



# **Pavement and Trench Widening Workshop**

## Purpose of Workshop

**To improve the quality of pavement and trench widening projects.**

## Goals of Workshop

- To provide guidance to VDOT personnel when establishing trench widening contracts**
- To provide guidance to for designing pavement widening projects**
- To provide guidance to VDOT, consultant and construction personnel on construction issues related to trench and pavement widening**
- To provide a form to discuss various trench and pavement widening issues.**



# Trench Widening Guidelines

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# Trench Widening Guidelines

## Background

- Virginia has been doing trench widening for over 20 years. Nothing New!
- Currently Statewide initiative to trench widen from the edge of pavement (EP): shoulder (safety concerns), edge support, bike lanes
- 2007 construction season, 2% of total maintenance budget into widening projects
- Joint task group Industry/VDOT took field trips to assess performance and capture cost effective practices



## **Construction Challenges to Trench Widening**

**Narrow work areas**

**Variable subgrade**

**Surface and subsurface drainage**

**Maintenance of traffic during construction**

**Potential need for acquisition of additional right-of-way**

# Why Do We Trench Widen?

**Safety and Pavement Performance**



## Special Provision – Trench Widening

### Special Provision Notes:

Revised in 2007 (3-15-07) and to be used in 2008 plant mix schedule

Trench widening greater than 2 feet in width, but should not exceed 6 feet

Asphalt mixes – IM-19.0T or BM-25.0T (T = Trench)

Asphalt binders – A or D, depending on location of trench

Unit cost for excessive material determined by each district

Minimum trench depth – 5”

Pay Item – IM-19.0T or BM-25.0T and paid by the ton

### Other Notes:

Widening widths greater than 6 feet, use WP-2 standard drawing

Trench widening not intended for use in travel lane on high volume primary and interstate routes

## Recommended Guidelines

### Guidelines:

Are not **SPECIFICATIONS**

Provide guidance to the field in using **Special Provision**

### Factors to Consider:

Project location(s) on pavement

Volume of traffic on road

Volume of trucks on road

Overlay thickness

## Recommended Guidelines – Factors to Consider

### Various Factors Will Determine Trench Depth, Asphalt Mix and Asphalt Binder

#### Factor Matrix 1

**Project Location on Pavement – Outside the painted edge strip**

**Traffic Volume – less than 5,000 vpd and Truck Volume – less than 10%**

**Trench Thickness – 5”**

**Trench Material – IM-19.0A or BM-25.0A**

#### Factor Matrix 2

**Project Location on Pavement – Outside the painted edge strip**

**Traffic Volume – more than 5,000 vpd or Truck Volume – more than 10%**

**Trench Thickness – 8”**

**Trench Material – IM-19.0A or BM-25.0A**

## Recommended Guidelines – Factors to Consider (cont.)

### Factor Matrix 3

Project Location on Pavement – Inside the painted edge strip

Trench Thickness – 8”

Trench Material – IM-19.0D or BM-25.0D

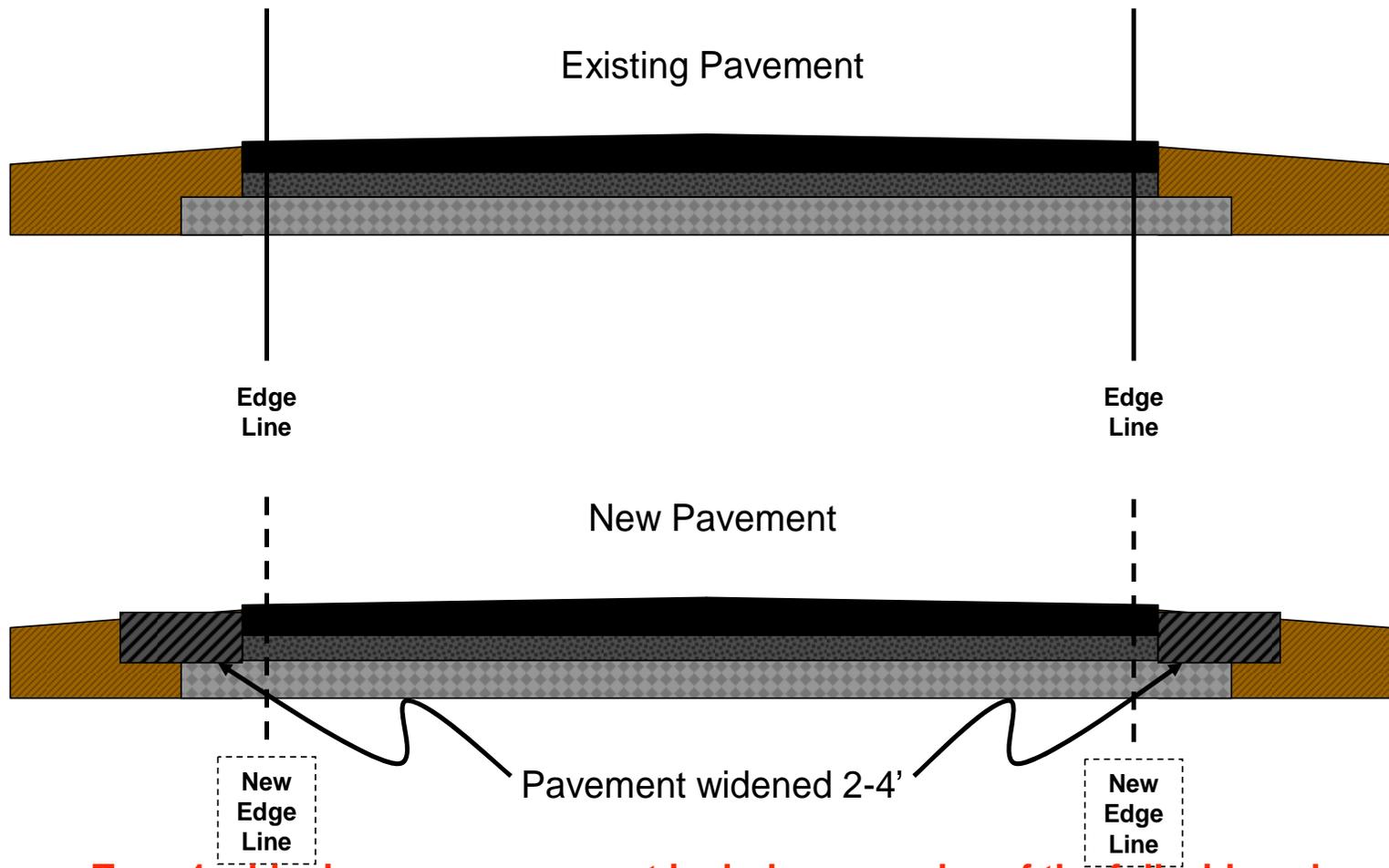
### What to do if an overlay will be placed?

