

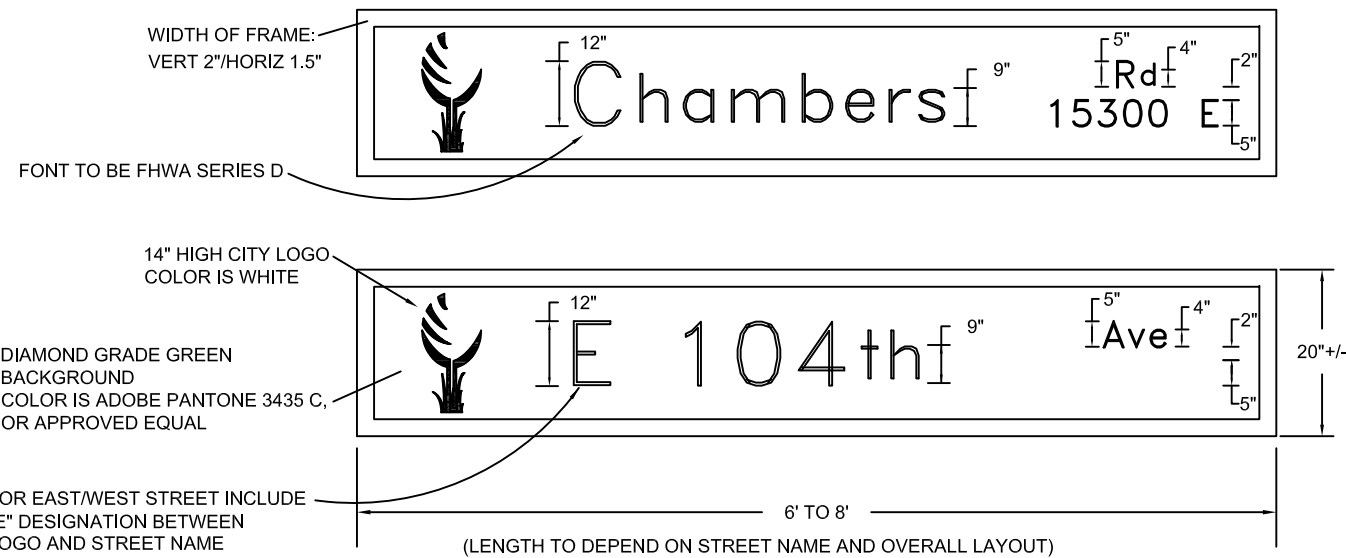
**SIDE VIEW**

**NOTES**

1. FINAL SIGN LAYOUT AND LETTERING DETAILS PER PROJECT MANAGER'S DIRECTION.
2. SIGN TO BE DOUBLE SIDED WITH WHITE PRINT ON GREEN BACKGROUND FOR STREET NAME AND LOGO.

**GENERAL NOTES**

1. STREET NAME SIGN TO BE FREE-SWINGING OR LIMITED-SWINGING. SIGN FIXTURE AND PANELS SHALL WITHSTAND 90 MPH WIND LOADING, WITH STRUCTURAL REQUIREMENTS MEETING AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS," LATEST EDITION.
2. HOUSING TO BE CONSTRUCTED OF ALUMINUM.
3. NEOPRENE GASKETS SHALL BE INSTALLED BETWEEN THE SIGN PANEL FRAME AND FIXTURE HOUSING TO PREVENT WATER ENTRANCE. SCREENED WEEP HOLES SHALL BE PROVIDED ON HOUSING BOTTOM FOR DRAINAGE.



**ILLUMINATED SIGN TYPICAL LAYOUT**

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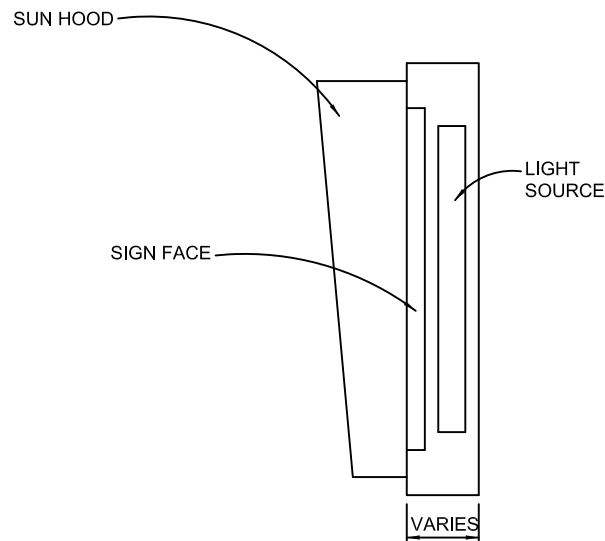
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 CITY ENGINEER	05-27-16 DATE

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<b>ILLUMINATED STREET NAME SIGN</b>
ENGINEERING CONSTRUCTION STANDARDS

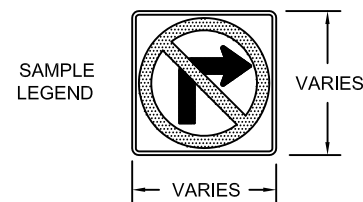
DETAIL NO. <b>900-01</b>
Sheet No. 1 of 1



**SIDE VIEW**

**NOTES**

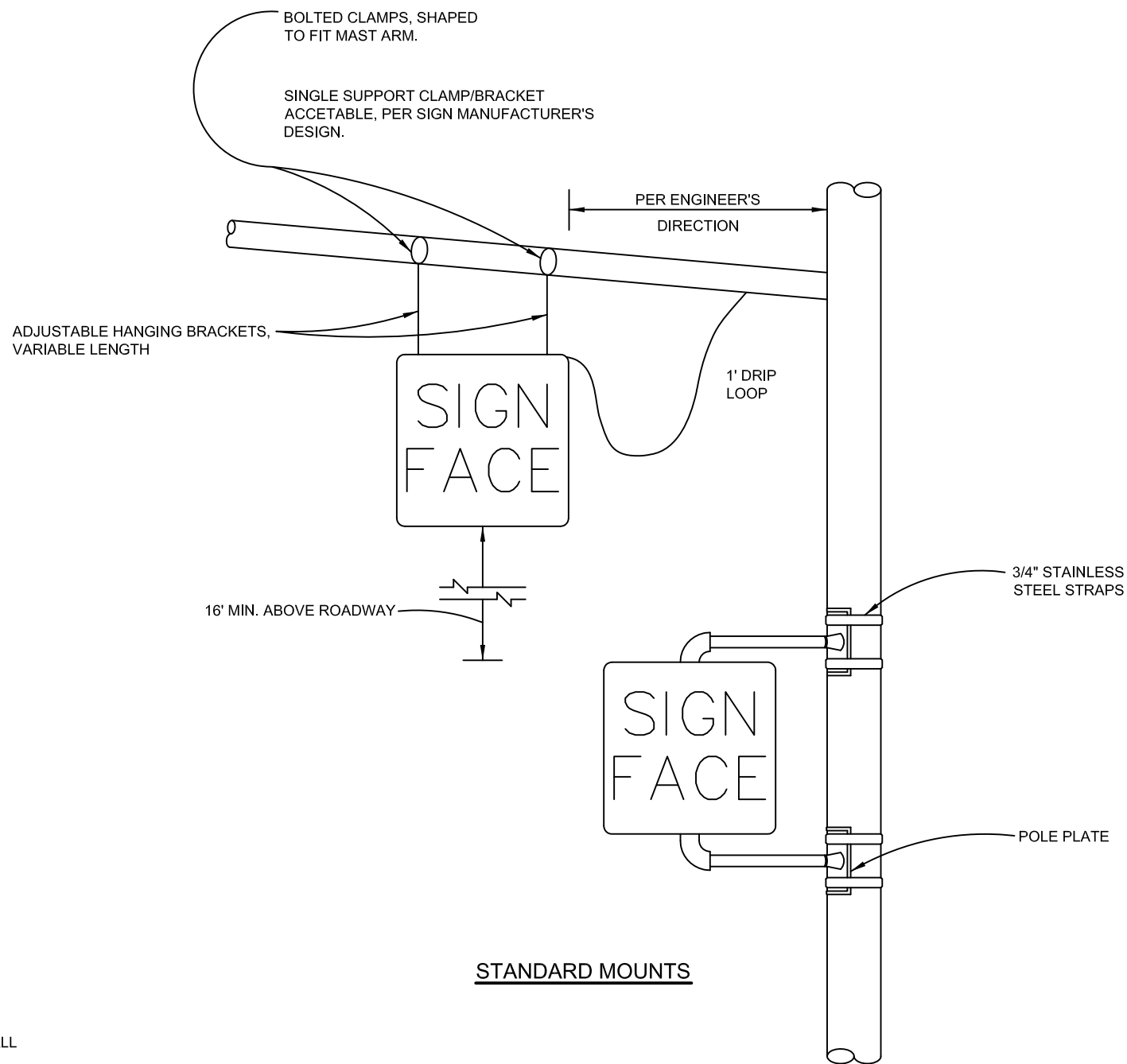
1. SIGN MAY BE SINGLE-SIDED OR DOUBLE SIDED PER ENGINEER'S DIRECTION.
2. SIGN COLOR, LEGEND AND SIZE PER ENGINEER DIRECTION.



**TYPICAL SIGN LAYOUT**

**NOTES**

1. LIGHT SOURCE SHALL BE LED. SIGN FACE SHALL COMPLETELY BLANK OUT WHEN NOT ENERGIZED.
2. CABINET INTERIOR AND CIRCUIT CONNECTIONS SHALL BE READILY ACCESSIBLE VIA HINGED DOORS OR REMOVABLE PANELS. THE LENS PANEL SHALL BE REMOVABLE WITHOUT THE USE OF TOOLS.



**STANDARD MOUNTS**


**GENERAL NOTES**

1. SIGN FIXTURE AND PANELS SHALL WITHSTAND 90 MPH WIND LOADING, WITH STRUCTURAL REQUIREMENTS MEETING AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS," LATEST EDITION.
2. HOUSING SHALL BE CONSTRUCTED OF ALUMINUM UNLESS OTHERWISE DIRECTED BY ENGINEER.
3. NEOPRENE GASKETS SHALL BE INSTALLED BETWEEN THE SIGN PANEL AND FIXTURE HOUSING TO PREVENT WATER ENTRANCE. SCREENED WEEP HOLES SHALL BE PROVIDED ON HOUSING BOTTOM FOR DRAINAGE.

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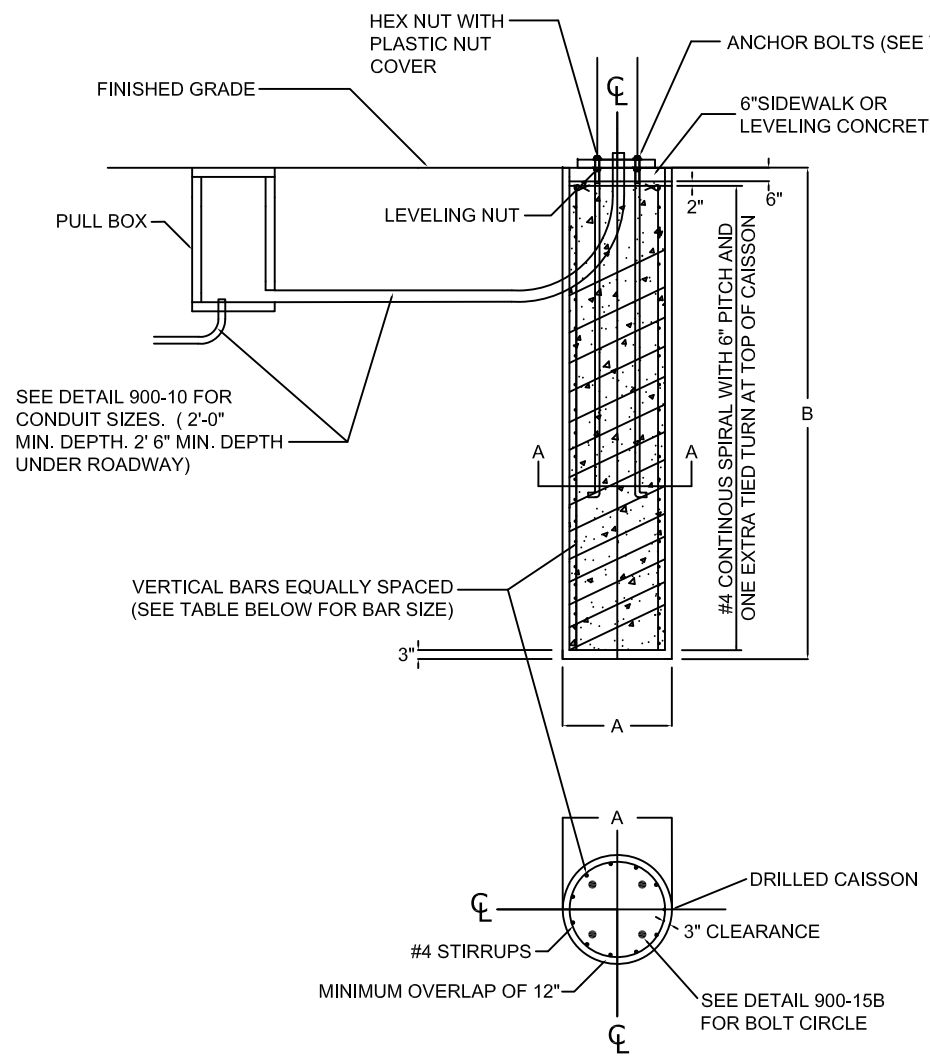
APPROVAL	
<i>Maria R. Fisher</i> CITY ENGINEER	05-27-16 DATE



