U.S. Department of Transportation
Federal Highway Administration

1200 New Jersey Avenue, SE
Washington, D.C. 20590

June 18, 2010

In Reply Refer To:
HSSD/SS-164

Mr. Raymond Kisiel
Northwest Pipe Company
6307 Toledo Street
P.O. Box 2002
Houston, TX 77252-2002

Dear Mr. Kisiel:

This letter is in response to your request for the Federal Highway Administration (FHWA) acceptance of a roadside safety system for use on the National Highway System (NHS).

Name of system:	Poz-Loc 10 inch square slip base system
Type of system:	Breakaway Sign Support
Test Level:	NCHRP Report 350 Test Level 3
Testing conducted by:	N/A
Date of request:	December 22, 2009
Request initially acknowledged:	December 23, 2009
Date completed package received by FHWA:	May 10, 2010

You requested that we find this system acceptable for use on the NHS under the provisions of the National Cooperative Highway Research Program (NCHRP) Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features."

Requirements
Roadside safety devices should meet the guidelines contained in the NCHRP Report 350 or the American Association of State Highway and Transportation Officials' (AASHTO) Manual for Assessing Safety Hardware. Requirements for breakaway supports are those in AASHTO's Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals.

Description
The system consists of an assembly that includes a ductile iron slip base for square tube sign supports. The supports are designed as a slip base casting that adapts thin-walled square tubing to a triangular shaped slip base. The adapter collar allows square tubing to be attached to a triangular slip base, mounted in a foundation. Details for the slip base casting are shown in Enclosure 1.

Assembly of the support system is shown in Enclosure 2. The collar of the slip base casting slides over the end of a thin-walled square tube support (perforated or nonperforated). This system also uses a triangular bolt keeper plate between 26 and 30 gauge separated from the base plate by circular cardboard washers (Enclosure 3). The triangular slip base plates for the support and the ground stub (shown in Enclosure 4) are clamped together using three bolts shown in Enclosure 5.

Crash Testing

No new crash testing was conducted in conjunction with this request. However, variations of this system have been previously crash tested and FHWA has found the test results acceptable according to NCHRP 350 Test Level 3. The findings of this letter recognize and utilize the results of previous testing and associated acceptance letters issued for earlier variations of this system.

Acceptance Letter Number >> Acceptance Letter Date>>>>	SS-88 August 15, 2000	SS-130 January 5, 2006	SS-150 September 5, 2008	SS-164 (Current Request)
Size of Slip Base Casting (i.e., 8" or 10")	10"	10"	8"	10"
NWPipe Designation	SB 6620	16819	31209	36104
Square tube size	2.5" Square	2.5" Square	2.5" Square	3" 7 ga Square
Torque on bolts (foot/pound)	40-80	40-60	40-80	40-80
Number of posts within 7-foot span	2	2	3	(see below)

Findings

You have requested we accept the use of 3-inch x 3-inch x 7-gauge square sign post (perforated and nonperforated) with the Northwest Pipe Poz-Loc 10-inch square slip base system. This request is accepted. The basis for this acceptance is that FHWA previously has found the system acceptable with 2.5-inch x 2.5-inch x 10-gauge and 12-gauge square tubes in letter SS-130 dated on January 5, 2006. The system described in this submission provides larger section modulus and moment of inertia, which will increase rigidity of the support and not result in any degradation of crash testing performance from that previously demonstrated.

Additionally, you submitted requests for this system to be used with:

- NCHRP 350 standard and weak soil installations when used with a concrete footing 12 inches x 42 inches, and, or;
- One piece welded or two-piece bolted slip plates (stubs).

These additional requests listed above are also acceptable.

An earlier variation of this system with 2.5-inch x 2.5-inch 10-gauge and 12-gauge square tubes was found acceptable under FHWA acceptance letter SS-130 dated January 5, 2006, where used in a standard Texas Department of Transportation (TxDOT) concrete footing (12-inch diameter

and 42 inches deep) placed in the NCHRP 350 Standards Soil. Also, the Northwest Pipe 8-inch Square system was found acceptable to be used with the same concrete footing in either strong or weak soil according to acceptance letter SS-150 dated on September 5, 2008. Furthermore, based on FHWA acceptance letter SS-65A the Poz-Loc slip base system with pipe rather than square tubes was found acceptable to use in weak soil with the 42-inch x 12-inch concrete footing. Based on these earlier tests the system detailed in this letter can be placed in the NCHRP 350 standard and weak soil with a standard TxDOT concrete footing, 12 inches x 42 inches.

