



# Risk Based Inspection and Material Testing Guide

Local Public Agency Projects



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## Foreword

The Risk Based Inspection and Material Testing Guide (RBIMTG) sets a baseline for hours of inspection and frequencies for material testing on Local Public Agency (LPA) projects administered by the Mississippi Department of Transportation (MDOT) in accordance with the Project Development Manual (PDM). The guide is developed around risk levels for project components and pay items associated with phases of work. A study based on guidance from the Transportation Research Board and other sources were used to establish the hours and frequencies. Inspection hours generated through the process outlined in this guide are to be used in the forms provided by MDOT CSU for development of LPA CE&I contracts. A companion Critical Inspection Guide is available for use by the construction inspector for prioritizing inspection activities. This is a living document with the most current version being stored on the gomdot.com website as, [Risk Based Inspection and Material Testing Guide.pdf \(ms.gov\)](#). The reader should use the web based version when compiling Fee Proposals for LPA Projects.

## Risk Based Inspection and Material Testing

The level of required construction inspection and material testing is developed around project risk categories. Projects are classified as either high, moderate or low risk. Project risk level is established by MDOT during the design phase of project development. Low risk projects will normally be off roadway projects and high-risk projects will normally be National Highway System, roadway and bridge projects. Project components and risk levels are shown in Table 1 below.

LPA Project Components		Risk Level
Roadway & Bridge	New Construction	High
	Reconstruction	High
	Pavement Preservation	Moderate
	Mill and Overlay	Moderate
	Full Depth Pavement Rehabilitation	High
	Interchange Modifications	High
	Lane Addition (Through and Auxiliary)	High
	Trench Widening	Moderate
	Drainage Improvements	Moderate
	Bridge Construction/Replacement	High
	Bridge Repair	Moderate
Traffic	Traffic Signal Installation	Moderate
	ITS Implementation	Moderate
	Signing	Low
Bike & Ped.	Sidewalks/Multiuse Pathways	Low
	ADA Improvements	Low
	Bike and Pedestrian Bridge	High
Site Development	Landscaping	Low
	Lighting	Low
	Fencing	Low
	Parking Lots	Low
	Building Projects (Depots/Pavilions/Museums)	Moderate
	Recreational Facilities	Low
Safety	Rail Crossing Closures/Improvement	High
	Guardrail	Low
	Intersection Improvement/Signalization/J-Turn	Moderate
	Traffic Calming/Road Diet	Moderate

**TABLE 1**

# Inspection Hours

The hours of inspection for an LPA project are to be established using the guidelines in this section, which are based on the approved Progress Schedule and the project risk level. The Progress Schedule is to be generated by the LPA or Consultant using the MDOT format, submitted to the MDOT District LPA Engineer, and approved by the MDOT Construction Division in accordance with the PDM. The Construction Schedule will contain all seven (7) Phases of work as shown below regardless if the Project contains those individual components or not. The Progress Schedule will identify a phase of construction for each pay item of work and establish a duration for each phase. A level of inspection will then be set for each phase as set out below.

Inspection Levels are defined as follows:

- Full Time (F) – Construction activities that require inspection during the majority of the time that work is ongoing and includes work that is buried or contains safety components.
- Part Time (P) – Construction items that require monitoring for compliance with specifications and quantity measurements but do not meet the above criteria for full time inspection. The inspector must consult with the engineer to determine critical times in construction to perform inspections.
- Intermittent (I) – Items that can be accepted though certification and end-product inspection. These items of work should be inspected during the construction operation randomly during other inspection down time.

Table 2 below places pay items into phases typically used in construction schedules. The risk associated with the items in each phase is used to establish the appropriate CE&I effort level for the phase. The overall project risk level from Table 1 should be used to determine the baseline for each phase inspection level shown in Table 2.

