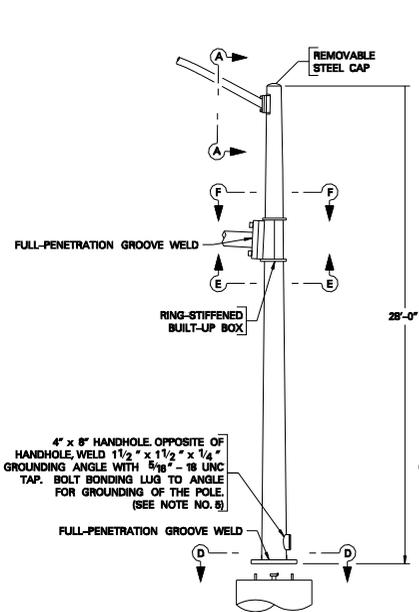
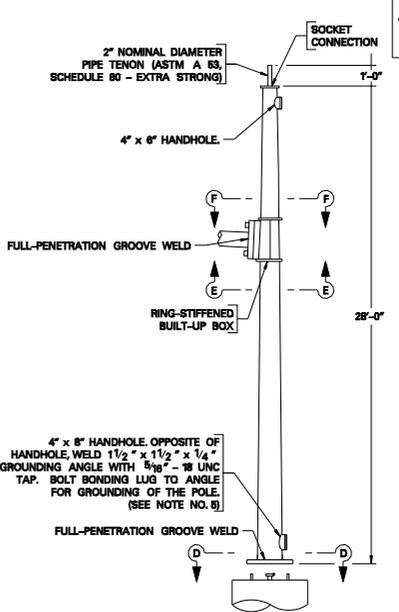


SIGNAL POLE WITH PROVISION FOR LIGHTING EXTENSION
(SEE NOTE NO. 7)



LUMINAIRE MAST ARM



TOP MOUNTED TENON

SIGNAL AND LIGHTING POLE

DESIGN NOTES:

- a) THE DESIGN CONFORMS TO THE "2001 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS", AND INTERIM SPECIFICATIONS.
- b) DESIGN WIND PRESSURES ARE BASED ON A 90 MPH FASTEST-MILE WIND SPEED WITH A 1.3 GUST COEFFICIENT IN ACCORDANCE WITH APPENDIX C OF THE 2001 AASHTO SPECIFICATIONS.
- c) FATIGUE IMPORTANCE CATEGORY II IS USED FOR FATIGUE DESIGN. FATIGUE DESIGN LOADS ARE THE NATURAL WIND GUST PRESSURE RANGE BASED ON A YEARLY MEAN WIND VELOCITY OF 12.9 MPH, AND TRUCK-INDUCED GUST PRESSURE RANGE BASED ON A TRUCK SPEED OF 56 MPH. THE NATURAL WIND GUST PRESSURE RANGE IS NOT APPLIED TO AREAS OF THE SIGNAL ARM COINCIDING WITH AREAS OF SIGNALS AND SIGNS.
- d) THE FULL-PENETRATION GROOVE WELD CONNECTION AT THE BASE OF THE SIGNAL ARMS AND POLES IS A STRESS CATEGORY E DETAIL FOR THE BACKING RING ATTACHED TO THE BASE PLATE WITH A CONTINUOUS INTERIOR FILLET WELD.
- e) FOR COLD-WORKED STEEL, 48 KSI IS THE MAXIMUM YIELD STRENGTH USED FOR DESIGN. FOR STEEL NOT REQUIRING COLD-WORKING TO BE BROUGHT TO ITS FINAL PROPERTIES, 80 KSI IS THE MAXIMUM YIELD STRENGTH USED FOR DESIGN.

