B-28

U.S. Department
of Transportation
**Federal Highway
Administration**

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

November 17, 1994

Refer to: HNG-14

AIRMAIL

Mr. Sergio Munafo
Marketing Manager
Metalmeccanica Fracasso SPA
Via Barbariga N. 7
30032 Fiesso D' Artico
Venezia, Italy

Dear Mr. Munafo:

Beginning with your original request on November 1, 1993, for the Federal Highway Administration's technical acceptance of your 3N Guardrail, and concluding with your October 19, 1994, letter to Mr. Seppo Sillan, you have provided a great deal of information on the crash performance of this traffic barrier.

One of the problems in responding to your request earlier were the differences in testing requirements in the United States (U.S.) and within the European Union. These differences required efforts on your part to provide data in a form which permitted evaluation of your product by U.S. standards. A second problem is the current lack of recognition of our respective test procedures and testing facilities. Our final concern is with the differences between the barrier for which you provided occupant impact and ridedown acceleration test data and the barrier for which you requested acceptance.

Taking the last item first, you reported the following information for the test identified as FRA/BSI/01/006:

Barrier: 3N 1180 mm high Median Barrier with two breakaway lower rails.

Vehicle: Peugeot 205 XA 900 kg.

Impact Speed: 101.4 km/h.

Impact Angle: 20 degrees.

Occupant Impact Velocity: 6.5 m/s (lat.)/4.4 m/s (long.)

Occupant Ridedown Acceleration: -16.4 G's at 0.1460 sec.

Although the double-faced median barrier shown in the drawings we received on October 19 is 30 mm lower than the barrier tested with the 900-kg Peugeot and has only one breakaway lower rail, we are willing to assume the test results cited above are as severe as those to be expected from tests of the slightly lower, less rigid design and for the single-faced roadside version of the barrier. These results are within the acceptable range in evaluation criteria recommended in the National Cooperative Highway Research Program (NCHRP) Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features."

In reviewing the heavy vehicle tests you conducted, we can readily conclude that the 3N Guardrail meets the NCHRP Report 350 criteria for at least a Test Level 4 barrier. Test Level 4 requires containment and redirection of an 8000-kg single unit truck impacting at 80 km/h at an angle of 15 degrees. The nominal impact severity of this test is 132.5 kJ. Although this exact test was not run, we find from the information you submitted that similar tests you conducted were successful. Specifically, we looked at test data for the following heavy vehicle tests:

Test Number 54

Vehicle Type/Mass: 3-axle FIAT Truck/9050 kg
Impact Speed/Angle: 62 km/h/20 degrees
Impact Severity: 157 kJ

Test Number BAST/937D002/ELL

Vehicle Type/Mass: Bus/13 000 kg
Impact Speed/Angle: 72 km/h/20 degrees
Impact Severity: 306 kJ

Test Number 57

Vehicle Type/Mass: 3-axle FIAT Tank Truck/15960 kg
Impact Speed/Angle: 64 km/h/21 degrees
Impact Severity: 324 kJ

We noted that Test Numbers 54 and 57 were conducted on a single-faced barrier that was 1050 mm high. Although this is 100 mm lower than the design for which you requested acceptance, we have assumed that the taller rail would perform as well as (and probably better) with these test vehicles. Test Number BAST/937D002/ELL used the 1150 mm tall median barrier design.

Finally, we note that both configurations of the barrier (single- and double-faced) at a 1075 mm height were tested with 4-axle trucks weighing over 20 000 kg at 60 km/h and 20 degrees (impact severity of almost 400 kJ) and with tractor semi-trailers in excess of 40 000 kg. The tractor semi-trailers struck the railing at 76 km/h at 15 degrees, and at 63 km/h at 20 degrees, or impact severities of 643 kJ and 717 kJ, respectively. We have previously acknowledged that these impact severities exceed those required for Test Level 5 and 6 barriers (596 kJ), but also noted that the ballast centers

of gravity in your tests were significantly lower than those recommended in the NCHRP Report 350. Our concern remains that the higher center-of-gravity test vehicles required by NCHRP Report 350 would be likely to roll over the 3N guardrail.