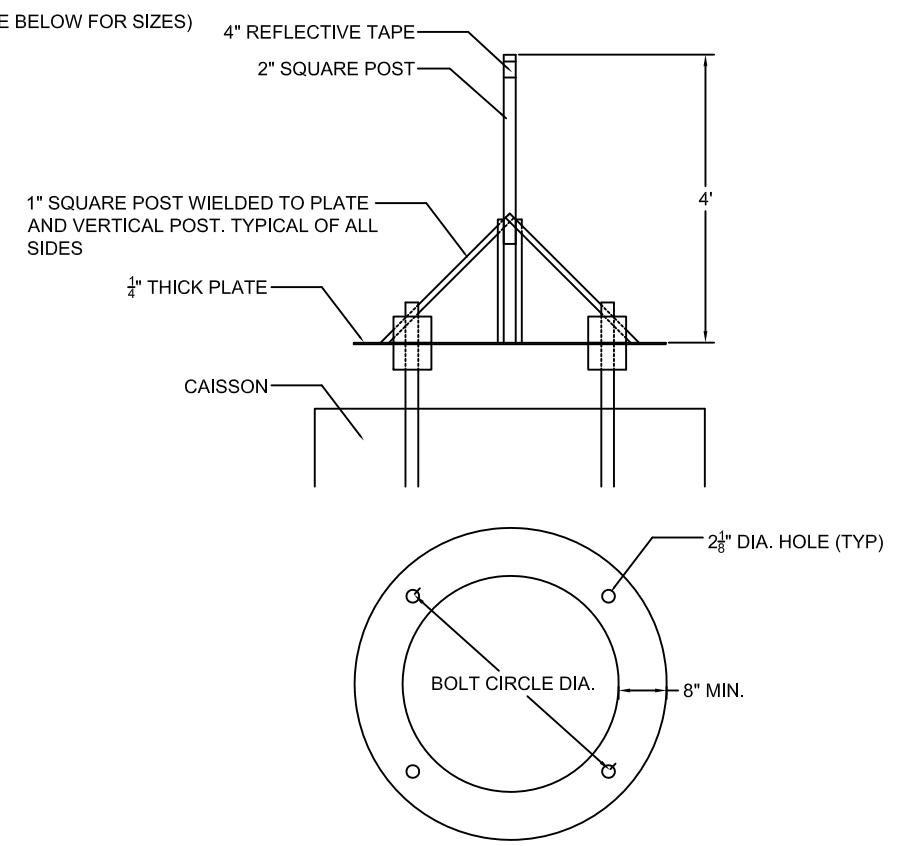
**CITY OF COMMERCE CITY**  
 Department of Public Works  
 8602 Rosemary St.  
 Commerce City, CO 80022  
 Ph: 303-289-8150

<b>REGULATORY WARNING SIGN</b>
ENGINEERING CONSTRUCTION STANDARDS

DETAIL NO. <b>900-02</b>
Sheet No. 1 of 1



TRAFFIC SIGNAL POLE CAISSON FOR MAST ARM POLES



BOLT PROTECTION AT FUTURE SIGNAL POLE LOCATIONS

CAISSON DATA (FOR SINGLE AND DOUBLE ARM INSTALLATION)				
DIAMETER (IN.) (A)	DEPTH (FT.) (B)	MAST ARM LENGTH. (FT)	VERTICAL BARS	ANCHOR BOLTS (D)
36	10.0	UP THRU 35	11 - #9	4 - 1.75"
42	14.0	40 THRU 55	14 - #9	4 - 1.75"
48	18.0	60 THRU 75	18 - #9	4 - 2"

**GENERAL NOTES**

1. CONCRETE CLASS AS PER THE COLORADO DEPT. OF TRANSPORTATION. REINFORCED STEEL: PER AASHTO M31 SPECIFICATION, GRADE 60 FOR #9, #5 & #4 BARS.
2. SHAFT FOR CONCRETE FOUNDATION TO BE DRILLED BY MECHANICAL AUGER. CASING, IF USED IN PLACING CONCRETE, SHALL BE REMOVED UPON COMPLETING POUR.
3. FOUNDATION DESIGN REQUIRES THAT THE SHAFT BE FOUNDED IN COMPACT SAND, CLAY, OR SANDY CLAY. THE ALLOWABLE SAFE LATERAL BEARING CAPACITY OF SOIL (AROUND SHAFT) TO BE 1,300 LBS./SQ. FT. MINIMUM AT DEPTH OF 4.0 FT. BELOW TOP OF FOUNDATION. THE AVERAGE FRICTIONAL RESISTANCE OF THE SOIL (AROUND THE SHAFT) TO BE 460 LBS./SQ. FT. MINIMUM ALLOWABLE UNDER WIND LOADING (TORSION). IF THE SOIL INVESTIGATION (CONDUCTED PRIOR TO CONSTRUCTION) INDICATES THE ABOVE NOTED REQUIREMENTS CANNOT BE MET, OR IF "EXPANSIVE" SOIL IS AN EXISTING PROBLEM, THEN THE FOUNDATION DESIGN SHOWN WILL HAVE TO BE MODIFIED AND APPROVED BY THE ENGINEER.
4. SHOULD ROCK BE ENCOUNTERED, THE SHAFT SHOULD EXTEND 6 FT. MINIMUM INTO ROCK. THE ALLOWABLE SAFE LATERAL BEARING CAPACITY OF ROCK TO BE 4,300 LBS./SQ. FT. THE SOIL (INCLUDING ROCK) SURROUNDING THE SHAFT SHOULD BE INVESTIGATED TO ENSURE IT WILL RESIST THE TORSIONAL MOMENT OF 93,435 FT. LBS.
5. CONCRETE SHALL BE POURED IN LIFTS NOT EXCEEDING 3 FEET IN DEPTH. AT THE POURING OF EACH LIFT, CONCRETE SHALL BE MECHANICALLY VIBRATED TO REMOVE AIR POCKETS.
6. FOUNDATIONS SHOULD BE POURED 10 TO 20 DAYS IN ADVANCE OF POLE INSTALLATION. SEE PROJECT SPECIAL PROVISIONS FOR SPECIFIC DIRECTIONS.
7. WHEN AMBIENT TEMPERATURE IS BELOW 40 F. POURED FOUNDATIONS SHALL BE COVERED WITH BLANKETS AND/OR STRAW PER DIRECTIONS OF THE ENGINEER.

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**MAST ARM POLE FOUNDATIONS**

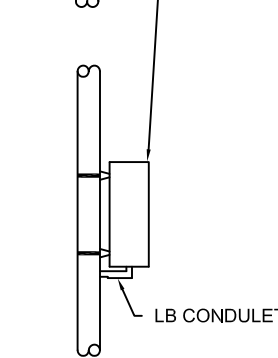
ENGINEERING CONSTRUCTION STANDARDS

DETAIL NO. <b>900-03</b>
Sheet No. 1 of 1

**OPTIONAL SOLAR PANEL**

INSTALL SOLAR PANEL FACING SOUTH AS PER MANUFACTURER'S BOLT ATTACHMENT

CABINET FOR SOLAR BATTERIES AND ELECTRONICS SUPPLIED BY MANUFACTURER. INSTALL AS PER MANUFACTURER'S SPECS



SEE DETAIL "A"  
4" D. GALVANIZED STEEL POST (WGT. : 10.8 LB/FT)

FRANGIBLE BASE INSTALL SET SCREW TO PREVENT MOVEMENT

PAVEMENT  
30" MIN. 24" MIN.

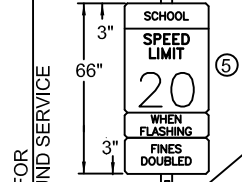
SEE POWER SOURCE DETAIL 900-06  
18" RADIUS  
2" PVC

10'x5/8" COPPER5 WELD GROUND ROD

FOR OVERHEAD SERVICE (IF REQUIRED), CONTRACTOR SHALL COORDINATE WITH THE CONSTRUCTION MANAGER

B5 BRACKET SEE DETAIL "B"

12" YELLOW BEACON WITH ALTERNATING FLASHING



20' FOR UNDERGROUND SERVICE

9'

7'

6'

PELCO COLLAR

6" DIRT BACKFILL, COMPLETED AFTER ELECTRICAL INSPECTION

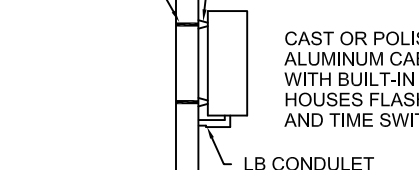
12"x48" CONCRETE FOUNDATION

3" CRUSHED ROCK

FOR OVERHEAD SERVICE ONLY

**DETAIL "A"**

3/4" BANDING STRAP  
SIGN MOUNTING BRACKET-DRILL CABINET FOR BOLT ATTACHMENT



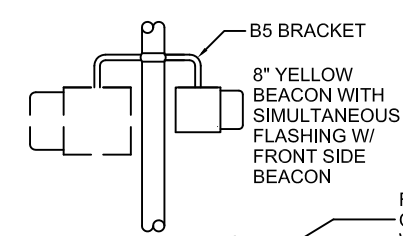
CAST OR POLISHED ALUMINUM CABINET WITH BUILT-IN LOCK, HOUSES FLASHERS AND TIME SWITCH

FRONT

LB CONDULET

**DETAIL "B"**

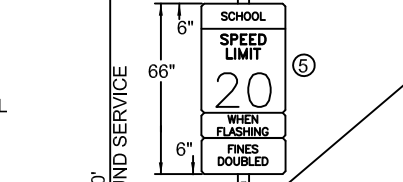
OPPOSITE DIRECTION 8" FLASHER



FOR OVERHEAD SERVICE (IF REQUIRED), CONTRACTOR SHALL COORDINATE WITH THE CONSTRUCTION MANAGER

B5 BRACKET SEE DETAIL "B"

12" YELLOW BEACON WITH ALTERNATING FLASHING



20' FOR UNDERGROUND SERVICE

8'9"

6'

4" D. GALVANIZED STEEL POST (WGT. : 10.8 LB/FT)

FRANGIBLE BASE INSTALL SET SCREW TO PREVENT MOVEMENT

PAVEMENT  
30" MIN. 24" MIN.

SEE POWER SOURCE DETAIL 900-06  
18" RADIUS  
2" PVC

10'x5/8" COPPER WELD GROUND ROD

PELCO COLLAR

6" DIRT BACKFILL, COMPLETED AFTER ELECTRICAL INSPECTION

12"x48" CONCRETE FOUNDATION

3" CRUSHED ROCK

FOR OVERHEAD SERVICE ONLY

**NOTES**

- ① WATERTIGHT GALVANIZED STEEL POLE CAP
- ② LEAVE 8' COILED WIRE FOR UTILITY COMPANY CONNECTION
- ③ PROVIDE CONDUIT AND TYPE III PULL BOX FOR UNDERGROUND SERVICE ONLY
- ④ BONDING STRAP IN BACKFILL
- ⑤ SIGN ASSEMBLY LAYOUT TO BE APPROVED BY THE CITY
- ⑥ SHOWN RADAR SPEED DISPLAY SIGN IS MODEL RU2 FAST 250 SUPPLIED BY RU2 SYSTEM, INC. 877-9829-5237. MAY BE SUBSTITUTED BY A CITY APPROVED ALTERNATIVE.

**FLASHING BEACONS**

ALL FLASHING BEACONS SHALL BE POLYCARBONATE WITH TUNNEL VISORS AND BLACK HOUSINGS


**SCHOOL FLASHING BEACON ASSEMBLY TYPE 1**

**SCHOOL FLASHING BEACON ASSEMBLY TYPE 2**

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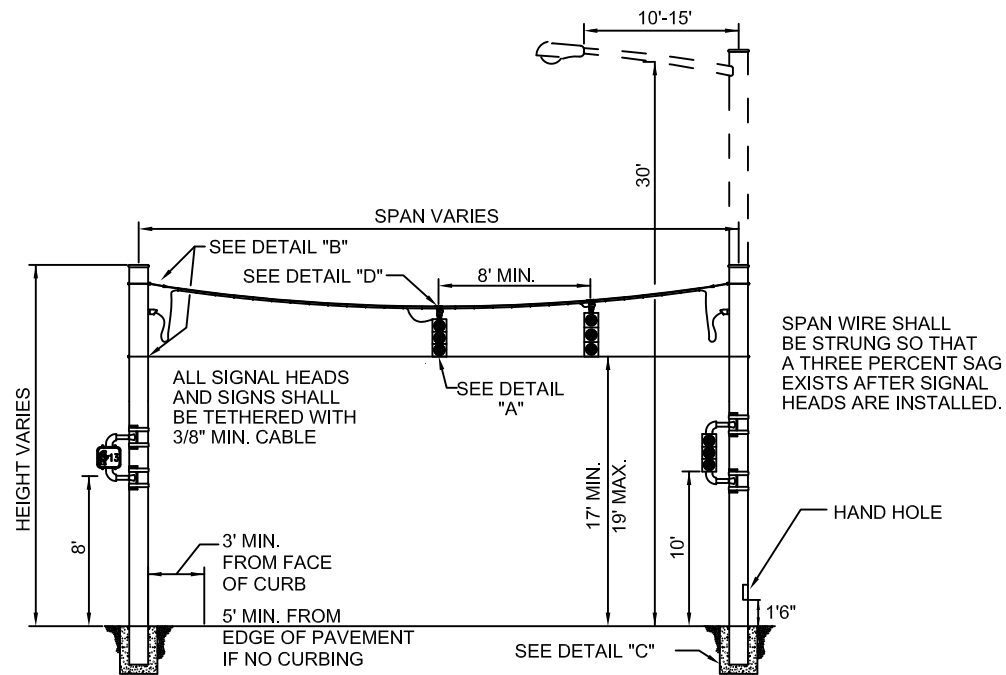
APPROVAL	
<i>Maria R. Fisher</i>	05-27-16
CITY ENGINEER	DATE



