NHDOT Quality Assurance Program for Municipally Managed Federal-aid Projects

Submitted by: _____ 11-19-10
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NHDOT Quality Assurance Program
Municipally Managed Federal-aid Projects

The legislation establishing the Federal-aid Highway program, Title 23 United States Code, requires that Federal-aid projects not on the National Highway System be constructed in accordance with State construction standards (23 U.S.C. 109(p)). The New Hampshire Department of Transportation (NHDOT) has established this quality assurance program to address the materials portion of this requirement for Federal-aid Municipally Managed projects.

This document refers to items by numbers used in the NHDOT Standard Specifications for Road and Bridge Construction and it is intended that Municipally Managed projects use these specifications unless the NHDOT approves an equivalent specification.

It is the policy of NHDOT to provide assurance that the materials and workmanship incorporated into Municipally Managed highway projects conform, or substantially conform, to the requirements of the plans and specifications including approved changes. To accomplish this, the quality assurance program provides for an acceptance program, an independent assurance program, a laboratory qualification program, and a materials certificate as follows:

1. DEFINITIONS

- Acceptance Samples and Tests – All of the samples and tests performed by qualified testing personnel used for determining the quality and acceptability of materials and workmanship which have been or are being incorporated into the project. Acceptance tests determine the conformance of the material to the correct specifications. The results are used to determine acceptance or rejection and may be used to adjust the level of pay for the material.
- Independent Assurance Program – Independent samples and tests, or observation of test procedures, performed by Materials and Research (M&R) personnel who do not normally have direct responsibility for quality control or acceptance sampling and testing. These tests are used for the purpose of making independent checks of the reliability of the results obtained in acceptance sampling and testing and not for determining the quality or acceptability of the materials and workmanship directly.
- Method Specifications - Specifications that direct the contractor to use specified materials in definite proportions and specific types of equipment and methods to place the material. Each step is usually directed by the Municipality.
- QC/QA Specifications - A combination of end result specifications and materials and methods specifications. The contractor is responsible for QC (process control), and the municipality is responsible for acceptance of the product. QA specifications are statistically based specifications that use methods such as random sampling and lot-by-lot testing that let the contractor know if the operations are producing an acceptable product and establish the pay for the item. This program includes sampling and testing requirements for QC/QA hot mix

asphalt and concrete items that use random sampling and testing to determine if specified properties are met and to establish the final pay.

- Quality Control – This constitutes the inspection of equipment and the material sampling and testing done by the Contractor to control his operations.
- Qualified Laboratories – A laboratory that provides calibrated equipment for the required test methods and has been accredited by AASHTO.
- Qualified Sampling and Testing Personnel – For soil and asphalt materials, qualified personnel are those who have been certified in the sampling and testing to be performed by the NorthEast Transportation Training & Certification Program (NETTCP) or a person working under the direct supervision of an NETTCP technician certified in the appropriate test. For concrete materials, qualified personnel are those who have been certified in the concrete sampling and testing to be performed by either the American Concrete Institute (ACI) or the NETTCP or a person working under the direct supervision of an ACI or NETTCP certified technician.
- Verification Tests – Samples tested to verify certified properties.

2. SAMPLING AND TESTING PROGRAM

- When the term Municipality or NHDOT is used, it is understood that an authorized firm working on behalf of the NHDOT or the Municipality may perform the action.
- Administration and coordination of the sampling and testing program is the responsibility of the Municipality. All acceptance sampling and testing shall be the responsibility of the municipality managing the construction project.
- The Municipality shall develop a Quality Assurance Program for each project, based on this document, and submit it to NHDOT for documentation prior to the contractor starting construction work. The program shall include the quantity of each item in the project that requires sampling and testing, the number of acceptance tests required, an anticipated schedule for testing, the name and contact information for the party conducting the acceptance tests, and it shall also indicate sources of materials including production plants for ready mix concrete, hot mix asphalt (HMA), precast concrete, and structural steel. See Appendix A for a sample documentation format.
- The municipality must contact NHDOT when work is planned on any item requiring NHDOT independent assurance sampling and testing. Contact the following individuals two weeks in advance of the start of work to establish communication with NHDOT and to provide contact information for the project and the Town:
    - Soils and Concrete Items – Concrete and Soils Supervisor 271 -1656
    - Asphalt Items – Bituminous Supervisor 271-1663
- All acceptance tests shall be performed by qualified sampling and testing personnel at the site using calibrated equipment or at a qualified laboratory.
- It shall be the responsibility of the municipality to request and verify that the sampling and testing personnel are NETTCP, ACI or PCI certified as appropriate for the tests being performed.