NOTES:

1. USE ANCHOR BOLTS CONFORMING TO AASHTO M 314 WITH A YIELD STRENGTH OF 55 KSI. SUPPLY TWO NUTS AND TWO WASHERS WITH EACH ANCHOR BOLT.
2. USE FLANGES, BASES AND PLATES WITH A YIELD STRENGTH OF 36 KSI OR GREATER.
3. ENSURE WELDING IS IN ACCORDANCE WITH THE CURRENT AWS D1.1 STRUCTURAL WELDING CODE - STEEL, AND ALL WELD SIZES ARE SHOWN ON THE SHOP PLANS.
4. ENSURE SIGNAL ARMS AND POLES HAVE A TAPER GREATER THAN 0.1377FT, AND ARE ROUND OR HAVE TWELVE OR MORE SIDES. ENSURE TUBES WITH LESS THAN SIXTEEN SIDES HAVE A MINIMUM CORNER RADIUS OF 4". MINIMUM REQUIRED ARM AND POLE BASE DIAMETERS ON SHEETS NO. 2, 3, AND 4 ARE THE OUTSIDE FLAT TO FLAT DIMENSION FOR MULTI-SIDED TUBES.
5. USE BONDING LUG FOR BONDING CONDUCTORS THROUGH NO. 4.
6. ENSURE THE POLE FABRICATOR ATTACHES THE IDENTIFICATION PLATE NEAR THE POLE BASE.
7. ENSURE THE TOP OF THE 21'-0" POLE HAS AN ATTACHMENT PLATE FOR A FUTURE LIGHTING EXTENSION WHEN FUTURE LIGHTING PROVISIONS ARE DESIGNATED ON THE CONTRACT. OTHERWISE, ENSURE THE TOP OF THE POLE HAS A REMOVABLE STEEL CAP AND NO PROVISIONS FOR A FUTURE EXTENSION.
8. FOR VIEW C-C, AND SECTIONS A-A, D-D, E-E, AND F-F, SEE SHEET NO. 2.

LOAD CASE	SIGNAL ARM LENGTH	SIGNAL ARM ATTACHMENT			POLE BASE ATTACHMENT	
		FLANGE ANGLE	△ARM ATTACHMENT HEIGHT	ATTACHMENT CAP SCREW	BASE BOLT CIRCLE	ANCHOR BOLT
1	10'-0" TO 24'-0"	3 DEGREES	20'-0"	1.25" x 3"	24"	1.75" x 84" x 6"
2	25'-0" TO 34'-0"	4 DEGREES	19'-3"	1.50" x 4"	24"	1.75" x 84" x 6"
3	35'-0" TO 50'-0"	4 DEGREES	19'-3"	1.50" x 4"	24"	1.75" x 84" x 6"
4	55'-0"	4 DEGREES	19'-3"	1.50" x 4"	24"	1.75" x 84" x 6"

△ FOR POLES WITH DOUBLE SIGNAL ARMS, SEE SHEET NO. 4 FOR REQUIRED ARM ATTACHMENT HEIGHTS.

LUMINAIRE ARM	
ARM LENGTH	RISE
4'-0"	9"
6'-0"	2'-0"
8'-0"	2'-9"
10'-0"	3'-0"
12'-0"	3'-3"
15'-0"	3'-9"
18'-0"	4'-0"
20'-0"	4'-3"

INSTALLATION REQUIREMENTS FOR CAP SCREWS OF SIGNAL AND LUMINAIRE ARMS, ANCHOR BOLT NUTS, GROUT PAD, AND CAULK

APPLY 100 PERCENT SILICONE CAULK (EXTERIOR USAGE) AT TOP OF BACKING RING ALONG ENTIRE INTERIOR CIRCUMFERENCE OF THE ARM AND POLE WALL FOR LOCATION THAT CAULK IS TO BE APPLIED, SEE FULL-PENETRATION GROOVE WELD DETAIL, SHEET NO. 2.

