A special thank you to the Arizona Division Office of the Federal Highway Administration and the Arizona Department of Transportation for their support of Maricopa County’s Transportation Program and their support of this manual for the purpose of uniformity, consistency and standardization.

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Permitting, Construction and Inspections Division
Construction Branch
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Final Quantity Adjustment Change Order (exhibit C)
Certification of Performance and Payment of All Claims (COP) (exhibit D)
Contractor Affidavit (exhibit E)
Consent of Surety and Power of Attorney (exhibit F & G)
County SBE Participation Reporting Form (exhibit H)

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Final Quantity Adjustment Change Order (exhibit C)

Appendix G.03.1 - Environmental Compliance Certification Form
SUMMARY OF CHANGES TO THE CONSTRUCTION MANAGEMENT MANUAL

Following is a summary of revisions made to this MCDOT Construction Management Manual as part of the December 2020 Update.

Revisions - Sections:

General Revisions
- Modified page footers for update
- Modified Table Of Contents
- Modified Cover sheet to refer to Permitting, Construction and Inspection Division
- Added sub-section numbers

Section II. Introduction
- Updated “The Maricopa County Department of Transportation (MCDOT)” with current statistics; What Do We Do? Spectrum Wheel; MCDOT Core Purpose; MCDOT Core Values; and current Organizational Chart.
- Updated “Roles and Responsibilities of Project Manager and Construction Engineer” for current MCDOT Division and Branch organization and to reference the Construction Handoff Meeting.

Section III. Partnering
- Modified for general discussion of current Partnering Program.

Section IV. Federal Requirements
- Section IV. removed and referenced as “Under Separate Cover”.

Section V. Change Orders
- Added opening overview paragraph that includes reference to Sections 109 and 109.4.
- Modified Quantity Adjustment subcategory to clarify Final Quantity Adjustment as un-preventable.
- Added V.3 Change Order Components to represent general format and component requirements.

Added Section VI. Lessons Learned
- VI.1. provides Overview of the MCDOT Lessons Learned process and references the MCDOT PDM.
- VI.2. Common Lessons to Consider provides summary of significant or commonly occurring construction phase lessons learned that should be considered in managing projects.
Added Section VII. Project Closeout

- VII.1. provides Overview of project closeout and references Section 109.7 for final payment for construction contract closeout.
- VII.2. Construction Project Closeout provides guidance on the construction project closeout process that follows final payment and closeout of the construction contract.
- VII.3. MCDOT Phase and Project Closeout provides guidance on the Construction Phase Closeout within the MCDOT Phase and Project Closeout process of the entire MCDOT Project.

Section 102 – Bidding Requirements and Conditions

- Modified 102.3 & 102.4 to represent current County Office of Procurement Services utilization of PeriscopeS2G (formerly BidSync) for advertisement and bidding MCDOT projects.
- Modified 102.4 to clarify recourses that Agencies may pursue to adjust bid unit prices in the situation of plan errors or omissions.

Section 103 – Award and Execution of Contract

- Text modifications to update for, and to represent current procedure including the role of the County Office of Procurement Services.

Section 105 – Control of Work

- Modified 105.1 to represent current Change Order authorization authority.
- Modified 105.4 to clarify correct order of precedence of construction contract documents.
- Modified 105.10 to clarify that Inspector Daily Project Diaries should note Inspector’s time of arrival and departure at the site.
- Text modifications to 105.15 to update for and to represent current project Acceptance procedures.
- Modified 105.15 to remove Project Closeout for inclusion in new Section VII.

Section 106 – Control of Materials

- Modified 106.1 for general discussion of the MCDOT Approved Products List (APL) and to provide the MCDOT website link to the APL.

Section 107 – Legal Relations and Responsibility To The Public

- Updated MCDOT Safety Office references to County Risk Management, Safety Division to represent current County organization.
- Modified 107.2.1 to reference ADEQ “myDEQ” website for AZPDES permit coverage SWPPP, NOI & NOT submittals.
- Modified 107.2.1 to represent current Maricopa County Stormwater Permit procedures including applicable website links.
- Modified Liaison with Local Government, Businesses and Residences in 107.6 to represent current MCDOT Community Relations Support procedures (MCDOT Specification 107.15).
- Modified Safety Plan in 107.6 to represent current procedure.
Section 108 – Commencement, Prosecution and Progress

- Updated Partnering & Preconstruction Conference references to Construction Kickoff Workshop to represent current terminology.
- Modified Partnering & Preconstruction to represent current Partnering Program.
- Modified Partnering & Preconstruction to include general list of Contractor submittals for the Kickoff Workshop.
- Modified to reference Weekly Meeting template and Weekly Project Report form added to Appendix A.
- Modified 108.1 to represent current procedure of Construction Branch, rather than Contracts Branch, sending Notice to Proceed letter to contractor.
- Modified 108.2 to represent current procedure requiring entire signed subcontract to be submitted with Subcontract Request Form (SRF).
- Modified 108.9 to represent current procedure to notify the MCDOT Finance Division, rather than Field Reports, of assessed liquidated damages.

Section 109 – Measurements and Payments

- Updated supplemental agreement references to change order to represent correct terminology.
- Modified 109.4 to clarify County Procurement Code change order approval authorization limits.
- Modified 109.4 to represent current MCDOT Certification Acceptance Agency delegated authority on federally funded projects.
- Modified 109.7 to represent current Final Payment procedure and documentation.
- Modified 109.7 to reference Section VII for Project Closeout procedures following Final Payment.

References and Additional Information

- Modified and updated as needed.

Revisions - Appendices

Appendix A - Blank Forms

- Modified to represent current procedure and documentation

Appendix B - Sample Forms, Logs and Reports

- Modified to represent current procedure and documentation

Appendix C – Change Order Examples

- Modified to represent current procedure and documentation

Appendix D – Deleted, Reserved for Future Use

Appendix E – Deleted, Reserved for Future Use
Appendix F – Federal Forms
• Moved Appendix to Section VI Federal Requirements “Under Separate Cover”.

Appendix G – Closeout Documents
• Modified to represent current procedure and documentation
## I. DEFINITIONS AND TERMS

### Abbreviations

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<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ADOT</td>
<td>Arizona Department of Transportation</td>
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<tr>
<td>AZPDES</td>
<td>Arizona Pollutant Discharge Elimination System</td>
</tr>
<tr>
<td>BECO</td>
<td>Business Engagement and Compliance Office</td>
</tr>
<tr>
<td>BOS</td>
<td>Board of Supervisors</td>
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<tr>
<td>CA</td>
<td>Certification Acceptance</td>
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<tr>
<td>CRN</td>
<td>Contract Revision Notification</td>
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<tr>
<td>DBE</td>
<td>Disadvantaged Business Enterprise</td>
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<tr>
<td>DOL</td>
<td>Department of Labor</td>
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<tr>
<td>FAR</td>
<td>Federal Acquisition Regulations</td>
</tr>
<tr>
<td>FHWA</td>
<td>Federal Highways Administration</td>
</tr>
<tr>
<td>LPA</td>
<td>Local Public Agency</td>
</tr>
<tr>
<td>MCDOT</td>
<td>Maricopa County Department of Transportation</td>
</tr>
<tr>
<td>NPDES</td>
<td>National Pollutant Discharge Elimination System</td>
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<td>OH</td>
<td>Overhead</td>
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<td>PC&amp;I Division</td>
<td>Permitting, Construction &amp; Inspection Division (a.k.a. MCDOT Construction Branch)</td>
</tr>
<tr>
<td>PI</td>
<td>Public Information</td>
</tr>
<tr>
<td>PM</td>
<td>Project Manager</td>
</tr>
<tr>
<td>PODI</td>
<td>Project of Divisional Interest</td>
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<tr>
<td>RE</td>
<td>Resident Engineer</td>
</tr>
<tr>
<td>RFI</td>
<td>Request for Information</td>
</tr>
<tr>
<td>RFP</td>
<td>Request for Proposals</td>
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<tr>
<td>SBE</td>
<td>Small Business Enterprise</td>
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<td>SOQ</td>
<td>Statement of Qualifications</td>
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<td>SOW</td>
<td>Scope of Work</td>
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<tr>
<td>SRF</td>
<td>Subcontractor Request Form</td>
</tr>
<tr>
<td>TCP</td>
<td>Traffic Control Plan</td>
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<tr>
<td>TMP</td>
<td>Transportation Management Plan</td>
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<td>TO</td>
<td>Transportation Operations</td>
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Definitions

Wherever the following terminology is used in this manual, the intent and meaning shall be interpreted as follows:

Construction Engineer:
For MCDOT administered projects, this refers to the MCDOT Construction Engineer position that serves as the Resident Engineer during construction. For Consultant Administered projects, this position is the Consultant Resident Engineer. In either case, depending on context, delegated authority may be granted to administrative or field inspection staff.

Design Engineer:
The Engineer of Record for the project, who signed and sealed the design plans. This person may be a MCDOT employee or a Consultant, depending on who designed the project.

Nomenclature

The typical Nomenclature used in this manual is as follows:

**Bold font typically indicates an action that needs to be taken.**

*Italic font typically indicates important information.*

Step-by-step instructions for a procedure will be found inside a black box similar to this.

Reference to Appendix documents are shown with a shaded highlight: Appendix F.0.0.

Links to websites change over time, and those shown herein are correct as of this latest update.
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II. INTRODUCTION

Purpose

The purpose of this manual is to identify specific written roles, responsibilities, procedures, forms and sample documents for use primarily during the construction phase of county transportation projects. This manual supports the procurement authority delegated to the Maricopa County Engineer through Article 5 of the Maricopa County Procurement Code, and when applicable, parts of Arizona Revised Statues (A.R.S.) Title 11, Title 16, Title 28, Title 34, Title 41 and the Code of Federal Regulations (CFR) Title 23, Part 635 and Part 637, and Title VI of the Civil Rights Act.

The guidelines in this manual apply to all Maricopa County Department of Transportation (MCDOT) projects including new structures, bridge and roadway widening or realignment; drainage, permanent and temporary traffic controls, intersection improvements, pavement preservation and/or safety improvements.

This manual has been assembled to provide standardized processes and clarify the content requirements of project documentation. Due to the variable size, complexity and diversity of MCDOT projects, not every element of this manual is applicable to every project. Instead, this manual should be used as the baseline requirement and sound engineering and management judgment can then be employed to tailor the guidance provided by this manual to the needs of the project being constructed.

In general, this manual guides the construction phase from the opening of competitive bids, through physical construction of the project, to Final Acceptance and one-year warranty inspection. The manual itself is not considered a contract document between MCDOT and its contractors. Construction contracts are issued to contractors through the County Procurement Office. These contracts specifically reference the MCDOT Supplement to the MAG Specifications and the MAG specifications themselves as contract documents, along with other supporting documents, to address both contractual and engineering requirements of the project.

This manual follows the sections of the Maricopa Association of Governments (MAG) Uniform Standard Specifications for Public Works Construction, just as does the Maricopa County’s Supplement to the MAG specifications. Transportation-related construction projects administered by MCDOT are designed to utilize the specifications and standard details provided within the MAG Uniform Standard Specifications and Details for Public Works Construction and the MCDOT Supplement to the MAG.

In addition, this manual provides procedures, forms and examples for administering specific aspects of a construction project under MCDOT jurisdiction.
Updates

MCDOT may periodically update this manual by revising this document or through Information Bulletins, Procedure Guidelines or Policy Directives issued by the Division Manager for the MCDOT Construction Branch. The intent of these documents will be to amend, further clarify or give additional guidance to requirements of this manual.

This manual, along with each of these updates, are available interactively through MCDOT’s internet website.

The Maricopa County Department of Transportation (MCDOT)

What Do We Do?

MCDOT Plans, Designs, Builds, Maintains and Operates roadways within the county’s unincorporated areas.

What is now known as MCDOT began more than 150 years ago and was charged with maintaining a few roads in the newly formed Maricopa County. Currently MCDOT operates and maintains approximately 2500 miles of roadway, more than 73 bridges (14 of them more than 400 feet long) and more than 367 culverts, more than 185 signalized intersections and nearly 61,000 traffic signs.

MCDOT’s funding is primarily derived from Highway User Revenue Funds, and other federal and state sources.
MCDOT Core Purpose:

Providing Connections that Improve People’s Lives

MCDOT Core Values:

- Service Minded
- Team Builder
- Get it done with a smile

Organizational Chart:

The Organizational Chart on the next page is a depiction of the management and supervisory levels of the MCDOT organization as of July 2020 and identifies many of those positions discussed throughout this document and their inter-relationship to the rest of the organization.
### Who are Our Customers?

A customer is anyone who uses or receives a benefit from the product or service you provide. For MCDOT to provide the highest quality work in construction, we have to think about who our customers are now and in the future. The construction of a highway project has many customers with varying needs. They include:

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<th>Organization</th>
<th>Who</th>
<th>Primary Needs</th>
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<tr>
<td>Traveling Public</td>
<td>motorists, truckers, mass transit</td>
<td>Safety, Convenience; easy to drive, maneuver, and navigate</td>
</tr>
<tr>
<td>Neighbors</td>
<td>residences, businesses, local jurisdictions</td>
<td>minimal or positive impact on their environment, accessibility</td>
</tr>
<tr>
<td>Government Representative</td>
<td>Taxpayers</td>
<td>the best value for every dollar spent; perceived needs of their constituents are being met</td>
</tr>
<tr>
<td>FHWA (when federally funded)</td>
<td></td>
<td>compliance with federal standards and regulations</td>
</tr>
<tr>
<td>Utilities and Local Governments</td>
<td>SRP, APS, CenturyLink, SWG, Cities, Counties, etc.</td>
<td>compatibility with their infrastructure and facilities</td>
</tr>
<tr>
<td>MCDOT’s Project Manager</td>
<td></td>
<td>project under construction satisfies the project’s design scope, completion schedule and overall MCDOT budget</td>
</tr>
<tr>
<td>Technical Groups</td>
<td></td>
<td>design and construction standards are met or exceeded</td>
</tr>
<tr>
<td>MCDOT Director/County Engineer, PC&amp;I Division Manager &amp; Construction Branch Manager</td>
<td></td>
<td>conformity to current public policy and compliance with MCDOT standards and policy</td>
</tr>
<tr>
<td>Maintenance Personnel</td>
<td></td>
<td>low maintenance costs (few repairs and preventative actions needed)</td>
</tr>
<tr>
<td>Regional Traffic Engineer and Technicians</td>
<td></td>
<td>traffic control devices (sign, Traffic striping, lights, &amp; signals) function Effectively and efficiently</td>
</tr>
</tbody>
</table>
With so many customers and so many needs, it’s easy to see why getting high quality in a constructed highway project is at the very least “challenging.” Fortunately, many of the needs complement each other and very few conflict. For example, an easy-to-maintain project is usually a good value to taxpayers. And everyone wants a safe highway that is compatible with the local community.

Roles and Responsibilities Project Manager and Construction Engineer

The Construction Management Manual was drafted to address the requirements and deliverables needed during the construction phase. Many of these needs must be addressed during the scoping phase, design and funding phases of a project. Below are described the duties and responsibilities of the MCDOT Project Manager (in the Transportation Systems Management Division - TSM) and the Construction Engineer in more detail.

Project Manager (TSM Division)
The Project Manager is an important source of information for the Construction Engineer concerning the history of the project before construction, the reason for its initiation, and the problems it is trying to solve. Ideally, the Construction Engineer should be involved during the development of the project from about the 50% to 60% design completion to the extent of involvement in periodic design progress meetings as well as given an opportunity to review preliminary plans and offer feedback for design preferences that will enhance the long-term maintenance of the project.

The Project Manager will be able to identify the major team members involved in project development, what agreements were made, and who to contact. The Project Manager oversees the entire development and design process and can help clarify issues in design and engineering that may arise in the field (or can at least put you in touch with someone who can).

Just prior to Bid Advertisement, the Project Manager shall be responsible to jointly review the project location, anticipated duration, anticipated start and completion dates and construction documents (Plans, Special Provisions and Engineer’s Estimate) with the Construction Division Manager. The Project Manager shall obtain the Division Manager’s signature as concurrence for the construction documents PRIOR to bid advertisement.

The Project Manager’s responsibilities for the project’s scope, schedule and budget terminate at the bid opening of the project and when successful recommendation for award of the project to the contractor by the Board of Supervisors is made. At that time, responsibility for scope, schedule and budget of the project transitions to the Construction Engineer and resides with the Construction Engineer throughout the construction phase to Substantial Completion, Final Acceptance, and to 1 year after the project is completed.

The Project Manager will oversee the review of bid documents. In the event that a bid protest or an anomaly is discovered within the bid documents, the Project Manager shall work closely with MCDOT’s Contracts Branch to resolve the issue(s) and shall be the primary person
assisting the Contracts Branch with obtaining any additional information needed from the MCDOT technical groups while keeping the Construction Engineer informed or obtaining their feedback.

If the Construction Engineer has not followed the project throughout its development, it is the Project Manager’s responsibility to brief the Construction Engineer on major project issues and important milestones prior to construction. This is accomplished with the Construction Handoff Meeting that typically occurs between bid opening and award. The Project Manager has the responsibility to assist with coordinating communication between the Construction Engineer (or their staff) and the design and development staff regarding plan interpretation and design issues arising from the Contractor’s operations.

The Department requires the Construction Engineer and the Project Manager to work as a team. The Project Manager represents the design and development aspects of the project, while the Construction Engineer represents the constructability and sequencing aspects. The Project Manager needs to assist the Construction Engineer when:

• Post design services are needed for shop drawing and specialty item reviews
• Design changes and plan revisions are needed during construction
• Contract documents need to be clarified and interpreted
• Coordination with other project stakeholders is required and
• Provide background on how the project was designed and developed, and why the contract documents were written the way they were.

Similarly the Construction Engineer needs to support the Project Manager during construction by discussing any contract changes to the project that would change the scope or intent of the project and providing the Project Manager with design and contract specification changes that can improve the project development process on future projects.

Construction Engineer
The Construction Engineer shall be a Professional Engineer registered to practice within the State of Arizona. This position is also sometimes referred to as the Resident Engineer (RE), although the person may not necessarily “reside” at a project office at or near the site of construction.

It is intended that the Construction Engineer have knowledge of the upcoming schedule of active design projects and be involved with the periodic design coordination meetings as the development of a project takes shape. The Construction Engineer’s feedback during the design is invaluable for the design professional and is the opportunity for the Construction Engineer to interact with the design to understand the challenges anticipated and reasons for the decisions taken that will ultimately become the final design. This involvement is not always possible based on workload and other ongoing construction responsibilities the Construction Engineer has, but the Construction Engineer should make every effort to keep plugged into the design schedule and interact with the project team whenever possible.
After bids are opened and the project is successfully awarded to the contractor by the Board of Supervisors, the Construction Engineer serves as the technical leader for the project in charge of the scope, schedule and budget for the project. The Construction Engineer monitors all construction activities and related construction costs and regularly compares them to the Department’s overall budget for the project. This manual sets forth procedures and requirements to keenly monitor the scope, schedule and budget, to assure project goals are met. These duties and responsibilities of the Construction Engineer continue throughout the construction phase until the project is closed out.

The Construction Engineer monitors the construction activity for progress toward meeting scheduled milestones established by the contractor and/or the contract documents. On occasion, specific schedule milestones are included in the contract documents to address issues related to agreements with other project stakeholders such as local governments, Indian tribes, developers or other state and federal agencies. Specific requirements of contractor’s project schedules and review elements are discussed later in Section 108.4.

On occasion, MCDOT employs an independent consultant or a consultant team to perform the duties of the Construction Engineer (or Resident Engineer) and perform contract administration and inspection duties on behalf of MCDOT. In this case, the consultant will organizationally be assigned below a MCDOT Construction Engineer within the Construction Branch and will have daily, weekly, monthly and as-needed reporting responsibilities throughout the lifecycle of the Construction Phase as would the MCDOT Construction Engineer on all other projects. The MCDOT Construction Engineer will then assume a role of oversight that is supervisory in nature; the Consultant Resident Engineer holds the primary responsibility for monitoring the scope, schedule and budget for the project.

**Job-Order Contracting**

MCDOT has developed a Job Order Contracting Guide that outlines much of the processes to follow to initiate a work assignment to a contractor under a Job Order Contracting (JOC) contract. While any project may be identified for JOC and initiated by other Divisions within MCDOT (e.g. new signalized intersection; minor roadway widening and restriping; minor paving, etc.), it is the Construction Engineers within the MCDOT Construction Branch that will take the lead of the project during construction. For this reason, the Construction Branch Manager (or delegate) shall be actively involved with review of the scope of work prior to communication to the contractor, shall be actively involved throughout the scoping process with the contractor to assure uniformity with other work, and shall concur with the final Work Order amount.

Once an approved Work Order is established, the Construction Engineer will take the lead role in administering the project. Those outlined in this Construction Management Manual shall then be implemented during execution of the work as would be for any other construction project administered by MCDOT.
III. PARTNERING

III.1: Overview and Partnering Facilitator

The intent of this section is to recognize that the Department will deal with the Contractor in a professional and businesslike manner. Construction Engineers, Inspection Supervisors, and Inspectors are expected to be honest, fair, and impartial in their dealings with the Contractor. It is not the Department’s intention to take unfair advantage of the Contractor or exploit a predicament of the Contractor's to the Department’s advantage. While every project is unique, a common theme of successful projects is that when the people involved truly adopt the partnering concepts, projects are more frequently constructed on time, within budget and with fewer unresolved disputes at the end.

**Partnering Facilitator**

The kickoff of a project, particularly large projects, will include the addition of a neutral person who can assist in the initiation, adoption and implementation of partnering with the construction project personnel. Working with the MCDOT Partnering Coordinator, this Partnering Facilitator will be mutually selected by the Construction Engineer and the Contractor from the MCDOT On-Call Facilitator list. The facilitator’s role is to educate and promote the partnering concepts within the project team throughout the duration of the project.

The facilitator will lead a Construction Kickoff Workshop to promote team building; establish roles, goals and expectations; establish the project-specific partnering process; develop risk/opportunity management strategies and action plans to resolve issues; and obtain commitment from the project team. *The Partnering Facilitator and the Kickoff Workshop is discussed in detail in Section 108.*

Facilitators should have familiarity with highway construction practices, MCDOT terminology and processes, and well as MCDOT’s Issue Resolution (Escalation) Matrix. The focus of this individual is to serve as a neutral professional to assist the team with communicating effectively to build trust and consensus, while allowing project teams to solve problems themselves. A facilitator is not a mediator or arbiter of issues for the project team (although these skills become a valuable resource to be effective and illustrate the other party’s point of view); the project team will adopt and follow a separate dispute resolution process that usually does not directly involve the facilitator.

