

2020

FHWA-Colorado Division and CDOT Stewardship and Oversight Agreement Annual Report



COLORADO
Department of Transportation

Prepared by the Quality Improvement Council

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TABLE OF CONTENTS

SECTION 1. PURPOSE	1
SECTION 2. CDOT PERFORMANCE BY FUNCTIONAL PROGRAM AREA	2
2.1. ENGINEERING: CIVIL RIGHTS	2
2.2. ENGINEERING: CONTRACTING, ENGINEERING ESTIMATES AND OTHER PROJECTS	6
2.3. ENGINEERING: HYDRAULICS	8
2.4. ENGINEERING: PAVEMENT AND MATERIALS	12
2.5. ENGINEERING: DESIGN AND CONSTRUCTION	17
2.6. ENGINEERING: PROGRAM AND PROJECT DELIVERY - PROGRAM MANAGEMENT	20
2.7. ENGINEERING: RIGHT OF WAY	23
2.8. ENGINEERING: STRUCTURES	33
2.9. ENGINEERING: TRAFFIC SAFETY AND ENGINEERING SERVICES.....	37
2.10. FINANCIAL MANAGEMENT	44
2.11. MAINTENANCE AND OPERATIONS: HIGHWAY MAINTENANCE	46
2.12. MAINTENANCE AND OPERATIONS: INTELLIGENT TRANSPORTATION SYSTEM (ITS).....	48
2.13. MAINTENANCE AND OPERATIONS: REAL-TIME OPERATIONS.....	50
2.14. TRANSPORTATION DEVELOPMENT: APPLIED RESEARCH AND INNOVATION	53
2.15. TRANSPORTATION DEVELOPMENT: ASSET MANAGEMENT	56
2.16. TRANSPORTATION DEVELOPMENT: ENVIRONMENT	58
2.17. TRANSPORTATION DEVELOPMENT: TRANSPORTATION PLANNING	63
2.18. TRANSPORTATION DEVELOPMENT: INNOVATIVE MOBILITY.....	67
SECTION 3. RISK RESPONSE STRATEGIES	69
SECTION 4. ADDITIONAL ACCOMPLISHMENTS INFORMATION	74
APPENDIX A. CDOT ORGANIZATIONAL CHART	82
APPENDIX B. FHWA ORGANIZATIONAL CHART	83
APPENDIX C. ENVIRONMENT SECTION - OTHER NOTABLE REGULATIONS AND ACCOMPLISHMENTS TO COMPARE FOR TRACK TRENDS 2019	84
APPENDIX D. MAJOR NEPA PROJECT - HISTORICAL DATA	88

SECTION 1. PURPOSE

This report serves as the principal instrument by which the Colorado Department of Transportation (CDOT) informs the Federal Highway Administration (FHWA) of its performance across a number of mutually agreed upon indicators and measures associated with the administration of the Federal Aid Highway Program (FAHP). In 23 U.S.C. 106(g), Congress directs that the Secretary shall establish an oversight program to monitor the effective and efficient use of funds authorized to carry out the FAHP. This program includes FHWA oversight of the State's processes and management practices, including those involved in carrying out the approvals and related responsibilities assumed by the State under 23 U.S.C. 106(c). Congress defines that, at a minimum, the oversight program shall be responsive to all areas relating to financial integrity and project delivery.

The goal of this performance summary is to ensure that FHWA and CDOT are administering the FAHP in a cost-effective manner that maintains Colorado's national highway network, optimizes operations, improves safety, and provides for national security while protecting and preserving environmental resources.

Section 2 briefly introduces the various functional program areas, describes key activities accomplished in 2020, and provides tables summarizing CDOT's performance and compliance in each area. Performance/compliance measures, and their associated reporting frequencies and targets/baselines, were established in the May 2020 version of the FHWA-CDOT Stewardship and Oversight Agreement.

Section 3 describes risk response strategies that the CDOT and FHWA Quality Improvement Council (QIC) is currently focusing on and the status of recommendations in the implementation phase.

SECTION 2. CDOT PERFORMANCE BY FUNCTIONAL PROGRAM AREA

2.1. ENGINEERING: CIVIL RIGHTS

INTRODUCTION

CDOT Manager: Greg Diehl and Kristi Graham-Gitkind
FHWA Manager: Nicole Bumpers

The Civil Rights Program is responsible for all activities in CDOT related to civil rights programs and requirements under state and federal law. Civil rights programs are an integral part of all aspects of CDOT's ongoing activities. The Civil Rights Stewardship Agreement is a Quality Control and Quality Assurance (QC & QA) approach, which relies on joint FHWA/CDOT team reviews of program activities to accomplish oversight of the program. The plan shifts federal oversight from a project-by-project basis to a program-level basis. Staff from CDOT's Civil Rights & Business Resource Center (CRBRC) and the Division of Human Resources work in partnership with each Regional Civil Rights Manager and with the FHWA Civil Rights Specialist to review, evaluate, and improve CDOT's Civil Rights Programs. The partnership between CDOT and FHWA continues to be an important part of ensuring compliance with the letter and spirit of laws and regulations.

QUALITY/RESULTS

Statewide activities conducted to accomplish elements in Quality Section:

1. Exceeded FFY 2020 Disadvantaged Business Enterprise (DBE) goal of 11.55% with 11.66% overall DBE participation.
2. Graduated two teams from the ESB Mentor-Protégé program. The full cohort was five teams, and the three returning teams will graduate this year after completing a full two-year tenure in the program.
 - a) CRBRC worked with a DBE vendor to create a full-length, high-definition video to highlight real-world impacts and successes of the ESB Mentor-Protégé Program. The piece encompassed the ongoing relationships and experiences of three graduated Mentor-Protégé teams, showing how the collaboration has been, and continues to remain beneficial. The video was used to promote the program in fall of 2020, and has received 156 views. The video is also embedded in CDOT's external website and that page received more than 450 unique page views between October and January. Because of the video, the program received 15 applications and accepted 8 new firms into the program, far more than in years prior.
<https://www.codot.gov/business/civilrights/smallbusiness/esb/mp>
 - b) To date, the ESB Mentor-Protégé Program has impacted 32 total firms, with 10 out of 16 Protégé firms having a dual DBE/ESB certification, thus developing the potential for race neutral DBE participation on professional services contracts.
3. Hosted seven small business forums (four for professional services and three for construction - one forum was cancelled due to the pandemic) to increase transparency in the CDOT process and improve communication on small business related issues.
4. In collaboration with the American Council of Engineering Companies (ACEC) and DBE

Professional Services firms, the process for DBE Compliance on Project Specific Contracts was improved to address both consistency and impact issues; 200 people have attended training on the new procedures, 134 of which were external consultants. This process enhanced working relationships with the industry and established improved collaboration internally at CDOT.

5. In collaboration with the American Council of Engineering Companies (ACEC) and DBE Professional Services firms, the process for DBE Compliance on Non-Project Specific Contracts was improved to address both consistency and impact issues; 337 people have attended training on the new procedures, 198 of which were external consultants. This process enhanced working relationships with the industry and established improved collaboration internally at CDOT.
6. Began piloting use of the B2GNow system on Local Agency Professional Services contracts for increased accuracy in reporting. This pilot required an update in forms as well as guidance documents to ensure consistency.
7. CM/GC contract language was updated to align with the updated Professional Services DBE Contract Requirements for continuity and consistency.
8. A task force was created in the summer of 2020 to establish enhanced clarity and guidance regarding Civil Rights requirements for subcontractors, suppliers, and independent trucking firms. This task force drafted proposed updates to specifications and processes that are anticipated to go into effect in the spring of 2021.
9. Annual Construction Contractor Compliance Training Sessions have long been part of CRBRC's services; in Q2 of 2020, CDOT trained 313 individuals on Civil Rights compliance requirements throughout the state.
10. Completed 17 Contractor Compliance Reviews. A request was made to the FHWA Division office to decrease the number of reviews from 18 to 17 for this federal year. The request was approved. It is anticipated that 19 Contractor Compliance Reviews will be completed in the upcoming federal year in an effort to pilot new Contractor Compliance forms and processes.
11. Achieved 75,480 On-the-Job Training (OJT) hours, which exceeded the goal of 50,000 hours.
12. Trained 37 individuals in construction related job skills through a 3-week intensive program delivered by an accredited community college. Successfully transitioned $\frac{2}{3}$ of the training program to a virtual platform to allow for delivery of online services because of the pandemic.
13. The Title VI E-learning was launched in CDOT's Learning Management System as a requirement for all CDOT staff. At the conclusion of FFY 2020, over 90% of CDOT staff members had taken the training, which is one of the highest completion rates for a required training.
14. A new Subrecipient Compliance Specialist was hired in May 2020. This individual has revised the subrecipient compliance template for Title VI and created a Title VI Subrecipient Review process. The Specialist has completed one review utilizing the new procedures during the FFY 2020 period.
15. CRBRC worked with a DBE vendor to script and shoot a high-definition highway construction

workforce recruitment video aimed at highlighting on-the Job Training/journey-level apprenticeship opportunities in the highway construction industry statewide, including both public and private sectors. CRBRC is currently working with industry stakeholders to roll out the piece in 2021.

PERFORMANCE MEASURES

The following performance measures demonstrate the health of the Civil Rights Program

Table - Performance/Compliance Measures (Civil Rights)

PM #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/Baseline	2019	2020
107	DBE participation (as percentage) to date on Federal Aid Highway Program	DBE Program	Transport	Federal FY Semiannual Reporting	11.55%	12.41%	11.66%
459	# of DBE firms receiving supportive services/benefits	DBE Supportive Services (DBE/SS)	Connect2DOT Program	Federal FY	100	101	231
313	# of completed Contract Compliance Reviews	Contractor Compliance (External EEO) Program	Google Drive	Federal FY	18	19	17
460	# of OJT hours achieved	On the Job Training (OJT) Program	Google Drive/ LCPtracker	Federal FY	50,000 hours	67,637 hours	75,480 hours
461	# of persons placed and employed (post-services)	OJT Supportive Services (OJT/SS)	Google Drive	Federal FY	50	Not available	None placed; 37 trained
310	# of completed STA reviews	Title VI Program	Title VI Assessment	Federal FY	6	6	1
462	# of completed sub recipient reviews	ADA Title II Program	ADA Transition Plan	Federal FY	10	10	0 ¹ (see Note below)
1438	Complete workplace culture reviews to support AAP and inclusive excellence strategy	EDI	Quarterly AA Report	Federal FY	100%	N/A	100%
1439	Gather EEO, sexual harassment, ADA and all Title VII investigation outcomes data	EEO/AA	Quarterly AA Report	Federal FY	100%	N/A	100%
440	Implement EDI training to support Governor's Executive Order D 2020175	EDI	Quarterly AA Report	Federal FY	75% of employees trained	N/A	72% of employees trained

¹ Reporting element for ADA Title II Subrecipient reviews should be removed from future reporting based on key learnings above.

KEY LEARNINGS

A key learning opportunity will be to educate on CDOT's Civil Rights Programs and to distinguish the responsibility of external versus internal roles in achieving performance measure outcomes. The external program comprises Contract Compliance Programs external to CDOT managed by the CRBRC. The Equal Employment Opportunity Program has an internal focus on personnel policies and practices and is managed by the Division of Human Resources.

In June 2020, CDOT requested additional clarification from FHWA regarding subrecipient oversight responsibilities related to ADA Title II. At that time, CDOT was informed that FHWA would be responsible for subrecipient oversight as it relates to ADA Title II in alignment with the FHWA Stewardship/Oversight Responsibilities: <https://www.fhwa.dot.gov/civilrights/programs/ada/>. Therefore, CDOT did not proceed with conducting ADA Title II subrecipient reviews and the FHWA Division Office is supportive of this approach based on the current guidance from FHWA Headquarters Civil Rights Office.

NEXT STEPS

Reporting element for ADA Title II Subrecipient reviews should be removed from future reporting based on key learnings above.

2.2. ENGINEERING: CONTRACTING, ENGINEERING ESTIMATES AND OTHER PROJECTS

INTRODUCTION

CDOT Manager: Markos Atamo
FHWA Manager: Chris Horn

The Engineering Contracts Branch contracts for construction and professional services in accordance with applicable Federal rules and regulations. The Engineering Estimates and Market Analysis (EEMA) Unit prepares project engineering cost estimates, as required by federal regulations, and monitors bidding activity for materially unbalanced bids and collusion. The Engineering Applications Unit provides technical support on the AASHTOWare Project suite of software to statewide users.

The Branch includes the following functional groups and assigned responsibilities:

Engineering Contracts Unit - The Engineering Contracts unit provides two different types of services - construction contracting and professional services contracting. The construction contracting staff conducts the contracting process for construction projects including contractor prequalification, advertisement for bids, opening of paper and electronic bids, award and execution of the contract, and issuance of the Notice to Proceed (NTP) once signed by the Chief Engineer. The professional services contracting staff conducts the contracting process for professional services (engineers, architects, surveyors, and industrial hygienists), including consultant prequalification, issuance of the Request for Proposals (RFP), facilitation of the selection process, contract negotiations, and execution of the contract.

Engineering Estimates and Market Analysis (EEMA) Unit - The EEMA unit prepares engineering cost estimates of construction projects prior to bidding, performs materially unbalanced bid and bid collusion analyses on submitted bids, and prepares cost estimates for added work on active construction projects.

Engineering Applications Unit - The Engineering Applications Unit is responsible for user support, training, and system enhancements for the AASHTOWare Project Bids, Preconstruction and SiteManager, PM Project Systems, and Survey 123 Field Diaries.

QUALITY/RESULTS

1. Contract performance (Engineering Contracts) - CY2020:
 - 120 construction contracts awarded through the Design Bid Build project delivery method (\$529.5 Million) 97% of which were awarded within 30 days of bid opening exclusive of the Award by Review (ABR) and projects requiring additional Transportation Commission fund approval.
 - 53 consultant selections, average processing time approximately 15.49 weeks. 88.6% of contracts executed within desired 17 weeks.
 - 951 task orders written, average processing time approximately 4.95 calendar days.
2. Engineering Applications - CY2020:
 - 392 tickets resolved
 - 3398 non-ticket issues resolved
 - 10 SiteManager classes conducted (1 in person/ 9 remotely)
 - Developed new REMOTE hands on SiteManager Training course (to continue training and access during pandemic)

- Implemented 2 full AASHTOWare Project Release Updates
- Creation of new SM Training manual to reflect updated training project creation.
- Implemented ACA & FCA process to retain funds when apparent low Bidders rejected Acceptance of these F/A Items.
- New Programs, MTF & PWQ total AWP system testing & implementation
- Presented to regions review of all Project & Proposal Validation errors/ breakdown of type, causation, failure result, and how to prevent/resolve each.

3. Overall Program Estimate Accuracy (EEMA):

- CY2020 Total Program Estimate (Design Bid Build projects): \$512.3M
- CY2020 Total Program Award (Design Bid Build projects): \$486.6M
- Accuracy: 4.63% of Engineer’s Estimate

PERFORMANCE MEASURES

The following performance measures demonstrate the health of the Contracts and Market Analysis Program:

Table - Performance/Compliance Measures (Contracts and Market Analysis)

PM #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline	2020
809	Overall program estimate accuracy (EEMA)	Accuracy of total Program Estimate as compared to total Program Award on ALL Design-Bid-Build projects	CMA Branch Work Plan	Calendar Year	+/- 3%	4.6%
463	Percent of projects awarded within set percentage of Engineer’s Estimate	Percent of awarded low bids within +/- 10% of Engineer’s Estimate on ALL projects	CMA Branch Work Plans	Calendar Year	50%	45.5%

KEY LEARNINGS

Engineering Contracts had key learning revolving around staff efficiency and accuracy associated with transitioning to an electronic paperless document management system and electronic document signature process. The transition to electronic document processing significantly improved the efficiency and quality of our work product with staff working remotely out of the office due to the Corona virus pandemic.

NEXT STEPS

Engineering Contracts and Engineering Estimates will continue to focus improvement on opportunities that increase speed to market and accuracy of estimates. New software and industry best practices are being analyzed for process improvements.

2.3. ENGINEERING: HYDRAULICS

INTRODUCTION

CDOT Manager: Alfred (Al) Gross
FHWA Manager: Spencer Tucker

The Hydraulic program addresses statewide issues involving design of hydraulics structures that include bridges, culverts, inlets, manholes, channels/ditches, and water quality basins. The program is responsible for working with the Regions to ensure that hydrologic and hydraulic design is implemented consistently according to CDOT Drainage Design Manual standards and criteria. The program is also responsible for creating and reviewing drainage/water related policy and procedural directives along with relevant and applicable standards and specifications.

