquire about receiving electric service as far in advance as practical and shall provide complete information regarding utilization equipment, connected load, service requirements, schedule, and complete set of final drawings of proposed structures. KPUB will require application for service to be made before the any necessary facilities are scheduled for construction.

### **Standard Service Voltages**

Service is provided with alternating current at a nominal frequency of 60 Hz.

<i>Single Phase</i>	<i>Three Phase</i>
120/240	120/208Y
	277/480Y
	7200/12470Y

As of January 2018, 240/480 Volt three phase service will only be provided for existing services. All new three phase services must be 277/480 V, 120/208 V, or 7200/12470 V.

### **Standard Ampacities**

The largest overhead transformer size provided is a 75 kVA single phase or 225 kVA three phase. Any

service requiring capacity above these limits will require a pad mount to be installed.

For all load requests over 400A, three phase service is required. Any three phase request over 750 kVA will require 480 V secondary service or primary voltage service. Please refer to the Meter Sockets section to determine the appropriate meter socket provided these requirements. For standard residential service and in order to meet service entrance fault current ratings, the typical transformer size will be a 100 kVA.

## **Ownership**

No person shall, by the payment of Contribution In Aid of Construction (CIAC) or causing any construction of facilities donated to and accepted by KPUB, acquire any interest or right in any KPUB operated facilities, or any portion thereof. The installation of any civil infrastructure prior to the point of service performed by the customer to establish electric service will become the property and responsibility of KPUB after inspection and installation of electrical facilities have taken place.

## **Contribution In Aid of Construction**

Contribution In Aid of Construction (CIAC) is the amount owed by the customer to KPUB to establish electrical service. Per KPUB Rates and Tariffs, KPUB has established an amount that KPUB allocates to establishing a new customer. This allowance is provided to every customer and is often communicated in terms of distance that existing lines can be extended. Any cost to establish service over the allowance is considered to be CIAC. CIAC is calculated by creating an estimate for necessary work less the amount of the defined service allowance. CIAC charges are nonrefundable as it is used to offset cost of material not typically stocked. CIAC charges must be paid before construction activities can be scheduled.

## **Safety**

KPUB considers safety a top priority in establishing electric service for its customers. This service policy outlines best practices to achieve this goal. Any alterations or additions to existing service should adhere to the current KPUB service policy. Any connection or disconnection of electrical service to KPUB facilities shall be performed by KPUB authorized personnel.

## **Continuity and Quality of Service**

KPUB shall use reasonable diligence to supply steady and continuous service consistent with good management and construction practices, but does not guarantee the service against irregularities, interruptions, or variations through operation of its distribution facilities. KPUB provides no expressed commitment to provide 100% uninterruptible power. Should a customer have such requirements, the customer is responsible for installation of power conditioning, protection, or backup power at their expense and subject to the requirements in the Special Utilization Equipment section.

KPUB service responsibility terminates at the defined point of service. KPUB voltage delivery requirement follows ANSI C84.1 delivery requirements at the point of service and shall not exceed +/- 5 percent. The customer should consult with a qualified electrician to ensure proper voltage is maintained beyond the point of service.

## **Liability**

KPUB is responsible for the design, installation, operation, and maintenance of distribution electric facilities, up to and including, the point of service, except as provided elsewhere in this document. KPUB is not, and shall not be, liable for damages to customer equipment through operation of its distribution facilities in providing electric service. Furthermore, KPUB cannot operate or provide advice on customer owned electrical equipment beyond the point of service.

## **Security**

KPUB normally installs locking devices or seals on meters, service enclosures, pad mount transformers, switchgears, and other equipment. Tampering with the meter, equipment, or conductors carrying

unmetered current, or unauthorized breaking of KPUB's seals or locks is illegal and may expose the public to a hazard. Only authorized KPUB personnel or its defined agents shall remove a seal or lock. Any service found to have been tampered is subject to disconnection. KPUB will pursue tampering and theft of service to the full extent legally available.

## **Codes**

The requirements in this book are based upon the applicable provisions of these codes provided below. Customer's wiring and electrical equipment shall be installed in accordance with the latest editions of these codes. Where municipal, state, or KPUB requirements exceed those stated in these codes, such requirements shall govern.

### **National Electrical Code (NEC)**

The NEC is an American National Standard, published by the National Fire Protection Association, and is used by electrical contractors to install Customer electrical facilities.

### **National Electrical Safety Code (NESC)**

The NESC is the American National Standard ANSI-C2, published by the Institute for Electrical and Electronics Engineers (IEEE), and is used by KPUB for design and construction of electric supply facilities.

## **Clearances**

Clearance from KPUB facilities is governed by the NESC, government agencies, and as outlined in this service policy. The governing clearance from these codes will be the most restrictive as allowed by prudent engineering judgement and as determined at KPUB's discretion.

## **Attachments to KPUB Facilities**

KPUB does not permit any attachments such as wires, ropes, signs, banners, or equipment to KPUB facilities by others except as authorized by written agreement. KPUB may without notice and without liability remove unauthorized attachments to KPUB facilities. Contact KPUB Engineering for further details.

## **Antennas, Signs, Light Standards**

Antennas such as those for television and radio, signs, light standards, and similar equipment shall not be erected over, under, or in close proximity to KPUB's electric lines, or on KPUB's poles or other equipment. These items should be located as far as practical from KPUB's lines so that they may not accidentally contact energized wires. To do otherwise may result in serious injury or death, and damage to property. When planning an installation in the vicinity of KPUB lines or poles, contact the Engineering department to verify required clearances. The attachment of antenna guys to poles supporting KPUB's wires is prohibited. Such attachments will be removed immediately and without liability upon discovery by KPUB.

## **Oversized Loads**

KPUB must be notified of the intent to move a house or other oversized load along a road over which KPUB's electric lines cross. With advance notice of the time and route of the move, KPUB will schedule a serviceman to accompany the moving. Under no circumstances shall anyone other than an authorized KPUB employee remove, cut, raise, or handle any KPUB facilities when moving a structure. The Customer will be invoiced for all expenses incurred by KPUB. A minimum 24 hour notice is required.

## **Right-of-Way**

Customer shall grant to KPUB any easement or right-of-way deemed necessary by KPUB for providing and maintaining electric service to Customer. Customer shall provide, at no cost to KPUB, suitable

space on Customer's premises, accessible at all times, for the installation and operation of facilities necessary to provide electric service to Customer. The customer is responsible for the clearing from ground to sky of all vegetation within the defined right-of-way. Additional clearing may be required to facilitate construction activities beyond the limits of the defined right-of-way. Customer must clear right-of-way before the design can be finalized and released for construction activities. The customer requesting service is responsible for the collection of any necessary easements from other property owners to establish electric service.

## **Service to Adjacent Properties**

Customer shall not extend wiring across or under a public street, alley, or avenue of other way in order to furnish electric service to another property or premises through one meter, even though Customer owns such property or premises, unless written consent is obtained from KPUB. KPUB reserves the right to discontinue service to a Customer whose electrical facilities cross properties for which they do not have legal authority to operate such facilities.

## **Easements**

Standard easement for KPUB facilities is 20 feet wide measured 10 feet laterally on both sides of proposed lines. The length of the easement should encompass all proposed facilities as designated by KPUB personnel. KPUB will provide standard easement documentation that shall be used. A survey indicating the bounds of the easement will be required as an Exhibit. Easements will need to have notarized signatures from KPUB and the property owner prior to execution. A copy of the unedited, recorded easement must be provided prior to the release of proposed electrical design for the scheduling of construction activities. For easements to be recorded on a survey plat, please contact KPUB Engineering department for inclusion of applicable language and defining of easement extents.

## **Tree Trimming**

After electrical service is established, KPUB is responsible for the maintenance of vegetation within provided easements in order to reliably operate our electrical distribution facilities. KPUB reserves the right to trim or remove any vegetation that may interfere with safe operation of electrical facilities. KPUB will not remove or trim vegetation for lines operating at voltages below 600 V. Customers are responsible for coordinating a necessary outages in order to perform such activities safely.

## **Determining Location of Existing KPUB Facilities**

KPUB shall provide the approximate location of underground facilities upon request and with at least two full working days' notice. State law requires anyone performing excavation deeper than 18 inches to call for underground utility cable locations at least two full working days (48 hours) prior to excavation. The excavation must not be started until locations have been marked or the utilities have informed the excavator that they have no facilities in the area. To satisfy this legal requirement, please call 811 before performing any digging. The service is free to everyone and helps to protect utility assets and general public safety. The service does not provide location services of privately operated facilities such as customer owned lines such as electrical wires, irrigation, or septic lines.

## ***Customer's Electrical Installation***

Details of establishing electrical service specific to the type are located in the following sections, Overhead Service or Underground Service. The following sections apply to both such situations.

## **Electric Load Form**

Customers are required to submit a completed Electric Load Form to KPUB that adequately conveys the customer's electrical service needs. This document is critical for KPUB Engineering to perform calculations to facilitate KPUB providing adequate capacity to the customer. The form can be found on our website. In addition to the load form, KPUB may request additional information such as one line diagrams, equipment specifications, and property survey plats.

## Alterations and Additions

KPUB installs facilities necessary to provide adequate electric service to Customer's equipment as described on the Electric Load Form. Customer shall notify KPUB of any alterations or additions to Customer's electrical installation before and after electric service is established.

Services, meters, or metering equipment shall not be removed or relocated except by authorized KPUB employees. Customer should make arrangements for such work with KPUB when the wiring changes have been completed and inspected by the governing authority.

## Electric Service Main Disconnect

Customer shall provide and install suitable disconnecting means on the outside of the building as close as possible to the point of service. Customer may locate main disconnect inside the building provided it is in an equipment room designed for that purpose having an outside door only and the door is accessible by a hasp with a padlock for fire department use. Approval of a Kirkkey interlock device by the fire department must be submitted prior to KPUB approval of such an installation. The equipment room door shall be marked "Electrical Equipment Room - Disconnect Inside" by permanently affixed letters no less than 1" high.

## Load Balance

Customer shall install and control the use of electrical equipment so that Customer's electrical load at the point of delivery remains in reasonable balance. Customers are responsible for maintaining reasonable balance of their load between all delivered conductors to prevent overload of KPUB service equipment.

## Grounding

All neutral conductors of all service entrances shall be solidly grounded. Customer shall provide a grounded (neutral) conductor of not less than two sizes smaller than the service entrance ungrounded conductor. The grounded conductor shall have white or gray insulation or be marked with white tape at weatherheads and meter socket. Customer shall provide a permanent grounding electrode conductor as required by the NEC. This grounding conductor shall be connected to the service entrance equipment, and neutral terminal in the service disconnect. It shall originate from the service entrance equipment and shall not terminate in meter socket. Customer shall install a driven ground rod, which meets or exceeds the requirements of the NEC at each meter location or point of service. Water pipes shall not be used for grounding purposes. Any other utility service entrances within 3 feet of the electrical service shall be bonded to the electrical ground. Ground resistance shall not be more than 25 ohms. All grounding connections shall be accessible for inspection. Coordination with the customer or their electrician and KPUB is recommended to confirm the grounded conductor for non-standard voltages. KPUB normally grounds the midpoint of one of the transformer secondaries in a three phase, 4 wire, delta connected service.

## Protective Devices

Customer is responsible for the proper protection of Customer's electrical equipment and facilities from over/under voltage and current, phase reversal, and phase failure. Customers are responsible for installation of equipment to prevent damage to their equipment including any potential loss of a single phase on three phase services. Upon request KPUB shall supply data regarding the maximum available fault current at the point of service. Fault current values are calculated utilizing an infinite bus assumption. This approach allows KPUB to operate distribution facilities, i.e. modification of power source and feed, and allow customer service equipment to meet those fault conditions.

## Surge Arrestors

Surge or lightning arrestors for secondary voltages are not required. When installed by Customer, they shall be connected to Customer's facilities on the load side of Customer's electric service main

disconnect.

## Customer Service Conductors

Customer service conductors shall be color coded as indicated below and in accordance with NEC.

Color Coding of Customer's Service Conductors				
Service Type	Phase			
	A	B	C	N
120/240V, Single Phase, 3 Wire	Red/Black	Black		White
120/240V, Three Phase, 4 Wire Delta – Through Meter Equipment	Red	Black	Orange (High-Leg) (NEC 230-56)	White
In Service Equipment	Red	Orange (High-Leg) (NEC 230-56)	Black	White
120/208V, Three Phase, 4 Wire Wye	Red	Black	Blue	White
277/480V, Three Phase, 4 Wire Wye	Brown	Yellow	Purple	Natural Gray

Green shall be used for the grounding conductor only. For three phase, 4 wire, delta secondary services, the high-leg shall always be connected as follows:

- In meter sockets, including pre-wired transockets, to the right hand terminals
- In CT enclosures to either the right hand CT or the bottom CT
- In service equipment to the center bus

## Special Utilization Equipment

Installation of equipment such as motors, welders, furnaces, x-ray, transmitters, etc. should be reviewed by KPUB so that adequate electric service can be provided and maintained to all Customers. Such information should be conveyed with submittal of the Electric Load Form.

## Auxiliary Generators, Battery Backup, Photovoltaic, & Other Distributed Generation Sources

Where energy sources other than that supplied by KPUB are installed, Customer shall install as per KPUB specifications a switching and control system to prevent the energization of KPUB facilities by Customer's energy source. Such alternative energy sources shall not be installed without prior written approval from KPUB, which may be obtained by submitting the following:

- Wiring schematic showing KPUB service entrance, standby service equipment, all panels, metering equipment, transfer switch
- Cut-sheet of the transfer switch
- Signed statement from Customer's licensed electrician or engineer that the equipment has been installed as per KPUB Electric Service Policy and the NEC

For interconnected distributed generation the following is required:

1. Completed application for interconnection and parallel operation of distributed generation (DG) with KPUB distribution facilities.
2. Executed agreement for interconnection and parallel operation of distributed generation.

Distributed generation systems should be terminated to a load side breaker sized in accordance with NEC. KPUB does not allow the utilization of tap connections to service wires that do not terminate to a breaker.

KPUB is not responsible for any necessary changes to adhere to service policy requirements that may result due to installations occurring prior to the customer securing an approved application and executed interconnection agreement. Should a customer need to establish service in their name at a location with a previously approved DG installation, they will be required to execute a new interconnection agreement at time of service application.

## **Harmonics**

KPUB customers shall limit harmonic current distortion measured at the point of service to that specified in IEEE Standard 519. KPUB may measure harmonic distortion at the customer's point of service and require the customer to install equipment and make adjustments in their electric distribution system as needed to mitigate harmonic currents.

## **Inspections**

In those locations where required by law, KPUB customer shall have his electrical installation inspected and approved by the proper authority. KPUB will provide electric service to the customer only after the customer has provided notification of approval from the inspecting authority certifying the customer's installation. Service equipment and civil installations are subject to inspection by KPUB personnel to ensure adherence to service criteria listed in this policy and other documents.

KPUB may refuse to provide electric service to any new or altered installation, or disconnect service to any existing installation which KPUB considers hazardous or of such character that satisfactory service cannot be given. The providing of electric service by KPUB does not indicate that KPUB has inspected the customer's electrical installation and deemed it safe or adequate.

## ***Non-Standard Requirements***

Customer shall pay the excess cost of any installation necessary to serve requirements above KPUB's standard electric service. All deviations from standard electric service shall be approved by KPUB in writing before service is connected. KPUB, under sole discretion, will determine what is considered to be standard electric service at a specific location for a specific load.

