

July 15, 2002

470-02-13

Modifications to design of Shoulder,
and Edgeline Rumble Strips (SOL 470-02-05)

District Engineers/Administrator

R. Craig Reed, PE /s/ RC Reed
Director, Bureau of highway Safety & Traffic Engineering

This letter is intended to revise the attachments B and C to SOL 470-02-05, "Low Cost Safety Improvements 3R Projects Center, Shoulder, and Edgeline Rumble Strips". After receiving input from the Districts, the following modifications were made to the attached guidelines and drawings:

Centerline Rumble Strips (Attachment A)

- No Changes made.

Bicycle-Tolerable Shoulder Rumble Strips (Attachment B)

- Radius of rumble strip cut changed to 8-1/2" R in order to achieve the desired depth and width of cut.
- Attachment B Drawing Details "Edge of Pavement" changed to "Edge of Travel Lane" to better indicate proper placement of rumble strip.
- Minor typographical and drawing changes for clarification.

Edgeline Rumble Strips (Attachment C)

- Radius of rumble strip cut changed to 8-1/2" R in order to achieve the desired depth and width of cut.
- Depth of rumble strip cut changed to 3/8" with a tolerance of 1/16" in order to have the same depth and tolerance as the Bicycle Tolerable Shoulder Rumble Strips for constructability and efficiency.
- Minor typographical and drawing changes for clarification.

Please make modifications as needed and use the attached design for future implementation. Contact Bill Crawford of my staff with any comments or questions at (717) 787-6853.

4700/WAC/cap

ATTACHMENT

cc: Michael M. Ryan, PE, Deputy Secretary, Highway Administration
Gary L. Hoffman, PE, Chief Engineer
Highway Administration Bureau Directors
BHSTE Division Chiefs
Michael A. Baglio, PE, SMD, BHSTE
Devang Patel, SMD, BHSTE
William Crawford, SMD, BHSTE
David Bachman, Bicycle/Pedestrian Program Manager, SMD, BHSTE
Patti Marshall, Ass't Bicycle/Pedestrian Coordinator, SMD, BHSTE
All ADE-Design
All ADE- Construction
All ADE-Maintenance
All District Traffic Engineers
All District Safety Engineers
All District Bicycle/Pedestrian Coordinators
Michael J. Castellano, PE, FHWA

Attachment A

**MILLED CENTERLINE RUMBLE STRIPS
(For Non-Interstate and Non-Expressways Use)**

Responsibilities:

District Safety Engineer is the process Owner.

Guidelines for Use:

1. The purpose of milled Center Line Rumble Strips (CLRS) is to reduce the occurrence of head-on and/or sideswipe crashes on undivided two-lane or four-lane highways.
2. Consider CLRS on the following locations and under following conditions:

Roadway Description	Typical Drawing Detail
Roadway with 12 feet or greater lane width and minimum of 3 feet of paved shoulder.	Detail # 1
Roadway with 11 feet lane width and minimum of 3 feet of paved shoulder.	Detail # 1 or Detail # 2
Roadway with 11 feet lane width and less than 3 feet of shoulder or no shoulder.	Detail # 2
Roadway with 10 feet lane width with or without shoulder.	Detail # 2
Roadway with less than 10 feet lane width	Consult BHSTE

