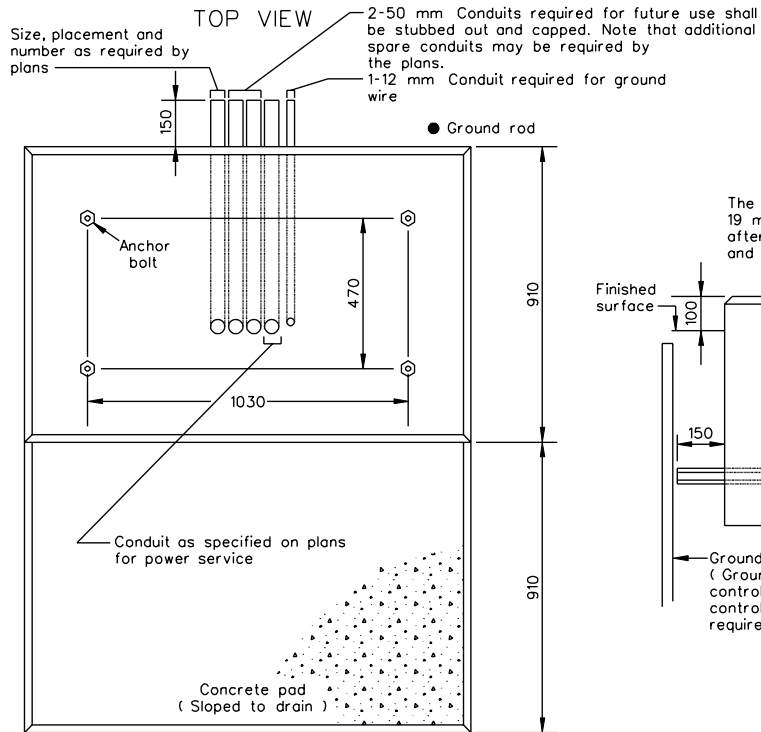
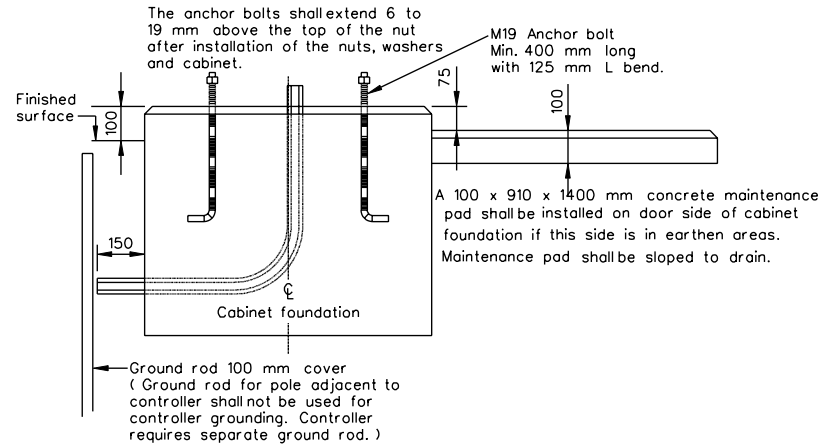


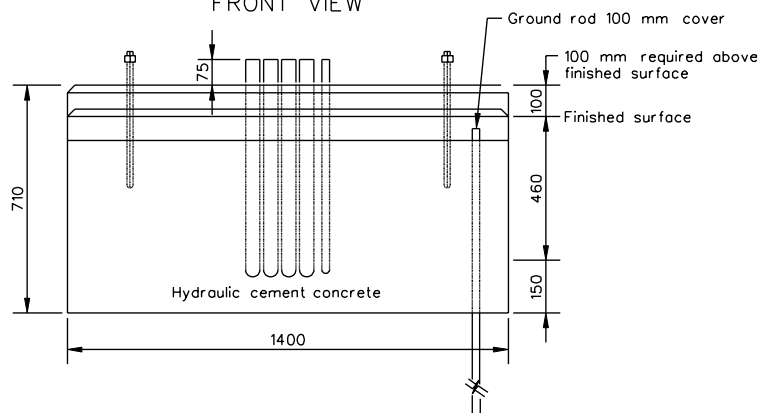
CF-1



SIDE VIEW



FRONT VIEW



Notes:

All exposed concrete surface edges shall be chamfered 20 mm.

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 6 mm deep and 100 to 150 mm long. Locations of empty conduits shall have an additional 50 mm 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 - 12 mm diameter weepholes shall be provided in the foundation and located 50 mm inside of the back or side edges of the controller cabinet. Weepholes shall be sloped to allow outlet to be 75 mm below top of foundation. 50 mm 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.

CONTROLLER CABINET FOUNDATION AND CONDUIT
PLACEMENT DETAILS

SPECIFICATION
REFERENCE

1301.01

UNLESS OTHERWISE NOTED, ALL DIMENSIONS
ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

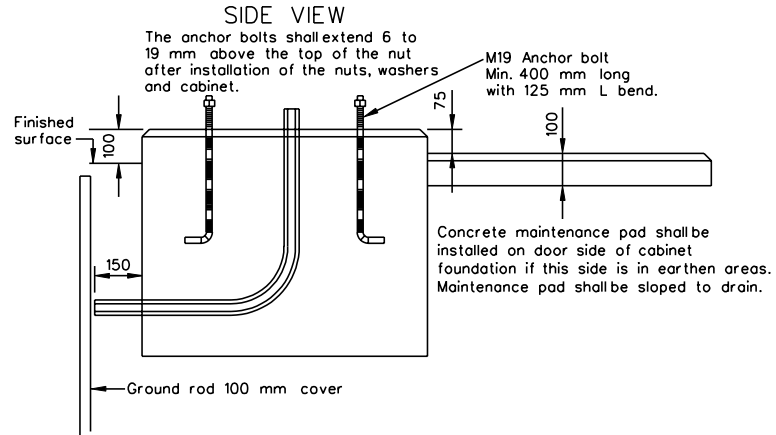
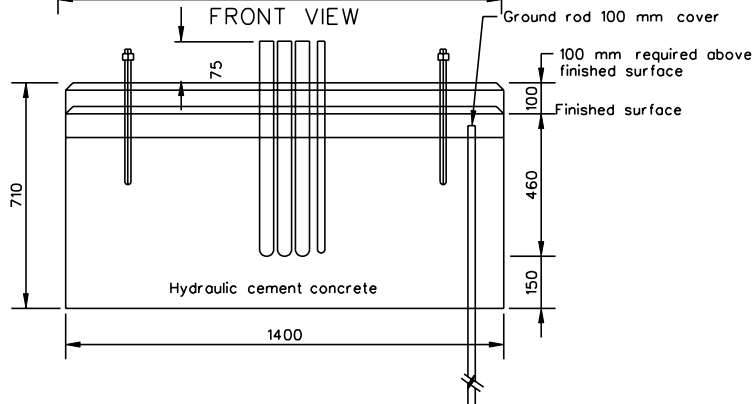
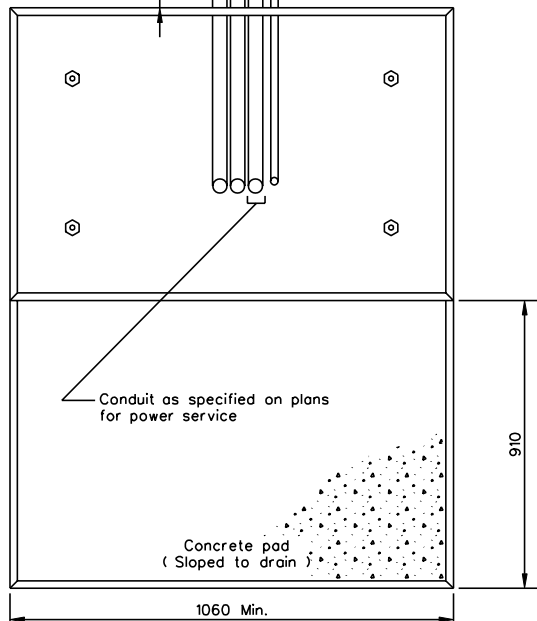
Size, placement and number as required by plans

TOP VIEW

1-50 mm Conduit required for future use shall be stubbed out and capped. Note that additional spare conduits may be required by the plans.

1-12 mm Conduit required for ground wire

● Ground rod



Notes:

- All exposed concrete surface edges shall be chamfered 20 mm.
- Foundation length and width shall be as required to project no less than a minimum 100 mm 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 6 mm deep and 100 to 150 mm long. Locations of empty conduits shall have an additional 50 mm 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 - 12 mm diameter weepholes shall be provided in the foundation and located 50 mm inside of the back or side edges of the controller cabinet. Weepholes shall be sloped to allow outlet to be 75 mm below top of foundation. 50 mm 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.

SPECIFICATION REFERENCE

CONTROL CENTER CABINET FOUNDATION AND CONDUIT PLACEMENT DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

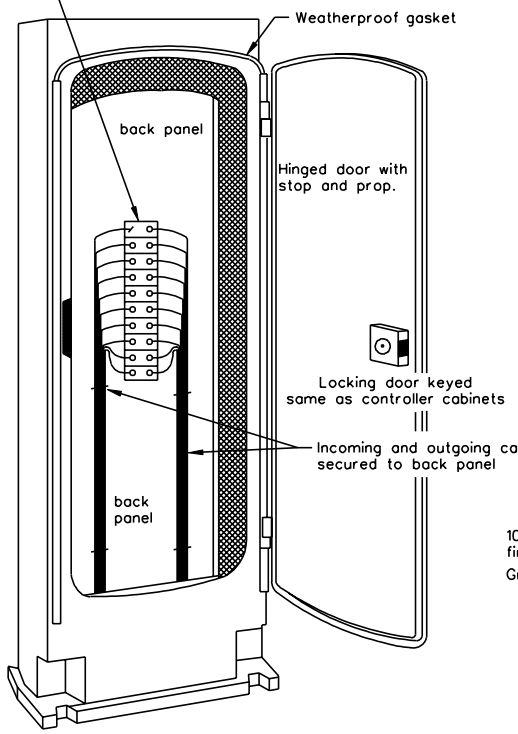
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

1301.02

CTE-1

Two pole terminal strip with jumpers sized to accommodate wire size and having number of terminal poles required to accommodate cable shown by plans plus 10 spare terminals. Terminal block shall be a non-corrosive material with stainless steel screws, washers and nuts.

Back panel shall be stainless steel or aluminum.

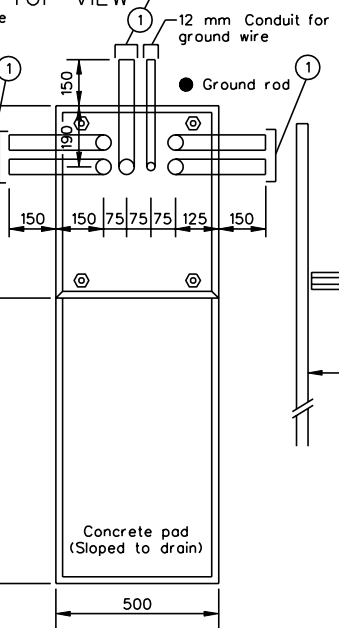


TYPICAL BOX DETAIL

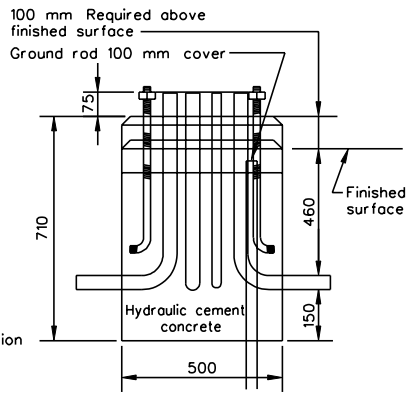
Height 910 mm minimum
Width 300 mm minimum
Depth 215 mm minimum

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

Size, placement and numbers as required by plans

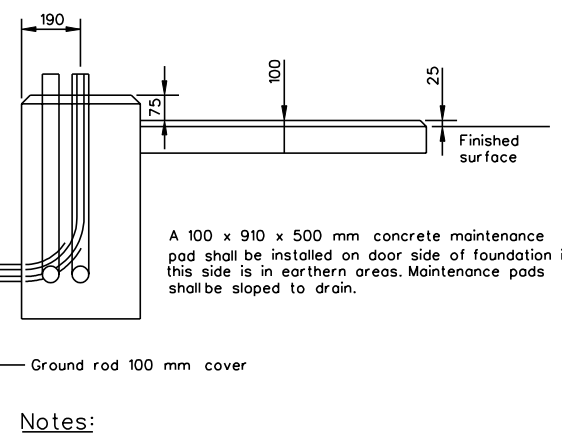


FRONT VIEW



TYPICAL FOUNDATION DETAIL

SIDE VIEW



A 100 x 910 x 500 mm concrete maintenance pad shall be installed on door side of foundation if this side is in earthen areas. Maintenance pads shall be sloped to drain.

Notes:

- All exposed concrete edges shall be chamfered 20 mm.
- 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 6 mm deep and 100 to 150 mm 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- 12 mm diameter weepholes shall be provided in the foundation and located 50 mm inside of the back or side edges of the controller cabinet. Weepholes shall be sloped to allow outlet to be 75 mm below top of foundation. 50 mm of the outlet end shall be fiber filled.
- The anchor bolts shall extend 6 to 19 mm 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.

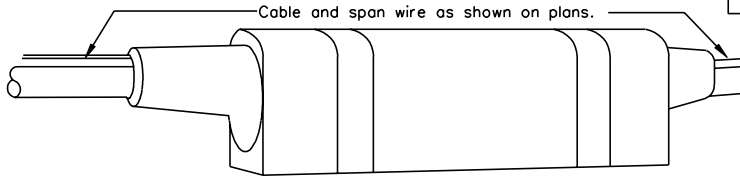
ABOVE GROUND CABLE TERMINAL ENCLOSURE AND CONDUIT PLACEMENT DETAILS

SPECIFICATION REFERENCE

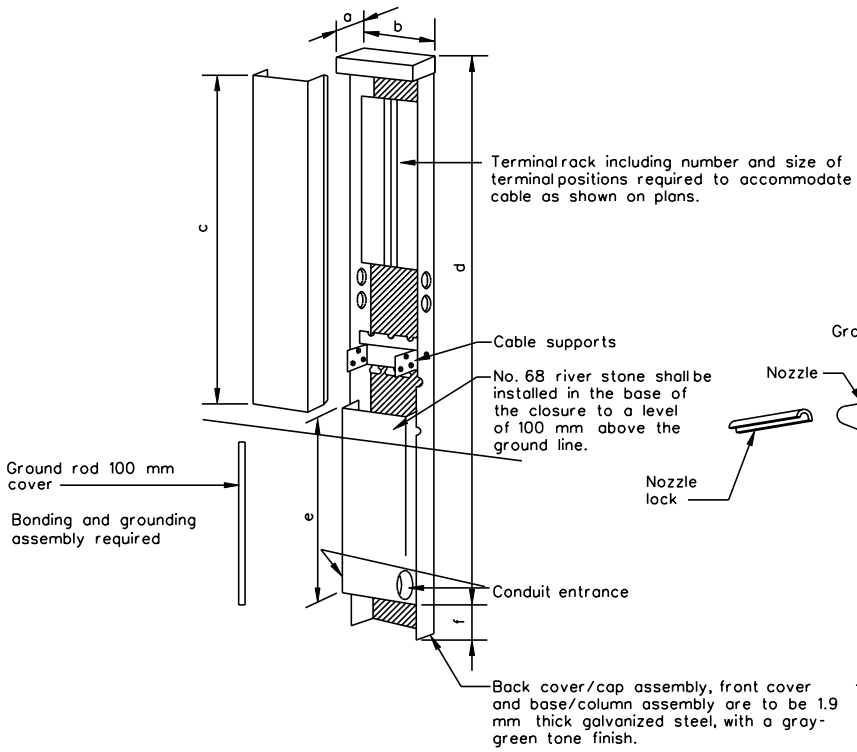
1301.03 UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

DIMENSIONS (min.)						
TYPE	a	b	c	d	e	f
A	165	165	660	1200	520	75
B	210	210	660	1200	520	75
C	325	325	600	1275	655	-

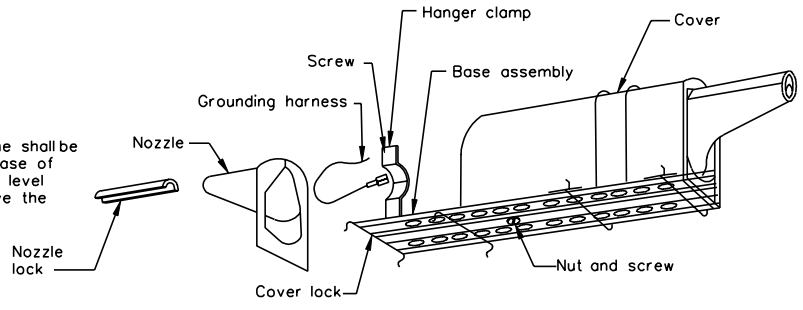


TYPICAL COMPLETED ASSEMBLY



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



TYPICAL ASSEMBLY BREAKDOWN

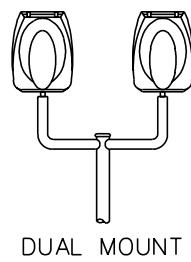
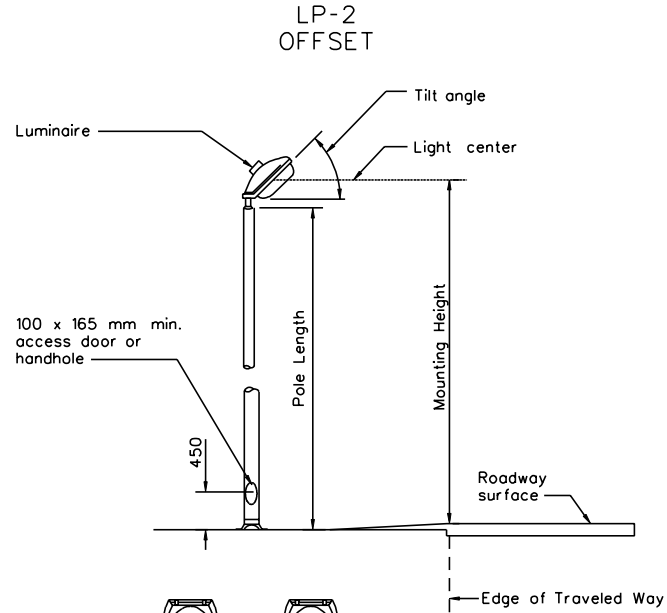
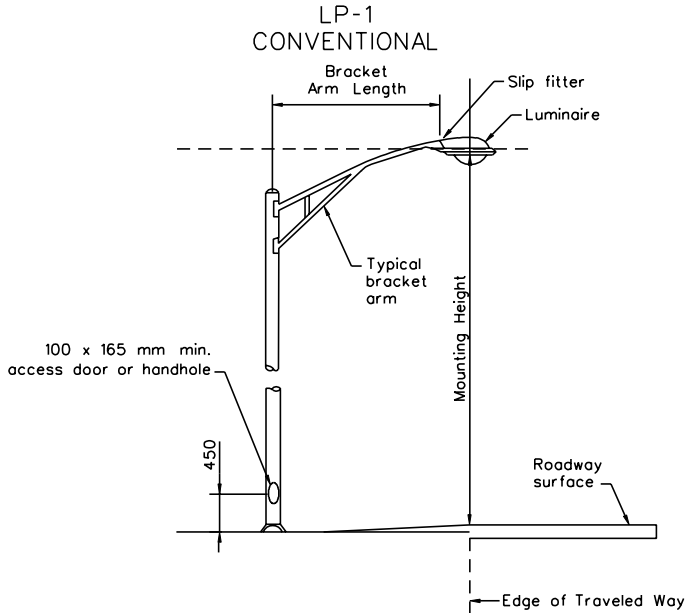
Notes:
 This item shall be easily re-enterable.
 This item shall be similar to standard telephone splice enclosures, and shall include terminal lugs for size and number of cables used, and shall be weather resistant.
 Where necessary this item shall be adapted for a "Y" branch of cable and /or for figure 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

SPECIFICATION REFERENCE

ABOVE GROUND AND AERIAL CABLE
 TERMINAL ENCLOSURE DETAILS

LP-1,2



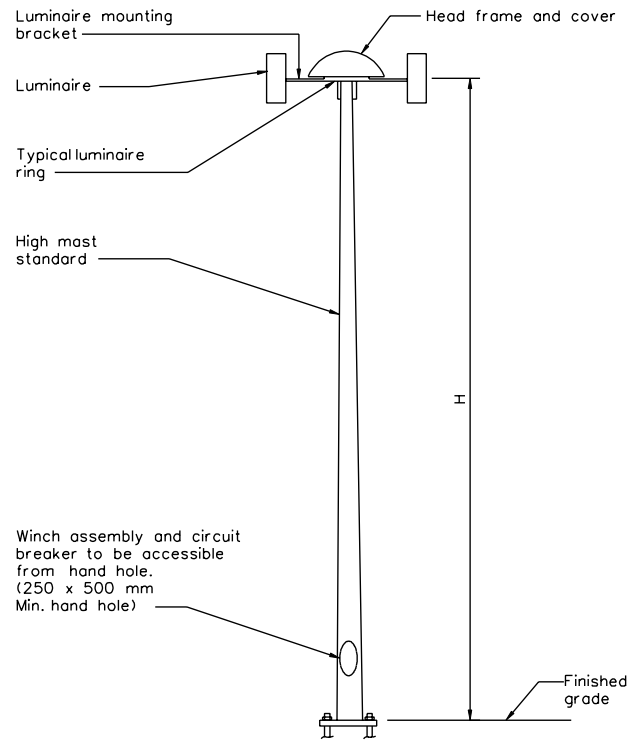
NOTE:
The mounting height shown on the plans shall be adhered to within a tolerance of 300 mm and in no case less than the mounting height shown.