The Northwest Pipe 8-inch square slip base system has been found acceptable to be used with one, two, or three supports in a 7-foot span, as noted in the FHWA acceptance letter SS-150 dated on September 5, 2008. Your request to use the 10-inch Square slip base system with one or two supports in a 7-foot span is acceptable based on extrapolation of the measured velocity and acceleration changes reported in the pendulum bogie crash test results reported in previous crash tests. However, the use of three supports in a 7-foot span needs additional justification from the test laboratory in the form of an engineering analysis or a crash test.

Your last request is acceptable on the grounds that a secure slip plate foundation will likely have no effect on the breakaway system performance when the 10 inch square slip base system is properly installed.

Therefore, the system described in the requests above and detailed in the enclosed drawings is acceptable for use on the NHS under the range of conditions tested, when such use is acceptable to a highway agency.

Please note the following standard provisions that apply to FHWA letters of acceptance:

- This acceptance is limited to the crashworthiness characteristics of the systems and does not cover their structural features, nor conformity with the Manual on Uniform Traffic Control Devices.
- Any changes that may adversely influence the crashworthiness of the system will require a new acceptance letter.
- Should the FHWA discover that the qualification testing was flawed, that in-service performance reveals unacceptable safety problems, or that the system being marketed is significantly different from the version that was crash tested, we reserve the right to modify or revoke our acceptance.
- You will be expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.
- You will be expected to certify to potential users that the hardware furnished has essentially the same chemistry, mechanical properties, and geometry as that submitted for acceptance, and that it will meet the crashworthiness requirements of the FHWA and the NCHRP Report 350.
- To prevent misunderstanding by others, this letter of acceptance is designated as number

SS-164 and shall not be reproduced except in full. This letter and the test documentation upon which it is based are public information. All such letters and documentation may be reviewed at our office upon request.

- The Poz-Loc 10 inch square slip base system is a patented product and considered proprietary. If proprietary systems are specified by a highway agency for use on Federal-aid projects, except exempt, non-NHS projects, (a) they must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with the existing highway facilities or that no equally suitable alternative exists; or (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411.
- This acceptance letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented system for which the applicant is not the patent holder. The acceptance letter is limited to the crashworthiness characteristics of the candidate system, and the FHWA is neither prepared nor required to become involved in issues concerning patent law. Patent issues, if any, are to be resolved by the applicant.

