

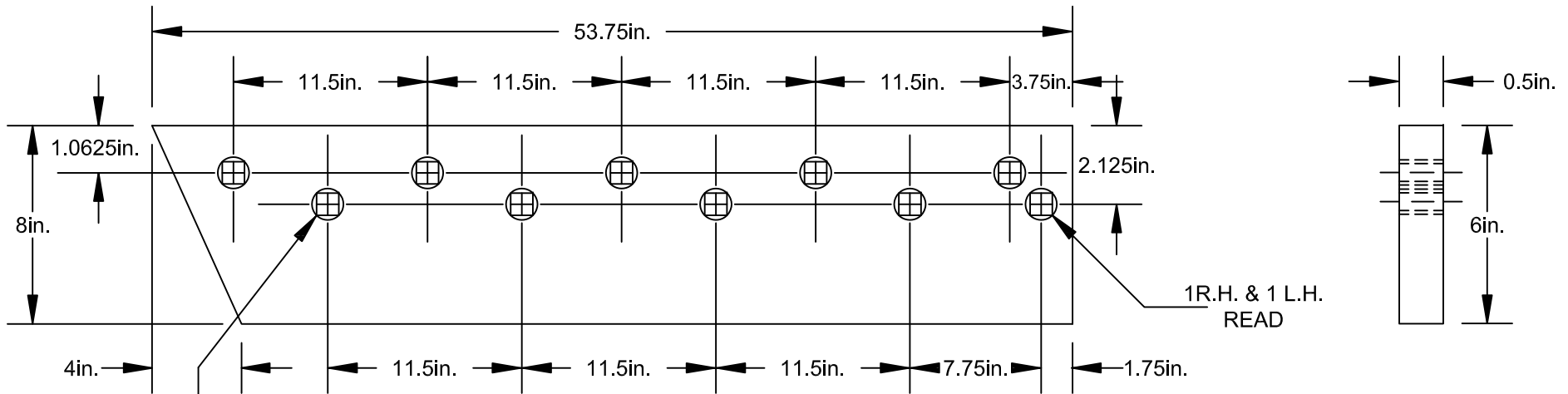
**NOTES:**

1. ALL DIMENSIONS ARE IN INCHES.
2. MATERIAL: CARBON STEEL AISI 1080-1085 BRINELL HARDNESS 250-325\*.

EACH BLADE SECTION SHALL BE PUNCHED WITH A DATE OF MANUFACTURE AND THE MANUFACTURER'S NAME.

\*STEEL SPECIFICATION.

PA DEPARTMENT OF TRANSPORTATION					
REVISIONS			STEEL CUTTING EDGES FOR SNOW PLOWS		
NO.	DATE	BY	DRAWN BY	SCALE	
1	03-30-07	CJW			
2	06-14-07	KNH	DLW	N/A	EQN-16A
3	07-29-15	JJJ	DATE 02-06-96	CHK'D BY WHM	SHEET 1 OF 2



TEN (10) .6875in.  
 SQUARE HOLES,  
 COUNTERSUNK TO  
 FIT .625in. DIA.  
 PLOW BOLTS.

1R.H. & 1 L.H.  
 READ

**NOTES:**

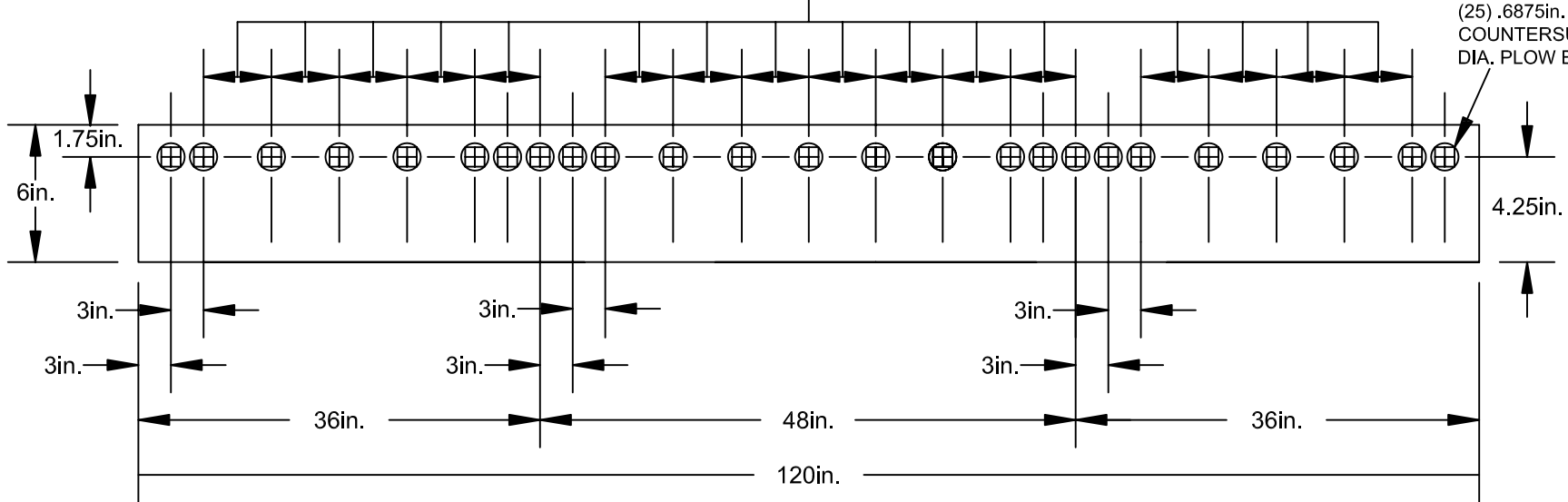
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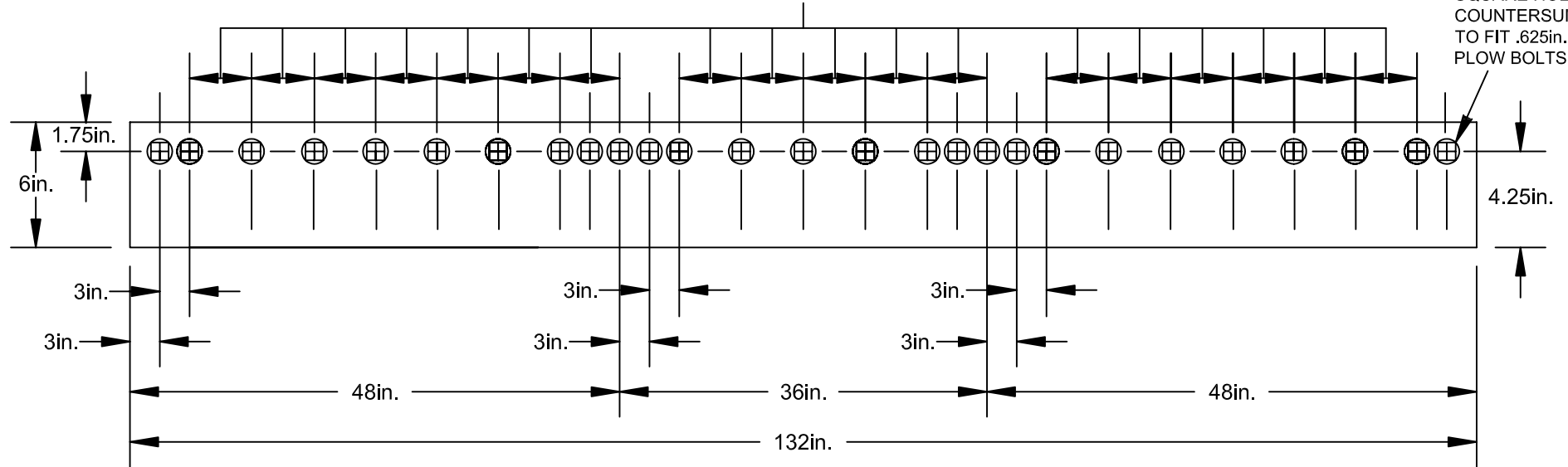
PA DEPARTMENT OF TRANSPORTATION					
REVISIONS			STEEL CUTTING EDGES FOR SNOW PLOWS		
NO.	DATE	BY			
1	03-30-07	CJW			
2	06-14-07	KNH	DRAWN BY	DLW	SCALE
3	07-29-15	JJB	DATE	05-13-98	CHK'D BY
			N/A	EQN-16A	SHEET 2 OF 2

EACH 6in. APART, CENTER TO CENTER



(25) .6875in. SQUARE HOLES, COUNTERSUNK TO FIT .625in. DIA. PLOW BOLTS

EACH 6in. APART, CENTER TO CENTER



(27) .6875in. SQUARE HOLES, COUNTERSUNK TO FIT .625in. DIA. PLOW BOLTS

**NOTES:**

1. ALL DIMENSIONS ARE IN INCHES.
2. MATERIAL: CARBON STEEL AISI 1080-1085 BRINELL HARDNESS 250-325\*
3. TO BE COMPATIBLE WITH PA SNOW PLOWS.
4. ORDER TO BE COMPLETED ONLY AFTER ACCEPTANCE OF PILOT MODEL.
5. THICKNESS .625in.

\*STEEL SPECIFICATION

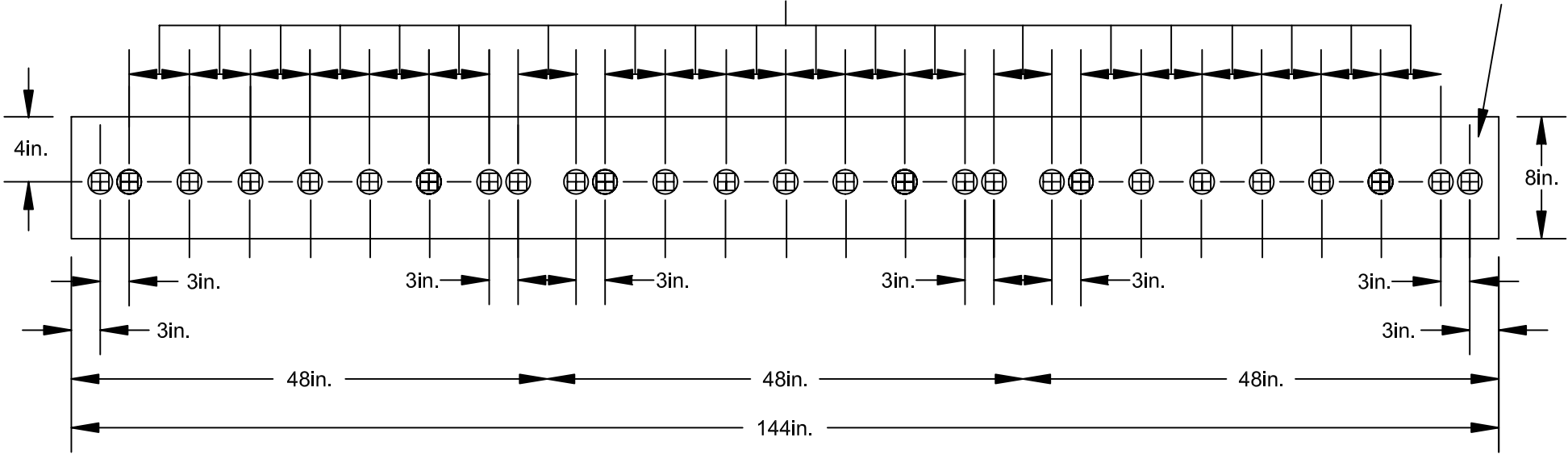
BLADE SELECTION SHALL BE PUNCHED WITH THE DATE OF MANUFACTURE AND NAME OF THE MANUFACTURER.

**PA DEPARTMENT OF TRANSPORTATION**

REVISIONS			STEEL COVER BLADES FOR CARBIDE CUTTING EDGES		
NO.	DATE	BY			
1	03-30-07	CJW			
2	06-14-07	KNH	DRAWN BY	DLW	SCALE N/A
3			DATE	02-09-96	CHK'D BY WHM
					EQN-16D
					SHEET 1 OF 1

EACH 6in. APART, CENTER TO CENTER

(27) .6875in.  
SQUARE HOLES,  
COUNTERSUNK  
HOLES TO FIT  
.625in. DIA.  
PLOW BOLTS



EACH BLADE SELECTION SHALL BE  
PUNCHED WITH DATE OF MANUFACTURE,  
AND MANUFACTURER'S NAME

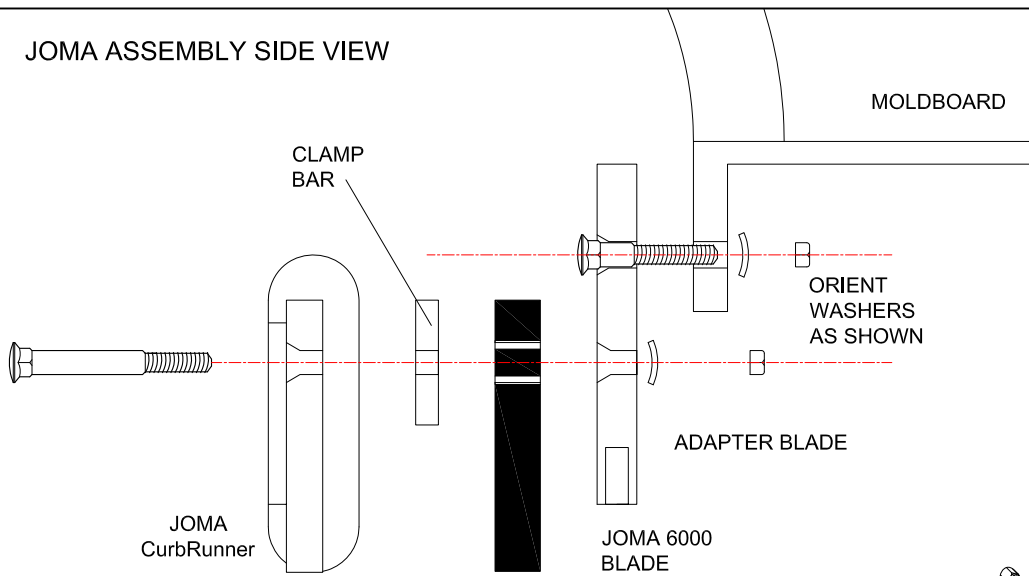
**NOTES:**

1. ALL DIMENSIONS ARE IN INCHES.
2. MATERIAL: CARBON STEEL AISI 1080-1085  
BRINELL HARDNESS 250-325\*
3. TO BE COMPATIBLE WITH PA SNOW PLOWS.
4. ORDER TO BE COMPLETED ONLY AFTER  
ACCEPTANCE OF PILOT MODEL.
5. THICKNESS .625in.

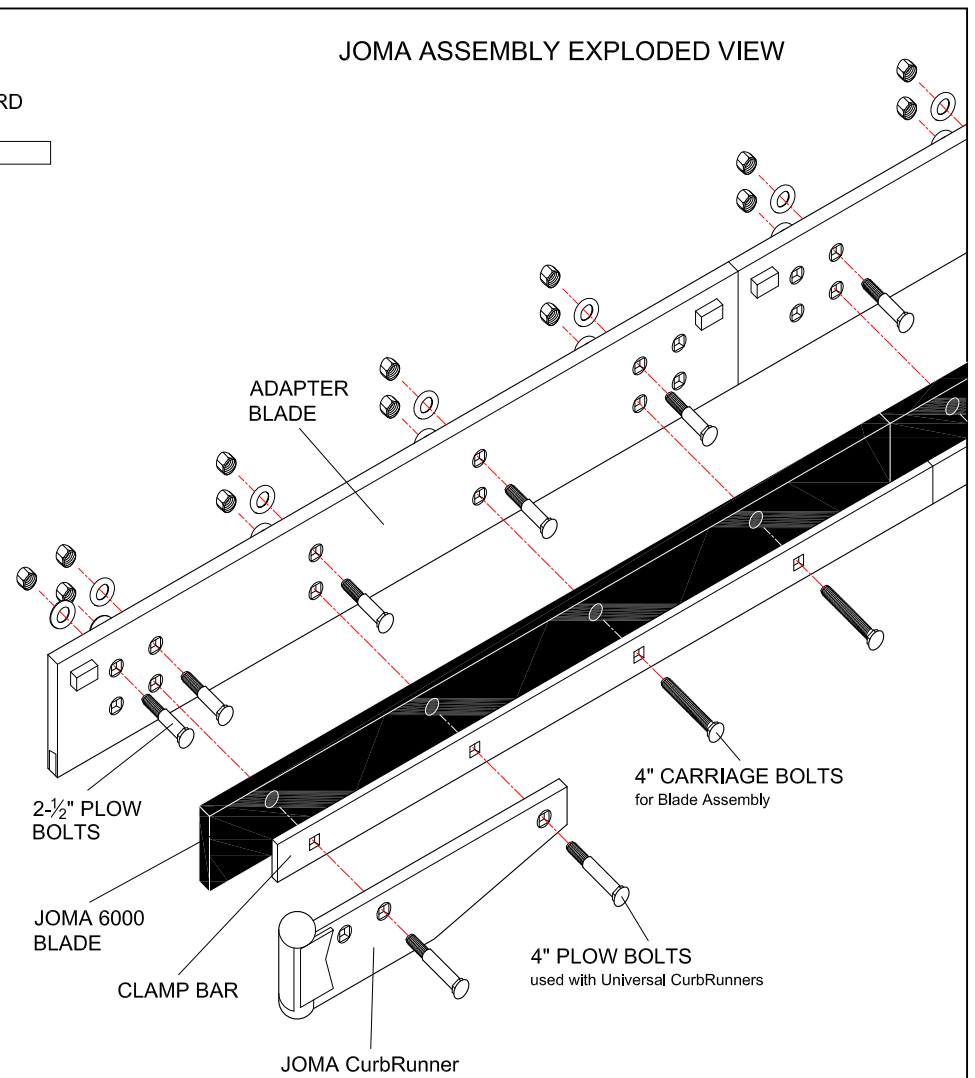
\*STEEL SPECIFICATION

PA DEPARTMENT OF TRANSPORTATION					
REVISIONS			STEEL COVER BLADES FOR CARBIDE CUTTING EDGES		
NO.	DATE	BY			
1	03-30-07	CJW			
2	06-14-07	KNH	DRAWN BY	DLW	SCALE N/A
3			DATE	05-26-98	CHK'D BY WHM
					EQN-16F
					SHEET 1 OF 1

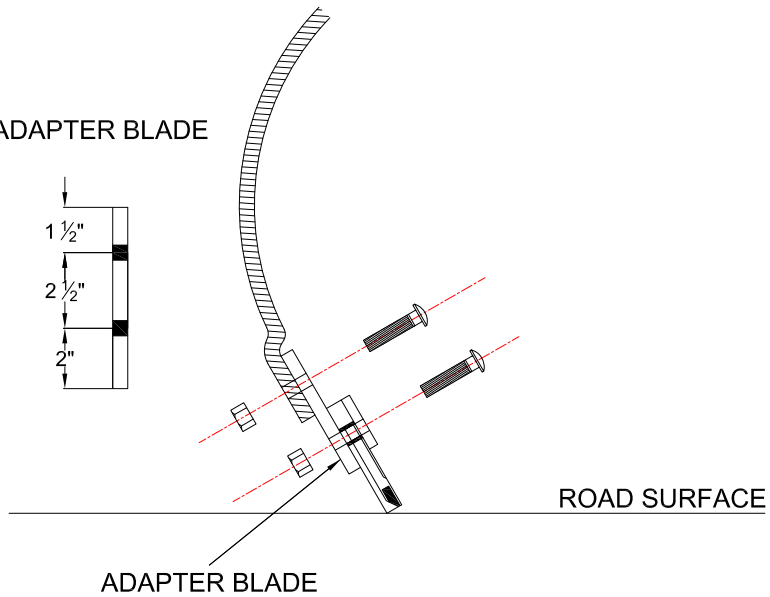
JOMA ASSEMBLY SIDE VIEW



JOMA ASSEMBLY EXPLODED VIEW

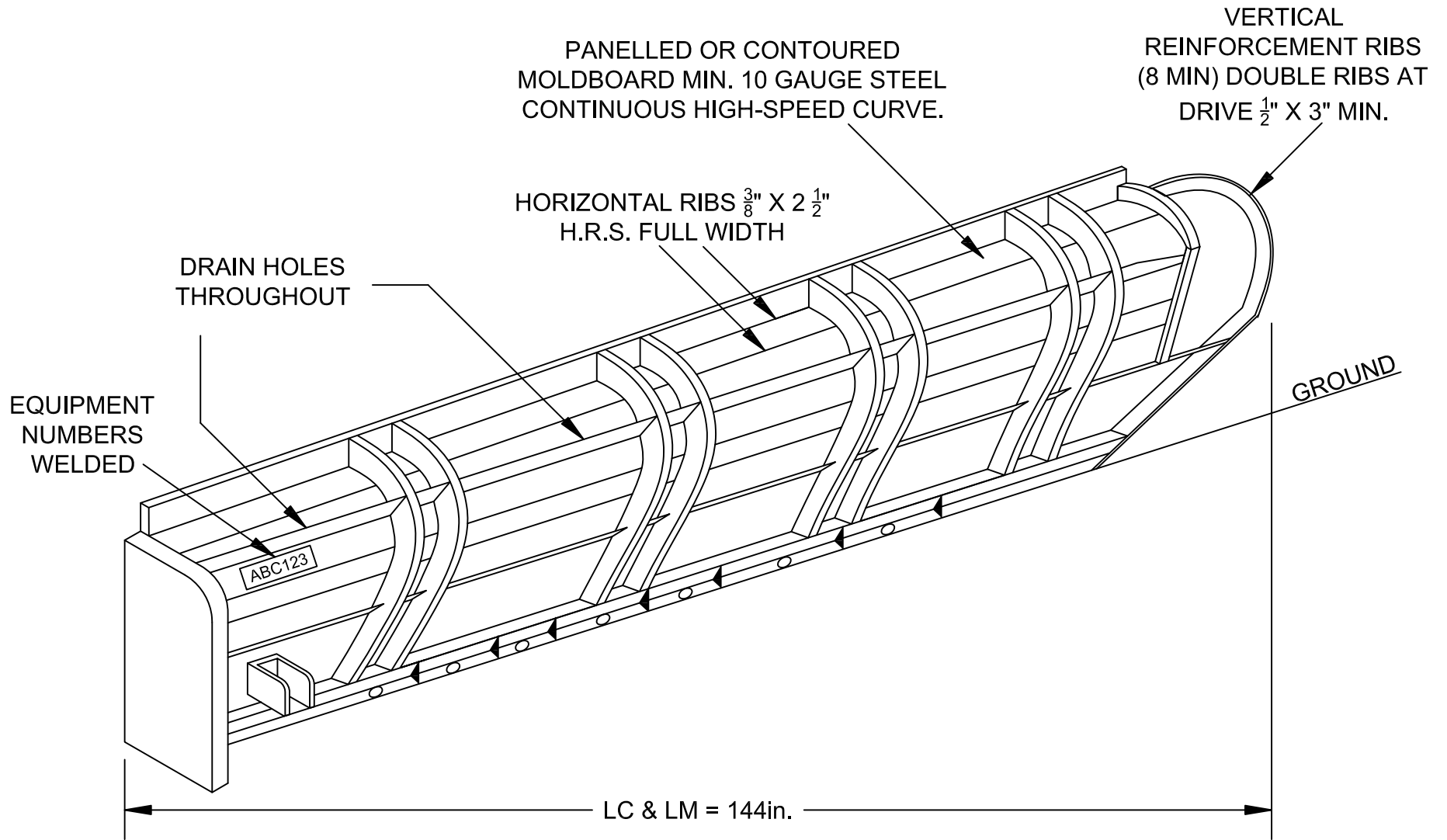


ADAPTER BLADE

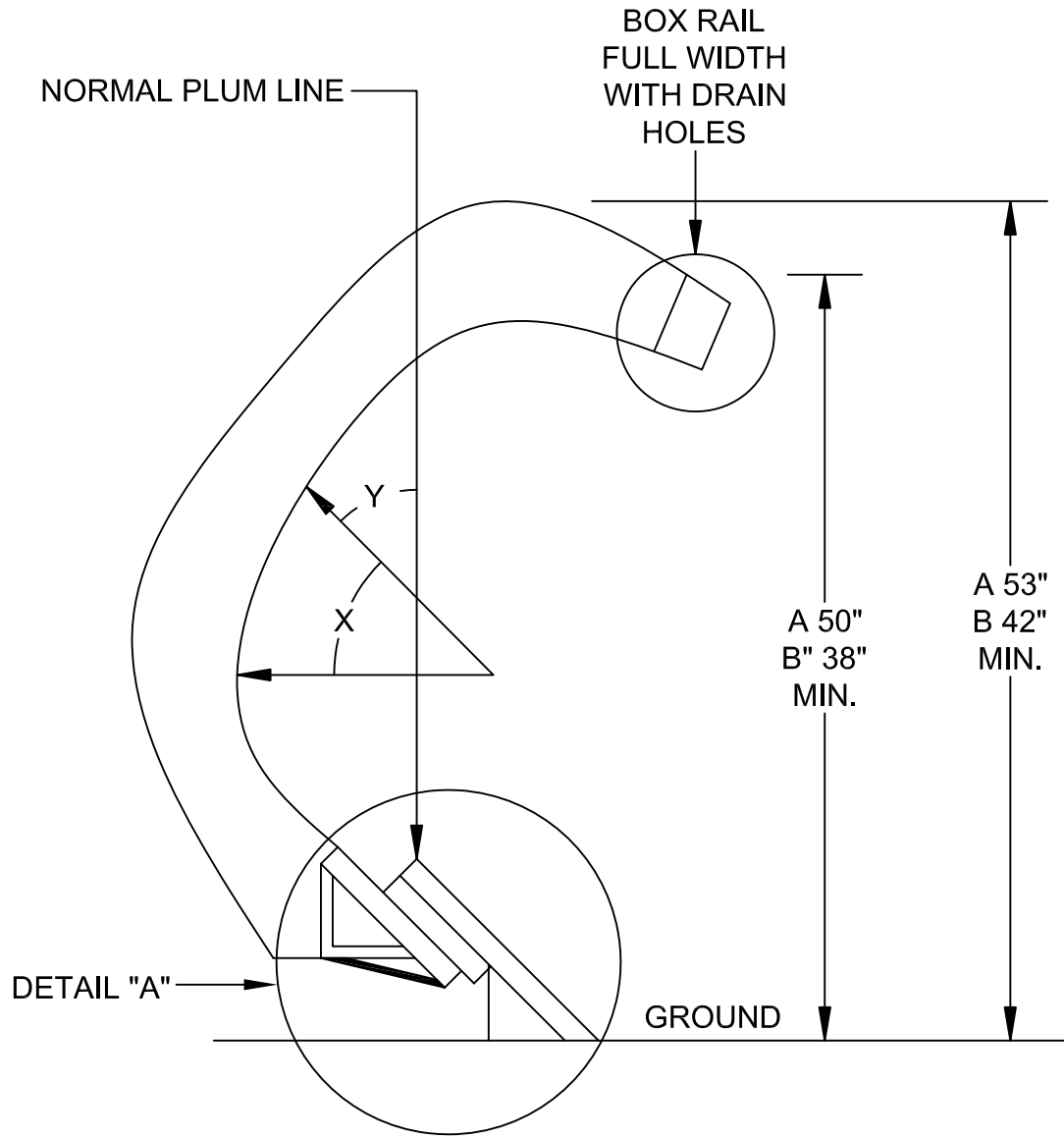


PA DEPARTMENT OF TRANSPORTATION

REVISIONS			JOMA 6000 CUTTING BLADE		
NO.	DATE	BY			
1	00-00-00	INT			
2			DRAWN BY	JFM	SCALE N/A
3			DATE	06-24-13	CHK'D BY INT
					EQN-16G
			SHEET 1 OF 1		

