DOUGLAS COUNTY
COLORADO

DOUGLAS COUNTY
STANDARD SIGNAL DETAILS
UPDATED DECEMBER 2023

INDEX

INDEX OF REVISIONS

Rev	Date	Description	App
	4/02		
	4/03		
	5/18		

DOUGLAS COUNTY
COLORADO
Engineering Division
100 Third Street
Castle Rock, Colorado 80104
(303) 660-7490

TITLE SHEET

DOUGLAS COUNTY STANDARD SIGNAL DETAILS

Design	
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Checked	
Date Created	6/93
Date Modified	
Scale	N/A
Job No.	

SHEET
1
OF 24 SHEETS

GENERAL NOTES:

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH DOUGLAS COUNTY (DC) STANDARDS AND SPECIFICATIONS, THE LATEST EDITION OF THE MUTCD, AND THE PROJECT CONSTRUCTION DRAWINGS AND SPECIFICATIONS INCLUDED HEREIN. IN CASES OF OMISSION FROM DC STANDARDS AND SPECIFICATIONS, THE MOST CURRENT EDITION OF THE COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION AND THE LATEST EDITION OF THE CDOT STANDARD PLANS, M&S STANDARDS SHALL APPLY.

2. THE BID QUANTITIES OF THE PROJECT ARE THE RESULT OF A CAREFUL QUANTITY TAKEOFF BY THE PROJECT ENGINEER. THE CONTRACTOR SHALL, HOWEVER, SATISFY HIMSELF AS TO THE ACCURACY OF ALL QUANTITIES AND BRING ANY DISCREPANCIES TO THE ATTENTION OF THE PROJECT ENGINEER, IN WRITING, AT HIS EARLIEST OPPORTUNITY.

3. ALL LABOR, EQUIPMENT, INCIDENTAL MATERIAL AND WIRING NECESSARY FOR THE INSTALLATION OF TRAFFIC SIGNAL POLE, SIGNAL HEADS, CABINET MODIFICATIONS (INCLUDING SIGNAL PHASE CHANGES AND VEHICLE DETECTION MODIFICATIONS) AND OTHER DEVICES SHALL BE PROVIDED BY THE CONTRACTOR AND SHALL NOT BE PAID FOR SEPARATELY, BUT INCLUDED IN THE COST OF THE WORK.

4. THE CONTRACTOR SHALL PROVIDE MATERIAL SUBMITTALS TO DC TRAFFIC SERVICES FOR APPROVAL ON ALL EQUIPMENT PRIOR TO INSTALLATION. THE COUNTY SHALL REVIEW THE REQUIRED MATERIAL SUBMITTALS AND RETURN COMMENTS WITHIN 5 BUSINESS DAYS.

5. ALL TRAFFIC SIGNAL EQUIPMENT WILL BE MEASURED BY THE VARIOUS TYPES INSTALLED AND SHALL INCLUDE ALL INCIDENTAL MATERIALS AND WIRING NECESSARY FOR THE INSTALLATION AND OPERATION OF EACH ITEM.

6. THE UTILITY INFORMATION SHOWN ON THE SIGNAL PLANS IS APPROXIMATE ONLY AND IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. TO AVOID ANY DAMAGE TO A UTILITY, THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING THE EXACT LOCATION OF UTILITIES BEFORE COMMENCING ANY DRILLING, BORING, TRENCHING OR OTHER EXCAVATION TYPE WORK. THE CONTRACTOR SHALL CONTACT COLORADO 811 AT 811 OR 1-800-922-1987.

7. CONTRACTOR SHALL COORDINATE WITH XCEL ENERGY OR INTERMOUNTAIN RURAL ELECTRIC ASSOCIATION (IREA) TO INITIATE ELECTRICAL POWER APPLICATION PROCESS AND DETERMINE POWER SOURCE LOCATION.

8. THE POWER SOURCE SHALL BE 120/240 VOLT 60 AMP METERED SERVICE. IT SHALL INCLUDE A WEATHERPROOF METERED CIRCUIT DISCONNECT BOX. LOCATION OF METERED CIRCUIT DISCONNECT BOX TO BE DETERMINED BY DOUGLAS COUNTY ENGINEER AND SHALL NOT BE PLACED FURTHER THAN 75 FEET FROM THE SIGNAL CABINET. IF IN HIGHLANDS RANCH METRO DISTRICT (HRMD), POWER FOR LUMINAIRE AND ILLUMINATED STREET NAME SIGNS (WHERE APPLICABLE) SHALL HAVE THEIR OWN POWER SOURCE AND DISCONNECT. CONTACT 303-791-0430 FOR ACCOUNT INFORMATION.

9. IF IN HIGHLANDS RANCH, THE CONTRACTOR SHALL CONTACT HIGHLANDS RANCH PARKS AND OPEN SPACE AT 303-791-2710, AS APPROPRIATE, FOR LOCATES ON IRRIGATION LINES AND TO COORDINATE ANY REPAIRS. ☐ CHECK IF NOTE 9 IS APPLICABLE TO THIS PROJECT.

10. UPON COMPLETION OF WORK, CONTRACTOR SHALL PROVIDE RECORD AS-BUILT DRAWINGS, CORRECTED PLANS AND ANY OTHER ADDITIONAL DATA REQUIRED BY THE COUNTY.

11. TRAFFIC SIGNAL INSTALLATION AND ALL ASSOCIATED WORK SHALL BE 100% COMPLETE PRIOR TO FLASH TURN ON. THIS INCLUDES ALL PUNCH LIST ITEMS AND OPERATIONAL LUMINAIRES.

12. ALL SIGNAL POLE AND CONTROLLER CABINET LOCATIONS SHOWN IN THE PLANS ARE APPROXIMATE ONLY. ACTUAL LOCATIONS SHALL BE APPROVED IN THE FIELD BY DC TRAFFIC PRIOR TO ANY DRILLING OR EXCAVATION. THE LOCATION OF EACH SIGNAL POLE FOUNDATION SHALL BE POTHOLED, PRIOR TO DRILLING, TO VERIFY WHETHER ANY UTILITY CONFLICTS EXIST.

13. ALL NON-FUNCTIONING TRAFFIC OR PEDESTRIAN SIGNAL HEADS AND PEDESTRIAN PUSH BUTTONS SHALL BE BAGGED WHILE UNDER CONSTRUCTION. BAGS SHALL BE ORANGE PLASTIC.

14. MAST ARMS SHALL BE OF SUFFICIENT LENGTH TO ALLOW A SIGNAL HEAD TO BE MOUNTED IN THE CENTER OF THE INSIDE LEFT TURN LANE. TO ENSURE PROPER MAST ARM LENGTHS, THE CONTRACTOR SHALL FIELD VERIFY THE EXACT LOCATION OF THE POLE FOUNDATIONS WITH PROJECT AND COUNTY ENGINEERS (PRIOR TO ORDERING THE SIGNAL POLES AND MAST ARMS).

15. THE CONTRACTOR IS RESPONSIBLE FOR STORAGE AND ULTIMATE DELIVERY OF NEW TRAFFIC POLES AND MAST ARMS TO THE PROJECT SITE UNLESS OTHERWISE APPROVED BY DC TRAFFIC SERVICES.

16. ALL ELECTRICAL SYSTEMS SHALL BE PROPERLY GROUNDED IN ACCORDANCE WITH THE LATEST DC TRAFFIC SIGNAL SPECIFICATIONS AND DETAILS. A GROUND ROD SHALL BE INSTALLED FOR EACH POLE AND CONTROLLER CABINET FOUNDATION IN THE NEAREST PULL BOX PER DC TRAFFIC SIGNAL SPECIFICATIONS.

17. ALL SIGNAL CABLE IS CONTINUOUS FROM CONNECTIONS MADE IN THE HAND HOLE COMPARTMENT OF THE SIGNAL POLE BASE TO THE TERMINAL COMPARTMENT IN THE CONTROLLER CABINET. SPLICING SHALL NOT BE PERMITTED UNLESS SPECIFICALLY APPROVED BY THE DC TRAFFIC ENGINEER.

18. ALL HAND HOLE SPLICES SHALL BE BUCHANAN TYPE USING THE PRES-SURE-TOOL PART #C-24 CRIMPING TOOL AND SHALL BE STORED IN THE "UP" ORIENTATION.

19. WHENEVER MULTIPLE CABLES FEED EQUIPMENT ON A SINGLE POLE, EACH CABLE SHALL CONTAIN A NEUTRAL WIRE.

20. THE CONTRACTOR SHALL PROVIDE THE LUMINAIRE WIRING AND FINAL HOOK UP UNLESS THE PROJECT IS IN HRMD. LUMINAIRE FIXTURE SHALL BE APPROVED LED TYPE. EXISTING STREET LIGHTS SHALL NOT BE REMOVED UNTIL NEW LUMINARIES ARE OPERATIONAL. ☐ CHECK IF PROJECT IS IN HRMD.

HOLE AT THE BASE OF THE SIGNAL POLE (NO OVERHEAD SPLICES). A SEPARATE 25 CONDUCTOR CABLE SHALL RUN FROM THE CONTROLLER CABINET TO THE TRAFFIC POLE HAND HOLE WITH NO SPLICES. WIRING SHALL BE LANDED AND LABELED IN ACCORDANCE WITH THE LATEST DC TRAFFIC SIGNAL SPECIFICATIONS AND DETAILS.

22. EACH VEHICLE SIGNAL HEAD ON MAST ARMS SHALL HAVE A LOUVERED ALUMINUM BACKPLATE, BLACK IN COLOR, WITH 2 INCH FLUORESCENT YELLOW, DIAMOND GRADE RETROREFLECTIVE BORDER.

23. SIGNAL HEAD HOUSINGS SHALL BE POLYCARBONATE AND BLACK IN COLOR. MAST ARM MOUNTED SIGNAL HEADS AND SIGNS SHALL USE PELCO ASTRO-BRAC OR SKY-BRAC TYPE MOUNTING BRACKETS.

24. ALL VEHICLE AND PEDESTRIAN INDICATIONS SHALL BE APPROVED SOLID STATE LED TYPE. ALL VEHICLE INDICATIONS SHALL BE 12-INCH. ALL PEDESTRIAN INDICATIONS SHALL BE 16-INCH WITH A COUNTDOWN TIMER.

25. EACH APPROACH SHALL INCLUDE OPTICOM DETECTION IN ACCORDANCE WITH LATEST DC TRAFFIC SIGNAL SPECIFICATIONS. CHECK IF NOTE 25 IS APPLICABLE TO THIS PROJECT.

26. THE CONTROLLER CABINETS SHALL BE IN ACCORDANCE WITH THE LATEST DC TRAFFIC SIGNAL SPECIFICATIONS AND DETAILS. THE CONTROLLER CABINET SHALL BE INSTALLED SUCH THAT, WITH THE FRONT DOOR OPEN, A TECHNICIAN CAN VIEW BOTH THE CONTROLLER AND THE SIGNAL OPERATIONS. CABINET BASE SHALL BE APPROVED POLYMER CONCRETE.

27. THE TRAFFIC SIGNAL CONTROLLER SHALL BE IN ACCORDANCE WITH THE LATEST DC TRAFFIC SIGNAL SPECIFICATIONS WITH FIRMWARE COMPATIBLE WITH SIGNAL SYSTEM SOFTWARE. CONFLICT MONITOR PROVIDED SHALL BE IN ACCORDANCE WITH THE LATEST DC TRAFFIC SIGNAL SPECIFICATIONS.

28. AN UNINTERRUPTABLE POWER SOURCE (UPS) SHALL BE INSTALLED IN THE CONTROLLER CABINET. THE UPS SHALL BE IN ACCORDANCE WITH THE LATEST DC TRAFFIC SIGNAL SPECIFICATIONS.

29. COMMUNICATION AND ALL INTERCONNECT EQUIPMENT INSTALLED INSIDE AND OUTSIDE THE CONTROLLER CABINET SHALL BE IN ACCORDANCE WITH THE LATEST DC TRAFFIC SIGNAL SPECIFICATIONS.

30. THE TRAFFIC SIGNAL CABINET, CONTROLLER AND ALL ANCILLARY CABINET EQUIPMENT NEEDED TO PROVIDE PLANNED SIGNAL OPERATIONS SHALL BE DELIVERED TO DOUGLAS COUNTY TRAFFIC OPERATIONS FOR INSPECTION, PROGRAMMING AND TESTING. A MAXIMUM OF 15 BUSINESS DAYS SHALL BE ALLOWED PRIOR TO SUBSEQUENT PICKUP BY CONTRACTOR. ANY CABINET, CONTROLLER OR OTHER EQUIPMENT ERRORS WILL RESULT IN A RETURN OF THE CABINET ASSEMBLY TO CONTRACTOR AND A RESTART OF 15 BUSINESS DAYS FOR REINSPECTION, PROGRAMMING AND TESTING UPON SUBSEQUENT DELIVERY.

31. All PULL BOXES AND CONDUIT SHALL BE IN ACCORDANCE WITH THE LATEST DC TRAFFIC SIGNAL SPECIFICATIONS. ALL MULTIPLE CONDUIT RUNS SHALL BE INSTALLED IN A COMMON BORE OR TRENCH. A CONTINUOUS LENGTH OF BORE PIPE IS REQUIRED FOR COMMUNICATION RUNS BETWEEN PULL BOXES AND FOR UNDER ROADWAY CONDUIT RUNS.

32. ALL CONDUIT SHALL HAVE PULL TAPE IN ACCORDANCE WITH THE LATEST DC TRAFFIC SIGNAL SPECIFICATIONS LEFT INSIDE CONDUIT WHEN CONSTRUCTION IS COMPLETED.

33. ALL INTERCONNECT CONDUIT TO INCLUDE A #14 AWG SOLID COPPER WIRE WITH AN ORANGE HDPE SHEATH, IN ACCORDANCE WITH THE LATEST DC TRAFFIC SIGNAL SPECIFICATIONS, THROUGH ENTIRE RUN TO FACILITATE FUTURE LOCATING.

34. CONTRACTOR SHALL INSTALL COUNTY PROVIDED DELINEATORS OR UTILITY MARKERS AS DIRECTED ON ALL PULL BOXES. COST OF INSTALLATION SHALL BE INCLUDED IN THE COST OF THE PULL BOX.

35. WHEN FIBER INTERCONNECT IS BEING INSTALLED, A MINIMUM OF 100 FEET SHALL BE COILED IN EACH COMMUNICATION VAULT, A MINIMUM OF 50 FEET IN EACH PULL BOX AND A MINIMUM OF 10 FEET IN THE CONTROLLER CABINET. ☐ CHECK IF NOTE 35 IS APPLICABLE TO THIS PROJECT.

36. VEHICLE DETECTION AND ASSOCIATED HARDWARE SHALL BE IN ACCORDANCE WITH THE LATEST DC TRAFFIC SIGNAL SPECIFICATIONS. STOP BAR DETECTION SHALL BE PROVIDED FOR ALL APPROACHES AND ADVANCE DETECTION AS SPECIFIED IN DESIGN PLANS.

37. CONTRACTOR SHALL COORDINATE WITH VEHICLE DETECTION MANUFACTURER REPRESENTATIVE TO DETERMINE FINAL PLACEMENT AND ORIENTATION OF DETECTION. VEHICLE DETECTION REPRESENTATIVE SHALL BE PRESENT FOR DETECTION SET UP AND INITIAL OPERATION.

38. THE CONTRACTOR SHALL INSTALL ACCESSIBLE PEDESTRIAN PUSH BUTTONS, PEDESTRIAN SIGNAGE AND ASSOCIATED RACK MOUNTED EQUIPMENT AND WIRING IN ACCORDANCE WITH THE LATEST DC TRAFFIC SIGNAL SPECIFICATIONS. ☐ CHECK IF NOTE 38 IS APPLICABLE TO THIS PROJECT.

39. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL STRIPING WITH DOUGLAS COUNTY ENGINEER PRIOR TO REMOVAL AND INSTALLATION. CONTACT DOUGLAS COUNTY ENGINEER TO COORDINATE.

40. APPROPRIATE REGULATORY SIGNS, STREET NAME SIGNS, WARNING SIGNS AND PAVEMENT MARKINGS (ARROWS, SYMBOLS, ETC.), APPROVED BY DOUGLAS COUNTY, SHALL BE IN PLACE PRIOR TO SIGNAL OPERATION.

41. STRIPING AND MARKING LEGENDS MAY BE SUBJECT TO MATERIALS CHANGES DUE TO SEASON AND OR WEATHER. TEMPORARY STRIPING MAY BE REQUIRED. FINAL SPECIFIED MATERIALS SHALL BE INSTALLED WHEN WEATHER/SEASON ALLOWS AS APPROVED BY DC TRAFFIC SERVICES.

42. FOR ALL DESIGN OR CONSTRUCTION INQUIRIES CONTACT DOUGLAS COUNTY ENGINEER, 303-660-6237. FOR 24 HOUR EMERGENCY AND NON EMERGENCY, CONTACT DOUGLAS COUNTY TRAFFIC AT 303-660-6254.

DOUGLAS COUNTY STANDARD NOTES:

1. THE DOUGLAS COUNTY PUBLIC WORKS DIRECTOR SIGNATURE AFFIXED TO THIS DOCUMENT INDICATES THE ENGINEERING DIVISION HAS REVIEWED THE DOCUMENT AND FOUND IT IN GENERAL CONFORMANCE WITH THE DOUGLAS COUNTY ROADWAY DESIGN AND CONSTRUCTION STANDARDS AND THE DOUGLAS COUNTY SUBDIVISION RESOLUTION OR ACCEPTED VARIANCES TO THOSE REGULATIONS. THE DOUGLAS COUNTY PUBLIC WORKS DIRECTOR, THROUGH ACCEPTANCE OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY, OTHER THAN STATED ABOVE, FOR THE COMPLETENESS AND/OR ACCURACY OF THESE DOCUMENTS. THE OWNER AND ENGINEER UNDERSTAND THAT THE RESPONSIBILITY FOR THE ENGINEERING ADEQUACY OF THE FACILITIES DEPICTED IN THIS DOCUMENT LIES SOLELY WITH THE PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF COLORADO WHOSE STAMP AND SIGNATURE IS AFFIXED TO THIS DOCUMENT.

2. ALL CONSTRUCTION SHALL CONFORM TO DOUGLAS COUNTY STANDARDS. ANY CONSTRUCTION NOT SPECIFICALLY ADDRESSED BY THESE PLANS AND SPECIFICATIONS WILL BE BUILT IN COMPLIANCE WITH THE LATEST EDITION OF THE MOST STRINGENT OF THE FOLLOWING:
   - THE DOUGLAS COUNTY ROADWAY DESIGN AND CONSTRUCTION STANDARDS
   - THE COLORADO DEPARTMENT OF HIGHWAYS STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION
   - THE COLORADO DEPARTMENT OF TRANSPORTATION M STANDARDS

3. ALL MATERIALS AND WORKMANSHIP SHALL BE SUBJECT TO INSPECTION BY THE DOUGLAS COUNTY ENGINEERING DIVISION AS APPLICABLE. THE COUNTY RESERVES THE RIGHT TO ACCEPT OR REJECT ANY SUCH MATERIALS AND WORKMANSHIP THAT DOES NOT CONFORM TO ITS STANDARDS AND SPECIFICATIONS.

4. THE CONTRACTOR SHALL NOTIFY THE DOUGLAS COUNTY ENGINEERING INSPECTION DIVISION, 303-660-7487, A MINIMUM OF 24-HOURS AND A MAXIMUM OF 72-HOURS PRIOR TO STARTING CONSTRUCTION. CONTRACTOR SHALL NOTIFY DOUGLAS COUNTY ENGINEERING INSPECTION DIVISION WHEN WORKING OUTSIDE OF THE PUBLIC RIGHT-OF-WAY ON ANY FACILITY THAT WILL BE CONVEYED TO THE COUNTY, URBAN DRAINAGE & FLOOD CONTROL DISTRICT, OR OTHER SPECIAL DISTRICT FOR MAINTENANCE (STORM SEWER, ENERGY DISSIPATERS, DETENTION OUTLET STRUCTURES, OR OTHER DRAINAGE INFRASTRUCTURES). FAILURE TO NOTIFY THE ENGINEERING INSPECTION DIVISION TO ALLOW THEM TO INSPECT THE CONSTRUCTION MAY RESULT IN NON-ACCEPTANCE OF THE FACILITY/INFRASTRUCTURE BY THE COUNTY AND/OR URBAN DRAINAGE.

5. CONSTRUCTION WILL NOT BEGIN UNTIL ALL APPLICABLE PERMITS HAVE BEEN ISSUED. IF A DOUGLAS COUNTY ENGINEERING INSPECTOR IS NOT AVAILABLE AFTER PROPER NOTICE OF CONSTRUCTION ACTIVITY HAS BEEN PROVIDED, THE PERMITTEE MAY COMMENCE WORK IN THE INSPECTOR'S ABSENCE. HOWEVER, DOUGLAS COUNTY RESERVES THE RIGHT NOT TO ACCEPT THE IMPROVEMENT IF SUBSEQUENT TESTING REVEALS AN IMPROPER INSTALLATION.

