



# 2016-17 CDOT Performance Plan



**COLORADO**  
Department of  
Transportation

*August 2016 Resubmission*





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# Introduction & Overview

The Colorado Department of Transportation (CDOT) is pleased to present its Performance Plan for fiscal year 2016-17. This plan will help the Department serve Coloradans by effectively administering and delivering transportation-related programs and services.

Described in this document are one- and three-year Strategic Policy Initiatives; strategies and processes supporting those initiatives; output and outcome measures indicating performance levels; and a description of the environment, inputs and customer for each initiative. A description of the Department also is included.

The Performance Plan is required by the 2013 revision of the State Measurement for Accountable, Responsive and Transparent Government (SMART) Act. The Governor's Office of State Planning and Budgeting (OSP) provides guidance each year on recommended and required content.

Certain components of the plan have changed this year due to consultations with OSPB throughout fiscal year 2015-16. (See page 9.) Revisions may continue to occur through this partnership, and as CDOT completes its annual review of the Federal Highway Administration-CDOT Stewardship and Oversight Agreement and other documents that contain many of the same or similar performance indicators.



*U.S. Highway 36, near Broomfield.*

# Department Description

The Colorado Department of Transportation is the cabinet department that plans for, operates, maintains and constructs the state-owned transportation system, including state highways and bridges. The Department's statutory authority resides within Title 43, Part 1, Colorado Revised Statutes (2016). Article 1 vests the Colorado Transportation Commission with authority over planning, development, and adoption of CDOT's annual budget.

CDOT is responsible for a state highway system that encompasses more than 9,100 centerline miles (about 23,000 total lane miles) and includes more than 3,400 bridges. This system each year handles more than 28 billion vehicle miles of travel. Although the Interstate system accounts for only about 10 percent, or 952, of the centerline miles on the state system, about 40 percent of state-highway travel within Colorado takes place on Interstate highways.

## Vision, Mission and Strategic Framework

The Department's **vision** is to enhance the quality of life and the environment of the citizens of Colorado by creating an integrated transportation system that focuses on safely moving people, goods and information by offering convenient linkages among modal choices. CDOT's **mission** is to provide the best multi-modal transportation system for Colorado that most effectively and safely moves people, goods and information. CDOT's core values are safety, people, respect, integrity, customer service and excellence.

From these organizational priorities, the Department establishes mid- to long-term performance goals and objectives. CDOT's Policy Directive 14, an updated version of which was adopted by the Governor-appointed Colorado Transportation Commission in 2015, provides policy direction on investment decisions to achieve certain performance levels for the statewide transportation system, including safety, infrastructure condition, maintenance and system performance levels. The objectives in Policy Directive 14 help set direction for funding levels for various programs in the long-range Statewide Transportation Plan, the near-term Statewide Transportation Improvement Plan (STIP), and the Department's annual budget.

CDOT continues to develop the strategic framework it established in June 2015 under new executive management. The Department reached out to employees at all levels to help refine this framework, and an associated employee survey in mid-2015 yielded more than 700 responses.



*CDOT intends to become the best transportation department in the country for its customers by reaching the three peaks above.*



The Department's new strategic framework focuses on reaching the "**summit**" of becoming the best transportation department in the country for our customers. Success in reaching this goal will boost the health of Colorado's transportation system and maximize the freedom of people in the state to decide how, when and where they want to go. CDOT's **purpose** is to provide freedom, connection and experience through travel.

CDOT's Executive Director has established four key goals and related strategies for fiscal year 2017. These goals overlap with the Strategic Policy Initiatives contained in this plan.

**Goal No. 1: Travel-Time Reliability**—Slow the growth of congestion on Interstates 25 and 70 according to the Planning Time Index targets for calendar year 2017 described in CDOT's 2016-17 Performance Plan.

Key strategies:

- Hire a new Director of Intelligent Mobility by summer 2016.
- Launch a Transportation Innovation Council to guide CDOT's new RoadX program by August 2016. RoadX aims to use innovations to achieve crash-free, injury-free, delay-free and technologically-transformed travel. RoadX projects will combine public and private efforts to implement innovative Intelligent Transportation Systems and prepare CDOT for the more widespread use of connected, automated and autonomous vehicles.
- Launch the cellular Interstate 70 Mountain Connected Vehicle pilot project by early 2017.
- Complete the Interstate 25 Managed Motorways design and stakeholder outreach by late spring 2017.
- Continue implementation of CDOT's "Vision 2018" Wildly Important Goal of improving travel-time reliability on Interstates 25 and 70 by May 2017.
- Identify funding for construction of North Interstate 25, from Fort Collins to Loveland, by fall 2016. Issue a Request for Proposal by spring 2017.
- Move toward construction on Central 70, a project that includes replacing the 50-year-old Interstate 70 viaduct in Denver, by obtaining a Record of Decision during fall 2016. Select CDOT's P3 (public-private partnership) partner in spring 2017. Reach financial close by mid-2017.

**Goal No. 2: Safety**—Move Colorado toward zero deaths by reducing traffic-related deaths by one-half by 2030 by reducing fatalities by 12 per year, from 548 in 2008 to 344 in 2025, and by reducing both worker's compensation and lost-time claims.

Key strategies:

- Actively promote the development and adoption of legislation to institute a primary seat-belt law by June 1, 2017.
- Reduce worker's compensation claims by 10 percent in calendar year 2016 compared to calendar year 2015 levels.
- Reduce lost-time claims by 10 percent in calendar year 2016 compared to calendar year 2015 levels.

**Goal No. 3: Healthy Multi-Modal System: Maintenance and Pavement Condition**—Maintain CDOT's roadways and facilities to minimize the need for replacement or rehabilitation in a constrained funding environment, achieving the Maintenance Levels of Service (MLOS) and Drivability Life targets described in CDOT's 2016-17 Performance Plan.

Key strategies:

- Complete work on U.S. Highway 34 Segment 1, and prioritizing remaining U.S. 34 segments and other permanent repair projects statewide by summer 2017.

- Progress on the pre-NEPA (National Environmental Policy Act) study for Interstate 25 South, from Monument to Castle Rock.
- Continue to actively support new revenue options including exploring road usage charging and other options.
- Complete CDOT's actionable activities for Colorado's "16 in 2016" recreational and other types of trails. These 16 trails were identified by the Colorado Department of Natural Resources with help from the public across Colorado.

**Goal No. 4: Our People**—Develop a workforce with a passion for coming to work every day and attract new employees who want to work for the best transportation department in the country.

Key strategies:

- Begin construction on a consolidated headquarters and Region 1 office by fall 2016.
- Host a second leadership retreat and launch new supervisor training by fall 2016.
- Develop new hiring and training strategies for CDOT's current and future workforce based on changing technology and needs (completion date to be determined).

## Department Structure

The state's transportation system is managed by CDOT under the direction of the Colorado Transportation Commission, which is composed of eleven members who represent specific districts. Each commissioner, appointed by the Governor and confirmed by the Senate, serves a four-year term. The commission directs policy and adopts Departmental budgets and programs.

The Executive Director's Office leads the Department in planning for and addressing Colorado's transportation needs. The Executive Director and other members of the Executive Management Team set the direction of the Department, make recommendations to the Transportation Commission, ensure consistent communication, set internal policy, set short-term and long-range goals, and provide leadership for the Department through the execution of the Transportation Commission's policies and budgets.

CDOT's Chief Engineer, who is also the Transportation Program Director, is responsible for integrated transportation program-development functions including planning, engineering, design and construction. Reporting to the Chief Engineer and Transportation Program Director are CDOT's Division of Transit & Rail, Division of Transportation Development, Office of Major Project Development, Project Support, Civil Rights, Property Management and the Office of Program Management.

The Department's divisions and offices, along with its Transportation Regions, perform an array of functions. Examples include:

- Colorado's five Transportation Regions operate under the guidance of the Deputy Director/Chief Operating Officer and their respective Regional Transportation Directors. CDOT's Transportation Regions design highway projects and awards contracts to private companies that submit the lowest bids to construct the projects. The Regions also deliver needed maintenance for the state highway system and maintain ongoing contact with local governments, industry and the public. Each Region covers all aspects of CDOT operations for that Region, including engineering, planning and environmental management, traffic, right-of-way and surveying, and utilities.
- Regions, supported by the Division of Highway Maintenance, also take care of the highway system by plowing snow, repairing pavement, maintaining guardrails and more.

- The Division of Transportation Systems Management and Operations (TSM&O) focuses on implementing low-cost, high-value operational improvements to get more out of Colorado’s existing transportation system.
- The Office of Transportation Safety helps local law-enforcement agencies with special funds to provide educational programs to reduce distracted and impaired driving and to increase the use of safety belts.
- The Division of Aeronautics supports aviation interests statewide, including by awarding and administering grants to help improve local airports. The Division operates under the direction of the Colorado Aeronautical Board.
- The Division of Transit and Rail provides assistance to numerous transit systems in the state.
- The Division of Transportation Development manages the statewide transportation-planning process, ensures the Department fulfills its environmental and reporting obligations, and monitors agency performance measures.
- The Office of Major Project Development helps CDOT and the High Performance Transportation Enterprise (HPTE) more effectively and efficiently develop major projects through the promotion of consistency in the advancement, management and oversight of such projects.

## Major Functions

CDOT administers highway, aviation, transit and rail, and other programs pursuant to state laws, federal laws and the policies of the Colorado Transportation Commission. For this plan, the Department uses six functional categories to describe its work:

1. **Capital Construction:** The Department delivers bridge, pavement and other capital construction projects. CDOT ensures pavements, tunnels, bridges and other structures statewide are properly designed, constructed and maintained. **Customers:** All users of the state highway system. This includes resident, tourist and recreational travelers; "through" travelers on the Interstates; business customers such as the freight and tourism industries; the construction community; transit service providers; the military; counties; municipalities and others.
2. **Operations and Maintenance:** CDOT maintains and operates the state highway system. The Division of Transportation Systems Management and Operations (TSM&O) plans, develops, and administers a statewide program to reduce congestion and improve the safety, security, mobility, and efficient use of Colorado’s existing highway system. TSM&O improves the surface transportation system through activities other than building new capacity. Examples include Variable Messaging Signs that allow travelers to adjust trips based on the latest information and traffic signals on ramps that dynamically control the rate at which vehicles enter freeways. Meanwhile, the Division of Highway Maintenance provides policy and guidance for the statewide maintenance program. This Division also maintains operational oversight for the administration of the maintenance program for the nine maintenance sections. CDOT’s maintenance forces take care of the highway system in numerous ways including plowing snow, striping and repairing pavement. **Customers:** All users of the state highway system. This includes resident, tourist and recreational travelers; "through" travelers on the Interstates; business customers such as the freight and tourism industries; the construction community; transit service providers; the military; counties; municipalities and others.
3. **Safety:** CDOT strives to reduce the incidence and severity of motor-vehicle crashes and associated human and economic loss. This is done by incorporating roadway-safety engineering principles in all state highway construction and enhancement projects, conducting safety-specific infrastructure projects, and by administering data-driven safety-education grant programs to influence driver behavior and support law enforcement and local community safety projects. CDOT also works to expand safety partnerships and to provide tools for safety advocates to work with the Department. **Customers:** All users of the state highway system. This includes resident, tourist and recreational travelers; "through" travelers on the Interstates; and

business customers such as the freight and tourism industries. Other customers include safety partners such as Mothers Against Drunk Driving and the Colorado Department of Public Health and the Environment; law enforcement agencies including the Colorado State Patrol; transit services; the military; counties; municipalities and others.