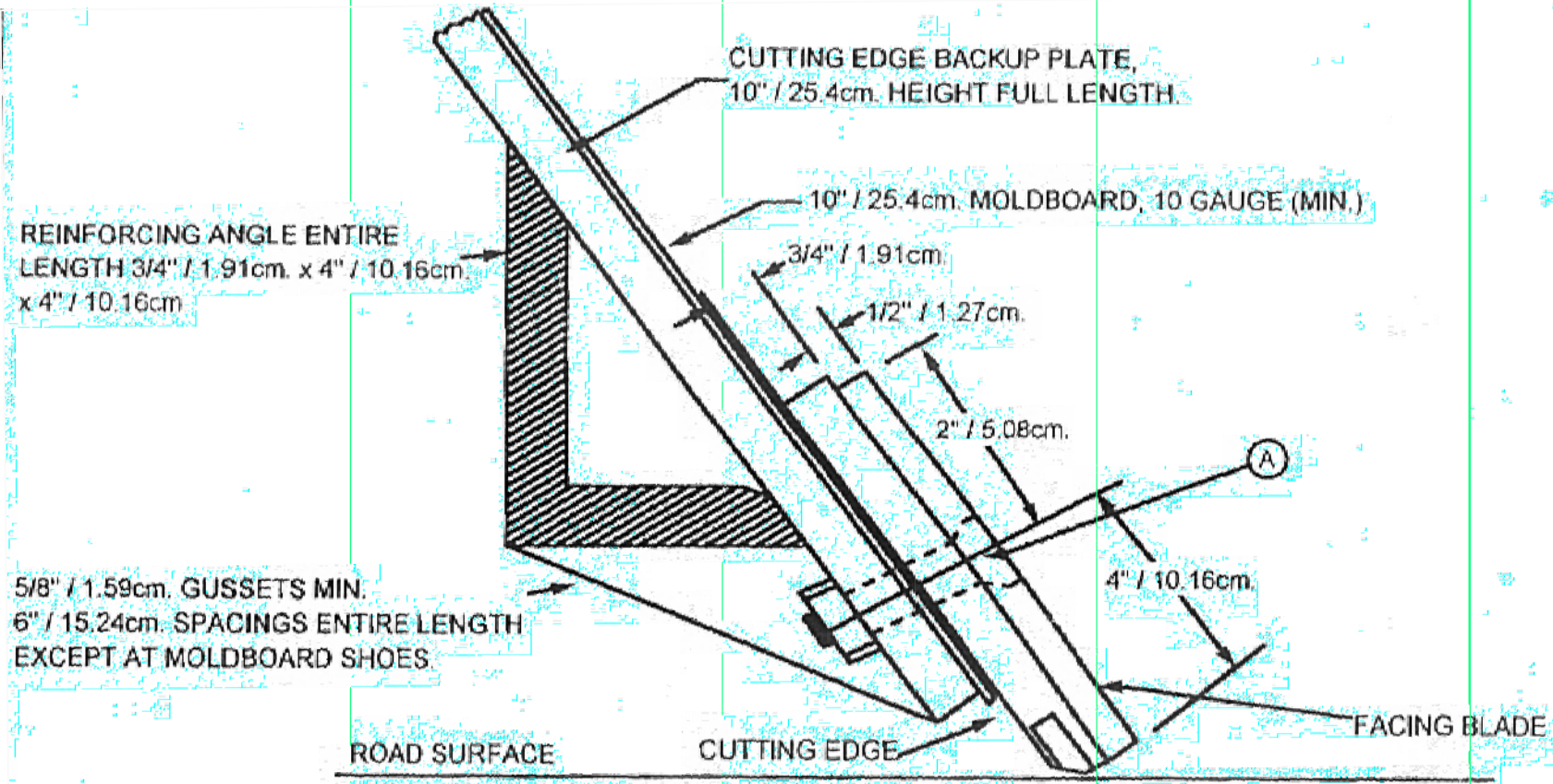


PA DEPARTMENT OF TRANSPORTATION						
REVISIONS			REVERSIBLE PLOW (50" X 144" & 42" X 132")			
NO.	DATE	BY	DRAWN BY	SCALE		
1	04-05-96	SWW	SWW	N/A	EQN-34	
2	03-01-99	SWW	DATE	04-05-96	CHK'D BY	RED
3	09-18-07	KNH				SHEET 1 OF 10



NOTES:  
 ANGLE Y = 15 MIN.  
 ANGLE X = AS SPECIFIED BY MANUFACTURER  
 RADIUS R = AS SPECIFIED BY MANUFACTURER  
 LC = LENGTH OF CUTTING EDGE  
 LM = LENGTH OF MOLDBOARD OVERALL, LESS NOSE SHOE  
 A = 50" X 144"  
 B = 42" X 132"

PA DEPARTMENT OF TRANSPORTATION					
REVISIONS			REVERSIBLE PLOW (50" X 144" & 42" X 132")		
NO.	DATE	BY	DRAWN BY	SCALE	
1	04-05-96	SWW	SWW	N/A	EQN-34
2	03-01-99	SWW	DATE 04-05-96	CHK'D BY RED	SHEET 2 OF 10
3	09-18-07	KNH			



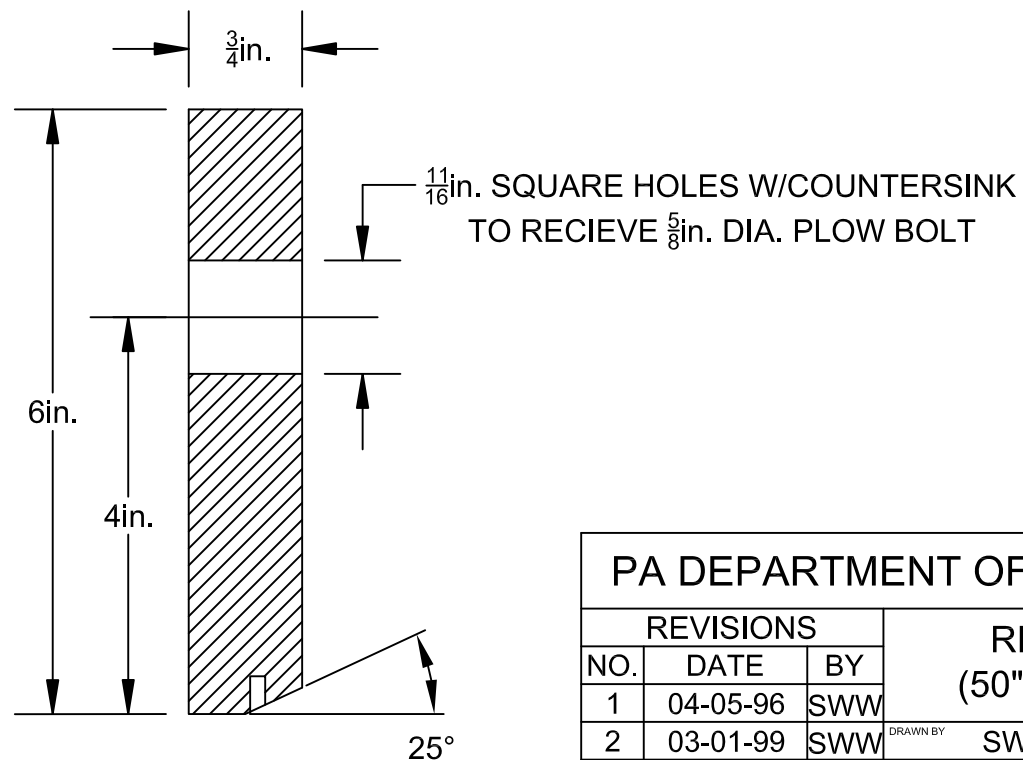
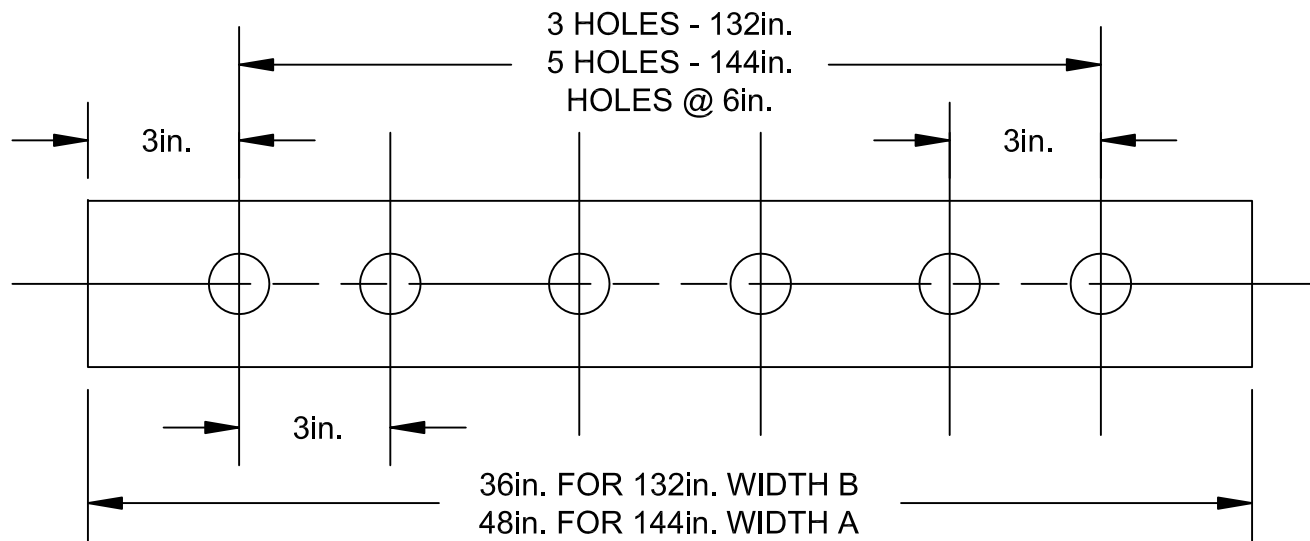
REINFORCING ANGLE ENTIRE LENGTH 3/4" / 1.91cm. x 4" / 10.16cm. x 4" / 10.16cm

5/8" / 1.59cm. GUSSETS MIN. 6" / 15.24cm. SPACINGS ENTIRE LENGTH EXCEPT AT MOLDBOARD SHOES.

(A) FLAT COUNTERSUNK GRADE 8 MINIMUM PLOW BOLT WITH SELF LOCKING ELASTIC GRADE 8 CENTER NUT. DIA. 5/8" / 1.59cm. BY APPROPRIATE LENGTH TO INSURE FULL USE OF THE NUT PLUS 1/4" / .64cm. OVERTHREAD BOLT HOLES SHALL BE SPACED TO CONTINUE WITH AASHO PUNCHINGS OF THE CUTTING EDGE. SPECIAL NOTE: BOTH BLADES MUST BE 6" / 15.24cm. BLADES.

PA DEPARTMENT OF TRANSPORTATION					
REVISIONS			REVERSIBLE PLOW (50" X 144" & 42" X 132")		
NO.	DATE	BY	DRAWN BY	SCALE	
1	04-05-96	SWW	SWW	N/A	EQN-34
2	03-01-99	DJA			
3			DATE 04-05-96	CHK'D BY RED	SHEET 3 OF 10





PA DEPARTMENT OF TRANSPORTATION

REVISIONS			REVERSIBLE PLOW (50" X 144" & 42" X 132")		
NO.	DATE	BY	DRAWN BY	SCALE	
1	04-05-96	SWW			
2	03-01-99	SWW	SWW	N/A	EQN-34
3	09-18-07	KNH	DATE 04-05-96	CHK'D BY RED	SHEET 4 OF 10

**NOTE:**

THE SUCCESSFUL VENDOR MUST PROVIDE WRITTEN CERTIFICATION THAT THE BLADES MEET OR EXCEED THIS CRITERIA.

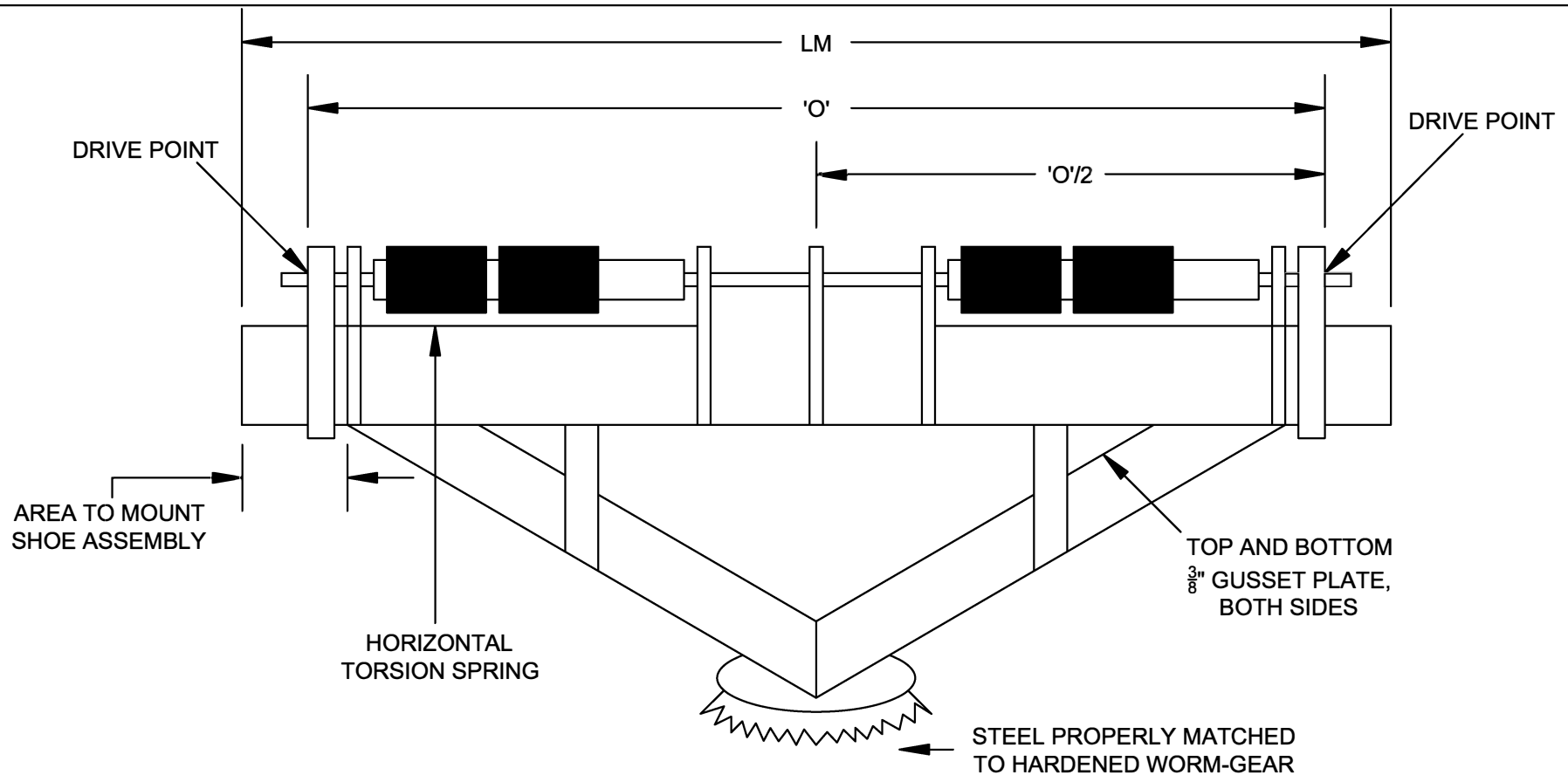
**BLADE ASSEMBLY FOR ((B) 132" & (A) 144"**

- CUTTING EDGE BOLT HOLES SPACED TO COINCIDE WITH STANDARD BOLT HOLE (AASHO) PUNCHING.
- LOCATION AND SPACING OF HOLES SHALL BE AS INDICATED (TOLERANCE OFF CENTER OFF CENTER LINE SHALL BE +/-  $\frac{1}{32}$ ").
- CUTTING EDGE SHALL BE FLAT HOT-ROLLED FINISHED STEEL SAE 1020-1040.
- TUNGSTEN BRAZING MATERIAL SHEAR STRENGTH SHALL BE 30,000psi MIN, ALL SIDES BRAZED.
- SPACE BETWEEN TUNGSTEN INSERTS SHALL BE  $\frac{1}{100}$ ".
- CUTTING EDGE WARPAGE AND LONGITUDINAL DEVIATION SHALL NOT EXCEED  $\frac{1}{8}$ " PER 4" LENGTH.

**CARBIDE CUTTING EDGE INSERTS**

SHAPE TRAPEZOIDAL.	DIMENSIONS AS LISTED	CHEMICAL AND PHYSICAL PROPERTIES AS LISTED	
HEIGHT	$\frac{3}{5}$ " +/- $\frac{1}{200}$ "	COBALT (%)	12.5-13
THICKNESS	$\frac{1}{5}$ " +/- $\frac{1}{100}$ "	SPECIFIC GRAVITY	14.1-14.6
LENGTH	1" NORMAL	ROCKWELL 'A'	
		HARDNESS	87.5-89
		TRANSVERSE	
		RUPTURED STRENGTH	350,000psi
HEIGHT	.635" +/- $\frac{1}{200}$ "	COBALT (%)	12.5-13.0
THICKNESS	.365" +/- $\frac{1}{100}$ "	SPECIFIC GRAVITY	14.1-14.6
LENGTH	1" NORMAL	ROCKWELL 'A'	
		HARDNESS	87.5-89
		TRANSVERSE	
		RUPTURED STRENGTH	350,000psi

PA DEPARTMENT OF TRANSPORTATION					
REVISIONS			REVERSIBLE PLOW (50" X 144" & 42" X 132")		
NO.	DATE	BY			
1	04-05-96	SWW			
2	03-02-99	DJA	<small>DRAWN BY</small> SWW	<small>SCALE</small> N/A	EQN-34
3	09-18-07	KNH	<small>DATE</small> 04-05-96	<small>CHK'D BY</small> RED	SHEET 5 OF 10

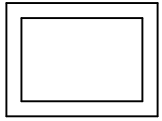


**NOTE:**

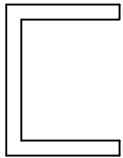
1. DRIVE FRAME SHALL BE ATTACHED TO MOLDBOARD BY MEANS OF A -325 STRUCTURAL BOLTS WITH WASHERS AND NUTS TORQUED TO 200lbs. OR TAPERED DRIVE PINS WITH COTTER PINS.
2. DRIVE FRAME CONNECTNG HINGES SHALL BE CAST OR FABRICATED.
3. DRIVE FRAME CONNECTION HINGES SHALL BE DESIGNED SO THAT NO SHEARING OF CONNECTION PINS IS POSSIBLE.
4. DRIVE FRAME SHALL BE REINFORCED WITH A MINIMUM OF 2" X 2" X 1/4" @ 5.73#/ft. SQUARE TUBE OR RECTANGULAR REINFORCING TUBES WITH PLATES AT THE CORNER STRESS POINTS, OR APPROVED EQUAL.
5. TRIP SPRING MECHANISM SHALL BE HORIZONTAL TORSION TYPE. SPRING SHALL BE PROPERLY MOUNTED TO DRIVE FRAME.
6. REVERSING MECHANISM SHALL BE WORM-GEAR TYPE INFINITLY VARIABLE, MACHINE TYPE, OR FABRICATED.
7. WORM-GEAR ASSEMBLY SHALL BE ADJUSTABLE TO PROPERLY MATCH THE TURNING MECHANISM AND TO ALLOW FOR CORRECT TOOTH CLEARANCE AND FULL POWER SWING.
8. BOLT ON STEEL RACK WITH A MIN. OF 6 3/4" BOLTS.

**PA DEPARTMENT OF TRANSPORTATION**

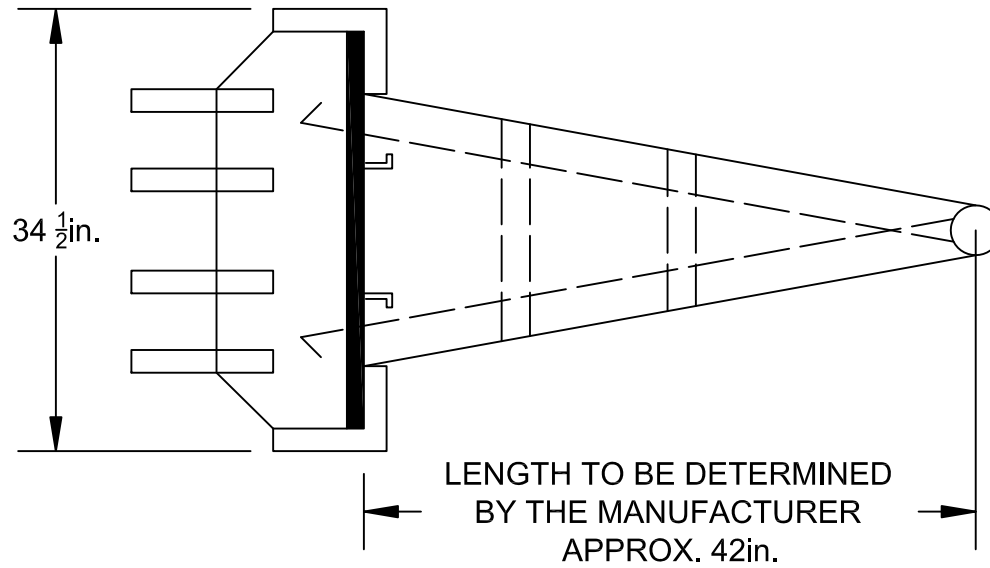
REVISIONS			REVERSIBLE PLOW (50" X 144" & 42" X 132")		
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1	04-05-96	SWW			
2	03-02-99	DJA	SWW	N/A	EQN-34
3	09-18-07	KNH	DATE 04-05-96	CHK'D BY RED	SHEET 6 OF 10



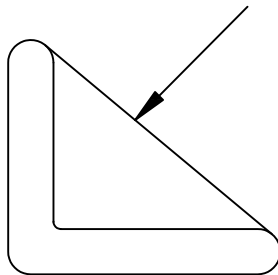
MIN. 5in. X 3in. X  
 $\frac{3}{8}$ in. @ 16.84#/ft.



MIN. 6in. X  $2\frac{1}{2}$ in. X  
 $\frac{7}{16}$ in. @ 12#/ft. SHIP  
 AND CAR CHANNEL

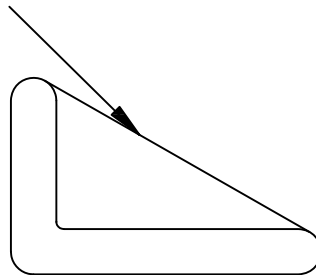


$\frac{1}{2}$ in. GUSSETS @ 8in. SPACINGS  
 SHALL CLEAR TORSION  
 SPRINGS



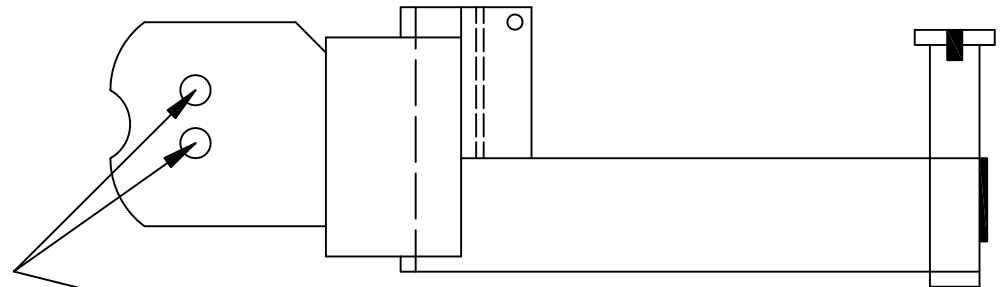
6in. X 6in. X  $\frac{1}{2}$ in.

OR



6in. X 4in. X  $\frac{1}{2}$ in.