6. THE LOCATION OF EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO ACTUAL CONSTRUCTION. FOR INFORMATION CONTACT COLORADO 811 AT 811 OR 1-800-922-1987

7. THE CONTRACTOR SHALL HAVE ONE (1) COPY OF THE PLANS SIGNED BY THE DOUGLAS COUNTY PUBLIC WORKS DIRECTOR, ONE (1) COPY OF THE ROADWAY DESIGN AND CONSTRUCTION STANDARDS, AS AMENDED, AND ALL APPLICABLE PERMITS AT THE JOB SITE AT ALL TIMES.

8. A TRAFFIC CONTROL PLAN, IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, SHALL BE SUBMITTED TO DOUGLAS COUNTY FOR ACCEPTANCE WITH THE RIGHT-OF-WAY USE AND CONSTRUCTION PERMIT APPLICATION. A RIGHT-OF-WAY USE AND CONSTRUCTION PERMIT WILL NOT BE ISSUED WITHOUT AN ACCEPTED TRAFFIC CONTROL PLAN FOR TRAFFIC CONTROL DURING CONSTRUCTION.

9. THE CONSTRUCTION PLANS SHALL BE CONSIDERED VALID FOR THREE (3) YEARS FROM THE DATE OF COUNTY ACCEPTANCE, AFTER WHICH TIME THESE PLANS SHALL BE VOID AND WILL BE SUBJECT TO RE-REVIEW AND RE-ACCEPTANCE BY DOUGLAS COUNTY.

10. DOUGLAS COUNTY STANDARD DETAILS SHALL NOT BE MODIFIED. ANY NON-STANDARD DETAILS WILL BE CLEARLY IDENTIFIED AS SUCH.

11. STANDARD DOUGLAS COUNTY HANDICAP RAMPS ARE TO BE CONSTRUCTED AT ALL CURB RETURNS AND AT MID-BLOCK LOCATIONS OPPOSITE OF ONE OF THE CURB RETURNS OF ALL "T" INTERSECTIONS AS IDENTIFIED ON THESE PLANS.

12. THE PROFESSIONAL ENGINEER, REGISTERED IN THE STATE OF COLORADO, SIGNING THESE PLANS IS RESPONSIBLE FOR ENSURING THAT THE DETAILS INCLUDED ARE COMPATIBLE WITH THE STANDARD DOUGLAS COUNTY DETAILS CONTAINED IN THE LATEST VERSIONS OF THE CRITERIA MANUALS. THIS INCLUDES, BUT IS NOT LIMITED TO:
   - DOUGLAS COUNTY ROADWAY DESIGN AND CONSTRUCTION STANDARDS
   - DOUGLAS COUNTY STORM DRAINAGE DESIGN AND TECHNICAL CRITERIA
   - DOUGLAS COUNTY GRADING, EROSION AND SEDIMENT CONTROL CRITERIA
   - CDOT M & S STANDARDS
   - MUTCD
   - URBAN STORM DRAINAGE CRITERIA MANUAL VOLUMES 1,2 & 3

13. A TEMPORARY CONSTRUCTION ACCESS PERMIT FROM DOUGLAS COUNTY MAY BE REQUIRED FOR ANY PROJECT.

INDEX OF REVISIONS

Rev	Description	Date	App
		4/02	
		4/03	
		2/18	

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COLORADO

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Castle Rock, Colorado 80104
(303) 660-7490

GENERAL NOTES

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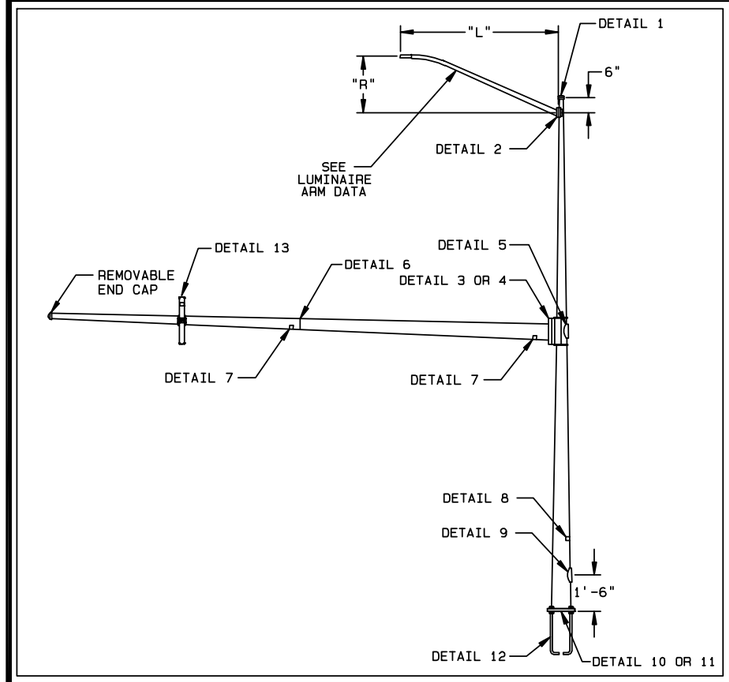
SHEET
2
OF 24 SHEETS



MATERIAL DATA		
COMPONENT	ASTM DESIGNATION	MIN. YIELD (KSI)
TAPERED TUBES	A595 GR.A OR A572	55
POLE BASE	A572 GR.50	50
SIGNAL ARM ATTACHMENT	A572 GR.50	50
SIGNAL ARM CONN.BOLTS	F3125 GR.A325	
LUM. ARM CONN. BOLTS	SAE GR.5	
LUM. ARM ATTACHMENT	A36	36
ANCHOR BOLTS	F1554 GR.55	55
GALVANIZING HARDWARE	F2329	

FINISH DATA	
SYSTEM:	CUSTOMER SPECIFIED
BASE COAT:	HOT-DIP GALVANIZED TO ASTM A123
PRIME COAT:	HIGH BUILD EPOXY POWDER
FINISH COAT:	TGIC POWDER
COLOR:	SEMI-GLOSS BLACK
SPEC:	F-540K

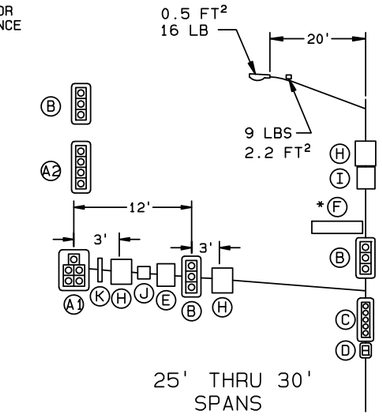
DESIGN CRITERIA:

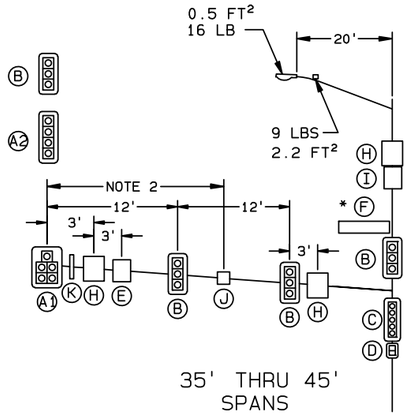
THE SIGNAL MAST ARM TRAFFIC STRUCTURES SHOWN ON THIS DRAWING HAVE BEEN DESIGNED IN ACCORDANCE WITH THE LOADING AND NOMINAL STRENGTH REQUIREMENTS OF THE 2015 AASHTO "LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS, FIRST EDITION" SLTS-1 INCLUDING LATEST INTERIMS. THE WIND LOADS WERE CALCULATED FROM AN ULTIMATE WIND VELOCITY OF 130MPH WITH A MEAN RECURRENCE INTERVAL OF 1700 YEARS AND AN EFFECTIVE PERFORMANCE TESTED MITIGATION DEVICE APPROVED BY DOUGLAS COUNTY ALLOWING FOR A FATIGUE CATEGORY OF II. THE FATIGUE LOADS WERE CALCULATED ON THE REQUIREMENTS OF SECTION 11 OF THE CODE, AND THE FOLLOWING

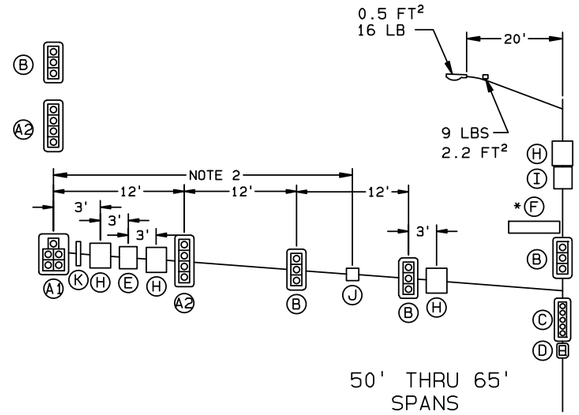
DESIGN CONDITIONS:

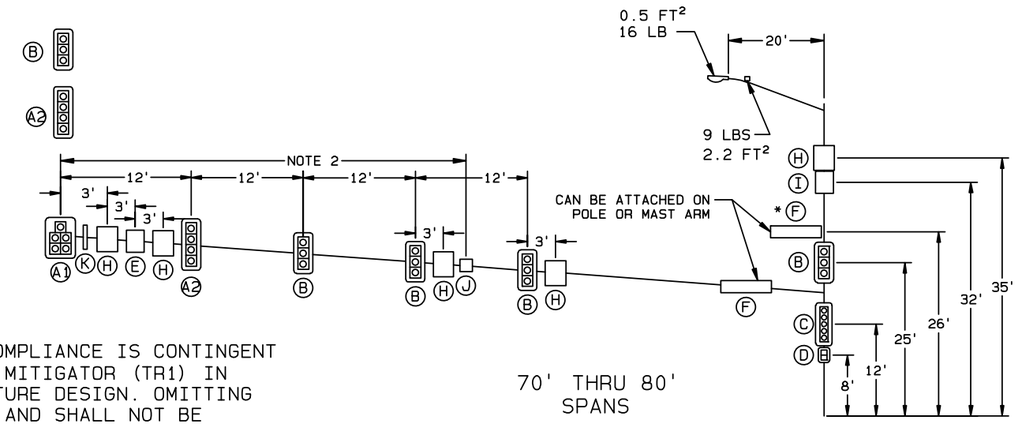
- STRUCTURES ARE DESIGNED TO RESIST NATURAL WIND GUSTS BASED ON THE YEARLY MEAN WIND VELOCITY OF 11.2 MPH.
- STRUCTURES ARE NOT DESIGNED TO RESIST GALLOPING-INDUCED CYCLIC LOADS DUE TO THE USE OF EFFECTIVE MITIGATION DEVICE.
- STRUCTURES ARE DESIGNED FOR TRUCK-INDUCED GUST LOADS, AS REQUIRED BY THE OWNER OF THE STRUCTURES.

*SIGN "F" CAN BE PLACED ON POLE AS SHOWN OR ON THE SIGNAL MAST ARM AT A MAXIMUM DISTANCE OF 6'-6" FROM THE POLE.









THIS DRAWINGS AASHTO CODE COMPLIANCE IS CONTINGENT ON THE MANDATORY USE OF THE MITIGATOR (TR1) IN CONJUNCTION WITH THIS STRUCTURE DESIGN. OMITTING SUCH DEVICE, VOIDS PE STAMP AND SHALL NOT BE CONSIDERED TO MEET AASHTO.

DEVICE	DESCRIPTION	PROJECTED AREA (FT^2)	WEIGHT (LBS)
A1	12"-5 SEC. SIGNAL WITH BACKPLATE (STACKED)	12.46	47.00
A2	12"-4 SEC. SIGNAL WITH BACKPLATE (VERTICAL)	10.22	57.00
B	12"-3 SEC. SIGNAL WITH BACKPLATE (VERTICAL)	8.15	45.00
C	12"-5 SEC. SIGNAL WITH BACKPLATE (VERTICAL)	13.81	65.00
D	DUAL-2 SEC.-PEDESTRIAN	8.00	80.00
E	30" X 36" REGULATORY SIGN	7.50	20.00
F	24" X 144" BACK TO BACK STREET NAME SIGNS	24.00	90.00
G	24" X 30" REGULATORY SIGN	5.00	17.00
H	36" X 36" REGULATORY SIGN	9.00	22.00
I	18" X 30" REGULATORY SIGN	3.75	15.00
J	RADAR DETECTION	1.65	8.00
K	TR1 MITIGATOR DEVICE	1.20	38

NOTE:
1. END OF ARM SIGNALS A2 AND B ARE ALTERNATE SIGNALS,DESIGN IS BASED ON A1 SIGNAL LOADING.
2. RADAR DETECTION TO BE CENTERED ON MAST ARM.

MAXIMUM LOADING INFORMATION

REV	DRAWN BY-DATE	CHECK BY-DATE	DESCRIPTION
F	RDS9 08/15/22	RDS9 08/15/22	ADDED AASHTO TR1 COMPLIANCE NOTE
E	RDS9 05/26/21	RDS9 05/26/21	CHANGED DESIGN NUMBERS FROM 01 TO 15
D	RDS9 03/25/21	RDS9 03/25/21	ADDED ANCHOR BOLT QTY AND 6-BOLT RADIAL
—	KP6 02/18/19	DJ7 02/25/19	— — — — — — — — — — — — — — — —

TITLE: DOUGLAS COUNTY, COLORADO
TRAFFIC SIGNAL STRUCTURES
2015 AASHTO DESIGN

valmont
Valley,NE 68064
(402) 359-2201

PAGE NUMBER: 1 OF 5
DRAWING NUMBER: TK01277
REV: F

Rev	Date	Description	App
	4/02		
	4/03		
	5/18	Valmont Industries Updates	
	9/18		

INDEX OF REVISIONS

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MAST ARM AND SIGNAL HEADS

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SHEET 3 OF 24 SHEETS

POLE DATA

ITEM	DESIGN NUMBER	SINGLE ARM SPAN (FT)	POLE BASE	ANCHOR BOLT				
			BOLT CIRCLE "Y" (IN)	ANCHOR BOLT QUANTITY	DIA. "K" (IN)	LENGTH "J" (IN)	HOOK "H" (IN)	THREAD LENGTH "U" (IN)
DOUG	115	25.00	22.00	4	2.25	89.00	7.00	12.00
DOUG	115	30.00	22.00	4	2.25	89.00	7.00	12.00
DOUG	215	35.00	22.00	4	2.25	89.00	7.00	12.00
DOUG	215	40.00	22.00	4	2.25	89.00	7.00	12.00
DOUG	215	45.00	22.00	4	2.25	89.00	7.00	12.00
DOUG	315	50.00	27.50	4	2.25	89.00	7.00	12.00
DOUG	315	55.00	27.50	4	2.25	89.00	7.00	12.00
DOUG	315	60.00	27.50	4	2.25	89.00	7.00	12.00
DOUG	315	65.00	27.50	4	2.25	89.00	7.00	12.00
DOUG	415	70.00	26.50	6	2.25	89.00	7.00	12.00
DOUG	415	75.00	26.50	6	2.25	89.00	7.00	12.00
DOUG	415	80.00	26.50	6	2.25	89.00	7.00	12.00

LUMINAIRE ARM DATA

ARM SPAN "L" (FT)	RISE HEIGHT "R"
20.00	1'-6"

INDEX OF REVISIONS

Rev	Date	Description	App
	4/02		
	4/03		
	5/18	Valmont Industries Updates	
	9/18		

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(303) 660-7490

MAST ARM AND SIGNAL HEADS

DOUGLAS COUNTY STANDARD SIGNAL DETAILS

TITLE
DOUGLAS COUNTY, COLORADO
TRAFFIC SIGNAL STRUCTURES
2015 AASHTO DESIGN

valmont
Valley,NE 68064
(402) 359-2201

PAGE NUMBER: 2 OF 5

DRAWING NUMBER: TK01277

REV: F

Design
Drawn
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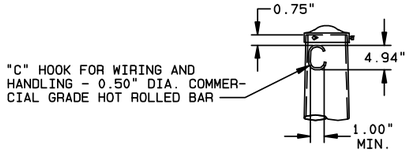
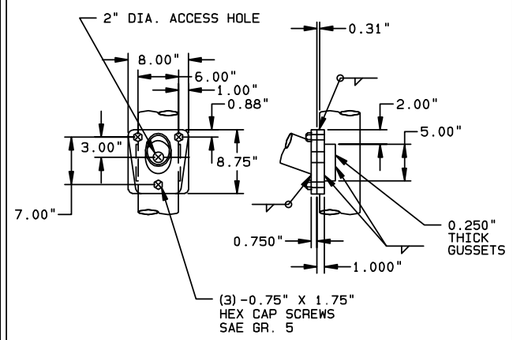
Date Created 6/93
Date Modified
Scale N/A
Job No.

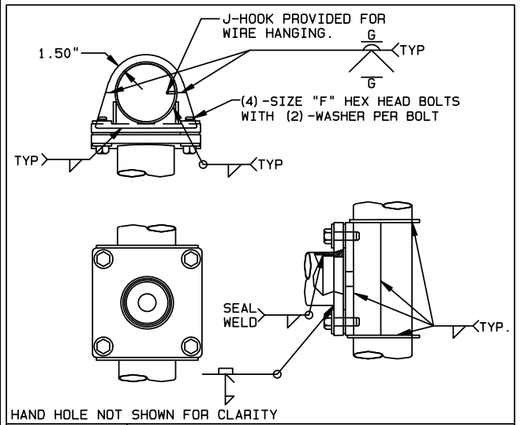
SHEET
4
OF 24 SHEETS



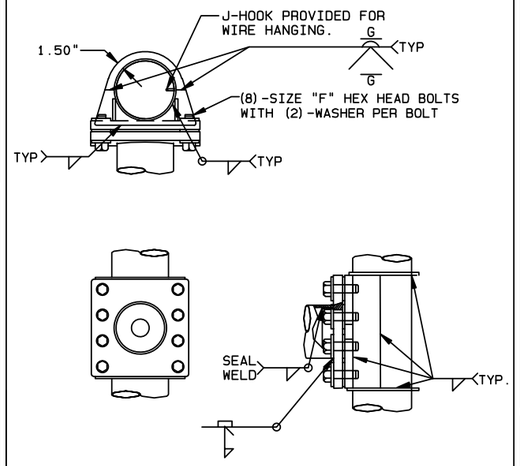
DETAIL 1 | POLE TOP



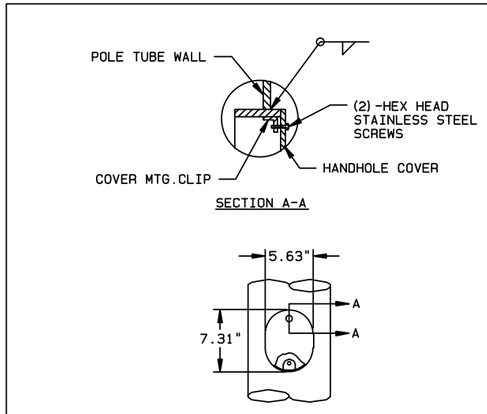
DETAIL 2 | LUMINAIRE ARM ATTACHMENT



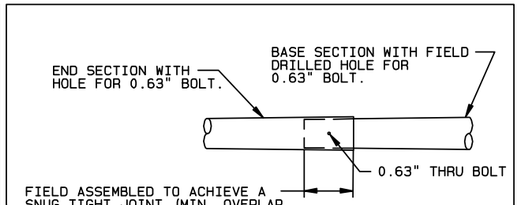
DETAIL 3 | DOUG 115-315 SIGNAL ARM ATTACH.



