

May 10, 2002

Refer to: HSA-10/B98

Terry Hopkins, PE
Traffic Congestion & Engineering Operations Unit Head
North Carolina Department of Transportation
1592 Mail Service Center
Raleigh, North Carolina 27699-1592

Dear Mr. Hopkins:

In your April 19 letter, you requested the Federal Highway Administration's (FHWA) acceptance of the North Carolina Department of Transportation's 3-m (10-ft) long New Jersey profile temporary concrete barrier with a triple-loop and drop-in pin connection as a National Cooperative Highway Research Program (NCHRP) Report 350 longitudinal barrier at test level 3 (TL-3). Mr. Powers of my staff concurrently has received revised copies of a Transportation Research Center (TRC) test report dated January-April 2002 entitled "NCHRP Report 350 Test 3-11 of the North Carolina Department of Transportation Design Portable Concrete Barrier for FHWA Approval, Test No. 2" and videotapes of the test that was conducted.

The tested barrier is a standard 810-mm (32-in) high New Jersey shape portable barrier in segment lengths of 3.0 m (10 ft). The base width is 610 mm (24 in) and the barrier tapers to a 150-mm (6-in) top width. Reinforcing consists of two longitudinal 13M (#4) bars in the barrier stem and a u-shaped section of 6 x 6 x w2.9 welded wire fabric throughout the barrier length. The loop connection between segments is comprised of round 19-mm (0.75-in) diameter steel bars bent to an inside radius of 51 mm (2.0 in). There are two such loops at the top of each segment on one end and a single loop on the opposite end. The bottom loops are reversed, with a single bottom loop on the end with a double top loop and a double bottom loop on the opposite end. Barrier segments are connected by positioning the single loops between the double loops at each end and inserting a galvanized 32-mm (1.25-in) diameter high-strength bolt, 660-mm (26-in) long through the all six loops. A flat washer and nut are welded to the pin 610 mm (24 inches) up from the bottom. No nut or other type of retention device is used on the pins. These details are shown on the enclosure.

Twenty barrier segments were used in the test for a total installation length of 60 m (200 ft). The test vehicle impacted the barrier at 100.4 km/h (62.4 mph) and at an angle of 25 degrees. The impact point was 1.2 m (4.0 ft) upstream from the connection between segments 7 and 8 or approximately 19 m (62 ft) from the upstream end of the test installation. The dynamic deflection of the barrier under these impact conditions was reported to be 1.54 m (5.0 ft). The pickup truck was contained and redirected, with its rear axle momentarily overriding the barrier before it was redirected back onto the roadway. Maximum occupant impact velocity and subsequent ridedown accelerations

were 5.1 m/sec (16.7 ft/sec) and 7.7 g's, respectively. The reported roll angle was 48 degrees. The partial override of the barrier and the relatively high vehicular roll angle may have resulted from using a Ford F-250 pickup truck for the test rather than the more commonly used Chevrolet C2500. These two vehicles have significantly different suspension systems.

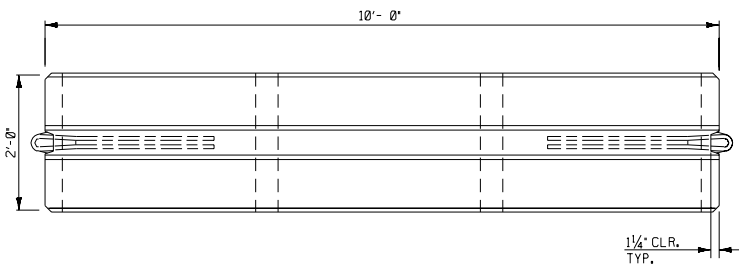
Based on staff recommendations, I agree that your precast New Jersey barrier with the pin and loop connection detail described above satisfies the evaluation criteria for an NCHRP Report 350 test level 3 (TL-3) longitudinal barrier and that it may be used on the NHS.

