MAPA Black to Basics
Columbia, MO
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Quality Control Options for Public Contracts

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- Professional Engineer
- 35 years in construction
- 27 years in asphalt
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DESIGN CHALLENGE TODAY

In the past, the city has had roads fail within one year. They think that they didn't get what they specified.

What Quality Control/Assurance Measures Do You Include in the Design Specifications?

Additional Constraints

- Total project budget is $500,000. The funding source requires the project to be bid and awarded to the lowest bidder.
- The city wants a guarantee that the roads will last 10 years
- The mayor has promised to make roads a priority, so they want to pave as many streets as possible
- Election is April 7th, 2026

What Items Need to Be Inspected?

Your Design Company Costs

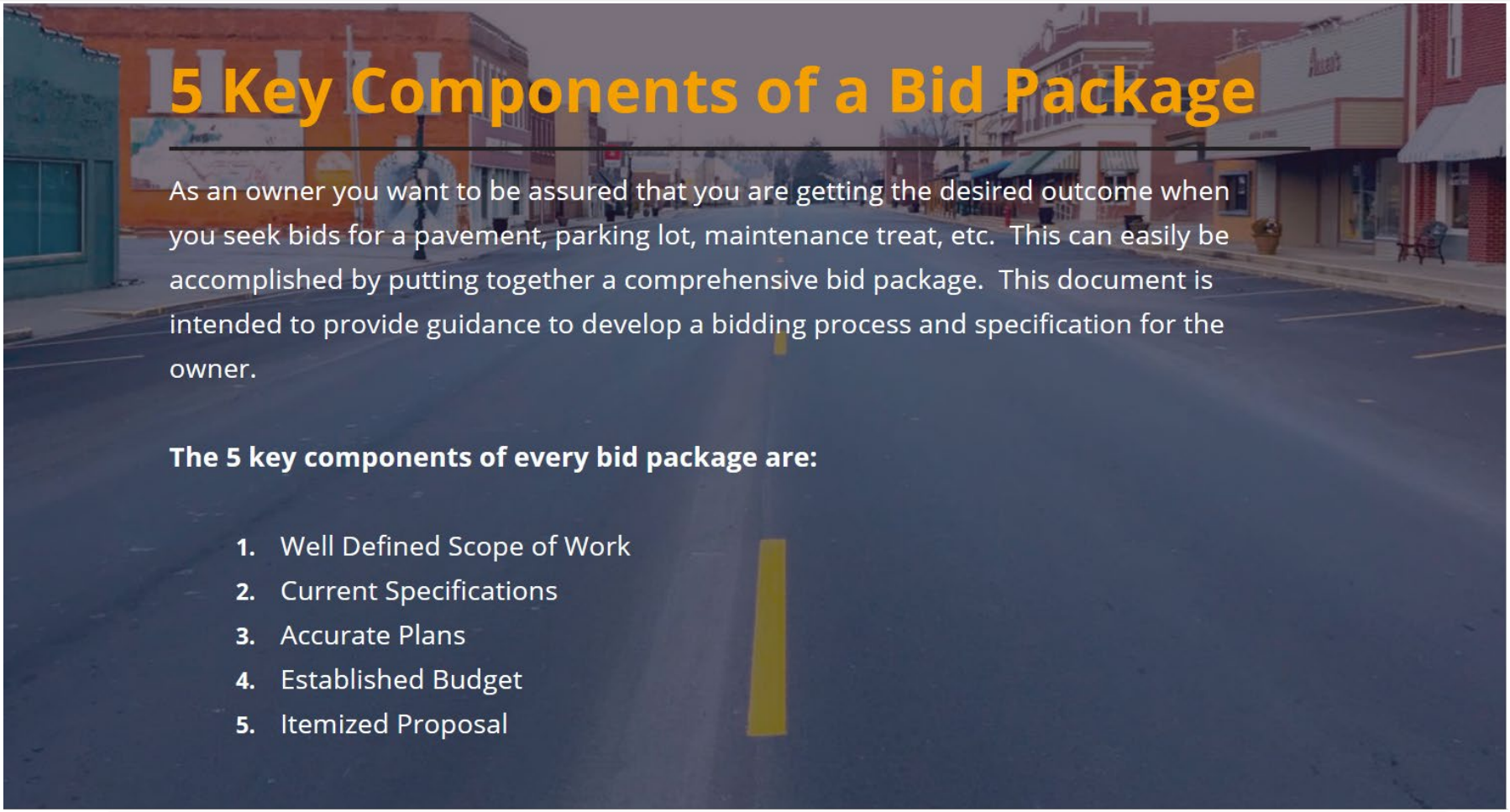
- Entry-level technician $100/Hr
- Senior technician $150/Hr
- Engineer $175/Hr
- Senior Engineer $250/Hr
- Core Rig $200/Hr
- Mileage $0.80/Mile
- Job is 54 miles from the office, 1 hour drive
- Materials testing is an additional charge of $150 per test.