WRENCH TIGHTEN ALL BOTTOM NUTS FIRMLY AGAINST BASE PLATE BEFORE TIGHTENING TOP NUTS. USE A STICK WAX TO HELP LUBRICATE BEARING FACE AND THREADS OF CAP SCREWS AND TOP ANCHOR BOLT NUTS. TIGHTEN CAP SCREWS AND TOP NUTS TO SNUG-TIGHT. SNUG-TIGHT IS DEFINED AS THE TIGHTNESS THAT EXISTS WHEN THE MEMBER'S BASE PLATE IS IN FIRM CONTACT WITH THE FLANGE PLATE OR WITH THE TOP AND BOTTOM NUTS, AND IS ATTAINED BY THE FULL EFFORT OF A MAN USING A WRENCH WITH THE FOLLOWING LENGTH:

BOLT OR CAP SCREW DIA.	LENGTH OF WRENCH
.75"	16"
1.25"	22"
1.50"	24"
1.75"	29"

AFTER THE SNUG TIGHT CONDITION IS ATTAINED, RETIGHTEN BOTTOM NUTS TO ENSURE FIRM CONTACT AGAINST THE BASE PLATE. ROTATE THE CAP SCREWS AN ADDITIONAL 1/4 TURN (90 DEG) AND ROTATE THE TOP NUTS AN ADDITIONAL 1/8 TURN (45 DEG). TIGHTEN IN TWO SEPARATE PASSES OF 1/8 TURN (CAP SCREWS) AND 1/16 TURN (TOP NUTS) IN EACH PASS. ROTATION TOLERANCES ARE PLUS AND MINUS 10 DEGREES FOR THE CAP SCREWS, AND PLUS 20 DEGREES AND MINUS 0 DEGREES FOR THE TOP NUTS.

ENSURE THE TOP NUTS HAVE FULL THREAD ENGAGEMENT AND THE DISTANCE FROM THE BOTTOM OF THE LEVELING (BOTTOM) NUTS TO THE TOP OF THE FOUNDATION DOES NOT EXCEED 1".

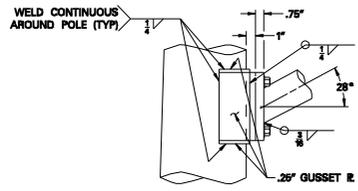
PLACE A NON-SHRINK GROUT PAD UNDER THE ENTIRE POLE BASE PLATE.

REVISION	
REVISED FOR WYDOT'S 2003 STANDARD SPECIFICATIONS	12-JAN-06

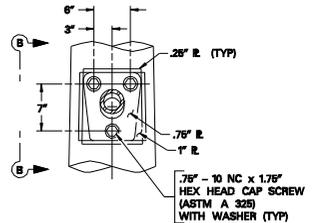
WYOMING DEPARTMENT OF TRANSPORTATION

STANDARD SIGNAL POLE FABRICATION AND INSTALLATION DATA (STRAIGHT SIGNAL ARMS)

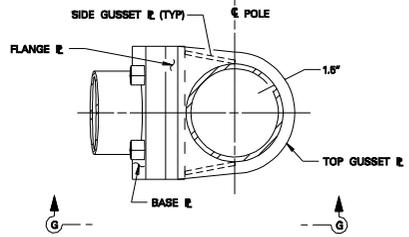
DRAWN BY: WES / KCD / TEW	DATE: 09-MAY-06
CHKD BY: PDH	SHEET 1 OF 4



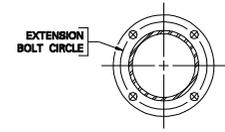
VIEW B-B
(LUMINAIRE MAST ARM ATTACHMENT)



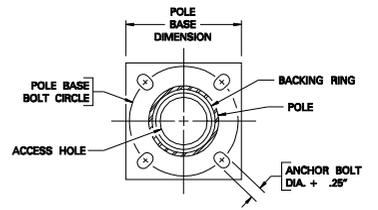
SECTION A-A
(LUMINAIRE MAST ARM ATTACHMENT)



