Deferred Infrastructure Maintenance and GASB 34

Analysis of Selected State Comprehensive Annual Financial Reports from 2002-2017

May 14th, 2018 | George Mason University

Schar School of Policy and Government
Transportation Policy, Operations, and Logistics

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In memory of J. Robert Vastine, Jr.

We would like to dedicate this report to J. Robert “Bob” Vastine, Jr., longtime partner of our professor Dr. Jonathan Gifford. Bob served roles in many organizations, both public and private, that focused on international trade policy. He most recently was the President of the Coalition of Service Industries, and before that worked for the US Department of Treasury, Senate Republican Conference, and Congressional Economic Leadership Institute, all with high-ranking positions.

Bob was a member of the Cosmos Club and the International Powerlifting Association. He enjoyed studying American history and gardening in his spare time. We are thankful our professor had the good fortune of spending time with a partner who pursued a noble cause and lived life to the fullest.

As General George S. Patton once said, “It is foolish and wrong to mourn the men who died. Rather, we should thank God that such men lived.” Our thoughts and prayers are with Dr. Gifford and his family, yet we hope they will celebrate the life of Bob for his contributions and for his valuable place on this Earth.

Sincerely,

The 2018 TPOL Practicum Class
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1.0 EXECUTIVE SUMMARY

There is a variety of approaches through which government entities invest in transportation infrastructure and execute related preventative maintenance programs. This absence of uniformity in approach presents numerous policy, planning, and operating challenges for individual governments and for those third-party organizations charged with assessing comparative infrastructure-related performance and financial risk among the states. The research herein analyzed how six specific states are addressing capital transportation infrastructure investment and deferred maintenance in the years since the publication of GASB’s Statement Number 34 (GASB 34). Inherent is an evaluation of the role GASB 34 is playing not only in the accounting process, but in its impacts on asset management systems as well. The research collected qualitative interview responses from asset management and financial personnel at the state DOT (Department of Transportation) and Comptroller levels. One of the main deliverables requested by the client, the Governmental Accounting Standards Board (GASB), was a quantitative analysis of state Comprehensive Annual Financial Reports (CAFRs) covering a period from 2002 to 2017. This dataset was provided to the client separately from the final report.

The financial accounting methods used in states as they relate to GASB 34 primarily determined which states were selected for the research. The research team selected Tennessee and Arizona as states that originally adopted GASB 34’s modified approach and continue to use it. Virginia and Massachusetts chose not to adopt the modified approach and were selected because they continue to use the traditional approach of depreciation in their accounting. Lastly, Colorado and Texas presented two unique cases of states that originally adopted the modified approach but later switched back to a traditional method. The decision to resume the traditional approach was paramount to the selection of Colorado and Texas as it generated interest in analyzing the reasons why they reverted to the traditional approach. This was of particular interest to GASB.

After collecting interview responses from the aforementioned states and analyzing CAFR data from those states from 2002-2017, we are able to produce the following findings:

- A lack of dedicated funding leads to varying asset condition levels each year. Federal infrastructure spending bills, such as Moving Ahead for Progress in the 21st Century Act (MAP-21) or the Fixing America’s Surface Transportation Act (FAST Act), in the form of formula and competitive grants, provide states with immediate assistance to repair the most dilapidated infrastructure assets, but they don’t address long term concerns. This is evident in the depreciation graphs in the following case studies.
- The CAFR is an extremely difficult tool to compare financial reporting across states. In the infrastructure category, states do not explain how they spend their money, making it difficult to see if the funding actually resulted in improved infrastructure.
- There is no one type of "asset management system,” which is a requirement under MAP-21. States have asset management systems for infrastructure classes, such as pavement, bridges, or digital signage. Some have an enterprise system, which is "off-the-shelf" by a company called Deighton, which combines the systems into a single program, and others have stand-alone system.
Executive Summary

- While MAP-21 required asset management systems on the National Highway System (NHS), most states already had systems in place. MAP-21 was influential in consolidating ongoing grant programs and creating new grant programs, but it did not significantly impact the way states conduct asset management.
- Attitudes towards infrastructure being "long-lived" are shared in states that used the modified approach, but states that use depreciation accounting witness a separation among state comptrollers and the DOTs. In modified approach states, both parties understand that bridges outlive their initial life expectancy, and that it is more cost effective to finance maintenance than completely rebuild a bridge. The comptroller's office in a depreciation state views bridges as depreciable assets, while DOT has a different interpretation.
- Several state officials interviewed for this report expressed views consistent with a 2010 survey on general feelings towards GASB 34, conducted by Frank and Gianakis. Their survey “found that over 70 percent of the respondents did not believe GASB 34 improved elected officials capacity or provided managers with planning or decision.”
- Several state officials interviewed for this report expressed consistent views that while GASB 34 was an effective tool for accounting of money already spent, it was not an effective tool to guide investment decisions of money yet to be spent.

Arizona and Tennessee both adopted the modified approach, and both had the lowest amount in dollars for depreciation and in percentage change (both at 4 percent). In addition, both states were not much different regarding population, and lane miles considering the amount. However, Tennessee did not report any of their “Business Activity” expenses as Arizona did report this type of expense. There were not any increases or decreases worth noting for Tennessee. However, Arizona did have a notable year one increase in “Government Activity Accumulated Depreciation Infrastructure” at 161 percent between the FY2002-2003. During this time-frame, it is important to note that capitalization thresholds were raised. In addition, there was a significant increase in the Arizona long-term debt standards. These variations may have influenced reporting cycles for “Government Activity Accumulated Depreciation Infrastructure.”

Massachusetts and Virginia both have notable changes in several sections of their CAFR data and are analyzed within each state case study. For Virginia, the total amount of depreciable infrastructure on average increased at five percent between 2002 and 2017. Virginia’s passing of transportation legislation in 2013 and 2015, provided the state with dedicated funding, which led to investment and condition improvements to the transportation infrastructure. Additionally, financial reporting of capital and infrastructure assets under business activities varied from year to year due to changes in reporting. Massachusetts’ changes in reporting of capital assets were mainly due to the increases in the Central Artery/Tunnel Project and opening of the I-90 Connector Tunnel. In addition, in 2010 there was an increase in many areas because of the establishment of the Massachusetts Department of Transportation (MassDOT).

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Colorado and Texas both changed approaches between the 15-year period that was analyzed. Colorado adopted the traditional approach in 2010 and Texas in 2014. Texas depreciable assets averaged at 9 percent per year. Due to Texas’ geographical characteristics and the ways in which they report maintenance, it is difficult to have a good comparison among the other states studied in this report, as seen in Figure 1 and Figure 2. Colorado had a notable increase between 2009 and 2010 and this was due to the change from modified approach to traditional. Within the time-frame of 2011-2013 there were negative decreases in “Business Activity Depreciable Infrastructure” and notable increases in “Business Non-Depreciable Infrastructure” with the highest increase between 2010-2011 at 3,931 percent and increasing significantly in dollar amount for the next six years.

All states who reported under the modified approach reported their maintenance costs both the estimated and the actual. States such as Arizona and Tennessee were consistently above on their actual costs compared to the estimated costs. Texas also had these issues on the “Turnpike Maintenance Cost.” For both Colorado and Texas, “Interstate and Non-Interstate Maintenance Costs” were consistently below their estimated costs.

Based on our findings, we provide the following recommendations:

1) Consistent sources of infrastructure funding are necessary. Without dedicated funding, the condition of many infrastructure assets remain unaddressed and continue to deteriorate. This funding can come in the form of an increase to the national gasoline tax, a vehicle miles traveled (VMT) system, or highway user fees. The Highway Trust Fund does not support the needs of the 21st century infrastructure system. GASB should implement a requirement that states have a dedicated source of funding for roads and bridges if they opt for the modified approach. Although Colorado and Virginia use the traditional approach, their dedicated funding for roads and bridges leads to improved infrastructure conditions.

2) GASB should provide guidance for how states record the road and bridge categories in their CAFRs to improve uniformity among the states. Currently, CAFR documents are extremely difficult to interpret, and compare across states and fiscal years. A standardized format for infrastructure reporting would help state comptrollers to better prepare for expected infrastructure costs, while creating transparency between the public and the state regarding infrastructure spending in each category.

3) GASB should provide guidance to improve the communication between state comptrollers and DOT officials in states that use the traditional approach. Currently, there is a disconnect between the comptrollers and DOT officials on how exactly infrastructure should be reported because asset managers believe infrastructure should be long-lived, and comptrollers primarily focus on the financials.

4) GASB should build on MAP-21 performance regulation to capture more uniform and consistent asset condition information in financial reporting. This will allow third party organizations, such as bond rating firms, taxpayers, and other interested groups to gain access to financial information related to infrastructure.
The following sections highlight these findings and recommendations, using both the qualitative information received from our interviews, and the quantitative analysis through CAFR research.
2.0 INTRODUCTION

In 1999, GASB released GASB 34, which Chairman Tom Allen proclaimed, “the most significant change in the history of governmental accounting.” It requires reporting of public infrastructure assets on the state and local annual financial reports, therefore increasing government accountability and transparency.

Governmental agencies achieve the financial reporting standards of GASB 34 by either using a “traditional approach” of depreciation or a “modified approach” which evaluates asset condition every year. Under the “modified approach,” baseline condition levels are determined, and the state must establish an asset management system to ensure the highway, bridge, or tunnel does not fall below that baseline. The traditional approach views infrastructure as an asset that has a definite life expectancy, although in reality infrastructure is often in service well beyond its intended lifespan. There are currently twenty states using the modified approach. The states of Colorado, and Texas initially adopted the modified approach, but since have abandoned it for the traditional approach, posing some questions about the long-term viability of the modified approach and its use in infrastructure reporting.

Our report studies the financial reporting experience of six states. These states consisted of Virginia and Massachusetts (traditional), Arizona and Tennessee (modified), and Colorado and Texas (switched from modified to the original traditional approach). The states mentioned have a total population of over 62.8 million (Figure 1), covering more than 568 thousand square miles (land), with close to 117,000 bridges and over 1.4 million in total lane miles which can be found in Figure 2 below. Over this 15-year period, the total depreciation (loss of value) for all six states averaged over $807 million each year, at an average increase of 9 percent.

![Figure 1: Population Data](image-url)

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3 Authors’ Compilation of State Population Data.
This study will compare and contrast the experience of these states, and will examine the following topics:

- Is it possible to identify a primary reason why Colorado and Texas abandoned the modified approach?
- What type of asset management and condition measurement system does each state use? Have the states elected to build in-house asset management systems, or are they using “off the shelf” systems? What are the strengths and weakness of each?
- What are the most recent developments concerning asset management systems and have they effected the decisions of states to use the modified approach?

2.1 AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)
The American Society of Civil Engineers (ASCE) is an engineering membership society that was founded in 1852. The ASCE has over 150,000 members throughout the world. The ASCE provides technical content regarding civil engineering to its members, as well as annual conferences and continuing education opportunities.\(^5\)

Each year, the ASCE Committee on America’s Infrastructure, develops infrastructure report cards for various states. Individual states are evaluated on a rolling basis, meaning not every state is evaluated every year. Criteria used to rate infrastructure are: capacity, condition, funding, future needs, operation and maintenance, public safety, resilience, and innovation.

\(^4\)Authors’ Compilation of State Geographic Data.
Based on the 2017 Infrastructure Report Card, the nation receives an overall grade of D+ on its infrastructure. The nation was given an overall grade of a C+ on bridges, with roadways receiving a D. The nation has 614,387 bridges, forty percent of which are more than fifty years old. Twenty percent of the nation’s roadways are in poor condition.⁶

### 2.2 THE GOVERNMENTAL ACCOUNTING STANDARDS BOARD (GASB®)

GASB was established in 1984 and is the independent private sector organization that establishes accounting and financial reporting standards for U.S. states and local governments that follow Generally Accepted Accounting Principles. According to the GASB website, the mission of GASB is to, “…Establish and improve financial accounting and reporting standards to provide useful information to investors and other users of financial reports and educate stakeholders on how to most effectively understand and implement those standards.” GASB standards are recognized as authoritative by the State Boards of Accountancy and the American Institute of Certified Public Accountants, and GASB issues standards through a transparent and informative process to promote reporting that is useful to anybody who may access financial reports. GASB standards are professionally recognized within the financial reporting sector. The Financial Accounting Foundation oversees GASB and is an independent, private sector organization responsible for the oversight, administration, financing, and appointment of the GASB and the Financial Accounting Standards Board. ⁷

### 2.3 GOVERNMENTAL ACCOUNTING STANDARDS BOARD STATEMENT NUMBER 34 (GASB 34)

GASB 34, Basic Financial Statements and Management’s Discussion and Analysis – for State and Local Governments was introduced to state governments on June 30, 1999.⁸ This standard required state governments to report on their infrastructure assets beginning in June 2001. The standard allowed governments to report their assets in one of two ways, using either the depreciation method or the modified approach. Using the depreciation method, states can report how much of the estimated original cost of the asset has been lost in the preceding years. Using the modified approach, states can report how much it costs to maintain the asset throughout the year.º

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In addition to standardizing depreciation methods, GASB 34 established new financial reporting requirements for how local and state governments report and organize annual financial statements. Designed in order to help governments, citizens, politicians, investors, and creditors have a better understanding of the financial standing of the state, GASB 34 increased the overall accountability for financial reporting among states. Further, the financial statements required by GASB 34 helped the public to assess the finances of the government in its entirety including the years’ operating results, evaluate if the government’s current year revenues were sufficient to pay for services, and understand the extent the government has invested in capital assets.

New information required for reporting under GASB 34 included an objective and easily understood analysis of the government’s financial performance for the year. This new format allowed readers to easily assess if the government’s financial situation had improved or deteriorated over the past year, concerning operations. Additionally, GASB 34 required financial managers to provide new government-wide financial statements prepared using accrual accounting for governmental activities. Accrual accounting measures current and long-term assets and liabilities, along with all revenues and costs of providing services each year. Reporting on restrictions on the planned use of resources and short-term measurements of the revenues and expenditures arising from certain activities and their operating costs remained. Another item that remained in the financial statements was budgetary compliance, which included budgetary comparison information that helped display government accountability since many public citizens participate in the process of establishing annual operating budgets of state and local governments.

Under GASB 34, capital assets for states should be reported at the historical cost and include capitalized interest as well as the costs of implementation of the asset itself. While using the depreciation method, these assets should be depreciated across the estimated useful life.

2.4 COMPREHENSIVE ANNUAL FINANCIAL REPORT (CAFR)
States produce an annual financial document called a CAFR. A CAFR is “a set of financial statements for a state, municipality or other governmental entity that comply with the accounting requirements established by the GASB.” Most states and localities are required by law to issue basic financial statements; CAFRs are not required, but are considered a best practice in government finance. A CAFR provides a much wider variety of information than a basic financial statement. For example, actual results of the entity’s financial activities of the previous year are provided. A CAFR has an introductory section, a financial section, and a statistical section. The introductory section is to orient the reader and guide them through the report. The financial section includes financial statements, notes, and independent auditor’s reports. Additional financial and statistical data are provided in the statistical section.

10 Ibid, 1.
11 Ibid, 10-12.
2.5 MOVING AHEAD FOR PROGRESS IN THE 21ST CENTURY (MAP-21)

MAP-21 is a two-year transportation authorization bill that provided over $105 billion in surface transportation for fiscal years 2013 and 2014.\(^{13}\) Signed into law by President Obama on July 6, 2012, and seen as a bipartisan success, MAP-21 passed through Congress with a vote count of 373-52 in the House of Representatives and 74-19 in the Senate.\(^{14}\) Asset Management is defined in MAP-21 as:

a strategic and systematic process of operating, maintaining, and improving physical assets, with a focus on engineering and economic analysis based upon quality information, to identify a structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions that will achieve and sustain a desired state of good repair over the lifecycle of the assets at minimum practicable cost.\(^{15}\)

Under the legislation, each state is required to submit a risk-based Transportation Asset Management Plan (TAMP) to the United States Department of Transportation (USDOT). The plan must identify the state assets that fall under the NHS, and how the state proposes to measure their condition and invest to maintain that condition level.

MAP-21 has several components related to asset management, and includes:

- Consolidating grant programs and developing new grant categories,
- Focusing on long-range planning, Transportation Improvement Programs (TIPs) are subject to USDOT evaluation to determine whether the goals being set are realistic,
- Establishing seven national goal areas, including safety, infrastructure condition, congestion, system reliability, freight movement and economic vitality, environmental sustainability, and reduced project delays,
- Establishing new competitive grant programs, along with continued formula grants, and
- Adding more roads to classify under the NHS.\(^{16}\)

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3.0 LITERATURE REVIEW

There has been a significant amount of research regarding the implementation of GASB 34. According to Bloch, Marlowe, and Mead, states that used the modified approach to financial reporting had considerably smaller bid spreads than those of states that used the depreciation method. A bid spread is the difference between the bid price and the asking price for a bond or security.\(^{17}\) The modified approach helped to reduce the uncertainty when it came to the condition of the assets.\(^{18}\) The authors found that this uncertainty related to the asset management systems in place to manage the infrastructure assets.\(^{19}\)

Bloch, Marlowe, and Mead’s research, 56 percent of states utilized the depreciation method, whereas 44 percent utilized the modified approach. The research found states using the modified approach did not always use a consistent method for assessing condition, instead each implementing their own condition assessments of the infrastructure assets. The states utilizing the depreciation approach did so because they felt that the modified was too difficult to implement or they did not have an asset management system.\(^{20}\) The research concludes when states utilized the modified approach and had an adequate asset management system, there could be less risk for emergency maintenance of infrastructure assets.\(^{21}\)

Patton, Styles, and Vermeer argue the comparison of infrastructure assets across states is very difficult because of the difference in approaches of the financial reporting. For states using the depreciation method, there is wide variation in the way states determine the estimated useful life of assets. For states using the modified approach, there is wide variation in the way that states measure the condition of the assets. In order for states to have accurate bond ratings, there must be a way to compare states’ infrastructure condition and risk. The authors suggest that GASB require states to divulge the amount that their infrastructure assets are capitalized and potentially provide a measurement scale and condition levels that each state could utilize, which would allow the states to be more analogous.\(^{22}\)

The research on GASB 34 shows that there has been an important shift in the way states report their infrastructure assets. The research suggests that additional requirements would help states to report in a unified and comparable fashion.

One of the reasons that MAP-21 emphasizes asset management is the idea that we are in an “era of constrained resources.”\(^{23}\) It is widely understood that the era of interstate highway expansion and massive


\(^{19}\) Ibid, 54.

\(^{20}\) Ibid, 56.

\(^{21}\) Ibid, 60.


federal aid grants is over, and states are acting with the expectation of reduced federal investment. Saha and Ksaibati discuss the Wyoming Department of Transportation’s development of a pavement management system (PMS) for the state’s local highways, which constitute 63 percent of the state’s total highway mileage.24 MAP-21 requires a PMS for highways that fall under the NHS, but it does not require a PMS for locally owned roads. The basis for Wyoming’s decision to develop a PMS for local roads is the strain on pavement from increased truck traffic from the oil and gas industries, contributing to over 75 percent of local roads being listed in poor condition.25 The implementation of a PMS will allow the state to prioritize maintenance based on where the need is greatest, and maximize budgets according to maintain the most critical commercial routes.

Amekudzi-Kennedy, et al find that Transportation Asset Management (TAM) systems can help decision makers make informed decisions regarding investing in infrastructure, but there is no clear link whether the investment leads to outcomes in terms of improved infrastructure condition.26 The findings include that while all transportation agencies have made investments in TAM, they are at different levels of maturity, and some have produced desirable results while others have not. The authors find that qualitative experience about TAMs can lead transportation agencies to have certain perceptions about TAMs. The study suggests that TAM is still a relatively new process, and more evidence is needed to relate investment in TAM to better performing and more reliable infrastructure.

Boadi and Amekudzi also discuss the impacts of TAMs on state DOT resource allocation.27 The asset management requirements of MAP-21 have resulted in risk management being an essential component of state DOT planning. “Managing risk” refers to repairing the most structurally deficient roadways and bridges to ensure motorist safety is not compromised. Similar to Amekudzi-Kennedy, the authors did not discuss whether TAMs resulted in improved system performance. Instead, they developed a model that the state of Georgia could use to identify high-risk corridors, and inform decision makers about the most crucial priorities.28 The model was based on data from the Computerized Pavement Evaluation Condition System and the changeable message signs systems.29 The Computerized Pavement Evaluation Condition System and changeable message signs data was analyzed on Georgia State Road 3, which was divided into three subsections for analysis. The result was a model the authors believe can be used by Georgia DOT officials in their long-range planning.

25 Ibid.
28 Ibid.
29 Ibid.
Lastly, Bhargava, Galenko, and Scheinberg discuss the different types of asset management systems that fulfill the requirements of MAP-21.\(^{30}\) The most simple and commonly known is the “Prioritization Model,” where maintenance projects are ranked according to a set of variables, and the highest ranked project is selected within the given budget.\(^{31}\) “Single item life-cycle composition” is more comprehensive. It focuses on a single asset rather than a group of assets and ranks “maintenance actions” to preserve condition levels.\(^{32}\) Finally, the Integer Programming Model is the most complex model for an asset management system. These models “include single item life cycle composition for each asset as well as performance constraints for an entire system,”\(^{33}\) essentially making it a combination of the first two models.

### 3.1 RESEARCH ON GASB 34 IMPACTS ON INFRASTRUCTURE SPENDING AND MAINTENANCE

One important area of analysis is whether GASB 34 reporting requirements have affected spending decisions on infrastructure projects and associated preventative maintenance, and if so to what extent. Using dynamic panel analysis with generalized method of moments, Jiseul Kim and Carol Ebdon’s research encompassed 47 states over a 15-year period from 1995 to 2009 and found in response to the increased availability of financial information on infrastructure, governments have changed their “existing practices related to capital and total spending for state highways, but not for maintenance spending. The choice of reporting method does not appear to have affected spending.”\(^{34}\)

Kim and Ebdon found that while overall capital spending generally increased and demonstrated a statistically significant relationship with the implementation of GASB 34, there was not a statistically significant effect on maintenance spending. A goal of both GASB and its supporters in publishing Statement 34 was that it would not only have focused more attention on the need for preventative maintenance spending in general, but more specifically that the choice of the modified approach would have played a larger role in informing spending decisions. GASB reasoned that the use of the modified approach under Statement 34 would enable governments, “to understand the extent to which the government has invested in capital assets, including roads, bridges, and other infrastructure assets… and a new and more comprehensive way to demonstrate their stewardship through the budgetary process.”\(^{35}\) Kim and Ebdon’s research provided several qualitative indicators to be aware of during the conduct of interviews and the analysis of quantitative data from the CAFRs.

Another interesting note in Kim and Ebdon’s work was their review of comments from a national survey of local governments conducted in 2010. The survey “found that over 70 percent of the respondents did not believe GASB 34 improved elected officials’ decision-making capacity or provided managers with

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\(^{31}\) Ibid.

\(^{32}\) Ibid.

\(^{33}\) Ibid.

\(^{34}\) Kim, Jiseul and Ebdon, Carol, “Have the GASB No. 34 Infrastructure Reporting Requirements Affected State Highway Spending?” Journal of Public Budgeting, Accounting & Financial Management 29, no. 3 (Fall 2017): 347–74.

useful information for planning or decisions.” Further, the study found that 77 percent of respondents disagreed that GASB 34 resulted in a “more informed political debate over capital budget priorities,” with the study’s authors stating they were surprised to find this “…in light of GASB 34’s intent to better reveal the ‘wearing out’ of fixed assets”\(^\text{36}\). The survey comments were of interest because interview respondents in some of the participating states contained herein echoed these same comments eight years later. This indicated that feelings on GASB 34, at least in several of the specific states analyzed, have not shifted since the 2010 survey.

While previous studies addressed the variables influencing infrastructure spending, Kim and Ebdon’s research covered new ground in that it looked at the relationship specifically between GASB 34 and expenditures. Kim and Ebdon’s research provided a basis for the research contained herein, as it too analyzed whether GASB 34 was a factor in infrastructure and preventative maintenance spending and if so in what ways. Their research assisted in shaping interview questions for respondents dealing both with asset management and accounting with respect not only to GASB 34 but to analyzing CAFR data as well.

4.0 METHODS

The methodological approach is a mixed methodology based on a combination of quantitative and qualitative methods. The qualitative data collection obtained from interviews conducted with state officials from each state’s DOT and comptroller’s office. The quantitative data collection source was 16 years of CAFRs data to analyze the financial reporting.

4.1 CAFR ANALYSIS METHODOLOGY

The research team coordinated with the client, GASB, to identify specific data points in order to produce the main deliverable of raw data. GASB is interested in the data because the organization will be re-evaluating the effectiveness of GASB 34. The resulting data gives a sense of the financial impact capital assets have on the balance sheet and financial position of the states. GASB recommended that we identify net book value, average rate of return, and changes from year to year. Data analysis included:

1. Analysis of the percent change each year over the 16-year period from 2002 to 2017 and identification of intra-period trends. Percent change each year was calculated by subtracting the “Depreciation Year Prior” value from the “Depreciation Year Present” value. The resulting value is divided by the “Depreciation Year Prior” value. For example, (2003 value-2002 value)/2002 value.
2. Use of an accounting rate of return formula. For example, if a project’s accounting rate of return is equal to 5 percent, the project is expected to earn five cents for every dollar invested per year.
3. Calculation of Net Book Value (NBV) of infrastructure as a percentage of total capital assets or other ratios that provide a sense of magnitude. This is achieved by dividing depreciation expenses by total expenses; by dividing NBV of infrastructure and NBV of total capital assets by the value of total assets; or by dividing net investment in capital assets by total net position.
4. Comparison of condition target rates for roads and bridges with their actual measurements to determine if states had met their goals, using the same calculations as identified above. However, only Arizona, Tennessee, Texas, and Colorado reported these numbers for maintenance. Virginia and Massachusetts do not report these under the traditional approach.
5. Identification of trends that lead Colorado and Texas to switch from the modified approach to the traditional approach.

4.2 CASE STUDY ANALYSIS METHODOLOGY

The research team identified six (6) states to assess the application and impacts of GASB 34 based on the findings from the literature review. States chosen reflect the diverse use the traditional or modified approach for reporting financial assets. Six states were selected for detailed study because three states would not have provided a large enough dataset, and more than six states would have been challenging to obtain data and provide case studies, due to the data collection limitations. The states identified for analysis also vary geographically, with different political affiliations, climate and topography. The modified approach states examined include Tennessee and Arizona; traditional states include Virginia and Massachusetts; and states who switched from modified back to traditional include Texas and Colorado.
Case studies are constructed using three primary methods of data collection: 1) the gathering of 16 years of CAFRs to analyze the financials of the six above-mentioned states; 2) phone interviews conducted with experts from each state’s DOT and comptroller’s office; and 3) review of relevant literature and applicable reports.

CAFR data is used to identify any financial trends that may affect the state regarding GASB 34 standards and as to why Texas and Colorado switched their accounting methods. Said financial data provided substantial financial data to identify certain methods such as year over year percentage differences to track which years were affected most, thus giving tools for further analysis for said year. This analysis found that some states were affected because of natural disaster, others because of the change in approaches and some states this most affected the way that infrastructure is reported thus affecting depreciation. Another analysis was of maintenance expenditures and the estimated costs versus the actual costs and the difference between. This illustrated how states compare their actual costs to their estimated maintenance costs. In states such as Colorado and Virginia there were other reporting practices that did not exist in other states. For example, Colorado reported the “Road and Bridge Actual verse Target” and Virginia reported the “Net Investments in Infrastructure.” However, this was not reported in other states and this information was collected and reflected in the data set. Additionally, fifteen years of CAFR data was examined because that is when GASB 34 went into effect across all states.

Different sets of interview questions were asked to the contacts based on their affiliation with the DOT or comptroller’s office and resulting background knowledge. The interviews are non-attributional to ensure privacy, and to allow the individual to speak freely and candidly. Interview summaries can be found in Appendix A.

Additional report information is incorporated into each case study to build a robust characterization of each state.
5.0 CASE STUDIES

The case studies below are a product of telephone interviews and desk research about each state. Interviews conducted contributed to the Asset Management System and Accounting Method sections. Desk research was used throughout each case study, but primarily in the Background and Literature Review sections. These interviews provided in-depth insightful information to the process within each state. The interviews are synthesized to provide a complete view of each respective state’s process of handling GASB 34. Following the interview sections, a brief analysis of the CAFR data collected for each state is presented. Finally, the findings are summarized in brief.

5.1 VIRGINIA

5.1.1 Background

State Profile

The Commonwealth of Virginia Department of Highways was formally established as a state agency in 1927 as part of a government reorganization. The agency received its current name, Virginia Department of Transportation (VDOT), in 1986, to reflect the increasing emphasis on the diverse modes of transportation. Today, Virginia has the third-largest state-maintained highway system in the country, following North Carolina and Texas. VDOT is responsible for building, maintaining, and operating the state’s 128,000 lane miles, 19,500 bridges and large culverts, and seven tunnels, based on the direction of law and the Commonwealth Transportation Board (CTB).

Virginia encompasses 42,767 square miles, and with five distinct climate regions, the geography presents unique challenges for asset management and maintenance decisions for infrastructure investment. Classified as a “humid subtropical” the climate becomes warmer and more humid farther south and east. Challenges include funding the pavement needs of its large and diverse roadway system and the needs of its maturing infrastructure assets. The population is increasing and has grown to over 8.4 million people, resulting in increasing infrastructure use, deterioration and congestion.

These unique challenges, among others, led to legislation House Bill (HB) 1887, from the 2015 General Assembly Session, which requires VDOT to fund the maintenance of existing transportation assets, prior to funding capital improvements.\(^{43}\) To ensure the best possible maintenance investment decisions, VDOT initiated a comprehensive maintenance and operations business process reengineering effort in 1995. This effort laid the groundwork for what is now widely known as Transportation Asset Management.\(^{44}\)

**Current Conditions**

In the 2015 ASCE Infrastructure Report Card, Virginia received an overall grade of C-, with roads given a grade of D (poor), and bridges a C (mediocre). Virginia’s infrastructure is slightly better compared to the national average of D+.\(^{45}\) The national average for roads is a D, with bridges receiving a grade of C+.\(^{45}\) The report card evaluates infrastructure based on capacity, condition, funding, future need, operation and maintenance, public safety, innovation, and resilience. The roadway grade of D resulted from maintenance and safety criteria rated as tolerable, but limited road capacity mainly in northern Virginia and Hampton Roads, resulting in traffic congestion and gridlock. The C grade for bridges was the result of declining health of bridges due to age and lack of maintenance. In addition, a 2013 bridge inventory indicated 23.3 percent of bridges are structurally efficient or functionally obsolete.

**Funding**

VDOT has several sources of dedicated state and federal funding. Federal revenues have been the largest single source of funds for the highway construction program. Transportation funding was addressed in the 2013 Virginia General Assembly Statute HB 2313, which renewed financial investment for transportation infrastructure assets, with significant efforts on pavement rehabilitation. In addition, HB 1887 modified the distribution of transportation revenue to maintain “a state of good repair,” and how the CTB prioritizes funding based on infrastructure needs. Together, HB 2313 and HB 1887 enhance the transparency and benefits of the funding process.\(^{46}\)

The Highway Maintenance and Operating Fund provides funding for VDOT’s maintenance, operations, and administrative needs. Dedicated state revenues provide funding, including sales tax on motor fuels (5.1 percent on gasoline and 6 percent on diesel), motor vehicle sales and use tax, retail sales and use tax, international registration plans, motor vehicle licenses, among others. Since 2002, the Highway Maintenance and Operating Fund has required transfers from VDOT’s Construction Fund to cover the budgetary needs.\(^{47}\)

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\(^{43}\) Ibid  
5.1.2 Literature Review
Virginia has over 20 years of experience with infrastructure asset management. Since adoption of GASB 34 in 2002, Virginia has been financially reporting infrastructure assets. A review of existing reports found that Virginia is focused on examining best practices for asset management and identifying trends to incorporate asset condition and system performance measures into funding decisions.

