

South Carolina Department of Transportation
Engineering Directive Memorandum

Number: 22

Primary Departments: Preconstruction, Traffic Engineering, Construction, Maintenance

Referrals: AASHTO, *Guide for the Development of Bicycle Facilities*, 1999

Subject: Considerations for Bicycle Facilities

On February 20, 2003, the South Carolina Department of Transportation Commission in meeting affirmed that bicycling accommodations should be a routine part of the Department's planning, design, construction, and operating activities, and will be included in the everyday operations of our transportation system. In order to provide guidance to Department personnel, the attached typical sections have been developed to supplement the following guidelines for the selection and design of bicycle facilities on all new projects. In addition, typical sections have been included to give guidance on how to restripe existing five-lane sections to accommodate bicycle facilities.

The following describes shared roadways and bike lanes/paved shoulders and gives guidance on their design requirements for new projects. Other design considerations for bicycle accommodations are also addressed.

A. Shared Roadways

Description

Shared roadways are the way most bicycle travel in the United States occurs. This type of facility can be used to accommodate bicyclists without signing and striping the roadway for bicycle travel. This type of facility works well to accommodate bicycles through urban areas that are not considered high bicycle-demand corridors or where other constraints do not allow the development of a bike lane/paved shoulder.

Design Considerations

On urban sections (curb and gutter), an outside travel lane width of fourteen (14) feet is the minimum recommended width for a shared-use lane. The gutter pan is not to be included in the width of the shared roadway. On stretches of roadways with grades greater than five percent, consideration should be given to providing a 15-foot travel lane width. Shared roadway widths greater than fourteen (14) feet that extend continuously along a stretch of roadway may encourage the undesirable operation of two motor vehicles, especially in urban areas, and are therefore not recommended as shared use roadways and consideration should be given to striping the additional width. The Department's Pedestrian

and Bicycle Coordinator and Traffic Engineering can provide assistance in determining the need for a shared roadway as opposed to bike lanes/paved shoulders.

On rural sections (shoulder), criteria should be used as described in the bike lanes/paved shoulders section of this document.

B. Bike Lanes/Paved Shoulders

Description

This type of facility incorporates bicyclists into a roadway by utilizing a bike lane/paved shoulder adjacent to the motor vehicle traffic. A bike lane should be a lane specifically signed and marked as indicated in the Manual on Uniform Traffic Control Devices (Part 9). A paved shoulder may be used to accommodate bicycle travel without specific markings and signs present. A bike lane provides for more predictable movements by the motorist and bicyclist. Bike lanes should be one-way facilities and carry bike traffic in the same direction as adjacent motor vehicle traffic. This type of facility should be used where the Department desires to provide continuity to other bicycle facilities or designate preferred routes through high demand corridors, such as any of our designated South Carolina bicycle touring routes or a municipality's bikeway. The Department's Pedestrian and Bicycle Coordinator and Traffic Engineering can provide assistance in determining the need for bike lanes as opposed to a shared roadway.

Design Considerations

On rural sections (shoulder) with ADT greater than 500, bike lanes/paved shoulders should be a minimum of four (4) feet wide in each direction to accommodate bicycle travel. The bike lanes/paved shoulders will have a cross slope of 24H:1V (4.17%). Where motor vehicle speeds exceed 50 mph or the percentage of trucks, buses, and recreational vehicles are greater than five percent of the ADT, consideration should be given to providing a minimum six (6) feet of width to accommodate bicycle travel adjacent to the higher speeds (50 mph or greater) and to lessen the effect of windblast from the larger vehicles. On rural sections (shoulder) with ADT less than 500, paving two (2) feet of the earthen shoulder will be adequate to better accommodate bicyclists.

On urban sections (curb and gutter), bike lanes/paved shoulders should be a minimum of four (4) feet wide to accommodate bicycle travel. The bike lanes/paved shoulders will have a cross slope of 24H:1V (4.17%). The gutter pan is not to be included in the width of the bike lane/paved shoulder. Where the percentage of trucks, buses, and recreational vehicles are greater than five percent of the ADT, consideration should be given to providing a minimum six (6) feet of width. Where motor vehicle speeds are 50 mph or greater, Department guidelines for shoulder widths should be utilized as defined in the SCDOT Highway Design Manual, thus giving the bicyclist either eight (8) or ten (10) feet of paved shoulder width to utilize.

