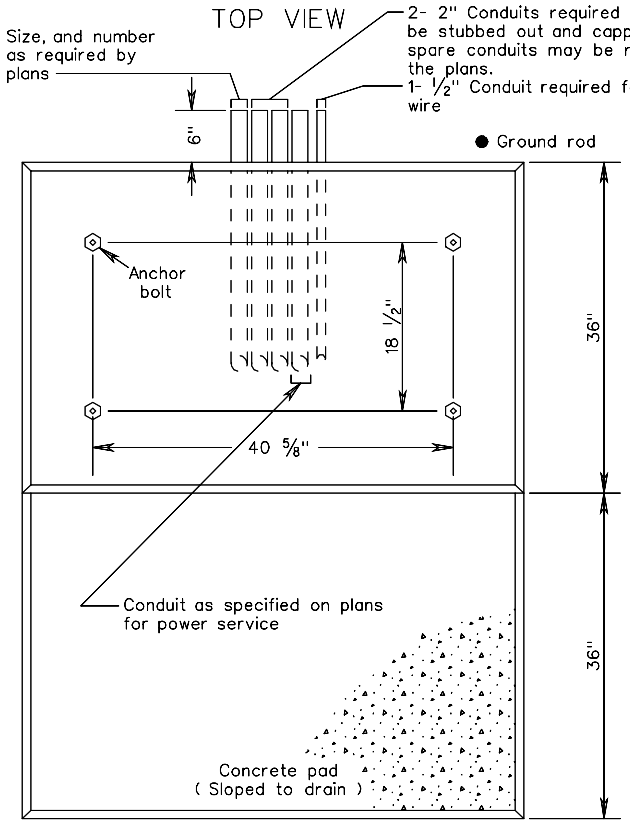
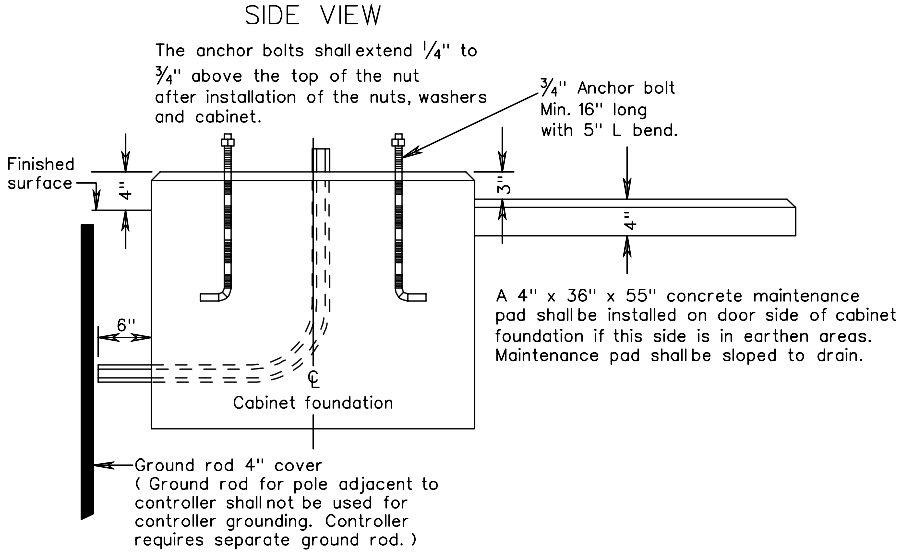
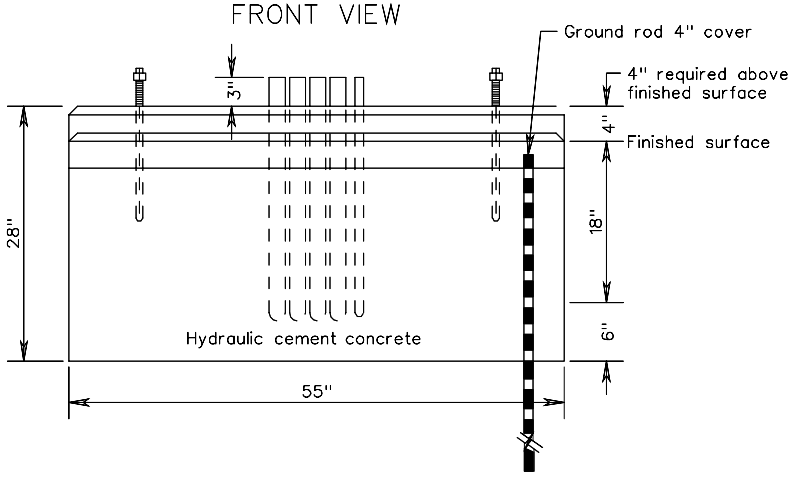
SECTION 1300

TRAFFIC CONTROL





A 4" x 36" x 55" concrete maintenance pad shall be installed on door side of cabinet foundation if this side is in earthen areas. Maintenance pad shall be sloped to drain.



Notes:

All exposed concrete surface edges shall be chamfered ¾".

Anchor bolts and bolt circle template shall be furnished with cabinet. Cabinet shall be centered on foundation.

Each foundation shall be permanently marked to indicate all sides from which conduits pass. This mark shall be made with a trowel when finishing the concrete and shall be ¼" deep and 4" to 6" long. Locations of empty conduits shall have an additional 2" long mark made perpendicular to and centered on this marking.

The controller cabinet at the inside and outside foundation joints shall be sealed with a silicone sealant.

Bell ends shall be installed on each end of PVC conduits. Empty conduits shall be plugged to prevent moisture and rodent entry.

Grounding bushings shall be installed on each end of metal conduits. Empty conduits shall be plugged to prevent moisture and rodent entry.

Two - ½" diameter weepholes shall be provided in the foundation and located 2" inside of the back or side edges of the controller cabinet. Weepholes shall be sloped to allow outlet to be 3" below top of foundation. Two inches of the outlet end shall be fiber filled.

Voids remaining after conductors exit or enter bell ends or bushings of conduits shall be sealed with silicone to prevent moisture or rodent entry.

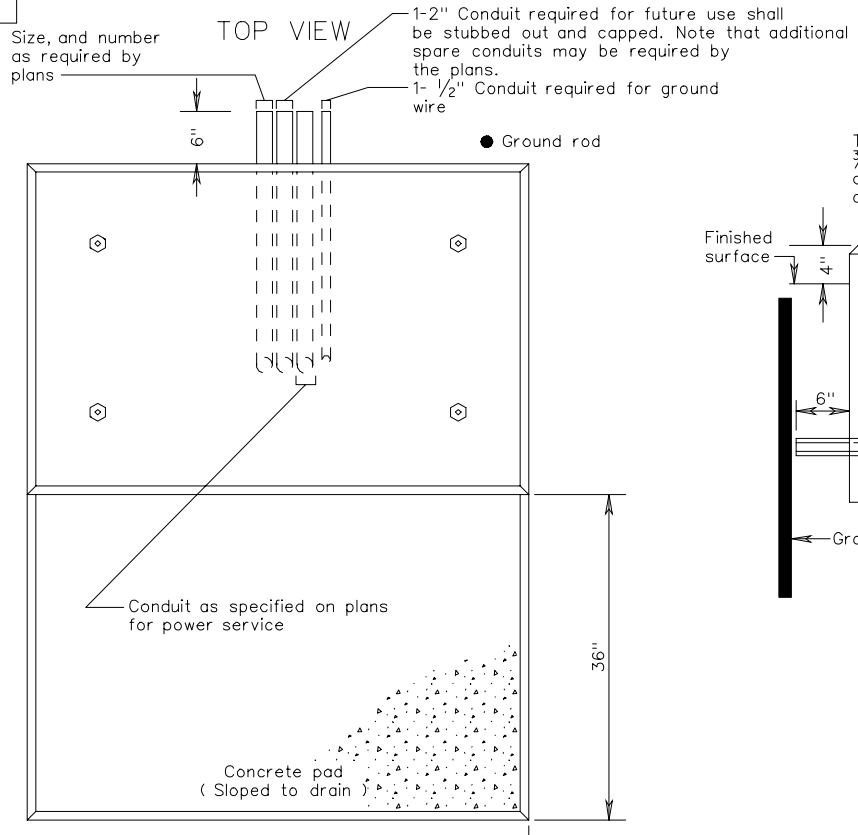
SPECIFICATION REFERENCE

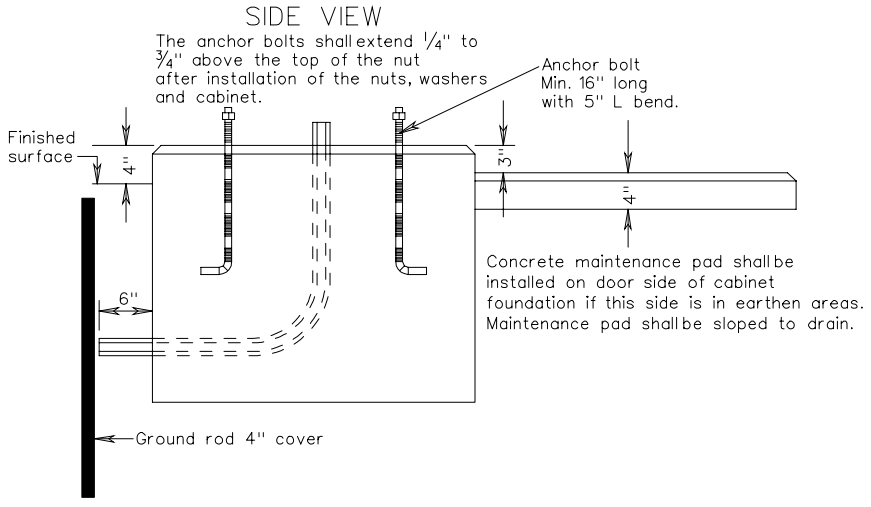
CONTROLLER CABINET FOUNDATION AND CONDUIT PLACEMENT DETAILS

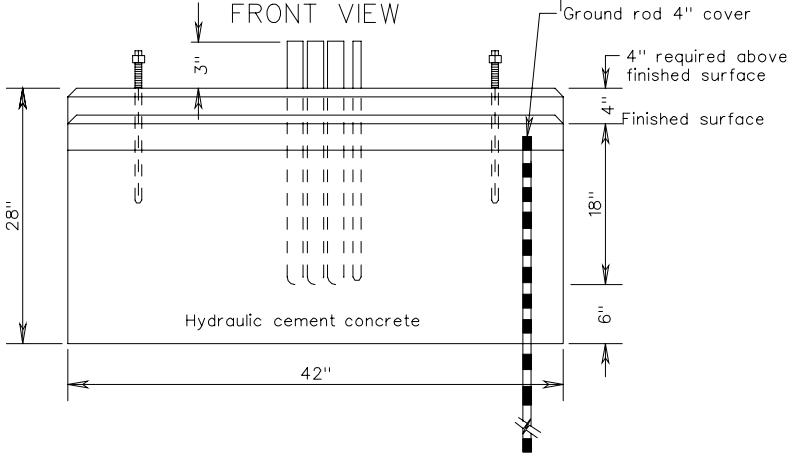
VIRGINIA DEPARTMENT OF TRANSPORTATION

1301.01

CF-2







Notes:

All exposed concrete surface edges shall be chamfered 3/4".

Foundation length and width shall be as required to project no less than a minimum 4" beyond all sides of the cabinet.

Anchor bolts and bolt circle template shall be furnished with cabinet. Cabinet shall be centered on foundation.

Each foundation shall be permanently marked to indicate all sides from which conduits pass. This mark shall be made with a trowel when finishing the concrete and shall be 1/4" deep and 4" to 6" long. Locations of empty conduits shall have an additional 2" long mark made perpendicular to and centered on this marking.

The control center cabinet at the inside and outside foundation joints shall be sealed with a silicone sealant.

Bell ends shall be installed on each end of PVC conduits. Empty conduits shall be plugged to prevent moisture and rodent entry.

Grounding bushings shall be installed on each end of metal conduits. Empty conduits shall be plugged to prevent moisture and rodent entry.

Two - 1/2" diameter weepholes shall be provided in the foundation and located 2" inside of the back or side edges of the controller cabinet. Weepholes shall be sloped to allow outlet to be 3" below top of foundation. 2" of the outlet end shall be fiber filled.

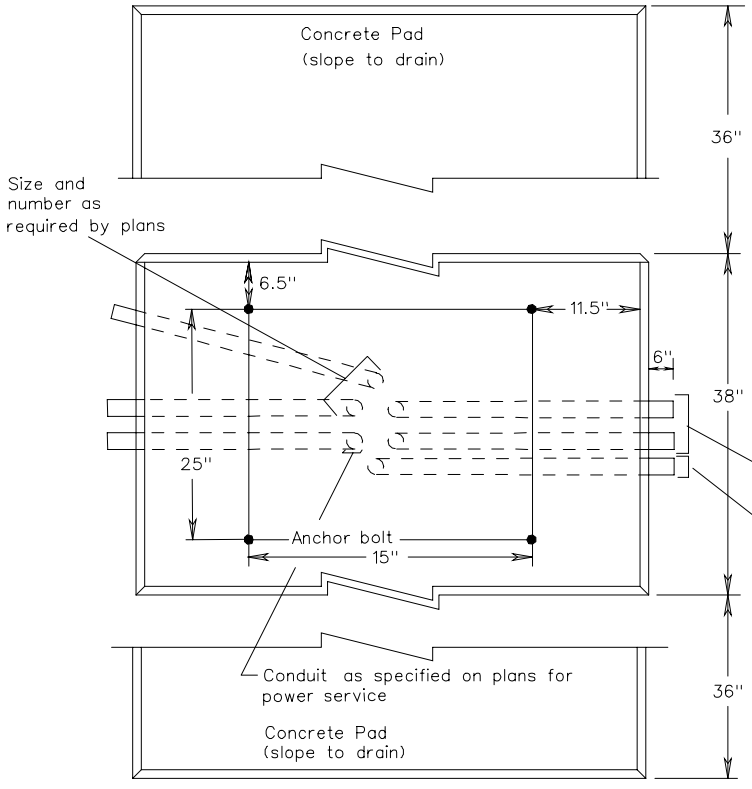
Voids remaining after conductors exit or enter bell ends or bushings of conduits shall be sealed with silicone to prevent moisture and rodent entry.

CONTROL CENTER CABINET FOUNDATION AND CONDUIT PLACEMENT DETAILS

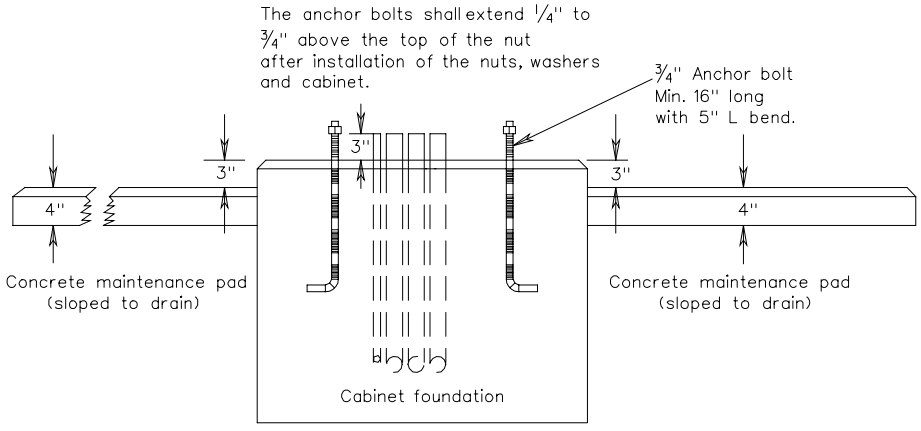
1301.02

VIRGINIA DEPARTMENT OF TRANSPORTATION

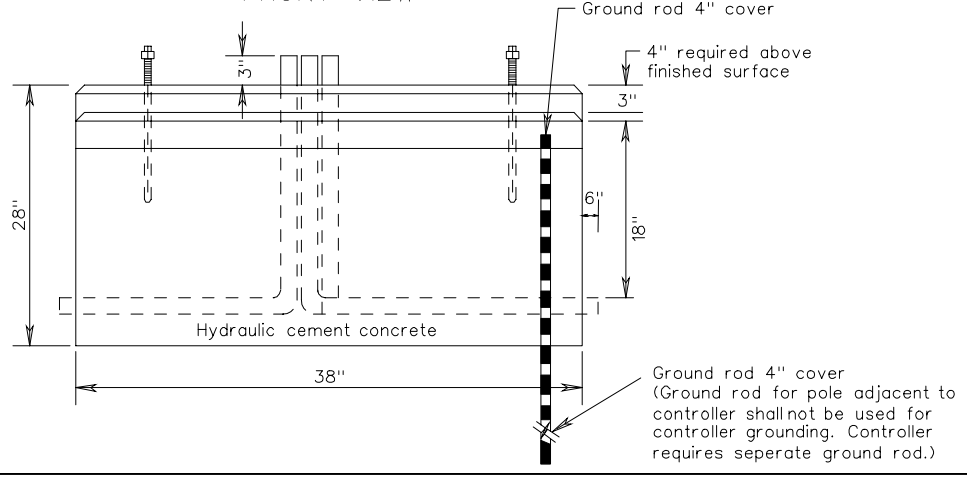
TOP VIEW



SIDE VIEW



FRONT VIEW



Notes:

All exposed concrete surface edges shall be chamfered 3/4".

Anchor bolts, bolt circle template and metal riser shall be furnished with cabinet. Cabinet shall be centered on foundation with riser attached to foundation & cabinet installed on metal riser.

Voids remaining after conductors exit or enter bell ends or bushings of conduits shall be sealed with silicone to prevent moisture or rodent entry.

Conduits entering the foundation shall be arranged in a circular pattern. The Contractor shall submit a conduit arrangement plan for approval prior to placement. Each foundation shall be permanently marked to indicate all sides from which conduits pass. This mark shall be made with a trowel when finishing the concrete and shall be 1/4" deep and 4" to 6" long. Locations of empty conduits shall have an additional 2" long mark made perpendicular to and centered on this marking.

The controller cabinet at the inside and outside foundation joints shall be sealed with a silicone sealant.

Bell ends shall be installed on each end of PVC conduits. Empty conduits shall be plugged to prevent moisture and rodent entry.

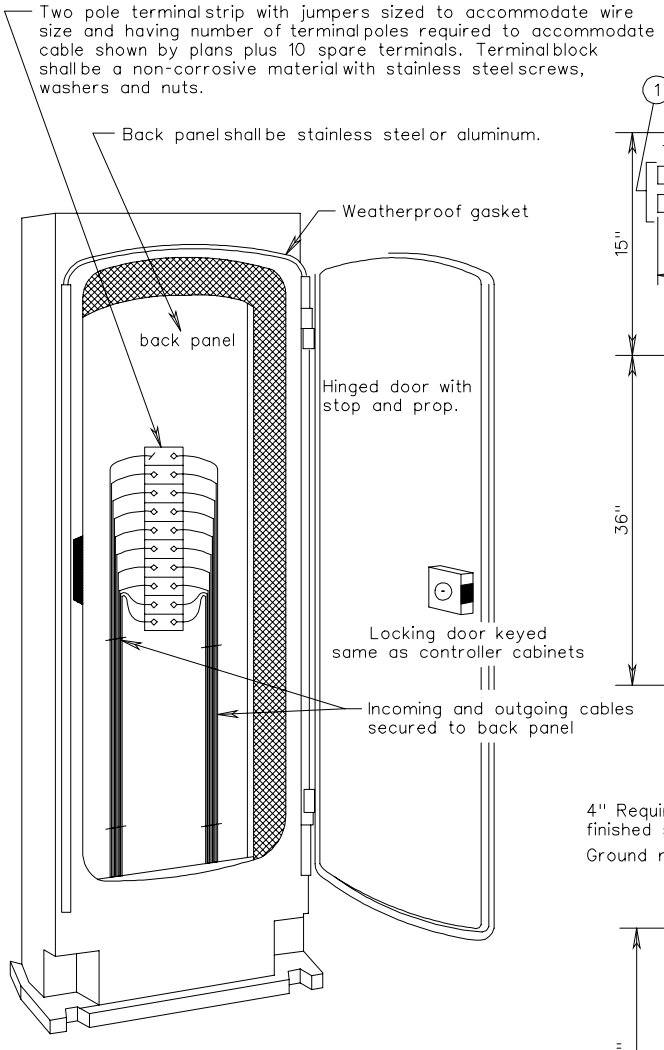
Grounding bushings shall be installed on each end of metal conduits. Empty conduits shall be plugged to prevent moisture and rodent entry.

Two - 1/2" diameter weepholes shall be provided in the foundation and located 2" inside of the back or side edges of the controller cabinet. Weepholes shall be sloped to allow outlet to be 3" below top of foundation. Two inches of the outlet end shall be fiber filled.

CONTROLLER CABINET FOUNDATION AND CONDUIT PLACEMENT DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

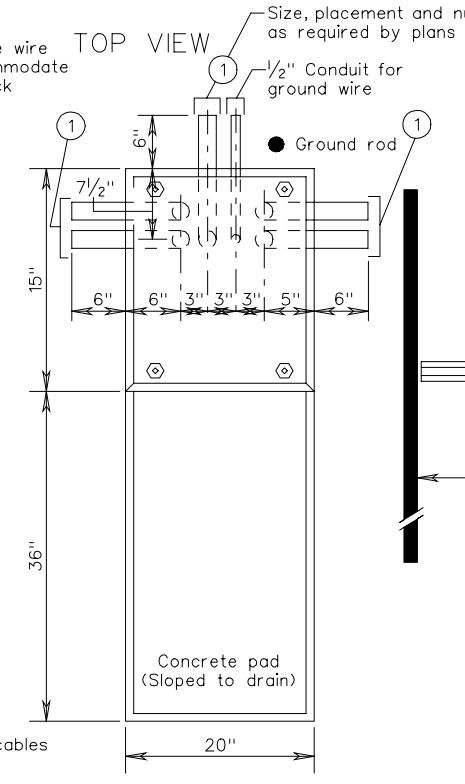
CTE-1



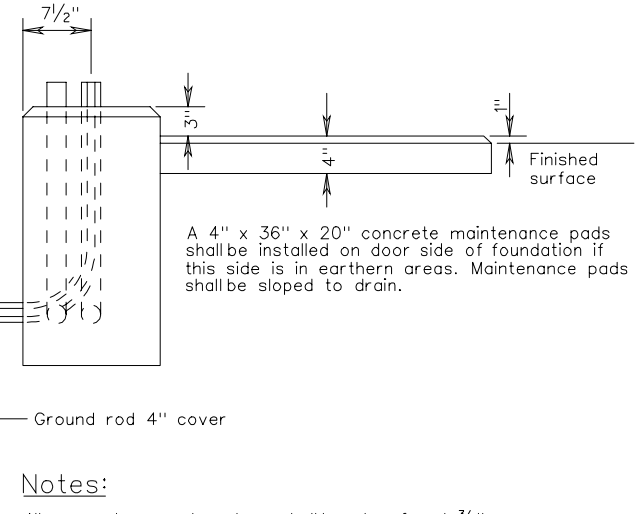
TYPICAL BOX DETAIL

Height 36" minimum
Width 12" minimum
Depth 8.5" minimum

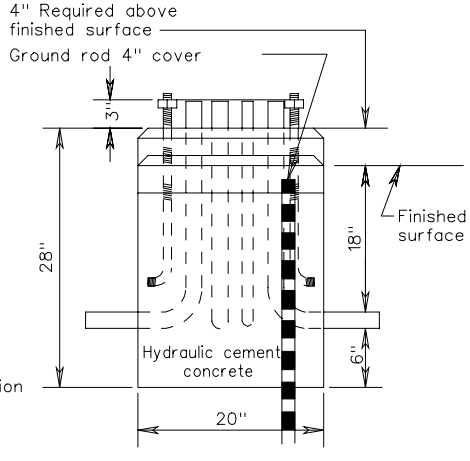
Cabinet material, finish and construction as required for controller cabinets.



FRONT VIEW



A 4" x 36" x 20" concrete maintenance pads shall be installed on door side of foundation if this side is in earthern areas. Maintenance pads shall be sloped to drain.



TYPICAL FOUNDATION DETAIL

Notes:

All exposed concrete edges shall be chamfered ¾"

Anchor bolts and bolt pattern shall be furnished with cabinet. Cabinet shall be centered on foundation. Foundation dimensions are typical. Cabinet foundation shall be adjusted to the cabinet dimensions.

Each foundation shall be permanently marked to indicate all sides from which conduits pass. This mark shall be made with a trowel when finishing the concrete and shall be ¼" deep and 4" to 6" long.

The enclosure at the inside and outside foundation joints shall be sealed with a silicone sealant.

Bell ends shall be installed on each end of PVC conduits. Empty conduits shall be plugged to prevent moisture and rodent entry.

Grounding bushings shall be installed on each end of metal conduits. Empty conduits shall be plugged to prevent moisture and rodent entry.

Two - ½" diameter weepholes shall be provided in the foundation and located 2" inside of the back or side edges of the controller cabinet. Weepholes shall be sloped to allow outlet to be 3" below top of foundation. Two inches of the outlet end shall be fiber filled.

The anchor bolts shall extend ¼" to ¾" above the top of the nut after installation of the nuts, washers and cabinet.

Spare conduits, if required by the plans, shall have bell ends or grounding bushings installed on PVC and metal conduits, respectively and shall be plugged to prevent moisture and rodent entry.

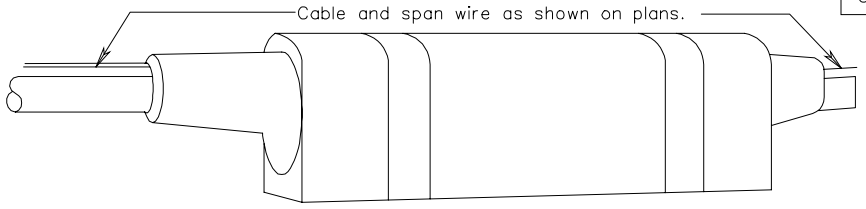
Voids remaining after conductors exit or enter bell ends or bushings of conduits shall be sealed with silicone to prevent moisture and rodent entry.

ABOVE GROUND CABLE TERMINAL ENCLOSURE AND CONDUIT PLACEMENT DETAILS

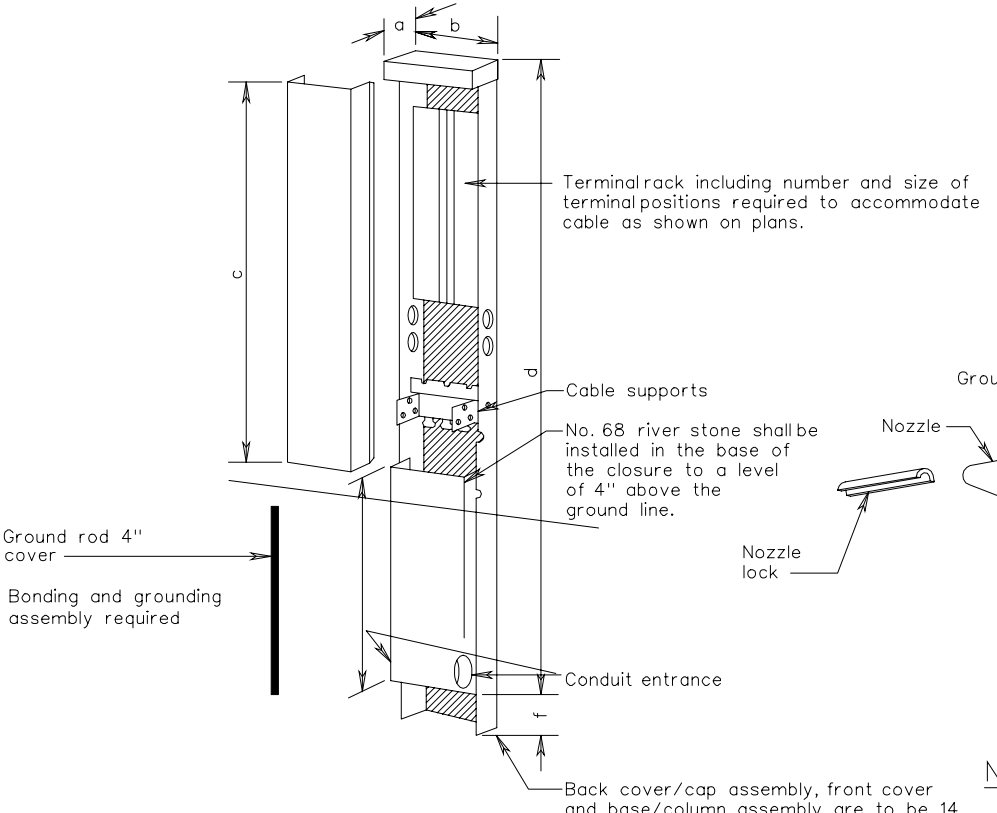
VIRGINIA DEPARTMENT OF TRANSPORTATION

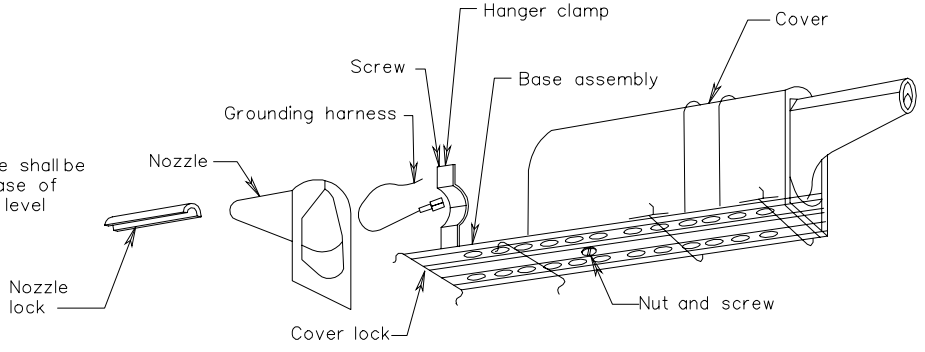
1301.04

DIMENSIONS (min.)						
TYPE	a	b	c	d	e	f
A	6 5/8"	6 5/8"	26"	47 5/16"	20 9/16"	3"
B	8 1/4"	8 1/4"	26"	47 5/16"	20 9/16"	3"
C	12 7/8"	12 7/8"	23 5/8"	50 5/16"	25 15/16"	-



TYPICAL COMPLETED ASSEMBLY





TYPICAL ASSEMBLY BREAKDOWN

Notes:

This item shall be similar to standard telephone splice enclosures. Terminal block shall be of a non-corrosive material with bright acid tin plated steel screws, nuts, and washers.

TYPICAL ABOVE GROUND CABLE TERMINAL ENCLOSURE

CTE - 2

Notes:

This item shall be easily re-enterable.

This item shall be similar to standard telephone splice enclosures, and shall include terminal lugs for size and number of cables used, and shall be weather resistant.

Where necessary this item shall be adapted for a "Y" branch of cable and /or for figure 8 cable.

Terminal block shall be of a non-corrosive material with bright acid tin plated steel screws, nuts, and washers.

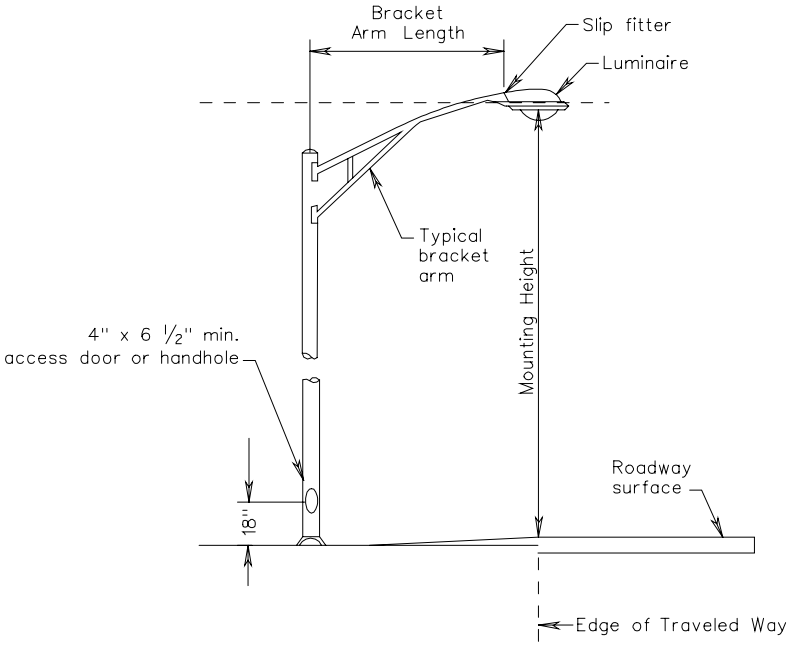
TYPICAL AERIAL CABLE TERMINAL ENCLOSURE

CTE - 3

ABOVE GROUND AND AERIAL CABLE TERMINAL ENCLOSURE DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

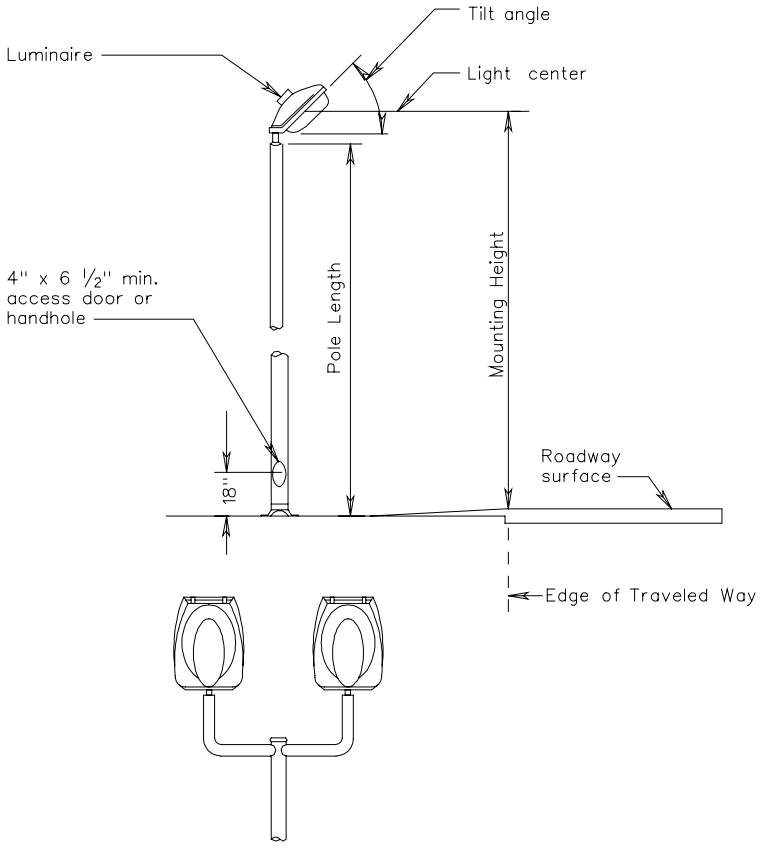
LP-1
CONVENTIONAL



NOTE:

The mounting height shown on the plans shall be adhered to within a tolerance of 12" and in no case less than the mounting height shown.

LP-2
OFFSET

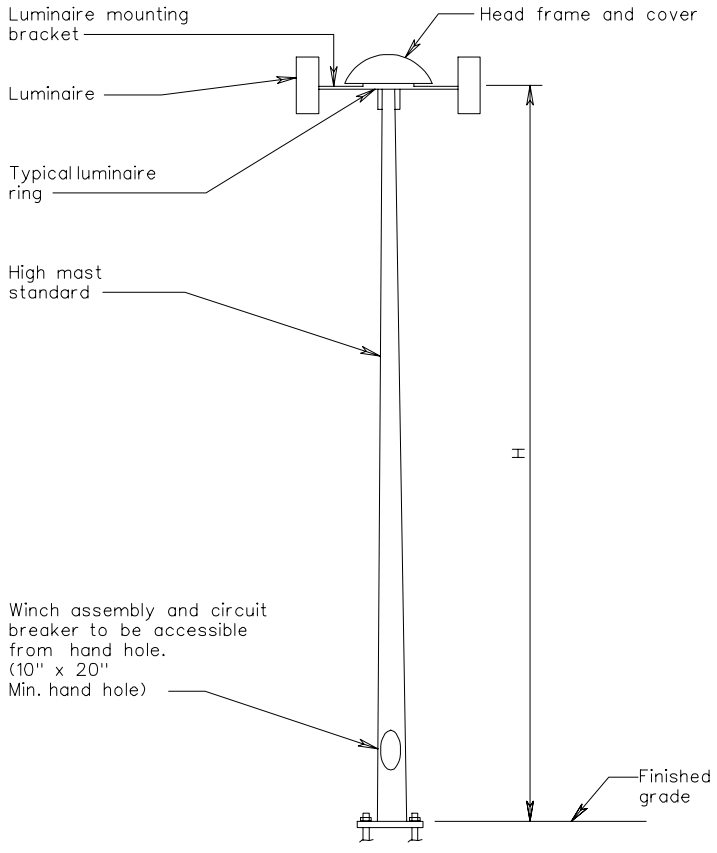


DUAL MOUNT

POLE LENGTH (feet)	BOLT CIRCLE DIAMETER	ANCHOR BOLT DIAMETER
A (5-17)	12"	1"
B (18-22)	12"	1"
C (23-27)	12"	1"
D (28-32	12"	1"
E (33-37)	15"	1"
F (38-42)	15"	1"
G (43-47)	15"	1"
H (48-52)	16"	1"
I (53-57)	16"	1 1/4"
J (58-62)	16"	1 1/4"

LIGHTING POLE DETAILS
CONVENTIONAL AND OFFSET

VIRGINIA DEPARTMENT OF TRANSPORTATION



TYPE	H
1	70'
2	80'
3	90'
4	100'
5	110'
6	120'
7	130'
8	140'
9	variable

Note:

Type 9 poles shall be of sufficient height to provide a luminaire mounting height above the roadway surface as indicated on the plans.

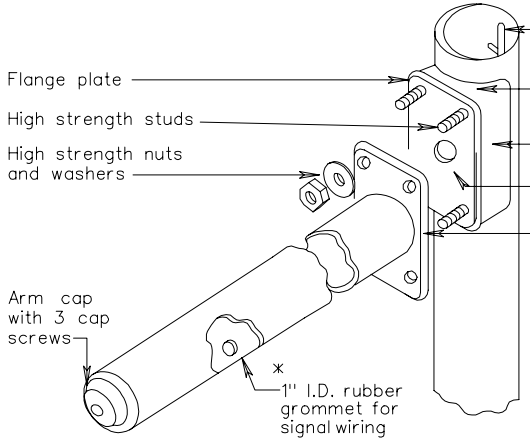
The mounting heights shown on the plans for a type 9 pole shall be adhered to within a tolerance of 3 feet and in no case be less than the mounting height shown.

LIGHTING POLE DETAILS
HIGH MAST

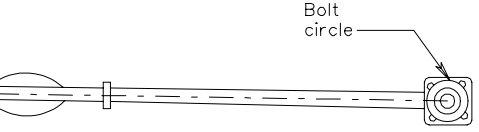
VIRGINIA DEPARTMENT OF TRANSPORTATION

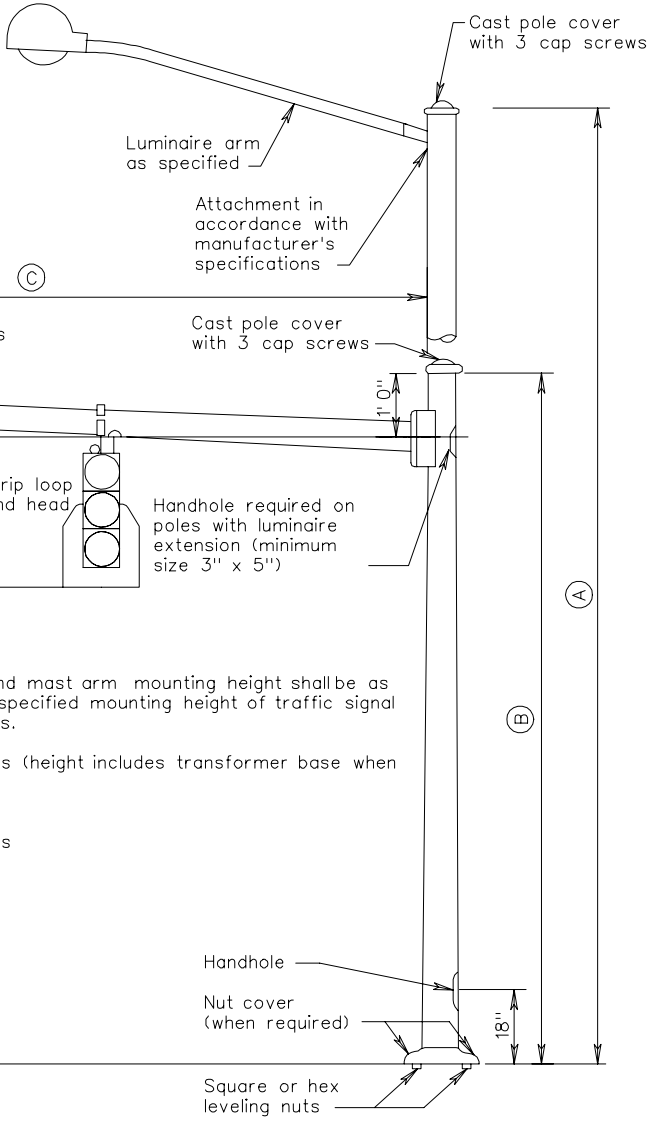
MP-1

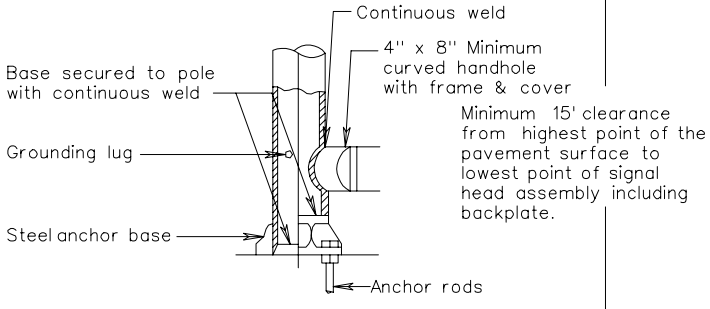
* Hole and grommet for signal wiring shall be located on the side of the arm directly behind the hanger assembly when Standard SM-3 hanger assemblies are required. Signal wiring shall be concealed in the Standard SM-3 hanger assemblies.



ARM AND SIGNAL ATTACHMENT







HANDHOLE DETAIL

NOTES:

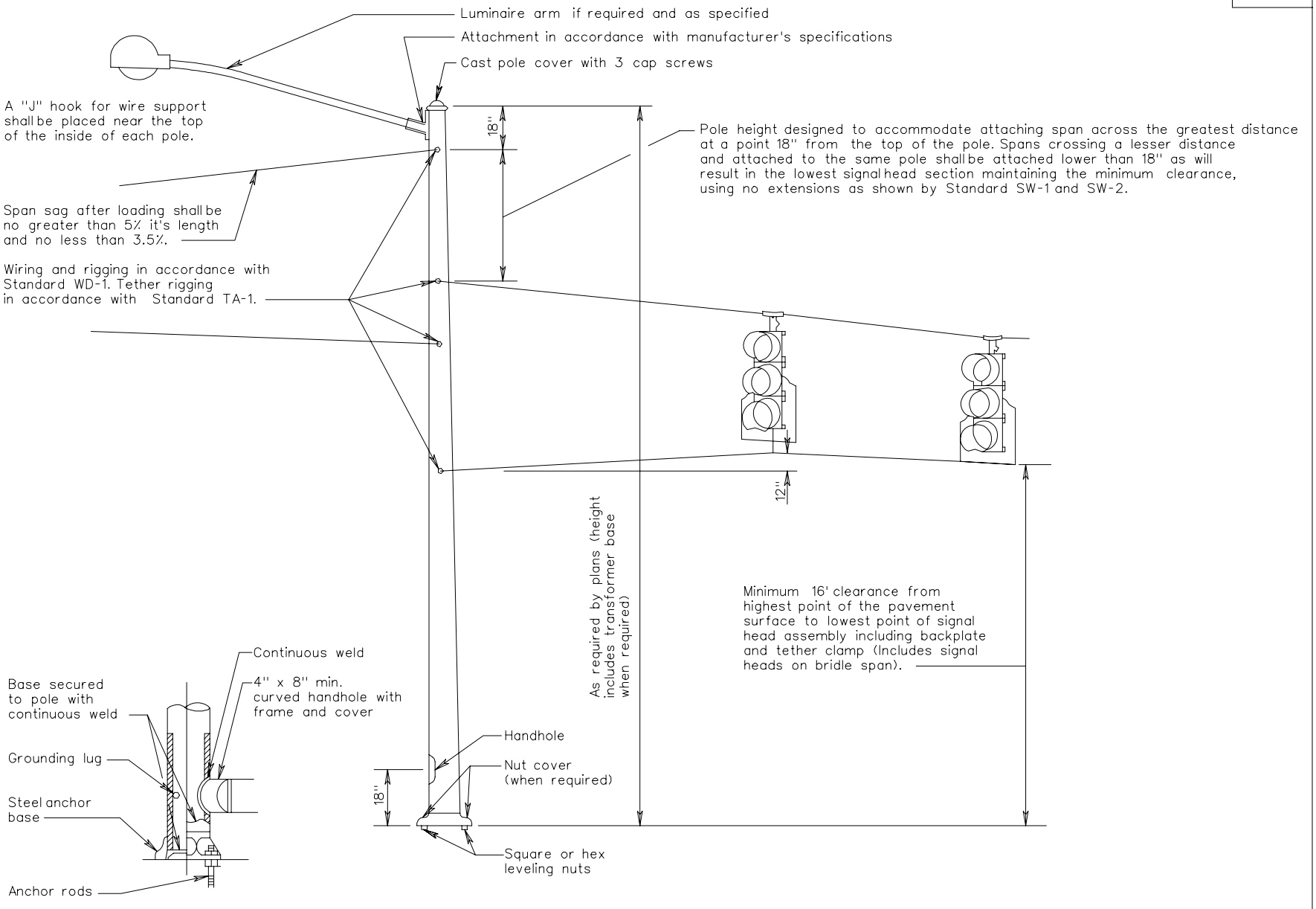
(A) Pole shaft length and mast arm mounting height shall be as required to obtain specified mounting height of traffic signal heads and luminaires.

(B) As required by plans (height includes transformer base when required).

(C) As required by plans

SIGNAL POLE DETAILS
(MAST ARM AND COMBINATION LUMINAIRE MAST ARM POLE)

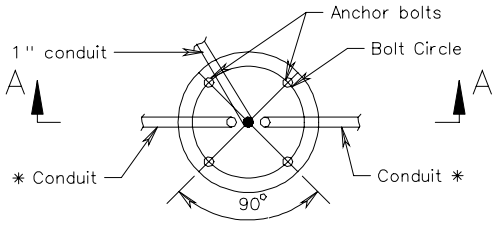
VIRGINIA DEPARTMENT OF TRANSPORTATION



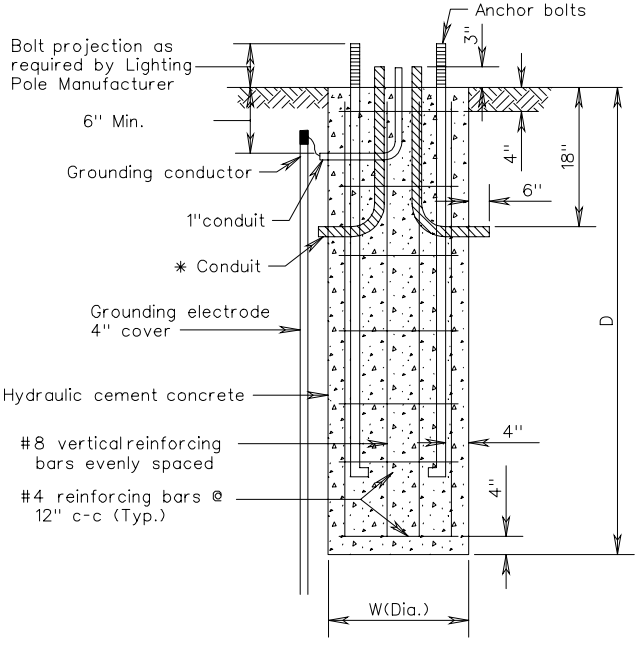
SIGNAL POLE DETAILS
(STRAIN AND COMBINATION LUMINAIRE STRAIN POLE)

VIRGINIA DEPARTMENT OF TRANSPORTATION

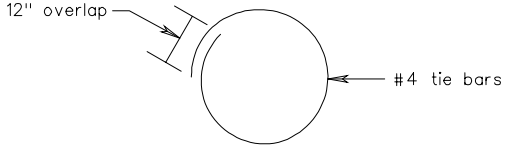
LF-1



PLAN VIEW



SECTION A-A



PLAN VIEW

Type	W	D	Vertical Bars
A	2'6"	8'	8 -#8

Notes:

Conduit elbows shall have a 90° bend. The bend radius shall be in accordance with the N.E.C.

The bolt circle template shall be furnished by the lighting pole manufacturer.

* The number, orientation and size of conduits entering and exiting foundations shall be as shown on plans.

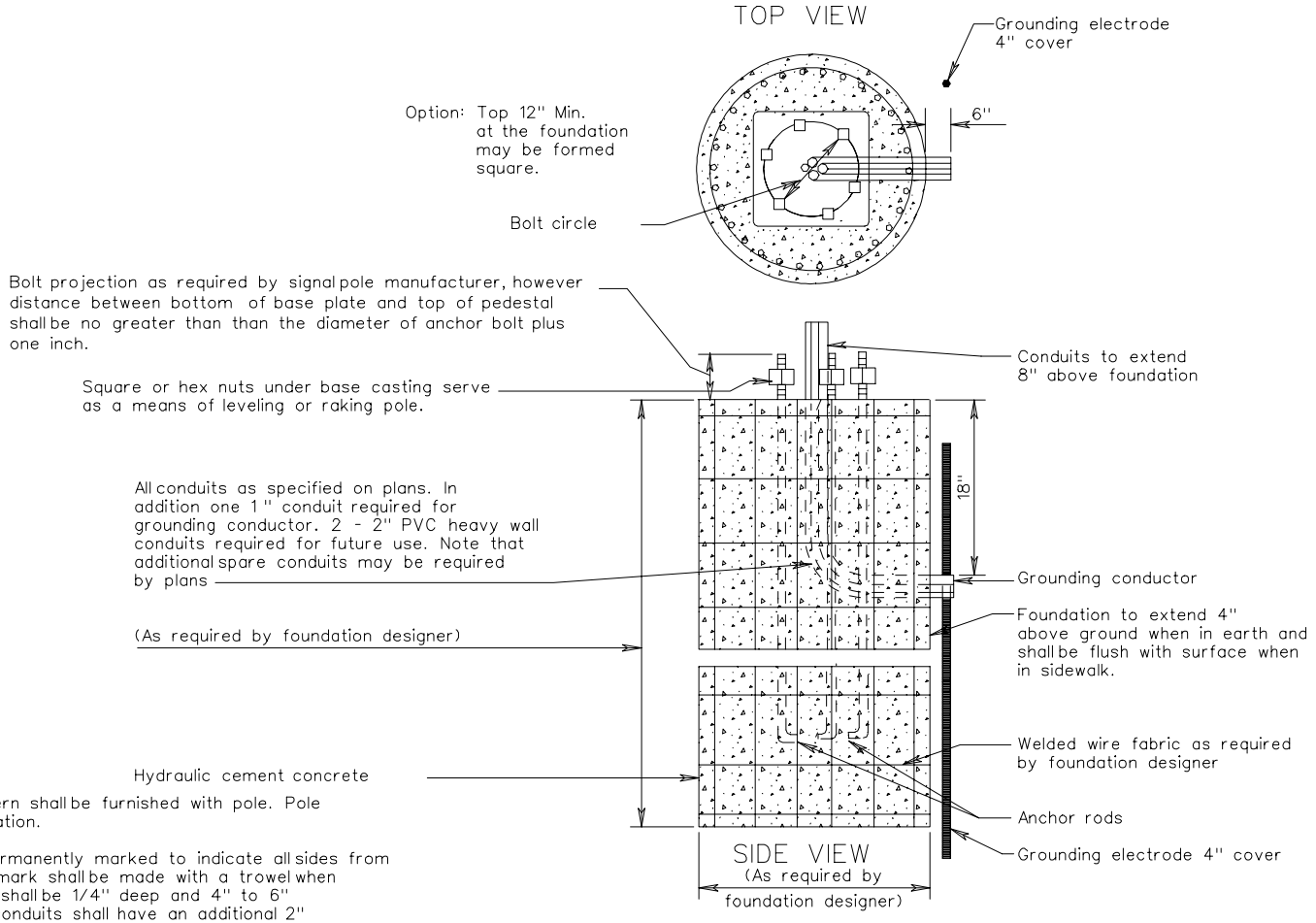
No mortar, grout, or concrete shall be placed between bottom of base plate and top of pedestal.

LIGHTING POLE FOUNDATION INSTALLATION DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 9/06

1301.10



CIRCULAR FOUNDATION

Notes:

Anchor bolts and bolt pattern shall be furnished with pole. Pole shall be centered on foundation.

Each foundation shall be permanently marked to indicate all sides from which conduits pass. This mark shall be made with a trowel when finishing the concrete and shall be 1/4" deep and 4" to 6" long. Locations of empty conduits shall have an additional 2" long mark made perpendicular to and centered on this marking.

When foundation extends 4" above finished grade all edges shall be chamfered $\frac{3}{4}$".

Grounding bushings shall be installed on each end of metal conduits. Empty conduits shall be plugged to prevent moisture and rodent entry.

Bell ends shall be installed on each end of PVC conduits. Empty conduits shall be plugged to prevent moisture and rodent entry.

Open ends of conduits with conductors installed shall be sealed with an approved soft. pliable, and easily removable waterproof sealant. The sealant shall no have a deleterious effect on cable coverings.

No mortar, grout, or concrete shall be placed between bottom of base plate and top of pedestal.

SIGNAL POLE FOUNDATION INSTALLATION DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

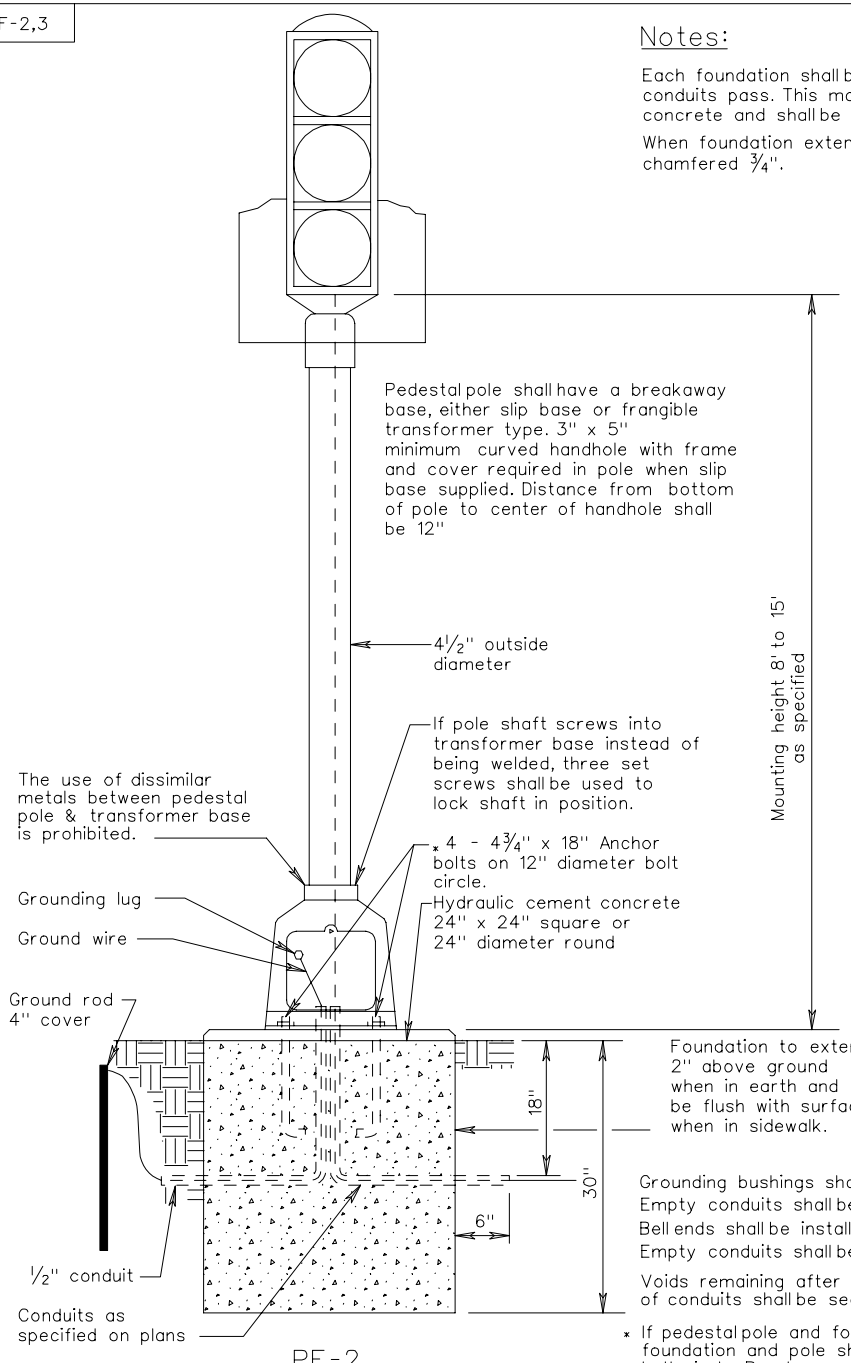
REV. 7/05

PF-2,3

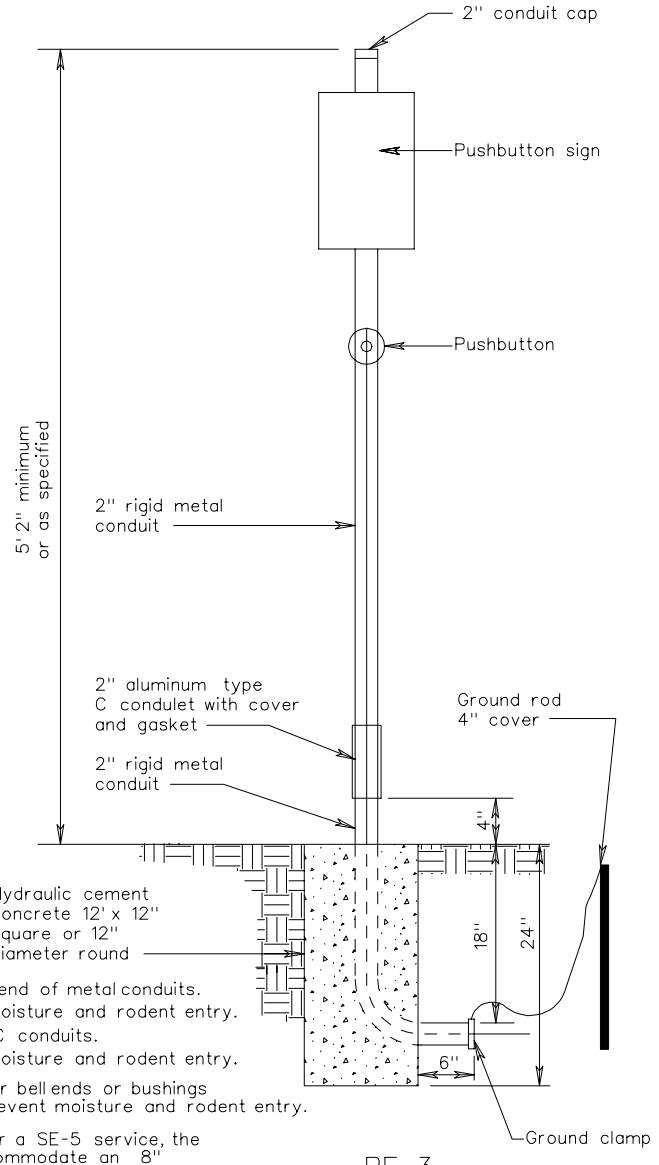
Notes:

Each foundation shall be permanently marked to indicate all sides from which conduits pass. This mark shall be made with a trowel when finishing the concrete and shall be 1/4" deep and 4" to 6" long.

