EXHIBIT C

IMPLEMENTATION OF THE HIGHWAY COMMISSION REVIEW AND ADVISORY SUBCOMMITTEE RECOMMENDATIONS

September 15, 2021

ARKANSAS STATE HIGHWAY COMMISSION

10324 Interstate 30
Little Rock, AR 72209

INTRODUCTION

Reference is made to the Final Report to the Arkansas Legislative Council by the Highway Commission Review and Advisory Subcommittee's (HCRAS) Study of the Arkansas Department of Transportation dated November 20, 2020 (Report) (see Appendix). In accordance with Act 739 of the 93rd General Assembly, the Arkansas Highway Commission submits these rules to implement the recommendations in the Report.

For ease in reviewing, this document is organized to repeat the recommendation from the Report followed by the proposed rules for implementation. Once the rules are finalized, periodic reporting on the progress of implementation will be submitted to the HCRAS.

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Organizational Structure

Recommendation #1

Finalize KPIs and implement performance management

The Subcommittee recommends ARDOT adopt leading performance management practices to formulate and track a variety of operational effectiveness key performance indicators within a larger performance management framework and finalize those key performance indicators currently in use.

a. Implementation:

(1) Finalize existing key performance indicators for system condition and preservation and establish a preliminary dashboard;

(2) Establish baseline performance targets and connect the performance targets to the ARDOT strategic plan; and

(3) Create and implement a roadmap for a comprehensive performance management plan.

b. Considerations:

(1) This is a long-term initiative and should be approached in phases;

(2) This practice should be used to improve the Department and foster collaboration; and

(3) Communication, training, and change management may be required to socialize a new performance-based approach.

Rules

ARDOT Primary Oversight: Assistant Chief Engineer – Planning

- Establish the ARDOT Key Performance Indicators (KPIs) Oversight Committee. This committee will be made up of senior administration officials. This committee will oversee implementation and long-term management of this recommendation.
- As stated in the Final Report, this is a long-term initiative and should be approached in phases. Therefore, the remaining actions for this recommendation will be accomplished in phases which align with the goals in the Strategic Plan, which are:
  - ~ Provide Safe and Efficient Transportation Solutions;
  - ~ Accomplish Our Mission with a Focus on Stewardship;
  - ~ Champion Transportation Solutions that Promote Quality of Life and Economic Development;
  - ~ Continually Improve Transportation Services and Solutions Through Employee Engagement; and
  - ~ Maximize External and Internal Customer Satisfaction.

- Hold internal meetings with key ARDOT staff members to finalize development of operational effectiveness KPIs and recommend performance targets for each one that will support and evaluate ARDOT's accomplishment of its Strategic Plan.
- Solicit stakeholder comments regarding operational KPIs and performance targets.
- Make final adjustments to the operational effectiveness KPIs and performance targets based on the comments received.
- Develop a dashboard to monitor and evaluate how ARDOT is meeting the performance measure for each KPI.
- Develop annual review to identify successes and address areas of needed improvement.

Recommendation #2

Strengthen knowledge management in anticipation of increased retirement

The Subcommittee recommends adopting leading practices regarding knowledge management and preservation in anticipation of increased personnel retirement to allow ARDOT to mitigate knowledge loss due to turnover, identify operational efficiencies, and improve succession planning and training

a. Implementation:

(1) Identify near-term "At Risk" business practices;

(2) Initiate near-term succession planning activities;

(3) Lay groundwork for more formal knowledge management system; and

(4) Implement systems to sustain the desired change.

b. Considerations:

(1) New IT systems and software may be required to support standard operating procedure creation and centralize content;

(2) Updating and creating new standard operating procedures can be a significant undertaking, however using a comprehensive inventory will help ARDOT prioritize; and

(3) Leadership support and change management may be needed for lasting change.

Rules

ARDOT Primary Oversight: Assistant Chief – Administration

- The ARDOT Human Resources Division has been assigned the responsibility to oversee the implementation and long-term management of ARDOT's Knowledge Management Program.

- Continue reviewing all ARDOT positions to identify which ones are at risk of knowledge loss and identify responsibilities and associated processes, workflows, and critical areas of expertise.
- Continue with knowledge interviews and further develop methods for knowledge capture of high-risk work responsibilities, processes, and workflows.
- Identify staff in each Division or District who will be responsible for management of the knowledge captured and transfer of the knowledge to appropriate parties.
- Develop annual review of ARDOT's KM Program to ensure alignment with current processes and workflows.

Portfolio Planning

Recommendation #3

Publish status of construction projects and maintenance activities

The Subcommittee recommends revising ARDOT's existing communication of construction project and maintenance activities to make communication less disjointed and difficult to navigate. Improving the communication and reporting structure can enhance public visibility into, and accountability for, project performance; enhance project delivery; and yield better data to inform planning and budget appropriations.

a. Implementation:

(1) Inventory current reporting infrastructure;

(2) Identify and implement short-term reporting enhancements; and

(3) Lay the groundwork for long-term reporting improvements.

b. Considerations:

(1) ARDOT does not need to build out an entire platform to rapidly enhance reporting of readily available project status data: leverage existing platforms and tools, such as IDriveArkansas and district office websites; and

(2) An enterprise level approach will be required to provide true real-time access to project status.

Rules

ARDOT Primary Oversight: Assistant Chief – Administration

- Evaluate existing reporting platforms currently in use and document project information provided through them.
- Identify additional project information that could be provided through currently used reporting platforms for construction projects that are under development or have been let to contract and for maintenance projects.
- Hold internal meetings with key ARDOT staff members to select project information that will be provided and how this information should be presented.
- Solicit stakeholder comments regarding project information that will be provided and how this information should be presented.
- Finalize project information that will be provided and how this information should be presented.
- Since the accomplishment of this recommendation involves information and data that will be provided by implementation of Recommendations 1, 7, and 10, the implementation for this recommendation will be phased to align with when the information and data is available.

Recommendation #4

Implement a platform that tracks all stakeholder inquiries to resolution

The Subcommittee recommends ARDOT implement a process to track all stakeholder inquiries from receipt to resolution. ARDOT primarily manages customer service by providing the public direct access to staff with no uniform process for documentation of the inquiry or response. Leading customer services practices suggest that ARDOT can improve its customer service, while simultaneously reducing the cost to the Department and finding new Department-wide operational efficiencies.

a. Implementation:

(1) Understand customer, stakeholder, and public needs;

(2) Define a new customer experience vision;

(3) Lay the groundwork for a new service approach, including adoption of a customer relationship management tool; and

(4) Create and execute on implementation plan; and measure and communicate customer service performance.

b. Considerations:

(1) Clear vision, leadership buy-in;

(2) Upfront investment for future return on investment;

(3) Project Manager passionate about customer service;

(4) Right technology application identified early in the process; and

(5) In a phased approach, transition "services" not divisions.

Rules

ARDOT Primary Oversight: Assistant Chief – Administration

- Establish the ARDOT Customer Service Oversight (ACSO) Committee. This committee will include at least one senior administration official and oversee implementation and long-term management of this recommendation.
- Hold internal meetings with key ARDOT staff members and evaluate existing resources to identify the quantity, scope, and type of customer inquiries.
- Conduct a targeted survey of ARDOT inquiries to assess customer's needs and create an analysis of their needs.
- Use the results of the internal meetings and the analysis of ARDOT customer's needs to establish goals for customer experience.
- Solicit stakeholder comments regarding the establish goals for customer experience.

- Select a consultant to provide software which can be integrated into our website that will provide ARDOT the ability to input, track, and document the processing and response to customer inquiries.
- The consultant provided software will also be developed to provide a reporting structure that can be used to provide summarized information regarding customer inquiries to ARDOT administration and the public.
- Establish metrics and performance measurements to evaluate accomplishment of customer service goals.

Procurement

Recommendation #5

Implement efficiencies in procurement and purchasing

The Subcommittee recommends ARDOT optimize and standardize procurement and purchasing procedures. ARDOT may more effectively use resources and maximize costs savings Department-wide – including and beyond construction procurement with documented and standardized procurement procedures.

a. Implementation:

(1) Use data-driven approaches like spend analysis and lifecycle costing to inform procurement and purchasing decisions;

(2) Standardize usage of project acceleration techniques, procurement methods, and delivery methods; and

(3) Push efficiencies to districts.

b. Considerations:

(1) IT systems to track data;

(2) Staff capacity and expertise to conduct data analysis;

(3) Assignment of responsibility between districts and divisions; and

(4) Change management to shift culture from low bid to best value.

Rules

ARDOT Primary Oversight: Deputy Director & Chief Engineer/Assistant Chief – Administration.

Procurement of Construction Projects

- Select focus areas to evaluate related to this portion of the recommendation. Consideration should be given to change orders, cost estimates, and project delivery methods.
- Identify needed data to be able to evaluate the current processes and procedures used in the focus areas.
- If any needed data is not currently tracked, identify and implement methods of capturing it.
- Perform evaluation of current processes and procedures used with respect to the focus areas and document the practices that yield the best benefits.
- If needed, implement new or improved processes and procedures that yield the best benefits.

Procurement of Equipment and Materials

- Select focus areas to evaluate related to this portion of the recommendation. Consideration should be given to supply and demand trends, term contracts, commodity price changes, ownership cost, procurement procedures, and purchasing methods.
- Identify needed data to be able to evaluate the current processes and procedures used in the focus areas.
- If any needed data is not currently tracked, identify and implement methods of capturing it. This will include the implementation of a software to move ARDOT to electronic bidding for equipment and materials.
- Perform evaluation of current processes and procedures used with respect to the focus areas and document and the practices that yield the best benefits.
- If needed, implement new or improved processes and procedures that yield the best benefits.

Recommendation #6

Implement construction contractor performance measurement

The Subcommittee recommends a construction contractor performance score. ARDOT rigorously monitors contractor quality through inspections, but lacks a tool to screen for contractor quality during procurement. By implementing performance-based scoring, ARDOT may improve work quality, safety, and timeliness; reward high-performing contractors; and encourage low-performers to improve.

a. Implementation:

(1) Identify quality indicators (i.e., repeated disincentives, claims, change orders, delays);

(2) Develop scoring system to quantify performance; and

(3) Track and monitor performance, using indicators and costs. In monitoring contractor performance, the recommendation of the Subcommittee is that the Department coordinate with county judges, mayors, and other municipal leaders to receive feedback regarding contractors performing work for the Department in the municipal leader's jurisdiction.

b. Considerations:

(1) Consider impact for both small and large contractors;

(2) Emphasize quantitative approach to minimize any appearance of subjectivity in scoring;

(3) Consider an appeals process for contractors to counter scores; and

(4) Ensure contractors have a clear path to raise their scores.

Rules

ARDOT Primary Oversight: Deputy Director & Chief Engineer

- Establish the Contractor Performance Evaluation Committee (CPEC) made up of ARDOT staff that have the work experience needed to oversee the implementation and long-term management of this recommendation.
- Identify metrics that define quality and desired performance of the prime contractor for construction projects.
- Establish how each metric will be used to evaluate the prime contractor.
- Develop a form which will be used by the ARDOT Resident Engineer and appropriate stakeholders to document their evaluation of the prime contractor.
- Establish how the CPEC will compile the completed evaluations into the project's final evaluation of the prime contractor.
- Establish a review and appeal process of the project's final evaluation of the prime contractor that is accomplished and completed prior to the results of the evaluation being published.
- Develop guidance for the type or size of projects where this evaluation will not be used.
- Solicit stakeholder comments regarding the identified process for this recommendation.
- Finalize the process for this recommendation.

Expenditures

Recommendation #7

Implement project and portfolio management frameworks

Subcommittee recommends adopting a project and portfolio management framework. ARDOT's pre-construction, construction and maintenance Project Portfolio Management systems vary in maturity. Enhancing these systems with leading Project Portfolio Management practices and a Project Management Office may allow ARDOT to more effectively budget, plan, execute, and communicate on its portfolio of construction projects and maintenance activities.

a. Implementation:

(1) Catalog existing Project Portfolio Management capabilities and identify baseline and target;

(2) Identify gaps in Project Portfolio Management (e.g. pre-construction resource planning);

(3) Establish a Project Management Office and Governance, and build on existing strengths and capabilities; and

(4) Phase deployment, develop tools, and train staff members.

b. Considerations:

(1) Will require Department-wide effort to unify disparate initiatives and assets and build out Project Portfolio Management framework; a qualified vendor can expedite this process;

(2) Implementation of Project Portfolio Management/project management office will be perceived as overhead, but will yield long-term benefits; and

(3) Change management and new IT applications may be required.

Rules

ARDOT Primary Oversight: Deputy Director & Chief Engineer

Construction Projects

- Evaluate the need for a Construction Project Management Office.
    - ✓ *The Program Management Division currently serves as the Project Management Office (PMO) for pre-construction projects while Construction Division currently serves as the PMO for construction projects. The noted Divisions will continue in their assigned roles as this recommendation is implemented.*
- Review existing planning and project management protocols currently in use by ARDOT to determine the software used and their capabilities for construction projects.

- Prepare a comparison of the planning and project management protocols currently in use by ARDOT for construction projects against systems and processes used by other state DOTs to identify potential benefits from the implementation of the identified systems.
- Select identified systems and processes for implementation.
- Coordinate implementation of the selected systems and processes with implementation of recommendation three to enhance publication of the status of construction projects.
- Provide needed training to implement the selected systems and processes.

Maintenance Projects

- Evaluate the need for a Maintenance Project Management Office.
  - ✓ *The Maintenance Division currently serves as the PMO for maintenance projects. They will continue in their assigned role as this recommendation is implemented.*
- Finalize the review of existing planning and project management protocols currently in use by ARDOT to determine the software used and their capabilities for maintenance projects.
- Prepare a comparison of the planning and project management protocols currently in use by ARDOT and those that will be provided by the MMS for maintenance projects against systems and processes used by other state DOTs to identify potential benefits from the implementation of the identified systems.
- Select identified systems and processes for implementation.
- Coordinate implementation of the selected systems and processes with implementation of Recommendation 3 to enhance publication of the status of maintenance projects.
- Provide needed training to implement the selected systems and processes.

Recommendation #8

Implement best practices in construction project design

The Subcommittee recommends adopting, implementing, and documenting best practices in construction project design. ARDOT lacks formal frameworks to ensure the consistent use of best practices in construction design, limiting their ability to demonstrate cost savings and strengthen institutional knowledge. By adopting and documenting such procedures, ARDOT may reduce project costs and improve achievement of system targets.

a. Implementation:

(1) Develop formal framework around use of performance-based practical design;

(2) Conduct value engineering earlier in design (i.e., at 30% complete) and more often; and

(3) Evaluate gap between original bid and final payment amounts to inform best practices in design.

b. Considerations:

(1) Not all projects are well suited to or would benefit from such approaches; frameworks should identify when to use them; and

(2) ARDOT is already employing many of these practices, so implementing recommendation will not require creation of new technical practices; rather, formalizing and documenting existing practices.

Rules

ARDOT Primary Oversight: Assistant Chief Engineer – Design

- Establish formal procedures for practical design, value engineering, and a comparison of engineer's estimates against final cost.
- Establish the analysis which will identify benefits, cost savings, and return of investment from the use of practical design, value engineering, and a comparison of engineer's estimates against final cost.
- Establish processes which will identify needed changes to design approach for projects most likely to have change orders, that exceed estimated completion dates, and are likely to benefit from practical design solutions.

Information Technology

Recommendation #9

Build an IT Governance Structure to guide to the Department's IT investments

The Subcommittee recommends building an information technology governance structure to determine ARDOT's IT investments. ARDOT's IT investments have grown 155% since FY 2016 to $23M in FY 2020 under unclear enterprise level guidance. Leading practices suggest that establishing a formal governance structure will enable the IT Division of ARDOT to support business objectives, help optimize ARDOT operations, manage enterprise risk, and meet internal and external stakeholder needs.

a. Implementation:

(1) Lay the groundwork to establish a robust governance structure;

(2) Establish a governance structure that identifies a cross-section of business and IT personnel to create a charter and decision making framework; and

(3) Create and execute on a governance roadmap; measure and communicate progress

b. Considerations:

(1) This is an ongoing process;

(2) Leadership support is needed;

(3) Emphasize how IT enables business performance and reduces risk; and

(4) Cascading of enterprise level goals through the IT Division to actual underlying processes.

Rules

ARDOT Primary Oversight: Assistant Chief – Administration

- Establish an Information Technical (IT) Governance Committee made up of ARDOT leadership including the appropriate Assistant Chiefs and Division Head that reports through the Deputy Director and Chief Operating Officer to the Director.
- Establish a framework and charter for the committee.
- Establish governance focus areas and priorities.
- Establish needed subcommittees to address each focus area.
- Establish a framework and charter for each subcommittee.
- Establish frequency for committee and subcommittee meetings.
- Identify KPIs to evaluate performance.

Recommendation #10

Implement mid-term IT initiatives that can optimize business operations

The Subcommittee recommends the adoption of information technology initiatives that optimize business operations. ARDOT spends ~$5.3M on software applications and has 300+ databases. Implementing leading data management and software application rationalization practices can deliver cost savings and unlock data value.

a. Implementation:

(1) Build a software application and database inventory;

(2) Assess and score each software application and database;

(3) Identify target state for each application and database; and

(4) Build phased roadmap for migration processes.

b. Considerations:

(1) Requires upfront investment to yield mid-to long-term savings;

(2) Requires leadership buy-in and change management to overcome resistance and assist staff in shifting to a new model;

(3) Requires software application such as the planned information technology service management tool; and

(4) Requires implementation plan for continuity of operations.

Rules

ARDOT Primary Oversight: Assistant Chief – Administration

- Determine preliminary ARDOT data governance and application development standards.
- Complete the existing application and database inventory including known policies, procedures, training and database schema categorized by business function.
- Establish application and database scoring system based on business function relevancy, risks, and cost of ownership.
- Review and validate scoring assessment with internal subject matter experts.
- Create an overall assessment for all applications and databases in the inventory, which will, in part, evaluate the security and configuration of each one.
- Establish a phased approach for implementation based on the needed actions as identified in the assessment as follows:
    - ✓ Phase 1 – Retain as is or eliminate
    - ✓ Phase 2 – Re-engineer
    - ✓ Phase 3 – Migrate

Recommendation #11

Develop critical pillars necessary to establish IT as an effective business partner

The Subcommittee recommends developing the critical pillars within ARDOT to establish the IT Division as an effective business partner. Currently, ARDOT's IT Division is not able to definitively articulate what services it will deliver, when it will deliver them, and its standards for effective delivery. Implementing an information technology service management framework may yield enhanced IT service delivery, improved internal customer satisfaction, and reduced IT costs.

a. Implementation:

(1) Establish baseline policies and procedures, and preliminary service catalog;

(2) Select appropriate software tools; and

(3) Establish a long-term IT Service Management Plan that includes appropriate communications and training to staff, and mature service catalog.

b. Considerations:

(1) Yield quick wins by establishing a basic service catalog and standards, capturing IT demand, and tracking requests;

(2) Include recommended project management infrastructure in the long-term information technology service management plan; and

(3) Communication and training will be critical to mitigate resistance to change.

Rules

ARDOT Primary Oversight: Assistant Chief – Administration

- Evaluate industry standards and protocols for Information Technology Project Management (ITPM).
- Select a preliminary set of ITPM tools, templates, and success metrics.
- Establish and provide training to staff members to implement the ITPM tools, templates, and success metrics.
- Complete implementation of the Information Technology Service Management (ITSM) already selected and installed at ARDOT including:
  - ✓ Service desk capabilities;
  - ✓ Service catalog management;
  - ✓ Risk management;
  - ✓ Asset catalog;
  - ✓ Project Management capabilities including tracking and reporting.
- Establish a multi-year long range plan for management and use of the ITSM.

People Capabilities

The Rules for Recommendations 12 and 13 should be combined into one set of actions since they are so closely connected.

Recommendation #12

Ensure staff can develop in their careers at the Department

The Subcommittee recommends developing a career development plan for ARDOT employees. Nearly half of ARDOT staff do not believe they can advance their careers there, and its turnover is rising. By developing career ladders and lattices, ARDOT may increase retention, reduce turnover-related costs, strengthen its talent pipeline, and improve morale.

In addition, the Subcommittee recommends the State Highway Commission establish a merit pay system for employees of the Department that incorporates performance evaluation standards, including an employee's attendance, completion of projects and assignments, and increased competence in the employee's job duties.

a. Implementation:

(1) Verify roles at high risk of turnover and important to succession planning;

(2) Conduct compensation study;

(3) Develop and publicize career, skill, and salary progression;

(4) Promote buy-in among staff for the performance-based pay and evaluation practice; and

(5) Implement a merit pay system that incorporates employee performance evaluation standards.

b. Considerations:

(1) Ability to promote may be limited by low turnover in desirable positions – consider career lattices when traditional career ladders are inaccessible; and

(2) Career development activities are closely aligned with training and knowledge management.

Recommendation #13

Improve staff capabilities to align with current/future organizational needs

The Subcommittee recommends ARDOT improve staff capabilities to align with the current and future needs of ARDOT. Staff and supervisors report that training resources are limited. By strengthening training, ARDOT may improve job satisfaction and retention, increase

productivity, and instill confidence in staff who then become more willing and able to take on greater responsibility within the ARDOT.

a. Implementation:

(1) Align trainings to job descriptions and career planning activities;

(2) Identify and fill training gaps;

(3) Assign trainings as part of performance evaluation process;

(4) Reinstitute manager training;

(5) Consider cross-training in high turnover districts and positions; and

(6) Consider formalizing on-the-job, practical training.

b. Considerations:

(1) Training will likely need to be updated over time, for example as new equipment is used or new programs are developed;

(2) Training need not be restricted to entry-level roles, senior level employees can benefit as well; and

(3) Priorities must be identified to focus rollout on training where it will have the most impact.

Rules

ARDOT Primary Oversight: Assistant Chief – Administration

- Continue to monitor turnover and identify high turnover positions that are important to ARDOT's continuity of operations for accomplishment of the Strategic Plan.
- Continue implementing the existing Workforce Strategic Plan, and adjust as needed, in order to mitigate the impact of turnover and increase employee engagement.
- Continue to establish how pooled positions can be used to properly align our employee's compensation with their competencies and responsibilities.
- Identify and publicize the steps required for advancement within career paths with respect to competencies, experience, training, and certifications.
- Consider the benefit of a compensation study.
- Evaluate the ACE employee performance evaluation process to ensure that the accomplishment of training, attendance, completion of projects and assignments, and increased competencies are taken into consideration.
- Continue to identify and fill training gaps, and prioritize training where it will have the most impact.
- Encourage supervisors to utilize employee development plans, including training and other activities, as part of the performance evaluation process.
- Continue providing manager training both in-house and by utilizing our existing external partners.
- Implement a Leadership Development Program to further develop existing leaders at all levels, as well as to prepare future leaders.

- Continue cross-training in high turnover areas and for high turnover positions.
- Complete implementation of the Maintenance Training Academy, which offers formalized practical training, including but not limited to equipment operation.

Appendix

Adopted by Subcommittee: October 12, 2020

Final Report to the Arkansas Legislative Council

Highway Commission Review and Advisory Subcommittee Study
of the Arkansas Department of Transportation

November 20, 2020

I. Background.

Act 298, passed by the 92nd General Assembly during the 2019 Regular Session, required the Arkansas Legislative Council to conduct a study of "the processes and functioning of the Arkansas Department of Transportation (the "Department"), including without limitation the department's processes, procedures, procurement procedures, projects, expenditures, and appeals processes." In its rules adopted May 17, 2019, the Arkansas Legislative Council assigned the study and its duties under the Act to the Highway Commission Review and Advisory Subcommittee (the "Subcommittee").

The objective of the Subcommittee, as proscribed by the Act, was to provide to the members of the Arkansas Legislative Council detailed and accurate information concerning the current state of the processes and functioning of the Department, as well as recommendations for legislative changes. In order to achieve the purposes of the study, the Subcommittee was tasked with the following:

1. Compare the procurement processes of the Department with the requirements of the Arkansas Procurement Law, Arkansas Code § 19-11-201, et seq.;
2. Study and consider the best practices for functioning of state transportation departments through consideration of practices in surrounding or comparable states;
3. Audit the expenditures and procurement processes of the Department in order to find ways to improve or create efficiencies in those areas; and
4. Consider and adopt recommended legislation based on the results of the study.

The Act also set forth a requirement that the Legislative Council "hire one (1) or more consultants to assist it in conducting the study." Pursuant to that directive, the Subcommittee began the process of acquiring consulting services and released a Request for Proposals for State Transportation Department Oversight Consulting Services on May 20, 2019. In August 2019, the Subcommittee selected Guidehouse, LLP ("Guidehouse") to perform a review of the Department and provide recommendations, and a contract was entered between Guidehouse and the Bureau of Legislative Research on August 23, 2019.

Act 298 further requires the Arkansas Legislative Council to file on or before December 1, 2020, with the Governor, the President Tempore of the Senate, and the Speaker of the House of Representatives a final report of its activities, findings, and recommendations, including recommended legislation related to the study. This document and its appendices and attached draft legislation constitute the final report of the Subcommittee.

The work of the Subcommittee will continue beyond submission of the November 20, 2020 report. The Subcommittee intends to use the remaining weeks of 2020 to refine its recommendations and legislative package for submission during the 2021 legislative session. As you review this report, please keep in mind that it is not a static document, but one that is subject to revision or modification by the Subcommittee as it works to refine its final recommendations.

II. Work of the Subcommittee

Guidehouse began its review of the Department in September of 2019 and provided regular updates to the Subcommittee on the progress of the study. In May of 2020, Guidehouse provided its Current State Assessment of the Department to the Subcommittee (*See* Current State Assessment Report, Appendix A). This report developed twenty-three (23) key findings in six (6) focus areas to be considered in the subsequent report on recommendations.

Guidehouse provided its Recommendations Report to the Subcommittee on June 17, 2020 (*See* Recommendations Report, Appendix B). The report identified thirteen (13) recommendations in the six (6) previously identified focus areas. In the following months the Subcommittee approached its workload by dividing the recommendations into focus areas. The Subcommittee met five (5) times between June and October to hear and discuss possible recommendations. At each meeting, Guidehouse presented a synopsis of its recommendations related to the meeting's focus area, the Department provided a response to each recommendation, and the Subcommittee asked questions of the Department and Guidehouse and had discussion regarding possible inclusion of the recommendation in its final report. The Subcommittee voted on whether to include the recommendations in the final report, and the following reflects the six (6) focus areas and related thirteen (13) recommendations that received approval from the Subcommittee for inclusion in this final report.

A. Organizational Structure

The following recommendations have been adopted by the Subcommittee with regard to Organizational Structure of the Arkansas Department of Transportation:

1. **Finalize Key Performance Indicators and Implement Performance Management.** The Subcommittee recommends ArDOT adopt leading performance management practices to formulate and track a variety of operational effectiveness key performance indicators within a larger performance management framework and finalize those key performance indicators currently in use.[1]

    a. ArDOT Implementation:

[1] Guidehouse, *Arkansas Department of Transportation Performance Review Recommendations Report*, April 20, 2020, pages 12-14.

(1) Finalize existing key performance indicators for system condition and preservation and establish a preliminary dashboard;

(2) Establish baseline performance targets and connect the performance targets to the ARDOT strategic plan; and

(3) Create and implement a roadmap for a comprehensive performance management plan.

b. Considerations:

(1) This is a long-term initiative and should be approached in phases;

(2) This practice should be used to improve the Department and foster collaboration; and

(3) Communication, training, and change management may be required to socialize a new performance-based approach.

2. **Strengthen Knowledge Management in Anticipation of Increased Retirement.** The Subcommittee recommends adopting leading practices regarding knowledge management and preservation in anticipation of increased personnel retirement to allow ArDOT to mitigate knowledge loss due to turnover, identify operational efficiencies, and improve succession planning and training.[2]

a. ArDOT Implementation:

(1) Identify near-term "At Risk" business practices;

(2) Initiate near-term succession planning activities;

(3) Lay groundwork for more formal knowledge management system; and

(4) Implement systems to sustain the desired change.

b. Considerations:

(1) New IT systems and software may be required to support standard operating procedure creation and centralize content;

(2) Updating and creating new standard operating procedures can be a significant undertaking, however using a comprehensive inventory will help ArDOT prioritize; and

(3) Leadership support and change management may be needed for lasting change.

B. Portfolio Planning

The following recommendations have been adopted by the Subcommittee with regard to Portfolio Planning of the Arkansas Department of Transportation:

[2] Guidehouse, *Arkansas Department of Transportation Performance Review Recommendations Report*, April 20, 2020, pages 15-17.

3. **Publish Status of Construction Projects and Maintenance Activities.** The Subcommittee recommends revising ArDOT's existing communication of construction project and maintenance activities to make communication less disjointed and difficult to navigate. Improving the communication and reporting structure can enhance public visibility into, and accountability for, project performance; enhance project delivery; and yield better data to inform planning and budget appropriations.[3]

   a. ArDOT Implementation:

   (1) Inventory current reporting infrastructure;

   (2) Identify and implement short-term reporting enhancements; and

   (3) Lay the groundwork for long-term reporting improvements.

   b. Considerations:

   (1) ArDOT does not need to build out an entire platform to rapidly enhance reporting of readily available project status data: leverage existing platforms and tools, such as iDRIVE AR and district office websites; and

   (2) An enterprise level approach will be required to provide true real-time access to project status.

4. **Implement a Platform that Tracks All Stakeholder Inquiries to Resolution.** The Subcommittee recommends ArDOT implement a process to track all stakeholder inquiries from receipt to resolution. ArDOT primarily manages customer service by providing the public direct access to staff with no uniform process for documentation of the inquiry or response. Leading customer services practices suggest that ArDOT can improve its customer service, while simultaneously reducing the cost to the Department and finding new Department-wide operational efficiencies.[4]

   a. ArDOT Implementation:

   (1) Understand customer, stakeholder, and public needs;

   (2) Define a new customer experience vision;

   (3) Lay the groundwork for a new service approach, including adoption of a customer relationship management tool; and

   (4) Create and execute on implementation plan; and measure and communicate customer service performance

   b. Considerations:

   (1) Clear vision, leadership buy-in;

   (2) Upfront investment for future return on investment;

[3] Guidehouse, *Arkansas Department of Transportation Performance Review Recommendations Report*, April 20, 2020, pages 19-22.

[4] Guidehouse, *Arkansas Department of Transportation Performance Review Recommendations Report*, April 20, 2020, pages 23-25.

(3) Project Manager passionate about customer service;
(4) Right technology application identified early in the process; and
(5) In a phased approach, transition "services" not divisions.

C. Procurement

The following recommendations have been adopted by the Subcommittee with regard to Procurement Procedures of the Arkansas Department of Transportation:

5. **Implement Efficiencies in Procurement and Purchasing.** The Subcommittee recommends ArDOT optimize and standardize procurement and purchasing procedures. ArDOT may more effectively use resources and maximize costs savings Department-wide –including and beyond construction procurement with documented and standardized procurement procedures.[5]

a. ArDOT Implementation:

(1) Use data-driven approaches like spend analysis and lifecycle costing to inform procurement and purchasing decisions;
(2) Standardize usage of project acceleration techniques, procurement methods, and delivery methods; and
(3) Push efficiencies to districts.

b. Considerations

(1) IT systems to track data;
(2) Staff capacity and expertise to conduct data analysis;
(3) Assignment of responsibility between districts and divisions; and
(4) Change management to shift culture from low bid to best value.

6. **Implement Construction Contractor Performance Management.** The Subcommittee recommends a construction contractor performance score. ArDOT rigorously monitors contractor quality through inspections, but lacks a tool to screen for contractor quality during procurement. By implementing performance-based scoring, ArDOT may improve work quality, safety, and timeliness.[6]

a. ArDOT Implementation:

(1) Identify quality indicators (i.e., repeated disincentives, claims, change orders, delays);
(2) Develop scoring system to quantify performance; and
(3) Track and monitor performance, using indicators and costs. In monitoring contractor performance, the recommendation of the Subcommittee is that the Department coordinate with county judges, mayors, and other municipal leaders to

[5] Guidehouse, *Arkansas Department of Transportation Performance Review Recommendations Report*, April 20, 2020, page 27-30.
[6] Guidehouse, *Arkansas Department of Transportation Performance Review Recommendations Report*, April 20, 2020, pages 31-33.

receive feedback regarding contractors performing work for the Department in the municipal leader's jurisdiction.

b. Considerations:

1. Consider impact for both small and large contractors;
2. Emphasize quantitative approach to minimize any appearance of subjectivity in scoring;
3. Consider an appeals process for contractors to counter scores; and
4. Ensure contractors have a clear path to raise their scores.

D. Expenditures

The following recommendations have been adopted by the Subcommittee with regard to Expenditures of the Arkansas Department of Transportation:

7. **Implement Project and Portfolio Management Frameworks.** The Subcommittee recommends adopting a project and portfolio management framework. ArDOT's pre-construction, construction and maintenance Project Portfolio Management systems vary in maturity. Enhancing these systems with leading Project Portfolio Management practices and a Project Management Office may allow ArDOT to more effectively budget, plan, execute, and communicate on its portfolio of construction projects and maintenance activities.[7]

a. ArDOT Implementation:

(1) Catalog existing Project Portfolio Management capabilities and identify baseline and target;

(2) Identify gaps in Project Portfolio Management (e.g. pre-construction resource planning);

(3) Establish a Project Management Office and Governance, and build on existing strengths and capabilities; and

(4) Phase deployment, develop tools, and train staff members.

b. Considerations

(1) Will require Department-wide effort to unify disparate initiatives and assets and build out Project Portfolio Management framework; a qualified vendor can expedite this process;

(2) Implementation of Project Portfolio Management/project management office will be perceived as overhead, but will yield long-term benefits; and

(3) Change management and new IT applications may be required.

[7] Guidehouse, *Arkansas Department of Transportation Performance Review Recommendations Report*, April 20, 2020, pages 35-40

8. Implement Best Practices in Construction Project Design. The Subcommittee recommends adopting, implementing, and documenting best practices in construction project design. ArDOT lacks formal frameworks to ensure the consistent use of best practices in construction design, limiting their ability to demonstrate cost savings and strengthen institutional knowledge. By adopting and documenting such procedures, ArDOT may reduce project costs and improve achievement of system targets.[8]

a. ArDOT Implementation:

(1) Develop formal framework around use of performance-based practical design;

(2) Conduct value engineering earlier in design (i.e., at 30% complete) and more often; and

(3) Evaluate gap between original bid and final payment amounts to inform best practices in design.

b. Considerations:

(1) Not all projects are well suited to or would benefit from such approaches; frameworks should identify when to use them; and

(2) ArDOT is already employing many of these practices, so implementing recommendation will not require creation of new technical practices; rather, formalizing and documenting existing practices.

E. Information Technology

The following recommendations have been adopted by the Subcommittee with regard to Information Technology of the Arkansas Department of Transportation:

9. Build an IT Governance Structure to Guide the Department's IT Investments. The Subcommittee recommends building an information technology governance structure to determine ArDOT's IT investments. ArDOT's IT investments have grown 155% since FY2016 to $23M in FY20201 under unclear enterprise level guidance. Leading practices suggest that establishing a formal governance structure will enable the IT Division of ArDOT to support business objectives, help optimize ArDOT operations, manage enterprise risk, and meet internal and external stakeholder needs.[9]

a. ArDOT Implementation:

(1) Lay the groundwork to establish a robust governance structure;

[8] Guidehouse, *Arkansas Department of Transportation Performance Review Recommendations Report*, April 20, 2020, page 41-44.

[9] Guidehouse, *Arkansas Department of Transportation Performance Review Recommendations Report*, April 20, 2020, pages 46-48.

(2) Establish a governance structure that identifies a cross-section of business and IT personnel to create a charter and decision making framework; and

(3) Create and execute on a governance roadmap; measure and communicate progress

b. Considerations:

(1) This is an ongoing process;

(2) Leadership support is needed;

(3) Emphasize how IT enables business performance and reduces risk; and

(4) Cascading of enterprise level goals through the IT Division to actual underlying processes.

10. **Implement Mid-term IT Initiatives that Can Optimize Business Operations.** The Subcommittee recommends the adoption of information technology initiatives that optimize business operations. ArDOT spends ~$5.3M on software applications and has 300+ databases. Implementing leading data management and software application rationalization practices can deliver cost savings and unlock data value.[10]

a. ArDOT Implementation:

(1) Build a software application and database inventory;

(2) Assess and score each software application and database;

(3) Identify target state for each application and database; and

(4) Build phased roadmap for migration processes.

b. Considerations:

(1) Requires upfront investment to yield mid-to long-term savings;

(2) Requires leadership buy-in and change management to overcome resistance and assist staff in shifting to a new model;

(3) Requires software application such as the planned information technology service management tool; and

(4) Requires implementation plan for continuity of operations.

11. **Develop Critical Pillars Necessary to Establish IT as an Effective Business Partner.** The Subcommittee recommends developing the critical pillars within ArDOT to establish the IT Division as an effective business partner. Currently, ArDOT's IT Division is not able to definitively articulate what services it will deliver, when it will deliver them, and its standards for effective delivery. Implementing an information technology service management framework may yield enhanced IT service delivery, improved internal customer satisfaction, and reduced IT costs.[11]

[10] Guidehouse, *Arkansas Department of Transportation Performance Review Recommendations Report*, April 20, 2020, pages 49-52.

[11] Guidehouse, *Arkansas Department of Transportation Performance Review Recommendations Report*, April 20, 2020, pages 53-55.

a. ArDOT Implementation:

(1) Establish baseline policies and procedures, and preliminary service catalog;

(2) Select appropriate software tools; and

(3) Establish a long-term IT Service Management Plan that includes appropriate communications and training to staff, and mature service catalog.

b. Considerations:

(1) Yield quick wins by establishing a basic service catalog and standards, capturing IT demand, and tracking requests;

(2) Include recommended project management infrastructure in the long-term information technology service management plan; and

(3) Communication and training will be critical to mitigate resistance to change.

F. People Capabilities

The following recommendations have been adopted by the Subcommittee with regard to People Capabilities of the Arkansas Department of Transportation:

12. Ensure Staff Can Develop in Their Careers at the Department. The Subcommittee recommends developing a career development plan for ArDOT employees. Nearly half of ArDOT staff do not believe they can advance their careers there, and its turnover is rising. By developing career ladders and lattices, ArDOT may increase retention, reduce turnover-related costs, strengthen its talent pipeline, and improve morale.[12] In addition, the Subcommittee recommends the State Highway Commission establish a merit pay system for employees of the Department that incorporates performance evaluation standards, including an employee's attendance, completion of projects and assignments, and increased competence in the employee's job duties. (*See* DTP006, *An Act to Create a Merit Pay System for Employees of the Arkansas Department of Transportation,* Appendix C.)

a. ArDOT Implementation:

(1) Verify roles at high risk of turnover and important to succession planning;

(2) Conduct compensation study;

(3) Develop and publicize career, skill, and salary progression;

(4) Promote buy-in among staff for the performance-based pay and evaluation practice; and

(5) Implement a merit pay system that incorporates employee performance evaluation standards.

b. Considerations:

[12] Guidehouse, *Arkansas Department of Transportation Performance Review Recommendations Report*, April 20, 2020, pages 57-58.

(1) Ability to promote may be limited by low turnover in desirable positions –consider career lattices when traditional career ladders are inaccessible; and

(2) Career development activities are closely aligned with training and knowledge management.

13. **Improve Staff Capabilities to Align with Current/Future Organization Needs.** The Subcommittee recommends ArDOT improve staff capabilities to align with the current and future needs of ArDOT. Staff and supervisors report that training resources are limited. By strengthening training, ArDOT may improve job satisfaction and retention, increase productivity, and instill confidence in staff who then become more willing and able to take on greater responsibility within the ArDOT.[13]

a. ArDOT Implementation:

(1) Align trainings to job descriptions and career planning activities;
(2) Identify and fill training gaps;
(3) Assign trainings as part of performance evaluation process;
(4) Reinstitute manager training;
(5) Consider cross-training in high turnover districts and positions; and
(6) Consider formalizing on-the-job, practical training.

b. Considerations:

(1) Training will likely need to be updated over time, for example as new equipment is used or new programs are developed;

(2) Training need not be restricted to entry-level roles, senior level employees can benefit as well; and

(3) Priorities must be identified to focus rollout on training where it will have the most impact.

G. Oversight of Implementation of Subcommittee Recommendations.

In addition to the thirteen (13) recommendations set forth above, the Subcommittee adopted a recommendation to expand the authority of the Subcommittee to maintain oversight of the progress of the Department in implementing the recommendations set forth herein. The Subcommittee adopted recommended draft legislation that authorizes the Subcommittee to review the State Highway Commission's proposed rules regarding the implementation of the recommendations set forth in this final report. The bill would also require the Subcommittee to review proposed contracts, of $50,000 or more, required to implement the recommendations prior to execution of the contracts. In addition, the Subcommittee will allow for reasonable public comment regarding both the proposed rules and contracts regarding implementation of the

[13] Guidehouse, *Arkansas Department of Transportation Performance Review Recommendations Report*, April 20, 2020, pages 59-62.

recommendations. (*See* DTP005, *An Act to Amend the Law Concerning the Duties of the State Highway Commission,* Appendix C.)

The Subcommittee also adopted and recommends an amendment to the Rules of the Arkansas Legislative Council reflecting the additional oversight authority of the Subcommittee, and requests immediate adoption of the amended rule. (*See* Proposed Amendment to ALC Rule 5.(a)(13), Appendix D .)

III. Looking Forward.

The recommendations of the Subcommittee provide ArDOT the opportunity to engage with members of the General Assembly and stakeholders to optimize the public's investment in the state's transportation infrastructure. The recommendations focus on creating a system of processes, standardized procedures, and documentation that spans all functions of the Department from administration, planning, design, construction, and maintenance. This structure, beginning with strong information technology resources, will standardize procedures across divisions and districts as well as increase transparency of how the Department is maximizing public funds. The implementation of the recommendations is a crucial step in completing this process. The subcommittee recommendation to bring the implementation of the recommendations before the subcommittee with the involvement of the public will ensure transparency in the process of implementation and provide the Department support during the process. The implementation of the recommendations will result in a strategic, efficient, optimized, and transparent ArDOT.

IV. Appendices.

A. Current State Assessment Report
B. Recommendations Report
C. DRAFT Legislation
D. Proposed Amendment to ALC Rule 5.(a)(13)

Guidehouse

Appendix A

Arkansas Department of Transportation Performance Review

Current State Assessment

March 13th, 2020

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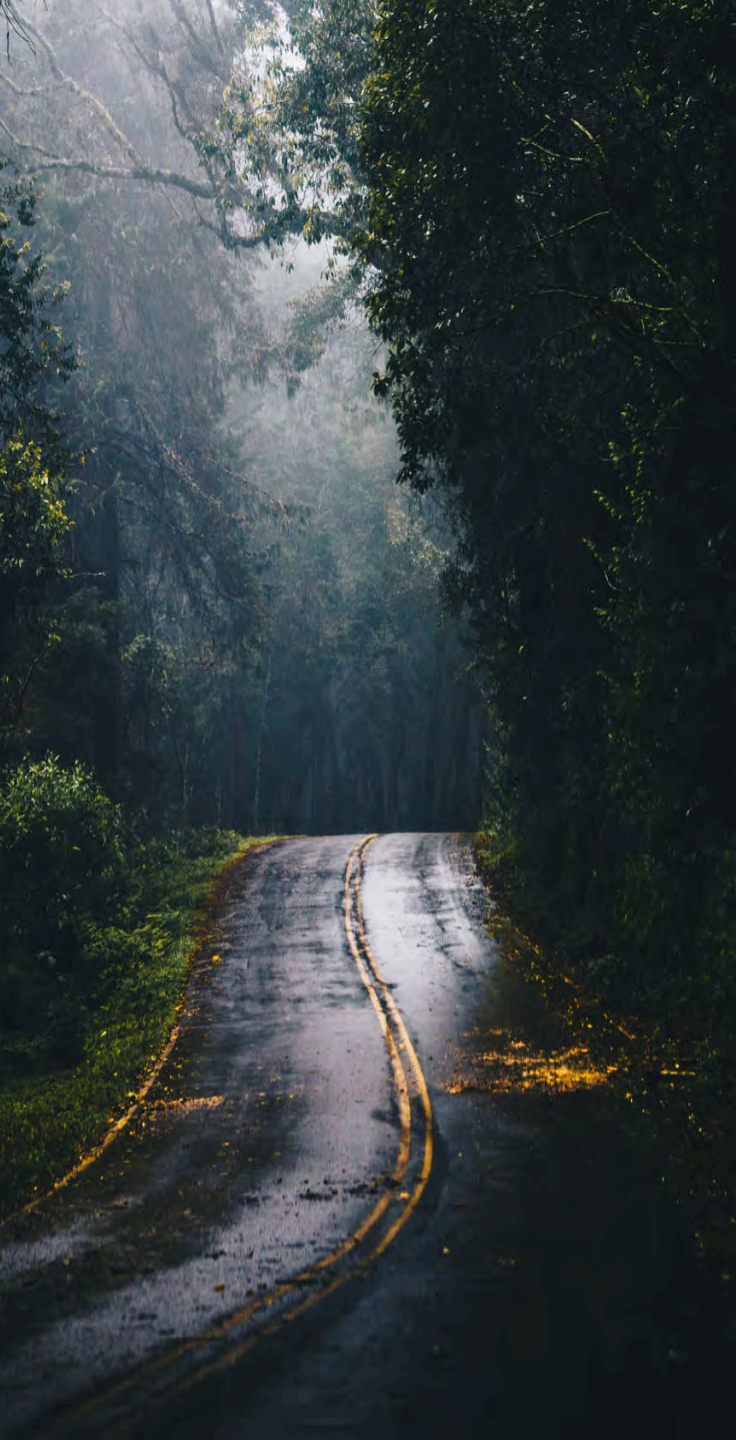


Acknowledgements

Guidehouse appreciates and wants to acknowledge the cooperation that the Arkansas Department of Transportation provided during the course of this review. We were impressed with the knowledge and level of engagement that ArDOT staff at all levels were able to provide

This report would not be possible without the countless individuals who agreed to be interviewed and provide documentation assistance. The quick and effective coordination with ArDOT staff was critical to the success of this report.

Lastly, Guidehouse would also like to take time to acknowledge any other external stakeholders that contributed to this assessment

Executive Summary

Background

The Arkansas Legislature selected Guidehouse LLP to conduct an efficiency review of the Arkansas Department of Transportation, authorized by Act 298 of 2019.

This report details the current state of the Department's functions and processes, and identifies areas of potential improvement within the areas of portfolio planning, procurement, expenditures, organizational structure and people capabilities, and information technology.

Report Objectives

Synthesize findings on ArDOT's key functions and operating platform

Analyze alignment with corresponding regulatory environment (preliminary)

Document and substantiate findings

ArDOT Snapshot

In FY18:

16,467
state highway miles

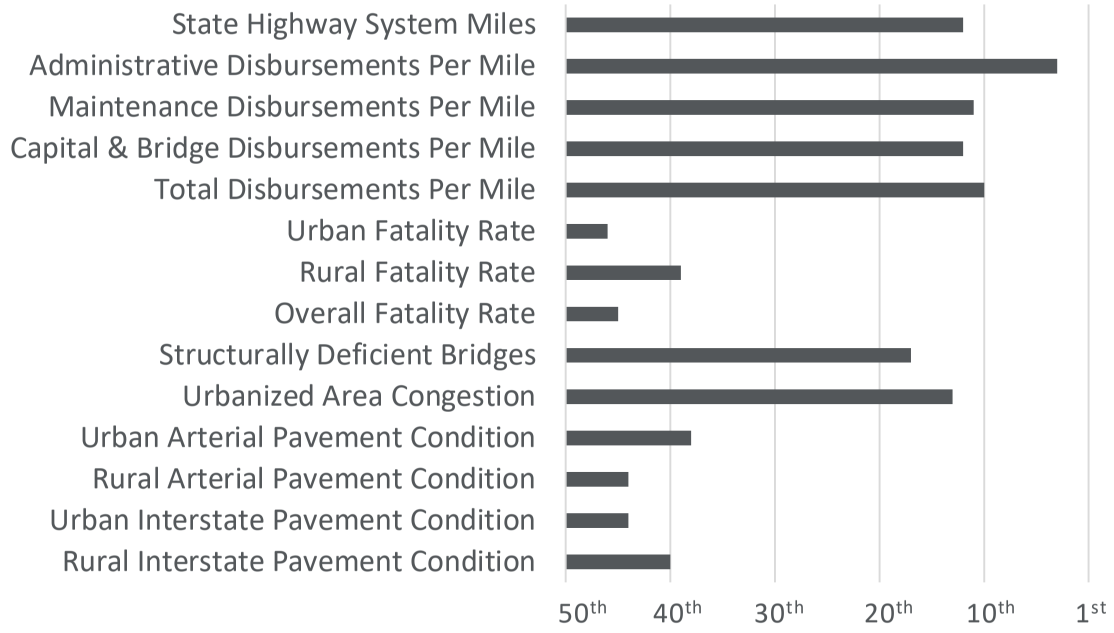
7,299
state bridges

3,705
full-time workforce

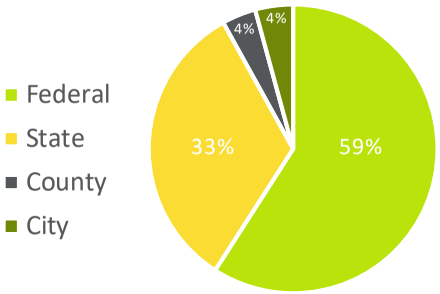
129
highway projects

$1.5B
annual spending

ArDOT National Rankings, 2016



Construction Lettings by Funding, FY18

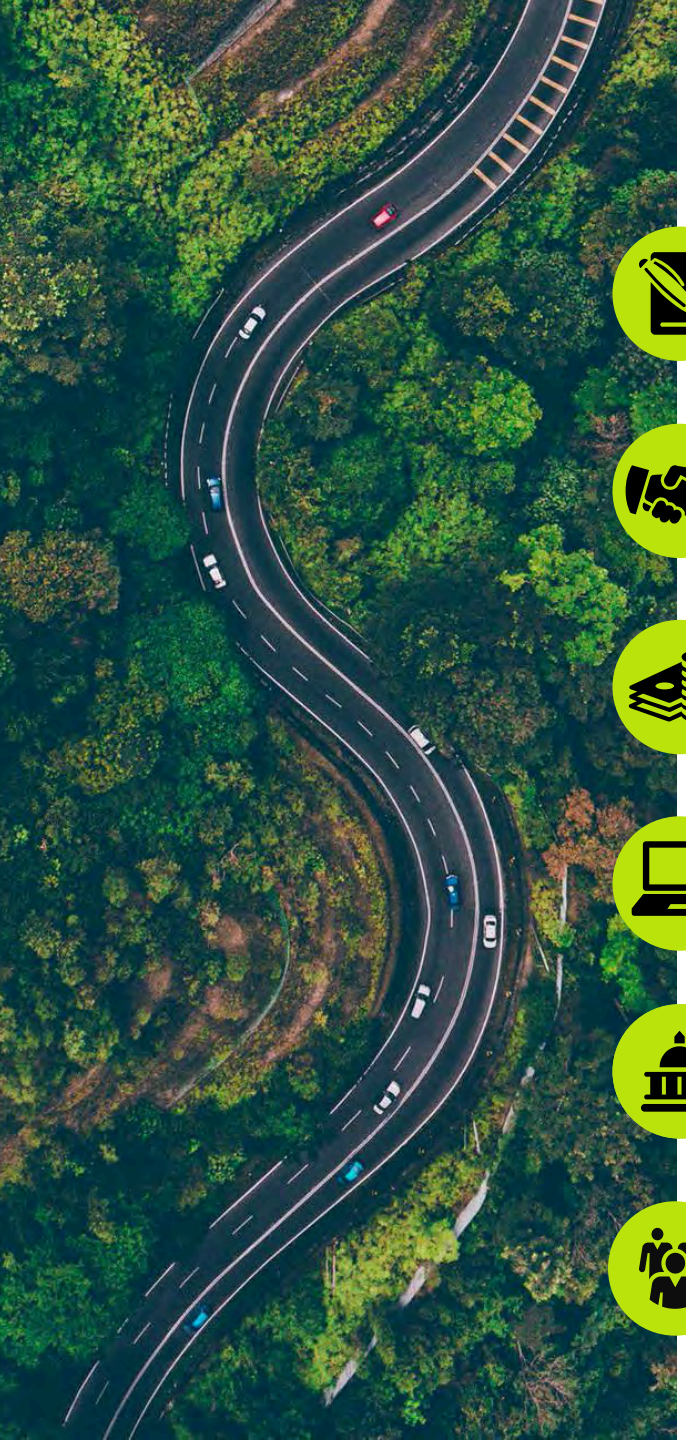


	Daily Vehicle Miles Traveled	% of Total
District 1	7,097,015	7%
District 2	6,592,130	7%
District 3	5,556,299	6%
District 4	13,670,622	14%
District 5	6,727,875	7%
District 6	24,908,981	25%
District 7	5,424,680	5%
District 8	9,638,117	10%
District 9	10,976,813	11%
District 10	9,006,109	9%
Total	**99,598,641**	**100%**

Source: Guidehouse analysis of ArDOT documents and data

Source: ArDOT

| The findings included in the report are a point in time representation and are subject to change. Please see the assumptions slide in the appendix for further details.



Focus Areas

PORTFOLIO PLANNING
Identification and prioritization of construction and maintenance projects

PROCUREMENT
Selection of contractors, project delivery methods, and contracting strategies

EXPENDITURES
Project and portfolio management to effectively utilize financial, human capital, and IT resources

INFORMATION TECHNOLOGY
Information systems and infrastructure

ORGANIZATIONAL STRUCTURE
Governance, knowledge management, and key performance indicators

PEOPLE CAPABILITIES
Implementation of competitive compensation, career advancement, training, and supports

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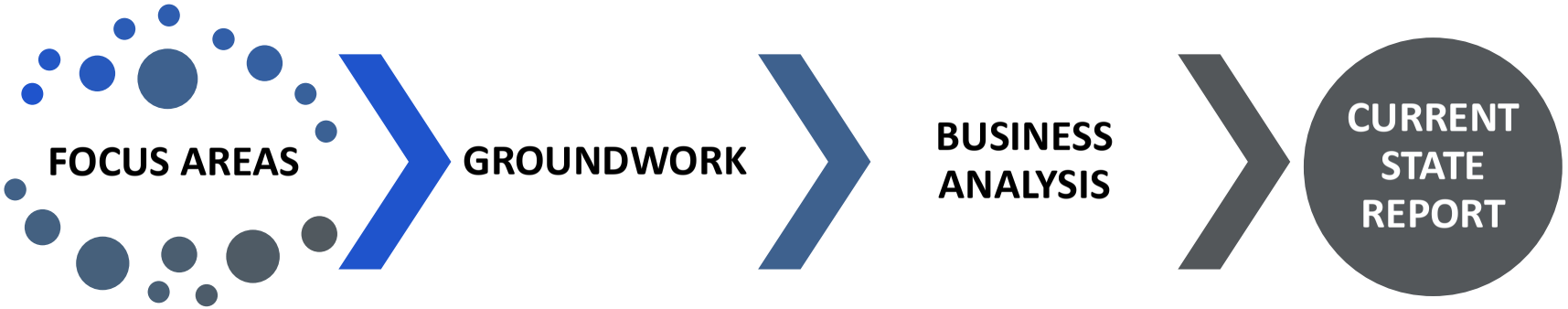
Approach



Portfolio Planning
Procurement
Expenditures
Information Technology
Organizational Structure
People Capabilities

Conducted 64 interviews during 4 site visits with 86 people, including: ArDOT staff across 4 branches, 18 divisions, 3 sections, and 4 districts, as well as Federal Highway Administration (FHWA) staff and utility owners

Reviewed ~1,100 documents on policies and procedures, and analyzed data to assess performance in focus areas

Developed 23 key findings and identified 23 initial leading practices to be considered in future recommendations

| The findings included in the report are a point in time representation and are subject to change. Please see the assumptions slide in the appendix for further details.

Summary of Key Findings

1 PORTFOLIO PLANNING

- ArDOT lacks a methodology to proactively communicate changes in construction and maintenance projects.
- ArDOT approaches maintenance projects based on allocated "resources" rather than Level of Service.
- There are no comprehensive processes to receive, track, and address public comments or measure their impact on ArDOT's project plans.

2 PROCUREMENT

- ArDOT's unique governance structure affords it some flexibility in procurement.
- Procurement methods do not consider past performance of construction contractors.
- Use of alternative contracting and project delivery methods have been successful to date.
- ArDOT lacks formal systems to identify and implement procurement efficiencies outside of construction.

3 EXPENDITURES

- ArDOT lacks formalized project and portfolio management tools at the enterprise level and for specific core functions.
- There may be opportunities to improve cost efficiencies through design and project management frameworks.
- Several internal and external audits are undertaken to ensure that ArDOT funds are spent appropriately.

4 INFORMATION TECHNOLOGY

- ArDOT is focused on addressing IT deficiencies, yet more needs to be done to implement long term operational efficiencies.
- ArDOT has developed a strategic 3-year IT roadmap, but lacks maturity with some of the enabling pillars that compromise effective delivery of that plan.

5 ORGANIZATIONAL STRUCTURE

- ArDOT's governance structure is unique when compared to other state DOTs.
- ArDOT uses KPIs for system condition, aligning with federal requirements for funding. Other KPIs are in their infancy.
- Some aspects of ArDOT's knowledge management are extensive, while others are not sufficiently mature.

6 PEOPLE CAPABILITIES

- ArDOT struggles to compete for talent, a challenge shared by many DOTs.
- The Department's compensation, learning pathways, and career pathways fall short for staff.
- Staff value the positive relationships with managers and flexible work strategies facilitated by ArDOT.

| The findings included in the report are a point in time representation and are subject to change. Please see the assumptions slide in the appendix for further details.

Portfolio Planning

Themes: Lack of proactive transportation program and project transparency; Need for Maintenance portfolio planning recalibration

Key Findings	Sample Benchmarks
• ArDOT has a process for identifying and prioritizing its Construction Projects; however, it does not have a methodology to communicate changes and progress against schedule and budget. • ArDOT approaches maintenance project identification and prioritization based on allocated "resources" rather than Level of Service. Proactive communication of projects is largely absent. • There are no comprehensive processes to receive, track, and address public comments or measure the impact on ArDOT's Construction and Maintenance plans.	• Virginia Department of Transportation (DOT) provides real time, interactive updates on construction projects. • Missouri DOT uses a 3 year maintenance work plan documenting activities for each of its 7 Districts. • Texas DOT tracks public inquiries and complaints and reports on responsiveness via a real time performance dashboard.