The first report reviewed was FHWA’s 2004 report, “Data Integration, The Virginia Experience”, which was part of an ongoing series of case studies aimed at examining best practices for developing asset management systems. This report provided the historical background and development of Virginia’s asset management system and transportation legislation.48

The second document reviewed was VDOT’s 2011 report, “Maintenance and Operating Budget: An Asset Management Approach” which provided Virginia’s asset management methodology and budgetary framework, along with the trends of incorporating asset condition and system performance measures into funding decisions.49

The third and fourth documents are VDOT’s 2014-16 and 2016-18, “Executive Progress Reports.” These progress reports are valuable sources of information that provided VDOT’s background and history, project finances, infrastructure performance and condition measures, key risk factors for the state, funding, information technology projects, and workforce development.50

The final document reviewed was Virginia’s Department of Accounts (DOA), Commonwealth Account Policy and Procedures (CAPP) Manual, which provided the DOA’s guidance and policy regarding financial reporting of infrastructure assets, to include asset maintenance and asset physical inventory requirements.

5.1.3 Asset Management System
Virginia’s asset management system has been developing since 1995, evolving over a twenty-three-year period. To further understand its development, driving forces, and critical influences, along with the impacts of GASB 34 and federal requirements such as MAP-21, our research group conducted interviews with state financial and transportation officials. Officials include representatives of the Virginia DOA office, VDOT’s Financial Controller’s Office, and VDOT’s Asset Management division. The information gained during the interviews provided a basis for the following sections of this case study.

The Code of Virginia, §33.2-232 in part, requires VDOT to submit an annual report on the condition and performance of existing transportation infrastructure, and use an asset management methodology of

generally accepted engineering principles and business practices to identify and prioritize maintenance and operation’s needs. Additionally, the annual report identifies performance standards to determine those needs, and funding required to meet those needs.51

The discussion with VDOT’s Asset Management Division revealed that infrastructure asset needs far exceed the received annual budget. It would require approximately $13 billion to bring all the infrastructure assets up to 100 percent condition levels, but VDOT’s maintenance and operations budget is $1.6 billion annually.52 The annual needs for just pavement and bridges to meet target thresholds is $1.8 billion and the cost to maintain these core assets in subsequent years would be $1 billion annually.53

Virginia’s application of the depreciation method for infrastructure asset reporting results in a separation of financial reporting of infrastructure assets and asset management. Based on interviews, there is no relationship between GASB 34 standards and VDOT’s asset management system. The condition assessment of core assets (bridges and pavement) was in place before the passage of GASB 34.54 The asset management system currently captures all the performance measures required by MAP-21. There are some differences between MAP-21 and VDOT’s requirements, e.g., the current system uses a ‘General Condition Rating’ of six as “good”, while MAP-21 requires a seven as “good”. An interview with officials from VDOT’s Financial Controllers office revealed that MAP-21 does not have a direct impact on the reporting of infrastructure assets in Virginia’s CAFRs.55

VDOT’s publicly available “Dashboard” website provides infrastructure condition, target thresholds, performance, safety, and project financing information, along with performance measurements to include management performance, citizen survey results, and project on-time status.56 VDOT currently utilizes two different asset management systems to monitor system performance and asset management for its core systems of pavement and bridges. VDOT anticipates transitioning to an all-encompassing asset management system in the next few years called Highway Maintenance Management System developed by Vue Works,57 and is currently in the process of bringing the system online by entering in ancillary structure information.58

52 Interview with VDOT’s Asset Management Division, March 29, 2018.
54 Interview with VDOT’s Asset Management Division, March 29, 2018.
55 Interview with VDOT’s Financial Controller Office, March 26, 2018.
58 Interview with VDOT’s Asset Management Division, March 29, 2018.
Pavement

The pavement network uses Agile Assessments Pavement Management System, and VDOT annually conducts 100 percent condition assessment of interstate and primary pavements and 20 percent of secondary roads. In 2016, they conducted 100 percent condition assessment of secondary roads to obtain a baseline.59

Virginia measures pavement condition using a Critical Condition Index (CCI). CCI ratings run from zero, very poor, to 100, excellent condition. The target for interstate highway and primary roadway condition is that at least 82 percent of lane miles are rated as fair or better.60 The target for secondary road condition is 65 percent. Interstate roadways are currently rated at 89 percent, primary roads rated at 85 percent, and secondary roads at 60 percent. Both interstate and primary roadway conditions have steadily improved since 2010, while secondary roadways have maintained a 60 percent rating since 2013,61 as indicated in Table 1.

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Interstate</td>
<td>78%</td>
<td>80%</td>
<td>83%</td>
<td>84%</td>
<td>84%</td>
<td>88%</td>
<td>90%</td>
<td>89%</td>
<td>89%</td>
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<td>Primary</td>
<td>73%</td>
<td>78%</td>
<td>81%</td>
<td>83%</td>
<td>83%</td>
<td>81%</td>
<td>84%</td>
<td>85%</td>
<td>85%</td>
</tr>
<tr>
<td>Secondary</td>
<td></td>
<td></td>
<td></td>
<td>60%</td>
<td>60%</td>
<td>60%</td>
<td>60%</td>
<td>60%</td>
<td>60%</td>
</tr>
</tbody>
</table>

Table 1: Virginia’s Pavement Condition 2010-201862

Bridges

For bridges, VDOT uses AASHTOWARE Bridge Management Software, formerly known as PONTIS. VDOT conducts bridge assessments annually for some bridges and every two years for others. VDOT measures bridge condition in terms of the percent of structures rated fair or better, based on inspections. The statewide target is for only 4.5 percent or fewer of the 19,500 bridges to be rated structurally deficient by the end of 2018.63 Bridge condition has steadily improved from 2012, as indicated in Table 2.

Since 2007, Virginia bridges have been designed and built using new standards and materials, achieving anticipated service lives of 75 years. Ninety-three percent of Virginia’s bridges were built before 2007, with anticipated service lives of 50 years, and approximately 47 percent of them are 50 years old or older, meaning they have reached or exceeded their anticipated service lives.64

59 Ibid.
60 Virginia Department of Transportation, "2016-18 Executive Progress Report."
61 Virginia Department of Transportation, "Dashboard: Performance Reporting System for Projects and Programs."
62 Ibid.
63 Virginia Department of Transportation, "2016-18 Executive Progress Report."
5.1.4 Accounting Method
Virginia’s DOA office is responsible for compiling the financial information for the state’s CAFRs. The state has a decentralized financial reporting system, meaning over 200 agencies report financial information to the DOA. VDOT makes up approximately 97 percent of the reported capital assets to the state. VDOT’s financial controllers prepare and report infrastructure asset information through the state’s Cardinal Financial System. The reporting threshold for depreciable infrastructure assets is $100,000.66

Infrastructure Life Cycle and Fully Depreciated Assets
Discussions with a former official from the Virginia State Comptroller’s office regarding asset life cycles revolved around a GASB concept that defines depreciation as not merely a number, but an asset’s condition that states should review periodically, since a maintained asset will have a longer life cycle. A potential issue is that states using the deprecation method apply a standard number of life cycle years to an infrastructure asset and never reevaluate based on the asset’s condition. The modified approach requires review of asset conditions and periodical updates of life cycles.67 In Virginia, individual agencies determine the life cycle of the capital assets within their responsibility. The state provides general guidance within the CAPP Manual, which offers a suggested range of life cycle years, requires a physical inventory of capital assets every two years, and recommends reevaluation of the useful lives.68 For Virginia’s infrastructure assets, VDOT engineers determine the life cycles. Their financial controllers work with engineers to periodically reassess some assets’ life cycles when there are changes in technology and/or materials. In a recent example, promoted by auditors, engineers decreased the 30-year life cycle to a 16-year life cycle for pavement restoration projects. When an asset is fully depreciated, VDOT financial controllers remove the asset from the financial records, resulting in no net impact. Tunnels have an anticipated 75-year life cycle and in special circumstances, such as service concession arrangements, they may be reported as non-depreciable assets.69

Depreciation Method
For Virginia, the depreciation method was consistent with the previous reporting of other types of assets, providing a reliable, straightforward approach and was the most efficient method to gather data in a decentralized method of reporting. The modified approach was not required and was thought to be more involved.70 Officials from VDOT’s Financial Controller’s Office indicated that they did not have the

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65 Virginia Department of Transportation, "Dashboard: Performance Reporting System for Projects and Programs."
67 Interview with former official from Virginia State Comptroller's Office, March 1, 2018.
68 Interview with Virginia Department of Accounts Office, March 15, 2018.
69 Interview with VDOT's Financial Controller's Office, March 26, 2018.
70 Interview with Virginia Department of Accounts Office, March 15, 2018.
required level of an asset management system at the time, nor the necessary level of dedicated funding to maintain the established conditions. VDOT more recently has weighed the costs and benefits of switching to the modified approach, but the need still exists for more consistent and reliable funding to maintain assets to the established condition thresholds. Officials pointed out how GASB 34 allows a lower threshold of condition reporting within the financial reports while the agency could establish a higher internal infrastructure condition threshold.  

Some advocates of GASB 34 suggest that infrastructure asset reporting in state CAFRs could potentially affect resource allocation decisions. Interviews revealed that the depreciation method does not make clear to policy and lawmakers that infrastructure assets are in need of resources and funding. Discussion included how political pressure is the driving force behind new infrastructure investments, not depreciation. VDOT’s officials observed that GASB 34’s depreciation method only affects the reporting of capital assets and were not aware of its effects on any transportation legislation.

**Financial Reporting of Condition Information**

Officials were asked if infrastructure condition information was provided to credit agencies, could that potentially result in better bond ratings or pricing. An official from VDOT’s Financial Planning Division offers the following,

> I do not believe it would help our ratings. Much of the detail behind the ratings of Commonwealth Transportation Board debt is around the health of the Commonwealth. We generally are one notch below the Commonwealths’ rating on [Conditional Prepayment Rate] bonds. For [Grant Anticipation Revenue Vehicle] bonds, the agencies consider the actions of Congress in providing the federal funding to provide for future debt service. The funds we use to back the debt service on bonds are not in line to be used to maintain the existing infrastructure.

Virginia’s DOA office indicated that the office responsible for dealing with the credit agencies has not requested any condition information and Virginia currently has an AAA rating.

**5.1.5 CAFR Analysis**

In June 2002, Virginia applied a new financial reporting model, as required by the provisions of GASB 34, which stated that the addition of infrastructure assets and the use of full accrual accounting in government-wide standards was required. Virginia chose the traditional method of depreciation to report infrastructure assets based on the straight-line basis over the useful lives. The reported types of infrastructure assets in

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71 Interview with VDOT’s Financial Controller’s Office, March 26, 2018.
72 Kim, Jiseul and Carol Ebdon, “Have the GASB No. 34 Infrastructure Reporting Requirements Affected State Highway Spending?”, 347-374.
73 Interview with a former Virginia State Comptroller, March 1, 2018.
74 Interview with VDOT Financial Controller’s Office, March 26, 2018.
76 Interview with Virginia Department of Accounts Office, March 15, 2018.
Case Studies

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the CAFRs include roads, bridges, tunnels, water and gas lines, lighting, cell towers, fuel storage tanks, sidewalks, parking lots and drainage systems. The range of estimated useful lives of infrastructure reported is between 5-50 years. In 2002, the initial capital thresholds for infrastructure reporting were assets that have a cost or value greater than $5,000 and an expected useful life of greater than two years. In 2003, the reporting thresholds increased to $100,000, which is consistent with Massachusetts’ thresholds, a state that also uses the depreciation method. Reported in Virginia’s 2002 CAFR, the beginning net infrastructure assets balance was $5.5 billion and the total increase in the investment in governmental capital assets was $7.9 billion, with $6.3 billion attributable to infrastructure being reported for the first time.78 Table 3, below provides a snapshot of capital asset financial data reported within Virginia’s CAFRs from 2002-2017.

Table 3: Snapshot of Virginia CAFR Data

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Depreciable Capital Assets</th>
<th>Accumulated Depreciation</th>
<th>Total Capital Assets</th>
<th>Depreciable Infrastructure Total</th>
<th>Accumulated Depreciation Infrastructure</th>
<th>Net Depreciable Capital Assets Infrastructure</th>
<th>Net Total Infrastructure</th>
<th>Total Infrastructure</th>
<th>Total Depreciation Expense</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>$17,394,117$</td>
<td>($9,244,303)$</td>
<td>$21,973,889$</td>
<td>$14,043,353$</td>
<td>($7,785,967)$</td>
<td>$6,257,386$</td>
<td>$14,043,353$</td>
<td>$434,657$</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>$18,259,923$</td>
<td>($9,167,553)$</td>
<td>$22,525,044$</td>
<td>$15,488,067$</td>
<td>($8,109,986)$</td>
<td>$7,378,081$</td>
<td>$15,488,067$</td>
<td>$408,092$</td>
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</tr>
<tr>
<td>2004</td>
<td>$19,803,188$</td>
<td>($9,590,249)$</td>
<td>$23,952,404$</td>
<td>$16,990,317$</td>
<td>($8,443,541)$</td>
<td>$8,546,776$</td>
<td>$16,990,317$</td>
<td>$466,599$</td>
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</tr>
<tr>
<td>2005</td>
<td>$20,825,989$</td>
<td>($10,001,728)$</td>
<td>$25,171,683$</td>
<td>$17,978,206$</td>
<td>($8,820,433)$</td>
<td>$9,157,773$</td>
<td>$17,978,206$</td>
<td>$489,297$</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>$21,891,252$</td>
<td>($10,366,167)$</td>
<td>$26,522,713$</td>
<td>$18,879,390$</td>
<td>($9,104,396)$</td>
<td>$9,774,994$</td>
<td>$18,879,390$</td>
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</table>

Note: Figures on table are in the thousands

The first column of Table 3 displays the total amount of depreciable infrastructure on average increased at five percent from 2002 to 2017, with the greatest increase between the years of 2012 and 2013. Virginia’s depreciation expense increased on average at seven percent every year from 2002 to 2017, with the greatest increase at 12 percent, also between the years of 2012 and 2013. In FY2017, the depreciation expense was broken down by approximately 91 percent ($868.8 billion) on roadways and 9 percent (80.9 billion) on bridges and tunnels. The increase in total depreciation expense and percentage change by year can be seen in Figure 3. The amount of capital assets and infrastructure assets reported under business activities varied from year to year due to changes in how these assets were reported. For example, business activity depreciable infrastructure assets reported in 2003 was $314.6 million, but in 2006 was reported as $1,000 and in 2010 reported as $0. These variations were due to reporting changes of the Pocahontas Parkway Association assets from business activity to primary government in 2006. Also, business non-depreciable

78 Ibid.
79 Authors’ Compilation of Virginia CAFR Data.
capital assets reported in 2012 was $2.7 million, but the next year, 2013, it increased to $58.9 million, corresponding to a significant percent change in asset reporting. These variations were primarily due to the reporting of RT 460 Corporation’s construction in progress in 2013.  

Each Virginia CAFR after 2002 in the Management’s Discussion and Analysis (MDA) section reports the dollar amount in net investment in infrastructure assets. For example, the 2017 CAFR reports, “The increase in the primary government’s net investment in capital assets was primarily attributable to increases in infrastructure of $2.4 billion. These changes are primarily attributable to transportation.”

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80 Interview with VDOT Financial Controller’s Office, March 26, 2018.
81 Authors’ Compilation of Virginia CAFR Data.
The lowest points of net infrastructure investments occurred before and during the economic recession, between the years of 2005 to 2008. The highest levels of net infrastructure investment were during 2013, 2015 and 2017, corresponding to the passing of transportation legislation for increases in funding. In 2013, Virginia’s General Assembly invested in the state’s transportation infrastructure by passing HB 2313, which was called, “Historic transportation funding package… For the first time in 27 years, Virginia has new, sustainable revenue sources to build, operate and maintain the state’s transportation infrastructure.”

In 2015, HB 1887 changed the distribution of transportation revenue to maintain a state of good repair, with the CTB prioritizing funding based on needs. HB 2 requires a project prioritization process, which created the SMART SCALE process. SMART SCALE is a prioritization process used by the CTB to select transportation projects to improve transparency and accountability. Additionally, during these investments periods, President Obama signed into law MAP-21 authorizing a total of $105 billion from FY2013 – 2014 for highway and transit programs, which provided a two-year authorization of the surface transportation programs, which now has been extended four times. In 2015, President Obama signed into law the FAST Act authorizing a total of $280 billion over FY2016-2018.

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83 Authors’ Compilation of Virginia CAFR Data.
84 Virginia Department of Transportation, “2014-16 Executive Progress Report.”
5.1.6 Findings/Conclusions

Virginia’s DOA and DOT display transparency in operations, plans, CAFRs, and condition reporting. Virginia chose the traditional approach of depreciation based on consistency with the way the agency previously reported of other types of assets and because it did not have the required level of an asset management system at the time, or the necessary level of dedicated funding to maintain the established asset conditions.

VDOT is an established transportation agency that is responsible for operating and maintaining the third largest state-maintained highway system. They account for approximately 97 percent of the reportable capital assets. Their asset management system has been developing since 1995, evolving over a twenty-three-year period. The current asset management systems are merging into one inclusive system, which has the potential to increase efficiency. Bridge and pavement (interstate and primary) conditions are improving and are meeting the established thresholds. Virginia’s recent trend is the passing of transportation legislation, providing several sources of dedicated funding. Still, the infrastructure condition needs vastly outweigh the available funding, requiring $13 billion to bring all infrastructure condition levels up to 100 percent. In 2015, ASCE assigned Virginia roads a grade of D (poor) and bridges C (mediocre). The Maintenance and Operations Fund of $1.6 billion is the largest discretionary fund in the state, while VDOT’s asset management system faces risk factors of aging structures and roadways, increasing population, congestion and unanticipated spending on weather events.

Virginia’s application of the depreciation method for reporting of infrastructure assets results in a separation of financial reporting of infrastructure assets and asset management. There is no reported association between GASB 34 requirements and VDOT’s asset management system. The condition assessment of core assets, bridges and pavement, was in place before the passage of GASB 34.

Regarding MAP-21, VDOT currently captures all the required performance measures. Some optimization reporting formulas will need to change, e.g., regarding pavement assessment VDOT captures 13 elements, while MAP-21 requires four elements. There are some small differences, e.g., VDOT uses a ‘General Condition Rating’ of six as “good”, while MAP-21 requires a seven as “good”. MAP-21 does not have a direct impact on the reporting of infrastructure assets in Virginia’s CAFRs.

5.2 MASSACHUSETTS

5.2.1 Background

State Profile

The 2017 Census estimates the population of Massachusetts as 6.8 million people, and the 2010 Census estimates the size of the state to be 7,800 square miles.\(^7\) Massachusetts borders Connecticut, New Hampshire, New York, Rhode Island and Vermont and is about one-eighth of New England’s total area, bordered by the Atlantic Ocean to the east. There are over 4,000 miles of rivers in Massachusetts, and the

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topography includes rolling hills, mountains, lakes and streams. In the summer months, the temperatures range from the 70-90 degrees Fahrenheit, fall temperatures range from the 40’s-70’s, and winter typically stays around freezing or lower. The elevation of Massachusetts is estimated at 3,486 feet above sea level.

Transportation developed in Massachusetts in the early 19th and 20th centuries with the emergence of canals, railroads and highways. During the 19th century, proposals were put forth to build canals between the Hudson River and Boston. This development led to tunnels, due to the obstacle of the Hoosac Mountain Range. Railroad lines were built in the 1820’s, and finally highways. Today, Massachusetts has 36,423 miles of roadways and 5,192 bridges.

In 2009, Massachusetts created a single transportation agency to improve the state’s infrastructure assets, called MassDOT. A MassDOT 2010 report states, “…On November 1, 2009 the Commonwealth integrates the state’s former transportation agencies and authorities into the new Massachusetts Department of Transportation (MassDOT).”

Prior to these Acts being signed, all aspects of Massachusetts transportation were segregated into separate stovepipes of, “…Quasi-independent authorities and state agencies. One primary goal of the reform act was to better coordinate our transportation efforts while funding economies of scale and best practices to reduce costs and manage a world class transportation network.” MassDOT now oversees highways, rail and transit, bridges, aeronautics, and the registry of motor vehicles.

**Current Conditions**

ASCE’s 2017 infrastructure report card states that 9.3 percent of Massachusetts’ bridges are rated as structurally deficient, and 16 percent of the 36,423 miles of public roads are in poor condition. This report concludes, “Deteriorating infrastructure impedes Massachusetts ability to compete…Delaying these investments only escalates the cost and risk of an aging infrastructure system.”

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89 Ibid.
97 Ibid.
Funding
Most of the services provided by MassDOT are provided by governmental funds, which include two main trust funds. The first trust fund is known as the Massachusetts Transportation Trust Fund, which is used for financing transportation related purposes of the MassDOT, and the second trust fund is the Commonwealth Transportation Fund, which receives funds from specific revenue sources, as designated by law. Furthermore, the Massachusetts Transportation Trust Fund acts as a repository that receives, “Revenues from quasi-independent toll agencies, federal government grants, and some budgeted money from the state.” Both of these trust funds were established in 2009, along with the creation of MassDOT. Along with the creation of the state’s trust funds, the Massachusetts Highway Department merged into MassDOT as well.

The specific areas that MassDOT receives funding are from state taxes, motor vehicle fees, federal funds, toll revenues and bonds.

A unique program in Massachusetts is called Chapter 90, which was established in 1973, and reimburses Municipalities for transportation infrastructure projects with documented expenditures. These funds have to be applied to state approved projects, and with the proper receipts, the funds are 100 percent refunded to the Municipality. The funds provided from the Transportation Bond Issues authorizes such capital improvement projects for highway construction, preservation and improvement projects that create or extend the life of capital.

5.2.2 Literature Review
The first document reviewed is the 2015 Western Turnpike Triennial Report that focuses on the condition of infrastructure assets throughout the state, as well as an action plan on how to achieve a state of good repair for all assets. This report is important to the case study by providing background information on how Massachusetts categorizes an asset as being in good repair, as well as why this is important to the state.

99 The 190th General Court of the Commonwealth of Massachusetts, “Section4: Massachusetts Transportation Trust Fund,” Accessed April 26, 2018https://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter6C/Section4.
101 Ibid.
102 Ibid.
103 Ibid.
105 Ibid.
The second and third documents reviewed are a 2016 progress report, and a 2017 annual report prepared for the Performance and Asset Management Advisory Council. The 2016 report is titled, *Progress Report of the Performance and Asset Management Advisory Council*\(^\text{107}\) and the 2017 report is titled *Annual Report of the Performance and Asset Management Advisory Council.*\(^\text{108}\) The 2016 report emphasizes the need to know what capital assets are valuable and how to maximize the useful life of the asset.\(^\text{109}\) Additionally, the specific ratings of the assets are contained in this report, as well as how the ratings can be improved in the future to ensure the assets are used to their full potential.\(^\text{110}\) This insight to Massachusetts asset management is helpful to understand how the state plans to maintain and improve their assets.

A reoccurring theme in the progress report is the implementation of the business model TAM.\(^\text{111}\) In 2016, the Federal Highway Administration (FHWA) issued a rule for transit agencies to maintain and document progress to meet minimum TAM standards to ensure their transport systems operate smoothly and efficiently.\(^\text{112}\) TAM paves the way for future goals and targets for capital assets. For example, following TAM guidelines, Massachusetts has goals to increase their pavement ratings by certain years. A target goal for the state is for 84 percent of pavement on interstates to be in good or excellent condition by 2018, and 87 percent by 2020.\(^\text{113}\) Figure 5 below provides a visual of target pavement goals for years 2012-2021.

![Figure 5: Pavement Chart\(^\text{114}\)](image)
The 2017 report is an update to the 2016 progress report and outlines in more detail the condition of major assets, and if targets have been met for maintaining and preserving assets. This report provides more in depth information for specific targets and goals for capital assets, including but not limited to, bridge and pavement. More specifically, “MassDOT forecasts that it will exceed its performance targets for Interstate Pavement through 2020, but will miss its targets for Non-Interstate Pavement in both of those years.” This information is relevant to focus on how future investments will be made by examining if previous targets have been reached and identifying how asset management systems can accurately forecast the overall condition and life span of capital assets. The asset management section of the report identifies the asset management team as a collection data of various assets to help direct capital funds to the assets in greatest need of repair or replacement.

The documents pertain to the case study by explaining the need for accurate forecasting to assign funds where they are the most needed. Furthermore, these documents display how and why capital assets are assigned a specific condition level, and if these condition levels have improved or declined. Asset management plays a role in targeting and understanding where funds are needed.

Deferred maintenance increases safety hazards, increases cost for the future to bring the infrastructure to acceptable condition and allows for inefficient operation of the system. In 2008, the Accelerated Bridge Program was introduced due to the future projection of 700 structurally deficient bridges by 2016, throughout the state. The ABP is financed through bonds and offers a dedicated funding stream for addressing structurally deficient bridges. Maintaining bridges in a state of good repair not only improves the physical condition of the bridge, but also saves money before bridges deteriorate further and require more funds to repair.

5.2.3 Asset Management System
The Performance and Asset Management and Advisory Council was created in 2013 in accordance to the Law Acts of 2013 that state, “On or before October 1 of each year, the council shall provide an annual progress report on the performance and asset management system to the House and Senate committees on Ways and Means and the Joint Committee on Transportation.” To better understand asset management, a phone interview with a DOT contact was conducted, as well as desk research. Only one interview was conducted due to the difficulty in making contact with the state comptroller’s office, or more than one person in the asset management division.

115 Massachusetts Department of Transportation, “Annual Report of the Performance and Asset Management Advisory Council.”
116 Ibid, 22.
117 Ibid, 34.
120 Ibid.
The state of Massachusetts does not use a single system for its asset management program, but rather integrates many systems. The first system, (4D) is a custom program to track bridge inventory and condition, as well as manage and track pavement condition and future deterioration in the Deighton Total Infrastructure Management System (dTIMS). Deighton is an asset management system solution that, “…Helps communities thrive by enabling them to make optimal use of their resources so that assets last longer, perform better and remain a positive legacy for generations to come.” Deighton is used by multiple states for various asset management systems, including Colorado. The contact confirmed these asset management systems are in place for investments on performance outcomes, and not related solely to the implementation of GASB 34, or MAP-21. Furthermore, the contact confirmed Massachusetts uses these asset management systems to base investments on performance outcomes and forecasting needs. When asked what type of improvements can be made to increase the productivity of the asset management system, the response was to improve forecasting needs with better predictive modeling based on investment scenarios. The contact stressed that Massachusetts is more concerned with condition vs value, and that it is more economical to maintain an asset versus replacing, which goes hand in hand with making smart monetary investments. This point is interesting, given that Massachusetts uses the traditional method of depreciation over the modified approach.

The depreciation method for reporting assets of infrastructure result in a separation of financial reporting of infrastructure assets and asset management. Based on interviews, there is no relationship between GASB 34 standards, and MassDOT’s asset management system. Furthermore, when MAP-21 was introduced, Massachusetts already had these asset management systems in place, and did not have to integrate additional systems to comply with MAP-21 requirements.

Massachusetts provides an online project-tracking center that can be used to track the progress of most MassDOT highway projects. The filters to track the projects include project phase, current FY projects, future FY projects, and projects that have not yet been programmed. The MassDOT website also offers various tools for tracking all ongoing and proposed projects.

One important note is that MassDOT and the state comptroller’s office seem to have conflicting views on condition and value of capital assets. As a traditional state, condition is not important for accounting perspectives. While MassDOT may focus more on condition, the state comptroller’s office uses depreciation, which does not take into account the condition of capital assets. During the interview, the

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123 Interview with a MassDOT contact, March 18, 2018.
126 Interview with a MassDOT contact, March 18, 2018.
127 Ibid.
129 Ibid.
contact emphasized condition over value multiple times, which can be seen as contradicting to the accounting method used.\textsuperscript{131}

MassDOT made its first formal inventory report in December 2015. The report is publicly available on MassDOT website. The report presents an analysis of historical and forecasted performance of capital assets maintained by MassDOT.

Pavement
MassDOT reports pavement condition assessments using Pavement Serviceability Index. Pavement Serviceability Index represents the ride quality of pavement based on a scale of 0 to 5, with 0 being the worst condition and five the best. The pavement is considered poor if the Pavement Serviceability Index is 2.5 or less for interstate roads and 2.3 for non-interstate roads.

The target for interstate pavement condition is 90 percent is in Good or Excellent Condition, and 62 percent for Non-Interstate Pavement. Table 4 and Table 5 below provide condition assessments of interstate and non-interstate pavement from 2012 to 2015. Interstate Pavement has been improving gradually. On the other hand, the non-interstate pavement has been declining notably.

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Table 4: MassDOT Conditions of Interstate Pavement 2012-2015\textsuperscript{132}

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<tr>
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<td>21%</td>
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<tr>
<td>Poor</td>
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<td>13%</td>
<td>18%</td>
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Table 5: MassDOT Conditions of Non-Interstate Pavement 2012-2015\textsuperscript{133}

Bridges
Massachusetts defines bridge condition using National Bridge Inspection Standards. National Bridge Inspection Standards categorize bridges on a nine-point scale, where good condition begins at a rating of seven, and structurally deficient has a rating of four or lower. As of 2017, 15 percent of the NHS bridge

\textsuperscript{131} Interview with a MassDOT contact, March 18, 2018.
\textsuperscript{133} Ibid.
area in Massachusetts is currently structurally deficient. Massachusetts main priority is to meet the FHWA maximum threshold of 10 percent structurally deficient to avoid restrictions how federal aid. MassDOT targets for bridge condition for Structurally Deficient is 14 percent in 2018, 13 percent in 2020 and less than 10 percent in the long term. MAP-21 an improved approach to evaluating bridges that consider bridge deck size, while the earlier methods considered all bridges equal. By the improved approach, Massachusetts ranks next to last nationally. Structurally deficient bridges have increased in the past few years. Massachusetts bridge inventory increased in 2009 due to the creating of MassDOT that combined eight agencies.\textsuperscript{134}

5.2.4 Accounting Method
Massachusetts uses the traditional method of reporting infrastructure that is based on straight-line depreciation. Straight-line depreciation decreases the cost of the fixed assets evenly over the useful life of the fixed asset. The reported estimated useful life of infrastructure range initially was 25-50 years, but in 2011, it changed to 20-50 years mainly because of the transfer of infrastructure assets to MassDOT. The capitalization threshold for reporting infrastructure assets are assets that exceed $100,000 dollars.

Massachusetts uses the traditional accounting depreciation method over the modified approach. Massachusetts does not assign a monetary value to bridges or pavement because they are more interested in maintaining the assets than knowing the specific monetary values. This method of accounting was adopted by Massachusetts in 2002/2003 by the comptroller’s office. The contact with MassDOT also confirmed that GASB 34 is not related to asset management within the definitions of MAP-21 and FHWA.

5.2.5 CAFR Analysis
In 2002, Massachusetts adopted the provisions of GASB 34, requiring that states report capital and infrastructure assets in government-wide statements and report depreciation expenses in the statement of activities.\textsuperscript{135} Table 6 presents a snapshot of the capital assets data from the CAFRs for the state of Massachusetts from 2002 to 2017. In the fiscal year of 2002, the liabilities of Massachusetts exceeded its assets by almost $4.4 billion dollars due to long-term obligations and construction of major projects, e.g., Boston’s Big Dig projects.\textsuperscript{136}

The state CAFR data reveals some notable changes over the past 16 years. In 2004, depreciable capital assets increased from $18,115 to $28,389 because of the increases to construction of the Central Artery/Tunnel Project and opening of the I-90 Connector Tunnel.\textsuperscript{137} Moreover, in 2010, the total depreciable capital assets decreased by 61 percent due to the establishment of MassDOT. MassDOT took control of all infrastructure assets, which explains the significant decrease in CAFR data after FY2009.