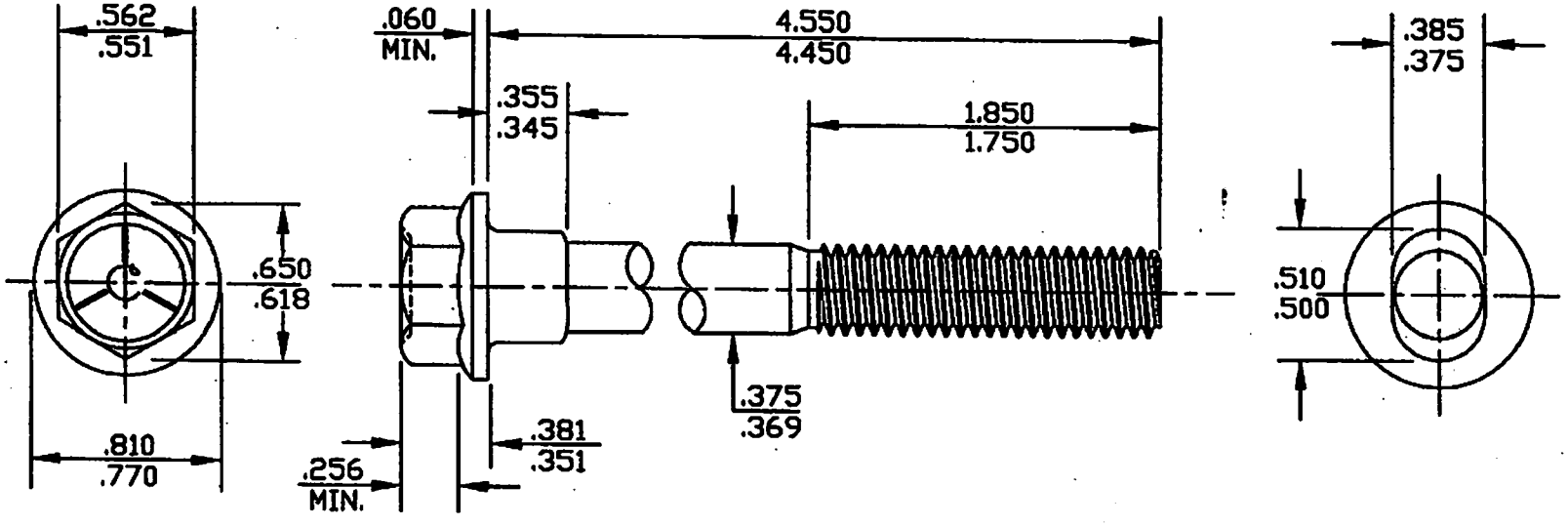
Sincerely yours,

David A. Nicol, P.E.
Director, Office of Safety Design
Office of Safety

5 Enclosures

APPROVED BY:	DATE	REV LET	REVISION RECORD	CHK
DATE:				

NOTE 1: ALL DIMENSIONS IN INCHES.
NOTE 2: GRADE 5 MARKS AND MANUFACTURER'S ID MARKS ON HEAD.



3/8-16 UNC-2A THREAD
(3A MAX. AFTER PLATING)

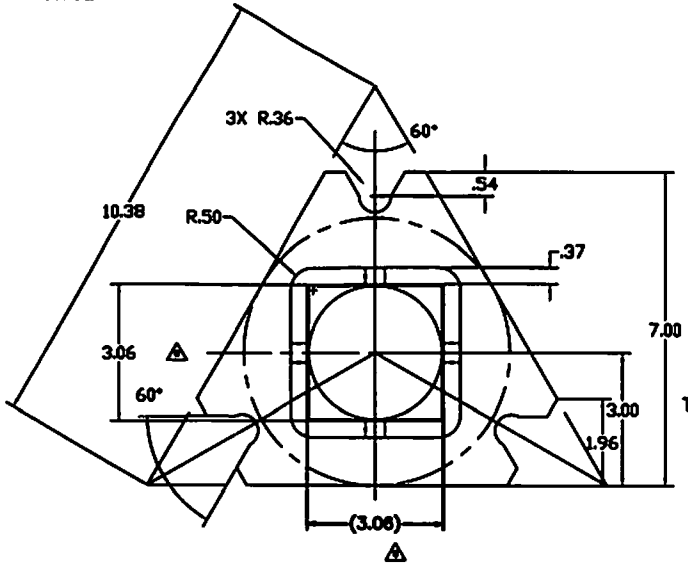
CUSTOMER	NOTE:	DWG DATE 12.03.09	SCALE NONE	DR AW	CHK
ALL-PRO	UNSPECIFIED DETAIL WITH RESPECT TO DIMENSIONS, MATERIAL, METHODS OF TEST, ETC., MUST CONFORM TO THE LATEST EDITION OF THE INDUSTRIAL FASTENERS INSTITUTE STANDARDS	MATERIAL SPEC			
NAME 3/8-16 X 4-1/2 HEX FLANGE OBLONG SHOULDER BOLT		GRADE 5 [SAE J429]			
PART NO 37C450HFB5Z/DOM	CAD FILE PR2311	FINISH COMMERCIAL ZINC AND CLEAR CHROMATE			

Enclosure 5

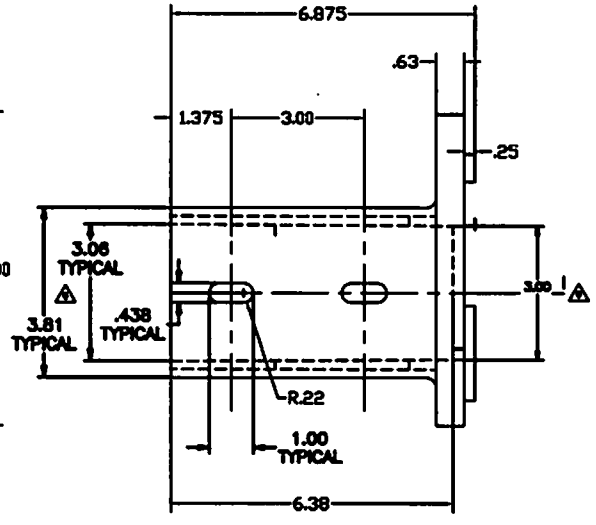
NOTES:

1. MATERIAL: ASTM A-536 GRADE 65-45-12 DUCTILE IRON
2. HOT DIP GALVANIZE PER ASTM A-153
3. CLEAN ID BORE AND COUNTERBORE AFTER GALVANIZING TO REMOVE EXCESS ZINC.
4. CASTING PART NUMBER - 36103
5. UNLESS NOTED, ALL RADII AND FILLETS ARE .25
6. SQUARE HOLE TAPERS FROM 2.06 TO 2.00 AT THE BOTTOM.