Procurement

Themes: Limited oversight; Need for trend analysis; Importance of quality vendors

Key Findings	Sample Benchmarks
• ArDOT's unique governance structure affords it some flexibility in procurement. • Procurement methods do not consider past performance of prospective construction contractors. • Working with quality contractors is essential to ArDOT's long-term objectives, and the Department has identified this as a risk. • Use of alternative contracting and project delivery methods have been successful for ArDOT, and can be expanded. • ArDOT lacks formal systems to identify and implement procurement efficiencies outside of construction.	• New Mexico DOT uses a pre-qualification approach that weights a contractor's bid amount based on the quality of their work. • Michigan DOTs uses a rubric to advise when to use certain strategies based on the construction project objectives.

Expenditures

Themes: Lack of project and portfolio management tools and protocols

Key Findings	Sample Benchmarks
• ArDOT does not have the protocols and tools to conduct enterprise project portfolio management. • There are opportunities to strengthen ArDOT's frameworks for making design decisions to promote improved system performance and cost savings. • There may be opportunities to improve cost efficiencies in ArDOT's project development process. • ArDOT lacks formalized project management tools in: project development, construction, and maintenance. • Several internal and external audits are undertaken to ensure that ArDOT funds are spent appropriately.	• California Department of Transportation (DOT) implemented a project resourcing and schedule mgmt. system, and independently evaluated its usage. • Missouri DOT saved an estimated $400M in its first year of using practical design. • Wisconsin DOT uses integrated 3D modeling tools to minimize redesign and change orders, saving costs up to 25%.

Information Technology

Themes: Focus on stabilizing current IT infrastructure has limited long term IT planning

Key Findings	Sample Benchmarks
• ArDOT is focused on addressing deficiencies in the IT platform; however, addressing these deficiencies alone will not allow the Department to implement long term operational efficiencies. • ArDOT has developed a strategic 3-year IT roadmap but lacks maturity with some of the enabling pillars that compromise effective delivery of that plan.	• Oregon's Enterprise Information Services document and reports on its service catalog and corresponding service level performance metrics. • Texas' Department of Information Resources provides their Project Management Framework and supporting tool set to all state agencies, and reports on the status of all major IT projects.

Organizational Structure

Themes: Unique governance structure; Informal KPIs and knowledge management

Key Findings	Sample Benchmarks
• ArDOT's governance structure is unique when compared to other state DOTs. • ArDOT uses KPIs for system condition and meets required federal benchmarks. Other KPIs are in their infancy. • Some aspects of ArDOT's knowledge management are extensive, while others are not mature.	• Oklahoma Department of Transportation (DOT) has budget performance measurements established by legislative appropriations subcommittee • Maryland DOT publishes an annual report that describes performance against mission aligned KPIs • TRB National Cooperative Highway Research Program provides a knowledge management framework

People Capabilities

Themes: Industry competition; Increasing turnover; Informal learning and career pathways

Key Findings	Sample Benchmarks
• ArDOT struggles to compete for talent, a challenge shared by peer DOTs. • The Department's compensation plans fall short, driving turnover of staff with few years of tenure. • Staff value the positive relationships with managers and flexible work strategies facilitated by ArDOT. • Staff are uncertain of their professional development within the Department. • The Department lacks formalized learning pathways that integrate with skill development opportunities and can be provided via practical, hands-on methods.	• New Mexico DOT assists maintenance staff to obtain certifications like GEDs • Texas DOT measures cost savings from flexible work schedules to justify expanding the practice as a recruiting and retention tool • Minnesota DOT deploys a van equipped with technical equipment to deliver hands-on, practical training directly to maintenance crews

| The findings included in the report are a point in time representation and are subject to change.
Please see the assumptions slide in the appendix for further details.

Next Steps

- Socialize Findings with ArDOT
- Formalize Leading Practice Research
- Finalize Recommendations and Create Road Map

| The findings included in the report are a point in time representation and are subject to change.
Please see the assumptions slide in the appendix for further details.

Focus Area Analysis: Portfolio Planning

| See the assumptions slide in the appendix for background information on the findings

Key Takeaways

1 ArDOT has a process for identifying and prioritizing its construction projects; however, it does not have a methodology to communicate changes and progress against schedule and budget.

2 ArDOT approaches maintenance project identification and prioritization based on allocated "resources" rather than Level of Service. Proactive communication of projects is largely absent.

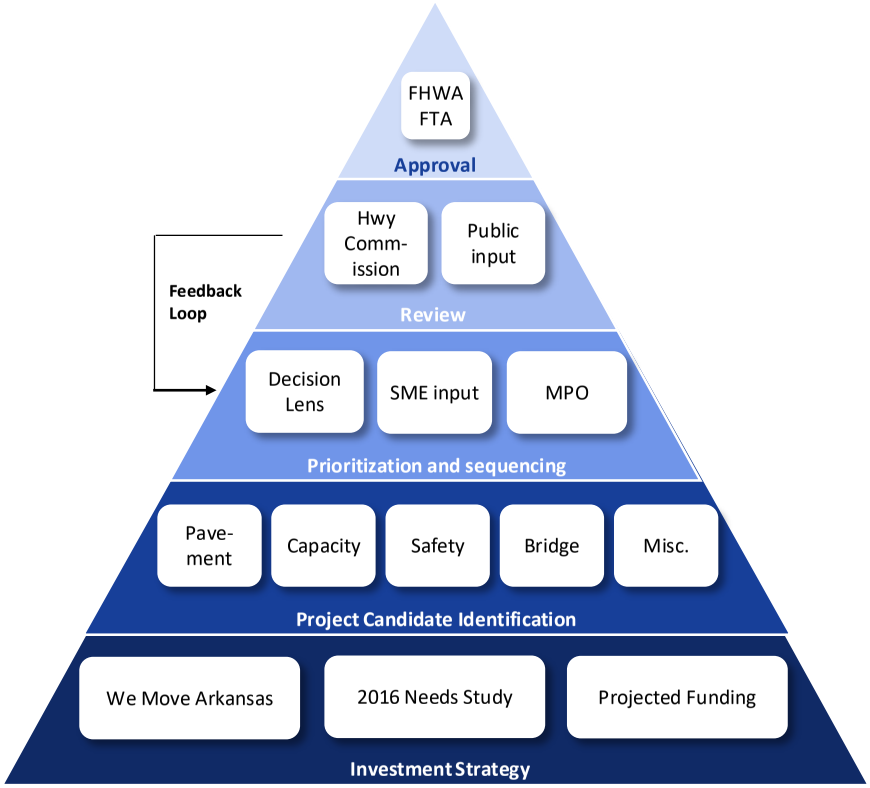
3 There are no comprehensive processes to receive, track, and address public comments or measure the impact on ArDOT's construction and maintenance plans.

ArDOT has a process for identifying and prioritizing its construction projects; however, it does not have a methodology to communicate changes and progress against schedule and budget.

ArDOT has a formal and quasi-objective process to identify construction projects, prioritize those projects, ensure public involvement, and secure required approvals.

- ArDOT has adopted a "System Preservation" investment strategy that aims to deploy funding according to the following protocol: 80% of funding on system preservation projects; 20% on capital improvements; with 90% of projects on the Arkansas Primary Highway Network.[1]
- ArDOT consults with various internal and external stakeholders to identify project candidates to be included in the Statewide Transportation Improvement Plan (STIP).[2]
    - Stakeholders: ArDOT: Transportation Planning and Policy (TPP), System Information and Research (SIR), Maintenance, Bridge, district Offices; Metropolitan Planning Organization (MPOs); and the General Public
    - Project Types: Pavement preservation, Capacity Improvement, Safety, Bridge, and other miscellaneous
- ArDOT employs a combination of Decision Lens software and stakeholder consultation to prioritize and sequence candidate projects within four broad categories: Pavement, Capacity, Bridge, and Safety; and a miscellaneous category.[2,3]
- Projects Identified by the 8 MPOs must be included without modification within the STIP.[4]
- ArDOT must demonstrate that the STIP is financially constrained.[5]
- There are several rounds of review by ArDOT executive leadership and the Highway Commission prior to the STIP being released to the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) for final approval.[2]
- ArDOT affords public commentary via the 8 MPOs who conduct extensive public review and prior to final review by FHWA and FTA.[2,6]

Statewide Transportation Improvement Plan (STIP) Development Framework



Source: Guidehouse analysis of ArDOT provided documents[2,7,8]

Governing Regulations

1. *Long Range Transportation Plan: 23 CFR 450.216*
2. *STIP Requirements and development process: 49 U.S.C. 5304(g); 23 USC 135; 23 CFR 450.218*
3. *Metropolitan Planning Organizations (MPOs) TIP development: 23 USC 134*
4. *MPO TIP inclusion without modification: 23 CFR 450.218(b)*
5. *Requirement for STIP to be financially constrained - 23 CFR 450.218(i)*
6. *FTA and FHWA Approval Requirements: 23 CFR 450.220*
7. *Four lane Grid System - ArDOT Commission MO: MO 2009-084*

ArDOT has a process for identifying and prioritizing its construction projects; however, it does not have a methodology to communicate changes and progress against schedule and budget.

ArDOT's public communication related to project status, schedule and budget is disjointed and inconsistent. It requires the public to navigate different sources to secure information.

- Since December 2016, ArDOT has implemented ~56 Statewide Transportation Improvement Plan (STIP) Amendments that impact a project's delivery timeline, cost, prioritization, or even inclusion on the STIP.[10]
  - Administrative amendments require public communication and solicitation of public input.
- ArDOT has approved numerous STIP administrative modifications but has not formally communicated these to the public until FY2020. [11,12]
  - Administrative Modifications pertain to changes in project funding, and/or cost and schedule with less than a 20% impact.
- From CY2015 – CY2019 ArDOT issued ~11,150 Change Orders (CO).[13]
- ArDOT has a multitude of communication vehicles to provide project status updates to the general public (see table below), of which the most comprehensive and user friendly is produced by a contractor (Garver).
- ArDOT's public communications meet regulatory requirements, however, it is not clear that the Department has assessed whether it meets the needs of it stakeholders, constituents, and the general public.[14]

Virginia DOT (VDOT)

VDOT provides real time and interactive access to the progress of all of its construction projects against schedule and budget at the Department, district, and individual project levels. ArDOT currently provides similar functionality with the CAP portfolio of projects.

Source: VDOT[15]

STIP Communications – Sample Reports

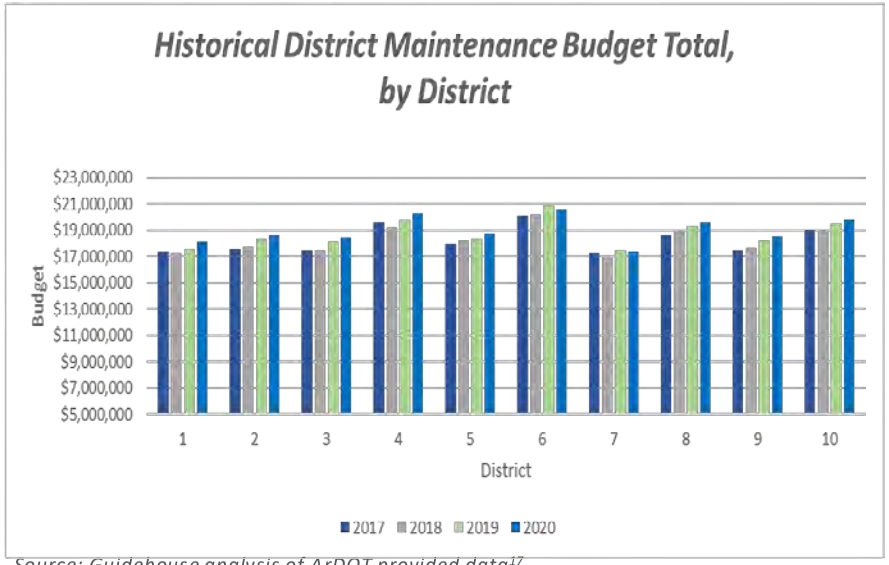
Report	Format	Audience	Content
STIP	Primarily Hardcopy (online)	General Public	Comprehensive listing of all projects identified on STIP, STIP Amendments and (recently) Modifications
iDrive Arkansas	Interactive Website	General Public	Real time traffic, travel conditions, and basic construction project information including length, start date, estimated completion time, cost, and contractor
Connecting Arkansas Program (CAP)	Interactive Website (Garver)	General Public	CAP Program Overview; Project Status Update per Project that includes (Recent and upcoming work, lane closures, construction progress, project overview); Interactive Map to view projects; and dedicated Contact line and email address
IRP	Primarily Hardcopy (online)	General Public	Interstate Rehabilitation Program (IRP) overview and several project lists: Commitment, Completed, Upcoming, Under Construction
Annual and Biennial Reports	Primarily Hardcopy (online)	General Public	High level summary of Top contracts and Programs, Construction highlights, Public involvement, Recognition; and detailed financial summaries

Source: Guidehouse analysis of ArDOT provided documents

ArDOT approaches maintenance project identification and prioritization based on allocated "resources" rather than Level of Service; proactive communication of projects is largely absent.

The Annual maintenance budgeting process is based on Historical Precedent.

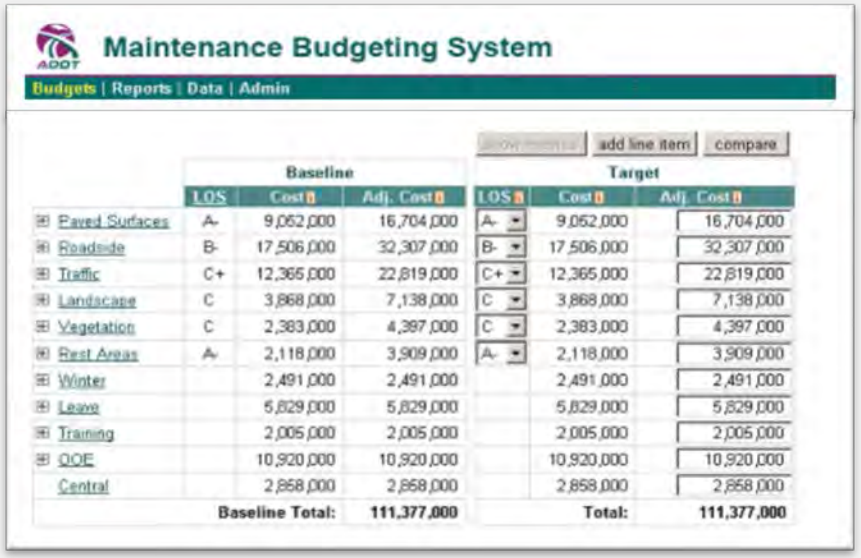
- ArDOT must manage ~ 16,467 miles broken out amongst 10 districts, and budgets ~ $190M at the district level per year for those activities.[16,17]
- Maintenance activities, resources, and supplies at all three levels of the organization (Central Office, district, Area) are tracked against ~36 Counties, ~41 districts, and ~3 Statewide Function or Activity Codes. [18]
- Interviews revealed that in March of every year, Fiscal Services furnishes the districts with Expenditures against these function codes to prepare a new budget. [19]
- District maintenance budgets have remained relatively stable over time. Since FY2017, annual growth rates have ranged from 0.2% - 1.9%. [17]
- Interviews revealed that districts need to manage their maintenance activities to these Budgets.[19]



Source: Guidehouse analysis of ArDOT provided data[17]

Arizona DOT (ADOT)

ADOT's maintenance budgeting protocol relates maintenance expenditures to asset conditions. With the assistance of an automated maintenance management system ADOT can project the level of funding required to meet specific performance standards



	Baseline			Target		
	LOS	Cost	Adj. Cost	LOS	Cost	Adj. Cost
Paved Surfaces	A-	9,052,000	16,704,000	A-	9,052,000	16,704,000
Roadside	B-	17,506,000	32,307,000	B-	17,506,000	32,307,000
Traffic	C+	12,365,000	22,819,000	C+	12,365,000	22,819,000
Landscape	C	3,868,000	7,138,000	C	3,868,000	7,138,000
Vegetation	C	2,383,000	4,397,000	C	2,383,000	4,397,000
Rest Areas	A-	2,118,000	3,909,000	A-	2,118,000	3,909,000
Winter		2,491,000	2,491,000		2,491,000	2,491,000
Leave		5,829,000	5,829,000		5,829,000	5,829,000
Training		2,005,000	2,005,000		2,005,000	2,005,000
OOE		10,920,000	10,920,000		10,920,000	10,920,000
Central		2,858,000	2,858,000		2,858,000	2,858,000
	Baseline Total:		111,377,000	Total:		111,377,000

North Carolina DOT (NC DOT)

NCDOT engaged SAS to identify baseline unit costs for 10 maintenance activities to inform division/district maintenance budgets and control costs

Table 10: Maintenance Activity Baseline Unit Costs

Maintenance - Statewide Baseline			
	Primary	Secondary	Unit of Measure
2817-Mechanical Asphalt Patching	$250.32	$222.53	per ton
2900-Grass Mowing	$63.34	$39.41	per shoulder mile
2912-Mechanical Brush and Tree Control	$698.81	$684.19	per shoulder mile
3104-Litter Removal	$279.65	$334.91	per shoulder mile

Source: ADOT (top)[20]; NCDOC (bottom)[21]

ArDOT approaches maintenance project identification and prioritization based on allocated "resources" rather than Level of Service; proactive communication of projects is largely absent.

Maintenance Work Plans are designed to deliver historically rooted activities rather than specific service conditions.

- Although Asset condition data exists and is furnished to districts, it does not appear that formalized Level of Service (LOS) targets have been established for every critical feature within each district (with Bridges and signs as a notable exception).
- Annual district level maintenance planning translates into:[22,27,28]
  - An Annual Work Program Computation Analysis that articulates proposed person-hours and resources per Activity Code for cyclical activities (e.g. mowing) and reactive work (e.g. debris cleanup).
  - A set of special projects for which dedicated funding has been set aside.
- Maintenance Supervisors are responsible for identifying projects, within given resource constraints and guided by the Annual Activity Schedule, in an annual work program, however, it is not clear how this translates into achieving a target level of service (except with Bridge and Sign Crews).[24]
- ArDOT is in the process of acquiring a maintenance management system to transition to a needs based maintenance planning system, however, that process is in it's infancy and an underlying framework that links maintenance activities to Level of Service has not been established.[24,25]

1 *Sample County Annual Work Plan*

2 *Annual Activity Schedule*

3 *Sample District Annual Work Plan*

Washington Department of Transportation (WSDOT)

WSDOT recently defined its maintenance Level of Service (LOS) targets, and communicates its performance against those targets

Maintenance Accountability Process
Activity Level Targets
CY 2018 - Statewide

Activity	A	B	C	D	F
Group - 1 Roadway Maintenance and Operations					
1A3 Shoulder Maintenance			✓⊙		
1A4 Sweeping and Cleaning	⊙	✓			
Group - 2 Drainage Maintenance and Slope Repair					
2A1 Ditch Maintenance		✓⊙			
2A2 Culvert Maintenance				✓⊙	
2A3 Catch Basin and Inlet Maintenance	✓⊙				
2A4 Stormwater Facility Maintenance	✓⊙				
2A5 Slope Repair	⊙		✓		
Group - 3 Roadside and Vegetation Management					
3A1 Litter Pickup				✓⊙	
3A2 Noxious Weed Control		⊙	✓		
3A3 Nuisance Vegetation Control				✓⊙	
3A4 Vegetation Obstruction Control			✓⊙		
3A5 Landscape Maintenance			✓	⊙	
Group - 4 Bridge and Urban Tunnel Maintenance and Operations					
4A3 Bridge Cleaning		✓⊙			
4B1 Special Bridge and Ferry Operation	✓⊙				
4B3 Urban Tunnel Systems Operation		⊙			

Key: ⊙ Projected Delivery; ✓ Service Level Delivered; ⊙ Missed Target

February 5 2019

National Cooperative Highway Research Board (NCHRP)

The NCRHP provides a comprehensive framework, guide, and supporting toolkits to establish establishing LOS targets to guide Maintenance work planning

The findings included in the report are a point in time representation and are subject to change. Please see the assumptions slide in the appendix for further details.

Source: ArDOT[22,27,28]

Source: WSDOT (top)[23]; NCHRP (bottom)[26]

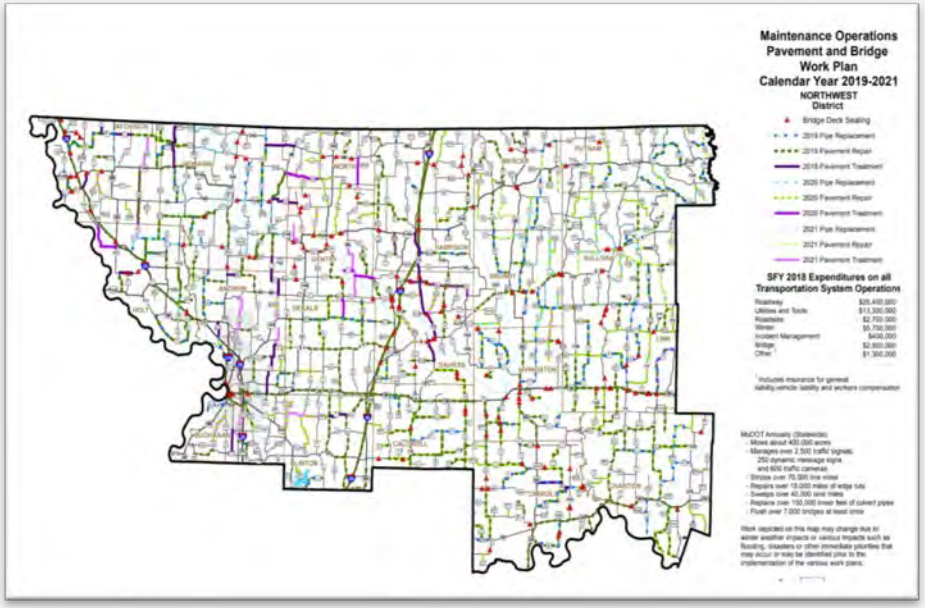
ArDOT approaches maintenance project identification and prioritization based on allocated "resources" rather than Level of Service; proactive communication of projects is largely absent.

There is no formal structure to coordinate Workplans within or across districts, or communicate these workplans to the General Public.

- Interviews revealed that Area Maintenance Supervisors meet on a monthly basis to discuss plans, however, it's not clear if there is a formalized process to align Workplans across Counties or Maintenance Job Superintendents.[28]
- Beyond limited ArDOT Press releases, Message Boards, and static maintenance project updates on ArDOT's websites there does not appear to be a formal and coordinated process nor resources to communicate maintenance workplans to the general public.[28,29,30]

Missouri DOT (MODOT)

In its recently released maintenance and operations plan, MODOT has created and released a 3 year maintenance work plan documenting planned maintenance activities for each of its 7 districts



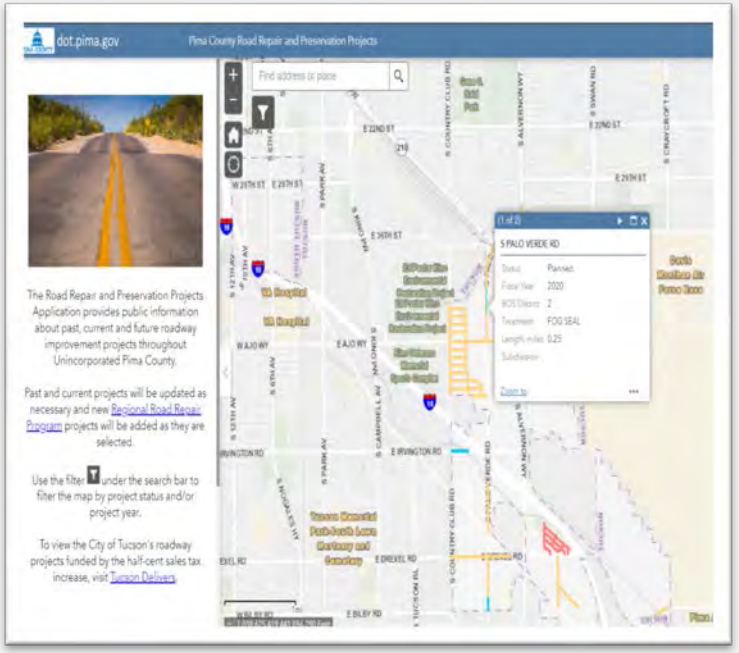
Source: MODOT[33]

Pima County DOT (AZ)

Pima County DOT makes its road repair and maintenance current and projected workplans available via a static list and an interactive map

2020 Regional Priority and Recreational Gateway Road List

Pavement Management Section	Start	End	AADT	District	Miles	PCI	Treatment
E CHULA VISTA RD	N 1ST AV	N MOONGLOW DR		1	0.66	19	MILL AND THICK OVERLAY
E RIVER RD	END OF ROAD	END OF ROAD	30,427	1	0.20	78	FOG SEAL
E RIVER RD	S ALVERNON WY	N PONTATOC RD	11,941	1	0.28	91	SEAL CRACKS
E RIVER RD	N SUTTON LN	S DODGE BL	11,641	1	0.12	91	SEAL CRACKS
E SKYLINE DR	E CAMINO CIELO	E CHULA VISTA RD	32,236	1	0.13	77	SEAL CRACKS
E SKYLINE DR	E CHULA VISTA RD	E CALLE LOS ALTOS	32,236	1	0.19	85	SEAL CRACKS
E SKYLINE DR	E CALLE LOS ALTOS	W ORANGE GROVE RD	32,236	1	0.30	77	SEAL CRACKS
E SKYLINE DR	W ORANGE GROVE RD	S CAMPBELL AV	39,844	1	0.50	85	SEAL CRACKS
E SKYLINE DR	S CAMPBELL AV	N TIERRA DE LAS CATALINAS	34,531	1	0.26	77	SEAL CRACKS
E SKYLINE DR	N TIERRA DE LAS CATALINAS	E SUNRISE DR	34,531	1	0.19	85	SEAL CRACKS
E SNYDER RD	N VALLE	N HIDDEN VALLEY RD		1	0.63	21	MILL AND THICK OVERLAY
E SUNRISE DR	E SKYLINE DR	N CAMINO ESPLENDORA	34,531	1	2.30	77	SEAL CRACKS
N ALVERNON WY	END OF ROAD	END OF ROAD	5,157	1	0.02	64	MICRO SEAL
N CAMINO DE OESTE	END OF ROAD	W MARS ST	3,430	1	0.06	23	MILL AND THICK OVERLAY
N CAMINO DE OESTE	W MARS ST	W MARGE ST	3,430	1	0.15	34	MILL AND THICK OVERLAY
N CAMINO DE OESTE	W MASSINGALE RD	W IVORY ROSE DR	3,430	1	0.66	34	MILL AND THICK OVERLAY



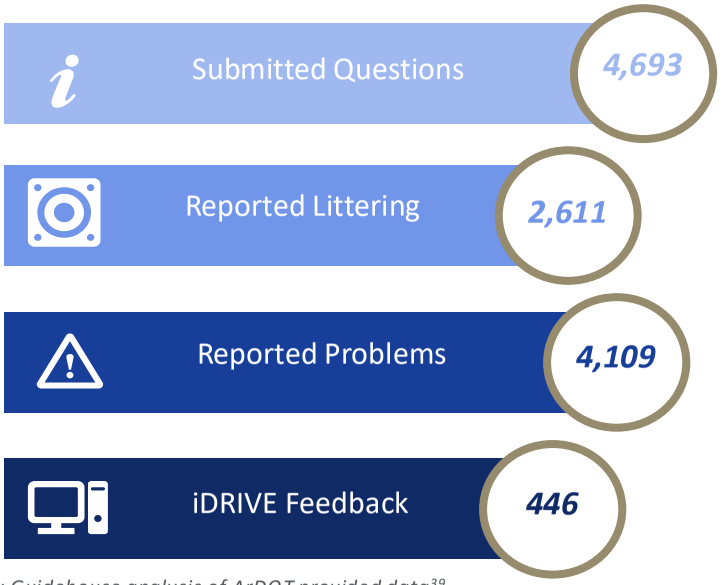
Source: Pima County DOT[31, 32]

There are no comprehensive processes to receive, track, and address public comments or measure the impact on ArDOT's construction and maintenance plans.

Although ArDOT is responsive to public inquiries, it only offers a limited number of tools to capture and track them.

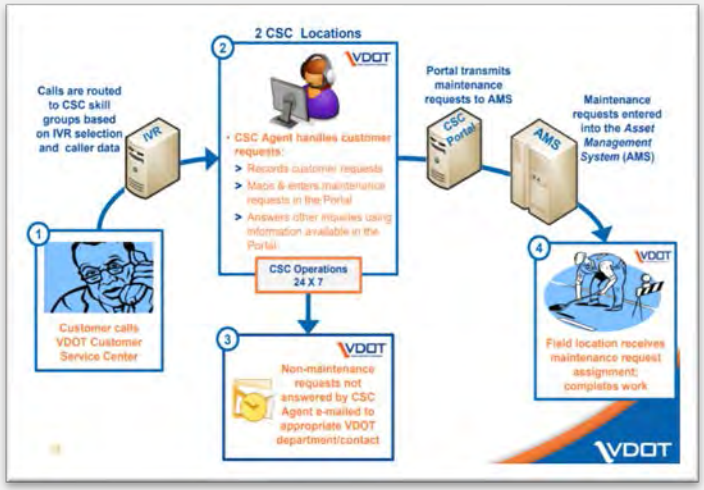
- Although iDrive Arkansas, and the Connecting Arkansas Program (CAP), provides mechanisms to capture customer inquiries and reports of problems, interviews with ArDOT district Level staff revealed that there is no comprehensive Department wide protocol or tool to capture these customer inquiries and problems, manage these inquiries, or track a resolution.[34,35,36]
- Interviews with ArDOT staff members indicated that public commentary and inquiries sometimes impacted project/maintenance delivery, however, they reported that no comprehensive protocol or tool allowed them to assess and document the corresponding impact to in-progress or planned work. [34]

iDrive Arkansas
Customer Utilization Statistics since 2013

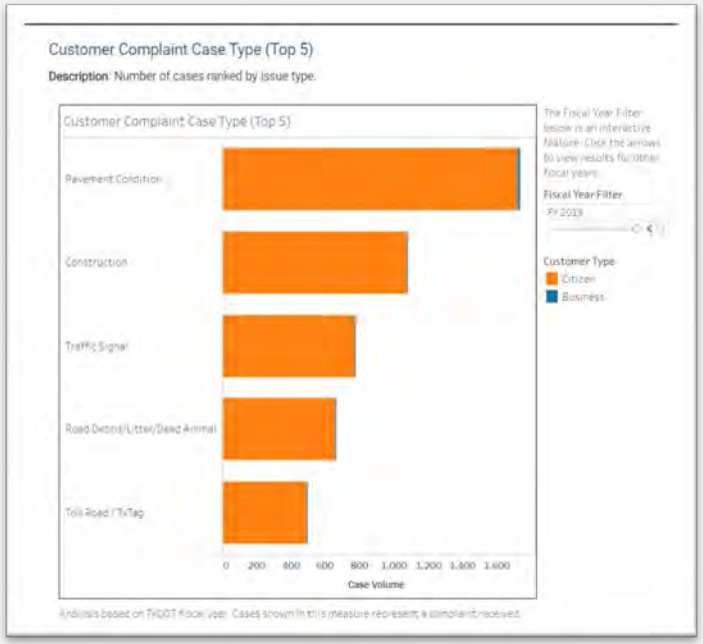


Source: Guidehouse analysis of ArDOT provided data[39]

Virginia DOT (VDOT)
In 2011, VDOT fundamentally shifted its customer service protocol to route all customer inquiries through centralized customer support centers to better resolve customer requests and provide better customer service



Texas DOT (TxDOT)
TxDOT tracks all of its customer inquiries and complaints via its TRACK system regardless of origin and reports on the Department's responsiveness to those inquiries and complaints as part of its real time performance dashboard. TxDOT resolves ~80% of customer complaints within 10 days



Source: VDOT (top)[37]; TxDOT (bottom)[38]

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Portfolio Planning Citations

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1. Implicitly adopted by the commission Minute Order authorizing the STIP 2018 - 2022 (MO 2018 080).
2. ArDOT STIP Development Document (Provided by ArDOT, analyzed by Guidehouse).
3. ArDOT Decision Lens Criteria Document (Provided by ArDOT, analyzed by Guidehouse).
4. Regulation: MPO TIP inclusion without modification: 23 CFR 450.218(b).
5. Regulation: Requirement for STIP to be financially constrained: 23 CFR 450.218(i).
6. Regulation: MPOs TIP development: 23 USC 134.
7. ArDOT. *We Move Arkansas*. http://www.wemovearkansas.com/index.html.
8. ArDOT. *Arkansas State Highway 2016 Needs Study*. September 2017.
9. ArDOT Historical Federal Obligation data (Provided by ArDOT, analyzed by Guidehouse).

Page 16

10. ArDOT STIP Amendment Data (Provided by ArDOT, analyzed by Guidehouse).
11. ArDOT. *STIP Amendments 2019 - 2022*. https://www.arkansashighways.com/stip/stip.aspx.
12. ArDOT. *STIP Amendments 2016 - 2020*. https://www.arkansashighways.com/stip/stip_prior.aspx.
13. ArDOT Change Order Data (Provided by ArDOT, analyzed by Guidehouse).
14. Regulations: Public Communication Requirements: 49 U.S.C. 5304(g); 23 USC 135; 23 CFR 450.218
15. VDOT. *SmartScale Dashboard*. http://dashboard.vasmartscale.org/.

Page 17

16. FHWA 2018 Statistics. https://www.fhwa.dot.gov/policyinformation/statistics/2018/
17. ArDOT Budget Data (Provided by ArDOT, analyzed by Guidehouse).
18. ArDOT. *Maintenance Manual*. Version 8.17.
19. Guidehouse Interviews with Fiscal Services, Maintenance, and District Staff
20. Cambridge Systems, Inc. *Asset Management Implementation Strategy*. December 2009. https://dspace.njstatelib.org/xmlui/bitstream/handle/10929/23952/t7642009z.pdf?sequence=1.
21. North Carolina Department of Transportation. *Efficiency - Establishing Baseline Unit Pricing & Streamlining Project Delivery*. December 2015.

Page 18

22. ArDOT. *Maintenance Manual*. Version 8.17.
23. Washington Department of Transportation. *Annual Service Level Report*. https://www.wsdot.wa.gov/maintenance/accountability-process.
24. Guidehouse Interviews with Maintenance, and District Staff
25. ArDOT Maintenance Management RFP excerpt (Provided by ArDOT, analyzed by Guidehouse).
26. Adams, Teresa M. et. al. *Guide to Level of Service (LOS) Target Setting for Highway Assets*. November 2014.
27. ArDOT sample County Level Annual Work Program Computation Sheet (Provided by ArDOT, analyzed by Guidehouse).
28. ArDOT sample District Level Annual Work Program Computation Sheet (Provided by ArDOT, analyzed by Guidehouse).

Page 19

28. Guidehouse Interviews with Maintenance, and District Staff
29. ArDOT. *Main website*. http://www.arkansashighways.com/index.aspx.
30. ArDOT. District websites. e.g. https://www.arkansashighways.com/district1.aspx.
31. Pima County DOT (AZ). *Regional Priority and Gateway Road List*. 2020. https://webcms.pima.gov/UserFiles/Servers/Server_6/File/Government/Transportation/Roadway%20Maintenance/FY20_RegionalPriorityandRecreationalGatewayRoad_SelectionList.pdf.
32. Pima County DOT (AZ). *Interactive Road Maintenance Map*. https://pimamaps.maps.arcgis.com/apps/webappviewer/index.html?id=e26b873e39b34381980ae5a89a767817.
33. Missouri Department of Transportation. *Operations and Maintenance Plan*. https://www.modot.org/sites/default/files/documents/Sec10OperationsAndMaintenancePlan.pdf.

Page 20

34. Guidehouse Interviews with Assistance Chief Engineers, Public Information Office, and/or District Staff
35. ArDOT. *iDrive Arkansas*. https://www.idrivearkansas.com/.
36. Garver. *reCAP Quarterly Report*. July - September 2019.
37. Virginia Department of Transportation. *CSC - ITS VA Presentation*. 2011. https://www.itsva.org/wp-content/uploads/2017/07/VDOT_CSC_ITSVA.pdf.
38. Texas Department of Transportation. *Focus on the Customer Dashboard*. http://www.dot.state.tx.us/dashboard/focus-on-the-customer.htm.
39. ArDOT iDRIVE Arkansas Customer Utilization Statistics (ArDOT provided, Guidehouse analyzed).

Focus Area Analysis: Procurement

| The findings included in the report are a point in time representation and are subject to change. Please see the assumptions slide in the appendix for further details.

Key Takeaways

1. ArDOT's unique governance structure affords it some flexibility in procurement.
2. Procurement methods do not consider past performance of prospective construction contractors.
3. Working with quality contractors is essential to ArDOT's long-term objectives.
4. Use of alternative contracting and project delivery methods have been successful for ArDOT, and can be expanded.
5. ArDOT lacks formal systems to identify and implement procurement efficiencies outside of construction.

ArDOT's unique governance structure affords it some flexibility in procurement.

ArDOT adheres to state procurement and transportation laws that limit its flexibility and do not necessarily apply.

- State procurement law excludes constitutional Departments and construction projects. Both exclusions apply to ArDOT, which resides under the constitutional office of the Highway Commission and conducts significant procurement for construction.[1]
- State and federal transportation law require procurement for construction projects, and award to the lowest responsive bidder meeting established criteria. Yet both allow exceptions for engineering and design services related to construction and for design-build and construction manager / general contractor construction projects.[2]
- Further, state transportation law suggests the Commission has authority to "award a project contract on a qualification basis that offers the greatest value for the state."[3]
- Separately, this law requires equipment and supply purchases "be awarded to the lowest and best bidder, price, quality, delivery cost, and time being considered."[4]
- Though exempt, ArDOT views state procurement law as a best practice and has aligned its policies and procedures to it, specifically its prioritization of low bid procurement. As a result, ArDOT does not take full advantage of the flexibility that the governing laws may allow for in order to consider qualifications and best value.[5]

Low bid procurement is viewed by staff as a cultural and financial necessity.

- Anecdotally, staff across construction and non-construction divisions believe that low bid procurement is imperfect but impartial, which is essential to public trust.[6]
- Staff shared concerns that strategies that give preference based on other criteria, such as vendor past performance, would be subjective and, therefore, unreliable.[7]
- For equipment and supplies, staff also reported a tension between maintaining annual budgets and investing in higher-quality products with a lower cost of ownership.[8]
- For construction, staff pointed to the pre-qualification process, bonding requirements, and the Standard Specifications for Highway Construction as existing criteria that fulfill a comparable function as qualifications-based procurement strategies.[9]

"We're so governed by Arkansas state procurement law… that's what we have to hang our hat on."

"We tend to write very specialized specifications."

"The only way to [procure] construction as qualifications-based is through alternative projects."

"[Vendor] performance is measured by meeting the specifications."

Source: Guidehouse interviews with ArDOT staff[10]

| The findings included in the report are a point in time representation and are subject to change. Please see the assumptions slide in the appendix for further details.

Procurement methods do not consider past performance of prospective construction contractors.

Pre-qualification and bonding approximate likelihood of project completion, but do not screen for quality.

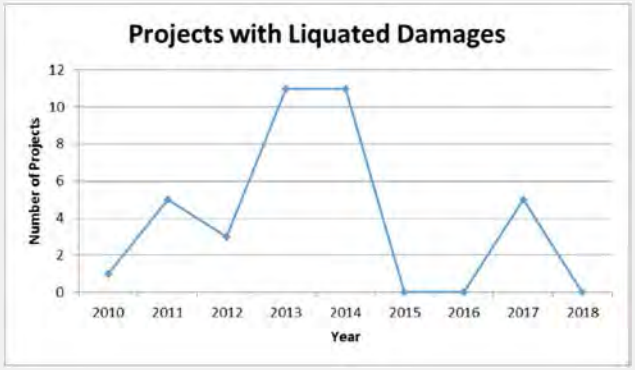
- Construction contractors are screened through pre-qualification and by receipt of bid, performance, and payment bonds, but these do not consider quality of past work.[11]
- ArDOT's pre-qualification review determines if a contractor can complete a project based on their completed and ongoing projects, history of incomplete projects, financial stability, equipment condition, and officer information.[12]
- ArDOT also requires contractors to obtain performance and payment bonds, a federal requirement. Bonding companies evaluate "character, capacity, and capital" to determine if they will complete the project and pay their subcontractors.[13]
- However, performance bonds provide "no guarantee against a contractor's marginal quality of work, so long as the contractor's failures are not large enough to trigger a default," according to an Federal Highway Administration's (FHWA) report.[14]
- Consultant contractors for engineering and design-related services and for equipment and supplies must apply to be added to bidder's lists. Bid bonds and performance bonds are also used as part of ArDOT's standard bid conditions.[15]

The Standard Specifications mandate certain performance criteria, but do not screen for quality.

- ArDOT's 2014 Standard Specifications for Highway Construction establishes exhaustive guidelines for construction and standards of acceptability, and is updated as needed.[16]
- ArDOT's Qualified Products List includes pre-approved products for construction.[17]
- Contractors are required to comply with these specifications and guidelines.[18]
- The Department rigorously validates the quality through testing and site inspections.[19]
- Contractors that do not meet thresholds may need to redo work at no cost to ArDOT. As appropriate, ArDOT will adjust the unit price for contract items based on quality.[20]
- Yet these measures only come into play after the bidder has been selected. Current policies do not limit the ability of poor-quality contractors to compete for bids.
- If contractors frequently repeat tasks until they reach the quality level sought by ArDOT, there may be indirect costs to the Department due to delays and staff time, as well as public safety concerns and economic impacts.

New Mexico DOT (NMDOT)

NMDOT is piloting a pre-qualification system that adjusts a contractor's bid amount based on the quality of their past performance (i.e, a high performing contractor's bid amount will be reduced, while a low performing contractor's will be increased). The system has encouraged contractors to improve performance on NMDOT contracts. This is exemplified in the graphs below depicting sharp declines in disincentives and liquidated damages since its 2014 implementation.



Source: NMDOT[21]

| The findings included in the report are a point in time representation and are subject to change. Please see the assumptions slide in the appendix for further details.

Working with quality contractors is essential to ArDOT's long-term objectives.

Anecdotes and data suggest some existing quality issues that may be improved through alternate contractor strategies.

- ArDOT's 2019 Transportation Asset Management Plan (TAMP) identifies pavement materials quality and poor quality construction work as "very high impact" risk factors for asset management. Quality materials are linked to managing lifecycle costs and achieving performance targets, while quality construction work is linked to achieving desired outcomes.[22]
- Yet the Department does not formally monitor contractor quality through such measures as: long-term maintenance and repair costs, repeated delays, repeated overruns, repeated poor performance on Standard Specifications quality measures, etc.[23]
- Maintaining quality contractors should be a priority for ArDOT, since between 2014 – 2019, ArDOT released over $6B of projects into the bidding pool; in that time, 10 bidders controlled 46% of the value of those projects.[24]
- ArDOT construction staff anecdotally report challenges with contractor workmanship and mitigating contractor disputes, but these issues are not formally tracked.[25]
- The Department quantifies the costs of construction delays through its Road User Cost, which considers the economic impact and safety risks of work zone activity. It is applied as a disincentive: a "site use" fee to contractors who are behind schedule at a key milestone.[26]
- The tables (right) provide detail on one indicator of quality issues: high volumes of change orders overall, and total change orders issued related to disincentives.[27]
- District construction and maintenance staff also report challenges with equipment procurement that favors lower capital outlays over lower lifetime costs. These anecdotes suggest the lack of cost-benefit analysis in equipment procurement. For one, a piece of equipment procured by low bid did not have a corresponding parts supplier in the vicinity, reportedly increasing costs for maintenance and repair.[28]

ArDOT Projects with Highest Total Change Orders, 2014-2019

Project	Total Change Orders	Bid Amount	CO % of Bid Amount
VANDENBERG BLVD. - HWY. 5 (WIDENING) (S)	$13,710,681.83	$79,264,377.02	17%
HWY. 112-I-49 (S)	$7,563,274.17	$100,620,381.24	8%
REDMOND RD. & MAIN ST. STRS. & APPRS. (JACKSONVILLE) (F)	$7,256,015.40	$41,943,453.44	17%
ARKANSAS RIVER STR. & APPRS. (BROADWAY) (LR/NLR) (F)	$5,581,773.14	$98,404,049.69	6%
ARK. RIVER BRIDGE - I-40 (S)	$5,531,376.64	$38,371,201.18	14%
BAPTIST HOSPITAL - UNIVERSITY AVE. (WIDENING) (F)	$5,046,037.44	$87,384,772.06	6%
HWY. 70 - SOUTHLAND DR. (WEST MEMPHIS) (S)	$4,916,565.46	$11,347,360.69	43%
BALD KNOB - NEWPORT (S)	$4,811,190.84	$18,692,509.65	26%
HWY. 65B - HWY. 65 (F)	$4,180,557.98	$67,232,300.00	6%
I-430/HWY. 10 INTERCHANGE IMPVT. (L.R.) (S)	$3,693,863.38	$22,892,895.53	16%

Source: Guidehouse analysis of ArDOT provided data [29]

Total ($) Disincentives and Item Deductions Charged by ArDOT, 2014-2019

Disincentive	Total Value	Average Yearly Value
Disincentive	$(711,500.00)	$(118,583.33)
Item Deduction – ACHM Mix Properties	$(1,801,999.24)	$(300,333.21)
Item Deduction	$(3,447,962.63)	$(574,660.44)
Disincentive-Site Use/A+C Bidding	$(14,068,266.55)	$(2,344,711.09)

Source: Guidehouse analysis of ArDOT provided data [30]

| The findings included in the report are a point in time representation and are subject to change. Please see the assumptions slide in the appendix for further details.

Use of alternative contracting and project delivery methods have been successful for ArDOT, and can be expanded.

ArDOT takes advantage of legislation that allows consideration of qualifications in some procurement.

- Qualifications-based procurement enables DOTs to consider factors beyond cost and time during bid evaluation. Absent this approach, low and high performing contractors may have equal standing in evaluation.
- ArDOT is permitted to use qualifications-based procurement for design-build projects and construction manager/general contractor projects. [31]
- The advantages of design-build are well documented: fewer engineering and inspection costs, design errors and omissions, and overruns.
- ArDOT's 30 Crossing project was procured through design-build, and the Department recently released Construction Manager/General Contractor RFQs (a similar method) for Independent Cost Estimating. [32]
- ArDOT also uses qualifications-based procurement for engineering and design related services, managed by Consultant Contracts. [33]
- Some divisions have developed qualifications-based approaches to screen for contractors that provide the best value. For example, Surveys requires consultants to complete its in-house certification program. [34]
- Others have developed ratings systems to track vendor performance, and use tools like score cards to consider such ratings in bid evaluation.[35]

Alternative contract methods have allowed ArDOT to influence contractor behavior.

- Construction contractors are not able to bid on new projects if they have uncompleted contracts with ArDOT, incentivizing on-time completion.[36]
- Incentive/Disincentive (I/D) bidding is used for projects with a high public value of early completion (i.e., traffic). Contractors are awarded bonuses for early completion and penalized for delays, based on a preset value.[37]
- ArDOT issued ~$7.3M per year on average in such incentives, between 2014 and 2019. Disincentives averaged $3.4M per year during this time.[38]
- A+C bidding is used to evaluate contractors based on their proposed cost and schedule, as opposed to cost only, based on a time multiplier.[39]
- Anecdotally, staff shared concerns that A+C bidding may favor larger contractors who can absorb the risk of shorter completion times.[40]
- Lane Rental is used to disincentivize unnecessary lane closures, especially during peak travel time, through an hourly lane usage charge. ArDOT charged $118K per year on average in fees, between 2014 and 2019.[41]
- However, ArDOT does not have formal protocols to standardize decision-making around when to use specific strategies, which limits their ability to evaluate the effectiveness of strategies and analyze contractor payments.

Michigan DOT (MDOT)

MDOT uses the following rubric to advise when to use certain strategies for construction acceleration, procurement, and project delivery, based on the project objective.

• = May apply	Acceleration Techniques								Procurement/Payment							Delivery Method				
Project Objective	Lane Rental	A+B Incentives	Accepted for Traffic Incentives	No Excuse Incentives	Standard Incentives	Accelerated Schedules	Interim Completion Date Incent.	Alternate Const Methods	Best Value	Project Specific Qualification	Lump Sum	Performance-Based Incentives	Alternate Pavement Bids	Fixed Price Variable Scope	Indefinite Delivery/Ind. Quantity	Design-Build	Design-Build-Finance	DBF-Operate Maintain	Alternate Technical Concepts	CMGC
Expedite construction	•	•	•	•	•	•	•	•								•	•	•	•	•
Minimize road user delay costs	•	•	•	•	•	•	•	•	•			•				•	•	•	•	•
Promote innovation [7]								•	•			•	•			•	•	•	•	•
Expedite contract award [4]																•	•	•		•
Minimize risk of claims/disputes				•												•	•	•		•
Maximize work within set budget [1]													•	•				•		•
Enhance quality [6]								•	•			•				•	•	•		•
Define construction budget early [2]																				•
Reduce design & construction time [5]									•							•	•	•	•	•
Leverage external funding sources [3]																	•	•		

The findings included in the report are a point in time representation and are subject to change. Please see the assumptions slide in the appendix for further details.

Source: MDOT[42]

ArDOT lacks formal systems to identify and implement procurement efficiencies outside of construction.

ArDOT is not using data to understand procurement trends and identify efficient practices.

- Equipment & Procurement (E&P) does not formally review procurement trends, such as prices or staff demand.[43]
- There is no formal mechanism to identify when term contracts would be most cost efficient. This is notable as ArDOT spends an average of $24.4M per year in purchases below $20K, some of which may be more cost efficient through term contracts.[44]
- There is no system to monitor change in commodity prices and reevaluate term contracts. E&P uses short-term contracts, but relies on districts to identify fair prices.[45]
- There is no formal protocol to check if "split purchases" are being used to circumvent the requirement for competitive bidding for purchases above $20K.[46]
- E&P lacks a formal lifecycle cost-based management system.[47]
- This may explain some dissatisfaction with the equipment available to staff: only 58% of ArDOT staff agree "I have all the tools I need to do a great job."[48]
- The Oracle implementation will bring many aspects of purchasing and self-service procurement together and provide approval and reporting capabilities, but will not in itself facilitate the level of data-driven decision-making discussed here.[49]

E&P has minimal authority to facilitate implementation of efficient procurement practices.

- E&P is the only central division with procurement oversight, but its role is primarily compliance-based. If it identified a Department-wide cost efficiency based on analysis of trends, it would not have authority to implement it across divisions and districts.[50]
- For example, current fuel expenditures suggest a gradual shift to electric and hybrid vehicles may be efficient for the Department to undertake.[51]
- There is most oversight for purchases $75K+, on which ArDOT spends an average of $24.5M per year (this excludes construction). Below this threshold, E&P conducts a compliance check. Purchases under $20K have minimal oversight, though staff report this will increase slightly with the implementation of the new Oracle system.[52]
- "If we know there's going to be a lot of buying throughout the year, we recommend they get a contract so we can get the best price in the front end… Ultimately we don't have authority to force them; we can strongly encourage, and usually folks do."[53]
- E&P also lacks authority over inventory management, which is decentralized.[54]

Wisconsin DOT (WisDOT)

Wisconsin's Dept. of Administration's State Bureau of Procurement has implemented Oracle Business Intelligence (OBIEE) to provide "business performance information on key operational indicators for procurement." WisDOT is included in this platform along with other state agencies. The table below is an OBIEE report: Percentage of Agency's Purchases that Occurred on Contract. It provides information on agency's operations and supplies purchases.

Business Unit Name	Budget Reference Code	# of Approved POs	# On Contract	% Approved On Contract
DATCP	FY2015	20	0	0.0%
	FY2016	175	96	54.9%
	FY2017	71	56	77.8%
DATCP Total		**265**	**152**	**56.9%**
DCF	FY2015	0	0	
	FY2016	330	269	81.5%
	FY2017	242	216	89.3%
DCF Total		**572**	**485**	**84.8%**
DFI	FY2016	49	47	95.9%
	FY2017	42	40	95.2%
DFI Total		**91**	**87**	**95.6%**
DHS	FY2015	119	6	5.0%
	FY2016	4664	1747	37.4%
	FY2017	1968	1069	54.2%
DHS Total		**6744**	**2822**	**41.8%**

Source: WisDOT[55]

Procurement Citations

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1. Regulation: A.C.A. 19-11-203
2. Regulation: A.C.A. 27-67-206; Regulation: 23 U.S. Code 112
3. Regulation: A.C.A. 27-65-111
4. Regulation: A.C.A. 27-65-107
5. Guidehouse Interview with ArDOT Legal
6. Guidehouse Interviews with ArDOT Construction, E&P, Legal, and Program Management
7. Guidehouse Interview with ArDOT Construction
8. Guidehouse Interview with ArDOT E&P
9. Guidehouse Interview with ArDOT Program Management and Construction
10. Guidehouse Interviews with ArDOT E&P (1,2), Legal (3), Program Management (4)

Page Number 25

11. FHWA. *Performance-Based Contractor Prequalification as an Alternative to Performance Bonds*. 2014. https://www.fhwa.dot.gov/publications/research/infrastructure/14034/14034.pdf
12. ArDOT Prequalification Questionnaire (via ArDOT website)
13. FHWA. *Performance-Based Contractor Prequalification as an Alternative to Performance Bonds*. 2014. https://www.fhwa.dot.gov/publications/research/infrastructure/14034/14034.pdf
14. FHWA. *Performance-Based Contractor Prequalification as an Alternative to Performance Bonds*. 2014. https://www.fhwa.dot.gov/publications/research/infrastructure/14034/14034.pdf
15. ArDOT Consultant Services Webpage
16. Arkansas 2014 Standard Specification for Highway Construction
17. Arkansas 2014 Standard Specification for Highway Construction, Section 106.10
18. Arkansas 2014 Standard Specification for Highway Construction, Section 106.10
19. Arkansas 2014 Standard Specification for Highway Construction, Section 106.03
20. Arkansas 2014 Standard Specification for Highway Construction, Section 105.04
21. NMDOT. *NMDOT Performance-Based Contractor Prequalification*. 2018. https://construction.transportation.org/wp-content/uploads/sites/20/2018/09/2.01-New-Mexico-Performance-Based-Contractor-Prequalificaiton.pdf

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22. ArDOT 2019 Transportation Asset Management Plan
23. Guidehouse Interview with ArDOT Construction
24. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
25. Guidehouse Interview with ArDOT Construction
26. ArDOT Road User Cost Guide (provided by ArDOT)
27. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
28. Guidehouse Interview with ArDOT District Equipment Supervisor (Rural)
29. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
30. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)

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31. ArDOT Design Build & CMGC Webpages
32. ArDOT Design Build & CMGC Webpages
33. ArDOT Consultant Services (via ArDOT website)
34. Guidehouse Interview with ArDOT Surveys
35. Guidehouse Interview with ArDOT Consultant Contracts
36. ArDOT. *Innovation at State Department of Transportation*. Feb 2019. https://www.arkansashighways.com/PowerPoints/2019/20190227_EPW_Innovation_Presentation.pdf
37. Arkansas 2014 Standard Specification for Highway Construction
38. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
39. Arkansas 2014 Standard Specification for Highway Construction
40. Guidehouse Interview with ArDOT Construction
41. Arkansas 2014 Standard Specification for Highway Construction; ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
42. Michigan DOT. *Innovative Construction Contracting Guide*. 2015: https://www.michigan.gov/documents/mdot/Innovative_Construction_Contracting_340000_7.pdf

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43. Guidehouse Interview with ArDOT E&P
44. Guidehouse Interview with ArDOT E&P; ArDOT Purchase Data (provided by ArDOT, analyzed by Guidehouse)
45. Guidehouse Interview with ArDOT E&P
46. Guidehouse Interview with ArDOT E&P
47. Guidehouse Interview with ArDOT E&P
48. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
49. ArDOT Oracle Scope of Work (provided by ArDOT)
50. Guidehouse Interview with ArDOT E&P
51. ArDOT Mileage & Fuel Consumption Data (provided by ArDOT, analyzed by Guidehouse)
52. ArDOT Accounting Manual
53. Guidehouse Interview with ArDOT E&P
54. Guidehouse Interview with ArDOT E&P
55. State of Wisconsin Department of Administration. *What's New in Procurement*. 2016: https://doa.wi.gov/Documents/DEO/WhatsNewinProcurement.pdf

Focus Area Analysis: Expenditures

| The findings included in the report are a point in time representation and are subject to change. Please see the assumptions slide in the appendix for further details.

Key Takeaways

1. ArDOT does not have the protocols and tools to conduct enterprise project portfolio management.
2. There are opportunities to strengthen ArDOT's frameworks for making design decisions to promote improved system performance and cost savings.
3. There may be opportunities to improve cost efficiencies in ArDOT's project development process.
4. ArDOT lacks formalized project management tools in: construction project development, construction, and maintenance.
5. Several internal and external audits are undertaken to ensure that ArDOT funds are spent appropriately.

ArDOT does not have the protocols and tools to conduct enterprise project portfolio management.

Project development, construction, and maintenance functions present unique resource management challenges.

Overview

- ArDOT is implementing an enterprise resource planning tool that will integrate existing systems for financials, inventory, and purchasing, among others.[1]
- Yet this is disconnected from project development and management, which require distinct approaches to better manage human capital / resource staffing, consultant, procurement, and IT resources at the project and enterprise levels.[2]
- While the Department is consistently able to execute on its project development, construction, and maintenance functions with current practices, improved resource planning may allow them to do so while saving costs.

Project Development

- At the project development phase, ArDOT should correctly identify and plan for staffing needs, particularly as it informs procurement for professional engineering and design-related services contractors.
- Further, effectively projecting the capacity required to execute project development tasks may inform cost-benefit analyses that justify the purchase of tools like software applications that improve efficiency and quality.