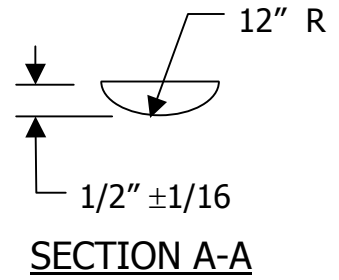
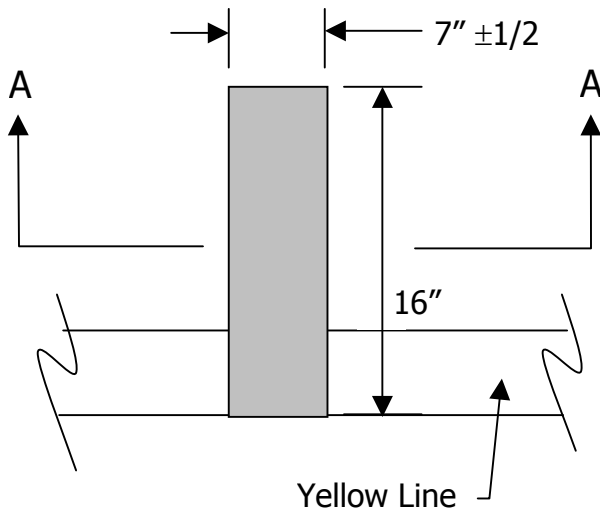
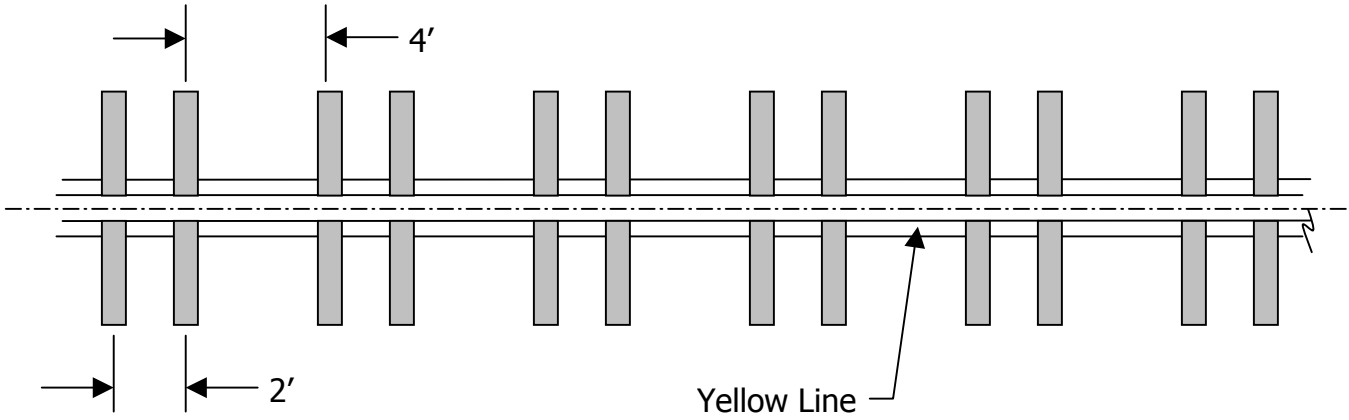
3. Milled centerline rumble strips (CLRS) are for use on bituminous pavement.
4. Installing CLRS on bituminous pavement requires an ID-2 or ID-3 surface with BCBC base or better.
5. If it is desired to retrofit CLRS on existing pavement, the pavement should be in sufficiently good condition, as determined by the District, to effectively accept the milling process without raveling or deteriorating. Otherwise the pavement needs upgraded prior to milling any desired CLRS.

6. CLRS should not be installed on existing concrete pavements with overlay less than 2 ½" in depth.
7. Do not install CLRS on bridge decks.
8. CLRS may be installed in passing zones where deemed appropriate by District safety personnel. Consider reducing depth of cut to 3/8" in areas where passing is permitted. If CLRS are being discontinued for a passing zone, use engineering judgment as to where to terminate CLRS in advance of a passing zone.
9. CLRS are to be broken for intersections. Also consider breaking for driveways according to engineering judgment. When breaking CLRS pattern, discontinue CLRS 25 feet from the Point of Curvature of any such highway or driveway (refer to Typical Detail #3).
10. Coordinate the milling of CLRS with all necessary project phases. Do not mill the CLRS until all appropriate construction phases are completed.
11. Coordinate the milling of CLRS with traffic line painting operations a) to avoid milling newly applied traffic lines and b) to install new yellow centerlines within two weeks of CLRS completion.
12. Consult the Bureau of Highway Safety & Traffic Engineering before installing CLRS on highways with travel lane widths that are less than 10 feet.
13. Take into consideration potential noise impacts when contemplating the installation of CLRS in residential or urban areas.