LIGHTING POLE DETAILS CONVENTIONAL AND OFFSET

SPECIFICATION
REFERENCE

1301.05 UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION



TYPE	H
1	24 m
2	27 m
3	30 m
4	33 m
5	36 m

SPECIFICATION
REFERENCE

LIGHTING POLE DETAILS HIGH MAST

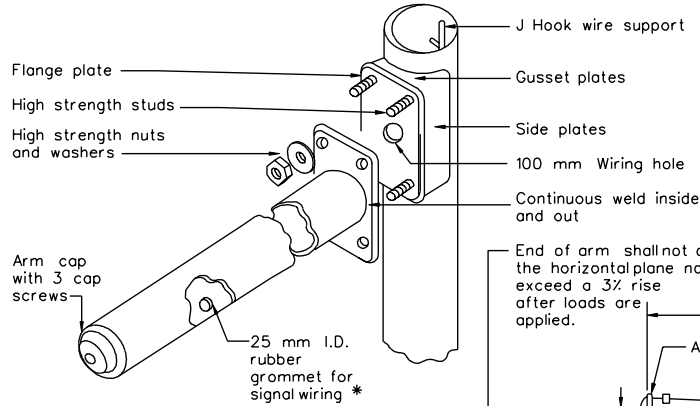
VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS
ON THIS SHEET ARE IN MILLIMETERS

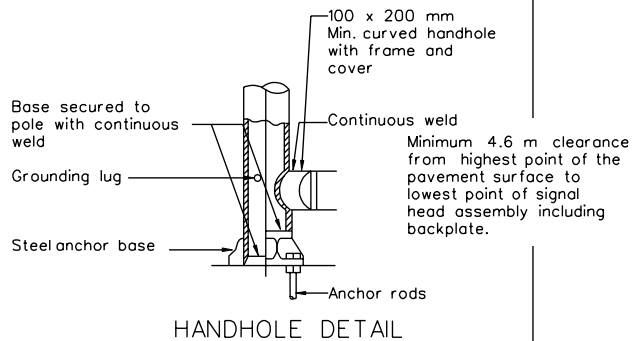
1301.06

MP-1

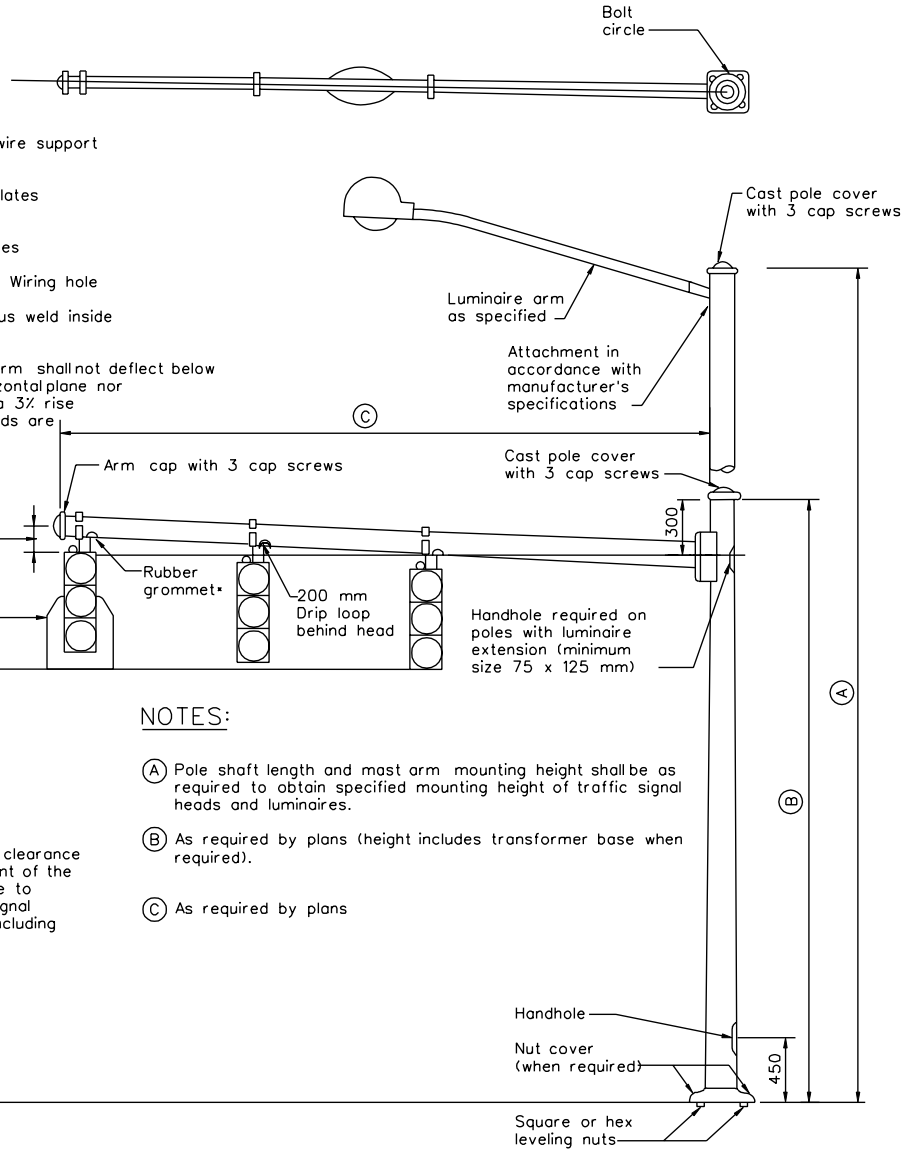
* Hole and grommet for signal wiring shall be located on the side of the arm directly behind the hanger assembly when Standard SM-3 hanger assemblies are required. Signal wiring shall be concealed in the Standard SM-3 hanger assemblies.



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

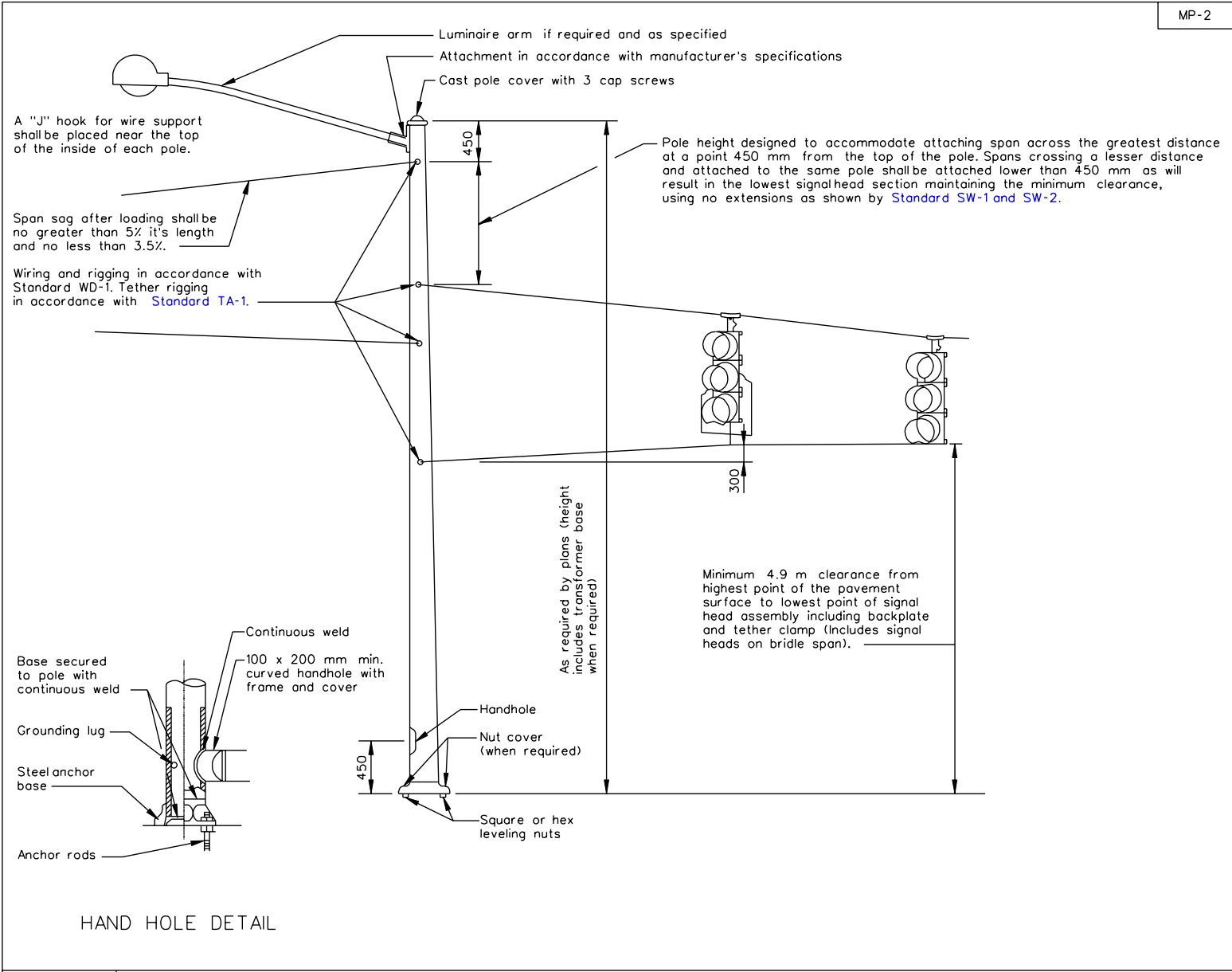
SIGNAL POLE DETAILS
(MAST ARM AND COMBINATION LUMINAIRE MAST ARM POLE)

SPECIFICATION REFERENCE

1301.07

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION



SPECIFICATION REFERENCE

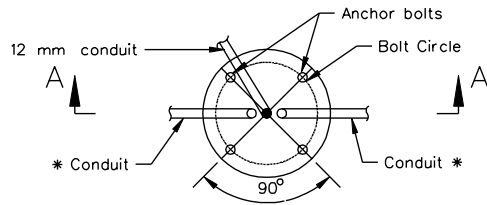
SIGNAL POLE DETAILS
(STRAIN AND COMBINATION LUMINAIRE STRAIN POLE)

VIRGINIA DEPARTMENT OF TRANSPORTATION

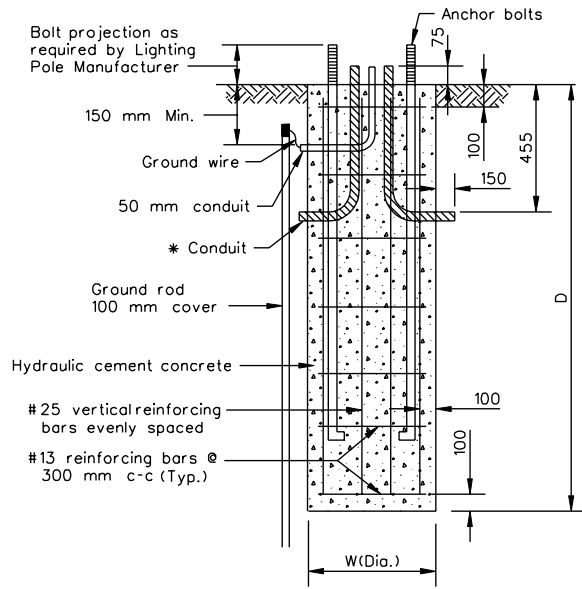
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

1301.08

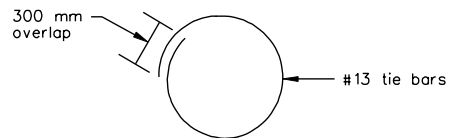
LF-1



PLAN VIEW
TYPE A AND B



SECTION A-A



PLAN VIEW

Type	W	D	Vertical Bars
A	800	1800	8 - #25
B	800	2400	8 - #25

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.

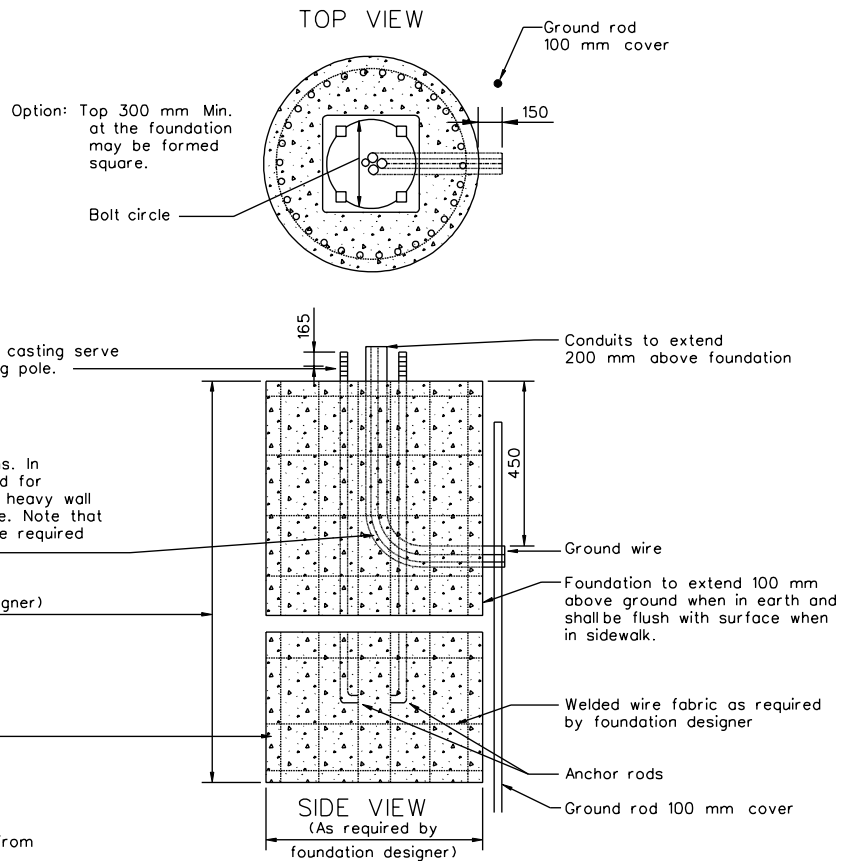
* The number, orientation and size of conduits entering and exiting foundations shall be as shown on plans.

LIGHTING POLE FOUNDATION
INSTALLATION DETAILS

SPECIFICATION
REFERENCE

1301.09 UNLESS OTHERWISE NOTED, ALL DIMENSIONS
ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION



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 6.0 mm deep and 100 to 150 mm long. Locations of empty conduits shall have an additional 50 mm long mark made perpendicular to and centered on this marking.

When foundation extends 100 mm above finished grade all edges shall be chamfered 20 mm.

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

Bellends 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.

SPECIFICATION REFERENCE	
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SIGNAL POLE FOUNDATION INSTALLATION DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

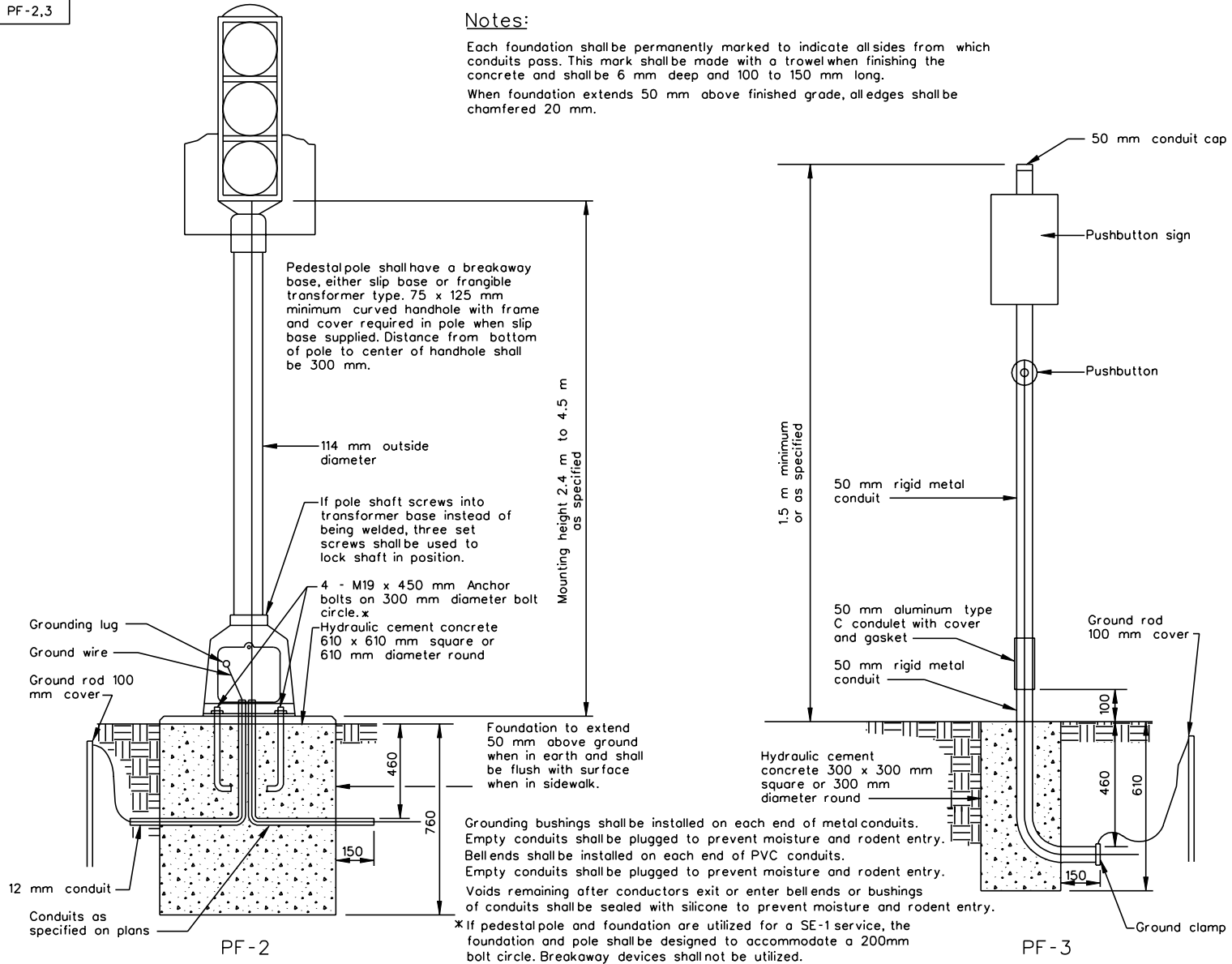
UNLESS OTHERWISE NOTED, ALL DIMENSIONS
ON THIS SHEET ARE IN MILLIMETERS

1301.10

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 6 mm deep and 100 to 150 mm long.
 When foundation extends 50 mm above finished grade, all edges shall be chamfered 20 mm.

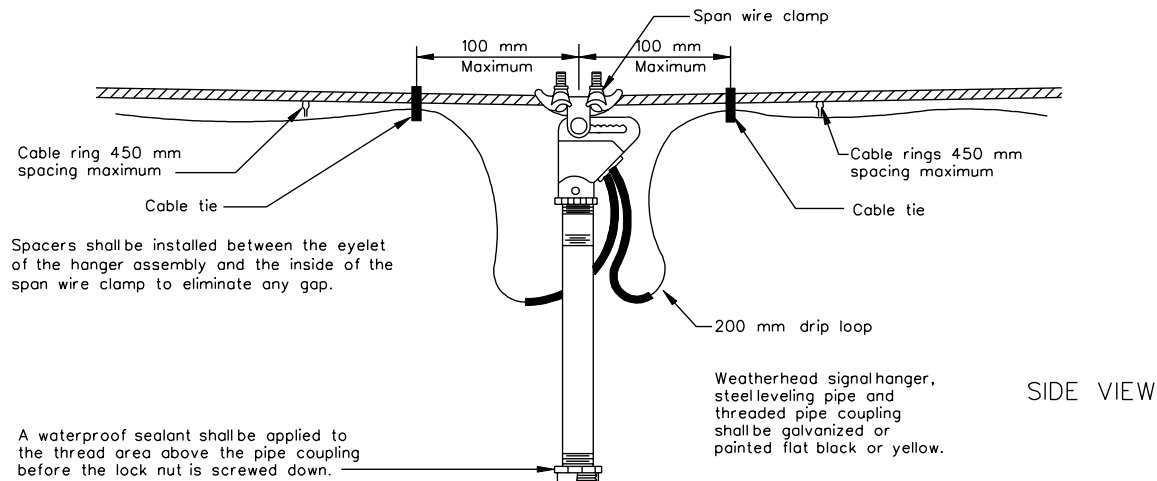


PEDESTAL POLE AND FOUNDATION
 DETAILS

SPECIFICATION
 REFERENCE

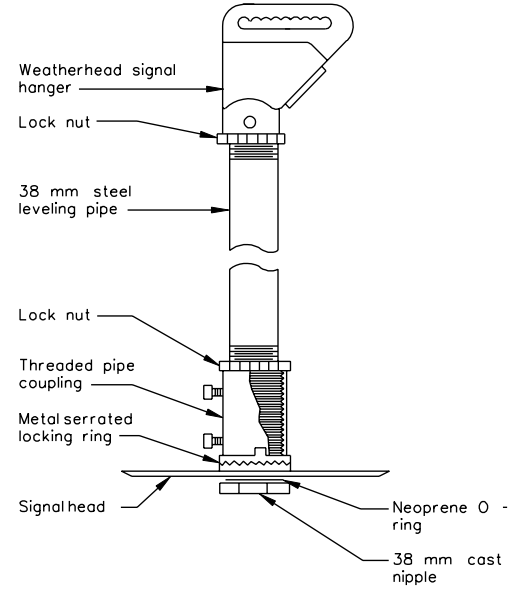
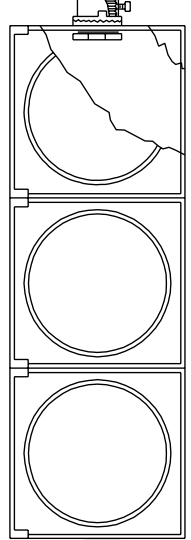
1301.11 UNLESS OTHERWISE NOTED, ALL DIMENSIONS
 ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION



Note:

Signalheads mounted on the same span wire shall be installed so the bottom sections are on a levelplane or no greater than 300 mm above the bottom of the lowest signalhead.



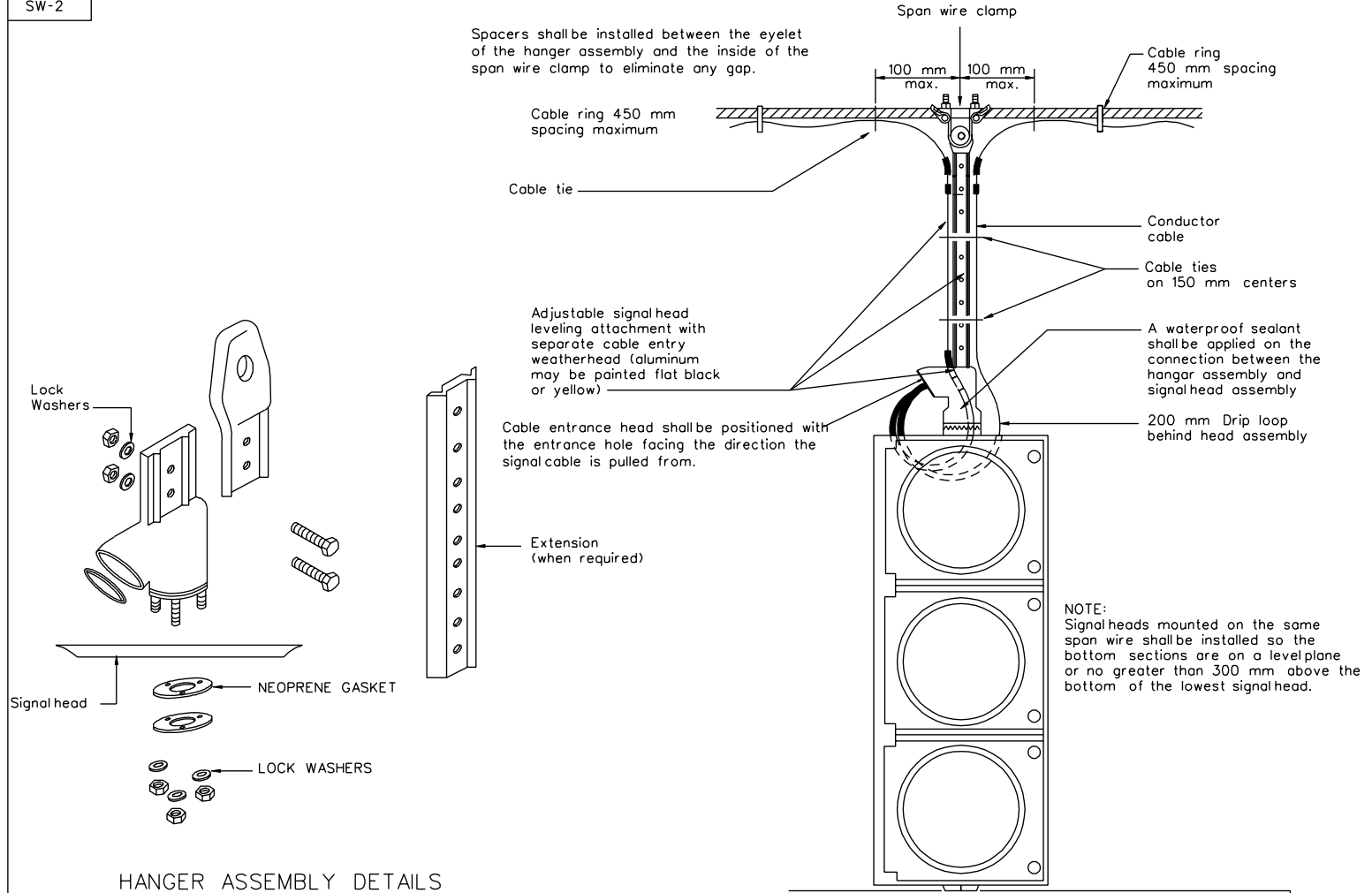
Signalhead cables shall be continuous from the controller to the nearest signalhead to which it applies except cable terminations may be allowed on the pole terminalstrip when required by the plans. The cable shall also be continuous from the first signal head to any additional heads with termination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

Minimum 4.9 m clearance from highest point of the pavement surface to the lowest point of signalhead assembly including backplate and tether clamp (Includes signalheads on bridle span).