Construction

- At the construction phase, ArDOT should correctly identify and plan for staffing, particularly for entry-level positions that require extensive on-the-job training.
- The current system to determine crew complements relies on outdated technology and does not yield outputs that are easily usable by staff for resource planning.[3]

Maintenance

- At the maintenance phase, ArDOT should correctly identify and plan for staffing, equipment, and materials needs.
- Currently, crew complements are based on historical data and not level of service.[4]
- Further, effectively projecting the location, scope, and volume of the maintenance activities required may inform cost-benefit analyses that justify the purchase of equipment or services that improve efficiency and quality.

Gartner's Top-Rated Project & Portfolio Management Tools

Project Management Tools Used by DOTs

State	Project Management Software Used
California	CA PPM
Michigan	Planisware
Kansas	In-house software
Pennsylvania	In-house Oracle database
North Carolina	SAP
Utah	In-house software
Georgia	Oracle Primavera
Montana	Planisware
New Jersey	Oracle Primavera
Virginia	Microsoft Project Server

Source: Gartner (top)[5], ITS Berkley (bottom)[6]

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There are opportunities to strengthen ArDOT's frameworks for making design decisions to promote improved system performance and cost savings.

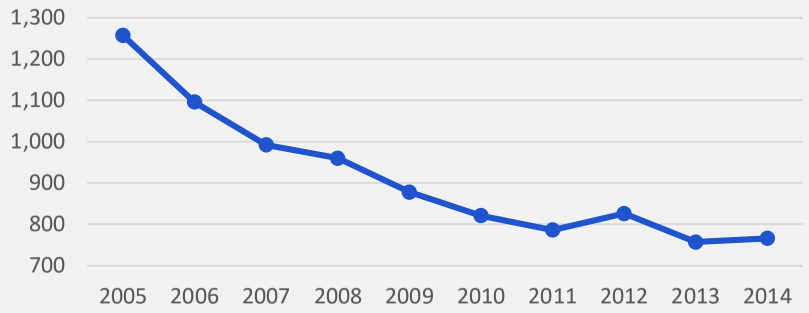
Formal protocols around the use of practical design are lacking.

- FHWA requires that state DOTs adhere to certain criteria in their plans and specifications for projects on the National Highway System. The standard for roadways is set by AASHTO's "A Policy on Geometric Design of Highways and Streets," also known as the Green Book.[7]
- Yet DOTs have some flexibility to depart from traditional designs as system performance, fiscal sustainability, and public needs demand.[8]
- Practical Design is a leading example: a context-sensitive approach through which DOTs can optimize roadway and bridge designs to obtain the maximum system benefit while still achieving project objectives.[9]
- Missouri DOT has used practical design since 2005 to generate cost savings and improve safety, implementing lower cost solutions system-wide rather than higher cost solutions in isolated areas, resulting in reduced fatalities (see graph) and $400M in cost savings in Year 1.[10]
- ArDOT applies a context-sensitive approach, but lacks formalized policies and procedures to govern and document its usage and outcomes.[11]
- Absent documentation, the Department is unable to implement best practice, show cost savings, and maintain knowledge management.

ArDOT has not taken advantage of the full benefits of Value Engineering.

- Value Engineering (VE) is a tool to analyze projects and identify opportunities to reduce costs, improve quality, and reduce completion time. It typically takes place during the planning phase.[12]
- Federal regulations require states to conduct VE for National Highway System (NHS) projects with $50M+ in project costs. For bridge projects, the threshold is $40M+.[13]
- ArDOT's Value Engineering Guidelines and Procedures dictate project selection, team selection, required training, work plan, and resources.[14]
- ArDOT conducts an average of 2.2 VE studies per year, yielding an average of 5.75 recommendations per study. However, only 2 VE recommendations have been approved since FY15, a total of ~$377K.[15]
- This puts ArDOT below the national average, as seen in the table below.[16]
- Anecdotally, staff shared the limitations of current VE practices, namely that it is conducted too late in the process to provide maximum value.[17]
- ArDOT allows construction contractors to submit VE Change Proposals (VECP) for all projects $2M+ after the contract has been executed. ArDOT approves an average of 1.5 VECPs per year, ~$904K on average.[18]
- This puts ArDOT near the national average for VECP.[19]

Missouri Annual Fatalities



Source: Guidehouse analysis of MoDOT data [20]

Value Engineering (VE) & Value Engineering Change Proposal (VECP)Across State DOTs

	# of Studies completed	# of Recs Proposed	# of Recs Approved	Value of Approved Recs
VE Total	175	1376	578	$1,148,883,369
VE Average	3.3	26.0	10.9	$21,677,045
VECP Total	n/a	n/a	200	$40,247,844
VECP Average	n/a	n/a	3.8	$759,393

On average, the value of approved VE recommendations is 157 times greater than the cost of the VE study.

Source: Guidehouse analysis of ArDOT provided data [21]

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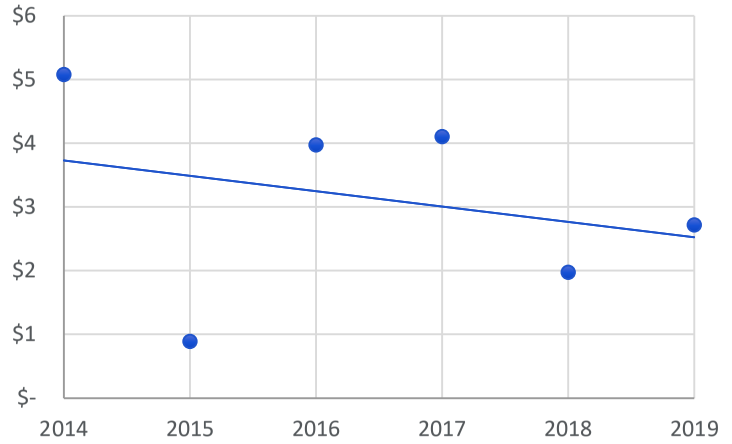
There may be opportunities to improve cost efficiencies in ArDOT's project development process.

Engineer's estimates are not formally evaluated to identify future design cost efficiencies.

- The engineer's estimate is developed based on the quantities of labor and materials required for each design. ArDOT uses an estimating software tool to complete this.[22]
- Accurate cost estimates are essential to the Department's financial accountability, constraints, project budgeting, resource planning, and contractor management.
- However, the Department does not engage in any formal evaluation of estimates against final project cost to integrate learnings that improve future cost estimates. [23]
- In contrast, other DOTs may compare the engineer's estimate to the low bid, award amount, and final contract amount to assess the accuracy of their estimates.
- The volume of change orders related to plan omission suggests some issues with the Department's current estimate approach: ~$3.1M in change orders were approved on average per year due to this reason, between 2014 and 2019. [24]
- As demonstrated in the graph (right), this trend is declining, indicating that ArDOT has taken positive steps to mitigating this issue. Yet there is still room for improvement. [25]

Change Orders due to Plan Omission (in millions of $)



Source: Guidehouse analysis of ArDOT provided data [33]

Right of Way (ROW) faces external obstacles to reducing costs.

- ROW takes the longest of any critical path steps and can be expensive. This process is hampered by external factors: negotiation delays and increasing acquisition costs.[26]
- ArDOT has ~34 ROW projects per year; each is, on average, 15 months and $834K.[27]
- State regulation allows property owners to challenge ArDOT's "just compensation" in condemnation. If the court awards an amount >20% of ArDOT's offer, they must cover the property owner's legal fees and expenses in addition to the acquisition cost.[28]
- This provision extends to other entities, including public utilities, which will increase ArDOT's costs if they are responsible for utility right of way reimbursement.[29]
- ArDOT acquisitions costs increased as a result. Before the legislation took effect in 2016, the Department paid, on average, 9% above appraisal value in condemnations; afterwards, ArDOT paid, on average, 26% above appraisal value.[30]
- ArDOT is limited in disposing surplus land due to state law requiring 3 appraisals for purchase. The total appraisal cost of ~$4,500 exceeds the value of some land.[31]
- The Department has $7.2M in surplus land, of which 11% ($764K; 912 tracts) is below $4,500 and 89% ($6.4M; 223 tracts) is above.[32]

Projects with Highest Volume of Change Orders (CO) due to Plan Omission (by Total CO Amount)

Project Name	Total CO Amount	Bid Amount	CO % of Bid Amt.
CACHE RIVER-BAYOU DEVIEW (S)	$2,543,236	$30,000,027	8%
HWY. 112-I-49 (S)	$1,350,119	$100,620,381	1%
HWY. 181-HWY. 158 (F)	$918,027	$28,983,450	3%
LEFT HAND CHUTE OF LITTLE RIVER STRS. & APPRS. (S)	$660,012	$4,705,005	14%
BRYANT ST. - CONVENTION CENTER DR. (PINE BLUFF) (S)	$527,572	$4,335,723	12%
MONETTE BYPASS (S)	$478,975	$13,719,431	3%

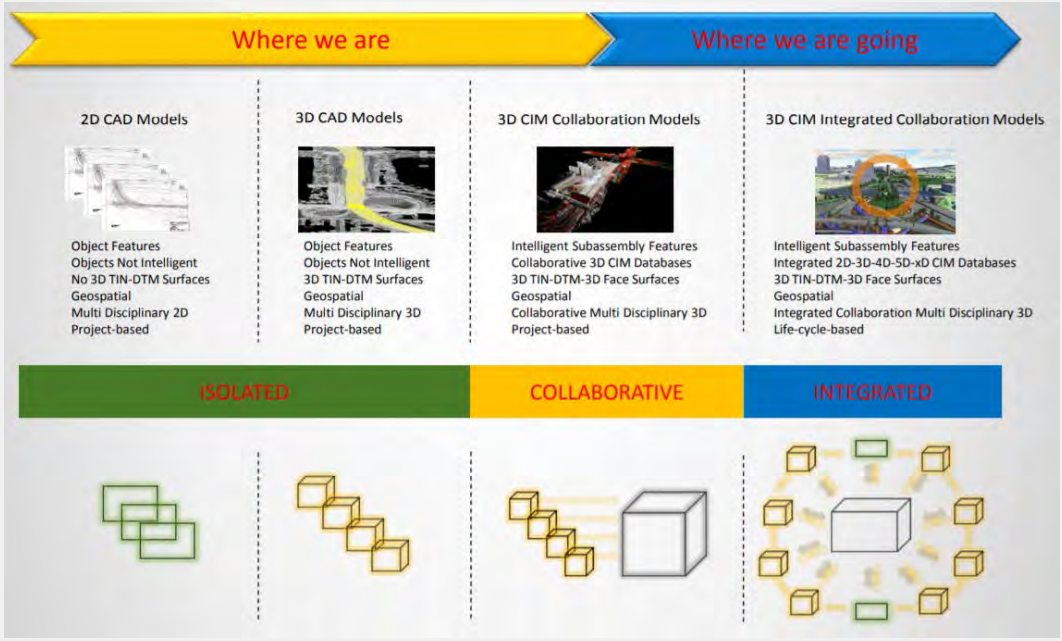
Source: Guidehouse analysis of ArDOT provided data [34]

The findings included in the report are a point in time representation and are subject to change. Please see the assumptions slide in the appendix for further details.

ArDOT's construction project development lacks formalized project management tools.

The construction project development process may be enhanced through formalized project management tools that increase accountability, identify process efficiencies, and facilitate collaboration across teams.

- ArDOT uses a critical path approach for pre-construction: after projects are adopted in the State Transportation Improvement Program, the path follows through the Survey, Roadway Design, Environmental, and Right of Way Divisions at determined intervals before Program Management lets it to contract.[35]
- This process is monitored via the Staff Minutes, which provides project information and tracks progress against interim milestones for each division.[36]
- Staff Minutes are maintained by Program Management and reviewed biweekly to highlight upcoming projects and troubleshoot projects behind schedule.[37]
- Yet there is no tool that offers robust project management for this process, which could increase accountability and identify process efficiencies earlier.
- Further, design, reviews, and handoffs are not necessarily conducted within the same software platform.[38]
- Some DOTs seeking to reduce project development time, increase accuracy of estimates, and reduce likelihood of future change orders have invested in tools that allow different divisions to dynamically design within an open access model.[39]
- One example of this approach is WisDOT's use of 3D Modeling and BIM, which would also facilitate coordination with construction staff (graphic below). [40]
- Anecdotally, district staff want more time for feedback on plan designs at 90% complete to potentially reduce the number of change orders down the line. [41]



Wisconsin DOT (WisDOT)
WisDOT has improved its project development workflows using integrated 3D modeling tools. 3D CIM Collaboration Models have reduced WisDOT's redesign, rework, and change orders, creating cost savings and avoidance opportunities up to 25%.

Source: WisDOT [42]

| The findings included in the report are a point in time representation and are subject to change. Please see the assumptions slide in the appendix for further details.

ArDOT's construction projects lack formalized project management tools.

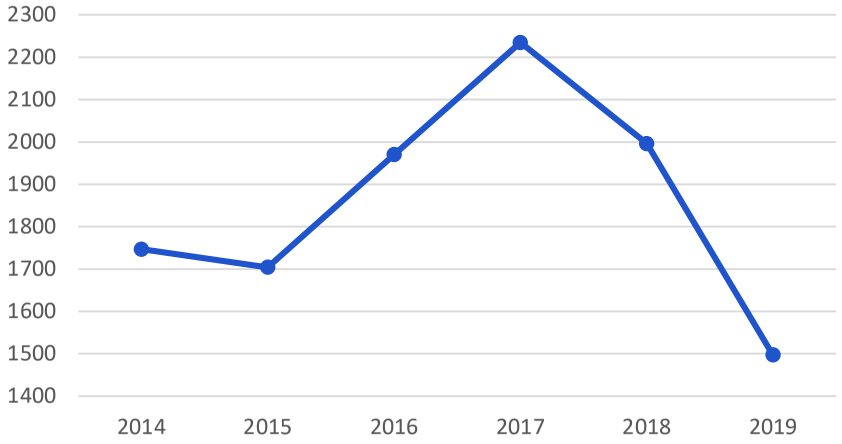
Existing project management tools may have broader applications for construction staff.

- Construction schedules are set by contractors, but Resident Engineers must efficiently coordinate construction monitoring tasks.[43]
- ArDOT lacks a project management system to fill this gap, by, for example, interfacing with the contractor's project plan to trigger construction monitoring tasks and check-ins at key milestones.[44]
- Though ArDOT uses Primavera P6, it is primarily for contractors. For ArDOT, it facilitates time impact analysis and change order analysis.[45]
- The use of this tool is limited to projects with A+C bidding.[46]
- Districts use SiteManager for contract administration, daily work reports, current and final estimates, materials management, and other functions. SiteManager is a leading information management tool, but does not provide project management support.[47]
- In the absence of a project management tool, Resident Engineers rely on daily meetings and weekly and monthly reports to plan, manage, and troubleshoot. They review major overruns, projects behind schedule, missing documentation, change orders, and more.[48]

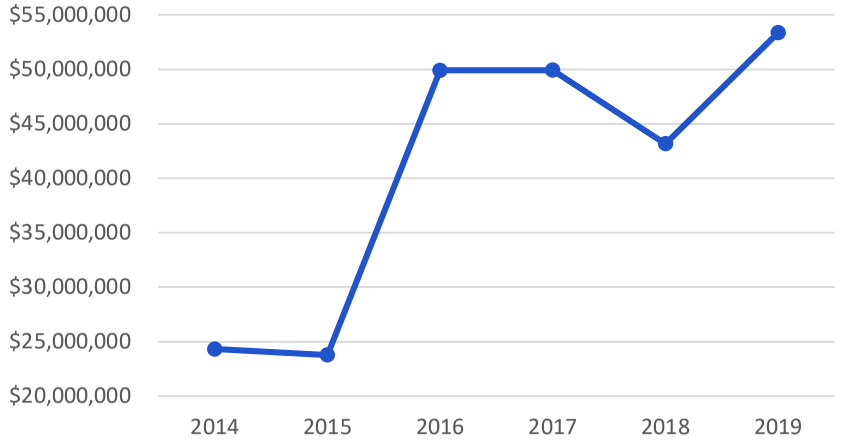
Change orders are not formally reviewed to identify potential efficiencies or problematic contractors.

- Change orders are used to approve and document changes in how contractors execute work, prompted by plan error, unexpected site conditions, and a range of other reasons.[49]
- Approval of change orders varies by type and amount. In general, Resident Engineers approve change orders <$20K, District Engineers <$75K, and Assistant Chief Engineer above that. Special considerations are made for changes to contract items, contract time, and VE.[50]
- FHWA approves change orders of $20K+ on federal oversight projects.[51]
- Change orders are documented in SiteManager, but not formally reviewed by the Department to identify trends in contractor performance, item costs (particularly those items not included in bid), or to analyze consistency of approvals and amounts across districts.[52]
- Since 2014, the total number of change orders that ArDOT has experienced has declined, however during the same time frame, the dollar value per change order has increased significantly.[53]

Number of Change Orders, by Year



Total ($) of Change Orders, by Year



Source: Guidehouse analysis of ArDOT provided data[54]

| The findings included in the report are a point in time representation and are subject to change. Please see the assumptions slide in the appendix for further details.

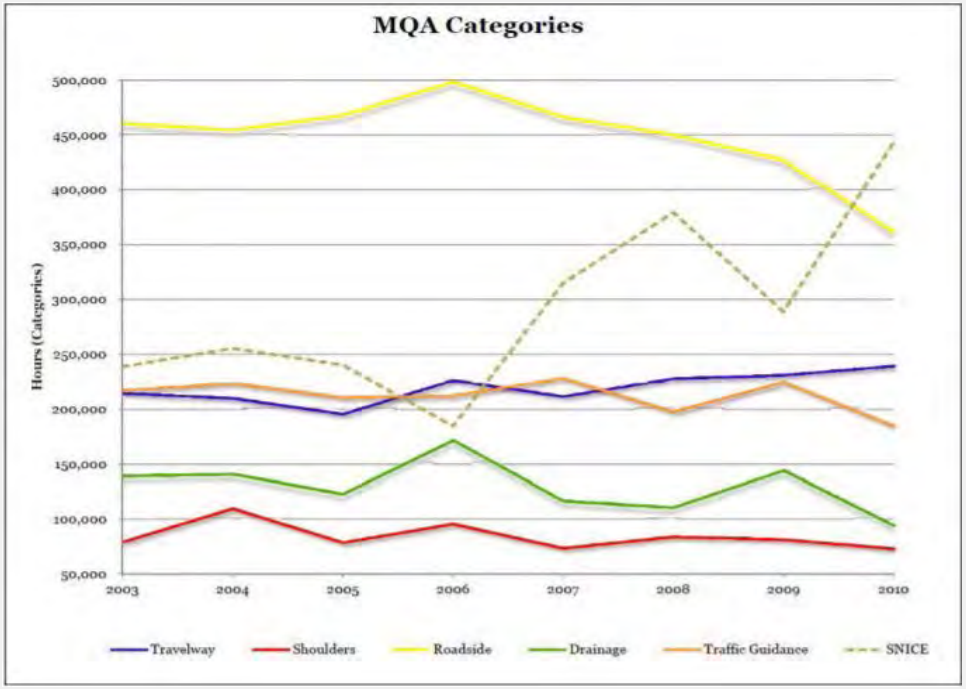
ArDOT's maintenance projects lack formalized project management tools.

Scheduling and evaluation of maintenance activities may be improved through the use of project management tools.

- Maintenance activities are broadly identified as part of the Annual Work Program, which includes a list of activities to be completed and the estimated materials, crew size, and time required.[55]
- The Annual Schedule of maintenance functions outlines during which months each activity is expected to be completed, possible, or in case of emergency.[56]
- District- and area-level maintenance staff use the annual work plans to develop bi-weekly schedules with functions, locations, materials, and crews to be used in two weeks.[57]
- Seasonality facilitates some level of project prioritization. However, of the 50+ activities listed in the Annual Schedule, nearly all are expected or possible each month, offering little guidance to staff on how to prioritize activities throughout the year.[58]
- Schedule management is conducted through comparison of actual progress against the annual work plan, reviewed once per month by district and annual staff.[59]
- Productivity is assessed through a comparison of actual productivity against historical rates (i.e., output per hour), reviewed once per month by the District Maintenance Engineer (DME) and District Maintenance Superintendent (DMS).[60]
- This review may yield a change in the maintenance crew size or other adjustment, but may be too late to make a productive change to the project in question.
- The new Maintenance Management System (MMS) should begin to address many of these issues by optimizing work plans based on system condition within financial and staff constraints.[61]
- Initial implementation of the MMS will emphasize performance-based planning and budgeting, and later phases will add in optimization capabilities.[62]

Kentucky DOT (KDOT)

KDOT uses a MMS that allows outputs such as this graph, which depicts the time spent by staff on various maintenance quality assurance (MQA) activities per year.



Source: KDOT[63]

75% *proportion of surveyed state DOTs with a performance-based approach to maintenance project management*

Source: National Highway Cooperative Research Program[64]

| The findings included in the report are a point in time representation and are subject to change. Please see the assumptions slide in the appendix for further details.

Several internal and external audits are undertaken to ensure that ArDOT funds are spent appropriately.

ArDOT is taking steps to strengthen its internal audit practices.

- Internal Audit (IA) largely conducts Administrative Compliance Audits of divisions, districts, Resident Engineer Offices, and sections, including internal controls, regulatory compliance, and safeguarding of assets.[65]
- "Management findings" are communicated directly to the audited group, and "reportable findings" are included in the audit report; Audit activities are reported to the Highway Commission bi-monthly.[66]
- IA completes a risk assessment every 2 years, per Arkansas Dept. of Finance & Administration (DFA), to identify risks for fraud, waste, abuse, and controls.[67]
- IA is developing audit policies and procedures for each division and district based on their assessed risk, as part of its risk-based approach.[68]

Auditor	Purpose of Audits	Areas of Focus	Sample Audits
ArDOT's Internal Audit Division	Ensure ArDOT divisions and districts are in compliance with policies and procedures, with focus areas determined based on a DFA-required Department-wide risk assessment; report to Highway Commission bi-monthly	Internal controls, safeguarding of assets, construction documentation and reporting, and compliance; methodology reviewed every 3 years by American Association of Highway Transportation Officials (AASHTO) Internal Audit Committee	• Administrative Compliance Audits • Architectural and Engineering Indirect Cost Rate CPA Workpaper Reviews • Investigative Audits • Motor Fuel Tax Audits • International Fuel Tax Agreement Audits

Source: Guidehouse analysis of ArDOT provided documents and publicly available documents[69]

External audits are primarily conducted by Legislative Audit and FHWA.

- Legislative Audit evaluates ArDOT's financial statements annually in compliance with generally accepted government auditing standards. In addition, every 3 years, Legislative Audit conducts the State of Arkansas Single Audit: ArDOT is one of many entities included.[70]
- FHWA uses a risk-based approach to its stewardship and oversight of federal aid projects, which includes approvals and reviews at the project and program level on a quarterly, annual, and as needed basis.[71]
- FHWA has historically conducted more project-level reviews, but this has declined due to changes at the federal level.[72]

Auditor	Purpose of Audits	Areas of Focus	Sample Audits
Arkansas Legislative Audit	In accordance with state law and generally accepted government auditing standards, audit ArDOT financial statements	Financial statements, internal controls, and compliance	• Audit of Financial Statements • State of Arkansas Single Audit
Federal Highway Administration (FHWA)	In accordance with federal law and the ArDOT Stewardship & Oversight Agreement, ensure ArDOT projects and programs are in compliance with federal policies and procedures; use a risk-based approach	Systems and practices related to: financial management, estimating project costs, awarding contracts, reducing costs, staffing resources, available funding, and fund management	• Compliance Assessment Program (compliance with federal requirements) • Projects of Division Interest review (identifies projects with elevated risk)

Source: Guidehouse analysis of ArDOT provided documents and publicly available documents[73]

Expenditures Citations

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1. ArDOT Oracle Scope of Work (provided by ArDOT)
2. Guidehouse analysis of ArDOT Oracle Scope of Work (provided by ArDOT)
3. Guidehouse Interview with ArDOT Construction
4. Guidehouse Interview with ArDOT District/Assistant Maintenance Superintendent (Rural)
5. Planisware. Blog Post 2019: https://www.planisware.com/hub/blog/2019-gartner-magic-quadrant-project-and-portfolio-management-out
6. Tommelein, Iris D., PhDBlampied, Nigel. *Review of the Project Resourcing and Schedule Management (PRSM) System used by Caltrans*. 2018: https://escholarship.org/uc/item/20t4r81t

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7. FHWA. *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects*. Version FP-14. https://flh.fhwa.dot.gov/resources/specs/fp-14/fp14.pdf
8. FHWA. *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects*. Version FP-14. https://flh.fhwa.dot.gov/resources/specs/fp-14/fp14.pdf
9. Utah DOT. *Practical Design Guide*. 2011.
10. FHWA. *Practical Design*. 2010: https://www.fhwa.dot.gov/publications/publicroads/10janfeb/06.cfm
11. Guidehouse Interview with ArDOT Roadway Design & Bridge Design
12. FHWA. *Value Engineering Final Rule*. 2014. https://www.fhwa.dot.gov/ve/
13. FHWA. *Value Engineering Final Rule*. 2014. https://www.fhwa.dot.gov/ve/
14. ArDOT Value Engineering Guidelines and Procedures (via ArDOT website)
15. National Value Engineering Data by State (provided by ArDOT, analyzed by Guidehouse).
16. National Value Engineering Data by State (provided by ArDOT, analyzed by Guidehouse).
17. Guidehouse Interview with ArDOT Consultant Contracts
18. National Value Engineering Data by State (provided by ArDOT, analyzed by Guidehouse).
19. National Value Engineering Data by State (provided by ArDOT, analyzed by Guidehouse).
20. Missouri State Highway Patrol. *Number of Persons Killed or Injured in Missouri Crashes by Year*. https://www.mshp.dps.missouri.gov/MSHPWeb/SAC/crash_data_severity_960grid.html
21. National Value Engineering Data by State (provided by ArDOT, analyzed by Guidehouse).

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22. Guidehouse Interview with ArDOT Roadway Design
23. Guidehouse Interview with ArDOT Roadway Design
24. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
25. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
26. ArDOT ROW and Utility Data (Provided by ArDOT, Analyzed by Guidehouse)
27. ArDOT ROW and Utility Data (Provided by ArDOT, Analyzed by Guidehouse)
28. Regulation: AR Code § 27-67-317 (2017)
29. Regulation: AR Code § 27-67-317 (2017)
30. ArDOT ROW and Utility Data (Provided by ArDOT, Analyzed by Guidehouse)
31. Regulation: ACA § 27-67-322 (c)(3)
32. ArDOT Surplus Land Data (provided by ArDOT, analyzed by Guidehouse)
33. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
34. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)

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35. ArDOT Staff Minutes (sample provided by ArDOT)
36. ArDOT Staff Minutes (sample provided by ArDOT)
37. Guidehouse Interview with ArDOT Program Management
38. Guidehouse Interview with ArDOT Roadway Design
39. Iowa DOT. *3D Model-based Planning-Design-Construction-O&M for Transportation Project Delivery: Structures Perspective*. 2015: https://iowadot.gov/bridge/3D/Presentations/150414-WisDOT-SEF.pdf
40. Iowa DOT. *3D Model-based Planning-Design-Construction-O&M for Transportation Project Delivery: Structures Perspective*. 2015: https://iowadot.gov/bridge/3D/Presentations/150414-WisDOT-SEF.pdf
41. Guidehouse Interviews with ArDOT Construction and Resident Engineers (Rural)
42. Iowa DOT. *3D Model-based Planning-Design-Construction-O&M for Transportation Project Delivery: Structures Perspective*. 2015: https://iowadot.gov/bridge/3D/Presentations/150414-WisDOT-SEF.pdf

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43. ArDOT Resident Engineer Manual. 2014.
44. Guidehouse Interview with ArDOT Resident Engineers (Rural)
45. ArDOT Resident Engineer Manual. 2014.
46. ArDOT Resident Engineer Manual. 2014.
47. ArDOT Resident Engineer Manual. 2014.
48. ArDOT Resident Engineer Manual. 2014.
49. ArDOT Change Order Policies and Thresholds
50. ArDOT Change Order Policies and Thresholds
51. ArDOT Change Order Policies and Thresholds
52. Guidehouse Interview with ArDOT Construction
53. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
54. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)

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55. ArDOT Maintenance Manual. Version 8.17
56. ArDOT Maintenance Manual. Version 8.17
57. ArDOT Maintenance Manual. Version 8.17
58. ArDOT Maintenance Manual. Version 8.17
59. Guidehouse Interviews with ArDOT District/Assistant Maintenance Superintendents (Rural) and District Engineers (Rural)
60. Guidehouse Interview with ArDOT District Maintenance Engineer (Rural)
61. ArDOT Maintenance Management Description
62. ArDOT Maintenance Management Description
63. Scan Team Report. *Best Practices In Performance Measurement For Highway Maintenance And Preservation*. http://onlinepubs.trb.org/onlinepubs/nchrp/docs/nchrp20-68a_10-03.pdf
64. Minnesota DOT. *MnDOT Measures of Financial Effectiveness: 2019 EVALUATION REPORT*. https://www.leg.state.mn.us/docs/2019/other/190400.pdf

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65. ArDOT Internal Audit Manual
66. ArDOT Internal Audit Manual
67. ArDOT Internal Audit Manual
68. ArDOT Internal Audit Risk Assessment Heatmap
69. ArDOT Internal Audit Manual
70. Regulation: 2 CFR § 200.514
71. FHWA. *Risk-based Approach to Stewardship and Oversight FAQ*. https://www.fhwa.dot.gov/federalaid/stewardship/140328_faq.pdf
72. Guidehouse Interview with FHWA – Arkansas Division
73. Stewardship and Oversight Agreement between FHWA and ArDOT. 2015.

Focus Area Analysis: Information Technology

| The findings included in the report are a point in time representation and are subject to change.
Please see the assumptions slide in the appendix for further details.

Key Takeaways

1 ArDOT is focused on addressing deficiencies in the IT platform; however, addressing these deficiencies alone will not allow the Department to implement long term operational efficiencies.

2 ArDOT has developed a strategic 3-year IT roadmap but lacks maturity with some of the enabling pillars that compromise effective delivery of that plan.

ArDOT is focused on addressing deficiencies in the IT platform; however, addressing these deficiencies alone will not allow the Department to implement long term operational efficiencies.

ArDOT appears to be approaching data center modernization phases, however, there does not appear to be a formal plan for integration.

- There appear to be 300+ databases (DBs) operating over 14 servers.[1]
- Interviews with IT indicate there is an unknown amount of data stored locally on ArDOT staff computers.
- There are several DBs for which the origin or the purpose have not been established and may be ready for decommissioning.[1]
- ArDOT's own internal analysis revealed that "Data quality is poor, data access across divisions is difficult and not real time". [2]
- Interviews with IT revealed that ArDOT has been approaching its data center modernization in phases prioritizing the Mainframe upgrade, Oracle implementation, several storage and server infrastructure upgrades and then will move to consolidate the remaining databases. Nevertheless, there is not a documented plan leaving the organization open to risks related to ensuring appropriate data capture, storage, and integration.

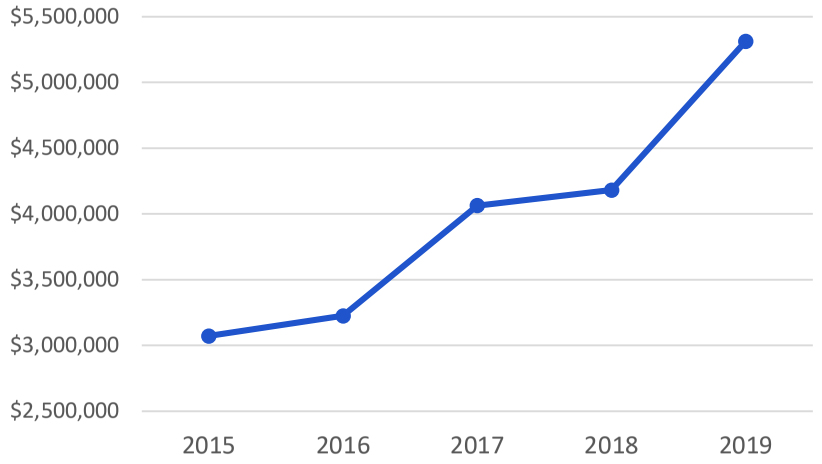
ArDOT has preliminarily identified staff's software needs but efforts to align technology purchases across the Department has not been universally implemented.

- ArDOT currently deploys approximately 263 software applications.[4]
- Support for these applications is distributed across a number of divisions including construction and maintenance as it relates to SiteManager, SiteManager Access Report System (SARS), and State Highway Police (SHP) radio communications.[5]
- ArDOT's software expenditures has increased significantly over the last 5 years, rising ~73% to ~$5.3M in FY2019.[6]
- Interviews with IT indicate that ArDOT has not conducted a software license inventory for these deployed applications which may increase IT costs and leave the Department exposed to risk/liability.
- Although in the current state IT has to approve application acquisition and enable installation, there is still a culture of divisions independently securing IT applications without IT approval.[7]
- ArDOT's own internal strategic planning documents reveal that there is lack of alignment between technology solutions purchases leading to multiple solutions for one business problem.[2]

ArDOT Staff Perspectives on Data Quality

Source: Guidehouse analysis of ArDOT provided documents[2]

ArDOT Software Expenditures by Fiscal Year



Source: Guidehouse analysis of ArDOT provided data[6]

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ArDOT is focused on addressing deficiencies in the IT platform; however, addressing these deficiencies alone will not allow the Department to implement long term operational efficiencies.

ArDOT has enlisted a number of vendors to rapidly implement Enterprise Infrastructure upgrades.

- An Info-Tech IT Capabilities assessment in 2019 indicated the need for ArDOT to focus on Network and Communications Infrastructure.[8]
- A Converge One Data Center Resiliency assessment (in 2019) revealed the need for critical Server, Storage, and Disaster Recovery (DR) Infrastructure upgrades.[9]
- Recognizing that it needs to stabilize it's baseline infrastructure in the above areas (Storage, Servers, Hardware, Security and DR) ArDOT has secured consultants to rapidly attend to these IT Infrastructure upgrades.[10]

ArDOT recognized that IT customer support is of critical importance and is looking to secure a supporting ITSM tool.

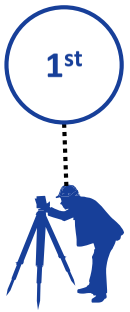
- ArDOT's internal IT Survey indicates that customer support is a critical pain point for the Business.[8]
- The IT Department is working to release an RFP to procure an IT Service Management (ITSM) tool in Q1 of 2020; and is looking to deploy this tool concurrently with the Oracle "go-live" window (July 2020).[11]
- It does not appear that IT has any frameworks to guide effective customer support, but is looking to secure this as part of the ITSM solution acquisition.
- Interviews revealed that IT is looking to broaden the utilization of this ITSM tool across numerous divisions (e.g. HR, Facilities, Construction).
- A review of the requirements indicates that ArDOT IT seeks to expand the platform's capabilities to support Change Control, Project Management, Problem resolution, and service catalog definition.[11]

In-flight Vendor Managed Infrastructure Upgrades

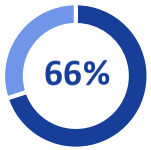
Vendor	Service
ConvergeOne	Server, Storage, Oracle Wireless, and misc. Disaster Recovery Upgrades
Presidio	VOIP, switch upgrades, and misc. server purchases
Various (<10)	Internet Connectivity
2 DBAs	Manage day-to-day needs of myriad databases
SharePoint Administrator	Support Intranet rebuild

Source: Guidehouse analysis of ArDOT provided documents[10]

ArDOT staff rated Network and Communications 1st in Importance



ArDOT satisfaction with Network and Communications



ArDOT satisfaction with IT Help Desk

ArDOT staff rated Help Desk Support 3rd in Importance

Source: Guidehouse analysis of ArDOT provided documents[8]

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ArDOT is focused on addressing deficiencies in the IT platform; however, addressing these deficiencies alone will not allow the Department to implement long term operational efficiencies.

Although ArDOT is making progress on developing Disaster Recovery (DR) platform, they currently lack a cyber security function, policies, and standards.

- ArDOT is addressing its DR related data storage risks via the Data Center infrastructure upgrade. This upgrade will also inform the creation of broader Disaster Recovery policies and procedures.[12]
- ArDOT has identified its Barling facility as a dedicated DR facility, but has yet to formalize the plan, or associated IT/business continuity policies and procedures.[12]
- ArDOT's plans to address the remaining DR risks (such as Fire risks, Firewalls and email security, and lack of DR environment) are in their infancy.[12]
- Interviews reveal that ArDOT is in the process of building a cybersecurity platform, and have recently hired a security architect to lead that effort.
- ArDOT has expressed a desire to align with the Criminal Justice Information Services (CJIS) cybersecurity policies, but an ArDOT specific policy has not been developed.[12]
- ArDOT's Security Architect has put in a platform to conduct threat monitoring and detection, and ArDOT is partnering with Arkansas Department of Emergency Management (ADEM) to understand best practices on cybersecurity training, but ArDOT is not currently conducting any cybersecurity audits across the Departments and divisions.[1]

Infrastructure Downtime

Several studies indicate that the cost of Infrastructure downtime can average between $2,300 to $9,000 per minute

Cyber Security Threat

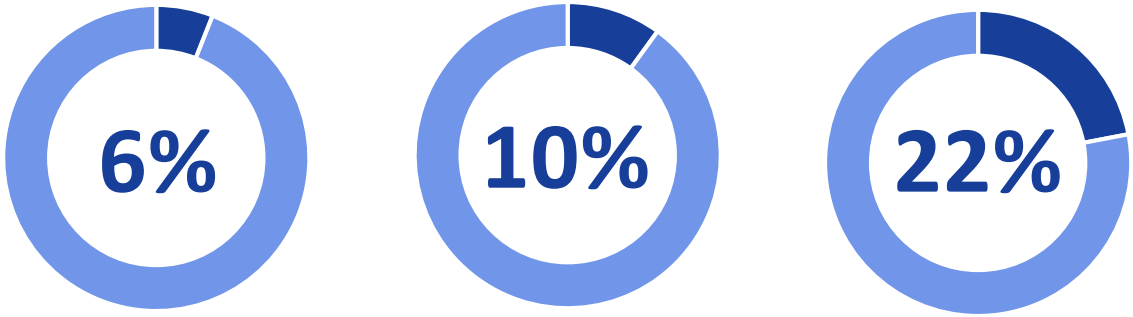
The Average Cost of a security breach is $5.85M

Case Study

In 2012 a security breach at South Carolina's Dept. of Revenue exposed the records of ~ 70M people, costing the state $41M

Source: Guidehouse analysis of documents from Atlassian, Inc (top) and Governing Institute (middle, bottom)[13,14]

ArDOT Data Resiliency Evaluation - ConvergeOne Analysis



Disaster Center Storage Score | *Disaster Recovery Score* | *Data Security Score*

The findings included in the report are a point in time representation and are subject to change. Please see the assumptions slide in the appendix for further details.

Source: Guidehouse analysis of ArDOT provided data[13]

ArDOT has developed a strategic 3-year IT roadmap but lacks maturity with some of the enabling pillars that compromise effective delivery of that plan.

ArDOT has not developed a Governance Structure to ensure IT investments support objectives, manage enterprise risk, and meet external stakeholder needs.

- IT staff meet with division and districts to catalog IT needs and gather requirements, the project intake process is not formalized nor documented (beyond capturing needs through customer initiated IT service tickets).[16]
- ArDOT recently implemented the use of a Project and Prioritization tool, however it does not appear to complete, tied to an enterprise strategy, or connected to a governance structure. [16,17]
- Beyond a long and short term initiatives document, it does not appear that ArDOT has an operational plan that supports the implementation of the 3 Year IT Strategic Plan. [16,18]
- There does not appear to be a formal decision making body related to IT investments, nor formal policies to govern and/or prioritize any investments. Interviews revealed that the Assistant Chief of Administration ultimately approves project prioritization.[16]
- ArDOT has created a Data Governance Plan to help operationalize how data is managed across the organization however, this document is in its infancy and only supported by three draft policy documents: Data Management, Backup, and Access. [16,19]
- ArDOT continues to increase its IT investment as the IT Budget has increased dramatically from ~$9.2M in FY16 to ~$23.5M in FY20 with Operating Expenses and Equipment costs being the biggest Drivers. [20]

There is no overarching Enterprise architecture or "Blueprint" to standardize and organize IT infrastructure and solutions to align with business goals.

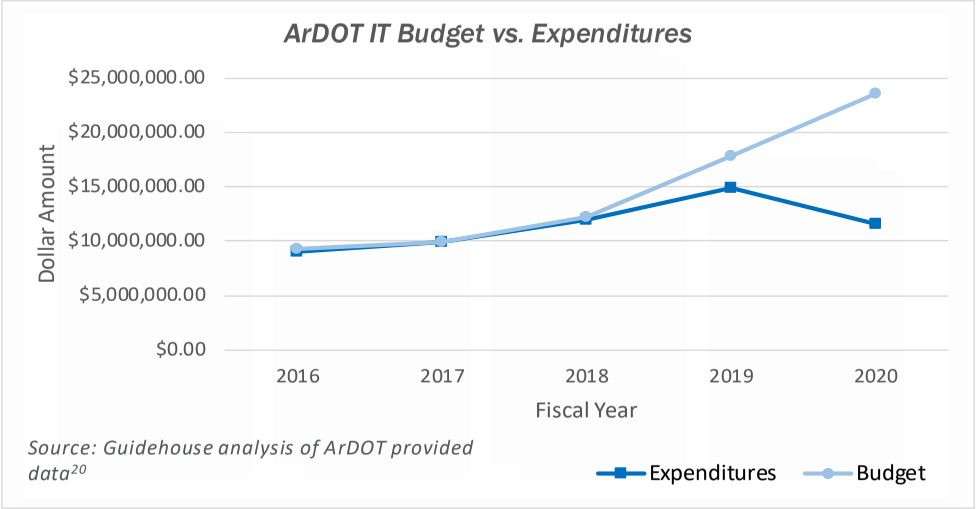
- Enterprise Architecture is siloed organizationally with this responsibility residing with each of the divisions and districts that primarily "owned" their respective IT platforms and solutions. [16]
- Within the IT division, architecture responsibility is distributed across various teams and is siloed on a project by project basis, and in many cases outsourced to external vendors.[16]

Info-Tech Report: Identified IT Threats

"Unclear accountability and decision-making process – No IT Governance."

"Technology decisions being made in isolation"

Source: Guidehouse analysis of ArDOT provided documents[22]



Source: Guidehouse analysis of ArDOT provided data[20]

1 *Short and Long Term IT Plans* 2 *Project prioritization tool*

Source: ArDOT[17,18]

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ArDOT has developed a strategic 3-year IT roadmap but lacks maturity with some of the enabling pillars that compromise effective delivery of that plan.

ArDOT has not adopted a service catalog nor defined service level expectations which has led to confusion on what IT will deliver, when it will deliver it, and how support is distributed.

- ArDOT's own internal strategic planning documents reveal that there is lack of clarity around core IT service offerings.[24]
- Interviews with IT revealed that IT has informally identified its core service offerings, however, it is not clear that a robust analysis has led to this determination nor whether this set of core service offerings has been formally adopted or communicated. [25]
- Interviews with IT revealed that determination of service offerings is handled on a case by case basis, however, a formalized Cost Benefit Analysis (CBA) has not historically been utilized to aid decision making.[26]
- It does not appear that the IT division has established service level agreements (SLA), nor tracks performance against any service level measures.

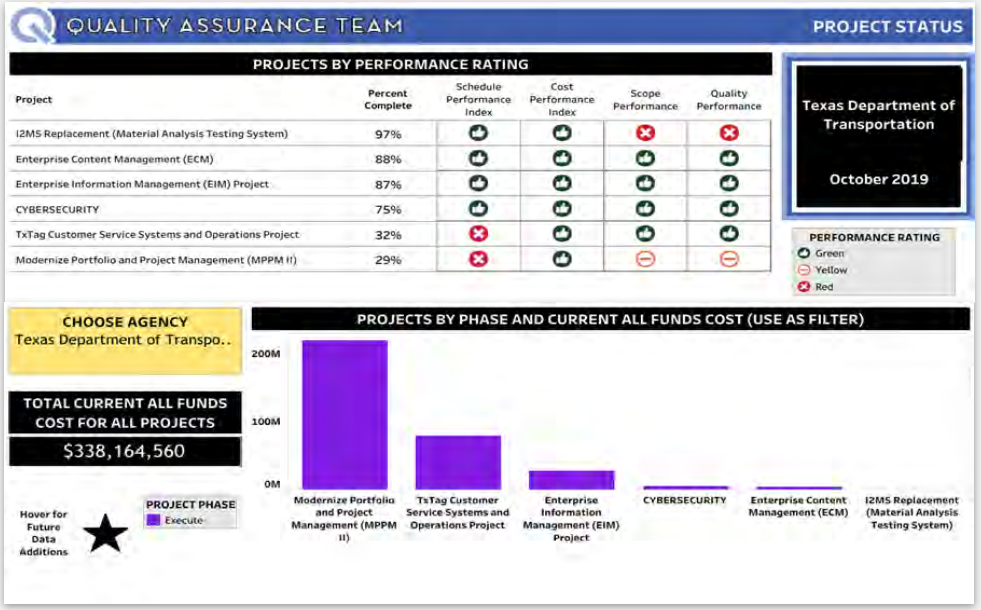
ArDOT's efforts to establish a Project Management (PM) infrastructure to ensure effective delivery of IT projects is still in its infancy.

- ArDOT has recently restructured its IT Department to include a Project Management Office (PMO) with five positions, but as of 10/25/2020 it still has 2 vacancies. [23,27]
- ArDOT has not adopted any formal Project Management (PM) guidelines, standards, or protocols to help drive IT Project delivery. Interviews with IT Staff indicated that they employ a "Waterfall" approach to project management. [23]
- Beyond templates to report on project status, ArDOT does not have core technology project planning execution and evaluation documents such as Project Charter, Risk Management Plan, Stakeholder Registers and Requirements Identification Templates. [27]

*The **State of Oregon's Enterprise Information Services** (EIS) has enshrined its service catalog, corresponding service level performance metrics in it's Service Level Agreement Document. EIS reports on these metrics on a quarterly basis*

Measure #	Performance Measure	Target	4 Previous Quarters				Current Quarter
			Q3 2017 (Jul-Sep)	Q4 2017 (Oct-Dec)	Q1 2018 (Jan-Mar)	Q2 2018 (Apr-Jun)	Q3 2018 (Jul-Sep)
1	% of times the server is available for use by the customers(ETS Sites)	≥99.9%	99.94%	99.94%	99.92%	99.60%	99.93%
2	% of times a router is available for use by the customers	≥99.7%	99.79%	99.81%	99.76%	99.55%	99.75%
3	% of server instance requests delivered on time	≥90%	92.1%	97.8%	99.0%	99.4%	99.8%

*Both **Michigan's Dept. of Technology, Management and Budget** (DTMB) and **Texas' Department of Information Resources** (DIR) provide their Project Management Framework and supporting Tool set to all state agencies. Additionally, DIR reports the status and progress of all major IT projects*



Source: State of Oregon Enterprise Information Services (top)[29], Texas Department of Information Resources (bottom)[30,31]

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Information Technology Citations

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1. ArDOT Data Base Inventory (ArDOT Provided, Guidehouse analyzed).
2. ArDOT 3 Year IT Strategic Plan (ArDOT provided, Guidehouse analyzed).
3. ArDOT Infrastructure Project Summary and Vendor SOW (ArDOT Provided, Guidehouse Analyzed).
4. ArDOT IT Application Catalog (ArDOT provided, Guidehouse analyzed).
5. ArDOT Detailed Organizational Chart (ArDOT provided, Guidehouse analyzed).
6. ArDOT IT Budget Report (ArDOT provided, Guidehouse analyzed).
7. Listing of applications acquired by ArDOT without IT approval (ArDOT provide, Guidehouse analyzed).

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8. ArDOT 3 Year IT Strategic Plan (ArDOT provided, Guidehouse analyzed).
9. ConvergeOne Data Center Resiliency Workshop Report (ArDOT provided, Guidehouse analyzed).
10. Various Infrastructure SOW documents and Infrastructure Refresh Project Summary (ArDOT provided, Guidehouse Analyzed).
11. ArDOT Draft IT Service Desk RFP (ArDOT provided, Guidehouse analyzed).

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12. Guidehouse Interviews with IT
13. ConvergeOne Data Center Resiliency Workshop Report (ArDOT provided, Guidehouse analyzed).
14. Atlassian, Inc. *Calculating the cost of downtime - understanding the financial impact of incidents*. https://www.atlassian.com/incident-management/kpis/cost-of-downtime.
15. Governing Institute. *Guide to Cybersecurity as Risk Management: The Role of Elected Officials*. https://media.erepublic.com/document/GOV15_HANDBOOK_CGI_V_low_res.pdf.

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16. Guidehouse Interviews with IT
17. ArDOT Project Intake and Prioritization Tool (ArDOT provided, Guidehouse analyzed).
18. ArDOT Short and Long Term Initiatives Document (ArDOT Provided, Guidehouse analyzed).
19. Various Data Governance policy documents (ArDOT provided, Guidehouse analyzed).
20. ArDOT IT Budget and Expenditure Data (ArDOT provided, Guidehouse analyzed).
21. Various Infrastructure SOW documents and Infrastructure Refresh Project Summary (ArDOT provided, Guidehouse Analyzed).
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25. ArDOT IT Division Responsibilities Document (ArDOT Provided, Guidehouse analyzed).
26. ArDOT provided IT CBA Tool (ArDOT Provided, Guidehouse analyzed).
27. ArDOT IT Organizational Chart (ArDOT provided, Guidehouse analyzed).
28. ArDOT IT project status updates for various IT projects including Infrastructure, ITSM, SiteManager, STIP Databased (ArDOT provided, Guidehouse analyzed).
29. Oregon - Office of the State. *Chief Information Officer presentation to the State Joint Committee on Ways and Means*. February 2019. https://olis.leg.state.or.us/liz/2019R1/Downloads/CommitteeMeetingDocument/155643.
30. Michigan Department of Technology, Management, and Budget. *SUITE Project Management Methodology*. https://www.michigan.gov/suite/0,4674,7-245-46056---,00.html.
31. Texas Department of Information Resources. *Project Delivery Framework*. https://dir.texas.gov/View-Resources/Pages/Content.aspx?id=16 and https://public.tableau.com/profile/state.of.texas.lbb#!/vizhome/QualityAssuranceTeamQAT-Dashboard/StatewideOverview.

Focus Area Analysis: Organizational Structure

| The findings included in the report are a point in time representation and are subject to change. Please see the assumptions slide in the appendix for further details.

Key Takeaways

1. ArDOT's governance structure is unique when compared to other state DOTs.

2. ArDOT uses KPIs for system condition and meets required benchmarks for federal funding. Other KPIs are in their infancy.

3. Some aspects of ArDOT's knowledge management are extensive, while others are not mature.

ArDOT's governance structure is unique when compared to other state DOTs.

ArDOT shares several characteristics with other state DOTs; some are unique to Arkansas.

- About half of state DOTs have a commission, board, or other independent body with some level of oversight over the DOT. In Arkansas, this is the Highway Commission.[1]
- Arkansas is one of only 6 states in which the DOT Director is appointed by the commission without any input from the governor or legislature, and one of only 2 states in which DOT Directors are not members of the Governor's cabinet (among states that use cabinet systems).[2]
- Federal funds are allocated to ArDOT through legislative appropriation, rather than directly to the Department. About two-thirds of states share this practice.[3]
- HCRAS reviews proposed rules from the Highway Commission. Most states have a similar practice to ensure proposed rules from DOTs comply with relevant statutes.[4]
- HCRAS reviews progress reports from the Commission on ArDOT projects exceeding $10M+. Half of other state legislatures play a more substantial role in approving projects.[5]
- Arkansas requires a financial audit of the state DOT (by Legislative Audit), as do most states.[6]

Performance Oversight Practices of State DOTs

Performance Oversight Practice	States Requiring this Oversight
Require inclusion of performance measures in DOT transportation plan	Vermont and Virginia
Review performance goals or progress as part of the budget process	Georgia, Kansas, Louisiana, Maine, Minnesota, Mississippi, Missouri, Nevada, New Hampshire, New Mexico, Oregon, Tennessee, Texas, Washington, and Wisconsin, and D.C.
Budget performance measurements established by legislative appropriations subcommittees	Oklahoma
Advisory bodies advise on certain aspects of performance management	Maryland, Massachusetts

Source: Guidehouse analysis of American Association of Highway And Transportation Official's (AASHTO) Report "A 50-State Review of State Legislatures and Departments of Transportation"[7]

Highway Commission Background[8]

In November 1952, the Highway Commission was reorganized by constitutional Amendment 42, approved by the voters. This established the Commission as an independent constitutional entity, rather than a traditional state agency. Prior to this, all changes related to the Commission were undertaken by legislative acts.

The desire for a politically independent Highway Commission at the time was borne from public dissatisfaction with how a large highway construction program had recently been implemented.

The amendment established a 5-member Commission with representation from each of the state's congressional districts. Members of the Arkansas Highway Commission are appointed for 10-year terms by the Governor with approval by the legislature, as is the case for the majority of states with such independent governing bodies.

Select Reporting by ArDOT to the Legislature & Executive[9]

1. *Biennial Report to General Assembly*
2. *Progress of Public Road Projects of $10 million or more to General Assembly*
3. *Annual Report to Governor*
4. *Maintenance of "Motor Vehicle and Traffic Laws and State Highway Commission Regulations"*

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ArDOT uses KPIs for system condition and meets required benchmarks for federal funding. Other KPIs are in their infancy.

Current Key Performance Indicators (KPIs) are limited to system condition. Operational effectiveness is not yet being measured.

- ArDOT has KPIs in support of its 2017-2022 Strategic Plan and 2040 Long Range Intermodal Transportation Plan. Many align with federal reporting requirements, and reflect FHWA's and FTA's emphasis on system condition and safety.[10]
- However, there is no formal implementation plan to operationalize the Department's Strategic Plan.
- The Department is required to meet federal performance targets in Pavements, Bridges, Travel Time Reliability, Freight Reliability, and Congestion Mitigation and Air Quality. ArDOT is on track to meet targets in all areas with financial penalties attached to below-target performance.[11]
- Department KPIs on operational effectiveness are in development, but have not been finalized or tracked and analyzed. This includes: rate of employee turnover and percent of customers who feel ARDOT provides clear information.[12]
- Division- and district-level KPIs have not been identified.
- Identifying and tracking performance metrics is essential to accountability, and may in some cases facilitate improvements, as demonstrated by some DOTs who saw such changes after implementing mature performance management systems.[13]

ArDOT System Performance from 2019 Transportation Asset Management Plan (TAMP)

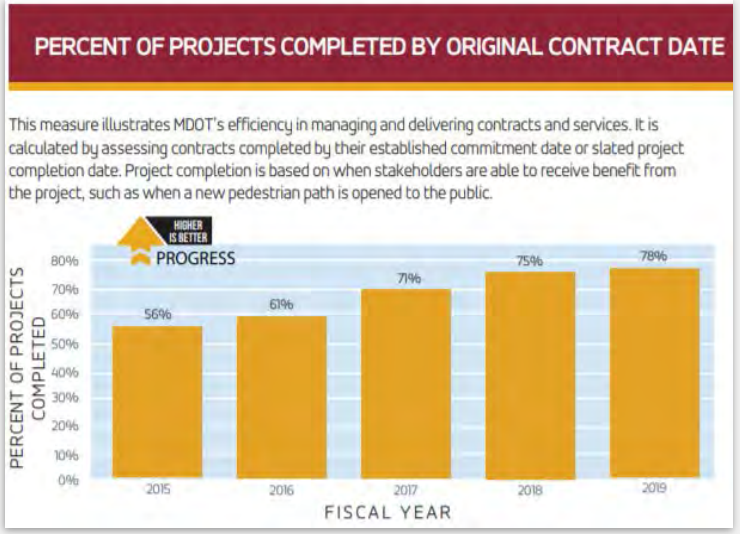
Arkansas NHS Pavement Inventory and Condition Summary Based on FHWA Thresholds

Owner/System	Centerline Miles	Lane Miles	Good	Fair	Poor
NHS Total	**3,365**	**10,931**	**41%**	**57%**	**2%**
Interstate (All State Owned)	749	3,221	72%	27%	1%
Non-Interstate NHS	2,616	7,710	29%	68%	3%
State Owned	2,581	7,609	29%	68%	3%
Non-State Owned	35	101	10%	84%	6%

Source: ArDOT[14]

Maryland Department of Transportation (MDOT)

MDOT publishes an annual Attainment Report that describes the Department's performance against mission aligned KPIs.



Source: MDOT[15]

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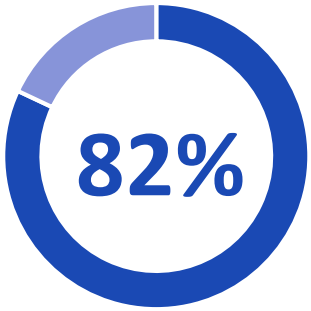
Some aspects of ArDOT's knowledge management are extensive, while others are not mature.

Standard operating procedures (SOPs) are extensive, but not regularly updated.

- ArDOT has 50+ Standard Operating Procedures documents, including job-specific manuals, approved criteria and specifications, and policies and procedures.[16]
- Yet there are no standard protocols for developing and maintaining SOPs. Instead, each division and district has their own internal protocol, filling gaps as identified.[17]
- Anecdotally, district staff report benefitting from network building and idea sharing with peers, although few such events are held frequently for most staff.[18]
- The recently published construction inspector's manual, which "fills in the blanks" for new hires, is an example of this. It was developed from the ground up by districts.[19]
- Knowledge management gaps may not be readily apparent to staff, who leverage positive working relationships to fulfill work tasks. 82% of staff say: "I know who/where to go to get the information I need to do my job effectively."[20]
- However, with retirement and turnover issues common at state DOTs, knowledge management practices are needed to maintain institutional knowledge.[21]

"I know who/where to go to get the information I need to do my job effectively."