4. **Program and Project Support:** CDOT provides administrative, planning, financial and other support for the transportation system. Project Support includes Operations, CDOT Administration, State Planning and Research, the State Infrastructure Bank, State Highway Fund Contingencies, and the Debt Service and Certificates of Participation programs. CDOT administers funds to Local Programs including the Transportation Alternatives, STP Metro, Congestion Mitigation and Air Quality (CMAQ) and Safe Routes to School programs. **Customers:** All users of the state highway system. This includes residents and visitors; CDOT staff; debt holders; the Federal Highway Administration; Metropolitan Planning Organizations; Transportation Planning Regions; counties; municipalities and others.
5. **Transit and Rail:** CDOT supports transit and rail. The Transit and Rail Division plans, develops, finances, operates, and integrates transit and rail into the statewide transportation system. The Division also operates the Bustang interregional bus system, which connects commuters along the Interstate 25 Front Range and Interstate 70 mountain corridors. The Division works with other transit and rail providers to plan, promote, and implement investments in transit and rail services statewide. The Division also is responsible for administering and expending state and federal transit funds and for developing the Statewide Transit Plan and the Freight and Passenger Rail Plan. **Customers:** Local transit agencies and their users; human service transportation providers; the Federal Transit Administration; Regional Transportation Authorities; and Transportation Planning Regions.
6. **Aeronautics:** CDOT supports statewide aviation interests. The Department's Division of Aeronautics, which is under the direction of the Colorado Aeronautical Board, collects and distributes aviation fuel tax revenue and provides services including planning; airport capital improvement program development; and airport grants administration. **Customers:** Colorado's public-use airports and their users, the flying public, and pilots and other aviation professionals, including those within the Federal Aviation Administration.

## Locations

CDOT's headquarters building is at 4201 East Arkansas Ave. in Denver. The Department owns about 1,200 buildings statewide, including the headquarters building in Denver and five regional offices in Denver, Durango, Grand Junction, Greeley and Pueblo. This inventory also includes 344 storage sheds, which is the most numerous type of building in the inventory, and 297 maintenance/repair buildings, which is the second most common type of building.

## Process Improvement Strategies

CDOT's focus on improving business processes is tied to the Governor's goal of making government more "effective, efficient and elegant." The Department began its structured process-improvement initiative in late 2011 and uses principles and practices of Lean process improvement as its foundation. The key pillars of the Lean initiative are continuous improvement and respect for people.

Process-improvement efforts are spread throughout the Department and include techniques and methods derived from private-sector organizations. CDOT's efforts range from individuals using Lean "Everyday Ideas" to improve their workplaces or processes to "Global Lean" projects that focus on larger, cross-functional processes.

Several cross-functional process-improvement efforts have been undertaken. Examples include:

- Improvement in managing the system of maintenance work orders, implementation of which is substantially complete. A new work order named "DOT1" went live in April 2016. The work order reduced the number



of fields requiring user input by 80 percent and should increase the accuracy of work orders and reduce the time it takes front-line employees to enter information.

- The Heavy Equipment Specification and Procurement Process Improvement Project, which also is nearly complete. CDOT is currently monitoring the process to procure heavy equipment to ensure it can be reduced from an average of 25 months to 14 months.
- The Customer Experience Improvement Project, which streamlined the previous 70-plus step process for addressing certain customer inquiries or complaints to fewer than 20 steps.
- CDOT also is improving how it approves charters for process-improvement projects and trying to speed up implementation of improvements resulting from such projects.

Results of the Department's recent process-improvement efforts and a summary of upcoming projects are available at <http://www.CoDOT.gov/business/process-improvement/>

## Plan Overview

To become the No. 1 transportation department in the country for our customers, CDOT will focus on the "peaks" of Leading-Edge Technology, Our People and a Healthy Multi-Modal System. The Strategic Policy Initiatives in this plan relate primarily to that last peak of creating and maintaining a Healthy Multi-Modal System, which is the traditional role of a transportation department.

### Strategic Policy Initiatives

**1. Safety:** Move Colorado toward zero deaths by reducing traffic-related deaths by one-half by 2030. This includes reducing fatalities by 12 per year, from 548 in 2008 to 344 in 2025. CDOT aims to reduce fatalities to 440 for its one-year target (Dec. 31, 2017 target, or calendar year 2017 fatalities) and 416 for its three-year target (Dec. 31, 2019 target, or calendar year 2019 fatalities).

**2. Pavement Condition:** Attain High or Moderate Drivability Life for 80 percent of sampled lane miles of pavement on the state highway system by 2025, up from 79 percent in fiscal year 2015. CDOT plans to achieve 69 percent High/Moderate Drivability Life for its one-year target (June 30, 2017, target, or fiscal year 2017 pavement condition) and 57 percent for its three-year target (June 30, 2019, target, or fiscal year 2019 pavement condition).

**3. Travel-Time Reliability:** Slow the growth of congestion on Interstate 25, between Northwest Parkway and C-470, during daytime and early evening weekday hours. Slow the growth of congestion on Interstate 70, between Vail and C-470, during daytime and early evening weekend hours. See page 16 for a full description of the initiative, which includes targets for 2017 and 2019.

**4. Maintenance:** Maintain CDOT's roadways and facilities to minimize the need for replacement or rehabilitation in a constrained funding environment. This includes achieving an overall Maintenance Levels of Service (MLOS) grade of C+ for the state highway system in fiscal year 2017 and a C for fiscal year 2019, compared to a B- in fiscal year 2015.

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The Department operates in a constrained funding environment. Greater fuel efficiency and ongoing cost inflation are weakening the ability of state and federal fuel taxes—which have not increased for two decades—to provide sufficient funding for the transportation system. At the same time, population growth means increasing wear and

tear on the highway system. As demonstrated by initiatives No. 3 and No. 4 above, CDOT forecasts its best efforts will at most curb the growth of congestion and the decline in Maintenance Levels of Service.

CDOT's goals are not limited to initiatives outlined in this plan. Other performance goals may be found in documents including CDOT's Stewardship and Oversight Agreement with the Federal Highway Administration, the Transportation Commission's Policy Directive 14, the Department's Risk-Based Asset Management Plan and other documents.

## Employee Involvement

Development of CDOT's Performance Plan included contacts with members of the Executive Management Team, program managers and other employees. CDOT and members of WINS, the state employee union, in fall 2014 discussed including narrative in the plan related to employee safety. CDOT continues this year to include information on worker's compensation claims and efforts to promote employee safety (see pages 10-11). WINS also will be sent a copy of the 2016-17 plan for review.

## Strategic Policy Initiative No. 1: Safety

**Initiative Description:** Move Colorado toward zero deaths by reducing traffic-related deaths by one-half by 2030. This includes reducing fatalities by 12 per year, from 548 in 2008 to 344 in 2025. CDOT aims to reduce fatalities to 440 for its one-year target (Dec. 31, 2017, target, or calendar year 2017 fatalities) and to 416 for its three-year target (Dec. 31, 2019, target, or calendar year 2019 fatalities).

**Background:** Annual fatalities on all roads statewide have fallen 10 percent in the past 10 years, from 606 in 2005 to 546 in 2015.<sup>1</sup> For the past five years alone, however, fatalities grew from 447 in 2011 to 546 in 2015. The Department in late 2014, along with its safety partners, issued an updated Strategic Highway Safety Plan (SHSP), which had the vision of "Moving Toward Zero Deaths." Other states, cities, industry groups and the Federal Highway Administration also support "Toward Zero Deaths" visions. As Colorado's plan notes, Toward Zero Deaths is "a realistic movement that recognizes the objective for every individual, every family and every community should be zero deaths on Colorado's transportation network." (See "Strategies" below for more on the plan.)

**Why this matters:** CDOT has an ethical responsibility to deliver safety programs. Roadway users—motorists and non-motorists alike—expect to arrive at their destinations safely. Through infrastructure projects and campaigns to influence public behavior, the Department plays an instrumental role in ensuring that roads, bridges, tunnels and other infrastructure statewide are safe for the traveling public. In addition to the human costs, the economic cost of fatalities is considerable. The National Safety Council estimates the average economic cost per death in a motor-vehicle crash was \$1.5 million in 2014.

**Environment:** Although declining over the long-term, fatalities since 2010 have begun to climb, as diminishing returns are being seen from improvements in vehicle manufacturing, roadway projects and behavioral education. In response, CDOT and its planning partners who helped create the Strategic Highway Safety Plan have established action plans for eight emphasis areas (see Strategies section below).

The Department is striving to reduce fatalities at a time when both population and Vehicle Miles Traveled on the highway system continue to increase. The state's population has grown 45 percent in the past 20 years, from 3.8 million in 1995 people to 5.5 million in 2015. The population will reach about six million by 2020 and about 8 million by 2040, according to forecasts from Colorado's State Demography Office. Other factors that could limit gains from current safety efforts include the legalization of recreational marijuana in Colorado, which could increase the incidence of impaired driving, and distracted driving due to increased use of mobile devices.

Conversely, the Department sees promise in emerging technologies such as connected vehicle technologies, both vehicle-to-vehicle and vehicle-to-infrastructure. Such technologies are expected to be a key driver in helping the state move "Toward Zero Deaths." Passing a primary seatbelt law and a helmet law in Colorado also would help reduce roadway fatalities.