What is your proposal for QA?

Considerations

- Who are the likely bidders?
- How many hours per day of paving? Travel
- How many tests? Plant? Road?
- Who is making the final decision on quality?

MAPA Design Guide



5 Key Components of a Bid Package

As an owner you want to be assured that you are getting the desired outcome when you seek bids for a pavement, parking lot, maintenance treat, etc. This can easily be accomplished by putting together a comprehensive bid package. This document is intended to provide guidance to develop a bidding process and specification for the owner.

The 5 key components of every bid package are:

1. Well Defined Scope of Work
2. Current Specifications
3. Accurate Plans
4. Established Budget
5. Itemized Proposal

4. Established Budget

As an owner it is important to know your budget and scope a project that you can afford to build. This can easily be achieved by estimating a project as the plans and specifications are developed. Working with local contractors can help you understand anticipated project costs.

A complete list of MAPA Contractor Members can be found at:
https://moasphalt.org/members/

MoDOT Quality Control

- Contractors run their own tests and report them to MoDOT through an online submission system
- Payment is based on the contractor's results
  - Retained samples for deleterious, gradation, asphalt content, and binder
- Inspectors may or may not be at the plant. Can pick up samples later.

What are the budget impacts of allowing a QC/QA process?

.3.6 Testing Requirements

This work shall consist of material and data collection necessary to test and verify compliance that the requisite design parameters and minimum standards have been met, as noted in these specifications.

The contractor shall maintain equipment and qualified personnel to perform QC field inspection, sampling and testing in accordance with applicable portions of Section 403. A proposed third party for dispute resolution shall be included with the mix design submittal.

The engineer will be responsible for Quality (QA), including testing, to assure the quality of the material incorporated into the project.

The contractor shall randomly test the mixture within the following frequencies. The gradation and the asphalt content shall be determined at least once every 1,000 tons of production or a minimum of once per day. QC tests on Superpave mixtures for VMA, Air Voids and Asphalt Content shall be performed in accordance with the small quantity

specification as outlined in Section 403 of the Missouri Standard Specifications for Highway Construction and at a frequency of no less than one per day if production does not exceed 750 tons and at a frequency of no less than two per day if production exceeds 750 tons. Independent or retained sample QA tests shall be performed at least once per 1500 tons, as indicated. Deleterious content of the aggregate shall be tested at least once per project. At the engineer's discretion, testing may be waived when production does not exceed 200 tons per day and the contractor shall certify the proper proportions of the approved mixture were used. The quantity of asphalt binder introduced into the mixer shall be the quantity specified in the job mix formula. No changes shall be made to the quantity of asphalt binder without written approval from the engineer. The quantity of asphalt binder determined by tests on the final mixture shall not vary by more than - 0.3 to + 0.5 percent from the job-mix formula. Gradation tolerances and deleterious content shall be within the limits outlined in Section 401.

During construction, the engineer will designate as many tests as necessary to ensure that the course is being constructed of proper thickness, composition and density. Density of the roadway shall be determined at a random location selected by the engineer for every 500 tons of production. The locations from each day's production will be averaged to determine acceptance. The maximum theoretical density shown on the job mix formula shall be used for this determination. The compacted mixture shall have a minimum density of 92 percent of the theoretical maximum specific gravity. Density shall be determined by the direct transmission nuclear method in accordance with MoDOT Test Method TM 41, by electromagnetic gauge, ASTM D6938, or by gravimetric method, AASHTO T 166.

When AASHTO T 166 is used, cores shall be a minimum 4-inch diameter and taken the full depth of the layer to be tested. The contractor shall restore the surface from which samples have been taken immediately with the mixture under production or with a cold patch mixture acceptable to the engineer.

Smoothness of the final pavement surface shall be measured with a 10-foot straightedge. The straightedge path in the longitudinal direction for driving lanes will be located three feet from the outside edge and for shoulders will be in the center. Additional paths with suspect roughness may be selected at the engineer's discretion. Shoulders that are paved integrally with an adjacent driving lane will not require straightedging. Any variations in the longitudinal direction exceeding 1/4 inch in 10 feet on shoulders and 1/8 inch in 10 feet on all other pavements shall be marked for correction in a manner approved by the engineer. (For higher traffic volumes on high-speed roadways pavement smoothness may be specified in accordance with Section 610.)