## **Relocation or Modification of Existing Facilities**

No person, not employed by KPUB for such purposes, will in any way alter, adjust, or extend any part of the electric distribution facilities belonging and operated by KPUB. Request for relocation or modification of existing facilities shall be approved by KPUB. The customer making such request shall be responsible for all costs to perform the modifications.

## **Two Way Feed**

The customer shall pay the cost of additional facilities required to fulfill a request for two-way feed. In addition to a submitted electric load form, the following information shall be provided by the customer for KPUB to design facilities for this capability.

- Total electrical load to be served under normal operating conditions from preferred feed.
- Amount of electrical load to be served under emergency operating conditions from alternate feed.
- Preference of overhead or underground service.

- Selection from the following options of an acceptable duration of outage for transfer to alternate feed: less than 4 hours, 1 hour, 30 seconds, 1 second, or less than 1 second.
- Alternate feed from different substation or different feeder of same substation.

The customer is responsible for the utilization of any uninterruptible power supply to prevent an intermittent outage due to the operation of KPUB equipment switching between provided feeds.

## Foreign Attachments

Corporations, government agencies, and other organizations may obtain the right to attach their facilities or equipment to KPUB poles or other structures only by execution of a contract for such purpose. Joint use agreements shall be individually negotiated between the requestor and KPUB. All facilities owned by others attached to KPUB structures shall at all times and under all required conditions meet or exceed the applicable codes as in Codes section of this policy. Any attachments found to be affixed to KPUB facilities that do not meet these requirements and/or not covered under an agreement are subject to immediate removal.

## Overhead Service

### Conditions

KPUB should install facilities for electric service along the front lot line on publicly maintained roadways. KPUB provides standard overhead electric service at KPUB's standard voltages in accordance with KPUB's extension policy. Standard overhead electric service at 600 volts or less should be limited to 225 kVA of load through a single customer's service entrance. KPUB may require loads exceeding the amount stated above to be served by pad mount transformers and underground service. If a customer requests an installation, which is non-standard, such service may be provided by KPUB at customer's expense.

### Responsibilities

Below is a summary of responsibilities for both KPUB and the customer in establishing overhead service.

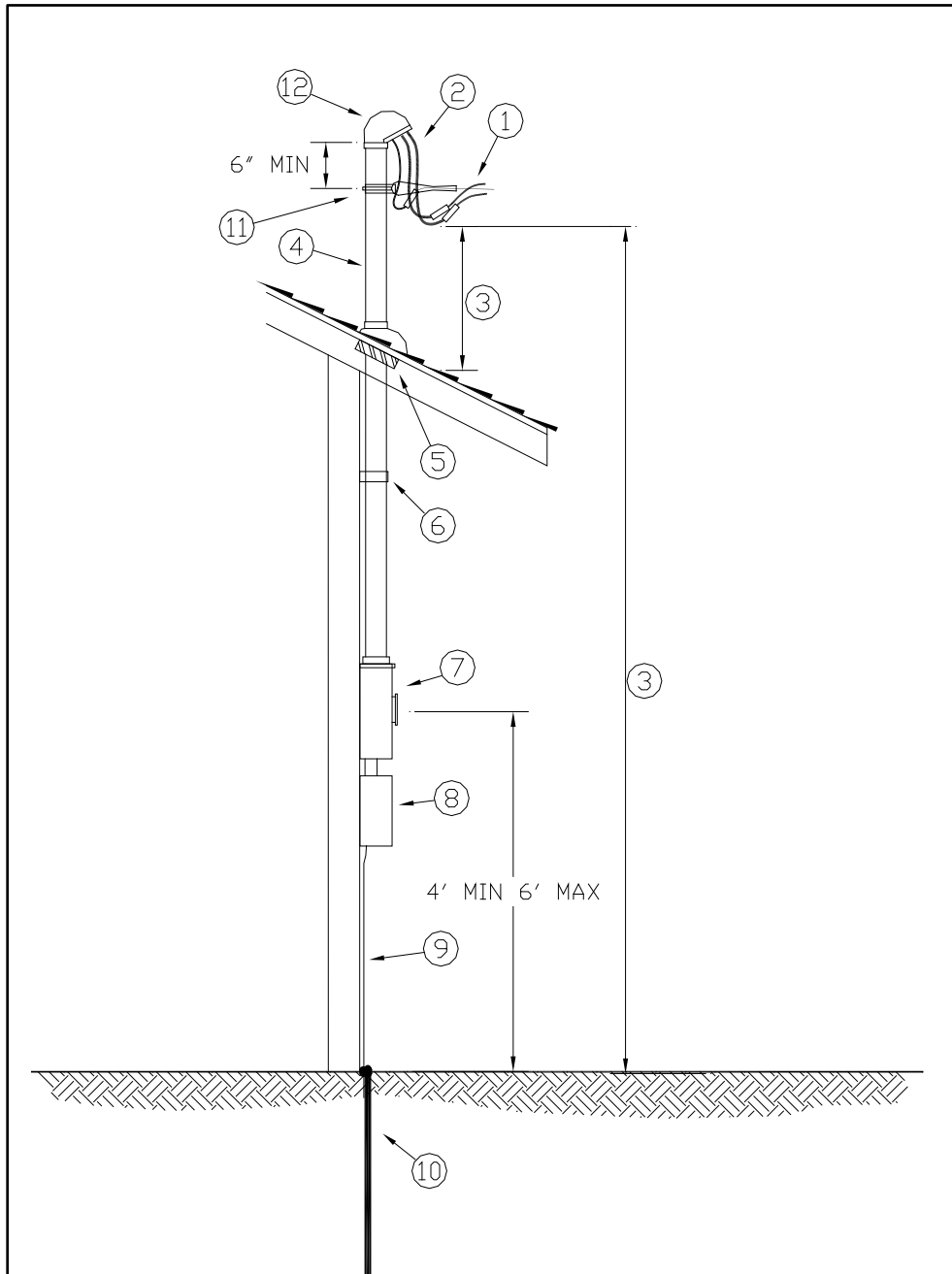
KPUB	Customer
Design and layout of electrical facilities including poles, guys, anchors, transformers, conductors, service drops, and metering.	Properly mark all phases of service conductors.
Providing construction details and plans for items to be furnished by customer.	Provide suitable space and structure for service drop attachment.
Staking all pole locations as per design layout. Customer must have all property corners clearly marked and right-of-way cleared before staking is begun.	Provide site at final grade, clear of all trees and other obstructions as required by KPUB.
Verifying meter sockets are on approved parts list and installing meters.	Stake all property corners with iron pins or other similar means such that corners are easily identifiable and will not be disturbed.
Designating the point of service and the meter location.	Full set of site plans showing grading, paving, drainage, easements, other utilities or underground facilities. Submittal in electronic CAD format is preferred.
Making all connections at the point of service.	Full set of building plans including architectural,



Providing connectors for this purpose.	mechanical, electrical, and plumbing designs.
Designate location of, provide, and install service drop attachment on customer's building.	Final recorded plat of subdivision or development in electronic CAD format.
Provide and install service drop to point of service.	Provide and install meter socket(s) for permanent service.
	Provide easements required by KPUB at no cost to KPUB.
	Provide written construction schedule including dates for temporary and permanent service
	Provide load information including square footage, HVAC unit ratings, motor horsepower, lighting, other equipment ratings and requirements. Specify hours/day of operation for premises and equipment.

## Typical Service Installation

### Self-Contained Meter



#### NOTES:

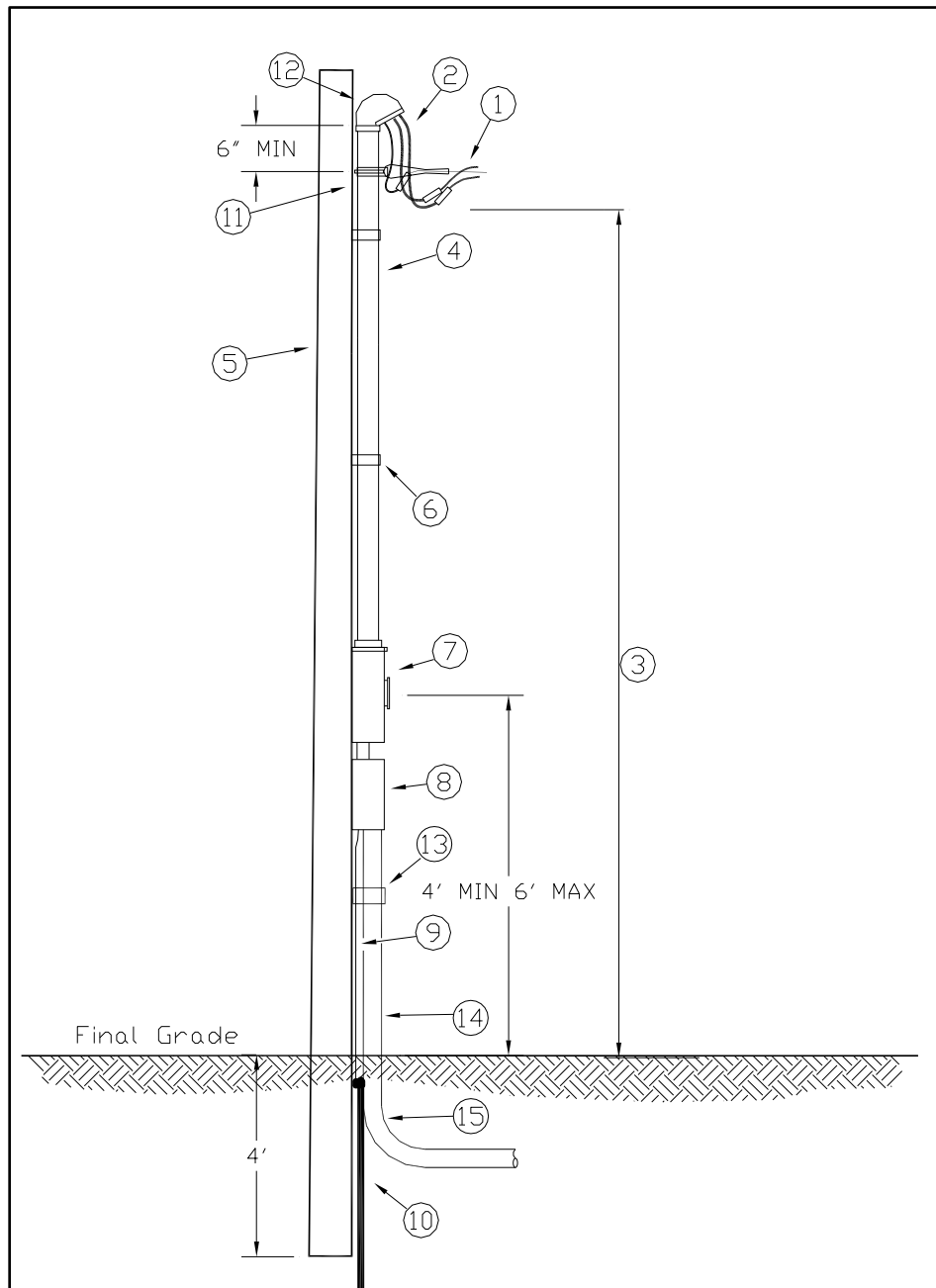
1. Service drop, connectors, and service grip provided, owned, and installed by KPUB.
2. Service entrance conductors provided, owned, installed, and maintained by customer. Extend conductors 24" minimum outside weatherhead or as needed for connection to service drop. Minimum #6 Al NEC approved conductor. Phase conductors shall have black insulation, neutral shall have white or gray insulation or white marking. Conductors should match to terminating device ampacity. Connections to service drop shall be made by KPUB.
3. Service mast shall be of sufficient height for the service drop including drip loop to maintain minimum clearances at all points along its span, minimum 18" over roof and 12 ft. over ground.

- Customer should contact KPUB for site-specific requirements.
4. Service raceway and mast roof kit provided, owned, installed, and maintained by customer. Service raceway shall be rigid galvanized steel or IMC conduit with no coupling above top conduit strap. Customer shall provide service mast of sufficient strength to support service drop. Any mast extending more than 24" above roof or having a service drop longer than 100 feet shall be sufficiently anchored with anchoring attaching to the mast in the immediate vicinity of the service attachment bracket.
  5. Mast shall have sufficient additional support where needed, i.e. 2"x6" framing between rafters to reinforce roof decking.
  6. Conduit strap clamp for mast support. If mast not used, two or more straps shall be installed.
  7. Meter socket provided by customer, and installed and maintained by customer. Socket shall be anchored securely to wall. Customer shall connect service entrance conductors to meter socket terminals.
  8. Customer's electric service main disconnect and shall be of rain tight construction.
  9. Customer's grounding electrode conductor. This conductor shall originate from the service entrance equipment and shall not terminate in meter socket. Conductor shall be #6 Cu minimum, and be connected to an NEC approved ground electrode. Conductor shall be protected as required by NEC.
  10. Ground electrode as required by the NEC, typically 5/8" x 8 feet copper clad ground rod, and with the top of the rod even with final grade or 4" below the surface. Any variances require KPUB written approval.
  11. Service drop attachment bracket provided and installed by customer. Service drop attachment point shall be a minimum of 6" below service head.
  12. Service head provided and installed by customer and shall be of rain tight construction with insulated bushing.

### **Instrument Rated Meter**

The instrument rated meter installation should be similar to that in Self-Contained Meter section. Instrument rated metering equipment including the meter is provided and should be installed by KPUB on a KPUB service pole located as near as possible to the point of service. KPUB shall provide and install the service drop to the point of service on customer's building.

