



Commonwealth of Massachusetts
Office of the State Auditor
Suzanne M. Bump

Making government work better

Official Audit Report – Issued October 19, 2021

Massachusetts Department of Transportation— Millbury Roadway Reconstruction and Related Work (Contract 86774)

For the period September 3, 2015 through June 30, 2020





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Making government work better

October 19, 2021

Mr. Jamey L. Tesler, Acting Secretary and Chief Executive Officer
Massachusetts Department of Transportation
10 Park Plaza, Suite 4160
Boston, MA 02116

Dear Mr. Tesler:

I am pleased to provide this performance audit of the Massachusetts Department of Transportation's Millbury roadway reconstruction and related work (Contract 86774). This report details the audit objectives, scope, methodology, findings, and recommendations for the audit period, September 3, 2015 through June 30, 2020. My audit staff discussed the contents of this report with management of the agency, whose comments are reflected in this report.

I would also like to express my appreciation to the Massachusetts Department of Transportation for the cooperation and assistance provided to my staff during the audit.

Sincerely,

A handwritten signature in blue ink, appearing to read "SMBump".

Suzanne M. Bump
Auditor of the Commonwealth

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LIST OF ABBREVIATIONS

CQE	contract quantity estimate
EWO	extra work order
FIR	field inspection report
MassDOT	Massachusetts Department of Transportation
MMARS	Massachusetts Management Accounting and Reporting System
OSA	Office of the State Auditor
SAM	Site Application Module
SOP	standard operating procedure

EXECUTIVE SUMMARY

In accordance with Section 12 of Chapter 11 of the Massachusetts General Laws, the Office of the State Auditor has conducted a performance audit of the Massachusetts Department of Transportation's (MassDOT's) Millbury roadway reconstruction and related work for the period September 3, 2015 through June 30, 2020.

In this performance audit, we determined whether MassDOT's Project 605964, under Contract 86774, for roadway reconstruction (including bridge replacement) in Millbury was substantially completed¹ in the budgeted timeframe, whether extra work orders were properly approved, whether payments for police details for traffic control were properly supported, and whether price adjustments for commodities were properly calculated and processed.

Below is a summary of our findings and recommendations, with links to each page listed.

Finding 1 Page 9	Payments for police details were not always supported by MassDOT records.
Recommendation Page 9	MassDOT should develop and implement a formal policy requiring its resident engineer to reconcile all police department invoices for police details to the field inspection reports that correspond to each contract quantity estimate.

1. Substantial completion means that 99% of the contracted work for a project is complete, according to Section 39G of Chapter 30 of the General Laws.

OVERVIEW OF AUDITED ENTITY

Chapter 25 of the Acts of 2009 (An Act Modernizing the Transportation Systems of the Commonwealth), as amended by Chapter 26 of the Acts of 2009, required the integration of various state transportation agencies (including the Executive Office of Transportation and Public Works and its divisions, the Massachusetts Turnpike Authority, the Massachusetts Highway Department, the Registry of Motor Vehicles, and the Massachusetts Aeronautics Commission) into a newly created Massachusetts Department of Transportation (MassDOT).

MassDOT is administered by the Secretary of Transportation, who is appointed by the Governor to serve as the department's chief executive officer. MassDOT currently has five divisions: the Highway Division, the Rail and Transit Division, the Aeronautics Division, the Registry of Motor Vehicles, and the Massachusetts Bay Transportation Authority. During our audit period, MassDOT had an 11-member board of directors (including the Secretary), the members of which have expertise in transportation, finance, and engineering. The board of directors is appointed by the Governor.

MassDOT Highway Division

MassDOT's Highway Division is responsible for the operation, construction, and maintenance of all state bridges and highways. The Highway Division is separated into six district offices, located in Lenox, Northampton, Worcester, Arlington, Taunton, and Boston. Each district office supervises all road and bridge construction and maintenance in its jurisdiction and provides engineering support to cities and towns. The Millbury roadway reconstruction and bridge replacement project reviewed in this audit was overseen from the Worcester office. According to MassDOT's website,

Through September 1, 2018 the MassDOT Accelerated Bridge Program has advertised 200 construction contracts with a combined construction budget valued at \$2.43 billion.

