Publications Transmittal

State of Alaska

Department of Transportation and Public Facilities
Statewide Design and Engineering Services
Design and Construction Standards

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99-01	**March 15, 1999**	**February 26, 1999**

Distribution

To: All Standard Drawing Holders

Publication Title	
State of Alaska-Standard Drawings Manual	

Originating Organization

State of Alaska, Department of Transportation and Public Facilities
Design and Construction Standards
Statewide Design and Engineering Services

Remarks and Instructions

Enclosed is an FHWA approved revision to Standard Drawings Manual. The main revisions are to the Guardrail drawings which are necessitated by the requirements of NCHRP 350 criteria. Other revisions include new Drainage Structure sheets. Also, there are deletions of some drawings.

Insertion instructions and comments follow.

Attached is a memorandum which discusses the reason for the guardrail sheets.

Distributed by	Phone Number	Signature
Statewide Design and Engineering Services	**(907) 465-2985**	Eugene M. Rehfield

REMOVE			INSERT		
Drawing Number	**Title**	**Action Required**	**Drawing Number**	**Title**	**Action Required**
C-04.00M / C-04.00	Construction Barricade 2L	Delete			
C-05.00M / C-05.00	Construction Barricade 4LU	Delete			
C-06.00M / C-06.00	Construction Barricade 4LD	Delete			
D-20.02M / D-20.02	Manholes, Frame & Cover	Delete	D-20.03M / D-20.03	Manholes, Frame & Cover	Revised
			D-22.00M / D-22.00	Stormdrain Frame & Grate	New
D-27.01M / D-27.01	Type B Inlet Box	Delete			
			D-35.00M / D-35.00	48” Storm Drain MH	New
			D-36.00M / D-36.00	72” Storm Drain MH	New
			D-37.00M / D-37.00	84”-144” Storm Drain MH	New
G-00.00M / G-00.00	Std. Guardrail Hardware	Delete Sheets 1-4	G-00.01M / G-00.01	Std. Guardrail Hardware	Revised Sheets 1-4
G-02.01M / G-02.01	G2S W-Beam GR	Delete			
G-04.05SM / G-04.05S	G4S Beam Guardrail	Delete	G-04.06SM / G-04.06S	G4S Beam Guardrail	Revised
G-04.06WM / G-04.06W	G4W Beam Guardrail	Delete	G-04.07WM / G-04.07W	G4W Beam Guardrail	Revised
G-09.02SM / G-09.02S	G9S Thrie-Beam GR	Delete	G-09.03SM / G-09.03S	Steel Post Modified Thrie	Revised
G-09.03WM / G-09.03W	G9W Thrie-Beam GR	Delete	G-09.04WM / G-09.04W	Wood Post Thrie-Beam	Revised
			G-10.00M / G-10.00	Beam Guardrail Post Installation	New
G-11.01M / G-11.01	G3S Box Beam	Delete			
G-12.00M / G-12.00	G2S Guardrail	Delete			
G-14.05SM / G-14.05S	G4S Steel BCT	Delete			
G-14.05WM / G-14.05W	G4S Wood BCT	Delete			
G-15.01M / G-15.01	G4 Buried Anchor Terminal	Delete	G-15.10M / G-15.10	Beam GR Buried-in Backslope	Revised Sheets 1-3
G-18.01SM / G-18.01S	G4S Embedded	Delete			
G-18.01WM / G-18.01W	G4W Embedded	Delete			
			G-20.00M / G-20.00	Widening for GR End Term	New
G-23.00M / G-23.00	G3S Box Beam	Delete			
G-24.05SM / G-24.05S	G4S GR Terminal	Delete	G-24.06SM / G-24.06S	Steel Post GR Term Transition @ Bridges	Revised
G-24.05WM / G-24.05W	G4W GR Terminal	Delete	G-24.06WM / G-24.06W	Wood Post GR Term Transition @ Bridges	Revised
G-25.11SM / G-25.11S	Controlled Release Terminal	Delete			
G-25.11WM / G-25.11W	Controlled Release Terminal	Delete	G-25.20WM / G-25.20W	Wood Post Controlled Release Terminal	Revised Sheets 1-3