Periodically throughout the project, the facilitator should be interacting with the project team to determine if the team needs assistance with on-going communication, risk assessment, dispute prevention and team evaluation. The facilitator may attend an occasional project weekly meeting to understand and see first-hand the team dynamic and state of the team relationship. Follow-up partnering session(s) may be necessary to help re-focus the team toward common project goals and expectations based on reaction to the monthly partnering evaluation results or part of a planned event to acknowledge the start of the second half of a large, multi-year project. In all cases, the facilitator’s experience with other project teams and their neutral role...
is a unique and valuable resource for all Stakeholders. It is important they stay connected with the project team leaders as a minimum to help them move forward together and succeed.

**Win/Win Solutions and Doing What is Best for the Project**

A dilemma that many Construction Engineers and Inspection Supervisors face is how to remain impartial and be fair to both the Department and the Contractor. The best solutions to project issues are the ones that meet the needs of all stakeholders.

Win/Win solutions should always be explored first. Sometimes Contractors may not perceive that the solutions you propose are win/win. On the other hand, their solutions may not be perceived by you as win/win either. As an alternative, look at each project issue separately and then do what is best for the project, rather than what is best for either the Contractor or the Department.

This means that sometimes the Contractor will have to do more work than expected and other times the Department will have to pay more than expected. If you are continually doing what is best for the project, it is difficult to be perceived as biased and unfair when a win/win solution cannot be reached. Experienced Construction Engineers and Inspection Supervisors have a clear sense of what is best for the overall project in terms of quality, schedule, and costs. By doing their best to balance these needs between the Contractor and the Department, they can help achieve good faith and fair dealing with the Contractor.

**III.2: Escalation of Issues**

There will be times whereby the contractor and MCDOT representatives disagree, which is a condition that almost always exists on every project. Neither the contractor nor MCDOT is obligated to agree on all issues, all the time. Disagreement can be healthy for the contractual relationship that exists between the two parties, as it allows each party to express their disagreement in an effort to attain a resolution at a higher authority level that is mutually agreeable or one that can improve or clarify the condition for the future.

A Resolution Ladder, or Escalation Matrix, is the vehicle provided through the Partnering relationship by which disagreements can be elevated to the next level of organizational authority. This provides a means to deal with disagreement in a professional manner and provide an organized, time-sensitive approach to solving problems while keeping the project moving forward to ultimate completion.
### Escalation Matrix (typical)

<table>
<thead>
<tr>
<th>MCDOT</th>
<th>Contractor</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Inspector</td>
<td>Field Foreman / Superintendent</td>
<td>Hours to no more than 1 work-shift</td>
</tr>
<tr>
<td>Inspection Supervisor / Construction Engineer / RE.</td>
<td>Project Manager</td>
<td>1 to 3 days</td>
</tr>
<tr>
<td>Construction Branch Manager</td>
<td>Project Manager or Regional Manager</td>
<td>As agreed</td>
</tr>
<tr>
<td>Construction Division Manager</td>
<td>Regional Manager or Vice President</td>
<td>As agreed</td>
</tr>
<tr>
<td>Director / County Engineer</td>
<td>Vice President, President or Owner</td>
<td>As agreed</td>
</tr>
</tbody>
</table>

Partnering is a voluntary relationship that both parties mutually agree to participate in before the project begins. However, there may still be contractual items whereby both parties still disagree after exhausting the Resolution Ladder that the contractor must follow the contract in terms of dispute resolution. This may result in filing a claim, mediation, arbitration and/or litigation. Each party is encouraged to resolve issues at the lowest, responsible level, but is in no way obligated to do so.

Each member on the Resolution Ladder has the responsibility to understand what the disagreement is and not hold onto an issue too long. Each party must first try to identify what specifically the item of disagreement is – seek first to understand, then be understood. At lower levels especially, it is common that personality differences can lead to disagreement more quickly. Focus on factual content to identify the source of disagreement. One easy way is to restate what the other party’s position is related to a specific issue. By doing so, if the other party concurs with your statements and both agree to mutually escalate the issue, this method will assist with communicating the source of disagreement to the next level of authority.

**Don’t hold onto an issue too long**
The other advantage for having a Resolution Ladder is to keep the project from being unnecessarily delayed due to indecision. For any issue, there is a certain amount of gathering of facts, supporting documents, and other related research to lend toward the final resolution. While some time is usually needed by both parties, be mindful of the criticality of the issue as well. Many times, it is better to prematurely escalate a critical issue so that both parties can mutually explore the problem than it is to retreat, over-research and speculate what position the
other party may be formulating. Neither party can refuse to escalate an issue, but both parties have an obligation to act in the best interest of the project to keep it progressing forward.

III.3: Construction Engineer/Inspectors Roles “as a Partner”

**The Construction Engineer as a Partner:**
- Champions partnering and sets the example on what a partner should be;
- Ensures everyone is playing by the partnering rules;
- Periodically evaluates the partnering process and makes improvements;
- Is proactive in looking for below-the-surface conflicts between partners;
- Says the things that need to be said to maintain the harmony of the group;
- Listens to the other partners; and
- Always recognizes the Contractor’s good work.

**The Inspection Supervisor as a Partner:**
- Looks ahead at upcoming construction work for possible conflicts with the Special Provisions, Standard Specifications and Project Plans;
- Helps the Contractor’s staff interpret plans and specifications;
- Is flexible in staffing the project to accommodate the Contractor’s needs when possible;
- Provides the Contractor with timely feedback on noncompliance issues;
- Communicates frequently with the Contractor’s foreperson and superintendent; and
- Always recognizes the Contractor’s good work.

**The Inspector as a Partner:**
- Uses knowledge of the Project Plans, Special Provisions, Standard Specifications and other contract documents to warn the Contractor early about potential problems;
- Escalates unresolved issues quickly;
- Doesn’t waive contract requirements just to get along;
- Anticipates noncompliance issues and brings concerns to the Contractor’s attention as soon as possible;
- When rejecting work, remains fair and sensitive to the Contractor’s predicament, and works with Contractor in correcting deficiencies;
- Continually reviews contract documents to make sure the Contractor’s operations do not accidentally fall into noncompliance; and
- Appreciates the work the Contractor is doing for the Department and the taxpayers, and both praises and encourages good performance.

Partnering works best when people are proactive. They anticipate and resolve issues before these issues affect their partner’s performance. Any conflicts or issues are resolved in a meeting room before the work begins, not on the project site as soon as work grinds to a halt.
III.4: Evaluating Partnering

It is important in Partnering to periodically self-evaluate and measure the success of the Partnership and the process. Each project typically has five goals, and additional goals may be added by the project team to further customize the measurement tool to fit the project. Regular evaluation reports should be shared with all team members and action plans for improvement developed when indicated. Periodic evaluation reports should be thoroughly reviewed by project management personnel so necessary improvements or corrections can be implemented. This provides an excellent opportunity to discover and correct conflicts that may exist. The evaluation is often done by an on-line survey based on the unique goals of the project.

For partnering to work, the Construction Engineer must review these evaluation forms and look for areas that need improvement. Taking action to improve a situation or a relationship is one of the most difficult things to do in partnering. Admitting mistakes, apologizing, or trying to correct someone else’s behavior requires character and fortitude.

MCDOT encourages each Construction Engineer to take a leadership role in these areas and set an example for the rest of the project team. The Construction Engineer should try to probe for any hidden partnering issues and bring them out in the open for discussion. Sometimes a separate, private meeting works best at revealing problems and resolving issues. For example, some Construction Engineers have a small, separate weekly meeting with just the superintendent, a key foreperson and the Inspection Supervisor after the formal weekly meeting. Other Construction Engineers take a driving tour of the project with just the Contractor’s Superintendent once a week so they can be alone to discuss the project.
IV. FEDERAL REQUIREMENTS

SEE SECTION IV. FEDERAL REQUIREMENTS: UNDER SEPERATE COVER

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V. CHANGE ORDERS

V.1: Overview

This Section provides a general discussion of Change Orders and the Department’s Change Order process and Change Order Components; including the Subcategories designations that are used for tracking and monitoring cost growth and trends. A more detailed and technical discussion of Change Orders in the context of the MAG Standard Specifications is included in Sections 109.4 and 109.5.

A contract change is merely something different than what the contract requires. On a roadway construction project of any size, contract changes are inevitable and may occur for a variety of reasons. The Department, as the project owner, has the right to make changes that it deems necessary for the satisfactory completion of the project; in turn, the contractor has the right to receive an equitable adjustment in payment or contract time.

When the contractor perceives a change to the contract, he must provide written notice whether it is: due to instructions from the Construction Engineer; due to physical conditions; or due to other circumstances related to the prosecution of the construction contract. The purpose of the written notice is to 1) communicate that a change has occurred that will result in additional cost and 2) provide MCDOT an opportunity to mitigate any additional costs.

The first condition should provide the contractor and MCDOT an opportunity to resolve issues as they arise during the course of constructing a project, rather than allow issues to manifest themselves into a large claim at the end of the project. This notification identifies very early that a change has occurred that may result in additional costs. In the event the Engineer’s instructions unknowingly create a condition that causes additional costs, this simple yet effective notification will afford the Engineer an opportunity to change the instructions if practical.

The second condition protects MCDOT from consenting a “blank check” for the contractor to carry out the Engineer’s instructions. There may be situations that a decision between hypothetical Method A and Method B could result in significant savings one from the other. This written notification, and subsequent discussion, will afford MCDOT representatives an opportunity to ascertain the risks and related costs and provide comprehensive direction to the contractor.

Also, it is much easier to address these types of issues as they occur, to establish the merits or entitlement of each issue, mutually agree to a course of action and determine if any additional compensation is warranted in real time. By resolving issues in this manner, the project can move forward more efficiently, allows the contractor a better opportunity to plan the remaining work and gives greater chance that the project can be closed out quicker at its conclusion.
Changes to the contract are specified in and communicated to the contractor by a Change Order document. The Change Order shall clearly specify the reason for the change, identify the plan details or specification(s) that are changed, specify the cost items that are created or modified by the agreement, and provide an independent cost analysis by the Engineer.

A Change Order must be issued to accomplish extra work, for differing physical condition work, for item quantity adjustments, or for changes to the design details. If alterations to the work considerably increases or decreases the total cost of the contract or total cost of any major item by more than 20 percent, either the contractor or MCDOT may request an adjustment in payment in accordance to Section 109.

V.2: Change Order Subcategories

The Department tracks and monitors the cost of Change Orders (Pending & Approved) by means of a Change Order Log. Each Change Order is organized by subcategory, chosen to identify trends as well as elements of plans, specifications and contracts for improvement for future projects. The Construction Engineer specifies the subcategory from the list below when the Change Order is drafted. The Construction Engineer should make a conscious effort keep issues related to only one subcategory within a change order.

**Change Order Subcategories**

1. Utility Conflict
2. Right-of-Way Conflict
3. Quantity Adjustment
4. Work Out of Scope (MCDOT)
5. Work Out of Scope (Other Jurisdiction)
6. Plan Revisions
7. Changed Physical Condition
8. Environmental
9. Value Engineering
10. Other

**Utility Conflict**
This item is to be used for any conflict due to utilities. Categorize per the following:

- **a)** Preventable. This subcategory is for utilities conflicts that “could” have been resolved prior to bidding or included in the contract for resolution.
  
  - **i)** Examples; no potholes taken or offset potholes, utilities not noted on plans, obvious utilities observed during field reviews, such as water meters, water valves, but no waterline shown on plans.

- **b)** Un-preventable. This subcategory is for utilities conflicts, such as:
  
  - **i)** Unknown subsurface utility conflicts that could not have been known at contract award, “Blue Stake” did not pick up utility, abandoned utilities that no one claims, etc.

**Right-of-Way Conflict**
This is for any work with costs that relates to Right-of-Way, temporary easements, or other that was incurred after bidding.

**Quantity Adjustment**
Use this type for any increase in cost resulting from an increase due to quantities. Categorize per the following:

a) Preventable. This subcategory is for quantity increases due to errors or omissions on the engineer’s estimate, missing obvious line items that “should” have been anticipated prior to bidding or included in the contract for resolution.
   i.) Examples: no officer allowance line item for projects near signalized intersection, miscalculations in estimate, or an owner initiated major item quantity increase or decrease of more than 20 percent of the plan quantity.

b) Un-preventable. This subcategory is for quantity increases that are due to owner-initiated changes to provide an improved project or reduce future maintenance.
   i.) Example: MCDOT or other jurisdiction requested additional pavement (or other line item quantity) in order to reduce future maintenance. This sub-category is not intended to change the original scope of the project but to provide an improved project. The Final Quantity Adjustment Change Order that is drafted at the conclusion of a project is considered to be un-preventable.

**Work out of Scope (MCDOT) & (Other Jurisdictions)**
This is for work not required nor included in the original contract but has later been deemed desirable for satisfactory completion of the contract. The Scope refers to the project limits and the major design elements required to meet the project purpose and needs. The Scope of the project was developed in the Scoping Phase and refined in the Design Phase; changes in scope during the Construction Phase should not normally be necessary. In general, the addition or deletion of designated elements such as a passing or turning lane would be a change in the project scope. This also includes enhancements or special products requested by other MCDOT departments, or outside agencies such as tribal governments, irrigation districts, utilities, local governments, etc. The extending or shortening of a pipe to meet field conditions would not be a scope change.

When there is doubt as to whether a contract modification constitutes a scope change, the Construction Project Manager or Construction Engineer should consult with the Design Project Manager and jointly make the determination. Change Orders for additions or deletions which change the scope as defined in the contract documents require the concurrence of the Design Project Manager. The cost of these improvements may compete with funds for new projects and should only be done with a very good reason.

**Plan Revisions**
Use this type when the plans did not accommodate existing visible field conditions, at the time of construction and a change to the design is desirable.
These changes may be within the original scope of design and details should have been on the original plans. These changes should be examined to determine if improvements could be made to the design process.

**Changed Physical Condition**
Use this type when an unusual and unknown condition occurs on the project after award of the contract.

Examples: Unknown utility conflicts or other subsurface conditions, unknown or unusual material characteristics, unusual acts of nature, or vandalism. This is a hidden condition that could not be known at contract award. This change cannot be controlled, estimated, or decreased. This subcategory explains that a certain percentage of the construction budget must be allocated to address construction conditions that cannot be predicted.

**Environmental**
Use this type when environmental mitigation is needed.

Examples: bones or pottery shards found, asbestos testing or mitigation of concrete or paint, etc.

**Value Engineering**
This is a contract change in which both the owner and the Contractor agree to alter the contract in some way in order to reduce the total contract amount. Both split the savings 50/50. The contractor usually proposes this change and the owner accepts or rejects it. These changes are examined so that future designs will include the value engineered improvements.

**Other**
Use this type when none of the other subcategories match with the topic of the Change Order. However, use of this subcategory should be utilized sparingly.

Examples of this subcategory:
- The assessment of a penalty that is not specifically stated in the contract, whereby a materials is allowed to remain in place at a reduce unit price – such as a $1.00 penalty per ton of ABC that fails to meet gradation, but after applying engineering judgment is allowed to remain in place.
- The final settlement of a claim that is not directly related to any of the other subcategories; or is a combination of various subcategories and not the majority of only one subcategory.

**V.3: Change Order Components**

The Construction Branch has general format and component requirements for Construction Change Orders for purposes of consistency among projects and conformance with County requirements.
Included in Appendix C are two Construction Change Order General Format Examples. The Examples demonstrate the following three components to a Change Order submittal.

1) **Pre-Authorization Request prepared by the Consultant Resident Engineer** and submitted to the project’s MCDOT Construction Engineer and the Construction Branch Manager for their Concurrence; and to the MCDOT Design Project Manager for purpose of notification.

   The Pre-Authorization outlines (as a minimum) the change, estimated cost, reasons, justification and the Resident Engineer’s recommendation for concurrence.

   *The Pre-Authorization is required in order to allow the Contractor to start the change order work prior to submittal and approval of the Change Order.*

2) **Change Orders are composed of following three components:**

   a. **Change Order Cover Sheet** – Agreement summary and executed signature sheet
   
   b. **Change Order Line Items Sheet** – Itemized quantities, unit prices and total cost of the work added by the change order agreement
   
   c. **Attachment “A” Supporting Documentation** which is limited to:
      - Change Order Scope
      - Change Order Specifications, if applicable
      - Change Order Plans, if applicable

   *Upon execution of the Change Order, the above three Items a, b & c become a part of the Contract.*

3) **“Supplemental Information For MCDOT Internal Review, Not Part Of Change Order”** which includes, but is not limited to the following:

   a. Contractor’s Cost Analysis/Change Order Request
   b. Resident Engineer’s Independent Cost Analysis
   c. Other pertinent or relevant Information or Correspondence
   d. Department Concurrences

   *The “Supplemental Information” is a separate document from the Change Order; and is not provided to the Contractor; and does not become a part of the Contract.* It accompanies the Change Order when routed for review, approval and signatures by MCDOT and/or County Management.
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VI. LESSONS LEARNED

VI.1: Overview and Process

MCDOT is committed to continuous improvement in delivery of County transportation projects. As part of this, MCDOT recognizes that a review of lessons that are learned during the development and construction of projects is a valuable tool in improving the process of delivering successful projects. In addition to the following paragraphs, the MCDOT Lessons Learned process is discussed in Section 2-2.14 of the MCDOT Project Delivery Manual (PDM).

A “lessons learned” session is held after each phase of project development (Scoping and Design) and near the end of the Construction phase. The Construction phase lessons learned session is held after substantial completion occurs and as part of the MCDOT close-out process of the entire project. The Construction Engineer is responsible for holding the Construction lessons learned and for inviting the members of the Project Team and Stakeholders. In preparation for the session, the Construction Engineer will use the MCDOT standardized lesson learned template to list the lessons for review and discussion in the session. The standardized template is found in Appendix 2-H of the MCDOT Project Delivery Manual (PDM).

A lessons learned session may not be required on all projects as is determined on a project by project basis depending on the project circumstances and outcome. The Construction Engineer and the Project Manager should mutually determine if a lessons learned for a project would be of value and necessary. The Construction Engineer should then communicate with the Project Team if the project was successful and a lessons learned session is not needed.

The lessons learned session provides a forum and opportunity for the attendees to discuss ways to improve future processes and procedures and for the Construction team to provide useful and constructive feedback to the Design team on the projects design. The session is not limited to project challenges but also provides for team member recognition and discussion of project successes. The Project Manager and Construction Engineer will document the lessons learned session and send the results to the Branch Managers and Division Managers. The lessons learned document will become part of the final project documents.

VI.2: Common Lessons to Consider

Following is a summary of those lessons learned during the construction phase that have been found to be significant or commonly occurring and are therefore recommended to be considered while preparing for or managing the construction phase of a project.

**Coordination between projects**
Coordination with other adjoining or nearby MCDOT projects that are planned for sequential construction is important when changes occur. The Construction Engineer or Construction team should communicate with the Project Manager and/or assigned Construction Engineer when changes occur that may affect or create a conflict for the other project. This is particularly important if the schedules are tight and there may not be adequate time to update the plans for “as-built” changes.

**Pre-activity meetings**
Pre-activity meetings with the prime contractor and sub-contractor are encouraged as a best practice for most work activities, even for the small activities. The Construction Engineer or Inspector can ensure that the contractor(s) understand the scope of the work activity and the specifications, so the contractor(s) are prepared when they arrive. This can help the contractor(s) avoid costly rework or remobilization.

**Care of existing traffic signs**
Contractors should be reminded of expectations to avoid damaging existing traffic signs and sign sheeting that are covered as part of the construction Traffic Control. The signs must be left in same or better condition after the project is complete. Good practice is to make sure contractors avoid using metal sign covers with rough surfaces and that cover bolts are not scratching the sign sheeting.

**Traffic control for Survey crews**
The importance of providing traffic control for the safety of Survey crews during construction should be emphasized by the Construction Engineer and Inspector and coordinated with contractors. Traffic Control Plans and work zones often focus on the construction work being performed but often do not necessarily take into account the work area of the Survey crew. This often occurs on long, lineal pavement overlay or large reconstruction project where survey work is performed further ahead or behind where the actual construction is taking place. A specific item on the contractor’s responsibility for traffic control for Survey should be included on the Preconstruction Meeting agenda and the Weekly Meeting agenda. Close coordination and frequent communication with the Survey Crew Chief is often needed.

**Traffic control and school bus routes**
School bus routes and schedules need to be a priority in traffic control planning and implementation. Children must arrive at school on time and school buses cannot be delayed in transporting children to school. Daily work activity planning must accommodate school bus schedules both before and after school and school buses must be given priority when they are traveling through the work zone. A specific item on school buses should be included on both the Preconstruction Meeting agenda and the Weekly Meeting agenda when a school bus route is within a project work zone or vicinity.

**Traffic control coordination between contractor and subcontractors**
Issues of traffic control not being set up or taken down timely have caused needless lane closures or work zones not being in place when work is performed. Traffic control setup and takedown procedures should be on the Preconstruction Meeting agenda to discuss specific
procedures in order to avoid safety issues, contractor down time, and negative public perception.

**Maricopa County Stormwater Permit submittal review time**
The Maricopa County Environmental Services Department (MCESD) is responsible for regulating work activities performed within the Maricopa County Municipal Separate Storm Sewer System (MS4) area under the MS4 General Permit enforced by ADEQ. A Maricopa County Stormwater Permit from MCESD is required for construction projects activities within urbanized unincorporated areas (UUA) of the County which define the County small MS4. When a project is within an UUA, an application for coverage under the County Stormwater Permit is made by the contractor to the Maricopa County Planning and Development Department (P&D) and the installed preconstruction BMP’s must be inspected and approved by P&D before any field work is conducted. The Construction Engineer should make the contractor aware as early as possible, of the 4-week time span required for P&D review of the preconstruction submittal and approval of the installed BMP’s before construction can begin. At a minimum, the Stormwater permit submittal and the review time by P&D should be on the Preconstruction Meeting agenda.

**Lessons Learned Weekly Meeting Agenda item and topic**
A Lessons Learned item should be on the Weekly Meeting Agenda to create and maintain an ongoing log of lessons learned during the project. New lessons learned can be discussed and added to the log each week and prior lessons can discussed and implemented, if appropriate.