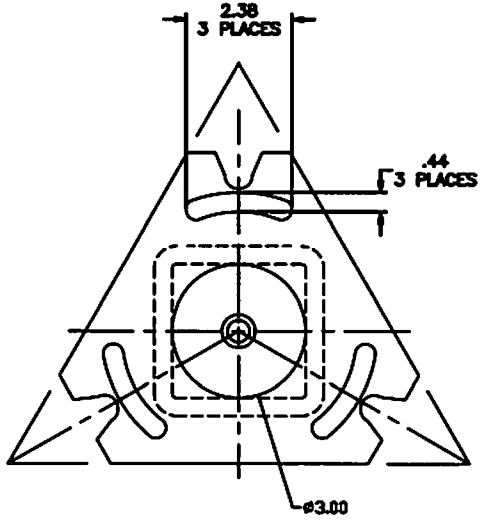
REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED



TOP VIEW



SIDE VIEW

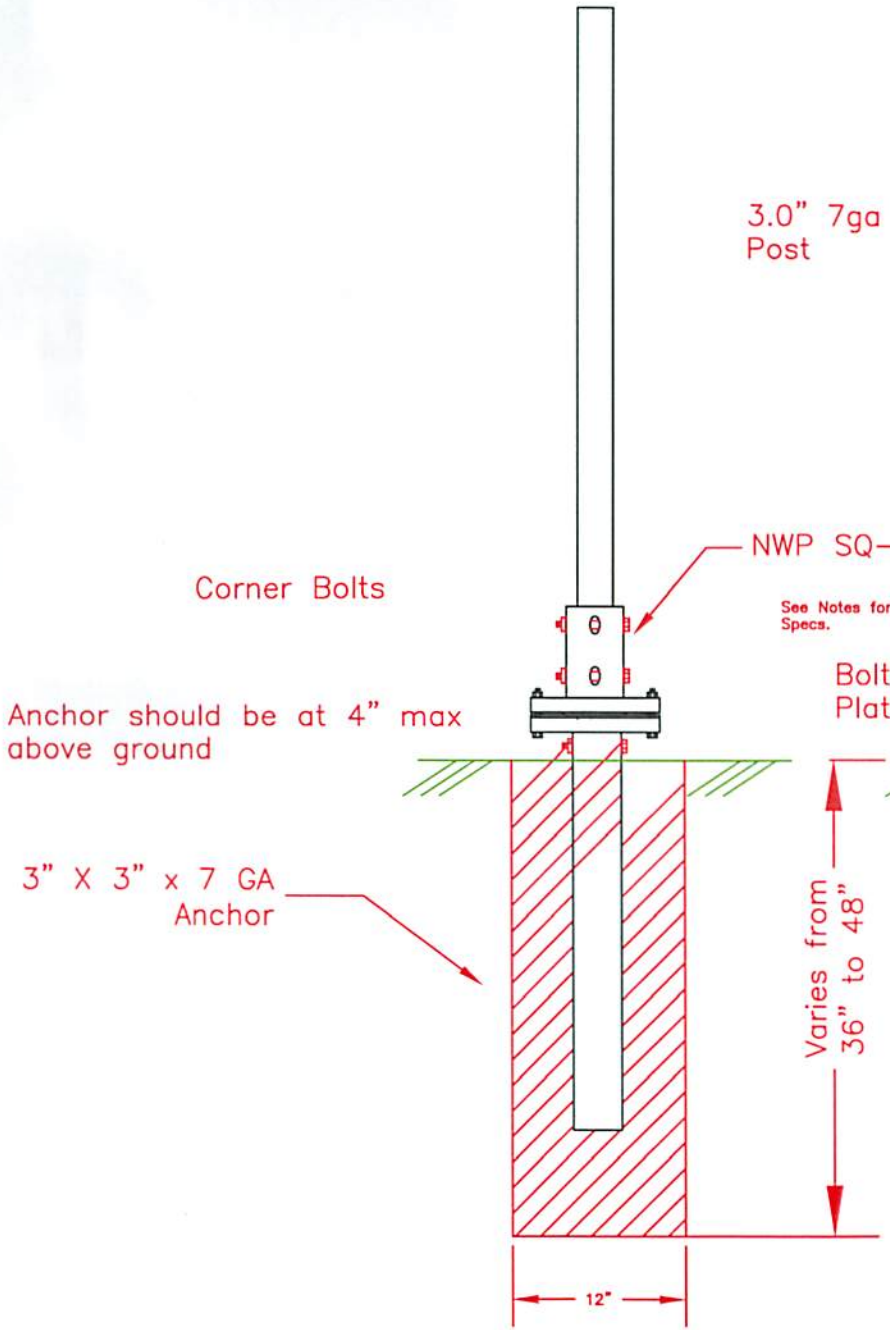


BOTTOM VIEW

Enclosure 1

	Northwest Pipe Company		
	SQ-10 Square Slipbase Casting		
Neo Lindley	SIZE	FSCM NO.	PART NO. 36104 REV
10/1/09	SCALE 1:1		SHEET

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED



