Department of Transportation
Division of Motor Vehicles
IT Modernization

Raleigh, NC

Information Systems Audit Report
August 2025

State Auditor
Dave Boliek

A Constitutional Office of the
State of North Carolina

OFFICE OF THE STATE AUDITOR
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NORTH CAROLINA

Auditor's Transmittal

The Honorable Josh Stein, Governor
The Honorable Phil Berger, President Pro Tempore
The Honorable Destin Hall, Speaker of the House
Honorable Members of the North Carolina General Assembly
Joey Hopkins, P.E., Secretary, Department of Transportation
Paul Tine, Commissioner, Division of Motor Vehicles
Mike Ware, Chief Information Officer, Department of Information Technology - Transportation

To all:

As part of the North Carolina Office of the State Auditor's comprehensive examination of the North Carolina Division of Motor Vehicles (DMV), our office conducted an Information Systems audit of the DMV.

The purpose of this audit was to examine information technology modernization efforts made by the DMV and North Carolina Department of Information Technology – Transportation (DIT-T). What we found is that IT modernization efforts at the DMV have not produced meaningful customer service improvements.

Since 2014, the DMV and DIT-T initiated 46 projects that resulted in a cost of approximately $42 million. Yet, all those projects and millions of tax dollars later, outside experts determined the current DMV mainframe systems are outdated and overdue for replacement.

These legacy systems support all operations, including all Driver and Vehicle services, but they keep the DMV operationally frozen in time and hinder efforts to meet stakeholder needs.

Our audit includes four specific recommendations for the DMV and DIT-T to take, such as having DIT-T prioritize IT infrastructure improvements that most directly affect customer-facing business process. We included timelines for each recommendation, and our team will be following up to check on implementation efforts.

I'd like to thank those involved for their willingness to assist our team as we conducted this audit.

Respectfully submitted,

Dave Boliek
State Auditor

Executive Summary

In April 2024, a legislative study, *Opportunities for Modernizing and Improving DMV Operations*, performed by the Institute for Transportation Research and Education (ITRE) and the UNC Greensboro Bryan School of Business and Economics, provided a detailed roadmap for **transforming** the North Carolina Division of Motor Vehicles' (DMV) outdated systems and customer service.

This audit builds on that foundation by assessing **progress** to date, identifying critical **obstacles**, and most importantly, defining the **urgent steps** needed to deliver the modern, reliable, and customer-focused DMV that North Carolinians deserve. With demand for DMV services at an all-time high, the need for transformation is urgent, and action cannot wait.

Objective

The objective of this audit was to determine the extent to which the DMV and the Department of Information Technology – Transportation (DIT-T) have implemented the system modernization recommendations from the April 2024 legislative study *Opportunities for Modernizing and Improving NCDMV Operations* as of April 22, 2025.

Completed its IT modernization **project planning** and provided the North Carolina General Assembly with an identification of the high-level **milestones** for the project alongside an anticipated **timeline** for each.

Prioritized the components of the current IT infrastructure that impact **customer-facing business processes**.

Critically examined the need to collect, store, and share the **data** it currently collects.

Prepared a **personnel management plan** for the staff resources that will be temporarily needed for the IT modernization project.

Auditors assessed this audit objective specifically for the DMV IT Modernization Project, officially known as the **DMV Application System Modernization (DASM)** program, which therefore comprises the audit scope. The purpose of this project is to upgrade the architecture of all the DMV's existing systems from a mainframe to a .NET platform, resulting in a new system to be known as **NC MAX**.

Executive Summary

What We Found

Despite broad agreement on the urgent need to modernize the DMV's core systems, the audit identified significant gaps and delays in critical project planning, infrastructure prioritization, data management, and personnel planning.

As a result, the DMV and DIT-T have not fully implemented the recommendations from the April 2024 legislative study *Opportunities for Modernizing and Improving NCDMV Operations.* Therefore, in order to fully implement the recommendations from the legislative study:

(1) The DMV Commissioner, in collaboration with the DIT-T Deputy Chief Information Officer, should:

- Define and document detailed **business, functional, and technical requirements** for the DASM program prior to engaging or contracting with an implementation vendor.

- Prepare a **formal business case** for the DASM program, identifying anticipated costs, funding sources, expected benefits, return on investment performance metrics, and key risks.

- Develop and maintain a unified project plan for the DASM program that includes major milestones, deadlines, roles and responsibilities, key risks, and a structured reporting framework for regular updates to the General Assembly and oversight bodies.

(2) DIT-T should establish and follow a formal business process for prioritizing IT infrastructure improvements that most directly affect **customer-facing business processes**.

(3) DIT-T should obtain a modern data cleansing software tool and utilize the tool selected to perform data cleansing procedures in preparation for the DASM program. Data cleansing procedures should be comprehensive, timely, and sustained throughout the modernization process.

(4) After the DMV selects an implementation vendor as directed by Section 19.2.(f) of Session Law 2024-45 (Senate Bill 607), the DIT-T Project Portfolio Manager should complete the comprehensive personnel management plan for the DASM program. The plan should **align** with the DMV's strategic goals and objectives and **clearly break out roles and responsibilities** between DIT-T staff and the implementation vendor.

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Background

Division of Motor Vehicles (DMV)

North Carolina General Statutes (N.C.G.S.) § 20-1 establishes the Division of Motor Vehicles (DMV) within the North Carolina Department of Transportation (DOT). Chapter 20 of the General Statutes identifies the powers and duties of the Division. The DMV's purpose is to serve the people of North Carolina by ensuring those who drive throughout the state are qualified to do so and that the motor vehicles that drivers use are safe and minimally impact the environment.

The DMV is led by a Commissioner, who is appointed by and serves at the pleasure of the Secretary of the Department of Transportation.[1]
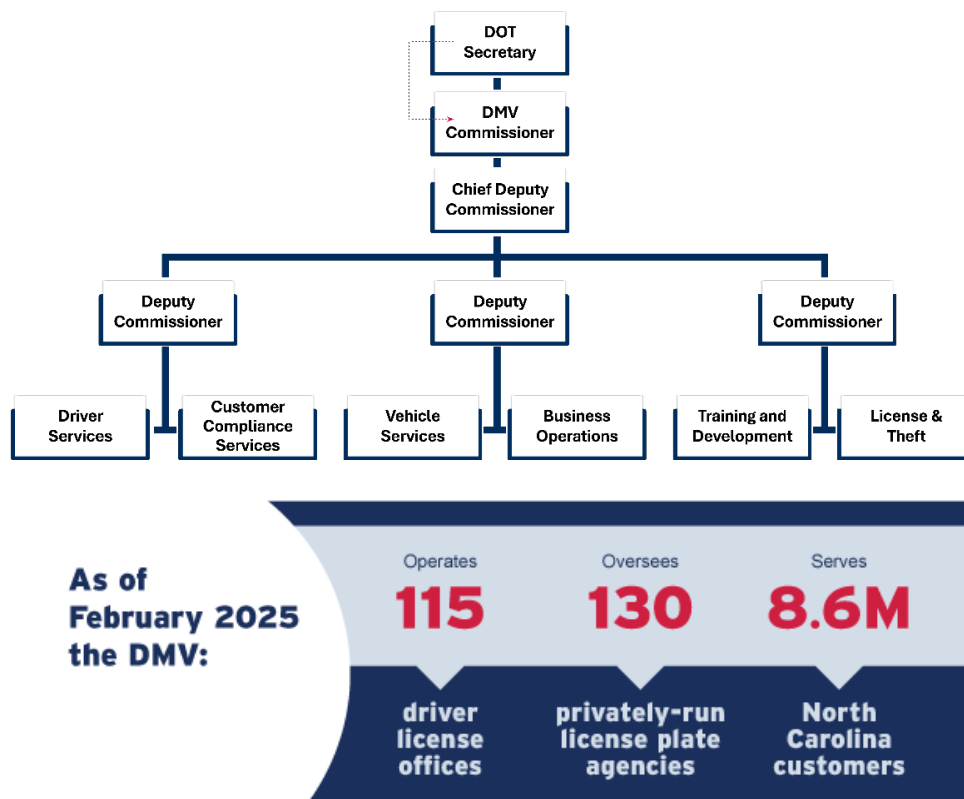
As of February 2025, the DMV operates 115 Driver License Offices and oversees 130 privately-run License Plate Agencies across the State. It serves approximately 8.6 million North Carolina customers through its driver license and ID card services alone.[2] The services the DMV provides to support North Carolina residents include:

- Issuing driver licenses and learner permits.
- Registering and titling vehicles.
- Maintaining driver history records.
- Conducting road tests for new drivers.
- Overseeing vehicle inspections.

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1 N.C.G.S. § 20-2.
2 DMV Performance and IT Modernization – Presentation to the North Carolina General Assembly Joint Appropriations Committee on Transporation, February 26, 2025.

Department of Information Technology – Transportation

The Department of Information Technology – Transportation (DIT-T) supports the information technology (IT) systems that create, manage, and store transaction data related to the DMV's provision of the services for which it is responsible. As mandated by law, effective July 1, 2018, enterprise information technology functions for several agencies within the executive branch, including DOT (and consequently DMV), were

> **DIT-T is part of DIT, it effectively serves as the IT support function within the DMV**

consolidated under the North Carolina Department of Information Technology (DIT). Thus, while DIT-T is organizationally part of DIT, it effectively serves as the IT support function within the DMV.[3]

The DIT-T is led by a Chief Information Officer (CIO), who oversees a team of over 600 employees and contractors and leads the planning, development, and execution of strategic technology initiatives and goals for the DOT. The DIT-T CIO reports to the State CIO.
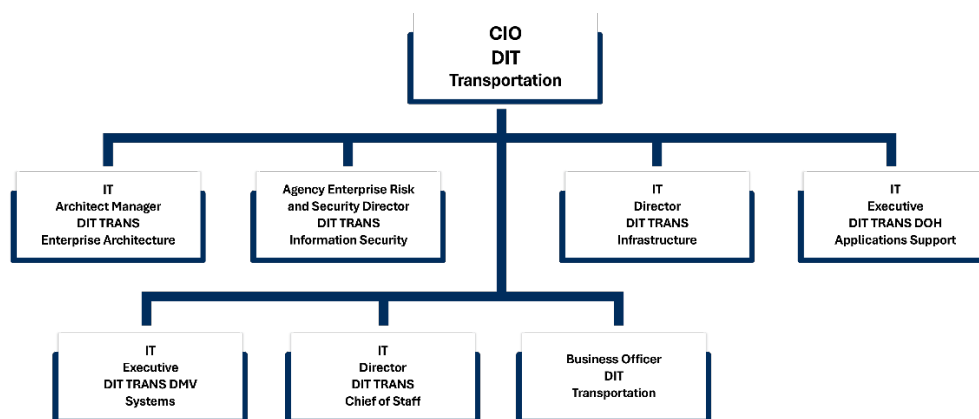
The DIT-T Deputy CIO (DMV Systems) reports to the DIT-T CIO. The DMV Deputy CIO and the Deputy CIO's team support DMV services that require application support.

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3 N.C.G.S. § 143B-1325.
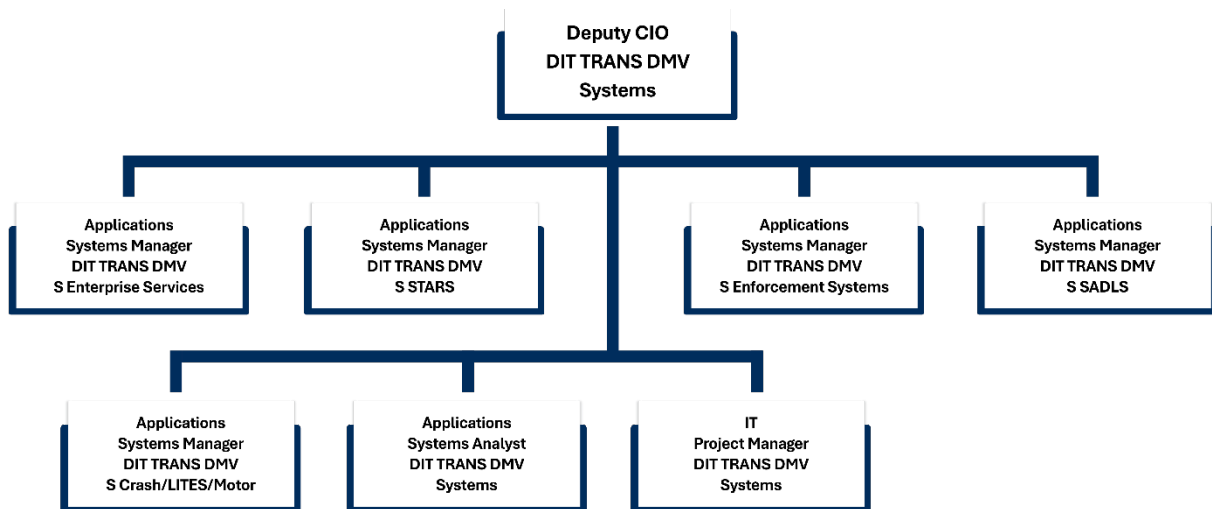
The DMV Deputy CIO assigns projects and initiatives to the DIT-T project management team, which is responsible for managing projects throughout their lifecycle. The project team dedicated to modernizing systems used by DMV customers is called Enterprise Services. The Applications Systems Manager (also known as the DMV Modernization Director) leads the Enterprise Services team.
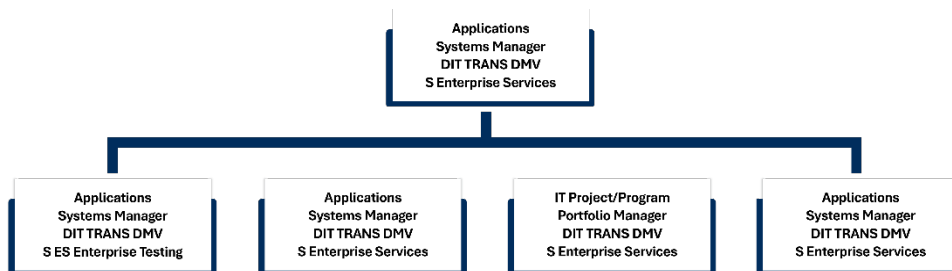
Significant Systems

The DMV relies on seven legacy **mainframe** systems maintained by DIT-T in its provision of services to North Carolina residents. These systems are:
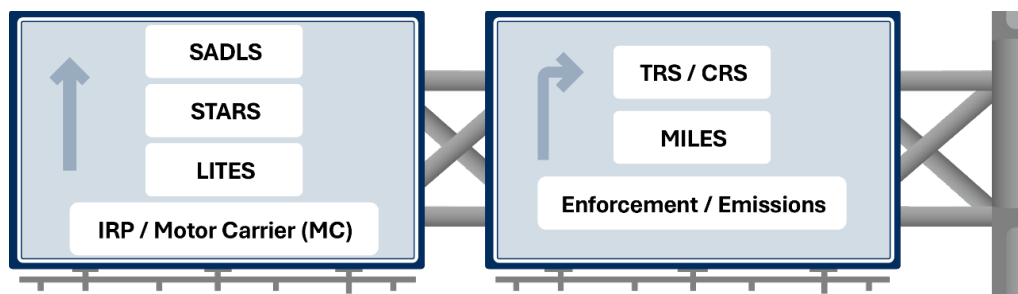
State Automated Driver License System (SADLS)

Issues Driver License Credentials

State Titling and Registration System (STARS)

Records and monitors license plates and vehicle ownership

Liability Insurance Tracking and Enforcement System (LITES)

Monitors liability insurance covered for NC registered motor vehicles

International Registration Plan (IRP) / Motor Carrier (MC)

Issues license plates for commercial vehicles transporting passengers or goods across state lines or into Canada

Traffic Records System (TRS) / Crash Reporting System (CRS)

Receives and processes crash reports and helps determine Resiliency Metrics

Motor Vehicle Inspection and Law Enforcement System (MILES)

Handles vehicle inspections and Law Enforcement functions

Enforcement/Emissions

Manages the NC vehicle inspection program which provides data to STARS to support vehicle renewals

Additionally, DMV application systems incorporate many internal and external **interfaces**. Approximately **50 federal**, **state**, and **local** applications connect to DMV systems, and these external applications depend on the DMV for accurate and timely data to provide services to meet the public's needs.[4]
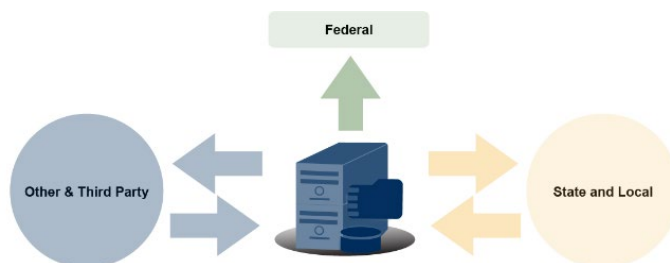
Other & Third Party	**Federal**	**State & Local**
AOC (Admin. Office of Courts)	SAVE (Systematic Alien Verification for Entitlements)	ATS (Automated Testers)
DCI (Driving Records)	Selective Service Batch	BizTalk (Ignition Interlock Interface)
DHHS (Child Support)	US Dept. of State	CBN (Images, Signatures & Print Stream)
DHHS(SAATE)		CDLIS/RDLIS
DOT CRASH		CJ Leads (Driving Records)
DOT Fiscal (DMV)		Collection Agencies (Bad Debt)
DPI (Dept of Public Instruction)		College Foundation Inc (CFI)
FMCSA		Content Manager (CAST)
Insurance Companies (Driving Records)		CSTIMS
		Driving Records (WebApp)
NC DOJ (Driving Records)		EVR WebApp (Voter)
NCDOR		FINALIST (Address Verification)
SBOE (State Board of Elections)		IFTA Reporting
TNS (Transit Driver)		iNovah Realtime
Vital Records (Deceased)		IVR (Voice Response)
Web Team Organ Donor Websrvc		NSOPR (National Sex offender)
		Organ Donor
		PayIt WebApp (Duplicate DL & Renew DL)
		PDPS
		SAP Financials
		SAS Data Warehouse
		SSOLV
		STARS Registration

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[4] DMV Performance and IT Modernization – Presentation to the North Carolina General Assembly Joint Appropriations Committee on Transporation, February 26th 2025.
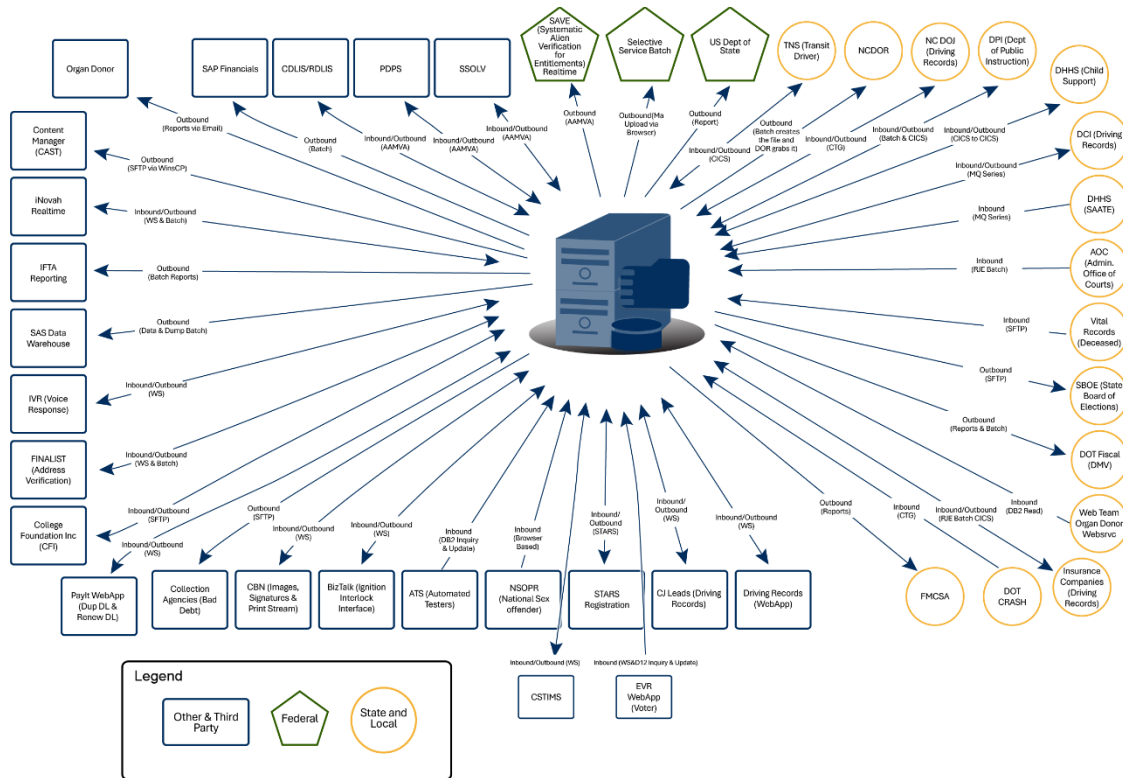
DMV Modernization Origins – Days of Future Past

There is no codified or standardized definition of what projects are included under the IT Modernization program. However, according to the DIT-T Budget Officer, the term as popularly understood began with the initiative to implement the REAL ID requirements in 2014.[5] However, over the ensuing decade, the DMV and DIT-T initiated 46 additional modernization projects with a collective **actual cost** of approximately **$42 million** to date.[6]

> Since 2014, DMV and DIT-T initiated 46 projects that resulted in a cost of approximately $42 million.

Modernization is a broad term used by the DMV for projects initiated to **improve customer services**. Despite the wide variety of projects encompassed under the term 'DMV Modernization,' the term **IT Modernization** specifically denotes replacement of legacy mainframe systems with a more modern cloud-based solution.

The timelines **[A]** and **[B]** over the following pages track the past 12 years of DMV and DIT-T modernization project activity. For context, the timelines also show the various individuals serving as DMV Commissioner over this period, as well as events described elsewhere in this report that affected modernization efforts. The timelines are a **visual** supplement to the chronological **narrative** of the DMV's modernization efforts that follows. Additional details for certain projects noted on the timeline appear at the end of this section.

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[5] The REAL ID Act of 2005 set forth minimum security requirements that driver licenses and identification cards issued by U.S. states and territories must satisfy to be accepted for certain federal purposes, including boarding airline flights in the United States. Phased enforcement of the REAL ID Act began on May 7, 2025.

[6] As of April 2025, DIT's Enterprise Project Management Office (EPMO) reports $42,171,132.26 expenditures.

[A] DMV / DIT-T Project Activity from 2013 to 2019

DMV Commissioners

James Forte (Jan 2013-Oct 2013)	Kelly J. Thomas (Oct 2013-Jul 2017)	Torre Jessup (Jul 2017-Jan 2022)	> > >

DMV IT Modernization Projects

(Real ID)
Next Gen

D360
Terminated
(Sep 2018)

DMV Applications
Alignment and
Interoperability
(AAaI)

Driver
360
(D360)

SADLS Refactoring
(SREF)

2013	2014	2015	2016	2017	2018	2019

Non-Legacy Mainframe System Projects

Channel Strategy

Virtual
Hearing
(Jan 2018)

Remittance Processor -
STARS Interface

SB824
Identification
to Vote
(SB824)

DMV Vehicle Services Queuing
(VSQUE)

DMV ELT
Replacement
(DERP)

Driver 360
Infrastructure -
Sandbox

Central
Issuance and
Print on
Demand
(CIPD)

MyDMV
Portal

NCDMV Optimization

State to State (S2S)

Law Enforcement
Case Management
System (LECMS)

Virtual Hearings and Hearing Fees

Electronic
Insurance
Verification (EIV)

Ignition
Interlock

DMV IVR Phase II (IVRP2)

DMV Callback
Assist (CBA)

Data Management and
Governance Project

Student
Online Testing
via DPI
(SOTD)

DMV IT Modernization
- Mainframe System Replacement Projects
- Projects with Application and Data Support from DIT-T

Read more details of these Projects in Background

DMV IT Modernization – First Attempt at System Replacement

2015

DMV modernization efforts began with an attempt to replace **SADLS**, as it existed at the time, through the execution of two separate projects:

- **Next Generation Secure Driver License** was developed to replace the front-end customer facing interface of the SADLS application.
- **Driver 360** was developed to replace the back-end process supporting the SADLS application.

The DMV **completed and closed** the Next Generation Secure Driver License project but **ended Driver 360 efforts**. The vendor IDEMIA (formerly MorphoTrust) was contracted to perform a gap analysis to compare its off-the-shelf product (Driver 360) to the DMV's requirements for replacing the SADLS application. At the end of the analysis, a go/no-go decision was to be made on whether the product could be customized to meet the DMV's needs. However, IDEMIA **did not complete** the gap analysis. Instead, IDEMIA informed the DMV it had changed its strategic direction and was not prepared to implement the product.[7]

2019

Following the cancellation of Driver 360, DMV management decided to refactor[8] and rearchitect[9] the SADLS application. DMV considered migrating the SADLS application to a cloud-based platform (.NET), to **increase system performance** and thereby **improve customer service**. However, according to the DMV Deputy CIO, it became evident in the initial phases of the SADLS refactoring project that refactoring SADLS presented significant challenges due to its interdependencies with other systems. This made it difficult to enhance SADLS without addressing the broader system landscape.

> Refactoring SADLS presented significant challenges due to its interdependencies with other systems.

[7] SB 744 Reporting of DMV Modernization Projects – September 2018.
[8] Refactor: Restructure and optimize the app's code to meet modern standards without changing its external behavior.
[9] Rearchitect: Create a new application architecture that enables improved performance and new capabilities.

[B] DMV / DIT-T Project Activity from 2020 to Present
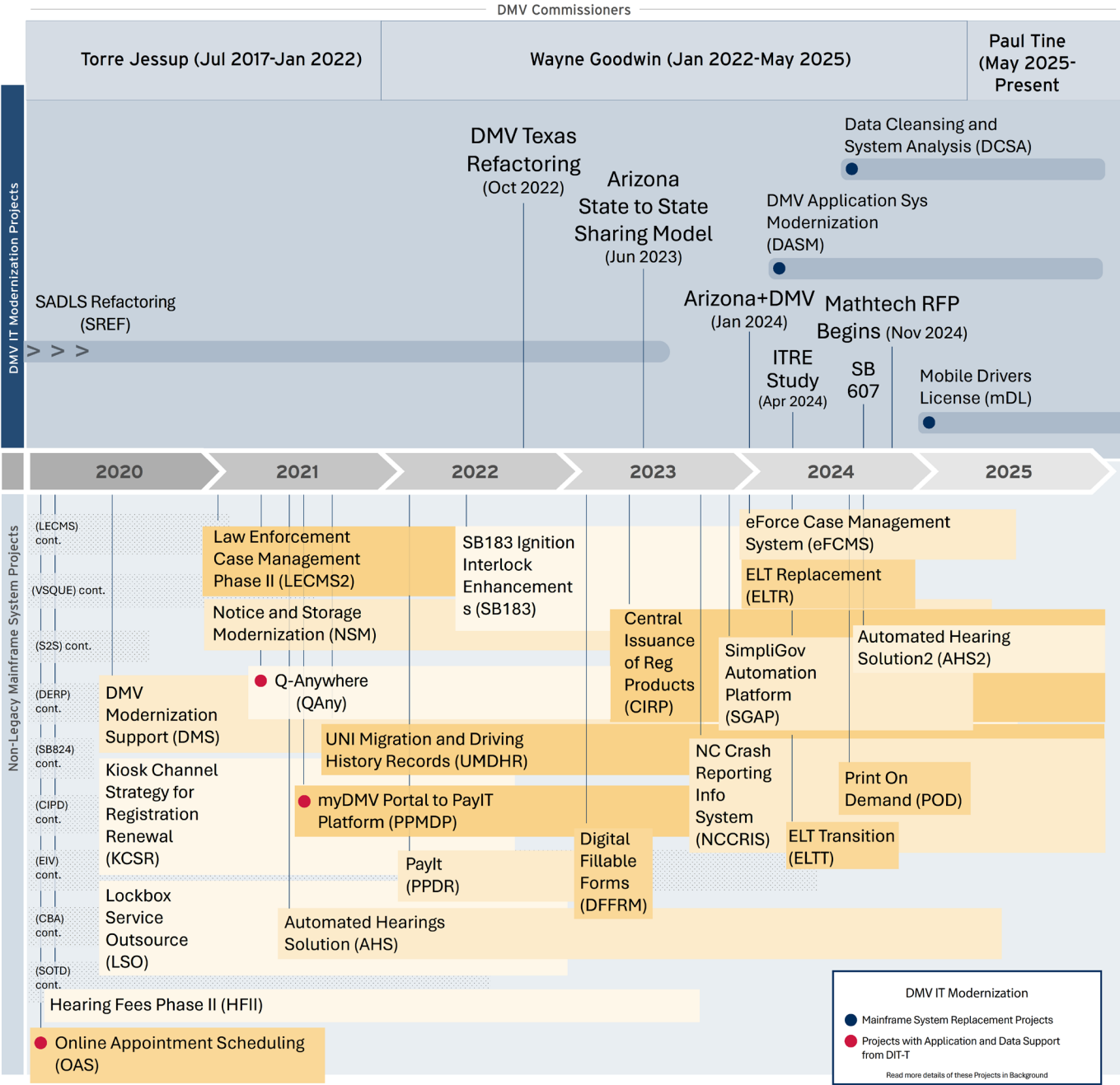
DMV IT Modernization – From Texas to Arizona
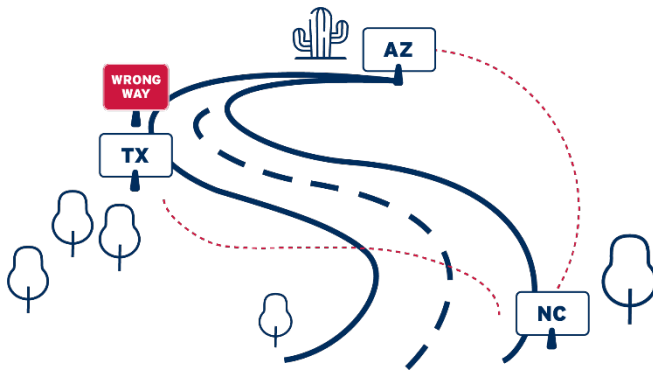
2022

The DMV, with the help of a third-party consultant, Gartner, and through its attendance at AAMVA (American Association of Motor Vehicle Administrators) conferences, learned about other jurisdictions refactoring their DMV systems. At this point, DMV management discovered the Texas DMV had recently completed a refactoring of its infrastructure similar to the one undertaken by the DMV in 2019. DMV management therefore traveled to Texas to discuss the Texas refactoring project. After the DMV assessed Texas's refactoring project, the DMV concluded that its own SADLS refactoring project should be terminated; the risk that changing one system could lead to problems because of the interdependencies of the other DMV systems outweighed the benefits to be gained from the project. The total cost for the DMV's SADLS refactoring project was $2,276,936.78.[10] DMV management decided instead to migrate all the North Carolina DMV mainframe systems to a one-system, cloud-based solution.

2023

DMV management learned through AAMVA that Arizona made a code sharing model available to other states to view its cloud-based platform. DMV management then traveled to Arizona to inquire about and observe the results of Arizona's efforts to change to a one-system, cloud-based solution, and to determine if it could be used in North Carolina. TheDMV determined that because Arizona has already implemented its system, the DMV would be able to leverage Arizona's code, which could reduce the cost and time spent in research and development for an in-house system. The DMV would also be able to benefit from utilizing the implementation vendor (Kyndryl) who completed the migration.

> DMV intends to leverage Arizona's software for migrating all 7 DMV legacy mainframe systems into one cloud-based platform.

Based on its understanding of these potential benefits, the DMV signed a memorandum of understanding (MOU) with Arizona to acquire the code for its cloud-based solution. DMV intends to use Arizona's software for migrating all 7 DMV legacy mainframe systems into one cloud-based platform. See significant systems section for additional information about the legacy systems.

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[10] DIT's Enterprise Project Management Office (EPMO) provided total cost for project (Appendix G).

DMV IT Modernization – A Brief Intermission

The Joint Legislative Transportation Oversight Committee consists of 22 members from the General Assembly that examine reports, funding, and compliance matters for the Department of Transportation. Legislation proposed for the DMV is reviewed and approved by the Joint Legislative Transportation Oversight Committee before final approval from the General Assembly. In 2023, the Joint Legislative Transportation Oversight Committee commissioned a study to examine delays, long lines, and staff shortages at DMV offices throughout North Carolina. The Committee authorized researchers from the Institute for Transportation Research and Education (ITRE) at North Carolina State University and the Bryan School of Business and Economics at UNC Greensboro to examine the DMV's operations. The ITRE report argues that continuing to use legacy mainframe systems poses the risks of obsolescence and limited functionalities to adapt to the growing demand for online and alternate DMV services.

In 2024, the General Assembly passed Section 19.2 of Session Law 2024-45 (Senate Bill 607) to ensure DIT oversight of DMV's IT modernization project. This law repealed and replaced the previously enacted Section 11.(a) of Session Law 2021-134, which authorized DOT to enter contracts for up to five information technology projects for DMV system modernization and exempted such projects from DIT oversight. Section 19.2.(c) required the DMV and DIT to develop and issue a request for proposal (RFP) to contract with a third-party organization to perform an evaluation of the DMV's ongoing efforts to modernize its Information Technology (IT) systems.

The RFP vendor, Mathtech, issued a full report to DMV and DIT-T on April 22, 2025, titled *System Modernization Evaluation North Carolina Department of Transportation Division of Motor Vehicles*.

Current Projects

2024

> Due to Session Law 2024-45, DMV paused all efforts for the DASM project.

DMV Application System Modernization (DASM) – The purpose of this project is to upgrade the architecture of all the DMV's existing systems from mainframe to a .NET platform. The DASM project commenced in March 2024 and DIT-T began evaluating Arizona code and conducting a gap analysis of the AZ Max software capabilities against its mainframe systems. Due to Session Law 2024-45, the DMV paused all efforts for the DASM project to work on other projects and to assist Mathtech in completing the RFP for assessing the DMV modernization attempts. The DMV and DIT-T will consider the results of the Mathtech DMV modernization report, issued April 22, 2025,[11] in determining the direction or continuation of this project.
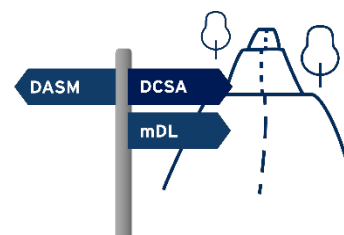
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[11] See Appendix H.

Data Cleansing System Analysis (DCSA) – The purpose of this project is to analyze redundant data and identify high level capabilities for critical mainframe systems. The DCSA project started in August 2024. Currently, DIT-T is prospecting vendors to purchase a data analytics tool to assist in the data cleansing process. The work for this project is independent of the DASM project but is essential because data needs to be refined and accurate before migrating to a new platform or maintained in the same legacy system.

2025

Mobile Drivers License (mDL) – Upon taking effect, Section 1.(c) of Session Law 2024-30 (House Bill 199) directed the DMV to begin pursuits to give North Carolina residents the option to receive a supplemental digital version of a valid drivers license. The DMV believes the mDL project benefits residents because personal identifiable information of a driver can be adjusted in real time and be more secure than physical cards. Moreover, the DMV argues that lost or stolen cards can lead to identity theft. This project began in January 2025 with the DMV conducting a study to determine if the DMV should charge fees for the mobile driver license service. The DMV developed and implemented a comprehensive plan to issue digital driver license credentials.[12] Currently, the DMV has completed the initiation phase of the project and is waiting for RFP approval to move on to the planning and design phase.

DMV Modernization Projects – Other Examples

The modernization projects detailed on the following page are **examples** of additional efforts where DIT-T provided application and data support to help the DMV business unit attempt to **improve customer service**. For each of the examples, the DMV and DIT-T were **unable** to provide evidence that they monitored project performance, measured the performance against the project objectives, or identified actionable opportunities for improvement.

As a result of the lack of DMV performance monitoring and measurement, the DMV was unable to determine the success of these modernization efforts. Consequently, depending on project results, staff such as Driver License Office (DLO) employees have dealt with customer frustration over **negative impacts to customer service** resulting from these modernization projects. For example, both DLO staff and DMV leadership,[13] in interviews with the audit team, expressed frustration with the Q-Anywhere system, and some DLO employees have attempted trying to create their own solutions to manage it as a work-around.

> DMV was unable to determine the success of these modernization efforts.

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[12] N.C. Division of Motor Vehicles, Mobile Driver License Study December 31 2024, Revised January 13, 2025.

[13] The DMV Chief Deputy Commissioner, Deputy Commissioner, Director, and Program Analyst.

NCDMV Optimization (2014 – 2017)

The purpose of this project was to identify and implement features to improve the DMV's customer experience through utilizing the DMV's existing office space. The DMV conducted customer surveys to improve customer service. Based on the results, the DMV became aware that wait times, extending office hours, and creating other methods to complete DMV transactions were customers' main concerns. The DMV employed efforts to improve office layouts, customer line flow, update mobile units, pilot full-service kiosks, and deploy portable units throughout the state. The total implementation cost for this project was $5,109,043.19.[14]

MyDMV Portal (2013 – 2017)

The DMV developed an online portal for driver license and vehicle registration transactions that enables users to view their statuses and complete DMV services anytime and anywhere. The total implementation cost was $2,068,233.72.[15]

PayIT (MyNCDMV) (2021 – 2025)

The DMV partnered with a vendor, ITI, to implement an online application for DMV customers to renew vehicle registrations and driver licenses, pay vehicle fees and property taxes, and complete voter registration. The project resulted in a forty percent reduction in **measured** office wait times. The PayIT platform has been used by 7.6 million individuals across North Carolina with 25 million completed transactions.[16]

The total implementation cost for this initiative was $753,389.99.[17]

Online Appointment Scheduling (2020 – 2021)

The DMV developed a portal where the public can make an appointment online to obtain a driver license rather than wait in line without an appointment.

The total implementation cost for this project was $55,683.86.[18]

Q-Anywhere (2021 – 2024)

In response to the COVID-19 pandemic, the DMV developed contactless check-in options where users scan a QR code, which sends a short text message to the driver license office establishing their place in line, and eventually letting the user know it's their turn to see a DMV agent. The project evolved to give customers a permanent place in line and give them the option to run errands nearby while waiting for their turn. The total implementation cost for this project was $595,713.96.[19]

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[14] DIT's Enterprise Project Management Office (EPMO) provided total cost for project.
[15] Ibid.
[16] PayIt North Carolina Department of Transportation A customer engagement platform for all things DMV.
[17] DIT's Enterprise Project Management Office (EPMO) provided total cost for project.
[18] Ibid.
[19] Ibid.