When foundation extends 2" above finished grade, all edges shall be chamfered 3/4".



PF-2



PF-3

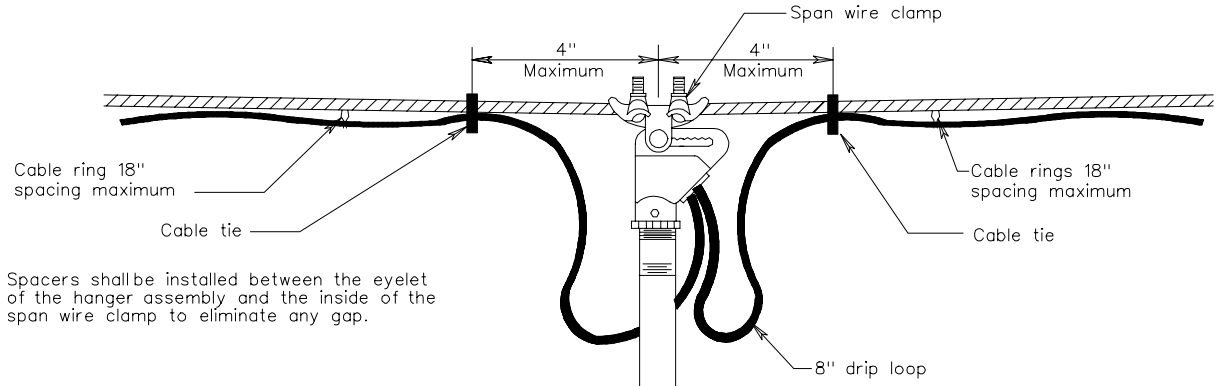
Grounding bushings shall be installed on each end of metal conduits.
Empty conduits shall be plugged to prevent moisture and rodent entry.
Bell ends shall be installed on each end of PVC conduits.
Empty conduits shall be plugged to prevent moisture and rodent entry.
Voids remaining after conductors exit or enter bell ends or bushings of conduits shall be sealed with silicone to prevent moisture and rodent entry.

* If pedestal pole and foundation are utilized for a SE-5 service, the foundation and pole shall be designed to accommodate an 8" bolt circle. Breakaway devices shall not be utilized.

PEDESTAL POLE AND FOUNDATION DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

1301.12

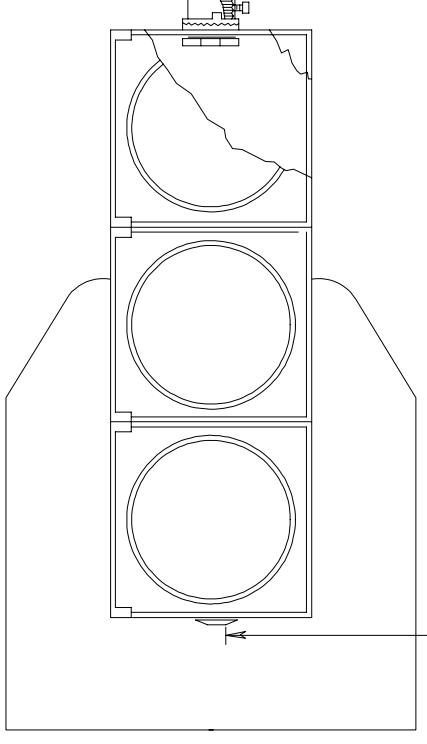


Spacers shall be installed between the eyelet of the hanger assembly and the inside of the span wire clamp to eliminate any gap.

Weatherhead signal hanger, steel leveling pipe and threaded pipe coupling shall be galvanized or painted flat black or yellow.

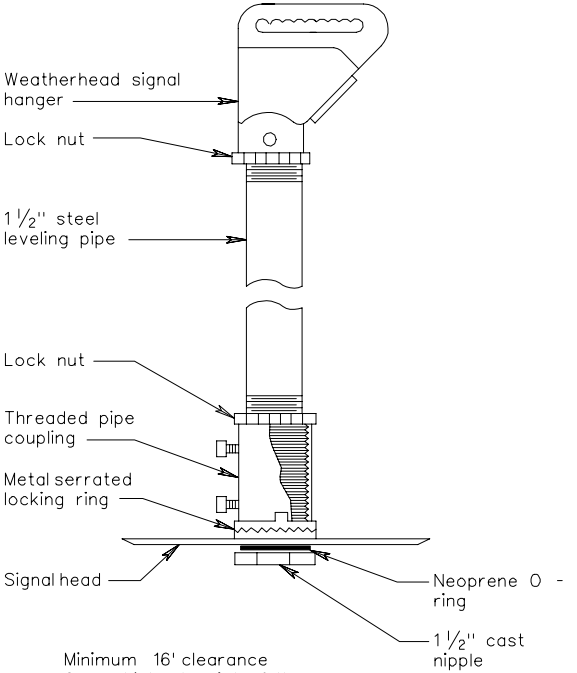
SIDE VIEW

A waterproof sealant shall be applied to the thread area above the pipe coupling before the lock nut is screwed down.



Note:

Signal heads mounted on the same span wire shall be installed so the bottom sections are on a level plane or no greater than 12" above the bottom of the lowest signal head.



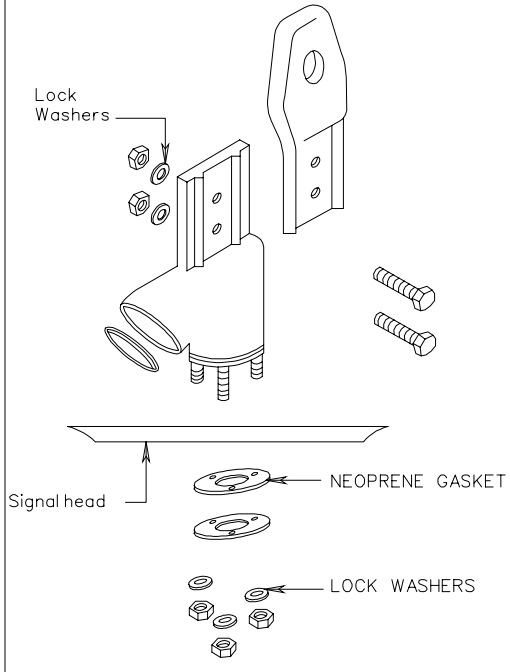
Signal head cables shall be continuous from the controller to the nearest signal head to which it applies except cable terminations may be allowed on the pole terminal strip when required by the plans. The cable shall also be continuous from the first signal head to any additional heads with termination on the terminals within the signal head housing.

Minimum 16' clearance from highest point of the pavement surface to the lowest point of signal head assembly including backplate and tether clamp (Includes signal heads on bridle span).

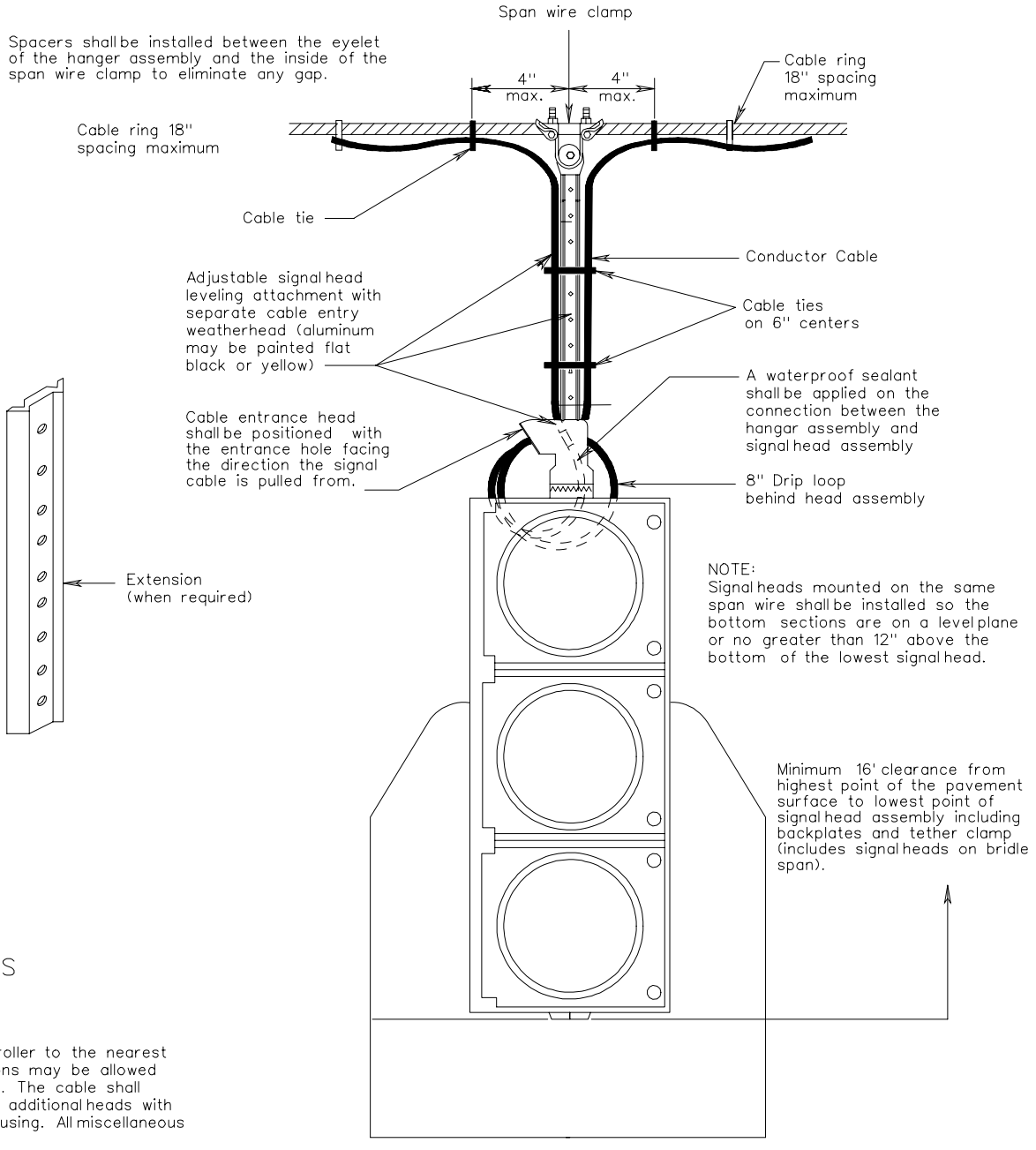
SIGNAL HEAD MOUNTING DETAILS
SPAN WIRE

VIRGINIA DEPARTMENT OF TRANSPORTATION

SW-2



HANGER ASSEMBLY DETAILS

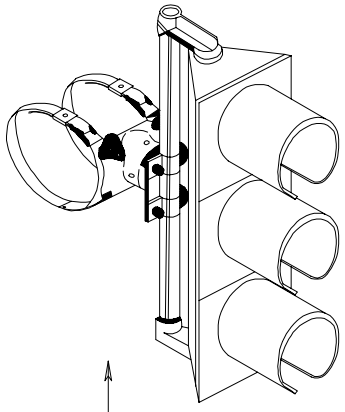


Signal head cables shall be continuous from the controller to the nearest signal head to which it applies except cable terminations may be allowed on the pole terminal strip when required by the plans. The cable shall also be continuous from the first signal head to any additional heads with termination on the terminals within the signal head housing. All miscellaneous hardware shall be stainless steel.

SIGNAL HEAD MOUNTING DETAILS
SPAN WIRE

VIRGINIA DEPARTMENT OF TRANSPORTATION

1301.14



Minimum 15' clearance from highest point of the pavement surface to lowest point of signal head assembly including backplate.

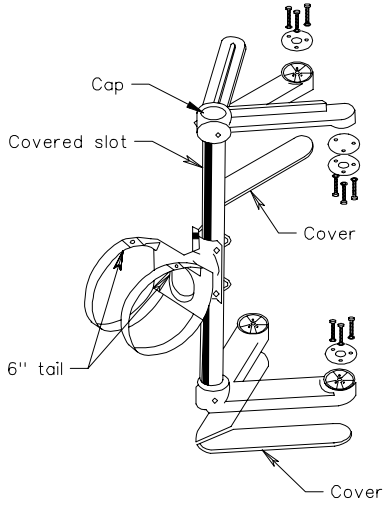
Notes:

Signal head cables shall be continuous from the controller to the nearest signal head to which it applies except cable terminations may be allowed on the pole terminal strip when required by the plans. The cable shall also be continuous from the first signal head to any additional heads with termination on the terminals within the signal head housing.

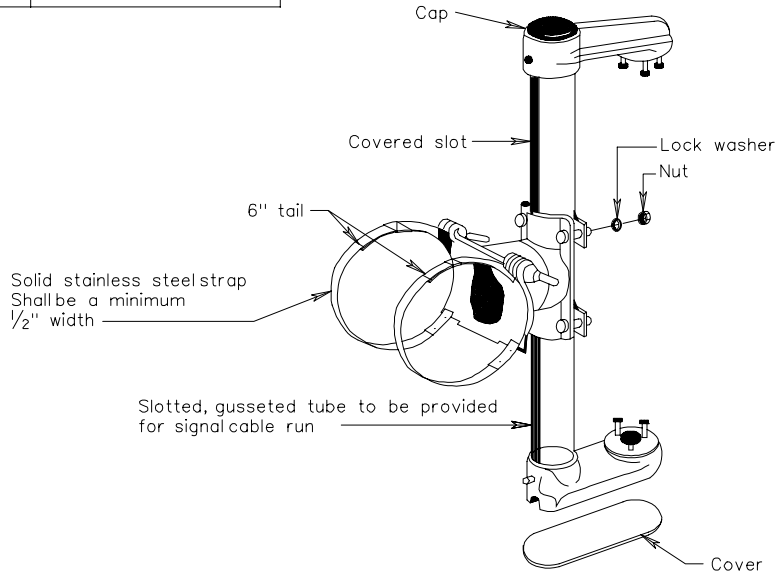
All bolts, nuts and washers shall be stainless steel.

POLE AND HANGER ASSEMBLY HARDWARE REQUIREMENTS

IF POLE IS	HARDWARE SHALL BE
Galvanized steel	Aluminum or galvanized iron
Steel painted aluminum	Aluminum, galvanized iron or iron painted aluminum
Steel painted other than aluminum	Aluminum or iron painted to match pole



5 SECTION CLUSTER MOUNTING DETAIL



RIGID MAST ARM MOUNTING DETAILS

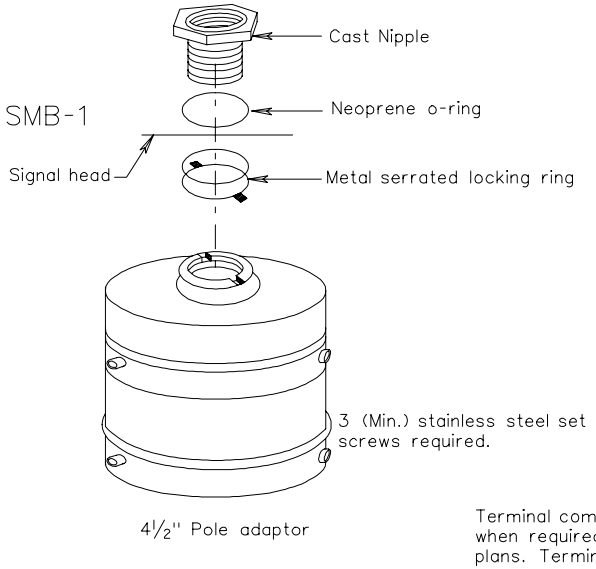
SIGNAL HEAD MOUNTING DETAILS MAST ARM

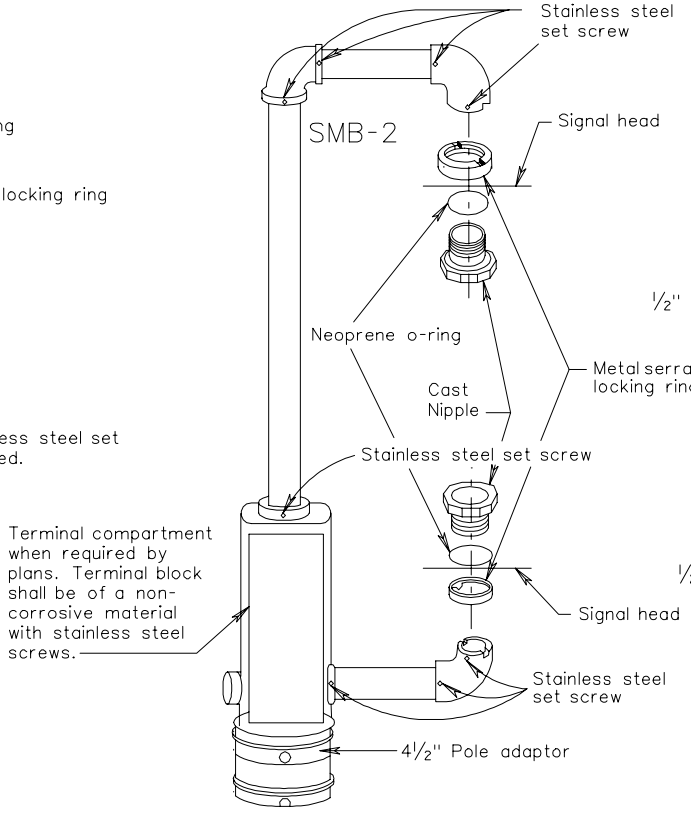
VIRGINIA DEPARTMENT OF TRANSPORTATION

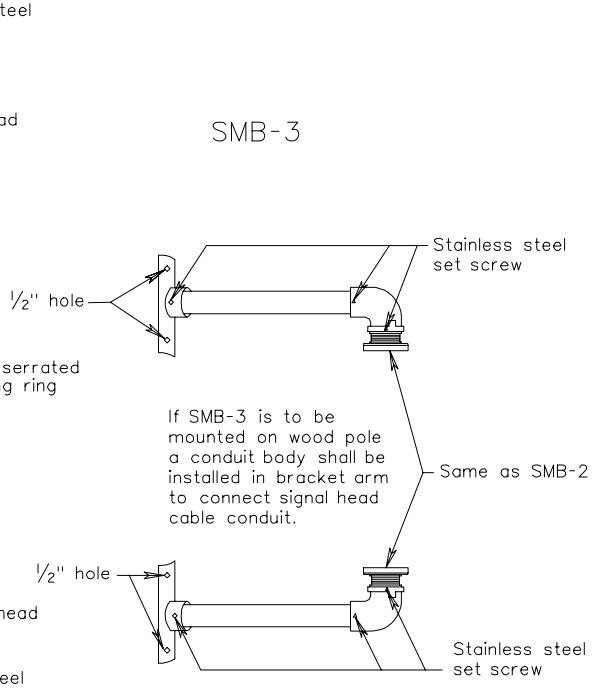
POLE TOP MOUNTING CAST ALUMINUM SIGNAL HEADS ONLY

POLE TOP MOUNTING CAST ALUMINUM OR POLYCARBONATE SIGNAL HEADS

POLE BRACKET MOUNTING CAST ALUMINUM OR POLYCARBONATE SIGNAL HEADS







POLE AND HANGAR ASSEMBLY HARDWARE REQUIREMENTS

IF POLE IS	HARDWARE SHALL BE
Galvanized steel	Aluminum or galvanized iron
Steel painted alum.	Aluminum galvanized iron or iron painted aluminum
Steel painted other than aluminum; Fiberglass tone other than gray	Aluminum or iron painted to match pipe
Wood or fiberglass with gray tone	Aluminum or galvanized iron

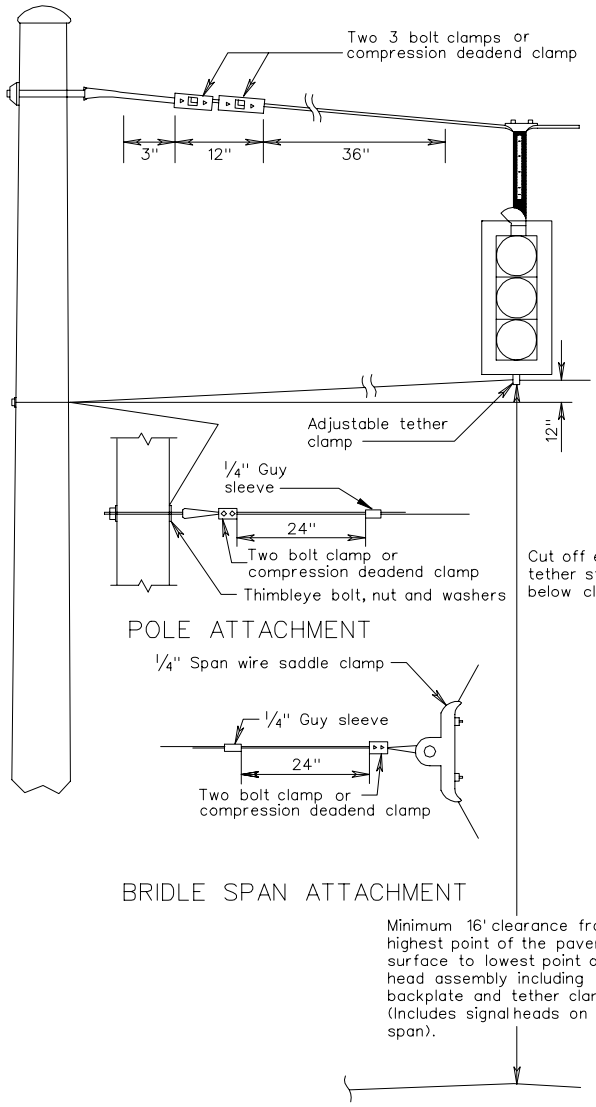
Notes:

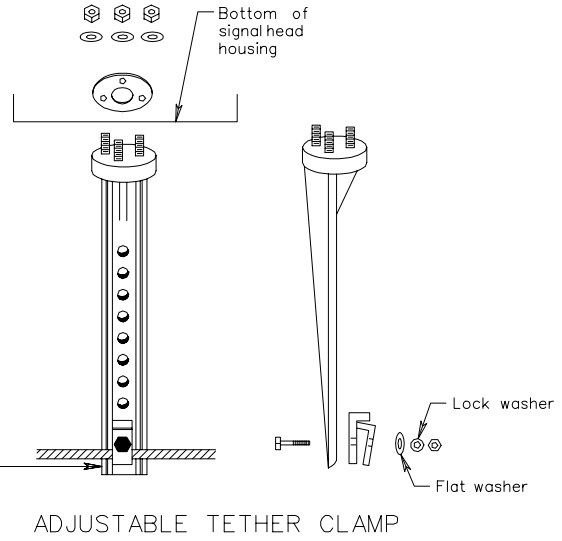
If pedestrian signals are being installed, the mounting attachments (SMB-1,2,3) shall be a type specifically manufactured for that purpose.

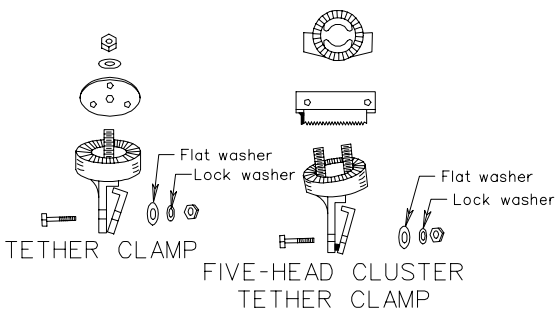
SMB-1, 2 and 3 shown are typical and for one way signal display. Other designs may be submitted for approval by the Engineer. Multi-way assemblies, when required, shall be of similar appropriate design.

SIGNAL HEAD MOUNTING DETAILS POLE TOP AND BRACKET

VIRGINIA DEPARTMENT OF TRANSPORTATION





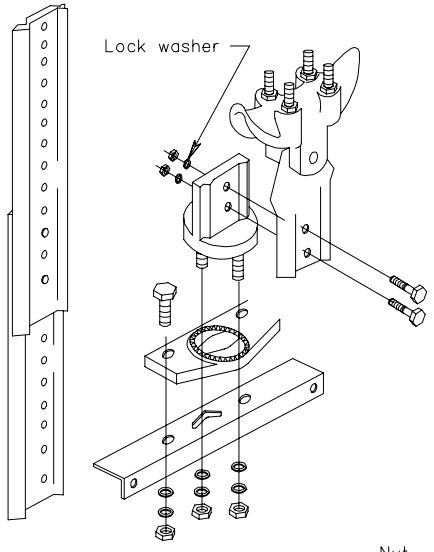


TETHER WIRE DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

SMD-1, 2

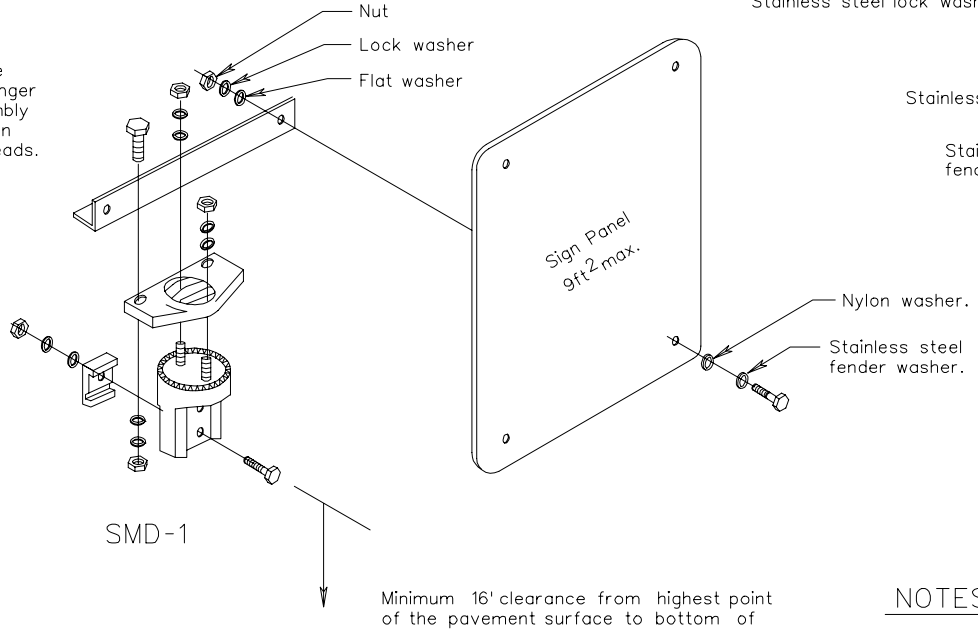
SPAN WIRE INSTALLATION



Spacers shall be installed between the eyelet of the sign hanger and the span wire clamp to eliminate any gap.

Note:

All nuts, bolts and washers shall be stainless steel or galvanized steel unless otherwise indicated.

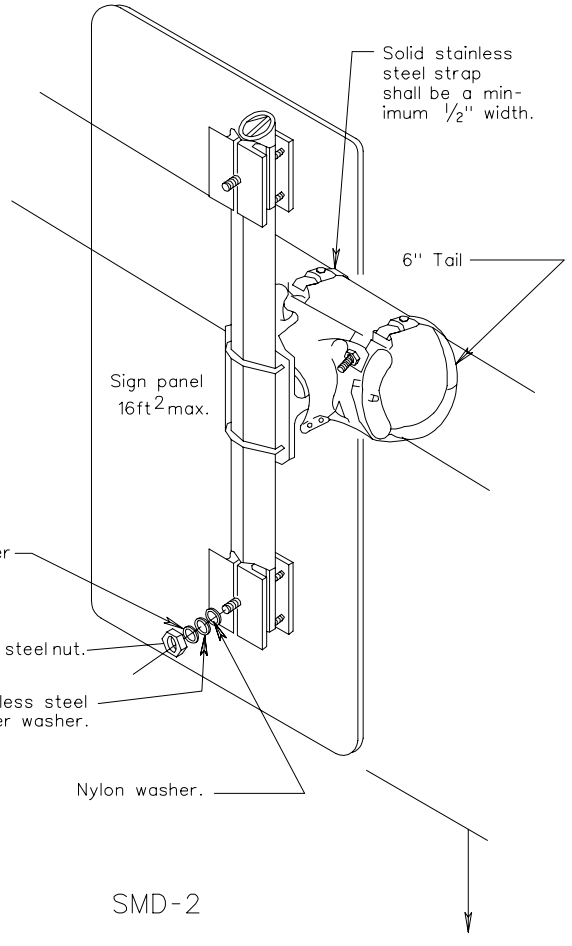


Extension shall be used with the hanger and tether assembly to center the sign with the signal heads.

SMD-1

Minimum 16' clearance from highest point of the pavement surface to bottom of tether clamp.

MAST ARM INSTALLATION



SMD-2

Minimum 15' clearance from highest point of the pavement surface to bottom of sign.

NOTES

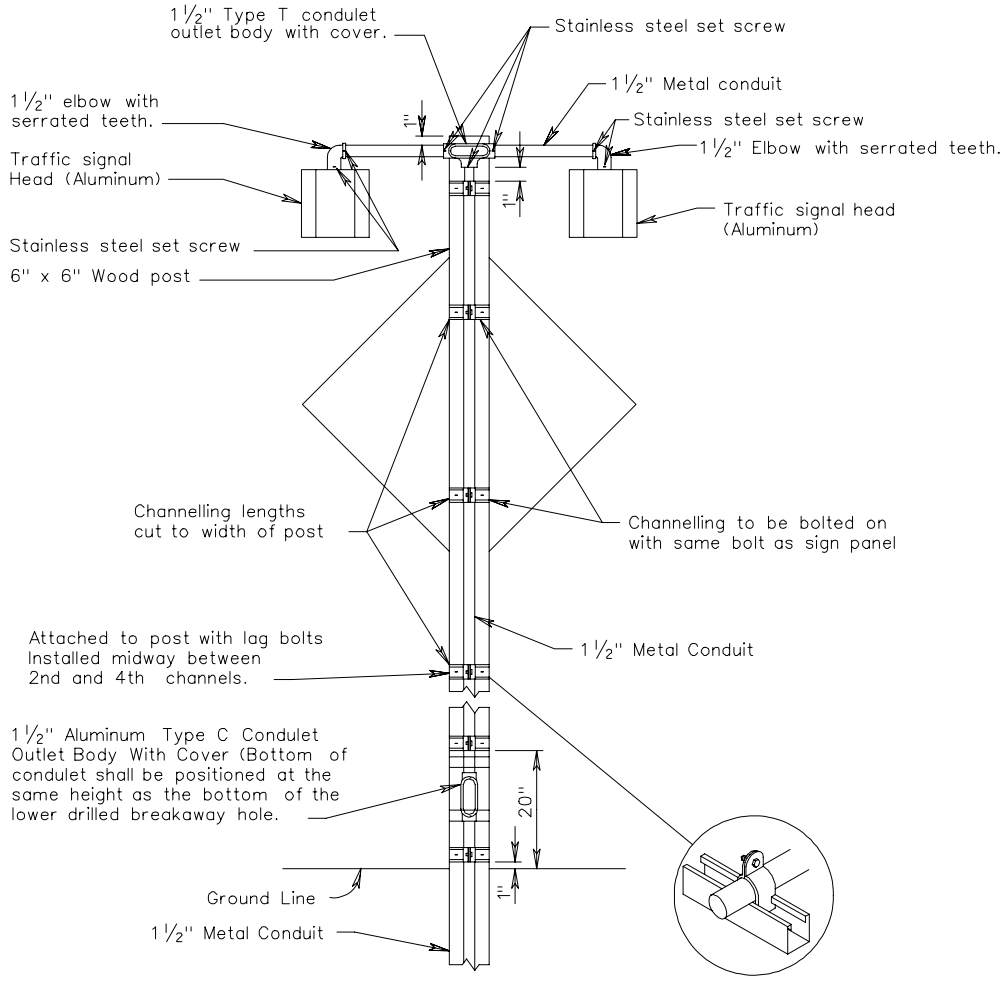
Nuts and bolts used for attachment of sign panel shall be stainless steel and 3/4" in diameter.

A 1 1/4" nylon and stainless steel fender washer shall be used on the front of sign panel where bolt passes through sign panel.

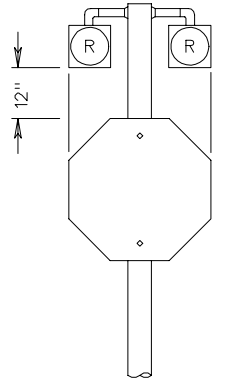
SIGN MOUNTING DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

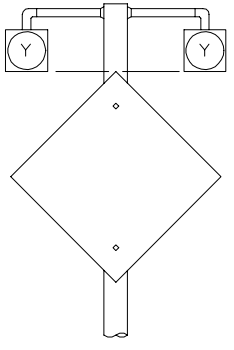
1301.18



CHANNELLING DETAIL



Beacons shall flash simultaneously.



Beacons shall flash alternately.

BEACON ALIGNMENT DETAIL

Notes:

All signal lenses shall be 12".

Post to be drilled for breakaway and installed in accordance with WSP-1, pages 1301.57 & 1301.58.

All elbows and condulets shall have set screws or lock nuts to prevent rotation.

Miscellaneous hardware shall be stainless steel.

Channelling shall be galvanized steel.

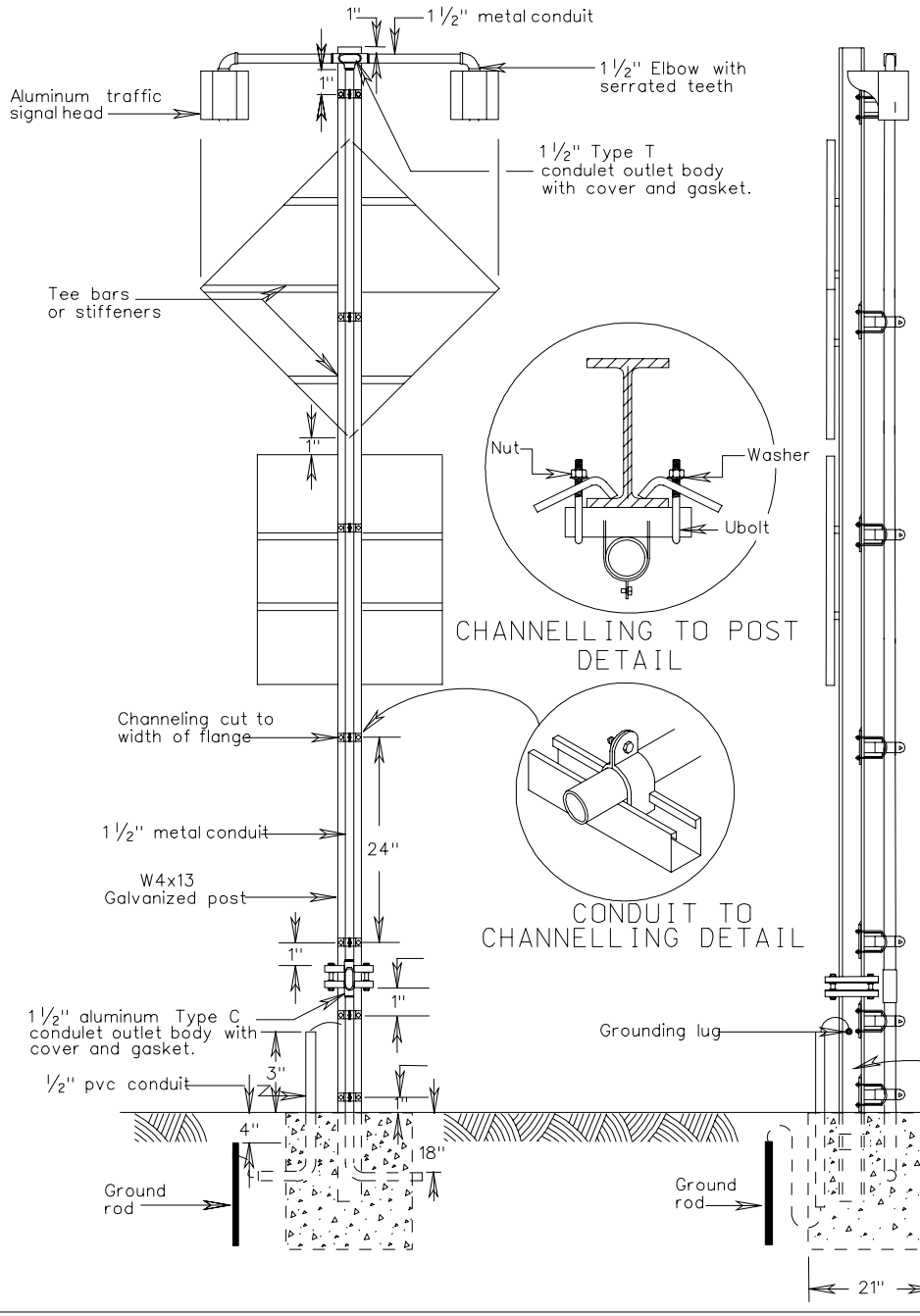
A water proof sealant shall be utilized between the elbow & signal head.

FLASHING BEACON INSTALLATION DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

FB-2

REAR VIEW

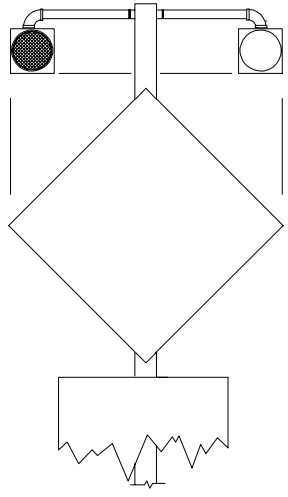


CHANNELLING TO POST DETAIL

CONDUIT TO CHANNELLING DETAIL

SIDE VIEW

FRONT VIEW

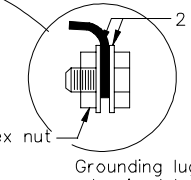


NOTES:

All signal lenses shall be yellow and shall be 12" diameter.
All elbows and condulets shall have set screws to prevent rotation.
All channeling, and clamps shall be galvanized or stainless steel.
Miscellaneous hardware shall be stainless steel.
Post and sign panels shall be installed in accordance with SSP-VA
A waterproof sealant shall be utilized between elbows and signal heads.
Foundation shall be in accordance with SSP-VA for a 4' 6" x 21" foundation except for the following:

1. A 1 ½" metal conduit shall be installed for electrical power.
2. A ½" PVC conduit, #6 wire and ground rod shall be installed for grounding purposes. Stub post shall be supplied with a grounding lug welded to post web.
3. Breakaway connectors shall be installed on the signal conductors within the type C condulet. Breakaway connectors shall be fused for the hot conductor and nonfused for the grounded conductor.
4. Part elevation on undivided highways shall be of the median type.

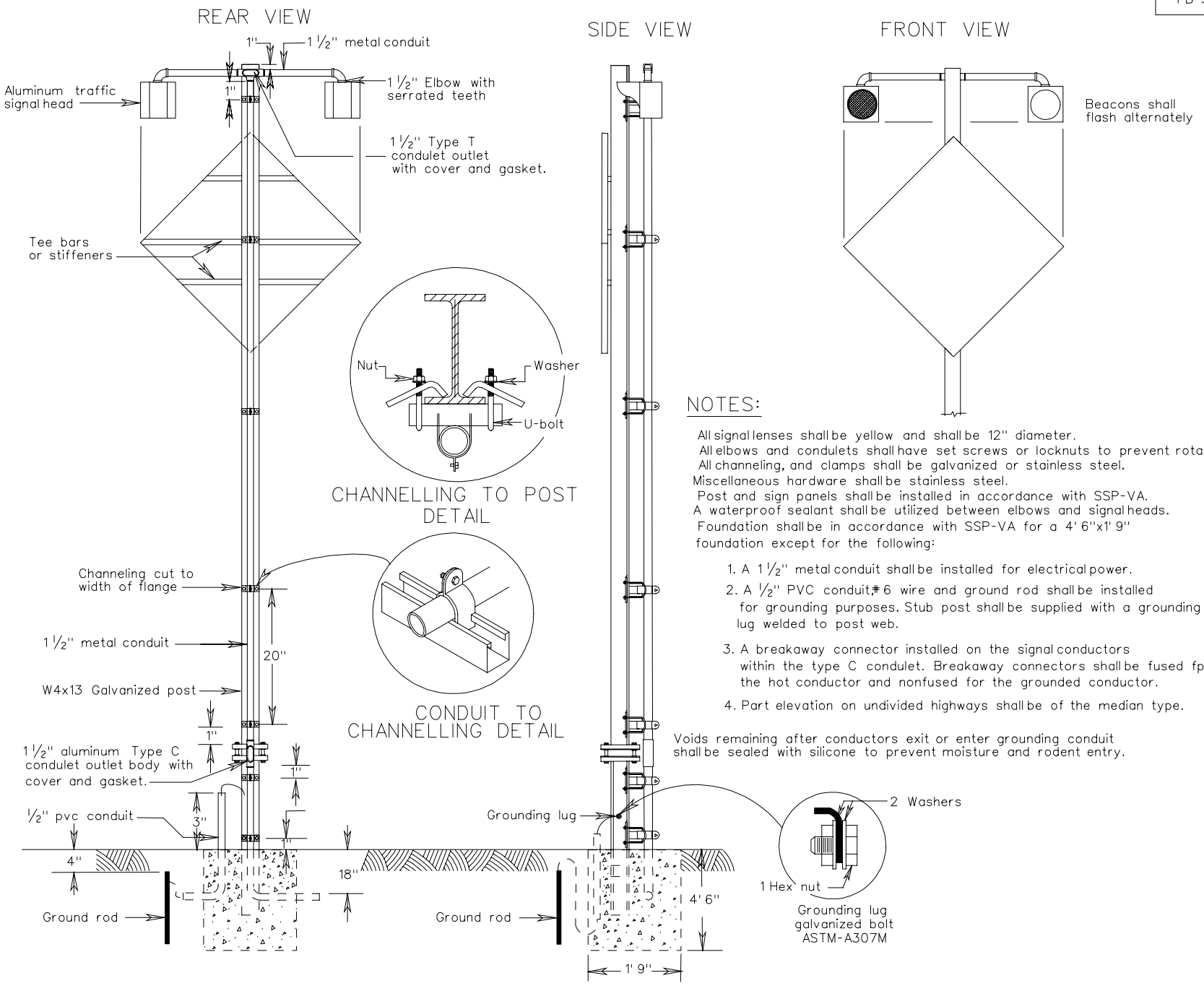
Voids remaining after conductors exit or enter grounding conduit shall be sealed with silicone to prevent moisture and rodent entry.



FLASHING BEACON INSTALLATION DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

1301.20



NOTES:

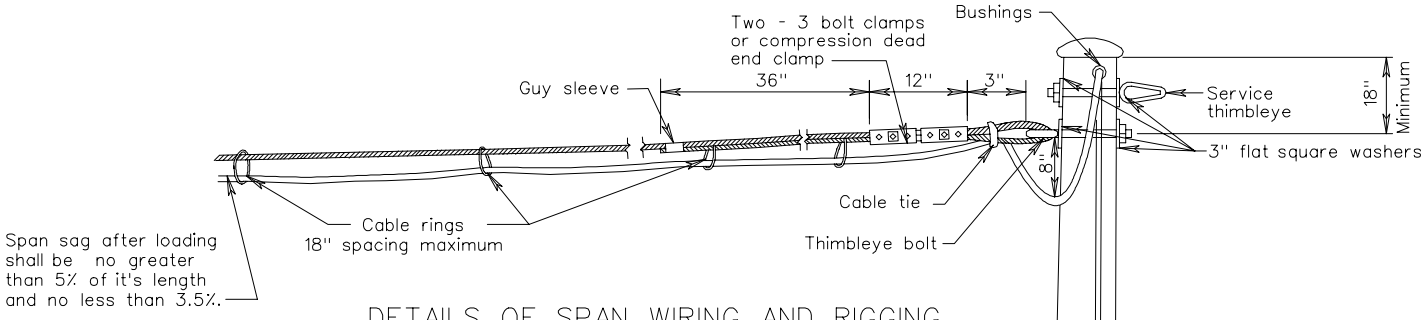
All signal lenses shall be yellow and shall be 12" diameter.
All elbows and condulets shall have set screws or locknuts to prevent rotation.
All channeling, and clamps shall be galvanized or stainless steel.
Miscellaneous hardware shall be stainless steel.
Post and sign panels shall be installed in accordance with SSP-VA.
A waterproof sealant shall be utilized between elbows and signal heads.
Foundation shall be in accordance with SSP-VA for a 4' 6"x1' 9" foundation except for the following:

1. A 1 1/2" metal conduit shall be installed for electrical power.
2. A 1/2" PVC conduit,# 6 wire and ground rod shall be installed for grounding purposes. Stub post shall be supplied with a grounding lug welded to post web.
3. A breakaway connector installed on the signal conductors within the type C condulet. Breakaway connectors shall be fused fpr the hot conductor and nonfused for the grounded conductor.
4. Part elevation on undivided highways shall be of the median type.

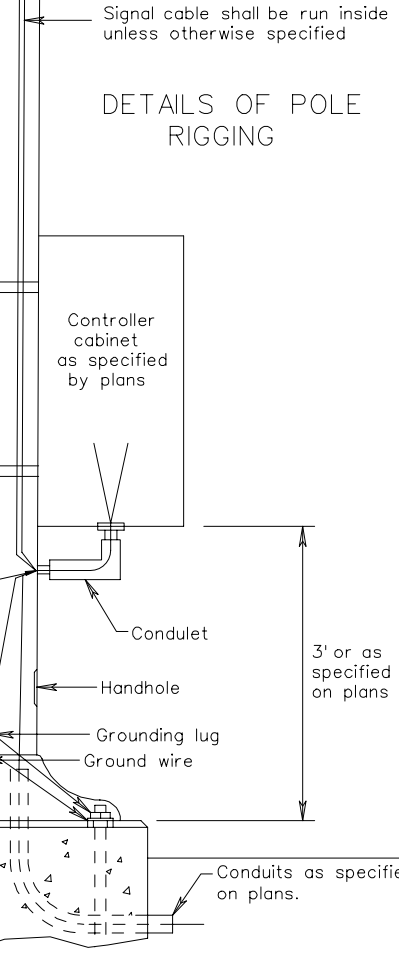
Voids remaining after conductors exit or enter grounding conduit shall be sealed with silicone to prevent moisture and rodent entry.

FLASHING BEACON INSTALLATION DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION



DETAILS OF SPAN WIRING AND RIGGING



DETAILS OF POLE RIGGING

Notes:

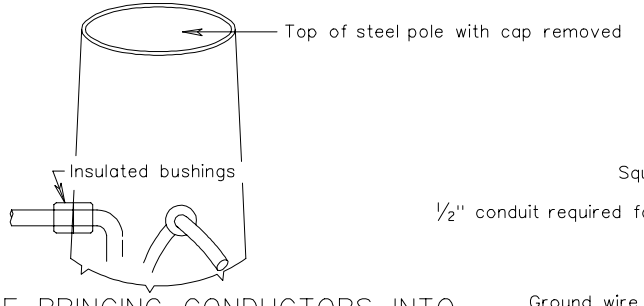
Concrete pad required when cabinet mounted on pole in earth areas.

See Standard CTE-1 for pad detail.

For methods approved for cable runs, see Standard WD-2.

Pole height designed to accommodate attaching span across the greatest distance at a point 18" from the top of the pole. Spans crossing a lessor distance and attached to the same pole shall be attached lower than 18" as will result in the lowest signal head section maintaining the minimum clearance, using no extensions as shown by Standard SW-1 and SW-2.

A strain insulator(s) may be used to extend the length of existing span wire if a span pull is to be modified.

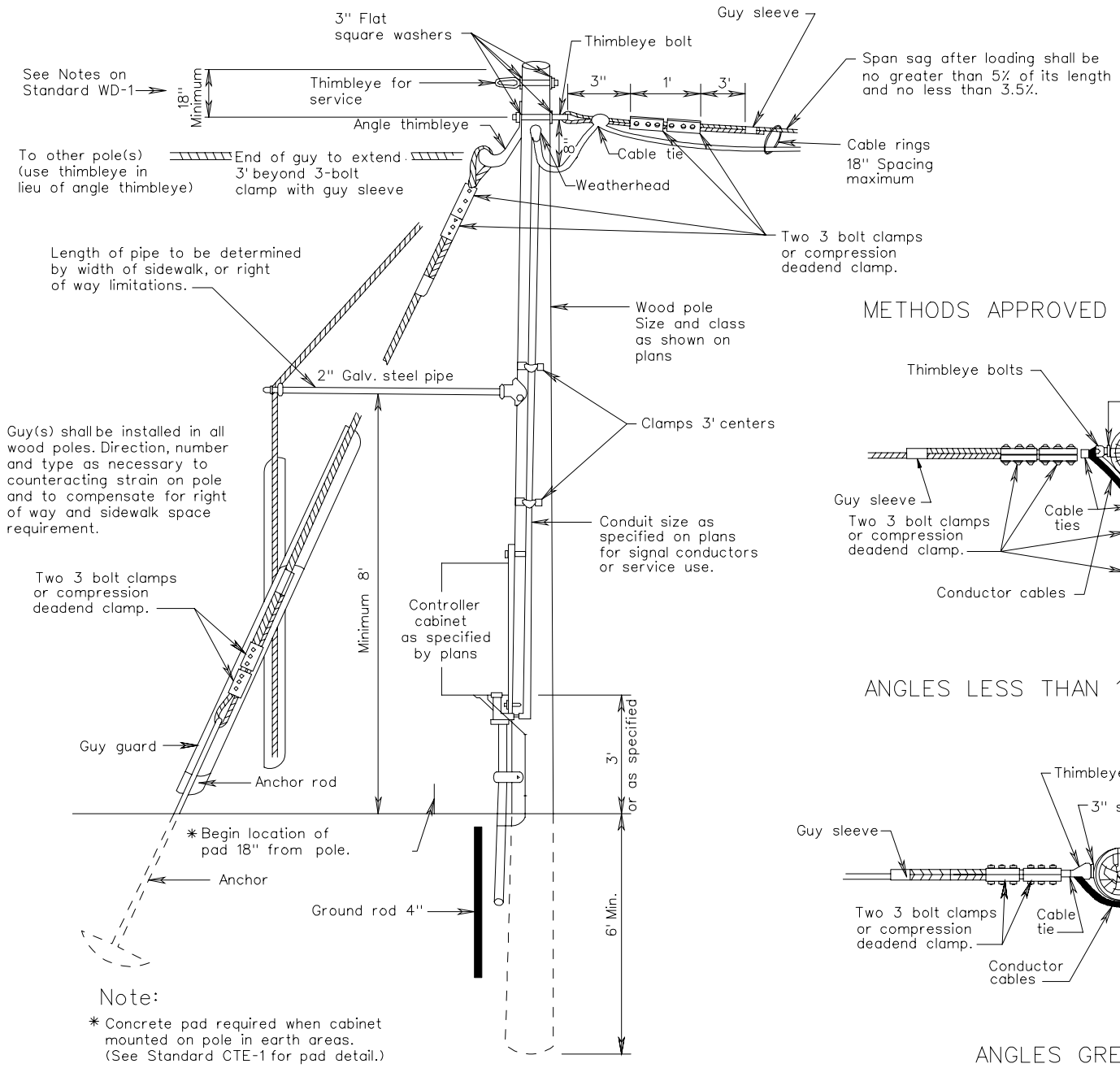


METHODS OF BRINGING CONDUCTORS INTO TOP OF STEEL POLES

DETAILS OF STEEL POLE BASE WITH CONTROLLER CABINET AND METHODS OF BRINGING IN CONDUCTORS

STEEL POLE WIRING AND RIGGING DETAILS

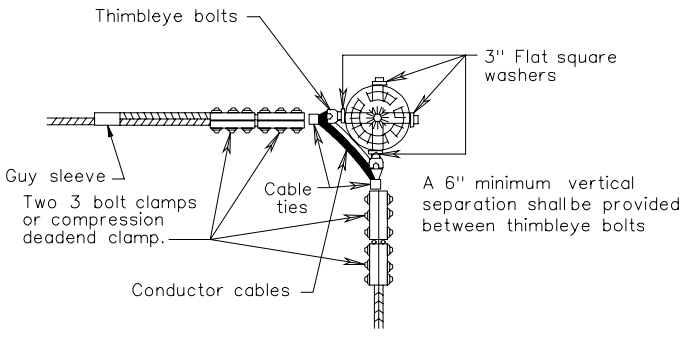
VIRGINIA DEPARTMENT OF TRANSPORTATION



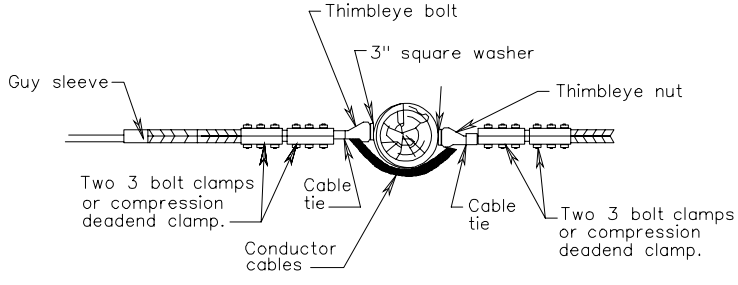
Note:

* Concrete pad required when cabinet mounted on pole in earth areas. (See Standard CTE-1 for pad detail.)