Notes:

1. Bolts should be installed with the threads up.

2. Bolt torque range: 40 ft/lb min, 80ft/lb max

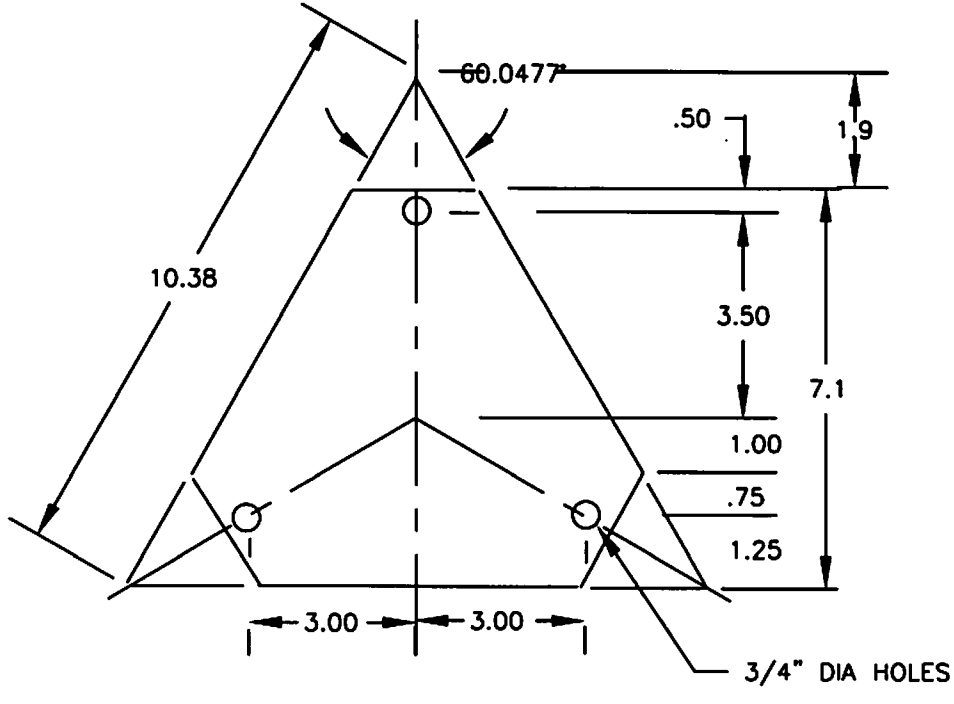
3. Contact Northwest Pipe Company for installation instructions.

Unless Noted: Tolernaces per ASTM A-536	Northwest Pipe Co.				
	SQ-10 Assembly Drawing				
NL	SIZE A	FSCM NO.	DWG NO. SQ 10 GEN. ASS'Y		REV
12/4/09	SCALE NTS			SHEET	