Millbury Roadway Reconstruction—Contract 86774

Project 605964 was for the replacement of a bridge at Route 146 over West Main Street and road improvements on Route 146 at Elm Street, Elmwood Street, and West Main Street in Millbury. The project was part of the statewide Accelerated Bridge Program, which had a goal of reducing the state's backlog of structurally deficient bridges to fewer than 450 by September 30, 2016. According to the terms of the awarded Contract 86774, project construction was to be performed by J.F. Lynch as the

general contractor. The project's construction was overseen by MassDOT's Highway Division, with MassDOT paying J.F. Lynch as work was completed.

The original bid price of the contract was \$20,444,070. However, the construction budget provided for additional costs not included in the general contractor's bid price. Accordingly, the overall construction budget totaled \$23,995,411, which included the general contractor's bid price of \$20,444,070, contract contingency funds of \$2,849,342, and police details totaling \$702,000.² Part of the project (85.7%) was financed by the Commonwealth, 11.8% by the federal government, and 2.5% by the town of Millbury. The contract's notice to proceed for the project was dated September 3, 2015, the first day of our audit period. The contract's completion date was to be June 19, 2020.

Invoicing

As construction takes place, MassDOT's resident engineer maintains records of the amount of work completed at a given interval (usually two weeks) and prepares a document called a contract quantity estimate (CQE)³ at the end of each interval. The resident engineer reviews the CQE with the general contractor; after they agree on the amount of work completed during the period, they both sign the CQE. Next, they send the CQE to the MassDOT district highway director for approval; then the director sends the approved CQE to the MassDOT business office for payment through the Massachusetts Management Accounting and Reporting System.

Extra Work Orders

During the construction phase of the project, changes or unforeseen circumstances may occur, necessitating additional work outside the original contract scope. This is referred to as extra work. MassDOT's Standard Operating Procedure CSD 25-12-1-000 states,

"Extra Work" is defined as work which:

- 1. Was not originally anticipated and/or contained in the contract, and*
- 2. Is determined by the Engineer to be necessary for the proper completion of the project, and*

2. The \$1 variance between the total budget and the sum of these three items is due to rounding.

3. MassDOT uses CQEs to record, by line item, payment reimbursements to the project's general contractor for costs incurred on the project. CQEs list police detail expenses under Line Item 999.001, "Traffic Police."

3. *Bears a reasonable subsidiary relation to the full execution of the work originally described in the contract; i.e. is work that is reasonably similar in type and character to the work originally described in the Contract.*

MassDOT prepares an extra work order (EWO) to describe the scope of significant extra tasks needed, the rationale for the additional work, and the cost to complete it. The resident engineer completes the EWO and sends it to the general contractor for approval; then the MassDOT district construction engineer reviews and approves it. These costs are not included in the original bid costs but are budgeted as estimated contingency costs.

Police Details for Traffic Control

As of June 30, 2020, MassDOT had incurred \$850,622 in police detail work for traffic control for the project. This work was performed by the state police and the Millbury and Sutton town police. The number of police officers needed each working day is determined a week in advance based on the construction phase. Each working day, MassDOT's resident engineer, or his/her designee, records in the daily field inspection reports (FIRs) the name/s of, police department/s of, and number of hours worked by the police officers who have provided traffic control services.

Each police department bills the general contractor for police details, and then the general contractor forwards the police detail invoices to MassDOT to approve them for payment. The resident engineer compares the hours on the police invoices to those on the FIRs for each police officer. After receiving approval from the resident engineer, the general contractor pays the police departments and MassDOT reimburses the general contractor.

Commodity Price Adjustments

According to Section 38A of Chapter 30 of the Massachusetts General Laws,

Contracts for road and bridge projects awarded as a result of a proposal or invitation for bids under section 39M [of the General Laws] shall include a price adjustment clause for each of the following materials: fuel, both diesel and gasoline; asphalt; concrete; and steel.

Rates for commodities are specified in the original contract. When the general contractor uses or purchases commodities, MassDOT reprices them according to the current market prices in federal pricing reports. If current prices differ from the contract prices by more than 5%, MassDOT calculates a price adjustment and records the new price in the CQE.

AUDIT OBJECTIVES, SCOPE, AND METHODOLOGY

In accordance with Section 12 of Chapter 11 of the Massachusetts General Laws, the Office of the State Auditor (OSA) has conducted a performance audit of certain activities of the Massachusetts Department of Transportation (MassDOT) for the period September 3, 2015 through June 30, 2020.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Below is a list of our audit objectives, indicating each question we intended our audit to answer; the conclusion we reached regarding each objective; and, if applicable, where each objective is discussed in the audit findings.

