Specifications Update

David Glover – Barnhill Contracting

Ted Naylor – NCDOT

Todd Whittington – NCDOT

2012 CAPA/NCDOT
Asphalt Training Workshop

What Are We Going To Cover?

- 2012 Major Specifications Changes
- Changes in the 2012 QMS Manual
- Review Other Recent Changes

SITE NAVIGATION

- Sections
- Personnel
- Project Flow Chart
- Provision Responsibility Chart
- General Project Notes & Standards List
- Calculation of Quantities
- Specifications and Provisions
- Special Provisions provided by other NCDOT Units
  - Geotechnical Unit
  - Structure Design
  - ITSS
  - Roadway Design
  - Roadside Environmental Unit
  - Work Zone Traffic Control Unit (english)
  - Work Zone Traffic Control Unit (metric)
- Standard Drawings Library
- 2010 Bid Averages
- Archive of Bid Averages
- 2002 Trns*port Pay Item List (pdf)
- 2002 Trns*port Pay Item List (xls)
- 2006 Trns*port Pay Item List (pdf format)
- 2006 Trns*port Pay Item List (2003 xls format)
- 2006 Trns*port Pay Item List (2010 xlsx format)

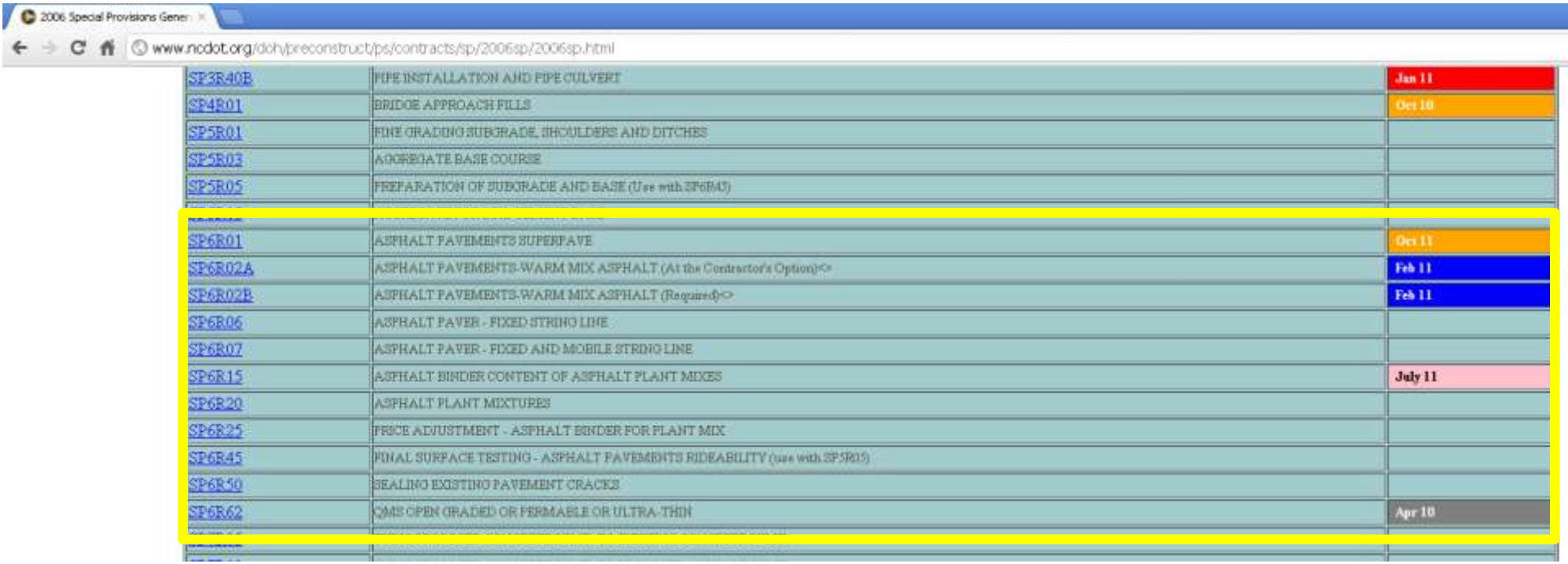
Contracts---Specifications & Provisions

Specifications and Special Provisions

2006	2012
2006 General Construction Special Provisions	2012 General Construction Line Up and Special Provisions
2006 Division Resurfacing Special Provisions	2012 Resurfacing Line Up and Special Provisions
2006 Municipal Projects	2012 Municipal Projects
2006 Standard Specifications English Metric	2012 Standard Specifications
2006 Roadway Standard Drawings	2012 Major Changes
Provision Style Guide	Publications Order Form

For questions or comments, please contact
Specifications

Special Provisions Added (since 2006)



