



**I-270 North Design-Build Project**

**St. Louis County, Missouri**

## **MoDOT Quality Oversight Plan**

**Contract ID: 191206-F01**

**Job: J6I3020B**

**Fed: FAF-I-270-5(352)**

## **Sampling and Testing**

Minimum frequencies for materials testing are defined in Appendix A - Schedule of Testing. These tests will be random in that MoDOT will not focus the testing on this schedule on suspected compliance or non-compliance. These frequencies are a bare minimum and the sampling and testing will be more frequent, when necessary. In addition to random sampling and testing, MoDOT may perform informational sampling and testing at any point.

MoDOT has a team of highly experienced engineers whose backgrounds include construction inspection, materials inspection, highway design, drainage design, and bridge inspection. All MoDOT personnel (verification and IAS) performing sampling and testing will be certified by the MoDOT Technician Certification Program for the tests they are performing.

## **Audits**

### **Construction:**

MoDOT will use an audit approach for assessing the Contractor's performance. This will entail checking on a sampling basis whether the Work is complying with the requirements of the Contract Documents. Quantities necessary for sampling and testing frequencies will be tracked by the Contractor and reported monthly.

The results of auditing will be documented and provided to the Contractor through E-Builder or Microsoft Sharepoint. This auditing program will notify the Contractor's Quality Manager, and/or appropriate designees, of nonconforming (NC) work and require corrective action be taken. In addition, immediate verbal discussion of an NC's will be standard practice. A copy of the MoDOT Audit Report Form is included in Appendix B. The audit results will be stored in E-Builder or Sharepoint in chronological order. All NC's will be clearly documented and referenced by the work breakdown structure. Nonconforming work will also be tracked by MoDOT to ensure a timely and satisfactory resolution is achieved.

MoDOT will hold an internal weekly team meeting to discuss the timing, frequency, and depth of auditing based upon the Contractor's Two-Week Look-Ahead Schedule. Nonconforming work will also be discussed. The MoDOT Staff will hold informal meetings daily to finalize the auditing schedule based upon the Contractor's daily schedule. The focus of audits will be on items with greater perceived risk based on engineering judgment. Items and activities that often fail to meet specifications or that have greater consequences of failure will be audited more intensely. Items that often meet specifications or have minimal consequences of failure will be audited less intensely. Audit priorities will be adjusted as the job progresses in order to focus resources where they are most needed.

MoDOT will hold, at a minimum, monthly internal and external meetings to ensure all frequencies are being met and determine if there are work items that will need additional testing and oversight. Materials incorporated into the project will be tracked through E-Builder, AASHTOWare, or an Excel spreadsheet according to the definable

feature of work and method of acceptance. Additionally there will be quarterly meetings between all parties to review the quality program, and ensure that the minimum sample and testing frequencies are being met, and all material is being properly accepted as described in the Contractor's Quality Management Plan (QMP).

### **Design:**

Also included in the audits will be the Design Process. MoDOT's staff will audit the Designer on a periodical and random basis to ensure that the review process in the Quality Management Plan (QMP) is being implemented and that the applicable standards listed in Book 3 are being met. These audits will be posted to the Microsoft SharePoint site. The Contractor is responsible for all Quality Control and Quality Assurance activities associated with any aspects of design, including, but not limited to, design plan reviews, shop drawing reviews, etc.

### **Materials Certification to FHWA**

At the completion of the project, MoDOT is required by 23 CFR Part 637 to provide a materials certification for the project. The certification will conform in substance to Appendix A of 23 CFR Part 637 Subpart B. The certification will be prepared and submitted at the project level by persons intimately familiar with the project.

The basis for the materials certification will be upon implementation of a quality assurance program meeting the criteria of 23 CFR Part 637 as follows:

Title 23 Chapter I Subchapter G Part 637 – Construction Inspection and Approval Subpart B—Quality Assurance Procedures for Construction.