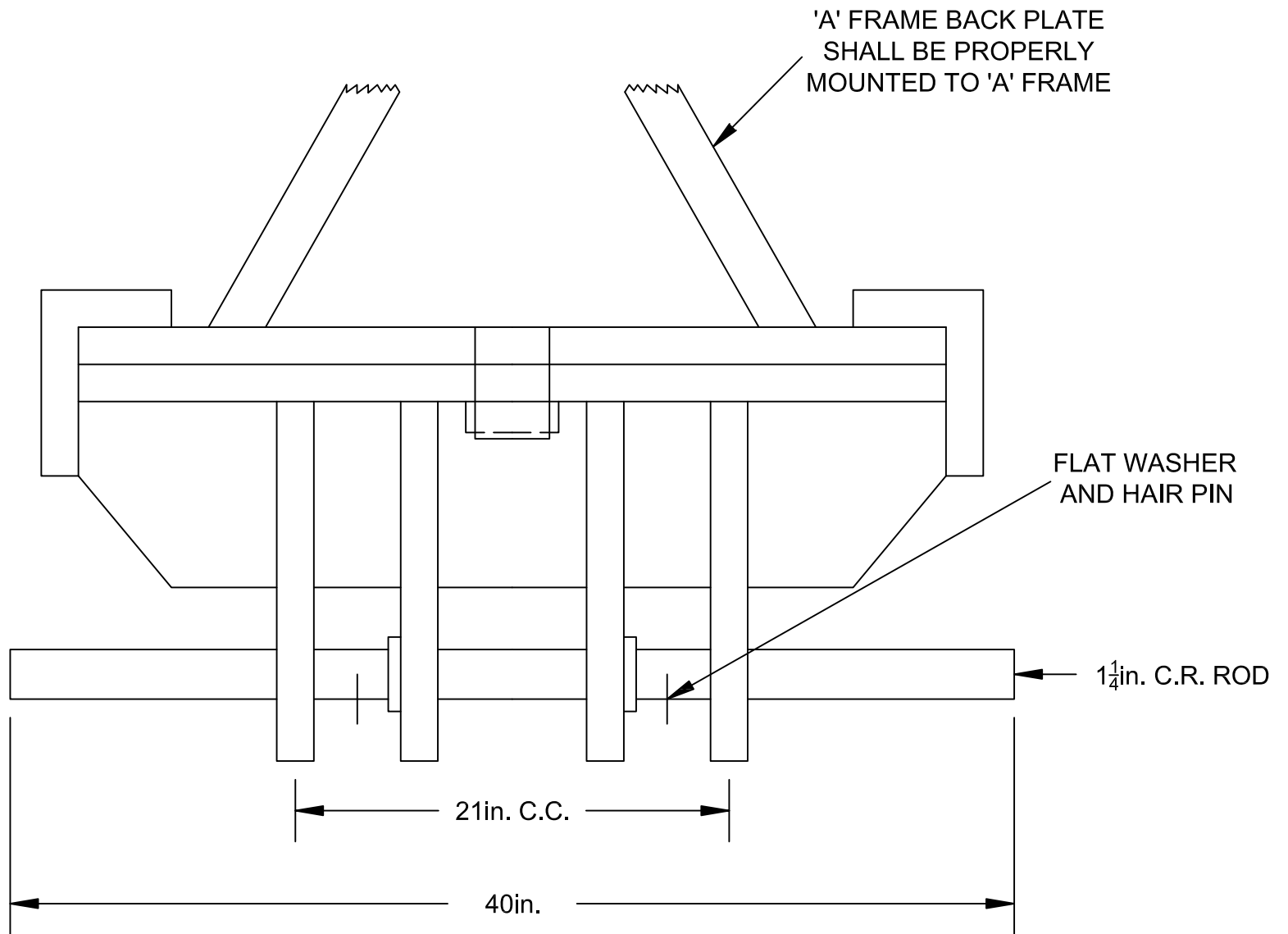
DRIVE TRAIN DETAIL



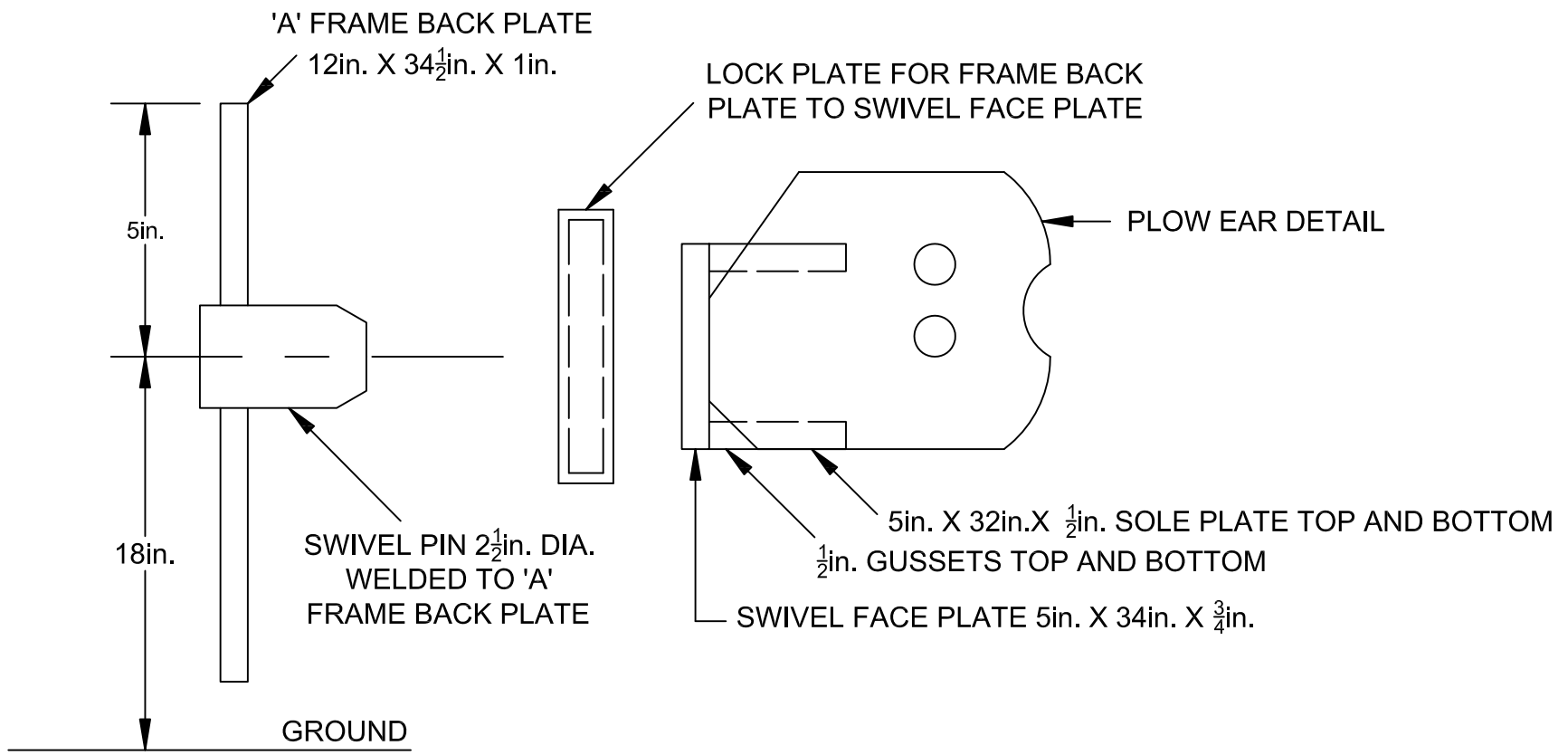
HOLES SHALL BE LINED  
 BORED OR JIGGED TO  
 ENSURE ALIGNMENT

PA DEPARTMENT OF TRANSPORTATION

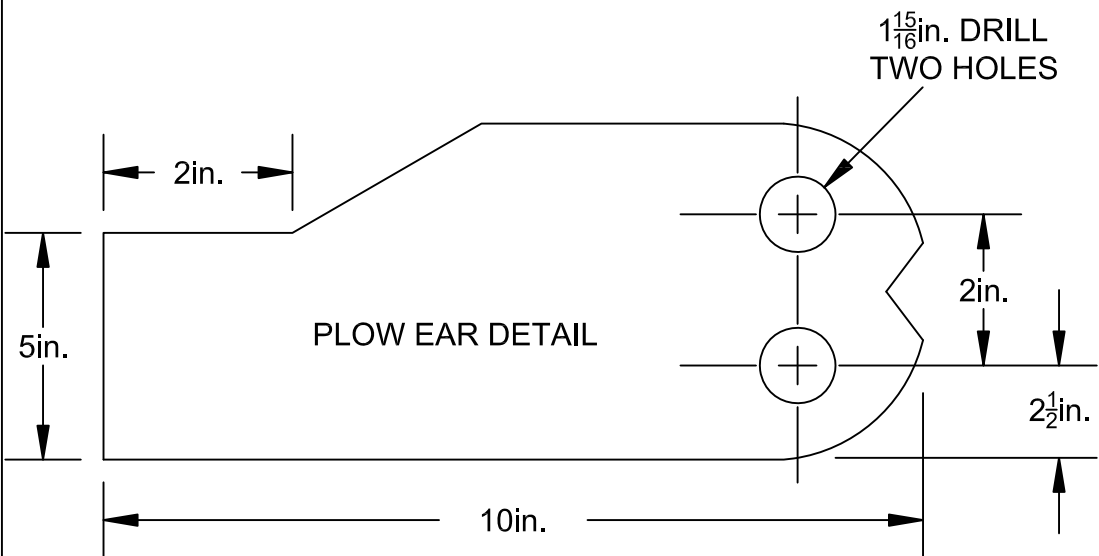
REVISIONS			REVERSIBLE PLOW (50" X 144" & 42" X 132")		
NO.	DATE	BY	DRAWN BY	SCALE	
1	04-05-96	SWW			
2	03-01-99	SWW	SWW	N/A	EQN-34
3	09-18-07	KNH	DATE 04-05-96	CHK'D BY RED	SHEET 7 OF 10



PA DEPARTMENT OF TRANSPORTATION							
REVISIONS				REVERSIBLE PLOW (50" X 144" & 42" X 132")			
NO.	DATE	BY					
1	04-05-96	SWW					
2	03-01-99	SWW	DRAWN BY	SWW	SCALE	N/A	EQN-34
3	09-18-07	KNH	DATE	04-05-96	CHK'D BY	RED	SHEET 8 OF 10



NOTE:  
ANY DEVIATIONS TO THESE  
DIMENSIONS SHALL BE DISCUSSED  
AT THE PRE-BUILD MEETING.



NOTE: 1in. PLATE STEEL

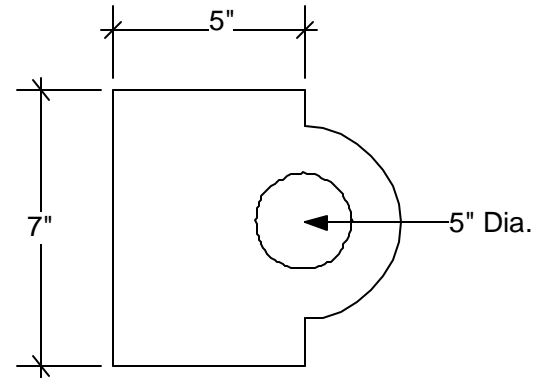
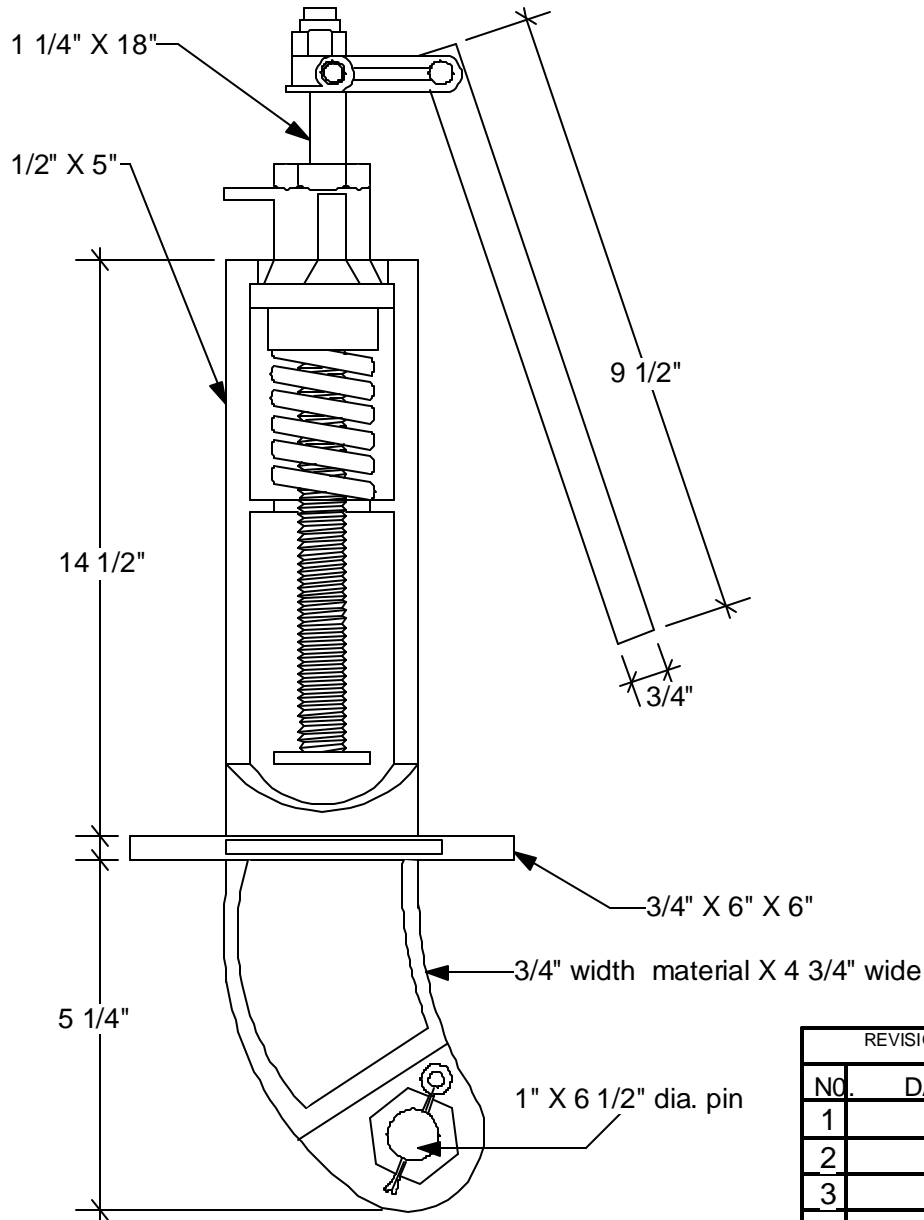
PA DEPARTMENT OF TRANSPORTATION					
REVISIONS			REVERSIBLE PLOW (50" X 144" & 42" X 132")		
NO.	DATE	BY	DRAWN BY	SCALE	
1	04-05-96	SWW	SWW	N/A	EQN-34
2	03-01-99	SWW	DATE	CHK'D BY	
3	09-18-07	KNH	04-05-96	RED	SHEET 9 OF 10

**NOTE:**

1. THE PLOW FABRICATION AND ASSEMBLY SHALL CONFORM TO THE LATEST ENGINEERING TECHNIQUES AND SHALL MEET THE SPECIFICATION REQUIRMENTS OF THE FOLLOWING  
 AMERICAN STANDARD LIMITS AND FITS  
 BRITISH STANDARD FITS AND LIMITS  
 AMERICAN SOCIETY FO TESTING MATERIALS  
 SOCIETY OF AUTOMOTIVE ENGINEERING  
 AMERICAN INSTITUE OF STEEL CONSTRUCTION  
 STEEL STRUCTURE PAINTING COUNCIL  
 AMERICAN WELDING SOCIETY D2-0-69 SUB SETION 303 (FIT AND ASSEMBLY)  
 AMERICAN WELDING SOCIETY D2-0-69 SECTION 3 (WELDING WORKMANSHIP AND QUALITY)
2. ALL WELDING SHALL BE ACCOMPLISHED BY ONE OR A COMBINATION OF THE FOLLOWING PROCESSES: GAS METAL ARC, FLUX CORED ARC AND / OR SUBMERGED ARC WELDING PROCEDURES.
3. BEFORE WELDING, ALL COMPONENTS MUST BE POSITIONED ON PRECISION ENGINEERED MECHANICAL POSITIONERS (JIG) IN ORDER TO ASSURE THE BEST POSSIBLE FIT.
4. ALL STEEL UNLESS OTHERWISE SPECIFIED SHALL BO HOT ROLLED STEEL (HRS) ASTM-A-36.
5. THE TWO (2) MOLDBOARD SHOES, SHALL BE PARALLEL TO ROAD SURFACE.
6. ACCESSORIES SUCH AS THE LIFT CHAIN, ( $\frac{7}{16}$ " CADIUM PLATED), BRACKET FOR ATTACHING LIFTING DEVICES, 48" LONG HYDRAULIC HOSES, HYDRAULIC QUICK COUPLERS, 1 MALE, 1 FEMALE (AEROQUIP 5100 SERIES), TO ACCOMODATE THE DEPARTMENT TRUCKS. ALL RELATED ITMES NECESSARY TO EQUIP THESE PLOWS ON THE DEPARTMENT TRUCKS SHALL BE FURNISHED AND INSTALLED.
7. PLOWS HAVE HORIZONTAL TORSION TRIP ASSEMBLIES WHICH SHALL PERMIT THE MOLDBOARD TO TRIP, PASS OVER AND OBSTRUCTION AND INSTANTLY RETURN TO PLOWING POSITION.
8. THE TRIP SPRINGS SHALL BE ADJUSTABLE RELATIVE TO TRIPPING ACTION.
9. THE MANUFACTURER SHALL PROVIDE A METAL TEMPLATE OF THE MOLDBOARD RADIUS INCLUDING THE CUTTING EDGE CUT OUT. THE BASE SHALL BE PARALLEL TO THE DECK SURFACE.
10. THERE SHALL BE A MECHANICAL LIMIT DEVICE TO STOP THE MOLDBOARD FROM OVERTIPPING BEYOND THE NORMAL SPRING TRIPPING ACTION OR IN THE EVENT OF THE MAIN TORSION SPRING BREAKING. A CABLY SYSTEM IS RECOMMENED.
11. REPLACEABLE STEEL NOSE SHOE OR RUNNER OR  $\frac{3}{4}$ " (HRS) STEEL VERITCALLY AND  $\frac{3}{4}$ " HIGH CARBON STEEL HORIZONTALLY SHALL BE PROVIDED ON BOTH SIDES OF CUTTING EDGE FOR GUIDING PLOW OVER OBSTRUCTIONS. REF: (BUMPER GUARDS).

<b>PA DEPARTMENT OF TRANSPORTATION</b>							
<b>REVISIONS</b>			<b>REVERSIBLE PLOW (50" X 144" &amp; 42" X 132")</b>				
NO.	DATE	BY					
1	04-05-96	SWW					
2	03-02-99	DJA	<small>DRAWN BY</small>	SWW	<small>SCALE</small>	N/A	EQN-35
3	09-18-07	KNH	<small>DATE</small>	04-05-96	<small>CHK'D BY</small>	RED	SHEET 10 OF 10

Quan 2 castors per plow



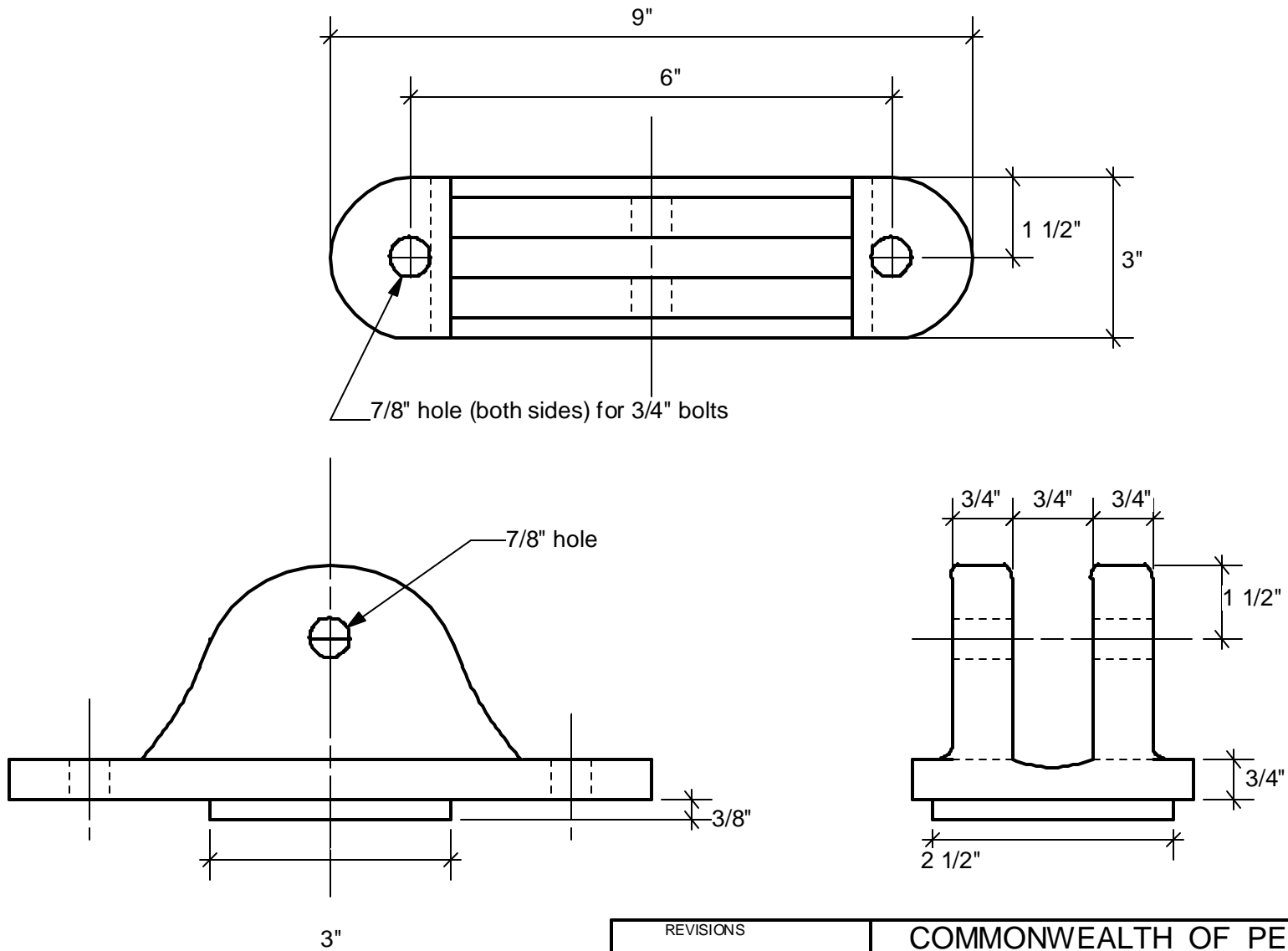
Mtdg bracket  
 Quan 2 with back plate  
 1/2" min back plate X 6" X 6" min.  
 with 6 adjustments shall be bolted  
 with 3/4" bolts Quan 4

Stem and housings shall be cast steel fitted with alemite grease fittings, fully lubricated, or fabricated

Castor shall also accomodate standard adaptor bracket and shoe as shown herein

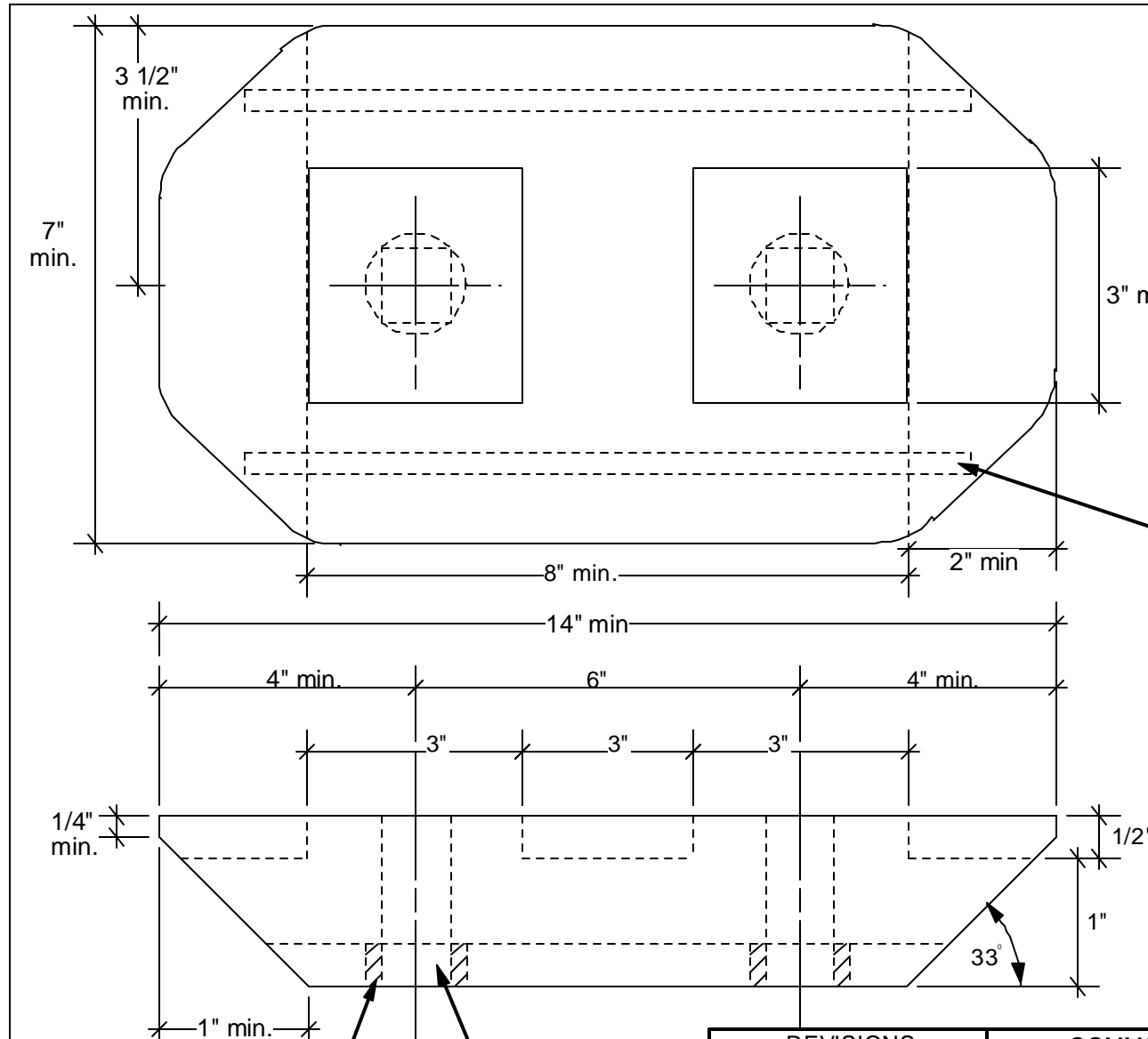
REVISIONS			COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION		
NO.	DATE	BY	REVERSIBLE PLOW 42"X11' CASTOR ASSEMBLY		
1					
2					
3			DRAWN BY	SCALE	MATERIAL
4			KNH	N/A	
5			CHKD	DATE	DRW NO
			KGK	06-23-15	EQN -34-A
			SHEET 1 OF 5		





Re: Kenemetal PBS-A25 casting

REVISIONS			COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION		
NO.	DATE	BY	REVERSIBLE PLOW 42"X11" SHOE ADAPTOR BRACKET		
1			DRAWN BY <b>KNH</b> SCALE <b>N/A</b> MATERIAL CHKD <b>KGK</b> DATE <b>06-23-15</b> DRW NO <b>EQN -34-A</b> <b>SHEET 2 OF 5</b>		
2					
3					
4					
5					



Carbide Insert Specifications  
 Width  $0.500 \pm 0.005$   
 Height  $0.375 \pm 0.010$   
 Length 1" nominal  
 Cobalt 12.5 to 13%  
 Sp. Gravity 14.1 to 14.4  
 Hardness, Rockwell 'A' 87 to 88.5  
 Transverse Rupture 350,000 P.S.I. min.

mill 1/2" wide x 3/8" deep slots and braze carbide inserts flush, tapered inserts both ends

Wear plate shall be replaceable type and shall be cast or fabricated

Re: Kenemetal PBS 2215  
 VALK V-401-0W

1" dia. 1/2" deep drill slot for bolt head  
 13/16" square hole

REVISIONS			COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION				
NO	DATE	BY					
1			REVERSIBLE PLOW 42"X11' WEAR PLATE				
2							
3			DRAWN BY	KNH	SCALE	N/A	MATERIAL
4			CHKD	KGK	DATE	06-23-15	DRW NO.
5							EQN -34-A
							SHEET 3 OF 5

**NOTES:**

1. The plow fabrication and assembly shall conform to the latest engineering techniques and shall meet the specification requirements of the following:

- American Standard Limits and Fits
- British Standard Fits and Limits
- American Society of Testing Materials
- Society Automotive Engineering
- American Institute of Steel Construction
- Steel Structure Painting Council
- American Welding Society D2-0-69 sub-section 303 (fit and assembly)
- American Welding Society D2-0-69 section 3 (welding workmanship and quality)

2. All welding shall be accomplished by one or a combination of the following processes: gas metal arc, flux cored arc and/or submerged arc welding procedures.

3. Before welding, all components must be positioned on precision engineered mechanical positioners (Jig) in order to assure the best possible fit.

4. Standard manufacturing tolerances shall be accepted by approval of the Chief-Equipment Division.

5. All steel unless otherwise specified shall be H.R.S. ASTM-A-36

6. Two (2) moldboard shoes (minimum) shall be mounted on plow.

7. Replaceable steel nose shoe or runner of 3/4" H.R.S. steel vertically and 3/4" high carbon steel horizontally shall be provided both sides of cutting edge for guiding plow over obstructions.