Reduce trench depth equal to overlay thickness – 2” overlay reduces an 8” trench to 6”

# Four Types of Trench Widening

# Type 1

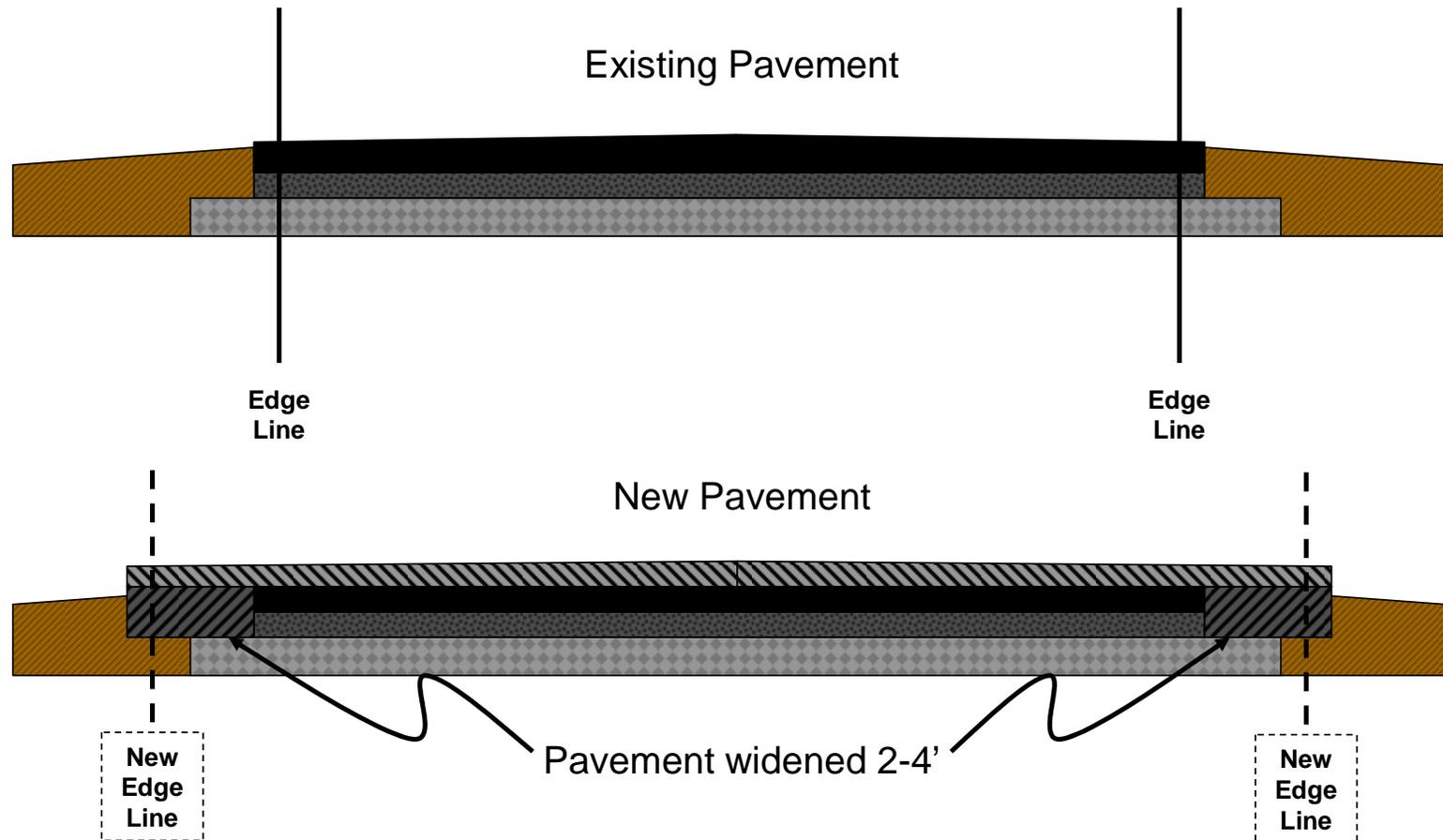
**Type 1 Trench Widening:** One or more shoulders are widened at or outside the existing edge line. New edge line does not extend into widened area.