**Precast concrete structural component fabrication by out of state supplier**
When precast concrete structural components will be fabricated out-of-state, the fabricator is required to perform and fulfill the testing and quality control tasks in accordance with the project special provisions. The Resident Engineer should arrange with MCDOT Materials Technology Branch for an on-call consultant lab as the secondary testing lab for only if the out-of-state fabricator will not fulfill the testing requirements in the project special provisions. The arrangements should be made early on so the secondary lab is available if needed. This is intended only as a backup contingency plan to be used as a last resort to avoid delays to the project.

**Construction project Partnering costs**
Since the Partnering program provides benefits to both MCDOT and the contractor, the Partnering expenses on MCDOT construction projects are shared equally between MCDOT and the contractor. The MCDOT Project Construction Engineer and Partnering Coordinator should obtain a fee proposal from the selected on-call Partnering Facilitator for the entire Partnering program being considered for the project. This provides the opportunity for MCDOT and the contractor to review and be aware of the Partnering expenses prior to the facilitator beginning work. This will help avoid surprises when the facilitators invoice for the project Construction Kickoff Workshop (Partnering & Preconstruction Conference) is received following the workshop.

**Environmental Analysis (EA) for earthwork borrow sources on federal projects**
MCDOT and MAG specifications do not have requirements for contractors to conduct Environmental Analysis (EA) for earthwork borrow sources. A modified ADOT Stored Specification 104.12 is typically used on MCDOT federal projects with modifications including the requirement for submittal of the EA to MCDOT for review and approval, rather than ADOT. The Resident Engineer should ensure the contractor is aware of the modified specification and understands and follows all requirements including the submittal, review and approval provisions. This will help avoid delays that occur when the contractor mistakenly submits the EA to ADOT who will respond that they will not review unless the borrow source is available for ADOT use and eligible for inclusion on the ADOT Materials Sources list, which is normally not the case.

**MCDOT Federal Northern Parkway Program hybrid Special Provisions**
The Special Provisions on the federal-aid Northern Parkway Program construction projects are a hybrid based on the ADOT Standard Specifications combined with MAG Uniform Standard Specifications; the MCDOT Supplement to MAG; and applicable specifications of the local government jurisdiction agency. This hybrid Special Provision can be a source of confusion for those who don’t familiarize themselves with it and assume it to be the ADOT Specifications. The Resident Engineer and his/her Construction Administration and Inspection Team should become thoroughly familiar with the projects Special Provisions and ensure the contractor is aware of, understands and follows all requirements of the Specifications. The contractor is encouraged to do the same with their subcontractors. It is recommended to include a discussion of the hybrid Special Provisions on a projects Construction Kickoff Workshop Agenda.

**Federal compliance monitoring**
There are many issues and challenges that are common and inherit to the compliance monitoring of contractor activities on federal funded projects that are not unique to MCDOT. These include but are not limited to, contractor Disadvantaged Business Enterprise (DBE) and certified payroll submittal and reporting. Following is a summary of several along with recommendations for possible improvement.

- **MCDOT has an LCP Tracker system that is separate from ADOT.** This has been a source of confusion for Contractors. MCDOT and the projects CM Consultant staff will continue to emphasize and clarify this in the project Preconstruction Office Meetings that discuss federal requirements as well as in the Preconstruction Conference.

- **Material Certification requirements.** The required information and content necessary for approval of Material Certifications as required for federal compliance and defined in the ADOT Quality Assurance Requirements is often a challenge for both the MCDOT CM Consultant and the contractor. The requirements and the contractor’s responsibility for obtaining appropriate Materials Certificates from material suppliers should be discussed in the Preconstruction Conference and the status reviewed in the Weekly Meetings. The Weekly Meeting Agenda three-week look ahead schedule review is an opportunity to discuss materials certificates that will be necessary in advance of upcoming work.

- **Contractors Project Manager and Office staff awareness of lower tier subcontractors.** Prime contractors are often unaware of lower tier subcontractors
(subcontractor sub-contracts) and this results in the lower tier starting work without an approved subcontract. This is often discovered on site during the contractor employee interviews and the lower tier is then removed from the site which can result in delays to the project. The Weekly Meeting Agenda three-week look ahead schedule review is an opportunity to discuss anticipated subcontractor (and lower tier) work and their subcontract approval status.

- **Trucking company subcontracts.** Often trucking companies do not have approved subcontracts or deminimus documentation prior to coming on site. When this occurs, they must be removed from the project until the proper documentation is submitted and approved which can result in delays to the project. The contractor’s responsibility for trucking subcontracts or deminimus documentation should be discussed in the Preconstruction Conference and the status reviewed in the Weekly Meetings. The Weekly Meeting Agenda three-week look ahead schedule review is an opportunity to discuss/anticipated work by the contractor and subcontractors and associated trucking subcontract approval status.

- **Subcontractor payment confirmation in the ADOT DBE system.** ADOT has implemented a DBE specification with stricter penalties for timely payment and reporting which is required and included in MCDOT contracts. MCDOT together with the project’s CM Consultant staff should continue to have project Preconstruction Office Meetings with the contractor’s federal compliance staff that discuss federal requirements and an emphasis should be on the DBE reporting requirements. Payment reporting status should continue as a topic on the Weekly Meeting Agenda.

- **Late payroll reporting in LCPTTracker.** Federal contract provisions required and included in MCDOT contracts include late payroll penalties. The Weekly Meeting Agenda includes a federal and payroll item for review of status and issues. Continued emphasis by the MCDOT and the projects CM Consultant staff on payroll reporting requirements is recommended.

- **Contractor DBE and payroll closeout submittals and reporting required for contract closeout and final payment are often inaccurate and late.** MCDOT together with the project’s CM Consultant staff should continue to have project Preconstruction Office Meetings with the Contractor (and subcontractors) that discuss federal requirements and an emphasis should be on the final DBE submittal and reporting requirements and the final certified payrolls requirements. It should be mandatory that not only the Prime Contactor’s office staff responsible for federal compliance attend this meeting, but also those of every subcontractor. It is also important that the Prime Contractor’s Project Manager attend. Additionally, a Pre-Closeout Meeting should be held before substantial completion in which the closeout tasks, requirements and all outstanding items are reviewed and explained.
VII. PROJECT CLOSEOUT

VII.1: Overview

Final Payment of the construction contract is the first of three separate, but related closeouts that the Construction Engineer completes before a MCDOT Project in its entirety, can be considered closed and completed.

- Construction Contract Closeout – See Section 109.7 (Final Payment)
- Construction Project Closeout
- MCDOT Phase and Project Closeout (Construction Phase)

The Construction Contract Closeout is reviewed in the Final Payment discussion of Section 109.7 and on the “MCDOT Construction Contract Closeout (Final Payment) Documents” in Appendix G, which lists and discusses the documents required for Final Payment.

The Construction Project Closeout and the MCDOT Project Phase Closeout are discussed within this Section.

VII.2: Construction Project Closeout

After preparing and submitting the Final Payment (retention release) for closeout of the construction contract as discussed in Section 109.7, the Construction Engineer will continue towards Closeout of the Construction Project.

To Closeout the Construction Project the Construction Engineer will complete and submit the “MCDOT Closeout Checklist for Construction Contracts / Construction Projects” in Appendix G and assure each item is included in the final project documents and files submitted to the MCDOT Construction Branch. It should be noted that this is a general list that fits most projects, but it may not include all required documents for every project.

The Closeout Checklist designates each item as being “Required for Contract Closeout (Final Payment)” OR “Required for Construction Project Closeout” by denoting with “C” or “P”, respectively. Many of the items are reviewed in Section 105.15 (Project Acceptance); Section 109.7 (Final Payment); and the “MCDOT Construction Contract Closeout (Final Payment) Documents” in Appendix G. Following is a review of several items not discussed elsewhere.

Environmental Assessment/Clearance Compliance: The Construction Engineer shall complete the MCDOT Environmental Compliance Certification (Appendix G) that all mitigation measures have been completed according to the project Environmental Assessment/Clearance.

Federal Aid Projects: In addition to the requirements outlined herein, federal aid projects require documentation showing conformance with labor standards requirements including
employee interviews, payroll certifications and restitution where employees have been underpaid. *All federal aid project and labor standards requirements are reviewed discussed in detail in Section IV, Federal Requirements, under separate cover.*

**Final Record Drawings:** The Construction Engineer is required to finish and transmit the Final Record Drawings (As-Built plans) within a maximum of 90-days from Final Acceptance. The Final Record Drawings shall be prepared in electronic pdf format and accurately drawn to scale, together with all necessary explanatory and reference notes included. They should include all changes from the bid documents, change order work, and utility relocation work. *The Construction Branch Record Drawing Standard Operating Procedures (SOP) should be referred to for guidance and requirements.*

**Project Files:** The hard-copy project file established according to the MCDOT PC&I Division Filing Indexing Guide and maintained during the project will be submitted at closeout of the Construction Project. The project file will include all applicable documents necessary to provide a complete and accurate job record from beginning to end. The file shall contain (but not limited to) relevant correspondence pertaining to valuable project information and/or project decisions, daily inspection diaries and logs, reports, test results, photographs, documentation for cause of delays, payment requests, change orders, field orders and sketches, survey notes, quantity estimates, shop drawings, maintenance manuals, manufacturer's instructions, parts lists, or other pertinent data applicable to the project. Electronic Project Record Documents (pdf format) in accordance with the Filing Indexing Guide are submitted on a monthly basis throughout the duration of the project and the last remaining files are submitted with or before the Project Files.

The hard-copy file records are stored in the Construction Branch Office until Final Acceptance or through the end of the one-year warranty. At that time, the project files are transferred to the MCDOT Document Warehouse. All records are retained in accordance with the County Records Policy.

**Permit Closeout:** All permits required for construction of the project shall be closed by the Contractor before final payment. Documentation of the closed permits shall be included in the Project Files.

**Intergovernmental Agreements (IGA):** As discussed in “MCDOT Project Phase Closeout” of this Section, MCDOT may enter into an Intergovernmental Agreement (IGA) with another government agency for improvements to and annexation of a County roadway. Besides computing cost share amounts, the Construction Engineer should assure all other terms or conditions stipulated in the IGA have been met.

**VII.3: MCDOT Phase and Project Closeout**

The MCDOT Closeout process of the Project in its entirety, including all phases and discipline areas, is performed once the project objectives have been met. *The MCDOT Phase and Project Closeout process and requirements are discussed in detail in Section 2-2.11 and 2-
2.12 of the MCDOT Project Delivery Manual (PDM). An overview of this MCDOT Project Closeout process is provided in the following two paragraphs.

The MCDOT Project Closeout process is initiated by the Construction Engineer after construction Substantial Completion is reached. At this milestone, the Construction Engineer will change the phase in the TIP Application to “Project Closeout” which will initiate the Project Closeout process during which each MCDOT Branch is responsible to complete the Closeout tasks for their discipline area. *A link to the MCDOT Closeout Process memo discussing specific roles and responsibilities is provided on the Closeout Tab in the TIP Application.*

The Scheduler in the MCDOT Transportation Project Management Branch oversees and monitors the status of the project closeout and will coordinate with each project team member as needed. In order for a project to be considered complete, all tasks within the closeout process for each discipline area are to be satisfied. The Scheduler will change the phase in the TIP Application to “Completed” after the closeout tasks have been completed by each discipline area.

**VII.3.1: Construction Phase Closeout Tasks**

As part of the MCDOT Phase and Project Closeout process, the Construction Engineer is responsible for completing the following Closeout Tasks (eleven in total) as assigned on the Construction Closeout Tab in the TIP Application.

- Substantial Completion Letter to Contractor
- Final Acceptance Letter to Contractor
- Contractor COP and Final Construction Invoice Approved and Submitted for Payment
- CM Consultant COP and Final Invoice Approved and Submitted for Payment
- Lesson Learned Meeting Complete
- Final Record Drawings Complete and Engineering Specialist Notified
- Final Record Drawings Uploaded to OnBase
- Final Construction Cost Share Prepared/Submitted to Finance for IGA Cost Share Invoice
- Filing and Archiving Process Documentation Complete
- Consultant Evaluation Form Complete
- Coordinate with Asset Program Supervisor to Confirm Asset Inventory is updated

At the initiation of the Project Closeout process, each MCDOT Branch enters on the TIP App Closeout Tab, their “Forecast” date for completion of all their discipline area Closeout Tasks. The Construction Branch has developed the following Total Durations (based on construction delivery type) for completion of all Construction Phase Closeout Tasks for a project. The Construction Engineer uses these Total Durations when entering the “Forecast” Closeout date in the TIP Application. Upon completing All Tasks, the “Actual” date of the Construction Phase Closeout is entered in the TIP App. It is important to adhere to the Total Durations whenever possible.
Construction Phase Closeout Total Durations (start at Substantial Completion)

- Article 5 Bid projects Without IGA: 210 days (7 months)
- Article 5 Bid projects With IGA: 270 days (9 months)
- Federal Article 5 Bid projects: 300 days (10 months)
- JOC Projects: 150 days (5 months)
- JOC Projects With Consultant: 210 days (7 months)

The Construction Phase Closeout Tasks are for the most part self-explanatory, but several are discussed below.

**Substantial Completion and Final Acceptance** of construction, and the requirements and conditions necessary for the Contractor’s work to achieve these milestones are discussed in Section 105.15.

**Final Payment of the construction contract** and the requirements, conditions and documents necessary for final payment of the contractor’s work are discussed in Section 109.7.

**The MCDOT Lessons Learned Meeting** and process is discussed in Section 2-2.14 of the MCDOT Project Delivery Manual (PDM) and in Section VI herein.

**Final Record Drawings** - As mentioned in “Construction Project Closeout” of this Section, Final Record Drawings are discussed in detail in the Construction Branch Record Drawing Standard Operating Procedures (SOP). Per the SOP, the expectation is for the Final Record Drawings (prepared in electronic PDF format) to be finished and submitted within a maximum of 90-days from Final Acceptance for upload and archive to MCDOT OnBase.

**IGA Cost Share** - MCDOT may enter into an Intergovernmental Agreement (IGA) with another government agency for improvements to, followed by annexation of, a County roadway. In many IGA projects, MCDOT is the “Lead” agency responsible for design and construction of the project improvements and the “Partner” agency will participate by providing funding for a “share” of the Design and/or Construction costs. On such projects, the Construction Engineer is responsible for computing the Cost Share of the Project’s Final Construction Cost based on the cost share terms specified in the IGA. The Design Project Manager is responsible for determining the Design Phase Cost Share. The Cost Shares are provided to MCDOT Finance for invoicing the Partner agency.

**The MCDOT Filing and Archiving process** for project documentation of the Overall MCDOT Project (including all phases) is discussed in Section 2-2.3 of the MCDOT Project Delivery Manual (PDM) and is summarized in the following overview paragraph.

The purpose of project filing is to track project related information through the project development process and to file those documents defined as public records, for archiving at the conclusion of the project. All TIP projects shall file project related documentation electronically using a standard file structure within MCDOT’s SharePoint Project Site. At the conclusion of each project phase, only the public record files located within the Project Site in
SharePoint will be archived following MCDOT’s archiving process. In general, the overall MCDOT Project documents that are defined as public record include, but are not limited to: meeting agendas and minutes; signed IGA documents; email correspondence with valuable project information and/or including a project decision; signed and sealed project submittal documents; contracts and change orders; signed/approved invoices; construction documentation; and construction Record Drawings.

The Construction Branch has implemented a Standard Project Filing System for construction documentation (hard copy and electronic) that was developed to align with the MCDOT SharePoint file index types and naming standards and to achieve consistency on all construction projects. The system is based on a “Construction File Index Guide” that provides consistency between the hard copy folder names and the SharePoint file index types; and identifies Construction Record document files (public records) that will be posted on SharePoint then archived at project closeout. An “Electronic Document Filing – Naming Convention Guide” provides consistent naming of the Construction Record document files (public records).

The Construction Engineer with support from the Construction Engineering Specialist and PC&I Administrative staff, ensures all Construction Record documents are accounted for and filed in the appropriate location within the Project Site on SharePoint. This team will also work together to archive the Construction Record documents from SharePoint to MCDOT OnBase. The OnBase migration marks completion of this Closeout Task.

The MCDOT Consultant Evaluation Process is discussed in detail in Section 7-9.1 of the MCDOT Project Delivery Manual (PDM) and is summarized in the following overview.

The Consultant Evaluation Program is a program administered by MCDOT as a means to monitor and evaluate the quality of work performed on all engineering consultant contracts, and to meet the federal requirement under Code of Federal Regulations 23 CFR 172. The program is effective for all engineering consultant contracts with a Notice to Proceed (NTP) date of July 1, 2015 or later.

A positive approach to the program assures that project schedule, contract scope and budget, and quality of design and construction administrative services are attainable. This helps assure that potential problems that may impact other projects are identified and resolved in a timely manner.

All engineering consultant contracts shall be evaluated annually (based on NTP anniversary date) by the Project Manager or Construction Engineer, as applicable. In addition to annual evaluations, a final consultant evaluation must be conducted at the end of all engineering consultant contracts and in the case of on-call contracts, at the completion of each assignment.

The MCDOT Contracts Consultant Performance Evaluation Application (CCPE) is used by MCDOT staff to complete and approve evaluations and to allow the outside consultants to
comment on and concur with the evaluations. The CCPE system will notify the Project Manager or Construction Engineer, as applicable, when the Evaluation has been started by the Contracts Staff. Completed performance evaluations are archived for consideration as an element of past performance in the future evaluation of the consultant to provide similar services.

Upon completing the Consultant Evaluation, including Supervisor approval and concurrence by the Consultant, the Consultant Evaluation Closeout Task in the TIP App is considered complete and the Construction Engineer will check off the task.

**Asset Inventory Confirmation with Asset Program** – MCDOT owns, operates and maintains thousands of transportation infrastructure assets which consists of physical elements and property found within MCDOT Right-of-Way. Examples include pavement, bridges, culverts, guardrail, traffic signal equipment, signs, and similar. The MCDOT Transportation Asset Management Program (TAMP) overseen by the MCDOT Asset Program Branch utilizes the Cartegraph system for inventory and strategic management of assets based on budget, resources and level of service standards.

The various features and elements of a MCDOT transportation improvement project become new assets when constructed, that need to be added to the Cartegraph system. Depending on size and complexity of the project, the constructed assets are collected in Cartegraph in a variety of ways.

- On larger projects, the MCDOT Survey Branch will periodically survey completed features (ideally twice each month) during the construction phase and provide the data to the Asset Branch for input into Cartegraph.
- In addition to the surveyed data, the Asset Branch will also use the project’s Final Record Drawings that the Construction Branch provides following construction completion (typically within 90-days).
- On smaller projects (typically MCDOT Administered) as another method, the MCDOT Inspection Branch or the Asset Branch may field collect the assets directly into Cartegraph during construction or soon after.

Regardless of the method, the Construction Engineer should coordinate with the Asset Program Supervisor (or Engineering Associate) to confirm the asset inventory has been updated for the projects constructed improvements or that the resources have been provided to do so.
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SECTION 102 – BIDDING REQUIREMENTS AND CONDITIONS

102.3 Interpretation of Quantities in Proposal

Bid Item quantities are estimates of individual items of work that are anticipated to be constructed, based on the approved plans. They are intended to quantitatively define the amount of work the contractor needs to do. Contractors should perform detailed takeoffs from the plans and specifications to accurately determine the required amount of work and quantity of materials needed to build the work. The bid item quantities are presented in the contract for three reasons:
1. They standardize the bid requirements so that each Contractor is bidding for the same amount of work.
2. They provide a method of interim measurement for portions of completed work that allow progress payments be made periodically for the duration of construction.
3. They help to equitably adjust the contract amount when work needs to be added or deleted.

Contractors should compute their own quantities when estimating work. Contractors who rely on bid quantities for pricing their work do so at their own risk.
The problem of relying on bid quantities becomes particularly acute for Subcontractors and Material Suppliers who may not have easy access to the project plans and specifications. The County Office of Procurement Services utilizes PeriscopeS2G (formerly known as BidSync) for advertisement and bidding of MCDOT construction projects. Project Plans and Special Provisions are available to contractors, subcontractors and suppliers registered on PeriscopeS2G (BidSync).

102.4 Examination of Plans, Special Provisions and Site of Work

The previous two subsections mentioned that MCDOT has an obligation to Contractors and their suppliers to both disclose all available site information and make contract documents readily available. The Contractors have a reciprocal obligation to thoroughly examine all of this information, visit the project site, and ask for clarification of anything they don't understand about the project. The intent of this specification is that both partners have a shared responsibility to produce accurate bids that truly reflect what the Department wants built and the costs associated with that work.

Taking Advantage of Errors
Occasionally the Inspector or Inspection Supervisor may feel that the Contractor is taking advantage of an error in the plans or specifications. This usually happens when the Contractor is being paid an excessive amount for some portion of the work. The reason may be due to a large quantity variation or a change in the nature of the work not contemplated by Designers. Sometimes Designers miscalculate quantities or simply misjudge what is required to accomplish the work.
Regardless of the reason, in order to get the Contractor to equitably adjust unit prices, the Department must show that the error or omission was readily apparent at the time of bidding. If the error or omission becomes apparent during construction, then the Department has no case under Section 102.4.

Other recourses the Department may pursue in this situation include:
- a reverse differing physical condition under Section 104.2.2;
- re-negotiate the unit price on the basis of either a major item increase/decrease or a total contract cost increase/decrease in accordance with Section 104.2.1.
- a violation under Section 105.4 if the Contractor is taking advantage in some other way.

**Oral Explanations**
As mentioned above, MCDOT staff needs to be careful about what they say to Contractors during the project bidding period. The intent is not to inadvertently change the contract requirements or to give an unfair advantage to one or more bidders. Prior to opening bids, the bid documents require contractors to direct all questions in writing to County Office of Procurement Services through the PeriscopeS2G (BidSync) system any time prior to 48 hours in advance of the scheduled bid opening date & time.

MCDOT and the County Office of Procurement Services may decide to conduct a pre-bid conference for large, complex projects. During prebid conferences, the discussions between the Department and potential bidders are recorded and transcribed. These discussions are no longer interpreted to be oral explanations or instructions since a written version does exist.