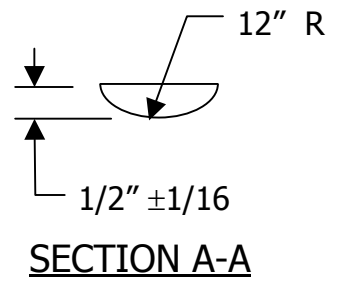
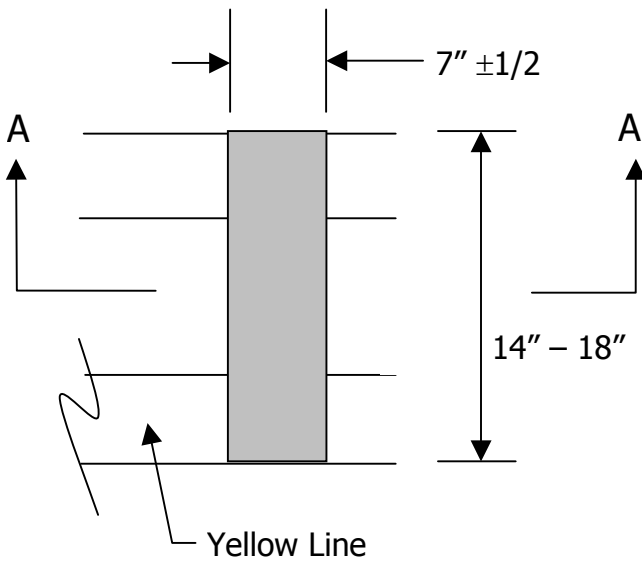
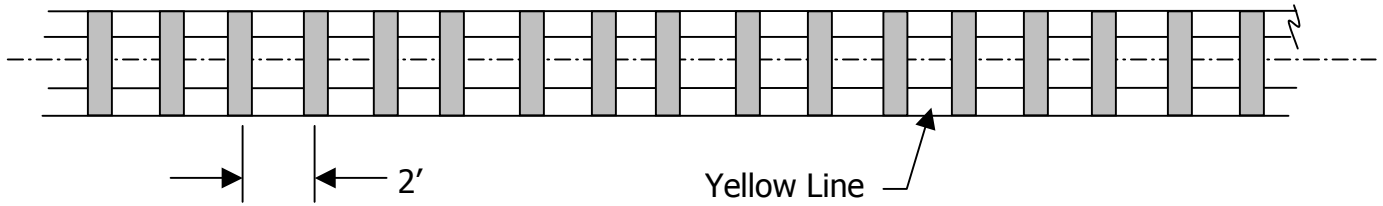
DESIGN DEVIATION

Deviation from the above specifications and guidelines may be considered by the district; however, they must be approved by the Bureau of Highway Safety & Traffic Engineering prior to being implemented.

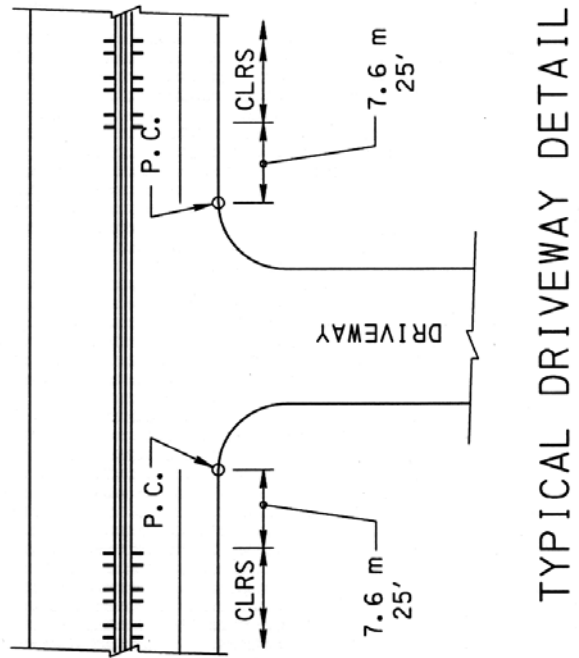
Attachment A (cont.)
Milled Centerline Rumble Strips
Typical Drawing Detail # 1



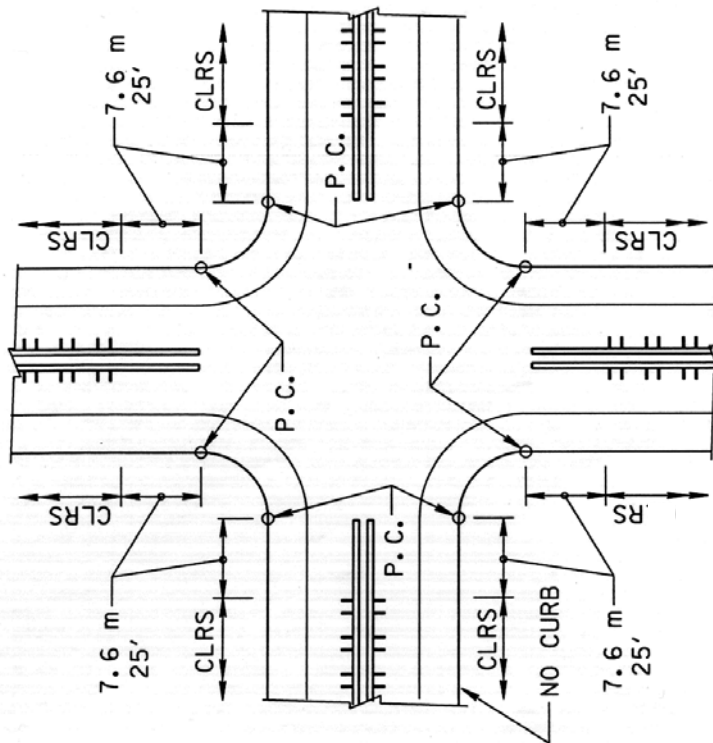
Attachment A (cont.)
Milled Centerline Rumble Strips
Typical Drawing Detail # 2



Attachment A (cont.)
Center Line Rumble Strips
Typical Drawing Detail # 3



TYPICAL DRIVEWAY DETAIL



TYPICAL INTERSECTION DETAIL

Attachment B

BICYCLE TOLERABLE SHOULDER RUMBLE STRIPS (BTSRS) (For Non-Interstate and Non-Expressways Use)

Responsibilities:

District Safety Engineer is the process owner.