In addition to the safety of the traveling public, CDOT strives to promote employee safety. Since the inception of the Department's Excellence in Safety program in 2013, CDOT supervisors have conducted on average 12,500 safety engagements each fiscal year. A safety engagement is a direct conversation between a supervisor and his or her direct report specifically about safety at a specific job site. These engagements are recorded by each supervisor into a database. These efforts helped reduce worker's compensation claims from 326 claims in fiscal year 2012 to 242 in

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<sup>1</sup> Fatalities data are subject to revision as new data become available.



fiscal year 2015. According to historical trends, this equates with preventing about 85 employees from suffering an injury who would have done so without the Excellence in Safety process.

**Strategies:** CDOT employs myriad strategies to reduce the incidence and severity of motor-vehicle crashes and associated fatalities. Such strategies include:

- Conducting safety-specific infrastructure projects.
- Administering data-driven safety-education grant programs to influence driver behavior and support law enforcement and local community safety projects.
- Monitoring and analyzing crash data to understand trends regarding the number and severity of collisions. Location-specific data identify sites requiring possible improvement actions.
- Engaging local agencies and organizations to develop safety-improvement strategies to prevent crashes and to address high-incidence locations.
- Advocating for legislation to reduce fatalities and injuries, such as a primary seatbelt law or helmet law.
- Working with the motor vehicle industry to leverage connected and autonomous vehicle technology.

Colorado's Strategic Highway Safety Plan, published in 2014, identifies eight emphasis areas related to the state's most serious traffic safety problems. These areas include: aging road users (65+); bicyclists and pedestrians; data; impaired driving; rural and urban infrastructure; motorcyclists; occupant protection; and young drivers (15-20). Strategies identified by each of the emphasis area teams are located in the appendix of the Strategic Highway Safety Plan. In addition, a Distracted Driving Task Force was formed.

**Selected operational process:** Qualify, select, advertise and award Highway Safety Improvement Program projects. Projects that are selected address identified crash patterns, which are mitigated by the scope of the project and meet a minimum benefit/cost ratio of 1.0. CDOT's goal is to meet a program-wide benefit/cost ratio of 2.0.

**Selected operational metrics ("lead metrics"):** Average benefit/cost ratio for Highway Safety Improvement Projects. Number of dedicated law enforcement contact hours for traffic safety enforcement.

**Major Functional Area:** Safety.

**Customers:** All highway users, including users of all highway transportation modes. This includes resident, tourist and recreational travelers on Colorado's state highway system. Other customers are business travelers including the trucking industry; safety partners such as Mothers Against Drunk Driving and the Colorado Department of Public Health and the Environment; law enforcement agencies including the Colorado State Patrol; transit services; the military; counties; municipalities and others.

**Evaluation:** Fatalities on Colorado roadways increased from 488 in 2014 to 546 in 2015. This was higher than the Department's goal of 464. See the "Environment" section on page 10 for a discussion of recent trends. The Department continues to pursue strategies outlined above and in the Strategic Highway Safety Plan to reduce highway fatalities.

Metric Type	Metric Description	Process	Associated Work Group or Program	Year Type	1- and 3-Year Targets	Performance Results
Strategic Policy Initiative/ outcome/lag metric	Fatalities on Colorado roadways	Implement safety program (see Strategies section above)	Division of Transportation Systems Management and Operations, and the Office of Transportation Safety	CY	CY17: 440 CY19: 416	2013: 481 2014: 488 (rev.) <sup>2</sup> 2015: 546
Outcome/lag metric	Fatalities per 100 million Vehicle Miles Traveled on Colorado roadways	Implement safety program (see Strategies section above)	Division of Transportation Systems Management and Operations, and the Office of Transportation Safety	CY	CY17: 0.92 CY19: 0.88	2013: 1.024 2014: 0.996 2015: N/A <sup>3</sup>
Operational/ "lead" metric	Average benefit/cost ratio for Highway Safety Improvement Projects	Qualify, select, advertise and award Highway Safety Improvement Program projects	Division of Transportation Systems Management and Operations	CY	CY17: 2.0 CY19: 2.0	2015: <sup>4</sup> Q1 (YTD <sup>5</sup> ): 1.68 Q2 (YTD): 2.33 (rev.) Q3 (YTD): 2.31 Q4 (YTD): 2.98 2016: Q1 (YTD) 1.83
Operational/ "lead" metric	Percentage of advertised FASTER Safety Mitigation projects that address Level of Safety Service 3 and 4 locations	Advertise FASTER Safety Mitigation projects	Division of Transportation Systems Management and Operations	CY	CY17: 90% CY19: 90%	2015: <sup>6</sup> Q1 (YTD): 80% (rev.) Q2 (YTD): 77% (rev.) Q3 (YTD): 71% (rev.) Q4 (YTD): 75% 2016: Q1 (YTD): 100%
Operational/ "lead" metric	FASTER Safety Mitigation program dollars spent as a percentage of the program's fiscal-year allocation <sup>7</sup>	Qualify, select, advertise and award FASTER Safety Mitigation program projects	Division of Transportation Systems Management and Operations, Division of Accounting and Finance	FY	FY17: 100% FY19: 100%	2013: 79% 2014: 84% 2015: 159%
Operational/ "lead" metric	Dedicated law enforcement contact hours for traffic safety enforcement <sup>8</sup>	Administer enforcement grants	Office of Transportation Safety	CY	CY17: 66,750 CY19: 92,000	2013: 67,808 2014: 75,689 2015: 84,146
Input	Vehicle Miles Traveled on Colorado roadways	N/A	N/A	CY	N/A (input)	2013: 47.0 billion 2014: 49.0 billion 2015: N/A

2 Revised to reflect latest data.

3 Official 2015 Vehicle Miles Traveled data will not be available until mid-2016.

4 Tracking of metric in current form began in late 2014.

5 Year-to-date.

6 Tracking of metric in current form began in 2015. Measure added to Performance Plan in December 2015 resubmission.

7 Metric compares program dollars spent during the specified time period to current year's allocation. The dollars spent may be revenue accumulated in any year.

From program inception through fiscal year 2015, 68 percent of dollars allocated to the program had been spent.

8 Dedicated law enforcement contact hours refer to the time spent by law enforcement conducting traffic law enforcement activities while using dedicated state funds or federal grant funds for impaired driving, speed, seat belt and other enforcement.

## Strategic Policy Initiative No. 2: Pavement Condition

**Initiative description:** Attain High or Moderate Drivability Life for 80 percent of sampled lane miles of pavement on the state highway system by 2025, up from 79 percent in fiscal year 2015. CDOT plans to achieve 69 percent High/Moderate Drivability Life for its one-year target (June 30, 2017, target, or fiscal year 2017 pavement condition) and 57 percent for its three-year target (June 30, 2019, target, or fiscal year 2019 pavement condition).

**Background/Definitions:** Drivability Life is an indication in years of how long a stretch of highway will have acceptable driving conditions. 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 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.

**Why this matters:** Drivers navigating pavement in "unacceptable" condition may need to endure rough rides; reduce speeds to safely navigate around potholes, deteriorating shoulders and other types of pavement damage; or otherwise compensate for deteriorating conditions. Water can collect in deep ruts or other depressions in pavement, which can increase the chances of hydroplaning. Excessive and severe cracking (pavement "fatigue") can reduce the passable width of a roadway, particularly on smaller highways.

**Environment:** CDOT is responsible for the pavement on a highway system that includes more than 9,100 centerline miles—or 23,000 total lane miles. Centerline miles represent the length of the road, and lane miles represent the length and lane count for a road. About 18 percent of the state's total lane miles, and 10 percent of its centerline miles, are on the Interstate. CDOT must plan and deliver its construction projects in challenging climates and topographies, including extreme freeze/thaw cycles and high mountain passes.

The Department maintains highway pavement in a constrained and uncertain funding environment. State and federal fuel taxes have not increased for two decades. An act authorizing federal highway, transit and rail programs from 2016-20 was signed into law by President Obama in December 2015. These programs fund much of the work of state transportation departments nationwide, including much of CDOT's surface treatment work. The law—the Fixing America's Surface Transportation (FAST) Act—is the first long-term, comprehensive surface transportation legislation since 2005. The American Association of State Highway and Transportation Officials, a trade group for transportation departments, continues to anticipate funding challenges for such agencies, noting that a gap remains between anticipated transportation spending and federal Highway Trust fund income.

In planning surface treatment projects, CDOT must weigh the capacity of the contracting community that performs the rehabilitation and reconstruction of highway pavement. That capacity can be exhausted or limited during natural disasters or times of heightened economic and construction activity.

**Strategies:** The Department's strategies for pavement management include:

- Increasing preservation practices on pavements. Pavement preservation means applying lower-cost treatments at an appropriate time in the life of pavements to extend the performance of the roadway and reduce the likelihood of high-cost rehabilitation and reconstruction. Key preservation activities include



crack sealing and filling; concrete joint sealing and filling; surface sealing (chip sealing, fog sealing, etc.); micro-surfacing; patching; and delivering ultra-thin asphalt overlays ( $\leq 1.5$  inches).

- Prioritizing Interstates and High- and Medium-Volume roadways over other roadways when selecting surface treatment projects. CDOT's long-term target is the same for all categories of pavement (80 percent High/Moderate Drivability Life), but the Department has developed different Drivability Life standards based on highway traffic volume. Interstates and High- and Medium-Volume roadways have the highest Drivability Life standards, while Low-Volume roadways have lower acceptable Drivability Life standards. All acceptable Drivability Life standards consider the safety and serviceability needed by the roadway users.
- Increasing the annual miles of roadway treated, particularly for low-volume roads, by using new and more cost-efficient combinations of repairs and thin surface treatments.
- Achieving economic efficiencies by coordinating pavement activities with activities on other CDOT assets.

More details are available in CDOT's [Risk-Based Asset Management Plan](#).

**Selected operational processes:** Operational processes related to pavement condition include preserving, resurfacing and rehabilitating roads with the optimized application of cost-effective pavement treatments.

**Selected operational metric ("lead metric"):** Percent of Surface Treatment program projects advertised for the fiscal year that match recommendations made from the pavement management system. This measure helps ensure actual construction projects are matching the pavement models that are designed to help ensure CDOT achieves the desired pavement condition, as measured by the Drivability Life metric.

CDOT's centralized Pavement Management Program monitors and reports on performance results of this metric. Materials programs in CDOT's Transportation Regions are responsible for developing and delivering a four-year surface treatment construction program comprising projects that match at least 80 percent of projects recommended by the pavement management system.

**Major Functional Areas:** Functional Areas that affect pavement condition include Capital Construction, Operations and Maintenance, Safety and Program and Project Support.