8. Accessories such as lift chain, (7/16" cadmium plated), bracket for attaching lifting device, hydraulic hoses, hydraulic quick couplers, (Aeroquip 5100 series), to accommodate the Departments trucks. All related items necessary to equip these plows on the Department trucks shall be furnished and installed.

9. Plow shall have horizontal torsion trip assemblies which shall permit moldboard to trip, pass over an obstruction and instantly return to plowing position.

10. The trip springs shall be adjustable relative to tripping action.

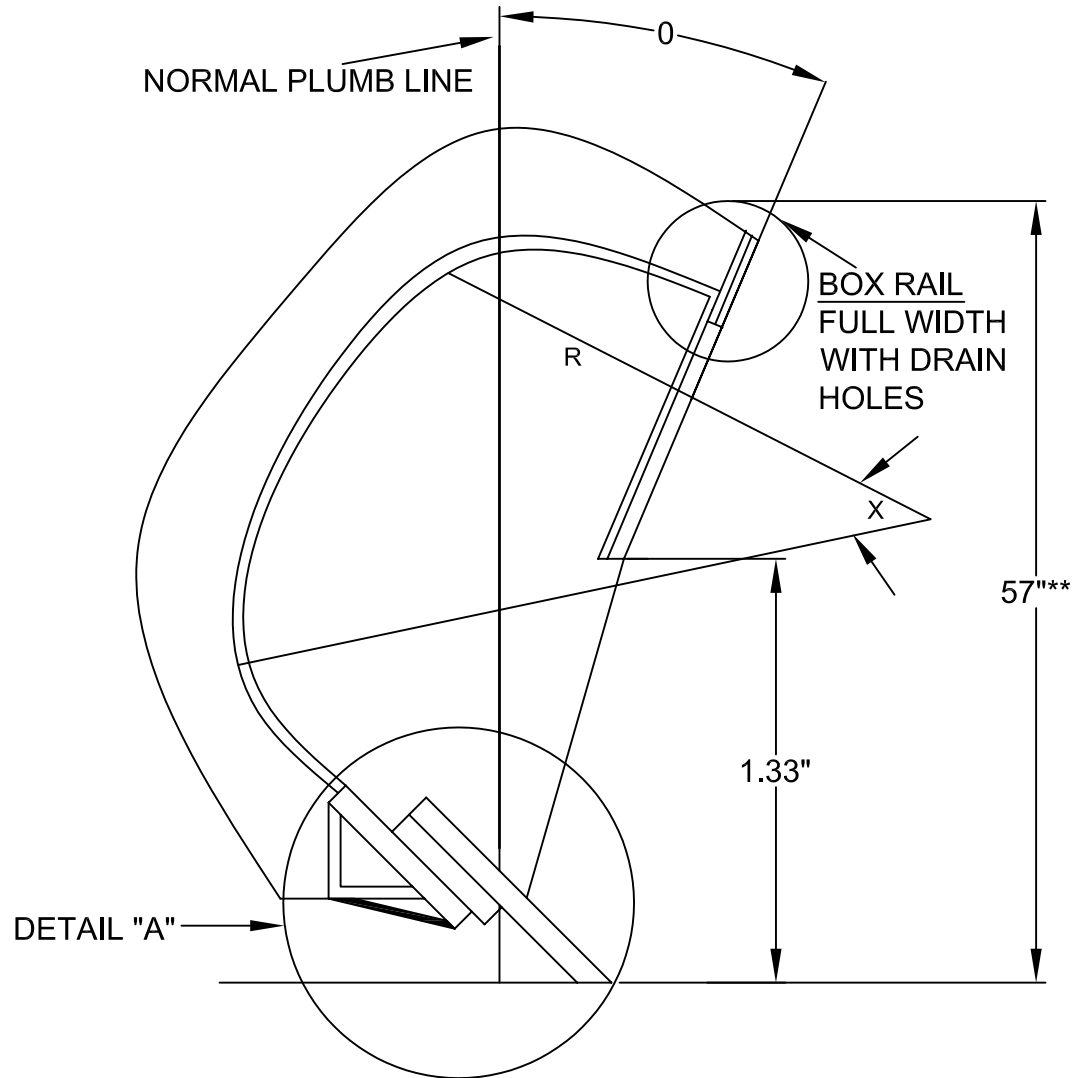
REVISIONS			COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION				
NO.	DATE	BY					
1			Reversible Plow General Notes				
2							
3							
			DRAWN BY	KNH	SCALE	N/A	MATERIAL
			CHKD	KGK	DATE	06-23-15	DRW NO.
5							EQN- 34A SHEET 4 OF 5



# MODEL #721B

ANGLE O= 15 DEG.  
 ANGLE X= 60 DEG.  
 RADIUS R= 33"  
 FOR MORE DETAIL INFORMATION ON CONTOUR  
 AND RADII SEE EQN-37A  
 LC= LENGTH OF CUTTING EDGE  
 138"-36", 36", 48".  
 LM= LENGTH OF MOLD BOARD - OVERALL LESS  
 NOSE SHOE= 162".

ALL BIDERS SHALL INSPECT THE DEPARTMENT  
 UNITS IN THE FIELD TO FUTHER CLARIFY THESE  
 DRAWINGS. THE UNITS MUST INCORPORATE  
 DESIGN FEATURES AND MOLDBOARD CONTOUR  
 OF PROTOTYPE. THE MFGR. SHALL PROVIDE A  
 METAL TEMPLATE OF THE MOLDBOARD  
 CONTOUR OF INCLUDING CUTTING EDGE CUT  
 OUT. THE BASE SHALL BE PARELLEL TO THE  
 DECK SURFACE.  
 SEE EQN-34 FOR DETAIL "A".



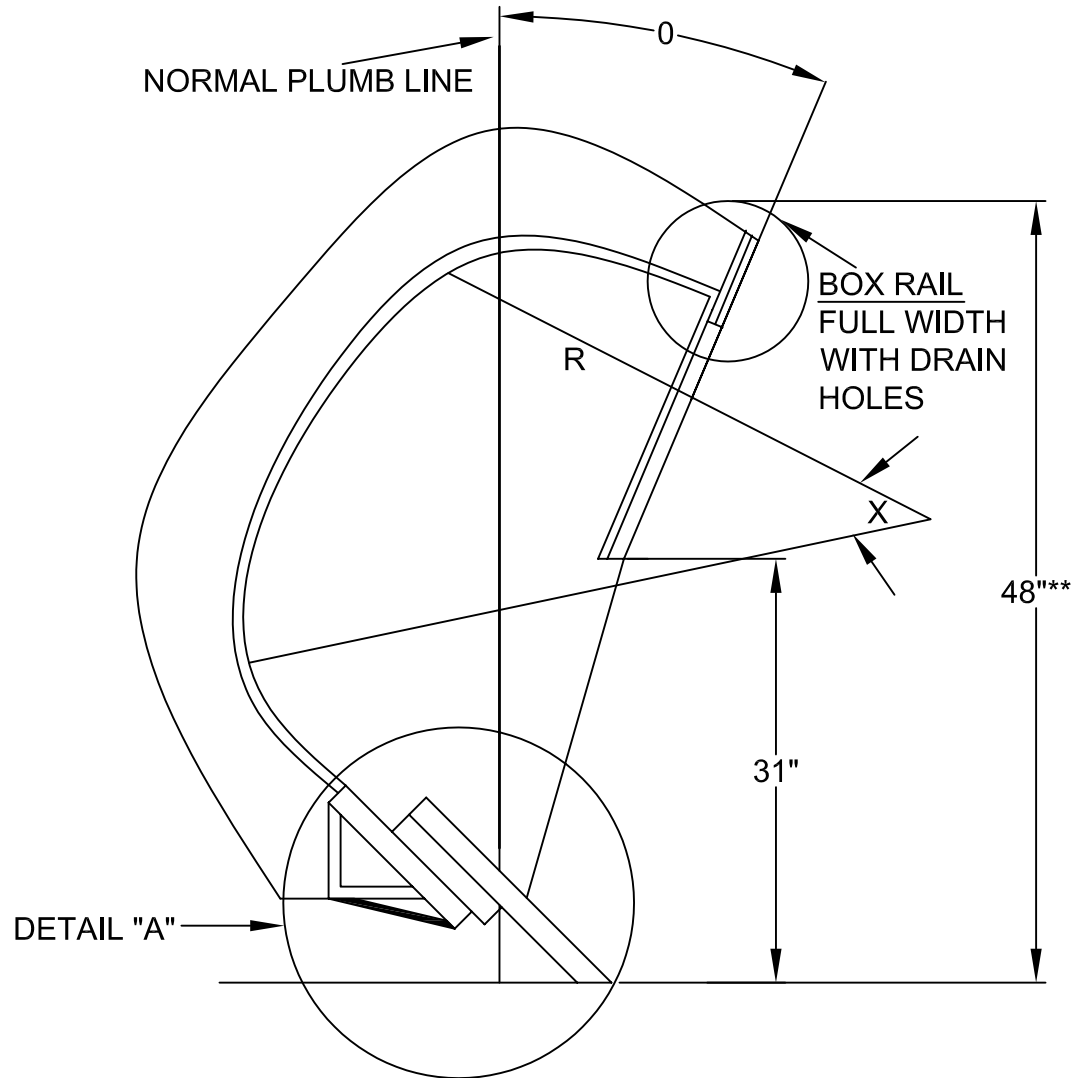
\*MEASURED AT END OF EACH BLADE

PA DEPARTMENT OF TRANSPORTATION						
REVISIONS			ONE WAY SNOW PLOW - TRIP TYPE TIME 721B SEVERE DUTY ADJUSTABLE MOLDBOARD RADIUS OVERVIEW ALSO 712, 721, AND 731 DATA			
NO.	DATE	BY	DRAWN BY	SCALE	CHKD BY	
1	07-27-94	GL	WHM	N/A	RR	EQN-37
2	12-15-99	GAH	08-21-91			
3	04-11-07	CJW				SHEET 1 OF 12
4						
5						

# MODEL #721

ANGLE O= 15 DEG.  
 ANGLE X= 60 DEG.  
 RADIUS R= 27-3/4"  
 FOR MORE DETAIL INFORMATION ON CONTOUR  
 AND RADII SEE EQN-37A  
 LC= LENGTH OF CUTTING EDGE  
 120", 36", 36", 48".  
 LM= LENGTH OF MOLD BOARD - OVERALL LESS  
 NOSE SHOE= 162".

ALL BIDDERS SHALL INSPECT THE DEPARTMENT  
 UNITS IN THE FIELD TO FURTHER CLARIFY THESE  
 DRAWINGS. THE UNITS MUST INCORPORATE  
 DESIGN FEATURES AND MOLDBOARD CONTOUR  
 OF PROTOTYPE. THE MFR. SHALL PROVIDE A  
 METAL TEMPLATE OF THE MOLDBOARD  
 CONTOUR OF INCLUDING CUTTING EDGE CUT  
 OUT. THE BASE SHALL BE PARELLEL TO THE  
 DECK SURFACE.  
 SEE EQN-34 FOR DETAIL "A".



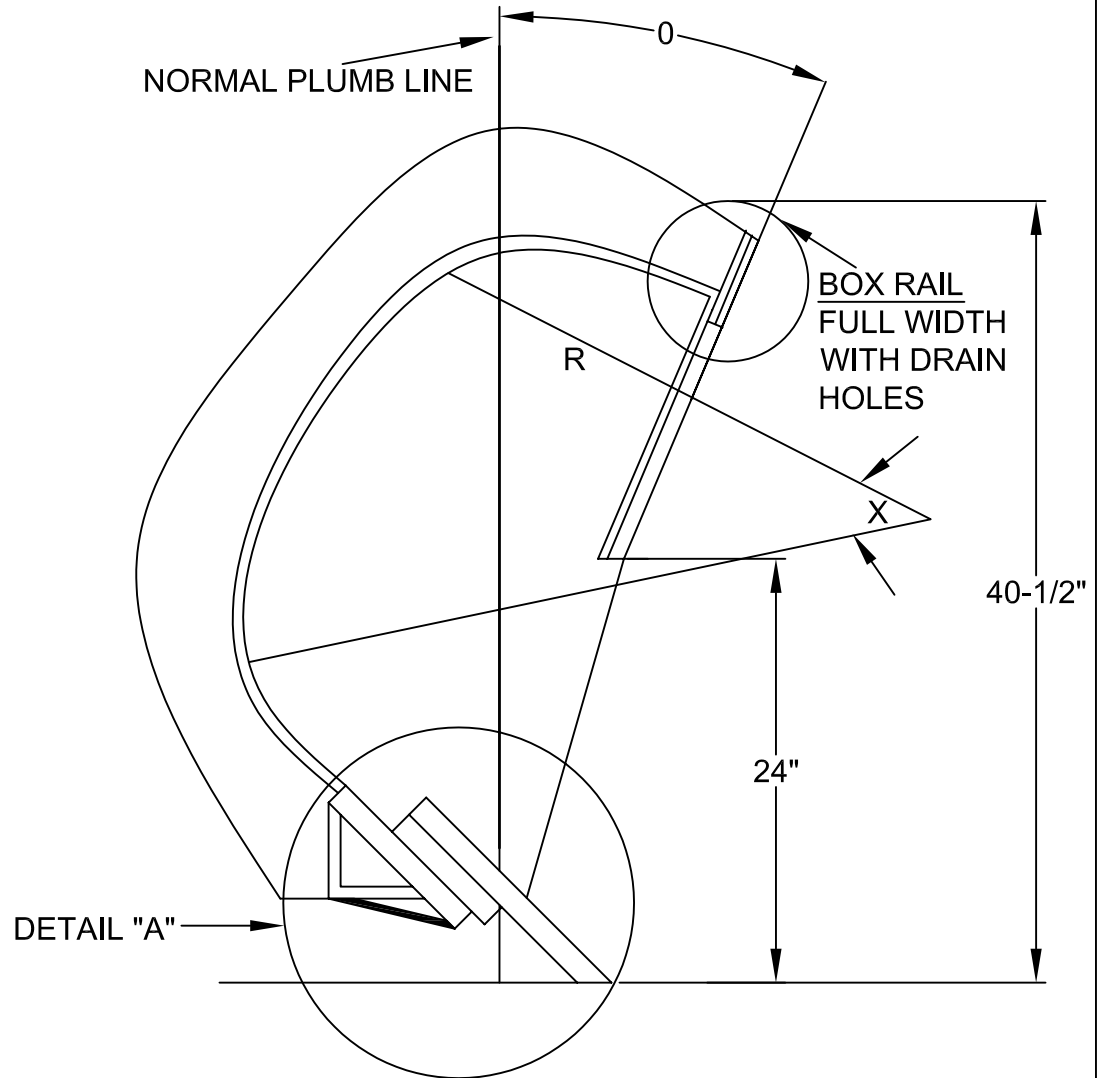
\*MEASURED AT END OF EACH BLADE

PA DEPARTMENT OF TRANSPORTATION					
REVISIONS			ONE WAY SNOW PLOW - TRIP TYPE TIME 721B		
NO.	DATE	BY	SEVERE DUTY ADJUSTABLE MOLDBOARD		
1	07-27-94	GL	RADIUS OVERVIEW ALSO 712, 721, AND 731		
2	12-15-99	GAH	DATA		
3	04-11-07	CJW	DRAWN BY WHM	SCALE N/A	EQN-37
4			DATE 08-21-91	CHKD BY RR	SHEET 2 OF 12
5					

# MODEL #712

ANGLE O= 15 DEG.  
 ANGLE X= 60 DEG.  
 RADIUS R= 22"  
 FOR MORE DETAIL INFORMATION ON CONTOUR  
 AND RADII SEE EQN-37A  
 LC= LENGTH OF CUTTING EDGE  
 120", 36", 36", 36", 48".  
 LM= LENGTH OF MOLD BOARD - OVERALL LESS  
 NOSE SHOE= 136".

ALL BIDERS SHALL INSPECT THE DEPARTMENT  
 UNITS IN THE FIELD TO FUTHER CLARIFY THESE  
 DRAWINGS. THE UNITS MUST INCORPORATE  
 DESIGN FEATURES AND MOLDBOARD CONTOUR  
 OF PROTOTYPE. THE MFGR. SHALL PROVIDE A  
 METAL TEMPLATE OF THE MOLDBOARD  
 CONTOUR OF INCLUDING CUTTING EDGE CUT  
 OUT. THE BASE SHALL BE PARELLEL TO THE  
 DECK SURFACE.  
 SEE EQN-34 FOR DETAIL "A".



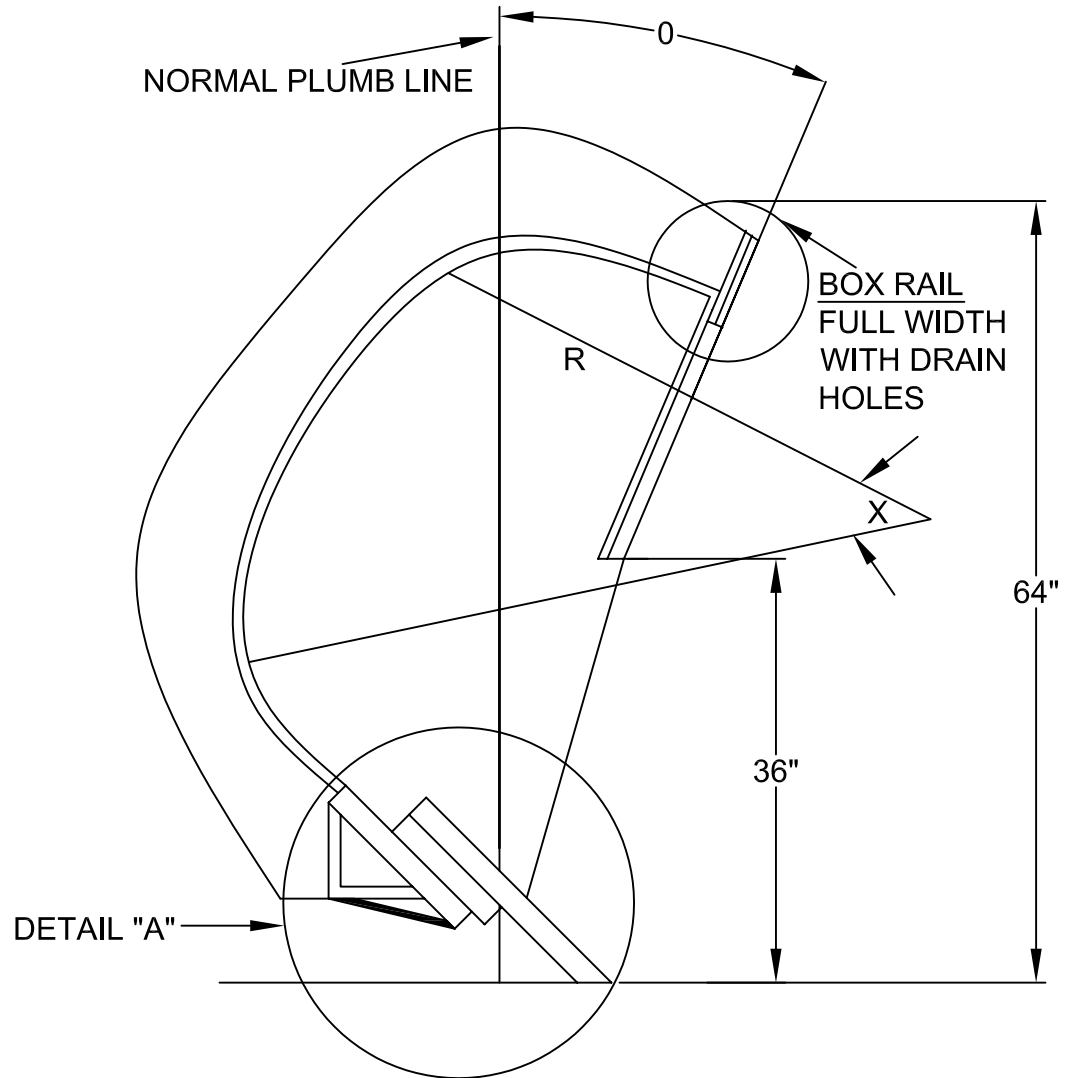
\*MEASURED AT END OF EACH BLADE

PA DEPARTMENT OF TRANSPORTATION						
REVISIONS			ONE WAY SNOW PLOW - TRIP TYPE TIME 721B SEVERE DUTY ADJUSTABLE MOLDBOARD RADIUS OVERVIEW ALSO 712, 721, AND 731 DATA			
NO.	DATE	BY	DRAWN BY	SCALE	CHKD BY	
1	07-27-94	GL	WHM	N/A	RR	EQN-37
2	12-15-99	GAH	08-21-91			
3	04-11-07	CJW				
4						
5						

# MODEL #712

ANGLE O= 15 DEG.  
 ANGLE X= 60 DEG.  
 RADIUS R= 37"  
 FOR MORE DETAIL INFORMATION ON CONTOUR  
 AND RADII SEE EQN-37A  
 LC= LENGTH OF CUTTING EDGE  
 144", 48", 48", 48"  
 LM= LENGTH OF MOLD BOARD - OVERALL LESS  
 NOSE SHOE= 168".

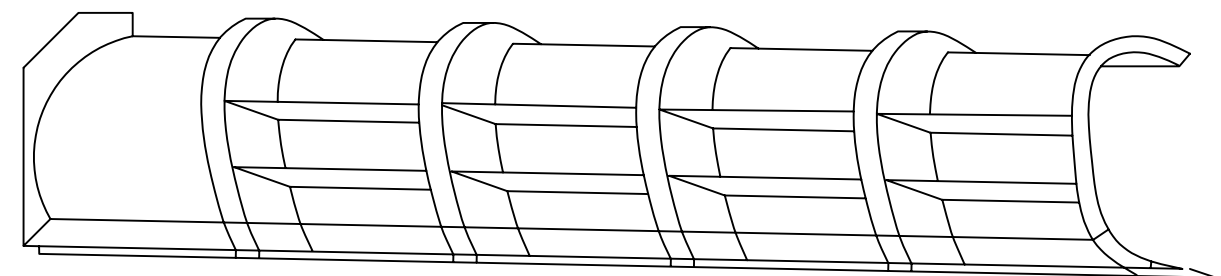
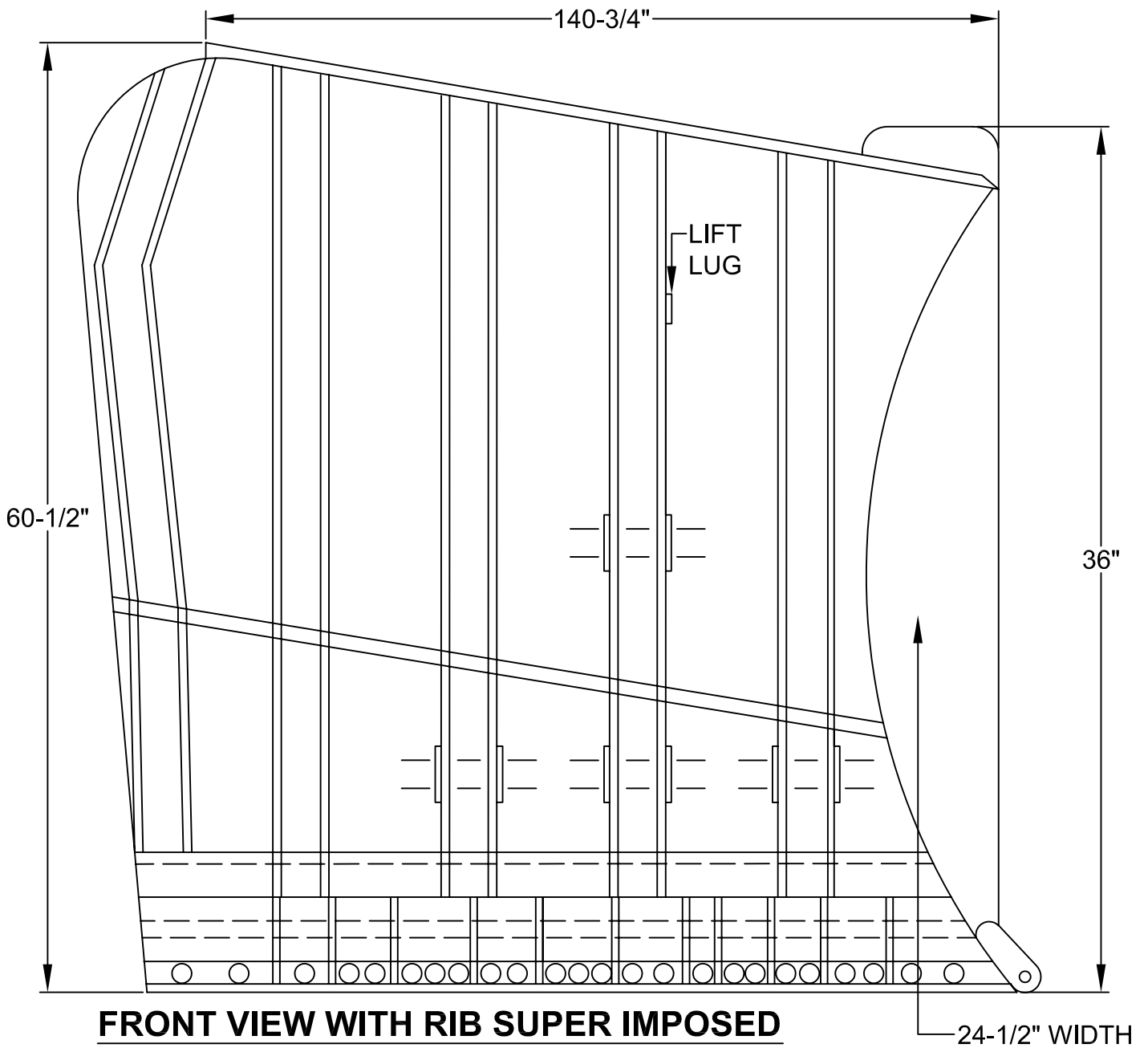
ALL BIDDERS SHALL INSPECT THE DEPARTMENT  
 UNITS IN THE FIELD TO FURTHER CLARIFY THESE  
 DRAWINGS. THE UNITS MUST INCORPORATE  
 DESIGN FEATURES AND MOLDBOARD CONTOUR  
 OF PROTOTYPE. THE MFG. SHALL PROVIDE A  
 METAL TEMPLATE OF THE MOLDBOARD  
 CONTOUR OF INCLUDING CUTTING EDGE CUT  
 OUT. THE BASE SHALL BE PARELLEL TO THE  
 DECK SURFACE.  
 SEE EQN-34 FOR DETAIL "A".