DETAIL 4 | DOUG 415 SIGNAL ARM ATTACHMENT

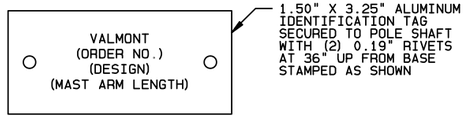


DETAIL 5 | UPPER HANDHOLE

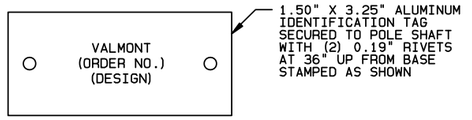


SPAN	BASE SECTION	END SECTION	
	LENGTH	LENGTH	GAUGE
55'	15.97'	41.72'	7
60'	21.33'	41.37'	7
65'	26.68'	41.01'	7
70'	28.47'	44.22'	7
75'	32.04'	45.65'	7
80'	37.40'	45.30'	7

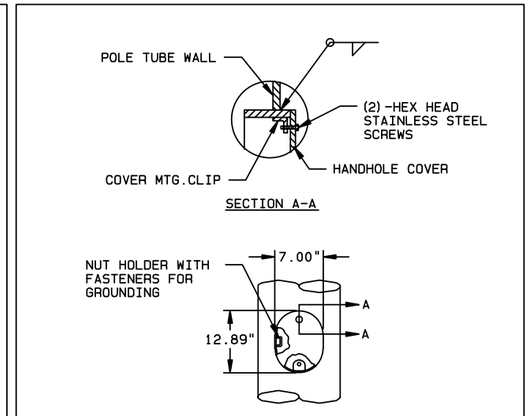
DETAIL 6 | SIGNAL ARM SLIP JOINT



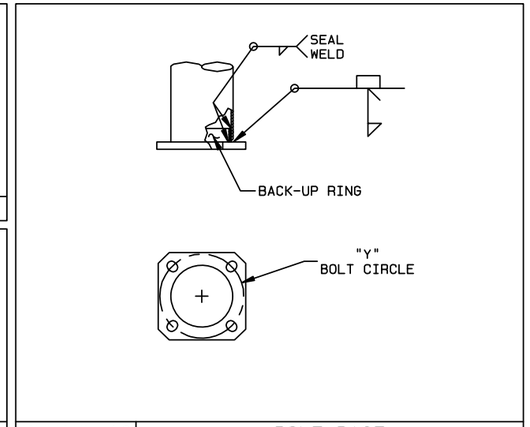
DETAIL 7 | MAST ARM I.D. TAG



DETAIL 8 | POLE I.D. TAG



DETAIL 9 | LOWER HANDHOLE



DETAIL 10 | POLE BASE

INDEX OF REVISIONS

Rev	Date	Description	App
	4/02	Valmont Industries Updates	
	4/03		
	5/18		
	9/18		

DOUGLAS COUNTY COLORADO
Engineering Division
100 Third Street
Castle Rock, Colorado 80104
(303) 660-7490

MAST ARM ATTACHMENT AND POLE BASE

DOUGLAS COUNTY STANDARD SIGNAL DETAILS

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2015 AASHTO DESIGN

valmont
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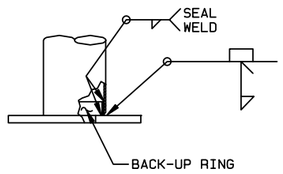
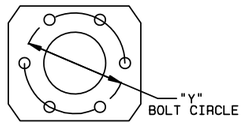
Job No.

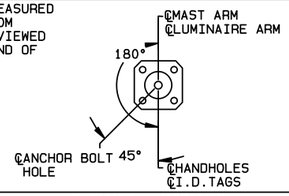
SHEET 5 OF 24 SHEETS





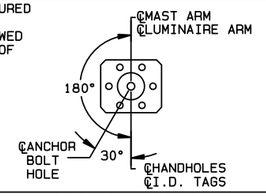
DETAIL 11 | POLE BASE

ALL ANGLES MEASURED CLOCKWISE FROM HANDHOLE AS VIEWED FROM SMALL END OF POLE



RADIAL INDEX

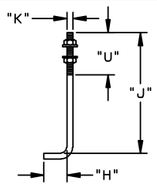
ALL ANGLES MEASURED CLOCKWISE FROM HANDHOLE AS VIEWED FROM SMALL END OF POLE



RADIAL INDEX

(4) OR (6) -ANCHOR BOLTS WITH (2) HEX NUTS AND (2) WASHERS PER BOLT WITH THREADED END GALVANIZED AT LEAST 12.00".

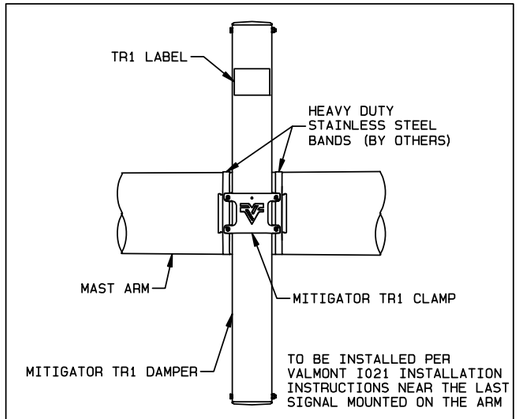
SEE POLE DATA TABLE FOR DIMENSIONS



DETAIL 12 | ANCHOR BOLT

ALTHOUGH RARE, VIBRATIONS SEVERE ENOUGH TO CAUSE DAMAGE CAN OCCASIONALLY OCCUR IN STRUCTURES OF ALL TYPES. BECAUSE THEY ARE INFLUENCED BY MANY INTERACTING VARIABLES, VIBRATIONS ARE GENERALLY UNPREDICTABLE. THE USER'S MAINTENANCE PROGRAM SHOULD INCLUDE OBSERVATION FOR EXCESSIVE VIBRATION AND EXAMINATION FOR ANY STRUCTURAL DAMAGE OR BOLT LOOSENING. THE VALMONT WARRANTY SPECIFICALLY EXCLUDES FATIGUE FAILURE OR SIMILAR PHENOMENA RESULTING FROM INDUCED VIBRATION, HARMONIC OSCILLATION OR RESONANCE ASSOCIATED WITH MOVEMENT OF AIR CURRENTS AROUND THE PRODUCT.

VIBRATION DISCLAIMER



DETAIL 13 | TR1 MITIGATOR

INDEX OF REVISIONS

Rev	Date	Description	App
	4/02		
	4/03		
	5/18	Valmont Industries Updates	
	9/18		

DOUGLAS COUNTY COLORADO
Engineering Division
100 Third Street
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MAST ARM ATTACHMENT AND POLE BASE

DOUGLAS COUNTY STANDARD SIGNAL DETAILS

Design	
Drawn	
Checked	
Date Created	6/93
Date Modified	
Scale	N/A
Job No.	

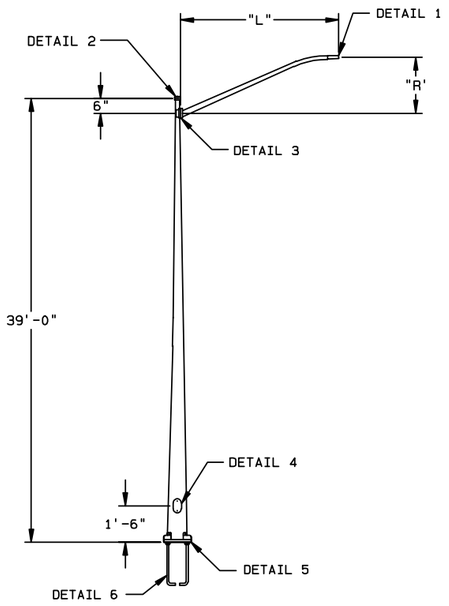
SHEET 6 OF 24 SHEETS

TITLE
DOUGLAS COUNTY, COLORADO
LIGHTING STRUCTURES
2015 AASHTO DESIGN

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

valmont
Valley,NE 68064
(402) 359-2201

PAGE NUMBER: 4 OF 5
DRAWING NUMBER TK01277
REV F



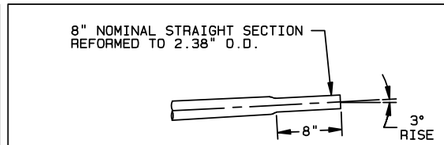
MATERIAL DATA		
COMPONENT	ASTM DESIGNATION	MIN. YIELD (KSI)
TAPERED TUBES	A595 GR.A OR A572	55
POLE BASE	A572 GR.50	50
ANCHOR BOLTS	F1554 GR.55	55
GALVANIZING HARDWARE	HOT DIP ZINC	55
GUSSETS	A36	36
LUM. ARM CONN. BOLTS	SAE GR.5	--
LUM. ARM ATTACHMENT	A36	36

FINISH DATA

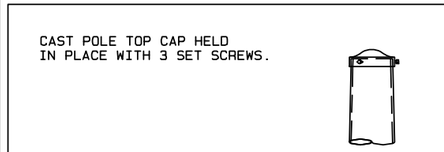
SYSTEM: CUSTOMER SPECIFIED
BASE COAT: HOT-DIP GALVANIZED TO ASTM A123
PRIME COAT: HIGH BUILD EPOXY POWDER
FINISH COAT: TGIC POWDER
COLOR: SEMI-GLOSS BLACK
SPEC: F-540K

POLE DATA						
		POLE BASE	ANCHOR BOLT			
ITEM	DESIGN NUMBER	BOLT CIRCLE "Y" (IN)	DIA. "K" (IN)	LENGTH "J" (IN)	HOOK "H" (IN)	THREAD LENGTH "U" (IN)
DOUG	01	15.00	1.50	54.00	6.00	8.00

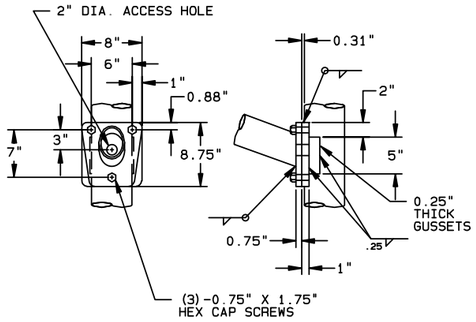
LUMINAIRE ARM DATA	
ARM SPAN "L" (FT)	RISE HEIGHT "R"
20.00	1'-6"



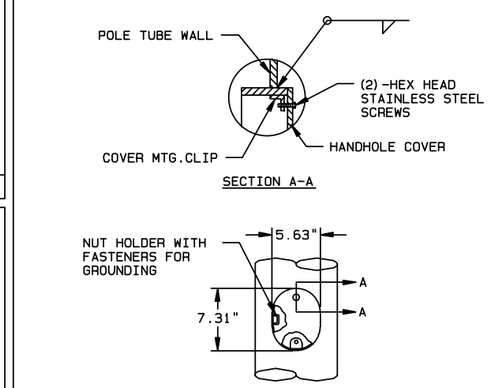
DETAIL 1 ARM END



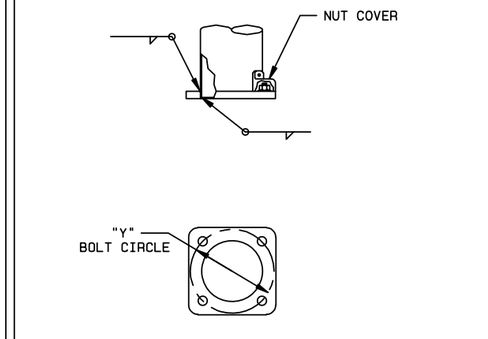
DETAIL 2 POLE TOP



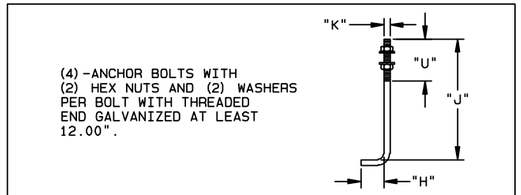
DETAIL 3 LUMINAIRE ARM ATTACHMENT



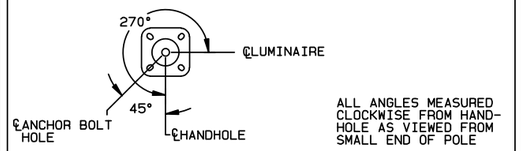
DETAIL 4 HANDHOLE



DETAIL 5 POLE BASE



DETAIL 6 ANCHOR BOLT



RADIAL INDEX

Rev	Date	INDEX OF REVISIONS Description	App
	4/02		
	4/03		
	5/18	Valmont Industries Updates	
	9/18		

DOUGLAS COUNTY COLORADO
Engineering Division
100 Third Street
Castle Rock, Colorado 80104
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LUMINAIRE POLE

DOUGLAS COUNTY STANDARD SIGNAL DETAILS

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PAGE NUMBER: 5 OF 5
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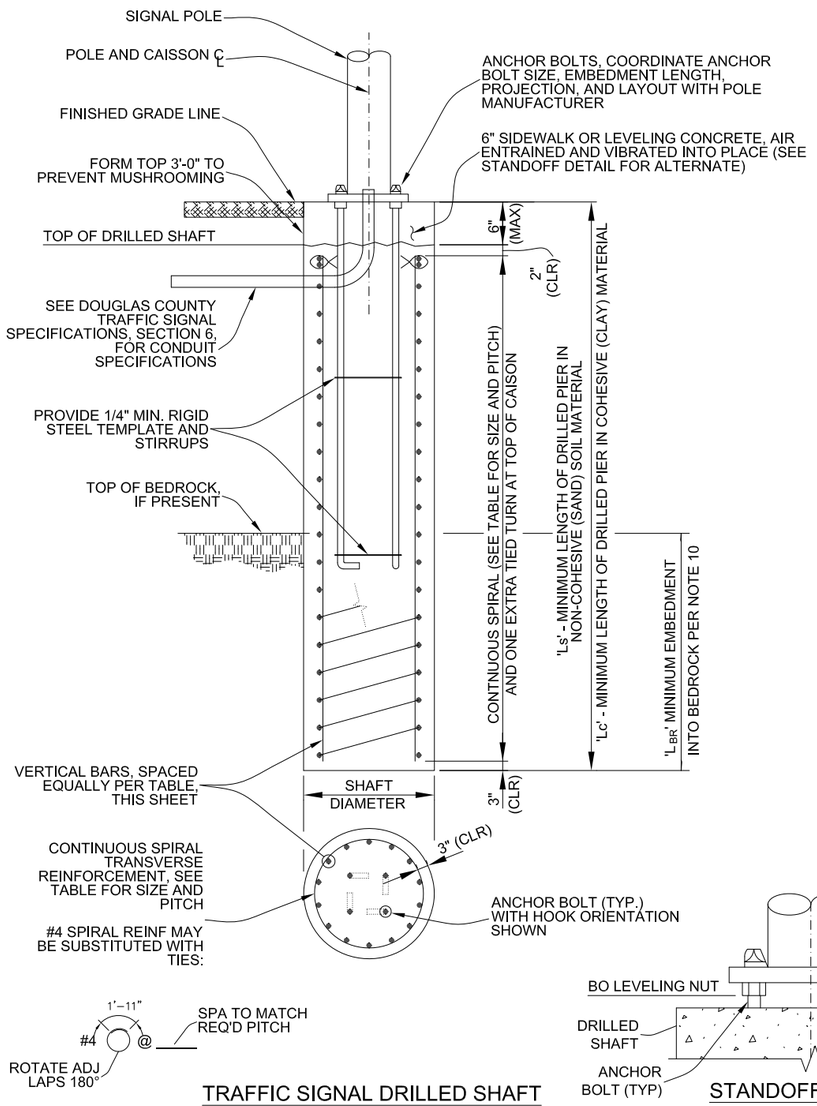
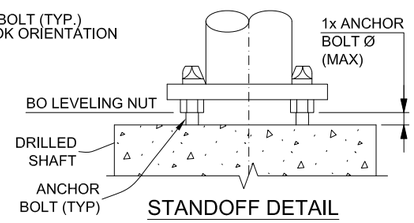
Job No.

SHEET 7 OF 24 SHEETS



TRAFFIC SIGNAL DRILLED SHAFT



STANDOFF DETAIL

(WHEN SIDEWALK / LEVELING CONCRETE IS NOT PRESENT)

CONCRETE MIXTURE NOTES:

1. CONCRETE FOR DRILLED SHAFTS SHALL BE AIR ENTRAINED CDOT CLASS BZ (f'c = 4,000 psi, CDOT STANDARD SPECIFICATIONS SECTION 601.02) UNLESS OTHERWISE APPROVED BY THE ENGINEER.
2. THE MAXIMUM COARSE AGGREGATE SIZE (D_{100}) SHALL BE 3/8" (AASHTO M 43 #8 AGGREGATE).
3. A MINIMUM SLUMP OF 6" SHALL BE MAINTAINED DURING PLACEMENT.

NOTES:

1. BUNDLED BARS ARE DENOTED THUS: ⊗
2. THE DESIGNS PRESENTED HEREIN ASSUME THE SIGNALS ARE INSTALLED WITHIN THE ROADWAY EARTHWORK PRISM WITH THE FOLLOWING SOIL PARAMETERS:
   NON-COHESIVE (SAND) SOIL:
   SOIL DENSITY γ = 110lbs./CU. FT. SOIL ϕ ANGLE = 28° FOR MEDIUM DENSE COHESIONLESS SOIL

   COHESIVE (CLAY) SOIL:
   SOIL DENSITY γ = 110 lbs./CU. FT. SOIL COHESION c = 750 lbs./SQ FT

   UNWEATHERED SANDSTONE BEDROCK:
   BEDROCK DENSITY γ = 130 lbs./CU. FT. BEDROCK COHESION c = 6,000 lbs./SQ. FT.
3. CONTACT THE ENGINEER IF ANY OF THE FOLLOWING CONDITION ARE ENCOUNTERED DURING DRILLING:

   (A) SIGNALS WILL NOT BE INSTALLED WITHIN THE ROADWAY EARTHWORK PRISM.
   (B) THE SOIL HAS A HIGH ORGANIC CONTENT OR CONSISTS OF A SATURATED SILT OR CLAY.
   (C) THE SITE WONT SUPPORT THE WEIGHT OF THE DRILLING RIG.
   (D) THE FOUNDATION SOILS ARE NOT HOMOGENEOUS.
   (E) HIGH GROUNDWATER IS ENCOUNTERED.
   (F) LARGE BOULDERS ARE ENCOUNTERED.
4. GEOTECHNICAL ENGINEER SHALL BE PRESENT FULL TIME AT SITE DURING PIER DRILLING FOR PIER SHAFT OBSERVATION AND INSPECTION WHEN SOIL CONDITIONS WARRANT THEIR PRESENCE.
5. PIER HOLES SHALL BE PROPERLY CLEANED PRIOR TO PLACEMENT OF CONCRETE. DRILLED PIER HOLES SHALL BE CLEAR OF EXCESS DIRT AND WATER. IF GROUNDWATER IS PRESENT UNDER 3', IT SHOULD BE PUMPED OUT PRIOR TO PLACING CONCRETE.
6. TESTING AGENCY SHALL BE USED TO SAMPLE AND TEST CONCRETE BEING PLACED ON SITE TO VERIFY CORRECT MIX, SLUMP AND DESIGN STRENGTH.
7. CONCRETE SHALL BE PLACED IN HOLE FULL HEIGHT SAME DAY OF DRILLING WITH NO CONSTRUCTION JOINTS.
8. TREMIE METHOD OF CONCRETE PLACEMENT SHALL BE USED IF MORE THAN 3' OF WATER IS PRESENT AT BOTTOM OF PIER.
9. DRILLED SHAFT LENGTH 'Ls' AND 'Lc' IS THE MINIMUM REQUIREMENT AND INCLUDES 2'-0" OF MATERIAL DISCOUNTED FOR DESIGN AT TOP OF SHAFT. IF SOIL MATERIAL IS LOOSE FILL DEEPER THAN 2'-0", DRILLED PIER LENGTH SHALL BE EXTENDED BY EQUIVALENT DEPTH.
10. IF HARD SANDSTONE BEDROCK IS ENCOUNTERED, MINIMUM LENGTH IN BEDROCK 'L_{BR}' SHALL BE PROVIDED.
11. REINFORCING STEEL SHALL CONFORM TO ASTM A615/A615M, GRADE 60 DEFORMED.
12. NO SPLICING OF VERTICAL REINFORCEMENT IS PERMITTED, EXCEPT AS APPROVED BY THE ENGINEER.
13. DRILLED SHAFTS SHALL BE PLACED AGAINST UNDISTURBED EARTH, WET OR CAVING HOLES SHALL BE BACKFILLED WITH FLOW-FILL AND REDRILLED AFTER A THREE DAY CURING PERIOD. USE OF TEMPORARY CASING SHALL BE APPROVED BY THE ENGINEER. PERMANENT CASING IS NOT PERMITTED.
14. IF SLOPING GROUND IS ENCOUNTERED WITHIN 3 DIAMETERS OF THE CENTER OF DRILLED PIER, THE "SLOPED CONDITION DRILLED PIER SCHEDULE" SHALL BE USED FOR DESIGN.

SLOPED CONDITION DRILLED PIER SCHEDULE

DC DWG	POLE SERIES/TYPE	NEW MAST ARM LENGTH [ft]	SHAFT DIAMETER [in]	SHAFT LENGTH		REINFORCING	
				L_S [ft]	L_C [ft]	VERTICAL	TRANSVERSE
TK01277	DOUG 115	25 - 30	36	27'-0"	27'-0"	(13) #8	#4 @ 8" PITCH
	DOUG 215	35 - 45	42	27'-0"	27'-0"	(17) #8	#4 @ 6" PITCH

SLOPED CONDITION NOTES:

1. TABLE MAY BE USED WHEN SLOPING GROUND IS WITHIN 3 DIAMETERS OF THE CENTER OF DRILLED PIER. THE SLOPE SHALL NOT EXCEED A 2:1.
2. SPECIAL DESIGN IS REQUIRED FOR DOUG 315/415 DESIGN NUMBERS WHEN SLOPING GROUND CONDITION IS PRESENT.

