OVERHEAD SERVICE

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PARAGRAPH **PAGE**

400.0 OVERHEAD SERVICES 0 - 600 VOLTS

400.1 GENERAL

1. CRA-ES RESERVES THE RIGHT TO DETERMINE ALL METER LOCATIONS, INCLUDING POINTS OF ATTACHMENT, AND ONLY AUTHORIZED CRA-ES PERSONNEL SHALL DETERMINE THIS LOCATION.
2. The height of the point of attachment on the Customer's building or structure for overhead services shall be adequate to provide vertical clearances between the service drop conductors and the ground as shown in Paragraph 401.0. **The service attachment height may have to be higher than the minimums shown in Paragraph 401.0 to maintain proper vertical clearance between service conductors and the ground.**
3. Service head and open wires between the service head and point of connection to the service drop (drip loop) shall have proper height above ground as shown in Paragraph 401.0.
4. The point of service drop attachment on a building shall be located on the exterior wall facing and nearest CRA-ES pole line. **The point of attachment shall be insulated.**
5. A solid point of attachment shall be provided to withstand a minimum 200 pounds of tension. The responsibility for furnishing a sufficiently substantial service support rests solely with the Customer. **(Lag bolts are not considered acceptable.)**
6. Where the service conduit riser is used as a mast for supporting the service drop, it shall be 1 1/2" min. size rigid steel conduit and contain no coupling or fittings which would be subject to strain by the service drop. If necessary to use more than one 10' length of conduit, the full length (10') conduit shall be the upper conduit, thereby putting the coupling below any strain.
7. EMT or Plastic shall not be used for riser.
   Point of attachment on service conduit risers to be no more than 20" above the top brace for 1-1/2" rigid steel conduit, no more than 30" above the top brace for 2" rigid steel conduit and no more than 50" above the top brace for 2-1/2" and larger rigid steel conduit. See Paragraph 401.4, Paragraph 401.4-1, and Figures 1, 2, 3 and 4. See Paragraph 401.5 for alternative method for point of attachment.
8. **In the event a mast type riser is required to attain the required height, it shall be of such construction and so supported that it will withstand the strain imposed by the service drop. Raceway fittings shall be of a type identified for use with service masts.**
9. **Service riser conduits shall be so located that the corner of the point of attachment for the service drop will be within twelve (12) inches of the center of the weatherhead.**
10. **When multiple risers are used leave 36" leads for connection by company.**
11. **A maximum of three (3) service riser conduits may be supplied from one overhead service drop.**
12. **No foreign attachments shall be permitted on a service riser conduit.**
13. **Overhead raceway (riser) shall not be enclosed by any wall.**

Note: Attachment tensions greater than 200 pounds may be required in special cases, such as for bus duct risers. (Consult CRA-ES)

400.2 IDENTIFICATION OF CONDUCTORS

Any neutral or delta power (high) leg of service entrance conductors, provided as required for various classes of service, shall be permanently identified. The identification shall be applied on the open conductors (drip loop) extended from the weatherhead or on the bus-stubs of a bus-duct servicehead, whichever is applicable. The neutral shall be white and the delta power (high) leg shall be orange. (See Section 300, Paragraphs 303.7 and 304.3).

400.3 MAXIMUM SERVICE ENTRANCE CONDUCTOR SIZE IN RISERS (OVERHEAD)

Service entrance conductors installed by the customer shall be sized per NEC requirements. Maximum size conductor shall be 750 MCM with a maximum number of two conductors per phase.

If service riser conductors are to be paralleled, they shall be paralleled in separate conduits. When metallic (ferrous) conduit is used or there is any encirclement of ferrous metal, induced current heating will damage the cable insulation. The only acceptable method is to install one of each phase conductor and neutral in each metallic conduit (e.g. ABCN of a four wire service).

NOTE:

Parallel service may be installed in one riser provided the conduit is sized properly per NEC for the total amount of wire installed. Parallel conductors must terminate on a common bus (e.g. 8 conductors in one conduit for a four wire service, 2 - ABCN).

401.0 CLEARANCES ABOVE GROUND, THOROUGHFARES, DRIVEWAYS, ETC.

Service drop conductors when not in excess of 300 volts phase to ground, shall have the following minimum clearance at the lowest point of the span. **(The height of the point of attachment shall be governed by these clearances.)** Clearances are based on conductors supported on and cabled together with an effectively grounded messenger.

Crossing over areas accessible to pedestrians only.....12.0 ft

Crossing over residential driveways..... .....12.5 ft

Crossing over non-residential areas, parking lots, agricultural or other areas subject to truck traffic.....NOTE 1..... .....18.0 ft

Crossing over non-residential or industrial parking lots, not subject to truck traffic NOTES 1 & 2..... .....12.5 ft

Crossing over public streets, alleys or roads in urban or rural districts and driveways on

other than residential property..... .....18.0 ft

Crossing over railroad tracks..... .....27.0 ft

NOTES:

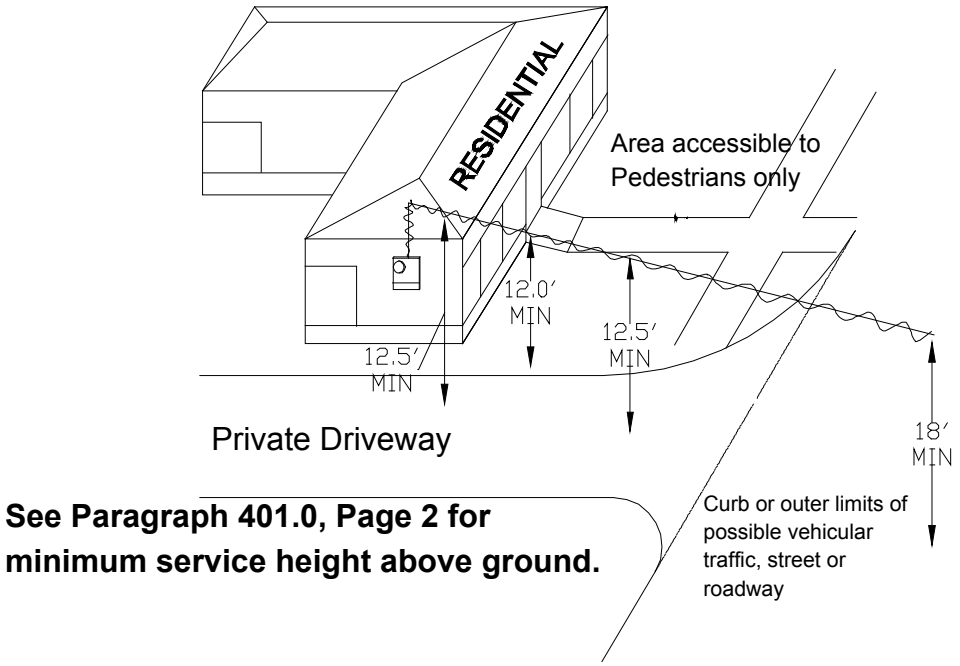
1. Trucks are defined as any vehicle exceeding 8 feet in height.
2. Truck height must be physically restricted.
3. Minimum height for Drip Loop shall be 10.5 feet.

SPECIAL NOTE:

Where clearance is questionable, please call CRA-ES for instructions before installing service entrance, conduit and other equipment.

It is recommended that an on site meeting be requested with an CRA-ES Representative to determine service attachment height before installation of service entrance, conduit and other equipment.

401.0-1 CLEARANCES ABOVE GROUND - RESIDENTIAL
THESE MINIMUM CLEARANCES APPLY TO THE LOWEST POINT OF SERVICE DROP SAG



See Paragraph 401.0, Page 2 for minimum service height above ground.

Figure 1

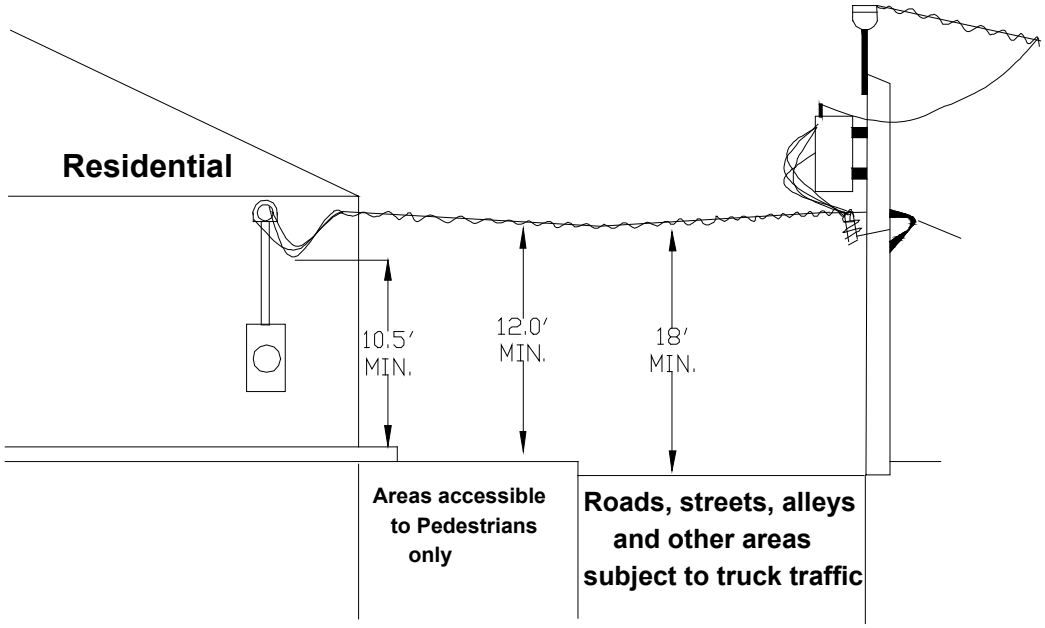


Figure 2

401.0-2 CLEARANCES ABOVE GROUND - INDUSTRIAL & NON - RESIDENTIAL

THESE MINIMUM CLEARANCES APPLY TO THE LOWEST POINT OF SERVICE DROP SAG.