Sincerely yours,

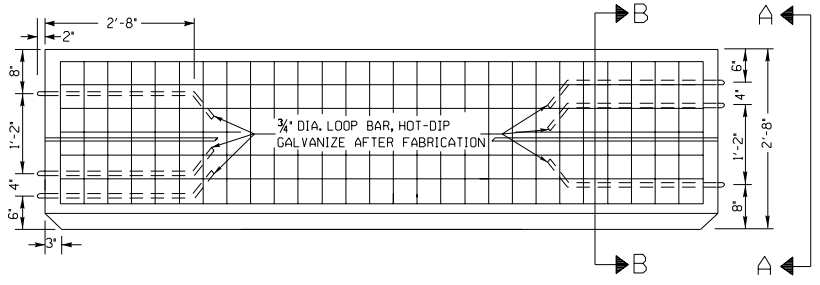
(original signed by Carol H. Jacoby)

for A. George Ostensen
Program Manager, Safety

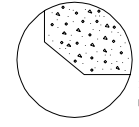
3 Enclosures



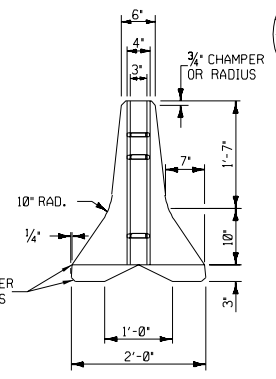
PLAN



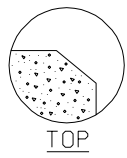
ELEVATION



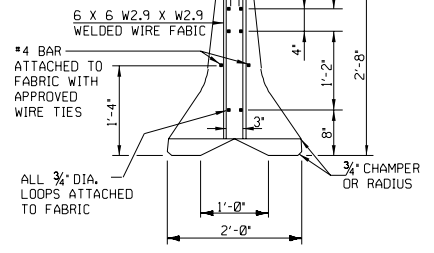
BOTTOM



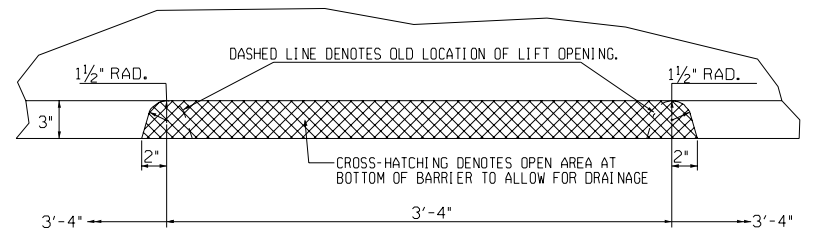
END VIEW A-A



TOP



SECTION B-B

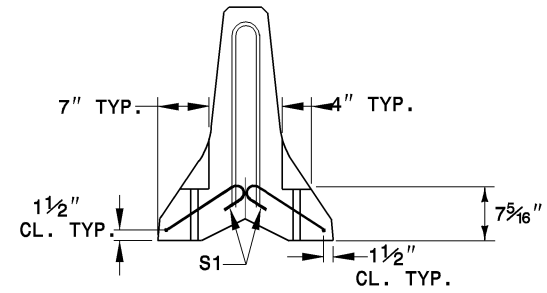
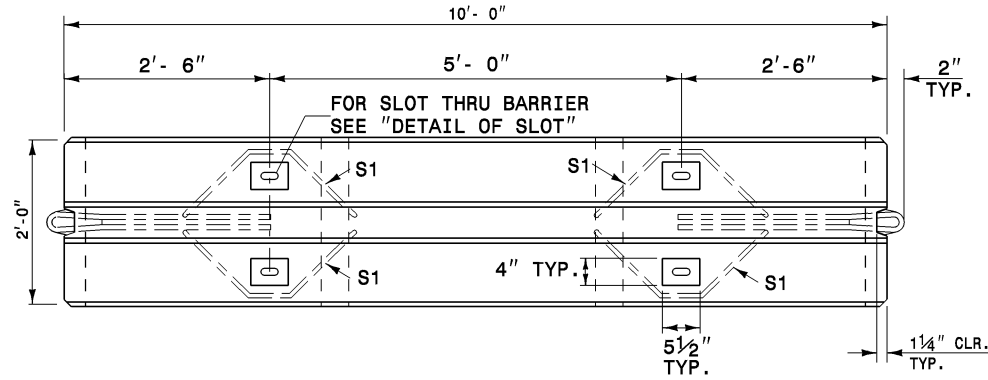