SPECIFICATION REFERENCE

SIGNAL HEAD MOUNTING DETAILS SPAN WIRE

SW-2



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.

Minimum 4.9 m clearance from highest point of the pavement surface to lowest point of signal head assembly including backplate and tether clamp (includes signal heads on bridle span).

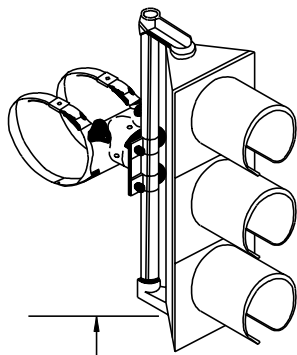
SIGNAL HEAD MOUNTING DETAILS SPAN WIRE

SPECIFICATION
REFERENCE

1301.13

UNLESS OTHERWISE NOTED, ALL DIMENSIONS
ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION



Minimum 4.6 m clearance from highest point of the pavement surface to lowest point of signal head assembly including backplate.

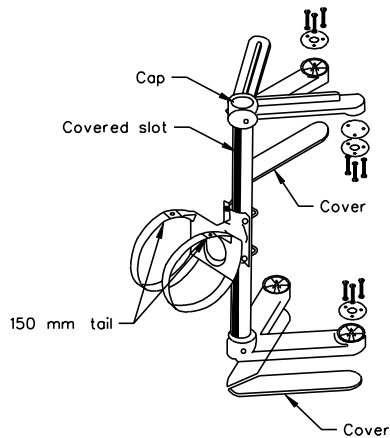
Notes:

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.

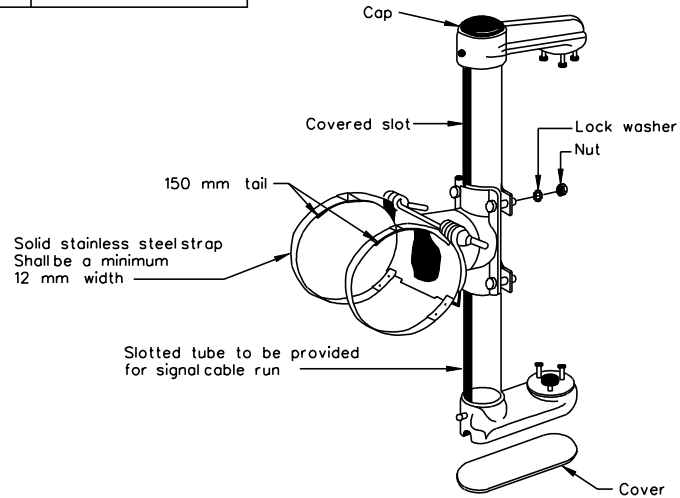
All bolts, nuts and washers shall be stainless steel.

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



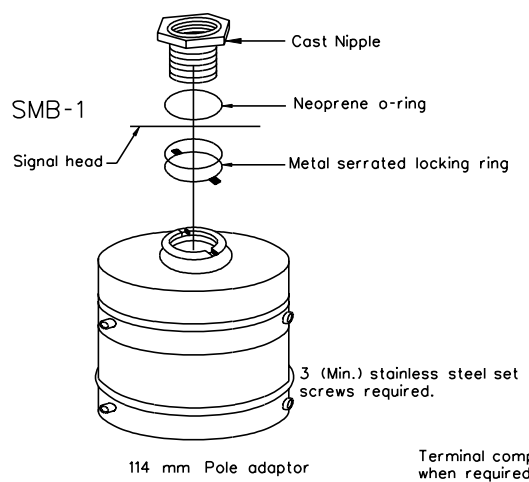
RIGID MAST ARM MOUNTING DETAILS

SPECIFICATION REFERENCE

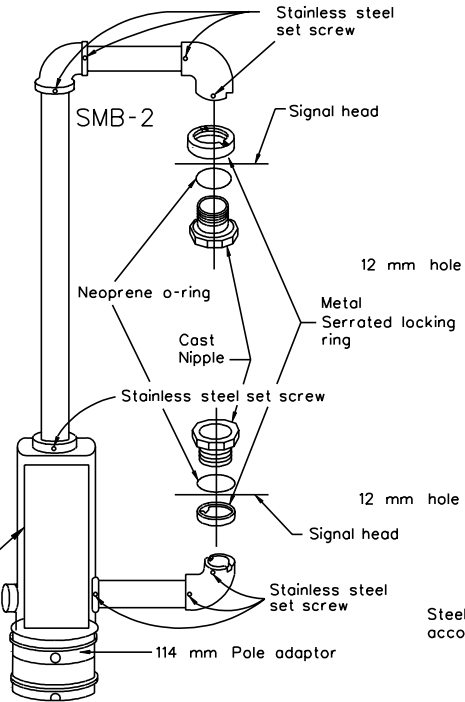
SIGNAL HEAD MOUNTING DETAILS
MAST ARM

SMB-1,2or3

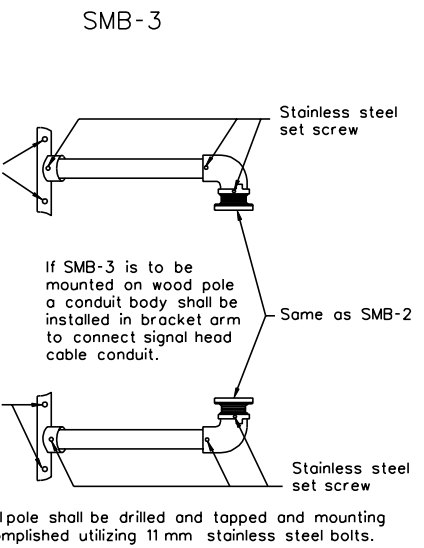
POLE TOP MOUNTING CAST ALUMINUM SIGNAL HEADS ONLY



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.

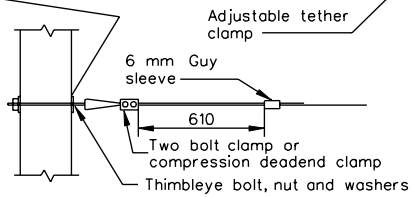
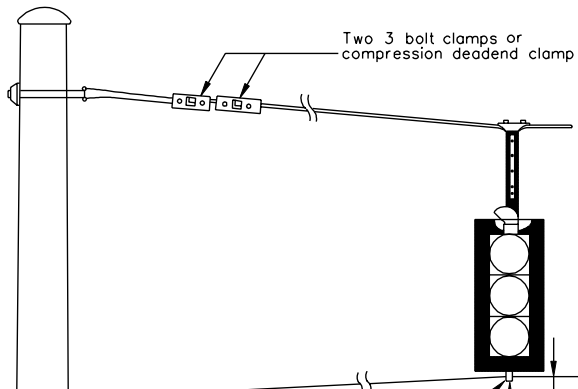
SMB-1, 2 and 3 shown are typical and for one way signal display. Other designs may be submitted for approval by the Engineer. Multi-way assemblies, when required, shall be of similar appropriate design.

SIGNAL HEAD MOUNTING DETAILS
POLE TOP AND BRACKET

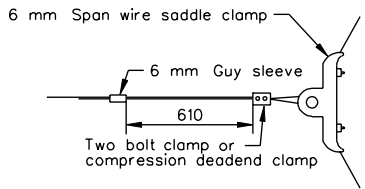
SPECIFICATION REFERENCE

1301.15 UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

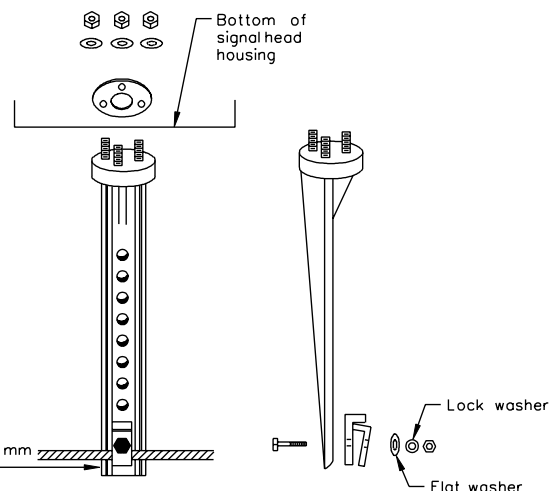


POLE ATTACHMENT

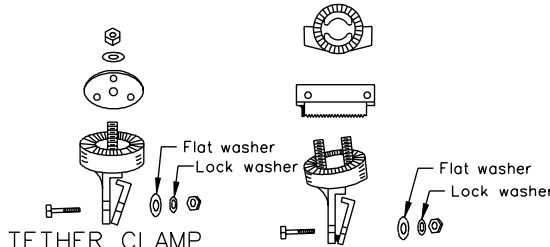


BRIDLE SPAN ATTACHMENT

Minimum 4.9 m clearance from highest point of the pavement surface to lowest point of signal head assembly including backplate and tether clamp (Includes signalheads on bridle span).



ADJUSTABLE TETHER CLAMP



TETHER CLAMP

FIVE-HEAD CLUSTER TETHER CLAMP

SPECIFICATION REFERENCE

TETHER WIRE DETAILS

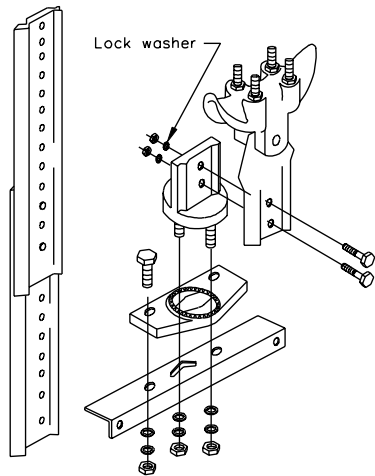
VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

1301.16

SMD-1, 2

SPAN WIRE INSTALLATION

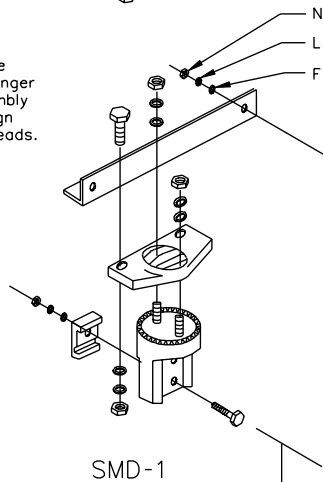


Spacers shall be installed between the eyelet of the sign hanger and the span wire clamp to eliminate any gap.

Note:

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

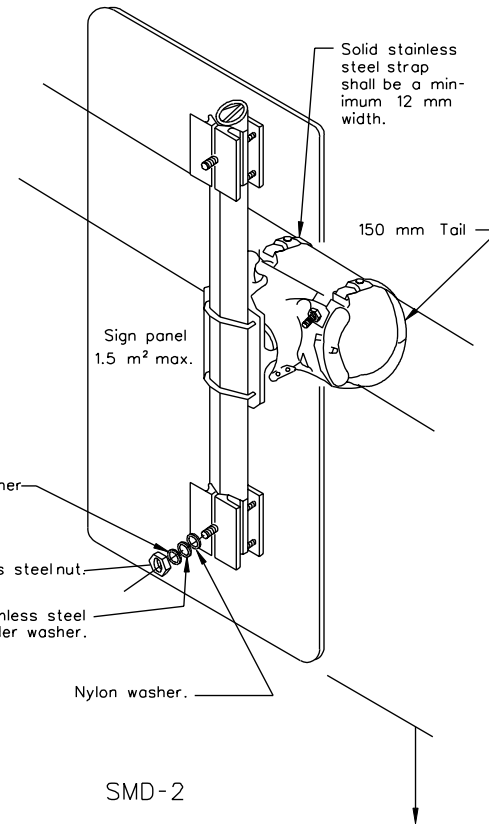
Extension shall be used with the hanger and tether assembly to center the sign with the signal heads.



SMD-1

Minimum 4.9 m clearance from highest point of the pavement surface to bottom of tether clamp.

MAST ARM INSTALLATION



SMD-2

Minimum 4.6 m 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 16 mm in diameter.

A 32 mm nylon and stainless steel fender washer shall be used on the front of sign panel where bolt passes through sign panel.

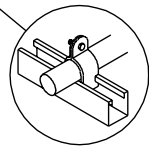
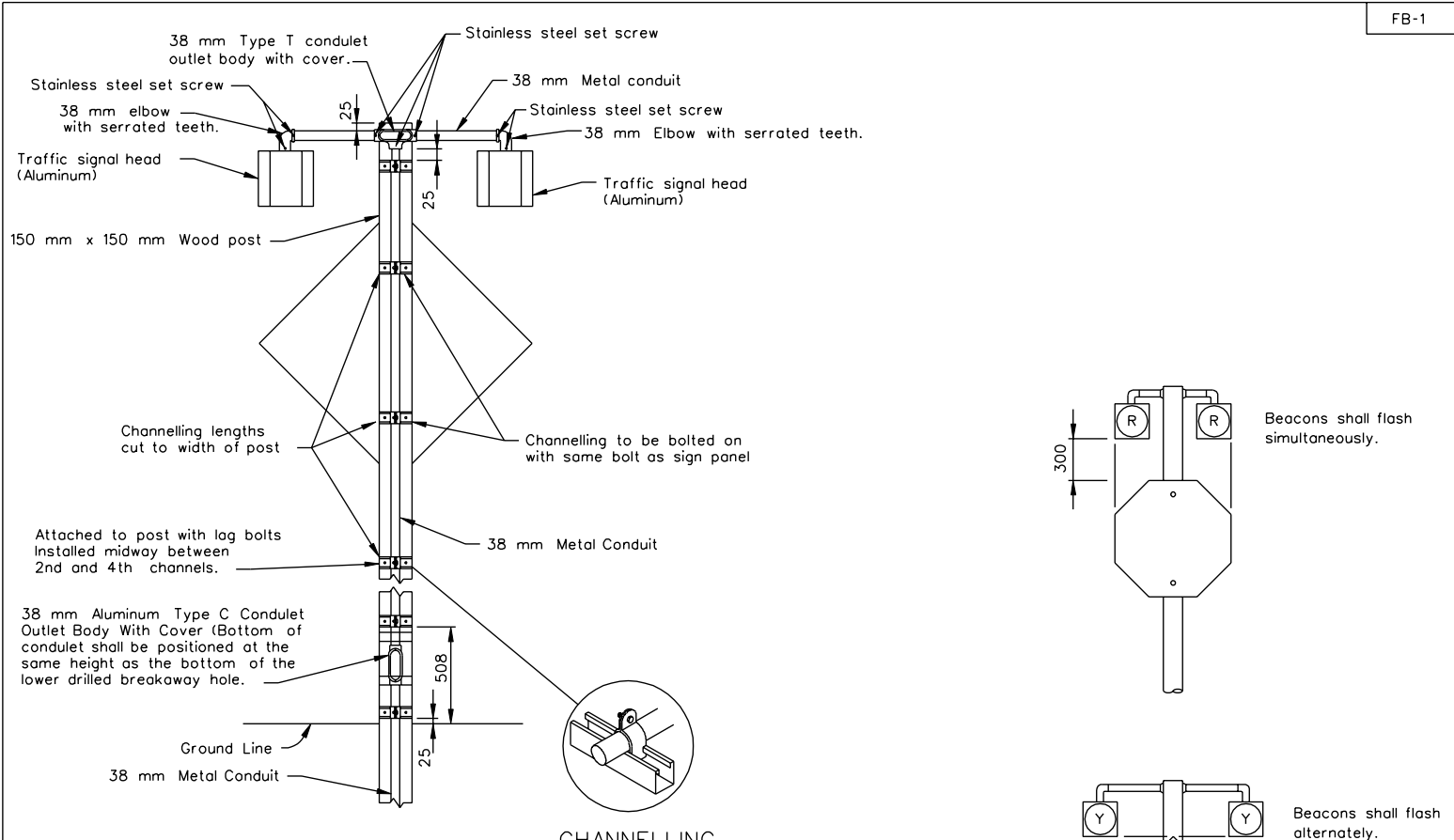
SIGN MOUNTING DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

1301.17

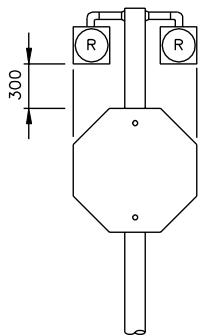
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS



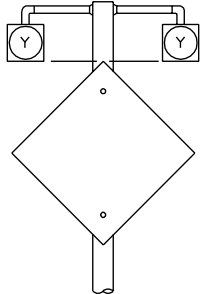
CHANNELLING
DETAIL

Notes:

- All signal lenses shall be 300 mm.
- Post to be drilled for breakaway and installed in accordance with WSP-1.
- 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.



Beacons shall flash simultaneously.

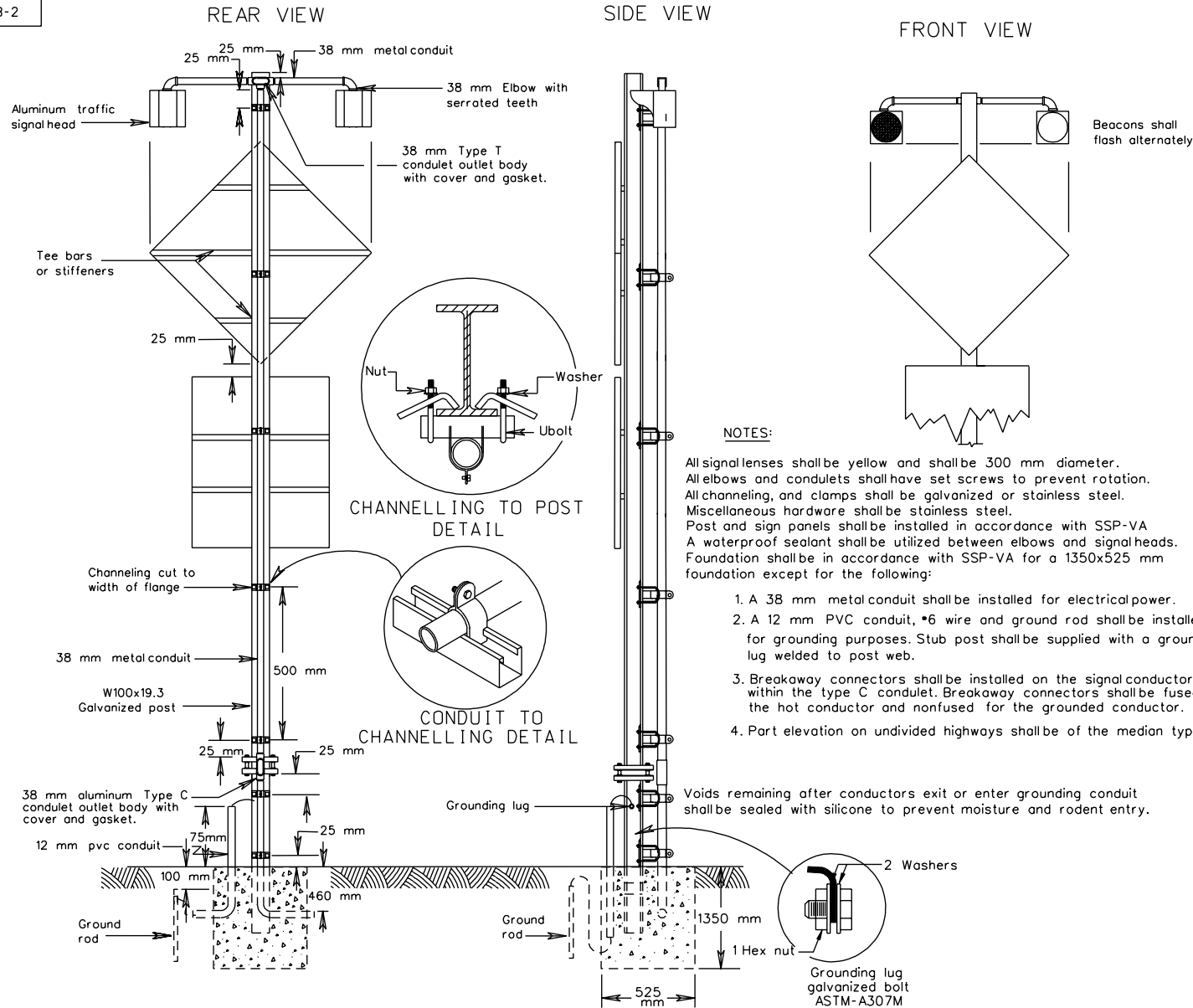


Beacons shall flash alternately.

BEACON ALIGNMENT
DETAIL

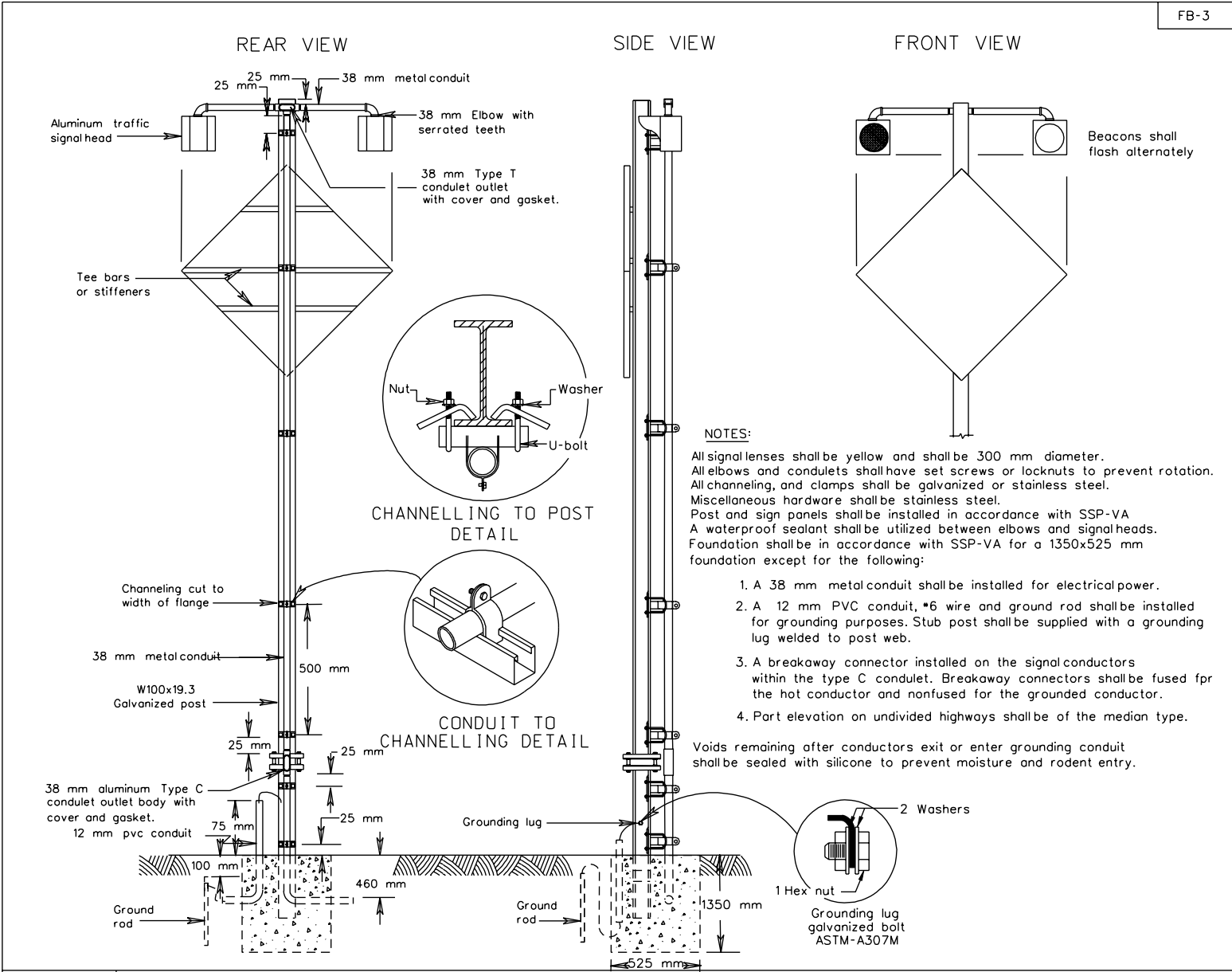
SPECIFICATION REFERENCE

FLASHING BEACON INSTALLATION DETAILS



FLASHING BEACON INSTALLATION
DETAILS

SPECIFICATION
REFERENCE



NOTES:
 All signal lenses shall be yellow and shall be 300 mm diameter.
 All elbows and condulets shall have set screws or locknuts to prevent rotation.
 All channelling, 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 signalheads.
 Foundation shall be in accordance with SSP-VA for a 1350x525 mm foundation except for the following:

1. A 38 mm metal conduit shall be installed for electrical power.
2. A 12 mm 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 conduit. 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.