The DMV and DIT have **made efforts** to improve customer experience but struggle to keep pace with evolving technology. Limited resources hinder their ability to adapt to the state's growing population, changing policies, and regulations.[20]

<u>**Need for IT Modernization – NCDMV Legacy Mainframe Systems Frozen in Time**</u>
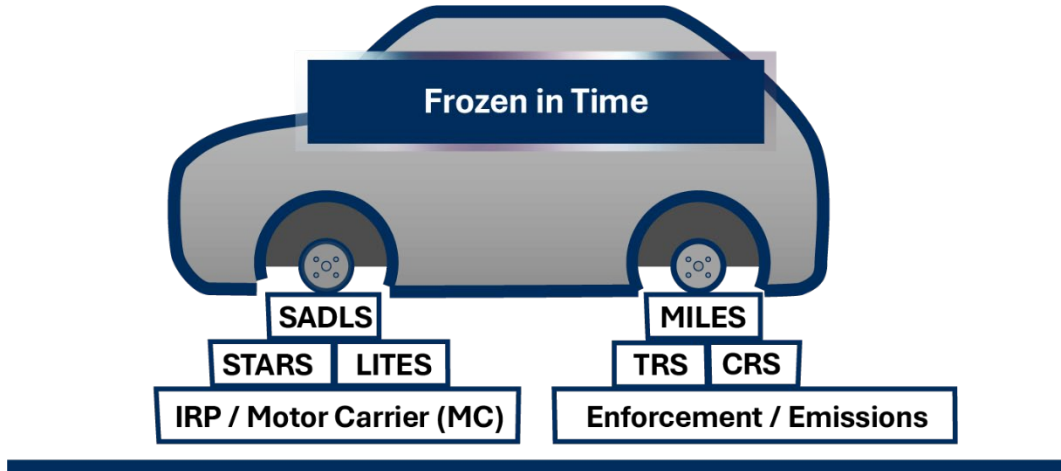
In a meeting with the North Carolina Joint Legislative Transportation Oversight Committee on February 29, 2024, the DMV Commissioner referred to a previous meeting where DMV "announced its decision to pursue a whole system modernization approach instead of the previous one piece at a time approach previously sought." The system modernization effort would, according to the Commissioner, "replace the multiple aging mainframe systems with a single solution containing all customer information." He further explained the benefits of this approach by saying a "one-system approach will break down the silos of information stored by NCDMV, and consequently, we expect increased efficiencies internally and improved customer service in addition to what we have strived for over the last two years, namely, shorter lines, shorter wait times, and better customer service."[21]

An April 2024 study published by ITRE and the University of North Carolina, Greensboro Bryan School of Business and Economics describes the risks that may occur if the DMV continues using legacy systems: "obsolescence–and more importantly, difficulty in adding new functions and a degraded ability to accommodate the growing demand for online and alternate service delivery."[22]

An April 2025 report published by Mathtech describes the DMV's portfolio of systems as having limited abilities for integration, making data retrieval difficult and increasing the potential for errors in transactions as staff alternate between systems to complete the transactions. Additionally, outdated programming languages do not provide the functionality required for the DMV to implement modern web-based systems, and legacy system changes require time

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[20] https://www.macrotrends.net/global-metrics/states/north-carolina/population.

[21] North Carolina General Assembly, Joint Committee on Legislative Transporation Oversight, Transcript of the Proceedings in Raleigh, North Carolina, February 29, 2024, p.11-12.

[22] *Opportunities for Modernizing and Improving NCDMV Operations*, April 2024, NC State Univeristy Institute for Transportation Research and Education (ITRE) and UNC Greensboro Bryan School of Business and Economics.

consuming and significant programming efforts. Furthermore, Mathtech describes the DMV's systems as "frozen in time."

It concludes, "[t]he DMV and agencies in similar situations find themselves **frozen in time** and unable to substantially modernize operations or provide new services such as end-to-end online transactions because the system cannot accommodate such enhancements, and the burden of ongoing maintenance is a distraction. Furthermore, mandatory enhancements to the system to maintain legislative or federal compliance are slow, time-consuming, and continually introduce the potential of breaking the system."[23]

Conversely, the ITRE findings describe the benefits of migrating to a one-system, cloud-based solution as: "A state-of-the-art solution that modernizes such legacy systems, which has been adopted in states such as Arizona, is to upgrade the existing IT architecture to one based on .NET, a proprietary software platform and ecosystem developed by Microsoft that has been widely adopted across the industry. The reported advantages of using this .NET platform include easy desktop and web application (re)engineering; better adaptability for web-based services; easier application development by NCDIT-T programmers; greater flexibility in system deployment; and easier maintenance."[24]

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[23] *System Modernization Evaluation,* North Carolina Department of Transportation, Division of Motor Vehicles, April 22, 2025, Mathtech, Inc.

[24] *Opportunities for Modernizing and Improving NCDMV Operations*, April 2024, NC State Univeristy Institute for Transportation Research and Education (ITRE) and UNC Greensboro Bryan School of Business and Economics.

Objective, Scope, and Methodology

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 support the findings and conclusions in relation to our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Objective

The objective of this audit was to determine the extent to which the DMV implemented the **system modernization** recommendations from the April 2024 legislative study *Opportunities for Modernizing and Improving NCDMV Operations* as of April 22, 2025.

Specifically, to determine the extent to which the DMV:

- Completed its IT modernization **project planning** and provided the North Carolina General Assembly with an identification of the high-level **milestones** for the project alongside an anticipated **timeline** for each.

- Prioritized the components of the current IT infrastructure that impact **customer-facing business processes**.

- Critically examined the need to collect, store, and share the **data** it currently collects.

- Prepared a **personnel management plan** for the staff resources that will be temporarily needed for the IT modernization project.

Opportunities for Modernizing and Improving NCDMV Operations was commissioned by the Joint Legislative Transportation Oversight Committee of the North Carolina General Assembly. It was prepared by researchers from the ITRE at North Carolina State University and the Bryan School of Business and Economics at the University of North Carolina at Greensboro. The DMV Modernization section from this report is included in *Appendix D*.

Scope

Auditors assessed this audit objective specifically for the DMV IT Modernization Project, officially known as the **DMV Application System Modernization (DASM)** program, which therefore comprises the audit scope. The purpose of this project is to upgrade the architecture of all the DMV's existing systems from a mainframe to a .NET platform, resulting in a new system to be known as **NC MAX**. Further details on the scope of NC MAX, including the mainframe systems being upgraded, are documented in the *Background* section of this report.

The *Background* section also documents a detailed history of DMV Modernization, broadly defined, to establish the context for the audit objectives and to facilitate understanding of the findings. However, auditor conclusions on the audit objectives are limited to the DMV IT Modernization Project as described in the paragraph above.

As stated in the Objective section above, auditors assessed the audit objective as of April 22, 2025, so this date comprises the scope in terms of the point in time reviewed.

Methodology

To achieve the audit objectives, auditors:

- Interviewed key Department of Information Technology – Transportation (DIT-T) and DMV managers and staff.

- Consulted with authors of the *Opportunities for Modernizing and Improving NCDMV Operations* legislative study.

- Consulted with the North Carolina Office of the State Auditor performance audit team.

- Reviewed legislation applicable to DMV modernization.[25]

- Reviewed studies and reports concerning DMV modernization.[26]

- Reviewed DMV modernization project planning documentation.

- Reviewed DMV modernization budgetary and spending documentation.

- Examined historical modernization project documentation and prepared a timeline of events related to the audit objectives.

- Reviewed and evaluated system downtime data provided by DIT-T.

- Reviewed best practice guidance from the COBIT framework and evaluated DIT-T and DMV activities and documentation against this framework.

Because of the test nature and other inherent limitations of an audit, together with limitations of any system of internal and management controls, this audit would not necessarily disclose all performance weaknesses or lack of compliance.

Methodology – COBIT Framework

Auditors utilized the COBIT framework, published by ISACA,[27] to provide **guidance** in assessing the audit objective. COBIT (formerly known as Control Objectives for Information and Related Technologies) is an internationally accepted framework for governing and managing enterprise information and technology. Although it is **not** formally adopted by DMV or DIT-T, because of its wide recognition as an IT governance and management framework, auditors consider it to be appropriate for this purpose.

Specific COBIT management objectives referenced in this report include:

- APO02 Managed Strategy.

- APO06 Managed Budget and Costs.

- APO08 Managed Relationships.

- APO14 Managed Data.

- BAI02 Managed Requirements Definition.

- BAI11 Managed Projects.

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[25] North Carolina Session Law 2024-45 Section 19.2 is included in Appendix A.
[26] Selected sections of *System Modernization Evaluation: North Carolina Department of Transportation Division of Motor Vehicles,* prepared by Mathtech, are included in Appendix H.
[27] ISACA (formally the Information Systems Audit and Control Association) is an international professional association focused on IT governance.

Results and Conclusions

Findings

Based on the results of the audit procedures performed, the Division of Motor Vehicles (DMV) and Department of Information Technology – Transportation (DIT-T) have not fully implemented the recommendations from the April 2024 legislative study *Opportunities for Modernizing and Improving NCDMV Operations.* Specifically:

The DMV and DIT-T **have not completed a comprehensive project plan** for the DMV Application System Modernization (DASM) program.

DIT-T does not have a formal, business-driven process to identify and prioritize improvements to the DMV's IT infrastructure that would most directly **enhance the customer experience**.

DIT-T has recognized the need to examine and improve the quality of the DMV's vast data holdings but has not yet begun the **data cleansing procedures** necessary for successful IT modernization.

DIT-T has taken initial steps to identify and estimate the staff resources needed for the DMV's IT modernization project, but it **has not yet completed a comprehensive personnel management plan**.

The Division:

DID NOT complete project planning, develop milestones or timelines

DID NOT prioritize current IT infrastructure components

DID NOT perform data cleansing procedures

DID NOT create a comprehensive personnel plan, *only a preliminary plan*

The details of these results are documented in the *Findings and Recommendations* section.

Recommendations

The Office of the State Auditor makes the following recommendations based on the results:

General

The DMV Commissioner, in collaboration with the DIT-T Deputy Chief Information Officer (CIO) for DMV Systems, should develop a **DMV strategic plan** that establishes clear strategic goals and objectives for IT modernization and overall DMV operations.

Project Planning

The DMV Commissioner, in collaboration with the DIT-T Deputy CIO, should:

- Define and document detailed **business, functional, and technical requirements** for the DASM program prior to engaging or contracting with an implementation vendor.

- Prepare a **formal business case** for the DASM program, identifying anticipated costs, funding sources, expected benefits, return on investment performance metrics, and key risks.

- Develop and maintain a **unified project plan** for the DASM program that includes major milestones, deadlines, roles and responsibilities, key risks, and a structured reporting framework for regular updates to the General Assembly and oversight bodies.

Prioritize Infrastructure

DIT-T should establish and follow a formal process for prioritizing IT infrastructure improvements that most directly affect **customer-facing business processes**.

Data

DIT-T should obtain a modern data cleansing software tool and utilize the tool selected to perform data cleansing procedures in preparation for the DASM program. Data cleansing procedures should be comprehensive, timely, and sustained throughout the modernization process.

Personnel Management Plan

After the DMV selects an implementation vendor as directed by Session Law 2024-45, the DIT-T Project Portfolio Manager should complete the comprehensive personnel management plan for the DASM program. The plan should **align** with the DMV's strategic goals and objectives and **clearly break out roles and responsibilities** between DIT-T staff and the implementation vendor.

<u>**Conclusions**</u>

As documented throughout the *Background* and *Findings and Recommendations* from this report, the DMV is committed towards pursuing an IT modernization initiative based on the existing system and code currently in use in Arizona. Although this plan is based in sound reasoning and research, it nonetheless entails risks that must be addressed if the project is to be successful. While not a comprehensive list, these risks include:

- DIT-T effectively serves as the IT support function within the DMV, including serving as the data owner for **all DMV data**, while being **organizationally part of DIT**. Without a dedicated **internal** IT staff of its own, the DMV's control of its own IT operations is limited. It is at risk of:

  o Exclusion from participation in key decisions.

  o Insufficient visibility of data needed to drive key decisions.

  o Over-dependence on third-party vendors.

- The DMV exists within the larger organizational structure of the Department of Transportation (DOT) where it is **not considered a primary function**, as evidenced by its near total absence from the DOT 2023-2025 strategic plan.

- The DMV lacks a **current strategic plan** of its own.

- The DMV IT modernization program is not expected to generate benefits in the **short term** but will nonetheless require a **significant commitment** of existing DMV personnel resources at a time when such resources are already seemingly insufficient.

- The DMV and DIT-T have **a history of limited effectiveness** in both **monitoring** modernization project performance and **measuring** it against project objectives, either explicit or implicit.

- Due to limitations in organization expertise, the DMV is **reliant** on any implementation vendor it selects to provide training to its staff to support and maintain the system.

Given the existence of these risks, the Office of the State Auditor proposes the following **additional recommendations**. While not directly related to the audit objective, these recommendations flow logically when considering the audit findings as a whole.

Additional Recommendations

DIT-T and DMV management should, as applicable:

- **Review** existing and proposed modernization projects continuously to identify those with greatest potential for **immediate** impact on **customer service** and prioritize their implementation. Based on recommendations from the Office of the State Auditor's DMV performance audit report, potential projects to prioritize quickly should include:

  - A centralized performance dashboard for customer service metrics.

  - A secure online portal for document pre-verification.

  - An improved public web page with accessible service requirement information.

- Establish an **IT steering committee** composed of executive, business and IT management to track the NC MAX project status, resolve resource conflicts, and ensure accountability and strategic alignment between IT and business objectives. The steering committee should:

  - Monitor project performance.

  - Provide strategic direction.

  - Ensure the project meets deadlines and stays within budget.

- Involve **key stakeholders** in project governance to make informed decisions and ensure the project meets objectives. This includes distributing information such as third-party studies to all impacted stakeholders.

- Share performance management results, including key performance indicators (KPIs) and other metrics relevant to DMV IT modernization, with all stakeholders for use in strategic planning and decision prioritization.

- Ensure formal DMV **business sign off** occurs indicating the project **met acceptance criteria** to ensure alignment of project deliverables with the DMV's business needs.

- Perform documented monitoring of the third-party implementation vendor's performance to ensure **accountability** and make informed decisions. This provides a clear record of compliance with contract obligations, ensures early identification of and response to risks, and makes the project robust to personnel changes throughout its life cycle.

Subsequent to the April 22, 2025 date documented as the point in time for the audit scope, DOT posted a job opening for a DMV Deputy Commissioner of Modernization. The position description indicates that this individual is responsible for:

- Ensuring strategic initiatives are developed and implemented for optimal staff performance and **customer service** throughout the state.

- **Overseeing** the execution of strategic initiatives and special projects.

- Ensuring clear and consistent communication throughout the DMV is maintained regarding **strategic planning** as it relates to modernization activities.

- Building strong **stakeholder** relationships and engagement.

Given the close alignment between these responsibilities and additional auditor recommendations, the individual selected for this role would likely play a significant role in implementing these recommendations.

Findings and Recommendations

1. IT Modernization Project Planning Not Yet Complete

The Division of Motor Vehicles (DMV) and the Department of Information Technology – Transportation (DIT-T)[28] **have not completed a comprehensive project plan** for the DMV Application System Modernization (DASM) program. Specifically:

- There is no unified document outlining project milestones, deadlines, responsible parties, or key risks for the modernization effort.

- The General Assembly has not received regular, structured updates on progress, issues, or anticipated timelines.

- Stakeholders, including DMV and DIT-T leadership, do not share a common framework for coordinating decisions or tracking accountability as the project evolves.

DIT-T is currently in the midst of **analysis and assessment** of the code from the **Arizona** DMV modernization solution (AZ MAX), which it intends to adopt. As part of this effort, DIT-T has initiated **various projects** to assess the benefits of partnering with the Arizona DMV and adopting its code, including:

- **Code Review** of the AZ MAX code using a code analysis tool.

- **Gap Analysis** to identify gaps between DMV business process requirements and AZ MAX capabilities.

- **Data Quality** assessment and data cleansing.[29]

- **Implementation approach** determination.[30]

- **Personnel planning** to identify staffing needs for modernization.[31]

However, the DMV and DIT-T **have not performed** several important project planning tasks recommended by best practices. Specifically, according to DIT-T leadership:[32]

- DIT-T did not align IT modernization planning with a **DMV strategic plan** to ensure that DIT-T's analysis and assessment efforts supported the **DMV's strategic goals**.[33]

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[28] Effective July 1, 2018, N.C.G.S. § 143B-1325(a) required the transfer and consolidation of executive branch agency IT operations under the Department of Information Technology (NC DIT). The DIT-T is the NC DIT unit that provides IT services for the DOT, including DMV.

[29] Refer to Finding 3.

[30] As described in Sections 11.1 and 11.5 of *System Modernization Evaluation: North Carolina Department of Transportation Division of Motor Vehicles*, prepared by Mathtech: The DMV/DIT-T team must determine if the **implementation approach** will be a consolidated effort launching Driver **and** Vehicle services system changes **at once**, or a phased approach, deploying changes to each **separately**.

[31] Refer to Finding 4.

[32] The DIT-T Deputy CIO for DMV Systems, DMV Modernization Director, and Project Portfolio Manager.

[33] COBIT APO08.02: Align IT strategies with current business objectives and expectations to enable IT to be a value-add partner for the business and a governance component for enhanced enterprise performance.

- DIT-T did not develop an **estimated cost** and **associated budget**[34] for the DMV Application System Modernization (DASM).[35]

- DIT-T did not fully develop a **business case** for the IT modernization program.[36]

- DIT-T and DMV did not develop **requirements** for business process functionality needed to ensure that the DASM program supports the DMV's business operations and achieves the desired level of service delivery.[37]

Increased Risk of Insufficient Funding, Delays, and Not Meeting Requirements

Without the DMV and DIT-T completing project planning, the DASM program is at increased risk of **insufficient funding**, **project delays**, and results that **do not meet DMV requirements**.

- Without a **known budget** based on **estimated costs**, DIT-T is unable to effectively monitor program cost. Because **all** DMV modernization projects share a common funding stream,[38] DASM program funding is at **continuous risk** of allocation to a different project. For example, Mathtech estimates total program cost at $102 to $117 million,[39] which **could** be covered by currently available appropriations; however, at one point, the Senate budget under consideration reappropriated **$65 million** for purposes other than DMV modernization.[40]

- Without alignment with a DMV **strategic plan**, DIT-T cannot ensure that IT modernization efforts, including resource allocation, support the DMV's **strategic goals**. As a result, even if the DASM project is completed on time and within budget, it may not achieve key strategic goals such as **improved customer service**.[41]

- Without a **business case** for the full DASM program, DIT-T and DMV cannot ensure that modernization funding is allocated to maximize its impact. According to Driver License Office (DLO) staff and DMV leadership,[42] not all DMV modernization projects have been value-added projects that enhanced the DMV's performance. For example, both groups indicated frustration with the Q-Anywhere system and some DLO employees have attempted to create their own solutions as work-arounds.

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[34] Section 16 of *System Modernization Evaluation: North Carolina Department of Transportation Division of Motor Vehicles*, prepared by Mathtech, provides high-level cost estimates, but acknowledges the DMV/DIT has not yet developed a final pricing structure for the full modernization effort.

[35] COBIT BAI11.04: Develop a project plan that provides information to enable management to control project progress progressively. The plan should include…budget and costs…

[36] COBIT APO08.02: Ensure the involvement of the IT organization from the start of a new initiative by providing value-added advice and recommendations (e.g. for business case development, requirements definition, solution design).

[37] Ibid.

[38] See "Modernization Budget History" from the *Background* section of this report.

[39] Mathtech *System Modernization Evaluation: North Carolina Department of Transportation Division of Motor Vehicles*, Section 16.6 Estimated Costs. Mathtech states in Section 16.2 Existing DMV Cost Estimates that, "While Mathtech's cost model provides a **structured financial projection**, collaboration with the implementation vendor is **still required** to refine the final budget." (Emphasis added).

[40] Senate Bill 257 Section 43.3.(a) Edition 2.

[41] The DMV's 2019-2023 Strategic Plan listed 'Customer Service' as an organizational goal. Although the DMV does not have a current Strategic Plan, DMV leadership, including the Chief Deputy Commissioner, indicated that the goals from this plan still applied.

[42] The DMV Chief Deputy Commissioner, Deputy Commissioner, Director, and Program Analyst.

- Without defined **requirements** for business process functionality, DIT-T cannot effectively evaluate whether the DASM program's mainframe replacement efforts will support the DMV's business operations and service delivery goals.

Caused By Legislative Pause, Lack of DMV Strategic Plan

According to DIT-T leadership,[43] the DMV and DIT-T did not complete their project planning for the DASM program because they had not yet **engaged an implementation vendor**. This was primarily due to the passage of Session Law 2024-45, which **paused** project planning. The Session Law directed DIT-T, in consultation with the DMV, to contract with a third party to evalute the DMV's ongoing effort to modernize its IT systems.[44]

Although the Session Law did not **explicitly** pause the DASM program, it required the DMV to use the findings of the third-party evaluation to select an implementation vendor for a cloud-based operating system.[45] This effectively put the implementation vendor selection on hold until the evaluation was complete.

However, industry best practice calls for agencies to define and document business requirements **before** engaging implementation vendors.[46] This ensures the solution aligns with the agency's mission and operational needs rather than being driven by vendor products or preferences. Postponing requirements development increases the risk of vendor-driven project scope, misalignment with DMV needs, and diminished accountability for project outcomes.

Additionally, even if the DMV and DIT-T **had** completed project planning, the **DMV does not have a current strategic plan**. Therefore, it is not possible to align project planning with current DMV strategic goals and objectives for IT modernization.

Recommended by Institute for Transportation Research and Education

Opportunities for Modernizing and Improving NCDMV Operations, published by NC State University's ITRE and UNC Greensboro Bryan School of Business and Economics in April 2024, provides guidelines for the DMV Modernization Project:

> NCDIT-T and NCDMV need to **complete their Project Planning** and provide the North Carolina General Assembly with an identification of the high-level milestones for the project alongside an anticipated timeline for each.

Recommendation

(1) The DMV Commissioner, in collaboration with the DIT-T Deputy Chief Information Officer for DMV Systems, should:

- Develop and adopt a comprehensive DMV strategic plan that establishes clear goals and objectives for IT modernization and overall DMV operations. This should

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[43] The DIT-T Deputy CIO for DMV Systems, DMV Modernization Director, and Project Portfolio Manager.
[44] N.C. Session Law 2024-45, Section 19.2(c).
[45] N.C. Session Law 2024-45, Section 19.2(f).
[46] COBIT BAI02: Identify solutions and analyze requirements **before acquisition or creation** to ensure that they align with enterprise strategic requirements. (Emphasis added.)

be completed with input from stakeholders and align with the findings and recommendations of the Office of the State Auditor's companion performance audit.

- Define and document detailed business, functional, and technical requirements for the DASM program before engaging or contracting with an implementation vendor. This requirements definition process should be transparent and incorporate input from all key stakeholder groups. Requirements should be maintained and refined as needed once the implementation vendor is procured, but a clear, agreed-upon baseline must be established prior to any procurement activities.

- Prepare a formal business case for the DASM program, identifying anticipated costs, funding sources, expected benefits, return on investment, performance metrics, and key risks. This business case should support decision-making and oversight by the General Assembly and serve as the foundation for project planning and procurement documents.

- Develop and maintain a unified project plan for the DASM program that includes major milestones, deadlines, roles and responsibilities, key risks, and a structured reporting framework for regular updates to the General Assembly and oversight bodies.

Action Plan

- **Strategic Planning:** Initiate and complete the development of a DMV strategic plan in partnership with DIT-T, soliciting input from internal and external stakeholders to ensure alignment with agency mission and modernization needs.

- **Requirements Definition:** Convene a cross-functional team from the DMV and DIT-T to define, document, and agree upon business and technical requirements for the DASM program prior to initiating vendor procurement. Ensure all key stakeholder needs and acceptance criteria are captured and prioritized.

- **Business Case:** Prepare and document a business case for the DASM program, including:

  o A scoring table for project benefits to other state agencies and the public.

  o Cost-benefit or return on investment (ROI) analysis.

  o Funding sources and budget impact.

  o Expected outcomes and performance metrics.

- **Unified Project Plan and Reporting:** Develop a comprehensive project plan, in partnership with the selected implementation vendor, outlining milestones, deadlines, roles, risks, and responsibilities, and establish a regular progress reporting framework for the General Assembly and oversight bodies.

Timeline

The DMV and DIT-T should complete the DMV strategic plan, requirements definition, business case, and unified project plan, and be prepared to report all deliverables to the North Carolina General Assembly within **9 months**.

2. Customer Facing Business Processes Not Prioritized

DIT-T does not have a formal, business-driven process to identify and prioritize improvements to the DMV's IT infrastructure that would most directly enhance the customer experience. As a result, technology investments may not be focused on the most pressing service needs, and critical upgrades, such as those that could reduce downtime or enable faster transactions, may be overlooked or delayed.

DIT-T leadership[47] confirmed that it has not yet begun to prioritize which components of the current IT infrastructure have the greatest impact on customer service, nor has it consulted with DMV business stakeholders to fully understand which IT needs matter most to the public.

According to the DIT-T Application Systems Manager, current network update efforts at DMV locations are **ongoing maintenance** and are not specifically linked to the DASM program or to improving customer-facing business processes.

Increases Risk of Negative Customer Experience

Without a strategic approach to prioritizing IT improvements based on their impact on **customer-facing** business processes, DIT-T cannot ensure technology investments are aligned with the DMV's most pressing service needs. This gap increases the risk that major customer issues, such as system outages, slow transactions, or limited online services, will persist despite ongoing maintenance.

For example, DIT-T's internal data show that DMV DLOs collectively experienced **124 business days** of unexpected network downtime during their hours of operation from January 1, 2024 through April 16, 2025.[48] Such downtime prevents DLOs from processing customer transactions, resulting in a **poor customer experience**.

If DIT-T were to strategically prioritize IT infrastructure that impacts such processes, it could **assess the root causes** of factors, such as network outages affecting that experience. This would thereby enable it to devote **resources** to addressing those root causes through completion of the DASM project, as recommended by best practices.[49]

Caused by Legislative Pause, Lack of DMV Strategic Plan

According to DIT-T leadership, DIT-T did not yet **prioritize** the components of current IT infrastructure that impact **customer facing business processes** because the passage of Session Law 2024-45 paused its planning and assessment. The Session Law directed DIT-T, in consultation with the DMV, to contract with a third-party to evaluate the DMV's ongoing effort to modernize its IT systems.[50]

Although the Session Law did not **explicitly** pause the DASM program, it directed DMV to use the findings of the third-party evaluation to select an implementation vendor for a cloud-

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[47] The DIT-T Deputy CIO for DMV Systems, DMV Modernization Director, and Project Portfolio Manager.
[48] Per auditor analysis of a DIT-T query of ServiceNow service management platform. The tool DIT-T uses to monitor network switches is integrated with ServiceNow and automatically generates an 'incident' within the system when it detects a network issue. The query identified approximately 3,000 hours of total network down time for the DLO's during this period, approximately 1,119 hours of which occurred during normal hours of operation.
[49] COBIT APO06.02: Implement a decision-making process to prioritize the allocation of resources.
[50] N.C. Session Law 2024-45, Section 19.2(c).

based operating system.[51] This effectively put the implementation vendor selection on hold until the evaluation was complete.

Additionally, DIT-T did not prioritize IT infrastructure components because DMV leadership **did not develop a current strategic plan**. Therefore, there were no **existing** DMV strategic priorities available to guide DIT-T's prioritization of IT infrastructure.

Recommended by Institute for Transportation Research and Education

Opportunities for Modernizing and Improving NCDMV Operations, published by NC State University's ITRE and UNC Greensboro Bryan School of Business and Economics in April 2024, provides guidelines for the DMV Modernization Project:

> NCDMV should prioritize the components of the current IT infrastructure that impact customer-facing business processes and that, when implemented, will directly improve customer experience.

Recommendation

(2) DIT-T should establish and follow a formal process for prioritizing IT infrastructure improvements that most directly affect customer-facing business processes, as recommended by the ITRE report.

Action Plan

- **Evaluate Reestablishing Prioritization Committee:** DIT-T and the DMV should evaluate whether to reestablish the defunct DMV and IT Review and Rating Board (DRB)[52] to identify and document current and proposed IT infrastructure changes that most affect customer-facing processes. If reestablished, the committee could:
  - o Identify and document customer-facing business processes where further IT infrastructure support is needed.
  - o Document integration needs with external applications.
  - o Prioritize IT components for infrastructure support and initiate a project plan.
  - o Implement continuous monitoring of all key infrastructure components.

  DIT-T and the DMV should identify an alternate IT infrastructure prioritization process if they opt **not** to reestablish the DRB.

- **Engage Business Stakeholders:** Include DMV staff and process owners in identifying and prioritizing the IT changes that will most improve customer service.

- **Align with Strategic Plan:** Once a DMV strategic plan is in place, ensure IT priorities directly support the agency's service improvement goals.

Timeline

DIT-T and the DMV should complete the evaluation of whether to reestablish the DRB and begin the IT infrastructure prioritization process within **6 months**.

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[51] N.C. Session Law 2024-45, Section 19.2(f).

[52] The DRB was a committee of DMV leadership and application owners whose purpose was to **review** and **prioritze** DMV infrastructure work needs. The DRB was formed by Torre Jessup, who was DMV Commissioner at the time, in 2018. The DRB was renamed the Impact Center in 2020 and it was discontinued shortly thereafter.

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3. Critical Examination of Data Not Yet Complete

DIT-T has recognized the need to examine and improve the quality of the DMV's vast data holdings, but it has not yet begun the data cleansing[53] procedures necessary for successful IT modernization. As a result, the planned DASM program faces increased risk of data-related problems, inefficiencies, and noncompliance.

To prepare for the DASM program, DIT-T developed a DOT Business Project Request for a project titled 'DMV Data Cleansing & System Analysis' (DCSA). In the Business Project Request, the planned timeline for DCSA was from October 2024 through September 2026.

According to the DIT-T Architect Manager, the goal of DCSA is to **cleanse** 30 years of data redundancies and **consolidate** customer records so that all DMV applications function more efficiently. DIT-T obtained an independent assessment of its planned data cleansing approach from Gartner,[54] a technology research and advisory firm, who endorsed DIT-T's plan, and the plan is aligned with best practices.[55]

However, DIT-T has not yet obtained a **software tool** that will enable it to carry out the DCSA project. According to the DIT-T Project Portfolio Manager, DIT-T is currently in the process of interviewing vendors to select such a tool. Therefore, although DIT-T has formally created the DCSA project, it has **not yet begun** actual data cleansing procedures.

Increases Risk of Data Issues and Inefficiencies

Without cleansing and organizing its existing data, the DMV's modernization efforts are at increased risk of **data issues and inefficiencies**.[56] Problems with legacy data can undermine the effectiveness of new systems and result in operational, financial, and compliance risks, including:

- Large volumes of redundant, obsolete, or trivial data, some of which dates back over 80 years.[57]

- Data subject to the Driver's Policy Protection Act,[58] which prohibits the release or use of personal information by any state DMV (or any officer, employee, or contractor thereof), can result in fines up to $5,000 a day per day of noncompliance.

- Complex interconnections with approximately 50 internal and external state and federal applications, all of which rely on the DMV for timely, accurate data.[59]

According to Gartner's research, **poor data quality** costs organizations at least $12.9 million a year on average.[60] Given the DMV's statewide reach, the potential impact of unresolved data quality issues could be far greater.

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[53] Data cleansing is the process of fixing or removing incorrect, corrupted, incorrectly formatted, duplicate, or incomplete data within a dataset.

[54] NC DIT-T/NC DMV Data Cleansing & Governance Approach, Terrilyn Phillips, March 07 2025.

[55] COBIT APO014.08: Ensure that the organization understands, maps, inventories, and controls its data flows through business processes over the data life cycle, from creation or acquisition to retirement.

[56] The DCSA Business Project Request 'problem summary' states that, "[t]he need for 'clean' data will allow [DIT-T] to continue DMV Systems Modernization efforts with lower risk of data issues and inefficiencies."

[57] DCSA Business Project Request.

[58] 18 U.S.C. § 2721-2725.

[59] DMV Performance and IT Modernization – Presentation to the North Carolina General Assembly Joint Appropriations Committee on Transportation, February 26, 2025.

[60] Data Quality: Best Practices for Accurate Insights.

Additionally, poor data quality increases risk of **poor customer relations**, **inaccurate analytics**, and **poor decision-making** that can harm business performance.[61] Low quality data shared with external state and federal agencies could lead to incorrect conclusions and further negatively impact the DMV's reputation.

Caused by Lack of Software Tool, Lack of DMV Strategic Plan

According to the DMV Modernization Director, DIT-T did not perform data cleansing procedures because DIT-T has not yet obtained a data cleansing software tool. DIT-T is currently in the process of reviewing data analysis tools with vendors.

Additionally, as documented in the *Background* section of this report, the DMV and DIT-T did not take on a data cleansing project until 2024. This was **nearly a decade** after the beginning of the DMV's IT modernization efforts, as broadly defined.

While data cleansing is not the **sole** priority of the DMV's IT modernization efforts, it is essential to the success of the overall DASM program, which DIT-T indicated is its top priority. Therefore, its exclusion up to this point is likely a downstream effect of the DMV's **lack of a strategic plan**, both current and historically.[62]

Recommended by Institute for Transportation Research and Education

Opportunities for Modernizing and Improving NCDMV Operations, published by NC State University's ITRE and UNC Greensboro Bryan School of Business and Economics in April 2024, provides guidelines for the DMV Modernization Project:

> NCDMV should critically examine the need to collect, store, and share the data it currently collects.

Recommendation

(3) **DIT-T should obtain a modern data cleansing software tool and utilize the tool selected to perform** data cleansing procedures in preparation for the DASM program. Data cleansing procedures should be comprehensive, timely, and sustained throughout the modernization process.

Action Plan

- **Obtain Data Cleansing Tool:** Select and procure a tool capable of identifying missing values and formatting errors, removing redundant and incompatible data, and reconciling data between multiple sources and applications.

- **Implement Data Cleansing Procedures:** Begin using the selected tool to systematically review, cleanse, and consolidate the DMV's data holdings, ensuring these efforts are sustained for the duration of the modernization project.

- **Document and Monitor Results:** Regularly report on data cleansing progress and results to DMV leadership, stakeholders, and oversight bodies to ensure transparency and accountability.

Timeline

DIT-T should select and implement a data cleansing tool, and begin full data cleansing activities, **within 6 months**.

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[61] *Dataversity*: ["The Impact of Poor Data Quality (and How to Fix It)" by Keith D. Foote, March 1, 2024](#).
[62] Refer to North Carolina Office of the State Auditor DMV performance audit report.

4. Personnel Management Planning Not Yet Complete

DIT-T has taken initial steps to identify and estimate the staff resources needed for DMV's IT modernization project, but it **has not completed a comprehensive personnel management plan**. Without a comprehensive plan that **clearly defines** responsibilities between DIT-T and the future implementation vendor, and ensures staffing is aligned with the DMV's business priorities, the DASM project faces significant risks, including missed deadlines, budget overruns, and disruptions to the DMV's essential services.

In preparation for the DASM program, DIT-T **hired** a Project Portfolio Manager in June 2024 and **assigned responsibility** for personnel plan development to this individual. The Project Portfolio Manager oversees the NC Business Systems Application Group within DIT-T. Collectively, the Group is responsible for continuously assessing staffing needs and building an internal team with the skills and knowledge to:

- Oversee and support DASM implementation.

- Provide long-term system maintenance after DASM implementation is complete.

Auditors reviewed the preliminary staffing estimate, developed by the Project Portfolio Manager, and determined that the staffing estimate adheres to several best practices. Specifically, the preliminary staffing estimate:

- Includes internal staff from **both** DIT-T and DMV business operations, facilitating collaboration to help ensure the DASM program meets business needs and process improvement goals.[63]

- Prioritizes hiring and retention of individuals with **specialized skill sets** unavailable within the organization such as system development experts and cloud architects.[64]

However, the staffing estimate remains incomplete because:

- It does not **break out responsibilities** between DIT-T and the future **implementation vendor**.[65]

- It does not align staffing and skill needs for the DASM program with the **DMV's strategic goals and objectives**.[66]

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[63] COBIT APO02.05: Ensure focus on the transformation journey through the appointment of a person who helps spearhead the digital transformation and drives alignment between business and [IT].

[64] COBIT APO07.05: Understand and track the current and future demand for business and IT human resources with responsibilities for enterprise IT. Identify shortfalls and provide input into sourcing plans, enterprise and IT recruitment processes, and business and IT recruitment processes.

[65] COBIT APO02.05: Group actions into programs and/or projects with a clear goal or deliverable. For each project, identify high-level resource requirements…

[66] COBIT APO02.05: Define the strategic plan and roadmap. Develop a holistic digital strategy, in cooperation with relevant stakeholders, and detail a road map that defines the incremental steps required to achieve the goals and objectives.

Increases Risk of Missed Deadlines, Budget Overruns, Other Project Issues

Without a **comprehensive personnel management plan** that breaks down responsibilities between DIT-T and the implementation vendor and aligns with strategic goals and objectives, the DASM program is at increased risk of:

- Missing deadlines and overrunning its budget due to **insufficient**, **improperly allocated**, or **unqualified** staff resources.

- Requiring **costly post-implementation customizations** due to misalignment between the program deliverables and the DMV's goals and objectives.

- **Shifting staff away from other DMV priorities**, causing backlogs and **reduced service** to the public.

The **case study** of the Minnesota Licensing and Registration System (MNLARS), implemented by the Minnesota Department of Public Safety (DPS), illustrates **real examples** of these risks being realized. As described in a February 2019 report[67] by the Minnesota Office of the Legislative Auditor, each of the risks above occurred, at least in part, due to incomplete planning for staff resources.

Insufficient and Improperly Allocated Staff

[Driver and Vehicle Services] participation…was largely assigned to staff who were already 100 percent busy with their normal business work. A MNIT manager…described the business side of the project as "massively understaffed"…[and]…said it is important to have enough business experts on a project so that the technical staff are not waiting to receive complete documentation of the business processes that need to be automated.

Costly Post-Implementation Customizations

The MNLARS release did not go smoothly. The new system was plagued by technical defects, missing components, and system performance problems in the months that followed the release. Despite having received more than $100 million in state revenues to develop this system, DPS and MNIT requested an additional $43 million from the Legislature in late January 2018 to address remaining issues with the system. The 2018 Legislature appropriated $9.65 million, leaving DPS and MNIT to work with stakeholders to identify top expenditure priorities for the available funding.

Reduced Service from Shifting Staff Away from Other DMV Priorities

According to the DPS and MNIT commissioners in their response:

Without appropriate resources to guarantee sufficient staff for business process development, identify system improvements, perform user acceptance testing, and provide stakeholder training, we are shifting resources from business needs supporting our customers to completing these critical tasks. In the case of MNLARS, DVS staff perform these duties, which has created vacancies in critical

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[67] *Factors That Contributed to MNLARS Problems*, Office of the Legislative Auditor, State of Minnesota, Special Review.

business roles. These staffing shifts have resulted in significant backlogs, with Minnesotans not getting the services they expect and deserve.

While each DMV IT modernization project is unique, the MNLARS implementation was analogous to the North Carolina DMV's planned DASM project in some ways. The MNLARS project started somewhat similarly with $100 million in resources and a nine-year planned timeline and involved interactions between a stand-alone state agency, a statewide enterprise IT agency, and a vendor. These outcomes can therefore serve as a caution that all such DMV modernization projects require comprehensive personnel planning to provide adequate precaution against such adverse outcomes.

Caused by Legislative Pause, Lack of DMV Strategic Plan

According to DIT-T leadership,[68] DIT-T did not yet develop a **comprehensive personnel management plan** for the DASM program primarily because the passage of Session Law 2024-45 **paused** its planning and assessment.[69] The Session Law directed DIT-T, in consultation with DMV, to contract with a third-party to evaluate the DMV's ongoing effort to modernize its IT systems.[70]

Although the Session Law did not **explicitly** pause the DASM program, it directed DMV to use the findings of the third-party evaluation to select an implementation vendor for a cloud-based operating system.[71] This effectively put the implementation vendor selection on hold until the evaluation was complete.