[§637.201 Purpose.](#)

[§637.203 Definitions.](#)

[§637.205 Policy.](#)

[§637.207 Quality assurance program.](#)

[§637.209 Laboratory and sampling and testing personnel qualifications.](#)

[Appendix A to Subpart B of Part 637—Guide Letter of Certification by State Engineer](#)

### **637.205 Policy**

*(a) Quality assurance program. Each STD shall develop a quality assurance program which will assure that the materials and workmanship incorporated into each Federal-aid highway construction project on the NHS are in conformity with the requirements of the approved plans and specifications, including approved changes. The program must meet the criteria in Sec. 637.207 and be approved by the FHWA.*

Quality assurance as defined in 637.203 Definitions is “All those planned and systematic actions necessary to provide confidence that a product or service will satisfy given requirements for quality.” MoDOT has developed a Quality Assurance Program unique to this project. Quality Assurance includes the Contractor's activities, both “Quality Control” and “Quality Assurance”, as defined

in the Contractor's approved Quality Manual and MoDOT's Quality Oversight activities as defined above and in Appendix A - Schedule of Testing.

- (b) STD capabilities. STD shall maintain an adequate, qualified staff to administer its quality assurance program. The State shall also maintain a central laboratory. The State's central laboratory shall meet the requirements in [Sec. 637.209\(a\)\(2\)](#).*

MoDOT has assembled a highly qualified staff to administer this project. This project will utilize MoDOT's Central Laboratory for more specialized testing not performed in the field laboratory.

- (c) Independent assurance program. Independent assurance samples and tests or other procedures shall be performed by qualified sampling and testing personnel employed by the STD or its designated agent.*

Provided for this Project as part of MoDOT's established System Based IA Program.

- (d) Verification sampling and testing. The verification sampling and testing are to be performed by qualified testing personnel employed by the STD or its designated agent,*

Certified MoDOT personnel will perform all verification sampling and testing in accordance with Appendix A - Schedule of Testing.

- (e) Random samples. All samples used for quality control and verification sampling and testing shall be random samples.*

As stated above under Sampling and Testing, tests will be random in that MoDOT will not focus the testing on this schedule on suspected compliance or non-compliance." The Contractor's QMP indicates that their Quality Control testing be random as well.

### **637.207 Quality assurance program**

- (a) Each STD's quality assurance program shall provide for an acceptance program and an independent assurance (IA) program consisting of the following:*

- (1) Acceptance program.*

- (i) Each STD's acceptance program shall consist of the following:*

- (A) Frequency guide schedules for verification sampling and testing which will give general guidance to personnel responsible for the program and allow adaptation to specific project conditions and needs.*

MoDOT's verification sampling and testing frequencies are defined in Appendix A - Schedule of Testing.

- (B) Identification of the specific location in the construction or production operation at which verification sampling and testing is to be accomplished.*

MoDOT's verification sampling and testing will be random at the locations. Both the contractor and MoDOT will utilize the ASTM, AASHTO, and MoDOT Spec Book and EPG as guidance for testing procedures include the location in the construction or production where the will be performed and accomplished.

- (C) Identification of the specific attributes to be inspected which reflect the quality of the finished product.*

MoDOT will audit based upon risk assessment. This system is described under the Audits section above. The Contractor's QC and QA inspections are defined in their approved Quality Manual.

- (ii) Quality Control sampling and testing results may be used as part of the acceptance decision provided that:*

- (A) The sampling and testing has been performed by qualified laboratories and qualified sampling and testing personnel.*

The Contract Documents (Book 2, Section 3.1) requires the Contractor to use qualified laboratories with properly calibrated equipment, and qualified personnel.

- (B) The quality of the material has been validated by the verification sampling and testing. The verification testing shall be performed on samples that are taken independently of the quality control samples.*

MoDOT will take independent samples for use in the verification process based upon the frequencies listed in Appendix A - Schedule of Testing

- (C) The quality control sampling and testing is evaluated by an IA program.*

The Contractor QC, Contractor QA, and MoDOT Quality Oversight verification sampling and testing will be evaluated by the formal MoDOT IA Program.

- (iii) If the results from the quality control sampling and testing are used in the acceptance program, the STD shall establish a dispute resolution system. The dispute resolution system shall address the resolution of discrepancies occurring between the*

*verification sampling and testing and the quality control sampling and testing. The dispute resolution system may be administered entirely within the STD.*

MoDOT has accepted the Test Dispute Resolution process proposed in the Contractor's Quality Management Plan.