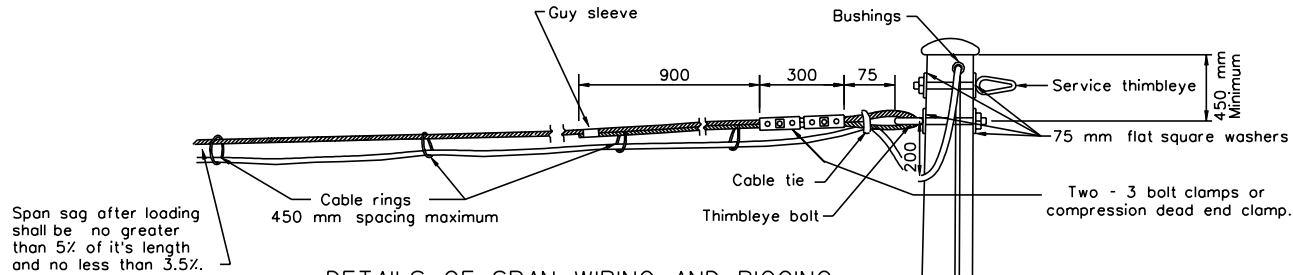
Voids remaining after conductors exit or enter grounding conduit shall be sealed with silicone to prevent moisture and rodent entry.

SPECIFICATION REFERENCE	
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FLASHING BEACON INSTALLATION DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS 1301.20



Span sag after loading shall be no greater than 5% of it's length and no less than 3.5%.

DETAILS OF SPAN WIRING AND RIGGING

Signal cable shall be run inside unless otherwise specified

DETAILS OF POLE RIGGING

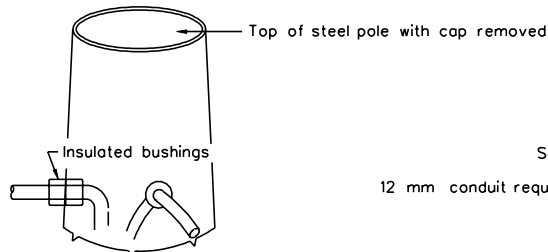
Notes:

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

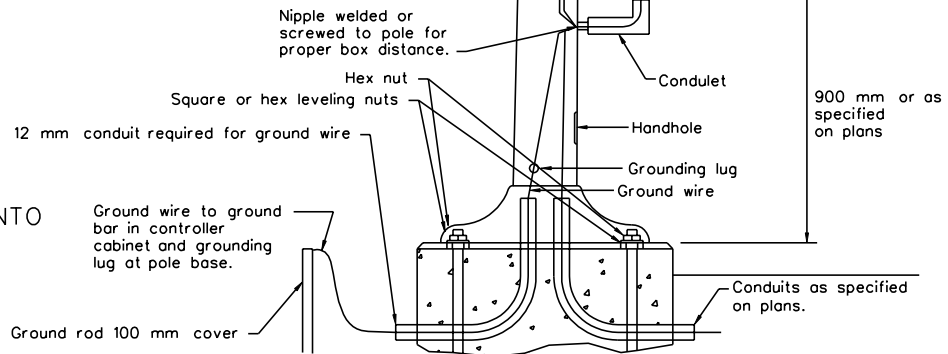
For methods approved for cable runs, see Standard WD-2.

Pole height designed to accommodate attaching span across the greatest distance at a point 450 mm from the top of the pole. Spans crossing a lesser distance and attached to the same pole shall be attached lower than 450 mm 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.



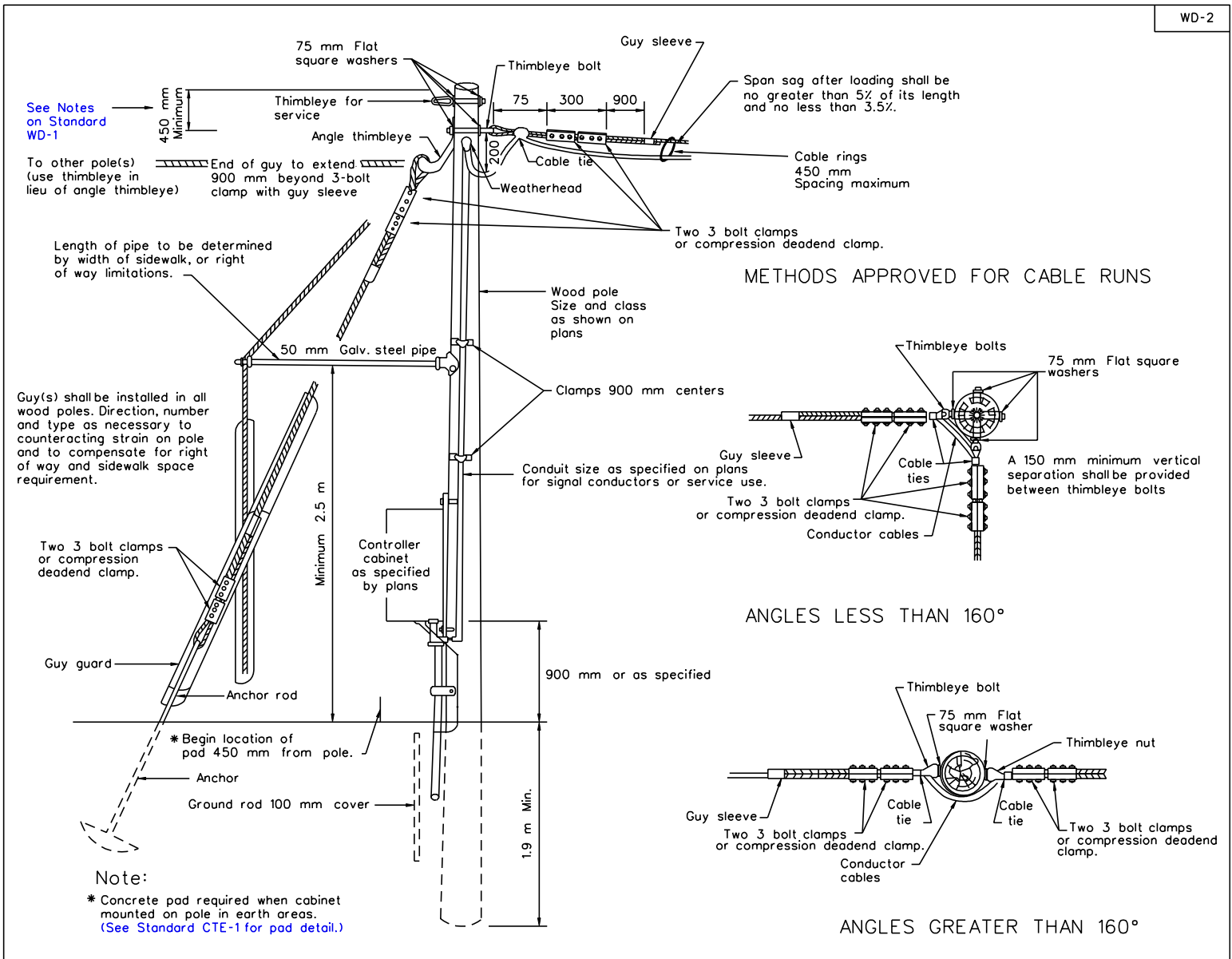
METHODS OF BRINGING CONDUCTORS INTO TOP OF STEEL POLES



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

STEEL POLE WIRING AND RIGGING
DETAILS

SPECIFICATION
REFERENCE



SPECIFICATION REFERENCE

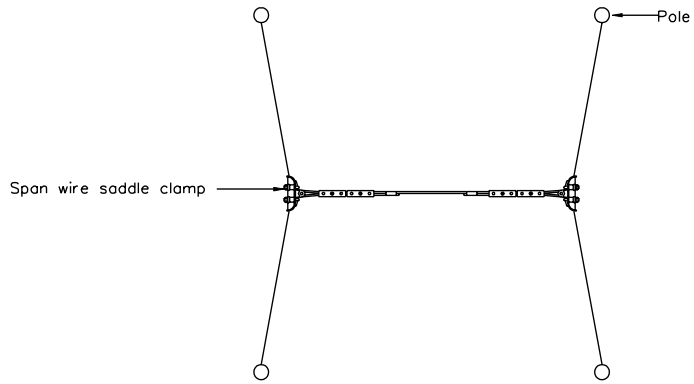
WOOD POLE WIRING AND RIGGING DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

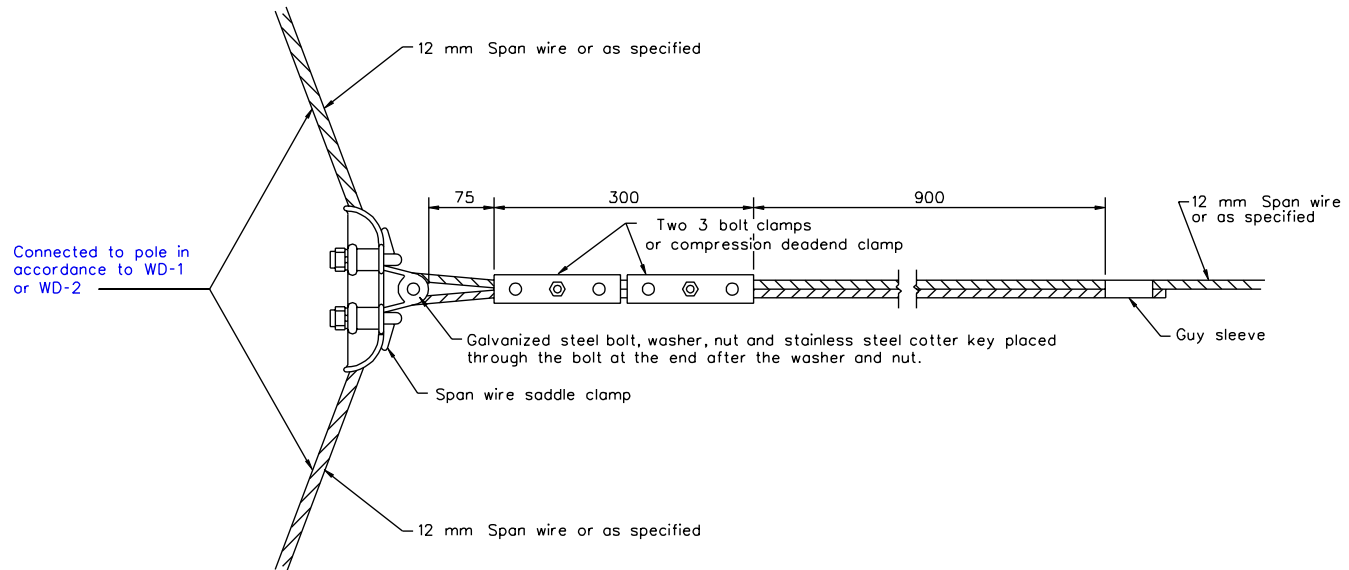
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

1301.22

WD-3



TYPICAL BRIDLE SPAN INSTALLATION



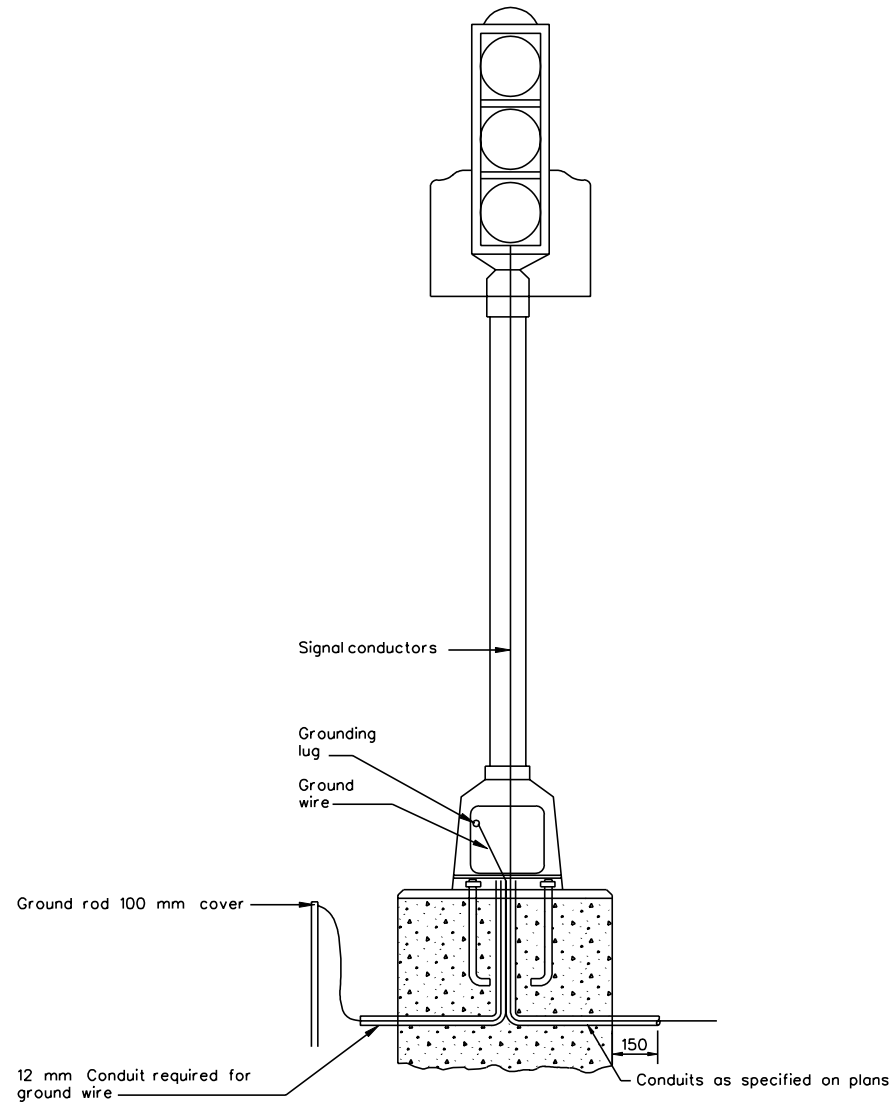
BRIDLE SPAN WIRING AND RIGGING DETAILS

SPECIFICATION
REFERENCE

1301.23

UNLESS OTHERWISE NOTED, ALL DIMENSIONS
ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION



SPECIFICATION REFERENCE

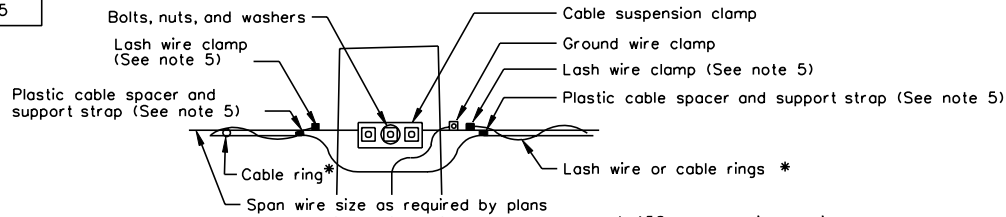
PEDESTRIAN POLE WIRING DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

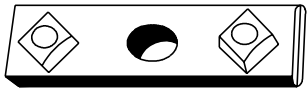
1301.24

WD-5



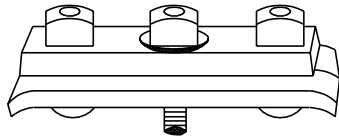
* 450 mm spacing maximum

STRAIGHT PULL CABLE SUSPENSION CLAMP

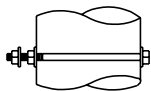


All bolts, nuts, washers, and suspension clamps shall be galvanized.

CURVED PULL CABLE SUSPENSION CLAMP



SIDE VIEW CENTER BOLT FOR HOLDING CLAMP



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 150 m 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.

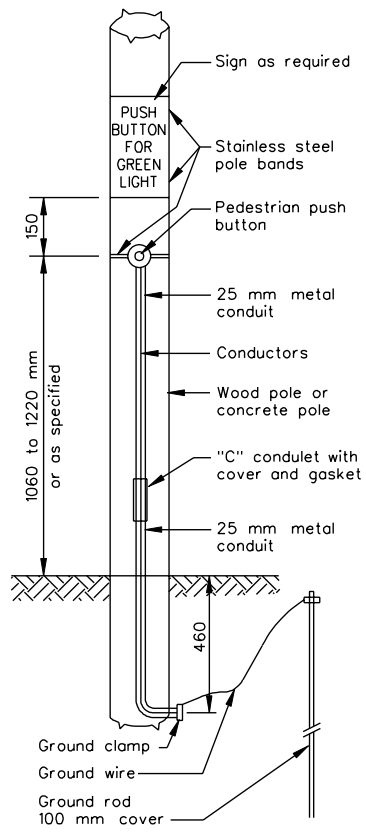
INTERCONNECT (IMPULSE) CABLE INSTALLATION

SPECIFICATION REFERENCE

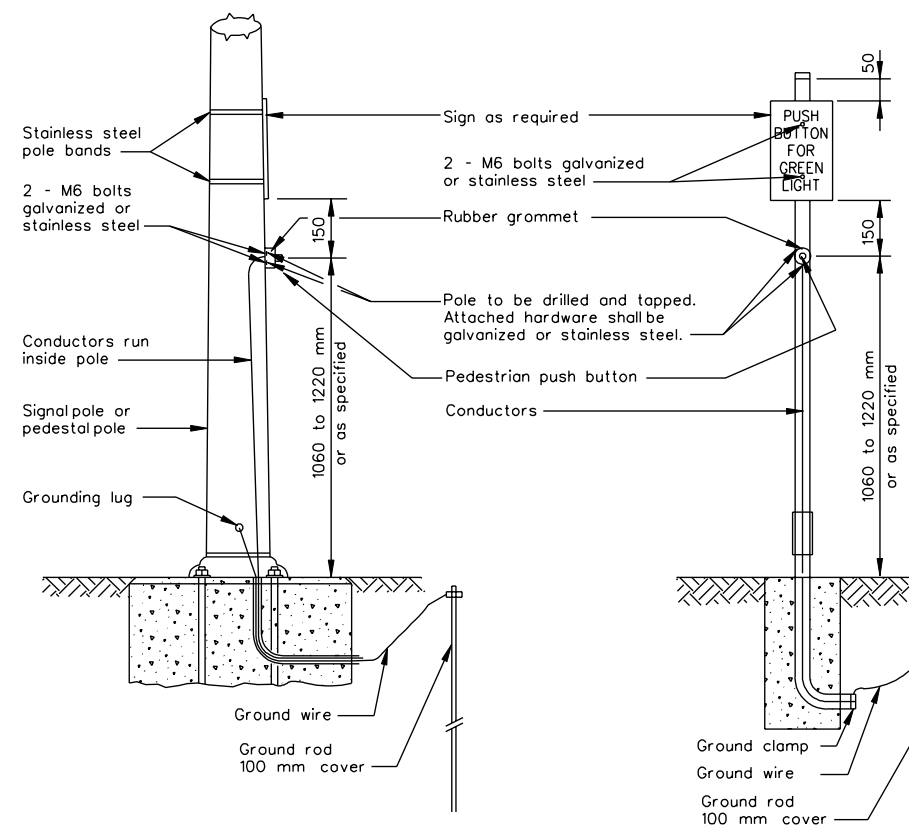
1301.25

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

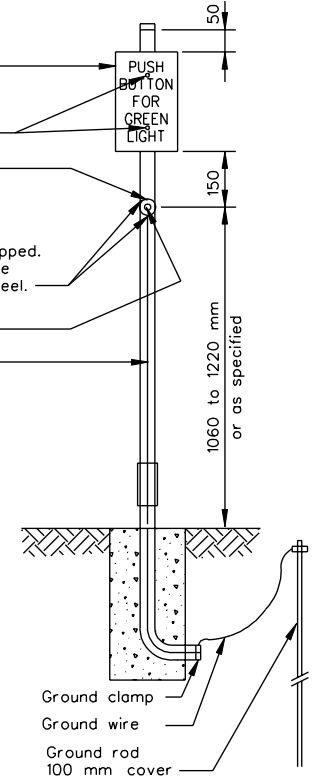
VIRGINIA DEPARTMENT OF TRANSPORTATION



PA-1



PA-2



PA-3

SPECIFICATION REFERENCE

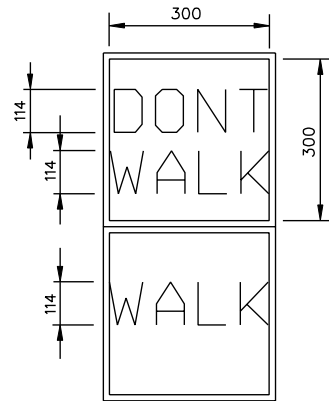
PEDESTRIAN ACTUATION DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS
ON THIS SHEET ARE IN MILLIMETERS

1301.26

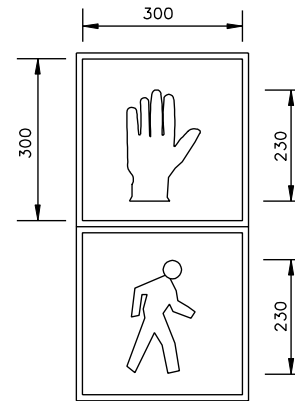
SP-1,2,3,4



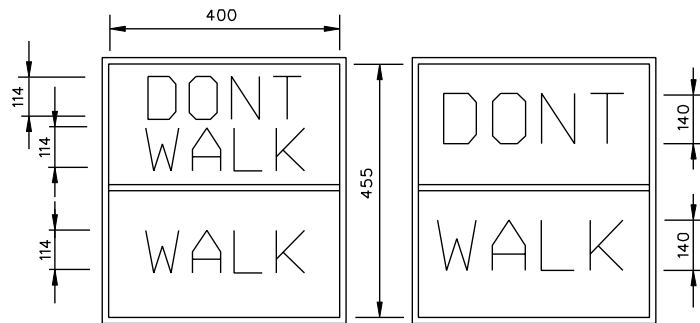
SP-1
(2-MBS)

COLOR

The standard colors for pedestrian traffic control signals shall be Portland Orange for the "DONT WALK" and White for the "WALK" indications. The background shall be an opaque material.



