It is desirable to pave the median section and a 3.0 meter shoulder under overpass bridges. In addition, miscellaneous asphalt should be placed from the paved shoulder to the slope pavement. This pavement will provide additional safety, enhance drainage, reduce maintenance and improve appearance. See **Figure 2.3.2**.

2.3.1 Limits of Friction Course on Shoulders

Friction courses on limited access facilities shall be extended 0.3 meter onto both the median and outside paved shoulders of roadways.

Friction courses should be extended the full width of the shoulder on free access highways because of bicyclist usage. Terminating the friction course at the edge of travel lane or within the paved shoulder should be avoided to accommodate bicycles.

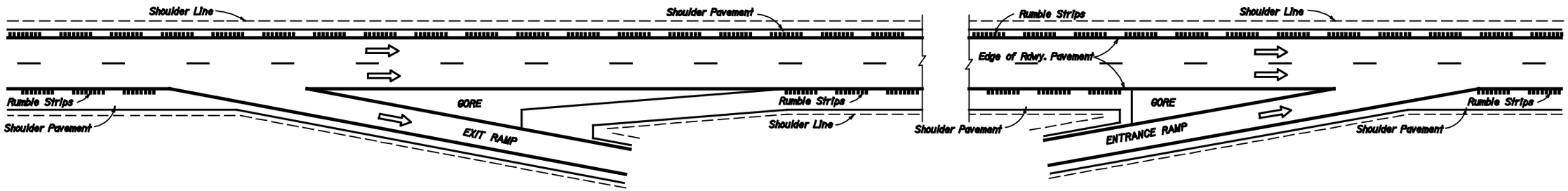
2.3.2 Shoulder Warning Devices (Rumble Strips)

The safety of freeways and other limited access facilities on the State highway system is to be enhanced by the installation of shoulder warning devices in the form of rumble strips. Projects on limited access facilities shall include the construction of ground-in rumble strips. Several types of applications have been tested. The ground-in strips provide the desired warning to the driver and consistency in application has been possible using this construction process.

These ground-in strips are installed using two patterns. The skip array is the standard array. These are used on both inside and outside shoulders on divided highway sections. The continuous array shall be constructed in advance of bridge ends for a distance of 300 meters or back to the gore recovery area for mainline interchange bridges. Other areas may be specified in plans.

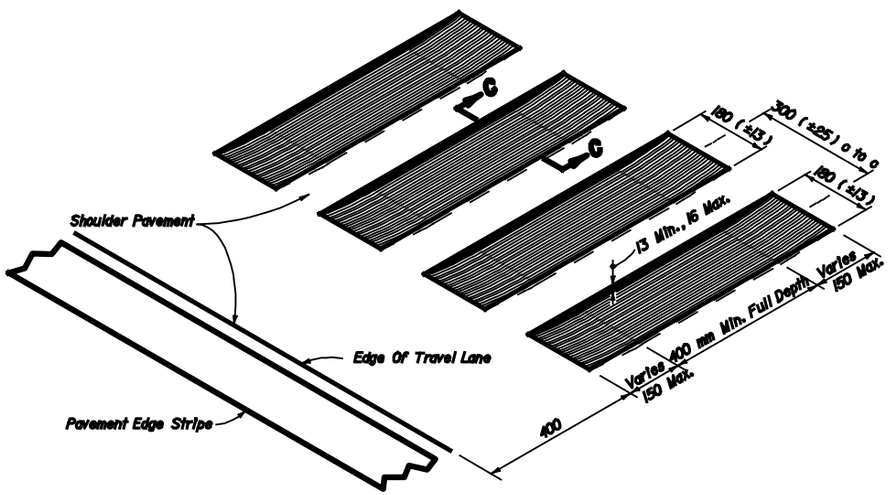
Methods and types of application other than described above and in ***Roadway and Traffic Design Standards, Index 518*** shall not be used unless concurred in by the State Roadway Design Engineer. Approval will be considered only with sufficient documented justification for deviation from the standard.

Roadway and Traffic Design Standards, Index 518 has been prepared to provide all needed details. This index also gives standards for raised rumble strips for use at structures where the bridge shoulder width is less than the width of the useable shoulder on the approach roadway. Notes for locations of raised rumble strip applications are also included on the index.