\*MEASURED AT END OF EACH BLADE

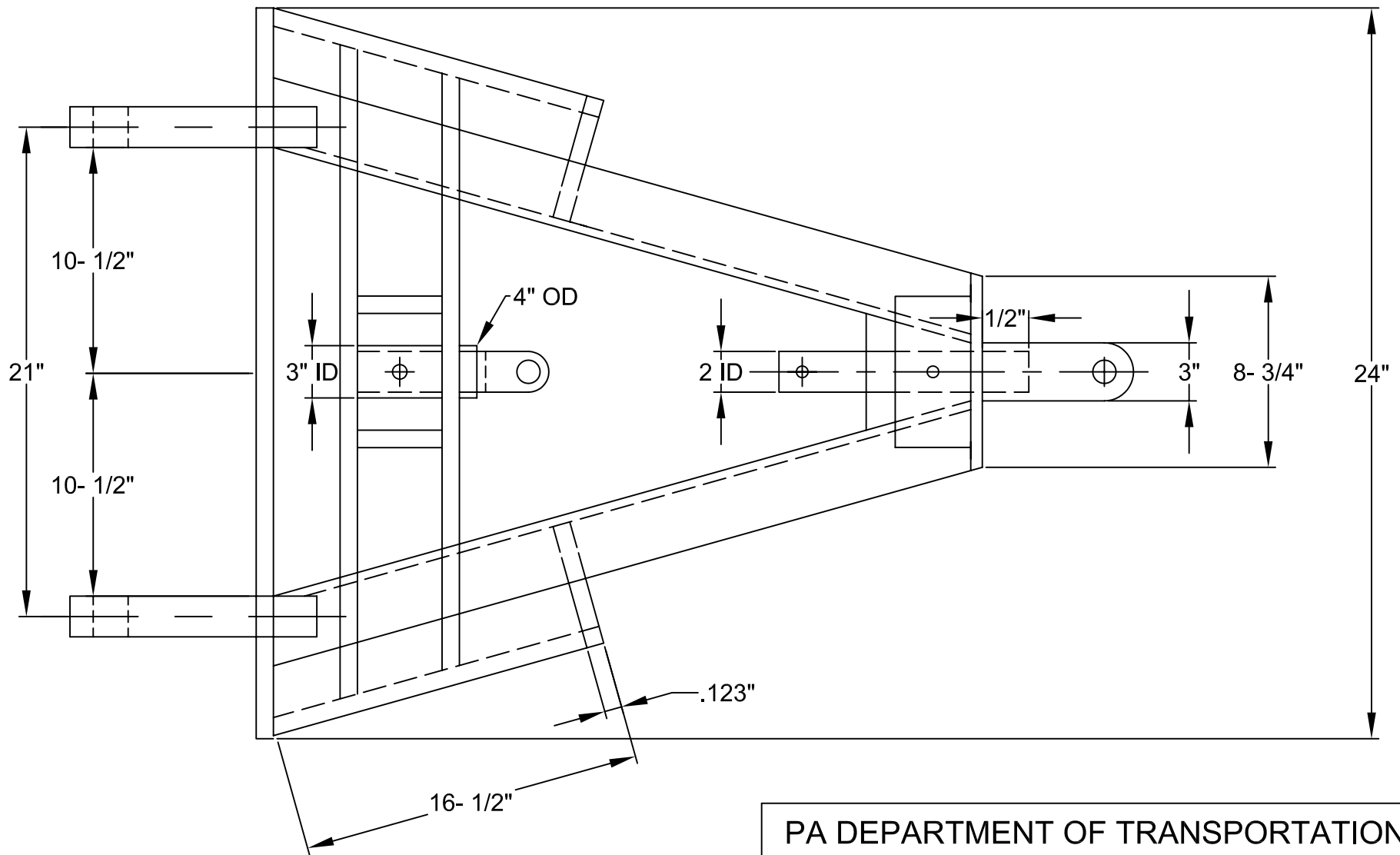
PA DEPARTMENT OF TRANSPORTATION						
REVISIONS			ONE WAY SNOW PLOW - TRIP TYPE TIME 721B SEVERE DUTY ADJUSTABLE MOLDBOARD RADIUS OVERVIEW ALSO 712, 721, AND 731 DATA			
NO.	DATE	BY	DRAWN BY	SCALE	CHKD BY	
1	07-27-94	GL	WHM	N/A	RR	EQN-37
2	12-15-99	GAH	WHM	N/A	RR	EQN-37
3	04-11-07	CJW	08-21-91		RR	SHEET 4 OF 12
4						
5						



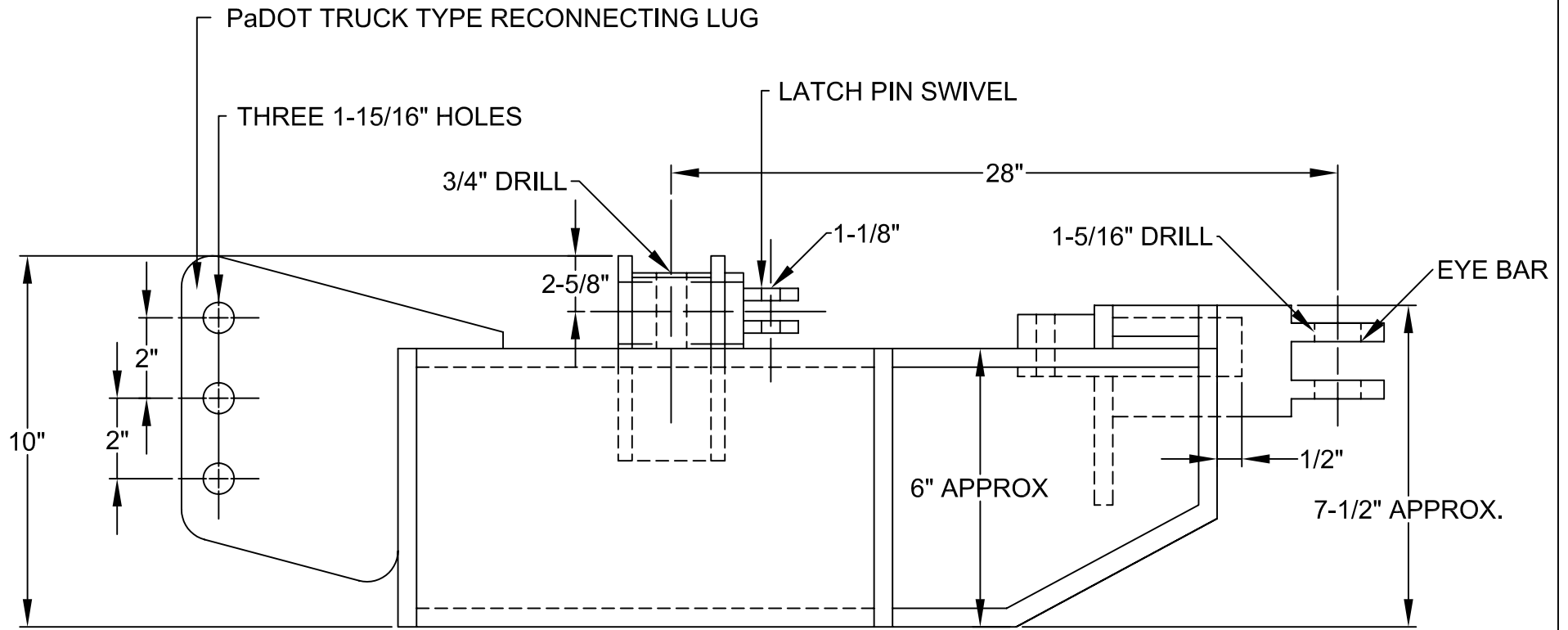


PA DEPARTMENT OF TRANSPORTATION

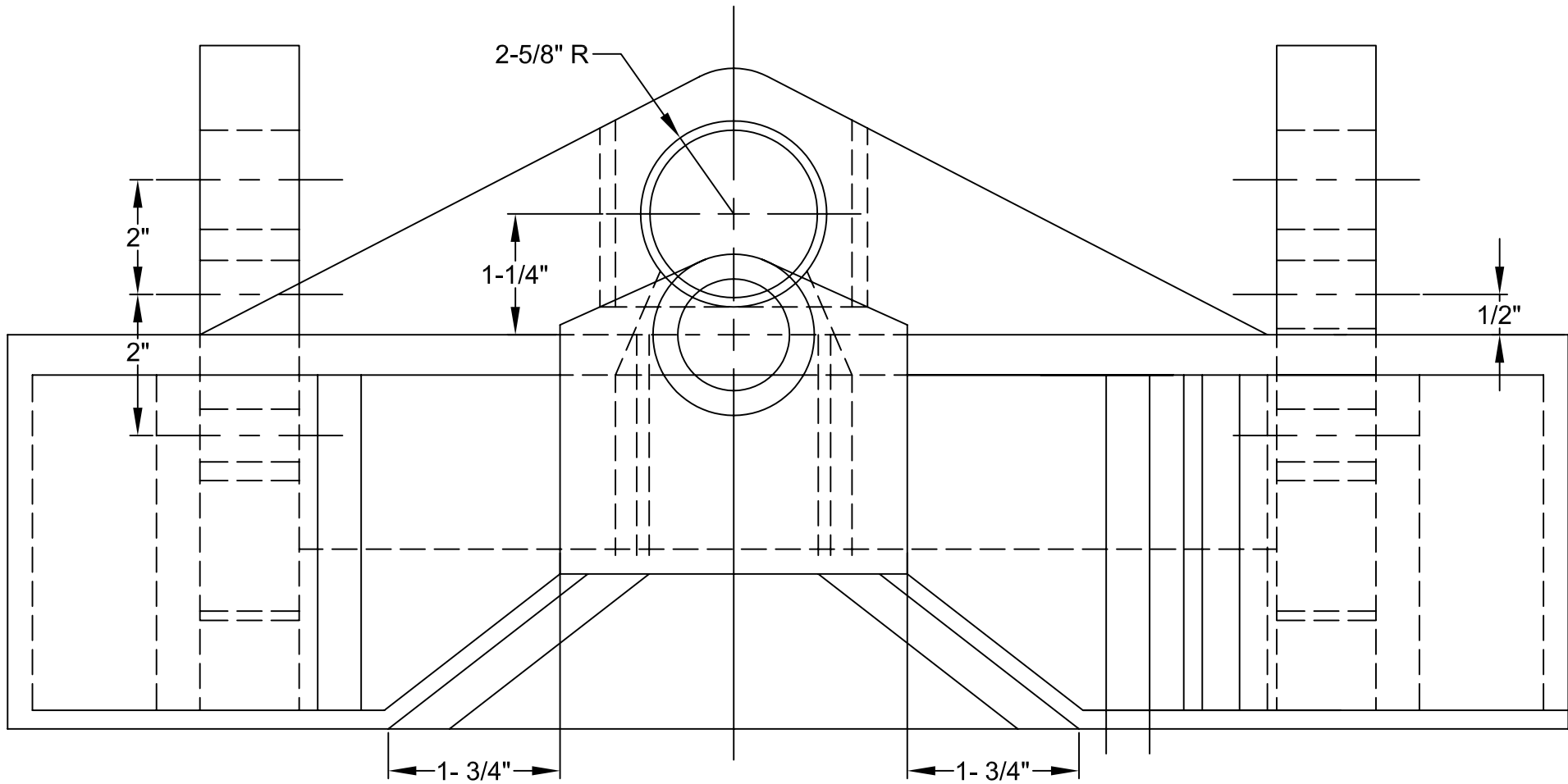
REVISIONS			PLOW INFO - 721B ONE WAY PLOW			
NO.	DATE	BY	DRAWN BY	SCALE		
1	07-27-94	GL				
2	12-15-99	GAH	WHM	N/A	EQN-37	
3	04-11-07	CJW	DATE 08-21-91	CHK'D BY RR	SHEET 5 OF 12	
4						
5						



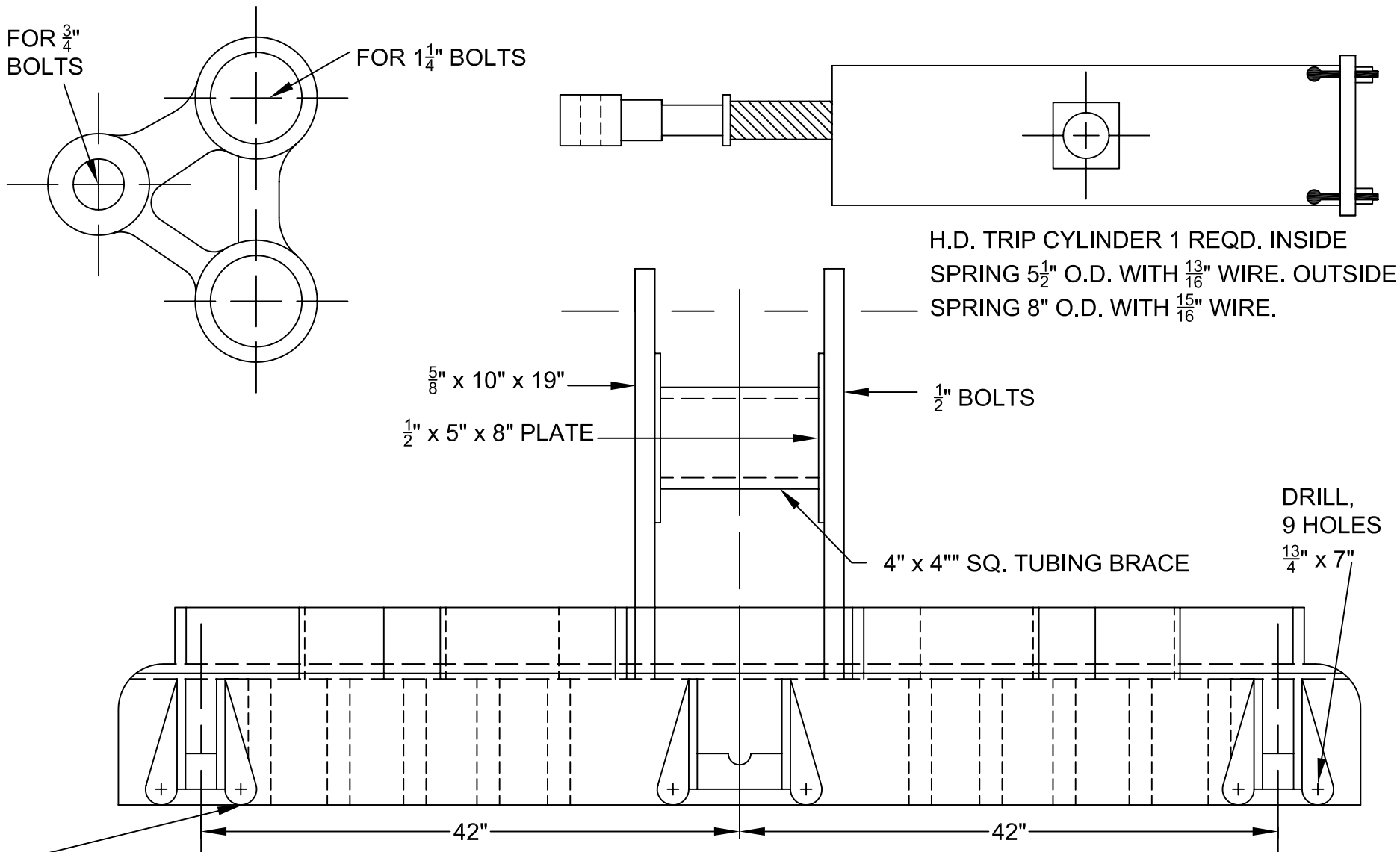
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REVISIONS			PLOW INFO - 721B ONE WAY PLOW		
NO.	DATE	BY			
1	07-27-94	GL			
2	12-15-99	GAH	<small>DRAWN BY</small> WHM	<small>SCALE</small> N/A	EQN-37
3	04-11-07	CJW	<small>DATE</small> 08-21-91	<small>CHKD BY</small> RR	SHEET 6 OF 12
4					
5					



PA DEPARTMENT OF TRANSPORTATION					
REVISIONS			PLOW INFO - 721B ONE WAY PLOW		
NO.	DATE	BY			
1	07-27-94	GL			
2	12-15-99	GAH	<small>DRAWN BY</small> WHM	<small>SCALE</small> N/A	EQN-37
3	04-11-07	CJW	<small>DATE</small> 08-21-91	<small>CHKD BY</small> RR	SHEET 7 OF 12
4					
5					

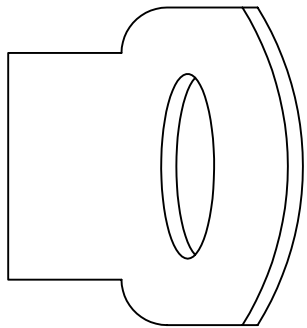
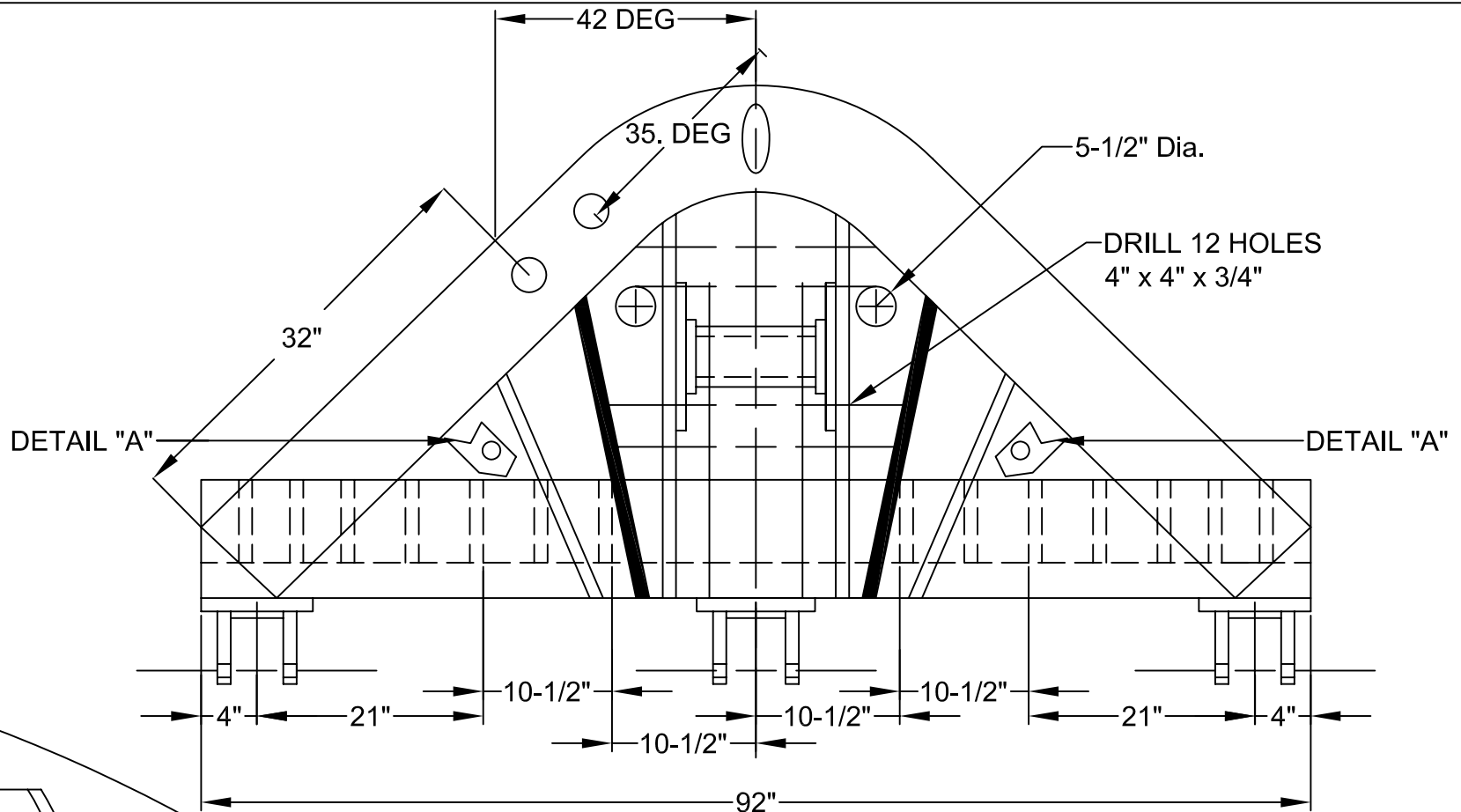


PA DEPARTMENT OF TRANSPORTATION					
REVISIONS			PLOW INFO - 721B ONE WAY PLOW		
NO.	DATE	BY			
1	07-27-94	GL			
2	12-15-99	GAH	<small>DRAWN BY</small> WHM	<small>SCALE</small> N/A	EQN-37
3	04-11-07	CJW	<small>DATE</small> 08-21-91	<small>CHKD BY</small> RR	SHEET 8 OF 12
4					
5					

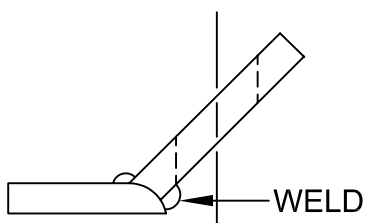


1" GUSSETS ON 7:  
 CENTERS EXCEPT ON  
 3" CENTERS AT ENDS.

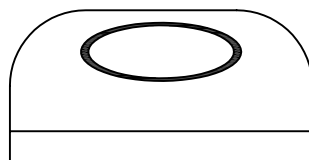
PA DEPARTMENT OF TRANSPORTATION							
REVISIONS			PLOW INFO 721B/712 -SEMI CIRCLE ASSEMBLY				
NO.	DATE	BY	DRAWN BY	SCALE	N/A	EQN-37	
1	07-27-94	GL					
2	12-15-99	GAH	WHM				
3	04-11-07	CJW	DATE 08-21-91	CHKD BY	RR	SHEET 9 OF 12	
4							
5							



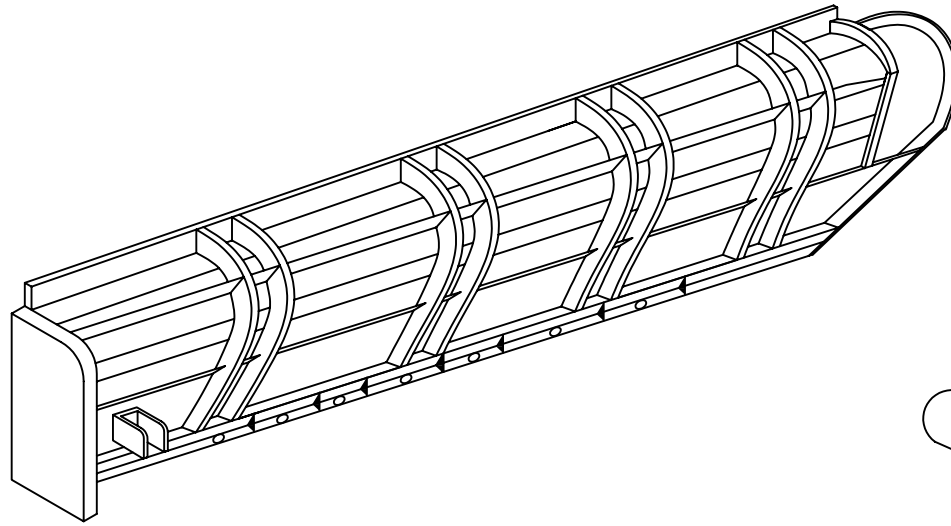
DETAIL "A"  
3/4" x 7"



LIFT CHAIN LUG



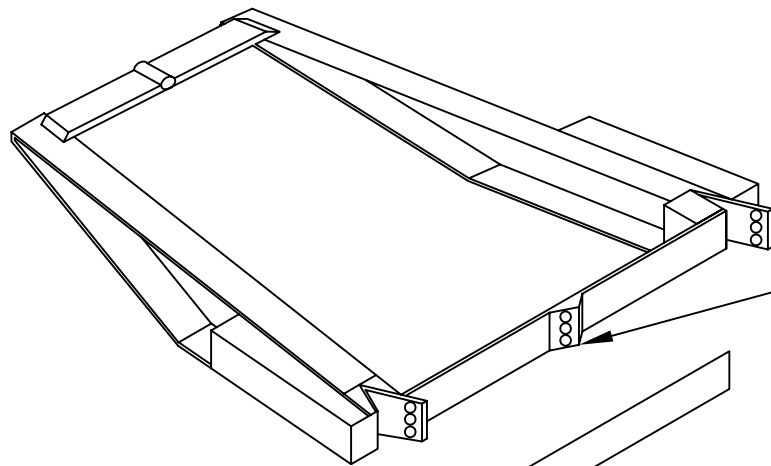
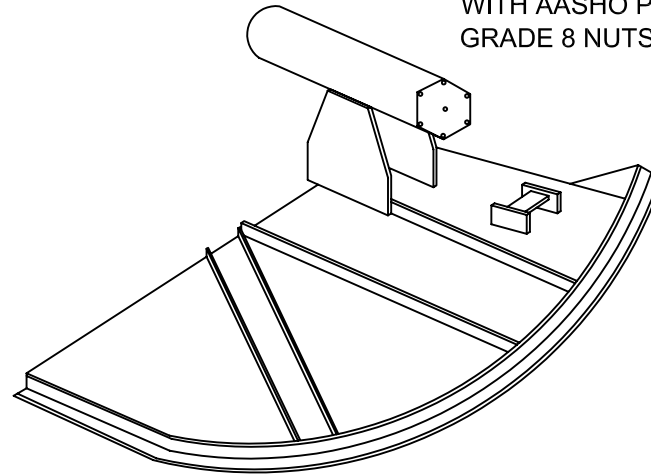
PA DEPARTMENT OF TRANSPORTATION							
REVISIONS			PLOW INFO 721B / 712 - SEMI CIRCLE ASSEMBLY				
NO.	DATE	BY	DRAWN BY		SCALE	EQU-37	
1	07-27-94	GL	WHM		N/A	EQU-37	
2	12-15-99	GAH	DATE 08-21-91		CHKD BY	RR	
3	04-11-07	CJW				SHEET 10 OF 12	
4							
5							



NOTE: ALL DIMENSIONS IN INCHES

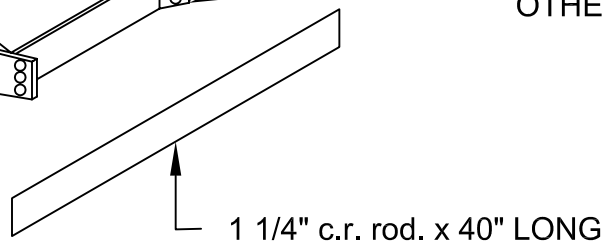
FOR DETAIL "A":  
 FLAT COUNTERSUNK GRADE-8MIN. PLOW  
 BOLT WITH SELF LOCKING ELASTIC CENTER  
 NUT, DIA.  $\frac{5}{8}$ " BY APPROPRIATE LENGTH TO  
 INSURE FULL USE OF THE NUT PLUS  $\frac{1}{4}$ "  
 OVERHEATED.

BOLT HOLES SHALL BE SPACED TO COINICIDE  
 WITH AASHO PUNCHINGS OF THE CUTTING  
 GRADE 8 NUTS SHALL BE FURNISHED.

