



**RICHMOND POWER & LIGHT**

# **RESIDENTIAL**

## **Electric Service Installation Manual**



*How to install electrical services  
at residential sites.*

**F I R S T E D I T I O N**

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# CHAPTER

# 1

## Introduction

Installing new electric service is a joint project between the customer and the power company. The power company is responsible for bringing power to the site, for installing the meter in the socket provided by the customer, and for energizing the service. The customer is responsible for obtaining permits and inspections, providing and maintaining the overhead path or underground trench for the power company's wires, and for installing the equipment at the service entrance.

### Residential Service

Residential service is defined as service to a single-family residence. Service to a multi-family residence such as an apartment or condominium is a business service.

Voltage for residential services is 120/240 volts, except for special situations. Services up to 400 amps are single-phase.

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<b>Current Rating</b>	<b>Typical Use</b>	<b>Comment</b>
Less than 200 amps	Small homes	See Note 1, below
200 amps	Medium homes	The most common service
400 amps	Large homes	
Over 400 amps	Very large homes	See Note 2, below

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Note 1. 200 amps is the minimum service installed by the power company. If the load is less than 200 amps and the service is overhead, the meter socket and service panel may be rated at less than 200 amps. If the load is less than 200 amps and the service is underground, the meter socket and service panel must be rated at 200 amps.

Note 2. Services over 400 amps are three-phase. These installations are addressed on an individual basis.

**Table 1-1. Typical residential services.**

## **Temporary Service**

Temporary service is defined as electric service to a site for less than one year. The most common use of temporary service is to deliver power during the construction phase of a project. When the project is complete, the temporary service is replaced by permanent service.

Temporary services are usually 120/240 volts, single-phase, 200 amperes.

Customers receiving service at primary voltage may own poles, conductors,

## CHAPTER

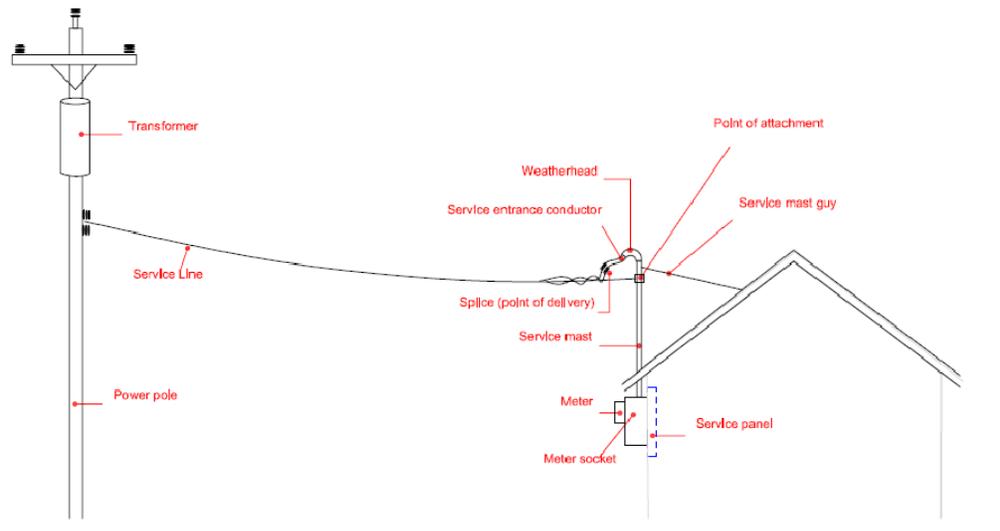
# 2

## Overhead Service

The cost for overhead service depends on the extent of special engineering required. The least complicated and cheapest situation is when a transformer is on a pole on, or near the property. If this is the case, engineering may not be required. The customer simply installs the service entrance equipment, has it inspected, and calls the utility to have service connected.

The customer is responsible for providing, installing, and maintaining all equipment from the point of delivery except for the meter.

The power company is responsible for providing and installing the meter, completing the connections between the meter and the service conductors, and making the final connections at the point of delivery.



**Figure 2-1. Features of an overhead service.**

Figure 2-1 shows a finished installation of overhead service, using a service mast. The customer provides everything shown here, except the meter, the overhead service line, and the power pole and pole-mounted equipment.

After the customer installs the required equipment, the power company installs the meter in the meter socket, strings the service line, attaches the service line supporting wire (neutral) to the insulated clevis, and splices the conductors together.

# Overhead Line Clearances

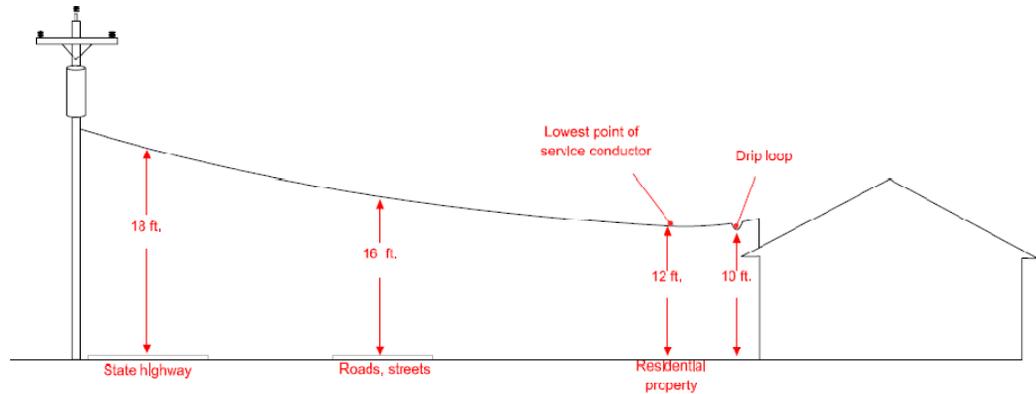


Figure 2-2. Clearances from ground.

Figures 2-2 and 2-3 show clearances under overhead lines, for the conditions most commonly encountered. For other situations and for details, see the National Electric Code, the National Electrical Safety Code, or contact the electrical inspector for your area.

The customer does not string the service conductor, but is required to provide a point of attachment high enough and strong enough, to allow the utility to install the service line and maintain the required clearances.

If the span of the service line exceeds 125 feet, an intermediate support pole may be required to relieve the tension on the service mast.

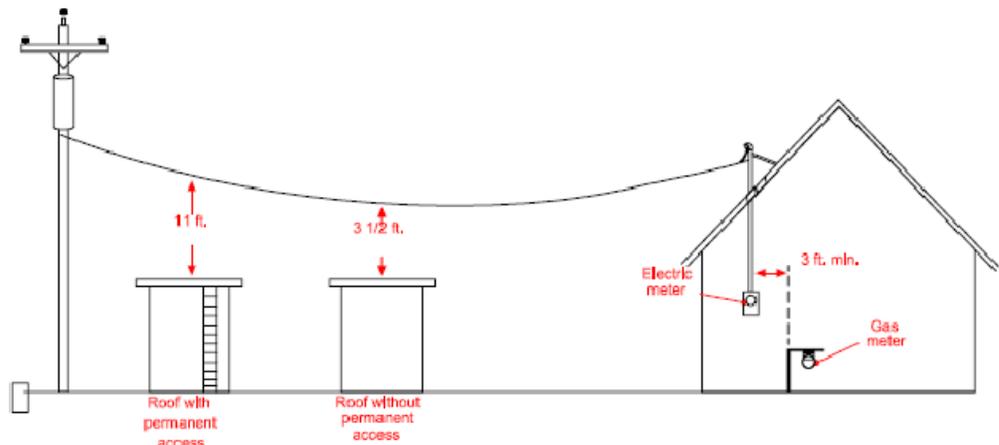
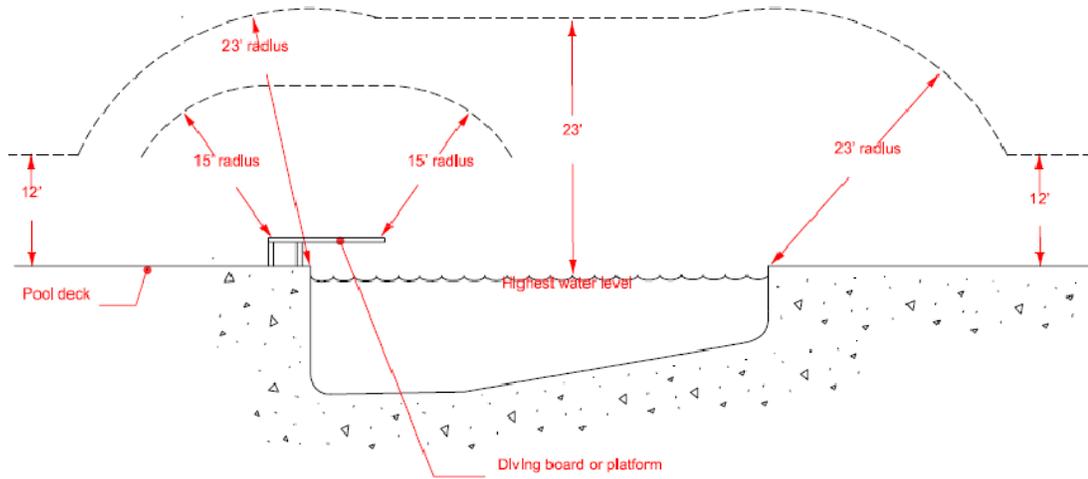