In summary, the single- and double-faced 1150 mm high 3N Guardrails may be considered Test Level 4 traffic barriers. This acceptance is subject to the following conditions:

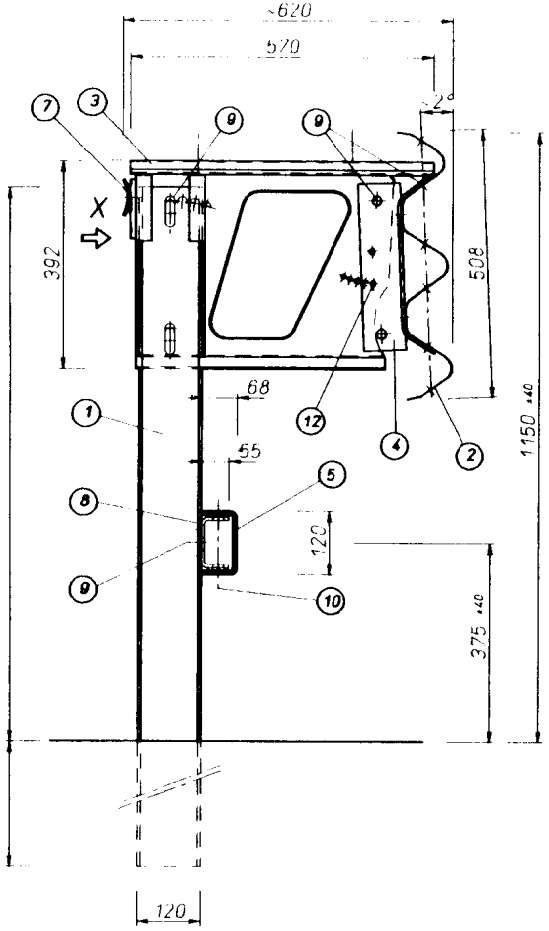
- The Buy America provisions of Section 635.410 of Title 23 CFR require all steel products used on highway projects to be made in the U.S. from domestic steel. Section 635.411 of the same title addresses the use of patented or proprietary products on highway construction projects, which will also apply to the 3N Guardrail. Copies of these provisions were enclosed for your information with Mr. Seppo Sillan's February 28 letter to Mr. James E. McDonald.

- This acceptance is based on our review of test reports on crash tests performed at European test laboratories. The acceptance of the competency of these laboratories is the subject of a proposed Mutual Recognition Agreement (MRA) for Conformity Assessment for Road Safety Equipment (RSE) between the U.S. and the European Union. The continuing acceptance of these test reports and therefore the 3N Guardrail in the U.S. depends on the timely initiation of the MRA negotiations on RSE and the final resolution of these talks in a manner acceptable to the FHWA.