METHODS APPROVED FOR CABLE RUNS



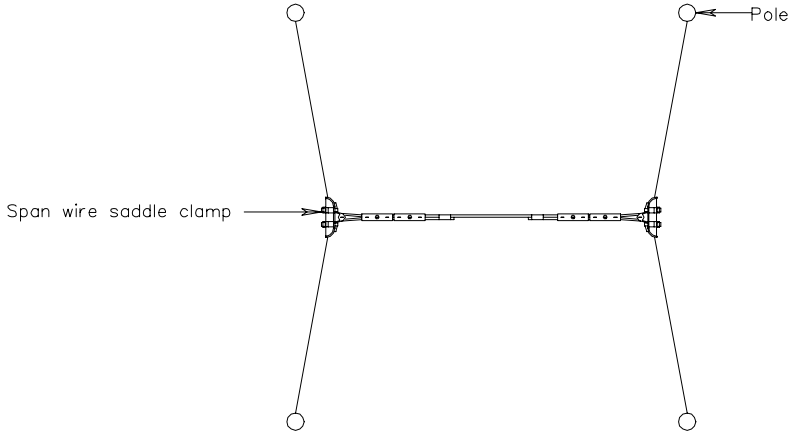
ANGLES LESS THAN 160°



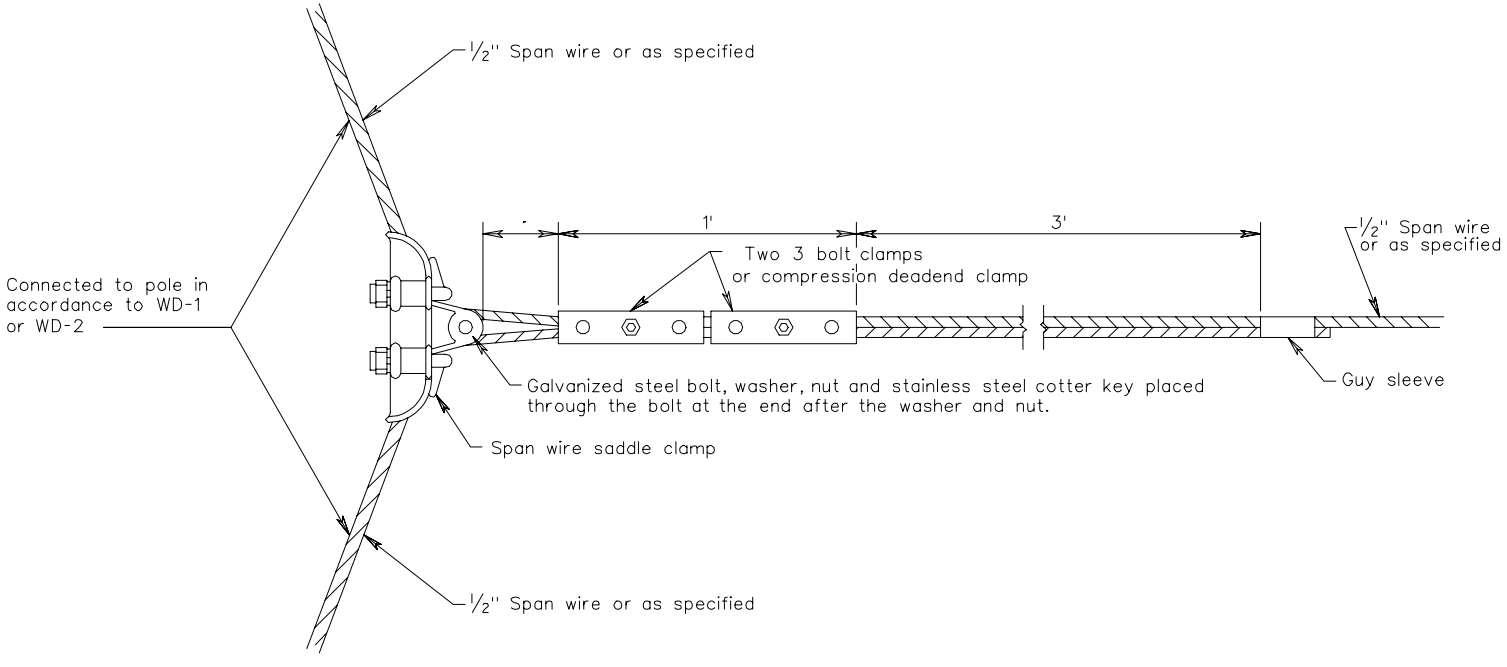
ANGLES GREATER THAN 160°

WOOD POLE WIRING AND RIGGING DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

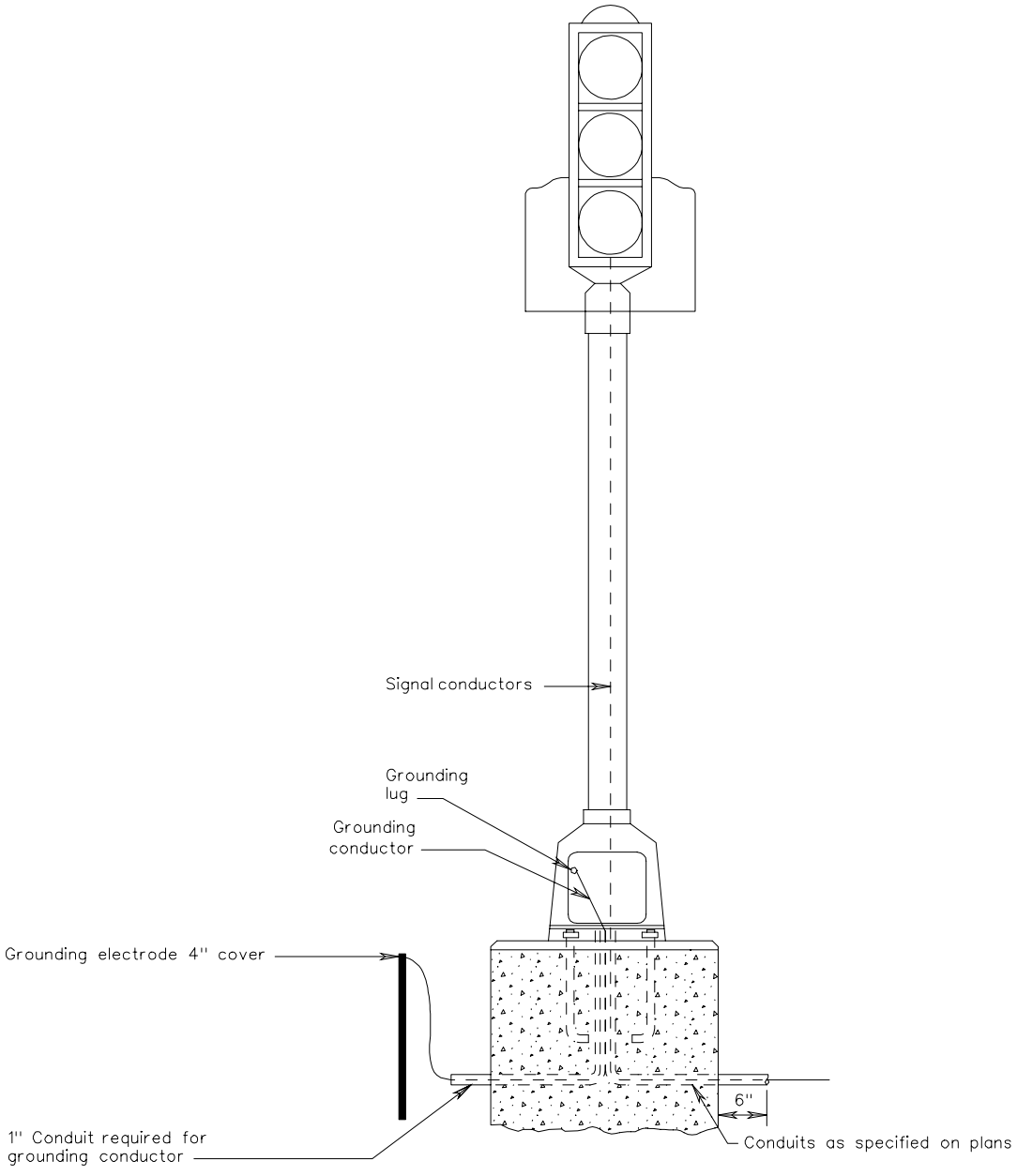


TYPICAL BRIDLE SPAN INSTALLATION



BRIDLE SPAN WIRING AND RIGGING DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION



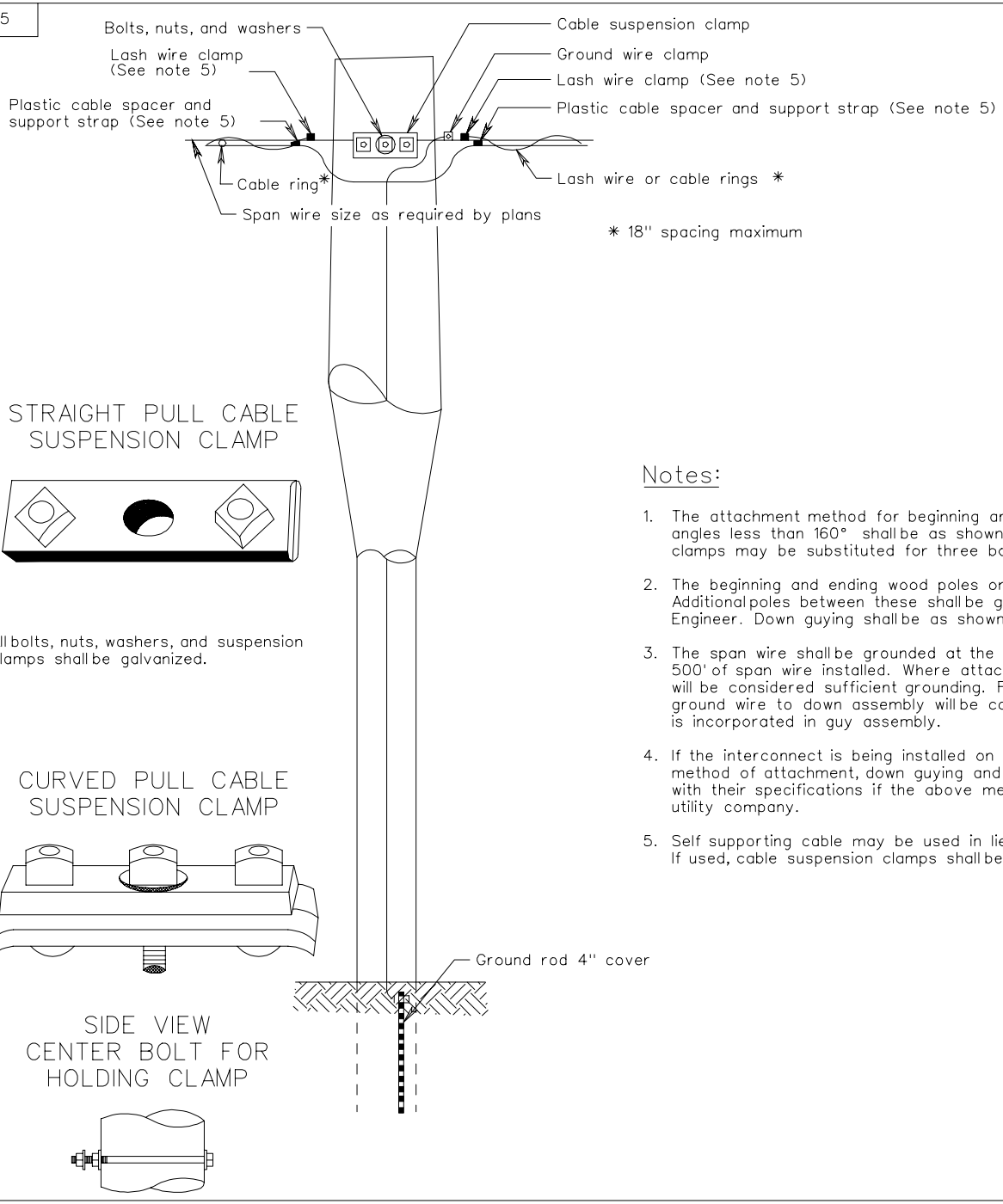
PEDESTAL POLE WIRING DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 9/06

1301.25

WD-5



Notes:

1. The attachment method for beginning and ending the interconnect runs and turning angles less than 160° shall be as shown for standard WD-2, except that two bolt clamps may be substituted for three bolt clamps.

2. The beginning and ending wood poles on all interconnect runs shall be guyed. Additional poles between these shall be guyed as deemed necessary by the Engineer. Down guying shall be as shown by standard WD-2.

3. The span wire shall be grounded at the first pole and repeated once for every 500' of span wire installed. Where attachment is made to steel poles the attachment will be considered sufficient grounding. For poles with down guys, attachment of ground wire to down assembly will be considered sufficient grounding if no insulator is incorporated in guy assembly.

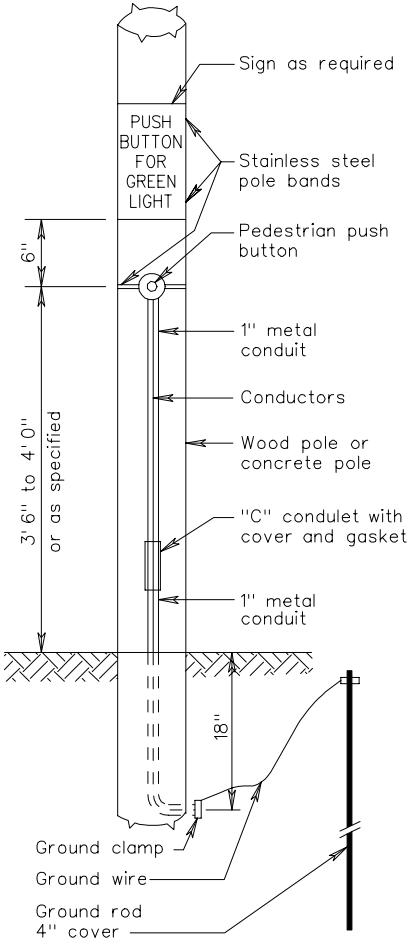
4. If the interconnect is being installed on existing utility company poles, the method of attachment, down guying and grounding shall be in accordance with their specifications if the above methods are not acceptable to the utility company.

5. Self supporting cable may be used in lieu of lashed cable or cable rings. If used, cable suspension clamps shall be designed for such use.

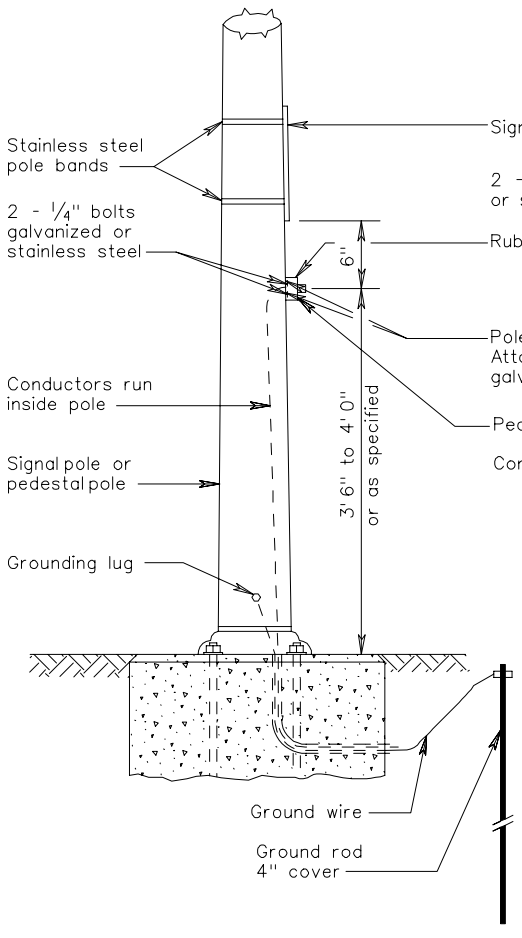
INTERCONNECT (IMPULSE) CABLE INSTALLATION

VIRGINIA DEPARTMENT OF TRANSPORTATION

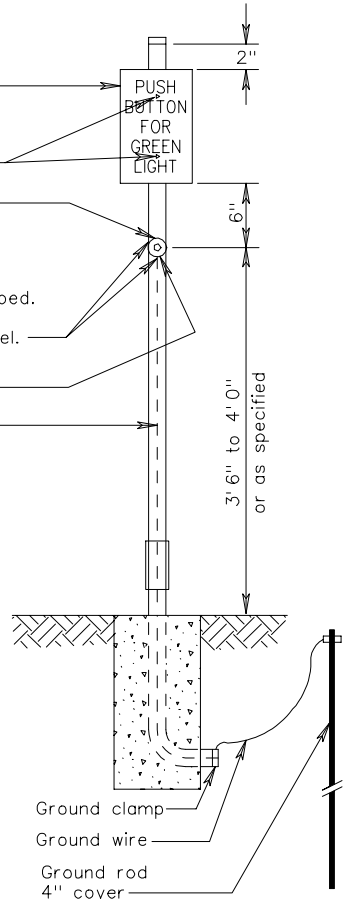
1301.26



PA-1



PA-2

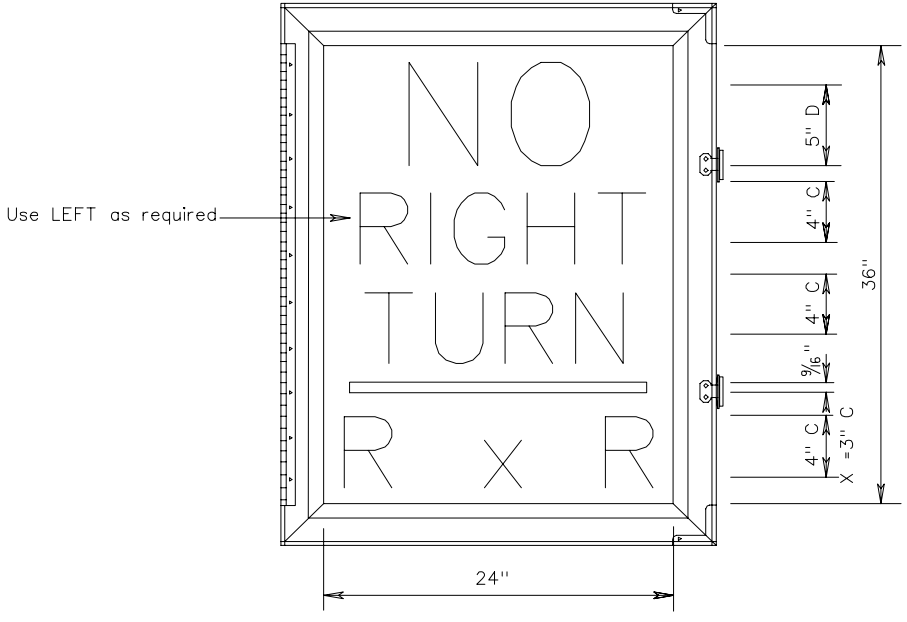


PA-3

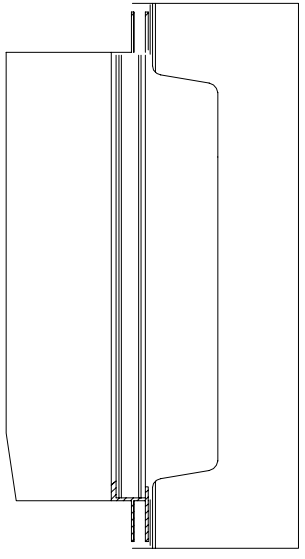
PEDESTRIAN ACTUATION DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

FRONT VIEW



SIDE VIEW



ILLUMINATED TRAFFIC CONTROL SIGN

VIRGINIA DEPARTMENT OF TRANSPORTATION

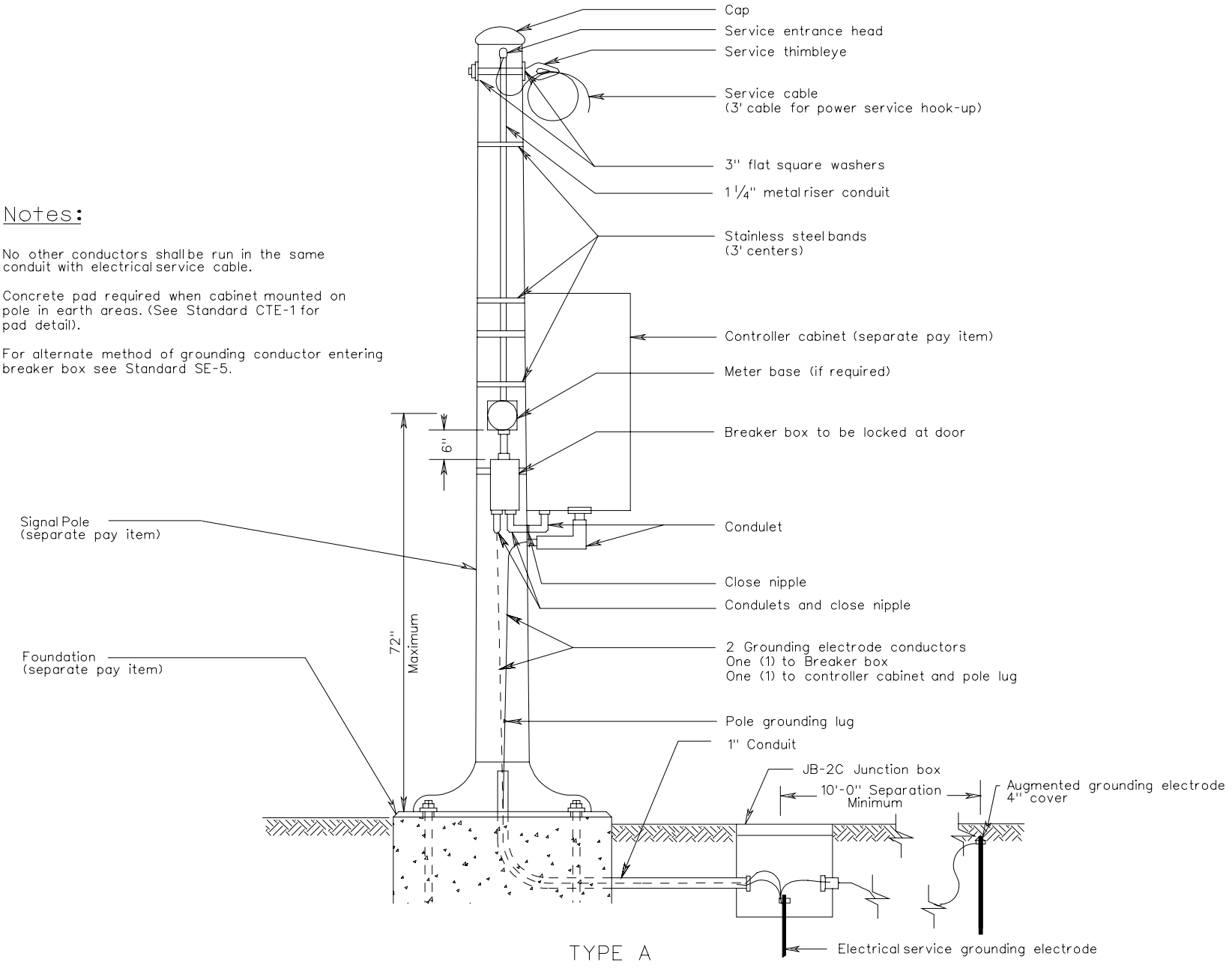
SE-1

Notes:

No other conductors shall be run in the same conduit with electrical service cable.

Concrete pad required when cabinet mounted on pole in earth areas. (See Standard CTE-1 for pad detail).

For alternate method of grounding conductor entering breaker box see Standard SE-5.



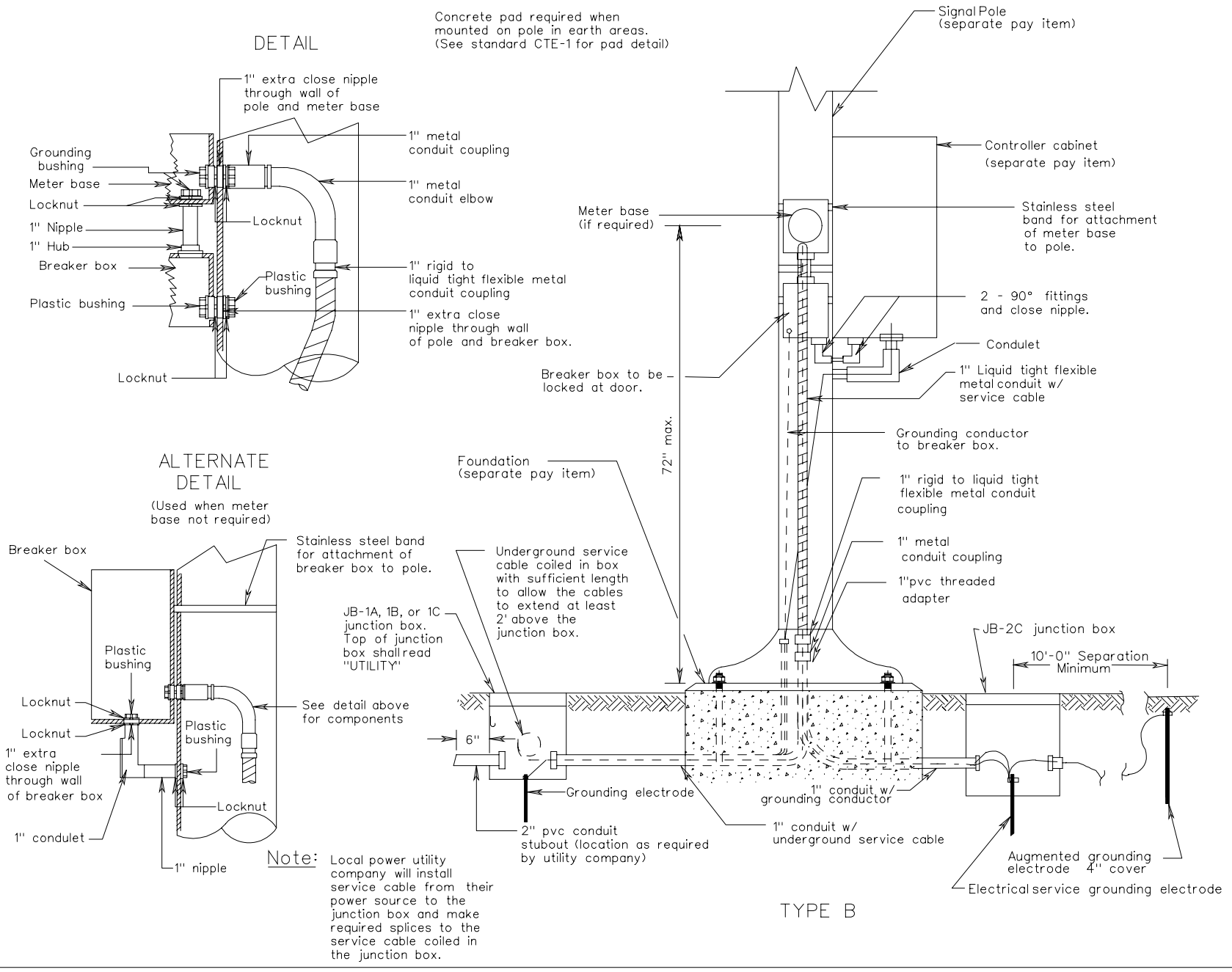
TYPE A

ELECTRICAL SERVICE DETAILS
SIGNAL INSTALLATIONS

REV 2/06

1301.30

VIRGINIA DEPARTMENT OF TRANSPORTATION



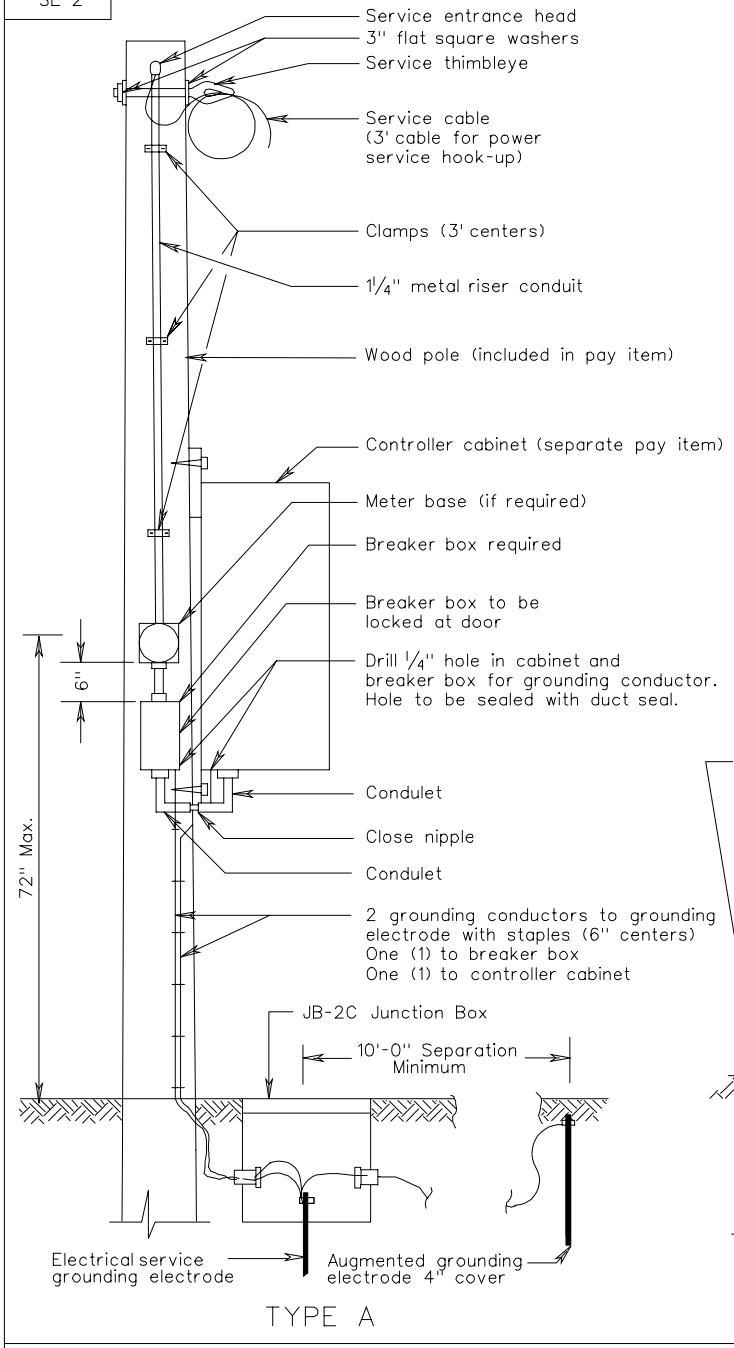
ELECTRICAL SERVICE DETAILS
SIGNAL INSTALLATION

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 2/06

1301.31

SE-2



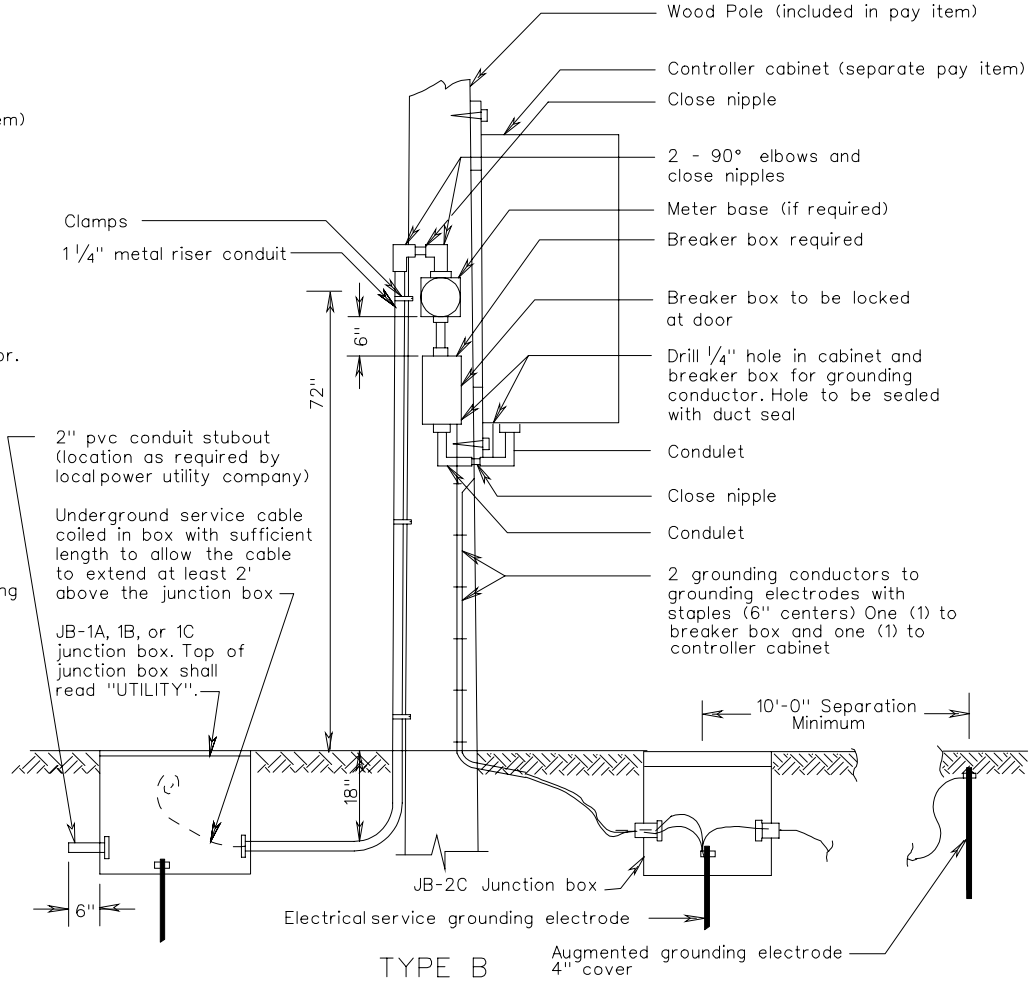
TYPE A

Notes:

No other conductors shall be run in the same conduit with electrical service cable.

Concrete pad required when cabinet mounted on pole in earth areas. The pad shall be 18" from pole. (See standard CTE-1 for pad detail).

For underground service installations, local power utility company will install service power utility cable from their power source to the junction box and make required splices to the service cable coiled in the junction box.



TYPE B

ELECTRICAL SERVICE DETAILS
SIGNAL INSTALLATION

VIRGINIA DEPARTMENT OF TRANSPORTATION

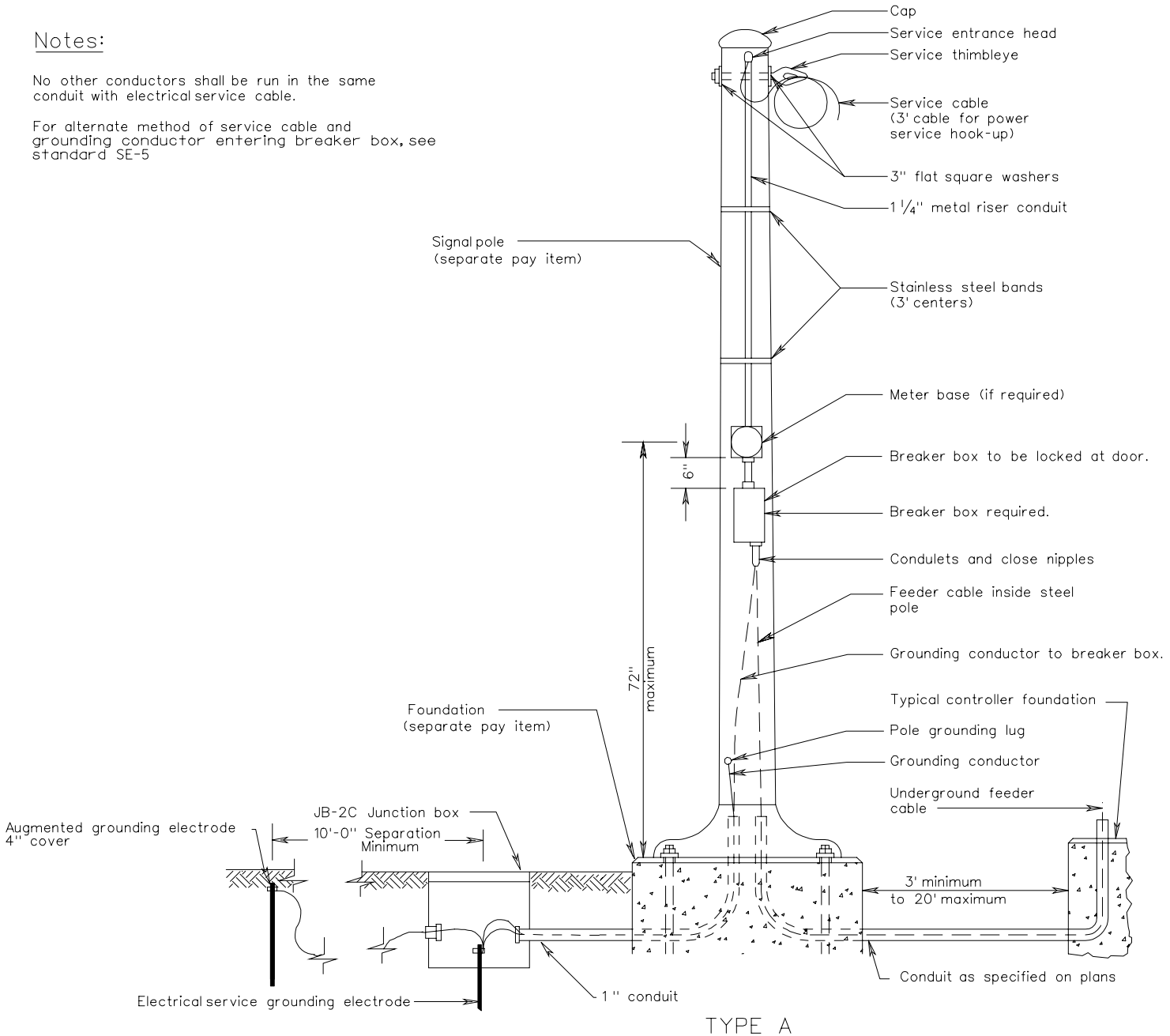
REV. 2/06

1301.32

Notes:

No other conductors shall be run in the same conduit with electrical service cable.

For alternate method of service cable and grounding conductor entering breaker box, see standard SE-5



TYPE A

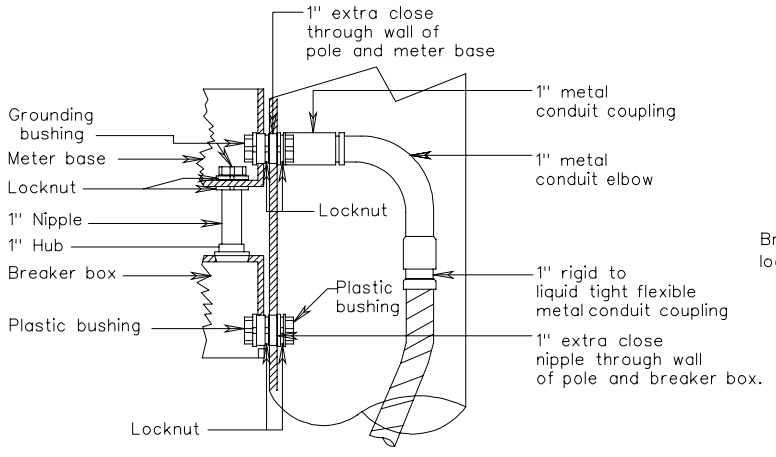
ELECTRICAL SERVICE DETAILS
SIGNAL INSTALLATION

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 2/06

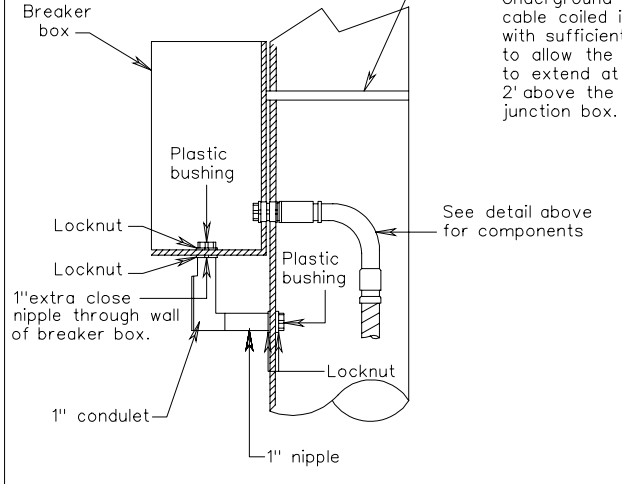
SE-3

DETAIL



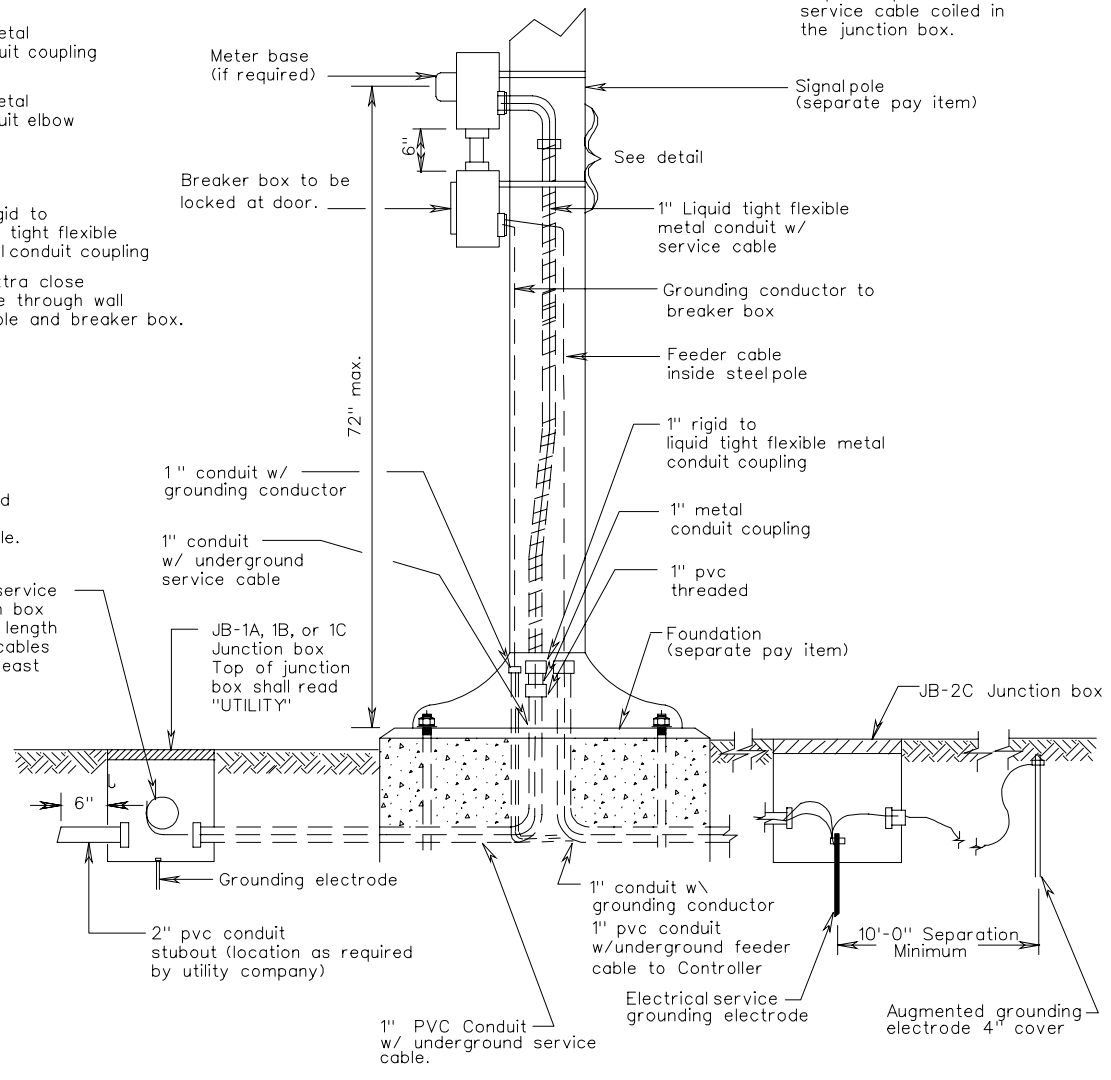
ALTERNATE DETAIL

(Used when meter base not required)



Note:

Local power utility company will install service cable from their power source to the junction box and make required splices to the service cable coiled in the junction box.



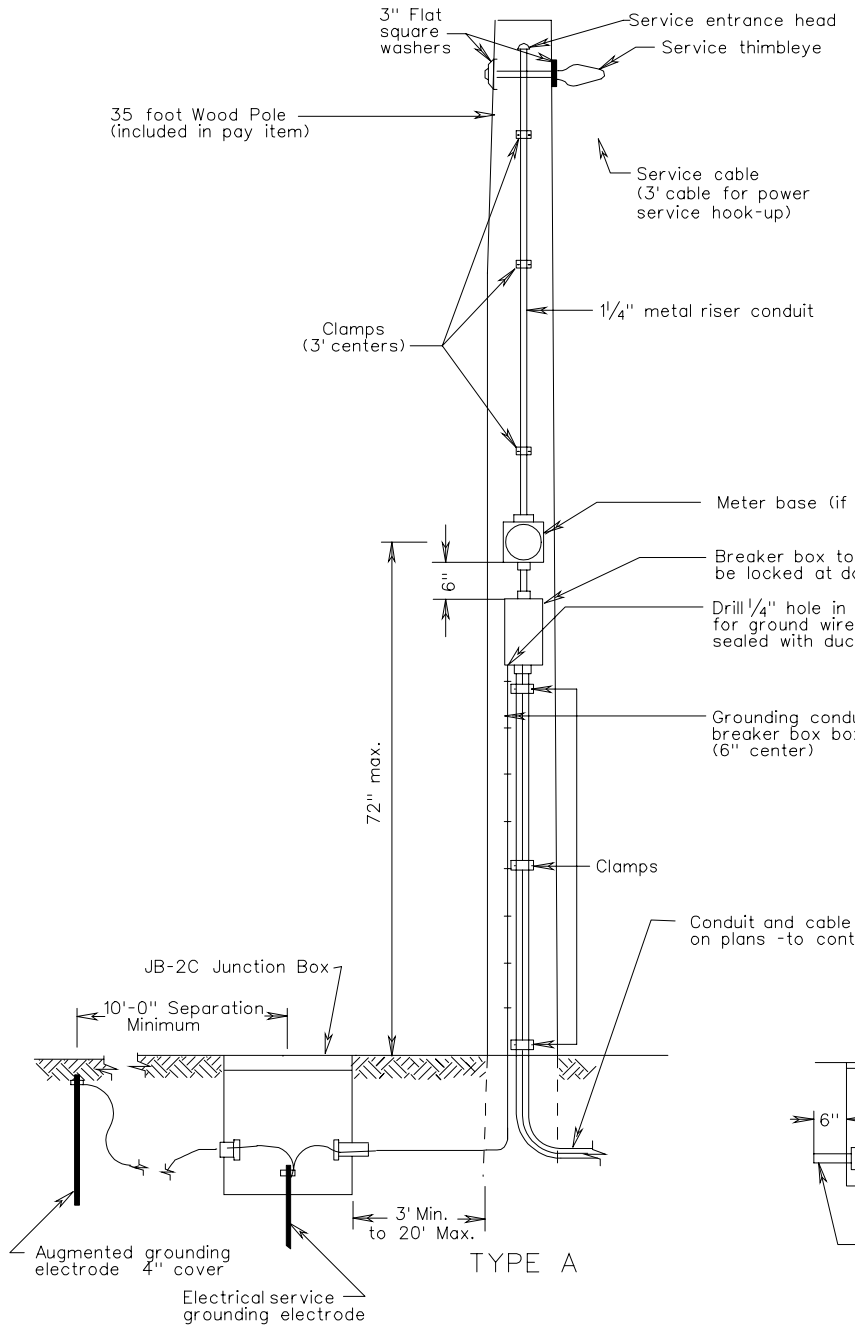
TYPE B

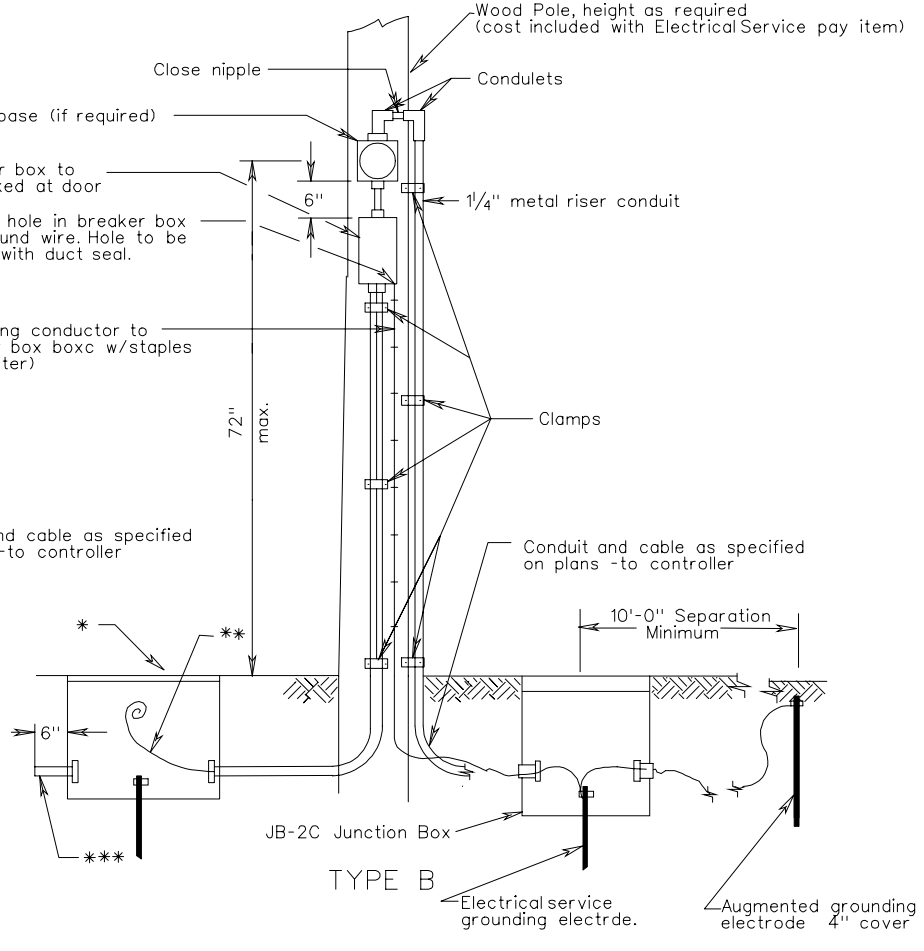
ELECTRICAL SERVICE DETAILS
SIGNAL INSTALLATION

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 2/06

1301.34





Notes:

No other conductors shall be run in the same conduit with electrical service cable.

For underground service installations, local power utility company will install service power utility cable from their power source to the junction box and make required splices to the service cable coiled in the junction box.

* JB-1A, 1B or 1C junction box Top of of junction box shall read "UTILITY".

** Underground service cable coiled in box with sufficient length to allow the cable to extend at least two feet above the junction box.

*** 2" PVC conduit stubout (location as required by local utility company).

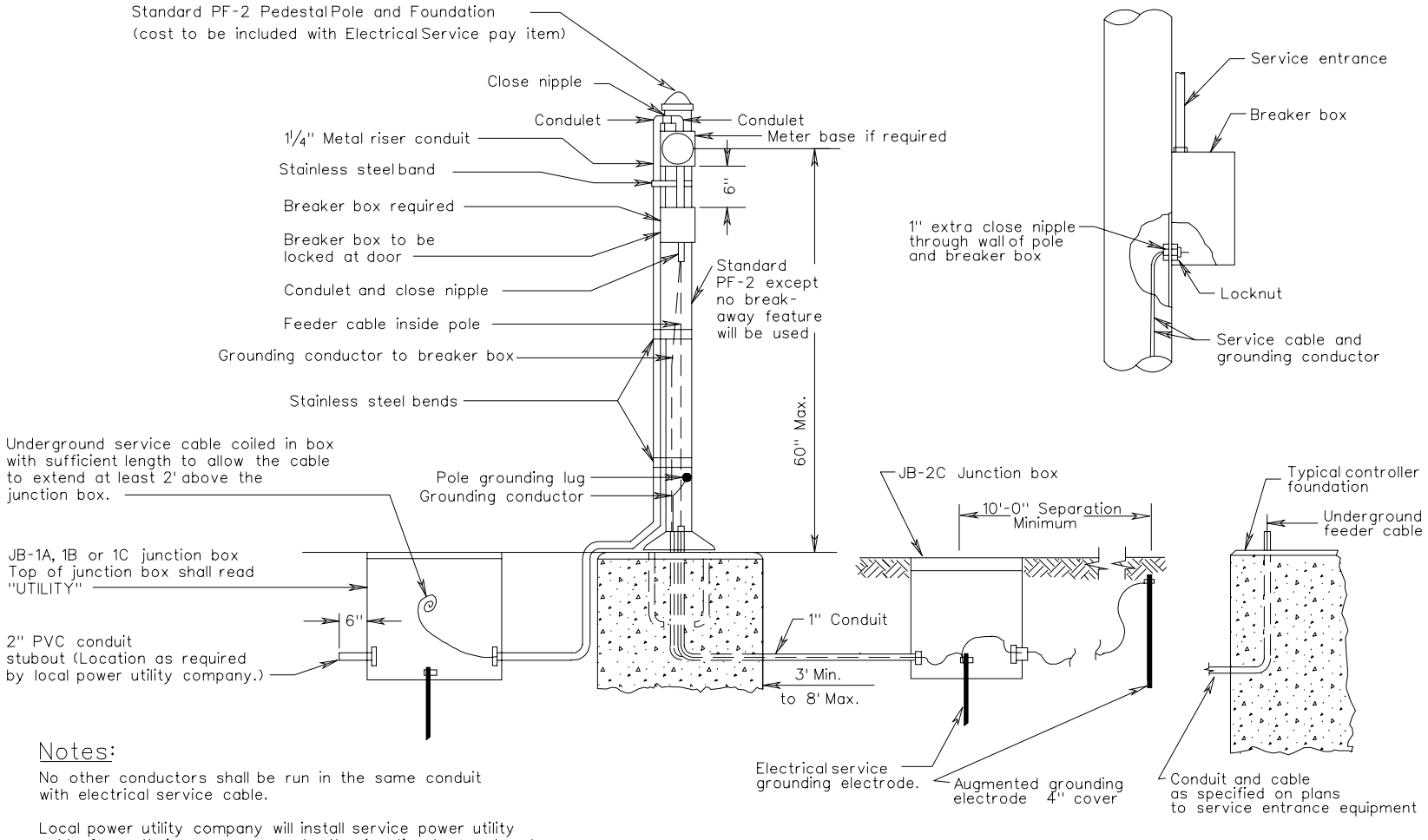
ELECTRICAL SERVICE DETAILS
SIGNAL INSTALLATION

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 2/06

1301.35

ALTERNATE METHOD OF SERVICE CABLE AND GROUNDING CONDUCTOR ENTERING BREAKER BOX



Notes:

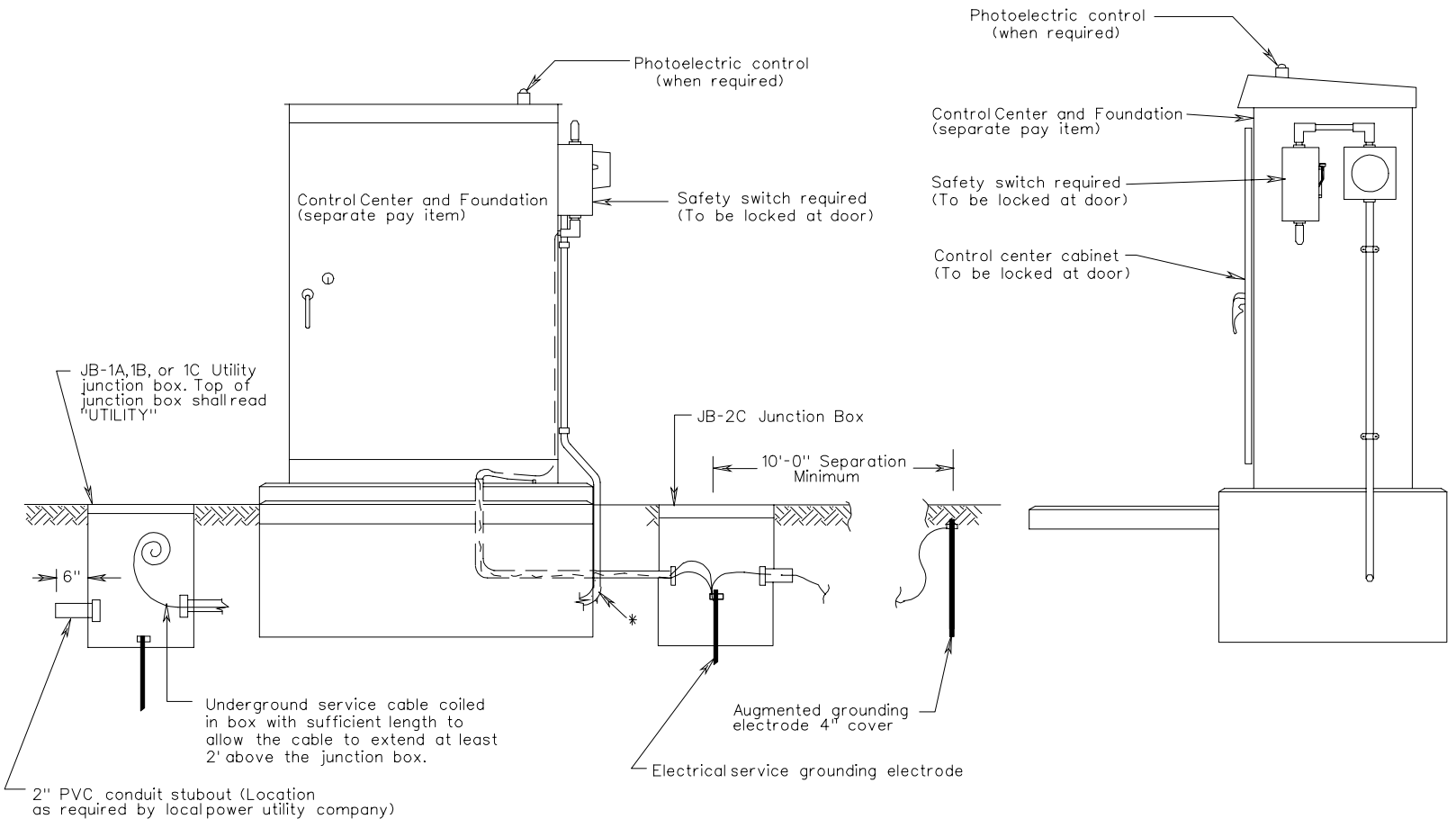
No other conductors shall be run in the same conduit with electrical service cable.

Local power utility company will install service power utility cable from their power source to the junction box and make required splices to the service cable coiled in the junction box.

PEDESTAL POLE WITH GROUND MOUNTED CABINET

ELECTRICAL SERVICE DETAILS
SIGNAL INSTALLATION

VIRGINIA DEPARTMENT OF TRANSPORTATION



Notes:

* The conduit and service cable shall extend from the cabinet to the utility junction box.

The control center cabinet at the inside and outside foundation joints shall be sealed with a silicone sealant

For alternate method of service cable entering safety switch see Standard SE-5.

When 200 amp or greater service is required, service shall enter meter base at right bottom.

No other conductors shall be run in the same conduit with electrical service cable.

Local power utility company will install service power utility cable from their power source to the junction box and make required splices to the service cable coiled in the junction box.

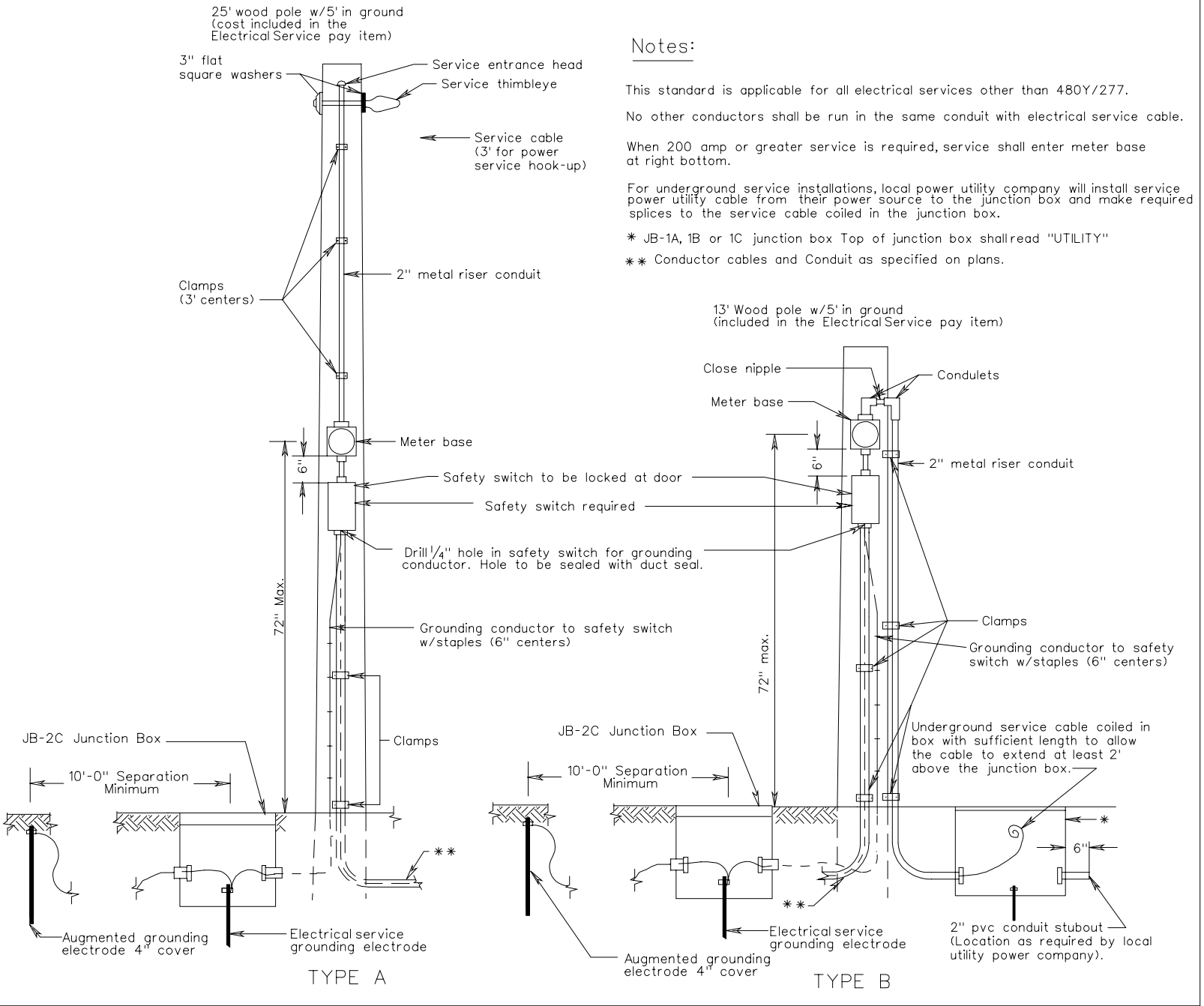
This standard is applicable for all electrical services other than 480Y/277. For 480Y/277 service, see Standard SE-9.

