Design Considerations from a Construction Point of View

Amy C. Tootle, P.E.
State Construction Engineer
Richard Hewitt, P.E.
State Construction Pavement Engineer
Agenda

- Conflicting Plan Notes
- Plan Errors and Omissions
- Bid Q & A
- Back Up Documentation
- Constructability Issues
Conflicting Plan Notes

• Geotechnical
  • PDA versus EDC
  • Drilled Shaft Installation
Conflicting Plan Notes: Example 1

The plan note calls for the use of PDA:

**PILE INSTALLATION NOTES:**

1. All piles shall be square pre-stressed concrete piles.
2. Minimum tip elevation is required for lateral stability.
3. All test pile shall be tested using Pile Driving Analyzer (PDA) and shall be driven to at least the nominal bearing resistance in accordance with Section 455 of the FDOT Standard Specifications.
The Specification allows for the use of EDC or PDA:

**455-5.14 Dynamic Load Tests**: The Engineer will take dynamic measurements during the driving of piles designated in the Plans or authorized by the Engineer. For concrete piles, install instruments prior to driving and assist the Engineer in monitoring all blows delivered to the pile. For steel production piles, the Engineer may accept instrumented set-checks or redrives. The Engineer will perform dynamic load tests to evaluate any or all of the following:

1. Suitability of the Contractor’s driving equipment, including hammer, capblock, pile cushion, and any proposed follower.
2. Pile capacity.
3. Pile stresses.
4. Energy transfer to pile.
5. Distribution of soil resistance.
6. Soil variables including quake and damping.
8. Pile installation problems.
9. Other.

Alternatively, install internal gauges in the piles in accordance with Standard Plans, Index 455-003 or attach instruments (strain transducers to measure force and accelerometers to measure acceleration) with bolts to the pile for dynamic load testing.
Conflicting Plan Notes: Example 2

The plan note discusses costs for difficult drilled shaft installation:

26. All costs for labor, equipment, materials and incidentals necessary to mitigate difficult drilled shaft installation shall be included in the unit bid price for the associated sign structure.
455-15.10 Excavation and Drilling Equipment:

455-15.10.1 General: All shaft excavation is unclassified shaft excavation. The Engineer will require drilled shaft sidewall overreaming when inspections show it to be necessary. These terms are defined in 455-15.10.2, 455-15.10.3, and 455-15.10.4, respectively.

Use excavation and drilling equipment having adequate capacity, including power, torque, and crowd (downthrust), and excavation and overreaming tools of adequate design, size, and strength to perform the work shown in the Plans or described herein. When the material encountered cannot be drilled using conventional earth augers and/or underreaming tools, provide special drilling equipment, including but not limited to rock augers.

455-24.3 Unclassified Shaft Excavation: Price and payment will be full compensation for the shaft excavation (except for the additional costs included under the associated pay items for casing); removal from the site and disposal of excavated materials; restoring the site as required; cleaning and inspecting shaft excavations; using slurry as necessary; using drilling equipment; blasting procedures, special tools and special drilling equipment to excavate the shaft to the depth indicated in the Plans; and furnishing all other labor, materials, and equipment necessary to complete the work in an acceptable manner.

455-24 Basis of Payment:

455-24.1 Drilled Shafts: Price and payment will be full compensation for all drilled shafts, including the cost of concrete, reinforcing steel and cross-hole sonic logging tubes, including all labor, materials, equipment, and incidentals necessary to complete the drilled shaft. The cost of the reinforcing steel, including lap lengths, to accommodate shaft lengths longer than shown in the Plans is included in the cost of drilled shafts. Costs associated with repairing defects found in the drilled shaft shall be included in the cost of the drilled shaft.
Conflicting Plan Notes: Example 2
Specification 700 – Highway Signing

700-2.2 Overhead Signs:

700-2.3 Method of Measurement: For single post and multi post sign assemblies, an assembly consists of all the signs mounted on a single structure. The Contract unit price per assembly for ground mounted signs (single post and multi-post), furnished and installed, will include furnishing the sign panels, support structure, foundation, hardware, and labor necessary for a complete and accepted installation.

The retroreflective sign strip will be paid for separately, and the Contract unit price per each will include furnishing the retroreflective sign strip, hardware and labor necessary for a complete and accepted installation.

For overhead signs, sign panels will be paid separately from support structures. The Contract unit price per each for sign panel, furnished and installed, will include furnishing the sign panels, hardware, and labor necessary for a complete and accepted installation. The Contract unit price for each overhead static sign structure, furnished and installed, will include furnishing the support structure, foundation, hardware, and labor necessary for a complete and accepted installation.

