



U.S. Department  
of Transportation

**Federal Highway  
Administration**

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

September 2, 1999

Refer to: HMHS-B55A

Steven O. Bradford, P.E.  
Chief Bridge Engineer  
Alaska Department of Transportation  
and Public Facilities  
3132 Channel Drive  
Juneau, AK 99801-7898

Dear Mr. Bradford:

My May 18 letter to you accepted the Alaska Multi-State Bridge Rail as a National Cooperative Highway Research Program (NCHRP) Report 350 test level 4 (TL-4) design. On August 6, you requested that a transition design for this bridge railing also be accepted by the Federal Highway Administration at TL-4. To support your request, you also sent copies of two July 1999 reports prepared by the Texas Transportation Institute, "NCHRP Report 350 Test 4-21 of the Alaska Multi-State Bridge Rail Thrie-Beam Transition" and "NCHRP Report 350 Test 4-22 of the Alaska Multi-State Bridge Rail Thrie-Beam Transition" and videotapes showing the two tests that were conducted.

As shown in detail in Enclosure 1, the transition consists of nested 12-gage Thrie-beam panels supported by three 1982-mm long W150x13.5 steel posts on 953 mm centers followed by six 1982-mm long W150x13.5 steel posts spaced on 476 mm centers. All posts are set 1245 mm into the soil. The post immediately adjacent to the first bridge rail post is offset 1145 mm from the first bridge rail post. The Thrie-beam is connected to the bridge rail using a standard Thrie-beam Terminal Connector bolted to a special connection plate made from 10-mm and 13-mm thick steel plate and 10-mm and 6.35-mm thick steel angles. The concrete curb was flared back 114 mm over its last 457 mm to minimize wheel snagging at that point.

Based on staff review of the test reports and the videotapes, I concur that the transition design meets all appropriate evaluation criteria for a TL-4 design and it may be used in conjunction with your Multi-State Bridge Rail on the National Highway System when such use is requested by a transportation agency. I understand that the design, like the bridge rail, is nonproprietary and that copies of detailed plans and specifications can be obtained directly from you upon request.

Sincerely yours,

A handwritten signature in cursive script that reads "Dwight A. Horne".