**Customer:** Customers include all highway users. This includes resident, non-resident, tourist, recreational, and "through" travelers on Colorado's state highway system. Other customer groups include business travelers including the trucking industry; transit services; the Federal Highway Administration; law enforcement agencies; the military; counties; municipalities and others.

**Evaluation:** The percentage of pavement on the state highway system with High or Moderate Drivability Life rose in fiscal year 2015 to 79 percent, from 73 percent in fiscal year 2014. This was just below the goal of 80 percent for fiscal year 2015 referenced in the 2014-15 Performance Plan. However, improvement in 2015 was primarily driven by an update to the pavement model, not a change in the actual condition of pavement. (See first footnote on following page.) Due in part to the age of pavement on the state highway system, the condition under current funding assumptions is expected to decline in the short term and begin improving in the 2020s.

Metric Type	Metric Description	Process	Associated Work Unit or Program	Year Type	1- and 3-Year Targets	Performance Results
Strategic Policy Initiative/ outcome/ lag metric	Percent of state highway pavement with High or Moderate Drivability Life	Preserving, resurfacing and rehabilitating roads with the optimized application of cost-effective pavement treatments	Division of Project Support (Pavement Management Program)	Fiscal	FY17: 69% FY19: 57%	2013: 82% 2014: 73% 2015: 79% <sup>9</sup>
Operational/ lead metric	Percent of Surface Treatment program projects advertised that match recommendations from the pavement management system	Select and advertise surface treatment projects	Division of Project Support (Pavement Management Program), materials programs in CDOT's Transportation Regions	Fiscal	FY17: 80% FY19: 80% <sup>10</sup>	<u>Fiscal year 2015</u> <sup>11</sup> July 2014: 0% August 2014: 0% September 2014: 0% October 2014: 0% <sup>12</sup> November 2014: 55.6% December 2014: 66.7% January 2015: 70.6% February 2015: 70.8% March 2015: 71.4% April 2015: 77.1% May 2015: 77.1% June 2015: 77.1%  <u>Fiscal year 2016</u> July 2015: 66.6% August 2015: 75.0% September 2015: 80.0% October 2015: 85.7% November 2015: 80.0% December 2015: 88.2% January 2016: 88.9% February 2016: 91.2% March 2016: 92.5%
Input/ environmental factor	Miles of roadway on state highway system	N/A	N/A	CY	N/A	2013: 23,021.5 2014: 23,018.2 2015: N/A
Input/ environmental factor	Annual Vehicle Miles Traveled on state highway system	N/A	N/A	CY	N/A	2013: 28.4 billion 2014: 29.8 billion 2015: N/A
Input/ environmental factor	Annual Vehicle Miles Traveled for trucks on the state highway system	N/A	N/A	CY	N/A	2013: 2.4 billion 2014: 2.6 billion 2015: N/A

<sup>9</sup> Improvement in 2015 was driven primarily by an update to the pavement model, not a change in the actual condition of pavement. Specifically, CDOT updated the evaluation scale used for pavement smoothness, which is one component of the Drivability Life metric used by the model to determine pavement condition. This change was made to better align the model with how smoothness is described in CDOT construction specifications and federal definitions.

<sup>10</sup> This target is set at 80 percent to allow the Transportation Regions flexibility in selecting projects that may not match recommendations from the model. Region selections could be more cost-effective, because they can take into account factors that the pavement management system does not.

<sup>11</sup> Monthly results are cumulative for fiscal year to date.

<sup>12</sup> Four projects were advertised in the first four months of fiscal year 2015, and none was a match. Several of these projects were delayed projects from fiscal year 2014, which was a transition year for the pavement model, and matching requirements were put on hold.

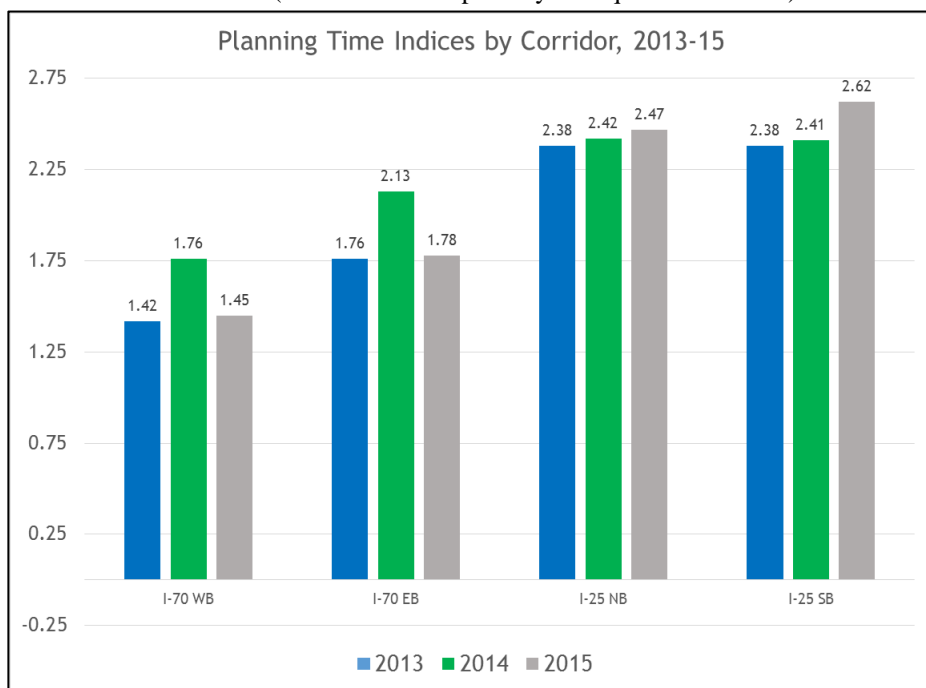
## Strategic Policy Initiative No. 3: Travel-Time Reliability

**Initiative description:** Slow the growth of congestion on Interstate 25, between Northwest Parkway and C-470, during daytime and early evening weekday hours. Slow the growth of congestion on Interstate 70, between Vail and C-470, during daytime and early evening weekend hours. One- and three-year goals include:

- Reduce the Planning Time Index for NB Interstate 25 from a projected average of 2.57 per month in calendar year 2017 to an actual average of 2.50 per month. Achieve a PTI of 2.70 in 2019.
- Reduce the Planning Time Index for SB Interstate 25 from a projected average of 2.73 per month in calendar year 2017 to an actual average of 2.70 per month. Achieve a PTI of 2.90 in 2019.
- Reduce the Planning Time Index for WB Interstate 70 from a projected average of 1.71 per month in calendar year 2017 to an actual average of 1.70 per month. Achieve a PTI of 1.80 in 2019.
- Reduce the Planning Time Index for EB Interstate 70 from a projected average of 1.82 per month in calendar year 2017 to an actual average of 1.80. Maintain a PTI of 1.80 in 2019.

**Metric background and definitions:** A Planning Time Index is a measure of the total travel time that should be planned for a trip. It includes sufficient buffer time to ensure that a driver and any passengers arrive on schedule, according to a definition from the Federal Highway Administration. For this plan, the PTI value represents the 95th percentile travel time divided by travel time at free-flow speed. In other words, the index represents the extra time needed to arrive on time for 19 of 20 trips. For a stretch of road with a PTI of 1.5, a driver should plan 45 minutes for a trip that takes 30 minutes in free-flow conditions (30 minutes multiplied by 1.5 equals 45 minutes) to be on-time 95 percent of the time.

Using data from INRIX, a private traffic data provider, CDOT calculated historical PTI values for Interstate 25 during daytime and early evening weekday hours, and on Interstate 70 during daytime and early evening weekend hours. These data were considered in developing goals for the two corridors for 2017 and 2019. The PTI goals are generally higher than historical PTI values due in part to recent increases in Colorado's population and traffic volumes. Using



Above are the average Planning Time Index values per month for the past three years for Interstate 70 (between Vail and C-470) and Interstate 25 (between Northwest Parkway and C-470). The values represent peak travel times.

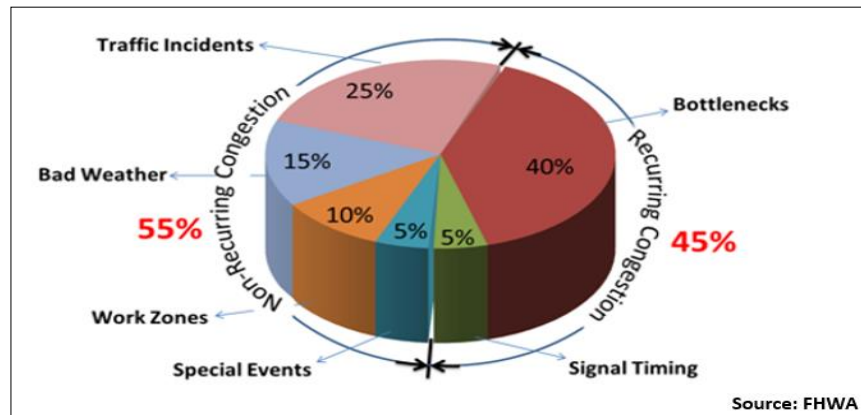
<sup>13</sup> 2017 projection and target revised in July 2016 to account for corrected data for March 2016.



strategies described on pages 18-19, CDOT will work to decrease the rate at which the PTI values are projected to grow.

**Why this matters:** Travelers and freight transporters depend on the reliability of the highway system for planning purposes. Unpredictable travel times can result in significant economic and social costs for highway users, such as missed appointments, delayed packages and late employees. Congestion—a key driver of reliability—on an annual basis costs \$2.1 billion in delay and fuel in the Denver-Aurora area alone, according to the Texas Transportation Institute’s 2015 Urban Mobility Scorecard.