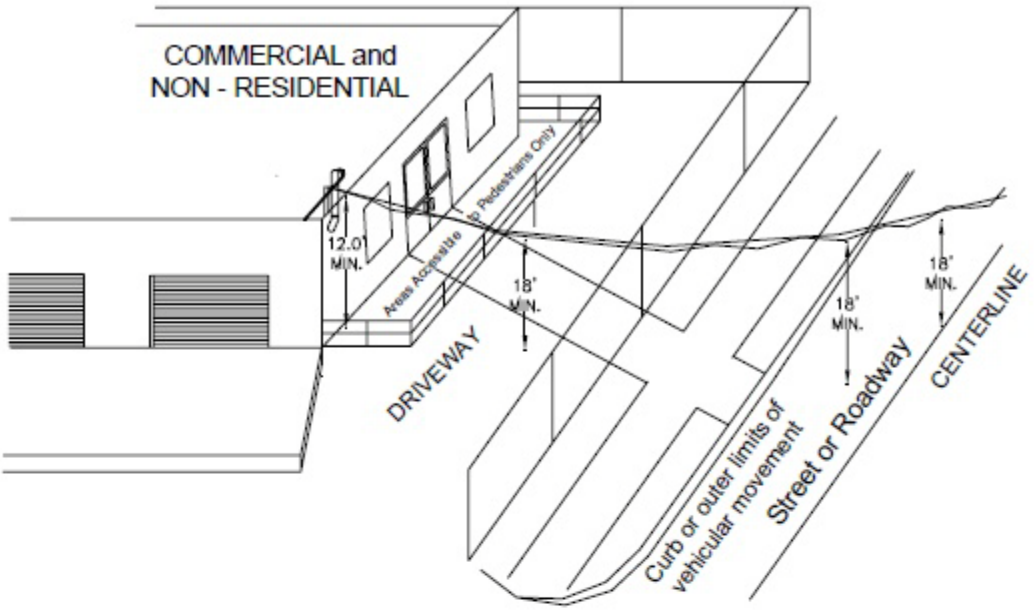


Figure 1

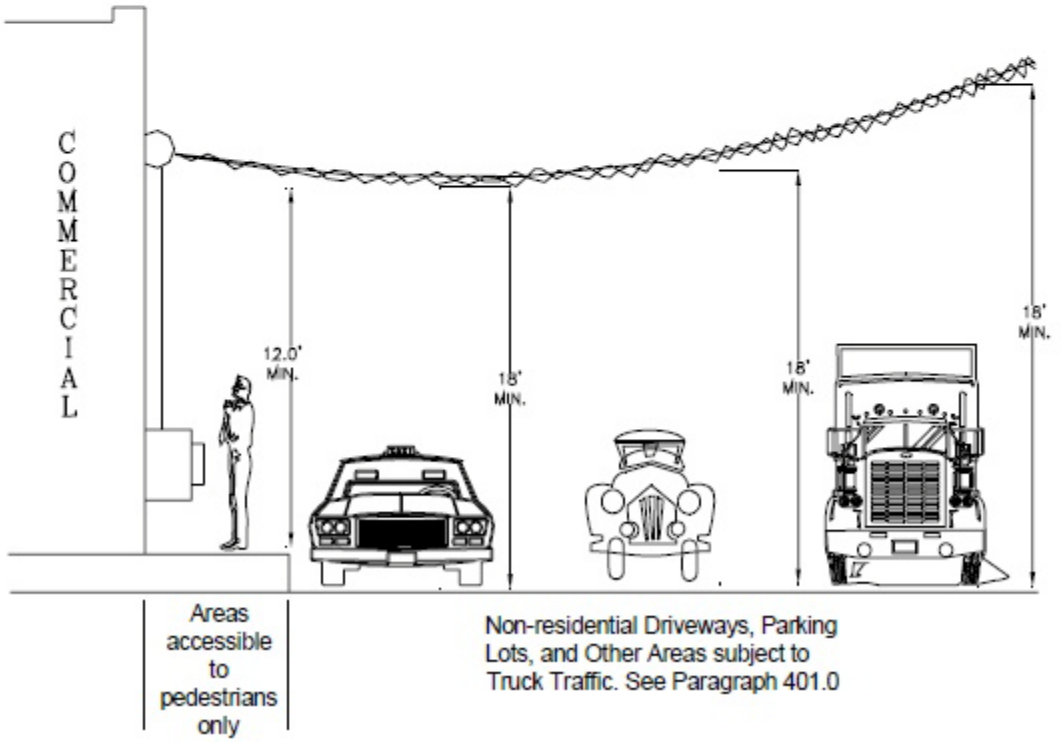
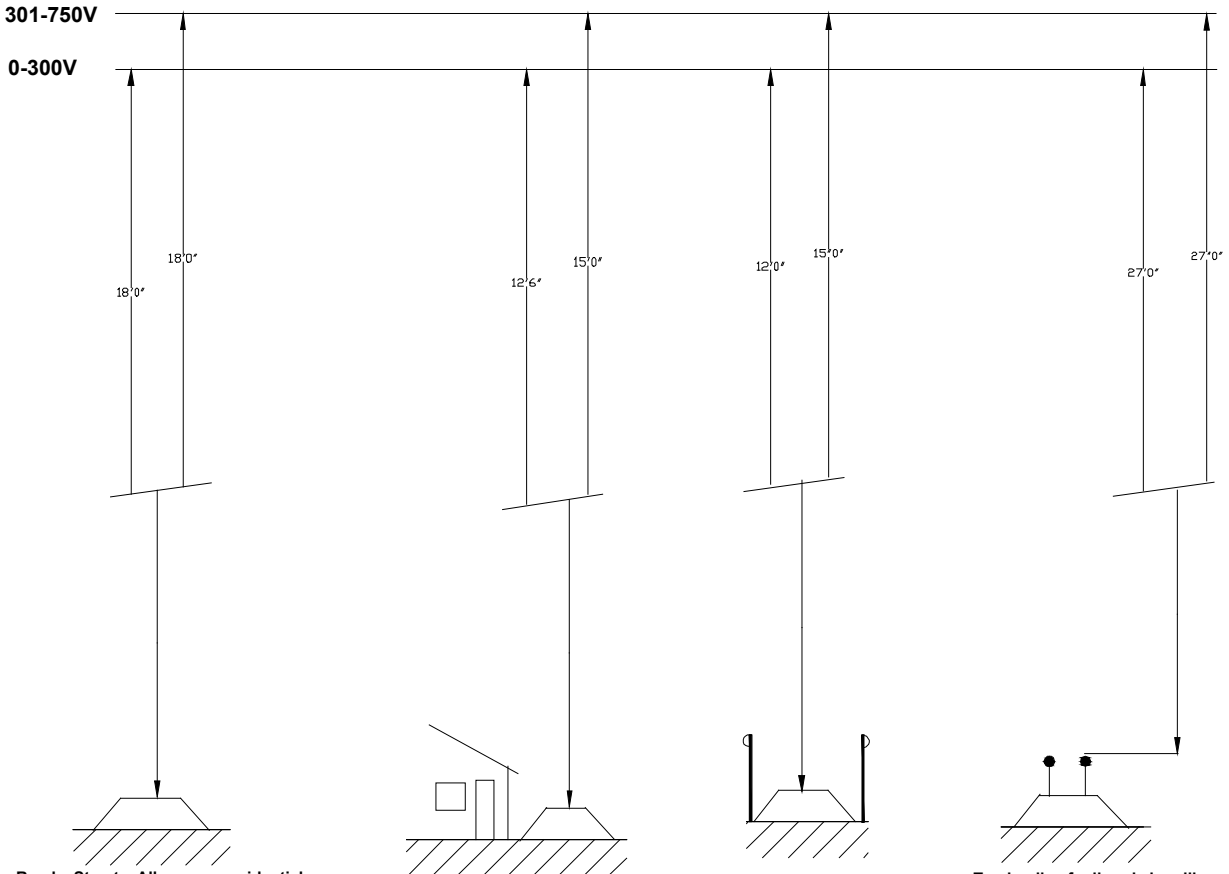


Figure 2

401.0-3 CLEARANCES ABOVE GROUND



Roads, Streets, Alleys non-residential driveways, parking lots, and other areas subject to truck traffic.

Figure 1

Residential driveways, commerical areas not subject to truck traffic- Note 1 & 3

Figure 2

Spaces or ways accessible to pedestrians only- Note 2

Figure 3

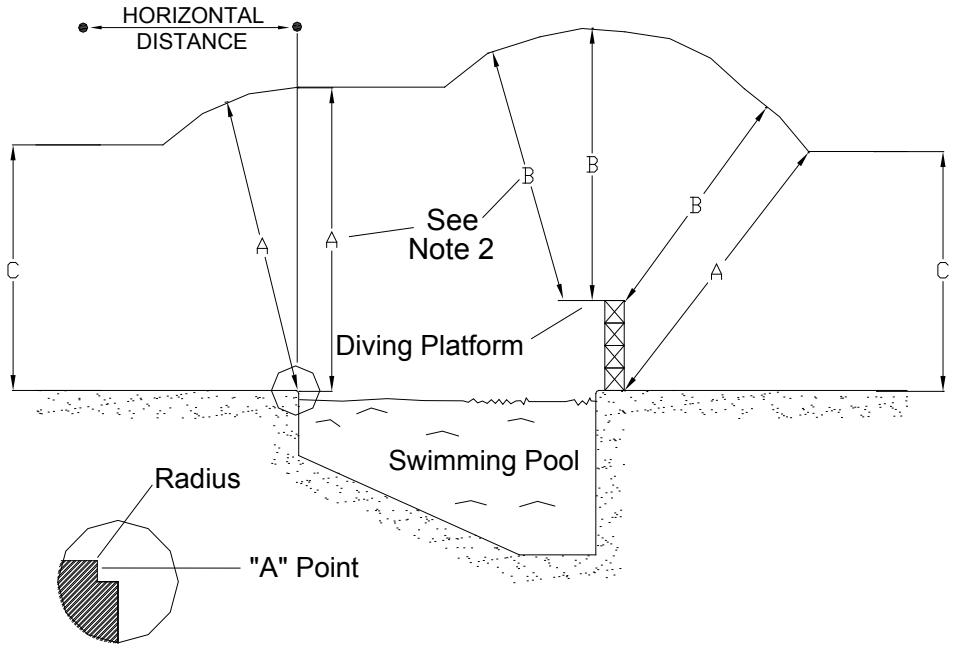
Track rails of railroads handling frieght cars on top of which men can ride.

Figure 4

Notes:

1. Trucks are defined as any vehicle exceeding 8 feet in height.
2. If accessible to equestrians, use figure 1.
3. Truck height must be physically restricted.

401.1 MINIMUM VERTICAL CLEARANCES (SWIM POOLS)



VOLTAGE PHASE TO GROUND	DIMENSION "A" VERTICAL CLEARANCE OVER POOL OR RADIAL CLEARANCE FROM EDGE OF POOL OR DIVING PLATFORM	DIMENSION "B" CLEARANCE IN ANY DIRECTION TO DIVING PLATFORM OR TOWER	DIMENSION "C" VERTICAL CLEARANCE OVER ADJACENT LAND
50KV – 470KV NOTE 21	26' – 0" + NOTE 7	26' – 0" + NOTE 7	NESC Rule 232
22KV – 50KV NOTE 21	26' – 0"	18' – 0"	NESC Rule 232
750V – 22KV	25' – 0"	17' – 0"	NESC Rule 232
0 – 750V OPEN NOTE 21	23' – 0"	15' – 0"	NESC Rule 232
0 – 750 MULTIPLEX W/ MULTIGRND NEUT	23' – 0"	15' – 0"	NESC Rule 232
GUY WIRE AND COMMUNICATIONS	22' – 0"	14' – 0"	NESC Rule 232

NOTES:

1. All voltages are phase-to-ground.
2. When Dimension “A” is greater than the sum of Dimension “B” plus the diving platform height, use Dimension “A”.
3. Minimum clearances must be maintained from neighboring services.
4. Clearances indicated are for areas accessible to pedestrians only, when service wires are located more than 10 feet horizontally away from pool’s edge.
5. The swimming pool clearances shown above apply to all types of swimming areas including above and below ground pools, and spas.
6. These dimensions shall also comply with local municipal requirements.
7. Increase clearances 0.4 inch per KV for all voltage in excess of 50KV. This 0.4 inch adder shall be increased 3 percent for each 1000 feet in excess of 3300 feet elevation. Add 5 percent to all nominal voltages over 50KV when calculating increased clearances.

401.2 HORIZONTAL CLEARANCES FROM BUILDINGS

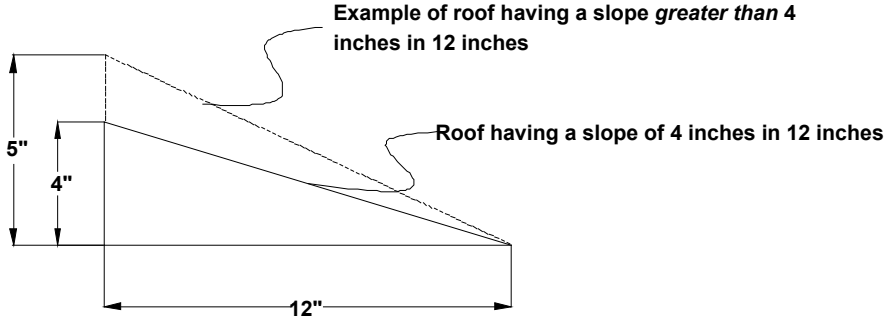
Conductors shall have a horizontal clearance of not less than 3 feet from buildings. For clearances from balconies, windows, fire escapes, doors, etc., see Paragraph 401.7

401.3 CLEARANCES OVER BUILDINGS AND STRUCTURES

Service drop conductors shall not be readily accessible. When not in excess of 600 volts, they shall conform to the following: It shall be the customer's responsibility to provide a point of attachment so CRA-ES service drop conductors meet these requirements.

Clearance Over Roof. Conductors shall have a clearance of not less than 8 ft. from the highest point of roofs over which they pass, with the following exceptions:

Exception No. 1: Where the voltage between conductors does not exceed 300 and the roof has a slope of not less than 4 inches in 12 inches the clearance may be not less than 3 feet.



The intent of this exception is that where the roof has a slope 4 in. in 12 in. or greater it is considered difficult to walk upon and the height of conductors could then be less than 8 ft. from the highest point over which they pass but in no case less than 3 ft. except as permitted in Exception 2.

