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

Trenton Clark, P.E.
Materials Division
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 that 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 that 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

<table>
<thead>
<tr>
<th>Trench Mix Type</th>
<th>Thick (in.)</th>
<th>Design Thick (in.)</th>
<th>Core Density</th>
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<tbody>
<tr>
<td>IM -19.0 A w/ RAP</td>
<td>5.125</td>
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<td>93.9</td>
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<tr>
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<tr>
<td><strong>Average</strong></td>
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<tr>
<td><strong>Std</strong></td>
<td><strong>0.6</strong></td>
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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)
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

**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 3)**
- **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 PAVEMENT 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 TRENCHES PAVEMENT-TC-RI SHALL CONFORM TO THE REQUIREMENTS OF SECTION 315.02 Of THE SPECIFICATIONS EXCEPT THAT ALL JOINTS IN LOCATIONS SHALL BE TESTED USING A 10 FOOT STRAIGHTEDGE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 315.07 Of THE SPECIFICATIONS.

**ASPHALT PAVEMENT WIDENING**

**FOR WIDENING SUBJECT TO TRAFFIC**

**VIRGINIA DEPARTMENT OF TRANSPORTATION**

**SPECIFICATION REFERENCE**

<table>
<thead>
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<th>REV. 11/07</th>
<th>303.02</th>
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<tbody>
<tr>
<td>305</td>
<td>315</td>
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Note 1:
• Asphalt pavement widening shall have a design in accordance with current VDOT procedures and be approved by the Engineer
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.
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.
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