Additionally, DIT-T did not align personnel resources for the DASM program with the DMV's strategic goals and objectives because DMV leadership **did not develop a current strategic plan.** Therefore, there were **no DMV strategic goals and objectives available** to guide the allocation of personnel resources in alignment with business needs.

Recommended by Institute for Transportation Research and Education

Opportunities for Modernizing and Improving NCDMV Operations, published by the NC State University's ITRE and UNC Greensboro Bryan School of Business and Economics in April 2024, provides guidelines for the DMV Modernization Project:

NCDMV needs to prepare a personnel management plan for the staff resources that will be temporarily needed for the IT modernization project, especially during the "testing and fail proofing" stage.

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[68] The DIT-T Deputy CIO for DMV Systems, DMV Modernization Director, and Project Portfolio Manager.
[69] N.C. Session Law 2024-45, Section 19.2(b).
[70] N.C. Session Law 2024-45, Section 19.2(c).
[71] N.C. Session Law 2024-45, Section 19.2(f).

<u>**Recommendation**</u>

DMV executive leadership should **first develop a strategic plan** with clear goals and objectives for IT modernization.[72]

(4) After the DMV selects an implementation vendor as directed by Section 19.2.(f) of Session Law 2024-45, the DIT-T Project Portfolio Manager should complete the comprehensive personnel management plan for the DASM program. The plan should:

- Align with the DMV's strategic goals and objectives.

- Clearly break out roles and responsibilities between DIT-T staff and the implementation vendor.

<u>**Action Plan**</u>

- **Develop a Phased Staffing Plan:** The DMV, DIT-T, and the implementation vendor should partner to develop a staffing plan that supports all phases of IT modernization.
   o Ensure the plan is aligned with the DMV's Strategic Plan.
   o Identify current and projected staffing needs for each phase.
   o Continuously monitor and update the plan to meet evolving project staffing needs.
   o Partner with experienced vendors, such as those who have implemented the AZ MAX code (e.g., Kyndryl).
- **Break Out Roles and Responsibilities:** The plan should specify which tasks will be handled by internal staff and which will be assigned to the vendor, minimizing confusion and risk.

<u>**Timeline**</u>

DIT-T and the DMV should complete and submit the phased staffing plan to the General Assembly and OSA within **9 months**.

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[72] Refer to the North Carolina Office of the State Auditor DMV performance audit report.

Response from the DOT, DMV, and DIT-T

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

JOSH STEIN
GOVERNOR

J.R. "JOEY" HOPKINS
SECRETARY

July 16, 2025

The Honorable David Boliek, State Auditor
North Carolina Office of the State Auditor
20601 Mail Service Center
Raleigh, North Carolina 27699-0600

Dear State Auditor Boliek:

The N.C. Department of Transportation (DOT), the Division of Motor Vehicles (DMV), and the N.C. Department of Information Technology (DIT) appreciate the opportunity to respond to the audit findings and acknowledge the valuable insights provided to improve customer experience and better serve the people of North Carolina. We take these findings seriously and are actively working to address them.

DOT, DMV, and DIT acknowledge the need for system improvements within DMV to enhance the quality of services provided and modernize the operations of the division. We look forward to continued collaboration with the Governor, the State Auditor, and the North Carolina General Assembly to implement meaningful changes. Our shared goal is to deliver efficient, customer-focused services that meet the needs of North Carolina's residents and businesses.

Response to recommendations

#1: IT Modernization Project Planning

DMV and DIT have not completed a comprehensive project plan for the DMV Application System Modernization (DASM) program.

Auditor's recommendation: The DMV Commissioner, in collaboration with DIT Chief Information Officer (CIO) for DMV Systems, should develop a DMV strategic plan that establishes clear strategic goals and objectives for IT modernization and overall DMV operations.
- Define and document detailed business, functional, and technical requirements for the DASM program before engaging or contracting with an implementation vendor.
- Prepare a formal business case for the DASM program, identifying anticipated costs, funding sources, expected benefits, return on investment, performance metrics, and key risks.
- Develop and maintain a unified project plan for the DASM program that includes major milestones, deadlines, roles and responsibilities, key risks, and a structured reporting framework for providing updates to the General Assembly and oversight bodies.

Agency response: DOT and DIT agree with the recommendations to clarify goals and plans for system modernization in the context of division, department, and state resources.

In alignment with this recommendation, DMV has already initiated strategic planning efforts and engaged an external consulting firm to support the delivery of a comprehensive, five-year DMV-focused strategic plan. DOT anticipates completion of the plan no later than December 1, 2025.

Session Law 2025-47 allowed DMV and DIT additional flexibility to select a vendor to manage implementation of a new system by January 1, 2026. DOT and DIT are using this flexibility to explore an RFP process that is broader in scope. This RFP process will require vendors to enable DMV to deliver Chapter 20 of N.C. General Statutes in a customer-centric manner that is based on established best practices, intuitive work processes, and an agile approach to development.

This agile development process, which is standard practice in private industry, will limit the number of formal requirements and instead manage toward agreed upon objectives. Functional and technical requirements will focus on security and legal needs to allow room for innovation.

During the RFP process, DOT will prepare a business case for the DASM program, including:
- Outcomes and performance metrics.
- Benefits to other state agencies and the public.
- Costs and funding sources.
- Return on investment.
- Key risks.

DOT will also develop and maintain a project plan to hold DMV, DIT, and any vendor accountable to timelines, budgets, and outcomes.

DOT and DIT will remain accountable to the public and policymakers throughout the process by reporting on DMV's and DIT's progress toward achieving the goals laid out in the strategic plan and the DASM Unified Plan.
- The strategic plan will be submitted to the General Assembly and the Governor's Office by December 1, 2025.
- The Department will report annually on the strategic plan to the General Assembly and the Governor's Office.
- The project plan will be submitted to the General Assembly and the Governor's Office by July 1, 2026.
- The Department will report quarterly on DASM progress against the project plan in alignment with the reporting required in Session Law 2024-45.

#2. Customer-Facing Business Processes
DIT does not have a formal, business-driven process to identify and prioritize improvements to DMV's IT infrastructure that would most directly enhance the customer experience.

Auditor's recommendation: DIT should establish and follow a formal process for prioritizing IT infrastructure improvements that most directly affect customer-facing business processes.

Agency response: DOT agrees with the recommendation to establish a formal, customer-focused process for prioritizing system improvements.

DOT will evaluate reestablishing the defunct DMV and IT Review and Rating Board (DRB) or establishing a similar process to prioritize IT infrastructure improvements by:
- Identifying and documenting customer-facing business processes where support is needed.

- Evaluating impact to customer experience and throughput.
- Documenting integration needs with external applications.
- Weighing benefit of short-term implementation vs. launching with DASM.
- Developing a project plan.
- Continuously monitoring all key infrastructure components.

DIT and DMV have begun engaging DMV process owners to identify and prioritize the IT changes with the most significant impacts on DMV throughput and customer experience. DIT's Process Improvement Team has brought a Lean approach to identifying pain points and developing baseline data for measuring improvements.

Initiatives underway include:
- Queueing system improvements.
- Document upload for driver license transactions.
- Scanner improvements.
- Website enhancements.

DIT and DMV will complete evaluation of whether to reestablish the DRB and begin its IT infrastructure prioritization process by December 1, 2025.

#3. Critical Examination of Data

DIT has recognized the need to examine and improve the quality of DMV's vast data holdings but has not yet begun the data cleansing procedures necessary for successful IT modernization.

Auditor's recommendation: DIT should obtain a modern data cleansing software tool and use the tool selected to perform data cleansing procedures in preparation for the DASM program. Data cleansing procedures should be comprehensive, timely, and sustainable throughout the modernization process.

Agency response: DOT and DIT agree with the recommendation to accelerate data cleansing in preparation for the DASM project. Discussions with other states further along in system modernization projects have highlighted that successfully preparing data is essential to successful delivery.
DOT and DIT will resource data cleaning efforts with personnel and tools capable of identifying missing values and formatting errors, removing redundant and incompatible data, and reconciling data between multiple sources and applications.

DOT and DIT will implement data cleansing procedures and use the appropriate resources to systematically review, cleanse, and consolidate DMV's data holdings, ensuring these efforts are sustained for the duration of the modernization project.

DOT and DIT will implement data cleansing procedures with appropriate resourcing within six months and report on data cleansing efforts in quarterly reporting on the DASM required under Session Law 2024-45.

#4. Personnel Management Planning

DIT has taken initial steps to identify and estimate the staff resources needed for DMV's IT modernization project, but it has not yet completed a comprehensive personnel management plan.

Auditor's recommendation: After DMV selects an implementation vendor as directed by Session Law 2024-45, the DIT Project Portfolio Manager should complete the comprehensive personnel management plan for the DASM program. The plan should align with DMV strategic goals and objectives and clearly break out roles and responsibilities between DIT staff and the implementation vendor.

Agency Response: DOT and DIT agree with the recommendation to develop a comprehensive staffing plan that considers DMV business unit, DIT, and third-party oversight personnel. The personnel plan will:

- Align with DMV's Strategic Plan.
- Identify current and projected staffing needs for each phase.
- Break out roles and responsibilities.
- Have mechanisms to continuously monitor and update the plan to meet evolving project staffing needs.
- Specify which tasks will be handled by internal staff and which will be assigned to the vendor or third parties to minimize confusion and risk.
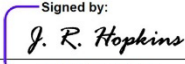
DIT and DMV will complete and submit the phased staffing plan to the General Assembly and OSA within nine months after a vendor has been selected.

Conclusion

DOT, DMV, and DIT appreciate the audit team's time and effort in conducting this review and providing valuable feedback. We remain committed to addressing the findings promptly and strengthening our process to prevent future occurrences.

Our team is actively implementing the necessary corrective actions and will continue to monitor progress to ensure full resolution. We value this opportunity to improve our processes and reinforce our commitment to compliance and best practices. Please let us know if any additional information or clarification is needed.

Sincerely,

J. R. Hopkins

Signed by:
F06A6A5878A7469...

Joey Hopkins, P.E., Transportation Secretary

Paul Tine

Signed by:
299C7887332247B...

Paul Tine, Commissioner, DMV

Michael Ware

Signed by:
7578FB9D8B93436...

Mike Ware, Chief Information Officer, Department of Information Technology - Transportation

Appendices

Appendix A – North Carolina Session Law 2024-45 Section 19.2

DIVISION OF MOTOR VEHICLES MODERNIZATION

SECTION 19.2.(a) Section 11 of S.L. 2021-134 is repealed.

SECTION 19.2.(b) The Department of Transportation shall not renew and allow to expire any contract entered into pursuant to the exemption created by Section 11 of S.L. 2021-134.

SECTION 19.2.(c) The Department of Information Technology (DIT), in consultation with the Division of Motor Vehicles of the Department of Transportation (Division), shall develop and issue a request for proposal (RFP) to contract with a third-party organization to perform an evaluation of the Division's ongoing efforts to modernize its Information Technology (IT) systems. The evaluation shall include:

(1) An in-depth analysis of the Division's plan to implement a cloud-based operating system and any other updates to its IT systems. Page 18 Session Law 2024-45 Senate Bill 607

(2) A proposed time line, including specifically identified objectives and a completion date, that the Division should reasonably be able to adhere to in modernizing its IT systems.

(3) An estimate of when the Division's anticipated updates to its IT systems will begin directly improving the Division's customer service.

(4) An assessment of whether the Division's IT modernization efforts include sufficient data security protocols, including what data the Division intends to collect or store.

(5) An assessment of whether the Division has an adequate personnel management plan in place to implement planned updates to its IT systems.

(6) An assessment of the Division's intended pricing structure for the provision of online or remote services after the Division completes the modernization of its IT systems.

(7) A discussion of any other factor the third-party organization deems relevant to assessing the efficacy of the Division's modernization efforts.

SECTION 19.2.(d) Funding for the implementation of subsection (c) of this section shall be provided by funds previously appropriated to the Division for the purpose of IT modernization.

SECTION 19.2.(e) The Division shall report the findings of the third-party organization's evaluation to the chairs of the Joint Legislative Transportation Oversight Committee, the chairs of the House and Senate Transportation Appropriations Committees, and the Fiscal Research Division no later than April 31, 2025.

SECTION 19.2.(f) No later than July 1, 2025, the Division, in consultation with DIT, shall use the findings of the evaluation required by this section to select a vendor to oversee and manage implementation of the cloud-based operating system. The selected vendor, in consultation with the Division and DIT, shall report to the Joint Legislative Transportation Oversight Committee, the Joint Legislative Commission on Governmental Operations, the chairs of the House and Senate Transportation Appropriations Committees, and the Fiscal Research Division on a quarterly basis. Each report shall include an update on the status of the Division's modernization efforts measured against targets and objectives identified in the evaluation.

Appendix B – Business Time Loss Due to Network Outages and Closures

This appendix presents data showing each Driver License Office (DLO) system downtime incident from January 1, 2024 through April 16, 2025 by office location and total downtime during business hours. This data is referenced in summary form in Finding #2.

Outage Start Date	Office Location	Total Business Hours
1/4/2024	MoreheadCity	0:08:23
1/6/2024	Hillsboro	0:00:00
1/9/2024	Whiteville	4:19:11
1/9/2024	Cary	1:12:05
1/9/2024	WinstonSalem	12:35:36
1/9/2024	Greensboro	0:03:59
1/9/2024	Polkton	1:25:55
1/9/2024	Hamlet	0:51:38
1/9/2024	Monroe	0:10:02
1/9/2024	Laurinburg	0:00:00
1/9/2024	Sanford	0:00:00
1/9/2024	Erwin	8:35:33
1/9/2024	Louisburg	9:00:00
1/11/2024	SilerCity	0:00:00
1/12/2024	Andrews	4:58:13
1/13/2024	Gastonia	0:00:00
1/15/2024	BrysonCity	0:00:00
1/16/2024	Statesville	0:05:55
1/18/2024	FL20	0:06:14
1/18/2024	Ashville	0:10:09
1/19/2024	Andrews	0:04:11
1/22/2024	Aberdeen	1:19:55
1/24/2024	Lincolnton	0:00:00
1/25/2024	Lumberton	1:30:32
1/25/2024	ElizabethCity	0:05:47
1/30/2024	Lillington	0:05:51
1/31/2024	Durham	0:22:05
2/8/2024	Gastonia	0:25:41
2/9/2024	Jefferson	2:48:16
2/9/2024	Kernersville	2:46:16
2/9/2024	NewBern	2:00:56
2/9/2024	Clayton	2:00:42
2/9/2024	Yanceyville	2:51:01
2/9/2024	RoanokeRapids	0:42:45
2/9/2024	Louisburg	1:55:08

Outage Start Date	Office Location	Total Business Hours
2/9/2024	Yadkinville	1:33:35
2/9/2024	Roxboro	0:40:14
2/9/2024	ElizabethCity	0:25:57
2/9/2024	Hickory	1:36:08
2/9/2024	Edenton	0:10:56
2/9/2024	Hillsboro	0:10:56
2/9/2024	NagsHead	1:06:04
2/9/2024	Troy	0:35:59
2/9/2024	Ahoskie	0:30:43
2/9/2024	Mocksville	0:15:57
2/9/2024	Henderson	0:30:00
2/9/2024	NWilkesboro	0:24:14
2/9/2024	Washington	0:16:00
2/9/2024	Raleigh	1:02:10
2/9/2024	Raleigh	1:02:04
2/20/2024	Franklin	0:10:49
2/28/2024	Aberdeen	1:10:14
3/4/2024	Lumberton	0:00:00
3/5/2024	Ahoskie	2:11:08
3/5/2024	ElizabethCity	1:40:51
3/5/2024	Washington	0:00:00
3/5/2024	Williamston	0:00:00
3/5/2024	NagsHead	0:00:00
3/5/2024	Edenton	0:00:00
3/7/2024	Yanceyville	7:11:40
3/14/2024	RockyMount	0:22:21
3/15/2024	BrysonCity	0:00:00
3/21/2024	Morganton	0:06:08
4/3/2024	WalnutCove	0:15:50
4/3/2024	Marshall	0:57:43
4/3/2024	Yanceyville	0:00:00
4/4/2024	RaleighGarnerRd	0:02:41
4/4/2024	Sanford	0:02:40
4/4/2024	Raeford	0:02:39
4/4/2024	Brevard	0:02:39
4/4/2024	Aberdeen	0:02:32
4/4/2024	Oxford	0:01:59
4/11/2024	Sanford	5:52:36
4/11/2024	Raleigh	2:42:05

Outage Start Date	Office Location	Total Business Hours
4/12/2024	Fayetteville	0:50:51
4/12/2024	Polkton	0:00:00
4/19/2024	Charlotte_S	3:26:39
4/24/2024	Kinston	0:00:00
4/24/2024	BrysonCity	0:06:00
4/29/2024	Carrboro	8:46:30
4/29/2024	Goldsboro	8:46:14
4/29/2024	RaleighGarnerRd	8:46:13
4/29/2024	Wendell	8:44:56
4/29/2024	Garner	8:43:46
4/30/2024	MoreheadCity	0:08:20
5/1/2024	Asheboro	1:53:24
5/1/2024	SilerCity	1:49:21
5/1/2024	Troy	1:49:07
5/2/2024	Franklin	0:30:48
5/2/2024	Andrews	0:32:03
5/6/2024	ElizabethCity	0:06:05
5/8/2024	Charlotte	0:26:23
5/9/2024	Monroe	1:10:05
5/9/2024	Charlotte	9:00:00
5/14/2024	Kinston	0:03:55
5/14/2024	Durham	0:06:10
5/15/2024	Carrboro	0:04:08
5/15/2024	RaleighGarnerRd	0:04:06
5/15/2024	Goldsboro	0:03:51
5/15/2024	Wendell	0:06:02
5/16/2024	Hillsboro	0:06:07
5/16/2024	Albemarle	0:44:00
5/23/2024	BrysonCity	0:06:09
5/23/2024	Hickory	0:00:00
5/24/2024	Albemarle	1:30:09
5/24/2024	Mocksville	0:05:43
5/27/2024	Kinston	0:00:00
5/31/2024	Greensboro	1:26:13
5/31/2024	Monroe	0:08:10
6/4/2024	Sparta	1:35:59
6/6/2024	Carrboro	0:58:04
6/6/2024	Williamston	0:41:03
6/13/2024	Charlotte	0:00:00

Outage Start Date	Office Location	Total Business Hours
6/14/2024	Marshall	0:00:00
6/14/2024	Clayton	0:22:06
6/18/2024	MoreheadCity	0:00:00
6/18/2024	Sylva	0:00:00
6/23/2024	Marion	0:00:00
6/24/2024	BrysonCity	9:00:00
6/27/2024	MoreheadCity	3:02:14
6/27/2024	Ashville	0:20:01
7/1/2024	WinstonSalem	0:08:14
7/2/2024	Lumberton	3:08:11
7/2/2024	Pembroke	3:18:07
7/2/2024	Hamlet	2:52:19
7/2/2024	Laurinburg	2:52:05
7/4/2024	Louisburg	0:00:00
7/10/2024	MoreheadCity	1:46:12
7/22/2024	ElizabethCity	0:00:00
7/23/2024	Shallotte	0:03:58
7/23/2024	Charlotte	1:49:42
7/23/2024	Polkton	0:00:00
7/24/2024	Charlotte_S	0:22:12
7/24/2024	Yanceyville	0:10:57
7/24/2024	Brevard	0:04:11
7/24/2024	Thomasville	0:36:01
7/31/2024	Hillsboro	0:30:51
8/5/2024	Sparta	0:06:08
8/7/2024	NewBern	0:10:21
8/7/2024	Lumberton	0:00:00
8/8/2024	Sanford	6:05:15
8/8/2024	MountHolly	0:16:54
8/8/2024	Louisburg	0:13:50
8/8/2024	Asheboro	0:00:00
8/14/2024	Sylva	0:54:11
8/15/2024	ElizabethCity	9:00:00
8/20/2024	Brevard	0:52:34
8/22/2024	Sparta	9:00:00
8/26/2024	Williamston	5:36:23
8/26/2024	BrysonCity	14:16:56
8/28/2024	Kernersville	0:08:16
8/29/2024	WinstonSalem	0:00:00

Outage Start Date	Office Location	Total Business Hours
9/4/2024	Washington	9:00:00
9/6/2024	Durham	0:10:13
9/6/2024	NewBern	1:14:35
9/9/2024	Hudson	0:05:47
9/10/2024	Durham	9:52:49
9/10/2024	Charlotte	0:48:15
9/11/2024	Washington	0:10:57
9/13/2024	Charlotte	2:03:39
9/15/2024	Burnsville	0:00:00
9/17/2024	Durham	0:10:17
9/18/2024	Havelock	0:36:01
9/18/2024	Hillsboro	0:50:41
9/18/2024	Erwin	0:00:00
9/19/2024	Hudson	0:00:00
9/20/2024	Whiteville	0:04:15
9/25/2024	Smithfield	0:50:49
9/25/2024	Marshall	18:00:00
9/26/2024	MountAiry	16:47:21
9/27/2024	SprucePine	45:00:00
9/27/2024	Morganton	9:00:00
9/27/2024	MountHolly	8:44:30
9/27/2024	Gastonia	8:55:01
9/27/2024	Monroe	9:00:00
9/27/2024	Ashville	31:25:54
9/27/2024	Hudson	9:00:00
9/27/2024	Hendersonville	9:00:00
9/27/2024	Burnsville	9:00:00
9/27/2024	Clyde	9:00:00
9/27/2024	Boone	8:48:55
9/27/2024	Hillsboro	2:00:45
9/27/2024	Marion	35:41:54
9/27/2024	Shelby	6:58:06
9/27/2024	ForestCity	7:00:44
9/27/2024	Lincolnton	6:49:57
9/27/2024	Hickory	6:33:40
9/27/2024	Andrews	4:37:10
9/27/2024	Brevard	4:32:38
9/27/2024	Louisburg	1:10:01
9/27/2024	Sylva	4:32:08

Outage Start Date	Office Location	Total Business Hours
9/27/2024	Franklin	4:30:07
9/27/2024	Sparta	4:04:48
9/27/2024	Statesville	3:44:42
9/27/2024	Wilson	3:15:09
9/27/2024	WinstonSalem	3:05:36
9/27/2024	Newland	0:57:39
9/27/2024	Yanceyville	0:30:07
9/30/2024	Fayetteville	2:42:40
10/1/2024	Greensboro	0:11:06
10/1/2024	WalnutCove	0:00:00
10/3/2024	Newton	0:36:09
10/4/2024	Kinston	8:21:55
10/4/2024	Hudson	0:05:44
10/6/2024	Sparta	0:00:00
10/8/2024	Greensboro	0:10:11
10/9/2024	Hickory	7:30:13
10/11/2024	Edenton	4:58:13
10/15/2024	Shallotte	9:29:02
10/22/2024	Marion	1:48:17
10/30/2024	Hillsboro	1:15:49
10/30/2024	Marion	0:00:00
11/6/2024	Stedman	0:06:03
11/10/2024	Wentworth	0:00:00
11/10/2024	Mocksville	0:00:00
11/11/2024	Statesville	0:00:00
11/13/2024	Polkton	0:20:45
11/13/2024	Goldsboro	0:02:23
11/14/2024	Shallotte	0:04:01
11/14/2024	Whiteville	5:27:57
11/14/2024	Newland	0:10:58
11/18/2024	Polkton	0:35:41
11/19/2024	Sanford	2:12:41
11/19/2024	SilerCity	6:34:50
11/19/2024	Burnsville	0:12:16
11/22/2024	MountHolly	0:13:27
11/27/2024	Louisburg	6:41:07
12/3/2024	Burnsville	14:48:12
12/5/2024	ElizabethCity	0:00:00
12/8/2024	BrysonCity	0:00:00

Outage Start Date	Office Location	Total Business Hours
12/9/2024	Erwin	12:18:29
12/10/2024	Hillsboro	0:30:56
12/10/2024	SilerCity	15:31:14
12/11/2024	FuquayVarina	0:04:01
12/11/2024	Louisburg	0:00:00
12/11/2024	ElizabethCity	0:00:00
12/12/2024	Burnsville	0:37:17
12/12/2024	Yadkinville	3:34:11
12/18/2024	Roxboro	0:16:30
12/19/2024	Elkin	0:12:15
12/20/2024	NorthWilmington	0:00:00
12/22/2024	Elkin	0:00:00
12/24/2024	Troy	0:00:00
12/24/2024	Fayetteville	0:00:00
12/26/2024	SilerCity	0:00:00
12/26/2024	Aberdeen	0:00:00
1/2/2025	Erwin	0:01:18
1/3/2025	Kenansville	1:45:49
1/6/2025	Kenansville	2:50:49
1/6/2025	Lexington	0:00:00
1/6/2025	MountAiry	0:00:00
1/6/2025	Mooresville	0:00:00
1/9/2025	SilerCity	0:05:34
1/9/2025	Newland	0:55:53
1/10/2025	Stedman	0:05:51
1/11/2025	Andrews	0:00:00
1/13/2025	Louisburg	0:36:26
1/16/2025	Newland	2:35:25
1/16/2025	Greensboro	0:22:14
1/17/2025	Graham	9:00:00
1/20/2025	Stedman	0:00:00
1/22/2025	Albemarle	0:04:24
1/22/2025	Burnsville	0:04:16
1/23/2025	Hillsboro	0:19:56
1/23/2025	Charlotte_S	0:24:20
1/24/2025	Newland	6:00:26
1/28/2025	Hamlet	4:16:43
1/29/2025	MountAiry	9:00:00
1/29/2025	Andrews	4:02:36

Outage Start Date	Office Location	Total Business Hours
1/31/2025	Roxboro	0:04:04
2/4/2025	Asheboro	4:53:57
2/6/2025	Roxboro	3:42:56
2/10/2025	SilerCity	0:06:08
2/11/2025	Newland	6:35:45
2/11/2025	Tarboro	0:08:12
2/12/2025	Boone	0:33:40
2/13/2025	Raleigh	2:01:42
2/13/2025	ElizabethCity	0:46:02
2/13/2025	MountAiry	1:18:03
2/17/2025	Erwin	0:04:09
2/18/2025	Ahoskie	0:06:16
2/20/2025	Hudson	18:00:00
2/20/2025	ForestCity	9:00:00
2/20/2025	Taylorsville	9:00:00
2/20/2025	Boone	9:00:00
2/20/2025	Newton	9:00:00
2/20/2025	Sparta	9:00:00
2/20/2025	Lincolnton	9:00:00
2/20/2025	Shelby	9:00:00
2/20/2025	SprucePine	9:00:00
2/20/2025	MountHolly	18:00:00
2/20/2025	Newland	9:00:00
2/20/2025	Statesville	9:00:00
2/20/2025	Morganton	9:00:00
2/20/2025	Gastonia	9:00:00
2/24/2025	MountAiry	15:34:11
2/25/2025	Marion	3:39:51
2/25/2025	Sanford	9:00:00
2/26/2025	Yadkinville	7:32:18
2/26/2025	Hickory	0:05:50
2/26/2025	Thomasville	18:00:00
3/3/2025	Pembroke	3:34:10
3/5/2025	Stedman	0:06:02
3/5/2025	SilerCity	7:31:54
3/11/2025	Shallotte	14:57:16
3/11/2025	Franklin	9:09:16
3/15/2025	SilerCity	0:00:00
3/20/2025	Goldsboro	0:48:08

Outage Start Date	Office Location	Total Business Hours
3/20/2025	RaleighGarnerRd	0:48:05
3/20/2025	Wendell	0:47:15
3/22/2025	Kernersville	0:00:00
3/25/2025	Monroe	0:00:00
3/25/2025	Marion	0:12:19
3/25/2025	Yanceyville	0:05:47
3/26/2025	BrysonCity	0:00:00
3/28/2025	Oxford	5:30:27
3/28/2025	Burnsville	0:16:20
3/31/2025	Pembroke	3:27:28
4/1/2025	Lincolnton	5:32:03
4/6/2025	Graham	0:00:00
4/7/2025	Clyde	0:13:47
4/9/2025	Hamlet	3:52:15
4/9/2025	BrysonCity	2:20:22
4/11/2025	Carrboro	0:00:00
4/11/2025	Garner	0:00:00
4/13/2025	Sparta	5:40:53
4/14/2025	Goldsboro	1:15:57
4/14/2025	Wendell	1:15:57
4/14/2025	RaleighGarnerRd	1:16:11
4/15/2025	Boone	9:00:00
4/15/2025	ForestCity	9:00:00
4/15/2025	Taylorsville	9:00:00
4/15/2025	SprucePine	9:00:00
4/15/2025	Morganton	9:00:00
4/15/2025	Lincolnton	9:00:00
4/15/2025	Shelby	9:00:00
4/15/2025	MountHolly	9:00:00

Outage Start Date	Office Location	Total Business Hours
4/15/2025	Newton	9:00:00
4/15/2025	Newland	9:00:00
4/15/2025	Hudson	9:00:00
4/15/2025	Gastonia	9:00:00
4/15/2025	Statesville	9:00:00
4/15/2025	Yanceyville	0:06:10
4/16/2025	Monroe	0:08:18

	Total Business Hours
Total Hours	1,118.76

Days lost due to Outages	**124.31**

*Business Hour totals exclude downtime during weekends, state holidays, and outside 8:00 AM – 5:00 PM range.

Appendix C - DIT-T / DMV Modernization Budget

The various DMV Modernization projects have been funded by a mix of appropriations from the North Carolina General Assembly. DMV Modernization projects are tracked within DOT's SAP enterprise resource planning system under a unique fund number. Utilizing the fund number, the DIT-T Budget Officer matches appropriations from the General Assembly against project expenditures. There is not a one-to-one match of appropriation streams to Modernization projects; most funding for these projects originates from four recurring appropriation streams originating between state fiscal years 2014 and 2017. IT Modernization efforts to replace legacy systems use the same unique funding stream as all other DMV modernization efforts.

> IT Modernization efforts to replace legacy systems use the same unique funding stream as all other DMV modernization efforts.

DIT Transportation Budget for DMV Modernization

4/22/2025

Accumulated Budget Remaining	**97,876,329**
Helene Budget Reduction	(65,000,000)
Adjusted Remaining Balance	32,876,329
DMV Project Designated Budget	
DASM (SADLS,STARS, LITES Replacement) See future Budget on row 33 below	12,963,781
NCRIS - NC Crash system used by DMV and DOT Traffic Safety (Data Collection)(NCCRIS) ITP.00290 S0:	1,188,948
Hearing Fees Phase 2 and Virtual Hearings (AHS2) ITP.00356, S0748	1,000,000
State Automated Administrative Hearing System (AHS) ITP.00329 S0507	950,000
MY DMV ITP.00331	700,000
Central Issuance of License Plates (CIRP) ITP.00348	970,600
Law Enforcement Case Management - LECMS/Eforce ITP.00350 S0678	1,900,000
Print on Demand (POD) ITP.00356 , S0744	-
Mobile Driver License (MDL) ITP.00361, S0755	3,903,000
NSM ITP.00337, S0551	800,000
UNI Migration and Driving History Records (UMDHR) ITP.00333, S0529	1,200,000
SimpliGov Automation Platform (SGAP) ITP.00351, S0679	400,000
DATA Cleansing and System Analysis (DCSA) ITP.00357	3,000,000
DMV Modernization Initiatives	
Driver License Issuance Replacement	500,000
Upgrade DMVCredit Card Machines for Mastercard and Visa EMV Contactless Requirements	1,300,000
DMV Optimization	2,100,000
Total for all Current Projects	**32,876,329**

		Budget	
	DASM Project (Estimated)	76,000,000	
FY2025	Remaining Budget after Helene Budget Reduction (65,000,000)	12,963,781	
	Remaining cost of project	63,036,219	
FY2026	Recurring Budget	11,500,000 *	
	Remaining cost of project	51,536,219 July 1, 2025 after Budget is approved	
FY2027	Recurring Budget	11,500,000 *	
	Remaining cost of project	40,036,219 July 1, 2026 after Budget is approved	
FY2028	Recurring Budget	11,500,000 *	
	Remaining cost of project	28,536,219 July 1, 2027 after Budget is approved	
FY2029	Recurring Budget	11,500,000 *	
	Remaining cost of project	17,036,219 July 1, 2028 after Budget is approved	
FY2030	Recurring Budget	11,500,000 *	
	Remaining cost of project	5,536,219 July 1, 2029 after Budget is approved	
FY2031	Recurring Budget	11,500,000 *	
		(5,963,781) July 1, 2030 after Budget is approved	

* DMV Modernization receives $11,500,000 recurring budget money every year that can be accrued year over year.

* Budgets for each project are developed by DIT-T and the project management team associated to the project.

Appendix D – *Opportunities for Modernizing and Improving NCDMV Operations –* Modernization Section

NCDMV System Modernization

1. BACKGROUND

NCDMV uses numerous IT systems in the delivery of its services, with STARS (State Titling and Registration System) and SADLS (State Automated Driver License System) the two primary components of its IT architecture, supporting vehicle titling/registration and driver licensing, respectively. Between these two systems and others, N.C. Department of Information Technology's Transportation Division (NCDIT-T) provides operational support to various units within the organization, including: Driver Services, Vehicle Services, Emissions, Liability Insurance, Dealer/Salesman Licensing, License and Theft, and Inventory Management. Simply put, the IT architecture is a critical backbone of NCDMV in the delivery of its services. Dedicated staff in NCDIT-T support these systems.

Presently, NCDMV uses legacy systems relying primarily on mainframes and antiquated platforms such as DOS and COBOL. The advantages of continuing with the status quo are twofold: existence of expertise for maintenance and changes within NCDIT-T and system robustness from their years of use. However, continuing with these legacy systems also poses numerous risks including obsolescence—and more importantly, difficulty in adding new functions and a degraded ability to accommodate the growing demand for online and alternate service delivery. A state-of-the-art solution that modernizes such legacy systems, which has been adopted in states such as Arizona, is to upgrade the existing IT architecture to one based on .NET, a proprietary software platform and ecosystem developed by Microsoft that has been widely adopted across the industry. The reported advantages of using this

.NET platform include easy desktop and web application (re)engineering; better adaptability for web-based services; easier application development by NCDIT-T programmers; greater flexibility in system deployment; and easier maintenance. However, NCDMV is an organization where systems are deeply interwoven and support multiple business processes, using and processing strongly interconnected data. To reap the full potential benefits, IT modernization at NCDMV must be undertaken en masse and be applied across its systems instead of focusing on modernizing only a limited number of them.

> A state-of-the-art solution that modernizes such legacy systems, which has been adopted in states such as Arizona, is to upgrade the existing IT architecture to one based on .NET, a proprietary software platform and ecosystem developed by Microsoft that has been widely adopted across the industry.

In recognition of the above, the General Assembly allocated approximately $119 million to NCDMV for a modernization of its IT systems and to ensure a complete migration of those systems to the .NET framework.[5] The larger goal of this initiative remains a complete modernization of IT systems at NCDMV to improve its capacity for conducting its work (especially in an online environment), and increase the efficiency of its various business processes to improve customer service, especially given the current long wait times for in-person services. However, due to circumstances described in the presentation by NCDMV to the Joint Legislative Transportation Oversight Committee on February 29, 2024, there has been scant progress on this project since then.

2. NCDMV MODERNIZATION PROJECT: PRESENT & FUTURE STATUS

Presently, NCDIT-T has embarked on the above-described modernization project on behalf of NCDMV. While NCDIT-T routinely works on upgrades and patches to the systems critical to NCDMV, this is inarguably the biggest IT project undertaken on behalf of NCDMV since 1996. The systems that have been targeted for modernization run the gamut of all services offered by NCDMV including, but not limited to: Driver License/ID Issuance; Driver Enforcement; Financial Management; Payment Services; Cross-Functional Elements (e.g., Common Customer; Workflow and Reporting; Customer, Correspondence and Document Management; Scheduling & Queueing; and Audit & Fraud Management); Title and Registration; Vehicle Property Tax Collection, Citizen Portal; Motor Carrier; Safety and Emission Inspection; Liability Insurance; Inventory Management; and Dealer/Salesman Licensing. In summary, the project scope of this modernization initiative represents a large-scale comprehensive overhaul of NCDMV's IT infrastructure. Once completed, not only will the new system boost the efficiency of business processes at NCDMV, but even more importantly, it will allow customers to have a much better experience when utilizing their services. For example, once the systems integration enabled by the upgrade is complete, NCDMV clients will be able to log in under a single account and view both their driver and vehicle details, rather than needing to interact with separate systems. The upgrade will also address the current issue where changing one driver or one vehicle record can modify the record for all drivers and vehicles associated with that account. Further, the new system could also allow clients to be alerted when their details have been shared or updated, e.g., by their automobile insurer. Additionally, moving NCDMV's applications and data to a cloud computing platform as part of this project will

improve efficiency while boosting the organization's resilience against cyber-attacks. Ultimately, successful implementation of the NCDMV Modernization Project should result in NCDMV being completely weaned off its current mainframes, with the legacy system being maintained only when historical data is needed. These modernization actions would further enable the possibility of enabling technological advancements, such as mobile driver licensing and electronic titling.

The large-scale and comprehensive scope of the system upgrade envisioned by the NCDMV Modernization Project has an exact parallel in private organizations, namely company-wide implementations of Enterprise Resource Planning (ERP) systems. While private organizations have widely adopted ERPs as part of their internal IT infrastructure, migration from legacy systems to an ERP has had mixed results across industries, and success or failure is determined principally by the management of the upgrade project—see references [2], [3], and [5]. A concise summary of the three principal lessons learned from a review of the literature on such large-scale IT upgrade projects undertaken in the public and private sectors is provided in Appendix 1.

Given the successful implementation of a similar project at Arizona's DMV, NCDMV has obtained their software code for the NCDMV Modernization Project. Further, using an industry-wide best practice for such a large-scale and comprehensive software project, NCDIT-T has decided to adopt the structured framework of Software Development Lifecycle (SDLC) that consists of the following steps:

    i. Project Initiation
    ii. Project Management
    iii. Agile Development
    iv. Data Conversion
    v. Interface Development
    vi. System Testing and Correction
    vii. Training
    viii. Implementation, Operations, and Support

The research team observes that the careful thought given by NCDIT-T and NCDMV to the planning of the implementation of the NCDMV Modernization Project as described above is in keeping with recommendations available in the extant literature on similar IT projects (see References [1] and [4], as well as the findings stated in Appendix 1). However, as of the writing of this document, the NCDIT-T team in charge of this project is still in the early stages of Project Initiation and the associated planning. This includes:

    i. Performing high-level requirements/gap analysis for the solution available from Arizona to identify changes necessary to accommodate the differences between Arizona and North Carolina laws, rules, and processes and thus determine the specific needs for the development of the transfer solution.

    ii. Performing data conversion analysis and documenting the data conversion approach for the project. As intermediates in this step, data cleansing may also be needed.

    iii. Performing project analysis and documenting items such as a roles and responsibilities matrix, processes and procedures for project management, interfaces, testing, training, development, implementation, maintenance and operations, and support.

The various outcomes of this project planning are expected to include an identification of the high-level milestones for the project as well as the scope of the initiation phase and the composition of the project team. To facilitate a successful implementation, NCDMV hopes to engage the assistance of experts from Arizona DMV who were involved in their upgrade as "champions" on this modernization initiative.