Exception No. 2: Service drop conductors of 300 volts or less between conductors where not more than 4 ft. of service-drop conductors pass above the roof overhang for the purpose of terminating at a (through-the-roof) service raceway or approved support may be maintained at a minimum of 18 inches from any portion of the roof over which they pass. (Illustrated on Paragraph 401.3-1, Figure 2)

401.3-1 CLEARANCE OVER BUILDINGS AND STRUCTURES

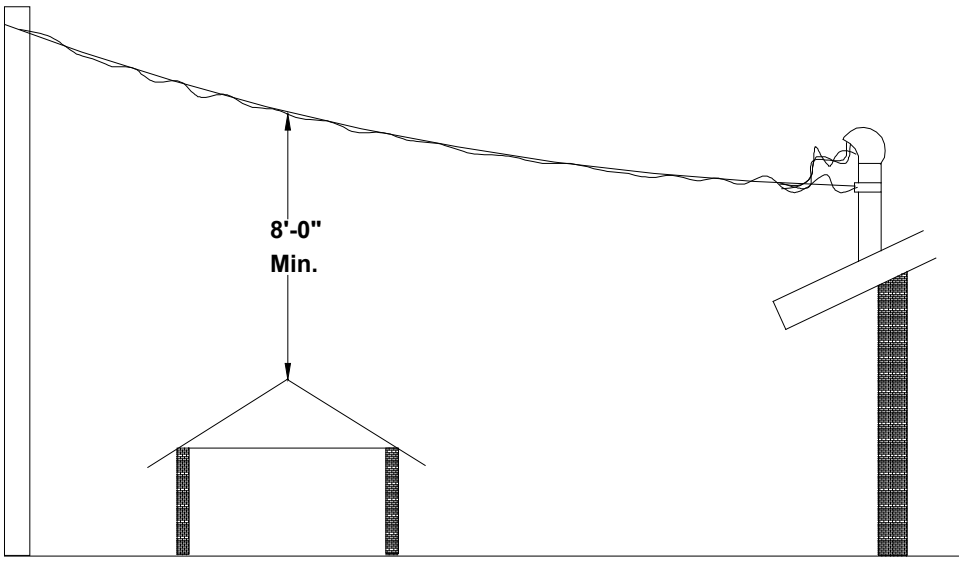
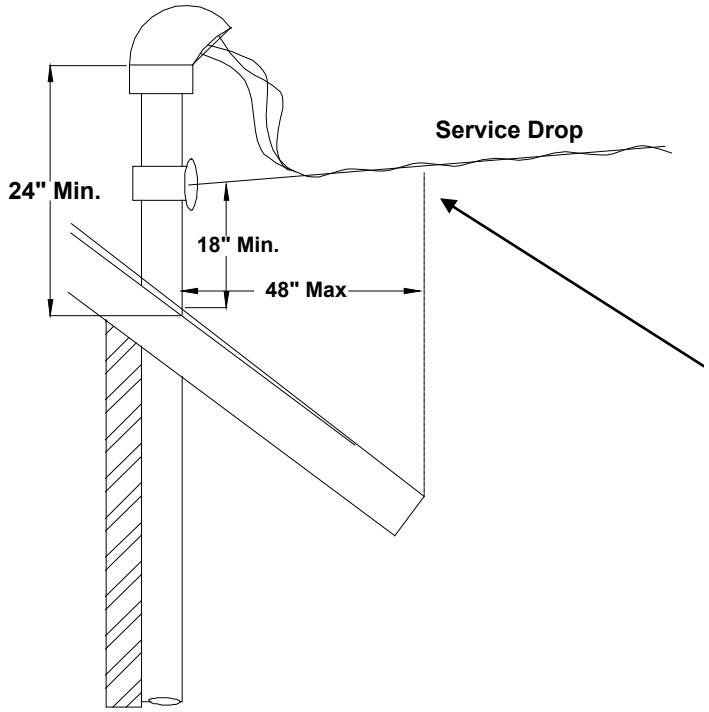


Figure 1

Clearance above residential, non-residential or industrial buildings on premises served or adjacent premises; OTHER THAN THE BUILDING SERVED. See Paragraph 401.3 for possible exceptions.



See Paragraph 401.0 for minimum point of attachment of service drop

Maximum of 4 feet of service drop conductors passing over the overhang portion of the roof.

Service entrances shall not be located within a roofed-over area necessitating CRA-ES personnel to walk on or place a ladder on roof to make attachment to riser conduit or support and to connect Customer's service.

Overhead Service to Wall-Mounted Meters

Surface or Flush Mount Metering (New and Rewire)

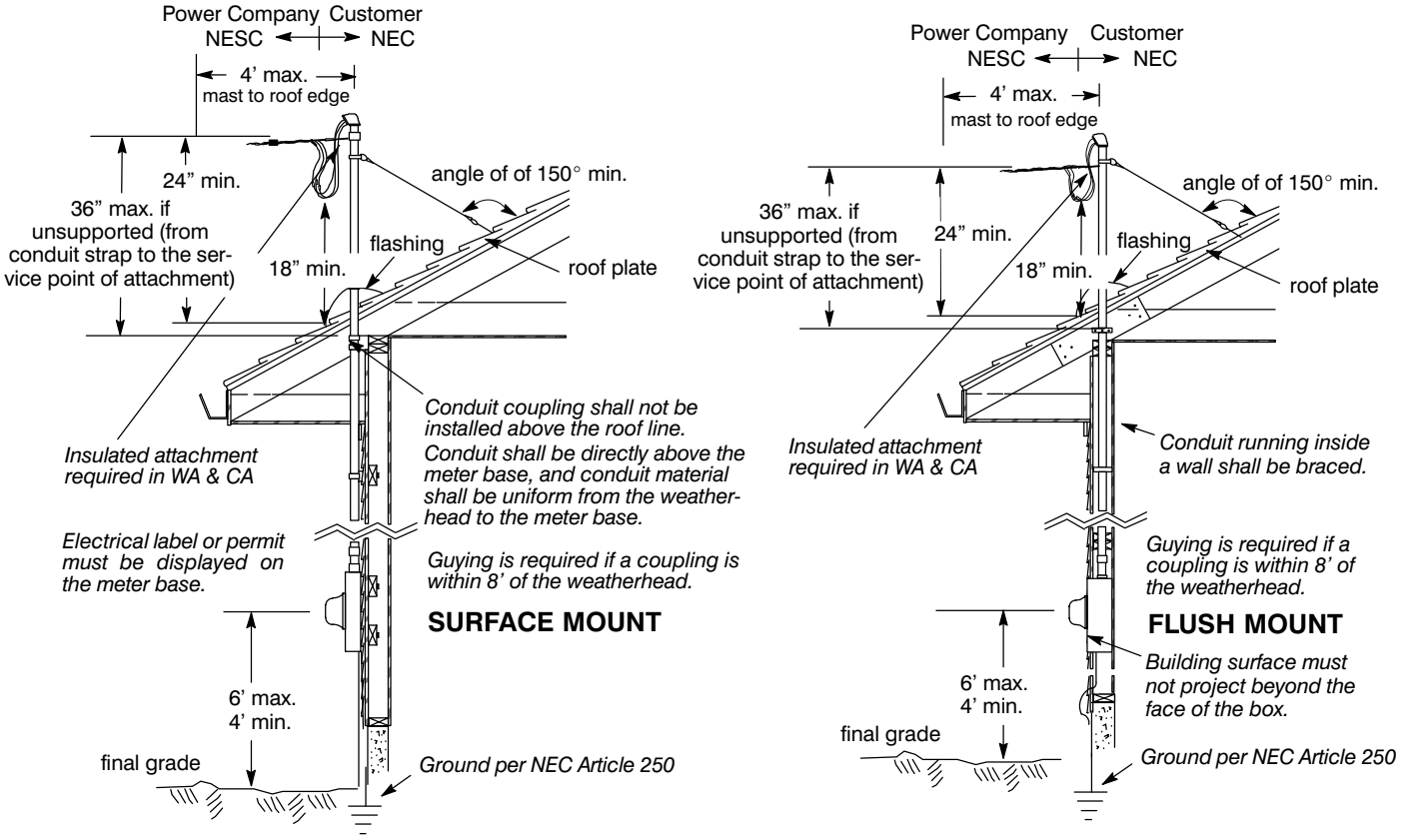


Table – Acceptable Service Conductor Lengths for Wall-Mounted Meters

Service Mast (Steel Conduit)	Service Size	Utility Service Length without Guying	Utility Service Length with Guying
2" min.	200 Amps or Less	60' Maximum	90' Maximum
2 1/2" min.	201 – 400 Amp Service	45' Maximum	90' Maximum
	401 Amps and Above	Consult Power Co.	Consult Power Co.

401.4 POINT OF ATTACHMENT STRUCTURE

An attachment structure is a support for the purpose of providing a higher point of attachment for the service drop than is provided by the building itself. It may be constructed of rigid galvanized steel pipe or galvanized angle iron. When an attachment structure is necessary to maintain the required clearances, it shall be of a type satisfactory to CRA-ES and meet all applicable codes. Such a structure shall be installed and maintained at the expense of the property owner or customer and be of sufficient strength to support the service drop wires and service attachment. The service entrance conduit may be used as and considered to be, an attachment structure; in which case the riser shall be not less than 1 1/2” galvanized rigid steel conduit or IMC. (See Paragraph 400.1) EMT or Plastic shall not be used.

401.4-1 ATTACHMENT STRUCTURE (BRACING RISERS)

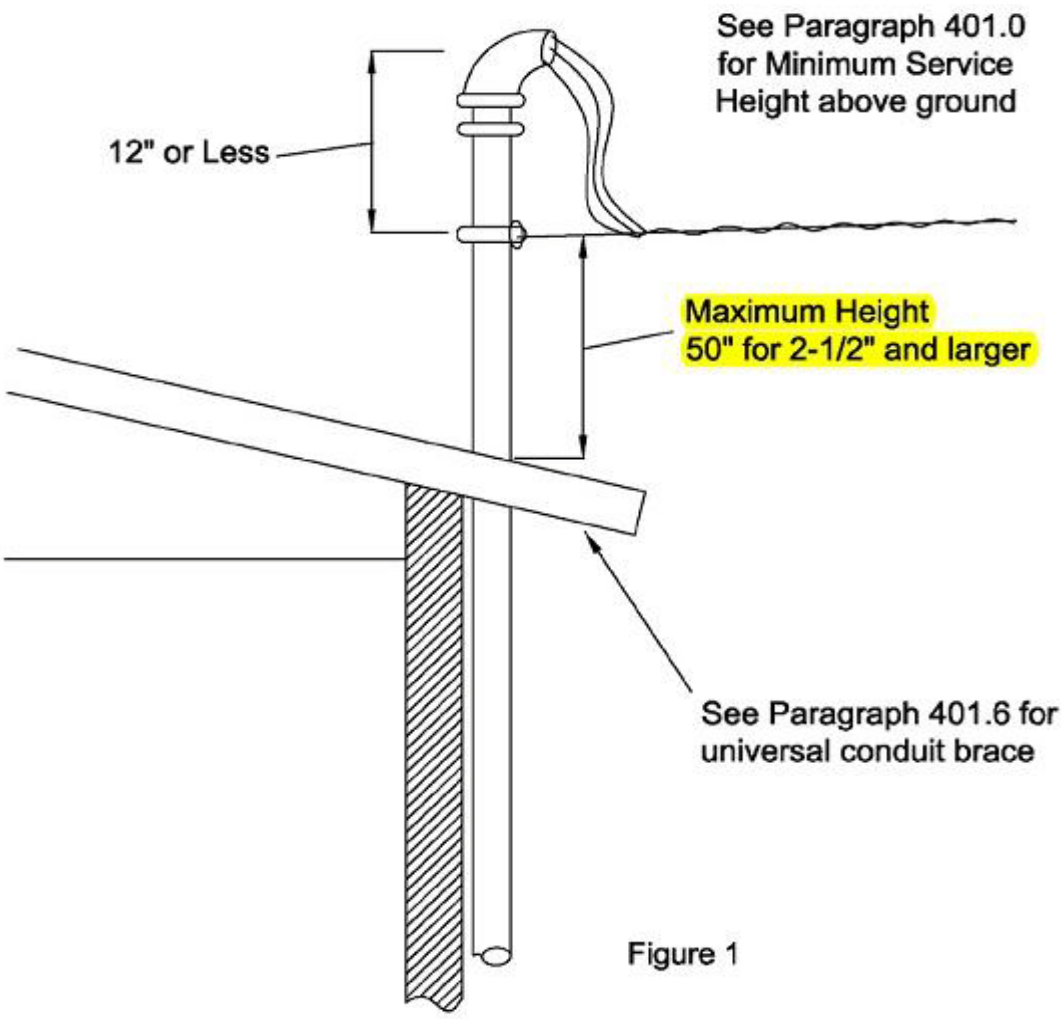
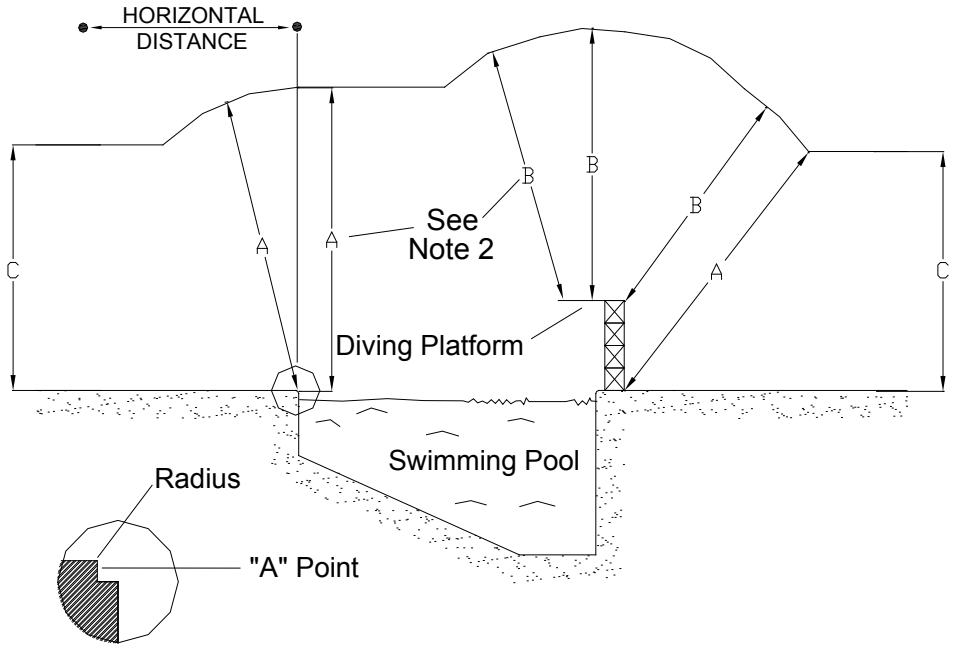