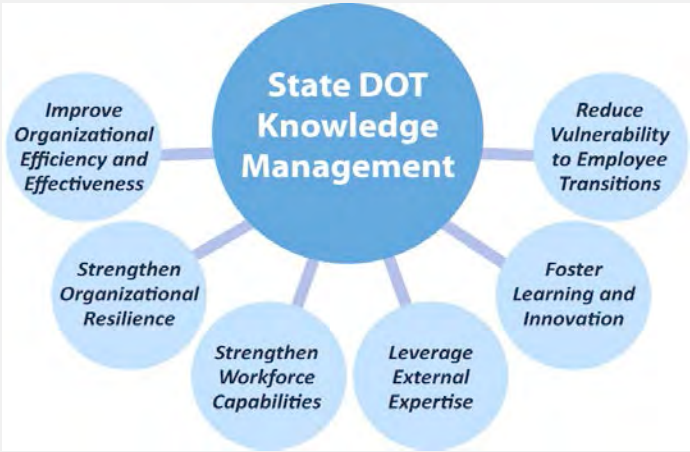


Source: Guidehouse analysis of ArDOT provided data [28]

Minimizing knowledge loss is a priority for ArDOT, but efforts are not mature.

- About 26% of staff are or will be eligible for retirement in the next 10 years. On par with broader demographic trends, about 74% of these staff are based in districts.[22]
- As such, the 2019 Transportation Asset Management Plan (TAMP) rated knowledge transfer a High Priority Asset Management-Related Risk, and identified high priority actions to mitigate this risk.[23]
- However, these efforts are not yet mature. HR has developed a matrix to identify key positions at risk for knowledge loss, but the next steps have not been finalized.[24]
- ArDOT advertises anticipated open positions due to retirement well in advance to allow time for retiring staff to train their replacements, but it is not always possible.[25]
- The Department does not have a policy of hiring back retired staff for temporary, part-time roles, as there is no enabling legislation to allow such a practice.[26]
- Some DOTs have enacted such policies: Facing recruitment challenges for qualified bus operators, City of Annapolis DOT began hiring retirees part-time. With capacity needs met, the DOT could promote existing part-time operators to full-time.[27]

TRB National Cooperative Highway Research Program Knowledge Management Framework



Source: TRB National Cooperative Highway Research Program [29]

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Organizational Structure Citations

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1. AASHTO. *A 50-State Review of State Legislatures and Departments of Transportation*. 2016: http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf
2. AASHTO. *A 50-State Review of State Legislatures and Departments of Transportation*. 2016: http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf
3. AASHTO. *A 50-State Review of State Legislatures and Departments of Transportation*. 2016: http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf
4. AASHTO. *A 50-State Review of State Legislatures and Departments of Transportation*. 2016: http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf
5. AASHTO. *A 50-State Review of State Legislatures and Departments of Transportation*. 2016: http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf
6. AASHTO. *A 50-State Review of State Legislatures and Departments of Transportation*. 2016: http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf
7. AASHTO. *A 50-State Review of State Legislatures and Departments of Transportation*. 2016: http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf
8. Encyclopedia of Arkansas. *Arkansas Highway Commission*. https://encyclopediaofarkansas.net/entries/arkansas-highway-commission-4149/
9. ArDOT Biennial Request 2019 - 2021.

Page Number 51

10. ArDOT 2017-2022 Strategic Plan; ArDOT 2040 Long Range Intermodal Transportation Plan; ArDOT Key Performance Indicators (provided by ArDOT); ArDOT Federal Performance Measures (provided by ArDOT)
11. ArDOT Federal Performance Measures (provided by ArDOT)
12. ArDOT Key Performance Indicators for 2017-2022 Strategic Plan (provided by ArDOT)
13. VDOT. VDOT'S New Project Dashboard: Conference on Performance and Data in Transportation. September 2019. http://onlinepubs.trb.org/onlinepubs/Conferences/2019/PerformanceData/Styles.pdf
14. ArDOT 2019 Transportation Asset Management Plan
15. Maryland DOT. *2019 Annual Attainment Report.* http://www.mdot.maryland.gov/newMDOT/Planning/AR/Update_2019/2019_Attainment_Report_2019_01_25%20LR%20Singles.pdf

Page Number 52

16. Guidehouse review of ArDOT provided Standard Operating Procedure documents
17. Guidehouse Interview with ArDOT HR
18. Guidehouse Interviews with ArDOT Area Maintenance Supervisors (Rural) and District/Assistant Maintenance Superintendents (Rural)
19. Guidehouse Interviews with ArDOT District Construction Engineers (Rural) and Construction
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22. ArDOT Current Personnel Data (provided by ArDOT, analyzed by Guidehouse)
23. ArDOT 2019 Transportation Asset Management Plan
24. Guidehouse Interview with ArDOT HR
25. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
26. Guidehouse Interview with ArDOT HR
27. Transit Cooperative Research Program. *Managing Transit's Workforce in the New Millennium*. 2002. https://books.google.com/books?id=cnikn3rnl5oC&dq=Maryland+DOT,+hiring+retirees&source=gbs_navlinks_s
28. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
29. TRB Knowledge Management Task Force. KM for Transportation Agencies. http://roadsafetyknowledge.com/NCHRP20_98KMGuide/understanding2.html

Focus Area Analysis: People Capabilities

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Key Takeaways

1. ArDOT struggles to compete for talent, a challenge shared by peer DOTs.
2. The Department's compensation plans fall short, driving turnover of staff with few years of tenure.
3. Staff value the positive relationships with managers and flexible work strategies facilitated by ArDOT.
4. Staff are uncertain of their professional development within the Department.
5. The Department lacks formalized learning pathways that integrate with skill development opportunities and can be provide via practical, hands-on methods.

ArDOT struggles to compete for talent, a challenge shared by peer DOTs.

Employee engagement and retention are challenges for ArDOT.

- The 2019 Transportation Asset Management Plan (TAMP) identified maintaining experienced staff as a High Priority Asset Management-Related Risk, and recommended flexible work strategies, improved staff training, and employment incentives. However, these efforts are not yet mature.[1]
- Only 54% of staff believe "Employee retention is important at the Department," and only 47% say ArDOT "values its employees."[2]
- Just one-third of staff are likely to recommend ArDOT as an employer to friends and family -- a common measure of job satisfaction.[3]
- The Department has seen an increase in turnover, potentially driven by staff choosing to leave earlier in their tenure than previously.[4]
- This is most pronounced among central office staff: average tenure of resigning staff dropped from 6.0 to 2.5 years between FY15-19.[5]
- Accordingly, surveys indicate engagement among staff with employment tenure of 3 to 5 years is the lowest of any group.[6]
- Yet staff shared anecdotally it takes ~5 years to fully train new hires. ArDOT may be losing staff just as they become fully capable.[7]
- ArDOT's staffing challenges are shared by other DOTs: in regional survey, Louisiana, New Mexico, Oklahoma, and Texas DOTs all reported challenges recruiting and retaining engineers. Most also reported challenges retaining maintenance staff.[8]
- However, the Department has a foundation from which to build on to improve its retention challenges: 63% of ArDOT staff who responded to the survey reported being unlikely to leave the Department in the next five years, compared to 45% at Oklahoma DOT.[9]

$4,129

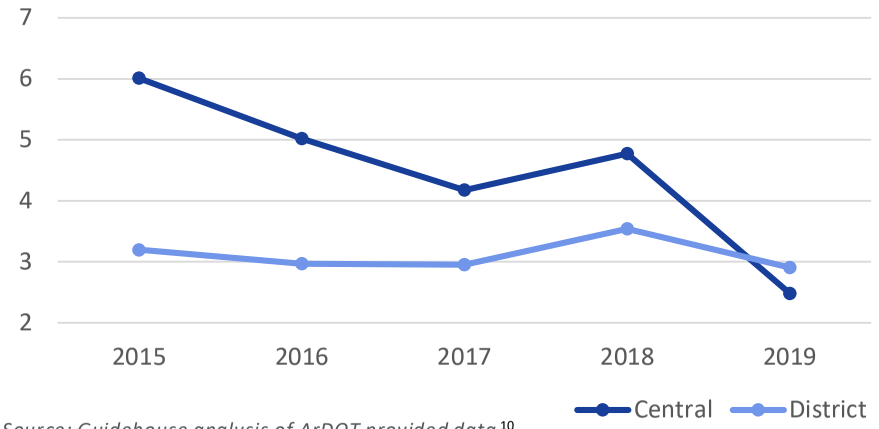
cost to fill open positions for typical company, 2016

42 days

time to fill open positions for typical company, 2016

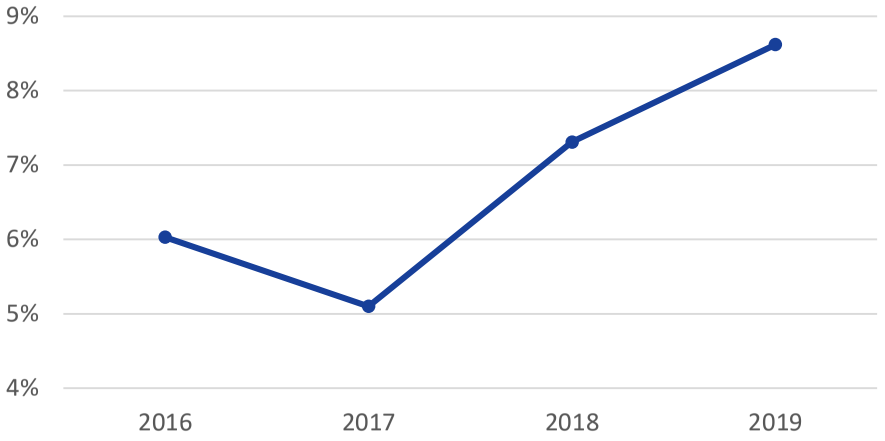
Source: SHRM[12]

Average Tenure of Staff Resigning from ArDOT (in Years of Experience)



Source: Guidehouse analysis of ArDOT provided data[10]

ArDOT Turnover Rate by Year



Source: Guidehouse analysis of ArDOT provided data[11]

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The Department's compensation plans fall short, driving turnover of staff with few years of tenure.

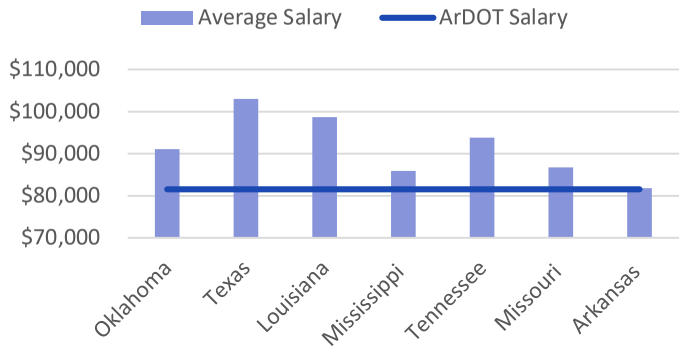
ArDOT staff value the Department's benefits, but dissatisfaction with compensation is widespread.

- Most staff cite benefits and stability as the main reasons they joined ArDOT.[13]
- More than 80% view the annual leave, sick leave, and retirement plan favorably, though only half are satisfied with the Department's insurance benefit.[14]
- ArDOT employs a leading practice by quantifying its benefits package, showing applicants how the combined salary and benefits package compares to competitors.[15]
- Despite this effort, lack of satisfaction with compensation is widespread. Less than half of staff are satisfied with their compensation and even fewer expect pay increases.[16]
- Only 56% believe the Department's performance-based pay practice will translate to wage progression, if their job performance meets or exceeds expectations.[17]

ArDOT faces strong competitors who offer higher wages for both entry-level and experienced professionals.

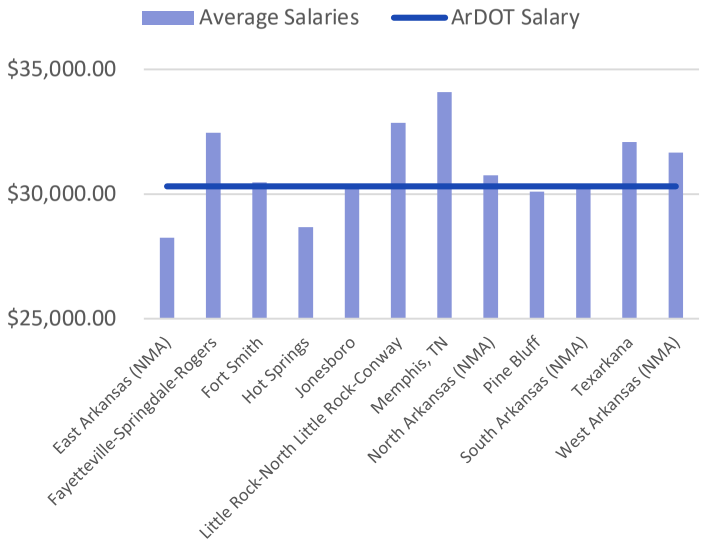
- Staff believe other employers can offer better compensation, with only 38% agreeing "My salary is competitive with similar jobs I might find elsewhere."[18]
- Labor market reports validate this claim, particularly for the two position categories reported to have the worst retention issues: engineering and maintenance.[19]
- The gap between public and private sector engineering salaries has been estimated to be $15,500 on average. For oil and gas specifically, the gap increases to $47,500.[20]
- ArDOT's engineer salaries are above average in the majority of Arkansas cities and nonmetropolitan areas surveyed in this report. However, Arkansas has the lowest civil engineer salaries of neighboring states, on average, as depicted in the graph.[21]
- Competitors for maintenance staff span many industries. DOTs in the region report that some private sector jobs with low barriers to entry have salaries that are much higher than DOTs', although few provide the same level of benefits as DOTs.[22]
- These DOTs report losing staff to oil and gas when the industry is expanding. ArDOT district staff have also reported losing entry-level staff to high-paying pipeline jobs.[23]
- ArDOT's Maintenance Aide salaries are at or below average compared to similar positions in Arkansas cities and nonmetropolitan areas, as depicted in the graph.[24]
- ArDOT is the only one among south-central DOTs to not provide tuition reimbursement.[25]

ArDOT Average Civil Engineer Salary vs. Comparable Jobs in Nearby States



Source: Guidehouse analysis of ArDOT data & Bureau of Labor Statistics data[26]

ArDOT Average Maintenance Aide (I and II) Salary vs. Comparable Jobs in Arkansas, by Area



Source: Guidehouse analysis of ArDOT data & Bureau of Labor Statistics data[27]

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Staff value the positive relationships with managers and flexible work strategies facilitated by ArDOT.

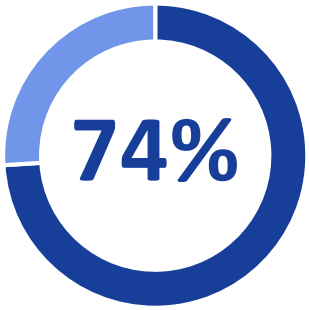
Staff have positive relationships with managers, but lack confidence in leadership.

- Nearly 70% of staff believe in ArDOT's mission, yet fewer than 60% believe the Department can execute to have "a bright future." [28]
- Favorability of division and district leadership exceeds that of executive leadership: there is a ~10% gap in measures of trustworthiness, decision-making, acting on employee feedback, and recognizing employees.[29]
- In contrast, staff report positive relationships with managers in measures of: fairness, trustworthiness, communication, and addressing conflicts.[30]
- Most staff credit ArDOT's culture for these positive relationships.[31]
- One investment has been sponsorship of employees to complete Dale Carnegie courses. About 1,000 courses were completed per year over the past 5 years, roughly equivalent to a minimum of 68 staff participating.[32]
- However, ArDOT recently discontinued this practice. The Department instead plans a new leadership development program involving mentorship, executive coaching, and 1-2 years of online coursework. Yet the planned program will serve many fewer staff: 20-30 per year.[33]
- In support of district managers and leaders, the Department has also hired HR specialists for staff disciplinary issues and 1:1 coaching.[34]

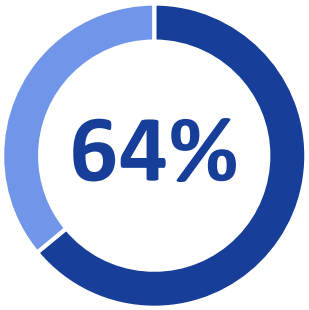
ArDOT is exploring flexible work strategies to alleviate staffing challenges.

- ArDOT joins many regional DOTs in offering flexible schedules to retain staff. Such practices have been shown to be widely well received by employees and to positively impact moral, productivity, and retention.[35]
- Three-quarters of staff believe "My manager allows for flexibility in how work is accomplished" and even more report having work-life balance.[36]
- Based on employee feedback, ArDOT expanded flex-time in 2019.[37]
- District staff shared positive anecdotes from their use of the 4/10 model, in which employees work 4 days per week, 10 hours per day, with any additional coverage provided on Fridays eligible for overtime. This practice is widespread and formalized across the Department.[38]
- This practice yielded nearly $20K in cost savings when implemented by Texas DOT for maintenance crews. With fewer days, staff spent more time per week on productive tasks, and less time staging equipment and traveling. The result was 52K fewer vehicle and equipment miles logged, which reduced fuel and supplies costs, as well as vehicle wear and tear.[39]
- District staff have struggled to make use of other flexible work strategies like telecommuting given the field-based nature of many roles.[40]

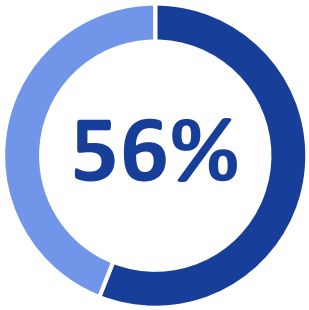
"I trust my manager."



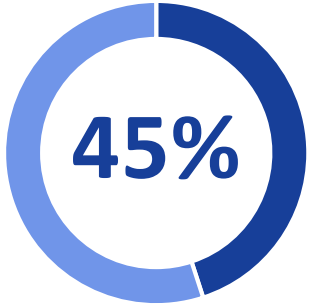
"I trust my District Engineer or Division Head."



"I trust the members of the executive leadership team."



"The Department Director inspires me."



Source: Guidehouse analysis of ArDOT provided data[41]

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Staff are uncertain of their professional development within the Department.

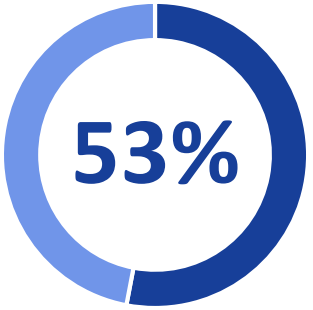
Career pathways are not defined or clearly communicated to staff.

- Just over half of staff believe they can advance their careers at ArDOT or that they are encouraged to pursue such career development activities at the Department.[42]
- The reported low engagement among staff with tenure of 3 to 5 years, and the increase in staff resigning with 3 years of tenure on average, support the need for career pathways that allow staff to grow within and beyond their roles.[43]
- As one example, district managers shared that entry-level staff cannot advance until there is an opening, which means that staff may remain in entry-level roles beyond the appropriate amount of time if staff above them do not leave until retirement.[44]
- Central to this issue is the lack of documentation and communication of accessible career pathways. Although career paths are known informally, staff lack clarity on precisely how their career can develop over time with the Department.[45]

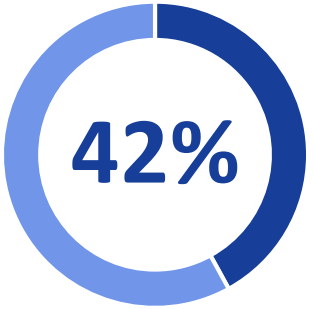
Staff lack confidence in the performance evaluation process.

- District staff shared during interviews that their direct reports found the performance evaluations difficult to understand, and were unsure how they related to their roles.[46]
- While 65% of staff say they understand how their performance is evaluated, less than half say "I believe it is worth my time and effort to complete the self-evaluation."[47]
- This likely connects to the previously reported observation that staff do not believe that a positive performance evaluation will translate to an increase in compensation.[48]
- About half of staff agree that good work is recognized and rewarded, yet only 38% say "If I exceed expectations, I receive rewards that I value."[49]
- Exemplifying this disconnect: only 42% of ArDOT staff agree "Promotions in my division/district go to those who deserve them the most."[50]
- Although staff have negative perceptions of the formal evaluation process, they speak positively of informal assessments: 62% of staff report that their manager regularly provides useful feedback related to their work product.[51]

"I can advance my career in this organization."



"Promotions in my Division/District go to those who deserve them the most."



Source: Guidehouse analysis of ArDOT provided data [52]

The Department lacks formalized learning pathways that integrate with skill development opportunities and can be provide via practical, hands-on methods.

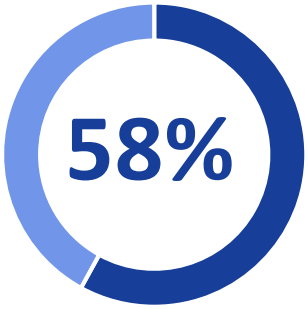
While training is offered, there are no formal learning pathways that define training plans.

- 6,160 optional trainings were completed by staff in FY19.[53]
- This represents a decline following years of increasing trainings from 3,786 in FY15 (1 per employee) to 9,486 in FY18 (2.6 per employee).[54]
- The largest training area is maintenance and construction with an average of 2,600 trainings completed yearly. Most trainings include courses related to Commercial Driving Licenses (CDL) and national programs like NPDES, as well as the Center for Training Transportation Professionals.[55]
- Only 58% of staff agree "In the last year, I have received an adequate amount of training," and only slightly more found the training useful.[56]
- Yet there are no formal learning pathways that align training with job competencies, performance evaluations, or career ladders.[57]
- Managers are unsure which courses should be required for staff at various points in their development, and will informally assign Achieving Career Excellence (ACE) trainings or on-the-job learning as needed.[58]
- The maintenance training academy may provide this in later phases, but those are not yet defined. The current focus is entry level training.[59]
- In a survey of 14 DOTs, Arkansas was the only to not provide project management training. Most developed in-house trainings.[60]

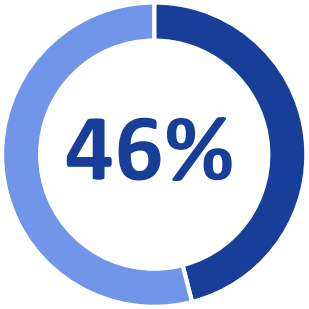
On-the-job training is often preferred, but difficult to institutionalize.

- Staff perspectives on ACE are mixed: while 65% report having used the system, only 46% say it provides valuable learning opportunities.[61]
- Managers shared that ACE offers generalized introductions to topics, but is not specific to ArDOT construction and maintenance plans.[62]
- Many reported a preference for training new staff by pairing them with experienced staff for on-the-job training and mentorship, which they find particularly useful given lack of computer literacy among some staff.[63]
- Staff find this approach useful: 65% of staff agree "My manager works with me to develop my skills to do my job effectively."[64]
- Yet on-the-job training is difficult to schedule and prioritize amid ongoing demands of construction and maintenance work.[65]
- Some districts make use of the at-times lighter project schedules in winter to conduct training then, but this is not a formalized practice.[66]
- There are alternative strategies to meeting training needs of district staff. For example, Minnesota DOT deploys a van equipped with technical equipment to deliver hands-on, practical training directly to maintenance crews. Courses cover maintenance of asphalt pavement, culverts, gravel roads; managing vegetation and erosion sediment; and several more.[67]

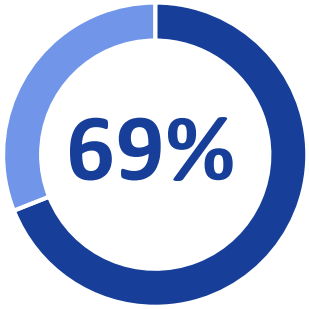
"In the last year, I have received an adequate amount of training."



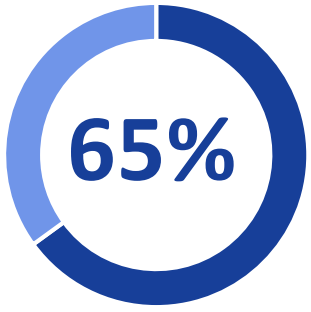
"I believe the ACE system provides more learning opportunities."



"I frequently learn from my co-workers"



"My manager works with me to develop my skills to do my job effectively"



Source: Guidehouse analysis of ArDOT provided data [68]

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People Capabilities Citations

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7. Guidehouse Interviews with ArDOT District/Assistant Maintenance Superintendent (Rural & Urban)
8. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
9. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
10. ArDOT Turnover Data (provided by ArDOT, analyzed by Guidehouse)
11. ArDOT Turnover Data (provided by ArDOT, analyzed by Guidehouse)
12. Society for Human Resource Management. Press Release. 2016: https://www.shrm.org/about-shrm/press-room/press-releases/pages/human-capital-benchmarking-report.aspx

Page Number 57

13. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
14. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
15. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
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20. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
21. Bureau of Labor Statistics. *May 2018 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates*. https://www.bls.gov/oes/current/oessrcma.htm
22. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
23. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
24. Bureau of Labor Statistics. *May 2018 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates*. https://www.bls.gov/oes/current/oessrcma.htm; Guidehouse Interviews with ArDOT Area Maintenance Supervisors (Rural)
25. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
26. Bureau of Labor Statistics. *May 2018 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates*. https://www.bls.gov/oes/current/oessrcma.htm; ArDOT Salary Information (provided by ArDOT, analyzed by Guidehouse)
27. Bureau of Labor Statistics. *May 2018 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates*. https://www.bls.gov/oes/current/oessrcma.htm; ArDOT Salary Information (provided by ArDOT, analyzed by Guidehouse)

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31. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
32. Guidehouse Interview with ArDOT HR
33. Guidehouse Interview with ArDOT HR
34. Guidehouse Interview with ArDOT HR
35. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
36. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
37. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
38. Guidehouse Interview with ArDOT District Maintenance Engineer (Urban)
39. Loskorn, Jeffrey Aaron. *Framework for compressed workweek implementation for TxDOT maintenance forces and flexible work arrangements for employees*. 2011. https://repositories.lib.utexas.edu/handle/2152/ETD-UT-2011-12-4604
40. Guidehouse Interviews with District Staff
41. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)

Page Number 59

42. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
43. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
44. Guidehouse Interview with ArDOT Area Maintenance Supervisor (Rural)
45. Guidehouse Interview with ArDOT District Engineer (Urban)
46. Guidehouse Interview with ArDOT District/Assistant Maintenance Superintendent and Area Maintenance Supervisor
47. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
48. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
49. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
50. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
51. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
52. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
53. ArDOT Training Completion Data (provided by ArDOT, analyzed by Guidehouse)

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54. ArDOT Training Completion Data (provided by ArDOT, analyzed by Guidehouse)
55. ArDOT Training Completion Data (provided by ArDOT, analyzed by Guidehouse)
56. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
57. Guidehouse Interview with ArDOT District Engineer (Urban)
58. Guidehouse Interview with ArDOT Resident Engineer (Rural)
59. ArDOT Maintenance Training Academy Overview (provided by ArDOT)
60. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
61. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
62. Guidehouse Interview with ArDOT Resident Engineer (Rural)
63. Guidehouse Interviews with ArDOT Resident Engineer (Rural), Construction, and Area Maintenance Supervisor (Urban)
64. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
65. Guidehouse Interview with ArDOT Resident Engineer (Rural)
66. Guidehouse Interview with ArDOT Resident Engineer (Rural) / Construction
67. University of Minnesota. *Circuit Training and Assistance Program*. http://www.mnltap.umn.edu/training/ctap/
68. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)

Appendix

| The findings included in the report are a point in time representation and are subject to change.
Please see the assumptions slide in the appendix for further details.

Acronym Glossary

Abbreviation	Definition
A+C	A type of construction project bidding protocol in which both cost and project time are considered in the evaluation process
AASHTO	American Association of Highway and Transportation Officials
ACE	Achieving Career Excellence - ArDOT's Performance Management and Professional Development platform
ADEM	Arkansas Department of Emergency Management
AMS	Area Maintenance Superintendent
APHN	Arkansas Primary Highway Network
CAP	Connecting Arkansas Program ($1.8B program financed through a 1/2 cent sales tax increase)
CDL	Commercial Driver's License
CJIS	Criminal Justice Information Services
CMGC	Construction Manager/General Contractor (Alternative contracting method for Construction Projects)
CO	Change Order
D/B	Design Build (Alternative contracting method for Construction Projects)
DB	Database
DCE	District Construction Engineer
DE	District Engineer
DFA	Arkansas Department of Finance and Administration
DME	District Maintenance Engineer
DMS	District Maintenance Superintendent
DOT	(State) Department of Transportation
DR	Disaster Recovery
E&P	ArDOT Division - Equipment and Procurement
ERP	Enterprise Resource Planning
FHWA	Federal Highway Administration
FTA	Federal Transit Authority
Green Book	AASHTO's Policy on Geometric Design of Highways and Streets

Acronym Glossary

Abbreviation	Definition
I/D	Incentives/Disincentives for vendors who meet specific Construction Project schedule and quality goals
IA	ArDOT Division - Internal Audit
IRP	Interstate Rehabilitation Program (Financed through up to $575M in GARVEE Bonds)
ITSM	IT Service Management Tool (primarily to manage IT customer service)
KPI	Key Performance Indicator
LD	Liquidated Damages applied to contractors for Construction Projects
LOS	Level of Service
LRITP	Long Range Intermodal Transportation Plan
MPO	Metropolitan Planning Organization
NHS	National Highway System
PM	Project Management
PMO	Project Management Office
QPL	Qualified Products List (for Construction Projects)
RE	Resident Engineer
ROW	Right of Way; or ArDOT Division - Right of Way
SARS	SiteManager Access Reporting System
SIR	ArDOT Division - System Information and Research
SM	SiteManager - ARDOT's application to aid in monitoring Construction Projects
SME	Subject Matter Expert
SOP	Standard Operating Procedure
Specs/Specs Book	2014 Standard Specifications for Highway Construction
STIP	Statewide Transportation Improvement Program
TAMP	Transportation Asset Management Plan (as of 2019)
TIP	Transportation Improvement Program (Generally developed by a Metropolitan Transportation Organization)
TPP	ArDOT Division - Transportation Planning and Policy
TRP	Transportation Research Board
VE	Value Engineering
VECP	Value Engineering Change Proposal

Portfolio Planning Citations

Page 15
1. Implicitly adopted by the commission Minute Order authorizing the STIP 2018 - 2022 (MO 2018 080).
2. ArDOT STIP Development Document (Provided by ArDOT, analyzed by Guidehouse).
3. ArDOT Decision Lens Criteria Document (Provided by ArDOT, analyzed by Guidehouse).
4. Regulation: MPO TIP inclusion without modification: 23 CFR 450.218(b).
5. Regulation: Requirement for STIP to be financially constrained: 23 CFR 450.218(i).
6. Regulation: MPOs TIP development: 23 USC 134.
7. ArDOT. *We Move Arkansas*. http://www.wemovearkansas.com/index.html.
8. ArDOT. *Arkansas State Highway 2016 Needs Study*. September 2017.
9. ArDOT Historical Federal Obligation data (Provided by ArDOT, analyzed by Guidehouse).

Page 16
10. ArDOT STIP Amendment Data (Provided by ArDOT, analyzed by Guidehouse).
11. ArDOT. *STIP Amendments 2019 - 2022*. https://www.arkansashighways.com/stip/stip.aspx.
12. ArDOT. *STIP Amendments 2016 - 2020*. https://www.arkansashighways.com/stip/stip_prior.aspx.
13. ArDOT Change Order Data (Provided by ArDOT, analyzed by Guidehouse).
14. Regulations: Public Communication Requirements: 49 U.S.C. 5304(g); 23 USC 135; 23 CFR 450.218
15. VDOT. *SmartScale Dashboard*. http://dashboard.vasmartscale.org/.

Page 17
16. FHWA 2018 Statistics. https://www.fhwa.dot.gov/policyinformation/statistics/2018/
17. ArDOT Budget Data (Provided by ArDOT, analyzed by Guidehouse).
18. ArDOT. *Maintenance Manual*. Version 8.17.
19. Guidehouse Interviews with Fiscal Services, Maintenance, and District Staff
20. Cambridge Systems, Inc. *Asset Management Implementation Strategy*. December 2009. https://dspace.njstatelib.org/xmlui/bitstream/handle/10929/23952/t7642009z.pdf?sequence=1.
21. North Carolina Department of Transportation. *Efficiency - Establishing Baseline Unit Pricing & Streamlining Project Delivery*. December 2015.

Page 18
22. ArDOT. *Maintenance Manual*. Version 8.17.
23. Washington Department of Transportation. *Annual Service Level Report*. https://www.wsdot.wa.gov/maintenance/accountability-process.
24. Guidehouse Interviews with Maintenance, and District Staff
25. ArDOT Maintenance Management RFP excerpt (Provided by ArDOT, analyzed by Guidehouse).
26. Adams, Teresa M. et. al. *Guide to Level of Service (LOS) Target Setting for Highway Assets*. November 2014.
27. ArDOT sample County Level Annual Work Program Computation Sheet (Provided by ArDOT, analyzed by Guidehouse).
28. ArDOT sample District Level Annual Work Program Computation Sheet (Provided by ArDOT, analyzed by Guidehouse).

Page 19
28. Guidehouse Interviews with Maintenance, and District Staff
29. ArDOT. *Main website*. http://www.arkansashighways.com/index.aspx.
30. ArDOT. District websites. e.g. https://www.arkansashighways.com/district1.aspx.
31. Pima County DOT (AZ). *Regional Priority and Gateway Road List*. 2020. https://webcms.pima.gov/UserFiles/Servers/Server_6/File/Government/Transportation/Roadway%20Maintenance/FY20_RegionalPriorityandRecreationalGatewayRoad_SelectionList.pdf.
32. Pima County DOT (AZ). *Interactive Road Maintenance Map*. https://pimamaps.maps.arcgis.com/apps/webappviewer/index.html?id=e26b873e39b34381980ae5a89a767817.
33. Missouri Department of Transportation. *Operations and Maintenance Plan*. https://www.modot.org/sites/default/files/documents/Sec10OperationsAndMaintenancePlan.pdf.

Page 20
34. Guidehouse Interviews with Assistance Chief Engineers, Public Information Office, and/or District Staff
35. ArDOT. *iDrive Arkansas*. https://www.idrivearkansas.com/.
36. Garver. *reCAP Quarterly Report*. July - September 2019.
37. Virginia Department of Transportation. *CSC - ITS VA Presentation*. 2011. https://www.itsva.org/wp-content/uploads/2017/07/VDOT_CSC_ITSVA.pdf.
38. Texas Department of Transportation. *Focus on the Customer Dashboard*. http://www.dot.state.tx.us/dashboard/focus-on-the-customer.htm.
39. ArDOT iDRIVE Arkansas Customer Utilization Statistics (ArDOT provided, Guidehouse analyzed).

Procurement Citations

Page Number 24

1. Regulation: A.C.A. 19-11-203
2. Regulation: A.C.A. 27-67-206; Regulation: 23 U.S. Code 112
3. Regulation: A.C.A. 27-65-111
4. Regulation: A.C.A. 27-65-107
5. Guidehouse Interview with ArDOT Legal
6. Guidehouse Interviews with ArDOT Construction, E&P, Legal, and Program Management
7. Guidehouse Interview with ArDOT Construction
8. Guidehouse Interview with ArDOT E&P
9. Guidehouse Interview with ArDOT Program Management and Construction
10. Guidehouse Interviews with ArDOT E&P (1,2), Legal (3), Program Management (4)

Page Number 25

11. FHWA. *Performance-Based Contractor Prequalification as an Alternative to Performance Bonds*. 2014. https://www.fhwa.dot.gov/publications/research/infrastructure/14034/14034.pdf
12. ArDOT Prequalification Questionnaire (via ArDOT website)
13. FHWA. *Performance-Based Contractor Prequalification as an Alternative to Performance Bonds*. 2014. https://www.fhwa.dot.gov/publications/research/infrastructure/14034/14034.pdf
14. FHWA. *Performance-Based Contractor Prequalification as an Alternative to Performance Bonds*. 2014. https://www.fhwa.dot.gov/publications/research/infrastructure/14034/14034.pdf
15. ArDOT Consultant Services Webpage
16. Arkansas 2014 Standard Specification for Highway Construction
17. Arkansas 2014 Standard Specification for Highway Construction, Section 106.10
18. Arkansas 2014 Standard Specification for Highway Construction, Section 106.10
19. Arkansas 2014 Standard Specification for Highway Construction, Section 106.03
20. Arkansas 2014 Standard Specification for Highway Construction, Section 105.04
21. NMDOT. *NMDOT Performance-Based Contractor Prequalification*. 2018. https://construction.transportation.org/wp-content/uploads/sites/20/2018/09/2.01-New-Mexico-Performance-Based-Contractor-Prequalificaiton.pdf

Page Number 26

22. ArDOT 2019 Transportation Asset Management Plan
23. Guidehouse Interview with ArDOT Construction
24. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
25. Guidehouse Interview with ArDOT Construction
26. ArDOT Road User Cost Guide (provided by ArDOT)
27. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
28. Guidehouse Interview with ArDOT District Equipment Supervisor (Rural)
29. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
30. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)

Page Number 27

31. ArDOT Design Build & CMGC Webpages
32. ArDOT Design Build & CMGC Webpages
33. ArDOT Consultant Services (via ArDOT website)
34. Guidehouse Interview with ArDOT Surveys
35. Guidehouse Interview with ArDOT Consultant Contracts
36. ArDOT. *Innovation at State Department of Transportation*. Feb 2019. https://www.arkansashighways.com/PowerPoints/2019/20190227_EPW_Innovation_Presentation.pdf
37. Arkansas 2014 Standard Specification for Highway Construction
38. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
39. Arkansas 2014 Standard Specification for Highway Construction
40. Guidehouse Interview with ArDOT Construction
41. Arkansas 2014 Standard Specification for Highway Construction; ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
42. Michigan DOT. *Innovative Construction Contracting Guide*. 2015: https://www.michigan.gov/documents/mdot/Innovative_Construction_Contracting_340000_7.pdf

Page Number 28

43. Guidehouse Interview with ArDOT E&P
44. Guidehouse Interview with ArDOT E&P; ArDOT Purchase Data (provided by ArDOT, analyzed by Guidehouse)
45. Guidehouse Interview with ArDOT E&P
46. Guidehouse Interview with ArDOT E&P
47. Guidehouse Interview with ArDOT E&P
48. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
49. ArDOT Oracle Scope of Work (provided by ArDOT)
50. Guidehouse Interview with ArDOT E&P
51. ArDOT Mileage & Fuel Consumption Data (provided by ArDOT, analyzed by Guidehouse)
52. ArDOT Accounting Manual
53. Guidehouse Interview with ArDOT E&P
54. Guidehouse Interview with ArDOT E&P
55. State of Wisconsin Department of Administration. *What's New in Procurement*. 2016: https://doa.wi.gov/Documents/DEO/WhatsNewinProcurement.pdf

Expenditures Citations

Page Number 32

1. ArDOT Oracle Scope of Work (provided by ArDOT)
2. Guidehouse analysis of ArDOT Oracle Scope of Work (provided by ArDOT)
3. Guidehouse Interview with ArDOT Construction
4. Guidehouse Interview with ArDOT District/Assistant Maintenance Superintendent (Rural)
5. Planisware. Blog Post 2019: https://www.planisware.com/hub/blog/2019-gartner-magic-quadrant-project-and-portfolio-management-out
6. Tommelein, Iris D., PhDBlampied, Nigel. *Review of the Project Resourcing and Schedule Management (PRSM) System used by Caltrans*. 2018: https://escholarship.org/uc/item/20t4r81t

Page Number 33

7. FHWA. *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects*. Version FP-14. https://flh.fhwa.dot.gov/resources/specs/fp-14/fp14.pdf
8. FHWA. *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects*. Version FP-14. https://flh.fhwa.dot.gov/resources/specs/fp-14/fp14.pdf
9. Utah DOT. *Practical Design Guide*. 2011.
10. FHWA. *Practical Design*. 2010: https://www.fhwa.dot.gov/publications/publicroads/10janfeb/06.cfm
11. Guidehouse Interview with ArDOT Roadway Design & Bridge Design
12. FHWA. *Value Engineering Final Rule*. 2014. https://www.fhwa.dot.gov/ve/
13. FHWA. *Value Engineering Final Rule*. 2014. https://www.fhwa.dot.gov/ve/
14. ArDOT Value Engineering Guidelines and Procedures (via ArDOT website)
15. National Value Engineering Data by State (provided by ArDOT, analyzed by Guidehouse).
16. National Value Engineering Data by State (provided by ArDOT, analyzed by Guidehouse).
17. Guidehouse Interview with ArDOT Consultant Contracts
18. National Value Engineering Data by State (provided by ArDOT, analyzed by Guidehouse).
19. National Value Engineering Data by State (provided by ArDOT, analyzed by Guidehouse).
20. Missouri State Highway Patrol. *Number of Persons Killed or Injured in Missouri Crashes by Year*. https://www.mshp.dps.missouri.gov/MSHPWeb/SAC/crash_data_severity_960grid.html
21. National Value Engineering Data by State (provided by ArDOT, analyzed by Guidehouse).

Page Number 34

22. Guidehouse Interview with ArDOT Roadway Design
23. Guidehouse Interview with ArDOT Roadway Design
24. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
25. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
26. ArDOT ROW and Utility Data (Provided by ArDOT, Analyzed by Guidehouse)
27. ArDOT ROW and Utility Data (Provided by ArDOT, Analyzed by Guidehouse)
28. Regulation: AR Code § 27-67-317 (2017)
29. Regulation: AR Code § 27-67-317 (2017)
30. ArDOT ROW and Utility Data (Provided by ArDOT, Analyzed by Guidehouse)
31. Regulation: ACA § 27-67-322 (c)(3)
32. ArDOT Surplus Land Data (provided by ArDOT, analyzed by Guidehouse)
33. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
34. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)

Page Number 35

35. ArDOT Staff Minutes (sample provided by ArDOT)
36. ArDOT Staff Minutes (sample provided by ArDOT)
37. Guidehouse Interview with ArDOT Program Management
38. Guidehouse Interview with ArDOT Roadway Design
39. Iowa DOT. *3D Model-based Planning-Design-Construction-O&M for Transportation Project Delivery: Structures Perspective*. 2015: https://iowadot.gov/bridge/3D/Presentations/150414-WisDOT-SEF.pdf
40. Iowa DOT. *3D Model-based Planning-Design-Construction-O&M for Transportation Project Delivery: Structures Perspective*. 2015: https://iowadot.gov/bridge/3D/Presentations/150414-WisDOT-SEF.pdf
41. Guidehouse Interviews with ArDOT Construction and Resident Engineers (Rural)
42. Iowa DOT. *3D Model-based Planning-Design-Construction-O&M for Transportation Project Delivery: Structures Perspective*. 2015: https://iowadot.gov/bridge/3D/Presentations/150414-WisDOT-SEF.pdf

Page Number 36

43. ArDOT Resident Engineer Manual. 2014.
44. Guidehouse Interview with ArDOT Resident Engineers (Rural)
45. ArDOT Resident Engineer Manual. 2014.
46. ArDOT Resident Engineer Manual. 2014.
47. ArDOT Resident Engineer Manual. 2014.
48. ArDOT Resident Engineer Manual. 2014.
49. ArDOT Change Order Policies and Thresholds
50. ArDOT Change Order Policies and Thresholds
51. ArDOT Change Order Policies and Thresholds
52. Guidehouse Interview with ArDOT Construction
53. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
54. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)

Page Number 37

55. ArDOT Maintenance Manual. Version 8.17
56. ArDOT Maintenance Manual. Version 8.17
57. ArDOT Maintenance Manual. Version 8.17
58. ArDOT Maintenance Manual. Version 8.17
59. Guidehouse Interviews with ArDOT District/Assistant Maintenance Superintendents (Rural) and District Engineers (Rural)
60. Guidehouse Interview with ArDOT District Maintenance Engineer (Rural)
61. ArDOT Maintenance Management Description
62. ArDOT Maintenance Management Description
63. Scan Team Report. *Best Practices In Performance Measurement For Highway Maintenance And Preservation*. http://onlinepubs.trb.org/onlinepubs/nchrp/docs/nchrp20-68a_10-03.pdf
64. Minnesota DOT. *MnDOT Measures of Financial Effectiveness: 2019 EVALUATION REPORT*. https://www.leg.state.mn.us/docs/2019/other/190400.pdf

Page Number 38

65. ArDOT Internal Audit Manual
66. ArDOT Internal Audit Manual
67. ArDOT Internal Audit Manual
68. ArDOT Internal Audit Risk Assessment Heatmap
69. ArDOT Internal Audit Manual
70. Regulation: 2 CFR § 200.514
71. FHWA. *Risk-based Approach to Stewardship and Oversight FAQ*. https://www.fhwa.dot.gov/federalaid/stewardship/140328_faq.pdf
72. Guidehouse Interview with FHWA – Arkansas Division
73. Stewardship and Oversight Agreement between FHWA and ArDOT. 2015.

Organizational Structure Citations

Page Number 50

1. AASHTO. *A 50-State Review of State Legislatures and Departments of Transportation*. 2016: http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf
2. AASHTO. *A 50-State Review of State Legislatures and Departments of Transportation*. 2016: http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf
3. AASHTO. *A 50-State Review of State Legislatures and Departments of Transportation*. 2016: http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf
4. AASHTO. *A 50-State Review of State Legislatures and Departments of Transportation*. 2016: http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf
5. AASHTO. *A 50-State Review of State Legislatures and Departments of Transportation*. 2016: http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf
6. AASHTO. *A 50-State Review of State Legislatures and Departments of Transportation*. 2016: http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf
7. AASHTO. *A 50-State Review of State Legislatures and Departments of Transportation*. 2016: http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf
8. Encyclopedia of Arkansas. *Arkansas Highway Commission*. https://encyclopediaofarkansas.net/entries/arkansas-highway-commission-4149/
9. ArDOT Biennial Request 2019 - 2021.

Page Number 51

10. ArDOT 2017-2022 Strategic Plan; ArDOT 2040 Long Range Intermodal Transportation Plan; ArDOT Key Performance Indicators (provided by ArDOT); ArDOT Federal Performance Measures (provided by ArDOT)
11. ArDOT Federal Performance Measures (provided by ArDOT)
12. ArDOT Key Performance Indicators for 2017-2022 Strategic Plan (provided by ArDOT)
13. VDOT. VDOT'S New Project Dashboard: Conference on Performance and Data in Transportation. September 2019. http://onlinepubs.trb.org/onlinepubs/Conferences/2019/PerformanceData/Styles.pdf
14. ArDOT 2019 Transportation Asset Management Plan
15. Maryland DOT. *2019 Annual Attainment Report.* http://www.mdot.maryland.gov/newMDOT/Planning/AR/Update_2019/2019_Attainment_Report_2019_01_25%20LR%20Singles.pdf

Page Number 52

16. Guidehouse review of ArDOT provided Standard Operating Procedure documents
17. Guidehouse Interview with ArDOT HR
18. Guidehouse Interviews with ArDOT Area Maintenance Supervisors (Rural) and District/Assistant Maintenance Superintendents (Rural)
19. Guidehouse Interviews with ArDOT District Construction Engineers (Rural) and Construction
20. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
21. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
22. ArDOT Current Personnel Data (provided by ArDOT, analyzed by Guidehouse)
23. ArDOT 2019 Transportation Asset Management Plan
24. Guidehouse Interview with ArDOT HR
25. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
26. Guidehouse Interview with ArDOT HR
27. Transit Cooperative Research Program. *Managing Transit's Workforce in the New Millennium*. 2002. https://books.google.com/books?id=cnikn3rnl5oC&dq=Maryland+DOT,+hiring+retirees&source=gbs_navlinks_s
28. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
29. TRB Knowledge Management Task Force. KM for Transportation Agencies. http://roadsafetyknowledge.com/NCHRP20_98KMGuide/understanding2.html

People Capabilities Citations

Page Number 56

1. ArDOT 2019 Transportation Asset Management Plan
2. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
3. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
4. ArDOT Turnover Data (provided by ArDOT, analyzed by Guidehouse)
5. ArDOT Turnover Data (provided by ArDOT, analyzed by Guidehouse)
6. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
7. Guidehouse Interviews with ArDOT District/Assistant Maintenance Superintendent (Rural & Urban)
8. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
9. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
10. ArDOT Turnover Data (provided by ArDOT, analyzed by Guidehouse)
11. ArDOT Turnover Data (provided by ArDOT, analyzed by Guidehouse)
12. Society for Human Resource Management. Press Release. 2016: https://www.shrm.org/about-shrm/press-room/press-releases/pages/human-capital-benchmarking-report.aspx

Page Number 57

13. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
14. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
15. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
16. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
17. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
18. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
19. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
20. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
21. Bureau of Labor Statistics. *May 2018 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates*. https://www.bls.gov/oes/current/oessrcma.htm
22. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
23. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
24. Bureau of Labor Statistics. *May 2018 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates*. https://www.bls.gov/oes/current/oessrcma.htm; Guidehouse Interviews with ArDOT Area Maintenance Supervisors (Rural)
25. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
26. Bureau of Labor Statistics. *May 2018 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates*. https://www.bls.gov/oes/current/oessrcma.htm; ArDOT Salary Information (provided by ArDOT, analyzed by Guidehouse)
27. Bureau of Labor Statistics. *May 2018 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates*. https://www.bls.gov/oes/current/oessrcma.htm; ArDOT Salary Information (provided by ArDOT, analyzed by Guidehouse)

Page Number 58

28. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
29. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
30. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
31. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
32. Guidehouse Interview with ArDOT HR
33. Guidehouse Interview with ArDOT HR
34. Guidehouse Interview with ArDOT HR
35. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
36. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
37. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
38. Guidehouse Interview with ArDOT District Maintenance Engineer (Urban)
39. Loskorn, Jeffrey Aaron. *Framework for compressed workweek implementation for TxDOT maintenance forces and flexible work arrangements for employees*. 2011. https://repositories.lib.utexas.edu/handle/2152/ETD-UT-2011-12-4604
40. Guidehouse Interviews with District Staff
41. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)

Page Number 59

42. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
43. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
44. Guidehouse Interview with ArDOT Area Maintenance Supervisor (Rural)
45. Guidehouse Interview with ArDOT District Engineer (Urban)
46. Guidehouse Interview with ArDOT District/Assistant Maintenance Superintendent and Area Maintenance Supervisor
47. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
48. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
49. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
50. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
51. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
52. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
53. ArDOT Training Completion Data (provided by ArDOT, analyzed by Guidehouse)

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54. ArDOT Training Completion Data (provided by ArDOT, analyzed by Guidehouse)
55. ArDOT Training Completion Data (provided by ArDOT, analyzed by Guidehouse)
56. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
57. Guidehouse Interview with ArDOT District Engineer (Urban)
58. Guidehouse Interview with ArDOT Resident Engineer (Rural)
59. ArDOT Maintenance Training Academy Overview (provided by ArDOT)
60. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
61. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
62. Guidehouse Interview with ArDOT Resident Engineer (Rural)
63. Guidehouse Interviews with ArDOT Resident Engineer (Rural), Construction, and Area Maintenance Supervisor (Urban)
64. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
65. Guidehouse Interview with ArDOT Resident Engineer (Rural)
66. Guidehouse Interview with ArDOT Resident Engineer (Rural) / Construction
67. University of Minnesota. *Circuit Training and Assistance Program*. http://www.mnltap.umn.edu/training/ctap/
68. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)

Assumptions

1. The findings included in the report are a point in time representation based on interviews conducted with the Arkansas Department of Transportation (ArDOT) staff members and various external stakeholders and a review of documents ArDOT provided to Guidehouse from September 2019 – February 2020. Findings are subject to change based on mitigating documentation and clarifications provided by ArDOT subsequent to the publication of this report.

Questions?

Guidehouse

| The findings included in the report are a point in time representation and are subject to change. Please see the assumptions slide in the appendix for further details.

Focus Area Analysis: Portfolio Planning

Portfolio Planning Citations

Page 15

1. Implicitly adopted by the commission Minute Order authorizing the STIP 2018 - 2022 (MO 2018 080).
2. ArDOT STIP Development Document (Provided by ArDOT, analyzed by Guidehouse).
3. ArDOT Decision Lens Criteria Document (Provided by ArDOT, analyzed by Guidehouse).
4. Regulation: MPO TIP inclusion without modification: 23 CFR 450.218(b).
5. Regulation: Requirement for STIP to be financially constrained: 23 CFR 450.218(i).
6. Regulation: MPOs TIP development: 23 USC 134.
7. ArDOT. *We Move Arkansas*. http://www.wemovearkansas.com/index.html.
8. ArDOT. *Arkansas State Highway 2016 Needs Study*. September 2017.
9. ArDOT Historical Federal Obligation data (Provided by ArDOT, analyzed by Guidehouse).

Page 16

10. ArDOT STIP Amendment Data (Provided by ArDOT, analyzed by Guidehouse).
11. ArDOT. *STIP Amendments 2019 - 2022*. https://www.arkansashighways.com/stip/stip.aspx.
12. ArDOT. *STIP Amendments 2016 - 2020*. https://www.arkansashighways.com/stip/stip_prior.aspx.
13. ArDOT Change Order Data (Provided by ArDOT, analyzed by Guidehouse).
14. Regulations: Public Communication Requirements: 49 U.S.C. 5304(g); 23 USC 135; 23 CFR 450.218
15. VDOT. *SmartScale Dashboard*. http://dashboard.vasmartscale.org/.

Page 17

16. FHWA 2018 Statistics. https://www.fhwa.dot.gov/policyinformation/statistics/2018/
17. ArDOT Budget Data (Provided by ArDOT, analyzed by Guidehouse).
18. ArDOT. *Maintenance Manual*. Version 8.17.
19. Guidehouse Interviews with Fiscal Services, Maintenance, and District Staff
20. Cambridge Systems, Inc. *Asset Management Implementation Strategy*. December 2009. https://dspace.njstatelib.org/xmlui/bitstream/handle/10929/23952/t7642009z.pdf?sequence=1.
21. North Carolina Department of Transportation. *Efficiency - Establishing Baseline Unit Pricing & Streamlining Project Delivery*. December 2015.

Page 18

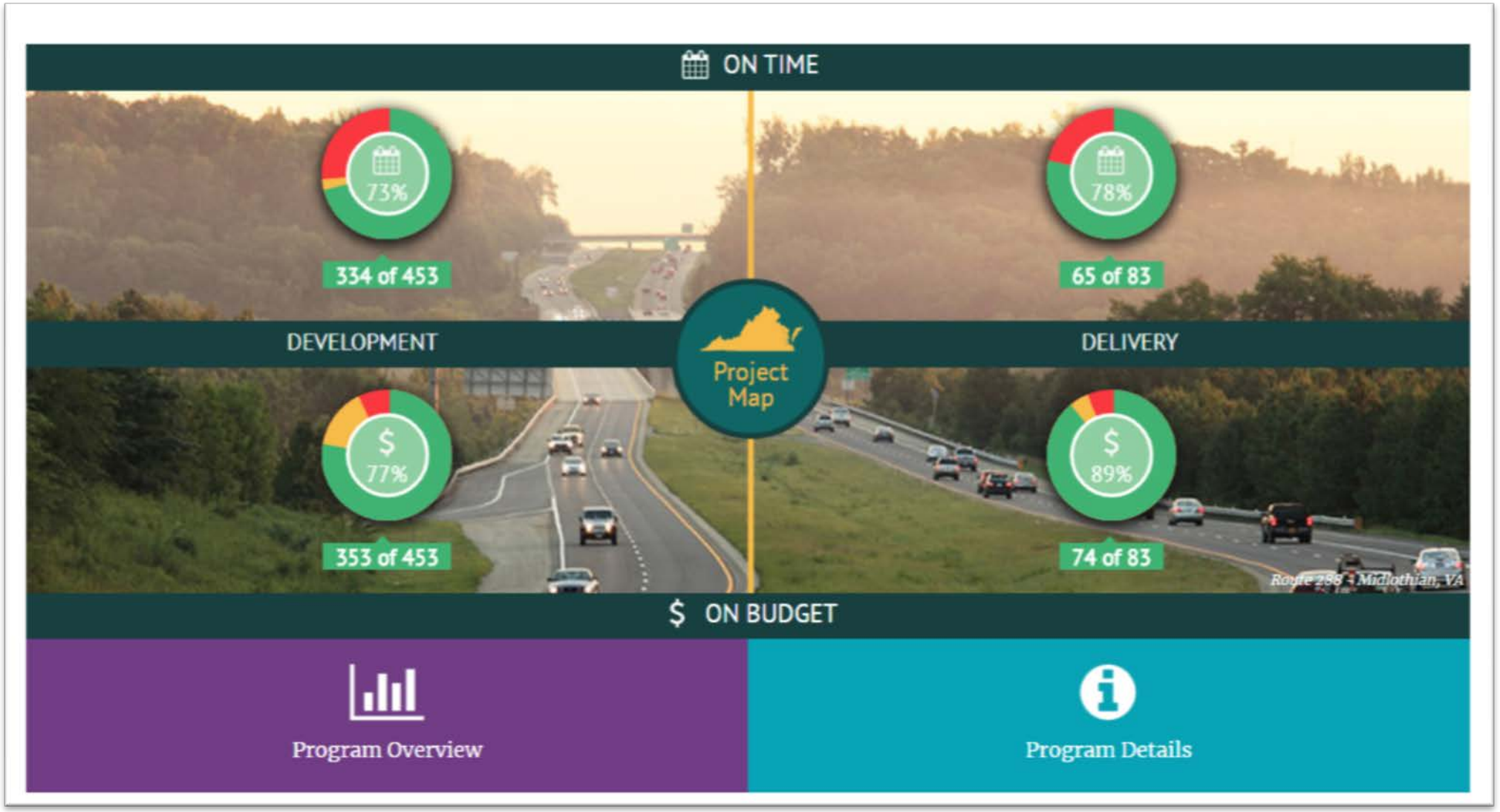
22. ArDOT. *Maintenance Manual*. Version 8.17.
23. Washington Department of Transportation. *Annual Service Level Report*. https://www.wsdot.wa.gov/maintenance/accountability-process.
24. Guidehouse Interviews with Maintenance, and District Staff
25. ArDOT Maintenance Management RFP excerpt (Provided by ArDOT, analyzed by Guidehouse).
26. Adams, Teresa M. et. al. *Guide to Level of Service (LOS) Target Setting for Highway Assets*. November 2014.
27. ArDOT sample County Level Annual Work Program Computation Sheet (Provided by ArDOT, analyzed by Guidehouse).
28. ArDOT sample District Level Annual Work Program Computation Sheet (Provided by ArDOT, analyzed by Guidehouse).