NEW MAST ARM DRILLED PIER SCHEDULE

DC DWG	POLE SERIES/TYPE	NEW MAST ARM LENGTH [ft]	SHAFT DIAMETER [in]	SHAFT LENGTH			REINFORCING		DESIGN SERVICE LOADS			
				L_S [ft]	L_C [ft]	L_{BR} [ft]	VERTICAL	TRANSVERSE	AXIAL [lbs]	SHEAR [lbs]	TORSION [lb-ft]	MOMENT [lb-ft]
TK01277	DOUG 115	25 - 30	36	15'-0"	20'-0"	9'-6"	(13) #8	#4 @ 8" PITCH	2,749	2,745	19,804	68,921
	DOUG 215	35 - 45	42	15'-0"	20'-0"	9'-6"	(17) #8	#4 @ 6" PITCH	3,412	2,762	23,833	85,234
	DOUG 315	50 - 65	42	16'-0"	22'-0"	11'-6"	(19) #8	#4 @ 6" PITCH	6,464	3,298	72,428	98,181
	DOUG 415	70 - 80	42	17'-6"	25'-6"	12'-0"	(21) #8	#4 @ 4 3/4" PITCH	6,549	3,898	107,139	143,529

Know what's below. Call before you dig.

INDEX OF REVISIONS

Rev	Date	Description	App

DOUGLAS COUNTY COLORADO
Engineering Division
100 Third Street
Castle Rock, Colorado 80104
(303) 660-7490

MAST ARM POLE FOOTINGS (20' THROUGH 80')

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Design	-
Drawn	-
Checked	-
Date Created	6/93
Date Modified	-
Scale	N/A
Job No.	-

SHEET 8 OF 24 SHEETS

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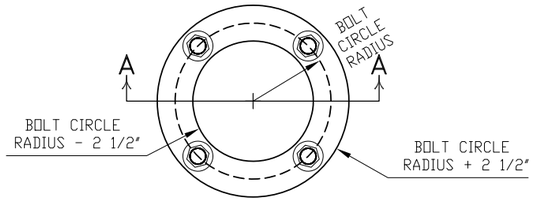
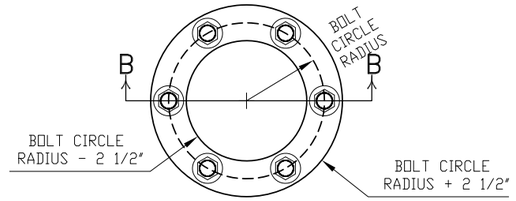
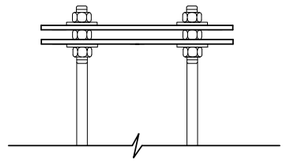
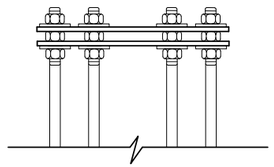






SECTION A–A

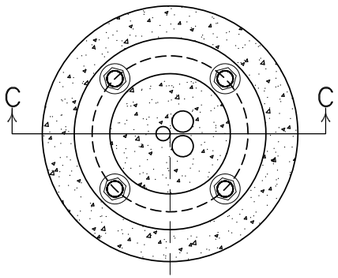


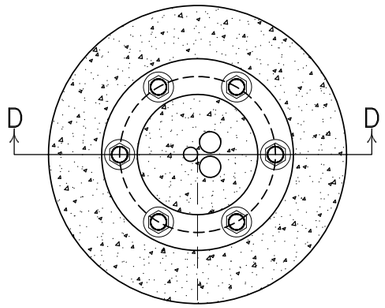
SECTION B–B

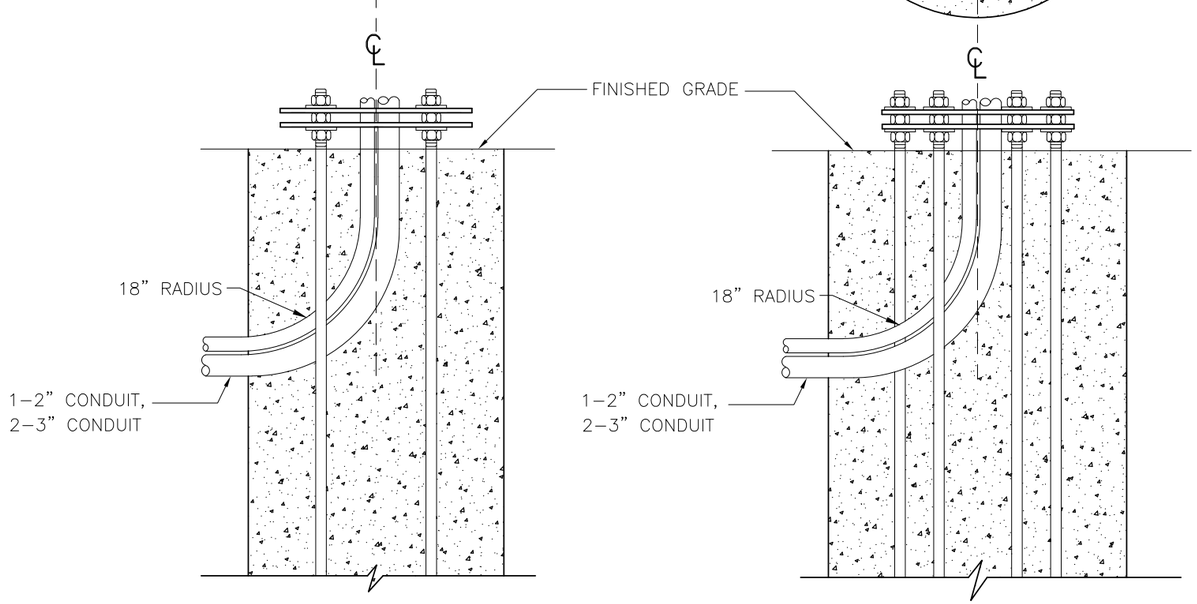
ANCHOR BOLT TEMPLATE NOTES

1. THE ANCHOR BOLTS SHALL BE SET WITH TWO STEEL TEMPLATES UNTIL THE CONCRETE HAS CURED AT LEAST TWO DAYS.
2. THE ANCHOR BOLT TEMPLATE SHALL BE A MINIMUM OF 3/8" THICKNESS.

ANCHOR BOLT TEMPLATE DETAIL







SECTION C–C

SECTION D–D

CAISSON CONDUIT NOTES

1. THE CONDUITS SHALL BE SET A MINIMUM OF 30" BELOW THE FINISHED GRADE.
2. THE CONDUITS SHALL BE SET TO EXTEND A MINIMUM OF 6" ON THE SIDE OF THE CAISSON AND EXTEND A MINIMUM OF 3" ABOVE THE FINISHED GRADE.
3. THE CONDUITS SHALL BE PLACED IN THE CENTER OF THE CAISSON

CAISSON CONDUIT DETAIL

INDEX OF REVISIONS

Rev	Date	Description	App
	4/02		
	4/03		
	5/18		

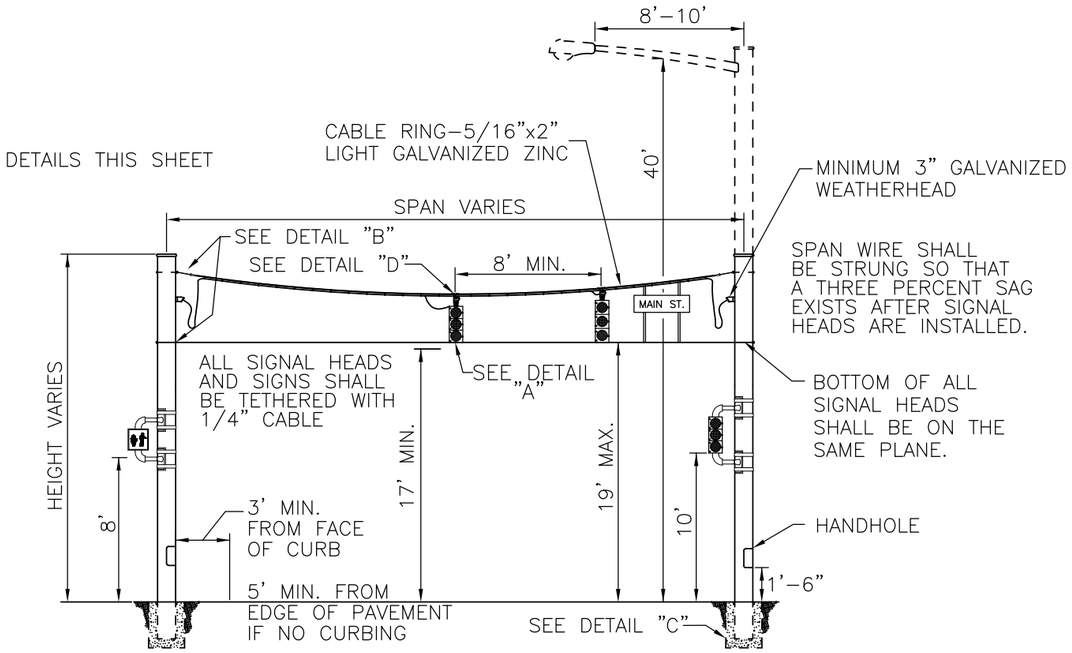
DOUGLAS COUNTY
COLORADO
Engineering Division
100 Third Street
Castle Rock, Colorado 80104
(303) 660-7490

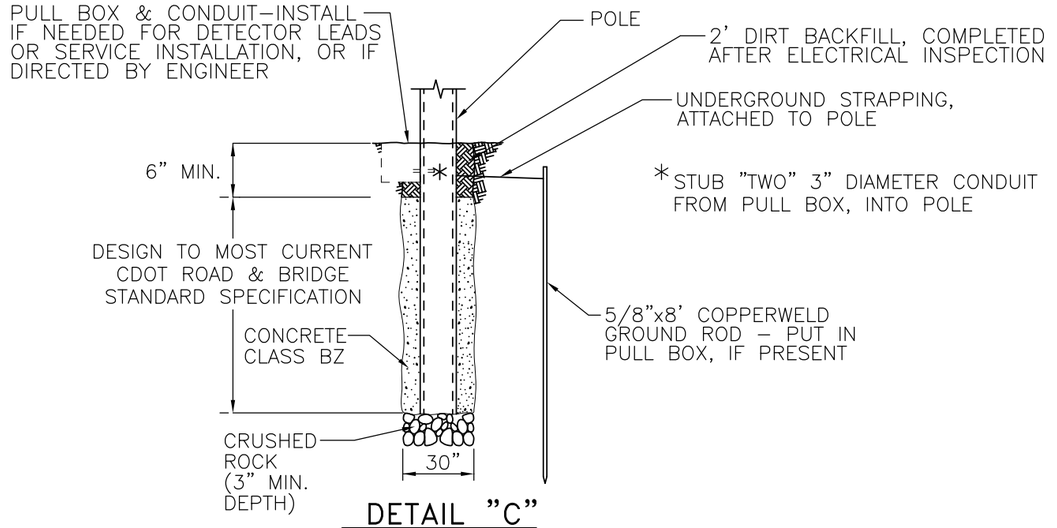
ANCHOR BOLT TEMPLATE AND CAISSON CONDUIT DETAIL

DOUGLAS COUNTY STANDARD SIGNAL DETAILS

Design	
Drawn	
Checked	
Date Created	6/93
Date Modified	
Scale	N/A
Job No.	

SHEET
9
OF 24 SHEETS

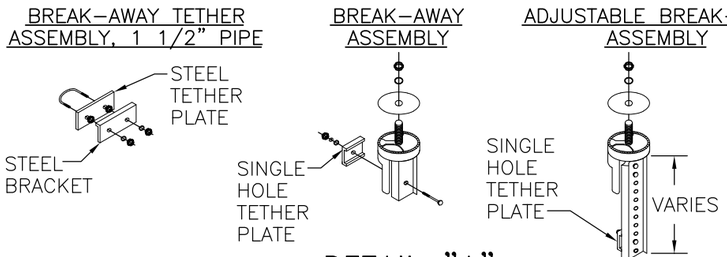




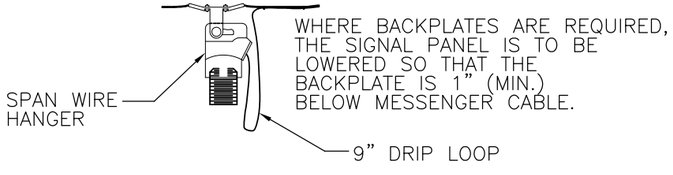
DETAIL "C"
TYPICAL TRAFFIC SIGNAL SPAN WIRE POLE FOOTING (CAST IN PLACE)

GENERAL NOTES

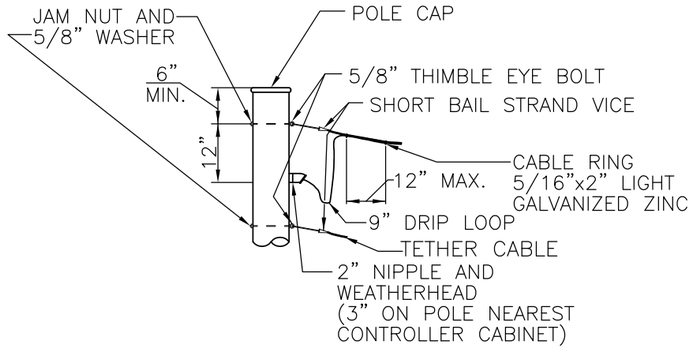
1. SPAN WIRE POLES SHALL BE FINISHED PER DOUGLAS COUNTY'S PAINT SPECIFICATION OR APPROVED EQUAL.
2. DESIGN CRITERIA SHALL MEET LATEST CDOT ROAD & BRIDGE STANDARD SPECIFICATIONS..
3. SPAN WIRE SIGNAL HEADS SHALL HAVE ONE POWER FEED WIRE IN AND OUT PER HEAD. CONNECTIONS SHALL BE MADE ONLY ON THE SIGNAL HEAD TERMINALS, WITH NO EXTERNAL SPLICES.
4. ALL SIGNAL INDICATIONS SHALL BE WIRED INDEPENDENTLY AND TERMINATED IN THE HANDHOLE WITH NO EXTERNAL SPLICES,



DETAIL "A"
TETHERING OPTIONS



DETAIL "D"
TYPICAL SPAN WIRE MOUNTING



DETAIL "B"
TYPICAL CABLE AND TETHER 1NSTALLATION

TEMPORARY SPAN WIRE POLE DETAIL
(FOR SPECIAL USE, WITH PRIOR APPROVAL OF COUNTY ONLY)

INDEX OF REVISIONS

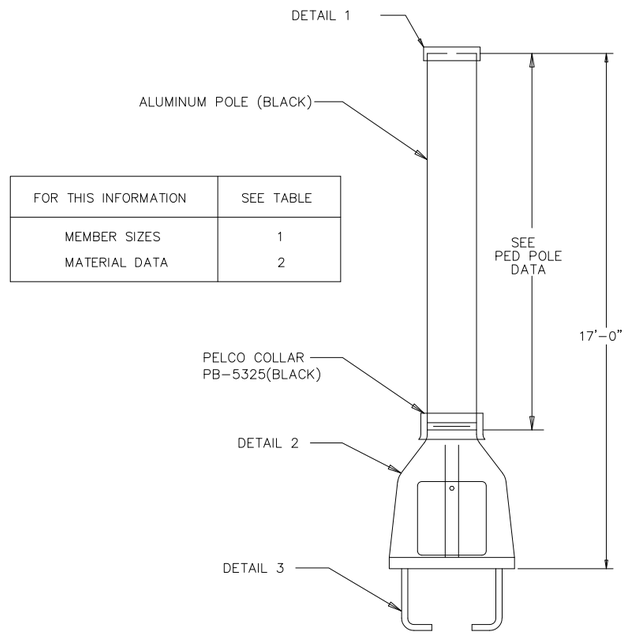
Rev	Date	Description	App
	4/02		
	4/03		
	5/18		

DOUGLAS COUNTY COLORADO
Engineering Division
100 Third Street
Castle Rock, Colorado 80104
(303) 660-7490

TEMPORARY SPAN WIRE POLE

DOUGLAS COUNTY STANDARD SIGNAL DETAILS

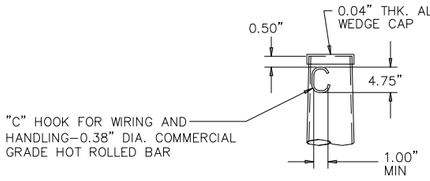
Design	
Drawn	
Checked	
Date Created	6/93
Date Modified	
Scale	N/A
Job No.	



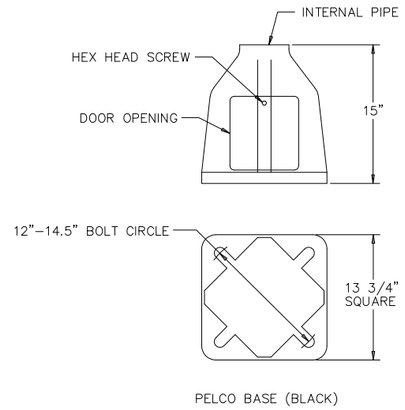
FOR THIS INFORMATION	SEE TABLE
MEMBER SIZES	1
MATERIAL DATA	2

DETAILS THIS SHEET

DOUG POLE SERIES

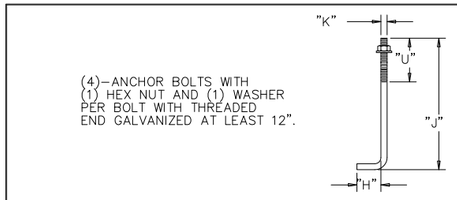


DETAIL 1 — POLE TOP



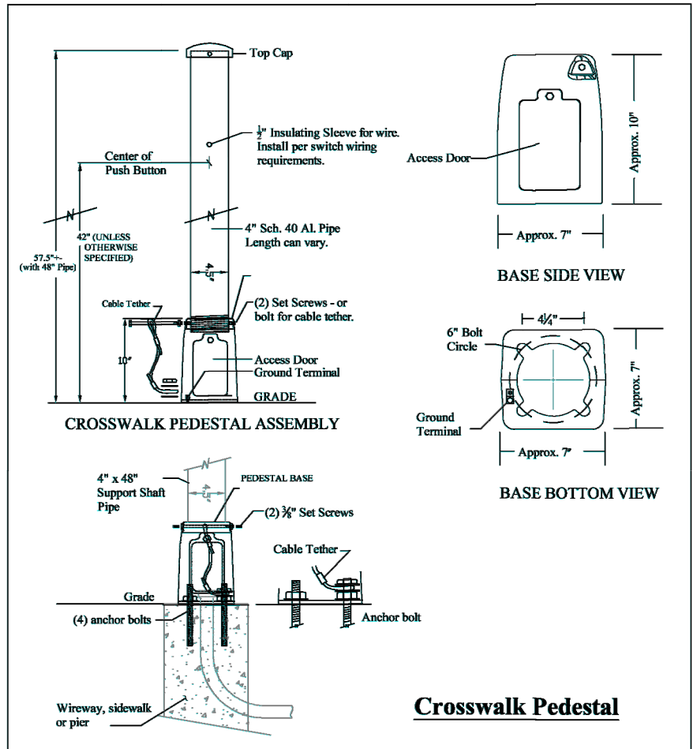
PELCO BASE (BLACK)

DETAIL 2 — PELCO BASE



(4)-ANCHOR BOLTS WITH (1) HEX NUT AND (1) WASHER PER BOLT WITH THREADED END GALVANIZED AT LEAST 12".

DETAIL 3 — ANCHOR BOLT



NOT TO SCALE — HARDWARE MEETS OR EXCEEDS STATE SPECIFICATIONS

FREY Manufacturing Corp. www.FreyMfgCorp.com Made in USA Phone: 952-467-4402

CROSSWALK PEDESTAL Generic Installation	DATE	DWG. NO.	REV.
	06-30-20	8.3.0	R1

DETAIL 4 — ALTERNATIVE PEDESTRIAN PUSH BUTTON POLE

TABLE 1: POLE SCHEDULE

DESIGNATION		POLE DATA					ANCHOR BOLT DATA			
POLE SERIES	POLE TYPE	BASE DIA. (IN)	TOP DIA. (IN)	LENGTH (FT)	THICK (IN)	BASE TYPE	DIA. "K" (IN)	LENGTH "J" (IN)	HOOK "H" (IN)	THREAD LENGTH "U" (IN)
PELCO	AL	4.50	4.50	15.83	0.337	PELCO	0.75	18	3	7

TABLE 2: MATERIAL DATA

COMPONENT	DESIGNATION	MIN. YIELD (KSI)
4" NOMINAL ALUM. SCH. 80 PIPE	ASTM B249 (BLACK)	35
ALUM. PELCO BASE	PB-5334(BLACK)	
ANCHOR BOLTS	AASHTO M314 GR.55	55

STRUCTURE FINISH
BLACK (PELCO SPECIFICATION 3099)

INDEX OF REVISIONS

Rev	Description	Date	App
		4/02	
		4/03	
		5/18	

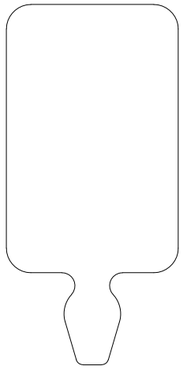
DOUGLAS COUNTY COLORADO
Engineering Division
100 Third Street
Castle Rock, Colorado 80104
(303) 660-7490

PEDESTRIAN POLE

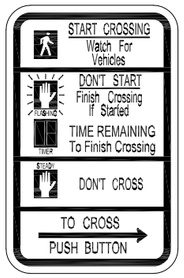
DOUGLAS COUNTY STANDARD SIGNAL DETAILS

Design	
Drawn	
Checked	
Date Created	6/93
Date Modified	
Scale	N/A
Job No.	