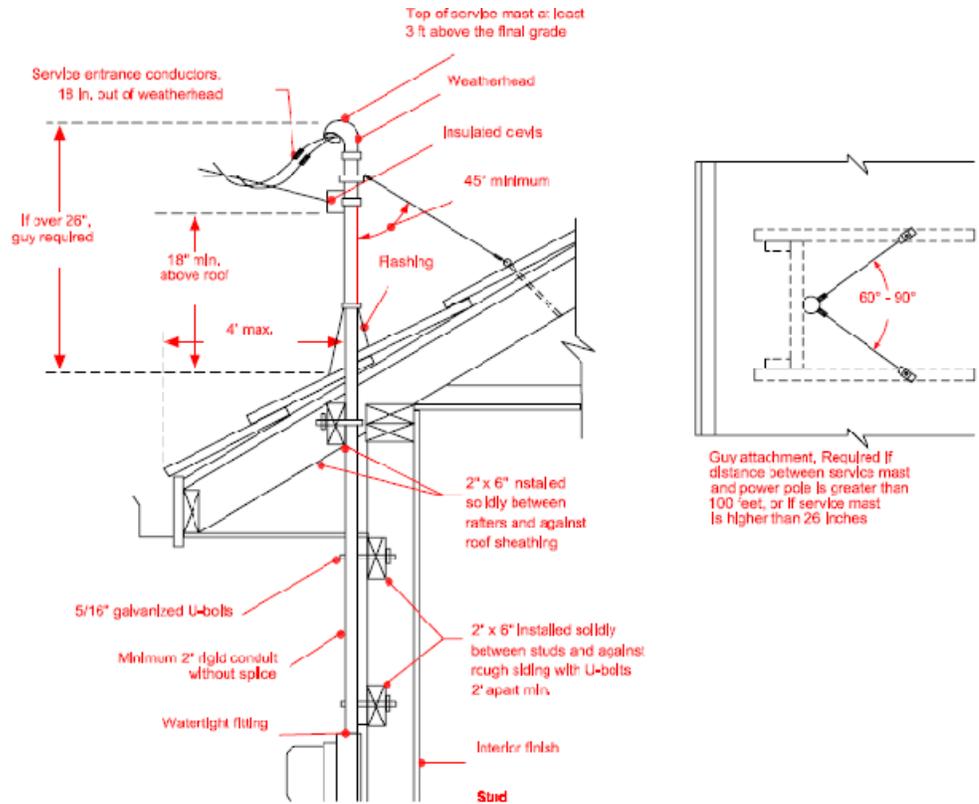
Figure 2-3. Clearances over other structures.

Avoid a route for the service line that passes over a driveway. Lines which cross driveways can be struck by tall trucks and other vehicles, causing damage to the service equipment and to the building. If the service line will pass through trees, the customer must prune the trees to provide a clear path for the line. The customer is also responsible for regular tree pruning, and if necessary, tree removal to keep the path clear. If the service line will pass over brush, the customer must clear a path for the power company's installation service personnel.



**Figure 2-4. Overhead service clearances over swimming pools.**

## Service Mast, Surface-Mount Meter

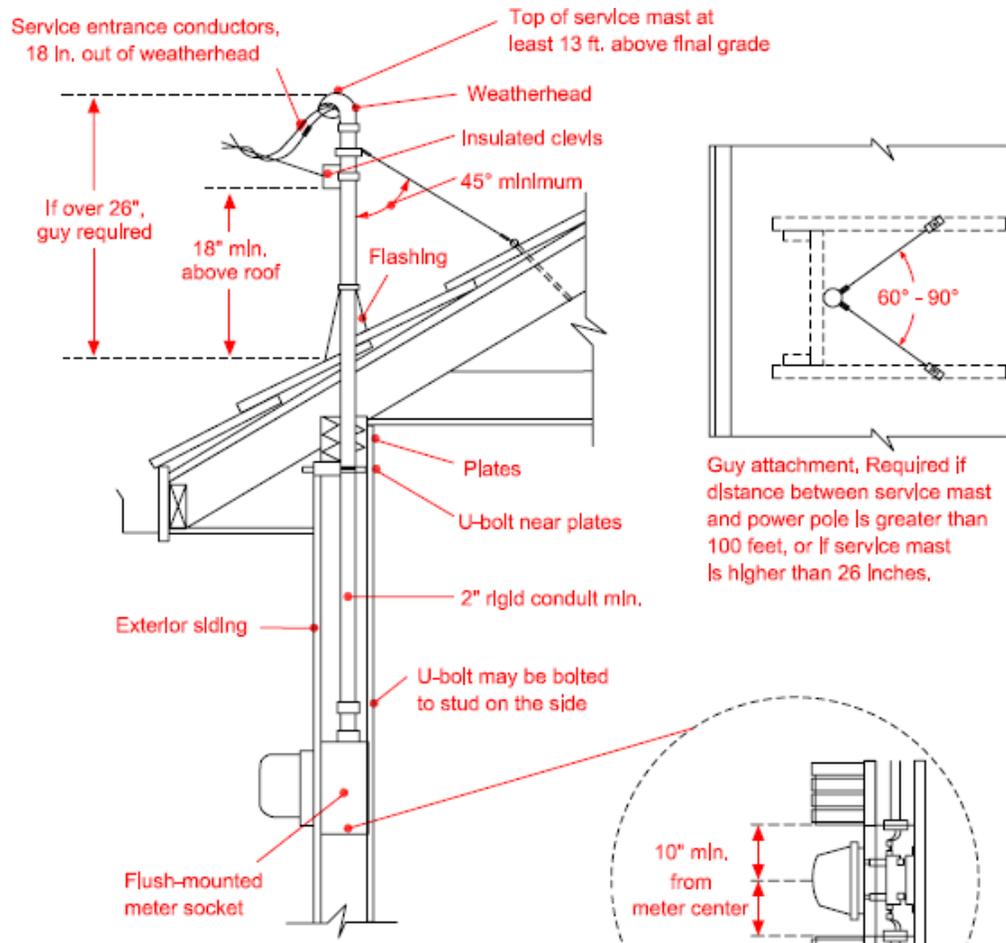


**Figure 2-5. Surface mounted meter installation.**

Figure 2-5 shows details of a service mast, with the meter on the surface of the building. The service could be wired to an exterior meter as shown here, or to service equipment inside the building. The customer installs everything in the picture, except the meter.

After the customer installs the service equipment, the power company installs the meter in the meter socket, strings the service line, attaches the service line supporting wire (neutral) to the insulated clevis, and splices the conductors together.