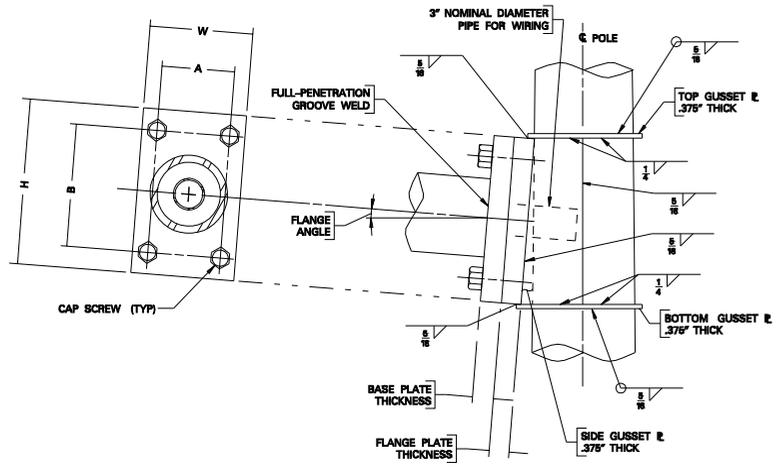
SECTION F-F
(SIGNAL ARM ATTACHMENT)



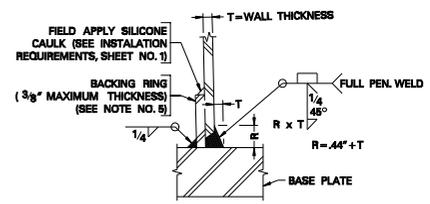
VIEW C-C
(LUMINAIRE EXTENSION ATTACHMENT)



SECTION D-D
(POLE BASE)



VIEW G-G
(RING-STIFFENED BUILT-UP BOX FOR SIGNAL ARM ATTACHMENT)



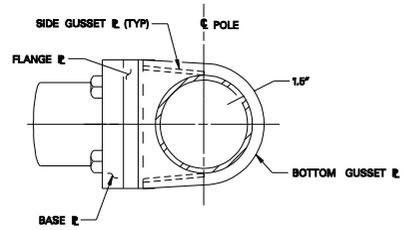
FULL-PENETRATION GROOVE WELD DETAIL
(SIGNAL ARM AND POLE BASE)

- NOTES:**
- USE SIGNAL ARM ATTACHMENT CAP SCREWS CONFORMING TO ASTM A 325.
 - ENSURE THE RADIAL SEPARATION BETWEEN THE FACE OF THE POLE AND THE ADJACENT INSIDE FACE OF THE TOP OR BOTTOM GUSSET PLATES DOES NOT EXCEED $\frac{1}{8}$ ". IF THE SEPARATION IS GREATER THAN $\frac{1}{8}$ ", INCREASE THE LEG OF THE FILLET WELD BY THE AMOUNT OF THE SEPARATION.
 - ENSURE THE LONGITUDINAL SEAM WELDS OF THE POLE ARE AT LEAST 3" FROM THE SIDE GUSSET PLATE TO POLE WELDS.
 - ENSURE WELDED SPLICES FOR POLE OR ARM SECTIONS USE FULL-PENETRATION WELDS WITH A STEEL SLEEVE AT THE WELDED JOINT AND HAVE THE SURFACE OF THE ENTIRE WELD CIRCUMFERENCE GROUND FLUSH WITH THE BASE METAL.
 - ENSURE THE BACKING RING IS WELDED TO THE BASE PLATE PRIOR TO THE ATTACHMENT OF THE ARM OR POLE TO THE BACKING RING, UNLESS AN ALTERNATE PROCEDURE IS APPROVED BY THE STATE BRIDGE ENGINEER. ENSURE THE BACKING RING IS FIT UP FOR THE ACTUAL INSIDE DIAMETER OF THE TUBE PRIOR TO ATTACHMENT TO THE BASE PLATE.
 - FOR LOCATIONS OF VIEW C-C, AND SECTIONS A-A, D-D, E-E, AND F-F, SEE SHEET NO. 1.