REMOVE			INSERT		
Drawing Number	**Title**	**Action Required**	**Drawing Number**	**Title**	**Action Required**
G-27.01SM / G-27.01S	Steel Post GR Stiffening	Delete	G-27.02SM / G-27.02S	Steel Post GR Stiffening	Revised
G-27.01WM / G-27.01W	Wood Post GR Stiffening	Delete	G-27.02WM / G-27.02W	Wood Post GR Stiffening	Revised
G-29.02M / G-29.02S	Steel Post Thrie-Beam	Delete	G-29.03SM / G-29.03S	Steel Post Thrie-Beam Transition @ Bridges	Revised
G-29.02WM / G-29.02W	Wood Post Thrie-Beam	Delete	G-29.03WM / G-29.03W	Wood Post Thrie-Beam Transition @ Bridges	Revised
G-33.01M / G-33.01	MBS Median Box Beam	Delete			
G-35.03M / G-35.03	MB4W Median Box Beam	Delete			
G-44.00M / G44.00	MB4W Median Barrier Glare	Delete			
I-01.00M / I-01.00	Railroad Crossing	Delete			
I-02.00M / I-02.00	Railroad Crossing	Delete			
I-82.00M / I-82.00	Superelevation Trans	Delete			
L-14.00M / L-14.00	Light Standard Base	Delete			
T-03.02M-T-03.02	Guide Marker Post	Delete			
T-32.00M / T-32.00	Signal Detector	Delete			
T-33.01M / T-33.01	Load Center-Signal	Delete			
T-75.01M / T-75.01	Railroad Signal Found	Delete			

MEMORANDUM

State of Alaska

Department of Transportation and Public Facilities
Statewide Design and Engineering Services Division
Design and Construction Standards Section

TO: Gene Rehfield, P.E.
PreConstruction Engineer
D&ES

DATE: January 28, 1999

FILE NO:

TELEPHONE NO: 465-6963
FAX NUMBER: 465-5240
TEXT TELEPHONE: 465-3652

FROM: Kurt Smith, P.E.
State Traffic Engineer
D&ES

SUBJECT: Transmittal of Modified Guardrail Standard Drawings

I have attached the final revised "G-sheets" - the standard drawings pertaining to roadside barriers, and a summary of revisions.

The new national standard for crashworthiness, NCHRP 350, is the catalyst for many of these changes. Many of the barriers and barrier end terminals shown on the drawings are required to be 350-compliant by March 15 (the FHWA granted an extension of the original October 1, 1998 deadline).

Regional DOT&PF staff reviewed the drawings. All comments (red-lined and written) were addressed and written comments were answered in writing. Comments from the FHWA have been addressed and answered in writing. We have received verbal FHWA approval and expect written approval soon.

Where applicable, these revised drawings must be used on all projects advertised on or after March 15, 1999

Attachments

cc: Al Fletcher, P.E., Traffic & Safety Operations Engineer, F.H.W.A. (summary only)
Gary Hogins, P.E., Chief, Design & Construction Standards, HQ (summary only)

Summary of Changes to the Barrier Standard Drawings (G-Sheets)
Starting with the drawings current as of 6/98

Old Sheet No.	New Sheet No.	Subject	Changes	Reg-ional Review	FHWA Review	FHWA Approval	350 TL3?	Comments
G-00.00 1 of 4	G-00.01 1 of 4	Std GR Hardware	Minor	-	-	-	n/a	Deleted tapered washer and anchor bolts (both used for the no-longer acceptable BCT)
G-00.00 2 of 4	G-00.01 2 of 4	Std GR Hardware	Minor	-	-	-	n/a	Minor change to one note.
G-00.00 3 of 4	G-00.01 3 of 4	Std GR Hardware	Minor	-	-	-	n/a	Deleted thrie beam end section
G-00.00 4 of 4	G-00.01 4 of 4	Std GR Hardware	Deleted details	-	-	-	n/a	Deleted the BCT Anchor Plate, Slip Base Plate A&B, and Bearing Plate for Steel Post details. The Bearing Plate for Wood Post detail remains (though modified) because it is used in the Controlled Release Terminal. Clarified radius plate use with a note.
G-01.02	G-01.02	G1S Cable GR	None	-	-	-	Yes	Although cable guardrail passed 350, TL-3, cable guardrail terminal crash tests have yet to be successfully crash-tested. Existing designs are acceptable until new designs have passed.
G-02.01		G2S W-beam GR	Delete	-	-	-	TL-2	Deleted. This guardrail system failed NCHRP 350 TL-3 (although it passed TL-2) Personnel from each of the regions report they don't use it.
G-03.01	G-03.01	G3S Box Beam GR	None	-	-	-	Yes	Although box beam guardrail passed 350 TL-3, box beam terminals have yet to be successfully crash-tested. See Comment for deleted sheet 11.01
G-04.05S	G-04.06S	G4S W-Beam GR	Substantial	8/26/98	10/5/98	Verbal 1/98 Written Pending	yes	Wood block-outs as required for NCHRP 350 compliance are shown. Post lengths and behind-post embankment details were deleted and are now handled with a reference to sheet G-10. The alternate C-post and C-post block were deleted. A note was added saying that curbs should not be installed with guardrail when the design speed exceeds 65 kph / 40 mph. (See Note at end of summary: "References on curb-guardrail combinations"). Past Alaska Standard Drawings have allowed posts for wood W-beam guardrail to extend 7 1/8" above the block. This appears to be excessive. WSDOT's Standard Plans show a 2" extension. That, along with their allowance for extending the block 2" above the post in the future, provides for 4" of rail raising (good for 2 typical overlays). The 3" operational leeway for guardrail height (specified in the Roadside Design Guide) allows for another 1 and 1/2 typical overlays. The drawings were changed to show a 2" instead of a 7 1/8" extension.
G-04.06W	G-04.07W	G4W W-Beam GR	Minor	8/26/98	10/5/98	Verbal 1/98 Written Pending	yes	Same changes as G-04.06S except there was no change to the block-outs - wood blocks on wood posts comply with 350.