Page 19

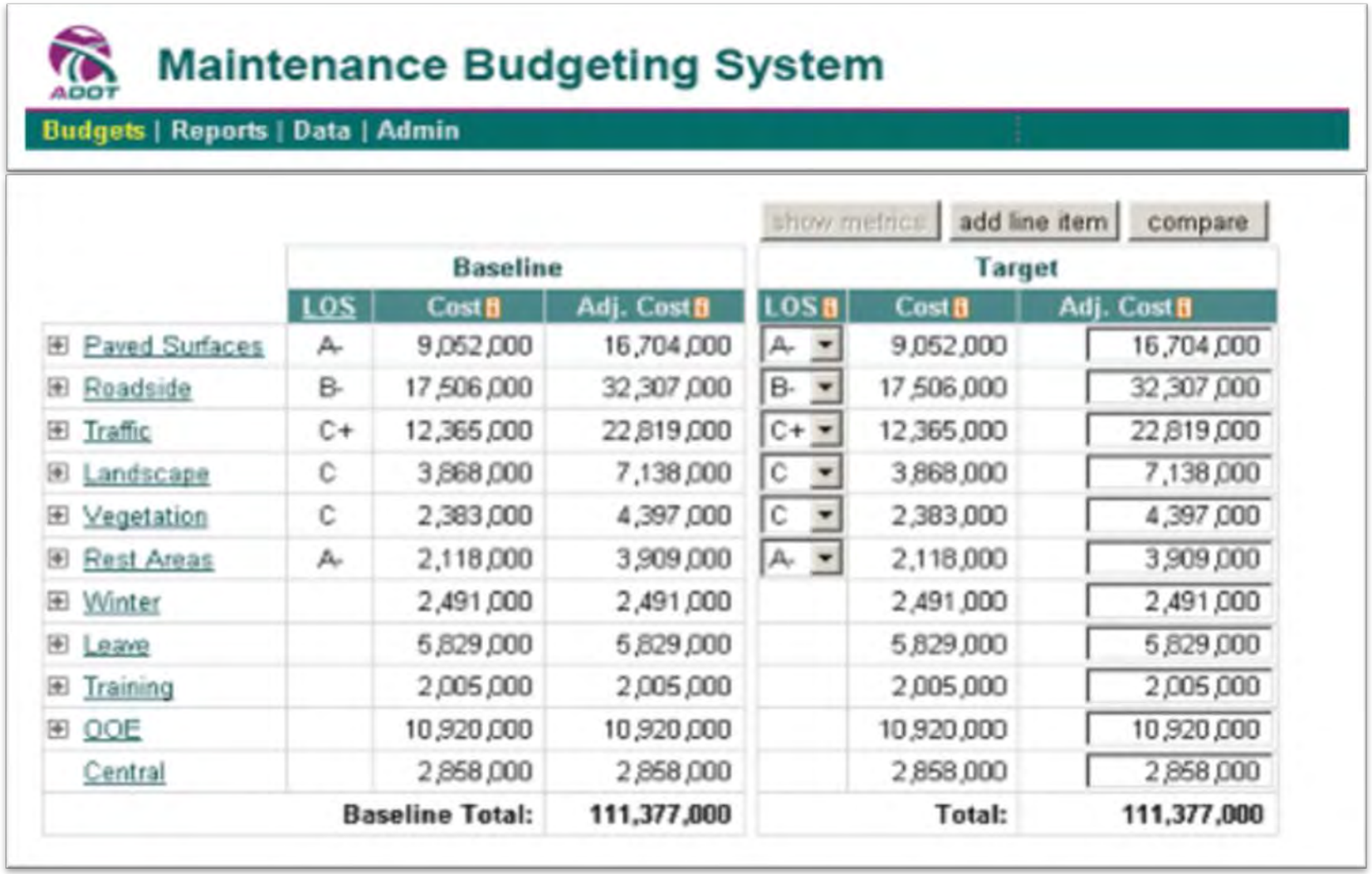
28. Guidehouse Interviews with Maintenance, and District Staff
29. ArDOT. *Main website*. http://www.arkansashighways.com/index.aspx.
30. ArDOT. District websites. e.g. https://www.arkansashighways.com/district1.aspx.
31. Pima County DOT (AZ). *Regional Priority and Gateway Road List*. 2020. https://webcms.pima.gov/UserFiles/Servers/Server_6/File/Government/Transportation/Roadway%20Maintenance/FY20_RegionalPrioritYandRecreationalGatewayRoad_SelectionList.pdf.
32. Pima County DOT (AZ). *Interactive Road Maintenance Map*. https://pimamaps.maps.arcgis.com/apps/webappviewer/index.html?id=e26b873e39b34381980ae5a89a767817.
33. Missouri Department of Transportation. *Operations and Maintenance Plan*. https://www.modot.org/sites/default/files/documents/Sec10OperationsAndMaintenancePlan.pdf.

Page 20

34. Guidehouse Interviews with Assistance Chief Engineers, Public Information Office, and/or District Staff
35. ArDOT. *iDrive Arkansas*. https://www.idrivearkansas.com/.
36. Garver. *reCAP Quarterly Report.* July - September 2019.
37. Virginia Department of Transportation. *CSC - ITS VA Presentation*. 2011. https://www.itsva.org/wp-content/uploads/2017/07/VDOT_CSC_ITSVA.pdf.
38. Texas Department of Transportation. *Focus on the Customer Dashboard*. http://www.dot.state.tx.us/dashboard/focus-on-the-customer.htm.
39. ArDOT iDRIVE Arkansas Customer Utilization Statistics (ArDOT provided, Guidehouse analyzed).



Slide 16, Source: VDOT[15]



Slide 17 Source: ADOT[20]

Table 10: Maintenance Activity Baseline Unit Costs

Maintenance - Statewide Baseline			
	Primary	**Secondary**	**Unit of Measure**
2817-Mechanical Asphalt Patching	$250.32	$222.53	per ton
2900-Grass Mowing	$63.34	$39.41	per shoulder mile
2912-Mechanical Brush and Tree Control	$698.81	$684.19	per shoulder mile
3104-Litter Removal	$279.65	$334.91	per shoulder mile

Slide 17 Source: NCDOC[21]

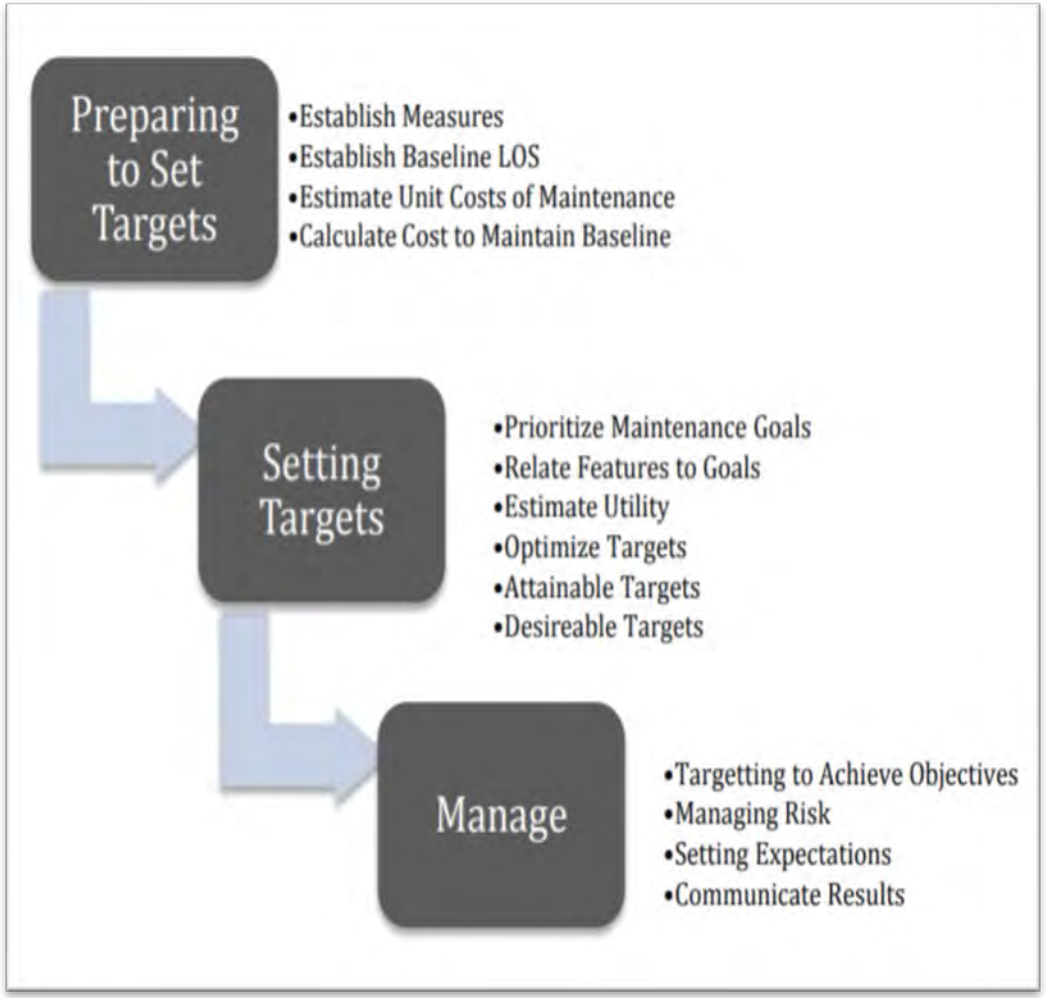
Maintenance Accountability Process
Activity Level Targets
CY 2018 - Statewide

Activity		A	B	C	D	F
Group - 1 Roadway Maintenance and Operations						
	1A3 Shoulder Maintenance			✓⊙		
	1A4 Sweeping and Cleaning	⊙	✓			
Group - 2 Drainage Maintenance and Slope Repair						
	2A1 Ditch Maintenance		✓⊙			
	2A2 Culvert Maintenance				✓⊙	
	2A3 Catch Basin and Inlet Maintenance	✓⊙				
	2A4 Stormwater Facility Maintenance	✓⊙				
	2A5 Slope Repair	⊙		✓		
Group - 3 Roadside and Vegetation Management						
	3A1 Litter Pickup				✓⊙	
	3A2 Noxious Weed Control		⊙	✓		
	3A3 Nuisance Vegetation Control				✓⊙	
	3A4 Vegetation Obstruction Control			✓⊙		
	3A5 Landscape Maintenance			✓	⊙	
Group - 4 Bridge and Urban Tunnel Maintenance and Operations						
	4A3 Bridge Cleaning		✓⊙			
	4B1 Special Bridge and Ferry Operation	✓⊙				
	4B3 Urban Tunnel Systems Operation		⊙			

Key ⊙ Projected Delivery
✓ Service Level Delivered
⊙ Missed Target

February 5 2019

Slide 18, Source: WSDOT[23]

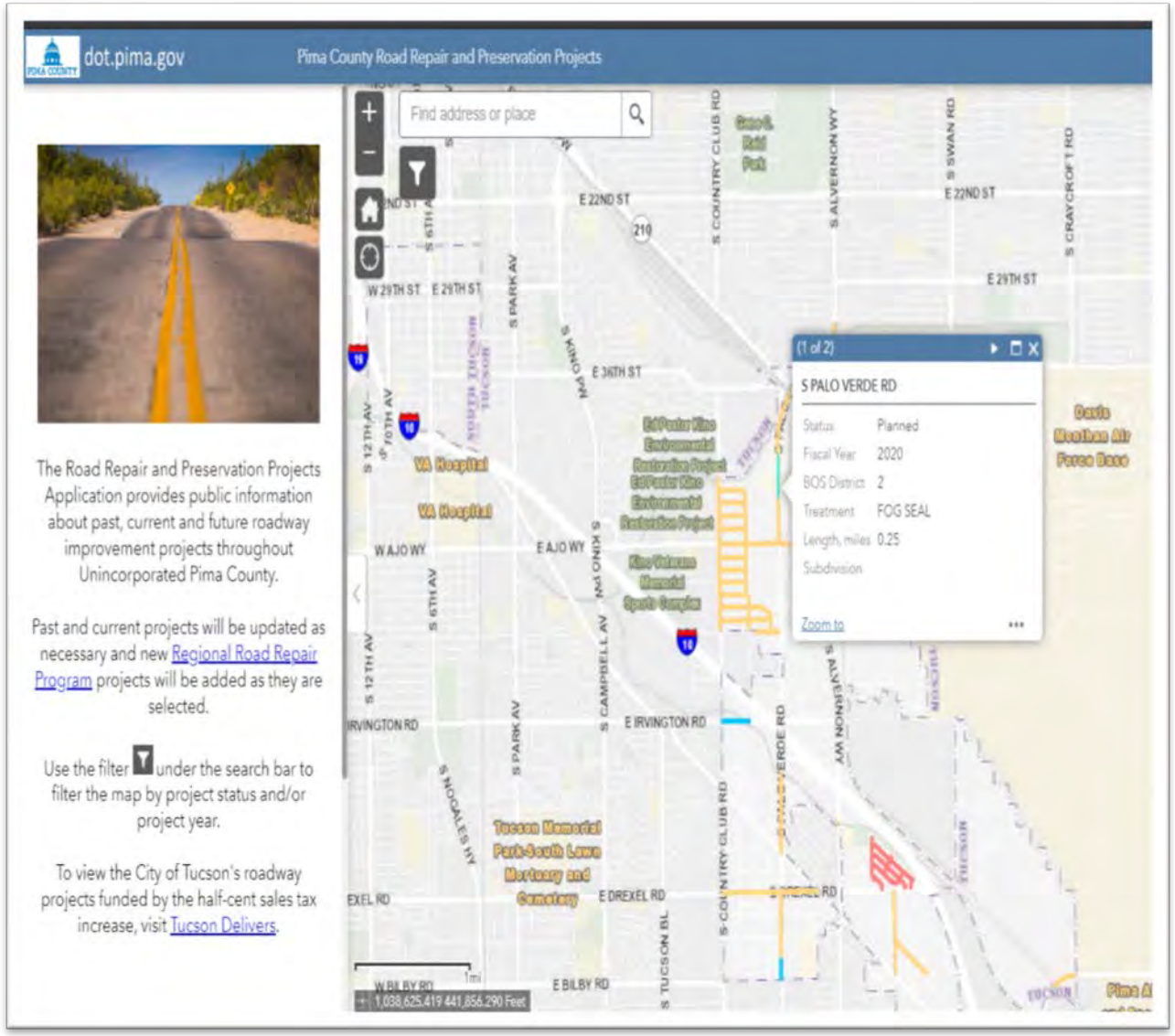


Slide 18, Source: ; NCHRP[26]

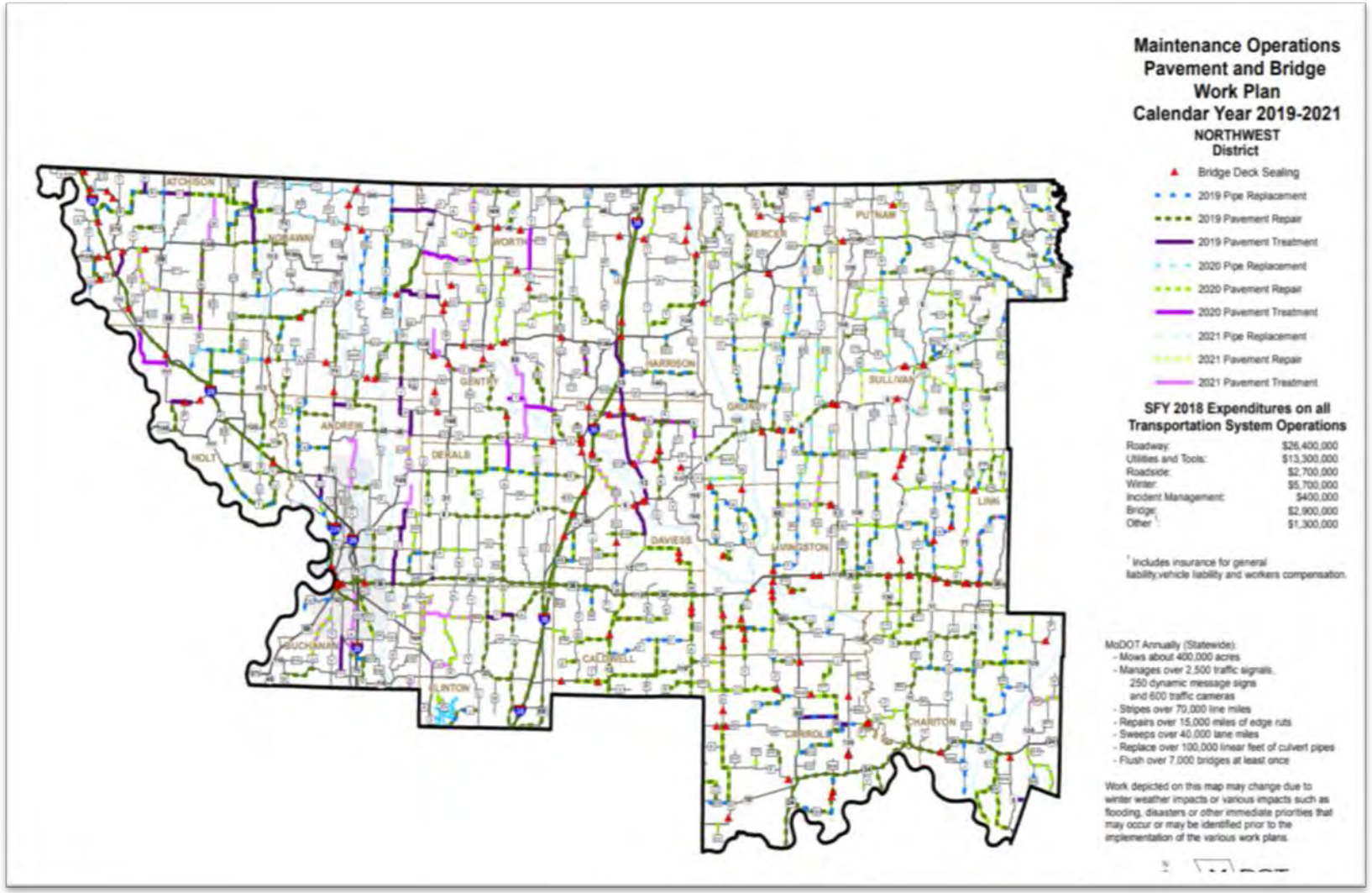
2020 Regional Priority and Recreational Gateway Road List

Pavement Management Section	Start	End	AADT	District	Miles	PCI	Treatment
E CHULA VISTA RD	N 1ST AV	N MOONGLOW DR		1	0.66	19	MILL AND THICK OVERLAY
E RIVER RD	END OF ROAD	END OF ROAD	30,427	1	0.20	78	FOG SEAL
E RIVER RD	S ALVERNON WY	N PONTATOC RD	11,941	1	0.28	91	SEAL CRACKS
E RIVER RD	N SUTTON LN	S DODGE BL	11,941	1	0.12	91	SEAL CRACKS
E SKYLINE DR	E CAMINO CIELO	E CHULA VISTA RD	32,236	1	0.13	77	SEAL CRACKS
E SKYLINE DR	E CHULA VISTA RD	E CALLE LOS ALTOS	32,236	1	0.19	85	SEAL CRACKS
E SKYLINE DR	E CALLE LOS ALTOS	W ORANGE GROVE RD	32,236	1	0.30	77	SEAL CRACKS
E SKYLINE DR	W ORANGE GROVE RD	S CAMPBELL AV	39,844	1	0.60	85	SEAL CRACKS
E SKYLINE DR	S CAMPBELL AV	N TIERRA DE LAS CATALINAS	34,531	1	0.26	77	SEAL CRACKS
E SKYLINE DR	N TIERRA DE LAS CATALINAS	E SUNRISE DR	34,531	1	0.19	85	SEAL CRACKS
E SNYDER RD	N VALLE	N HIDDEN VALLEY RD		1	0.63	21	MILL AND THICK OVERLAY
E SUNRISE DR	E SKYLINE DR	N CAMINO ESPLENDORA	34,531	1	2.30	77	SEAL CRACKS
N ALVERNON WY	END OF ROAD	END OF ROAD	5,157	1	0.02	64	MICRO SEAL
N CAMINO DE OESTE	END OF ROAD	W MARS ST	3,430	1	0.06	23	MILL AND THICK OVERLAY
N CAMINO DE OESTE	W MARS ST	W MARGE ST	3,430	1	0.15	34	MILL AND THICK OVERLAY
N CAMINO DE OESTE	W MASSINGALE RD	N IVORY ROSE DR	3,430	1	0.66	34	MILL AND THICK OVERLAY

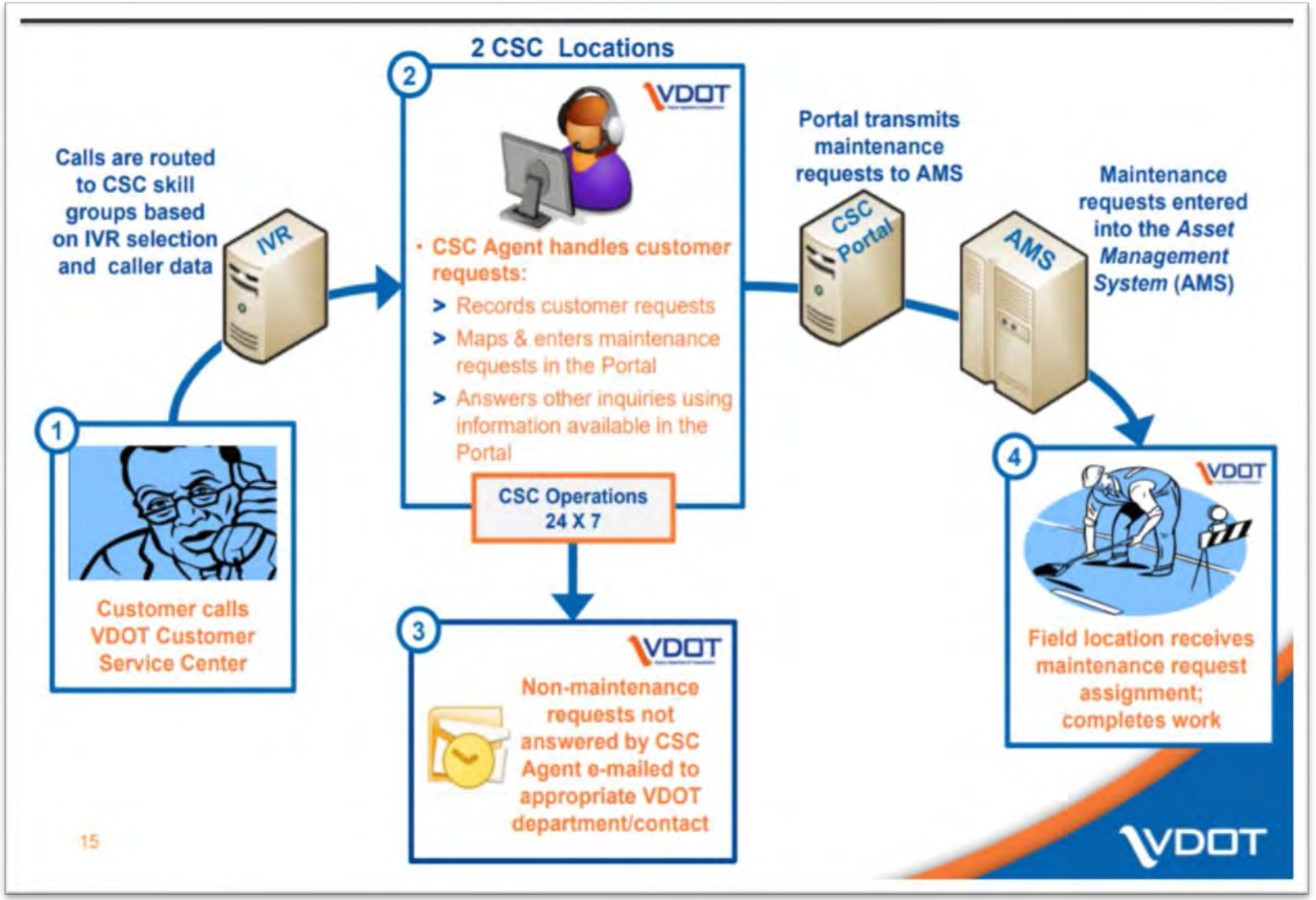
Slide 19, Source: Pima County DOT[31, 32]



Slide 19, Source: Pima County DOT[31, 32]



Slide 19, Source: MODOT[33]



Slide 20, Source: VDOT[37]

Focus Area Analysis: Procurement

Procurement Citations

Page Number 24

1. Regulation: A.C.A. 19-11-203
2. Regulation: A.C.A. 27-67-206; Regulation: 23 U.S. Code 112
3. Regulation: A.C.A. 27-65-111
4. Regulation: A.C.A. 27-65-107
5. Guidehouse Interview with ArDOT Legal
6. Guidehouse Interviews with ArDOT Construction, E&P, Legal, and Program Management
7. Guidehouse Interview with ArDOT Construction
8. Guidehouse Interview with ArDOT E&P
9. Guidehouse Interview with ArDOT Program Management and Construction
10. Guidehouse Interviews with ArDOT E&P (1,2), Legal (3), Program Management (4)

Page Number 25

11. FHWA. *Performance-Based Contractor Prequalification as an Alternative to Performance Bonds*. 2014. https://www.fhwa.dot.gov/publications/research/infrastructure/14034/14034.pdf
12. ArDOT Prequalification Questionnaire (via ArDOT website)
13. FHWA. *Performance-Based Contractor Prequalification as an Alternative to Performance Bonds*. 2014. https://www.fhwa.dot.gov/publications/research/infrastructure/14034/14034.pdf
14. FHWA. *Performance-Based Contractor Prequalification as an Alternative to Performance Bonds*. 2014. https://www.fhwa.dot.gov/publications/research/infrastructure/14034/14034.pdf
15. ArDOT Consultant Services Webpage
16. Arkansas 2014 Standard Specification for Highway Construction
17. Arkansas 2014 Standard Specification for Highway Construction, Section 106.10
18. Arkansas 2014 Standard Specification for Highway Construction, Section 106.10
19. Arkansas 2014 Standard Specification for Highway Construction, Section 106.03
20. Arkansas 2014 Standard Specification for Highway Construction, Section 105.04
21. NMDOT. *NMDOT Performance-Based Contractor Prequalification*. 2018. https://construction.transportation.org/wp-content/uploads/sites/20/2018/09/2.01-New-Mexico-Performance-Based-Contractor-Prequalificaiton.pdf

Page Number 26

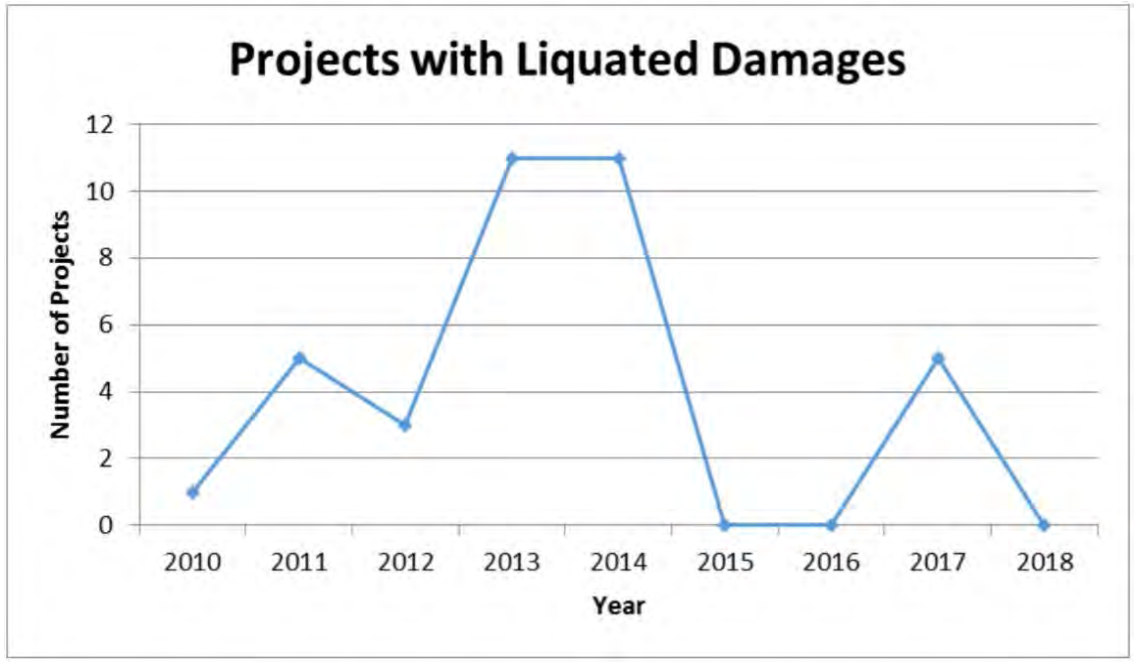
22. ArDOT 2019 Transportation Asset Management Plan
23. Guidehouse Interview with ArDOT Construction
24. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
25. Guidehouse Interview with ArDOT Construction
26. ArDOT Road User Cost Guide (provided by ArDOT)
27. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
28. Guidehouse Interview with ArDOT District Equipment Supervisor (Rural)
29. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
30. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)

Page Number 27

31. ArDOT Design Build & CMGC Webpages
32. ArDOT Design Build & CMGC Webpages
33. ArDOT Consultant Services (via ArDOT website)
34. Guidehouse Interview with ArDOT Surveys
35. Guidehouse Interview with ArDOT Consultant Contracts
36. ArDOT. *Innovation at State Department of Transportation*. Feb 2019. https://www.arkansashighways.com/PowerPoints/2019/20190227_EPW_Innovation_Presentation.pdf
37. Arkansas 2014 Standard Specification for Highway Construction
38. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
39. Arkansas 2014 Standard Specification for Highway Construction
40. Guidehouse Interview with ArDOT Construction
41. Arkansas 2014 Standard Specification for Highway Construction; ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
42. Michigan DOT. *Innovative Construction Contracting Guide*. 2015: https://www.michigan.gov/documents/mdot/Innovative_Construction_Contracting_340000_7.pdf

Page Number 28

43. Guidehouse Interview with ArDOT E&P
44. Guidehouse Interview with ArDOT E&P; ArDOT Purchase Data (provided by ArDOT, analyzed by Guidehouse)
45. Guidehouse Interview with ArDOT E&P
46. Guidehouse Interview with ArDOT E&P
47. Guidehouse Interview with ArDOT E&P
48. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
49. ArDOT Oracle Scope of Work (provided by ArDOT)
50. Guidehouse Interview with ArDOT E&P
51. ArDOT Mileage & Fuel Consumption Data (provided by ArDOT, analyzed by Guidehouse)
52. ArDOT Accounting Manual
53. Guidehouse Interview with ArDOT E&P
54. Guidehouse Interview with ArDOT E&P
55. State of Wisconsin Department of Administration. *What's New in Procurement*. 2016: https://doa.wi.gov/Documents/DEO/WhatsNewinProcurement.pdf



Slide 25, Source: NMDOT

• = May apply	Acceleration Techniques								Procurement/Payment							Delivery Method				
	Lane Rental	A+B Incentives	Accepted for Traffic Incentives	No Excuse Incentives	Standard Incentives	Accelerated Schedules	Interim Completion Date Incent.	Alternate Const Methods	Best Value	Project Specific Qualification	Lump Sum	Performance-Based Incentives	Alternate Pavement Bids	Fixed Price Variable Scope	Indefinite Delivery/Ind. Quantity	Design-Build	Design-Build-Finance	DBF-Operate Maintain	Alternate Technical Concepts	CMGC
Project Objective																				
Expedite construction	•	•	•	•	•	•	•	•								•	•	•	•	•
Minimize road user delay costs	•	•	•	•	•	•	•	•	•			•				•	•	•	•	•
Promote innovation [7]								•	•			•	•			•	•	•	•	•
Expedite contract award [4]																•	•	•		•
Minimize risk of claims/disputes				•												•	•	•		•
Maximize work within set budget [1]													•	•				•		•
Enhance quality [6]								•	•			•				•	•	•		•
Define construction budget early [2]																				•
Reduce design & construction time [5]									•							•	•	•	•	•
Leverage external funding sources [3]																	•	•		

Slide 27, Source: MDOT

Business Unit Name	Budget Reference Code	# of Approved POs	# On Contract	% Approved On Contract
DATCP	FY2015	20	0	0.0%
	FY2016	175	96	54.9%
	FY2017	71	56	77.8%
DATCP Total		**265**	**152**	**56.9%**
DCF	FY2015	0	0	
	FY2016	330	269	81.5%
	FY2017	242	216	89.3%
DCF Total		**572**	**485**	**84.8%**
DFI	FY2016	49	47	95.9%
	FY2017	42	40	95.2%
DFI Total		**91**	**87**	**95.6%**
DHS	FY2015	119	6	5.0%
	FY2016	4664	1747	37.4%
	FY2017	1968	1069	54.2%
DHS Total		**6744**	**2822**	**41.8%**

Slide 28, Source: WisDOT

Focus Area Analysis: Expenditures

Expenditures Citations

Page Number 32

1. ArDOT Oracle Scope of Work (provided by ArDOT)
2. Guidehouse analysis of ArDOT Oracle Scope of Work (provided by ArDOT)
3. Guidehouse Interview with ArDOT Construction
4. Guidehouse Interview with ArDOT District/Assistant Maintenance Superintendent (Rural)
5. Planisware. Blog Post 2019: https://www.planisware.com/hub/blog/2019-gartner-magic-quadrant-project-and-portfolio-management-out
6. Tommelein, Iris D., PhDBlampied, Nigel. *Review of the Project Resourcing and Schedule Management (PRSM) System used by Caltrans*. 2018: https://escholarship.org/uc/item/20t4r81t

Page Number 33

7. FHWA. *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects*. Version FP-14. https://flh.fhwa.dot.gov/resources/specs/fp-14/fp14.pdf
8. FHWA. *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects*. Version FP-14. https://flh.fhwa.dot.gov/resources/specs/fp-14/fp14.pdf
9. Utah DOT. *Practical Design Guide*. 2011.
10. FHWA. *Practical Design*. 2010: https://www.fhwa.dot.gov/publications/publicroads/10janfeb/06.cfm
11. Guidehouse Interview with ArDOT Roadway Design & Bridge Design
12. FHWA. *Value Engineering Final Rule*. 2014. https://www.fhwa.dot.gov/ve/
13. FHWA. *Value Engineering Final Rule*. 2014. https://www.fhwa.dot.gov/ve/
14. ArDOT Value Engineering Guidelines and Procedures (via ArDOT website)
15. National Value Engineering Data by State (provided by ArDOT, analyzed by Guidehouse).
16. National Value Engineering Data by State (provided by ArDOT, analyzed by Guidehouse).
17. Guidehouse Interview with ArDOT Consultant Contracts
18. National Value Engineering Data by State (provided by ArDOT, analyzed by Guidehouse).
19. National Value Engineering Data by State (provided by ArDOT, analyzed by Guidehouse).
20. Missouri State Highway Patrol. *Number of Persons Killed or Injured in Missouri Crashes by Year*. https://www.mshp.dps.missouri.gov/MSHPWeb/SAC/crash_data_severity_960grid.html
21. National Value Engineering Data by State (provided by ArDOT, analyzed by Guidehouse).

Page Number 34

22. Guidehouse Interview with ArDOT Roadway Design
23. Guidehouse Interview with ArDOT Roadway Design
24. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
25. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
26. ArDOT ROW and Utility Data (Provided by ArDOT, Analyzed by Guidehouse)
27. ArDOT ROW and Utility Data (Provided by ArDOT, Analyzed by Guidehouse)
28. Regulation: AR Code § 27-67-317 (2017)
29. Regulation: AR Code § 27-67-317 (2017)
30. ArDOT ROW and Utility Data (Provided by ArDOT, Analyzed by Guidehouse)
31. Regulation: ACA § 27-67-322 (c)(3)
32. ArDOT Surplus Land Data (provided by ArDOT, analyzed by Guidehouse)
33. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
34. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)

Page Number 35

35. ArDOT Staff Minutes (sample provided by ArDOT)
36. ArDOT Staff Minutes (sample provided by ArDOT)
37. Guidehouse Interview with ArDOT Program Management
38. Guidehouse Interview with ArDOT Roadway Design
39. Iowa DOT. *3D Model-based Planning-Design-Construction-O&M for Transportation Project Delivery: Structures Perspective*. 2015: https://iowadot.gov/bridge/3D/Presentations/150414-WisDOT-SEF.pdf
40. Iowa DOT. *3D Model-based Planning-Design-Construction-O&M for Transportation Project Delivery: Structures Perspective*. 2015: https://iowadot.gov/bridge/3D/Presentations/150414-WisDOT-SEF.pdf
41. Guidehouse Interviews with ArDOT Construction and Resident Engineers (Rural)
42. Iowa DOT. *3D Model-based Planning-Design-Construction-O&M for Transportation Project Delivery: Structures Perspective*. 2015: https://iowadot.gov/bridge/3D/Presentations/150414-WisDOT-SEF.pdf

Page Number 36

43. ArDOT Resident Engineer Manual. 2014.
44. Guidehouse Interview with ArDOT Resident Engineers (Rural)
45. ArDOT Resident Engineer Manual. 2014.
46. ArDOT Resident Engineer Manual. 2014.
47. ArDOT Resident Engineer Manual. 2014.
48. ArDOT Resident Engineer Manual. 2014.
49. ArDOT Change Order Policies and Thresholds
50. ArDOT Change Order Policies and Thresholds
51. ArDOT Change Order Policies and Thresholds
52. Guidehouse Interview with ArDOT Construction
53. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)
54. ArDOT Change Order Data (provided by ArDOT, analyzed by Guidehouse)

Page Number 37

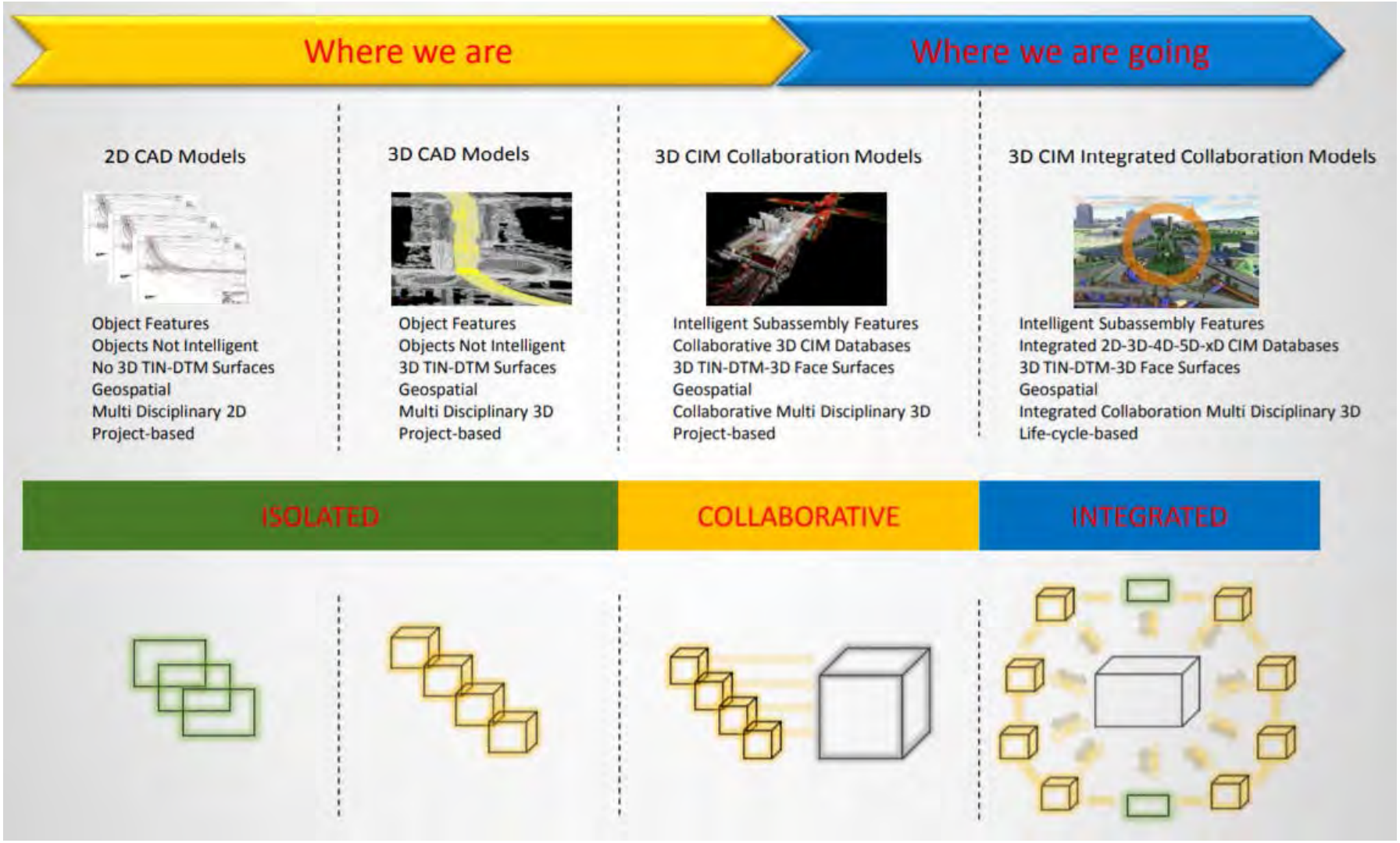
55. ArDOT Maintenance Manual. Version 8.17
56. ArDOT Maintenance Manual. Version 8.17
57. ArDOT Maintenance Manual. Version 8.17
58. ArDOT Maintenance Manual. Version 8.17
59. Guidehouse Interviews with ArDOT District/Assistant Maintenance Superintendents (Rural) and District Engineers (Rural)
60. Guidehouse Interview with ArDOT District Maintenance Engineer (Rural)
61. ArDOT Maintenance Management Description
62. ArDOT Maintenance Management Description
63. Scan Team Report. *Best Practices In Performance Measurement For Highway Maintenance And Preservation*. http://onlinepubs.trb.org/onlinepubs/nchrp/docs/nchrp20-68a_10-03.pdf
64. Minnesota DOT. *MnDOT Measures of Financial Effectiveness: 2019 EVALUATION REPORT.* https://www.leg.state.mn.us/docs/2019/other/190400.pdf

Page Number 38

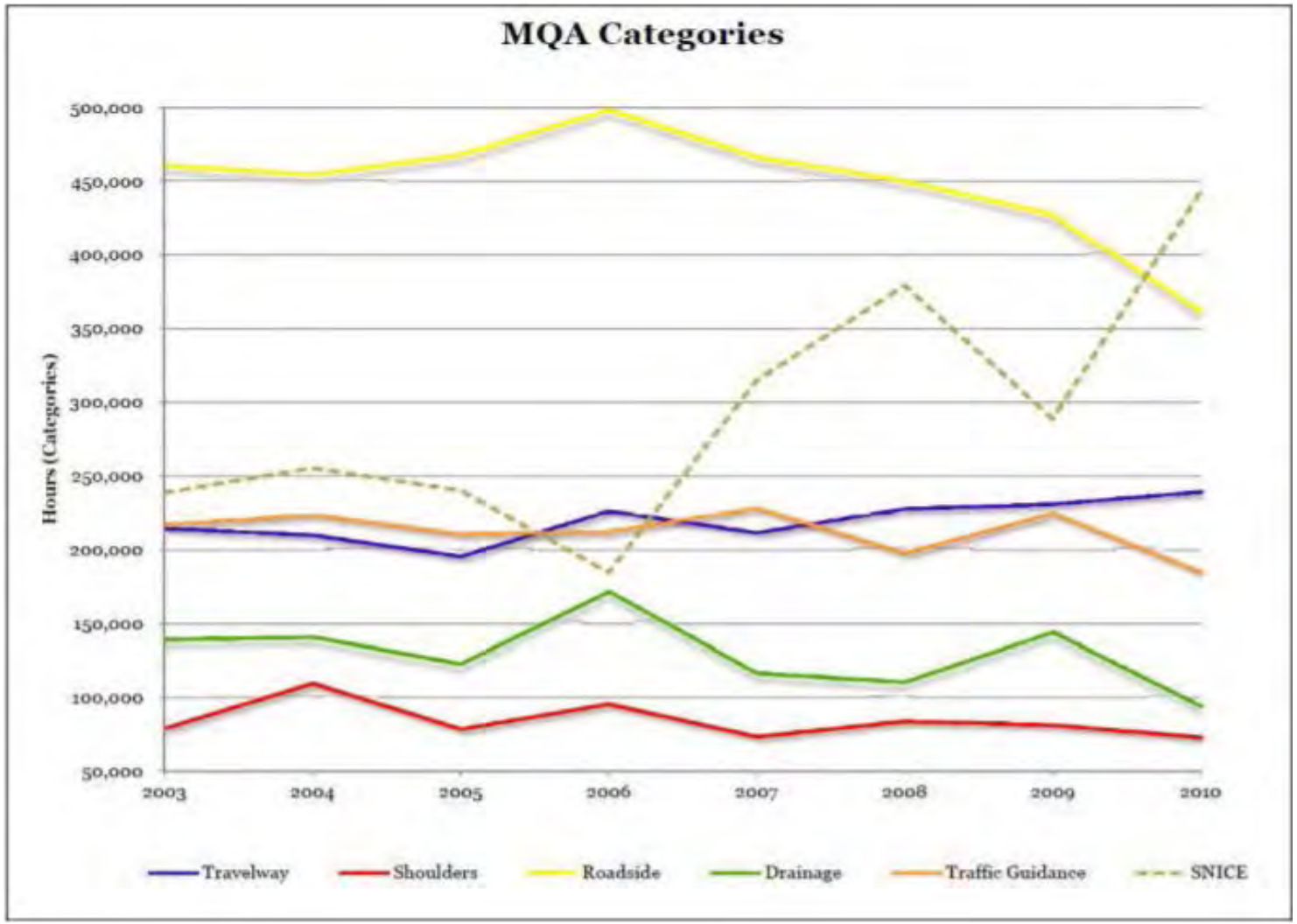
65. ArDOT Internal Audit Manual
66. ArDOT Internal Audit Manual
67. ArDOT Internal Audit Manual
68. ArDOT Internal Audit Risk Assessment Heatmap
69. ArDOT Internal Audit Manual
70. Regulation: 2 CFR § 200.514
71. FHWA. *Risk-based Approach to Stewardship and Oversight FAQ*. https://www.fhwa.dot.gov/federalaid/stewardship/140328_faq.pdf
72. Guidehouse Interview with FHWA – Arkansas Division
73. Stewardship and Oversight Agreement between FHWA and ArDOT. 2015.

State	Project Management Software Used
California	CA PPM
Michigan	Planisware
Kansas	In-house software
Pennsylvania	In-house Oracle database
North Carolina	SAP
Utah	In-house software
Georgia	Oracle Primavera
Montana	Planisware
New Jersey	Oracle Primavera
Virginia	Microsoft Project Server

Slide 32, Source: : Gartner (left) [5]*, ITS Berkley (right)* [6]



Slide 35, Source: WisDOT



Slide 37, Source: KDOT

Focus Area Analysis: Information Technology

Information Technology Citations

Page 42

1. ArDOT Data Base Inventory (ArDOT Provided, Guidehouse analyzed).
2. ArDOT 3 Year IT Strategic Plan (ArDOT provided, Guidehouse analyzed).
3. ArDOT Infrastructure Project Summary and Vendor SOW (ArDOT Provided, Guidehouse Analyzed).
4. ArDOT IT Application Catalog (ArDOT provided, Guidehouse analyzed).
5. ArDOT Detailed Organizational Chart (ArDOT provided, Guidehouse analyzed).
6. ArDOT IT Budget Report (ArDOT provided, Guidehouse analyzed).
7. Listing of applications acquired by ArDOT without IT approval (ArDOT provide, Guidehouse analyzed).

Page 43

8. ArDOT 3 Year IT Strategic Plan (ArDOT provided, Guidehouse analyzed).
9. ConvergeOne Data Center Resiliency Workshop Report (ArDOT provided, Guidehouse analyzed).
10. Various Infrastructure SOW documents and Infrastructure Refresh Project Summary (ArDOT provided, Guidehouse Analyzed).
11. ArDOT Draft IT Service Desk RFP (ArDOT provided, Guidehouse analyzed).

Page 44

12. Guidehouse Interviews with IT
13. ConvergeOne Data Center Resiliency Workshop Report (ArDOT provided, Guidehouse analyzed).
14. Atlassian, Inc. *Calculating the cost of downtime - understanding the financial impact of incidents*. https://www.atlassian.com/incident-management/kpis/cost-of-downtime.
15. Governing Institute. *Guide to Cybersecurity as Risk Management: The Role of Elected Officials*. https://media.erepublic.com/document/GOV15_HANDBOOK_CGI_V_low_res.pdf.

Page 45

16. Guidehouse Interviews with IT
17. ArDOT Project Intake and Prioritization Tool (ArDOT provided, Guidehouse analyzed).
18. ArDOT Short and Long Term Initiatives Document (ArDOT Provided, Guidehouse analyzed).
19. Various Data Governance policy documents (ArDOT provided, Guidehouse analyzed).
20. ArDOT IT Budget and Expenditure Data (ArDOT provided, Guidehouse analyzed).
21. Various Infrastructure SOW documents and Infrastructure Refresh Project Summary (ArDOT provided, Guidehouse Analyzed).
22. ArDOT 3 Year IT Strategic Plan (ArDOT provided, Guidehouse analyzed).

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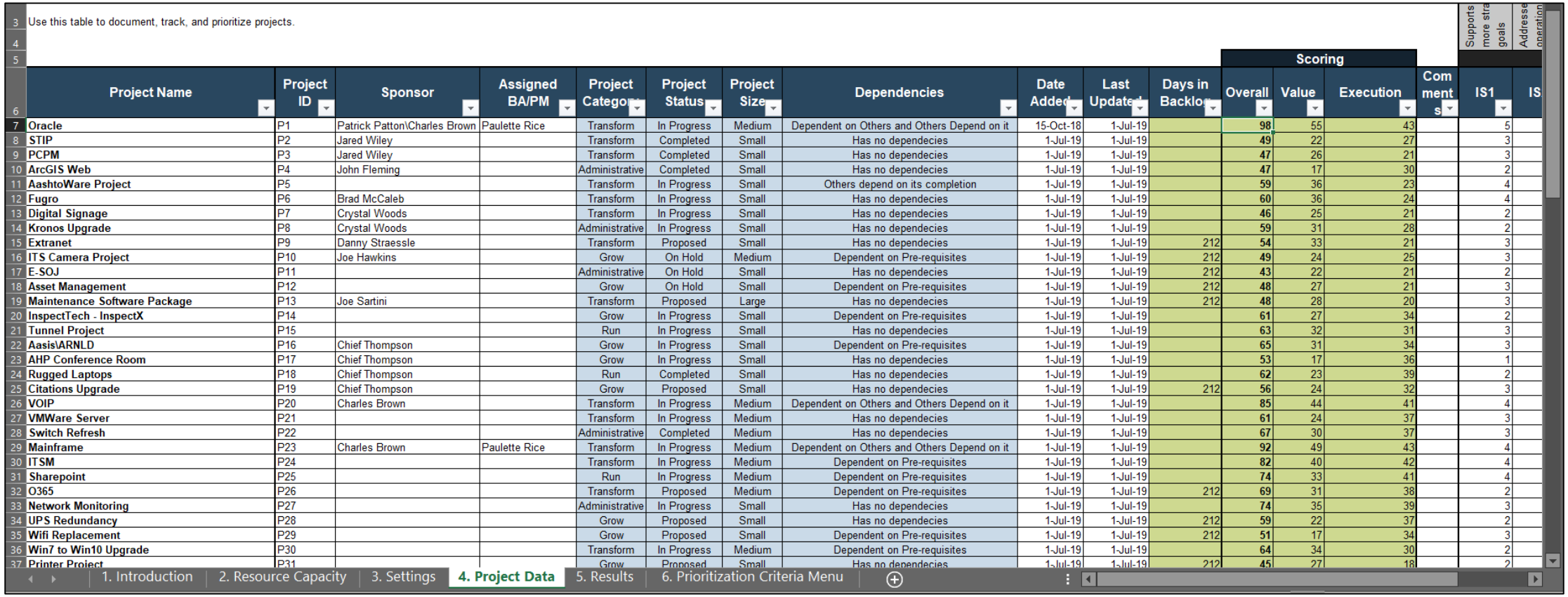
23. Guidehouse Interviews with IT
24. ArDOT 3 Year IT Strategic Plan (ArDOT provided, Guidehouse analyzed).
25. ArDOT IT Division Responsibilities Document (ArDOT Provided, Guidehouse analyzed).
26. ArDOT provided IT CBA Tool (ArDOT Provided, Guidehouse analyzed).
27. ArDOT IT Organizational Chart (ArDOT provided, Guidehouse analyzed).
28. ArDOT IT project status updates for various IT projects including Infrastructure, ITSM, SiteManager, STIP Databased (ArDOT provided, Guidehouse analyzed).
29. Oregon - Office of the State. *Chief Information Officer presentation to the State Joint Committee on Ways and Means.* February 2019. https://olis.leg.state.or.us/liz/2019R1/Downloads/CommitteeMeetingDocument/155643.
30. Michigan Department of Technology, Management, and Budget. *SUITE Project Management Methodology*. https://www.michigan.gov/suite/0,4674,7-245-46056---,00.html.
31. Texas Department of Information Resources. *Project Delivery Framework*. https://dir.texas.gov/View-Resources/Pages/Content.aspx?id=16 and https://public.tableau.com/profile/state.of.texas.lbb#!/vizhome/QualityAssuranceTeamQAT-Dashboard/StatewideOverview.

	A	B	C	D	E
1	**Initiative**	**FY Started**	**Completion Date\Anticipated Date**	**Summary of Initative with Benefits**	**Cost Savings**
2	VOIP	18-19	On-going/Complete by October 2020	Creates a common telecommunications system for all of ARDOT. In-house support team provides quicker resolutions to requests and issues versus the delayed support experienced with external providers (hours versus days). Consolidated billing saves the department over $150k annually.	$13,600 monthly/$163,200 annually
3	Infrastructure Refresh	19-20	On-going/Complete by December 2020	Upgrade Data Center Infrastructure including servers, storage, virtualization platform, and enterprise backup solution for primary and secondary data centers. Department benefits will be: better application performance; enterprise IT stability; lower IT operations with industry best practice solutions and process; efficient monitoring capabilities; DR enhancements; and consistent end user experience.	
4	ITSM	18-19	Planning stage/Complete by July 2020	Information Technology Service Management solution customized for ArDOT's specific needs. Benefits will include: lower cost for IT operations; ability establish well-defined, repeatable and manageable IT processes; improved efficiencies of IT Help Desk teams; clear expectations on service levels and service availability; improved transparency into IT processes and services; and improved end-user satisfaction	

Slide 45, Source: ArDOT[17]



Use this table to document, track, and prioritize projects.