The bottom line is that representatives of the Department need to be very careful about what they say to bidders. This means researching and discussing questions internally within MCDOT, then answering accurately and consistently through the County Office of Procurement Services and the PeriscopeS2G (BidSync) system to allow all bidders an opportunity to review the question and answer stated, and then bid accordingly.
SECTION 103 – AWARD AND EXECUTION OF CONTRACT

Most of the provisions in this section of the Standard Specifications deal with the procedures both the Contractor and MCDOT must follow in awarding and executing a MCDOT construction contract. The County Procurement Office together with the MCDOT Contracts Branch handles these administrative procedures and provides the Construction Engineer with a copy of the Contractor’s executed contract. It is important for the Construction Engineer to check with the Contracts Branch to ensure the contract has been fully executed and awarded before issuing an NTP letter, and definitely before any work begins. An executed contract is a means of ensuring the Contractor has met all the bonding and insurance requirements before working within the Department’s right-of-way.

Prior to formal advertisement for bids, the proposed project is placed by the MCDOT Design Project Manager on the agenda for the Maricopa County Board of Supervisors with the estimated, itemized cost of the project. Their favorable approval (Board authorization) of the project is the signal to the Project Manager to work with the County Procurement Office and the MCDOT Contracts Branch to formally advertise the project to prospective bidders. The County Procurement Office utilizes PeriscopeS2G (BidSync) for advertisement and bidding of MCDOT construction projects.

When bids close on a project, the Project Manager and MCDOT’s Contracts Branch reviews each bid for completeness and accuracy in order to determine the lowest responsible bidder. They check for unbalanced bid items, unit price extensions, insurance arrangements, and bonding capacity. The Project Manager and the Contracts Branch make a recommendation to the MCDOT Director as to who is the lowest, successful, responsible bidder. As long as the lowest responsible bidder is within +/-10% of the Board’s authorization of the project, the MCDOT Director and the MCDOT Contracts Branch can recommend that the County Procurement Office issue formal award to the contractor. If the lowest responsible bidder is more than 10% of the Board’s authorization, the contract must return for Board approval along with the MCDOT’s Staff recommendation to either award or not award the contract. The Board reserves the right to table or reject the recommendation.

The Construction Engineer should avoid any official communication with the Contractor until after the award. Early communication with the Contractor might create the perception that MCDOT staff favors one Contractor over another. This problem can become particularly acute when a contract bid is under protest. Any protests or inquiries regarding a Contractor’s bid or the awarding of a contract should be referred to MCDOT’s Contracts Branch and the County Procurement Office.

**Escrow of Bid Documentation**

On large projects or projects of a special nature, the Contractor may be required by the Special Provisions to place his bid documents in storage in a safe-deposit box or local bank. The contractor and MCDOT can then only jointly review the documentation should a dispute arise during the course of construction whereby the bid condition is brought into question.
The intent of this documentation is to objectively determine what assumptions the contractor made during the bidding phase of the project, and how the disputed items were originally priced.

Prior to the escrow of bid documents, the MCDOT Construction Engineer and the Contractor should jointly review the completeness of the documentation being provided. Review at this early stage (after bid opening, but prior to NTP) will assure that there are adequate, quantitative estimates for the work including assumed production rates, anticipated activity durations and substantial documentation that is worth preserving. This brief, but detailed review, will avoid later relying on these documents at a critical stage of dispute resolution during construction only to find out what was provided for escrow is unreliable or unusable.
SECTION 104 – SCOPE OF WORK

104.1.2 Maintenance of Traffic

It is the Contractor's obligation to maintain a safe, smooth, and stable road for the traffic and to install and maintain required traffic control devices. It is the Construction Engineer's responsibility to verify that the design of the traffic control plan is appropriate and that the plan is being followed. Traffic must be able to quickly distinguish the correct path when traveling at reasonable speed. Pedestrian traffic safety and access should always be addressed within the temporary traffic control plans.

Construction zones require special considerations in traffic control design because many drivers are inexperienced in what to expect. Unpredictable maneuvers can result when objects are too close to the traveled way. Some drivers may veer away, while others may slow down. Loose material can be particularly hazardous and must be kept to a minimum. Such factors as road width, shoulder area, relation of curves, height of the driver’s eye, and nighttime visibility should be considered when the contractor develops traffic control plans for locating temporary signs, barricades, and other traffic control devices.

Once the contractor submits traffic control plans for approval, the Construction Engineer will review them for conformance to the Manual on Uniform Traffic Control Devices (MUTCD). The MUTCD provides guidance for the selection of pre-warning signage, device spacing and usage, and typical applications for various work zone situations. If the plan is approved, the Construction Engineer will mark the plan “Approved for MCDOT ROW” with a date stamp of its approval; otherwise, the plan is redlined and returned to the contractor for corrections to be made.

Depending on the complexity or duration of the project, The Construction Engineer may choose to approve every traffic control plan for a specific date(s)/time(s) or approve a plan generically for use then later have the contractor request use of an approved plan for specific date(s)/time(s). The latter gives ability to reuse approved plans throughout the construction phase without having to modify dates/times that are specifically shown on the plan drawing itself. At all times, the inspector shall note in their daily diary which traffic control plan was implemented each day and that the plan was installed in accordance with the approved plan.

A periodic photographic (or video) record is recommended for each construction phase change showing all installations and any changes in the traffic control devices, from beginning to end of the work zone. (Digital video of the work zone traffic control is the preferred alternative to photographs.) This periodic documentation may be utilized later to confirm the state of the temporary traffic control that was in place if some event were to occur, a claim for damage is filed with the contractor’s insurance, or a need to confirm that a given traffic control plan was in use during a specific phase of construction.
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SECTION 105 – CONTROL OF WORK

105.1 Authority of the Engineer

The County Chief Procurement Officer has been delegated authority within the County Procurement Code to authorize Change Orders up to a cumulative project total of $1M. The Chief Procurement Officer has delegated the Department Director/County Engineer authority to authorize Change Orders up to a cumulative project total of $250,000.00.

The Permitting, Construction & Inspection (PC&I) Division is also commonly referred to in this context as the Construction Branch. The MCDOT Construction Branch oversees all construction activities within MCDOT. The Construction Division Manager (along with the Engineering and Project Management Division Managers) represents MCDOT on all transportation issues involving local and county governments and has input into what new projects are planned for the Department.

The Chief Construction Engineer (Construction Branch Manager) reports to the Construction Division Manager and is responsible to oversee each construction project through the variety of Construction Engineers in charge of each project. Part of the Construction Branch Manager’s job is to ensure uniformity in contract interpretation and consistency in how construction contracts are administered. The Construction Branch Manager decides which projects are assigned to each Construction Engineer and assists the Construction Engineer in staffing each project.

The Construction Engineer has immediate charge of one or more construction projects. The Construction Engineer represents the Department on official business conducted at the project site. The Construction Engineer is seen by the Contractor, local government agencies, and the traveling public as a county official who can make (or get) decisions and conduct business on behalf of MCDOT.

The Construction Engineer’s main tasks are to administer and oversee construction contracts for the Department and ensure that projects are built according to the contract documents and the Department’s requirements. Administrative responsibilities involve managing the routine affairs of construction contracting such as recording work progress, paying the Contractor, documenting changes, and ensuring compliance with state and federal regulations. Oversight responsibilities include observation of construction activities, sampling and testing materials, interpreting contract documents, measuring work for conformity to the contract requirements, and tracking construction costs and contract time.

These are some specific responsibilities of the Construction Engineer.
1. Creating and maintaining an atmosphere of trust and teamwork on the project. Good communication must be maintained with the Project Manager, Field Office Personnel, members of other MCDOT groups, the Contractor's staff, outside agencies, private citizens, and any other involved parties.
2. Building and maintaining an organization that can administer the projects efficiently, effectively, and in accordance with MCDOT policies and procedures. Sufficiently trained personnel must be allocated to provide all the required inspection, sampling, testing, and documentation. In many cases the Construction Engineer relies on staff from the Materials Lab to sample materials; from the Survey Branch to provide timely construction survey layout. In most instances the lab and survey can accommodate the Construction Engineer’s request, when proper advanced notice is given. The contract requirements usually state that at least 2 working days in advance of material sampling or survey layout is required. There may be periods when the workload is too great for the MCDOT personnel to handle themselves. In these instances, MCDOT has established separate on-call contracts with consultants who can be tapped to assist MCDOT in any capacity.

3. Being involved first-hand in every major project-related issue. The Construction Engineer must visit each project as often as possible and attempt to view all the major work items underway.

4. Ensuring the design is compatible with the conditions encountered at the project site.

5. Communicating promptly and accurately—the Construction Engineer must manage the flow of project information and paperwork.

6. Ensuring the Department’s policies and procedures are followed in the area of construction administration.

The Construction Engineer can also suspend work and accept work on behalf of the Department. However, one of the most important duties of the Construction Engineer is to keep a project moving and maintain control. All roadway projects (especially the larger ones) tend to get bogged down from time to time due to a major issue such as a major design change or differing physical condition. Regardless of the cause, it’s up to the Construction Engineer to lead the project team and Contractor through the obstacle as most Construction Engineers are empowered with a wide range of authority so they can do just that.

The Construction Engineer should not make unilateral decisions that have a major effect on project scope, schedule, or construction costs. The project management process covers the entire life of the project from development and design through construction and maintenance. Administration of the project is a team effort and all decisions must be made within the framework of the project management process. The Construction Engineer is encouraged to confer with the Project Manager and other team members when making decisions affecting project scope, schedule, or budget. The Construction Engineer should realize that the Department is a large organization and that other groups that do not actually participate in building the project play an important role in achieving the final goal.

105.3 Conformity with Plans and Specifications
Occasionally, Contractors and Inspectors are uncertain when work is reasonably acceptable. When a specific tolerance is described in the contract documents, there should be no confusion. The work is either in or out of specification. If the Contractor claims they did not have to meet that specification on previous projects, then the issue is different. The issue is then the inconsistent enforcement of the contract specifications, which is something the Construction Engineer or Construction Branch Manager should handle.

When no tolerances or requirements are listed and the Inspector is dissatisfied with the workmanship or materials used, then the only recourse is to determine what is considered an industry standard for that type of work. Trade and material producer associations such as the Asphalt Institute, ACI, PCA, and AISC publish manuals that describe generally accepted practices for different types of construction work. The Contractor is expected to follow accepted industry standards if the contract specifications are silent on a desired quality of materials or workmanship. For example, the Standard Specifications do not go into specific details on how to rake asphalt. This is covered in Asphalt Institute or National Asphalt Paving Association literature. Some judgment is required in applying industry standards to the Contractor’s work. Sometimes, local practices take precedence over industry standards when these practices are widely accepted by the contracting community.

Contractors have a duty to perform work in strict accordance with the plans and specifications, whether the Department inspects the work or not. The presence of an Inspector does not legally relieve the Contractor of the responsibility to comply with all the contract requirements. Inspectors and Inspection Supervisors can’t catch everything. However, they do have a duty to point out defects in workmanship or materials to the Contractor as soon as they recognize them.

On occasion, the Department accepts work at a reduced price that does not totally meet the specifications. This process usually involves the Contractor submitting a proposal/request to allow the item of work to remain in-place at a reduced price. The Construction Engineer then consults with the Designers and other technical experts regarding the merits of the Contractor’s proposal. The Construction Engineer must examine the cost involved in accepting substandard work. This should include the lifecycle costs to the Department, especially any higher operational and maintenance expenses. If the Contractor's proposal is accepted, the Construction Engineer must document the acceptance by change order (for price reductions) or some other form of documentation needs to take place.

105.4 Coordination of Plans, Specifications, and Special Provisions

Order of Precedence of Contract Documents
This Subsection is utilized to resolve conflicting specifications or contract requirements found in different contract documents. The basic philosophy is that the project Special Provisions, Project Plans and Supplemental Agreements/Change Orders are site-specific and should take precedence over the more generic contract documents such as the Standard Drawings and Standard Specifications. In turn, these documents should take precedence over the MUTCD, AASHTO, and ASTM specifications when conflicts arise involving these documents.
On projects in which local government work is involved, city or municipality construction specifications are often cited as the requirement for certain portions of the work. When a discrepancy or conflict exists, the basic philosophy discussed above still applies; go from the site-specific to the more generic contract specifications. In the case of local government work, the order would be:

1. Change Orders,
2. Addenda,
3. Special Provisions,
4. Project Plans,
5. City or Local Municipality Supplemental Specifications,
6. City or Local Municipality Supplemental Details,
7. MCDOT Supplemental Specifications,
8. MCDOT Supplemental Details,
9. MAG Standard Specifications, and
10. MAG Standard Details.

Keep in mind, MCDOT typically serves as the lead agency on behalf of other local governments. In turn, it is MCDOT’s specifications that govern the contract and the local government’s general contract provisions do not apply such as bidding requirements, control of work, or prosecution and progress. MAG Section 104.1.1 also details the order of precedence in the event a conflict exists among contract documents.

Override Documents
There are some types of government documents that are not part of the construction contract that can override anything specified in the contract. State laws and federal regulations are examples. The Contractor is not required to do anything that violates the law or a government regulation. The more typical problem that a Construction Engineer or Inspection Supervisor encounters prior agreements MCDOT has made with other government agencies, local community, or individuals. These could involve intergovernmental agreements (IGAs), 404 permits, Right of Way agreements, or environmental mitigation requirements. These documents obligate the Department to construct something or conduct construction operations in a certain way, and the MCDOT Project Manager is responsible for coordinating and tracking these types of agreements. When there is a conflict or discrepancy with the contract documents, a change order must be utilized to bring the construction contract into compliance.

105.5 Cooperation by Contractor

The intent of this subsection is to have someone from the Contractor’s staff who can represent the Contractor at all times to address on-site safety, traffic control, and quality issues. This representative does not need to be someone at the superintendent level. It’s more important that this person be empowered to take immediate corrective action when instructed by the
Department. If this person refuses or hesitates to take immediate action, then the only recourse may be to require the presence of a superintendent fulltime on the project site.

105.6 Cooperation with Utility Companies

Utility relocation work is a common occurrence on most roadway projects. Regardless if a utility is relocated or not, the contractor has a duty and responsibility to call for a locate of utilities prior to excavating (i.e. Blue Stake, ARS 40-360.21 through 40-360.29. In addition, Section 107.11, Contractor’s Responsibility for Utility Property and Services of the MAG specifications outlines additional responsibilities of the contractor.

Subsection 105.6 deals with utility conflicts at the project when conflicting utilities are relocated by the utility company. The Department does its best to have all utilities that may conflict with the project work adjusted or relocated before the contract is awarded. The Department also tries to accurately represent what utilities are at the project site. Occasionally, utilities and utility work do conflict with the Contractor’s work.

During the final stages of design, and prior to advertisement of the project, MCDOT’s Utility Coordinator is required to provide a Utility Clearance Letter. This letter may identify those utilities that have already been relocated; but it also may state at what future date another utility is expected to be complete by. These dates should be shown in the project special provisions so that the contractor can plan the schedule around these constraints. Unless the Special Provisions or Project Plans warn the Contractor about specific utility work going on within the project, the Contractor is generally entitled to additional compensation when utility work conflicts with project work. In addition, if the project’s controlling item at the time is delayed, the Contractor may be entitled to a time extension including costs for extended overhead. Some utility conflicts are the result of utilities discovered by the Contractor during construction that are not shown on the Project Plans or mentioned elsewhere in the contract documents. In these cases, the utility conflict is handled like a differing site condition (see Subsection 104.02 of this manual).

Then the question is whether the Contractor should have known about the utility and adjusted the construction work accordingly? Utility conflicts can be a very costly matter for the Department. The Construction Engineer must take an active role in managing these situations. The Construction Engineer shouldn’t hesitate to involve the Project Manager or MCDOT’s Utility Coordinator if help is needed in dealing with a utility company. The Utility Coordinator is responsible for coordinating proposed project work with utility and railroad companies and for preparing and processing agreements with these companies.

105.7 Cooperation Between Contractors

This subsection applies when:
- Two or more Contractors are working at the same time within the same project limits or Right-of-Way; or
• Two or more Contractors are working on different projects but must tie their work together.

Getting Contractors to cooperate with each other can be challenging at times. Even with this subsection Contractors may have difficulty cooperating. As soon as a Contractor’s access is restricted or the Contractor has to perform work out of sequence, the Contractor may attribute the difficulties to the adjacent Contractor. Attempts by the Construction Engineer to order the Contractors to cooperate may do nothing to diffuse the situation. Construction Engineers must take a leadership role when Contractors have difficulty cooperating. Anticipating areas of conflict and meeting ahead of time to resolve common issues are the best ways to keep Contractors working together. Some Construction Engineers conduct regularly scheduled coordination meetings in an effort to get Contractors to work together. Ultimately, if Contractors do not cooperate and damage or hinder each other’s work, it is usually the Department that ends up paying for the damages.

105.9 Duties of Inspector

Inspection Supervisor:
The Inspection Supervisor serves as the Lead Inspector for the project. The primary responsibility of the Inspection Supervisor is to oversee the Department’s inspection operations at the site.
Most MCDOT projects require a team of Inspectors, material testers, surveyors, and other specialists who must work together to inspect and document the project work. The Inspection Supervisor ensures that there is a single coordinated effort at the project site to effectively inspect and document the work. The Inspection Supervisor must handle other project oversight responsibilities such as safety, traffic control, and government regulation compliance.
Duties of the Inspection Supervisor include:
• Day-to-day inspection staffing and scheduling;
• Project-wide monitoring of the Contractor’s operation and construction schedule;
• Enforcing and explaining the Project Plans, Special Provisions, and other contract specifications;
• Coordinating the documentation and payment of contract work;
• Resolving site issues with the Contractor’s field staff;
• Performing quality control over inspection work, site materials testing, and project documentation;
• Maintaining the project as-built plans;
• Interfacing with surveyors, material labs, and other offsite MCDOT groups that support the inspection and testing efforts for the project; and
• Inspecting and documenting the work as needed.

One of the most important things the Inspection Supervisor can do on site is to anticipate the Contractor’s work, then figure out the inspection and testing requirements ahead of time. The Inspection Supervisor should be the onsite expert for what is contained in the Project Plans, Special Provisions, and other contract documents. By proactively reviewing the plans and specifications, then discussing the contract requirements with the Contractor’s
superintendent, the Inspection Supervisor can prevent many of the conflicts that arise between the Inspectors and the Contractor’s production staff. In most cases, these conflicts are either resolved ahead of time by the Inspection Supervisor or escalated to the Construction Engineer, limiting the Inspector’s involvement. The Inspection Supervisor helps the Construction Engineer resolve site related issues with the Contractor. The Inspection Supervisor does not have the authority to waive or alter the provisions of the contract, but can provide valuable information on how an issue developed and conduct the necessary research (contact Project Designers, review contract documents, talk to MCDOT technical sections, etc.) to get the issue resolved.

Inspectors
Inspectors have two important responsibilities. The first and primary responsibility is to require the Contractor’s work and site activities to conform to the contract plans and specifications. Plans and specifications describe in detail the work that is to be constructed including the materials to be used, the workmanship required, and certain construction procedures to be followed. The plans illustrate graphically the various elements and components of the project. The specifications describe in words the materials and workmanship required. The second responsibility is to accurately document the level or degree of conformity of the Contractor’s work with the plans and specifications. Inspection duties include:

• Observing and measuring the Contractor’s workmanship, materials, and methods for compliance with the plans and specifications;
• Communicating to the Contractor’s field staff the contract requirements for work under construction or about to be constructed;
• Assisting the Contractor with reading and interpreting the plans and specifications;
• Seek assistance when determining the intent of the specifications;
• Documenting inspection observations and measurements including summaries of labor equipment and material usage;
• Measuring work for payment; and
• Observing construction operations for general compliance with safety regulations, traffic control requirements, and construction-related government regulations (air quality, noise levels, erosion control, equipment licensing, federal aid requirements, etc.)

Inspecting Work in Progress
Although Inspectors are not required to inspect an item until it is complete, the Department encourages Inspectors to periodically observe and inspect work in progress to assist the Contractor in avoiding rework and stoppages. The Contractor should be notified of non-compliant work as soon as it is detected, and usually occurs verbally between the inspector and the contractor’s representative in charge of the work. If the Contractor fails to correct the non-compliant work after several verbal notices, then a written non-compliance notice should then be issued.

For example, the inspection of reinforcing steel for a bridge deck can take place once all the rebar has been completely installed and tied. However, should there be an error in the bar spacing in the bottom mat, considerable time and effort would be expended by the Contractor
to correct this deficiency. Simple periodic checks of the rebar placement operation by the Inspector could potentially avoid this problem. When conditions arise at the project site that make compliance with the plans and specifications impractical or completely unreasonable, the Inspector should immediately notify the Inspection Supervisor or Construction Engineer.

**The Inspector as a Buyer for the Taxpayers** - The Inspector is the Department’s point of acceptance for most contract work. The Inspector is essentially a buyer of construction work. The Inspector accepts work the Contractor produces and then fills out a diary to document and pay for that work.

The Inspector's objective should be to get the expected value or quality that is required by the contract and the Department and taxpayers are getting what they're paying for. The Inspector is there to assist the Contractor with the contract documents and review work in progress, so that produced construction work meets or exceeds the Department’s standard the first time. This is how inspectors get the best value for the taxpayers and help avoid the rework by the contractor and potential disputes.

**Cooperation by Contractors**

Contractors have a duty to cooperate with the Department's inspection efforts. Contractors often get so focused on their work that they often overlook their obligations to the Inspector. The Inspectors and the Inspection Supervisor should be proactive in bringing up potential inspection issues such as sufficient warning, adequate time to inspect, and suitable access to the work. Sometimes it requires constant reminding to get the Contractor to be a little more accommodating. But keep in mind, if the Contractor is producing high quality work efficiently, then the Department is getting what they want most from the Contractor and the Inspectors should be a little more flexible about timing and access requirements.

**105.10 Inspection of Work**

**Inspection Fundamentals**

Inspection, in its purest form, is simply a measurement for compliance. Measuring is the act or process of regulating to a standard, while compliance means conformity in fulfilling official requirements.

When you inspect, you measure (or observe) something and then compare your measurements to the requirements of the work. The requirements are described in the contract documents (Project Plans, Special Provisions, Standard Specifications, etc.). Construction work requirements can be divided into five elementary categories.

1. **Layout**
   - (location, elevation, grade, horizontal control and other survey related information)
2. **Material Properties**
   - (type, gradation, strength, compaction, density, grade, Certificates of Compliance, stability, prestress, binder content, temperature, cure time, and color)
3. **Dimensions**
(spacing, length, width, thickness, height, clearance, slope, diameter, and other shape related information)

4. Workmanship
   (finish, appearance, cure, edge and connection treatments, texture, and handling)

5. Performance
   (smoothness, pressure test, bacteria count, pour rate, flow rate, waterproof, and mortar tight)

Any contract specification that describes construction work will fit into one of these five categories, and completely describe the work. Inspectors can use this important information to greatly improve their effectiveness.