\textsuperscript{134} Massachusetts Department of Transportation, “Annual Report of the Performance and Asset Management Advisory Council.”
\textsuperscript{135} Governmental Accounting Standards Board, “Summary of Statement No. 34.”
Deferred Infrastructure Maintenance and GASB 34

May 2018

34

Table 6: Snapshot of Massachusetts CAFR Data

<table>
<thead>
<tr>
<th>Year</th>
<th>Type of Approach</th>
<th>Total Depreciable Capital Assets</th>
<th>Accumulated Depreciation</th>
<th>Total Capital Assets</th>
<th>Depreciable Infrastructure Total</th>
<th>Accumulated Depreciation</th>
<th>Net Depreciable Capital Assets</th>
<th>Net Total Infrastructure</th>
<th>Total Infrastructure</th>
<th>Total Depreciation Expense</th>
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<td>($4,533,657)</td>
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<td>$16,273,686</td>
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<td>($6,986,204)</td>
<td>$16,122,429</td>
<td>$308,432</td>
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<tr>
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<td>($249,567)</td>
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<tr>
<td>2017</td>
<td>Traditional</td>
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<td>($9,329,943)</td>
<td>$21,733,965</td>
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<td>($258,562)</td>
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<td>$408,582</td>
<td>$591,524</td>
</tr>
</tbody>
</table>

Note: Figures on table are in the thousands.

Figure 6 illustrates the total depreciation expense and its annual percent change from 2005 to 2017. The significant changes in the total depreciation expense happened in 2009 and 2010. In 2009, portions of the Central Artery/Tunnel Project segments were open to traffic, and the Massachusetts Clean Energy Center began operating following the American Clean Energy and Security Act of 2009. Furthermore, the enactment of the 2009 Transportation Reform Legislation established the consolidated MassDOT. In 2010, the state’s infrastructure asset responsibilities of financial reporting, operations and maintenance were transferred to MassDOT. Therefore, infrastructure assets are no longer reported in the state’s CAFRs, but are reported in the MassDOT’s financial reporting and they are incorporated into the CAFRs as a component unit. Another anomaly is in 2010 and 2011 where no depreciation expense is evident for business type activity. Overall, the total depreciation expense changed on average 10 percent year over year from 2002 to 2017.

138 Authors’ Compilation of Massachusetts CAFR Data.
140 Mass.gov, “Transportation Reform, Overview of the Reform Act.”
5.2.6 Findings/Conclusion
Coordinating interviews regarding financial reporting and infrastructure assets with the appropriate state personnel was a challenge for the research of this case study.

Regarding GASB 34, the research shows that the asset management systems were not put in place due to GASB 34 or MAP-21 requirements. The contact at MassDOT confirmed that the state already had their asset management system in place in 2012, when MAP-21 was signed into law. Massachusetts already had guidelines in place that lined up with the requirements of MAP-21, so implementation was not seen as being difficult by the various departments.

The contact stressed the importance of condition over value. This statement appears to show MassDOT and the comptroller’s office on two different thoughts processes regarding condition and value, as Massachusetts uses the traditional approach of accounting.

During the interview with MassDOT, multiple references were made to the fact that the comptroller’s office is responsible for all financial information and the day-to-day implementation of GASB 34 and other pronouncements from any entity, and did not comment on any questions related to the financial component of the state.

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143 Authors’ Compilation of Massachusetts CAFR Data.
5.3 TENNESSEE

5.3.1 Background
Tennessee, a state in the southeastern section of the United States with 6.7 million residents spread across 42,143 square miles, boasts one of the better records of maintaining infrastructure in the country. According to the 2017 ASCE Report Card, Tennessee infrastructure scores a “C” overall. Tennessee’s bridges score a B and the state’s roadways score a C+. “The Volunteer State” has impressive ranks when it comes to infrastructure maintenance.144

The Tennessee Department of Transportation (TDOT) is responsible for maintaining the state-owned highways, which includes interstate lanes and bridges. A six-member State Highway Department was created in 1915,145 and in 1972, the agency’s name was changed to “Department of Transportation” due its role in regulating aviation, public transit, and railroads. The FY2018-19 budget allocates $2.15 billion to transportation, with the state contributing $972 million and the remainder from Federal grants. The state’s contribution is funded through a dedicated pool, meaning transportation funding cannot be used to support other government services. Tennessee does not issue debt for major infrastructure projects, which is due to a fiscally conservative view on government spending.146

Most of Tennessee’s highways are county owned, in contrast to states like Virginia, where the state owns and operates the vast majority of highway miles. Tennessee has 95,737 highway miles, and the state owns and operates just 14.5 percent of them. Across Tennessee, there are 8,389 state-owned bridges and 11,462 county-owned bridges. Most of the state is relatively flat and at low-altitude. The eastern edge is mountainous, however, with the Appalachian Mountains passing in the south, parallel with the North Carolina border. Because Tennessee is a southern state, it does not face the maintenance problems characteristic of a harsh winter. Although there are mountains along the state’s eastern border, TDOT is spared from dealing with the winter frost heaves that a state such as Colorado has to cope with.

5.3.2 Literature Review
TDOT’s 2017 to 2020 State Transportation Improvement Program (STIP) report provides background on transportation infrastructure funding. The largest sources of federal revenue come from two grant programs: The National Highway Performance Program and the Surface Transportation Block Program. According to Tennessee’s STIP for FY2017-2020, the National Highway Performance Program was projected to provide $223.9 million in federal funding during FY2018 for “Construction, reconstruction, resurfacing, restoration, rehabilitation, preservation, or operational improvements of NHS segments.”147

The National Highway Performance Program can be used for “bridge and tunnel inspection and evaluation

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145 Tennessee Department of Transportation, “100 Years of Driving to be the Best,” tn.gov, N.D., https://www.tn.gov/content/tn/tdot/100years-home/100years-transportation-history/100years-transportation-anecdotes.html
on the NHS and inspection and evaluation of other NHS highway infrastructure assets,” as well as other projects. The $129.1 million Surface Transportation Block Program (for FY2018) is available for state highways not considered part of the NHS, and funding can used for a broad range of activities, including transportation planning, roadway construction and maintenance, bridge construction and maintenance, and research programs.148 Other significant sources of Federal funding for FY2018 include the Appalachia Development Highway System ($51.4 million), the Highway Safety Improvement Program ($36 million), and the Transportation Alternatives Program ($13 million), mainly used for pedestrian and bicycle facilities.149

5.3.3 Asset Management System
Three phone interviews were conducted for the Tennessee portion of this research. One was with a representative of the State Comptroller’s office, a second with an employee of the TDOT Finance Division, and a third with TDOT Asset Management.

Tennessee is a modified approach state, and was one of the first states to adopt the modified approach of infrastructure reporting after implementation of GASB 34. TDOT and Tennessee’s Department of Finance and Administration made the decision to use the modified approach.150 Because GASB 34 was issued in 1999 and the state elected to report under the modified approach following the end of FY2002, it took just three years for the new financial reporting method to take hold.

According to an official with the Comptroller’s Office, the modified approach aligns closely with the way Tennessee had been viewing infrastructure for many years. A major shift in policy was not necessary to adopt the modified approach. The fundamental belief that infrastructure assets are long-lived, and investment in preventative maintenance is a TDOT priority, which correlates strongly with GASB 34’s language under requirements for usage of the modified approach. The State Comptroller’s Office respondent also mentioned Tennessee is “fiscally conservative” when it comes to infrastructure spending. In the end, it is more cost effective to view infrastructure assets as long-lived as opposed to having definite life expectancies. The cost of resurfacing a section of highway is less for instance, than waiting for the highway to fully deteriorate and pave a new section from scratch.

Tennessee reports three infrastructure categories on its CAFR: roadway, right-of-way, and bridges. Under the modified approach, states must set target condition levels for infrastructure assets, and allocate resources to meet those condition levels. For roadways, the “Maintenance Rating Index,” which uses a 1-100 scale, is used to get condition goals. The target condition level is a 75, and Tennessee exceeded that value in 2017 CAFR with an 84.61 rating.151 Bridges use the National Bridge Inventory (NBI), and the baseline is set at

148 Ibid.
149 Ibid
150 University of Delaware, Department of Accounting and MIS, “Infrastructure Assets,” University of Delaware, 12 November 2009, Accessed March 11, 2018,
75 percent, which means that a minimum of 75 percent must not be “Structurally Deficient or Functionally Obsolete.” The 2017 CAFR shows an achievement of an 85 percent bridge rating.

Tennessee uses three asset management systems, as opposed to an “enterprise system” such as a Deighton product. This includes a bridge management system developed by Stantek, a pavement management system developed by PONTIS, and a maintenance management system developed by Booz-Allen, which is customized for Tennessee’s needs. While using a single system to take care of all asset management needs would be more efficient, the respondent explained that it could not be justified currently due to the resources TDOT has already committed to updating the older legacy systems.

The official stated that the systems in place are designed to make a projection as to what the condition level of a bridge, for instance, would look like if a certain amount of money were invested. The bridge management system could project how $4 million in capital improvements would improve longevity compared to $6 million in capital improvements. The weakness of Tennessee Asset Management systems, the respondent explains, is that resources cannot be shifted from bridges to pavement, or vice-versa. If $1 million is allocated for a road project, every dime of that $1 million must be spent on the road project. Funds cannot transfer to repair a bridge that is in greater need of attention.

### 5.3.4 Accounting Method

Although Tennessee does use the modified approach of infrastructure reporting, an official with TDOT admits that state engineers do not build bridges with the expectation of an indefinite life expectancy. While it is worth investing to prolong their years in service, designing a bridge to last 500 years, for instance, is not cost effective. The respondent said the public does not understand this concept, but from a capital budgeting perspective, it would be impossible to design bridges to the standard of having an indefinite life span. In addition, the estimated life expectancies themselves are not always accurate. Bridges may deteriorate several years prior to the original estimate, further imposing a strain on budgets.

When asked about the impacts of MAP-21 on Tennessee’s asset management systems, the official said the legislation has not forced a major overhaul on the state in terms of new federal reporting. When interviewed about the impacts of MAP-21, the official from TDOT’s Finance Division stated that the legislation is affecting how the state looks at long-term investment. It requires a longer-term strategy for budgeting than the state is accustomed to, and the interviewee stated that it is hard to forecast ten years in the future because the funding situation is uncertain. Nevertheless, Tennessee has always had enough funding to keep its roads in decent shape, and the gas tax revenues provide adequate revenue.

### 5.3.5 CAFR Analysis

Tennessee does not borrow money to fund transportation projects; instead initiatives follow a “pay-as-you-go” philosophy that utilizes bond authorizations as a cash management tool to accelerate projects in anticipation of expected revenues in relation to a project’s horizon. The bonds are authorized but remain unissued. Authorization allows TDOT to obligate projects and get them started. Project costs are then paid throughout the year using TDOT’s current cash flow. Using a model they developed, TDOT manages
project costs by projecting the cumulative cash requirement of multiple projects at different stages of construction and maintenance.\(^{152}\)

The model projects TDOT’s cash balance and indicates when additional bonds can be authorized or if expected revenue failed to meet targets, whether the bonds must be sold to cover expenses. The state’s practice of using cash flow to finance road projects in lieu of issuing debt is one of the key factors in Tennessee’s ability to secure and retain high bond ratings.

Table 7: Snapshot of Tennessee Data\(^ {153}\)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Depreciable Capital Assets</th>
<th>Accumulated Depreciation</th>
<th>Total Capital Assets</th>
<th>Depreciable Infrastructure-Total</th>
<th>Accumulated Depreciation Infrastructure</th>
<th>Net Depreciable Capital Assets-Incurred</th>
<th>Net Total Infrastructure</th>
<th>Total Infrastructure</th>
<th>Total Depreciation Expense</th>
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<td>(800,000)</td>
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<tr>
<td>2016</td>
<td>$2,100,000</td>
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<td>$1,300,000</td>
<td>$1,300,000</td>
<td>(800,000)</td>
<td>$500,000</td>
<td>$500,000</td>
<td>$500,000</td>
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</tr>
<tr>
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<td>$1,300,000</td>
<td>$1,300,000</td>
<td>(800,000)</td>
<td>$500,000</td>
<td>$500,000</td>
<td>$500,000</td>
<td>$500,000</td>
</tr>
</tbody>
</table>

Note: Figures on table are in the thousands.

The state defines capital assets, except for infrastructure, land, and internally generated intangibles, as assets with an initial individual cost of $5,000 or more and an estimated useful life of three years or more. Tennessee capitalize infrastructure assets and land regardless of cost or useful life. Tennessee does not capitalize the costs of normal maintenance and repairs that do not add to the value of the asset or materially extend the life of the asset. Internally generated intangibles assets that are not physical in nature are capitalized if the total estimated project costs are $1 million or more and have an estimated useful life of three years or more. Capitalized assets are recorded at historical cost or estimated historical cost if purchased or constructed. Donated capital assets are recorded at estimated acquisition value at the date of donation. Capitalized assets, except for land and infrastructure, are depreciated over their useful lives.

Tennessee has elected to apply the modified approach to accounting for infrastructure roadways and bridges. The modified approach is an alternative to depreciation that may be applied to infrastructure capital assets that meet certain requirements. Under the modified approach, depreciation expense is not recorded for these assets. Instead, costs for both maintenance and preservation of these assets is expensed in the period incurred while additions and improvements are capitalized.\(^ {154}\)

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\(^{153}\) Authors’ Compilation of Tennessee CAFR Data.

As noted in the 2011 CAFR, Tennessee generally maintains a relatively low debt burden, accomplished using conservative debt management practices. Such practices include funding a portion of the state capital program with surplus cash, cancellation of bond authorizations in lieu of issuing debt, creating, and maintaining a “rainy day fund” to offset anticipated revenue shortfalls, and the adoption of state statutes designed to control the issuance of excessive debt.155

Tennessee was greatly impacted by the effects of the great recession. As noted in the 2012 CAFR, most recessions have only a short-term impact on economic growth. The Great Recession is an exception to this rule. Having started in December, 2007 and ended in the summer of 2009, the last recession continues to influence national and state economic growth. A few fluctuations in reporting trends were affected by Tennessee labor market “non-farming jobs,” due to the effects of the great recession and high unemployment rates.156

Based on the 2012 CAFR, recent estimates by the University of Tennessee’s Center for Business and Economic Research show total employment in both the US and Tennessee regaining or exceeding their previous peaks by 2015.157 As shown in Figure 7, the expectation for recovery in some sectors in Tennessee, however, remains dismal. The retail trade, wholesale trade, financial activities, and information sectors are not expected to return to their peak employment levels until after 2022, and manufacturing may never return to its peak.158

Additionally, in 2013, Tennessee enacted the Tennessee Governmental Act of 2013. As a whole, this effort was intended to create a new approach to measuring the strategic functions and operations of each department. The act requires a system of strategic planning, program performance measures and audits to be implemented to measure the effectiveness and efficiency of governmental services.159 The new system will generate transparent and publicly available information and for the general assembly to make meaningful decisions about the allocation of scarce resources in meeting vital needs. This initiative caused reporting figures to be revised and reset based on the new reporting criteria.160

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Roads
Tennessee uses a Maintenance Rating Index (MRI) that addresses all elements of the roadway system. A statistical sample of randomly selected highway segments, representative of the entire subsystem, is inspected annually and rated in accordance with the MRI criteria. The following elements are rated: traveled pavement; shoulders; various roadside elements such as debris, grass height, slope erosion, and fencing; drainage elements such as culverts, cross drainpipes, and drain inlets; and traffic services such as signage, pavement markings, and guardrails. The MRI is a numerical score from one to 100, with 100 being a perfect score. The average MRI of all the rated segments is the reported condition level. As discussed above, the state intends to maintain roadways so that the reported condition level each year does not fall below 75.162

In the future, many challenges face Tennessee. With the increase in oil and construction materials, TDOT’s purchasing power is eroding. Business and manufacturing has streamlined and is more efficient with “just-in-time” logistics increasing the number of trucks on our system. Since 1970, traffic has nearly doubled.163 Instead of reactive or routine maintenance, preventive maintenance has been TDOT’s strategy of cost-effective pavement treatments to extend the life or improve the serviceability of existing roadways. The purpose of TDOT’s Pavement Management Program is to protect the pavement structural integrity, maintain functional characteristics, slow the rate of pavement deterioration, and/or correct pavement surface deficiencies.

161 Authors’ Compilation of Tennessee CAFR Data.
Bridges

TDOT is committed to keeping its bridges in a state of good repair. This is accomplished by fulfilling the federal requirement of inspecting all state-maintained bridges on a 24-month cycle. TDOT consistently meets and exceeds their target of examining 95 percent of all bridges, which helps to determine where investments need to be made in the repair or replacement of deficient bridges. Tennessee accomplishes this using state and federal funds from the State of Good Repair Program.\textsuperscript{164}

Per the 2017 CAFR, the state maintains information on its 8,401 bridges in compliance with the NBI guidelines established by the FHWA. Bridges are inspected at every other year and the results are coded on a zero to nine scale, with nine being the most desirable. A bridge coded four or less for its deck, superstructure, or substructure, or coded two or less for its structural evaluation or waterway adequacy, is classified as structurally deficient. Whether caused by structural deterioration, obsolete design standards, or an insufficient waterway opening, a structurally deficient bridge is inadequate to carry legal loads. A bridge coded three or less for its structural evaluation, deck geometry, vertical or horizontal under clearance, water adequacy, or approach roadway alignment is classified as functionally obsolete. A functionally obsolete bridge cannot properly accommodate the current traffic. The state intends to maintain bridges so that 75 percent or more of the total deck area is not classified as structurally deficient or functionally obsolete.\textsuperscript{165}

\textbf{Table 8: Tennessee’s Road and Bridge Target and Actual Conditions}\textsuperscript{166}

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|}
\hline
Year & Road Actual Value & Road & Bridge \&
\hline
 & & Bridge Target & Actual \n & & Condition & Value \n\hline
2002 & 88\% & 75\% & 80\% \n\hline
2003 & 88\% & 75\% & 80\% \n\hline
2004 & 91\% & 75\% & 80\% \n\hline
2005 & 90\% & 75\% & 80\% \n\hline
2006 & 90\% & 75\% & 86\% \n\hline
2007 & 91\% & 75\% & 86\% \n\hline
2008 & 89\% & 75\% & 81\% \n\hline
2009 & 90\% & 75\% & 81\% \n\hline
2010 & 89\% & 75\% & 82\% \n\hline
2011 & 89\% & 75\% & 82\% \n\hline
2012 & 89\% & 75\% & 83\% \n\hline
2013 & 88\% & 75\% & 83\% \n\hline
2014 & 89\% & 75\% & 84\% \n\hline
2015 & 87\% & 75\% & 84\% \n\hline
2016 & 86\% & 75\% & 84\% \n\hline
2017 & 86\% & 75\% & 84\% \n\hline
\end{tabular}
\end{table}


\textsuperscript{166} Authors’ Compilation of Tennessee CAFR Data.
Maintenance

Tennessee operates on a ‘fix it first’ basis. By placing a great amount of emphasis on its ability to identify problem areas that arise in various portions of their infrastructure, the result is a response with a maintenance solution that is often more cost-effective than a complete replacement. As the transportation infrastructure continues to age across the country and in Tennessee, the maintenance needs of roadways, bridges, and other infrastructure continue to grow. As such, the portion of TDOT’s budget allocated to maintenance activities continues to be a significant amount year after year.\textsuperscript{168}

Tennessee reports their annual maintenance and preservation costs under the modified approach between 2002 and 2017. The most recent condition assessment indicates that bridges were rated at 10 points above the state’s established condition level and roadways were 10 points above the state’s benchmark level. Bridges are assessed biennially and roadways annually. The state’s capital outlay budget for FY2016-2017 reflects a $136.9 million decrease from the previous year. The capital outlay budget includes funding for both capital outlay projects and capital maintenance projects.\textsuperscript{169}

Estimated maintenance costs fell short of actual costs in 2010. A significant surge of maintenance costs in 2010 was due to the ongoing effects of the recession. In addition, severe flooding affected Tennessee in 2010, which caused substantial infrastructure damages.

\textsuperscript{167} Ibid
\textsuperscript{169} TN Department of Finance & Administration, “2017 Comprehensive Annual Financial Report (CAFR).”
Overall, the monetary needs of the transportation system are not decreasing; they are only increasing. Inflation alone will increase project costs, and as the infrastructure expands and ages, more maintenance will be required. Based on the available data, future budgets will not be able to accommodate the projected transportation needs of the state.

Figure 9: Chart of Estimated, and Actual Maintenance Cost, and Difference

5.3.6 Findings/Conclusions
Overall, Tennessee has a highway network with a high standard of maintenance and a steady stream of funding. Tennessee’s asset management system is not new, but has been updated to meet state’s need and standards. There are more efficient enterprise all-encompassing systems, such as those developed by Deighton. The state exceeds the minimum standards for pavement and bridge quality according to the 2017 CAFR. Tennessee can be considered a model for how a state ensures its infrastructure is safe without taking on large amounts of debt. The fact that the state does not issue debt for major capital projects, but instead relies on dedicated user fees suggests it is possible to accomplish that mission.

Both the State DOT and Comptroller’s office understand the merits of the modified approach. Tennessee does not use depreciation in financial reporting. The Comptroller’s Office shares the same view as the TDOT’s Asset Management Division in saying that infrastructure assets are long-lived, and should not be valued as if they have a definite life expectancy. The second finding, that there is no single “asset management system for a state,” holds true, with Tennessee having three separate systems for pavement, bridges, and maintenance. The asset management interviewee did admit that in an ideal world, the systems would be consolidated, but for now they are working to ensure public safety on the state’s highway network. Finally, while MAP-21 requires states to have asset management systems as a condition of receiving federal...
money, Tennessee had their systems in place prior to the issuance of MAP-21 in 2012. MAP-21 affects how states plan their future investment in infrastructure, but it has little effect on asset management.

5.4 ARIZONA

5.4.1 Background
Arizona became a state in 1912 and it is located in the southwest corner of the country. It is the sixth largest state covering almost 114,000 square miles. Its population was 7,016,270 in 2010. The southern part of the state has a desert climate, whereas the northern part has mountains and canyons, with a significant winter climate. This wide range of climate can make transportation planning across the state a difficult task, as the state must deal with a variety of issues relating to temperature and weather. The highest point in Arizona is Humphrey’s Peak at 12,633 feet and the lowest is the Colorado River at 70 feet. A unique challenge for Arizona is the fact that one fourth of the state is comprised of Indian reservations.

The Arizona state legislature established the Arizona Department of Transportation (ADOT) in July 1974. When the state approves the operating budget appropriations bill, each organization, the DOT included, receives a lump sum budget allocation to cover its operating costs for the year. The appropriations lapse at the end of the fiscal year, excluding capital budgets, highway maintenance costs, and any special line items. The year 2017 was an economically positive year for Arizona. Compared to 2016, Arizona saw increases in employment, income, and population.

Arizona has over 21,000 miles of roadways and 4,866 bridges in their transportation infrastructure. Arizona’s transportation infrastructure contributes to the economic vitality of the entire state. However, if the state’s transportation infrastructure does not have proper maintenance and management, it can negatively affect the functions of the state, primarily the economy. According to the 2015 ASCE Report Card, approximately seventeen percent of Arizona’s urban roads were in poor condition, resulting in a D+ grade. The poor condition of roadways resulted in an estimated $1.5 billion in vehicle costs for drivers, including maintenance and repair charges. Estimates show that the current level of funding, primarily afforded by the national gas tax, will not and cannot cover all the costs necessary to bring Arizona’s transportation infrastructure up to an acceptable level.

Arizona’s bridges cover approximately 53 million square feet of bridge deck space, which ranks it the 29th largest deck space in the country. More than 50 percent of these bridges are over forty years of age and there is a significant lack of new bridges across the state. Arizona received a B grade (fairly good condition)

on its bridges in 2015; however, if funding cannot be identified to help maintain these bridges, the decline in health will continue.¹⁷⁵

5.4.2 Literature Review
ADOT has two main sources for funding; these include the Highway User Revenue Fund and the Regional Area Road Fund. For fiscal year 2017, Arizona received $1,405.4 million from the Highway User Revenue Fund and $414.1 million from the Regional Area Road Fund, both of which increased from the previous fiscal year. The 2017 CAFR anticipates that Arizona’s economy will continue to grow throughout the next two years.¹⁷⁶

5.4.3 Asset Management System
ADOT’s infrastructure assets include roads (including related right-of-way), bridges, and construction in progress (unfinished roads and bridges). Signage is included as part of roadways in the initial capitalization, however, subsequent expenditures for signage are expensed in the period incurred. Arizona has accounted for all its assets since 1980.

The division that is responsible for maintaining the assets is the same one that reports the infrastructure condition in the financial report. Details of the roadway and bridge condition assessments are disclosed in the Required Supplementary Information section of the CAFR. Arizona uses a combination of visual inspections and International Roughness Index (IRI) to measure pavement conditions.¹⁷⁷ Developed by the World Bank in 1980, IRI measures smoothness of the pavement.¹⁷⁸ Currently, Arizona’s standards are even higher than AASHTO’s recommendations. Arizona uses NBI to measure bridge condition. The NBI rates bridges based on how much load and stress a bridge can endure.¹⁷⁹ A bridge inspection team performs the inspection and the timing of the inspections is determined by previous inspection conditions, as well as age of the bridge.¹⁸⁰

5.4.4 Accounting Method
ADOT prepares their CAFRs completely separately from the Arizona Department of Administration. The financial reports from ADOT are still included in the statewide CAFR, but the financials are reported as a major fund. ADOT has their own Comptroller’s Office, which is responsible for compiling the information in the CAFR, which is then submitted directly to the Governor.

¹⁷⁷ Ibid, 2-4.
ADOT chose to use the modified approach while filing their financial reports. They do not depreciate their infrastructure assets, nor do they assign a “useful life” to these assets. Assets that are not deemed infrastructure assets utilize the useful life of the asset as set forth in the State of Arizona Accounting Manual. These non-infrastructure assets remain on financial reports until they no longer have a service life, by which they are then removed from financial reports.

For ADOT, non-depreciable assets are assets that fall into the categories of infrastructure, land, construction in progress, and all right-of-ways. Any asset not included in those categories and that meet the Arizona capitalization threshold are depreciated on a straight-line basis. Arizona learned through GASB training, that $5,000 is a common capitalization threshold.

In the end, ADOT receives most of its financial reporting guidance for roadways from FHWA and the AASHTO. For bridges, ADOT strictly follows FHWA’s condition ratings.181

5.4.5 CAFR Analysis
Assets for the state of Arizona accounted under the modified approach include 6,780 center lane miles (21,532 travel lane miles) and 4,866 bridges that ADOT is responsible for maintaining. ADOT manages its roads using the Pavement Serviceability Rating (PSR), which measures the condition of the pavement and its ability to serve the traveling public. The PSR uses a five-point scale (5 excellent, 0 poor) to characterize the condition of the roadway. ADOT’s serviceability rating goal is 3.23 for the overall system. The most recent available assessment indicates that ADOT received an overall rating of 3.6 for fiscal year 2002.182

Adjustments are made to the annual plans based on the needs of ADOT to maintain the level of the roads and bridges at a level equal to the goals they have established. Not only are adjustments made during the life of the program, but also circumstances may require that refinements to the individual components of the program be made during the fiscal year.

In comparing Estimated to Actual Expenditures in Table 9, significant variances occur. In this program, the Estimated Expenditures for the current year are based on “programmed” projects, which may or may not be spent in the current year of the program. Programmed expenditures consist of those items that are planned for the future, with contracts that have not yet been awarded. Furthermore, the actual expenditures will include projects that were programmed for a prior year’s estimated expenditures but which did not occur, or were not completed, in the prior year.

Table 9: Snapshot of Arizona CAFR Data\textsuperscript{183}

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Depreciable Capital Assets</th>
<th>Accumulated Depreciation</th>
<th>Net Depreciable Capital Assets</th>
<th>Total Capital Assets</th>
<th>Depreciable Infrastructure</th>
<th>Accumulated Depreciation Infrastructure</th>
<th>Net Depreciable Capital Assets Infrastructure</th>
<th>Net Total Infrastructure</th>
<th>Total Infrastructure</th>
<th>Total Depreciation Expense</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>$5,257,592</td>
<td>($2,423,226)</td>
<td>$2,834,366</td>
<td>$19,291,474</td>
<td>$217,944</td>
<td>($74,819)</td>
<td>$143,128</td>
<td>$7,607,024</td>
<td>$7,681,840</td>
<td>$257,932</td>
</tr>
<tr>
<td>2003</td>
<td>$5,474,418</td>
<td>($2,506,503)</td>
<td>$2,965,915</td>
<td>$20,426,881</td>
<td>$268,098</td>
<td>($67,675)</td>
<td>$190,223</td>
<td>$7,762,996</td>
<td>$7,800,671</td>
<td>$248,985</td>
</tr>
<tr>
<td>2004</td>
<td>$6,072,377</td>
<td>($2,636,447)</td>
<td>$3,435,930</td>
<td>$24,642,262</td>
<td>$253,385</td>
<td>($61,187)</td>
<td>$192,208</td>
<td>$8,778,579</td>
<td>$8,844,766</td>
<td>$236,332</td>
</tr>
<tr>
<td>2005</td>
<td>$6,442,142</td>
<td>($2,841,973)</td>
<td>$3,600,169</td>
<td>$24,133,774</td>
<td>$295,819</td>
<td>($61,067)</td>
<td>$234,752</td>
<td>$9,068,350</td>
<td>$9,159,447</td>
<td>$268,327</td>
</tr>
<tr>
<td>2006</td>
<td>$6,442,231</td>
<td>($3,052,319)</td>
<td>$3,389,912</td>
<td>$24,816,656</td>
<td>$317,584</td>
<td>($100,341)</td>
<td>$217,243</td>
<td>$9,591,955</td>
<td>$9,692,539</td>
<td>$270,010</td>
</tr>
<tr>
<td>2007</td>
<td>$7,529,917</td>
<td>($3,252,630)</td>
<td>$4,277,287</td>
<td>$26,433,475</td>
<td>$332,627</td>
<td>($110,821)</td>
<td>$221,806</td>
<td>$10,077,147</td>
<td>$10,187,968</td>
<td>$314,421</td>
</tr>
<tr>
<td>2008</td>
<td>$7,973,038</td>
<td>($3,462,262)</td>
<td>$4,510,776</td>
<td>$28,098,632</td>
<td>$353,386</td>
<td>($121,899)</td>
<td>$231,487</td>
<td>$10,332,865</td>
<td>$10,454,794</td>
<td>$317,577</td>
</tr>
<tr>
<td>2009</td>
<td>$8,267,666</td>
<td>($3,743,983)</td>
<td>$4,513,683</td>
<td>$29,525,836</td>
<td>$382,729</td>
<td>($136,337)</td>
<td>$246,392</td>
<td>$10,878,181</td>
<td>$11,014,518</td>
<td>$336,327</td>
</tr>
<tr>
<td>2010</td>
<td>$8,713,267</td>
<td>($4,065,956)</td>
<td>$4,647,310</td>
<td>$31,365,952</td>
<td>$405,903</td>
<td>($152,197)</td>
<td>$253,307</td>
<td>$11,290,095</td>
<td>$11,442,291</td>
<td>$342,881</td>
</tr>
<tr>
<td>2011</td>
<td>$9,047,497</td>
<td>($4,354,554)</td>
<td>$4,692,943</td>
<td>$32,637,907</td>
<td>$421,384</td>
<td>($175,953)</td>
<td>$255,431</td>
<td>$11,859,987</td>
<td>$12,025,350</td>
<td>$348,045</td>
</tr>
<tr>
<td>2012</td>
<td>$9,837,705</td>
<td>($4,637,073)</td>
<td>$5,200,632</td>
<td>$34,311,866</td>
<td>$471,203</td>
<td>($181,255)</td>
<td>$289,948</td>
<td>$12,497,385</td>
<td>$12,678,840</td>
<td>$370,960</td>
</tr>
<tr>
<td>2013</td>
<td>$10,520,790</td>
<td>($5,007,236)</td>
<td>$5,513,554</td>
<td>$35,847,763</td>
<td>$483,537</td>
<td>($196,860)</td>
<td>$286,677</td>
<td>$13,237,869</td>
<td>$13,434,729</td>
<td>$382,327</td>
</tr>
<tr>
<td>2014</td>
<td>$11,074,663</td>
<td>($5,305,150)</td>
<td>$5,769,513</td>
<td>$37,192,510</td>
<td>$500,691</td>
<td>($212,644)</td>
<td>$288,047</td>
<td>$14,096,376</td>
<td>$14,279,220</td>
<td>$395,215</td>
</tr>
<tr>
<td>2015</td>
<td>$11,629,256</td>
<td>($5,626,534)</td>
<td>$6,002,720</td>
<td>$38,715,496</td>
<td>$556,679</td>
<td>($230,700)</td>
<td>$325,979</td>
<td>$15,058,482</td>
<td>$16,289,248</td>
<td>$411,963</td>
</tr>
<tr>
<td>2016</td>
<td>$12,338,062</td>
<td>($5,846,914)</td>
<td>$6,491,148</td>
<td>$40,384,084</td>
<td>$573,312</td>
<td>($248,944)</td>
<td>$324,368</td>
<td>$16,419,461</td>
<td>$16,668,405</td>
<td>$453,091</td>
</tr>
</tbody>
</table>

Note: Figures on table are in the thousands

Capital assets are stated at cost or, if donated, at acquisition value. Interest incurred during the construction of capital assets, net of interest earned on the invested proceeds over the same period, is only capitalized in the proprietary funds. Most capital assets are depreciated over their estimated useful lives. However, ADOT reports most infrastructure assets using the modified approach, as provided by the GASB. Under this approach, rather than being depreciated, costs to maintain and preserve these assets are expensed. This approach is discussed further in the Required Supplementary Information (RSI) portion of CAFR report.