2.1 Anticipated Timeline of Implementation: The summary conclusion of the research team was that as of the writing of this document, it is not clear how long the NCDMV Modernization Project will take. For comparison, Arizona's project has taken approximately eight years to complete. Unforeseen circumstantial factors make it difficult to predict how long the NCDMV Modernization Project will take to fully complete. However, based on Arizona's experience as well as the expertise of the research team, we conclude that it would not be unreasonable for that timeline to extend for several years—possibly four to six, reflecting the time savings from using Arizona's platform and prior experience. However, due to the modular implementation approach being adopted by NCDIT-T, different components of the current IT infrastructure at NCDMV will be upgraded to the new framework throughout this period. This will not only allow some results to be seen before the project is fully completed, but it will also reduce project risk by minimizing the potential disruption from any single component initially failing.

2.2 Budget Sufficiency: The research team's conversations with NCDIT-T indicate that the amount allocated by the General Assembly for this project amount seems sufficient for the moment, but that observation must be understood with the caveat that this might change during the course of project implementation should unforeseen challenges arise. This is clearly borne out by the experience of private and public sector entities in previous similar IT upgrade projects as illustrated in Appendix 1. However, one aspect of the NCDMV Modernization Project will require the allocation of additional resources: the implementation and testing of every component of the new system will require substantial time from NCDMV staff who are responsible for the corresponding business processes. That, in turn, could lead to further personnel shortages at NCDMV, which risks exacerbating customer dissatisfaction with wait times, leading to public frustration with the implementation schedule.

3. NCDMV MODERNIZATION PROJECT: RECOMMENDATIONS FROM RESEARCH TEAM

The nascent nature of the implementation of the NCDMV Modernization Project at NCDMV precludes the research team from providing detailed and focused recommendations. Nonetheless, based on a study of the available materials as well as extensive conversations with NCDMV and NCDIT-T staff, the team makes the following recommendations as guidelines as the project proceeds:

1. **NCDIT-T and NCDMV need to complete their Project Planning and provide the North Carolina General Assembly with an identification of the high-level milestones for the project alongside an anticipated timeline for each.** Given the uncertainties associated with such large-scale projects, it should be understood that unforeseen circumstances might lengthen the timelines over the course of the implementation. Nonetheless, having a reasonable initial map of the milestones and their timelines will address current concerns, establish realistic expectations about the initiative and communicate a potential completion date.

2. NCDIT-T's decision to adopt a modular approach in implementing the NCDMV Modernization Project is correct. **NCDMV should prioritize the components of the current IT infrastructure that impact customer-facing business processes and that, when implemented, will directly improve customer experience.** The potential to do this will be more thoroughly understood at the completion of the Project Planning stage.

3. In upgrading each component of the current IT infrastructure, **NCDMV should critically examine the need to collect, store and share the data it currently collects.** The modular implementation approach will provide NCDMV a one-time and unique opportunity to determine the core set of data it needs to execute its business processes. By asking the critical question, "Would there be any detrimental impact if this data is absent from the upgraded system?" at each step, the probability of a more streamlined and data-efficient system post-implementation is improved, and the risk to privacy posed by future cyber-attacks is reduced.

4. In collaboration with the project team from NCDIT-T, **NCDMV needs to prepare a personnel management plan for the staff resources that will be temporarily needed for the IT modernization project, especially during the "testing and failproofing" stage.** Staff who are most familiar with the business processes associated with the component being upgraded should be included, and NCDMV should prepare a parallel personnel plan addressing how the duties of those staff members would continue to be discharged while they are engaged with this effort.

5. Even before implementation, **the price of online and kiosk NCDMV transactions should be reduced at least to that of in-office and mail transactions, and preferably be lowered below those.** Presently, customers pay more to receive NCDMV services online or at a kiosk than they would when receiving the same service in person due to fees charged by NCDMV's vendors. However, to improve customer satisfaction, customers should not just be able to transact with NCDMV online, but be actively encouraged to do so. For most customers, online transactions are quicker and easier than going into an office. Moving more transactions online will reduce demand for in-person office visits, leading to shorter wait times, which is an especially important goal given recent and ongoing staff shortages. Not only should online transactions cost customers less, they should also result in lower costs for NCDMV as online transactions do not require the same labor, equipment and real estate resources as in-person transactions. If NCDMV's own expenses for online transactions are higher than for in-person transactions, a critical examination of the division's cost structure and contracts is required. Therefore, the General Assembly should ensure that the fees associated with online services offered by NCDMV are no more than—and preferably less than—what is paid by customers for receiving the same service in person, as is the case in states such as Kansas, Colorado and Illinois. Absent pricing parity, NCDMV and its customers will be unable to reap the full benefits of the state's investment in system modernization.

Appendix E - AZ and NC
MOU

SYSTEM APPLICATION AGREEMENT

and Memorandum of Understanding between

Arizona Department of Transportation Motor Vehicle Division and

North Carolina Department of Transportation Division of Motor Vehicles

Whereas the Arizona Department of Transportation Motor Vehicle Division (ADOT MVD) has developed software solutions for the processing, recording, and retaining of information pertaining to motor vehicle and driver license transactions that may be useful to organizations in other jurisdictions, and

Whereas it is the intent of ADOT MVD to share the solutions it has developed with other jurisdictions that may benefit from adopting portions of said solutions, and

Whereas ADOT MVD intends to enter into licensing agreements with multiple jurisdictions in order to share knowledge and development capacity, and

Whereas licensing jurisdictions will use licensed portions of ADOT MVD's solutions only for their intended purpose, and only for the licensing jurisdiction, and

Whereas ADOT MVD will continue to enhance its solutions and will expect any licensing jurisdictions to enhance the portions of ADOT MVD's solutions shared with them, and share those enhancements with ADOT MVD and other jurisdictions licensing ADOT MVD's solutions,

The ADOT MVD, the Licensor, enters into this agreement, hereinafter "Agreement," with the North Carolina Department of Transportation Division of Motor Vehicles ("NCDOT DMV"), the Licensee, for the use of intellectual property related to ADOT MVD's system of record for processing, recording, and retaining information pertaining to motor vehicle and driver license transactions, hereinafter "Application." Details regarding the items shared with Licensee will be spelled out in an addendum to this agreement. The Application may not be used for commercial purposes or for financial gain which does not include taxes, fees, or other state revenues. In accordance with this Agreement, the Licensor is making the Application available to the Licensee under the following definitions, terms and conditions:

DEFINITIONS:

1. Agreement: means this license agreement.

2. Software: means the software in its Object Code and/or Source Code form and, where applicable, its documentation, as it exists on the date the Licensee signs the Agreement.

3. Source Code: means all the Software's instructions and program lines to which access is required so as to modify the Software.

4. Object Code: means the binary files originating from the compilation of the Source Code.

5. Application: Means intellectual property owned by the Licensor, and includes but is not limited to software, source code, object code, information, forms and documents developed by the Licensor.

6. Licensee: means the NCDOT DMV with principal offices at 1417 N Church St, Rocky Mount NC 27801 authorized to accept the Agreement.

7. Licensor: means the Arizona Department of Transportation Motor Vehicle Division, with principal offices at 1801 W Jefferson, Phoenix, AZ 85007, who is providing the Application under the Agreement.

8. Parties: mean both the Licensee and the Licensor.

9. Effective Date: this Agreement becomes effective when signed by both parties and continues until terminated by either party, with at least thirty (30) days written notice.

TERMS AND CONDITIONS:

1. PURPOSE: The purpose of the Agreement is the grant by the Licensor to the Licensee of a non-exclusive and non-transferable license for the Application as set forth in Terms and Conditions paragraph four below.

2. ACCEPTANCE: The Licensee shall be deemed as having accepted the terms and conditions of this Agreement upon the signing of this Agreement.

3. EFFECTIVE DATE AND TERM: This Agreement becomes effective when signed by both parties and continues for five years or until terminated by either party with at least thirty (30) days written notice. Notwithstanding the foregoing, the rights granted in Section 4 of this Agreement shall not terminate with the termination of the Agreement and shall be granted in perpetuity.

4. SCOPE OF RIGHTS GRANTED: The Licensor hereby grants to the Licensee, who accepts, the following rights over the Application for any use permitted herein, and for the term of the Agreement, on the basis of the terms and conditions set forth herein.

   The Licensee is authorized to use the Software, with it being hereinafter specified that this comprises:

   a. Permanent or temporary reproduction of all or part of the Application by any or all means and in any or all form.

   b. Loading, displaying, running, or storing the Application on any medium.

   c. Entitlement to observe, study or test its operation so as to determine the ideas and principles behind any or all constituent elements of said Application. This shall apply when the Licensee carries out any or all loading, displaying, running, transmission or storage operation as regards the Application that it is entitled to carry out hereunder.

   d. The right to make changes includes the right to translate, adapt, arrange, or make modifications to the Application.

   e. Licensee shall not use the Application for commercial purposes or for financial gain which does not include taxes, fees, or other state revenues.

   f. Licensee shall secure the Application to at least the same standards required and implemented for its own Applications.

5. CONTINUED ENHANCEMENTS: Enhancements to the Software will be shared with ADOT MVD and made available to other licensing jurisdictions for use at their own discretion. Enhancements will be shared at least annually. As ADOT MVD continues to maintain and enhance the core Software, it will provide updated release versions to the Licensee. It is the Licensee's responsibility to maintain its implementation of ADOT MVD solutions up to date if the Licensee wishes to ensure continued compatibility with future versions.

6. RELATED SERVICES: Under no circumstances shall the Agreement oblige the Licensor to provide technical assistance or maintenance services for the Software. The Licensee will develop its own technical and implementation resources for deployment of the Application, however, the Licensor may continue to offer advice on implementation as resources allow.

7. THIRD PARTY SOFTWARE DEVELOPERS: The Licensee may provide the Application to any third party, provided that the Licensee's contract with the third party complies with the terms of this Agreement, including without limitation, the prohibition against use of the Application for commercial purposes or for financial gain which does not include taxes, fees, or other state revenues.

8. DISCLAIMER OF WARRANTY: To the maximum extent permitted by applicable law, the software is provided and licensed "as is" without warranty of any kind, either expressed or implied, including, but not limited to, the implied warranty of quality, merchantability, title, non-infringement and fitness for a particular purpose, and such implied warranties, any other warranties, representations, conditions and terms, express or implied (and whether
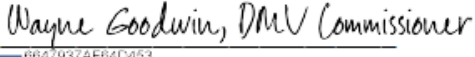
implied by statute, common law, course of dealing, trade usage or otherwise) are hereby excluded to the fullest extent permitted by law. ADOT MVD does not warrant that (i) the software will meet the Licensee's requirements, (ii) the use of the software will be uninterrupted or error free, (iii) the software will comply with regulatory requirements applicable to the Licensee or appear precisely as described in any demonstrations of the software or in any accompanying documentation. The Licensee agrees that it is solely responsible for the results obtained from the use of the software.

9. LIMITATION OF LIABILITY AND DAMAGES: In no event shall ADOT MVD be liable for any damages whatsoever (including, without limitation, indirect, incidental, special, or consequential damages including lost profits, business interruption, loss of information, or other loss) arising out of this Agreement or the Licensee's use or inability to use the Licensed Software.

10. DISTRIBUTION: The redistribution of this Application is strictly forbidden without the specific written consent by the ADOT MVD.

11. INDEMNIFICATION: Each party to this Agreement shall assume the risk of any liability arising from its own conduct. Neither party agrees to insure, defend, or indemnify the other.

12. AMENDMENTS: Any amendment, change or modification to this Agreement will be effective only upon the written mutual consent of both Parties.

13. DISPUTE RESOLUTION: The parties shall resolve any controversy or claim arising out of or relating to this Agreement, or the breach thereof, through mediation with a mediator selected by the parties who shall follow mediation procedures agreed upon by the parties and the mediator at that time

14. GOVERNING LAW/JURISDICTION: Title 9 of the United States Code (the United States Arbitration Act) and the rules shall govern the interpretation and enforcement of the arbitration hereunder. Nothing herein shall be interpreted as a waiver of either party's Tenth Amendment or Eleventh Amendment immunity or otherwise as a waiver of sovereign immunity.

This Agreement is in effect only insofar as there exists a signed addendum specifying the products or applications shared by ADOT MVD.

Licensee:

NCDOT, Division of Motor Vehicles
State of North Carolina

DocuSigned by:
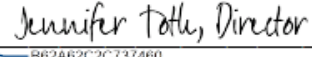
Wayne Goodwin, DMV Commissioner
———6647937AF64D453...
Signature

1/19/2024
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Date

Licensor:

AZ Department of Transportation
State of Arizona

DocuSigned by:

Jennifer Toth, Director
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Signature

1/23/2024
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Date

Appendix F – Excerpts from Minnesota Office of the Legislative Auditor Report

The selected passages below are from the February 14, 2019 Minnesota Office of the Legislative Auditor Special Review, Factors that Contributed to MNLAR Problems. This report is referenced in Finding #4.

MNLARS p.54

To a considerable degree, MNLARS managers used DPS Division of Driver and Vehicle Services staff to provide assistance with the project's development, such as identifying business requirements and determining whether the software met those requirements. However, many of these individuals' MNLARS assignments supplemented their regular daily duties. As one person observed:

[Driver and Vehicle Services] participation [in MNLARS] was largely assigned to staff who were already 100 percent busy with their normal business work. There were a handful of full-time DVS staff assigned to the project, but a project of this size would have benefitted from 10 to 20 full-time business staff to better align with the size of the technical team.

A MNIT manager—who described the business side of the project as "massively understaffed"—said it is important to have enough business experts on a project so that the technical staff are not waiting to receive complete documentation of the business processes that need to be automated. This manager also said DPS had only about 5 staff assigned to the MNLARS help desk for deputy registrars on the day of initial release but it should have had at least 20.62 A top DPS official told us that the Division of Driver and Vehicle Services was understaffed even *without* the diversion of certain staff to work on MNLARS—suggesting that MNLARS assignments compounded staff workloads.

p.78

Without appropriate resources to guarantee sufficient staff for business process development, identify system improvements, perform user acceptance testing, and provide stakeholder training, we are shifting resources from

business needs supporting our customers to completing these critical tasks. In the case of MNLARS, DVS staff perform these duties, which has created vacancies in critical business roles. These staffing shifts have resulted in significant backlogs, with Minnesotans not getting the services they expect and deserve.

p.77

We recognize the importance of consistent senior leadership's involvement on this project and the insufficient involvement prior to July 2017. We took significant steps to improve this after the failed roll-out. The governance structure of the MNLARS project now includes a MNLARS Executive Steering Committee, a MNLARS Project Management Team, a MNLARS Senior Leadership Team, and a MNLARS Executive Leadership Team. The MNLARS Quarterly Updates submitted to the MNLARS Legislative Oversight Committee identify the specific members' details in accordance with Minnesota Laws 2018, Chapter 101. We have already established consistent documentation of the Executive Steering Committee, and we are implementing documentation requirements at all levels of the project's governance teams. Additionally, we have added a member of the quality assurance team to the project governance structure.

p.69

The MNLARS project had sufficient resources ($100 million) and time (nine years) to succeed, but resources and time were spent in the project's early years without achieving the intended outcome. It took time to solicit, choose, and reach an agreement with a private vendor, but there were disputes about vendor responsibilities even after this lengthy process. Ultimately, MNIT and DPS officials agreed that the vendor did not produce high-quality work in a timely manner. When state officials terminated the contract, MNLARS was already a six-year-old project that had spent significant funds to make limited progress toward its ultimate goal.

p.64

A project as critical to agency operations as MNLARS requires direct involvement by top agency management. In such cases, agencies should designate a "sponsor" from top management who can help ensure that a project has the resources it needs and will, when completed, meet agency business requirements. The involvement of top DPS officials in the MNLARS project appears to have varied over time.

p.9

July 2017, the Minnesota Department of Public Safety (DPS) released and began administering a new motor vehicle registration and title system. This was part of a nearly decade-old project called the Minnesota Licensing and Registration System (MNLARS), which was intended to replace a system developed more than 30 years earlier. DPS developed MNLARS in conjunction with the Office of Minnesota Information Technology Services (MNIT), which is state government's information technology agency.

In The MNLARS release did not go smoothly. The new system was plagued by technical defects, missing components, and system performance problems in the months that followed the release. Despite having received more than $100 million in state revenues to develop this system, DPS and MNIT requested an additional $43 million from the Legislature in late January 2018 to address remaining issues with the system. The 2018 Legislature appropriated $9.65 million, leaving DPS and MNIT to work with stakeholders to identify top expenditure priorities for the available funding.

Factors That Contributed to MNLARS Problems

Office of the Legislative Auditor

State of Minnesota

Special Review February 14, 2019

Appendix G - DIT Enterprise Project Management Office (EPMO) Projects

The following table presents active and closed DMV modernization projects managed by the DIT EPMO along with their total estimated project cost and actual cost to date.

Project No	Project Name	Current Project Cost Estimate	Actual Cost
ITP.00238	DMV Applications Alignment and Interoperability (AAaI)	$1,435,000.00	$1,398,825.03
ITP.00243	MyDMV Portal	$2,786,701.00	$2,068,233.72
ITP.00247	Data Management and Governance Project	$5,786,400.00	$2,349,703.71
ITP.00249	DMV IVR Phase II (IVRP2)	$1,208,709.65	$777,714.15
ITP.00250	Virtual Hearings and Hearing Fees	$1,347,869.00	$1,094,811.38
ITP.00255	NCDMV Optimization	$5,572,000.00	$5,109,043.19
ITP.00254	DMV Vehicle Services Queuing (VSQUE)	$2,128,270.70	$817,256.58
ITP.00270	DMV Channel Strategy	$2,120,000.00	$54,318.49
ITP.00280	Driver 360 (D360)	$40,511,496.00	$852,429.31
ITP.00284	Driver 360 Infrastructure - Sandbox	$406,256.00	$70,571.96
ITP.00276	Remittance Processor - STARS Interface	$767,900.00	$535,187.32
ITP.00297	Ignition Interlock Management System Phase II	$178,430.00	$178,433.63
ITP.00298	Law Enforcement Case Management System (LECMS)	$3,663,739.00	$3,579,069.53
ITP.00299	State to State (S2S)	$6,237,188.84	$2,281,532.61
ITP.00303	DMV ELT Replacement (DERP)	$310,083.00	$317,012.06
ITP.00307	Student Online Testing via DPI (SOTD)	$1,645,500.00	$176,891.19
ITP.00306	DMV Callback Assist (CBA)	$207,728.40	$72,619.72
ITP.00310	Electronic Insurance Verification (EIV)	$7,765,000.00	$716,927.09

Project No	Project Name	Current Project Cost Estimate	Actual Cost
ITP.00309	Central Issuance and Print on Demand (CIPD)	$84,845,600.00	$259,052.00
ITP.00308	SB824 Identification to Vote (SB824)	$1,348,240.00	$243,925.92
ITP.00311	SADLS Refactoring (SREF)	$13,160,000.00	$2,276,936.78
ITP.00317	Online Appointment Scheduling (OAS)	$55,683.86	$55,683.86
ITP.00316	Hearing Fees Phase II (HFII)	$1,691,168.00	$1,561,563.67
ITP.00318	Lockbox Service Outsource (LSO)	$0.00	$8,217.63
ITP.00319	Kiosk Channel Strategy for Registration Renewal (KCSR)	$0.00	$9,319.48
ITP.00320	DMV Modernization Support (DMS)	$175,000.00	$176,967.84
ITP.00337	Notice and Storage Modernization (NSM)	$2,967,963.00	$300,006.70
ITP.00323	Law Enforcement Case Management Phase II (LECMS2)	$757,966.00	$1,018,953.39
ITP.00325	Q-Anywhere (QAny)	$462,760.00	$595,713.96
ITP.00329	Automated Hearings Solution (AHS)	$2,625,500.00	$1,723,575.93
ITP.00331	myDMV Portal to PayIT Platform (PPMDP)	$1,022,933.00	$753,389.99
ITP.00333	UNI Migration and Driving History Records (UMDHR)	$2,292,400.00	$1,103,385.93
ITP.00339	Driving Records to PayIt Platform (PPDR)	$350,250.00	$226,515.53
ITP.00338	SB183 Ignition Interlock Enhancements (SB183)	$2,136,240.00	$509,629.71
ITP.00345	Digital Fillable Forms (DFFRM)	$2,000,000.00	$27,558.37
ITP.00348	Central Issuance of Reg Products (CIRP)	$35,588,700.00	$34,347.09
ITP.00290	NC Crash Reporting Info System (NCCRIS)	$2,377,083.00	$5,975,999.39
ITP.00351	SimpliGov Automation Platform (SGAP)	$7,541,984.00	$1,823,423.88

Project No	Project Name	Current Project Cost Estimate	Actual Cost
ITP.00347	ELT Replacement (ELTR)	$579,225.00	$16,743.25
ITP.00350	eForce Case Management System (eFCMS)	$2,192,238.00	$312,524.63
ITP.00354	DMV Application Sys Modernization (DASM)	$4,793,000.00	$42,802.19
ITP.00352	ELT Transition (ELTT)	$0.00	$68,292.72
ITP.00356	Print On Demand (POD)	$1,706,803.00	$60,755.22
ITP.00357	Data Cleansing and System Analysis (DCSA)	$3,000,000.00	$490,346.04
ITP.00358	Automated Hearing Solution2 (AHS2)	$0.00	$26,535.21
ITP.00361	Mobile Drivers License (mDL)	$3,903,300.00	$18,385.28
	Total DMV Modernization Projects	$261,652,308.45	$42,171,132.26

System Modernization Evaluation
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF MOTOR VEHICLES

Full Report Including Executive Summary
April 22, 2025

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For more information regarding this report, please contact the author.

Steven E. Young, PMP, Sr. Vice President
syoung@mathtechinc.com

Mathtech, Inc.
One AAA Drive, Suite 102
Hamilton, New Jersey, USA 08691
Phone: 215.378.7067

1. About This Report

Mathtech, Inc. was engaged by the North Carolina Department of Information Technology (DIT) and the Department of Transportation (DOT) Division of Motor Vehicles (DMV or Division) to perform an evaluation of the Division's ongoing efforts to modernize its Information Technology systems.

Per the scope of work, "The NC Division of Motor Vehicles (DMV) has embarked on a modernization program that will incrementally deliver value to the organization over a period of years through a series of enabling and complementary projects to modernize DMV's end-of-life technology. To that end, in January 2024, DMV signed a Memorandum of Understanding (MoU) with the State of Arizona Department of Transportation to utilize the fully developed and deployed Arizona DOT ("AZ MAX") solution at no cost." Since the execution of the MoU, the DMV has continued to focus its efforts on an analysis of the AZ MAX solution. This report assesses the DMV's vision and plan for the overall modernization.

The scope of work requires that Mathtech perform an "in-depth analysis of the Division's plan to implement a cloud-based operating system" and specifically assess the following project elements:

- Timeline
- Customer Service Improvements
- Data Security
- Personnel
- Pricing Structure
- Other Relevant Factors

This report's organization is aligned with the scope of work assigned to Mathtech. It includes an executive summary, followed by the overall analysis, and supported by the required individual analysis elements.

North Carolina Agencies Referenced in this Report
DMV – In this report, we refer to the North Carolina Department of Transportation, Division of Motor Vehicles as the "Division" and as the "DMV". In some cases, we also use "DMV" to refer to general motor vehicle operations and to "DMVs" from other states and jurisdictions.
DIT – The North Carolina Department of Information Technology is North Carolina's central Information Technology (IT) agency and it provides the technology resources and support to the Division.
DMV & DIT – As this report refers to the Division's modernization efforts, we frequently refer to the DMV/DIT team and their collaboration to plan and modernize the Division's computer systems.

2. Executive Summary

Key Findings
■ The Division's current mainframe systems are outdated and overdue for replacement. These legacy systems support all operations, including all Driver and Vehicle services, but they keep the Division operationally "frozen in time" and hinder efforts to meet stakeholder needs.
■ The Division needs to replace all of its systems fully. A partial or incremental upgrade is not an option.
■ The Division and DIT have a reasonable strategy for system modernization, which is to leverage a modern system built by the Arizona Motor Vehicle Division (MVD), known as the AZ MAX system. The details of the modernization plan are not finalized at this point.
■ The AZ MAX solution is technically modern and complex and should meet the division's needs. The Division has been conducting a commendable analysis of the AZ MAX solution.
■ Other states are adopting the AZ MAX solution, but no state other than Arizona has fully implemented it yet. Wyoming is more than halfway through its implementation of AZ MAX Driver Services functions, and the project is proceeding successfully.
■ The Division and DIT have begun modernization preparation efforts that are consistent with Mathtech's expectations, including data preparation, documentation of business processes, personnel planning, and an in-depth analysis of the proposed AZ MAX solution.
■ The Division and DIT's plan to build an internal team to support the implementation and lead long-term maintenance of the system is sound. Still, it will require significant hiring and training efforts to be fully implemented.
■ The Division and DIT should fully engage a system implementation vendor with deep AZ MAX experience to refine the plan and approach, conduct the functional analysis, and develop and implement the system. During the implementation, the Division and DIT should collaborate with and support the implementation vendor and oversee its activities.
■ Once the implementation vendor begins work, a complete DMV modernization using a modern solution such as AZ MAX, including both Vehicle and Driver Services, typically takes about 4 years to complete.
■ The current DMV systems are expensive to maintain, and over time, a new system should pay for itself and be less costly to maintain.

2.1 About Mathtech

Mathtech is a national consulting firm with over 50 years of experience supporting government modernization initiatives. The company specializes in system transformation, business process improvement, project management, and strategic planning.

Mathtech is widely recognized as a leader in DMV system modernization and motor vehicle operations. Mathtech has worked with over twenty motor vehicle agencies around the country and supports projects in states such as Wyoming, Missouri, South Carolina, Iowa, and Maryland and works closely with AAMVA on national standards, including electronic vehicle titling. Mathtech's experience includes managing DMV vendors, assessing legacy systems, supporting procurement, and guiding the transition to modern solutions. Mathtech's proven methodologies and industry insight help agencies achieve modernization goals while minimizing risk.

2.2 Project Approach

From November 2024 to March 2025, Mathtech worked with the North Carolina DMV and DIT to assess its system modernization plans. The project involved working sessions with DMV and DIT staff to understand the current strategy, develop a project timeline, and evaluate the Division's goals.

Mathtech also benchmarked North Carolina's approach against other DMV modernization efforts across the country, identifying strengths, gaps, and opportunities for improvement. Findings and recommendations were compiled into this report, with input from DMV/DIT and other stakeholders to ensure alignment with the project's goals and vision.

2.3 Understanding the DMV/DIT's Strategy

Mathtech's evaluation was informed by extensive discussions with DMV and DIT leaders, along with a review of internal plans and documentation. While the strategy was not captured in a single document, the DMV/DIT leadership team presented a unified vision emphasizing the complexity and importance of the project, its modernization goals, and a clear path forward. At the time of assessment, the DMV/DIT team was in an "Assessment and Planning" phase, which was temporarily paused for this external review.

The DMV/DIT's modernization strategy is to replace outdated mainframe systems with a flexible, cloud-based solution by leveraging a prebuilt, proven system (AZ MAX) that will help achieve operational and service improvement goals. The DMV/DIT team aims to implement a system that is:

- **Technically Strong** and leverages modern technologies, including cloud hosting and services.
- **Feature-Rich** with support for modern DMV and customer service features such as eTitling, a Self-Service Portal, and mobile driver's licenses (mDL).
- **Functionally Complete** with full support for all Driver and Vehicle functions and interfaces to mandatory AAMVA systems and other Federal systems.
- **State-Controlled** with a solution that the State could directly own, control, and manage.
- **Technically Transparent** through a solution that the state could carefully inspect for technical quality and security issues.
- **Vendor Independent** with a solution that allows for vendor competition and options, flexible support options, and a solution that doesn't lock the state into dependence on one vendor.
- **Supported** by vendors and other DMV jurisdictions to enable collaboration, shared investments, and mutual benefit from collective efforts.
- **Fully Integrated,** allowing data to be shared across business functions and simplifying business processes.
- **Aligned with the DMV's Vision** through existing capabilities and future expansion.

The DMV/DIT's modernization strategy is:

- **Consistent with the Industry** – The Vision presented to Mathtech was consistent with DMV operations across the country and aligned with common initiatives such as the implementation of mobile driver's license documents (mDL), electronic titling, general process automation, and self-service.
- **Realistic** – The Division's Vision for moving forward is consistent with modern technology and available solutions in the marketplace, and not of unusually high risk.

Challenges

The Division suffers from a range of operational challenges, which are typical for all state agencies, specifically DMVs, that operate with outdated systems. These challenges keep the Division "frozen in time" and prevent it from meeting stakeholder needs.

Vision

The Division, including each major business area, has a sufficiently clear and consistent vision for the modernization project. The Vision is consistent with many state agencies and DMVs across the country that struggle with outdated computer systems.

At a high level, the vision includes:

- Digital Transformation and Modernization
- Improved Customer Experience
- Process Efficiency and Workflow Optimization
- Enhanced Data Management
- Digitization of Business and Commercial Services

2.4 Assessment of the Current DMV Systems

The Division's core systems are 30-year-old COBOL-based systems that support critical operations and interfaces to important third parties but are outdated and inflexible.

- **Difficult and Costly to Maintain** – Limited documentation and aging technology make the systems difficult to support, relying heavily on experienced staff and requiring significant time for complex changes.
- **Limits of Modernization and Innovation** – The current systems cannot easily support end-to-end online services or modern enhancements, leaving the Division "frozen in time" and focused on maintenance over innovation.
- **Fragmented System Architecture** – The Division relies on multiple partially connected subsystems with limited integration, which adds complexity, increases the risk of errors, and reduces efficiency in daily operations.
- **Consistent with Many Agencies** – Many state agencies around the country face similar modernization challenges, and based on national experience, the North Carolina DMV is ready for a system replacement.
- **Full Replacement Needed** – The Division needs to fully replace all of its systems. There is no real option for a partial or incremental upgrade as these would be stop-gap and throw-away solutions.

2.5 AZ MAX Background

- **Cloud-Based Platform** – AZ MAX is a Microsoft Azure-based system developed by the Arizona DOT over the past decade, supporting all core DMV functions and integrating with required AAMVA and federal systems. Arizona is considered a leader in DMV operations and one of the first states to implement an intra-state eTitling solution.
- **Modern Capabilities** – The system includes advanced features such as mobile driver licenses (mDL), electronic titling, and a flexible architecture designed for reuse by other states.
- **Experienced Implementation Team** – AstreaX led the system's development and architecture and Kyndryl serves as the primary system integrator and supports other jurisdictions adopting the platform.
- **Multi-State Collaboration Underway** – Arizona aims to create a multi-jurisdictional partnership to share and maintain the system; Wyoming and Virginia are currently implementing AZ MAX.
- **Positive Progress** – Although Arizona is currently the only state with the system in full operation, early implementations in Wyoming and Virginia are progressing well. Wyoming is expected to launch its Driver Licensing system by late 2025.

2.6 Review of the DMV/DIT's Current Efforts

- **Prior Modernization Efforts** – The DMV/DIT team previously attempted to refactor/translate its legacy COBOL systems but found that this approach retained outdated logic and technical debt. Some business process documentation from that effort may still be useful moving forward.

- **Structured Analysis Approach** – The DMV/DIT team developed a formal plan and timeline for evaluating the AZ MAX solution, known as the "Deeper Dive & Gap Analysis," to determine if the system meets North Carolina's functional, technical, and security standards. Efforts include:

  - **System and Code Evaluation** – Beginning in early 2024, the DMV/DIT team conducted a detailed technical review of AZ MAX source code using code analysis tools. Early findings indicate that the system is secure, high-quality, and aligns with state standards. Mathtech believes this is a commendable evaluation effort.

  - **Requirements Gap Analysis** – The DMV/DIT team is assessing current business processes and reviewing the AZ MAX system for compatibility and functional gaps. Currently, the DMV is performing this comparison by reviewing source code, which is not the most effective approach. Moving forward, the State should get a demo system and assistance from the implementation vendor.

  - **Data Preparation and Cleansing** – The DMV/DIT team is evaluating tools to support a data quality analysis and cleansing in preparation for migration. Final strategies will be refined with support from the future implementation vendor.

- **Proof-of-Concept and Implementation Planning** – A planned proof-of-concept pilot was paused during this external review. A final implementation schedule will be developed with input from the selected implementation vendor.

2.7 Review of The Modernization Project's Scope

The Division operates a wide scope of operations, which is completely typical, including:

- Driver Licensing & Compliance
- Vehicle Services
- Motor Carrier Services
- Business Licensing
- Financial Operations
- Interactions with Other Agencies and Stakeholders

The AZ MAX solution will align with the Division's needs and allow for the retirement of all of the Division's major systems. The Division needs to replace all of its systems fully. There is no benefit in a partial or incremental upgrade. The Division's plans are:

- **Clear & Consistent Across the Division** – The scope of operations has been documented by the DMV/DIT team through a number of activities. While there is no one definitive detailed scope document at this point in the project, there is a clear understanding across all internal team members that the Division's primary systems, including SADLS, STARS, and LITES, will all be replaced by modernization.

- **Consistent with Peers** – The modernization scope presented to Mathtech is consistent with many DMVs around the country that have or are in progress with modernization projects and fully replacing their outdated systems.

- **Realistic** – The Division's approach for moving forward leverages modern technology and available solutions in the marketplace and is not of unusually high risk, aligning it with the approach taken by other DMVs

2.8 Implementation Timeline

The DMV/DIT team has a detailed project schedule for the current preparation tasks, but does not have a schedule for the overall implementation. An overall schedule would require collaboration and contracting with the implementation vendor.

Governance and Project Management – DMV/DIT team will need to ensure it has a strong Program/Project Manager and team to manage the project to ensure it remains on-time and within budget. This would also include forming a Governance structure with an executive leadership team that meets at least quarterly and a leadership team that meets at least monthly.

Potential Timeline – The implementation timeline for a well-planned DMV modernization project that replaces all core systems is at least four years and can be more depending on the level of preparation needed. This includes:

Preparation – 1 Year or Less

The DMV has already begun preparation tasks, which can easily take a full year or more.

- **Infrastructure Analysis and Preparation** – The DMV/DIT team should review workstation setups, network capacity, and other infrastructure to ensure all planning and upgrades are defined to ensure readiness for the new system.

- **Data Analysis & Cleansing** – The DMV/DIT team must identify, document, and assess data sources in preparation for conversion to the new system. Although a data analysis plan is in place, such plans have many unknowns, as data quality issues are not known until the analysis finds them.

- **Interface Analysis & Preparation** – Interfaces with external systems are a high-risk area, and early identification, documentation, and communication with partners are essential. The DMV/DIT team will need to allocate resources to document existing and future interfaces needed to support its modernization goals.

- **Functional Requirements & Process Analysis** – The DMV/DIT team must define its system expectations and business processes, aligning them with its customer service and efficiency goals. This includes developing a catalog of requirements. Some of this work is already underway.

- **Technical & Delivery Requirements Analysis** – The DMV/DIT team should document technical, system delivery, training, and support requirements to define the project better. This builds on work already done through code analysis but needs to be expanded to all technical areas.

- **Staff Development** – The DMV/DIT team is planning to strengthen internal IT and business staff capabilities to support implementation and reduce long-term vendor reliance. Early involvement will help staff learn the system, tools, and practices and position the State for sustainable system support.

Procurement – 3 Months to 1 Year

Engaging a system implementation vendor can take anywhere from three months to over a year, depending on the procurement approach. Some of this effort can be in parallel with the Preparation Phase.

The State needs to determine if a sole-source award is possible or if an entire public procurement via an RFP is needed. If an RFP-based procurement is required, then the timeline will need to include:

- **Preparing an RFP** – 6 months or longer
- **Soliciting Vendor Bids** – 3 months
- **Evaluating Bids** – 2 to 3 months
- **Contract Negotiation and Award** – 2 to 3 months

Implementation – 3.5 Years to 4 Years

The Division must fully replace its legacy systems, SADLS, STARS, and LITES, as they are outdated, fragmented, and cannot be modernized incrementally. A full system replacement is required, and the DMV/DIT team is considering two implementation strategies for deploying the AZ MAX system.

Option 1: Phased Implementation – Two Years for Driver Services, Two Years for Vehicle Services

- **Approach**: Deploy Driver Services first (replacing SADLS), followed by Vehicle Services (replacing STARS and LITES). Each phase would take about 2 years.

- **Pros**: Reduces risk by allowing staff to focus on one major system at a time. Enables customer service improvements for Driver Services to be introduced two years earlier.

- **Cons**: Requires temporary integration between the new AZ MAX Driver Services system and the legacy Vehicle systems, adding complexity during the transition period.

Option 2: Consolidated Implementation – Three and a Half to Four Years for Both Driver and Vehicle Services

- **Approach**: Deploy both Driver and Vehicle Services at the same time. The combined phase would take 4 years but may be shortened to 3.5 years.

- **Pros**: Potentially shortens the total project timeline and avoids the need for backward integration between old and new systems.

- **Cons**: Increases rollout complexity, as all DMV operations would change at once. Delays customer service improvements for Driver Services until the entire system is ready.

The Division will make a final decision on its implementation approach based on input from the implementation vendor, an assessment of risks, and available resources. Both approaches involve deploying extensive functionality—including licensing, vehicle registration, financial processing, and business/motor carrier services—and will require detailed planning to ensure success.
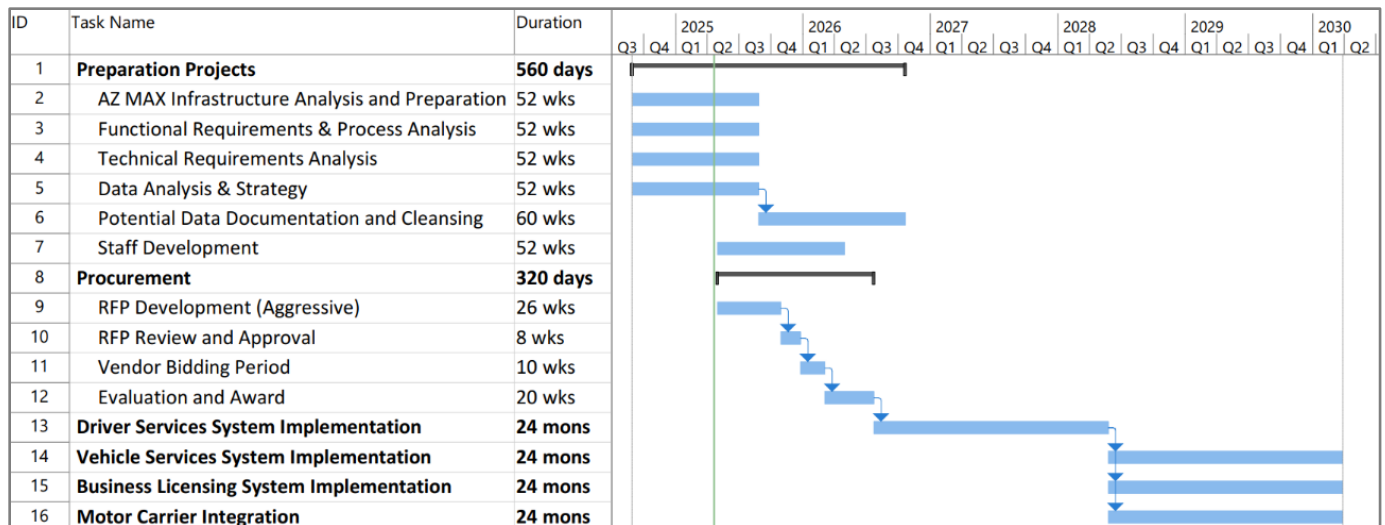
Ongoing Support and Maintenance

Once the system is live, the DMV/DIT team will transition into ongoing support and optimization of the system. Objectives will include:

- **System Maintenance** – Ensuring the new system remains secure, stable, and high-performing.
- **System & Operations Enhancements** – Refining business processes and enhancing the system's functions.
- **Collaboration with AZ MAX Jurisdictions** – Collaborating with Arizona and other jurisdictions to improve the MAX solution and implement shared/national requirements.
- **Legacy System Retirement** – Planning for and retiring SADLS, STARS, LITES, and other legacy systems – including archiving of data that was not migrated to the new system. This will reduce mainframe costs for the Division.