**Type 1 widening may or may not include an overlay of the full widened pavement width.**

## Type 2

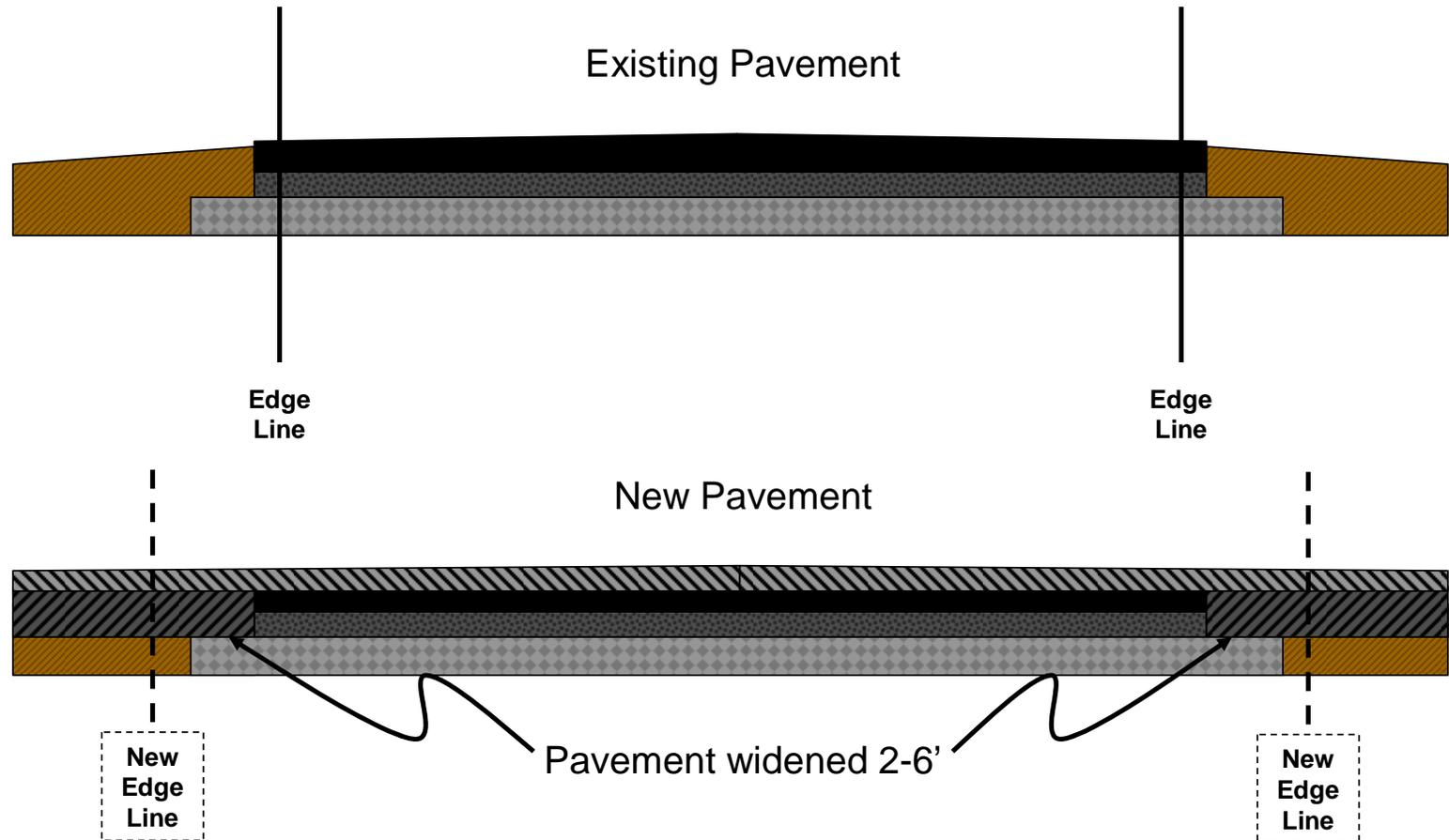
**Type 2 Trench Widening:** One or more shoulders are widened at or outside the existing edge line. New edge line extends into widened area (increased pavement lane width).



**Type 2 widening should include an overlay of the full widened pavement width.**

# Type 3

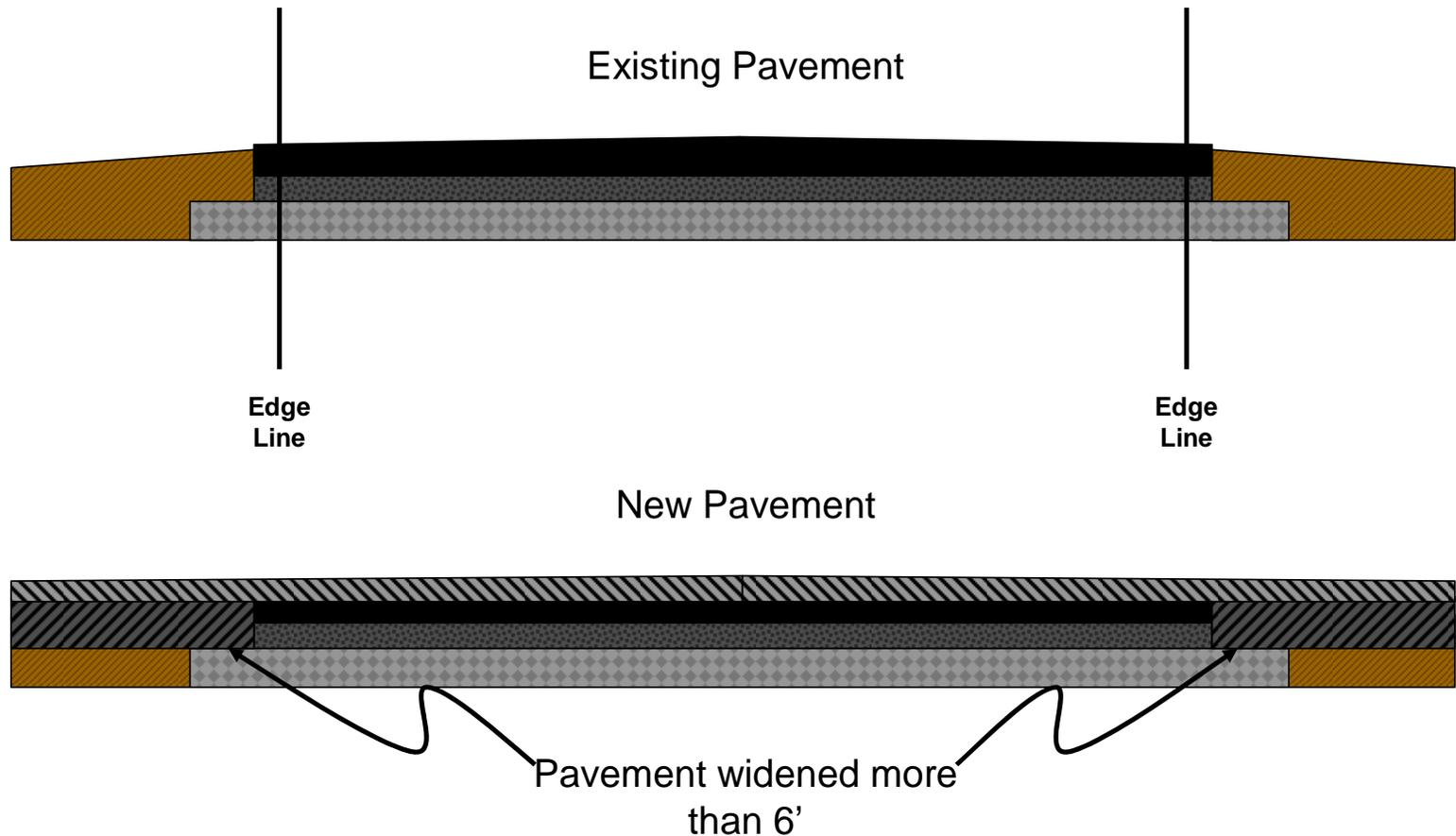
**Type 3 Trench Widening:** One or more shoulders are widened at or outside the existing edge line. New edge line extends into widened area (increased lane width) plus new widened shoulder.