**Environment:** Traffic volumes are influenced by factors including population, the size of the workforce, freight transport and tourism travel. Various factors contribute to congestion, including increases in traffic volumes, incidents such as crashes, work zones, special events (such as concerts and football games), inclement weather, poor traffic signal timing and highway



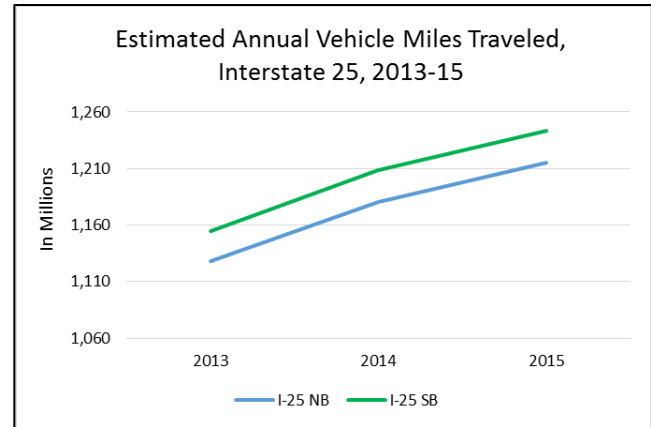
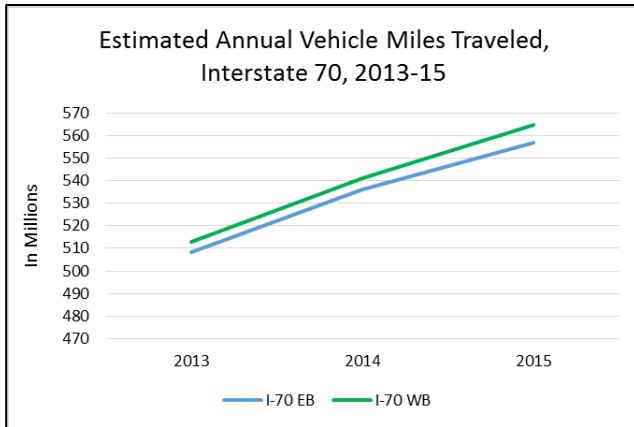
*More than half of congestion in urban areas is due to non-recurring causes.*

bottlenecks. Assuming there is no increase in highway capacity, PTI values for Interstates 25 and 70 are expected to grow.

The chart above shows that in urban areas, about 55 percent of congestion is nonrecurring. Twenty-five percent of congestion is caused by traffic incidents, such as an automobile crash, a disabled vehicle or roadway debris. For each minute that a freeway travel lane is blocked during peak use, an estimated four minutes of delay occur after the incident is cleared. Americans living in urban areas bought an extra 3.1 billion gallons of fuel than they otherwise would have in 2014 because of congestion, according to the Texas Transportation Institute. Moreover, congestion caused these Americans to travel an additional 6.9 billion hours that year, according to the Institute's Urban Mobility Scorecard.

Population growth and non-recurring traffic events are both contributing to congestion and reliability problems on Colorado's highways. The state’s population has grown 45 percent in the past 20 years, from 3.8 million in 1995 people to 5.5 million people in 2015. The population will grow to about six million by 2020 and to about 8 million by 2040, according to forecasts from Colorado’s State Demography Office. Along with this growth has come higher traffic volumes. As the charts on the following page show, the number of Vehicle Miles Traveled per year grew from 2013-15 by about 10 percent for Interstate 70 (between Vail and C-470, both directions) and about 8 percent for Interstate 25 (between Northwest Parkway and C-470, both directions).

CDOT is responsible for a highway system that includes 23,000 total lane miles of highway, including more than 9,100 centerline miles. In addition, the Department maintains more than 3,400 bridges with more than 33 million square feet of deck area. CDOT is responsible for managing a total of 21 tunnel bores throughout Colorado with a



*From 2013 to 2015, the number of Vehicle Miles Traveled per year grew by 10 percent for Interstate 70 (between Vail and C-470, both directions) and about 8 percent for Interstate 25 (between Northwest Parkway and C-470, both directions).*

total length of 6.9 miles. Disruptions to any of this infrastructure can result in unreliable travel times. CDOT must manage reliability in challenging climates and topographies, including extreme freeze/thaw cycles and high, heavily traveled mountain passes.

**Strategies:** CDOT is focused on improving reliability on Interstates 25 and 70, which are among the most congested stretches of Interstate in Colorado. CDOT formed the Division of Transportation Systems Management & Operations (TSM&O) in 2013. The division focuses on implementing low-cost, high-value operational improvements to the transportation system. Initiatives include:

1. Improving Traffic Incident Management (TIM) and clearance times through statewide training efforts, which are critical to improving the safety of first responders, to decreasing incident clearance times, and to decreasing the potential for secondary crashes. The Federal Highway Administration offers a National TIM Responder Training program. The multi-disciplinary program advocates a shared vision to implement safe, quick clearance at traffic incident scenes; prompt, reliable and open communications; and motorist and responder safeguards. CDOT can help save lives, time and funds by promoting the TIM training program. TIM efforts include detecting, verifying and responding to incidents; clearing the incident scene; and restoring traffic flow. As of May 2016, almost 3,400 first responders in Colorado have received the TIM training. First responders include personnel from CDOT, law enforcement, fire and rescue, towing and recovery, the Federal Highway Administration, public works and EMS (Emergency Medical Staff).
2. Targeting corridor improvements, such as bottleneck reduction funded through the Highway Safety Improvement Program.
3. Implementing managed lanes through tolling, variable speed limits, peak-period shoulder lane operations and Active Traffic Management (ATM). ATM is the ability to dynamically manage recurrent and non-recurrent congestion based on prevailing and predicted traffic conditions. Focusing on



trip reliability, it maximizes the effectiveness and efficiency of the highway. ATM approaches seek to increase throughput and safety through the use of integrated systems with new technology, such as dynamic routing, dynamic junction control, adaptive signal control and transit signal priority.

4. Adding ramp meters to Interstates to better manage system flow.
5. Using Intelligent Transportation Systems devices to provide real-time weather and roadway information to travelers.
6. Developing command-level partnerships with law enforcement and other stakeholders to implement integrated traffic management during events for safe and reliable travel during these increases in traffic. Events could include a major concert at the Pepsi Center, a Denver Broncos game, or a Presidential motorcade.
7. Implementing new, innovative technologies through CDOT's RoadX program, which is under development. RoadX projects will combine public and private efforts to bring innovative Intelligent Transportation System technology to the Interstate system. For example, the Interstate 25 Managed Motorways project will feature coordinated ramp metering for 14 northbound interchanges on Interstate 25. Coordinated meters would help optimize traffic flow and reliability of travel. Reduced crashes are also expected. The project also will provide travel information, such as real-time information for northbound commuters taking light rail or Interstate 25. CDOT is scheduled to complete the design of the project and conduct stakeholder outreach in spring 2017. Another RoadX project is a "text-to-voice" mobile application for Interstate 70, a pilot program for which will be launched by early 2017. The application will warn drivers of slick roads, curves, incidents and work zones.



Each strategy will address causes of congestion, improve reliability and help slow the increase in the Planning Time Indices on Interstates 25 and 70. CDOT also plans to increase the effectiveness of programs such as the Courtesy Patrol and Heavy Tow programs by working with Incident Commanders to enable faster responses to incidents and to reduce incidents through active traffic and incident management.

**Selected operational processes:** Train first responders, conduct after-action reviews of incident clearance.

**Selected operational metrics ("lead metrics"):** CDOT has created several operational measures and targets to help offset the growth of the Planning Time Indices for Interstates 25 and 70. They include:

- Reducing the average incident clearance time<sup>14</sup> on eastbound and westbound Interstate 70 (between Vail and C-470), and on northbound and southbound Interstate 25 (between Northwest Parkway and C-470), by 10 percent in 2017 compared to the average 2015 time. CDOT also aims to reduce the average incident clearance times on these roadways by 20 percent in 2019 compared to the 2015 times. Please see the table on the following pages for specific targets.
- Reducing average road closure event times on eastbound and westbound Interstate 70 (between Vail and C-470), and on northbound and southbound Interstate 25 (between Northwest Parkway

<sup>14</sup> Incident clearance times include recorded incidents, such as those cleared by CDOT's Courtesy Patrol, the Heavy Tow program and others. The clearance time is from the time an incident is reported to the time at which an incident is cleared and all first responders have left the scene.

and C-470) by 10 percent in 2017 compared to 2015 times. CDOT plans to reduce the closure time on the same roadways by 20 percent for calendar year 2019 compared to 2015 times. Please see the table on the following page for details. Road closures can drive up the Planning Time Index. Closure times will be addressed by training first responders, deploying new Highway Incident Commanders, expanding the Interstate 25 Courtesy Patrol, working with law enforcement to incentivize private and heavy towing services, conducting after-action reviews, and developing and updating Traffic Incident Management Plans.

**Major Functional Area:** Operations and Maintenance.

**Customers:** All users of the state highway system are customers of CDOT’s efforts to promote travel-time reliability. Highway users include all resident, tourist and recreational travelers on the highway system; business customers such as freight transporters, the tourism industry, the U.S. Postal Service and Federal Express; transit services; city and county law enforcement agencies; emergency services personnel; the military; and others.

**Evaluation:** CDOT set its first goals for the reliability metrics in this plan for calendar year 2016, so a comparison of performance to targets is not available. Planning Time Indices on both Northbound and Southbound Interstate 25 increased in 2015 compared to 2014 levels. This occurred in a year that also saw the number of Vehicle Miles Traveled on the corridor increase (see page 18). Meanwhile, incident clearance and road closure times improved in calendar year 2015 for both directions, with the exception of clearance time on Northbound Interstate 25, which remained unchanged from 2014 times. The Planning Time Indices for both Westbound and Eastbound Interstate 70 improved in 2015 compared to 2014 values, despite increases in Vehicle Miles Traveled in 2015. Incident clearance times grew longer for both directions of the Interstate, while road closure times improved.

Readers should note that Interstate 25 metrics in the table below represent performance in the Denver metro area, between Northwest Parkway and C-470. Performance is for daytime and early evening weekday hours, with the exception of Vehicles Miles Traveled, which represents the entire year. Interstate 70 metrics represent performance in the mountain corridor, between Vail and C-470. Performance represents daytime and early evening weekend hours, with the exception of Vehicle Miles Traveled, which represents the entire year.