ADOT has adopted a general policy for capitalization thresholds, depreciation, and estimated useful lives of capital assets. In addition, ADOT has approved alternative policies for some of the state’s agencies. Depreciable capital assets are depreciated on a straight-line basis. Capitalization thresholds (the dollar values at which asset acquisitions are added to the capital asset accounts) and estimated useful lives of capital assets being depreciated in the government wide financial statements and the proprietary funds are and the proprietary funds are broken down as; land, building, improvements, equipment, infrastructure, software, and other intangibles.\textsuperscript{184} This can be seen in Figure 10 below.

\textsuperscript{183} Authors’ Compilation of Arizona CAFR Data.

\textsuperscript{184} Authors’ Compilation of Arizona CAFR Data.
Infrastructure, such as roads and bridges, was capitalized for the first time in FY2001-2002. Most capital assets are depreciated over their useful lives using the straight-line depreciation method. However, infrastructure assets constructed and maintained by ADOT will utilize an alternative accounting treatment in which costs to maintain and preserve these assets are expensed and no depreciation expense is recorded.

**Roads**

The mission of ADOT’s PMS is to develop and provide a cost-effective pavement rehabilitation program that preserves ADOT’s investment in its highway system and enhances public transportation and safety. The requirements of GASB 34 and the PMS both work toward the same basic goal: the efficient, effective management of ADOT’s assets to produce long-term benefits, while minimizing expenditures.

As discussed above, the PMS has developed performance goals for the condition level of the pavement in ADOT’s highway system. These goals require periodic assessment of pavement conditions and the budget level needed to meet that goal. The goal is expressed as a measure called “Serviceability”, which can be defined as the ability of a pavement to serve the traveling public (as documented in 1961 after the AASHTO Road Test, 1956-1961). Serviceability is based on detailed measurements of objective features of the pavement. Many surveys since the original road test have shown that these measurements closely track the subjective opinion of the traveling public. The PSR is similar to the Weaver/AASHTO Scale, as indicated in Table 10 below.

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185 Authors’ Compilation of Arizona CAFR Data.
As stated above, ADOT’s goal is to maintain a PSR rating of 3.23 or better for all roads in the highway system. Annually, technicians drive over the system with inertial profiling equipment and measure the roughness of the pavement. This process is continuous throughout the year in order to assess the condition level of all pavement on an annual basis. Figure 11 and Table 11 show the Arizona Road Serviciability Target and Actual Conditions.

Table 10: Road Pavement Serviceability Rating (PSR)<sup>186</sup>

<table>
<thead>
<tr>
<th>Numerical Rating</th>
<th>PSR</th>
<th>Weaver/AASHTO Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Excellent</td>
<td>Perfect</td>
</tr>
<tr>
<td>4</td>
<td>Good</td>
<td>Very Good</td>
</tr>
<tr>
<td>3</td>
<td>Fair</td>
<td>Good</td>
</tr>
<tr>
<td>2</td>
<td>Poor</td>
<td>Fair</td>
</tr>
<tr>
<td>1</td>
<td>Very Poor</td>
<td>Poor</td>
</tr>
<tr>
<td>0</td>
<td>Impassable</td>
<td>Very Poor</td>
</tr>
</tbody>
</table>

Authors’ Compilation of Arizona CAFR Data.

Figure 11: Target Condition vs Actual Condition<sup>187</sup>
### Bridges

ADOT’s bridge assets constitute a significant portion of all infrastructure assets in Arizona. As of June 30, 2016, ADOT owned and maintained 4,866 bridges with an approximate total deck area of 49,764,611 square feet. Bridges, for purposes of this report, include all structures erected over an opening or depression with a centerline of 20 feet or more. Information related to these bridges is stored and updated in the Arizona Bridge Information and Storage System. The Arizona Bridge Information and Storage System is used to efficiently manage the bridge inventory by storing all bridge related data and assisting bridge engineers in arriving at appropriate bridge preservation decisions. Also, the Arizona Bridge Information and Storage System is used for reporting bridge inventory and condition, on a biennial basis, to FHWA.

#### Table 11: Arizona Road Serviceability Target and Actual Conditions

<table>
<thead>
<tr>
<th>Year</th>
<th>Road Actual Value</th>
<th>Road Target Condition</th>
<th>Bridge Actual Value</th>
<th>Bridge Target Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>3.6</td>
<td>3.23</td>
<td>93.6</td>
<td>92.5</td>
</tr>
<tr>
<td>2003</td>
<td>3.6</td>
<td>3.23</td>
<td>93.9</td>
<td>92.5</td>
</tr>
<tr>
<td>2004</td>
<td>3.8</td>
<td>3.23</td>
<td>93.8</td>
<td>92.5</td>
</tr>
<tr>
<td>2005</td>
<td>3.8</td>
<td>3.23</td>
<td>93.9</td>
<td>92.5</td>
</tr>
<tr>
<td>2006</td>
<td>3.52</td>
<td>3.23</td>
<td>93.8</td>
<td>92.5</td>
</tr>
<tr>
<td>2007</td>
<td>3.87</td>
<td>3.23</td>
<td>93.6</td>
<td>92.5</td>
</tr>
<tr>
<td>2008</td>
<td>3.91</td>
<td>3.23</td>
<td>93.4</td>
<td>92.5</td>
</tr>
<tr>
<td>2009</td>
<td>3.74</td>
<td>3.23</td>
<td>93.4</td>
<td>92.5</td>
</tr>
<tr>
<td>2010</td>
<td>3.71</td>
<td>3.23</td>
<td>93.2</td>
<td>92.5</td>
</tr>
<tr>
<td>2011</td>
<td>3.69</td>
<td>3.23</td>
<td>93.1</td>
<td>92.5</td>
</tr>
<tr>
<td>2012</td>
<td>3.69</td>
<td>3.23</td>
<td>93.1</td>
<td>92.5</td>
</tr>
<tr>
<td>2013</td>
<td>3.67</td>
<td>3.23</td>
<td>93.2</td>
<td>92.5</td>
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<tr>
<td>2014</td>
<td>3.69</td>
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<td>93.8</td>
<td>92.5</td>
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<td>2015</td>
<td>3.68</td>
<td>3.23</td>
<td>93.5</td>
<td>92.5</td>
</tr>
<tr>
<td>2016</td>
<td>3.66</td>
<td>3.23</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>2017</td>
<td>3.67</td>
<td>3.23</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

#### Table 12: Bridge Condition Rating Index (CRI)

<table>
<thead>
<tr>
<th>Numerical Rating</th>
<th>Condition Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Excellent</td>
</tr>
<tr>
<td>8</td>
<td>Very Good</td>
</tr>
<tr>
<td>7</td>
<td>Good</td>
</tr>
<tr>
<td>6</td>
<td>Satisfactory</td>
</tr>
<tr>
<td>5</td>
<td>Fair</td>
</tr>
<tr>
<td>4</td>
<td>Poor</td>
</tr>
<tr>
<td>3</td>
<td>Serious</td>
</tr>
<tr>
<td>2</td>
<td>Critical</td>
</tr>
<tr>
<td>1</td>
<td>Imminent Failure</td>
</tr>
</tbody>
</table>

188 Authors’ Compilation of Arizona CAFR Data.
189 Authors’ Compilation of Arizona CAFR Data.
Historically, a Condition Rating Index (CRI) has been used to track the condition of the bridge network. The CRI was based on four selected bridge inspection condition ratings, which in turn are based on standards established in the FHWA’s “Recording and Coding Guide for the Structural Inventory of the Nation’s Bridges.”

In 2015, the FHWA issued new rules, which have had the effect of replacing the CRI as the summary statistic for bridge condition. Instead, the various states are expected to maintain their bridges so that no more than 10 percent are classified as “Poor”. Financial sanctions are held against states that do not comply with this standard. Management of the bridge inventory is a major function of the ADOT’s Bridge Group and regularly scheduled biennial inspections are made of all bridges. A civil or structural engineer, licensed to practice in Arizona, performs these inspections.

In FY2016, 2.9 percent of bridges maintained by ADOT were classified as “Poor”. This may be explained by the fact that approximately 56 percent of the bridges in Arizona were constructed before 1970, while only 15 percent have been constructed since 2000\textsuperscript{190}, as shown in Figure 12. As this is the first year this measurement has been used, long-term trend data is not available, but will be accumulated over time. Bridges represent a major public investment, and their inspection and maintenance is an essential function of ADOT’s mission of providing products and services for a safe, efficient, and cost effective transportation system.

\textbf{Figure 12: Arizona Bridges Target and Actual Conditions}\textsuperscript{191}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{arizona_bridges_actual_target.png}
\caption{Arizona Bridges Target and Actual Conditions\textsuperscript{191}}
\end{figure}

\textsuperscript{190} Authors’ Compilation of Arizona CAFR Data.
\textsuperscript{191} Authors’ Compilation of Arizona CAFR Data.
Case Studies

Maintenance
During FY2008, the total maintenance fund decreased due, in part, to the transfer of $26.705 million to the General Fund, in response to the 2008 HB 2620, Chapter 53, which required the transfer in order to help Arizona balance the General Fund.

During FY2009, the total maintenance fund balance decreased due, in part, to the transfer of $203,695 million to the General Fund, in response to the 2009 HB 2209, Chapter 285. According to the bill, the transfer was required in order to help Arizona balance the General Fund. During FY2010, the total maintenance fund balance increased due, in part, to a decrease in financial distributions to Arizona counties and cities. During FY2011, the total fund balance increased, primarily due to the increased receipts of federal aid under the American Recovery Reinvestment Act of 2009.

Figure 13: Chart of Estimated, and Actual Maintenance Cost, and Difference

5.4.6 Findings/Conclusions
Arizona has a large roadway and bridge system to maintain, covering many different conditions, issues, and climates. The state has had a relatively positive economic standing during the past few years, with increases in income, population, and employment. Arizona chose to use the modified approach because they were aware that new regulations were on the way, so they began planning early and implementing their asset management system prior to any regulations put in place by GASB 34 and MAP-21. According to officials with ADOT, the state made changes primarily in anticipation of MAP-21 and were therefore compliant with GASB 34 when it was introduced.

192 Authors’ Compilation of Arizona CAFR Data.
Arizona does not use depreciation in their infrastructure financial reporting. Arizona has dedicated funding through the Highway User Revenue Fund and Regional Area Road Fund, but ultimately the state relies heavily on the national gas tax for infrastructure spending. While ADOT may be performing better than other states across the country, without increases to dedicated funding, bridges across the state could face immense decreases in condition and lead to greater failures.

An asset management official with ADOT holds MAP-21 regulations in high regard and feels that the regulations make financial sense for the state. The official noted that ADOT would like to bring all of their assets into their asset management system, but they feel that they should perfect the current system before adding in new components. Interviews with the asset management official and the finance official showed that ADOT has a firm understanding of the modified approach and believes that asset management reporting is beneficial to the state.

5.5 COLORADO

5.5.1 Background
Colorado was granted statehood on August 1, 1876, but it was not until 1909 that the state legislature passed a bill establishing a highway commission with three members. That commission evolved into what is today known as the Colorado Department of Transportation (CDOT). With roads and highways representing the clear majority of transportation infrastructure, CDOT remains the primary agency charged with administering Colorado’s transportation system. The Colorado Transportation Commission provides oversight of CDOT on behalf of the state legislature. The Commission approves system targets and goals and shapes the state transportation plan in accordance with federal requirements and state needs. However, there are other components and other agencies that play a role. The diverse system is comprised of “the state highway system, county and municipal roads, mass transit, airports, railroads, and bicycle and pedestrian routes…cities, counties, transit authorities, regional transportation authorities, public highway authorities, and the Colorado Public Utilities Commission also manage portions of the system.”

Much of Colorado’s population lives east of the Rocky Mountains along the north-south Interstate 25 corridor, but the population living in the central Rocky Mountain regions are presented with some of the most unique transportation challenges.

Colorado has a very diverse landscape and weather conditions that present unique challenges for asset management and preventive maintenance decisions for infrastructure investment. Its lowest elevation is 3,317 feet at its high plains border with Kansas, while Mt. Elbert’s peak at 14,440 feet is the highest point. Colorado claims the most peaks over 14,000 feet for any U.S. state at 53 and is the only state that is entirely above 1000 meters (3280.84 feet), with an average elevation of 6,800 feet. The climate runs the gamut from high plains and high deserts to snow covered mountains and deep canyons. CDOT often compares its experiences servicing its over 5.6 million residents with that of other Rocky Mountain states in pursuit of best practices and to evaluate lessons learned.

The ASCE’s 2013 Infrastructure Report Card (2010 data) rated the state’s roads as a D and found that 40 percent of Colorado’s 88,353 miles of road were rated as poor condition.\(^\text{194}\) The ASCE’s 2017 Infrastructure Report Card found that only 21 percent were in poor condition.\(^\text{195}\) The data within ASCE’s 2013 and 2017 reports show that even though Colorado added 387 miles of road between 2010 and 2017, the number of roads in poor condition declined by 19 percent.

The ASCE’s 2013 Infrastructure Report Card (2010 data) rated the state’s bridges a C- and found that 536 of Colorado’s 8,612 bridges (6.22 percent) were structurally deficient.\(^\text{196}\) The ASCE’s 2017 Infrastructure Report Card found that 497 of Colorado’s 8,682 bridges (5.70 percent) were structurally deficient.\(^\text{197}\) The ASCE’s data indicates that between 2010 and 2017 the actual number of bridges increased by 70, but the structurally deficient bridge rate decreased overall by 0.52 percent during that same time. Colorado showed improvements between 2010 and 2017 in both the road and bridge categories, according to the ASCE data.

### 5.5.2 Literature Review

Colorado has had robust experience with asset management for approximately two decades\(^\text{198}\) and several reports were reviewed to better understand that experience. CDOT defined asset management in the early 2000s and laid out a strategic vision for how they expected to manage infrastructure in the future. The goals identified were:

1. To build, preserve, operate, and reinvest in facilities more cost-effectively with improved performance;
2. To deliver to an agency’s customers the best value for the dollar spent; and
3. To enhance CDOT’s credibility and accountability in its stewardship of transportation assets.\(^\text{199}\)

The genesis of CDOT’s current asset management program is captured in Deighton Associates Limited’s Asset Management Implementation Framework for Colorado Department of Transportation from September 2010.\(^\text{200}\) Deighton’s document represented an “off the shelf” plan for integrating their asset management system in support of CDOT’s vision and goals. Since dTIMS was subsequently selected as the asset management system of record for CDOT, this document was critical in understanding its origins. Utilizing dTIMS, Colorado’s 2013 Risk-Based Transportation Asset Management Plan provided a comprehensive assessment of what CDOT actually owned and managed, to include infrastructure condition at that time. It also set asset management objectives specifically for pavement, bridges, and maintenance.

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196 American Society of Civil Engineers, “2013 Colorado Infrastructure Report Card.”
197 American Society of Civil Engineers, “2017 Colorado Infrastructure Report Card.”
199 Ibid.
Finally, it assessed investment strategies and formally acknowledged federal MAP-21 requirements that CDOT would be obligated to meet.  

CDOT’s initial Policy Directive 14 was published October 16, 2003 and provided purpose, vision, mission, goals and objectives for five investment categories: system quality, safety, mobility, program delivery, and strategic projects. Subsequent revisions have evolved to provide a developmental framework for the Statewide Transportation Plan and guide:

the distribution of resources in the Statewide Transportation Plan, the Statewide Transportation Improvement Program (STIP), and the annual budget. To better align budget setting with Policy Directive 14, the Commission annually reviews the performance of Policy Directive 14 objectives to determine if there is a need to modify objectives or realign resources to meet an objective(s).

The Colorado Transportation Commission in conjunction with CDOT published its latest updated Policy Directive 14 on 19 October 2017 and is in the process of incorporating those performance goals.

In total, these documents demonstrate the evolution of CDOT’s approach to asset management over a nearly twenty-year period. The question of what was driving this evolution arises. Was it MAP-21, GASB 34 or something else? CDOT’s Asset Management Plan stated that, “Even before the MAP-21 legislation was signed into law, the CDOT had embraced asset management as an important business practice for maintaining its assets in a state of good repair over the long-term with the least investment of resources.”

The aforementioned documentation preceding the 2013 Risk Based Asset Management Plan all indicate that CDOT’s statement is accurate, and that a strong and sanctioned asset management philosophy was well rooted in CDOT prior to the passage of MAP-21 requirements.

A review of GASB 34’s role in asset management and accounting procedures was also conducted. Colorado initially adopted the modified approach under GASB 34, but later abandoned it in favor of depreciation under GASB 34 as noted in a 2008 Colorado panel report. As reported in Appendix A of Colorado’s Final Budget Allocation Plan for FY2017-2018, the January 2008 report concluded that CDOT “did not have adequate resources to maintain the state transportation system at the level of service sufficient to meet the needs of the citizens.”

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203 Cambridge Systematics, Inc. and Larry Redd, “CDOT’s Risk-Based Transportation Asset Management Plan.”
action on the part of the state legislature, such as Colorado Senate Bill 09-108, to directly confront funding deficits and address those deficits through innovative means.

Colorado developed a special transportation program in 2009 called the Colorado Bridge Enterprise (CBE). It originated under Colorado Senate Bill 09-108, also known as the Funding Advancement for Surface Transportation and Economic Recovery (FASTER). The CBE operates as a government-owned business within CDOT and the Colorado Transportation Commission serves as the CBE Board. The purpose of the CBE is to finance, repair, reconstruct and replace bridges designated as structurally deficient or functionally obsolete, and rated ‘poor’. In order to accomplish this goal, a bridge safety surcharge ranging from $13 to $32 dollars has been imposed on vehicle registration based upon vehicle weight. Revenues from the bridge safety surcharge fee are estimated to generate approximately $100 million dollars in annual funding. Since its inception, the CBE inducted 219 bridges, with the majority (181) occurring between 2009 and 2013 and an additional 38 added between 2014 and January 2018.

A review of CDOT funding reveals that the total Summary of CDOT Revenue Estimate for FY2017-2018 was $1,428,238,439. In the FY2017-2018 budget Federal Highway Revenue funds are by far the largest source of revenue at $677,885,300 million but those funds are designated for specific federal highway use only. The Highway Users Tax Fund is the primary source of state highway system funding in Colorado at $571,915,089 million, followed by Senate Bill 09-228 General Fund transfer at $79,000,000 million. Additional sources collectively account for the remaining $99,438,050.

### 5.5.3 Asset Management System

The asset management system that Colorado uses to administer 10 of its 11 asset classes is called CDOT Asset and Investment Management System (AIMS), which is built directly off the previously mentioned dTIMS by Deighton Associates Limited. The asset classes managed by dTIMS are Pavement, Bridge, Fleet Assets, Information Technology Systems, Traffic Signals, Tunnels, Culverts, Geohazards, Facilities/Buildings, and Walls. CDOT considers maintenance to be its remaining asset class and manages it separately through an internally developed system paired with elements from SAP called the Maintenance Management System (MMS). CDOT does this to account for its data collection and management in much the same way as it manages the other 10 asset classes. However, MMS better informs resource allocation and investment decisions that are largely based on the level of service performance metrics organized under MMS.

Two personnel were interviewed for Colorado. One focused on asset management and the other on financial accounting. During both interviews, it was clear that significant support exists for standards that sustain an asset management system designed to deliver the most efficient and effective outcome across the

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209 Shailen Bhatt, “Colorado Department of Transportation Final Budget Allocation Plan for Fiscal Year 2017-18.”
210 Ibid.
state for every dollar spent. Deighton’s system was selected because CDOT was looking for a better way to do business, and funding deficits for projects were causing CDOT to make difficult austerity decisions. The desire to achieve greater cost effectiveness drove CDOT to asset management and dTIMS. In the process of adopting Deighton, there was acknowledgment that Colorado was still a growing state with needs to include additional capacity, but asset managers were determined not to accept declining levels of service for existing infrastructure in favor of additional capacity projects. In addition to asset management, there was also a focus on expending resources based on a performance goal. CDOT recognized that they needed more data-driven and performance-driven tools to inform those goals and dTIMS provided those solutions. Approximately 22 DOTs use Deighton software. Interview respondents felt that dTIMS is functioning well but acknowledged that there are always areas for improvement, specifically in areas of process and optimization. CDOT models are currently driven off condition and dollar amount alone and do not include other, less tangible benefits, such as social benefits. Any time CDOT spends a dollar, they believe they are gaining positive externalities and CDOT wants to know how they use other goal areas within categories to best prioritize their investment strategy. According to the respondents, achieving the greatest cost effectiveness is not limited to just condition alone; it also includes those positive externalities.

**Bridges**

Colorado’s bridges are considered a single asset managed by CDOT, but there are two distinct classifications of bridge in the state. The first set fall into CDOT’s Bridge Preventative Maintenance Program and the second set fall into the CBE where construction and maintenance are not managed with CDOT funding. Both programs have been tasked in the 2013 Risk Based Asset Management Program to, among other items, maintain the percent of national highway and state highway system total bridge deck area that is not structurally deficient at or above 90 percent.²¹¹

CDOT’s Bridge Preventative Maintenance Program utilizes CDOT’s in-house developed system called MMS. Its stated goal is to “maintain an overall maintenance level of service of B- for the State highway system.”²¹² This program represents Colorado’s primary method of conducting maintenance operations on its bridges. If a bridge becomes structurally deficient or becomes too costly to maintain under the traditional maintenance program it is then transferred to the CBE for major refurbishment or replacement through its dedicated funding stream. However, once a bridge is transferred to the CBE there is no process currently in place for returning it to CDOT for maintenance management following its refurbishment/replacement. By law, it becomes a CBE asset.

**Roads**

The 2013 Risk Based Asset Management Program tasked CDOT to maintain its roads at 80 percent High/Moderate Drivability Life threshold for its Interstates, NHS and state highway system, based on condition standards and treatments set for traffic volume categories.²¹³ Drivability Life is represented in years as an indicator of how long a road or highway will have driving conditions that are acceptable. CDOT’s FY2017-2018 Performance Plan states, “Acceptable driving condition is a function of smoothness and safety, as determined by the amount of pavement cracking and depth of rutting. Pavement with High

²¹¹ Cambridge Systematics, Inc and Larry Redd, “CDOT’s Risk-Based Transportation Asset Management Plan.”
²¹² Ibid.
²¹³ Ibid.
Drivability Life is expected to have acceptable driving conditions for more than 10 years. Pavement with Moderate Drivability Life is expected to have four to 10 years of acceptable driving conditions. Pavement with Low Drivability Life is expected to have fewer than four years of acceptable driving conditions. CDOT’s centralized Pavement Management Program is responsible for collecting and reporting performance results for the Drivability Life metric. Drivability life is assessed based on several factors to include the IRI, rutting, transverse cracking, fatigue cracking for asphalt, corner breaks for concrete and longitudinal cracking.

CDOT’s Pavement Inventory and Condition are managed through dTIMS, but maintenance of that pavement such as patching and sealing holes and cracks occurs through CDOT’s MMS. Its goal is to “maintain an overall MLOS [Maintenance Level of Service] of B- for the State highway system.”

5.5.4 Accounting Method
Colorado initially adopted GASB 34’s modified approach with the intention of reporting annual maintenance and preservation costs to achieve greater transparency. However, the state reverted to straight-line depreciation beginning in FY2007-2008 because of what they determined to be severe funding shortfalls rendering them incapable of meeting their reporting goals under the modified approach. The respondents stated that, for asset management, Colorado uses a difference between current asset value and gross replacement cost. They look at the age, the quality of the features, inflation, etc. in contrast to depreciation, which can take an asset down to zero, and asset managers, would never value their infrastructure at zero. Current asset value, the respondents argue, factors in condition, obsolescence, and other factors like whether any improvements have been made to that asset, and at what cost. Gross replacement cost, by including the obsolescence factor in the equation for determining what CDOT thinks the value is, really determines that if CDOT were to build a particular asset over again it would not likely be a replacement in kind. It would be building toward current specifications and toward current driver need. The respondents stated that asset managers are not concerned with depreciation, but accountants are using GASB 34 depreciation because it is still a requirement they have to meet within CDOT.

5.5.5 CAFR Analysis
Colorado’s 2002 CAFR stated that the FY2001-2002 opened with a $61.6 million-dollar reduction in anticipated General Fund revenues setting a pattern of declining revenue expectations that continued throughout the year. By the end of the FY2002, the General Fund revenue estimates had been reduced by $1.02 billion due to the fact that national events had significantly affected the state’s revenues. Which provided the explanation as to why there was such a high percentage increase in depreciation between 2002 and 2003, and other notable increases in certain areas such as “Govt. Activity Depreciation Expense” at 40 percent. Table 13 provides an overall snapshot of capital asset financial data reported within Colorado’s
Deferred Infrastructure Maintenance and GASB 34  

May 2018

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CAFRs during 2002-2017, representing the total numbers that has been determined to be relevant to the report’s findings.

Table 13: Snapshot of Colorado CAFR Data

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Depreciable Capital Assets</th>
<th>Accumulated Depreciation</th>
<th>Total Capital Assets</th>
<th>Depreciable Infrastructure Total</th>
<th>Accumulated Depreciation Infrastructure</th>
<th>Net Depreciable Capital Assets Infrastructure</th>
<th>Net Total Infrastructure</th>
<th>Total Infrastructure</th>
<th>Total Depreciation Expense</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>$5,301,001</td>
<td>$2,262,939</td>
<td>$16,779,516</td>
<td>$3,010,001</td>
<td>(17,229)</td>
<td>$5,283,772</td>
<td>$16,762,286</td>
<td>$16,779,516</td>
<td>$205,992</td>
</tr>
<tr>
<td>2003</td>
<td>$5,889,154</td>
<td>$2,437,523</td>
<td>$17,442,089</td>
<td>$5,889,144</td>
<td>(13,910)</td>
<td>$5,875,234</td>
<td>$17,428,169</td>
<td>$17,442,079</td>
<td>$265,326</td>
</tr>
<tr>
<td>2004</td>
<td>$6,444,979</td>
<td>$2,612,930</td>
<td>$18,399,688</td>
<td>$6,444,979</td>
<td>(14,904)</td>
<td>$6,430,075</td>
<td>$18,384,784</td>
<td>$18,399,888</td>
<td>$268,962</td>
</tr>
<tr>
<td>2005</td>
<td>$6,923,442</td>
<td>$2,784,707</td>
<td>$19,393,588</td>
<td>$6,923,442</td>
<td>(35,240)</td>
<td>$6,888,207</td>
<td>$19,004,348</td>
<td>$19,393,588</td>
<td>$295,418</td>
</tr>
<tr>
<td>2006</td>
<td>$7,150,892</td>
<td>$3,110,112</td>
<td>$19,392,209</td>
<td>$7,150,892</td>
<td>(67,221)</td>
<td>$7,093,671</td>
<td>$19,304,988</td>
<td>$19,362,209</td>
<td>$314,961</td>
</tr>
<tr>
<td>2007</td>
<td>$7,509,851</td>
<td>$3,369,851</td>
<td>$20,145,008</td>
<td>$7,509,851</td>
<td>(62,710)</td>
<td>$7,447,141</td>
<td>$20,082,298</td>
<td>$20,145,008</td>
<td>$329,861</td>
</tr>
<tr>
<td>2008</td>
<td>$9,415,152</td>
<td>$3,667,528</td>
<td>$20,283,157</td>
<td>$9,415,152</td>
<td>(86,621)</td>
<td>$9,328,531</td>
<td>$20,016,536</td>
<td>$20,283,157</td>
<td>$368,665</td>
</tr>
<tr>
<td>2009</td>
<td>$9,902,123</td>
<td>$3,947,704</td>
<td>$21,510,804</td>
<td>$9,902,123</td>
<td>(99,241)</td>
<td>$9,802,882</td>
<td>$21,211,563</td>
<td>$21,510,804</td>
<td>$364,437</td>
</tr>
<tr>
<td>2010</td>
<td>$18,708,376</td>
<td>$5,105,689</td>
<td>$21,562,648</td>
<td>$9,333,485</td>
<td>(969,814)</td>
<td>$8,363,671</td>
<td>$9,224,675</td>
<td>$10,194,489</td>
<td>$1,238,777</td>
</tr>
<tr>
<td>2011</td>
<td>$13,212,727</td>
<td>$6,155,855</td>
<td>$19,392,216</td>
<td>$9,490,714</td>
<td>(1,884,904)</td>
<td>$7,605,810</td>
<td>$8,687,398</td>
<td>$10,372,302</td>
<td>$1,122,041</td>
</tr>
<tr>
<td>2012</td>
<td>$22,007,839</td>
<td>$7,156,067</td>
<td>$24,930,999</td>
<td>$10,263,684</td>
<td>(2,302,721)</td>
<td>$7,960,963</td>
<td>$8,861,620</td>
<td>$11,164,341</td>
<td>$1,669,365</td>
</tr>
<tr>
<td>2013</td>
<td>$22,860,047</td>
<td>$8,084,023</td>
<td>$26,960,577</td>
<td>$10,566,546</td>
<td>(2,871,623)</td>
<td>$7,694,923</td>
<td>$8,624,978</td>
<td>$11,496,601</td>
<td>$1,920,063</td>
</tr>
<tr>
<td>2014</td>
<td>$24,503,031</td>
<td>$9,025,910</td>
<td>$27,505,065</td>
<td>$11,065,303</td>
<td>(3,356,965)</td>
<td>$7,708,338</td>
<td>$8,657,900</td>
<td>$12,014,856</td>
<td>$2,020,063</td>
</tr>
<tr>
<td>2016</td>
<td>$27,712,997</td>
<td>$10,653,593</td>
<td>$31,217,348</td>
<td>$12,278,914</td>
<td>(4,159,178)</td>
<td>$8,119,736</td>
<td>$9,121,300</td>
<td>$13,280,478</td>
<td>$982,038</td>
</tr>
<tr>
<td>2017</td>
<td>$29,103,027</td>
<td>$11,562,380</td>
<td>$33,086,627</td>
<td>$12,668,429</td>
<td>(4,525,742)</td>
<td>$8,142,687</td>
<td>$9,178,248</td>
<td>$13,703,990</td>
<td>$1,447,100</td>
</tr>
</tbody>
</table>

Note: Figures on table are in the thousands

Infrastructure

The range of estimated useful life of infrastructure assets reported in the CAFRs is between 20-75 years. The initial capital thresholds for infrastructure reporting are assets that have a cost or value greater than $50,000 dollars (buildings) and $500,000 dollars (infrastructure). Colorado uses the “Straight Line Approach” for the depreciation method, as this is the most common approach for depreciation due to the simplicity of its nature and using this method allows assets to depreciate consistently during their lifespan.