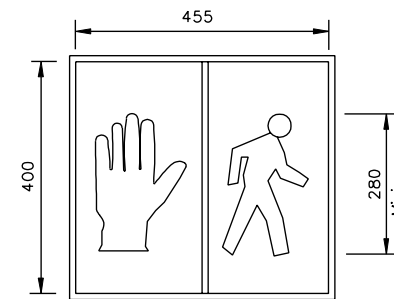
SP-3
(2-MBS)



TYPE A
(1-MBS)

TYPE B
(1-MBS)

SP-2



SP-4
(1-MBS)

MBS - Message bearing surface

PEDESTRIAN SIGNAL INDICATION DETAILS

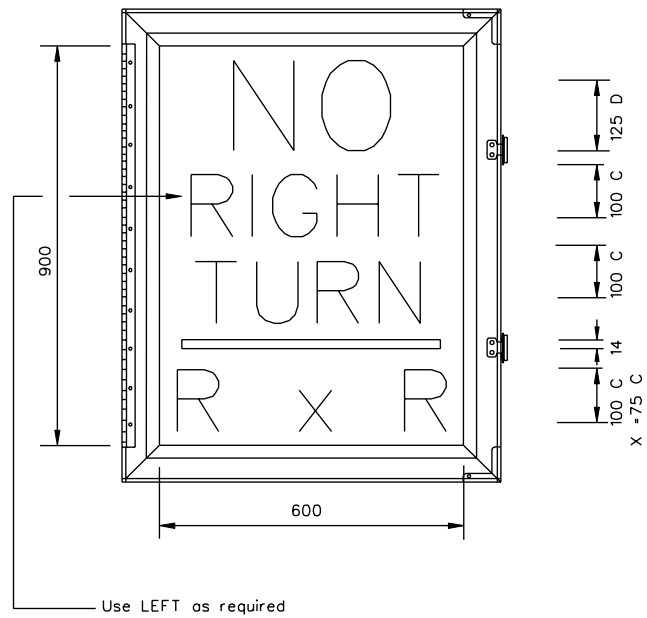
SPECIFICATION REFERENCE

1301.27

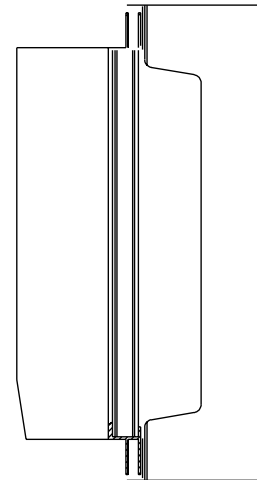
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

FRONT VIEW



SIDE VIEW



SPECIFICATION REFERENCE

ILLUMINATED TRAFFIC CONTROL SIGN

VIRGINIA DEPARTMENT OF TRANSPORTATION

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ON THIS SHEET ARE IN MILLIMETERS

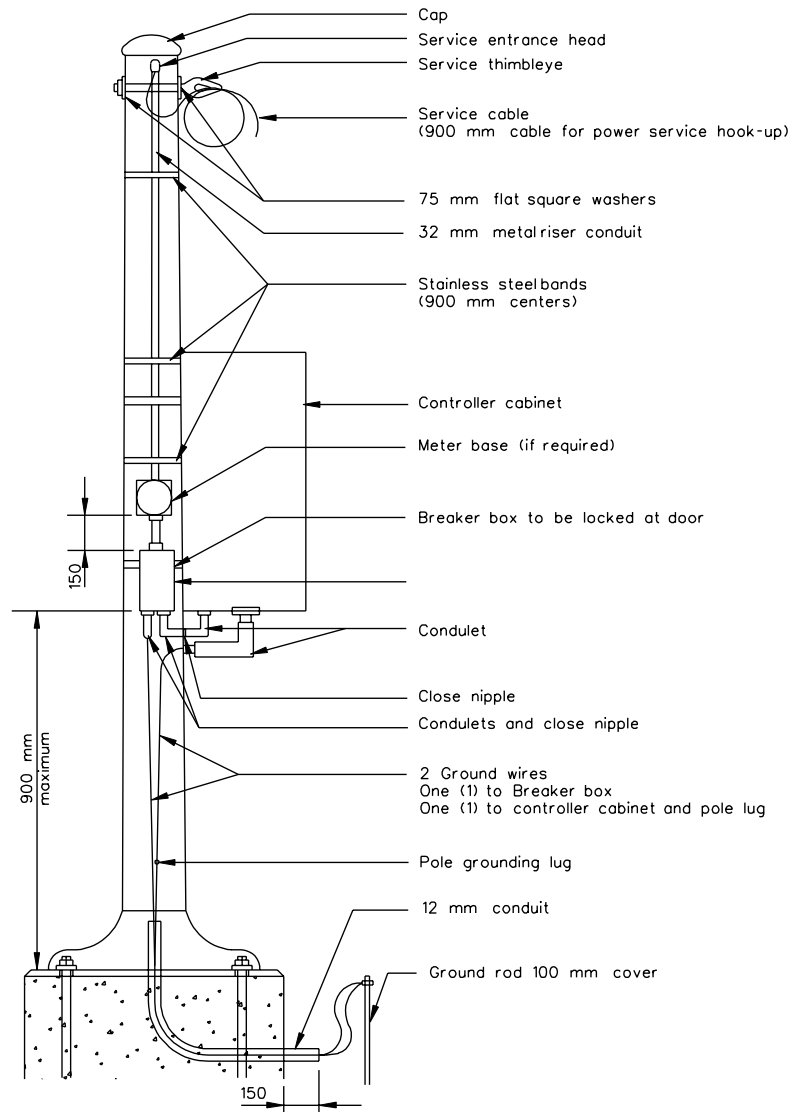
SE-1

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 ground wire entering breaker box see Standard SE-5.



TYPE A

ELECTRICAL SERVICE DETAILS
SIGNAL INSTALLATIONS

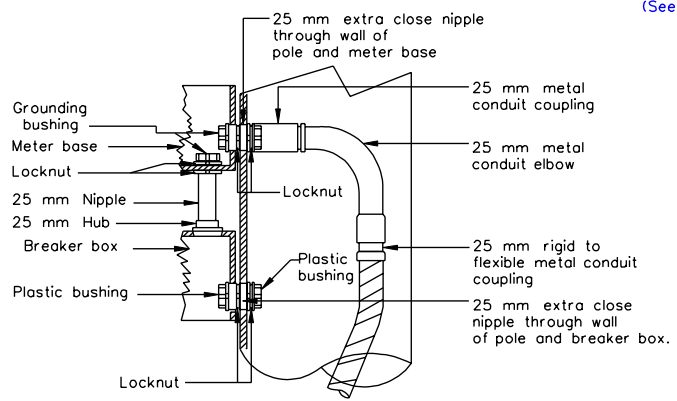
SPECIFICATION
REFERENCE

1301.29

UNLESS OTHERWISE NOTED, ALL DIMENSIONS
ON THIS SHEET ARE IN MILLIMETERS

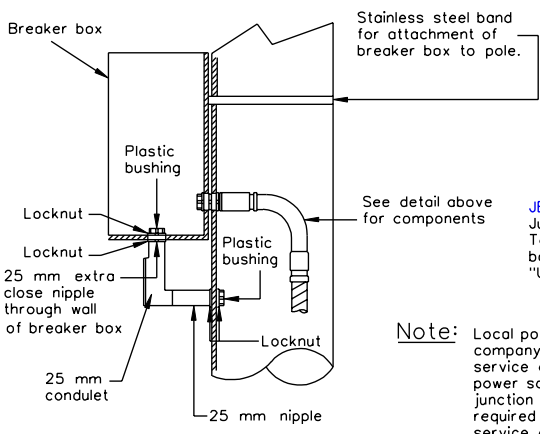
VIRGINIA DEPARTMENT OF TRANSPORTATION

DETAIL



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

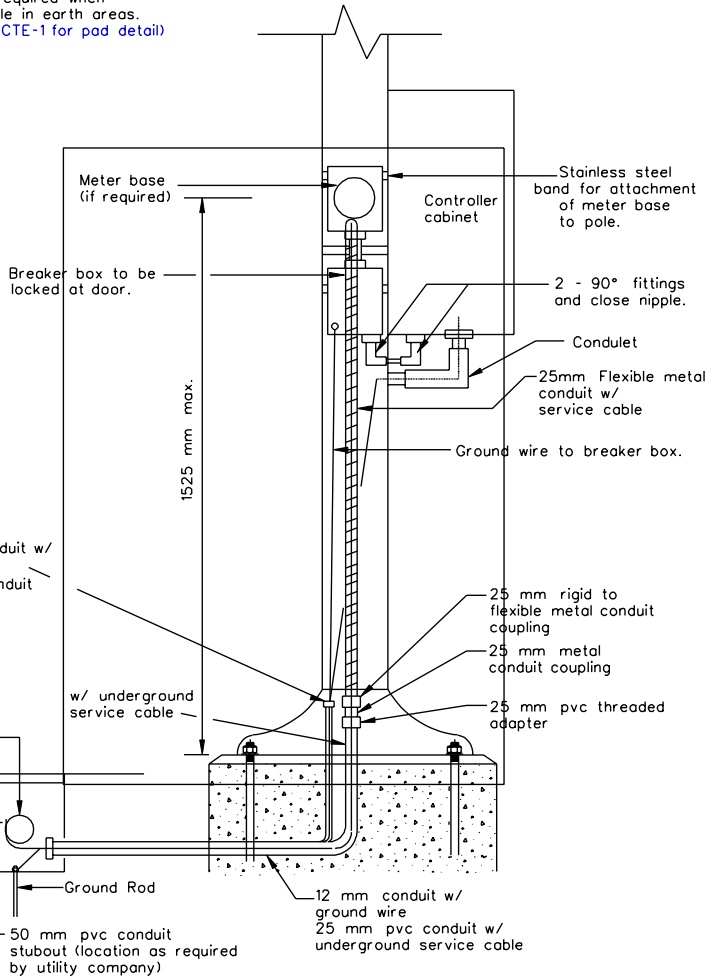
ALTERNATE DETAIL
(Used when meter base not required)



Underground service cable coiled in box with sufficient length to allow the cables to extend at least 600 mm above the junction box.

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

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

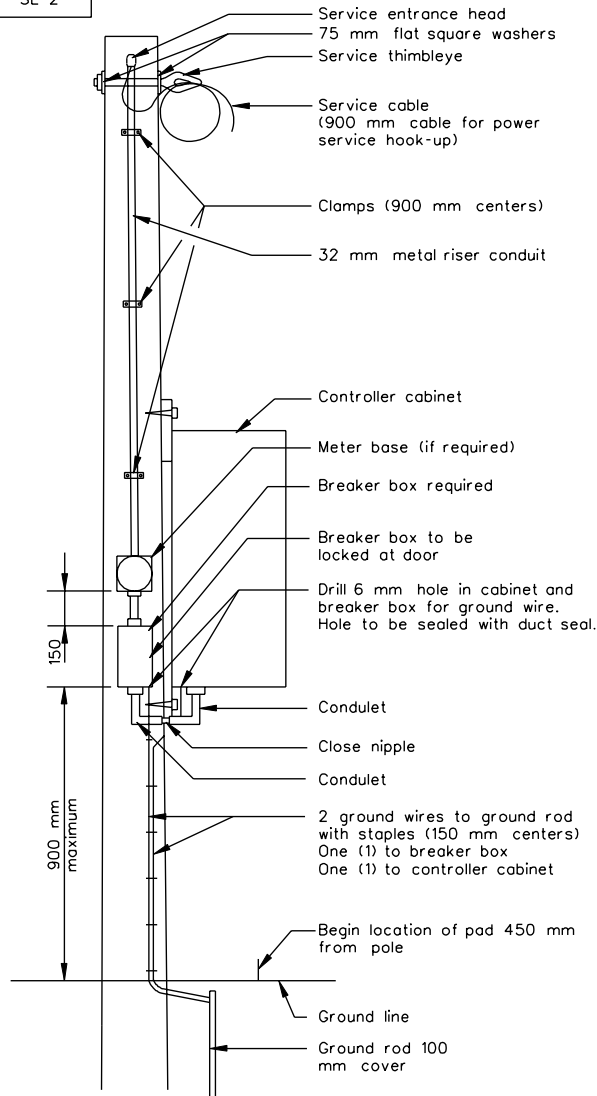
SPECIFICATION REFERENCE

ELECTRICAL SERVICE DETAILS
SIGNAL INSTALLATION

VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

SE-2



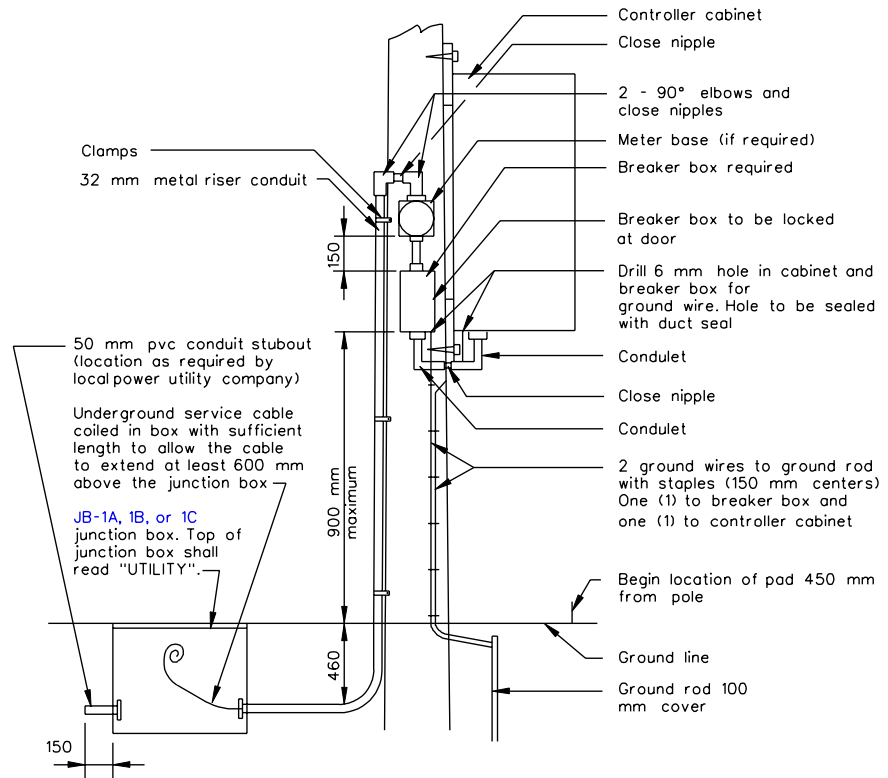
TYPE A

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. (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

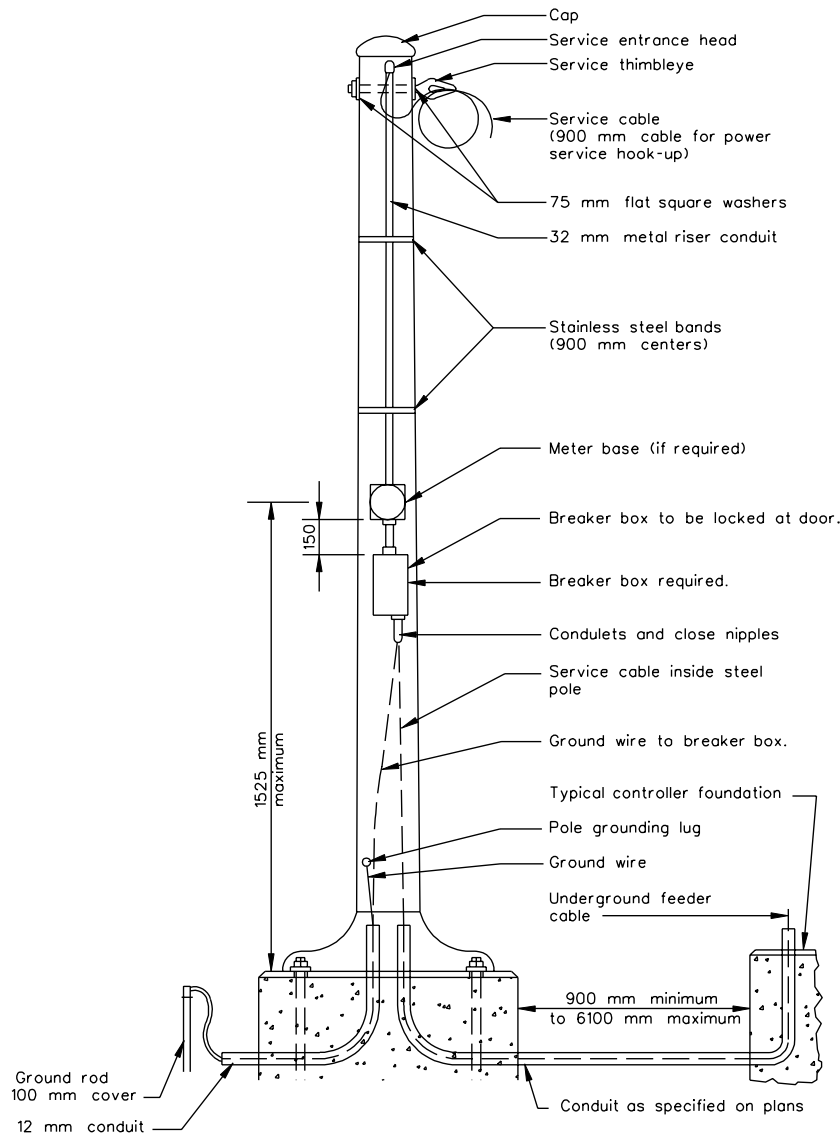
ELECTRICAL SERVICE DETAILS
SIGNAL INSTALLATION

SPECIFICATION
REFERENCE

1301.31

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION



Notes:

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

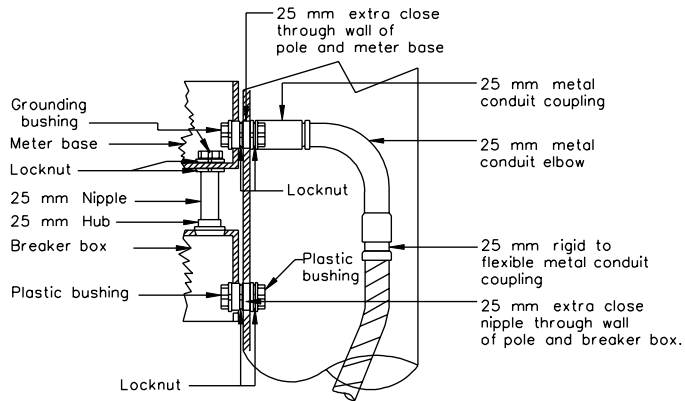
For alternate method of service cable and ground wire entering breaker box, see standard SE-5.

TYPE A

SPECIFICATION REFERENCE

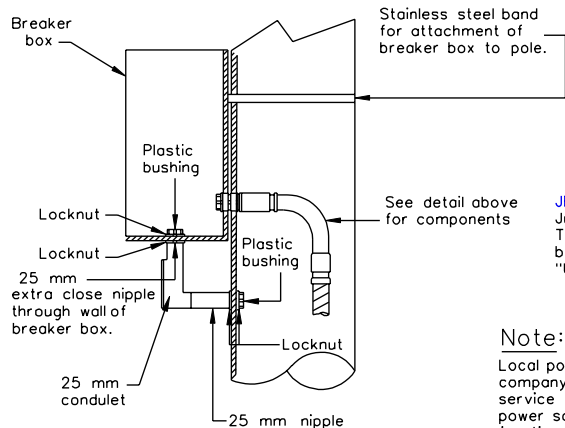
ELECTRICAL SERVICE DETAILS
 SIGNAL INSTALLATION
 VIRGINIA DEPARTMENT OF TRANSPORTATION

DETAIL



ALTERNATE DETAIL

(Used when meter base not required)

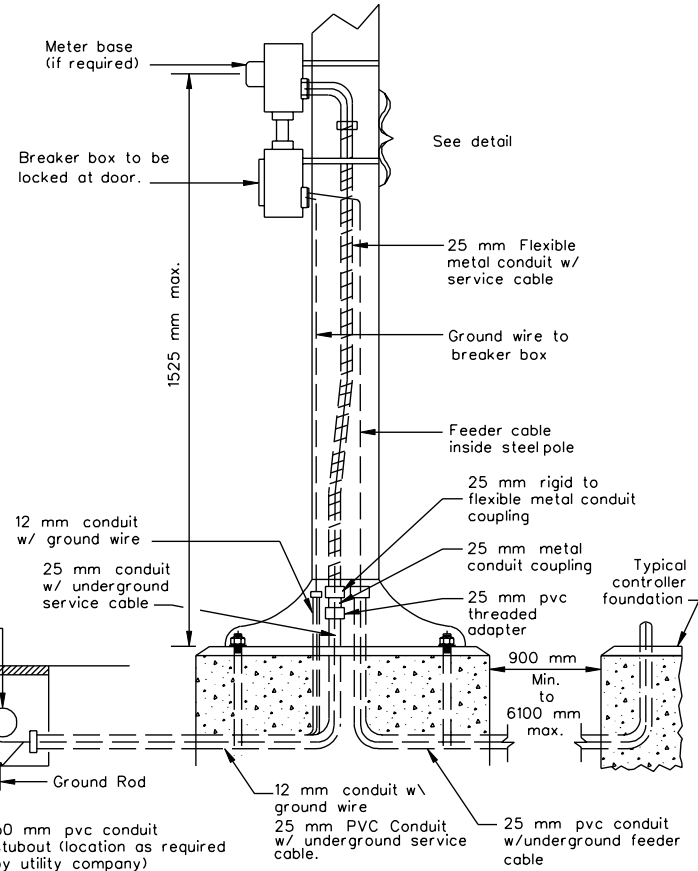


Underground service cable coiled in box with sufficient length to allow the cables to extend at least 600 mm above the junction box.

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

Note:

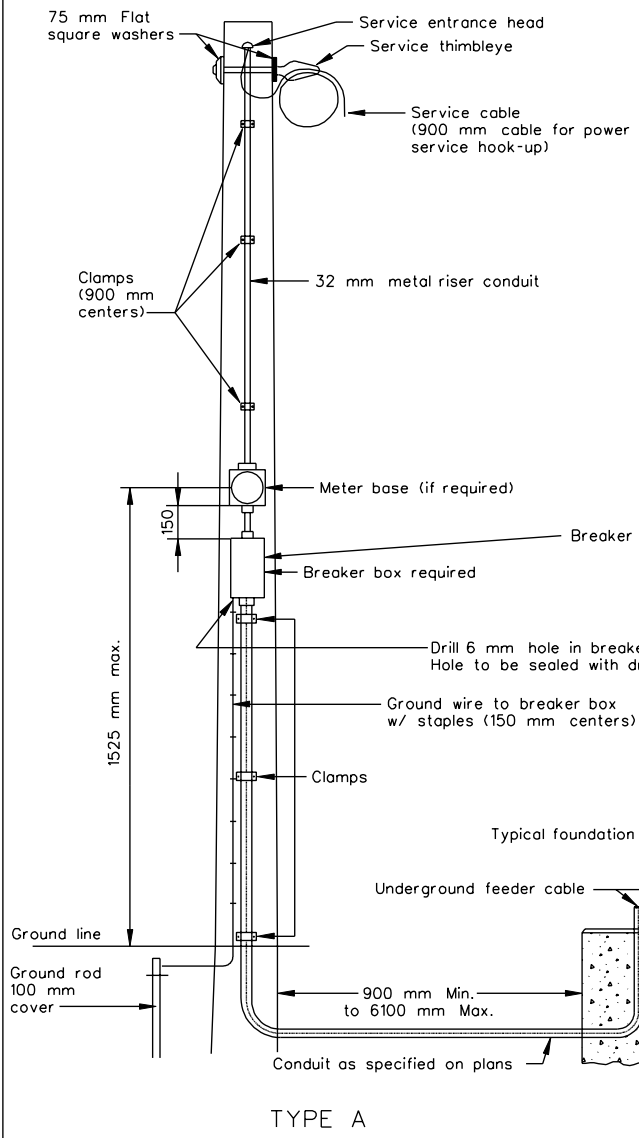
Local power utility company will install service cable from their power source to the junction box and make required splices to the service cable coiled in the junction box.