District Pedestrian/Bicycle Coordinator shall jointly review the areas to be targeted.

Guidelines for Use:

Consider Bicycle Tolerable Shoulder Rumble Strips (BTSRS) on the following locations and under following conditions:

1. The purpose of BTSRS is to reduce run-off-the-road crashes on highways (except interstates and expressways).
2. Consider BTSRS for the following types of two-four lane highways (except Interstate & Expressways):
 - Where the roadway lane width is 11 feet or greater, 6 feet or more of paved shoulder and the posted speed is 55 MPH or greater, the BTSRS shall be installed on the shoulder as shown in Typical Drawing Detail # 1.
 - Where the roadway lane width is 11 feet or greater, 6 feet or more paved shoulder and the posted speed is less than 55 MPH, the BTSRS shall be installed on the shoulder as shown in Typical Drawing Detail #2.
 - If the shoulder width is less than 6 feet in any case, consider the Edgeline Rumble Strips (ERS), outlined in Attachment C.
3. The paved shoulder must be equal in smoothness to that of the adjacent travel lane.
4. Installing BTSRS on bituminous pavement requires an ID-2 or ID-3 surface with BCBC base or better.
5. If it is desired to retrofit BTSRS on existing pavement, the pavement & shoulder should be in sufficiently good condition, as determined by the District, to effectively accept the milling process without raveling or

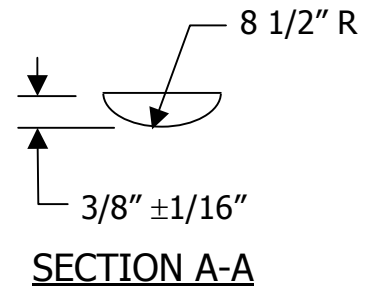
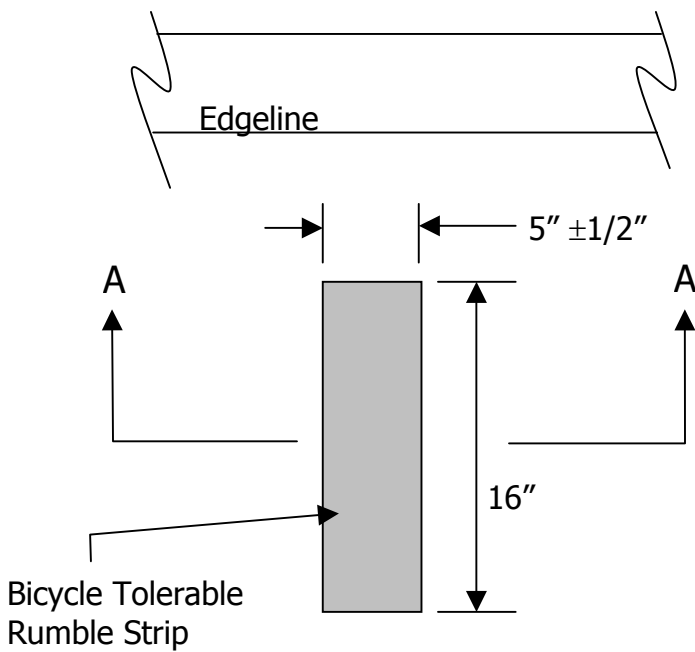
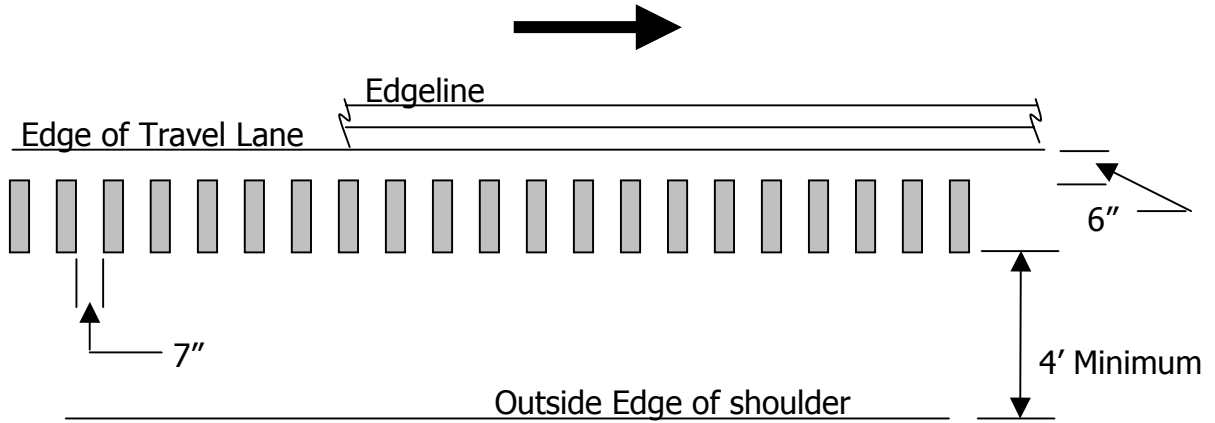
deteriorating the pavement. Otherwise both the pavement & shoulders need to be upgraded prior to milling BTSRS.