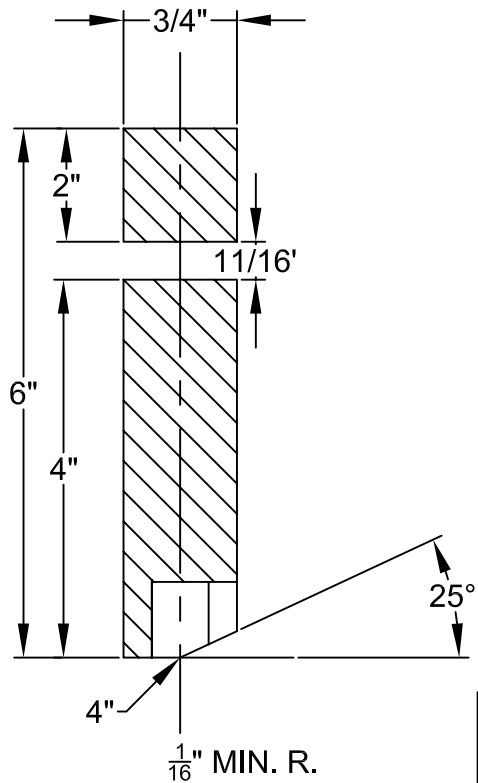


THE CENTER BRACE SHALL BE  
 CENTERED EVENLY BETWEEN THE  
 OTHER BRACES

SPECIAL NOTE:  
 BOTH BLADES MUST  
 BE 6" BLADES



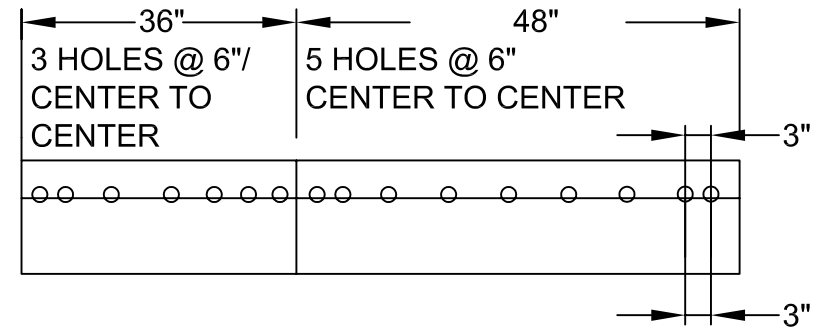
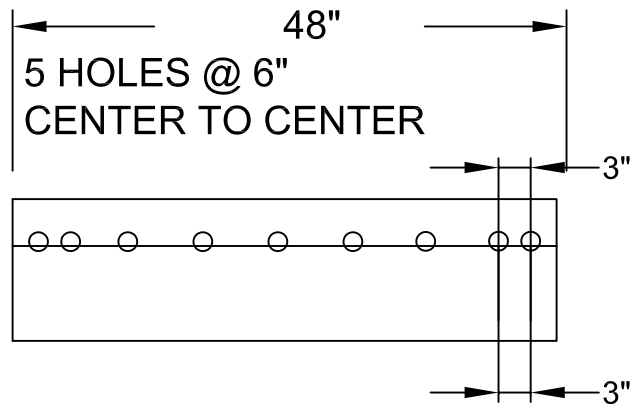
PA DEPARTMENT OF TRANSPORTATION					
REVISIONS			712 / 721 / 721B REFERENCE DRAWING		
NO.	DATE	BY			
1	07-27-94	GL			
2	12-15-99	GAH	DRAWN BY WHM	SCALE N/A	EQN-37
3	04-11-07	CJW	DATE 08-21-91	CHKD BY RR	SHEET 11 OF 12
4					
5					



**11 FOOT BLADE ASSEMBLY**

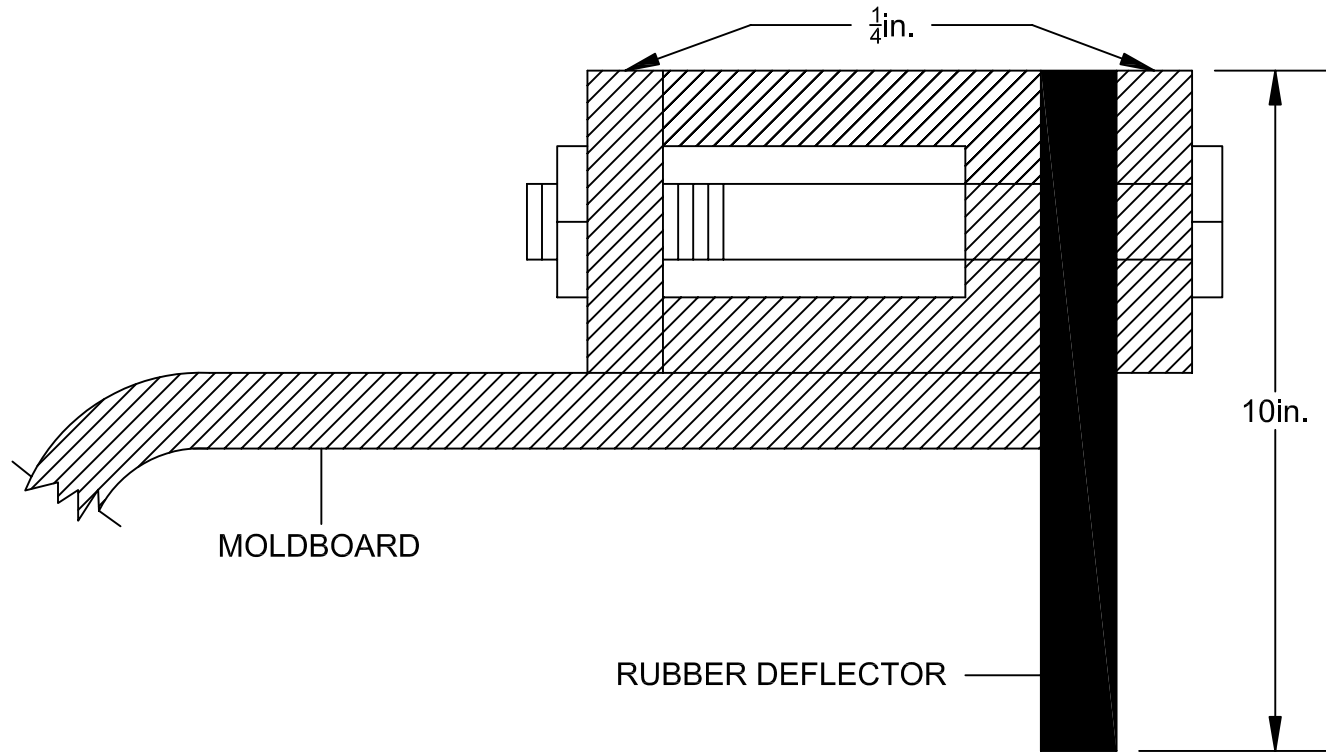
CUTTING EDGE BOLT HOLES SPACED TO COINCIDE WITH STANARED BOLT HOLE (AASHO PUNCHING). LOCATION AND SPACING OF HOLES SHALL BE AS INDICATED (TOLERANCE SHALL BE  $\frac{1}{32}$ " +/- ) CUTTING EDGE SHALL BE FLA HOT-ROLLED FINISHED STEEL SAE 1020-1040. TUNGSTEN BRAZING MATERIAL SHEAR STRENGTH SHALL BE 30,000 psi MINIMUM. ALL SIDE BRAZING. SPACE BETWEEN TUNGSTEN INSERTS SHALL BE  $\frac{1}{100}$ " CUTTING DGE WARPAGE AND LONGITUDINAL DEVIATION NOT TO EXCED  $\frac{1}{8}$ " PER 48" LENGTH.

SQUARE HOLES WITH COUNTERSUNK TO RECIEVE  $\frac{5}{8}$ " Dia PLOW BOLT.



PA DEPARTMENT OF TRANSPORTATION					
REVISIONS			PLOW INFO ONE WAY SNOW PLOW-TRIP TYPE 721B SEVERE DUTY		
NO.	DATE	BY	DRAWN BY	SCALE	
1	07-27-94	GL			
2	12-15-99	GAH	WHM	N/A	EQN-37
3	04-11-07	CJW	DATE 08-21-91	CHKD BY RR	SHEET 12 OF 12
4					
5					

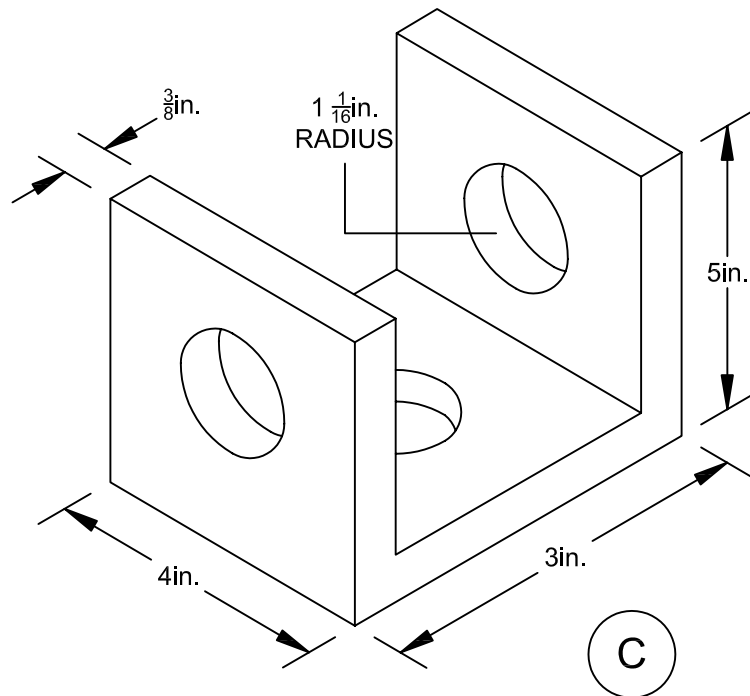
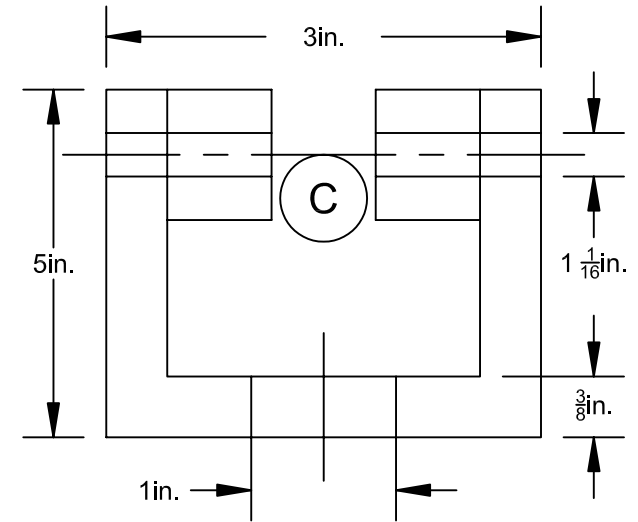
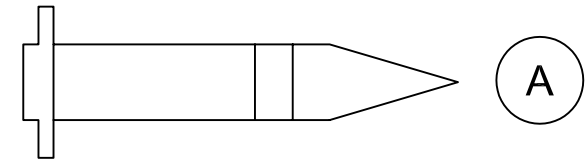
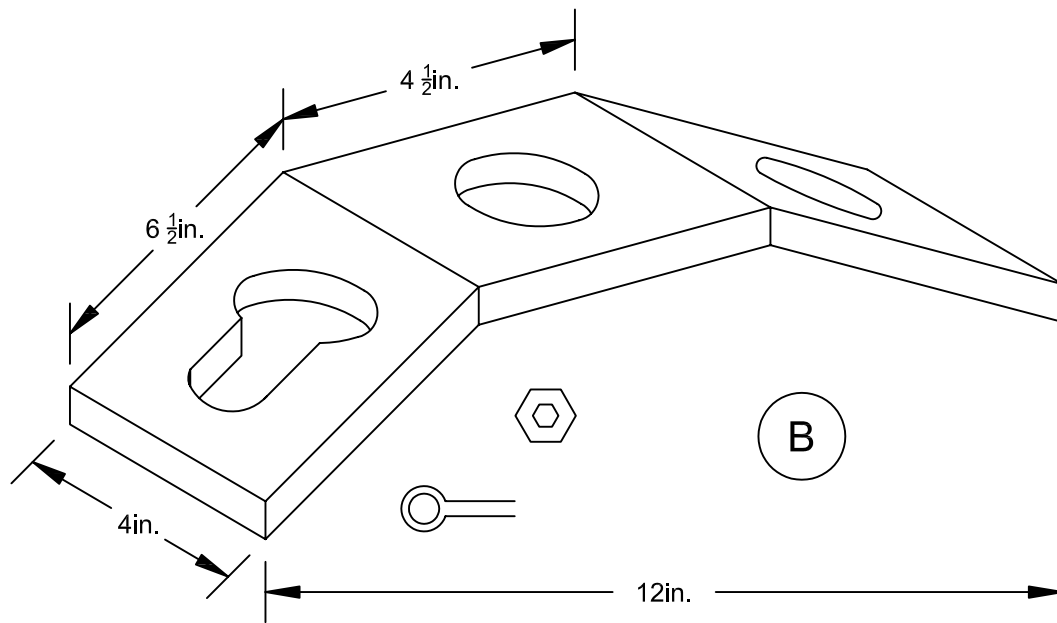




NOTES:

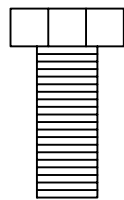
1. ALL DIMENSIONS ARE MINIMUM AND IN INCHES.
2. RUBBER, BLACK, NATURAL, OR SYNTHETIC. TIRE CORE IMPREGNATED, SMOOTH SIDES  $\frac{1}{2}$ in. X 10in. WIDE X FULL LENGTH OF THE MOLDBOARD TOP EDGE CARBON STEEL, ASTM A-36 MINIMUM.  $\frac{1}{4}$ in. THICK X 2in. WIDE X FULL LENGTH OF THE MOLDBOARD TOP EDGE.
3. BOLTS, LENGTH TO SUIT THE SECTION OF THE REINFORCEMENT AT THE TOP EDGE OF THE MOLDBOARD,  $\frac{3}{8}$ in' IN SIZE.
4. SPACING OF THE BOLTS NOT MORE THAN 6in. APART.
5. SNOW DEFLECTOR TO INCLUDE ALL HARDWARE NECESSARY FOR A FINISHED PRODUCT.

PA DEPARTMENT OF TRANSPORTATION						
REVISIONS			SNOW PLOW SNOW DEFLECTOR			
NO.	DATE	BY	DRAWN BY	SCALE		
1	08-13-98	DJA				
2	05-23-02	DWG	DMB	N/A	EQN-37B	
3	06-12-07	KNH	DATE 05-02-96	CHK'D BY WHM	SHEET 1 OF 1	



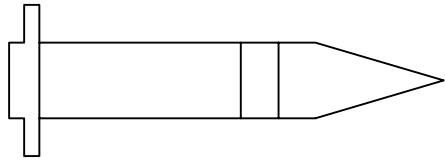
- A. 1in. X 4in. PIN AND HAIRPIN TO BE SUPPLIED WITH PLOW. PIN SHALL BE ATTACHED TO BRACKET BY A CHAIN OR CABLE.
- B.  $\frac{5}{8}$ in. X 3in. HIGH GUSSET. GUSSET WELDED TO BACK SIDE OF SWIVEL. BANJO OPENININGS TO ACCOMMODATE  $\frac{1}{2}$ in. CHAIN.
- C.  $1\frac{1}{4}$ in. OPENING TO ACCEPT LIFT ARM REFERENCED IN EQN-50 SPACERS TO BE WELDED TO BRACKET.

ALL DIMENSIONS ARE APPROXIMATE.

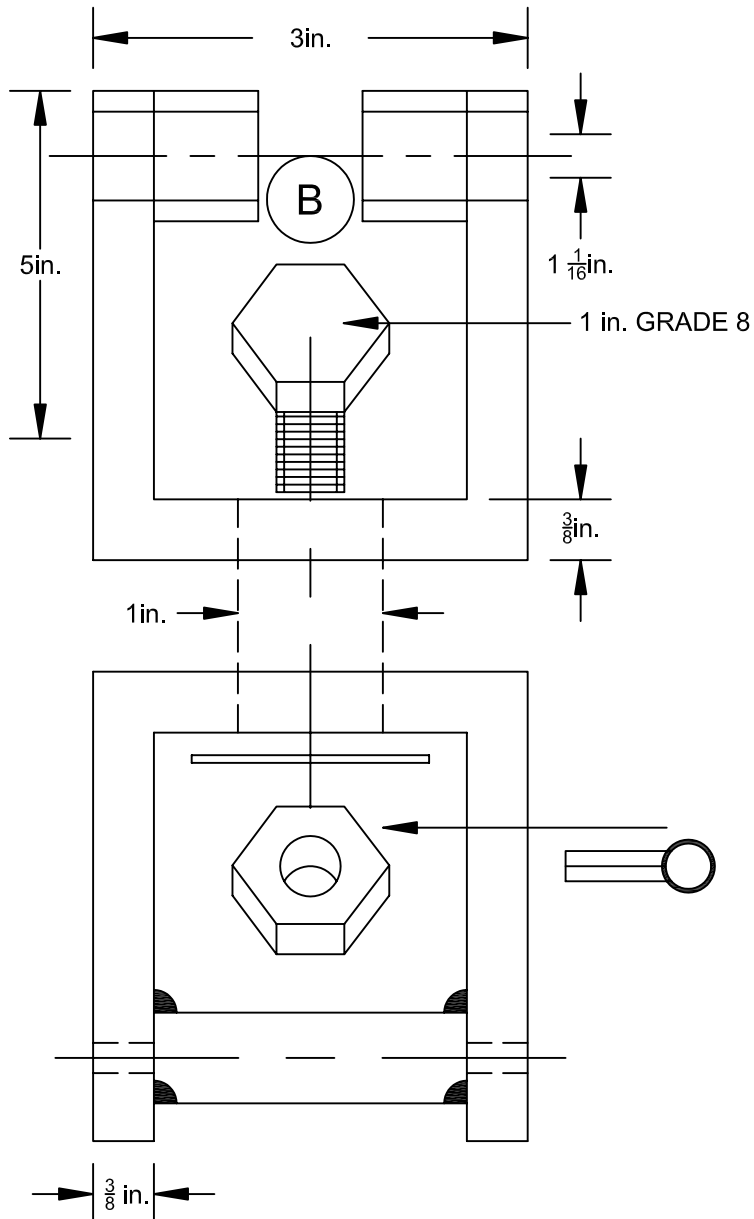


1in. BOLT  
(GRADE 8)

PA DEPARTMENT OF TRANSPORTATION					
REVISIONS			PLOW HITCH TO SWIVEL		
NO.	DATE	BY			
1	06-16-99	GAH			
2	05-23-02	DWG	DRAWN BY	GL	SCALE N/A
3	06-15-07	KNH	DATE	06-27-94	CHK'D BY RED
			EQN-39	SHEET 1 OF 1	



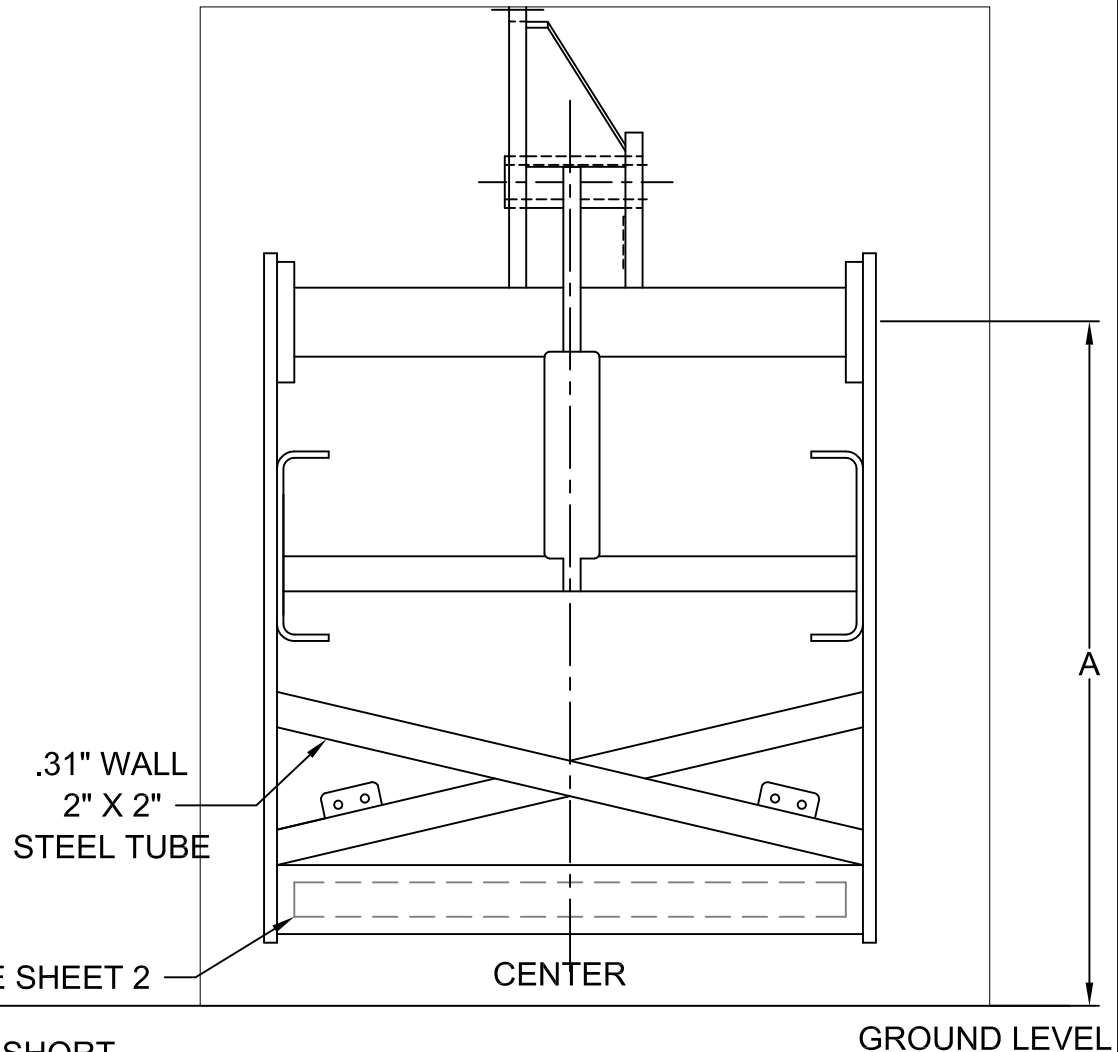
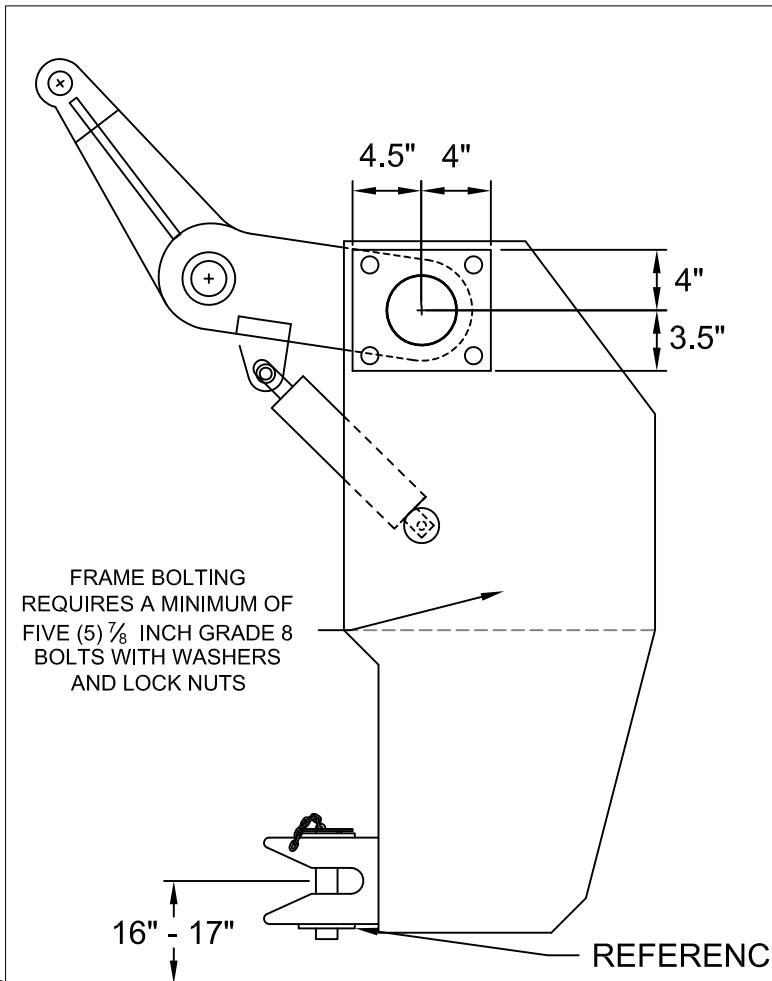
A



- A. 1 in. X 4 in. PIN AND HAIRPIN TO BE SUPPLIED WITH PLOW, PIN SHALL BE ATTACHED TO BRACKET BY A CHAIN OR CABLE
- B. 1  $\frac{1}{4}$  in. OPENING TO ACCEPT LIFT ARM REFERENCED IN EQN-50, SPACERS TO BE WELDED TO BRACKET.