Dwight A. Horne  
Director, Office of Highway Safety Infrastructure

2 Enclosures

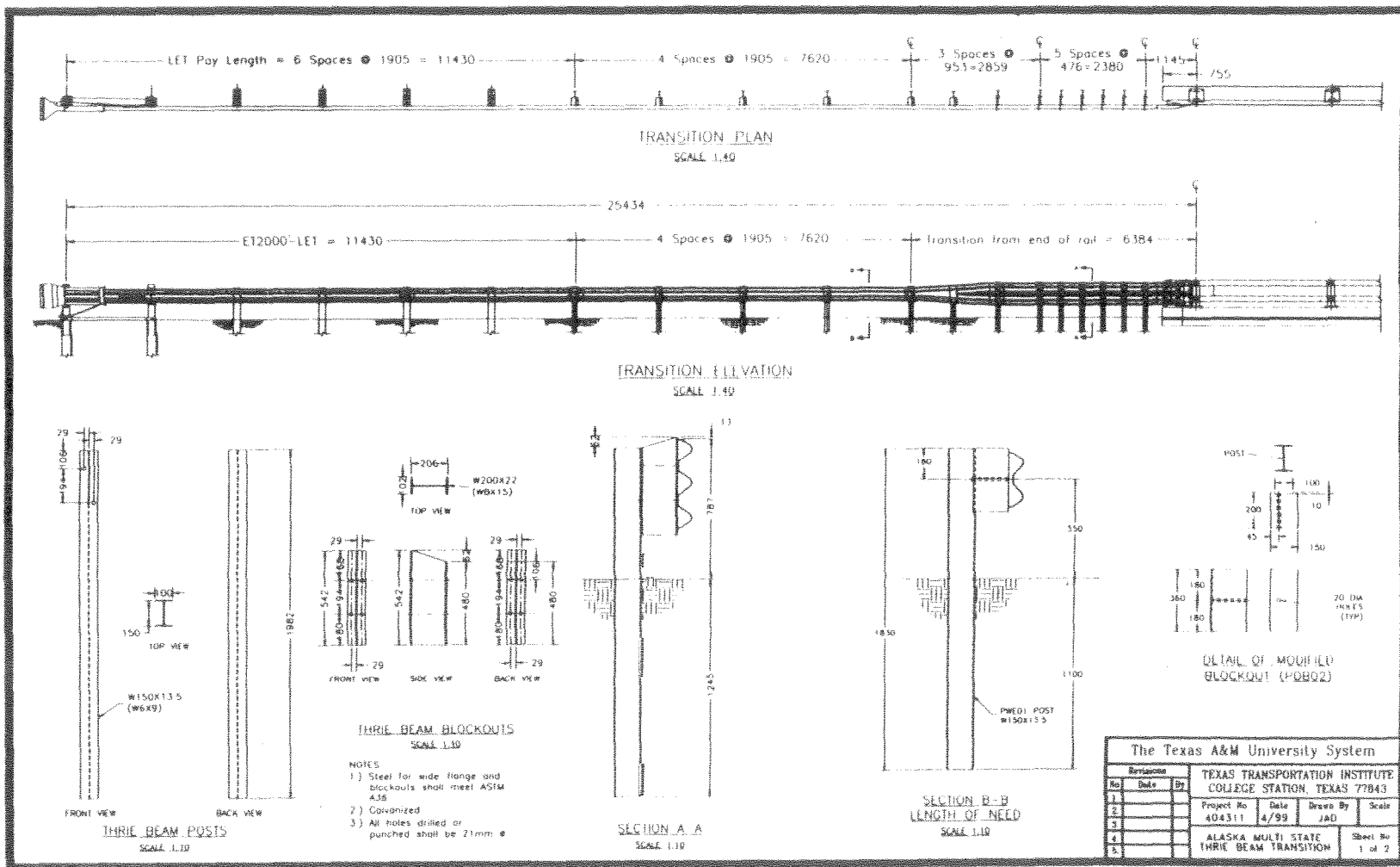
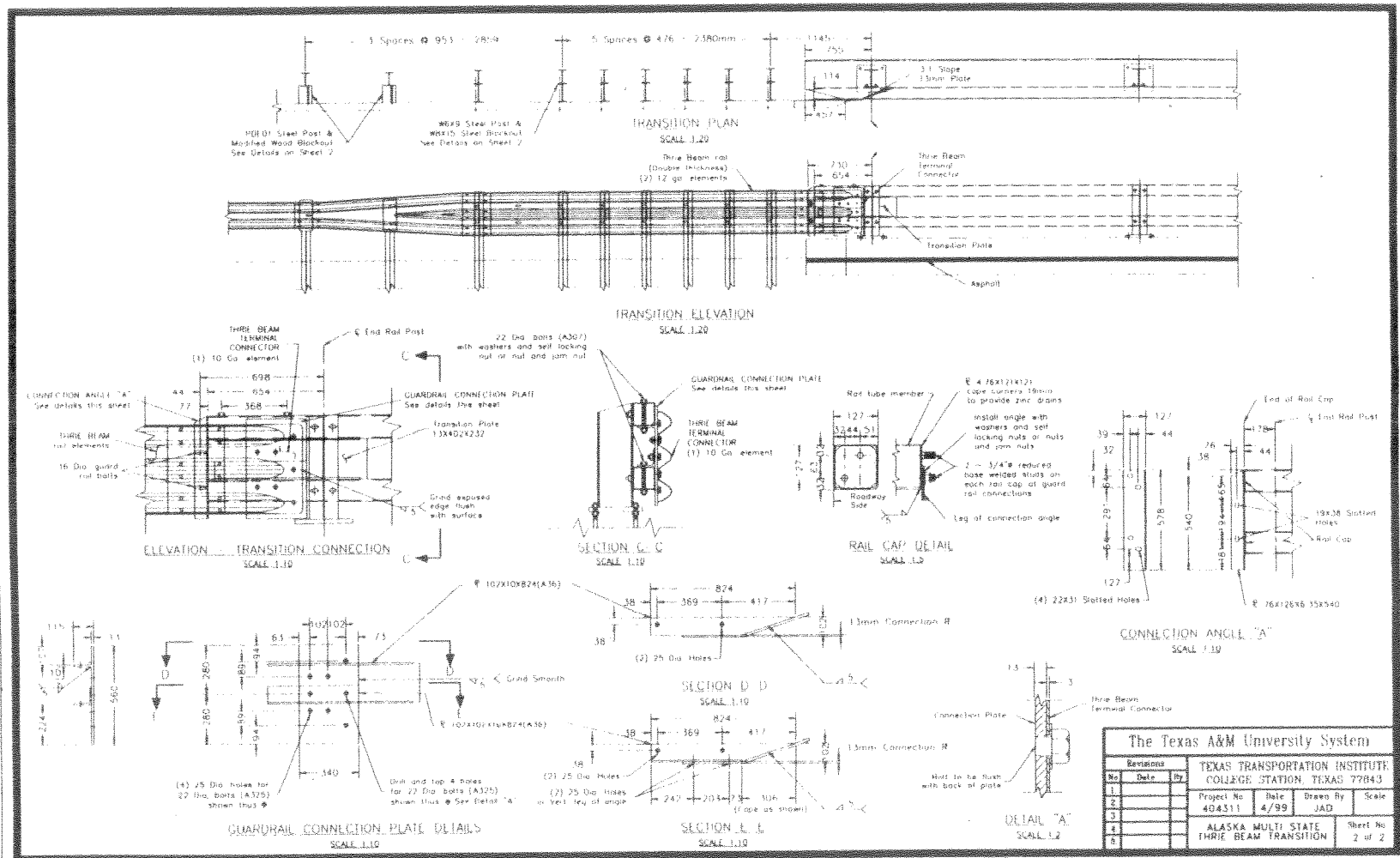