Enclosure 2

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

STAMP BOLT KEEPER PLATE SPACER FROM GALVANIZED SHEET
26-30 GA ASTM A-563 G-90 COATING



PART NO. 2707

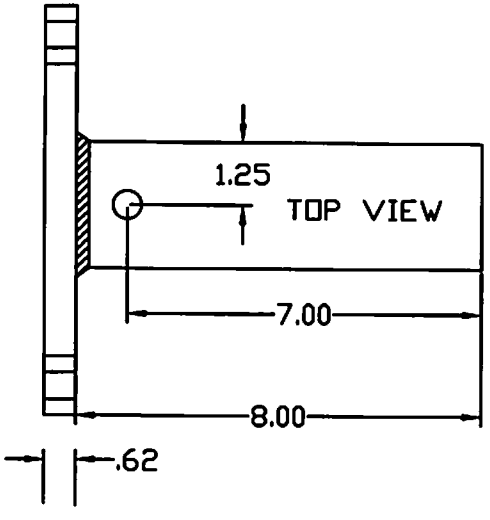
Unless Noted: Tolernaces per ASTM A-536	Northwest Pipe Co.			
	SLIPBASE BOLT KEEPER PLATE			
LEP	SIZE A	FSCM NO.	DWG NO. SB 2707	REV
03/07/03	SCALE NTS			SHEET

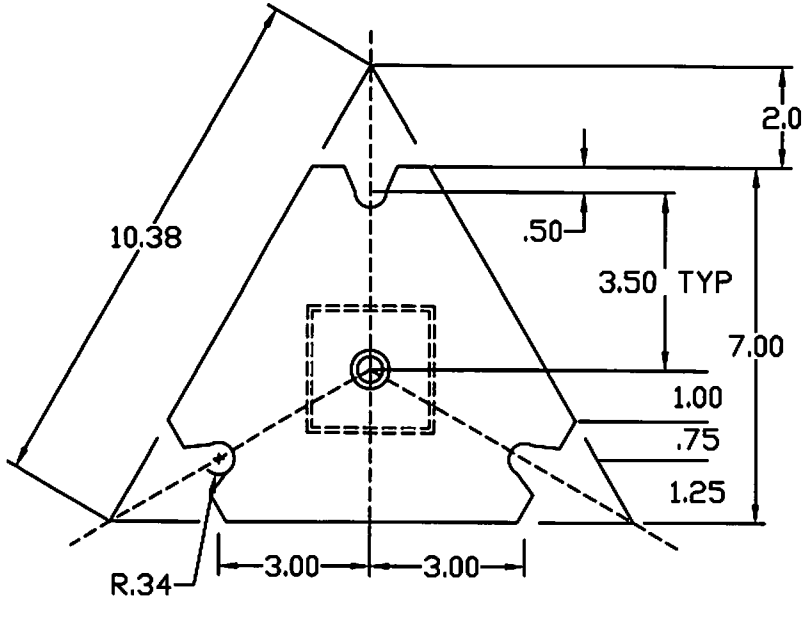
Enclosure 3

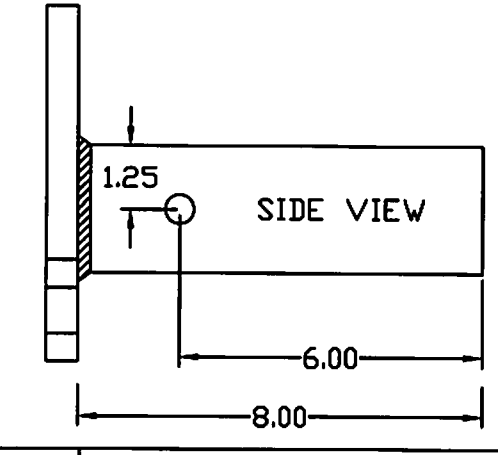
NOTES:

1. TUBE SHALL CONFORM TO ASTM A 53 GR B or A500
2. ALL FABRICATION SHALL BE COMPLETED PRIOR TO GALVANIZATION ACCORDING TO ASTM A 123 G85 MIN.
3. HOLE IN SLIP PLATE IS TO PROVIDE ESCAPE PATH FOR GASES DURING HOT DIP GALVANIZATION. EXACT HOLE PLACEMENT MAY VARY AS NEEDED
4. SLIP PLATE SHALL BE FABRICATED FROM ASTM A36 OR A572 STEEL PLATE
5. ALL WELDING TO BE PERFORMED IN ACCORDANCE WITH ANSI/AWS D1.1 SPECIFICATIONS
6. FINISHED STUBS SHALL BE STEEL STENCILED A MINIMUM OF $\frac{1}{16}$" DEEP WITH THE LETTERS "NP" FOLLOWED BY A THREE DIGIT IDENTIFIER ASSIGNED BY NORTHWEST PIPE

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED







Northwest Pipe Company

10" SQUARE SLIPBASE STUB INSERT

NL	SIZE	FSCM NO.	PART NO. 00000	REV
9/2/09	SCALE 1:1			SHEET

Enclosure 4