The depreciable amount is the total cost of construction minus the salvage value (which is the amount it is worth at the end of its lifecycle). The straight-line method equals depreciable amount divided by useful life. However, it was reported by the CDOT representative that Colorado does not utilize “salvage value” reporting. While depreciation is considered an acceptable method of accounting, CDOT does not find it particularly useful for asset management purposes in that they do not believe any of their assets would ever be worth zero and that assets should never reach the point of salvage value.

The total amount of depreciable infrastructure increased on average at 6 percent from 2002 to 2017, with the greatest increase between the years of 2006 and 2007 at 25 percent. Colorado 2006 CAFR reported the current year decline in the amount indicates that current year depreciation exceeded the liquidation of borrowing related to the capital assets, which means the state is not paying off the borrowing for capital assets at the rate at which the capital assets are declining in service utility. The total amount of depreciable

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218 Authors’ Compilation of Colorado CAFR Data.

infrastructure increased on average at 22 percent from 2002 to 2017, with the greatest increase between the years of 2009 to 2010 at 240 percent. However, this is primarily due to the change from the modified to the traditional approach, as discussed above. Another notable increase is between 2016 and 2017, at 47 percent. The increase in total depreciation expense and percentage change by year can been seen in Figure 14.

Figure 14: Colorado Total Depreciation Expense and Percent Change

Roads
Beginning in 1998, Colorado used Remaining Service Life for the state’s Road Measurement Scale until 2009, when they switched back to the traditional approach and roads were no longer reported. Remaining Service Life is a representation, in years, of functional and structural performance of the roadway pavement. Colorado defines Remaining Service Life in Table 14.

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220 Authors’ Compilation of Colorado CAFR Data.
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Table 14: Colorado Remaining Service Life Measurement

<table>
<thead>
<tr>
<th>Condition</th>
<th>Bituminous Surface</th>
<th>Concrete Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 or more years = Good</td>
<td>No distress or some indication of initial distress, but no appreciable maintenance is required. Distress items include low or a small amount of moderate severity cracking such as transverse, longitudinal, or fatigue. Slight rutting in the wheel paths.</td>
<td>No distress or some indication of initial distress, but no appreciable maintenance is required. Distress items include low or a small amount of moderate severity cracking such as transverse or longitudinal or slight corner breaks.</td>
</tr>
<tr>
<td>6 to 10 years = Fair</td>
<td>Initial distresses are apparent requiring routine maintenance. Distress items include moderate and some high severity cracking such as transverse, longitudinal, or fatigue. Moderate rutting in the wheel paths.</td>
<td>Initial distresses are apparent requiring sealing. Distress items include moderate and some high severity cracking such as transverse or longitudinal or moderate corner breaks.</td>
</tr>
<tr>
<td>0 to 5 years = Poor</td>
<td>Excessive distresses requiring high maintenance or major rehabilitation treatments. Distress items include a large amount of moderate to high severity cracking such as transverse, longitudinal, or fatigue. Moderate to severe rutting in the wheel paths.</td>
<td>Excessive distresses requiring high maintenance or slab replacement. Distress items include a large amount of moderate to high severity transverse or longitudinal cracking or moderate to severe corner breaks.</td>
</tr>
</tbody>
</table>

From 2002 to 2005, Colorado required that 60 percent of roadways receive ratings of “good” or “fair” and the Road Target Condition be 100 percent. However, during this period, the Road Actual Condition was consistently higher each year and had an average of 61 percent. In 2008, Colorado requirements changed and setting a goal that 63 percent of roadways must receive ratings of “good” or “fair”. After the roadway requirement by the state was changed to 63 percent, the Road Actual Value decreased to 53 percent in the same year and maintained an average of 54 percent until in 2013. When the data for condition of roads was no longer reported and CDOT ended their reporting with road conditions being 79 percent, up 32 percent from 2012 reporting. In 2013, Colorado changed the way its pavement was measured and moved to a new standard driven by Drivability Life, which identifies how long a pavement will last until the user experience becomes unacceptable. In 2013, the statewide pavement condition was rated as 82 percent (High/Moderate).223

Bridges

As of 2002, CDOT utilized PONTIS and the NBI to monitor the condition of the 3,699 bridges (as of 2002) under its authority. The inventory rates bridges including the deck, superstructure, and substructure, using a 10-point scale as follows in Table 15.224 CDOT continued to utilize this rating structure until 2007. In 2008 the condition rating and description was changed and is reflected in Table 16. In 2009, before the switch back to the traditional approach, Colorado reported that 3,800 bridges were utilizing the PONTIS and NBI methods.

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222 Ibid.
For historical data purposes, the state of Colorado continued to report road and bridge condition data until 2013 (roads) and 2014 (bridges) which is reflected in Table 17. According to the 2014 Colorado CAFR in 2013, CDOT changed the overall metric for assessing bridges due to MAP-21 requirements. The focus is now on structurally deficient bridges. In 2013, CDOT reported that 5.9 percent of their state-owned bridges were structurally deficient, and that 5.5 percent were in “poor condition,” for a total of 11.4 percent poor or structurally deficient bridges. According to the ASCE Infrastructure Report, during the same year Colorado received $138,208,228 dollars for bridge funding which made an impact on bridges in 2014 with nearly a 2 percent gain in value. Roads gained a notable 32 percent in value between 2012 and 2013 as well.

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Table 15: PONTIS and NBI Condition Rating (2002 – 2007)\(^{225}\)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Excellent</td>
</tr>
<tr>
<td>8</td>
<td>Very Good</td>
</tr>
<tr>
<td>7</td>
<td>Good. Some minor problems.</td>
</tr>
<tr>
<td>6</td>
<td>Satisfactory. Structural elements show some minor deterioration.</td>
</tr>
<tr>
<td>5</td>
<td>Fair. All primary structural element are sound but may have minor section loss, cracking, spalling or scour.</td>
</tr>
<tr>
<td>4</td>
<td>Poor. Advanced section loss, deterioration, spalling, or scour.</td>
</tr>
<tr>
<td>3</td>
<td>Serious. Loss of section, deterioration, spalling, or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.</td>
</tr>
<tr>
<td>2</td>
<td>Critical. Advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close bridge until corrective action is taken.</td>
</tr>
<tr>
<td>1</td>
<td>Imminent failure. Major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic, but corrective action may put it back in light service.</td>
</tr>
<tr>
<td>0</td>
<td>Failure. Out of service; beyond corrective action.</td>
</tr>
</tbody>
</table>

Table 16: PONTIS and NBI Condition Rating (2008-2010)\(^{226}\)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td>Sufficiency rating less than 50 and status of structurally deficient or functionally obsolete. Bridges in Poor condition do not meet all safety and geometry standards and require reactive maintenance to ensure safe service. For the purpose of determining bridge-funding needs it is assumed that bridges in Poor condition have exceeded their economically viable service life and require replacement.</td>
</tr>
<tr>
<td>Fair</td>
<td>Sufficiency rating between 50 and 60 and status of structurally deficient or functionally obsolete. Bridges in Fair condition require preventative maintenance and either marginally satisfy safety and geometry standards or require rehabilitation.</td>
</tr>
<tr>
<td>Good</td>
<td>All remaining major bridges that do not meet the criteria for Poor or Fair classification. Bridges in Good condition typically adequately meet all safety and geometry standards and typically do not require maintenance.</td>
</tr>
</tbody>
</table>

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\(^{225}\)Ibid.

Table 17: Colorado’s Road and Bridge Target and Actual Conditions\textsuperscript{227}

<table>
<thead>
<tr>
<th>Year</th>
<th>Road Actual Value</th>
<th>Road Target Con.</th>
<th>Bridge Actual Value</th>
<th>Bridge Target Con.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>58%</td>
<td>100%</td>
<td>93.40%</td>
<td>100%</td>
</tr>
<tr>
<td>2003</td>
<td>58%</td>
<td>100%</td>
<td>93.70%</td>
<td>100%</td>
</tr>
<tr>
<td>2004</td>
<td>61%</td>
<td>100%</td>
<td>93.50%</td>
<td>100%</td>
</tr>
<tr>
<td>2005</td>
<td>65%</td>
<td>100%</td>
<td>93.80%</td>
<td>100%</td>
</tr>
<tr>
<td>2006</td>
<td>63%</td>
<td>100%</td>
<td>93.40%</td>
<td>100%</td>
</tr>
<tr>
<td>2007</td>
<td>59%</td>
<td>100%</td>
<td>94.75%</td>
<td>100%</td>
</tr>
<tr>
<td>2008</td>
<td>53%</td>
<td>100%</td>
<td>94.29%</td>
<td>100%</td>
</tr>
<tr>
<td>2009</td>
<td>50%</td>
<td>100%</td>
<td>94.38%</td>
<td>100%</td>
</tr>
<tr>
<td>2010</td>
<td>48%</td>
<td>100%</td>
<td>94.38%</td>
<td>100%</td>
</tr>
<tr>
<td>2011</td>
<td>48%</td>
<td>100%</td>
<td>94.52%</td>
<td>100%</td>
</tr>
<tr>
<td>2012</td>
<td>47%</td>
<td>100%</td>
<td>94.47%</td>
<td>100%</td>
</tr>
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<td>100%</td>
</tr>
<tr>
<td>2014</td>
<td>N/A</td>
<td>N/A</td>
<td>96.40%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Figure 15: Chart of Colorado’s Road and Bridge Target Verses Actual Conditions\textsuperscript{228}

\textsuperscript{227} Authors’ Compilation of Colorado CAFR Data.

\textsuperscript{228} Ibid.
Case Studies

**Maintenance**

Colorado reported their annual maintenance and preservation costs under the modified approach between 2002 and 2009, which means that they are reported rather than depreciated. The Colorado Transportation Commission determines the condition levels the state’s infrastructure must be maintained (Figure 15). Bridges were taken off the modified accrual approach in FY2007-2008 according to the 2009 Colorado CAFR. However, prior to FY2006-2007, CDOT did not report projections, but instead, reported budgeted amounts as a surrogate for the cost to maintain. Because of the “multiple year nature of the infrastructure budgets, it was determined that the department’s projections of costs are a better basis for the comparison of estimated and actual costs to maintain.” When Colorado reports their maintenance funding, it is for the maintenance and improvement of the existing infrastructure of the next 20-year span. Figure 16 estimated maintenance cost, actual maintenance cost, and the difference between estimated and actual costs.

![Figure 16: Chart of Estimated, and Actual Maintenance Cost, and Difference](image)

**Findings/Conclusions**

Based on the interviews conducted support exists for standards. However, those same officials believe that standards must be designed in such a way to inform and guide financial decisions in addition to sound engineering practices. The respondents believe that guidelines and standards should go beyond accounting for money previously spent and look to advise planners on where money would best be invested in the future to achieve the greatest good. The officials acknowledged the difficulty in doing this in a fiscally constrained environment where dedicated funding streams are often non-existent, and budgeting can therefore be unpredictable.

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230 Ibid.

231 Authors’ Compilation of Colorado CAFR Data.
As previously noted, on pages 38 and 39 of Colorado’s June 30, 2009 CAFR it states when and why Colorado chose to break from the modified approach and follow GASB 34’s depreciation method: Based on the estimates, Colorado previously reported bridge and roadway infrastructure owned and maintained by CDOT under the modified approach. Beginning in FY2007-2008, CDOT reported that available resources were no longer adequate to maintain Colorado’s bridges at the Commission established condition levels as required by the modified approach. Therefore, the department began reporting depreciation of its bridges in FY2007-2008. Beginning in FY2009-2010, CDOT reported that due to several years of decreases due to General Fund diversions and transfers, available resources were no longer adequate to maintain the State’s roadways at the Commission established condition levels as required by the modified approach. Therefore, the department began reporting depreciation of its roadways in FY2009-2010. It was during this same period that Colorado initiated the CBE under Senate Bill 09-108 to adjust for CDOT fiscal shortfalls in addressing critical bridge infrastructure safety.

As previously noted those shortfalls were formally acknowledged in a January 2008 panel report. In Appendix A of Colorado’s Final Budget Allocation Plan for FY2017-2018 it states that the General Assembly Enacted Senate Bill 09-108 in response to the January 2008 report, and that the Senate Bill authorized additional revenue sources for local and state transportation systems to reverse those shortfalls. These official statements account for the reason and rationale for CDOT’s switch to depreciation, and during the conduct of our interviews both respondents confirmed that CDOT is still using depreciation under GASB 34 to comply with approved methods and procedures for accounting. However, the lack of utility of depreciated accounting information in asset management was strongly commented on by both respondents. The respondents could not envision an instance where they would move back to the Modified Approach, stating that staying above the required ratio of good/fair rated roads and bridges was difficult to maintain.

In its 2017 Infrastructure Report, the ASCE stated, “Dedicated public funding sources on the local, state, and federal levels need to be consistently and sufficiently funded from user-generated fees, with infrastructure trust funds never used to pay for or offset other parts of a budget.”232 As described, the CBE is a program aligned with the ASCE’s current recommendations in the sense that it provides dedicated funding that is not subject to competing interests in the state budget.

The approach described within Asset Valuation of Transportation Infrastructure: Proof of Concept in Colorado includes a process for estimating the current monetary value of the agency’s assets and as a result provides useful, effective capabilities for asset, risk, and performance management. These capabilities support robust investment decisions and cross-asset trade-off analyses, with improved savings over the long-term, and they enable better evaluations of risk and resilience options. This approach to asset valuation informs economic analysis of highway system/investments, shows good stewardship of public assets, and justifies additional investment in assets.233 Also provided in the report is the recommended method from

Any understanding of Colorado’s asset management system should include a review of this concept paper.

5.6 TEXAS

5.6.1 Background
The State of Texas is located in the southwest United States. Texas is the second largest state in the U.S., containing 261,797 square miles of land and 6,687 square miles of water. It was recognized as The Republic of Texas in 1837, and it became 28th state in 1845. Bordering Mexico to the south, Louisiana to the east, Arkansas and Oklahoma to the North and New Mexico to the west, Texas is comprised of 254 counties, the most of any state, and a growing population of 28,304,596. It has over 80,483.391 miles of roads within the state. In addition, the state has over 53,875 bridges and 82 percent of Texas’ bridges are rated “good or better”. The 2017 ASCE Infrastructure Report assigns the grade of C- for the Texas’ overall infrastructure, which is above the national grade of D+. Texas roadways received a grade of D and bridges earned a grade of B. The Infrastructure Report states, “Texas is leading the way in wind power energy production, population growth and some of the largest infrastructure that has an ever increasing need for improvement…several of [Texas’] infrastructure categories show areas of satisfactory performance, the clear majority indicate that Texas infrastructure lacks funding, proper maintenance, and is poorly equipped to deal with environmental change as Texas continues to grow.”

5.6.2 Literature Review
According to a 2004 report issued by the Transportation Research Board, Texas chose to adopt the modified approach for financial reporting of most of its infrastructure assets but selected the traditional approach of depreciation for the state’s bridges. Texas chose the traditional depreciation approach for bridges because bridges have a more definable lifecycle than highways, and better fit the depreciation model. The Transportation Research Board report also states that the depreciation method was chosen for bridges because the in-house accounting software did not have the functionality to allow the modified approach to

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235 Ibid.
236 Ibid.
241 Ibid.
243 Ibid, 19.
An official at the Texas Department of Transportation (TxDOT) commented that it has undertaken significant efforts to put the GASB 34 in place through the modified and depreciation approach, but has seen little benefit for the state other than compliance with the GASB 34 requirement. The report further states that TxDOT has seen little interest in the results of implementation of the GASB 34 requirements. TxDOT stated that the “2002 CAFR shows an increase in maintenance expenditures for interstate highways, as compared with the estimate, but a reduction in the overall condition assessment. No one questioned this disparity.”

In a second study, Vermeer, Patton, and Styles examined the reporting of assets under GASB 34, due to a concern of whether “governments are meeting the requirements of the modified approach and whether the useful lives adopted for depreciation accounting are consistent with the physical lives of these assets.” Only Texas, Nebraska, and Idaho used the modified approach for roadways only. The researchers looked at whether states which use the depreciation method and also gather information needed for a modified approach, as Texas does for its bridges, provide that information. The study pointed out that although GASB 34 does not require states to disclose the information, none of the 29 governments that use depreciation accounting, including Texas, provide this information. The concern suggested by the study is “that either these governments choose not to disclose the information or do not have the information readily available to make the modified approach disclosures”. The result of the study showed “significant variation in the methods governments use to assess the condition of their bridges”, and that since Texas does not use a modified approach and does not disclose the information gathered in its reporting, it could not be examined under the study. This study illuminates the need for disclosure of information and data on the condition of bridges in Texas for evaluating the real life of the asset for both safety and financial market evaluation. Indeed, there were consistencies found in the current study which raise concerns about the reliability of making cross sectional or longitudinal comparisons. Thus, to support the federal funding mandate, and to support maintaining roads and bridges at a minimum safety threshold established by DOT, increased reporting of existing data is recommended.

The third study reviewed is the 2017 report card for Texas’ infrastructure conducted by the Texas Section of the American Society of Civil Engineers. The report indicates that Texas is geographically the largest continental state, and is an “economic powerhouse for the United States”, playing a national leadership role in wind power energy production, population growth, and yet it has one of the largest collection of infrastructure that has an “ever-increasing need for improvement”. The study gave Texas an overall grade

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244 Ibid, 33.
245 Ibid, 33.
246 Ibid, 33.
248 Ibid, 394.
249 Ibid.
250 Ibid.
251 Ibid, 399.
252 American Society of Civil Engineers, “Texas Infrastructure Report Card 2017.”
of “C-”, which represents a drop from the previous 2012 score of a “C”. Interestingly, the area in which Texas uses the modified approach, highways received a score of “D”, while its score for bridges for which is uses a depreciation method received a score of “B”. Texas has over 53,000 bridges for which 18 percent of them are considered to be rated as “insufficient”. The study included several recommendations for Texas’ bridges, one of which is consistent with the previous studies’ finding of missing data, e.g. Texas “should consider the costs associated with the infrastructure’s entire lifecycle to prioritize maintenance and rehabilitation”.

One important conclusion drawn from the literature review, which is illuminated by the study conducted by Plummer, Hutchison, and Patton, reveals that governments that adopted the modified approach provide more meaningful information because “the modified approach answers the basic question of whether assets are being maintained or allowed to deteriorate, and there is no need to report depreciation expense, especially since infrastructure assets are generally not disposed of”. Likewise, the study concluded that “governments that adopt the modified approach have a statistically smaller percentage of structurally deficient bridges (6 percent versus 11 percent), suggesting that governments that maintain their bridges at or above a reasonable condition level choose to use the modified approach”. The literature review was conducted to understand how states such as Texas were reporting their assets, and why the states chose the approach being used. The concerns highlighted in the literature review supported the questions for the interviews conducted for this study. Particularly, why did Texas choose to adopt a combination approach in which bridges were depreciated and roads were reported using the modified approach? Texas switched to a depreciation reporting method for roads and bridges in 2014. The interview revealed that the decision was based in part on the availability of the current software which raises the concern of administrative convenience.

5.6.3 Asset Management System
TxDOT utilizes Peoplesoft’s Asset Management Module system, developed by Oracle. Texas' asset management system was purchased “off the shelf” and the Asset Management Module was modified to meet the business needs of TxDOT. The transportation infrastructure assets reported are land, construction in progress, easements, buildings, highways, vehicles, equipment, leaseholds, and software. TxDOT is satisfied with the current design of the system, but noted that there is always room for improvement. The management system allows TXDOT some flexibility, e.g., permitting them to initiate procedure changes as necessary.

5.6.4 Accounting Method
Information obtained in the interviews conducted confirms that Texas is currently utilizing the traditional method of depreciation for financial reporting for all the state’s infrastructure assets. The traditional method uses straight-line depreciation for assets unlike the modified approach. From what we have come across in

253 Ibid, 5.
254 Ibid, 8.
255 Ibid, 17.
256 Ibid, 19.
258 Ibid, 395.
the Texas CAFR, the state has always used depreciation for bridges, but used the modified approach for highways until Fiscal Year 2014. Information obtained during the interviews conducted in this matter revealed that at the time, TxDOT conducted a survey of other states’ reporting methods through the National Association of State Auditors, Comptrollers and Treasurers and discovered it was one of the few states to use a hybrid approach for reporting infrastructure assets. When TxDOT considered switching to the traditional approach for both roads and bridges, they received input from the State Auditor’s office, State Comptroller’s office, and financial reporting staff members from other states.

In FY2014, TxDOT decided to switch to depreciation for both bridges and highways. The traditional method assists TxDOT with streamlining their capital asset financial reporting since bridges and highways can now be reported under a single asset type instead of accounting for them separately. The Texas State Comptroller’s Office produces the state’s CAFRs and sets the capitalization thresholds for major classes of assets. TxDOT is required to use these thresholds, which are $500,000 for infrastructure capital assets and $100,000 for temporary easements. Land, permanent easements, and construction in progress do not have capitalization thresholds and are treated as non-depreciable capital assets. GASB 34 does not set capitalization thresholds; the amounts previously mentioned were deemed material by the State of Texas.

5.6.5 CAFR Analysis
As indicated on page 109 in the 2002 CAFR, TxDOT performs, “visual inspections [which] are conducted on approximately 10 percent of the Interstate system and 5 percent of the Non-Interstate system.” Non-Interstate roads as defined by Texas in the 2002 CAFR are U.S. Routes, State Routes, and Farm-to-Market roads. There is no measurement table for bridges because Texas never fully committed to the modified approach and opted only to apply it to roadways. This decision not to fully commit made it easier for Texas to revert to the traditional approach in FY2014. Unfortunately, Texas does not provide an explicit reason in the 2014 CAFR as to why the state left the modified approach. According to the 2014 CAFR, Texas is using the composite approach as a form of depreciation which “[calculates] depreciation of dissimilar assets of the same class (all the roads and bridges of the state) using the same depreciation rate.”

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260 Ibid.
Table 18: Snapshot of Texas CAFR Data

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Depreciable Capital Assets</th>
<th>Accumulated Depreciation</th>
<th>Total Capital Assets</th>
<th>Depreciable Infrastructure</th>
<th>Accumulated Depreciation Infrastructure</th>
<th>Net Depreciable Capital Assets Infrastructure</th>
<th>Net Total Infrastructure</th>
<th>Total Infrastructure</th>
<th>Total Depreciation Expense</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>$32,624,057</td>
<td>($17,144,589)</td>
<td>$79,657,938</td>
<td>$13,594,089</td>
<td>($7,266,490)</td>
<td>$6,329,599</td>
<td>$39,551,878</td>
<td>$46,816,884</td>
<td>$1,223,767</td>
</tr>
<tr>
<td>2003</td>
<td>$34,630,006</td>
<td>($18,160,307)</td>
<td>$81,023,447</td>
<td>$14,440,584</td>
<td>($7,312,185)</td>
<td>$6,920,759</td>
<td>$41,017,698</td>
<td>$48,530,083</td>
<td>$1,510,387</td>
</tr>
<tr>
<td>2004</td>
<td>$36,990,788</td>
<td>($19,902,181)</td>
<td>$85,993,132</td>
<td>$15,043,293</td>
<td>($7,599,792)</td>
<td>$7,443,411</td>
<td>$47,539,236</td>
<td>$50,596,008</td>
<td>$1,975,771</td>
</tr>
<tr>
<td>2005</td>
<td>$40,694,863</td>
<td>($21,062,744)</td>
<td>$91,785,948</td>
<td>$15,722,791</td>
<td>($8,465,023)</td>
<td>$7,261,768</td>
<td>$44,412,123</td>
<td>$52,879,146</td>
<td>$1,552,092</td>
</tr>
<tr>
<td>2006</td>
<td>$43,162,912</td>
<td>($22,430,144)</td>
<td>$97,822,097</td>
<td>$16,357,565</td>
<td>($8,950,855)</td>
<td>$7,406,710</td>
<td>$51,372,242</td>
<td>$60,223,880</td>
<td>$1,676,237</td>
</tr>
<tr>
<td>2007</td>
<td>$45,876,521</td>
<td>($23,908,513)</td>
<td>$104,193,030</td>
<td>$17,170,146</td>
<td>($9,466,281)</td>
<td>$7,707,865</td>
<td>$50,797,144</td>
<td>$70,972,042</td>
<td>$1,790,954</td>
</tr>
<tr>
<td>2008</td>
<td>$48,015,153</td>
<td>($25,400,850)</td>
<td>$110,416,995</td>
<td>$17,909,972</td>
<td>($9,953,200)</td>
<td>$7,956,775</td>
<td>$53,460,795</td>
<td>$63,693,312</td>
<td>$1,904,532</td>
</tr>
<tr>
<td>2009</td>
<td>$52,415,814</td>
<td>($27,298,147)</td>
<td>$117,786,935</td>
<td>$19,755,314</td>
<td>($10,703,742)</td>
<td>$9,054,072</td>
<td>$56,536,668</td>
<td>$67,237,310</td>
<td>$2,061,251</td>
</tr>
<tr>
<td>2010</td>
<td>$54,342,938</td>
<td>($28,778,075)</td>
<td>$121,803,872</td>
<td>$20,276,857</td>
<td>($11,160,877)</td>
<td>$9,155,980</td>
<td>$58,089,029</td>
<td>$70,059,906</td>
<td>$2,204,894</td>
</tr>
<tr>
<td>2011</td>
<td>$58,499,957</td>
<td>($30,250,203)</td>
<td>$128,754,369</td>
<td>$21,142,092</td>
<td>($11,823,811)</td>
<td>$9,318,281</td>
<td>$60,971,128</td>
<td>$72,594,939</td>
<td>$2,429,623</td>
</tr>
<tr>
<td>2012</td>
<td>$62,462,780</td>
<td>($32,872,860)</td>
<td>$134,335,640</td>
<td>$22,017,483</td>
<td>($12,474,283)</td>
<td>$9,543,198</td>
<td>$61,824,027</td>
<td>$74,326,596</td>
<td>$2,655,496</td>
</tr>
<tr>
<td>2013</td>
<td>$65,712,481</td>
<td>($35,573,626)</td>
<td>$141,285,907</td>
<td>$23,032,588</td>
<td>($13,135,212)</td>
<td>$9,807,372</td>
<td>$65,367,040</td>
<td>$78,502,252</td>
<td>$2,810,632</td>
</tr>
<tr>
<td>2014</td>
<td>$124,496,425</td>
<td>($77,723,230)</td>
<td>$200,079,676</td>
<td>$80,050,075</td>
<td>($14,768,488)</td>
<td>$65,282,187</td>
<td>$80,051,273</td>
<td>$82,816,783</td>
<td>$3,884,492</td>
</tr>
<tr>
<td>2015</td>
<td>$130,254,605</td>
<td>($81,094,564)</td>
<td>$211,349,169</td>
<td>$82,814,235</td>
<td>($16,348,760)</td>
<td>$66,465,531</td>
<td>$86,645,679</td>
<td>$82,816,783</td>
<td>$3,884,492</td>
</tr>
<tr>
<td>2016</td>
<td>$139,695,137</td>
<td>($85,601,277)</td>
<td>$217,860,311</td>
<td>$89,092,700</td>
<td>($18,027,333)</td>
<td>$71,065,167</td>
<td>$71,065,798</td>
<td>$89,093,836</td>
<td>$4,097,101</td>
</tr>
<tr>
<td>2017</td>
<td>$147,202,340</td>
<td>($88,393,962)</td>
<td>$219,103,059</td>
<td>$93,311,276</td>
<td>($29,063,333)</td>
<td>$74,040,928</td>
<td>$74,040,928</td>
<td>$93,311,312</td>
<td>$4,096,621</td>
</tr>
</tbody>
</table>

Note: Figures on table are in the thousands.

As seen in Table 18 and Figure 17, depreciation expenses increased by $1 billion between FY2013 and FY2014. Another notable change is that in FY2014 the depreciable capital assets for infrastructure increased by approximately $55.4 billion which fully encompasses the increase in the total depreciable capital assets overall. One concerning issue in 2014 is that the depreciable capital assets for infrastructure rose by approximately 560 percent and the accumulated depreciation for infrastructure minimally increased by 12 percent. This low value for accumulated depreciation may lead to the conclusion of why the depreciation expense for Texas in FY2014 only rose by 34 percent and not by a larger amount.

262 Authors’ Compilation of Texas CAFR Data.
Texas’ depreciation expense changes year over year is steady, at approximately 5-15 percent each year with an overall average of 9 percent (Figure 17). The only year Texas was outside of this range was in 2014 where the depreciation expense increased by 36 percent. This abnormality is attributed to the switch from the modified approach to the traditional depreciation approach. Compared with Colorado’s experience of switching to the traditional approach in which the depreciation expense increased by 240 percent, Texas’ decision to depreciate bridges allowed the increase to be minimal.

Roads
Texas is one of the more complex states when it comes to the modified approach with respect to roadways. The state initially divided their data into two categories, Interstate and Non-Interstate, and then later added the Central Texas Turnpike System, which opened in 2008. Each of these breakdowns has their own target and actual condition level. As stated earlier, Texas only inspects 10 percent of Interstate roadways, 5 percent of Non-Interstate roadways, and starting in 2012, 20 percent of the Central Texas Turnpike System in a given year. Therefore, values may be skewed based on which portion of the network is being inspected. When looking at both Table 19 and Figure 18 it is important to note that Texas never dropped below the Road Target Condition for any given category. It is an interesting correlation that the state no

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263 Authors’ Compilation of Texas CAFR Data.

Deferred Infrastructure Maintenance and GASB 34 May 2018 72
longer utilized the modified approach after 2013 when the Interstate Road Actual Value was in jeopardy of going below the Interstate Road Target Condition.\textsuperscript{266} When switching from the modified approach to the traditional approach, Texas no longer reported road conditions.

Table 19: Texas’s Road Target and Actual Conditions\textsuperscript{267}

<table>
<thead>
<tr>
<th>Year</th>
<th>Road Actual Condition Interstate</th>
<th>Road Target Interstate</th>
<th>Road Actual Condition Non-Interstate</th>
<th>Road Target Non-Interstate</th>
<th>Road Actual Condition Turnpike</th>
<th>Road Target Condition Turnpike</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>82.5%</td>
<td>80.0%</td>
<td>78.7%</td>
<td>75.0%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2003</td>
<td>81.3%</td>
<td>80.0%</td>
<td>78.5%</td>
<td>75.0%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2004</td>
<td>82.3%</td>
<td>80.0%</td>
<td>79.1%</td>
<td>75.0%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2005</td>
<td>82.1%</td>
<td>80.0%</td>
<td>77.9%</td>
<td>75.0%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2006</td>
<td>83.4%</td>
<td>80.0%</td>
<td>78.0%</td>
<td>75.0%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2007</td>
<td>84.1%</td>
<td>80.0%</td>
<td>79.5%</td>
<td>75.0%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2008</td>
<td>83.7%</td>
<td>80.0%</td>
<td>79.0%</td>
<td>75.0%</td>
<td>91.7%</td>
<td>80.0%</td>
</tr>
<tr>
<td>2009</td>
<td>81.4%</td>
<td>80.0%</td>
<td>76.5%</td>
<td>75.0%</td>
<td>90.5%</td>
<td>80.0%</td>
</tr>
<tr>
<td>2010</td>
<td>83.6%</td>
<td>80.0%</td>
<td>77.9%</td>
<td>75.0%</td>
<td>87.9%</td>
<td>80.0%</td>
</tr>
<tr>
<td>2011</td>
<td>83.0%</td>
<td>80.0%</td>
<td>78.5%</td>
<td>75.0%</td>
<td>89.9%</td>
<td>80.0%</td>
</tr>
<tr>
<td>2012</td>
<td>82.0%</td>
<td>80.0%</td>
<td>77.7%</td>
<td>75.0%</td>
<td>86.2%</td>
<td>80.0%</td>
</tr>
<tr>
<td>2013</td>
<td>80.3%</td>
<td>80.0%</td>
<td>77.4%</td>
<td>75.0%</td>
<td>85.1%</td>
<td>80.0%</td>
</tr>
</tbody>
</table>


\textsuperscript{267} Authors’ Compilation of Texas CAFR Data.
**Maintenance**

Similar to Colorado, Texas reports their annual maintenance costs as required by the modified approach, but splits it into three categories: Interstate, Non-Interstate, and the Central Texas Turnpike System. For the sake of uniformity, this report breaks down the maintenance costs with respect to their ratings separately, like the state of Colorado.