Figure 1

Where the service conduit riser is used as a mast for supporting the service drop, the point of attachment shall not be higher than 50” above the roof unless substantially braced (not guyed) to provide sufficient strength to support the strain of the service conductors, and to permit a man to work safely from a ladder bearing against the conduit. (See Paragraph 401.5 for alternative to bracing for residential.)

401.1 MINIMUM VERTICAL CLEARANCES (SWIM POOLS)



VOLTAGE PHASE TO GROUND	DIMENSION "A" VERTICAL CLEARANCE OVER POOL OR RADIAL CLEARANCE FROM EDGE OF POOL OR DIVING PLATFORM	DIMENSION "B" CLEARANCE IN ANY DIRECTION TO DIVING PLATFORM OR TOWER	DIMENSION "C" VERTICAL CLEARANCE OVER ADJACENT LAND
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22KV – 50KV NOTE 21	26' – 0"	18' – 0"	
750V – 22KV	25' – 0"	17' – 0"	
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GUY WIRE AND COMMUNICATIONS	22' – 0"	14' – 0"	

NOTES:

1. All voltages are phase-to-ground.
2. When Dimension “A” is greater than the sum of Dimension “B” plus the diving platform height, use Dimension “A”.
3. Minimum clearances must be maintained from neighboring services.
4. Clearances indicated are for areas accessible to pedestrians only, when service wires are located more than 10 feet horizontally away from pool’s edge.
5. The swimming pool clearances shown above apply to all types of swimming areas including above and below ground pools, and spas.
6. These dimensions shall also comply with local municipal requirements.
7. Increase clearances 0.4 inch per KV for all voltage in excess of 50KV. This 0.4 inch adder shall be increased 3 percent for each 1000 feet in excess of 3300 feet elevation. Add 5 percent to all nominal voltages over 50KV when calculating increased clearances.

401.5 ALTERNATE METHOD FOR POINT OF ATTACHMENT (BLOCK STRUCTURE)

This method of service attachment is acceptable to CRA-ES if point of attachment is no higher than 50" above top support. Check the local CRIT municipal inspection agency for acceptance.

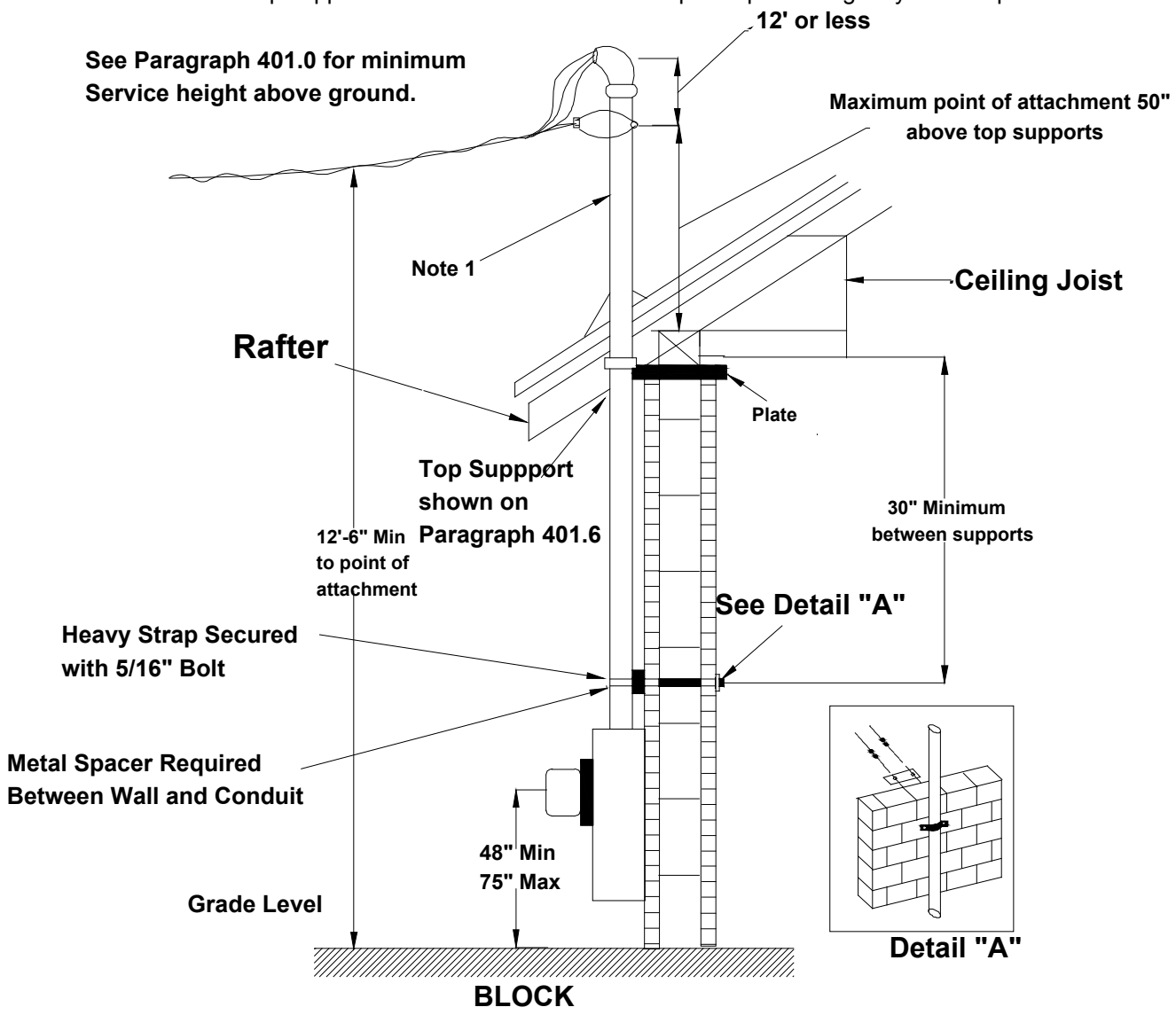


Figure 1

2. No couplings are permitted above the highest brace.
3. CRA-ES will not be responsible for any damage to the building caused by rain or structural failure.
4. If point of attachment is higher than 50" above top support then bracing is required. (See Paragraph 401.4-1)
5. Maximum service length for this installation is 100 feet.
6. See Section 300, Paragraph 301.16 for Electric to Gas clearances.

401.5-1 ALTERNATE METHOD FOR POINT OF ATTACHMENT (WOOD FRAME STRUCTURE)

This method of service attachment is acceptable to CRA-ES if point of attachment is no higher than 50" top support. Check the local municipal inspection agency for acceptance above.

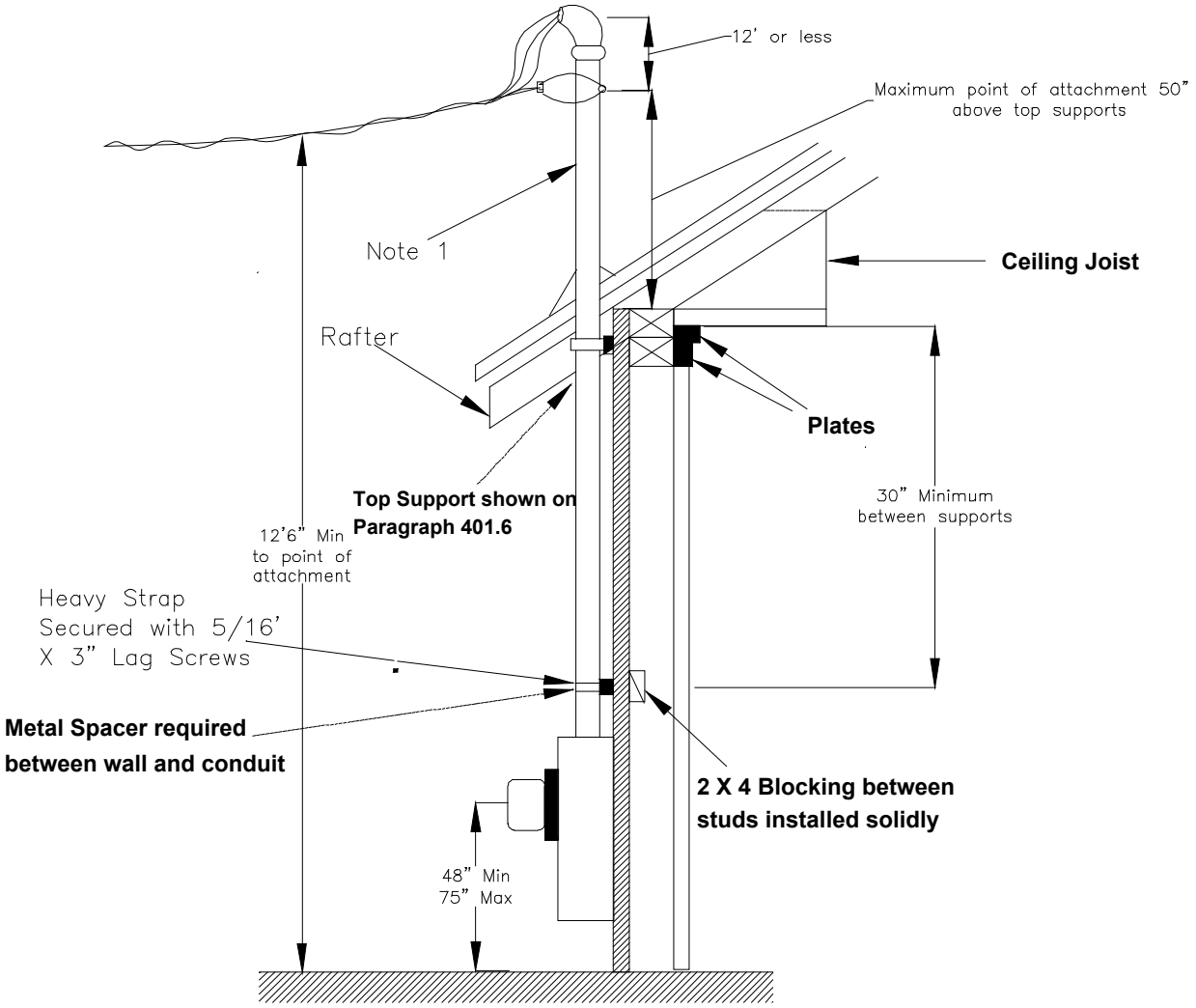


Figure 1

NOTES:

1. Riser to be minimum 2-1/2" rigid steel conduit or IMC. EMT or Plastic shall not be used, no thread less connection shall be used
2. No couplings are permitted above the highest brace.
3. CRA-ES will not be responsible for any damage to the building caused by rain or structural failure.
4. If point of attachment is higher than 50" above top support then bracing is required. (See Paragraph 401.4-1)
5. Maximum service length for this installation is 100 feet.
6. See Section 300, Paragraph 301.6 for Electric to Gas clearances.