- All equipment used for acceptance testing shall have been calibrated within the period prescribed by the respective AASHTO or ASTM method as demonstrated by documentation.
- All acceptance test reports shall include the test locations to allow further testing, if necessary. The required frequency of testing is as shown in the tables in this document.
- The sampling location of the acceptance testing shall be as shown in the tables contained in this document.
- All Independent Assurance sampling and testing shall be the responsibility of NHDOT. The NHDOT conducts a system-based Independent Assurance Program, meaning that each acceptance tester must participate in at least one IA test per calendar year for each material test performed (see tables). The IA test will be done during or prior to the project work. If an acceptance tester has already participated in an Independent Assurance test for a material property in the current calendar year on another project, then the testing program for a project does not have to include an Independent Assurance test for that property. The acceptance tester must be present when Independent Assurance sampling is performed.
- The municipality shall provide a project materials test summary that includes test designation number, the number of tests performed, the name of the acceptance testers, the testers' certification numbers and date of IA test for each tester for each performed test. See Quality Assurance Program Information sheet. This document will become part of the project final records.
- The Independent Assurance personnel shall make a prompt comparison of test results and thereafter investigate, resolve, and document the source of any discrepancies between the results of the assurance and acceptance tests, which are outside the acceptable deviations. See the table of acceptable deviations in Appendix B.
- HMA quantities of less than 500 tons used on roadways will be accepted by field inspection of the work and certification from the producer that it is a NHDOT approved mix design, that it meets the appropriate NHDOT specification, and that it is from a NHDOT certified hot mix asphalt (HMA) plant. No acceptance sampling and testing is required. The municipality is responsible for obtaining the certifications and the certifications for tack coat and crack sealant.
- All HMA quantities used on trails and sidewalks will be accepted by field inspection of the work and certification from the producer that it is a NHDOT approved mix design, that it meets the appropriate NHDOT specification, and that it is from a NHDOT certified hot mix asphalt (HMA) plant. No acceptance sampling and testing is required. The municipality is responsible for obtaining the certifications.
- All structural concrete mix designs shall be approved NHDOT mix designs and the material shall be produced at a NHDOT approved concrete plant and delivered in NHDOT approved mixing trucks.
- All precast concrete items and structures less than or equal to 20' in span along the centerline of roadway, except full depth deck slabs, will be accepted based on the manufacturer's certification that a NHDOT approved mix design was used, that it meets the appropriate NHDOT specification, and that it is from a NHDOT approved plant. The municipality is responsible for obtaining these certifications.

- All items, except natural materials, not in the Materials Frequency of Sampling and Testing Tables in this document will be accepted either:
    - Based on the contractor's or producer's certification that it meets the appropriate NHDOT specification, or
    - Based on inclusion in the NHDOT Qualified Products List & Certificate of Compliance, whichever is required by Specifications.
    - In addition to the certification, plastic pipe shall be supplied by a National Transportation Products Evaluation Program compliant manufacturer.

  It is the responsibility of the municipality to obtain the necessary certifications.
- All natural materials, such as granite, fieldstone, and mulch, not requiring testing or certification in the NHDOT specifications will be accepted based on the municipality's field inspection.
- Contractors are responsible for their own quality control. This includes maintaining production equipment in good working order and all sampling and testing necessary to confirm that all material being produced meets specifications.
- Non-NHDOT laboratories, if used in dispute resolution sampling and testing, shall be accredited in the testing to be performed by the AASHTO Accreditation Program.
- The municipality shall prepare a Materials Certificate and submit it to the NHDOT for each Federal-aid municipally-managed construction project (See Appendix C for sample Certificate).