## Meter Pole Installation



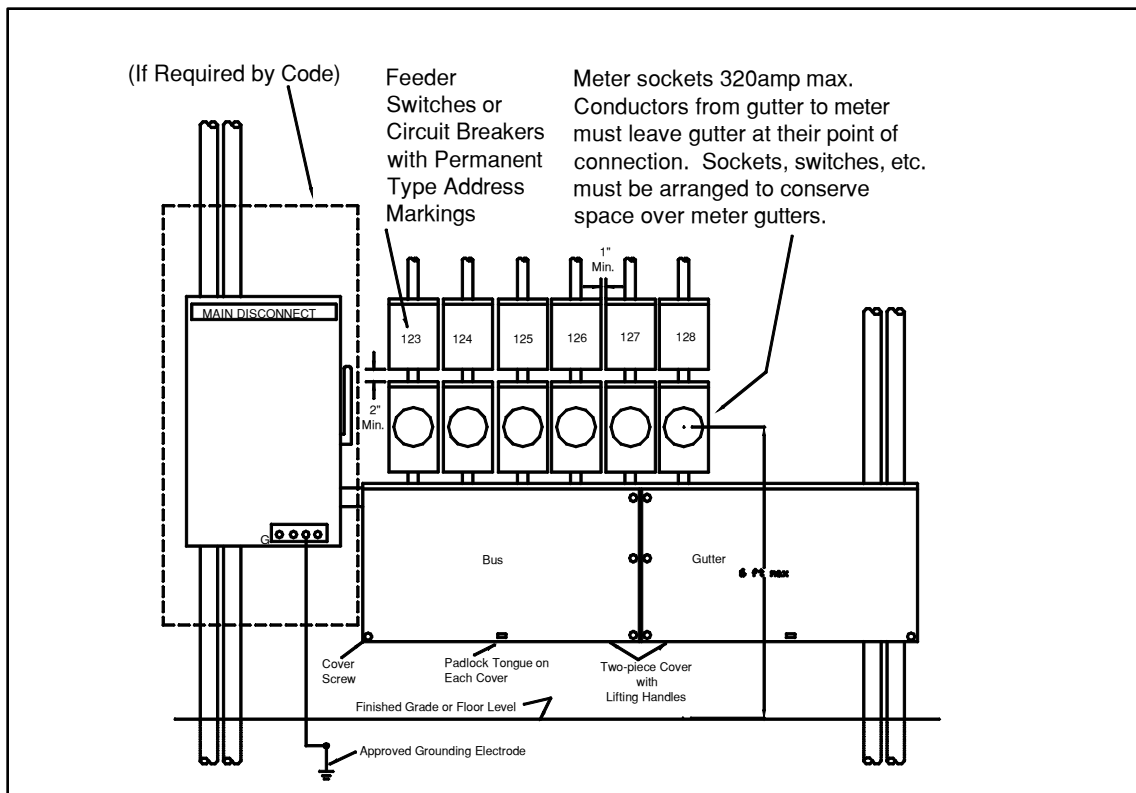
### NOTES:

1. Service drop, connectors, and service grip provided, owned, and installed by KPUB.
2. Service entrance conductors provided, owned, installed, and maintained by customer. Extend conductors 24" minimum outside service head or as needed for connection to service drop. Minimum #6 Al NEC approved conductor. Phase conductors shall have black insulation, neutral shall have white or gray insulation or white marking. Connections to service drop shall be made by KPUB.
3. Service raceway shall be of sufficient height for the service drop including drip loop to maintain minimum clearances at all points along its span, minimum 12 feet over ground. Customer should contact KPUB for site-specific requirements.
4. Service raceway provided, owned, installed, and maintained by customer. Service raceway

- shall be rigid galvanized steel, IMC, or EMT conduit with no coupling above top conduit strap.
5. Customer provided pole shall be unspliced, tapered, and treated wood with 4" minimum diameter top. Pole shall be installed without braces. Pole shall be set 4 feet minimum depth in tamped soil or concrete.
  6. Conduit strap clamp for raceway support. Two or more straps shall be installed.
  7. Meter socket provided by customer and installed and maintained by customer. Socket shall be anchored securely to pole. Customer shall connect service entrance conductors to meter socket terminals.
  8. Customer's electric service main disconnect and shall be of rain tight construction.
  9. Customer's grounding electrode conductor. This conductor shall originate from the main disconnect panel and terminate at the ground rod, but shall not terminate in meter socket. Conductor shall be #6 Cu minimum, and be connected to an NEC approved ground electrode. Conductor shall be protected as required by NEC.
  10. Ground electrode as required by the NEC, typically 5/8" x 8 feet copper clad ground rod, and with the top of the rod even with final grade or 4" below the surface. Any variances require KPUB written approval.
  11. Service drop attachment bracket provided and installed by customer. Service drop attachment point shall be a minimum of 6" below service head.
  12. Service head provided and installed by customer and shall be of rain tight construction with insulated bushing

### ***Multiple Occupancy Buildings***

Where allowed by the NEC and practical, meter sockets and service entrance equipment should be grouped together to allow installation of one service drop. Weatherheads shall be located within 3 feet of service drop attachment. Service entrance conductors shall extend minimum of 24" beyond service drop attachment. See also Multi-Family Gang Meter and Identification of Meter Sockets and Main Disconnects sections.



## Service Drop Attachments

Customer shall provide and install adequate service attachment. Customer shall make available a safe and adequate structure to which KPUB will attach service conductors. KPUB shall not be responsible for damage or injury to persons or property resulting from the condition of Customer's building or structure to which service conductors are attached or have been attached. If service conductors are to be installed on metal or masonry structures, Customer shall install suitable service attachment or anchorage. KPUB should be consulted for recommendations in these cases.

## Underground Service

### Conditions

KPUB should install facilities for electric service along the front lot line on publicly maintained roadways. Underground service will be made available where feasible based on engineering, operation, and economic evaluations. Evaluation is dependent upon customer providing civil infrastructure to KPUB specification. The final layout of electrical facilities as specified in Responsibilities provided below shall be provided by KPUB only after having received the approved preliminary plat and construction drawings for a subdivision or the full set of building plans for structures. Preliminary designs and layouts can be provided before such time but will be issued as not for construction.

All underground facilities installed for the distribution of KPUB's electric service up to the point of service, including those installed by others for this purpose, are the property of KPUB and are maintained by KPUB. All such installations provided by customer shall be inspected by KPUB prior to acceptance. Upon notification by KPUB of acceptance of the facilities as installed, Customer shall convey those facilities to KPUB. Civil infrastructure is not conveyed until electrical infrastructure is installed and energized. The customer is responsible for the maintenance of civil infrastructure until ownership is transferred to KPUB. Customer shall pay the costs of any rearrangements in the underground electric facilities, which may be required by customer after installation of such facilities.

Where KPUB provides underground electric service, KPUB retains the right to limit electric service to such underground distribution systems. Customer shall pay the full cost of relocating or removing existing facilities as requested by Customer. All new subdivisions in the City shall be served with an underground residential distribution system as per the City's ordinance.

## **Responsibilities**

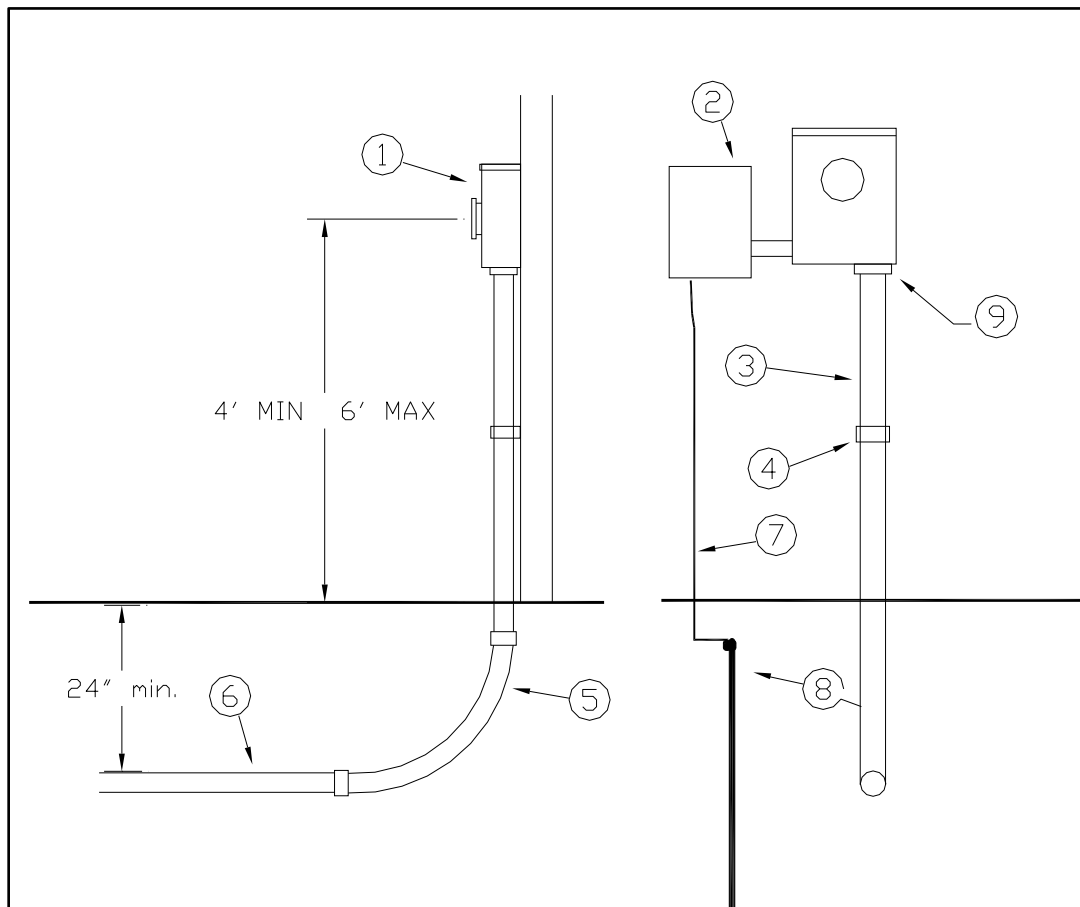
Below is a summary of responsibilities for both KPUB and the customer in establishing underground service.

<b>KPUB</b>	<b>Customer</b>
Design and layout of electrical facilities including trench, transformers, cabinets, hand holes, conduit, street crossings, metering, and conductors.	Properly mark all phases of three phase service conductors.
Providing construction details and plans for items to be furnished by Customer.	Provide all trenching, backfilling, and conduit as per KPUB specifications and design layout.
Verifying meter sockets are on approved parts list and installing meters	Provide site at final grade, clear of all trees and other obstructions as required by KPUB.
Designating the point of delivery and the meter location.	Stake all property corners with iron pins or other similar means such that corners are easily identifiable and will not be disturbed.
Determining the maximum number of service lateral conductors.	Provide concrete pads for all pad mounted equipment as per KPUB specifications.
Making all connections at transformers and hand holes, source side connections at meters. Providing connectors for this purpose.	Provide and install vaults and hand holes as per KPUB specifications.
(Residential) Provide and install service lateral conductors.	Full set of site plans showing grading, paving, drainage, easements, other utilities or underground facilities.
Inspection of items to be furnished by Customer.	Full set of building plans including architectural, mechanical, electrical, and plumbing designs.
	Final recorded plat of subdivision or development.
	Install meter socket(s) supplied by customer for permanent service.
	Provide easements required by KPUB at no cost to KPUB.
	(Residential) Provide trench, conduit with mule tape, and backfill for service lateral from transformer or hand hole to designated point of delivery.
	(Commercial) Provide, install, and maintain trench, conduit, and service conductors from service entrance equipment to designated point of delivery.
	Provide written construction schedule including

	dates for temporary and permanent service.
	Provide load information including square footage, HVAC unit ratings, motor horsepower, lighting, other equipment ratings and requirements. Specify hours/day of operation for premises and equipment.

## Typical Service Installation

### Self-Contained Meter



#### NOTES:

1. Meter socket furnished by customer and installed and maintained by Customer. KPUB owned service lateral conductors are installed by KPUB and source (top) connections made by KPUB. Customer's service entrance conductors are installed and connected in socket by Customer. Customer shall not install other unassociated equipment (gas meter, A/C unit, water/sewer services, etc.) within 3 feet of all sides and front of meter socket to allow for adequate working space.
2. Outdoor service entrance equipment or main disconnect of rain tight construction, mounted beside meter socket. Customer conductors shall not exit top of meter socket. There shall be no exposed wiring exiting the meter socket or service entrance equipment. All service entrance conductors shall be approved for use in outdoor locations. Neutral conductors shall have white or gray insulation or white marking.
3. Customer provided and installed 2" minimum rigid galvanized steel, PVC Schedule 80, or IMC

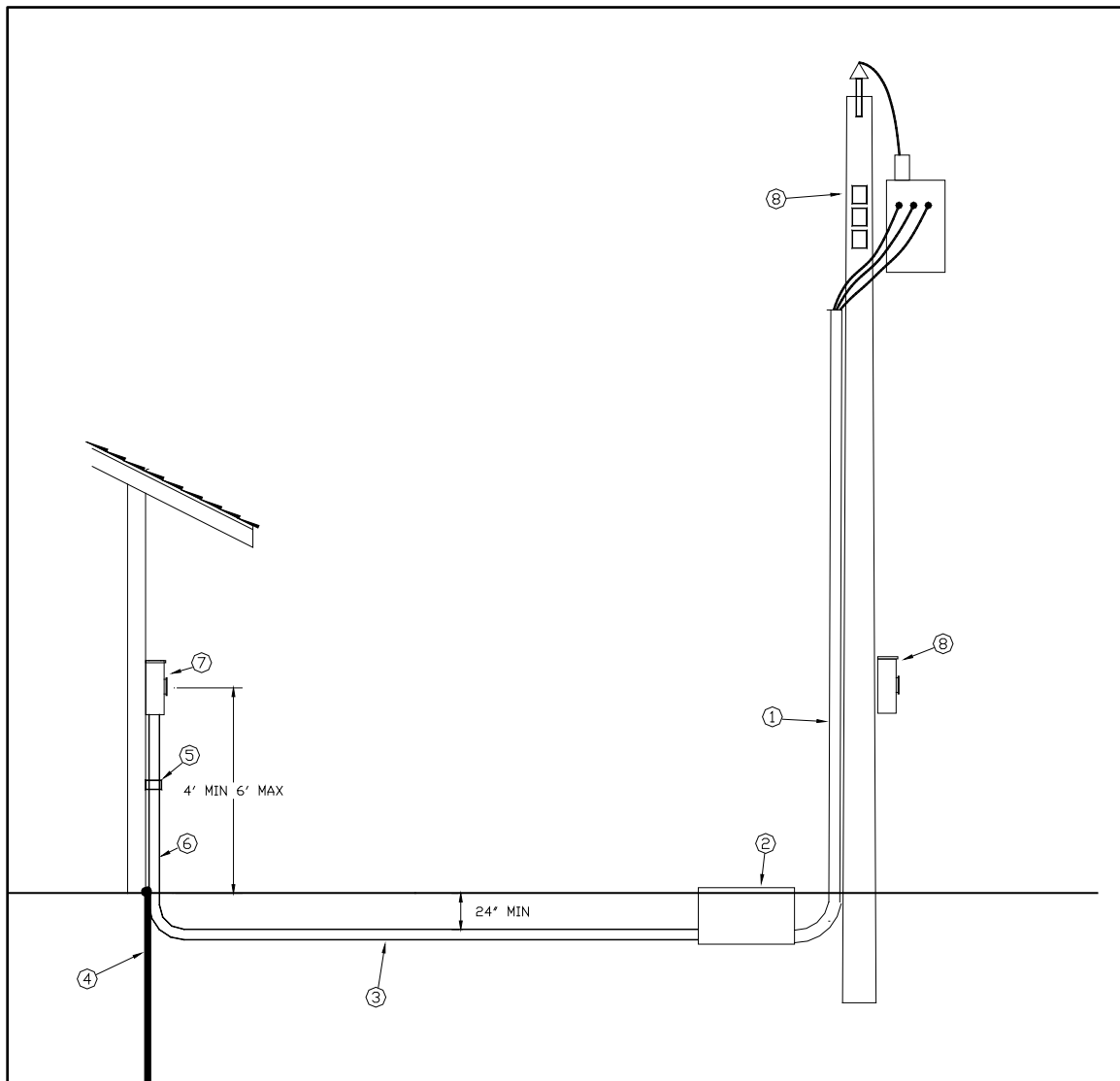


- service raceway. Steel raceway shall be continuously wrapped with Scotch tape No. 50 to 6" above ground line. Insulated conduit bushing required for all conduits terminating in meter socket. Customer shall install conduit to 12" below final grade and fit with female-female PVC adapter. If concrete flat work is poured around raceway, box out or sleeve conduit for mechanical protection.
4. One or more conduit straps to secure raceway to wall.
  5. Conduit PVC long radius bends provided and installed by Customer, owned, and maintained by KPUB.
  6. Service lateral raceway provided and installed by Customer, owned and maintained by KPUB. Raceway conduit shall be Schedule 80 PVC of size as determined by KPUB. All joints shall be made as per manufacturer's specification using suitable primer and glue. Conduit markings indicating Schedule 80 shall be visible and not face the wall.
  7. Customer's grounding electrode conductor. This conductor shall originate from the service entrance equipment and shall not terminate in meter socket. Conductor shall be #6 Cu minimum, and be connected to an NEC approved ground electrode. Conductor shall be protected as required by NEC.
  8. Ground electrode as required by the NEC, typically 5/8" x 8 feet copper clad ground rod, and with the top of the rod even with final grade or 4" below the surface. Any variances require KPUB written approval.
  9. Service lateral raceway shall be installed in either corner of meter socket opposite of customer wiring conduit as shown.