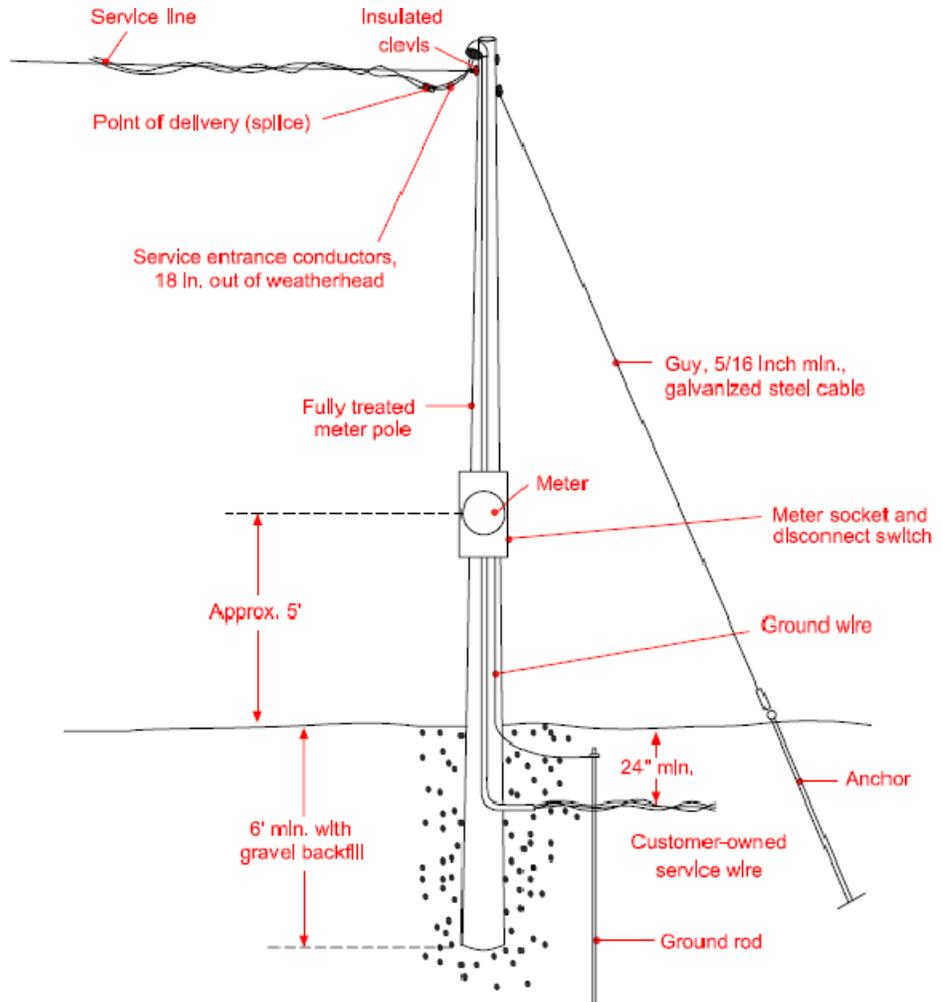
## Service Mast, Flush-Mount Meter



**Figure 2-6. Flush-mount meter installation.**

Figure 2-6 shows the details of a service mast, with the meter mounted flush with the surface of the building. Flush-mount meters are sometimes installed for aesthetic reasons. The service could be wired to an exterior meter as shown here, or to service equipment inside the building.

# Overhead Service, Meter Pole



**Figure 2-7. Overhead service to a pole.**

In Figure 2-7, the service is overhead from the power company to the pole. From the pole, the service could be overhead to the building, or underground as shown here.

# Temporary Overhead Service, Meter Post

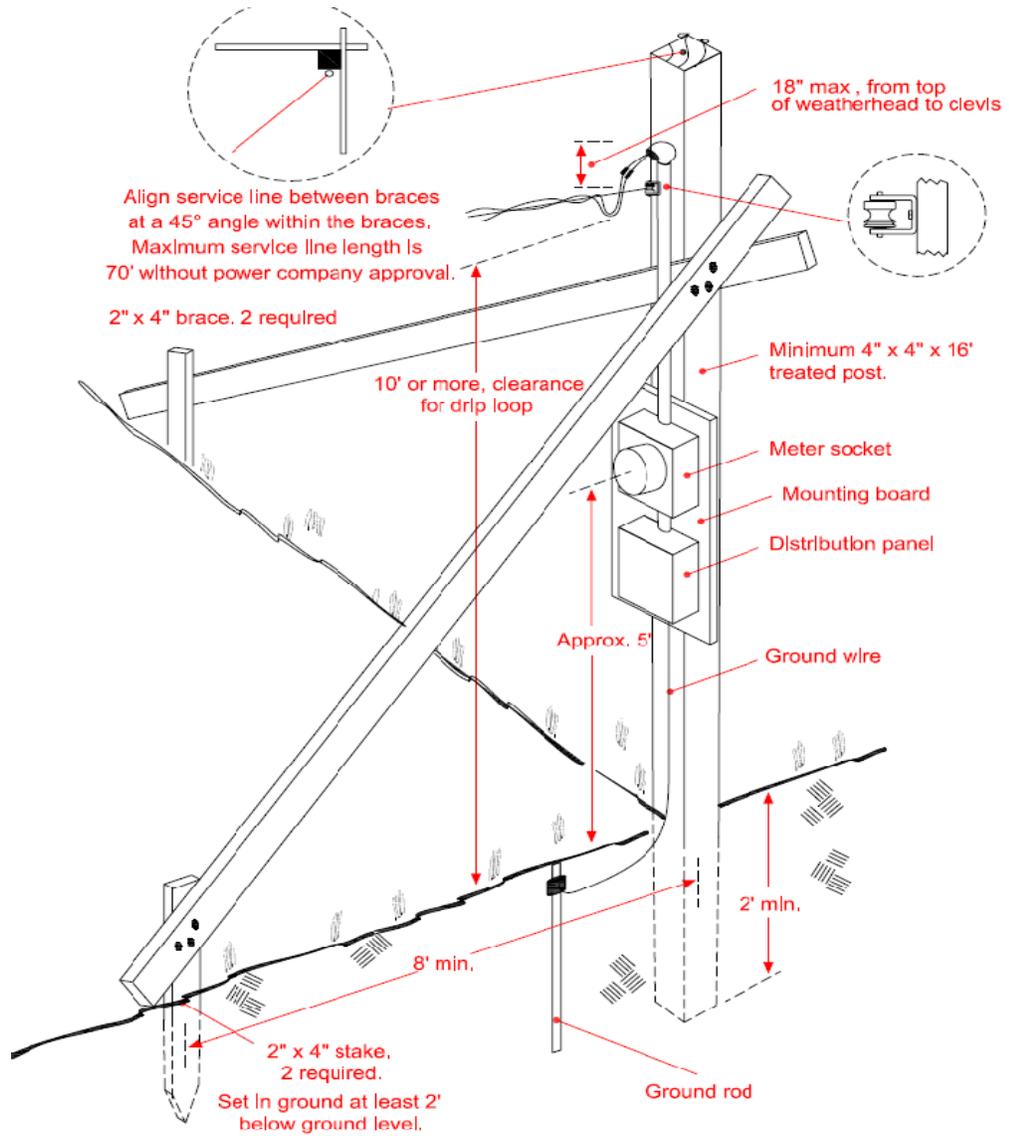


Figure 2-8. Temporary overhead service.

Figure 2-8 shows a finished installation for temporary service, using a meter post. The service is overhead from the power company to the post. From the post, the service to the building could be overhead or underground.

## CHAPTER

# 3

## Underground Service

The cost for underground service depends on the extent of special engineering required. The least complicated and cheapest situation is if a padmount transformer, stubout, or access hole is already on the property. If this is the case, engineering may not be required. The customer simply installs the service entrance equipment, has it inspected, and calls the utility to have service connected.

### Check List for Installing Underground Service

#### CUSTOMER RESPONSIBILITY

1. Contacts the utility to discuss the project, to determine where the service line will originate from and the point of delivery, and to request the service.
2. If requested, provides the power company with:
  - Site drawings
  - Load information
  - An easement for permanent equipment owned by the power company and installed on the customer's property
  - Payment for pre-construction costs
3. Obtains permits and inspections.
4. Contacts City or County Inspector for final Inspection.
5. Signs for new electrical service at RP&L Customer Service Office.

#### UTILITY RESPONSIBILITY

1. RP&L provides trench for underground (fees may apply).
2. Makes the final connection at the point of delivery. Must be inspected by City or County Inspector.