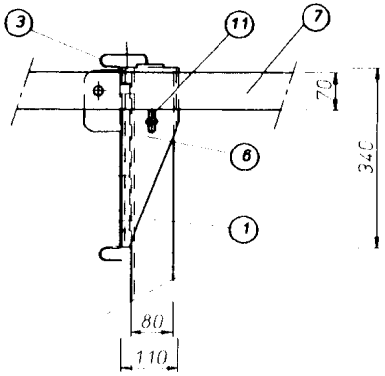
Sincerely yours,

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

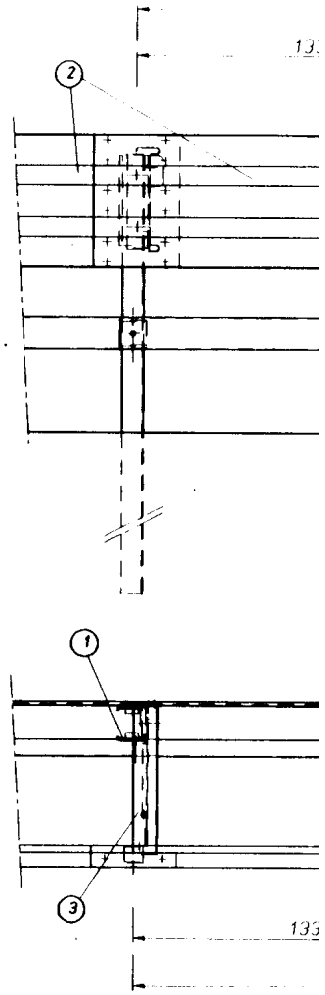
SECTION A-A
SCALE 1:10



X VIEW
SCALE 1:10



TYPICAL ELEVATION
SCALE 1:20



PLAN
SCALE 1:20

POS.	MATERIAL DESCRIPTION
1	POST U120X80X6 H.2200
2	'3N' BEAM C/C 4000 THICK 3 mm
3	'3N' SPACER 570x392 THICK 3 mm
4	'3N' ENERGY ABSORBER
5	'3N' RAIL U120x65x4 C/C 4000
6	'3N' C137x110x6 L.340 POST TOP SLEEVE
7	TENSION RAIL 70X5 L.4140
8	'3N' PROFILE U95x55x5 L.100
9	BOLTS M16 CLASS 8.8
10	BOLTS M14 CLASS 8.8
11	BOLTS M10 CLASS 4.6
12	BOLTS M10 CLASS 8.8

METALMECCANICA FRACASSO S.p.A.
VIA BARBARIGA N° 7 30032 FIESSO D'ARTICO (VENEZIA)
TEL. 049/9899111 TLX 430089 FRAVEN I FAX 049/9800072

CUSTOMER: FHWA FILE

SITE: TYPICAL INSTALLATION ON GROUND

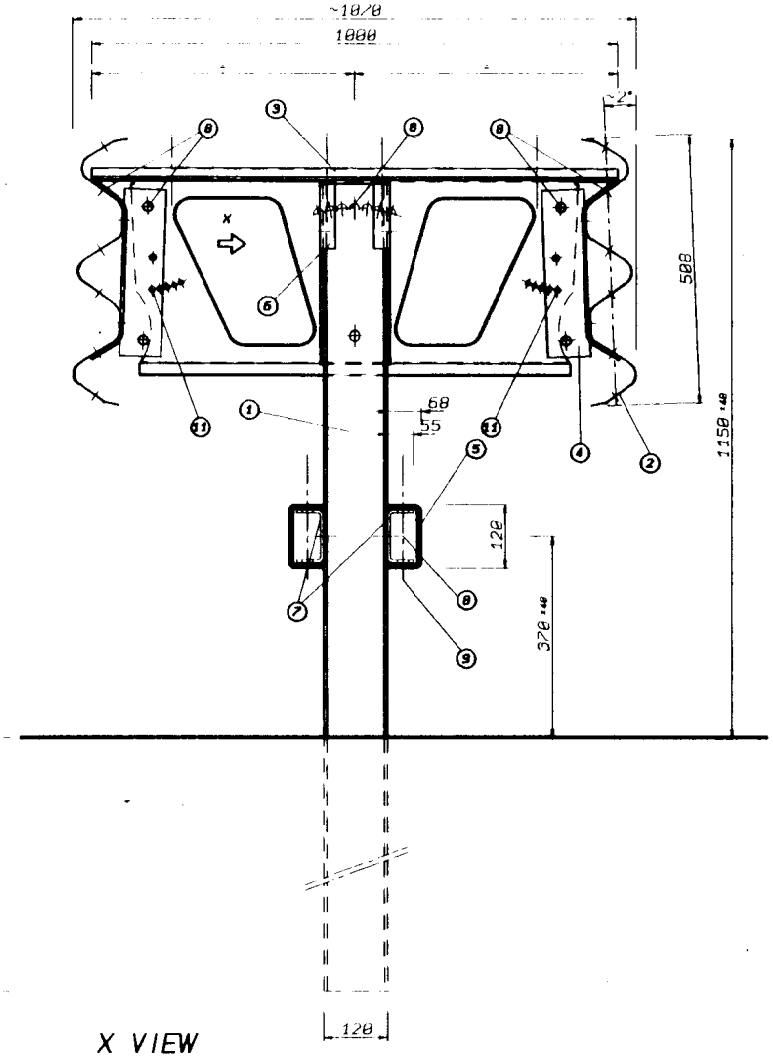
SUBJECT: 3N SINGLE GUARDRAIL (LATERAL, MEDIAN) C/C 4000 POST C/C 1333 H.2200, SPACER 570

