

January 8, 2002

Refer to: HSA-10/B93

Larry F. Sutherland
Deputy Director, Office of Roadway Engineering Services
Ohio Department of Transportation
P.O. Box 899
Columbus, Ohio 43216-0899

Dear Mr. Sutherland:

In your October 29 letter to Mr. Richard Powers of my staff, you requested the Federal Highway Administration's (FHWA) acceptance of the Ohio Department of Transportation's 3-m (10-ft) long New Jersey profile temporary concrete barrier as a National Cooperative Highway Research Program (NCHRP) Report 350 longitudinal barrier at test level 3 (TL-3). Mr. Powers has also received copies of a Transportation Research Center (TRC) test report dated October 2001 (revised December 2001), entitled "NCHRP Test 3-11 of the Ohio Department of Transportation New Jersey Shape Portable Concrete Barrier, Test No. 011012" 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 five longitudinal 16M (#5) bars with four 10M (#3) stirrups at each end on 150-mm (6-in) centers, with three additional stirrups evenly spaced from the end stirrups on 483-mm (19-in) centers. The pin and loop connection between segments is comprised of round 19-mm (0.75-in) diameter steel bars bent to an inside radius of 44 mm (1.7 in). A galvanized 32-mm (1.25-in) diameter high-strength bolt, 560-mm (22-in) long, with heavy plate washers and a bottom hex nut, connects adjoining segments. After being connected, each segment is pulled tight, leaving a 44-mm (1.7-in) wide gap between adjoining segments. Enclosure 1 contains these and other design details. To avoid possible misinterpretation, please be aware that the tapered concrete end section, also shown on the enclosure, is not a crashworthy terminal and should not be used on the approach end of temporary barrier on the National Highway System (NHS) unless it is located beyond the appropriate clear zone.

Twenty-two barrier segments comprised of ten 3-m (10-ft) sections in the impact area, three 3.8-m (12.5-ft) sections upstream of the impact area, and nine 3.8-m (12.5-ft) sections at the trailing end of the test installation) were used in the test for a total installation length of 76 m (244 ft). The test vehicle impacted the barrier at 102.4 km/h (63.6 mph) and at an angle of 25 degrees. The impact point was 1.5 m (5.0 ft) upstream

from the connection between segments 6 and 7 or approximately 20 m (65.5 ft) from the upstream end of the test installation. The upstream end of the test installation moved 0.38 m (1.25 ft) longitudinally and the dynamic deflection of the barrier near the impact point was reported to be 1.67 m (5.5 ft). The pickup truck was contained and redirected, with its bed and rear axle momentarily overriding the barrier by an estimated 1.7 m (5.6 ft) before it was redirected back onto the roadway. Maximum occupant impact velocity and subsequent ridedown accelerations were 6.0 m/sec (20 ft/sec) and 7.2 g's, respectively. The reported roll angle was slightly over 46 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. Virtually all NCHRP report 350 barrier tests have been run with Chevrolet trucks, and many researchers believe that their suspension design results in better crash performance than the stiffer suspension found on the Ford pickup truck.

Based on the reported test results, we conclude that your precast New Jersey barrier with its pin and loop connection satisfies the evaluation criteria for an NCHRP Report 350 test level 3 (TL-3) longitudinal barrier. When installed as tested, it may be used on the NHS as a temporary barrier when such use is considered appropriate by a transportation agency.