QUALITY/RESULTS

Staff Branches Activities:

1. Bridge Scour (Plan of Action) POA project. We Scoped 30 structures but ended up working on 36 structures due to Regions requesting work on six additional structures. The work involved preparing 24 scour designs on approximately 12 projects. Construction support was done on eight structures that were completed in construction. For seven of those, we did re-coding memos and they were taken off the CDOT Staff Bridge scour critical list. Approximately 17 of those structures will be carried over into TO #13 for 2021. A yearly report was completed and sent to FHWA and CDOT Staff Bridge. A summary breakdown of CDOT's scour critical projects and structures is as follows:
 - **Region 1**
 - Project #21222: SH 121, I-70, I-76 and SH 95 over Clear Creek with structures: E-16-O, E-16-P, E-16-KB, E-16-KB, E-16-KC, E-16-GS, E-16-PM, E-16-KD and Retaining Wall. Design progressed after temporary measures were implemented at Wadsworth SH 121 Bridge and along the on-ramp to I-76/I-70 retaining wall. Design includes grade control, boulder sloping drop structures and pier protection. Ongoing coordination with local governments Arvada, Wheat Ridge and Mike High Flood District (MHFD). AD is expected July 2021.
 - G-18-BC: 2-D Model was created and structural analysis completed. Based on our findings, it was determined structure was not scour critical and re-coding memo was issued.
 - F-16-JP: 2-D model completed and analysis done to determine if bridge was scour critical. After much discussion, it was decided to put this bridge on hold, as it is probably not scour critical.
 - **Region 2**
 - N-18-AC: #21922 SH 10 over Cucharas River. Completed 2-D model and finalized shelf level plans.
 - P-17-J: SH 12 over S. Fork Purgatoire River. Shelf Plans finalized.
 - P-22-A: US 160 over Tobe Creek. 2-D model developed and scour counter measures completed. Shelf level plans completed.
 - P-22-D: US 160 over Chacuaco Creek. 2-D model developed and scour counter measures were completed. Shelf level plans completed.
 - K-18-BY/BZ: #22481. Coordinated floodplain permitting and LOMR will be required after construction. Construction completed November 2020.
 - P-17-A: #21591. SH 12 over Zaracillo Canyon. Updated Ad set but due to funding Region put back on Shelf. They will try to bundle with future bridgework in 2021.
 - I-17-EG/EQ: #21461 US 24 over Fountain Creek. Was constructed spring 2020. Scour

countermeasure utilized matrix riprap, which was challenging from a construction support perspective.

- **Region 3**

- C-07-A: US 40 over Yampa River. 2-D model completed and Shelf level plans finalized.
- F-05-R: SH 13 over Colorado River. In communication with Region to setup a project in late fall or early winter.
- L-07-A: SH 149 over Lake Fork Gunnison River. Completed 2-D model and finalized shelf plans.
- K-08-D: SH 149 over Cebolla Creek. Completed 2-D model and finalized shelf plans.
- E-10-A: SH 131 over Colorado River. Completed 2-D model and finalized shelf plans.

- **Region 4**

- D-15-A: SH 7 N. St. Vrain Creek. Plans and Specs completed and placed on Shelf. Expected AD in spring 2022.
- I-22-A/O: #20853 SH 71 over Mustang Creek and Drainage Ditch. Construction was complete summer 2020. Matrix riprap was utilized for the scour countermeasure.
- G-25-F: #20518 SH 59 over Sand Creek. Construction completed Spring/Summer 2020.

- **Region 5**

- P-02-A: SH 491 over Mancos River. 2-D model completed, overtopping roadway analyzed and incorporated into scour countermeasure.
- P-02-B: SH 491 over Indian Creek. Same as above.
- K-01-A: SH 141 over Dolores River. Completed 2-D Model and finalized shelf level plans. Staff Bridge decided on the structural alternative versus the hydraulic alternative. In fall, after looking at old plans, it was discovered that structure (piers) was built on deep foundation and determined it was most likely stable. Structure had monitoring equipment installed and Region will continue to monitor.
- P-01-G: US 160 over San Juan River. Structure has been on hold while we worked on other structures in R5; K-01-A and N-10-V. Project update meeting was held in fall.
- N-10-V #20627 was taken off Shelf, design was re-analyzed with changes incorporated, and plan set was prepared for AD. Construction completed late summer and into early Fall 2020.

2. Supported the Transportation Engineering Training Program (TETP) - Transportation Core Curriculum for the annual Hydraulic training presentation. However, the Core Curriculum TETP conference was cancelled due to COVID 19. As mentioned previously, Chief Engineer Harelson, who is a long-time advocate and participated in the program for many years, was no longer able to participate in the Hydraulic presentation. However, R3 Hydraulic Engineer Stuart Gardner was interested in joining and took the required prerequisite classes in December 2019. He was to participate and fill the role for the Hydraulics co-presentation but due to the cancellation from COVID-19, we met locally in Golden and went over presentation slides. He provided great suggestions for changes and updates to the Hydraulic presentation.
3. Supported the Environmental Programs Branch by participating in various committees and meetings. Committees included; Water Quality Advisory Committee (WQAC) and the Permanent Water Quality Mitigation Pool Fund Committee. Attended meetings and reviewed documents for development of the new permanent water quality operation and manual template. Project Development (Neil Lacey and I) worked closely with the Staff Environmental Permanent Water Quality group on the Pond Volume Certification language. We also implemented a pilot program and hired a consultant to perform the PVC certifications for the 2020 year. Consultant tasks included reviewing water quality reports and survey models for an estimated 30 water quality ponds statewide. As of the end of 2020, we are in process of reviewing six ponds in R1 and 1-2 in

R4. Ultimately, the Pond Certification will be done by the CDOT RHE's statewide. This will require them to review the pond information and PE stamp the certification form stating the permanent water quality facility (e.g. extended detention basin) was constructed according to plan.

4. Supported the Specifications and Standards Unit - Worked on several drainage related standards and specifications details. Worked with the Materials Branch (Ed Trujillo) in reviewing new drainage related products that have been requested to go onto the CDOT Approved Products List. Also working with Materials & Geotechnical branch to address a request from ADS Drainage Company to revise some of our culvert specifications and drainage details for plastic pipe.
5. Supported the Applied Research and Innovation Branch. Attended meetings and reviewed documents and materials for several water/drainage related projects. The research projects in 2020 included: *Rapid Deployment Bridge Scour System, Eastern Colorado Crest Stage Network, Bridge Scour- Use of Non-Contact Radars to Detect and Monitor Scour at CDOT Ungauged Structures, Enhancements to Streamstats Interface-Updates to Regression Equations in Western Colorado, Precipitation, Flood Gage Warning System-A proof of Concept and 2-D Quick Check-Impact on Construction Efficiency, Safety and Cost.*
6. Championed and supported FHWA's Every Day Counts (EDC-5) and Collaborative Hydraulics Advancing to the Next Generation of Engineering C.H.A.N.G.E. Program. Strongly encouraged Regions and their consultants to use 2D modeling on all culvert and bridge projects. Consultants for the Bridge Scour POA project are using 2-D modeling on all of our scour countermeasure designs. Staff Hydraulics and several of the Regions participate regularly in FHWA's 2-D Hydraulic Modeling Users Forum webinar.

Brian Varrella, R4 Resident Engineer, and Kalli Wegren, Project Manager, developed the 2D Quick Checks (2dQC) initiative. Final task order information was completed and approved with Notice to Proceed on July 6, 2020, under Project 23532.10.50. Project Champions are Resident Engineer Brian Varrella, State Hydraulic Engineer Alfred Gross, and Project Manager Kalli Wegren. This initiative is part of Colorado's EDC-5 framework sponsored by Chief Engineer Stephen Harelson and Region 4 Transportation Director Heather Paddock. The statewide 2dQC initiative proceeded in July 2020 with the primary objective to improve safety, enhance design element efficiency, and reduce construction costs during the design planning and scoping phases of a CDOT project. It is expected this initiative will develop a statewide process that saves the Colorado DOT millions annually. Outcomes include institutionalizing a process to prepare a 2dQC on 1 of 6 projects in the state, and developing Region Hydraulic Engineers' capabilities to review 2D analyses with SMS.

The 2dQC initiative secured \$425,760 in funding and selected 45 of 77 projects to demonstrate the benefits of 2D Quick Checks in CY2021. A Technical Advisory Committee (TAC) and Executive Oversight Committee (EOC) were established, and a 1-day training is being prepared to create Subject Matter Experts (SMEs) to identify and guide 2dQCs in the future. Progress of the 45-project delivery effort (Project 23532) and the training curriculum development (Project 24149) is monitored by the EOC at quarterly meetings. EOC materials are developed from meeting notes, summary reports, and direct feedback from CDOT Hydraulic Engineers and our TAC. All innovations, lessons learned, and work products are authorized to be shared with other State DOT and FHWA partners.

7. Responded to internal and outside agency requests for water quality and drainage information. Met with vendors and set up internal meeting with hydraulic staff and others for various drainage related products. Participated on the Risk and Resiliency Working group; attended meetings, participated in workshops, and reviewed reports.

Region Activities:

1. The annual Hydraulic Meeting was held virtually in October 2020. It was a half day meeting that centered around discussion topics by Region Hydraulic Engineers (RHE's) followed by round table discussions based on an agenda of topics ranging from hydrology and hydraulics to various specific Region issues or concerns.
2. Sponsored Hydraulic training in conjunction with FHWA. This year was little different with COVID-19 as FHWA determined the course and offered it remotely for several areas of the country. They offered several phases for the Two Dimensional Hydraulic Modeling of Rivers at Highway Encroachments-Virtual Option class. The Rocky Mountain Region CDOT's time slot was from July 20-July 23. Several folks from each of the Regions participated remotely in the training. Office of Employee Development (OED) was kind enough to provide funding for one Hydraulic Engineer from each Region.
3. CDOT Project Support continues to sponsor a corporate membership (\$400) for the Colorado Association of Stormwater and Floodplain Managers (CASFM). CDOT has approximately 35-40 members statewide from Hydraulics, Environmental and other specialty

PERFORMANCE MEASURES

The following performance measures demonstrate the health of the Hydraulics Programs:

Table - Performance/Compliance Measures (Hydraulics)

PM #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/Baseline	2019	2020
1441	Update of the Scour Designs going to Construction for all Scour Critical Bridges	The percentage of scour critical on-system bridges worked on (NBI Item 113 Code: 2, 3 or U) in current year that went to AD or construction.	Consultant management reports	State FY	30%	35%	26.7%

KEY LEARNINGS

1. RHE's voiced concerns that they cannot get approval to attend various workshops or conferences. The MHFD annual seminar and the CASFM conference are the two most important water related events to attend each year. Some of the RHE's are attending but many are paying for these expenses themselves. This was not an issue in 2020 due to COVID-19. Most workshops and conferences locally and nationally were cancelled.

NEXT STEPS

1. At the advice of Staff Bridge, the Hydraulics Program will be setting up a new invoice system to better track costs associated with Bridge Scour POA project for scour critical bridges. A new consultant invoice system was set up to better track Bridge Scour POA project costs. Consultants will be finishing billing cycle in January and I will present to Staff Bridge Management on the budget tracking system early in 2021.
2. Addressing problem culverts statewide is an important effort for CDOT. This was put on hold due to COVID-19 in 2020, but CDOT will be working with the Specifications and Standards group and the Regions to put together a culvert repair specification template in 2021.

2.4. ENGINEERING: PAVEMENT AND MATERIALS

INTRODUCTION

CDOT Manager: Craig Wieden
FHWA Manager: Brian Doblin

The Materials and Geotechnical Services Branch is responsible for ensuring quality in the products used for construction of the State transportation system. The Branch is responsible for the specifications, test procedures, and associated testing of materials to ensure compliance with CDOT standards and specifications and FHWA Regulations. The Materials and Geotechnical Services Branch includes Programs in the following areas: Soils/Geotechnical, Geohazards, Concrete and Physical Properties, Asphalt Pavements, Pavement Management, and Pavement Design. Due to the COVID Pandemic and restrictions that were put in place on in-person training and/or number of training attendees, some modifications to our typical processes were required. Updates below reflect those modifications where appropriate.

QUALITY/RESULTS

1. Fifty students were trained in SMM/LIMS (Site Manager Material's tracking software) with an overall course evaluation score of 4.55 out of 5. Additionally, the CDOT Soils and Geotechnical Program conducted 39 Western Alliance for Quality Transportation Construction (WAQTC) certification classes. Due to COVID restrictions on the number of total participants and instructors, additional certification courses were held to try to keep up with the same throughput we have achieved in the past. This included off-site offerings at host consultant laboratories, and doubling the number of offerings normally conducted at our CDOT facility. COVID restrictions on in state travel also prevented us from traveling to the Western Slope to provide a certification offering. To facilitate inclusion of western slope technicians, training/certification materials were provided to CDOT Region 3 personnel so they could host their own certification offering. Three WAQTC training courses were conducted prior to COVID restrictions being implemented. As certification offerings were doubled up, we were not able to offer additional training sessions post-COVID. Instead, CDOT's WAQTC personnel developed training videos on the various procedures that are now available for industry use.
2. Through partnerships with industry (Colorado Asphalt Pavement Association [CAPA], American Concrete Pavement Association [ACPA], Colorado Ready Mixed Concrete Association [CRMCA], etc.), CDOT hosted numerous ACI certification courses and Concrete Paving Inspector courses at our Central Lab location, and provided certified proctors for various LabCAT certifications courses over the year. 46 American Concrete Institute (ACI) certification/training courses were offered, with the majority of those consisting of both morning and afternoon sessions due to COVID attendance restrictions. Six Concrete Paving Inspector classes were offered via the Colorado Ready Mixed Concrete Association and American Concrete Pavement Association. 29 LabCAT certification courses and 8 Asphalt Inspector certification courses were offered via the Rocky Mountain Asphalt Education Center (RMAEC). Three meetings of the LabCAT Board of Directors were also held, as were two meetings of the WAQTC Board of Directors to review and discuss the Programs.
3. Four manuals were updated and improved over the course of the year. They included the Field Materials Manual (FMM), the CDOT Laboratory Manual of Test Procedures, the Independent Assurance Manual, and the Pavement Design Manual. FMM improvements included additional enhancements to project documentation when using SiteManager, updated forms, the addition of a section for suspension of testers, and instructions for new documentation procedures. The Pavement Design Manual updates included: a new section for electronic documentation; clarification that use of widened lanes in PCCP shall not be done to reduce thickness; guidance on

use of Type I or Type II chip seals depending on bicycle traffic; and updates clarifications to general processes/calculations that are routinely omitted from LCCA's; addition of a chapter on use of the BcT (back calculation tool); and clarification on determining the years to first rehab for PCCP.

4. The Materials Advisory Committee met six times to identify, discuss, and resolve Materials related issues. Notable improvements include:
 - Updates to CP 52 - Contractor HMA Mix Design Submittal to clarify requirements and develop a checklist that can be used by both Contractor and CDOT personnel to evaluate the mix design submittals for completeness.
 - Revised Section 412 to remove the requirement for joint scores on PCCP. Joints will still be utilized, but will be based on images developed from the MIT Scan device, making project construction management simpler.
 - Revised Sections 105 and 106 to require the use of Sand Equivalence testing for Flexural Strength PCCP Acceptance in addition to the already required Compressive Strength Acceptance. Fine Aggregate cleanliness/difference between design and production has been flagged as a potential cause of some low flexural strengths seen recently.
 - New Task Forces were formed to look at the use/testing of recycled concrete aggregates used in the production of concrete, and review/revise the M 412 PCCP M-standards.
5. The CDOT, Arizona Department of Transportation, New Mexico Department of Transportation Utah Department of Transportation Four Corners peer exchange meeting could not be held in 2020 due to COVID concerns. Talks were in progress to try to hold remote meetings, but remote meetings could not be scheduled to accommodate multiple State calendars.
6. The Central Laboratory maintained 86 tests in the American Association of State Highway and Transportation Officials (AASHTO) Accreditation Program (AAP). In addition, the CDOT Central Lab also underwent a successful CCRL Accreditation review in 2020.
7. The Central Laboratory quality review of each of the five Region Laboratories and remote testing facilities was conducted and reporting completed in May 2020. COVID restrictions required modification of the inspections. As a result, the annual lab inspections conducted in 2020 consisted of paperwork reviews and round robin testing/review. No in person lab inspections were conducted.
8. The testing reports for the round-robin proficiency program with the Regions, consultants, and contractors were completed for asphalt, concrete compressive strength, aggregates, sulfates in soil, and soils materials.
9. The Pavement Management Technical Committee met six times during the year. Improvements made to the Pavement Management system are documented in the Technical Committee meeting minutes. Significant improvements were implementation of Best Management Practices resulting from EMT review of the pavement asset class with all five Regions and HQ Staff. In addition, both the inflation and discount rates were updated in the dTIMS Pavement Management Program to reflect more current values, as well as correcting an error in the financial cost equations that was discovered. The FY 24 planned SUR projects were finalized, as were the planning percentage estimates for FY 25 and FY 26. Additionally, Pavement Management personnel worked closely with members of DTD and Deighton to revise and begin using the Federal Performance Measure models that were successful in modifying our 4-year good and poor targets for Interstates and NHS Non-Interstates.