TYPE B

ELECTRICAL SERVICE DETAILS
SIGNAL INSTALLATION

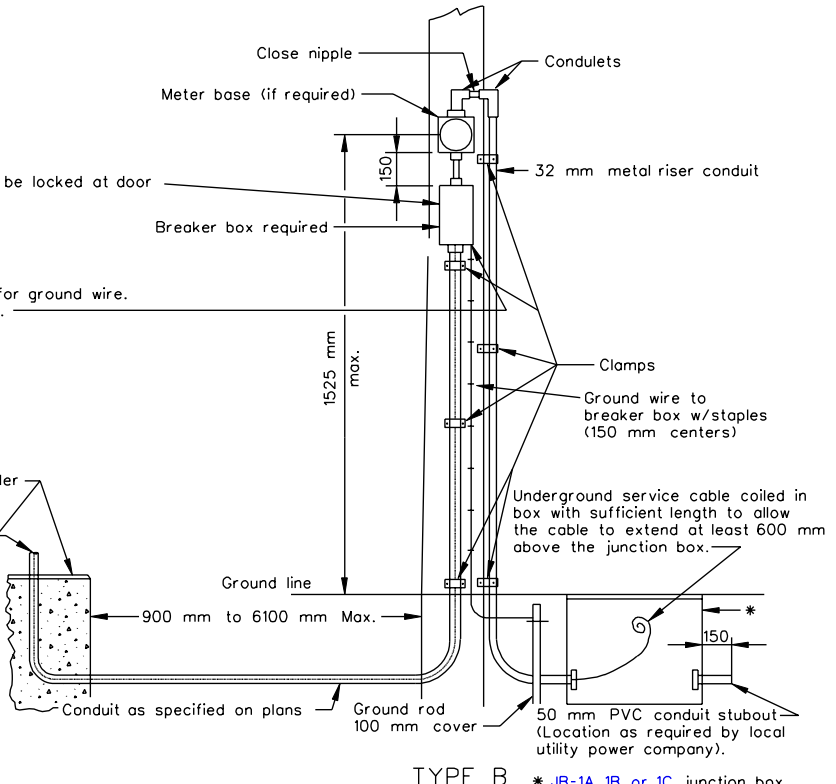
SPECIFICATION
REFERENCE



TYPE A

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.



TYPE B

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

SPECIFICATION REFERENCE

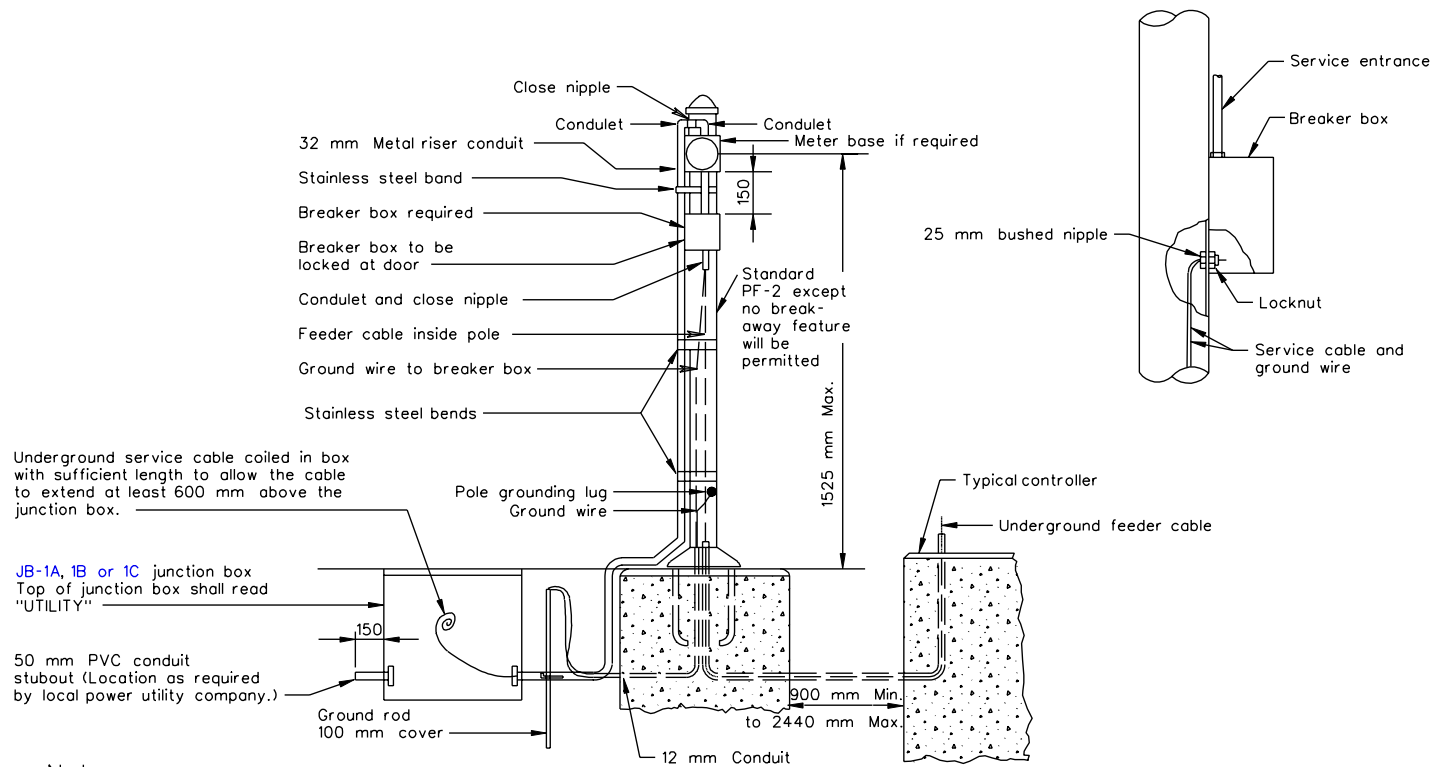
**ELECTRICAL SERVICE DETAILS
 SIGNAL INSTALLATION**

VIRGINIA DEPARTMENT OF TRANSPORTATION

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1301.34

ALTERNATE METHOD OF SERVICE CABLE AND GROUND WIRE ENTERING BREAKER BOX



Underground service cable coiled in box with sufficient length to allow the cable to extend at least 600 mm above the junction box.

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

50 mm PVC conduit stubout (Location as required by local power utility company.)

Notes:

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

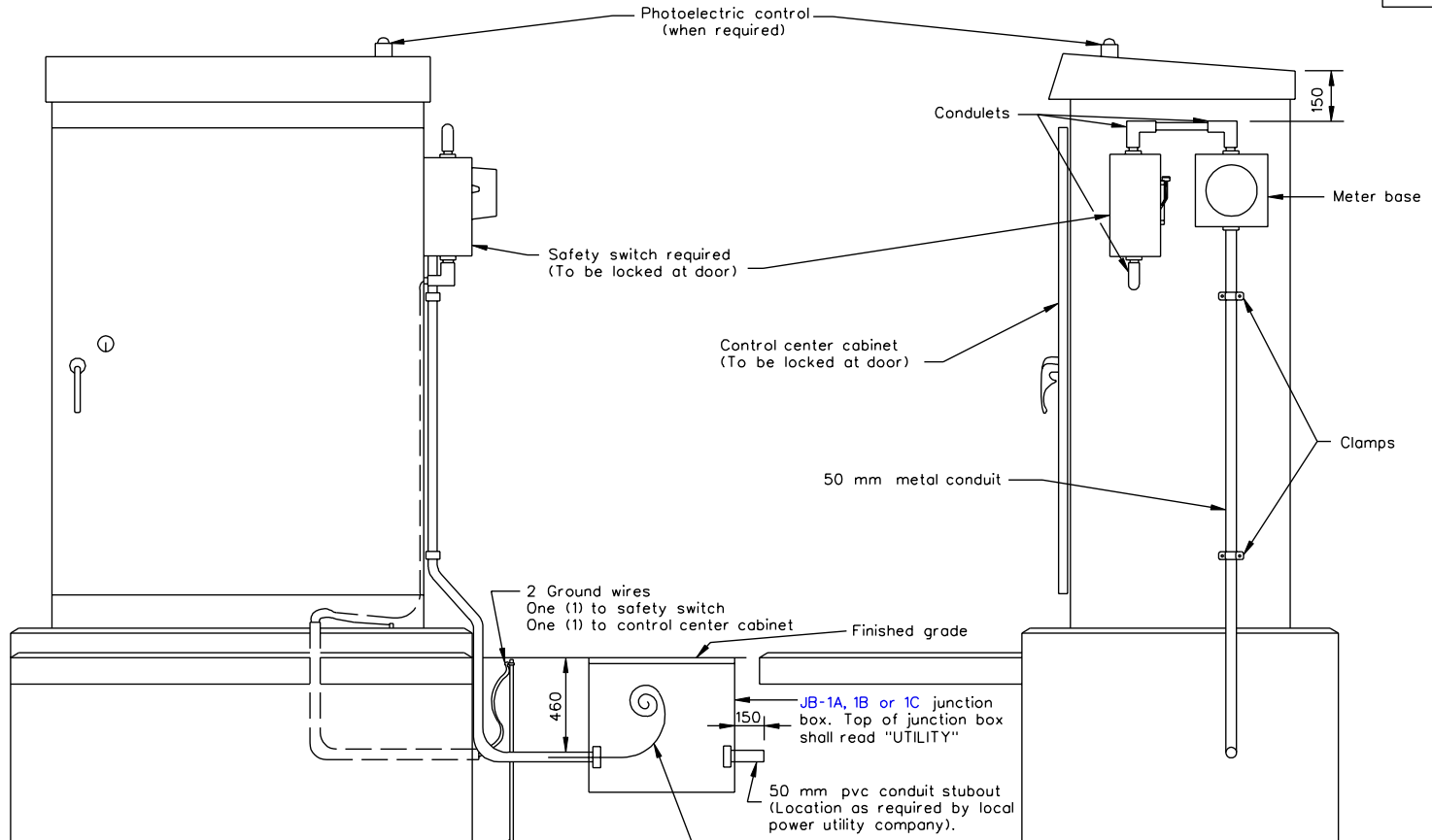
Local power utility company will install service power utility cable from their power source to the junction box and make required splices to the service cable coiled in the junction box.

PEDESTAL POLE WITH GROUND MOUNTED CABINET

ELECTRICAL SERVICE DETAILS
SIGNAL INSTALLATION

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

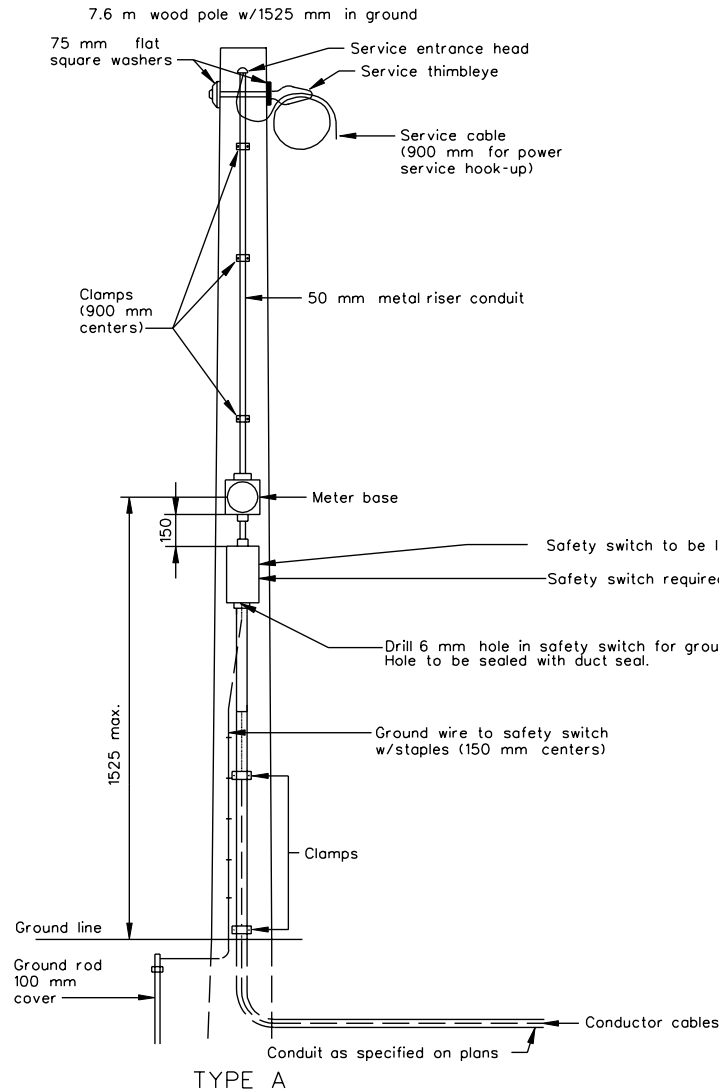


Notes:

- 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.

SPECIFICATION REFERENCE

ELECTRICAL SERVICE DETAILS
SIGN AND LIGHTING INSTALLATIONS
VIRGINIA DEPARTMENT OF TRANSPORTATION



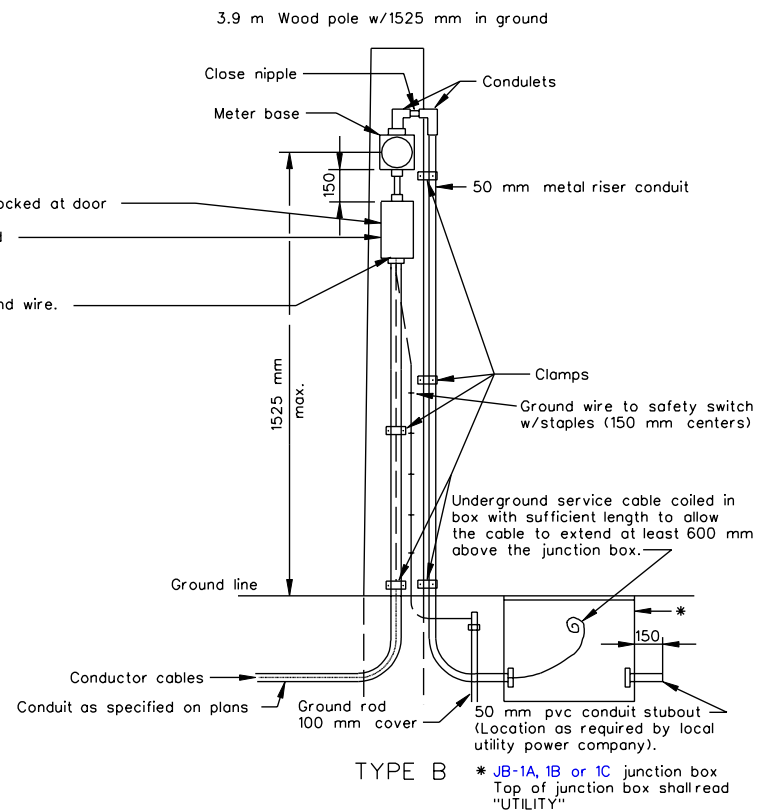
Notes:

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.

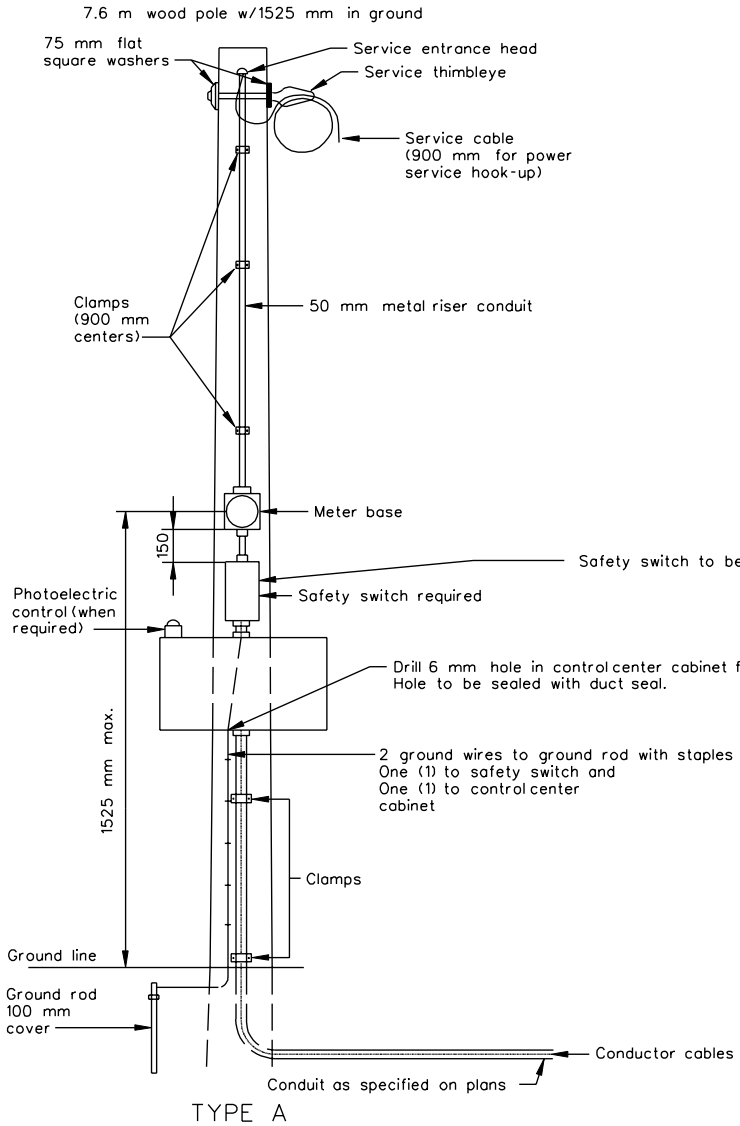
When 200 amp or greater service is required, service shall enter meter base at right bottom.

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.



ELECTRICAL SERVICE DETAILS
SIGN AND LIGHTING INSTALLATION

SPECIFICATION
REFERENCE



TYPE A

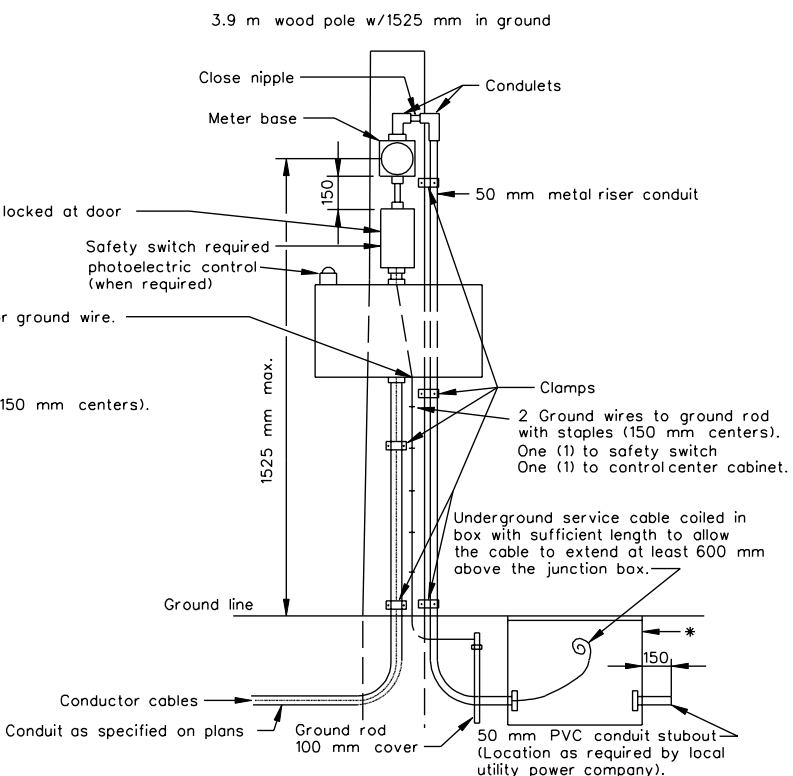
Notes:

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.

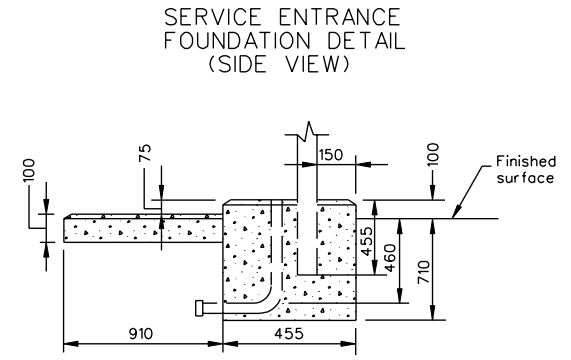
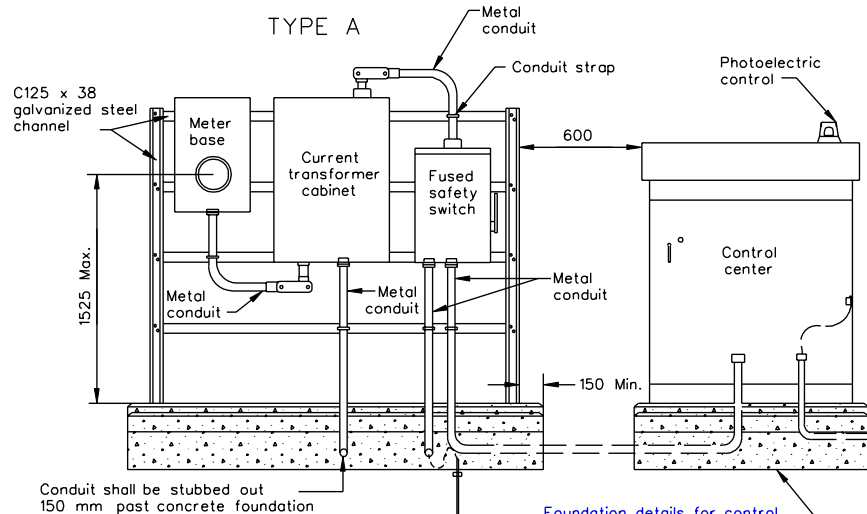


TYPE B

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

SPECIFICATION REFERENCE

ELECTRICAL SERVICE DETAILS
SIGN AND LIGHTING INSTALLATION
VIRGINIA DEPARTMENT OF TRANSPORTATION

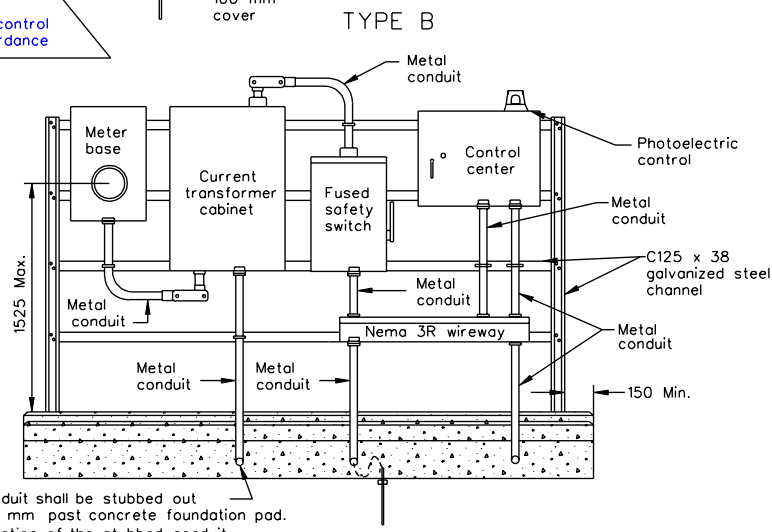


Conduit shall be stubbed out 150 mm past concrete foundation pad. Location of the stubbed conduit shall be as required by the local power company.