For all other metal parts of the cast base, the Engineer will allow galvanized steel as an alternative to aluminum.

700-2.2.2 Foundations: Meet the requirements of Section 455.
Conflicting Plan Notes

Design Considerations, Verify The Note:

• Doesn’t conflict with an existing specification
• Ties to a pay item for the contractor to bid on
• Is a project specific exception
• Doesn’t repeat the Specification
Plan Errors and Omissions

- MOT
  - Inadequate Pedestrian Detours and Sidewalk Closures
  - Conflicting Pavement Markings
  - Improper Use of Barriers
  - Incorrect Barrier Transitions
- Drainage and Erosion & Sediment Control
  - Incorrect Placement of Erosion and Sediment Control Devices
  - Missing Pay Items and Quantities
Plan Errors and Omissions – Example 1

• Plans did not properly delineate hazards with Ped LCDs.
• Does not meet FDOT Design Manual, Chapter 240, Standard Plans, Index 102-660 and ADA Guidelines
Plan Errors and Omissions – Example 1

**PHASE IIIA (STEP 1 RECONSTRUCTION)**

1. **PLACE TRAFFIC CONTROL DEVICES AND WORK ZONE SIGNS AS PER STANDARD INDEX 400 AND AS SHOWN ON TRAFFIC CONTROL PLANS (PHASE IIIA - STEP 1 RECONSTRUCTION) AND TEMP. SIGNAL SHEETS.**
2. **MAINTAIN PEDESTRIAN TRAFFIC AS PER STANDARD INDEX 460.**
3. **PLACE TEMP. CONCRETE BARRIER WALLS AS SHOWN ON TRAFFIC CONTROL PLANS (PHASE IIIA - STEP 1 RECONSTRUCTION).**
4. **RECONSTRUCT ROADWAY AND PLACE ALL NECESSARY DRAINAGE STRUCTURES (REFER TO TYPICAL SECTION DETAILS).**

*Provide temp. drainage structure opening during construction cost to be included in pay item 102-1*
Plan Errors and Omissions – Example 2

- Type II barricades with Sidewalk Closed signs attached were used to close pedestrian walkways and sidewalks.
- No pay item was provided in the Plans for Pedestrian LCDs.
Plan Errors and Omissions – Example 3

- Conflicting pavement markings. Plans called for yellow turn lane striping instead of white
- Does not meet MUTCD 3A.05
Plan Errors and Omissions – Example 3
Standard Plans, Index 711-001 & MUTCD 3A.05

TYPICAL RURAL DIRECTIONAL INTERSECTION

Section 3A.05 Colors

Standard:
1. Markings shall be yellow, white, red, blue, or purple. The colors for markings shall conform to the standard highway colors. Black in conjunction with one of the colors mentioned in the first sentence of this paragraph shall be a usable color.

2. When used, white markings for longitudinal lines shall delineate:
   A. The separation of traffic flows in the same direction, or
   B. The right-hand edge of the roadway.

3. When used, yellow markings for longitudinal lines shall delineate:
   A. The separation of traffic traveling in opposite directions,
   B. The left-hand edge of the roadways of divided highways and one-way streets or ramps, or
   C. The separation of two-way left-turn lanes and reversible lanes from other lanes.

4. When used, red raised pavement markers or delineators shall delineate:
   A. Truck escape ramps, or
   B. One-way roadways, ramps, or travel lanes that shall not be entered or used in the direction from which the markers are visible.

5. When used, blue markings shall supplement white markings for parking spaces for persons with disabilities.

6. When used, purple markings shall supplement lane line or edge line markings for toll place approach lanes that are restricted to use only by vehicles with registered electronic toll collection accounts.
Plan Errors and Omissions – Example 4

- Improper transitions for temporary low profile barrier to existing guardrail and bridge barrier wall.
- Does not meet Standard Plans, Index 102-120
Plan Errors and Omissions – Example 4
Standard Plans, Index 102-120

• The designer should have chosen a more appropriate type of barrier system based on the project conditions.

GENERAL NOTES

1. Pursuant to 35 United States Code, Chapter 18, also known as the Bayh Dole Act of 1980, on the non-mountable curb was developed through federal funding. The Portable Temporary Low Profile Barrier For Roadside Safety is a licensed design by the University Of Florida. Any infringement on the rights of the designer shall be the sole responsibility of the user.