- (2) *The IA program shall evaluate the qualified sampling and testing personnel and the testing equipment. The program shall cover sampling procedures, testing procedures, and testing equipment. Each IA program shall include a schedule of frequency for IA evaluation. The schedule may be established based on either a project basis or a system basis. The frequency can be based on either a unit of production or on a unit of time.*

IA requirement for the project is satisfied by MoDOT's established System Based IA Program which identified technicians and testing equipment for audit. This is described in MoDOT's EPG [Article 123.3.1.](#)

- (i) *The testing equipment shall be evaluated by using one or more of the following: Calibration checks, split samples, or proficiency samples.*

IA requirement for the project is satisfied by MoDOT's established System Based IA Program which identified technicians and testing equipment for audit. This is described in MoDOT's EPG [Article 123.3.1.](#)

- (ii) *Testing personnel shall be evaluated by observations and split samples or proficiency samples.*

IA requirement for the project is satisfied by MoDOT's established System Based IA Program which identified technicians and testing equipment for audit. This is described in MoDOT's EPG [Article 123.3.1.](#)

- (iii) *A prompt comparison and documentation shall be made of test results obtained by the tester being evaluated and the IA tester. The SHA shall develop guidelines including tolerance limits for the comparison of test results.*

This is described in MoDOT's Engineering Policy Guide [Article 123.3.1.](#)

- (iv) *If the SHA uses the system approach to the IA program, the SHA shall provide an annual report to the FHWA summarizing the results of the IA program.*

MoDOT provides an annual report to FHWA summarizing the results of the IA program.

- (3) *The preparation of a materials certification, conforming in substance to Appendix A of this subpart, shall be submitted to the FHWA Division Administrator for each construction project which is subject to FHWA construction oversight activities.*

*APPENDIX A TO SUBPART B OF PART 637—GUIDE LETTER OF CERTIFICATION BY STATE ENGINEER, Date , Project No.; 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 sampling and testing, were in conformity with the approved plans and specifications. (The following sentence should be added if the IA testing frequencies are based on project quantities. All independent assurance samples and tests are within tolerance limits of the samples and tests that are used in the acceptance program.) Exceptions to the plans and specifications are explained on the back hereof (or on attached sheet). Director of STD Laboratory or other appropriate STD Official.*

Requirement will be met as stated in Materials Certification to FHWA section above.

*(b) In the case of a design-build project funded under title 23, U.S. Code, the STD's quality assurance program should consider the specific contractual needs of the design-build project. All provisions of paragraph (a) of this section are applicable to design-build projects. In addition, the quality assurance program may include the following:*

*(1) Reliance on a combination of contractual provisions and acceptance methods;*

Acceptance will be made through verification of random samples based upon the frequencies listed in Appendix A - Schedule of Testing. When material sampling and testing is not required as part of the acceptance decision, Contractor QC documentation such as approved checklists, and Daily Work Reports (DWR's) may be used.

*(2) Reliance on quality control sampling and testing as part of the acceptance decision, provided that adequate verification of the design-builder's quality control sampling and testing is performed to ensure that the design-builder is providing the quality of materials and construction required by the contract documents.*

Acceptance will be made through verification by MoDOT of random samples based upon the frequencies listed in Appendix A - Schedule of Testing. Quality control sampling and testing will be relied upon as part of the acceptance decision, provided that adequate verification of the Contractor's quality control sampling and testing is performed by MoDOT's random sampling.

*(3) Contractual provisions which require the operation of the completed facility for a specific time period.*

The contract for this project (as included in Book 1, Section 21.1.3 of the contract document) states that "Warranties regarding all elements of the Project shall remain in effect until **one year** after... Acceptance." If MoDOT determines that any of the Work has not met the standards set by Book 1, Section 21.1 at

any time during the Warranty period, then the Contractor shall correct such Work within the one year warranty term.

**637.209 Laboratory and sampling and testing personnel qualifications.**

*(a) Laboratories.*

- (1) After June 29, 2000, all contractor, vendor, and STD testing used in the acceptance decision shall be performed by qualified laboratories.*

MoDOT's Central Laboratory is AASHTO accredited. The Contract Documents (Book 2, Section 3.1) require the Contractor to use qualified laboratories. MoDOT will verify the accreditation status of all laboratories used in the acceptance decision on an annual basis.

- (2) After June 30, 1997, each STD shall have its central laboratory accredited by the AASHTO Accreditation Program or a comparable laboratory accreditation program approved by the FHWA.*

MoDOT's Central Laboratory is AASHTO accredited.

- (3) After June 29, 2000, any non-STD designated laboratory which performs IA sampling and testing shall be accredited in the testing to be performed by the AASHTO Accreditation Program or a comparable laboratory accreditation program approved by the FHWA.*

MoDOT's Central Laboratory performs IA testing.