	DRAWN	CHECKED	REVISION		DATE	SIGN
DATE	05-10-93			3		
SIGNAT.	Z.T.			2	DATE	SIGN
				1	DATE	SIGN

$WEIGHT_{block}$ (Kg)	$WEIGHT_{galv.}$ (Kg)	PAINTING	GALVANIZATION
SCALE 1:20 1:10	PIECES N°	CODE	DRAWING N° 3N1139

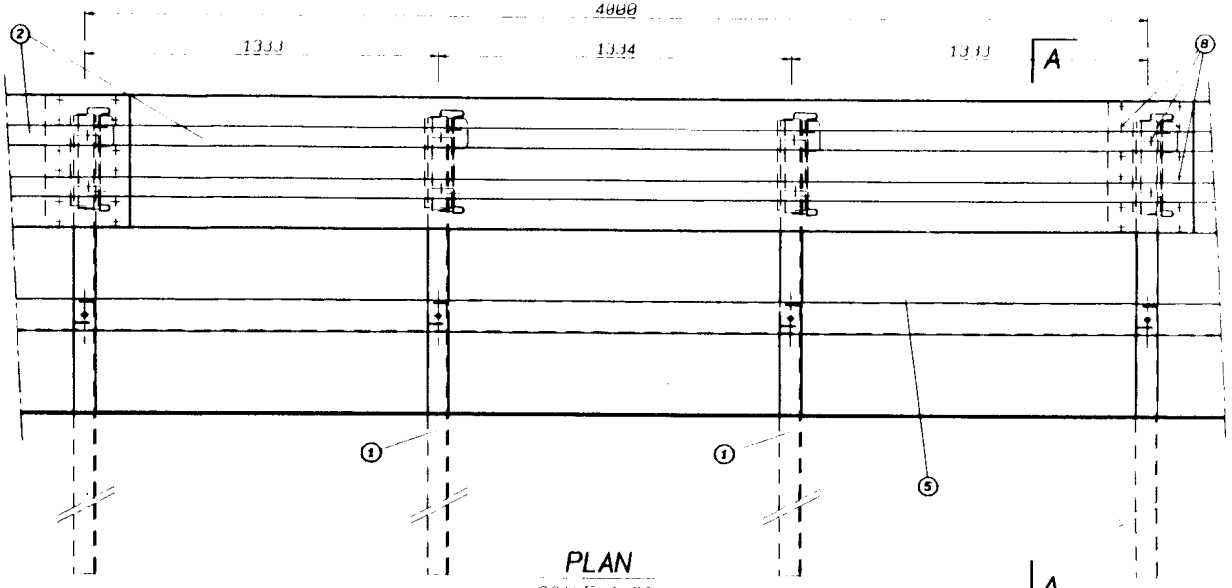
SECTION A-A

SCALE 1 10



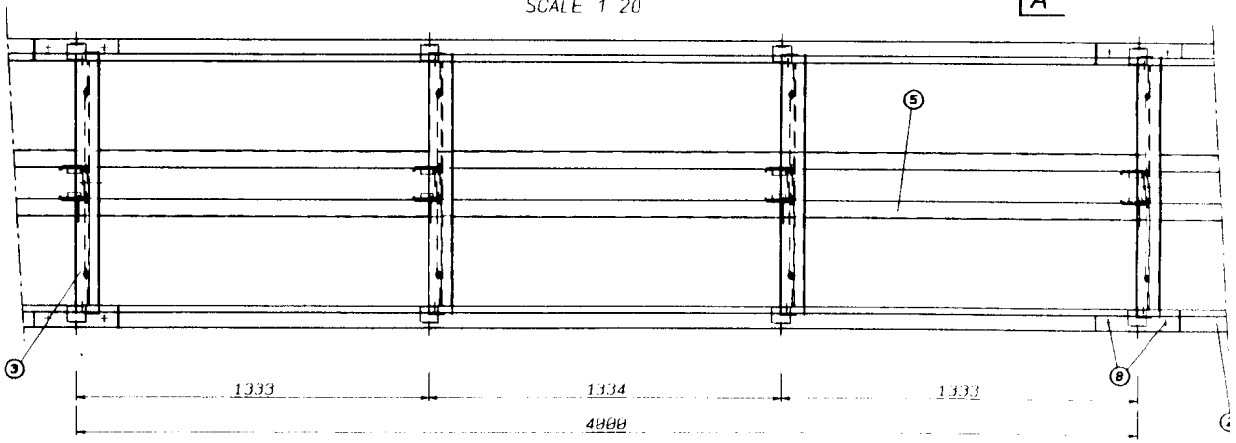
TYPICAL ELEVATION

SCALE 1 20



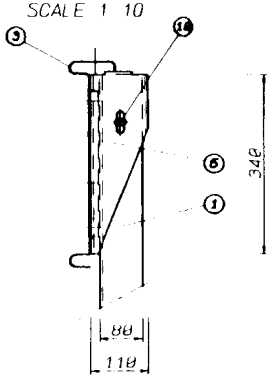
PLAN

SCALE 1 20



X VIEW

SCALE 1 10



POS.	MATERIAL DESCRIPTION
1	POST U120X80X6 H 2200
2	"3N" BEAM C/C 4000 THICK 3 mm
3	"3N" SPACER 1000x392 THICK 3 mm
4	"3N" ENERGY ABSORBER
5	"3N" RAIL U120x65x4 C/C 4000
6	"3N" C137x110x6 L 340 POST TOP SLEEVE
7	"3N" PROFILE U95x55x5 L 100
8	BOLTS M16 CLASS 8.8
9	BOLTS M14 CLASS 8.8
10	BOLTS M10 CLASS 4.6
11	BOLTS M10 CLASS 8.8

METALMECCANICA FRACASSO S.p.A.
VIA BARBARIGA N° 7 30032 FIESSO D'ARTICO (VENEZIA)
TEL 041/9899111 TLX 430089 FRAVEN I FAX 041/9800072