Figure 1. Details of the Alaska Multi-State Bridge Rail Thrie-Beam Transition

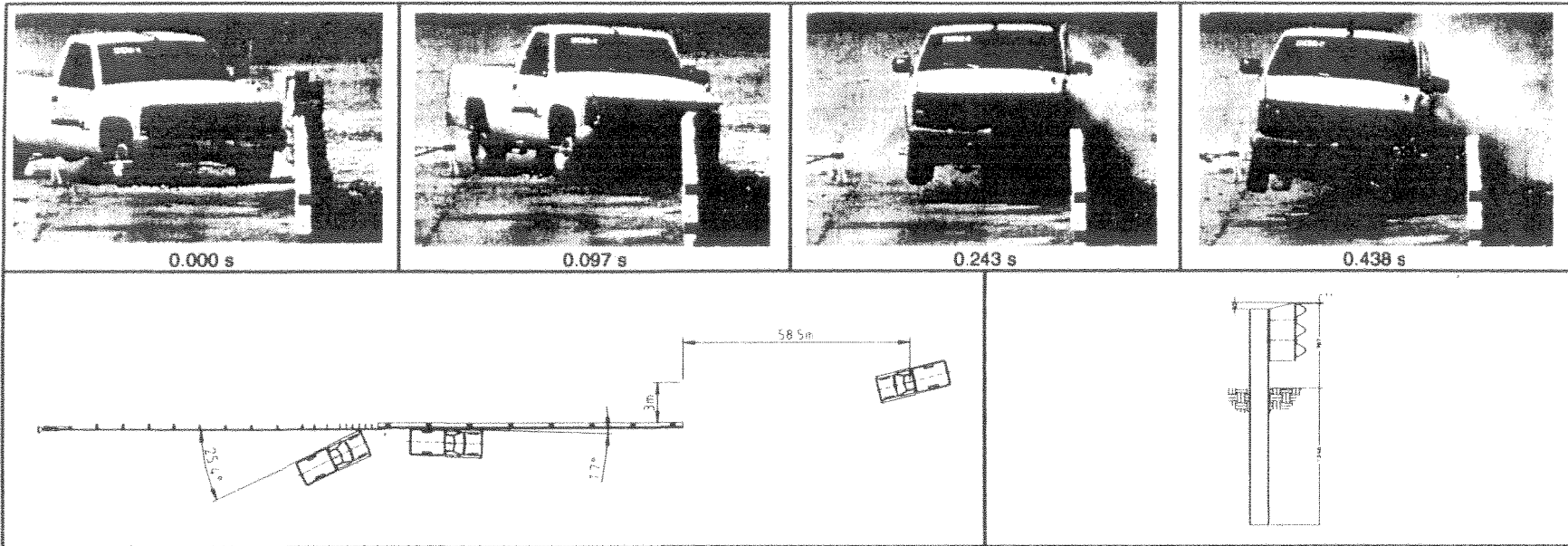


The Texas A&M University System			
TEXAS TRANSPORTATION INSTITUTE			
COLLEGE STATION, TEXAS 77843			
Revision No	Date	By	Scale
1			
2			
3			
4			
5			