6. Do not install BTSRS on bridge decks.
7. BTSRS are to be broken for intersections. Also consider breaking for driveways according to engineering judgment. When breaking BTSRS pattern, discontinue BTSRS 25 feet from the Point of Curvature of any such highway or driveway (refer to Typical Detail #3).
8. Coordinate the milling of BTSRS with all necessary project phases. Do not mill the BTSRS until all appropriate construction phases are completed.
9. Take into consideration potential noise impacts when contemplating the installation of BTSRS in residential or urban areas.
10. As part of multi-modal transportation system planning, consult the District Pedestrian/Bicycle Coordinator where BTSRS are being planned for installation, and determine if the District Coordinator has any concerns. These concerns may include Bicycle PA routes, other local bike routes, Adventure Cycling Association, National Bike routes in Pennsylvania, proposed bike routes from MPO/LDD regional plans, potential ADA violations and others.

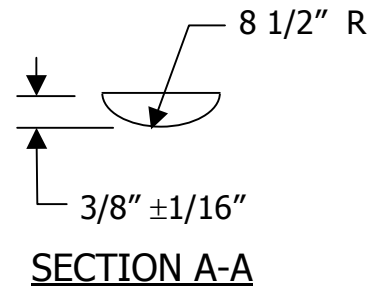
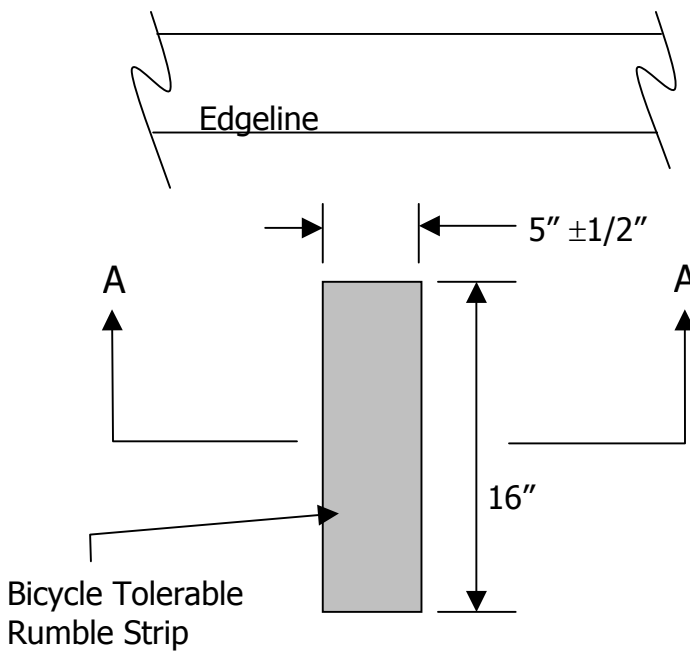
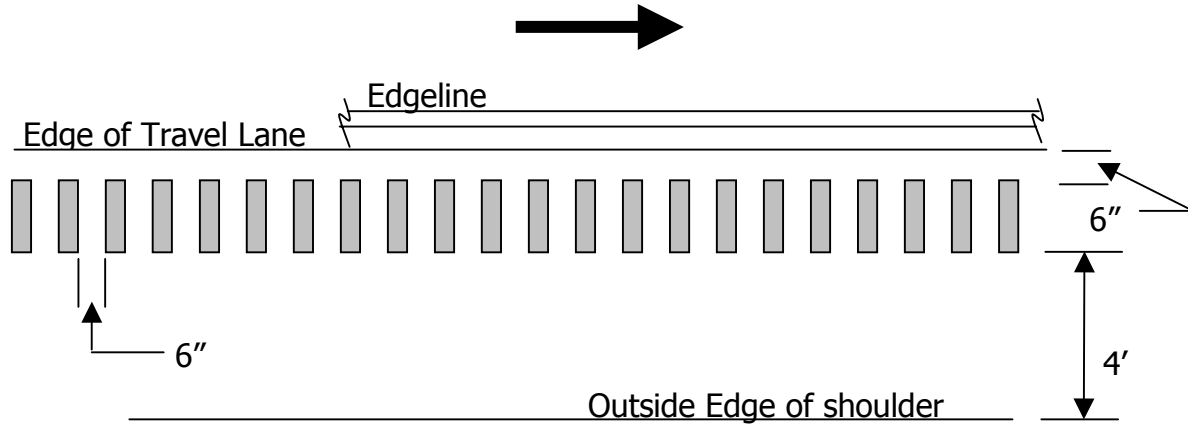
DESIGN DEVIATION