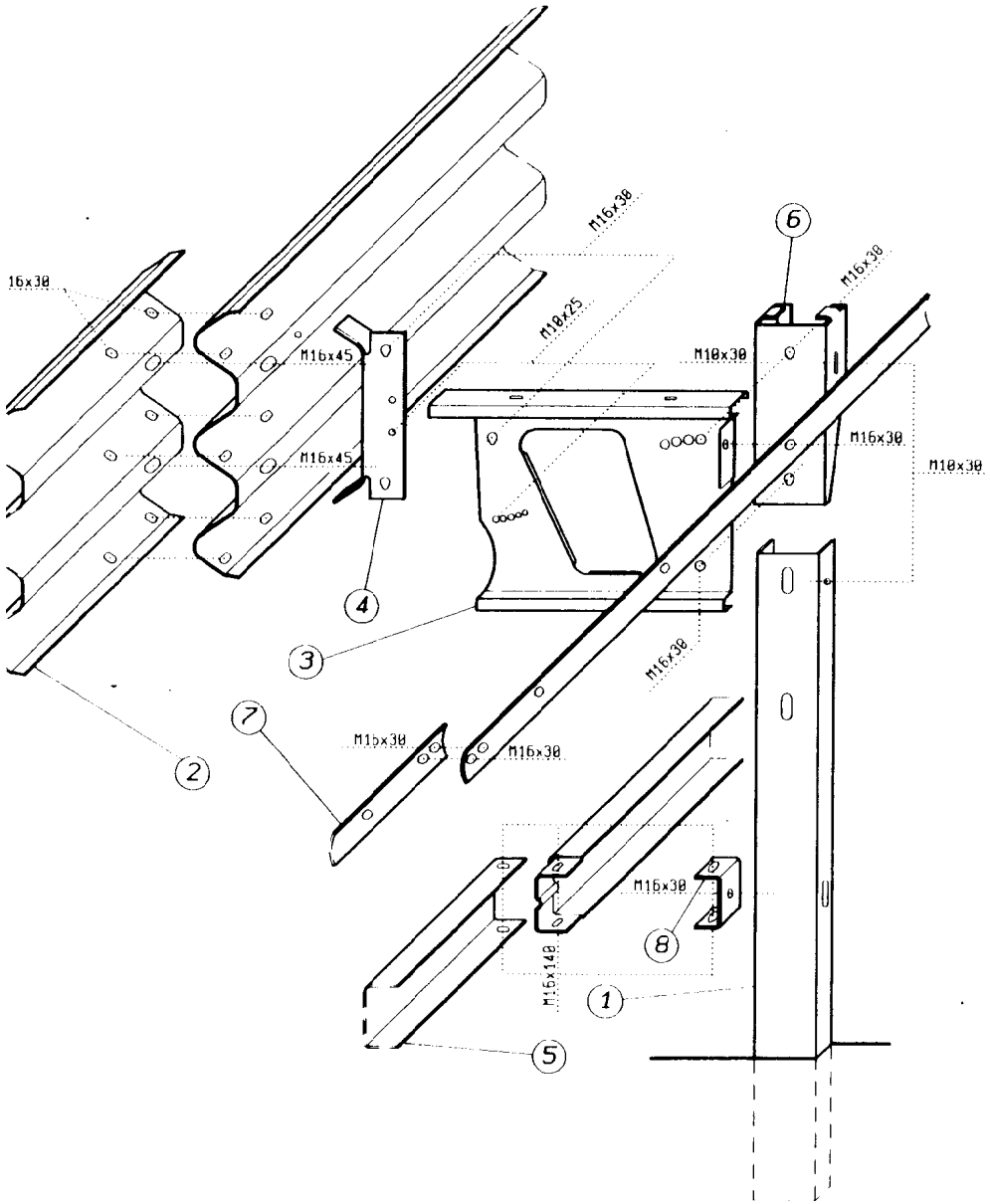
CUSTOMER: FHWA FILE

SITE: TYPICAL INSTALLATION ON EMBANKMENT

SUBJECT: 3N MEDIAN BARRIER

	DRAWN	CHECKED	REVISION		DATE:	SIGN
DATE	30-09-94			3		
SIGNAT	Zacchetti			2	DATE:	SIGN
				1	DATE:	SIGN

WEIGHT$_{black}$ (Kg)	WEIGHT$_{galv}$ (Kg)	PAINTING	GALVANIZATION
SCALE: 1:20 1:10	PIECES N°:	CODE	DRAWING N° 3N1139



POS.	LIST OF ITEMS	MATERIAL
18	WASHER UNI6592 10.5x21	
17	NUT M10	8S
16	SCREW M10x25 TE	8.8
15	NUT M10	4H
14	SCREW M10x30 TE	4.6
13	WASHER UNI6592 17x30	
12	NUT M16	8S
11	SCREW M16x140	8.8
10	SCREW M16x45 TT	8.8
9	SCREW M16x30 TT	8.8
8	"3N" U100x50x5 BRACKET	FE 360B UNI
7	"3N" TENSION RAIL C/C 4000	" "
6	"3N" POST TOP SLEEVE	" "
5	"3N" CHANNEL 4000	" "
4	"3N" ENERGY ABSORBER	" "
3	"3N" SPACER 520x392	" "
2	"3N" BEAM C/C 4000	" "
1	"3N" POST U120x80x6 H.2200	" "

FRACASSO
METALMECCANICA FRACASSO SPA 36032 FIONSO D'ARTICO / VE / ITALIA TEL.049 502655 FAX 049 504614 TLX 430009 FRAPD

SUBJECT : "3N" GUARDRAIL C/C 4000

DESIGNER: M.D. | DATE : 09-10-91 | SCALE :

DRAWING N° 3NI139