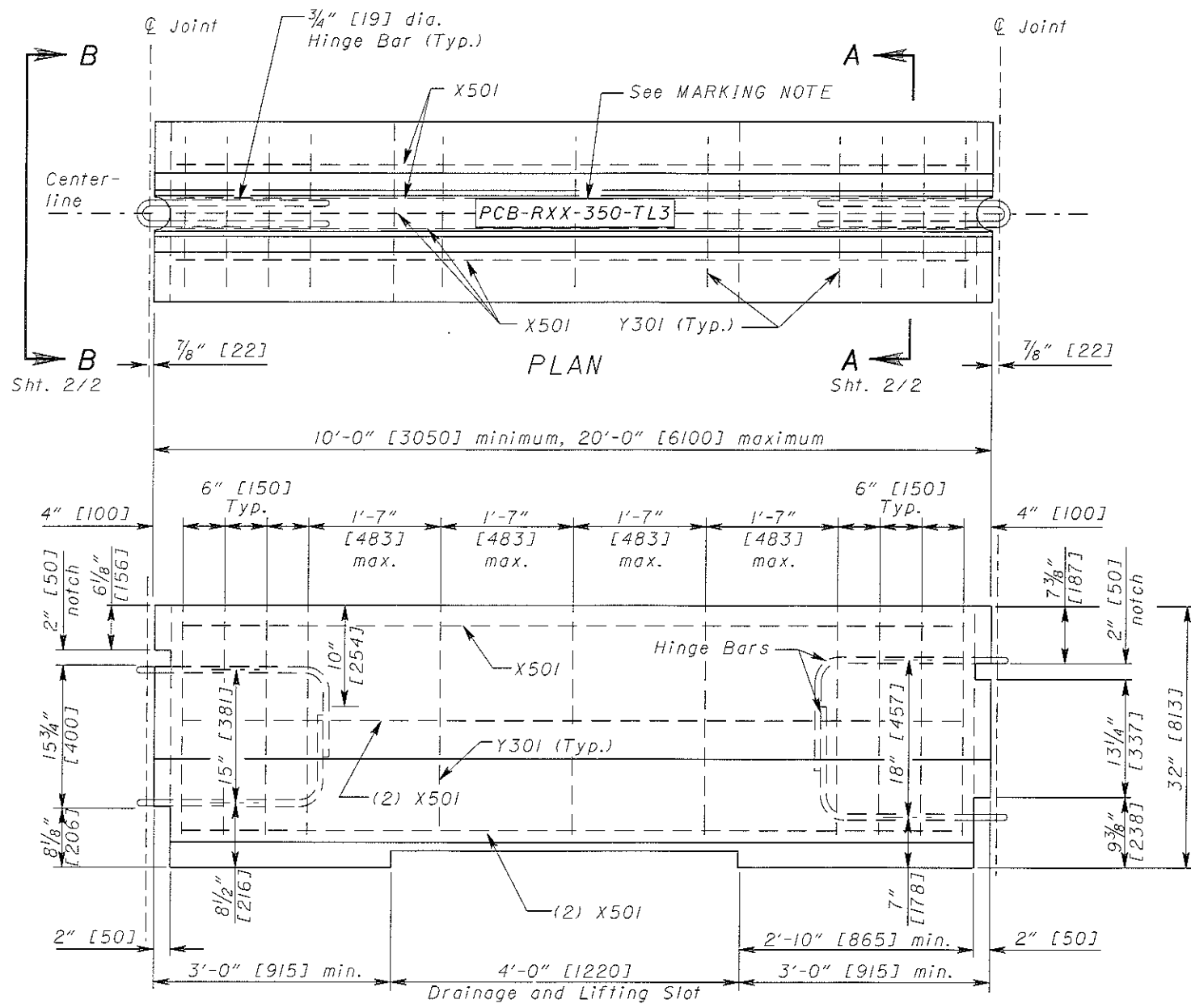
Sincerely yours,

(original signed by Michael L. Halladay)