Project Phases and Inspection Levels based on Project Components				
PHASE of WORK	PAY ITEM NUMBER	INSPECTION LEVEL		
		HIGH RISK	MODERATE RISK	LOW RISK
Miscellaneous	201-202, 210-249, 607, 611-614, 617-622, 699	I	I	I
Excavation and Drainage	203-209, 601-605, 623	F	P	P
Base and Pavement	300, 400, 500, 614	F	P	P
Pedestrian Facilities	200, 304, 403, 407, 608, 614	F	P	I
Traffic Safety	606, 609-610, 615-616, 629-665, 680-686	F	P	I
Pavement Markings	625-628	I	I	I
Bridges/Retaining Walls	800	F	F	P

TABLE 2

Excavation and pavement pay items will be placed in a Pedestrian Facilities phase for sidewalk and multi-use pathway projects not attached to mainline facilities, and in their own phases for roadway projects. Phases will not typically be established for pay items with small quantities of work as defined in the MDOT Inspector's Handbook and should be placed in the Miscellaneous Phase. For pay items not shown in Table 2 or for small quantity items that may need to be placed in a phase other than the Miscellaneous Phase, the appropriate phase will be established in consultation with the District LPA Engineer.



Example: A 403 pavement pay item of less than 250 tons on a traffic signal project that does not have a Base and Pavement phase. This work should be placed in the miscellaneous phase. Once the pay item numbers listed in Table 2 are assigned line item numbers by the SQS generator, the generated line item numbers should then be used to develop the Progress Schedule for the project. The line item numbers should be listed under the appropriate phases in the “Line Numbers” column of the Progress Schedule.

**Inspection of the Work**

The amount of time allocated performing inspection of the work is based on the level of risk associated with the work being performed and is determined using the methodology established in the May 2019 MDOT report titled *Construction Engineering, Inspection and Testing Requirements for Local Public Agency Projects*. Inspection during “punch list” work is also covered under this category.

The time available to the contractor on any given workday can vary significantly based on season, available daylight, and night work requirements. These factors and project specific requirements should be considered when establishing the working hours within the established ranges. For the typical project, hours allotted for inspection for a working day for full-time, part-time or intermittent inspection as designated should be in accordance with Table 3 below. This includes time for inspection of the work and completion of routine project documentation. Unless extenuating circumstances exist, minimum hours in Table 3 should be utilized. For example, for the Phase Miscellaneous and an Inspection Frequency of Intermittent, one (1) hour per day should be selected.

Inspection Frequency	Hours
Full Time	7-10
Part Time	4-6
Intermittent	1-3

**TABLE 3**

**Additional Winter Months’ Time**

This consists of visits to the jobsite to check rainfall, soil conditions, and weather impacts to ongoing work, perform traffic control inspections and erosion control inspections during the months of December, January and February. **An additional one (1) hour per working day may be added during those months in the miscellaneous phase with an intermittent frequency only.** The additional time will be added in accordance with Table 4 below for the full months of December, January and February.

Month	Working Days Available	Maximum Additional Hours Considered per Working Day	Maximum Monthly Additional Hours Considered
December	5	1	5
January	6	1	6
February	7	1	7

**TABLE 4**

**Travel Time**

Travel time to and from the project should be shown in the Cost Fee proposal under “Participating Drive Time”, and should consider up to a maximum of (1) one hour each way. Any travel time beyond the negotiated amount will be considered a non-participating cost.

**Summary**

The total time for inspection is to be calculated using the approved Progress Schedule and the MDOT established Project Risk Level. The total time will be the sum of “Inspection of the Work” and “Winter Miscellaneous Phase” additional time, and participating drive time. **Engineering and administrative time is not established using the Risk-Based procedures outlined in this publication.** These costs will be based on the scope of work as defined in contract.

## Material Testing Frequency

Acceptance sampling and testing of LPA project material is the responsibility of the LPA and the CE&I consultant. All acceptance testing for LPA projects must be performed by laboratories and technicians certified by MDOT. Acceptance sampling and testing is performed according to a project specific LPA Sampling and Testing Proposal developed by the consultant and approved by the MDOT District Materials Engineer.