\(^{268}\) Authors’ Compilation of Texas CAFR Data.
In Figure 19 above, it is clear that with respect to interstate maintenance costs, Texas’ budget was inaccurate in 2002, 2005, and 2009 through 2012, with the differential of those years being more than $100 million off target. Regarding interstate maintenance spending and interstate road actual value, there appears to be a small correlation in 2009 where the sudden drop in actual maintenance cost was also reflected in the sudden drop in the road actual condition value, seen in Figure 18. This correlation disappears when the actual maintenance cost does not increase in the following years but the condition value recovers. From this example, the conclusion can be made that there is no clear correlation between maintenance cost amounts and the actual road condition, when discussing Interstates.

269 Authors’ Compilation of Texas CAFR Data.
Figure 20 above shows that with respect to non-interstate maintenance costs, TxDOT was able to budget accurately until 2008, when estimates were off as much as $1.7 billion. There does not appear to be any correlation to maintenance costs and actual road condition, even though in 2009 the decrease occurs in road actual conditions (Figure 18). This decrease in road actual condition is similar to the one seen for interstates in 2009. Some potential factors for this decrease could be that the state focused more on the Central Texas Turnpike System which opened in 2008, or that the area that inspected was in a worse condition than the areas inspected years prior.

270 Authors’ Compilation of Texas CAFR Data.
The Central Texas Turnpike System is slightly different from the Interstate and Non-Interstate figures because it has significantly less data available, as it was created in 2008 and Texas stopped the modified approach in 2013. Unlike Interstates and Non-Interstates, the Central Texas Turnpike System does not portray a significant decline in actual road conditions in 2009 but instead identifies a decline in 2010 while the others experience an increase (Figure 18). When compared with the statewide Interstate and Non-Interstate systems, the Central Texas Turnpike System has a significantly lower maintenance cost (Figure 21).

5.6.6 Findings/Conclusions
Prior to 2014, Texas used a combination approach to reporting, e.g. a modified approach for its highways and a depreciation method for bridges. It now uses the depreciation method for all infrastructure assets. Geographically, Texas is the largest state in the contiguous United States with the most bridges and one of several states that uses the depreciation method for bridges. The literature reviewed suggests that states that use the modified approach of reporting have fewer deficient bridges. Additionally, the literature reflects that Texas originally adopted a combination approach because the existing in-house software was not set up to use the modified approach for bridges. One obvious concern is the accuracy of the life span condition of the bridges, and another is whether the depreciation accounting accurately conveys the financial condition of the various authorities such as toll road authorities. Since the state legislature uses the financial condition to authorize additional construction and the issuance of bonds it is important to have an accurate

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271 Authors’ Compilation of Texas CAFR Data.
financial picture of the agency or authority. These questions and concerns may require additional studies to examine whether the adoption of software to use the modified approach could reveal data about the life span condition of the bridges, which is consistent with the overall grade received by Texas on its roads and highways.
6.0 CONCLUSION

When GASB begins its Statement 34 re-evaluation phase, it will have to consider the current usage of the modified approach and the traditional approach. Our analysis did not provide enough evidence to advocate for one approach over the other. We do believe our dataset, however, which was the primary deliverable to GASB, will be a useful tool when the organization decides whether to keep Statement 34 in its current form or revise the language. The dataset contains information from CAFRs across six states, covering the years 2002-2017. Included is data on depreciation of infrastructure assets, value of capital assets, condition levels for roads and bridges, estimated costs to maintain assets, and numerous other categories.

We chose six states based on their infrastructure reporting type. Tennessee and Arizona are states that originally adopted GASB 34’s modified approach and continue to use it. Virginia and Massachusetts chose not to adopt the modified approach and were selected because they continue to use the traditional approach of depreciation in their accounting. Lastly, Colorado and Texas presented two unique cases of states that originally adopted the modified approach but later switched back to a traditional method. The decision to resume the traditional approach was paramount to the selection of Colorado and Texas, as it generated interest in analyzing the reasons why they reverted to the traditional approach. This was of particular interest to GASB.

6.1 Findings and Recommendations

Through our CAFR analysis, and interviews of officials from State DOT offices and Comptroller’s offices across our six case studies, we list several findings along with corresponding recommendations:

1) A lack of dedicated funding leads to varying asset condition levels each year. Federal infrastructure spending bills, such as MAP-21 or the FAST Act, in the form of formula and competitive grants, provide states with immediate assistance to repair the most dilapidated infrastructure assets, but they do not address long-term concerns.

**Recommendation:** Consistent sources of infrastructure funding are necessary. Without dedicated funding, many infrastructure assets remain unaddressed and continue to deteriorate. This funding can come in the form of an increase to the national gasoline tax, a vehicle miles traveled (VMT) system, or highway user fees. The Highway Trust Fund does not support the needs of the 21st century infrastructure system. GASB should implement a requirement that states have a dedicated source of funding for roads and bridges if they opt for the modified approach. Although Colorado and Virginia use the traditional approach, our analysis concluded that specific dedicated funding initiatives for roads and/or bridges led to improved infrastructure conditions.

2) The CAFR is an extremely difficult tool to compare financial reporting across states. In the infrastructure category, states do not explain how they spend their money, making it difficult to see if the funding actually resulted in improved infrastructure.

**Recommendation:** GASB should provide guidance for how states record the road and bridge categories in their CAFRs to improve uniformity among the states. Currently, CAFR documents are extremely difficult
to interpret, and compare across states and fiscal years. A standardized format for infrastructure reporting would help state comptrollers to better prepare for expected infrastructure costs, while creating transparency between the public and the state regarding infrastructure spending in each category.

3) Attitudes towards infrastructure being "long-lived" are shared in states that used the modified approach, but states that use depreciation accounting witness a separation among financial comptrollers and the DOT. In modified states, both parties understand that bridges outlive their initial life expectancy, and it is more cost effective to finance maintenance than completely rebuild a bridge. The comptroller's office in a depreciation state generally views bridges as depreciable assets, while DOT has a different interpretation.

**Recommendation:** GASB should provide guidance to improve the communication between state comptrollers and DOT officials in states that use the traditional approach. Currently, there is a disconnect between the comptrollers and DOT officials on how exactly infrastructure should be reported because asset managers believe infrastructure should be long-lived, and comptrollers primarily focus on the financials.

4) While MAP-21 required asset management systems on the NHS, most states already had systems in place. MAP-21 was influential in consolidating ongoing grant programs and creating new grant programs, but it did not significantly impact the way states conduct asset management.

**Recommendation:** GASB should build on MAP-21 performance regulations to capture more uniform and consistent asset condition information in financial reporting. This will allow third party organizations, such as bond rating firms, taxpayers, and other interested groups to gain access to financial information related to infrastructure.

In addition, we discovered there is no one type of "asset management system," which is a requirement under MAP-21. States have asset management systems for infrastructure classes, such as pavement, bridges, or digital signage. Some have an enterprise system, which is "off-the-shelf" by a company called Deighton, which combines the systems into a single program, and others have stand-alone system. We were not able to conclude, however, if the consolidated enterprise systems result in better maintained infrastructure. Many states are transitioning to Deighton’s product, but an analysis containing more state case studies is necessary for determining correlation.

The following represents a brief description of our findings for each case study:

**Virginia**
VDOT is an established transportation agency that is responsible for operating and maintaining the third largest state-maintained highway system. The state’s asset management system has been developing since 1995, evolving over a twenty-three-year period. The current asset management systems are merging into one inclusive system, which has the potential to increase efficiency. Bridge and pavement (interstate and primary) conditions are improving and are meeting the established thresholds.

Virginia chose the traditional approach of depreciation based on consistency with the way the agency previously reported other types of assets. At the time GASB 34 was introduced, the state lacked the
dedicated funding to maintain the established asset conditions. Because Virginia uses the depreciation method for reporting of infrastructure assets, there is a resulting separation of financial reporting of infrastructure assets and asset management. There is no reported association between GASB 34 requirements and VDOT’s asset management system. The condition assessment of core assets, bridges and pavement, was in place before the passage of GASB 34.

**Massachusetts**
Massachusetts is a depreciation state, and the official interviewed from the state DOT was not aware of GASB 34. All of the financial reporting requirements are handled by the comptroller’s office. The state’s asset management systems were not put in place due to GASB 34 or MAP-21 requirements. The state already had its asset management system in place in 2012, when MAP-21 was signed into law. Massachusetts already had guidelines in place that lined up with the requirements of MAP-21, so implementation was not viewed as difficult.

The official from MassDOT stressed the importance of condition over value. This statement shows the MassDOT and the comptroller’s office are of two different opinions regarding condition and value, as Massachusetts uses the traditional approach of accounting.

**Tennessee**
Tennessee has a highway network with a high standard of maintenance and a steady stream of funding. Tennessee’s asset management system is not new, but has been updated to meet the state’s needs and standards. The state exceeds the minimum standards for pavement and bridge quality according to the 2017 CAFR. Tennessee can be considered a model for how a state ensures its infrastructure is safe without taking on large amounts of debt. The fact that the state does not issue debt for major capital projects, but instead relies on dedicated user fees suggests it is possible to accomplish that mission.

Both the State DOT and Comptroller’s office understand the merits of the modified approach. Tennessee does not use depreciation in financial reporting. The Comptroller’s Office shares the same view as the TDOT’s Asset Management Division in saying that infrastructure assets are long-lived, and should not be valued as if they have a definite life expectancy. Finally, while MAP-21 requires states to have asset management systems as a condition of receiving federal money, Tennessee had their systems in place prior to the issuance of MAP-21 in 2012. MAP-21 affects how states plan their future investment in infrastructure, but it has little effect on asset management.

**Arizona**
Arizona has a large roadway and bridge system to maintain, covering many different conditions and climates. Arizona chose to use the modified approach because they were aware that new regulations were on the way, so they began planning early and implementing their asset management system prior to any regulations put in place by GASB 34 and MAP-21. Interviews with the asset management official and the finance official showed that ADOT has a firm understanding of the modified approach and believes that asset management reporting is beneficial to the state.

Arizona does not use depreciation in their financial reporting. Arizona has dedicated funding through the Highway User Revenue Fund and Regional Area Road Fund, but ultimately the state relies heavily on the
national gas tax for infrastructure spending. While ADOT may be performing better than other states across
the country, without increases to dedicated funding, bridges across the state could face immense decreases
in condition and lead to greater failures.

**Colorado**

Colorado is one of the states that originally choose to adopt the modified approach, then broke away from
it. Colorado’s 2009 CAFR states when and why Colorado chose to break from the modified approach and
follow GASB 34’s depreciation method: Based on the estimates, Colorado previously reported bridge and
roadway infrastructure owned and maintained by CDOT under the modified approach. Beginning in
FY2007-2008, CDOT reported that available resources were no longer adequate to maintain Colorado’s
bridges at the Commission established condition levels as required by the modified approach. Therefore,
the department began reporting depreciation of its bridges in FY2007-2008. Beginning in FY2009-2010,
CDOT reported that due to several years of decreases due to General Fund diversions and transfers,
available resources were no longer adequate to maintain the State’s roadways at the Commission
established condition levels as required by the modified approach. Therefore, the department began
reporting depreciation of its roadways in FY2009-2010.

In its 2017 Infrastructure Report, the ASCE stated, “Dedicated public funding sources on the local, state,
and federal levels need to be consistently and sufficiently funded from user-generated fees, with
infrastructure trust funds never used to pay for or offset other parts of a budget.” The Colorado Bridge
Enterprise is a program adopted from this philosophy. It is closely aligned with the ASCE’s current
recommendations, in the sense that it provides dedicated funding that is not subject to competing interests
in the state budget.

**Texas**

Prior to 2014, Texas used a combination approach to reporting, e.g. a modified approach for its highways
and a depreciation method for bridges. It now uses the depreciation method for all infrastructure assets.
Geographically, Texas is the largest state in the contiguous United States with the most bridges and one of
several states that uses the depreciation method for bridges. Additionally, the literature reflects that Texas
originally adopted a combination approach because the existing in-house software was not set up to use the
modified approach for bridges.

One obvious concern is the accuracy of the life span condition of the bridges, and another is whether the
depreciation accounting accurately conveys the financial condition of the various authorities such as toll
road authorities. Since the state legislature uses the financial condition to authorize additional construction
and the issuance of bonds, it is important to have an accurate financial picture of the agency or authority.
These questions and concerns may require additional studies to examine whether the adoption of software
to use the modified approach could reveal data about the life span condition of the bridges.

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April 22, 2018).
Future Research

Although time consuming in nature, including more states in an analysis would yield a higher degree of statistical significance, possibly providing a causal link between use of the modified approach or traditional approach and condition level of roads and bridges. Given the time constraints of the report team members, we elected for “depth over breadth,” and chose six states to analyze based on their financial reporting characteristics and geography. A study that covered a more surface level analysis of a larger group of states could prove beneficial in identifying just a few variables of interest.

The information obtained in the interviews conducted with state transportation professionals and officials from financial comptroller’s offices has revealed a need for future research. The research could examine why governments do not provide all disclosures, and how and why DOTs choose the asset management systems they use. Additional research can look at how municipalities and counties report infrastructure assets. They may follow the state’s lead, or determine on their own whether the modified or traditional approach should be used.

The examination of CAFRs reveals that there are significant disparities from state to state, and within states from year to year which makes comparisons extremely difficult. Additional research should concentrate on these disparities, and how the CAFR can be a more consistent, universal tool. Specifically, researchers should examine how states estimate their maintenance costs for the following year, because many states do not perform this task effectively. Additionally, it would be beneficial to conduct studies examining the MAP-21 performance regulations, and whether they could be incorporated into CAFRs to improve cross sectional and longitudinal consistency.

We hope this report inspires a future body of research related to financial reporting of infrastructure assets. The way in which assets are reported has a major impact in determining funding levels, and allocating spending on transportation infrastructure in long-range plans. Knowledgeable citizens, as well as well-informed elected officials and agency executives, are capable of making decisions that will benefit future generations by ensuring our infrastructure is safe, reliable, and efficient.
Appendix A: Interview Summaries
Interview Questions
George Mason Spring 2018 Practicum

All responses are non-attributional. Names will not be included in our final report.

1.) Can you describe your current asset management system? Is it developed by the state or is it an “off the shelf” system? What transportation assets are reported?

Section 33.1-13.03 – in part, requires VDOT to submit an annual report (by November 30th) on the condition and performance of the existing transportation infrastructure, using asset management methodology and generally accepted engineering principles and business practices to identify and prioritize maintenance and operations needs and to identify performance standards to be used to determine those needs, and funding required to meet those needs.

VDOT Background: Maintenance and Operations Program Fund is a $1.6 billion program, largest discretionary fund in the Commonwealth. Includes weather events (snow/ice/flooding) of which funding for these events is approximately $2 million. VDOT is the third largest transportation agency with 127,000 lane miles, 2100 structures of which VDOT maintains approximately 1800, six tunnels, operations services, traffic and operation centers, and incident responses. Nine construction districts and five regional operations.

System Performance and Asset Condition:

Two separate core systems - bridges and pavement;

Pavement asset management system: Agile Assets pavement management software system (http://www.virginiadot.org/vtrc/main/online_reports/pdf/16-r3.pdf) VDOT conducts 100% condition assessment of Interstate and primary pavements and 20% of secondary roads, but in 2016, they conducted 100% condition assessment of secondary roads to obtain a baseline.

VDOT uses AASHTOWARE BrM software (http://aashtowarebridge.com/) for their bridge asset management system, which she stated was used by other DOT’s. VDOT conducts bridge condition assessments every 24 months and some bridges on annual basis. This is a person going out to each structure assessing the condition and then engineer’s asses the lifecycle cost analysis.

VDOT is transitioning to a new all-encompassing Asset Management System. They are slowly brining the system online with a projected date of 2021, they are first entering in ancillary structures (road sign) information into the system. She said it is an ERP software, but could not remember the name... (looking online, the manufacture is VueWorks (http://worldviewsolutions.com/2016/09/vdot-statewide-highway-maintenance-management-system-hmms-selection/)

VDOT develops set target conditions for bridges and pavement, see VDOT’s DASHBOARD website. Great website open to the public that contains a lot of information that can be easily broken down, such as bridge and pavement condition overall, by district, by county, trends, specific maintenance jobs.... http://dashboard.virginiadot.org/Pages/Maintenance/Bridge.aspx

Pavement Condition: measured using the Critical Condition Index (CCI) – “0” for very poor to “100” for excellent condition. VDOT’s target for interstate highway and primary roadway pavement condition is at least 82 percent of lane miles are rated fair or better, while eliminating road segments with a “35” CCI rating or less. Currently at 86%. VDOT’s target for secondary road condition is 63% - currently just below at 60%.
Interview with VDOT’s Asset Management Group
March 29, 2018

Bridge Condition: Condition measured in terms of the percent of structures not rated as being structurally deficient, based on inspections. VDOT’s statewide target is that at least 95.5 percent of the commonwealth’s approximately 21,000 structures are not rated as being structurally deficient – currently at 95.8 percent.

State passed in 2017 that the Commonwealth Transportation Board (CTB) will approve the infrastructure performance measures.

Needs Analysis: This is the next step in the Asset management process after obtaining the condition information. System Performance and Asset Condition feeds into the needs analysis step, then each District develops an annual budget. *VDOT’s needs are way above the received budget, e.g., it would take $13 billion to bring all infrastructure assets up to 100% condition levels, but they receive $1.6 billion annually. If they have numerous weather events they slow or balance services…. significant weather events can cause unanticipated spending which negatively impacts funding available for other highway work. (See risks portion of 2016-18 Executive Progress Report, great source of information)


VDOT develops optimization formulas for need.

1. Unconstrained need – fix everything to 100%
2. Constrained need – based on meeting performance measures (set target conditions)
3. Constrained need – based on meeting performance measures and budget

Budget: Nine construction districts and five regional operations develop baseline spending plan and midyear update.

2.) Is your asset management system in place because of the General Accounting Standards Board (GASB) Statement 34 standards, or for some other reason?

*Both the asset management group and financial controller stated there is no relationship between GASB 34 asset financial reporting and VDOT’s asset management system. Also, providing that condition assessment of core assets (bridge and pavement) was in place well before GASB 34. The discussion then led to MAP-21, which addresses question #8.

8.) Please describe the impact MAP-21 requirements have had on your state’s asset management system and reporting of infrastructure assets in CAFRs?

Impact on VDOT’s asset management system: VDOT currently captures all the required performance measures required by MAP-21. They will need to change some optimization reporting formulas, e.g., regarding pavement assessment VDOT captures 13 elements, MAP 21 requires requires 4 elements. General Condition Rating VDOT uses the rating of 6 as good, while MAP 21 requires a 7 as good.

No direct impact on reporting of infrastructure assets in CAFRs.
Interview with VDOT’s Asset Management Group
March 29, 2018

A. On a scale of 1-10, with 1 being the lowest and 10 being the highest, how do you feel your asset management system is performing?

VDOT is a mature agency that has an asset management program with methodical ways to address condition and services, and uses the Highway Maintenance and Operating Fund. Did not want to provide a numerical answer.

B. How do you think it could it be improved?

Providing a more comprehensive highway management system and combining the systems under one management system.

We discussed asset management system funding. Is there a constant funding mechanism to meet the established asset condition levels? Is that establish by legislation?

2016-18 Biennium Executive Progress Report, 2015’s House Bill 1887 maintain a state of good repair, state of good repair of structures and pavement – 45 percent, high priority projects program for key statewide needs 27.5 percent, highway construction district grant programs - 27.5 percent.

Funding comes from the Highway Maintenance and Operating Fund revenues and construction Program

Statutes 33.2-358 Allocation of funds among highway systems
https://law.lis.virginia.gov/vacode/title33.2/chapter3/section33.2-358/

Stature 33.2-1530 Highway Maintenance and Operating Fund
https://law.lis.virginia.gov/vacode/title33.2/chapter15/section33.2-1530/

*The challenge is funding to address the infrastructure asset needs as they mature. One of the reasons that they are not going to the modified approach is that they need to have dedicated funding to maintain the established condition level.

Has your Asset Management System been recently audited by the auditor of public accounts? Can we obtain a copy of that report?

Ms. Ahlin stated they been audited on annual basis. The most recent was by the Office of Inspector General, the final report has not been published. They have received an audit by the auditor of public accounts and will forward the report.

***Questions below were addressed and answered during our interview on Monday March 26, with VDOT’s financial controllers.

3.) Does your asset management system use depreciation accounting to assess the value of capital assets or some other method?

A. If using depreciation, what type of depreciation is used? Straight line depreciation or something else?

C. Does your method account for maintenance preservation costs? If so, how?

D. Does the method maintain infrastructure assets at or above a condition level established by the state? [ex. infrastructure assets are not to drop under listed % or some other value]

E. If so, what are those condition levels for: a. bridges; b. highways?

4.) Does the method account for all infrastructure assets or only major capital assets?
Interview with VDOT’s Asset Management Group  
March 29, 2018

A. Has the state accounted for those assets retroactively to 1980 (previously constructed) or just new construction? As of what date did that accounting start?

B. Does your method account for those assets at historical cost, or at estimated historical cost if historical cost is not available?

C. If infrastructure asset expenses are not itemized individually in the state’s Comprehensive Annual Financial Report (CAFR), what state Department of Transportation (DOT) or other financial documents might contain that information?

D. What is your state’s threshold for capitalizing infrastructure assets? For example, do you start counting infrastructure as a major capital asset when it exceeds $10,000 or more, or some other threshold?

5.) For what other reasons, besides those from a financial reporting perspective, did your state choose to adopt the modified (or traditional) approach? Can you speak to any political aspects, such as input from the Governor’s Office, a voter referendum, or legislative actions that influenced the state’s financial reporting?

6.) Do you know of another state that uses a similar asset management system as yours? If so, which state(s), and how is your system similar?

9.) Would you be able to refer us to colleagues who could also answer these questions? Do you have any associates in the state DOT or Federal Highway Association (FHWA) who would be willing to participate in this research?
1. **Why did the state of Virginia decide to select the traditional approach of depreciation versus the modified approach?**

He thought this is a good question and one we should ask the state's controller. He was not in the position at the time, but suspects that states found it to be more work than the modified approach of reporting infrastructure condition. It is easier to report cost and depreciation than condition.

2. **What are the reported types of infrastructure assets for the state of Virginia?** The CAFR's list infrastructure assets of roads, bridges, drainage systems and other similar assets. Wrong to assume that it only includes these items, and could include airports, ports, internet related infrastructure and others, recommends using the checklist of the types of infrastructure listed in the ASCE report and asking the state's controller which of these types of infrastructure assets are included in their financial reporting. (ASCE lists the following; roads, bridges, airports, ports, dams, drinking water, energy, hazardous waste, levees, rail, schools, solid waste, transit and wastewater.) In addition asking what portion of the roadways are included the state's reported infrastructure, e.g., the state of Virginia maintains approximately 95 percent of the states roads.

Recommends a follow on question posed to GASB: What was GASB's line of thinking when developing statement 34 regarding condition reporting to only include roads and bridges?

3. **How is the life-cycle years of an asset in Virginia determined? What happens if an asset outlives its life-cycle and is fully depreciated.**

Good question and recommends asking for a given asset, such as a length of highway or particular bridge, how did you determine the amount of lifecycle years? What happens when an asset is at the end of its life and is fully depreciated?

He discussed there is a GASB concept statement that defines depreciation. It is not simply a number, but the states have to consider its condition periodically, e.g., a 100 miles of roadway that is properly maintained and sealed will have a longer lifecycle of say 40 years compared to a roadway that is not properly maintained and sealed - its lifecycle will be shorter. There needs to be an assessment and analysis of the condition of assets regarding the assumption of the anticipated lifecycle. He thought it would be interesting of the 30 states that did not adopt the modified approach, how many on a new infrastructure asset applied a rule of thumb regarding lifecycle years and never looked at it again. *Powerful case for GASB to require the Modified Approach. That would require the condition of an asset to be brought up every couple of years on the financial reporting. Mentioned a few times that would be a powerful finding.*

He recommends a follow-up question regarding asset lifecycle: Of all the individual assets valued over a million dollars, are they fully depreciated? Where were they 15 years ago? Where are they now?

4. **How does the depreciation method exhibit to policy and lawmakers infrastructure is in need of resources and funding?**

It does not, no state uses depreciation method for decision making purposes. He discussed that political pressure is the driving force behind new infrastructure investment, not depreciation, e.g., adding capacity in Northern Virginia. ASCE report highlights and says there is poor condition (Virginia roads D+), but where is the flow of information to decision makers, not that it is depreciating for 25 years, it would fall to VDOT. For bond
Interview with a former Virginia State Comptroller
March 01, 2018

holders and rating agencies there is no information on the condition of the assets, how do they complete their analysis.

He provided a little background on when they were establishing accounting principles in the early 80's on fixed building assets, they adopted a private sector corporate model, and does not remember any discussion on decision useful information.

5. GASB 34 provides support for increased budget allocations for capital and maintenance. Has GASB 34 affected infrastructure capital and maintenance spending in the state of Virginia? Some examples of transportation related legislation include 2013 House Bill (HB) 2313 which addressed funding for transportation, 2015 HB 1887 and 2014 HB 2 distribution of transportation revenue to maintain a state of good repair. Was GASB 34 reporting of infrastructure assets influential in the creation of these bills?

He said good question for the current state controller. He discussed that over the many years people have questioned the role of CAFR's in decision making. They state that CAFR's are not important because they come out late, 6 months after the end of the fiscal year. He argues that they provide accountability and transparency. Also, there is managerial reporting throughout the year that conditions are changing, e.g., if 25 percent of assets are coming to the end of their useful lives. Also, in the statistical sections of the CAFR's there is a section of rolling ten years. He would distill the report down, brief legislative agencies and brief the governor.

6. Has Virginia's implementation of an asset management system affected the financial reporting? Has Virginia considered going to the modified approach?

He thought this is a good question and we should ask the current state controller.

7. It appears that transportation funding and pavement and bridge condition is improving in the state of Virginia. Examining the attached VDOT 2016-18 Executive Progress Report, which highlights improvement in pavement and bridge condition. ASCE 2015 Report gave Virginia the following scores; Bridges grade C due to age and lack of funding, Roads grade D, mostly due to a lack of capacity, while roadways were tolerable from a maintenance and safety standpoint.

He recommends asking the following question to the state controller; Is anyone on your staff reviewing VDOT's biannual infrastructure condition reports and is there any consideration on adding this information in the management, decision and analysis portions of the CAFR?

He contents that the role of the state controller should provide condition information, more information in the financial reports has a better chance to influence infrastructure legislation. He discussed that this speaks to risk, reporting of financial risk. These VDOT biannual infrastructure reports could be subject to modest audit review, why not include them in the CAFR.

8. Has the reporting practices changed in the state of Virginia over the last 15 years, and if so what is the possible cause and significance?

He suspects that they probably have not, but a good question to ask the current state controller.

9. Attached is the CAFR data spreadsheet for the state of Virginia from 2002 to 2017, based on the data points selected. Requesting to go over some of the more pertinent items to GASB 34 in the attached excel
spreadsheet and a Virginia CAFR to get a better understanding of those items and how those numbers are generated.

His internet was down, so he could not see the data. He recommended looking at the trends and direction of the data to develop observations, e.g., over the 15 years comparing the amount of increased infrastructure assets of the six states, also the amount of depreciation over that time between the states. He thought figuring out why would be its own research project in itself.

10. You mentioned in a previous email, to our class, other sources of information, such as periodic management reports, special studies, and legislative studies, any recommendation on these sources of information for the state of Virginia.

State auditor expresses opinion of VA CAFR.
Separate financial statement for VDOT bonds issued for VA transportation bonds.
VDOT transportation reports.
March 26, 2018
Interview with VDOT Financial Controller’s Office

All responses are non-attributional. Names will not be included in our final report.

1. Could you please provide a brief overview of VDOT’s financial controllers role and the process with the state Department of Accounts (DOA) in regards to reporting of infrastructure assets?

VDOT makes up 97% of the reported capital assets to the state. VDOT’s capital assets receives an annual audit by the state (special audit team for capital assets). VDOT’s financial controller’s do not have a list of every individual infrastructure asset, they are grouped together in a category, e.g., bridges over $100,000 for financial reporting. Controllers identify the cost on the front end of an infrastructure asset and then group an asset in a category. VDOT prepares and reports financial information via the Cardinal Financial System. Capital assets, thresholds: non-depreciable - $100,000 (land, **Tunnels; found that tunnels last such a long time now reporting them as non-depreciable assets, construction in progress and once construction is completed then asset is reported as depreciable.

2. What are VDOT’s reported types of infrastructure assets? Some state’s CAFRs include only roads and bridges, but others include state owned railroads, ports, or highway supplements such as signage and drainage systems.

Pavement, roadways, bridges, land, buildings and facilities...

3. How is the life-cycle years of an infrastructure asset determined? Is an asset’s life-cycle re-evaluated periodically based on the infrastructure’s condition? What happens if an asset outlives its life-cycle and is fully depreciated?

Engineers at VDOT determine an assets life-cycle. VDOT’s financial controllers work with VDOT’s engineers to periodically reassess some asset’s life-cycles as there are changes in technology and materials. Recent example, pavement restoration projects, which was promoted by auditors, engineers decreased 30-year life to 16-year life for pavement restoration. The financial controllers do not conduct or report physical inventory of all the infrastructure assets every 2 years and evaluation of the useful lives, that is completed for buildings and equipment.

When a bridge is fully depreciated it removed from the financial books – no net impact of total (historical value = accumulated depreciation). Controllers work with auditors to pull off the books. Asset still within the asset management system (restoration maintenance).

4. What system does VDOT use to report capital assets to DOA?

Cardinal Financial system

5. Has GASB 34 affected infrastructure capital and maintenance spending in the state of Virginia? The intent of GASB 34 is that it provides support for increased budget allocation for capital and maintenance. How does the depreciation method exhibit to policy and lawmakers that the infrastructure is in need of resources and funding?

Some example of transportation related legislation includes 2013 House Bill (HB) 2313 which addressed funding for transportation, 2015 HB 1887 and 2014 HB 2 distribution of transportation revenue to maintain a state of good repair and Virginia’s Smart Scale program.

GASB 34 impacts reporting of capital assets, not aware of effecting any transportation legislature. Depreciation is not a direct indication measure for revenue. Depreciation is a number on the books, based on
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historical cost. Virginia developed historical cost when GASB 34 was proposed around 2000, developing mileage tables back to the late 30’s, consult with engineers on when roads where built. Developed consumer price index, prices deflated back to 1938. Table built year by year when the roads where built, cost of the road by mileage and depending on location – mile in the mountain cost more.

6. Does VDOT provide infrastructure condition information to credit agencies to receive better bond rating or pricing? How does VDOT fund infrastructure projects? Fund maintenance of infrastructure?

March 2017, report, ‘Infrastructure Asset Reporting and Pricing Uncertainty in the Municipal Bond Market’ (Bloch, Marlowe, Mead), finds bonds from modified approach states have significantly narrower bid spreads than bonds from traditional depreciation states, indicating the modified approach process unique information about governments’ financial condition. Finding suggest the modified approach reduces uncertainty about infrastructure condition, improving marker efficiency.

They were not aware that the condition information is given to the rating or bond issuing agencies. (Note: This information is easily obtained online (http://dashboard.virginiadot.org/)). VDOT’s financial planning and CFO obtain bonds for construction projects. Construction projects are also funded by Federal funds, and local funds. The state funds (motor fuels tax…) primarily pays for maintenance. Every bond issuance receives a booklet the size of a phone book, which has a lot of information including VDOT’s financial information/balance sheets. VDOT financial reporting of capital assets passes annual audits and credit agencies would be looking at the audit reports.

7. Regarding funding of infrastructure maintenance; What type of system does VDOT have for its Asset Management System? Is it divided into different segments, e.g., one for bridges, one for pavement and another for tunnels? Does the system use third party software, such as Deighton, or is it an in house system?