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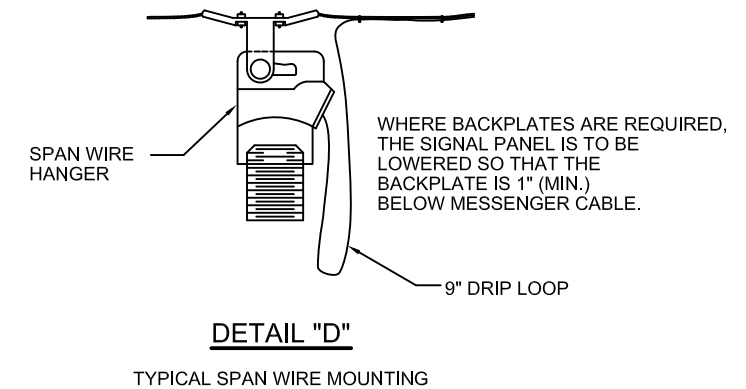
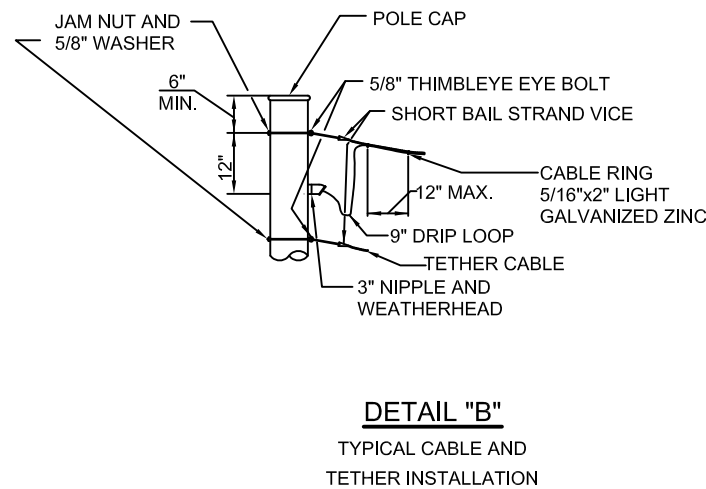
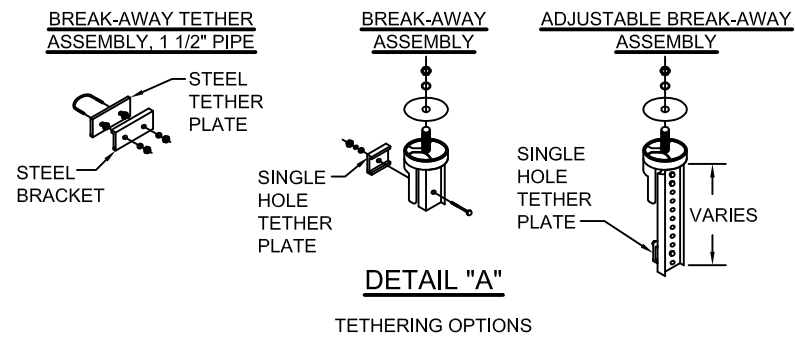
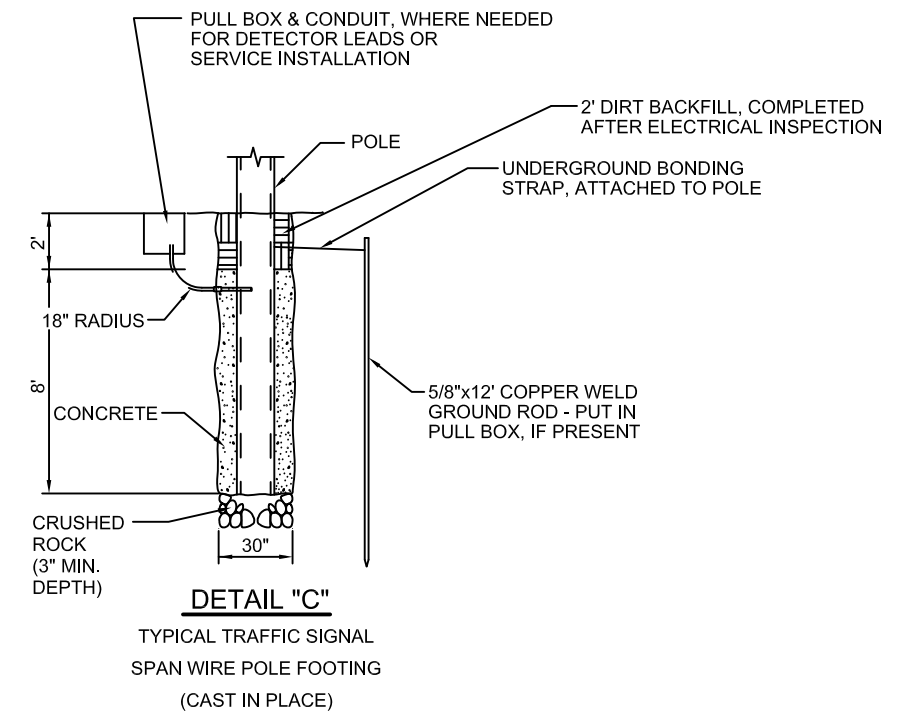
SCHOOL FLASHING BEACON	
ENGINEERING CONSTRUCTION STANDARDS	

DETAIL NO. <b>900-04</b>
Sheet No. 1 of 1



**GENERAL NOTES**

1. SPAN WIRE POLES SHALL BE HOT DIPPED GALVANIZED PRIMER AND FINISHED WITH FEDERAL GREEN POWDER COATING. POLE SURFACE SHALL BE WIPED CLEAN AND FREE OF DEBRIS PRIOR TO FINISH APPLICATION. FINISH APPLICATION SHALL BE COMPLETED PRIOR TO INSTALLATION OF SIGNAL/PEDESTRIAN HEADS AND PEDESTRIAN PUSH BUTTONS. FOLLOWING INSTALLATION OF THESE ITEMS, CONTRACTOR SHALL TOUCH UP NICKS AND ABRASIONS AS NEEDED.
2. DESIGN CRITERIA SHALL MEET LATEST AASHTO EDITION OF "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS," FOR A WIND VELOCITY OF 90 MPH.
3. SPAN WIRE POLES SHALL BE FABRICATED OF GALVANIZED STEEL WITH A MIN. YIELD STRENGTH OF 35 KSI. AND A MIN. WEIGHT PER LINEAR FOOT AS FOLLOWS: 49.5 LB. FOR 12" DIA. POLES. POLES SHALL BE INSTALLED SO THAT THEY WILL BE PLUMB WHEN DEFLECTED BY THE INSTALLED LOAD. SPAN WIRE CABLE SHALL BE A MINIMUM OF 3/8 INCH DIAMETER, RATED AT A MINIMUM OF 13,000 POUNDS.
4. SPAN WIRE SIGNAL HEADS SHALL HAVE ONE POWER FEED WIRE IN AND OUT PER HEAD. CONNECTIONS SHALL BE MADE ONLY ON THE SIGNAL HEAD TERMINALS, WITH NO EXTERNAL SPLICES.



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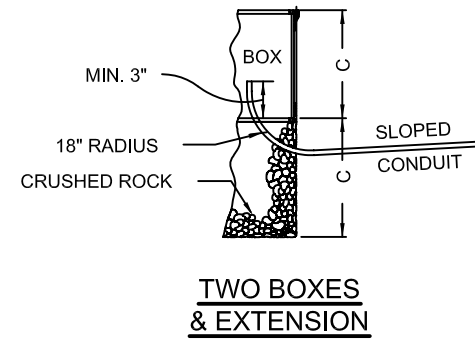
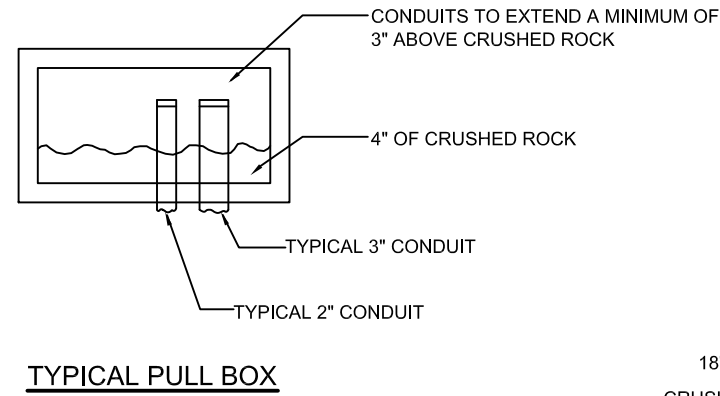
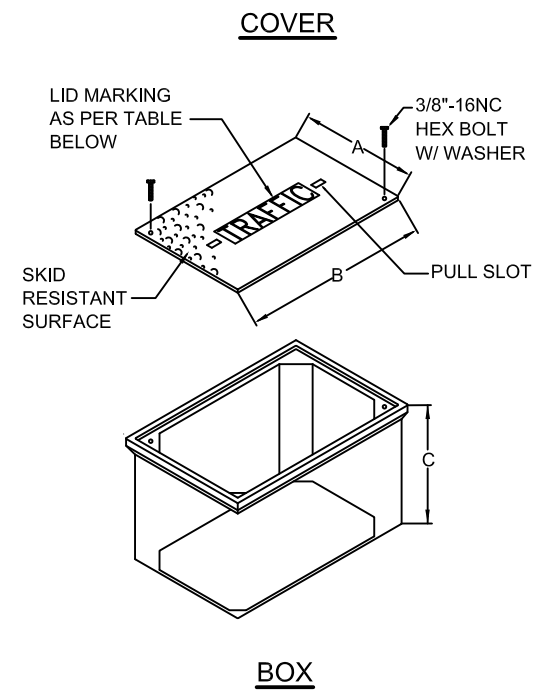
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**SPAN WIRE POLE  
DETAIL**

ENGINEERING CONSTRUCTION STANDARDS

DETAIL NO. <b>900-05</b>
Sheet No. 1 of 1

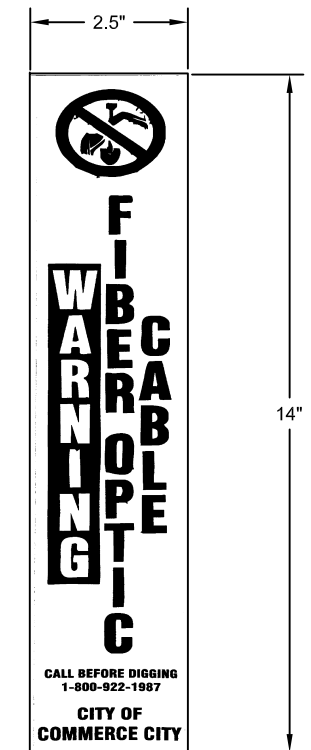




FIBERGLASS REINFORCED POLYMER CONCRETE DESIGNED FOR SERVICE LOAD (MINIMUM) OF 15,000 LBS. OVER A 10" SQUARE

**PULLBOXES**

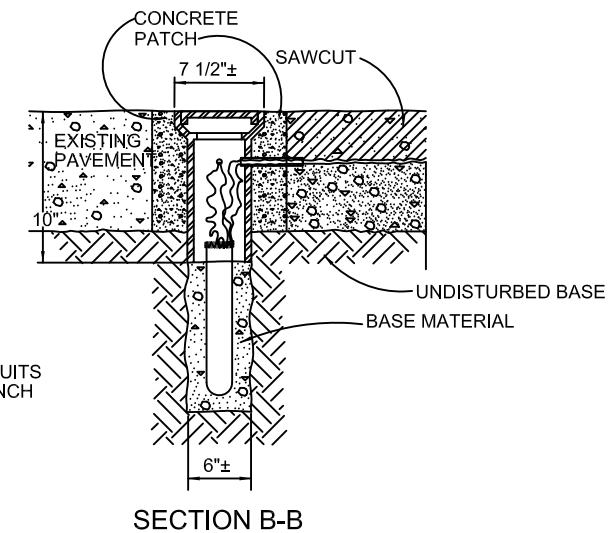
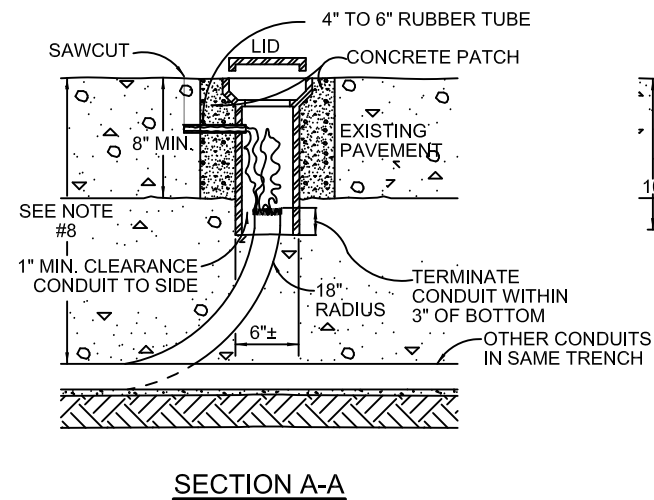
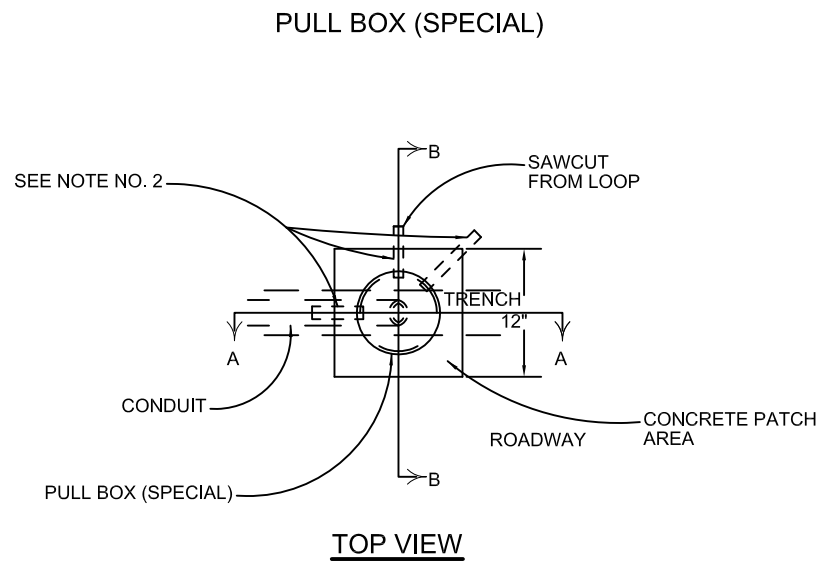
PULL BOX USAGE	SIZE (A X B X C)	PULL BOX LID MARKING
CABINET HOME RUN PULLBOX	24"x36"x18"	TRAFFIC
SIGNAL POLE PULL BOX	17"x30"x12"	TRAFFIC
DETECTOR PULL BOX (SIDE OF ROAD)	12"x12"x12"	TRAFFIC
DETECTOR WATER VALVE	WATER VALVE	TRAFFIC
COMMUNICATION VAULT (T/S CABINET)	30"x48"x18"	TRAFFIC COMM
COMMUNICATION VAULT (INTERMEDIATE LOCATIONS)	24"x36"x18"	TRAFFIC COMM
TELEPHONE DEMARCATION	13"x24"x12"	TRAFFIC COMM
ELECTRICAL DEMARCATION	13"x24"x12"	ELECTRIC



**UTILITY DECAL**

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**GENERAL NOTES**

1. PULL BOX (SPECIAL) SHALL BE A WATER VALVE STEM TYPE PULL BOX MADE OF ALUMINUM WITH A CAST IRON LID. THE PULL BOX SHALL HAVE THE CAPABILITY OF ACCEPTING RISER RINGS FOR FUTURE OVERLAYS. THE LID SHALL HAVE THE WORD "TRAFFIC" PRINTED ON IT.
2. PULL BOXES SHALL HAVE 3/4" TO 1" DIAMETER HOLES DRILLED OR TORCHED 3" FROM TOP TO ACCEPT A 4" TO 6" RUBBER TUBE (3/4" GARDEN HOSE). THE NUMBER OF HOLES SHALL BE AS PER PLANS OR AS DIRECTED BY THE CITY ENGINEER.
3. CARE SHALL BE TAKEN DURING BACKFILL COMPACTION TO PREVENT COLLAPSE OF THE TUBES.
4. 2' MINIMUM SLACK OF BOTH FEED AND LOOP WIRES IS TO BE PROVIDED SO THAT ALL TESTING AND SPLICING CAN BE DONE OUTSIDE OF THE PULL BOX.
6. PULL BOX IS TO BE LOCATED IN AN AREA OF THE STREET NOT HEAVILY TRAVELED IF POSSIBLE AND CENTERED A MINIMUM OF 12" FROM THE CONCRETE GUTTER PAN.
7. ALL WORK LISTED ABOVE FOR INSTALLATION OF PULL BOXES SHALL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE PRICE OF THE CONDUIT.
8. CONDUIT UNDER ROADWAY SHALL BE LOCATED AT A DEPTH OF NOT LESS THAN 30 INCHES.
9. PULL BOX LID SHALL BE FLUSH TO 1/4" LOW OF FINAL GRADE.