Testing General Notes

- Specifying more testing means more cost
  - Consulting fees if you do not have a lab
  - Higher bid prices from the contractor
- The bigger contractors tend to have more "exotic" mixes and generally have design and quality control labs
- Smaller contractors may not grasp the complexity of newer specifications

What happens when a test slightly fails?

- Remove and replace the impacted mix?
- Typically, a city cannot adjust the contract price, so a deduction is not allowed.
- Resolution may involve the city attorney and the finance person.
- What if you required MoDOT specs?

401.8.4 Pavement Testing. During construction, the engineer will designate as many tests as necessary to ensure that the course is being constructed of proper thickness, composition and density. Density of the roadway shall be determined by one core obtained by the contractor at a random location selected by the engineer for every 500 tons of production. The cores from each day's production will be averaged to determine acceptance. A joint density core shall be taken from the same transverse cross section as the mat core and alternate sides. The maximum theoretical density shown on the job mix formula shall be used for this determination. Minimum 4-inch diameter cores, shall be taken the full depth of the layer to be tested. Cores tested by AASHTO T 166 shall be in accordance with Sec 403.19.3.1.3. The contractor shall restore the surface from which samples have been taken immediately with the mixture under production or with a cold patch mixture acceptable to the engineer.

401.8.5 Density Adjustment. Payment for mixture placed at or below the required minimum density will be adjusted as follows:

Field Density Percent of Maximum Theoretical Density	Percent of Contract Unit Price[a]
91.5 or above	100%
91.0 to 91.4, inclusive	97%
90.5 to 90.9, inclusive	94%
90.0 to 90.4, inclusive	90%
89.5 to 89.9, inclusive	80%
Below 89.5	Remove and Replace

[a]When adjustments are necessary, the lower percent of the contract unit price of either the pavement or joint density adjustment will apply.

401.9 Quality Assurance. Acceptance tests for gradation, deleterious content and asphalt content will be performed by the engineer at a minimum rate of one independent sample per 4 QC samples. A favorable comparison will be considered when a QA test is within the specification tolerances. An acceptance test for

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plasticity index will be performed at a minimum rate of one per project by the engineer on an independent sample taken during production. Initial testing will be performed the first week of production. When the plasticity index on an individual aggregate fraction is more than two percentage points above the value shown on the approved mix design, moisture susceptibility testing shall be required in accordance with Sec 401.4.5. At least once for every five days of production, a split of the contractor's sample will be tested. If the results of the split sample are not within five percent on all sieves above the No. 200, two percent on the No. 200, within the specification ranges on the deleterious content, and within 0.5 percent on the asphalt content from the contractor's results, another split sample will be taken jointly with the contractor and tested. If the second test results do not compare within the specification tolerances, production shall cease until the discrepancy is resolved. If the second test results compare within the above tolerances, production may continue. The engineer will retain one half of the plasticity index test and moisture susceptibility test for 7 days after testing is complete. Results of QA testing will be furnished to the contractor within 24 hours of obtaining the sample, with the exception of moisture susceptibility testing.

Conclusion

- Quality control/assurance measures adherence to contract specifications and may help roads last longer.
- However, there is an associated cost that reduces the amount of tons that can be paved for the city.