ELECTRICAL SERVICE DETAILS
SIGN AND LIGHTING INSTALLATIONS

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 2/06

SE-7



Notes:

This standard is applicable for all electrical services other than 480Y/277.

No other conductors shall be run in the same conduit with electrical service cable.

When 200 amp or greater service is required, service shall enter meter base at right bottom.

For underground service installations, local power utility company will install service power utility cable from their power source to the junction box and make required splices to the service cable coiled in the junction box.

* JB-1A, 1B or 1C junction box Top of junction box shall read "UTILITY"

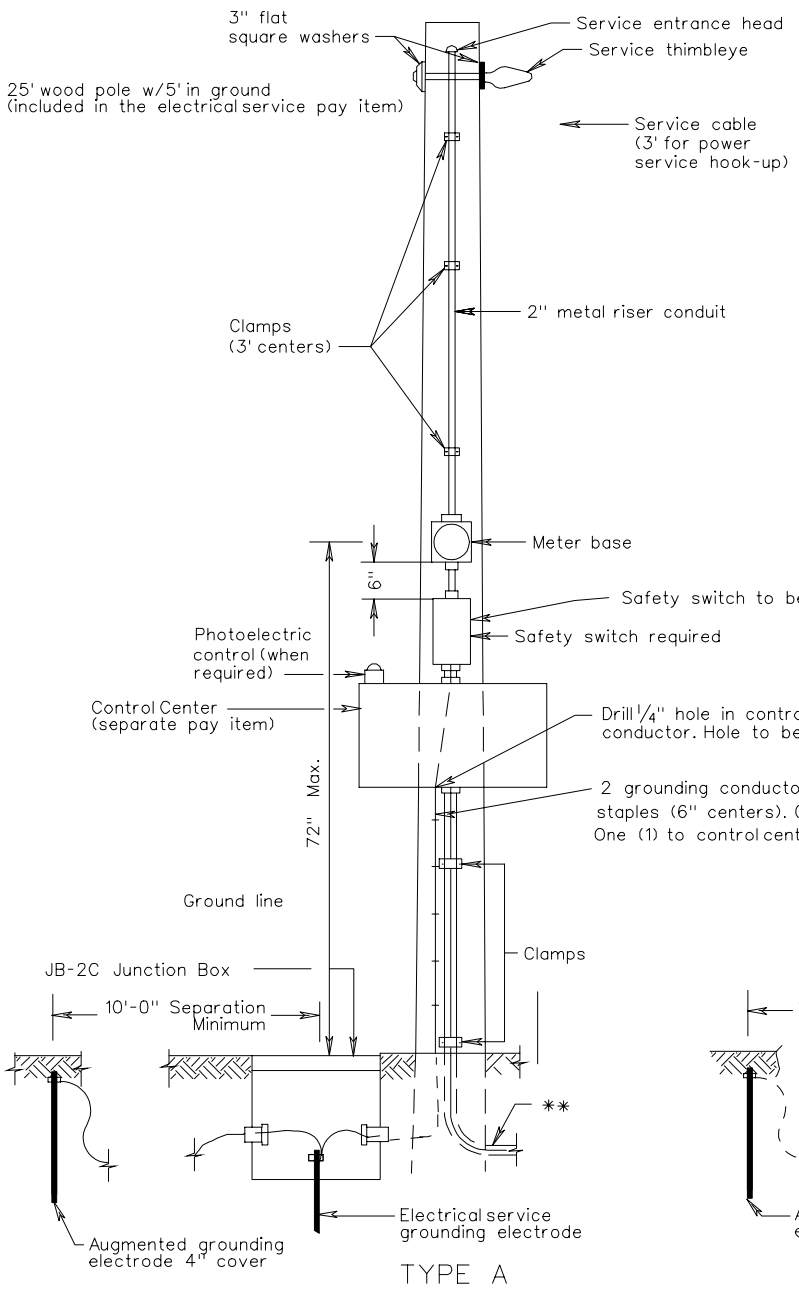
** Conductor cables and Conduit as specified on plans.

ELECTRICAL SERVICE DETAILS
SIGN AND LIGHTING INSTALLATION

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 2/06

1301.38



Notes:

This standard is applicable for all electrical services other than 480Y/277.
For 480Y/277 service, see standard SE-9.

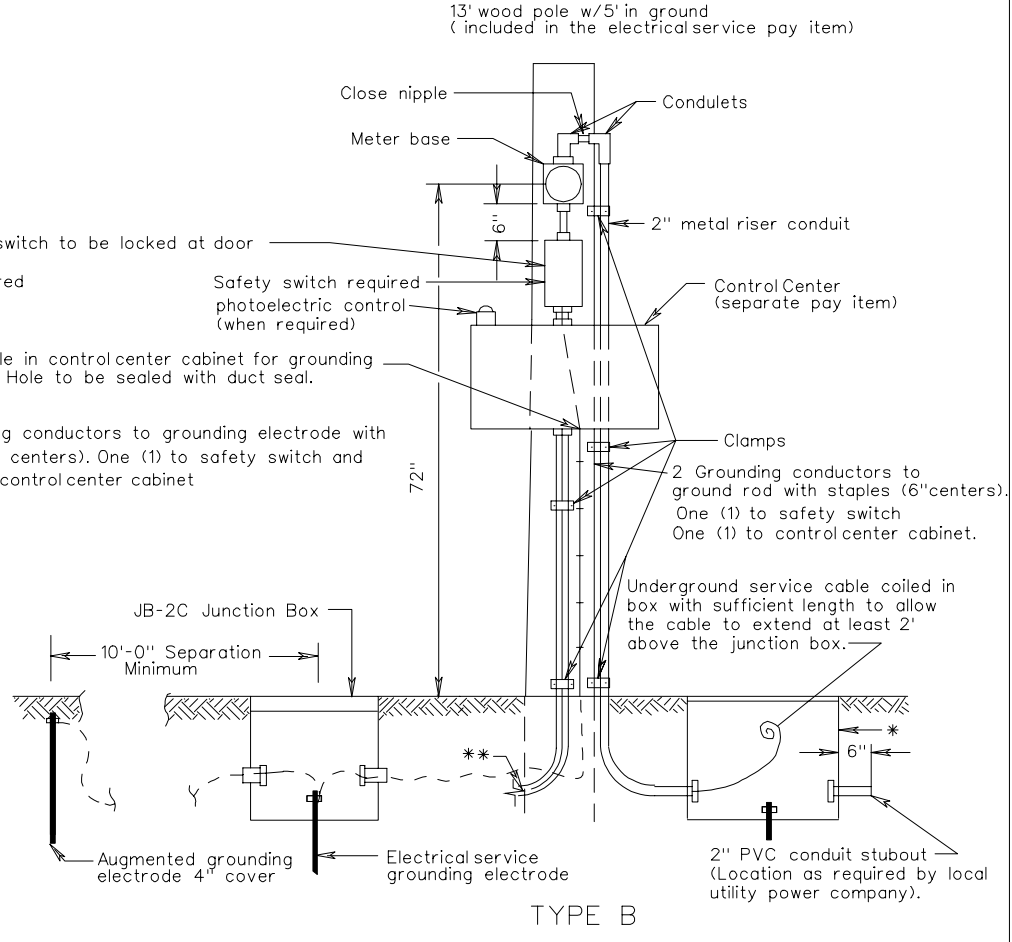
No other conductors shall be run in the same conduit with electrical service cable.

When 200 amp or greater service is required, service shall enter meter base at right bottom.

For underground service installations, local power utility company will install service power utility cable from their power source to the junction box and make required splices to the service cable coiled in the junction box.

* JB-1A, 1B or 1C junction box Top of junction box shall read "UTILITY".

** The conduit and conductor cable shall be as specified on the plans.



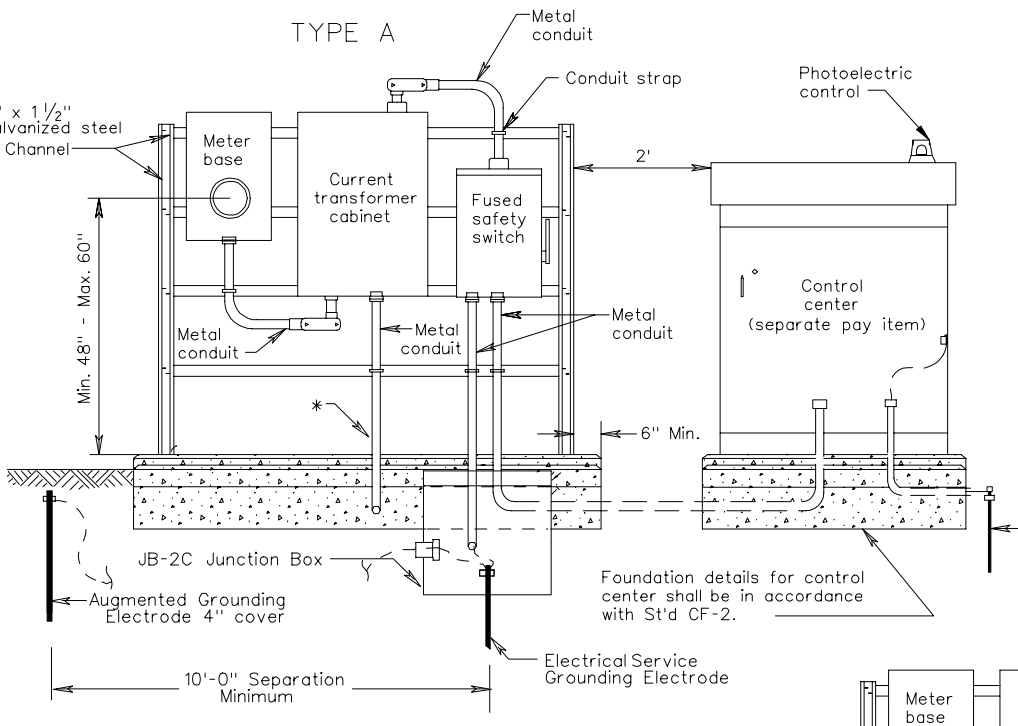
ELECTRICAL SERVICE DETAILS
SIGN AND LIGHTING INSTALLATION

VIRGINIA DEPARTMENT OF TRANSPORTATION

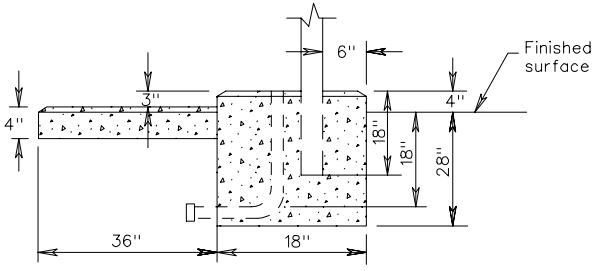
REV.2/06

1301.39

TYPE A



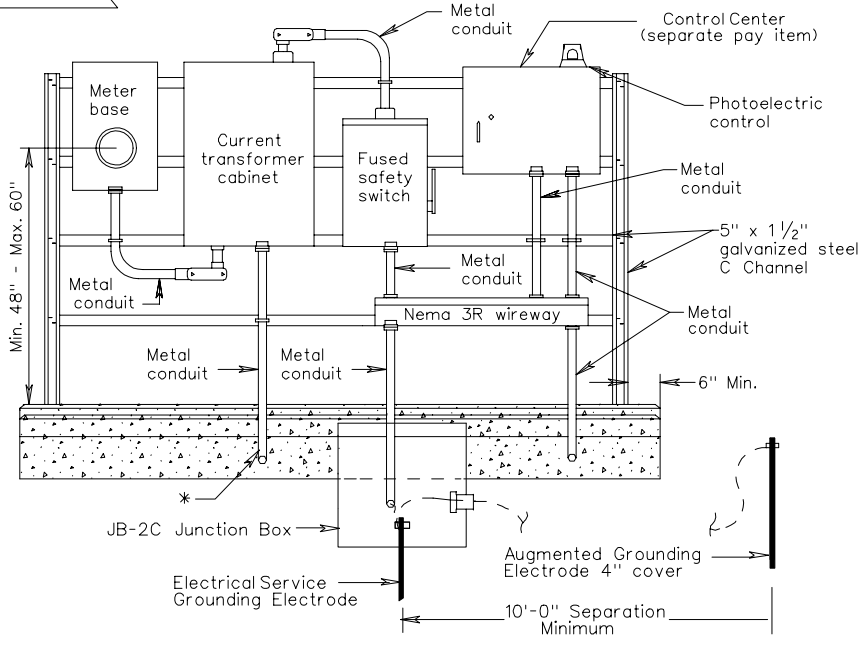
SERVICE ENTRANCE FOUNDATION DETAIL (SIDE VIEW)



Concrete pad shall be installed on the front of control side of foundation.

AMP RATING	CONDUIT SIZE	CONDUCTOR SIZE
30 AMP	1"	#8
60 AMP	1 1/4"	#6
100 AMP	1 1/2"	#3
200 AMP	2"	#000

TYPE B



Notes:

* Conduit shall be stubbed out 6" past concrete foundation pad. Location of the stubbed conduit shall be as required by the local power company.

All exposed concrete edges shall be chamfered 3/4".

Grounding bushings shall be installed on each end of metal conduits.

Bell ends shall be installed on the ends of PVC conduits.

Local power company will install service cable from their power source to the current transformer cabinet and meter base.

Safety switch, meter base, wireway, current transformer cabinet and control center shall be attached to the channeling with 3/8" galvanized bolts, lock washers and nuts. Four cross channels shall be utilized.

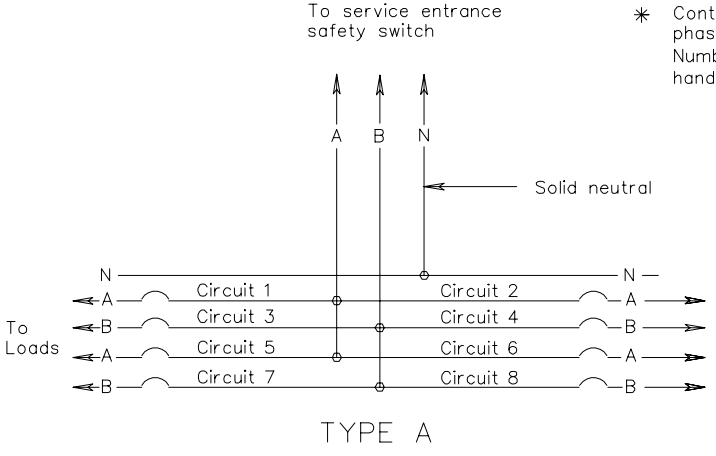
Each foundation shall be permanently marked to indicate all sides from which conduits pass. This mark shall be made with a trowel when finishing the concrete and shall be 1/4" deep and 4" to 6" long.

This standard is applicable for 480Y/277 electrical service only.

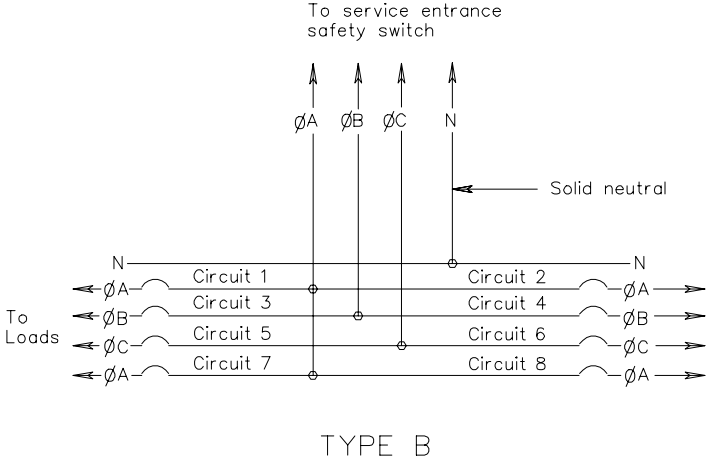
The contractor shall leave a sufficient amount of conductor cable coiled inside the current transformer cabinet to permit the local power company to make their connection.

ELECTRICAL SERVICE DETAILS
SIGN AND LIGHTING INSTALLATIONS

VIRGINIA DEPARTMENT OF TRANSPORTATION

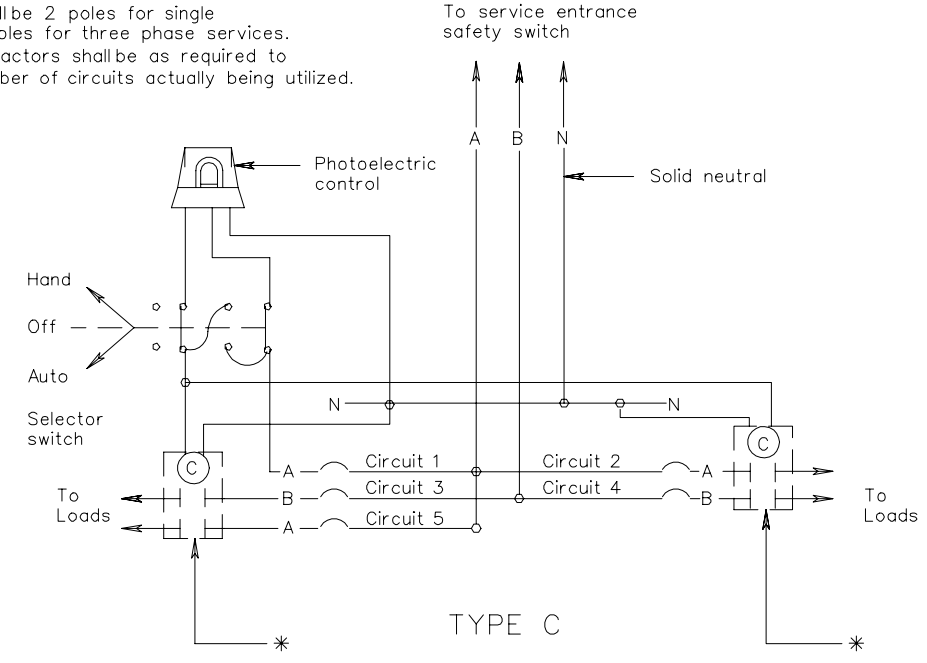


TYPE A

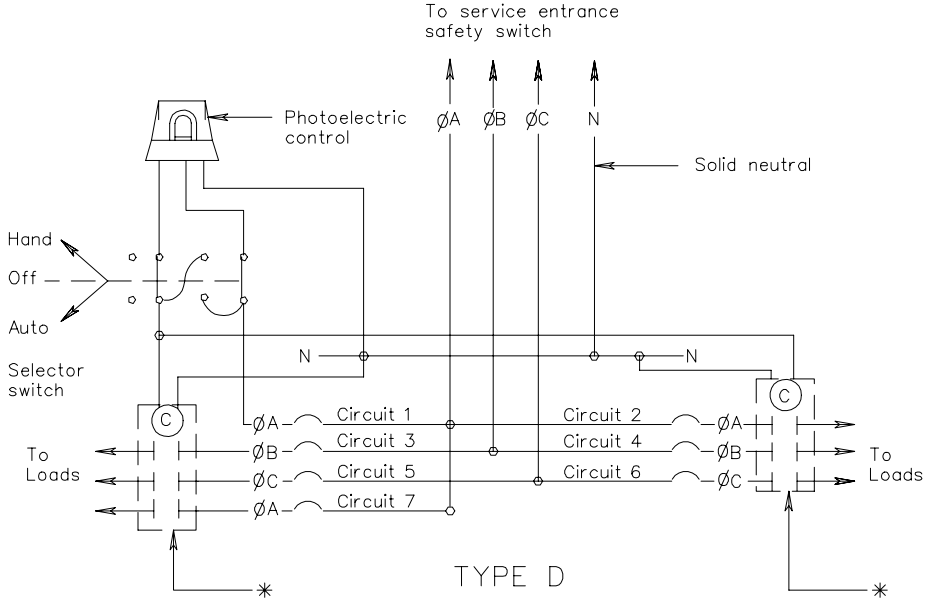


TYPE B

✳ Contactors shall be 2 poles for single phase and 3 poles for three phase services. Number of contactors shall be as required to handle the number of circuits actually being utilized.



TYPE C



TYPE D

Notes:

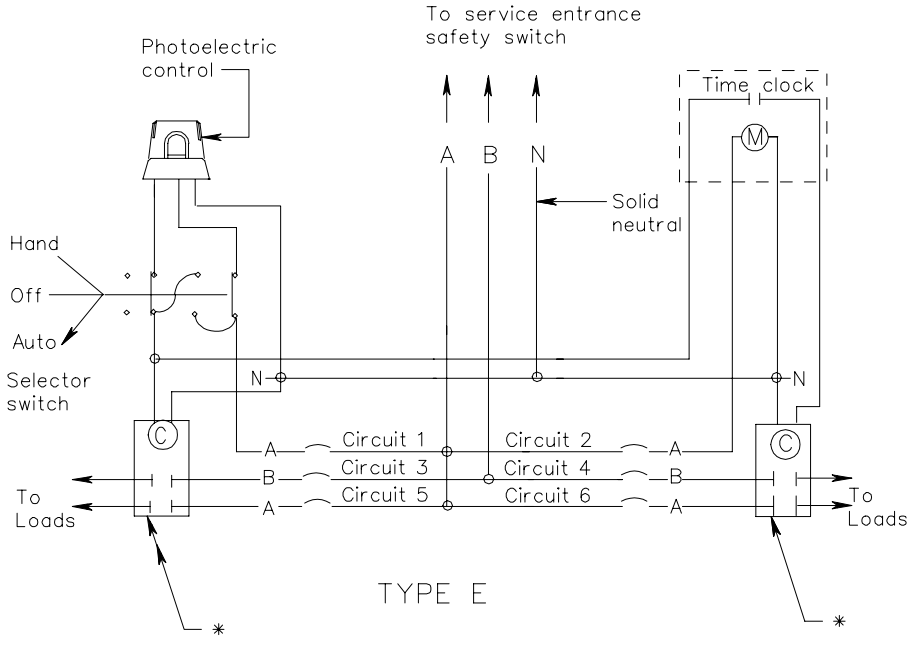
All circuit breakers shall be single pole.

Voltage and amperage ratings of contactors and breakers shall be as indicated on the plans.

Number of circuits shown are typical. Exact number required shall be as indicated on the plans.

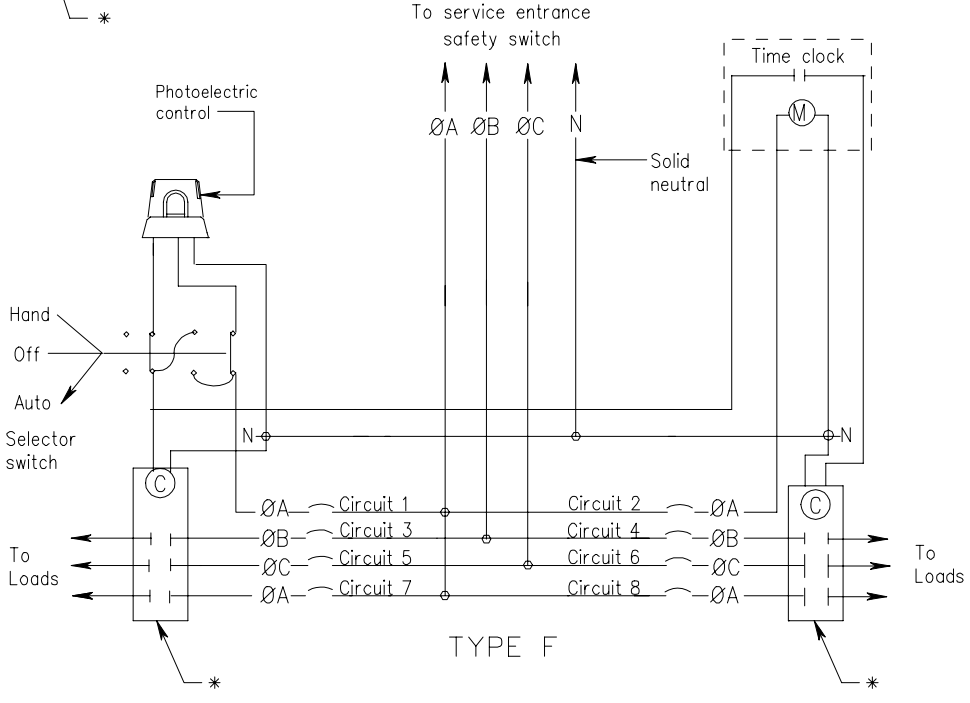
CONTROL CENTER WIRING DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION



TYPE E

* Contactors shall be 2 poles for single phase and 3 poles for three phase services. Number of contactors shall be as required to handle the number of circuits actually being utilized.



TYPE F

Notes:

All circuit breakers shall be single pole.

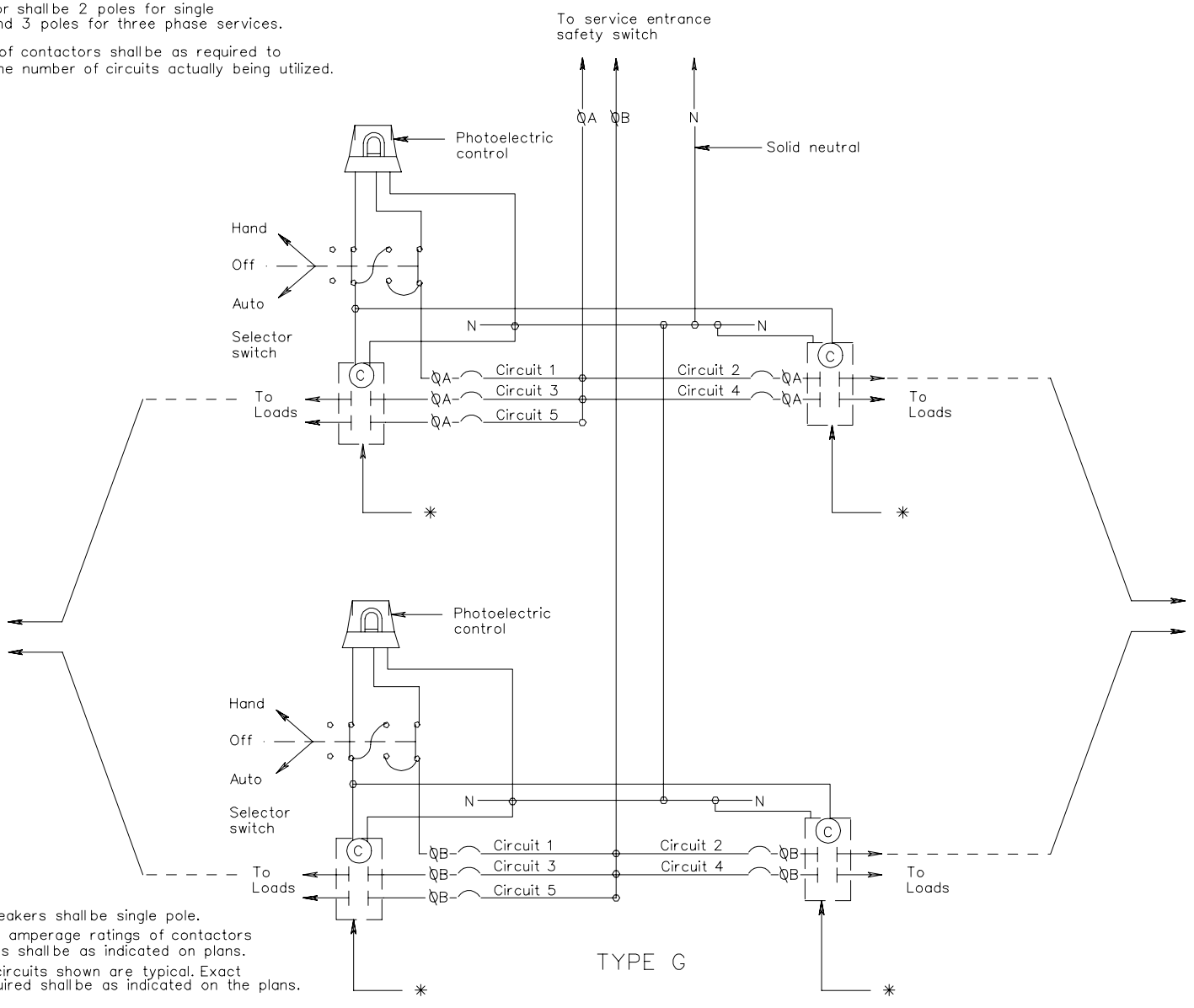
Voltage and amperage ratings of contactors and breakers shall be as indicated on the plans.

Number of circuits shown are typical. Exact number required shall be as indicated on the plans.

CONTROL CENTER WIRING DETAILS

✳ Contactor shall be 2 poles for single phase and 3 poles for three phase services.

Number of contactors shall be as required to handle the number of circuits actually being utilized.



TYPE G

Notes:

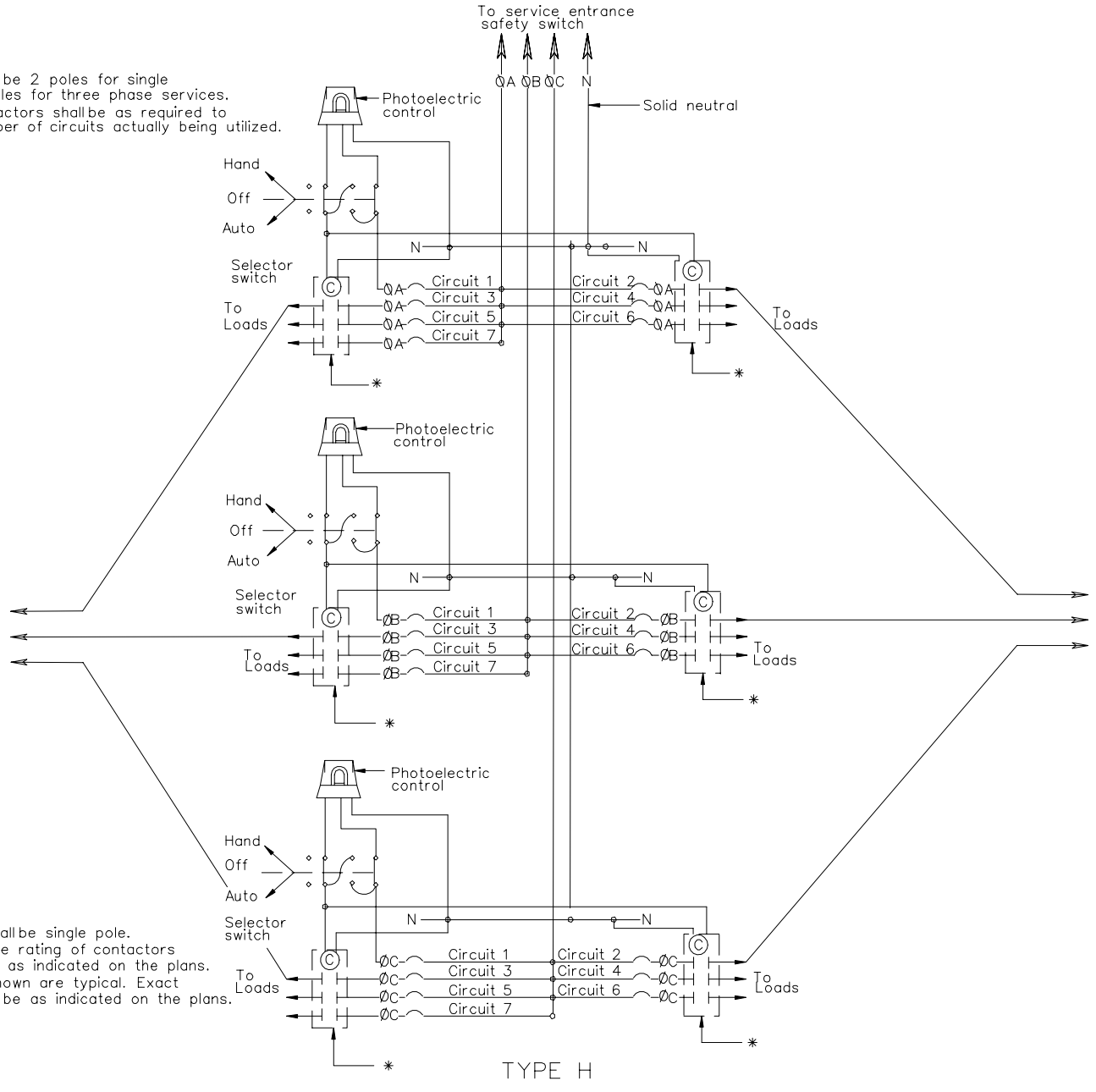
All circuit Breakers shall be single pole.

Voltage and amperage ratings of contactors and breakers shall be as indicated on plans.

Number of circuits shown are typical. Exact number required shall be as indicated on the plans.

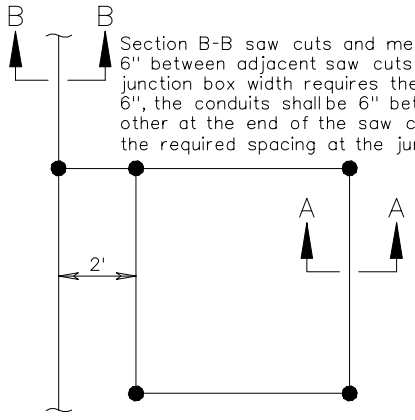
CONTROL CENTER WIRING DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION



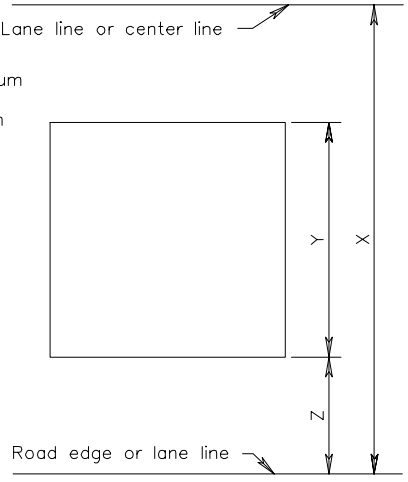
Notes:
All circuit Breakers shall be single pole.
Voltage and amperage rating of contactors and breakers shall be as indicated on the plans.
Number of circuits shown are typical. Exact number required shall be as indicated on the plans.

CONTROL CENTER WIRING DETAILS



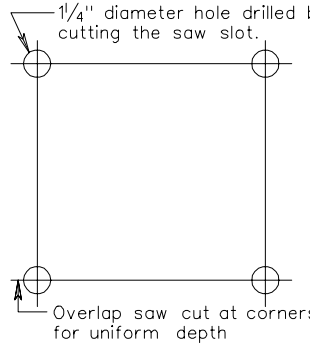
Section B-B saw cuts and metal conduits shall be a minimum 6" between adjacent saw cuts and conduits. If the junction box width requires the conduits to be closer than 6", the conduits shall be 6" between each other at the end of the saw cut and then tapered to the required spacing at the junction box.

TYPICAL LOOP WIRE PLAN

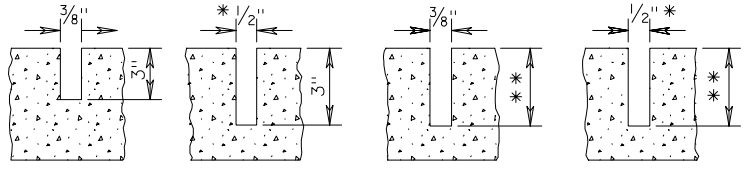


$\frac{X - Y}{2} = Z$

TYPICAL LANE COVERAGE DIAGRAM



TYPICAL SAW CUT DIAGRAM



LOOP IN HYDRAULIC CEMENT CONCRETE

LOOP IN ASPHALT CONCRETE

* Saw slot shall be 5/8" when loop detector cable enclosed in tubing is installed.

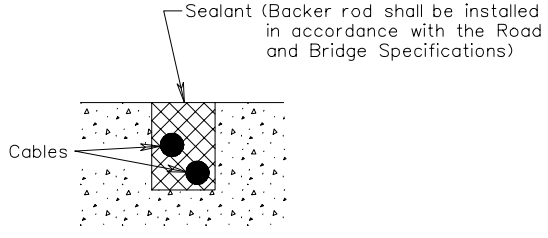
** In new asphalt concrete roadways, saw slots shall be cut into the base course to a depth of 3".

In existing asphalt concrete roadways which are to be planned, saw slots shall be cut into the post planned surface to a depth of 3".

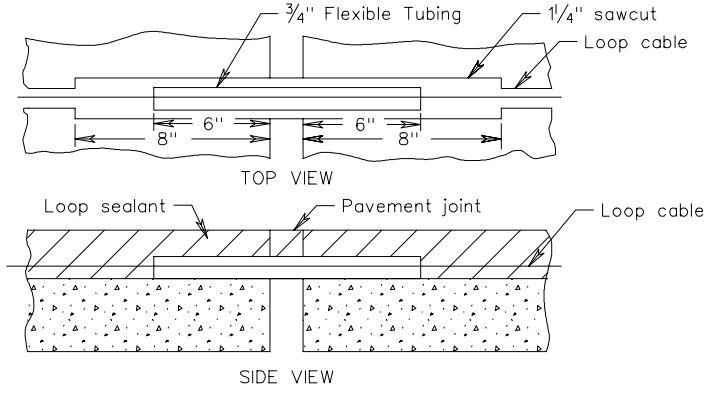
In existing asphalt concrete roadways which are not to be planned, saw slots shall be cut into the existing surface to a depth of 4".

Depth of saw cut shall be measured from pavement surface at time of installation. Not necessarily finished grade.

TYPICAL SAW SLOT DETAIL



CROSS SECTION TYPICAL SEALED SLOT

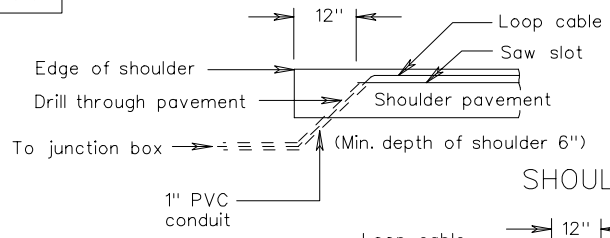


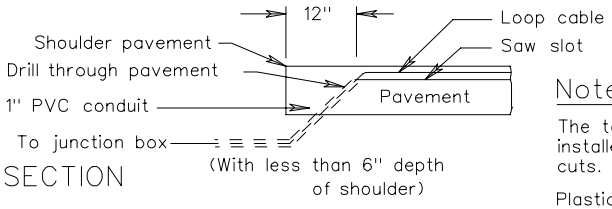
INSTALLATION OF LOOP CABLE ACROSS HYDRAULIC CEMENT CONCRETE PAVEMENT JOINTS

LOOP DETECTOR INSTALLATION DETAILS

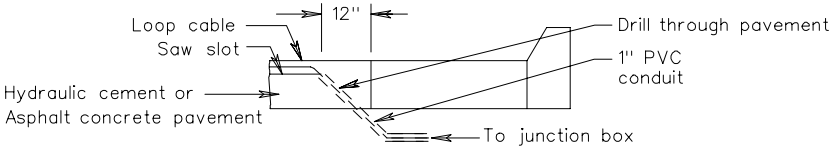
VIRGINIA DEPARTMENT OF TRANSPORTATION

TD-1A,B,C

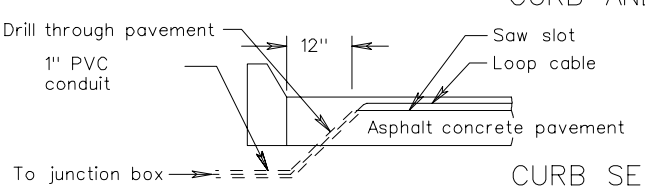


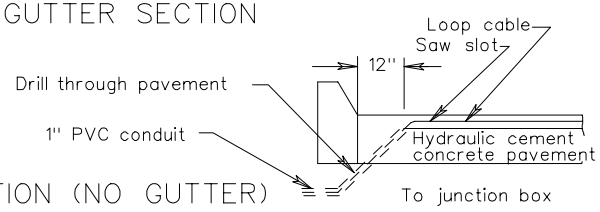


SHOULDER SECTION



CURB AND GUTTER SECTION





CURB SECTION (NO GUTTER)

Notes:

The top of the 1" PVC conduits shall be installed 1" below the bottom of the saw cuts.

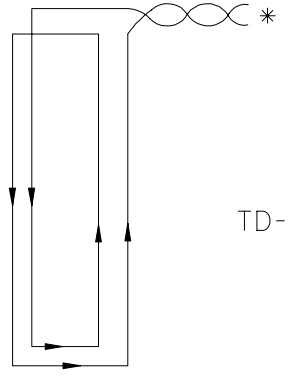
Plastic bushings shall be installed on the ends of the conduits in the pavement. Duct seal shall be applied to the open end of the bushing.

Saw slots shall intersect with the holes drilled for installation of the conduits and loop cables. Drilled holes shall be no larger than required for installation of the conduit and plastic bushing. Removal of large sections of pavement to perform this work will not be allowed.

One PVC conduit shall be provided for each saw slots.

Angle of drill for installation of conduit and loop cable shall be approximately 45°.

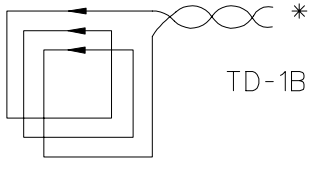
All dimensions not shown shall be as specified on the plans.



TD-1A

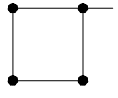
LOOP WIRE INSTALLATION

PLAN VIEW

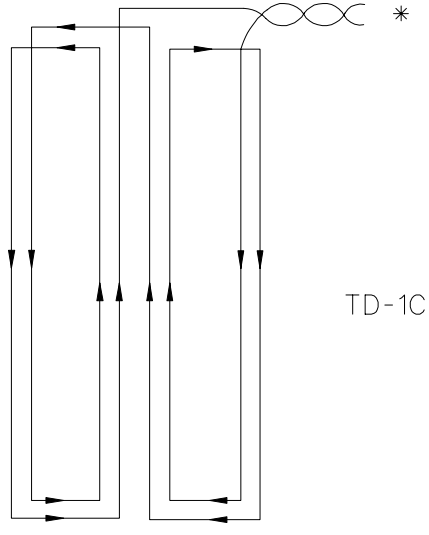


TD-1B

LOOP WIRE INSTALLATION

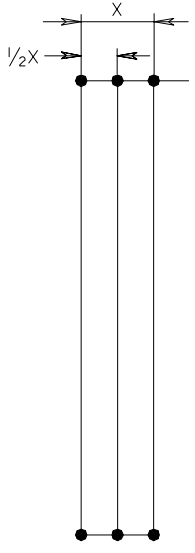


PLAN VIEW



TD-1C

LOOP WIRE INSTALLATION



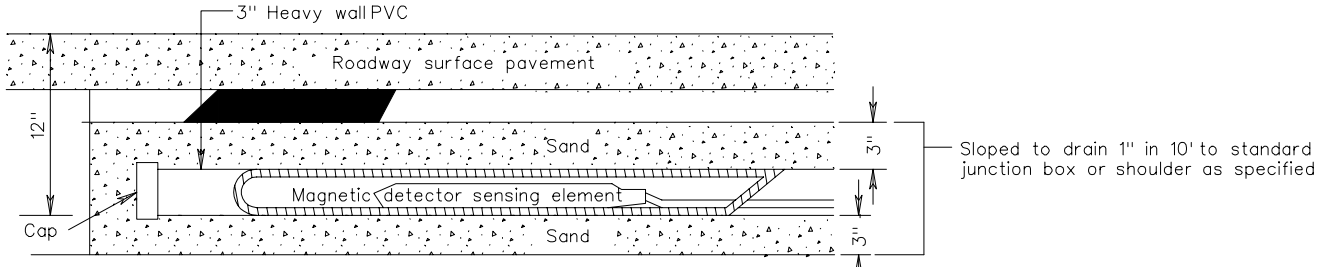
PLAN VIEW

* Twisted together with a minimum of ten turns per running meter.

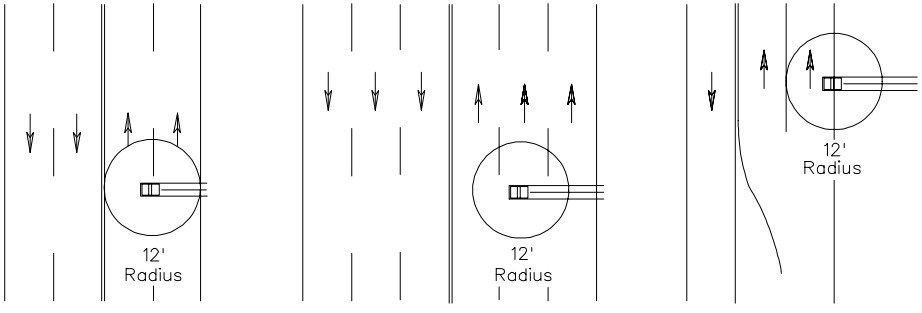
LOOP DETECTOR INSTALLATION DETAILS

1301.46

VIRGINIA DEPARTMENT OF TRANSPORTATION

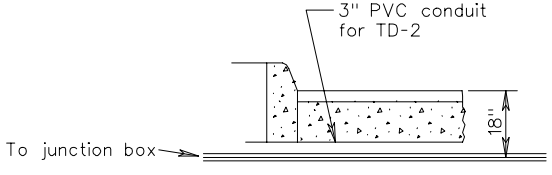


INSTALLATION DETAILS FOR MULTILANE MAGNETIC DETECTORS
TD-2



Two lane coverage | Three lane coverage | One lane coverage

TYPICAL MAGNETIC DETECTOR LOCATIONS

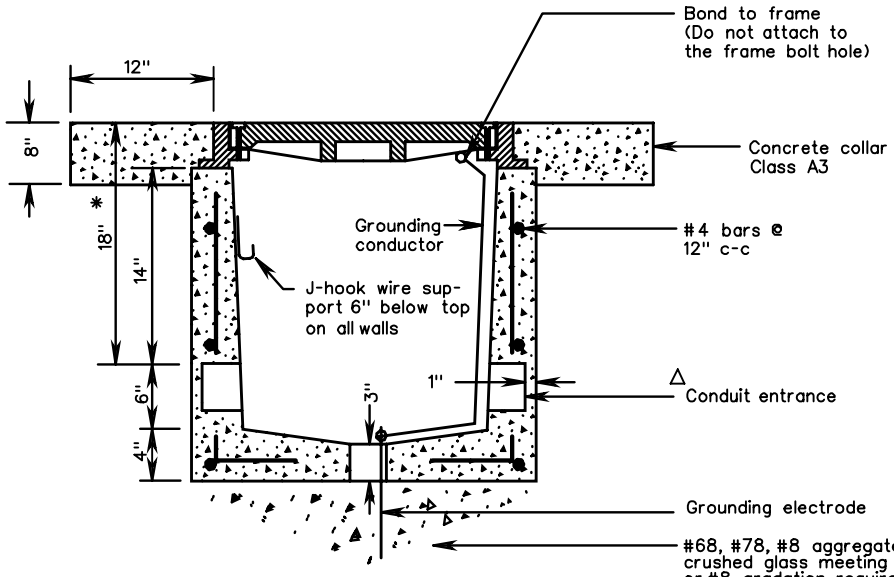


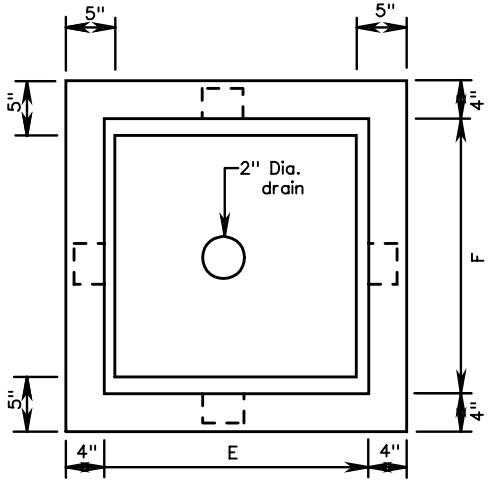
CURB OR CURB AND GUTTER SECTION

MAGNETIC DETECTOR INSTALLATION DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

JB-1A,2A,3A,4A,&5A





PLAN VIEW

(FRAME AND COVER REMOVED)

STANDARD	DIMENSIONS	
	E	F
JB-1A	14"	14"
JB-2A	14"	20"
JB-3A	20"	20"
JB-4A	20"	27"
JB-5A	27"	27"

Notes:

J-Hook wire supports shall be securely attached to the junction box with a bolt and nut with a neoprene washer or an expansion fitting.

Conduit entrances shall be located as shown on the plans. Conduits shall extend 2" min. to 3" max. beyond the inside wall of the junction box.

Bell ends shall be installed on the ends of PVC conduits. Grounding bushings shall be installed on the ends of metal conduits. Bell ends & bushings shall be plugged to prevent moisture & rodent entry.

* Depth of conduit entrances for magnetic detectors shall be in accordance with St'd TD-2.

All reinforcing steel shall have a minimum 1 ½" concrete cover. Any reinforcing steel in conflict with conduit shall be cut a minimum of 1 ½" from conduit.

The junction box may be precast or cast in place concrete.

△ A minimum 2" diameter conduit entrance is required unless otherwise specified on plans.

A concrete collar is required only when junction box is installed in earth areas.

High strength grout conforming to the Road & Bridge Specifications shall be used to secure the frame to the junction box.

All junction boxes shall be installed with a grounding electrode unless box houses only communication/interconnect cable.

Voids resulting from entrance of conduits into junction box shall be completely filled with hydraulic cement grout conforming to the Road & Bridge Specifications.

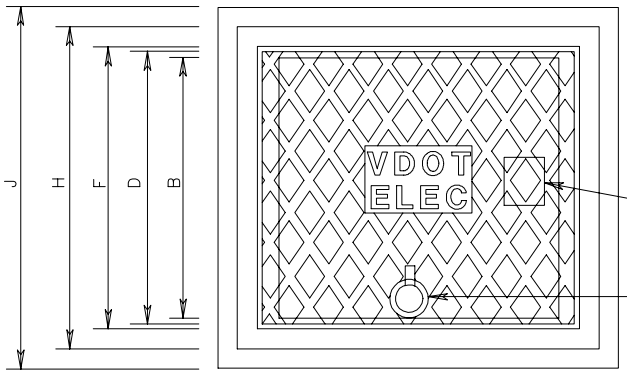
JUNCTION BOX

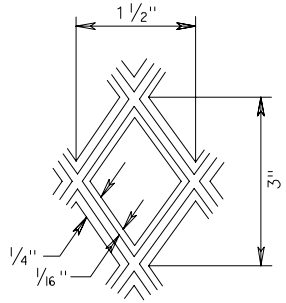
REV 8/07

1301.48

VIRGINIA DEPARTMENT OF TRANSPORTATION

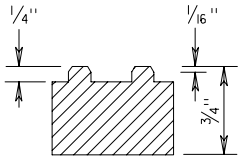
TOP VIEW



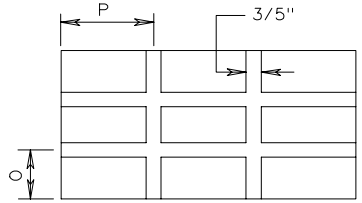


DETAIL A

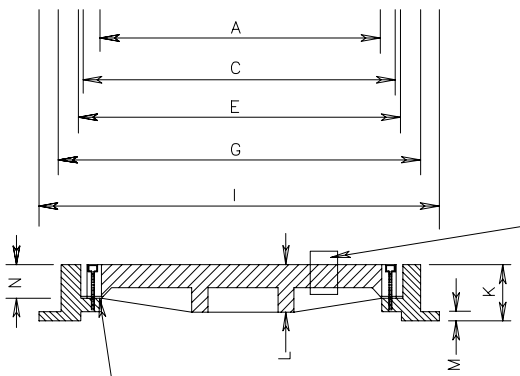
Recessed lift ring or handle



DETAIL B



BOTTOM OF COVER



1/8" Neoprene gasket permanently attached to frame

SIDE VIEW

Notes:

The cover shall have a non-skid surface with letters cast in the depression on top. The letters "VDOT ELEC", "VDOT TRAF", "VDOT COMM" or "UTILITY" as applicable are to be 1" wide and raised 1/4" high. Covers used for junction boxes installed within municipalities shall not require the VDOT reference.

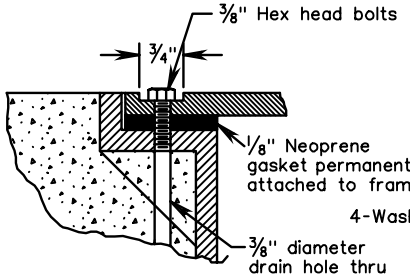
Four recessed 3/8" hex head bolts are required for each cover. Bolts shall be located at each corner or center of each side of cover.

STANDARD	DIMENSIONS															
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
JB-1A	12"	12"	13 3/4"	13 3/4"	14"	14"	15"	15"	18"	18"	4"	1 1/2"	1/2"	1 1/2"	4 1/2" ± 1/2"	4 1/2" ± 1/2"
JB-2A	12"	18"	13 3/4"	19 3/4"	14"	20"	15 1/4"	21 1/4"	18"	24"	4"	1 1/2"	5/8"	1 1/2"	6 1/2" ± 1/2"	4 1/2" ± 1/2"
JB-3A	18"	18"	19 3/4"	19 3/4"	20"	20"	21 1/4"	21 1/4"	24"	24"	4"	1 3/4"	5/8"	1 1/2"	6 1/2" ± 1/2"	6 1/2" ± 1/2"
JB-4A	18"	24"	19 3/4"	26 3/4"	20"	27"	21 1/2"	28 1/2"	24"	33 1/2"	4"	1 3/4"	3/4"	1 1/2"	9" ± 1/2"	6 1/2" ± 1/2"
JB-5A	24"	24"	26 3/4"	26 3/4"	27"	27"	28 1/2"	28 1/2"	33 1/2"	33 1/2"	4"	1 3/4"	3/4"	1 1/2"	9" ± 1/2"	9" ± 1/2"

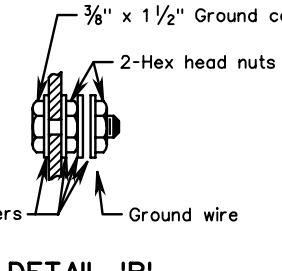
JUNCTION BOX

VIRGINIA DEPARTMENT OF TRANSPORTATION

JB-1B,2B,3B,4B & 5B

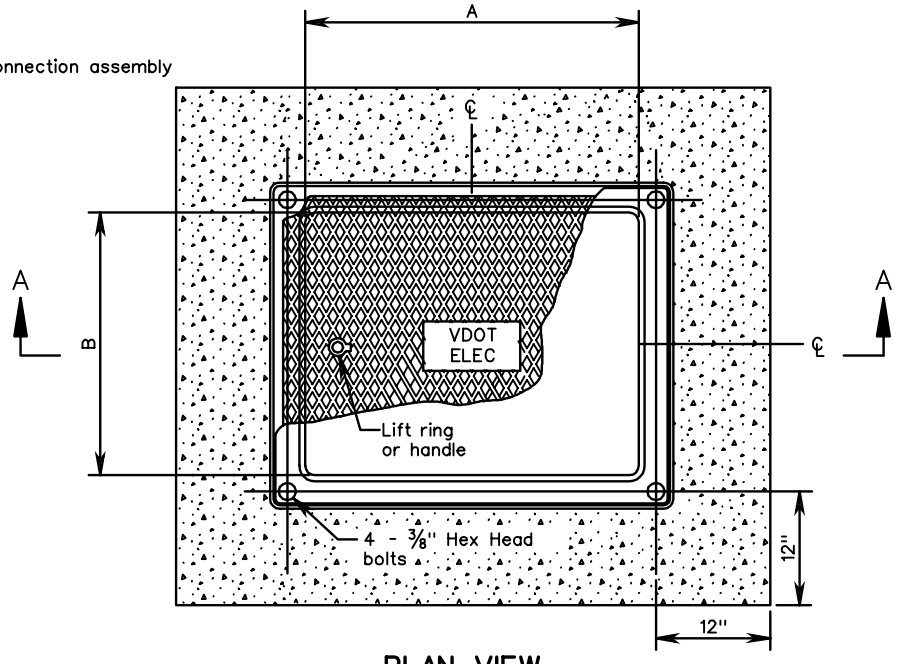


DETAIL 'A'



DETAIL 'B'

STANDARD	DIMENSIONS	
	A	B
JB-1B	12"	12"
JB-2B	12"	18"
JB-3B	18"	18"
JB-4B	18"	24"
JB-5B	24"	24"



PLAN VIEW

Notes:

Conduit entrances shall be located as shown on the plans. Conduits shall extend 2" min. to 3" max. beyond the inside wall of the junction box.

Bell ends shall be installed on the ends of PVC conduits. Grounding bushings shall be installed on the ends of metal conduits. Bell ends & bushings shall be plugged to prevent moisture & rodent entry.

* Depth of conduit entrances for magnetic detectors shall be in accordance with Standard TD-2.

The cover shall have a non-skid surface with letters cast in the depression on top. The letters "VDOT ELEC", "VDOT TRAF", "VDOT COMM" or "UTILITY" as applicable are to be 1" wide and raised 1/4" high. Covers used for junction boxes installed within municipalities shall not require the VDOT reference.