Frequency of Sampling & Testing – Soil Items Method Specifications

Item	Description	Property	Test Method	Test Location & Frequency	
				Acceptance	Independent Assurance
203	Embankment	Compaction	AASHTO T191, AASHTO T310, or Test Strip	In place 1/2,000 CY	*
209	Granular Backfill, Bridge	Compaction	AASHTO T191, AASHTO T310, or Test Strip	In Place 2/Abutment or Substructure Location	*
		Gradation	AASHTO T27	In Place 1/Structure/Source	None Required
304.1 through 304.6	Select Materials	Compaction	AASHTO T191, AASHTO T310, or Test Strip	In Place 1/1,200 CY	*
		Gradation	AASHTO T27	In Place 1/4,000 CY	*
		Wear	AASHTO T 96, Grading A	1/Source	None Required
306	Reclaimed Stabilized Base	Compaction	Control Strip	In Place 1/2,000 SY	*
		Gradation	AASHTO T27	In Place 1/4,000 SY	*
508	Structural Fill	Compaction	AASHTO T191 or AASHTO T310	In Place 1/Two Lifts/ Location	*
		Gradation	AASHTO T27	In Place 1/Structure/Source	None Required

* Except if completed on another project during the current calendar year, the materials program for a project must include the acceptance tester's participation in one Independent Assurance test for each material test performed.

Frequency of Sampling & Testing
Asphalt Items, Method Specification

Item	Description	Property	Test Method	Test Location and Frequency		
				Acceptance	Independent Assurance	Verification Test**
403	Asphalt Cement HMA > 500 Tons Placed on Roadway*	Relevant AASHTO	AASHTO M320		None Required	Asphalt Plant 1/Project
	HMA > 500 Ton Quantity Placed on Roadway*	Compaction	AASHTO T166	In Place 2 Cores/ Lane Mile	None Required	
		Gradation	AASHTO T30 and T164	At Plant 1/750 Tons	***	
		Asphalt Content	AASHTO T164	At Plant 1/750 Tons	***	
	Emulsified Asphalt	Relevant AASHTO	AASHTO M320		None Required	Asphalt Plant 1/Project
410	Tack Coat	Relevant AASHTO	Certification		None Required	
413	Crack Sealant	Relevant AASHTO	Certification		None Required	

* If the project HMA method specification quantity placed on a roadway is $\leq$ 500tons, then the AC content and HMA are accepted by certification. If the HMA method specification quantity is not used on a roadway, then the AC content and HMA are accepted by certification.

** The municipality shall take samples and furnish them to the NHDOT laboratory in Concord for testing

*** Except if completed on another project during the current calendar year, the materials program for a project must include the acceptance tester's participation in one Independent Assurance test for each material test performed.

Frequency of Sampling & Testing
Concrete Items, Method Specifications

Item	Description	Property	Test Method	Test Location and Frequency	
				Acceptance	Independent Assurance*
520, 608, 615, 616	Structural Concrete, All Classes	Strength	AASHTO T22 & T23	2/200 CY Min. 2/Placement	From Any Class
		Air Content	AASHTO T152	1/50 CY	From Any Class
		Slump	AASHTO T119	1/50 Cy	From Any Class
All	Non- Stressed Precast ≤ 20' Span	Strength	AASHTO T22 & T23	None Required Accepted by Certification	None Required
		Air Content	AASHTO T152		
		Slump	AASHTO T119		
All	Precast > 20' Span & All Deck Slabs & Prestressed Precast	Strength	AASHTO T22 & 23	2/Member, Bed, or Lot	None Required
		Air Content	AASHTO T152	1/Member, Bed, or Lot	None Required
		Slump	AASHTO T119	1/Member, Bed, or Lot	None Required
	Deck Slabs & Prestressed Precast Items	Rapid Chloride Permeability	AASHTO T277	1/Member, Bed, or Lot	None required

*Except if completed on another project during the current calendar year, the materials program for a project must include the acceptance tester's participation in one Independent Assurance test for each material test performed.