## Locating Underground Utilities

The customer must call (Call - 411 for Indiana Dig) the underground utilities locating service at least two full working days (48 hours) before trenching or excavating for underground service. One call to the locating service notifies all utilities that locates are required. In some areas, not all utilities are members of the one-call system. In those areas, the customer must contact each utility individually.

Do not begin excavation until the locations of underground wires, cables, and pipes have been marked, or the utilities have informed the customer that they have no facilities in the area.

Any digging within 24 inches of location marks must be done by hand.

The color code for marking underground utilities is:

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<b>Color</b>	<b>Underground Service</b>
Red	Electric
Yellow	Gas, Oil, Steam
Orange	Telephone, Cable TV
Blue	Water
Purple	Reclaimed water
Green	Sewer
Pink	Temporary survey marks
White	Proposed excavation

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**Table 3-1. Color code for marking underground services.**

## Trenching

Richmond Power & Light digs their own trench for underground services (fees may apply). Contact Richmond Power & Light Engineering (765) 973-7203

# Underground Service, Surface-Mount Meter

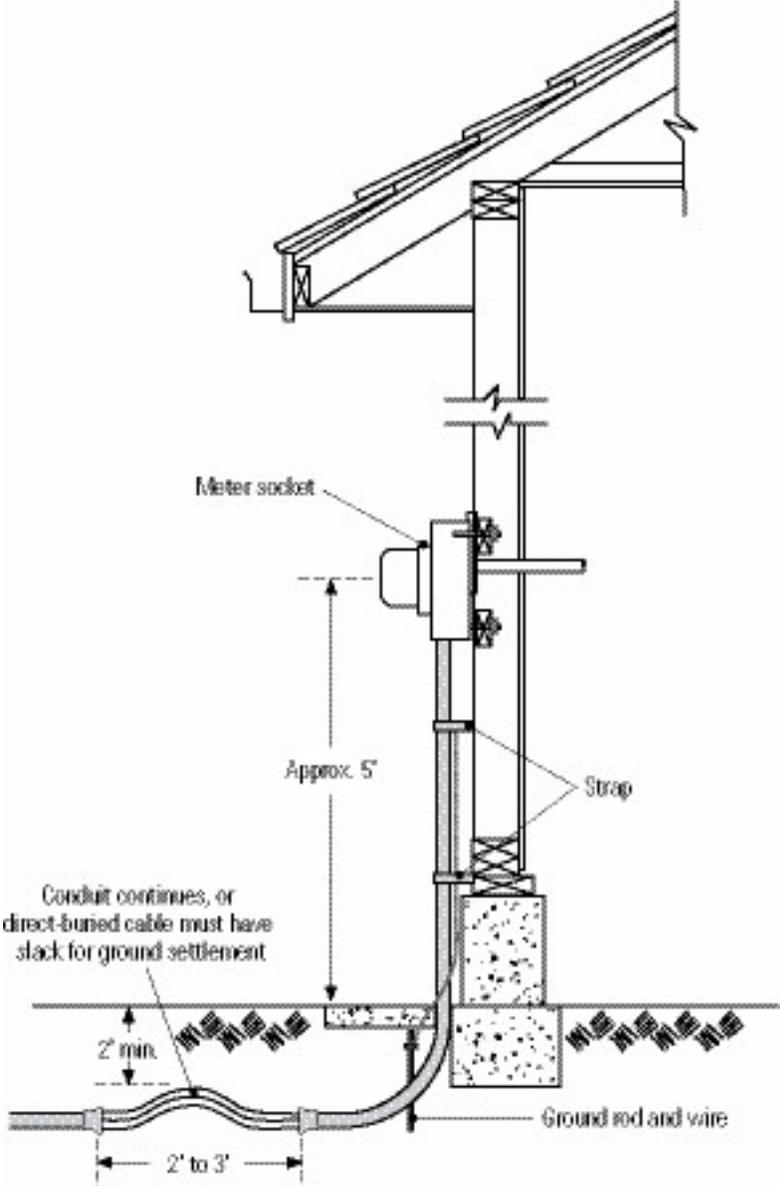
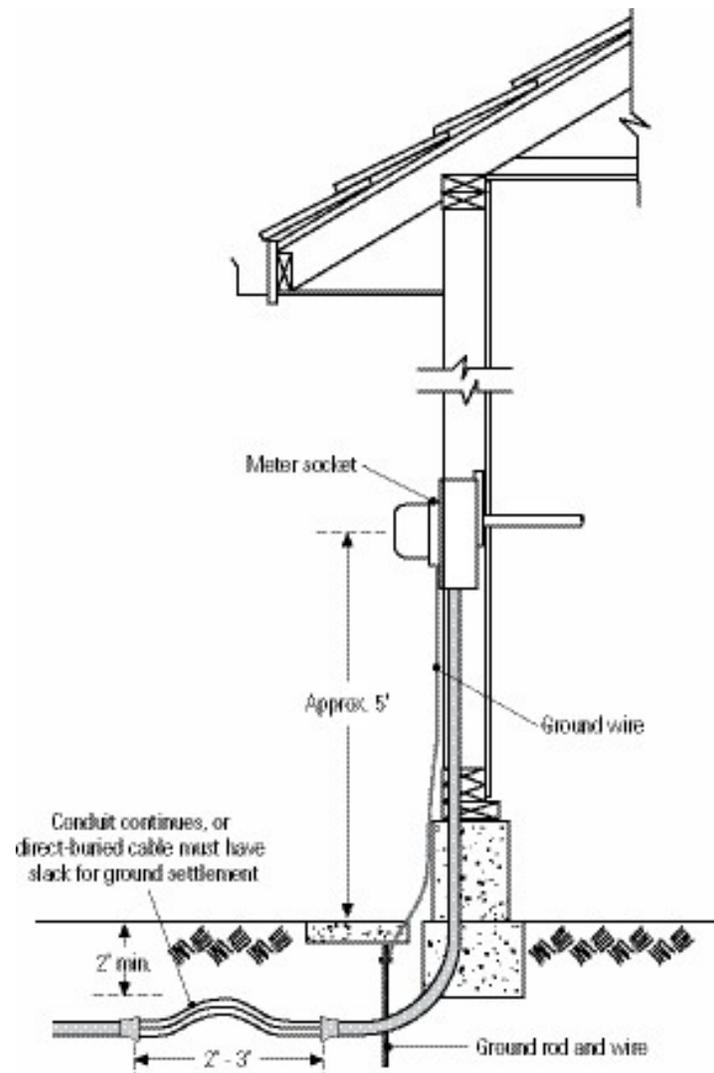


Figure 3-4. Underground service to a surface-mount meter.

Figure 3-4 shows a finished underground installation with the meter on the surface of a house.

The service is underground from the power company to a stubout, handhole, or padmount transformer (off to the left and not shown here). Conductors placed in the trench bring the power to the conduit at the base of the service entrance.

## Underground Service, Flush-Mount Meter



**Figure 3-5. Underground service to a flush-mount meter.**

Figure 3-5 shows a finished underground installation with the meter mounted flush with the surface of the building. Flush-mount meters are sometimes installed for aesthetic reasons.

The service is underground from the power company to a stubout, handhole, or padmount transformer (off to the left and not shown here). Conductors placed in the trench bring the power to the conduit at the base of the service entrance.