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<i>Maria R. Fisher</i> CITY ENGINEER	05-27-16 DATE



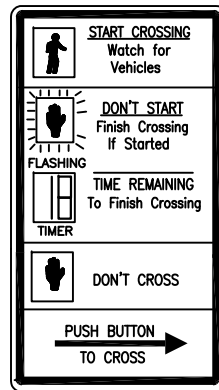
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PULL BOX (SPECIAL)	
ENGINEERING CONSTRUCTION STANDARDS	

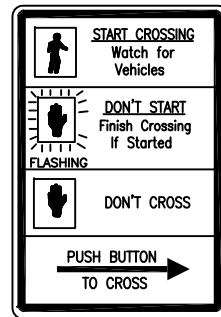
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Sheet No. 1 of 1



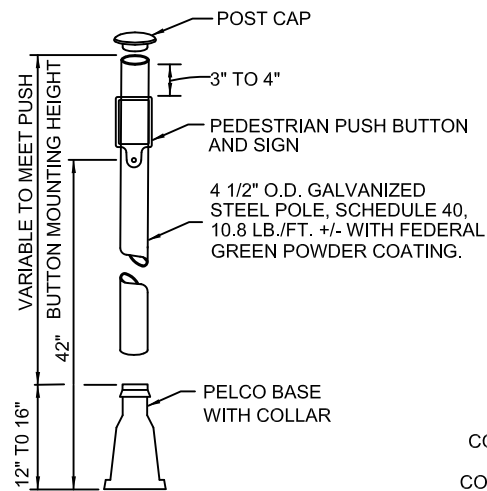
**TYPICAL PEDESTRIAN PUSH-BUTTON SIGNS**  
SIGN SHALL BE LABEL (STICK-ON) TYPE



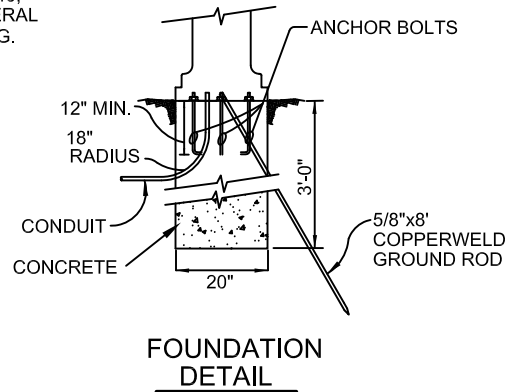
R10-3e  
9"x15"  
COUNTDOWN



R10-3b  
9"x12"  
NON-COUNTDOWN



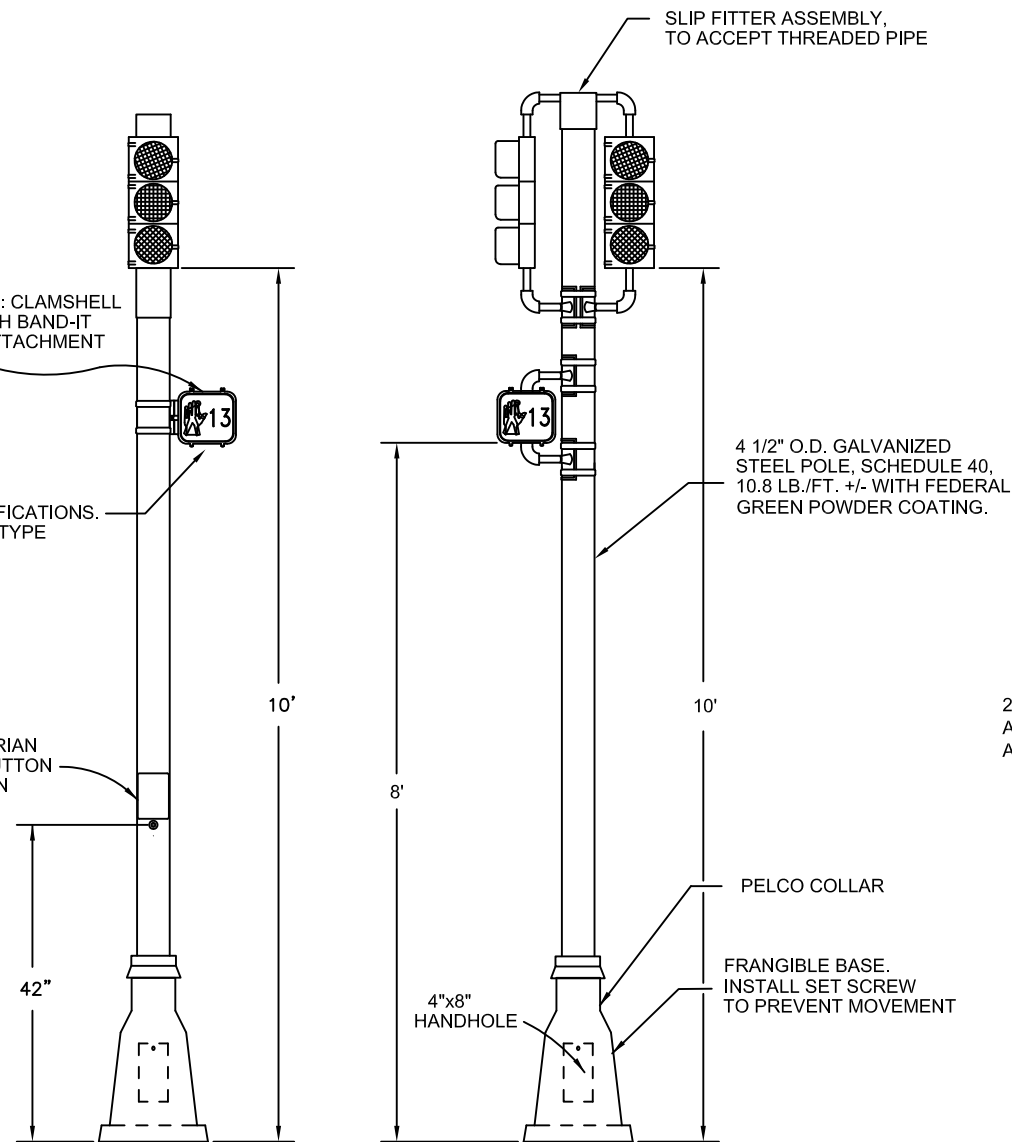
**PEDESTRIAN PUSH BUTTON POLE**



**FOUNDATION DETAIL**

ALTERNATE: CLAMSHELL MOUNT WITH BAND-IT OR BOLT ATTACHMENT TO POLE

SEE PROJECT SPECIFICATIONS. COUNTDOWN TIMER TYPE MAY BE REQUIRED.



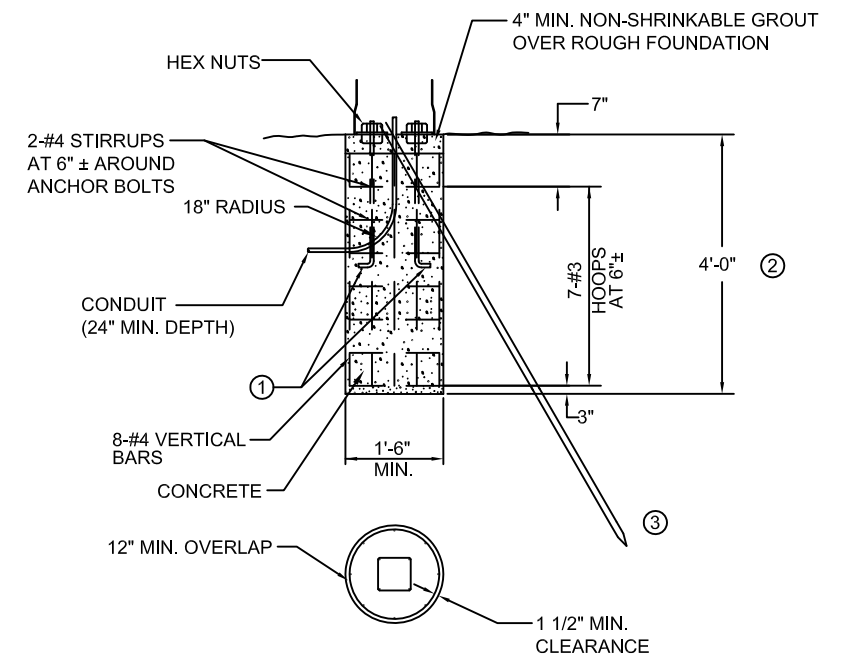
PEDESTAL POLE SHALL BE HOT DIPPED GALVANIZED PER ASTM A123, EQUIVALENT TO 2 OZ. PER SQUARE FOOT, INSIDE AND OUT

**TYPICAL PEDESTAL POLE DETAIL**

1/4" SPLIT PIN SHALL BE INSTALLED IN THE UPPER PORTION OF THE ALUMINUM BASE AND SHALL COMPLETELY PENETRATE BASE AND POLE TO SECURE POLE TO PREVENT MOVEMENT OR TWISTING. PELCO COLLAR TO BE INSTALLED.

**FOOTING NOTES**

- ① ANCHOR BOLTS (FURNISHED WITH POLE) PER MANUFACTURER'S TEMPLATE.
- ② CAISSON DESIGNS REQUIRE THAT THE CAISSON BE FOUNDED IN COMPACT SAND, CLAY OR SANDY CLAY. IF, BY VISUAL INSPECTION OF THE HOLE, OTHER MATERIAL IS PRESENT, THE CAISSON DESIGN SHALL BE MODIFIED AND APPROVED BY THE CONSTRUCTION MANAGER.
- ③ 5/8"x8' COPPERWELD GROUND ROD THROUGH FOUNDATION, INTO GROUND.
- ④ HAND HOLE SHALL BE PROVIDED.



**TYPICAL PEDESTAL POLE FOUNDATION (CAST IN PLACE)**

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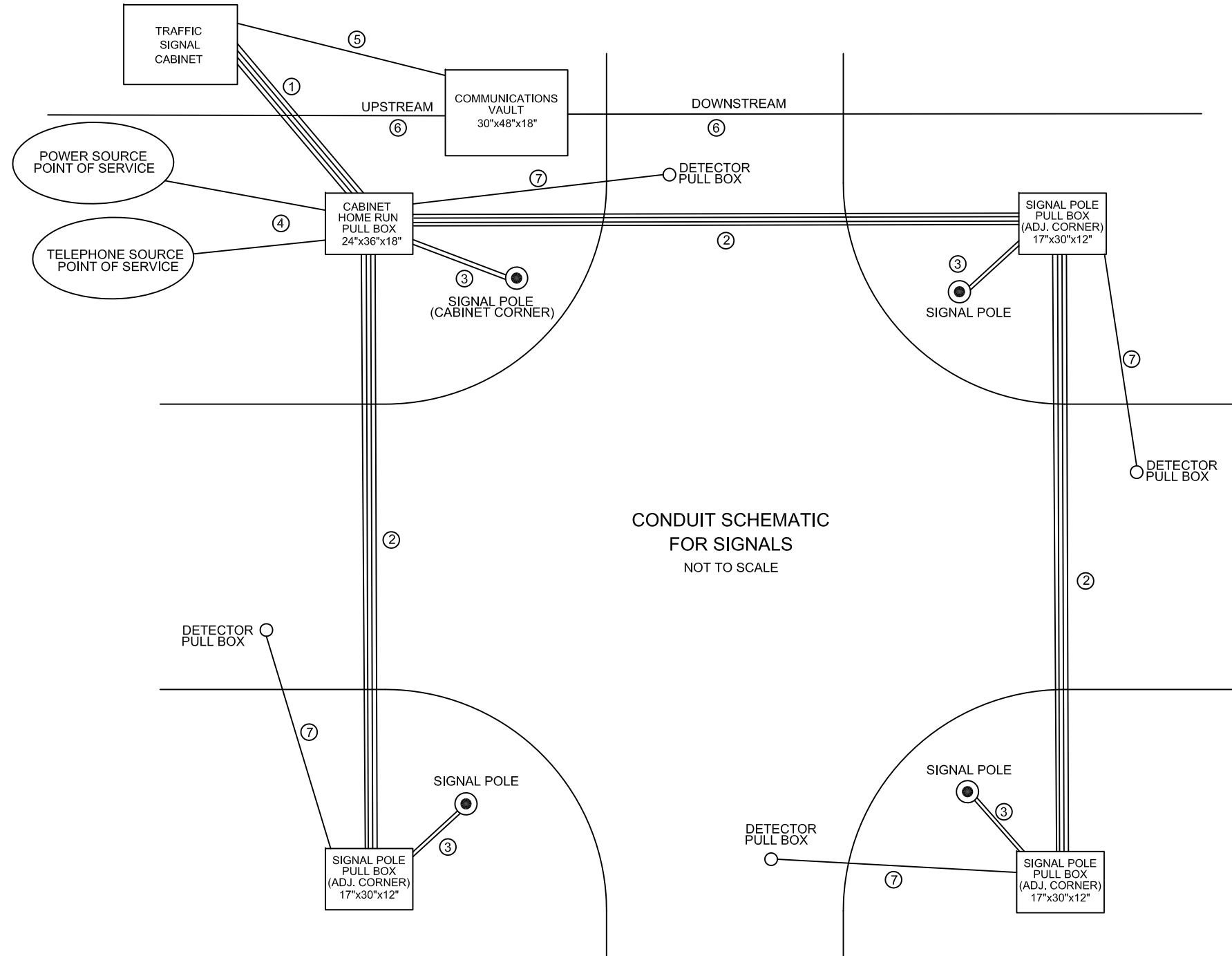
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CITY ENGINEER	DATE