G-09.02S	G-09.03S	Modified Thrie Beam GR	Substantial	8/26/98	10/5/98	Verbal 1/98 Written Pending	yes	This drawing was revised to show the Modified Thrie Beam system, which is the only 350-approved steel block thrie beam. The modification consists of a notch in a larger steel blockout and a longer post. Post lengths and behind-post embankment details were deleted and are now handled with a reference to sheet G-10. The alternate C-post and C-post block were deleted. A note was added saying that curbs should not be installed with guardrail when the design speed exceeds 65 kph / 40 mph. (See Note at end of summary: "References on curb-guardrail combinations").
G-09.03W	G-09.04W	G9W Thrie Beam GR	Minor	8/26/98	10/5/98	Verbal 1/98 Written Pending	yes	Wood thrie beam passed 350. Post lengths and behind-post embankment details were deleted and are now handled with a reference to sheet G-10. A note was added saying that curbs should not be installed with guardrail when the design speed exceeds 65 kph / 40 mph. (See Note at end of summary: "References on curb-guardrail combinations").
	G-10.00	Beam Guardrail Post Installation	New	8/26/98	10/5/98	Verbal 1/98 Written Pending	n/a	These post length details (for W-beam) come from the WSDOT Design Manual, page 710-18 (dated Nov, 97). Post lengths (rounded) for thrie beam (for the most common embankment conditions) came from the AGC/AASHTO/ARTBA guide for Standardized Highway Barrier Hardware. Where longer posts are required for other embankment conditions, thrie beam post lengths have been set at one foot longer than W-beam posts. This sheet has been referenced by all other sheets that require guardrail post length designation.
G-11.01		G3S Box Beam GET	Delete	-	-	-	no	Deleted - This terminal is not acceptable under 350. Wyoming is working on getting 350 approval for a non-proprietary box beam end terminal (the WY-BET). It will be included as a standard drawing when it receives approval.
G-12.00		G2S Transition and GET	Delete	-	-	-	no	Deleted - This terminal is not acceptable under 350.
G-14.05S		G4S BCT	Delete	-	-	-	no	Deleted - This terminal is not acceptable under 350.
G-14.05W		G4W BCT	Delete	-	-	-	no	Deleted - This terminal is not acceptable under 350.

G-15.01	G-15.10 1 of 3	Buried-in-Backslope Terminal	Replace	10/27/98	11/18/98	Verbal 1/98 Written Pending	Old-No New-Yes	The old drawing (G15.01) was deleted because it had not been approved under 350. The new drawings are based on drawings transmitted under cover of a memo from Michael Trentacoste, Director of Hwy Safety, FHWA, to FHWA Regional Administrators, 8/4/98. The system was crash tested and passed NCHRP 350, TL 3
	G-15.10 2 of 3	Buried-in-Backslope Terminal Concrete Anchor & Misc	New	10/27/98	11/18/98	Verbal 1/98 Written Pending	Yes	
	G-15.10 3 of 3	Buried-in-Backslope Terminal Rub-rail and Post Anchors	New	10/27/98	11/18/98	Verbal 1/98 Written Pending	Yes	
G-18.01S		G4S Terminal Posts	Delete	-	-	-	n/a	Deleted - this drawing pertained to the deleted Breakaway Cable Terminal.
G-18.01W		G4W Terminal Posts	Delete	-	-	-	n/a	Deleted. This drawing pertained to the deleted Breakaway Cable Terminal. Details for a similar post required for the Controlled Release Terminal have been included in new sheet 25.20W, 3 of 3.
	G-20.00	Widening for Guardrail End Terminals	New	8/26/98	10/5/98	Verbal 1/98 Written Pending	n/a	A draft of this widening detail was agreed to by the Regional Traffic Engineers in 1996 or 1997. Several changes have been made to that original drawing during the review process.
G-23.00		G3S Box Beam Terminal Transition at Bridges	Delete	-	-	-	No	This terminal is not acceptable under 350.
G-24.05S	G-24.06S	G4S Guardrail Terminal Transition at Bridges	Substantial	8/26/98	10/5/98	Verbal 1/98 Written Pending	No	Drawing revised to show wood block-outs. Note # 1 was re-written to read, *"Use a DOTPF approved and NCHRP 350, TL-3 certified end terminal."* BCT references were deleted. Bolts on the terminal connection were shown. Road cross-section and profile details were deleted. Post lengths and behind-post embankment details were deleted and are now handled with a reference to sheet G-10.

