U.S. Department
Of Transportation
Federal Highway
Administration

400 Seventh St., S.W.
Washington, D.C. 20590

September 18, 1996

Refer to: HNG-14/SS-68

Mr. Lawrence E Leahy
President
Xcessories Squared
7350 W. Street, Route 104
P.O. Box 135
Auburn, Illinois 62615

Dear Mr. Leahy:

This is in response to your July 22 letter requesting Federal Highway Administration's (FHWA) acceptance of your company's bolt on triangular slip-base (SB8-250 series) for use with perforated square steel tube sign supports. Your letter was accompanied by videotape and a crash test report from the Texas Transportation Institute (TTI) dated July 1996. The pendulum crash testing was conducted to assess the breakaway performance of the slip-base on a single post support embedded into standard soil with a "winged anchor" (HDWA-250-36.) Additional information in response to your request was received via fax on August 14.

Testing was done in accordance with the NCHRP Report 350, Recommended Procedures for the Safety Performance Evaluation of Highway Features. Requirements for breakaway supports are those found in the American Association of State Highway and Transportation Officials' (AASHTO) Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals. One deviation from the recommended procedures was the use by TTI of their 1099-kg pendulum instead of the required 820-kg mass. TTI reduced the impact speed of the pendulum to account for the increased mass, yielding the same impact severity as if the 820-kg mass had been used at 35-kmh. This is not a recognized procedure. However, because of the very low change in velocity in the pendulum mass and past favorable experience in tests of structures of the type being evaluated, we will accept the procedure this time.

Drawings of the hardware are enclosed. The triangular slip plates were plasma cut from 19-mm (3/4-inch) ASTM A36/ASME SA36 40-50 carbon steel before notching and debarring of the three points. The angle sections were then welded vertically to the plate facing each other. The foundation conditions of the tested hardware differed from those

shown in that the "winged anchor" soil plate was used in lieu of the concrete foundation illustrated.

A summary of the crash test is presented below:

Test Number	270687-XSD P1
Foundation	Stub with Soil plate embedded in standard soil
Sign Size mm (in)	610 x 760 (24 x 30)
Sign and Support Mass kg (wt, lbs)	22.9 (50.5)
Support Size, mm (in)	63.5 x 63.5 (2.5 x 2.5)
Pendulum Mass, kg (wt, lbs)	1099 (2422)
Impact Speed, km/h (mph)	30.82 (19.15)
Vehicle Velocity Change, m/s (fps)	0.24 (0.79)
Occupant Impact Speed, m/s (fps)	0*
Stub Height, mm (in)	57 (2.24)

* Because of the modifications made to the recommended test vehicle mass and impact speed, the maximum permissible occupant impact speed was 4.3 m/s.

The results of this modified test met the change-in-velocity and stub-height requirements adopted by the FHWA. Your company's three bolt slip-base for use with a single 63.5 mm square, 12 gauge perforated steel tube sign support, with soil plate, is therefore acceptable for use in standard soil on projects on the National Highway Systems where breakaway systems are required if proposed by a State. The base may also be used with other configurations of single square steel tube posts provided that the section modulus of the support is similar to or greater than that of the tested post. Because a similar base was tested with a concrete foundation with acceptable results, your company's base may also be used when the stub is set in a 760-mm deep concrete foundation with a minimum diameter of 200 mm.

Our acceptance is limited to the breakaway characteristics of the supports systems and does not cover their structural features. Presumably you will supply potential users with sufficient information on structural design and installation requirements to ensure proper performance. We anticipate that the States will require certification from Xcessories Squared that the slip-base hardware and posts furnished have essentially the same chemistry, mechanical properties, and geometry (or with larger section modulus as mentioned above) as those used in the crash testing, and that they will meet the Federal Highway Administration change in velocity requirements.

You indicated that the slip-base should be considered proprietary. To be used in Federal-aid projects, except exempt, non-NHS projects: (a) must be supplied through completive

bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with existing highway facilities for 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, a copy of which is enclosed.