Potential Timeline

To the right is an estimated timeline for the phased implementation. It shows preparations that are already underway, a full procurement cycle including an RFP, followed by two distinct two-year implementation phases.

ID	Task Name	Duration
1	**Preparation Projects**	**560 days**
2	AZ MAX Infrastructure Analysis and Preparation	52 wks
3	Functional Requirements & Process Analysis	52 wks
4	Technical Requirements Analysis	52 wks
5	Data Analysis & Strategy	52 wks
6	Potential Data Documentation and Cleansing	60 wks
7	Staff Development	52 wks
8	**Procurement**	**320 days**
9	RFP Development (Aggressive)	26 wks
10	RFP Review and Approval	8 wks
11	Vendor Bidding Period	10 wks
12	Evaluation and Award	20 wks
13	**Driver Services System Implementation**	**24 mons**
14	**Vehicle Services System Implementation**	**24 mons**
15	**Business Licensing System Implementation**	**24 mons**
16	**Motor Carrier Integration**	**24 mons**

2.9   Customer Service Benefits

The complexity and time required for DMV modernization projects are typically underestimated. No State can realistically implement a Driver and Vehicle modernization in less than four years, including planning. Additionally, the Division needs to completely replace its systems, which makes incremental delivery very difficult.

Timing

The timing of benefits depends on whether the Division chooses a Phased or Consolidated Implementation. In a Phased Implementation, Driver Services would be completed first, delivering benefits in two years, while Vehicle Services would follow, taking four years in total. In a Consolidated Implementation, the entire system would launch at once, with all benefits realized in 3.5 to 4 years.

While all parties would like to see benefits roll out sooner, the required implementation process does not accommodate partial functionality, and a full system replacement is needed.

Some functions, such as a mobile Driver's License (mDL), can be rolled out separately and attached to the current SADLS system and later switched to the AZ MAX system. Few enhancements lend themselves to such flexibility. Additionally, any new enhancement to the existing systems attempted during the modernization process is a significant distraction from the actual modernization effort and adds risk to the project.

Customer Service Benefits to Be Realized

A full description of the DMV's Vision for improved future operations is contained in this document. The DMV anticipates realizing the following customer service benefits:

- One Customer, One Record Enhanced Customer Management
- Proactive Customer Communication and Digital Notifications
- Enhanced Mobile Accessibility & App-Based Services
- Mobile Driver License (mDL)
- Full-Service Customer Portal
- Expanded Kiosk Self-Service Options
- Improved Transparency in Fees, Payments, and Transactions
- Real-Time Data Access and Ad Hoc Reporting
- Automated Error Detection and Data Cleanup
- Digital Payment and Revenue Collection Modernization

- Predictive Analytics for Staffing and Customer Flow Management
- Electronic Dealer and Business Licensing
- Streamlined Commercial and Motor Carrier Services
- Improved Integration with Law Enforcement & Regulatory Agencies
- Electronic Titling

Years to Realize Customer Service Benefits

	Phased Implementation	Consolidated Implementation
Mobile Driver's License	1 year	1 year
Driver Services	2 years	3.5-4 years
Vehicle Services	4 years	3.5-4 years

2.10 Staffing Plan Assessment

As the DMV/DIT team moves forward with modernization, it will need a dedicated internal team to lead the project, make operational and technical decisions, and collaborate with the implementation vendor and other consultants or stakeholders.

DMV/DIT Staffing Needs

The following represents a dedicated, full-time team that the DMV/DIT team should assemble and prepare as the modernization team. These numbers are typical for a project of this size. Assembling this team also requires planning to backfill their daily responsibilities so that they are available for the project.

IT Staff – 10 to 20 technical staff would provide the core support for a variety of technical responsibilities.

Business Staff – A team of 8 to 12 business/operations staff would provide the core of a functional team responsible for defining the system's operations.

Project Management Staff – At least 2 and up to 5 project managers would lead and oversee the project.

The DMV/DIT Staffing Plan

DMV/DIT Guiding Principles

The DMV/DIT team developed the following guiding principles to ensure that the State's team could effectively support the implementation of the AZ MAX System, oversee the implementation, and maintain the system afterward, minimizing dependence on any vendors.

- **Knowledge Transfer to DIT Staff** – The DMV/DIT team plans to implement a "2-in-a-box" model to ensure hands-on knowledge transfer from the implementation vendor to State IT staff, enabling long-term system support and internal expertise.
- **Upskilling the Workforce** – The staffing plan emphasizes training existing staff in modern technologies such as .NET Core, cloud platforms, cybersecurity, and data management to support and maintain the new system effectively.
- **Hiring Specialized Talent** – The DMV/DIT team will recruit and retain IT professionals with key expertise, including cloud architecture, cybersecurity, and data migration, to ensure successful implementation and long-term system sustainability.

Other considerations identified by the DMV/DIT team include:

- **Balancing New and Legacy System Work** – To manage the dual demands of modernization and ongoing operations, the DMV/DIT team plans to assign a dedicated team focused primarily on the new system implementation.
- **Retirements Impact** – The team is assessing projected retirements to understand their effect on staffing continuity and ensure knowledge retention throughout the project.
- **Reduction in Legislative Changes** – A pause on legislative changes would be desirable during modernization to avoid reworking the legacy systems while maintaining focus on building the new system. Mathtech can confirm that this is a best practice among jurisdictions that are modernizing.

DMV/DIT Staffing Estimates

The DMV/DIT team created a preliminary staffing model for the project that estimated the modernization project would require up to 80 staff. This model described a range of skill sets and responsibilities, but did not distinguish between State and implementation vendor staff.

A total project team size of approximately 60 to 80 staff is reasonable for a modernization effort of this scale, with the implementation vendor providing much of the team. This estimate is based on comparisons with similar projects in other states, such as Arizona, Wyoming, Missouri, and Maryland.

Moving forward, the DMV/DIT team will need to address:

- **Full-Time Staff** – Train and engage the full-time staffing levels described above – approximately 10 business staff, 10 to 20 IT staff, and 2 to 5 project managers. These staff members should represent the DMV/DIT's best staff.
- **Part-Time Staff** – Plan and accommodate a wide range of part-time staff who will participate in the project to bring needed expertise.
- **Backfilling** – Backfill staff who leave operational positions to join the project.

DMV/DIT's Goal of Creating an In-House Team to Support the Project.

If the State can develop internal IT resources with sufficient skills to participate in the project, then it will:

- Learn how the AZ MAX system works during its implementation
- Learn the development tools and methodologies used by the MAX consortium of states
- Be able to oversee and closely monitor the work of the implementation vendor
- Develop the skills to better support the system in the long term and leverage external assistance when needed

2.11 Data Security

Mathtech reviewed DIT's security policies and procedures to ensure that they are aligned with best practices. The assessment also examined the Division's current scope of operations and data collection, and any planned expansion that would occur during the planned modernization.

The modernization effort is in a "planning and analysis" phase, so nothing has been implemented at this point in time. Mathtech's assessment found the following:

- **No System Yet** – The DMV/DIT team has selected the AZ MAX solution, but nothing has been implemented at this time, not even a demo system. Given that there is no live system at this time, no customer or test data has been loaded.
- **Sufficient IT and Data Security Policies** – DIT's IT and data security policies are aligned with industry standards and best practices, including NIST and Federal DPPA standards. As the DMV/DIT team continues to

implement these policies for modernization, it should provide sufficient structure to protect the Division's data.

- **Security Prioritization** – DMV/DIT resources have placed a priority on IT and data security throughout their initial assessments and for the modernization effort.

- **Same Scope of Data Managed** – The Division collects a broad range of data consistent with its mission and will continue to do so under system modernization. Any refinements to improve efficiency or combat fraud will remain consistent with its authority, and Mathtech does not see any notable expansion to the scope of data collected.

- **Secure Foundation** – The AZ MAX solution has been built to be a secure system using modern tools by another jurisdiction (Arizona), which has equal expectations for IT and data security. This system should provide a strong starting point for the DMV/DIT team.

While no system, project, or plan can be guaranteed to be perfect, the DMV/DIT team, in combination with the AZ MAX solution and DIT's IT and data security standards, represents a sufficient plan to move forward securely. By implementing the planned system and following DIT's established security policies and procedures, the DMV/DIT team will have a solid foundation to both modernize and safeguard DMV data.

2.12 Other Factors – External Stakeholders

The Division guided Mathtech to engage external stakeholders for additional input and directed us to the following stakeholders: the North Carolina Association of Sheriffs and Chiefs of Police, North Carolina Insurance Carriers and Agents, and the North Carolina Automobile Dealers Association. Mathtech found the following:

- **Stakeholders are Satisfied** – The external stakeholders Mathtech met with are generally satisfied with the Division.

- **Continue Making Incremental Improvements** – A complete system modernization that will make processes more efficient and quicker would be welcome. Preferably, such a transition would not impact the incremental improvements that the Division makes on an ongoing basis.

- **Real-time Expectations** – Real-time processing is preferred by stakeholders because it reduces errors and rework and is increasingly expected by North Carolina businesses and DMV customers.

2.13 Potential Pricing Structure

Mathtech prepared a pricing model for the modernization project based on similar projects and collaborated with the DMV/DIT team to incorporate their strategy into the model. This allowed Mathtech to develop a reasonable pricing structure that could be used to estimate implementation and operational costs for the new system. The development of the pricing model enabled the DMV/DIT team and Mathtech to reconcile estimated costs with the timeline and proposed staffing plan.

Reasonable Initial Estimates – The DMV/DIT team was not far enough along in its collaboration with the implementation vendor to have finalized a project pricing structure for the implementation or for ongoing support. Mathtech found that the Division's estimates for preparation tasks such as data cleansing, change management, staffing, and other variable costs were consistent with industry standards.

Pricing Model

Mathtech's modernization pricing model includes cost projecting out 10 years, including planning, implementation, and support.

Cost components include:

- Hardware & Platform Fee
- Hosting & Cloud Fees
- Data Cleansing
- Organizational Change & Training
- Department Staff
- System Integrator Implementation & Rollout Services
- Contingency
- Software Purchase/License or Fees
- Management Support and Program Assurance/IV&V
- IT Contractors and Vendors
- Agency Facilities & Space

The pricing model compared three options:

- **AZ MAX Solution From Arizona** – This is a complete "DMV" system that should support all of the Division's needed functionality. While it is not a product that receives regular upgrades, Arizona and other jurisdictions intend to collaborate on needed enhancements.
- **Commercial Off-The-Shelf (COTS)** – This COTS solution is a commercial "DMV" software package from FAST Enterprises that is maintained as a product for many states and also offers complete functionality. Some enhancements will be included over time as the product evolves as part of the vendor's licensing and support fees.
- **Custom Development** – This approach involves using general commercial products used by many commercial businesses in combination with substantial custom software development to create a DMV solution from "scratch." These solutions require substantial time to complete, reaching almost 10 years. Some jurisdictions are still attempting such approaches, and they are slow, costly, and high-risk.

The table below has many factors that could influence the pricing. In general, the AZ MAX solution should be the least expensive approach and allow the State to own and control its solution. The Custom Build solution is not recommended, as some states have pursued this path, which is longer in duration to deliver and substantially more expensive.

	10-Year Description	Estimated Implementation Costs, *Including Vendor, Additional State Staff, Hosting, and Other Project Costs*	Estimated Annual Support Costs, *including Vendor, Licenses, Hosting, and other Support Costs*	Estimated 10-Year Project Costs
Option 1 AZ MAX	*1 Year Prep 4 Years Implement 5 Years Support*	$72,000,000 to $82,000,000	$6,000,000 to $7,000,000	$102,000,000 to $117,000,000
Option 2 COTS	*1 Year Prep 4 Years Implement 5 Years Support*	$82,000,000 to $95,000,000	$7,000,000 to $8,000,000	$117,000,000 to $135,000,000
Option 3 Custom Built	*1 Year Prep 8 Years Implement 1 Year Support*	$189,000,000 to $239,000,000	$13,000,000 to $17,000,000	$202,000,000 to $256,000,000
Option 4 No Change & Incremental Improvements	*Continue With the Current Program, Making Small Improvements*	Annual Hosting Costs for the Existing DMV Mainframe Systems are approximately $15M per year = $150M for 10 years		

Long-Term Savings – The Division currently spends approximately $15M per year for mainframe hosting costs associated with the current SADLS, STARS, and LITES systems alone. This includes mainframe and related software and operating costs. This does not include networking costs or IT staff that support the system. While the new system will have new hosting service costs associated with it, the modernization project will introduce savings that can offset the modernization investment and ongoing support. The entire annual support costs for the AZ MAX solution, as shown above, is $7M/year, which includes hosting.

Determining Actual Costs – The DMV's final cost estimates will depend on implementation vendor negotiations and detailed project scoping.

This is the end of the Executive Summary – the remainder of the report presents all findings in greater detail.

3. Project Background

3.1 DMV Background

The North Carolina DOT Division of Motor Vehicles (Division or DMV) systems are outdated and in need of an upgrade. These legacy systems lack modern features and flexibility, making it increasingly difficult to meet the expectations of the Division's customers and staff. The systems have not kept pace with technological advancements, resulting in operational inefficiencies and a growing risk of customer dissatisfaction.

Over the past decade, several factors have made it harder for the Division to meet customer needs:

- **Increased Expectations** – Customer and staff expectations have evolved as new technologies have made other services faster, more efficient, and easier to access.
- **Population Growth** – North Carolina's significant population growth has increased demand for DMV services.
- **Operational Changes** – Needed improvements and legislative mandates have added pressure to the current systems. Due to their rigidity, implementing new policies often requires extensive programming effort.

To address these challenges, the Division, along with the Department of Information Technology (DIT), is pursuing a full system modernization. The new system will be unified, scalable, flexible, and capable of integrating data across different business functions. This will enable the Division to deliver efficient, customer-focused services and meet changing regulatory requirements. By leveraging a pre-built solution from another jurisdiction, such as Arizona's MAX system, the DMV/DIT team aims to adopt proven best practices and avoid common pitfalls associated with large-scale system implementations.

The Department of Information Technology is the technical team responsible for building and maintaining the Division's systems. They work together to ensure that the Division has the technology it needs to deliver on its mission.

3.2 Project Approach

Mathtech was tasked with assessing the DMV/DIT team's modernization strategy. From November 15, 2024, to March 31, 2025, Mathtech collaborated with the DMV/DIT team to perform and provide guidance. The approach included the following activities:

Working Sessions

Mathtech conducted in-depth working sessions with DMV business staff, DIT technical staff, and key stakeholders to:

- Understand and document the DMV/DIT's modernization efforts.
- Evaluate the DMV/DIT team's strategic approach and implementation plans.
- Facilitate collaborative discussions, including the development of a project timeline.

Analysis and Planning

Beyond working sessions, Mathtech leveraged its industry experience to benchmark the DMV/DIT team's modernization plan against similar motor vehicle industry projects. This analysis included:

- Comparing the plan's staffing, pricing, and customer service goals with other modernization initiatives.
- Identifying potential gaps and areas for improvement in the proposed approach.
- Providing recommendations to enhance project outcomes and mitigate risks.

Final Plans and Report

Mathtech compiled its findings into this assessment report, ensuring it met the RFP requirements. Throughout the process, DMV/DIT staff reviewed iterative drafts, refining the documentation to accurately reflect the DMV/DIT modernization vision, project scope, and strategic plans.

3.3 About Mathtech

Mathtech is a strategy and consulting services firm with offices in New Jersey, Virginia, and Arizona. With over 50 years of experience serving federal, state, and local government agencies, nonprofits, and commercial organizations, Mathtech has built a solid reputation for successfully completing projects and working collaboratively with our clients. Mathtech Inc. evolved as the strategy and consulting arm of Mathematica, Inc., a professional services firm located in Princeton, NJ. The company has been employee-owned since 1986. Mathtech leverages industry-leading methodologies, staff expertise, and a wealth of best practices and tools to deliver consistently clear approaches and solutions for our clients' projects.

Mathtech has successfully supported large and small projects across the country, from Washington State to Florida, including large-scale modernization efforts for Motor Vehicle, Tax, Motor and Labor agencies.

Mathtech provides a full range of consulting services, including:

- **Management Consulting** – Mathtech provides a wide variety of services, such as Business Process Reengineering, Strategic Planning, and Organizational Change Management.
- **System Modernization Support** – Mathtech is a leader in modernization efforts and has helped agencies across the country transform systems and business processes.
- **IV&V/Project Management, PMOs, and Governance** – Mathtech provides project management support to any size project. Mathtech has developed a governance model to properly guide a project, handle strategic decisions, and connect a project or operations to the organization.
- **Project Assessments and Turnarounds** – Mathtech performs detailed analyses of projects, SDLCs, and project management operations as part of managing a project, establishing or improving a PMO, or turning around a struggling project.
- **Assessments and Planning** – Mathtech provides all levels of assessments and consultation to Boards, Executive Management, and Project teams for diagnosing and improving the effectiveness of projects and daily operations.
- **IT Strategy and Architecture** – Mathtech helps agencies develop a flexible strategy to meet technology objectives by leveraging existing technology and new technology as needed.
- **Requirements Analysis and RFPs** – Mathtech can develop detailed requirements, write RFPs, and assist in the bidding and evaluation process. We design our RFPs to create manageable, well-defined projects.
- **System Development** – Mathtech provides a full range of implementation services that allow agencies to provide more services quickly using industry-standard methods and technologies.

3.3.1 Mathtech Experience

Mathtech leveraged a broad range of experience for this project.

Motor Vehicle Operations

Mathtech is the national leader in motor vehicle and licensing operations and has worked with jurisdictions around the country and with AAMVA. Mathtech's experience includes modernization planning and strategy, business process improvement, technology operations, and vendor management. Mathtech serves on AAMVA committees and regularly presents at regional and international conferences. Mathtech recently finished working on AAMVA's project to create and implement a new standard for electronic vehicle titling.

Motor Vehicle Vendor & Product Experience – Mathtech has managed vendors installing and maintaining Vehicle, Licensing, Card Production, Document Management, Inspections, and Queueing Systems. We have a deep understanding of vendor strengths and weaknesses, support contracts, and the procurement process.

Recent DMV Modernization Projects – Mathtech is currently working with Wyoming, Missouri, South Carolina, and Iowa on modernization projects and recently completed a project with Maryland.

IT Operations

The Mathtech team supports a wide range of technology operations, including conversion to new methodologies, Project Management, Cost Allocation to Departments, Reorganizations and Redesigns, Quality Assurance, and Enterprise Architecture. Our team has supported federal and state agencies, CIOs, and the private sector. We leverage best practice models for managing IT operations and assessing maturity.

System & Process Modernization

The Mathtech team has worked on many state agency modernization and transformation projects. These projects bring great improvements in business processes and technology. But they are also very taxing on an agency in every area, including operations and IT. Outdated legacy systems are often accompanied by outdated legacy support and maintenance skills, processes, and tools, making any IT organization's modernization more challenging.

4. Report Overview

The assessment is divided into the following sections.

- **Overall Assessment of DMV's Strategy and Plan** – Brings together the findings from all of the sections and evaluates the overall modernization strategy.

- **Modern Driver and Motor Vehicle Systems – Industry Expectations** – Describes the features and capabilities expected in a modern DMV system.

- **Assessment of the Current DMV Systems** – Reviews the DMV's existing applications and provides a high-level assessment of their functionality and limitations.

- **Review of The DMV's Modernization Efforts and Plans** – Examines the DMV's past and current modernization initiatives, including schedules and implementation plans.

- **DMV's Modernization Vision & Existing Challenges** – Documents the DMV's vision for modernization and outlines the challenges posed by the current system.

- **System Scope & Future System Blueprint** – Defines the scope of modernization, detailing which functions will be included in the proposed AZ MAX solution.

- **Implementation Timeline** – Presents timeline options for deploying the AZ MAX solution, including phased and consolidated approaches.

- **Customer Service Benefits** – Evaluates when and how the DMV expects to realize improvements in customer service.

- **Staffing Plan Assessment** – Reviews the DMV/DIT staffing strategy for the implementation phase and long-term system maintenance.

- **Data Security** – Assesses the security protocols in place to protect DMV data within the modernized system.

- **Other Factors** – Examines the expectations of external stakeholders and third parties regarding the new system.

- **Potential Pricing Structure** – Analyzes the DMV/DIT cost estimates and pricing strategy for modernization.

5. Overall Assessment of DMV's Strategy and Plan

Assessment Task:	**Conduct an in-depth analysis of the Division's plan to implement a cloud-based operating system and any other updates to its IT systems.**
Assessment Approach:	As part of the assessment, Mathtech reviewed prior work efforts, collaborated with the leadership and staff to assess current challenges and their vision for modern operations, reviewed the planned scope and approach, and leveraged experience from other DMV modernization projects to develop this assessment.
	Mathtech leveraged its planning and assessment framework, focusing on components of a successful modernization project, to guide the assessment.
Summary Findings:	■ The Division's current mainframe systems are outdated and overdue for replacement. These legacy systems support all operations, including all Driver and Vehicle services, but they keep the Division operationally "frozen in time" and hinder efforts to meet stakeholder needs.
	■ The Division needs to replace all of its systems fully. There is no real option for a partial or incremental upgrade.
	■ The Division and DIT have a reasonable strategy for system modernization, which is to leverage a modern system built by the Arizona Motor Vehicle Division (MVD), known as the AZ MAX system. The details of the modernization plan are not finalized at this point.
	■ The AZ MAX solution is technically modern and complex and should meet the Division's needs. The Division has been conducting a commendable analysis of the AZ MAX solution.
	■ Other states are adopting the AZ MAX solution, but no state other than Arizona has fully implemented it yet. Wyoming is more than halfway through its implementation of AZ MAX Driver Services functions, and the project is proceeding successfully.
	■ The Division and DIT have begun modernization preparation efforts that are consistent with Mathtech's expectations, including data preparation, documentation of business processes, personnel planning, and an in-depth analysis of the proposed AZ MAX solution.
	■ The Division and DIT's plan to build an internal team to support the implementation and lead long-term maintenance of the system is sound. Still, it will require significant hiring and training efforts to be fully implemented.
	■ The Division and DIT should fully engage a system implementation vendor with deep AZ MAX experience to refine the plan and approach, conduct the functional analysis, and develop and implement the system. During the implementation, the Division and DIT should collaborate with and support the implementation vendor and oversee its activities.
	■ A complete DMV modernization using a modern solution such as AZ MAX, including both Vehicle and Driver Services, typically takes about 4 years to complete once the implementation vendor begins work.
	■ The current DMV systems are expensive to maintain, and over time, a new system should pay for itself and be less costly to maintain.

5.1   Understanding the DMV's Strategy

Mathtech's understanding of the DMV/DIT modernization strategy was developed through many discussions and a review of its documents and plans. Though not necessarily presented in one definitive document, the DMV/DIT team was unified in expressing:

- The complexity, challenges, and importance of the project,
- The goals and objectives they hoped to achieve,
- The general strategy for moving forward.

The DMV/DIT team is clearly in an "Assessment and Planning" phase, which was put on hold during this external assessment. The Mathtech team developed the following understanding of the current modernization strategy.

DMV/DIT Modernization Goals

- Replace the existing portfolio of legacy systems and transition off the mainframe platform, which is both costly and lacks flexibility.
- Achieve the vision of improving operations, increasing operational efficiency, and enhancing customer service.
- Position the State for long-term success and an ability to support its systems and operations.

DMV/DIT Modernization Strategy

The DMV/DIT strategy is to leverage a high-quality, prebuilt solution that matches the required scope of functionality and avoids the challenges, costs, and risks of building a complete solution from scratch. The strategy is to implement a solution that is:

- **Technically Strong** and leverages modern technologies, including cloud hosting and services.
- **Feature-Rich** with support for modern DMV and customer service features such as eTitling, a Self-Service Portal, and mobile driver's licenses (mDL).
- **Functionally Complete** with full support for all Driver and Vehicle functions and interfaces to mandatory AAMVA systems and other Federal systems.
- **State-Controlled** with a solution that the State could directly own, control, and manage.
- **Technically Transparent** through a solution that the state could carefully inspect for technical quality and security issues.
- **Vendor Independent** with a solution that allows for vendor competition and options, flexible support options, and a solution that doesn't lock the state into dependence on one vendor.
- **Supported** by vendors and other DMV jurisdictions to enable collaboration, shared investments, and mutual benefit from collective efforts.
- **Fully Integrated,** allowing data to be shared across business functions and simplifying business processes.
- **Able to Achieve the DMV's Vision** through existing capabilities and future expansion.

Sound Strategy – Given the available solutions, the DMV/DIT team selected the AZ MAX Solution.
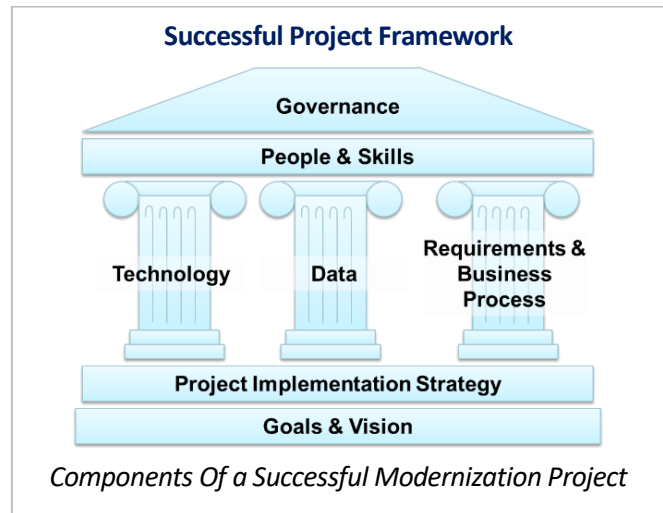At a high level, this is a sound strategy being leveraged by other jurisdictions, including Wyoming and Virginia, and other states are likely to follow.

5.2   Assessment Framework – Mathtech's Components of a Successful Project

To assess the DMV's modernization strategy and plan, Mathtech leveraged its *Successful Project Framework,* which is used for both planning new projects and assessing existing plans and projects.

The framework includes seven components that all projects must successfully address.

The following table describes each component and Mathtech's general assessment approach.

Components Of a Successful Modernization Project

Component	Description	*Mathtech Assessment Approach*
Vision	A clear vision and goals are critical for modernization projects and the foundation for success.	*Mathtech conducted Vision sessions to assess the DMV's challenges and vision for modernization.* ***See Section 9, DMV's Modernization Vision & Existing Challenges, for a detailed analysis of the DMV's Vision.***
Project Implementation Strategy & Execution Approach	No vision can be implemented without a thoughtful and complete plan. As a foundation for success, an agency's strategy and project plan must address all aspects of project management.	*Mathtech reviewed the DMV's implementation strategy and plan from the perspective of the PMI PMBoK, which is the industry standard for project management.* ***This section includes the assessment based on PMBoK. For a detailed review of past and current efforts, see Section 8, Review of the DMV's Modernization Efforts and Plans.***
Technology	Successful projects must have a solid strategy for using technology and ensuring that the technology meets the project's needs and is consistent with the State's technical capabilities.	*The Mathtech team understands the scope and capabilities of the AZ MAX solution and reviewed the DMV's preparation and planning efforts to assess its technical quality.* ***See Section 10, System Scope & Future System Blueprint***

Component	Description	*Mathtech Assessment Approach*
Data	Success depends on a team's recognition of data's importance to a modernization project, along with proper planning and a strategy for documenting, assessing, cleaning, and otherwise preparing data for the new system, as data typically outlives the system.	*The Mathtech team reviewed and discussed the DMV's data preparation strategy with the DMV/DIT team, a project that the DMV had initiated earlier in 2024. Mathtech also reviewed the State's data security protocols.* ***See Section 8, Review of the DMV's Modernization Efforts and Plans, for a detailed review of the past and current efforts.*** ***See Section 14, Data Security***
Requirements and Business Processes	A clear project scope is essential for success; this includes understanding the big picture of the scope and the approach for implementing it, as well as the details of all the individual processes that must be supported.	*Mathtech reviewed the DMV's scope expectations and project approach using our Future System Blueprint tool. We also reviewed and discussed the DMV's strategy for confirming the fit between the AZ MAX solution and its needs. The DMV had already initiated a project earlier in 2024 to compare AZ MAX to its needs.* ***See Section 10, System Scope & Future System Blueprint***
Staffing	Properly skilled and knowledgeable IT staff and business operations staff are critical to a large, multi-year modernization project. Even if an implementation vendor brings substantial staff, the State needs to be an active and capable participant.	*Mathtech reviewed the State's estimation of staffing needs for the project and discussed how it planned to implement it conceptually.* ***See Section 13, Staffing Plan Assessment***
Governance	Governance is critical for guiding a large-scale project, setting priorities, addressing challenges, and ensuring that all necessary resources are available.	*Mathtech reviewed preliminary documentation describing the state's planned Governance model and observed how the State responded to information requests and discussions.*

5.3   Vision

The Division has a sufficiently clear and consistent vision for the modernization project. Mathtech reviewed project documentation and had numerous discussions with a range of DMV leadership and operational staff, as well as DIT leadership and staff. The Vision is consistent with many state agencies and DMVs across the country that struggle with outdated computer systems. Mathtech found the Division's Modernization Vision to be:

✓ **Clear** – The Vision presented in this analysis is not pulled from one specific DMV/DIT document. Still, the leadership and staff were able to clearly articulate their vision for modernization and goals to operate more efficiently and better serve stakeholders.

✓ **Consistent Across Division** – The Vision presented to Mathtech was consistent and unified across each business area.

✓ **Consistent with Industry** – The Vision presented to Mathtech was consistent with DMV operations across the country and aligned with common initiatives such as the implementation of mobile driver's license documents (mDL), electronic titling, general process automation, and self-service.

✓ **Realistic** – The Vision presented for moving forward reflects a practical understanding of modern technologies and aligns with solutions currently available in the marketplace. It is achievable and does not present unusually high levels of risk.

Section 9 of this report, *DMV's Modernization Vision & Existing Challenges*, includes the details of the Vision Session discussions and the resulting vision and challenges, which are consistent with other successful modernization projects.

5.4 Project Implementation Strategy & Execution Approach

When assessing the implementation strategy and execution approach, the Mathtech team reviewed the current and planned activities. The Mathtech team used the knowledge areas from the Project Management Institute's (PMI) project management guidelines (PMBoK) as an assessment framework.

The DMV/DIT team executed formal planning and assessment projects in 2024 and has been in the middle of a "Planning and Assessment" Phase, where it focused on the following:

■ **Assessing the Technical Quality of the AZ MAX System** – The team has performed a range of code scans and analyses on the AZ MAX code to identify quality, complexity, and security concerns.

■ **Defining DMV Scope and Requirements and Comparing to the AZ MAX Solution** – The team is reviewing existing documentation of DMV business processes and is attempting to identify gaps between DMV operational needs and the AZ MAX capabilities.

■ **Assessing and Preparing Existing Data** – The team is executing a plan to review the documentation and quality of existing data with the goal of cleansing and preparing the data for migration to a new system.

■ **Estimates of Staffing Requirements** – The project team has prepared preliminary estimates of staffing requirements. However, no formal plan has been finalized, nor will it be until this assessment is complete and a plan for moving forward is approved.

■ **Discussion with Arizona Team and Vendors on Approach** – The State had engaged Arizona's implementation vendor to perform an initial analysis and assist with planning. That effort was placed on hold while this external assessment is underway.

Assessment of the Modernization Strategy Using the PMI Framework

Assessing the DMV/DIT modernization strategy using the PMI Framework, the Mathtech team made the following observations.

■ **Schedule** – The team does not have a definitive project schedule that maps out the entire modernization effort to completion, as they are not far enough along in finalizing the approach. Additionally, planning and collaboration with the potential implementation vendor were paused for this assessment, and this collaboration is required to finalize the full modernization schedule. The DMV does have a schedule for activities that are in progress, including business process work, data analysis, and code analysis, and this schedule was of sufficient detail and reasonably organized.

■ **Scope** – The scope of the project is sufficiently defined.

▪ **Minimally**, the project needs to replace the current systems and support existing system functions; the modernization effort cannot cause DMV operations or customers to lose functionality.

▪ **Ideally**, the DMV is looking to implement the new system and support all of the functionality needed to support its entire vision for improved operations and enhanced customer service.

- **Realistically**, Mathtech expects that the DMV will implement all desired functionality that the AZ MAX solution offers and build into the future with enhancements and other tools and solutions.

- **Cost** – The DMV does not have a budget at this time to execute the entire project. Collaboration with the implementation vendor would be needed to finalize the duration of the implementation effort, the number of phases, resourcing, and other factors impacting costs.

- **Resources** – See section *5.8 Staffing* below.

- **Quality** – The team's Quality Management approach needs to evolve throughout the project. The state has targeted a number of important quality issues at this early point in the project through the activities executed to date. This includes:

  - **Technical Quality** – The DMV's effort in source code analysis is inherently focused on ensuring that the DMV implements a system of acceptable technical quality.

  - **Security** – The DMV's effort in assessing security vulnerabilities in the code focuses on ensuring that the system is of high quality from a security perspective and identifying needed upgrades to ensure its overall quality.

  - **Implementation Quality** – The DMV's strategy to develop internal technical resources that understand the coding and architecture of the system should allow the DMV/DIT team to better monitor and manage the quality of the implementation vendor's technical work over the course of the implementation and afterward.

- **Communications** – Internal project communications appear functional. Broader stakeholder communications plans have not been enacted at this point.

- **Stakeholder Management** – No substantial stakeholder outreach has begun as the actual project implementation has not started, nor is it formally planned. The DMV directed the Mathtech team to a number of important external stakeholders to interview. The State has also identified Organizational Change Management as an important project task.

- **Risk** – Strategically, the DMV's modernization effort is addressing some high-level risks. As the project progresses and an implementation vendor is engaged, a more detailed risk management process will need to be implemented. In this early phase of the project, the strategy is addressing two substantial risks, specifically:

  - **Security Vulnerabilities** – The DMV's focus on source code analysis will partially address security risks, and security vulnerability management should be incorporated into every phase of the project.

  - **Never-ending Project and Outright Failure – DMVs have struggled with modernization over the past 20 years,** with many failed projects. The complexity of DMV systems is often underestimated. Custom development projects are notorious for substantially overrunning their schedules and budgets. The selection of a pre-built system and the engagement of an implementation vendor that is experienced with the system will help to minimize that risk.

- **Procurement** – The procurement process for this project appears unclear at this time. The DMV has executed a no-cost MoU with Arizona for the AZ MAX source code, but the DMV still needs to engage project support and an implementation vendor. The various State entities (i.e., DMV, DIT, Procurement) should collaborate to determine which procurement options are available and select the quickest.

FINDINGS

Schedule Assistance – The DMV needs the implementation vendor's assistance in finalizing a schedule. The implementation vendor must commit to the scope and cost. A complete DMV modernization using a modern solution such as AZ MAX, including both Vehicle and Driver Services, typically takes about 4 years to complete once the implementation vendor begins work.

Approach Assistance – The DMV will also need to collaborate with the implementation vendor to define the approach, including whether the system can be implemented in two phases, Driver Services followed by Vehicle Services or a consolidated approach where both functions are rolled out together. The deciding factor will likely be the ability to integrate with the existing STARS and SADLS systems in the short term.

Cost Assistance – The DMV will also need to negotiate with the implementation vendor or conduct a procurement to ascertain implementation costs. Mathtech has developed a cost model as part of this assessment, and it should guide the State in further planning.

Procurement Approach – State stakeholders need to determine available procurement paths for vendor services to support the project.

Project Management Team – The State should start building its Project Management Office (PMO) to manage the project as it moves into the next phase.

5.5   Technology

The AZ MAX solution is a sound technology selection that was built and recently deployed by the State of Arizona and its implementation vendors. Arizona is considered a leader in DMV operations and one of the first states to implement an intra-state eTitling solution.

The AZ MAX solution is a modern, cloud-native application, meaning that it was built to take advantage of the benefits, maintainability, and scalability of cloud services like Microsoft Azure.

Wyoming and Virginia have adopted the AZ MAX solution, but neither state has completed the implementation. Wyoming is over a year into the implementation and is planning a rollout later this year.

The NC DMV has prioritized finding a solution and thoroughly assessing it before committing to moving forward.

FINDINGS

DMV and DIT staff have spent substantial time performing a deep analysis of the tools, technologies, and coding practices used to create the AZ MAX system. These results were shared with the Arizona team and Mathtech confirmed that the Arizona team found them insightful and positive. The State found that the system was complex but also well-designed. Any concerns that the State found can be addressed or may already have been addressed in newer versions of the AZ MAX system.

The State's conclusions are consistent with Mathtech's understanding of the AZ MAX solution, and Mathtech has spent time with the Arizona team reviewing their processes for software development, documentation, and architecture management. The State team has conducted an analysis that is deeper and complementary to those performed by Mathtech on another project.

The State has not been able to conduct any performance tests because it does not have a working system, only a code base.

5.6   Data

The DMV has formally established a project to document, assess the quality of, and cleanse existing databases in preparation for modernization. This is a multi-year effort, and it should be an early activity in the implementation strategy.

The DMV's current plan allocates approximately two years for this process, and the planning and Data Quality tool selection for this effort have already started.

Cleansing efforts are always difficult to estimate as the amount and complexity of data quality issues and the related cleanup effort cannot be fully estimated until the quality issues are found.

5.7   Requirements and Business Processes

Business process documentation is a critical component of a successful modernization project because any new system must implement all of the required business processes. The DMV has documented business processes over multiple projects in the past years and has used these documents to perform a gap analysis comparing DMV processes to the AZ MAX software.

5.8   Staffing

The DMV has developed a project team resource estimate that includes upwards of 70 staff, including software developers and architects, business analysts and testers, project managers, and leaders. The resource estimate sufficiently estimates the number of staff needed to implement a large DMV system, specifically the AZ MAX solution. The ratio of State resources to Implementation Vendor resources has not been determined. Collaboration with the Implementation Vendor is needed to further strategize that ratio so that the system can be implemented in a timely, low-risk manner and so that the state can train an internal team that can support the system in the long term.

Implement the "2-in-a-Box" Knowledge Transfer Approach – State IT staff should shadow and collaborate with the implementation vendor, gaining expertise and transitioning into active contributors over time.

5.9   Governance

DMV/DIT Participation and Draft Governance Structure – Throughout our interactions with the State, all levels of DMV and DIT leadership, managers, and staff participated in the assessment. In this "Assessment and Preparation" phase the State was following its prescribed project management and SDLC methodology. The DMV/DIT team shared a draft governance structure for the larger modernization effort with Mathtech for review.

FINDINGS

Assessing the Draft Governance Structure – Mathtech evaluated the draft governance model in the context of best practices for large-scale public sector IT modernization projects, with a focus on DMV operations. The proposed governance framework is properly conceived, featuring executive, strategic, and operational levels of oversight. It includes business and technical leadership, cross-functional advisory teams, and clear meeting cadences. It reflects best practices in aligning business and technical leadership and creating structured feedback channels. A large modernization effort must be treated as a transformation with full participation from business and IT.