ELEVATION DETAIL OF DRAINAGE/LIFT SLOT

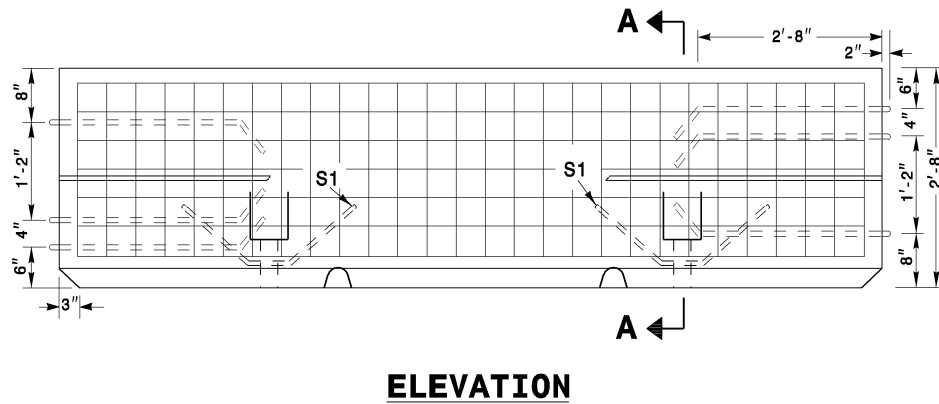
GENERAL NOTES

- THE DRAINAGE/LIFT SLOT SHOWN IS A MODIFICATION OF THE LIFT OPENINGS, ALL OTHER DESIGN CRITERIA SUCH AS REINFORCEMENT BARS ETC. ARE THE SAME AS SHOWN ON THE STANDARD DRAWING.
- BARRIER WITH DRAINAGE/LIFT SLOT IS INTENDED TO BE USED IN AREAS WHERE ROADWAY SURFACE WATER RUNOFF CAUSES EXCESS PUDDLING ADJACENT TO THE TEMPORARY BARRIER. INSTALL THE BARRIER AS SHOWN IN THE PLANS, OR AS DIRECTED BY THE ENGINEER.
- DRAINAGE/SLOT CAN BE USED WITH ANCHORED *PORTABLE CONCRETE BARRIER*.

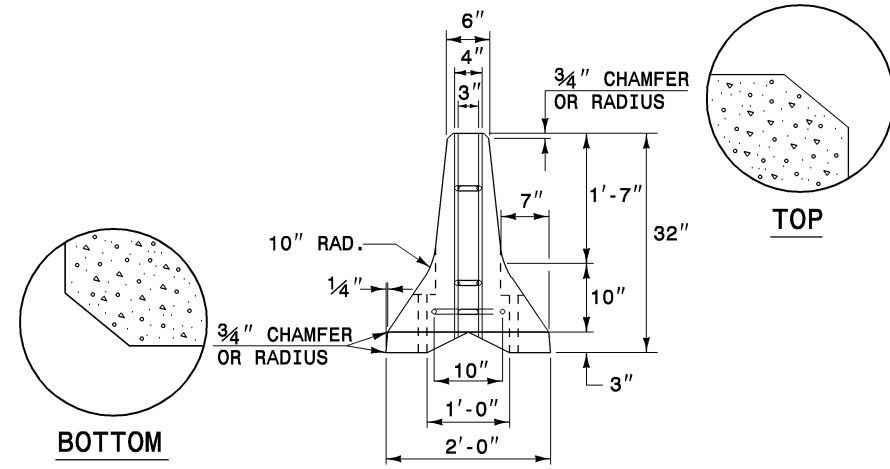
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



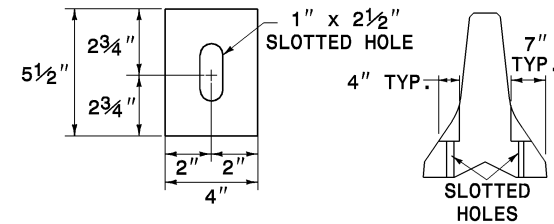
SECTION A-A



ELEVATION



END ELEVATION



AFTER CASTING, THE DIAMETER OF THE SLOT CAN VARY BETWEEN 1" AND 1 1/8".

DETAIL OF SLOT

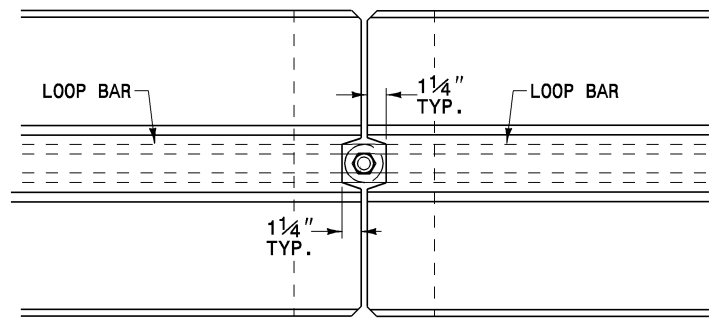
NOTE: REFER TO STD. DWG. 1170.01-SHEET 4 FOR METHODS OF ANCHORING TEMPORARY BARRIER.