Sincerely yours,

Seppo I. Sillan, Acting Chief
Federal-Aid and Design Division

Enclosures

Geometric and Safety Design Acceptance Letter SS-68

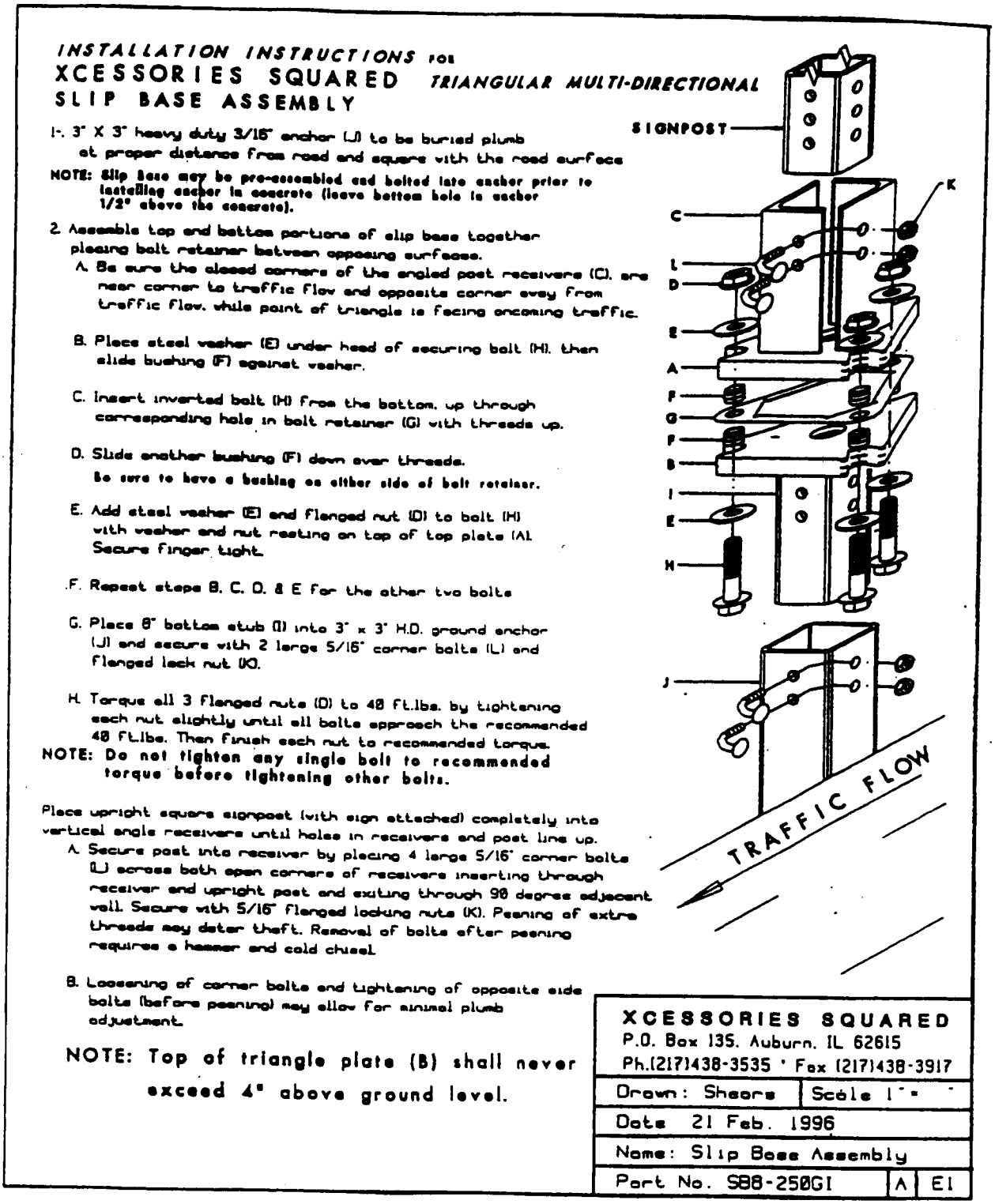
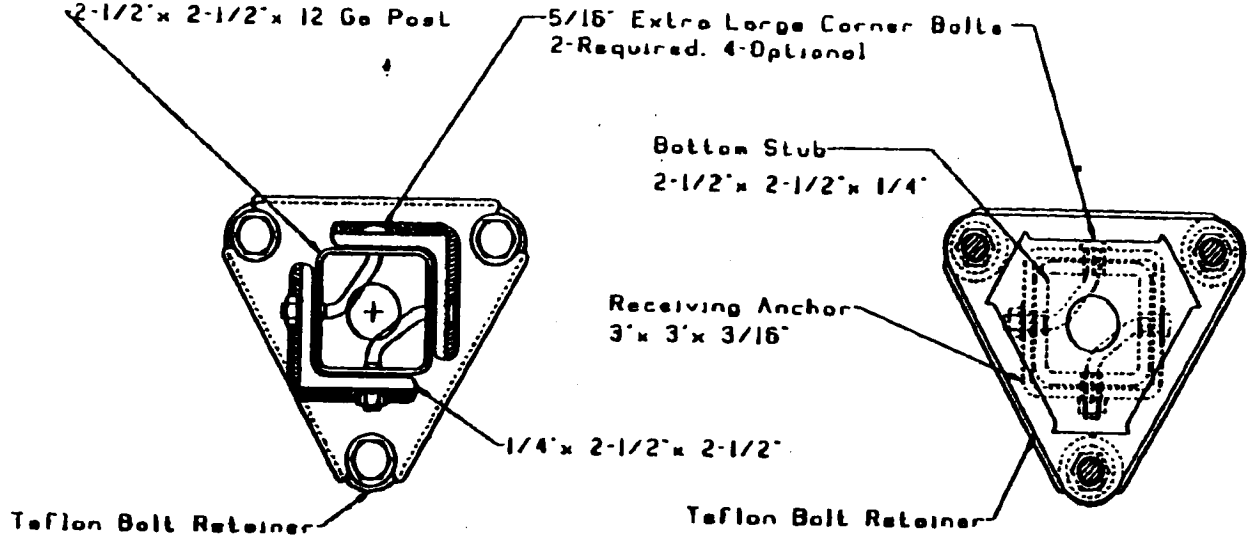