**SIGNAL ARM ATTACHMENT AND MINIMUM POLE REQUIREMENTS								
LOAD CASE	A	B	H	W	FLANGE PLATE THICKNESS	ARM'S BASE PLATE THICKNESS	MINIMUM POLE BASE DIAMETER	MINIMUM POLE WALL THICKNESS
1	9.5"	13"	20"	14"	1.8"	1.5"	12.5"	*.239"
2	12"	20"	27"	17"	2"	2"	15"	*.3125"
3	12"	20"	27"	17"	2"	2"	15"	*.3125"
4	12"	20"	27"	17"	2"	2"	15"	*.3125"

* VALUES SHOWN ARE AT AND BELOW THE SIGNAL ARM CONNECTION. ENSURE POLE WALL THICKNESS ABOVE THE SIGNAL ARM CONNECTION IS NOT LESS THAN .239".

** SEE SHEET NOS. 3 & 4 FOR DIAMETER AND WALL THICKNESS REQUIREMENTS FOR SIGNAL ARMS. SEE SHEET NO. 4 FOR REQUIREMENTS OF POLES WITH DOUBLE SIGNAL ARMS.

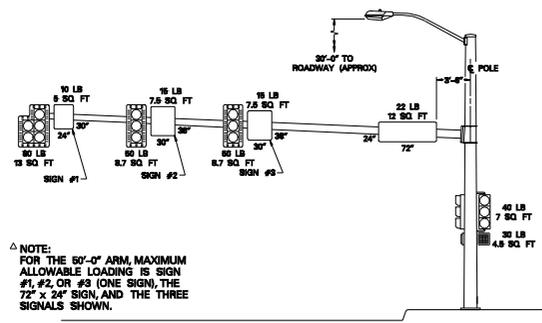


SECTION E-E
(SIGNAL ARM ATTACHMENT)

REVISION	
REVISED FOR WYDOT'S 2003 STANDARD SPECIFICATIONS	12-JAN-05

WYOMING DEPARTMENT OF TRANSPORTATION
STANDARD SIGNAL POLE FABRICATION AND INSTALLATION DATA (STRAIGHT SIGNAL ARMS)

DRAWN BY: WES / KCD / TEW	DATE: 09-MAY-06
CHKD BY: PDH	SHEET 2 OF 4



LOAD CASE 3

SIGNAL ARM DATA									
SIGNAL ARM LENGTH	MINIMUM ARM BASE DIAMETER	*MINIMUM ARM BASE WALL THICKNESS	MAST ARM BASE R.			CAP SCREW SPACING	ATTACHMENT CAP SCREW	BASE THICKNESS	FLANGE THICKNESS
			W	H	A B				
36'-0"	11.25"	.3125"	17"	27"	12"	20"	1.5" x 4"	2"	2"
	12.25"	.239"							
40'-0"	12"	.3125"	17"	27"	12"	20"	1.5" x 4"	2"	2"
	13.50"	.239"							
48'-0"	13"	.3125"	17"	27"	12"	20"	1.5" x 4"	2"	2"
△ 50'-0"	13.5"	.3125"	17"	27"	12"	20"	1.5" x 4"	2"	2"

POLE DATA						LUMINAIRE ARM	SIGNAL ARM LENGTH
SIGNAL POLE LENGTH	POLE BASE DIMENSION	BASE BOLT CIRCLE	POLE BASE THICKNESS	ANCHOR BOLT			
21'-8" OR 28'-0"	24"	24"	2"	1.78" x 84" x 6"		4'-0" TO 20'-0"	35'-0" TO 60'-0"

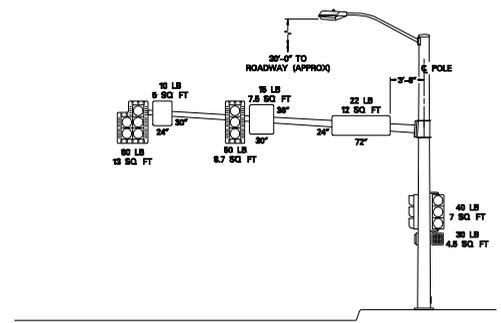
NOTES:

USE POLE WITH A MINIMUM BASE DIAMETER OF 16", A MINIMUM WALL THICKNESS OF .3125" AT AND BELOW THE SIGNAL ARM CONNECTION, AND A MINIMUM WALL THICKNESS OF .239" ABOVE THE SIGNAL ARM CONNECTION.