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

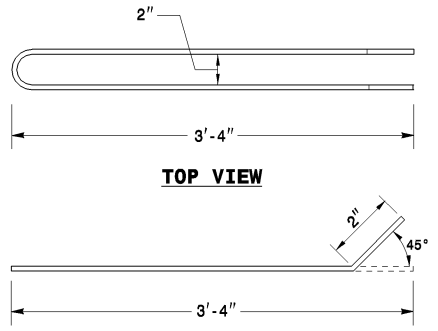
ENGLISH DETAIL DRAWING FOR
PORTABLE CONCRETE BARRIER
ANCHORED

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

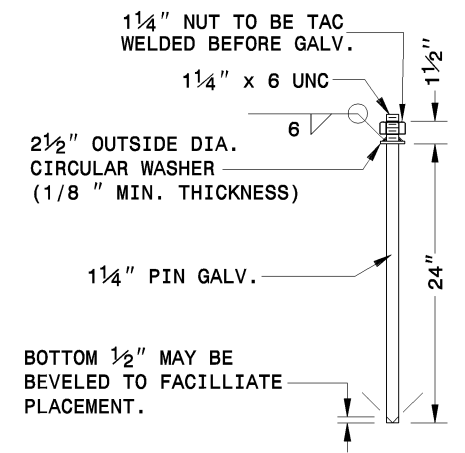
ENGLISH DETAIL DRAWING FOR
PORTABLE CONCRETE BARRIER
ANCHORED



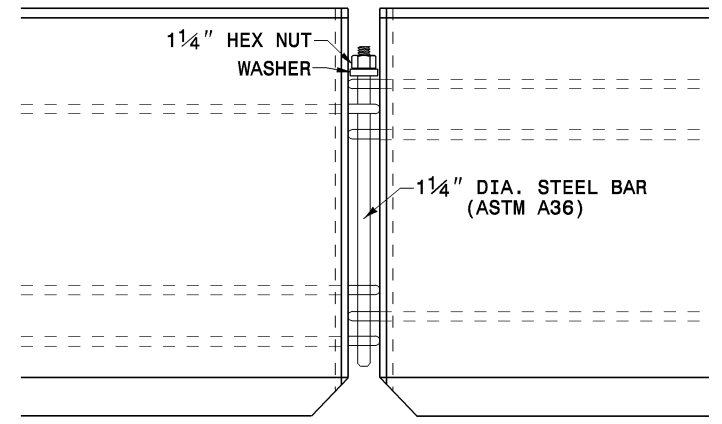
PLAN OF CONNECTION



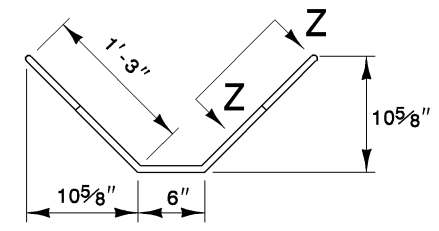
REINFORCEMENT DETAIL



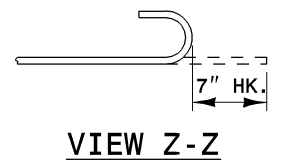
CONNECTOR PIN ASSEMBLY



ELEVATION OF CONNECTION

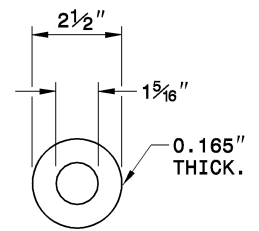


S1 BARS

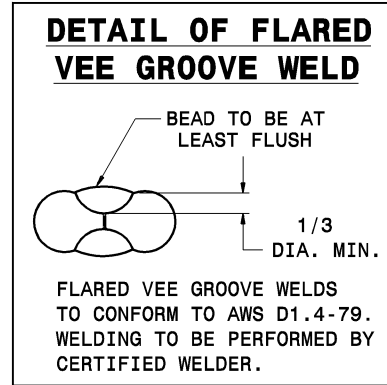


VIEW Z-Z

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



PLAIN GALVANIZED STEEL WASHER FOR 1 1/4\"/>



DETAIL OF FLARED VEE GROOVE WELD

FLARED VEE GROOVE WELDS TO CONFORM TO AWS D1.4-79. WELDING TO BE PERFORMED BY CERTIFIED WELDER.