**Type 3 widening should include an overlay of the full widened pavement and shoulder width.**

# Type 4

**Type 4 Trench Widening:** One or more shoulders are widened at or outside the existing edge line where width of widening exceeds 6'.



**This is pavement widening and outside the scope of the Trench Widening Guidelines.**

# Modified Blade For Trenching



# Trench Milling Machine



# Trench Compaction



## Trench After Compaction



# Tacking Vertical Face



## After Tacking



## Laying The Trench Mix



## Close-Up (BM-25.0A)



# Compaction



# Finished Product



## What is Next?

**See how well the SP and guidelines work, make needed improvements**

**Seek input from all parties involved**

**Investigate in-place density requirements**

**Potentially revise SP based on 2008 experiences**

# Preliminary Density Results

Trench Mix Type	Thick (in.)	Design Thick (in.)	Core Density
IM -19.0 A w/ RAP	5.125	6	93.9
IM -19.0 A w/ RAP	5.250	6	93.9
IM -19.0 A w/ RAP	5.125	6	93.4
IM -19.0 A w/ RAP	5.310	6	92.6
		Average	93.5
		Std	0.6

**Thank You**





# Pavement Widening Standard (WP-2)

**Mohamed Elfino, Ph.D., P.E. – Assistant State  
Materials Engineer**

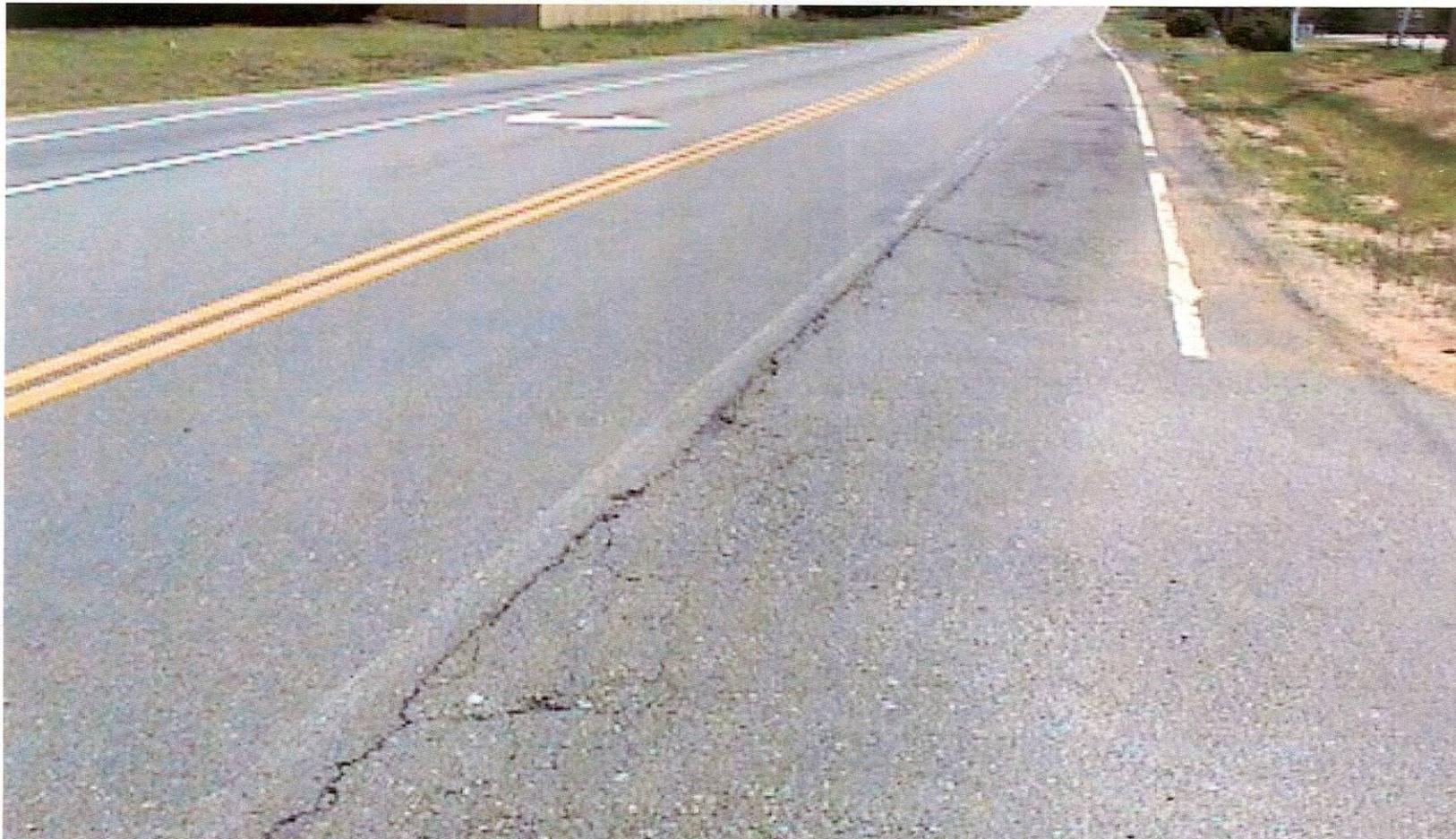
**Affan Habib, MS, P.E. – Pavement Program  
Engineer**