* FOR ARMS WITH A REQUIRED MINIMUM BASE WALL THICKNESS OF .3125", A WALL THICKNESS OF NOT LESS THAN .239" MAY BE USED ON THE PORTION OF THE ARM WITH DIAMETERS LESS THAN 10.25". ENSURE THE REMAINDER OF THE ARM HAS THE SAME WALL THICKNESS AS PROVIDED AT THE ARM BASE. FOR ARMS WITH A REQUIRED MINIMUM BASE WALL THICKNESS OF .239", USE ARM WITH .239" MINIMUM WALL THICKNESS FOR ENTIRE ARM LENGTH.

USE ARM WITH BASE DIAMETER NOT EXCEEDING THE SPECIFIED MINIMUM DIAMETER BY MORE THAN 0.75" FOR THE 36'-0", 40'-0", AND 48'-0" ARMS. USE ARM WITH BASE DIAMETER NOT EXCEEDING THE SPECIFIED MINIMUM DIAMETER BY MORE THAN 0.25" FOR THE 50'-0" ARM.

DO NOT USE SPACING LESS THAN 10'-0" BETWEEN THE CENTER OF THE THREE HEAD SECTION OF ADJACENT SIGNALS.



LOAD CASE 2

SIGNAL ARM DATA									
SIGNAL ARM LENGTH	MINIMUM ARM BASE DIAMETER	*MINIMUM ARM WALL THICKNESS	MAST ARM BASE R.			CAP SCREW SPACING	ATTACHMENT CAP SCREW	BASE THICKNESS	FLANGE THICKNESS
			W	H	A B				
28'-0"	10"	.239"	17"	27"	12"	20"	1.5" x 4"	2"	2"
30'-0"	10.75"	.239"	17"	27"	12"	20"	1.5" x 4"	2"	2"
34'-0"	11.5"	.239"	17"	27"	12"	20"	1.5" x 4"	2"	2"

POLE DATA						LUMINAIRE ARM	SIGNAL ARM LENGTH
SIGNAL POLE LENGTH	POLE BASE DIMENSION	BASE BOLT CIRCLE	POLE BASE THICKNESS	ANCHOR BOLT			
21'-8" OR 28'-0"	24"	24"	2"	1.78" x 84" x 6"		4'-0" TO 20'-0"	25'-0" TO 34'-0"

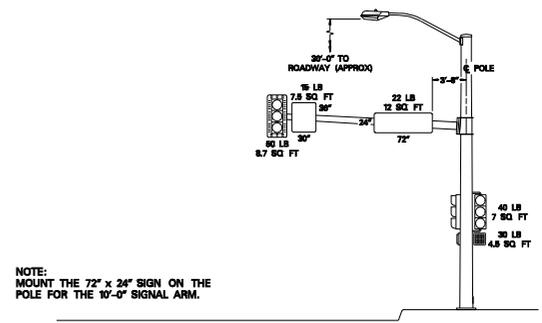
NOTES:

USE POLE WITH A MINIMUM BASE DIAMETER OF 16", A MINIMUM WALL THICKNESS OF .3125" AT AND BELOW THE SIGNAL ARM CONNECTION, AND A MINIMUM WALL THICKNESS OF .239" ABOVE THE SIGNAL ARM CONNECTION.

* USE ARM WITH .239" MINIMUM WALL THICKNESS FOR THE ENTIRE ARM LENGTH.

USE ARM WITH BASE DIAMETER NOT EXCEEDING THE SPECIFIED MINIMUM DIAMETER BY MORE THAN 1.25".