Asset Management Division, has been gathering information for a conference call.

They have a bridge asset management system, highway and pavement management system. Believes they use the software AASHTOWare.

8. Has the federal government’s MAP21 regulations affected the funding for infrastructure assets? Maintenance programs or management systems for infrastructure assets?

The asset management division would be able to better answer this question.

9. Why did Virginia choose to adopt the traditional approach of depreciation verse the modified approach? Please speak to the financial reporting aspects, as well as any outside factors such as political pressure.

Not part of the decision making group back then, but offered the following: Using the modified approach requires an asset management system to evaluate an asset condition every 3 years and disclose. In 2002, VDOT did no have that type of system and the necessary level of funding to maintain a condition. The modified approach needs a dedicated source of funding and there was no legislation to keep the condition at a certain condition. They speculate there was concern on keeping a condition level.

Recently, there was a discussion on the pros and cons of going to the modified approach with the auditors. They said, easier in some ways, but “could not be assured that they would be able to maintain that level of condition due to funding – need legislation to ensure funding. Janice discussed, how in GASB 34 allows lower
threshold of condition reporting in the financial reports verse a higher condition threshold established by the agency.

10. Do you recommend any other sources of information, besides the CAFR, that contain information related to financial reporting of infrastructure?

VDOT’s annual financial report.

11. Would you be able to refer us to colleagues who could also answer these questions?

Yes, Asset Management Division.
Comptroller Questions:

All responses are non-attributional. Names will not be included in our final report.

1. What are the reported types of infrastructure assets in Virginia? Some state’s CAFRs include only roads and bridges, but others include state owned railroads, ports, or highway supplements such as signage and drainage systems.

Virginia’s reported types of infrastructure in primary government include roads, bridges, tunnels, water and gas lines, lighting, cell towers, fuel storage tanks, side walks, parking lots and drainage systems.

2. How is the life-cycle years of an infrastructure asset in Virginia determined? What happens if an asset outlives its life-cycle and is fully depreciated? Is an asset’s life-cycle re-evaluated periodically based on the infrastructure’s condition?

The state of Virginia has decentralized financial reporting, meaning over 200 agencies report financial information to the state. For infrastructure assets the number of agencies would be much less but not just limited to VDOT. Virginia uses a state-wide system for reporting capital assets called, Fixed Asset Accounting and Control System (FAACS). Not all agencies use FAACS, including VDOT.

The individual agency determines the life-cycle of the infrastructure asset within their responsibility. The state provides general guidance within the Commonwealth Accounting Policy and Procedures (CAPP) Manual. CAPP manual does not specify a year but provides a suggested range. The CAPP manual (policy) requires a physical inventory of capital assets every 2 years and recommends evaluation of the useful lives (CAPP Manual 30505). When the individual agencies are reporting their annual financial information (Financial Statement Directive) there are two questions regarding the inventory of assets that they must answer.

Each agency evaluates and certifies they have accurately evaluated and reported all accounting records, which includes useful lives to the DOA, and is subject to audit. DOA does not second guess or evaluate how the useful lives of how an asset was calculated or if the asset’s useful lives were reevaluated based on its current condition.

If an asset outlives its life-cycle and is fully depreciated, which does happen, the asset remains within the system zeroing out its balance, unless or until it is disposed.

Below are some applicable sections of the CAPP Manual;

a. CAPP Manual – 30505 Physical Inventory
   a. ...The physical inventory must verify the asset’s existence, and should provide a reference to lists and/or other documents evidencing the existence and cost of the asset examined....

b. CAPP Manual – 30310 Fixed Asset Accounting
   a. ...Infrastructure assets are depreciable, and the total acquisition or construction cost must be considered for capitalization. Agencies are responsible for reporting the agency-maintained infrastructure (such as roads, bridges, curbs, surface gutters, streets, sidewalks, drainage systems, parking lots, lighting systems) and similar
March 15, 2018
Director, Financial Reporting, Commonwealth of Virginia, Department of Accounts (DOA)
Office is responsible for preparing Virginia’s CAFR’s

assets which, while not identifiable to any particular structure, nevertheless, have a quantifiable value to the agency...

3. Why did Virginia choose to adopt the traditional approach of depreciation verse the modified approach? Please speak to the financial reporting aspects, as well as any outside factors such as political pressure.

Not in the position at that time, but offered that the traditional approach was consistent with previous reporting of other types of assets, provided a consistent, straight forward approach and was the most efficient method to gather data in a decentralized method of reporting. Modified approach was not required and was more involved.

4. How does the depreciation method exhibit to policy and lawmakers that the infrastructure is in need of resources and funding?

VDOT would be able to address this question better, they have a significant portion of the transportation projects.

5. Has Virginia’s implementation of an asset management system in FY2005 affected the financial reporting? Has the state considered going to the modified approach?

Virginia’s implementation of asset management system has not affect the financial reporting and the state has not considered switching to the modified approach at this time.

6. Attached is the VDOT 2016-18 Executive Progress Report, which highlights improving pavement and bridge conditions. Is anyone on financial controller’s staff reviewing infrastructure condition reports and is there any consideration on adding condition information in the management, decision and analysis (MDA) portions of the CAFR?

The people responsible for dealing with the credit agencies have not asked for any condition information and Virginia currently has a AAA rating. MDA portions requires specific information and infrastructure condition is not required.

7. Has the financial reporting practices changed in Virginia over the last 15 years, and if so what is the possible cause and significance?

No, same method of depreciation with only small terminology changes.

8. What is the capitalization threshold for Virginia’s infrastructure assets? Are the standards adopted from GASB guidelines or some other standard?
Infrastructure capitalization threshold is 100,000. Ms. Lawrence did not believe the GASB guideline outlined an actual number, and Virginia evaluated infrastructure assets based on what would prove to best cost beneficial to report and have auditors evaluate.

9. **Do you recommend any other sources of information, besides the CAFR, that contain information related to financial reporting of infrastructure?**

   None.

10. **Would you be able to refer us to colleagues who could also answer these questions?**

    VDOT Financial Controller’s
Interview Questions, Massachusetts DOT

1.) Can you describe your current asset management system? Is it developed by the state or “off the shelf." What transportation assets are reported?

Massachusetts does not have a singular system. Massachusetts views two major assets from capital: pavement and bridges. These assets are maintained with separate systems for retention of inventory and retention of and forecasting needs. The first system (used for bridges) is custom developed software based on 4D DB architecture. For pavement, we use a Deighton system. Massachusetts maintains other systems such as implementation of View Works by DTX for work management.

2.) Is your asset management system in place because of GASB Statement 34 standards or for some other reason [MAP 21 requirements]? The asset management system was already in place prior to MAP 21.

A. On a scale of 1-10, with 1 being the lowest and 10 being the highest, how do you feel your asset management system is performing? 7 on how well the systems are performing.

B. How do you think it could it be improved? The asset management system could be improved by better forecasting with better modeling. Predictive modeling for funds-forecast condition performance based on different investment scenarios.

3.) Does your asset management system use depreciation accounting to assess the value of capital assets or some other method?

Value—We measure condition, which doesn’t relate to value. Don’t use depreciation because major concern is not value of bridge or pavement, but condition. Asset management is about making an investment before things get poor because that is more economically efficient to maintain assets vs. replacing them. There is a monetary benefit to making smart investments.

A. If using depreciation, what type of depreciation? Straight line depreciation or something else? Depreciation. Massachusetts looks at assets as an economical investment, which is why we look at condition over value. This is a question for the comptroller’s office.

With the implementation of GASB34, Massachusetts depreciates with 40 year life with infrastructure, but this needs to be verified with the comptroller.

B. If other method, what method are you using and why? This is a question for the comptroller’s office. The highway department does not handle anything related to financial aspects.

C. Does your method account for maintenance preservation costs? Question for comptroller.

D. Does this method maintain infrastructure assets at or above a condition level established by the state? Massachusetts pays attention to condition over value. Further explanation needed from comptroller’s office

E. If so, what are those condition levels for: a. bridges; b. highways? Comptroller question
Massachusetts does depreciate, but there is no connection with GASB 34. We set targets for assets and investment levels based on investment plans.

4.) Does the method account for all infrastructure assets or only major capital assets? **In PDF I sent you, many of these questions are answered.**

   A. Has the state accounted for those assets retroactively (all previously constructed) or just new construction? **As of what date did that accounting start? This is a question for the comptroller’s office.**

   B. Does your method account for those assets at historical cost, or at estimated historical cost if historical cost is not available? **This is a question for the comptroller’s office.**

C. **Comptroller Question**

D. **Comptroller Question**

5.) GASB34 accounting standards were adopted by Massachusetts in 2002/2003 by comptroller’s office, and the comptroller’s office sets these standards on how the highway division should be using the accounting standards. Fiscal section handles day to day projects that include: identifying assets, tagging of expenditures and depreciation. This is all accounting, which is the extent to how GASB34 is used. The questions asked get into asset management. GASB34 is not related to asset management, within the definitions through MAP 21 and FHWA.

6.) Do you know of another state that uses a similar system or method like yours? If so, who and how is your system/method similar? **Colorado**

7.) Do you know of another state that uses a similar accounting method (depreciation / modified approach) as yours? If so, which state(s), and how is your method similar? **Question for comptroller’s office.**

8.) Please describe the impact MAP-21 requirements have had on your state’s asset management system and reporting of infrastructure assets in CAFRs. **Massachusetts already has an asset management system in place, so it was easy to adapt to MAP-21 requirements. The comptroller’s office handles all financial items.**

9.) Would you be able to refer us to colleagues who could also answer these questions? Do you have any associates in the state DOT or Federal Highway Association (FHWA) who would be willing to participate in this research? **I will send you the names of a contact in the comptroller’s office. I would like to think using my name would help, but I am not sure that would get you very far.**

**Reach out to the director of asset management on Highway Division. Speak with comptroller’s office to get more info on accounting standards and Mass DOT.**
1.) Can you describe your current asset management system? Is it developed by the state or “off the shelf?” What transportation assets are reported?

Tennessee’s asset management includes three separate classes: bridges, roadways, and right-of-way. The asset management systems are rather old, likely developed in house, but could have been bought off shelf a long time ago and customized to the state’s needs.

2) Is your asset management system in place because of GASB Statement 34 standards or for some other reason?

The asset management system was in place prior to GASB 34 implementation.

   A. On a scale of 1-10, with 1 being the lowest and 10 being the highest, how do you feel your asset management system is performing?

      8

   B. How do you think it could it be improved?

      Question not answered

3) Does your asset management system use depreciation accounting to assess the value of capital assets or some other method?

   Other capital assets do depreciate, but not infrastructure assets use the modified approach.

   A. If using depreciation, what is the depreciation target rate, and how is that value determined?

      Tennessee does not depreciate infrastructure assets.

   B. If other method, what method are you using and why? Please describe.

      Tennessee is allowed to use the modified approach for infrastructure reporting under GASB 34 guidelines.

   C. Does the method account for maintenance preservation costs?

      Yes

   D. Does the method maintain infrastructure assets at or above a condition level established by the state? [ex. infrastructure assets are not to drop under listed % or some other value]

      Yes, condition levels are set by the state the target is met every year.

   E. If so, what are those condition levels for: a. bridges; b. highways?
Tennessee uses the Maintenance Rating Index for roadways. 75 out of 100 is the minimum rating, and it is most likely determined by a cost-benefit analysis. The state uses the National Bridge Inventory rating for bridges, and sets a minimum of 75 as well.

4.) Does the method account for all infrastructure assets or only major capital assets?

GASB only allows for the modified approach being used for infrastructure, doesn’t allow for anything else. Other things are intangible or depreciated.

A. Has the state accounted for those assets retroactively (all previously constructed) or just new construction? As of what date did that accounting start?

Tennessee had records that allowed them to retroactively account for all assets (1914-1964). AASHO (predecessor of AASHTO) and then TDOT was able to look at their own financial date to retroactively account for all assets. A Base year of 1980 was established. Tennessee began using the modified approach the fiscal year beginning July 1, 2006. All assets were retroactively accounted from that date back to 1980.

B. Does your method account for those assets at historical cost, or at estimated historical cost if historical cost is not available?

Historical cost is used when available. When it’s not available, estimated historical cost is used.

C. If infrastructure assets are not itemized individually in the CAFR, what documents contain that information?

It's possible TDOT may have those documents, as the CAFR does not contain that information.

D. What is your state’s threshold for capitalizing infrastructure assets?

For the state there is no threshold. All infrastructure assets are capitalized. Other capital assets have $100,000.

5. We noticed a jump in Tennessee’s infrastructure capitalization threshold from 2011-2012, where assets in 2011 had a minimum life expectancy of 2 years, and it was raised to 3 years in 2012. What are the reasons for raising this threshold?

Interviewee was not aware of the reason for increase from two to three years. In the CAFR, the three year minimum does not apply to infrastructure assets, however it may apply to other capital assets.

A. In the 2002-2016 CAFRs, the road miles remain constant at 14,000 lane miles. But bridge miles increase incrementally from 8,028 to 8358 miles over that time frame. Do you have an explanation?

No direct answer for this. It would take a major road construction to change the number significantly. Had an old highway and decided to expand to 4 lanes, it would eliminate old road for more efficient route. It Would take multiple major construction projects to change that number. 8401 is the actual number of bridges, not miles. Road mileage
includes bridge mileage. Bridges actually constitute the structure. Tunnels are included in the roadway.

B. Does the CAFR “infrastructure” category only include state highways, or county roads as well?

**Only the assets managed by the state, which include interstate highways and state highways.**

6.) What other reasons, besides those from a financial reporting perspective, did your state choose to adopt the modified (or traditional) approach? Can you speak to any political aspects, such as input from the Governor’s Office, a voter referendum, or legislative actions that influenced the state’s financial reporting?

*Interviewee did not know of any political reasons. There may have been ulterior motives, but it was never portrayed that way. The fundamental viewpoint in Tennessee is the does not issue debt for infrastructure construction or acquisition. They use a dedicated motor vehicle fuel tax, and as a result have no debt when it comes to infrastructure. Management thought the modified approach would be more meaningful decision making tool. This may not be reason as to why TN choose the modified approach, but hopefully it gives some context.*

7.) Has the modified approach helped to reduce state debt?

**Tennessee does not have debt related to infrastructure. The state is very conservative from a fiscal sense.**

8.) Do you know of another state that uses a similar system or method like yours? If so, what is that state, and how is your system similar?

**All states use a scale, breaking it into subsystems. In a broad sense they are all doing the same thing, but the types of scales and details vary.**

9.) Please describe the impact MAP-21 requirements have had on your state’s asset management system and reporting of infrastructure assets in CAFRs

*Interviewee was not aware of any impact from auditing standpoint. There was a new state law which was just passed, and it relates directly to infrastructure.*

10.) Would you be able to refer us to coworkers who could answer these questions? Do you have any contacts in the state DOT or FHWA who would be willing to participate in an interview?

**Contacts referenced via email**
1) Can you describe your current asset management system? Is it developed by the state or “off the shelf?” What transportation assets are reported?

Tennessee does not have a single “asset management system.” There are three separate systems for bridges, pavement, and maintenance. The bridge system is developed by Pontis, pavement is a Stantek system, and the maintenance management system is an older program developed by Booze Allen, which was customized for Tennessee’s needs.

2.) Is your asset management system in place because of GASB Statement 34 standards or for some other reason?

Tennessee is required by the Federal Highway Administration (FHWA) to do annual bridge inspections, and that’s why the asset management system is in place. The asset management systems in place are not a result of GASB 34. It’s also a good business practice to maintain assets.

A. On a scale of 1-10, with 1 being the lowest and 10 being the highest, how do you feel your asset management system is performing?

The maintenance management system receives a 6/10. The bridge system is the most mature, although forecasting is better with the pavement management system.

B. How do you think it could be improved?

Consolidating the three systems could help if it’s done right. The legacy systems are working after much needed upgrades, but it would have to be cost efficient to replace them. The problem with the current set-up if that it doesn’t allow for trade-off analysis between systems. TDOT cannot shift funding between systems. Whatever money is allocated for bridge repairs must be spent on bridges, it cannot be shifted for highways if resurfacing a highway is more critical at the moment.

3.) Does your asset management system use depreciation accounting to assess the value of capital assets or some other method?

The pavement management system has the most mature depreciation models. Funding scenarios can be plugged in, and projections for condition level can be made based on the funding level. The bridge system relies more on institutional knowledge rather than raw data. For instance, engineers with years of experience can estimate “bang for the buck.”

When a bridge is designed, it’s not built to last forever. That would not be cost effective. Sometimes the estimates are accurate, sometimes they’re not.

A. If using depreciation, what is the depreciation target rate, and how is that value determined?

Question not asked

B. If other method, what method are you using and why? Please describe.

Question not asked

C. Does the method account for maintenance preservation costs?

Question not asked
Question not asked

D. Does the method maintain infrastructure assets at or above a condition level established by the state? [ex. infrastructure assets are not to drop under listed % or some other value]

Question not asked

E. If so, what are those condition levels for: a. bridges; b. highways?

Question not asked

4.) Does the method account for all infrastructure assets or only major capital assets?

A. Has the state accounted for those assets retroactively (all previously constructed) or just new construction? As of what date did that accounting start?


B. Does your method account for those assets at historical cost, or at estimated historical cost if historical cost is not available?

Question not asked

C. If infrastructure assets are not itemized individually in the CAFR, what documents contain that information?

Question not asked

D. What is your state’s threshold for capitalizing infrastructure assets?

Question not asked

5.) What other reasons, besides those from a financial reporting perspective, did your state choose to adopt the modified (or traditional) approach? Can you speak to any political aspects, such as input from the Governor’s Office, a voter referendum, or legislative actions that influenced the state’s financial reporting?

Interviewee was not working for TDOT at the time the state decided to adopt the modified approach, but he understands it already fit Tennessee’s ideology about infrastructure assets being long-lived.

6.) Do you know of another state that uses a similar system or method like yours? If so, what is that state, and how is your system similar?

Interviewee was not 100% sure, but he believes other states are using the AASHTO bridge product. Kentucky might be using the same bridge system. South Carolina, Georgia, and Alaska are using similar maintenance management systems.

7.) Please describe the impact MAP-21 requirements have had on your state’s asset management system and reporting of infrastructure assets in CAFRs.

MAP-21 defined how pavement and bridges are supposed to be reported. States are supposed to report the % of a bridge deck area in good or poor condition. MAP-21 has not had a major impact on the way Tennessee measures condition, however.

MAP-21 forces states to look further in the future in terms of investment strategy and budgeting. It’s hard to forecast that far in future, however, because the funding situation cannot be predicted. But Tennessee has always had dedicated funding for transportation, in the form of a gasoline tax reserved
only for DOT. The state does not issue bonds, but it has always had enough revenue to maintain the roads in decent shape. Revenue from the gas tax will increase by 6% over the next 6 years. No state will always have enough money to meet all of its transportation projects, but Tennessee does the best it can given the available resources.

8.) Would you be able to refer us to coworkers who could answer these questions? Do you have any contacts in the state DOT or FHWA who would be willing to participate in an interview?

Interview Questions
George Mason Spring 2018 Practicum

All responses are non-attributional. Names will not be included in our final report.

1.) Can you describe your current asset management system? Is it developed by the state or is it an “off the shelf” system? What transportation assets are reported?

The existing asset management system is a work in progress. It covers pavement and bridges. A separate system covers maintenance. Arizona uses an off the shelf product. They use AASHTOWARE for bridges, Deighton for pavements, and maintenance has used an in-house system called PECOS for at least 25 years. Pavement and bridges are reported. Maintenance is not depreciated. Arizona plans to bring more assets into their reporting system. The state owns the state highway system and de facto owns the interstate highway system (they maintain IHS). Counties and municipalities operate the local and county roads. There are also 26 tribes throughout Arizona, which have tribal roads. Those are only federal if classified as federal roads. The state provides oversight for these tribal roadways.

2.) Is your asset management system in place because of the General Accounting Standards Board (GASB) Statement 34 standards, or for some other reason?

The system is not in place because of GASB 34. Arizona has had the maintenance management system for at least 25 years. Asset management system is more in place due to MAP-21, but it was still in place prior to MAP-21 regulations.

A. On a scale of 1-10, with 1 being the lowest and 10 being the highest, how do you feel your asset management system is performing?

4 – the asset management system is still work in progress

B. How do you think it could be improved?

Would be best to implement in a phased operation. It would be good to get to 100% operation and then make improvements from there. Arizona DOT would like to include other assets in the system.

Assets that are reported include pavements and bridges. Pavements are the roadway from shoulder to shoulder, other items, such as box culverts are not included with the pavement asset. Bridges are both the super- and the sub- structure of the bridge.

3.) Does your asset management system use depreciation accounting to assess the value of capital assets or some other method?

No. Use net present value.

A. If using depreciation, what type of depreciation is used? Straight line depreciation or something else?

N/A
B. If other method, what method are you using and why? Please describe.

Net present value is used.

C. Does your method account for maintenance preservation costs? If so, how?

No. Maintenance preservations are separate. They are included in the long range transportation plan.

D. Does the method maintain infrastructure assets at or above a condition level established by the state? [ex. infrastructure assets are not to drop under listed % or some other value]

Yes. Pavements are set at a level lower than AASHTO condition ratings. Arizona uses IRI and visual inspections for roadway ratings. What is Fair in Arizona is only Good in other states. That rating is likely to change in order to align with the requirements of MAP-21. Bridges use the NBI rating for bridge condition. There is a bridge inspection team. The bridge inspection rating depends on the previous rating and how old the bridge is.

E. If so, what are those condition levels for: a. bridges; b. highways?

See above.

4.) Does the method account for all infrastructure assets or only major capital assets?

Method accounts for bridges and pavements only.

A. Has the state accounted for those assets retroactively to 1980 (previously constructed) or just new construction? As of what date did that accounting start?

All assets are included since 1980.

B. Does your method account for those assets at historical cost, or at estimated historical cost if historical cost is not available?

N/A

C. If infrastructure asset expenses are not itemized individually in the state’s Comprehensive Annual Financial Report (CAFR), what state Department of Transportation (DOT) or other financial documents might contain that information?

Infrastructure assets are itemized individually. The CAFR pulls the data straight from the asset management program.

D. What is your state’s threshold for capitalizing infrastructure assets? For example, do you start counting infrastructure as a major capital asset when it exceeds $10,000 or more, or some other threshold?

N/A

4.) For what other reasons, besides those from a financial reporting perspective, did your state choose to adopt the modified (or traditional) approach? Can you speak to any political aspects, such as input from the Governor’s Office, a voter referendum, or legislative actions that influenced the state’s financial reporting?
Arizona chose to use the modified approach in order to meet federal financial reporting requirements. Arizona knew it would eventually be a federal requirement, so they began the implementation early. They do not depreciate, but unsure of exact reasons.

5.) Do you know of another state that uses a similar asset management system as yours? If so, which state(s), and how is your system similar?

No.

6.) Do you know of another state that uses a similar accounting method (depreciation / modified approach) as yours? If so, which state(s), and how is your method similar?

N/A

7.) Please describe the impact MAP-21 requirements have had on your state’s asset management system and reporting of infrastructure assets in CAFRs.

The opinion is that it is a good thing. In an operational sense, it makes more sense, in a financial sense, it makes more sense. Transition period will be the hardest.

Comptroller Questions

All responses are non-attributional. Names will not be included in our final report.

1. What are the reported types of infrastructure assets in your state? Some state’s CAFRs include only roads and bridges, but others include state owned railroads ports, or highway supplements such as signage and drainage systems.

ADOT prepares a CAFR of ADOT’s reporting entity separately from the State of Arizona’s statewide CAFR. ADOT’s funds and accounts are presented as a major fund in the State of Arizona statewide CAFR. ADOT’s infrastructure assets include roads (including related right-of-way), bridges, and construction in progress (unfinished roads and bridges). Signage would be included as part of roadways in the initial capitalization, however, subsequent expenditures for signage are expensed in the period incurred (see also response to question 2 below).

Information regarding other infrastructure reported in the State of Arizona may be obtained from the statewide CAFR (webpage linked below)

https://gao.az.gov/financials/cafr

2. How is the life-cycle years of an asset in your state determined? What happens if an asset outlives its life-cycle and is fully depreciated?

ADOT has elected to use the “modified approach” as allowed by the GASB, to report its infrastructure assets. Therefore, ADOT does not depreciate infrastructure assets, nor assign a “useful life” to such assets in our accounting records. All other assets useful lives for financial reporting purposes are determined using guidance from the State of Arizona Accounting Manual (aka “SAAM”). These policies are presented in Footnote 1(D) of our FY 2017 CAFR. I’ve attached the Capital Asset portion of this footnote for your reference. Assets with remaining service utility remain on the books regardless of the period over which the historical cost is allocated (i.e. depreciation), and are retired when the asset is deemed to have no value to ADOT’s operations. Please bear in mind that asset useful lives are an ESTIMATE of such assets’ service utility.

3. What is capitalization threshold for your state’s transportation assets? Are the standards adopted from GASB guidelines or for some other reason?

I am unclear on what is meant by “transportation assets”, therefore, our answer includes all assets owned or having the potential to be owned, by ADOT.

Infrastructure (including Construction in Progress), Right-of-Way, Land, Land Improvements, Buildings, and Building Improvements are always capitalized, irrespective of cost. Non-infrastructure assets (excluding the above listed asset types) are subject to the State’s capitalization threshold of $5,000. IT assets not meeting the $5,000 threshold are expensed in the period acquired; however, IT assets are still recorded in the Fixed Asset System and inventoried for stewardship purposes. See also Footnote 1(D), referenced in the answer to Q2 above.
4. For your state, what is the criteria for identifying non-depreciable capital assets? Are you aware of other states that have different criteria?

Non-depreciable assets include Right-of-Way, Land, Construction in Progress, and Infrastructure. All other assets meeting the State’s capitalization threshold are depreciated on the straight-line basis over their useful lives as prescribed in the State of Arizona Accounting Manual. I am not aware of other states’ depreciation policies. However, there may be other states that elect to depreciate their infrastructure assets, as opposed to using the modified approach. It has come to our attention, through GASB training, that use of the modified approach is uncommon. We are aware that the State of New Mexico DOT also uses the modified approach to report its infrastructure assets.

5. (Depreciation State) How does your state set the depreciation target rate? Do you use straight-line or another accounting method?

Straight-line depreciation is required on all State owned depreciable assets meeting the capitalization threshold(s). It has come to our attention, through GASB training, that $5,000 is a common threshold among State and Local Governments. Additionally, attendees to these training sessions indicated that while discussions to increase the capitalization threshold to $10,000 or $15,000 are ongoing, no action has been taken thus far.

6. Please discuss your state’s measurement scale and ratings system. What is the criteria behind their rating scales and “what is behind the numbers?”

The state follows the FHWA (Federal Highway Administration) as well as AASHTO (American Association of State Highway and Transportation Officials) guidance to determine the serviceability rating of the roads. For bridges, the FHWA condition ratings are followed. There are many publications and engineering standards that have been developed over the years and are continuously reviewed and evaluated to be updated with the latest processes and materials. Some of these publications are identified in the Required Supplementary Information of the CAFR.

7. Please discuss your state's inventory asset index, and possible changing data points over time.

We looked back to the CAFR 2002 report which was the first year reporting on the modified approach and there was essentially NO difference in wording.......  
- For roadways, the 3.23 PSR rating has been consistent for all years  
- For bridges, the four elements of condition rating are also noted throughout all CAFRs. However, the 2002 CAFR indicates that one of the elements (the bridge joint condition rating) is an Arizona specific rating, whereas the other three are federally mandated condition ratings. I notice where that language is now gone – perhaps the Arizona specific was adopted Federally?

8. (Depreciation State) Has the implementation of an asset management system affected the financial reporting? Has the state considered going to the modified approach?

Yes, ADOT has always used the modified approach in reporting infrastructure assets, which was first implemented with the 2002 CAFR.
9. (Depreciation State) Is anyone on financial controller’s staff reviewing infrastructure condition reports and is there any consideration on adding this information in the management, decision and analysis portions of the CAFR?

Infrastructure condition reports are obtained from the appropriate division responsible for maintaining those assets. Details of the roadway and bridge condition assessments are disclosed in the Required Supplementary Information section of the CAFR. This information is not duplicated in the MD&A (Management’s Discussion and Analysis)

10. GASB 34 provides support for increased budget allocations for capital and maintenance. Has GASB 34 affected infrastructure capital and maintenance spending in your state?

I am not aware that GASB 34 specifically, has impacted capital and maintenance budgets. The GASB has made it clear in its communications that accounting standards should not significantly impact the operating/budgeting decisions of State and local governments. The maintenance of roadways and bridges has been the same budget and condition goals as prior to GASB34......the details were just not reported in the CAFR.

11. Why did your state choose to adopt the modified approach (or traditional)? Please speak to the financial reporting aspects, as well as outside factors such as political pressure.

Although most of the Financial Management Services staff has left the employ of ADOT since the original implementation of GASB 34, we believe that the Federal Highway Administration had a significant role in the factors related to Infrastructure reporting in the CAFR and had standards already in practice that were possibly utilized, even to the extent of assisting the states with determination of the infrastructure value at the outset. In ADOT’s FY 2000 CAFR, total capital assets (net of A/D) were $242,707,393 and in the FY 2001 CAFR, $270,561,054. This increased to $10,565,510,805 in the FY 2002 CAFR (the fiscal year GASB 34 was implemented). ADOT’s FY 2017 CAFR showed $21,702,383,527 for both depreciable and non-depreciable capital assets, including Infrastructure.

12. Has the reporting practices changed in your state over the last 15 years, and if so what is the possible cause and significance?

With the exception of implementing new GASB standards as required, financial reporting has not significantly changed.

13. Do you know of any other sources of information, besides the CAFR, that contain information related to financial reporting of infrastructure?

Azdot.gov contains a significant amount of financial and operating information regarding ADOT’s transportation programs, including the Current Five-Year Transportation Facilities Construction Program, as adopted by the State Transportation Board. Additionally, the Financial Management Services division (FMS) of ADOT provides other financial reports, in addition to the CAFR, on its “Transportation Funding” webpage. Links to both the Current Five-Year Transportation Facilities Construction Program and the Transportation Funding webpage are provided below. Please note that the links below are not an exhaustive list of all financial information generated by all of ADOT’s divisions. We recommend exploring azdot.gov in more detail if you are unable to locate the information you’re seeking from the links below.

State Transportation Improvement Program (STIP):
https://www.azdot.gov/planning/transportation-programming/state-transportation-improvement-program

FMS Transportation Funding Webpage:

https://www.azdot.gov/about/FinancialManagementServices/transportation-funding/highway-user-revenue-fund
**Colorado Case Study Interview Questions**

A.) Interview One—Questions on Asset Management:

1.) Can you describe your current asset management system? Is it developed by the state or is it an “off the shelf” system? What transportation assets are reported?

---Deighton is our asset management technology, a part of the total asset management system. It is a centralized process with a very decentralized implementation. We have a staff of 2 people in my branch that coordinate the asset management process for CDOT. In that we have 11 different asset classes that we manage with a roughly $55 million budget annually. With this asset management system we are responsible for coordinating the activities of those 11 asset classes as well as coordinating with internal stakeholders on items such as project selection, prioritization, implementation, and documentation of asset management processes. Included in this is data collection and monitoring. We probably have about a dozen people overall in CDOT directly associated with asset management as part of their full time job, with another 100 additional stakeholders who have either asset management duties or coordination with asset management responsibilities. The asset management tool that we use which could be described as our asset management system is Deighton dTIMS. We use it as a multi-asset management system and out of 11 different asset classes 10 of them have analysis of data within Deighton. The one missing is maintenance. That is in a different system: Maintenance Management System (MMS). It is sort of an in house developed tool with some SAP integrated in.

Additional Question: Is your goal for the future to migrate maintenance over to Deighton’s system? Is that part of your long range plan?