## Underground Service, Pedestal Meter

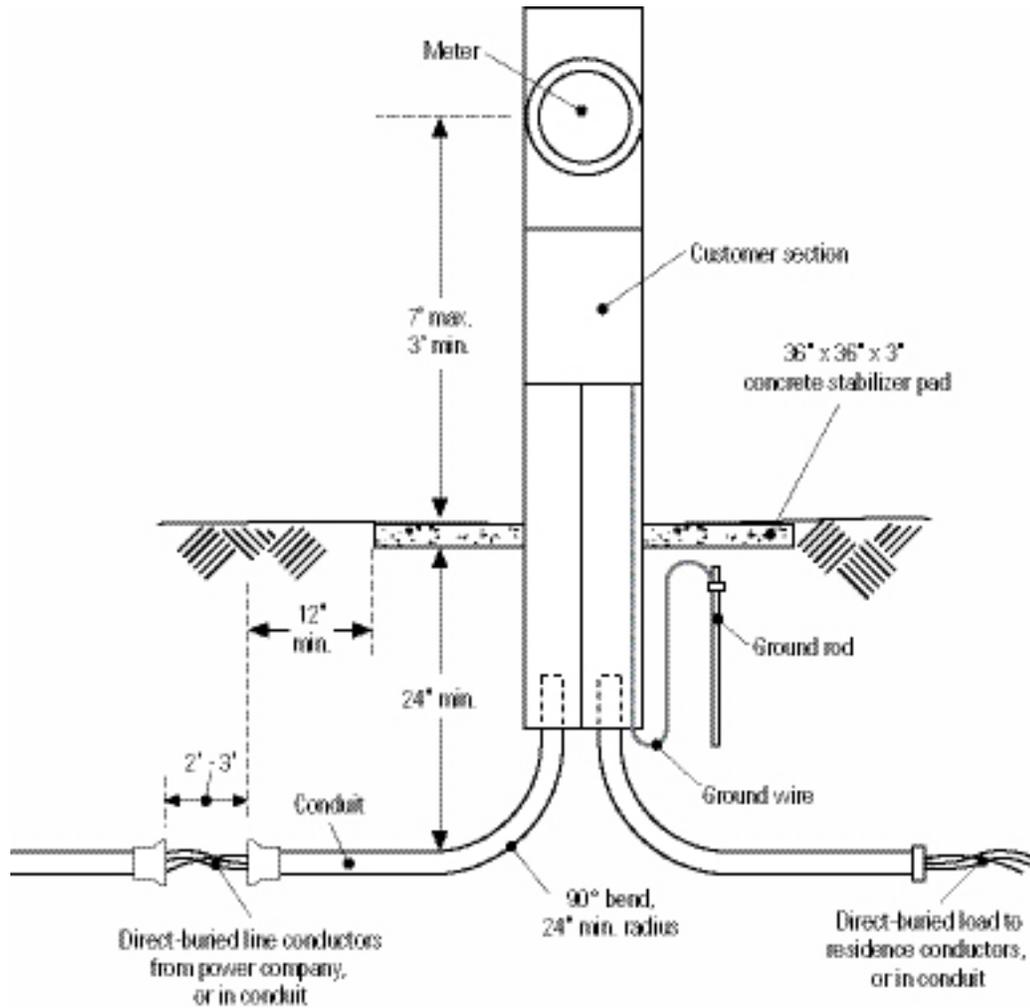


Figure 3-6. Underground service to a pedestal meter.

A meter pedestal is a free-standing factory-built structure that supports service equipment for underground service. It is most commonly used with manufactured homes. If a meter pedestal is called for, it is the customer's responsibility to purchase and install it.

Install the meter pedestal between the home and normal public access, and within 30 feet of the home. The pedestal usually contains the disconnect switch required by the NEC.

# Underground Service, Free-Standing Steel-Post

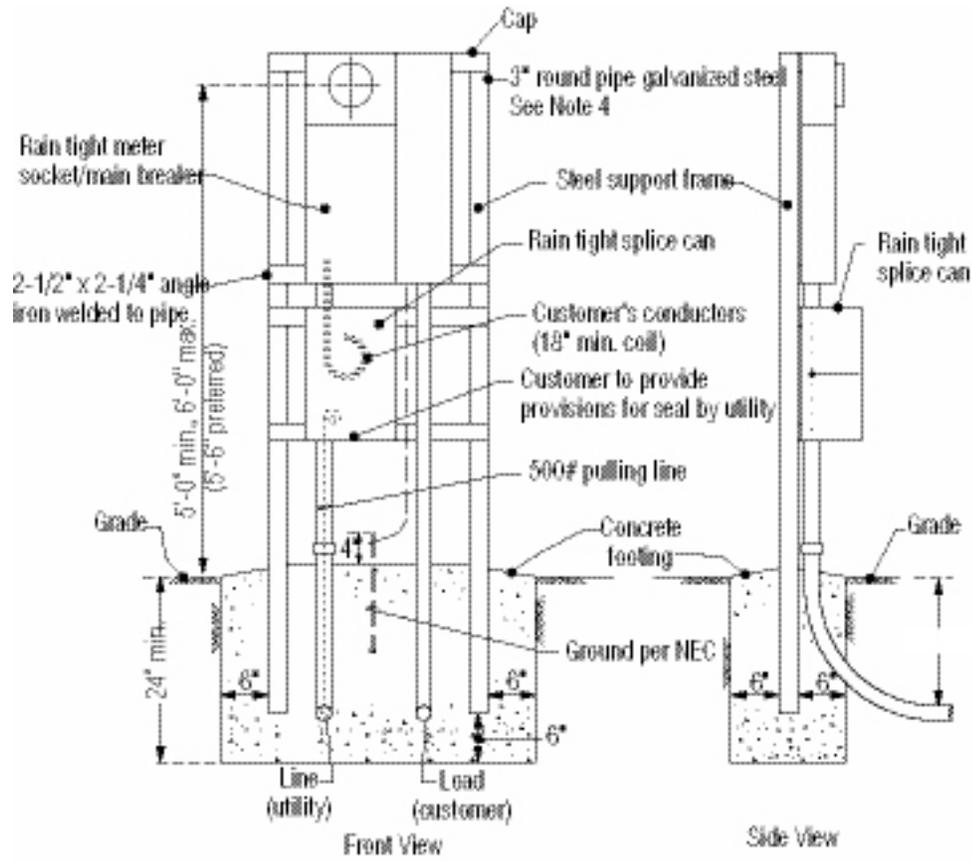


Figure 3-7. Underground service to a free-standing steel-post structure.

## Underground Service, Meter Post

Figure 3-8 shows a finished installation for temporary service, using a meter post. The service is underground from the power company to a stubout, handhole, or padmount transformer. Conductors placed in the trench bring the power to the base of the post. From the post, the service to the building is usually underground, but could be overhead.

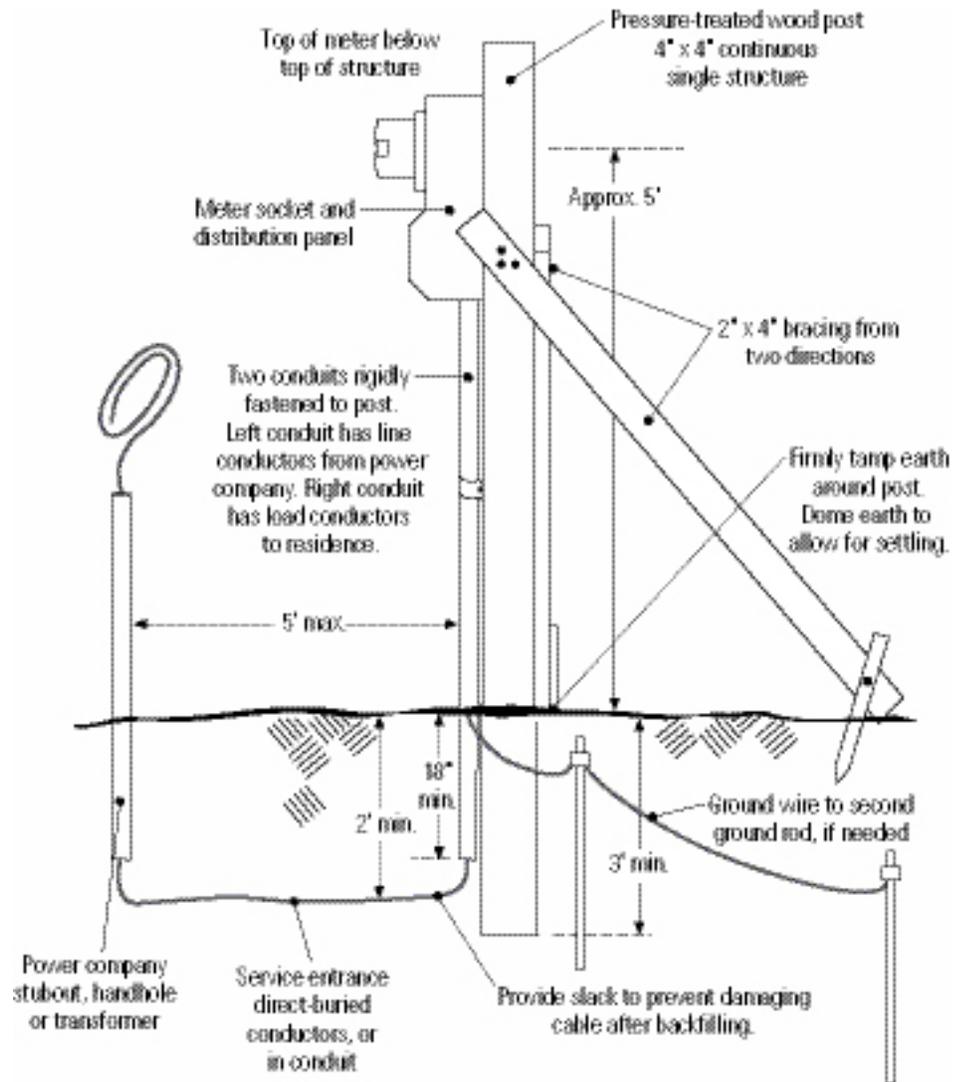


Figure 3-8. Temporary underground service.