2. This standard drawing (Index No. 412) is provided by the Florida Department Of Transportation solely for use by the Department and its assignees. The purpose for this standard drawing is to indicate the approval of use of the barrier on the State Highway System to provide sufficient pictorials for identifying the barrier unit; and, to provide general installation geometry for the barrier.

3. This legally mandated relationship is unique to federally funded University patents that Department contractors use on contracts. Pursuant to federal law, the University may pursue royalties for a valid patent. Only those barrier units cast by producers licensed by the University Of Florida will be allowed for installation on the State Highway System in Florida. Barrier wall units shall conform to Section 521 of the Standard Specification and shall be produced in Department-approved plants with quality control plans for precasting concrete barrier walls. Each barrier wall unit shall be permanently marked with an identification that is traceable to the manufacturer, the producing precast concrete plant and the date of production. This permanent identification mark will serve as certification that the unit has been manufactured in accordance with University of Florida drawings and specifications, and the approved quality control program.

4. The low profile barrier is to be installed only with hardware and accessories furnished by the licensed barrier producer. Unit shall be used for no purpose other than as interconnected segments in a run of barrier. Low profile barrier wall units shall maintain firm contact with adjoining units. Nuts on tensioning rods shall be installed snug tight.
Plan Errors and Omissions – Example 5

- Plans called for removal of partial run of guardrail and approach terminal without accounting for required ribbon strength.
- Does not meet Standard Plans, Index 536-001
Plan Errors and Omissions – Example 5
Standard Plans, Index 536-001
Plan Errors and Omissions – Example 6
Erosion & Sediment Control Devices

- Floating turbidity barrier shown perpendicular to the flow, which is incorrect
Plan Errors and Omissions – Example 6
Erosion & Sediment Control Devices
Plan Errors and Omissions – Example 7
Missing Quantities and Pay Items

### SUMMARY OF MISCELLANEOUS DRAINAGE ITEMS

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<th>PAY ITEM NO.</th>
<th>PAY ITEM DESCRIPTION</th>
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<th>UNIT</th>
<th>QUANTITY</th>
<th>TOTAL</th>
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*Needed 18" MSE @ Sta. 4760+00*

### SUMMARY OF QUANTITIES

Sheet No. 12
Plan Errors and Omissions

**Design Considerations:**

- Verify Design Standard Plans, ADA and MUTCD are being met
- Review plans to make sure items placed in appropriate location
- Verify all Pay Items and Quantities are accounted for
Bid Q & A

• Incorrect Bid Tab Quantities
• Plan Deficiencies
**Bid Q & A – Example 1**

**Plan Deficiency and Bid Tab Quantity**

<table>
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<th>Question ID: 22843</th>
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<tr>
<td>The expedite files, quantity table and plan page all indicate there should be two 70' mast arms and two 78' mast arms. However the data table on sheet T-14 indicates all four mast arms are 78'. Can you please clarify?</td>
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</table>

**Answers**

**Note:** The District Approved Answer is the most recent answer published by the Department. Previously published answers are either applicable or void (no longer applicable).

<table>
<thead>
<tr>
<th>District Approved Answer</th>
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<td>All prospective bidders shall prepare their bids based upon the contract plans.</td>
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Published: 7/16/2018 9:27:45 AM

Published: 7/19/2018 4:24:40 PM
### Bid Q & A – Example 1

**Plan Deficiency and Bid Tab Quantity**

#### STANDARD MAST ARM ASSEMBLIES DATA TABLE

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<th>STRUCTURE ID NUMBERS</th>
<th>DESIGNATION</th>
<th>FIRST ARM</th>
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<th>UF (deg)</th>
<th>LL (deg)</th>
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Bid Q & A – Example 2
Missing Drainage Details

Question ID: 23068

Ref sh 11, proposed 18” Pipe crossing and MES @ Sta 357+22 LT. A review of the drainage structures sh 13 appears to indicate a proposed swale off the end of the MES, yet the plan view does not show a proposed swale, nor any limits to said swale. If swale is required, please provide more detail and the station limits expected.

Answers

Note: The District Approved Answer is the most recent answer published by the Department. Previously published answers are either applicable or void (no longer applicable).

District Approved Answer

The swale/ditch is to be constructed from S-3 to S-6, and beginning and end stations are noted in the Plan Sheet No. 11. Please refer to the special ditch/swale detail in Plan Sheet No. 12.