Clearances for Services

The customer shall provide a point of attachment which allows minimum clearances to be met in all conditions. The clearances listed in Table 401.5 are required for overhead installations in all states except California. For California clearances, see Table 401.5.1

Long services or other special cases may require additional clearance. Consult the Power Company if the service length exceeds 45 feet, if services cross uneven or sloped terrain, or for situations not listed in the following tables.

Table 401.5 – NESC Clearances for Service Drops and Drip Loops, 750 Volts and Below

	NESC Minimum Clearance (ft)	Power Company-Required Minimum Clearance at Time of Construction (ft)[1]
Service drop clearance *(NESC Table 232–1)*		
Over roads, streets, and other areas subject to truck traffic	16	18
Over or along alleys, parking lots, and nonresidential driveways	16	18
Over land travelled by vehicles	16	18
Clearances over residential driveways *(NESC Table 232–1)*		
If height of building or installation will permit	16	18
If height of building or installation will not permit and is not subject to truck traffic:		
• for service drops 120/240 & 208Y/120 volt	12	14
• for drip loops of service drops 120/240 and 208/120 volts	10	12
Clearances over spaces and ways subject to pedestrians/restricted traffic only *(NESC 232–1. See note b. of Table 5.2.2.)*		
If height of building or installation will permit	12	14
If height of building or installation will not permit, drip loop clearances may be reduced:		
• for 480Y/277V (see Note 8–b of NESC Table 232–1)	10.5	10.5
• for 120/240 and 208Y/120 volt (see Note 8–d of NESC Table 232–1)	10	10
Clearances from building for service drops not attached to the building *(NESC Table 234–1)*		
Vertical clearance over or under balconies and roofs and:		
• accessible to pedestrians, if cabled with a grounded bare neutral (not available in coastal areas)	11	13
• accessible to pedestrians, if open wire or cabled with an insulated neutral (not available in coastal areas)	11.5	13.5
• not accessible to pedestrians, if cabled with a grounded bare neutral (not available in coastal areas)	3.5	5.5
• not accessible to pedestrians, if open wire or cabled with an insulated neutral (not available in coastal areas)	10.5	12.5
Horizontal clearance to walls, projections, windows, balconies, and areas accessible to pedestrians if:		
• cabled with grounded bare neutral (not available in coastal areas)	5	5
• open wire or cabled with an insulated neutral (coastal areas only)	5.5	5.5
Clearances for service drops attached to a building or other installation *(over or along the installation to which they are attached; service cable with an effectively grounded bare neutral; see NESC 230.C)*		
From the highest point of roofs, decks, or balconies over which they pass and:		
• readily accessible (see NESC 234.C.3.d.1)	8	10
• not readily accessible (see NESC 234.C.3.d.1, exception 1)	3	5
• above a not-readily-accessible roof and terminating at a (through-the-roof) service conduit or approved support, the service and its drop loops set no less than 18" above the roof. No more than 6' of the service cable passes over the roof or within 4' of the roof edge (see NESC 234.C.3.2.1)	1.5	1.5
• in any direction from windows designed to open (does not apply to service cable above the top level of a window; see NESC 234.C.3.d.2)	3	3
• in any direction from doors, porches, fire escapes, etc. (see NESC 234.C.3.d.2)	3	3

[1]A two-foot addition to certain NESC values is required by the Power Company to ensure minimum clearances in extreme conditions.

Note: For remodels or rewires where services cross an adjacent property, or where a service mast extends beyond six feet (6') above the roofline, consult the Power Company prior to construction.

Table 401.5.1 – Minimum Clearances for Service Drops and Drip Loops, California Only (GO 95)
480/277 Volts and Below

	GO 95 Minimum Clearance (ft)
Service drop clearance	
• Crossing or along thoroughfares in urban districts or crossing thoroughfares in rural districts	18
• Above ground along thoroughfares in rural districts, or across other areas traversed by vehicles or agricultural equipment	15
• Over private driveways, lanes, or other private property areas accessible to vehicles used for industrial or commercial purposes	16
• Over private driveways, lanes, or other private property areas accessible to vehicles used for residential purposes only	12
• Above ground in areas accessible to pedestrians only	10
Clearances from buildings for service drops not attached to the building	
• Vertical clearance above walkable surfaces on buildings, bridges, or other structures that do not ordinarily support conductors, whether attached or unattached	8
• Vertical clearance above non-walkable surfaces on buildings, bridges, or other structures that do not ordinarily support conductors, whether attached or unattached	8
Horizontal and radial clearances	
• From fire escapes, exits, windows, and doors.	3
• Horizontal clearance of the conductor at rest from building, bridges, or other structures where such conductor is not attached	3
Clearances for service drops near swimming pools	
• Consult the Power Company prior to the installation of pools, spas, or hot tubs.	

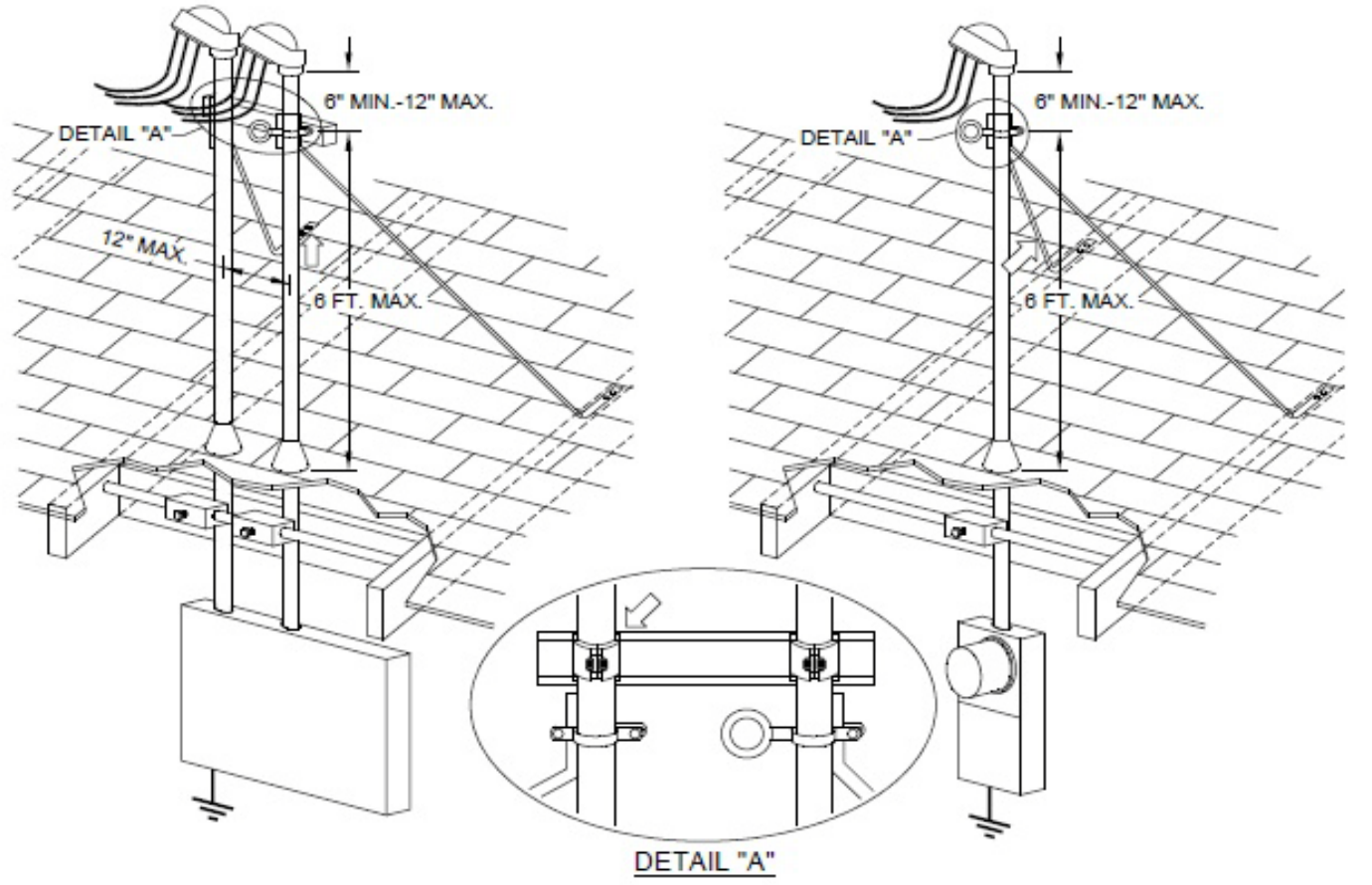
Notes for Clearance Tables 401.5 and 401.5.1:

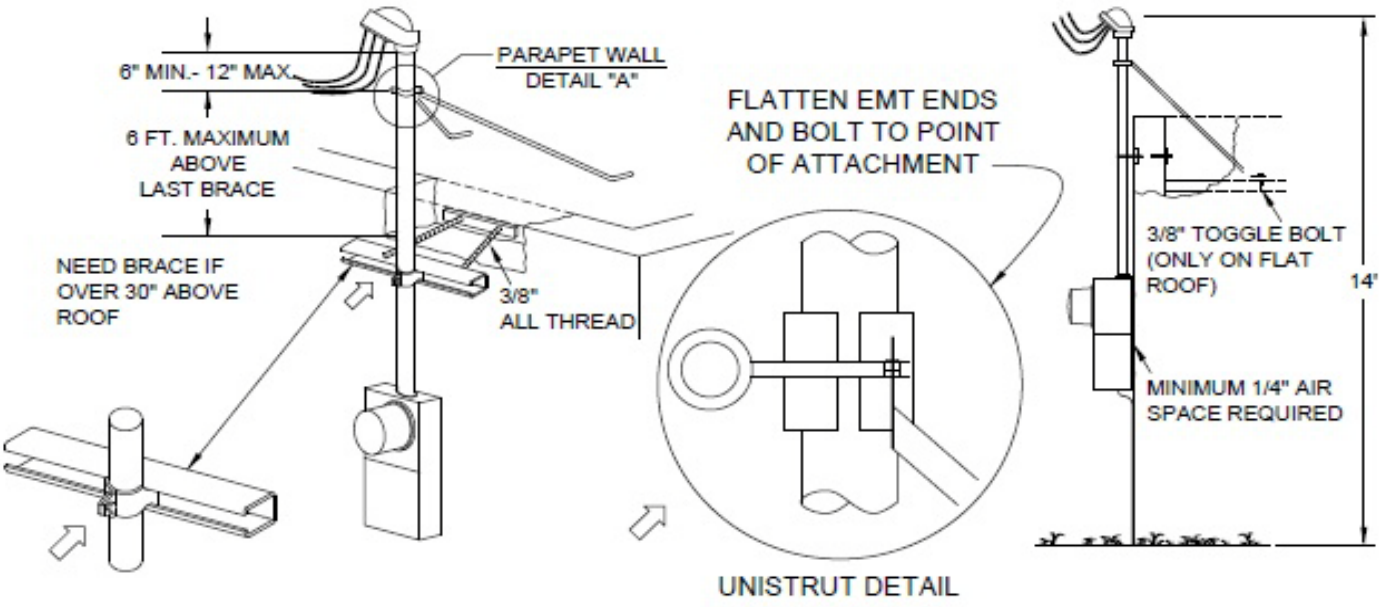
a. A “truck” is any vehicle exceeding eight feet in height. Areas not subject to truck traffic include places where truck traffic normally doesn’t occur or is not reasonably anticipated.

b. “Spaces and ways subject to pedestrians or restricted traffic only” include those areas where equestrians, vehicles, or other mobile units that exceed 8 feet in height are prohibited by regulations, permanent terrain configurations, or are otherwise not normally encountered or anticipated.