## Transformer Installations

The power company is responsible for installing a padmount or submersible (totally underground) transformer at or near the customer's site. Conductors to the primary side of the transformer enter at the left side of the transformer; conductors to the secondary side enter at the right. The trench runs from the right side of the transformer to the customer's building.

The customer is responsible for installing the service conductors in the trench, from the transformer to the building.

## Safety Clearances Around Transformers

Clearances from padmount transformers to structures are measured from the nearest metal portion of the transformer, to the structure or any overhang.

The clearance from a building is 3 feet if the building has non-combustible walls (brick, concrete, steel, or stone), 10 feet if the building has combustible walls (including stucco).

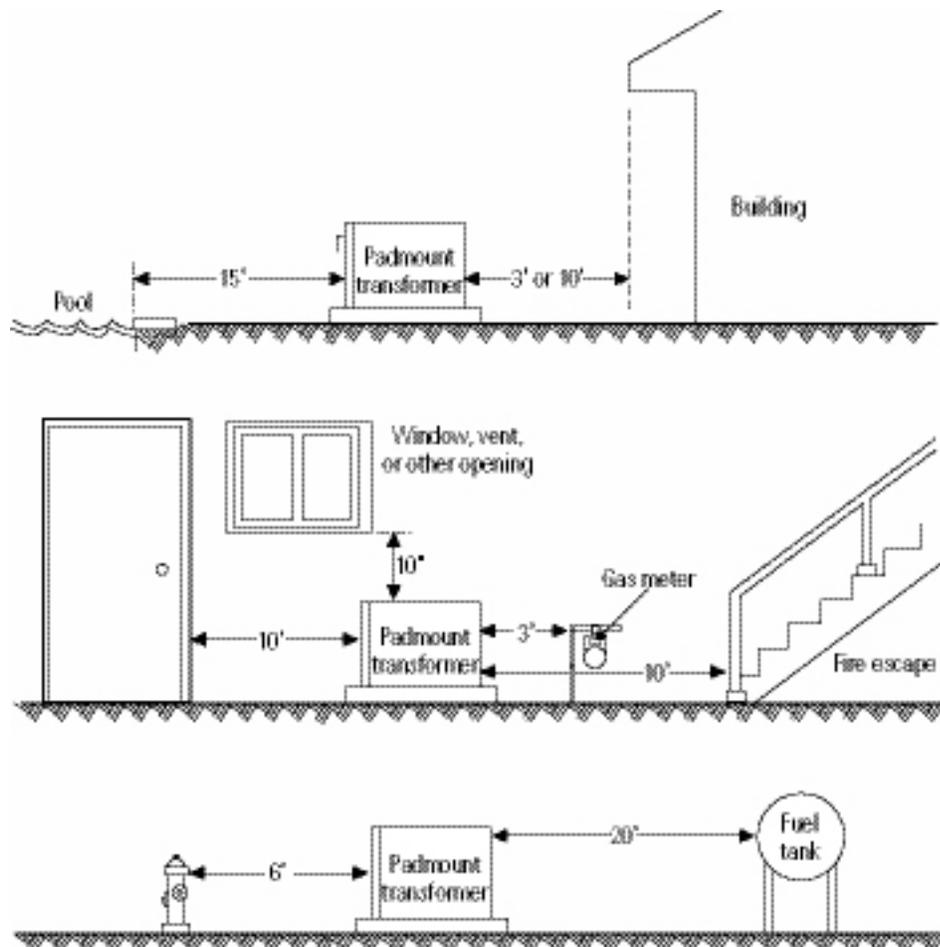


Figure 3-9. Safety clearances around a padmount transformer.

## Work Clearances Around Transformers

A minimum clearance of 10 feet of clear, level working space is required in front of a padmount transformer, to allow use of hot sticks.

The clearances shown here apply to any oil-filled electrical equipment.

Landscaping and other obstructions must not encroach on these clearances.

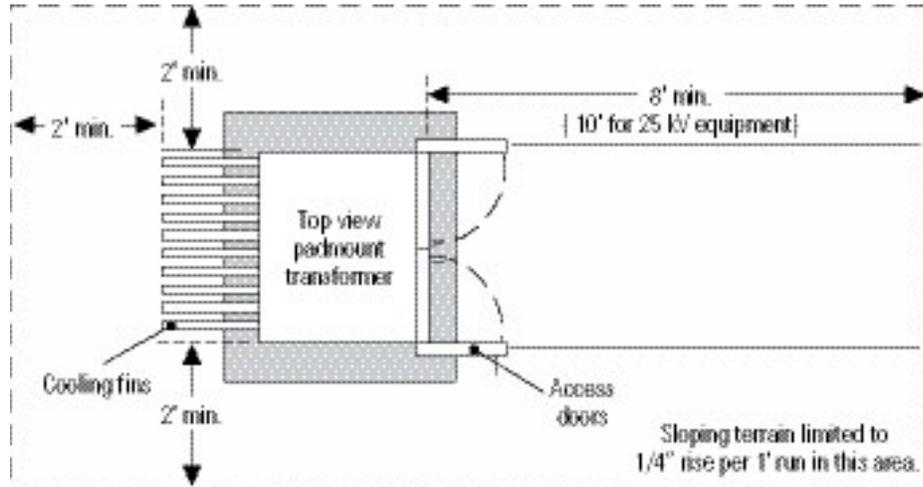


Figure 3-10. Work clearances around a padmount transformer.

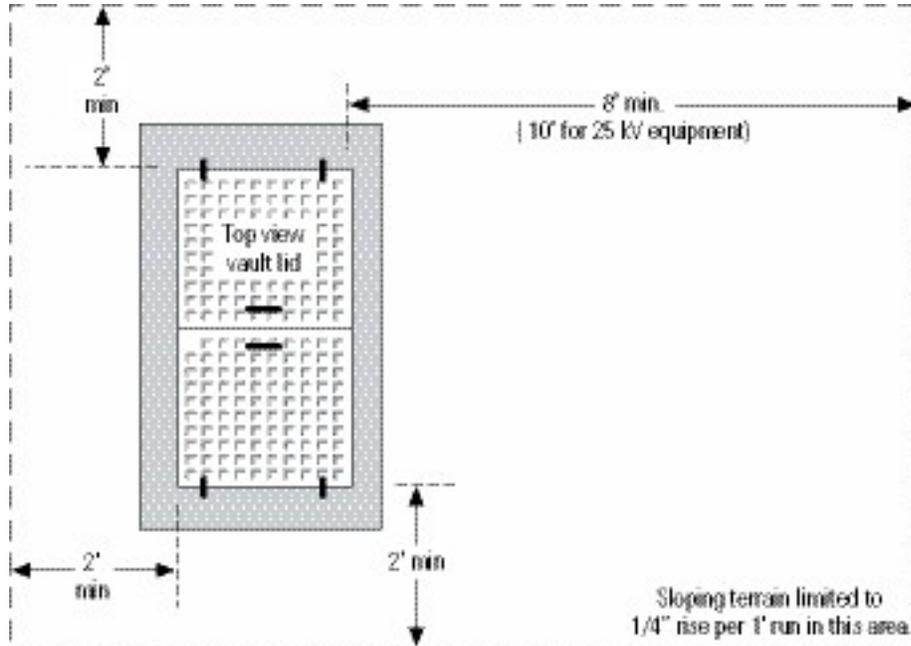
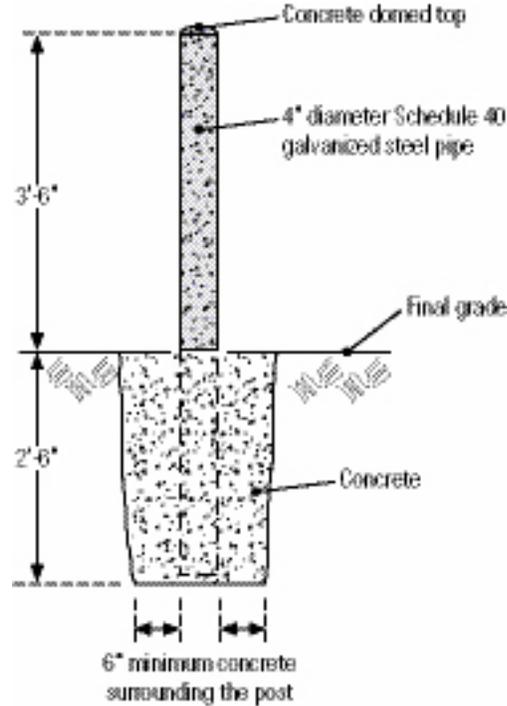