Michael L. Halladay
Acting Program Manager, Safety

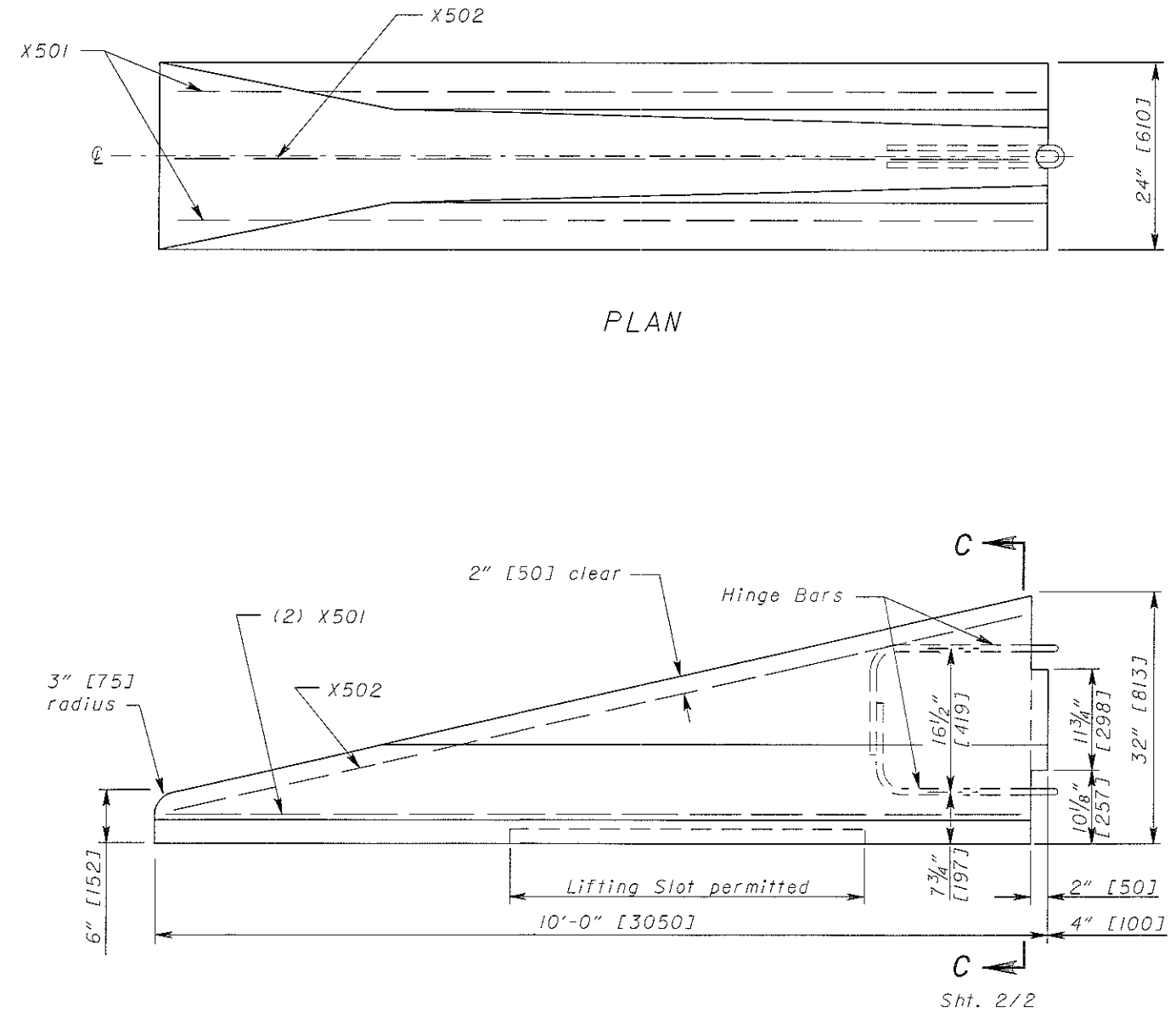
Enclosure

mbaputani@RECCD103 - odot nj pcb 3-11.m - Friday October 26 2001 09:32:05 AM EDT



ELEVATION

32" [813-mm] BARRIER SECTION DETAILS



ELEVATION

TAPERED END DETAILS

NOTES

PORTABLE CONCRETE BARRIER (PCB): PCB, as shown, shall not be used on bridge deck edges. PCB, Bridge Mounted, shall be used at such locations in accordance with Structural Engineering's Standard Drawing PCB-9I [PCB-9IM].

CONNECTING HARDWARE: Bolts, washers and hex nuts shall be galvanized after fabrication per CMS 711.02 and shall meet the requirements of CMS 711.09 except that the Rotational Capacity test specified in ASTM A 325 shall be waived.

In lieu of the pin and loop connections detailed on this Standard Construction Drawing, barrier sections with "J-J Hooks" end connections may be utilized.

Transition barrier sections with pin and loop connections on one end and "J-J Hooks" on the other shall be used to connect runs of "J-J Hooks" barrier to other permitted barrier types. The heights of the transition sections shall be the same as the barrier runs being connected.

"J-J Hooks" is a trademark of Easi-Set Industries, P.O. Box 300, Midland, VA 22728, (540) 439-8911 or (800) 547-4045.

HINGE AND REINFORCING BARS: The 3/4" [19] hinge bars, #3 [#13M], and #5 [#16M] reinforcing bars shall meet the requirements of CMS 509.

HANDLING DEVICES: Such devices may be used in lieu of the lifting slot for moving the barrier. They may be of any design sufficient to handle the weight of the section being lifted. No handling devices shall protrude from the surface of the barrier when in place.

MARKING: All barrier segments shall be marked as shown, where XX indicates the year cast. These markings shall be permanently impressed in the barrier using a minimum of 2" [50] high lettering.

Each segment shall have, on its top, a unique identification as to its manufacturer and, somewhere on the barrier, the day and month that the barrier was manufactured.