Now you may ask, "How can remembering these five inspection categories make me a better Inspector?" As mentioned earlier, all five categories completely describe the requirements of any work to be constructed or even manufactured (such as aircraft engines, furniture, and circuit boards). When Inspectors are examining work under construction, they should continually ask themselves these five questions:

1. What are all the layout requirements for this work?
2. What are the material properties that materials used in the work must comply with?
3. What are all the dimensional requirements for this work?
4. What are the workmanship requirements?
5. What are the performance specifications the completed work must meet, if any?

Then the Inspectors search through the contract documents for all the answers to these five questions. This should be a systematic search by answering one question at a time. By following this approach, Inspectors will gain a thorough and complete understanding of the contract requirements for the work to be inspected. Most Inspectors take the opposite approach to determining the work requirements. They search in the appropriate sections of the contract documents for any type of specification related to the work. They may find a material specification in one section, a dimensional requirement in another, and eventually they find all the specifications related to the work. Then they may see something at the site that doesn’t look right and do a brute-force search of the contract documents to find the requirement the Contractor must meet. After much effort, they eventually get an overall view of the work requirements.

Although there is nothing wrong with randomly searching the contract documents to catch all the work requirements, this approach alone leads to a greater chance of overlooking important contract requirements when inspecting unfamiliar work. The systematic approach described previously is a more complete way of capturing all the contract requirements for a particular item of work. Both approaches should be used together—a random search of the contract documents followed by a review of the five questions. This is the best way to ensure Inspectors have a complete picture of all the contract requirements.
Construction Rework and Additional Inspections
Occasionally it is appropriate to charge the Contractor for additional inspection work. To be fair, the Construction Engineer should be careful about how and when Contractors are charged for additional inspections. The Department’s policy on back charging Contractors is based on the belief that we are partners with the Contractor. Both the Department and the Contractor must be flexible in accommodating each other’s schedule.

The other belief is that sometimes Contractors make honest mistakes. Back charging the Contractor for additional inspections done when fixing honest mistakes only adds insult to injury and is inappropriate.

Back charging is appropriate when:
- The Contractor chronically refuses to cooperate with the Department’s Inspectors about adequate warnings for inspections that result in additional overtime expenses;
- The Contractor repeatedly makes the same mistakes and won’t change construction methods to eliminate or reduce defects; and
- The Contractor attempts to alter already accepted work without notice to or the approval of the Department’s Inspectors.

The Construction Branch Manager will usually support back charges to the Contractor only when there is documented evidence of a chronic lack of cooperation by the Contractor. Some prior attempt must also have been made by the Construction Engineer to resolve the issue with the Contractor through the partnering escalation process.

When inspecting unique items of construction (such as electrical and mechanical equipment installations) Inspectors should take advantage of the experience and expertise of the equipment supplier. Often these people have their reputation to protect and will help the Inspector ensure the Contractor installs and uses their equipment correctly. In addition, MCDOT may have its own in-house experts who can assist the Inspector with reading and interpreting specialized contract requirements.

Why Document Inspection Work?
Many Inspectors question how much documenting of construction and inspection activities is needed. Some Inspectors question why they need to document at all. Others are unclear as to the value of good inspection records. Unfortunately, there is not one good reason why it’s important for Inspectors to document contract work and inspection observations. However, there are several reasons when looked at together that offer a compelling argument for good record keeping by Inspectors.

Reason 1:
Historical information on how the work was constructed is valuable in the future if a project has to be modified or rebuilt to solve a future transportation or traffic problem. Good inspection documentation will instill in future Planners and Engineers confidence in what is there and how well it is built. In addition, if there is a failure of a structure, pavement, or other project component, the Inspector’s diaries can be helpful in ruling out possible modes of failure.
Reason 2:
Recording of an Inspector’s observations and measurements provides valuable quality control information. This information can be used to identify performance trends, as well as determine a level of confidence in accepting work that may be marginal in other areas. More importantly, inspection documentation indicates to MCDOT management, taxpayers, the FHWA, and other customers that there was an authentic compliance and quality control effort at the project site. This documentation also indicates how effective that effort was.

Reason 3:
Pay quantities are required to be measured and documented for contract payment and tracking purposes. Part of the Field Office’s role is to pay the Contractor for work performed. Inspectors are best suited for paying for contract work since they are the closest to the work. Good documentation of pay quantities is needed to avoid underpaying, overpaying, or double paying the Contractor for completed work.

Reason 4:
Regardless of the notice requirements in Subsection 104.03, Contractors often notify the Department after the fact regarding additional compensation for work already performed. The Inspector's diary should represent a summary of the day’s construction activities assigned to the Inspector. In addition to recording inspection observations and measurements, Inspectors should summarize labor, material, and equipment usage, delays, breakdowns, idle time, inefficiencies, work accomplished, and other important events that affect or explain the Contractor's progress. Proficient record keeping by Inspectors has saved the Department thousands of dollars in overpayments to Contractors for extra work performed.

Reason 5:
An Inspector's diary is a communication device or tool. It tells others what the Inspector did that day and what went on at the construction site. Documenting inspection work directly communicates the level of professionalism and conscientiousness an Inspector applies to his or her work. Inspectors—more than anyone else in a county or state highway agency—are expected to document their day-to-day work activities. Secretaries don't keep diaries, nor do Materials Engineers or highway maintenance workers. Only Inspectors are charged with the daily duty of recording the activities and events that surround them. The taxpayers of this county and state and the Department place a lot of faith in their Field Inspectors to assure the quality and durability of our roads and bridges. A well-written, comprehensive diary is one of the best acknowledgments of that faith an Inspector can give.

Daily Project Diaries
Each inspector who is assigned responsibility for any project operation is required to keep a daily diary. Each inspector’s dairy should provide detailed information concerning the specific phase of work they are assigned to. Entries should be on the appropriate form, written legibly, in ink and signed at the end of each day. Dairies should be kept in such detail and manner that new personnel could take over the work at any time.
- A partial list of items to be noted in a dairy is: Inspector’s time or arrival and departure at the site
- Weather
- Verbal or written orders given to the contractor.
- Important discussion with the contractor or his representatives.
- Official visitors and inspections.
- Work or materials rejected and reasons.
- Time of shutting down or resuming of work and explanations of the delays.
- Work done by contractor’s forces during the day, including the location of the work.
- Accounting for any time spent by contractor’s personnel or equipment on disputable items of work and especially any work, which might be the basis of a claim.
- Arrival and departure of major equipment
- Record of important phone calls.
- Unusual conditions, if any such as high water, bridge construction problems, slides, unsatisfactory subgrade or foundation conditions, detour conditions, etc. Care should be used when explaining hazardous conditions.
- Progress of staking and surveys.
- An up-to-date inventory of contractor’s equipment and list of the contractor’s work force.
- If problems are noted, explain the steps taken to correct them.

All diaries are the property of the Department and shall be filed as a part of the project records. A good diary can provide valuable information and evidence in the event controversies arise. There should be no personal information entered in the project diaries.

105.11 Removal of Unacceptable and Unauthorized Work

MCDOT Inspectors can accept and reject contract work. They have a duty to immediately inform the Contractor about any workmanship, methods, or materials that do not conform to the plans or specifications. When work or materials are rejected, the Inspector should make the reasons clear for the rejection. Whenever possible, don’t just quote specifications; explain the reasons why it is important for the Contractor to comply while remaining open minded and willing to listen to the Contractors point of view. The hardest part for most Inspectors who reject work is handling the Contractor’s response. Here are some points to keep in mind as you and the Contractor try to work through the difficulties:

1. Maintain your respect for the Contractor’s field staff. If it seems they are not listening or they are attempting to do things underhandedly, give them the benefit of the doubt. Often, they are under pressure to produce and occasionally lose perspective of what is best in the long run for the project.
2. Listen to the Contractor’s explanation. Acknowledge that you understand why the work turned out the way it did.
3. Be supportive of the Contractor’s predicament. Instead of shifting the problem entirely to the Contractor, express your willingness to work through this problem.
4. Avoid personality conflicts. If you make a rejection look like a test of wills between you and the Contractor, somebody ends up losing every time. Instead, stay focused on both the work and the specifications, and avoid assigning or shifting blame.

5. If you and the Contractor can’t work out a mutually acceptable solution, escalate the problem quickly. Don’t let a confrontation or the threat of one postpone corrective action.

At a fundamental level, you should view the Contractor as a partner and equal. No matter how tough things get, if you can fix this perspective solidly in your mind and behave accordingly, most Contractors will feel you are treating them fairly and impartially. Truly seeing the Contractor as a partner and equal will make you say the right things and behave honorably and professionally without having to think about specific behavior patterns to follow.

When work has been rejected, the Contractor has several options:
- Immediately fix the problem;
- Remove and replace the rejected work;
- Submit a proposal to request acceptance of the work (usually some type of alteration to the work is involved or at minimum, a price reduction should be expected) ; or
- Fix the problem later, but before other work is affected.

The decision as to which option to pursue is entirely up to the Contractor. However, as the Contractor's partner, you should assist the Contractor in working through this decision, but in no way should you assume any responsibility for making the decision. Often the Contractor will ask what you would like them to do and try to shift the problem over to the Inspector.

**Be careful. Inspectors cannot direct the Contractor's work.** All you should do is advise them on what the plans or specifications require and avoid telling them how to achieve those requirements.

The management and direction of the work are the Contractor's business. However, if methods are employed which the Inspector has reason to believe will be detrimental to the quality of the finished work, give notice to the Contractor accordingly and immediately advise the Construction Engineer. The Inspector should not attempt to supervise the Contractor's work or give any appearance of doing so.

**Suggestions can also be dangerous.** If the Contractor relies on your suggestion and the work doesn't turn out as everyone expected, guess who the Contractor is going to blame? Inspectors and Construction Engineers should be helpful while thoughtfully assessing the risks involved before giving advice to the Contractor.

**105.12 Maintenance During Construction**

Contractors are expected to maintain finished work until it is accepted by the Department. This includes removing graffiti, sweeping sidewalks, maintaining landscaping, and repairing work hit by traffic. Contractors may be reluctant to repair newly constructed work at their expense.
when damaged by the traveling public or by natural causes, but Section 107.10 affirms their responsibility until final acceptance.

**Work Constructed under Traffic**

In this situation traffic runs through the project exposing the work to potential damage by the traveling public. Common examples include shoulder improvements, lane widenings, and passing-lane construction. Lane closures and restrictions are used to control traffic, while phased construction is used to move traffic through different parts of the project. In most cases, a line of barricades and perhaps a small buffer zone are the only means that separate the traffic from the work. In this case the Contractor is responsible for maintaining and repairing work damaged by either the public or natural causes until formal partial or final acceptance is given. Regardless of what construction phases have been completed or what new lanes are opened to traffic, the Contractor is still responsible until acceptance.

**Work Constructed Away from Traffic**

In this situation the work is physically separated from traffic and protected from damage. A detour may be used, or the work may be on a new roadway alignment. Traffic cannot get to the area of work. Under this scenario, the Contractor is completely responsible for all damages and maintenance to the work until the roadway is opened to traffic.

When a roadway (or new widening) is opened to traffic, the responsibility for maintenance and repairs depends on why the road was opened.

1. If the road is opened formally under a partial or final acceptance, then MCDOT assumes responsibility.
2. If the Contractor (with Department consent) opens the road before all the work is completed or opens the roadway under a substantial completion described in MCDOT Supplement Section 105.15, the Contractor is still responsible for maintenance and repairs until final acceptance. This also applies to work constructed under traffic.
3. If MCDOT orders the road opened ahead of its scheduled opening, the Department assumes responsibility, regardless of the condition of the work.
4. If the Contractor has fallen behind schedule and MCDOT orders the road opened after its scheduled opening date, the Contractor is responsible for all maintenance, repairs, and traffic control until acceptance.

There are two reasons why the Department holds the Contractor responsible for maintenance and repairs until some type of formal acceptance is given. The first has to do with damage to the work by the Contractor’s own operations. Until all work is completed, the Department does not want to get into a situation in which it has to determine whether damage done to existing work was done by the Contractor or by traffic passing through the project. The second reason involves liability for the project. By assuming maintenance and repairs responsibilities, the Department is implying acceptance of the project. This can leave MCDOT liable for the work before final inspection or acceptance has been made.
105.15 Acceptance

Substantial Completion

Substantial completion should not be confused with partial or final acceptance. Substantial completion is a point reached in the project where enough work has been completed to stop contract time. When the Contractor reaches substantial completion, the Construction Engineer holds a final inspection.

The final inspection has four objectives:

- to determine if the project is in fact substantially complete as defined by subsection 105.15 of the MCDOT Supplement to MAG;
- to review the completed project work for compliance with the plans, specifications, and the requirements of the district, local government, FHWA, or other important project stakeholders;
- to determine if the traffic can safely travel through the completed work; and
- to develop a punch list of items that need to be completed before final acceptance.

The Construction Engineer should invite, as a minimum, the Construction Branch Manager, the ADOT representative (if the project contains federal aid), local government representatives (when applicable), the Project Manager, the Maintenance Foreperson, and the Contractor’s superintendent. The Construction Engineer and the inspection staff should try to be as thorough as possible during the final inspection—leave no stone unturned; check everything. Contractors allocate equipment and staff to finish the project based on the size and complexity of the Department’s punch list. What Contractors find most frustrating is how punch lists tend to grow after the final inspection. During the final inspection, there should be MCDOT Inspectors and Engineers crawling all over the place so a thorough and complete punch list can be developed at the outset.

As defined in 105.15 of the MCDOT Supplement to MAG, there are four criteria that the contractor must meet before requesting Substantial Completion:

- All pavement, pavement markings and signing are complete and accepted and traffic can move unimpeded through the project at the posted speed;
- All pedestrian pathways are completed and accepted, and pedestrians are not restricted by any construction activity;
- All guardrails, drainage devices, ditches, excavation and embankment have been accepted;
- The only work left for completion is incidental, away from vehicle and pedestrian traffic, and does not affect the safety or convenience of the traveling public.

Substantial Completion Letter

Substantial completion does not imply acceptance. It does not relieve the Contractor of the obligation to finish the rest of the work nor does it relieve the Contractor of the duty to maintain and repair work until acceptance. **Once the final inspection is complete, the Construction Engineer should write a Substantial Completion letter to the Contractor**
disclosing the results of the final inspection, the date of Substantial Completion, and that the project will be accepted as final when all remaining punch list work is complete. If a punch list has been developed, the Construction Engineer should reference and attach it to the letter. The Construction Engineer should close the letter with a statement citing the one-year warranty requirement and it’s effective and end dates.

Keep in mind that the Department can always re-inspect the work even after a final inspection has been performed. Final inspections are used to determine substantial completion and may not result in complete and final acceptance of the work.

Acceptance (Partial and Final)
Acceptance is another important project milestone. This is the point at which all or a portion of the work has been completed to the extent that the Department is willing to assume responsibility. We are taking delivery; the work is ours.

This is the Department’s last chance to have the Contractor fix any problems, repair any damage, or perform any cleanup (see Section 107.10). Once the work has been formally accepted under a partial or final acceptance, any repairs or alterations to that work will require a supplemental agreement. Since the responsibility for the work shifts from the Contractor to the Department, it is very important for the Construction Engineer to make certain that all the required contract work has been completed in accordance with Contract documents. This includes all punch list items and any cleanup work. Any performance tests should be rerun if possible, and the work should be re-inspected for any signs of unusual wear, damage, deterioration, or missing hardware.

Acceptance Letter
Once all the working drawings, if applicable, are submitted and accepted and all the punch list items and follow-up inspections are complete, the Construction Engineer should write an acceptance letter for the Construction Branch Manager’s signature. The letter should clearly identify what is being accepted. This is particularly important for a partial acceptance. Any assessment of liquidated damages should be discussed, and any conditions attached to the acceptance. If there are any unresolved contract issues, they should be summarized as well. It is important to write a partial or final acceptance letter. The letter not only allows the Contractor to recover much the contract retention, but also clearly outlines when responsibility for the work shifts from the Contractor to MCDOT. On federal aid projects, a copy of the acceptance letter must be sent to the ADOT representative.

(A) Partial Acceptance
Requests for partial acceptance should be in writing and discussed with the Construction Branch Manager. Only those portions of the work, which can be completely separated and adequately protected from the Contractor’s operation, should be considered for partial acceptance. Once the Department accepts any portion of the work, we are responsible for maintaining it and repairing any damages. If there is a possibility the work could be damaged by the Contractor’s operations, then the Department will not consider that work eligible for partial acceptance.
Usually the work that qualifies for partial acceptance is standalone work that, when completed, can be opened to traffic. After the opening, the Contractor should have a reason for being around the work. The Partial Acceptance letter should clearly spell out what is being accepted and any conditions attached to that acceptance. The Construction Engineer must consider how items such as drainage and the Contractor's hauling operation can affect the work already accepted.

(B) Final Acceptance
The final acceptance process can become administratively complex and tedious for the Construction Engineer. Here is a partial list of the things the Field Office should do in preparation for a final acceptance and closeout of the project and before the Construction Engineer writes the Final Acceptance letter

INSPECTION BEFORE ACCEPTANCE
A. Contractor cleanup of detours, roadway, Contractor’s yard and processing sites, and adjacent private land should be completed. Pay particular attention to oil and air filters, material wrappings, crew trash, lumber fragments, AC, striping tape, and survey stakes/flagging.
B. Develop a punch list. All project personnel must participate, including the Electrical, Water, Utility, and Landscape Inspectors.
C. Utilities should be connected and working.
D. Salvage items are to be removed to a final location.
E. Any intergovernmental agreements drafted as part of the project must have been complied with. Contact the Project Manager.

ACCEPTING A PROJECT
A. Remember that a project should not be accepted until all materials have been verified as acceptable. This includes certifications, but it also means that concrete poured toward the end of the project must have the cylinders broken before acceptance.
B. All quantity surveys and measurements must be completed (and preferably undisputed).
C. All paperwork needs to be completed. Payrolls must be corrected, quantities checked and submitted to the Contractor, and force accounts transmitted and approved.
D. Letters of acceptance should have been received from landowners, pit owners, etc.
E. All keys, etc. are to be handed over to the county, utility, or local municipality.
F. All bills must be paid such as electric, water, and royalties.
G. Money is to be deducted for resurveying, damaged salvage items or other property, or for liquidated damages.
H. As-built plans or information that may be required of the Contractor must be received and verified by project personnel.
I. Contractors or manufacturers must conduct meetings in how to operate, adjust, and maintain systems such as the irrigation system or a pump station.
J. All operating manuals and instruction sheets are to be accepted at the office.

K. All warranties and guarantees should be transferred to MCDOT (or other final owner) as if they were the original purchaser, as specified.

L. MCDOT specifications require the Contractor to provide a 12-month warranty. This should be noted in the project Substantial Completion or acceptance letter.

M. Final acceptance should only be given when all punch list items have been completed, and the Construction Engineer is satisfied that all the Contractor’s field work is completed. The Construction Engineer should contact both the Construction Branch Manager and the Maintenance Foreperson before writing the Final Acceptance letter in case either wants to make one last tour of the project.
SECTION 106 - CONTROL OF MATERIALS

106.1 Source of Materials and Quality

Subsection 106.1 requires the use of new materials unless noted otherwise elsewhere in the contract documents. New means unused, not previously placed in service, and the same appearance, quality, dimensions, and performance as material direct from the factory or fabrication plant. For example, corrugated pipe salvaged by the Contractor from a previous project does not qualify as new pipe. The Construction Engineer may still allow the pipe, but at a reduced unit price. On the other hand, unused concrete pipe that has been sitting in a pipe supplier's yard for a few years may qualify as new if it is undamaged and in the same basic condition as the day it was cast.

Inspectors should be careful about the water the Contractor uses for dust palliative, compaction, cleanup, or landscape establishment. Untreated effluent from industrial or mining operations must not be used. Effluent from these sources may contain hazardous microbes or chemicals that pose a health risk to everyone at the site. In general, potable water or water from an approved lake, stream, or irrigation canal is acceptable for construction work.

For many products and materials incorporated into the work, MCDOT requires Certificates of Compliance be supplied by the manufacturer to confirm the product or material meets the specification requirements for the project. The special provisions will usually specify which materials require certifications be supplied, but items such as pipe products are generally commonly required – either by special provision or by standard specification. Both the special provisions and the standard specification should therefore be checked for material certification requirements.

The purpose of these certifications is to assure MCDOT that the products that have been supplied to the project meet the material type and standard of quality that was anticipated for the engineering design, identify the test results (i.e. Certificate of Analysis) or test standard (i.e. ASTM, AASHTO, or other) and identify the person accountable with the manufacturer. Without a valid Certificate of Compliance (or Certificate of Analysis when required), the only other method to determine if a product meets the specification(s) is to perform destructive testing of a random sample from the field.

Approved Products List
MCDOT maintains an Approved Products List (APL) which is a list of products that have been shown to meet the requirements of the MAG Standard Specifications and the MCDOT Supplement Specifications. The current version of the Approved Products List is available on the MCDOT website as follows:

For products that are on the APL, the Construction Engineer should verify that the Contractor is using products from the APL version that was most current at time of bid opening for the project. Unless the project Special Provisions allow otherwise, products not on the APL will not be allowed for use.

106.5 Storage of Materials

Material stored on the project should be observed to determine whether the storage practices may be harmful. Potentially harmful practices include stacking too high (causing bending, denting, or crushing), exposing to weather, or providing inadequate base (causing soiling, staining, or rusting). No partial payments should be made if materials are not stored in a manner that will provide adequate protection. Adequate protection is that which will preserve materials in their original condition. If material is damaged in storage, any payment for material allowance should be recovered until the damage is repaired or the material is replaced.

106.8 Furnished Material

When MCDOT furnishes material for the Contractor to use on the project, the Department is responsible for the quality and quantity of the material supplied. When the Contractor takes control of the material, the Contractor becomes responsible for the material.