**CITY OF COMMERCE CITY**  
Department of Public Works  
8602 Rosemary St.  
Commerce City, CO 80022  
Ph: 303-289-8150

<h1>PEDESTRIAN POLE</h1>
ENGINEERING CONSTRUCTION STANDARDS

DETAIL NO. <b>900-09</b>
Sheet No. 1 of 1



CONDUIT SCHEMATIC  
FOR SIGNALS  
NOT TO SCALE

**RECOMMENDED CONDUIT/CABLE RELATIONSHIPS**


- ① "CABINET HOME RUN PULL BOX" TO "TRAFFIC SIGNAL CABINET"  
1 OF 1 - 2" CONDUIT: POWER FROM POINT-OF-SERVICE  
1 OF 3 - 3" CONDUITS: LOW VOLTAGE & VIDEO  
2 OF 3 - 3" CONDUITS: FIELD WIRING (120 VAC)  
3 OF 3 - 3" CONDUITS: SPARE
- ② "CABINET HOME RUN PULL BOX" TO "SIGNAL POLE PULL BOX (ADJ. CORNER)"  
"SIGNAL POLE PULL BOX (ADJ. CORNER)" TO "SIGNAL POLE PULL BOX (ADJ. CORNER)"  
1 OF 1 - 2" CONDUIT: LUMINAIRE POWER  
1 OF 3 - 3" CONDUITS: LOW VOLTAGE & VIDEO  
2 OF 3 - 3" CONDUITS: FIELD WIRING (120 VAC)  
3 OF 3 - 3" CONDUITS: SPARE
- ③ "CABINET HOME RUN PULL BOX" TO "SIGNAL POLE (CABINET CORNER)"  
"SIGNAL POLE PULL BOX (ADJ. CORNER)" TO "SIGNAL POLE"  
1 OF 1 - 2" CONDUIT: LUMINAIRE POWER  
1 OF 1 - 3" CONDUITS: FIELD WIRING
- ④ "CABINET HOME RUN PULL BOX" TO "POINTS OF SERVICE"  
1 OF 2 - 2" CONDUITS: POWER FROM POINT OF SERVICE  
2 OF 2 - 2" CONDUITS: TELEPHONE FROM POINT OF SERVICE (IF REQUIRED)
- ⑤ "COMMUNICATIONS VAULT" TO "TRAFFIC SIGNAL CABINET":  
1 OF 1 - 2" CONDUIT: INTERCONNECT
- ⑥ "COMMUNICATIONS VAULT" UPSTREAM/DOWNSTREAM:  
1 OF 1 - 3" CONDUIT: INTERCONNECT
- ⑦ "CABINET HOME RUN PULL BOX" TO "DETECTOR PULL BOX"  
"SIGNAL POLE PULL BOX (ADJ. CORNER)" TO "DETECTOR PULL BOX"  
1 OF 1 - 2" CONDUIT: INDUCTANCE DETECTOR WIRING

NOTE: ⑦ IS SHOWN AS A REFERENCE ONLY. INSTALL ONLY IF REQUIRED IN THE CONSTRUCTION PLANS AND SPECIFICATIONS.

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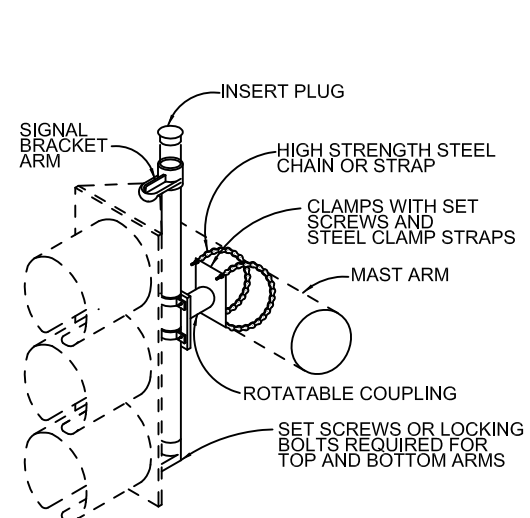
APPROVAL	
<i>Maria R. Fisher</i>	05-27-16
CITY ENGINEER	DATE



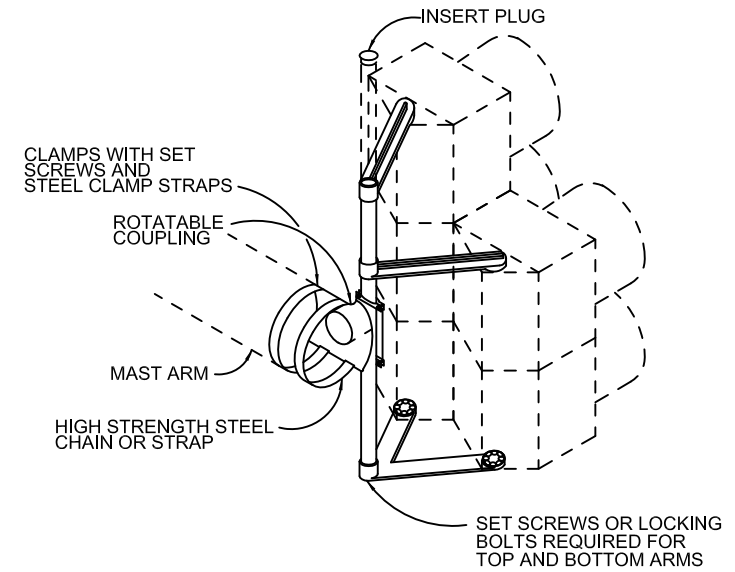
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<h1>CONDUIT SCHEMATIC</h1>
ENGINEERING CONSTRUCTION STANDARDS

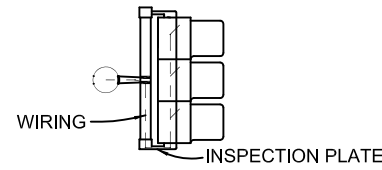
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Sheet No. 1 of 1



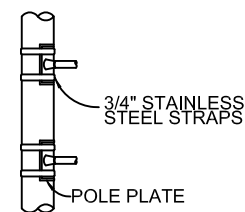
**DETAIL OF MAST ARM MOUNTING  
FOR IN-LINE SIGNAL HEAD  
(3-SECTION OR 5-SECTION)**



**DETAIL OF MAST ARM MOUNTING  
FOR SIDE-BY-SIDE SIGNAL HEAD  
(5-SECTION)**



**WIRING DIAGRAM**



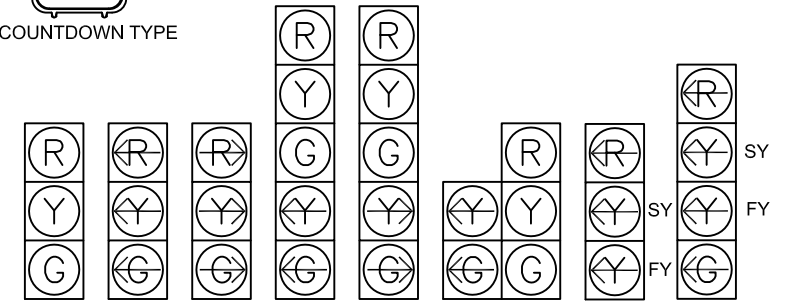
**TYPICAL SIDE OF POLE  
SIGNAL MOUNTING**

**MOUNTING NOTES**

1. PIPE COUPLINGS FOR SIGNAL BRACKETS SHALL BE EITHER 1-1/2 OR 2 INCH DEPENDING UPON THE SIGNAL HEAD TO BE INSTALLED. SIGNAL BRACKETS SHALL BE FURNISHED BY THE MANUFACTURER OF THE SIGNAL HEADS.
2. UNLESS OTHERWISE SPECIFIED, ALL TRAFFIC SIGNALS MOUNTED ABOVE THE ROADWAY SHALL HAVE A HEIGHT OF 17' TO 19' ABOVE THE PAVEMENT GRADE AT THE ROADWAY CENTER. ALL SIDE-OF-POLE MOUNTED TRAFFIC SIGNALS SHALL HAVE A HEIGHT OF 10' ABOVE GROUND LINE AND PEDESTRIAN SIGNALS SHALL HAVE A HEIGHT OF 8' ABOVE GROUND LINE AS MEASURED TO THE BOTTOM OF THE SIGNAL HEAD HOUSING OR BRACKET.
3. MAST ARM MOUNTED SIGNAL HEADS SHALL USE ASTRO-BRAC'S OR SKY-BRAC. ALL SIGNAL HEADS SHALL BE MOUNTED IN SUCH A MANNER AS TO BE EASILY REMOVED FROM THEIR SUPPORTING STRUCTURE.
4. GASKET SEALING COMPOUND SHALL BE USED IN ADDITION TO ANY LEAD WASHERS REQUIRED FOR CREATING A WATER-TIGHT CONNECTION BETWEEN THE SIGNAL HEAD AND MOUNTING BRACKET.
5. SIGNAL HEADS SHALL BE SECURELY AFFIXED BY USE OF A SERRATED COUPLING OR OTHER ACCESSORIES RECOMMENDED BY THE SIGNAL MANUFACTURER.
6. WIRING FROM INSIDE MAST ARM THROUGH A 1" FIELD DRILLED HOLE IN ARM SHALL BE BROUGHT THROUGH THE MOUNTING SUPPORT TUBE AND LOWER ARM (AS SHOWN). FIELD DRILLED HOLES SHALL HAVE RUBBER GROMMETS INSTALLED.

**NOTES**

ALL VEHICLE SIGNAL HEADS SHALL BE POLYCARBONATE WITH 12" SECTIONS AND TUNNEL VISORS.  
ALL VEHICLE AND PEDESTRIAN SIGNAL HEADS SHALL BE LED TYPE AND BLACK IN COLOR, WITH THE EXCEPTION OF THE SIDE OF POLE SIGNALS. SIDE OF POLE SIGNALS SHALL HAVE RED BULBS. PEDESTRIAN HEADS SHALL BE COUNTDOWN TYPE.



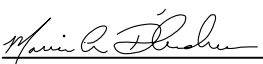
**PEDESTRIAN AND VEHICLE SIGNAL HEADS**


**GENERAL WIRING NOTES**

1. TRAFFIC SIGNAL CONDUIT SHALL NOT CARRY WIRING OF OTHER UTILITIES.
2. EXCEPT FOR LOOP DETECTOR LEADS, ALL SPLICES SHALL BE IN HAND HOLES AT POLE BASES AND NOT IN PULL BOXES.
3. PEDESTRIAN AND VEHICLE SIGNAL HEADS SHALL BE INDIVIDUALLY WIRED FROM THE POLE BASE TO THE SIGNAL HEAD.
4. CONTRACTOR SHALL PROVIDE 2 WIRING DIAGRAMS OF THE SIGNAL INSTALLATION TO THE CITY.
5. UNLESS ALLOWED BY THE ENGINEER, WIRE SHALL NOT OCCUPY MORE THAN 40% OF THE INSIDE AREA OF CONDUIT.

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	05-27-16
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**SIGNAL HEAD  
MOUNTING**

ENGINEERING CONSTRUCTION STANDARDS

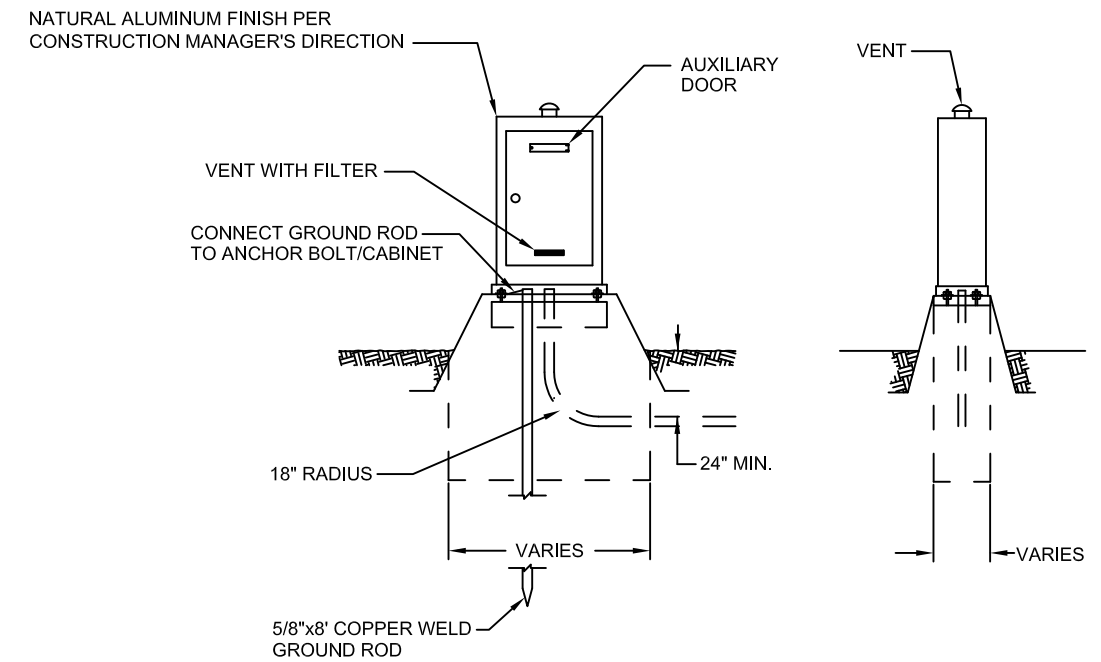
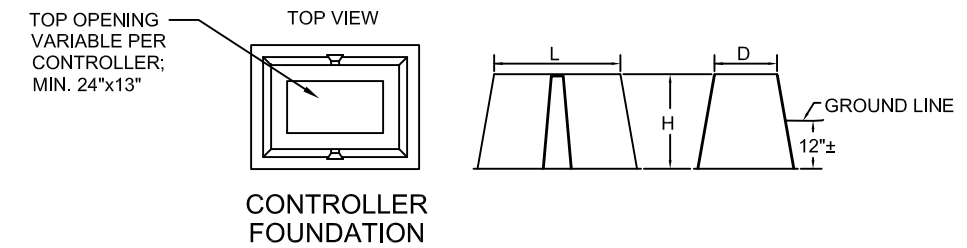
DETAIL NO. <b>900-11</b>
Sheet No. 1 of 1