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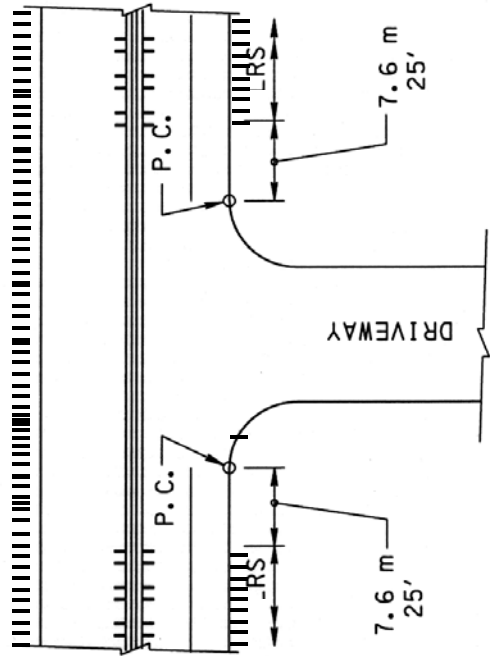
Attachment B (cont.)
BTSRS Detail (55 MPH or More Posted Speed)
Typical Drawing Detail # 1



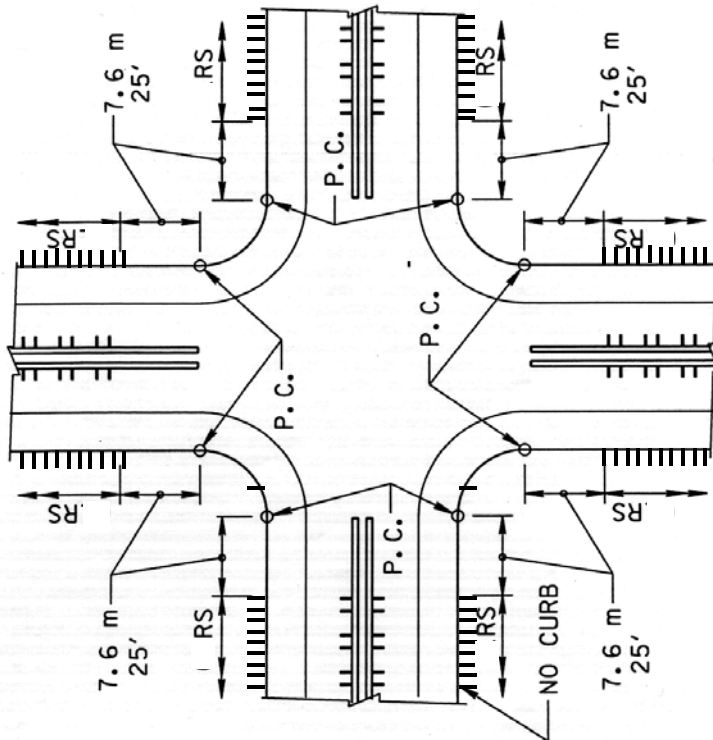
Attachment B (cont.)
BTSRS Detail (Less than 55 MPH Posted Speed)
Typical Drawing Detail # 2



Attachment B (cont.)
Bicycle Tolerable Rumble Strips
Typical Drawing Detail # 3



TYPICAL DRIVEWAY DETAIL



TYPICAL INTERSECTION DETAIL

Attachment C

PENNSYLVANIA EDGELINE RUMBLE STRIP (ERS) GUIDELINES **(For Non-Interstate and Non-Expressways Use)**

Responsibilities:

District Safety Engineer is the process owner.

District Pedestrian/Bicycle Coordinator shall jointly review the areas to be targeted.

Guidelines for Use:

Consider milled Edgeline Rumble Strips on the following locations and under the following conditions:

The purpose of ERS is to reduce run off the road crashes on highways (except interstates and expressways).