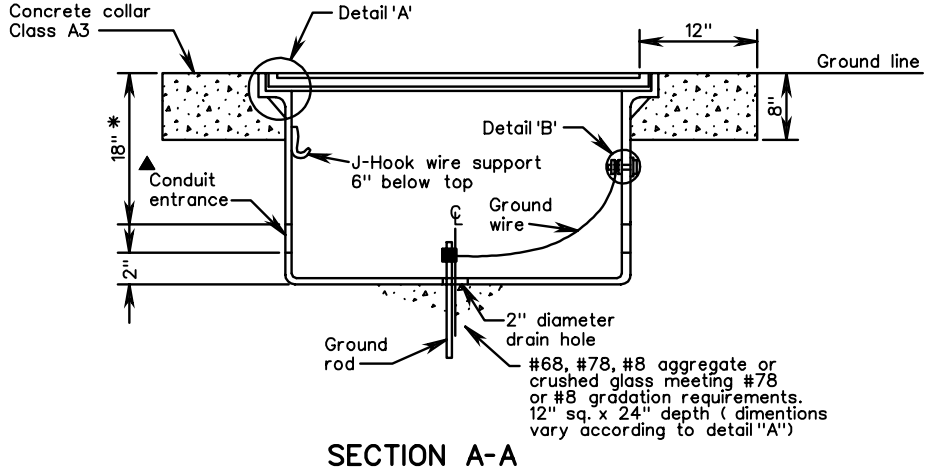
▲ A minimum 2" diameter conduit entrance is required, unless otherwise specified on plans.

A concrete collar is required only when junction box is installed in earth areas.

All junction boxes shall be installed with a ground rod unless box houses only communication/ interconnect cable.

Voids resulting from entrance of conduits into junction boxes shall be completely filled with an appropriate material.

Junction box shall be a gray-iron casting with an asphalt coating on exterior surface except cover.



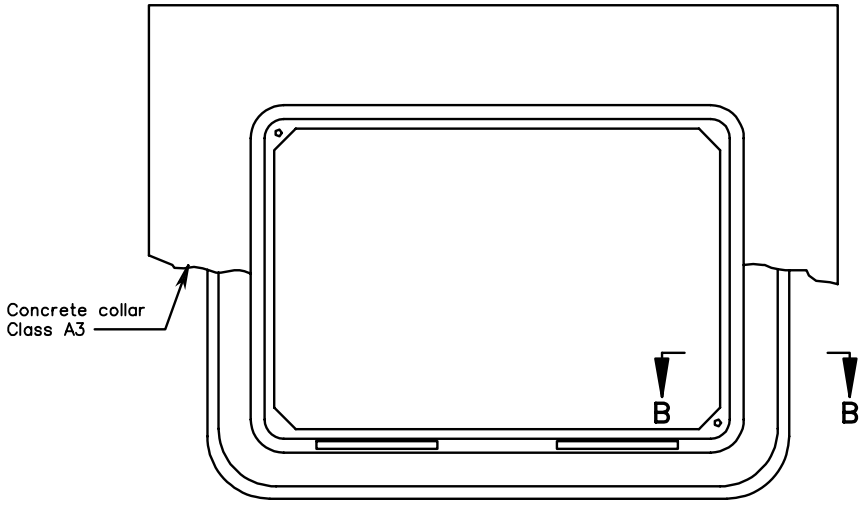
SECTION A-A

JUNCTION BOX

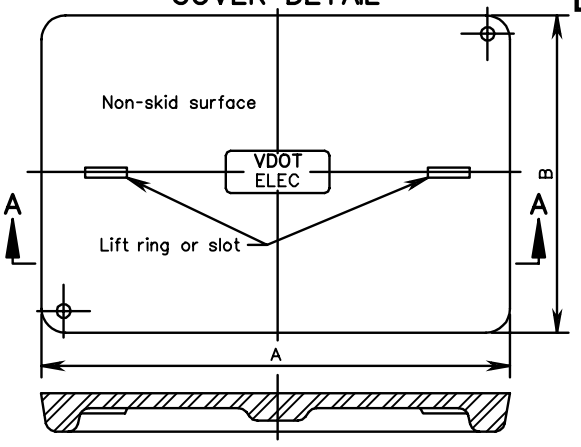
VIRGINIA DEPARTMENT OF TRANSPORTATION

REV 8/07

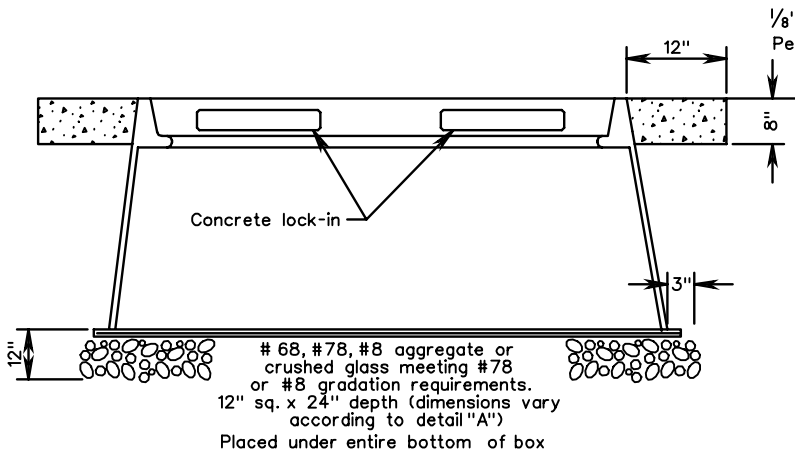
1301.50

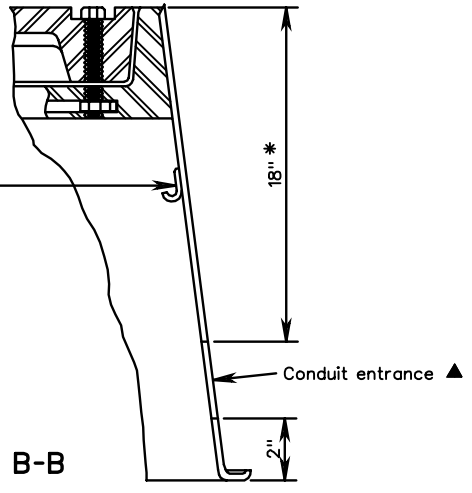


COVER DETAIL



SECTION A-A





STANDARD	DIMENSIONS	
	A	B
JB-1C	12"	12"
JB-2C	12"	18"
JB-3C	18"	18"
JB-4C	18"	24"
JB-5C	24"	24"

SECTION B-B

Notes:

Conduit entrances shall be located as shown on the plans.

Bell ends shall be installed on the ends of PVC conduits.
Grounding bushings shall be installed on the ends of metal conduits.
Bell ends and bushings shall be plugged to prevent moisture and rodent entry.

Depth of conduit entrance for use of magnetic detectors shall be in accordance with Standard TD-2.

The junction box shall be of a polymer concrete with fiberglass sides.

The cover shall have a non-skid surface with letters cast in the depression on top. The letters "VDOT ELEC", "VDOT TRAF", "VDOT COMM" or "UTILITY" as applicable are to be 1" wide and raised 1/4" high. Covers used for junction boxes installed within municipalities shall not require the VDOT reference.

All junction boxes shall be installed with a ground rod unless box houses only communication/interconnect cable.

Two recessed 3/8" Hex head bolts are required for each cover.

▲ A minimum 2" diameter conduit entrance is required, unless otherwise specified on the plans.

A concrete collar is required only when junction box is installed in earth areas.

Conduits shall extend 2" to 3" max. beyond the inside wall of the junction box.

The junction box may be a two piece design with the top section no less than 17" in depth.

Voids resulting from entrance of conduits into junction boxes shall be completely filled with an appropriate material.

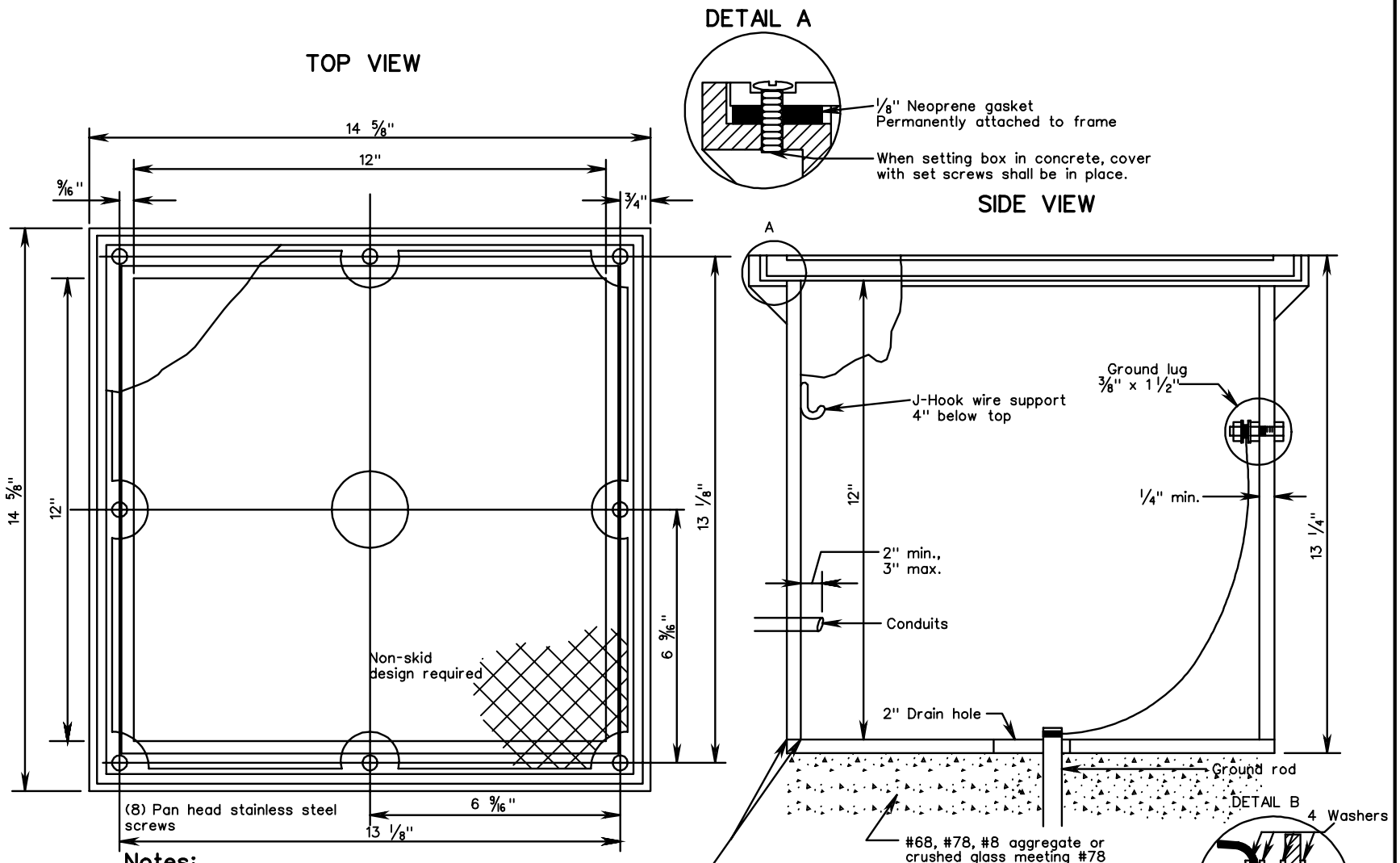
JUNCTION BOX

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV 8/07

1301.51

JB-1D



Notes:

Finish: Galvanized in accordance with Section 233 and coated (outside) except the cover with an approved mastic.
Material: Box 1/4" steel plate & cover 1" steel plate ASTM-A36M.

All junction boxes shall be installed with a ground rod unless box houses only communication/interconnect cable.

PVC conduits shall have bell ends and metal conduits shall have grounding bushings on all ends.

Bell ends and bushings shall be plugged to prevent moisture and rodent entry.

Voids resulting from entrance of conduits into junction boxes shall be completely filled with an appropriate material.

JUNCTION BOX

REV 8/07

1301.52

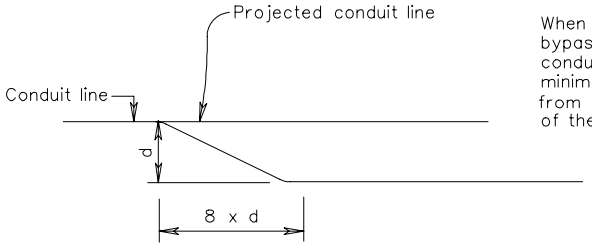
VIRGINIA DEPARTMENT OF TRANSPORTATION

ECI-1

Notes:

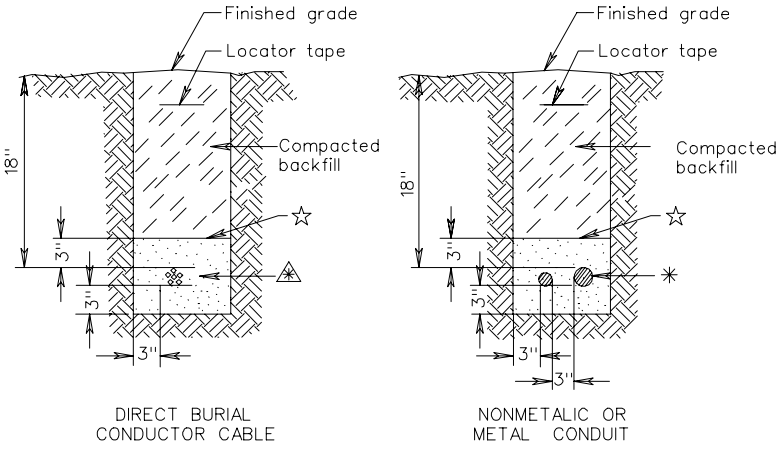
Offsetting of conduit may be used for tieing into existing conduit systems or bypassing obstructions as directed by the Engineer.

When offsetting conduit to bypass an obstruction, the conduit shall maintain a minimum clearance of 12" from the closest point of the obstruction.



METHOD OF OFFSETTING CONDUIT

d = Width of offset



DIRECT BURIAL CONDUCTOR CABLE

NONMETALIC OR METAL CONDUIT

NON - PAVEMENT AREA INSTALLATION

ECI-2

Notes:

Contractor shall install a 4" minimum to 6" maximum wide red plastic locator tape 2" to 4" below finished grade and directly above buried conduit or conductor cables, except under pavement.

Conduit installed under existing or proposed roadways for direct buried cables shall extend 24" beyond the paved surface and/or sidewalk.

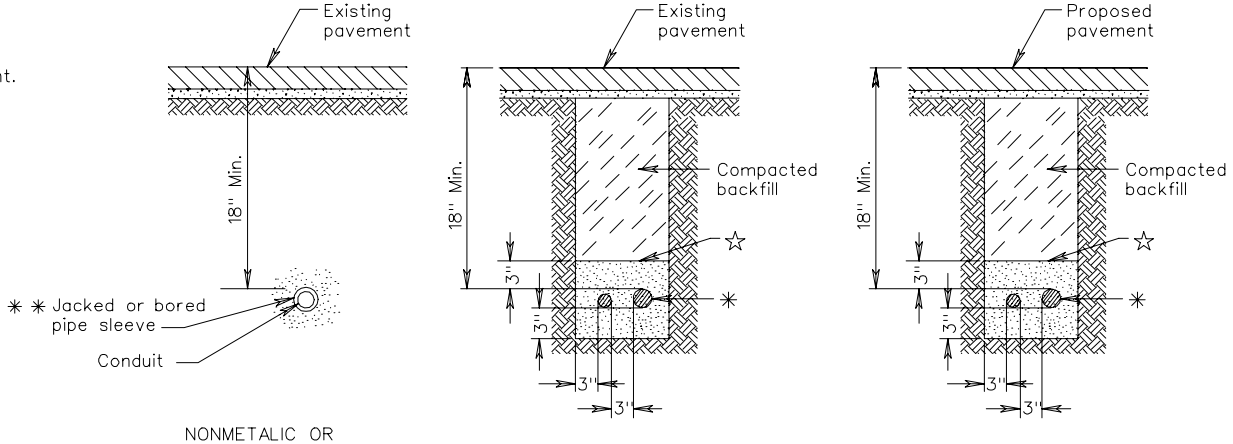
Where conduit for power and conduit for communication are to be installed in close proximity to each other, conduits shall be placed parallel in a common trench with no less than 6" of separation between conduit systems.

☆ Backfill material below this level shall be sandy fill (free of any stones, cinders, wood, roots, debris, etc.).

✳ One or more conduits as required.

⚠ One or more conductor cables as required.

✳✳ Only jacking operation requires sleeve.



NONMETALIC OR METAL CONDUIT

NONMETALIC OR METAL CONDUIT

NONMETALIC OR METAL CONDUIT

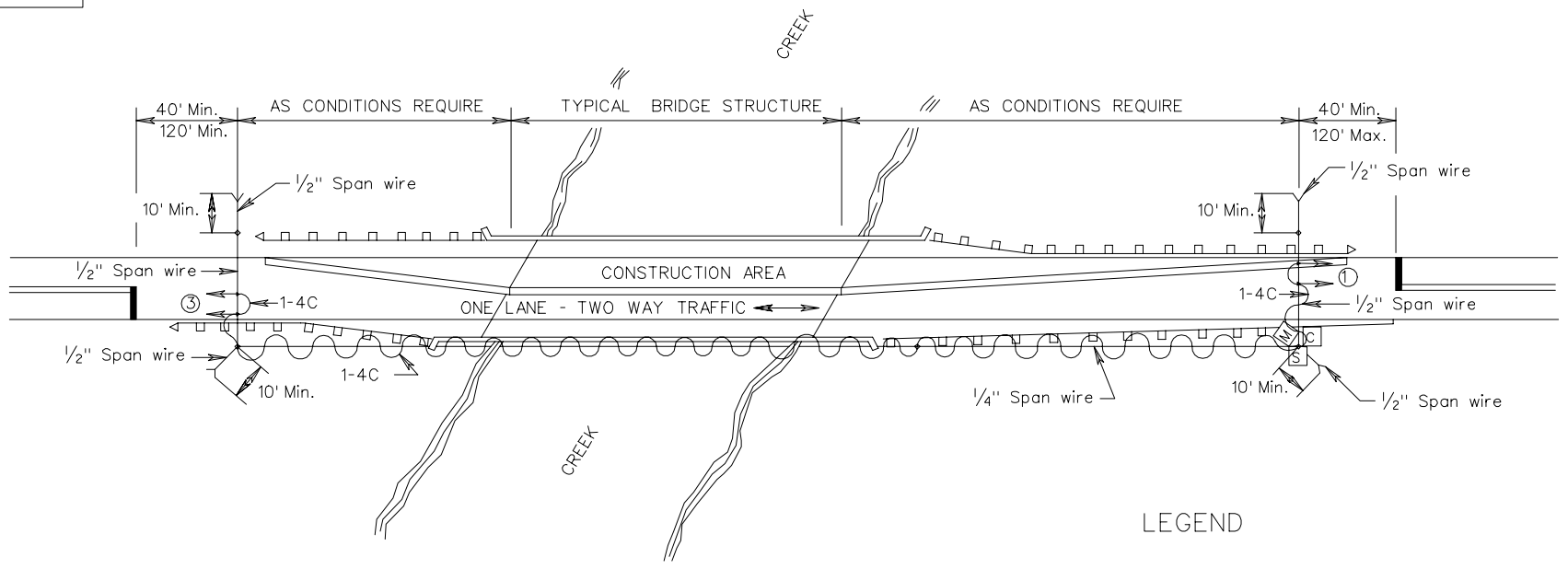
PAVEMENT AREA INSTALLATION

INSTALLATION OF ELECTRICAL CONDUIT AND CONDUCTOR CABLE (UNDERGROUND INSTALLATION)

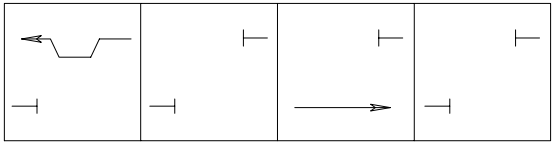
VIRGINIA DEPARTMENT OF TRANSPORTATION

1301.53

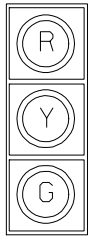
TS-1



PHASING DIAGRAM



SIGNAL HEAD



①, ③

LEGEND

- M METER BASE (IF REQUIRED)
- C CONTROLLER
- S BREAKER BOX OR SAFETY SWITCH

COLOR SEQUENCE CHART

Signal	Ø1			Ø2			Ø3			Ø4			Flash
	R/W	Clear to Ø2		R/W	Clear to Ø3		R/W	Clear to Ø4		R/W	Clear to Ø1		
		#1	#2		#1	#2		#1	#2		#1	#2	
1	G	Y	R	R	R	R	R	R	R	R	R	R	R
3	R	R	R	R	R	R	G	Y	R	R	R	R	R

Notes:

Controller shall be pole mounted or ground mounted next to the wood pole closest to the power source.

Placement of poles are typical. Exact distances for pole placements, stop bar locations, etc shall be determined by the Engineer at the time of installation.

Signal Ahead signs shall be installed when sight distance is limited.

The contractor shall be responsible for furnishing and implementing signal timings unless otherwise specified.

Signal heads shall be installed in accordance with Standards SW-1 or 2 and TA-1.

Wood pole wiring and rigging for 1/2" and 1/4" span wire shall be in accordance with Standards WD-2 and WD-5, respectively.

Electrical service shall be in accordance with Standard SE-2 unless a generator is used.

When an intersection is located between the stop lines for the two approaches, additional phasing and signals shall be provided to accommodate those traffic movements.

If required by plans, entrances located between the stop lines for the two approaches shall be provided with additional phasing and signals to accommodate those traffic movements.

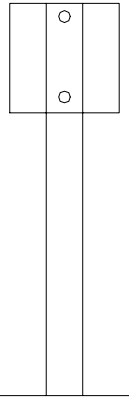
Vehicle detection of each approach shall be accomplished unless otherwise specified.

TYPICAL ONE - WAY BRIDGE TEMPORARY SIGNAL INSTALLATION

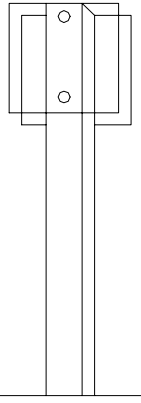
VIRGINIA DEPARTMENT OF TRANSPORTATION

1301.54

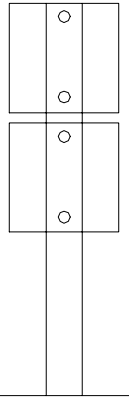
TYPE A



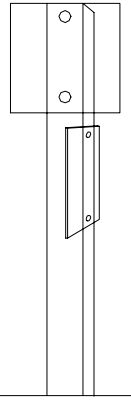
TYPE B



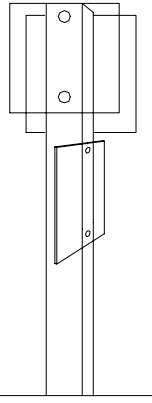
TYPE C



TYPE D



TYPE E



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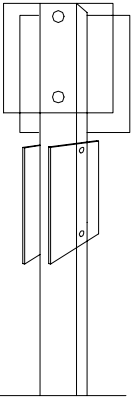
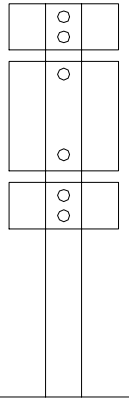
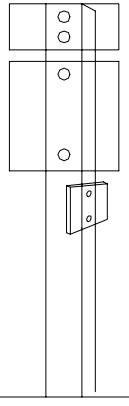


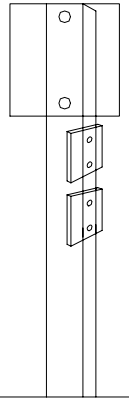
TYPE G



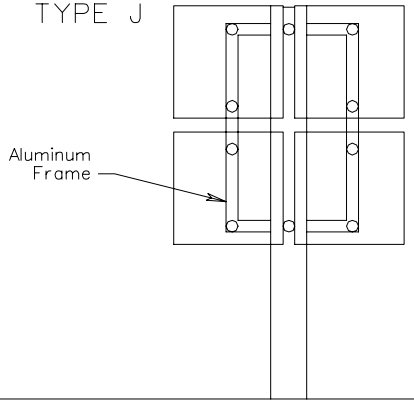
TYPE H



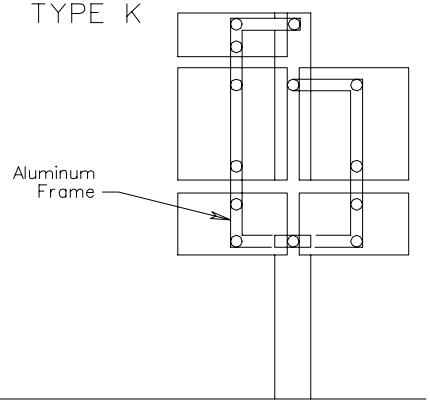
TYPE I



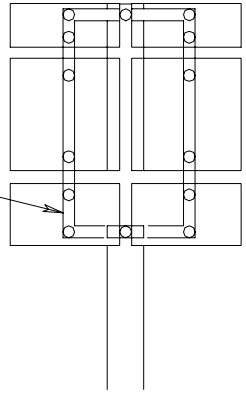
TYPE J



TYPE K



TYPE L



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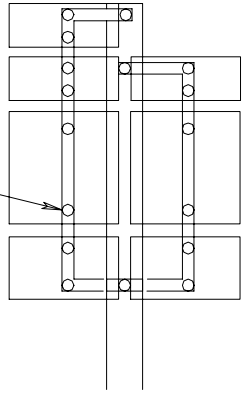
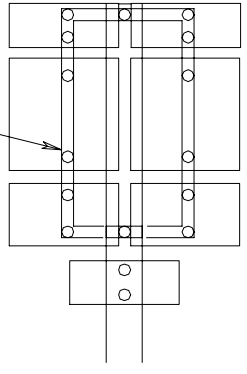
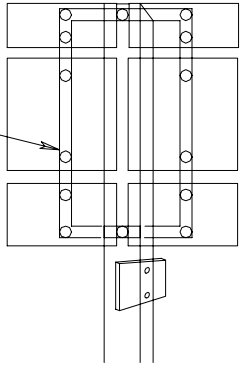


TYPE N



TYPE O

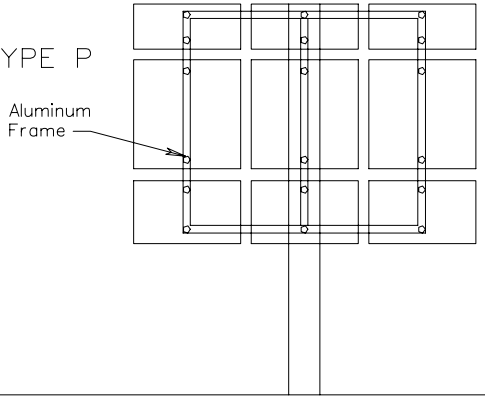


TYPICAL DETAILS FOR STANDARD WOOD POST STRUCTURE TYPES

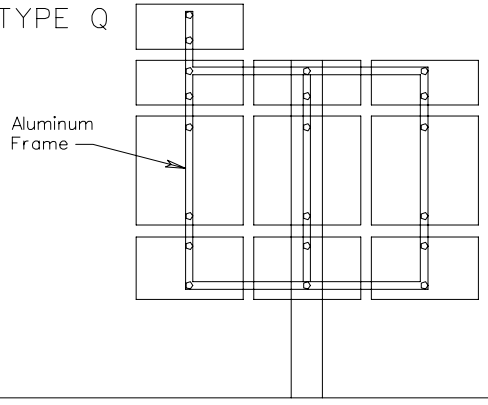
VIRGINIA DEPARTMENT OF TRANSPORTATION

WSP-1

TYPE P



TYPE Q



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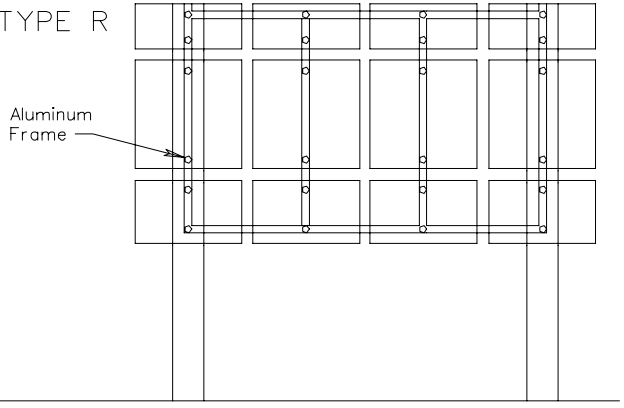

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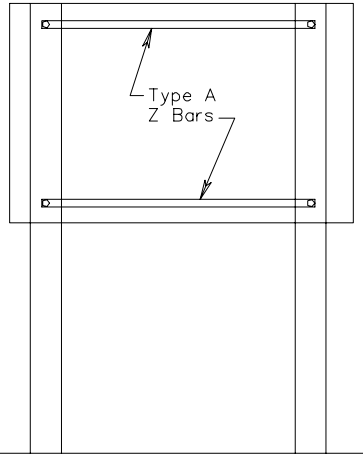
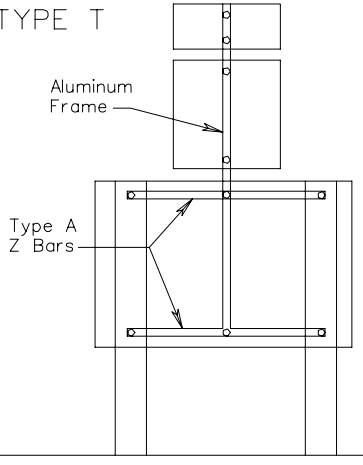
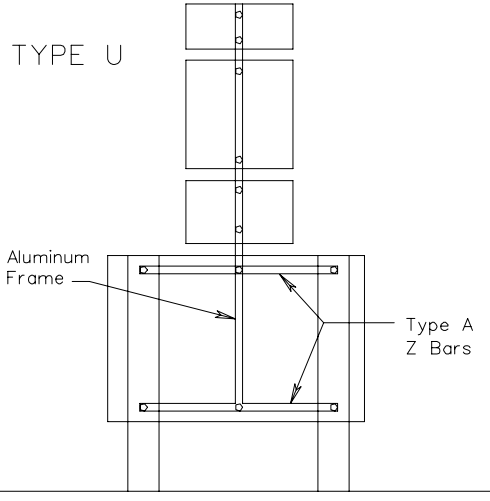


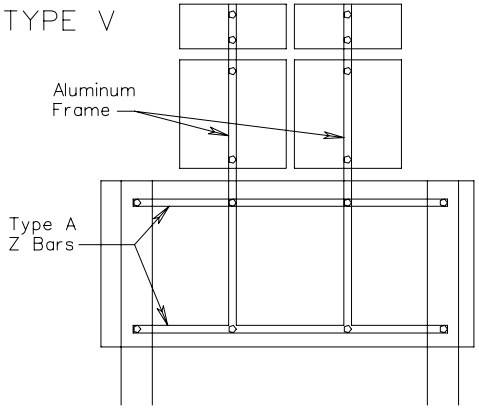
TYPE T



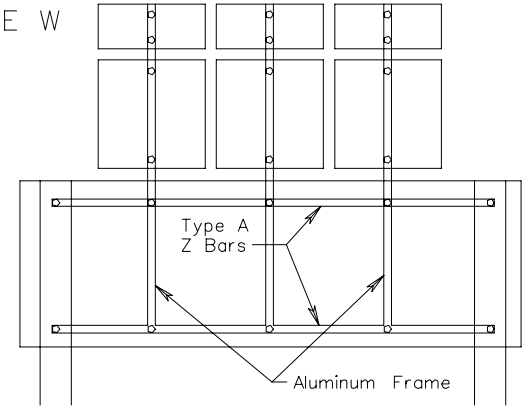
TYPE U



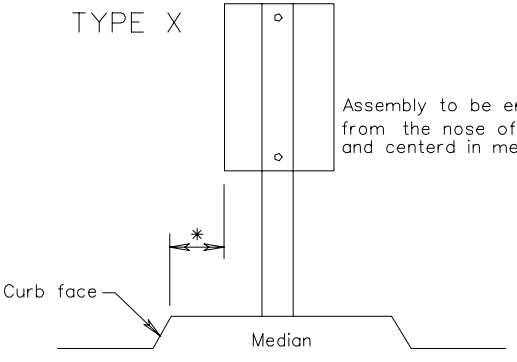
TYPE V



TYPE W



TYPE X



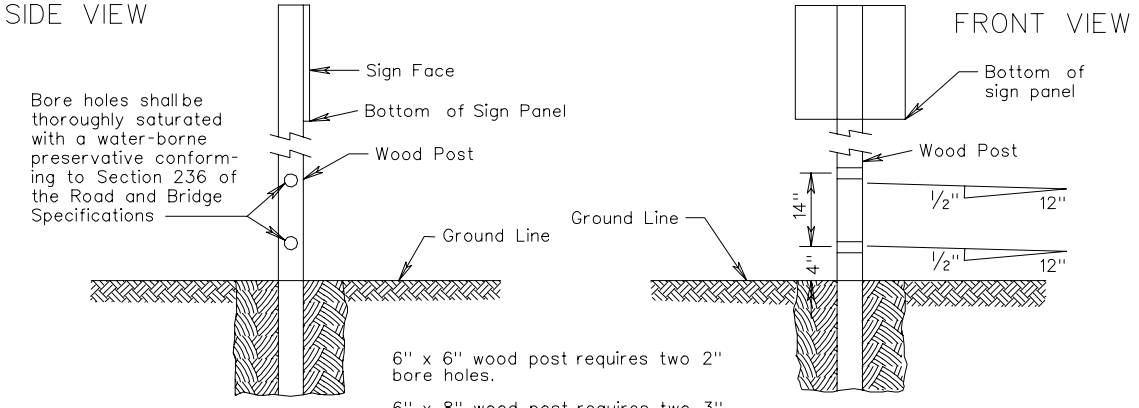
* 2' for medians over 10' in width. 12''
for medians 10' or less in width.

TYPICAL DETAILS FOR STANDARD WOOD POST STRUCTURE TYPES

VIRGINIA DEPARTMENT OF TRANSPORTATION

1301.56

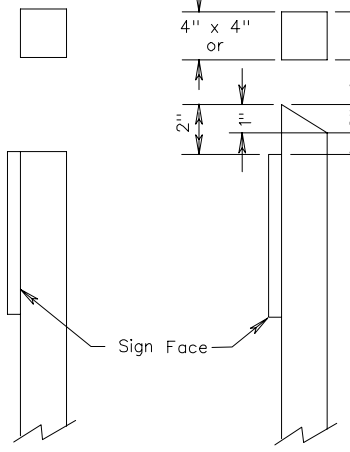
METHOD OF POST DRILLING



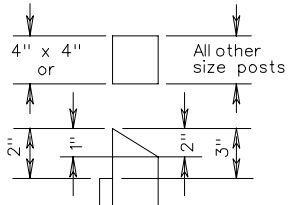
6" x 6" wood post requires two 2" bore holes.

6" x 8" wood post requires two 3" bore holes. Posts less than 6" x 6" do not require bore holes.

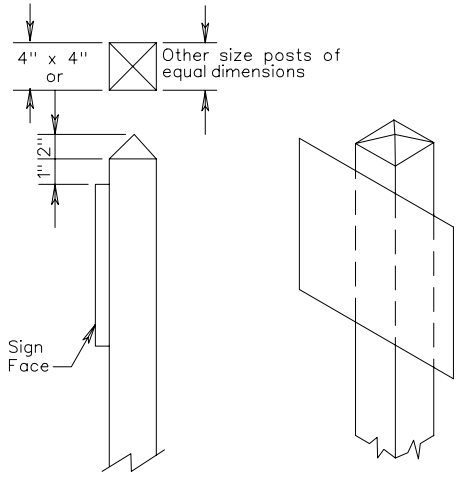
FLAT CUT



SHED CUT



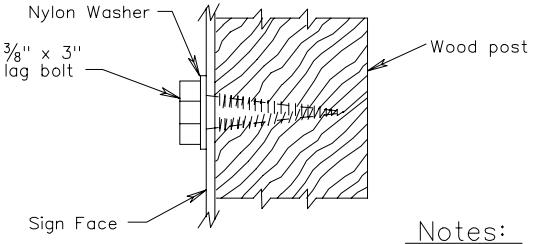
PYRAMIDAL CUT



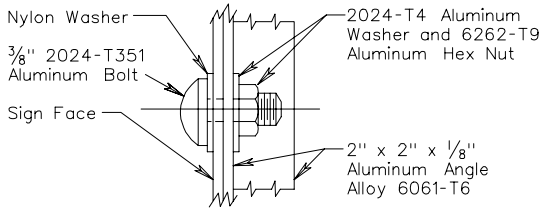
SIGN PANEL ATTACHMENT DETAILS

WOOD POSTS

(For Sign Panel Attachment To Z Bars, See Standard SPD-1)



ALUMINUM FRAMING



Notes:

Nylon washer shall be 1/8" thick minimum with an outside diameter of 1" and an inside diameter of 7/16"

To obtain a flush mounting surface for signs, all wood shall be mortised where necessary, to receive flange of aluminum angle.

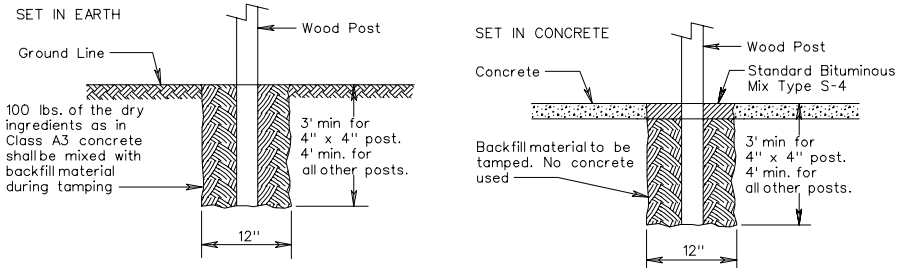
Note:

Flat cut wood post is shown on Types A through X as typical. Shed cut and pyramidal cut wood post designs may be used; however, the style of wood post shall be uniform throughout a project.

TYPICAL DETAILS FOR STANDARD WOOD POST STRUCTURE TYPES

VIRGINIA DEPARTMENT OF TRANSPORTATION

WSP-1

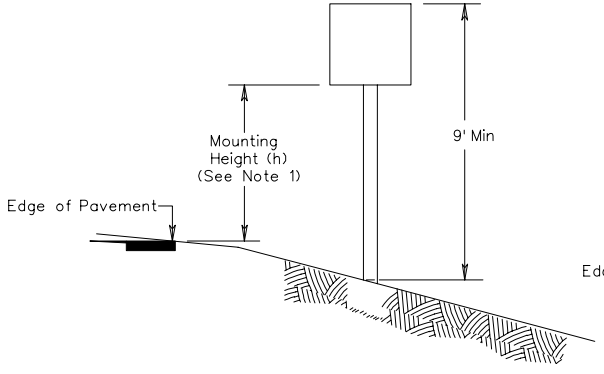


INSTALLATION DETAILS

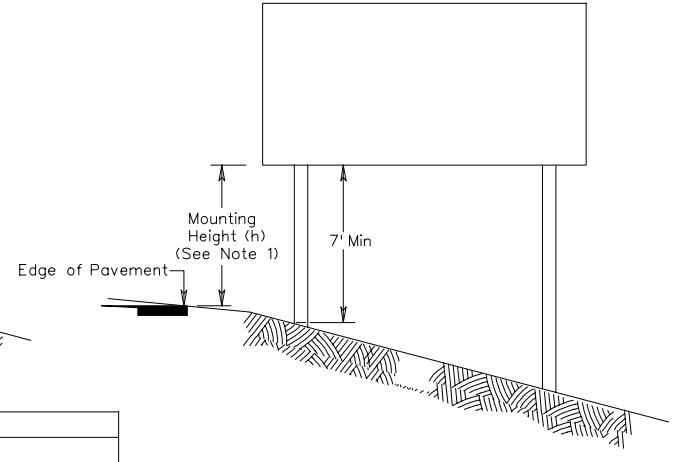
Notes:

Minimum spacing between two 4" x 4" wood posts shall be 3'. Minimum spacing between any other two size posts shall be 8'.

SINGLE POST INSTALLATIONS



MULTI-POST INSTALLATIONS



PERMANENT SIGN INSTALLTIONS

MINIMUM MOUNTING HEIGHT (h) (See Note 1)

Sign Types	Limited Access Highways		Non- limited Access Highways	
	Signs located less than 30' from the edge of travel lane	Signs located 30' or more from the edge of travel lane	Rural Areas	Urban Areas
Directional Signs	7'	5'	5'	7'
Route Markers, Warning and Regulatory Signs	6'	5'	5'	7'
Secondary Signs (See Note 2)	5' (See Note 3)	5' (See Note 3)	4'	6'

1. Mounting heigth may need to be greater than indicated in chart to provide the minimum height to the top of the sign for single post installations and the minimum height to the bottom of the sign for multi-post installations.
2. A secondary sign is considered to be a sign mounted below another sign except a route marking assembly consisting of a route marker with an auxiliary plate is considered to be a single sign.
3. Mounting height (h) of the major sign above the secondary sign shall be 8' minimum.

CONSTRUCTION SIGN INSTALLTIONS

MINIMUM MOUNTING HEIGHT (h) (See Note 1)

Sign Types	Limited Access Highways		Non- limited Access Highways	
	Signs located less than 30' from the edge of travel lane	Signs located 30' or more from the edge of travel lane	Rural Areas	Urban Areas
Construction Signs	7'	7'	7'	7'
Secondary Signs (See Note 2)	6' (See Note 3)	6' (See Note 3)	6'	6'

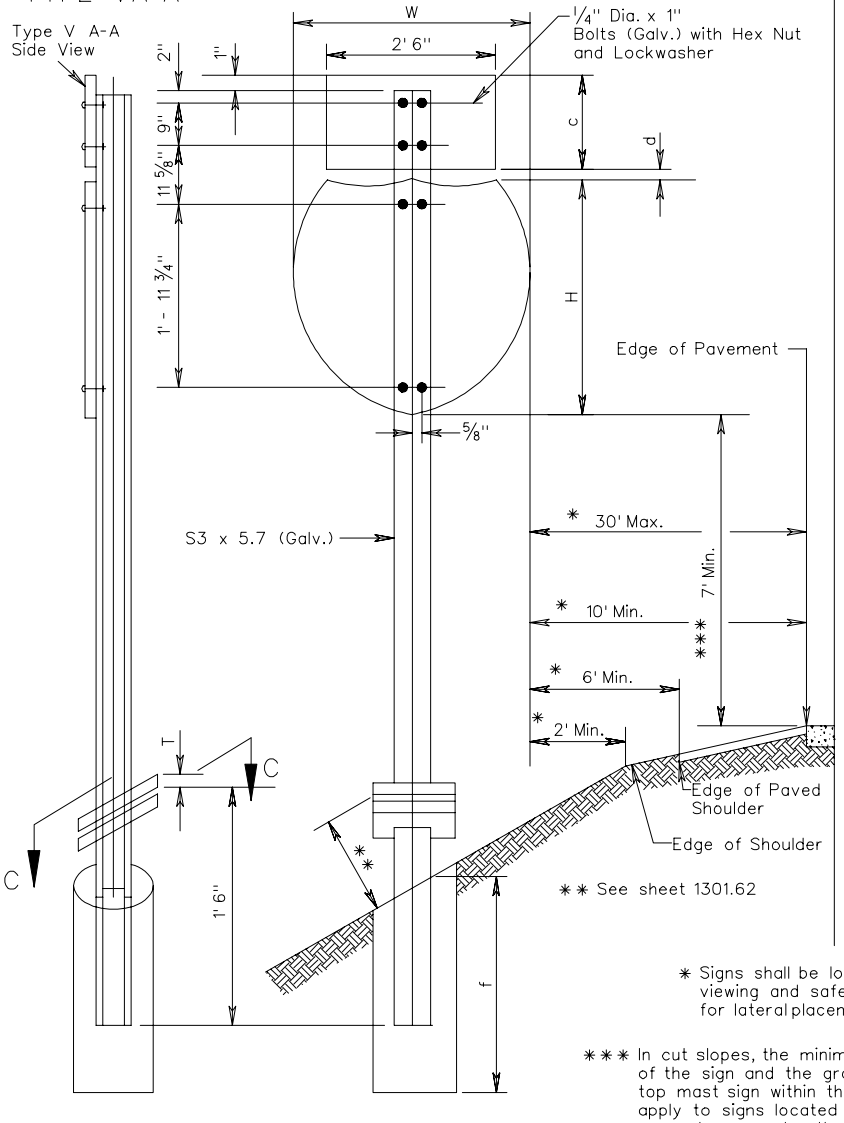
1. Mounting heigth may need to be greater than indicated in chart to provide the minimum height to the top of the sign for single post installations and the minimum height to the bottom of the sign for multi-post installations.
2. A secondary sign is considered to be a sign mounted below another sign.
3. Mounting height (h) of the major sign above the secondary sign shall be 8' minimum.

TYPICAL DETAILS FOR STANDARD WOOD POST STRUCTURE TYPES

VIRGINIA DEPARTMENT OF TRANSPORTATION

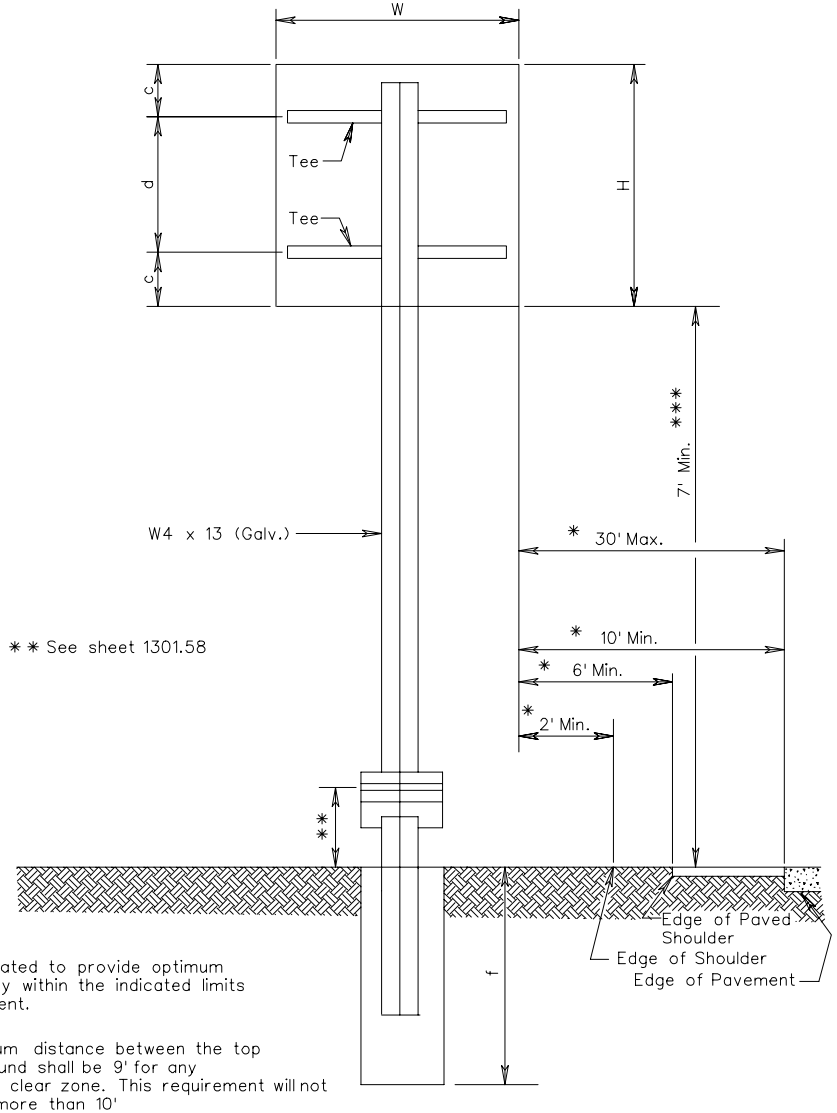
1301.58

TYPE VA-A



See Sheet 1301.61 for
Section C-C

TYPES VA-B, VA-C, VA-D, VA-E, VA-L AND VA-M



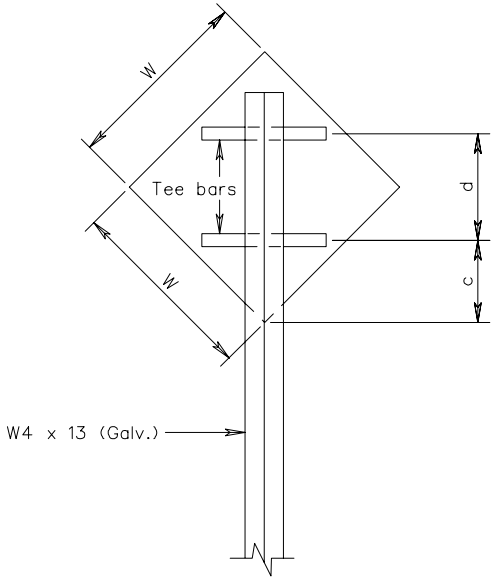
* Signs shall be located to provide optimum viewing and safety within the indicated limits for lateral placement.

*** In cut slopes, the minimum distance between the top of the sign and the ground shall be 9' for any top mast sign within the clear zone. This requirement will not apply to signs located more than 10' up a slope greater than 3:1.

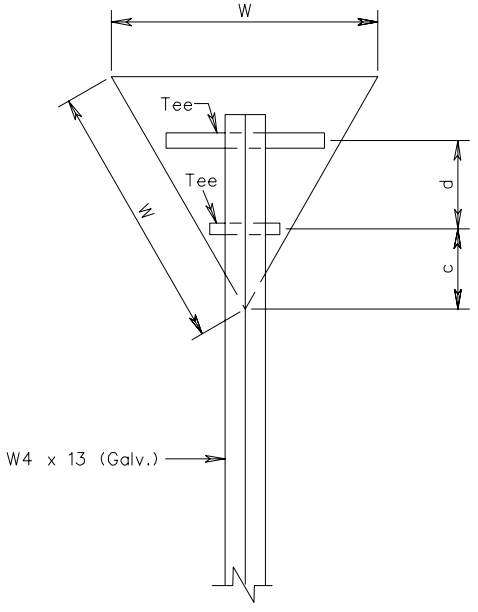
TYPICAL DETAILS FOR TYPE VA SIGN STRUCTURES

VIRGINIA DEPARTMENT OF TRANSPORTATION

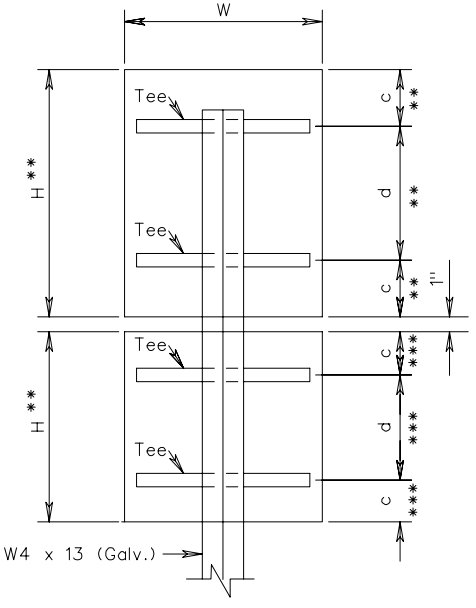
TYPE VA-F



TYPE VA-G



TYPE VA-K



SUPPORT DETAILS

STRUCTURE TYPE	SIGN PANEL DIMENSIONS				POST LENGTH DIMENSIONS		TEE 6061-T6 2.5 x 3.0 @ 1.175 lb/ft.		FOUNDATION DIMENSIONS		WELDED WIRE MESH		STEEL BASE PLATE
	W	H	c	d	Slope 3:1 to 2:1	Clamp	Number	Length	f	Diameter	Length	Sq. Ft.	T (Thickness)
VA-A	3'	3'	1'-3"	5/8"	12'-3"	-	-	-	3'-0"	1'-0"	2'-6"	5	1/2"
VA-B	4'	4'	1'-2"	1'-8"	12'-3"	4	2	3'-0"	4'-6"	1'-9"	4'-4"	20	1"
VA-C	4'	5'	1'-3"	2'-6"	13'-3"	4	2	3'-0"	4'-6"	1'-9"	4'-4"	20	1"
VA-D	5'	3'	0'-8"	1'-8"	12'-9"	4	2	4'-0"	4'-6"	1'-9"	4'-4"	20	1"
VA-E	6'	5'	1'-3"	2'-6"	13'-9"	4	2	5'-0"	4'-6"	1'-9"	4'-4"	20	1"
VA-F	4'	-	1'-8"	2'-4"	13'-9"	4	2	2'-10"	4'-6"	1'-9"	4'-4"	20	1"
VA-G	5'	-	1'-8"	-	13'-0"	4	1 each	2'-10" & 1'-4"	4'-6"	1'-9"	4'-4"	20	1"
VA-K	4'	5'	1'-3"**	2'-6"**	17'-3"	4	2	3'-0"	4'-6"	1'-9"	4'-4"	20	1"
VA-K	4'	4'	1'-2"***	1'-8"***	-	4	2	3'-0"	-	-	-	-	-
VA-L	6'	6'	1'-6"	3'-0"	14'-6"	4	2	5'-0"	4'-6"	1'-9"	4'-4"	20	1"
VA-M	5'	5'	1'-3"	2'-6"	13'-9"	4	2	4'-0"	4'-6"	1'-9"	4'-4"	20	1"
VA-A2	6'	3'	1'-3"	5/8"	13'-9"	-	4	5'-0"	4'-6"	1'-9"	4'-4"	20	1"

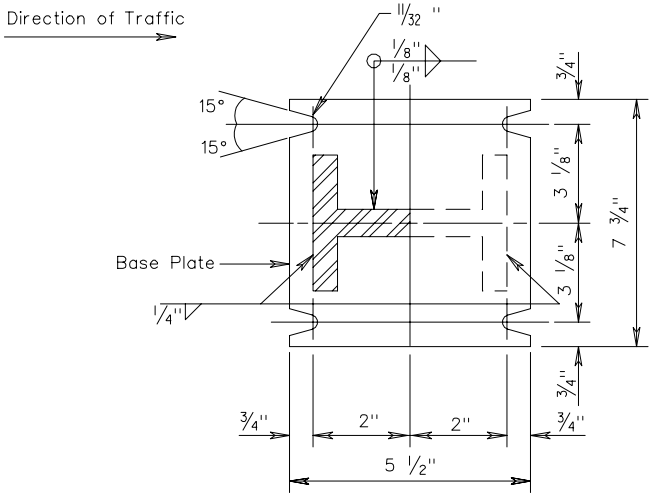
* All post lengths shall be field checked by contractor prior to fabrication.

TYPICAL DETAILS FOR TYPE VA SIGN STRUCTURES

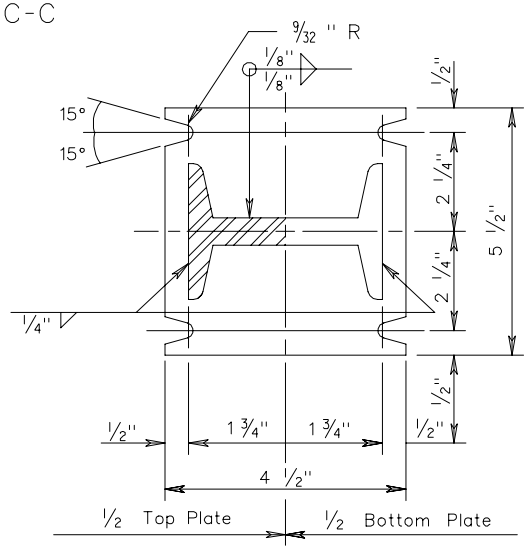
VIRGINIA DEPARTMENT OF TRANSPORTATION

SECTION A-A

SECTION B-B

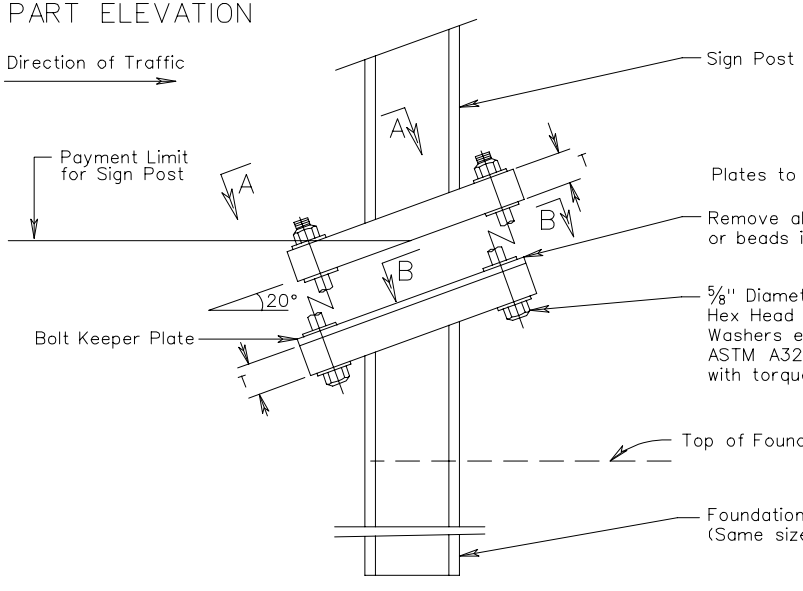


SECTION C-C

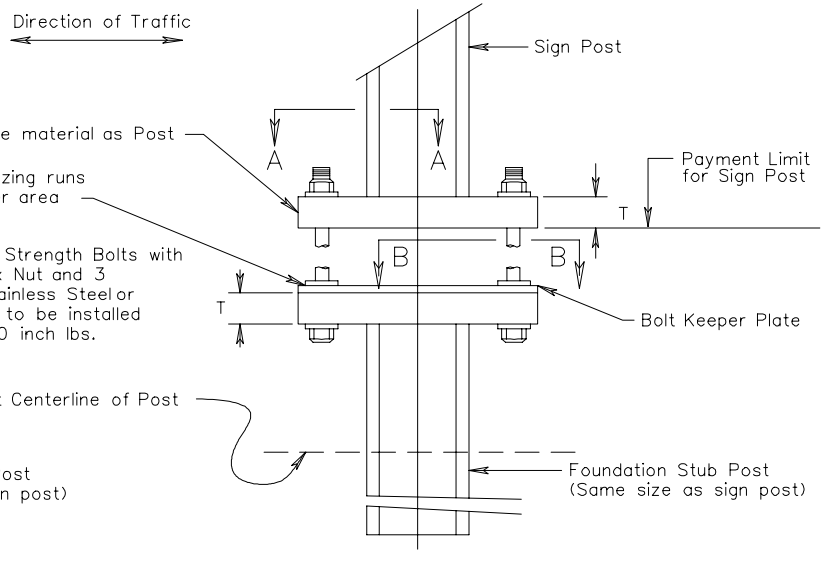


For Type VA-A, use 1/2" Diameter High Strength Bolts with Hex Head, Hex Nut and 3 Washers each Stainless Steel or ASTM A325. Bolts to be installed with a torque of 155 inch lbs. for typical assembly, see Project Plans.