**NOTES**

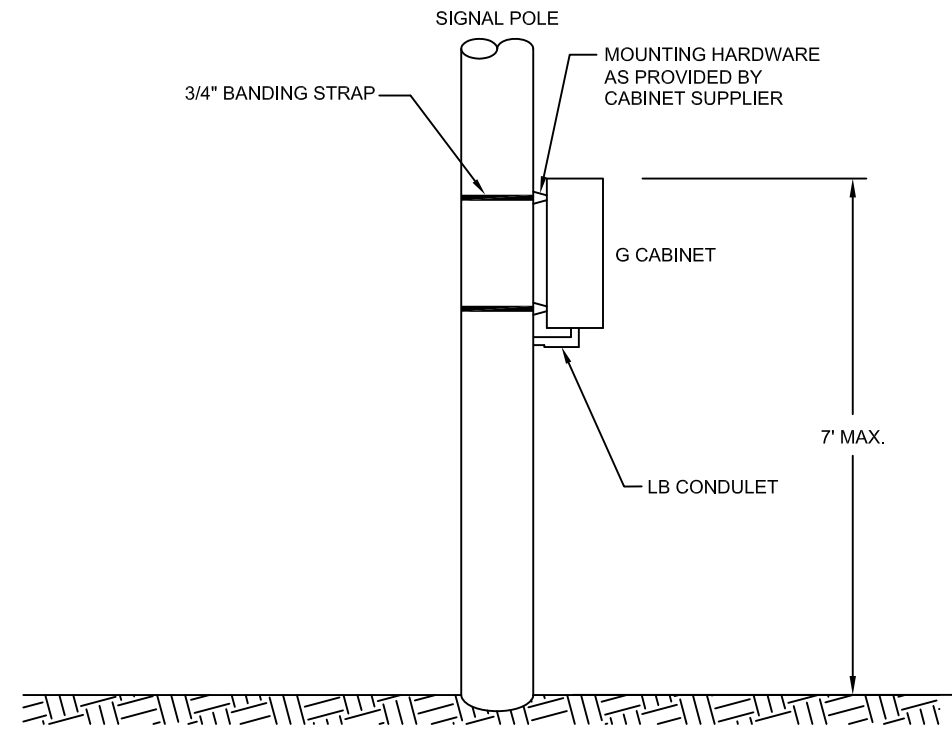
AN UNINTERRUPTABLE POWER SUPPLY (UPS) SHALL BE INSTALLED WITH THE CONTROLLER EQUIPMENT. SEE SPECIFICATIONS.

**CABINET FOUNDATION**

	<u>L</u>	<u>D</u>	<u>H</u>
P CABINET	44"	26"	24"



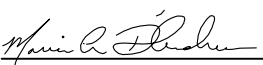
**TYPICAL BASE MOUNTED CONTROLLER CABINET  
INSTALLATION AND FIBERGLASS FOUNDATION**




**TYPICAL SIDE-OF-POLE MOUNTED  
CONTROLLER CABINET**

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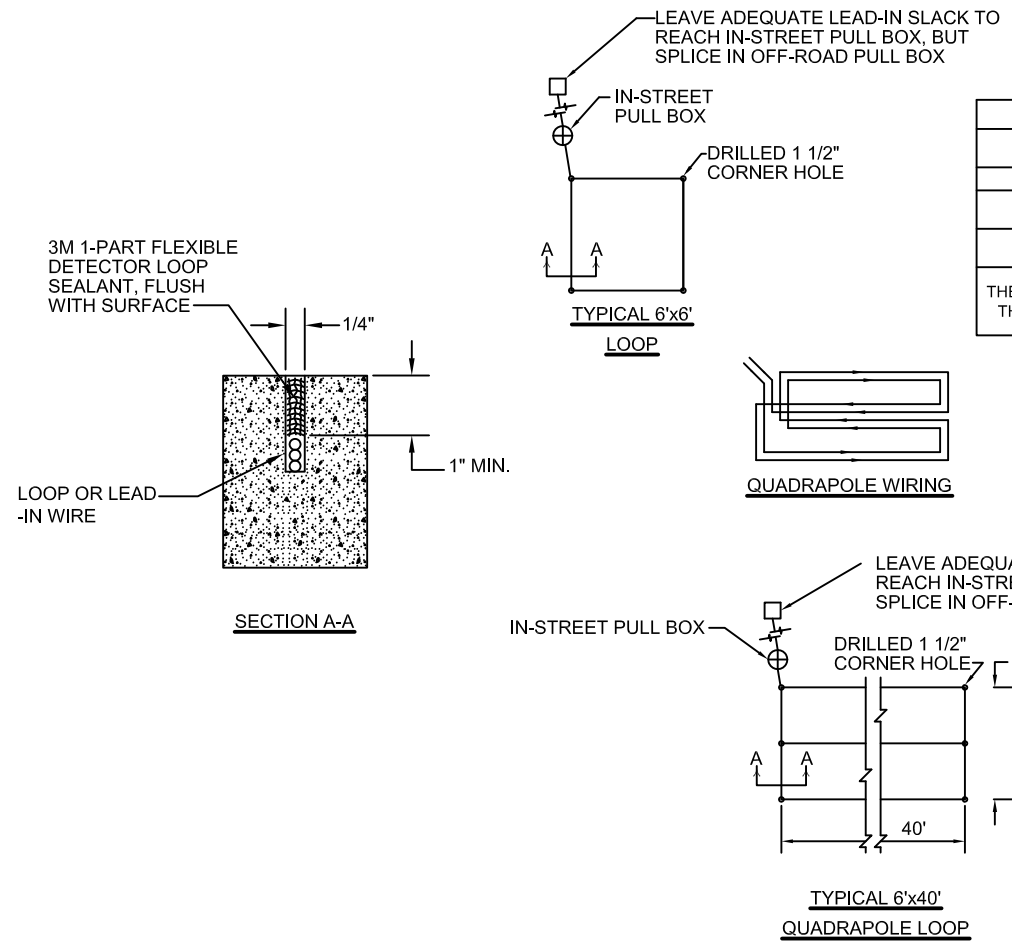
APPROVAL	
	05-27-16
CITY ENGINEER	DATE



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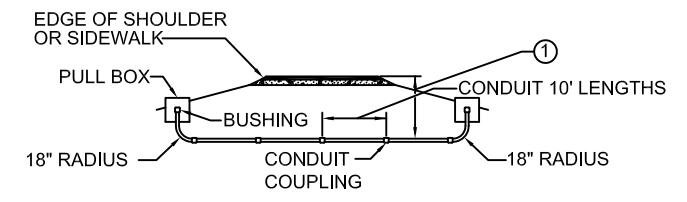
<b>CONTROLLER CABINET</b>
ENGINEERING CONSTRUCTION STANDARDS

DETAIL NO. <b>900-12</b>
Sheet No. 1 of 1



LOOP TURNS	
SIZE OF LOOP	NUMBER OF TURNS
6' X 6'	4
6' X 8' TO 6' X 20'	3
6' X 22' TO 6' X 40'+	2

THE NUMBER OF TURNS MAY BE ADJUSTED BY THE ENGINEER IN THE FIELD. WIRING CONNECTIONS TO BE FIELD DETERMINED.



**CONDUIT PLACEMENT UNDER PAVEMENT OR SIDEWALK**

**NOTES**

- ① MINIMUM CONDUIT DEPTH: UNDER PAVEMENT 30" UNDER SIDEWALK 24"
- ALL PVC CONDUIT SHALL BE SCHEDULE 80

**LOOP SAW CUT AND INSTALLATION**


**NOTES**

1. IMMEDIATELY BEFORE LAYING THE LOOP CABLE, THOROUGHLY CLEAN AND DRY SAW CUT WITH HIGH PRESSURE COMPRESSED AIR.
2. LOOP WIRE IN ADJACENT LOOPS SHALL BE LAID UNIFORMLY IN EITHER A CLOCKWISE OR COUNTER-CLOCKWISE DIRECTION AND THE LOOP TAGGED TO INDICATE THE DIRECTION.
3. USE A BLUNT, NON-METALLIC INSTRUMENT TO PUSH WIRE INTO SLOT.
4. LOOP WIRE SHALL BE CONTINUOUS (NO SPLICES) FROM THE PULL BOX. SPLICES IN PULL BOX SHALL BE WATERPROOFED WITH 3M SPLICE KIT.
5. CONTINUITY TEST FOR EACH LOOP SHALL BE CONDUCTED 1) BEFORE ANY LOOP SEALER IS INSTALLED AND 2) AFTER LOOP SEALER IS INSTALLED AND LEAD-IN CABLE IS SPLICED AND TRAINED TO THE CONTROLLER. "RESISTANCE-TO-GROUND" AND "INDUCTANCE" SHALL BE MEASURED AND RECORDED FOR EACH TEST.

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<i>Maria R. Fisher</i> CITY ENGINEER	05-27-16 DATE



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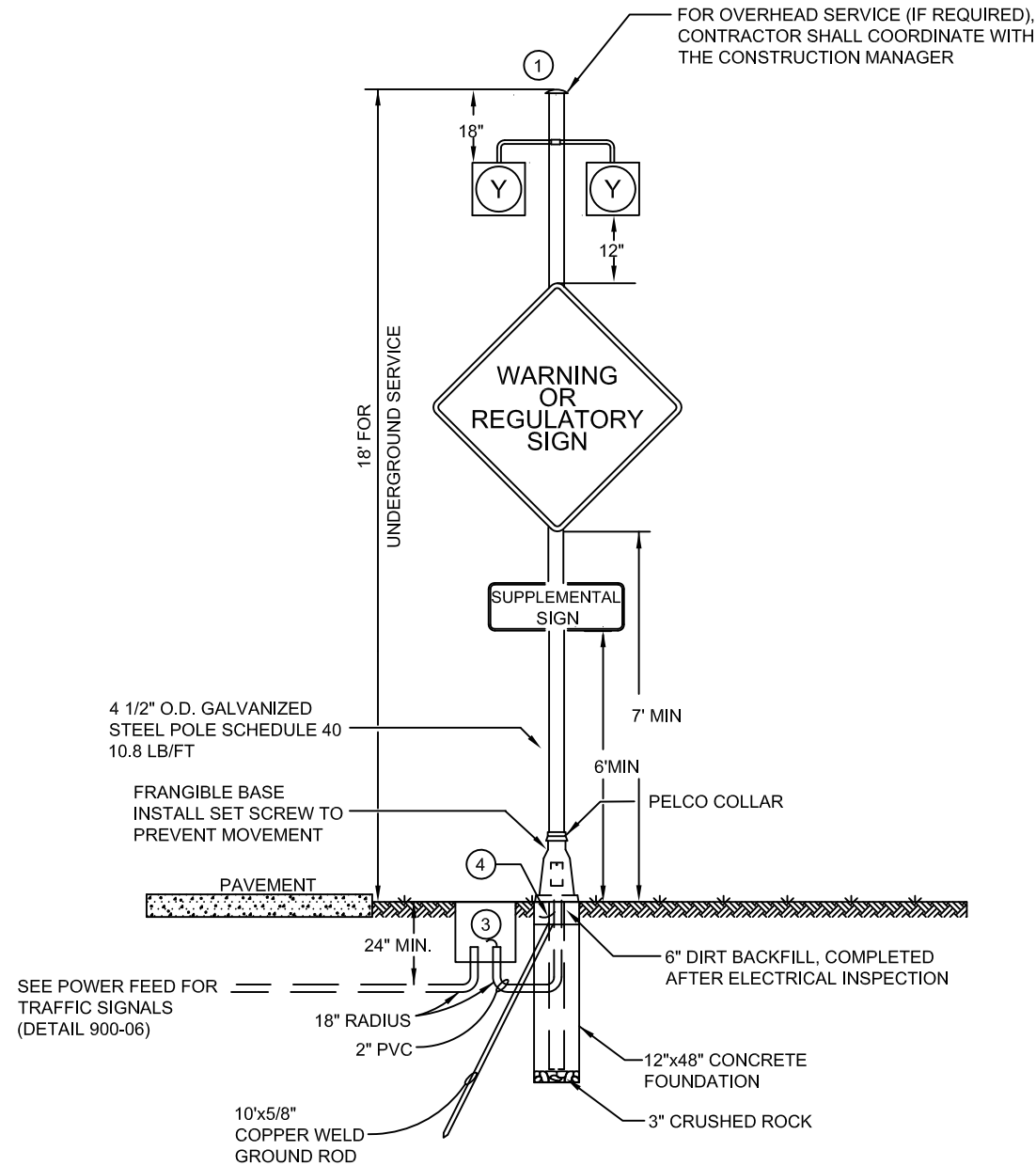
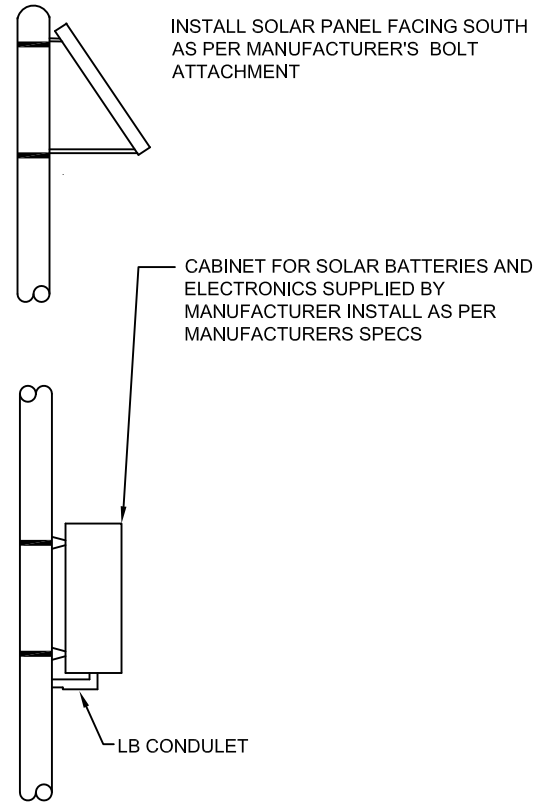
CONDUIT DETAILS	
ENGINEERING CONSTRUCTION STANDARDS	