C. Other Design Considerations for Bicycle Facilities

Paving Existing Shoulders

In order for a shoulder to be usable to a bicyclist, it must be paved. Adding or improving paved shoulders often can be the best way to accommodate bicyclists in rural areas and benefit motor vehicle traffic. Paved shoulders have the added benefits of not only accommodating bicyclists, but also they can extend the service life of the road surface since edge deterioration will be significantly reduced. It is currently Department policy to provide two (2) feet of paved shoulder width on all new projects utilizing earthen shoulders. Where practical and attainable, a minimum width of four (4) feet should be paved on the shoulder to provide for bicycle facilities where the ADT of the road is greater than 500.

Where constraints do not allow obtaining the indicated widths, any additional width can be beneficial to a bicyclist.

Resurfacing/Restriping Existing Roadways

When the Department desires to accommodate bicycle facilities by resurfacing/restriping existing roadways, lane or median widths may be narrowed to obtain the desired bicycle facility. Roadways designated as being on the National or South Carolina Truck Network or roadways where the percentage of trucks, buses, and recreational vehicles are greater than five percent of the ADT should have lane widths of twelve (12) feet. Where conditions allow utilizing lane widths narrower than twelve (12) feet to accommodate bicycle facilities, the impacts of the narrower lane widths to motor vehicle traffic should be determined. Guidance on selecting the proper lane width for a roadway can be found in Chapters 19 through 22 of the SCDOT Highway Design Manual.

A flush /painted median width of fifteen (15) feet is indicated by the South Carolina Highway Design Manual, but the width can be reduced to twelve (12) feet to accommodate bicycle facilities on an existing roadway or existing project. Median widths less than twelve (12) feet are not recommended where posted speeds are greater than 35 mph and the percentage of trucks, buses, and recreational vehicles is greater than five percent of the ADT.

Drainage Inlet Grates

Where practical, drainage inlets should be placed outside of the bicycle facility. Where this is not practical, hydraulically efficient, bicycle-safe grates should be utilized and should be placed or adjusted to be flush with the adjacent pavement surface. On bridges, a minimum of four (4) feet from the edge of the travel lane should be clear of drainage inlets.

Longitudinal Rumble Strips

Longitudinal rumble strips shall not be used where bicycle traffic is expected to occur.

Bridges

In general, bridge widths should match the approach roadway widths (travelway plus bike lanes/paved shoulders). However, in determining the width for major water crossings, consider the cost of the structure, traffic volume, and potential for future width requirements.

Valley Gutter Sections

The guidelines for shared roadways and bike lanes/paved shoulders will be utilized to accommodate bicycle facilities on roadways with valley gutter. Due to the fact that valley gutter sections are typically used on low volume, two-lane secondary roadways, the cross slope of the paved shoulder/bike lane should be 48H:1V (2.08%).

Submitted by: _____
Director of Preconstruction

Submitted by: _____
Director of Construction

Recommended by: _____
Deputy State Highway Engineer

Submitted by: _____
Director of Traffic Engineering

Submitted by: _____
Director of Maintenance

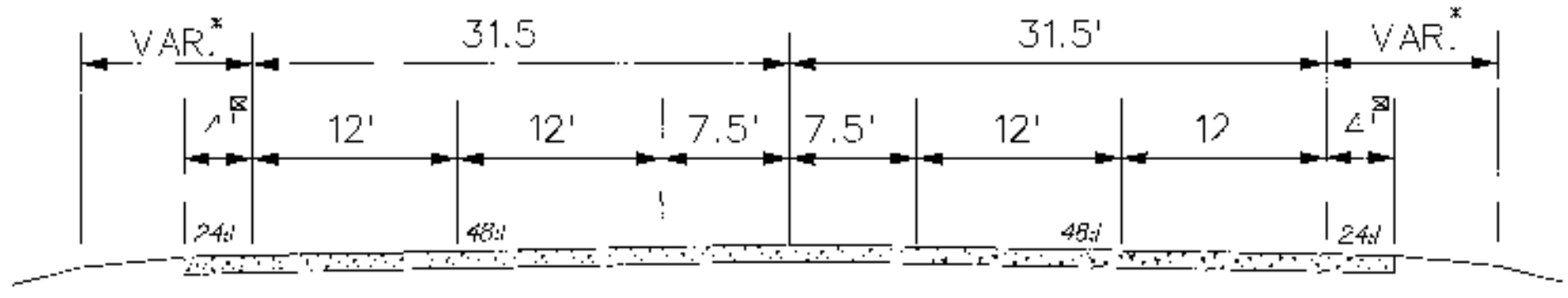
Recommended by: _____
Deputy State Highway Engineer