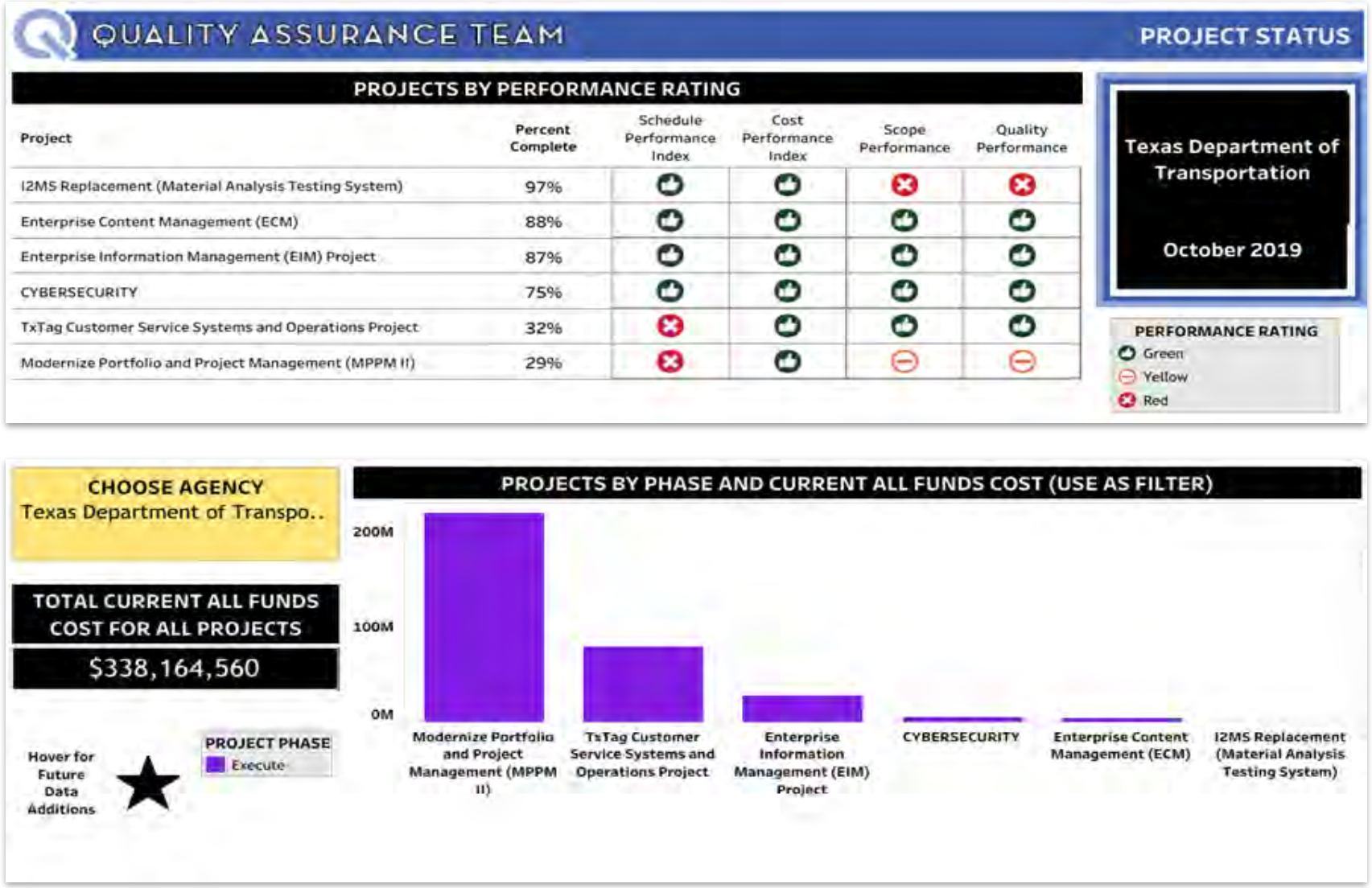
Project Name	Project ID	Sponsor	Assigned BA/PM	Project Category	Project Status	Project Size	Dependencies	Date Added	Last Updated	Days in Backlog	Scoring: Overall	Scoring: Value	Scoring: Execution	Comments	Supports more strategic goals: IS1	Addresses operational: IS
Oracle	P1	Patrick Patton\Charles Brown	Paulette Rice	Transform	In Progress	Medium	Dependent on Others and Others Depend on it	15-Oct-18	1-Jul-19		98	55	43		5	
STIP	P2	Jared Wiley		Transform	Completed	Small	Has no dependecies	1-Jul-19	1-Jul-19		49	22	27		3	
PCPM	P3	Jared Wiley		Transform	Completed	Small	Has no dependecies	1-Jul-19	1-Jul-19		47	26	21		3	
ArcGIS Web	P4	John Fleming		Administrative	Completed	Small	Has no dependecies	1-Jul-19	1-Jul-19		47	17	30		2	
AashtoWare Project	P5			Transform	In Progress	Small	Others depend on its completion	1-Jul-19	1-Jul-19		59	36	23		4	
Fugro	P6	Brad McCaleb		Transform	In Progress	Small	Has no dependecies	1-Jul-19	1-Jul-19		60	36	24		4	
Digital Signage	P7	Crystal Woods		Transform	In Progress	Small	Has no dependecies	1-Jul-19	1-Jul-19		46	25	21		2	
Kronos Upgrade	P8	Crystal Woods		Administrative	In Progress	Small	Has no dependecies	1-Jul-19	1-Jul-19		59	31	28		2	
Extranet	P9	Danny Straessle		Transform	Proposed	Small	Has no dependecies	1-Jul-19	1-Jul-19	212	54	33	21		3	
ITS Camera Project	P10	Joe Hawkins		Grow	On Hold	Medium	Dependent on Pre-requisites	1-Jul-19	1-Jul-19	212	49	24	25		3	
E-SOJ	P11			Administrative	On Hold	Small	Has no dependecies	1-Jul-19	1-Jul-19	212	43	22	21		2	
Asset Management	P12			Grow	On Hold	Small	Dependent on Pre-requisites	1-Jul-19	1-Jul-19	212	48	27	21		3	
Maintenance Software Package	P13	Joe Sartini		Transform	Proposed	Large	Has no dependecies	1-Jul-19	1-Jul-19	212	48	28	20		3	
InspectTech - InspectX	P14			Grow	In Progress	Small	Dependent on Pre-requisites	1-Jul-19	1-Jul-19		61	27	34		2	
Tunnel Project	P15			Run	In Progress	Small	Has no dependecies	1-Jul-19	1-Jul-19		63	32	31		3	
Aasis\ARNLD	P16	Chief Thompson		Grow	In Progress	Small	Dependent on Pre-requisites	1-Jul-19	1-Jul-19		65	31	34		3	
AHP Conference Room	P17	Chief Thompson		Grow	In Progress	Small	Has no dependecies	1-Jul-19	1-Jul-19		53	17	36		1	
Rugged Laptops	P18	Chief Thompson		Run	Completed	Small	Has no dependecies	1-Jul-19	1-Jul-19		62	23	39		2	
Citations Upgrade	P19	Chief Thompson		Grow	Proposed	Small	Has no dependecies	1-Jul-19	1-Jul-19	212	56	24	32		3	
VOIP	P20	Charles Brown		Transform	In Progress	Medium	Dependent on Others and Others Depend on it	1-Jul-19	1-Jul-19		85	44	41		4	
VMWare Server	P21			Transform	In Progress	Medium	Has no dependecies	1-Jul-19	1-Jul-19		61	24	37		3	
Switch Refresh	P22			Administrative	Completed	Medium	Has no dependecies	1-Jul-19	1-Jul-19		67	30	37		3	
Mainframe	P23	Charles Brown	Paulette Rice	Transform	In Progress	Medium	Dependent on Others and Others Depend on it	1-Jul-19	1-Jul-19		92	49	43		4	
ITSM	P24			Transform	In Progress	Medium	Dependent on Pre-requisites	1-Jul-19	1-Jul-19		82	40	42		4	
Sharepoint	P25			Run	In Progress	Medium	Dependent on Pre-requisites	1-Jul-19	1-Jul-19		74	33	41		4	
O365	P26			Transform	Proposed	Medium	Dependent on Pre-requisites	1-Jul-19	1-Jul-19	212	69	31	38		2	
Network Monitoring	P27			Administrative	In Progress	Small	Has no dependecies	1-Jul-19	1-Jul-19		74	35	39		3	
UPS Redundancy	P28			Grow	Proposed	Small	Has no dependecies	1-Jul-19	1-Jul-19	212	59	22	37		2	
Wifi Replacement	P29			Grow	Proposed	Small	Dependent on Pre-requisites	1-Jul-19	1-Jul-19	212	51	17	34		3	
Win7 to Win10 Upgrade	P30			Transform	In Progress	Medium	Dependent on Pre-requisites	1-Jul-19	1-Jul-19		64	34	30		2	
Printer Project	P31			Grow	Proposed	Small	Has no dependecies	1-Jul-19	1-Jul-19	212	45	27	18		2	

1. Introduction | 2. Resource Capacity | 3. Settings | 4. Project Data | 5. Results | 6. Prioritization Criteria Menu

Slide 45, Source: ArDOT[18]

Measure #	Performance Measure	Target	4 Previous Quarters				Current Quarter
			Q3 2017 (Jul-Sep)	Q4 2017 (Oct-Dec)	Q1 2018 (Jan-Mar)	Q2 2018 (Apr-Jun)	Q3 2018 (Jul-Sep)
1	% of times the server is available for use by the customers(ETS Sites)	≥99.9%	99.94%	99.94%	99.92%	99.60%	99.93%
2	% of times a router is available for use by the customers	≥99.7%	99.79%	99.81%	99.76%	99.55%	99.75%
3	% of server instance requests delivered on time	≥90%	92.1%	97.8%	99.0%	99.4%	99.8%

Slide 46, Source: State of Oregon Enterprise Information Services[29]



Slide 46, Source: Texas Department of Information Resources[30,31]

Focus Area Analysis: Organizational Structure

Organizational Structure Citations

Page Number 50

1. AASHTO. *A 50-State Review of State Legislatures and Departments of Transportation*. 2016: http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf
2. AASHTO. *A 50-State Review of State Legislatures and Departments of Transportation*. 2016: http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf
3. AASHTO. *A 50-State Review of State Legislatures and Departments of Transportation*. 2016: http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf
4. AASHTO. *A 50-State Review of State Legislatures and Departments of Transportation*. 2016: http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf
5. AASHTO. *A 50-State Review of State Legislatures and Departments of Transportation*. 2016: http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf
6. AASHTO. *A 50-State Review of State Legislatures and Departments of Transportation*. 2016: http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf
7. AASHTO. *A 50-State Review of State Legislatures and Departments of Transportation*. 2016: http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf
8. Encyclopedia of Arkansas. *Arkansas Highway Commission*. https://encyclopediaofarkansas.net/entries/arkansas-highway-commission-4149/
9. ArDOT Biennial Request 2019 - 2021.

Page Number 51

10. ArDOT 2017-2022 Strategic Plan; ArDOT 2040 Long Range Intermodal Transportation Plan; ArDOT Key Performance Indicators (provided by ArDOT); ArDOT Federal Performance Measures (provided by ArDOT)
11. ArDOT Federal Performance Measures (provided by ArDOT)
12. ArDOT Key Performance Indicators for 2017-2022 Strategic Plan (provided by ArDOT)
13. VDOT. VDOT'S New Project Dashboard: Conference on Performance and Data in Transportation. September 2019. http://onlinepubs.trb.org/onlinepubs/Conferences/2019/PerformanceData/Styles.pdf
14. ArDOT 2019 Transportation Asset Management Plan
15. Maryland DOT. *2019 Annual Attainment Report.* http://www.mdot.maryland.gov/newMDOT/Planning/AR/Update_2019/2019_Attainment_Report_2019_01_25%20LR%20Singles.pdf

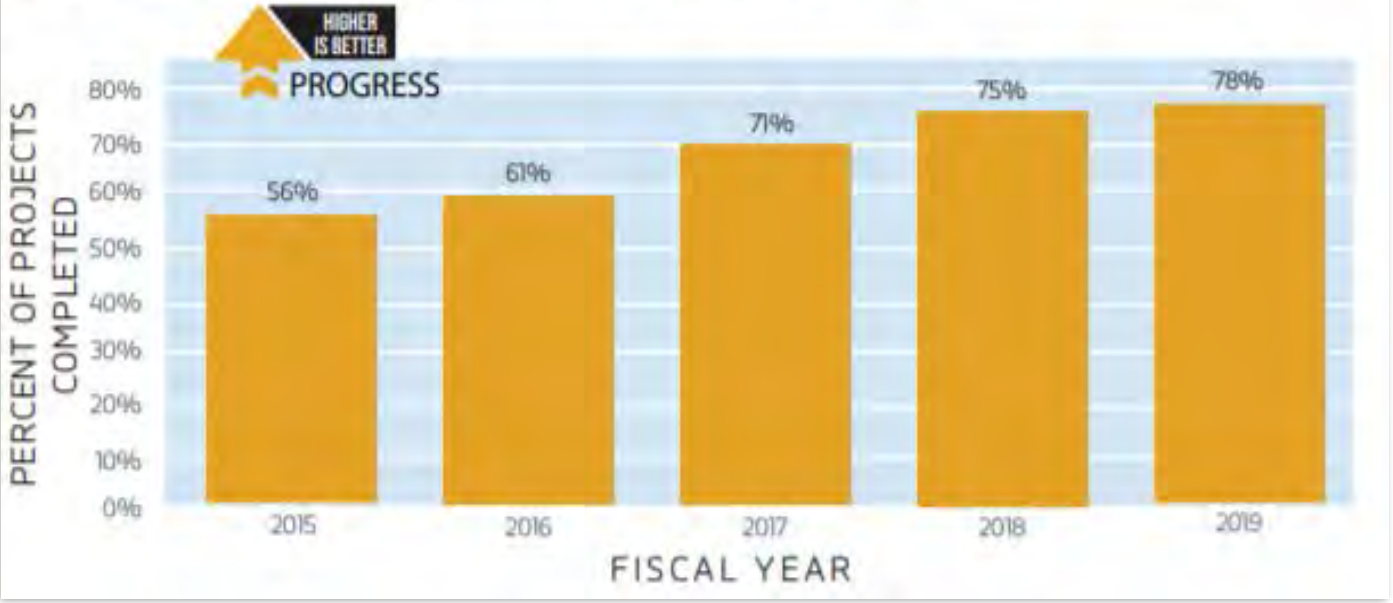
Page Number 52

16. Guidehouse review of ArDOT provided Standard Operating Procedure documents
17. Guidehouse Interview with ArDOT HR
18. Guidehouse Interviews with ArDOT Area Maintenance Supervisors (Rural) and District/Assistant Maintenance Superintendents (Rural)
19. Guidehouse Interviews with ArDOT District Construction Engineers (Rural) and Construction
20. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
21. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies.* 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
22. ArDOT Current Personnel Data (provided by ArDOT, analyzed by Guidehouse)
23. ArDOT 2019 Transportation Asset Management Plan
24. Guidehouse Interview with ArDOT HR
25. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
26. Guidehouse Interview with ArDOT HR
27. Transit Cooperative Research Program. *Managing Transit's Workforce in the New Millennium*. 2002. https://books.google.com/books?id=cnikn3rnl5oC&dq=Maryland+DOT,+hiring+retirees&source=gbs_navlinks_s
28. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
29. TRB Knowledge Management Task Force. KM for Transportation Agencies. http://roadsafetyknowledge.com/NCHRP20_98KMGuide/understanding2.html

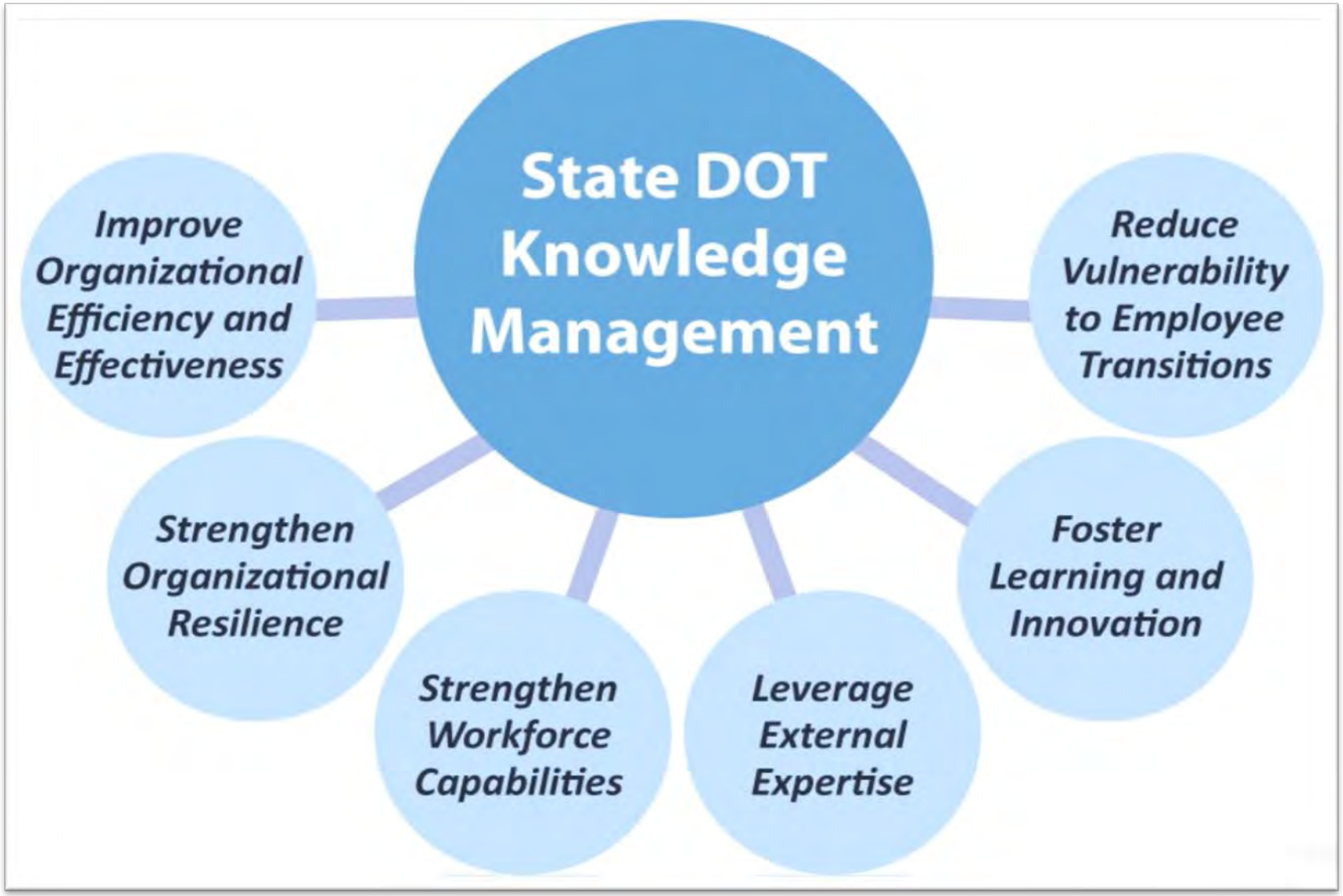
Slide 51, Source: MDOT

PERCENT OF PROJECTS COMPLETED BY ORIGINAL CONTRACT DATE

This measure illustrates MDOT's efficiency in managing and delivering contracts and services. It is calculated by assessing contracts completed by their established commitment date or slated project completion date. Project completion is based on when stakeholders are able to receive benefit from the project, such as when a new pedestrian path is opened to the public.



Slide 51, Source: MDOT



Slide 52, Source: TRB National Cooperative Highway Research Program

Focus Area Analysis: People Capabilities

People Capabilities Citations

Page Number 56

1. ArDOT 2019 Transportation Asset Management Plan
2. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
3. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
4. ArDOT Turnover Data (provided by ArDOT, analyzed by Guidehouse)
5. ArDOT Turnover Data (provided by ArDOT, analyzed by Guidehouse)
6. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
7. Guidehouse Interviews with ArDOT District/Assistant Maintenance Superintendent (Rural & Urban)
8. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
9. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
10. ArDOT Turnover Data (provided by ArDOT, analyzed by Guidehouse)
11. ArDOT Turnover Data (provided by ArDOT, analyzed by Guidehouse)
12. Society for Human Resource Management. Press Release. 2016: https://www.shrm.org/about-shrm/press-room/press-releases/pages/human-capital-benchmarking-report.aspx

Page Number 57

13. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
14. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
15. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
16. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
17. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
18. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
19. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
20. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
21. Bureau of Labor Statistics. *May 2018 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates*. https://www.bls.gov/oes/current/oessrcma.htm
22. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
23. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
24. Bureau of Labor Statistics. *May 2018 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates*. https://www.bls.gov/oes/current/oessrcma.htm; Guidehouse Interviews with ArDOT Area Maintenance Supervisors (Rural)
25. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
26. Bureau of Labor Statistics. *May 2018 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates*. https://www.bls.gov/oes/current/oessrcma.htm; ArDOT Salary Information (provided by ArDOT, analyzed by Guidehouse)
27. Bureau of Labor Statistics. *May 2018 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates*. https://www.bls.gov/oes/current/oessrcma.htm; ArDOT Salary Information (provided by ArDOT, analyzed by Guidehouse)

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28. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
29. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
30. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
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33. Guidehouse Interview with ArDOT HR
34. Guidehouse Interview with ArDOT HR
35. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies.* 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
36. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
37. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies.* 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
38. Guidehouse Interview with ArDOT District Maintenance Engineer (Urban)
39. Loskorn, Jeffrey Aaron. *Framework for compressed workweek implementation for TxDOT maintenance forces and flexible work arrangements for employees*. 2011. https://repositories.lib.utexas.edu/handle/2152/ETD-UT-2011-12-4604
40. Guidehouse Interviews with District Staff
41. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)

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42. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
43. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
44. Guidehouse Interview with ArDOT Area Maintenance Supervisor (Rural)
45. Guidehouse Interview with ArDOT District Engineer (Urban)
46. Guidehouse Interview with ArDOT District/Assistant Maintenance Superintendent and Area Maintenance Supervisor
47. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
48. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
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52. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
53. ArDOT Training Completion Data (provided by ArDOT, analyzed by Guidehouse)

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54. ArDOT Training Completion Data (provided by ArDOT, analyzed by Guidehouse)
55. ArDOT Training Completion Data (provided by ArDOT, analyzed by Guidehouse)
56. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
57. Guidehouse Interview with ArDOT District Engineer (Urban)
58. Guidehouse Interview with ArDOT Resident Engineer (Rural)
59. ArDOT Maintenance Training Academy Overview (provided by ArDOT)
60. Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Careers at Transportation Agencies*. 2018: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs
61. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
62. Guidehouse Interview with ArDOT Resident Engineer (Rural)
63. Guidehouse Interviews with ArDOT Resident Engineer (Rural), Construction, and Area Maintenance Supervisor (Urban)
64. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)
65. Guidehouse Interview with ArDOT Resident Engineer (Rural)
66. Guidehouse Interview with ArDOT Resident Engineer (Rural) / Construction
67. University of Minnesota. *Circuit Training and Assistance Program*. http://www.mnltap.umn.edu/training/ctap/
68. ArDOT Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse)

Appendix B

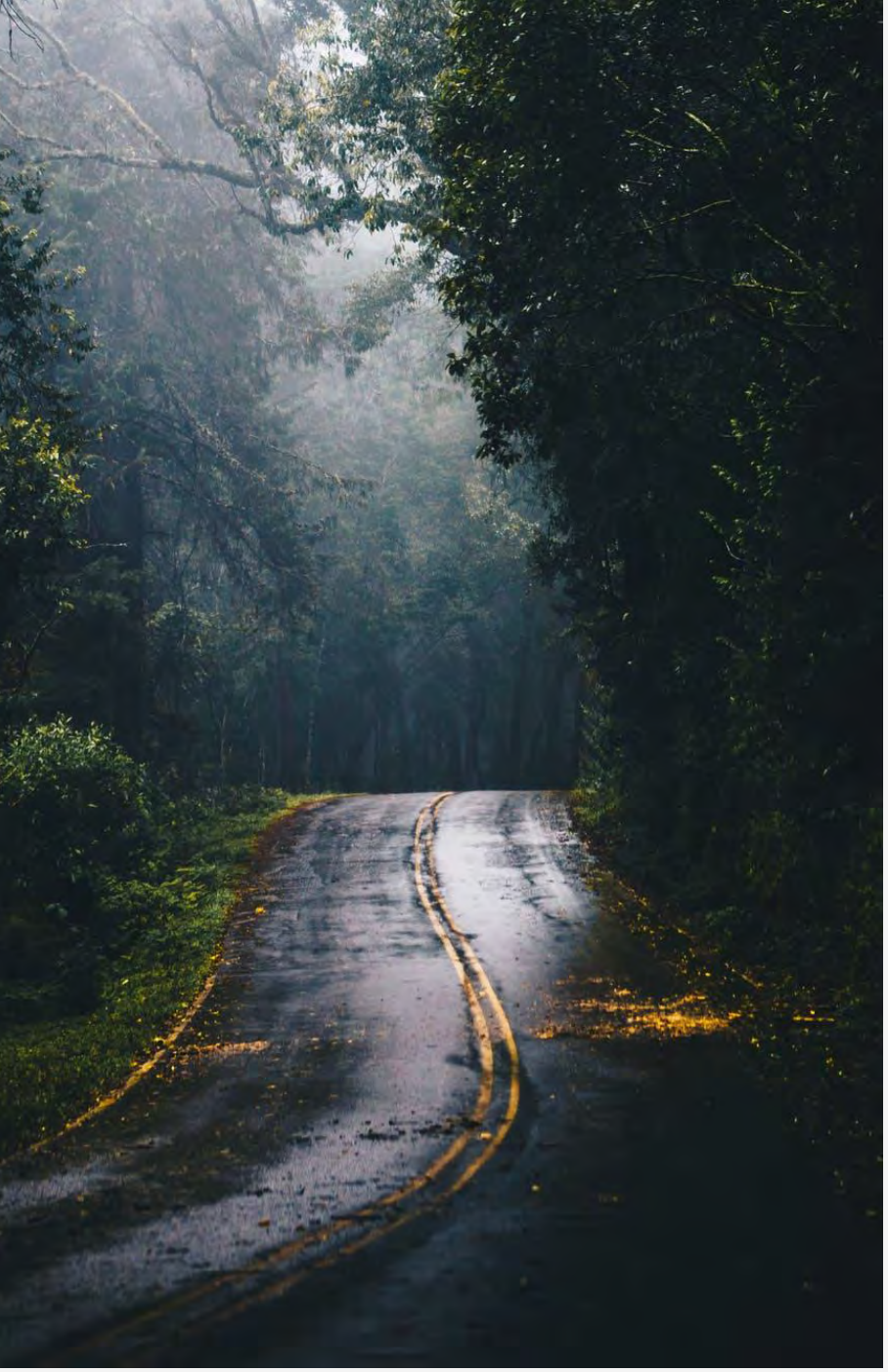
Guidehouse

Arkansas Department of Transportation Performance Review

Recommendations Report

April 20, 2020

Table of Contents



Acknowledgements

Guidehouse, once again, appreciates and wants to acknowledge the cooperation that the Arkansas Department of Transportation (ArDOT) provided during the course of the Current State review which informed the Current State Assessment Report (delivered on March 13, 2020), and laid the foundation for this Recommendation Report. We were impressed with the knowledge and level of engagement that ArDOT staff at all levels were able to provide during the Current State review.

This process would not have been possible without the countless individuals who agreed to be interviewed and provide documentation assistance. The quick and effective coordination with ArDOT staff was critical to the success of the Current State review.

Lastly, Guidehouse would also like to take time to acknowledge any other external stakeholders that also contributed to this process.

Executive Summary

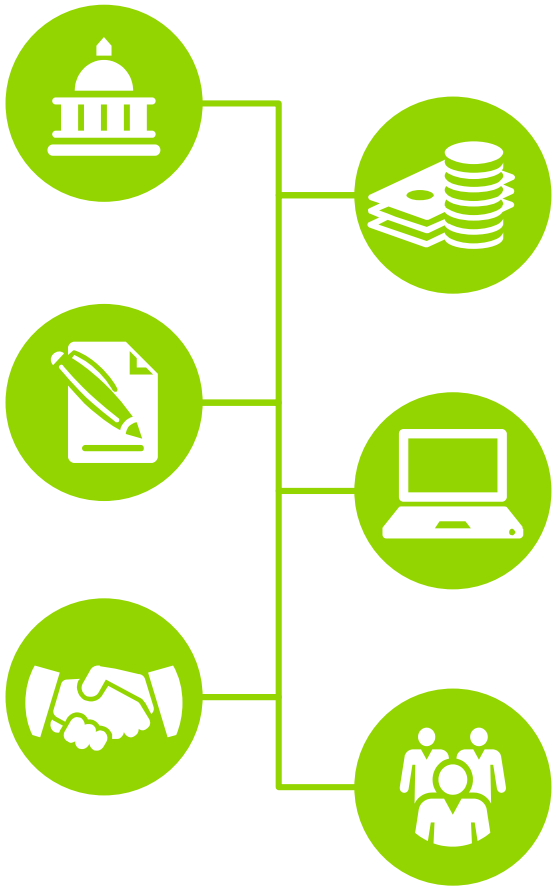
Current State

Opportunities & Challenges

ORGANIZATIONAL STRUCTURE
Unique governance structure; Lack of formal KPIs and knowledge management

PORTFOLIO PLANNING
Lack of proactive transportation program and project transparency; Need for maintenance portfolio planning recalibration

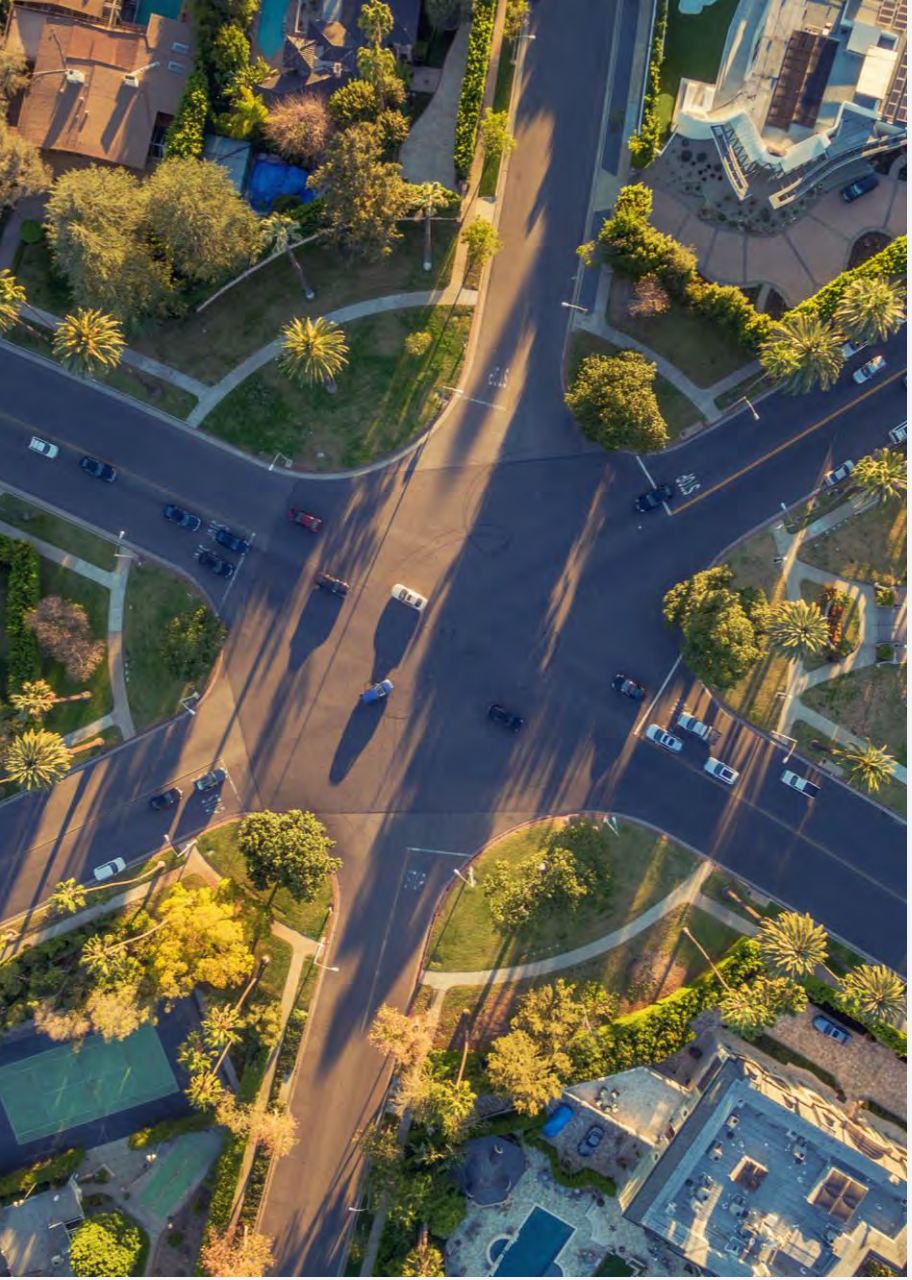
PROCUREMENT
Limited oversight; Need for trend analysis; Not able to screen for high-performing vendors; Lack of vendor performance management



EXPENDITURES
Lack of project and portfolio management tools and protocols; Lack of documentation and analysis to refine approaches

INFORMATION TECHNOLOGY
Focus on stabilizing current IT infrastructure; Limited long-term IT planning

PEOPLE CAPABILITIES
Industry competition; Increasing turnover; Lack of formal learning and career pathways



Recommendations

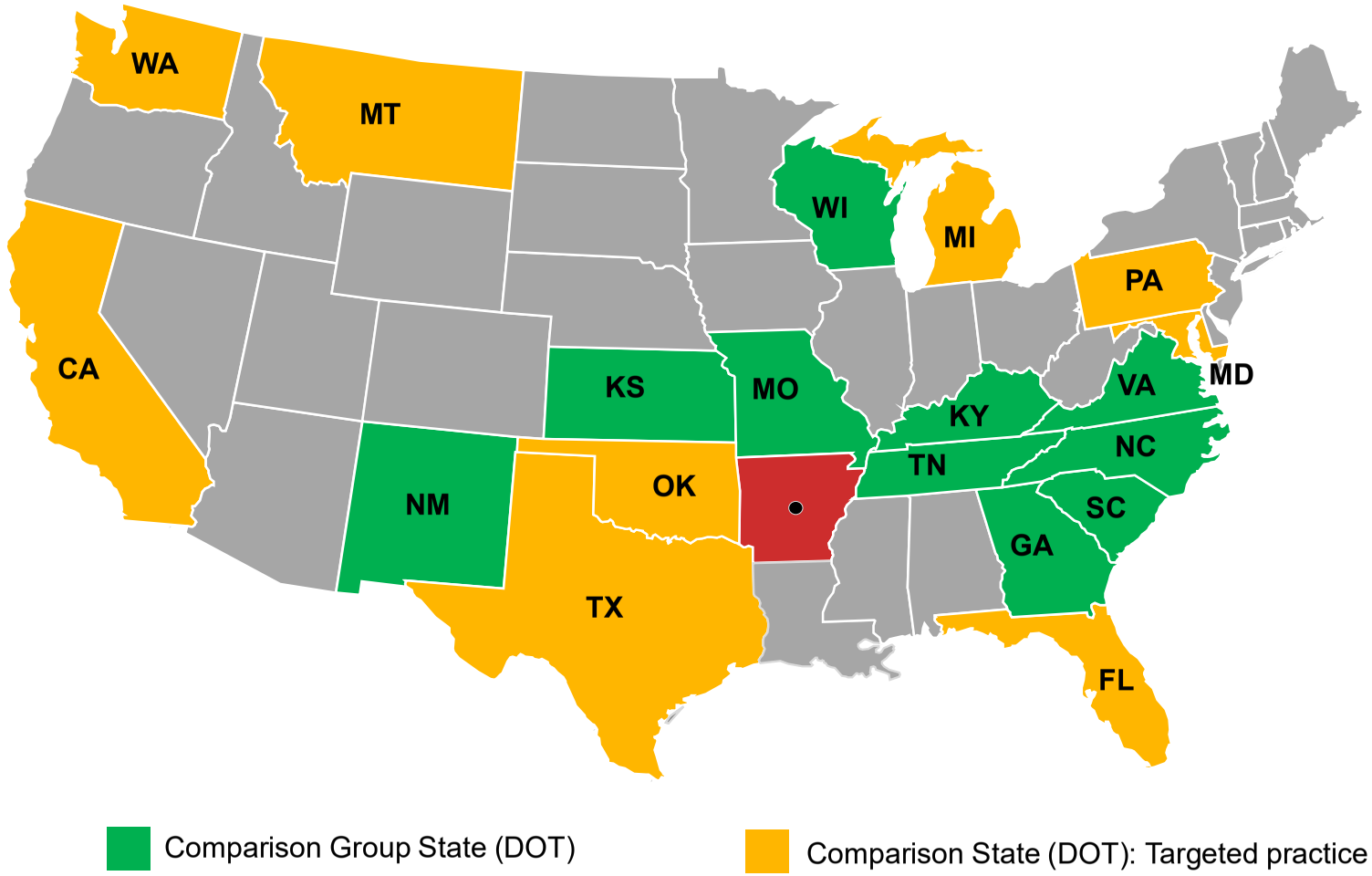
Evaluation Criteria

- Contributes to the objective of an effective, efficient ArDOT
- Has been implemented by leading DOTs, and where possible, proven with data
- Aligns with generally accepted industry standard, strategies, and frameworks

Leading Practices

Guidehouse identified a set of 10 comparison group DOTs that have realized robust performance on a set of Transportation specific measures, yet have similar or lower expenditures on a per lane mile basis (identified in green, see Map right). The appendix presents a detailed comparison of these DOTs to ArDOT. Where publicly available data yielded a comprehensive and coherent depiction of leading practices within a specific focus area, we summarize those practices in our recommendations.

In the remaining instances, Guidehouse sourced leading practices on an individual DOT basis (identified in yellow, see Map right); existing research commissioned or conducted by credible Transportation authorities such as the Federal Highway Administration (FHWA), Transportation Research Board (TRB), and National Cooperative Highway Research Program (NCHRP); or from leading industry authorities such as the Society for Human Resources Management (SHRM).



Future State
A Vision Forward

Strategic

Adopting a portfolio view to optimize investments and resource deployment; ensuring accountability

What It Looks Like

- Performance-based investments
- Resource planning to meet objectives
- KPIs to ensure internal accountability

Efficient

Documenting outcomes and analyzing trends to inform best practices; standardizing procedures for consistency

What It Looks Like

- Direct & indirect cost savings / avoidance
- Optimizing practices based on data analytics
- Policies and procedures repeatable efficiency

Optimized

Strengthening human capital and information technology to align with current and future business needs

What It Looks Like

- Maintenance of core institutional knowledge
- Engaged staff who are retained by ArDOT
- IT service that supports business objectives

Transparent

Communicating proactively with the traveling public, ArDOT employees, and other key stakeholders

What It Looks Like

- Visibility into goals, process, and progress
- Awareness of decision-making priorities
- Closing the loop on all public inquiries

Recommendations

Overview

		Recommendation	Strategic	Efficient	Optimized	Transparent
Organizational Structure	1	Finalize KPIs and implement performance management	✓	✓		✓
	2	Strengthen knowledge management in anticipation of increased retirement			✓	
Portfolio Planning	3	Publish status of construction projects and maintenance activities				✓
	4	Implement a platform that tracks all stakeholder inquiries to resolution	✓	✓		✓
Procurement	5	Implement efficiencies in procurement and purchasing	✓	✓		
	6	Implement construction contractor performance measurement	✓	✓		✓

Recommendations

Overview

		Recommendation	Strategic	Efficient	Optimized	Transparent
Expenditures	7	Implement project and portfolio management frameworks	✓	✓		✓
	8	Implement best practices in construction project design		✓		
Information Technology	9	Build an IT Governance Structure to guide the Department's IT investments	✓		✓	
	10	Implement mid-term IT initiatives that can optimize business operations		✓	✓	
	11	Develop critical pillars necessary to establish IT as an effective business partner	✓	✓	✓	
People Capabilities	12	Ensure staff can develop in their careers at ArDOT	✓	✓	✓	
	13	Improve staff capabilities to align with current / future organization needs	✓		✓	

Recommendations

Organizational Structure

Guidehouse

1.

Finalize KPIs and implement performance management

ArDOT has mature KPIs primarily for system condition and preservation. By adopting leading performance management practices, ArDOT should formulate and track a variety of operational effectiveness KPIs within a larger performance management framework.

Findings Addressed

OS2.2: Current Key Performance Indicators (KPIs) are limited to system condition. Operational effectiveness is not yet being measured

ArDOT Implementation

- Finalize existing KPIs and establish preliminary dashboard
- Establish baseline performance targets; connect to strategic plan
- Create and implement a roadmap for a comprehensive performance management plan

Anticipated Impact

Adopting FHWA's Transportation Performance Management (TPM) framework[1] and DOT leading practices may yield:

- Greater public transparency into, and accountability for, progress towards goals and objectives
- Assisting the legislature in informed policy and budget decisions[2]
- Actionable insights into initiatives that can achieve increased operational effectiveness

Considerations

- This is a long-term initiative and should be approached in phases
- This practice should be used to improve the Department and foster collaboration
- Communication, training, and change management may be required to socialize a new performance-based approach

GLOSSARY

KPI: Key Performance Indicators *FHWA: Federal Highway Administration* *TPM: Transportation Performance Management Framework*

Disclaimer: Anticipated Impacts are estimates, directional in nature, and represent the upper end of the savings range

Leading Practices: Performance Reporting

FHWA's TPM framework and practices from other DOTs provide a template for ArDOT to report on the Department's performance and utilize that data to optimize funding and resources.

Description

FHWA offers a comprehensive TPM framework[1] comprised of 10 components that link strategic planning, performance reporting, and continuous improvement. The framework and associated toolkits are available to DOTs.

Many DOTs maintain a performance scorecard. Of the 10 comparison group DOTs, nine do so. Missouri DOT[2], Wisconsin DOT[3], and (although not a comparison group DOT), Maryland DOT[4] have the most more mature reporting systems.

Applied to ArDOT, these practices may yield:

- ***Ability to communicate overall Department-wide performance to the public***
- ***Ability to utilize performance data to improve efficiency and optimize transportation funding***

Image Source: Screen capture of 2020 Maryland DOT Attainment Report[6]

MDOT: Annual Attainment Report[5]

This report is published annually and articulates:

- *MDOT's progress on seven goals*
- *Performance against ~50 KPIs*
- *What contributed to the change in performance*
- *Planned initiatives to improve performance*

Guidehouse

GLOSSARY

FHWA: Federal Highway Administration *TPM: Transportation Performance Management* *MDOT: Maryland DOT* *KPI: Key Performance Indicator*

Implementation Roadmap

1 FINALIZE EXISTING KPIs

Benchmark KPIs against other peer states and verify relevance of KPIs with ArDOT stakeholders

Finalize ArDOT's identified KPIs[1] incorporating benchmark findings, stakeholder feedback, and a review of remaining report recommendations (and monitoring obligations)

Identify frequency of measurement and reporting

Establish preliminary dashboard to track performance on a regular basis

Consider making preliminary dashboard publicly available

2 ESTABLISH TARGETS

Establish Department-wide baseline targets and connect to the Department's strategic plan

Identify preliminary objectives that will yield identified performance targets

Translate goals and objectives to specific divisions and districts

Establish ArDOT leadership working group to monitor performance against targets with regular frequency; course correct as needed

3 CREATE A ROADMAP

Complete FHWA's TPM maturity level self assessment (or other comparable maturity assessment)

Identify gaps in key performance management components and in the underlying organizational and IT infrastructure

Create long-term roadmap to address gaps and achieve target maturity level

Establish a communications and change management plan to ensure staff members are informed and supported, and that performance framework meets stakeholder needs

Establish an annual review of KPIs to determine which ones truly measure and enhance Department performance

GLOSSARY

KPI: Key Performance Indicator *FHWA: Federal Highway Administration* *TPM: Transportation Performance Management*

2.

Strengthen knowledge management in anticipation of increased retirement

Knowledge management will be a key issue for ArDOT, yet their efforts to mitigate this challenge have not been fully implemented. Aligning these efforts to leading practices may allow ArDOT to mitigate knowledge loss due to turnover, identify operational efficiencies, and improve succession planning and training.

Findings Addressed

- OS3.1: SOPs are extensive, but not regularly updated
- OS3.2: Minimizing knowledge loss is a strategic priority for ArDOT, but efforts are not mature

ArDOT Implementation

- Identify near-term "At Risk" business practices
- Initiate near-term succession planning activities
- Lay groundwork for more formal knowledge management system
- Implement systems to sustain the desired change

Anticipated Impact

Adopting leading knowledge management practices may:

- Minimize institutional knowledge loss due to the **~26%** of staff eligible to retire in 10 years[1]
- Help identify operational efficiencies such as VDOT's **$1.4M** in transportation consultant cost avoidance[2] due to better resource sharing

Considerations

- New IT systems and software may be required to support SOP creation and centralize content
- Updating and creating new SOPs can be a significant undertaking; using a comprehensive inventory will help ArDOT prioritize
- Leadership support and change management may be needed for lasting change

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GLOSSARY

SOP: Standard Operating Procedures *KM: Knowledge Management* *ROW: Right of Way*

Disclaimer: Anticipated Impacts are estimates, directional in nature, and represent the upper end of the savings range

Leading State: Virginia DOT

In 2003, VDOT faced a potential wave of retirees, as ArDOT does today. In response, VDOT implemented a Knowledge Management Division (the first state to do so), yielding direct financial and human capital benefits for the Department .

Description

A Harvard Kennedy School Report[1] revealed that VDOT successfully implemented its knowledge management strategy by focusing on the following tools and techniques: communities of practice, knowledge mapping, process mapping, and frequent assessments.

$1.4M

Return on investment from ROW and Utility resource sharing[2]

$500K

Return on investment from use of the new KM system to launch VDOT's Project Record Keeping System[3]

Applied to ArDOT, these practices may yield:

- ***Maintenance of institutional knowledge amid turnover***
- ***Operational efficiencies such as reduced reliance on transportation consultants and former staff members***
- ***Strategic use of training to support knowledge management***

VDOT's pilot program led to VDOT being the recipient of the Harvard Innovations in Government Program in 2008[4]

Guidehouse

GLOSSARY

VDOT: Virginia Department of Transportation *ROW: Right of Way* *KM: Knowledge Management*

Implementation Roadmap

1 IDENTIFY NEAR-TERM "AT RISK" BUSINESS PRACTICES

Expand existing initiative to identify "at risk of separation" employees by:

- Identifying districts and divisions with greatest likelihood of turnover
- Cataloging high-risk processes, applications, and areas of subject matter expertise

Inventory existing Standard Operating Procedures (SOPs) and training mechanisms to understand documentation and knowledge transfer gaps

2 INITIATE NEAR-TERM SUCCESSION PLANNING

Designate candidate staff members and teams to be new owners of "at risk" business process knowledge and expertise

Identify pathways for effective knowledge capture and transfer:

- SOP creation
- Job shadowing
- Cross-training
- Communities of practice

Identify and execute on implementation timeline

3 LAY GROUNDWORK FOR FORMAL KM SYSTEM

Designate a knowledge management team (i.e. SIR)

Identify POCs within each district and division to:

- Catalog existing SOPs
- Identify SOP owners, users, and contributors
- Oversee SOP development and revision
- Lead Communities of Practice (CoP)

Create a centralized hub for Department-wide SOPs, policies, and training materials; link appropriately to public website

4 IMPLEMENT SYSTEMS TO SUSTAIN CHANGE

Conduct annual review of hiring and workforce data (e.g., at the 1-, 3-, 5-, and 10-year tenure marks)

Create and rollout a standardized system for regular SOP review

Provide staff with a formalized approach to coaching, mentoring, and CoPs for continuous knowledge management

Consider employee incentives, where possible

GLOSSARY

SOPs: Standard Operating Procedures *SIR: System Information and Research* *POCs: Points of Contact* *CoP: Communities of Practice*

Portfolio Planning

Guidehouse

3.

Publish status of construction projects and maintenance activities

ArDOT's existing communication of project and maintenance activities is disjointed and difficult to navigate. Improving the communication and reporting structure can enhance public visibility into, and accountability for, project performance; enhance project delivery; and yield better data to inform planning and budget appropriations.

Findings Addressed

- PP1.2: ArDOT's public communication related to project status, schedule and budget is disjointed and inconsistent
- PP2.3: There is no formal structure to coordinate maintenance workplans to the general public or interested stakeholders

ArDOT Implementation

- Inventory current reporting infrastructure
- Identify and implement short-term reporting enhancements
- Lay the groundwork for long-term reporting improvements

Anticipated Impact

Bringing ArDOT in line with comparison DOTs may:

- Improve public access to the prioritization and status of Department-wide and county projects and road maintenance
- Expedite project and maintenance delivery time
- Yield more precise data on maintenance needs to better inform planning and budget appropriations

Considerations

- ArDOT does not need to build out an entire platform to rapidly enhance reporting of readily available project status data: leverage existing platforms and tools, such as iDRIVE AR and district office websites
- An enterprise level approach will be required to provide true real-time access to project status

Disclaimer: Anticipated Impacts are estimates, directional in nature, and represent the upper end of the savings range

Leading Practices: Construction Project Reporting

Enhancing project reporting will bring ArDOT in line with comparison DOTs. Project reporting practices from these DOTs reveal how ArDOT can better inform the public of the status and progress of its construction projects and utilize that data to enhance project delivery.

Description

Review of the 10 comparison group DOTs reveals that all provide interactive maps of projects:

- KDOT[1] and VDOT[2] have the most mature platforms, with **"one-stop"** to locate projects, access status, and view the entire portfolio
- Seven DOTs, such as GDOT[3], also provide a view of **future construction projects**
- Four DOTs, such as KTC[4], provide access to construction progress via **"Data Mart"** portals

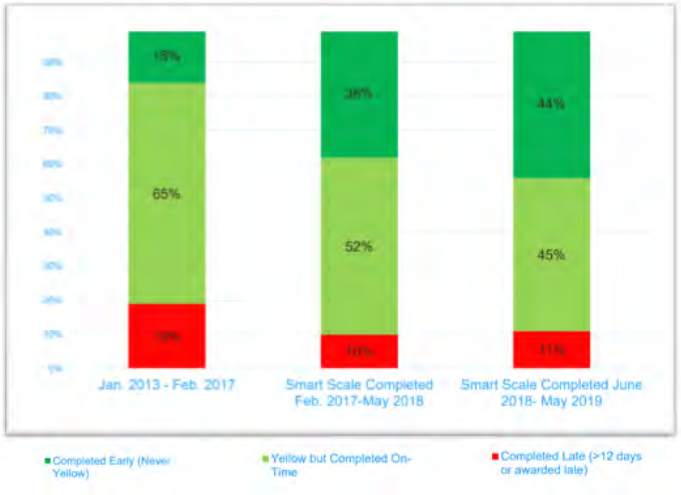
Applied to ArDOT, these practices may yield:

- ***Increased public visibility into, and accountability for, portfolio performance***
- ***Enhanced project delivery***
- ***Reduced project status inquiries***

Virginia DOT (VDOT): Portfolio View[5]

VDOT provide interactive portfolio/program level summaries of their major construction programs. These summaries, allow "click-through" access to view project information including project progress and performance.

Image Source: Screen capture of VDOT Smart Scale Dashboard [6]



Virginia DOT (VDOT): Project Performance Analysis[7]

VDOT attributes an increase in early delivery of construction activities (16% to 44%) to improved performance reporting and business rules.

Image Source: Screen capture of VDOT presentation[8] at the Performance and Data in Transportation conference[8]

GLOSSARY

KDOT: Kansas DOT VDOT: Virginia DOT GDOT: Georgia DOT KTC: Kentucky Transportation Cabinet

Leading Practices: Maintenance Activities Reporting

Increasing visibility into maintenance activities will bring ArDOT in line with comparison DOTs. Maintenance reporting practices from these DOTs reveal how ArDOT can communicate current and planned maintenance work, and utilize data for planning and budget appropriations.

Description

All but one of the 10 comparison group provide visibility into maintenance work plans or budgets:

- NCDOT[1] provides a listing of all active maintenance projects on its website
- PennDOT[2] districts publish weekly maintenance activities
- MoDOT[3] and KDOT[4] provide long-term workplans
- KTC[5] publishes State-level analyses of maintenance performance

Applied to ArDOT, these practices may yield:

- ***Increased public visibility into, and accountability for, portfolio performance***
- ***More precise maintenance needs data to better inform planning/budget appropriations***

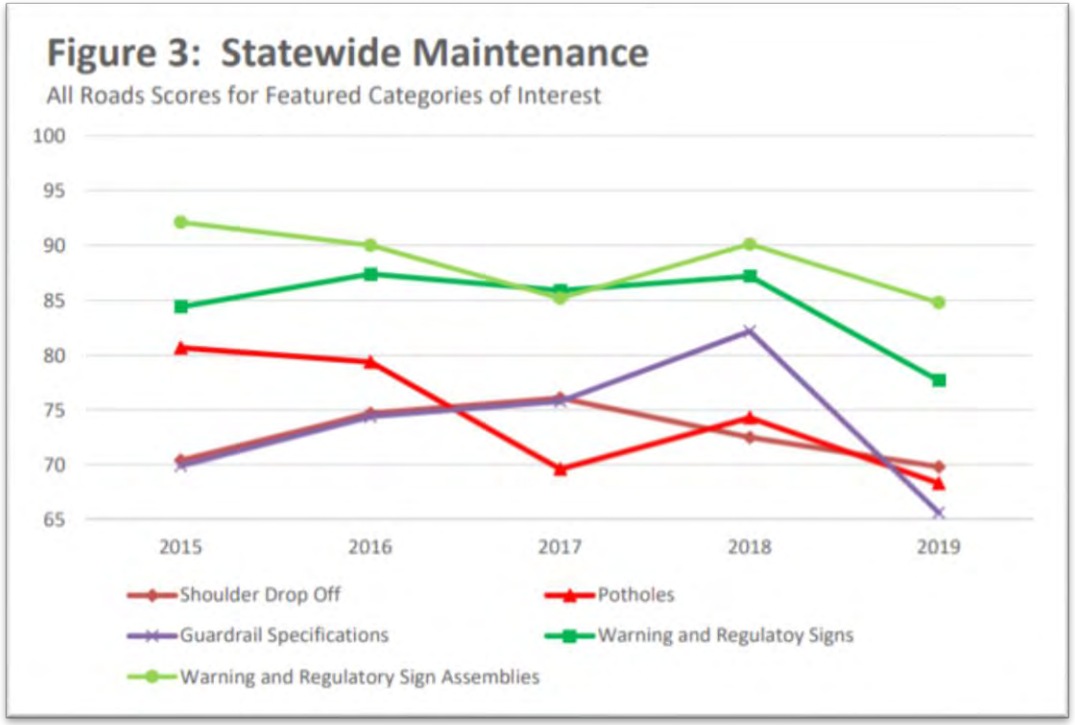


Image Source: Screen capture of KTC FY2019 Maintenance Condition Report[7]

KTC: Statewide Performance Reporting[6]

KTC publishes an annual report on routine maintenance activities at State and district levels. They also provide expenditure data on State and district maintenance

KTC uses the analysis to inform "planning and management decisions regarding maintenance activities and resources"

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GLOSSARY

NCDOT: North Carolina DOT PennDOT: Pennsylvania DOT MoDOT: Missouri DOT KDOT: Kansas DOT KTC: Kentucky Transportation Cabinet

Implementation Roadmap

1 INVENTORY CURRENT INFRASTRUCTURE

Catalog existing reporting platforms:
- iDRIVE Arkansas
- STIP website
- CAP website
- District office websites

Identify underlying data platforms:
- Staff Minutes database
- SiteManager and SARS
- Homegrown databases

2 IDENTIFY SHORT-TERM ENHANCEMENTS

Identify project data that can be provided via existing infrastructure:
- iDRIVE Arkansas: Identify future projects; Pre-Construction status and milestone dates; Project Change Order data, A+C Project completion percentages
- District office websites: County maintenance bi-weekly plans; district paving projects

Leverage CAP And IRP infrastructure to establish portfolio and county level reporting for all projects

Identify short-term implementation timeline

3 LAY GROUNDWORK FOR LONG-TERM IMPROVEMENTS

Identify additional reporting needs via customer service surveys
(See also Recommendation 1)

Ensure the MMS system can scale to provide State and district performance data and county level work plans
(See also Recommendation 7)

Ensure that the new construction Project Management framework facilitates detailed project status information reporting
(See also Recommendation 7)

In partnership with IT, build backend database to enable automated long-term reporting capabilities
(See also Recommendation 10)

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GLOSSARY

STIP: Statewide Transportation Improvement Program *CAP: Connecting Arkansas Program* *SARS: SiteManager Access Report System*

IRP: Interstate Rehabilitation Program *MMS: Maintenance Management System*

4.

Implement a platform that tracks all stakeholder inquiries to resolution

ArDOT primarily manages customer service by providing the public direct access to staff. Leading customer services practices suggest that ArDOT can improve its customer service, while simultaneously reducing the cost to the Department and surfacing new Department-wide operational efficiencies.

Findings Addressed

- PP3*:* Although ArDOT is responsive to public inquiries, it only offers a limited number of tools to capture and track them

ArDOT Implementation

- Understand customer needs
- Define a new customer experience vision
- Lay the groundwork for a new service approach, including adoption of a CRM tool
- Create and execute on implementation plan; and measure and communicate customer service performance

Anticipated Impact

- Brings ArDOT in line with other DOT's with more mature customer service platforms
- Reduces customer service and (long term) Department operating costs based on a review of Portland's 311 call- center implementation[1] a and McKinsey report[2]
- Increase in staff engagement by **Up to 50%**, according to a Tempkin Group survey[2]

Considerations

To avoid potential landmines and a particularly long timeline, lessons learned suggest:

- Clear vision, leadership buy-in
- Upfront investment for future ROI
- Project Manager passionate about customer service
- Right technology application identified early in the process
- In a phased approach, transition "services" not divisions

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GLOSSARY

CRM: Customer Relationship Management *ROI: Return on Investment*

Disclaimer: Anticipated Impacts are estimates, directional in nature, and represent the upper end of the savings range

Leading Practice: Customer Service

Customer service practices and trends from DOTs, the private sector, and the broader public sector (specifically for 311 call-centers) illuminate the benefits of this practice and potential implementation strategies for ArDOT.

Description

A review of the 10 comparison group DOTs reveals DOT-specific structures to manage customer inquiries and measure service:

- Six DOTs ***measure and report on customer service/responsiveness***
- Eight DOTs have a ***centralized call-center*** or ***IVR system***, and allow the public to report a concern online

Portland's[1] and Philadelphia's 311[2] call-centers can serve as a model roadmap for a centralized customer service approach.

Applied to ArDOT, these practices may yield

- ***Improved customer service through better tracking and management of customer inquiries***
- ***Reduced operational spend via lower transaction costs, elimination of irrelevant customer services, and resource allocation aligned with stakeholder requirements***

15 – 25%

Typical cost reductions achieved through successful customer experience projects across a variety of industries[3]

$4.25 - $5.10

Projected Portland 311 call-center cost reduction per transaction in switching from phone agent to online self service[4]

Image Source: Screen capture of Missouri DOT 2019 Results Report[6]

Missouri DOT (MoDOT) measures customer service[5] on a quarterly basis and administers a biennial survey of ~3,500 customers to:

- Assess customer needs
- Evaluate ArDOT responsiveness
- Improve the MoDOT customer experience

GLOSSARY

IVR: Interactive Voice Response *MoDOT: Missouri Department of Transportation*

Implementation Roadmap

1 UNDERSTAND CUSTOMER NEEDS

Leverage existing resources to quantify the scope and type of customer inquiries:

- iDRIVE Arkansas
- Call Logs from Public Information Office, district offices, other divisions
- Interviews with key public facing staff

Conduct targeted survey of sample ArDOT customers to assess their needs

Create a comprehensive analysis of customer needs by key citizen segments

2 DEFINE CUSTOMER EXPERIENCE VISION

Conduct workshops with key ArDOT leaders to develop a customer experience vision and corresponding customer service journey maps

Leverage best practices to inform implementation frameworks and roadmaps

Identify a Project Manager and Governance team to ensure robust project sponsorship and effective delivery

3 LAY THE GROUNDWORK

Review key business processes through a customer service lens

Revisit existing customer inquiry intake and routing process to improve workflow

Identify new business and technology requirements for technology solutions

Identify metrics and service level agreements to track performance; document roles and responsibilities to ensure service meets expectations

4 FORM AND EXECUTE ON PLAN

Identify quick win improvements to generate momentum for the effort

Create a long-term implementation plan:

- Website upgrades
- Software tools, including CRM tools
- Expanded Customer Service Team; call-center

Establish reporting structure to communicate volume of customer service requests and ArDOT's management and resolution

GLOSSARY

CRM: Customer Relationship Management

Procurement

Guidehouse

5.

Implement efficiencies in procurement and purchasing

ArDOT prioritizes cost savings, but lacks the data to demonstrate what works and when. By optimizing and standardizing procurement and purchasing procedures, ArDOT may more effectively use resources and maximize costs savings Department-wide – including and beyond construction procurement.