Foundation details for control center shall be in accordance with St'd CF-2.

AMP RATING	CONDUIT SIZE	CONDUCTOR SIZE
30 AMP	25	#8
60 AMP	32	#6
100 AMP	38	#3
200 AMP	50	#000

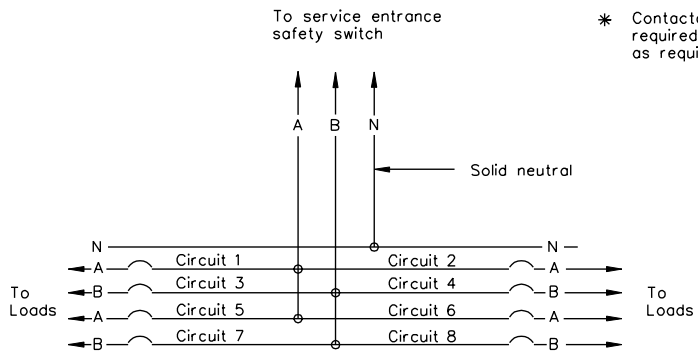
- Notes:**
- All exposed concrete edges shall be chamfered 20 mm.
 - Grounding bushings shall be installed on each end of metal conduits.
 - Bell ends shall be installed on the ends of PVC conduits.
 - Local power company will install service cable from their power source to the current transformer cabinet and meter base.
 - Safety switch, meter base, wireway, current transformer cabinet and control center shall be attached to the channeling with M9 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 6 mm deep and 100 to 150 mm 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.



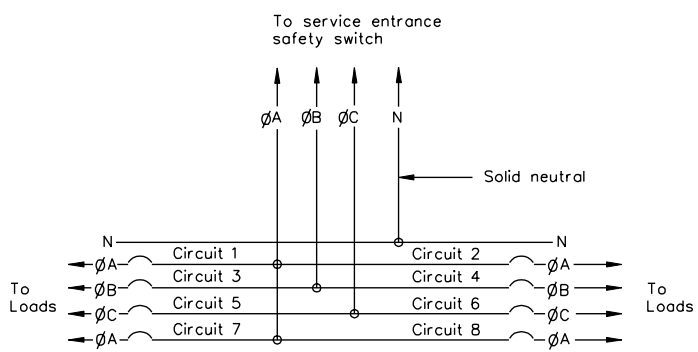
Conduit shall be stubbed out 150 mm past concrete foundation pad. Location of the stubbed conduit shall be as required by the local power company.

ELECTRICAL SERVICE DETAILS SIGN AND LIGHTING INSTALLATIONS

SPECIFICATION
REFERENCE

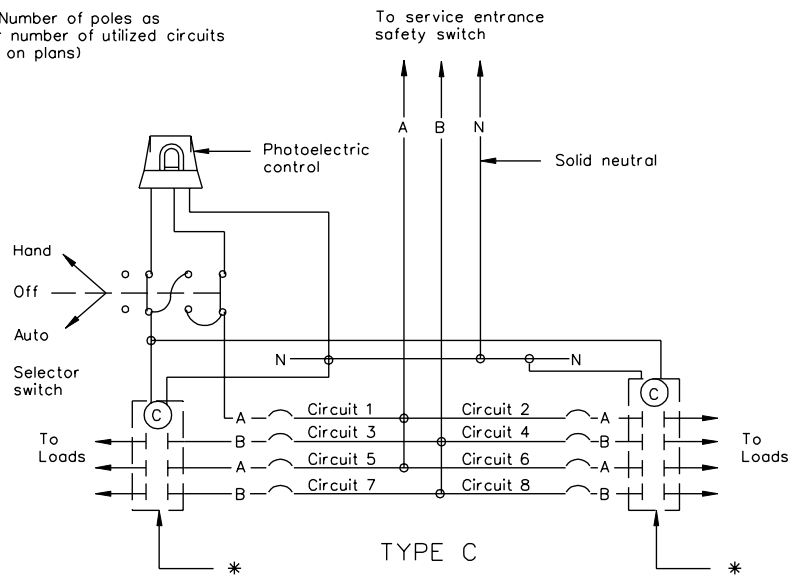


TYPE A

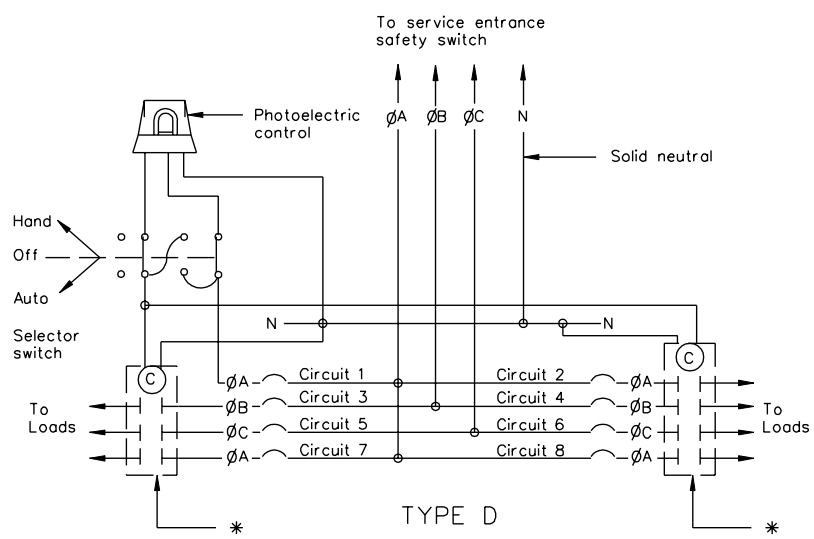


TYPE B

* Contactor (Number of poles as required for number of utilized circuits as required on plans)



TYPE C



TYPE D

Notes:

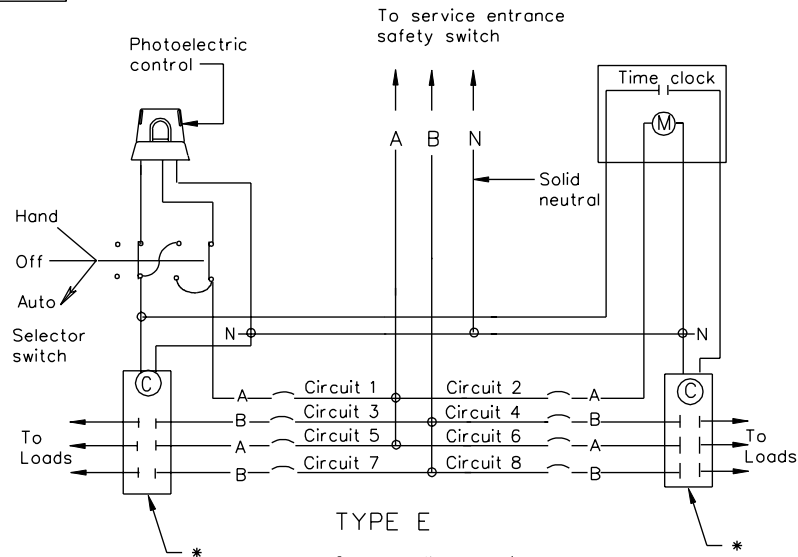
- All circuit breakers shall be single pole.
- Voltage and amperage ratings of contactors and breakers shall be as indicated on the plans.
- Number of circuits shown are typical. Exact number required shall be as indicated on the plans.

SPECIFICATION REFERENCE

CONTROL CENTER WIRING DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS 1301.40



TYPE E

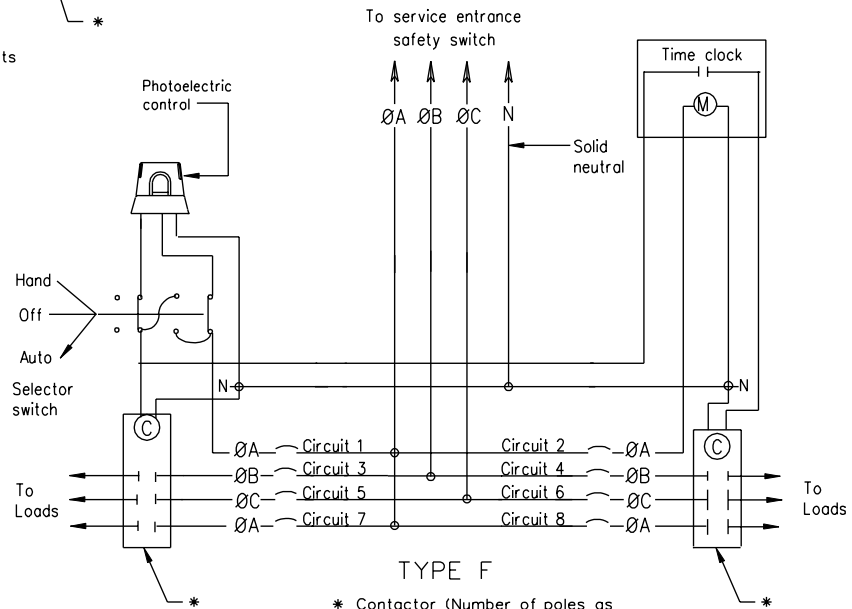
* Contactor (Number of poles as required for number of utilized circuits as required on plans)

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.

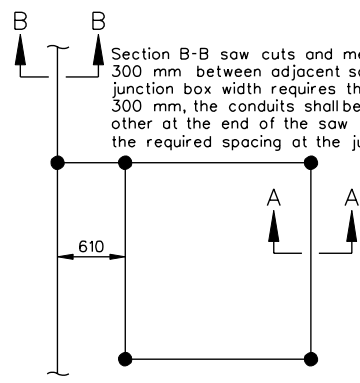


TYPE F

* Contactor (Number of poles as required for number of utilized circuits as required on plans)

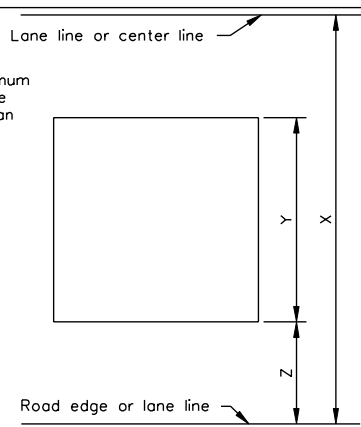
CONTROL CENTER WIRING
DETAILS

SPECIFICATION
REFERENCE



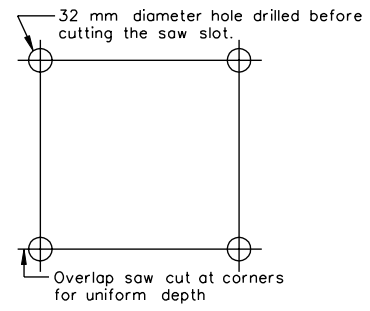
TYPICAL LOOP WIRE PLAN

Section B-B saw cuts and metal conduits shall be a minimum 300 mm between adjacent saw cuts and conduits. If the junction box width requires the conduits to be closer than 300 mm, the conduits shall be 300 mm between each other at the end of the saw cut and then tapered to the required spacing at the junction box.

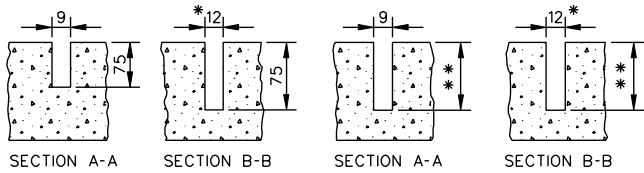


TYPICAL LANE COVERAGE DIAGRAM

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



TYPICAL SAW CUT DIAGRAM

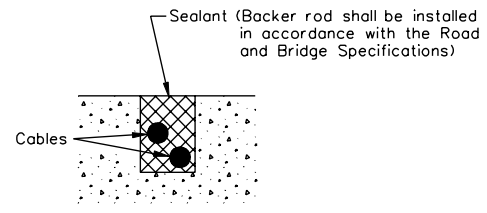


LOOP IN HYDRAULIC CEMENT CONCRETE LOOP IN ASPHALT CEMENT CONCRETE

SAW SLOTS TO BE FILLED WITH TRAFFIC LOOP SEALANT

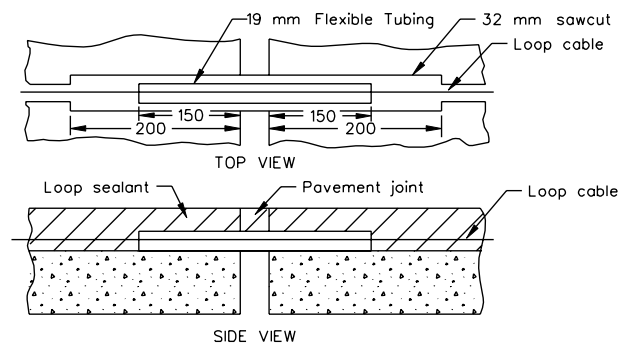
Depth of saw cut shall be measured from pavement surface at time of installation. Not necessarily finished grade.

TYPICAL SAW SLOT DETAIL



CROSS SECTION TYPICAL SEALED SLOT

- * Saw slot shall be 16 mm 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 75 mm.
- ** In existing asphalt concrete roadways which are to be planned, saw slots shall be cut into the post planned surface to a depth of 75 mm.
- In existing asphalt concrete roadways which are not to be planned, saw slots shall be cut into the existing surface to a depth of 100 mm.



INSTALLATION OF LOOP CABLE ACROSS HYDRAULIC CEMENT CONCRETE PAVEMENT JOINTS

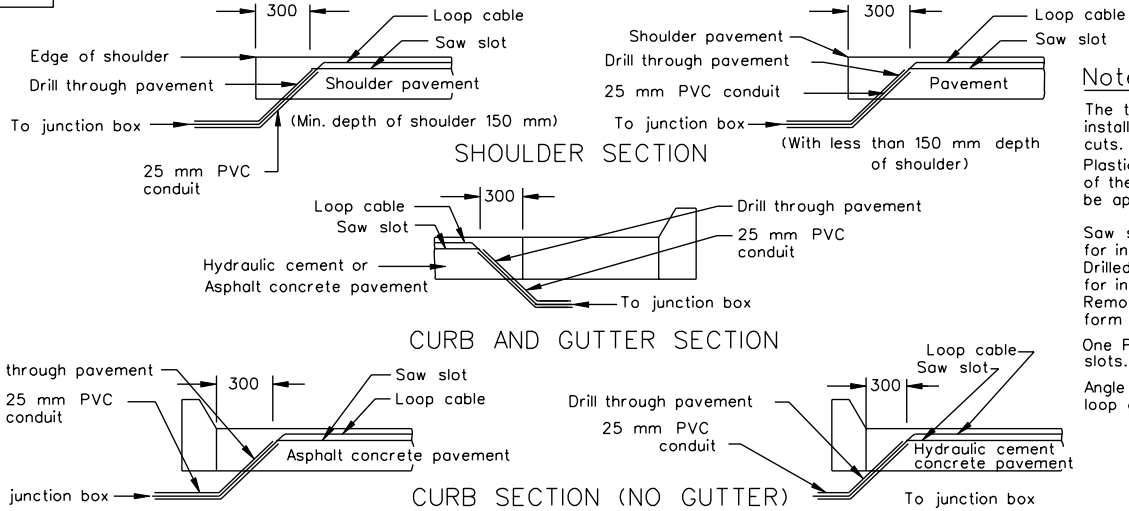
SPECIFICATION REFERENCE

LOOP DETECTOR INSTALLATION DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS 1301.42

TD-1A,B,C



Notes:

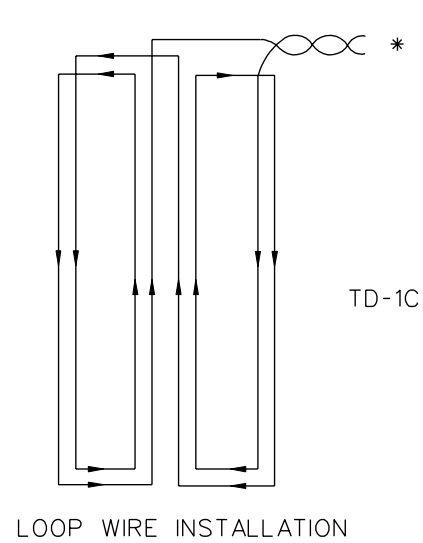
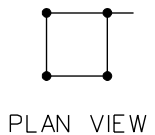
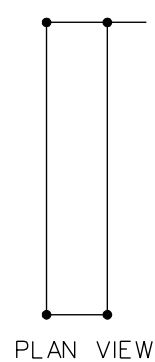
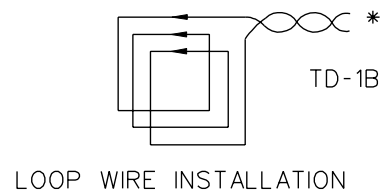
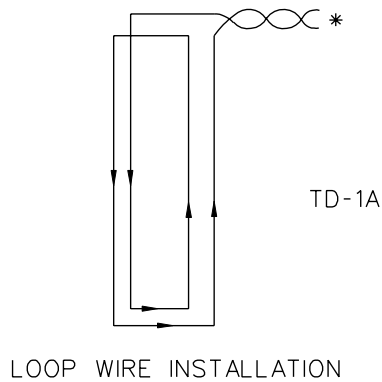
The top of the 25 mm PVC conduits shall be installed 25 mm below the bottom of the saw cuts. Plastic bushings shall be installed on the ends of the conduits in the pavement. Duct seal shall be applied to the open end of the bushing.

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°.

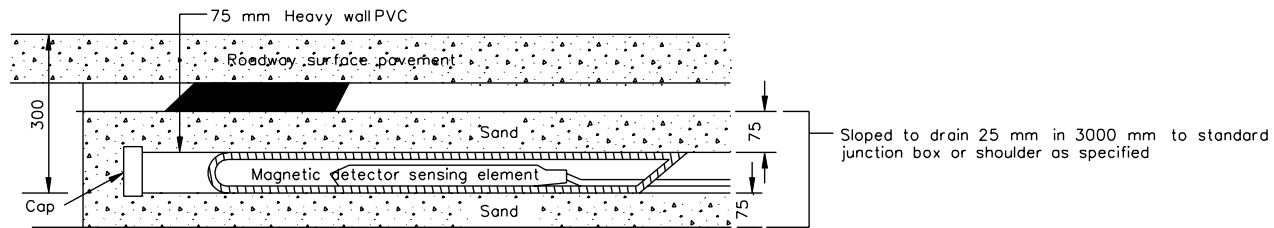
All dimensions not shown shall be as specified on the plans.



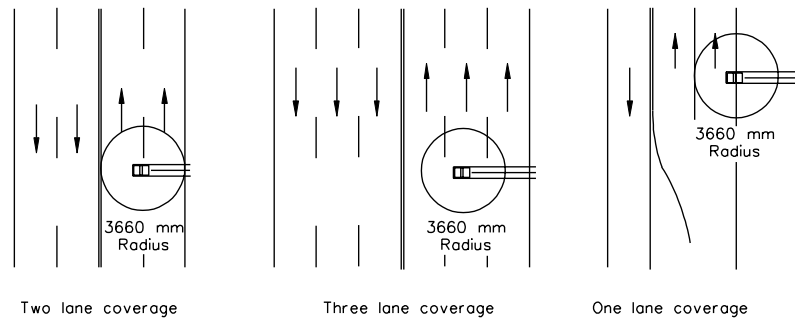
* Twisted together with a minimum of ten turns per running meter.

LOOP DETECTOR INSTALLATION DETAILS

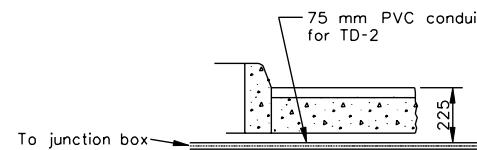
SPECIFICATION REFERENCE



INSTALLATION DETAILS FOR MULTILANE MAGNETIC DETECTORS
TD-2



TYPICAL MAGNETIC DETECTOR LOCATIONS



CURB OR CURB AND GUTTER SECTION

SPECIFICATION REFERENCE

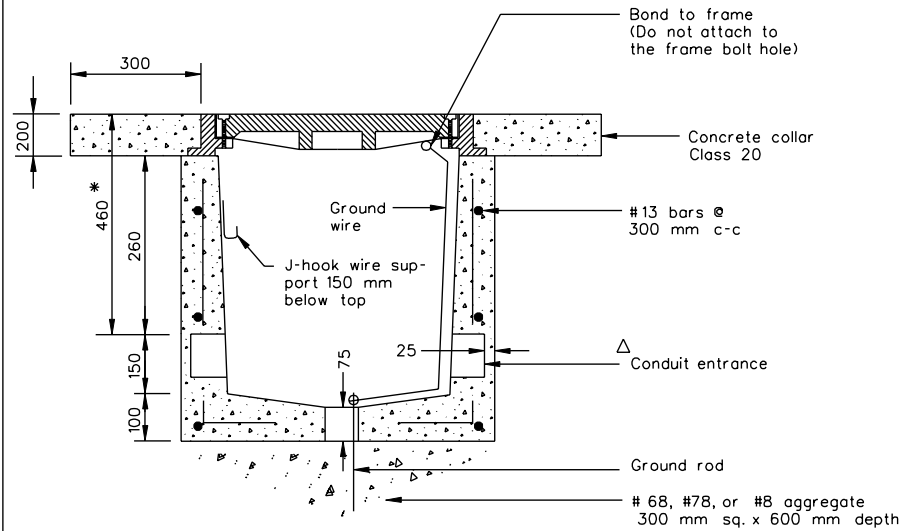
MAGNETIC DETECTOR INSTALLATION DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

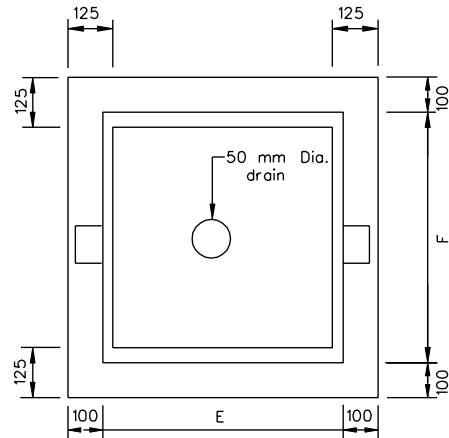
UNLESS OTHERWISE NOTED, ALL DIMENSIONS
ON THIS SHEET ARE IN MILLIMETERS

1301.44

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



STANDARD	DIMENSIONS	
	E	F
JB-1A	350	350
JB-2A	350	500
JB-3A	500	500
JB-4A	500	685
JB-5A	685	685



PLAN VIEW
(FRAME AND COVER REMOVED)

Notes:

Conduit entrances shall be located as shown on the plans. Conduits shall extend 50 mm min. to 75 mm 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 40 mm concrete cover. Any reinforcing steel in conflict with conduit shall be cut a minimum of 40 mm from conduit.