PART ELEVATION



PART ELEVATION FOR MEDIAN ONLY

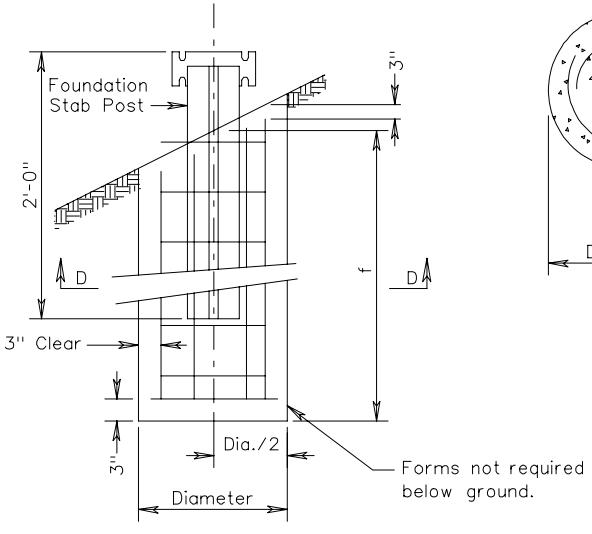


TYPICAL DETAILS FOR TYPE VA SIGN STRUCTURES

VIRGINIA DEPARTMENT OF TRANSPORTATION

FOUNDATION

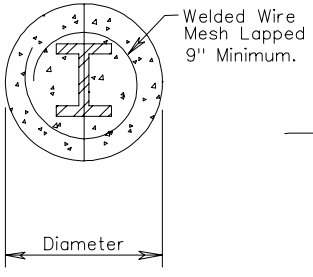
Elevation



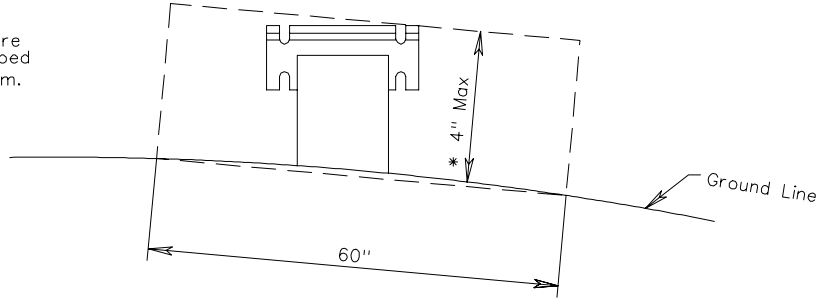
6 x 6 - MW5.5 x MW5.5

** 6 x 6 - 2/2 Welded Wire Mesh

SECTION D-D



METHOD TO DETERMINE MAXIMUM PROJECTION OF SIGN STUB POST



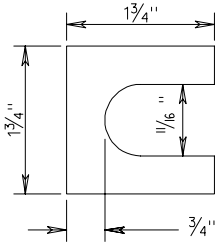
* 4" Maximum projection when measured above a 60" chord aligned radially to the centerline of the highway and connecting any point, within the length of the chord, on the ground surface on one side of the support to a point on the ground surface on the other side.

** Requires two layers offset in both directions resulting in 3" square openings.

TYPICAL DETAILS FOR TYPE VA SIGN STRUCTURES

VIRGINIA DEPARTMENT OF TRANSPORTATION

SHIM DETAIL



Furnish 2 @ 0.63" thick and 2 @ .032" thick shims per post. Shims shall be fabricated from brass conforming to ASTM B36M or from stainless steel with a minimum chromium content of 11.50% . No more than 2 shims shall be used per bolt with a maximum of 4 shims per post.

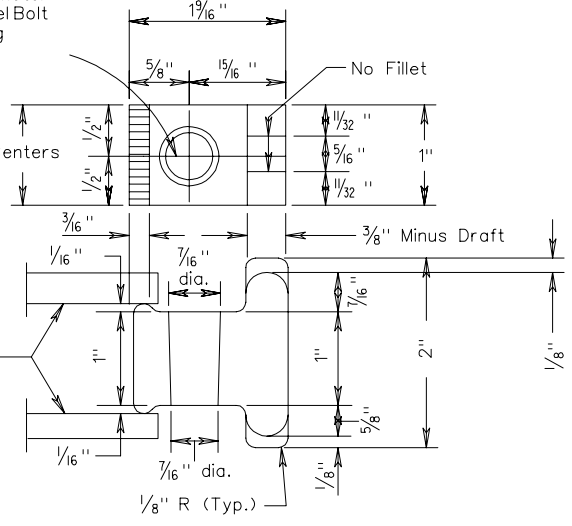
POST CLAMP DETAIL

Galvanized Gray - Iron or Aluminum Casting

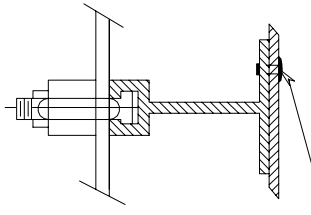
Centerline Hole for ⅜" diameter Square Head Stainless Steel Bolt x 2¼"long with Self-locking Nut and one Flat Washer.

Serrate 1/32" Deep at 1/16" Centers

5/16" or 7/16" Leg of Clamp is for adjustment to Post Flange

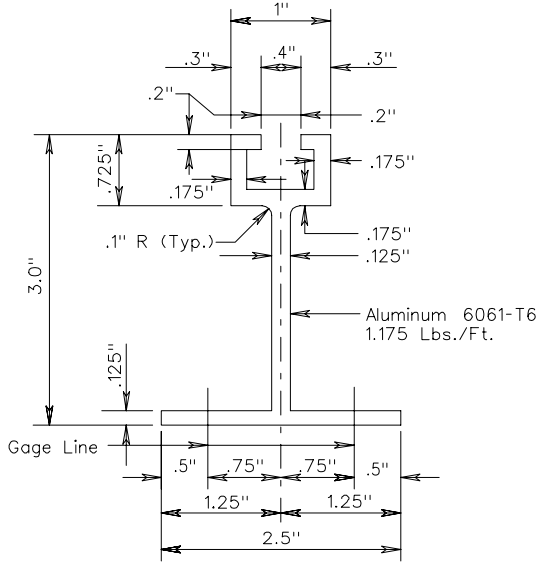


FASTENING



3/16" diameter rivet. -Rivets shall be dome head,break mandrel, blind rivets conforming to Industrial Fasteners Institute Standard IFI-114, Style 1, Grades 10 or 11 except that the minimum ultimate tensile strength shall be 360 pounds. Rivets shall have a grip range accommodating the combined thickness of the sign panel and zee bar and shall be installed in accordance with the manufacturer's recommendations.

TEE CROSS SECTION

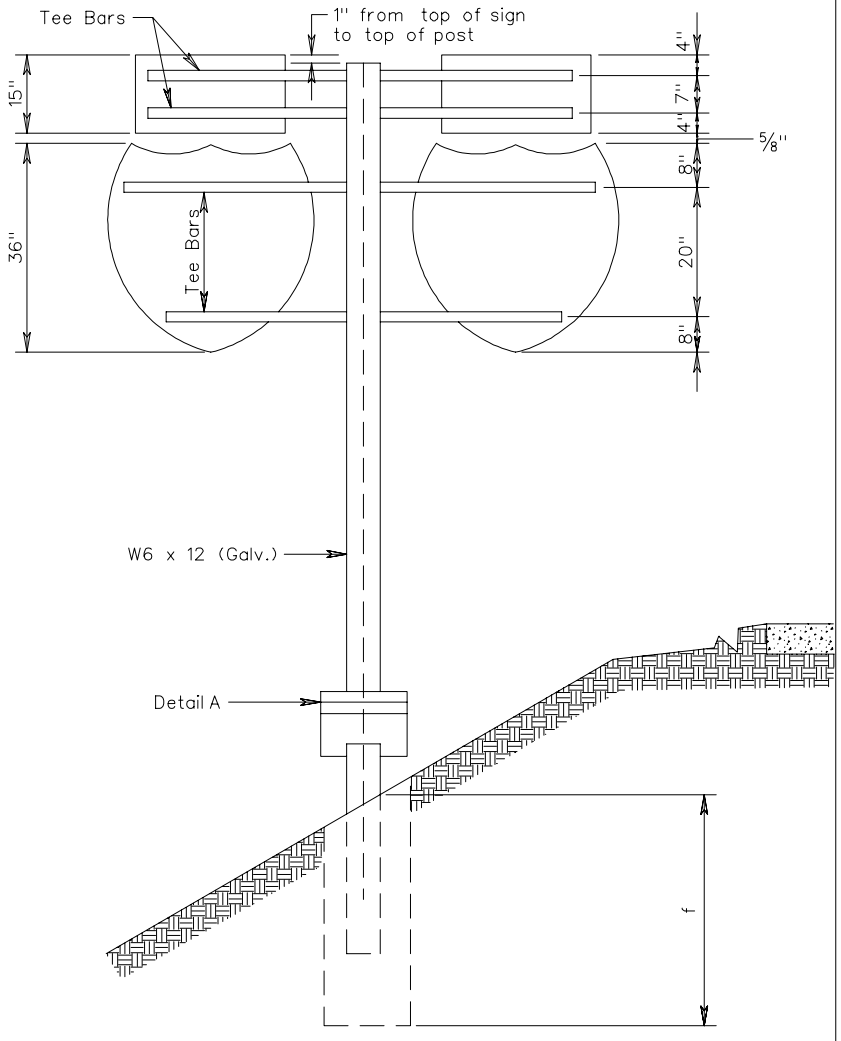


TYPICAL DETAILS FOR TYPE VA SIGN STRUCTURES

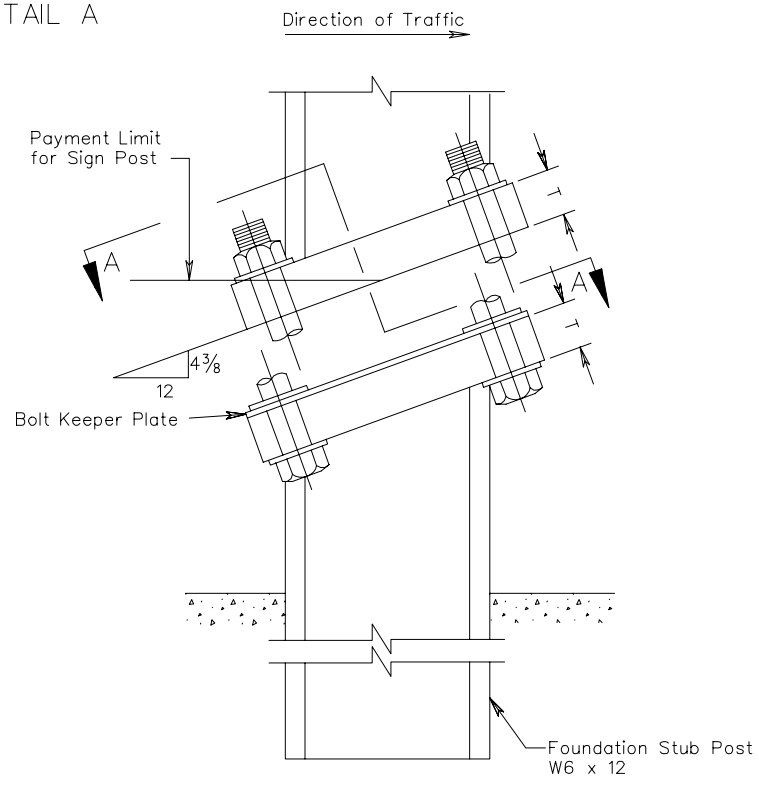
VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 7/05
REV. 4/04

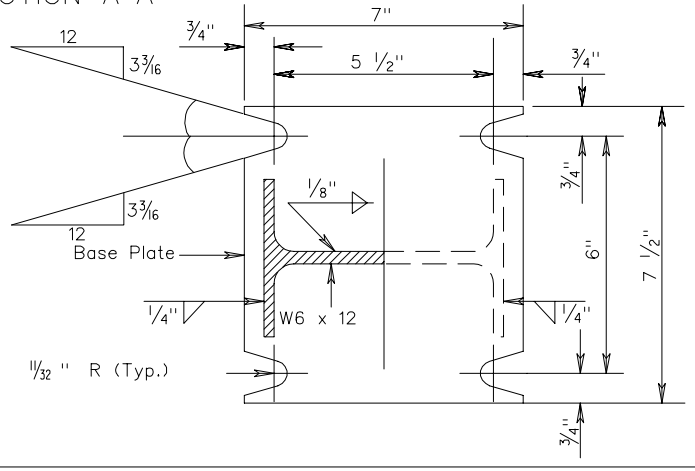
TYPE VA-A2



DETAIL A



SECTION A-A



NOTES:

There is to be a maximum space of 1" between signs

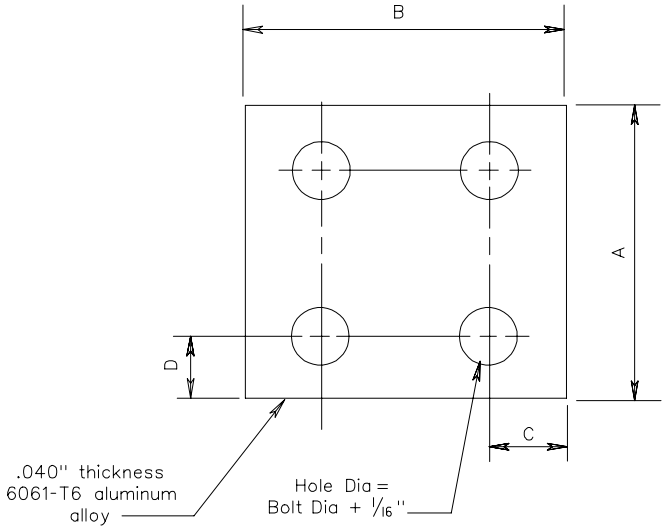
Cardinal directions are to be centered above shields.

For details of shims, tee bars, clamps, and other notes, see standard 1301.63.

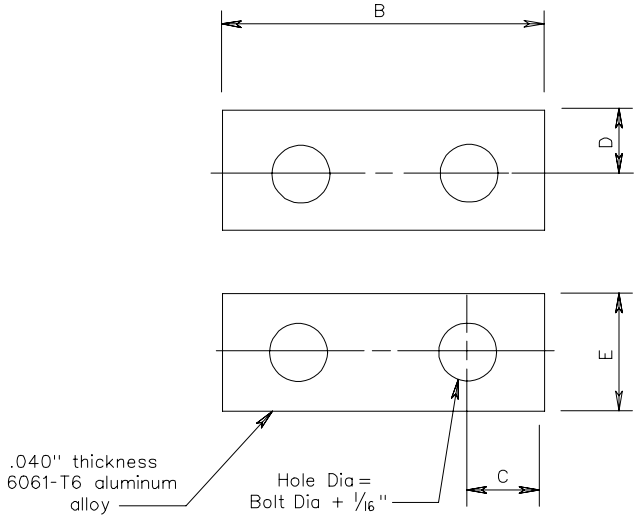
TYPICAL DETAILS FOR TYPE VA SIGN STRUCTURES

VIRGINIA DEPARTMENT OF TRANSPORTATION

BOLT KEEPER PLATE



ALTERNATE BOLT KEEPER PLATE



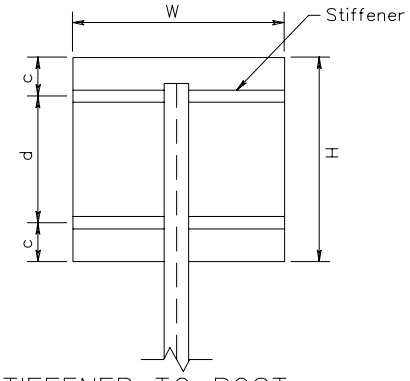
BOLT KEEPER PLATE DATA

POST SHAPE	A	B	C	D	E
S3 x 5.7	5''	4''	1/2''	1/2''	1''
W4x 13	7 3/4''	5 1/2''	3/4''	3/4''	1 1/2''
W6 x 12	7 1/2''	7''	3/4''	3/4''	1 1/2''

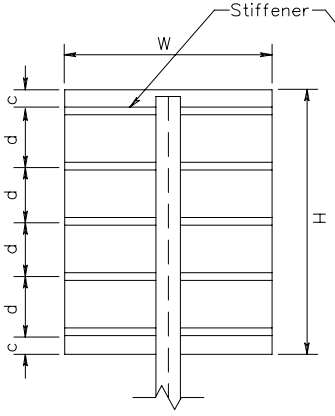
TYPICAL DETAILS FOR TYPE VA SIGN STRUCTURES

VIRGINIA DEPARTMENT OF TRANSPORTATION

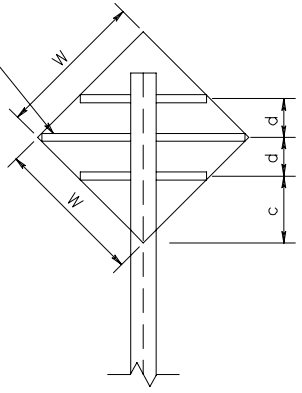
TYPES VA-B, VA-C, VA-D, VA-L AND VA-M



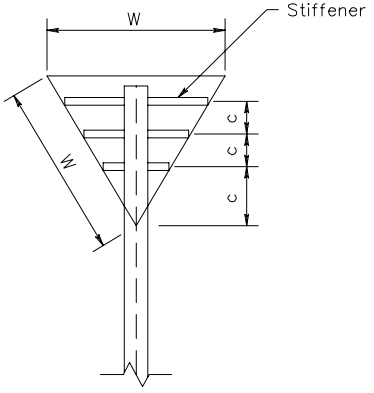
TYPES VA-E



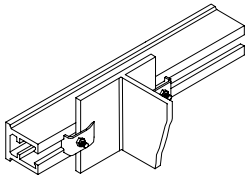
TYPES VA-F



TYPES VA-G



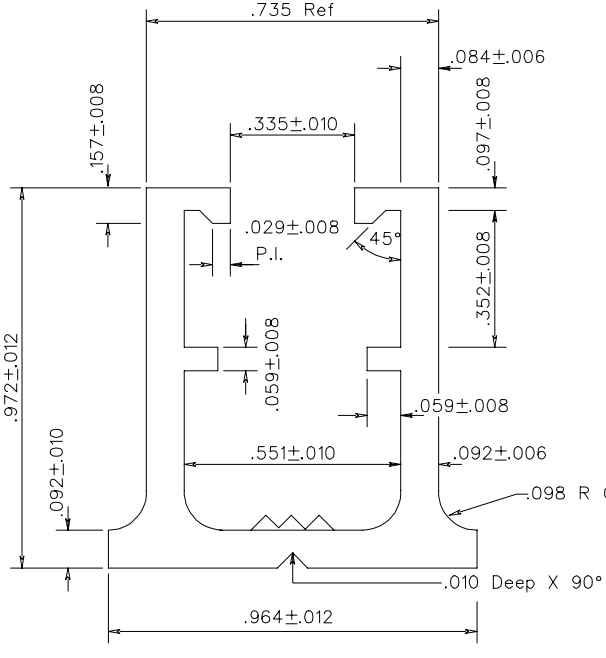
STIFFENER TO POST ATTACHMENT DETAIL



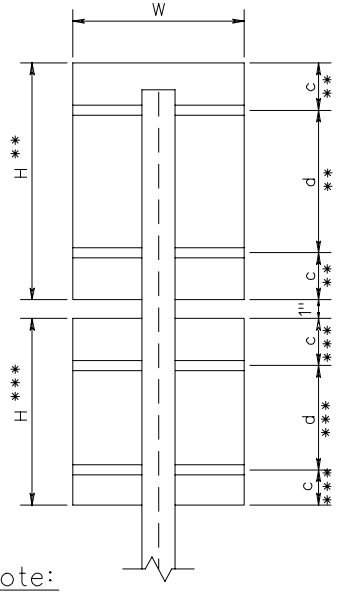
STRUCTURE TYPE	W	H	c	d	STIFFENERS NO.	STIFFENERS SIZE
VA-B	4'	4'	6½"	2'-11"	2	MEDIUM
VA-C	4'	5'	12½"	2'-11"	2	MEDIUM
VA-D	5'	3'	7"	1'-10"	2	MEDIUM
VA-E	6'	5'	0"	1'-3"	5	MEDIUM
VA-F	4'	——	8"	2'-2"	3	MEDIUM
VA-G	5'	——	1'-4"	——	3	MEDIUM
VA-K	4'	5'**	12½"**	2'-11"	2**	MEDIUM
	4'	4'***	6½"***	2'-11"	2***	MEDIUM
VA-L	6'	6'	6"	1'-3"	5	MEDIUM
VA-M	5'	5'	8"	1'-10"	3	MEDIUM

See Standard SSP-VIA for post clamp and bolt details.
See sheets 1301.59 thru 1301.63 for other details.

MEDIUM STIFFENER DETAIL



TYPES VA-K



Note:

Rivets shall be used for securing the stiffeners to the sign unless otherwise specified or approved, and shall be 3/16" minimum diameter by ½" long aluminum and capable of withstanding a minimum shear force of 460lbs. Rivet spacing for attaching the stiffeners to the sign panel shall be 6" maximum begining 1½" from the ends of the sign panel.

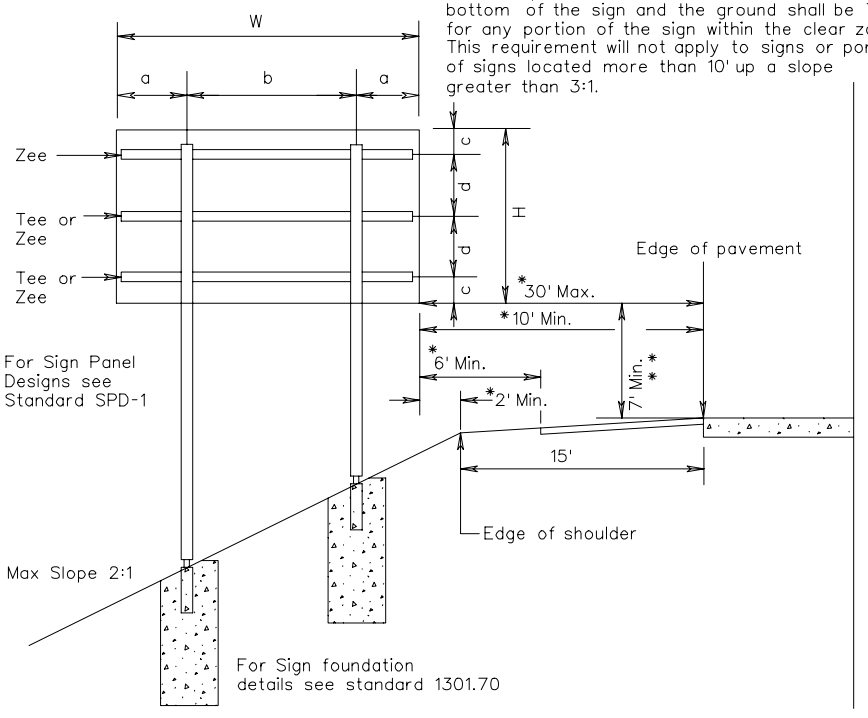
ALTERNATE DETAILS FOR TYPE VA SIGN STRUCTURES

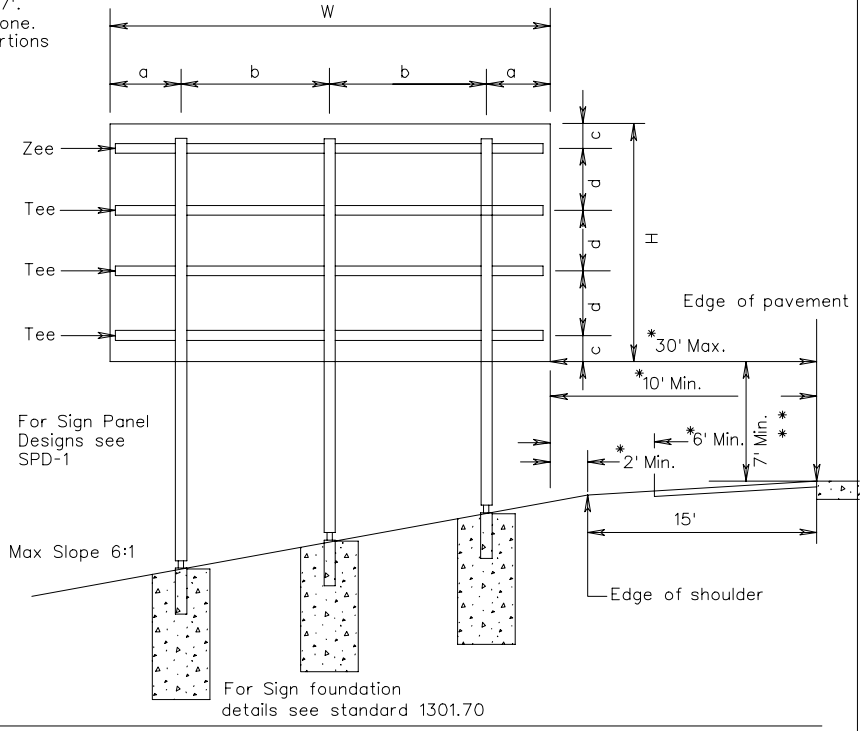
VIRGINIA DEPARTMENT OF TRANSPORTATION

The spacing between sign posts shall be a minimum of 8' center to center.

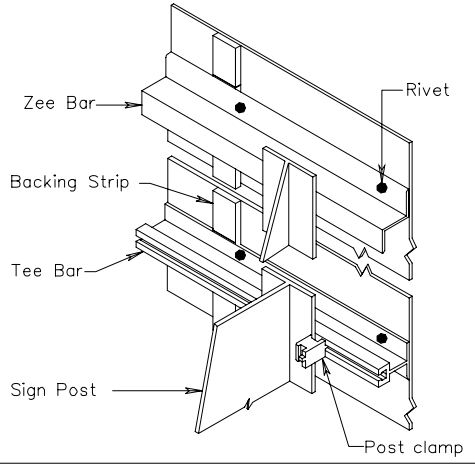
* Signs shall be located to provide optimum viewing and safety within the indicated view limits for lateral placement.

* * In cut slopes, the minimum clearance between the bottom of the sign and the ground shall be 7'. for any portion of the sign within the clear zone. This requirement will not apply to signs or portions of signs located more than 10' up a slope greater than 3:1.

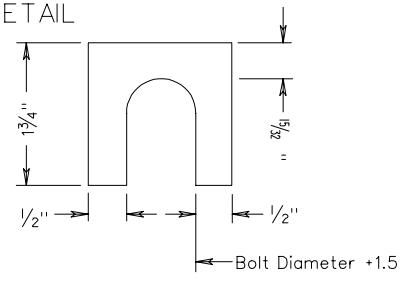




ISOMETRIC VIEW

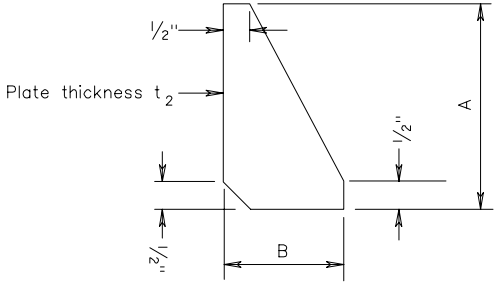


SHIM DETAIL



Furnish 2 each .063"± and 2 each .032± mm thick shims per pole. Shims shall be fabricated from brass conforming to ASTM B36 or from stainless steel with a minimum chromiun content of 11.50 %. No more than 2 shims shall be used per bolt with a maximum of 4 shims per pole.

STIFFENER PLATE DETAIL



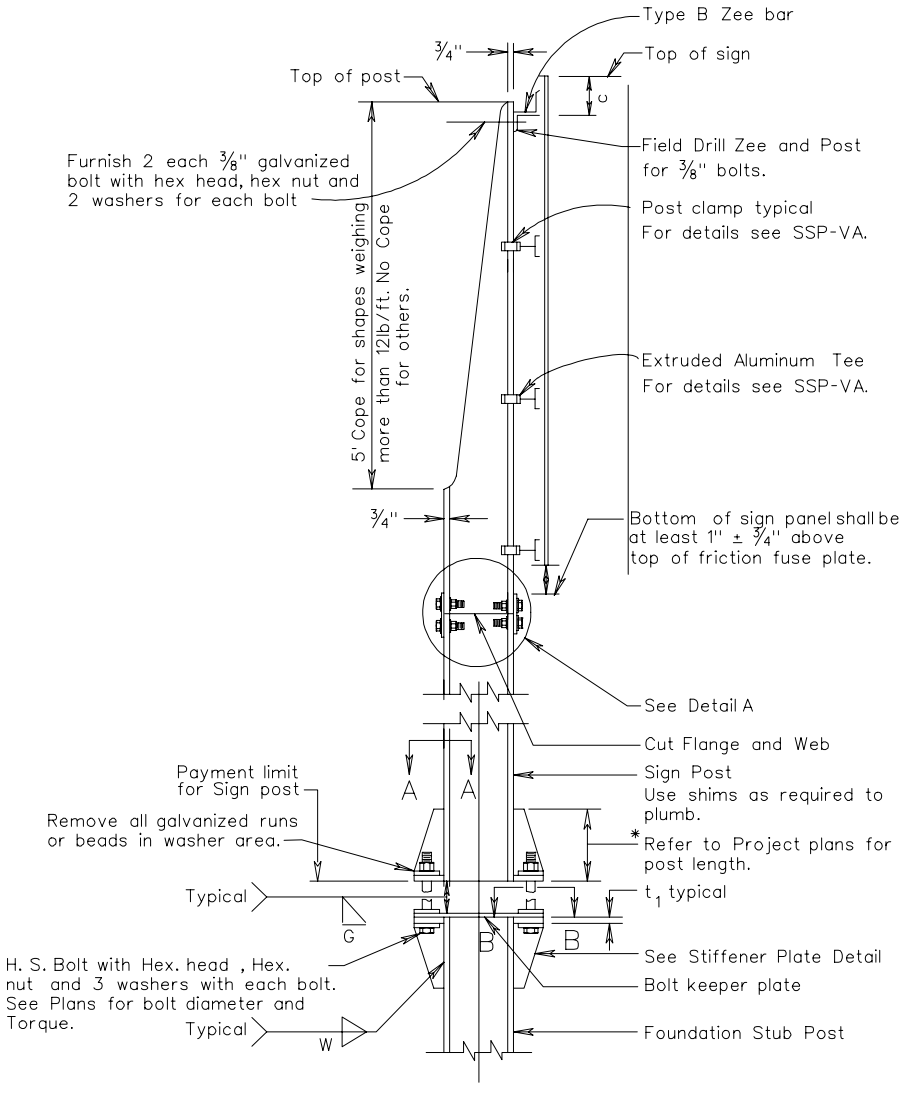
TYPICAL DETAILS FOR TYPE VI A INTERSTATE SIGN STRUCTURE

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 7/05
REV. 4/04

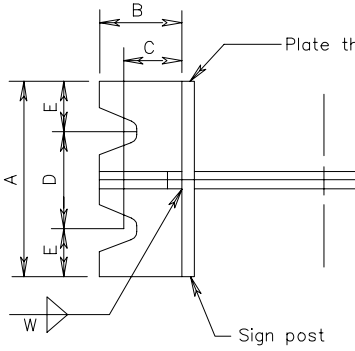
SSP-VI A

SIGN POST AND FOUNDATION STUB POST ELEVATION

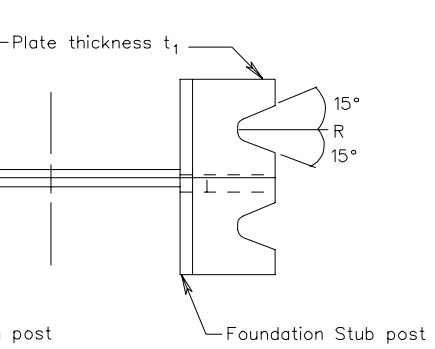


* Post lengths shown on plans are typical for a 2:1 slope. All post lengths shall be field checked by contractor prior to fabrication.

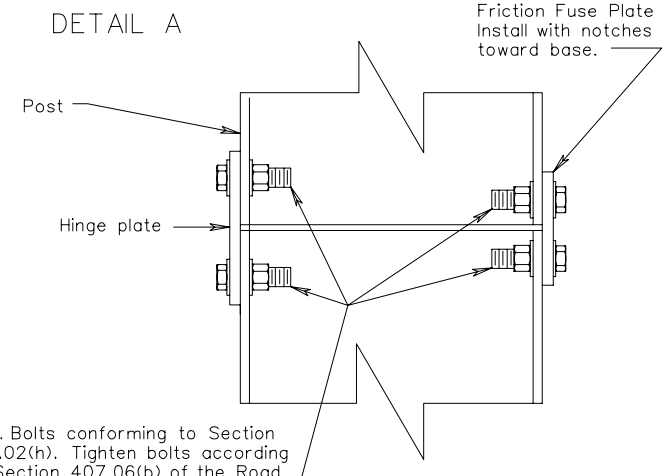
SECTION A-A



SECTION B-B



DETAIL A



H. S. Bolts conforming to Section 226.02(h). Tighten bolts according to Section 407.06(b) of the Road and Bridge Specifications.

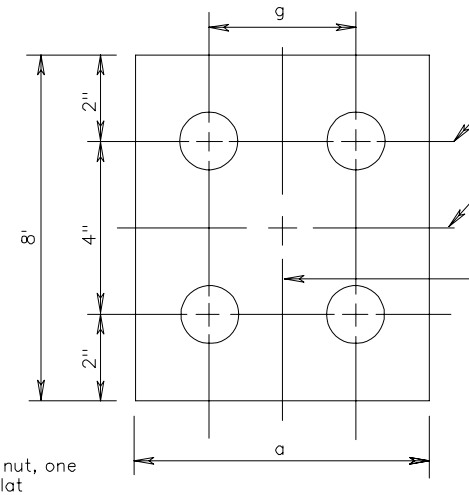
Direction of Traffic

TYPICAL DETAILS FOR TYPE VI A INTERSTATE SIGN STRUCTURES

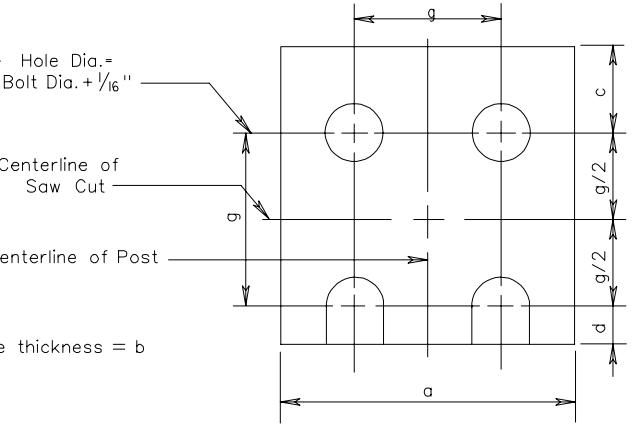
VIRGINIA DEPARTMENT OF TRANSPORTATION

1301.68

HINGE PLATE DETAIL



FUSE PLATE DETAIL

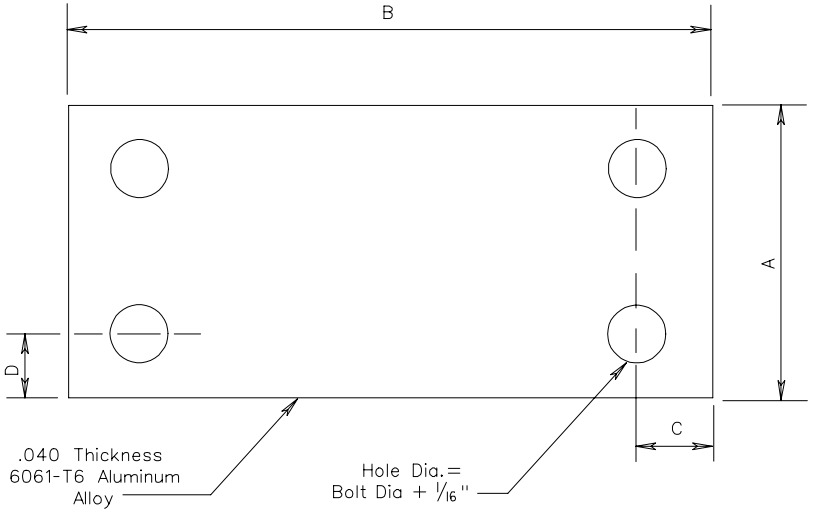


ZEE BARS		
TYPE	SIZE	WEIGHT
A	2 3/8" x 1 1/4" x 3/16"	1.00lbs./ft.
B	3" x 2 11/16" x 1/4"	2.40lbs./ft.
C	4" x 3 1/16" x 1/4"	2.93lbs./ft.
D	5" x 3 1/4" x 5/16"	4.13lbs./ft.
E	6" x 3 1/2" x 3/8"	5.58lbs./ft.

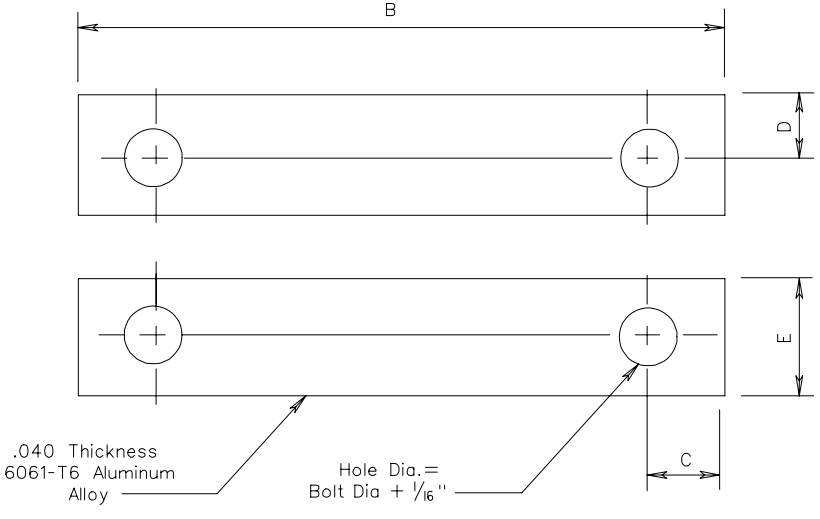
NOTES:

Use H.S. bolts with hexagon head and hexagon nut, one flat washer under each bolt head and bevel or flat washer, where required, under nut. Tighten in accordance with section 407.06 of the Road and Bridge Specifications.

BOLT KEEPER PLATE



ALTERNATE BOLT KEEPER PLATE



TYPICAL DETAILS FOR TYPE VI A INTERSTATE SIGN STRUCTURES

VIRGINIA DEPARTMENT OF TRANSPORTATION

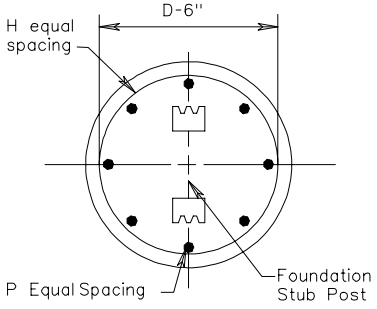
SSP-VI A

TYPE VI A	FOOTING DIMENSIONS		BAR P			BAR H		
	D	d	Length	Bar Size	No.	Bar Size	No.	Length
A	2'-3"	4'-0"	3'-7"	# 4	8	# 4	5	6'-7"
B	2'-3"	4'-0"	3'-7"	# 4	8	# 4	5	6'-7"
C	2'-3"	4'-0"	3'-7"	# 4	8	# 4	5	6'-7"
D	2'-3"	4'-0"	3'-7"	# 4	8	# 4	5	6'-7"
E	2'-3"	4'-6"	4'-1"	# 4	8	# 4	5	6'-7"
F	2'-9"	4'-6"	4'-1"	# 4	8	# 4	5	8'-2"
G	2'-9"	5'-0"	4'-7"	# 4	8	# 4	6	8'-2"
H	2'-9"	5'-6"	5'-1"	# 5	8	# 4	6	8'-2"
J	3'-0"	5'-6"	5'-1"	# 5	8	# 4	6	9'-0"
K	3'-0"	6'-0"	5'-7"	# 5	8	# 4	7	9'-0"
L	3'-0"	6'-6"	6'-1"	# 5	8	# 4	7	9'-0"
M	3'-6"	6'-6"	6'-1"	# 5	8	# 4	7	10'-7"
N	3'-6"	7'-0"	6'-7"	# 5	8	# 4	8	10'-7"
O	3'-6"	7'-0"	6'-7"	# 6	8	# 4	8	10'-7"
P	3'-6"	7'-6"	7'-1"	# 6	8	# 4	8	10'-7"
Q	2'-9"	4'-6"	4'-1"	# 4	8	# 4	5	8'-2"
R	2'-9"	5'-0"	4'-7"	# 4	8	# 4	6	8'-2"
S	2'-9"	5'-6"	5'-1"	# 4	8	# 4	6	8'-2"
T	2'-9"	6'-0"	5'-7"	# 5	8	# 4	7	8'-2"
U	2'-9"	6'-6"	6'-1"	# 5	8	# 4	7	8'-2"
V	3'-0"	6'-6"	6'-1"	# 5	8	# 4	7	9'-0"
W	3'-0"	7'-0"	6'-7"	# 6	8	# 4	8	9'-0"
X	3'-0"	7'-6"	7'-1"	# 6	8	# 4	8	9'-0"
Y	3'-6"	7'-6"	7'-1"	# 6	8	# 4	8	10'-7"
Z	3'-6"	8'-0"	7'-7"	# 6	8	# 4	9	10'-7"
AA	3'-6"	8'-6"	8'-1"	# 7	8	# 4	9	10'-7"
BB	3'-6"	9'-0"	8'-7"	# 7	8	# 4	10	10'-7"
CC	2'-9"	5-'6"	5'-1"	# 5	8	# 4	6	8'-2"
DD	2'-9"	6'-6"	6'-1"	# 5	8	# 4	7	8'-2"
EE	2'-9"	7'-0"	6'-7"	# 6	8	# 4	8	8'-2"
FF	3'-0"	7'-0"	6'-7"	# 6	8	# 4	8	9'-0"
GG	3'-6"	7'-6"	7'-1"	# 6	8	# 4	8	10'-7"
HH	3'-6"	8'-0"	7'-7"	# 6	8	# 4	9	10'-7"
JJ	3'-6"	8'-6"	8'-1"	# 7	8	# 4	9	10'-7"
KK	3'-6"	9'-0"	8'-7"	# 7	8	# 4	10	10'-7"
LL	3'-6"	9'-6"	9'-1"	# 7	8	# 4	10	10'-7"
MM	3'-6"	10'-0"	9'-7"	# 8	8	# 4	11	10'-7"
NN	3'-6"	10'-0"	9'-7"	# 8	8	# 4	11	10'-7"

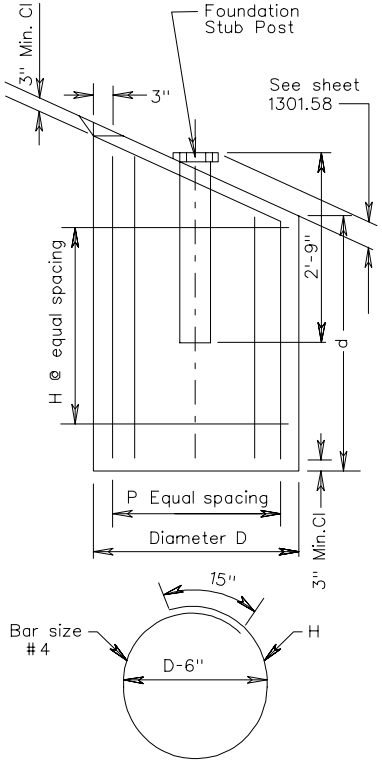
TYPE VI A	FOOTING DIMENSIONS		BAR P			BAR H		
	D	d	Length	Bar Size	No.	Bar Size	No.	Length
OO	2'-9"	5'-6"	5'-1"	# 4	8	# 4	6	8'-2"
PP	2'-9"	6'-0"	5'-7"	# 5	8	# 4	7	8'-2"
QQ	2'-9"	6'-6"	6'-1"	# 5	8	# 4	7	8'-2"
RR	3'-0"	7'-0"	6'-7"	# 5	8	# 4	8	9'-0"
SS	3'-0"	7'-0"	6'-7"	# 6	8	# 4	8	9'-0"
TT	3'-0"	8'-0"	7'-7"	# 6	8	# 4	9	9'-0"
UU	3'-6"	8'-0"	7'-7"	# 6	8	# 4	9	10'-7"
VV	3'-6"	8'-0"	7'-7"	# 6	8	# 4	9	10'-7"
WW	3'-6"	8'-6"	8'-1"	# 7	8	# 4	9	10'-7"
XX	3'-6"	9'-0"	8'-7"	# 7	8	# 4	10	10'-7"
YY	3'-6"	9'-6"	9'-1"	# 8	8	# 4	10	10'-7"
ZZ	3'-0"	7'-0"	6'-7"	# 6	8	# 4	8	9'-0"
AB	3'-0"	7'-6"	7'-1"	# 6	8	# 4	8	9'-0"
AC	3'-6"	8'-0"	7'-7"	# 6	8	# 4	9	10'-7"
AD	3'-6"	8'-6"	8'-1"	# 7	8	# 4	9	10'-7"
AE	3'-6"	9'-0"	8'-7"	# 7	8	# 4	10	10'-7"
AF	3'-6"	9'-6"	9'-1"	# 7	8	# 4	10	10'-7"
AG	3'-6"	10'-0"	9'-7"	# 8	8	# 4	11	10'-7"
AH	4'-0"	10'-0"	9'-7"	# 8	8	# 4	11	12'-1"
AJ	4'-0"	10'-6"	10'-1"	# 8	8	# 4	11	12'-1"
AK	4'-0"	11'-0"	10'-7"	# 8	8	# 4	12	12'-1"
AL	4'-0"	7'-6"	7'-1"	# 6	8	# 4	8	12'-1"
AM	4'-0"	8'-0"	7'-7"	# 6	8	# 4	9	12'-1"
AN	4'-0"	9'-0"	8'-7"	# 7	8	# 4	10	12'-1"
AO	4'-0"	9'-6"	9'-1"	# 7	8	# 4	10	12'-1"
AP	4'-0"	10'-0"	9'-7"	# 8	8	# 4	11	12'-1"
AQ	4'-0"	10'-6"	10'-1"	# 8	8	# 4	11	12'-1"
AR	4'-0"	11'-0"	10'-7"	# 8	8	# 4	12	12'-1"
AS	4'-0"	11'-6"	11'-1"	# 9	8	# 4	12	12'-1"
AT	4'-0"	12'-0"	11'-1"	# 9	8	# 4	13	12'-1"
AU	4'-0"	9'-0"	8'-7"	# 7	8	# 4	10	12'-1"
AV	4'-0"	9'-6"	9'-1"	# 7	8	# 4	10	12'-1"
AW	4'-0"	10'-0"	9'-7"	# 8	8	# 4	11	12'-1"
AX	4'-0"	11'-0"	10'-7"	# 8	8	# 4	12	12'-1"
AY	4'-0"	11'-6"	11'-1"	# 9	8	# 4	12	12'-1"
AZ	4'-0"	12'-0"	11'-7"	# 9	8	# 4	13	12'-1"
BC	4'-0"	13'-0"	12'-7"	# 10	8	# 4	14	12'-1"
BD	4'-0"	13'-6"	13'-1"	# 10	8	# 4	14	12'-1"

PLAN

Parallel to face at Footing



ELEVATION

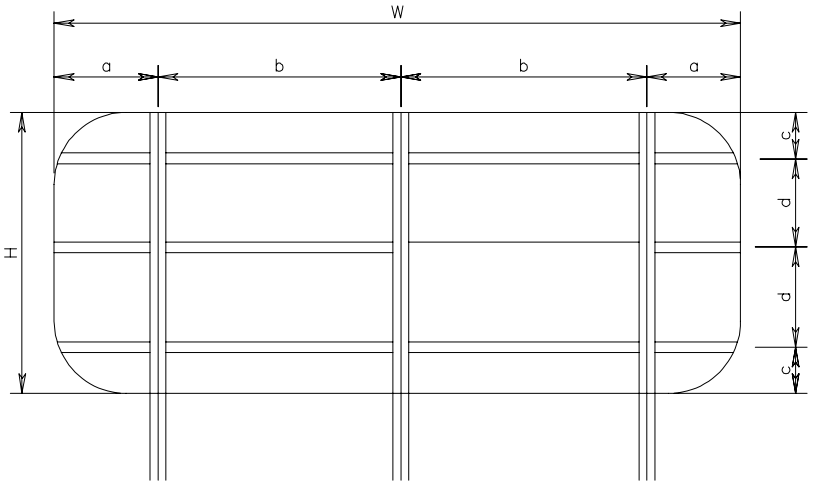


TYPICAL VI A FOUNDATION DETAILS

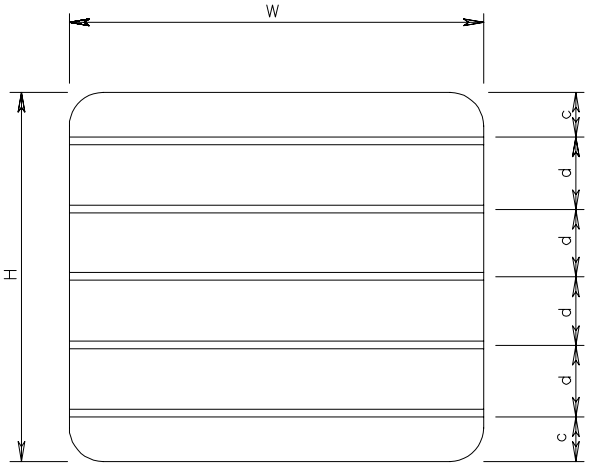
VIRGINIA DEPARTMENT OF TRANSPORTATION

1301.70

SIGN PANEL
DETAIL

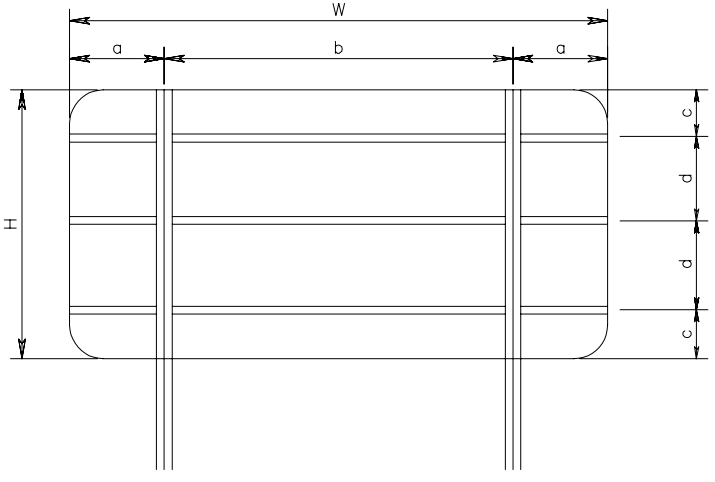


SIGN PANEL
DETAIL

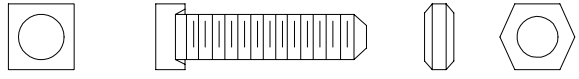


Use the above sign panel detail for "c" and "d" spacing when the "c" dimension for Alternate Sign Panel Attatchment Details is "0" or 12 mm.

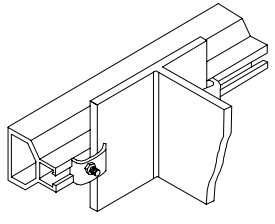
SIGN PANEL
DETAIL



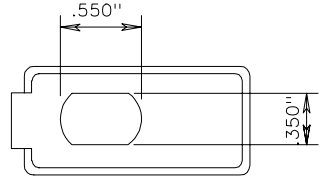
Post clam bolt
(Stainless steel)

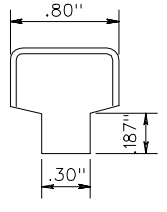


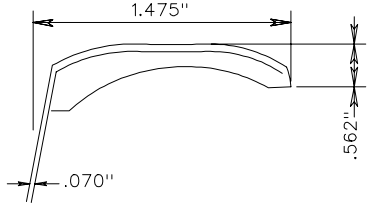
STIFFENER TO POST
ATTACHMENT DETAIL



POST CLAMP
(Stainless steel)







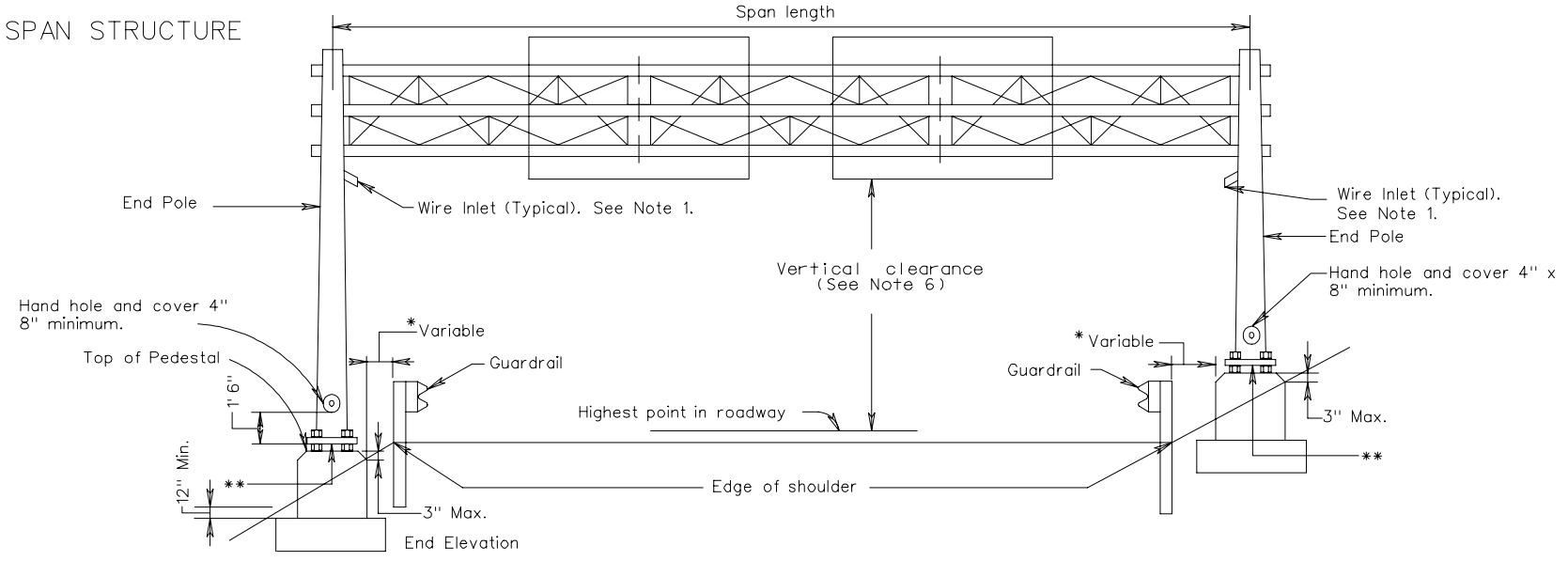
See Standard SPD-1 for sign panel design.
See sheets 1301.67 thru 1301.70 for other details.

ALTERNATE DETAILS FOR TYPE VIA INTERSTATE SIGN STRUCTURES

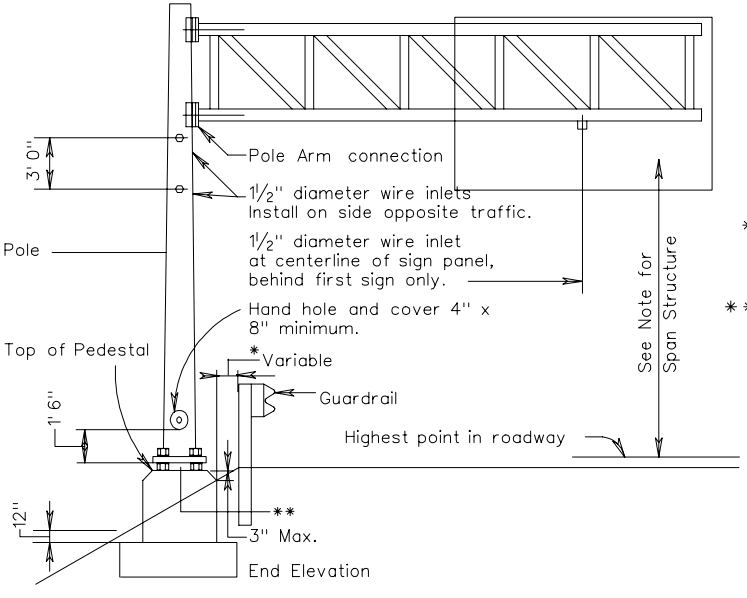
VIRGINIA DEPARTMENT OF TRANSPORTATION

OSS-1

SPAN STRUCTURE



CANTILEVER STRUCTURE



NOTES:

1. 1½" diameter wire inlets shall be provided at the following locations:
   - A. On span structures on the front leg of end pole 12" below bottom chord.
   - B. On cantilever structures on pole 12" below bottom chord.
   - C. On span structures below bottom chord at centerline behind first sign panel from each end pole.
   - D. On cantilever structures below bottom chord at centerline behind first sign panel from pole.
2. All unused wire inlets shall be capped water tight.
3. *Distance shall be no less than the minimum indicated in Standard GR-INS.
4. No mortar, grout, or concrete shall be placed between bottom of base plate and top of pedestal.
5. **The maximum space beetween the bottom of the base plate and the top of the foundation shall be no more than the diameter of the anchor bolt plus one inch.
6. Vertical clearance for overhead and bridge mounted sign structures shall be no less than 5.8 metersand no more than 6.4 meters from the bottom of the lowest mounted sign panel to the crown of the roadway, unless otherwise specified on the plans. Luminaire assemblies shall have a vertical clearence of no less than 5.3 meters from the bottom of the assembly to the crown of the roadway.
7. All poles/uprights of overhead sign structures including "butterfly" structures shall have a minimum of six anchor bolts, each having a minimum diameter of 1½". Anchor bolts shall be cast in place. Adhesive anchors with epoxy or non-shrink grout shall not be allowed.