DO NOT USE SPACING LESS THAN 10'-0" BETWEEN THE CENTER OF THE THREE HEAD SECTION OF ADJACENT SIGNALS.



LOAD CASE 1

SIGNAL ARM DATA									
SIGNAL ARM LENGTH	MINIMUM ARM BASE DIAMETER	*MINIMUM ARM BASE WALL THICKNESS	MAST ARM BASE R.			CAP SCREW SPACING	ATTACHMENT CAP SCREW	BASE THICKNESS	FLANGE THICKNESS
			W	H	A B				
10'-0"	6.75"	.178"	14"	20"	9.5"	13"	1.25" x 3"	1.5"	1.5"
15'-0"	7.5"	.178"	14"	20"	9.5"	13"	1.25" x 3"	1.5"	1.5"
20'-0"	8.25"	.178"	14"	20"	9.5"	13"	1.25" x 3"	1.5"	1.5"
24'-0"	9"	.178"	14"	20"	9.5"	13"	1.25" x 3"	1.5"	1.5"

POLE DATA						LUMINAIRE ARM	SIGNAL ARM LENGTH
SIGNAL POLE LENGTH	POLE BASE DIMENSION	BASE BOLT CIRCLE	POLE BASE THICKNESS	ANCHOR BOLT			
21'-8" OR 28'-0"	24"	24"	1.78"	1.78" x 84" x 6"		4'-0" TO 20'-0"	10'-0" TO 24'-0"

NOTES:

USE POLE WITH A MINIMUM BASE DIAMETER OF 12.5" AND A MINIMUM WALL THICKNESS OF .239".

* USE ARM WITH .178" MINIMUM WALL THICKNESS FOR THE ENTIRE ARM LENGTH.

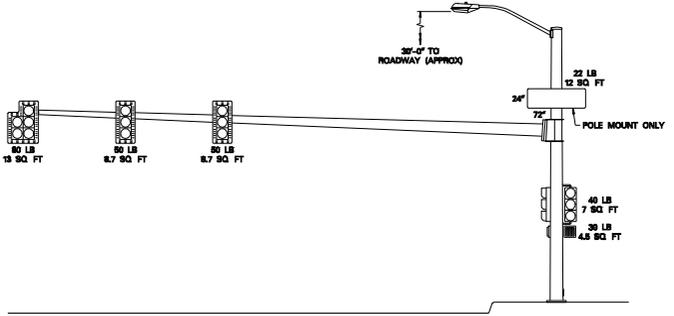
USE ARM WITH BASE DIAMETER NOT EXCEEDING THE SPECIFIED MINIMUM DIAMETER BY MORE THAN 1.25".

REVISION	
REVISED FOR WYDOT'S 2003 STANDARD SPECIFICATIONS	12-JAN-06
REVISED SIGNAL POLE LENGTH AND ADDED NOTE FOR LOAD CASES 2 AND 3	08-MAY-06

WYOMING DEPARTMENT OF TRANSPORTATION

STANDARD SIGNAL POLE FABRICATION AND INSTALLATION DATA (STRAIGHT SIGNAL ARMS)

DRAWN BY: WES / KCD / TEW	DATE: 09-MAY-06
CHKD BY: PDH	SHEET 3 OF 4



LOAD CASE 4

SIGNAL ARM DATA									
SIGNAL ARM LENGTH	ARM BASE DIAMETER	*MINIMUM ARM BASE WALL THICKNESS	MAST ARM BASE E.			CAP SCREW SPACING	ATTACHMENT CAP SCREW	BASE THICKNESS	FLANGE THICKNESS
			W	H	A B				
55'-0"	13.5"	.3125"	17"	27"	12" 20"	1.5" x 4"	2"	2"	