SP3R40B	PIPE INSTALLATION AND PIPE CULVERT	Jan 11
SP4R01	BRIDGE APPROACH FILLS	Oct 10
SP5R01	FINE GRADING SUBGRADE, SHOULDERS AND DITCHES	
SP5R03	AGGREGATE BASE COURSE	
SP5R05	PREPARATION OF SUBGRADE AND BASE (Use with SP6R45)	
SP6R01	ASPHALT PAVEMENTS SUPERPAVE	Oct 11
SP6R02A	ASPHALT PAVEMENTS-WARM MIX ASPHALT (At the Contractor's Option)<>	Feb 11
SP6R02B	ASPHALT PAVEMENTS-WARM MIX ASPHALT (Required)<>	Feb 11
SP6R06	ASPHALT PAVER - FIXED STRING LINE	
SP6R07	ASPHALT PAVER - FIXED AND MOBILE STRING LINE	
SP6R15	ASPHALT BINDER CONTENT OF ASPHALT PLANT MIXES	July 11
SP6R20	ASPHALT PLANT MIXTURES	
SP6R25	PRICE ADJUSTMENT - ASPHALT BINDER FOR PLANT MIX	
SP6R45	FINAL SURFACE TESTING - ASPHALT PAVEMENTS RIDEABILITY (use with SP5R05)	
SP6R50	SEALING EXISTING PAVEMENT CRACKS	
SP6R62	QMS OPEN GRADED OR PERMABLE OR ULTRA-THIN	Apr 10

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Major Changes for 2012 Specifications

ARTICLE	DIVISION 6 – ASPHALT PAVEMENTS
Division 6	Referenced many of the quality control values and requirements to the Department's *HMA/QMS Manual*.
607-3	Added the option of using a temporary bridge steel plate over utilities during milling operations.
607-5	Modified when to use the pay item of incidental milling.
609, 610	Removed the 4.75 mm mix.
609-3	Added the field verification instructions for warm mix asphalt.
609-6	Corrective actions are triggered by moving average values instead of warning limits.
610	Added warm mix asphalt requirements. Added reclaimed asphalt shingle requirements and modified reclaimed asphalt pavement requirements. Removed redundant sections that are covered by the Department's *HMA/QMS Manual*.
610-8	Expanded use of MTV to Interstate and US routes that have four or more lanes and median divided.
610-13	Modified the Final Surface Testing with the Inertial Profiler testing and Hearne straightedge option.
610-14	Changed pay factor formula for density deficiency to go to a 70% reduction in pay.
657-3	Modified the temperature range and minimum application thickness for the application of hot applied joint sealer.
660-11	Added price adjustment for slurry seal.

Modifications / Clarifications

- **Article 607-3**: Use of steel plates over utilities and constructing a temporary ramp
- **Article 607-5**: Modified and clarified when to pay for incidental milling
- **Article 609-6**: Corrective actions triggered by Moving Avg. values instead of Warning Limits
- **Article 657-3**: Joint sealer application per manufacturer for temperatures
- **Article 660-11**: Added price adjustment for slurry seals

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Major Items/New Additions

- **Division 6**:
  - Removed 35+ pages – duplication
  - QMS Manual serves as a "Supplemental Specification"
- **Sections 609 & 610**:
  - Removed "Old" 4.75 mm mix
  - Added Warm Mix Asphalt (WMA) to Spec. Book
  - Added Post-consumer Shingles (PRAS) – "Tear-offs"
    - Materials Specifics – Article 1012-1(E)

Major Items/New Additions

- **Article 610-8**:
  - Expanded use of Material Transfer Vehicle (MTV)
- **Article 610-13**:
  - Modified Final Surface Testing Requirements to include Inertial Profiler (IRI) option
- **Article 610-14**:
  - Changed Pay Factor Formula for Density Deficiencies

What is a on?

- From the
  - *"Specifi anuals or codes r al revisions or addi ifications that are ental Specific ns shall be conside tions."*
- The 2012 ed as part of the Spe

2012

Hot Mix Asphalt Quality Management System

SUPERPAVE

MATERIALS AND TESTS UNIT
HMA/QMS

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4.75 mm Mix

- Removed from 2012 Spec. Book
  - Still have PSP for SA-1 (“Sand Asphalt”)
- New SP coming for 4.75 mix (true Superpave)
  - Placed in a ¾” lift (~85 lb/sy)
  - Paid by the TON
  - A preservation treatment
    - “4.75mm mixes should only be used as overlays on structurally sound pavements.”
  - Looking for Trial Sections for New Version
  - SR’s or Lower Traffic NC Routes