The Construction Engineer should document the condition of the material and verify its quantity before it is released to the Contractor. This protects the Department if the material is later mishandled. Some testing may need to be done on the material to accurately determine its quality. A letter or another form of documentation should be used to establish when the material was officially turned over to the Contractor.
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SECTION 107 - LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

107.2 Permits

The Department requires the Contractor to comply with all local, tribal, county, state and federal regulations, laws, and ordinances, and bear any costs or inconveniences associated with those requirements. Regulations or permit requirements unfamiliar to either the Contractor or the Construction Engineer do not relieve the Contractor of the obligation to comply. The Special Provisions will often identify some of the requirements, but they should not be construed to be the only requirements. Local ordinances such as noise limitations, haul restrictions, and permit fees are usually the most cumbersome for the Contractor. For example, most cities require a connection fee and permit when a Contractor taps into a city waterline. Some cities require a permit to use and haul explosives. Usually permits associated with construction and installation activities such as hauling, dust control, and connecting to utilities are the Contractor's responsibility. Specialized permits that could not be foreseen by the Contractor at bid time and royalties are usually the Department's responsibility.

Permits required to construct the project in the first place, such as 404 Permits for the Corps of Engineers or utility relocation clearances, are usually the Department's responsibility. Contractors are responsible for paying all existing federal, state, county, and local sales taxes associated with the work. This includes future taxes or tax increases passed into law before bid opening. Any new taxes or tax increases passed after bid opening will be paid by change order.

107.2.1 AZPDES (NPDES) Construction General Permit Requirements:

The contractor shall comply with the Arizona Pollutant Discharge Elimination System (AZPDES) requirements and conditions, which is administered by the Arizona Department of Environmental Quality. This also includes compliance with the requirements of all municipal separate storm sewer system (MS4) that are within the project limits. For projects on Indian Tribal Lands, the contractor shall be responsible for compliance with the National Pollutant Discharge Elimination System (NPDES) requirements of the Environmental Protection Agency (EPA).

Prior to the pre-construction conference, the contractor is required to develop a comprehensive Stormwater Pollution Prevention Plan (SWPPP) when one acre or more is disturbed as part of the project. This plan should show all of the project site of work, and separate plans should be developed based on each phase of construction (for multi-phased projects). The SWPPP should be submitted to the Construction Engineer for review, at latest at the pre-construction conference. Once the Construction Engineer concurs with the SWPPP and if the project is within another municipality, then and only then can the Notice of Intent (NOI) be applied for through ADEQ. ADEQ maintains a website known as “myDEQ” on which the contractor
applies for an NOI. The contractor can submit the SWPPP in myDEQ as part of the NOI application process.

**Maricopa County Stormwater Permit**

Should the project site be within an Unincorporated County Urbanized Area (UUA)*, an application for coverage under the Maricopa County Stormwater permit is made to the Maricopa County Planning and Development Department (P&D), including the SWPPP, before any field work is conducted (*The County Stormwater Program maintains an interactive Unincorporated Urbanized Area map on their website at the link below). P&D will issue an approval of the pre-construction BMP’s no sooner than 15-30 working days once all of their comments have been addressed and they have inspected the installed BMP’s. P&D may periodically inspect the project site during construction and will inspect the site once construction is complete and permanent stabilization is in place.

The Flowchart of the County Stormwater Preconstruction & Construction Plan Review process is available at the following website:


Information on the County Stormwater Permit, including a link to the UUA map, is available at the Stormwater Program website:

https://www.maricopa.gov/2411/Stormwater-Regulations

Information on the Stormwater Quality permitting process, is available at the following website:

https://www.maricopa.gov/3980/Water-Sewage-Stormwater-Waste

The County Planning & Development on-line permit application is at the following website:


The contractor cannot begin work until the NOI is obtained, regardless of when Notice to Proceed was issued for the project. Once the NOI is obtained, and still prior (or at least concurrent with same startup shift) to the start of work, the contractor shall install all erosion control BMPs (Best Management Practices) for the first phase of construction.

For areas outside of the Unincorporated County Urbanized Area(s) - when construction is completed; all permanent erosion control measures are installed; and MCDOT has accepted the project - the contractor shall apply for a Notice of Termination (NOT) in the ADEQ “myDEQ” system to close out the permit.

Safety is an integral part of construction. Every construction activity has its own safety element. Because most safety issues are inseparable from the construction activity, safety is discussed throughout this manual in conjunction with the different activities. The importance of a safe environment cannot be overemphasized. Most industrial injuries stem from a combination of two causes: an unsafe physical condition and an unsafe act. The unsafe physical condition is often a product of the environment; the general conditions at the site of the work, the equipment and materials used, or the process employed. Improvement in the environment can help eliminate the unsafe physical condition and improve working conditions. The unsafe act can usually be traced to a momentary lapse of attention, inadequate training, or inexperience. Construction sites are unpredictable places, and employees must be constantly aware of what is going on around them. Most construction accidents are due to unsafe acts. The rest of this subsection will introduce the various safety regulations that govern on a construction site and indicate where to find additional information on safety.

OSHA Safety and Health Standards for the Construction Industry (29 CFR Part 1926)
These safety standards apply to all construction sites in Arizona. The standards are published yearly in a book distributed by the Industrial Commission of Arizona, Division of Occupational Safety and Health (ADOSH). This book (see references) is the safety bible for all construction sites. The Industrial Commission sells these standards at a nominal price, so there is no reason why every Inspector and Construction Engineer should not have a copy.

The standards are identical to the U.S. OSHA standards and are adopted by the Industrial Commission, which is responsible for safety enforcement within the state. To help you understand OSHA standards and navigate your way through them, the following is a basic description of how the standards are organized.

Subparts
The standards are broken up into 26 subparts from A to Z categorizing the different type of construction and safety activities. There are subparts on demolition, steel erection, fire protection, and trench safety, to name a few.

Sections
Each subpart is made up of one or more sections that are the key elements of the standards. Each section is labeled with the prefix “1926”—the federal standard number. The standard number is followed by a decimal point and then the section number (ex., 1926.500). Every section has a title describing what the section is about. Every paragraph in the OSHA standards has an alphanumeric identifier. This is done to make it easier to reference or quote specific safety provisions. The labels may seem a little confusing at first. Some paragraphs have a letter in front. Others are labeled with a number, while still others are labeled with a Roman numeral. The paragraph labeling is based on a hierarchy or tier. The more complicated the section, the more tiers or different sub-levels OSHA will use to identify paragraphs (provisions) within the section. The hierarchy is best explained by the following example:
OSHA Standard 1926.57(c)(3)(iii)(B)

.57—This is the section number in the OSHA Standards.
(c)—This is the first sublevel, which is labeled with lowercase letters (a - z).
(3)—Each of the first sublevels can be further subdivided into a second sublevel, with numerals (1 - 99).
(iii)—Each second sublevel can be further subdivided into a third sublevel, labeled by lowercase Roman numerals (i - xcix).
(B)—If the third sublevel needs to be further subdivided into a fourth sublevel, uppercase letters are used to identify the fourth sublevel (A - Z).

All sections within OSHA are labeled in this manner. However, not all sections may have as many sublevels as shown in the example. For instance, 1926.704 has only five paragraphs, labeled (a) through (e). No further subdividing is needed. The subdividing depends on how complicated a particular safety standard is.

Understanding how the safety standards are structured and labeled is an important first step in becoming proficient in their use. We suggest that each Inspector spend about one-half hour just skimming the safety standards to understand how they are structured and organized. Eventually, Inspectors should be able to navigate through them and find provisions as easily as MCDOT’s Standard Specifications.

Hazardous Materials

Inspectors and other MCDOT field personnel have a right to know about any hazardous material they may come in contact with at the workplace. The Contractor is required by law and by the contract specifications to make available material safety data sheets (MSDS) to everyone at the project site. Refer to Section 1926.59 of OSHA standards for further information on right-to-know requirements.

When hazardous materials are spilled, accidentally discharged, or encountered at the project site, MCDOT’s Supplemental Specification Section 107.5.3.3 describes the procedures to follow. When MCDOT’s field staff is notified of a hazardous material situation, the following actions should be taken:

• Call 911 in a life-threatening situation
• The contractor shall stop work in the immediate area and ensure all workers are removed from the contaminated area;
• Ensure the area is sealed off to the extent that no one else can become contaminated.
This also may require additional traffic control to prohibit unauthorized entry;
• Call the Construction Engineer. Depending on the seriousness of the situation and how much the public is affected, additional contacts should be made with the:
• MCDOT Construction Branch Manager and Division Manager,
• County Risk Management, Safety Division (602-506-8601), and
• MCDOT Traffic Operations Center.
• Notify the appropriate regulatory agencies.
Construction Engineers and Inspection Supervisors shall consult with the appropriate regulatory agencies and emergency services to determine the necessary remediation plan.

However, experts should handle the more serious hazardous material incidences. Your job should be to isolate and seal off the area containing the hazardous material until qualified help arrives.

**Maricopa County Risk Management, Safety Division**

The County’s Risk Management Department has a Safety Division (602-506-8601) and full-time Safety Technicians who solely deal with safety issues and regulations. They can be a valuable resource in interpreting OSHA standards and can help you identify safety hazards at the project site. They have a full set of OSHA standards, including hazardous materials regulations and OSHA safety brochures.

Risk Management should be notified when:
- an employee of MCDOT or the Contractor is seriously injured at the project site;
- there is a chronic safety problem suspected at the project site which is not being corrected; and
- dangerous amounts of hazardous materials are spilled or encountered.

**OSHA Enforcement**

Construction Engineers are empowered to shut down unsafe operations at the project site. However, some judgment is needed in deciding whether to shut down unsafe activities or to let them continue until corrective action can be taken. Here are some questions to consider as the Construction Engineer and Inspection Supervisor arrive at their decision.

1. Is an unsafe condition away from the main site activities? Can the area be isolated or barricaded until the condition is made safe?
2. Most serious accidents are caused by unsafe acts. Are the workers’ activities jeopardizing their own or other people’s safety? How high is the risk of serious injury?
3. Assess the risk to the general public. Could the Contractor’s operation cause property damage or injury to those not associated with the construction?
4. Call the Contractor’s superintendent and safety supervisor to the site. Review the situation with them. Involve one of MCDOT’s safety consultants, if available.
5. Can something be done to make the hazard temporarily safe? Can someone be assigned to closely monitor the hazard full-time while people are at risk?
6. Consult the OSHA standards as well as any available safety experts. Do the standards or previous enforcement actions offer any direction on what to do?

Answering these questions will help prepare the Construction Engineer for making a well-thought-out, carefully deliberated decision; shutting everything down at the slightest safety infraction is too extreme.

For example, an unsecured, infrequently used, 10-foot ladder at a remote corner of the job site is probably not enough to warrant a stop work order. Even if the Contractor does not rectify the
problem for a few days, the most a Construction Engineer should do initially is to strongly warn the Contractor in writing about the hazard. On the other hand, workers found in an unshored 10 foot (3-meter) deep vertical trench is a serious safety violation, which obviously warrants an immediate stop work order and a meeting with the Contractor.

Unfortunately, most safety hazards lie between these two extremes. Making a good decision that balances strict adherence to safety standards with the perceived risk of injury can be difficult. For those difficult decisions, the best words of advice are “err on the side of safety!”

**Industrial Commission**

The Industrial Commission’s Division of Occupational Safety and Health (ADOSH) is divided into two sections. The enforcement section makes site inspections, issues violation notices, levies fines, and shuts down unsafe projects. Construction Engineers should call the enforcement section as a last resort when chronic safety problems cannot be quickly resolved with the Contractor. The other section is a consultation section that advises business owners, such as Contractors, how to improve worker safety. This section has safety consultants who inspect job sites and point out safety hazards and violations. These Inspectors do not issue citations but are there to advise on safety issues. When there have been chronic safety violations, some Construction Engineers have required Contractors to invite these Inspectors to the site instead of calling the enforcement section.

**107.6 Public Convenience and Safety**

**Traffic Disruptions**

Much of MCDOT’s construction work is situated in and/or interfaces with traffic. As a result, there is often a conflict between how to construct the work and how to least disrupt traffic. Contractors sometimes want to perform the work in the most efficient manner, but at the expense of disrupting traffic. The Construction Engineer must then decide how much of a traffic disruption is tolerable. A Construction Engineer’s number one concern is public welfare and safety. This is the Construction Engineer’s ethical duty, both as a Professional Engineer and as a public servant.

Traffic restrictions have two impacts on the public. First, they are an inconvenience that causes travel delay, extra fuel consumption, vehicle wear, economic loss, and driver stress. Second, they are a safety hazard. The restrictions eliminate some of the safety features of the road (i.e., shoulders), require quicker adjustments in driving behavior, and expose drivers to unusual situations—all result in higher vehicle accident risk.

In addition to decisions regarding safety, the Construction Engineer must carefully consider and investigate all the alternatives and weigh the impacts on public safety and the project work. For instance, closing a street for a day or two may be a significant disruption and inconvenience to the traveling public, but it may be preferred to several weeks of lane closures that might be more of a disruption and cause more accidents. This situation also requires concurrence from MCDOT’s Traffic Division, with usually 2 weeks advanced notice.
In deciding what to do, the Construction Engineer’s priorities should be:
1. Risk to public safety (accident risk assessment in particular),
2. Minimize public inconvenience, and
3. Construction efficiency.

The risk of even one serious accident involving personal injury seems too high a price to pay for construction efficiency, especially when other feasible alternatives are available. However, assessing the risks ahead of time requires judgment, experience, and sometimes expert advice. Construction Engineers are often pressured by the Contractor to favor construction efficiency. The Construction Engineer should also draw upon the experience of traffic control experts including MCDOT’s Traffic Engineers or Supervisors, a city’s Traffic Engineer or Supervisors, and the Contractor’s own traffic control coordinator and barricade Subcontractor to assist with identifying the risks of an alternative traffic control approach to complete the work.

Sometimes there is no feasible alternative, and the disruption and accident risk must be endured. However, the Construction Engineer should be the one to make the decision. Do not remain passively silent and let the Contractor do what he or she thinks is appropriate. The Construction Engineer should proactively approve or disapprove each closure or traffic restriction, even when there is a previously approved traffic control plan.

**Liaison with Local Government Officials, Business Owners, and Residents**

During construction, phasing of the site work and public information are crucial elements of MCDOT’s desired coordination effort with the surrounding community. Construction sequencing, local access, and traffic control should be outlined at the preconstruction conference (Construction Kickoff Workshop) and at other critical milestones during construction. The local government officials should be kept informed of these matters at least monthly or more often so all affected parties can be alerted to ongoing construction impacts.

The Construction Engineer should work closely with the MCDOT Public Information Officer to get notices and project information to local businesses, residents, neighborhood associations, emergency services, service providers, government officials and stakeholders.

Under the MCDOT 107.15 Community Relations Support Specification and Payment Allowance of the construction contract, the Contractor shall provide the MCDOT Public Information Officer with information need for notifications. This information includes, but is not limited to:

- Scheduled working days and hours of work
- Road and intersection closures
- Changes to property access, lane restrictions or traffic switches
- Utility disruptions affecting residents and businesses
- Transit or school bus, delivery or trash route impacts
- Night work (pre-approval required)
As part of the Community Relations Support requirement of the contract, when requested the Contractor will distribute project notifications developed by the Public Information Officer including door hangers to businesses, emergency services and residents.

The Construction Engineer and the Contractor will also assist the Public Information Officer in responding to questions or complaints concerning construction operations or procedures.

The Construction Engineer and the Contractor may also assist with local public meetings arranged and conducted by the MCDOT Public Information Officer. Such meetings are often at one of the business establishments adjacent to a project or at a local community center or school. The businesses and residences affected by the project should be invited to attend. The MCDOT Public Information Officer should conduct the meeting, with significant input and participation provided by the Construction Engineer and the Contractor's representative to explain the construction schedule and answer questions about ongoing work. The Contractor needs to feel a sense of accountability to the community concerning project progress and construction impacts.

When construction is completed, the Construction Engineer working with the Public Information Officer should contact each business and/or resident where the project had constructed new work or reconstructed existing features to ensure that any cleanup or property damage issues are resolved. If there has been a significant involvement by local individuals or groups, then a letter prepared jointly with the Public Information Officer, expressing appreciation for their participation is recommended.

**Local Access and Signing**

Adjacent businesses should be contacted to establish the level of access and hours of high use. Signs stating “Business Access” or “Driveway Entrance” may be used to denote access driveways to individual businesses or business complexes. Other special construction signing may be identified on a project-by-project basis. Signs should not identify business names and must not be furnished or altered by the businesses. Special signs can be made by MCDOT if unavailable from the Contractor.

Traffic control plans should require that local cross streets have access across construction activities whenever possible. This cross-street access should be a smooth, well-graded subgrade material or base course material with a paved surface where feasible. Provisions should be made to have in-place smooth subgrade or base course material across construction activities for at least one-half the width of all driveways to businesses, commercial, and institutional properties.

The minimum width should be 20 feet for driveways and if possible, driveway grades should be maintained at profile grades flatter than a 10:1 slope. All open trenches for utilities or culvert work must be protected with fencing or with steel-plate crossings for cross streets and driveways during non-working periods.
Stranded Motorists
Occasionally some of MCDOT’s customers need immediate help. MCDOT field staff may give stranded motorists limited assistance. This assistance includes:
• notifying the Sheriff or Department of Public Safety (DPS) of the stranded motorist;
• telephoning a roadside service for the stranded motorist;
• making phone calls to get in touch with one relative or acquaintance; and
• providing drinking water and other first-aid assistance.

The assistance does not include:
• phone calls to more than one relative or acquaintance;
• calling a towing company;
• running errands; and
• transporting stranded motorist, their passengers, or their cargo, unless there is an immediate safety hazard.

Safety Plan and Safety Supervisor
The safety plan a Contractor submits at the preconstruction conference must be site specific or customized for the project. For example, a company-wide plan that covers such topics as fall protection, crane safety, and confined spaces should not be included as part of the safety plan for an overlay or chip seal project. On the other hand, information on how the company performs general safety practices—such as fire prevention, hazardous material communication, and accident reporting—should be included in any safety plan.

As the Contractor develops the plan, safety issues specific to the type of work should be combined with general safety practices so a coordinated, unified plan is developed. In most cases, only slight revisions to a Contractor’s company safety plan should be needed. The work of Subcontractors should be included in the plan.

The Construction Engineer should forward the plan to the County Risk Management, Safety Division for review and comment or advice on the safety plan contents. They may make comments or suggestions to improve the plan, but the County, including MCDOT, does not approve contractor safety plans.

107.9 Protection and Restoration of Property and Landscape
Contractors sometimes use private property or adjacent public land as a staging area, construction yard, stockpile area, or for improved access to the project. Regardless of the reason, the Contractor must have written permission from the property owner or the operating public agency (Subsections 106.09 and 107.11). It does not matter where the property is located or who owns it. If the Contractor needs to use the property in order to carry out or accomplish any activities for the project, then written permission is needed.
The written permission should clearly describe what the property is to be used for. This is important, because many times the Department has been drawn into disputes between the property owner and the Contractor as to what he or she can and cannot do on the property. For instance, if the property owner is allowing the Contractor to store a few materials, the Contractor should not be setting up a fully equipped construction office on the property. The Contractor must furnish evidence that the owner is satisfied with the cleanup and restoration of the property at the completion of the project. Unless the owner states otherwise, private property should be cleaned and restored to its original condition.

Lack of written permission to use private or public property is grounds for withholding part of the Contractor’s monthly progress payment (5 to 10 percent range). In addition, any material stockpiled on private or public property should not be paid for until written permission is received.

107.11 Contractor’s Responsibility for Utility Property and Services

General
Arizona state law (ARS 40-360.21-.29) requires anyone excavating in public streets, alleys or utility easements to first identify the location of all underground facilities in the vicinity of the excavation. The Contractor is responsible for contacting the Blue Stake Center and locating all utilities before excavating. See the Special Provisions for the Blue Stake phone number and known utility conditions and arrangements. The Construction Engineer and Inspection Supervisor should have a copy of How To Locate Underground Utilities Before You Dig, published by the Arizona Blue Stake, Inc.

The preconstruction conference should deal with known conditions and discuss the arrangements for cooperation between the Contractor and the utility company. On projects in which utility companies relocate their own utilities, the Construction Engineer should obtain copies of all permits. The Construction Engineer’s Office is responsible for inspecting this work and ensuring that all requirements and conditions of the permit are fulfilled. The results of the inspection should be provided to MCDOT’s Utility Coordinator for the project.
SECTION 108 – COMMENCEMENT, PROSECUTION AND PROGRESS

Construction Kickoff Workshop (Partnering & Preconstruction Conference)
One of the first things to do after the contractor is awarded the project by the County Board of Supervisors is that the Construction Engineer should begin informal and formal communication with the contractor to schedule a Construction Kickoff Workshop (aka Partnering and Preconstruction Conference) specifically for the project. Every project is different in size, scope and complexity but the startup of most will have the same basic components and the Kickoff Workshop sets the tone to begin the project on the right foot. The Construction Engineer working with the MCDOT Partnering Coordinator and the Contractor will mutually select a Partnering Facilitator from MCDOT’s On-Call Facilitator list. The Facilitator under the guidance of the Construction Engineer should coordinate with key individuals from MCDOT, the contractor and other Stakeholders such as local government officials and utilities to establish a date/time for the workshop, a tentative agenda and a complete attendee list. Once established, the Facilitator should send out invitations to all attendees, giving them sufficient advanced notification of at least two weeks, of the meeting. See Section III (Partnering) for additional discussion of Partnering, the Partnering Facilitator and the Kickoff Workshop.

In developing the Kickoff Workshop agenda, the Construction Engineer should identify a list of all submittals and project-specific information needed from the contractor that is expected to be communicated or handed in at the Workshop. This list should be formalized and sent to the contractor in advance of the meeting so the contractor can be prepared and the Notice to Proceed date can be established at the meeting based on the completeness of the contractor’s submittals and information.

Following is a general list of Contractor’s Submittals typically needed at the Kickoff Workshop. This is not a complete list and project-specific items should be identified and added as needed.

- List of all Subcontractors
- List of Material Sources
- Preliminary Work Schedule
- Preliminary Traffic Control Plan
- Emergency Telephone Numbers
- Signing Authority Letter
- Name and Phone Number of the Certified Safety Professional
- Copies of all Permits required for project Construction
- Safety Plan with OSHA 300 Logs
- Material Safety Data Sheets
- Contractors QC Materials Testing Plan
- Mix Designs
- Manufacturer’s certification for all materials
- Shop drawings
Weekly Meetings
Once the project is underway, the Construction Engineer should conduct a weekly meeting with the contractor. Topics discussed at the meeting should include the following. A Weekly Meeting Agenda template is included in Appendix A.

- The Contractor’s 2-week (or 3-week) look-ahead schedule;
- Project progress;
- Safety and traffic control;
- The status of contract submittals, supplemental agreements, and other project documents;
- Project problems and new issues;
- Contract requirements and interpretations;
- Partnering issues and remedies;
- Local community relations and environmental concerns; and
- Inspection, testing, and survey.