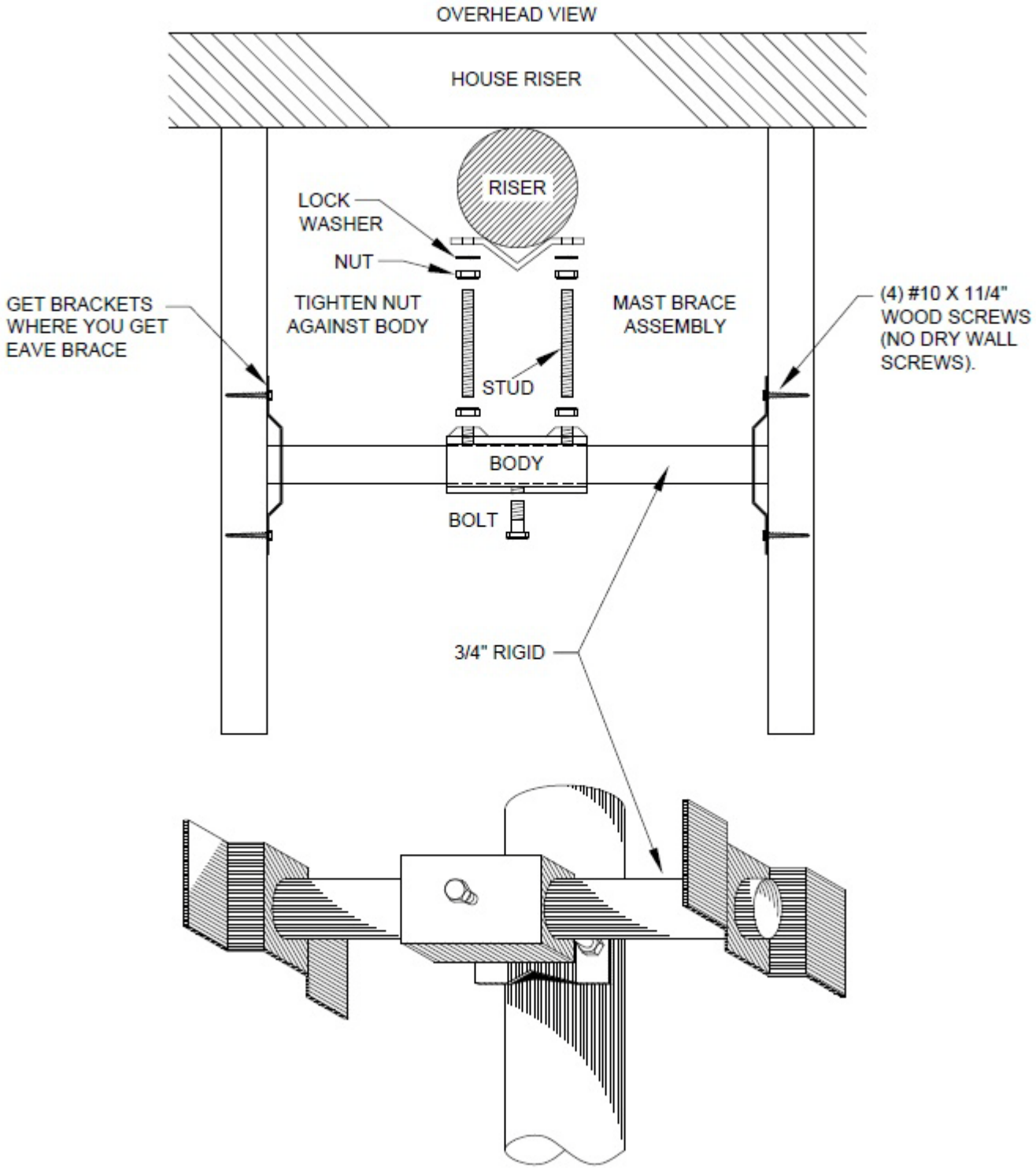
c. The Power Company considers a roof, balcony, or other area to be readily accessible to pedestrians if it can be casually accessed through a doorway, ramp, window, stairway, or permanently-mounted ladder, by a person on foot who neither exerts extraordinary physical effort nor employs special tools or devices to gain entry. The Power Company does not consider a permanently-mounted ladder as a means of access if its bottom rung is eight feet or more from the ground or other permanently-installed accessible surface (NESC 234.C.3.d, Exception 1).

401.6-1 UNIVERSAL SERVICE DROP CONDUIT BRACE





401.6-2 UNIVERSAL SERVICE DROP CONDUIT BRACE



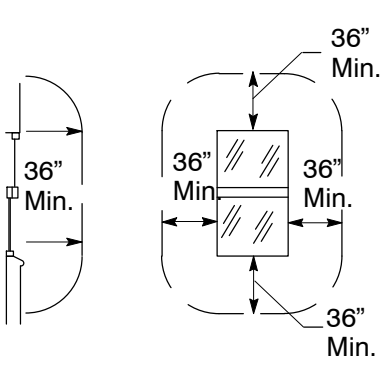
401.7 CLEARANCE FROM DOORS, EXITS, WINDOWS, FIRE ESCAPES AND BALCONIES

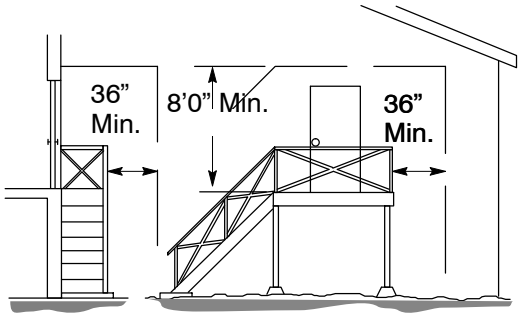
The vertical, horizontal and radial service drop conductor clearance from doors, exits, windows, fire escapes, and other openings, at any of which human contact might be expected, shall not be less than that specified and illustrated:

	Minimum Clearance
1. Vertically above and below surfaces of fire escapes, balconies, stairways and walkways	8 Feet
2. Horizontally and radially from doors, exits, windows and other openings	3 Feet
3. Horizontally and radially from the outer extremities of the fire escapes, balconies, stairways and walkways.	3 Feet

CLEARANCE FROM DOORS, EXITS, WINDOWS, FIRE ESCAPES, BALCONIES, ETC.

(For Exposed Service Conductors Only — See Note 3)





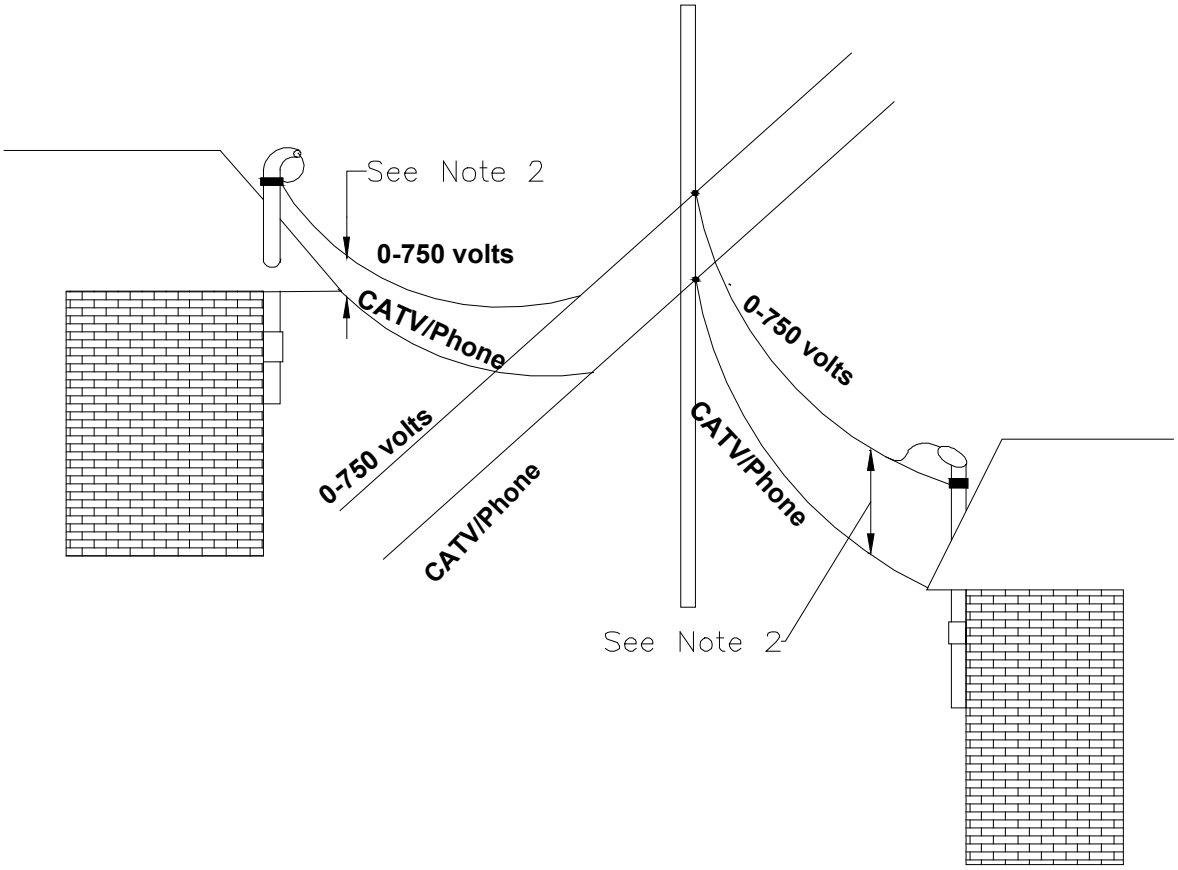
Clearances around Doors and Windows

Service drops are not requried to clear buildings by any specific horizontal distance; however, applicants must ensure that the service weatherhead, the service drop and the open wires between the service weatherhead and the service drop maintain the following clearances from fire excapes, balconies, stairways, exits doors, widnows and other locations where people could be present.

A) Wires that are either below the level of the top of exits, doors, windows and other openings must have a radial clearance from the boundaries of such opens of not less than 3 feet, as shown in the figures above.

B) Wires less than 10 feet above, or 3 feet below, the surface levels of fire escapes, balconies, porches, stairways, and walkways must have a minimum horizontal distance clearance of at lest 3 feet from such surfaces as shown in the figures above.

401.8 CLEARANCE FROM CATV/TELCO AND ELECTRIC SERVICES



NOTES:

1. Voltages are phase to ground.
2. Clearance from CATV/TELCO to electric service conductors.

   12” ----- multiplex electric service

   30” ----- open wire electric service
3. Clearances are for any point in the service span.
4. Clearances must be maintained between electric services and all telephone/CATV cables and services. A higher point of attachment may be necessary to maintain clearances. This is especially important if the electric point of attachment is close to existing CRA-ES pole lines. Contact your local CRA-ES customer service representative if you are in doubt about proper clearances.

402.0 CUSTOMER SERVICE POLE

402.1 LOCATIONS:

THE LOCATION OF CUSTOMER METER POLES SHALL BE APPROVED BY CRA-ES BEFORE SETTING.

Meters or attachments shall not be mounted on CRA-ES poles. When it is necessary for the service point of attachment and service entrance to be made to a pole instead of the residence or building, that pole is to be provided by the Customer and its height shall be great enough to give sufficient clearance for CRA-ES service wires.