REV. 2/06
REV. 7/05
REV. 4/04
REV. 1/04

TYPICAL DETAILS FOR OVERHEAD SIGN STRUCTURES

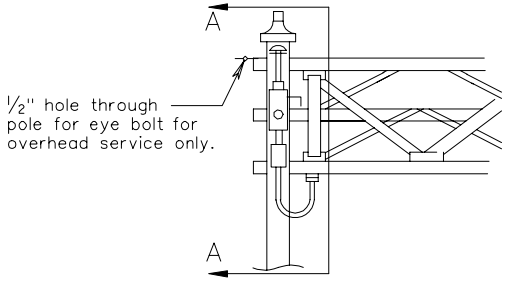
VIRGINIA DEPARTMENT OF TRANSPORTATION

1301.72

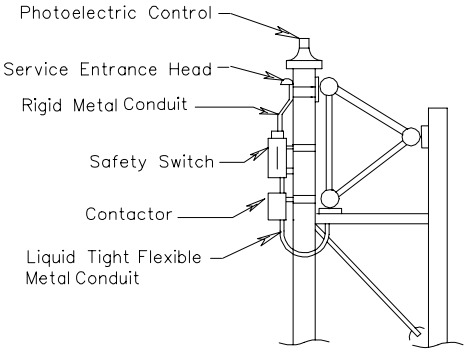
ELECTRIC DETAILS FOR SIGN LIGHTING

SPAN SIGN STRUCTURE

FRONT VIEW

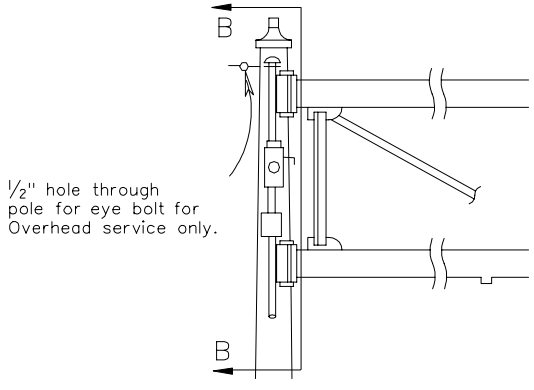


SECTION A-A

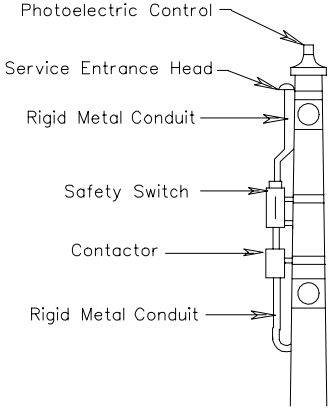


CANTILEVER SIGN STRUCTURE

FRONT VIEW



SECTION B-B



Note:

A safety switch shall be installed on all sign structures requiring electrical power. Electrical service for sign structures not controlled by a control center shall be have a photocell and a photocell controlled contactor to control the electrical power to luminaires. The contactor shall be in a NEMA 3R enclosure within 24 inches of the safety switch.

All conduit located in or on overhead sign structure shall be ¾" minimum.

TYPICAL DETAILS FOR OVERHEAD SIGN STRUCTURES

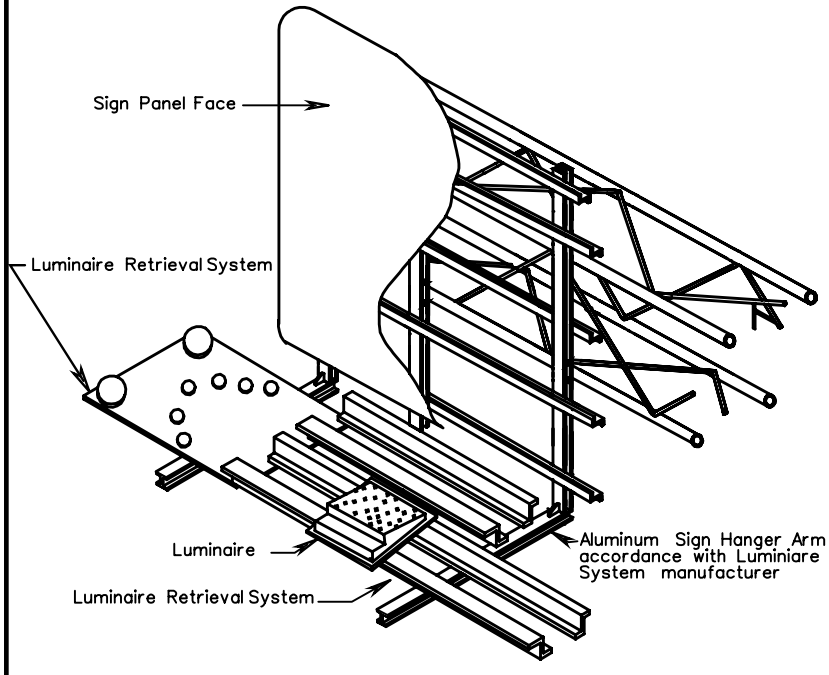
VIRGINIA DEPARTMENT OF TRANSPORTATION

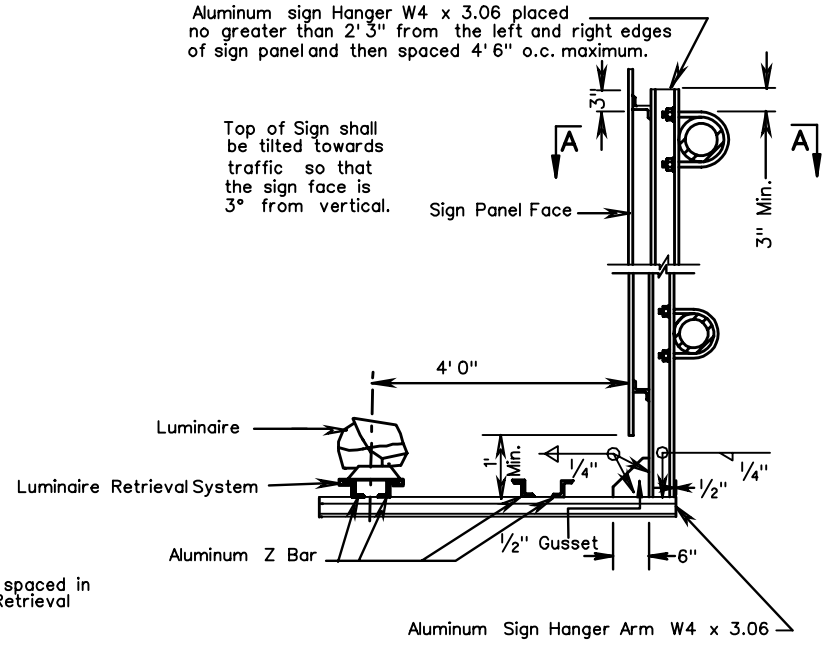
REV. 7/05
REV. 4/04
REV. 1 / 04

1301.73

OSS-1

SIGN HANGER ERECTION DETAIL WITH LUMINAIRE RETRIEVAL SYSTEM



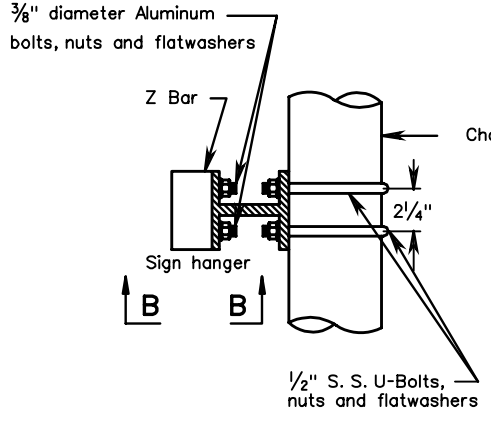


Note:

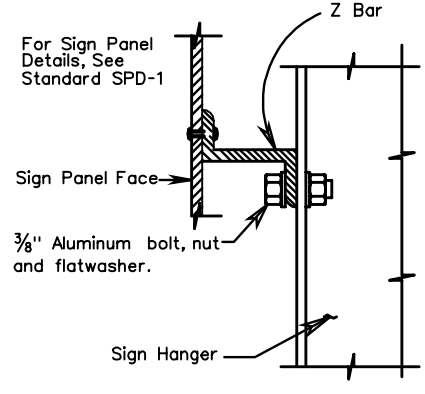
Luminaire Retrieval System including electrical system shall be equal to "LUMI-TRAK" and designed for the number of luminaires indicated on the plans. Spacing of hangers used to support the retrieval system shall be in accordance with manufacturer's recommendations. Turntable end shall be of sufficient length to align with the vertical edge of the outside paved shoulder (±6") or shall be extended 5 feet beyond the vertical edge (±6") of the outermost sign luminaire whichever is greater. The opposite end of retrieval system shall extend a minimum of 6 inches past the outermost vertical edge of the sign hanger arm.

Luminaires and Luminaire Retrieval System required only where indicated on the plans.

SECTION A-A



SECTION B-B

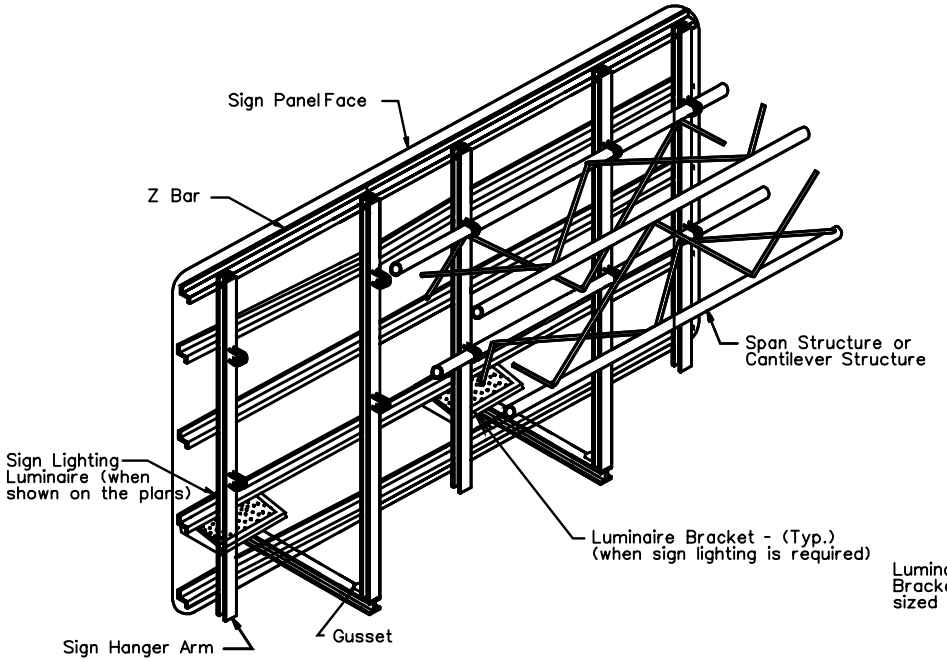


TYPICAL DETAILS FOR OVERHEAD SIGN STRUCTURES

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV 8/07

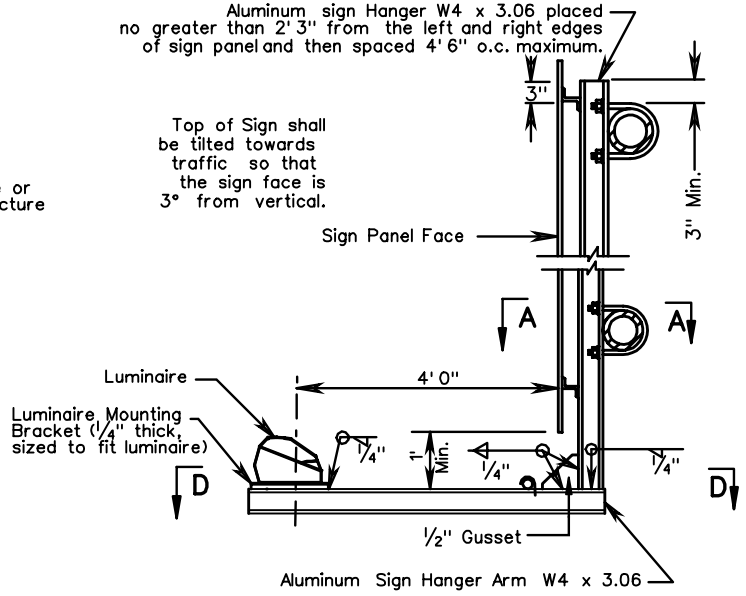
1301.74



SIGN ATTACHMENT TO TRUSS-TYPE STRUCTURES

SIGN HANGER ERECTION DETAIL WITH LUMINAIRE

(WHEN NO LUMINAIRE RETRIEVAL SYSTEM IS REQUIRED)

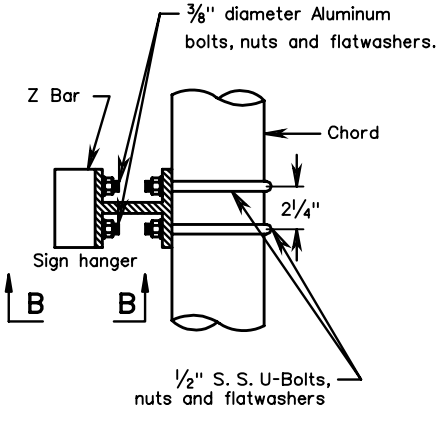


Note

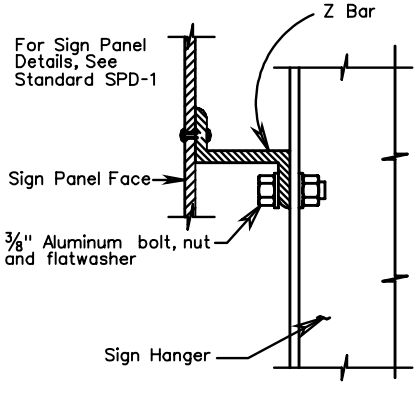
Luminaires required only where indicated on the plans.

Luminaire to be attached to mounting bracket with 4, 3/8" Dia. galvanized cap screws, lockwashers and nuts.

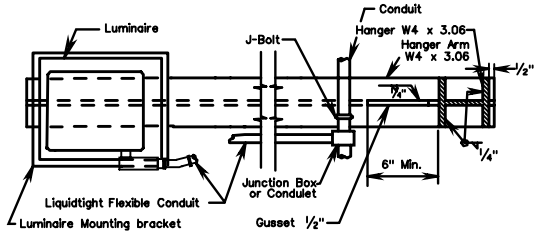
SECTION A-A



SECTION B-B



SECTION D-D



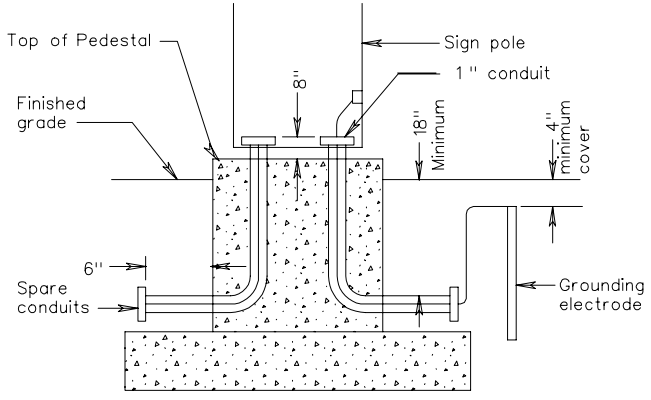
TYPICAL DETAILS FOR OVERHEAD SIGN STRUCTURES

VIRGINIA DEPARTMENT OF TRANSPORTATION

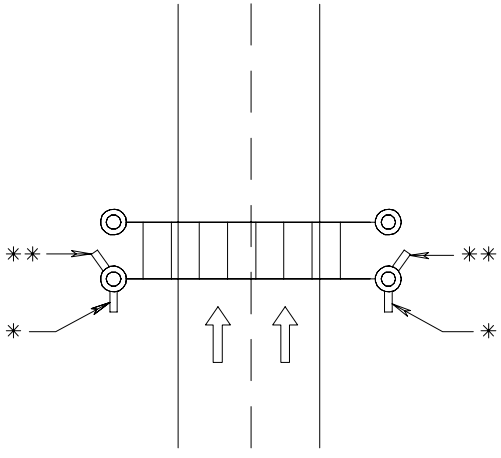
REV 8/07

1301.75

TYPICAL SIGN FOOTING DETAIL WITH CONDUIT



LOCATION OF FUTURE USE CONDUITS FOR DOUBLE END POLE STRUCTURES



* Future use conduits placed parallel to the roadway

** Future use conduits placed at an angle to miss the back foundation or anchor bolts in a spread footing foundation.

The maximum space between the bottom of the base plate and the top of the foundation shall be no greater than the diameter of the anchor bolt plus one inch.

Overhead sign structures including "buterfly" structures shall have a minimum of six anchor bolts, each having a minimum diameter of 1½".

NOTES:

The type, size, number and orientation of conduits entering and exiting footings may vary per sign location.

In addition to the conduits specified on the plans, one - 1" conduit required for ground wire and two - 2" pvc heavy wall conduits required for future use. Future use conduits shall be stubbed out and capped. Future use conduits shall be oriented to run parallel to the roadway. For location of future use conduits in foundations for double end pole structures, see drawing at right.

Each foundation shall be permanently marked to indicate all sides from which conduits pass. This mark shall be made with a trowel when finishing the concrete and shall be ¼" deep and 4" to 6" long. Locations of empty conduits shall have an additional 2" long mark made perpendicular to and centered on this mark.

Foundations above finished grade shall be chamfered ¾" on all edges.

Grounding bushings shall be installed on each end of metal conduits.

Bell ends shall be installed on each end of PVC conduits.

Bell ends & bushings of empty conduits shall be plugged to prevent moisture and rodent entry.

Voids remaining after conductors exit or enter bell ends or bushings of conduits shall be sealed with silicone to prevent moisture and rodent entry.

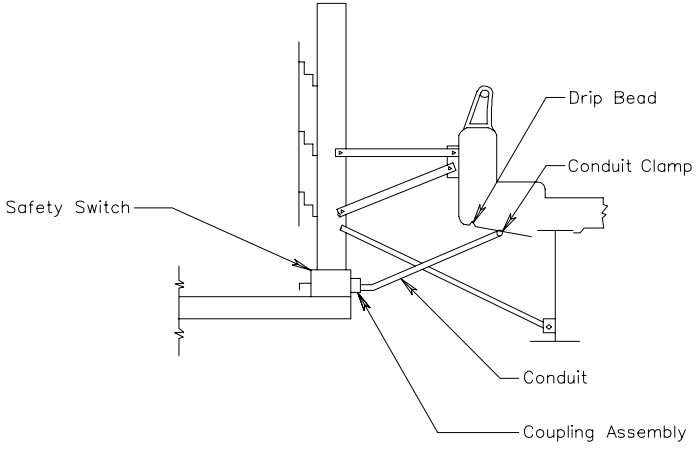
No mortar, grout, or concrete shall be placed between bottom of base plate and top of pedestal.

TYPICAL DETAILS FOR OVERHEAD SIGN STRUCTURES

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 7/05
REV. 4/04

BRIDGE PARAPET ELECTRICAL DETAILS



NOTES:

The vertical and horizontal conduit runs shall be supported at 10' intervals for metal conduits and 5' intervals for PVC conduit; all bends shall be supported within a minimum of 12'' on each side of bend.

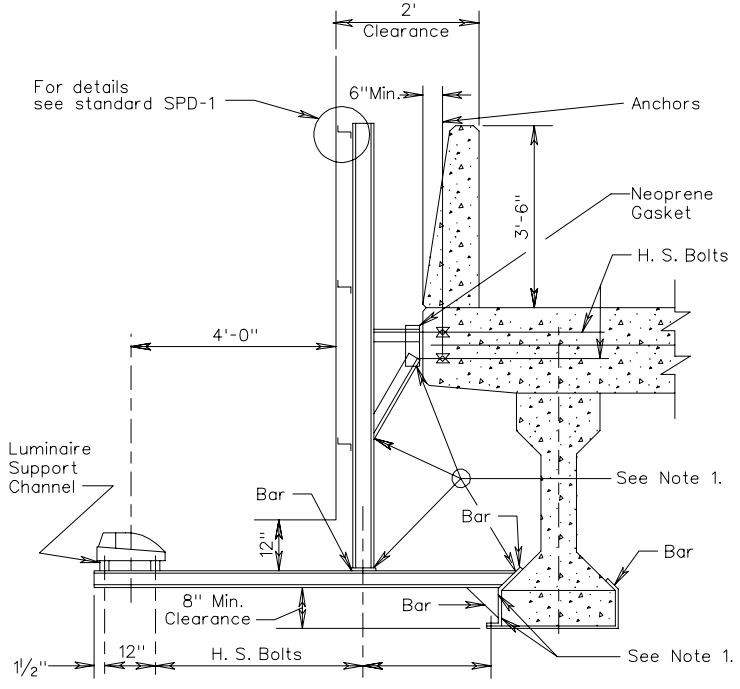
Conduit clamps shall be designed for the size and type of conduit indicated. The expansion anchor bolt shall be galvanized or stainless steel, 1/4'' diameter embedded a minimum length of 2'' with a minimum tensile pullout strength of 500 Lbs. Conduit clamps shall be located 4'' minimum from the drip bead.

TYPICAL BRIDGE PARAPET ELECTRICAL DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

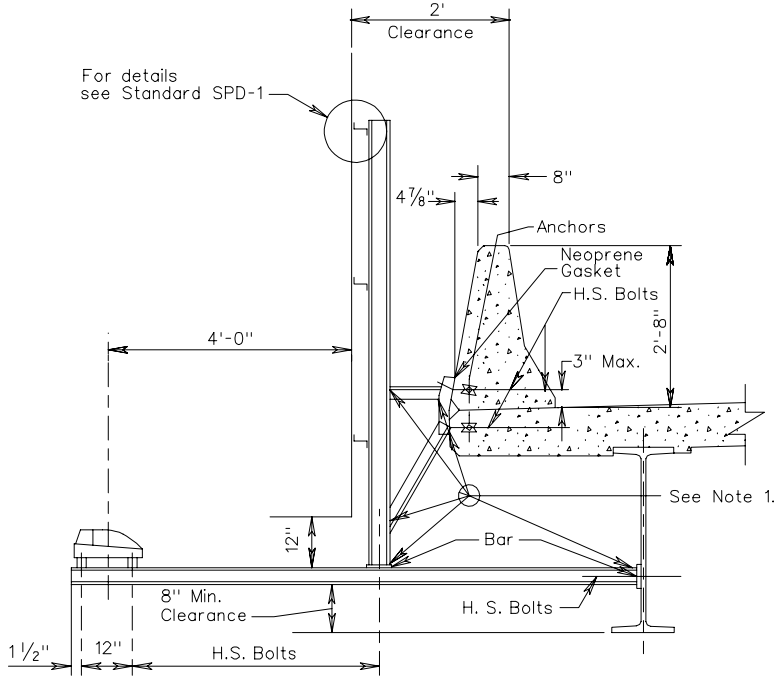
BSS-1

TYPICAL FOR PRESTRESSED CONCRETE BEAM



This parapet is not typical for bridges with a sidewalk.
Bridge plans shall be reviewed for project specific parapet/rail.

TYPICAL FOR STEEL BEAM/GIRDER



Bridge plans shall be reviewed for project specific parapet/rail.

NOTES:

1. The size of members and weld size(s) shall be designed by the contractor for the sign to be supported. Minimum size fillet weld shall be ¼".
2. Minimum clearances are as specified by AASHTO or approved by the Virginia Department of Transportation.
3. For attachment to concrete superstructures or to painted or galvanized steel superstructures, supporting frame may be either aluminum or galvanized steel. For attachment to unpainted weathering steel superstructures, the supporting frames shall be with weathering steel.
4. The spacing of zees and supports shall be as shown on the plans.
5. Sign supports shall be braced for lateral forces.
6. Bolts shall be High-Strength ASTM A325, galvanized except when attachment is made to unpainted weathering steel in which case bolts shall be ASTM A325 Type 3.

   Anchors shall be cast-in-place. Thru-bolting may also be used for attachments to parapets. When cast-in-place anchors are used, they shall develop the strength of the bolts. When thru-bolting is used, anchorage on the traffic side of the parapet shall be flush with the parapet face.

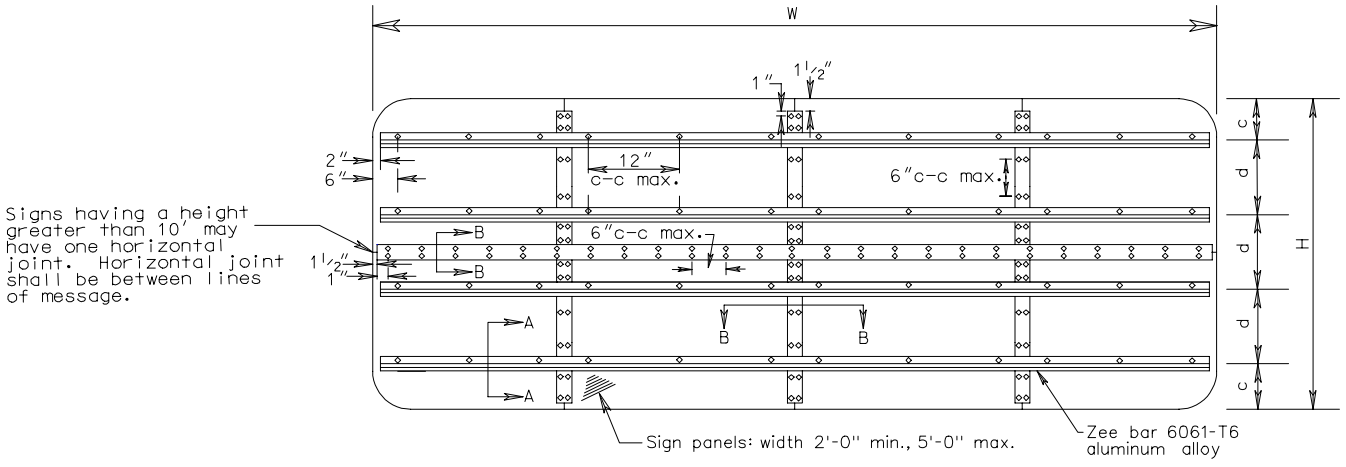
   Anchors shall be placed no higher than 3" above top of deck slab. Adhesive anchors (with expoxy or non-shrink grout) shall not be allowed.
7. When required by the plans bridge mounted sign structure luminaires shall be installed on a luminaire retrieval system with supports and electrical system designed for track mounted luminaires. Retrieval system including the electrical system shall be equal to "LUMI-TRAK" and designed for the number of luminaires as indicated on the plans. Spacing of hangers used to support the retrieval system shall be increased to a maximum 7-foot distance only where hangers do not support sign panels. Turntable end of retrieval system shall be of sufficient length to align with the vertical edge of the outside paved shoulder (± 6") or shall extend five feet beyond the vertical edge (± 6") of outermost sign luminaire whichever is greater. The opposite end of retrieval system shall extend a minimum of 6 inches past the outermost vertical edge of the sign hanger arm. Luminaire support channels and associated equipment will not be required with the luminaire retrieval system.

TYPICAL BRIDGE PARAPET SIGN MOUNTING DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 2/06
REV. 7/05

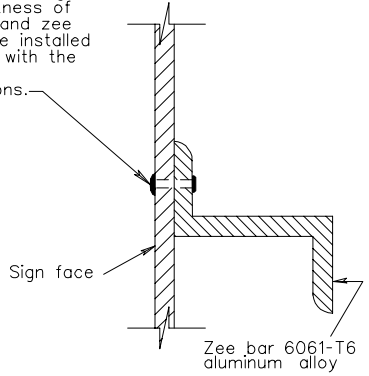
1301.78



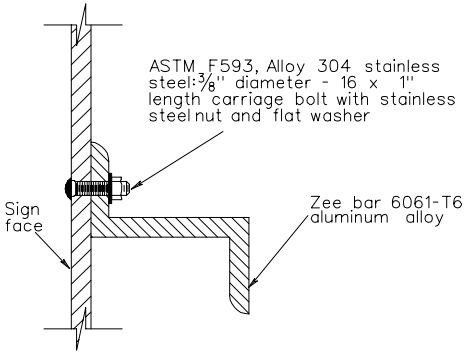
SECTION A-A

ALL INSTALLATIONS EXCEPT TOP AND BOTTOM ZEE BARS ON OVERHEAD SIGNS

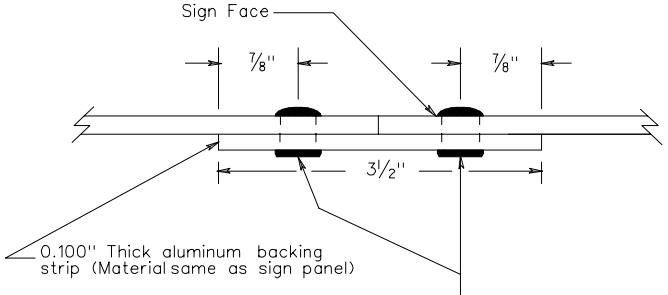
3/16" diameter rivet - Rivets shall be dome head, break mandrel, blind rivets conforming to Industrial Fasteners Institute Standard IFI-114, Style 1, Grades 10 or 11 except that the minimum ultimate tensile strength shall be 360 pounds. Rivets shall have a grip range accommodating the combined thickness of the sign panel and zee bar and shall be installed in accordance with the manufacturer's recommendations.



TOP AND BOTTOM ZEE BAR INSTALLATION ON OVERHEAD SIGNS



SECTION B-B



Rivet (Same as used for connecting sign to zee bar). In lieu of using rivets, tape equal to 3M's VHB Double Coated Acrylic Foam Tape may be used except on horizontal backing strip. Tape shall be installed in accordance with the manufacturer's recommendations.

SIGN PANEL DESIGN

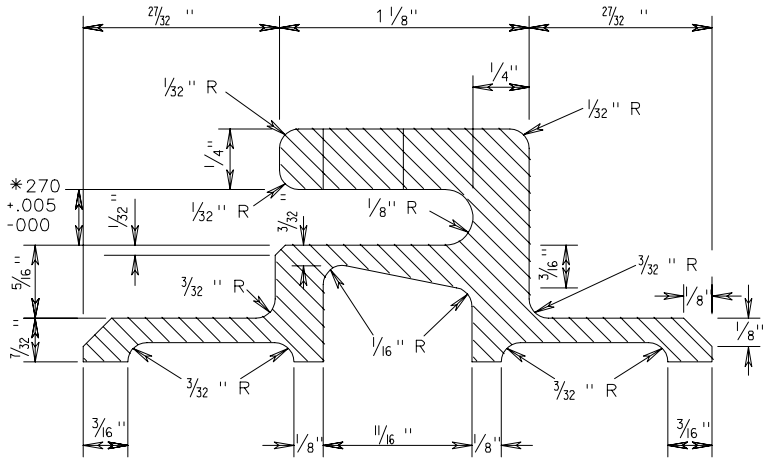
VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 2/06
REV. 7/05

1301.79

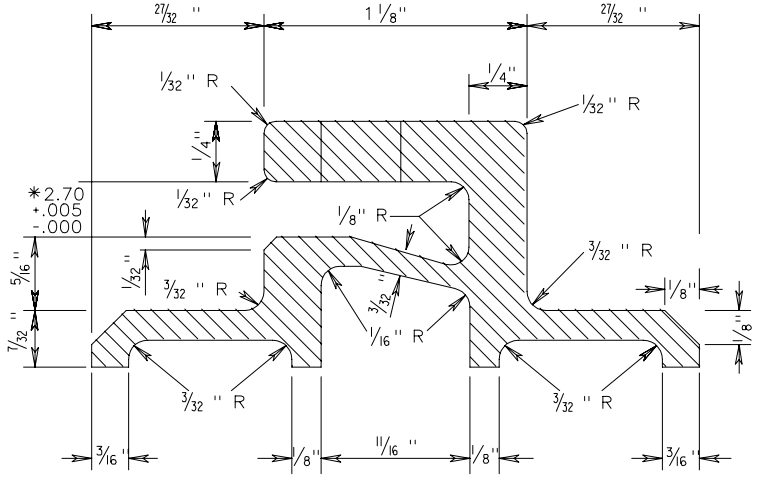
SPD-1

TYPE ONE PANEL CLIP DETAIL



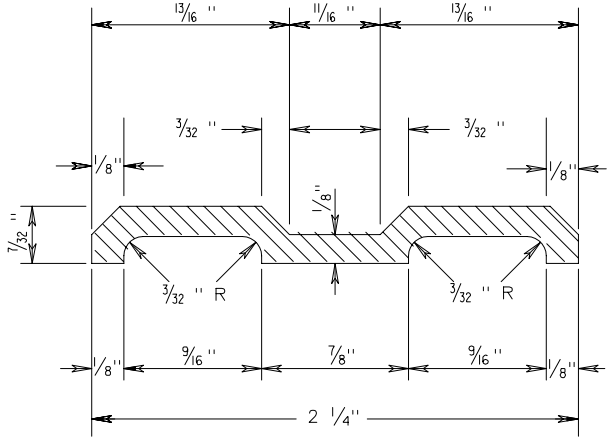
*Use 380 for Type D and E Zee Bars

TYPE TWO PANEL CLIP DETAIL



*Use 380 for Type D and E Zee Bars

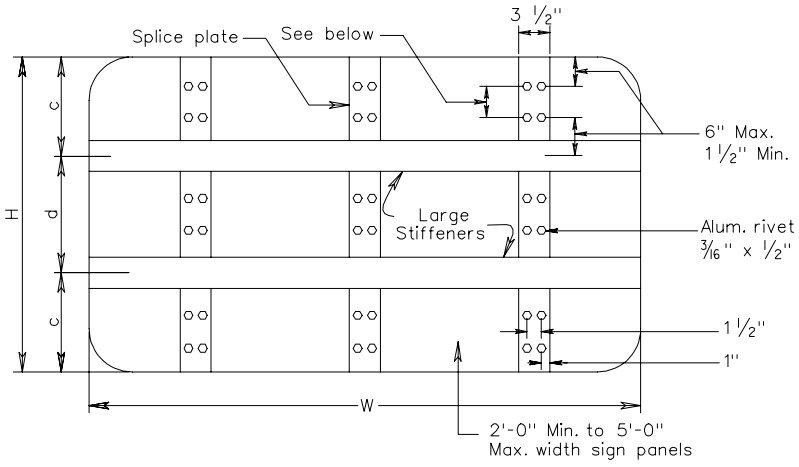
BACKING STRIP DETAIL

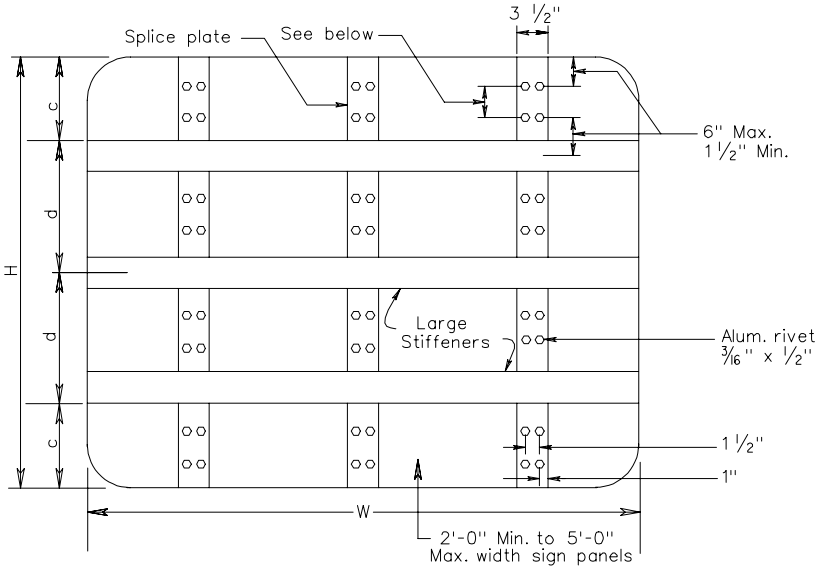


SIGN PANEL DESIGN

VIRGINIA DEPARTMENT OF TRANSPORTATION

1301.80

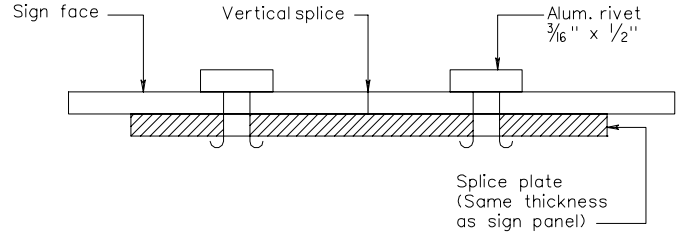




Use the above sign panel detail for "c" and "d" spacing when the "c" dimension for alternate sign panel attachment details is "0" or ½".

Rivets used for securing the stiffeners and splice plate to the sign, and the large stiffener splice bar to the large stiffener shall be 3/16" minimum diameter by ½" long aluminum and capable of withstanding a minimum shear force of 460 lbs. Rivet spacing for attaching the stiffeners to the sign shall be 6" maximum beginning 1 ½" from the ends of the sign panel. Rivet spacing for attaching the large stiffener splice bar to the large stiffener shall be 3" beginning 1 ½" from the ends of the splice bar. Rivet spacing for attaching the splice plate shall be based on stiffener spacing in accordance with the following:

Stiffener spacing	Splice plate rivet spacing
6"	3"
7"	4"
8"	5"
9" or greater	6"

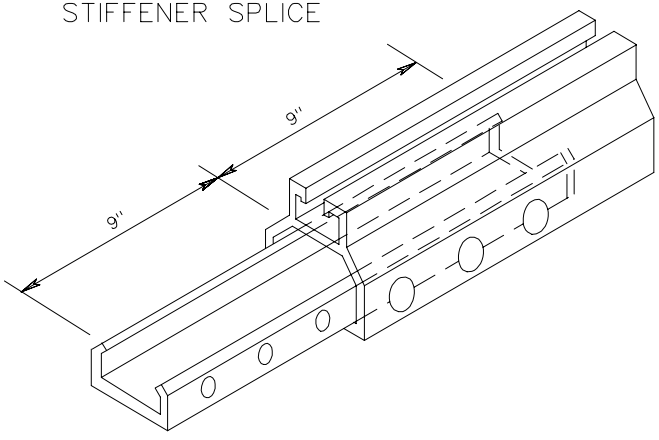


VERTICAL SPLICING DETAIL

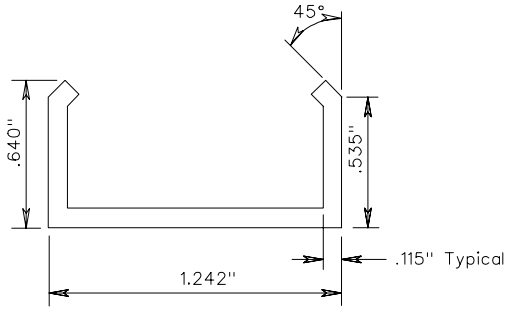
ALTERNATE SIGN PANEL DESIGN

VIRGINIA DEPARTMENT OF TRANSPORTATION

LARGE STIFFENER SPLICE



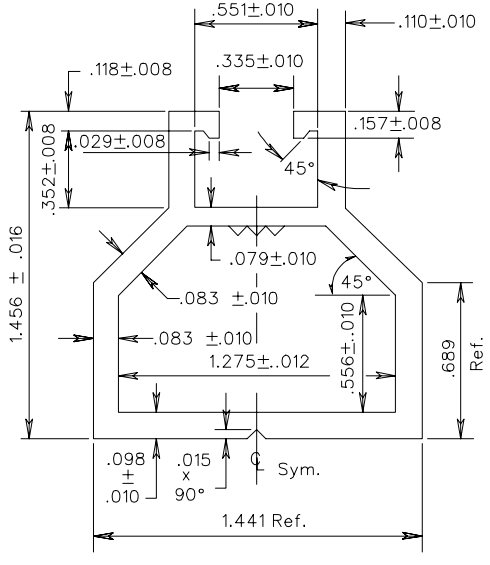
LARGE STIFFENER SPLICE BAR



The maximum number of splices in a stiffener shall be one per stiffener location.

Splices shall not be in a vertical alignment but shall be offset 12" from each other.

LARGE STIFFENER DETAIL

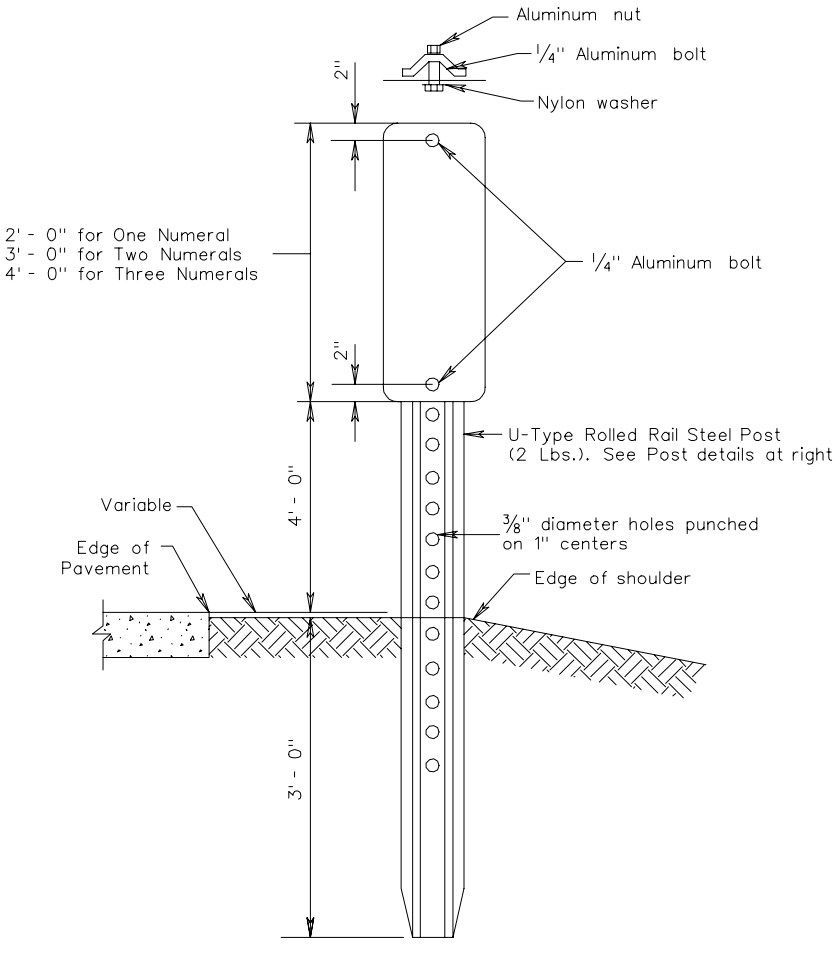


ALTERNATE SIGN PANEL DESIGN

VIRGINIA DEPARTMENT OF TRANSPORTATION

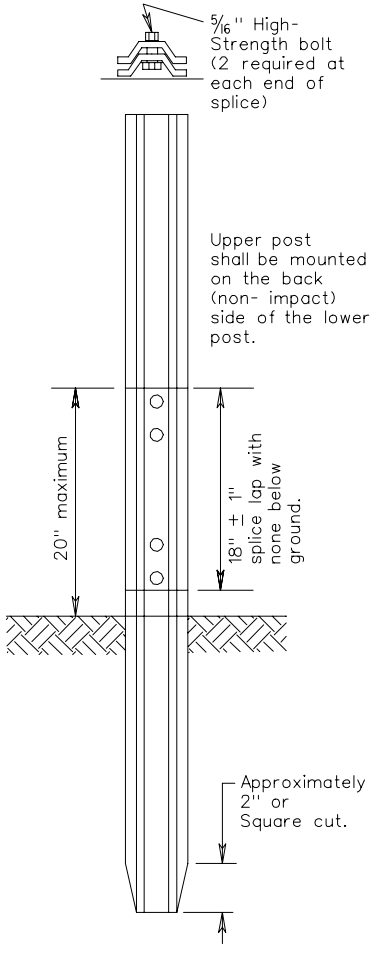
MM-1

MOUNTING DETAIL

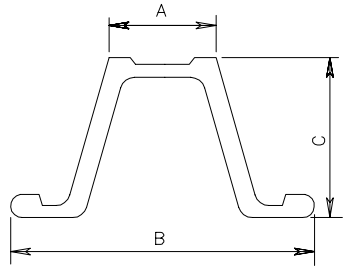


USP-1

SPLICING DETAIL



POST SECTION DIMENSIONS



1.33 Lb./LF

	Minimum	Maximum
A.	1/2"	1"
B.	2"	2 1/4"
C.	3/4"	1 1/4"

2.00 Lb./LF

	Minimum	Maximum
A.	1 13/64 "	1 9/32 "
B.	3 1/16 "	3 1/8"
C.	1 27/64 "	1 33/64 "

3.00 Lb./LF

	Minimum	Maximum
A.	1 17/64 "	1 5/8"
B.	3 3/16 "	3 1/2"
C.	1 1/2"	1 7/8"

Length is variable
Weight is linear foot

Notes:

Driving cap to be used when driving post.

Panel to be fabricated of ASTM B209 alloy 6061-T6 or 5052-H38, 0.080 thick.

Top of panel to be flush with top of post.

ERECTION

Milepost markers to be located in line with delineator posts, edge of shoulder or back of guardrail, if present.

	D10-4	D10-5	D10-6
Curb face to sign edge:	2'	2'	2'
Pavement top to sign bottom:	4'	4'	4'
Curb top to sign bottom:	4'	4'	4'
Sign face to pavement edge:	93°	93°	93°

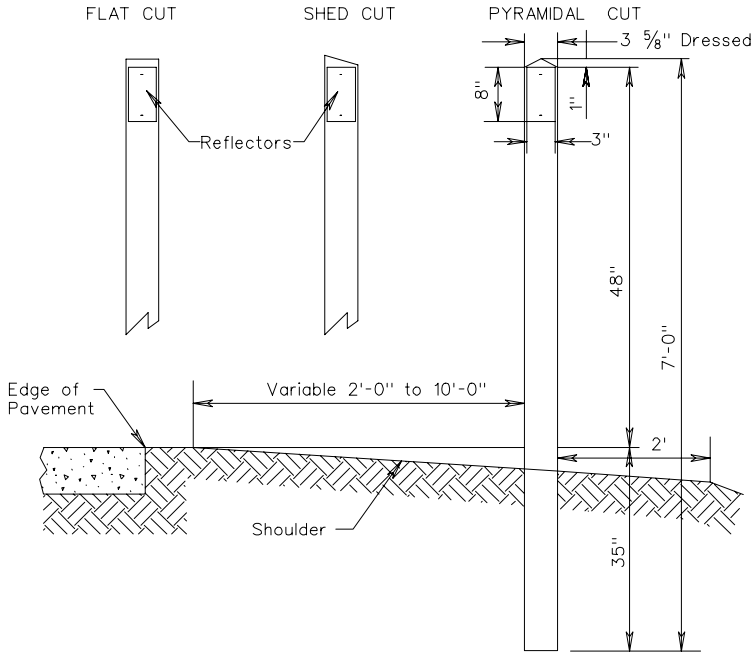
TYPICAL DETAILS FOR MILEPOST MARKERS & U-TYPE STEEL POST STRUCTURES

VIRGINIA DEPARTMENT OF TRANSPORTATION

1301.83

ED-1

STANDARD ROAD EDGE DELINEATORS



NOTES:

Standard ED-1 delineators consist of reflectorized sheeting, cut to a 3" by 8" vertical rectangle, mounted on a backing of aluminum alloy, not less than 0.063 thick conforming to ASTM B209, alloy 6061-T6 or 5052-H38. The color of the reflective sheeting shall, in all cases, conform to the color of the edgelines.

The reflectors are attached to wood posts with a minimum of two nails or screws produced from alloy 2024-T4 or 6061-T6.

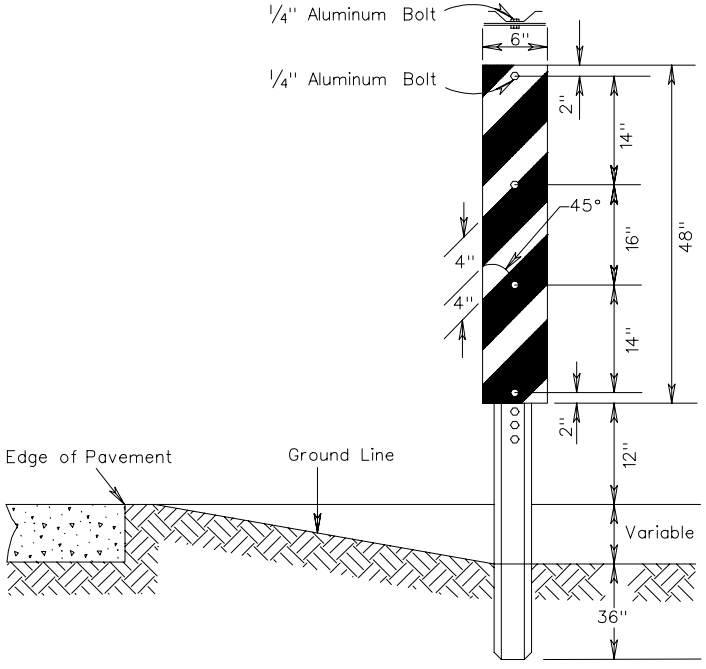
The posts above the ground are painted white with number 11 white paint.

Posts are treated with a water-borne preservative in accordance with Section 236 of the Road and Bridge Specifications.

The top of the posts may have a flat, shed, or pyramidal cut: however, they shall be uniform throughout a project. Cuts shall be in accordance with Standard WSP-1.

ED-2

SPECIAL ROAD EDGE DELINEATORS



NOTES:

Special delineators are made from aluminum alloy, not less than 0.080 thick conforming to ASTM B209, alloy 6061-T6 or 5052-H38.

Delineators extend 1" above the top of the post.

Delineators are reflectorized, and in all cases, the color shall conform to the color of the edgelines, alternating with a black stripe.

The stripes shall slope down toward the center of roadway.

Delineators are mounted on U-Type posts fabricated from rolled-rail steel 1.33 lb./ft. minimum.

The bottom of the delineator panel is 12" above the pavement edge elevation.

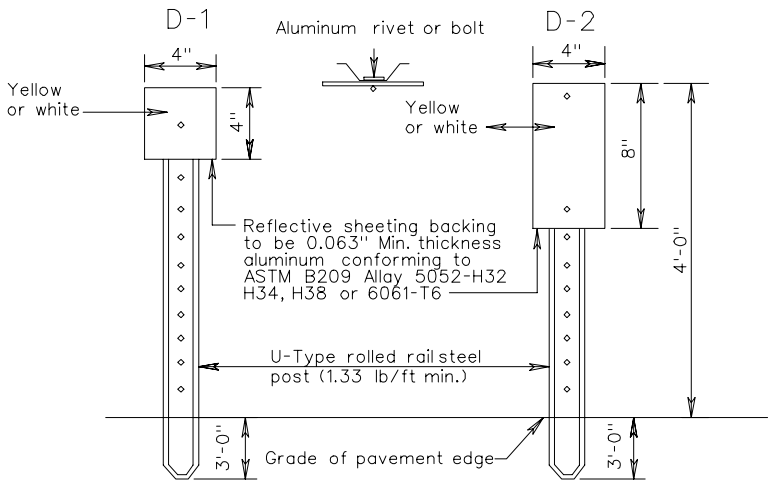
TYPICAL DETAILS FOR STANDARD & SPECIAL ROAD EDGE DELINEATORS

REV. 9/06

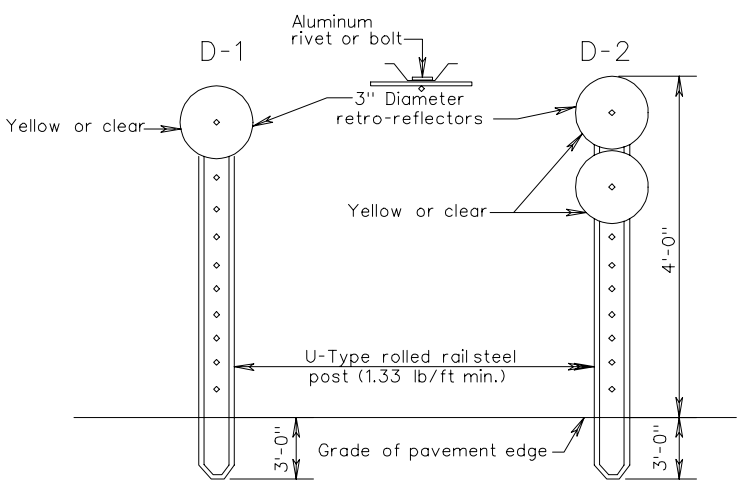
1301.84

VIRGINIA DEPARTMENT OF TRANSPORTATION

TYPE I



TYPE II



NOTES:

Road edge delineators are to be erected two feet beyond the outer edge of the shoulder or the face of unmountable curb.

D-1 delineators shall be placed on the right of through roadways at 528 foot spacing with the following exceptions:

Tangent roadways where pavement markers are installed will not require the installation of delineators.

Locations where delineators are installed on guardrails, parapets or barriers on the right of the roadway will not require the installation of road edge delineators.

D-1 delineators shall be placed on at least one side and on the outside curve of interchange ramps except where delineators are installed on guardrails, parapets or barriers. The spacing along the ramps shall be at 100' intervals except in horizontal curves where the spacing shall conform to the chart on SPACING FOR HIGHWAY DELINEATORS.

D-2 delineators shall be placed on acceleration and deceleration lanes at 100' spacing.

The color of delineators shall conform to the color of the edgelines.

SPACING FOR HIGHWAY DELINEATORS ON HORIZONTAL CURVES

Distance in feet rounded to the nearest 5'.

RADIUS OF CURVE IN FEET	SPACING ON CURVE IN FEET
50	20
150	30
200	35
250	40
300	50
400	55
500	65
600	70
700	75
800	80
900	85
1000	90

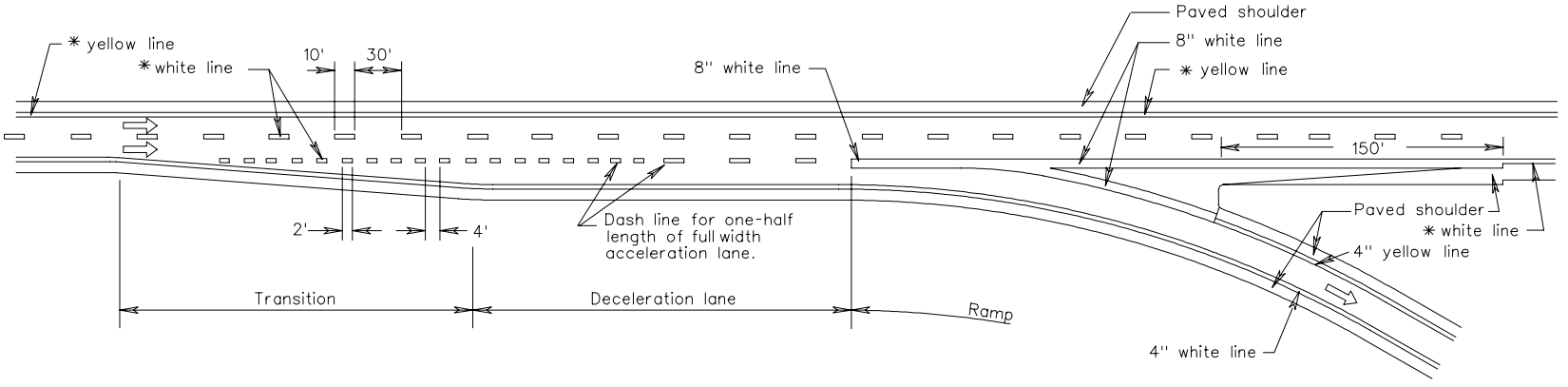
Spacing for specific radii not shown may be interpolated from table. The minimum spacing should be 20'. The spacing on curves should not exceed 300'. In advance of or beyond a curve, and proceeding away from the end of the curve, the spacing of the first delineator is 2S, the second 3S and the third 6S but not to exceed 300'. S refers to the delineator spacing for specific radii computed from the formula $S = 3\sqrt{R-50}$

TYPICAL DETAILS FOR INTERSTATE ROAD EDGE DELINEATORS

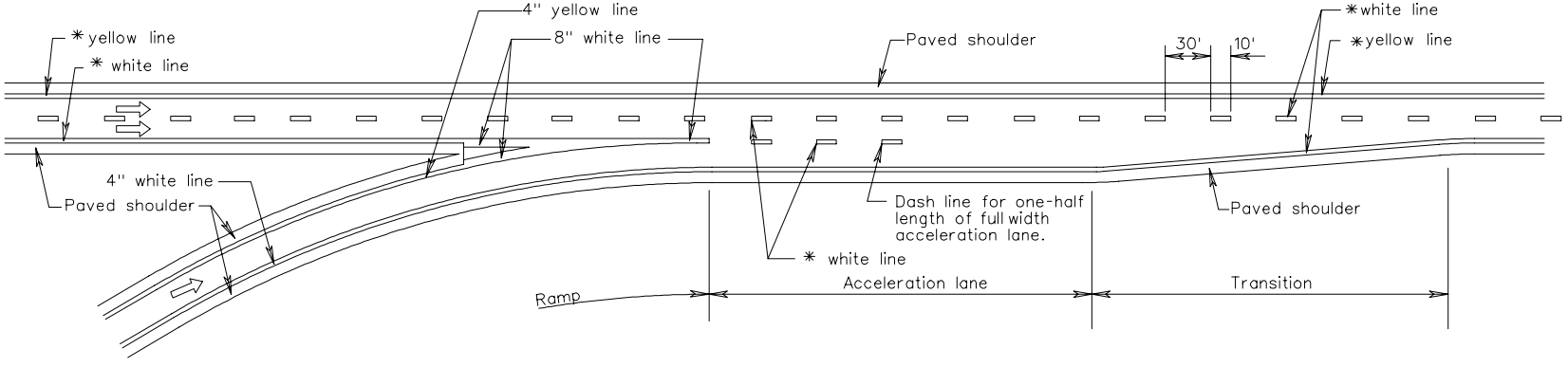
VIRGINIA DEPARTMENT OF TRANSPORTATION

PM-1

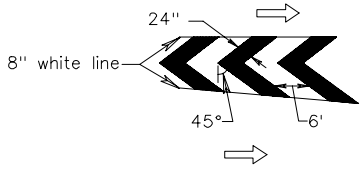
INTERCHANGE EXIT



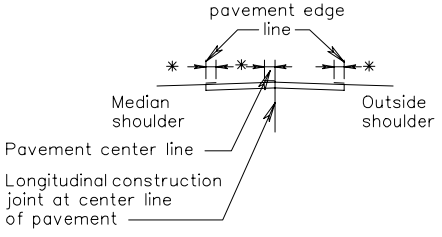
INTERCHANGE ENTRANCE



GORE AREA HATCHING OPTIONAL



LATERAL PLACEMENT FOR PAVEMENT LINE MARKING ON HYDRAULIC CEMENT CONCRETE



Notes:

Place pavement center line marking on center line of bituminous surface.