Approved: _____
State Highway Engineer

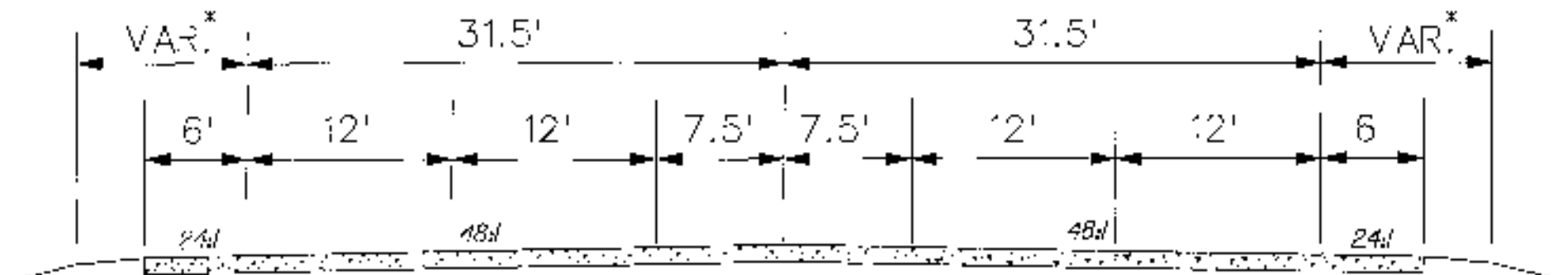
Effective Date: _____

Original signed by State Highway Engineer, D.H. Freeman, July 10, 2004. All original EDM's maintained by State Highway Engineer's Office.

BICYCLE FACILITIES NEW CONSTRUCTION 5-LANE RURAL SECTION (SHOULDER)