The meeting should be held at the project site to encourage the attendance of both the Contractor’s and MCDOT’s field staff or it’s Consultant Resident Engineer staff. However, the meetings can be held at an alternate, mutually agreeable location close to the project when the project has inadequate meeting facilities.

Minutes of the meeting must be kept (see Example in Appendix B). The aim is not to tape record and transcribe each meeting— this is too extreme in a partnering environment. Instead, the idea is to summarize major discussions and document important commitments.

The minutes should also track:
- Attendees to the meeting,
- The status of contract submittals and other documents,
- Project progress,
- Unresolved project issues, and
- Other unfinished business.

When used effectively, the weekly meeting minutes will allow no important contract issues to fall through the cracks. As project issues are raised or administrative requirements are carried out, they are documented on the report. Tracking of these items continues until some type of resolution is reached or an administrative process is completed (i.e., review of a shop drawing).

By including important weekly meeting discussions and issue resolutions, the weekly meeting minutes serve as a historical record of agreements and commitments made by both the contractor and the Department. The weekly minutes also updates the status of project time and progress, contract submittals, contract changes, and other routine contract administration procedures. More routine procedures, such as payroll submission, are usually tracked when problems or exceptions arise.
To ensure everyone gets the most use out of the report, it should be updated immediately after each weekly meeting and distributed to the Contractor, MCDOT’s Project Manager, and other important project stakeholders.

**Weekly Project Report**
The minutes are usually kept in addition to the weekly project report. The weekly project report is a document that captures and tracks all the current project issues. The intent is that the Construction Engineer, Inspection Supervisor, Construction Branch Manager, anyone can go to one document to find up-to-date key tracking information about the following. A Weekly Project Report form is in Appendix A.
- Current project progress,
- Recently resolved and unresolved project issues,
- A couple of relevant photos
- Summary of upcoming and completed work
- Summary of the budget status or conflicts.

**Pre-Activity Meetings**
Pre-activity meetings are encouraged for all new activities/phasing changes. This meeting can be in conjunction with the weekly meeting.
Pre-activity meetings must be scheduled sufficiently in advance of ordering materials to resolve all issues (a minimum of 20 days is recommended). Attendees should include the contractor’s superintendent, the subcontractor(s) as applicable, the foreman installing or performing the work, the Construction Engineer, the Inspection Supervisor and Inspectors assigned to the work.

The Construction Engineer should assign discussion roles and times. The contractor should be requested to bring manufacturer’s installation requirements, including manufacturer’s drawings approved by MCDOT to the meeting. If there are more recent standards approved by MCDOT or the local government agency, the Construction Engineer should encourage the contractor to work to current approved standards (changes to Specifications require a Change Order).

**108.1 Notice to Proceed**
The MCDOT Construction Branch will send by certified mail the Notice to Proceed letter addressed to the Contract signatory of the contractor. A courtesy .pdf of the document is sent by email to the contractor’s Project Manager soon after it is signed.

**108.2 Subletting of Contract**
All subcontracts and Subcontractors – (regardless of the subcontracting tier) must be approved by the Department, including Federal Aid (FA) and non-FA projects. This approval is needed before a Subcontractor mobilizes and begins any work on a project. The MCDOT Construction Branch Manager approves or disapproves all Subcontractors.
The subcontractor and the contractor must first complete and sign a Subcontractor Request Form (SRF). This MCDOT form identifies the basic subcontractor information (name, license number, contact person) and the specific items of work that the subcontractor is expected to perform for the project. There are several statements at the bottom of the form which are used as a checklist of the attachments that are required to be submitted with the SRF. These attachments assure that every subcontractor’s contract with the Prime includes the same provisions that are included within the Prime contractor’s contract. It is important to note that MCDOT requires the entire signed subcontract be submitted with the SRF.

Nearly everyone who performs work on the project that is not directly employed by the Prime Contractor is considered a subcontractor as it applies to this specification. This includes those who provide services to a construction site such as barricade companies, cleanup and sanitation services, surveyors, material testing firms, and some trucking firms. All are counted toward the subcontracted work, which cannot exceed 60% for FA projects (50% for non-FA project as stated in MAG 108.2). This percentage is based on the original contract total amount.

Material Suppliers must be careful how they deliver materials to the project, or they can be considered Subcontractors as well. Material Suppliers can deliver and stockpile materials at the project site. However, they should not be allowed to set their materials in place either manually or by machine. For example, a commercial asphalt plant that supplies asphaltic paving materials cannot run the laydown machine. Their trucks can load the machine, and independent truckers can work for the Material Supplier, but either the Contractor or Subcontractor must place and compact the material. Companies that supply temporary concrete barriers and other traffic control devices cannot set these materials in their final place without being an approved Subcontractor. However, these companies can perform basic maintenance on their materials. They can pick up these materials from a storage area away from or adjacent to the work area. They cannot remove their materials from the roadway or directly from a work area.

108.4 Contractor’s Construction Schedule

As stated in the contract provisions, the contractor is required to complete the project successfully within the contract time prescribed by MCDOT for the project. The contractor cannot charge that the contract time is insufficient for the project after award is made; any concern by the contractor that the construction duration stipulated for the project is insufficient must be addressed before the opening of bids.

The contractor is responsible for employing a qualified workforce and deciding the means and methods to accomplish the work with an acceptable quality. To this end, they are required to produce a construction schedule of anticipated tasks and activities that can be utilized to measure the effectiveness and productivity of the workforce they employ.

The Construction Engineer and their staff are responsible to receive, review and critique the schedule submitted by the contractor for what may or may not be included for activities,
milestones identified, and any constraints that relate to either what is stated in the contract or what the physical limitations that may exist in the field. The schedule should include continuous dates from the Notice to Proceed (NTP) through Final Acceptance and the total duration should match the contract time provided.

The preferred schedule to receive from the contractor is a Critical Path Method (CPM) schedule, which clearly identifies predecessor activities, successor activities, a duration and float for each activity, and a logically organized critical path. The critical path identifies the longest path to complete the project based on the inter-relationship of each activity. The schedule should also identify the early start, late start, early finish and late finish dates for each activity. The early start and late finish dates for a critical activity (or controlling item of work) is the total duration that activity can last without making the project longer.

MCDOT Supplemental Specification Section 108.4 requires and makes it mandatory for every contractor to submit a CPM schedule, initially at the pre-construction conference, followed by monthly updates as the project progresses.

The contractor is required to submit a 2-week (or some provide a 3-week) look-ahead schedule at each weekly progress meeting. These schedules are usually more detailed than a project schedule but are more fluid and susceptible to change – especially in week 2 or week 3. These schedules are intended to be a tool for the Construction Engineer and the inspection staff as a planning aid to decide on the appropriate staffing required, anticipated survey or material testing needs, and any notifications to other MCDOT Divisions (Signals, Traffic Striping, etc.) for when they may be needed on the project.

Objectives of CPM Scheduling
The intent of the CPM schedule is to get the Contractor to determine which construction activities are critical to completing the project on time. These critical activities are called the controlling items for the project (see definitions in Subsection 101.2). Once the controlling items are identified, the Contractor’s superintendent, the Construction Engineer, and other project team members can focus their management efforts on ensuring these items stay on track and are not unduly delayed. The CPM schedule demonstrates that the Contractor has considered not only all the activities needed to complete the project in accordance with the contract, but the effect of each activity on project time and the Contractor’s resources.

Reviewing the CPM Schedule
It is the Construction Engineer’s responsibility to review the schedule. Keep in mind that the CPM schedule is a planning tool. It predicts how work is going to be carried out in the future. As a project partner, you should be of great service to the Contractor during this planning stage. The intent of the Construction Engineer’s review is primarily to look at the sequencing of the work to determine if the Contractor has considered:

- All the contract requirements, such as shop drawing reviews, traffic restrictions, access limitations, time constraints, etc.;
- Any unusual site conditions;
• Any regulatory impediments from local, county, state, or federal agencies;
• Interface requirements with other Contractors;
• Construction method limitations specifically described in the Project Plans and Special Provisions; and
• Any other unusual contract constraints.

The Construction Engineer should review the schedule to see that activity durations appear realistic and that the logic makes sense. A good critique of the Contractor’s schedule is a major contribution the Construction Engineer can make in helping the Contractor correctly execute the contract work.

**Submittal and Review Deadlines**

It is important for the Construction Engineer to insist that the Contractor submit the CPM schedule and the monthly updates within the time limits described. One reason is that schedules are time-sensitive documents, so information in a schedule starts becoming useless and outdated the longer the Contractor waits to submit.

A second reason for insisting on a schedule is that the Construction Engineer’s insistence demonstrates that the Department is taking the project schedule and contract time seriously. It would be difficult to assess liquidated damages for a late completion if the Construction Engineer never insisted on or reviewed any of the Contractor’s CPM schedules.

Finally, the CPM schedule determines the controlling items for the project ahead of time. This is very important for the Construction Engineer to know in advance so that the Department does nothing to unknowingly affect these items.

**108.5 Limitation of Operations**

Often contractors will need to work weekends, holidays, and evenings to stay on schedule, to optimize resource usage, or to perform work that normal daytime traffic would preclude. Although many contractors believe 24-48 hours’ notice of weekend or night work is sufficient, many local municipalities require their advanced approval as the contractor would need to request a waiver of noise ordinance.

When work is performed at night, adequate lighting needs to be provided by the Contractor so that:

- work can be performed safely,
- the work can be adequately inspected, and
- traffic can move safely around the work.

OSHA Standard 1926.56 has minimum lighting standards for workers safety. However, the Construction Engineer has the right to ask for additional lighting above the minimum so Inspectors can adequately inspect the work. For example, equipping the Inspectors with flashlights is not good enough when large areas or large surfaces, such as concrete paving, need to be inspected. If the work can be inspected and tested the following day without rushing the
Inspectors, then work may be allowed to continue into the night as long as the OSHA standards are met.

108.7 Determination and Extension of Contract Time

**Measuring Contract Time**

Time allowed for completion of the contract work will be specified in the Bid Invitation advertised by the MCDOT Contracts Branch. One of the following methods will be specified for measuring time:

1. Number of calendar days (Majority of MCDOT projects utilize Calendar Days)
2. Number of working days
3. Fixed completion date

Time allowed for projects with a construction phase and a landscape establishment phase may be specified separately, as Phase 1 and Phase 2 for example, or the landscape establishment phase may be included within the total contract time.

**Stopping Contract Time**

The Construction Engineer may suspend project time when work on the controlling item(s) must stop for any of the following reasons.

- Adverse weather or seasonal conditions.
- A recognized differing physical condition that meets the requirements of Section 104.2.2.
- Labor strikes.
- A recognized nationwide shortage of raw materials or basic items.
- Government interventions.
- Unexpected utility conflicts.
- Archaeological finds.
- Unexpected hazardous materials.

The reason for suspending project time must be clearly documented, including a detailed accounting of the start and end dates of suspended contract time.

For all other types of changes that impact contract time, either the Contractor must file a request for extension of contract time, or the Construction Engineer can include additional contract time within a change order.

**Contract Time and Controlling Items**

The Department stops or extends contract time based only on effects to the controlling items for the project. For example, suppose the controlling item for a project is the curing of a concrete box culvert, and let’s say it rains on the project for the next three days. Even though the project may be shut down, no stopping of contract time or contract time extension is needed because the controlling item is unaffected by the rain.
Contractors may make time extension requests when non-controlling items are affected by changed conditions, directed changes, or other changes beyond the Contractor’s control. For example, let’s say in the previous box culvert example, a non-controlling item such as prepare subgrade was delayed five days due to the rain. If the item had seven days of total float time before the rain began, then after the five-day delay, the item would still have two days of float. It is still a non-controlling item, so no time extension is needed.

Sometimes a non-controlling item becomes a controlling item. In this case, the Contractor may ask for a time extension due to uncontrollable past delays that consumed some of the float time. In the previous example, a few days later, say a key piece of equipment breakdowns while the Contractor is preparing the subgrade. The equipment will take at least a week to fix. The prepare subgrade item now becomes a controlling item because the remaining float time is gone. The project is now being delayed. The Contractor will then contend that if it hadn’t rained, the float would still be available for fixing the equipment. In this case, the Contractor is attempting to benefit exclusively from the use of float time. This is not fair to the Department since contract time does have a value, and neither party should have a monopoly over it. If the situation were reversed (the equipment breakdown occurred just before the rain) it would be just as unfair for the Department to contend that the rain would not have delayed the project had the Contractor properly maintained the equipment.

### 108.9 Failure to Complete on Time

**Liquidated Damages**

Liquidated damages are assessed against the Contractor when the project work is not substantially complete (MAG Section 108.9, Table 108-1) within the allotted contract time. Liquidated damages are not a penalty, but a method for recovering some of the Department’s costs and damages due to the additional time needed to complete the project.

The Department uses liquidated damages as a last resort. These damages should be the final result of a process during which the Construction Engineer has been communicating to the Contractor the ramifications of not finishing within the contract time available. Liquidated damages should be no surprise to the Contractor. The Contractor should receive plenty of warning about what could happen if the project is allowed to fall behind schedule. There should be letters written and escalation meetings held long before project time runs out. It is important for Contractors to receive a clear message from the Construction Engineer and the Construction Branch Manager about where the Department stands on assessing liquidated damages for each project. This message should not be received at the last minute when Contractors have lost the opportunity to adjust their operations to make up for lost time.

When liquidated damages are assessed, the Construction Branch Manager should write a letter notifying the Contractor of the assessment. The letter should come shortly after substantial completion is achieved or when all project time issues are resolved. The Construction Engineer needs to notify the MCDOT Finance Division in writing of any assessed liquidated damages.
before any retention is released. The Construction Engineer should attach a copy of the Construction Branch Manager’s letter.

**Constructive Acceleration**

Construction Engineers should be very careful about how they communicate to the Contractor the requirements for getting the project work back on schedule. Construction Engineers should not tell the Contractor that the work must be completed by a certain time or within a certain time period. Some Contractors may misinterpret this as a request to accelerate the work and then bill the Department for the acceleration costs. Instead, the Construction Engineer should warn the Contractor about the consequences of not completing the project on-time and request the contractor determine their plan to get back on schedule and submit an updated schedule to reflect such plan.
SECTION 109 - MEASUREMENTS AND PAYMENTS

109.1 Measurement of Quantities

Method of Measurement
Roadway construction work is divided into separate pay items. Each pay item represents a unique construction element of the project (i.e., guardrail, culvert pipe, roadway excavation, etc.). Each pay item has a method of measurement, which is a specified uniform procedure used to determine the quantity of work eligible for payment under each pay item. Usually the method of measurement measures the quantity of a key material for each pay item (i.e. lineal feet of curb and gutter) or measures the completed work as a unit (i.e., each catch basin or a sidewalk ramp). Each pay item has a method of measurement clause or subsection, which can be found in either the MAG Standard Specifications, MCDOT Supplements or the Special Provisions. The clause will describe exactly how the item is to be measured for payment. Subsection 109.1 more fully describes the method of measurement for pay items that have an undefined or incomplete description of how to measure the work for payment.

A method of measurement may or may not represent the actual quantities of materials used. For example, structure backfill is measured based on Standard Drawing B19.40, which shows vertical fill limits adjacent to the structure. In reality, excavations are sloped next to structures so that the volume of structure backfill placed will always exceed the amount measured for payment. Carefully review “Method of Measurement” and “Basis of Payment” sections in the Standard Specifications / Special Provisions to know exactly what is included in a pay item.

Measuring and Documenting Pay Quantities
The accurate measurement of pay quantities is a very important task for the Inspector. Field measurements for pay items are converted directly into dollars for the Contractor. Because there is a direct relationship between what the Inspector measures and what the Department pays out, inaccuracies in measurements lead to underpayments or overpayments to the Contractor.

Scales
Scale Inspector
For many pay items involving bulk materials (i.e., aggregate base, asphalt, etc.), payment to the Contractor is based on the weight of the material. Unlike other methods of measurement, measuring by weight can be a concern for the Department.

When paying for material by weight, MCDOT has very little direct control or involvement in the weighing process. The material is weighed for payment on scales either owned or leased by the Contractor or Material Supplier. The material is entirely handled by the Contractor or Material Supplier before it is placed at the project site. Only when the material arrives at the project site does the Department exercise some control over it. As a result, the Department must rely on the accuracy of the Contractor’s scales and the honesty of the Contractor’s scale operators and trucking staff when this method of measurement is used.
To help ensure the integrity of this process, the Department may require a scale inspector to monitor the weighing of materials for payment. When manually operated platform scales are used, a scale operator shall be assigned full-time to monitor weighing. When automatic scales are used (weights are automatically displayed and printed), the monitoring can be done part-time.

Regardless of whether scale monitoring is done on a part- or full-time basis, the scale inspector has several important duties related to the weighing of materials.

- Ensuring the scales are properly certified by Arizona Weights & Measures.
- Ensuring the scales are being operated correctly and within their prescribed limits.
- Verifying the vehicle tare weights are correct if there is doubt about their accuracy (this could include weighing empty trucks on another scale).
- Verifying that the weight being measured is the same as the weight being recorded (more of an issue on manually operated scales).
- Tracking the accumulated amount of material used on a daily basis.
- Ensuring the Contractor’s weigh tickets are completed correctly.

The Construction Engineer or Inspection Supervisor may assign other duties to the scale inspector to keep the person busy full-time. However, it is important that the scale inspector has sufficient time to fully carry out the duties listed above so they can competently oversee the weighing process.

Scale Accuracy and Calibration
Like a tape measure, a scale needs to measure accurately and consistently according to accepted standards. A scale’s accuracy directly reflects how accurately MCDOT pays the Contractor for work measured by weight.

To measure weight accurately, two things must occur.
1. The scale must be calibrated correctly.
2. The tare weight of the container holding the material must be accurately known.

Even when the scale weighs accurately and the correct tare weights are used, weights still need to be accurately recorded so payment can be made.

Policy on Scales
1. Truck scales must be sealed by the State Inspector of Weights & Measures or a registered service agency (RSA) within a period of 12 months preceding the date of weighing.
2. The original setup of scales and all moves of scales should be licensed and certified by Weights & Measures or an RSA before the scales are to be used.
3. In the event MCDOT personnel cannot satisfy themselves as to the proper accuracy of the scales, at any time prior to or during the weighing operations, weighing operations should cease and the State Inspector of Weights & Measures or a registered service person or agency should be called by the Contractor to inspect the scales.
4. MCDOT personnel should not repair scales. An adjustment of the balance bar to maintain zero balance of the beam is the only adjustment that should be made by MCDOT personnel. All other adjustments or repairs must be performed by a registered service agency.

5. Scale certifications are good for 12 months. No grace period for recertification should be allowed. Commercial scales are required to be recertified by Weights & Measures or an RSA within 45 days prior to expiration of the 12-month period.

6. Responsibility for scale setup, operation, maintenance, adjustment, and repair lies with the Contractor.

7. The Department of Weights & Measures maintains a list of current Registered Service Agencies. Please ensure the RSA is currently certified.

**Weighing Requirements**

1. An acceptable load invoice or ticket should include truck number, time, source, date, type of material, and net pounds or tons. Each invoice should be signed by the scale operator and collected by the Inspector calculating the spread, who in turn should make a notation of station limits of the spread on the front of the invoice and initial. At the completion of the shift, the spread person should deliver the invoices to the project office for checking and totaling.

2. In the event loads or portions of loads are rejected, notes explaining the reason should be made on the respective invoice, initialed, and dated by MCDOT and Contractor representatives.

3. Each day's totals and accumulated totals should be recorded, including other information such as moisture deductions. Each weigh record will be signed daily by the scale operator or their deputy.

4. The daily weigh record should be attached to the daily invoices and adding machine tapes. The invoices, checked tapes, and weigh sheet should be retained at the project office and kept with the project files.

5. Spot checks of weighing operations and tare weights should be made. The frequency of these checks is dependent on the quantity of material being weighed daily, so the frequency of checking should be at the Construction Engineer's discretion.

**109.2 Scope of Payment**

Even though the Department pays for completed work on a monthly basis as the job progresses, this does not mean the work has been accepted. The Department has the right, until final or partial acceptance (Section 105.15), to require defective work to be corrected by the Contractor, even after the Department has paid for that work.

**109.4 Compensation for Alteration of Work**

**General**

The quantities shown in the bidding schedule are just estimates of the amount of work required to complete the contract, and except for small projects, the actual measured quantities should be expected to be different than what was estimated. Contractors often ask for unit price
adjustments when quantities run under the estimated amounts, items are deleted, or when work is added. Regardless of the reason, Construction Engineers should stay within the guidelines of 104.2 when making unit price adjustments.

Change orders are used to make changes to MCDOT construction contracts. They change work in the contract and adjust the contract cost accordingly. They CREATE new pay items or INCREASE or DECREASE the quantity of existing pay items. Change orders may also be used to change or modify specifications or ADD contract time to the contract, even when there is no effect on contract costs. Bid Items are never deleted within a change order; Instead, quantities are adjusted to zero. When signed by the Contractor and the Construction Engineer, Change Order Agreements are binding legal documents that supplement the original contract.

Procedure
A change order may be initiated by MCDOT or the contractor, whenever a change to the “scope of work” is perceived by either party. The “scope of work” is defined by the work that is shown in the project plans, described in the project special provisions and referenced in standard details and specifications.

As in the case of a change to the project plans initiated by MCDOT, the Construction Engineer should write a letter to the contractor describing in detail the change instructions, accompanied by a sketch or modified plan sheet that illustrates the change. If the change is believed to be incorporated into the work at the contract unit price established in the contract, then the letter should also summarize the quantity difference, unit price of the item(s) affected, and anticipated total cost of the change. The contractor may agree, and if so, a Change Order would not be required.

Should the contractor disagree with the Construction Engineer’s analysis of the change and its impact to the project, then the contractor needs to identify the specific impacts of the change in writing, accompanied with a detailed cost breakdown of the additional costs being sought. This condition would also be true if the contractor was initiating a request for change order.

If the change cannot be handled by adjusting the quantities of existing contract items within 20% of a major items original value, then a detailed cost analysis of the extra work must be provided and included with the Change Order package. The Change Order is best suited when the work can be quantified ahead of time. Since Change Order prices are agreed on before the extra work begins, Contractors may include many contingencies in their cost estimates to offset any perceived risks.