SHEET
11
OF 24 SHEETS



POLARA iNS23TN1Y
STANDARD PEDESTRIAN STATION



R10–3e L or R
(9"x15")

WHEN MOUNTING (2) PEDESTRIAN PUSH BUTTON ASSEMBLIES ON A 4.5" O.D. PEDESTRIAN POLE, APPROVED STAND–OFF MOUNTING BRACKETS (POLARA iNSPA4X2–B OR EQUIVALENT) SHALL BE USED TO ACCOMMODATE THE 9"x15" PEDESTRIAN SIGNAGE

TYPICAL PEDESTRIAN PUSH–BUTTON STATION AND SIGN

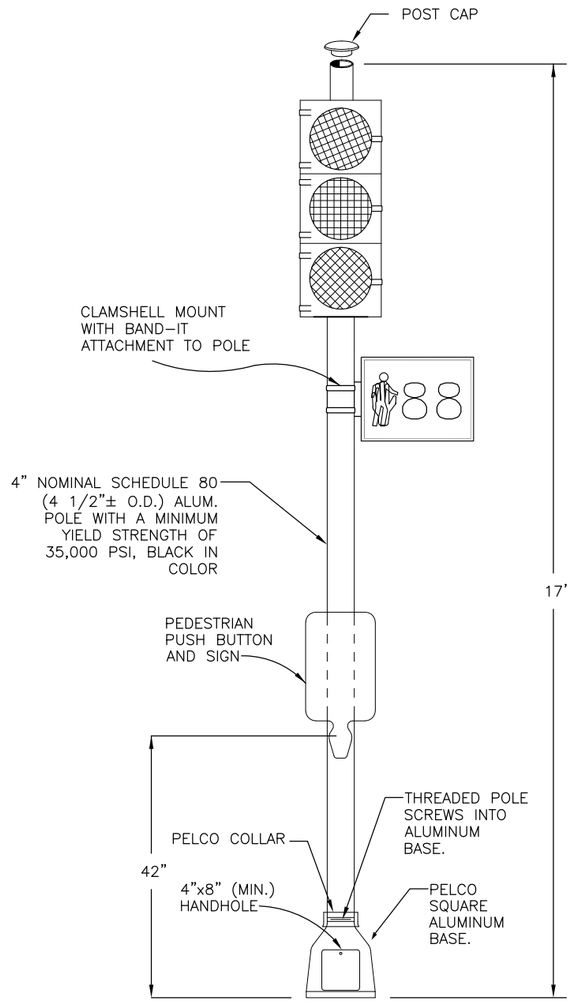
SIGNS SHALL BE MOUNTED SQUARE TO POLE.

FINISH REQUIREMENTS

ALL PEDESTRIAN PUSH BUTTON AND PEDESTAL POLES SHALL BE FACTORY FINISHED (BLACK)

PEDESTRIAN PUSH BUTTON POLE

SHALL BE ALUMINUM (BLACK) ON PELCO BASE (BLACK) OR FREY BASE (BLACK) AS NOTED ON PLANS



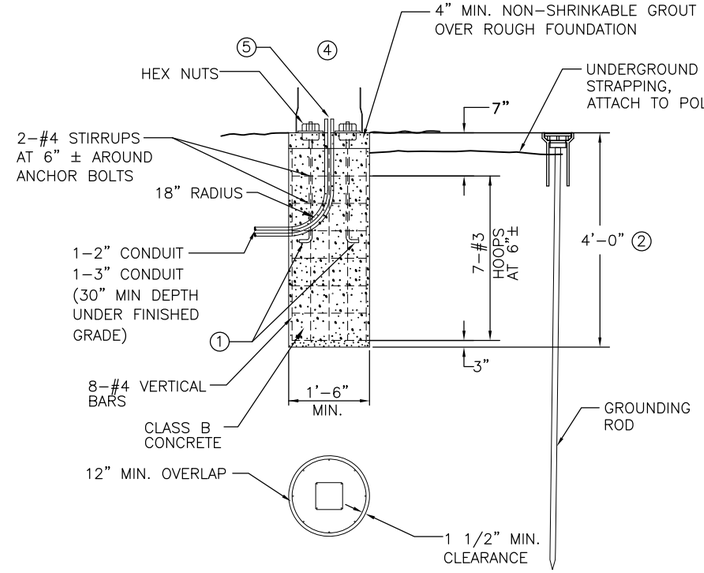
TYPICAL PEDESTAL POLE DETAIL

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.

SHALL BE ALUMINUM (BLACK) ON PELCO BASE (BLACK)

FOOTING NOTES

1. ANCHOR BOLTS (FURNISHED WITH POLE) PER MANUFACTURER'S TEMPLATE.
2. THESE DESIGNS REQUIRE THAT THE FOOTING BE FOUNDED IN COMPACT SAND, CLAY OR SANDY CLAY, AND BE LOCATED ABOVE THE WATER TABLE. IF, BY VISUAL INSPECTION OF THE HOLE OTHER MATERIAL IS PRESENT, THE FOUNDATION DESIGN MAY NEED TO BE MODIFIED.
3. 5/8"x8' COPPERWELD GROUND ROD THROUGH GROUND, OR DRIVEN IN ADJACENT PULL BOX AND BONDED TO POLE WITH UNDERGROUND STRAPPING.
4. HANDHOLE SHALL BE PROVIDED.
5. 3" MINIMUM CONDUIT HEIGHT ABOVE FOUNDATION.



TYPICAL PEDESTAL POLE FOOTING

(CAST IN PLACE)

INDEX OF REVISIONS

Rev	Date	Description	App
	4/02		
	4/03		
	5/18		

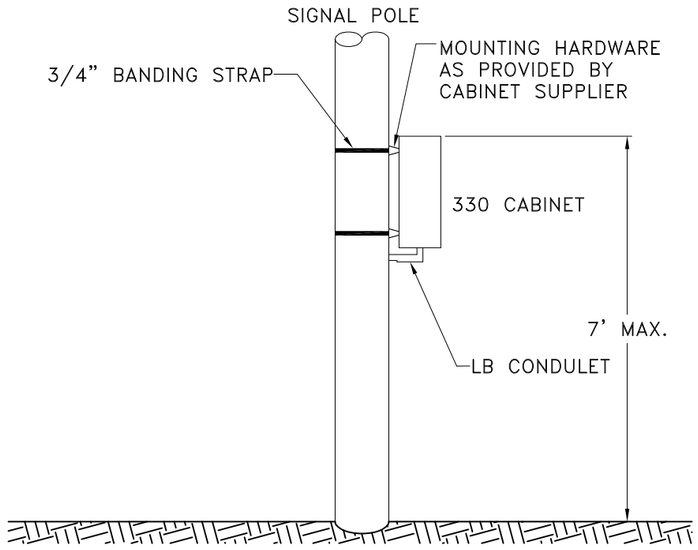
DOUGLAS COUNTY
COLORADO
Engineering Division
100 Third Street
Castle Rock, Colorado 80104
(303) 660–7490

PEDESTRIAN PUSH BUTTON POLE
PEDESTAL POLE

DOUGLAS COUNTY STANDARD SIGNAL DETAILS

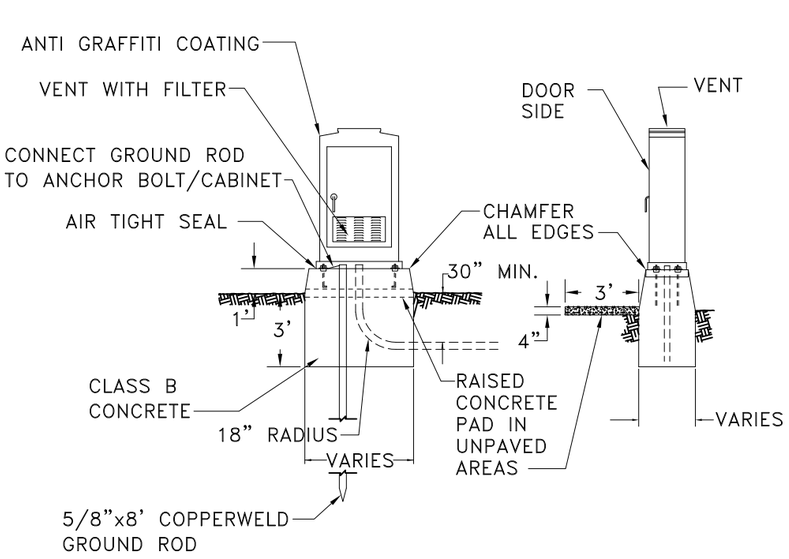
Design	
Drawn	
Checked	
Date Created	6/93
Date Modified	
Scale	N/A
Job No.	

SHEET
12
OF 24 SHEETS



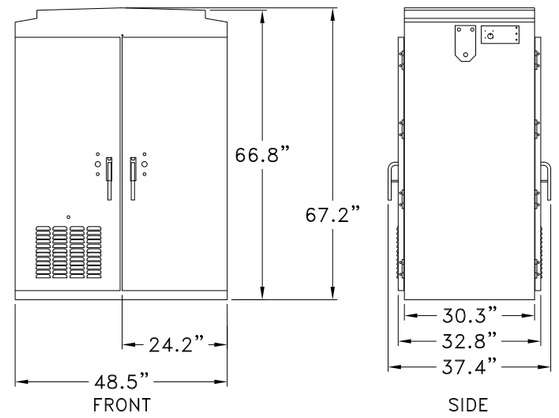
TYPICAL SIDE-OF-POLE MOUNTED CONTROLLER CABINET

(FOR SPECIAL USE, WITH PRIOR APPROVAL OF COUNTY ONLY)

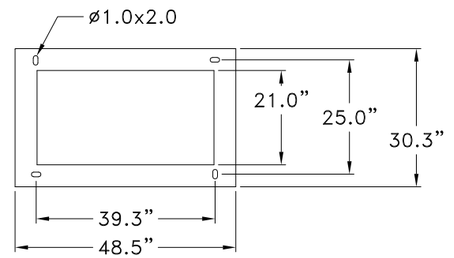


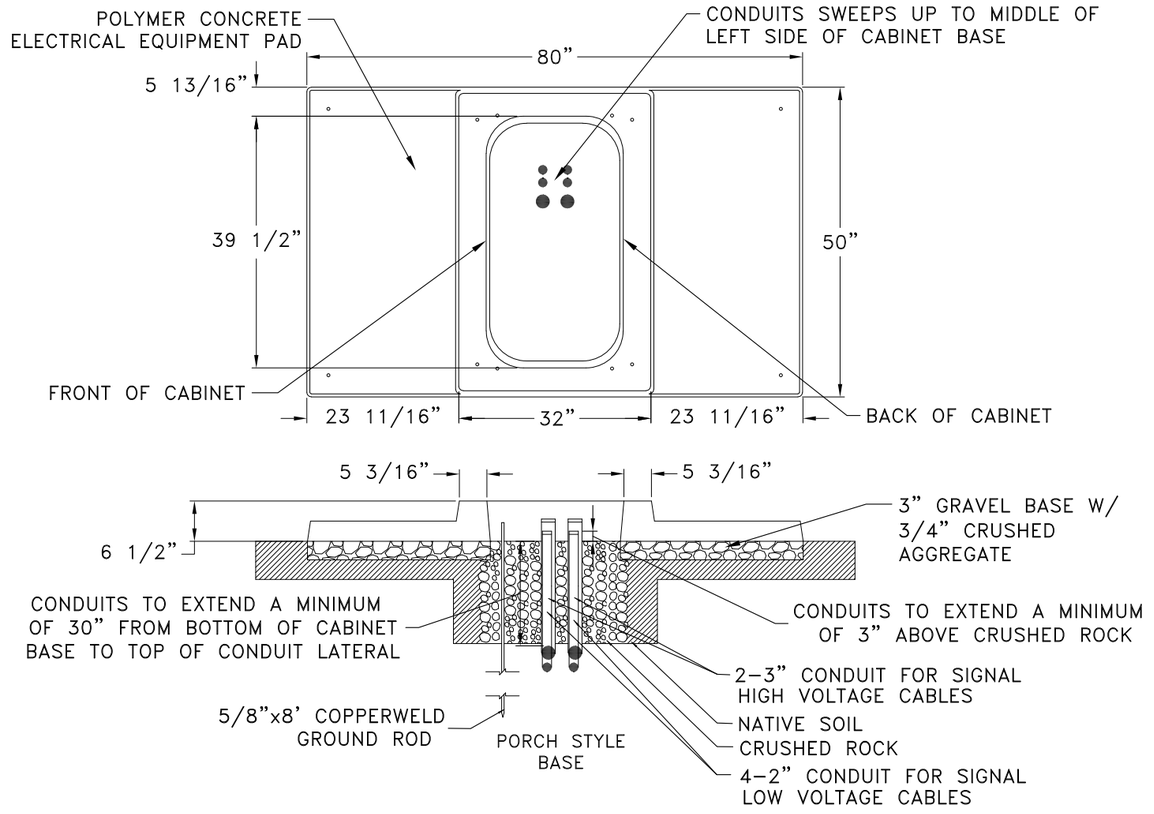
BASE MOUNTED CONTROLLER CABINET INSTALLATION AND CONCRETE FOUNDATION

(FOR SPECIAL USE, WITH PRIOR APPROVAL OF COUNTY ONLY)



CABINET TYPE	W	D	H
350I/ATCC-P	49"	30"	67"





TYPICAL CONDUIT LAYOUT LOCATION IN CABINET BASE

NOTE: FIBERGLASS BASE MAY BE SUBSTITUTED ONLY IF DIRECTED BY ENGINEER

INDEX OF REVISIONS

Rev	Description	Date	App
		4/02	
		4/03	
		5/18	

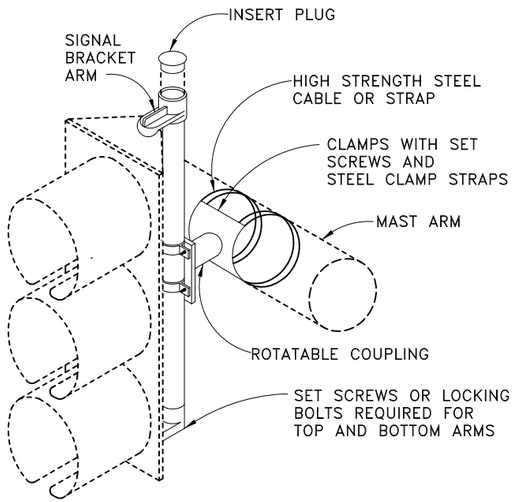
DOUGLAS COUNTY COLORADO
Engineering Division
100 Third Street
Castle Rock, Colorado 80104
(303) 660-7490

CONTROLLER CABINET INSTALLATION

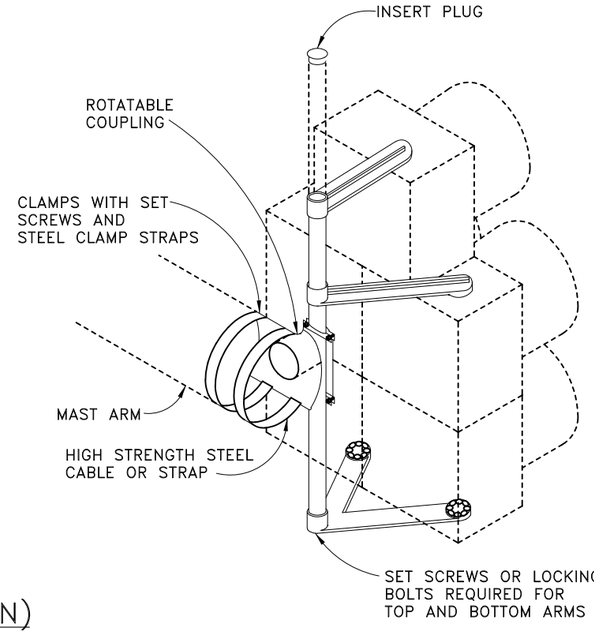
DOUGLAS COUNTY STANDARD SIGNAL DETAILS

Design	
Drawn	
Checked	
Date Created	6/93
Date Modified	
Scale	N/A
Job No.	

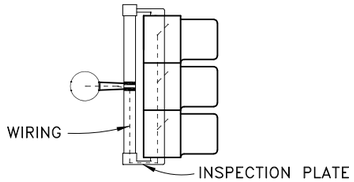
SHEET **13** OF 24. SHEETS



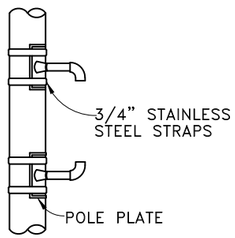
DETAIL OF MAST ARM MOUNTING FOR IN-LINE SIGNAL HEAD (3-SECTION, 4-SECTION OR 5-SECTION)



DETAIL OF MAST ARM MOUNTING FOR DOGHOUSE SIGNAL HEAD (5-SECTION)



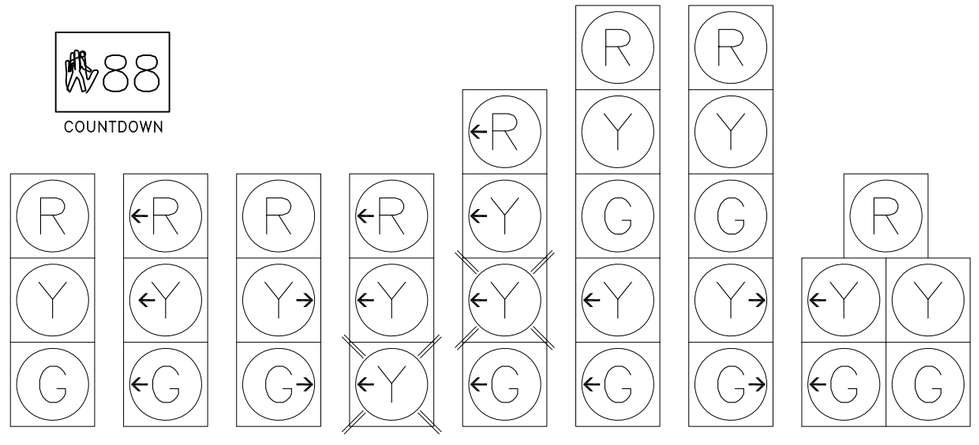
WIRING DIAGRAM



TYPICAL SIDE OF POLE SIGNAL MOUNTING

NOTES

1. ALL VEHICLE SIGNAL HEADS SHALL BE POLYCARBONATE AND BLACK IN COLOR WITH 12" SECTIONS AND TUNNEL VISORS. ALL SIGNAL FACES SHALL BE LED.
2. ALL OVERHEAD SIGNAL HEADS SHALL HAVE LOUVERED BACKPLATES WITH A 2" DIAMOND GRADE FLUORESCENT YELLOW RETROREFLECTIVE BORDER.
3. ALL PEDESTRIAN HEADS SHALL BE POLYCARBONATE AND BLACK IN COLOR. PEDESTRIAN SIGNAL FACES SHALL BE LED.
4. SIDE OF POLE MOUNT SHALL BE 90° MOUNT. NO "T"S ALLOWED. SEE "TYPICAL SIDE OF POLE SIGNAL MOUNTING" DRAWING.



TYPICAL PEDESTRIAN AND VEHICLE SIGNAL HEADS

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 BE APPROXIMATELY LEVEL WITH ONE ANOTHER AND 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-TYPE MOUNTING BRACKETS. 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.

GENERAL WIRING NOTES

1. TRAFFIC SIGNAL CONDUIT SHALL NOT CARRY WIRING OF OTHER UTILITIES.
2. ALL SPLICES SHALL BE IN HANDHOLES 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.