### **Multi-Family Gang Meter**

Gang meter sockets are to be approved by KPUB prior to being provided by and installed by Customer. Each of the sockets in the gang shall be clearly and permanently marked by Customer to indicate the location it serves prior to the connection of service. Markings should be made with permanent decals rated for outdoor use and of a minimum 1" in height. See also Multi-Family Gang Meter and Identification of Meter Sockets and Main Disconnects sections.

## Underground Service from Overhead Transformer



### NOTES:

1. Underground service lateral riser provided and installed by KPUB.
2. Hand hole provided and installed by KPUB. Contractor installation must be approved by KPUB in writing and is subject to inspection.
3. Residential. This item should be installed where more than one service is expected to be served from this location.
4. Commercial. This item shall be installed for all services and shall be the point of service. Customer shall install service lateral conductors from building to hand hole where KPUB shall make up connections.
5. Underground service lateral raceway installed by Customer, and owned and maintained by:
  - KPUB if residential
  - Customer if commercial. Raceway conduit shall be Schedule 80 PVC size as allowed by NEC. All joints shall be made as per manufacturer's specification using suitable primer and glue. Conduit markings indicating Schedule 80 shall be visible and not face the wall.

6. Ground electrode as required by the NEC, typically 5/8" x 8 feet copper clad ground rod, and with the top of the rod even with final grade or 4" below the surface.
7. One or more conduit straps to secure raceway to wall.
8. Customer provided and installed 2" minimum rigid galvanized steel, PVC Schedule 80, or IMC service raceway. Steel raceway shall be continuously wrapped with Scotch tape No. 50 to 6" above ground line. Insulated conduit bushing required for all conduits terminating in meter socket. Customer shall install conduit to 12" below final grade and fit with female-female PVC adapter. If concrete flat work is poured around raceway, box out or sleeve conduit for mechanical protection. A spare conduit is required for any installations under pavement.
9. Meter socket furnished by customer and installed by customer. KPUB owned service lateral conductors are installed by KPUB and source (top) connections made by KPUB. Customer's service entrance conductors are installed and connected in socket by customer. Customer shall not install other unassociated equipment (gas meter, A/C unit, water/sewer services, etc.) within 3 feet of all sides and front of meter socket to allow for adequate working space. See Typical Service Installation in the Underground Service section.
10. Instrument rated metering equipment, if required, excluding the meter socket is provided and should be installed by KPUB on the pole with the service lateral riser.

### **Instrument Rated Meter**

The instrument rated meter installation for underground service from overhead transformer should be similar to that in Underground Service from Overhead Transformer, reference Item 8 and 10 above. For pad mounted transformer applications, the instrument rated transformers and meter should be located on the pad with the service transformer. Consult with KPUB Engineering for specifications.

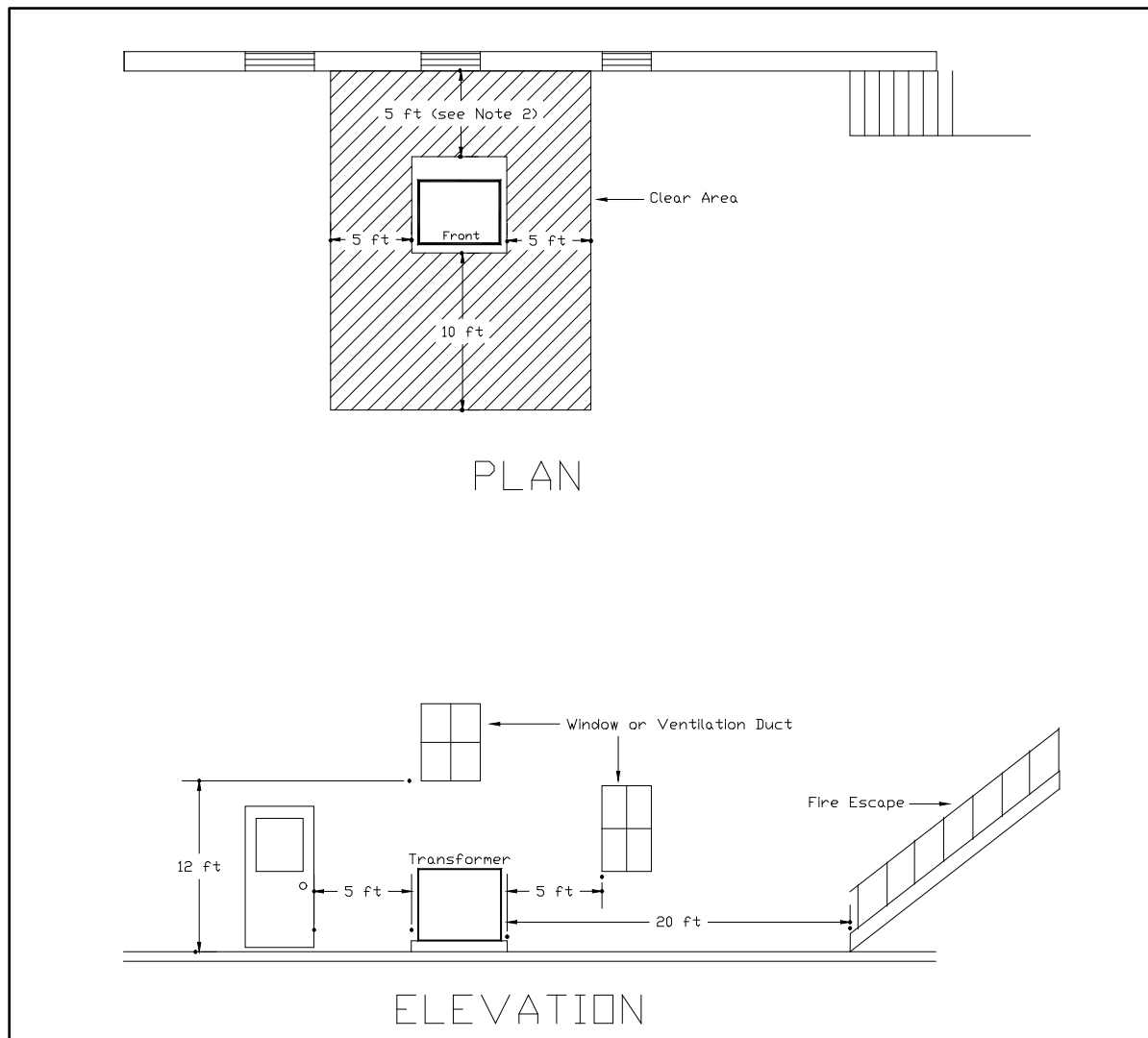
### **Mobile Home Pedestal**

Customer shall provide, install, and maintain meter pedestal that meets KPUB specifications. KPUB will install and connect service lateral to pedestal. KPUB shall designate the location of the pedestal.

### **Maximum Number of Service Runs**

<i>3 Phase Transformer kVA</i>	<i>Maximum Number 4" Conduits</i>	
	<i>120/208V</i>	<i>277/480V</i>
75-300	8	8
500	8	8
750	10	10
1000	-	10
1500	-	10
2000	-	10
2500	-	10

## Clearances from Padmount Equipment



### NOTES:

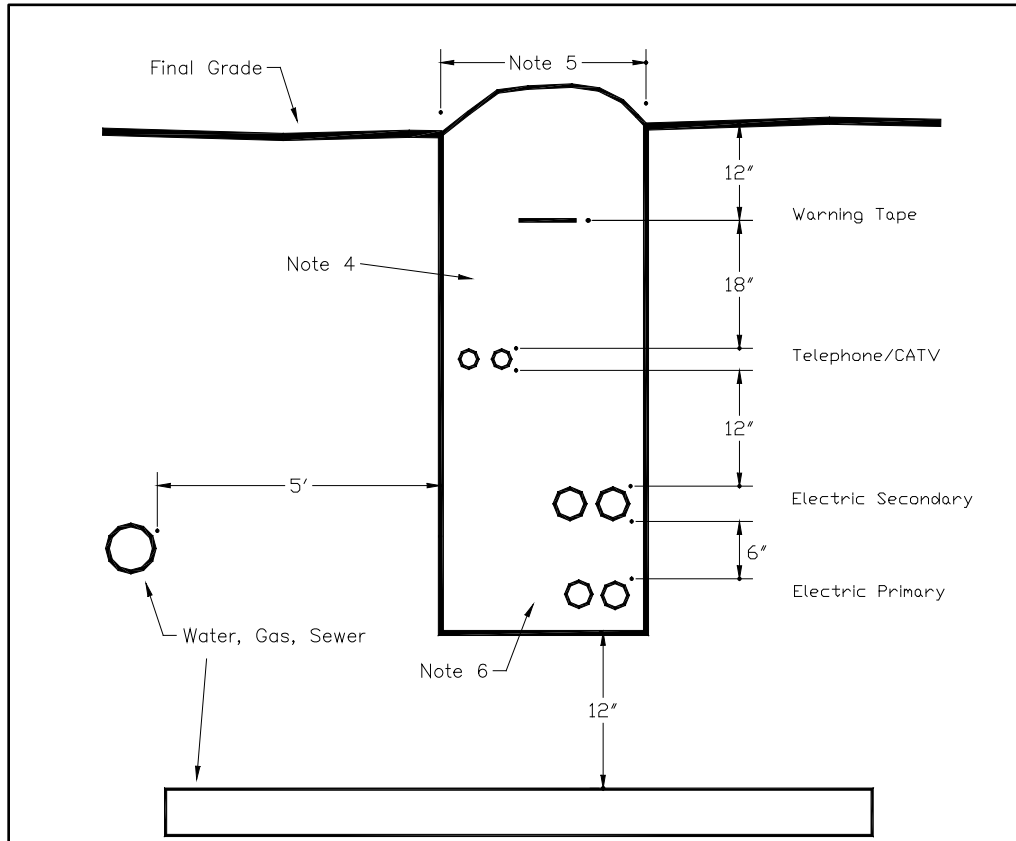
1. All dimensions are minimums
2. Increase clearance to 12 feet if window or vent behind equipment is less than 12 feet above ground and less than 5 feet lateral separation.
3. This drawing is applicable only to brick or masonry structures with a three hour fire rating. For other applications additional protection measures will be necessary.
4. Liquid flow of area surrounding equipment shall be away from building.
5. There shall not be any above ground obstructions, such as shrubs, gas meters, fencing, air conditioning units, etc. within 5 feet of pad or any overhangs above pad facilities.
6. When installed on private property there shall not be any piping or conduit under the pad other than those entering the equipment.
7. Equipment shall not obstruct fire lanes.
8. Bollard protection may be required depending upon equipment placement. Consult with KPUB Engineering for determination.

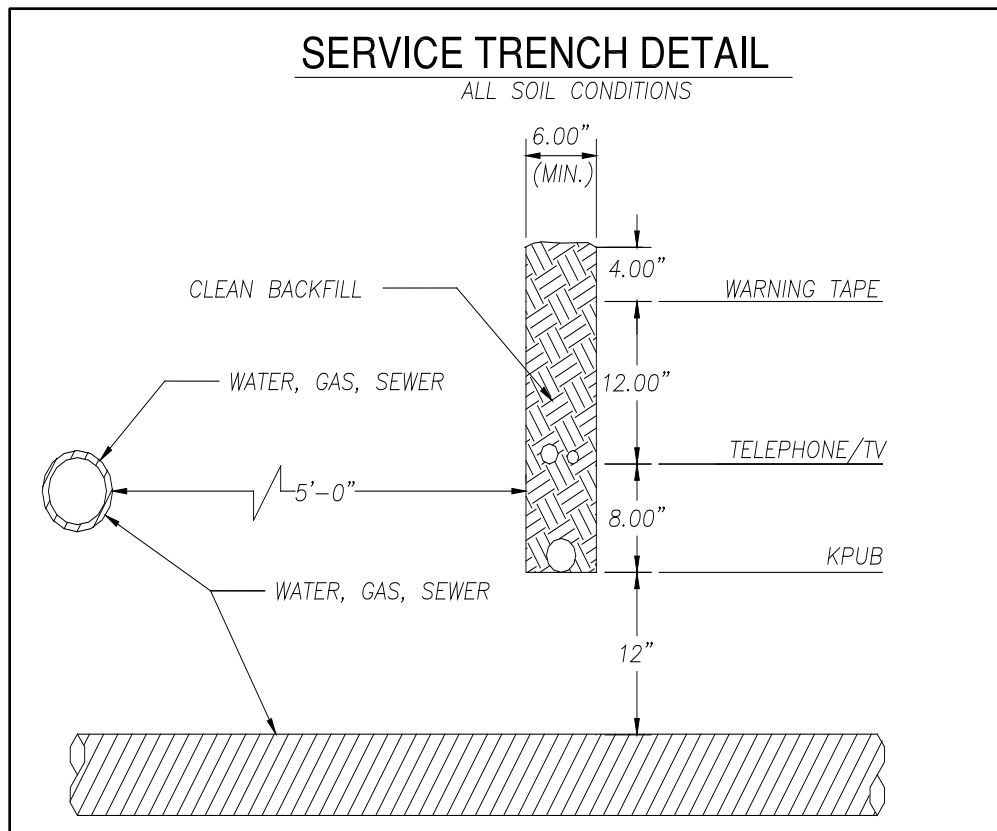
### Civil Requirements

Customer responsible for all civil infrastructure as specified by KPUB. KPUB requires open trench inspection for all installed civil infrastructure installed by the customer. Inspection requires a minimum of 24 hour notice for scheduling.

### Trenching and Conduit

Placement of utilities within street right-of-way should be coordinated with the City and other utilities to minimize conflicts at crossings and maintain needed clearances. KPUB shall provide the layout and route for underground electrical trench and conduit.