Published: 8/10/2018 4:26:21 PM
Bid Q & A – Example 2
Missing Drainage Details

Question ID: 23099

Please read the last question again as the response does not reflect the stationing defined in the question. S5 is the structure involved and does not have any details reflected on sheet 12 (defines the special ditch parallel to US 41) nor anywhere else in the plan set. Please confirm if there is a proposed swale required (as indicated on sh 13) and if so, provide the typical section and limits of said proposed swale.

Published: 8/18/2018 3:07:27 PM

Answers

Note: The District Approved Answer is the most recent answer published by the Department. Previously published answers are either applicable or void (no longer applicable).

District Approved Answer

For clarification, the swale is required from Station 357+05 to 357+29 Left. The bottom width of the swale is 1.5 feet. The swale shall have 1:4 front and back slopes and a 1.5-foot bottom width.

Published: 8/23/2018 4:40:04 PM
Bid Q & A – Example 2

Missing Drainage Details
Bid Q & A – Example 2

Missing Drainage Details
### Bid Q & A – Example 3

**Bid Quantities**

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## Bid Q & A – Example 3

### Bid Quantities

### SUMMARY OF LITTER REMOVAL AND MOWING

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<th>CONST. PHASE</th>
<th>LOCATION</th>
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**SUB-TOTAL:** 26,020

**TOTAL:** 26,020

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**SUB-TOTAL:** 11,267

**TOTAL:** 11,267
## Bid Q & A – Example 3

### Bid Quantities

#### SUMMARY OF LITTER REMOval AND MOWING

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- **LITTER REMOVAL**
  - **AREA ID**
  - **L**
  - **W**
  - **Cycles**
  - **Total (AC)**
  - **AC/Cycle**
  - **P**
  - **F**

- **MOVING**
  - **AREA ID**
  - **L**
  - **W**
  - **Cycles**
  - **AC/Cycle**
  - **Total (AC)**
  - **P**
  - **F**

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<td><strong>F</strong></td>
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| 24 | 184+00.00 to 188+52.09 | LT | 30 | 30 | 452.1 | 17.3 | 1 | 0.185 | 0.185 | 105.3 | 6.3 | 1 | 0.815 | 0.815 |
| 26 | 184+37.01 to 187+23.31 | LT | 30 | 30 | 146.3 | 42.7 | 1 | 0.184 | 0.184 | 116.2 | 14.6 | 1 | 0.063 | 0.063 |
| 28 | 184+54.53 to 187+48.00 | RT | 30 | 30 | 345.5 | 23.5 | 1 | 0.186 | 0.186 | 154.7 | 3.0 | 1 | 0.011 | 0.011 |
| 30 | 279+22.07 to 284+12.78 | LT | 60 | 30 | 420.7 | 38.1 | 2 | 0.368 | 0.736 | 205.1 | 6.5 | 2 | 0.031 | 0.061 |
| 3 | 280+60.45 to 280+92.07 | RT | 60 | 30 | 32.2 | 23.4 | 2 | 0.617 | 0.333 | 2 |
| 4 | 280+00.58 to 281+67.42 | RT/LT | 90 | 30 | 166.6 | 12.0 | 3 | 0.046 | 0.138 | 3 |
| 5 | 201+04.07 to 204+48.06 | LT | 75 | 30 | 344.0 | 146.8 | 3 | 1.159 | 2.839 | 3 |
| 6 | 201+42.52 to 204+30.76 | RT | 75 | 30 | 346.2 | 17.3 | 3 | 0.132 | 0.744 | 111.3 | 3.4 | 3 | 0.069 | 0.022 |
| 7 | 201+63.48 to 204+39.57 | RT/LT | 75 | 30 | 776.2 | 34.8 | 3 | 0.620 | 1.550 | 3 |
| 8 | 202+04.48 to 205+15.61 | RT | 75 | 30 | 311.3 | 15.4 | 3 | 0.110 | 0.375 | 111.3 | 3.4 | 3 | 0.069 | 0.022 |
| 9 | 202+12.01 to 218+76.38 | LT | 75 | 30 | 1454.4 | 62.4 | 3 | 2.083 | 5.209 | 3 |
| 10 | 201+04.07 to 204+48.06 | LT | 45 | 30 | 344.0 | 146.8 | 2 | 1.159 | 1.739 | 188.6 | 5.6 | 2 | 0.026 | 0.036 |
| 11 | 204+15.53 to 216+91.06 | RT | 45 | 30 | 1275.5 | 61.1 | 2 | 1.789 | 2.664 | 745.9 | 24.9 | 2 | 0.426 | 0.640 |
| 12 | 201+45.54 to 204+30.76 | RT | 45 | 30 | 346.2 | 17.3 | 2 | 0.139 | 0.209 | 111.3 | 3.4 | 2 | 0.069 | 0.013 |
| 13 | 387+19.69 to 392+70.00 | RT | 45 | 30 | 550.7 | 24.6 | 2 | 0.373 | 0.559 | 200.7 | 6.0 | 2 | 0.078 | 0.081 |
| 14 | 388+39.87 to 392+51.69 | RT | 45 | 30 | 411.6 | 48.1 | 2 | 0.455 | 0.682 | 2 |
| 15 | 200+00.00 to 217+94.39 | RT/LT | 30 | 30 | 1 | 0.700 | 0.700 | 1 | 0.700 | 0.700 |
| 16 | 200+00.00 to 217+94.39 | RT/LT | 30 | 30 | 1 | 0.700 | 0.700 | 1 | 0.700 | 0.700 |
| 17 | 30 | 30 | 1 | 0.700 | 0.700 |