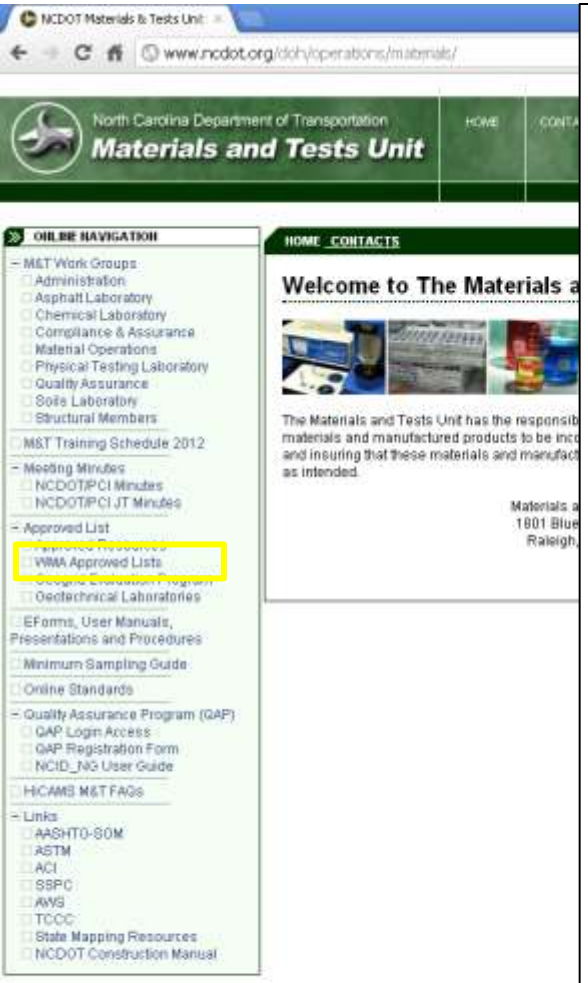
4.75 mm Mix

	SA-1		S 4.75	
Sieve Size	*Min.*	*Max.*	*Min.*	*Max.*
12.5mm (1/2")			100	
9.50mm (3/8")	100		95	100
4.75mm (#4)	90	100	90	100
2.36mm (#8)	65	90	---	---
1.18mm (#16)	---	---	30	60
0.075mm (#200)	4	8	6	12
Ndes Gyrations	50		50	
	Min.	*Max.*	*Min.*	*Max.*
VMA	20.0	---	16.0	---
VFA	n/a	n/a	65	80
VTM	7.0	15.0	4.0	6.0
Dust to Binder Ratio	0.6	1.4	1.0	2.0

Warm-Mix Asphalt

- Continue to Use Throughout the State
  - 860,000+ tons placed in NC (as of 12/31/2011)
- Now have 3 Technologies with "Limited Approval" status (can be placed on US routes)
- Increased Use in 2012?
  - NuStar Anti-strip Changeover
  - Still looking to do WMA Interstate Pilot

Warm-Mix Asphalt



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Approved Products Listing

APPROVED WARM MIX ASPHALT (WMA) TECHNOLOGIES

Prior to any approval, the WMA technology manufacturer must submit documentation from a minimum of three (3) successfully constructed projects using the WMA technology that includes the following:

- Product Name & Supplier;
- Contact Name & Telephone Number;
- WMA Technology Material Safety Data Sheet (MSDS);
- Documentation from each successfully constructed project, including: project type, project owner, location, tonnage placed, mix design used, field density and performance data.

After the initial review process, the WMA technology can be given the following approval statuses based on the construction and performance of NCDOT-approved job mix formulas (JMFs) using the technology:

WMA Manufacturer	WMA Technology	Current Approval Status
Astec Industries	Double Barrel Green	Limited
Gencor Industries	Ultrafoam GX	Limited
MeadWestvaco	Evotherm 3G	Limited
Aqua Foam, LLC	Aqua Foam WMA	Trial
Arkema, Inc.	Cecabase RT	Trial
Maxam Equipment	AQUABlack WMA	Trial
PQ Corporation	Advera	Trial
Sasol Wax	Sasobit	Trial
Terex Roadbuilding	Terex WMA	Trial

1) Trial Approval – one or more NCDOT-let projects have been successfully constructed using the WMA technology and monitored through a minimum of one Winter season.

- WMA technologies with **Trial** status may be used on NC and Secondary Routes.

2) Limited Approval – a minimum of 75,000 tons of mix using the WMA technology have been successfully constructed on NCDOT-let projects.

- WMA technologies with **Limited** status may be used on US, NC, and Secondary Routes.

Contact **Todd Whittington** of the Materials & Tests Unit at (919) 329-4060 for any information and current approval status.

Shingles In Asphalt

- Shingles in asphalt mix for 15+ years
  - Manufacturer-Waste Shingles (MRAS)
- Post-Consumer shingles (PRAS) allowed on case-by-case basis on projects in 2010-2011
- Collaboration with NC State Agencies and CAPA to develop latest NCDOT RAS Spec.