**NOTES:**

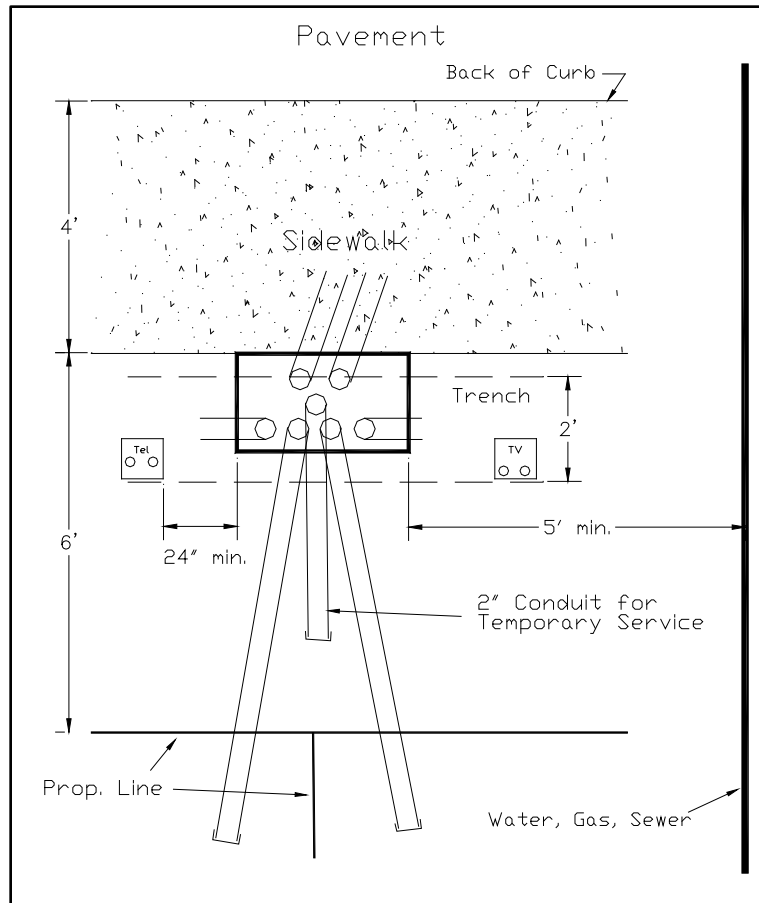
1. All dimensions are minimums and may require adjustments due to site-specific requirements, avoidance of obstructions, other utilities, etc.
2. Trench and completed conduit system shall be inspected by KPUB before backfill.
3. All conduits for KPUB facilities shall be PVC Schedule 40, except for bends for switchgear, risers, and other as specified which should be rigid galvanized steel. Galvanized conduit shall be wrapped continuously with Scotch tape No. 50 to 6" above ground line.
4. Backfill to be select material, 1/4" maximum aggregate size.
5. Minimum trench width shall be 18". Width variance can be provided with written request and written KPUB approval.
6. Trench shall be free of debris and bottom shall be undisturbed, tamped, or smooth earth or sand. Where excavation is in rock, conduit shall be laid on 4" of clean tamped backfill.
7. Install 1800 lb. mule tape with measurement indications without splices in each conduit. Conduit shall be clear of any debris or soil and should be swabbed after entire run is complete. Conduit shall be plugged or capped at ends with molded sealers on primary and PVC caps on secondary.
8. Backfill shall be compacted to not less than 95% of the density of the surrounding undisturbed soil.
9. All conduit bends for primary cable shall have a 36" radius.
10. Crossings of other utilities shall be made with a minimum of 12" separation and backfilled with stable sand (one sack concrete mix) a distance of 5 feet both sides of the crossing.
11. All PVC conduit sections shall be joined using colored chemical cleaner and colored cement. Joints shall be H-style couplings or utilize preformed bell ends.

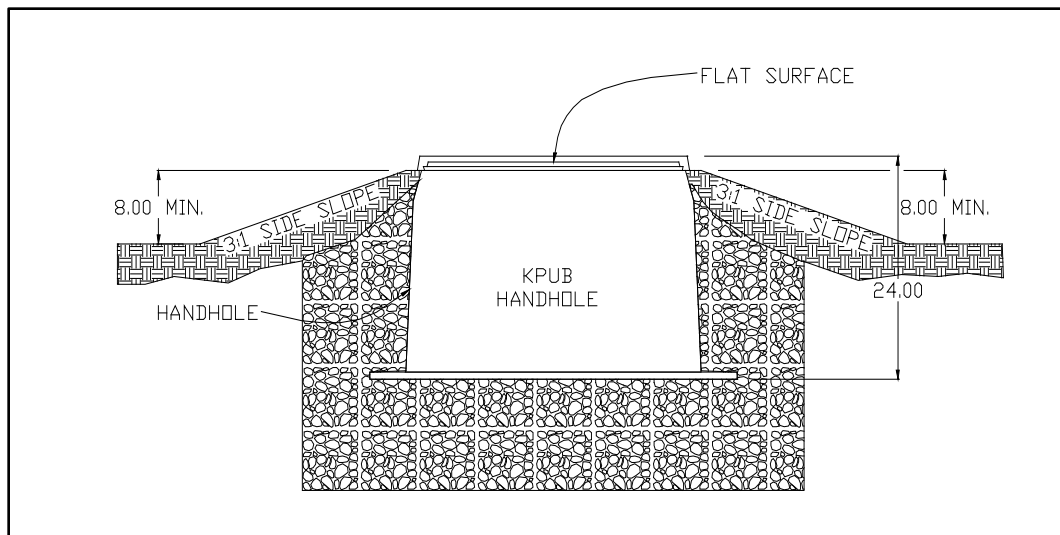
12. Stub up conduit for risers shall be located by KPUB. Conduit shall be swept up not more than 6" above final grade. For three phase installations, the conduit shall be grouped in flat configuration at the pole spaced 7.5 inches from pole. Spare conduit should be placed on outside of arrangement. Consult KPUB Engineering for specification.
13. Multiphase conduit installations shall have each phase uniquely marked at each end of the conduit run.

**Hand holes**

Hand holes shall be installed level and 6-8" above rough grade to allow for topsoil and sod. Lids shall be above final grade including topsoil.

Service conduits shall be installed to a minimum of 5 feet past the lot line, capped with PVC caps, and location marked with iron pin, 1/2 inch rebar, or similar durable item below grade so they can be found when customer requests service. Conduits shall be stubbed into hand hole with 45 degree bends.



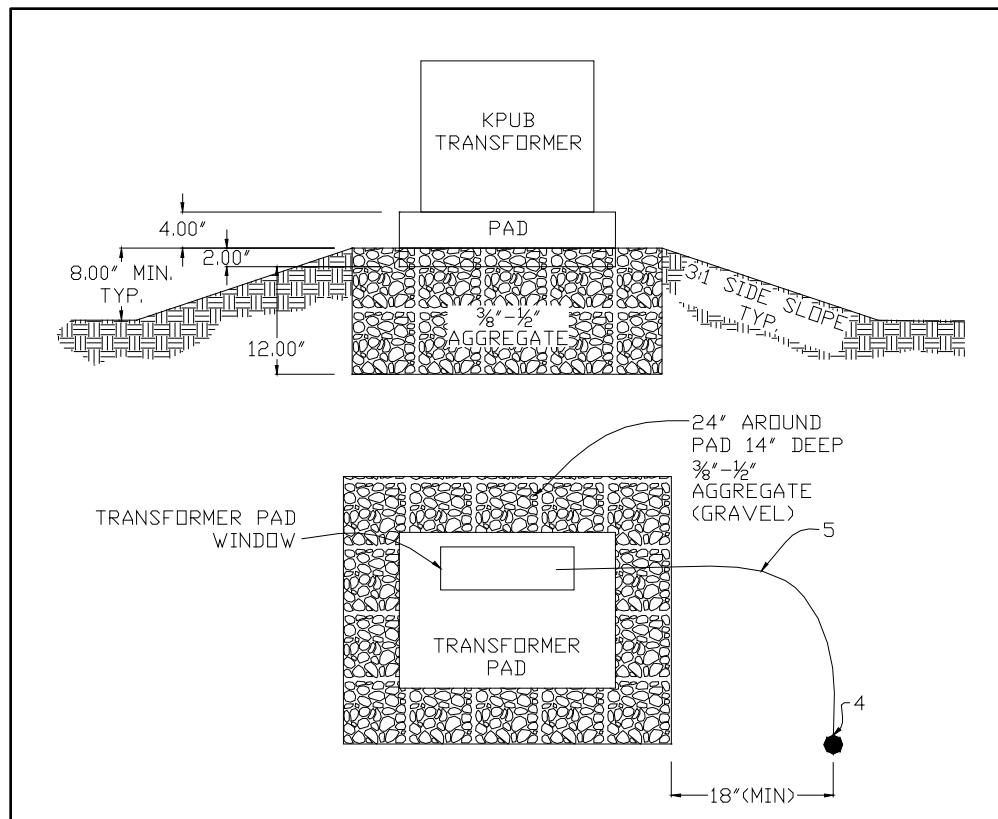
**NOTES:**

1. Excavate total hand hole area plus an additional surrounding area of 12" width to a depth of 12", and compact at 95% of the density of the surrounding undisturbed soil.
2. Install 3/8" gravel to a depth of 2 inches directly underneath the hand hole.
3. Hand hole to be parallel to all streets unless notified otherwise by KPUB personnel.

**Transformer Pads**

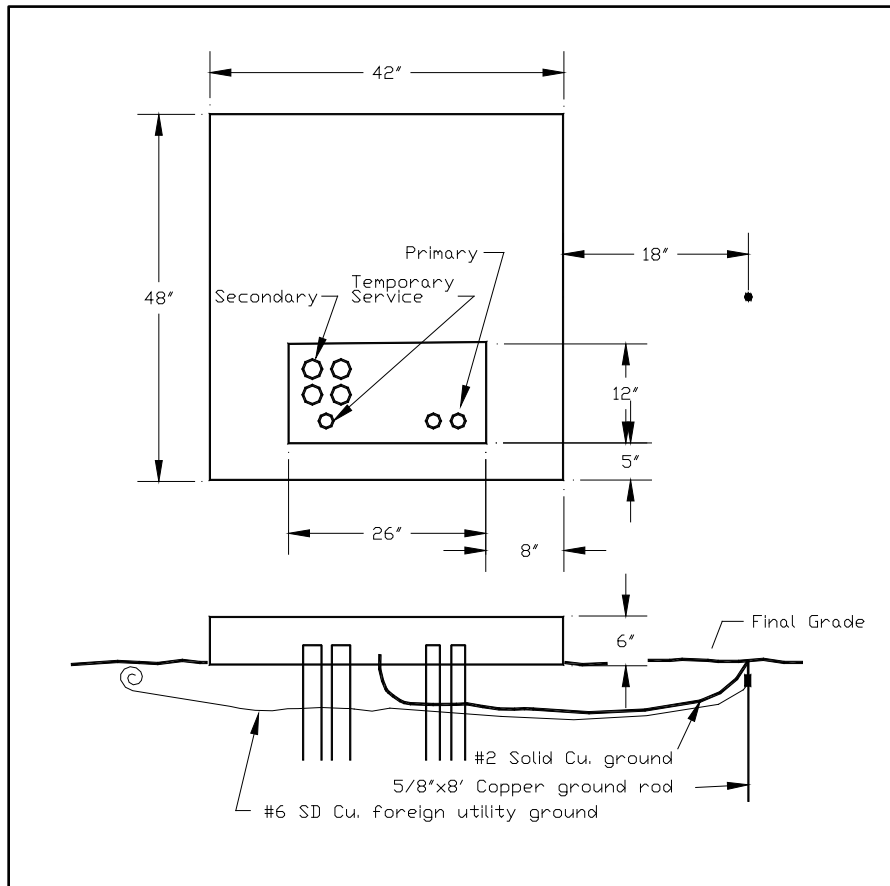
Transformer pads shall be installed level and 6-8" above rough grade to allow for topsoil and sod. Service conduits shall be installed to a minimum of 5 feet past the lot line, capped with PVC caps, and location marked with iron pin, 1/2 inch rebar, or similar durable item below grade so they can be found when customer requests service. Notes in Single Phase Residential - Location behind curb section may apply to any pad. Check with KPUB Engineering for specifications.



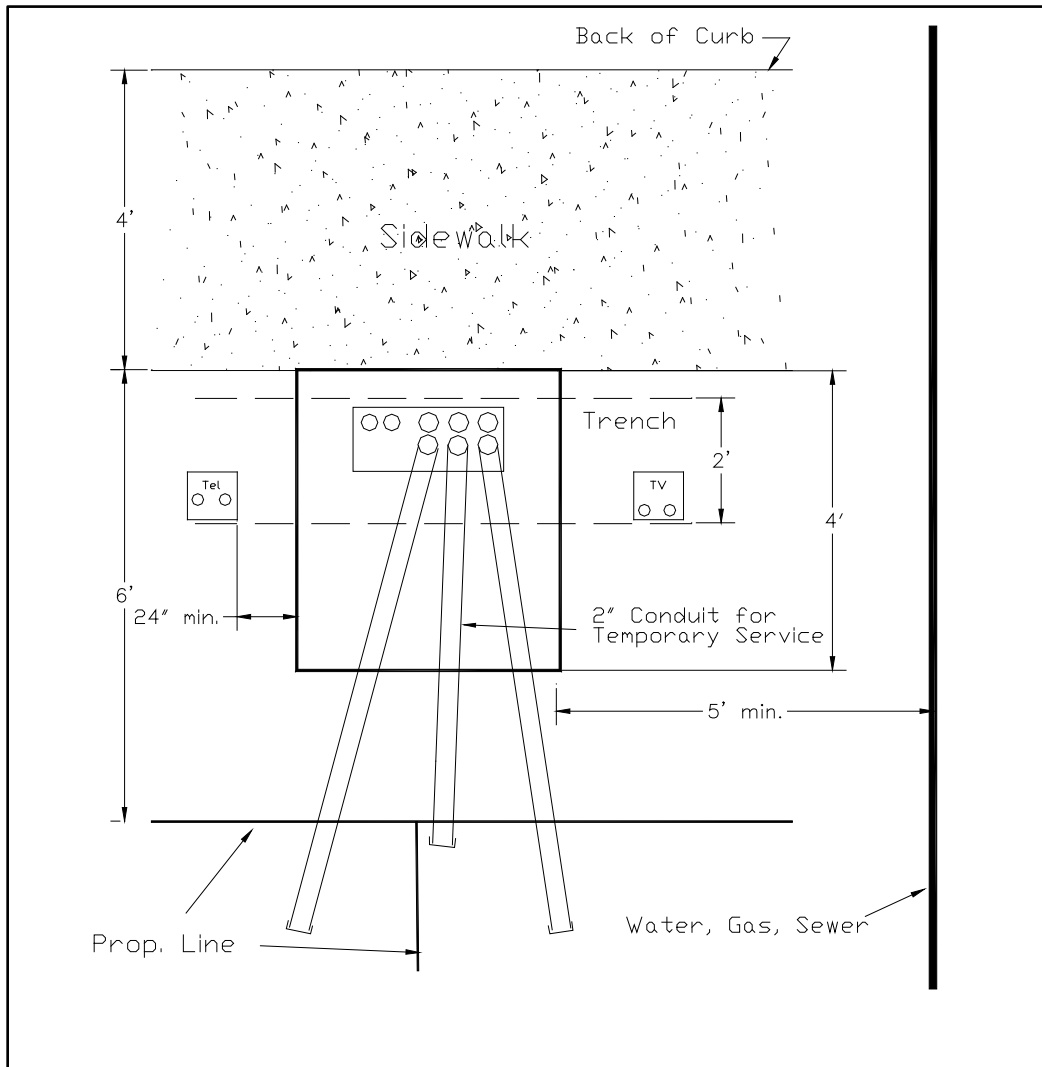
**NOTES:**

1. Excavate total pad area plus an additional surrounding area of 24" width to a depth of 14", and compact at 95% of the density of the surrounding undisturbed soil.
2. Install 3/8" gravel to a depth of 2 inches directly underneath the transformer pad.
3. Transformer pad window to be parallel to all streets unless notified otherwise by KPUB personnel.
4. 5/8" x 8 feet ground rod shall be installed 18" minimum from edge of excavated area in undisturbed soil and not in trench line. Top of ground rod shall be 4" below final grade.
5. Install (1) #2 solid copper ground wire. Connect with ground clamp to rod. Leave 36" tail inside pad.