402.2 REQUIREMENTS: (WOOD)

Poles shall comply with the following requirements:

1. Full length pressure treated as per RUS Bulletin-1728F-700.
2. Framing shall conform to RUS Bulletin 1728H-701.
3. Temporary service poles may be moved from jobsite to jobsite, but must be inspected and approved by CRA-ES prior to each setting in place.
4. For permanent or temporary installations, a used or cutoff pole which is sound and is retreated in accordance with RUS specifications may be used provided it is inspected and approved by authorized CRA-ES personnel prior to being installed in place.
5. Used poles may be used as customer service poles, without being retreated, if,

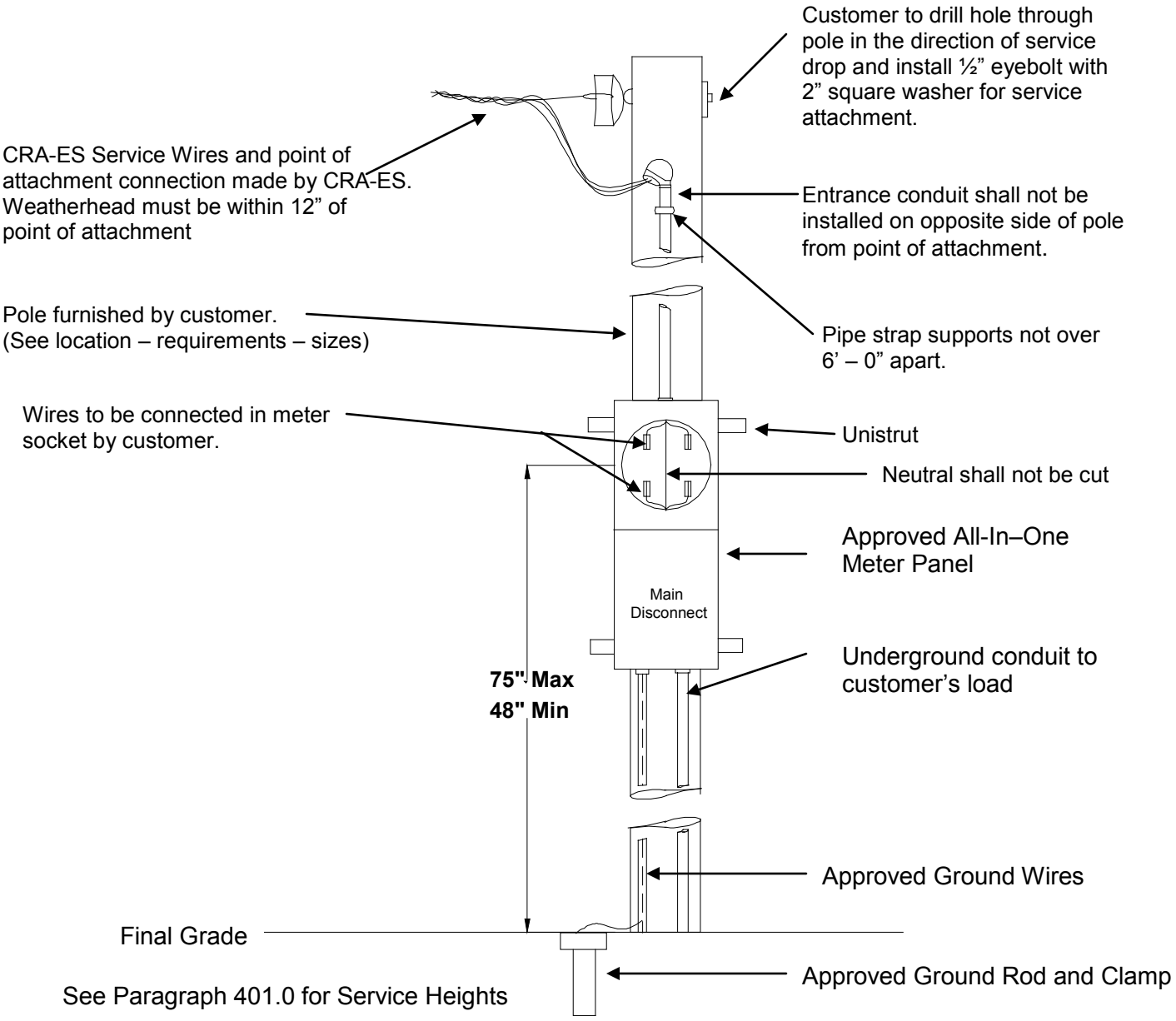
   (a) The pole is eight years of age or less, and

   (b) The butt has not been cut off, or damaged by abrasion or penetration.

If the top of the pole has been cut off, a commercial wood preservative must be applied to the cut to prevent water penetration and resultant pole deterioration.

If the pole is over eight years old or the butt has been cut off or damaged, the pole must be retreated by a full length pressure treatment per RUS Bulletin-1728F-700. This can only be done by a commercial plant especially designed to perform this treatment. Surface applications of preservatives will not meet the specifications.

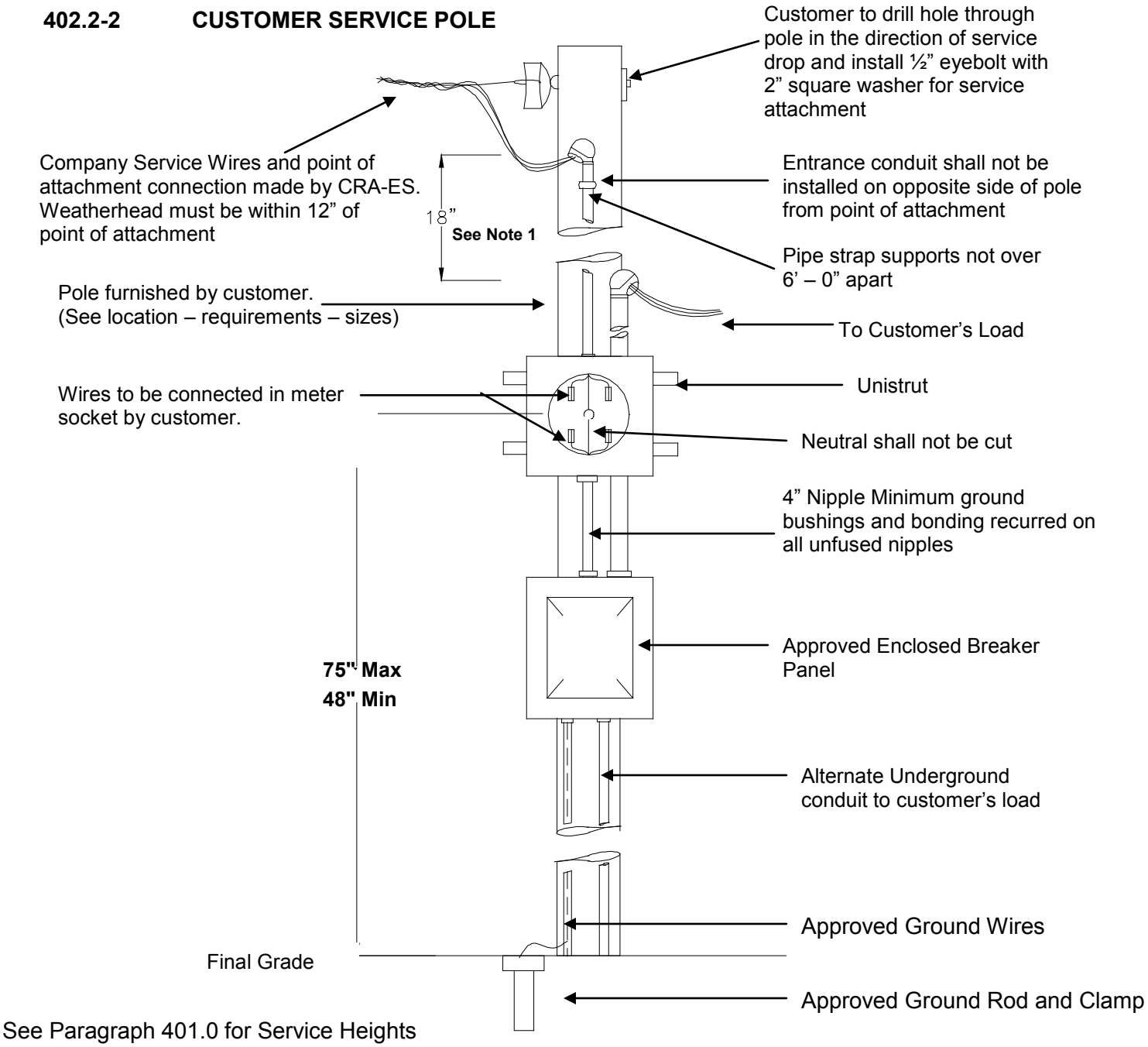
402.2-1 CUSTOMER SERVICE POLE
0 - 300 VOLTS



NOTES: **CUSTOMER'S SERVICE ENTRANCE POLE**

1. See Paragraph 401.0 for minimum heights.
2. Drip Loop conductors minimum height is 10 feet 6 inches.
3. See Paragraph 402.3 for wood and steel pole sizes.
4. Weatherhead must be located within 12 inches of point of attachment.
5. Wood poles are exempt from insulated point of attachment requirement.
6. Unistrut shall be mounted to pole using a 1/2" minimum galvanized through bolt with a 1 1/2" backing and a lock nut. Meter panel shall be attached to unistrut using 1/4" minimum through bolts. Pole shall be notched to the depth of the unistrut. (1" unistrut maximum)

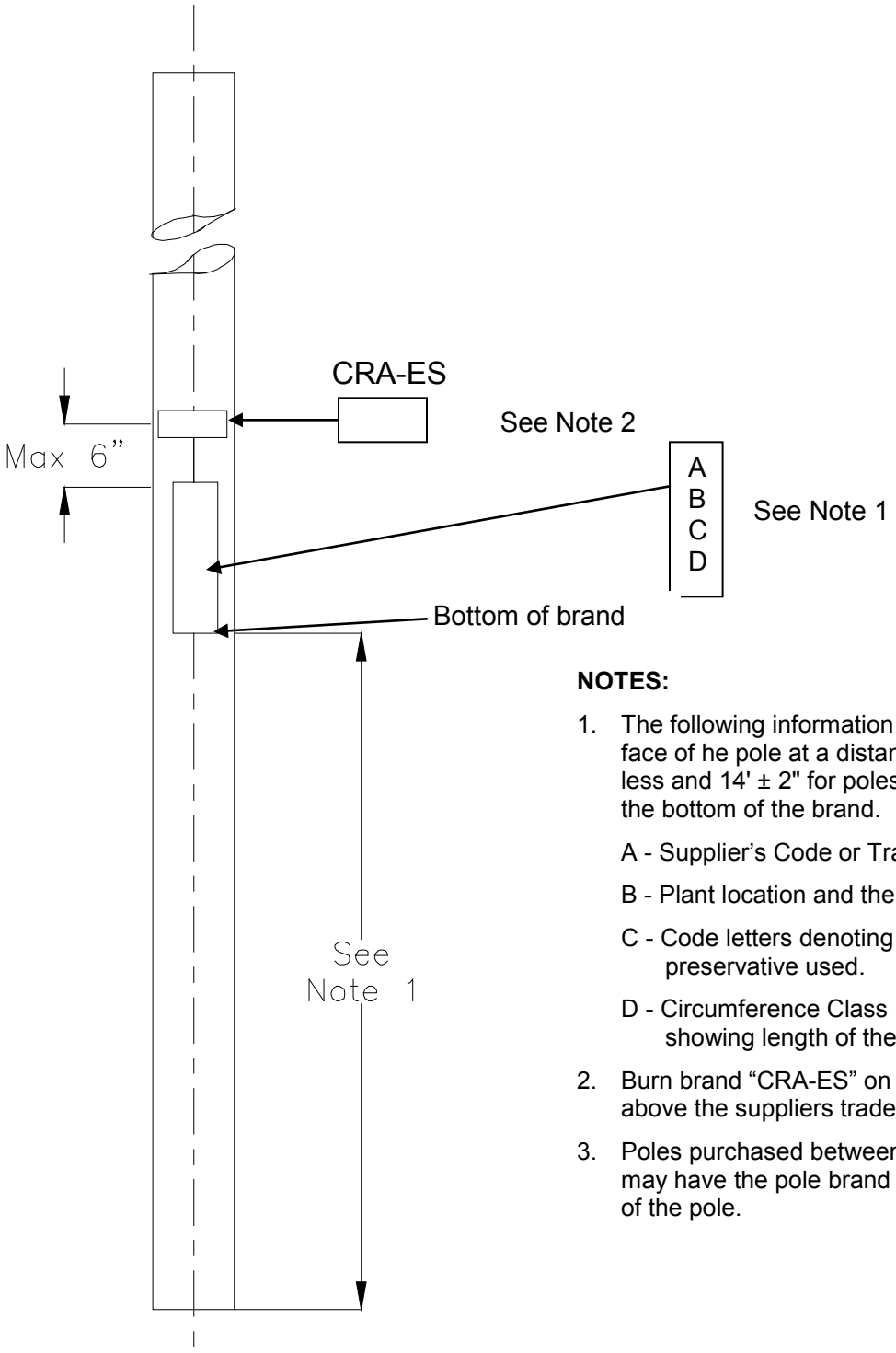
402.2-2 CUSTOMER SERVICE POLE



See Paragraph 401.0 for Service Heights

NOTES: **CUSTOMER'S SERVICE ENTRANCE POLE**

1. Minimum clearance from the CRA-ES line-side wires to the Customer's load-side wires, or Customer attachments, shall be 18 inches.
2. No Customer facilities shall be located above CRA-ES facilities.
3. Wood poles are exempt from insulated point of attachment requirement.
4. Unistrut shall be mounted to pole using a 1/2" minimum galvanized through bolt with a 1 1/2" backing and a lock nut. Meter panel shall be attached to unistrut using 1/4" minimum through bolts. Pole shall be notched to the depth of the unistrut. (1" unistrut maximum)



NOTES:

1. The following information shall be burn branded on the face of he pole at a distance of 10' ± 2" for poles 50' and less and 14' ± 2" for poles 55' and greater from the butt to the bottom of the brand.