Shingles In Asphalt

- Amended Air Permit
- Asbestos Operations Plan
- Asbestos Testing Data
- Source Documentation
  - Receipts
  - Deliveries
  - Internal Auditing processes
- Sampling Personnel = NC-Accreditations
    - Asbestos Inspector
    - Roofing Supervisor

Expanded Use of MTV

- 2006: *"Use a Material Transfer Vehicle (MTV) when placing all asphalt concrete… that require the use of asphalt binder grade PG 76-22."*
- 2012 adds: *"Use a MTV for all surface mix regardless of binder grade placed on Interstate and US routes that have 4 or more lanes and are median divided."*

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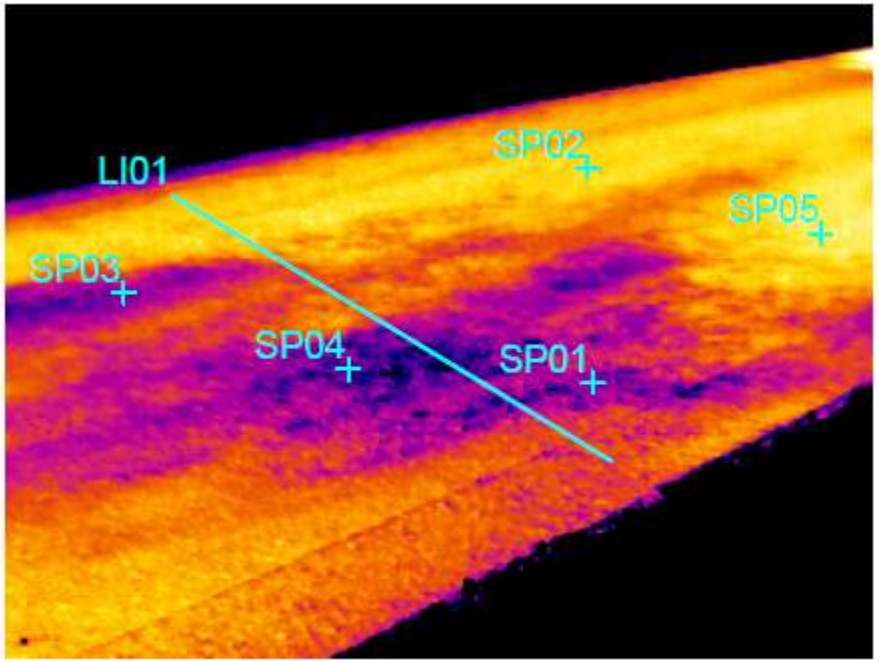
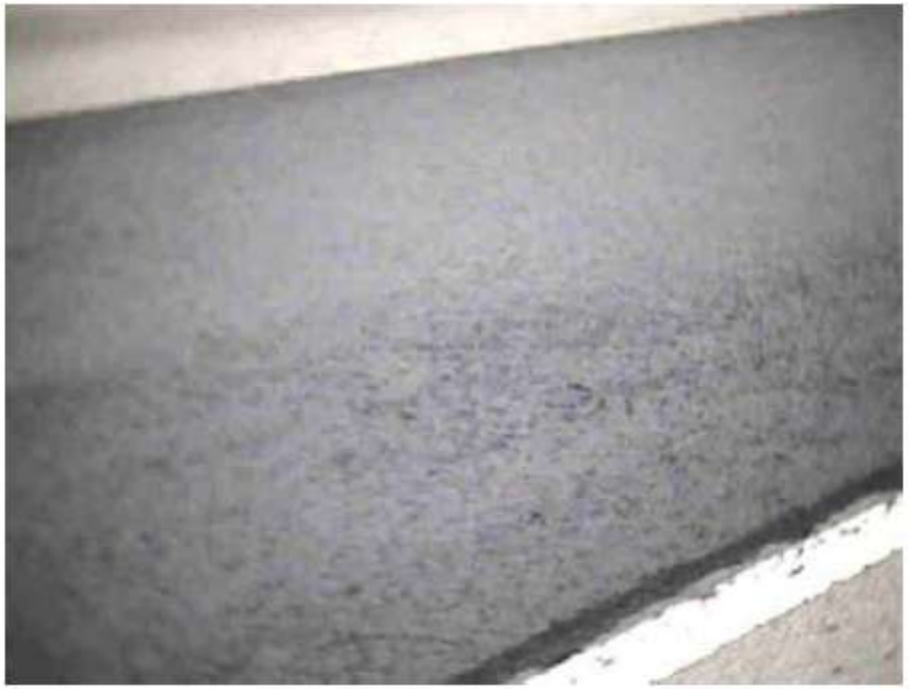
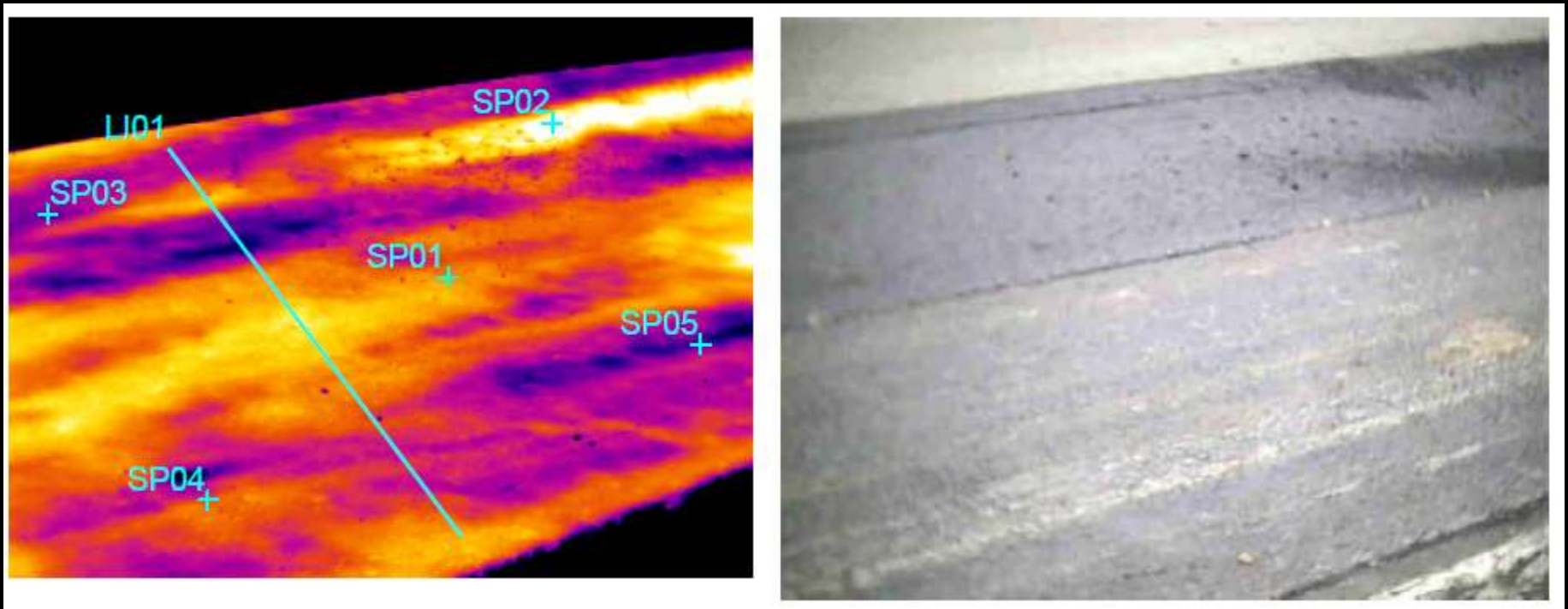
WHY an MTV?