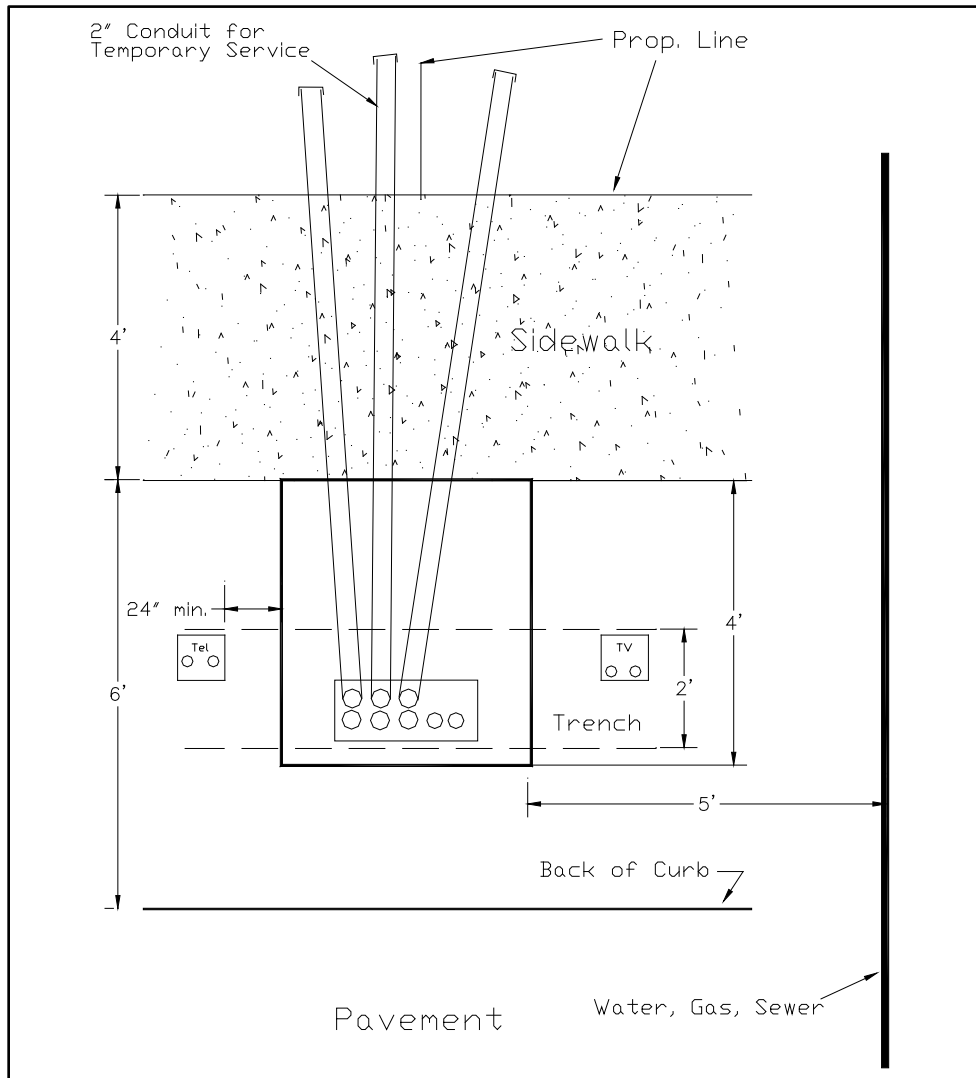
# Single Phase Residential – Detail



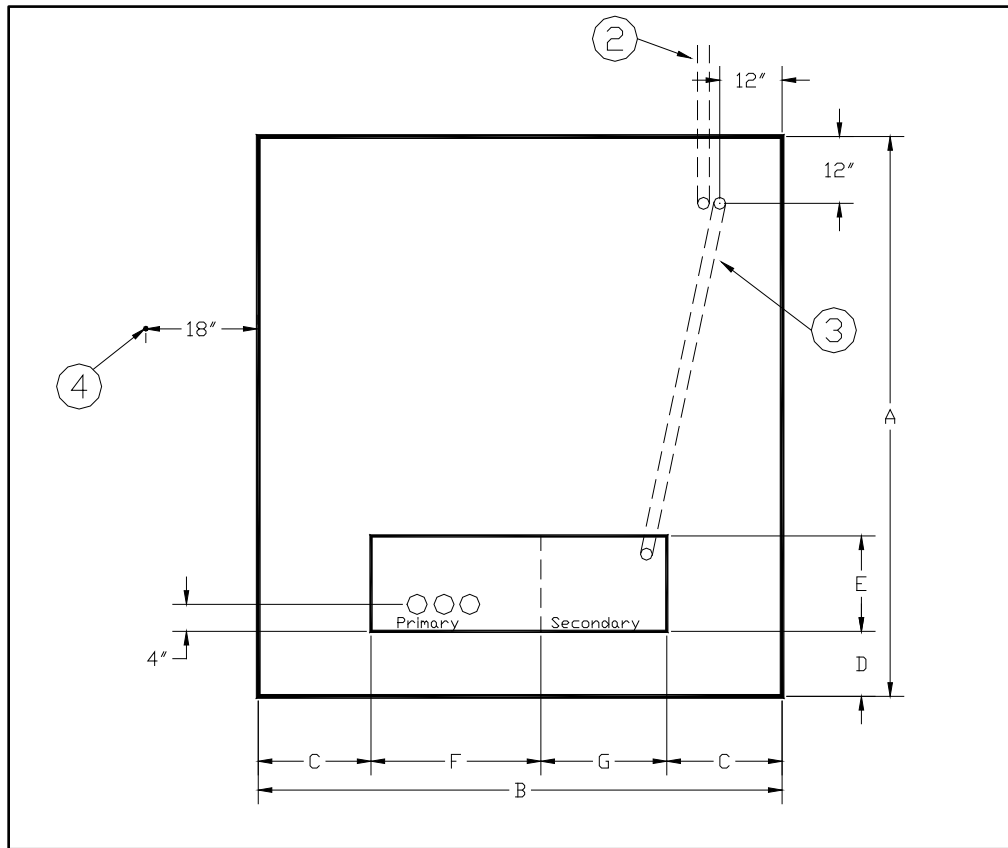
### Single Phase Residential - Location behind sidewalk



### Single Phase Residential - Location behind curb



### Three Phase Commercial – Detail



KVA	A	B	C	D	E	F	G
75-150	76	76	17	12	14	24	18
225-500	94	94	25	12	14	24	20
750-1000	114	96	22	12	14	27	25
1500-2500	132	114	29	12	20	31	25

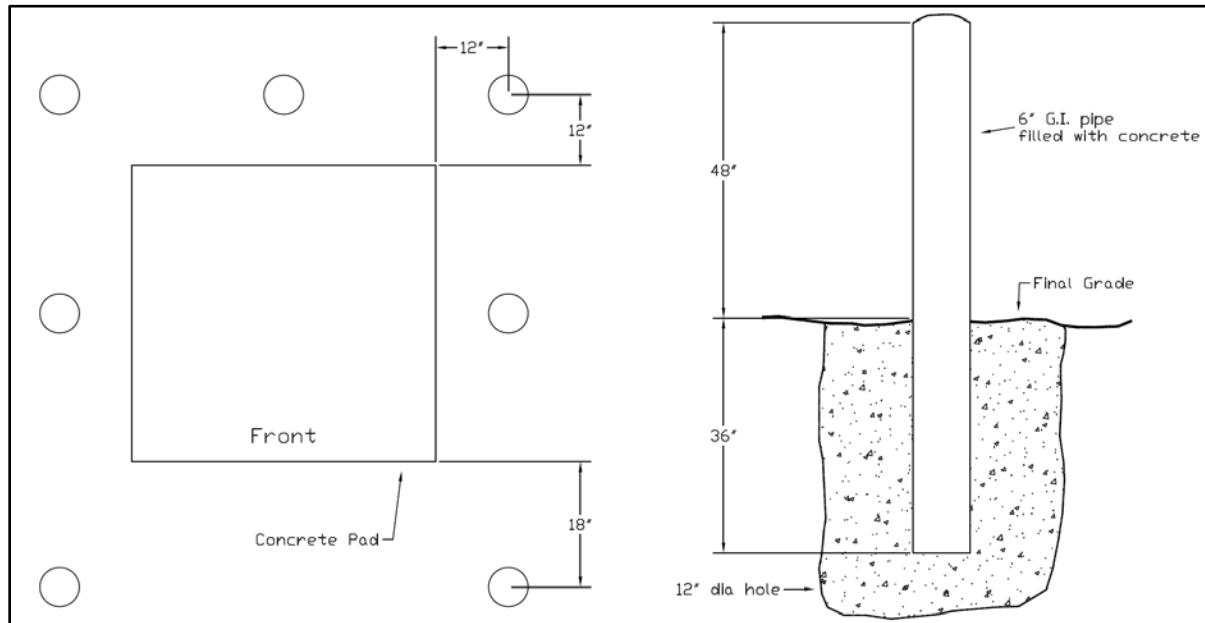
**NOTES:**

1. Three-phase transformer pads shall be pre-cast to KPUB specifications and provided by approved suppliers. Contact KPUB for obtaining approved supplier information. For poured in place pads, contact KPUB Engineering for written approval prior to beginning work.
2. Optional: Customer installed 1" conduit for energy management system wiring if required connecting to metering equipment. Requires written approval from KPUB Engineering.
3. Instrument transformer secondary wiring conduit shall be 1 1/4" Schedule 40 PVC.
4. Ground rods shall be installed 18" in each direction from the pad, in undisturbed soil, and shall be 5/8" x 8 feet copper clad. Rod shall be level 4" below the surface. Rods shall not be driven in trench line.
5. Tamp all disturbed soil underneath pad to 95% compaction. Piers may be required where backfilled soil is deeper than 12". Contact KPUB for determination and specifications.
6. Pad surface shall be level, smooth, flat, and even across the entire dimension.
7. Conduits shall be swept up into pad window not more than 2" above the top of the pad.
8. Surrounding grade shall be of slope to allow run-off without erosion. If this is not achievable

while maintaining clearances required in Maximum Number of Service Runs section, other devices shall be installed. Contact KPUB for determination and specifications for approved retaining devices.

## Guard Posts

Customer shall provide and install guard posts to protect pad mounted equipment as determined by KPUB Engineering. Installed bollards shall be painted safety yellow.



## Temporary Service

### Availability

Temporary service shall be provided for construction, fairs, and other similar purposes. Customer must make application for service at KPUB office and execute an agreement. Temporary is classified as a service that is intended to be connected for less than 24 months.

When temporary service is requested for construction purposes, and such temporary line extension results in a permanent service upon completion of the construction, KPUB will, at its option, extend temporary service under the appropriate rule for permanent extensions.

### Charge

Customer shall pay in advance a charge for the installation and removal of facilities required to furnish temporary service. Such charges will encompass the entire cost off installation and removal of necessary facilities.

### Term

The term for temporary service shall not exceed 24 months. If service exists longer than this period without approval from KPUB, the service will be considered permanent. Any future requests for removal will be considered as a removal of permanent service, regardless of prior fees paid, and be subject to all costs to remove facilities.

### Customer's Installation

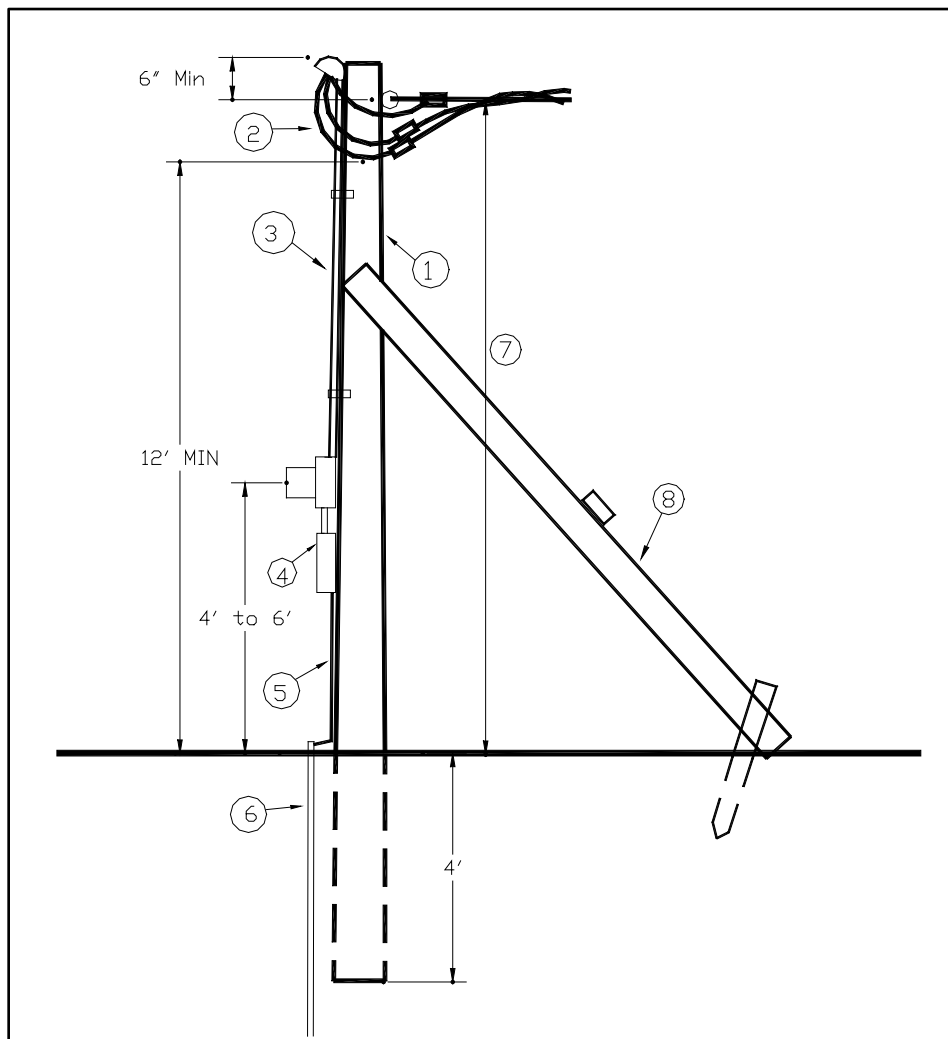
Service entrance wiring and equipment shall be supplied and installed by Customer, including the meter socket. If not installed on a permanent structure, a temporary pole shall be installed by the Customer

in accordance with Typical Service Installation for Temporary Service as provided in subsequent section. The location for the temporary pole, service, and other temporary facilities shall be determined by KPUB. The location should be no more than 25 feet from the nearest KPUB transformer or service pole. Customer's installation shall be made and inspected in the same manner as permanent service as provided in prior sections. Customer shall not allow pole to be moved or tampered with as long as KPUB service wires are attached. All single phase receptacle outlets for construction sites shall have approved ground fault protection for personnel safety.

## Typical Temporary Service Installation

### Overhead

Service drop (conductors, attachment, grips, and connectors) shall be owned and installed by KPUB. All other materials and equipment provided and installed by Customer.