Objective	Conclusion
1. Did MassDOT send to the general contractor, within 65 days after the effective date of a declaration of substantial completion of Contract 86774, a substantial completion estimate documenting that the contract was substantially complete (as defined by Section 39G of Chapter 30 of the General Laws) by the contract completion date?	Yes
2. Were extra work orders (EWOs) completed and approved in accordance with MassDOT's Standard Operating Procedure (SOP) SCD 25-12-1-000?	Yes
3. Did MassDOT have sufficient documentation, in accordance with its procedures, to support payments for police details for traffic control?	No; see Finding <u>1</u>
4. Did MassDOT properly calculate and process price adjustments for commodities (gasoline, diesel fuel, asphalt, concrete, and steel) used in performing Contract 86774, in accordance with Section 38A of Chapter 30 of the General Laws?	Yes

To achieve our objectives, we gained an understanding of MassDOT's internal control environment related to the objectives by reviewing policies and procedures, as well as conducting inquiries with MassDOT officials. We evaluated the design, and tested the effectiveness, of controls over the approval of police detail payments.

In addition, we performed the following procedures to address our audit objectives.

Substantial Completion

We determined whether MassDOT sent to the general contractor, within 65 days after substantial completion, a substantial completion estimate documenting that the project had met all requirements to be considered substantially complete in accordance with Section 39G of Chapter 30 of the General Laws by the planned substantial completion date in the general contractor's project contract (June 19, 2020).

To determine this, we inspected a contract quantity estimate (CQE), signed by both the general contractor and MassDOT, documenting that the general contractor had substantially completed Contract 86774 on June 14, 2020, and that the work required by the contract was complete except work with a contract price of less than 1% of the adjusted total contract price. Additionally, we reviewed a Completion of Contract Items list, as of the substantial completion date, and recalculated the total dollar amount of work completed to determine whether work with a contract price of 1% or less of the adjusted total contract price remained to be completed.

EWOs

We reviewed all 21 EWOs processed for work done on the project during the audit period. We determined whether they complied with MassDOT's SOPs for EWOs. Specifically, we reviewed them to determine whether they contained the following: the scope and necessity of the work to be performed, the estimated cost, the effect on the estimated contract completion date, a statement of whether a review by an environmental engineer was necessary, a statement assessing alternatives to the proposed work, a statement on whether the work should have been anticipated and how it could be avoided in the future, and a statement on whether MassDOT should pursue reimbursement of costs. We also determined whether EWOs were approved by MassDOT officials and whether the general contractor documented its agreement to perform the work that was necessary according to the EWOs.

From the 18 EWOs with labor charges, we selected a nonstatistical, judgmental sample of 12 EWOs and verified the charges by comparing amounts charged for each worker to general contractor and/or subcontractor payroll data.

Police Details

We selected a nonstatistical, random sample of 20 of 98 CQEs that showed police detail expenses paid during the audit period. To ensure that MassDOT was billed appropriately by the general contractor for police details for this project, we compared police detail hours worked and amounts paid from the sampled CQEs to the police detail hours worked and amount paid from the resident engineer's police time log report. We also compared police detail hours worked according to field inspection reports to those on the paid police department invoices according to each CQE.

Commodity Price Adjustments

We selected a nonstatistical, judgmental sample of 28 price adjustments from a population of 118. Our sample included at least one commodity of every type that was subject to price adjustments (gasoline, diesel fuel, asphalt, concrete, and steel) for Contract 86774. For our sample, we verified the accuracy of MassDOT's Monthly Price Adjustment Calculation Spreadsheets, which MassDOT uses to compute the price adjustments on its CQEs. We also verified that MassDOT properly calculated and processed price adjustments for each commodity used for our sample.

When sampling was used, we used nonstatistical sampling methods and therefore did not project the results of our testing to the population.

Data Reliability

MassDOT uses a system called Site Application Module (SAM) to hold reports and other records related to this contract. MassDOT provided us with CQEs from SAM so we could review project cost reimbursements to the general contractor, which include police detail cost reimbursements. To determine the reliability of the data in SAM, we gained an understanding of SAM and its controls, interviewed information technology personnel, reviewed information security policies and procedures, and tested access controls over SAM. Further, we reconciled all CQEs in SAM to amounts reported in the Massachusetts Management Accounting and Reporting System (MMARS).

To conduct the above tests, we relied on work performed by OSA in two separate projects completed in 2014 and 2018 that focused on testing certain information system general controls in MMARS.

MassDOT also reports commodity price adjustments in SAM. We selected a judgmental sample of 10 commodity price adjustments from reports generated through SAM and traced them to CQEs for

agreement. Additionally, we selected a judgmental sample of 10 CQEs that contained commodity price adjustments and traced them to the commodity price adjustment reports for agreement.