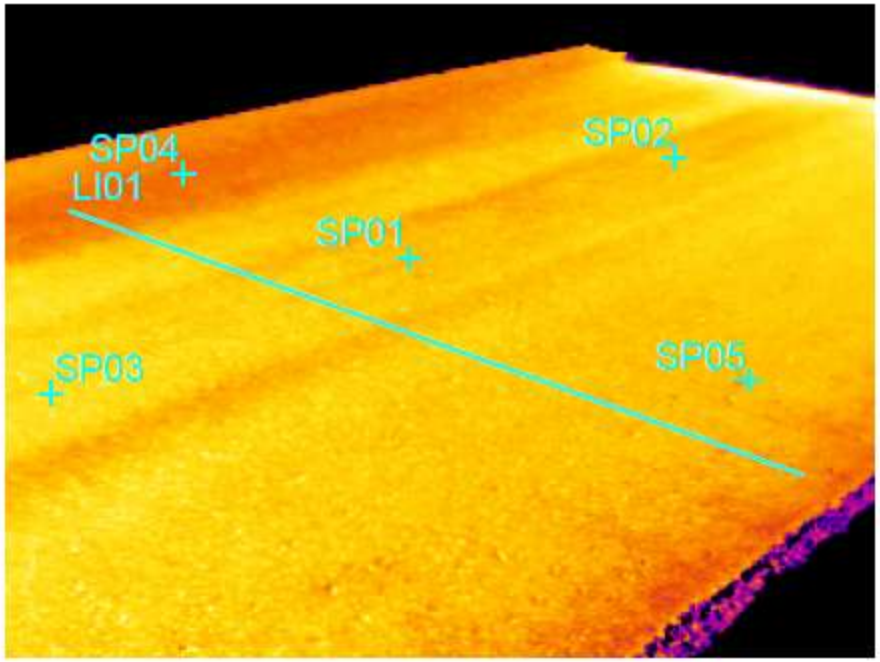




WHY an MTV?



WHY an MTV?



Final Surface Testing Options

- Inertial Profiler vs. Hearne Straightedge option
- If a Contract meets the requirements, it will have Final Surface Testing included.

Final Surface Testing

- Criteria when FST is NOT required on a project:
  - The project has less than 2 new lifts of asphalt.
  - The speed limit is less than 45 mph.
  - The project is less than one mile in length.
  - The existing site conditions make it impractical to obtain rideability as determined by the Division
    - Considerations may include:
      - pavement width;
      - traffic phasing constraints;
      - type of facility;
      - large number of utility adjustments, driveways, or y-lines.