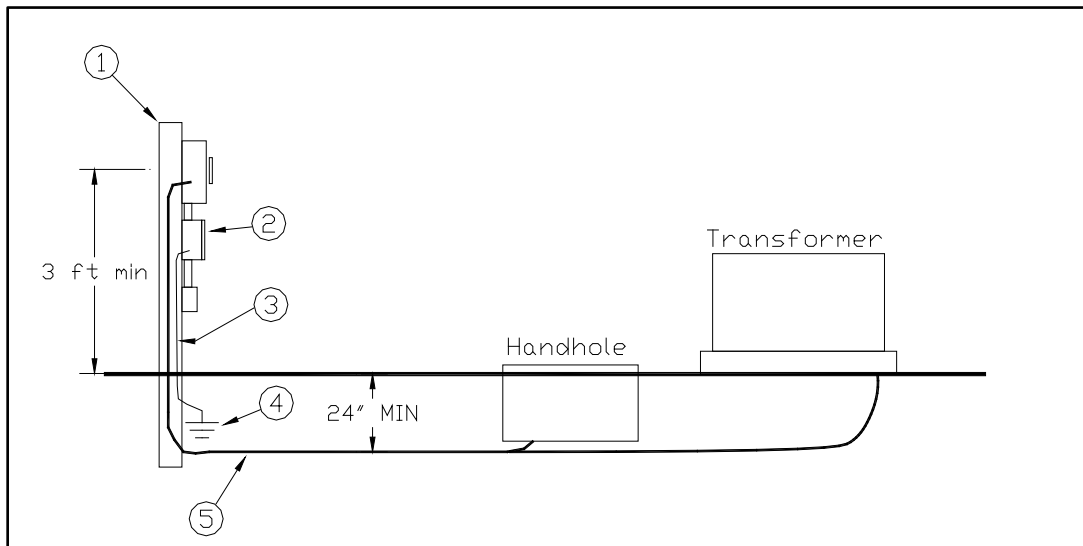


#### NOTES:

1. Pole shall be unspliced, tapered, and treated wood with 4" minimum diameter top or 4"x4" treated post.
2. Service entrance conductors shall extend 24" minimum out of service head. Minimum #6 Al conductor to be NEC approved for this use. Phase conductors shall be black insulation, neutral shall be white insulation or bare.

3. Weatherhead and raceway shall be attached to pole with minimum of 2 conduit straps. Raceway conduit shall be rigid galvanized steel, PVC, IMC, or EMT with no coupling above top conduit strap.
4. Weatherproof main service disconnect or breaker enclosure provided and installed by customer. There shall not be any exposed wiring exiting meter socket or service entrance equipment.
5. Grounding electrode conductor shall not terminate in meter socket. Conductor shall be #6 Cu minimum.
6. Ground electrode shall be 5/8" x 8 feet copper clad rod or other NEC approved electrode.
7. Pole shall provide sufficient height for service drop and drip loop to meet minimum clearances specified by KPUB. The minimum clearance shall not be less than 12 feet above ground.
8. 2" x 4" treated lumber braces shall be installed.

## Underground



### NOTES:

1. Pole shall be 4" x 4" minimum treated wood, unspliced, and set a minimum of 2 feet deep or 4"x4" treated post. Pole should be set within 3 feet of the transformer or hand hole.
2. Weatherproof main service disconnect or breaker enclosure provided and installed by Customer. There shall not be any exposed wiring exiting meter socket or service entrance equipment.
3. Grounding electrode conductor shall not terminate in meter socket. Conductor shall be #6 Cu minimum.
4. Ground electrode shall be 5/8" x 8 feet copper clad rod or other NEC approved electrode.
5. Customer shall trench to within 2 feet of transformer, pedestal, or hand hole. KPUB will make final trenching and connections. Customer shall provide sufficient conduit to reach inside the transformer or hand hole. Customer's wiring shall be protected by metal conduit, flexible or rigid in all areas exposed above ground.



## Metering And Metering Equipment

### **General**

KPUB supplies and installs electric meters to measure Customer's electric power usage. Only KPUB employees or authorized persons shall install or remove, turn on or off, KPUB meters or make any modifications or changes, which may affect the accuracy of KPUB meters. Any customer load greater than 320 amps for single phase loads and 400 amps for three phase loads will require instrument rated metering. For 480V services, the maximum ampacity for self-contained metering is 100 amps.

### **Location of Metering Equipment**

Meters and meter equipment shall be installed in a location determined by KPUB. All meter locations shall be outside the building and as near as possible to the point of delivery. Customer shall pay the actual cost of installing additional facilities to provide service to a meter location other than that designated by KPUB. Customer shall provide a proper space, accessible at all times, clean, safe, and free from vibration for the installation of metering equipment. KPUB may remove, or require customer to remove, as necessary to obtain working space, any debris, equipment, landscaping, and other obstacles. For specific clearances and working space requirements, please refer to the following section: Work Space.

### **Point of Service**

The location of the point of service shall be designated by KPUB and may differ from the location of the metering equipment. Customer shall extend service entrance conductors to the point of service. Only authorized KPUB employees are permitted to make and energize the connection to customer's service entrance conductors.

### **Meter Sockets**

The customer shall furnish, install, own, and maintain all meter sockets, transocket enclosures, and modular metering enclosures for permanent, temporary, and meter pedestal installations. This equipment shall conform to the installation requirements of KPUB as outlined in equipment specifications, this service policy, and NEC. Customer shall be responsible in the event of damage, injury, loose connection, or overload of meter socket. A list of approved material is available on KPUB's website or through inquiry with KPUB Engineering. Service shall not be reconnected until approved by local inspection authorities. KPUB will provide current transformers (CT's) for any necessary installation as outlined in following section: Instrument Transformers.

The meter socket shall be used exclusively for KPUB's metering, and shall not be used as a connection enclosure, or raceway for conductors not required for metering. KPUB may refuse service if the incorrect socket is installed or if the socket is wired incorrectly. No meter sockets other than those approved by KPUB will be connected on permanent services. A customer may submit a request in advance for approval to use equipment not previously listed to KPUB Engineering. All modular metering installations require KPUB written approval.

### **Meter Socket Ampacity and Conductor Sizes**

The meter socket ampacity shall be determined by KPUB using customer provided information on electric service requirements.

The connectors provided in meter sockets are rated for aluminum or copper. Aluminum conductors require wire brushing to remove oxide film and application of an oxide inhibitor immediately before installation. Customer shall not exceed the number of conductors for which manufacturer provided connectors are intended.

<i>Maximum Amps</i>	<i>Voltage</i>	<i>Phase</i>	<i>Hub Size</i>	<i>Max No. Conductor/Phase, Connector Size Range</i>	<i>Approx. Dim. WxHxD (in.)</i>
200	120/240	1	2"	One #6 - 350 MCM	12 x 15 x 5
320	120/240	1	3"	Two #6 – 600 MCM	13 x 35 x 6
100	120/208/ 240	3	2"	One #8 - #2/0	8 x 15 x 5
200	120/208/ 240	3	2"	One #6 - 350 MCM	10 x 19 x 5
320	120/208/ 240	3	3"	Two #6 – 600 MCM	19 x 35 x 7

### ***Identification of Meter Sockets and Main Disconnects***

Meter sockets and main disconnects on multiple occupancy buildings or services requiring more than one meter shall be clearly and permanently identified by Customer as to street address, apartment number, or building section that each socket serves utilizing adhesive labels suitable for outdoor use of a minimum 1" in height.

### ***Work Space***

Customer shall keep meters and metering equipment at all times readily accessible and free from obstructions. A minimum working space of three feet on all sides of metering equipment shall be kept clear of walls, shrubs, other equipment, doors, and other obstructions. KPUB may remove, or require customer to remove, to obtain working space, any debris, equipment, landscaping, and other obstacles.

### ***Instrument Transformers***

KPUB provides, installs and maintains instrument transformers when Customer's service requirements exceed the capacity of self-contained metering equipment. Voltage transformers are used whenever the nominal voltage to ground exceeds 240 volts and ampacity prevents 480 volt self-contained metering.

Meter sockets should come prewired from the manufacturer. Reference wiring diagrams are available upon request from KPUB Engineering. For overhead installations, customer must provide equipment as specified by KPUB or elect to have KPUB provide for a charge.

By written permission from KPUB, 480 volt self-contained metering may be permitted, but will require that the electric service main disconnect be installed on the source side of the meter. Ampacity is not to exceed 100 amps.

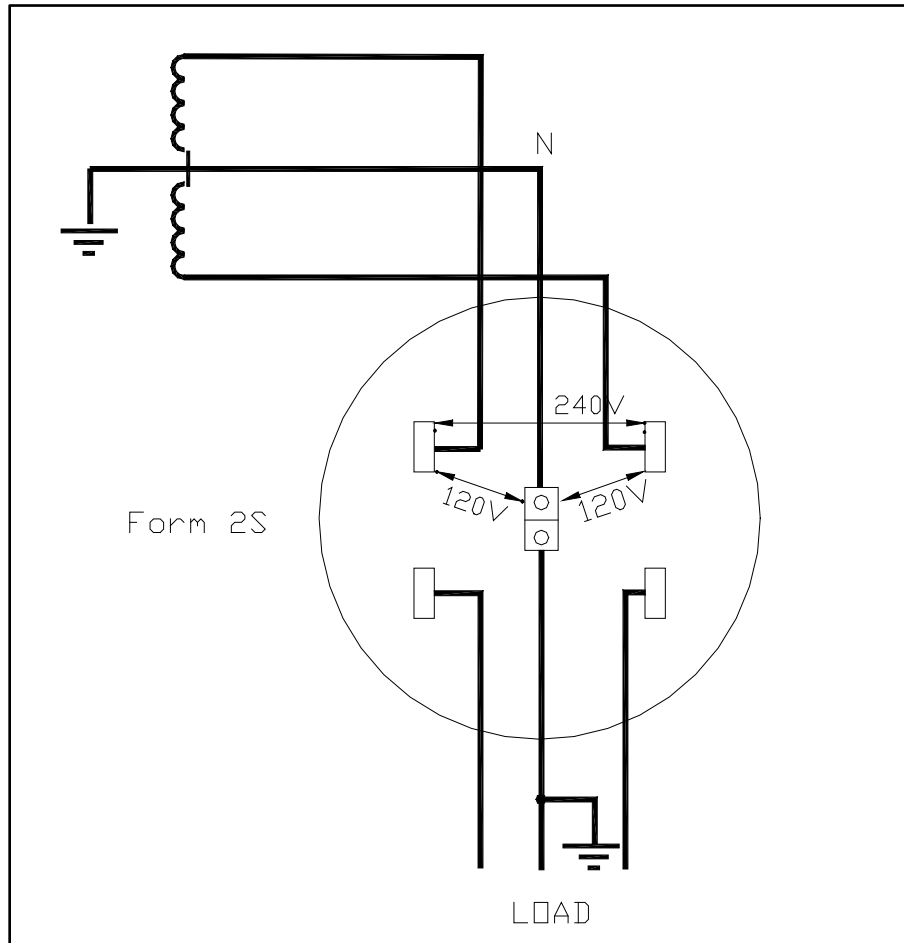
### ***Primary Metering***

Primary metering equipment may be used by KPUB under special circumstances such as when a customer owns and operates an electrical distribution system. KPUB may install additional protective equipment on the source side of the point of service to protect the primary metering equipment and to isolate the customer's system from KPUB. Primary metering is not available for multi-family housing installations.

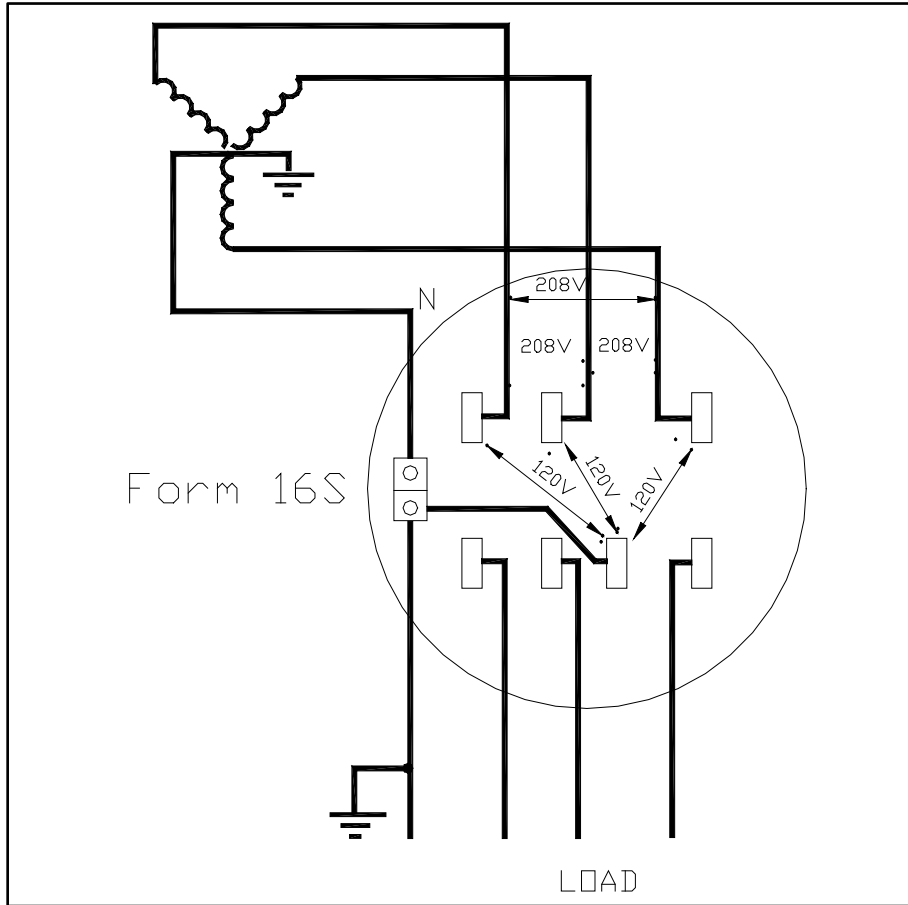
### ***Electrical Connections***

All meter sockets whether served overhead or underground, require the top connections to be connected to the source conductors.