**Central Office, Materials Division**

# Outlines

- **Why do we need Standard for Asphalt pavement widening?**
- **Existing practice observations**
- **Who are the stakeholders for the standard?**
- **Construction details**
- **Questions?**

## Secondary Road Widening in 2004



# Overall View of Secondary Road widening in 2004



# Half Road Overlay in a Subdivision



# Haphazard Overlay at Intersection in a Subdivision



# In consistent Widening in a Subdivision



# Spalling Due to Feathering the Asphalt Overlay



## Good Transverse Joint Created by Milling



# Turning Lane to New Subdivision (Poor Joint)



# Turning Lane from I-64 to Route 197(Laburnum Ave)







YIELD

OVERSIZED  
LOAD

TRAIL KING

TRAIL KING

TRAIL KING







KBS

# Turning Lane On Route 5 Near Downtown Richmond



# High Fines Subbase









# AGENDA

## Asphalt Pavement Widening Standard (WP-2)

Materials Division

October 30, 2007

9:00 AM – 3:00PM

Mohamed Elfino, (Moderator)

- **Welcome & opening remarks. (Stan Hite)**
- **Genesis of the WP-2 and regulatory impact (Ken Smith and Mohamed Elfino)**
- **Residency perspective. (David Stanley/Clyde Hamrick)**
- **Standard format and requirements. (Adam Wilkerson)**
- **Stakeholders and constrains. (All)**
- **Pavement Widening/Trench Widening. (Affan Habib/Mourad Bouhajja)**
- **Constructability issues. (David Shiells/Roger Riner/David Wright))**
- **Maintenance issues. (Glenn McMillan, David Kaulfers/Andy Babish)**
- **Finalizing the standard. (ALL)**
- **Timetable for publishing the standard. (Mohamed Elfino/ Adam Wilkerson)**

# VDOT Asphalt Pavement Widening Standard

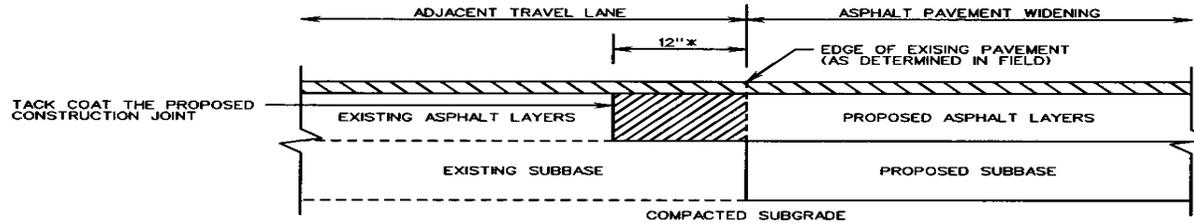
- **Draft was sent to stakeholders for review and comments**
- **VDOT officially adopted a pavement widening standard in January 2008**
- **Distributed to internal and external stakeholders**

# Major Features

- **Constructability**
- **Clarity**
- **Flexibility to meet field conditions**
- **Applies to full lane asphalt pavement addition**
- **Uniform joint details regardless of existing pavement thickness**

# Construction Details

WP-2



**CONSTRUCTION JOINT DETAIL**

- REMOVE EXISTING ASPHALT LAYERS TO EXISTING SUBBASE AND REPLACE WITH PROPOSED ASPHALT WIDENING LAYERS
- PROPOSED MINIMUM 1 1/2 INCH THICK ASPHALT SURFACE COURSE (SEE NOTE 5)
- \* MINIMUM 12 INCHES, OR GREATER AS NECESSARY TO ABUT THE FULL THICKNESS OF EXISTING ASPHALT LAYERS AS DETERMINED BY CORES (SEE NOTE 3)

**NOTES:**

1. ASPHALT PAVEMENT WIDENING SHALL HAVE A PAVEMENT DESIGN IN ACCORDANCE WITH CURRENT VDOT PROCEDURES AND BE APPROVED BY THE ENGINEER.
2. THE PAVEMENT DESIGN FOR ASPHALT PAVEMENT WIDENING SHALL MEET OR EXCEED THE DEPTHS AND TYPES OF THE LAYERS OF EXISTING PAVEMENT. SUBSURFACE DRAINAGE OF THE EXISTING AND PROPOSED PAVEMENT SHALL BE ADDRESSED IN THE PAVEMENT DESIGN.
3. A MINIMUM OF THREE CORES SHALL BE TAKEN ALONG THE CENTER OF THE ADJACENT TRAVEL LANE TO DETERMINE THE TYPE AND THICKNESS OF EXISTING PAVEMENT LAYERS. THESE CORES SHALL BE SPACED NO MORE THAN 500 FEET APART.
4. THE ADJACENT TRAVEL LANE SHALL BE MILLED A MINIMUM DEPTH OF 1 1/2 INCHES AND REPLACED WITH AN ASPHALT SURFACE COURSE TO MATCH THE PROPOSED PAVEMENT WIDENING SURFACE COURSE, UNLESS WAIVED BY THE ENGINEER.
5. THE ENGINEER MAY REQUIRE THE MILLING DEPTH OF THE EXISTING PAVEMENT TO BE ADJUSTED TO ACHIEVE AN ACCEPTABLE PAVMENT CROSS-SLOPE AND EFFECTIVE SURFACE DRAINAGE.
6. EXISTING PAVEMENT MARKINGS AND MARKERS WITHIN THE PROJECT LIMITS SHALL BE RESTORED SUBJECT TO THE APPROVAL OF THE ENGINEER.
7. FINAL TRANSVERSE PAVEMENT TIE-IN SHALL CONFORM TO THE REQUIREMENTS OF SECTION 315.05(c) OF THE SPECIFICATIONS EXCEPT THAT ALL JOINTS AT TIE-IN LOCATIONS SHALL BE TESTED USING A 10' FOOT STRAIGHTEDGE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 315.07(g) OF THE SPECIFICATIONS.