Figure 3. Details of the triangular multi-directional slip base assembly.



TOP SECTION
P/N SB8-250GA
8"x 8"x 8"x 3/4"

BOTTOM SECTION
P/N SB8-250GB
8"x 8"x 8"x 3/4"

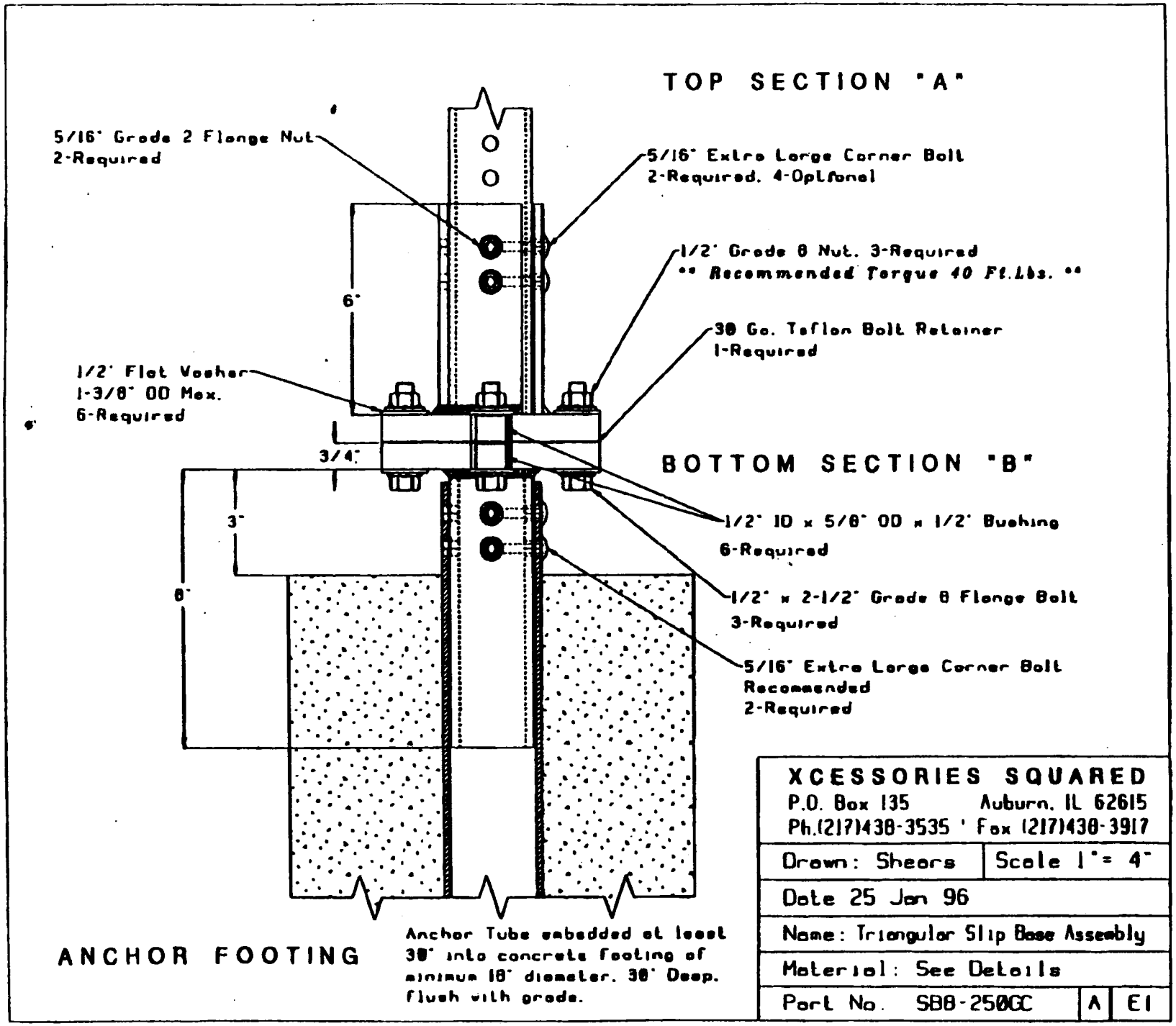
SLIP BASE MATERIAL SPECIFICATIONS

1. MATCH PLATES-8"x 8"x 8"x 3/4" ASTM. A36/ASME. SA-36 .48-.58 Carbon
2. TOP PLATE ANGLE RECEIVER-2-1/2"x 2-1/2"x 1/4" HR-P&O ASTM. A-36/ASME-SA-36
3. BOTTOM PLATE ANCHOR STEM-2-1/2"x 2-1/2"x 1/4" Sq. Structual Welded Tube ASTM A500 Gr. B
4. BOLT RETAINER-.035 Teflon Coated Plastic
5. CONNECTING BOLTS-1/2"x 2-1/2" Grade 8 Flanged Bolt. UNC
6. FLANGE WASHER NUT-Grade 8. 1/2" UNC
7. FLAT STEEL WASHER-1/2"x 1-3/8"
8. RELEASE BUSHING-17/32" I.D. x 1/2" SS

*STEEL PARTS GALVANIZED TO ASTM 123
HARDWARE PLATE TO ASTM-B633. TYPE 3 SCI

XCESSORIES SQUARED
P.O. Box 135 Auburn, IL 62615
Ph.(217)438-3535 * Fax (217)438-3917

Drawn: Sheers	Scale 1" = 4"
Date 25 Jan96	
Name: Triangular Slip Base Assembly	
Material: See Details	
Part No. SB8-250GC	A | E1



