MassDOT Highway
ACEC – State Markets Conference
April 5, 2018

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About MassDOT Highway

- 9,561 Lane Miles of Interstate, Numbered Routes, and Toll Roads – 60% of all trips
- Own 3,492 federal definition bridges (over 20 feet in span)
- Inspect 1,615 municipally owned federal definition bridges
- 35 lane miles of Tunnels
- $1.2 Billion Capital Program
About MassDOT Highway

- Combined Transportation Assets of Mass Highway, Mass Pike, DCR, and Port Authority plus Aeronautics, MBTA, and RMV
- Operates as a Quasi-Authority with agency characteristics under the Executive Branch of the Governor’s office
- Led by a Secretary and CEO
- Governed by a Board of Directors
MassDOT Year in Review

- Successful rollout of AET
  - Fast paced demolition
  - Management of complex back office integration
  - Strong Public Process
  - 86% Transponder Saturation

- Major Construction and Advertisement Program
  - Commonwealth Ave Bridge
  - Braintree Splits
  - Mega Projects
  - $1.2 Billion Spent
  - 98% of planned projects advertised

- Municipal Programs
  - Complete Streets
  - Small Bridge
MassDOT Year in Review

- Personnel Changes...
  - Two New Highway Directors
  - New Deputy Chief Engineer of Projects
  - New Chief of Operations and Assistant Chief of Operations
  - New Administrator

- Organizational Efficiencies
  - Improve Engineering oversight
  - Elevate Traffic and Safety
  - Focus on Construction Management
  - Improve Municipal Connections
Upcoming Priorities - Engineering

- Asset and Risk Based Approach to Capital Program Development and Project Management
Upcoming Priorities - Engineering

- Reformation of Project Controls

Project controls to be reformed. Goal is to make program easier to manage and more focused and useful to MassDOT. It is expected that smaller well defined projects will have limited controls.
Upcoming Priorities - Engineering

- Development of a Five-year Technology Plan

5-year plan to inform industry of direction
MassDOT is going with use of technology
Upcoming Priorities - Organization

- Focus on Traffic and Safety
- Focus on Construction Management

Traffic group handles traffic management and planning for clustered construction projects to minimize impacts to the driving public.

Key Initiatives
Workzone Safety Program
Congestion Modeling
Outlook for 2018

Cumulative construction expenditures are trending similar to last year. There is less than a 2% difference between SFY2018 and SFY2017 expenditures year to date.
Outlook for 2018

- 5 Year CIP
- Allston Viaduct Project Permitting
- 495/90 Interchange Permitting
- Similar sized Construction program
  - Commonwealth Ave Phase 2
  - Tobin Bridge
  - Chelsea Viaduct
  - North Washington Street Bridge

5 year CIP – expected to be $4.6 to $4.8B for Highway with a continued focus on reliability

We have a similar sized construction program expecting to spend another $1.2 B
MassDOT values partnership with industry

Continuing to use MSA Contracts to expedite design and reviews

Looking to partner with our reform process
Strengthen relationship between the Districts and Municipalities and MassDOT Headquarters

- Strengthening municipal connections and District decision making
- Adding HQ structure in place to provide better consistency across assistance programs
  - Chapter 90, MassWorks, Complete Streets and Small bridge
Metropolitan Planning Regions

Commonwealth of Massachusetts
Metropolitan Planning Regions
Federal Metropolitan Planning Process

• Federally required forum for transportation decision-making

• 13 “MPOs” cover all 351 municipalities in Commonwealth

• 3 “C” Process- Continuing, Cooperative, Comprehensive

• Must ensure compliance and Air Quality Regulations

• Fiscal Constraint Required
Upcoming Priorities - Engineering

- Project Development Reform
  - Simplification of PM Structure
  - Flatten Advertisement Program
Design phase is the advancement of the scope, schedule and budget for individual projects from concept (PRC) to final design (Plans, Specifications and Estimate (PS&E))

- Highway Division uses a series of milestones to advance projects from concept to final design
- Guidelines are used to advance the scope, schedule and cost estimate at each milestone
- Each stage has inherent confidence levels
- PS&E milestone represents completion of the design phase and transition to construction
Components of Construction Cost Estimating

The office estimate is only one part of the overall construction contract estimate:

- **Base Estimate**
  - AKA Office Estimate
  - Conceptual design estimate based on aggregate cost factor (cost/unit area)
  - As design progresses, based on estimated contract work items

- **Allowance Items**
  - Includes Traffic Police
  - Based on Guidance from Construction Section

- **Construction Contingency**
  - 10-15% of the office estimate, for use in allowance in item overruns

- **Inflation**
  - FHWA Recommends 4%, compounded annually to the midpoint of construction
  - TIP currently used 4% to year of Advertisement
  - Cash flow system calculates 4% to midpoint of construction

- **Design Contingency**
  - Based on Historical Data, to account for risk in design
  - Value decreases as design becomes better defined

- **Utility Contingency**
  - Line item for conceptual cost of utilities
  - Attributed to utilities once specific scope is identified, or removed
The diagram depicts the components of construction cost estimating, according to development phase.
Calculation of Design Contingency Guidance