**Sub-total:** 19.005

**Total:** 19.00

- **SUB-TOTAL:** 2.324
- **TOTAL:** 2.32
Bid Q & A

Design Considerations:

• If Bid Tabs are missing or have extraneous Pay Items or contain incorrect quantities, correct and issue a revision.

• If plan sheets are missing information, correct and issue a plans revision with updated Bid Tabs.

• Don’t use Q&A as an avenue to avoid addendums.
Back Up Documentation

- Summary of Quantity Sheets - Area IDs
- CADD Zip Files
- Commitments
## Back Up Documentation - Example 1
### Summary of Quantity’s - Area IDs

#### SUMMARY OF LITTER REMOVAL AND MOWING

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<th>SIDE</th>
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<th>FREQUENCY (DAYS)</th>
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<th>W</th>
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<th>W</th>
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</table>

**SUB-TOTAL:** 26.02  **SUB-TOTAL:** 11.267  
**TOTAL:** 26.02  **TOTAL:** 11.27
Back Up Documentation
CADD Zip Files

• Verify that the CADD.zip files are being delivered
• Files are necessary for the Construction Final Estimates verification of subsurface soil excavation quantities
  ➢ Multiline no longer supported, now using Trimble Business Center HCE
• Include all backup calculations
Back Up Documentation
Commitments

• Provide details on the “Commitments Form” on how a commitment was addressed through the Design Process
  ➢ Clearly inform construction of how a commitment was incorporated into the design
  ➢ Helps construction when CSIs and ATCs are proposed
Back Up Documentation

Design Considerations:

• Confirm CADD Zip Files include:
  ➢ All Shape Files with Area Identifications
  ➢ Include all backup calculations and documentation related to design

• Provide Detailed records of commitments
Constructability Issues

- Erosion and Sediment Control
- Temporary Traffic Diversions
- Asphalt Paving
Constructability Issues – Example 1
Erosion & Sediment Control on Embankments
Constructability Issues – Example 1
Erosion & Sediment Control on Embankments

E&S Control Embankment Design Considerations:

• Step the embankment slopes to avoid ending toe of slope next to wetland or R/W line
Constructability Issues – Example 2
Temporary Traffic Diversion
Constructability Issues – Example 2
Temporary Traffic Diversion

Temporary Traffic Diversion Design Considerations:

• Consider any potential conflicts when incorporating temporary traffic diversions
Asphalt Pavement

- Consider Milling & Paving Equipment Dimensions
- Minimize Milling Depth & Paving Thickness Changes
- Correct Cross Slope with Milling
- Require Manhole Adjustments
- Keep FC-5 out of Medians, Turn Lanes, Urban Areas
- Maximize Lane Closure Times
Paving Equipment Dimensions

10ft Main Screed (blue arrow)
Up to 5 ft Extensions (green arrows)
Paving Width 20ft or Less Doesn’t Mean It’s Constructable
Slope Changes Can Only Occur at Certain Points (red arrows)
Example 3: Paving Equipment Dimensions

- To pave 12’ lane:
- 10’ main screed (blue arrow)
- + 2’ extension (blue line) at same slope
  - Max. 5’ paved with extension (green arrow)
  - at different slope (pivot point (at red arrow))
Paving Equipment: Shoulder Width Design Considerations

- **5ft or less**
  - Pave Shoulder AND Travel Lane in Single Pass
  - 10ft Screed + 2ft Extension = 12ft Lane, Pave 5ft Shoulder with Other Extension