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

△ A minimum 50 mm 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 ground rod 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.

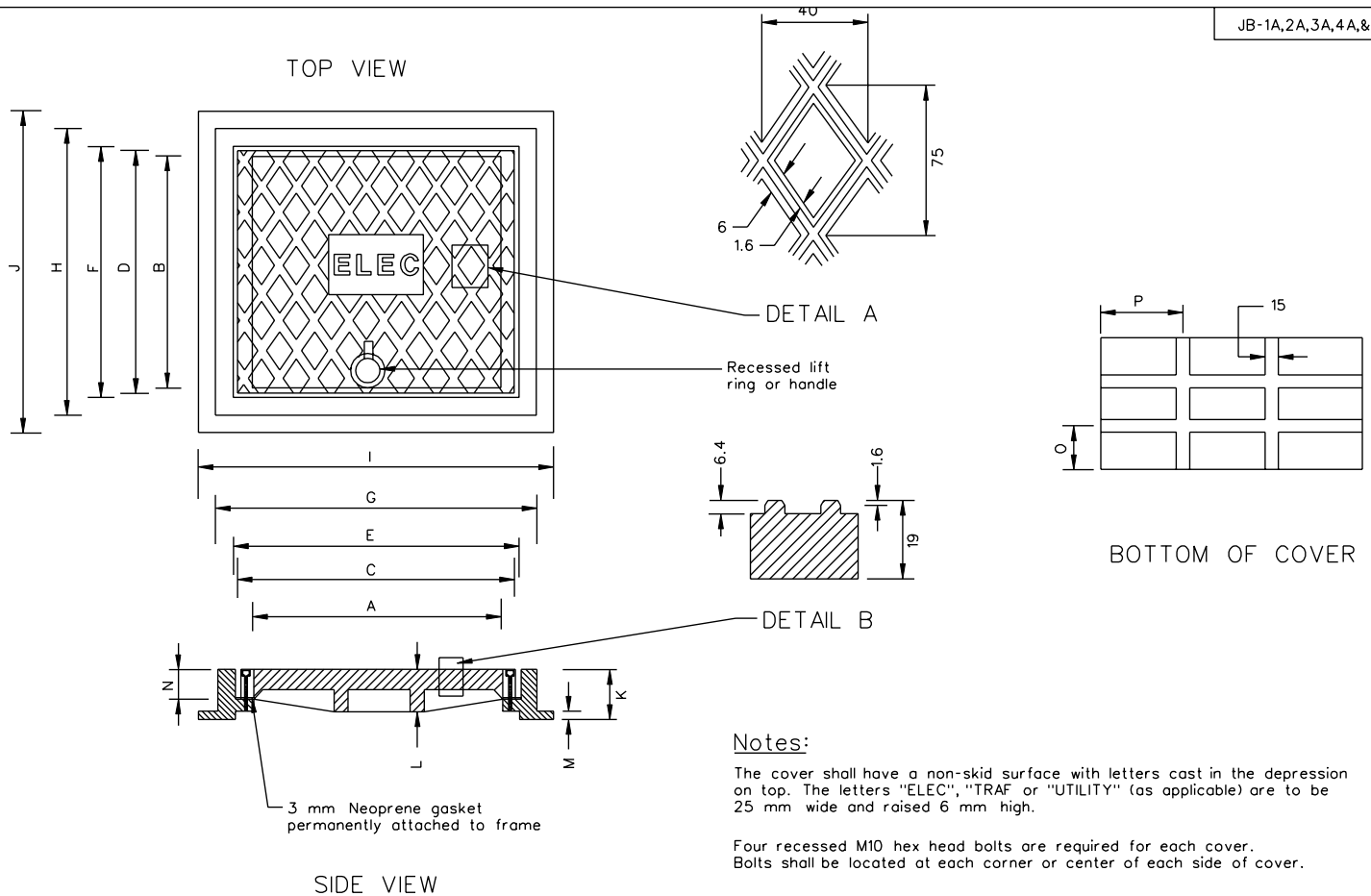
JUNCTION BOX

SPECIFICATION
REFERENCE

1301-45

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION



STANDARD	DIMENSIONS																	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
JB-1A	305	305	350	350	355	355	380	380	455	455	100	40	15	40	125	100	125	100
JB-2A	305	455	350	350	355	510	385	540	455	610	100	40	15	40	180	150	180	150
JB-3A	455	455	500	500	510	510	540	540	610	610	100	45	15	40	180	150	180	150
JB-4A	455	610	500	500	510	685	545	725	610	850	100	45	20	40	240	215	180	150
JB-5A	610	610	680	680	685	685	725	725	850	850	100	45	20	40	240	215	240	215

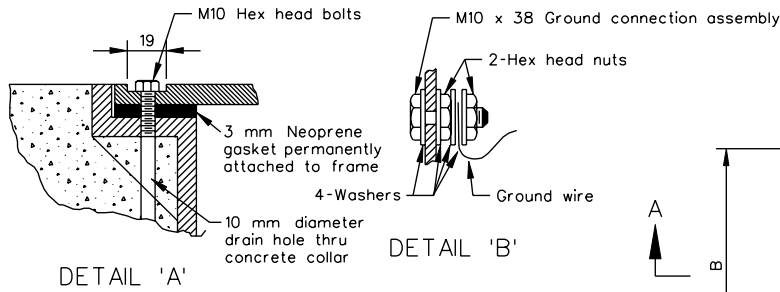
SPECIFICATION REFERENCE

JUNCTION BOX

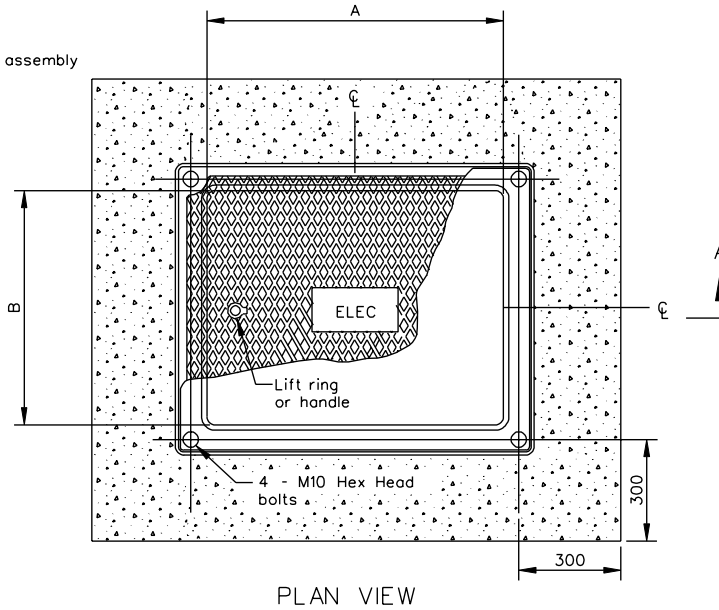
VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS 1301.46

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



STANDARD	DIMENSIONS	
	A	B
JB-1B	305	305
JB-2B	305	455
JB-3B	455	455
JB-4B	455	610
JB-5B	610	610



Notes:

Conduit entrances shall be located as shown on the plans. Conduits shall extend 50 mm min. to 75 mm max. beyond the inside wall of the junction box.

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

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

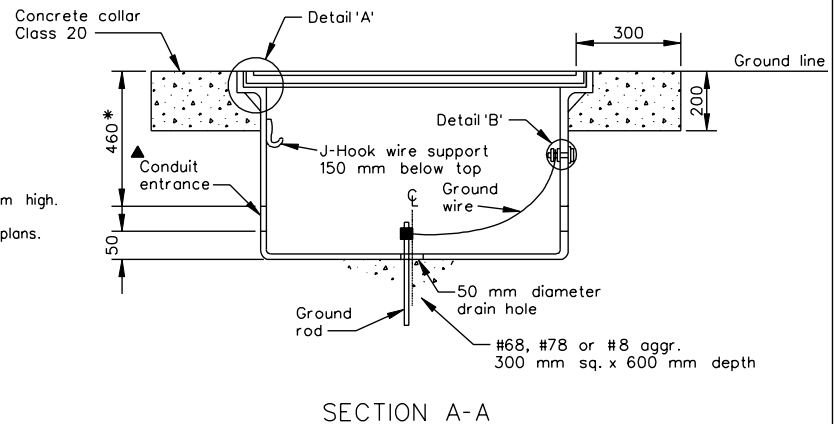
The cover shall have a non-skid surface with letters cast in the depression on top. The letters "ELEC", "TRAF" or "UTILITY" (as applicable) are to be 25 mm wide and raised 6 mm high.

▲ A minimum 50 mm 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 grounded regardless of voltage passing through box.

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



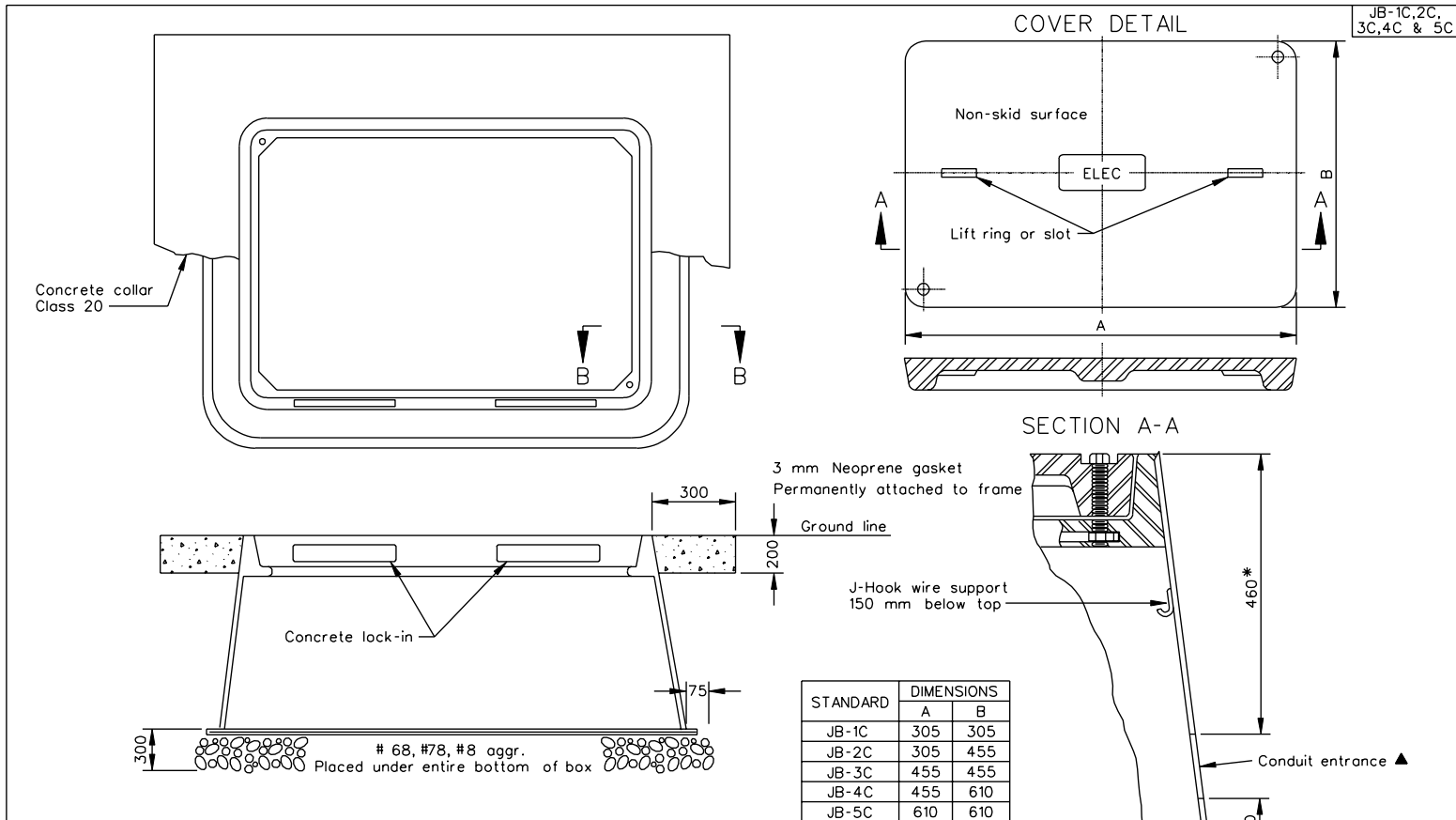
JUNCTION BOX

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

1301.47

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS



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 "ELEC", "TRAF", or "UTILITY" (as applicable) are to be 25 mm wide and raised 6 mm high.

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

Two recessed M10 Hex head bolts are required for each cover.

▲ A minimum 50 mm 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.

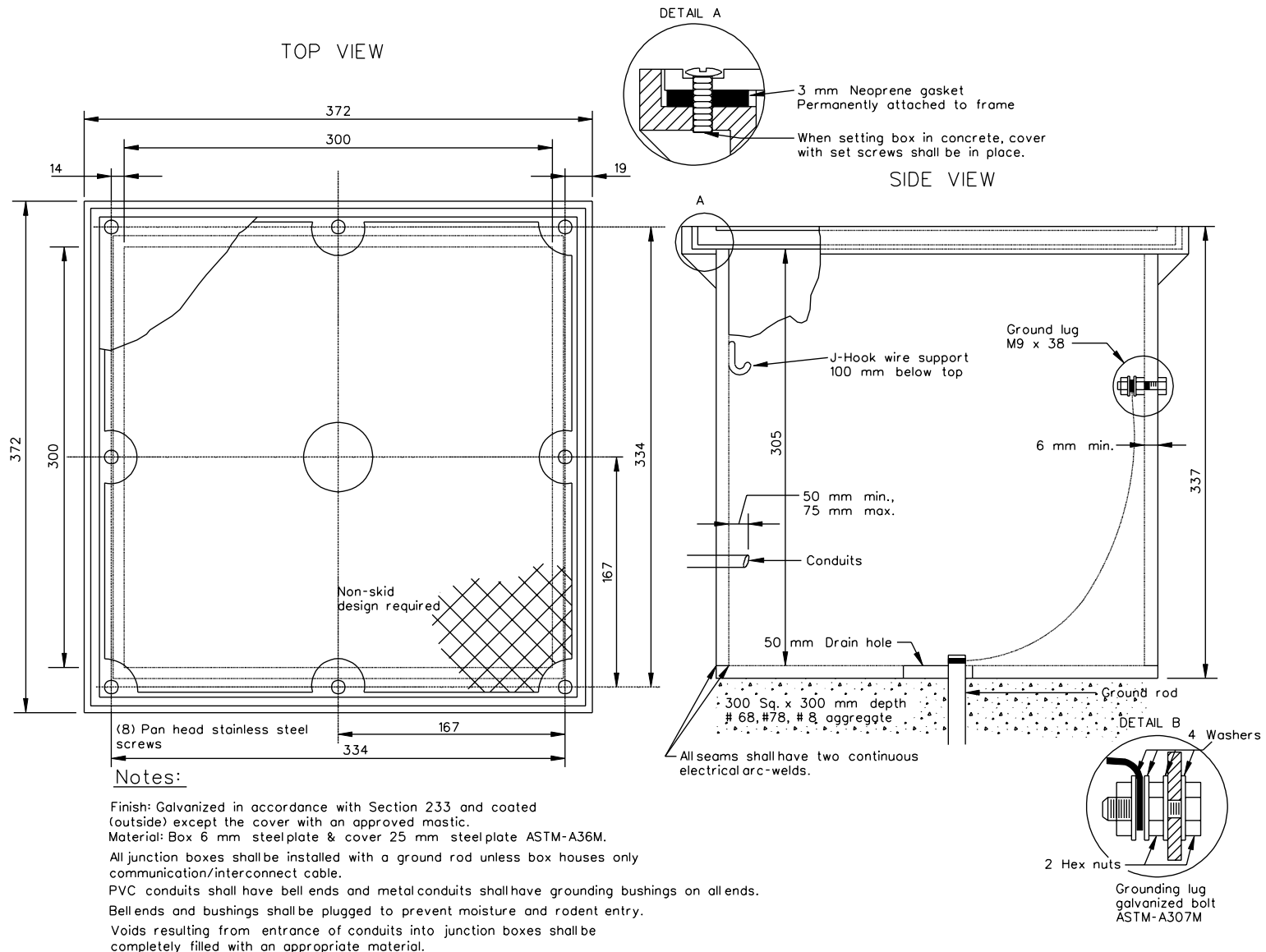
Conduits shall extend 50 mm to 75 mm max. beyond the inside wall of the junction box.

The junction box may be a two piece design with the top section no less than 430 mm in depth.

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

SPECIFICATION REFERENCE	<h1>JUNCTION BOX</h1>		
	VIRGINIA DEPARTMENT OF TRANSPORTATION	UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS	1301.48

JB-1D



JUNCTION BOX

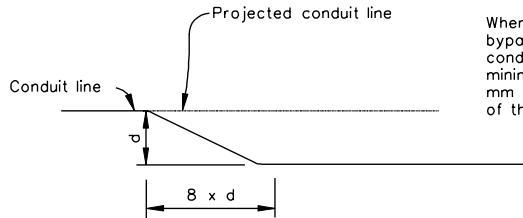
SPECIFICATION REFERENCE

1301.49

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

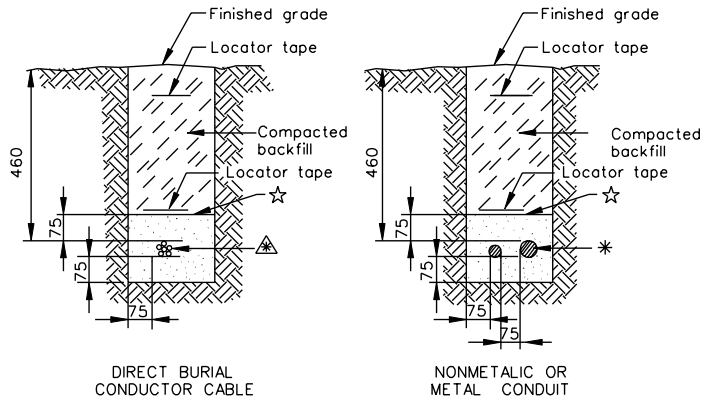
Notes:
 Offsetting of conduit may be used for tying into existing conduit systems or bypassing obstructions as directed by the Engineer.



METHOD OF OFFSETTING CONDUIT

d - Width of offset

When offsetting conduit to bypass an obstruction, the conduit shall maintain a minimum clearance of 300 mm from the closest point of the obstruction.



NON - PAVEMENT AREA INSTALLATION

Notes:

Contractor shall install two 100 mm minimum to 150 mm maximum wide red plastic locator tapes except under pavement. One shall be installed 50 to 100 mm below finished grade and the other shall be installed 75 mm above the buried conduit or conductor cables. Locator tapes shall be placed so they are in vertical alignment with the buried conduit or conductor cables.

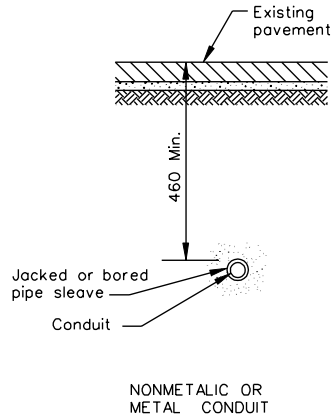
Conduit installed under existing or proposed roadways for direct buried cables shall extend 600 mm beyond the paved surface and/or sidewalk.

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 150 mm of separation between conduit systems.

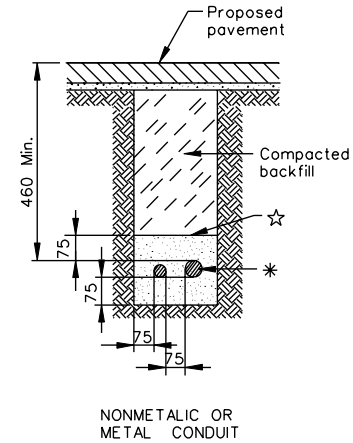
☆ Backfill material below this level shall be sandy fill (free of any stones, cinders, wood, roots, debris, etc.).

* One or more conduits as required.

▲ One or more conductor cables as required.



PAVEMENT AREA INSTALLATION



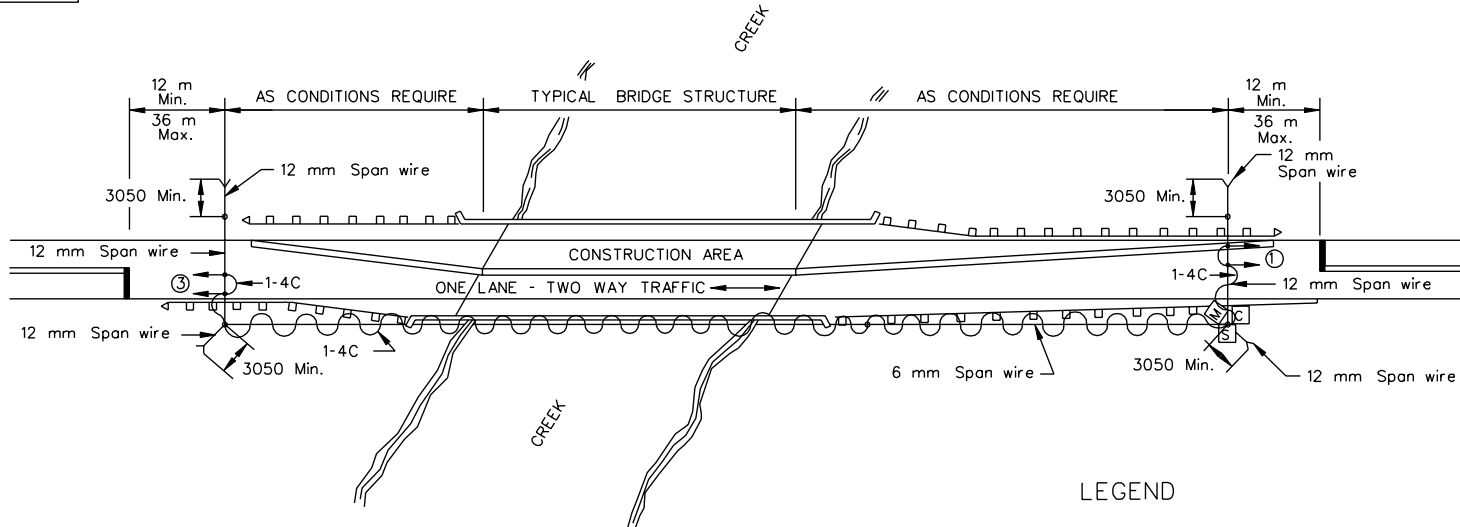
SPECIFICATION REFERENCE

INSTALLATION OF ELECTRICAL CONDUIT AND CONDUCTOR CABLE (UNDERGROUND INSTALLATION)

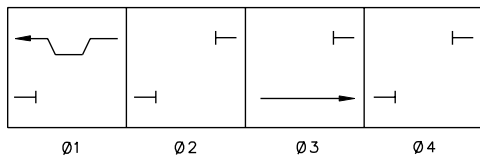
VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

1301.50



PHASING DIAGRAM



SIGNAL HEAD



LEGEND

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

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 12 mm and 6 mm 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.

COLOR SEQUENCE CHART

Signal	Ø1		Ø2		Ø3		Ø4		Phase
	R _y	W _y	R _y	W _y	R _y	W _y	R _y	W _y	
1	G	Y	R	R	R	R	R	R	R
3	R	R	R	R	R	R	G	Y	R

TYPICAL ONE - WAY BRIDGE
TEMPORARY SIGNAL INSTALLATION

SPECIFICATION
REFERENCE