Metric Type	Metric Description	Process	Associated Work Unit or Program	Year Type	1- and 3-Year Targets	Performance Results
Strategic Policy Initiative/ Outcome A	Planning Time Index for NB I-25	Improve incident management, decrease road closure times, and implement new technologies through CDOT's RoadX program.	Division of Transportation Systems Management and Operations	CY	Reduce PTI for NB I-25 from a projected average of 2.57 per month in 2017 to an actual average of 2.50. Achieve an average PTI of 2.70 per month in 2019.	Average PTI per month 2013: 2.38 2014: 2.42 2015: 2.47
Operational /lead metric	Average incident clearance time on NB I-25	Train first responders, deploy new Highway Incident Commanders, expand I-25 Courtesy Patrol, work with law enforcement to incentivize private and heavy towing services,	Division of Transportation Systems Management and Operations	CY	2017: 46 minutes (10% reduction from 2015) 2019: 41 minutes (20% reduction from 2015)	2013: N/A 2014: 51 minutes 2015: 51 minutes

Metric Type	Metric Description	Process	Associated Work Unit or Program	Year Type	1- and 3-Year Targets	Performance Results
		conduct after-action reviews.				
Operational /lead metric	Average road closure time, per event, on NB I-25	Train first responders, deploy new Highway Incident Commanders, expand I-25 Courtesy Patrol, work with law enforcement to incentivize private and heavy towing services, conduct after-action reviews, and develop and update Traffic Incident Management Plans.	Division of Transportation Systems Management and Operations	CY	2017: 45 minutes (10% reduction from 2015) 2019: 40 minutes (20% reduction from 2015)	2013: 42 minutes <sup>15</sup> 2014: 61 minutes 2015: 50 minutes
Input	Annual Vehicle Miles Traveled on NB I-25	N/A (input)	N/A (input)	CY	N/A (input)	2013: 1.13 billion 2014: 1.18 billion 2015: 1.22 billion
Strategic Policy Initiative/ Outcome B	Planning Time Index for SB I-25	Improve incident management, decrease road closure times, and implement new technologies through CDOT's RoadX program.	Division of Transportation Systems Management and Operations	CY	Reduce the PTI for SB I-25 from a projected average of 2.73 per month in 2016 to an actual average of 2.70. Achieve an average PTI of 2.90 per month in 2019.	Average PTI per month 2013: 2.38 2014: 2.41 2015: 2.62
Operational /lead metric	Average incident clearance time on SB I-25	Train first responders, deploy new Highway Incident Commanders, expand I-25 Courtesy Patrol, work with law enforcement to incentivize private and heavy towing services, conduct after-action reviews.	Division of Transportation Systems Management and Operations	CY	2017: 40 minutes (10% reduction from 2015) 2019: 35 minutes (20% reduction from 2015)	2013: N/A 2014: 49 minutes 2015: 44 minutes

<sup>15</sup> Results include at least nine months of data, but not a full calendar year.



Metric Type	Metric Description	Process	Associated Work Unit or Program	Year Type	1- and 3-Year Targets	Performance Results
Operational /lead metric	Average road closure time, per event, on SB I-25	Train first responders, deploy new Highway Incident Commanders, expand I-25 Courtesy Patrol, work with law enforcement to incentivize private and heavy towing services, conduct after-action reviews, and develop and update Traffic Incident Management Plans	Division of Transportation Systems Management and Operations	CY	2017: 42 minutes (10% reduction from 2015) 2019: 38 minutes (20% reduction from 2015)	2013: 51 minutes <sup>16</sup> 2014: 58 minutes 2015: 47 minutes
Input	Vehicle Miles Traveled on SB I-25	N/A (input)	N/A (input)	CY	N/A (input)	2013: 1.15 billion 2014: 1.21 billion 2015: 1.24 billion
Strategic Policy Initiative/ Outcome C	Planning Time Index value for WB I-70	Improve incident management, decrease road closure times, and implement new technologies through CDOT's RoadX program.	Division of Transportation Systems Management and Operations	CY	Reduce the PTI for WB I-70 from a projected average of 1.71 per month in 2017 to an actual average of 1.70 per month. Achieve a PTI of 1.80 in 2019.	Average PTI per month 2013: 1.42 2014: 1.76 2015: 1.45
Operational /lead metric	Average incident clearance time on WB I-70	Train first responders, deploy new Highway Incident Commanders, work with law enforcement to incentivize private and heavy towing services, conduct after-action reviews.	Division of Transportation Systems Management and Operations	CY	2017: 64 minutes (10% reduction from 2014) 2019: 57 minutes (20% reduction from 2015)	2013: N/A 2014: 45 minutes 2015: 71 minutes
Operational /lead metric	Average road closure time per event on WB I-70	Train first responders, deploy new Highway Incident Commanders, expand I-25 Courtesy Patrol, work with law enforcement to incentivize private and heavy towing services, conduct after-action reviews, and develop and update Traffic Incident Management Plans.	Division of Transportation Systems Management and Operations	CY	2017: 147 minutes (10% reduction from 2015) 2019: 130 minutes (20% reduction from 2015)	2013: N/A 2014: 166 minutes 2015: 163 minutes

<sup>16</sup> Results include at least nine months of data, but not a full calendar year.

Metric Type	Metric Description	Process	Associated Work Unit or Program	Year Type	1- and 3-Year Targets	Performance Results
Input	Annual Vehicle Miles Traveled on WB I-70	N/A (input)	N/A (input)	CY	N/A (input)	2013: 513 million 2014: 541 million 2015: 565 million
Strategic Policy Initiative/ Outcome D	Planning Time Index for EB I-70	Improve incident management, decrease road closure times, and implement new technologies through CDOT's RoadX program.	Division of Transportation Systems Management and Operations	CY	Reduce the PTI for EB I-70 from a projected average of 1.82 per month in 2016 to an actual average of 1.80. Maintain a PTI of 1.80 in 2019.	Average PTI per month 2013: 1.76 2014: 2.13 2015: 1.78
Operational /lead metric	Average incident clearance time on EB I-70	Train first responders, deploy new Highway Incident Commanders, work with law enforcement to incentivize private and heavy towing services, conduct after-action reviews.	Division of Transportation Systems Management and Operations	CY	2017: 67 minutes (10% reduction from 2015) 2019: 59 minutes (20% reduction from 2015)	2013: N/A 2014: 49 minutes 2015: 74 minutes
Operational /lead metric	Average road closure time per event on EB I-70	Train first responders, deploy new Highway Incident Commanders, expand I-25 Courtesy Patrol, work with law enforcement to incentivize private and heavy towing services, conduct after-action reviews, and develop and update Traffic Incident Management Plans.	Division of Transportation Systems Management and Operations	CY	2017: 112 minutes (10% reduction from 2015) 2019: 99 minutes (20% reduction from 2015)	2013: N/A 2014: 278 minutes 2015: 124 minutes
Input	Vehicle Miles Traveled on EB I-70	N/A (input)	N/A (input)	CY	N/A (input)	2013: 508 million 2014: 536 million 2015: 557 million

## Strategic Policy Initiative No. 4: Maintenance

**Initiative description:** Maintain CDOT's roadways and facilities to minimize the need for replacement or rehabilitation in a constrained funding environment. This includes achieving an overall Maintenance Levels of Service (MLOS) grade of C+ for the state highway system in fiscal year 2017 and a C for fiscal year 2019, compared to a B- in fiscal year 2015.

**Metric background and definitions:** Maintenance Levels of Service is a "report card" style grading system that CDOT uses to rate its maintenance performance. An A+ is the highest service level achievable, while an F- is the lowest. Nine Maintenance Program Areas (listed below) are each given a grade, and those individual grades are used to determine an overall MLOS grade. To measure service levels, CDOT employees conduct condition surveys across the transportation network on an ongoing basis. Inspectors rate each maintainable feature in a given section of the network according to established criteria.

The Staff Maintenance and Operations Branch provides policy and guidance for the statewide maintenance program and maintains operational oversight for program administration. Under nine Maintenance Program Areas, CDOT performs an array of activities:

1. The **Roadway Surface** area includes patching and sealing potholes and blading unpaved services.
2. The **Roadside Facilities** area includes cleaning drainage structures, repairing eroded slopes and repairing guardrails.
3. The **Roadside Appearance** area includes controlling vegetation, sweeping the road surface and removing trash.
4. The **Traffic Services** area includes maintaining roadway signs and striping, maintaining traffic signals, and maintaining roadway lighting.
5. The **Structure Maintenance** area includes painting bridges, repairing expansion joints and patching decks.
6. The **Snow and Ice Control** area includes plowing snow and taking avalanche control measures.
7. The **Equipment, Buildings and Rest Areas** program area includes maintenance for all buildings and grounds.
8. The **Tunnel Activities** area includes providing structural maintenance and repair, as well as tunnel washing and maintenance of the tunnels' electrical, mechanical and ventilation systems.
9. The **Planning and Scheduling** area includes providing performance budgeting and training maintenance staff.

**Why this matters:** Maintaining roads, bridges, tunnels and other infrastructure minimizes the need for replacement and rehabilitation. Maintenance activities such as striping roadways and clearing the highways of snow and ice also improve safety and mobility.

**Environment:** CDOT's maintenance patrols serve a system that includes 23,000 total lane miles of highway, including more than 9,100 centerline miles. In addition, the Department owns about 3,400 bridges with almost 33 million square feet of deck area. CDOT is responsible for managing a total of 21 tunnel bores throughout the state. The Division of Highway Maintenance administers various programs to maintain this system, including the Snow and Ice Removal program, Traffic Services, Vegetation Management, Debris Removal and more.

CDOT owns a large number of safety and traffic-related devices that the Department must maintain. In the past, CDOT had completed annual inventories of these items. Due to budget constraints, this annual inventory has not been completed in several years. The most recent counts are:

- 192,726 signs
- 511,000 delineators

- 1,156,402 linear feet of cable guardrail
- 7,300,476 linear feet of metal guardrail
- 2,568,675 linear feet of concrete guardrail
- 50,779 miles of striping
- 29,890 roadway lights
- 2,000 traffic signals
- 936 attenuators

The list above is not a comprehensive account of assets served by CDOT's maintenance forces, but it provides a sense of the scope of work performed by the maintenance program.

CDOT must plan and deliver maintenance services in challenging climates and topographies, including extreme freeze/thaw cycles and high, heavily traveled mountain passes. The Department also maintains the highway system in a constrained and uncertain funding environment. The maintenance program budget allocation rose just 1 percent in fiscal year 2016 compared to fiscal year 2015. Compared to anticipated funding, CDOT's 2016 Transportation Deficit Report estimated the Department over the next several years would face a deficit to maintain a B- grade for overall Maintenance Levels of Service. Such a funding environment has prompted CDOT to establish a target grade of C+ for fiscal year 2017 and a C for fiscal year 2019.

**Strategies:** CDOT strategically invests in maintenance areas of critical importance. The Department devotes well over half of its maintenance budget to its two largest maintenance areas: Snow and Ice Control and Traffic Services, which includes maintaining signs and striping. The maintenance program in recent years has seen inflation rising at a faster rate than its annual budgets. In this environment, the program's focus will remain on snow and ice removal and pavement markings. CDOT will adjust the funding of each Maintenance Program Area (MPA) to maintain as high a level of service as possible in the two focus areas, while funding for other MPAs will decline.