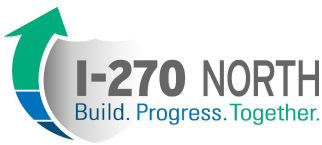
- (4) After June 29, 2000, any non-STD laboratory that is used in dispute resolution sampling and testing shall be accredited in the testing to be performed by the AASHTO Accreditation Program or a comparable laboratory accreditation program approved by the FHWA.*

MoDOT has accepted the Test Dispute Resolution process proposed in the Contractor's QMP. Should the need arise for dispute resolution, an AASHTO accredited third party laboratory will be used.

- (b) Sampling and testing personnel. After June 29, 2000, all sampling and testing data to be used in the acceptance decision or the IA program shall be executed by qualified sampling and testing personnel.*

All MoDOT personnel (verification and IAS) and Contractor personnel (QC/QA) performing sampling and testing will be certified by the MoDOT Technician Certification Program for the tests they are performing. The Contract Documents (Book 2, Section 3.1) require the Contractor's technicians to be certified.





*(c) Conflict of interest. In order to avoid an appearance of a conflict of interest, any qualified non-STD laboratory shall perform only one of the following types of testing on the same project: Verification testing, quality control testing, IA testing, or dispute resolution testing.*

MoDOT will perform the verification testing and IA testing using MoDOT's Central Lab (1617 Missouri Blvd. Jefferson City, MO 65109), MoDOT's St. Louis District Lab (1590 Woodlake Dr. Chesterfield, MO 63017), and MoDOT's Maryland Heights Project Office (2620 Adie Road, Maryland Heights, MO 63043). MoDOT will not allow dispute resolution to be performed by the same lab as the quality control testing.

## **Appendices**

Appendix A – Schedule of Testing

Appendix B – MoDOT Audit Report Form



I-270 North  
Missouri Department of Transportation  
Quality Oversight Plan  
Job No. J613020B

## Appendix A – MoDOT Schedule of Testing

MoDOT Quality Oversight Plan  
I-270 North Design-Build Project  
**Appendix A - Schedule of Testing**

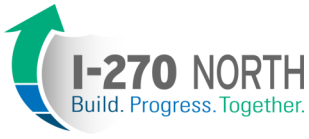
Spec	Item Description	Parameter	Requirement Additional Reference	Criteria	MoDOT's Frequency
203	Borrow Material	Soil Charateristics	Proctor and Plasicity Index ASTM D698 and AASHTO T99	Testing	1 Per Each Borrow Site over 15,000 CY
203	Roadway & Drainage Excavation, Embankment, and Compaction	Density, Moisture, Thickness, Frozen	Relative Compaction T191 or T310 <i>(Unless verified as too rocky to test per 203.62)</i>	Testing	1 Per 2 QA
205	Subgrade Stabilization	Gradation, LL, PI, Moisture	<i>If used by the Contractor</i>	Testing	1 per Project
210	Subgrade Compaction	Construction and Materials	Density Test Required ASTM D2922	Testing	1 Per 2 QA
302	Stablized Permeable Base	Gradation and Deleterious	If used by the Contractor AASHTO T11 and T27	Testing	1 per Project
304	Aggregate Base Course	Shaping and Compacting	Relative Compaction T91 or T310	Testing	1 per 8,000 Tons
304	Aggregate Base Course	Plasticity Index	T89 & T90	Testing	1 per 40,000 Tons
304	Aggregate Base Course	Gradation and Deleterious	T11, T27, TM71	Testing	1 per 40,000 Tons
310	Aggregate Surface	Gradation and Deleterious	<i>If used by the Contractor T11, T27, TM71</i>	Testing	1 per Project
401	Bituminous Base and Pavement	Gradation and Deleterious	T11, T27, & TM71	Testing	1 per 5 Production Days
401	Bituminous Base and Pavement	Asphalt Content and Moisture	T164, TM54, T287, T308 and T329	Testing	1 per 5 Production Days
401	Bituminous Base and Pavement	Mat Density and Thickness	<i>TM41/T166</i>	Testing	1 per 5 Production Days
401	Bituminous Base and Pavement (RAP)	Gradation and AC Content	T27, T164, T308	Testing	1 Per Project
403	Asphaltic Concrete Pavement	Gradation and Deleterious	T11, T27	Testing	1 per 5 Production Days
403	Asphaltic Concrete Pavement	Asphalt Content and Moisture	T164, TM54, T287, T308 and T329	Testing	1 per 5 Production Days
403	Asphaltic Concrete Pavement	Voids in Min Aggr, Air Voids, Voids Filled w/ Asphalt, Rice Test	T312, R35, T209	Testing	1 per 5 Production Days
403	Asphaltic Concrete Pavement	Mat Density and Thickness	TM41, T166, T148	Testing	1 per 5 Production Days
403	Asphaltic Concrete Pavement	Plant Temperautre	TM20	Testing	1 per 5 Production Days