10. The Geohazards Program completed a study relating Geologic Hazards to Severe Storm Events. FHWA and CDOT's Geohazard Program funded the study jointly, and provided support associated with the I-70 Grizzly Creek Fire through Glenwood Canyon, assessing rockfall and debris flow areas/potential. The Program also adopted the use of Box Cloud Storage for UAS data and information.
11. Partnering with Industry: The CDOT/American Concrete Paving Association (ACPA) Coop met four times to identify and resolve issues. The Asphalt Industry Forum Meetings scheduled for early in 2020 were cancelled due to COVID. Remote Task Force meetings were held over the year to discuss ongoing topic areas. No AIF meetings were scheduled/held for the fall of 2020. The Colorado Ready Mixed Concrete Association and the Concrete & Physical Properties Program meet bi-monthly to discuss specification changes and administration of the ACI certifications. The Pavement Design Program met with industry representatives two times over the course of the year to discuss enhancements to CDOT's Pavement Design Manual, including industry concerns and enhancements regarding CDOT's Life Cycle Cost Analysis (LCCA) procedures. Industry partnerships generate and refine the finished implemented improvements that are listed under MAC accomplishments in item 4 above.
12. The use of CP-59 to document and approve WMA technologies and contractors continued in 2019. The total number of approved Warm Mix Asphalt (WMA) technologies stands at 12 and contractors at 12. Many contractors are approved for more than one WMA technologies.
13. LIMS (Laboratory Information Management System) continues with full project implementation on all active construction projects. System and network improvements continue to document performance improvement of the system. Mat/Geo personnel who were dedicated to LIMS support/training have been transferred to CDOT's Technology and Data Services, Engineering Software. CDOT has undertaken an effort to evaluate our engineering software systems moving forward, including LIMS. This effort is being headed by CDOT's Technology and Data Services Group, but does include Materials personnel from around the State.
14. CDOT's Materials Technician Certification continued through 2020 as an e-learning course through our Transportation Engineering Training Program (TETP). This e-learning certification provides Materials Technicians an overview of what is expected from them as a Materials Technician on CDOT projects, including processes and resources, communication protocols/expectations, documentation requirements, and provides an overview/refresher of SMM/LIMS. 185 personnel (CDOT and Consultant) completed the course over calendar year 2020.
15. CDOT continues to work on improvements to our Buy America documentation requirements as well as efforts to update our pre-qualification requirements for Pre-Cast Manufacturers as detailed in CP-11. Updates to our processes will continue into 2021 through coordination with the Colorado Contractors Association as well as pre-cast product manufacturers.
16. The Product Evaluation Program has several new and ongoing changes/improvements in the works. These include: continuing to develop and communicate the partnership between the Manufacturers and the CDOT Subject Matter Experts; added two new sound wall products to the APL with assistance of the manufacturers and SME's; developed a new Team Drive Folder to house updated CDOT Materials Forms; created new cement categories in the CDOT APL; as well as updates to various forms related to the APL items and documentation.
17. The Concrete/Physical Properties Program, in addition to certifying Pavement Smoothness Testing Devices, also took over the certification of Pavement Smoothness Operators this year. Through these certifications, the Program certified 18 Operators and 12 Devices in 2020.

PERFORMANCE MEASURES

The following performance measures demonstrate the health of the Pavement and Materials Program:

Table - Performance/ Compliance Measures (Pavements and Materials)

PM #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline	2018	2019 ¹
811	Percentage of pavements of the Interstate System in good condition	Percent of all Interstate pavement segments rated good under the criteria set by 23 CFR 490	Highway Performance Monitoring System (HPMS)	State FY	National Performance Measure Targets: 2020: 46% 2022: 40%	44.30%	46.5%
812	Percentage of pavements of the Interstate System in poor condition	Percent of all Interstate pavement segments rated poor under the criteria set by 23 CFR 490	Highway Performance Monitoring System (HPMS)	State FY	National Performance Measure Targets: 2020: 1% 2022: 5%	2.47%	2.7%
813	Percentage of pavements of the non- Interstate NHS System in good condition	Percent of all non- Interstate NHS pavement segments rated good under the criteria set by 23 CFR 490	Highway Performance Monitoring System (HPMS)	State FY	National Performance Measure Targets: 2020: 50% 2022: 40%	42.32%	41.5%
814	Percentage of pavements of the non- Interstate NHS System in poor condition	Percent of all non- Interstate NHS pavement segments rated poor under the criteria set by 23 CFR 490	Highway Performance Monitoring System (HPMS)	State FY	National Performance Measure Targets: 2020: 1% 2022: 5%	3.03%	3.1%

¹Data for the reporting year 2020 is not available until June 15th after the close of the reporting year. Therefore, data from 2019 is reported.

KEY LEARNINGS

CDOT still has concerns with ensuring the proper Buy America Documentation is being received for qualifying items. Specification improvements are being proposed to change/clarify the Buy America Documentation received on projects, so they can be traced back to the point of origin. Currently, certification that the materials are in compliance are being received, but when conducting an in-depth review of the documentation, disconnects on the tracking of the materials are often found. The revised specification is intended to address this by requiring all documentation received references a mill test report/heat number from the point of smelting/melting.

Continued efforts to revise/improve our pre-qualification of manufacturers of pre-cast concrete projects is also underway. While this initially started as an attempt to improve or strengthen Buy America documentation requirements for Buy America relevant projects used in the pre-cast manufacturing process, it has morphed into a length overhaul of our pre-qualification requirements as outlined in CP-11. We are currently working with manufacturers on the proposed changes. The concern and continued goal is to ensure compliance with Federal Buy America requirements to the satisfaction of the FHWA Personnel, without causing additional undue burden on CDOT's Field Construction Staff.

NEXT STEPS

Asphalt Cement Cost Adjustment - Continue to monitor the index trends and associated payments with the new specification to track the benefit to CDOT as well as those projects now bid that opt in or out of the AC adjustment specification.

Buy America - Work with CCA on the proposed Buy America specification language to address concerns raised by the Contracting community.

Pre-Qualification of Pre-cast Manufacturers (CP-11) - Continue to work with manufacturers on the proposed changes to CP-11.

2.5. ENGINEERING: DESIGN AND CONSTRUCTION

INTRODUCTION

CDOT Manager: Neil Lacey (Design) and Markos Atamo (Construction)
FHWA Manager: Shaun Cutting

The Design Program Manager and Construction Area Engineers are responsible for assisting the five CDOT Regions to maintain uniform administration and management practices in construction, design and contract administration. In addition, they are responsible for providing technical assistance to the Regions and various local agencies.

QUALITY/ RESULTS

1. There were 283 Change Orders submitted in FY2020. Of those 283, 267 (94%) were complete as submitted, 16 (6%) needed revision, and zero (0%) needed supplemental documentation. There were three Major Change Orders requiring FHWA approval.
2. The Liquidated Damages table was revised and in place for FY 2020-21. The next revision is scheduled for review in FY 2022, revised bi-annually.
3. There were four claims filed in FY 2020. Typically, claims are filed only after the dispute resolution process is exhausted. This year two claims went straight to claim status.

Status of FY20 Claims		< \$250,000	>\$250,000
Claims Open Beginning FY20	2*	0	1
New Claims FY20	4*	0	2
Claims Resolved FY20	1	0	1
Claims Carrying Over FY21	5*	0	3

*claims of undetermined amount

4. Dispute Status FY 2020

Status of FY20 Disputes		< \$250,000	>\$250,000
Disputes Open Beginning FY 20	3*	1	1
New Disputes FY20	4*	0	3
Disputes Resolved FY20	3*	1	1
Disputes Carrying Over FY21	3*	0	2

*dispute of undetermined amount

5. Four Joint CDOT/ Colorado Contractors Association (CCA) Specifications Committee meetings were held and forty-three standard specifications, two material bulletins and three local agency bulletins were issued. There were 7 M-standard plans issued.
6. No Post Construction or inter-regional reviews were performed for FY 2020.
7. The Area Engineers and FHWA Area Engineers conducted Residency Visits with all of the regional design/construction residencies and traffic units.
8. Four Area Engineer/FHWA Program Delivery Team Leader meetings were held in FY 2020.

9. The Project Development and/or Contracts and Market Analysis Branches were represented at the following committee meetings:
 - CDOT/CCA Specifications Committee - 3 of 3 meetings
 - CDOT/ American Concrete Pavement Association (ACPA) Coop - 4 of 4 meetings
 - CDOT/ Colorado Asphalt Pavement Association (CAPA) Coop - 4 of 4 meetings
 - Project Development Advisory Committee (PDAC) - 4 of 4 meetings
 - Materials Advisory Committee (MAC) - 6 of 6 meetings
 - Local Agency Roundtable Team (LART) - 4 of 4 meetings
 - Resident Engineer Committee - 6 of 6 Meetings including the Annual PE II Meeting.
 - Water Quality Advisory Committee - 4 of 4 Meetings

10. Twenty construction projects and two maintenance project traffic control reviews were conducted in FY 20, of which two were nighttime reviews. Statewide average construction and maintenance project scores were 94.1% and 98.5%, respectively. The final report was submitted to FHWA on December 19, 2019.

11. Two Construction Bulletins, six Design Bulletins, seven Chief Engineer Memos and one Policy Memo were issued.

12. The TETP conducted training courses in numerous subject areas (number of classes held): Transportation Core Curriculum (1); Construction Project Administration (1); Construction Project Administration for Local Agencies (1); CPM Scheduling for Construction (1); Disputes and Claims Resolution (1); Introduction to the Major Types of Project Delivery at CDOT VILT (8), Lighting Design Guide (1); Managing Contract Time (1); Preconstruction Project Management Workshop - Specialty Groups 4 hr. (1); Project First Program (10); Reading Structural Plans (1);, & Writing for Engineering Professionals - 3 Day (1). 20 instructor-led courses were held in FY 2020. In addition to the instructor-led training courses, there were 14 e-learning courses completed: Construction Budget Mgmt. for Project Managers & Engineers; Construction Change Orders; Construction Force Accounts; Construction Manual: Section 100; Construction Project Financials; CPM Scheduling: MS Project 2013; Design Project Administration; Guardrail Systems for Construction Engineers and Inspectors; Managing Contract Time eLearning course; Plan Checking; Project Development Manual; Project Lifecycle Simulation; SAP Project Portal; Specifications Writing and Development; Survey Basics for Engineers; & Work Hour Estimation: Scope of Work. Due to the ongoing COVID-19 pandemic, TETP cancelled 10 in-person classes between March 16th and June 30th: Applied Roadway Design (1); Construction Project Administration for Local Agencies (1); Construction Project Administration for Maintenance (1); Context Sensitive Solutions (1); CPM Scheduling for Construction (1); Interchange Planning and Design (1); Project First Program (3); & Writing for Engineering Professionals (1).

PERFORMANCE MEASURES

The following performance measures demonstrate the health of the Design and Construction Programs:

Table 1 - Performance/ Compliance Indicators (Design and Construction)

PM #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline	2020 Actual
328	Number of change orders approved by CDOT	Number of change orders which did not require FHWA approval	CDOT Work Plan	State FY Quarterly reporting	track trend	2020 :280 2019 :394 2018: 415 2017: 443 2016: 374 2015: 278 2014: 314

345	Time to close a project from final acceptance to project closure in (Fiscal Management Information System (FMIS)	Average # of days to close a project	CDOT Work Plan	State FY Quarterly reporting	200 days	334 days ¹
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¹ landscape establishment is a major factor for the delay in project closure

KEY LEARNINGS

1. CDOT determined that landscape establishment is a major factor for the delay in project closure, SAP #345. Currently we are working on process improvements in this regard. The goal is to have 95% of projects closed and de-budgeted within 12 months of project acceptance.

NEXT STEPS

Resolve any disputes within the projects as timely as possible. Continue to teach and support the development of engineering training courses in order to support consistency and maintain knowledge throughout our design and construction staff.

2.6. ENGINEERING: PROGRAM AND PROJECT DELIVERY - PROGRAM MANAGEMENT

INTRODUCTION

CDOT Manager: Roselle Drahushak-Crow
FHWA Manager: Kelly Galardi

QUALITY/ RESULTS

To ensure overall program quality, the Program Management Office (PMO) tracked program delivery monthly at the statewide level using the Expenditure Performance Index (XPI) to compare actual construction expenditures to planned values for the 2020 calendar year (CY20). PMO reports the results of data analysis and data trending to the Regions on a monthly basis for review and actions, if needed. PMO monitors statewide data trends and when necessary, the Governance Committee adjusted the portfolio of projects to meet Program goals. Moving forward, PMO will be renamed Program Reporting Transparency Office (PRT0).

To improve the quality of Program and Project Management, PMO led the initiatives described in the table below.

Table - PMO Initiatives

Initiative	Description	Status	Benefits
Asset Management	Guidance that supports decision-making for key asset programs	Guidance is published on the PM Webpage and this effort is complete.	<ul style="list-style-type: none"> Improves consistency in the management of key asset programs by delineating roles and responsibilities, processes, business rules, terminology and reporting requirements
Program/ Project Management Webpage	Webpage with PM information, guidance, tools, templates, etc.	Updated quarterly	<ul style="list-style-type: none"> One-stop shop for program and project management information regarding processes and tools
Web-based Project Development Manual (PDM)	Integration of The Project Development Manual on the PM Webpage	Specialty content for the PM audience was added to the PM Webpage. This effort is complete.	<ul style="list-style-type: none"> Summarizes technical project information for the PM and team Links to Specialty Unit information including technical manuals and websites
MS Power BI Dashboards	Visual, easy-to-read reports that instantly aggregate and organize key program and project management data and metrics	Updated Monthly and new Dashboards and views are added and modified as needed.	<ul style="list-style-type: none"> Provides access to consolidated data in an easily accessible and understandable manner Track project progress and helps identify issues Facilitates responses to questions and set realistic expectations regarding funding availability, project timelines, etc.
Landscape warranty task force efforts	Landscape establishment for most projects will be handled by CDOT Maintenance and/or a separate contract, allowing projects to close sooner.	New Contracting capacity and New Traffic Control contracts are now available. This Initiative is complete.	<ul style="list-style-type: none"> Closing construction projects earlier. Trained CDOT staff will accomplish landscape establishment or contractors specializing in landscaping, leading to better quality work. Improved inspection of soil and seeding will ensure that quality work is provided.
OnTrack	Project information system to support program and project management lifecycle, including	Rollout of PM Web Release 1 is in progress.	<ul style="list-style-type: none"> User friendly, one-stop shop for all project information, including progress tracking, workflows, approvals, notifications, and more Supports efforts to group and aggregate

	multiple levels of CDOT stakeholders across functions, Regions, headquarters and partner organizations (e.g. FHWA). PMO has a key role in advising system configuration requirements.		<p>projects, identify program needs, prioritize projects and distribute funds</p> <ul style="list-style-type: none"> • Provides access to easy-to-use metrics-based dashboards • Data from across the program and project lifecycle can be used to forecast • Increases efficiency of process workflows, collaboration and data entry • Aligns programs/projects with the STIP and track asset improvements
Project Management Guidance for Preconstruction & Construction	Processes, guidance, tools and requirements for project managers that are standardized across CDOT	Preconstruction Guidance Updated quarterly; Construction PM Guidance is in development	<ul style="list-style-type: none"> • Establishes standardized, consistent approach for managing projects across Regions • Ensures accurate and consistent project data is maintained in OnTrack, critical to supporting accurate progress reporting and the capability to aggregate project data in dashboards

PERFORMANCE MEASURES

The following performance measures demonstrate the health of the Program Management Program.

Table - Program Management Performance/ Compliance Measures

PM #	Indicator	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline	2019	2020
555	Expenditure Performance Index (XPI)	XPI is actual program expenditures divided by annual target ¹ for program expenditures.	Reported to PMO Governance	Monthly	$0.95 \leq XPI \leq 1.05$	0.75	0.92
1442	% Projects advertised by baseline Late AD date	Projects must be advertised by the Late AD Date set at the FIR milestone, in order to achieve planned construction expenditures for the CY	Reported to PMO Governance	Monthly	95%	N/A	76%
1443	% Projects closed on-time	Percent of projects closed and de-budgeted within 12 months of final acceptance	Reported to PMO Governance	Monthly	95%	N/A	82%

¹The CY20 annual target reflects planned expenditures as of 01/2020.

KEY LEARNINGS

1. XPI achieved in 2020 was 92 percent, with total expenditures of \$809 million compared to a target of \$877 million, or 3 percent lower than the desired range.
2. More than a third of the shortfall occurred from delayed spending in 10 major projects (budget > \$100 M). Construction spending in CY20 was a significant achievement recognizing the conditions surrounding the year.
3. Late AD indicates the date which individual projects must be advertised by in order to meet their spending targets for the construction season. In project level analysis, there

was little correlation between projects missing their Late Ad date and projects not spending per their target. Further investigation into setting the Late Ad date, the merits of monitoring this date, and establishing a consistent statewide method for setting it, may be warranted.

4. Twenty-eight of the 159 projects closed within CY20 took more than one year to close. Investigations are ongoing for specific reasons for delays including analysis of the closeout process.