Additionally, MassDOT reports EWOs in SAM. We selected a judgmental sample of 10 of the 21 EWOs processed for work done on the project during the audit period and traced them to CQEs for agreement. We also selected a judgmental sample of 10 CQEs that contained EWOs and traced them to the processed EWOs for agreement.

MassDOT reports payments for police details on this contract in an Excel spreadsheet referred to as the Police Timebook. We verified that all police detail payments in the Police Timebook reconciled to CQEs. Additionally, we traced a sample of 22 police detail work days to police department billings.

Based on the results of the data reliability procedures performed, we determined that the data were sufficiently reliable for the purposes of our audit work.

DETAILED AUDIT FINDINGS WITH AUDITEE'S RESPONSE

1. Payments for police details were not always supported by Massachusetts Department of Transportation records.

From our sample of 20 payments for police details shown on contract quantity estimates (CQEs), we identified 1 payment that was not fully supported by hours shown on the Massachusetts Department of Transportation's (MassDOT's) daily field inspection reports (FIRs). The police invoices that corresponded to the CQE for this payment showed 24 more hours worked than the FIRs for the same dates, causing a possible overpayment of \$1,200.

As a result, MassDOT cannot be certain it paid the correct amount in police detail costs related to this project.

Authoritative Guidance

According to a memo sent to us by the Project 605964 resident engineer,

The [resident engineer] would review the Police bills and compare them to hours recorded for details in the official FIR. Once complete the [resident engineer] would approve the invoices for payment by the [General] Contractor and log in the invoice into the excel workbook for Police Bills.

Reasons for Issue

MassDOT does not have a formal policy requiring its resident engineer to perform a full formal reconciliation of police detail hours on FIRs and those on invoices.

MassDOT officials told us that the FIRs probably showed fewer police detail hours than had been worked. They stated that they believed that the police bills were correct and MassDOT did not overpay for police details.

Recommendation

MassDOT should develop and implement a formal policy requiring its resident engineer to reconcile all police department invoices for police details to the FIRs that correspond to each CQE.

Auditee's Response

As you are aware, the Report noted only one issue with the referenced project. Specifically, that a total of 24 hours of police detail time was not captured. As an initial matter, and as you are likely aware, the Millbury Bridge Project was incredibly complex with a bid price of over \$20 million. This project included the following scope of work:

The replacement of the existing bridge (superstructure and substructure) over Route 146 and adjustments to the Route 146 profile. The project also includes the reconstruction of the intersections of the Route 146 Southbound On/Off Ramps / Elmwood Street / West Main Street, the Route 146 Northbound On/Off Ramps / Elm Street / Elm Court, the closing of Faron Circle access to Route 146 and the construction of an access drive to Faron Circle. The work also includes the realignment and reconstruction of the ramps and deceleration lanes and construction of acceleration lanes/shoulders of Route 146 Northbound and Southbound.

Your office tested 20 [Contract] Quantity Estimates ("CQEs") for Audit Objective No. 3. Those CQEs included a total of 3,556 police detail hours. Despite the complexity of this project and the over four years necessary to complete the work, the Report noted only one issue—that 24 police detail hours were not captured in the Field Inspection Reports for one of the 20 CQEs tested. Those 24 hours represent less than 1% of the police detail hours identified in the relevant CQEs. In other words, MassDOT accurately captured 99.33% of the police detail hours in the CQEs tested for this Report.

It is also worth noting that before the Resident Engineer approved payment for these 24 hours, he confirmed with the police department that the hours were worked. Unfortunately, this conversation was not documented in the project records.

MassDOT acknowledges the issue presented in the Report. To address this issue and to avoid future instances like this one, MassDOT is in the process of updating the Traffic Officer / Police Detail Standard Operating Procedure (SOP) and the Police Log/Timebook Spreadsheet. The update will include language requiring the Resident Engineer to reconcile the police bills against the project's Field Inspection Reports and document this reconciliation within the police log/timebook spreadsheet. If the Resident Engineer discovers a discrepancy during this process, they shall document this within the Notes column of the spreadsheet and include any actions taken to resolve the discrepancy. (e.g., noting they called the police department and confirmed the office had a record of the police detail being on site for a specific shift.) MassDOT anticipates issuing the updated SOP prior to the start of the next construction season.

Auditor's Reply

Based on its response, MassDOT is taking measures to address our concerns in this area.