See CMS 622 for additional information.

REFLECTORIZATION: Barrier reflectors shall be installed in accordance with Traffic Engineering's Standard Drawing MT-95.82, when specified in the plans.

THIS DRAWING REPLACES RM-4.2M DATED 10-21-97.

STANDARD ROADWAY CONSTRUCTION DRAWING
32" [813-mm]
PORTABLE CONCRETE BARRIER

ROADWAY
ENGINEERING
SERVICES

All metric dimensions
(in brackets []) are
millimeters unless
otherwise noted.

STDS. ENGR.
M. EVANS
DRAWN
D. FOCKE

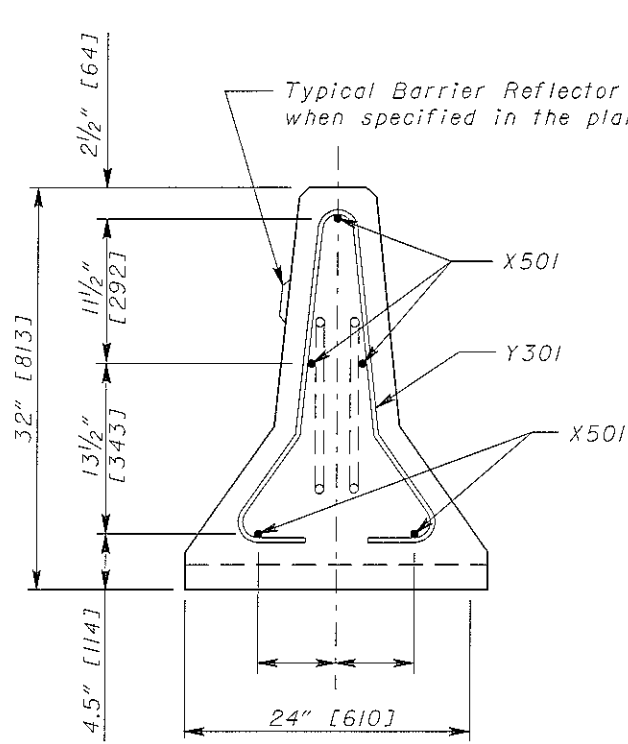
REVISIONS

OHIO DEPARTMENT OF TRANSPORTATION
ADMINISTRATOR

DATE
(6-27-00)

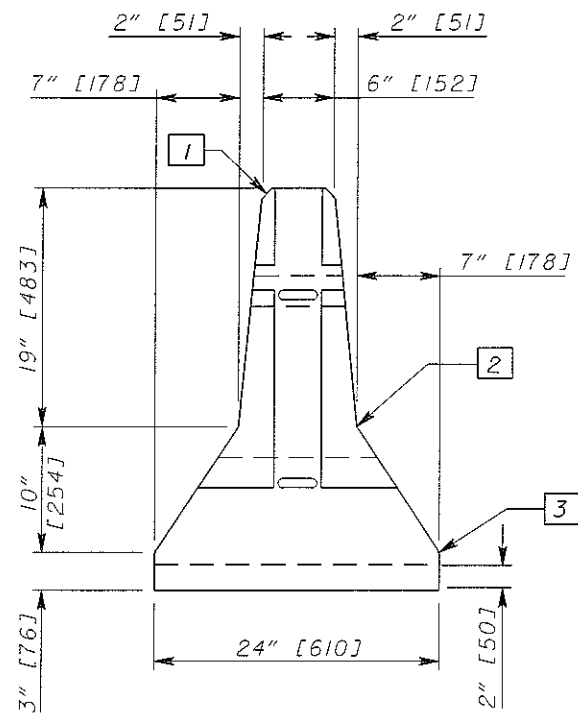
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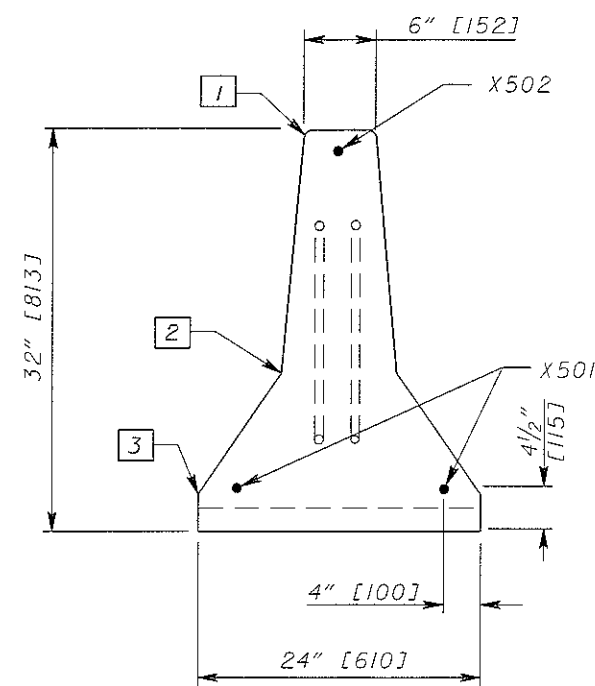