NEXT STEPS

The CY21 Expenditure Target (\$827 M) and Baseline will be adjusted if additional funding becomes available from SB 267 Year 3 funds, federal infrastructure stimulus, or state funded stimulus.

2.7. ENGINEERING: RIGHT OF WAY

INTRODUCTION

CDOT Manager: Christine Rees
FHWA Manager: Jeff Bellen

A host of state and federal rules and regulations governs the acquisition of private property for public use. The Right of Way (ROW) program has overall responsibility for the acquisition of real property on Federal Aid projects. This responsibility includes assuring that acquisition and relocation activities are conducted in compliance with Federal and State legal requirements.

The ROW program is part of the CDOT Project Development Branch. The right of way phase of the project development process can be divided into four process categories or work activities:

- Surveying
- Valuation (Appraisals/Review and Waiver Valuations)
- Acquisition
- Relocation

QUALITY/RESULTS

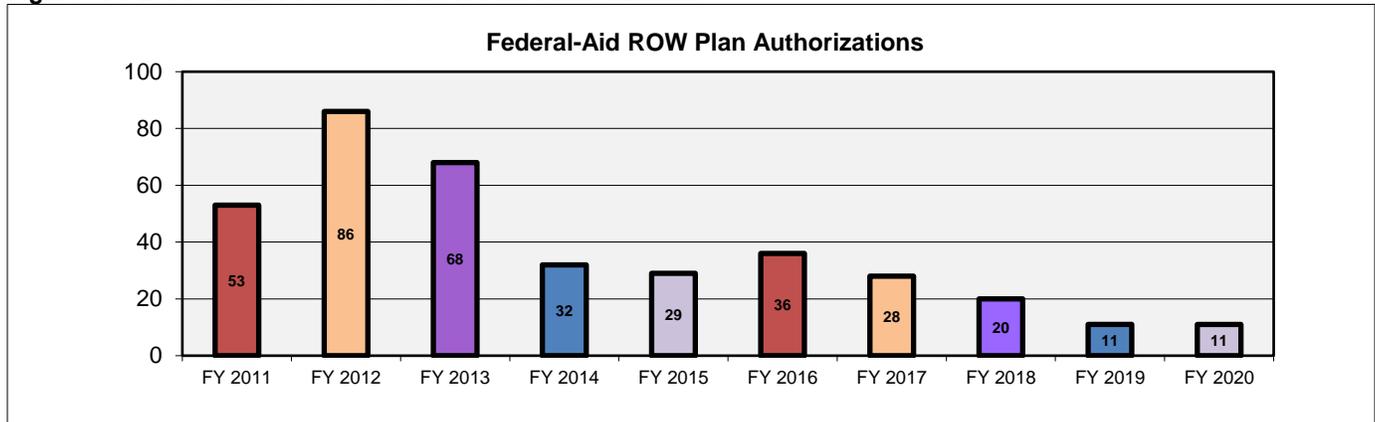
1. All of the required actions in the FHWA ROW Required Actions List assigned to ROW were completed for fiscal year 2020.
2. CDOT's ROW Manual is updated every 5 years. Process updates to reflect the *Amerco* decision, CDOT Records Management directives and changes to 23 CFR 710- 201(C)(2)(i) were made with direction and prior approval from FHWA. The ROW Program drafted a complete 5-year update to the ROW Manual in FY 2020 and FY 2021 and submitted for approval to FHWA in FY 2021.
3. There were no requests for waivers.
4. In accordance with the Statistical Report requirement in 49 CFR Part 24 Appendix B, CDOT submitted the required annual statistical report to FHWA on November 16, 2020.
5. To better understand the data, a baseline of the number of Federal Aid projects with ROW is useful and shown below.

Table - FY 2011-2020 CDOT Authorized ROW Plans for Federal Aid Projects

ROW Plans Authorized	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	10 Year Avg.
Federal Aid Projects with ROW	53	86	68	32	29	36	28	20	11	11	37

6. Ongoing monitoring regarding Uniform Act-based processes was performed on every project for which federal participation was sought. All required forms were fully completed, and three or more levels of review were done on each acquisition and relocation prior to issuance of any funds.
7. CDOT authorized 11 ROW Plans for Federal Aid Participation projects and 31 ROW plans for non- participation projects, for a total of 42. (See Figure FY 2011 - 2020 Federal Aid ROW Plan Authorizations).

Figure - FY 2011 – 2020 Federal Aid ROW Plan Authorizations



8. HQ ROW staff and Region ROW staff continue to conduct systematic file reviews. In August 2019, CDOT Region 2 conducted a Quality Assurance Review of Region 3 ROW files. Improvements in contact log summaries were suggested, and a training on the topic is being developed in FY 2021. Best practices were observed by Region 2 and shared with the ROW Program. In response to the findings from the FY 2019 relocation field visit on the Central 70 project, a relocation-tracking document was created by HQ ROW staff in order to better reconcile authorizations with claims and identify outstanding payments. This new tool will be utilized for all displaces identified on new Acquisition Stage Relocation Plans on a go-forward basis. This will ensure that displaces have an opportunity to claim available benefits, sufficient budgets are maintained, and will allow for better transparency between CDOT and displaces.

9. On May 29, June 12, and June 26, 2020, the CDOT ROW Program provided virtual training to statewide ROW staff. The focus of the training sessions included CDOT condemnation authority, title commitment exceptions, and reading right of way plans. This training format continued into FY 2021. HQ ROW made updates to training materials for the annual TETP statewide training program in response to feedback from the February 2019 event. The new materials included survey, acquisition, and relocation information and were presented to CDOT staff in February 2020. Finally, HQ ROW continued to provide training and technical assistance to consultants, local agencies and CDOT Region ROW staff as requested.

PERFORMANCE MEASURES

The following performance measures demonstrate the health of the Right of Way Program: CDOT will continue to track the Conditional Clearance, Condemnation, and Fair Market Value Settlement Rate, and Appeals statistics and compare against the prior 10 years for major deviations

Table - Performance/Compliance Measures (ROW)

PM #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/Baseline	10-Year Avg.	2020
319	Conditional clearances	Percentage of Federal-aid projects with conditional ROW certifications	A list of conditional clearances	State FY	Track trend	13%	15%

320	Condemnations	Percentage of parcels acquired using condemnation	Uniform Act Relocation Assistance and Real Property Acquisition Statistical report as required by 49 CFR, Appendix B	State FY	Track trend	4.03%	3.79%
322	Fair market value settlement rate	The percentage of parcels settled at FMV	Calculation of the number of parcels that settled at FMV versus the total number of parcels acquired	State FY	Track trend	68%	69%
321	Appeals	The number of appeals filed each year	A list of appeals	State FY	Track trend	1.3	0
426	ROW customer survey	ROW appraiser and agent customer service rating	ROW customer service survey by Region	State FY	Achieve very good or better in all categories	4.4	4.23

Additional detail on the performance measures is provided below:

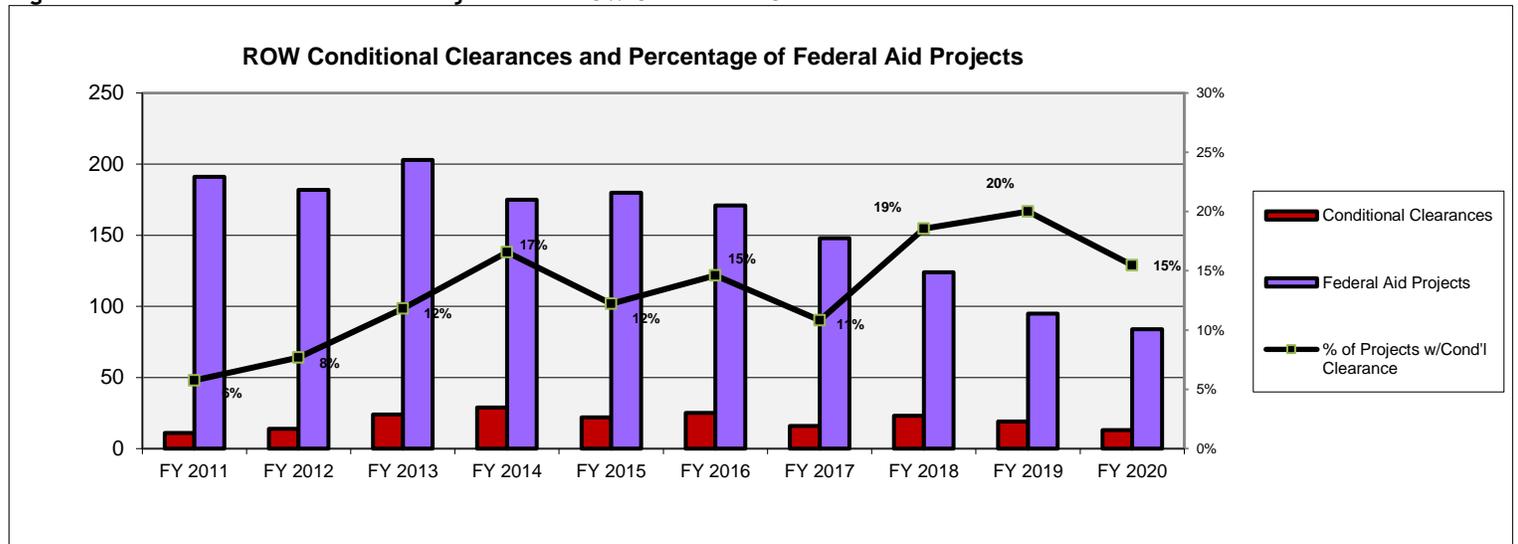
10. Conditional Clearances - Percentage of Federal Aid projects with conditional ROW certifications was 15%.

Table - FY 2010 - 2020 Federal Aid Projects with Conditional Clearances

Federal Aid Projects with ROW Conditional Clearances	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	10-Year Avg.
Federal Aid Projects with ROW	59	191	182	203	175	180	171	148	124	95	84	155
Conditional Clearances (granted)	17	11	14	24	29	22 ¹	25 ¹	16 ¹	23 ¹	19	13	20
Percentage of Conditional Clearances	29%	6%	8%	12%	17%	12%	15%	11%	19%	20%	15%	13%

¹ FY 2015, 2016, 2017, 2018, 2019 & 2020 Clearances include Local Public Agency (LPA) project

Figure - FY 2011 - 2020 Federal Aid Projects with ROW Conditional Clearances

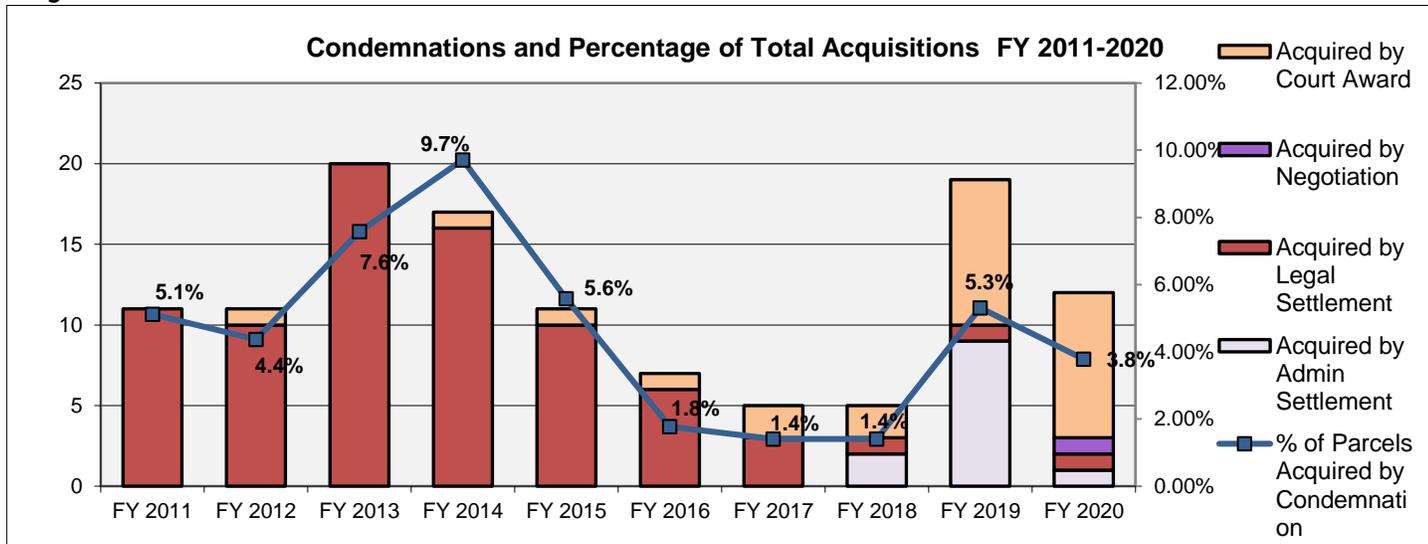


11. Condemnations - In FY 2020, 317 acquisitions were conducted. Twelve (12) acquisition cases were forwarded to the Office of the Attorney General for the initiation of condemnation proceedings. Nine (9) cases resulted in acquisition by condemnation (via court award).

Table - FY 2011 - FY 2020 Condemnations - Cases Settled

Condemnations - Cases Settled	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	10-Year Avg.
Total Number of Acquisitions (Acq.)	215	252	264	175	197	395	252	427	358	317	296
Parcels Acquired by Region Administrative Settlement / % of Total Acq.	0 / 0%	0 / 0%	0 / 0%	0 / 0.0%	0 / 0%	0 / 0%	0 / 0%	2 / 0.5%	9 / 2.5%	1 / 0.3%	1.2 / 0.4%
Parcels Acquired by Legal Settlement / % of Total Acq.	11 / 5.1%	10 / 4.0%	20 / 7.6%	16 / 9.1%	10 / 5.1%	6 / 1.5%	3 / 1.2%	1 / 0.2%	1 / 0.3%	1 / 0.3%	7.9 / 2.6%
Parcels Acquired by Negotiation / % of Total Acq.	0 / 0%	0 / 0%	0 / 0%	0 / 0%	0 / 0%	0 / 0%	0 / 0%	0 / 0%	0 / 0%	1 / 0.3%	1 / 0.3%
Parcels Acquired Using Condemnation (via court award) / % of Total Acq.	0 / 0%	1 / 0.4%	0 / 0%	1 / 0.6%	1 / .5%	1 / 0.3%	2 / 0.8%	2 / 0.5%	9 / 2.5%	9 / 2.8%	2.6 / 0.8%
TOTAL (Cases) / % of Total Acq.	11 / 5.1%	11 / 4.4%	20 / 7.6%	17 / 9.7%	11 / 5.6%	7 / 1.8%	5 / 1.4%	6 / 1.4%	19 / 5.3%	12 / 3.79%	11.9 / 4.0%

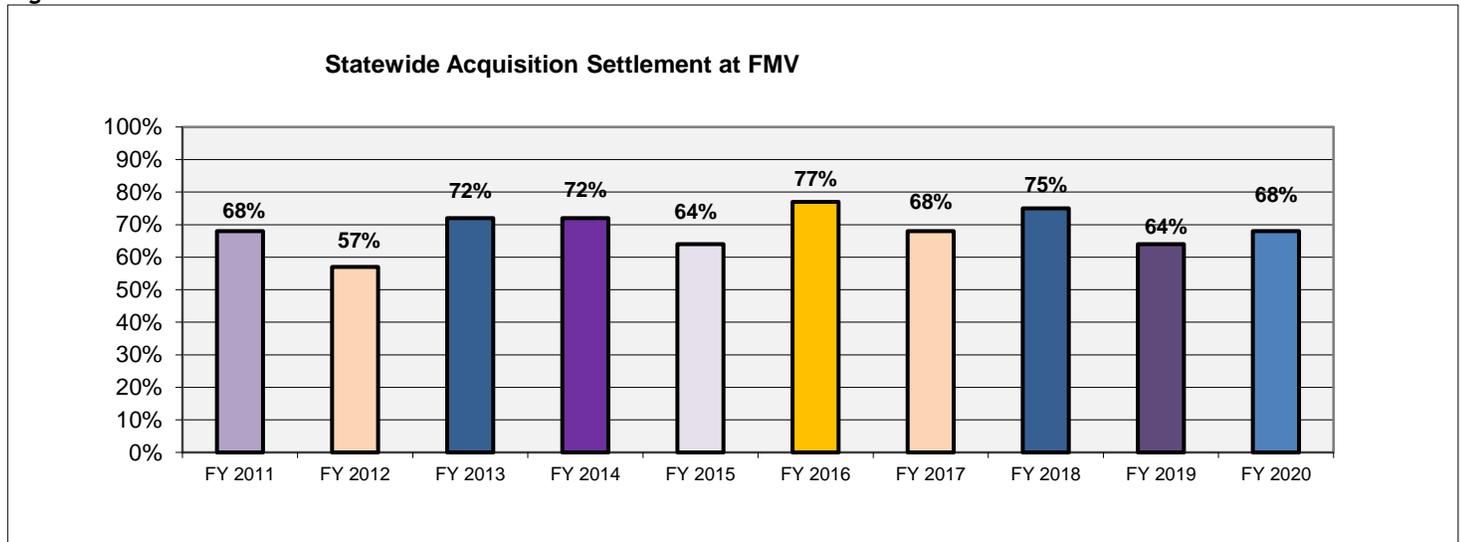
Figure - FY 2011 - FY 2020 Condemnations



12. Statewide acquisition settlement rate at Fair Market Value: 68%. When including parcels that were acquired under the Voluntary ADA Acquisition Pilot Program, the acquisition settlement rate at Fair Market Value was 75%. Most of these additional acquisitions were below \$5,000 with offer amounts determined through streamlined procedures. Furthermore, parcels that could not be acquired were removed from the project, so the acquired parcels are not included in the baseline statistic.