Other current strategies include:

- **Maintenance Optimization Study:** This study is a third-party review of the Department's Maintenance Performance Standards, budget planning, resource allocation and staffing levels. CDOT will implement study recommendations to increase efficiencies and maximize resources.
- **Winter Operations and Operational Readiness:** Under these strategies, CDOT is focusing on continuously assessing the Maintenance Division's preparedness levels for winter operations and other operations throughout the year. Monitoring personnel, equipment, and materials readiness rates gives visibility into how prepared the Department is to respond to events and emergencies.
- **Level of Service (LOS) Mapping:** LOS Mapping is a program that reports to managers and patrols the level of service they achieve for snow and ice removal operations. Each patrol gives a report after winter storms on the service level they provided during the last storm event. This allows managers to conduct after-action reviews with the patrols, discuss what went right and wrong, and provide direction on providing more efficient and effective services.
- **Maintenance Decision Support System (MDSS):** The MDSS is a computer program that provides managers and patrols weather forecasts and roadway treatment recommendations. MDSS bases recommendations off of weather and pavement temperature forecasts, the capabilities of a patrol, and available materials. The system maximizes the effectiveness of materials.

**Selected operational process:** See description of processes associated with Maintenance Program Areas on the previous page.

**Selected operational metric/"lead" metric:** Retro-reflectivity score for long-line striping.

**Major Functional Area:** Operations and Maintenance.

**Customers:** Customers include all highway users. This includes resident, tourist, recreational, and "through" travelers on Colorado's state highway system; business customers such as the freight and tourism industries; transit services; law enforcement agencies; the military; counties; municipalities and others.

**Evaluation:** CDOT achieved a B- for overall Maintenance Levels of Service in fiscal year 2015, which met the goal in the 2014-15 Performance Plan. The Department has achieved a B- each year from 2010-15, except for 2013, when a B was achieved. For fiscal year 2017, CDOT forecasts it will achieve a C+ grade for overall Maintenance Levels of Service, while a B level of service is projected for Snow and Ice Removal and a C- is projected for Traffic Services. For fiscal year 2019, the department forecasts it will achieve a C grade for overall Maintenance Levels of Service, while a B is forecast for Snow and Ice Control, and a C- is forecast for Traffic Services. Future initiatives will be focused on increasing the level of service for Traffic Services.



Metric Type	Metric Description	Process	Year Type	Associated Work Unit or Program	1- and 3-Year Targets	Performance Results
Strategic Policy Initiative/ outcome/ lag metric	Maintenance Levels of Service grade	Deliver maintenance program <sup>17</sup>	FY	Division of Highway Maintenance, CDOT Maintenance and Traffic Sections	FY17: C+ FY19: C	2012: B- 2013: B 2014: B- 2015: B-
Operational/ lead metric	Snow-and-Ice Control grade	Plow and remove snow, apply chemicals and abrasives, proactively control avalanches	FY	Division of Highway Maintenance, CDOT Maintenance and Traffic Sections	FY17: B FY19: B	2012: B 2013: B 2014: B 2015: B
Operational/ lead metric	Retro-reflectivity score for long-line striping. Sampled monthly at random locations.	Stripe and evaluate state highway system pavement	FY	Division of Transportation Systems Management and Operations, Division of Highway Maintenance, CDOT Maintenance and Traffic Sections	FY17: ≥80 mcd/ m <sup>2</sup> / lux FY19: ≥80 mcd/ m <sup>2</sup> / lux	FY15: <sup>18</sup> April 2015: 146 May 2015: 173 June 2015: 166 FY16: July 2015: 161 (rev.) August 2015: 176 (rev.) September 2015: 223 (rev.) October 2015: 195 November 2015: 178 December 2015: 135 January 2016: 128 February 2016: 96 <sup>19</sup> March 2016: 155 April 2016: 159
Input	Maintenance program spending	Deliver maintenance program	FY	Division of Highway Maintenance, CDOT Maintenance and Traffic Sections	N/A input	2012 actual: \$242 million 2013 actual: \$249 million 2014 actual: \$249 million 2015 actual: \$260 million 2016 (budget): \$254 million
Input	Maintenance Full Time Equivalents at fiscal-year end <sup>20</sup>	Hire and retain maintenance workforce	FY	CDOT Maintenance and Traffic Sections, CDOT Regions and others	N/A input	2012: 1,177.0 2013: 1,166.5 2014: 1,183.5 (rev.) 2015: 1,178.0

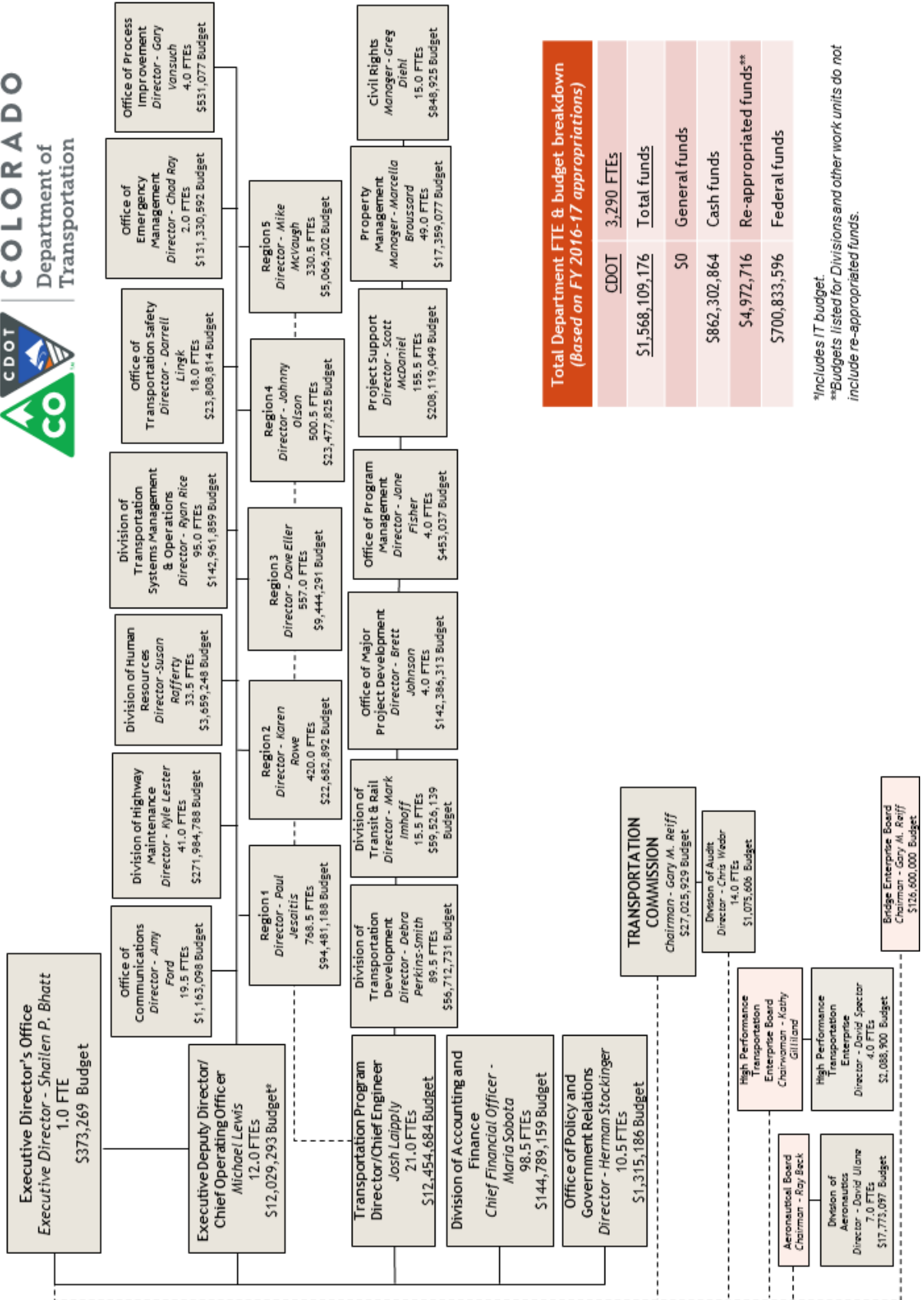
<sup>17</sup> See page 24 for a more complete description of Maintenance Program Areas (MPAs) and associated processes.

<sup>18</sup> CDOT began tracking this metric in this format in early 2015.

<sup>19</sup> Does not include Region 5.

<sup>20</sup> Includes Trans Mtc I, II, and III and LTC Ops I.

Appendix 1: Organizational Chart



# Appendix 2: Fiscal Year 2015-16 Performance Evaluation

*This evaluation includes data supplied for CDOT's Performance Plan update for the third quarter of fiscal year 2016. Data for the full fiscal year were not available at the time of publication.*

## Strategic Policy Initiatives

The Colorado Department of Transportation (CDOT) has identified several Strategic Policy Initiatives (SPIs) for FY 2015-16 and beyond. For this performance evaluation, the Department has updated progress on initiatives in its Fiscal Year 2016 Performance Plan that capture the Department's strategic and operational priorities. The updates reflect data available as of April 2016. Additional details on these initiatives are available in the Department's Performance Plan, which may be accessed [here](#).

**Safety:** Move Colorado toward zero deaths by reducing traffic-related deaths by one-half by 2030. This includes reducing fatalities by 12 per year, from 548 in 2008 to 344 in 2025. CDOT aims to reduce fatalities to 452 for its one-year target (Dec. 31, 2016, target, or calendar year 2016 fatalities) and 428 for its three-year target (Dec. 31, 2018, target, or calendar year 2018 fatalities).

**Pavement Condition:** Attain High or Moderate Drivability Life for 80 percent of sampled lane miles of pavement on the state highway system by 2025, up from 79 percent in fiscal year 2015. CDOT plans to achieve 74 percent High/Moderate Drivability Life for its one-year target (June 30, 2016, target, or fiscal year 2016 pavement condition) and 62 percent for its three-year target (June 30, 2018, target, or fiscal year 2018 pavement condition).