Refining the Governance Structure – As it is refined, the governance structure will need greater clarity around decision-making authority and formal mechanisms for managing risks, changes, and benefit realization.

Evolving the Governance Process – As the project moves from planning to engaging an implementation vendor to assessing the transformation to a new system to implementing the new system, the DMV/DIT team will find that the governance structure will need to adapt over time in terms of meeting cadence, levels of stakeholder participation, and overall effort required.?

6. Modern Driver and Motor Vehicle Systems – Industry Expectations

As the State plans to implement a modern Driver and Motor Vehicle system, a number of features and capabilities should be expected.

6.1 360-degree View of the Customer

DMV agents and customers will have a complete "360-degree view" of customer information with the ability to:

- **View All Products & Correspondence –** Customers and agents will have a place where they can view all customer products, such as driving credentials, vehicle registrations and titles, and other products.
- **View All Issues and Problems –** All violations and the driver's entire transaction and violation history will be visible in one place for both the customers and the agents.
- **View Compliance and Reinstatements** – Customers and agents will be able to view all the compliance and reinstatement requirements that the customer needs in one place.

6.2 Easy-to-Understand Driver Records

Many legacy systems are capable of tracking driving record violations and reinstatement requirements, but they are often very difficult, if not cryptic, to read. Modern systems display this information in a format that is easy to read for both the customer and the agent. This eliminates erroneous and changing interpretations and makes staff training much easier.

6.3 Fully Integrated and Real-Time

A modern system will allow DMV to integrate business processes with all partners and stakeholders electronically. This will increase efficiency, reduce transaction time, and increase customer service. This includes the courts, dealerships, financial institutions, and other partners. In general, this covers:

- **Real-time Data Exchange** – Data from DMV partners, such as parking tickets, citations from courts, and accident reports from law enforcement, should be electronically received in real-time
- **Automated Data Processing** – All data received from DMV partners should be processed automatically when received
- **Real-time with National Databases** – Interfaces with national databases and systems such as NMVTIS, AAMVA, FMSCA, USCIS, IRP, IFTA and others should be real-time
- **Meaningful Error Reporting** – Clear and detailed error messaging should be provided to partners to improve the timeliness and quality of transaction processing

6.4 Support for National Standards

The DMV operates in a community where data must be continually exchanged with other jurisdictions and national clearinghouses. These data exchange standards are continually evolving and becoming more complex including enforcement and oversight of commercial drivers, the exchange of driver records, processing of vehicle titles, mobile driver license information, and electronic titles. Modern systems have this functionality built-in and often include a support strategy for staying up-to-date and in compliance.

6.5 Online Services

Modern Motor Vehicle and Driver Licensing Systems provide customers with a range of online services so that they can check products, submit transactions, upload documents, and have access to their accounts. These services are improvements in customer service and allow for more efficient operations. The range of services should be considered similar to those that a customer has for online banking.

6.6   E-Titling

Modern systems support a number of components that are necessary for electronic vehicle titling including automated interfaces to car dealers, banks and lenders, national databases, and identity management services. These functions and more are necessary to implement electronic titling in the coming years.

6.7   Strong Financial Management

Modern systems should provide a full set of tools to fully support the accounting of all financial transactions, collection and distribution of revenue, and reporting and management activities. The system should be fully integrated into the State's financial system and allow the DMV to execute its fiduciary responsibilities accurately and efficiently. This includes the following:

- **Complete Point of Sale System** – The system should track payment collections by customer accounts, transactions, and individual line items; generate automated deposits; perform cash drawer closeout; generate closeout reports; and support cash-drawer balancing.

- **Inventory Tracking and Management** – Staff should be able to track and manage inventory at the cash drawer and generate related inventory reports.

- **Standardized Financial Functions** – The system should support standard financial functions such as accounts receivable (AR) and general ledger (GL), including the ability to perform financial adjustments.

- **Comprehensive Financial Reconciliation** – The system should support financial reconciliation across all transaction types, including purchases, payments, receipts, deposits, distributions, refunds, and other DMV financial activities.

- **Payments and Refunds Management** – The system should include integrated capabilities for managing all aspects of refunds and dishonored payments.

- **Financial Reporting and Analytics** – The system should be able to generate a full range of standard and ad hoc financial reports and analytics to meet DMV user needs.

- **Automated Revenue Distribution** – The system should be configurable to automate the receipt and distribution of transaction funds to appropriate sub-accounts.

6.8   Integrated Document Management

Modern DMV systems typically contain all of the document management functions that are required to process driver, vehicle, and business licensing transactions. This allows the system to accept scanned documents, process them, and attach them to customer records and specific transactions. This makes the management and retrieval of these supporting documents much easier for all staff, ensures seamless access to documents by both state and county users, and better supports auditing and other oversight functions.

7. Assessment of the Current DMV Systems

Assessment Task:	**Conduct an in-depth analysis of the Division's plan to implement a cloud-based operating system and any other updates to its IT systems.**
Assessment Approach:	As part of the assessment, Mathtech reviewed the status and scope of the current systems. The condition of the current systems impacts the available options for moving forward.
Summary Findings:	There is little value in preserving the existing COBOL/Mainframe systems. They do not offer a solid foundation for new functions, the technology is outdated, they are very expensive, and any attempts to incrementally upgrade them will prolong the burden of maintenance for another 10 years.

7.1 Portfolio of Systems

The DMV's portfolio of systems includes:

- **SADLS** – Supports driver services
- **LITES** – Tracks liability insurance
- **IRP/MC** – Supports International Registration Plan and motor carrier functions
- **OpenText/SharePoint** – Stores and retrieves documents
- **NST** – Tracks notice, storage, and theft cases

- **STARS** – Supports vehicle services
- **MILES** – Handles vehicle inspections
- **FUELTACS** – Processes motor fuel tax, inspections, and enforcement
- **iNovah** – Processes point-of-sale financial transactions

7.2 Technology & Status – Frozen in Time

The DMV's systems are primarily 30-year-old COBOL systems that support all main operations as well as customer websites and interfaces with dealers, insurance companies, banks, federal agencies, and law enforcement. These functions are spread across multiple subsystems and these systems have varying degrees of integration and data sharing. The result is the following:

Difficult to Maintain – Like many older systems, the DMV's systems have limited design and business rule documentation, which makes them difficult to maintain and creates a dependence on experienced staff who understand the system logic and programming. A capable IT team supports the system, and while small changes may be accomplished quickly, complex changes can take significant time to complete.

Frozen in Time – The DMV and agencies in similar situations find themselves "frozen in time" and unable to substantially modernize operations or provide new services such as end-to-end online transactions because the system cannot accommodate such enhancements, and the burden of ongoing maintenance is a distraction. Furthermore, mandatory enhancements to the system to maintain legislative or federal compliance are slow, time-consuming, and continually introduce the potential of breaking the system.

Architecture of Disparate Technologies – The DMV's portfolio of systems includes the core DMV systems along with a range of other technologies and systems that collectively support the DMV. Integration among the systems is limited, which makes data retrieval difficult and increases the likelihood of errors as staff toggle between systems to complete transactions.

7.3   Typical of Many State Agencies Around the Country

Many state agencies across the country face similar challenges, balancing the need to extend the life of aging systems with the cost and complexity of modernization. Based on Mathtech's experience with similar situations, it is clear that the North Carolina DMV is at a point where system modernization is both necessary and timely.

7.4   Time For A Full Replacement of the DMV Systems

At this point in the DMV's system lifecycle, there is little value in preserving the existing COBOL/Mainframe systems. They do not offer a solid foundation for new functions, the technology is outdated, they are very expensive, and any attempts to incrementally upgrade them will prolong the burden of maintenance for another 10 years. Furthermore, every potential incremental enhancement would have the challenge of retrofitting to older technology. If the State can invest in modernization, it can fully position the DMV and the State for substantial operational improvements.

8.　Review of the DMV's Modernization Efforts and Plans

Assessment Task:	**Conduct an in-depth analysis of the Division's plan to implement a cloud-based operating system and any other updates to its IT systems.**
Assessment Approach:	As part of the assessment, Mathtech reviewed historical documents and prior modernization initiatives to understand how the DMV arrived at this point in its modernization effort. Mathtech also had numerous follow-up discussions with leadership, operational staff, and IT staff to understand current efforts. Understanding the DMV's prior efforts and lessons learned is important for understanding and assessing the current modernization plan.
Summary Findings:	*Prior Efforts* The DMV previously pursued a refactoring approach to migrate off its COBOL-based mainframe system but found that refactoring preserved outdated business logic and technical debt. Some work products from that effort, such as business documentation, should be reusable moving forward. Mathtech believes that refactoring is unsuitable for full modernization, as it retains legacy system flaws while still requiring substantial rework. *Modernization Current Status* The DMV is in an "analysis and preparation" stage, with AZ MAX identified as the preferred solution due to its completeness, adaptability, cloud-based architecture, and ability to be owned and managed by the State. AZ MAX is a Microsoft Azure cloud-based system developed by Arizona DOT DMV. AstreaX (architecture and development) and Kyndryl (development and implementation) led its implementation. Other states, including Wyoming and Virginia, have begun implementing AZ MAX, but no jurisdiction outside Arizona has deployed it yet. *AZ MAX System Evaluation Approach & Preparation* The Division's modernization team is performing a thoughtful and fairly detailed analysis of the AZ MAX Solution to determine if it meets the State's standards for: ■ Security ■ Technical Quality ■ Functional/Business Requirements The Division's team is also preparing to review DMV data and execute a data cleansing effort. *Moving Forward* Mathtech believes that the Division will find that the AZ MAX aligns well with its modernization vision and functional expectations. The DMV does not currently have access to a working AZ MAX system for testing; Mathtech recommends collaboration with Arizona and its implementation vendors (AstreaX and Kyndryl) to create a test system.

	The DMV had planned a Proof-of-Concept pilot by June 2025, but this was paused due to this external review.
	A detailed implementation schedule has not yet been developed, pending further analysis and input from the implementation vendor.

8.1 Approach

Our review of current and historical documents and plans included an analysis of the planning and project materials provided to Mathtech by the DMV and discussions with team members. We analyzed the existing documentation provided to us, made observations, and developed our observations into findings.

The primary objectives of the review were to understand:

- **Historical modernization initiatives and lessons learned.** This includes understanding the Division's work with Gartner to prepare for a potential refactoring project. (Refactoring projects aim to take the existing driver and vehicle systems and translate them into a newer programming language)
- **The current activities related to the DMV's modernization initiative.** This includes reviewing capital authorization requests, project charters, schedules, requirements gathering documents, code analysis results, and data cleansing documentation. Taken together, these documents show the Division's coordinated approach to the current system modernization.

8.2 Document Identification and Collection

On November 21, 2024, Mathtech requested the following documentation from the client. A list of the documents received is contained in Appendix A.

General

- Identification of Key Stakeholders
- DOT/DMV Organization chart(s)

Planning & Analysis

- Any departmental or division priorities or strategies, especially related to operational improvement and customer service
- Past or current operations/IT analyses, reports, or strategies

Technology

- Description of current DMV systems and any known strengths or weaknesses
- Description of existing IT projects

Operations

- Current level of business processes documentation
- Any operational strengths, weaknesses, or current concerns

AZ DOT & AZ MAX Solution

- Agreements or other documentation with AZ DOT and related vendors
- Evaluation or analysis leading to the AZ DOT decision
- Any preparation or project work completed related to the AZ DOT MAX system

8.3   System Analysis and Modernization Timeline to Date

DMV/DIT modernization activities date back to 2013, with a focus on refactoring/translating the current systems into a new programming language. In late 2023, DMV/DIT began an informal investigation into the AZ MAX system. This effort became more structured in January 2024 when the Division signed a Memorandum of Understanding (MOU) with the State of Arizona and obtained the AZ MAX source code for analysis. Over the first half of 2024, the team developed a general understanding of the system and its source code, leading to the execution of a Business Project Request and a DMV Systems Analysis/Gap Analysis plan and schedule in Q3 2024. As the team proceeded with its plan to assess the AZ MAX system, the legislature called for an external review. In response, Mathtech was engaged in November 2024 to conduct this assessment, and the DMV's formal modernization planning process was put on hold.

Timeline of Activities

- **2013.** The Division began working with Gartner to document and improve its business processes.
- **2022.** The Division confirmed that Gartner's proposed refactoring approach would not meet Division objectives and halted refactoring efforts.
- **2023 December.** An Assessment of AZ MAX commenced.
- **2024, January 23.** The DMV signed a Memorandum of Understanding with the Arizona Department of Transportation to secure all the source code for their IT Solution, Arizona Max – DASM Resource Plan.v5_0402.2024.
- **2024, January 24.** The NC DMV Information Technology Cloud Adoption Plan outlines the steps to develop a modernization roadmap.
- **2024, February 19.** Per the Application Systems Replacement plan, the NCDIT-Transportation team began an analysis and assessment of the Arizona MAX solution – DASM Resource Plan.v5_0402.2024.
- **2024, July 26.** DASM: Plans for DMV Application System Replacement document is circulated.
- **2024, August 26.** The Business Project Request form to conduct a 'DMV Systems Analysis' is executed.
  - The project is described as an "enabler and critical path for existing and future DMV System Modernization efforts."
  - The schedule section indicates a start date of 10/1/2024 and a finish date of 9/30/2026 with a 6-month confidence interval.
- **2024, August 29.** DCSA Systems Analysis project commences as per Project Schedule DCSA Systems Analysis DRAFT 120424.
- **2024, September.** The DMV Systems Analysis/Gap Analysis Approach documents a plan to perform a gap analysis comparing AZ MAX to the NC Division's needs. The approach involves Technical and Functional gap analyses for the following applications: SADLS, STARS, LITES, IRP/MC, Emissions, and others.
- **2024, September 26.** Kyndryl provides the Division with a draft Statement of Work to perform 6-8 weeks of analysis to do an assessment and planning.
- **2024, November 15.** Mathtech commences DMV IT Modernization Evaluation SB607.

8.4   Observations

8.4.1 Past Refactoring Modernization Initiative

While smaller-to-mid-sized modernization efforts are ongoing at DMVs and other government agencies across the country, complete modernizations are typically conducted only once every few decades.

The DMV/DIT began working with Gartner to document its procedures in 2013 and eventually settled on preparing for the refactoring of the DMV systems to move them off the State's mainframe computer platform.

The DMV/DIT team found that after laying the groundwork to move their systems off the mainframe, the proposed refactoring solution still had major issues. The team decided to meet with the State of Texas to understand their refactoring project better. This culminated in DMV/DIT staff traveling to Texas to see the results of their refactoring project, where the Texas DMV confirmed that refactoring had led to an unsatisfactory outcome for Texas. Subsequently, the DMV/DIT team halted refactoring efforts.

Mathtech Insight: Refactoring projects are typically good for transferring existing functions to a new hardware platform or programming language, but they inherently maintain the same flawed database, business logic, and the same good or bad capabilities of the initial system. Real benefits come from redesigning or rewriting the existing software. Proponents of refactoring or code conversion will suggest that it creates a platform from which to build forward with modern tools. Still, it also leaves the business and technical staff anchored to the original design with a substantial rework that can be equivalent to a total rewrite. For this reason, the DMV chose wisely not to pursue this approach for modernization.

Reusable Work Products: The earlier work of preparing for a refactoring project potentially resulted in work products such as business process documentation that the DMV can reuse and build upon as it moved into the preparation phase for the AZ MAX modernization.

8.4.2 Current Modernization Status

AZ MAX Selection

The current DMV modernization project is in the "analysis and preparation" stage. The team understands its current challenges and has a vision for its future state. In 2023, the team researched potential modernization alternatives and settled on the AZ MAX solution as its preferred option.

The DMV/DIT team decided to focus on AZ MAX based on feedback from other jurisdictions, its completeness as a solution, and its adaptability to North Carolina's specific needs. The team determined that AZ MAX could effectively support both internal and external operations and prioritized the State's ability to control and manage the system's security and functionality.

Mathtech Insight: DMVs across the country face or have faced the same modernization challenges that the NC DMV is facing. Some agencies have needed to replace parts of their system, and some agencies have needed to perform a complete replacement. For agencies needing a complete replacement of all Driver and Vehicle Services, Mathtech sees only two viable solutions/strategies in the market – and that is implementing either the FAST Enterprises DS-VS solution or the AZ MAX solution. Both offer complete solutions matching the modernization vision of the NC DMV.

The AZ MAX solution is a Microsoft Azure Cloud-Based Solution developed by the Arizona DOT DMV over the past 10 years. It supports the full range of driver and vehicle services and interfaces with all necessary AAMVA and Federal government systems. It also supports a range of modern functions, such as mobile driver's license (mDL) and eTitling.

The AZ MAX system was custom-developed for Arizona and, by all accounts, is a well-designed system leveraging cloud technologies, built to be flexible, and developed with the idea of strategically being shared with other jurisdictions. The implementation vendors associated with the development of the AZ MAX solution are AstreaX, which has led the architecture and software development, and Kyndryl, which serves as the overall integration vendor and also supports software development. As other jurisdictions seek to implement the system, it is primarily Kyndryl that serves as the prime contractor and integrator.

Arizona has a further goal of seeing multiple jurisdictions collaborate together to support the system. At least two other jurisdictions have begun to implement the AZ MAX solution: Wyoming and Virginia. Wyoming is over one year into the implementation process and expects to deploy the Driver Licensing functions in late 2025. Virginia is

approximately 4 months into a 3.5 to 4-year effort to implement both Driver Services and Vehicle Services.

At this time, no jurisdiction other than Arizona has the system up and running. Mathtech has been working with Wyoming since the beginning of its modernization effort and believes the project is proceeding successfully.

AZ MAX Analysis Approach

The DMV/DIT team developed an approach and an associated schedule to support their AZ MAX solution analysis. The approach is depicted on page 8 of the DASM: Plans for DMV Application System Replacement document dated July 26, 2024, and it is titled "The Deeper Dive & Gap Analysis."

The Deeper Dive and Gap Analysis Plan depicts the approach to validating that the AZ MAX solution will meet the state's needs.
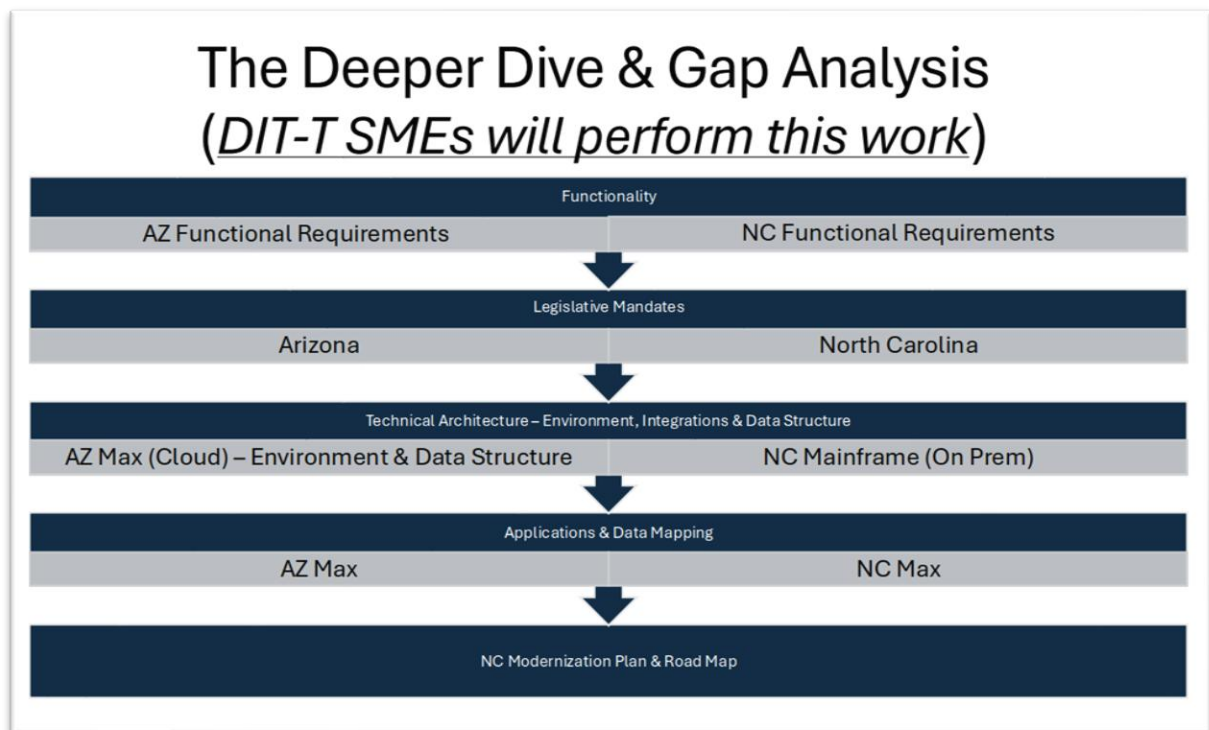
AZ MAX System Analysis and Data Preparation

The AZ MAX evaluation process commenced in December of 2023. The DMV/DIT team received code from the Arizona MVD in January 2024, and the team has been performing analysis on the code and overall solution. The team periodically followed up with Arizona MVD staff to request and/or review additional documentation regarding their systems. Some of the requested documentation was either not entirely available from the Arizona MVD or needed to be obtained from Arizona's implementation vendors, Kyndryl and AstreaX.

Currently, the DMV/DIT team is not actively communicating with the State of Arizona, as that process was put on hold during this assessment.

The team has two major initiatives underway that will support its modernization:

- **System Analysis / Gap Analysis** involves evaluating the AZ MAX capabilities against the needs of the Division. Included in this analysis are the following:
  - **Requirements Gap Analysis** that compares AZ MAX capabilities against Division business requirements
  - **Technical System Analysis** that compares the AZ MAX code and architecture against the Division's technical and security expectations.

- **Data Preparation & Cleansing** involves preparing the Division's data for migration to a new system. Based on the current schedule, it is expected to be completed around November 2026. At this point, the team is in the process of reviewing data analysis tools.

Technical System Analysis

The DMV/DIT team conducted a fairly comprehensive assessment of the AZ MAX source code before confirming it as a viable solution for its modernization efforts. This evaluation continues and includes comparing the AZ MAX codebase against North Carolina's development standards and security requirements.

To ensure compliance, the DMV/DIT team has been leveraging code analysis tools to assess the AZ MAX code against North Carolina security policies, ISO standards, and NIST 800-53 security controls. Additionally, the assessment evaluates deviation from industry software development best practices and overall code quality.

Code Analysis

DMV/DIT code scans and analysis of the AZ MAX source code, provided by Arizona, focused on the following:

- Code complexity
- Security vulnerabilities
- Coding style consistency
- Logical flow and maintainability
- Adherence to established coding standards

To maintain continuous due diligence, the team plans to conduct ongoing scans of refreshed code versions to ensure alignment with its modernization requirements.

The DMV's Initial Findings

The DMV/DIT assessment to date indicates that the AZ MAX code is secure, adheres to best practices, and meets a high-quality standard, making it a strong candidate for North Carolina's modernization efforts. The assessment has identified opportunities for code improvements, and these issues are being categorized and prioritized for resolution. The team has reviewed some of its findings with the Arizona team, and both parties were pleased with the findings and their collaboration.

Requirements Gap Analysis

The team has been conducting a high-level gap analysis to evaluate how well the AZ MAX system aligns with its business and IT requirements. This assessment involves comparing the Division's required capabilities with those available in AZ MAX and determining whether the system can either meet these needs as-is or be customized accordingly.

The DMV/DIT team is conducting an in-depth review of AZ MAX's capabilities at both functional and technical levels to ensure it can support the core operational functions of the Division, including driver licensing, vehicle titling and registration, and dealer licensing.

The Requirements Gap Analysis consists of the following key tasks:

- Identify the Division's Functional Requirements to define what capabilities are necessary for the new system. This effort has leveraged existing documents and analyses developed over the past years and from prior modernization efforts.
- Document and map current functional processes to establish baseline operational workflows.
- Evaluate whether each required function exists within AZ MAX and analyze technical patterns that may impact implementation.

- Assess AZ MAX's technical structures, frameworks, and components to determine if they comply with North Carolina's compliance standards and IT policies.

During this process, Mathtech and the State have noted that the gap analysis tool used by the DMV/DIT team functions similarly to a requirements traceability matrix, utilizing a structured approach to track capabilities against business needs.

To date, the analysis has indicated a strong match between the Division's needs and the system's capabilities. The gap analysis is scheduled for completion in July 2025.

Mathtech Insight: Mathtech has always found that each jurisdiction is "Exactly the same, and totally different." While the Division may have specific business rules and operating practices, DMVs across the country operate in line with many national standards and perform the same functions with a high degree of collaboration, data sharing, and interoperability. Mathtech believes that the Division will find a high level of alignment with the AZ MAX solution. It should be noted that the AZ MAX solution continues to evolve as other jurisdictions implement it and push it to evolve and meet their needs.

The Division is currently assessing the functional capabilities of the AZ MAX solution by examining the source code. Still, the Division's team does not have access to a working AZ MAX system that they can use and test. If the Division plans to move forward, Mathtech recommends collaborating with the Arizona team and its system implementation vendors to get access to a working test system that would better support their gap analysis. Such a gap analysis would be more productive in collaboration with an implementation vendor who knows the system "inside and out." The gap analysis could also be part of the planning and design process rather than just a compatibility exercise. These steps were likely part of the DMV/DIT team's plans, but they were put on hold as this assessment was being conducted.

Data Preparation & Cleansing

The DMV/DIT team is conducting an assessment of the current state of its data. Following this evaluation, the team has worked to identify and assess potential tools that can support an effective data-cleansing strategy.

While the DMV/DIT team is in the process of selecting a data cleansing tool, the team recognizes that collaboration with the future system implementation vendor or another experienced organization will be essential. The vendor's expertise will help determine the most effective approach for data cleansing before migrating to the new system.

To support this effort, the team has compiled a shortlist of potential data cleansing tools and assessed their ability to meet the project's needs.

AZ Max Proof of Concept Project

The next step in the team's plan was a pilot project, which was paused during this assessment. The team's existing System Analysis schedule had a target date of June 2025 for completing a proof-of-concept exercise to confirm requirements.

AZ MAX Phasing and Implementation Schedule

Phased Approach – The DMV/DIT team is considering modernizing both Driver and Vehicle Services simultaneously but is open to modernizing Driver Services first if that approach is possible. The team intends to determine the phasing of major system components based on the results of its AZ MAX System Analysis work and collaboration with a system implementation vendor.

Schedule To Be Determined – The DMV/DIT team has not developed a detailed schedule to date. The team has focused on evaluating the AZ MAX solution, and based on the analysis performed to date, they expect to proceed with AZ MAX. A complete implementation schedule has not yet been developed and would eventually require input from the implementation vendor.

9. DMV's Modernization Vision & Existing Challenges

Assessment Task:	**Conduct an in-depth analysis of the Division's plan to implement a cloud-based operating system and any other updates to its IT systems.**
Assessment Approach:	As part of the assessment, Mathtech conducted Vision Sessions with leadership and each major business area to determine the Division's current operational challenges and motivation and vision for moving forward with system modernization.
	Mathtech reviewed project documentation and had numerous follow-up discussions with leadership and operational staff, as well as IT staff.
	Understanding the DMV's current challenges and vision is critical for assessing whether the modernization plan will meet its needs.
Summary Findings:	*Challenges*
	The Division suffers from a range of operational challenges typical for all state agencies, specifically DMVs, which operate with outdated systems. These challenges keep the Division "frozen in time" and prevent it from meeting stakeholder needs.
	Vision
	The Division, including each major business area, has a sufficiently clear and consistent vision for the modernization project. The Vision is consistent with many state agencies and DMVs across the country that struggle with outdated computer systems. At a high level, the vision includes:
	■ Digital Transformation and Modernization
	■ Improved Customer Experience
	■ Process Efficiency and Workflow Optimization
	■ Enhanced Data Management
	■ Digitization of Business and Commercial Services
	Mathtech finds that the Division's vision is:
	✓ **Clear** – The Vision presented in this analysis is not taken from one specific Division document. Still, the leadership and staff were able to clearly articulate their vision for modernization and goals to operate more efficiently and better serve stakeholders.
	✓ **Consistent Across Division** – The Vision presented to Mathtech was consistent and unified across each business area.
	✓ **Consistent with Industry** – The Vision presented to Mathtech was consistent with the state of the DMV industry and common initiatives such as the implementation of mobile driver license documents (mDL), electronic titling, general process automation, and self-service.
	✓ **Realistic** – The Division's Vision for moving forward is consistent with modern technology and available solutions in the marketplace and not of unusually high risk.

9.1 Challenges With the Current DMV Systems

The Division faces a complex set of operational and technology-related challenges, which motivate its modernization efforts. These challenges span multiple areas, including outdated legacy systems, fragmented data management, cumbersome manual processes, and operational inefficiencies that impact both staff and customers.

The Division spoke to its major challenges during our vision sessions. Mathtech has organized these challenges into the following categories:

- Technology Limitations
- Inefficiencies in Business Processes
- Customer Service Challenges
- Data Management and Reporting Challenges

9.1.1 Technology Limitations

System Fragmentation and Integration Challenges

- The Division relies on multiple disparate systems that lack effective interoperability.
- Staff must log into multiple applications daily, toggle between applications to conduct straightforward transactions, and manually cut and paste information between them.
- Different systems handle customer records separately, causing inefficiencies and data duplication.

Outdated Technology and Mainframe Technology

- The current mainframe-based systems utilize outdated user-interface screens. This issue is faced by many states prior to modernization.
- New staff are not interested in learning or using these legacy systems, making training difficult.
- The Division has difficulty attracting and retaining younger talent who prefer to use modern technologies rather than outdated mainframe systems.

Slow System Changes and Custom Code Dependency

- Even minor system changes require extensive programming efforts, and all changes are slow and complicated efforts.
- COBOL-based tools and other programming languages do not easily provide the functionality necessary to implement modern, web-based systems.
- The system lacks a modern rules engine, which would allow for quicker and more efficient modifications of operational business rules, fees, and other configurations.

Lack of an Efficient Revenue Management System

- Revenue collection is managed across multiple systems with inconsistent processes.
- Real-time payment processing is not available, leading to batch processing inefficiencies.
- Refund management is labor-intensive and could benefit from an integrated solution.

Limited Opportunity for Automation and Future Growth

- Many processes, like fraud detection, customer service, and workflow automation, are substantially manual.
- Automation tools, advanced analytic tools, and even Artificial Intelligence tools require modern databases, high-quality data, and efficient interfaces, which are a partial challenge for the existing systems, leaving an unclear path to future technologies.

9.1.2 Inefficiencies in Business Processes

Manual, Paper-Intensive Processes

- Many DMV processes, including titling, licensing, and inspections, are paper-based.
- License applications from customers require manual review and scanning, causing inefficiencies.
- The lack of electronic workflows results in lost paperwork and slow approvals.
- For some services, office staff manually stuff envelopes (> 1,000 at a time) to send out monthly renewals.

Cumbersome Dealer Licensing and Inspections

- Dealer applications are processed manually, requiring scanning and data entry.
- The system does not allow flagging incomplete license applications for follow-up.
- Inspection reports must be physically stored, making retrieval slow and inefficient.

Inconsistent Business Rules Enforcement Across Offices

- DMV processes vary by office and even by individual employees because the system does not fully enforce rules and procedures.
- The lack of business rule enforcement by the system makes training and staff activities more complicated.
- Inconsistencies across offices can result in customers receiving different outcomes depending on which office they visit.

Complicated Motor Carrier and IRP Processes

- Commercial vehicle registration is cumbersome due to the use of multiple unintegrated systems.
- Renewals and compliance checks may involve excessive paperwork.
- Insurance data is sometimes erroneously rejected or lost by the Division's current software system.
- If mailed-in data is entered into the system in one office, a customer cannot pay for the associated transaction in another office due to system limitations.

Slow Title Processing and Dealer System Limitations

- Titles are mostly paper-based, requiring mailing and manual processing.
- Dealers use outdated screen-scraping technology to send transactions to the DMV, which limits the ability to manage data quality and reduces efficiency.
- Title turnaround times remain slow despite efforts to improve efficiency.

Complexities Caused by Mandated Legacy Processes

- Requiring customers to provide wet signatures and paper notarizations hinders modernization.
- Process changes are needed to move to fully electronic transactions.
- Compliance with evolving laws requires frequent system updates, causing delays.

9.1.3 Customer Service Challenges

Limited Online Services

- While some transactions are available online, many still require in-person visits.
- Temporary placards, forms requiring signatures, and title work must be processed manually.
- Customer wait times are higher than necessary due to a lack of online service, which forces customers to visit an office.

Lack of Customer Self-Service Options

- Customers cannot easily access their full DMV records online.
- There is no consolidated portal for customers to view all transactions and fees.
- DMV call centers are burdened with inquiries that could be self-served.

Inconsistent and Confusing Customer Communications

- Some DMV notices are written containing legal jargon, which can be confusing to customers.
- The system cannot optimally format correspondence, making it harder to read.
- There is no centralized customer messaging system for communicating information, transaction status updates, reminders, and other notices.

Unclear Fee Structures and Refund Processing

- Customers have difficulty determining the fees for certain transactions due to difficulty finding information on the current website.
- Refund processing is complex, requiring multiple manual steps.

9.1.4 Data Management and Reporting Challenges

Duplicate and Inconsistent Customer Records

- Customers may have multiple records due to data entry inconsistencies.
- Staff struggle to find the correct customer record, leading to errors and delays.
- The Division does not have a unified customer record across all DMV services.

Inefficient Data Access and Ad Hoc Reporting Limitations

- Data retrieval is difficult or impossible for business operations staff, requiring IT staff to run reports.
- The Division lacks a flexible and advanced centralized reporting tool for business intelligence, requiring IT to custom-code most data requests and reports.
- Legislative and executive teams frequently struggle to get timely reports because IT staff are needed to run ad hoc reports.

Duplicate Vehicle Records Due to Data Entry Errors

- Vehicle records sometimes have incorrect make or model data due to manual input errors.
- There are, at times, multiple entries for the same vehicle, making tracking difficult.
- Weak validation rules and system controls are negatively impacting data quality.

Limited Interoperability with External Agencies

- DMV data is often difficult to share with existing and new agencies because of a lack of tools to quickly exchange and track data.
- Other State agencies (police, courts, insurance) may need to submit manual requests for data.

Challenges in Law Enforcement Data Integration

- Law enforcement relies on disparate DMV systems for data access, which is unwieldy and time-consuming.
- Data silos hamper investigations into fraud and stolen vehicles, as different applications must be used to access relevant data.

9.2 The Division's Vision for Future Operations

The goal of the modernization effort is not just to upgrade technology but to improve the way the DMV operates. Major themes and supporting objectives emerged from our vision sessions, documentation reviews, and staff discussions, which have been organized as follows:

- Digital Transformation and Modernization
- Improved Customer Experience
- Process Efficiency and Workflow Optimization
- Enhanced Data Management
- Digitization of Business and Commercial Services

9.2.1 Digital Transformation and Modernization

Unified System to Support All DMV Functions

The Division has prioritized integrating all major systems, including driver services, vehicle services, IRP/Motor Carrier, etc., into a single, cohesive platform to the greatest extent possible.

- By consolidating these functions into a unified system, the DMV can eliminate redundancies, streamline workflows, and improve data accuracy.
- This integration will also improve the customer experience, as all DMV-related transactions will be connected and accessible through a single system.

Scalable, Adaptable Systems

An important aspect of the Division's proposed modernization is building a new system that is based on a scalable, cloud-based infrastructure that can adapt to future needs and emerging technologies.

- The Division is interested in a modular system that can be readily updated and will be able to efficiently adapt to customer expectations, operational improvements, and legislative-driven change.
- Cloud-based solutions typically allow for faster deployment of new features, strong data security, and improved system uptime.
- Cloud-based solutions also reduce the risk of technical debt, helping the DMV avoid being locked into outdated technology that becomes expensive to maintain.
- A cloud-based approach will enable updates, remote access for employees, and greater flexibility in managing DMV operations across the state.

Digital Document Management and Paperless Workflows

A modernized system can implement fully digital document management, allowing for electronic signatures (eventually with legislative approval), automated approvals, and streamlined storage.

- Digital workflows will reduce administrative overhead and the time it takes to complete a transaction and improve searchability, retrieval, and data accuracy.
- Digital workflows will also accelerate application processing, making it easier for customers and businesses to submit and track license applications and related documentation online.

Automated Compliance and Fraud Prevention Tools

The Division seeks to leverage automated compliance tracking and enforcement tools to reduce manual audits, flag regulatory violations, and improve adjudication processes.

- Technology-enabled compliance monitoring can detect patterns of non-compliance, flag high-risk entities, and send automated alerts to customers before they incur penalties.

- Leveraging enforcement automation tools will reduce the need for manual enforcement interventions, allowing staff to focus on more complex cases.

Integrated Revenue Tracking and Budget Management

A modern financial model would provide improved financial reporting by eliminating software silos and moving the Division closer to real-time tracking of transaction data.

9.2.2 Improved Customer Experience

One Customer, One Record Approach

The Division envisions a single, unified customer record that will contain all transaction information, compliance issues, and historical data in one profile.

- This will make it easier for both staff and customers to access customer data and improve customer service.
- Duplication errors will be nearly eliminated, and DMV staff will be able to provide more accurate and efficient service.

Proactive Customer Communication and Digital Notifications

A proactive digital notification system could provide real-time updates via email, SMS, or app notifications, reminding customers of renewals, required documents, pending suspensions, or outstanding payments.

- This change would also reduce paper mailings and help minimize missed deadlines, late fees, and customer frustration.

Enhanced Mobile Accessibility & App-Based Services

Due to increasing customer reliance on smartphones for daily tasks, the Division is seeking to improve mobile accessibility, offering app-based services that allow customers to complete transactions, receive notifications, and store digital credentials.

Expanded Kiosk and Self-Service Options

To reduce congestion at DMV offices, the modernization effort is intended to eventually include an expansion of self-service kiosks placed in strategic locations such as grocery stores, malls, and government buildings.

- These kiosks would handle straightforward transactions like license renewals, vehicle registration updates, and fee payments, reducing the need for in-person visits.

Improved Transparency in Fees, Payments, and Transactions

A modernization of the financial module in the DMV technology suite would provide better visibility into customer accounts, enabling customers to track balances, past payments, outstanding fees, and refunds through an intuitive portal.

9.2.3 Process Efficiency and Workforce Optimization

Integration with Law Enforcement & Regulatory Agencies

Upgrading DMV systems and interfaces would support real-time data sharing with law enforcement, courts, and other regulatory bodies that rely on DMV data for vehicle registrations, driver records, and compliance checks.

AI-Driven Customer Assistance and Support Services

A modern unified platform would enable the DMV to implement AI-driven chatbots and virtual assistants more easily. This would allow DMV customers to get answers to common questions, troubleshoot application errors, and receive guidance on the next steps in their transactions.

Further, AI-enhanced customer support could reduce 'Contact Us' inquiries by allowing AI to provide answers based on historical interactions while also incorporating real-time website and policy updates.

Efficient Adjudication and Hearing Management

The DMV's adjudication processes could be streamlined to allow for digital appeal submissions, virtual hearings, and automated notifications of case status.

Predictive Analytics for Staffing and Customer Flow Management

A modernized system offering improved access to data could use predictive analytics and historical data to forecast demand and optimize staffing levels.

- For example, analyzing seasonal trends, regional variations, and real-time queue data will enable the DMV to allocate resources more efficiently, proactively adjust office hours, and deploy staff.