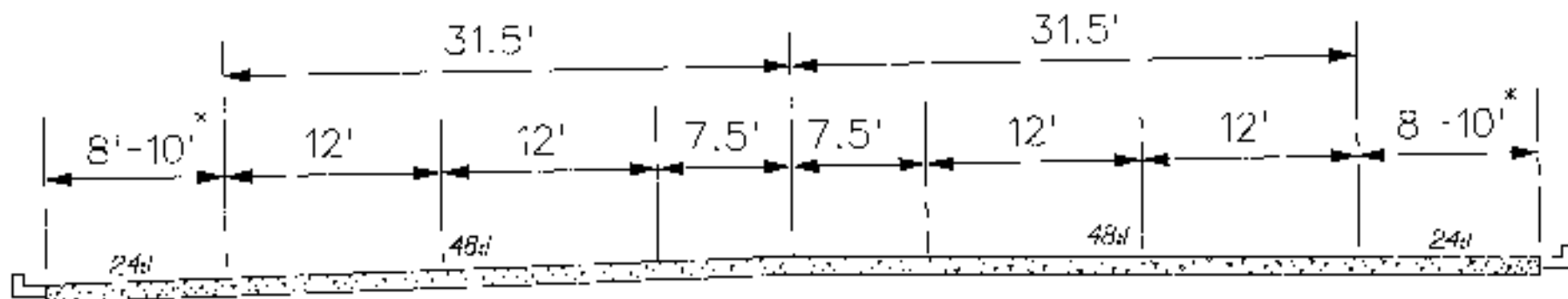
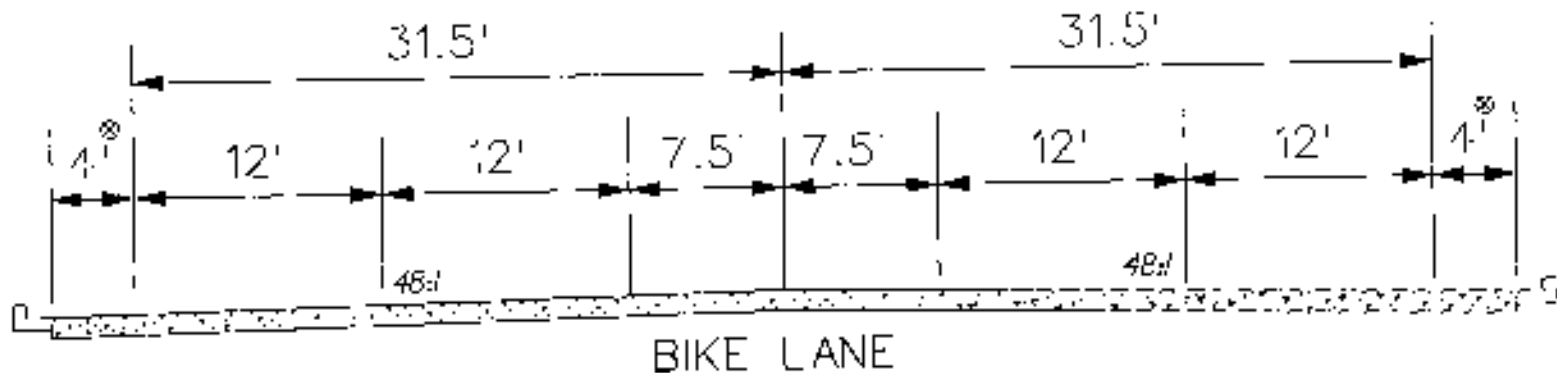
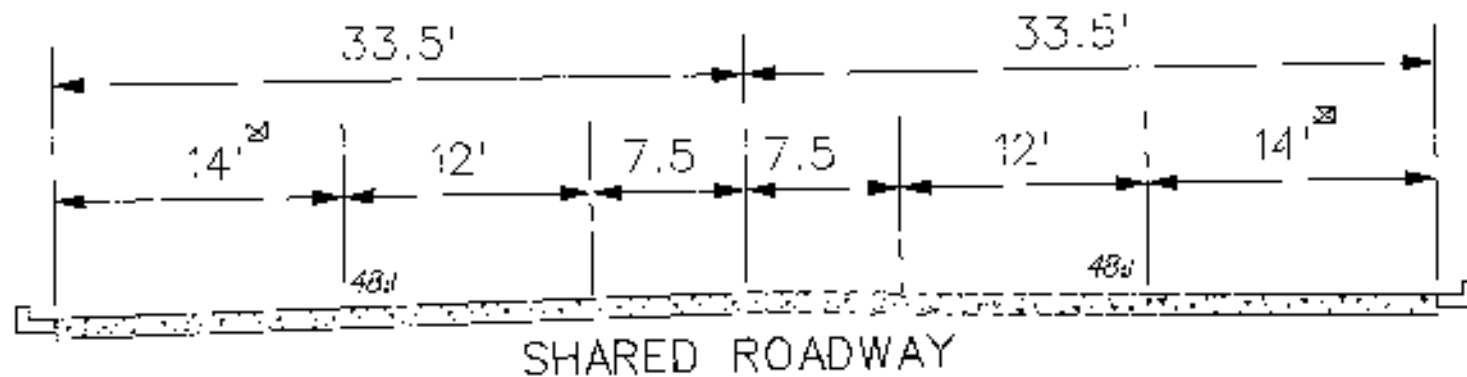
BIKE LANE - POSTED SPEED < 50 MPH OR ≤ 5% TRUCKS



BIKE LANE - POSTED SPEED ≥ 50 MPH OR > 5% TRUCKS

• SHOULDER WIDTH PER SCDOT - HIGHWAY DESIGN MANUAL
 ☒ USE A 2' PAVED SHOULDER FOR A SHARED ROADWAY

BICYCLE FACILITIES NEW CONSTRUCTION 5-LANE URBAN SECTION (CURB AND GUTTER)

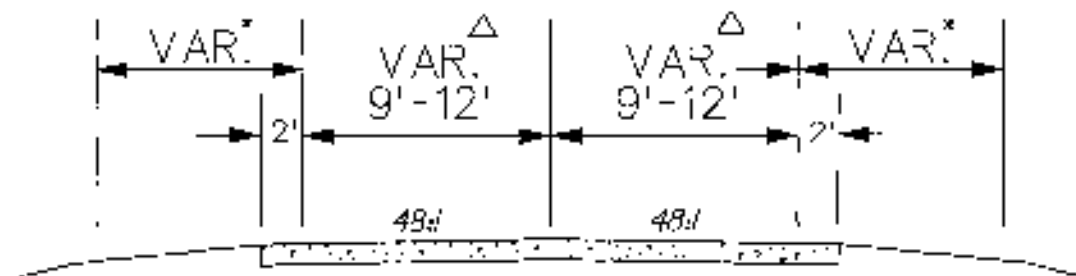


- * SHOULDER WIDTH PER SCDOT HIGHWAY DESIGN MANUAL
- ⊠ CONSIDER USING 15' WHEN GRADES $>$ 5%
- ⊡ CONSIDER USING 6' WHEN $>$ 5% TRUCKS