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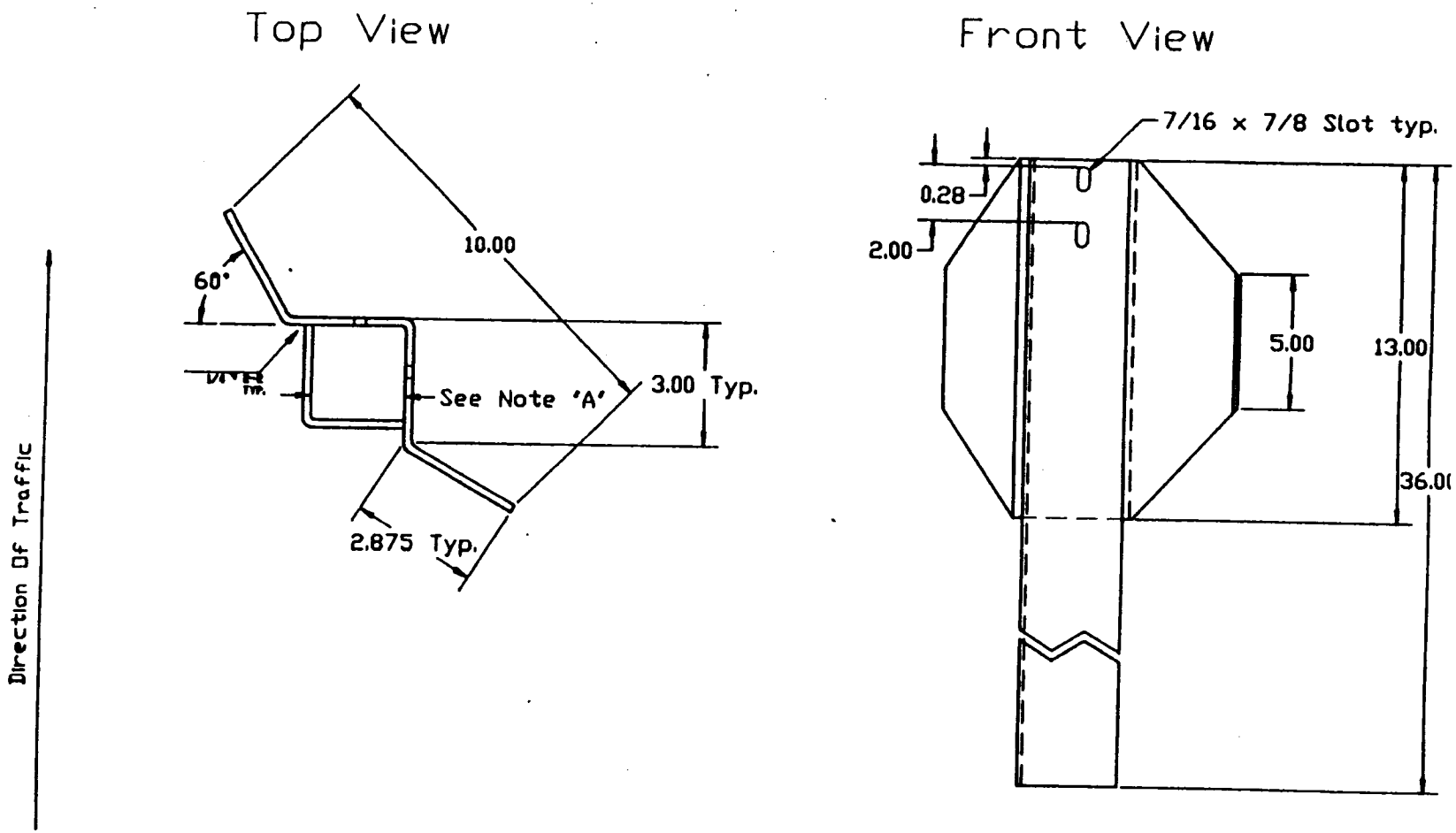

Figure 4. Details of winged anchor.