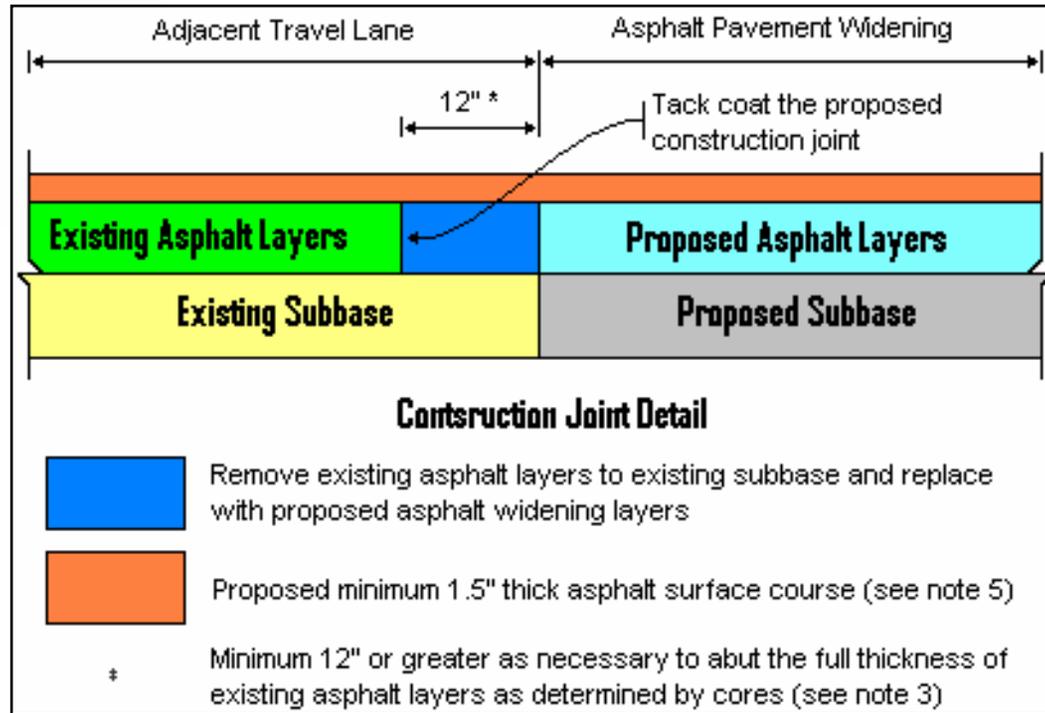
**ASPHALT PAVEMENT WIDENING  
FOR WIDENING SUBJECT TO TRAFFIC**  
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION  
REFERENCE

305  
315

REV. 11/07  
303.02

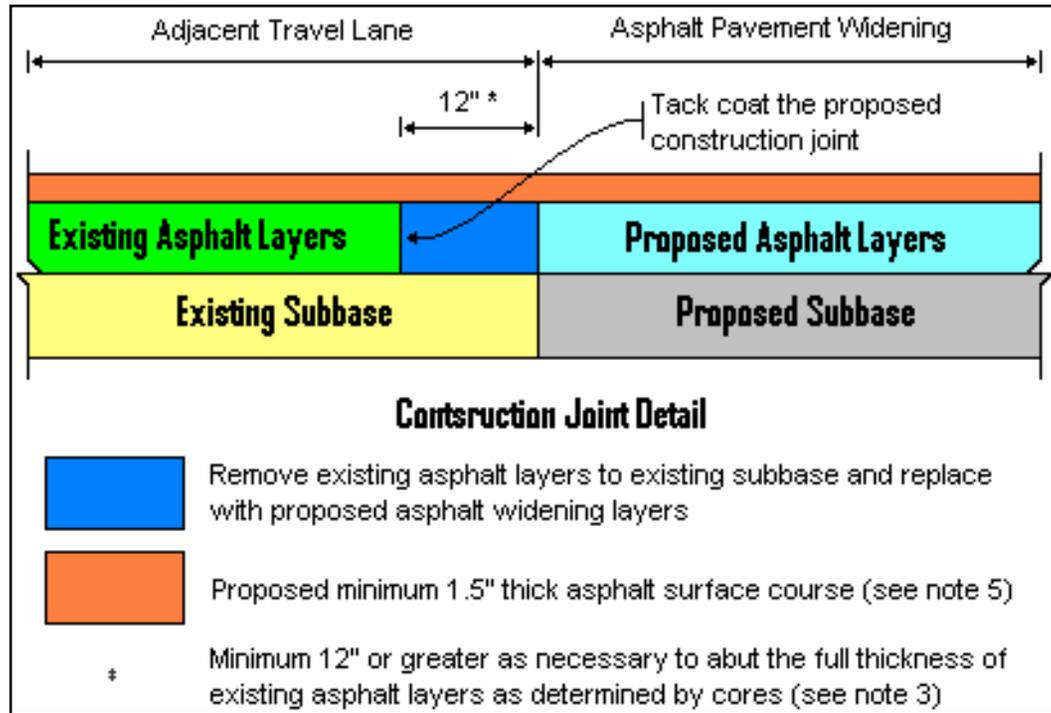
# Construction Details



## Note 1:

- Asphalt pavement widening shall have a design in accordance with current VDOT procedures and be approved by the Engineer