DETAIL NO. <b>900-13</b>
Sheet No. 1 of 1

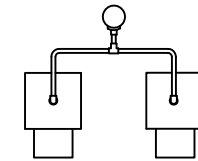
### FLASHING BEACONS

ALL FLASHING BEACONS SHALL BE 12" POLYCARBONATE WITH TUNNEL VISORS AND BLACK HOUSINGS

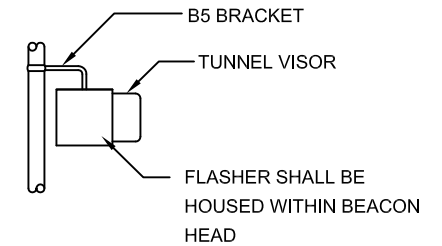
#### OPTIONAL SOLAR



#### BEACON TOP VIEW



#### BEACON SIDE VIEW




#### NOTES

- ① WATERTIGHT GALVANIZED STEEL POLE CAP
- ② LEAVE MINIMUM OF 8' COILED WIRE FOR UTILITY COMPANY CONNECTION AT UTILITY DEMARCATION POINT
- ③ PROVIDE CONDUIT AND PULL BOX FOR UNDERGROUND SERVICE ONLY
- ④ BONDING STRAP IN BACKFILL

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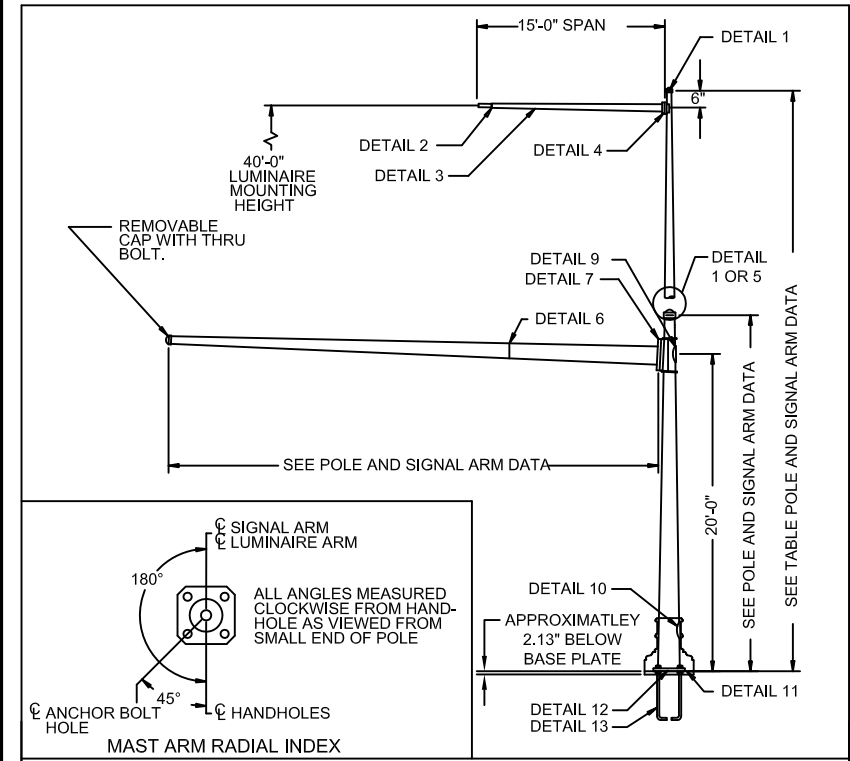


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<h2>FLASHING BEACON</h2>
ENGINEERING CONSTRUCTION STANDARDS

DETAIL NO. <b>900-14</b>
Sheet No. 1 of 1

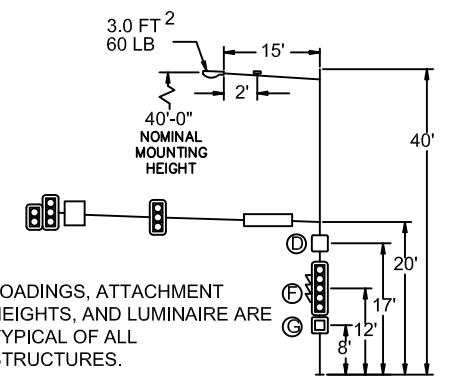
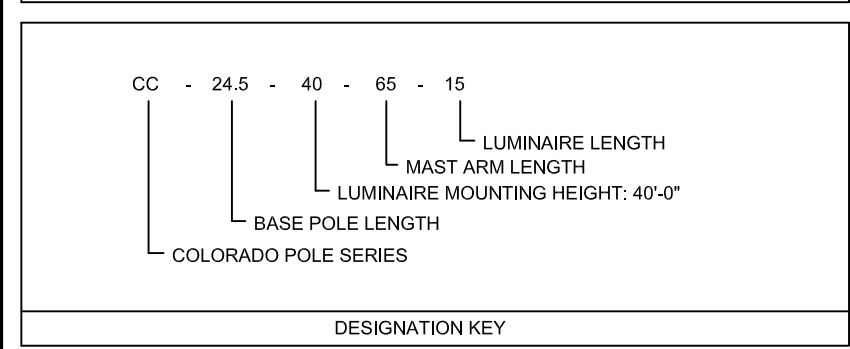


COMMERCE CITY, COLORADO POLE SERIES

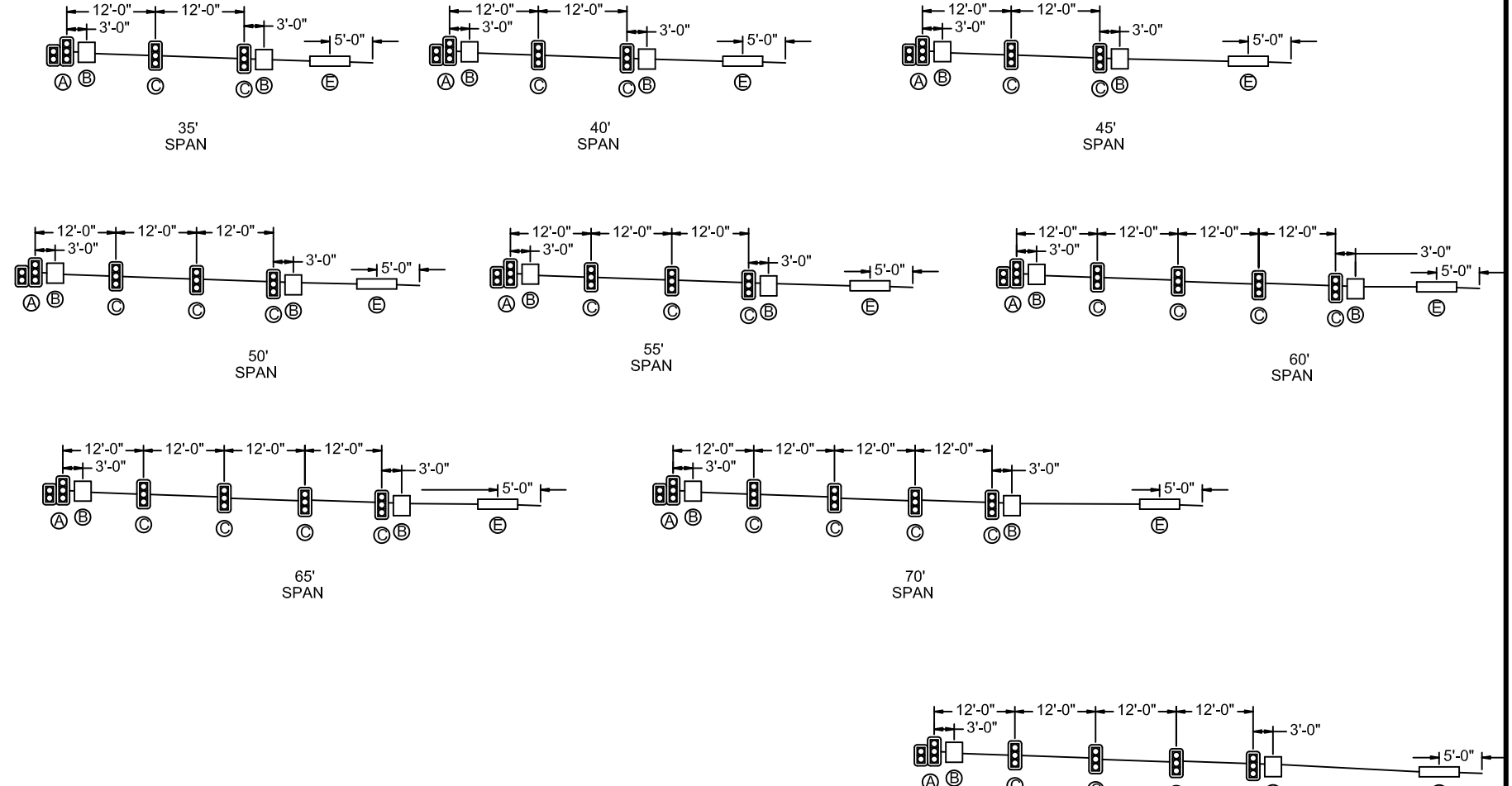
MATERIAL DATA

COMPONENT	ASTM DESIGNATION	MIN. YIELD (KSI)	COMPONENT	ASTM DESIGNATION	MIN. YIELD (KSI)
POLE SHAFT (OTHER)	A595 GR. A	55	LUM. ARM ATTACHMENTS	A36	36
POLE SHAFT .250,.188	A572 GR. 65	65	MAST ARM ATTACHMENTS	A36	36
ARM SHAFT .219,.250,.281	A572 GR. 65	65	MAST ARM CONN. BOLT	A325	-
ARM SHAFT (OTHER)	A595 GR. A	55	LUM. CONNECTION BOLT	A307	-
ANCHOR BOLTS	F1554	55	GALVANIZING HARDWARE	A153	-
POLE BASE	A36	36	GALVANIZING STRUCTURES	A123	-

FINISH: PAINT OVER GALVANIZED  
 BASE COAT: HOT DIP GALVANIZE TO ASTM 123  
 FINISH COAT: TGIC OR URETHANE POLYESTER POWDER  
 VALMONT SPEC.: F-283CL  
 COLOR: FEDERAL GREEN



LOADINGS, ATTACHMENT HEIGHTS, AND LUMINAIRE ARE TYPICAL OF ALL STRUCTURES.



DEVICE	DESCRIPTION	PROJ. AREA (FT <sup>2</sup> )	WEIGHT (LBS)
(A)	12"-5 SEC. SIGNAL WITH BACKPLATE	13.72	71
(B)	30" X 36" REGULATORY SIGN	7.50	25
(C)	12"-3 SEC. SIGNAL WITH BACKPLATE	8.67	38
(D)	24" X 30" REGULATORY SIGN	5.00	15
(E)	20" X 96" INT. ILLUM. STREET SIGN	13.33	125
(F)	DUAL SIGNALS	13.61	142
(G)	DOUBLE 16" PED SIGNALS	8.00	80

REV	DRAWN BY-DATE	CHECK BY-DATE	DESCRIPTION
B	MRL1 12/15/06	MRL1 12/15/06	REVISED DECORATIVE BASE COVERS
A	MRL1 04/15/06	MRL1 04/15/06	ADDED DECORATIVE BASES
	MRL1 11/22/05	MRL1 11/23/05	

TITLE CITY OF COMMERCE CITY, COLORADO TRAFFIC STRUCTURES

VALMONT INDUSTRIES, INC. RESERVES THE RIGHT TO INSTALL VARIOUS, ENGINEER APPROVED, MATERIAL HANGING ACCOMMODATIONS TO FACILITATE THE MANUFACTURING PROCESS.

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 (402) 359-2201

PAGE NUMBER: 1 OF 3
DRAWING NUMBER: DB00748
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APPROVAL

*Maria R. Fisher*  
 CITY ENGINEER

05-27-16  
 DATE

CITY OF COMMERCE CITY

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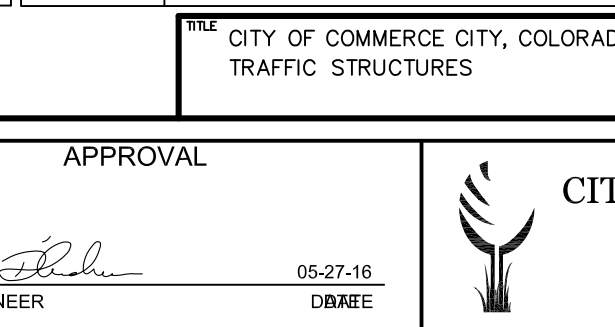
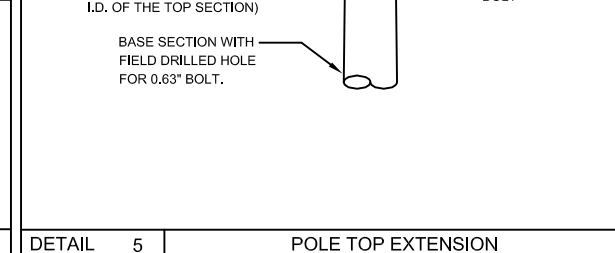
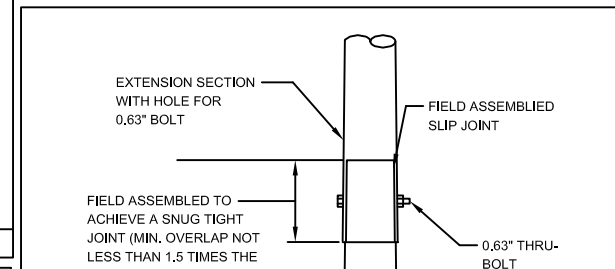
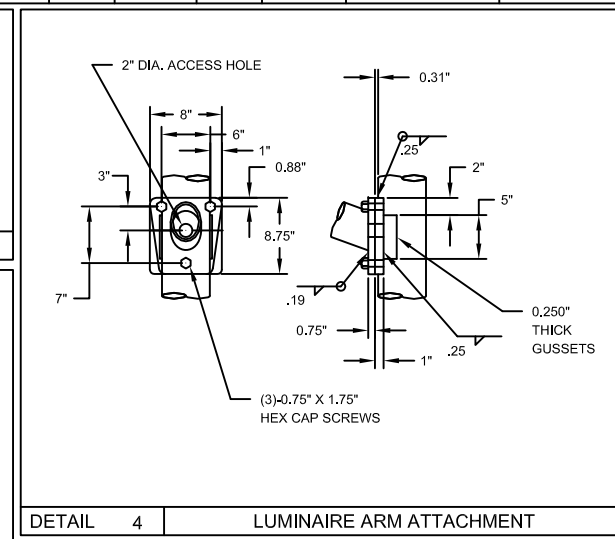
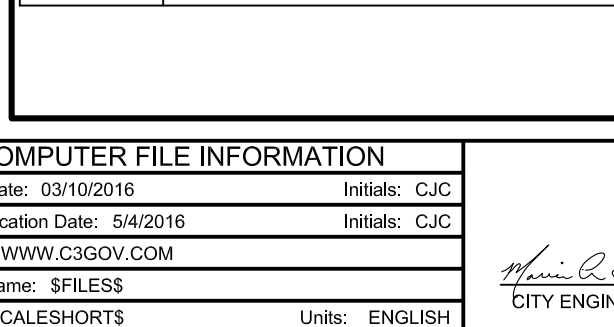
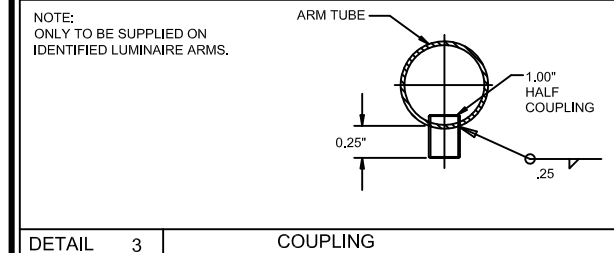
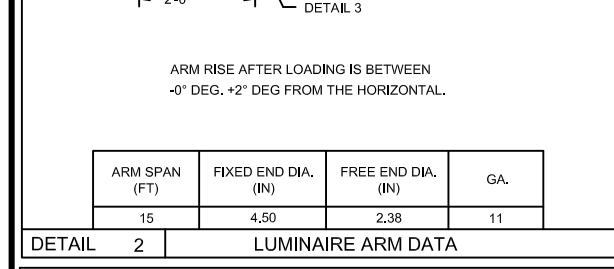
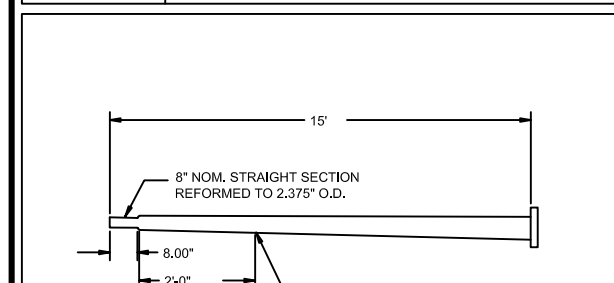
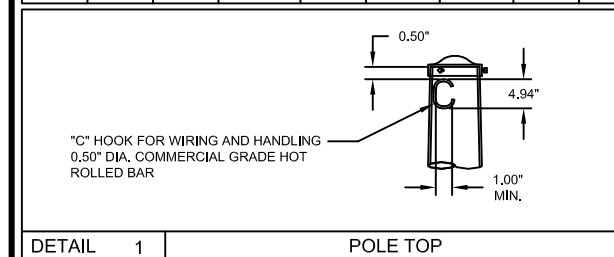
ENGINEERING CONSTRUCTION STANDARDS