Final Surface Testing

- If the Division decides not to use FST – must request to exclude it from the contract.

  (Contract line-up sheets)

FINAL SURFACE TESTING (Not Required):

(5-18-04) (Rev. 1-17-12)	610	R6 R45

Final surface testing is not required on this project.

Density Pay Factor Formula

- 2006

$$PF = 100 - 10(D)^{1.465}$$

where: PF = Pay Factor (computed to 0.1%)
D = the deficiency of the lot average density, not to exceed 3.0%

- 2012

$$\textbf{Reduced Pay Factor} = 100 + \left[\left(\frac{Actual\ \ Density - Specified\ \ Density}{2}\right) x30\right]$$

Where:

Actual Density = the lot average density, not to exceed 2.0% of the specified density

Specified Density = the density in Table 610-6 or as specified in the contract

Density Pay Factor Formula

- Gives a Continuous Equation
  - Each Percent Reduction is equal

Density (%)	Old Pay Factor	New Pay Factor
92.0	100.0%	100.0%
91.5	96.4%	92.5%
91.0	90.0%	85.0%
90.5	81.9%	77.5%
90.0	72.4%	70.0%

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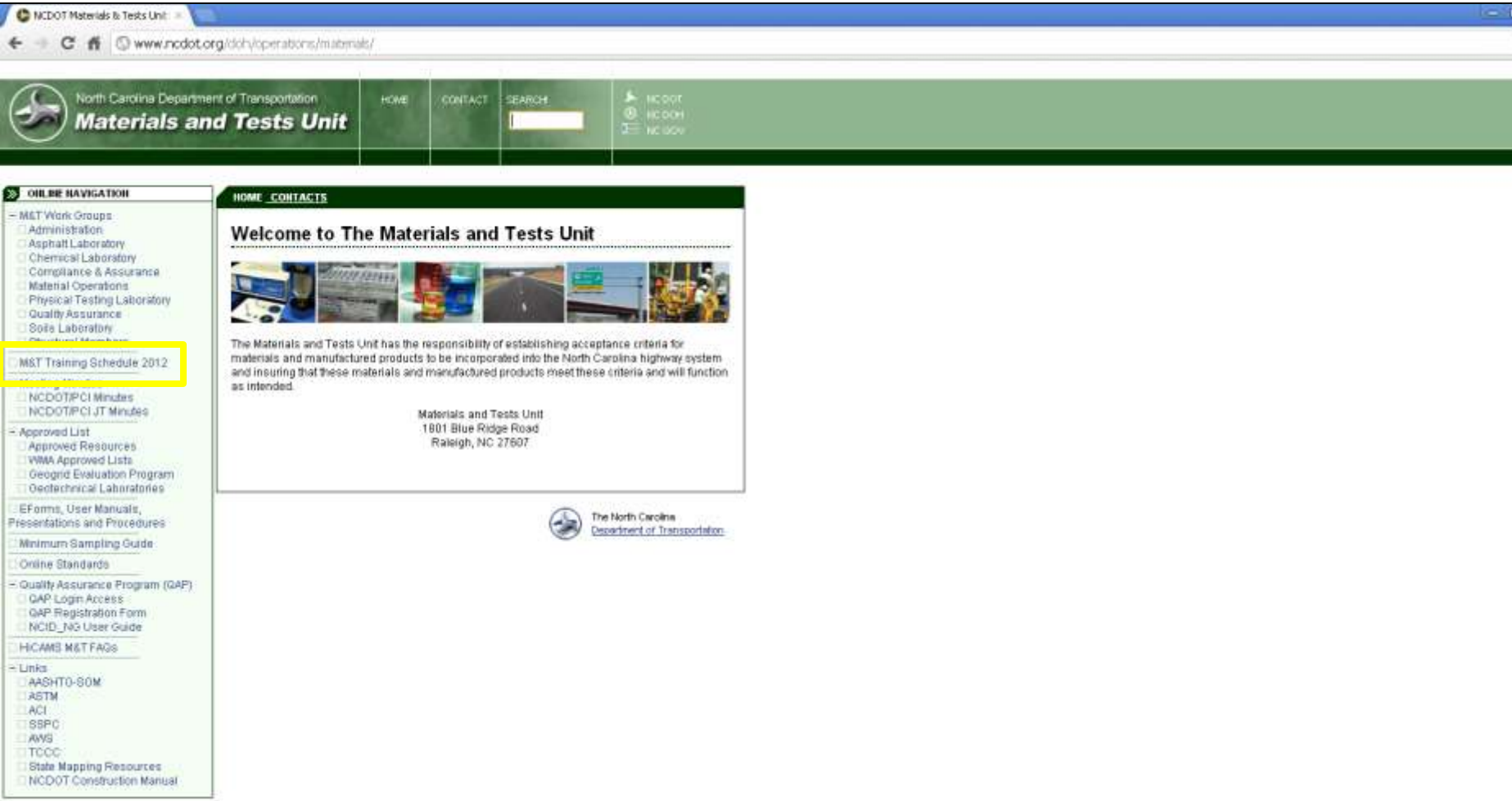
QMS Manual Changes