Tracking the settlement rate at Fair Market Value (FMV) is used as one gauge to assess the overall health of the CDOT ROW Program. Settlement rates are influenced by the strength and quality of the property rights valuations and the negotiation skills of the acquisition agents. The ROW Program's consistent settlement rate trend in the 60-75% range is interpreted as evidence that the property owners from whom CDOT acquires property rights have confidence in CDOT's valuation methods and outcomes used to determine the FMV. Similarly, the trend also indicates that the acquisition agents meeting and negotiating with the property owners are doing a very good job of explaining CDOT's valuation and acquisition processes, and then negotiating toward the final acquisition price.

Figure - FY 2011 - FY 2020 Settlement at FMV



Beginning in FY 19, CDOT ROW began tracking the FMV settlement rate at three different valuation thresholds to reflect the different valuation methods used and to provide additional context to the FMV Settlement Rate statistic. The three thresholds are: 1) FMVs under \$5,000 where the landowner does not have a right to obtain an appraisal at CDOT's expense; 2) FMVs between \$5,000 and \$25,000 where CDOT may perform waiver valuations, but the landowner is provided an option of obtaining an appraisal; and 3) FMVs above \$25,000 where CDOT will always perform appraisal and the landowner is provided an option of obtaining an appraisal. In FY 2020, the FMV settlement rate below \$5,000 was 86%, between \$5,000 and \$25,000 was 68%, and above \$25,000 was 27%.

Table - FY 2011 - FY 2020 FMV Settlement Rates

FMV Settlement Rate	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	10-Year Avg
FMV Settlement Rate below \$5,000	NA	82%	77%	86% ²	82% ¹						
FMV Settlement Rate between \$5,000 and \$25,000	NA	66%	48%	68% ²	61% ¹						
FMV Settlement Rate above \$25,000	NA	50%	34%	27% ²	37% ¹						
TOTAL FMV Settlement Rate	68%	57%	72%	72%	64%	77%	68%	75%	64%	68% ²	69%

¹10-Year FMV Settlement Rates only reflect 3 years of data for the three valuation thresholds

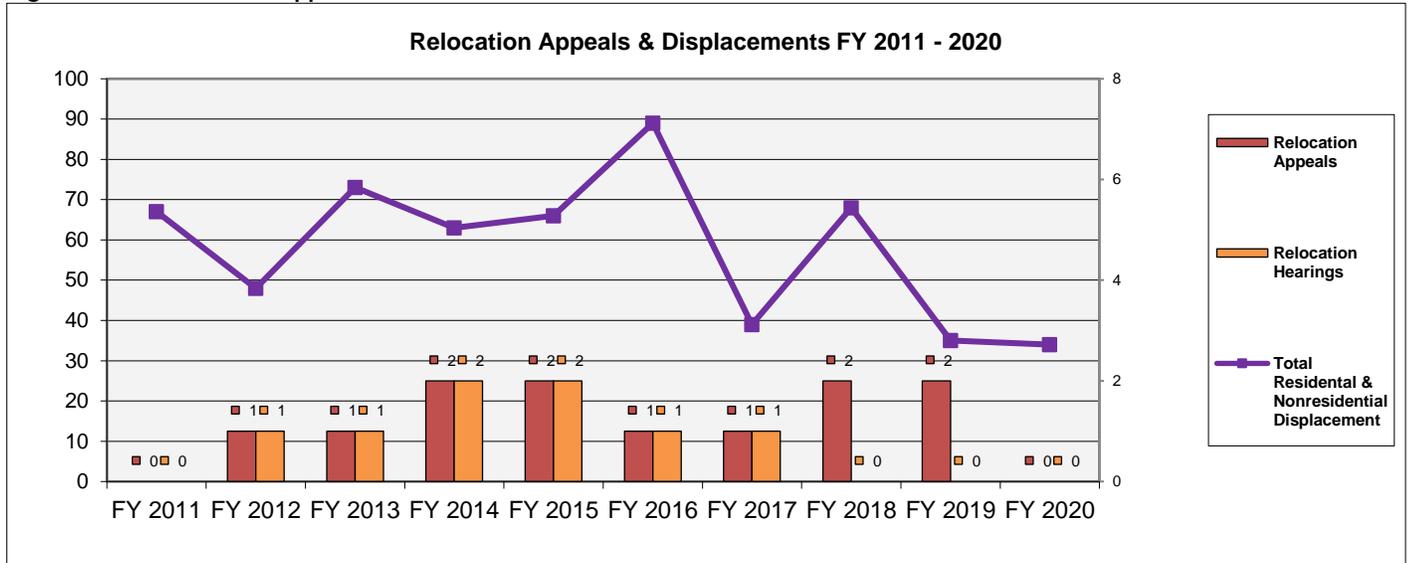
²FY 2020 FMV Settlement Rates including ADA Pilot Program: <\$5K – 91%; \$5K-\$25K – 71%; >\$25K – 30%; Total – 75%

13. Appeals - Zero (0) relocation appeals were filed.

Table - FY 2011 - FY 2020 Appeals

Appeals	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	10-year Avg.
Appeals Filed	0	1	1	2	2	1	1	2	2	0	1.2
Appeals that went to Hearings	0	1	1	2	2	1	1	0	0	0	0.8
Total Residential and Nonresidential Displacements	67	48	73	63	66	89	39	68	35	34	58.2

Figure - FY 2011 - 2020 Appeals



Mid FY 2010, CDOT ROW began the process of surveying the public impacted by ROW acquisition and/or relocation. That survey was a Quality Assurance Review (QAR) effort and, although it was conclusive, CDOT has decided to continue these efforts in order to assure continued high-quality customer service to the public. For FY 2020, the rate of return on this survey was 59%. Following are statewide results of said survey for FY 2020 and FY 2019. In FY 2020, CDOT achieved very good or better in all categories, and an overall rating of 4.23, which was lower than the 10-year average of 4.41. Attendance and participation were strong, and the new format has allowed all regions to actively participate and attend.

Figure - FY 2020 ROW Customer Survey

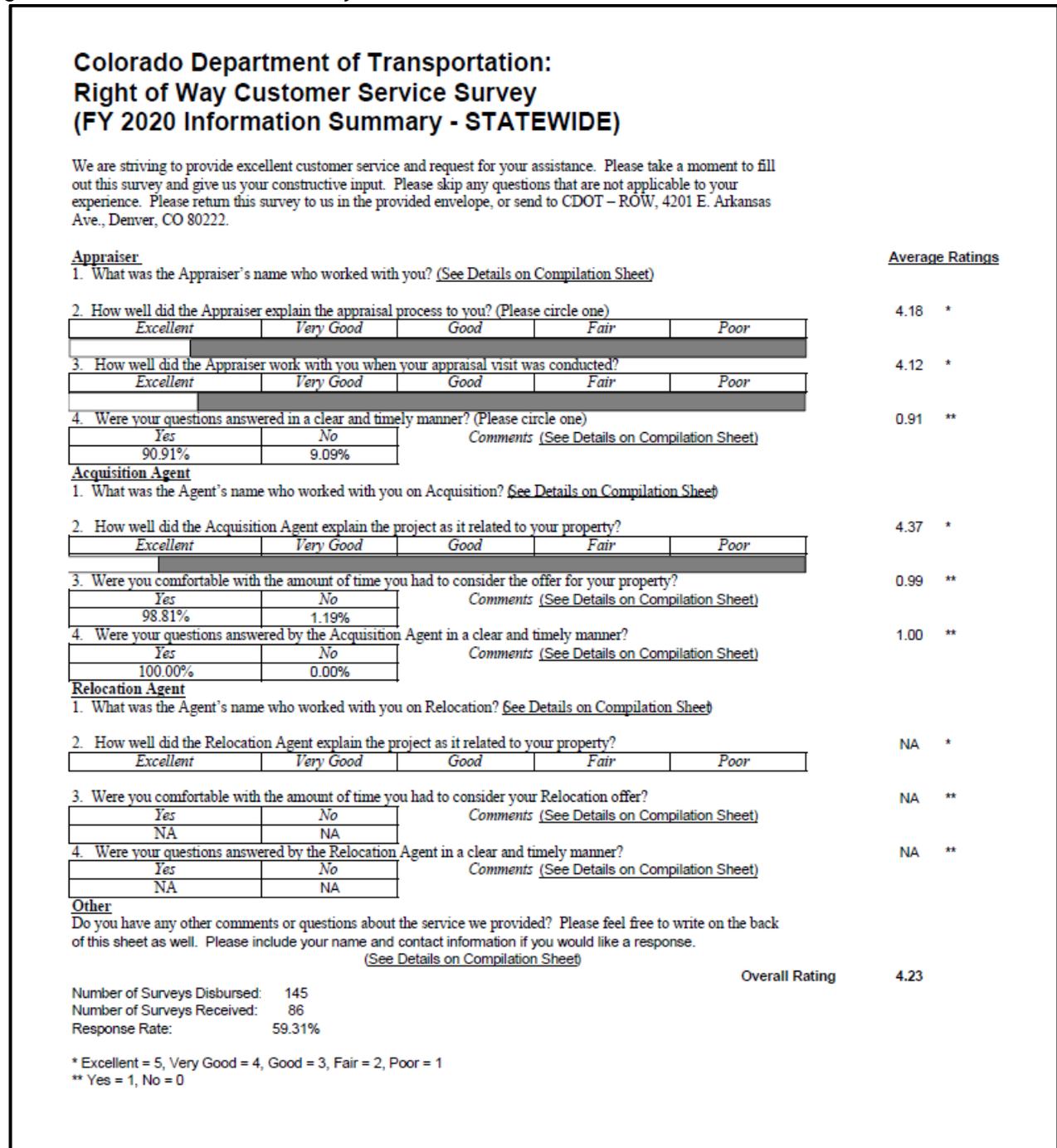


Figure - FY 2019 ROW Customer Survey

Colorado Department of Transportation: Right of Way Customer Service Survey (FY 2019 Information Summary - STATEWIDE)

We are striving to provide excellent customer service and request for your assistance. Please take a moment to fill out this survey and give us your constructive input. Please skip any questions that are not applicable to your experience. Please return this survey to us in the provided envelope, or send to CDOT – ROW, 2829 W. Howard Place Ave., Denver, CO 80204

Appraiser

Average Ratings

1. What was the Appraiser's name who worked with you? (See Details on Compilation Sheet)

2. How well did the Appraiser explain the appraisal process to you? (Please circle one)

4.41 *

Excellent	Very Good	Good	Fair	Poor

3. How well did the Appraiser work with you when your appraisal visit was conducted?

4.41 *

Excellent	Very Good	Good	Fair	Poor

4. Were your questions answered in a clear and timely manner? (Please circle one)

0.99 **

Yes	No	Comments (See Details on Compilation Sheet)
98.91%	1.09%	

Acquisition Agent

1. What was the Agent's name who worked with you on Acquisition? (See Details on Compilation Sheet)

2. How well did the Acquisition Agent explain the project as it related to your property?

4.59 *

Excellent	Very Good	Good	Fair	Poor

3. Were you comfortable with the amount of time you had to consider the offer for your property?

1.00 **

Yes	No	Comments (See Details on Compilation Sheet)
100.00%	0.00%	

4. Were your questions answered by the Acquisition Agent in a clear and timely manner?

1.00 **

Yes	No	Comments (See Details on Compilation Sheet)
100.00%	0.00%	

Relocation Agent

1. What was the Agent's name who worked with you on Relocation? (See Details on Compilation Sheet)

2. How well did the Relocation Agent explain the project as it related to your property?

4.70 *

Excellent	Very Good	Good	Fair	Poor

3. Were you comfortable with the amount of time you had to consider your Relocation offer?

0.89 **

Yes	No	Comments (See Details on Compilation Sheet)
88.89%	11.11%	

4. Were your questions answered by the Relocation Agent in a clear and timely manner?

1.00 **

Yes	No	Comments (See Details on Compilation Sheet)
100.00%	0.00%	

Other

Do you have any other comments or questions about the service we provided? Please feel free to write on the back of this sheet as well. Please include your name and contact information if you would like a response.

(See Details on Compilation Sheet)

Overall Rating 4.53

Number of Surveys Disbursed: 257
Number of Surveys Received: 150
Response Rate: 58.37%

* Excellent = 5, Very Good = 4, Good = 3, Fair = 2, Poor = 1

** Yes = 1, No = 0

KEY LEARNINGS

FY 2020 saw both a reduction in the total number of condemnations and an increase in the Fair Market Value Settlement rate with both figures trending towards historical averages. The fair market value settlement rate increased in the two lower valuations where CDOT commonly performs waiver valuations.

The ROW Program found that there was substantial interest for virtually delivered training.

NEXT STEPS

CDOT will continue to monitor the Fair Market Value Settlement Rate at the higher valuation to determine whether there are any common issues. If settlements are being reached above Fair Market Value to avoid condemnation proceedings, CDOT will encourage the continuation of this practice and look for a corresponding continued reduction in the number of condemnations.

CDOT will continue to provide virtual training with a goal of at least one event per month. This will also be the preferred format for implementing major changes to the ROW Manual as part of the complete 5-year update.

HQ ROW staff will continue to monitor the customer service survey data closely given the lower performance in FY 2020. Region-specific reports detailing all surveys received will be created and provided to Region ROW Managers shortly after the end of the FY 2021.

2.8. ENGINEERING: STRUCTURES

INTRODUCTION

CDOT Manager: Mike Collins
FHWA Manager: Spencer Tucker

The Structures Program is responsible for working with the Regions to ensure structures are properly designed, constructed, and maintained throughout the state. Structures include: major structures (bridges and culverts that span more than 20 feet); minor structures (culverts and bridges that span 4 to 20 feet); overhead sign structures; high mast luminaires and mast arm traffic signals; retaining walls; noise walls; and tunnels. The staff of the Structures program develops structural design requirements, standard structural details, and structural construction specifications. In addition, the Structures program evaluates structural products and materials. The Structures program provides the vital services of structure inspection, fabrication inspection, construction assistance, structure asset management, bridge load rating, and oversize overweight vehicle permit investigations.

QUALITY/RESULTS

Staff Bridge Branch Activities:

1. The FHWA Colorado Division bridge engineer is invited to a new monthly meeting with the inspection, asset management, and rating units, and continues to be invited to participate in the Department's quarterly bridge inspection & asset management meetings as well as the biweekly Staff Bridge unit leader meetings. Issues with the Department's structures program and needed improvements are identified, process improvements are discussed, and process improvements are implemented at these meetings.
2. Funds continue to be directed to On-System bridge preventative maintenance actions, bridge repairs requiring engineering, and bridge rehabilitations, per the CDOT Transportation Asset Management Plan.
3. The data management program Bridge Management (BrM) has been upgraded to the Enterprise version to improve data quality, data collection processes, and streamline inspection data reporting for the department moving forward until the System for Inspection & Management of Structural Assets (SIMSA) is in production.
4. Development of SIMSA began in 2018 which will expand the data collection to all structural assets, improve data collection quality and timeliness, be web based, be spatially driven, reduce paper usage, reduce inspection costs for savings reallocation to projects, and expand the access to structure data for CDOT personnel at all levels.
5. Staff Bridge completed the first stage with the CDOT Office of Financial Management and Budget (OFMB) on Off-System Bridge Program process improvement to better manage off-system funding and awarded projects tracking from award to completion. The entire Off-System Bridge Program process has been documented and sent out for review and implementation by all stakeholders. Steps are currently underway to implement feedback from stakeholders and to continue improvement of tracking and utilization of off-system funding.
6. Staff Bridge continues to improve FHWA National Bridge Inspection Standards (NBIS) inspection metrics evaluation by regularly tracking bridge inspection frequency, and inspection schedules.