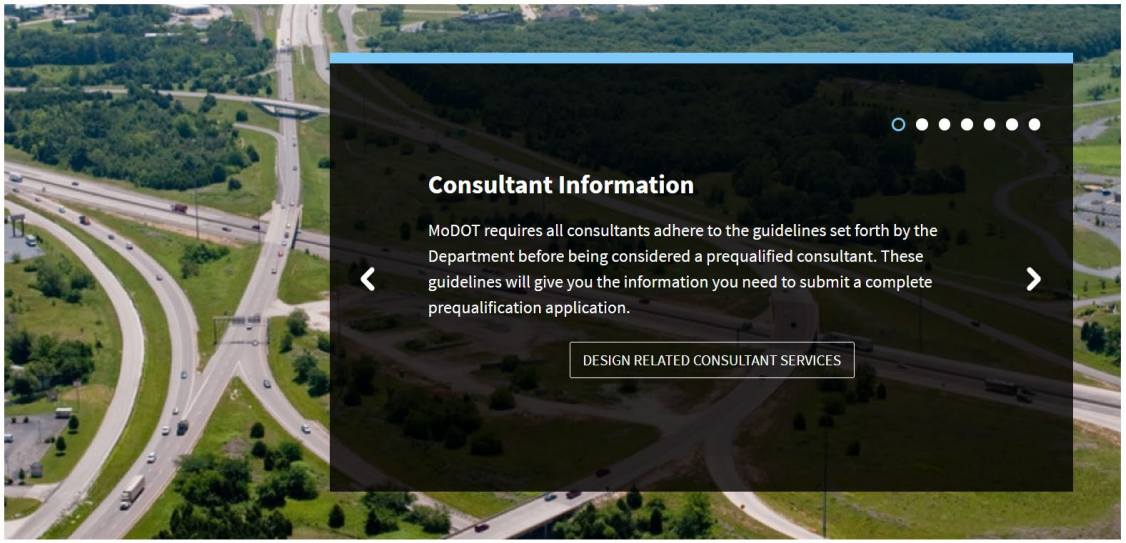
EXPLORE THIS TOPIC

- Consultant Prequalification List
- Solicitations (RFQ) Opportunities
  - Archived Solicitation and Selection Information
- LPA OnCall List
- MoDOT OnCall List
- Consultant ROW Negotiators and Appraisers
- **Consultant Information**
- Design Related Consultant Services
  - Qualifications & Certifications
  - Financial Prequalification Requirements
  - Safe Harbor Rate Requirements
  - Subconsultant Requirements
- Non-Profit and Governmental Organization Indirect Cost Rate Review Requirements
- Bridge Information
  - Bridge Advertisements
  - Bridge Special Provisions
  - Spreadsheets
  - Structural Engineering Guidance
- CADD Training and Support
- CADD Environment
- TSMO Strategies

Consultant Information

MoDOT consultant services, news and information.

In order to deliver projects, there may be occasions when additional engineering professional services and expertise are needed for a variety of reasons. EPG 134 Engineering Professional Services is a guide for soliciting, selecting and managing consultant contracts. Professional services are defined under the federal law, The Brooks Act, 40 USC 1102. Most consulting services used by MoDOT are included in the federal description of professional services, therefore MoDOT must follow the federal guidelines outlined in the Brooks Act for soliciting and selecting a consultant.



CONSULTANT RELATED NEWS

2026 - 2029 MoDOT On-Call Consultant Selections

01/16/2026

MoDOT is pleased to announce the consultant selections for the solicitation for firms to be added to the 2026-2029 MoDOT On-Call program.

Linked below is the selections list of firms to be added to the 2026-2029 MoDOT On-Call List:

- 2026-2029 MoDOT...

MoDOT Consultant Open Roads Designer Training

12/26/2024

To MoDOT Consultants Partners,

Non-Profit and Governmental Organization Indirect Cost Rate Review Requirements
Bridge Information
Bridge Advertisements
Bridge Special Provisions
Spreadsheets
Structural Engineering Guidance
CADD Training and Support
CADD Environment
TSMO Strategies

+ Utility Accommodation & Coordination

– Construction Materials Testing & Inspection

ABNA Engineering, Inc.
AECOM Technical Services, Inc.
Affinis Corp
Alfred Benesch & Company
All Civil Engineering, LLC
Allstate Consultants, LLC
Anderson Engineering, Inc.
Bacon Farmer Workman Engineering & Testing, Inc.
Bartlett & West, Inc.
Brungardt Honomichl & Company, P.A.
Burns & McDonnell Engineering Company, Inc.
CB Engineering, Inc., dba Cochran
Cook, Flatt & Strobel Engineers, P.A.
Crawford, Murphy & Tilly, Inc.
Engineering Design Source, Inc.
Engineering Surveys & Services LLC
Farnsworth Group, Inc.
Garver, LLC
George Butler Associates, Inc.
Gonzalez
Great River Associates, Inc. dba Great River Engineering
H.W. Lochner, Inc.
HDR Engineering, Inc.
HG Consult, Inc.
Horner & Shifrin, Inc.
Howe Company, LLC
HR Green Inc.
Klingner & Associates, P.C.
Olsson
Quigg Engineering, Inc.
Renaissance Infrastructure Consulting, Inc.
S.H. Smith & Company, Inc. (dba Smith & Co.)
SCI Engineering, Inc.
Shannon & Wilson, Inc.
Snyder & Associates, Inc.
Surveying & Mapping, LLC
Terracon Consultants, Inc.
TranSystems Corporation
TREKK Design Group, LLC
Volkert, Inc.
Wilson & Company, Inc., Engineers & Architects

+ Roadway Design

+ Surveying

+ Transportation Planning

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