- QMS Certification Expirations
  - QMS Roadway
  - Level I – Plant
  - Level II – Plant
  - Mix Design Technician
- Now Expire on December 31st of the 4th Year
  - Page 1-9

QMS Manual Changes



QMS Manual Changes

HMA/QMS Asphalt Technician Training Schedule

2012

NCDOT HMA/QMS Asphalt Technician Training Schedule					2012											
Courses	**Location**	**City**	**Begin Time**	**Capacity**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Level II Plant Technician Class	Salon 1 & 2, City Hotel and Bistro	Greenville	8:30 AM	25	11-12											
Roadway Technician Class	Salon 1 & 2, City Hotel and Bistro	Greenville	8:30 AM	60	24-25											
Level II Plant Technician Class	Wake Forest Room, Ramada Inn	Burlington	8:30 AM	25		8-9										
Roadway Technician Class	Wake Forest Room, Ramada Inn	Burlington	8:30 AM	60		22-23										
Level II Plant Technician Class	Galleria III & IV, Holiday Inn - Biltmore West	Asheville	8:30 AM	25			7-8									
Roadway Technician Class	Galleria III & IV, Holiday Inn - Biltmore West	Asheville	8:30 AM	60			21-22									
Roadway Technician Class	NCSU - McKimmon Center	Raleigh	8:30 AM	60				3-4								
Level I Plant Technician Class	Wake Forest Room, Ramada Inn	Burlington	8:30 AM	30				11-12								
Roadway Technician Class	Village Inn	Clemmons, NC	8:30 AM	50				25-26								
**** Added Class**																
Last Revised:																
1/31/2012																
x = Confirmed																

QMS Manual Changes

- JMF Numbering System
  - Page 4-17

Job Mix Formula numbers will be 9 digits with a 4 character code at the end. This is the number shown on the JMF posted at the plant and shown on all appropriate reports.

Ex: xx-yyyy-abc-defg

where:	xx	=	Calendar Year
	yyyy	=	Sequential number assigned by HiCAMS System
	a	=	plant number, (1 for 1st plant 2 for a 2nd plant, etc.)
	b	=	anti-strip percentage (2 for 0.25%, 5 for 0.5% etc.)
	c	=	JMF revision number
	defg	=	Code for Mix Type (Following Table)

CODE	Mix Type Description
HMAC	*Hot-Mix Asphalt Concrete [Default]*
WMDB	Warm Mix Astec Double Barrel Green
WMUF	Warm Mix Gencor Ultrafoam
WMAB	Warm Mix Maxam AquaBlack
WM3G	Warm Mix Evotherm 3G
WMAF	Warm Mix Meeker AquaFoam
WMSB	Warm Mix Sasol Sasobit
WMAD	Warm Mix PQ Corp. Advera
WMTX	Warm Mix Terex WMA
MRAS	Manufacturer RAS
PRAS	Post-Consumer RAS
RPAS	RAP-RAS Mixture
RP15	RAP Mix 15%
RP20	RAP Mix 20%
RP21	RAP Mix 21%
RP25	RAP Mix 25%
RP30	RAP Mix 30%
RP40	RAP Mix 40%
FC1F	OGFC Type FC-1 w/Fibers
FC1S	OGFC Type FC-1 w/Shingles
FC2F	OGFC Type FC-2 w/Fibers
FC2S	OGFC Type FC-2 w/Shingles
UBWC	Ultra-thin Bonded Wearing Course
DC78	Permeable Asphalt Drainage Course, Type P-78M
DC57	Permeable Asphalt Drainage Course, Type P-57
MCSB	Micro-surfacing, Type B
MCSC	Micro-surfacing, Type C

QMS Manual Changes

- Section 7.17 Resampling/Retesting (Sublots)
  - "Contractor may request…"
  - Only for mix in Remove and Replace
    - Outside of the Retest Limits
    - Otherwise, Pay Factor is applied to mix that remains in place.
  - Referee = "Dispute Resolution"
    - Tested at Central Lab or another Division QA Lab
  - New Form QA-2A for tracking of Sublots

New QA-2A Form

QA-2A
(Revised 02-21-12)

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
MIX DEFICIENCY PAY FACTOR / RETEST FORM

PROJECT NO: _____ CONTRACT NO: _____
DATE PRODUCED: _____ PROJECT ENGINEER: _____
CONTRACTOR: _____ PLANT LOCATION: _____
TYPE MIX / JMF: _____ MIX DEFICIENCY: _____
INDIVIDUAL TEST LIMIT: _____ RETEST LIMIT: _____
JMF TARGET: _____
TEST RESULTS: QC = _____
QA = _____
If necessary, DR = _____
Are the QC and QA results within limits of precision? _____

1) Are test results within PAY ADJUSTMENT criteria? YES or NO
2) If YES to #1, what is the Pay Factor adjustment? _____
3) If NO to #1, has Contractor requested Retest option? YES or NO
4) If YES to #3, complete RETEST section below.
5) If NO to #3, then "Remove and Replace" or apply Article 105-3 as directed by Project Engr.