Consider ERS for the following types of two-to-four lane highways (except Interstate & Expressways):

- On highways with 11 feet or greater lane width and 4-6 feet of paved shoulder, ERS shall be installed on the edge of the roadway as shown in Typical Drawing Detail # 1.
- If the shoulder width is greater than or equal to 6 feet, consider the Bicycle Tolerable Rumble Strips shown in Attachment B.

If there is concern with the pavement joint between the roadway and the shoulder, district may consider the following options:

- Where shoulder width is between 5-6 feet, offset ERS 2-4 inches from the joint into the shoulder surface.
- Where shoulder width is less than 5 feet, district may offset ERS 2-4 inches from the joint into the travel lane surface.

The ERS shall be discontinued 50 feet before and after adjacent guiderail, where the face of the guiderail is located less than 4 feet from the edge line of the roadway.

The paved shoulder and the adjacent travel lane should be of equal smoothness.

Installing ERS on bituminous pavement requires an ID-2 or ID-3 surface with BCBC base or better.

If it is desired to retrofit ERS on existing pavement, the pavement & shoulder should be in sufficiently good condition, as determined by the District, to effectively accept the milling process without raveling or deteriorating the pavement. Otherwise both the pavement & shoulders need to be upgraded prior to milling any desired ERS.

Do not install ERS on bridge decks.

ERS are to be broken for intersections. Also consider breaking for driveways according to engineering judgment. When breaking ERS pattern, discontinue ERS 25 feet from the Point of Curvature of any such highway or driveway (refer to Typical Detail #2).

Coordinate the milling of ERS with all necessary project phases. Do not mill the ERS until all appropriate construction phases are completed.

Coordinate the milling of ERS with traffic line painting operations a) to avoid milling newly applied traffic lines and b) to install new white edge lines within two weeks of ERS completion.

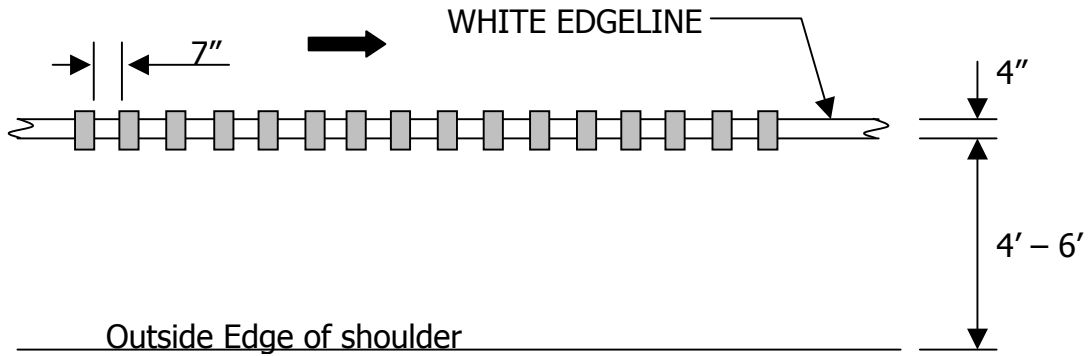
Take into consideration potential noise impacts when contemplating the installation of ERS in residential or urban areas. Do not install ERS on the inside of moderate to sharp curves which are in the immediate vicinity of any residence.

As part of multi-modal transportation system planning, consult the District Pedestrian/Bicycle Coordinator where ERS are being planned for installation, and determine if the District Coordinator has any concerns. These concerns may include Bicycle PA Routes, other local bike routes, Adventure Cycling association, National Bike Route segments in Pennsylvania, proposed bike routes from MPO/LDD regional plans, potential ADA violations and others.