7. Consultants have been selected to perform nondestructive evaluation of post-tensioned bridges and efforts have begun to implement the first task order.
8. Staff Bridge has completed all ratings of bridges on the Interstate and within reasonable access for Emergency Vehicles (EVs) and is continuing to rate required bridges for Specialized Hauling Vehicles (SHVs), with an expected completion date of December 2022. These efforts are reducing the risk of bridge overloading due to EVs and SHVs.
9. Staff Bridge has begun a more formal process for tracking construction-related issues with CDOT's structures across the state. These efforts include the development of a Joint Process Review with QIC started in 2020, as well as three consultant contracts that are being utilized to develop a tracking database, construction inspection training, and augment Staff Bridge construction inspection staff capacity. FHWA has also supported CDOT in awarding support from the Resource Center.
10. Staff Bridge has begun to track projects in more detail to capture (a) construction milestones for new structures, (b) potential construction-related issues with structures (c) lifecycle costs for structures. This includes bi-weekly meetings with unit leaders to discuss updates with projects, as well as a new full-time position that has been advertised and will be responsible for tracking and communication regarding projects that include structures.
11. Staff Bridge is completing a pilot project to define a new timber girder repair design that can be implemented at a statewide level to increase the longevity of CDOT's timber structures, improve load carrying capacity, and reduce the number of poor timber bridges.

Region Activities:

1. The Branch produces an essential repair tracking report. The essential repair finding spreadsheet is effective in tracking maintenance needs, identifying future structure project work, and the subsequent repairs.
2. Regions bridge maintenance continue to schedule essential repair work.
3. Regions have been allocated \$1M each to develop a Bridge Bundle Planning and Prioritization project, which will be used to position for grant opportunities and to ensure quick and efficient use of any federal, state, or stimulus funding that may be allocated for bridges.
4. Regional Bridge Maintenance Crews are working with CCI to perform preventative maintenance in bridge rinsing actions on the deck, bearings, drainage, and other critical elements to ensure the longevity of CDOT's bridges

PERFORMANCE MEASURES

The following performance measures demonstrate the health of the Structures Program. CDOT updates the bridge¹ reporting data annually in April.

Table - Performance/ Compliance Measures (Structures)

PM #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/Baseline	2019	2020
745, 746, 747	NHS bridges ¹ and deck area in Poor condition (FHWA Definition)	Number of Poor bridges* per NHS Deck area of Poor bridges* per NHS Percentage of Poor deck area per NHS	Staff Bridge annual asset management reports	State FY	National Performance Measure Targets: 2020: 4% 2022: 4%	104 1.85M sf 6.12%	117 1.90M sf 5.88%
748, 749, 750	NHS bridges ¹ and deck area in Good condition (FHWA Definition)	Number of Good bridges* per NHS Deck area of Good bridges* per NHS Percentage of Good deck area per NHS	Staff Bridge annual asset management reports	State FY	National Performance Measure Targets: 2020: 45% 2022: 44%	1,148 14.0M sf 46.39%	1,107 3.7M sf 42.36%

¹The term “bridge” is used in place of “major structures”, which includes all bridge and culvert structures carrying vehicular traffic and that span more than 20 feet along the centerline of the carried roadway.

Additional detail on the performance measures is provided below:

Figure - NHS Bridge Condition

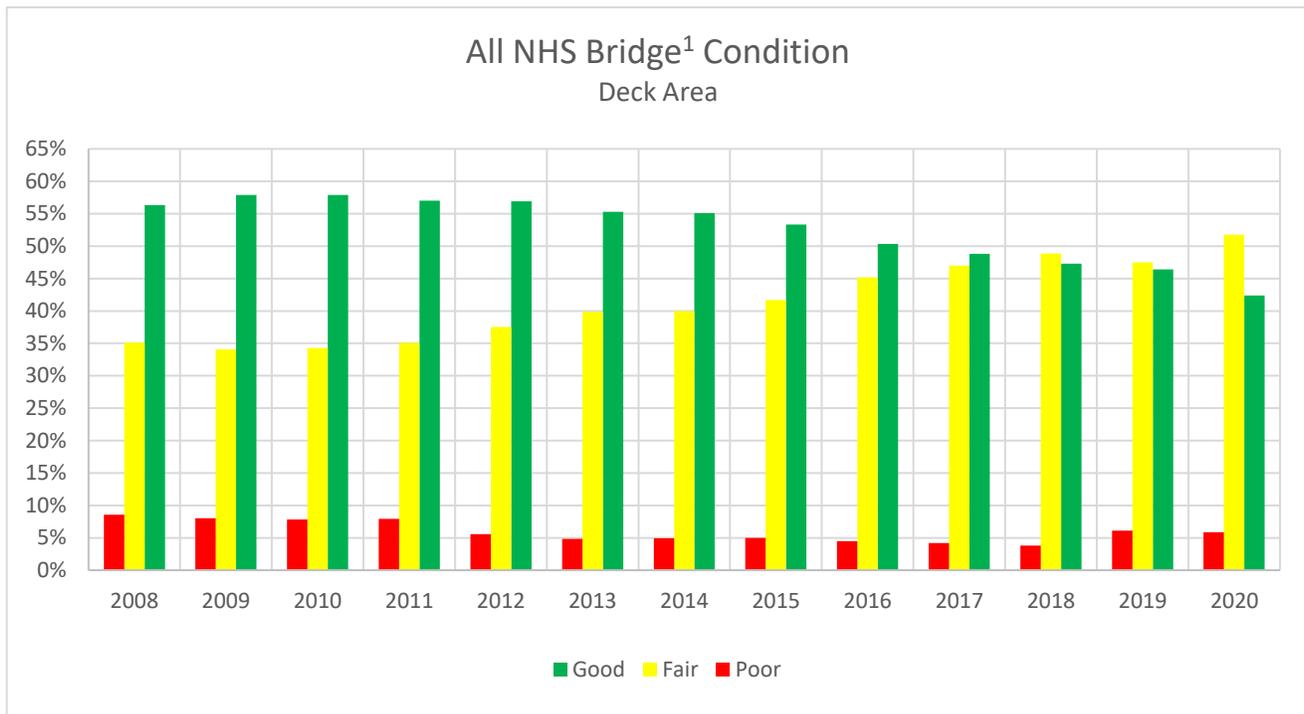
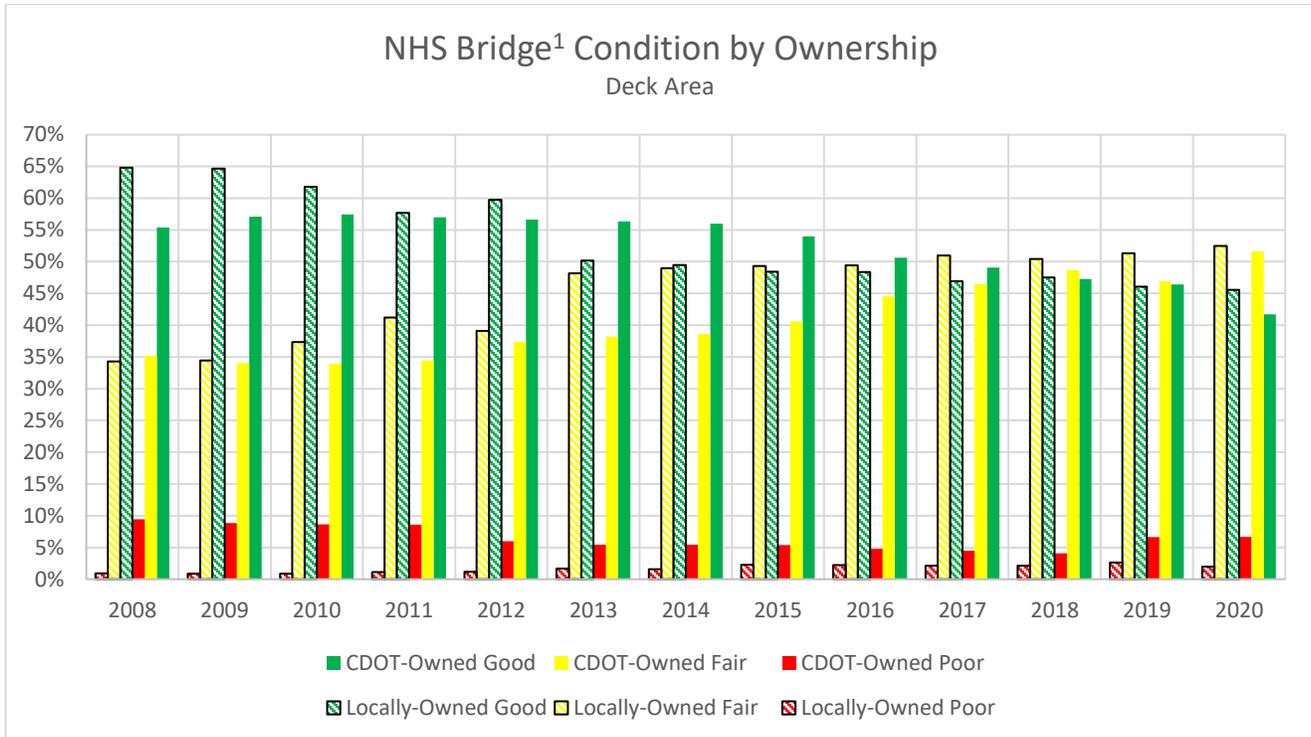


Figure - NHS Bridge Condition by Ownership



KEY LEARNINGS

No key learnings were identified.

NEXT STEPS

1. Solidify the formal process for tracking construction-related issues with CDOT's structures across the state.
2. Staff Bridge is hiring a Bridge Project Portfolio Manager to define processes for better tracking of bridge projects to improve resource allocation and bridge quality improvement.

2.9. ENGINEERING: TRAFFIC SAFETY AND ENGINEERING SERVICES

INTRODUCTION

CDOT Manager: San Lee
FHWA Manager: Dahir Egal

The Traffic Safety and Engineering Services Branch (The Branch), in collaboration with the CDOT Office of Transportation Safety (OTS) and multiple other safety stakeholders, focuses on reducing fatalities and serious injuries resulting from crashes on the transportation system. The Branch is the responsible steward for developing, maintaining, and coordinating delivery of the Highway Safety Improvement Program (HSIP) (as defined by 23 CFR 924) for CDOT.

The Branch coordinates with the region traffic engineers to plan and deliver HSIP funding to safety improvement projects along all public roadways statewide, including high-risk rural roads. The Branch is responsible for developing and maintaining the FHWA-mandated Strategic Highway Safety Plan (SHSP). CDOT has updated the plan in 2020, referred to as the Colorado Strategic Transportation Safety Plan (STSP). CDOT understands the importance of a vision of transportation safety and works with Colorado stakeholders to form that vision - Zero Deaths and Serious Injuries. CDOT continues to work with its stakeholders to implement the 2020-2023 STSP plan. FHWA and CDOT will ensure that STSP implementation efforts are developed and tracked for each emphasis area identified.

The STSP also provides a roadmap for development of the annual Colorado Integrated Safety Plan (ISP). The ISP is a comprehensive program and project plan for addressing both behavioral and engineering safety issues. The ISP meets the annual safety program planning requirements of the NHTSA. The goal of the program is to reduce traffic deaths on Colorado's highways. Primary focuses of the program, implemented by OTS, include reducing impaired driving related traffic deaths, motorcycle and pedestrian fatalities, and increasing adult seat-belt use. Public information and outreach activities are coordinated through the program, as are training and education services and high visibility and enforcement (HVE). The OTS administers the state's traffic safety program funded by the NHTSA.

The STSP also provides a basis for delivering HSIP funding. The Branch works with region traffic engineers and local agencies to identify and construct cost-effective projects that improve safety on Colorado's roadways. This is accomplished by assessing the nature and magnitude of safety problems on roadways in a region, county, or town and providing adequate information to support the development of an investment strategy to resolve the problems. Finally, a cost-benefit analysis affirms that the regions select the most beneficial and cost-effective safety projects for implementation.

Statistically based and consistent with the Highway Safety Manual (HSM), the Branch applies advanced safety performance functions (SPF) and diagnostic analysis to identify statewide locations of high crash concentrations with potential for crash reduction. This safety analysis applies to the HSIP as well as most types of projects delivered by the state by means of project-safety assessments done during the early planning and design phases.

The Branch also acts as the state's repository for statewide traffic crash information. Approximately 120,000 crash records are reported in a calendar year. The Branch administers both the National Highway Traffic Safety Administration (NHTSA) and FHWA funding to improve the accuracy, completeness, timeliness, and availability of the data after receiving the statewide crash records from the Department of Revenue. The Branch serves on and carries out the strategic plan of the Statewide Traffic Records Advisory Committee (STRAC), made up of representatives from the Colorado Departments of Transportation, Revenue, Public Health and Environment, Human Services,

Public Safety, and the Judicial Department. Crash data serves as the foundation for planning safety improvement projects and programs.

State agencies rely on crash data to meet the requirements of the federal FAST Act (Fixing America’s Surface Transportation Act, December 4, 2015), which includes timeliness, accuracy, uniformity, integration, and accessibility of data suitable for problem identification and countermeasure analysis. CDOT puts forth significant effort to cultivate a crash data set that possesses these attributes. CDOT remains committed to improving its safety data and has established a goal to keep crash data processing backlogs to no more than six months.

QUALITY/RESULTS

1. Traffic Fatalities - The mission of both the OTS and the Branch is to “reduce the incidence and severity of motor vehicle crashes and the associated human and economic loss”. In 2017, Colorado saw fatalities hit the highest number since 2010, with a slight drop from 2017 in the 2018 fatalities. While CDOT has continued to deliver programs that engineer safer highways, educate the driving public, recommend traffic safety legislative enhancements, and conduct high-visibility enforcement of the State’s driving laws, fatalities and the fatality rate continued to increase. This marked increase can in part be attributed to Colorado’s popularity - increases in population, significantly in urban areas, and increases in VMT and registered vehicles.

Consistently now, for the last four years, Colorado saw urban fatalities surpass rural fatalities, a historic trend change. While 2020 crash data is currently being verified and is not yet official, preliminary indications show that the number of fatalities has increased 2.5% from 2019.

Many of the most serious transportation safety challenges continue to be driver behavior related - impaired driving and the lack of occupant protection compliance (seat belts). These driver behaviors are leading to an alarming increase in vulnerable user fatalities. In fact, fatalities to pedestrians, motorcyclists, and speed related continue to remain high or increase each year. Preliminary 2020 crash data shows a slight decrease in bicyclist fatalities. The OTS aggressively addresses these challenges by supporting projects, programs, and other measures to educate the public and raise awareness. Public information programs and high-visibility enforcement have served to raise the awareness of the public of the risks of driving and their responsibilities as drivers. Grassroots organizations, state partnerships, and local community efforts also have had a significant impact.

Below is a snapshot of how fatalities have changed from the previous years in certain areas. Note: some of the fatalities below are accounted for in multiple categories.

Table - Change in Type of Fatalities - 2014-2019

Fatal Crashes by Category	2014	2015	2016	2017	2018	2019
Run off road crash fatalities (FHE)	201	240	235	239	244	246
Intersection related fatalities	128	153	200	190	210	189
Speed related fatalities	167	216	211	230	210	239
Unrestrained fatalities (Excl MC)	163	191	192	233	221	200
Impaired driving crash fatalities	132	128	137	142	155	124
Overtaking fatalities (FHE ; Excl MC)	73	102	97	84	98	56
Motorcycle fatalities (Incl Scooters)	94	106	125	103	103	103
Aging road user 65+ ; (All Person Types)	69	95	109	113	110	115

Fatal Crashes by Category	2014	2015	2016	2017	2018	2019
Pedestrian fatalities (Any Event)	65	64	84	92	90	76
Head-on crash fatalities (FHE)	56	51	57	78	74	67
Rear-end crash fatalities (FHE)	24	35	40	40	30	28
Wildlife/Animal caused fatalities (FHE)	6	7	4	5	2	2

2. National Safety Performance Measures - Now in its fourth year of implementation, CDOT met with safety stakeholders and established 2017-2021 safety performance measure targets. Below is a table of the last three years so far for comparison, reflecting the expectation of fatality decreases, yet injury remains the same in Colorado.

Table - Colorado Safety Targets - Actual vs. Target for 3 Years

Colorado Safety Targets		Time Period		
		2015-2019	2016-2020	2017-2021
	Baseline:	2013-2017	2014-2018	2015-2019
	Targets must be set by:	Jul-2018	Jul-2019	Jul-2020
	Data / Results will be official:	Jan-2021	Jan-2022	Jan-2023
Fatalities	Target	644	618	603
	Baseline	555	584	
	Actual / Preliminary	606		
	Target Met?	Yes		
Fatality Rate	Target	1.21	1.143	1.113
	Baseline	1.097	1.125	
	Actual / Preliminary	1.146		
	Target Met?	Yes		
Serious Injuries	Target	2909	3271	3161
	Baseline	3161	3122	
	Actual / Preliminary	3188		
	Target Met?	No		
Serious Injuries Rate	Target	5.575	6.075	5.828
	Baseline	6.463	6.035	
	Actual / Preliminary	6.029		
	Target Met?	No		
Non-motorized Users Fatalities and SI	Target	514	670	551
	Baseline	542	576	
	Actual / Preliminary	513		
	Target Met?	Yes		

The above measures reflect the unfortunate trend that Colorado is seeing general increases in

these categories, and we expect to continue to see increases in the future. While all safety stakeholders in Colorado are striving to reduce crashes and fatalities, they have to be strategic and effective with limited resources. Noting that without significant changes in funding, legislation, population growth, VMT, or increased enforcement and education, these trends will continue. Agencies are striving to be strategic in their approaches and more prioritizing of effective strategies that will reduce crashes - for example, concerted data analysis, project safety analysis and prioritization, and deployment of innovations and technologies. Further, the automotive industry alone, and transportation partnerships with them hold promise for future years' reductions in crashes and fatalities.