RETEST section

SUBLOTS (tons) #1 = _____ #2 = _____ #3 = _____

Original sample taken from Sublot #____

Show approximate location of retests on sublots

Retest Results #1 = _____ #2 = _____ #3 = _____
#1 = _____ #2 = _____ #3 = _____

Action taken: #1 = _____ #2 = _____ #3 = _____

PROJECT ENGINEER'S FINAL ACTION

The _____% pay factor specified above was applied on Estimate Number_____ Dated _____
Deficiency Location:_____
NOTE: For any mix accepted under Article 105-3, provide penalty assessed and justification:_____
_____
_____
Signature:_____

Original To: Project Engineer

cc: State Asphalt Design Engineer
State Pavement Construction Engineer
QA Supervisor
Division Construction Engineer
Area Roadway Engineer

* Contractor must be notified in writing by Project Engineer of any adjustment / action within 30 calendar days of original QC test.

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A Reminder About Sublots

A Reminder About Sublots

- Do we want #1 or #2?

QMS Manual Changes

- Section 7.18 – QA Sampling and Testing
  - Increased Verification testing from 10% to 20%
    - QA Split testing remains at 5%
  - Additional set of Limits of Precision
    - For comparing QC and Verification Samples
  - New Dispute Resolution Process
    - Tested at Central Lab or another Division QA Lab
    - DR sample results can replace QC results for material acceptance and payment.

“Roadway Paving – Best Practices Checklist”

- Draft form - Trial basis
- #1 Objective = Facilitate communication
- Roadway Inspector fill out and attach to Asphalt Daily Report
- Provide a copy to Paving foreman on 1st day and weekly thereafter
- Provide feedback

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Roadway Paving - Best Practices Checklist

Date: _____ **Type Mix:** _____

Contractor: _____ **Project No:** _____

NOTE: Attach this form to Asphalt Roadway Inspector's Daily Report	CIRCLE	COMMENTS/NOTES
1. Have the subgrade conditions been evaluated? Proofrolling?	n/a Y / N	
2. Is tack being applied uniformly? Verify proper rate? Application Temp?	n/a Y / N	
3. Is stringline being placed for alignment?	n/a Y / N	
4. Visually observe if 3 drops were made in truck?	n/a Y / N	
5. Are temperatures in truck and on roadway within specs?	n/a Y / N	
6. Are haul trucks raising bed before releasing gate?	n/a Y / N	
7. Are trucks cleaning out in front of paver?	n/a Y / N	
8. Is paver engaging truck - not trucks bumping paver?	n/a Y / N	
9. Is paver folding hopper wing only when the hopper is relatively full?	n/a Y / N	
10. Is hopper remaining 1/3 full?	n/a Y / N	
11. Is paving at consistent speed to match truck delivery rate?	n/a Y / N	
12. Is head of material kept level w/ auger shaft (± 1")?	n/a Y / N	
13. Is segregation observed in delivery and/or placement of material?	n/a Y / N	
14. Are automatic controls used properly to provide grade and cross-slope?	n/a Y / N	
15. Are auger extensions being used for paving when necessary?	n/a Y / N	
16. Is mat thickness appropriate for type mix?	n/a Y / N	
17. Is longitudinal joint being properly constructed and straight?	n/a Y / N	
18. Are there any equipment leaks or issues?	n/a Y / N	
19. Is MTV required on this Map? - If yes, note if MTV in use	n/a Y / N	

Additional observations or comments:

Checklist completed by: _____

List DATE checklist provided to the contractor & NAME of person receiving the checklist (paving foreman or other person in charge)

Table 610-4 RAP Contents

TABLE 610-4 SUPERPAVE APPLICABLE VIRGIN ASPHALT GRADES			
Mix Type	**Percentage of RAP in Mix**		
	Category 1[A]	**Category 2[B]**	**Category 3[C]**
	% RAP ≤ 20%	*21% ≤ % RAP ≤ 30%*	*% RAP > 30%*
All A and B Level Mixes, I19.0C, B25.0C	PG 64-22	PG 64-22	Established by Engineer
S9.5C, S12.5C, I19.0D	PG 70-22	PG 64-22	Established by Engineer
S9.5D and S12.5D	PG 76-22	-	-

Asphalt Binder Pay Items

- From Memo dated: May 9, 2011
- Effective with August 2011 Letting
- Simplified from 4 Pay Items to 2 Pay Items
  - No Specific PG Binder Grades Used
  - Removed references to PG 58, 64, 70, 76, etc.
- Two New Pay Items:
  - "Asphalt Binder for Plant Mix"
  - "Polymer-Modified Asphalt Binder for Plant Mix"

Questions ?