ALL DIMENSIONS ARE APPROXIMATE

PA DEPARTMENT OF TRANSPORTATION					
REVISIONS			PLOW TO HITCH SWIVEL SLIDING		
NO.	DATE	BY			
1	08-24-98	DJA			
2	05-23-02	DWG	DRAWN BY	SCALE	
			DJA	N/A	EQN-43
3	06-22-07	KNH	DATE	CHK'D BY	
			08-24-98	WHM	SHEET 1 OF 1



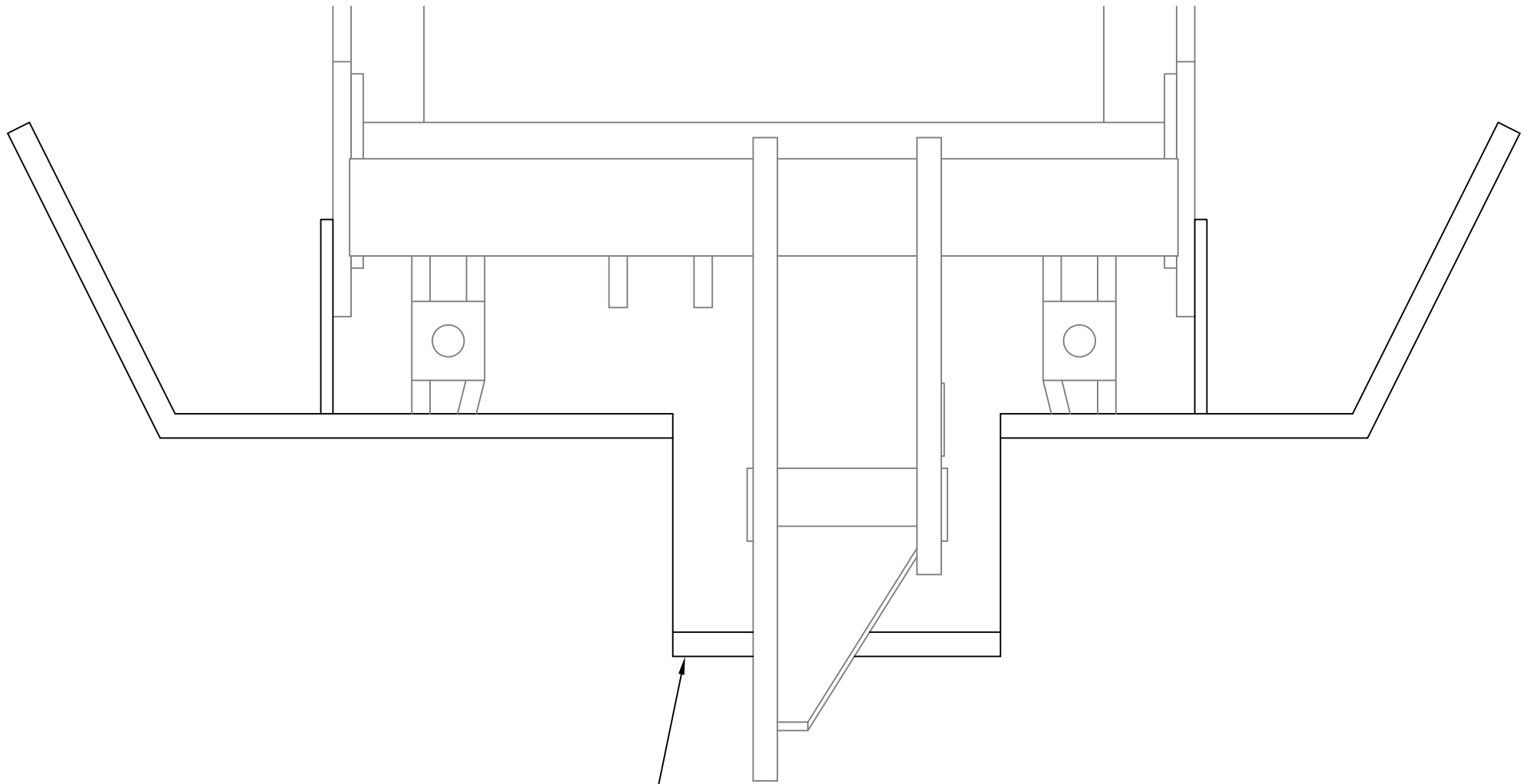
**NOTES:**

- ALL GREASE ZERKS SHALL BE SURROUNDED BY A SHORT LENGTH OF PIPE (WELDED IN PLACE) OR PLACED IN A RECESSED HOLE.
- "A" - HEIGHT SHALL BE SUFFICIENT TO AFFORD UNRESTRICTED LIFT FOR PENNDOT PLOWS. 16 INCH MINIMUM LIFT.
- ALL HYDRAULIC CONNECTIONS TO THE PLOW HOIST CYLINDER SHALL BE POSITIONED TO THE SIDES OR REAR TO PREVENT HOSE DAMAGE WHILE CONNECTING / DISCONNECTION TO THE FRONT PLOW.
- ALL FINAL DIMENSIONS AND ANGLES SHALL BE VERIFIED THROUGH FIELD VISITATIONS AND CORRESPONDING WITH THE FLEET MANAGEMENT DIVISION.

**PA DEPARTMENT OF TRANSPORTATION**

REVISIONS			FRONT PLOW HITCH ASSEMBLY		
NO.	DATE	BY	DRAWN BY	SCALE	
1	04-27-15	GAW			
2	12-19-16	JJB	SWW	N/A	EQN-50
3	08-02-18	KBD	09-25-95	WHM	SHEET 1 OF 4



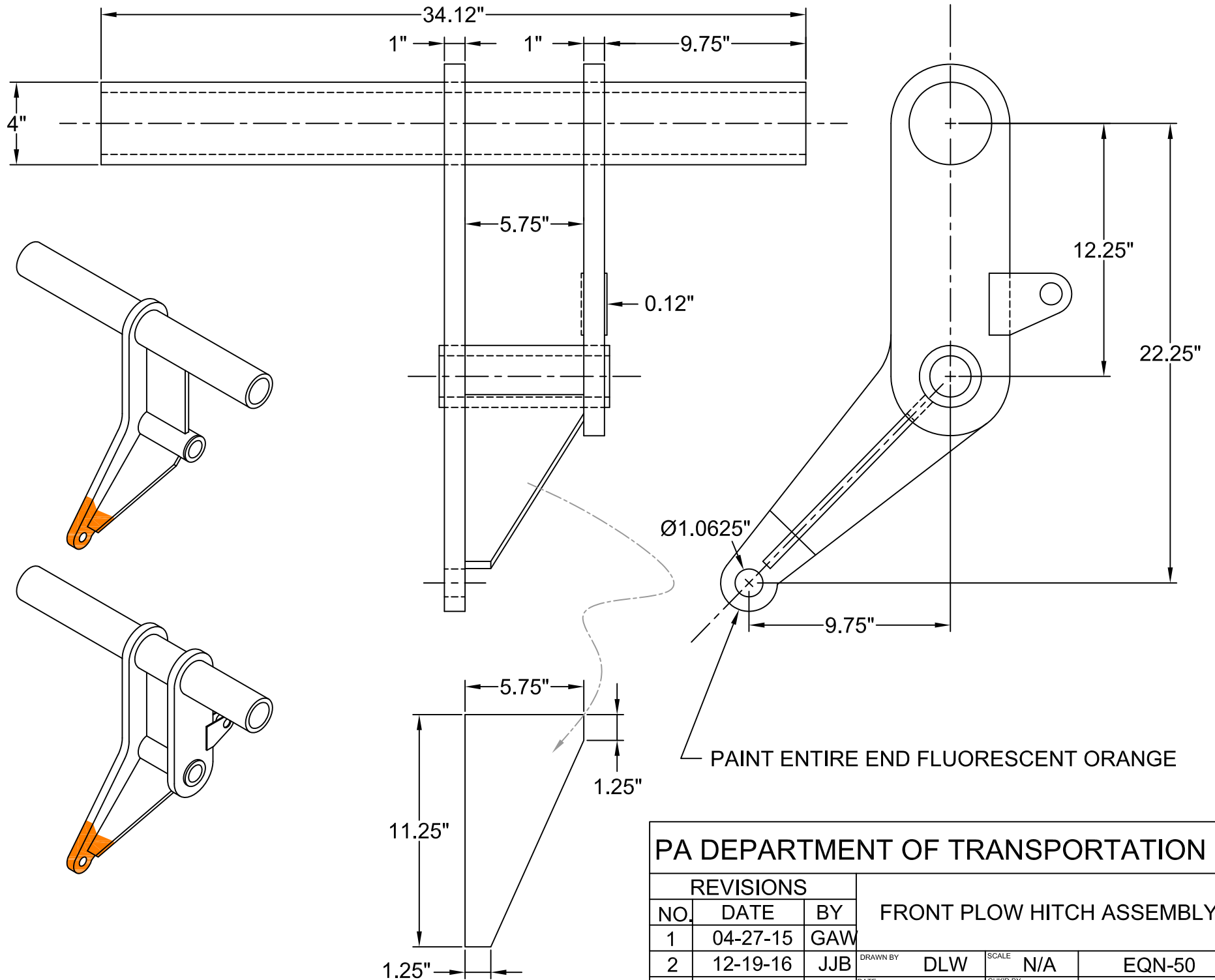


BUMPER SHALL EXTEND ACROSS THE ENTIRE FRONT OF TRUCK  
 (NOTE: BUMPER EXTENDS AROUND PLOW CYLINDER)

ADDITIONAL BUMPER SUPPORTS SHALL BE FABRICATED AND  
 INSTALLED TO INSURE BUMPER RIGIDITY

PA DEPARTMENT OF TRANSPORTATION

REVISIONS			FRONT PLOW HITCH ASSEMBLY		
NO.	DATE	BY	SCALE	DATE	CHK'D BY
1	04-27-15	GAW			
2	12-19-16	JJB	WHM	N/A	EQN-50
3	08-02-18	KBD	11-05-95	WHM	SHEET 3 OF 4



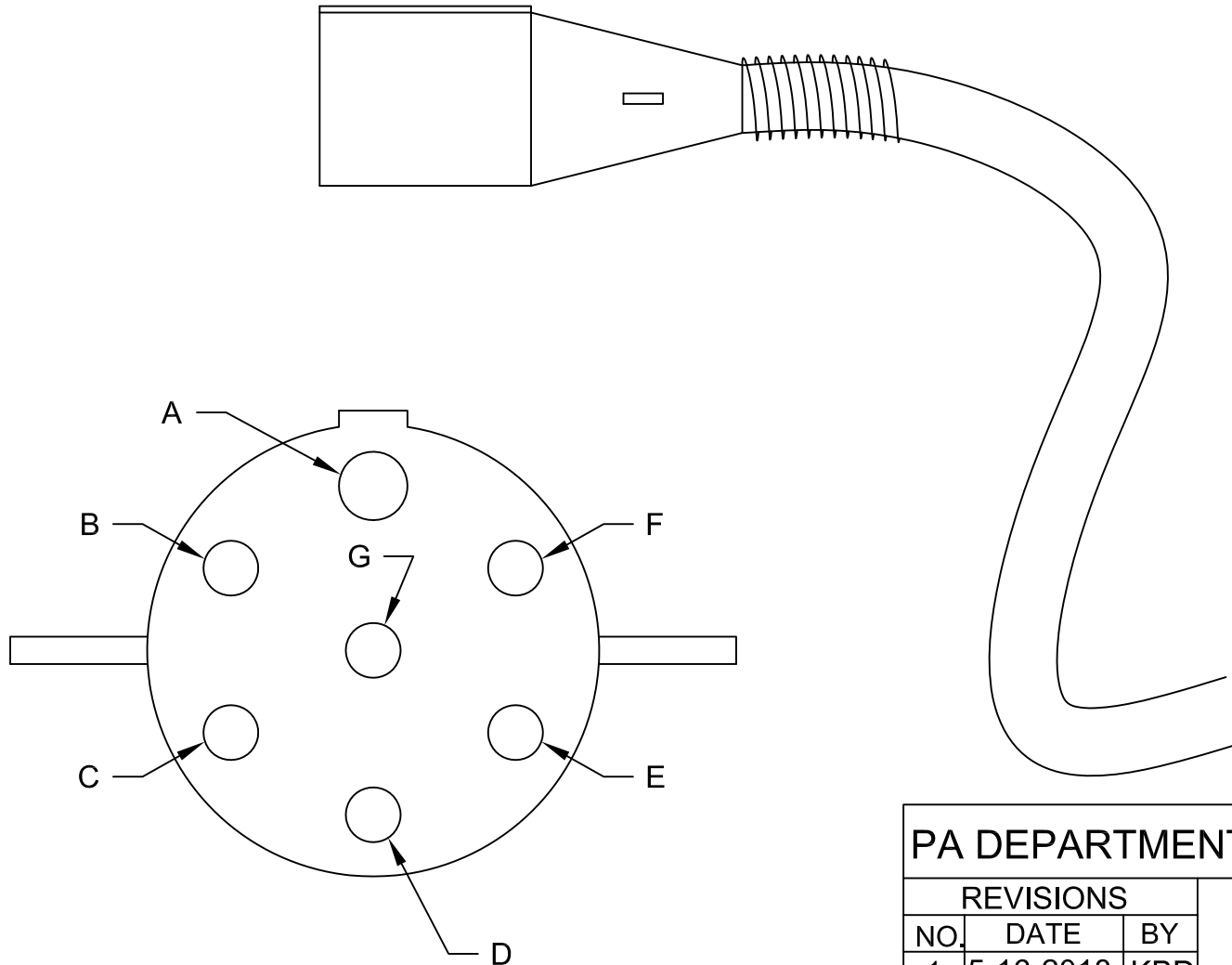
PA DEPARTMENT OF TRANSPORTATION						
REVISIONS			FRONT PLOW HITCH ASSEMBLY			
NO.	DATE	BY	DRAWN BY	SCALE		
1	04-27-15	GAW				
2	12-19-16	JJB	DLW	N/A	EQN-50	
3	08-02-18	KBD	DATE 01-05-95	CHK'D BY WHM	SHEET 4 OF 4	

**NOTES:**

To extend 8ft. beyond pintle.

**WIRING NOTES:**

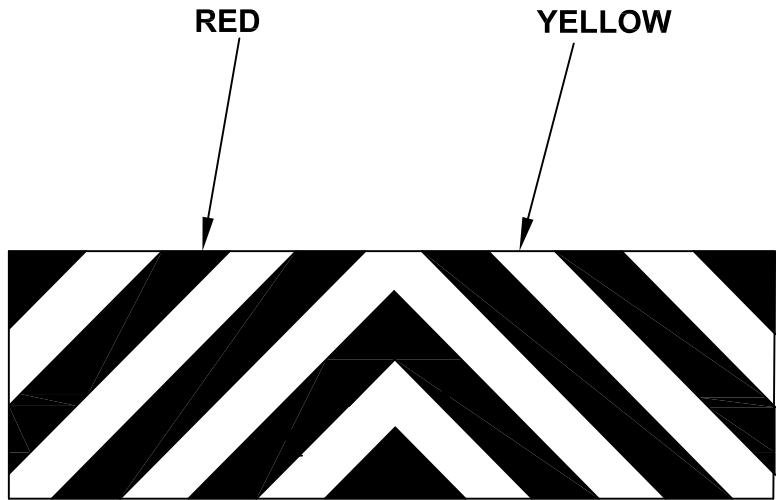
- A. WHITE: GROUND - 10
- B. BLACK: MARKER - 12
- C. YELLOW: LEFT TURN & BRAKE - 12
- D. RED: STOP / BRAKE - 12
- E. GREEN: RIGHT TURN & BRAKE - 12
- F. BROWN: TAIL - 12
- G. BLUE: ABS - 12



**PA DEPARTMENT OF TRANSPORTATION**

REVISIONS			WIRING DIAGRAM / 7 WAY ROUND PIN MALE CONNECTOR		
NO.	DATE	BY	DRAWN BY	SCALE	
1	5-16-2018	KBD	JJB	N/A	EQN-80B
2					
3			DATE 08-02-16	CHK'D BY	SHEET 1 OF 1





**REAR BUMPER STRIPING**

THE REAR BUMPER SHALL BE STRIPED AS SHOWN WITH 8" WIDE ALTERNATING RED/YELLOW BANDS CREATING A CHEVRON (INVERTED V) AT 45 DEGREE ANGLES, ACROSS THE BUMPER TO SERVE AS A SAFETY WARNING SYSTEM. TAPE SHALL BE REFLEXITE DAYBRIGHT V92 CONSPICUITY SHEETING. RED - SRHI4R, YELLOW - SRHI4Y. TWO 4" SHEETS CAN BE COMBINED TO EQUAL THE 8" REQUIREMENT.

THIS VEHICLE SHALL COMPLY WITH THE RULES OF THE NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION (NHTSA). THE MOST CURRENT REGULATIONS SHALL BE ADHERED TO.

<b>PA DEPARTMENT OF TRANSPORTATION</b>					
<b>REVISIONS</b>			<b>REAR BUMPER REFLECTIVE SHEETING</b>		
<b>NO.</b>	<b>DATE</b>	<b>BY</b>	<small>DRAWN BY</small>	<small>SCALE</small>	
1			TOD	N/A	EQN-122 A
2			<small>DATE</small>	<small>CHK'D BY</small>	
3	04-09-12		TOD		SHEET 1

THIS VEHICLE SHALL COMPLY WITH THE RULES OF THE NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION (NHTSA) IN THAT:

THE MOUNTING HEIGHT OF THE HORIZONTAL STRIPES ARE RESTRICTED TO THE SAME HEIGHT AS OTHER RETROFLECTIVE DEVICES CURRENTLY REQUIRED BY STANDARD NUMBER 108. THE CENTER OF THE MATERIAL MUST NOT BE LESS THAN 15in. ABOVE THE ROAD SURFACE, AND THE UPPER EDGE NOT MORE THAN 60in. ABOVE IT.

REFLECTIVE MATERIAL SHALL BE APPLIED TO THE HORIZONTAL BAR OF THE REAR UNDERRIDE DEVICE IN ADDITION TO THE FLOOR LEVEL HORIZONTAL STRIPE. THE UPPER CORNERS ARE TO BE MARKED BY TWO 90 DEGREE ANGLE BRACKETS OF WHITE STRIPES 12in. BY TWO INCHES WIDE, INDICATING THE WIDTH AND HEIGHT OF THE TRAILER.

THE CONFIGURATION SHALL IDENTIFY THE VEHICLE AS TO ITS ESTIMATED SIZE AND THE CLOSEING DISTANCE TO IT. THE DISTRIBUTION OF SPACES AND MATERIALS SHALL BE AS UNIFORM AS PRACTICAL AND INDICATE THE FULL LENGTH AND WIDTH OF THE VEHICLE. THE COLORS SHALL BE PLACED IN ALTERNATING SEQUENCE WITH MORE THAN TWO-THIRDS OF THE MATERIAL IN COLOR.

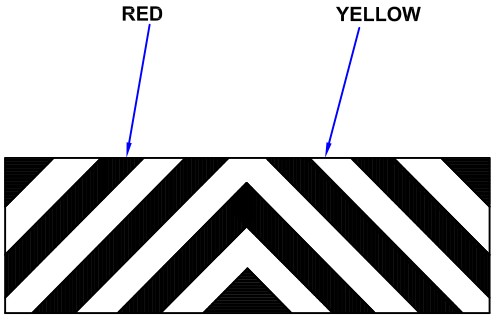
CONSPICUITY TAPE SHALL BE REFLECTORIZED. 2in. WIDE, MATERIAL SHALL BE APPLIED. MATERIAL SHALL BE RED/SILVER CONTINUOUS BACKING REFLEXITE CONSPICUITY II SYSTEM OR 3M SCOTCHLITE CONSPICUITY SHEETING SERIES 980.

THE MOST CURRENT REGULATIONS SHALL BE ADHERED TO.

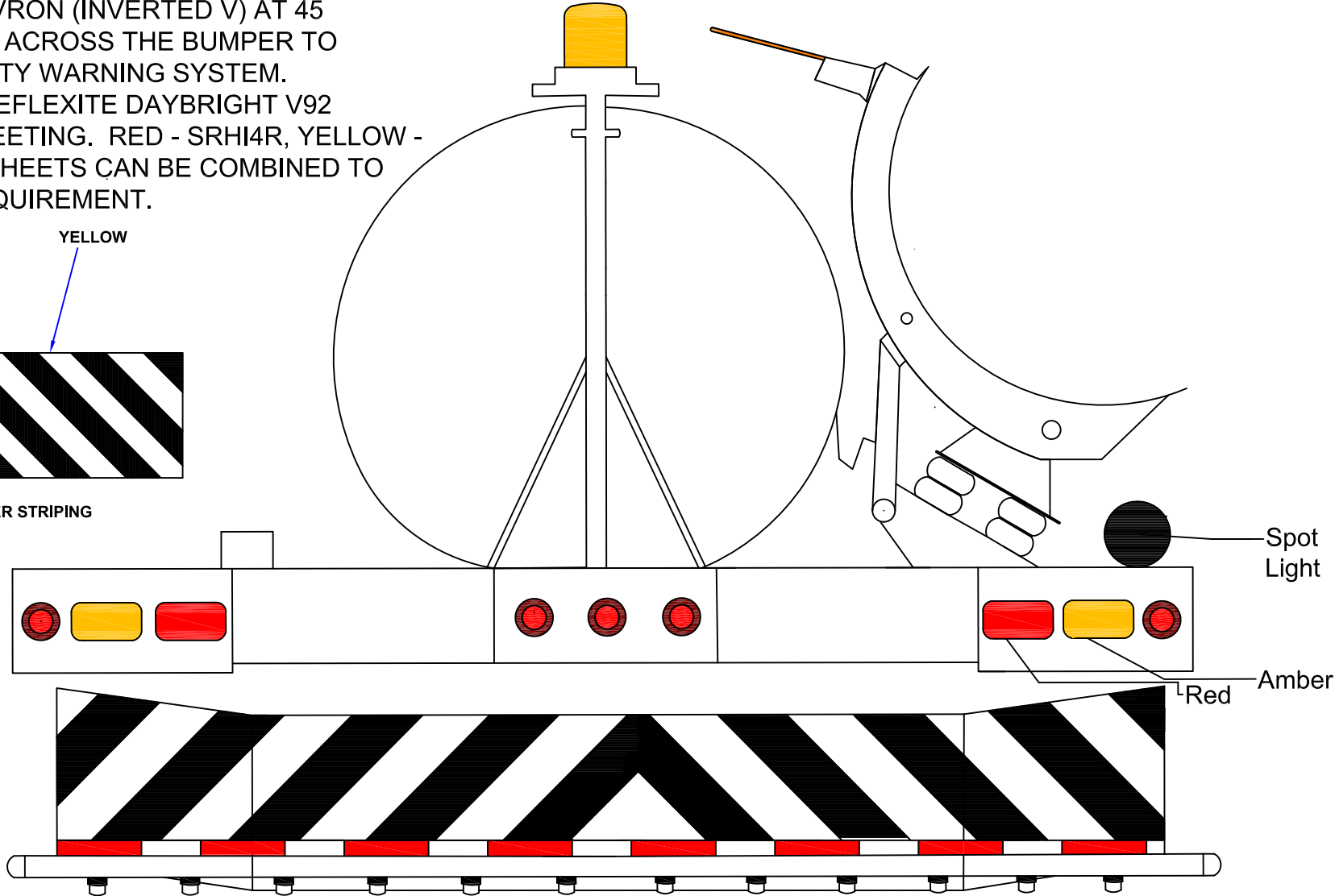
PA DEPARTMENT OF TRANSPORTATION							
REVISIONS			CONSPICUITY TAPE STRIPING REQUIREMENTS				
NO.	DATE	BY					
1	05-16-02	DWG					
2	11-03-06	CJW	<small>DRAWN BY</small>	DLW	<small>SCALE</small>	N/A	EQN-127A
3	01-02-09	MHH	<small>DATE</small>	11-07-97	<small>CHK'D BY</small>	DMA	SHEET 1 OF 1

# Rear View

THE REAR BUMPER SHALL BE STRIPED AS SHOWN WITH 8" WIDE ALTERNATING RED/YELLOW BANDS CREATING A CHEVRON (INVERTED V) AT 45 DEGREE ANGLES, ACROSS THE BUMPER TO SERVE AS A SAFETY WARNING SYSTEM. TAPE SHALL BE REFLEXITE DAYBRIGHT V92 CONSPICUITY SHEETING. RED - SRHI4R, YELLOW - SRHI4Y. TWO 4" SHEETS CAN BE COMBINED TO EQUAL THE 8" REQUIREMENT.

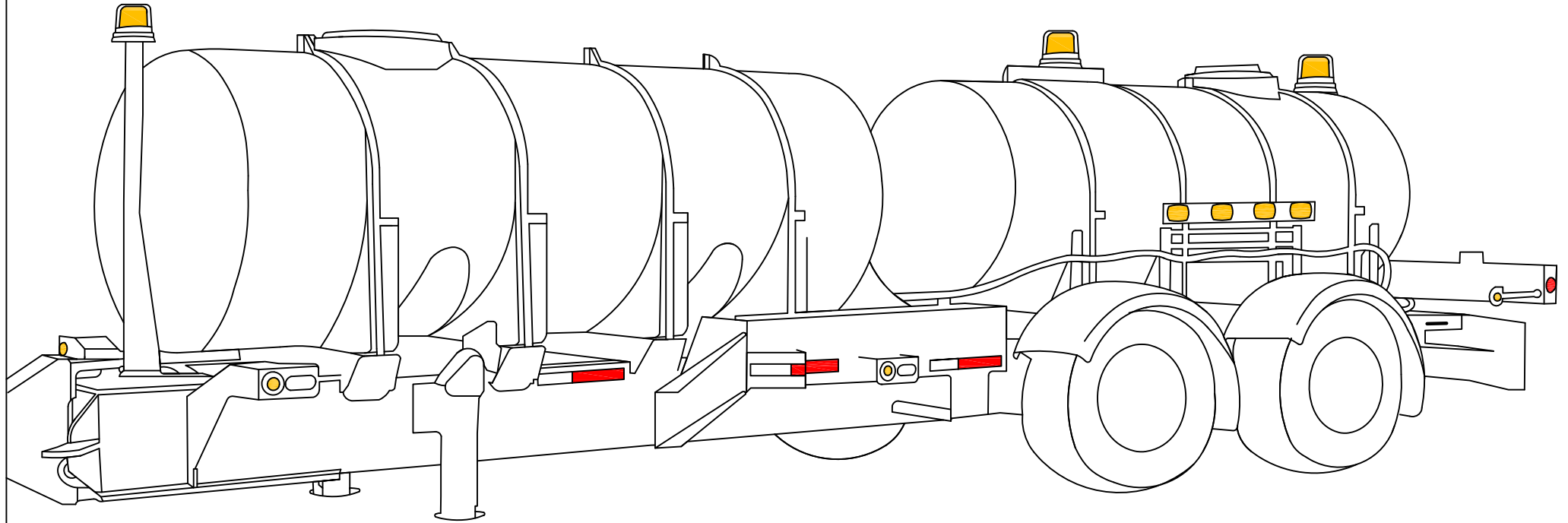


REAR BUMPER STRIPING



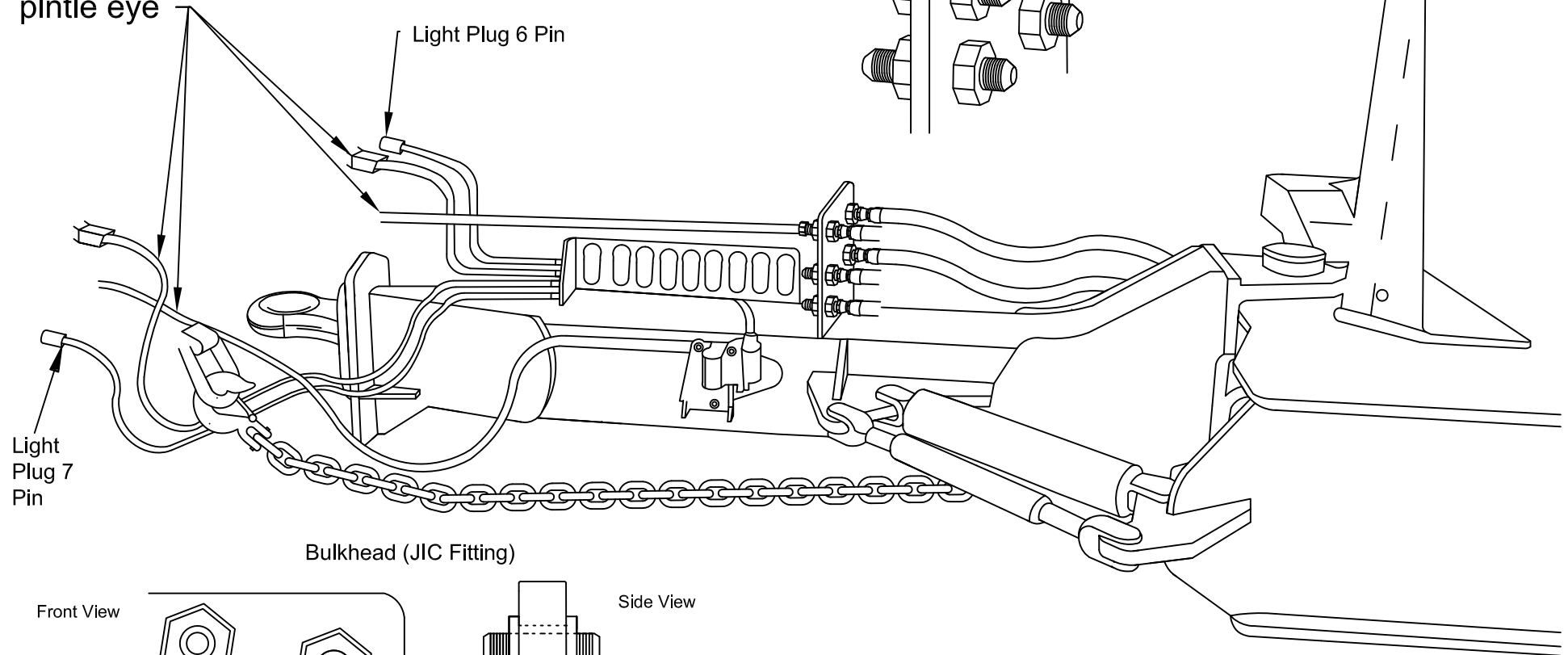
THIS VEHICLE SHALL COMPLY WITH THE RULES OF THE NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION (NHTSA). THE MOST CURRENT REGULATIONS SHALL BE ADHERED TO.