A Change Order is also used to extend or otherwise modify contract time, to account for the total amount of days to complete a project. The Contractor initiates this process through a formal, written request which specifically identifies whether they are seeking compensatory or non-compensatory additional contract time for excusable or non-excusable delay. The Construction Engineer reviews the Contractor’s request and recommends, to the Construction Branch Manager, the number of additional days to be added, if any. In the recommendation, the
Construction Engineer specifically identifies excusable or non-excusable delay, whether or not the time is compensatory, and if so, how much is recommended. All Change Orders to extend contract time with compensation requires a detailed accounting of costs be submitted by the contractor. The MCDOT Construction Division Manager shall be consulted and provide guidance in price negotiations, but the Chief Construction Engineer (Construction Branch Manager) grants approval for compensable and non-compensable time extensions. If the Contractor does not agree with the Chief Construction Engineer’s decision, the Construction Engineer schedules an Escalation to the MCDOT Construction Division Manager level.

Time Extensions add days to Working Day & Calendar Day contracts. Changes to Fixed Date Contracts require that the contract’s completion date be deleted, and a new Fixed Date established for completion. Change Orders adjusting contract time may or may not be combined with other contract changes. For example, if the cause for delay is the result of added scope to the project, then it is entirely appropriate to document the additional items of work and the related additional time within the same change order.

Investigation and Preparation
The Construction Engineer must basically answer these four questions when analyzing a contract change:
1. Was there a contract change? (What was the change?)
2. Who caused the change?
3. What are the impacts of the change?
4. What are the costs?

Cost Analysis for Complex Items of Work
A Construction Engineer’s cost analysis should be prepared for Change Orders and/or Time Extensions that involve complex project issues. The analysis is intended to be separate and independent, with stated assumptions for anticipated production rates, crew size, equipment or materials that may be needed. Time extensions with compensatory time require consultation with the MCDOT Construction Division Manager. Cost analyses for extra work are best done by carefully examining the impacts of the change first, then looking at costs last. Here is a rudimentary procedure that can be used on any cost analysis that will keep you focused on analyzing the impacts first before you are ready to examine costs:

1. Quantify the Extra Work
   This means calculating the amount of work that must be performed: such as cubic yards of dirt to move, linear feet of guardrail to install, or pounds of rebar to eliminate. The trick here is not only calculating the quantity correctly, but also selecting the correct unit of measurement. Your selection should be based on industry practice and what unit of measurement best represents how the work will be performed.
   For example, excavation work is usually done on a cubic yard basis because excavation work involves moving volumes of material. On the other hand, structural concrete is usually estimated on a square yard basis and not by the cubic yard basis MCDOT uses to measure it for payment. Most of the expense in structural concrete is in the formwork and not in the amount
of concrete used. Selecting the correct unit of measurement is an important element in producing an accurate analysis.

2. Analyze How the Work is Constructed
Construct the work in your mind. Write down all the different steps that must be followed (continuously ask yourself who will do what, where, when, and how?). This is where your analytical thinking as a technician or engineer is of prime importance. One reason Inspection Supervisors’ estimates are usually less than the Contractor’s on extra work is that Inspection Supervisors fail to take into account all the little hidden extras that add to the cost of the work (ex., additional crane time may be needed to lift extra rebar from a delivery truck to a bridge deck).

3. Select the Crew Size, Equipment and Materials Needed to Complete the Work
Once you have decided how you’re going to build the work and have broken it down into smaller, definable units, then it is simply a matter of selecting the appropriate resources for the work. This selection is based on judgment as well as availability of the needed resources.

4. Estimate Production Rates
Here a lot of judgment is involved, and often historical data can be used. Some of the more experienced inspectors may be able to help estimate how long the work will take. Sometimes you just have to assume a rate. Two things to remember are that no one works a 60-minute hour or less than half a shift. It is very common to utilize a 50-minute or 55-minute hour to account for normal inefficiency of labor.

5. Calculate Direct Costs
Up to this point, we haven’t even mentioned costs and yet a lot of analysis has already been done. Good cost estimates are often the result of understanding how to build the work (steps 1 through 4) more than having accurate numbers on costs. On the other hand, don’t be afraid to call material suppliers and to use the Contractor’s payrolls to improve your accuracy.

Another source of historical cost information is Means Heavy Construction Cost Data. This cost guide is published yearly and contains unit cost information as well as information on production rates and crew sizes. Direct costs usually include project overhead, but not home office overhead. Don’t forget incidental costs for things like haul roads, water, and waste disposal.

6. Add up all costs:

*Labor*, which includes burden and fringes. The use of Certified Payrolls for actual employees’ pay data and fringe amount is preferred. The labor plus burden is calculated on Wages x 1.5 (the current multiplier from ADOT’s Standard Specifications as outlined in MAG 109.5.3). Labor burden is the total of all indirect labor costs necessary for an employee to perform the work that they are hired to do. It includes Social Security and Medicare Tax, Worker’s Comp (Insurance the employer must purchase), State and Federal Unemployment Insurance, training, paid holidays, use of vehicles, computers, PPE, office, office furniture, equipment, supplies, etc. Fringes are the non-take home portion of wages which include Pension/401K, paid
vacation and sick leave, contributions to health insurance, etc. MCDOT verifies fringe benefit rates from the certified payrolls.

**Equipment** costs: Here the Blue Book Rates could be utilized based on the make/model and size of the equipment used to perform the work.

**Materials:** The delivered cost of AB, pipe, concrete, etc.

7. **Add Markups and Arrive at a Grand Total or Unit Price**

Profit and overhead is calculated as 5% to 15% of the total of all Labor, Equipment and Material costs for work done by the prime contractor. Work done by subcontractors is calculated as 5% to 15%, and an additional 5% for the Prime Contractor to make the total no more than 20% for only the portion of the work done by the subcontractor. MAG Section 109.5 identifies the details and thresholds for these requirements.

**Negotiating**

If the extra work is not covered by an existing item, the Construction Engineer and the Contractor may be able to negotiate a new unit price for the work and establish a new item or items in the change order. If the Contractor proposes a new item or unit price, a detailed cost analysis must be provided. The cost analysis should include a breakdown of the estimated time for labor (including labor classifications) and the estimated costs of materials and equipment. The total cost of the extra work is divided by the units of work to arrive at a unit price for the work.

The Contractor’s cost proposal must be analyzed by a thorough review by the Construction Engineer. The Contractor’s analysis should be compared with the Construction Engineer’s own independent analysis. The Construction Engineer should be completely satisfied that the Contractor’s cost analysis is equitable and fair before accepting it as part of the change order. Both the Contractor’s and the Construction Engineer’s cost analysis must accompany the Change Order document as part of the separate Supplemental Information package.

Some Construction Engineer’s think that Contractors try to take advantage of the Department when a change order arises. This is usually not the case. Contractors are no longer in a competitive bid situation after they’re awarded the project, so there is no reason for them to assume unnecessary risk. This lack of risk taking is simply reflected in contractors’ change order prices.

**Authorization and Responsibilities**

Although Construction Engineers are not authorized to approve changes to the contract themselves, they are delegated the responsibility to research the issues involved with the additional work, gather cost data for and perform an independent analysis of the additional costs, obtain and thoroughly review the contractor’s request, and negotiate with the contractor to then ultimately arrive at a recommendation to execute a change order or utilize a different approach to accomplish the work.
The Construction Engineer is also responsible during the course of this review to contact other technical groups with MCDOT for their input and advice, along with notifying the MCDOT Project Manager. For any items where consensus cannot be attained but has an expedited timeframe to keep the project on schedule, the issue should be immediately escalated internally.

The Construction Engineer is also responsible for monitoring the cumulative value of all changes to the original contract amount. This includes significant item overruns and underruns, potential and executed change orders so that sound, responsible fiscal decisions can be made with confidence.

With regard to a contractor’s request for additional compensation, the Construction Branch Manager will review the documentation that is presented by the Construction Engineer, watching out for uniformity, potential for setting precedence, and basis for negotiation. The approval of the MCDOT Construction Division Manager is required for all specification changes. In the absence of the MCDOT Construction Division Manager, the Director has this authority.

Per the County Procurement Code, the Director/County Engineer has authority to approve all Change Orders on a construction contract up to a cumulative maximum $250,000 amount. This authorization includes changes in specifications, design, and unit price adjustments and other negotiated agreements.

The County Chief Procurement Officer has the authority to approve all Change Orders on a construction contract up to a cumulative maximum of $1,000,000.00. This authorization includes changes in specifications, design, and unit price adjustments and other negotiated agreements. When the cumulative total of all change orders equal or exceed $1,000,000.00, each subsequent change order must be approved by the County Board of Supervisors.

The authorization levels discussed previously apply to the financial approval for a Change Order. Changes that require alterations to the specifications, MCDOT design policy or design details have to be agreed upon by the appropriate MCDOT technical section prior to preparing a Change Order. The MCDOT technical managers include Materials, Engineering, Environmental, Traffic Engineering, Right of Way and Bridge. If a technical manager does not agree with the proposed change, the issue can be escalated to the MCDOT Construction Division Manager or MCDOT Director/County Engineer for resolution.

On federally funded projects, MCDOT as a Certification Acceptance Agency has delegation authority from ADOT to approve change orders, for certain change order types and within certain authorization limits as outlined and defined in the ADOT LPA Manual (also see Chapter IV, Federal Requirements, for an overview). The ADOT LPA Manual defines certain change orders that require either ADOT notification, ADOT concurrence or ADOT approval. If a change order is considered “not eligible” for federal assistance, then the items included in the agreement must be shown as “non-FA” and tracked separately from the other “eligible” work.
Additionally, the Construction Engineer needs to be aware that any local government or agency participating on a project must also be contacted and sign the change order document for changes in which they are participating financially.

Prescribed penalties for work items failing to meet specification requirements (i.e., PCCP smoothness or compaction on asphaltic concrete pavement) do not require a change order. The Construction Engineer creates a separate pay item found from the standard item list and may notify the Contractor by letter of the penalty adjustments. The same procedure applies to contract bonuses prescribed within the special provisions.

Section 109.4, Compensation for Alteration of Work of the MAG Standard Specifications states that except for emergency situations or otherwise directed by the Engineer, the contractor shall not proceed with change order work until authorized by the Engineer. This condition not only protects MCDOT, it protects the contractor from the risk of performing work that may not be paid later by MCDOT. As the cost for altered work increases, contractors are less willing to take any risks under contract.

109.5 Actual Cost Work

Actual Cost Work compensates the Contractor for extra work based on the actual hours worked for labor and equipment, and for the quantity of actual materials used (time and materials). It is the most cumbersome and administratively complex agreement. It contains all the supporting documents found in a Change Order, plus additional record keeping requirements that are agreed upon daily between MCDOT’s inspector and the contractor.

Actual Cost Work should be the method of compensation of last resort because it is the most expensive and administratively tedious. This method is utilized for contract changes in which the amount of work is difficult to quantify (such as an emergency situation) or the financial risks of performing the work are too high for either party, the County or the Contractor. Another situation may be that although the work is known and quantifiable, a mutual agreement cannot be reached between MCDOT and the contractor.

For these reasons, Section 109.5, Actual Cost Work identifies a method to document the labor, equipment and materials that a contractor requires to perform the altered work. In these cases, the work is performed and later quantified in a structured manner to arrive at the total cost for the work.

Once the work begins, daily records are kept of the labor, materials, and equipment used to accomplish the extra work. The Contractor takes these daily records and invoices the Department for the work, based upon Section 109.5. The field office reviews and approves these details for accuracy and completeness or returns to the contractor with comments if corrections are required. Once the invoice and backup documentation are acceptable, payment is made within the Pay Application.

To sum up, the Actual Cost Work method is best used when:
1. Defining the work clearly and accurately enough for a change order is too difficult,
2. The extra work needs to begin right away, or
3. The Construction Engineer and the Contractor cannot agree on costs.

109.7 Payment for Bond Issue and Budget Projects

Monthly Progress Payment Procedures (ARS 34-609)
The Construction Engineer and staff prepare progress estimates on a regular basis – generally each month, but can be a shorter or longer timeframe that is agreeable to the contractor. The progress payment’s primary intent is to fairly compensate the Contractor for work performed and materials furnished acceptably each month.

The 20th of each month is designated as the monthly cutoff date, regardless of which day of the week it falls. Item quantities for completed work during the month prior will be documented for payment through this day of each month. A monthly progress estimate will be drafted by the Construction Engineer based on the completed work documented.

The Construction Engineer and staff will review the monthly progress estimate with the contractor, resolve any discrepancies and will submit the progress payment documents with appropriate signatures to MCDOT for processing within 5 working days after the cutoff date for processing.

In accordance with MAG 109.7, MCDOT withholds 10% of all payment estimates (retention) as a guarantee for complete performance of the contract. This percentage reduces to 5% once 50% of the original contract work is completed. In addition to normal retainage, the Department does have the right to withhold part or all of the monthly progress payments if the project work or project progress is unsatisfactory. If the Construction Engineer is suspicious of the Contractor’s ability to complete the project, a meeting with the Contractor and the Construction Branch Manager should be held to discuss the issue before any payments are withheld.

Documenting Payment
Quantities developed for the monthly progress estimate should be based on sound engineering procedures rather than on arbitrary selection of quantities that help expedite payment. For this reason, the inspector’s daily dairy shall be the source document for all payments. The item payments shall be further detailed within the diary to specifically identify the Station and offset location, length, area or volume of payment. All two-dimensional and three-dimensional payments shall be accompanied by an area or volume diagram and supporting calculation.

The monthly pay estimates are prepared on a computer program using a standardized format used for all MCDOT projects. It shall be the Construction Engineer and staff’s responsibility to maintain a detailed accounting of all quantities of work completed for each pay item of the contract. Sample format is provided in Appendix B.
Pay item entries and other entries should not just appear on the progress estimate. Sufficient backup documentation (i.e., diaries, change orders, invoices, or others) needs to support each entry. If corrections need to be made for previously paid quantities that were later found to be incorrect, the corrections need to be documented (typically in a diary). All payment documentation must be kept as part of the project records and may be subject to periodic audit.

When preparing the monthly progress estimate, the Construction Engineer and the Contractor’s Superintendent should review all quantities of work completed. Should there be pay item quantities on which the two parties disagree, the disagreement needs to be resolved (through escalation if needed) prior to submittal of the next month’s progress pay estimate.

**Partial Payment for Material on Hand**
MAG Section 109.7 provides guidelines to determine eligibility of partial payments when the materials needed to construct those items have been procured by the Contractor or a materials supplier for the specific use on the project.

To qualify for a partial payment on stockpiled materials, the following conditions must be met.
1. The Construction Engineer must be satisfied with the progress of the project.
2. When applicable, the stockpiled material should have been tested and the material must have passed the test(s).
3. When applicable, acceptable certificates of compliance for the material have been received by the Department.
4. The material is stockpiled on the project, or if stockpiled off the project (including commercial material sources), the material is located in a separate area away from the main inventory, and is reasonably secure from vandalism or theft.

The purpose of this partial payment is to promptly compensate the material supplier for materials produced for the project. The intent is not to finance their inventory. Once a partial payment is made, the material supplier should not be allowed to sell the material to other customers. Construction Engineers have the authority to deny partial payment for material stockpiled at commercial sources if the material cannot reasonably be separated from the main inventory, or if the Construction Engineer suspects the material supplier is in financial trouble.

Generally, the material should be delivered to the project site or the Contractor’s yard and reasonably secure from vandalism or theft. Partial payments for materials can be made without the need for a change order, provided eligibility for partial payment is met and paid invoices are supplied.

**Final Payment**
Once a Final Acceptance letter (discussed in Section 105.15) has been issued for the project, the closeout of the construction contract and final payment can begin. Closing out a construction contract involves verifying that the Contractor has complied with all contract requirements; all documentation and paperwork is complete for the project; and preparing the Final Payment Estimate and the Final Quantity Adjustment Change Order. The contractor is required to provide a Certificate of Performance (COP); Payment of All Claims Affidavit;
Consent from their Surety with accompanying Power of Attorney; and an SBE Participation Reporting form.

Reference is made to the two subsections below for further discussion and general listing of the final payment and project documentation.

*The final payment on MCDOT construction projects is Only for release of monies retained on the contract. Before proceeding with the final retention release payment estimate, the Construction Engineer will prepare and submit a payment estimate for final quantities of work performed. The final payment (retention release) estimate should not be submitted until the Construction Engineer has verified that payment has been made for all work performed.*

**Final Documentation Required Before Final Payment**
The Construction Engineer will prepare the final payment estimate (retention release) after the following documents have been submitted and the final actions have been completed. It should be noted that this is a general list and may not include all required documents.

1. Final Acceptance letter has been sent to the Contractor (MAG & MCDOT Supplement 105.15).
2. All Change Orders, Time Extension requests, Actual Cost Work invoices have been signed and executed copies are in the project files.
3. Contractor has submitted the required Certification of Performance (COP); Affidavit of payment of all claims; Consent of Surety with Power of Attorney; SBE Participation Reporting form.
4. The Final Quantity Adjustment (FQA) Change Order has been drafted and signed. The FQA is submitted with and accompanies the final payment estimate and related documents.
5. All Actual Cost Work invoices have been received and verified as paid.
6. Construction Engineer/Inspector, Contractor and the Subcontractor agree on final quantities.
7. Incentive and disincentive payments have been substantiated with detailed calculations, drawings, daily diary reports, or other supporting documents.
8. Any as-built plans, records or documents that may be required of the contractor have been reviewed and accepted by the Construction Engineer.
9. Materials checklist has been reviewed by the Construction Engineer and submitted to the Materials Engineer for approval.
10. For specific pay items, the completion of:
    - Asphaltic concrete related documentation
    - Bituminous treatments documentation
    - Bituminous material price adjustment documentation
    - Incentives/disincentive payment summary
11. NOI (Notice of Intent) submitted to ADEQ and is on-file.
12. NOT (Notice of Termination) submitted to ADEQ (If applicable), or the project turned over to MCDOT Maintenance for subsequent monitoring.
13. A Transaction Detail Log, or similar documentation detailing quantities paid for every item of the contract.
14. **Federal aid projects - Verification of all certified payrolls**
15. **Federal aid projects - Final EEO compliance reports for the last working month and year are on file at ADOT’s BECO Office (Forms 109405 and PR1391).**
16. **Federal aid projects - Certification of Payments to DBE Firms Affidavit are in the project file and on file at ADOT’s BECO Office.**
17. **Federal aid projects - Contractor’s annual training reports have been sent to ADOT’s BECO Office.**
18. **Federal aid projects - Final trainee report completed by Contractor and on file at ADOT’s BECO Office.**

**See Section IV. Federal Requirements for detailed discussion of the federal aid items above.**

### Final Pay Estimate and Required Support Documentation

As previously mentioned, the final payment on MCDOT construction projects is Only for release of monies retained on the contract. Before proceeding with the final retention release payment estimate, the Construction Engineer will prepare and submit a payment estimate for final quantities of work performed. The final payment (retention release) estimate should not be submitted until the Construction Engineer has verified that payment has been made for all work performed.

*Reference is made to the “MCDOT Construction Contract Closeout (Final Payment) Documents” included in Appendix G for a detailed list and review of documents required for Final Payment.* The Final Payment documents include the following:

- Pay Estimates and documents prepared by the Construction Engineer and required as part of final payment (i.e... the final work performed progress payment; the final retention release estimate and the accompanying FQA)
- Contractor Submittals required for final payment
- Construction Engineer Reports submitted in support of, but separate from the Final Payment Estimate

To expedite final processing and payment to the Contractor, the final pay estimate (retention release) should be submitted no later than 60 days after the date of final acceptance of the project. If delays are anticipated, the Construction Engineer must notify the Construction Branch Manager explaining the reason for the delay and providing an expected delivery date. Quantity calculations and other project records discussed below (payrolls, certifications, Actual Work details, Materials testing, etc.) should be kept up-to-date throughout the life of the project so the final estimate can be submitted promptly.

### Construction Project Closeout

After preparing and submitting the Final Payment for closeout of the construction contract, the Construction Engineer continues towards closeout of the Construction Project which is discussed in Section VII - Project Closeout.

### Construction Closeout Conference -

As the project nears completion, the Construction Engineer may, if the project warrants, schedule a closeout conference to include key personnel
from the contractor before they are reassigned to other projects, along with applicable MCDOT personnel. This is not a substitute for a Final Walkthrough inspection; rather, it is intended to get the Project Stakeholders together to discuss what went well, what could be improved and identify lessons learned that can be applied to future projects. The Construction Engineer can then incorporate lessons that may be identified in this Closeout Conference, particularly those of the Contractor, into the MCDOT “lessons learned” session and process discussed in Section VI.
REFERENCES AND ADDITIONAL INFORMATION

ADOT Construction Manual, Arizona Department of Transportation, Phoenix, AZ

MCDOT Project Development Manual, Maricopa County Department of Transportation, Phoenix, AZ

Maricopa County Procurement Code: Article 5 Procedures Manual, Maricopa County Office of Procurement Services, Rev. September 2020

Arizona Pollutant Discharge Elimination System General Permit De Minimus General Permit (DGP) No. AZG2016-001. Arizona Department of Environmental Quality, Phoenix, AZ

Arizona Pollutant Discharge Elimination System General Permit for Discharge from Construction Activities to Waters of the United States. ADEQ. Arizona Department of Environmental Quality, Phoenix, AZ

National Pollution Discharge Elimination System General Permit for Storm Water Discharges from Construction Activities, United States Environmental Protection Agency, Washington, DC

Blue Stake Booklet, Arizona Blue Stake Inc., Phoenix, AZ

EquipmentWatch.com (Equipment Rental Rate Blue Book)

Local Public Agency Projects Manual, Arizona Department of Transportation, Phoenix, AZ

2015 Certification Acceptance Academy, Arizona Department of Transportation, Phoenix, AZ


Arizona Department of Transportation Disadvantaged Business Enterprise (DBE) Policy, Arizona Department of Transportation, Phoenix, AZ

Arizona Department of Transportation FHWA DBE Program Plan, Arizona Department of Transportation, Phoenix, AZ

Maricopa County Department of Transportation Title VI Plan, Maricopa Department of Transportation, Phoenix, AZ

Field Operations Handbook, United States Department of Labor, Wage and Hour Division, Washington, DC
Required Contract Provisions Federal-Aid Construction Contracts (FHWA-1273), Federal Highways Administration, Washington, DC

Arizona Department of Transportation Materials Quality Assurance Program, Arizona Department of Transportation, Phoenix, AZ

Maricopa County Department of Transportation Sampling Guide, Maricopa County Department of Transportation, Phoenix, AZ