Project No 404311	Date 4/99	Drawn By JAD	Scale
ALASKA MULTI-STATE THRIE-BEAM TRANSITION			Sheet No 2 of 2

Figure 2. Details of the bridge rail connection of Alaska Multi-State Bridge Rail Thrie-Beam Transition



**General Information**

Test Agency . . . . . Texas Transportation Institute  
 Test No. . . . . 404311-5  
 Date . . . . . 06/01/99

**Test Article**

Type . . . . . Transition  
 Name . . . . . Alaska Multi-State Thrie Beam  
 Installation Length (m) . . . . . 25.4  
 Material or Key Elements . . . . . Thrie Beam Attached to  
 Alaska Multi-State Bridge Rail  
 Soil Type and Condition . . . . . Standard Soil, Dry

**Test Vehicle**

Type . . . . . Production  
 Designation . . . . . 2000P  
 Model . . . . . 1994 Chevrolet 2500 pickup truck  
 Mass (kg)  
 Curb . . . . . 1982  
 Test Inertial . . . . . 2000  
 Dummy . . . . . No dummy  
 Gross Static . . . . . 2000

**Impact Conditions**

Speed (km/h) . . . . . 100.6  
 Angle (deg) . . . . . 25.4

**Exit Conditions**

Speed (km/h) . . . . . 75.6  
 Angle (deg) . . . . . 1.7

**Occupant Risk Values**

Impact Velocity (m/s)  
 x-direction . . . . . 7.4  
 y-direction . . . . . 7.6  
 THIV (km/h) . . . . . 35.0  
 Ridedown Accelerations (g's)  
 x-direction . . . . . 9.5  
 y-direction . . . . . 9.6  
 PHD (g's) . . . . . 12.7  
 ASI . . . . . 1.84  
 Max. 0.050-s Average (g's)  
 x-direction . . . . . -11.4  
 y-direction . . . . . 14.4  
 z-direction . . . . . -6.2