SECTION A-A
See Sheet 1 of 2.

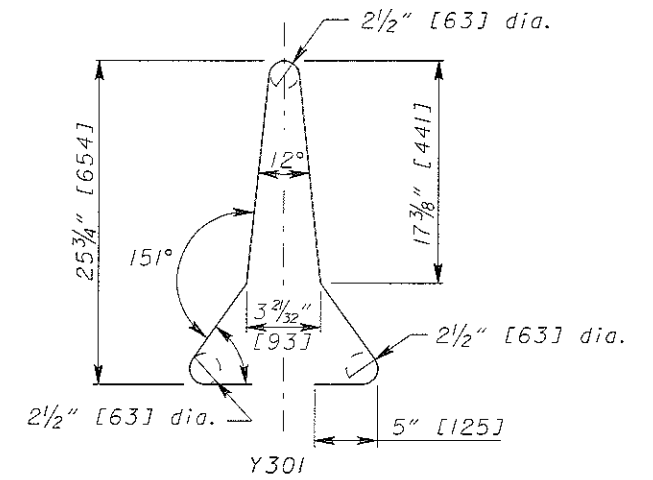
Vertical edges on Keyway and Drainage Slots may be battered. Depth 2" ± 1/4" [50 ± 6].



VIEW B-B
See Sheet 1 of 2.