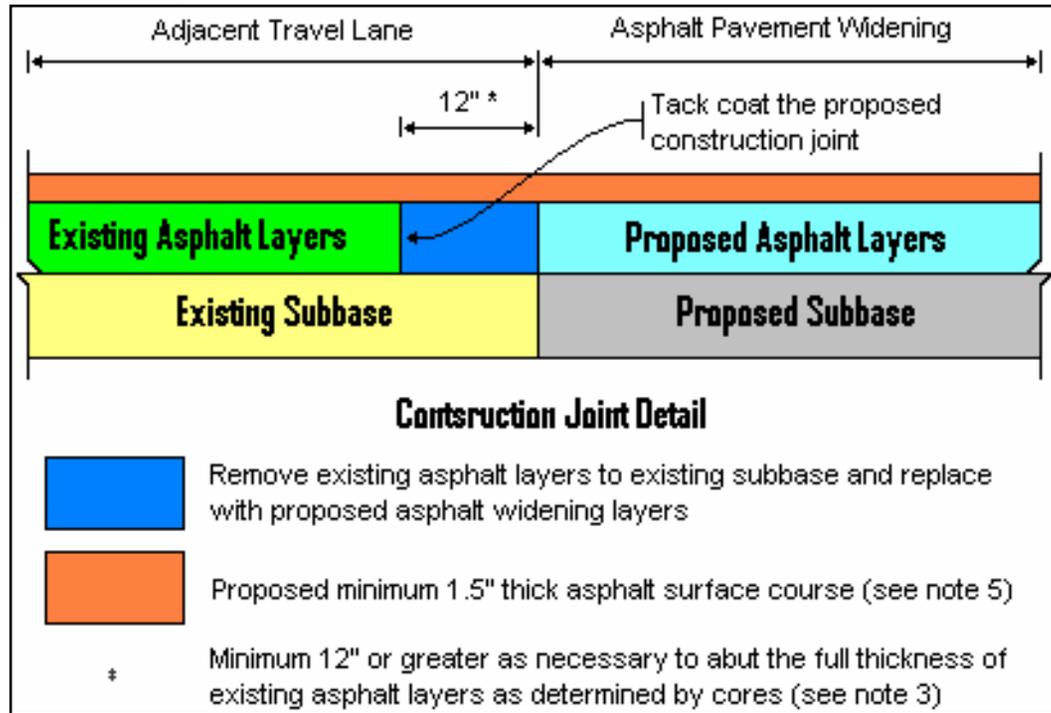
# Construction Details



## Note 2:

- The pavement design for an asphalt widening shall meet or exceed the depths and types of layers of the existing pavement.
- Subsurface drainage of the existing and proposed pavement shall be address in the pavement design

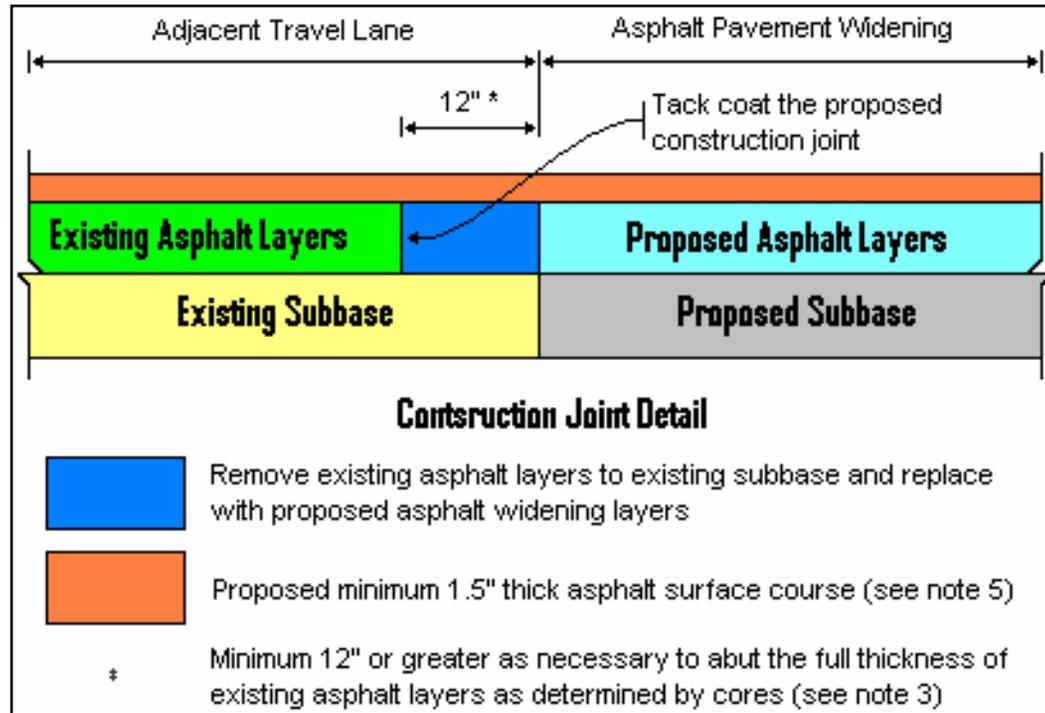
# Construction Details



## Note 3:

- A minimum of 3 cores shall be taken along the center of the adjacent travel lane to determine the type and thickness of the existing pavement layers.
- These cores shall be spaced no more than 500 feet apart

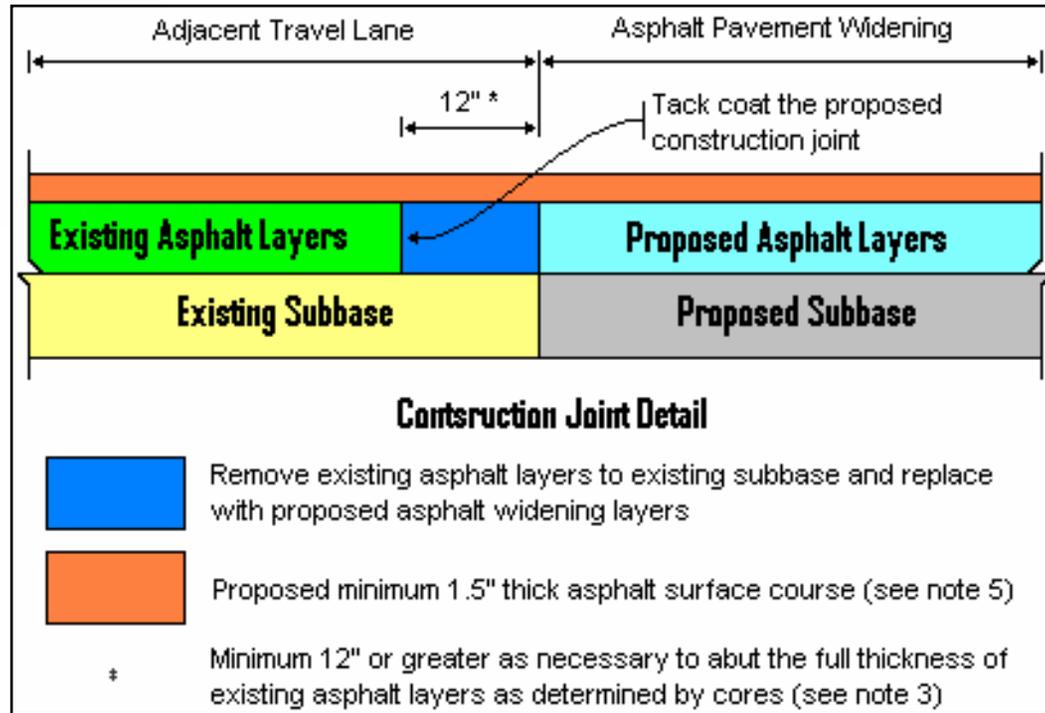
# Construction Details



## Note 4:

- The adjacent travel lane shall be milled to a minimum depth of 1½” and replaced with an asphalt surface course to match the pavement asphalt surface course, unless waived by the Engineer