Figure 3-11. Work clearances around an underground transformer.

## Guard Posts



**Figure 3-12. Equipment guard post.**

It is the customer's responsibility to install and maintain guard posts where power company equipment is exposed to vehicular traffic.

Guard posts are also required where minimum clearances around equipment cannot be met. For example: Guard posts are required where pad mounted devices cannot be given 3 feet clearance from the back and sides of the device, and 10 feet from the front.

If the post is placed in stable soil, surround it with 6 inches of concrete. If the soil is unstable or sand, surround the post with 12 inches of concrete.

If several guard posts are used, locate them no more than 5 feet apart. For extra visibility, paint the posts traffic yellow.

In some situations, a 6-inch diameter post is required, not the 4-inch post illustrated here.

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# 5

## Customer Service

### Customer Service

Signing up for your electric service is easy! All you have to do is visit our Customer Service Office located at 44 South 8<sup>th</sup> Street. If you are unable to come into our office, we would be glad to fax or e-mail you the necessary forms.

You will need to bring a photo ID, such as your driver's license or other valid U.S. photo identification. In addition, if you are renting a property, please bring in a copy of your lease agreement. **All adults living in the household must be listed on the account.** Signing up for service only takes a minute of your time. If you are signing up via fax or e-mail we ask that you send back a copy of your photo ID and the lease with the application form.

### OFFICE HOURS

The Customer Service Office is open:

7:30 a.m. – 5:00 p.m. Monday through Friday

# RP&L – RESIDENTIAL FAX APPLICATION



**RICHMOND POWER & LIGHT**

[www.RP-L.com](http://www.RP-L.com)

2000 U.S. 27 SOUTH

P.O. BOX 908

RICHMOND, IN 47375-0908

**BUSINESS: 765.973.7200 FAX: 765.973.7418**

**Please email completed form to: [Cust.Service@RP-L.com](mailto:Cust.Service@RP-L.com)**

Dear Customer,

In order to complete the "Name Change" or the transfer of service as requested, the completion of a service application is needed. This process can either be completed by visiting our office, or by fax or email.

**Please include a copy of your driver's license or picture identification if you choose to fax or email the information to us. In addition, please include a copy of your lease with the property owner's information and signature if you are renting or leasing the property.**

Your full name: \_\_\_\_\_

Your social security number: \_\_\_\_\_ Phone number: \_\_\_\_\_

Your employer: \_\_\_\_\_

Your spouse's name: \_\_\_\_\_  
(and/or any other adults residing in the household)

Their social security number(s): \_\_\_\_\_ Phone number: \_\_\_\_\_

The service address: \_\_\_\_\_

The mailing address: \_\_\_\_\_  
\*(if different from service address)

The effective date: \_\_\_\_\_

If applicable provide address you are moving from and date you request services taken

out of your name \_\_\_\_\_

YOUR SIGNATURE: \_\_\_\_\_

SIGNATURE OF SPOUSE OR ANY/ALL ROOMMATES \_\_\_\_\_

\*Each adult needs to sign and each adult needs to include Photo Identification

\*\*\*Please indicate if you are the property owner: Owner? Renter? (Please circle correct option)

RP&L reserves the right to use any data accessible to them in order to verify and validate residency at a specific location. We also reserve the right to run ID verification and/or credit checks on all customers who have signed the application for service.

Any customer signing the application takes financial responsibility for services rendered and must contact RP&L and provide the necessary documents to be removed from an account if living arrangements change. The account balance must be current for removal of any person from the account.

## DEPOSITS

### **Will a deposit be required?**

New residential customers aren't usually asked to make a deposit unless they have had previous service with us and the account credit history requires a deposit be made. However, current customers may be asked to make a deposit if either of the two following situations apply:

1. You have an unpaid Richmond Power and Light bill from a previous residence.
2. Your service was disconnected due to non-payment.

When a deposit is required, Richmond Power and Light will add all of the electric bills for the past 12 months, then divide that total by 6.

If a deposit is required, we will put the total deposit on an agreement to be paid in 3 monthly installments due with your electric bill each month.

### **Will my deposit earn interest?**

Yes! If your deposit is held for more than 6 months, you will earn interest at a rate of 1% per year.

### **Will my deposit be returned?**

In order to have your deposit returned, you need to pay your electric bills in full, and on time, for at least 10 of the last 12 consecutive months with no disconnect notices being issued. Once your payment record meets those guidelines, your deposit plus any interest earned will automatically be refunded to your account.

If you request a disconnection of your service at your current residence, your deposit plus any interest earned will be transferred to your new account, refunded to you, or applied toward your final bill.

## PAYING YOUR BILL

### **Pay By Mail:**

You can mail us your check or money order, along with the top part of your electric bill, using the return envelope provided. You keep the bottom half of your bill for your records. Make sure you mail your payment in plenty of time for it to reach our offices by the due date. Your payment will be credited to your account on the day it is received by our office.

### **Pay by Credit Card:**

Available to residential and small commercial customers. We will accept MasterCard, Visa, and Discover cards in addition to debit cards. Credit card payments will be taken at our Customer Service Office, over the phone, or on-line at [www.RP-L.com](http://www.RP-L.com)

### **Pay In Person:**

There is a night depository box at our Customer Service Office for customers to pay their bills when the office is closed. To avoid a penalty and to make sure your account is credited in a timely manner, we suggest that if you pay your bill at one of the local businesses, that you do so five days prior to the due date as your account will not be credited until we receive your payment at our Customer Service Office.

### **Pay at our Customer Service Office:**

There are two ways for you to pay your bill at our Customer Service Office, which is located at 44 South 8<sup>th</sup> Street. You can make your payment inside at the cashier window, or you can use the drive-up window, which is located to the rear of the building.

## **PARTIAL PAYMENTS/PAYMENT AGREEMENTS**

Payments that are made with a disconnect notice or on an account that has a disconnect notice should only be made at the Richmond Power and Light office and not at any other local business to ensure that it is posted when received.

If you write a check for your bill, and the check does not clear the bank, a \$20.00 return check charge will be added to your bill. If your check does not clear the bank, you will have 10 days to pick up the check at our Customer Service Office, and the full amount of your check plus the \$20.00 returned check charge must be paid in cash, cashier's check, money order, credit card, or e-check at that time. If you are on a payment agreement and your check is returned, your payment agreement could be broken, and the entire balance would need to be paid.

You will have at least 17 days to pay your regular current monthly bill from the date it is mailed. After the due date, a penalty of 3% of the balance is charged. You will receive a reminder notice if your bill is not paid by the due date giving you approximately 15 days to make the payment current. If you have a balance that becomes 30 days past due, you will receive a disconnect notice.