SIGNAL HEAD MOUNTING

INDEX OF REVISIONS

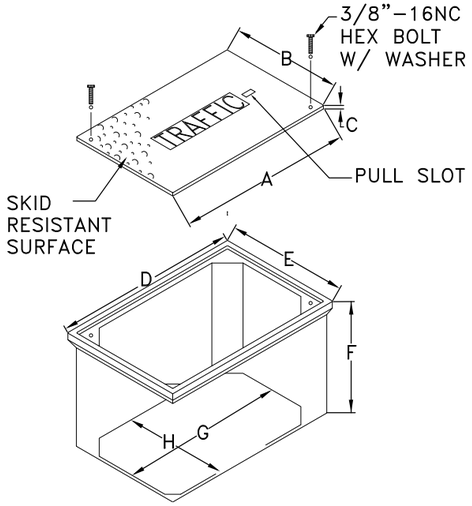
Rev	Date	Description	App
	4/02		
	4/03		
	5/18		

DOUGLAS COUNTY
COLORADO
Engineering Division
100 Third Street
Castle Rock, Colorado 80104
(303) 660-7490

SIGNAL HEADS AND MOUNTING GENERAL WIRING NOTES

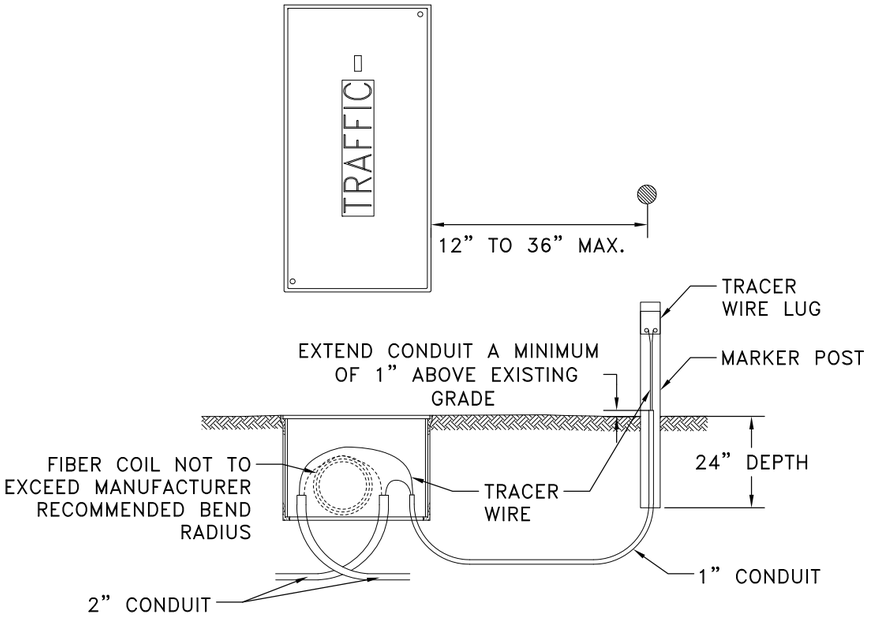
DOUGLAS COUNTY STANDARD SIGNAL DETAILS

Design	
Drawn	
Checked	
Date Created	6/93
Date Modified	
Scale	N/A
Job No.	



GENERAL NOTES

1. PAVEMENT HOLE FOR PULL BOX SHALL BE SAWCUT TO FULL DEPTH, IN A RECTANGLE THAT EXTENDS 6" BEYOND THE EXPANSE OF THE PULL BOX.



TYPICAL FIBER PULL BOX

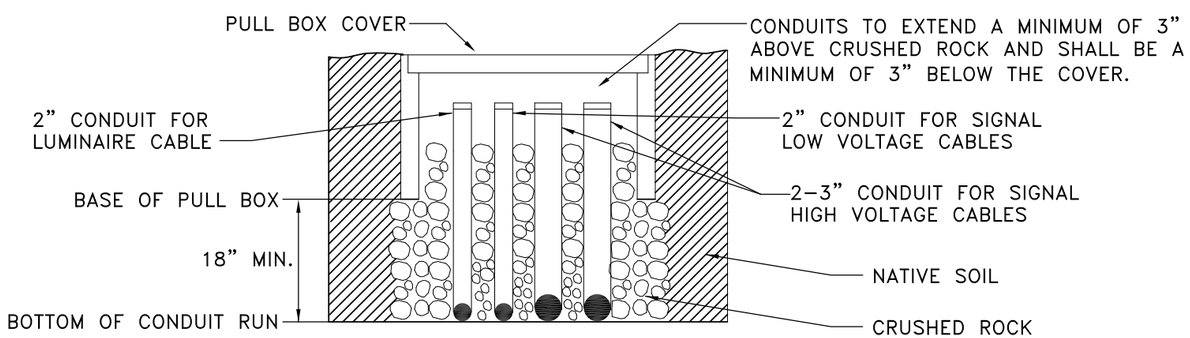
TAKE BORE PIPE INTO PULL BOX, CRISS–CROSS BORE PIPES IN BOX

PULL BOX TABLE OF DIMENSIONS (MINIMUMS)

TYPE	DESCRIPTION	DIMENSIONS (IN.)							
		A	B	C	D	E	F	G	H
1	17x30x24 – LARGE/DEEP	30 1/2	17 1/2	2	32 1/4	19 1/4	24	26 1/2	13 1/2
2	24x36x24 – TWO PIECE LID	35 5/8	24	3	37 5/8	26	24	30 1/8	18 1/2
VAULT	30x48x24 – TWO PIECE LID	47 5/8	30	3	49 5/8	32 1/8	24	45 5/8	28 1/8

PERMANENT (PRECAST) PULL BOX
(FOR USE WITH ALL OPERATIONAL SIGNALS)

TIER 22 FIBERGLASS REINFORCED POLYMER CONCRETE UL LISTED DESIGNED FOR SERVICE LOAD (MINIMUM) OF 22,500 LBS. OVER A 10" SQUARE



TYPICAL PULL BOX INSTALLATION

INDEX OF REVISIONS

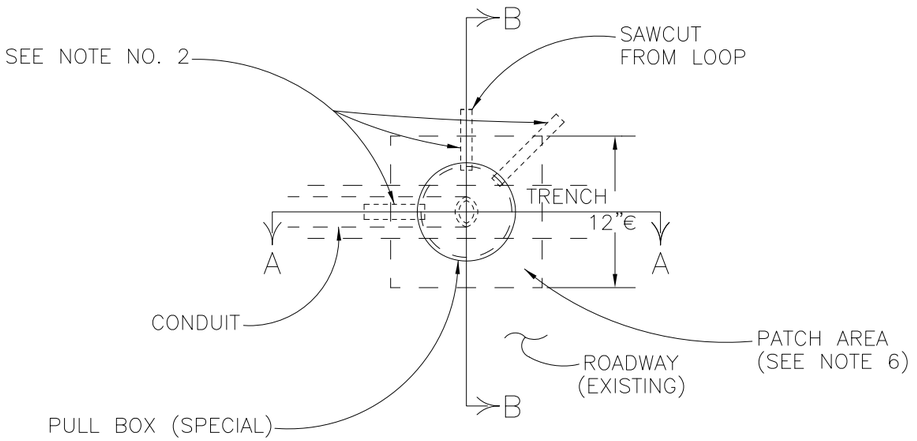
Rev	Description	Date	App
		4/02	
		4/03	
		5/18	

DOUGLAS COUNTY
COLORADO
Engineering Division
100 Third Street
Castle Rock, Colorado 80104
(303) 660-7490

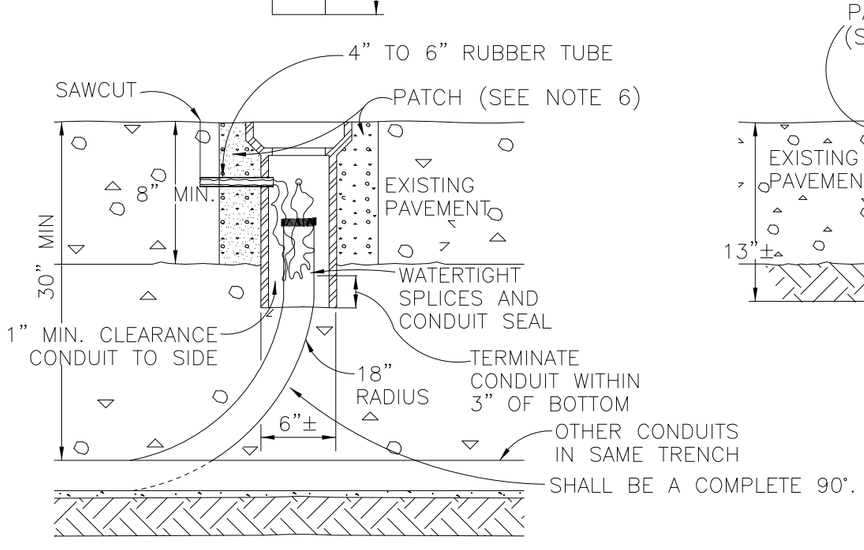
PERMANENT (PRECAST) PULL BOX

DOUGLAS COUNTY STANDARD SIGNAL DETAILS

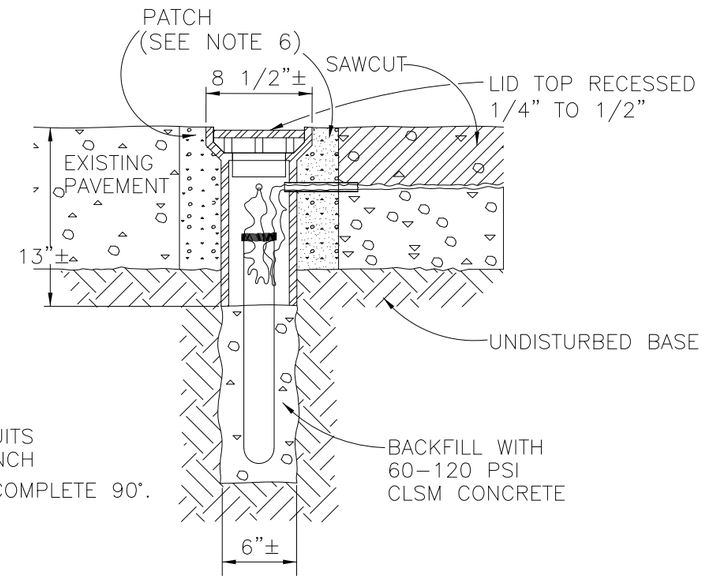
Design	
Drawn	
Checked	
Date Created	6/93
Date Modified	
Scale	N/A
Job No.	



TOP VIEW



SECTION A–A

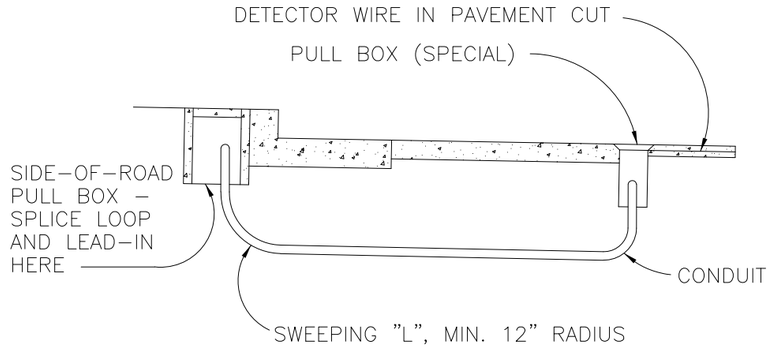


SECTION B–B

PULL BOX (SPECIAL)

GENERAL NOTES

1. PULL BOX (SPECIAL) SHALL BE A WATER VALVE STEM TYPE PULL BOX MADE OF CAST IRON OR STEEL. THE PULL BOX SHALL HAVE 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 ENGINEER.
3. CARE SHALL BE TAKEN DURING BACKFILL COMPACTION TO PREVENT COLLAPSE OF THE TUBES.
4. 2' MINIMUM SLACK OF LOOP WIRES IS TO BE PROVIDED SO THAT ALL TESTING CAN BE DONE OUTSIDE OF THE PULL BOX. SPLICE DETECTOR LEADS IN SIDE–OF–ROAD PULL BOX, NOT IN PULL BOX SPECIAL.
5. PULL BOX IS TO BE LOCATED IN AN AREA OF THE STREET NOT HEAVILY TRAVELED. FOR EDGE–OF–ROAD LOCATIONS, MAINTAIN A MINIMUM OF 12" FROM CONCRETE GUTTER PAN.
6. PAVEMENT HOLE FOR PULL BOX SHALL BE EITHER CORE DRILLED TO FULL DEPTH, OR SAW CUT TO FULL DEPTH IN 12"x12" SQUARE WITH NO OVERLAPPING CUTS. FOR CORE DRILLING AND SAWCUT, GROUT PULL BOX IN PLACE.



LOOP DETECTOR LEAD–IN

INDEX OF REVISIONS

Rev	Date	Description	App
	4/02		
	4/03		
	5/18		

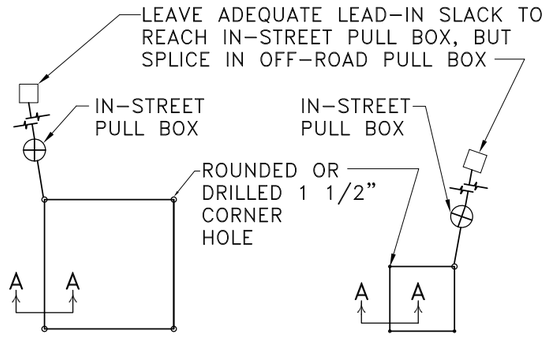
DOUGLAS COUNTY
COLORADO
Engineering Division
100 Third Street
Castle Rock, Colorado 80104
(303) 660-7490

PULL BOX (SPECIAL)
LOOP DETECTOR LEAD-IN

DOUGLAS COUNTY STANDARD SIGNAL DETAILS

Design	
Drawn	
Checked	
Date Created	6/93
Date Modified	
Scale	N/A
Job No.	

SHEET
16
OF 24 SHEETS



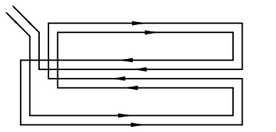
TYPICAL 6'x6' LOOP

TYPICAL 3'x3' LOOP

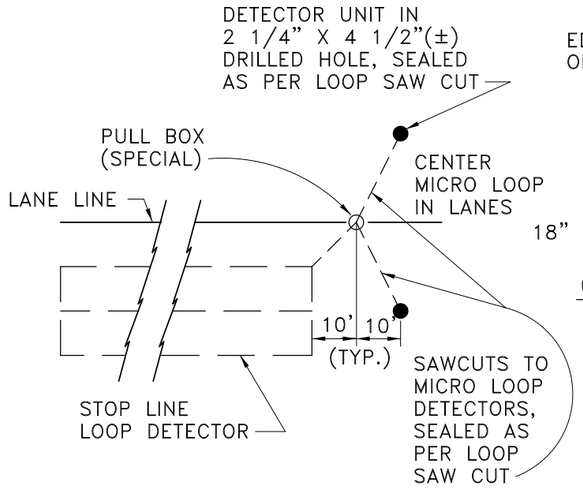
SIZE OF LOOP	NO. OF TURNS
6'x6'	4
3'x3'	4

LOOP TURNS

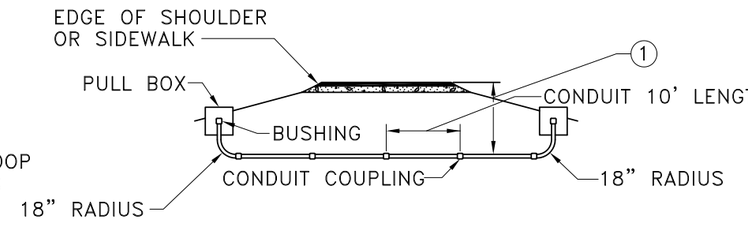
NO. OF TURNS MAY BE ADJUSTED BY ENGINEER IN FIELD. WIRING CONNECTIONS TO BE FIELD DETERMINED.



6'X40' QUADRAPOLE WIRING



MICRO LOOP DETECTOR

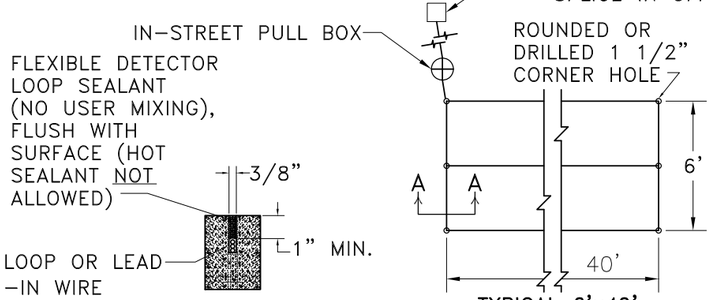


CONDUIT PLACEMENT UNDER PAVEMENT OR SIDEWALK

NOTES

1	MINIMUM CONDUIT DEPTH:	UNDER PAVEMENT 30"	UNDER SIDEWALK 24"

2 ALL PVC CONDUIT SHALL BE SCHEDULE 80



SECTION A-A

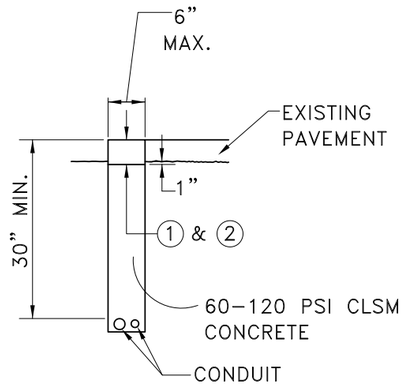
TYPICAL 6'x40' QUADRAPOLE LOOP

WHERE SAWCUT SPANS CONCRETE AND ASPHALT, CONTRACTOR SHALL DRILL 1 1/2" HOLES

LOOP SAW CUT AND INSTALLATION

NOTES

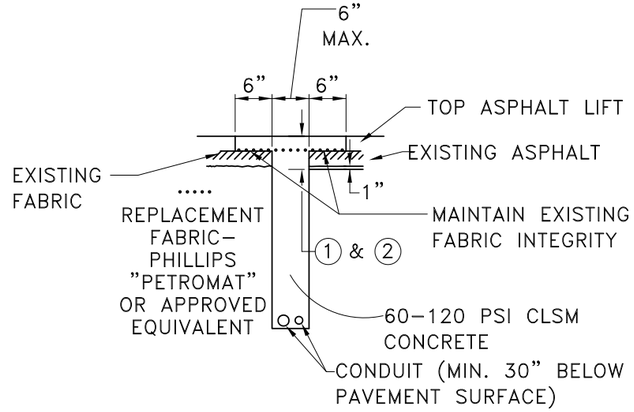
1. ALL DETECTOR LOOP WIRE SHALL MEET IMSA SPECIFICATION 51.5, ENCASED IN PVC OR POLYETHYLENE TUBING.
2. IMMEDIATELY BEFORE LAYING THE LOOP CABLE, THOROUGHLY CLEAN WITH WATER AND DRY SAW CUT WITH HIGH PRESSURE OIL-FREE COMPRESSED AIR.
3. LOOP WIRE IN ADJACENT LOOPS SHALL BE LAID UNIFORMLY IN EITHER A CLOCKWISE OR COUNTER-CLOCKWISE DIRECTION AND THE LOOP TAGGED TO INDICATE THE DIRECTION.
4. USE A BLUNT, NON-METALLIC INSTRUMENT TO PUSH WIRE INTO SLOT. DO NOT COIL LEADS.
5. LOOP WIRE SHALL BE CONTINUOUS (NO SPLICES) FROM THE PULL BOX. SPLICES IN PULL BOX SHALL BE WATERPROOFED WITH SPLICE KIT.
6. 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.
7. DETECTOR WIRE ACROSS BRIDGE JOINTS SHALL BE ENCASED IN A 12" SECTION OF 3/4" PVC PIPE THAT SPANS THE JOINT AREA.