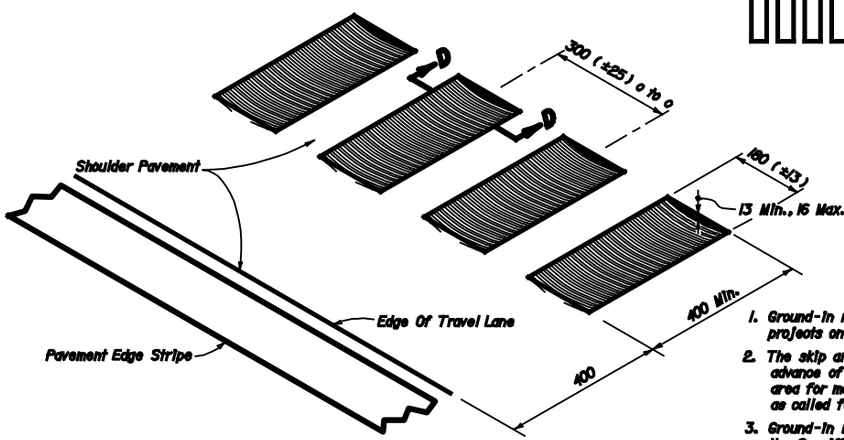


LIMITED ACCESS FACILITIES

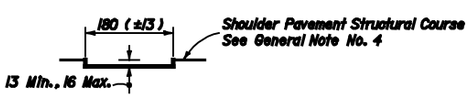
SHOULDER GROUND-IN RUMBLE STRIP PLACEMENT



ISOMETRIC - TRANSVERSE CUT

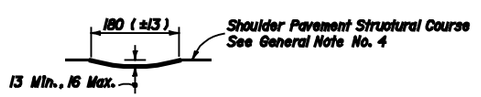


ISOMETRIC - LONGITUDINAL CUT



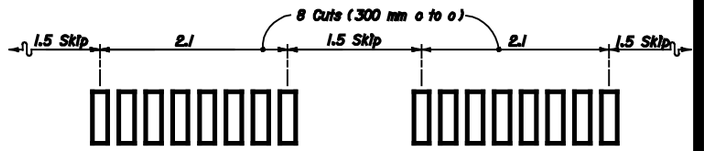
SECTION CC

TRANSVERSE CUT

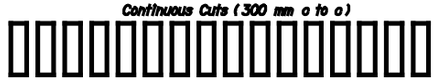


SECTION DD

LONGITUDINAL CUT



SKIP ARRAY



CONTINUOUS ARRAY

ARRAYS

GENERAL NOTES FOR SHOULDER GROUND-IN RUMBLE STRIPS

1. Ground-in rumble strips shall be constructed on freeway and other limited access projects only, and only when called for in the plans.
2. The skip array is the standard array. The continuous array shall be constructed in advance of bridge ends for a distance of 300 m, or back to the gore recovery area for mainline interchange bridges; and constructed at other specific locations as called for in the plans.
3. Ground-in rumble strips are to be constructed in accordance with Section 546 of the Specifications.
4. When friction course extends more than 0.3 m beyond the edge of the outer traffic lane, the extended friction course shall be bladed off back to the 0.3 m line, prior to rumble strip grinding.
5. Both arrays shall be paid for under the contract unit price for Rumble Strips (Ground-In), KM. Such price and payment shall be full compensation for all work and materials required.

DESIGN NOTE

1. The rumble strips described on this sheet are intended for use on flexible pavement shoulders. When constructing ground-in rumble strips on existing rigid (concrete) shoulders, no rumble strips shall be located closer than 150 mm from any pavement joint. When specifying ground-in rumble strips on existing rigid shoulders their location and array shall be detailed in the plans.
2. Other methods and types of applications shall not be used unless approved in writing by the State Roadway Design Engineer. Approval will be considered only with sufficient documented justification for variance from this standard.

LOCATION ALONG SHOULDER (FLEXIBLE PAVEMENT)