G-24.05W	G-24.06W	G4W Guardrail Terminal Transition at Bridges	Substantial	8/26/98	10/5/98	Verbal 1/98 Written Pending	No	Same changes as G-24.06S except there was no change to the block-outs - wood blocks on wood posts comply with 350.
G-25.11S		Controlled Release Terminal	Deleted	-	-	-	No	Deleted - There is no steel-post controlled release terminal - all CRT posts are wood.
G-25.11W	G-25.20W 1 of 3	Controlled Release Terminal	Replace	10/27/98	11/18/98	Verbal 1/98 Written Pending	No	The original drawing (G-25-11.W) was deleted and replaced by three drawings for the following reasons: 1) To eliminate all BCT references, 2) to bring the detail into closer conformance with FHWA Technical Advisory T 5040.32, and Central Region's CRT drawing, and 3) to incorporate the anchor post information (with substantial revisions) previously included in drawing G-18.01W (deleted). This terminal has not been approved under 350. However, there is no functionally equivalent alternative that has been and compliance is not required until at least October, 2000. Anchor Post details come from the AASHTO/AGC/ARTBA "A Guide to Standardized Highway Barrier Hardware", pages SEW03a-b, PTE05, PLS03, and PDF01.
	G-25.20W 2 of 3	CRT Anchors	New	10/27/98	11/18/98	Verbal 1/98 Written Pending	No	
	G-25.20W 3 of 3	CRT Anchor Posts	New	10/27/98	11/18/98	Verbal 1/98 Written Pending	No	
G-27.01S	G-27.02S	Steel Post Guardrail Stiffening at Obstacles	Substantial	8/26/98	10/5/98	Verbal 1/98 Written Pending	No	BCT references and details were deleted. Wood block-outs were shown instead of steel. The detail showing an obstacle with more than 3 feet of separation from guardrail posts was deleted because it is identical to the rail in areas without obstacles. The method of attaching the rail to the obstacle was modified. NCHRP 350 compliance is not required until 10/1/02.
G-27.01W	G-27.02W	Wood Post Guardrail Stiffening at Obstacles	Substantial	8/26/98	10/5/98	Verbal 1/98 Written Pending	No	Same changes as G-27.02S except there was no change to the block-outs - wood blocks on wood posts comply with 350. NCHRP 350 compliance for the stiffening transition is not required until 10/1/02.

G-29.02S	G-29.03S	Steel Post Thrie Beam Transition at Bridges	Substantial	8/26/98	10/5/98	Verbal 1/98 Written Pending	No	Note # 1 was re-written to read, "Use a DOT&PF approved and NCHRP 350, TL-3 certified end terminal." BCT references were deleted. Road cross-section and profile details were deleted. Post lengths and behind-post embankment details were deleted and are now handled with a reference to sheet G-10. NCHRP 350 compliance is not required until 10/1/02.
G-29.02W	G-29.03W	Wood Post Thrie Beam Transition at Bridges	Substantial	8/26/98	10/5/98	Verbal 1/98 Written Pending	No	Same changes as G-29.03S. NCHRP 350 compliance is not required until 10/1/02.
G-33.01		MB3 Median Box Beam	Delete	-	-	-	No	This end terminal is not acceptable under 350.
G-35.03		MB4W Median GR w BCT	Delete	-	-	-	No	This end terminal is not acceptable under 350.
G-44.00		MB4W Glare Screen	Delete	-	-	-	No	The glare screen shown is no longer used and the median barrier end terminal shown is not acceptable under 350.
G-45.01	G-45.01	Jersey Barrier	None	-	-	-	Yes	
G-46.00	G-46.00	"F" Shape Concrete Barrier	None	-	-	-	Yes	

References on curb-guardrail combinations: Roadside Design Guide, 1996, Page 5-19, Section 5.6.2.1 Curbs: "Crash tests have shown that use of any guardrail/curb combination where high-speed, high-angle impacts are likely should be discouraged. 1994 Green Book, page 67, bottom: " For application in this publication, the upper limit for low or lower design speed is 60 Km/h, and the minimum limit for high speed design is 80 km/h. The intermediate design speed of 70 km/h could be considered as either low speed or high speed depending on the specific conditions . . .".