CDOT continues to work with the Metropolitan Planning Organizations (MPOs) to assist them in establishing their own safety performance targets, required by February 2021.

3. Strategic Transportation Safety Plan (STSP) - The 2020-2023 STSP update was issued in April 2020. This updated plan sets a visionary goal of zero deaths and serious injuries so all people using any transportation mode arrive at their destination safely. The effort to update this plan involved the engagement of hundreds of stakeholders across the state, in coordination with several other pertinent plans (Denver Regional Council of Governments [DRCOG] Vision Zero, Denver Vision Zero, and CDOT Statewide Plan). Implementation of the STSP strategies is anticipated to reduce the number and rate of fatalities and serious injuries in Colorado. The STSP Executive Committee has established a 15% reduction in fatalities and serious injuries as the performance target for the 2020 to 2023 period.
4. Highway Safety Improvement Program (HSIP) - In State Fiscal Year (FY) 2020, CDOT delivered \$31.6 million in HSIP and state matching funding to the Regions and Local Agencies around the state for 54 projects to address fatal and serious injury crashes related to infrastructure and the driver interaction (run off road, intersections, speed, and pedestrians). These projects have an estimated present value safety benefit of \$113.5 million for an overall benefit cost ratio of 3.59. CDOT also has a state funded FASTER Safety Mitigation program that delivers approximately \$70 million annually in safety improvement projects along the state highway system.

Examples of safety improvement projects include roundabouts, intersection improvements, guardrail upgrades, pedestrian crossings, traffic signal upgrades, interchange ramp improvements, wrong way driving treatments, variable speed signing, and access improvements. The Branch and regions are currently programming State FY 2021 HSIP projects while compiling new projects for the State FY 2022 through FY 2025 plan. Included in this planning is meeting the requirements for the High Risk Rural Roads (HRRR) Special Rule to obligate \$2.8 million for HRRR in Federal FY 2021.

5. Work Zone Safety and Mobility (WZSM) - The bi-annual WZSM Task Force issued its Process Review report to FHWA in April of 2020. The Task Force found that additional work is necessary in the areas of training and Smarter Work Zones. Training focuses on creating a new course designed to educate all design and construction stakeholders on CDOT's procedures regarding work zone safety and mobility. This course is to be piloted in the spring of 2021. Smarter Work Zone strategies continue developing through partnerships with the Regions. Pilot projects have been completed and CDOT will soon create safety standards and specifications in reference to this technology. A break through has occurred within CDOT divisions and ITS's new data hub will allow the transition from data collected in the field to be uploaded and distributed to public feeds. This process will kick-off due to a recent FHWA grant awarded to CDOT's MOI division. The original scope of this grant will focus on maintenance TMA's, but the data feed created in this endeavor can be universally applied. This will help achieve our goal to upload data and provide real-time information to the traveling public. CDOT will continue to participate in the national USDOT Joint Program Office (JPO) through the (Work Zone Data Exchange) (WZDX). The Task Force has begun its new process to send survey questionnaires out to a much broader and larger audience. This has helped better define the Task Forces efforts while also creating performance measurements for these efforts. CDOT has released a new procedural directive titled "*Traffic Control for Planned and Unplanned Work*". While COVID 19 has hindered work zone traffic control reviews, CDOT Area Engineers made a plan to handle these reviews and unfortunately, not all proposed projects received a review this year. The Area Engineers still sent their required letter to FHWA, however with the information received.
6. Crash Data - in 2020, the CDOT Crash Data Intelligence Unit focused on the development of the new Behavioral and Engineering Safety Data for Transportation (BESDT) database and application. This application replaces the older ERS/EARS system, with a modern database and database tools. BESDT includes an updated, electronic fatal blotter to improve accuracy and security for fatal crash data information. An electronic crash form was also created to be available for smaller law enforcement agencies to submit directly to the Department of Revenue (DOR) once DOR and CDOT complete a project for the data transmission. The BESDT system will be going live in March 2021 and the DOR DRIVES system will start accepting electronic DR3447 records from the larger law enforcement agencies in March as well. BESDT will advance the mission to improve statewide crash data significantly and improve accessibility and timeliness of the CDOT crash database.

It should be noted that while CDOT reduced the backlog of records in 2019, the backlog has been maintained through 2020 in spite of challenges associated with working remotely during COVID and staff time invested in the BESDT system. Publication of data is anticipated to be on schedule with the remaining 2020 records published in late June or early July.

DOR's DRIVES improvements are anticipated to increase the number of electronically submitted records resulting in improved timeliness of the data available to CDOT. CDOT's BESDT system improves CDOT's processing time of the crash data. These two projects combined will result Colorado's crash data being available in a timelier fashion in the coming months and years.

Table - Summary of Crash Data

Data Year	Average CDOT Coding Backlog (months)	Average Crash Date to Data Release (months)
2020 (Anticipated)	3.0	6.4
2019	3.4	15.6
2018	4.5	9.7
2017	7.8	13.0
2016	1.2	11.2
2015	2.5	7.3

CDOT’s BESDT application provides new reports for CDOT staff to identify quality and completeness of records. This information will be used to collaborate with law enforcement to improve data quality, accuracy, and completeness in the coming years.

The Crash Data Intelligence Unit has also worked closely with DOR regarding a number of issues with data sharing, data linkages, and various projects. CDOT and DOR have a new draft interagency agreement, which allows CDOT to share data more readily with the public as well as state, federal and local agency partners. With the removal of restrictions on location information and statewide data, CDOT is taking steps to publish dashboards and data to improve the visibility and availability of CDOT’s crash dataset.

7. Rail Highway Grade Crossing Program - During FY 2020, CDOT apportioned Federal safety funds to approximately 10 individual safety projects entailing improvements to at-grade highway crossings. The program is responsible for maintaining a database of all active public railroad crossings within the State of Colorado. CDOT has developed a data collection tool to allow for more accurate and consistent data collection efforts along with the creation of a geo-database to host the data. This tool incorporates CDOT's hazard index calculation as identified by staff.

There are two Class I railroads: BNSF Railway and Union Pacific (UP) Railroad and there are no Class II railroads operating in Colorado. Additionally, there are 15 short-line railroads that provide local service with connections to the Class I railroads. Colorado has nine tourist railroad lines, which highlight Colorado’s history and offer trips through Colorado’s scenic outdoors. The two percent support funds used from the annual apportionment was utilized to maintain the inventory of all public railway-highway crossings in Colorado including the Hazard Index formula calculations.

8. Colorado Safety Legislation and Statutes
 - Primary Seat Belt: Colorado does not have a primary seat-belt law.
 - Repeat Offender Law: Colorado is not in compliance.
 - Zero Tolerance Law: Colorado is in compliance.
9. Colorado Repeat Intoxicated Driver Requirements of 23 U.S.C. Section 164 - Due to changes in Colorado State Statutes, Colorado does not meet requirements of 23 U.S.C. Section 164 for mandatory minimum sentencing of imprisonment.

PERFORMANCE MEASURES

The 2020 Colorado HSIP Report lists nearly all of the applicable safety performance measures are through FHWA’s web reporting system, including the required FHWA and NHTSA national safety performance measures in FAST: fatalities, fatality rate, serious injuries, serious injury rate, and non-motorized fatalities and serious injuries.

<https://safety.fhwa.dot.gov/hsip/reports/pdf/2020/co.pdf>

Measures not specifically in the HSIP Annual Report and still pertinent to the Stewardship Agreement are listed below.

Table - Performance/ Compliance Measures (Traffic Safety and Engineering)

PM #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline	Past Years	2019 Actual ¹
336	Reduce alcohol-related fatal crashes	Alcohol-related fatal crashes as a percentage of overall fatal crashes	Colorado Highway Safety Program Annual Report	Calendar Year	Less than 45%	2018:227 2017:254 2016:249	223
376	Reduce crash data processing time	Number of months crash data from crash to publication	Colorado Highway Safety Program Annual Report	Calendar Year	Less than 6 months	2018:9.7 2017:13.0 2016:11.2	15.6

¹ Data is not official for a year after the end of the calendar year. Therefore, this is 2019 data.

KEY LEARNINGS

No key learnings were identified.

NEXT STEPS

No next steps were identified.

2.10. FINANCIAL MANAGEMENT

INTRODUCTION

CDOT Manager: Bethany Nicholas
FHWA Manager: Andre Compton

The Financial Management Program encompasses the entire Federal-aid program from the authorization of a project through expenditure, billing, and final closure. This includes all phases (right of way, utilities, preliminary engineering, and construction) of a capital project as well as non-infrastructure projects such as planning and research. Oversight is performed at Headquarters, Regional business offices, and during project site visits to ensure eligibility of Federal-aid funds.

QUALITY/RESULTS

- The closure of projects continues to be an area of interest from Federal as well as State lawmakers. As such, item 1445 was adopted in 2020. CDOT is substantially ahead of the target of 365 days, recording an average of 201 days.
- CDOT continues to outperform the goal of less than 2% of its annual apportionment value being inactive at any given time, however due to the importance of this metric it was adopted in 2020 as an official Performance Measure. Although in FY 2020 the inactive rate increased slightly, CDOT is still performing ahead of the goal.

PERFORMANCE MEASURES

The following performance measures demonstrate the health of the Financial Management Program:

Table - Performance/Compliance Measures (Financial Management)

PM #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline	2019	2020
1444	Federal Funds Inactive Relative to Annual Apportionment	Federal funds inactive should be no more than 1-2%. 2% is the official FHWA target and 1% is the Colorado target.	PM	Federal FY	Less than 1% = Excellent Less than 2% = Good Greater than 2% = Poor	Q1: 0.15% Q2: 0.33% Q3: 0.20% Q4: 0.51%	Q1:0.51% Q2:0.40% Q3:0.97% Q4:0.71%
1445	Closure of federal aid projects (including non-construction in calendar days.	The average # of calendar days after the final federal expenditure/billing date to closure in Fiscal Management Information's Systems.	FMIS	Federal FY	Average not to exceed 365 days.	-	201 Days

KEY LEARNINGS

CDOT is becoming increasingly reliant on federally authorized Toll Credits/“soft match” in order to maximize reimbursements by FHWA. The impact of COVID-19 on state revenues reduced the funds available to match the federal program. A growing proportion of state gas tax and vehicle registration fee revenues must be used for maintenance and administrative costs not currently eligible for federal reimbursement. The earnings and use of Toll Credits is currently being provided to FHWA on an annual basis independent of this report.

In addition to large-scale efforts to address the state mandated project closure requirements from Senate Bill (SB) 16-122, CDOT is renewing focus on closures from a federal compliance perspective as well. On August 13, 2020, the Office of Management and Budget (OMB) revised sections of 2 CFR 200 Guidance for Grants and Agreements. These revisions reflect a foundational shift outlined in the President's Management Agenda (PMA) to set the stage for enhanced result-oriented accountability for grants and agreements. This communication is specific to the updates to 2 CFR 200.344 closeout revisions and supplements the prior communication sent on October 7, 2020. These revisions are effective November 12, 2020.

Having a process map and laid out guidance has helped to reduce some closure times and sparked ideas on how to further reduce time on projects.

The Division of Accounting and Finance (DAF) responded to these renewed requirements by implementing a periodic review of projects based on Federal Agreement End Date to close projects no later than 365 days after the end date or provide a justification to extend the end date when applicable. Additionally, DAF has worked with the Program Management Office to develop dashboards to assist regional representatives to review their projects requiring action (closure, extension, etc.).

NEXT STEPS

Additional direction regarding the closure of projects was provided to all staff on April 24, 2020 outlining key responsibilities and procedures. CDOT will continue to monitor the closure of projects from both the state and federal perspectives. The division of Accounting and Finance will continue to work with FHWA and internal partners to identify opportunities to reduce inactivity and meet closure requirements, such as developing a procedure to address "shelved projects" in which the design or other preconstruction activities are complete, but the construction phase is not ready for federal authorization. We are continuing to discuss the closure steps with the regional Program Management Office representatives and helping with awareness of how to get past some slowdowns in the process. The dashboard tracking is being updated and will help to identify the areas that are taking longer than they should.

2.11. MAINTENANCE AND OPERATIONS: HIGHWAY MAINTENANCE

INTRODUCTION

CDOT Manager: Braporh Jacobs
FHWA Manager: Shaun Cutting

CDOT has within its Central Office a Division of Maintenance and Operations (DMO), and Information Management Services (IMS) Unit. The Division of Maintenance and Operations has two primary functions:

- Providing policy and guidance for the state maintenance program; and
- Maintaining operational oversight for the administration of the maintenance program for the eight maintenance sections and five traffic sections. The Division provides a liaison contact that assists and oversees the successful completion of the Methods of Operations and Maintenance.

QUALITY/RESULTS

The IMS Unit is responsible for overseeing the collection of performance data for the MLOS performance-based budgeting system. The sources for the performance data comes from various location including, but not limited to, Pavement Management, Staff Bridge, Night Inspection and remote data collection. MLOS performance data is listed in the chart below:

Table - FY 2020 MPA Performance

MPA	2020 LOS Target	2019 LOS Achieved	2020 LOS Achieved
100 - Planning, Training & Scheduling	N/A	N/A	N/A
150 - Roadway Surface	B-	B+	A-
200 - Roadside Facilities	B-	B+	B-
250 - Roadside Appearance	B	C+	A+
300 - Traffic Services	B-	A-	B
350 - Structure Maintenance	B-	B+	A-
400 - Snow and Ice Control	B	B	B-
450 - Rest Areas, Buildings and Grounds	N/A	N/A	N/A
500 - Tunnel Maintenance	N/A	N/A	N/A
Overall	B-	B	B

This year, CDOT was able to exceed its overall targeted Levels of Service (LOS), but did not meet the target LOS for Snow and Ice Removal.

PERFORMANCE/COMPLIANCE MEASURES

The following performance measures demonstrate the health of the Highway Maintenance Program:

Table - Performance/Compliance Measures (Highway Maintenance)

PM #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline	2019	2020
271	Maintain the transportation system at the adopted annual MLOS grade	Annual MLOS adopted target grades for Maintenance Program Areas 150, 200, 250, 300, and 350	MLOS actual grades from annual survey	State FY	B-	B	B
270	Maintain the annual LOS snow mapping grade at the adopted annual grade	Annual LOS grade for snow and ice removal	MLOS reporting	State FY	B	B	B-

KEY LEARNINGS

Colorado’s statewide winter snowfall totals were in line with the average winter over the past 30 years. However, upon taking a deeper dive there were several record set for snowfall totals experienced throughout the state. The following cities ranked in the top 10 snowiest cities in the country. Boulder was #1, Lakewood was #3, Fort Collins was #6 and Denver was #7.

NEXT STEPS

The I-70 corridor, from mile markers 205 to 213.5, is a highly used corridor that is vital to moving commerce and providing access to highly sought-after tourist locations in the state of Colorado. Due to the high Amount of Daily Traffic (ADT) along this corridor, especially during winter months, DMO developed a temporary solution called the Joint Operations Area (JOA) to address the unique challenges within this area during the winter months. Over the next few years, DMO will move to replace this temporary solution. As of fiscal year 2022, the JOA will no longer be in operation and DMO will move to develop a dedicated maintenance facility with staffing to meet the needs within this corridor.

2.12. MAINTENANCE AND OPERATIONS: INTELLIGENT TRANSPORTATION SYSTEM (ITS)

INTRODUCTION

CDOT Manager: Bob Fifer
FHWA Manager: Eva LaDow

The overall purpose of the ITS/Technology program is to use innovative technology and strategies to enhance and improve operations of the transportation system by implementing advanced traveler information, advanced traffic and incident management, and other applications that improve mobility and safety of the system for all travelers. Over the last decade, rapidly changing technology has influenced the implementation of operational applications and how technology can be used to improve operational effectiveness. Advances in wireless communications, Digital Short Range Radio (DSRC) and Cellular to Vehicle (C2X), connected vehicles, higher quality and higher volume of transportation data (a.k.a. “Big Data”), traveler information, and smarter roadways have significantly improved the capability of ITS to impact operations on a greater level and at the same time the ability to deliver more sophisticated, focused, and real-time operational services. Some examples of these services and applications are: Adaptive Traffic Signal Control; Dynamic and Integrated Ramp Metering Access System Control; Freeway to Freeway Ramp Metering; Personalized Traveler Information using geo-fencing and targeted information; Active Traffic Management; Managed Lanes; Peak Period Shoulder Lanes; Variable Speed Limits (VSL); real-time video analytics cameras; weather stations; incident detection software; unmanned aerial systems; and others. ITS is one of the primary, if not the foremost, transportation tools that can provide high-levels of quantifiable and visible operational benefits on the entire transportation system more rapidly and at a lower cost than other traditional transportation applications, while providing a force multiplier on resource productivity. The goals are to improve safety, reduce traffic delays and congestion, and increase system reliability so that the transportation system can operate as effectively and efficiently as possible.