- **8ft or more (10ft or more is optimal)**
  - Pave Travel Lane in First Pass, Pave Shoulder in Second Pass

- **>5ft to <8ft (Worst Case)**
  - Requires More Specialized (Less Common) Equipment
  - Saves Tonnage, but Results in Higher Price per Ton
  - Can Pay More For 6ft Shoulder than 8ft
Milling Machine Details: Design Considerations

• Standard Drum Width 7-8ft
• Standard Drum Width Allows Milling Standard Lane in Two passes
  • Follow One Lane Line on First Pass & Other Lane line on Second Pass
• 12ft Drums Available
  • But Machine is Wider than Lane = Increases Transport Cost
• 12ft drum means left edge follows right edge, not always ideal
• Machine is 30-40ft long and driver is on top about 10ft above road surface
• Operator behind machine sets 2 controls to depth (or 1 to depth & 1 to slope)
Milling Machine Details:
Minimize Milling Depth & Paving Thickness Changes
Example 4: Minimize Milling Depth & Paving Thickness Changes

- Structural Course thickness reduced by 0.5” in overbuild areas
- Taper structural course from 1.5” > 2” > 1.5”
- 15 paving thickness changes (not good)
Milling Depth & Paving Thickness

Design Considerations:
• Varying Milling Depths & Paving Thicknesses
  • Not Recommended for Traditional Milling & Paving Projects
  • More Difficult to Construct
  • Decreases Production Rates & Increases Costs
  • Increases Chances for Mistakes (i.e. Construction ≠ Design)
Structural Course & Overbuild

Design Considerations:

• Keep Structural Course Thickness Consistent
  ➢ If Cross Slope Corrections Can Be Achieved with Milling
    ➢ Paving is All Constant Thickness
  ➢ Constant Thickness Paving
    ➢ More Consistent, Better Quality Pavement
    ➢ Contractor Can Be Held to Density Requirements for Constant Thickness Paving
Correct Cross Slope with Milling

• Results in Constant Thickness Paving
  • More Consistent, Higher Quality, Smoother Pavement
• Density Testing is Required
  • Variable Thickness Overbuild is Exempt
Provide Design Slopes aka No “Match Existing”

- Specific Design Slopes Provide Defined Construction Requirements
- Can Hold Contractor to Specification’s Cross Slope Tolerances
- When Paving, Contractor Can Maintain 2 of the 3 controls
  - Smoothness, Thickness, & Cross Slope
- Slopes are More Work to Design, but Pavement Construction Quality is Better
330-9.4.5.2 Straightedge Exceptions: Straightedge testing will not be required in the following areas: shoulders, intersections, tapers, crossovers, sidewalks, shared use paths, parking lots and similar areas, or in the following areas when they are less than 250 feet in length: turn lanes, acceleration/deceleration lanes and side streets. The limits of the intersection will be from stop bar to stop bar for both the mainline and side streets.

As an exception, in the event the Engineer identifies an objectionable surface irregularity in the above areas, straightedge and address all deficiencies in excess of 3/8 inch in accordance with 330-9.5.

The Engineer may waive straightedge requirements for transverse joints at the beginning and end of the project, at the beginning and end of bridge structures, at manholes, and at utility structures if the deficiencies are caused by factors beyond the control of the Contractor, as determined by the Engineer. In addition, the Engineer may also waive the straightedging requirements on ramps and superelevated sections where the geometrical orientation of the pavement results in an inaccurate measurement with the rolling straightedge.
Keep FC-5 out of Median Cross Overs, Turn Lanes, and Urban Curb & Gutter Sections

- FC-5 is Open-Graded:
  - Lacks Aggregate Interlock of Dense-Graded Asphalt
  - Susceptible to Raveling from Turning Movements
    - Warranty Spec Exemption for Raveling in Cross Overs & Turn Lanes
    - FPDM says don’t place FC-5 in such locations
  - Warranty Enforcement – Challenging or Impossible
Maximize Lane Closure Time

Design Considerations

• Widen Work Windows, When Safety Allows
• Every 15 minutes/day = 1.0 to 1.5 hours/week
• Longer Working Time
  • More Tons Per Day, Fewer Stops & Starts, Fewer Joints
  • Higher Quality, Smoother Pavement, Constructed Faster
Questions?

State Construction Office Staff Directory

http://www.fdot.gov/construction/contact(SCOContact.shtm)