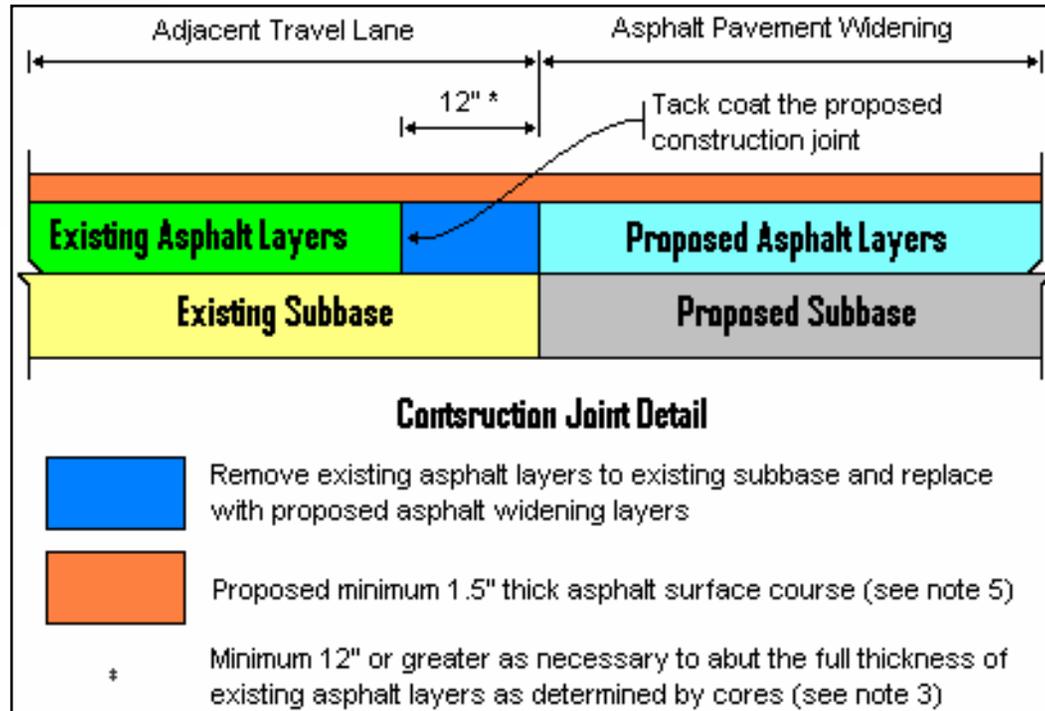
# Construction Details



## Note 5:

- The Engineer may require the milling depth to be adjusted to achieve an acceptable pavement cross slope and effective surface drainage

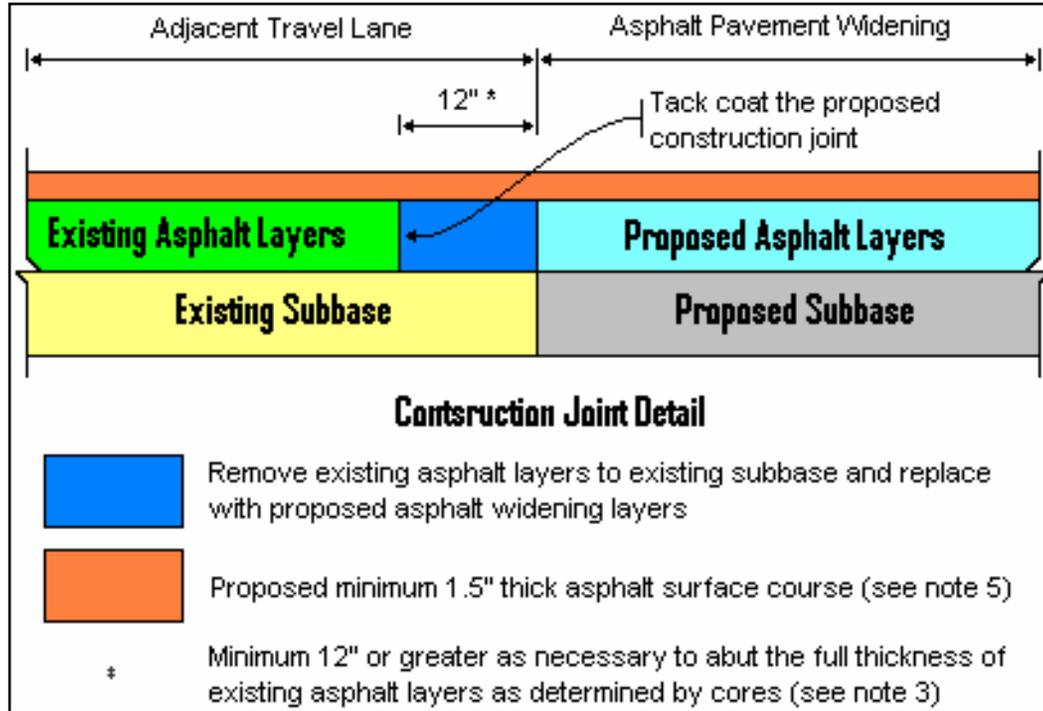
# Construction Details



## Note 6:

- Existing pavement markers and markings within the pavement limits shall be restored subject to the approval of the Engineer

# Construction Details



## Note 7:

- Final transverse pavement tie-in shall conform to the requirements of Section 315.05(c) of the specifications except that all joints at tie-in locations shall be tested using a 10' straight edge in accordance with the requirements of section 315.07(a) of the specifications.

# Questions?

**Thank You**