PA DEPARTMENT OF TRANSPORTATION					
REVISIONS			Tow Plow Rear View		
NO.	DATE	BY	DRAWN BY	Combined With	
1	08-02-19	KBD	KBD		EQN-1081A
2			DATE	CHK'D BY	Scale
3			07-26-18		



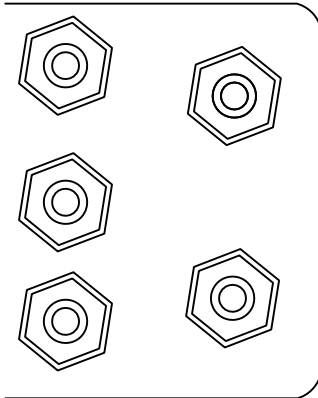
PA DEPARTMENT OF TRANSPORTATION					
REVISIONS			Tow Plow Left Side		
NO.	DATE	BY			
1	08-02-19	KBD			
2			DRAWN BY	Combined With	EQN-1081A
3			DATE	CHK'D BY	
			07-26-18		Sheet 2 OF 3

**Note:**  
 All hydraulic lines, electrical cords and  
 safety chains to extend 3 feet beyond  
 pintle eye

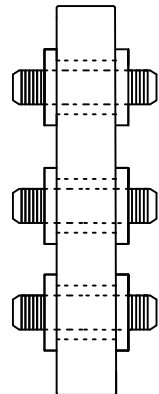


Bulkhead (JIC Fitting)

Front View



Side View

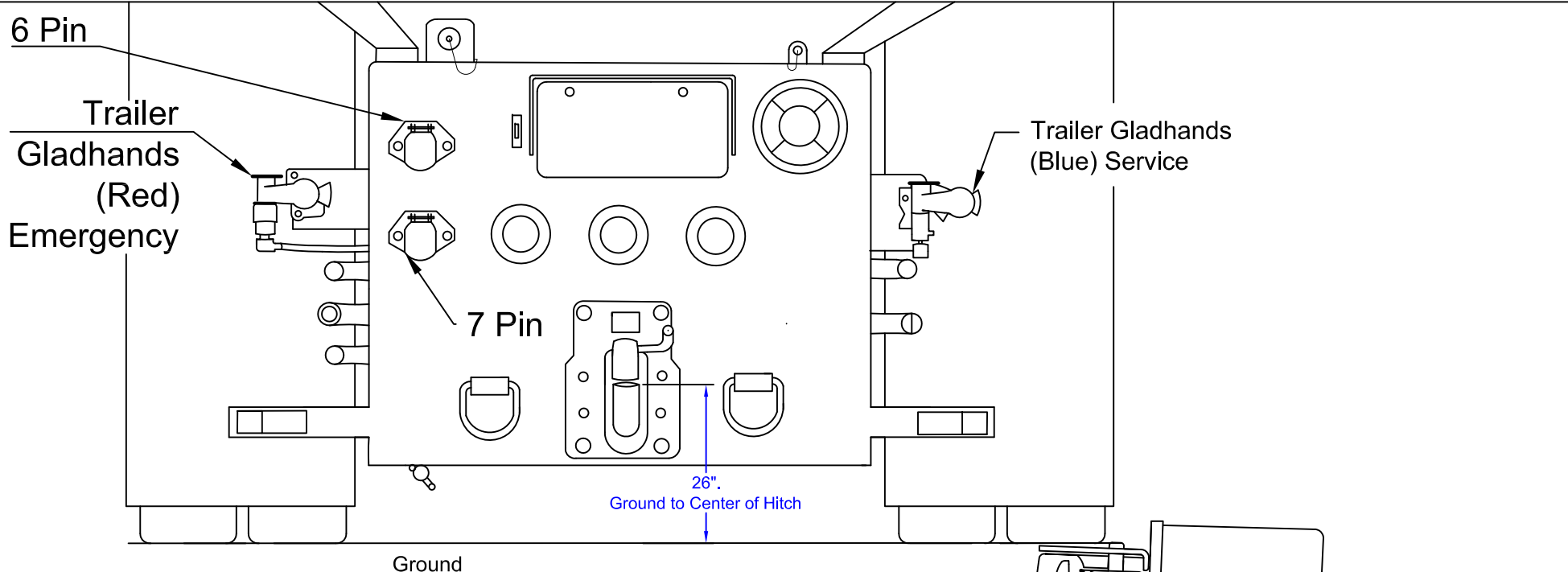


PA DEPARTMENT OF TRANSPORTATION

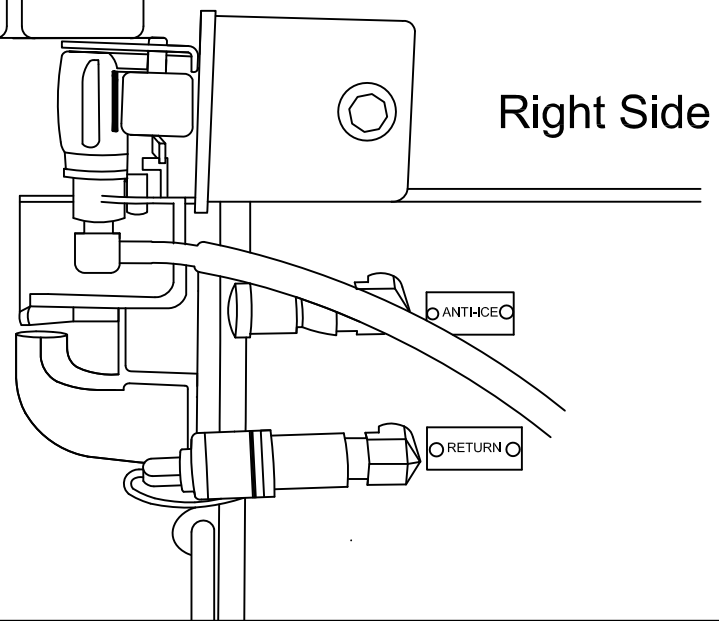
REVISIONS

Tow Plow Hitch Left Side

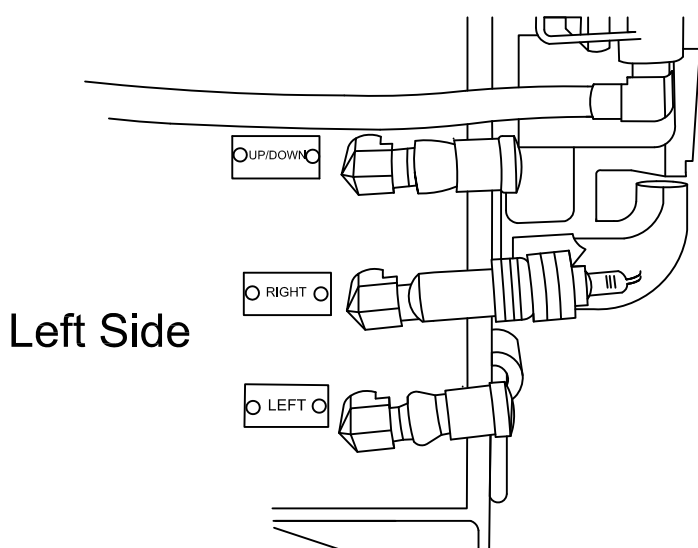
NO.	DATE	BY			
1	08-02-19	KBD	DRAWN BY		KBD
2			Combined With	EQN-1081A	
3			DATE	07-26-18	CHK'D BY Scale



Back View



Right Side



Left Side

PA DEPARTMENT OF TRANSPORTATION				
REVISIONS			Tow Plow Truck	
NO.	DATE	BY		
1	05-23-19	KBD		
2			DRAWN BY KBD	Combined With EQN-1081B
3			DATE 07-26-18	CHK'D BY Scale Sheet 1 OF 2

**PENNDOT Specification for Snow Plows  
Large, Small and Towed**

NOTE: Pennsylvania Department of General Services, PCID No. 1075, "*General Requirements for Bidding PennDOT Vehicles/Equipment*", most current version effective at the time and date of bid opening, is included as a part of this specification. PCID No. 1075 may be reviewed and downloaded from the Department of General Services website, <http://www.dgs.state.pa.us>. Delivery as required per Department of General Service PCID NO. 1075 Section "G". All units must be delivered at ground level within **120** days after receipt of the purchase order by the successful bidder.

The unit shall meet this specification, be a current production model, new and complete.

The unit shall be complete with all equipment required for immediate operation to function as stated in this specification, and the unit must meet all applicable codes and standards.

Any deviations to the specification must be granted in writing by the Chief of the Specification Section. It shall be understood that any discrepancies/deviations between the specification and the completed unit(s), OEM, Vendor or up-fitter related, must be addressed and corrected prior to the delivery deadline and the Departments acceptances.

It shall be the sole responsibility of the successful vendor to ensure compatibility with the Department's dump truck. The vendor shall, prior to bid, inspect the Department's dump truck plow frame and wing mounting to ensure this compatibility. For contact the Fleet Management Division at 717-783-2371.

It is understood that the components specified are minimum and if the unit's manufacturer's Engineering Department recommends or deems necessary, a larger component, the burden of responsibility is hereby placed upon the Manufacturer's Engineering Department to supply a unit that is totally engineered.

Each unit shall bear the manufacturer's model number, serial number and date of manufacture with a non-rusting metal tag, properly affixed.

Paper work provided by manufacturer, vendor or carrier company at time of equipment delivery for signature will only be signed for verification of delivery. Signature will not endorse delivered equipment is free of defects or verification that equipment meets specification/quote. Acceptance of equipment is pending through inspection, with equipment meeting the specification/quote. Paper work will not be submitted for payment until all deficiencies are corrected, prior to purchase order delivery deadline.

It shall be the sole responsibility of the successful vendor to ensure compatibility with the Department's tow plow equipped dump truck. The vendor shall, prior to bid, inspect the Department's dump truck to ensure this compatibility. For model of tow plow equipped dump truck and or location contact the Fleet Management Division at 717-783-2371.

MSO/ Certificate of Origin, and MV 1 to be supplied to the Department at time of delivery.

Paper work will not be submitted for payment until all deficiencies are corrected, prior to purchase order delivery deadline.

May 6, 2020 GAW

**INTENT: Multiple Award Contract to purchase Snow Plows.**

**A. All Plows Specifications**

1. Plow hitch shall be compatible with agency plow frame: EQN-34 and EQN-50
2. Paint: For PENNDOT Yellow, reference DuPont F9885, PPG 85246, Sherwin Williams 73266, and NAPA 73266.

The complete rear facing parts (moldboard and frame) of the plow must be painted with flat paint to reduce glare. It is acceptable to paint the entire plow with flat paint.

Pricing shall also be provided for manufacturer's standard yellow paint.

**Safety:** For the safety of oncoming traffic to make the centerline side of the plow noticeable. The centerline side of the plow shall be painted with a reflective paint to create a minimum (6") wide reflective strip running the full height of the moldboard including the mouse ear (if equipped), starting at the cutting edge. Poly equipped moldboards shall not be painted. They shall be constructed using high visibility Orange or Red in color material viewed from the front of the plow.

A reflective conspicuity style material "Yellow" strip shall be applied to the metal strip attaching the rubber snow deflector, full width, excluding the bolt holes. If snow deflector metal is not present on model a metal strip shall be added to the top of the moldboard to affix the reflective tape. Ref. 3M 983-71 YELLOW

3. Snow deflector shall be mounted to the top edge of moldboard: EQN 37B
4. Highly visible left and right snow plow guides shall be supplied. (Reference part no. Buyers B2036 or Signs and Safety Equipment SPT-36).
5. Plow to lift swivel, type shall depend on type of plow delivered. Reference: EQN-39 and EQN-43 or prior approved manufactures standard.
6. A cadmium plated lift chain shall be supplied: .438in/1.113cm size and 10ft./3.048m to 13ft./3.9264m long as required for the various types of plows supplied.
7. A lifting bail shall be supplied to handle the plow in a balanced manner when unloading or moving.
8. Plow numbers shall be welded on plow before priming and painting. Manufacture to supply serial number(s) at receipt of the purchase order. The Department will then forward equipment numbers to the vendor. Contact the Fleet Management Division at 717-787-1567.
9. All plows shall be tagged with a non-rusting metallic tag containing the manufacture serial number, model number and weight, and be affixed to the plow on the upper right backside of the plow as viewed from the rear.
10. All plows shall work in conjunction with Pa-DOT wing plows.
11. Manufactures plow circle / frame adjustable height shoes will not be installed from manufacture as standard equipment. (See options available)

**Option:** If requested lines 5 and 6, plow shall be supplied with a non-rusting lifting cable and pulley swivel. Lifting cable and pulley swivel shall be properly sized to load weight rating to handle weight of plow in an elevated position for extended periods of time. Pulley swivel shall be grooved to accommodate cable diameter. Pulley swivel pin and clevis shall meet the same dimension to fit the low hoist ram. Ref. EQN-39 and EQN-43.



**B. All Plows Specifications (continued)**

**For Worm drive/cylinder angle reversible and South Dakota PA-DOT Spec'd Plows the following shall include;**

1. Four (4) foot long hoses, hydraulic quick couplers, one (1) male and one (1) female, Aeroquip 5100 series.
2. Angling cylinders shall be double acting with cushion valve (cross port relief) to protect the cylinders and a counter-balance valve 3/8"SAE port installed on the plow. Reference Gresen LOAD6.

**Option: Plow Blades (Only available from this contract when plow(s) are initially purchased)**

1. Standard reversible carbide blade equipped with moldboard shoes.
2. JOMA 6000 plow blades with JOMA 6000 attachment components including clamp bar and Winter Equipment Company style backer blades equipped with carbide inserts.
3. Kueper Blades, Tuca SX Wave.
4. Kueper Blades, GK5.

**Option: Plow Frame Wear Shoe (Only available from this contract when plow(s) initially are purchased)**

1. Adjustable height wear shoe.
2. Adjustable height caster wheel type.

**Option: All other optional equipment items and attachments from OEM or Aftermarket, are to be provided on a (discount from list price) basis.**

**NOTE: Delivery will be direct to the County ordering the unit. Freight will be a separate line item at time of quote. Delivery will be 120 days from receipt of purchase order. (Reference "Specifications Part 1", Page 3 of 4, Section titled "Shipping").**

## PennDOT Snow Plows

**INTENT: Multiple Award Contract to purchase 7 1/2', 8', 8 1/2', 9' and 9 1/2' V and straight blade power angle snow plows for 1/2 ton, 3/4 ton 1 ton and 14,000-17,000 Lb. pickup trucks. Ref. Western and SnowDogg.**

Price for a complete snow plow package shall include installation and hardware.

**Delivery will be 120 days from receipt of purchase order.**

**A. BLADE ASSEMBLY:**

Moldboard: shall be a minimum 14 Ga. thickness steel or stainless steel with formed upper edge. Composite moldboards will not be accepted.

Cutting Edge: shall be replaceable high carbon steel, attached with minimum grade 5 carriage bolts and nuts.

Shoes: shall be full rotation, ductile iron and field adjustable. Shoe brackets shall be welded or bolted to vertical ribs.

Trip & Absorbers: shall be full blade, moldboard trip with shock absorbers.

Blade Guides: shall be highly visible orange, replaceable on both sides.

Moldboard Snow Deflector: shall be supplied full width.

**B. A-FRAME:**

Lift Chains: shall be minimum 1/4 inch grade 43 high test. Frame: shall allow moldboard to pivot and follow surface contour.

**C. LIFT FRAME & MOUNT:**

Chassis Mount: shall meet federal and state vehicle safety standards by compliance and vehicle manufacturing approval. Mount shall be attached with a minimum grade 5 fasteners.

Removable Lift Frame: shall have provisions for a front mounted self-contained hydraulic motor, reservoir and pump. Electric solenoid activated and detachable with lift frame. Shall have stands for dismounting. Shall not obstruct hood latch.

Lights: standard low/high beam headlight with turn signals. Headlights and turn signals shall automatically activate when plow harness is connected to truck.

A lifting bail shall be supplied to handle the plow in a balanced manner when unloading or moving.

**D. PLOW CONTROL:**

Manufactures standard plug in hand held controller with dash mount.

**OPTION:** Pricing shall be included for plow and frame mount only, less the pump for a truck already equipped with hydraulic system and controller. It shall be the vendor's responsibility to confirm compatibility with the department's controller. A wiring harness shall be made available for purchase to make the plow fully operational. Ref. Cirus and Lancaster Truck bodies.

**E. PAINT PREPARATION:**

All corners shall be angled or rounded for safety prior to painting.

Complete plow and frame shall be shot blasted and cleaned with phosphate solution prior to epoxy primer and powder coating. Not applicable to stainless steel.

Paint Color: manufacturer's standard paint color

Stainless steel need not be painted.

**F. IDENTIFICATION:**

Plow Numbers: shall be welded on plow before priming and painting. Manufacture to supply serial number(s) at receipt of the purchase order. The Department will then forward equipment numbers to the vendor. Contact the Fleet Management Division at 717-787-1567.

All plows shall be tagged with a non-rusting metallic tag containing the manufacture serial number, model number and weight, and be affixed to the plow on the upper right backside of the plow as viewed from the rear.

**G. Install: hourly labor rate to install 7 1/2', 8', 8 1/2', 9' & 9 1/2' plows to existing department owned trucks.**

**Option: All other optional equipment items and attachments from OEM or Aftermarket, are to be provided on a (discount from list price) basis.**

**PennDOT Snow Plows**

**022951 PLOW, TOWED, TRAILER, W/ANTI-ICING**

**022956 PLOW, TOWED, TRAILER, STAINLESS STEEL HOPPER, W/GRANULAR, PRE-WET**

A. Intent Statement:

The purpose of these specifications is to describe an anti-ice or granular equipped tow plow to couple to the Department's tow plow equipped dump truck capable. It must be capable of plowing a single roadway with a clearing path minimum of 14 feet while applying liquid anti-ice (salt brine) and or granular material. Tow plow shall deploy to the right side. All functions shall be controlled within the cab from the central hydraulic system. Ref. Viking Cives.

It shall be the sole responsibility of the successful vendor to ensure compatibility with the Department's tow plow equipped dump truck. The vendor shall, prior to bid, inspect the Department's dump truck to ensure this compatibility. For model of tow plow equipped dump truck and or location contact the Fleet Management Division at 717-783-2371.

MSO/ Certificate of Origin, and MV 1 to be supplied to the Department at time of delivery.

Manufacturer standard tow plow with the following requirement:

B. Tow Plow Options:

1. Anti-Ice Components:

Anti-icing, two (2) 1025-gallon polymer brine tanks. OEM Pump shall be driven hydraulically via a love joy connection. Hydraulic motor / pump assembly shall be housed in a NEMA enclosure large enough to facilitate servicing of unit, an electronic flow meter shall be installed to properly calibrate prewet. There shall be a low-level switch to automatically shut down the prewet motor when empty and an indicator to the operator shall be supplied. Anti-icing system shall have a flush kit, installed complete with flush tank, minimum 10 gallon and a garden hose connection.

2. Granular Components:

Hopper Sander, 304L Stainless Steel hopper construction. Any metal lines used for the hopper hydraulic plumbing shall be stainless steel, hydraulic conveyor motor with sensor. Conveyor Motor shall be White Hydraulics: Model RE (no substitution), with a 50-pulse auger motor sensor installed. Kit # W80509. 225 gal. Poly pre-wet tank installed on tow plow with OEM pump and hydraulic motor plumbing and spray nozzles. Flush kit, tank, minimum 10 gallon and a garden hose adapter.

C. Hitch Components:

Pintle eye shall be set at 26-inch from ground to center of eye, with trailer set level.

Hydraulic hoses shall extend 3 feet past pintle eye with connection to bulkhead fittings in middle of trailer tongue, Ref. EQN-1081, sheet 7 of 7 for truck coupler connections.

OEM/Up fitting vendor shall have complete wiring harness connection installed ready to hook to tow plow equipped dump truck with a Certified Cirus XDS or SpreadSmart RX controller connection. Tow plow shall be a complete turn key unit ready to operate once connection is made to dump truck. For harness and connection contact Frank Macalik 717-417-3397 at Certified Cirus.

## PennDOT Snow Plows

### D. Lighting Requirement:

There shall be a Truck-Lite Model# 36140C LED license plate light with light bracket PN# 36710 installed with license plate bracket.

All lighting shall be Whelen L.E.D.'s:

Amber markers 2-inch round PN# 01-02634898A90

Red markers 2-inch round PN# 01-02634898R90

1 - Flood light PAR36 PN# 01-066C579-30C

3 - Round L.E.D. Beacon PN# 01-0685953-AFG

2 - M6AD Amber warning 01-066A797-A1J, rear bumper

4 - M6AD Amber warning 01-066A797-A2J left side rear

2 - M6BTDD PN# 01-066B1866R1J

Whelen light package, (2) M6BTDD on rear (stop turn tail), (2) Amber Warning PN# 01-066A797-A1J on rear (yellow warning) and (4) Amber Warning PN# 01-066A797-A2J strategically placed on left side to face rearward when in plowing mode. Manufacture to provide wiring harness, shall be Grote, Trucklite, or pre-approved equal. Ref. EQN-1081

The above Whelen lights are supplied with male and female Deutsch connectors that shall be utilized to connect the vendor supplied harness to each light source.

Light plugs shall be seven (7) round pin type and seven (7) round pin type with holders Ref. EQN-80B & EQN-1081, sheet 7 of 7 for location of truck plug connections.

There shall be no splices outside of a sealed box or fixture. 3M Scotch-Lok type connectors will not be accepted.

A color-coded electrical wiring chart and schematic shall accompany each unit.

### E. Plow Blade Components:

Plow cutting edge shall be supplied with Joma 6000 blades with JOMA 6000 attachment components including clamp bar, with Winter Equipment Company style backer blade equipped with carbide inserts.

### F. Paint:

Tow plow shall be galvanized, entire unit except for glass, plastic, rubber and metallic accessories or fixtures constructed of rust-resistant or plated material not normally painted.

Conspicuity Reflective Sheeting required on the rear bumper, Orafol America Inc. Red SRHI4R PN# 18716 and Yellow SRHI4Y PN# 18836 VC 312. Ref. EQN-1081.

Unit shall have reflective enhancement per EQN-127A.

### G. Safety:

Manufactures standard safety devices required for transport/operation shall be supplied.

Manufactures standard safety decals displayed on the attachment.

### H. Wheels & Tires:

Wheels: 22.5 x 12.25, 10 hole - 285.75mm bolt circle with 220mm bore, tubeless steel disc wheel rated at 10,500 LBS at a maximum inflation pressure of 120 PSIG. Accuride part number 29807. **(No substitute, standardization).**

Wheel-Guard Separators: The wheel ends shall be equipped with the Accuride part number 5903 Wheel Guard Separator, between the wheel and the brake drum.

Paint: The wheels shall be topcoat painted with TGIC Polyester Powder Paint MLD-82008 High Gloss Gray or equal applied over Cathodic Electro-Disposition Gray Primer.

Tires: 385/65R22.5 (Load Range J) shall be mud/snow tread. All tires shall be radials and have minimum 25/32 thread depth. Acceptable tire manufacturers Goodyear, Michelin and Bridgestone.

**PennDOT Snow Plows**

II. DRAWINGS:

**DRAWINGS:**

EQN 16A	07-29-15	2 sheets	STEEL CUTTING EDGES FOR SNOW PLOWS	
EQN 16D	06-14-07	1 sheet	STEEL COVER BLADES FOR CARBIDE CUTTING EDGES	
EQN-16F	06-14-07	1 sheet	STEEL COVER BLADES FOR CARBIDE CUTTING EDGES	
EQN-16G	06/24/13	1 sheet	JOMA 6000 CUTTING BLADE.	
EQN-34	09/18/07	10 sheets	REVERSIBLE PLOW (50" X 144" & 42" X 132"	
EQN-34-A	06/23/15	5 sheets	REVERSIBLE PLOW 42" X 11' CASTOR ASSEMBLY	
EQN-37	04/11/07	12 sheets	ONE WAY PLOW OVERVIEW, SEVERE DUTY, TRIP TYPE, 721B, 712, 721, AND 731.	
EQN-37B	06/12/07	1 sheet	SNOW PLOW SNOW DEFLECTOR SPECIFICATION	
EQN- 39	06/15/07	1 sheet	PLOW HITCH TO SWIVEL SPECIFICATIONS	
EQN- 43	06/22/07	1 sheet	PLOW TO HITCH SWIVEL SLIDING SPECIFICATIONS	
EQN-50	08-02-18	4 sheets	LOW PROFILE FRONT PLOW HITCH SPECIFICATIONS	
EQN-80B	dated	Rev. 05-16-18	1 sheet	7 WAY POUND PIN MALE CONNECTOR
EQN-122A	dated	Rev. 04-09-12	1 sheets	REAR BUMPER REFLECTIVE SHEETING
EQN-127A	dated	Rev. 01-02-09	1 sheet	CONSPICUITY TAPE STRIPING REQUIREMENT
EQN-1081A	dated	Rev. 08-02-19	3 sheets	TOW PLOW GENERAL REQUIREMENTS
EQN-1081B	dated	Rev. 07-26-18	1 sheet	TOW PLOW TRUCK

The above referenced drawings shall become part of these specifications.

These drawings reflect the intent of the Department and any discrepancies shall be resolved at the line setting ticket meeting between the vendor and the Fleet Management Division Specifications Chief, or the pre-production inspection of the unit.

**PennDOT Snow Plows**

III. MANUALS:

The successful vendor shall furnish all applicable manuals per unit:

- 1 Operators
- 1 Parts
- 1 Service
- 1 Body and Sub-frame (Parts and Service)
- 1 Complete set of manuals for any additional items/equipment added to a piece of equipment.

The manuals listed shall be official O.E.M. publications supplemented with technical manuals for all components as published by sub-vendors/manufacturers.

Parts Manual presented must be relative to "all" items utilized to build this unit(s), with appropriate part numbers.

Delivery of these paper manuals shall be completed at time of delivery of each unit along with an electronic form of each manual on a USB thumb drive in Adobe PDF format.

IV. WARRANTY: Per **PCID No. 1075**

Warranty period shall begin with the date the receiving county takes possession of the completed unit.