Structural Steel Inspection

Item	Description	Structural Steel Fabrication Inspection
550	Structural Steel	An inspection program shall be developed and implemented that includes all the provisions in the current section 550 of the NHDOT Standard Specifications for Road and Bridge Construction pertaining to shop inspection and non-destructive testing of welds.

Frequency of Sampling & Testing
Asphalt &Concrete Items, QC/QA Specifications

Item	Description	Property	Test Method	Test Location and Frequency		
				Acceptance	Independent Assurance	Verification Test*
403	Asphalt Cement	Relevant AASHTO	AASHTO M320		None Required	Asphalt Plant 1/Project
	QC/QA HMA	Compaction	AASHTO T166	In Place 1 Core/750 Tons	None Required	
		Gradation	AASHTO T30 & T164	In Place 1/750 Tons	**	
		Asphalt Content	AASHTO T164	In Place 1/750 Tons	**	
520	QC/QA Structural Concrete Class A	Strength	AASHTO T22 & T23	Minimum 3 Tests/ Lot, 50 CY Maximum Sublot	None Required	
		Air Content	AASHTO T152		From Any Class	
		Rapid Chloride Permeability	AASHTO T277		None Required	
	QC/QA Structural Concrete Class AA	Strength	AASHTO T22 & T23	Minimum 3 Tests/ Lot, 50 CY Maximum Sublot	From Any Class	
		Air Content	AASHTO T152		From Any Class	
		W/C Ratio	NHDOT Microwave		From Any Class	
		Rapid Chloride Permeability	AASHTO T277		None Required	
	Fine & Coarse Aggregate	Gradation	AASHTO T27	None Required	*	

* The municipality shall take samples and furnish them to the NHDOT laboratory in Concord for testing

** Except if completed on another project during the current calendar year, the materials program for a project must include the acceptance tester's participation in one Independent Assurance test for each material test performed.

Quality Assurance Program Information

At the beginning of project, submit to:

NHDOT Bureau of Materials & Research
P.O. Box 483, 5 Hazen Drive
Concord, NH 03302-0483
ATTN: Chief of Materials Technology
http://www.nh.gov/dot/org/projectdevelopment/materials/index.htm

Project Name & Number:			
Project Description:			
Construction Schedule:			
Contact Information:			
Municipal:		Phone:	
Project Manager:		Phone:	
Testing Firm:		Phone:	
Material Suppliers:			
Redi-mix Concrete:		Phone:	
Precast Concrete:		Phone:	
Hot Mix Asphalt:		Phone:	

Project Materials Test Summary:
Complete during the project and submitted to NHDOT Materials & Research at completion.

	Total Project Quantity	Acceptance Test Method & Required No.		Name of Acceptance Tester	IA Test Dates from This or Other Project
Redi-mix Concrete:					
Precast Concrete:					
Hot Mix Asphalt:					
Select Bases:					

Appendix B
Independent Assurance / Acceptance Test
Acceptable Deviations

Type of Test	% Deviation
Sieve Analysis – All Items #4 (4.75mm) Sieve and Larger	± 5%
Smaller than #4 (4.75mm) Sieve (Sand Portion)	± 4%
Compaction testing – All Items	± 2.5%
Bituminous Mix Evaluation #4 (4.75) Sieve to ¾"	± 3%
Smaller than #4 (4.75mm) Sieve (Total Sample)	± 2%
Asphalt Content	± 0.4%
Portland Cement Concrete	
Air Content	± 0.8%
Water/Cement	0.03

Appendix C

Sample Materials Certification for
Municipally Managed NHDOT Project

Date:
Project Name & Number:

This is to certify that:
The results of the tests used in the acceptance program indicate that the materials incorporated in the construction work, and the construction operations controlled by the sampling and testing, were in conformity with the approved plans and specifications. Exceptions to the above statement are explained in the attachment to this certification.

_____ _____
Duly Authorized Municipal Official Date

_____ _____
Resident Engineer Date