**Travel-Time Reliability:** Slow the growth of congestion and achieve satisfactory travel-time reliability on Interstate 25 in the Front Range and in the Interstate 70 West Mountain Corridor. One- and three-year goals include:

- Reduce the average monthly Planning Time Index value on Northbound Interstate 25 from a projected 2.59 in calendar year 2016 to an actual 2016 value of 2.50. Achieve a PTI of 2.60 or below in 2018.
- Reduce the average monthly Planning Time Index value on Southbound Interstate 25 from a projected 2.74 for calendar year 2016 to an actual 2016 value of 2.70. Achieve a PTI of 2.80 or below in 2018.
- Reduce the average monthly Planning Time Index value on Eastbound Interstate 70 from a projected 1.93 for calendar year 2016 to an actual 2016 value of 1.90. Achieve a PTI of 2.00 or below in 2018.
- Reduce the average monthly Planning Time Index value on Westbound Interstate 70 from a projected 1.67 for calendar year 2016 to an actual 2016 value of 1.60. Achieve a PTI of 1.70 or below in 2018.

**Maintenance:** Maintain CDOT's roadways and facilities to minimize the need for replacement or rehabilitation in a constrained funding environment. This includes achieving an overall Maintenance Levels of Service (MLOS) grade of C for the state highway system in fiscal years 2016 and 2018, down from a B- in fiscal year 2015.

## Operational Measures

**SPI 1 - Safety:** Move Colorado toward zero deaths by reducing traffic-related deaths by one-half by 2030. This includes reducing fatalities by 12 per year, from 548 in 2008 to 344 in 2025. CDOT aims to reduce fatalities to 452 for its one-year target (Dec. 31, 2016, target, or calendar year 2016 fatalities) and to 428 for its three-year target (Dec. 31, 2018, target, or calendar year 2018 fatalities).

### Major Functional Area – Safety

**Process – CDOT implements a variety of processes to mitigate injuries and fatalities on Colorado's roadways. For example, the Department qualifies, selects, advertises and awards Highway Safety Improvement Program projects. Projects that are selected address identified crash patterns, which are mitigated by the scope of the project and meet a minimum benefit/cost ratio of 1.0. CDOT's goal is to meet a program-wide benefit/cost ratio of 2.0.**

Measure	CY12 Actual	CY13 Actual	CY14 Actual	CY15 Actual	Q1 CY16	CY16 Goal	CY18 Goal
Outcome: Fatalities on Colorado Roadways	474	481	488	546 (rev.)	84	452	428
Outcome: Fatalities per 100 million Vehicle Miles Traveled on Colorado roadways	1.016	1.024	0.996	N/A*	N/A*	0.94	0.90
Lead Metric 1: Average benefit/cost ratio for Highway Safety Improvement Projects	N/A	N/A	N/A	2.98	1.83	Minimum of 2.0	Not established
Lead Metric 2: Dedicated law enforcement contact hours for traffic safety enforcement	50,880	67,808	75,689	84,146	25,519	75,000****	Not established****
Lead Metric 3: Percentage of advertised FASTER Safety projects that address Level of Safety Service 3 and 4 locations	N/A	N/A	N/A	75%	100%	90%	Not established
Measure	FY12 Actual	FY13 Actual	FY14 Actual	FY15 Actual	FY16 Actual	FY16 Goal	FY18 Goal
Lead Metric 4: FASTER Safety Mitigation program dollars spent as a percentage of the program's fiscal-year allocation**	69%	79%	84%	159%	Q1: 57% Q2: 100% Q3: 132%	100%	100%

Note: Fatalities and injuries statistics are subject to frequent revision as new data become available.

\*Official 2015 Vehicle Miles Traveled data will not be available until mid-2016.

\*\*Metric compares program dollars spent during the specified time period to current year's allocation. The dollars spent may be revenue accumulated in any year. From program inception through fiscal year 2015, 68 percent of dollars allocated to the program had been spent.

\*\*\*The 2016 goal has been raised to account for recent performance data. The previous target for 2016 was 65,000.

**SPI 2 - Pavement Condition:** Attain High or Moderate Drivability Life for 80 percent of sampled lane miles of pavement on the state highway system by 2025, up from 79 percent in fiscal year 2015. CDOT plans to achieve 74 percent High/Moderate Drivability Life for its one-year target (June 30, 2016, target, or fiscal year 2016 pavement condition) and 62 percent for its three-year target (June 30, 2018, target, or fiscal year 2018 pavement condition).

**Major Functional Area – Various, including Capital Construction; Operations and Maintenance; Safety; and Program and Project Support**

**Process – Operational processes related to pavement condition include preserving, resurfacing, and rehabilitating roads with the optimized application of cost-effective pavement treatments.**

Measure	FY12 Actual	FY13 Actual	FY14 Actual	FY15 Actual	Q1 FY16	Q2 FY16	Q3 FY16	FY16 Goal	FY18 Goal
Outcome: Percentage of sampled lane miles of state highway pavement with High or Moderate Drivability Life	N/A	82%	73%	79%	Annual Metric	Annual Metric	Annual Metric	74%	62%
Lead Metric: Percentage of Surface Treatment program projects advertised for the fiscal year that match recommendations from CDOT's pavement management system	N/A	N/A	N/A	77%	80% (YTD)	88% (YTD)	93% (YTD)	80%	80%

Note: Seventy-nine percent of sampled lane miles of pavement on the state highway system had High or Moderate Drivability Life in fiscal year 2015. Drivability Life is an indication of how long a stretch of highway will have acceptable driving conditions. The percentage of pavement in the High or Moderate category in 2015 was higher than had been forecast due to recent updates in the pavement management model. Specifically, CDOT has updated the evaluation scale used for pavement smoothness, which is one component of the Drivability Life metric used by the model to determine pavement condition. This change was made to better align the model with how smoothness is described in CDOT construction specifications and federal definitions. Based on new forecasts, CDOT in fall 2015 updated its one- and three-year targets for Drivability Life.

**SPI 3—Travel-Time Reliability:** Slow the growth of congestion and achieve satisfactory travel-time reliability on Interstate 25 in the Front Range and in the Interstate 70 West Mountain Corridor. (See specific targets in chart below.)

**Major Functional Area – Operations and Maintenance**

**Process – Various processes will be used to achieve this goal, such as improving incident management, decreasing road closures, training first responders and expanding the Interstate 25 Courtesy Patrol.**

Measure	CY12 Actual	CY13 Actual	CY14 Actual	CY15 Actual	CY16 Q1	CY16 Goal	CY18 Goal
<b>Outcome A:</b> Average monthly Planning Time Index value on NB I-25*	2.20	2.38	2.42	2.47	2.40	2.50	2.60
Lead Measure 1: Average incident clearance time on NB I-25.	N/A	N/A	51 minutes	51 minutes	45 minutes	46 minutes	40 minutes
Lead Measure 2: Average road closure time on NB I-25.	41*** minutes	42*** minutes	61 minutes	50 minutes	42 minutes	55 minutes	48 minutes
<b>Outcome B:</b> Average monthly Planning Time Index value on SB I-25	2.20	2.38	2.41	2.62	2.45	2.70	2.80
Lead Measure 1: Average incident clearance time on SB I-25.	N/A	N/A	49 minutes	44 minutes	76 minutes	44 minutes	39 minutes
Lead Measure 2: Average road closure time on SB I-25.	39*** minutes	51*** minutes	58 minutes	47 minutes	97 minutes	52 minutes	46 minutes
<b>Outcome C:</b> Average monthly Planning Time Index value on EB I-70**	1.74	1.76	2.13	1.78	1.95	1.90	2.00
Lead Measure 1: Average incident clearance time on EB I-70.	N/A	N/A	49 minutes	74 minutes	25 minutes	44 minutes	39 minutes
Lead Measure 2: Average road closure time on EB I-70.	N/A	N/A	278 minutes	124 minutes	20 minutes	250 minutes	222 minutes
<b>Outcome D:</b> Average monthly Planning Time Index value on WB I-70	1.32	1.42	1.76	1.45	1.77	1.60	1.70
Lead Measure 1: Average incident clearance time on WB I-70.	N/A	N/A	45 minutes	71 minutes	68 minutes	40 minutes	36 minutes
Lead Measure 2: Average road closure time on WB I-70.	N/A	N/A	166 minutes	163 minutes	155 minutes	149 minutes	133 minutes

\*Termini for Interstate 25 metrics are C-470 and Northwest Parkway. Results and goals are for daytime and early evening weekday hours.

\*\*Termini for Interstate 70 metrics are Vail and C-470. Results and goals are for daytime and early evening weekend hours. \*\*\*CY 2012 and 2013 results for I-25 include at least nine months of data. The data do not represent a full calendar year.



**SPI 4—Maintenance:** Maintain CDOT’s roadways and facilities to minimize the need for replacement or rehabilitation in a constrained funding environment. This includes achieving an overall Maintenance Levels of Service (MLOS) grade of C for the state highway system in fiscal years 2016 and 2018, down from a B- in fiscal year 2015.

**Major Functional Area – Operations and Maintenance**

**Process – Under nine Maintenance Program Areas, CDOT performs an array of processes to maintain the state highway system. For example, the Roadway Surface area includes patching and sealing potholes and blading unpaved surfaces. The Structure Maintenance area includes painting bridges, repairing expansion joints and patching bridge decks. The Snow and Ice Control area includes plowing snow and taking avalanche control measures.**

Measure	FY12 Actual	FY13 Actual	FY14 Actual	FY15 Actual	Q1 FY16	Q2 FY16	Q3 FY16	FY16 Goal	FY18 Goal
Outcome: Overall Maintenance Levels of Service Grade	B-	B	B-	B-	Annual Metric	Annual Metric	Annual Metric	C	C
Lead Measure 1: Snow and Ice Control Grade	B	B	B	B	Annual Metric	Annual Metric	Annual Metric	B	B
Lead Measure 2: Retro-reflectivity score for sampled long-line striping*	N/A	N/A	N/A	April**: 146 May: 173 June: 166	July: 161 Aug: 176 Sept: 223	Oct: 195 Nov: 178 Dec: 135	Jan: 128 Feb: 96*** Mar: 155	≥80 mcd/m <sup>2</sup> /lux****	≥80 mcd/m <sup>2</sup> /lux

\*Aggregate numbers do not include yellow striping for Region 3. \*\*First month of reporting with current methodology. \*\*\* February 2016 results do not include Region 5. \*\*\*\*The goal is to achieve, at minimum, a retro-reflectivity score for longitudinal pavement markings of 80 mcd/m<sup>2</sup>/lux (millicandelas per square meter per lux), a measure of luminous intensity. Properly implemented and maintained longitudinal pavement markings convey directional information, location of the road center and edges, the presence of passing or no-passing zones, and an indication that a driver is occupying the correct lane.



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