403	Asphaltic Concrete Pavement (RAP)	Aggregate Properties, TSR, RAP	T304, D5821, T176, D4791, T283 T164	Testing	1 Per Project
407	Tack	Emulsified Asphalt	Section 1015	Testing	1 per Project
501	Concrete Plant	Calibration and Verifications	Certified by MoDOT	Document	1 per year (Verify 6 months after)
501	Concrete	Compressive Strength, Slump, and Air	T22, T119, & T152	Testing	1 per 1,000 CY
501-504	Concrete Aggregate	Gradation, Deleterious, and Absorptions	T11, T27, TM71, T85	Testing	1 per Source/Year
501-504	Concrete Aggregate	Thin or Elongated Pieces	ASTM D4791	Testing	1 per Source/Year
501-504	Mix Design Verification	28 Day Cured Cylinders	T22 & T23	Testing	1 per Mix Design
502-504	Concrete	Compressive Strength, Slump, and Air	T22, T119, & T152	Testing	1 Per 5 Production Days
502	Concrete Placement	Cores for Strength & Thickness	T22, T24, T148, T231	Testing	1 Per 2 Lots
505	Bridge Deck Concrete	Compressive Strength, Slump, and Air	T22, T119, & T152	Testing	1 Per Deck
600s	Incidental Construction	Concrete	See Section 501	Testing	1 Per 1,000 CY
701-704	Structures - Concrete	Concrete	See Section 501	Testing	1 Per 500 CY
720	MSE Wall	Concrete	See Section 501	Testing	1 Per 1,000 CY
720	MSE Wall	Gradation D or E (1005)	AASHTO T27	Testing	1 per Project
901-903	Lighting, Signals, Signing	Concrete	See Section 501	Testing	1 Per 1,000 CY
1010	Select Granular Backfill for Structural Systems		AASHTO T19, T90, T236, T99, T234-85, T104 & T267		1 per Source
1052	Fabricating MSE Wall Panels	Quality Assurance			Follow MoDOT Materials Quality Assurance Plan
1029	Fabricating Prestressed Concrete Members for Bridges	Quality Assurance			Follow MoDOT Materials Quality Assurance Plan
1080	Fabricating Structural Members for Bridges	Quality Assurance			Follow MoDOT Materials Quality Assurance Plan



I-270 North  
Missouri Department of Transportation  
Quality Oversight Plan  
Job No. J613020B

## Appendix B – MoDOT Audit Report Form



# MoDOT Compliance Audit Quality Oversight Reporting



<b>WBS No.</b>		<b>Date</b>		<b>Audit No.</b>	
<b>WBS Description</b>		<b>MoDOT Auditor</b>			
<b>Work Activity</b>		<b>Inspection/Test Plan Section</b>			
<b>Location</b>		<b>Responsible Manager(s)</b>			
<input checked="" type="checkbox"/> <b>Product</b>		<input type="checkbox"/> <b>Process</b>		<input type="checkbox"/> <b>Release Point</b>	
No.	Requirement(s)	Reference	Status	Objective Evidence	
1			<input checked="" type="checkbox"/> COMP <input type="checkbox"/> NC3 <input type="checkbox"/> NC2 <input type="checkbox"/> NC1		
2			<input checked="" type="checkbox"/> COMP <input type="checkbox"/> NC3 <input type="checkbox"/> NC2 <input type="checkbox"/> NC1		
3			<input checked="" type="checkbox"/> COMP <input type="checkbox"/> NC3 <input type="checkbox"/> NC2 <input type="checkbox"/> NC1		
<b>Signature of MoDOT Auditor</b>			<b>Date</b>		

**Status Definitions**

**COMP** - Audited item is in compliance  
**NC3** - Non Compliance item that does not require MoDOT verified correction  
**NC2** - Non Compliance item that requires a MoDOT verified correction  
**NC1** - Non Compliance item that is major project or safety issue requiring immediate response