   A - Supplier’s Code or Trade Mark.

   B - Plant location and the Year of Treatment.

   C - Code letters denoting the pole species and preservative used.

   D - Circumference Class numeral and numerals of showing length of the pole.

2. Burn brand “CRA-ES” on the face of the pole 6" maximum above the suppliers trade mark.
3. Poles purchased between May 1958 and December 1991 may have the pole brand stamped at 12 feet from the butt of the pole.

WOOD POLE MARKING

402.3 CUSTOMER SERVICE POLE – SIZES

(WOOD POLES)

Minimum Attachment Clearance Above Ground (Feet)	Length Of Pole (Feet)	Minimum Circumference At Top (Inches)	Minimum Circumference At 6 Feet From Butt (Inches)	Minimum Setting Depth (Feet)
12.5	18**	19	24.0	4
15	20	19	28.0	4
18	25	19	28.0	5
24	30	19	30.0	5

(STEEL POLES)

Clearance Above Ground (Feet)	Length Of Pole (Feet)	Minimum Setting Depth (Feet)*	Minimum Diameter (Inches)	Minimum Gauge (Inches)
12.5	16	3	3.5	.226
16	20	4	4	.237
20	25	5	5	.258
25	30	5	5	.258

*** Minimum setting depth in rock is 3' when approved by CRA-ES.**

*** * Minimum length for joint use with communications.**

NOTES:

1. Steel poles shall be treated with corrosive resistant paint 3" above grade and 3" below grade. Pole is to be centered in 12" diameter hole and encased in concrete to full depth of pole. Point of attachment for steel poles to be insulated.
2. Circumferences are for Class 5 Ponderosa Pine.

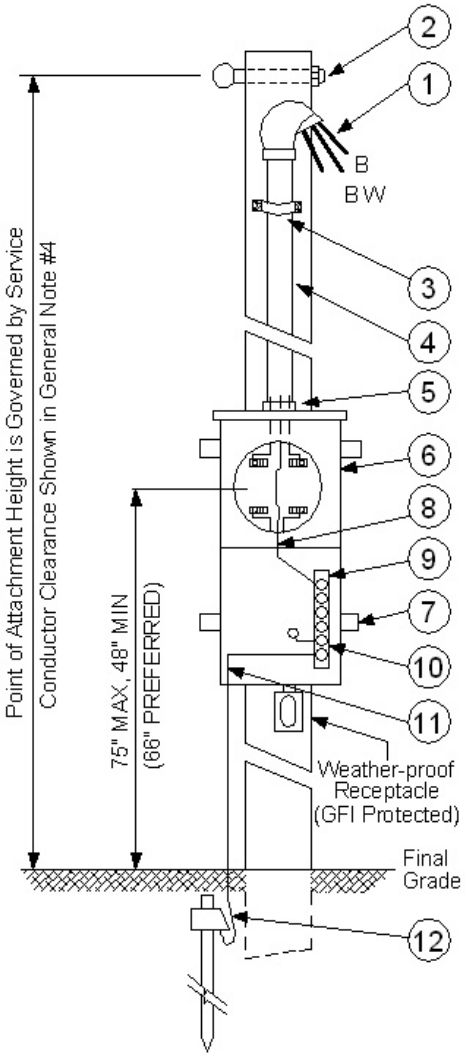
402.4 SERVICE RISER CONDUCTORS

Wires from the weatherhead and from the main service switch shall be properly made-up and connected to the meter socket - by the Customer. The neutral wire shall be bonded to the meter socket at the "lay-in" lug on the socket. (It shall not be cut within the socket enclosure. See Paragraph 400.2 for identification of conductors.)

402.5 TYPICAL POLE-MOUNTED METER INSTALLATION FOR RESIDENTIAL/ COMMECIAL OR TEMPORARY SERVICE

100-225A, 1 Ph, 3W, 120/240 VOLT

Permits and inspections are required. Please contact the governing inspection agency. This is a list of material for a normal pole-mounted meter installation. It is not intended to be all inclusive but gives the more common requirements. All equipment shall comply with EUSERC requirements and all specifications found in the CRA-ES Electric Service Requirements Manual (ESRM)



1) Weatherhead-conductor leads to extend a minimum of 36” beyond the weatherhead.

2)1/2" eyebolt with a 2" backing washer. Must be located within 12” of the weatherhead & shall be point of attachment. Customer to drill hole through pole in the direction of service drop. Insulated point of attachment required if steel pole is used.

3) Conduit support. Not over 6' apart.

4) Rigid or IMC metal conduit.

5) Approved hub must be rain-tight.

6) Meter socket, breaker panel must be rain-tight equipment. Meter socket jaws or clips shall be free of foreign material (mud, paint, plaster, etc…). RING-LESS METER SOCKETS ARE NOT ACCEPTABLE.

7) Meter box to be bolted to unistrut. Uninstrut to be mounted to pole using through bolts. Pole shall be notched to the depth of the unistrut. Minimum 1/4" bolt diameter or box to unistrut & 1/2" minimum for unislrut to pole.

8) Neutral to be a continuous. unbroken conductor from the weatherhead to the neutral landing block.

9) Neutral landing block.

10) Install a bonding jumper or screw if the neutral landing block is insulated from the enclosure.

11) The ground wire (#4 bare, stranded or solid copper) shall be continuous from the neutral landing block to an approved grounding electrode system In compliance with NEC Article 250.
The ground wire must be properly supported and attached to the pole at 24" intervals.

12) Approved grounding electrode system. 5/8" x 8' long ground rod and approved clamp. Entire length of rod to be below grade.

POLE REQUIREMENTS

Only approved poles will be accepted. The pole must be fully commercially pressure treated and branded in accordance with CRA-ES specifications. A used or cut-off pole must be approved by a company representative. Minimum pole length is 18' with 4' set in the ground. Additional pole length will be required If the pole used Is to be used by other utility companies. If a steel pole is used, refer to note 402.3.

GENERAL NOTES:

1. Meter location to be specified by Company Representative.

2. If more than one meter to the premise, each meter shall be permanently identified, by the Customer, to properly identify that portion of the premises being served. Metal stamping or metal tag is required. Painted identification is not acceptable.

3. All materials or work furnished by the Customer shall be in accordance with all applicable codes or standards.

4. Minimum service height above ground 9 (phase to ground voltages):

   a) Within Right-of-Way of roads, streets, alleys, non-residential driveways, parking lots, and other areas subject to truck traffic ..... 18'-0
   b) Service over residential driveways ..... 12'-6
   c) Pedestr1an spaces & ways, driveways, commercial areas not subject to truck traffic ..... 12’-0

5. Minimum attachment height is 12ft - 6in. Additional height may be required according to Authority Having Jurisdication (AHJ).

OVERHEAD SERVICE WIRE SIZES TABLE

Permits and inspections are required. Please contact the governing inspection agency. This is a list of material for a normal pole-mounted meter installation. It is not intended to be all inclusive but gives the more common requirements. All equipment shall comply with EUSERC requirements and all specifications found in the CRA-ES Electric Service Requirements Manual (ESRM)

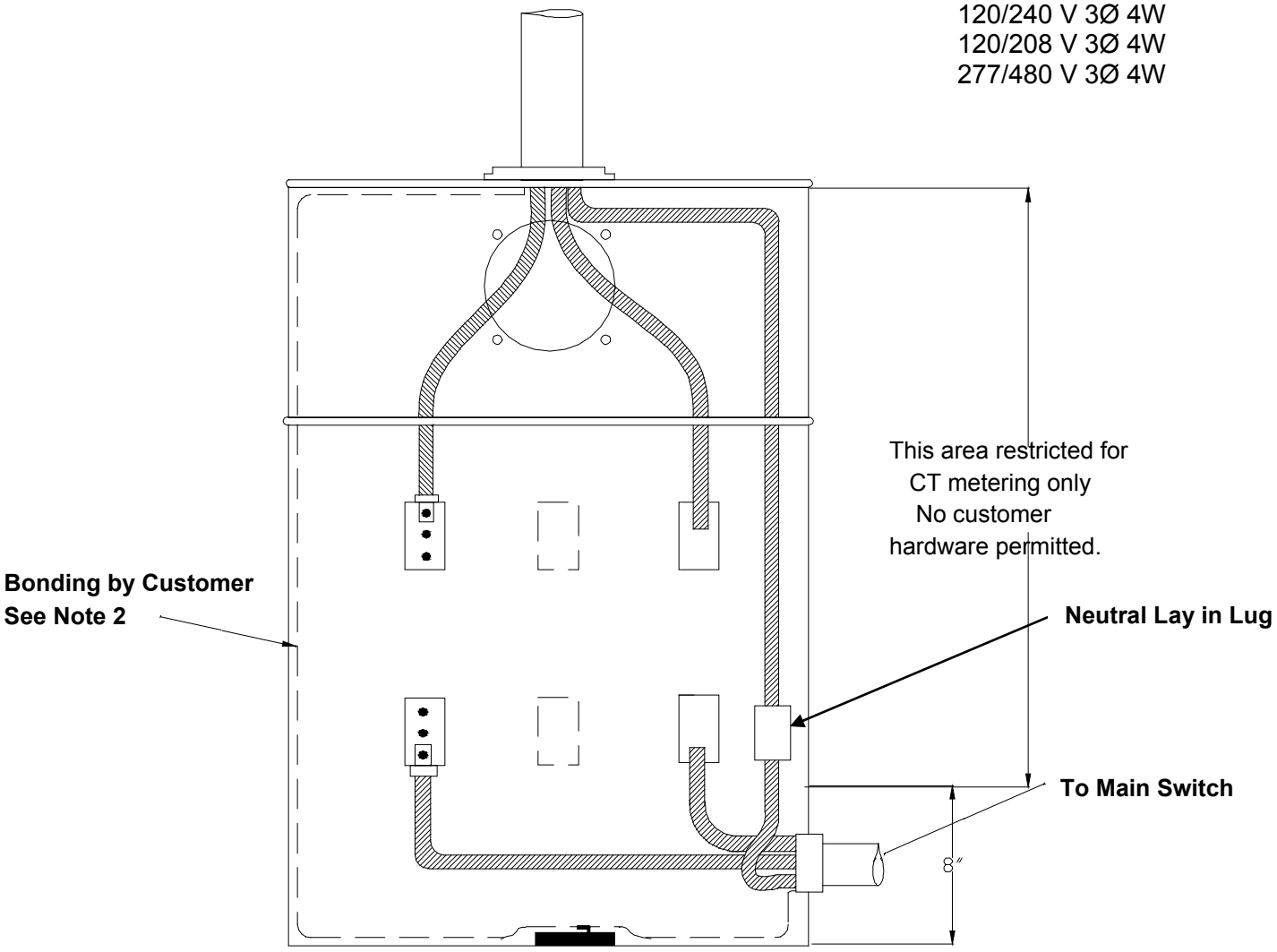
SERVICE RATING	COPPER		ALUMINUM		WEATHERHEAD & CONDUIT
	RES	COM	RES	COM	
100A	#2	#1	#4/0	#2/0	1-1/2"
125A	#1/0	#2/0	#2/0	#3/0	1-1/2"
150A	#2/0	#3/0	#4/0	#250	1-1/2" (2" If #3/0)
200A	#4/0	#250	#300	#350	2" (2-1/2" If > 4/0A)
225A	#250	#300	#350	#500	2" (2-1/2" If > 4/0A)

RES = RESIDENTIAL
COM = COMMERCIAL

403.0 OVERHEAD 400 AMP C.T./METER CAN

APPLICATION

120/240 V 1Ø 3W
120/240 V 3Ø 4W
120/208 V 3Ø 4W
277/480 V 3Ø 4W



(1Ø 3W and Customer Wiring Shown)

400 AMP Overhead Service

1. Wire and conduit sizes shall be per NEC.
2. When approved bond bushings are used, bond wire may be eliminated.
3. CRA-ES furnishes and installs CT's and test switch. The Customer installs the meter socket and runs customer neutral into meter panel.
4. When used for 3Ø-4W Delta service, high phase shall be on the right hand side and identified.