Findings Addressed

- PR1.2: Low bid procurement
- PR4.1: Qualifications-based procurement methods
- PR4.2: Alternative contracting methods
- PR5.1: Trend analysis
- PR5.2: Procurement governance

ArDOT Implementation

- Use data-driven approaches like spend analysis and lifecycle costing to inform procurement and purchasing decisions
- Standardize usage of project acceleration techniques, procurement methods, and delivery methods
- Push efficiencies to districts

Anticipated Impact

- Applying policies similar to TxDOT's[1] change order policy, ArDOT could save **~1.4M (3.5%)**
- Adopting NIGP's[2] best practices in spend analysis, management, and oversight could reduce small order (<$20k) and competitive bid ($20K-$75K) costs by up to **~$1.8 to 7.1M (5-20%)**

Considerations

Effective implementation will require the following resources:

- IT systems to track data
- Staff capacity and expertise to conduct data analysis
- Assignment of responsibility between districts and divisions
- Change management to shift culture from low bid to best value

GLOSSARY

TxDOT: Texas DOT *NIGP: Institute for Public Procurement*

Leading Practice: Procurement Decision Matrix

This tool will allow ArDOT to integrate their own analysis and priorities alongside generally accepted industry standards to yield a roadmap of when alternative strategies should be used to achieve desired outcomes.

Description

Transportation Construction Management (a working group of DOTs, AASHTO, FHWA, and researchers) commissioned a guidebook[1] for project delivery, procurement, and payment methods. The provided frameworks and tools enable DOTs to select the optimal methods for projects based on desired outcomes, constraints, and other factors.

A Minnesota DOT study[2] on the efficacy of their alternative contracting policies reveals their value in helping identify optimal contracting and project delivery methods. For example, ***A+B contracts yielded comparable final contract amounts, but lower internal MnDOT costs***

Applied to ArDOT, these practices may yield:

- ***More strategic deployment of alternative strategies to maximize cost savings***
- ***Standardized practices to facilitate consistency for staff and the contractor community***

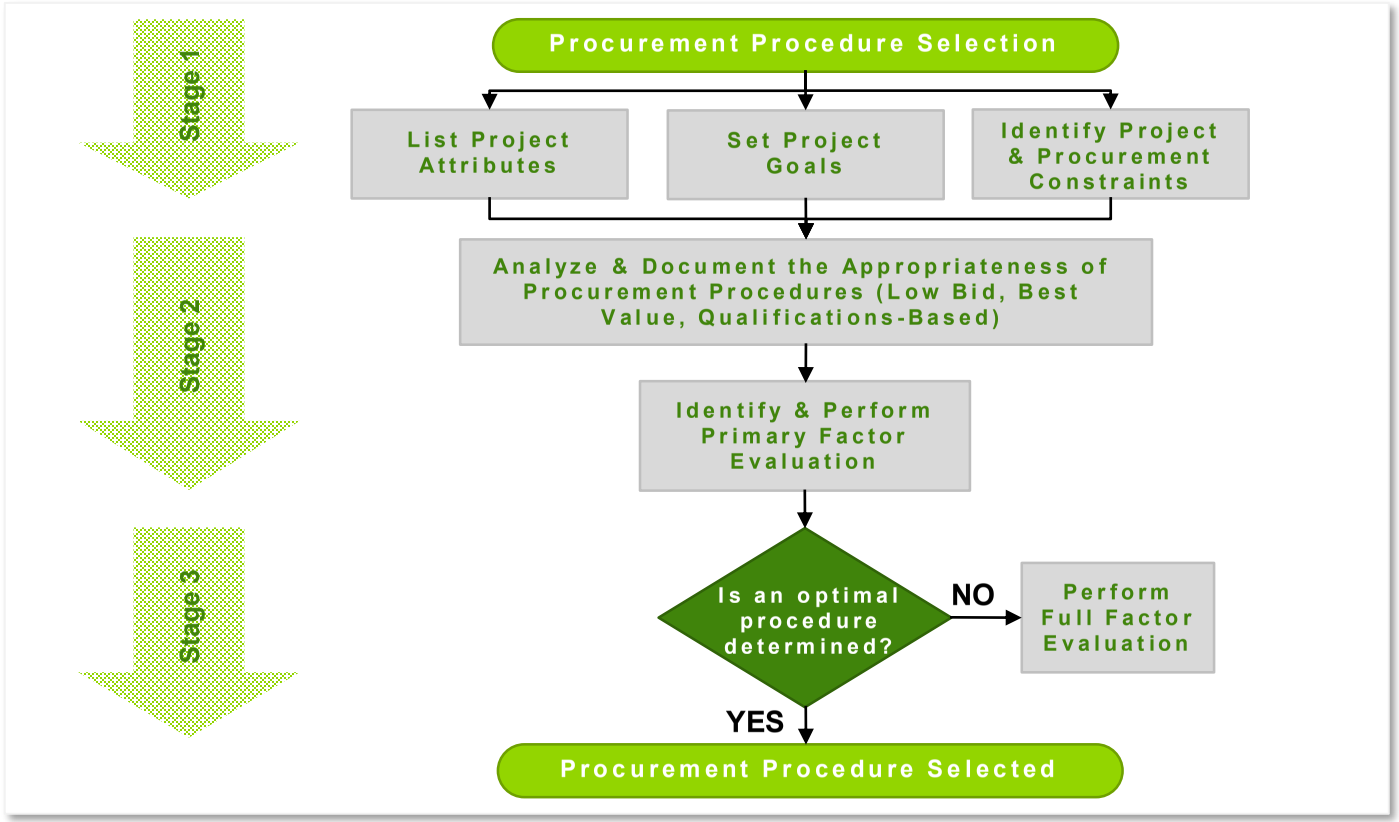

Image Source: Guidehouse recreation of "Procurement Procedure Selection Process" created by Next-Generation Transportation Construction Management[3] Transportation Pooled Fund Program Study TPF-5(260)

Guidehouse

GLOSSARY

AASHTO: American Association of State Highway Transportation Officials *FHWA: Federal Highway Administration* *MnDOT: Minnesota Department of Transportation*

Implementation Roadmap

1 CREATE DATASETS

Identify focus areas:
- Procurement spend
- Equipment ownership cost
- Change orders
- Alternative procurement and purchasing strategies

Identify data points:
- Spend by district, category, season, total
- Lifetime cost of purchase, considering repair
- Change order by project, vendor, type
- Strategy by cost, ROI, schedule, safety, convenience

Assign data collection roles and set frequency

2 ASSESS TRENDS

Gain insights into:
- Supply trends
- Demand trends
- Term contracts / CBA
- Commodity price changes
- Ownership costs / CBA
- Change order amounts, consistency, and drivers
- Cost estimates (in comparison to bids)
- Project delivery methods effectiveness
- Procurement procedures effectiveness
- Purchasing methods effectiveness

Identify conditions under which practices are most effective at yielding results

3 INSTITUTIONALIZE BEST PRACTICES

Develop policies and procedures to implement best practices, such as:
- Decision matrix for when certain strategies are used
- Authority of divisions to push Department-wide efficiencies to districts and policies for consistency

Communicate policies to staff and vendors, outlining:
- Purpose of change
- Performance metrics
- Frequency of evaluation
- Owners of data and decision-making
- Opportunities for feedback
- Opportunities for training

4 MONITOR & REEVALUATE

Evaluate policies and procedures by continuing to monitor trends in key areas, at predetermined frequencies

Determine if revisions to policies and procedures are necessary to obtain desired outcomes, and if so, implement necessary revisions

Consider data points for inclusion in broader KPI monitoring and evaluation (i.e., change order volume)

GLOSSARY

ROI: Return on Investment *CBA: Cost-Benefit Analysis* *KPI: Key Performance Indicator*

Anticipated Impact Assumptions

1

~$1.4M (3.5%) in direct project savings by adopting TxDOT's[1] policy of limiting change orders

TxDOT reduced direct and indirect costs for project modifications by 3-4% by altering change order policies. ArDOT spends $40.4M on average in change orders annually

- 3.5% * $40.4M = $1.4M

2

~$1.8 to 7.1M (5-20%) in savings on small order (<$20K) and competitive bid ($20K-$75K) purchases by adopting NIGP's[2] best practices in spend analysis, management, and oversight

A 2015 Institute for Public Procurement report identified that State governments can save 5-20% of expenditures by improving procurement processes (i.e., spend analysis). ArDOT spends on average $22.5M annually on small order purchases (<$20K) and $12.8M on competitive bid purchases ($20K-$75K)

- At 5%, savings would be $1.1M and $639K respectively (total: $1.8M)
- At 20% savings would be $4.5M and $2.6M respectively (total: $7.1M)

Guidehouse

GLOSSARY

TxDOT: Texas DOT *NIGP: Institute for Public Procurement*

Disclaimer: Anticipated Impacts are estimates, directional in nature, and represent the upper end of the savings range

6.

Implement construction contractor performance measurement

ArDOT rigorously monitors contractor quality through inspections, but lacks a tool to screen for contractor quality during procurement. By implementing performance-based prequalification, ArDOT may improve work quality, safety, and timeliness; reward high-performing contractors; and encourage low-performers to improve.

Findings Addressed

- PR2.1: Pre-qualification and bonding do not screen for quality
- PR2.2: ArDOT's Standard Specifications (2014) do not screen for quality
- PR3: Opportunities to improve existing quality issues

ArDOT Implementation

- Identify quality indicators (i.e., repeated disincentives, claims, change orders, delays)
- Develop scoring system to quantify performance
- Track and monitor performance, using indicators and costs
- Integrate into prequalification

Anticipated Impact

By implementing performance-based prequalification, ArDOT may see similar improvements to those reported by implementing DOTs:

6 of 6 DOTs reported improvements in work quality

- **5 of 6** in safety
- **6 of 6** in timely work completion
- **5 of 6** in contractor cooperation

Data compiled by Guidehouse from two different surveys by NCHRP[1] and FHWA[2]

Considerations

- Consider impact for both small and large contractors[3]
- Emphasize quantitative approach to minimize any appearance of subjectivity[4] in scoring
- Consider an appeals[5] process for contractors to counter scores
- Ensure contractors have a clear path to raise[6] their scores

Leading Practice: Performance-Based Prequalification

This tool will allow ArDOT to integrate contractor's past performance on Department contracts into their prequalification to yield a modified bidding capacity score that incentivizes high-quality performance.

Description

An FHWA-commissioned study[1] proposed a quantitative, performance-based prequalification system. It evaluates contractors on **administrative**, **performance**, and **project-specific** (i.e., technical qualifications) factors. It incorporates elements of systems used in Florida, Michigan, Oklahoma, Utah, Virginia, and Washington – the DOTs that reported improvements in the surveys on the previous slide.

Applied to ArDOT, these practices may yield:

- ***Alignment of contractor performance evaluation with project objectives***
- ***High-performing contractors being rewarded***
- ***Low-performers encouraged to improve***

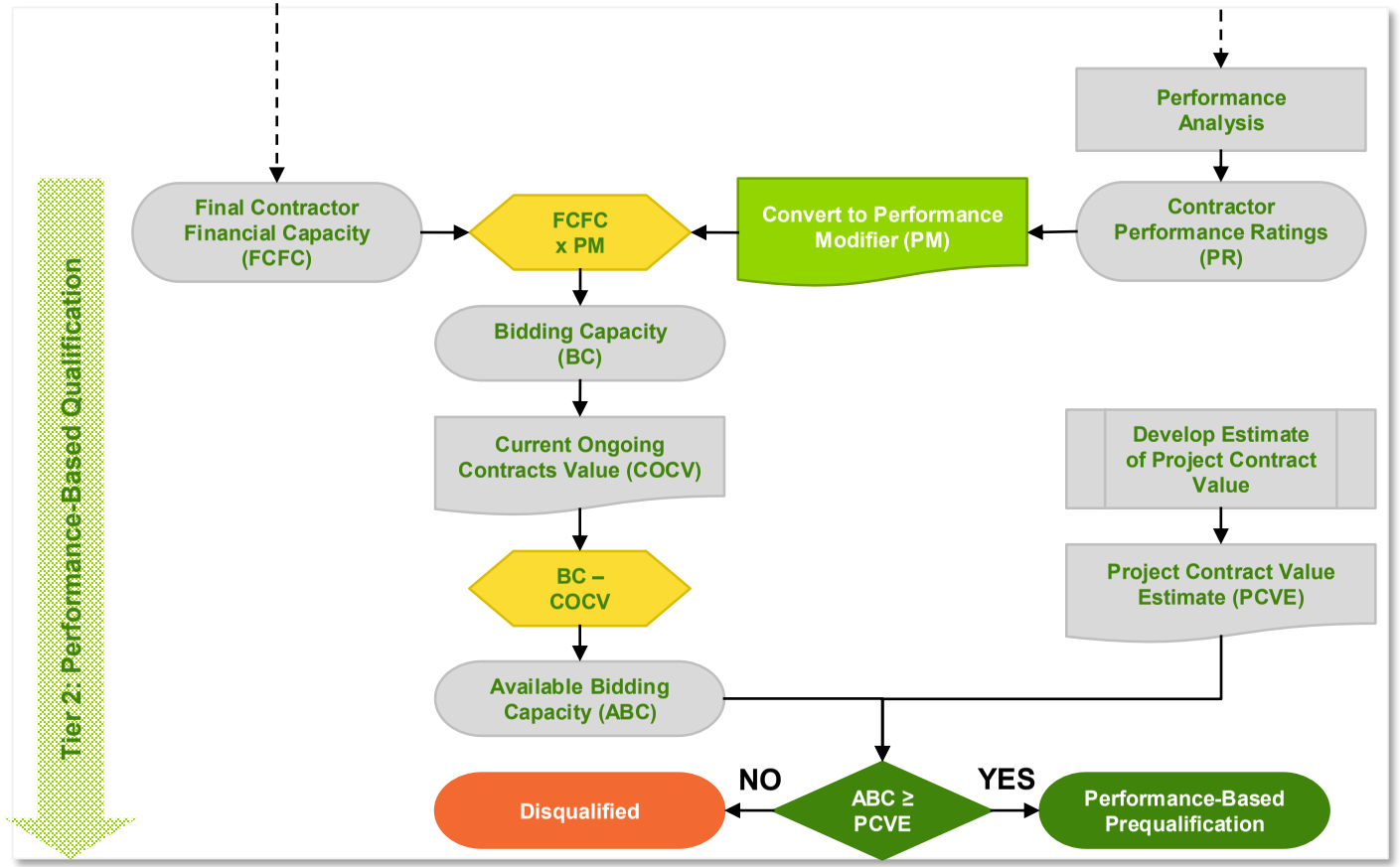

Image Source: Guidehouse recreation of an excerpted framework from the "Performance-Based Contractor Prequalification as an Alternative to Performance Bonds"[2] Study

GLOSSARY

FHWA: Federal Highway Administration

Implementation Roadmap

1 IDENTIFY QUALITY INDICATORS

Determine which indicators[1] define quality for ArDOT:

- Past performance (i.e., quality of workmanship)
- Managerial ability
- Safety record
- Technical capability
- Traffic and public impact
- Cooperation with ArDOT

Identify the ArDOT staff that will conduct performance evaluations and how their work product will be audited[2]

Determine frequency of performance evaluation

2 DEVELOP SCORING SYSTEM

Use an industry standard formula or algorithm to convert performance evaluations into bid capacity scores (see Leading Practices for an example)

Determine how bid capacity score will be used to modify bidders' submissions

Publicize process widely, for example through Q&As with contractors; integrate stakeholder feedback

Complete rulemaking process, as required

3 TRACK PERFORMANCE

Collect performance data at the closeout of each contract, and more frequently, in accordance with set policies (building up a full dataset will take time, and will vary by the number and length of projects ArDOT lets annually)

Continue to iterate on the scoring system while building up the dataset

4 INTEGRATE INTO PREQUALIFICATION

Determine monetary threshold at which process will be used (i.e., >$100K)

Determine which project types process will be used

Determine policy for contractors that are new to working with ArDOT

Begin to implement performance-based prequalification approach, in accordance with set policies

Evaluate regularly to ensure effectiveness and relevance

Expenditures

Guidehouse

7.

Implement project and portfolio planning frameworks

ArDOT's pre-construction, construction and maintenance Project Portfolio Management (PPM) systems vary in maturity. Enhancing these systems with leading PPM practices and a Project Management Office (PMO) may allow ArDOT to more effectively budget, plan, execute, and communicate on its portfolio of construction projects and maintenance activities.

Findings Addressed

- EX1: Construction (CST) and maintenance (MTC) resource planning
- EX4: CST project development management
- EX5.1: CST project management
- EX6: MTC project management
- PP2.1: MTC budget determination
- PP2.2: MTC project identification workplans

ArDOT Implementation

- Catalog existing PPM capabilities and identify baseline and target
- Identify gaps in PPM (e.g. pre-construction resource planning)
- Establish PMO and Governance, and build on existing strengths and capabilities
- Phase deployment, develop tools, and train staff members

Anticipated Impact

A more mature project management framework may allow ArDOT to realize **~$3.82M** in annual cost savings given:

- ArDOT's five year average of actual state funded internal pre-construction and construction costs[1]
- Industry findings[2] on project cost savings by developing a more mature PM infrastructure

Considerations

- Will require Department-wide effort to unify disparate initiatives and assets and build out PPM framework; a qualified vendor can expedite this process
- Implementation of PPM/PMO will be perceived as overhead, but will yield long-term benefits – highlight quick wins early on
- Change management and new IT applications may be required

GLOSSARY

PPM: Project Portfolio Management PMO: Project Management Office CST: Construction MTC: Maintenance

Disclaimer: Anticipated Impacts are estimates, directional in nature, and represent the upper end of the savings range

Leading Practice: Construction Portfolio Planning

The Project Management Institute provides a definitive framework for organizations to implement a Project Portfolio Management (PPM) system[1] that connects strategic planning to project execution; TxDOT demonstrates this framework in practice.

Description

TxDOT utilizes a "funnel" approach to PPM[2] that identifies the right portfolio of projects at the right time and allocates appropriate resources. TxDOT's TPP Division runs a quarterly "funnel" review designed to:

- Review performance against portfolio targets
- Verify that the mix of projects is aligned to TxDOT's strategic priorities; address any gaps
- Allocate financial and human capital resources
- Review the volume of projects at each stage to predict future workload and authorize budgets

Applied to ArDOT, these practices may yield:

- ***Alignment of STIP to ArDOT's resources to ensure necessary capacity to deliver on identified projects***
- ***Automated project reporting***
- ***Continuous project flow and mix monitoring to ensure strategic alignment and phase alignment***

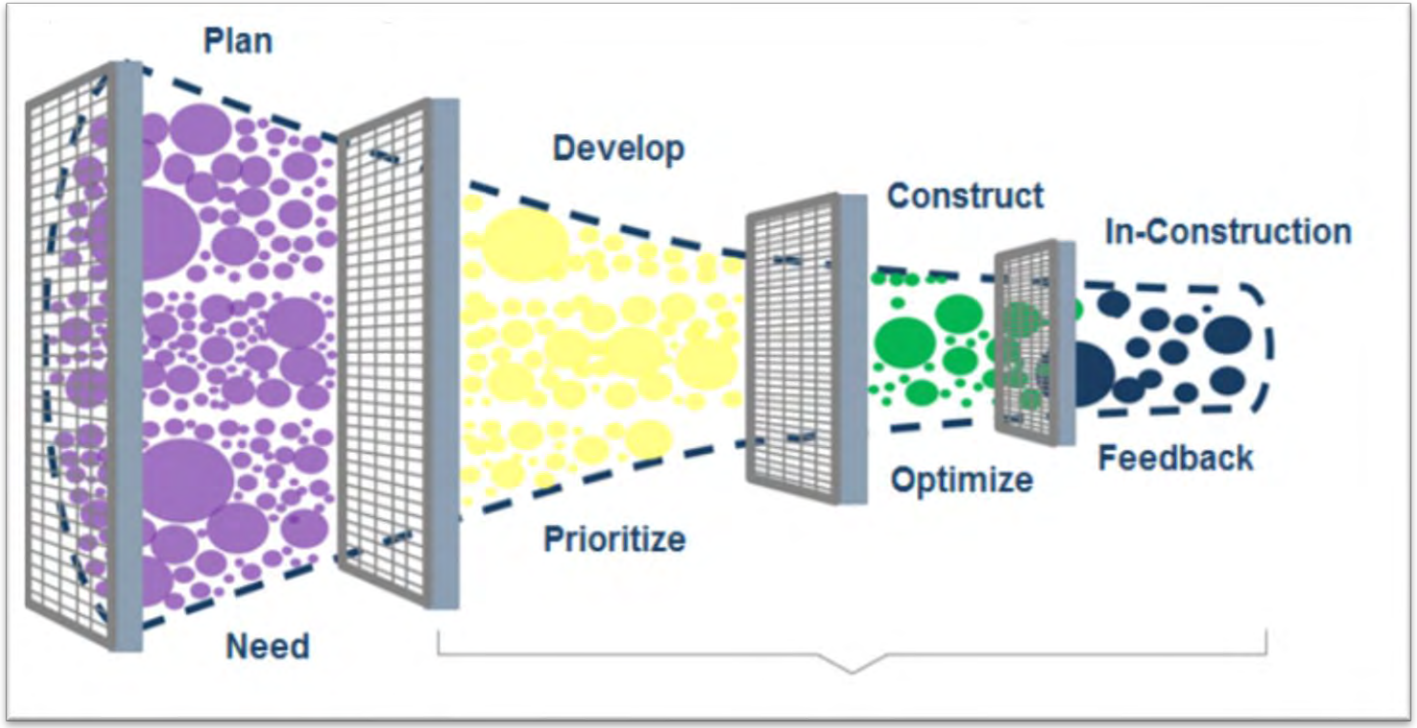

Image Source: Screen capture of the TxDOT funnel approach from TxDOT's website[3]

GLOSSARY

PPM: Project Portfolio Planning *TxDOT: Texas Department of Transportation* *TPP: Transportation Programing and Planning* *STIP: Statewide Transportation Improvement Program*

Leading Practice: Maintenance Portfolio Planning

NCHRP's LOS maintenance guide assists DOTs to determine their maintenance portfolio based on asset condition. Combined with its newly acquired MMS, ArDOT can use this guide to adopt a more robust approach to project identification and budgeting.

Description

NCHRP offers a performance-based guide[1] to establish a baseline catalog of roadway features, performance measures, and costs; identify and prioritize maintenance projects; and manage and report on performance.

Currently, seven DOTs implement such a system. WisDOT's performance-based system (Compass) dates back to 2002[2], and from 2011 to 2015, WisDOT saw similar or improved performance in 22 of 28 measures.

Applied to ArDOT, these practices may yield:

- ***Identification of maintenance projects and activities based on need and road user experience, and corresponding allocation of resources***
- ***Effective project management platform for maintenance activities and automated reporting***

Element	What are we spending? Dollars spent (in millions)[1] FY 11	FY 12	FY 13	FY 14	FY 15	Feature	How much of the system still needs work at the end of the maintenance season? Condition change: 2014 to 2015[2]	% of system backlogged 2011	2012	2013	2014	2015	How well maintained is the system? 2015 Feature grades A	B	C	D	F
Shoulders	11.05	11.08	8.16	7.79	8.91	Hazardous Debris	↑	7	7	7	7	6			C		
	11.64	11.44	8.31	7.80	8.91	Drop-off/Build-up (paved)	↑	3	1	4	4	2	A				
	0.33	0.33	0.24	0.23	0.26	Cracking (paved)	↑	60	55	54	69	67					F
	0.34	0.34	0.24	0.23	0.26	Potholes/Raveling (paved)	↑	6	6	7	8	6	A				
						Drop-off/Build-up (unpaved)	↓	37	36	36	41	42					F
						Cross-Slope (unpaved)	↑	27	26	22	27	25				D	
						Erosion (unpaved)	↑	2	1	1	3	2	A				
Drainage	8.54	7.90	7.10	7.04	7.58	Ditches	-	3	1	1	1	1	A				
	9.00	8.15	7.22	7.04	7.58	Culverts	↑	22	25	25	21	20				D	
	0.25	0.23	0.21	0.20	0.22	Under-drains/Edge-drains	↑	33	30	29	26	23			C		
	0.27	0.24	0.21	0.21	0.22	Flumes	↑↑	39	45	47	42	23			C		
						Curb & Gutter	↓	4	5	4	5	6	A				
						Storm Sewer System	↑	17	13	14	15	11			C		

Image Source: Screen capture of Wisconsin DOT 2015 Final Compass Report[3]

GLOSSARY

NCHRP: National Cooperative Highway Research Program *LOS: Level of Service* *MMS: Maintenance Management System* *WisDOT: Wisconsin DOT*

Leading Practices: Construction Project Management

ArDOT can look to numerous industry agnostic frameworks to establish effective project management frameworks for pre-construction and construction monitoring activities. Several DOTs also offer mature frameworks that can serve as a launching pad for ArDOT.

Description

Six of the ten comparison group DOTs utilize project management frameworks (Virginia DOT) or offer project management training (Kentucky DOT) to ensure effective project delivery from development through construction monitoring. Caltrans offers one of the more mature project management frameworks[1], which they use to limit project development and administration costs to within a certain percentage of initial estimates.

Applied to ArDOT, these practice may yield:

- ***A unified project management approach for all construction and maintenance activities***
- ***Better communication relative to project level work throughout the Department***

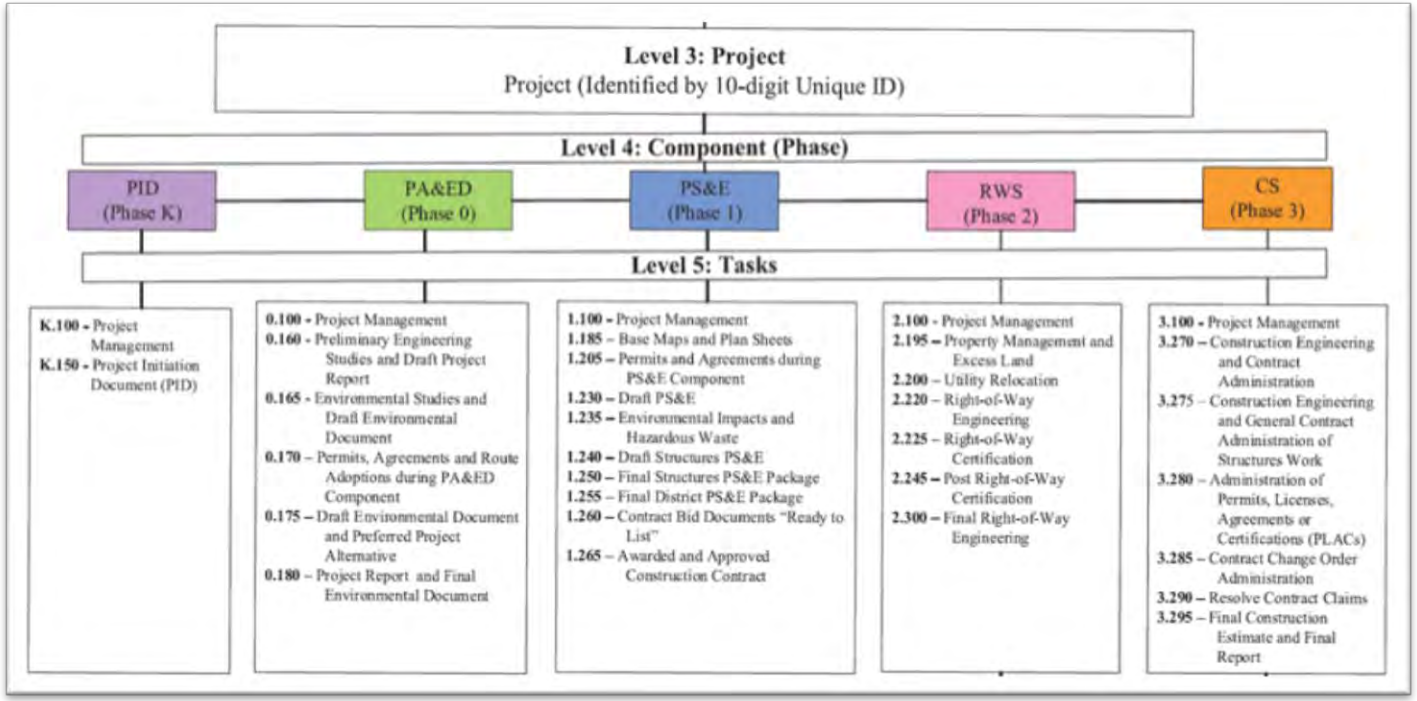

Image Source: Screen capture of the Caltrans Work Breakdown Structure (WBS) Diagram[2]

GLOSSARY

Caltrans: California Transportation Department WBS: Work Breakdown Structure

Implementation Roadmap

1 CATALOG EXISTING PPM CAPABILITIES AND TARGET STATE

Catalog current portfolio planning and project management protocols, capabilities, software applications, and reporting

Conduct landscape review of industry-approved frameworks and those used by State DOTs to identify baseline and target portfolio planning (e.g. WisDOT Compass) and project management frameworks (e.g. VDOT PM[1])

2 IDENTIFY GAPS IN THE CURRENT SYSTEM

Conduct internal review to identify system gaps in construction and maintenance; focus on:

Pre-construction and construction monitoring
- Resource and budget planning
- Project management

Maintenance
- Portfolio planning
- Resource and budget planning
- Project management

3 ESTABLISH PMO AND BUILD ON EXISTING STRENGTHS

Create PMO with identified governance and resources to oversee design and implementation of Project Portfolio Management across pre-construction, construction and maintenance activities

Leverage existing organization assets (e.g. IT PMO), practices (e.g. STIP process), resources (e.g. Garver PM supports) and software (e.g. new MMS) to kickstart PMO planning

4 PHASE DEPLOYMENT, DEVELOP TOOLS, TRAIN EMPLOYEES

Prioritize deployment based on organizational maturity and need; for example:
- 1a: Project management for pre-construction and construction activities;
- 1b: LOS portfolio planning framework for maintenance activities

Develop standards, toolsets, and formalize reporting, risk/issue management, and change control protocols

Train staff members, deploy resources, operationalize PPM and PMO processes

GLOSSARY

WisDOT: Wisconsin DOT VDOT: Virginia DOT PM: Project Management PMO: Project Management Office STIP: State Transportation Improvement Plan

MMS: Maintenance Management System LOS: Level of Service PPM: Project Portfolio Management

Anticipated Impact Assumptions

1

A more mature project management framework may allow ArDOT to realize ~$3.82M in annual cost savings

PMSolutions', Project Management Maturity & Value Benchmark Report[1] revealed:

- An organization with less mature project management platform realizes cost reductions of 6% per project
- The average cost savings for all organizations is 16% (This represents cost savings from an organization with an average level of project management maturity)

ArDOT's percentage cost savings by implementing a more mature project management platform:

- Assume ArDOT has a less mature project management platform and 6% cost savings are already factored into their internal construction costs.
- Assume implementation of a more mature project management platform ArDOT can yield the average cost savings per PMSolutions (16%). As a result, ArDOT can increase cost savings by 10%.

ArDOT's five year (FY2015 – FY2019) average internal state specific construction project costs based on actual pre-construction, construction engineering right of way, utility engineering, utility audit, misc. engineering, state force, EEO, and surveys expenditures*.

- ArDOT five year average state specific construction costs = $38,168,661[2]

Cost savings by implementing rising to an organizational average project management platform = $38,168,661 * 10% = ~$3.82M

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** Costs include 20% of Federal Participating and Billable costs; 100% of Non-Participating costs; 20% IRP Bond Funds to supplement Federal Participating costs; 100% of IRP Bond Funds to supplement Non-Participating costs*

8.

Implement best practices in construction project design

ArDOT lacks formal frameworks to ensure the consistent use of best practices in construction design, limiting their ability to demonstrate cost savings and strengthen institutional knowledge. By adopting such procedures, ArDOT may reduce project costs and improve achievement of system targets.

Findings Addressed

- EX2.1: Practical design protocols
- EX2.2: Value engineering frequency and timing
- EX3.1: Cost estimates not being evaluated based on outcomes
- EX5.2: Change orders not being analyzed for trends and insights

ArDOT Implementation

- Develop formal framework around use of performance-based practical design
- Conduct value engineering earlier in design (i.e., at 30% complete) and more often
- Evaluate gap between original bid and final payment amounts to inform best practices in design

Anticipated Impact

ArDOT cost savings may include:

- **~$664K** in cost savings per project by adopting formal framework for practical design[1]*
- Increased total project savings by bringing ArDOT up to national averages[2] of: annual number of VE studies (**~$1M**), cost savings generated per VE study (**~$7.7M**), or both (**~$15.8M**)

** ArDOT is already capturing some of these savings through informal use of practical design*

Considerations

- Not all projects are well suited to or would benefit from such approaches; frameworks should identify when to use them
- ArDOT is already employing many of these practices, so implementing recommendation will not require creation of new technical practices; rather, formalizing existing practices

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GLOSSARY

VE: Value Engineering

Disclaimer: Anticipated Impacts are estimates, directional in nature, and represent the upper end of the savings range

Leading State: Washington State DOT

Many DOTs use practical design, but vary in their approaches. In 2013, WSDOT was using practical design, but not consistently or strategically to maximize savings – similar to ArDOT's position. Their experience shows the potential outcomes of formalizing this practice.

Description

WSDOT[1] transformed its design approach from formulaic to flexible by updating outdated standards, adopting a "least cost" planning methodology, creating performance measures to evaluate alternative designs, and shifting its culture.

40%

Average project cost savings from practical design (from a sample of 10 projects)

$21.5M

Average project cost savings from practical design (from a sample of 10 projects)

Applied to ArDOT, these practices may yield:

- ***Reduced project costs***
- ***Improved achievement of system targets***

Practical design solutions used by WSDOT:
Redesigning to reduce right-of-way costs • Adjusting project staging to increase efficiency • Opting for low-cost enhancements (e.g., rumble strips) instead of realignment • Adjusting design or alignments to reduce environmental costs

GLOSSARY

WSDOT: Washington State DOT

Implementation Roadmap

1 DEVELOP FRAMEWORKS

Determine methodologies, timing, and frequency of analyses for:

- Practical design
- Value engineering
- Engineers estimates compared to final cost

For example, FHWA[1] suggests VE studies for:

- High-cost and/or high-priority projects
- Complex or challenging projects with multiple stages / traffic control
- Projects involving multiple stakeholders

2 TRACK OUTCOMES & REVIEW TRENDS

Conduct analyses and track outcomes in accordance with set policies, for example:

- Benefits, cost savings and ROI from practical design and value engineering

Identify trends and leverage learnings to strengthen design approach:

- Project types most likely to have change orders due to plan error or omission
- Projects that have exceeded timelines
- Project types likely to benefits from certain practice design solution

3 MONITOR & REEVALUATE

Evaluate policies and procedures by continuing to monitor trends in key areas, at predetermined frequencies

Determine if revisions to policies and procedures are necessary to obtain desired outcomes

If so, implement necessary revisions

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GLOSSARY

FHWA: Federal Highway Administration *VE: Value Engineering* *ROI: Return on Investment*

Anticipated Impact Assumptions

1

~$664K in cost savings per project by adopting formal framework for practical design[1]

MoDOT saved 13% on average in its first year of implementing a formalized practical design program. ArDOT's average contract amount 2014-19 is $5.1M.

- 13% * $5,113,314 = $664K

2

Increased total project savings by bringing ArDOT up to national averages[2] of: annual number of VE studies (~$1M), cost savings generated per VE study (~$7.7M), or both (~$15.8M)

ArDOT can increase its cost savings from value engineering by: 1) increasing the % of cost savings yielded per study (i.e., by conducting studies earlier in the design process, generating more recommendations per study); 2) increasing the # of studies, or 3) both. ArDOT currently conducts an average of 1.75 VE studies per year (total project costs $181M), generating 0.7% in project costs saved (~$1.3M). The national average is 3.30 studies per year and 5.0% of savings. Note: applied to ArDOT, 3.30 studies per year would yield a proportional project cost of $343M.

- Increasing %: 1.75 studies of projects totaling $181M @ 5.0% cost savings = $9.1M (= $7.7M greater than current savings)
- Increasing #: 3.30 studies of projects totaling $343M @ 0.7% cost savings = $2.4M (= $1.0M greater than current savings)
- Both: 3.30 studies of projects totaling $343M @ 5.0% cost savings = $17.2M (= $15.8M greater than current savings)

GLOSSARY

MoDOT: Missouri DOT VE: Value Engineering

Disclaimer: Anticipated Impacts are estimates, directional in nature, and represent the upper end of the savings range

Information Technology

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9.

Build an IT Governance Structure to guide ArDOT's IT investments

ArDOT's IT investments have grown 155% since FY2016 to $23M in FY2020[1] under unclear enterprise level guidance. Leading practices suggest that establishing a formal governance structure will enable the IT Division to support business objectives, help optimize Department operations, manage enterprise risk, and meet internal and external stakeholder needs.

Findings Addressed

- IT2.1: ArDOT has not developed a Governance Structure to ensure IT investments support objectives, manage enterprise risk, and meet external stakeholder needs
- IT2.2: There is no overarching enterprise architecture or blueprint to standardize, organize, and align IT infrastructure and solutions with business goals

ArDOT Implementation

- Lay the groundwork to establish a robust governance structure
- Establish a governance structure that identifies a cross-section of business and IT personnel to create a charter and decision making framework
- Create and execute on a governance roadmap; measure and communicate progress

Anticipated Impact

- Improved ArDOT performance on business outcomes such as system condition and operational effectiveness measures, based on an ISACA survey and study[2]
- Strengthened enterprise level IT capability and performance[3]
- Reduced security and disaster-related risk per a Forbes Insights report[4]

Considerations

This is an ongoing process; lessons learned suggest it requires:

- Leadership support
- Emphasizing how IT enables business performance and reduces risk, not the framework
- Cascading of enterprise level goals through the IT Division to actual underlying processes

Disclaimer: Anticipated Impacts are estimates, directional in nature, and represent the upper end of the savings range

Leading Practices: Building IT Governance

ArDOT can leverage any number of resources to establish an effective IT Governance structure that will enable the IT Division to strengthen business performance, reduce risk and maintain compliance with applicable regulations.

Description

Forrester, a leading Enterprise IT research group, suggests three key objectives for IT Governance[1]:

- Ensure business value and alignment by only approving projects aligned with strategic business objectives and balancing future investments and current operations
- Manage risk, as an increasing percentage of ArDOT's operating structure is supporting by underlying IT platform
- Hold IT leadership accountable for ROI and service delivery

90%

Business leaders that believe strong technology governance leads to improved business outcomes[2]

63%

Percent of IT executive respondents reporting root cause of ineffective IT departments as a lack of a well defined IT operating model and clarity related to IT's role and services[3]

Applied to ArDOT, these practices may yield:

- ***Enhanced ability to improve State's transportation assets***
- ***More efficient and effective operations***
- ***Greater ability to meet the needs of stakeholders***
- ***Improved security and disaster related risk management***

There are numerous "off the shelf" IT Governance frameworks that can be tailored or combined to meet ArDOT's needs, including:

COBIT[4] // ITIL[5] // CMMI[6]

Guidehouse

GLOSSARY

COBIT: Control Objectives for Information Technologies *ITIL: Information Technology Infrastructure Library* *CMMI: Capability Maturity Model Integration*

Implementation Roadmap

1 LAY THE GROUNDWORK

Build on Info-Tech report to assess the maturity of the Department's current IT Governance Structure

Identify current structure of IT operations and potential future states:
- Centralized
- Decentralized
- Federated

Conduct an analysis of existing IT Governance frameworks to identify a potential best fit such as:
- COBIT[1]
- ITIL[2]
- CMMI[3]

2 ESTABLISH A GOVERNANCE STRUCTURE

Identify a formal IT Governance committee with appropriate representatives from around the Department such as:
- Assistance Chiefs
- Key Division Heads

Create a reporting structure directly beneath the ArDOT Director

Select a governance framework and establish a charter

Identify IT domains and processes that require governance such as IT investments, data management, business continuity, and cybersecurity

3 CREATE AND EXECUTE ON A GOVERNANCE ROADMAP

Establish governance priorities and create corresponding subcommittees:
- Portfolio management
- Data governance
- Service management
- Technology standards
- Project management

Create high-level governance roadmap and subcommittee charters

Establish Governance committee and subcommittee meetings and reporting frequency

Develop success measures (KPIs) and an IT performance scorecard

GLOSSARY

COBIT: Control Objectives for Information Technologies *ITIL: Information Technology Infrastructure Library* *CMMI: Capability Maturity Model Integration*

KPI: Key Performance Indicator

10.

Implement mid-term IT initiatives that can optimize business operations

ArDOT spends ~$5.3M on software applications and has 300+ databases. Implementing leading data management and software application rationalization practices can deliver cost savings and unlock data value.

Findings Addressed

- IT1.1: ArDOT appears to be approaching data center modernization phases, but without a formal integration plan
- IT1.2: ArDOT has preliminarily identified software needs, but efforts to align IT purchases across the Department has not been universally implemented

ArDOT Implementation

- Build software application and database inventory
- Assess and score each software application and database
- Identify target state for each application and database
- Build phased roadmap for migration processes

Anticipated Impact

- Through robust software application management, ArDOT may save **up to $1M**, per Gartner analysis[1]
- Through leading data management practices, ArDOT could increase already captured savings (**$600K**)[2]
- Improved data analytics may increase Department productivity[3]
- Establishing open data access can unlock data value and private sector innovation per CIO Magazine and McKinsey reports[4,5]

Considerations

- Requires upfront investment to yield mid- to long-term savings
- Requires leadership buy-in and change management to overcome resistance and assist staff in shifting to a new model
- Requires software application such as the planned ITSM tool
- Requires implementation plan for continuity of operations

GLOSSARY

ITSM: IT Service Management

Disclaimer: Anticipated Impacts are estimates, directional in nature, and represent the upper end of the savings range

Leading Practices: Mid-Term IT Initiatives

Already common in the private sector, application rationalization and master data management are emerging initiatives in the public sector that can reduce costs and unlock significant value.

Description

Leading IT industry research reveals:

- Software application rationalization cuts costs by eliminating redundancy, consolidating usage, and reducing internal application development and operations costs[1]
- Optimizing data cuts costs by eliminating redundancy, reducing support costs, and improving decision making[2,3]
- Strategic deployment of data unlocks value by optimizing IT investments and enabling private sector innovation[4,5]

20%

Application rationalization cost savings in a 12-month period[6]

5%

Productivity difference between "top one third Data Driven" companies and their competitors[7]

Applied to ArDOT, these practices may yield:

- ***Reduced application and data management costs***
- ***Increased reliability***
- ***Improved productivity and decision making***
- ***Enhanced private sector planning and innovation***

Image Source: Screen capture of Virginia DOT Open Data Portal Landing Page[10]

Data assets represent ~25% of an organization's assets[8]. To unlock the value of their data assets, several DOTs including Virginia[9] (left), Kentucky, and New York provide free access to public data through open data portals

Implementation Roadmap

1 BUILD APPLICATION AND DATABASE INVENTORY

Determine preliminary enterprise-wide data governance and application development/operations standards

Complete existing application and database inventory data per standards

Conduct targeted interviews with SMEs and external stakeholders

Review relevant policies, procedures, trainings, and database schema

Develop preliminary catalog of applications and databases by business function

2 ASSESS APPLICATION AND DATABASE INVENTORY

Update preliminary standards per findings in Step 1

Develop application and database scoring methodology based on business relevancy, technology risks, total cost of ownership

Score each application and database via scoring methodology

Review and validate scoring assessments with internal SMEs

Create an assessment for the entire portfolio of applications and databases

3 DEVELOP TARGET STATE AND ROADMAP

Determine high-level database architecture, implementation methodologies, and business intelligence approach

Determine target state for each application and database, for example: retain as is; eliminate, re-engineer, and migrate

Develop implementation road map subdivided into phases:

- Phase 1: Retain As Is/Eliminate
- Phase 2: Re-Engineer
- Phase 3: Migrate

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GLOSSARY

SME: Subject Matter Expert

Anticipated Impact Assumptions

1

Up to $1M in savings from application management, per Gartner analysis

A 2009 Oracle Report[1] quotes a Gartner analysis which reveals that Chief Information Officers report application rationalization combined with business process optimization can yield on average 20% cost savings within one year. ArDOT spent ~$5.3M on software in FY2019[2]. It does not appear that ArDOT separately tracks software license expenditures or application development/support. As a result, using the total software expenditure as a proxy for the costs that could be reduced as a result of application rationalization, and applying the 20% cost savings from the Oracle report yields:

- 20% * $5.3M = $1.06M

11.

Develop necessary pillars to establish IT as an effective business partner

Currently, ArDOT's IT Division is not able to definitively articulate what services it will deliver, when it will deliver them, and its standards for effective delivery. Implementing an ITSM framework may yield enhanced IT service delivery, improved internal customer satisfaction, and reduced IT costs.

Findings Addressed

- IT2.3: ArDOT lacks a service catalog and defined service level expectations, yielding confusion on what IT will deliver, when, and how support is distributed
- IT2.4: ArDOT's efforts to establish a project management infrastructure to ensure effective delivery of IT projects is still in its infancy

ArDOT Implementation

- Establish baseline policies and procedures, and preliminary service catalog
- Select appropriate software tools
- Establish a long-term IT Service Management Plan that includes appropriate communications and training to staff, and mature service catalog

Anticipated Impact

- ArDOT will realize a fundamental enhancement to IT service delivery, as indicated by a Forbes Insight report[1] on IT Service Management
- Reduction in IT service delivery costs of **up to 26%**, per a PMSolutions Project Management Maturity and Value benchmark study[2]

Considerations

- Yield quick wins by establishing a basic service catalog and standards, capturing IT demand, and tracking requests
- Include PM infrastructure in the long-term ITSM plan
- Communication and training will be critical to mitigate resistance to change

GLOSSARY

PM: Project Management *ITSM: IT Service Management*

Disclaimer: Anticipated Impacts are estimates, directional in nature, and represent the upper end of the savings range

Leading Practices: IT Service Management Pillars

IT Service Management (ITSM), which includes project management, is rapidly being adopted as a framework to allow IT departments to deliver quality service, lower costs, and yield high levels of customer satisfaction.

Description

Leading IT industry research reveals :

- Effective PM yields alignment between business and IT operations, project savings, and fewer failed projects[1,2]
- Robust ITSM implementation yields cost savings, increased productivity, and faster response times to customers[3]
- ITSM implementation is long-term, but PM practices and standards can be rapidly implemented: Texas DIR provides a "PM Lite" [4] version of its framework for rapid scaling

42%

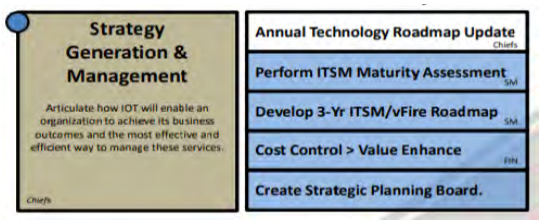
Surveyed executives who agree that ITSM has reduced business costs[5]

26% vs. 6%

Cost savings per project for firms with mature PM infrastructure versus those firms with less mature PM infrastructure[6]

Applied to ArDOT, these practices may yield:

- ***Fundamentally enhanced service delivery***
- ***Improved customer satisfaction***
- ***Reduced IT service delivery costs***



The Indiana Office of Technology (IOT) launched its ITSM initiative in 2016. Its implementation roadmap is based on ITIL and is publicly available[7] (*see graphic, left, for one component*). IOT Customer Satisfaction ratings increased from 94.1% in 2018 to 98.3% in 2020 [8,9].

Image Source: Screen capture of IOT ITSM implementation roadmap[10]

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GLOSSARY

ITSM: IT Service Management *PM: Project Management* *Texas DIR: Texas Department of Information Resources* *ITIL: Information Technology Infrastructure Library*

Implementation Roadmap

1 ESTABLISH BASELINE STANDARDS AND POLICIES

IT project management:
- Adopt a preliminary set of project management standards and protocols
- Create a preliminary set of PM tools, templates, and project success metrics (e.g. DIR PM Lite[1])
- Establish and provide necessary training to staff members

IT Service Management (ITSM):
- Identify and socialize core service offerings in an IT Service Catalog
- Create initial service policy and standards for existing IT offerings
- Identify success metrics relevant to business need

2 SELECT APPROPRIATE SOFTWARE TOOLS

Identify a proven ITSM framework such as ITIL[2] to establish a baseline

Select ITSM tool and prioritize the "out of the box" ITSM capabilities:
- Service desk capabilities, including incident and problem management, and fulfillment request management,
- Service catalog management, risk management, vendor management
- Demand and capacity measurement
- Asset catalog and IT configuration
- PM capabilities including PM plan creation, project progress and performance dashboarding, change management,

Ensure ITSM tool scales to include a comprehensive ITSM Model build out

3 ESTABLISH A LONG-TERM ITSM PLAN

Synthesize existing IT demand and service data, and conduct an ITSM maturity analysis

Identify ITSM maturity gaps and create a multi-year roadmap

Create a communications and rollout plan with engagement of change champions across the Department, and appropriate training for staff

Integrate project management maturity within the ITSM roadmap

GLOSSARY

PM: Project Management *ITSM: IT Service Management* *ITIL: Information Technology Infrastructure Library*

People Capabilities

12.

Ensure staff can develop in their careers at ArDOT

Inadequate career development is the leading driver[1] of resignations in the US. Nearly half of ArDOT staff do not believe they can advance their careers there,[2] and its turnover is rising.[3] By developing career ladders and lattices, ArDOT may increase retention, reduce turnover-related costs, strengthen its talent pipeline, and improve morale.

Findings Addressed

- PC1: Recruitment and retention
- PC2.1: Dissatisfaction with compensation
- PC2.2: Competition for talent
- PC3.2: Flexible work strategies
- PC4.1: Career paths not defined
- PC4.2: Performance evaluations not understood or trusted

ArDOT Implementation

- Verify roles at high risk of turnover and important to succession planning
- Conduct compensation study
- Develop and publicize career, skill, and salary progression
- Promote buy-in among staff for the performance-based pay and evaluation practice

Anticipated Impact

- For ArDOT, improved retention could increase cost avoidance per year by **~$5M**, based on cost estimates from Tran-SET[4]
- Adopting HBR's[5] best practices in career development may increase likelihood ArDOT staff are retained to seek promotion at the Department rather than at a competitor by **~5.0%**

Considerations

- Ability to promote may be limited by low turnover in desirable positions – consider career lattices when traditional career ladders are inaccessible
- Career development activities are closely aligned with training and knowledge management

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GLOSSARY

Tran-SET: Transportation Consortium of South-Central States

HBR: Harvard Business Review

Leading Practices: Growth Opportunities

ArDOT can consider strategies used by other DOTs to strengthen growth opportunities for employees.
Many DOTs share ArDOT's turnover challenges and constrained resources to compete with the private sector for talent

Description

Workforce development interventions are tailored to the skills, culture, and goals of the implementing organization. The solutions here reflect a range of strategies by DOTs to strengthen growth opportunities in response to turnover. Few have published outcomes, though their approaches align with generally accepted standards.[1]

Applied to ArDOT, these practices may yield:

- ***Reduced turnover***
- ***Strengthened talent pipeline***
- ***Improved morale***

State DOT	Intervention
Oklahoma[2]	• Commissioned compensation study of all DOT roles • Implemented pay raises averaging 7% • Turnover fell from 12% to 11% in first year
Florida[3]	• Commissioned compensation study of DOT management roles
Missouri[4]	• Commissioned compensation study of all State roles (including DOT) • Implemented pay raises of at least 3% for all DOT staff, with higher percent increases for lower salaried staff
Texas[5]	• Supervisors responsible for career planning with reports • Financial assistance for engineers training to obtain licensing • Special bonuses for high performers and long tenured staff
Montana[6]	• Implemented career ladders in: engineering, construction contracting, info services, maintenance, motor carrier services, and safety & health

13.

Align staff capabilities with current and future organizational needs

ArDOT staff and supervisors report that training resources are limited. By strengthening training, ArDOT may improve job satisfaction and retention, increase productivity, and instill confidence in staff who then become more willing and able to take on greater responsibility within the Department.

Findings Addressed

- PC3.1: Staff have positive relationships with managers
- PC5.1: Training is offered, but lack formal learning pathways
- PC5.2: On-the-job training is preferred, but difficult to institutionalize

ArDOT Implementation

- Align trainings to job descriptions and career planning activities
- Identify and fill training gaps
- Assign trainings as part of performance evaluation process
- Reinstitute manager training
- Consider cross-training in high turnover districts and positions
- Consider formalizing on-the-job, practical training

Anticipated Impact

Skill development is common at top companies, where **73%** of staff update their skills biannually. By implementing "opportunities to learn and grow"[1] ArDOT may increase:

- Job satisfaction and retention
- Staff confidence and motivation
- Staff ability and interest in taking on more work

Considerations

- Training will likely need to be updated[2] over time, for example as new equipment is used or new programs are developed
- Training need not be restricted to entry-level roles: senior level[3] employees can benefit as well
- Priorities must be identified to focus rollout on training where it will have the most impact

Leading Practice: Individualized Training Plans

ArDOT staff report[1] that existing training resources are not necessarily relevant to their work, and supervisors are unsure[2] how to set learning objectives for their reports. PennDOT shows how to align training with job competencies and support career planning.

Description

PennDOT[3] uses a standardized approach to identify the skills, knowledge, and competencies for each key component of a role. It then identifies all related training opportunities available, and provides a suggested curriculum from a selection of these trainings. Staff discuss their learning plans with supervisors, and create individualized learning plans based on their performance evaluations.

Applied to ArDOT, these practices may yield:

- ***Improved job satisfaction and retention***
- ***Increased productivity***
- ***Confident staff willing and able to take on greater responsibility within the organization***

SUGGESTED CURRICULUM FOR DISTRICT BRIDGE INSPECTION MANAGER/SUPERVISOR

Phase One	Phase Two
Alkali-Silica Reactivity Workshop-Lithium Impact APRAS Basic Bridge Safety Inspection Course BMS Bridge Scour Evaluation Business Writing Crystal Reports for BMS Users Design and Operation of Work Zone Traffic Control	Advanced Section 4(f) Context Sensitive Solutions Training Environmental Permit Requirements for Maintenance/Inspection Around Streams: The Dos and Don'ts Fundamentals of Project Management With Open Plan LRFD for Highway Bridge Substructures
Phase Three	**Phase Four**
ECMS ECMS (Engineering and Construction Management System) Wave 3 -PennDOT EMPLOYEES ONLY Microsoft Access, Level 2	Dynamic Time Management: Critical Elements Effective Presentations Engineering dataset programs Evelyn Wood Reading Dynamics for Business Professionals

Image Source: PennDOT[4] –District Bridge Inspection Manager/Supervisor Position Analysis Workbook
(Image has been edited to fit)

Implementation Roadmap*

1 IDENTIFY TALENT NEEDS

Identify the skills and roles essential to the Department's success, based on:

- ArDOT's strategic plan
- Over- and under-utilized teams across districts and divisions

Validate current and anticipated talent gaps via:

- Analysis of high turnover positions and teams
- Finalizing succession planning analysis

Conduct compensation study to validate appropriateness of salary bands

2 DEVELOP CAREER PATHS

Identify existing career paths within ArDOT, based on:

- Existing job descriptions and detailed competencies
- Data on past promotions
- Interviews with District Engineers and Division Heads

Identify gaps in career pathways, and determine if new roles should be created

Adjust compensation as needed based on study; ensure salary progression along career paths is competitive and appropriate

3 PUBLICIZE CAREER PATHS

Document steps required for advancement along career paths, including:

- Competencies
- Years of experience
- In-house trainings
- External certifications

Develop materials for staff, supervisors, and recruiters to facilitate understanding of the steps required and, for supervisors, be able to support direct reports through the process

4 ALIGN WITH TRAINING & EVALUATION

Training:

- Catalog training resources by related competency
- Develop suggested curriculum for roles
- Consider training performance in evaluation

Evaluation:

- Formalize career planning with supervisors as part of annual evaluation
- Refer staff to specific training resources for performance improvement

** Note: This roadmap combines suggested implementation plans for Recommendation 12 and Recommendation 13.*

Anticipated Impact Assumptions

1

~$5M in cost avoidance per year by averting projected turnover increases (instead maintaining current 8.6% rate), based on cost estimates from Tran-SET[1]

A report from the Transportation Consortium of South-Central States identified the cost of turnover as exceeding 100% of the annual compensation of the resigning employee. Applied to ArDOT, this yields a 2019 turnover cost of ~$11.8M (320 staff, $36.9K salary). Based on available data for 2015-2019, the turnover rate is increasing ~15.3% annually. If unchecked, the rate will rise from 9.6% in 2020 to 14.9% in 2024. This translates to:

- $13.3M in 2020, $14.9M in 2021, $16.7M in 2022, $18.7M in 2023, $21.0M in 2024; 5-year total: $84.6M
- If ArDOT maintains the current rate of turnover, it will instead spend $11.8M per year; 5-year total: $59.2M (a difference of: $25.4M, or ~$5M/year)
- Note: We assume no change in salary, as between 2014 and 2019, salaries remained fairly flat at -0.58%
- Note: MoDOT has reported an even higher cost: ~$54K per person, with annual costs ~$32.5M (as of 2019)[2]

2

~5.0% increase in likelihood staff are retained to seek promotion at ArDOT rather than at competitor, by adopting HBR's[3] best practices in career development

A study published in Harvard Business Review found that raising a company's Glassdoor "career opportunities" rating by one star (out of five) was "associated with a five-percentage-point higher chance that workers would stay for their next role."

- ArDOT's current "career opportunities" score is 3.6; raising it by 1 star to 4.6 would be associated with a 5% higher chance that staff will remain at ArDOT for their next role, rather than leaving to pursue advancement elsewhere

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GLOSSARY

Tran-SET: Transportation Consortium of South-Central States

Disclaimer: Anticipated Impacts are estimates, directional in nature, and represent the upper end of the savings range

Appendix

Appendix Contents

Leading Practices: State Selection

Similar to many DOTs across the country facing declining resources and increasing business costs, ArDOT is continuously searching for more effective and efficient methods to deliver transportation solutions to the State. To better understand the effectiveness and efficiency of ArDOT's business practices, Guidehouse conducted a targeted analysis of a set of comparison group State DOTs. The methodology for identifying this comparison group is described to the right, and their performance data is described in the following pages.