CE&I consultants are responsible for daily acceptance sampling and testing of project materials. All materials utilized on LPA projects must meet the project contract requirements and MDOT specifications. CE&I consultants are also responsible for obtaining all material documentation (i.e., mix designs, material submittals and pretested stock materials) prior to allowing materials to be incorporated into the project work and ensuring all component materials (i.e., asphalt binder, cement, hydrated lime) are sampled from the producer's facility/job site and submitted to MDOT for approval testing. The CE&I consultant ensures that the contractor is performing the required Quality Control (QC) tests and that MDOT is performing the required Quality Assurance (QA) hot-mix-asphalt sampling and testing. The remaining QA materials testing is performed by the CE&I consultant. This relationship of material risk level and material property importance was utilized to develop the 2020 LPA project sampling and testing requirements to provide new risk-based frequencies. The frequency of acceptance risk-based sampling and testing is outlined in the 2020 LPA project sampling and testing requirements.



# Example Project

In this section the Risk Based guidelines are applied to a project using the project risk level, approved progress schedule and project pay item quantities to establish inspection hours and material testing frequencies. All supporting documentation are in the Appendices.

The example project is a Multi-Use pathway and has been identified as a low risk project consistent with the Bike and Ped facility project component in Table 1 above.

## Construction Inspection Hours

The actual hours for construction inspection are tabulated in Table E-1 below. The phase durations come from the progress schedule in Appendix A. The Risk level should be identified at the time of the Field review, and fall into one of the categories found in Table 1, and should be confirmed by the District LPA Engineer. The Inspection Frequency for each phase comes from Table 2 above using your overall project risk level as a baseline. From Table 2 above the baseline for Construction Inspection can be determined. The range for inspection hours per day is found in Table 3 above. Inspection time development should utilize the low end of the range due to overlapping phases of work. If more time is needed provide a detailed explanation, and consideration will be given. For the example project it was determined that the minimum hours in the range was appropriate.

Inspection of the Work Hours				
Phase	Duration (Working Days)	Inspection Frequency	Hours per Day	Hours
Miscellaneous	63	I	1	63
Excavation and Drainage				
Base and Pavement				
Pedestrian Facilities	55	I	1	55
Traffic Safety				
Pavement Markings	3	I	1	3
Bridges/Retaining Walls				
<b>TOTAL</b>				<b>121</b>

TABLE E-1

The Winter Miscellaneous Phase Additional Time is shown in Table E-2 below. The project was not active during the winter months, therefore there was no additional time was considered.

<b>Winter Miscellaneous Phase Additional Time</b>			
<b>December</b>	<b>January</b>	<b>February</b>	<b>Hours</b>
0	0	0	0
<b>TOTAL</b>			<b>0</b>

**TABLE E-2**

From Table E-1 and E-2 the total inspection hours are shown tabulated in Table E-3 below:

<b>Total Inspection Time</b>		
<b>Inspection of Work</b>	<b>Winter Miscellaneous Phase Additional Hours</b>	<b>Total Hours</b>
121	0	121
<b>TOTAL</b>		<b>121</b>

**TABLE E-3**

### Material Testing

The frequency of material sampling and laboratory/field testing has been determined by the LPA or consultant team and MDOT Materials Division utilizing risk-based guidance for the low risk Multi-Use pathway project. Based on the approved LPA Sampling and Testing (S&T) Proposal for the project Pay Items and Quantities presented in Appendix B, the required field and laboratory QA LPA materials testing is presented in Table E-4 below. Typical MDOT Central Lab testing will be performed by MDOT personnel according to the 2020 LPA project sampling and testing requirements.

QA LPA Materials Testing			
Phase	Pay Item	Description	No. of Tests
Excavation and Drainage	203-EX040	<b>Borrow Excavation, AH, LVM, Class B9</b>	
		Proctor	1
		Atterberg Limits (PI)	1
		Gradation	1
		Density	5
Base and Pavement	304-F002	<b>Size 610 Crushed Stone Base</b>	
		Proctor	1
		Gradation	1
		Atterberg Limits (PI)	1
		Density	15
Pedestrian Facilities	608-B001	<b>Concrete Sidewalk, with Reinforcement</b>	
		Compressive Strength	15
		Gradation	2

**TABLE E-4**



# Appendix B – Example Project Pay Items and Quantities