CONDUIT TRENCH DETAIL- WITHOUT PAVEMENT FABRIC

NOTES

1. HOT BITUMINOUS PAVEMENT (PATCHING) OR PORTLAND CEMENT CONCRETE PATCH, FULL DEPTH PLUS 1" (4" MIN). MATCH EXISTING PAVEMENT TYPE.
2. FOR ASPHALT PATCH, 48 HOUR NOTICE TO THE ENGINEER REQUIRED PRIOR TO INSPECTION



CONDUIT TRENCH DETAIL- WITH PAVEMENT FABRIC

INDEX OF REVISIONS

Rev	Date	Description	App
	4/02		
	4/03		
	5/18		

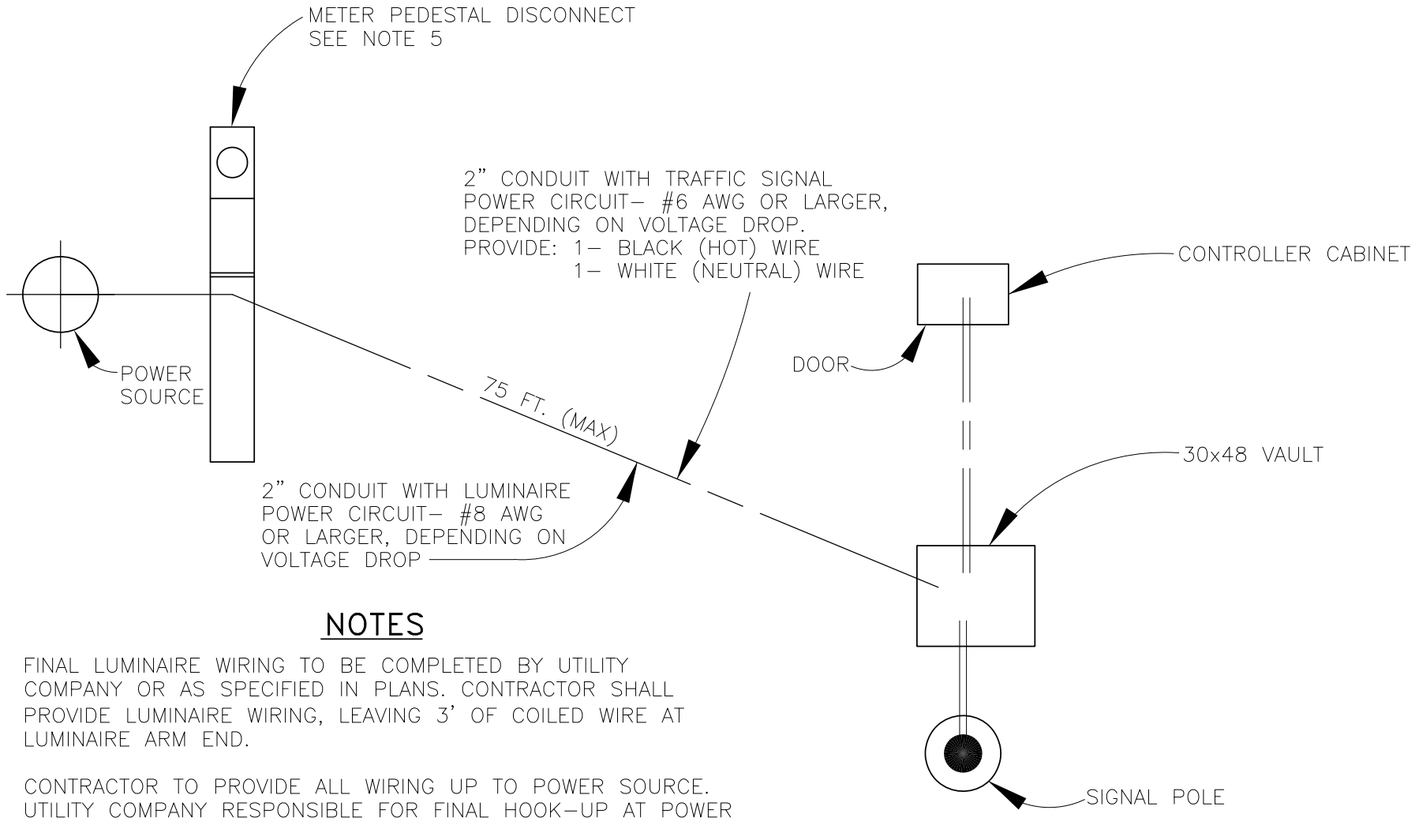
DOUGLAS COUNTY COLORADO
Engineering Division
100 Third Street
Castle Rock, Colorado 80104
(303) 660-7490

DETECTOR CONDUIT INSTALLATIONS

DOUGLAS COUNTY STANDARD SIGNAL DETAILS

Design	
Drawn	
Checked	
Date Created	6/93
Date Modified	
Scale	N/A
Job No.	

SHEET 17 OF 24 SHEETS



NOTES

1. FINAL LUMINAIRE WIRING TO BE COMPLETED BY UTILITY COMPANY OR AS SPECIFIED IN PLANS. CONTRACTOR SHALL PROVIDE LUMINAIRE WIRING, LEAVING 3' OF COILED WIRE AT LUMINAIRE ARM END.

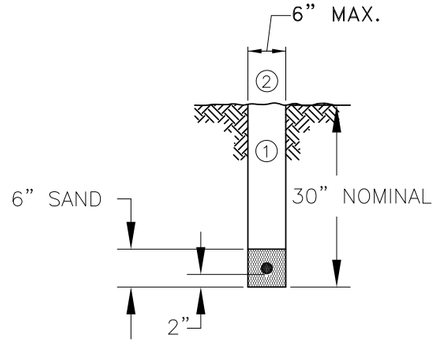
2. CONTRACTOR TO PROVIDE ALL WIRING UP TO POWER SOURCE. UTILITY COMPANY RESPONSIBLE FOR FINAL HOOK–UP AT POWER SOURCE.

3. INDIVIDUAL CIRCUIT WIRING SHALL BE TAGGED PER STANDARD SPECIFICATIONS.

4. METER PEDESTAL/DISCONNECT NO FURTHER THAN 75 FT. FROM VAULT/CABINET/HOMERUN PULLBOX.

5. WHERE REQUIRED BY UTILITY COMPANY, CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING PERMIT AND INSPECTION FROM DOUGLAS COUNTY BUILDING DIVISION.

6. CONTRACTOR SHALL STRICTLY ADHERE TO DOUGLAS COUNTY ELECTRICAL INSPECTION REQUIREMENTS. CONTACT DOUGLAS COUNTY BUILDING DIVISION AT 303–660–7497 FOR FURTHER INFORMATION.



UNDER GRASS/GROUND TRENCHING DETAIL

NOTES

1. BACKFILL AND TAMP WITH NATIVE MATERIAL TO MATCH COMPACTION OF SURROUNDING GROUND.
2. RESEED OR RESOD SURFACE AT DIRECTION OF THE ENGINEER.

UNDERGROUND POWER SOURCE SCHEMATIC FOR SIGNALS

(NO SCALE)

Rev	Date	Description	App
	4/02		
	4/03		
	5/18		

INDEX OF REVISIONS

DOUGLAS COUNTY
COLORADO
Engineering Division
100 Third Street
Castle Rock, Colorado 80104
(303) 660-7490

UNDERGROUND POWER SCHEMATIC-SIGNALS / GROUND TRENCHING

DOUGLAS COUNTY STANDARD SIGNAL DETAILS

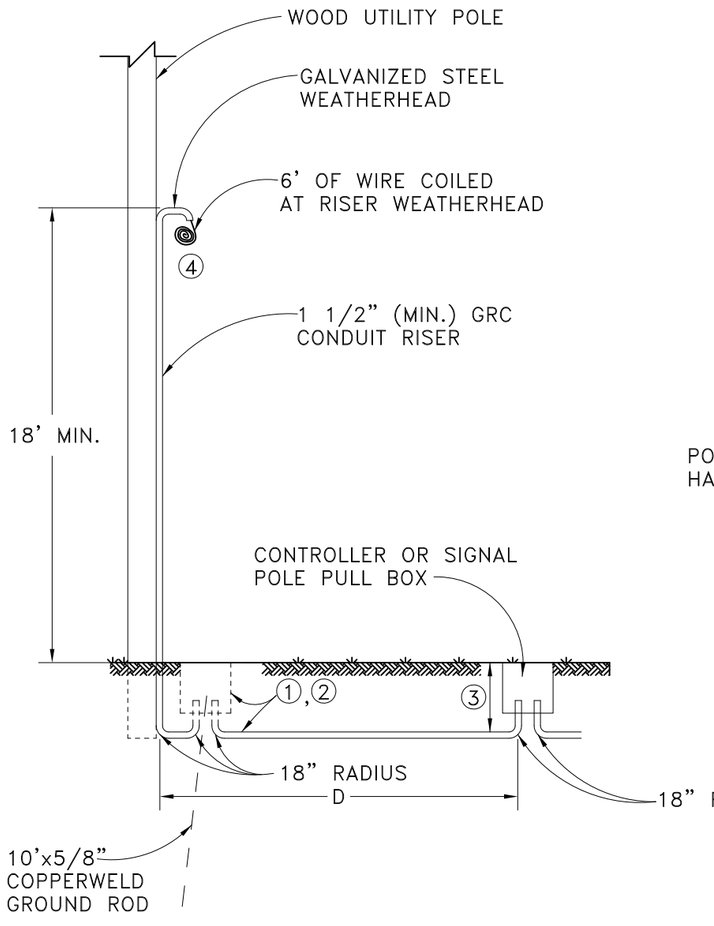
Design	
Drawn	
Checked	
Date Created	6/93
Date Modified	
Scale	N/A
Job No.	

SHEET
18
OF 24 SHEETS

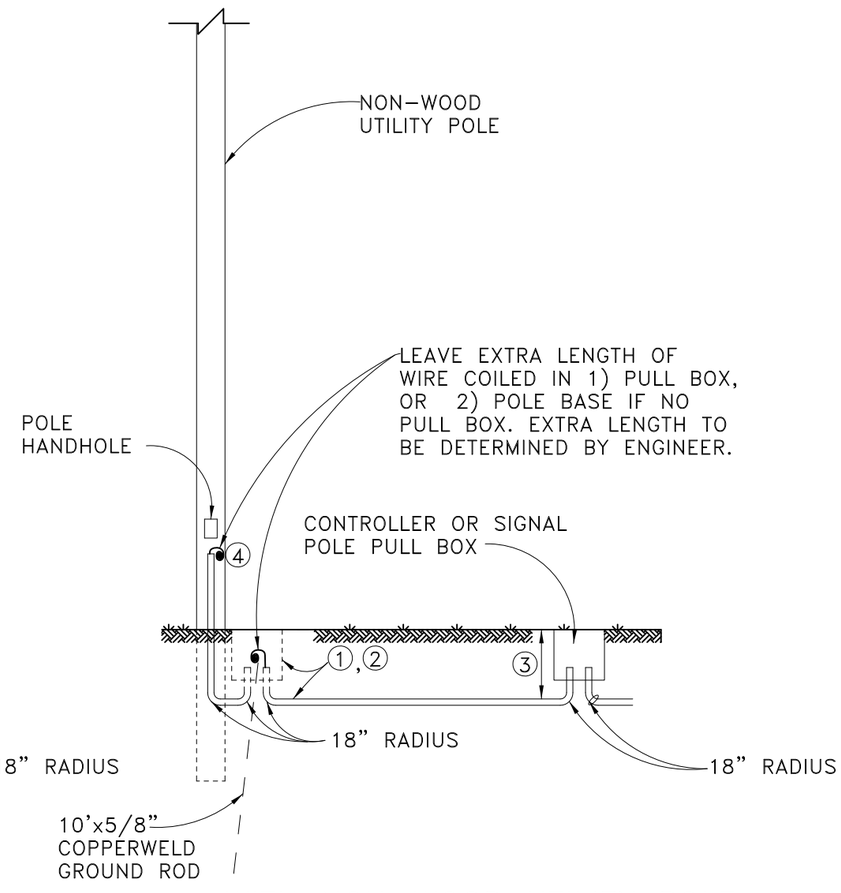
NOTES

1. PROVIDE TYPE III PULL BOX/GROUND ROD AND 2" PVC CONDUIT ONLY IF D EXCEEDS 10'.
2. PROVIDE 2" GRC CONDUIT WITHOUT PULL BOX/GROUND ROD IF D IS LESS THAN 10'.
3. MINIMUM CONDUIT DEPTHS:

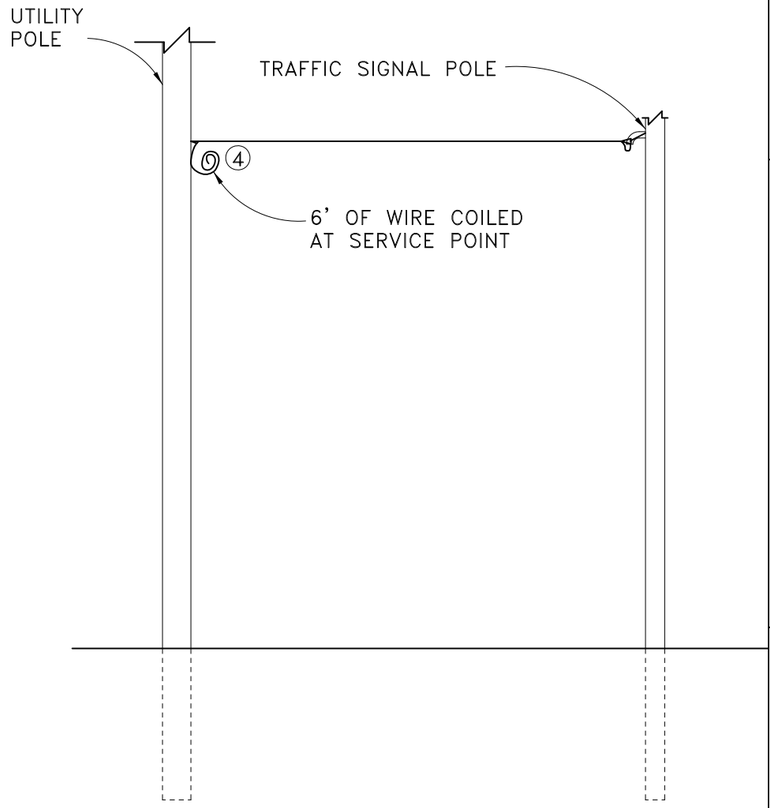
   UNDER GROUND AND PAVEMENT 30"
4. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A PERMIT AND SCHEDULING ELECTRICAL INSPECTION FROM DOUGLAS COUNTY BUILDING DIVISION, 303-660-7497.



WITH WOOD UTILITY POLE



WITH NON-WOOD UTILITY POLE



TYPICAL OVERHEAD POWER FEED FOR TRAFFIC SIGNAL ASSEMBLIES

OVERHEAD POWER SCHEMATIC SIGNALS / GROUND TRENCHING

INDEX OF REVISIONS

Rev	Description	Date	App
		4/02	
		4/03	
		5/18	

DOUGLAS COUNTY COLORADO
Engineering Division
100 Third Street
Castle Rock, Colorado 80104
(303) 660-7490

OVERHEAD POWER SCHEMATIC-SIGNALS / GROUND TRENCHING

DOUGLAS COUNTY STANDARD SIGNAL DETAILS

Design	
Drawn	
Checked	
Date Created	6/93
Date Modified	
Scale	N/A
Job No.	

SHEET
19
OF 24 SHEETS

FINISH REQUIREMENTS

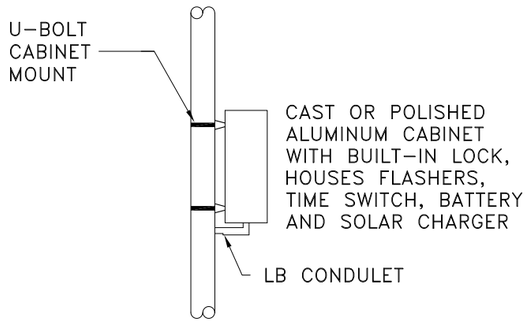
ALL PEDESTRIAN PUSH BUTTON AND PEDESTAL POLES SHALL BE FACTORY FINISHED (BLACK)

FLASHING BEACONS

ALL FLASHING BEACONS SHALL BE POLYCARBONATE WITH TUNNEL VISORS AND YELLOW HOUSINGS. SOLAR DESIGN VARIES.

FOOTING NOTES

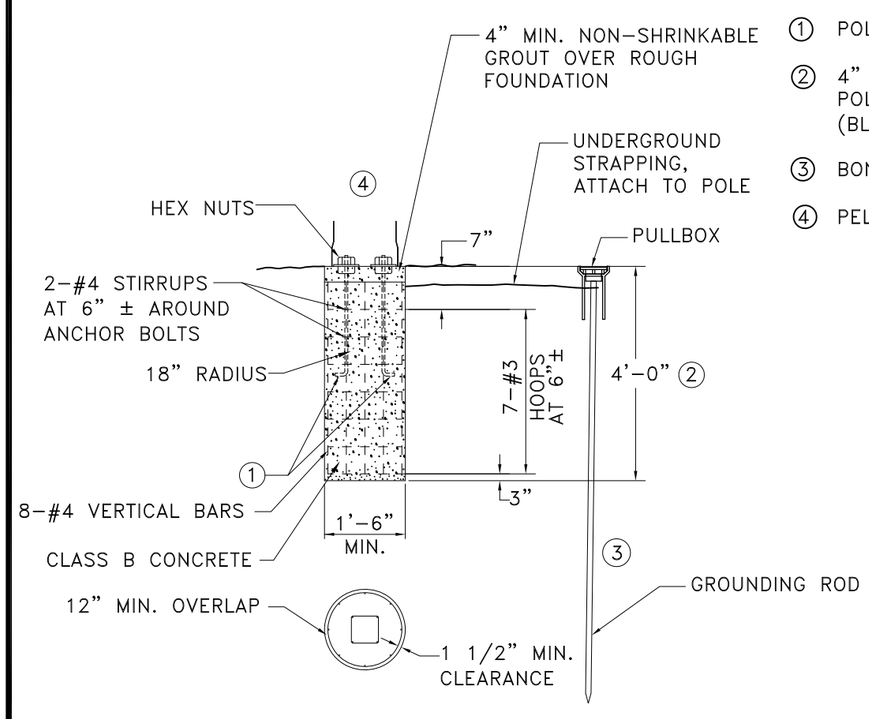
1. ANCHOR BOLTS (FURNISHED WITH POLE) PER MANUFACTURER'S TEMPLATE.
2. THESE DESIGNS REQUIRE THAT THE FOOTING BE FOUNDED IN COMPACT SAND, CLAY OR SANDY CLAY, AND BE LOCATED ABOVE THE WATER TABLE. IF, BY VISUAL INSPECTION OF THE HOLE OTHER MATERIAL IS PRESENT, THE FOUNDATION DESIGN MAY NEED TO BE MODIFIED.
3. 5/8"x8' COPPERWELD GROUND ROD THROUGH GROUND OR DRIVEN IN ADJACENT PULL BOX AND BONDED TO POLE WITH UNDERGROUND STRAPPING.
4. HANDHOLE SHALL BE PROVIDED.



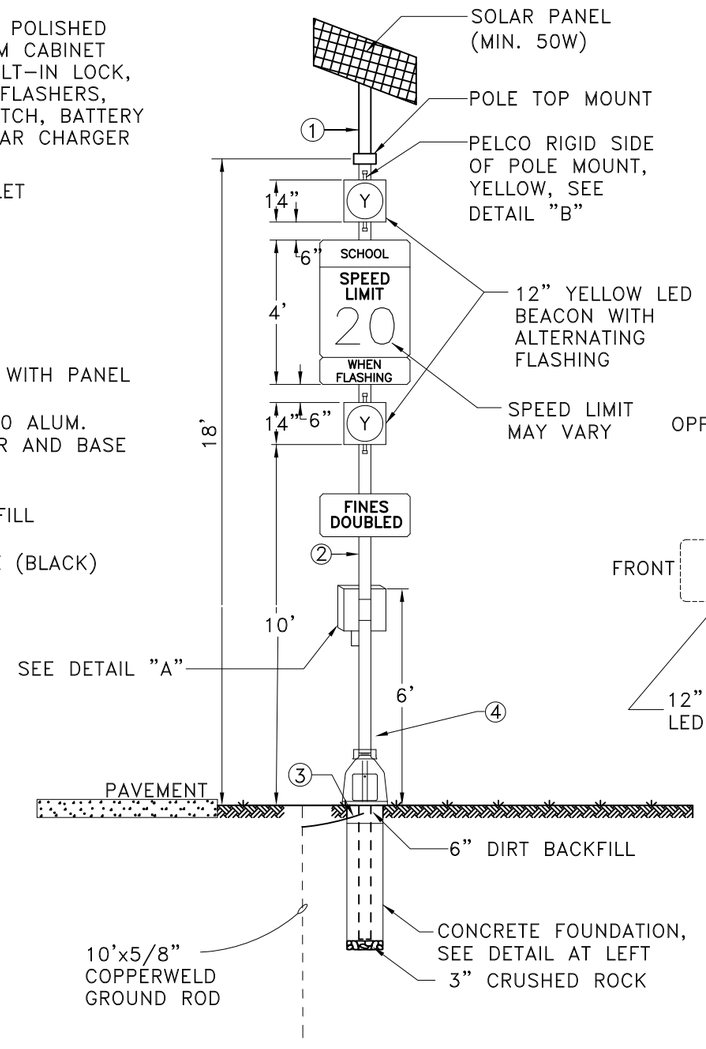
DETAIL "A"

NOTES

1. POLE TOP SOLAR MOUNT WITH PANEL
2. 4" NOMINAL SCHEDULE 80 ALUM. POLE WITH PELCO COLLAR AND BASE (BLACK)
3. BONDING STRAP IN BACKFILL
4. PELCO COLLAR AND BASE (BLACK)



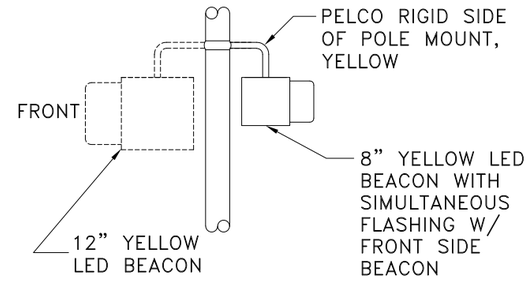
TYPICAL POLE FOOTING
(CAST IN PLACE)



SCHOOL FLASHING BEACON ASSEMBLY
SIDE OF ROAD

DETAIL "B"

OPPOSITE DIRECTION 8" FLASHER



Rev	Date	INDEX OF REVISIONS Description	App
	4/02		
	4/03		
	5/18		

DOUGLAS COUNTY COLORADO
Engineering Division
100 Third Street
Castle Rock, Colorado 80104
(303) 660-7490

SCHOOL FLASHING BEACONS - SIDE OF ROAD

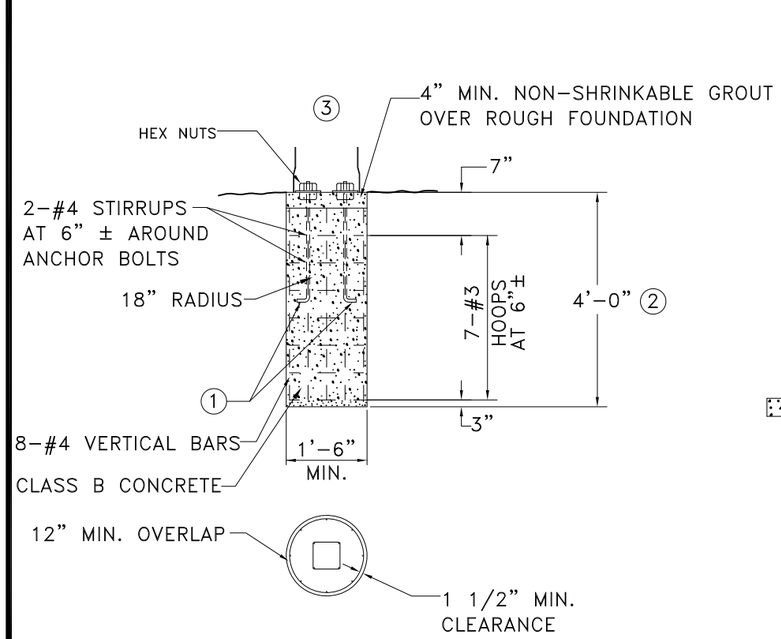
DOUGLAS COUNTY STANDARD SIGNAL DETAILS

Design	
Drawn	
Checked	
Date Created	6/93
Date Modified	
Scale	N/A
Job No.	