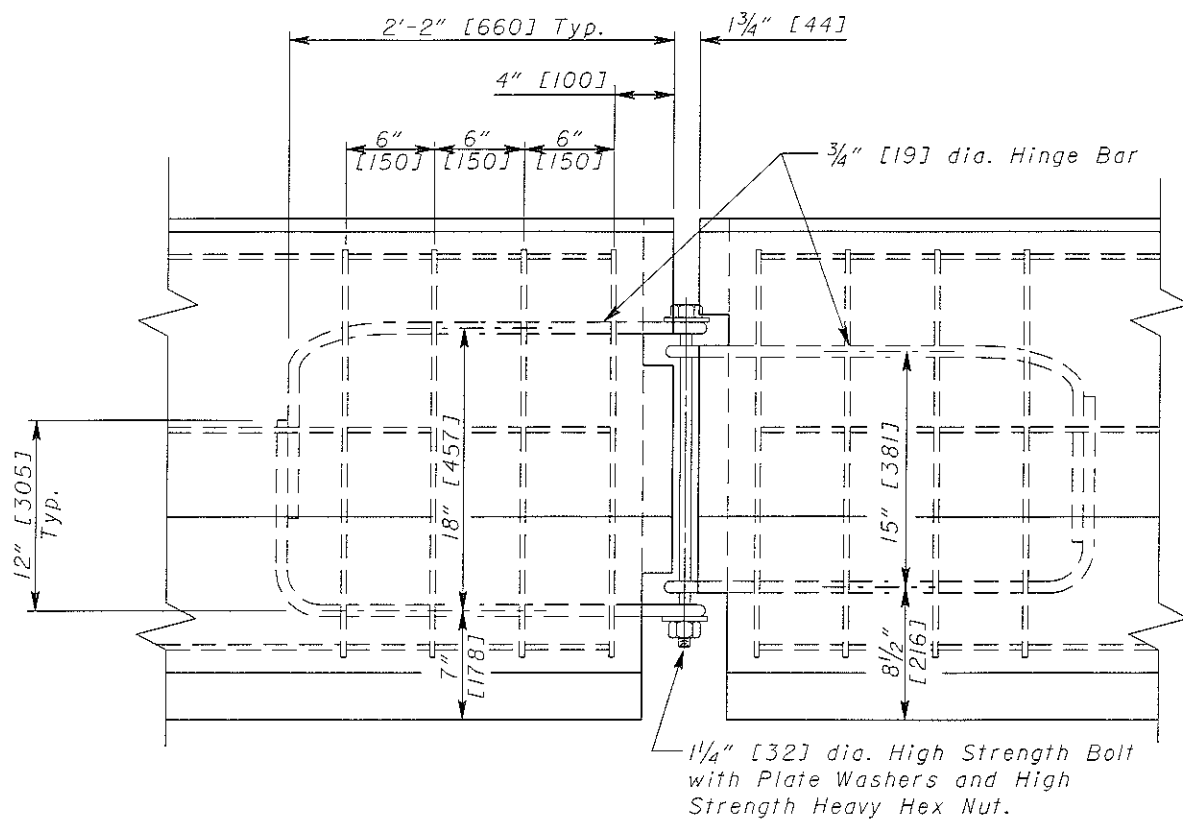


SECTION C-C
See Sheet 1 of 2.

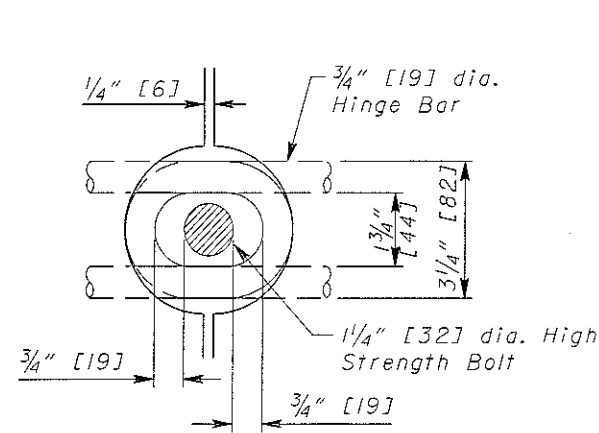


BENDING DIAGRAM

REINFORCING BAR LIST					
For a 10'-0" [3050] section					
	Mark	Length	Shape	Quantity	Weight [Mass]
Barrier Section	Y301	5'-5" [1650]	Bent	11	2.0 lbs [0.9 kg]
	X501	9'-6" [2900]	Str.	5	9.9 lbs [4.5 kg]
	Total (for information only):				71.4 lbs [32.4 kg]
Tapered End	X501	9'-6" [2900]	Str.	2	9.9 lbs [4.5 kg]
	X502	9'-8" [2950]	Str.	1	10.1 lbs [4.6 kg]
	Total (for information only):				29.9 lbs [13.5 kg]

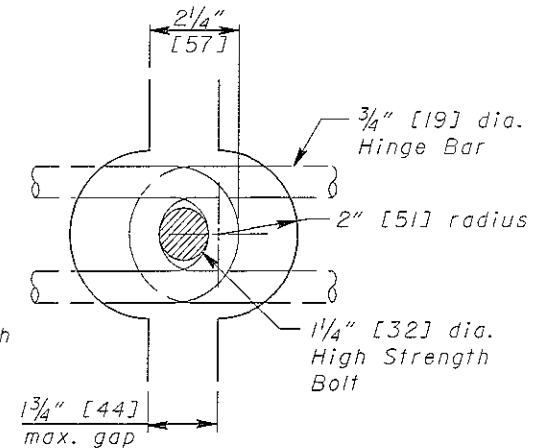


DETAIL AT HINGED CONNECTION



CLOSED JOINT

Barriers shall initially be placed close together so that Bolts can be easily inserted through Hinge Bar loop.



OPEN JOINT

Barrier joints shall be fully open before the Nut is tightened onto Bolt.

LEGEND

- 1 1" [25] radius or 3/4" [19] chamfer, all top and end corners.
- 2 Permissible 10" [250] radius.
- 3 Permissible 1" [25] radius.

THIS DRAWING REPLACES RM-4.2M DATED 10-21-97.

STANDARD ROADWAY CONSTRUCTION DRAWING
32" [813-mm]
PORTABLE CONCRETE BARRIER

NUMBER
RM-4.2

2 / 2

ROADWAY
ENGINEERING
SERVICES

All metric dimensions
(in brackets []) are
in millimeters unless
otherwise noted.

STDS. ENGR.
M. EVANS
DRAWN
D. FOCKE

REVISIONS

OHIO DEPARTMENT OF TRANSPORTATION
ADMINISTRATOR
16-27-00
DATE