### Wire 120/240 volt

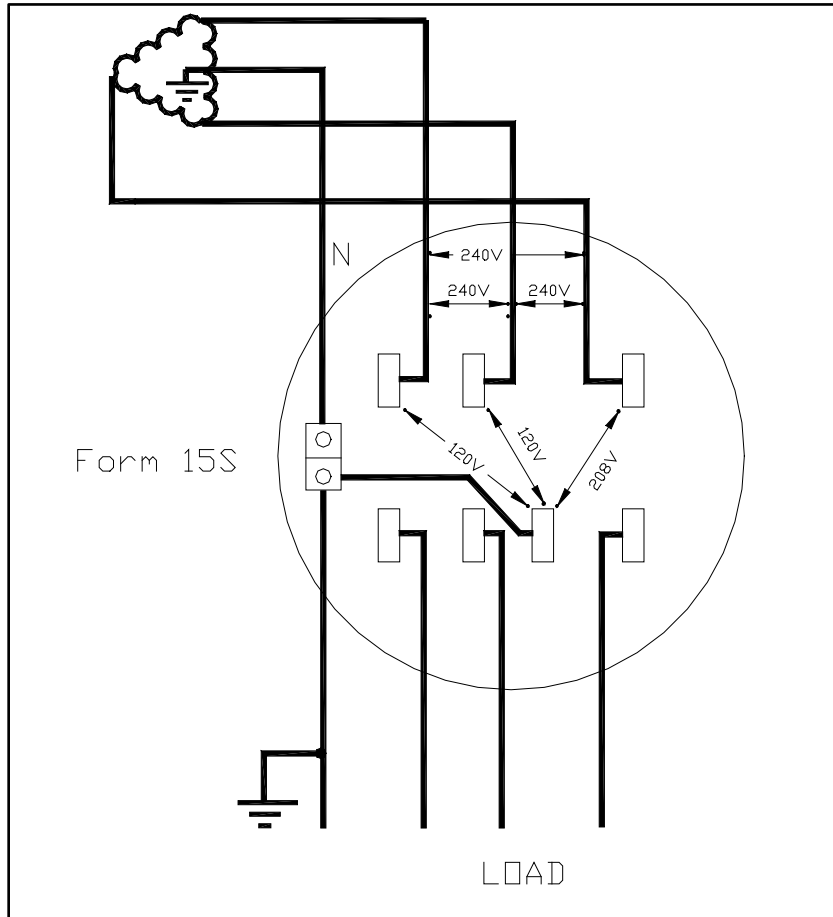


### 4 Wire, Wye 120/208 volt 3 Phase



## 4 Wire, Delta 120/240 volt 3 Phase

The phase commonly called the “power leg”, “high leg”, “freak leg”, or “wild phase” shall always be connected to the **right hand** meter socket connectors and shall be effectively identified in accordance with NEC 230-56 (marked by outer finish that is orange in color) at **both** the service head and in the meter socket. This section provided for reference for existing services.



### ***Providing Energy Pulses to Customer***

KPUB shall provide, at customer's request and after execution of an agreement by customer, electric energy pulses for the purpose of monitoring customer's energy consumption as metered by KPUB. According to the terms of the agreement, KPUB should provide and install the equipment and devices needed to deliver pulses to a terminal block to which Customer's monitoring equipment is connected. KPUB shall determine all pulse quantities, constants, and multipliers, and provide these to Customer. Demand interval timing pulses shall not be made available to customer.

### ***Meter Tampering and Theft of Service***

Unauthorized connections to, or tampering with, KPUB's meter, associated equipment or meter seals, or indications or evidence thereof, subjects customer to immediate discontinuance of electric service, prosecution under the laws of the State of Texas and local jurisdictions, adjustment of prior bills for electric service, and reimbursement to KPUB for all extra expenses incurred on customer's account.

## Outdoor Lighting

### **General**

Street light service will be provided by KPUB according to the applicable rate schedules for KPUB standard voltage, wattage, bulb type, and lumen output utilizing KPUB approved fixtures and light standard. Street lighting designs shall conform to the guidelines as established by the city for which they are installed.

Requests for street lighting shall be made by the appropriate governmental authority or legal homeowners association using forms for this purpose available from KPUB.

Street lighting service shall be provided to public streets, alleys, highways, parks, and other public grounds by means of light fixtures installed on either (1) existing overhead distribution facilities, (2) new poles installed by KPUB expressly for street lighting or (3) light standards supplied and installed by customer, developer, or city. Light standards provided by a customer, developer, or city must match KPUB specifications and are available upon request.

Streetlights in areas with overhead electric facilities should be served overhead. Streetlights in areas with underground electric facilities should be served underground. Street lighting design and installation should be coordinated with the design and installation of electric distribution facilities. Developers should contact KPUB regarding provisions for streetlights in subdivisions at the time subdivision plat is presented for electric facility design. Streetlights should be installed to coincide with the building activity within the subdivision. Luminaires shall not be installed more than 500 feet from the last residence in a partially developed subdivision. Conditions for street lighting are the same as specified in section titled Underground Service.

### **Maintenance**

KPUB shall provide all necessary maintenance to satisfactorily operate streetlights during nighttime hours. Upon notification of street light malfunction, repair shall normally be made by KPUB within three working days.

### **Type of Services**

KPUB offers lighting utilizing industry best practices and standards. Lighting provided will confirm to being dark sky compliant and minimize light trespass whenever possible. All lighting fixtures are energy efficient LED's with a maximum color temperature of 4000 Kelvin.

### **Street Light**

This service is only offered to the governing authority of the roadway, i.e. cities, HOA's, state entities, etc. Fixtures utilized for this service shall not be used in other manner than to light roadways.

### **Area Lighting**

This service is often referred to as security lighting. Coordination with KPUB Engineering is required to establish service. KPUB personnel will advise as to the optimum location for light placement to meet customer's requirements. Customer is responsible for all charges associated with installing distribution facilities to establish such service. Lighting is required to be completely contained within the property of the requesting party.

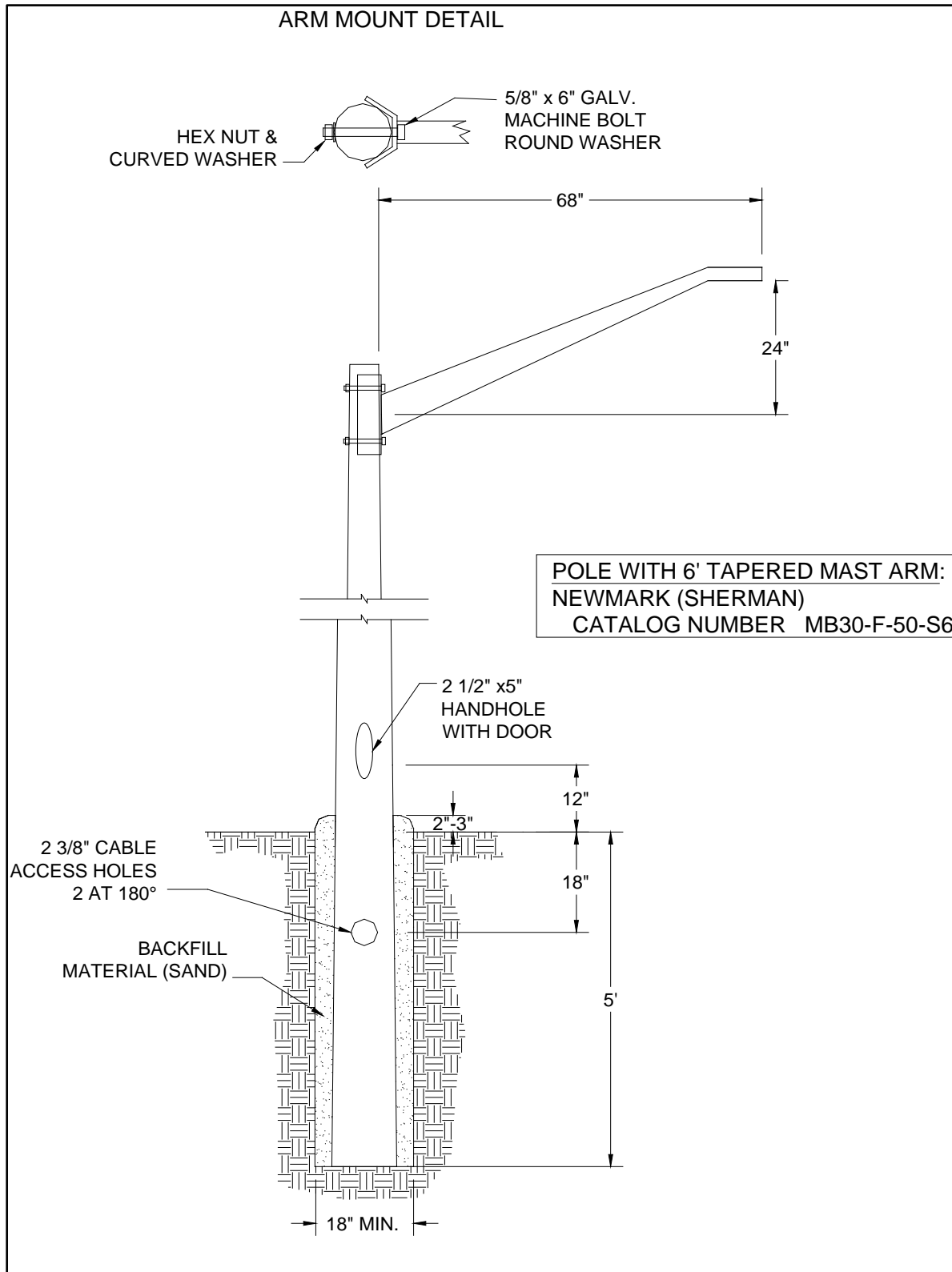
### **Flood Lighting**

Flood lighting is only available to commercial customers. Coordination with KPUB Engineering is required to establish service. KPUB personnel will advise as to the optimum location for light placement to meet customer's requirements. Customer is responsible for all charges associated with installing distribution facilities to establish such service. Lighting is required to be completely contained within the property of the requesting party.

## ***Metering***

Street lighting systems should not be metered except where non-standard or Customer owned systems are to be served. All traffic signal installations shall be metered as per KPUB rates and tariffs. KPUB shall determine the point of service, metering location, and source of supply for all traffic and street lighting systems.

# Street Light Detail





## Responsibilities

Below is a summary of responsibilities for both KPUB and the customer in establishing overhead service.

KPUB	Customer/Developer/City
Provide, install and maintain street light luminaires.	(Underground) Provide and install trench, conduit, and light standard with mast arm as per KPUB specifications.
(Overhead) Provide and install mast arms.	(Underground) Install wiring in light standard to consist of 3 #12 Cu THHN, 1 green, 1 black, and 1 white. Wiring to extend 24" out of mast arm and roll 12" excess in hand hole of standard.
Make all connections to luminaires and to transformer or hand hole.	Provide easements required by KPUB at no cost to KPUB.
Provide and install all service conductor and protective devices to streetlights.	Provide illumination standards for design and layout of street lighting.
Provide complete street lighting layout on subdivision plat as per city specifications.	Approve, control, and request of KPUB the adjustment, addition, removal, or modification of the quantity and location of streetlights.
Inspection of items to be furnished by Customer.	

## Work Flow Processes & Timelines

Details regarding work flow processes for establishing new electrical service are available on KPUB's website. Further description is also provided for expected timelines to establish new electrical service. Such timeframes are dependent upon the customer providing requested information and fulfilling their responsibilities. KPUB Engineering requires 24 hour notice prior to scheduling any onsite activities such as meetings or inspections.

## Glossary

### Agreement for Electric Service

A written contract between KPUB and Customer under which KPUB provides electric service.

### City of Kerrville

A municipal corporation hereinafter called the "City"

### Connected Load

The combined electrical requirements (i.e., the sum of the capacities and/or ratings) of all motors and other electric power consuming devices installed on the Customer's premises.

### Contribution in Aid of Construction (CIAC)

Payment made to KPUB by the Customer to defray KPUB's construction cost, when required.

### Current Transformer (CT)

An instrument transformer used in metering which reduces the load current measured at the meter by a known ratio.

**Customer**

An individual, partnership, association, joint venture, corporation, etc., or governmental agency who is receiving, who is applicant for, or who is receiving the benefit of electric service at a specified point of delivery.

**Customer's Electrical Installation**

All service entrances, weatherheads, bus ducts, and appliances or apparatus of every kind and nature used in connection with or forming a part of an installation for utilizing electric service. In general, Customer's installations are located on the Customer's side of the "Point of Delivery", whether such installation is owned outright by the Customer or issued by the Customer under lease or otherwise.

**Demand**

The rate at which electric energy is used at any instant or averaged over any designated period of time.

**Developer**

Any person or legal entity engaged in developing or subdividing land to which utility services are to be rendered by KPUB. Where applicable, any individual or legal entity that applies for the extension of utility services in order to serve a certain property.

**Electric Service**

Electric power and energy produced, transmitted and distributed, and provided or made available by KPUB at the point of delivery.

**Electric Service Main Disconnect**

Equipment usually consisting of circuit breakers or switches and fuses installed by and at the expense of the Customer on the service entrance conductors to a building and intended to constitute the main control and means of disconnect of electric service to that building.

**Energy**

The measure of how much electric power is provided over time for doing work. The electrical unit is the watt-hour, or kilowatt-hour, which are 1000 watt-hours.

**Inspection Authority**

Generally, an incorporated City or Town, but may be an agency of the County, State or Federal Government.

**Inspector**

A person or agency authorized to inspect and approve electric installations.

**Instrument Transformer**

A device used in metering arrangements, which limits the amount of current or voltage potential necessary to operate metering equipment.

**Kerr County**

A County in the State of Texas hereinafter called the "County".

**Kerrville Public Utility Board (KPUB)**

A municipal corporation of the City of Kerrville empowered to manage and control the electric distribution system for Kerrville and Kerr County as certified by the Public Utility Commission of Texas.

**Maximum Available Fault Current**

The amount of current that will flow due to a direct short circuit from one conductor to ground or from one conductor to another.

**Meter**

A device or devices, together with any required auxiliary equipment, for measuring electric service.

**Meter Socket**

A receptacle of weatherproof construction used for mounting a socket-type meter.

**Mobile Home**

A detached residential dwelling designed for long term occupancy and intended to be transported after fabrication on streets and highways on its own wheels or on a flatbed or other trailer, and arriving at the site where it is to be occupied as a dwelling complete and ready for occupancy, except for minor and incidental unpacking and assembly operations, location on jacks or permanent foundation, connection to utilities and the like.

**Point of Service**

The point where the KPUB's conductors are connected to the Customer's conductors. At KPUB's option, locations where the electrical installation has multiple connections to KPUB's conductors, due to KPUB facilities' limitations or design criteria may be considered one point of delivery for billing purposes.

**Primary**

That portion of the electric distribution system, which delivers energy to the primary (high voltage) electric side of the distribution transformer from the substation or point of supply. Nominal voltages of the primary system are 7.2/12.5 kV wye.

**Raceway**

Tubular or rectangular channel or conduit for containing electrical conductors, which may be exposed, buried beneath the surface of the earth, or encased in a building structure.

**Service Drop**

Overhead conductors that extend from KPUB's overhead distribution system to the point of delivery, where connection is made to Customer's electrical installation.

**Service-Entrance Conductors**

Conductor provided by Customer extending from Customer's electrical equipment or service main disconnect to the point of service where connection is made.

**Service Lateral**

Conductors, usually underground but sometimes in raceway above ground, that extends from KPUB's distribution system to the point of delivery or from Customer's electrical installation to the point of service.

**Service Regulations**

A statement of terms and conditions governing the supplying and taking of electric service by Customer from KPUB, and supersedes and annuls all such regulations by whatever term designated which may heretofore have governed the supplying and taking of KPUB's electric service. Such Service Regulations are subject to change, from time to time by KPUB and regulatory authorities having jurisdiction, and are on file at KPUB's business offices and with various regulatory authorities.

**Subdivision**

A division of a lot, tract or parcel to land or water in two or more lots, plots, sites or other subdivision of land or water for the purpose, whether immediate or future, of sale, rent, lease, building development or other use, and which further includes the term "subdivide", meaning to divide land by conveyance or improvement into lots, blocks parcels, tracts or other portions.

**Voltage Transformer (VT)**

(Also known as Potential Transformer PT)

An instrument transformer used in metering which reduces the voltage measured at the meter by a known ratio.