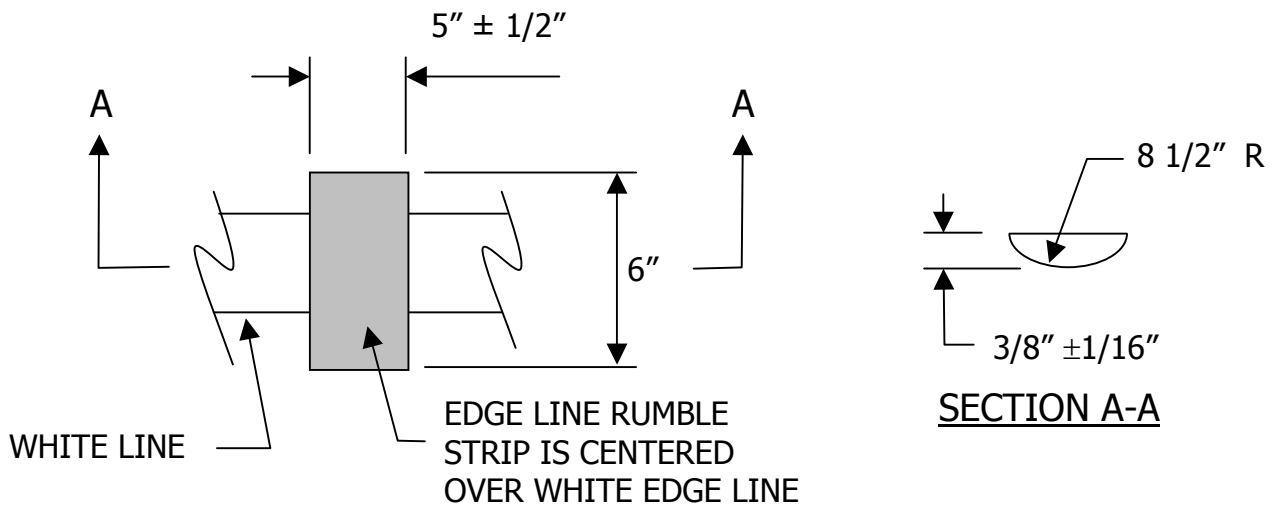
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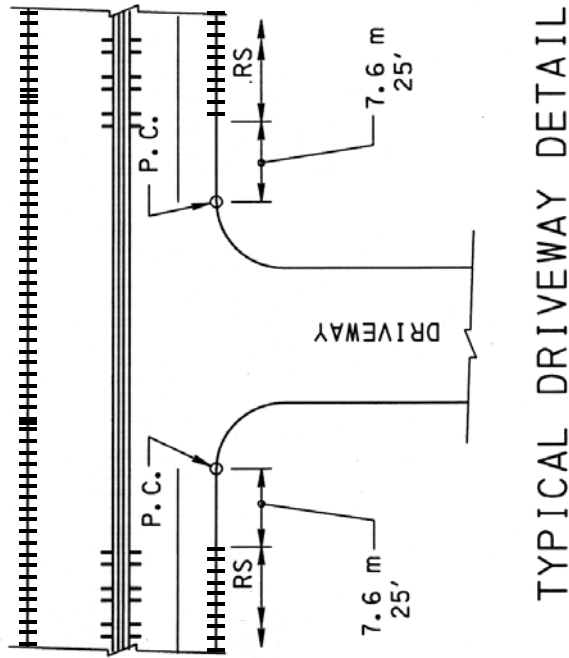
Attachment C (cont.)
Edgeline Rumble Strips
Typical Drawing Detail # 1



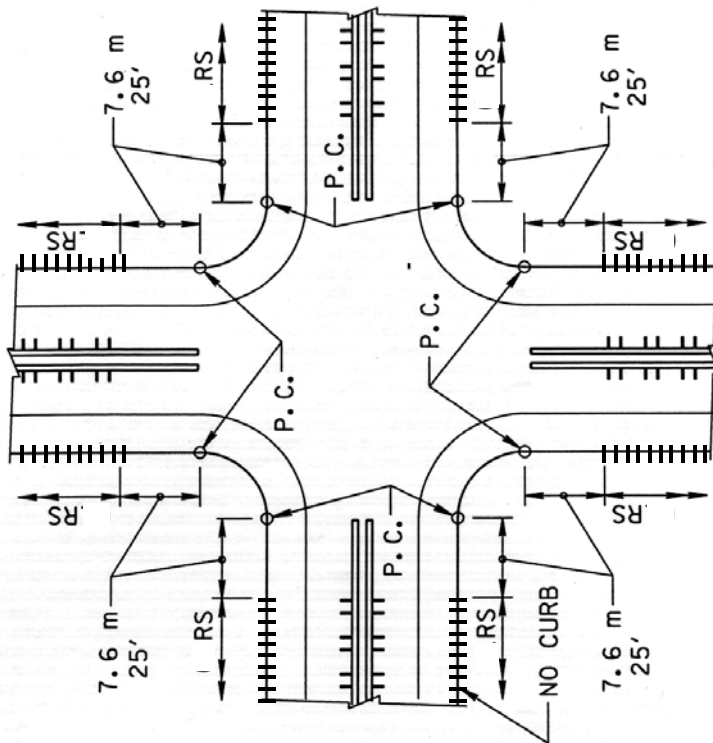
TYPICAL PLAN VIEW FOR MILLED EDGE
LINE RUMBLE STRIP PATTERN



Attachment C (cont.)
Edgeline Rumble Strips
Typical Drawing Detail # 2



TYPICAL DRIVEWAY DETAIL



TYPICAL INTERSECTION DETAIL