DETAIL NO.  
**900-15A**

Sheet No. 1 of 1

POLE AND SIGNAL ARM DATA

ARM SPAN (FT)	POLE TUBE				POLE BASE				ANCHOR BOLT				SIGNAL ARM DATA				POLE TOP EXTENSION									
	BASE DIA. (IN)	TOP DIA. (IN)	LENGTH (FT)	GAUGE OR THK. (IN)	SQUARE "S" (IN)	BOLT CIRCLE "M" (IN)	THK. "M" (IN)	HOLE "Z" (IN)	DIA. "K" (IN)	LENGTH "J" (IN)	HOOK "H" (IN)	THREAD LENGTH "U" (IN)	PLATE SHAPE "A" X "A"	BOLT PATTERN "B" X "B"	POLE PLATE THICK "C" (IN)	GUSSET THICK "D" (IN)	CONNECTION BOLT "F"	QTY. OF BOLTS	FIXED END DIA. (IN)	FREE END DIA. (IN)	GAUGE OR THICK (IN)	SPAN (FT)	BASE DIA. (IN)	TOP DIA. (IN)	WALL THICK (IN)	LENGTH (FT)
15.00																			7.00	4.90	7	15.00				
20.00																			8.00	5.20	7	20.00				
25.00	14.50	11.07	24.50	0.250	23.00	23.00	2.00	2.00	1.75	84.00	6.00	8.00	19.25 X 19.25	16.00 X 16.00	1.50	0.375	1.25"-7UNC X 3.25" LONG	4	10.00	6.50	7	25.00	11.78	9.47	0.1793	18.04
30.00																			10.50	6.30	7	30.00				
35.00																			11.00	6.10	3	35.00				
40.00																			12.50	6.90	3	40.00				
45.00	16.00	12.57	24.50	0.250	23.00	23.00	2.00	2.00	1.75	84.00	6.00	8.00	22.25 X 22.25	18.50 X 18.50	1.75	0.438	1.50"-7UNC X 3.75" LONG	4	13.00	6.70	3	45.00	13.33	10.77	0.1875	18.23
50.00																			13.00	6.36	DET.6	50.00				
55.00																			13.34	6.00	DET.6	55.00				
60.00																			14.04	6.00	DET.6	60.00				
65.00																			14.74	6.00	DET.6	65.00				
70.00	19.00	15.50	25.00	0.250	25.00	25.00	2.00	2.25	2.00	84.00	6.00	10.00	26.75 X 26.75	23.00 X 23.00	2.25	0.500	1.50"-7UNC X 4.50" LONG	4	15.44	6.00	DET.6	70.00	16.31	13.77	0.1875	18.11
75.00																			16.14	6.00	DET.6	75.00				



TITLE CITY OF COMMERCE CITY, COLORADO TRAFFIC STRUCTURES

VALMONT INDUSTRIES, INC. RESERVES THE RIGHT TO INSTALL VARIOUS, ENGINEER APPROVED, MATERIAL HANGING ACCOMMODATIONS TO FACILITATE THE MANUFACTURING PROCESS.



PAGE NUMBER: 2 OF 3  
DRAWING NUMBER: DB00748  
REV: B

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COMPUTER FILE INFORMATION

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Last Modification Date: 5/4/2016	Initials: CJC
Full Path: WWW.C3GOV.COM	
Drawing Name: \$FILE\$\$	
Scale: \$SCALESHORT\$	Units: ENGLISH

APPROVAL

*Maria R. Fisher*  
CITY ENGINEER

05-27-16  
DATE

CITY OF COMMERCE CITY

Department of Public Works  
8602 Rosemary St.  
Commerce City, CO 80022  
Ph: 303-289-8150

MASTARM POLES

ENGINEERING CONSTRUCTION STANDARDS

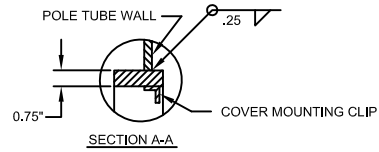
DETAIL NO. 900-15B

Sheet No. 1 of 1

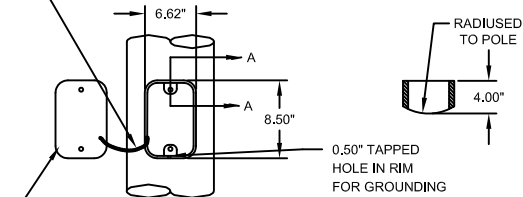


NOTE: HAND HOLES ON THE 14.50" AND 19.00" BASE POLES WILL BE SEMI-FLUSH, HAND HOLES ON 16" BASE POLES WILL BE FLUSH.

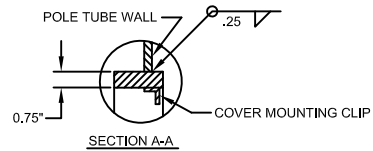
POLES WITH 14.50" BASE DIA.



NO.12 STAINLESS STEEL SINGLE JACK CHAIN SECURED WITH 0.19" X 0.50" POP RIVETS

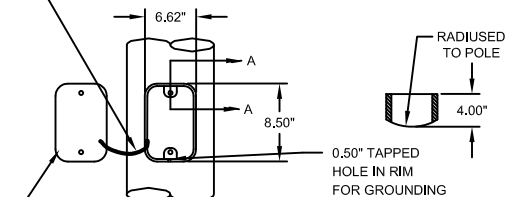


12 GA. H.R.M.S. COVER SECURED WITH 0.25" X 0.50" STAINLESS STEEL CAP SCREWS

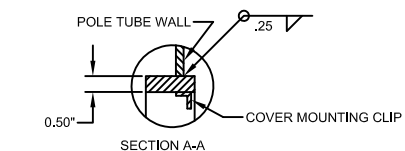


POLES WITH 16" BASE DIA.

NO.12 STAINLESS STEEL SINGLE JACK CHAIN SECURED WITH 0.19" X 0.50" POP RIVETS

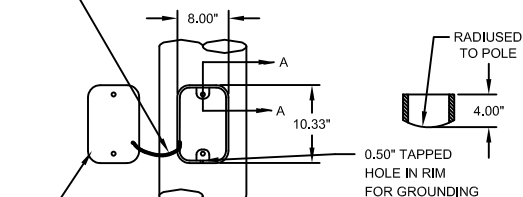


12 GA. H.R.M.S. COVER SECURED WITH 0.25" X 0.50" STAINLESS STEEL CAP SCREWS



POLES WITH 19" BASE DIA.

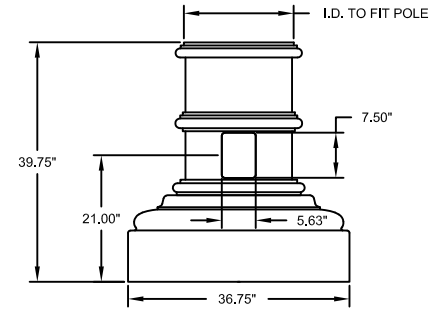
NO.12 STAINLESS STEEL SINGLE JACK CHAIN SECURED WITH 0.19" X 0.50" POP RIVETS



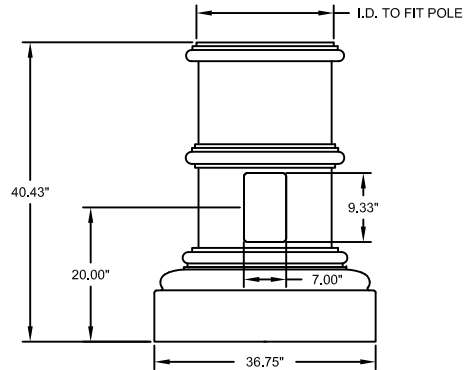
12 GA. H.R.M.S. COVER SECURED WITH 0.25" X 0.50" STAINLESS STEEL CAP SCREWS

DETAIL 10 LOWER HANDHOLE

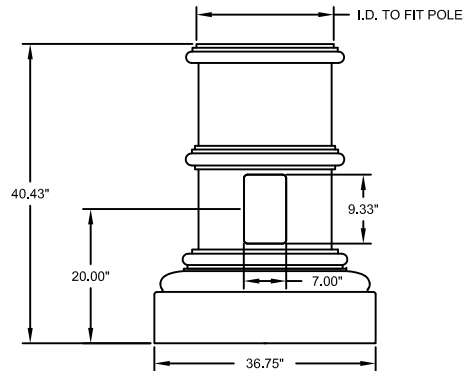
NOTE: ALL DIMENSIONS NOMINAL.



POLES WITH 14.50" O.D. BASE



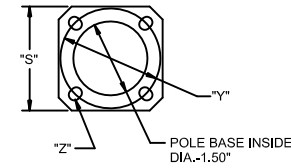
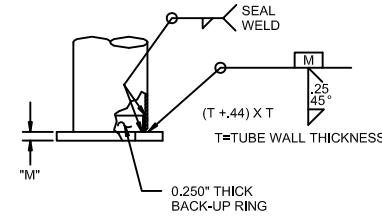
POLES WITH 16.00" O.D. BASE



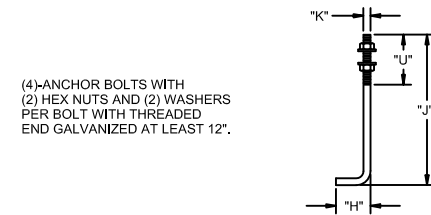
POLES WITH 19.00" O.D. BASE

DETAIL 11 DECORATIVE BASE COVERS

NOTE: THE HAND HOLES IN THE TRAFFIC POLES WILL BE MOUNTED TO CORRESPOND TO THE HAND HOLE OPENINGS IN THE DECORATIVE BASES.



DETAIL 12 POLE BASE



DETAIL 13 ANCHOR BOLT

THESE TRAFFIC SIGNAL SUPPORT STRUCTURES ARE DESIGNED IN ACCORDANCE WITH LOADING AND ALLOWABLE STRESS REQUIREMENTS OF 2001 AASHTO "STANDARDS SPECIFICATION FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS", FOURTH EDITION. WIND LOADS ARE BASED ON A BASIC WIND SPEED OF 100 MPH WITH A RECURRENCE INTERVAL OF 50 YEARS, AND A FATIGUE CATEGORY OF II. FATIGUE LOADS ARE BASED ON THE REQUIREMENTS OF SECTION 11.7 AND THE FOLLOWING DESIGN LOADS:

VORTEX SHEDDING: NOT APPLICABLE FOR STRUCTURES WITH A TAPER OF AT LEAST 0.14 IN/FT, PER AASHTO.

NATURAL WIND GUSTS: THE YEARLY MEAN WIND SPEED FOR NATURAL WIND GUSTS WILL BE ASSUMED TO BE 11.2 MPH.

GALLOPING: STRUCTURES ARE NOT DESIGNED TO RESIST PERIODIC GALLOPING FORCES.

TRUCK-INDUCED GUST: STRUCTURES ARE DESIGNED TO INCLUDE TRUCK-INDUCED GUSTS. (THE SPECIFIED AVERAGE TRUCK SPEED IS 65 MPH)

AASHTO 2001 SPECIFICATIONS

TITLE CITY OF COMMERCE CITY, COLORADO TRAFFIC STRUCTURES

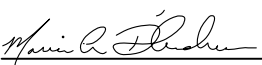
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**valmont**  
Valley, NE 68064  
(402) 359-2201

PAGE NUMBER: 3 OF 3  
DRAWING NUMBER: DB00748  
REV: B

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APPROVAL	
 CITY ENGINEER	05-27-16 DATE

 **CITY OF COMMERCE CITY**  
Department of Public Works  
8602 Rosemary St.  
Commerce City, CO 80022  
Ph: 303-289-8150

**MASTARM POLES**  
ENGINEERING CONSTRUCTION STANDARDS

DETAIL NO.	
<b>900-15C</b>	
Sheet No.	1 of 1