SHEET
20
OF 24 SHEETS

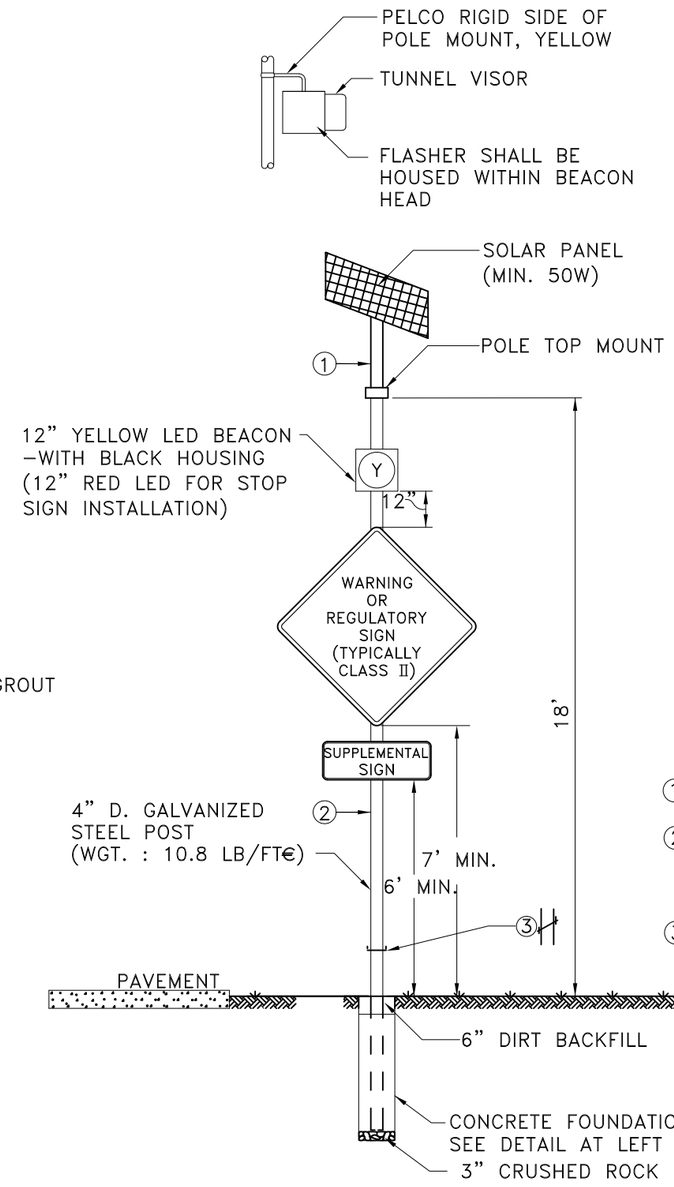
FOOTING NOTES

1. ANCHOR BOLTS (FURNISHED WITH POLE) PER MANUFACTURER'S TEMPLATE.
2. THESE DESIGNS REQUIRE THAT THE FOOTING BE FOUNDED IN COMPACT SAND, CLAY OR SANDY CLAY, AND BE LOCATED ABOVE THE WATER TABLE. IF, BY VISUAL INSPECTION OF THE HOLE OTHER MATERIAL IS PRESENT, THE FOUNDATION DESIGN MAY NEED TO BE MODIFIED.
3. HANDHOLE SHALL BE PROVIDED.



TYPICAL POLE FOOTING
(CAST IN PLACE)

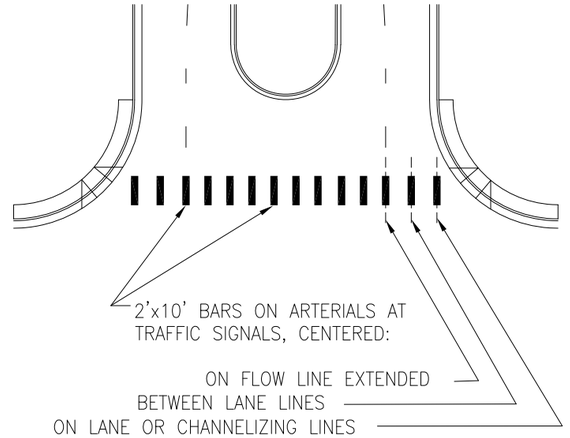
BEACON SIDE VIEW



NOTES

1. POLE TOP SOLAR MOUNT WITH PANEL
2. 4" NOMINAL SCHEDULE 80 ALUM. POLE WITH PELCO COLLAR AND BASE (BLACK)
3. PELCO COLLAR AND BASE (BLACK) OR BREAKAWAY SLIP BASE PER PLAN.

WARNING OR REGULATORY SIGN FLASHING BEACON ASSEMBLY



NOTE: ALL LONGITUDINAL LINES TO BE 12" TO 24" SIDE (OR AS DIRECTED BY THE DOUGLAS COUNTY ENGINEER) AND SPACED 12" TO 60" APART. CENTER CROSSWALKS ON CURB RAMPS. IF CURB RAMPS ARE NOT PRESENT, CENTER ON SIGNAL POLES, WHEREVER PRACTICAL.

TYPICAL CROSSWALK MARKING
(SEE APPENDIX G FOR COMPLETE SIGNING AND STRIPING STANDARDS)

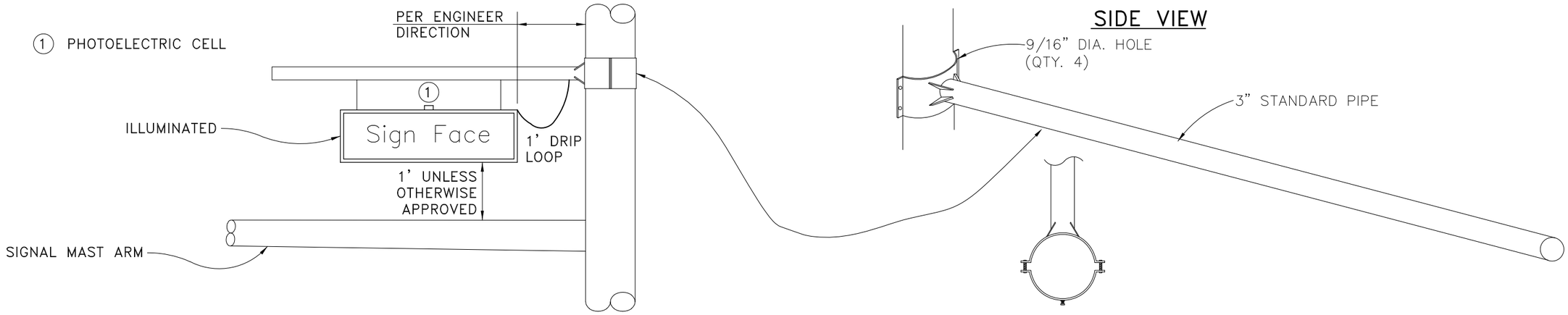
Rev	Date	INDEX OF REVISIONS Description	App
	4/02		
	4/03		
	5/18		

DOUGLAS COUNTY COLORADO
Engineering Division
100 Third Street
Castle Rock, Colorado 80104
(303) 660-7490

WARNING / REGULATORY FLASHING BEACON TYPICAL CROSSWALK MARKING

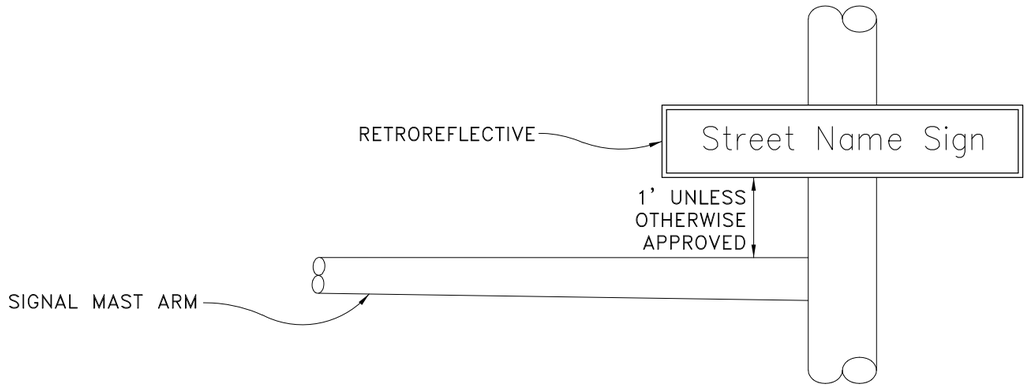
DOUGLAS COUNTY STANDARD SIGNAL DETAILS

Design	
Drawn	
Checked	
Date Created	6/93
Date Modified	
Scale	N/A
Job No.	



ILLUMINATED STREET NAME SIGN

PELCO PART NO. AP-3130, AP-3079
OR APPROVED EQUAL



STANDARD STREET NAME SIGN

TYPICAL SIGN LAYOUT

NOTES

1. FOR ILLUMINATED STREET NAME SIGN SPECIFICATIONS SEE APPENDIX F – TRAFFIC SIGNAL SPECIFICATIONS, SECTION 9.50.
2. FOR STANDARD STREET NAME SIGN SPECIFICATIONS SEE APPENDIX F – TRAFFIC SIGNAL SPECIFICATIONS, SECTION 14.40.

Rev	Date	Description	App
	4/02		
	4/03		
	5/18		

INDEX OF REVISIONS

DOUGLAS COUNTY COLORADO
Engineering Division
100 Third Street
Castle Rock, Colorado 80104
(303) 660-7490

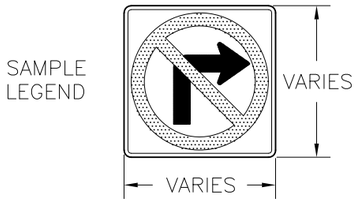
STREET NAME SIGNS

DOUGLAS COUNTY STANDARD SIGNAL DETAILS

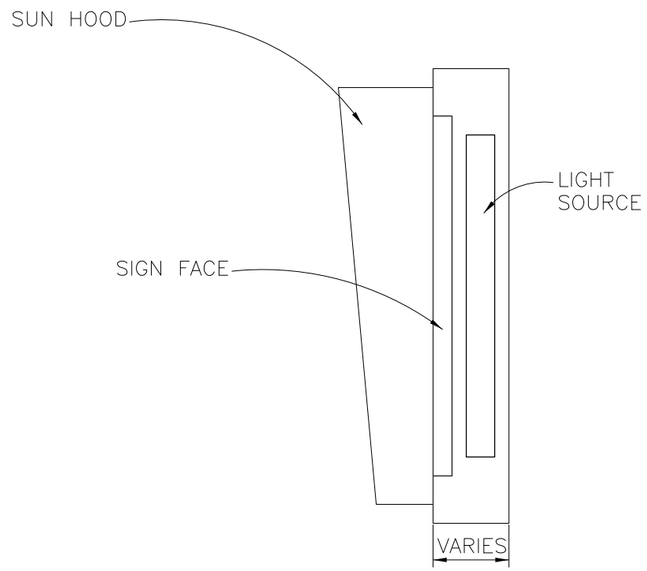
Design	
Drawn	
Checked	
Date Created	6/93
Date Modified	
Scale	N/A
Job No.	

NOTES

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



TYPICAL SIGN LAYOUT



SIDE VIEW

NOTES

1. LIGHT SOURCE SHALL BE LIGHT–EMITTING DIODE (LED), PER DIRECTION OF THE ENGINEER. SIGN FACE SHALL BE COMPLETELY DARK WHEN NOT ENERGIZED.
2. LIGHT SOURCE SHALL BE READILY ACCESSIBLE THROUGH HINGED DOORS OR SLIDING PANELS.
3. LED'S SHOULD BE WIRED TO INCORPORATE FAULT TOLERANCE OR BYPASS TO ISOLATE LED FAILURES OF A PARTICULAR LED ALLOWING REMAINING LED'S TO OPERATE NORMALLY.
4. HOUSING COLOR PER DIRECTION OF THE ENGINEER.

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 THE 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.
4. BLANKOUT REGULATORY/WARNING SIGNS SHALL BE MOUNTED WITH ASTROTYPE MOUNTING BRACKETS. SEE "SIGNAL HEADS AND MOUNTING GENERAL WIRING NOTES" SHEET FOR FURTHER DETAIL.
5. BLANKOUT SIGN SHALL BE WIRED AS SPECIFIED IN THE PLANS.

INDEX OF REVISIONS

Rev	Description	Date	App
		4/02	
		4/03	
		5/18	

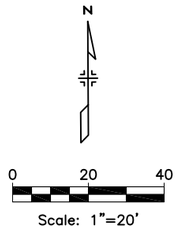
DOUGLAS COUNTY
COLORADO
Engineering Division
100 Third Street
Castle Rock, Colorado 80104
(303) 660-7490

BLANK-OUT REGULATORY/WARNING SIGN

DOUGLAS COUNTY STANDARD SIGNAL DETAILS

Design	
Drawn	
Checked	
Date Created	6/93
Date Modified	
Scale	N/A
Job No.	

SHEET
23
OF 24 SHEETS



SIGNAL PHASING

Ø 2 IS MAIN PHASE

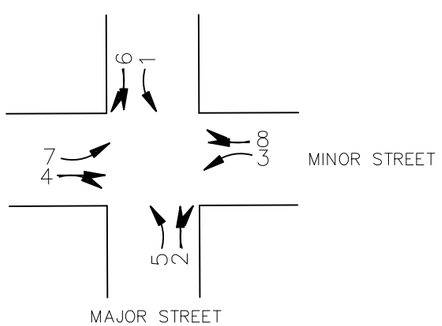
IF MAIN PHASE IS NORTHBOUND

Ø 1 S/B LEFT TURN
Ø 2 N/B THROUGH
Ø 3 W/B LEFT TURN
Ø 4 E/B THROUGH
Ø 5 N/B LEFT TURN
Ø 6 S/B THROUGH
Ø 7 E/B LEFT TURN
Ø 8 W/B THROUGH

IF MAIN PHASE IS EASTBOUND

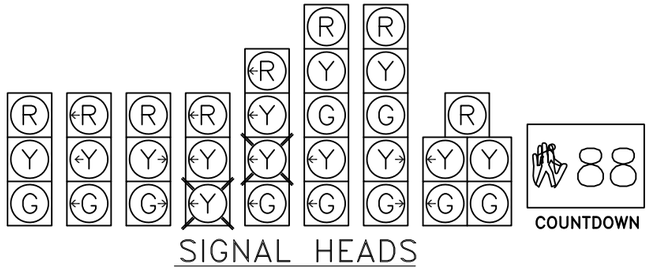
Ø 1 W/B LEFT TURN
Ø 2 E/B THROUGH
Ø 3 N/B LEFT TURN
Ø 4 S/B THROUGH
Ø 5 E/B LEFT TURN
Ø 6 W/B THROUGH
Ø 7 S/B LEFT TURN
Ø 8 N/B THROUGH

PHASING LAYOUT



NOTES

1. ALL VEHICLE SIGNAL HEADS SHALL BE POLYCARBONATE WITH 12" SECTIONS AND TUNNEL VISORS.
2. ALL VEHICLE AND PEDESTRIAN SIGNAL HEADS SHALL BE BLACK IN COLOR.
3. BACKPLATES WHERE INDICATED SHALL BE LOUVERED TYPE, WITH 2" DIAMOND GRADE FLUORESCENT YELLOW RETROREFLECTIVE TAPE BORDER.

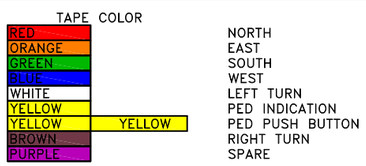


SIGNAL HEADS

DOUGLAS COUNTY SIGNALIZED INTERSECTION STANDARD WIRING

	CONDUCTOR COLOR	CONDUCTOR #
MAIN STREET		
MAIN STREET GREEN BALL	GREEN	4
MAIN STREET YELLOW BALL	ORANGE	5
MAIN STREET RED BALL	RED	3
MAIN STREET LT GREEN ARROW	BLUE	6
MAIN STREET LT YELLOW ARROW	BLACK	1
MAIN STREET FLASHING YELLOW ARROW	ORANGE / GREEN	21
MAIN STREET LT RED ARROW	RED / GREEN	20
MAIN STREET WALK	GREEN / WHITE	14
MAIN STREET DON'T WALK	RED / WHITE	13
SIDE STREET		
SIDE STREET GREEN BALL	GREEN / BLACK	9
SIDE STREET YELLOW BALL	ORANGE / BLACK	10
SIDE STREET RED BALL	RED / BLACK	8
SIDE STREET LT GREEN ARROW	BLUE / RED	19
SIDE STREET LT YELLOW ARROW	ORANGE / RED	18
SIDE STREET FLASHING YELLOW ARROW	BLACK / RED	16
SIDE STREET RED ARROW	RED (2)	24
SIDE STREET WALK	BLUE / WHITE	15
SIDE STREET DON'T WALK	BLACK / WHITE	12
RIGHT TURN		
RIGHT TURN OL GREEN ARROW	BLUE / BLACK	11
RIGHT TURN OL YELLOW ARROW	BLACK (2)	22
AC - RETURN		
AC - RETURN	WHITE	2
AC - RETURN	WHITE (2)	23
SPARE		
SPARE	WHITE / BLACK	7
SPARE	WHITE / RED	17
SPARE	GREEN (2)	25

INTERSECTION APPROACH HAND HOLE AND PULLBOX



LEGEND

- TRAFFIC SIGNAL POLE
- SPAN WIRE POLE
- MAST ARM AND POLE
- TRAFFIC SIGNAL FACE
- TRAFFIC SIGNAL FACE WITH BACKPLATE
- TRAFFIC SIGNAL FACE FOR TURNING MOVEMENT
- PEDESTRIAN SIGNAL FACE
- PEDESTRIAN PUSH BUTTON & SIGN
- LUMINAIRE
- TRAFFIC SIGNAL CONTROLLER & CABINET
- ①,④,⑤ MAST ARM, POLE MOUNTED SIGN W/IDENTIFIER
- ISN ILLUMINATED STREET NAME SIGN
- BOR BLANK-OUT REGULATORY SIGN
- BOW BLANK-OUT WARNING SIGN
- METER PEDESTAL
- PULL BOX (TYPE 1S)
- PULL BOX (TYPE IF)
- 24x36x18 SPECIAL PULL BOX (TYPE II)
- 30x48 VAULT
- 40' LOOP DETECTOR (6'x40')
- 30' LOOP DETECTOR (6'x30')
- LOOP DETECTOR (6'x6')
- CAMERA DETECTION
- RADAR DETECTION
- MICRO LOOP DETECTOR W/ SAW CUT LEAD
- CONDUIT-SCHEDULE 80 PVC
- OPTICOM DETECTOR
- SF-X SCHOOL FLASHING BEACON (TYPE X)
- WF WARNING FLASHING BEACON
- RF REGULATORY FLASHING BEACON
- RADIO ANTENNA
- TRAVEL TIME DEVICE
- PTZ CAMERA

INDEX OF REVISIONS

Rev	Description	Date	App
		4/02	
		4/03	
		5/18	

DOUGLAS COUNTY
COLORADO
Engineering Division
100 Third Street
Castle Rock, Colorado 80104
(303) 660-7490

SIGNAL PHASING / STANDARD INTERSECTION WIRING / TYPICAL LEGEND

DOUGLAS COUNTY STANDARD SIGNAL DETAILS

Design	
Drawn	
Checked	
Date Created	6/93
Date Modified	
Scale	N/A
Job No.	

SHEET
24
OF 24 SHEETS