• Analysis performed on advertised project data to quantify historical fluctuation of cost estimate from concept through final design
• Data mined from ProjectInfo System, Estimate at PRC & Final Estimate (office or base estimate only)
• Inflation is not applied to estimates in projectInfo, but is instead accounted for in STIP (and HWY cash-flow system), in the amount of 4% annually, to the planned federal fiscal year of advertisement
• For the analysis, inflation applied to PRC estimate is based on elapsed time between PRC & Final
Historical data on cost increases during design phase

- Over 1,200 projects analyzed (2010 to present)
- PRC estimates inflated to year of advertisement, compared to Final estimate
- Average change shown, grouped roughly by CIP Program (Bridge Program broken out for capital and maintenance)

<table>
<thead>
<tr>
<th>Program</th>
<th># Projects</th>
<th>Average Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROADWAY RECONSTRUCTION</td>
<td>113</td>
<td>22%</td>
</tr>
<tr>
<td>MULTI USE PATH</td>
<td>16</td>
<td>16%</td>
</tr>
<tr>
<td>FACILITIES</td>
<td>77</td>
<td>12%</td>
</tr>
<tr>
<td>INTERSTATE DOT PAVEMENT</td>
<td>41</td>
<td>11%</td>
</tr>
<tr>
<td>BRIDGE CAPITAL</td>
<td>114</td>
<td>10%</td>
</tr>
<tr>
<td>BRIDGE MAINTENANCE</td>
<td>210</td>
<td>8%</td>
</tr>
<tr>
<td>ROADWAY MAINTENANCE</td>
<td>506</td>
<td>6%</td>
</tr>
<tr>
<td>NON INTERSTATE DOT PAVEMENT</td>
<td>127</td>
<td>4%</td>
</tr>
<tr>
<td>ITS</td>
<td>30</td>
<td>4%</td>
</tr>
</tbody>
</table>

- Internal guidance provided to Designers & Project Managers in Summer with recommended design contingency % for Bridge and Roadway Projects.
Guidance To Proponents

- Initial project cost estimate from PRC introduced concept of design contingency
- Introduces utility contingency
- Projects proposed for acceptance at future PRC will be evaluated for inclusion of design contingency
- Project Intake tool & ProjectInfo System have been configured for the use of these new factors

### Design Contingency

The purpose of the design contingency is to account for risks and uncertainties that are inherent in the design development process. A review of projects advertised over the last four years has revealed that the amount of the increase in the Office Estimate from PRC approval to project advertisement varies depending on the nature of the proposed work. The chart below provides recommended values to be applied to the Office Estimate.

<table>
<thead>
<tr>
<th>Project Group</th>
<th>% of Office Estimate for Design Contingency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roadway Reconstruction</td>
<td>25%</td>
</tr>
<tr>
<td>Bridge Construction</td>
<td>15%</td>
</tr>
<tr>
<td>Resurfacing and Maintenance Type Contracts</td>
<td>0%</td>
</tr>
</tbody>
</table>
Focus on Engineering, Technology & Innovation

- **READi Committee**
  - Monthly meetings collaborating on innovation throughout MassDOT Divisions and Highway Departments and Districts
  - External presentations on new innovations that would benefit MassDOT’s Highway Division

✓ **Resource – READi email:** READi@dot.state.ma.us

- **Innovation Conference**
  - April 10th + 11th at Worcester’s DCU Center
  - Registration is open

✓ **Resource – Innovation Conference**
Doing Business with MassDOT

- **COMMBUYYS** is the State’s official online procurement platform, links public purchasers in search of products and services with vendors who are able to provide them.

- **Free access tools to:**
  - Find bidding opportunities
  - Find sub-contracting opportunities
  - Find grant postings

- **Types of State Contracting Opportunities**
  - Statewide Contract
  - Departmental Contract
  - Incidental Purchases (>$5k)

✔ **Resource – COMMBUYYS information**
  - [https://www.mass.gov/learn-about-commbuys](https://www.mass.gov/learn-about-commbuys)
MassDOT’s A&E Board

- Prequalifies **Architectural and Engineering Firms (A&E)** to provide services in various A&E discipline categories.
- MassDOT uses this prequalification information as a partial basis for the selection of firms for new A&E contract services with MassDOT.
  - Municipalities and other parties may use this prequalification information for the selection of firms for A&E services with their organizations.

Resource – Prequalification Information

MassDOT Contract Opportunities

- Design Services to support CIP
- Smaller procurements to augment Master Service Agreement (MSA) Contracts
- Specialty Services to support Highway Division activities
  - Environmental, Right of Way, Complete Streets, etc.
- Successor to Master Service Agreements (MSA)
- Right-of-Way
  - ROW Activities
  - ROW Plan Preparation and Review
- Project Controls
  - Estimating
  - Scheduling
  - Claims Analysis
Additional Opportunities: Municipal Contracts

MassDOT / ACEC Municipal Project Guide

- Provides perspective on relationships
- Stresses importance of soliciting and retaining qualified consultants
- Provides a one-page, step-by-step Project Summary Guide
- Provides Consultant Procurement Guidelines

✓ Resource – Municipal Project Summary Guide

Thank you

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