POLE DATA						LUMINAIRE ARM	SIGNAL ARM LENGTH
SIGNAL POLE LENGTH	POLE BASE DIMENSION	BASE BOLT CIRCLE	POLE BASE THICKNESS	ANCHOR BOLT			
21'-0" OR 28'-0"	24"	24"	2"	1.75" x 84" x 6"		4'-0" TO 20'-0"	55'-0"

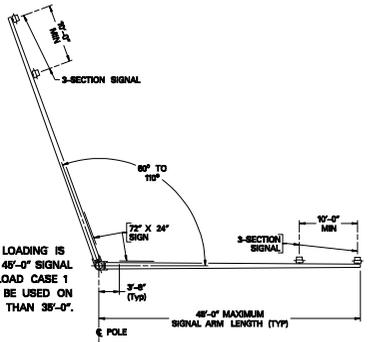
NOTES:

USE POLE WITH A MINIMUM BASE DIAMETER OF 15", A MINIMUM WALL THICKNESS OF .3125" AT AND BELOW THE SIGNAL ARM CONNECTION, AND A MINIMUM WALL THICKNESS OF .238" ABOVE THE SIGNAL ARM CONNECTION.

* A WALL THICKNESS OF NOT LESS THAN .238" MAY BE USED ON THE PORTION OF THE ARM WITH DIAMETERS LESS THAN 10.25". ENSURE THE REMAINDER OF THE ARM HAS THE SAME WALL THICKNESS AS PROVIDED AT THE ARM BASE.

ENSURE ARM BASE DIAMETER DOES NOT EXCEED THE SPECIFIED DIAMETER.

DO NOT USE SPACING LESS THAN 10'-0" BETWEEN THE CENTER OF THE THREE HEAD SECTION OF ADJACENT SIGNALS.



NOTE: MAXIMUM ALLOWABLE LOADING IS SHOWN FOR 35'-0" TO 45'-0" SIGNAL ARM LENGTHS. FULL LOAD CASE 1 OR LOAD CASE 2 MAY BE USED ON SIGNAL ARMS SHORTER THAN 35'-0".

DOUBLE SIGNAL ARM LOADING

NOTES:

USE POLE WITH A MINIMUM BASE DIAMETER OF 15" WHEN NEITHER SIGNAL ARM LENGTH EXCEEDS 24'-0".

USE POLE WITH A MINIMUM BASE DIAMETER OF 18.25" WHEN ONE OR BOTH SIGNAL ARM LENGTHS EXCEED 24'-0".

USE POLE WITH A MINIMUM WALL THICKNESS OF .3125" AT AND BELOW THE HIGHEST SIGNAL ARM CONNECTION, AND A MINIMUM WALL THICKNESS OF .238" ABOVE THE HIGHEST SIGNAL ARM CONNECTION.

USE BASE PLATE AND ANCHOR BOLTS CORRESPONDING TO LOAD CASE 4 REQUIREMENTS.

USE POLE WITH TWO SEPARATE SIGNAL ARM TO POLE CONNECTION ASSEMBLIES. ENSURE ATTACHMENT HEIGHT OF THE LONGER SIGNAL ARM IS 1'-3" LESS THAN THE ARM ATTACHMENT HEIGHT SPECIFIED ON SHEET NO.1. ATTACH SHORTER SIGNAL ARM ABOVE THE LONGER SIGNAL ARM PROVIDING 4" CLEARANCE BETWEEN THE TWO SIGNAL ARM TO POLE CONNECTION ASSEMBLIES.

REVISION	
REVISED FOR WYDOT'S 2003 STANDARD SPECIFICATIONS	12-JAN-06
REVISED SIGNAL POLE LENGTH AND ADDED NOTE FOR LOAD CASES 4	09-MAY-06

WYOMING DEPARTMENT OF TRANSPORTATION	
STANDARD SIGNAL POLE FABRICATION AND INSTALLATION DATA (STRAIGHT SIGNAL ARMS)	
DRAWN BY: WES / KCD / TEW	DATE: 09-MAY-06
CHKD BY: PDH	SHEET 4 OF 4