Sourced Data

- To ensure a fair comparison across State DOT's, Guidehouse used the Federal Highway Administration nationally normed 2018 Highway Statistics Data[1]
- Expenditure[2], mileage[3], system condition[4], and bridge deficiency[5] data was harvested to structure the comparison

State Selection

- Guidehouse approximated the cost effectiveness of each State DOT by calculating the aggregate pre-construction, construction, maintenance, and administrative expenditures per lane mile
- Each DOT was ranked using this cost effectiveness measure, and those with lower or similar expenditures per lane mile to ArDOT were selected into a preliminary comparison DOT group
- Guidehouse refined this preliminary group to form a final comparison DOT group by:
    - Selecting only those DOTs who generally performed better on system performance measures such as pavement condition, bridge condition, and fatality rate
    - Eliminating State DOTs whose geographic location would not yield a meaningful comparison with Arkansas (e.g. Montana)
- As a result, Guidehouse was able to identify ten comparison group DOTs that were similarly or more cost effective than ArDOT, yet realized similar or better transportation outcomes

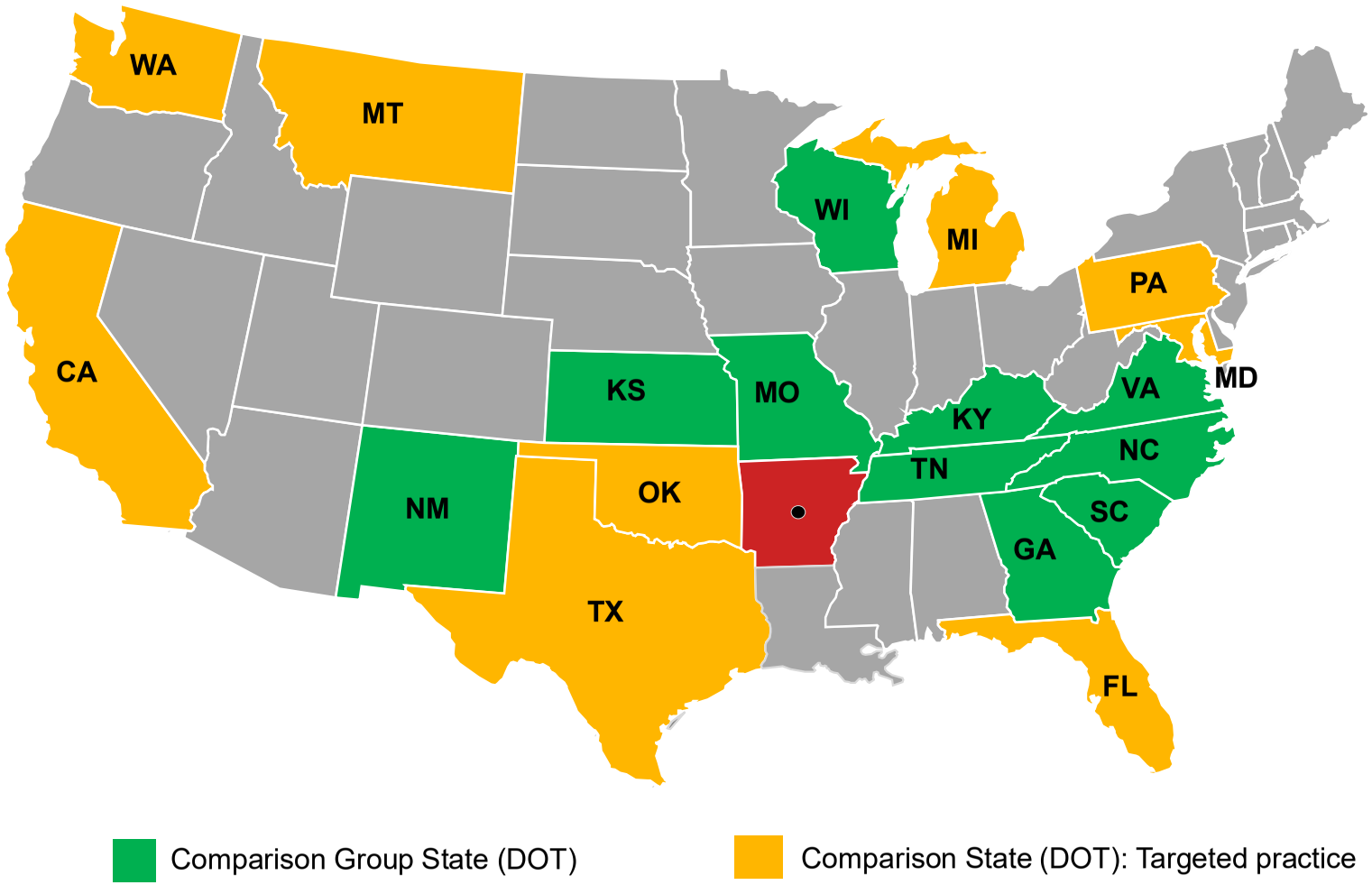
Considerations

- Guidehouse utilized this methodology to select a set of comparison group DOTs from which to conduct a leading practice review; Guidehouse does not guarantee that identified practices will yield the anticipated impact identified in the report
- In some instances, publicly available data did not yield a promising practice, and so Guidehouse identified practices from other sources as described in the following page

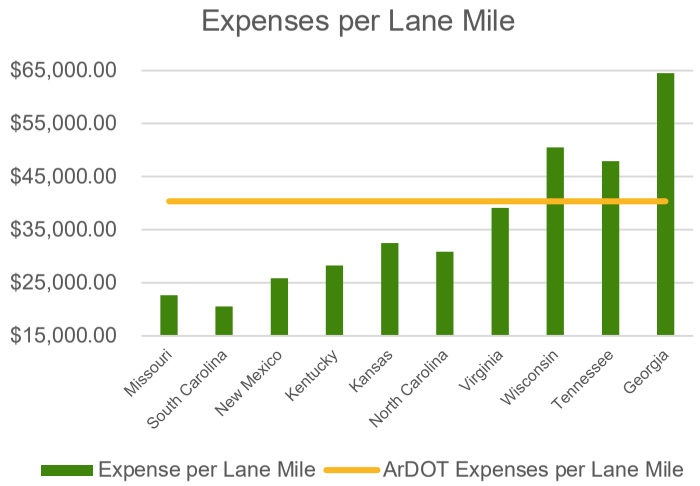
Leading Practices: Identified States and Sources

The set of ten comparison group State DOTs that Guidehouse selected from which to conduct a leading practice comparison are identified in green in the Map to the right. These DOTs have realized strong performance on a set of Transportation specific measures, yet have similar or lower expenditures on a per lane mile basis. The following pages provide a detailed comparison of these States. Where publicly available data yielded a comprehensive and coherent depiction of leading practices within a specific focus area, we summarize those practices in our recommendations.

In the remaining instances, Guidehouse sourced leading practices on an individual DOT basis identified in yellow on the Map to the right; existing research commissioned or conducted by credible Transportation authorities such as the Federal Highway Administration (FHWA), Transportation Research Board (TRB), and National Cooperative Highway Research Program (NCHRP); or from leading industry authorities such as the Society for Human Resources Management (SHRM).

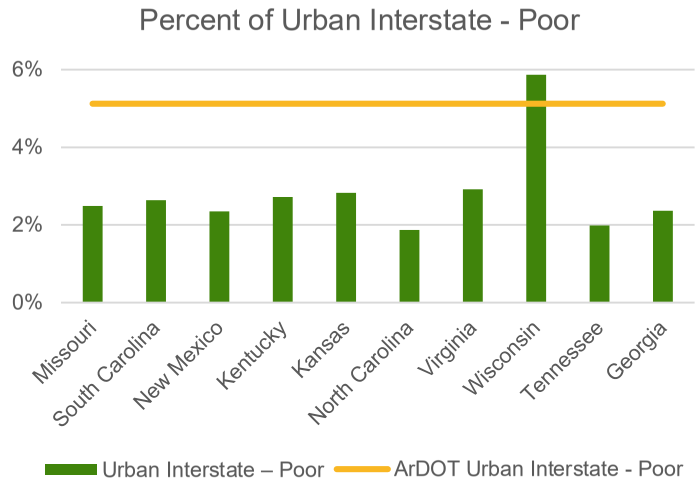


Comparison Group DOTs – Benchmark Highlights



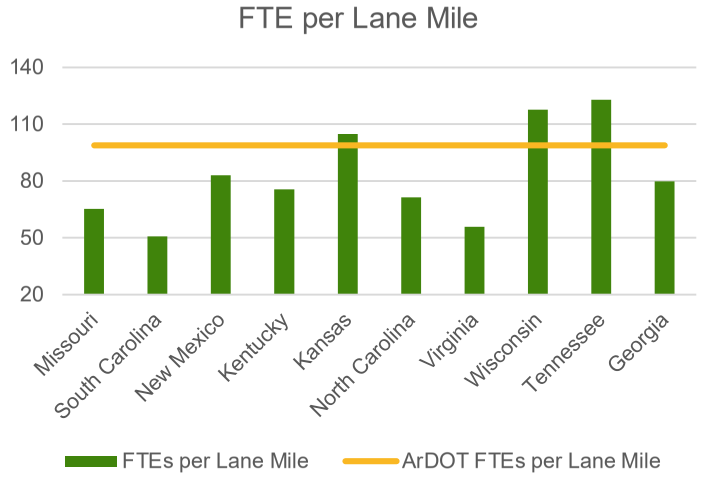
FTE per Lane Mile

Staff per lane mile provides an indicator of how DOTs are deploying resources to attend to meeting transportation needs. Compared with the comparison group, Arkansas' FTE per lane mile figure ranks 4th highest, deploying ~ 99 FTE per lane mile.[3]



Expense per Lane Mile

State controlled highway (lane) mileage is an indicator of the overall responsibility of a DOT, and by this measure Arkansas is the 16th largest system in the nation.[1] Against comparison group DOTs and by virtue of the comparison methodology, Arkansas ranks 4th highest in pre-construction, construction, maintenance, and administrative spend: ~$40k/lane mile.[2]



System Condition

Arkansas performs well amongst comparison group DOTs in Bridge Condition,[4] ranked 4th best. However, it lags behind these DOTs when fatality rate and percentage of roads in poor condition are considered: Arkansas is ranked 4th worst in fatality rate,[5] and 2nd worst in percentage of rural and urban interstate roads in poor condition.[6]

Comparison Group States – Summary Data

This table provides the data utilized to identify comparison State DOTs. DOTs are listed, from left to right, in ascending order of total capital, maintenance, and administrative costs

DOTs	Missouri	South Carolina	New Mexico	Kentucky	Kansas	North Carolina	Virginia	Arkansas	Wisconsin	Tennessee	Georgia
Total Lane Miles[1]	77,708	90,524	29,500	62,216	24,005	172,887	128,377	37,951	29,739	37,424	49,339
Total Center Miles[2]	33,838	41,296	11,953	27,671	10,288	80,011	59,020	16,467	11,743	13,920	17,946
Total Vehicle Miles Traveled per Lane Mile (Thousands) [3]	986	627	925	796	1,341	701	665	966	2,215	2,173	2,664
Staff Size[4]	5,079	4,594	2,448	4,700	2,516	12,337	7,176	3,749	3,499	4,600	3,941
Total Expenses (Thousands)[5]	$1,759,994	$1,857,361	$763,059	$1,757,712	$779,025	$5,329,768	$5,018,223	$1,530,369	$1,501,301	$1,792,354	$3,182,070
Total capital, maintenance, and admin costs per lane mile*,[6]	$19,547 (3)	$19,794 (4)	$25,477 (7)	$28,004 (8)	$28,053 (9)	$31,686 (12)	$37,950 (16)	$38,255 (17)	$47,853 (19)	$49,076 (21)	$60,497 (26)
Total Law enforcement and safety costs per lane mile*,[7]	$3,221 (23)	$1,152 (10)	$505 (3)	$1,649 (12)	$4,024 (27)	$1,059 (8)	$1,968 (14)	$2,301 (17)	$2,432 (19)	$962 (7)	$5,822 (33)
System condition performance measures*:											
% Rural interstate – Poor*,[8]	.60% (11)	.74% (16)	1.22% (27)	1.03% (17)	.48% (8)	1.08% (21)	.31% (4)	2.03% (38)	3.51% (47)	.59% (10)	1.86% (35)
% Urban interstate – Poor*,[9]	2.49% (17)	2.64% (18)	2.35% (15)	2.72% (19)	2.83% (21)	1.87% (7)	2.92% (22)	5.12% (34)	5.87% (37)	1.99% (8)	2.37% (16)
% Rural arterial – Poor*,[10]	1.12% (19)	.94% (15)	7.23% (46)	.77% (13)	.41% (8)	2.02% (29)	.22% (2)	1.76% (26)	4.00% (40)	.33% (6)	.45% (10)
% Urban arterial – Poor*,[11]	5.66% (18)	4.33% (11)	12.85% (35)	4.76% (14)	3.73% (7)	5.19% (15)	4.47% (12)	6.34% (20)	14.76% (39)	4.26% (10)	2.56% (2)
% Deficient Bridges*,[12]	8.60% (34)	8.50% (32)	5.80% (21)	7.10% (26)	5.20% (17)	10.20% (41)	4.60% (12)	4.60% (12)	7.40% (28)	4.30% (10)	3.30% (8)
Fatality Rate*,[13]	1.20% (33)	1.83% (51)	1.43% (42)	1.46% (45)	1.25% (34)	1.19% (32)	.93% (14)	1.41% (41)	.89% (9)	1.28% (35)	1.14% (27)

** National rankings are shown in parentheses; a lower value implies better performance*

GLOSSARY: *Total capital, maintenance, and admin costs per lane mile: Capital Outlay, Admin, ROW, Maintenance, Traffic, Operations, and SRIC, Preconstruction Expenses per Lane Mile*

% Rural Interstate - Poor: Percentage of rural interstate roads in poor condition *% Urban Interstate Poor: Percentage of urban interstate roads in poor condition*

% Rural Arterial – Poor: Percentage of Rural arterial roads in poor condition *% Urban Arterial – Poor: Percentage of urban arterial roads in poor condition*

Fatality Rate - Numbers of fatalities recorded per vehicle miles traveled (in millions)

Current State Key Findings Glossary

Focus Area	#	Description
Organizational Structure	OS1	ArDOT shares several characteristics with other State DOTs; some are unique to Arkansas.
	OS2	Current Key Performance Indicators (KPIs) are limited to system condition. Operational effectiveness is not yet being measured.
	OS3.1	Standard operating procedures (SOPs) are extensive, but not regularly updated.
	OS3.2	Minimizing knowledge loss is a strategic priority for ArDOT, but efforts are not mature.
Portfolio Planning	PP1.1	ArDOT has a formal and quasi-objective process to identify construction projects, prioritize those projects, ensure public involvement, and secure required approvals.
	PP1.2	ArDOT's public communication related to project status, schedule and budget is disjointed and inconsistent. It requires the public to navigate different sources to secure information.
	PP2.1	The Annual maintenance budgeting process is based on Historical Precedent.
	PP2.2	Maintenance workplans are designed to deliver historically rooted activities rather than specific service conditions.
	PP2.3	There is no formal structure to coordinate Workplans within or across districts, or communicate these workplans to the general public.
	PP3	Although ArDOT is responsive to public inquiries, it only offers a limited number of tools to capture and track them.

Current State Key Findings Glossary

Focus Area	#	Description
Procurement	PR1.1	ArDOT adheres to State procurement and transportation laws that limit its flexibility and do not necessarily apply.
	PR1.2	Low bid procurement is viewed by staff as a cultural and financial necessity.
	PR2.1	Pre-qualification and bonding approximate likelihood of project completion, but do not screen for quality.
	PR2.2	The Standard Specifications mandate certain performance criteria, but do not screen for quality.
	PR3	Anecdotes and data suggest some existing quality issues that may be improved through alternate contractor strategies.
	PR4.1	ArDOT takes advantage of legislation that allows consideration of qualifications in some procurement.
	PR4.2	Alternative contract methods have allowed ArDOT to influence contractor behavior.
	PR5.1	ArDOT is not using data to understand procurement trends and identify efficient practices.
	PR5.2	E&P has minimal authority to facilitate implementation of efficient procurement practices.
Expenditures	EX1	Project development, construction, and maintenance functions present unique resource management challenges.
	EX2.1	Formal protocols around the use of practical design are lacking.
	EX2.2	ArDOT has not taken advantage of the full benefits of Value Engineering.
	EX3.1	Engineer's estimates are not formally evaluated to identify future design cost efficiencies.
	EX3.2	Right of Way (ROW) faces external obstacles to reducing costs.
	EX4	The construction project development process may be enhanced through formalized project management tools that increase accountability, identify process efficiencies, and facilitate collaboration across teams.
	EX5.1	Existing project management tools may have broader applications for construction staff.
	EX5.2	Change orders are not formally reviewed to identify potential efficiencies or problematic contractors.
	EX6	Scheduling and evaluation of maintenance activities may be improved through the use of project management tools.
	EX7.1	ArDOT is taking steps to strengthen its internal audit practices.
	EX7.2	External audits are primarily conducted by Legislative Audit and FHWA.

Current State Key Findings Glossary

Focus Area	#	Description
Information Technology	IT1.1	ArDOT appears to be approaching data center modernization phases, however, there does not appear to be a formal plan for integration.
	IT1.2	ArDOT has preliminarily identified staff's software needs but efforts to align technology purchases across the Department has not been universally implemented.
	IT1.3	ArDOT has enlisted a number of vendors to rapidly implement Enterprise Infrastructure upgrades.
	IT1.4	ArDOT recognized that IT customer support is of critical importance and is looking to secure a supporting ITSM tool.
	IT1.5	Although ArDOT is making progress on developing Disaster Recovery (DR) platform, they currently lack a cyber security function, policies, and standards.
	IT2.1	ArDOT has not developed a Governance Structure to ensure IT investments support objectives, manage enterprise risk, and meet external stakeholder needs.
	IT2.2	There is no overarching Enterprise architecture or "Blueprint" to standardize and organize IT infrastructure and solutions to align with business goals.
	IT2.3	ArDOT has not adopted a service catalog nor defined service level expectations which has led to confusion on what IT will deliver, when it will deliver it, and how support is distributed.
	IT2.4	ArDOT's efforts to establish a project management infrastructure to ensure effective delivery of IT projects is still in its infancy.
People Capabilities	PC1	Employee engagement and retention are challenges for ArDOT.
	PC2.1	ArDOT staff value the Department's benefits, but dissatisfaction with compensation is widespread.
	PC2.2	ArDOT faces strong competitors who offer higher wages for both entry-level and experienced professionals.
	PC3.1	Staff have positive relationships with managers, but lack confidence in leadership.
	PC3.2	ArDOT is exploring flexible work strategies to alleviate staffing challenges.
	PC4.1	Career pathways are not defined or clearly communicated to staff.
	PC4.2	Staff lack confidence in the performance evaluation process.
	PC5.1	While training is offered, there are no formal learning pathways that define training plans.
	PC5.2	On-the-job training is often preferred, but difficult to institutionalize.

Recommendation Citations

Recommendation	Page #	Citation
1. Identify operational KPIs and implement performance management	12	1. FHWA. *Transportation Performance Management (TPM) Framework and Toolbox*. https://www.tpmtools.org/ 2. Pew. *The Role of Outcome Monitoring in Evidence-Based Policymaking*. https://www.pewtrusts.org/en/research-and-analysis/issue-briefs/2018/08/the-role-of-outcome-monitoring-in-evidence-based-policymaking#0-overview
	13	1. FHWA. *Transportation Performance Management (TPM) Framework and Toolbox*. https://www.tpmtools.org/ 2. Missouri DOT. *Tracker: Measures of Departmental Performance*. https://www.modot.org/tracker-measures-departmental-performance 3. Wisconsin DOT.*MAPPS Performance Improvement Program*. https://wisconsindot.gov/Pages/about-wisdot/performance/mapss/default.aspx 4. Maryland DOT. *Annual Attainment Report*. http://www.mdot.maryland.gov/newMDOT/Planning/AR/Index 5. Ibid. 6. Ibid.
	14	1. ArDOT Key Performance Indicators (provided by ArDOT, analyzed by Guidehouse).
2. Strengthen knowledge management in anticipation of increased retirement	15	1. ArDOT Current Personnel Data (provided by ArDOT, analyzed by Guidehouse) 2. Harvard Kennedy School.*VDOT Knowledge Management Toolkit*. https://www.innovations.harvard.edu/sites/default/files/1176770.pdf
	16	1. Harvard Kennedy School.*VDOT Knowledge Management Toolkit*. https://www.innovations.harvard.edu/sites/default/files/1176770.pdf 2. Ibid. 3. Ibid. 4. Ibid.

Recommendation Citations

Recommendation	Page #	Citation
3. Publish status of construction projects and maintenance activities	20	1. Kansas DOT. *T-Work Program Landing Page*. http://tworks.ksdot.org/ 2. Virginia DOT. *Smartscale Dashboard*. http://dashboard.vasmartscale.org/ 3. Georgia DOT. *Project Information search page*. http://www.dot.ga.gov/BS/Projects/ProjectSearch 4. Kentucky DOT. *Data Mart*. http://datamart.business.transportation.ky.gov/ 5. Virginia DOT. *Smartscale Dashboard*. http://dashboard.vasmartscale.org/ 6. Ibid. 7. Virginia DOT. *VDOT's New Project Dashboard – Conference Presentation* .http://onlinepubs.trb.org/onlinepubs/Conferences/2019/PerformanceData/Styles.pdf 8. Ibid.
	21	1. North Carolina DOT. *Project Progress Report*. https://www.ncdot.gov/about-us/our-mission/Pages/project-progress.aspx?countynumber=9 2. Pennsylvania DOT. *District 6 Weekly Status Report*. https://www.penndot.gov/RegionalOffices/district-6/Pages/Philly-Regional-Traffic-Bulletin.aspx 3. Missouri DOT. *Operations and Maintenance Plan*. https://www.modot.org/sites/default/files/documents/Sec10OperationsAndMaintenancePlan.pdf. 4. Kansas DOT.*Appendix to KDOT 2020 Annual Report*. . https://www.ksdot.org/Assets/wwwksdotorg/bureaus/offTransInfo/AnnualReports/2020/Appendix_2020.pdf 5. Kentucky DOT. *FY2019 Maintenance Conditions of Kentucky Highways.* https://transportation.ky.gov/Maintenance/Documents/PavementOperations/MRP%20FY19-Statewide.pdf 6. Kentucky DOT. *FY2019 Maintenance Conditions of Kentucky Highways.* https://transportation.ky.gov/Maintenance/Documents/PavementOperations/MRP%20FY19-Statewide.pdf 7. Ibid

Recommendation Citations

Recommendation	Page #	Citation
4. Implement a platform that tracks all stakeholder inquiries to resolution	23	1. City of Portland. *2018 311 Implementation Plan.* https://www.portlandoregon.gov/omf/article/705011 2. Mckinsey & Company. *Improving the Customer Service Experience to achieve government-agency goals*. https://www.mckinsey.com/industries/public-sector/our-insights/improving-the-customer-experience-to-achieve-government-agency-goals 3. Tempkin Group. *2016 Employee engagement benchmark study*. https://experiencematters.blog/2016/02/16/report-employee-engagement-benchmark-study-2016/
	24	1. City of Portland. *2018 311 Implementation Plan.* https://www.portlandoregon.gov/omf/article/705011 2. City of Philadelphia. *Creating a welcoming and connected city: The Philadelphia Experience*. https://www.phila.gov/311/Documents/15-132%20Customer%20Service%20Primer-Philly311%20Report_web.pdf 3. Mckinsey & Company. *Improving the Customer Service Experience to achieve government-agency goals*. https://www.mckinsey.com/industries/public-sector/our-insights/improving-the-customer-experience-to-achieve-government-agency-goals 4. City of Portland. *2018 311 Implementation Plan.* https://www.portlandoregon.gov/omf/article/705011 5. Missouri DOT. *2019 Results*. https://www.modot.org/sites/default/files/documents/2019%20MoDOT%20Results_Final_1.pdf 6. Ibid.
5. Implement efficiencies in procurement and purchasing	27	1. De Silva, Dakshina G. et al. *Project Modifications and Bidding in Highway Procurement Auctions.* 2016. https://as.vanderbilt.edu/econ/documents/desilva_paper.pdf 2. NIGP: The Institute for Public Procurement. *The Strategic Value of Procurement in Public Entities.* 2015. https://www.nigp.org/home/find-procurement-resources/guidance/position-papers
	28	1. Molenaar, Keith, et al; prepared for Next-Generation Transportation Construction Management Transportation Pooled Fund Program Study TPF-5(260). *Guidebook for Selecting Alternative Contracting Methods for Roadway Projects.* 2014. https://www.colorado.edu/tcm/sites/default/files/attached-files/tpf-5260_project_no_1_-_guidebook_for_selecting_contracting_methods_-_final.pdf 2. Center for Transportation Research and Education – Iowa State University. *Performance Effectiveness of Design-Build, Lane Rental, and A + B Contracting Techniques. https://www.lrrb.org/pdf/200609.pdf* 3. Molenaar, Keith, et al; prepared for Next-Generation Transportation Construction Management Transportation Pooled Fund Program Study TPF-5(260). *Guidebook for Selecting Alternative Contracting Methods for Roadway Projects.* 2014. https://www.colorado.edu/tcm/sites/default/files/attached-files/tpf-5260_project_no_1_-_guidebook_for_selecting_contracting_methods_-_final.pdf
	30	1. De Silva, Dakshina G. et al. *Project Modifications and Bidding in Highway Procurement Auctions.* 2016. https://as.vanderbilt.edu/econ/documents/desilva_paper.pdf 2. NIGP: The Institute for Public Procurement. *The Strategic Value of Procurement in Public Entities.* 2015. https://www.nigp.org/home/find-procurement-resources/guidance/position-papers

Recommendation Citations

Recommendation	Page #	Citation
6. Implement construction contractor performance measurement	31	1. National Cooperative Highway Research Program (NCHRP). *Synthesis 390: Performance-Based Construction Contractor Prequalification*. 2009. http://www.trb.org/Publications/Blurbs/156872.aspx 2. Ibid. 3. Dye Management Group, Inc.; prepared for FHWA Office of Safety Research and Development. *Performance-Based Contractor Prequalification as an Alternative to Performance Bonds.* https://www.fhwa.dot.gov/publications/research/infrastructure/14034/14034.pdf 4. Ibid. 5. Ibid. 6. National Cooperative Highway Research Program (NCHRP). *Synthesis 390: Performance-Based Construction Contractor Prequalification*. 2009. http://www.trb.org/Publications/Blurbs/156872.aspx
	32	1. Dye Management Group, Inc.; prepared for Federal Highway Administration Office of Safety Research and Development. *Performance-Based Contractor Prequalification as an Alternative to Performance Bonds.* https://www.fhwa.dot.gov/publications/research/infrastructure/14034/14034.pdf 2. Ibid.
	33	1. Dye Management Group, Inc.; prepared for Federal Highway Administration Office of Safety Research and Development. *Performance-Based Contractor Prequalification as an Alternative to Performance Bonds.* https://www.fhwa.dot.gov/publications/research/infrastructure/14034/14034.pdf 2. Ibid.

Recommendation Citations

Recommendation	Page #	Citation
7. Implement project and portfolio planning frameworks	35	1. ArDOT five year average preliminary and construction engineering actual costs (provided by ArDOT, analyzed by Guidehouse) 2. PM Solutions. *Project Management Maturity & Value Benchmark*. https://www.pmsolutions.com/articles/PM_Maturity_2014_Research_Report_FINAL.pdf
	36	1. Project Management Institute. *The Standard for Portfolio Management*. https://www.pmi.org/pmbok-guide-standards/foundational/standard-for-portfolio-management/fourth-edition 2. Texas DOT. *Portfolio Management and the Unified Transportation Program (presentation)*. https://static.tti.tamu.edu/conferences/tpp16/presentations/breakout-01/amberg-ramirez.pdf 3. Ibid.
	37	1. National Cooperative Highway Research Program (NCHRP). Guide to Level of Service (LOS) Target Setting for Highway Assets. http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rrd_396_contractorsguide.pdf 2. National Cooperative Highway Research Program (NCHRP). Performance-Based Highway Maintenance and Operations Management. http://www.trb.org/Publications/Blurbs/167221.aspx 3. Wisconsin DOT. *2015 Final Compass Report*. https://wisconsindot.gov/Documents/doing-bus/local-gov/hwy-mnt/programs/compass/reports/compass-2015-annual-report.pdf
	38	1. Caltrans. Workplan Standards Guide, Release 12.0. https://dot.ca.gov/-/media/dot-media/programs/project-management/documents/worplan-standards-guide.pdf 2. University of California Office of the President. Review of the Project Resourcing and Schedule Management (PRSM) System used by Caltrans. https://escholarship.org/content/qt20t4r81t/qt20t4r81t.pdf?t=pnhbjo&v=lg
	39	1. Virginia DOT. Project Management Office. http://www.virginiadot.org/business/locdes/project_management_office.asp
	40	1. PM Solutions. *Project Management Maturity & Value Benchmark*. https://www.pmsolutions.com/articles/PM_Maturity_2014_Research_Report_FINAL.pdf 2. ArDOT five year average preliminary and construction engineering actual costs (provided by ArDOT, analyzed by Guidehouse)
8. Implementing best practices in design	41	1. Jones, Joseph. "Practical Design." *FHWA Public Roads.* 2010. V.73 #4. https://www.fhwa.dot.gov/publications/publicroads/10janfeb/06.cfm 2. FHWA. *FY 2018 Value Engineering Summary Report.* https://www.fhwa.dot.gov/ve/2018/
	42	1. Kentucky Transportation Center. *Overview of Performance Based Practical Design.* 2018. https://uknowledge.uky.edu/ktc_researchreports/1590/
	43	1. FHWA. *The Value Engineering (VE) Process and Job Plan.* 2017. https://www.fhwa.dot.gov/ve/veproc.cfm
	44	1. Jones, Joseph. "Practical Design." *FHWA Public Roads.* 2010. V.73 #4. https://www.fhwa.dot.gov/publications/publicroads/10janfeb/06.cfm 2. FHWA. *FY 2018 Value Engineering Summary Report.* https://www.fhwa.dot.gov/ve/2018/

Recommendation Citations

Recommendation	Page #	Citation
9. Build an IT Governance Structure to guide ArDOT's IT investments	46	1. ArDOT IT Budget and Expenditure Data (ArDOT provided, Guidehouse analyzed). 2. ISACA. *Better Tech Governance is Better for Business*. https://www.isaca.org/why-isaca/about-us/newsroom/press-releases/2017/survey-strong-tech-governance-drives-improved-business-outcomes 3. Mckinsey&Company. *Partnering to shape the future – IT's new imperative*. https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/partnering-to-shape-the-future-its-new-imperative 4. Forbes. *Disruption is the New Norm*. https://www.forbes.com/forbes-insights/our-work/our-work-disruption-is-the-new-norm/
	47	1. Forrestor. *IT Governance Framework*. https://www.academia.edu/4430617/IT_Governance_Framework 2. ISACA. *Better Tech Governance is Better for Business*. https://www.isaca.org/why-isaca/about-us/newsroom/press-releases/2017/survey-strong-tech-governance-drives-improved-business-outcomes 3. Mckinsey&Company. *Partnering to shape the future – IT's new imperative*. https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/partnering-to-shape-the-future-its-new-imperative 4. ISACA. *COBIT Framework*. https://www.isaca.org/resources/cobit 5. AXELOS. *ITIL Framework*. https://www.axelos.com/best-practice-solutions/itil 6. CMMI Institute. CMMI Framework. https://cmmiinstitute.com/cmmi
	48	1. ISACA. *COBIT Framework*. https://www.isaca.org/resources/cobit 2. AXELOS. *ITIL Framework*. https://www.axelos.com/best-practice-solutions/itil 3. CMMI Institute. CMMI Framework. https://cmmiinstitute.com/cmmi

Recommendation Citations

Recommendation	Page #	Citation
10. Implement mid-term IT initiatives that can optimize business operations	49	1. ArDOT IT Budget Report (ArDOT provided, Guidehouse analyzed) & Oracle. *Benefits of Application Rationalization. Reduce costs and improve service with a systematic approach*. http://www.oracle.com/oms/eppm/042763.pdf 2. GovTech. *Gartner's Cost-Cutting Tactics in Data Management and Integration*. https://www.govtech.com/e-government/Gartners-Cost-Cutting-Tactics-in-Data-Management.html 3. McKinsey&Company. *Big Data: The Management Revolution*. https://hbr.org/2012/10/big-data-the-management-revolution 4. CIO. *Data Governance: Proving Value*. https://www.cio.com/article/3391560/data-governance-proving-value.html 5. McKinsey&Company. Open Data. Unlocking innovation and performance with liquid information. https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/open-data-unlocking-innovation-and-performance-with-liquid-information
	50	1. Oracle. *Benefits of Application Rationalization. Reduce costs and improve service with a systematic approach*. http://www.oracle.com/oms/eppm/042763.pdf 2. GovTech. *Gartner's Cost-Cutting Tactics in Data Management and Integration*. https://www.govtech.com/e-government/Gartners-Cost-Cutting-Tactics-in-Data-Management.html 3. NASCIO. *Data Governance Part II: Maturity Models – A Path to Progress*. https://www.nascio.org/wp-content/uploads/2019/11/NASCIO-DataGovernancePTII.pdf 4. CIO. *Data Governance: Proving Value*. https://www.cio.com/article/3391560/data-governance-proving-value.html 5. McKinsey&Company. Open Data. Unlocking innovation and performance with liquid information. https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/open-data-unlocking-innovation-and-performance-with-liquid-information 6. Oracle. *Benefits of Application Rationalization. Reduce costs and improve service with a systematic approach*. http://www.oracle.com/oms/eppm/042763.pdf 7. McKinsey&Company. *Big Data: The Management Revolution*. https://hbr.org/2012/10/big-data-the-management-revolution 8. CIO. *Data Governance: Proving Value*. https://www.cio.com/article/3391560/data-governance-proving-value.html 9. Virginia DOT. *Virginia DOT Open Data Portal*. https://www.virginiaroads.org/ 10. Ibid.
	52	1. Oracle. *Benefits of Application Rationalization. Reduce costs and improve service with a systematic approach*. http://www.oracle.com/oms/eppm/042763.pdf 2. ArDOT IT Budget Report (ArDOT provided, Guidehouse analyzed)

Recommendation Citations

Recommendation	Page #	Citation
11. Develop necessary pillars to establish IT as an effective business partner	53	1. Forbes. *How IT Service Management delivers value to the digital enterprise*. https://www.forbes.com/sites/forbesinsights/2017/03/16/how-it-service-management-delivers-value-to-the-digital-enterprise/#ff6927c732ee 2. PM Solutions. *Project Management Maturity & Value Benchmark*. https://www.pmsolutions.com/articles/PM_Maturity_2014_Research_Report_FINAL.pdf
	54	1. PM solutions. P*roject Management Maturity & Value Benchmark*. https://www.pmsolutions.com/articles/PM_Maturity_2014_Research_Report_FINAL.pdf 2. PM Solutions. *State of the PMO, 2016.* https://www.pmsolutions.com/reports/State_of_the_PMO_2016_Research_Report.pdf 3. Forbes. *How IT Service Management delivers value to the digital enterprise*. https://www.forbes.com/sites/forbesinsights/2017/03/16/how-it-service-management-delivers-value-to-the-digital-enterprise/#ff6927c732ee 4. Texas Department of Information Resources. *PM Lite*. https://dir.texas.gov/View-Resources/Pages/Content.aspx?id=17 5. Forbes. *How IT Service Management delivers value to the digital enterprise*. https://www.forbes.com/sites/forbesinsights/2017/03/16/how-it-service-management-delivers-value-to-the-digital-enterprise/#ff6927c732ee 6. PM solutions. P*roject Management Maturity & Value Benchmark*. https://www.pmsolutions.com/articles/PM_Maturity_2014_Research_Report_FINAL.pdf 7. Indiana Office of Technology. *ITSM-ITIL Roadmap*. https://www.in.gov/iot/2466.htm 8. Indiana Office of Technology. *2019 – 2020 IOT Strategic Direction*. https://www.in.gov/iot/files/2019-2020%20IOT%20Strategic%20Direction.pdf 9. Indiana Office of Technology. *February 2020 Service Performance Report.* https://www.in.gov/iot/files/Monthly%20IOT%20Service%20Performance%20Report%20-%20StateFeb.pdf 10. Indiana Office of Technology. *ITSM-ITIL Roadmap*. https://www.in.gov/iot/2466.htm
	55	1. Texas Department of Information Resources. *PM Lite*. https://dir.texas.gov/View-Resources/Pages/Content.aspx?id=1 2. AXELOS. *ITIL Framework*. https://www.axelos.com/best-practice-solutions/itil

Recommendation Citations

Recommendation	Page #	Citation
12. Ensure staff can advance their careers and ArDOT	57	1. Agovino, Theresa. "To Have and to Hold." *Society for Human Resource Management.* 2019. https://www.shrm.org/hr-today/news/all-things-work/pages/to-have-and-to-hold.aspx 2. ArDOT 2019 Employee Engagement Survey (provided by ArDOT, analyzed by Guidehouse) 3. ArDOT Turnover Data (provided by ArDOT, analyzed by Guidehouse) 4. Harper, Christofer, et al; prepared for Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Construction Careers at Transportation Agencies.* 2018. https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs 5. Chamberlain, Andrew. "Why Do Employees Stay? A Clear Career Path and Good Pay, for Starters." *Harvard Business Review.* 2017. https://hbr.org/2017/03/why-do-employees-stay-a-clear-career-path-and-good-pay-for-starters
	58	1. Agovino, Theresa. "To Have and to Hold." *Society for Human Resource Management.* 2019. https://www.shrm.org/hr-today/news/all-things-work/pages/to-have-and-to-hold.aspx 2. Off, Gavin. "Oklahoma Department of Transportation reaps pay raises." *The Oklahoman*. 2009. https://oklahoman.com/article/3351414/oklahoma-department-of-transportation-reaps-pay-raises 3. Thomas Howell Ferguson (THF) and MGT of America, Inc.; prepared for the Florida Transportation Commission. *Management Compensation Study of The Florida Department of Transportation.* 2015. http://www.ftc.state.fl.us/documents/reports/Other/FTC_FDOT_FINAL_REPORT_FULL_Report_2-8-15.pdf 4. McKenna, Patrick. "Director's Letter." *MoDOT.* 2019. https://www.modot.org/sites/default/files/documents/DirectorsLetterJuly2019_0.pdf 5. Harper, Christofer, et al; prepared for Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Construction Careers at Transportation Agencies.* 2018. https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs 6. Montana DOT. *Careers Webpage.* https://www.mdt.mt.gov/jobs/careerdev.shtml

Recommendation Citations

Recommendation	Page #	Citation
13. Align staff capabilities with current and future organizational needs	59	1. Bersin, Josh. “New Research Shows "Heavy Learners" More Confident, Successful, and Happy at Work.” *LinkedIn Pulse*. 2018. https://www.linkedin.com/pulse/want-happy-work-spend-time-learning-josh-bersin/ 2. NCHRP. *Synthesis 483: Training and Certification of Highway Maintenance Workers.* 2015. https://www.nap.edu/catalog/23458/training-and-certification-of-highway-maintenance-workers 3. Ibid.
	60	1. Guidehouse analysis of ArDOT 2019 Employee Engagement Survey 2. Guidehouse Interview with ArDOT Resident Engineer (Rural) 3. NCHRP. *Report 685: Strategies to Attract and Retain a Capable Transportation Workforce.* 2011. https://www.nap.edu/catalog/14475/strategies-to-attract-and-retain-a-capable-transportation-workforce 4. PennDOT. *District Bridge Inspection Manager/Supervisor: Position Analysis Workbook.* 2004. https://www.dotdom1.state.pa.us/ECMS/ECMS_Training_Calendar.nsf/vwPaws/DA75A607D124E384852578D80040C4FE/$File/DistBridgeInspectMgrSup.pdf
	62	1. Harper, Christofer, et al; prepared for Transportation Consortium of South-Central States. *Recruiting, Retaining, and Promoting for Construction Careers at Transportation Agencies.* 2018. https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1019&context=transet_pubs 2. Crowley, Brendan. “Director: High turnover puts MoDOT in 'triage mode.'” *The Joplin Globe.* 2020. https://www.joplinglobe.com/news/local_news/director-high-turnover-puts-modot-in-triage-mode/article_90967895-bab0-59a8-b8d4-6b5bdd411d2e.html 3. Chamberlain, Andrew. “Why Do Employees Stay? A Clear Career Path and Good Pay, for Starters.” *Harvard Business Review.* 2017. https://hbr.org/2017/03/why-do-employees-stay-a-clear-career-path-and-good-pay-for-starters

Recommendation Citations

Appendix	Page #	Citation
Leading Practices	65	1. Federal Highway Administration (FHWA). *Highway Statistics 2018*. https://www.fhwa.dot.gov/policyinformation/statistics/2018/ 2. Ibid. Table SF-4. 3. Ibid. Table HM-10, Table HM-81 4. Ibid. Table HM-64, Table FI-20, Table VM-2 5. Federal Highway Administration (FHWA). *Bridge Condition by Highway System 2018*. https://www.fhwa.dot.gov/bridge/nbi/no10/condition18.cfm
	67	1. Federal Highway Administration (FHWA). *Highway Statistics 2018* - Table HM-10, Table HM-81. https://www.fhwa.dot.gov/policyinformation/statistics/2018/ 2. Ibid. Table SF-4. 3. American Association of State Highway and Transportation Officials. *A 50-State Review of State Legislatures and Departments of Transportation*. http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf 4. Federal Highway Administration (FHWA). *Bridge Condition by Highway System 2018*. https://www.fhwa.dot.gov/bridge/nbi/no10/condition18.cfm 5. Federal Highway Administration (FHWA). *Highway Statistics 2018* - Table FI-20, Table VM-2. https://www.fhwa.dot.gov/policyinformation/statistics/2018/ 6. Federal Highway Administration (FHWA). *Highway Statistics 2018* - Table HM-64. https://www.fhwa.dot.gov/policyinformation/statistics/2018/

Recommendation Citations

Appendix	Page #	Citation
Leading Practices	68	1. Federal Highway Administration (FHWA). *Highway Statistics 2018* – Table HM-10, Table HM-81. https://www.fhwa.dot.gov/policyinformation/statistics/2018/ 2. Ibid. 3. Federal Highway Administration (FHWA). *Highway Statistics 2018* – Table HM-10, Table HM-44. 4. American Association of State Highway and Transportation Officials. *A 50-State Review of State Legislatures and Departments of Transportation*. http://www.financingtransportation.org/pdf/50_state_review_nov16.pdf 5. Federal Highway Administration (FHWA). *Highway Statistics 2018* – Table SF-4. https://www.fhwa.dot.gov/policyinformation/statistics/2018 6. Ibid. 7. Ibid. 8. Federal Highway Administration (FHWA). *Highway Statistics 2018* – Table HM-64. https://www.fhwa.dot.gov/policyinformation/statistics/2018 9. Ibid. 10. Ibid. 11. Ibid. 12. Federal Highway Administration (FHWA). *Bridge Condition by Highway System 2018*. https://www.fhwa.dot.gov/bridge/nbi/no10/condition18.cfm 13. Federal Highway Administration (FHWA). *Highway Statistics 2018* – Table FI-20, Table VM-2. https://www.fhwa.dot.gov/policyinformation/statistics/2018

Appendix

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Recommendation 5 - Anticipated Impact Assumptions

1

~$1.4M (3.5%) in direct project savings by adopting TxDOT's policy of limiting change orders

TxDOT reduced direct and indirect costs for project modifications by 3-4% by altering change order policies. ArDOT spends $40.4M on average in change orders annually

- 3.5% * $40.4M = $1.4M

2

~$1.8 to 7.1M (5-20%) in savings on small order (<$20K) and competitive bid ($20K-$75K) purchases by adopting NIGP's best practices in spend analysis, management, and oversight

A 2015 Institute for Public Procurement report identified that State governments can save 5-20% of expenditures by improving procurement processes (i.e., spend analysis). ArDOT spends on average $22.5M annually on small order purchases (<$20K) and $12.8M on competitive bid purchases ($20K-$75K)

- At 5%, savings would be $1.1M and $639K respectively (total: $1.8M)
- At 20% savings would be $4.5M and $2.6M respectively (total: $7.1M)

Guidehouse

GLOSSARY

TxDOT: Texas DOT NIGP: Institute for Public Procurement

Recommendation 7 - Anticipated Impact Assumptions

1

A more mature project management framework may allow ArDOT to realize ~$3.82M in annual cost savings

PMSolutions', Project Management Maturity & Value Benchmark Report revealed:

- An organization with less mature project management platform realizes cost reductions of 6% per project
- The average cost savings for all organizations is 16% (This represents cost savings from an organization with an average level of project management maturity)

ArDOT's percentage cost savings by implementing a more mature project management platform:

- Assume ArDOT has a less mature project management platform and 6% cost savings are already factored into their internal construction costs.
- Assume implementation of a more mature project management platform ArDOT can yield the average cost savings per PMSolutions (16%). As a result, ArDOT can increase cost savings by 10%.

ArDOT's five year (FY2015 – FY2019) average internal State specific construction project costs based on actual pre-construction, construction engineering right of way, utility engineering, utility audit, misc. engineering, State force, EEO, and surveys expenditures*.

- ArDOT five year average State specific construction costs = $38,168,661

Cost savings by implementing rising to an organizational average project management platform = $38,168,661 * 10% = ~$3.82M

** Costs include 20% of Federal Participating and Billable costs; 100% of Non-Participating costs; 20% IRP Bond Funds to supplement Federal Participating costs; 100% of IRP Bond Funds to supplement Non-Participating costs*

Recommendation 8 - Anticipated Impact Assumptions

1

~$664K in cost savings per project by adopting formal framework for practical design

MoDOT saved 13% on average in its first year of implementing a formalized practical design program. ArDOT's average contract amount 2014-19 is $5.1M.

- 13% * $5,113,314 = $664K

2

Increased total project savings by bringing ArDOT up to national averages of: annual number of VE studies (~$1M), cost savings generated per VE study (~$7.7M), or both (~$15.8M)

ArDOT can increase its cost savings from value engineering by: 1) increasing the % of cost savings yielded per study (i.e., by conducting studies earlier in the design process, generating more recommendations per study); 2) increasing the # of studies, or 3) both. ArDOT currently conducts an average of 1.75 VE studies per year (total project costs $181M), generating 0.7% in project costs saved (~$1.3M). The national average is 3.30 studies per year and 5.0% of savings. Note: applied to ArDOT, 3.30 studies per year would yield a proportional project cost of $343M.

- Increasing %: 1.75 studies of projects totaling $181M @ 5.0% cost savings = $9.1M (= $7.7M greater than current savings)
- Increasing #: 3.30 studies of projects totaling $343M @ 0.7% cost savings = $2.4M (= $1.0M greater than current savings)
- Both: 3.30 studies of projects totaling $343M @ 5.0% cost savings = $17.2M (= $15.8M greater than current savings)

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GLOSSARY

MoDOT: Missouri DOT VE: Value Engineering

Disclaimer: Anticipated Impacts are estimates, directional in nature, and represent the upper end of the savings range

Recommendation 10 - Anticipated Impact Assumptions

1

Up to $1M in savings from application management, per Gartner analysis

A 2009 Oracle Report quotes a Gartner analysis which reveals that Chief Information Officers report application rationalization combined with business process optimization can yield on average 20% cost savings within one year. ArDOT spent ~$5.3M on software in FY2019. It does not appear that ArDOT separately tracks software license expenditures or application development/support. As a result, using the total software expenditure as a proxy for the costs that could be reduced as a result of application rationalization, and applying the 20% cost savings from the Oracle report yields:

- 20% * $5.3M = $1.06M

Disclaimer: Anticipated Impacts are estimates, directional in nature, and represent the upper end of the savings range

Recommendation 13 - Anticipated Impact Assumptions

1

~$5M in cost avoidance per year by averting projected turnover increases (instead maintaining current 8.6% rate), based on cost estimates from Tran-SET

A report from the Transportation Consortium of South-Central States identified the cost of turnover as exceeding 100% of the annual compensation of the resigning employee. Applied to ArDOT, this yields a 2019 turnover cost of ~$11.8M (320 staff, $36.9K salary). Based on available data for 2015-2019, the turnover rate is increasing ~15.3% annually. If unchecked, the rate will rise from 9.6% in 2020 to 14.9% in 2024. This translates to:

- $13.3M in 2020, $14.9M in 2021, $16.7M in 2022, $18.7M in 2023, $21.0M in 2024; 5-year total: $84.6M
- If ArDOT maintains the current rate of turnover, it will instead spend $11.8M per year; 5-year total: $59.2M (a difference of: $25.4M, or ~$5M/year)
- Note: We assume no change in salary, as between 2014 and 2019, salaries remained fairly flat at -0.58%
- Note: MoDOT has reported an even higher cost: ~$54K per person, with annual costs ~$32.5M (as of 2019)

2

~5.0% increase in likelihood staff are retained to seek promotion at ArDOT rather than at competitor, by adopting HBR's best practices in career development

A study published in Harvard Business Review found that raising a company's Glassdoor "career opportunities" rating by one star (out of five) was "associated with a five-percentage-point higher chance that workers would stay for their next role."

- ArDOT's current "career opportunities" score is 3.6; raising it by 1 star to 4.6 would be associated with a 5% higher chance that staff will remain at ArDOT for their next role, rather than leaving to pursue advancement elsewhere

Guidehouse

GLOSSARY

Tran-SET: Transportation Consortium of South-Central States

Disclaimer: Anticipated Impacts are estimates, directional in nature, and represent the upper end of the savings range

Assumptions

1. The recommendations included in the presentation and in the corresponding Recommendations Report are based on a point in time Current State Report delivered to the Highway Commission and Advisory Subcommittee on March 13, 2020. This Current State Report was based on interviews conducted with the Arkansas Department of Transportation (ArDOT) staff members and various external stakeholders and a review of documents ArDOT provided to Guidehouse from September 2019 – February 2020. Recommendations and Findings are subject to change based on mitigating documentation and clarifications provided by ArDOT subsequent to the publication of this report.
2. The Anticipated Impacts identified within this presentation and the corresponding Recommendations Report are estimates, directional in nature, and represent the upper end of the savings range

Stricken language would be deleted from and underlined language would be added to present law.

State of Arkansas
92nd General Assembly
Second Extraordinary Session, 2020

A Bill

DRAFT DTP/DTP
SENATE BILL

By: Senator J. Dismang

For An Act To Be Entitled

AN ACT TO AMEND THE LAW CONCERNING THE DUTIES OF THE STATE HIGHWAY COMMISSION; AND FOR OTHER PURPOSES.

Subtitle

TO AMEND THE LAW CONCERNING THE DUTIES OF THE STATE HIGHWAY COMMISSION.

BE IT ENACTED BY THE GENERAL ASSEMBLY OF THE STATE OF ARKANSAS:

SECTION 1. DO NOT CODIFY. Legislative Intent.

The General Assembly finds that:

(1) Acts 2019, No. 298, required a study of the working processes and functioning of the Arkansas Department of Transportation;

(2) The purpose of the study was to examine and identify areas of potential improvement within the overall functioning of the department and to recommend legislation to the General Assembly for consideration in order to:

(A) Maximize the department's use of taxpayer dollars;

(B) Improve the efficiency and overall functioning of the department; and

(C) Ensure the responsiveness of the department to the needs of the State of Arkansas and its citizens with regard to improvement of the state highways and roads;

(3) The study was conducted with transparency through the collaboration of the department, members of the Highway Commission Review and Advisory Subcommittee of the Legislative Council, and members of the public; and

(4) Continued collaboration between the department, members of the Highway Commission Review and Advisory Subcommittee of the Legislative Council, and members of the public is necessary to facilitate transparency and the implementation of the recommendations resulting from the study.

SECTION 2. Arkansas Code § 27-65-107(a)(18), concerning the powers and duties of the State Highway Commission, is amended to read as follows:

(18)(A) To propose and submit rules regarding the:

(i) Criteria for distribution of funds and the distribution of funds from the:

(a) State Highway and Transportation Department Fund; and

(b) Road and Bridge Repair, Maintenance, and Grants Fund; ~~and~~

(ii) Spending priority designated for highway construction contracts and public road construction projects by the department and the commission, including the criteria used to establish the spending priority~~.~~; and

(iii) Implementation of the recommendations included in the final report submitted by the Legislative Council resulting from the study of the Arkansas Department of Transportation required by the Highway Commission Review and Advisory Subcommittee of the Legislative Council under Acts 2019, No. 298.

(B)(i) The commission shall submit the proposed rules required under subdivision (a)(18)(A) of this section to the Highway Commission Review and Advisory Subcommittee of the Legislative Council for review.

~~(ii) Proposed rules required under subdivision (a)(18)(A) of this section that are under consideration at the time the act passes do not require review by the Highway Commission Review and Advisory Subcommittee of the Legislative Council prior to implementation but shall be submitted to the Highway Commission Review and Advisory Subcommittee of the Legislative Council by October 1, 2017, as a report.~~

~~(iii)~~ (ii) The proposed rules required under subdivision (a)(18)(A) of this section are not required to be promulgated under the Arkansas Administrative Procedure Act, § 25-15-201 et seq., but

shall be published after review by the Highway Commission Review and Advisory Subcommittee of the Legislative Council~~; and~~.

(C) The commission shall submit proposed contracts under subdivision (a)(18)(A)(iii) of this section of fifty thousand dollars ($50,000) or more to the Highway Commission Review and Advisory Subcommittee of the Legislative Council for review before the execution of the contracts.

(D) The Highway Commission Review and Advisory Subcommittee of the Legislative Council shall allow members of the public a reasonable length of time to comment on the proposed rules and contracts submitted under subdivision (a)(18)(A)(iii) and subdivision (a)(18)(C) of this section.

Stricken language would be deleted from and underlined language would be added to present law.

State of Arkansas
92nd General Assembly
Second Extraordinary Session, 2020

A Bill

DRAFT DTP/DTP
SENATE BILL

By: Senator L. Chesterfield

For An Act To Be Entitled

AN ACT TO CREATE A MERIT PAY SYSTEM FOR EMPLOYEES OF THE ARKANSAS DEPARTMENT OF TRANSPORTATION; AND FOR OTHER PURPOSES.

Subtitle

TO CREATE A MERIT PAY SYSTEM FOR EMPLOYEES OF THE ARKANSAS DEPARTMENT OF TRANSPORTATION.

BE IT ENACTED BY THE GENERAL ASSEMBLY OF THE STATE OF ARKANSAS:

SECTION 1. Arkansas Code Title 27, Chapter 65, Subchapter 1, is amended to add an additional section to read as follows:

27-65-148. Merit pay system — Definition.

(a) As used in this section, "merit pay system" means a pay system that incorporates pay and performance evaluation standards and establishes criteria for payments for employees who meet requisite performance categories.

(b) An employee of the Arkansas Department of Transportation may receive a merit pay adjustment based on a merit pay system established by the State Highway Commission.

(c) The commission shall establish a merit payment as either of the following, based on sufficiency of funding:

(1) An increase to an employee's base salary; or

(2) A lump-sum payment.

(d)(1) A department employee shall be evaluated using a merit pay system developed by the commission that incorporates performance evaluation

standards, including without limitation an employee's:

(A) Punctuality;

(B) Attendance;

(C) Completion of projects or assignments; and

(D) Increased competence in his or her field.

(2) The merit increase pay system developed by the commission as required by this section shall be reviewed by the Legislative Council, or if the General Assembly is in session, the Joint Budget Committee.

(e)(1) If a merit pay adjustment is awarded, an employee reaching the maximum rate of pay for his or her position classification may receive the merit pay in a lump-sum payment.

(2) Additional compensation under this section shall not be construed as exceeding the line item maximum for that position classification.

Proposed Amendment to ALC Rule 5.(13)

(13) **Highway Commission Review and Advisory Subcommittee.**

(A) Membership. The subcommittee shall consist of twenty (20) members with at least four (4) or more members of the Legislative Council from each congressional district of the state. The Legislative Council may, by an affirmative vote of two-thirds (2/3) of a quorum to suspend the rules, alter the membership of the subcommittee.

(B) Duties. To this subcommittee shall be referred the following matters:

(i) Proposed rules of the State Highway Commission required under Arkansas Code § 27-65-107(a)(18)(A). Proposed rules of the State Highway Commission submitted under this subdivision are not subject to approval by the Legislative Council or any of its subcommittees and shall be presented for review only;

(ii) Reports from the State Highway Commission regarding the progress of each public road construction project of ten million dollars ($10,000,000) or more;

(iii) Report of the Director of State Highways and Transportation regarding draft legislation that has been approved by the State Highway Commission to be presented for filing during the next regular legislative session. This report shall be presented to the Subcommittee at its December meeting of each year immediately preceding a regular session;

(iv) Proposed rules of the State Highway Commission related to implementation of the recommendations included in the final report submitted as required under subdivision 5.(a)(13)(C)(iii) of this rule. Proposed rules of the State Highway Commission submitted under this subdivision are not subject to approval by the Legislative Council or any of its subcommittees and shall be presented for review only;

(v) Proposed contracts of the State Highway Commission, in the amount of fifty thousand dollars ($50,000) or more, that are entered for the purpose of implementing any of the recommendations included in the final report submitted as required under subdivision 5.(a)(13)(C)(iii) of this rule. A contract shall be submitted to the Subcommittee for review prior to execution of the contract;

(vi) Monthly reports regarding the status of the implementation of the recommendations included in the final report submitted as required under subdivision 5.(a)(13)(C)(iii) by the State Highway Commission and the Arkansas Department of Transportation;

~~(iv)~~(vii) Other State Highway Commission matters the subcommittee considers necessary to perform its duties as prescribed by law; and

~~(v)~~(viii) Other duties as assigned to the subcommittee by the Legislative Council.

(C) In addition to the duties listed in subdivision (B), and in compliance with Act 298 of 2019, the subcommittee shall:

(i) Conduct a study of the processes and functioning of the Arkansas Department of Transportation, including without limitation the department's processes, procedures, procurement procedures, projects, expenditures, and appeals processes;

(ii) Assist the Legislative Council in the selection of one (1) or more consultants to assist the subcommittee in conducting the study; and

(iii) Provide a final written report of its activities, findings, and recommendations, including recommended legislation related to the study to the

Proposed Amendment to ALC Rule 5.(13)

Legislative Council at its November 2020 meeting;