All pavement markings shall be installed in accordance with the MUTCD.

* The pavement marking for the mainline of Interstate Highways shall be 6" wide; all other highways the pavement marking shall be 4" wide unless otherwise noted on the plans.

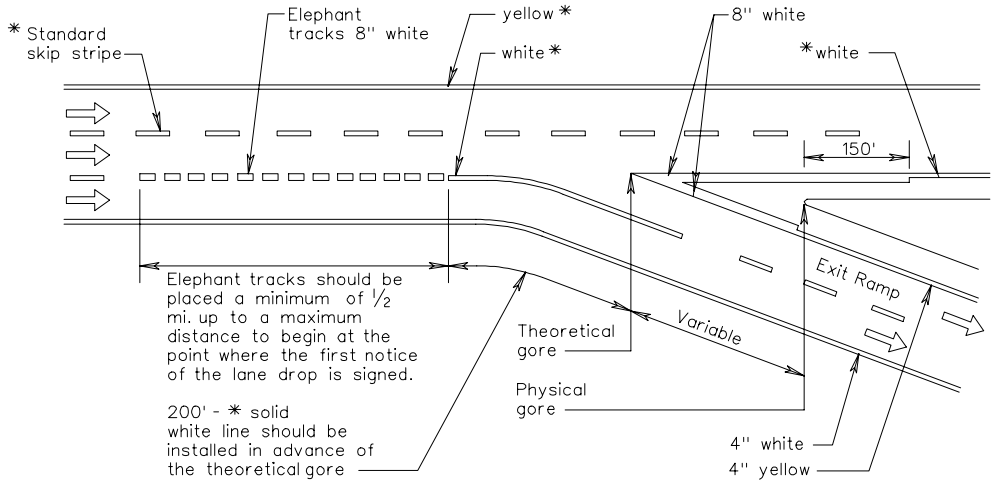
TYPICAL PAVEMENT MARKING DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

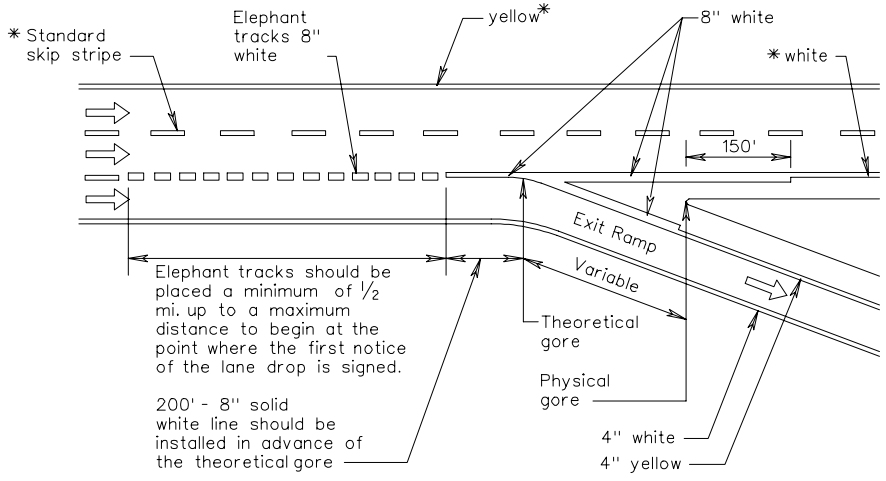
REV. 2/06

1301.86

LIMITED ACCESS LANE DROP EXIT RAMPS
BESIDE CHOICE LANE THRU / EXIT

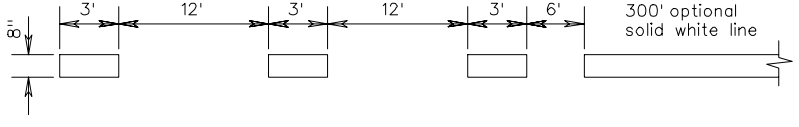


LIMITED ACCESS LANE DROP EXIT RAMPS



* The pavement marking for the mainline of Interstate Highways shall be 6" wide; all other highways the pavement marking shall be 4" wide unless otherwise noted on the plans.

STANDARD ELEPHANT TRACKS



TYPICAL PAVEMENT MARKING DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 2/06

TURN LANE ARROWS

Turn arrows required in accordance with the following, unless otherwise directed by the Engineer.

TURN LANE LENGTH

301' or longer: 3 arrows
- 1 Arrow located at beginning of full width turn lane.
- 1 Arrow located at midpoint of full width turn lane.
- 1 Arrow located 50' back from stopbar or end of lane line.

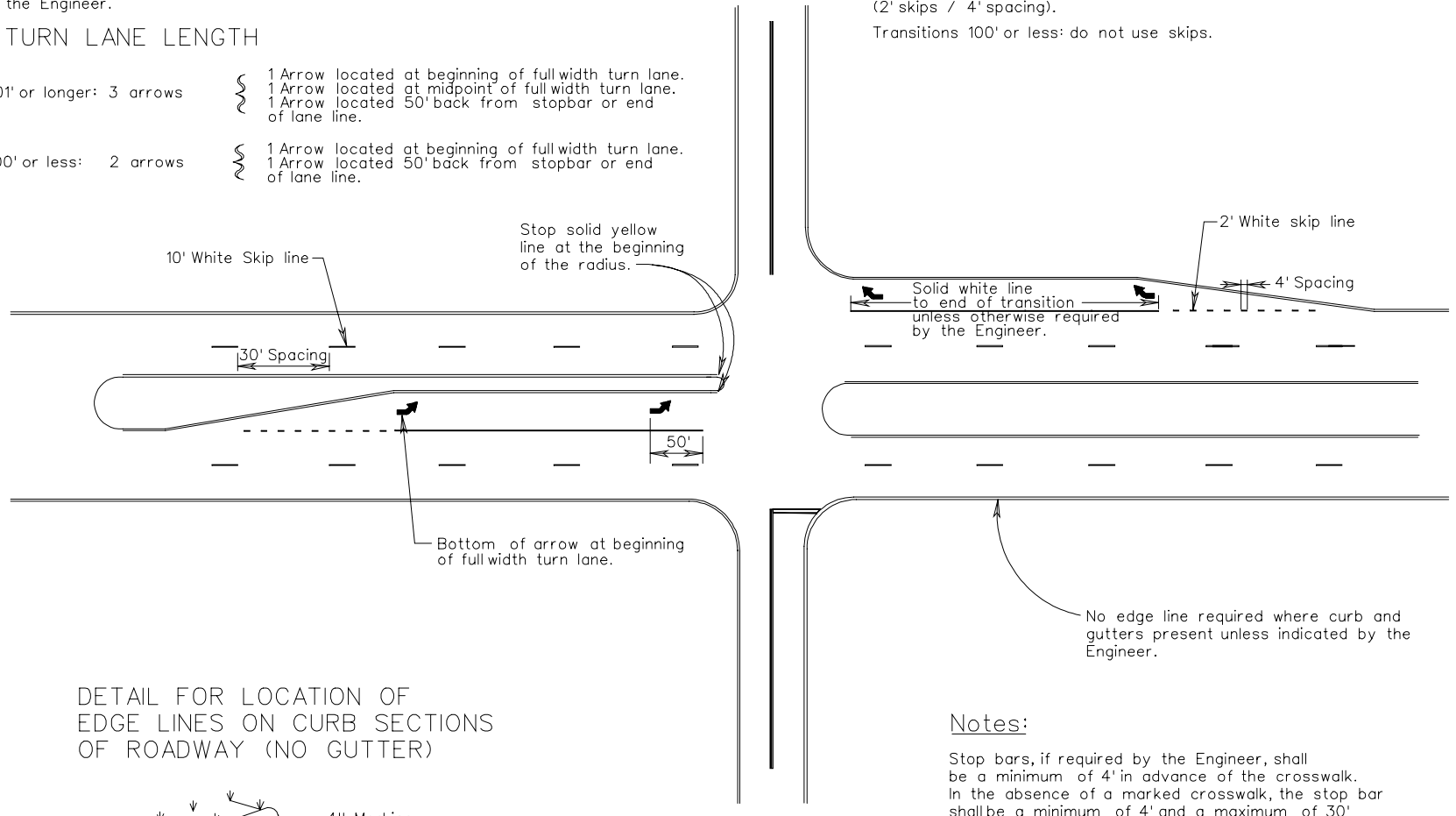
300' or less: 2 arrows
- 1 Arrow located at beginning of full width turn lane.
- 1 Arrow located 50' back from stopbar or end of lane line.

SKIPS

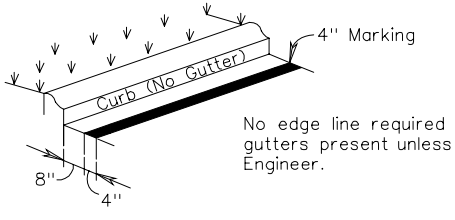
Thru lanes: use 10' skips / 30' spacing.

Transitions more than 100': use mini skips (2' skips / 4' spacing).

Transitions 100' or less: do not use skips.



DETAIL FOR LOCATION OF EDGE LINES ON CURB SECTIONS OF ROADWAY (NO GUTTER)



No edge line required where curb and gutters present unless indicated by the Engineer.

Notes:

Stop bars, if required by the Engineer, shall be a minimum of 4' in advance of the crosswalk. In the absence of a marked crosswalk, the stop bar shall be a minimum of 4' and a maximum of 30' in advance of the nearest edge of the intersecting roadway. Stopbars shall be 2' in width.

Arrows shall be in accordance with the Federal MUTCD.

Spacing between double solid yellow lines shall be 4".

TYPICAL PAVEMENT MARKING FOR UNSIGNALIZED INTERSECTIONS

VIRGINIA DEPARTMENT OF TRANSPORTATION

TURN LANE ARROWS

Turn arrows required in accordance with the following, unless otherwise directed by the Engineer.

TURN LANE LENGTH

301' or longer: 3 arrows
- 1 Arrow located at beginning of full width turn lane.
- 1 Arrow located at midpoint of full width turn lane.
- 1 Arrow located 50' back from stopbar.

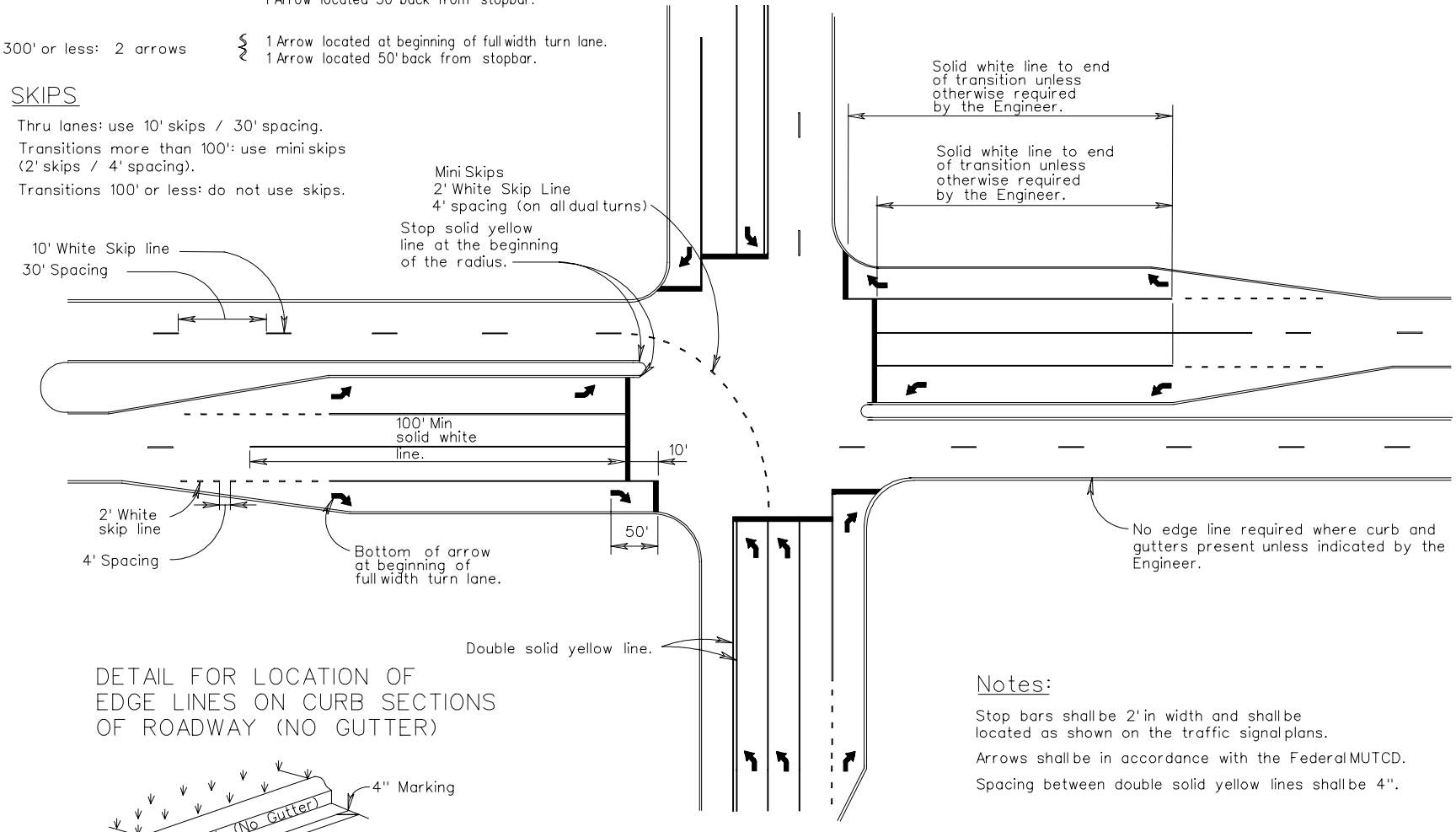
300' or less: 2 arrows
- 1 Arrow located at beginning of full width turn lane.
- 1 Arrow located 50' back from stopbar.

SKIPS

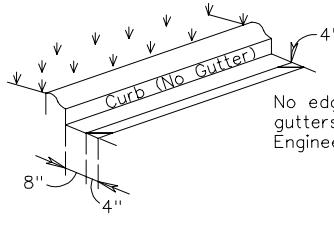
Thru lanes: use 10' skips / 30' spacing.

Transitions more than 100': use mini skips (2' skips / 4' spacing).

Transitions 100' or less: do not use skips.



DETAIL FOR LOCATION OF EDGE LINES ON CURB SECTIONS OF ROADWAY (NO GUTTER)



No edge line required where curb and gutters present unless indicated by the Engineer.

Notes:

Stop bars shall be 2' in width and shall be located as shown on the traffic signal plans.

Arrows shall be in accordance with the Federal MUTCD.

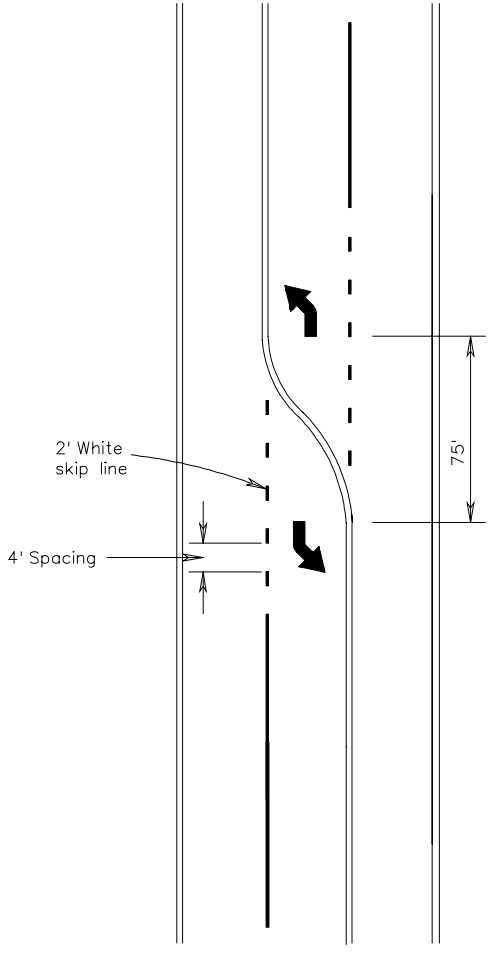
Spacing between double solid yellow lines shall be 4".

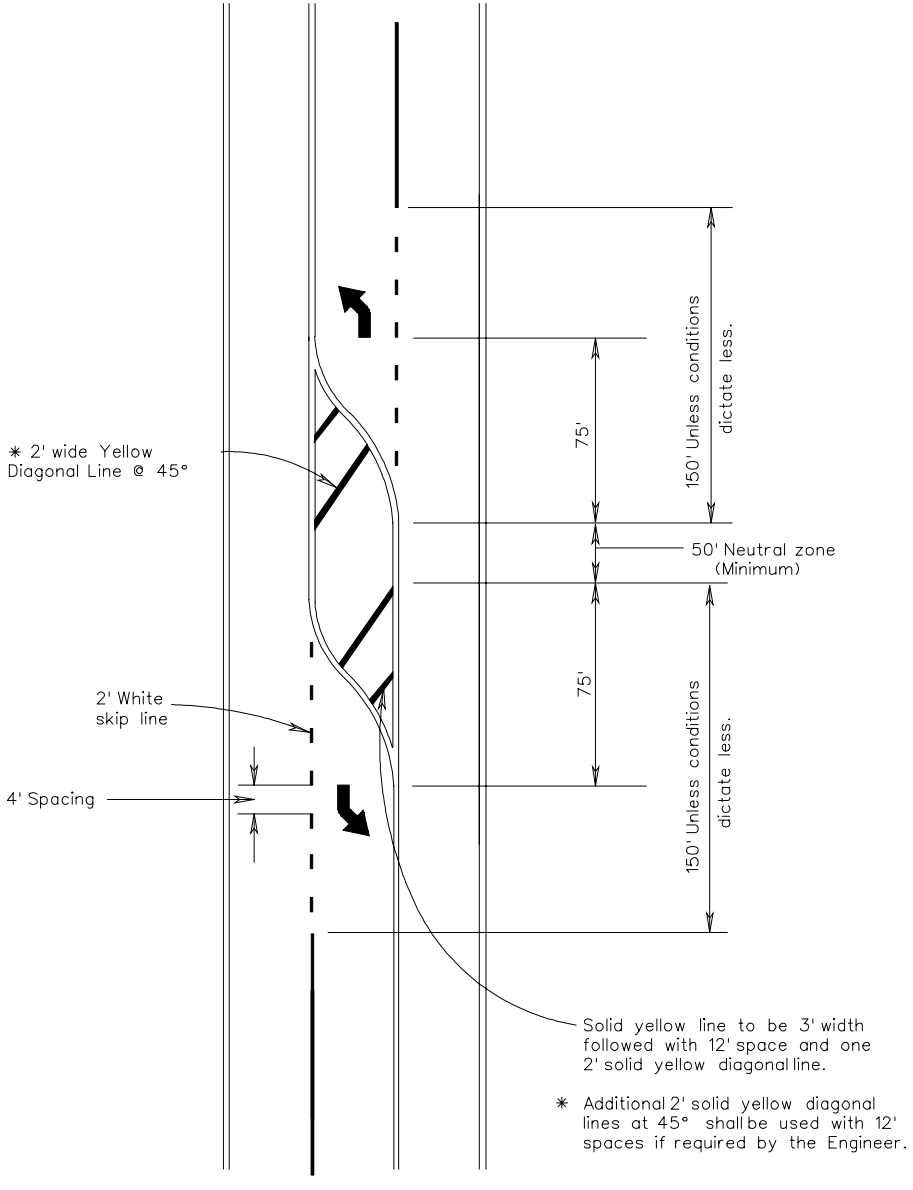
TYPICAL PAVEMENT MARKING FOR SIGNALIZED INTERSECTIONS

VIRGINIA DEPARTMENT OF TRANSPORTATION

Note:

Method used shall be
as directed by the Engineer.

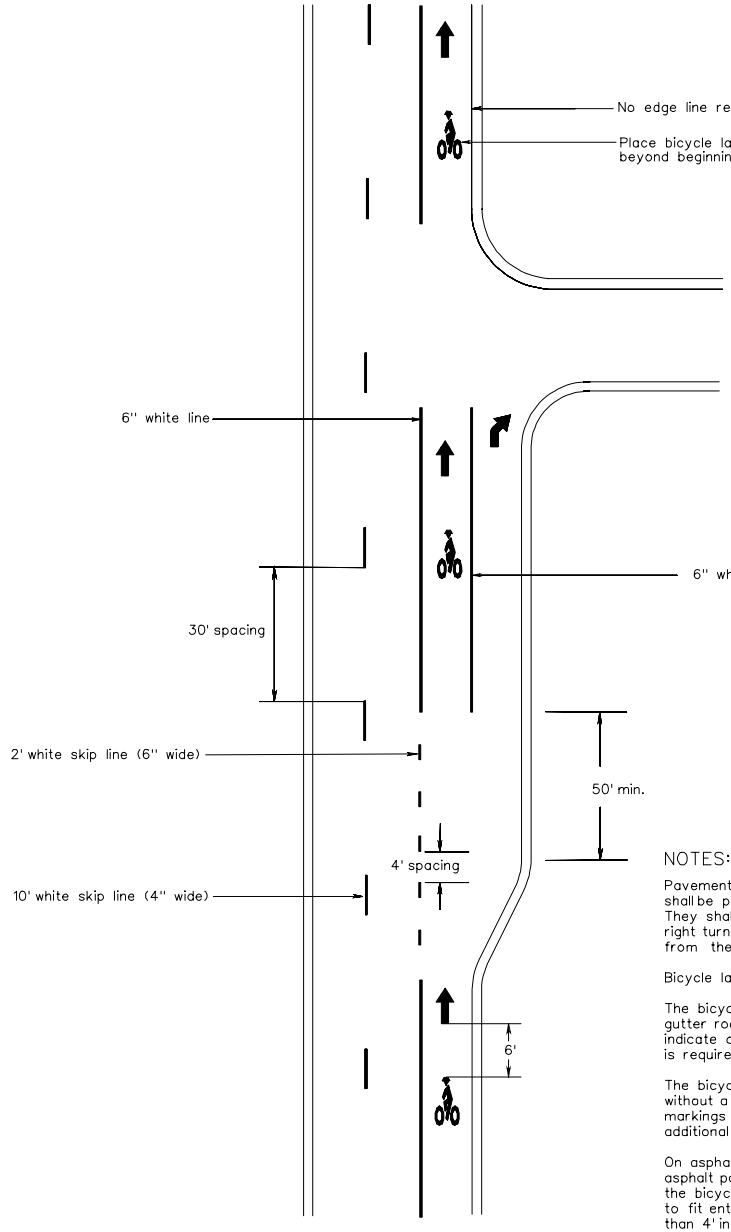




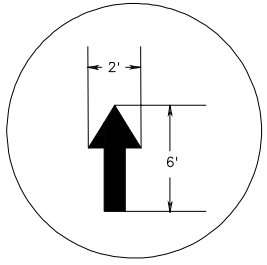
TYPICAL PAVEMENT MARKING
LEFT TURN PAVEMENT MARKED MEDIAN

VIRGINIA DEPARTMENT OF TRANSPORTATION

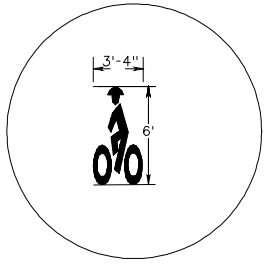
PM-6



ARROW DETAILS



BICYCLE LANE SYMBOL



NOTES:

Pavement markings consisting of arrow and bicycle lane symbols shall be placed at the beginning of the bicycle lane at right turn lanes. They shall also be placed at the end of the bicycle lane at right turn lanes if the solid white line separating the bicycle lane from the right turn lane is greater than 100' in length.

Bicycle lane symbols shall be placed a maximum of 500' apart.

The bicycle lane stripe shall be 4' from the edge of pavement on curb & gutter roadways unless otherwise noted on the plans or existing markings indicate otherwise. (Contact Mobility Management Division if additional guidance is required.)

The bicycle lane stripe shall be 5' from the face of curb on roadways without a gutter pan unless otherwise noted on the plans or existing markings indicate otherwise. (Contact Mobility Management Division if additional guidance is required.)

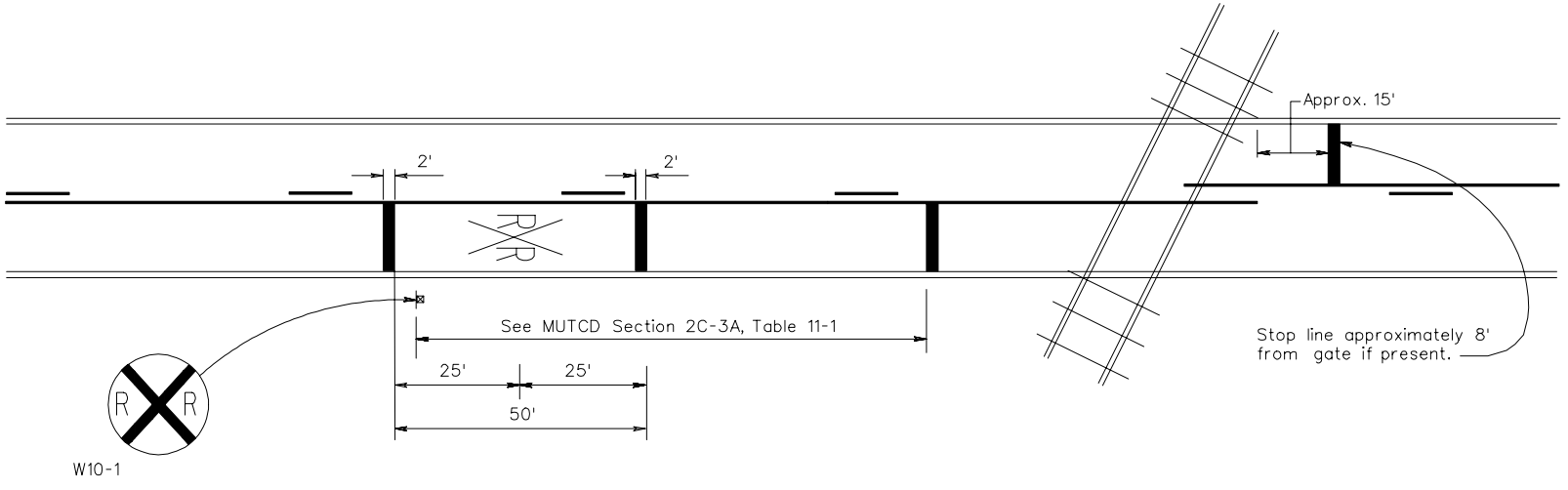
On asphalt roadways where the bicycle lane is beside curb and gutter and the asphalt portion of the bicycle lane is of insufficient width to allow placement of the bicycle symbol entirely on the asphalt, the symbol shall be reduced in size to fit entirely on the asphalt. The bicycle symbol shall be reduced to no less than 4' in height at these locations.

TYPICAL PAVEMENT MARKINGS FOR BICYCLE LANE

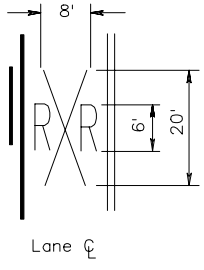
VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 7/05

1301.91



Width may vary according to lane width.



A portion of the pavement marking symbol should be directly opposite the advance warning sign (W10-1). If needed, supplemental pavement marking symbols(s) may be placed between the advance warning sign and the crossing, but should be at least 50' from the stop line.

Markings shall be installed at grade crossing which conform to the requirements of the MUTCD and as directed by the Engineer.

A three lane roadway should be marked with a centerline for two - lane approach operation on the approach to a crossing.

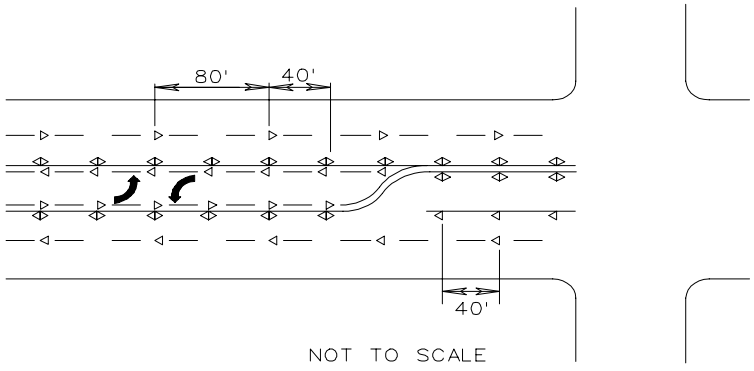
On multi-lane roads the transverse bands should extend across all approach lanes, and individual RXR symbols should be used in each approach lane.

Refer to standard alphabet for highway signs and markings for RXR symbols details.

TYPICAL PAVEMENT MARKING
RAILROAD - HIGHWAY GRADE CROSSING

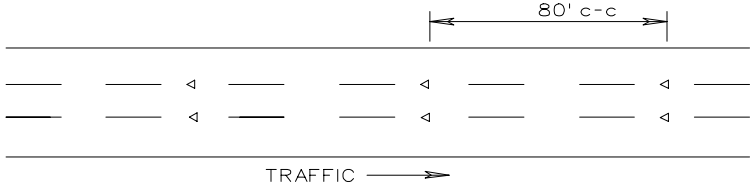
VIRGINIA DEPARTMENT OF TRANSPORTATION

FIVE LANE - CENTER LANE LEFT TURN ONLY



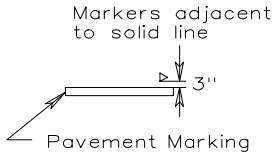
NOT TO SCALE

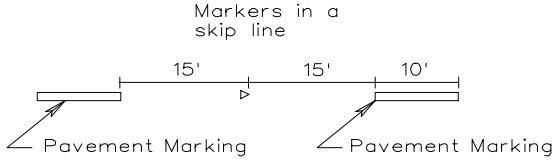
DIVIDED ROADWAYS



NOT TO SCALE

GENERAL PLACEMENT:





Notes:

Exact locations of the markers shall be approved by the Engineer prior to installation.

Typical spacing is 40' c-c when used adjacent to a solid line and 80' when used in conjunction with a skip line except that on horizontal curves of 4° or more, the spacing along skip lines and channelizing lines adjacent to turn lanes can be reduced by ½ as shown on the plans or as directed by the Engineer.

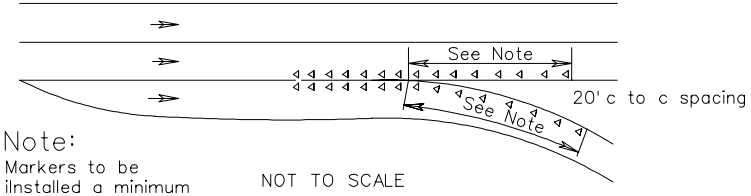
KEY:

◂▸ Two way
◂ One way

TYPICAL PAVEMENT MARKER LOCATION DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

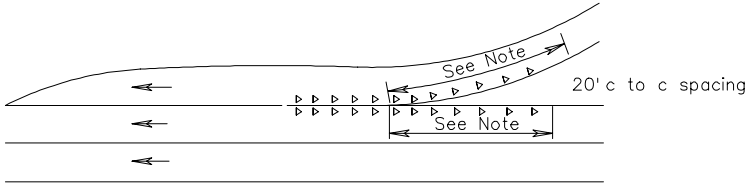
EXIT RAMP



Note:
Markers to be ilnstalled a minimum of 80' beyond physical gore.

NOT TO SCALE

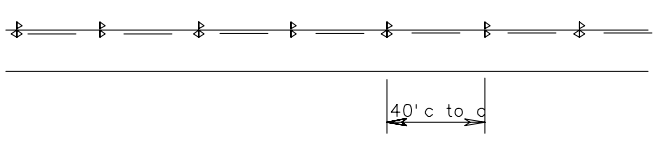
ENTRANCE RAMP



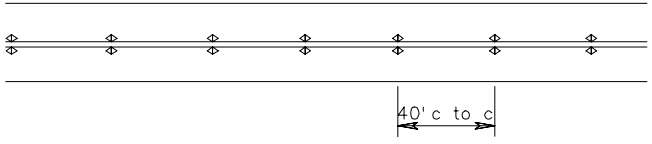
NOT TO SCALE

Note:
Markers to be ilnstalled a minimum of 80' beyond physical gore.

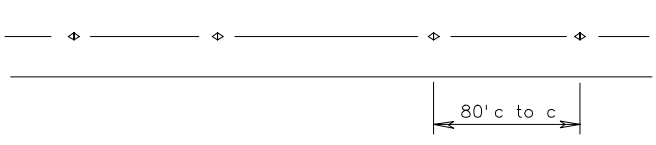
PASSING ONE DIRECTION



NO PASSING



PASSING TWO DIRECTIONS



TYPICAL PAVEMENT MARKER LOCATION DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

PROCEDURE FOR USING TABLES:

A_1 = area of sign panel 1

A_2 = area of sign panel 2

A_3 = area of sign panel 3

H_1 = centroidal distance from sign panel 1 to ground line through reference point

H_2 = centroidal distance from sign panel 2 to ground line through reference point

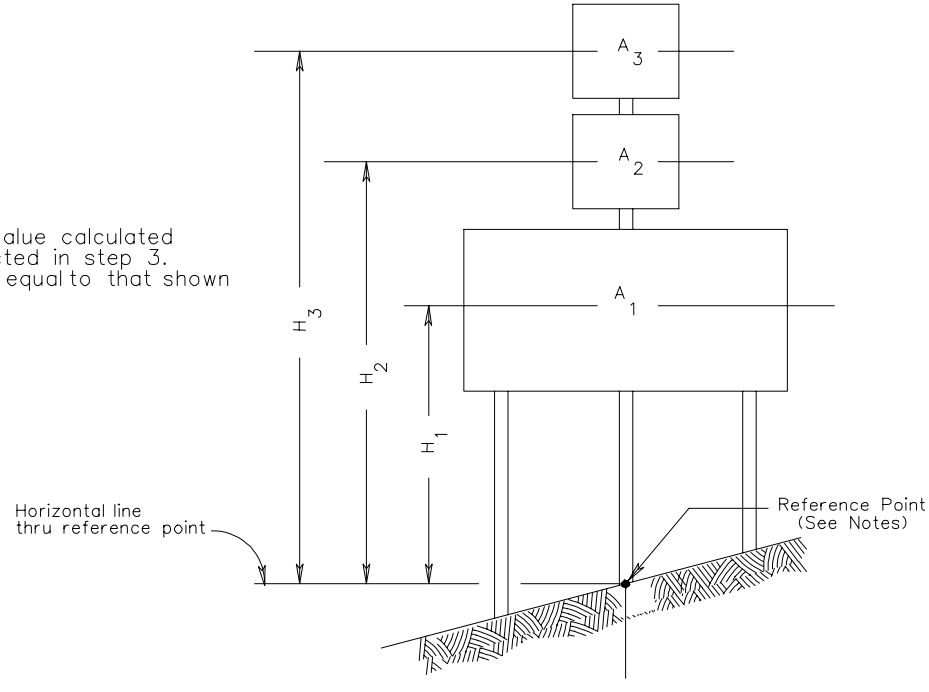
H_3 = centroidal distance from sign panel 3 to ground line through reference point

1. Select minimum mounting height to be used (5'-0" or 7'-0").
2. Determine slope of ground line (level, 1 ½: 1 or 2: 1).
3. Decide on number of posts to be used (single, two or three).
4. Calculate the area of each sign panel (A_1, A_2, A_3, . . . A_n).
5. Calculate the centroidal distance for each sign panel (H_1, H_2, H_3, . . . H_n).

   The centroidal distance is the vertical distance from the reference pont on the ground line to the center of each sign panel.
6. Calculate the centroidal distance (H) for the entire sign panel grounp:

$$H = \frac{(A_1 \times H_1 + A_2 \times H_2 + A_3 \times H_3 + \ldots A_n \times H_n)}{(A_2 + A_2 + A_3 + \ldots A_n)}$$

7. Enter the appropriate table based on:
   the minimum mounting height selected in step 1
   the ground slope select in step 2
   Pick the post size(s) to be reviewed, and entering with the "H" value calculated in step 6, read the maximum area under the size of posts selected in step 3. If the total area of sign panel(s) to be supported is less than or equal to that shown in the table(s), the size of the post(s) will be satisfactory.



Notes:

Reference point for calculating centroidal distance(s):
For single post: on ground line at intersection of post
For two-posts: on ground line, half-way between posts
For three posts: on ground line at intersection of center post

PROCEDURES FOR CALCULATING SIZE OF WOOD POSTS FOR PERMANENT & CONSTRUCTION SIGNS

VIRGINIA DEPARTMENT OF TRANSPORTATION

SAMPLE PROBLEM:

Given sign panels: 10'-0" X 5'-0", 6'-0" X 2'-0" (see layout)

Find: Size of post(s) that will be acceptable

1. Minimum mounting height: 7'-0"

2. Slope of ground line: 2:1

3. Area of sign panels: A_1 = 10.0 x 5.0 = 50 sq. ft.

   A_2 = 6.0 x 2.0 = 12 sq. ft.

4. H_1 = 11.5 ft

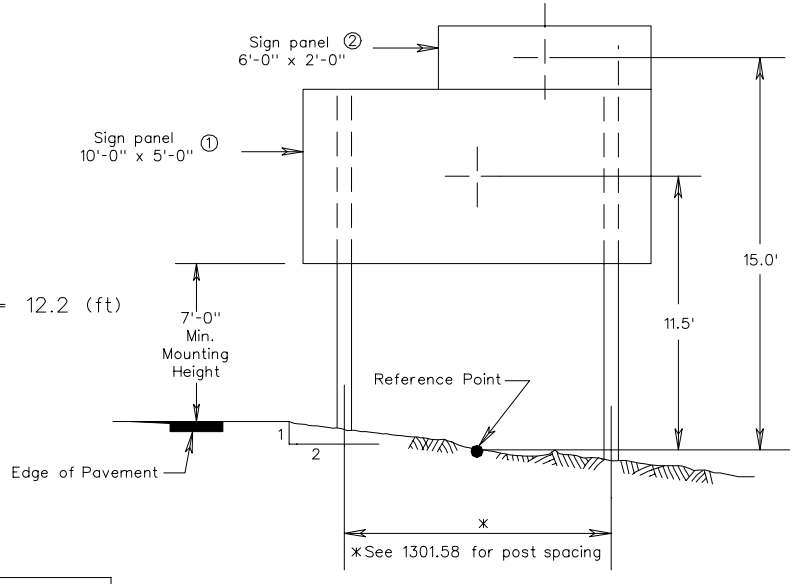
   H_2 = 15.0 ft

$$H = \frac{(A_1 \times H_1 + A_2 \times H_2)}{(A_1 \times A_2)} = \frac{(50 \times 11.5 + 12 \times 15.0)}{(50 + 12)} = \frac{755}{62} = 12.2 \text{ (ft)}$$

Round up H to 12.5 (ft) (Tables are in 0.5 foot increments)

6. Using Table with 7'-0" min. mounting height and 2:1 ground slope, enter with H = 12.5 and use column for 2-posts:

   The following maximum area (Total of sign panel(s) (ft^2)) is indicated in the tables for the following post sizes:



Post size	Maximum area (Total of sign panel(s) (ft^2))
4 x 4	---
5 x 5	18
4 x 6	22
6 x 6	35
6 x 8	64

The total area of sign panels is 62 sq. ft. The only post size that satisfies this requirement is the is the 6 x 8 post which has a maximum area of 64 sq. ft.

SAMPLE OF PROCEDURE FOR CALCULATING SIZE OF WOOD POST

DESIGN TABLE FOR WOODEN SUPPORTS

Size of post	H (FT)	Maximum area (Total of sign panels) (ft^2)		
		Single-post**	Two-posts	Three-posts
4"x 4"	8.0	7	13	20
	8.5	6	13	19
	9.0	6	12	18
	9.5	6	11	17
	10.0	5	11	16
	10.5	5	10	15
	11.0	5	10	15
	11.5	5	9	14
	12.0	4	9	13

** For a single 4x4 post (construction sign installation only) the maximum total sign panel can be increased to 16 square feet provided:

1. The maximum clearance between the ground level and bottom of the sign panel does not exceed 7'-6" while maintaining a 7"-0" minimum mounting height between the bottom of the sign and the top of the pavement at the edge of the pavement.
2. Contractor supplies Department with materials certification for wood posts to ensure conformance with Section 236.02(a) of the Road & Bridge Specifications.

DESIGN TABLE FOR WOODEN SUPPORTS

Size of post	H (ft)	Maximum area (Total of sign panels) (ft^2)		
		Single-post	Two-posts	Three-posts
4"x 6" (*)	8.0	18	37	55
	8.5	17	35	52
	9.0	16	33	49
	9.5	15	31	46
	10.0	15	29	44
	10.5	14	28	42
	11.0	13	27	40
	11.5	13	26	38
	12.0	12	25	37
5"x 5"	8.0	15	31	46
	8.5	14	29	43
	9.0	14	27	41
	9.5	13	26	39
	10.0	12	24	37
	10.5	12	23	35
	11.0	11	22	33
	11.5	11	21	32
	12.0	10	20	31

DESIGN TABLE FOR WOODEN SUPPORTS

Size of post	H (ft)	Maximum area (Total of sign panels) (ft^2)		
		Single-post	Two-posts	Three-posts
6"x 6"	8.0	29	58	87
	8.5	27	54	82
	9.0	26	51	77
	9.5	24	49	73
	10.0	23	46	69
	10.5	22	44	66
	11.0	21	42	63
	11.5	20	40	60
	12.0	19	39	58
	12.5	19	37	56
	13.0	18	36	53
6"x 8" (*)	8.0	52	103	155
	8.5	49	97	146
	9.0	46	92	138
	9.5	44	87	131
	10.0	41	83	124
	10.5	39	79	118
	11.0	38	75	113
	11.5	36	72	108
	12.0	34	69	103
	12.5	33	66	99
	13.0	32	64	95
	13.5	31	61	92
	14.0	22	44	66
	14.5	21	42	63

(*) Larger dimension in direction of (parallel to) traffic.

DETAILS FOR CALCULATING SIZE OF WOOD POSTS FOR CONSTRUCTION & PERMANENT SIGNS INSTALLED AT 7'-0" MINIMUM MOUNTING HEIGHTS ON LEVEL GROUND

VIRGINIA DEPARTMENT OF TRANSPORTATION

DESIGN TABLE FOR WOODEN SUPPORTS

Size of post	H (ft)	Maximum area (Total of sign panels) (ft^2)		
		Single-post**	Two-posts	Three-posts
4"x 4"	8.0	7	---	---
	8.5	6	12	---
	9.0	6	11	---
	9.5	6	10	14
	10.0	5	10	13
	10.5	5	9	13
	11.0	5	9	12
	11.5	5	9	12
	12.0	4	8	11
	12.5	4	8	11
	13.0	---	8	10

** For a single 4x4 post (construction sign installation only) the maximum total sign panel con be increased to 16 square feet provided:

1. The maximum clearance between the ground level and bottom of the sign panel does not exceed 7'-6" while maintaining a 7"-0" minimum mounting height between the bottom of the sign and the top of the pavement at the edge of the pavement.
2. Contractor supplies Department with materials certification for wood posts to ensure conformance with Section 236.02(a) of the Road & Bridge Specifications.

DESIGN TABLE FOR WOODEN SUPPORTS

Size of post	H (ft)	Maximum area (Total of sign panels) (ft^2)		
		Single-post	Two-posts	Three-posts
4"x 6" (*)	8.0	18	---	---
	8.5	17	---	---
	9.0	16	---	---
	9.5	15	---	---
	10.0	15	28	---
	10.5	14	26	---
	11.0	13	25	---
	11.5	13	24	---
	12.0	12	23	---
	12.5	---	22	30
	13.0	---	21	29
	13.5	---	20	28
	14.0	---	14	19
	14.5	---	14	18
	15.0	---	13	17

DESIGN TABLE FOR WOODEN SUPPORTS

Size of post	H (ft)	Maximum area (Total of sign panels) (ft^2)		
		Single-post	Two-posts	Three-posts
5"x 5"	8.0	15	---	---
	8.5	14	---	---
	9.0	14	---	---
	9.5	13	---	---
	10.0	12	22	---
	10.5	12	21	---
	11.0	11	20	---
	11.5	11	19	---
	12.0	10	18	---
	12.5	---	18	23
	13.0	---	17	22
	13.5	---	16	21
	14.0	---	11	13
	14.5	---	11	13
	15.0	---	10	12

(*) Larger dimension in direction of (parallel to) traffic.

DETAILS FOR CALCULATING SIZE OF WOOD POSTS FOR CONSTRUCTION & PERMANENT SIGNS INSTALLED AT 7'- 0" MINIMUM MOUNTING HEIGHTS ON $1\frac{1}{2}$: 1 SLOPE

DESIGN TABLE FOR WOODEN SUPPORTS				
Size of post	H (ft)	Maximum area (Total of sign panels) (ft^2)		
		Single-post	Two-posts	Three-posts
6"x 6"	8.0	29	---	---
	8.5	27	---	---
	9.0	26	---	---
	9.5	24	---	---
	10.0	23	43	---
	10.5	22	41	---
	11.0	21	39	---
	11.5	20	38	---
	12.0	19	36	---
	12.5	19	35	47
	13.0	18	33	46
	13.5	---	32	44
	14.0	---	21	29
	14.5	---	20	28
	15.0	---	19	27
6"x 8" (*)	8.0	52	---	---
	8.5	49	---	---
	9.0	46	---	---
	9.5	44	---	---
	10.0	41	80	---
	10.5	39	76	---
	11.0	38	73	---
	11.5	36	69	---
	12.0	34	67	---
	12.5	33	64	91
	13.0	32	61	88
	13.5	31	59	84
	14.0	---	42	58
	14.5	---	40	56
	15.0	---	39	54

(*) Larger dimension in direction of (parallel to) traffic.

DETAILS FOR CALCULATING SIZE OF WOOD POSTS FOR CONSTRUCTION & PERMANENT SIGNS INSTALLED AT 7'- 0" MINIMUM MOUNTING HEIGHTS ON $1\frac{1}{2}$: 1 SLOPE

VIRGINIA DEPARTMENT OF TRANSPORTATION

DESIGN TABLE FOR WOODEN SUPPORTS				
Size of post	H (ft)	Maximum area (Total of sign panels) (ft)^2		
		Single-post**	Two-posts	Three-posts
4"x 4"	8.0	7	---	---
	8.5	7	---	---
	9.0	6	11	---
	9.5	6	11	---
	10.0	5	10	14
	10.5	5	10	13
	11.0	5	9	13
	11.5	5	9	12
	12.0	4	8	12

** For a single 4x4 post (construction sign installation only) the maximum total sign panel con be increased to 16 square feet provided:

1. The maximum clearance between the ground level and bottom of the sign panel does not exceed 7'-6" while maintaining a 7"-0" minimum mounting height between the bottom of the sign and the top of the pavement at the edge of the pavement.
2. Contractor supplies Department with materials certification for wood posts to ensure conformance with Section 236.02(a) of the Road & Bridge Specifications.

DESIGN TABLE FOR WOODEN SUPPORTS				
Size of post	H (ft)	Maximum area (Total of sign panels) (ft)^2		
		Single-post	Two-posts	Three-posts
4"x 6" (*)	8.0	18	---	---
	8.5	17	---	---
	9.0	16	---	---
	9.5	15	---	---
	10.0	15	28	---
	10.5	14	27	---
	11.0	13	26	---
	11.5	13	24	---
	12.0	12	23	26
	12.5	---	22	25
	13.0	---	22	24
	13.5	---	21	23
	14.0	---	14	15

DESIGN TABLE FOR WOODEN SUPPORTS				
Size of post	H (ft)	Maximum area (Total of sign panels) (ft)^2		
		Single-post	Two-posts	Three-posts
5"x 5"	8.0	15	---	---
	8.5	14	---	---
	9.0	14	---	---
	9.5	13	---	---
	10.0	12	23	---
	10.5	12	22	---
	11.0	11	21	---
	11.5	11	20	---
	12.0	10	19	26
	12.5	---	18	25
	13.0	---	18	24
	13.5	---	---	23
	14.0	---	---	15

(*)Larger dimension in direction of (parallel to) traffic

DETAILS FOR CALCULATING SIZE OF WOOD POSTS FOR CONSTRUCTION & PERMANENT SIGNS INSTALLED AT 7'- 0" MINIMUM MOUNTING HEIGHTS ON 2 : 1 SLOPE

VIRGINIA DEPARTMENT OF TRANSPORTATION

DESIGN TABLE FOR WOODEN SUPPORTS				
Size of post	H (ft)	Maximum area (Total of sign panels) (ft)^2		
		Single-post	Two-posts	Three-posts
6"x 6"	8.0	29	---	---
	8.5	27	---	---
	9.0	26	---	---
	9.5	24	---	---
	10.0	23	44	---
	10.5	22	42	---
	11.0	21	40	---
	11.5	20	38	---
	12.0	19	37	52
	12.5	19	35	50
	13.0	18	34	48
	13.5	---	33	46
	14.0	---	23	31
	14.5	---	22	30
	15.0	---	21	29
6"x 8" (*)	8.0	52	---	---
	8.5	49	---	---
	9.0	46	---	---
	9.5	44	---	---
	10.0	41	81	---
	10.5	39	77	---
	11.0	38	73	---
	11.5	36	70	---
	12.0	34	67	98
	12.5	33	64	94
	13.0	32	62	90
	13.5	31	60	87
	14.0	---	42	61
	14.5	---	41	59
	15.0	---	39	57

(*) Larger dimension in direction of (parallel to) traffic.

DETAILS FOR CALCULATING SIZE OF WOOD POSTS FOR CONSTRUCTION & PERMANENT SIGNS INSTALLED AT 7'-0" MINIMUM MOUNTING HEIGHTS ON 2 : 1 SLOPE

VIRGINIA DEPARTMENT OF TRANSPORTATION

DESIGN TABLE FOR WOODEN SUPPORTS				
Size of post	H (FT)	Maximum area (Total of sign panels) (ft)^2		
		Single-post	Two-posts	Three-posts
4"x 4"	6.0	10	20	29
	6.5	9	18	27
	7.0	8	17	25
	7.5	8	16	23
	8.0	7	15	22
	8.5	7	14	21
	9.0	7	13	20
	9.5	6	12	19
	10.0	6	12	18
4"x 6" (*)	6.0	25	51	76
	6.5	23	49	70
	7.0	22	43	65
	7.5	20	41	61
	8.0	19	38	57
	8.5	18	36	54
	9.0	17	34	51
	9.5	16	32	48
	10.0	15	30	46
5"x 5"	6.0	21	43	64
	6.5	20	40	59
	7.0	18	37	55
	7.5	17	34	51
	8.0	16	32	48
	8.5	15	30	45
	9.0	14	29	43
	9.5	14	27	41
	10.0	13	26	39

DESIGN TABLE FOR WOODEN SUPPORTS				
Size of post	H (ft)	Maximum area (Total of sign panels) (ft)^2		
		Single-post	Two-posts	Three-posts
6"x 6"	6.0	40	80	120
	6.5	37	74	110
	7.0	34	68	102
	7.5	32	64	96
	8.0	30	60	90
	8.5	28	56	84
	9.0	27	53	80
	9.5	25	50	75
	10.0	24	48	72
	10.5	23	46	68
	11.0	22	43	65
6"x 8" (*)	6.0	70	140	211
	6.5	65	130	194
	7.0	60	120	181
	7.5	56	112	169
	8.0	53	105	158
	8.5	50	99	149
	9.0	47	94	140
	9.5	44	89	133
	10.0	42	84	126
	10.5	40	80	120
	11.0	38	77	115
	11.5	37	73	110
	12.0	35	70	105
	12.5	34	67	101

(*) Larger dimension in direction of (parallel to) traffic.

DETAILS FOR CALCULATING SIZE OF WOOD POSTS FOR PERMANENT SIGNS INSTALLED AT 5'-0" MINIMUM MOUNTING HEIGHTS ON LEVEL GROUND

VIRGINIA DEPARTMENT OF TRANSPORTATION

DESIGN TABLE FOR WOODEN SUPPORTS				
Size of post	H (ft)	Maximum area (Total of sign panels) $(ft)^2$		
		Single-post	Two-posts	Three-posts
4"x 4"	6.0	10	---	---
	6.5	9	---	---
	7.0	8	---	---
	7.5	8	15	---
	8.0	7	14	---
	8.5	7	13	18
	9.0	7	12	17
	9.5	6	12	16
	10.0	6	11	15
	10.5	6	11	15
	11.0	5	10	14
4"x 6" (*)	6.0	25	---	---
	6.5	23	---	---
	7.0	22	---	---
	7.5	20	---	---
	8.0	19	---	---
	8.5	18	34	---
	9.0	17	32	---
	9.5	16	31	---
	10.0	15	29	---
	10.5	14	28	---
	11.0	14	26	---
	11.5	13	25	35
	12.0	13	24	34
	12.5	---	23	32
	13.0	---	22	31

DESIGN TABLE FOR WOODEN SUPPORTS				
Size of post	H (ft)	Maximum area (Total of sign panels) $(ft)^2$		
		Single-post	Two-posts	Three-posts
5"x 5"	6.0	21	---	---
	6.5	20	---	---
	7.0	18	---	---
	7.5	17	---	---
	8.0	16	---	---
	8.5	15	28	---
	9.0	14	27	---
	9.5	14	25	---
	10.0	13	24	---
	10.5	12	23	31
	11.0	12	22	29
	11.5	11	21	28
	12.0	11	20	27
	12.5	---	19	26
	13.0	---	18	25

(*) Larger dimension in direction of (parallel to) traffic.

DETAILS FOR CALCULATING SIZE OF WOOD POSTS FOR PERMANENT SIGNS INSTALLED AT 5'- 0" MINIMUM MOUNTING HEIGHTS ON $1\frac{1}{2}$: 1 SLOPE

VIRGINIA DEPARTMENT OF TRANSPORTATION

PSI-1

DESIGN TABLE FOR WOODEN SUPPORTS				
Size of post	H (ft)	Maximum area (Total of sign panels) $(ft)^2$		
		Single-post	Two-posts	Three-posts
6"x 6"	6.0	40	---	---
	6.5	37	---	---
	7.0	34	---	---
	7.5	32	---	---
	8.0	30	---	---
	8.5	28	54	---
	9.0	27	51	---
	9.5	25	48	---
	10.0	24	46	---
	10.5	23	43	---
	11.0	22	41	---
	11.5	21	40	55
	12.0	20	38	53
	12.5	19	36	51
	13.0	18	35	49
6"x 8" (*)	6.0	70	---	---
	6.5	65	---	---
	7.0	60	---	---
	7.5	56	---	---
	8.0	53	---	---
	8.5	50	97	---
	9.0	47	91	---
	9.5	44	86	---
	10.0	42	82	---
	10.5	40	78	---
	11.0	38	75	---
	11.5	37	71	103
	12.0	35	68	99
	12.5	34	66	95
	13.0	32	63	91
	13.5	31	61	88
	14.0	22	43	62
	14.5	22	42	59
	15.0	21	40	57

(*) Larger dimension in direction of (parallel to) traffic.

DETAILS FOR CALCULATING SIZE OF WOOD POSTS FOR PERMANENT SIGNS INSTALLED AT 5'- 0" MINIMUM MOUNTING HEIGHTS ON $1\frac{1}{2}$: 1 SLOPE

VIRGINIA DEPARTMENT OF TRANSPORTATION

1301.104

DESIGN TABLE FOR WOODEN SUPPORTS				
Size of post	H (ft)	Maximum area (Total of sign panels) (ft)^2		
		Single-post	Two-posts	Three-posts
4"x 4"	6.0	10	---	---
	6.5	9	---	---
	7.0	8	16	---
	7.5	8	15	---
	8.0	7	14	20
	8.5	7	13	19
	9.0	7	13	18
	9.5	6	12	17
	10.0	5	11	16
4"x 6" (*)	6.0	25	---	---
	6.5	23	---	---
	7.0	22	---	---
	7.5	20	---	---
	8.0	19	37	---
	8.5	18	35	---
	9.0	17	33	---
	9.5	16	31	---
	10.0	15	29	42
	10.5	14	28	40
	11.0	14	27	38
	11.5	13	26	37
	12.0	13	25	35

DESIGN TABLE FOR WOODEN SUPPORTS				
Size of post	H (ft)	Maximum area (Total of sign panels) (ft)^2		
		Single-post	Two-posts	Three-posts
5"x 5"	6.0	21	---	---
	6.5	20	---	---
	7.0	18	---	---
	7.5	17	---	---
	8.0	16	31	---
	8.5	15	29	---
	9.0	14	27	---
	9.5	14	26	---
	10.0	13	24	34
	10.5	13	23	33
	11.0	12	22	31
	11.5	11	21	30
	12.0	11	20	28

16ximum area (Total of sign panels) (ft)

(*) Larger dimension in direction of (parallel to) traffic

DETAILS FOR CALCULATING SIZE OF WOOD POSTS FOR PERMANENT SIGNS INSTALLED AT 5'- 0" MINIMUM MOUNTING HEIGHTS ON 2 : 1 SLOPE

VIRGINIA DEPARTMENT OF TRANSPORTATION

DESIGN TABLE FOR WOODEN SUPPORTS				
Size of post	H (ft)	Maximum area (Total of sign panels) $(ft)^2$		
		Single-post	Two-posts	Three-posts
6"x 6"	6.0	40	---	---
	6.5	37	---	---
	7.0	34	---	---
	7.5	32	---	---
	8.0	30	58	---
	8.5	28	54	---
	9.0	27	51	---
	9.5	25	49	---
	10.0	24	46	66
	10.5	23	44	63
	11.0	22	42	60
	11.5	21	40	58
	12.0	20	39	55
	12.5	19	37	53
	13.0	18	36	51
	13.5	18	34	49
	14.0	13	24	34
	14.5	12	23	33
	15.0	12	23	32
6"x 8" (*)	6.0	70	---	---
	6.5	65	---	---
	7.0	60	---	---
	7.5	56	---	---
	8.0	53	103	---
	8.5	50	97	---
	9.0	47	92	---
	9.5	44	87	---
	10.0	42	83	121
	10.5	40	79	115
	11.0	38	75	110
	11.5	37	72	105
	12.0	35	69	101
	12.5	34	66	97
	13.0	32	64	93

(*) Larger dimension in direction of (parallel to) traffic.

DETAILS FOR CALCULATING SIZE OF WOOD POSTS FOR PERMANENT SIGNS INSTALLED AT 5'-0" MINIMUM MOUNTING HEIGHTS ON 2 : 1 SLOPE

VIRGINIA DEPARTMENT OF TRANSPORTATION