SHOULDER GROUND-IN RUMBLE STRIPS

FOR INFORMATIONAL PURPOSES ONLY, NOT FOR CONTRACT USE

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

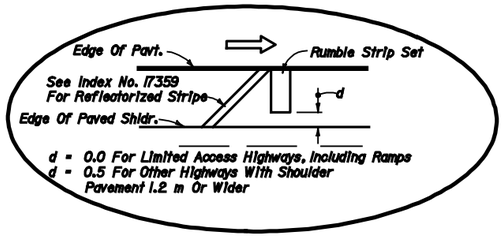
RUMBLE STRIPS

	Names	Dates
Designed By	COMM	11/93
Drawn By	HKH	11/93
Checked By	FLS/JVG	11/93

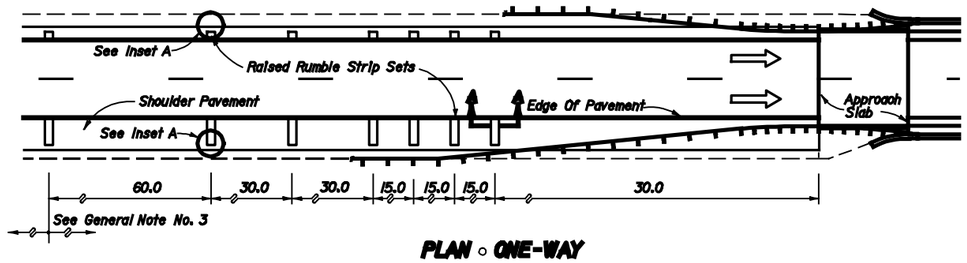
Approved By

State Roadway Design Engineer

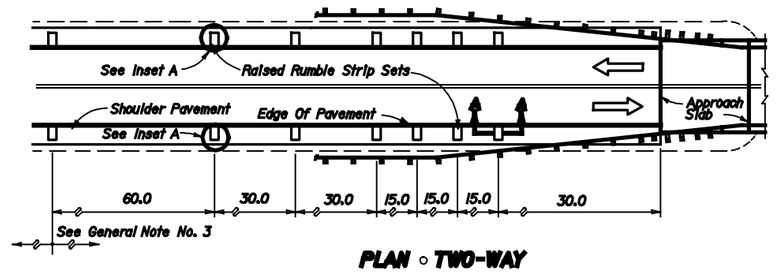
Revision	Sheet No.	Index No.
94	2 of 2	



INSET A

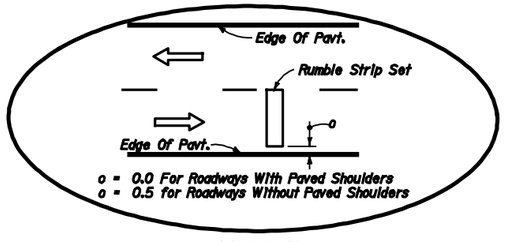


PLAN ○ ONE-WAY



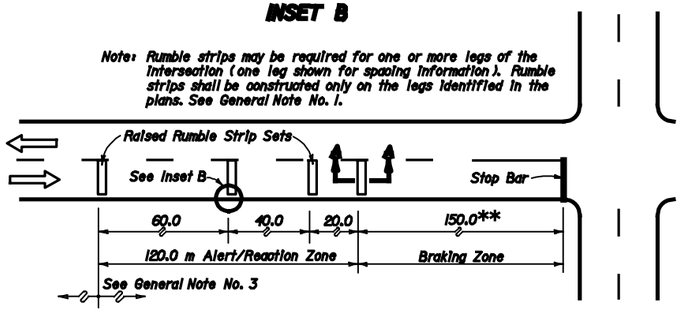
PLAN ○ TWO-WAY

STRUCTURES WITH LESS THAN FULL WIDTH SHOULDERS



INSET B

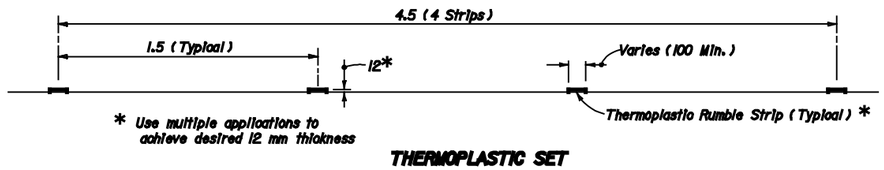
Note: Rumble strips may be required for one or more legs of the intersection (one leg shown for spacing information). Rumble strips shall be constructed only on the legs identified in the plans. See General Note No. 1.



** May be decreased in urban areas with low operating speeds.

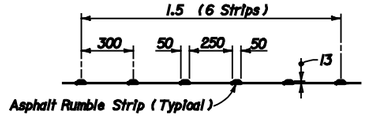
PLAN

INTERSECTIONS



* Use multiple applications to achieve desired 12 mm thickness

THERMOPLASTIC SET



ASPHALT SET

SECTION AA ○ FOR THERMOPLASTIC AND ASPHALT RUMBLE STRIP SETS

GENERAL NOTES FOR RAISED RUMBLE STRIPS

1. Raised rumble strips shall be constructed on all paved shoulders approaching structures, where the structure shoulder width is less than the usable shoulder width of the approach roadway. Raised rumble strips at intersections shall be constructed only when specified in the plans.
2. Raised rumble strips are to be constructed in accordance with Section 546 of the Specifications.
3. When any portion of a curve falls within the limit of rumble strips shown in these details, additional rumble strip sets spaced at 60.0 m centers shall be constructed throughout the remainder of the approaching curve.
4. Raised rumble strips shall be paid for under the contract unit price for Rumble Strips Sets, EA. Such price and payment shall be full compensation for all work and materials required.

   Raised rumble strips shall be paid for per set without any adjustment due to width of pavement receiving the strips or length of strips.

RAISED RUMBLE STRIPS

FOR INFORMATIONAL PURPOSES ONLY, NOT FOR CONTRACT USE

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

RUMBLE STRIPS

	Names	Dates
Designed By	KHM/CAS	10/87
Drawn By	JBW	10/87
Checked By	KHM/JVG	10/87

Approved By

State Roadway Design Engineer

Revision	Sheet No.	Index No.
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******SYTIME******