If you receive a disconnect notice, please contact our Customer Service Office to see if you are eligible for a payment agreement. Our customer service representatives will be glad to work with you. However, if a customer makes only a partial payment, sends in a promissory note, or makes no contact with us concerning a delinquent bill, we have no alternative but to disconnect the electric services.

## COMMUNITY ASSISTANCE PROGRAMS:

There are programs designated each year in Indiana to assist households. If you need help you can contact the following agencies for information on getting assistance:

Community Action of East Central Indiana  
201 East Main Street  
Richmond, Indiana  
966-7733

Wayne Township Trustees Office  
County Administration Building  
Richmond, Indiana  
973-9392

## RP&L FEES

Dishonored Check Charge	\$20.00
Reconnect after Disconnect for Non Payment	
At Meter if paid by 4:30 p.m.	\$30.00
At Pole if paid by 2:00 p.m.	\$50.00
Above after hours	\$70.00
Meter Test	\$35.00
Service Call Labor	\$40.00 per hour (1 hour minimum)
Meter Tampering Charges	
Labor	\$50.00 per hour (1 hour minimum)
Material	As needed
Electric Usage	Estimated at appropriate rate

## Glossary of Metering Terms

**ANSI** – American National Standards Institute. An independent administrator and coordinator of voluntary industry standards.

**bypass** – A device which shunts current around the socket, so the meter can be removed without interrupting service.

**clearance** – There are two, quite different meanings for “clearance.” One meaning is: A specified minimum distance between two objects to assure adequate space for safety, security, or access. The other meaning is: An agreement between a foreman and the system operator, for permission. When describing new electric services, “clearance” has the first meaning – the distance between two objects.

**common ground point** – The point where the grounding electrode connects to the equipment-grounding conductor and/or the circuit-grounding conductor.

**conduit** – A pipe with a smooth interior surface for easy drawing-in of electrical conductors. Conduit may be metallic or non-metallic.

**corrosion inhibitor** – An electrical joint compound used to retard oxidation at electrical connections.

**current transformer** – A transformer whose secondary current is a precise fraction of its primary current. Using current transformers, high-current circuits can be measured with conventional meters. Abbreviation: CT.

**demand** – The average rate at which energy (kilowatt hours) is consumed during a specified interval of time.

**direct-buried cable** – Cable which may be installed in the ground without the protection of a conduit.

**direct-connect meter** – A meter which carries full load current and connects across full line voltage. Also called a self-contained meter.

**drip loop** – A downward loop in the customer’s conductors, near where the customer’s conductors attach to the power company’s overhead conductors, to prevent water from entering the service mast at the weatherhead.

**fault** – A partial or total failure of insulation which causes a short circuit between conductors, or between a conductor and ground, causing an abnormal current to flow. Also, a failure (break) in a conductor which causes an open circuit.

**fault current** – A current which flows between conductors, or between a conductor and ground, due to an abnormal connection between the two. A fault current flowing to ground may be called a ground fault current.

**guy** – A cable or brace that supports a mast or pole.

**high leg** – In a four-wire delta service, the phase with a voltage higher than the other two phases. Also called wild leg, delta leg.

**instrument transformer** – A transformer which delivers as its output, a precise fraction of the input line current or line voltage. Instrument transformers allow standard meters to measure high currents and voltages.

**instrument-rated meter** – A meter used in conjunction with instrument transfor-

mers, to measure high-voltage or high-current services. Also called a transformer-rated meter.

**line conductor** – A service conductor installed by the electric utility, to the meter.

**load conductor** – A service conductor to the customer's load, after the meter.

**manual link bypass** – Provision for manually installing conductive links between the line and load terminals in the meter socket. These links maintain electrical service to the customer when the meter is removed. Also called manual circuit-closing block.

**manufactured home** – A factory-assembled structure built on a permanent chassis, transportable in one or more sections, and designed to be used as a dwelling with a permanent foundation. Also called a modular home. New electric service to a manufactured home has the same requirements as installing new service to a permanent single-family residence.

**meter jaw** – A spring-loaded receptacle inside a meter socket which captures the terminals (blades) of a meter and connects the meter terminals to the service conductors.

**meter pedestal** – A factory-built assembly containing a meter socket and disconnect switches.

**meter ring** – A metal ring which secures the meter to the meter socket, which can be sealed by the electric utility to prevent tampering with the meter.

**meter socket** – The mounting device consisting of meter jaws, connectors, and enclosure for receiving a socket-type meter.

**mobile home** – A factory-assembled structure built on a permanent chassis, transportable in one or more sections, and designed to be used as a dwelling without a permanent foundation. Overhead service to a mobile home is provided by a meter pole. Underground service to a mobile home is provided by a meter pedestal.

**NEC** – National Electrical Code. National regulations for the installation of electrical equipment inside buildings. Published by the National Fire Protection Association. NEC rules apply to equipment on the customer's side of the point of delivery.

**NEMA** – National Electrical Manufacturers Association. A trade association which publishes standards for manufacturers of electrical equipment, including enclosures and racks.

**NESC** – National Electrical Safety Code. National regulations for the installation, operation, and maintenance of electric supply and communication lines. Published by Institute of Electrical and Electronics Engineers. NESC rules apply to equipment on the electric utility's side of the point of delivery.

**neutral** – The grounded conductor in a single-phase three-wire, or three-phase four-wire system.

**point of attachment** – The point at which the utility's service conductors are mechanically attached to the customer's premises. For overhead services, the point of attachment is usually an insulated clevis.

**point of delivery** – The point where the utility's service line makes the electrical

connection to the customer's wires. For overhead services, the point of delivery is the splice between the utility's and the customer's conductors. For underground services, the point of delivery is the secondary lugs of the distribution transformer, or the service stubout, or the secondary hand hole – if the utility's existing service is on the customer's property. If the utility's existing service is not on the customer's property, the point of delivery is the customer's property line. The utility determines the point of delivery based, in part, on convenient access to existing service.

**power factor** – Technically, the cosine of the phase angle between the circuit voltage and current waveforms. Since phase angles are difficult to measure, power factor is usually derived by measuring power or impedance. Power factor is the ratio of active power to apparent power (watts divided by volt-amperes). Power factor has no units, but is commonly expressed as a percentage. For example, if active power is 96 kW and apparent power is 100 kW, the power factor is 96%.

**primary voltage** – The voltage at which electricity is delivered from substations to distribution transformers. Primary voltage is greater than 600 volts.

**raceway** – An enclosed channel for holding wires or cables. If designated for line conductors, the raceway must be sealable. The intermixing of line and load conductors in the same raceway is not permitted.

**seal** – A locking device to secure a meter or other service equipment.

**secondary voltage** – The voltage at which electricity is delivered from distribution transformers to customers. Secondary voltage is less than 600 volts.

**select backfill** – Soil or sand free from sharp objects, rocks, scrap building material, and corrosive material.

**self-contained meter** – A meter which carries full load current and connects directly across full line voltage. Also called a direct-connect meter.

**service drop** – For overhead service, the power company's service line between the distribution transformer and the point of delivery.

**service line** – Conductors from the distribution transformer to the customer's point of delivery. See service drop, service lateral.

**service entrance equipment** – The service equipment which is supplied by the customer: conduit, conductors, mast, weatherhead, meter base, enclosures, disconnects, and panels.

**service lateral** – For underground service, the service line between the distribution transformer and the point of delivery.

**service mast** – For overhead service, the conduit rising above the meter to provide mechanical protection to the customer's conductors and to support the service drop from the power company.

**socket** – The mounting device for socket meters. Includes spring-loaded meter jaws, connectors for line and load conductors, and an enclosure.

**temporary service** – Electric service during the construction phase of a project.

**test switch** – A device used to isolate connections to a meter from its instrument transformers.

**transformer-rated meter** – A meter used in conjunction with instrument trans-

formers, to measure high-voltage or high-current services. Also called an instrument-rated meter.

**UL** – Underwriters Laboratories. An independent product-testing and certification organization.

**voltage transformer** – A transformer whose secondary voltage is a precise fraction of its primary voltage. Using voltage transformers, high-voltage circuits can be measured with conventional meters. Abbreviation: VT, or PT (potential transformer).