9.2.4 Enhanced Data Management

Real-Time Data Access and Ad Hoc Reporting

One unified system offering modern data analysis tools would provide access to data necessary to generate ad hoc reports efficiently.

- The DMV business staff would no longer be fully dependent on IT to generate ad hoc reports.
- Better access to data analysis tools would not only free up IT resources but also allow for timely analyses for the legislature and improved decision-making.

Automated Error Detection and Data Cleanup

A modernized system could automatically flag duplicate records, incorrect data entries, and inconsistencies to improve data quality.

Improved Legislative Response Times

The DMV will be better able to provide the legislature with quick responses to data requests and data analyses.

9.2.5 Digitization of Business and Commercial Services

Streamlined Commercial and Motor Carrier Services

An industry standard, web-based system could allow businesses to submit registrations, update mileage records, manage compliance documents, and handle fee payments entirely online.

Digital Payment and Revenue Collection Modernization

A modernized financial module would integrate with real-time payment processing, allowing for digital transactions, automated reconciliations, and more efficient customer billing.

Electronic Dealer and Business Licensing

Dealer and business licensing could transition to a fully digital system, eliminating paper submissions, manual approvals, and disconnected workflows.

10.   System Scope & Future System Blueprint

Assessment Task:	Conduct an in-depth analysis of the Division's plan to implement a cloud-based operating system and any other updates to its IT systems.
Assessment Approach:	As part of the assessment, Mathtech conducted a scope definition exercise to document and confirm the scope of the Division's modernization effort.
	Mathtech conducted several fact-finding sessions and follow-up discussions with leadership, operational, and IT staff.
	Understanding the scope of the Division's modernization needs is critical for understanding and assessing the current plan.
Summary Findings:	*Scope of DMV Operations to Modernize*
	The Division operates a wide scope of operations, which is completely typical, including:
	■ Driver Licensing & Compliance
	■ Vehicle Services
	■ Motor Carrier Services
	■ Business Licensing
	■ Financial Operations
	■ Interactions with Other Agencies and Stakeholders
	Mathtech finds that the Division's modernization scope and plans to leverage the AZ MAX Solution are:
	✓ **Clear & Consistent Across the Division** – The scope of operations has been documented by the DMV/DIT team through a number of activities. While there is no one definitive detailed scope document at this point in the project, there is a clear understanding across all internal team members that the DMV's primary systems, including SADLS, STARS, and LITES, will all be replaced by the modernization.
	✓ **Consistent with Peers** – The modernization scope presented to Mathtech is consistent with many DMVs around the country that have or are in progress with modernization projects and fully replacing their outdated systems.
	✓ **Realistic** – The Division's approach for moving forward leverages modern technology and available solutions in the marketplace and is not of unusually high risk, aligning it with the approach taken by other DMVs

This section assesses the overall scope of the modernization effort. After defining the Division's current challenges and future system expectations, Mathtech worked with the DMV/DIT team to document the scope of the modernization project. To accomplish this, we determined what services the DMV currently offers and then used Mathtech's *Future System Blueprinting* tool to identify which systems the DMV planned to migrate to AZ MAX, keep as is, or migrate to another 3rd party solution.

At a summary level, the DMV's systems currently support the following services:

■ Driver Licensing & Compliance

■ Vehicle Services

■ Motor Carrier Services

- Business Licensing
- Financial Operations
- DMV Systems Interactions with Other Agencies and Stakeholders

10.1 Driver Licensing & Compliance

The DMV's SADLS System manages and maintains driver licenses, tests, and renewals for all classes of personal driver licenses, commercial driver licenses, learner permits, and identification cards. It maintains driver records, including convictions for motor vehicle offenses and crashes, and administers the process of withdrawing and reinstating driving privileges. This functionality includes:

- Driver Licensing
- Driver Records
- Suspensions
- Driver Training
- Voter Registration Applications
- Selective Service
- Auditing

- Identification Cards
- Sanction Processing and Conviction Reporting
- Restorations
- Accident Reporting
- Emergency Contact Information
- Vision Screenings
- Revenue Collection

10.2 Vehicle Services

STARS's Motor Vehicle Services handles all aspects of motor vehicle titling and registration. Functions supported include:

- Titles
- Electronic Registration and Titling (ERT)
- Disability Placards, Plates, Stickers
- Abandoned vehicle reimbursements
- Management of Source of Record
- Inventory Management
- Vehicle Inspections

- Registrations
- Electronic Lien and Titling (ELT)
- Plate Management
- Odometer Corrections
- Trusted Party Access
- North Carolina VIN Management
- Motor Carriers for Local Farms and Industry Vehicles

10.3 Motor Carrier Management

Motor Carrier support functions are not part of an integrated system. The DMV would benefit by integrating these functions with the other functions involving vehicle services. Motor carrier functions include:

- Account Management
- All International Registration Plan (IRP) functionality
- Road Use Fee
- Unified Carrier Registration (UCR)
- Heavy Vehicle Use Tax (HVUT)
- IRP - International Registration Plan and Fee Sharing

- Business Insurance Information and Insurance Tracking
- Permits
- Integration with all Vehicle and Customer Functionality and Databases
- Commercial Vehicle Registration

10.4 Business Licensing

The Division has responsibility for licensing and overseeing a variety of businesses related to drivers and vehicles. The processes supported by the Division include:

- Licensing a Business
- Complaints and Compliance
- Business Inspections
- Electronic Registration and Titling (ERT) Program
- Dealer Plates

- Dealer Accounts
- Temporary License
- Permits
- Dealer Educational Requirements

10.5 Financial Operations

The DMV's systems are responsible for consolidating and tracking all revenue collection for customer transactions and distributing the fees to appropriate funds, which are then transferred to the State's financials system. This includes reconciling payment types and amounts by location and transaction type, supporting daily deposits and a range of reporting and auditing.

- Cash and Payment Collection
- Collections
- Balancing and Deposits
- Reconciliation
- Refunds
- Dishonored Payment

- Chart of Accounts
- Accounts Receivable
- Financial Reporting
- Distribute Funds
- Tracking Collections and Distributions

10.6 DMV Systems Interactions with Other Agencies and Stakeholders

DMV services affect a wide range of stakeholders beyond citizens and businesses. Major stakeholders that are dependent upon DMV systems include the following entities. Most of these entities interact with the DMV through computerized interfaces, which will add time and complexity to the modernization project.

- State Agencies
- County Government
- Auto Dealers
- Insurance Companies

- Federal Agencies
- Law Enforcement
- Lenders

10.7 Defining The Modernization Project Scope – Future System Blueprint

Scope Assessment Using Mathtech's Blueprint Tool

A successful modernization project requires a well-defined project scope that aligns with the Division's vision, functional requirements, and strategic objectives. To ensure alignment, Mathtech utilized its *Future System Blueprint*, a structured framework that has been successfully applied across multiple state agencies, including other DMV modernization projects. This tool was used to confirm the project scope and evaluate the Division's modernization strategy.

Future System Blueprint Framework

The Blueprint consists of three distinct layers, each representing a critical aspect of the modernized DMV system:

- **Business Systems** – These represent the major business areas and the overall system functionality that supports them.
- **Base Systems** – These subsystems or components represent functionality that is commonly required by several or most business areas. Subsystems in this layer might be purchased as "off-the-shelf" products or custom-developed.

- **Foundation System** – These represent the tools and technologies necessary to build consistent Base Systems and system functions.

## Scope Validation and Strategy Review

As part of the process, Mathtech conducted:

- Interviews with DMV/DIT modernization team and leadership to discuss the project scope and approach.
- A review of key documentation to confirm the planned implementation strategy and breadth of in-scope functionality.

The Blueprint diagram provides an overview of all functional capabilities required in the new system and the planned implementation strategy.

Future System Blueprint Diagram

The shading on the blueprint diagram shows that the AZ MAX solution is planned to support the vast majority of DMV functions, thereby providing a very integrated solution and approach. Some functions, such as Knowledge and Skills testing or Kiosks, naturally have specialized solutions.
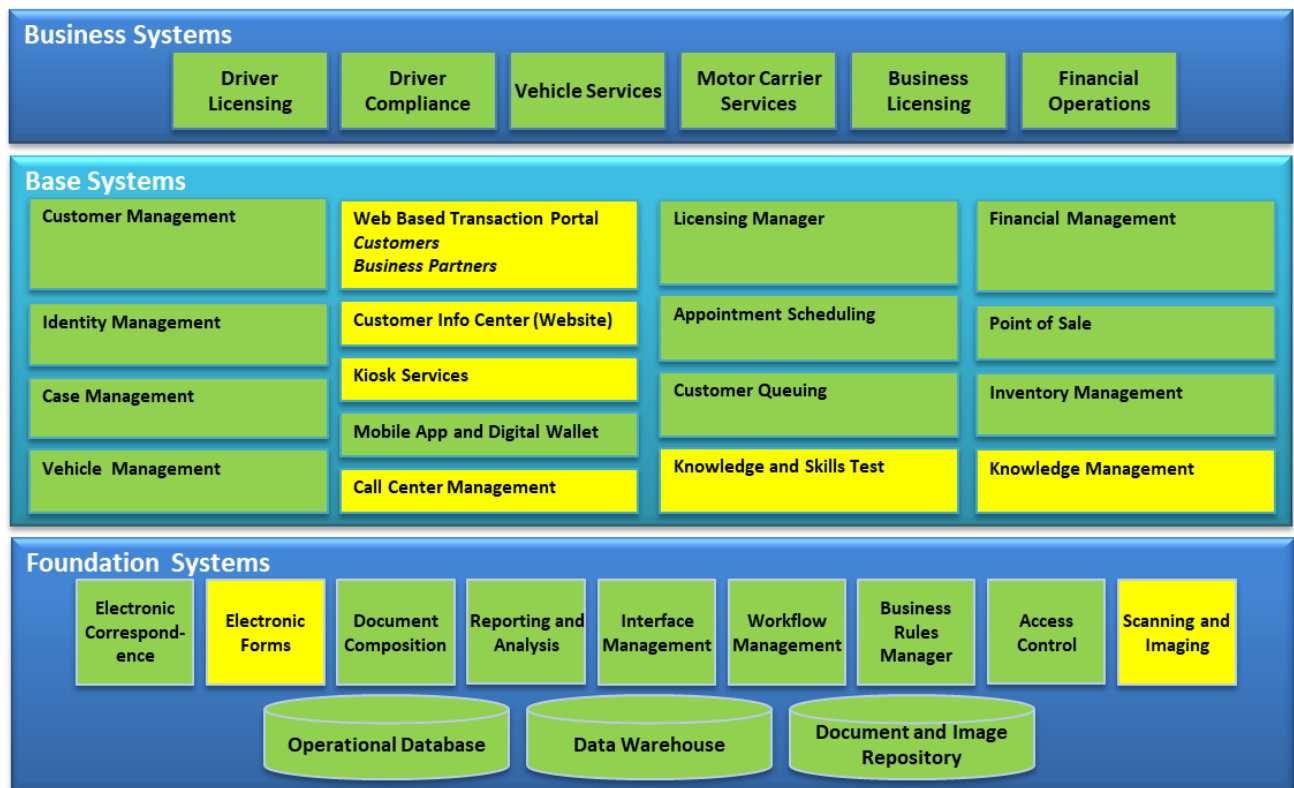
As collaboration begins with the system implementation vendor, final approaches for each functional area will be developed. Ideally, these approaches will maximize the use of the AZ MAX functions.

In Scope leveraging AZ Max	Green
In Scope with AZ MAX preferred, but other solutions may also be needed	Yellow
Not Part of Modernization	Grey

Alignment with AZ MAX Solution

FINDINGS

Strong Overall Alignment – The AZ MAX solution includes a wide and generally complete range of Driver and Vehicle functions. The Blueprint confirms that AZ MAX is expected to support a significant portion of the DMV's required functionality, with the flexibility to integrate specialized or existing solutions where appropriate.

Some functions may not be fully supported by AZ MAX or may require external solutions:

- **Web Portal** – The AZ MAX Solution can provide a range of online portals and self-service tools that meet the needs of the DMV. There may be circumstances where custom development or third-party solutions will need to supplement the DMV service requirements. Still, this path should only be pursued after all AZ MAX options are considered.

- **DMV Website / Customer Information Center** – The MAX system may partially support the Division's public website. Still, many informational pages are part of the broader State/DOT website that will be separate from the MAX system.

- **Kiosk Services** – Kiosk hardware and related services are typically supported by specialized software, depending on the hardware and software combination. Further analysis will be required to determine how existing kiosks will be supported or how future kiosks will be planned.

- **Call Center Management** – The AZ MAX solution will certainly provide the capabilities for customer management and features typically found in a CRM (Customer Relationship Management) system. Still, it will not serve all the needs necessary to track and manage incoming calls or manage a call center operation.

- **Knowledge & Skill Testing** – Testing is a specific task that requires integration with driver licensing processes but can be performed in a variety of ways, with many different tools, and delivered by many parties. The AZ MAX system will likely not provide all of the options that the Division may want to consider.

- **Knowledge Management** – There is a range of tools that can support staff with online procedure manuals, training materials, and other knowledge management tools, including AI-based tools. The Division will not want to limit knowledge management to only the tools provided within AZ MAX.

As the project progresses, continued scope validation and alignment with modernization goals will be essential to ensuring a successful system transformation.

11. Implementation Timeline

Assessment Task:	**Develop a proposed timeline with specifically identified objectives and a completion date for the Division's IT system modernization efforts.**
Assessment Approach:	Mathtech has worked with many DMV agencies around the country to help them plan and execute full DMV modernization projects. The Mathtech team assessed the Division's scope, vision, and approach and developed a timeline/schedule based on experience with similar projects and best practices. The division will need to develop the final schedule and approach in conjunction with the implementation vendor.

Summary Findings:	*Preparation Already Underway*
	
	■ The DMV/DIT team has already developed and begun executing a data analysis plan, and it should continue down that path.
	
	■ The DMV/DIT team has already embarked on an analysis of business requirements and leveraged materials developed over the past years. The efforts should prioritize documenting the Division's needs even more so than assessing the AZ MAX Solution capabilities, as the implementation vendor will be able to conduct the gap analysis more efficiently given their understanding of the system.
	
	■ The DMV/DIT team should prepare IT and business staff to participate in the modernization project with the implementation vendor. If the State can develop internal IT resources with sufficient skills to participate in the project from the beginning, then it will:
	
	  ▪ Learn how this complex system works during its implementation
	
	  ▪ Learn the development tools and methodologies used by the MAX Consortium of States
	
	  ▪ Be able to oversee and closely monitor the work of the implementation vendor
	
	  ▪ Develop the skills to support the system in the long term better – leverage external assistance when needed
	
	Options For Procurement
	
	The State needs to assess procurement options. Arizona has already obtained the AZ MAX solution via an MOU. The State now needs to procure implementation support, which is critical to successfully implementing the system. The existing integration vendors are the sole team able to bring critical experience to the Division's project.
	
	The State needs to decide if an RFP or a sole-source arrangement is a potential procurement path.
	
	Timeline
	
	■ **Preparation < 1 Year** – The DMV/DIT team has already begun preparations, which should take no more than one year.
	
	■ **Procurement TBD** – The procurement timeline will depend on the approach.
	
	■ **Implementation 4 Years** – Implementation of Driver and Vehicle services and most other functions should take approximately four years once the implementation starts, based on all best practices and comparable plans from other states.

11.1 Developing a Timeline and Project Schedule Based on Similar Projects

Mathtech has worked with many DMV agencies around the country to help them plan and execute full DMV modernization projects. Recent projects include the Maryland MVA, South Carolina DMV, Iowa DOT/DMV, Missouri DOR/MVDL, and Wyoming DOT. Our experience includes working with the AZ MAX system in Wyoming.

Estimated Timeline – The Mathtech team assessed the Division's scope, vision, and approach and developed a timeline/schedule based on experience with similar projects and best practices.

No Division Prepared Schedule At This Point – The DMV/DIT team has not developed a detailed implementation schedule at this time as they have not yet engaged a system implementation vendor. The team must resolve outstanding tasks before it can finalize a schedule, including:

- Approval to move forward
- Determination of a procurement approach to engage an implementation vendor
- Collaboration with the implementation vendor to determine the implementation approach (Two Phases v. Consolidated Phase)

Actual Timeline – Once the above tasks are resolved, the DMV/DIT team will work with a system implementer to develop both milestones and a detailed system implementation schedule. This should be part of a contract and the Scope of Work (SOW) negotiation.

11.2 Moving Forward

The DMV/DIT team has identified AZ MAX as the preferred solution for its statewide modernization effort. The initiative will replace all major DMV systems, including the three largest mainframe systems:

- SADLS (Driver Licensing System)
- STARS (Vehicle Titling & Registration System)
- LITES (Liability Insurance Tracking System)

Given the scale of this effort, modernization should follow a phased approach that aligns with industry best practices. The approach consists of four key phases: Preparation, Procurement, Implementation, and Support. The timeline developed by Mathtech includes these four phases.

11.3 Preparation Phase (Planning, Analysis, and Staff Development)

This preparation phase focuses on laying the groundwork for a smooth transition to the new system by documenting and preparing critical infrastructure, data, and functional requirements. The DMV/DIT team has already initiated the *Data Cleansing and System Analysis* project as part of its preparation phase, and this is a very worthwhile effort.

This foundational work ensures that the team is prepared and has a clear understanding of its requirements before engaging vendors. Key preparation activities include:

- Infrastructure Analysis and Preparation
- Interface Analysis & Preparation
- Technical & Delivery Requirements Analysis
- Data Analysis & Cleansing
- Functional Requirements & Process Analysis
- Staff Development

Infrastructure Analysis and Preparation

The DMV/DIT team should assess workstation configurations, network capacity, and other infrastructure components to verify that these would support a new system as envisioned and determine what upgrades are needed. This should include coordinating with the other stakeholders. Upgrades to workstations and peripherals (e.g., scanners and photo ID cameras) can take time and typically need periodic refreshes. Other components may

be part of existing contracts, which would be included as part of the modernization. Some of this work can begin now, and some may need to wait until the implementation plan is finalized.

Data Analysis & Cleansing

Poor data quality can derail a functioning system. Preparation activities start with cataloging the data sources that will be replaced by the new system. The next focus is to collect the documentation about that data and create documentation that is missing and will be needed to support data conversion and migration.

Interface Analysis & Preparation

Interface Management is one of the higher-risk areas in a modernization project. Interfaces are external dependencies that are not under complete control of the project. Early documentation of interfaces and communications with interface partners is key to managing that risk and understanding approaches that will work for both sides and allow the project to move forward. Preparation includes identifying and cataloging interfaces with specifications and contact information, analyzing and documenting characteristics (e.g., frequency, volumes and technologies), gathering specifications, and developing a management approach for moving forward.

Functional Requirements & Process Analysis

DMV/DIT team needs to define and review all requirements and expectations of the new system. It must know which processes will be supported and what features it expects from the new system. These expectations should link to Division's vision to enhance customer service and improve operational efficiency.

A process and requirements catalog is a good tool for capturing such requirements and expectations. An analysis and planning effort will be needed to organize functional user groups, define transactions and expectations, and begin preparations for developing an SOW for a system implementation vendor. As part of this effort, existing forms, correspondence, reports, and other artifacts can be documented and reviewed to understand how they will change, be consolidated, or improved in the new system.

Technical & Delivery Requirements Analysis

Gaps in the current DMV systems and environment must be identified so that they can be addressed from both the technical and functional perspectives. This effort will facilitate the necessary requirements to inform the procurement strategy. These requirements include technical, system delivery, training and support requirements.

FINDING

The DMV/DIT team has identified and developed a range of technical and security requirements and expectations through its code analysis effort. This effort needs to continue and expand to ensure that all other requirements are documented in preparation for developing a Scope of Work (SOW) for the implementation vendor.

Staff Development

The DMV/DIT team should refine its staffing plan and prepare a business/IT team to participate in all aspects of the project.

FINDING

DMV and DIT have been clear that developing internal support capabilities is a high priority and important to limiting long-term vendor dependence. If the State can develop internal resources with sufficient skills to participate in the project from the beginning, then it will have the following benefits for the State:

- Learn how this complex system works during its implementation
- Learn the development tools and methodologies used by the MAX Consortium of States
- Ability to oversee and closely monitor the work of the implementation vendor
- Develop the skills to support the system in the long term and better leverage external assistance when needed

11.4 Procurement Phase (Request for Proposal & Implementation Vendor Selection)

In parallel with the preparation phase, the DMV/DIT team will need to begin the procurement process to acquire an implementation vendor. A large part of this effort will include the development of a Scope of Work (SOW) or full Request for Proposal (RFP). Key activities include:

- RFP/SOW Development
- RFP Review and Approval
- Vendor Bidding Period
- Evaluation, Award & Contract Negotiations

This phase needs to ensure that the team selects a vendor with proven expertise in implementing AZ MAX.

RFP/SOW Development

A comprehensive RFP or Scope of Work (SOW) must be developed to engage an implementation vendor. This includes defining functional requirements, technical requirements, hosting requirements, delivery requirements, and support requirements. The team will leverage the preparation activities to develop the RFP or SOW. Well-defined RFPs and SOWs are critical for a successful project and critical to obtaining the desired pricing and pricing model.

More than anything, a well-written RFP can protect the State and lay a foundation for a successful, realistic project that manages risk.

RFP Review and Approval

Regardless of the procurement path, the SOW and other procurement documents must be prepared. Review and collaboration by all procurement-related stakeholders in any State is typically time-consuming and varies by State. Sufficient time should be planned to move from the final draft to the published procurement.

Vendor Bidding Period

If the State needs to execute a full public procurement, then a vendor bidding period must provide sufficient time for vendors to prepare their bids and ask questions and for the State to respond with answers, amendments, and strategy updates as necessary. This is minimally a three-month period.

Evaluation, Award & Contract Negotiations

Regardless of the procurement path, evaluations and negotiations will take time. The approach must balance the project's and procurement's needs with the State procurement standards and processes.

Evaluations can include both qualitative and quantitative assessments. If a public procurement is needed, each proposal received will be large and complex and will contain many assumptions that must be assessed and understood. The final effort may include negotiations and reworking of the scope to bring the procurement to a conclusion.

Comparing Public RFP to a Sole Source Procurement

A full public procurement could take up to a year, including the development of a detailed RFP, the public bidding period, and the subsequent evaluation and award process. In contrast, a sole-source procurement could be completed much faster, potentially saving the DMV more than six months in project time.

11.5 Implementation Phase (System Configuration & Rollout Strategy)

The DMV/DIT team will need to choose between two implementation strategies for rolling out the new system:

Option 1: Phased Implementation

- Phase 1: Deploy Driver Services first (SADLS replacement).
- Phase 2: Deploy Vehicle Services second (STARS & LITES replacement).

Advantage: This approach allows the team to focus on one major transformation at a time, reducing risk and ensuring smoother adoption. It also allows customer service improvements to be rolled out two years earlier instead of waiting for the entire 4 years of the project.

Challenge: This approach does require backward integration between the new AZ MAX system and the STARS & LITES systems for the two years when SADLS has been replaced and STARS & LITES are still operational.

Option 2: Consolidated Implementation

- One Phase: Simultaneously implement Driver and Vehicle Services, launching both at once.

Advantage: May reduce the overall timeline and decrease software development risk by separating new system development from legacy systems.

Disadvantage: This increases the rollout complexity, requiring the entire organization to change both driver and vehicle operations at once. It also delays the rollout of customer service improvements for Driver Service until all Driver and Vehicle system components are ready.

The final decision on the implementation strategy will be made based on vendor input, risk assessment, and resource availability.

Driver Services System Implementation

The Driver Licensing System implementation would include both personal and commercial driver licensing functions as well as the Driver History function that tracks violations, suspensions, and reinstatements. This would naturally be the first phase of the implementation because driver management will be the foundation for customer management.

Financial Management – Implementation of the Driver Licensing System would likely include the implementation of a new financial module to collect payments and manage revenue. This will impact the DMV and DOT's financial operations.

Vehicle Services System Implementation

A Vehicle Services system would be the second phase of the project. This would include all vehicle types, all titles, registrations, plate management, liens, liability insurance tracking, and integrations with dealers and lenders.

Business Licensing Functions – After assessing all functions and transactions, this functionality may be partially or fully implemented with the Drivers and Vehicles implementations. Business licensing would include all Dealer Licensing and other vendors that are licensed.

Motor Carrier Full Integration – Motor Carrier services need to be fully integrated with the broader vehicle services functionality, as many functions share data with the Vehicle Services system. Depending upon the implementation vendor's methodology, this functionality may also be part of the Vehicle Services implementation.

11.6 Support & Optimization Phase (Post-Implementation – Continuous Improvement)

Once the system is live, the DMV/DIT team will transition into ongoing support and optimization of the system. Objectives include:

- **System Maintenance** – Ensuring the new system remains secure, stable, and high-performing.
- **System & Operations Enhancements** – Refining business processes and enhancing the system's functions.
- **Collaboration with AZ MAX Jurisdictions** – Collaborating with Arizona and other jurisdictions to improve the MAX solution and implement shared/national requirements.
- **Legacy System Retirement** – Planning for and retiring SADLS, STARS, LITES, and other legacy systems – including archiving of data that was not migrated to the new system. This will reduce mainframe costs for the Division.

Support Approach

Jurisdictions (other states) vary in their approach to support and maintenance. Some jurisdictions prefer to outsource much of the system maintenance to the system implementation vendor or another support vendor. In contrast, others, if they have the capacity, prefer to develop in-house resources to ensure control over the system, security, and their ability to respond to legislative and other mandates and requirements.

11.7   AZ MAX Phasing and Implementation Schedule

Implementation of either a Driver Services system or Vehicle Services system typically takes upwards of 2 years for each system. These implementations are complex and include:

- System Setup and Environment Configuration
- Gap Analysis Comparing System Functions to DMV Operational Needs
- Collaborative Definition, Design and Implementation
- System Testing, Including Operations, Dealers, Lenders, and AAMVA/Federal Systems
- Data Preparation & Migration
- Training
- Help & Support Setup
- Cutover to Live Production

There is the potential for an entire system modernization to take 3.5 years if both Driver Services and Vehicle Services are modernized in parallel and planned as one rollout. However, 4 years would be a more realistic duration.

First Implementations Still In Progress – It is important to remember that the AZ MAX solution has not been fully implemented in any jurisdictions other than the original Arizona implementation. These new implementations (Wyoming, Virginia, and potentially North Carolina) have inherently more risk, which should be accommodated with planning, preparation, and flexibility. Wyoming is more than one year into the implementation of Driver Services and the project is proceeding forward successfully with normal challenges.

11.8   Approach Option 1 – Driver Services Followed by Vehicle Services

For this approach, the total project duration is 4 years, with Driver Services being completed in 2 years and Vehicle Services coming online after 2 additional years. Without planning with the implementation vendor, it is not possible to determine if Motor Carrier services would be completed during the Vehicle Services phase or after. If they do occur as a third phase, the duration would likely be closer to a one-year rollout.

Gantt Chart Summary

The following schedule is a sequential delivery (Drivers Services followed by Vehicle Services) estimate based on information provided by the DMV/DIT team and Mathtech's experience. The overall project duration could be reduced by up to 9 months if the State opted to sole source a vendor rather than conduct a formal RFP.

ID	Task Name	Duration
1	**Preparation Projects**	**560 days**
2	AZ MAX Infrastructure Analysis and Preparation	52 wks
3	Functional Requirements & Process Analysis	52 wks
4	Technical Requirements Analysis	52 wks
5	Data Analysis & Strategy	52 wks
6	Potential Data Documentation and Cleansing	60 wks
7	Staff Development	52 wks
8	**Procurement**	**320 days**
9	RFP Development (Aggressive)	26 wks
10	RFP Review and Approval	8 wks
11	Vendor Bidding Period	10 wks
12	Evaluation and Award	20 wks
13	**Driver Services System Implementation**	**24 mons**
14	**Vehicle Services System Implementation**	**24 mons**
15	**Business Licensing System Implementation**	**24 mons**
16	**Motor Carrier Integration**	**24 mons**

11.9   Approach Option 2 – Driver Services and Vehicle Services in Parallel

For this approach, the total project duration remains the same, 4 years. Customer benefits are realized at the system's go-live, approximately 4 years after implementation commences. The system could potentially be brought online 6 months earlier than the target completion date. Still, collaboration with the implementation vendor and finalization of the SOW/Contract should be completed before determining a final date.

Gantt Chart Summary

The following schedule is a consolidated delivery (Driver Services and Vehicle Services in Parallel) estimate based on information provided by the DMV/DIT team and Mathtech's experience. The overall project duration could be reduced by up to 9 months if the State opted to sole source a vendor rather than conduct a formal RFP.

ID	Task Name	Duration
1	**Preparation Projects**	**560 days**
2	AZ MAX Infrastructure Analysis and Preparation	52 wks
3	Functional Requirements & Process Analysis	52 wks
4	Technical Requirements Analysis	52 wks
5	Data Analysis & Strategy	52 wks
6	Potential Data Documentation and Cleansing	60 wks
7	Staff Development	52 wks
8	**Procurement**	**320 days**
9	RFP Development (Aggressive)	26 wks
10	RFP Review and Approval	8 wks
11	Vendor Bidding Period	10 wks
12	Evaluation and Award	20 wks
13	**Driver Services System Implementation**	**48 mons**
14	**Vehicle Services System Implementation**	**48 mons**
15	**Business Licensing System Implementation**	**48 mons**
16	**Motor Carrier Integration**	**48 mons**

12. Customer Service Benefits

Assessment Task:	**Provide an estimate of when the Division's anticipated updates to its IT systems will begin directly improving customer service.**
Assessment Approach:	Based on the results of our analysis, Mathtech extracted the anticipated timeline for customer service benefits, which aligns with the overall implementation schedule.
Summary Findings:	The complexity and time required of DMV modernization projects are typically underestimated. No State will realistically implement a Driver and Vehicle modernization in less than three to four years. Additionally, the Division is performing a necessary, complete replacement of its systems, which makes incremental delivery very difficult.
	Customer Service Benefits To Be Realized
	The Division anticipates realizing the following customer service benefits:
	■ One Customer, One Record: Enhanced Customer Management
	■ Proactive Customer Communication and Digital Notifications
	■ Enhanced Mobile Accessibility & App-Based Services
	■ Mobile Driver License (mDL)
	■ Full-Service Customer Portal
	■ Expanded Kiosk Self-Service Options
	■ Improved Transparency in Fees, Payments, and Transactions
	■ AI-Driven Customer Assistance and Support Services
	■ Real-Time Data Access and Ad Hoc Reporting
	■ Automated Error Detection and Data Cleanup
	■ Digital Payment and Revenue Collection Modernization
	■ Predictive Analytics for Staffing and Customer Flow Management
	■ Electronic Dealer and Business Licensing
	■ Streamlined Commercial and Motor Carrier Services
	■ Improved Integration with Law Enforcement & Regulatory Agencies
	■ Electronic Titling
	The timing of benefits depends on whether DMV/DIT chooses a Phased or Consolidated Implementation. In a Phased Implementation, Driver Services would be completed first, delivering benefits within two years, while Vehicle Services would follow, taking four years in total. In a Consolidated Implementation, the entire system would launch at once, with all benefits realized in 3.5 to 4 years.
	While all parties would like to see benefits roll out sooner, the required modernization process does not accommodate incremental improvements, and a full system replacement is needed.
	Some functions, such as a mobile Driver's License (mDL), can be rolled out separately and attached to the current SADLS system and later switched to the AZ MAX system. Few enhancements lend themselves to such flexibility. Additionally, any added feature attempted during the modernization process is a significant distraction from the actual modernization effort and adds risk to the project.

Years to Realize Customer Service Benefits		
	Phased Implementation	**Consolidated Implementation**
Mobile Driver's License	1 year	1 year
Driver Services	2 years	3.5-4 years
Vehicle Services	4 years	3.5-4 years

12.1 Timing

As described in the prior section, the DMV/DIT team will need to determine if it should proceed with a phased or consolidated implementation. A Phased Implementation approach begins with Driver Services, followed by Vehicle Services. A Consolidated Implementation approach delivers Driver Services and Vehicle Services simultaneously.

Option 1 Phased Implementation – 2 Years for Driver Services Improvements, 2 More Years for Vehicle Services Improvements – The Division could select an incremental approach of implementing Driver Services first, followed by Vehicle Services, along with Motor Carrier and Business Licensing services. If this approach is followed, it should take approximately 2 years to realize Driver Services benefits once the implementation is started.

Realizing Vehicle Services benefits should require an additional 2 years of work after the Driver Services has been completed. Thus, Vehicles Services benefits would take a total of 4 years to realize.

Option 2 Consolidated Implementation – 4 Years for Both Driver Services and Vehicle Services Improvements – If the Division elects to implement Driver and Vehicle Services simultaneously, it should take 3.5 to 4 years to realize the vast majority of customer service benefits.

Mobile Driver's License (mDL) – Mobile Driver License functionality can be implemented in parallel with the implementation of Driver Services. It can be linked to both the current DMV system and the future modernized system. mDL benefits could be realized in less than two years.

12.2 Incremental Upgrades Are Not Practical

While all parties would like to see benefits roll out sooner, the required implementation process does not accommodate partial functionality, and a full system replacement is needed. Driver and Motor Vehicle functions are tightly integrated. For example, initial driver licensing is completely connected to identity verification and again linked to driver violation, suspension, and restoration management. Additionally, all of these functions are linked to AAMVA interfaces that exchange data with other states and the Federal government. Incrementally building, testing, and rolling out new parts of the system is as challenging as continually "adding new parts to an old car with the goal of ending up with a newer, modern model automobile."

Some functions, such as a mobile Driver's License (mDL), can be rolled out separately and attached to the current SADLS system and later switched to the AZ MAX system. Few enhancements lend themselves to such flexibility. Additionally, any added feature attempted during the modernization process is a significant distraction from the actual modernization effort and adds risk to the project.

12.3 Common Customer Service Features

Overall, the modernization approach will provide a range of customer service improvements consistent with the Division's Vision and with common marketplace expectations around real-time operations, data management, and innovation, including:

- ✓ **Real-time** – Modern solutions offer the ability for transactions, notifications, system updates, and data retrieval to be completed in real-time. The Division is aligned with evolving industry standards and is focused on implementing real-time processes for its citizens. Real-time rather than nightly batch processing of transactions is the critical element that enables real-time data updates to occur and, thus, benefits to be realized.

- ✓ **Data Management** – An integrated system with a common customer record for all services will greatly improve operational efficiency and customer service. The Legislature will also benefit from improvements to data management because gathering and analyzing data will be less complex and far timelier.

- ✓ **Innovation** – As companies like Amazon drive efficiency and offer new services to their customers, customer service expectations are raised for all service providers. The Division is focused on trends in customer service, such as full-service customer portals, AI-driven support features, and self-service kiosks. Mathtech finds that the Division's modernization objectives are keeping pace with industry trends and standards.

12.4 Benefits When Mobile Driver's License Is Implemented

The implementation of the mobile Driver's License (mDL) will have a number of customer service improvements, including:

- ■ Allows customers to digitally store and access their driver's license information on a mobile device.
- ■ Provides immediate updates to the driver's license status, including new endorsements and suspensions.
- ■ Improved verification options for merchants and other third parties.

12.5 Benefits When Driver Services Is Implemented

The Driver Services implementation will completely reinvent how driver license and ID services are delivered and include substantial online and self-service functions. The implementation will also improve financial operations and general customer management. Specific improvements include:

One Customer, One Record: Enhanced Customer Management

- ■ Consolidates all transaction information into a single profile.
- ■ Reduces duplicate records and errors.
- ■ Enables DMV staff to provide more accurate and efficient service.

Proactive Customer Communication and Digital Notifications

- ■ Provides real-time notifications via email, SMS, or app alerts to provide reminders for renewals, required documents, pending suspensions, and outstanding payments.
- ■ Reduces paper mailings, increases the effectiveness of communication efforts, and minimizes missed deadlines or late fees.

Enhanced Mobile Accessibility & App-Based Services

- ■ Provides mobile-friendly access to DMV transactions.
- ■ Enables customers to receive electronic notifications via a mobile app.

Full-Service Customer Portal

- ■ Allows customers to conduct a full range of services online, including checking the status of applications, completing transactions, and corresponding with the DMV.

Expanded Kiosk Self-Service Options

- ■ Reduces congestion at DMV offices.

- Allows customers to complete license renewals, vehicle registration updates, and fee payments at kiosks.

Improved Transparency in Fees, Payments, and Transactions

- Provides visibility via an online portal for customers to track balances, past payments, outstanding fees, and refunds.
- Enhances clarity in fee structures.

AI-Driven Customer Assistance and Support Services

- Enables the ability to offer virtual assistants and chatbots for real-time support and a reduction in customer inquiries and call center workload.
- Provides quicker and more accurate detailed guidance that answers specific customer questions and challenges when customers need the information without waiting.

Real-Time Data Access and Ad Hoc Reporting

- Eliminates reliance on IT staff for data retrieval.
- Allows DMV business staff to generate reports quickly and accurately to meet the needs of internal operations and external stakeholders, such as dealers, other agencies, and the Legislature.

Automated Error Detection and Data Cleanup

- Flags duplicate records, incorrect data entries, and inconsistencies.
- Improves data quality and reduces errors.
- Provides better quality data which results in more accurate products, such as driver licenses, titles, registrations, and liens.

Digital Payment and Revenue Collection Modernization

- Enables real-time payment processing for more efficient customer billing.
- Automates reconciliations and customer billing.

Predictive Analytics for Staffing and Customer Flow Management

- Optimizes office hours and staffing levels based on seasonal trends.
- Improves customer service by reducing wait times.

12.6 Benefits When Vehicle Services is Implemented

The Vehicle Services implementation will reinvent how title, registration, lien and specialty plate processes are conducted with substantial online and self-service functions. This will also improve how Motor Carrier customers are served and how dealerships and other businesses apply for and receive their business licenses. Specific improvements will include:

Electronic Dealer and Business Licensing

- Eliminates paper submissions and manual approvals.
- Creates a fully digital workflow for licensing applications.

Streamlined Commercial and Motor Carrier Services

- Allows businesses to manage registrations, compliance, and payments online.

Improved Integration with Law Enforcement & Regulatory Agencies

- Improves data sharing with law enforcement and courts.

- Enhances fraud detection and compliance enforcement.

Electronic Titling

- Enables electronic intra-state title transactions.
- Enables electronic titling as AAMVA implements electronic title data exchange.

13. Staffing Plan Assessment

Assessment Task:	**Provide an assessment of whether the Division has an adequate personnel management plan in place for implementing planned updates to its IT systems.**
Assessment Approach:	Mathtech reviewed resource plans, schedule iterations, and other relevant documentation with the DMV/DIT team to understand its staffing approach and projections for the project. Mathtech compared the staffing plan to similar projects and developed findings and recommendations.
Summary Findings:	The Division intends to work very closely with its implementation vendor to not only support a successful implementation but also reduce its dependency on the implementation vendor after go-live.

The Division intends to work very closely with its implementation vendor to not only support a successful implementation but also reduce its dependency on the implementation vendor after go-live.

- **The Division's Staffing Estimates are Accurate** – The DMV/DIT team accurately estimated the overall project team size but has not yet identified which staff would be from the implementation vendor.

- **Let the Implementation Vendor Lead and Perform the Implementation** – The DMV/DIT team should rely on an experienced AZ MAX implementation vendor to handle most of the work, ensuring compatibility, reducing errors, and accelerating deployment.