---No, it was part of our short range plan when we first started implementing Deighton and when I took the position that’s probably the first thing that I did was to stop that process. What we found is that maintenance ended up with too many treatment options to inform any sort of investment decision making or prioritization decision making. More generally they don’t have projects like the other programs for their asset engineering and constructing. It’s more of a series of activities that they do. And when you try to allocate resources based on a performance of those activities you end up with let’s say over a 10 year analysis period between 40 thousand and 60 thousand treatment recommendations, and you can see how it just gets to be not very well informing.

2.) Is your asset management system in place because of the General Accounting Standards Board (GASB) Statement 34 standards, or for some other reason?

---I’m one of those people in DOT that wonders why we have such a big emphasis on GASB in asset management. It’s a total non-factor for things that we do on the asset management side. We are looking for a better way to do business, and essentially we were running out of money to fund some of these projects and if we’re really pinching pennies here let’s make sure we are investing with the biggest “bang for the buck” in mind. That’s pretty much the primary driver for going toward asset management, the biggest bang for the buck for CDOT was preserving what we currently had—asset management. Yes, we still have needs, Colorado is a growing
state, we have needs to include additional capacity but we weren't going to sacrifice that additional capacity for declining levels of service for our existing infrastructure and that was the primary driver. Not just aimed toward asset management but expending resources based on a performance goal in mind. We needed more data driven or performance driven tools to inform that. For us we have been with Deighton since 1997 and it was the best system for us at the time to manage our asset classes. Going through and evaluating what type of system we could invest in Deighton just sort of found its way up to the top, and that's why we chose that. I want to say there are 22 DOTs that use Deighton.

Additional Question: Did MAP 21 play a role at all in your choice for how you manage assets? I'd probably say no to that. We ramped up asset management probably at the tail end of 2011 before we got the MAP-21 mandates. With that I think we had made all decisions on the direction for asset management and had at least 9 of our asset management classes included within our asset management approach by 2012. It definitely is more forming the shape of asset management at least in reporting for Colorado in the short term. We're focused on the NHS but for us again we made this decision to find a better way to do business and we were focused on a statewide approach irrespective of the administrative classification. We had our own prioritization and we always knew that the interstates and NHS sort of formed that prioritization as more used based rather than administrative classification.

A. On a scale of 1-10, with 1 being the lowest and 10 being the highest, how do you feel your asset management system is performing? About a 7. You'd be hard pressed to find a DOT that is 1.) managing as many asset classes in a formal way, 2.) that has data driven approaches and analysis on asset management, and 3.) has such a large amount in their project budget. Our annual budget is between $1.4 to $1.6 billion a year and almost $800 million of that goes toward asset management. That said there are still a lot of areas we can improve in.

B. How do you think it could it be improved? Primarily process and optimization. Right now our models are driven off condition and dollar amounts alone. So they don't include other less tangible benefits that you get. Think about social benefits. The theory behind that is if you do any kind of construction project you are likely going to get a safety benefit. If you do a bridge project or pavement project you'll likely get a benefit to mobility. Any time you spend a dollar you're gaining economic vitality benefits and how do you use those other goal areas within those categories to best prioritize your investment strategy. It's about achieving the greatest bang for the buck, and it isn't limited to just condition alone. We want to achieve safety benefits. We want to have better mobility, we want to drive economic vitality activities throughout the state. Which projects are going to best enable us to do that? We are working over the next year to figure out exactly how we're going to be able to get that logic built within the Deighton infrastructure.

3.) Does your asset management system use depreciation accounting to assess the value of capital assets or some other method? In asset management we do not use depreciation.
A. If using depreciation, what type of depreciation is used? Straight line depreciation or something else?  
---[REFERRED TO FINANCIAL PERSONNEL]

B. If other method, what method are you using and why? Please describe.  
---Colorado uses more of a difference between current asset value and gross replacement cost.  
We’re looking at the age, the quality of the features, inflation. Depreciation can take an asset  
down to zero and for asset managers our asset infrastructure would never be worth zero.  
That’s part of the inherent issue with GASB. If you’re asking people doing asset management  
we’re not concerned with depreciation. If you’re asking someone from accounting, accounting  
absolutely is using the GASB depreciation, but that information is not useful to me. Let me  
explain how we look at gross replacement cost. With that we are factoring in condition,  
obsolescence, and other factors like have we made any improvements to that asset and at what  
cost. For us gross replacement cost by including the obsolescence factor in our equation for  
determining what we think the value is we’re really look at is if we were to build this over again  
it wouldn’t likely be a replacement in kind. It would be building toward current spec and  
toward current driver need. If that wasn’t the case we would end up with a lot of two lane  
bridges and not six lane or four lane bridges even though that was the need.

C. Does your method account for maintenance preservation costs? If so, how?  
---Gross replacement cost accounts for maintenance preservation costs. Current value  
accounts for—have we made any improvements like adding a better guardrail to a bridge, or  
widened the shoulders of the pavement that adds extra value.

D. Does the method maintain infrastructure assets at or above a condition level  
established by the state? [ex. infrastructure assets are not to drop under listed % or some  
other value]  
---Yes, for all of our asset classes there is a performance metric and a performance target. At  
least one performance metric and performance target. It’s not a low or minimum threshold--  
with a balanced budget this is what we believe we can achieve, this is what we’re striving for.  
As well as an aspirational target—that given unlimited amounts of money this is what we  
believe we can do. It is for both assets managed by Deighton as well as MMS for maintenance.  
To clarify, 1.) all 11 assets’ performance targets are adopted by our transportation commission  
by a resolution. So that lays out what the commission’s investment strategy is.  2.) When  
looking at maintenance and MMS it’s more or a service level of activities. So if you have  
roadway services or a traffic services maintenance program area it will have a grade associated  
with what you are trying to achieve.

E. If so, what are those condition levels for: a. bridges; b. highways? Are those in line  
with engineering standards?  
---When it comes to maintenance it is more of a level of service standard based on our  
interpretation of what the customer is wanting. When it comes to the other asset classes that  
are more traditional engineering it is based upon an engineering standard and the cost for
achieving those standards. There is some wiggle room there, for example when it comes to ITS equipment there is a manufacturer’s spec.

4.) Does the method account for all infrastructure assets or only major capital assets?  
---I would never say all assets. Out of our 11 asset categories we chose those through a prioritization study. I would say it includes all major assets but there are of course some things that are not explicitly in that strategy. For example, things like guardrail, it’s not an asset class in and of itself; it’s handled under maintenance. Same with fencing. We do have some other ancillary assets like traffic signals. Our Policy Directive 14, the commission’s approved or adopted performance metrics, you’ll be able to see what the high level assets that are included within our asset management strategy. Maintenance is the one that takes care of everything else.

   A. Has the state accounted for those assets retroactively to 1980 (previously constructed) or just new construction? As of what date did that accounting start?  
---I believe it was fixed assets over $5,000 in value. I want to say yes, but that’s not my department.

   B. Does your method account for those assets at historical cost, or at estimated historical cost if historical cost is not available?  
---[SEE QUESTION 5 ANSWER]

   C. If infrastructure asset expenses are not itemized individually in the state’s Comprehensive Annual Financial Report (CAFR), what state Department of Transportation (DOT) or other financial documents might contain that information?  
---[REFERRED TO FINANCIAL PERSONNEL]

   D. What is your state’s threshold for capitalizing infrastructure assets? For example, do you start counting infrastructure as a major capital asset when it exceeds $10,000 or more, or some other threshold?  
---For asset management a $5k or $10k threshold is not a determinant if it is a major capital asset. In the previously mentioned example of ITS many of the devices cost less than that threshold, but it is one of those things where we ask what is the sum of the parts. We look at the whole and what is our total investment state. That determines whether we look at it as a major capital asset class. We are not looking at individual cameras or computers, but the ITS personnel are looking at individual cameras for replacement.

5.) For what other reasons, besides those from a financial reporting perspective, did your state choose to adopt the modified (or traditional) approach? Can you speak to any political aspects, such as input from the Governor’s Office, a voter referendum, or legislative actions that influenced the state’s financial reporting?  
---Bridge Enterprise was sent up to address our most critical bridges. Bridges that are not only in bad condition but are functionally obsolete. They were not meeting the needs of our customers. They were attached to our asset management program but there are two sides to
it. 1.) Bridge Replacement Activity which Bridge Enterprise is responsible for and 2.) Bridge Preventative Maintenance Program which CDOT maintenance staff is responsible for. When maintenance is too costly and a bridge needs to be replaced it will be transferred to the Bridge Enterprise. Bridge Enterprise money is dedicated use, but can only be used on bridges transferred into that program. It then ceases being a CDOT bridge. The bridge does not transfer back to CDOT when it is replaced and preventive maintenance on that new bridge becomes minimal. The four methods used are 1.) the GASB way, 2.) Gross Replacement Cost / Obsolescence, 3.) Current Asset Value, and 4.) User Value. User Value is what is the benefit of our assets to the traveling public; a use based way of evaluation. Everybody asks what does replacement cost or the current asset value tell you. We calculate what the value of a particular asset was, say $1 billion that we weren’t managing and would end up going away. We said that out of the other assets this is too large of an asset to let it go unmanaged. Using that information you are able to start developing a strategy for what the replacement looks like. You find in your analysis using current value what you will have to spend annually to make a $1 billion asset last 30 years in good condition. Asset management is a different process than using accounting to meet a federal standard like GASB.

6.) Do you know of another state that uses a similar asset management system as yours? If so, which state(s), and how is your system similar?
---I believe 22 other states use Deighton, but I don’t know of another state that uses it the way Colorado does.

7.) Do you know of another state that uses a similar accounting method (depreciation / modified approach) as yours? If so, which state(s), and how is your method similar?
---Michigan uses GASB approach and normally when there is a discussion about valuation it is either Michigan or Colorado talking. California has a robust asset management system and Utah is another state to look at. The uniqueness of Colorado is that we pool all of our money together and the assets compete for that. What that required us to do was put all the assets in the same system, and I think we are the only ones doing that at this point.

8.) Please describe the impact MAP-21 requirements have had on your state’s asset management system and reporting of infrastructure assets in CAFRs.
---MAP-21 is causing large changes in how we do business. We take a statewide approach but we are having to rebuild our models within Deighton. We had been using our own performance metrics for pavement and bridge that don’t necessarily align with the federal performance metrics. Bridge is a little more straightforward as we had been using structural deficiency and structural deficiency is not too far off from bridge good-fair-poor. For pavement we are using drivability life which does use IRI (International Roughness Index) and includes webbing, cracking, and faulting but uses it in a very different way. There are regional differences that are not taken into account. There have also been issues with data collection and difficulties in aligning data collection with reporting timelines to set effective targets.
9.) Would you be able to refer us to colleagues who could also answer these questions? Do you have any associates in the state DOT or Federal Highway Association (FHWA) who would be willing to participate in this research?
---I know of one person who can comment on CAFRs and the work that feeds into them. Between myself and this other associate you will be speaking to the two people who would be most knowledgeable in terms of informing your questions.

Additional Question: In terms of recommendations. If you could make a specific recommendation to GASB what would that be?
---I’m actually a proponent for standards. For me what a standard does is by stating a minimum requirement it gives an understanding for states to find innovative ways to go above and beyond those minimum requirements, but also have something to report on the equal playing field. For us with standards we absolutely look at what is our neighbor doing, our neighbors being the Rocky Mountain states, Idaho, Utah, New Mexico—places that have similar environmental factors and similar terrain. Similar urban/rural issues and how are they achieving excellence either in condition or just user experience, and can we use those to baseline and a minimum standard does that. My point is have a standard that’s actually meaningful. When it comes to the current methodologies it doesn’t really inform the investment decision making process. It doesn’t tell me what do I need to spend money on, and how does it relate to asset condition. If we’re going towards standards, which again, standards are the most useful thing a governmental board or agency can do for a department if it means something to inform an investment decision.

B.) Interview Two—Questions on Asset Management:

1.) Can you describe your current asset management system? Is it developed by the state or is it an “off the shelf” system? What transportation assets are reported?
---Colorado’s Asset Management Plan (TAMP) is developed, by law, by the Colorado Department of Transportation (CDOT). CDOT has a consultant on board to assist them. CDOT is incorporating 11 assets. Bridge, pavements, culverts, road equipment, geohazards, retaining walls, maintenance, buildings, ITS equipment, Tunnels, and traffic signals.

2.) Is your asset management system in place because of the General Accounting Standards Board (GASB) Statement 34 standards, or for some other reason?
---It is a requirement of MAP-21

   A. On a scale of 1-10, with 1 being the lowest and 10 being the highest, how do you feel your asset management system is performing?
---CDOT has been operating on an existing TAMP sine 2013. Adjustments are being made to be in compliance with MAP-21 rule making.

   B. How do you think it could be improved?
---Not sure what their revised TAMP will have?
3.) Does your asset management system use depreciation accounting to assess the value of capital assets or some other method?
---Not sure, need to ask CDOT

   A. If using depreciation, what type of depreciation is used? Straight line depreciation or something else?
---[NO RESPONSE]
   B. If other method, what method are you using and why? Please describe.
---[NO RESPONSE]
   C. Does your method account for maintenance preservation costs? If so, how?
---[NO RESPONSE]
   D. Does the method maintain infrastructure assets at or above a condition level established by the state? [ex. infrastructure assets are not to drop under listed % or some other value]
---[NO RESPONSE]
   E. If so, what are those condition levels for: a. bridges; b. highways?
---[NO RESPONSE]

4.) Does the method account for all infrastructure assets or only major capital assets?
---Bridge, pavements, culverts, road equipment, geohazards, retaining walls, maintenance, buildings, ITS equipment, Tunnels, and traffic signals.

   A. Has the state accounted for those assets retroactively to 1980 (previously constructed) or just new construction? As of what date did that accounting start?
---Not sure, need to ask CDOT
   B. Does your method account for those assets at historical cost, or at estimated historical cost if historical cost is not available?
---Not sure, need to ask CDOT
   C. If infrastructure asset expenses are not itemized individually in the state’s Comprehensive Annual Financial Report (CAFR), what state Department of Transportation (DOT) or other financial documents might contain that information?
---Not sure, need to ask CDOT
   D. What is your state’s threshold for capitalizing infrastructure assets? For example, do you start counting infrastructure as a major capital asset when it exceeds $10,000 or more, or some other threshold?
---Not sure, need to ask CDOT

5.) For what other reasons, besides those from a financial reporting perspective, did your state choose to adopt the modified (or traditional) approach? Can you speak to any political aspects,
such as input from the Governor’s Office, a voter referendum, or legislative actions that influenced the state’s financial reporting?
---Not sure, need to ask CDOT

6.) Do you know of another state that uses a similar asset management system as yours? If so, which state(s), and how is your system similar?
---Not sure, MAP-21 requires all states to develop a TAMP by April 30, 2018

7.) Do you know of another state that uses a similar accounting method (depreciation / modified approach) as yours? If so, which state(s), and how is your method similar?
---Not sure, need to ask CDOT

8.) Please describe the impact MAP-21 requirements have had on your state’s asset management system and reporting of infrastructure assets in CAFRs.
---Not sure, need to ask CDOT

9.) Would you be able to refer us to colleagues who could also answer these questions? Do you have any associates in the state DOT or Federal Highway Association (FHWA) who would be willing to participate in this research?
--Contact CDOT Representatives for further details.

**C.) Interview Three—Questions on Financial Issues:**

1. What are the reported types of infrastructure assets in your state? Some state’s CAFRs include only roads and bridges, but others include state owned railroads ports, or highway supplements such as signage and drainage systems.
---Roads and Bridges (tunnels are included in the Bridge asset class as a sub-category)

2. How are the life-cycle years of an asset in your state determined? What happens if an asset outlives its life-cycle and is fully depreciated?
---Both Roads and Bridges were converted from the modified approach to the depreciation approach. Bridges were first and the useful life is 75 years. That was before my time and the conversion memo does not say how that was determined. Roads were determined to be 40 years. Research on the subject did not provide anything specific. However, the State of Louisiana had converted just prior to us and we adopted their useful life. If an asset is fully depreciated, it remains on the books until disposal.

3. What is the capitalization threshold for your state’s transportation assets? Are the standards adopted from GASB guidelines or for some other reason?
---$500,000 for both infrastructure per the Colorado State Fiscal Procedures Manual

4. For your state, what is the criteria for identifying non-depreciable capital assets? Are you aware of other states that have different criteria?
Land is the only non-depreciable category we have. Land purchased for infrastructure purposes (right-of-way land) is considered non-depreciable infrastructure on the state’s CAFR and thus in our accounting system as well. It is separate from Land owned by CDOT, primarily where buildings sit.

5. (Depreciation State) How does your state set the depreciation target rate? Do you use straight-line or another accounting method?
---We use straight line depreciation for all asset classes

6. Please discuss your state’s measurement scale and ratings system. What is the criteria behind their rating scales and “what is behind the numbers?”
---I’m not familiar with that concept

7. Please discuss your state’s inventory asset index, and possible changing data points over time.
---Same as #6

8. (Depreciation State) Has the implementation of an asset management system affected the financial reporting? Has the state considered going to the modified approach?
---Asset management and financial reporting for assets have such different focal points there is very little interaction. Here’s my take on the difference: Asset Management is more forward looking and is concerned with how we are going to replace or improve the infrastructure. What it cost originally is not much of a concern. Financial Accounting is more rear-view focused with infrastructure recorded at historical cost and depreciated from there with little concern for replacement or improvement. The concern is to account for how money was spent. With the implementation of GASB 34, CDOT started with the modified approach for roads and bridges (includes tunnels). Neither could be maintained at the proscribed level (60% rated good or fair), so converted to the depreciation approach.

9. (Depreciation State) Is anyone on the financial comptroller/controller’s staff reviewing infrastructure condition reports and is there any consideration on adding this information in the management, decision and analysis portions of the CAFR?
---Infrastructure condition was reported in the CAFR for a few years after the conversion to the modified approach but that has been discontinued. Because of the difference in focus as noted above in question #8, the CDOT financial office is not very involved with infrastructure condition from an asset management standpoint.

10. GASB 34 provides support for increased budget allocations for infrastructure capital and maintenance. Has GASB 34 affected infrastructure capital and maintenance spending in your state?
---I would guess that GASB 34 has not had an effect on capital and maintenance spending in Colorado. If there were more money made available for transportation projects, there are plenty of projects that could be done.
11. Why did your state choose to adopt the modified approach (or traditional depreciation)? Please speak to the financial reporting aspects, as well as outside factors such as political pressure.
---The decision to use the modified approach was before my time, but as I understand it, the approach was easier to implement given information available and the time to implement.

12. Have the reporting practices changed in your state over the last 15 years, and if so what is the possible cause and significance?
---No change in reporting practices

13. Do you know of any other sources of information, besides the CAFR, that contain information related to financial reporting of infrastructure?
---The CAFR would be the best source. I do not know of any others for the State of Colorado.

14. Would you be able to refer us to colleagues who could also answer these questions?
---I am the only accountant for Fixed Assets at CDOT

Additional Follow Up Questions:
A.) Do you feel that GASB-34's standards are helpful, or are they just a requirement you believe you have to continuously meet?
---The GASB 34 standards are used here at CDOT only as a means to comply with financial statement reporting. The rate of an infrastructure asset's depreciation would never be used for the planning of replacement or improvement, that planning is handled by Asset Management using their data and methods.

B.) Do you have any recommendations to improve GASB-34?
---No recommendations for improving GASB 34. It feels like more of a compliance requirement than a real-life useful tool.

C.) Do you ever foresee Colorado moving back to GASB-34's Modified Approach? Why or why not?
---I don’t see Colorado ever moving back to the Modified Approach. We started with that approach and staying above the required ratio of good/fair rated roads and bridges (60%) was difficult to maintain. With funding being stretched even further these days, I don't think we could be certain to stay above that ratio for the foreseeable future. Also, no one would want to go through the work required to implement the Depreciation Approach again.
Office of the Comptroller Questions

All responses are non-attributional. Names will not be included in our final report.

1. What are the reported types of infrastructure assets in your state? Some state’s CAFRs include only roads and bridges, but others include state owned railroads ports, or highway supplements such as signage and drainage systems.

TxDOT reports roads, bridges, and the South Orient Rail Line as part of infrastructure assets. TxDOT also capitalizes highway supplements such as signage, traffic signals and tolling equipment for on system roads. New road construction costs are coded to specific work types, and TxDOT maintains a list that states whether each work type is capitalizable to infrastructure, is a maintenance cost, or is another type of activity that does not fit the previous two categories.

2. How is the life-cycle years of an asset in your state determined? What happens if an asset outlives its life-cycle and is fully depreciated?

We use a consistent 40-year useful life for infrastructure assets owned by TxDOT. When switching to the depreciation approach we polled other states and did an analysis of the expected useful life of our road components. Based on this research we chose the 40 year life. Preservation costs are capitalized after an asset is originally built and then depreciated separately.

3. What is capitalization threshold for your state’s transportation assets? Are the standards adopted from GASB guidelines or for some other reason?

Capitalization thresholds for major classes of assets were established by the State Comptroller’s Office, who produces the State Comprehensive Annual Financial Report. These thresholds are required to be used by all state agencies. Land, permanent easements and construction in progress do not have a capitalization threshold. Infrastructure has a capital asset threshold of $500,000 and temporary easements have a threshold of $100,000. These thresholds were not specifically-mandated by GASB, but were set at amounts deemed material by the State of Texas.

4. For your state, what is the criteria for identifying non-depreciable capital assets? Are you aware of other states that have different criteria?

Our accounting policy treats land, permanent easements and construction in progress as non-depreciable capital assets. I am not aware of other states with different criteria.

5. (Depreciation State) How does your state set the depreciation target rate? Do you use straight-line or another accounting method?

We use straight line depreciation over a 40-year life. As discussed above, the 40-year life was decided on after polling other states using the depreciation approach to see what useful life was being applied.

6. Please discuss your state’s measurement scale and ratings system. What is the criteria behind their rating scales and “what is behind the numbers?”
I believe this only applies to the modified approach. TxDOT reports infrastructure using the depreciation approach. If not, please provide additional clarification and I will get you an answer to this question.

7. Please discuss your state’s inventory asset index, and possible changing data points over time.

I believe this only applies to the modified approach. TxDOT reports infrastructure using the depreciation approach. If not, please provide additional clarification and I will get you an answer to this question.

8. (Depreciation State) Has the implementation of an asset management system affected the financial reporting? Has the state considered going to the modified approach?

TxDOT transitioned from using the modified approach for highways to using the depreciation approach for all infrastructure assets in fiscal 2014. The change in accounting policy has streamlined our financial reporting, because we are now able to report bridges and highways under a single asset type instead of accounting for them separately.

9. (Depreciation State) Is anyone on financial controller’s staff reviewing infrastructure condition reports and is there any consideration on adding this information in the management, decision and analysis portions of the CAFR?

Since TxDOT is not longer using the modified approach, these reports are mainly the responsibility of our maintenance division, however, Financial Reporting does reach out to the Maintenance Division periodically throughout the year to ensure there aren’t impairment concerns with any specific roads.

10. GASB 34 provides support for increased budget allocations for capital and maintenance. Has GASB 34 affected infrastructure capital and maintenance spending in your state?

I would say our capital and maintenance spending is not specifically linked to GASB 34 since we are using the depreciation approach and are not tied to reporting our infrastructure assets at a specific condition level. The capital and maintenance spending on our roads is most directly linked to what funding (state, federal, bond, etc.) is available.

11. Why did your state choose to adopt the modified approach (or traditional)? Please speak to the financial reporting aspects, as well as outside factors such as political pressure.

Our state transitioned from the modified approach to the depreciation approach for all infrastructure beginning in fiscal 2014 to streamline our financial reporting process. Prior to this change, our bridges were reported using the depreciation approach and our highways were reporting using the modified approach. TxDOT conducted a survey of other states’ reporting methods through NASACT and found that we were only of only a few states to adopt a hybrid approach for reporting our infrastructure assets.

12. Has the reporting practices changed in your state over the last 15 years, and if so what is the possible cause and significance?

The main change has been the transition to the depreciation approach for reporting all infrastructure assets for reasons discussed above. Prior to this change we presented bridges as depreciable infrastructure and highways as non-depreciable infrastructure in our Annual Financial Report.
13. Do you know of any other sources of information, besides the CAFR, that contain information related to financial reporting of infrastructure?

Please see the Comptroller Reporting Requirements page at the following link to see policy documentation on the reporting of infrastructure in the state CAFR.


Detailed information at the project level is maintained in our internal accounting system.

14. Would you be able to refer us to colleagues who could also answer these questions?

Responses to these questions are provided after gathering input from the Financial Reporting Manager and our Capital Assets Analyst.
Interview Questions
George Mason Spring 2018 Practicum

All responses are non-attributional. Names will not be included in our final report.

1.) Can you describe your current asset management system? PeopleSoft – Asset management module (AM). This is an Oracle-based product that houses the inventory of TxDOT’s capital assets. Accounting entries are generated to record capital asset activity from this module to the general ledger on a monthly basis.

Is it developed by the state or is it an “off the shelf” system? The PeopleSoft product was purchased off the shelf and the AM module within the system was modified to fit our business needs.

What transportation assets are reported? Land, Construction in Progress, Easements, Buildings, Highways, Vehicles, Equipment, Leaseholds, Software.

2.) Is your asset management system in place because of the General Accounting Standards Board (GASB) Statement 34 standards, or for some other reason? GASB 34

A. On a scale of 1-10, with 1 being the lowest and 10 being the highest, how do you feel your asset management system is performing? The system is a 9, there is always room for improvement.

B. How do you think it could it be improved? We are happy with the current design of the system. We have a ticket process to initiate changes to the system when they are needed and reasonable.

3.) Does your asset management system use depreciation accounting to assess the value of capital assets or some other method? No, depreciation is calculated by the State Property Accounting system (SPA) and then recorded to the TxDOT financial statements through an annual journal entry.

A. If using depreciation, what type of depreciation is used? Straight line depreciation or something else? Straight line.

B. If other method, what method are you using and why? Please describe. N/A

C. Does your method account for maintenance preservation costs? If so, how? Preservation costs are capitalized as part of the state highway system.

D. Does the method maintain infrastructure assets at or above a condition level established by the state? [ex. infrastructure assets are not to drop under listed % or some other value]. TxDOT uses the depreciation approach, thus we do not have a set condition level threshold.

E. If so, what are those condition levels for: a. bridges; b. highways? N/A

4.) Does the method account for all infrastructure assets or only major capital assets? All capital assets.

A. Has the state accounted for those assets retroactively to 1980 (previously constructed) or just new construction? As of what date did that accounting start? All capital assets in existence prior to 2002 were added in 2002. All new capital assets acquired or constructed subsequent to 2002, were added in the year acquired or constructed.

B. Does your method account for those assets at historical cost, or at estimated historical cost if historical cost is not available? Historical cost
C. If infrastructure asset expenses are not itemized individually in the state’s Comprehensive Annual Financial Report (CAFR), what state Department of Transportation (DOT) or other financial documents might contain that information? TxDOT is able to run the itemized capital asset expenditures out of the PeopleSoft System.

D. What is your state’s threshold for capitalizing infrastructure assets? For example, do you start counting infrastructure as a major capital asset when it exceeds $10,000 or more, or some other threshold? Infrastructure assets have a $500,000 threshold.

5.) For what other reasons, besides those from a financial reporting perspective, did your state choose to adopt the modified (or traditional) approach? Can you speak to any political aspects, such as input from the Governor’s Office, a voter referendum, or legislative actions that influenced the state’s financial reporting? Prior to fiscal 2014, TxDOT used the modified approach for highways and the depreciation approach for bridges. In fiscal 2014, TxDOT elected to switch to the depreciation approach for all infrastructure assets to streamline capital asset reporting. When making this changed we received input from the State Auditor’s Office, the State Comptroller’s Office as well as financial reporting staff members from other states.

6.) Do you know of another state that uses a similar asset management system as yours? If so, which state(s), and how is your system similar? Peoplesoft may be used by other states, but our system is modified to handle unique TxDOT systems that interface with our version of Peoplesoft.

7.) Do you know of another state that uses a similar accounting method (depreciation / modified approach) as yours? If so, which state(s), and how is your method similar? We mirror the State of Virginia and have adopted a simplified approach for converting Construction in Progress (CIP) to Infrastructure. We hold three years of highway costs in CIP and move the first year of cost to depreciable infrastructure in year 4. We do not do not analyze completion dates of each highway to determine when costs should be moved from CIP to depreciable infrastructure.

8.) Please describe the impact MAP-21 requirements have had on your state’s asset management system and reporting of infrastructure assets in CAFRs.

No change to the reporting of infrastructure assets in CAFR due to MAP-21. However, TxDOT has developed additional software to better track the condition of our roads.

9.) Would you be able to refer us to colleagues who could also answer these questions? Do you have any associates in the state DOT or Federal Highway Association (FHWA) who would be willing to participate in this research?

Responses of multiple individuals within TxDOT were consolidated to complete this survey. We are happy to provide additional information if requested.
All responses are non-attributional. Names will not be included in our final report.

1.) Can you describe your current asset management system? Is it developed by the state or is it an “off the shelf” system? What transportation assets are reported?

Answer: TxDOT assets are managed separately by different divisions. There is an ongoing project (MPPM) to possibly combine all assets into one system. Most likely the one MPPM system will integrate with all other individual asset management system to extract data. The most important system is pavement management system called Pavement Analyst in Texas. The PA is off the shelf system. Bridge has bridge management database but not a system.

2.) Is your asset management system in place because of the General Accounting Standards Board (GASB) Statement 34 standards, or for some other reason?

A. On a scale of 1-10, with 1 being the lowest and 10 being the highest, how do you feel your asset management system is performing?

Answer: for pavement management system, I would rate 8.

B. How do you think it could be improved?

Answer: it is a good system. We just need to improve performance models and decision trees to help districts to make better decisions regarding choosing right treatment on the right roads at the right time.

3.) Does your asset management system use depreciation accounting to assess the value of capital assets or some other method?

A. If using depreciation, what type of depreciation is used? Straight line depreciation or something else?

Answer: our system doesn’t do assess the value of asset. That is more for accounting and finance division. For MAP 21 requirement, we use replacement cost only..

B. If other method, what method are you using and why? Please describe.

C. Does your method account for maintenance preservation costs? If so, how?

Answer: no. We only consider material in place not including right of way and maintenance costs.

D. Does the method maintain infrastructure assets at or above a condition level established by the state? [ex. infrastructure assets are not to drop under listed % or some other value]

Answer: That is a separate topic related to the allocated funding level. That information will be in TxDOT official TAMP.

E. If so, what are those condition levels for: a. bridges; b. highways?

4.) Does the method account for all infrastructure assets or only major capital assets?

A. Has the state accounted for those assets retroactively to 1980 (previously constructed) or just new construction? As of what date did that accounting start?
Answer: we use all of our inventory pavements and bridges when meet MAP 21 requirements.

B. Does your method account for those assets at historical cost, or at estimated historical cost if historical cost is not available?

Answer: No

C. If infrastructure asset expenses are not itemized individually in the state’s Comprehensive Annual Financial Report (CAFR), what state Department of Transportation (DOT) or other financial documents might contain that information?

Answer: Most likely Finance Division

D. What is your state’s threshold for capitalizing infrastructure assets? For example, do you start counting infrastructure as a major capital asset when it exceeds $10,000 or more, or some other threshold?

Answer: This is a question for Finance Division.

5.) For what other reasons, besides those from a financial reporting perspective, did your state choose to adopt the modified (or traditional) approach? Can you speak to any political aspects, such as input from the Governor’s Office, a voter referendum, or legislative actions that influenced the state’s financial reporting?

Answer: you may need to work with Finance Division for these details.

6.) Do you know of another state that uses a similar asset management system as yours? If so, which state(s), and how is your system similar?

No.

7.) Do you know of another state that uses a similar accounting method (depreciation / modified approach) as yours? If so, which state(s), and how is your method similar?

No.

8.) Please describe the impact MAP-21 requirements have had on your state’s asset management system and reporting of infrastructure assets in CAFRs.

Answer: as far as I know, we do separate asset valuation in TAMP, which is completely separated from CAFRs.

9.) Would you be able to refer us to colleagues who could also answer these questions? Do you have any associates in the state DOT or Federal Highway Association (FHWA) who would be willing to participate in this research?

Not sure.