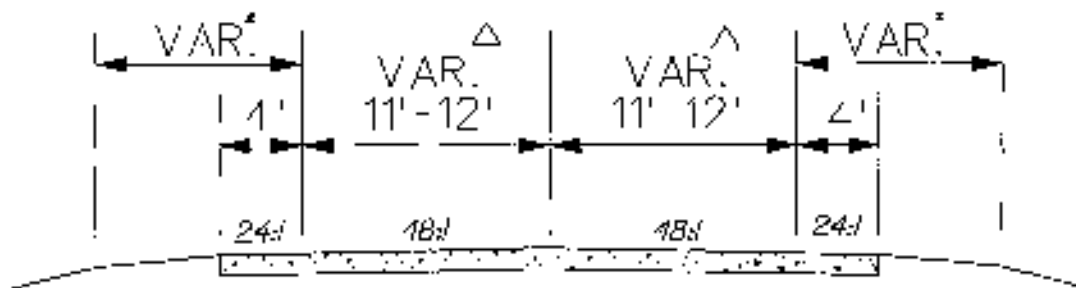
BICYCLE FACILITIES NEW CONSTRUCTION 2-LANE RURAL SECTION (SHOULDER)

* SHOULDER WIDTH PER
SCDOT HIGHWAY DESIGN MANUAL

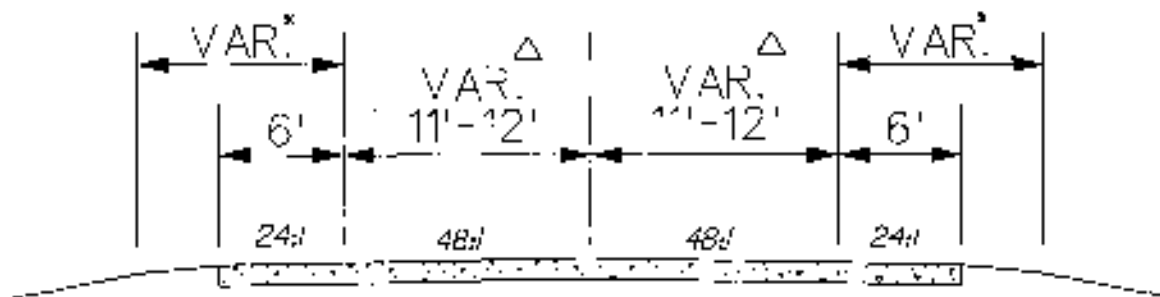
△ LANE WIDTHS PER
SCDOT HIGHWAY DESIGN MANUAL



SHARED ROADWAY - LESS THAN 500 ADT

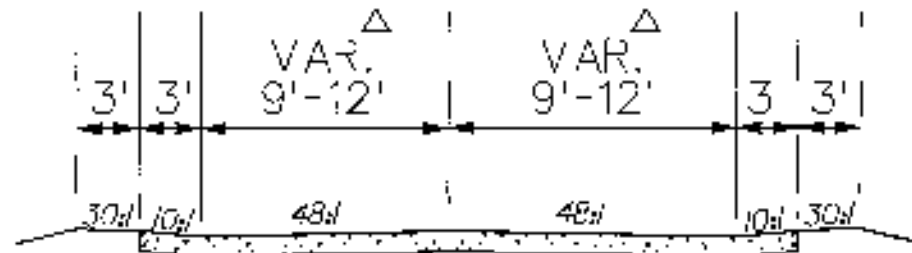


BIKE LANE - POSTED SPEED < 50 MPH OR < 5% TRUCKS



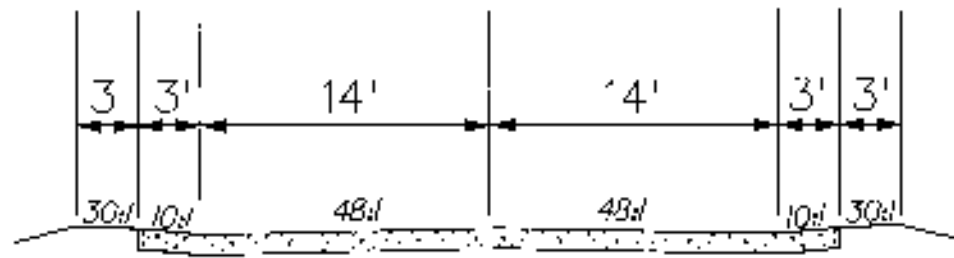
BIKE LANE - POSTED SPEED ≥ 50 MPH OR > 5% TRUCKS