- **Build an In-House Team** – Developing an internal IT team will provide the State with greater control, oversight, and long-term system sustainability.

- **Leverage Contractors to Build the In-House Team** – To address hiring challenges, DMV/DIT should combine permanent IT staff with contract resources to ensure flexibility and access to specialized skills as needed.

- **Determining IT Team Size** – The in-house team should gradually scale from 10 to 20 IT staff members over the course of the implementation, adjusting based on project needs and experience gained.

- **Implement the "2-in-a-Box" Knowledge Transfer Approach** – DIT staff should shadow and collaborate with the implementation vendor, gaining expertise and transitioning into active contributors over time.

- **Maintain a Relationship with Arizona and the Implementation Vendor** – Ongoing collaboration with Arizona and the vendor will enable continuous system enhancements and ensure alignment with future AZ MAX updates.

13.1 General Staffing Considerations

Staffing Skill Sets

All modernization projects require participation from a broad set of skills and stakeholders. The future DMV/DIT system modernization team will need to include the following:

IT Staff – The AZ MAX solution is a modern and complex software solution. Most existing IT staff will require training and support to participate in such a complex project where new technologies are used. Some aspects of the modernization will focus on interfacing new systems with existing systems. In these cases, the existing staff will have the required skills and knowledge to support a range of tasks.

Business Staff – Business staff generally have the expertise required to describe current and future business operations. An implementation vendor cannot substitute for this role. However, new staff or contractors can be brought in early in the project to assist with requirements analysis and planning, and they can usually continue to support the project through implementation and support or supplement internal business staff.

Project Management Staff – State staff may not have the skills or experience necessary to manage such a large project or to oversee vendors. Training in project management, quality management, and other skills may be necessary but may not substitute for large project experience.

General Staffing Expectations

As the Division moves forward with modernization, it will need a dedicated internal team to lead the project, make operational and technical decisions, and collaborate with the implementation vendor and other consultants or stakeholders.

The following represents a core team that any DMV should assemble and prepare as the modernization team, and these numbers are typical for a project of this size. Assembling this team also requires planning to backfill their daily responsibilities to make them available for the project.

IT Staff – 10 to 20 technical staff would provide the core support for a variety of technical responsibilities, including:

- Data analysis, interpretation, and conversion guidance
- Interface management and planning integration with other systems, such as the Driver License card production system
- Architecture planning and implementation
- Systems analysis
- Software development
- Infrastructure preparations and support planning
- Quality reviews of the implementation vendor's technical tasks

This IT staffing level may vary depending on whether the State prefers to be "hands-on" in the technical aspects of the project or mostly delegate the technical tasks to the implementation vendor. The "hands-on" option is consistent with the DMV/DIT plan as they wish to develop the skills necessary to maintain the system and not be dependent on the implementation vendor.

Business Staff – A team of 8 to 12 business/operations staff would provide the core of a functional team responsible for defining the operations of the system, including:

- Defining business rules and calculations
- Defining process flows and transaction requirements
- Defining and designing new notices, products, and correspondence
- Assessing changes to current operations to fit the new system
- Approving all system functions
- Guiding and conducting acceptance testing

The team must have enough operational expertise to cover all business operations, including Driver Licensing, Driver Records, Vehicle Services, Motor Carrier, Business Licensing, and Finance. The team will cross-train over the course of the project to ensure that the design and configuration of the system in each business area is compatible with and supports the other business areas.

Project Management Staff – At least 2 and up to 5 project managers would lead and oversee the project for the DMV. Their responsibilities would include:

- Coordinate DMV/DIT resources and ensure team commitments are met
- Oversee implementation vendor activities and approve deliverables and progress
- Coordinate with all stakeholders

- Coordinate and collaborate with supporting consultants such as a project management support vendor
- Manage project risk, engage governance, and overall project management

Staffing – Dual Burden

An additional burden on staff is the need to focus on the planning and development of the new systems while also maintaining and, in some cases, expanding the existing systems to meet legislative and other functional needs.

This issue must always be considered when planning and funding the modernization effort, and every state deals with this challenge. Some states leverage vendors and staff supplementation, some hire new project staff, and some hire new staff to make existing staff available. In all cases, staffing must be considered early in the project, and it is critical to minimize or completely freeze changes to the existing system to minimize maintenance work.

13.2   DMV/DIT Staffing Plan

Guiding Principles

Mathtech and DMV/DIT reviewed and discussed the *Application System Modernization (DASM) Resource Plan* dated April 2, 2024, and the team's current *Data Cleansing and System Analysis* schedule dated February 17, 2025. As part of our discussion, the DMV/DIT team shared these guiding principles that will be followed throughout the project:

Knowledge Transfer to DIT Staff

The staffing plan will include a structured knowledge transfer process from the implementation vendor to the DIT staff. This will be achieved through a "2-in-a-box" approach. DIT staff will shadow and collaborate with vendor personnel in overlapping roles, ensuring they gain hands-on experience and deep system knowledge throughout the implementation.

Upskilling Staff to Support a Modernized System

To successfully manage and maintain the new modernized DMV system, the staffing plan will prioritize training and skill development for existing staff. This includes upskilling employees in .NET Core, cloud-based technologies, system integration, cybersecurity, and data management to support the long-term sustainability and efficiency of the new system.

Acquiring and Retaining Specialized Skillsets

The team will focus on hiring and retaining specialized IT professionals with the expertise necessary for a successful modernization effort. This includes dedicated resources with critical skill sets, such as cloud architects, cybersecurity specialists, and system development experts. For example, a database architect will be essential to design and manage the data migration strategy, ensuring a smooth transition from legacy systems to the modernized platform.

Other Staffing Considerations

Other staffing considerations raised by DMV/DIT include:

- **Retirements Impact** – The team must evaluate retirement projections within the existing staff to assess their impact on staffing levels and project continuity.
- **Legislative Freeze** – A temporary freeze on legislative changes will be needed during the modernization process to prevent disruptions and ensure system stability. This is a best practice during modernization projects as it allows the team to focus on building a new system, not enhancing the old system.
- **Staffing Ramp-Up Planning** – The team must estimate and plan for hiring lead times, accounting for potential delays in recruitment. These hiring timelines will be factored into future staffing models to ensure the right personnel are in place when needed.

- **Staffing Cycle Considerations** – Since procurement and hiring processes are often lengthy, the staffing plan must account for potential delays and their impact on project timelines and resource availability.
- **Balancing New System Work and Current System Maintenance** – The DMV/DIT team anticipates challenges associated with balancing modernization efforts with day-to-day operations. DMV/DIT intends to have a dedicated project team to mitigate this challenge.

DMV/DIT Staffing Estimates

Modernization Team Skill Set and Overall Size

The DMV/DIT team is actively developing its staffing plan for the project. Preliminary models shared with Mathtech have been well-organized and include an appropriate mix and quantity of personnel. The *Division's Application System Modernization (DASM) Resource Plan* reflects an understanding of the key roles needed to support the system modernization efforts. It also acknowledges that a full-scale modernization requires a substantial number of technically skilled resources.

Role of the Implementation Vendor – The estimate of 60 to 80 total staff, combining both State and implementation vendor personnel, is reasonable given the size and complexity of the project. However, planning has not yet advanced to the point where the specific division of responsibilities between DMV/DIT staff and implementation vendor resources has been determined. The team does acknowledge that a project of this complexity is heavily dependent on the Implementation Vendor.

13.3 Assessment

Mathtech and the DMV/DIT team engaged in multiple discussions regarding staffing strategies for the modernization project, drawing from experiences with similar large-scale implementations. Considering similar projects, the staffing described above would be required if all development and training were provided by an experienced third-party vendor.

The size of any jurisdiction's IT team on a modernization project will vary substantially depending on how much work the IT department wants to bring in-house. Similarly, the size of the data team will vary based on the level of data cleansing the team wants to perform before migration. Given the complexity of this project and the plan for the State to be fully engaged, a large team size is expected.

Shadow Staffing Approach for Knowledge Transfer

The DMV/DIT team has proposed a "2-in-a-box" approach, where two staff members (1 Implementation Vendor + 1 DIT) perform a single functional role, or one "shadows" the other, during implementation or operations. This strategy has both short-term and long-term implications:

- **Effective Knowledge Transfer** – The process should be very effective in helping develop in-house knowledge and skills. It may create extra effort for the implementation vendor.
- **Short-Term Cost Impact** – Hiring and training additional in-house staff may lead to higher initial costs.
- **Long-Term Cost Savings** – Utilizing internal staff for ongoing operations can reduce dependency on costly third-party support over time.
- **Staffing Retention Challenges** – Due to the State's lower compensation rates compared to private industry, it has historically struggled to attract and retain skilled staff. This could pose an ongoing challenge in maintaining the necessary staffing levels to support both implementation and long-term operations. Every organization, public and private, has an in-house team that is part employee and part contractor. Contractors are generally better compensated but do not receive the fringe benefits and job security that an employee receives. Contractors do, however, provide greater flexibility in staffing.

Staffing Quantity & Approach

Estimating Staffing Needs – A total project team size of approximately 60 to 80 staff is reasonable for a modernization effort of this scale, with a majority of the team being provided by the implementation vendor. This estimate is based on comparisons with similar projects in other states, such as Arizona, Wyoming, Missouri, and Maryland.

Full-Time Staff – DMV modernization projects typically have approximately 10 dedicated business staff. IT staffing levels vary based on the amount of support an agency can provide. IT staff typically range between 10 to 15 staff for a project of this scope – and up to 20 staff depending on tasks and preparation to take over long-term support. Agencies should always place their best staff on the modernization project and backfill accordingly.

Part-Time Staff – A wide range of staff will need to participate on the project on a part-time basis as particular expertise or experience is needed. This also contributes to a strain on overall staffing levels.

Backfilling – Staff that join a major modernization effort are often some of an agency's strongest performers, who will not only support the implementation but also be a champion of the modernized solution going forward. Agencies typically need to backfill vacancies left by these staff when they transition to the modernization project full-time.

On-Site v. Remote Staff – Depending on the preferences of the agency and input from the implementation vendor, vendor staff may manage the project remotely or on-premises. If the State selects the AZ MAX solution, there is the potential for an implementation vendor to predominantly work remotely, gathering onsite periodically as needed – but the final determination of how the project executes will be for the State to decide.

Goal of Providing Long-Term Support through In-House Resources – DIT has indicated that they plan to take on a significant portion of the system support effort after implementation. While this approach will not reduce the overall amount of work required to support the system, it will shift the associated costs from the implementation vendor to the Division. By using in-house staff for ongoing support, the Division is likely to achieve cost savings, as internal resources typically cost less than hiring an external support vendor. This strategy reflects a deliberate effort by DIT to control long-term support costs.

Staffing Challenges – The DMV/DIT team may find it difficult to hire and retain a substantial number of capable staff. During our assessment, the Division stressed that it was having difficulty hiring and retaining staff due to its lower compensation rates relative to the private industry. This risk is somewhat mitigated by hiring contractors, which is still different than engaging a third-party support vendor. Contractors and employees would be managed by DIT where a support vendor would engage and manage and make a profit on its staff.

RECOMMENDATION

Let the Implementation Vendor Lead and Perform the Implementation – DMV/DIT should plan on having an implementation vendor with AZ MAX experience perform a large majority of the work. The implementation vendor understands how the system is designed, the coding process used, and the proper approach to enhancing the system while maintaining the architecture and compatibility with other AZ MAX implementations. This will minimize the risk of errors and allow the implementation to proceed more quickly.

Build An In-House Team – DMV/DIT should develop an in-house development and support capability tailored to the new system. This provides the State with greater flexibility, control, and oversight of critical systems. It will give the State the ability to better oversee the implementation vendor and assess the quality and progress of work.

Leverage Contractors To Build The In-House Team – If DMV/DIT is experiencing compensation-related hiring challenges, then it should, like every agency, build an in-house IT team that includes strong employees and managers and is supplemented with contract IT staff that can be ramped up and down over the years as necessary and as new skill sets are needed.

Determining IT Team Size – An In-house team will take time to develop. DMV/DIT should plan to ramp up the team from a minimum of 10 to a maximum of 20 throughout the implementation project. The ramp-up will evolve as the team is successful and experience with the project is gained.

Implement the "2-in-a-Box" Knowledge Transfer Approach – It is very worthwhile for DMV/DIT to collaborate with the implementation vendor team and shadow their resources, eventually evolving into contributors to the development effort. The result is the desired knowledge transfer and development of in-house support capabilities.

Maintain a Relationship With Arizona and the Implementation Vendor – The final judgment will come during the implementation project. Still, ideally, DMV/DIT will need to maintain a relationship with Arizona and the implementation vendor so that enhancements from other AZ MAX states can be incorporated into North Carolina's system.

14. Data Security

Assessment Task:	**Provide an assessment of whether the Division's IT modernization efforts include sufficient data security protocols, including an assessment of the type of data the Division intends to collect or store.**
Assessment Approach:	Mathtech reviewed the State's security policies and procedures to ensure that they are aligned with best practices. Mathtech's assessment examined the current scope of operations and data collected by the Division and any planned expansion that would occur during the planned modernization.
Summary Findings:	The modernization effort is in a "planning and analysis" phase, so nothing has been implemented at this point in time. Mathtech's assessment found the following. ■ **No System Yet** – The DMV/DIT team has selected the AZ MAX solution, but nothing has been implemented at this time, not even a demo system. Given that there is no live system at this time, no customer or test data has been loaded. ■ **Sufficient IT and Data Security Policies** – The State's IT and data security policies are aligned with industry standards and best practices, including NIST and Federal DPPA standards. As the DMV/DIT team continues to implement these policies for modernization, it should provide sufficient structure to protect DMV data. ■ **Security Prioritization** – DMV/DIT resources have placed a priority on IT and Data security throughout their initial assessments and for the modernization effort. ■ **Same Scope of Data Managed** – The DMV collects a broad range of data consistent with its mission and will continue to do so under system modernization. Any refinements to improve efficiency or combat fraud will remain consistent with its authority and Mathtech does not see any notable expansion to the scope of data collected. ■ **Secure Foundation** – The AZ MAX solution has been built to be a secure system using modern tools by another jurisdiction (Arizona), which has equal expectations for IT and data security. This system should provide a strong starting point for the DMV/DIT team. While no system, project, or plan can be guaranteed to be perfect, the DMV/DIT team, in combination with the AZ MAX solution and the State's IT and data security standards, represents a sufficient plan to move forward securely. As the DMV/DIT implements the planned system and adheres to the State's security policies and procedures then they have a sufficient plan to modernize their systems and protect DMV data.

14.1 Sufficient Data Security Protocols

This part of the assessment evaluates the State's IT and data security policies in relation to industry and federal standards, including their applicability to the DMV. The review specifically considers whether these policies are suitable for protecting driver and vehicle data in accordance with the federal Driver's Privacy Protection Act (DPPA), the National Institute of Standards and Technology (NIST) frameworks, and broader data protection best practices.

> The State's IT Security Policies can be found at: Statewide Information Security Policies | NCDIT
>
> https://it.nc.gov/programs/cybersecurity-risk-management/esrmo-initiatives/statewide-information-security-policies

Compliance with Federal Standards

North Carolina's policies demonstrate clear alignment with federal cybersecurity guidelines by adopting the National Institute of Standards and Technology (NIST) Special Publications 800-37 and 800-53 Rev 5. The Statewide Information Security Manual outlines required control families such as Access Control, Audit and Accountability, Incident Response, and System Integrity. The adoption of these frameworks ensures that the state's IT security posture is consistent with federal expectations for risk management and data protection.

Alignment with Industry Best Practices

The State's policies are also aligned with industry standards such as NIST 800-53 Rev5 and the Center for Internet Security (CIS) Controls. The policies also include a NIST control crosswalk which integrates key principles including but not limited to:

- Role-based access control
- Least privilege
- Secure system configurations
- Continuous monitoring
- Security awareness training

These practices are essential for maintaining secure and resilient public sector systems.

Completeness of Security Policies

The policies reviewed—including the Statewide Information Security Manual and the Data Classification and Handling Policy—are broad in scope. They clearly define, but are not limited to:

- Data classification categories (Low, Medium, High Risk)
- System classification procedures
- Roles and responsibilities (Data Owner, Steward, Custodian, and User)
- Procedures for data labeling, media sanitization, secure disposal, and data sharing Annual review requirements and incident response processes further reinforce the completeness of the framework.

Protection of DMV Data (DPPA Considerations)

The policies effectively identify and protect Personally Identifiable Information (PII), including driver's license numbers, Social Security numbers, and other sensitive attributes defined under the DPPA. High-risk classifications explicitly include data types regulated under federal and state laws, ensuring that DMV systems are compliant with the DPPA's restrictions on disclosure and use of motor vehicle records.

Strengths Observed

The current set of policies and procedures provides a strong framework for moving forward, including the following.

- Strong adherence to NIST Risk Management Framework principles
- Annual classification and security posture review mandates
- Clear guidance for handling high-risk and PII data
- Comprehensive audit and access control requirements
- Effective structure for assigning data stewardship roles

14.2 Data Intended To Be Collected Or Stored By The DMV

The Division currently collects and manages a wide range of sensitive information (including PII) consistent with its authorized mission, including but not limited to the following.

Driver	Vehicle	Business
■ Individual Customer Records	■ Vehicle Records	■ Business Customer Records
■ Driver License Records	■ Titles	■ Vendor Records
■ Driver Violation & Sanction Records	■ Registrations	■ Dealer Records
■ Driver Test Records	■ Liens	■ Lender Records
	■ Insurance Coverage Records	■ Motor Carrier Records

Operational Improvements But No Significantly New Categories of Data – As part of its system modernization, the DMV will continue collecting all currently authorized and required categories of data. The project involves migrating all existing data to a modern system and database that will enhance operational support, automate manual processes, improve efficiency, and expand online services. While some refinements in types of data or format may occur to support these improvements and strengthen fraud prevention, all data collection will remain within the DMV's authority. These changes or enhancements do not represent a significant expansion in the scope of data collected.

14.3 Understanding of the AZ MAX Security Posture

The AZ MAX solution is a .NET Core system built in the Microsoft Azure cloud with Microsoft SQL Server as the database management system.

Arizona has similarly strict IT and data security policies and procedures, references the same federal standards, and, as a peer DMV, must implement the same secure interfaces to federal/national systems and follow the same federal laws for driver data protections (i.e., DPPA).

Arizona and its system implementation vendors, throughout the system's development and maintenance process, have initiated a range of security planning and testing to ensure that the system is secure for Arizona. If nothing else, this helps to ensure that the NC DMV has a starting point in its modernization effort that is secure.

As implemented in Arizona, AZ MAX was developed and implemented to be a secure solution including technical security measures, compliance with NIST standards, and secure development practices.

Technical Security Measures

■ **Encryption** – Data is encrypted at rest and in transit using Azure Government's built-in encryption services. Sensitive integrations (e.g., with SSA) are encrypted and secured through approved interfaces.

■ **Access Controls** – Role-based access for employees with auditing and fraud detection capabilities. Public access uses multifactor authentication and digital identity verification.

■ **Monitoring & Incident Response** – Azure-native tools (e.g., Microsoft Defender for Cloud) monitor cloud security configurations and threats. Formal penetration testing was conducted; identified risks were mitigated or accepted with monitoring.

Compliance with NIST Standards

■ **NIST 800-53 Compliance** – AZ MAX complies with Arizona's statewide security policies based on NIST SP 800-53. Controls include access management, incident response, contingency planning, and encryption.

- **AZRAMP & FedRAMP Alignment** – Hosted in Azure Government Cloud, which is FedRAMP High authorized. Arizona's AZRAMP program ensures cloud solutions meet NIST-equivalent standards.
- **Audit & Validation** – Compliance confirmed through penetration tests, third-party reviews, SSA reviews, and Arizona Auditor General reviews.

Secure Development Practices

- **Secure SDLC & Testing** – Agile development with structured testing: unit, integration, performance, UAT, and regression. All MAX interfaces passed penetration testing before go-live.
- **DevSecOps Integration** – Security was embedded into development with real-time scanning, automated configuration checks, and continuous hardening via Azure tools. Modular microservices architecture supports rapid patching and secure deployments.

14.4 Recommendations for Continued Data Protection During the Modernization

As the DMV/DIT team moves forward with modernization, it will need to ensure that the best practices from above are continually applied. The modernization team could consider the following as part of its overall preparation.

- **Extend the Data Governance Framework** – Continue to define clear roles and responsibilities for data management, including owners, stewards, and custodians. Implement a governance structure to oversee data access, use, and compliance with DPPA and security policies.
- **Conduct Privacy and Security Impact Assessments** – Perform relevant assessments such as a Privacy Impact Assessment (PIA) to ensure the system complies with DPPA limitations on data use and disclosure. Conduct a Security Impact Assessment (SIA) aligned with NIST standards to identify and address risks.
- **Implement Data Classification and Labeling** – Continue to apply the State's data classification framework to label data as Low, Medium, or High Risk. Ensure sensitive data is properly marked and managed according to its classification, defaulting to the highest risk level when data types are mixed.
- **Enforce Access Controls and Role-Based Security** – Restrict access to DMV data using least privilege and role-based access control. Require multi-factor authentication and maintain detailed audit logs to monitor access by internal staff and external partners.
- **Secure Interfaces and Data Transfers** – Ensure integrations with external systems (e.g., SSA, AAMVA, TSA) use strong encryption and secure protocols that are already part of those interfaces. Document data-sharing agreements and confirm they meet DPPA and state-specific security standards.
- **Monitor and Audit Continuously** – Use automated tools like SIEM (Security Information and Event Management) systems to detect unauthorized access or unusual activity. Conduct regular audits and penetration testing to validate the system's defenses and compliance posture.
- **Train Personnel on Data Privacy and Security** – Continue to provide training for users, emphasizing DPPA compliance, proper handling of PII, and responsibilities tied to data access. Require annual recertification to reinforce understanding.
- **Establish Incident Response and Breach Notification Procedures** – Maintain a tested incident response plan and clearly defined breach notification protocol aligned with NIST and state requirements. Ensure staff are trained to respond promptly and correctly to security events.
- **Retain, Archive, and Dispose of Data Securely** – Follow state retention policies and use approved sanitization methods for disposing of data and hardware. Prevent data from being improperly commingled or stored beyond its required lifecycle.
- **Collaborate with Vendors and Jurisdictions** – Ensure that vendors comply with State policy and procedures. Engage with jurisdictions already using AZ MAX to share lessons learned and stay aligned with evolving best practices.

15. Other Factors

Assessment Task:	Provide a summary of any other factors the Vendor deems relevant to assessing the efficacy of the Division's modernization efforts.
Assessment Approach:	In order to identify other factors that may affect the modernization, Mathtech conducted discussions with a variety of third-party stakeholders at the request of the State.
Summary Findings:	The collective findings from the discussions are: ■ **Stakeholders are Satisfied** – The external stakeholders Mathtech met with are generally satisfied with the DMV. ■ **Continue Making Incremental Improvements** – A complete system modernization that will make processes more efficient and quicker for decades to come would be welcome. Preferably, such a transition would not materially impact the incremental improvements that the DMV makes on an ongoing basis. ■ **Real-time Expectations** – Real-time processing reduces errors and rework and is increasingly expected by North Carolina businesses, citizens, and DMV customers.

15.1 North Carolina Association of Sheriffs and Chiefs of Police

The North Carolina Sheriff's Association representative indicated that he has not received any complaints from the Sheriff's Department staff and that the Department is very satisfied with its interactions with the DMV. He indicated that the DMV has effectively and efficiently supported the Sheriff's Department over the years. Since the Department is fully satisfied, they have no suggestions for improvement at this time.

The Chiefs of Police representative noted that the Division's policy of allowing third parties to access crash reports benefits law enforcement and the insurance industry. Law enforcement and insurance companies currently have real-time access to crash reports, which makes handling accident-related processes more efficient. They have asked that the Division continue to provide third parties access to crash reports. The process of having to submit requests to DMV staff each time a crash report is needed is an inefficient process found in some other jurisdictions.

15.2 North Carolina Insurance Carriers and Agents

On March 12, 2025, Mathtech met with representatives from North Carolina's insurance industry to discuss their needs and expectations for a modernized Division of Motor Vehicles (DMV) system.

15.2.1 Real-Time Updates

The insurance industry emphasized the critical need for real-time transaction processing and updates, regardless of which system the DMV selects. This is the top priority for insurance carriers, licensed agents, and customers. Auto insurance carriers require the ability to notify both the DMV and their customers instantly when there are changes to a policy. Likewise, they expect the DMV to process and reflect these updates immediately. A key concern is ensuring that law enforcement officers have access to up-to-date vehicle registration and insurance information. For instance, when a vehicle owner switches insurance carriers, the DMV must be promptly informed. Suppose updates are delayed due to nightly batch processing rather than real-time. In that case, there is a risk that outdated information will appear during a traffic stop, potentially causing confusion and enforcement issues.

15.2.2 Direct Agent Access to DMV Systems

Currently, insurance agents must go through their carriers to access DMV systems, creating delays and limiting their ability to efficiently assist customers. Agents expressed a strong preference for direct access to a future DMV system for quick information retrieval. Insurance carriers, on the other hand, impose these access restrictions to maintain control and prevent erroneous data entries. Process changes at the DMV and among carriers could improve agent efficiency while preserving data accuracy.

15.2.3 Improved Data Integrity

Insurance agents have noted occasional inaccuracies in customer records, particularly when customers switch insurance providers. These errors often involve the effective date of new or canceled policies. A common trigger for these issues is remarketed renewals, where brokers find customers better deals just before an auto-renewal. This process frequently leads to gaps, errors, or confusion in insurance coverage. To address these concerns, agents have requested more accurate and reliable reporting on key data points such as:

- The effective date of coverage
- The carrier's name
- Vehicle identification details

15.2.4 Reducing Driver's License Wait Times

Insurance representatives relayed customer frustration over long wait times for driver's license renewals. Appointments are reportedly booked up to 90 days out for some DMV offices, although walk-in service is available. They expressed hope that system improvements and technology efficiencies could streamline the process, making it faster and easier to complete a driver's license renewal via appointment.

15.2.5 Original Date of Driver's License Issuance

Insurance carriers require access to the original issuance date of a driver's license. Some carriers calculate premiums based on driving experience rather than age, making this information essential for accurate policy pricing. Currently, the DMV system can make determining the original date difficult, and the carriers would prefer to be able to gather this information more efficiently in the future.

15.3 North Carolina Automobile Dealers Association

The North Carolina Automobile Dealers Association (Association) indicated that it has a strong working relationship with the North Carolina DMV and has generally had a positive experience with existing systems. The Electronic Lien and Titling (ELT) system has functioned smoothly for dealers, and the Electronic Vehicle Registration (EVR) system has been in place for many years without major issues. Despite these successes, the Association identified several key areas for improvement.

15.3.1 Paper-Based Title Processes

One of the biggest challenges for dealers is the continued reliance on paper documentation. Dealerships are still required to print physical title paperwork, organize it into a deal jacket, and send it to the DMV or a tag agency. Once received, the DMV scans the documents into their system and then disposes of the originals. This process is inefficient, and the Association is eager to see the implementation of electronic workflow and, ultimately, digital titles, which would eliminate much of the manual paperwork burden. The DMV has an existing project in place that will allow all dealers to scan images and transmit them electronically to the DMV. This project should reduce paper-based transmission and improve dealer satisfaction.

15.3.2 Paper-Based Dealer License Renewal Processes

Inconvenient Process

Another concern is the dealership license renewal process. Even though renewals occur on a two-year cycle, the process remains paperwork-intensive and, in some cases, requires dealers to travel to Raleigh, NC, to complete the necessary steps. The Association would like to see this transition to a fully electronic system to reduce the administrative burden on the dealerships and eliminate the need for in-person visits. Some of the DMV's current functions are being transitioned from the DMV to North Carolina's Department of Public Safety. Dealer licensing and renewals will be handled by DPS.

The Association also emphasized the need for faster processing times for certain transactions. Currently, when paper dealer applications are submitted, it can take up to 25 days for dealers to receive a response. In cases where information is missing or corrections are required, dealers are often left with only 5 days to address the issues before a common 30-day deadlines expire. A more responsive system that provides quicker feedback would significantly improve efficiency and reduce delays in processing transactions.

15.3.3 Mobile Driver License (mDL)

While mobile driver licenses are not a top priority for the Association, they are possible to implement as an add-on to current systems, and some customers will receive benefits immediately after implementation.

For example, commercial drivers could receive real-time updates to their endorsements, and a mobile driver's license solution could give them faster access to required credentials while they wait for official documentation.

15.3.4 Other Considerations

While the Association supports a major backend modernization effort at the DMV, it stressed that existing modernization initiatives should not be put on hold during this process. They want to ensure that current improvements continue while the larger system overhaul moves forward.

Overall, the conversation highlighted the Association's strong interest in reducing paperwork, expediting processing times, and ensuring that modernization efforts continue without disruption. The Association is looking forward to advancements in digital titling, streamlined licensing renewals, and broader system enhancements that will improve efficiency for both dealers and the DMV.

16.   Potential Pricing Structure

Assessment Task:	**Provide an assessment of the Division's intended pricing structure for the provision of online or remote services after the Division completes the modernization of its IT systems**
Assessment Approach:	Mathtech prepared a pricing model for the modernization project based on similar projects and collaborated with DMV/DIT to incorporate the modernization strategy into the model. This allowed Mathtech to develop a reliable pricing structure that could be used to estimate implementation and operational costs for the new system. This assessment enabled the team and Mathtech to reconcile estimated costs with the timeline and proposed staffing plan.
Summary Findings:	The Division was not far enough along in its collaboration with the implementation vendor to have finalized a project pricing structure for the implementation or for ongoing support. The modernization pricing model presented here includes cost models developed by Mathtech projecting out 10 years, including planning, implementation, and support. ✓ **Complete Model** –The model presented in this section includes the major cost elements of modernization. This includes new staff, hosting and licensing costs, vendor costs, as well as contingency and inflation estimates. The model is as accurate as it can be at this point in the project. ✓ **Reasonable Initial Estimates** – The DMV/DIT estimates for data cleansing, change management, staffing, and other variable costs are consistent with industry standards. ✓ **Long-Term Savings** – The Division currently spends approximately $15M per year for mainframe hosting costs alone associated with the current SADLS, STARS, and LITES systems. This includes mainframe and related software and operating costs. This does not include networking costs or IT staff that support the system. While the new system will have new hosting service costs associated with it, the modernization project will introduce savings that can offset the modernization investment and ongoing support.

16.1   Developing a Cost Model

Understanding The Costs Of The Division's Modernization Plan

An estimated cost model is essential for understanding the financial requirements and long-term impact of the modernization effort. The model accounts for both implementation costs and ongoing annual support costs, spanning a 10-year period. This timeframe roughly includes a 1-year preparation phase and a 4-year implementation phase, followed by 5 years of system operation and maintenance.

Mathtech's cost model breaks down expenses into key cost categories, including hardware, software, and services over tasks for preparation, implementation, and support. The model includes new staff, hosting and licensing costs, vendor costs, as well as contingency and inflation estimates.

Compare To Other Options

When comparing project costs, it is important to consider other available options. Mathtech has included an estimate for implementing the AZ MAX solution compared to the cost of other available solutions, and the cost of keeping with the status quo of maintaining the current systems. The model assumes consistent scopes of work across the AZ MAX, COTS, and custom-built solutions.

Leverage Insight From Other Projects

Mathtech referenced the relative costs from other projects to develop this model in combination with cost estimates from the DMV/DIT team.

16.2 Existing DMV Cost Estimates

Estimates For Current Analysis Efforts

DMV/DIT has prepared estimates for its current analysis and preparation projects, including requirements analysis, data quality analysis, and for the upcoming organizational change management efforts. These estimates are reasonable and consistent with similar projects.

No Estimates For The Entire Modernization

At this stage, the DMV/DIT team has not yet developed a final pricing structure for the full modernization effort. While Mathtech's cost model provides a structured financial projection, collaboration with the implementation vendor is still required to refine the final budget. This includes determining vendor pricing for integration, support, and ongoing enhancements, coupled with the final determination of how much ongoing support work the DMV/DIT team will take on in the long term.

Need Collaboration With The Implementation Vendor

The final cost estimates will depend on vendor negotiations and detailed project scoping. Mathtech recommends that the DMV/DIT team:

- Work closely with the selected implementation vendor to finalize pricing.
- Conduct a detailed review of the scope, schedule (including phasing), contract terms, and service-level agreements (SLAs).
- Ensure cost transparency and risk mitigation measures are built into vendor agreements.

16.3 Options Considered

The budget model is divided into Implementation Costs and Annual Support Costs and developed to present a *10-year overall total cost* model including approximately 1 year of preparation followed by 4 years of implementation and 5 years of ongoing support. Based on our experience with many Driver and Vehicle modernization projects, this implementation plan is very achievable. Other approaches take longer than 5 years.

Imperfect Comparison

This analysis compares very different project approaches and, therefore, cannot be considered a perfect comparison. The approaches considered are as follows:

The pricing model compared three options:

- **AZ MAX Solution From Arizona** – This is a complete "DMV" system that should support all of the Division's needed functionality. While it is not a product that receives regular upgrades, Arizona and other jurisdictions intend to collaborate on needed enhancements.
- **Commercial Off-The-Shelf (COTS)** – This COTS solution is a commercial "DMV" software package from FAST Enterprises that is maintained as a product for many states and also offers complete functionality. Some enhancements will be included over time as the product evolves as part of the vendor's licensing and support fees.
- **Custom Development** – This approach involves using general commercial products used by many commercial businesses in combination with substantial custom software development to create a DMV solution from "scratch." These solutions require substantial time to complete, reaching almost 10 years. Some jurisdictions are still attempting such approaches, and they are slow, costly, and high-risk.
- **No Change** – Option 4 is for the Division to continue with its current IT operations and system. This results in consistent support costs moving forward and small operational improvements as have been accomplished in the past. This option is used as the baseline to which the other four options are compared.

16.4 Cost Factors

The model includes the following cost categories. Costs are expected to increase at 3% annually based on long-term inflation trends.

- **Hardware & Platform Fee** – Costs related to purchasing or leasing physical infrastructure, such as servers, networking equipment, workstations, mobile devices, kiosks, and other necessary hardware.

- **Software Purchase/License or Fees** – Costs associated with acquiring software, whether through a one-time purchase, annual subscription, or licensing fees. A COTS product would be an example of a software license fee.

- **Hosting & Cloud Fees** – Expenses for cloud-based infrastructure, storage, software services, and computing power needed to host the new DMV system.

- **System Integrator Implementation & Rollout Services** – Costs for hiring a system integrator to customize, configure, and help deploy a new DMV system. Implementation vendors also support data conversion, testing, and rollout of the system and can lead the training of DMV, DIT, and other staff.

- **Data Cleansing** – Costs for cleaning, validating, and preparing legacy data for migration to the new system. This includes removing duplicate records, correcting errors, standardizing formats, and ensuring data integrity before transition.

- **Management Support and Program Assurance/IV&V** – Costs related to third-party project management, consulting services, oversight, and governance of the modernization effort.

- **Organizational Change & Training** – Costs for preparing DMV employees and stakeholders for the transition, including change management initiatives and communication plans. This cost can focus on an advisor or leader or can include the entire organization's change and training effort.

- **IT Contractors and Vendors** – Expenses for external IT professionals and service providers engaged in security, network infrastructure, software development, and other specialized IT services necessary for the implementation. These are typically staff augmentation costs.

- **Department Staff** – Costs associated with engaging DMV/DIT staff for the modernization effort, including salaries, benefits, overtime, and any additional compensation for project-related responsibilities.

- **Agency Facilities & Space** – Costs for physical infrastructure, including office space, workstations, utilities, and any modifications needed to accommodate project teams, training facilities, or new system hardware.

- **Contingency** – Contingency is necessary to address potential changes in approach, scope, or schedule. Large modernization projects with well-defined scope and schedule should still plan for unforeseen challenges. Our estimate includes an additional 10% of implementation costs for contingency.

16.5   Current Costs

Existing Mainframe Hosting Costs Are Substantial

The SADLS, STARS, and LITES systems currently operate on the State's mainframe, representing a significant portion of the Division's overall system hosting costs. According to the Division's 2024 cost data, mainframe hosting—including associated software and operating expenses—totals approximately $15 million annually. This figure does not include network costs or IT staff who support and enhance the system.

Significant Reduction in System Hosting Costs After Implementation

In 2024, the Division paid $15,032,765 to DIT for mainframe hosting services for SADLS, STARS, LITES, and the IRP System. These legacy systems are expected to sunset in five years when the modernization is complete. A brief transition period may be needed to fully migrate off the mainframe.

Once the Driver and Vehicle Services components of the new AZ MAX system are live, the Division will no longer incur mainframe these hosting costs. Instead, the modernized system will be hosted in the cloud, with estimated annual hosting expenses of $4 to $5 million.

By eliminating mainframe-related costs, the Division could realize annual savings of well over $5 million, significantly offsetting the initial implementation and ongoing support costs associated with AZ MAX. These long-term operational savings represent a meaningful return on investment and reinforce the value of system modernization.

Major DMV Systems Retiring After AZ MAX Implementation

System	Function	Annual Mainframe Hosting Cost *
SADLS	Supports driver services	$ 7,469,189
STARS	Handles vehicle services	6,299,766
LITES	Tracks liability insurance	1,184,420
IRP	Manages IRP & Motor Carrier functions	99,390
Total		**15,052,765**

* Per DIT-Transportation APM 2024 Final Cost Report

16.6   Estimated Costs

The following table summarizes the estimated 10-year costs for each option. These are estimates with many factors able to influence the overall totals. Potentially,

- The COTS solution is likely more expensive than the AZ MAX solution to implement and maintain.
- The Custom Built solution is substantially more expensive than the AZ MAX option and is not a reasonable option.
- The AZ MAX solution is substantially less expensive than the current mainframe systems to maintain, given the difference in hosting costs alone.

	10 Year Description	Estimated Implementation Costs, *Including Vendor, Additional State Staff, Hosting, and Other Project Costs*	Estimated Annual Support Costs, *including Vendor, Licenses, Hosting, and other Support Costs*	Estimated 10-Year Project Costs
Option 1 **AZ MAX**	*1 Year Prep* *4 Years Implement* *5 Years Support*	$72,000,000 to $82,000,000	$6,000,000 to $7,000,000	$102,000,000 to $117,000,000
Option 2 **COTS**	*1 Year Prep* *4 Years Implement* *5 Years Support*	$82,000,000 to $95,000,000	$7,000,000 to $8,000,000	$117,000,000 to $135,000,000
Option 3 **Custom Built**	*1 Year Prep* *8 Years Implement* *1 Year Support*	$189,000,000 to $239,000,000	$13,000,000 to $17,000,000	$202,000,000 to $256,000,000
Option 4 **No Change &** **Incremental** **Improvements**	*Continue With the Current Program, Making Small Improvements*	Annual Hosting Costs for the Existing DMV Mainframe Systems are approximately $15M per year = $150M for 10 years		

This is the end of the report.

Ordering Information

Copies of this report may be obtained by contacting:

Office of the State Auditor
State of North Carolina
20601 Mail Service Center
Raleigh, North Carolina 27699

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Internet: www.auditor.nc.gov

To report alleged incidents of fraud, waste or abuse in state government contact the Office of the State Auditor's Tipline:

Telephone:1-800-730-8477

Internet: www.auditor.nc.gov/about-us/state-auditors-tipline

This audit required 1,574 hours of auditor effort at an approximate cost of $243,970.