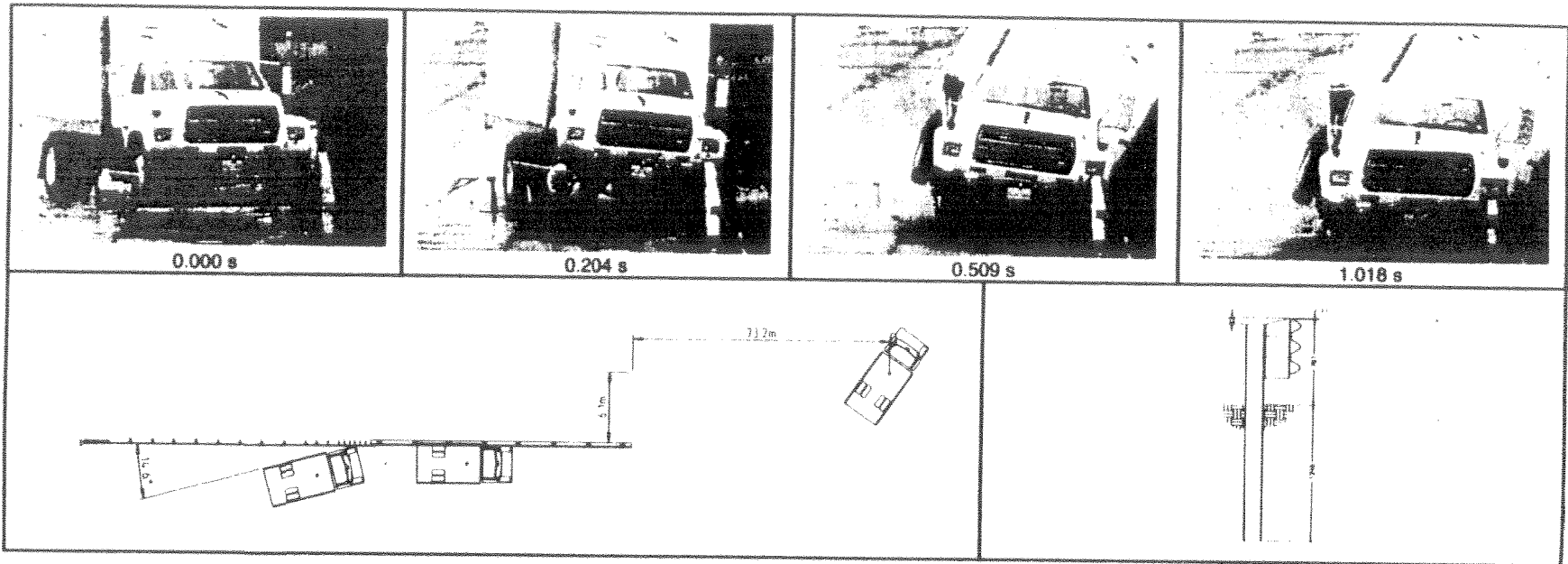
**Test Article Deflections (m)**

Dynamic . . . . . 0.131  
 Permanent . . . . . 0.50

**Vehicle Damage**

Exterior  
 VDS . . . . . 11LFQ4  
 CDC . . . . . 11FLEK3  
 & 11LDEW3  
 Maximum Exterior  
 Vehicle Crush (mm) . . . . . 570  
 Interior  
 OCCI . . . . . LF02020001  
 Max. Occ. Compart.  
 Deformation (mm) . . . . . 130  
**Post-Impact Behavior**  
 (during 1.0 s after impact)  
 Max. Yaw Angle (deg) . . . . . 28  
 Max. Pitch Angle (deg) . . . . . -4  
 Max. Roll Angle (deg) . . . . . -7

Figure 11. Summary of Results for test 404311-5, NCHRP Report 350 test 4-21



<b>General Information</b>		<b>Impact Conditions</b>		<b>Test Article Deflections (m)</b>	
Test Agency .....	Texas Transportation Institute	Speed (km/h) .....	49.9	Dynamic .....	0.077
Test No. ....	404311-6	Angle (deg) .....	14.6	Permanent .....	0.049
Date .....	06/16/99	<b>Exit Conditions</b>		<b>Vehicle Damage</b>	
<b>Test Article</b>		Speed (km/h) .....	65.4	Exterior	
Type .....	Transition	Angle (deg) .....	approx. 1	VDS .....	N/A
Name or Manufacturer .....	Alaska Multi-State Thrie Beam Transition	<b>Occupant Risk Values</b>		CDC .....	N/A
	25.4	Impact Velocity (m/s)		Maximum Exterior	
Installation Length (m) ..	Thrie Beam Attached to Alaska Multi-State	x-direction .....	3.2	Vehicle Crush (mm) .....	N/A
Material or Key Elements ..	Bridge Rail Transition	y-direction .....	-3.4	Interior	
	Standard Soil, Dry	THIV (km/h) .....	13.8	OCDI .....	FS0000000
<b>Soil Type and Condition</b>		Ridedown Accelerations (g's)		Max. Occ. Compart.	
<b>Test Vehicle</b>		x-direction .....	-2.4	Deformation (mm) .....	N/A
Type .....	Production	y-direction .....	3.8	<b>Post-Impact Behavior</b>	
Designation .....	8000S	PHD (g's) .....	4.0	(during 1.0 s after impact)	
Model .....	1986 Ford F700 single-unit truck	ASI .....	0.34	Max. Yaw Angle (deg) .....	16
Mass (kg) .....	5135	Max. 0.050-s Average (g's)		Max. Pitch Angle (deg) .....	-5
Curb .....	8000	x-direction .....	-2.0	Max. Roll Angle (deg) .....	-10
Test Inertial .....	No dummy	y-direction .....	3.0		
Dummy .....	8000	z-direction .....	-1.9		
Gross Static .....					

Figure 11. Summary of results for test 404311-6, NCHRP Report 350 test 4-22.