BICYCLE FACILITIES NEW CONSTRUCTION 2-LANE VALLEY GUTTER SECTIONS

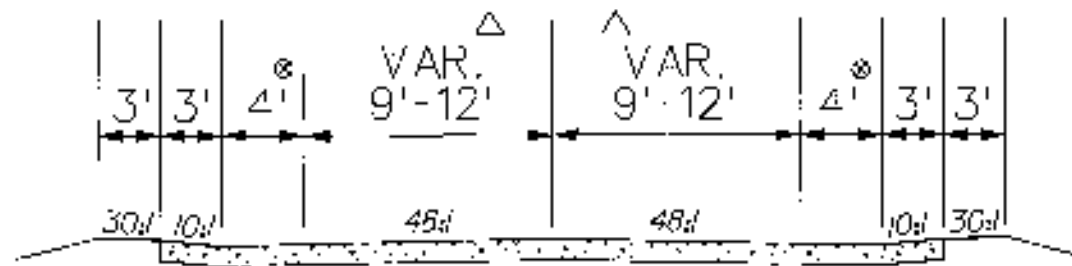


- △ LANE WIDTHS PER
SCDOT HIGHWAY DESIGN MANUAL
- ⊗ CONSIDER USING 8' W/ CN > 5% TRUCKS

SHARED ROADWAY - LESS THAN 500 ADT



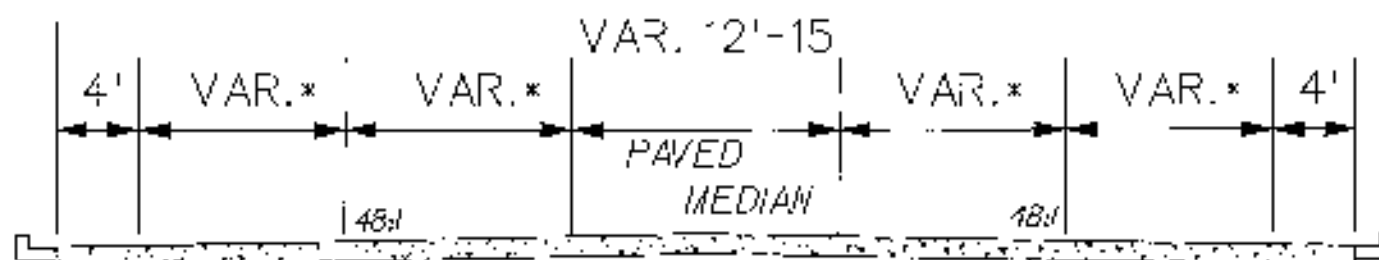
SHARED ROADWAY



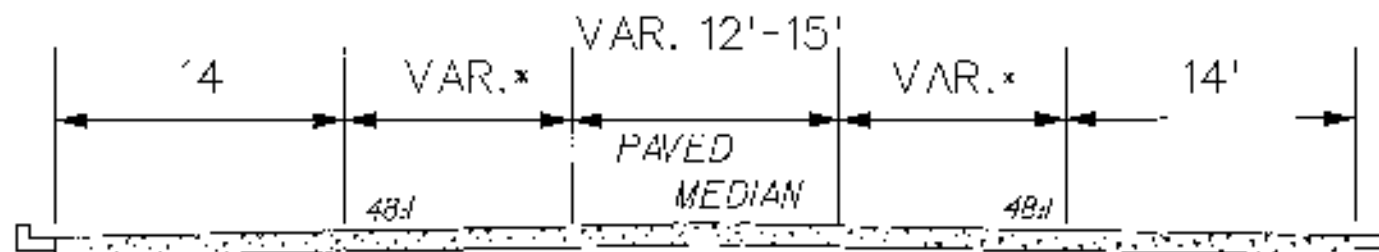
BIKE LANE

BICYCLE FACILITIES

RESTRIPING EXISTING 5-LANE URBAN SECTION (CURB AND GUTTER)



BIKE LANE



SHARED ROADWAY

* 11' 12' LANE WIDTHS
(ON NATIONAL OR SOUTH CAROLINA TRUCK NETWORK USE 12' MIN. LANE WIDTH)