QUALITY/RESULTS

To accomplish the elements identified above, the ITS Branch works with numerous stakeholders, both within and outside of the Department, to engage broad-based and representative participation. Working with these stakeholders the ITS Branch participated in the development of the Smart Mobility Plan. The ITS Branch has also developed, and is in the process of implementing performance measures to evaluate and quantify specific activities and applications to ensure optimum effectiveness and applicability to similar operational situations.

To ensure continuous success and improve the level of technical advancements within CDOT, in fiscal year 2019-20, ITS developed the Joint Process Review on the System Engineering Analysis (SEA). In fiscal year 2020-21, a charter was kicked off to address the timeliness, quality, and ownership of SEA documentation and deliverables.

PERFORMANCE/COMPLIANCE MEASURES

The following performance measures demonstrate the health of the ITS Program:

Table - Performance Measures (ITS)

PM #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline ¹
1450	Technology Availability	Measure the uptime of critical technology and fiber backbone	ITS Work Plan Performance Measures	Calendar FY	Track Trend
1451	Mean Time To Restore (MTTR)	How long it takes to restore the technology	ITS Work Plan Performance Measures	Calendar FY Semiannual reporting	Track Trend
489	Device Useful Life (UL)	Percentage of Useful Life of the technology	ITS Work Plan Performance Measures	Calendar FY	90%
1446	SEA Completion	Percent of projects with an ITS element that have completed a SEA	SEA Tool	Calendar FY	Track Trend

¹ Data will not be available until 2022.

KEY LEARNINGS

- How important clear expectations and documentation is for SEA processes and deliverables,
- The SEA and the ITS architecture cannot succeed without each other,
- Updating the ITS architecture will go hand in hand with the ATMS project, and
- Training is need for Project Managers to be successful in implementing technology projects.

NEXT STEPS

The branch will be implementing a new ATMS system in 2021. This system is at the heart of many ITS Architecture service packages. During the next year, ITS will be working on developing CDOT specific service packages from the national architecture.

2.13. MAINTENANCE AND OPERATIONS: REAL-TIME OPERATIONS

INTRODUCTION

CDOT Manager: Ryan Tyler
FHWA Manager: Eva Ladow

The Real-time Operations Services Branch is within the Division of Maintenance and Operations. The Real-time Operations Services Branch facilitates the Department's commitment to place a higher strategic emphasis on delivering statewide operations and to align and consolidate critical traffic incident, event, and regional operations functions with other traffic and traveler operational activities. The two primary program areas within this branch are the Statewide Operations Center and Traffic Incident Management programs.

The Real-time Operation Services Branch directly oversees the Statewide Operation Center (Golden), and Statewide Program Management for the Operation Centers, and Traffic Incident Management programs. The other operation centers are located in Region 1 (Eisenhower-Johnson Memorial Tunnel), Region 2 (Pueblo Headquarters), and Region 3 (Hanging Lake Tunnel).

QUALITY/RESULTS

Not including the day-to-day operations work, some of the key program accomplishments in 2020 include:

Operation Centers Program:

- CDOT Maintenance Dispatch: Hanging Lake Tunnel started primary dispatching for Sections 2, 3, and 6 (Western Slope). This added to other current CDOT operation center dispatch services: Sections 4 (Pueblo - southeast), Section 5 (Golden - Denver Metro) and Section 9 (EJMT - I-70 Mountain Corridor).
- Advertised and Awarded department's first Invitation to Negotiate (ITN) for a new Advanced Traffic Management System (replace existing CTMS), Advanced Traveler Information System (replace existing CoTrip), and Video Management System (replace existing Nice Vision System) for all operation centers. The awarded vendor, Q Free, replaces the twenty-year old "in house" developed system called the Colorado Traffic Management System, with a proven, modularized, commercial ATMS.

Traffic Incident Management (TIM) Program:

- Supported Colorado First Responder Task Force: Strategic support and guidance for TIM Teams.
- Developed TIM Team workbooks to provide assistance for local team development and improvement.
- Held 4th Annual TIM Virtual Conference.
- Supported CSP to integrate UAVs to support shorter incident investigations.
- Advertised state Safety Patrol contract renewal to increase support on high traffic volume corridors.
- Increased numbers of Colorado first responders trained on SHRP2 to over 55%.

PERFORMANCE MEASURES

The following performance measure demonstrates the health of the Real-Time Operations Program:

Table - Performance Measures (Real-Time Operations)

PM #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline	Past Data	2020 Data
815	Interstate Level of Travel Time Reliability (LOTTR)	Percent of person- miles traveled on the Interstate that are reliable per federal requirements	Highway Performance Monitoring System (HPMS)	Calendar Year	National Performance Measure Targets: 2020: 81% 2022: 81%	2019: 78.3% 2018: 78.2% 2017: 80.7% 2016: 81.0% 2015: 79.3%	91.5%
816	Non- Interstate NHS Level of Travel Time Reliability (LOTTR)	Percent of person- miles traveled on the Non- Interstate NHS that are reliable per federal requirements	Highway Performance Monitoring System (HPMS)	Calendar Year	National Performance Measure Targets: 2020: 64% 2022: 64%	2019: 87.7% 2018: 86.5% 2017: 86.2% 2016: 64.3% 2015: 64.2%	94.3%
386	CDOT Safety Patrol Assists ¹	Measure the # of CDOT Safety Patrol Assists	CTMS Software	Calendar Year	Track trend	2019: 30,187 2018: 29,452 2017: 30,071 2016: 20,640 2015: 17,190	36,590
665	Non-CDOT Safety Patrol Assists ²	Measure the # of non- CDOT Safety Patrol Assists on E-470	E-470 Highway Group Data	Calendar Year	Track trend	2019: N/A 2018: 12,920 2017: 13,116 2016: 12,400	11,187
666	Hits for CDOT Traveler Tools	Measure the number of hits for CDOT traveler tools that customers have accessed on CoTrip in order to identify trends to improve information consumption by the public	Google Analytics CoTrip Site	Calendar Year	Track trend	2019: 5,647,068 2018: 9,794,945 2017: 2,741,671 2016: 3,116,098 2015: 2,647,327	5,982,222
667	Number of CDOT Push Notifications	Measure the number of CDOT communications pushed out (i.e., public email/text alerts) in order to identify trends to improve information consumption by the public	511 Data collection (Prior to 2019) CARS (2019 and after)	Calendar Year	Track trend	2019: 23,633 2018: 15,66 2017: 18,035 2016: 18,251 2015: 13,423	19,549
1404	Number of Lane Miles Covered by TIMS Coalitions ³	In coordination with Department of Public Safety and Colorado State Patrol, increase the number of lane miles covered by TIM coalitions	TIMS Website	State Fiscal Year	2020: 8,928	2019: 8,796 2018: 5,846	N/A

¹ The CDOT Safety Patrol operates on selected routes such as: US 6, I-25, US 36, I-70, I-225 and C470 with varying coverage 7 days/week. The assists include, but are not limited to, the following services: protection and clearance of crashes, debris removal, and mechanical failure services (e.g. flat tire, fluid(s) transfer, jump-start). For 5 months this past year, there was expanded Safety Patrol coverage during the weekdays on the I-70 mountain corridor.

² The non-CDOT Safety Patrol includes the E-470 Highway Group's courtesy patrol, with operational periods and services similar to CDOT's Safety Patrol. N/A means no data was received.

³ This metric was discontinued as the goal was accomplished.

KEY LEARNINGS

Invitation to Negotiate (ITN) Procurement Method: This procurement method aligns similarly to the Request for Procurement process; however, the distinct difference is there is a formal negotiation process after the proposals have been shortlisted. This provides distinct advantages when procuring long-term service contracts, or contracts with significant risk.

NEXT STEPS

1. Implement new ATMS, ATIS and VMS System.
2. Provide enhanced dispatch services in Operation Centers.

2.14. TRANSPORTATION DEVELOPMENT: APPLIED RESEARCH AND INNOVATION

INTRODUCTION

CDOT Manager: Stephen Cohn
FHWA Manager: Aaron Bustow

The Research Development and Technology Transfer Program at CDOT aims to save Colorado money, time, and lives. The program strives to improve the state's quality of life and environment by developing and deploying new or innovative methods, products or materials in the planning, design, construction and operation of transportation. To meet this purpose, research must be timely, relevant, and valid when applied to priority real-world problems, as well as cost-effective and accurately documented and disseminated. Technology must be appropriately transferred to practitioners to be effectively used.

QUALITY/RESULTS

Seven (7) research reports were published in State FY2020 (July 2019 - June 2020) (<https://www.codot.gov/programs/research/pdfs>).

1. 2019-05 [Feasibility of Using Hand-Held Dynamic Cone Penetrometer for Analyzing Soft Subgrade Quickly](#)
2. 2019-06 [Improving Durability of Asphalt Mixtures](#)
3. 2020-01 Analyze and Validate Bearing Pressure Requirements for Truncated Base Mechanically-Stabilized Earth/Geosynthetically-Reinforced Soil (GRS) Walls
4. 2020-02 [Sensitivity of Dynamic Modulus and Flow Number of CDOT HMA Mixes in the Pavement Mechanistic-Empirical Design \(PMED\)](#)
5. 2020-03 [Supporting Pavement Maintenance Decisions of Low-Volume Roads In Colorado Using Optimization Analysis and Artificial-Intelligence Techniques](#)
6. 2020-04 [Caisson Drilling Fluid Interaction with Fine Grained Bedrock](#)
7. 2020-05 [Evaluation of the Feasibility of Deployment of Swedish 2+1 Road with Barrier in Colorado](#)

PERFORMANCE MEASURES

The following performance measures demonstrate the health of the Research Program:

Table - Performance/Compliance Measures (Research)

PM #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline	2019 Actual	2020 Actual
97	Percent of recommendations implemented	Percent of recommendations implemented or adopted within two years of final research report, using 5 years of data The research findings and recommendations will impact one or more of the following: improve design and construction methods, improve design and construction specifications, improve planning processes, impact maintenance practice, update manuals, initiate new programs, and provide new technology	Research Work Plan and Report	State FY	35%-80%	57%	57%
412	Number of projects completed on schedule	The number of projects completed in the fiscal year on schedule	Research Work Plan and Report	State FY	10	9	7

KEY LEARNINGS

The baseline for PM #97 is revised to be between 35% and 80%. This reflects that research inherently has risk. CDOT benefits when research leads to conclusions that are implementable and improve our processes and outcomes. A very low implementation rate would indicate that we are selecting more basic rather than applied problems to investigate. A very high implementation rate would indicate that we are selecting only easy problems where outcomes are likely already known. Therefore, a central range for this PM indicates a balanced research program that takes on challenges and achieves improvements.

ARIB staff are intimately involved in managing research projects to their successful conclusions. FY20 saw the continuation of transition in personnel, with three departures and one new hire - the ARIB manager. The PM #412 outcome of seven completed projects (as reflected in published reports) reflects a lower total output due to reduced staffing. In fact, research productivity was better than this metric reflects, but personnel transitions hampered the follow-up activities that move from preliminary research findings to published report. This metric should be monitored as vacancies are filled and new staff become productive and efficient.

ARIB is exploring changes to improve efficiency, stakeholder experience during the research cycle, and to become targeted toward research that is more impactful. As the branch updates our practices for research selection and for research management practices, these Performance Measures should be monitored for unexpected changes.

NEXT STEPS

- Continue to monitor and update the implementation status of completed research projects.
- Emphasize publication of completed research, as new staff pick-up the roles of staff who have departed. This is particularly necessary for the Pavement & Materials Program area and the Structures/Geotech/Hydraulic Program area.
- Research Branch is also examining our steps and timeline, from the request for research

Problem Statements through delivery of Final Reports. We will test innovations to make the steps more efficient, and to ensure CDOT's research portfolio addresses recognized priorities.

2.15. TRANSPORTATION DEVELOPMENT: ASSET MANAGEMENT

INTRODUCTION

CDOT Managers: William Johnson and Toby Manthey
FHWA Manager: Aaron Bustow

CDOT's Performance and Asset Management Branch (PAMB) coordinates with FHWA, the Department's asset-program managers, CDOT Regions, and other agencies to manage 12 asset classes. PAMB empowers CDOT's strategic planning and decision-making by providing tools to measure, analyze, forecast and communicate to staff and transportation stakeholders the performance of asset programs and investment decisions.

The Department's 12 asset classes are pavement, bridges, culverts, walls, traffic signals, intelligent transportation systems, tunnels, geohazards, fleet, buildings, rest areas, and maintenance.

QUALITY/RESULTS

CDOT, in June 2019, published its *Risk-Based Asset Management Plan Version 2.0 (RB-AMP 2.0)*, which describes the Department's current processes and plans for managing pavement and bridges, including those on the National Highway System (NHS). FHWA determined in August 2019 that the plan was consistent with requirements for asset management plans established by 23 U.S.C. 119 and 23 CFR part 515.

The 2019 plan was CDOT's third asset management plan. In 2018, CDOT published its "Initial" Asset Management Plan. The initial plan contained "development" processes that were certified by FHWA for meeting asset management plan requirements. In addition, in 2013, CDOT voluntarily published one of the first asset management plans for a state DOT.

The Department employs a multi-level organizational structure to support asset management. At the highest level, the Transportation Commission formulates general transportation policy and makes recommendations to the Governor and General Assembly on issues related to transportation policy and CDOT's budgets and programs. At the middle level, the Transportation Asset Management Oversight Committee includes the Executive Director, Deputy Director, Chief Engineer, Chief Financial Officer, Chief of Staff, Director of the Division of Transportation Development, the Director of Project Support, and all Regional Transportation Directors. This committee makes decisions on asset management strategy, goals, and objectives. A Working Committee includes headquarters-level asset managers. Finally, program developments are reported to Regional and Division staff in a regular briefing. The Working Committee and the Oversight Committee work together on the Risk-Based Asset Management Plan (RB-AMP), asset management implementation, and emerging issues.

The Department's infrastructure objective for all asset categories is "to preserve the transportation infrastructure condition to ensure safety and mobility at a least life cycle cost."

PERFORMANCE MEASURES

The Department has developed statewide targets for "national performance measures" for pavements and bridges on the Interstate and National Highway System. This process has included working collaboratively with MPOs in support of their target-setting activities. The Department has revised its four-year target for pavement, and this revision was reported to FHWA in October 2020. CDOT also has long maintained internal metrics for all its asset classes, which are contained in the

Department's Policy Directive 14. The Department continues to revise its budget setting process.

KEY LEARNINGS

The asset management program has spent the previous year refining certain asset models, including a model that forecasts pavement condition according to National Performance Measures. The program has been increasing documentation of its general policies. This has included a new policy directive, PD 1609.0.

NEXT STEPS

CDOT will be developing its 2022 asset management plan over the course of 2021 and 2022. The Department continues to refine its asset models and how it tracks investment according to federally defined work types for pavement and bridges. These investments will be reported in an annual memo sent to FHWA for determining whether CDOT is managing its asset management program in accordance with the Department's asset management plan.

The program also is developing a related procedural directive to accompany its recently passed policy directive.

2.16. TRANSPORTATION DEVELOPMENT: ENVIRONMENT

INTRODUCTION

CDOT Manager: Jane Hann and David Singer
FHWA Manager: Stephanie Gibson

The FHWA/CDOT Environment program is focused on avoiding, minimizing and mitigating potential adverse impacts of the transportation system on the people and the environment of Colorado in accordance with the National Environmental Protection Act (NEPA) and other applicable environmental legislation, regulations and policy direction. This is accomplished by ensuring:

1. Environmental issues are identified early;
2. Appropriate impact analyses are performed in a timely manner;
3. Adequate documentation is submitted and reviewed as scheduled;
4. Required authorizations are received from the governing entities for all projects and maintenance activities in accordance with the laws, environmental policies, letters of agreement and rules governing the environment; and
5. Mitigation tracking is conducted.

Timely compliance with environmental requirements is critical for advancing projects. The Regions, with assistance from the Project Development Branch and the Division of Transportation Development (DTD), are charged with the responsibility of project development, construction, and maintenance of the Colorado transportation system in a manner that will preserve the social and natural environment.

QUALITY/RESULTS

1. Updates to Performance Tracking Measures -

- Wetland impact and replacement ratios were eliminated for 2020 documentation.
- Water quality measures were changed to track recalcitrant and chronic findings on CDOT construction projects.

2. Completion Time for Environmental Documents -

The completion time for major environmental documents completed in 2020 is displayed in the table below: **Table 1: NEPA and PEL Projects Completed in 2020**. Additionally, **Appendix B** contains all major NEPA projects that have occurred since 1999, and lists the length of time for each project.

Table 1: NEPA & PEL Projects Completed in 2019

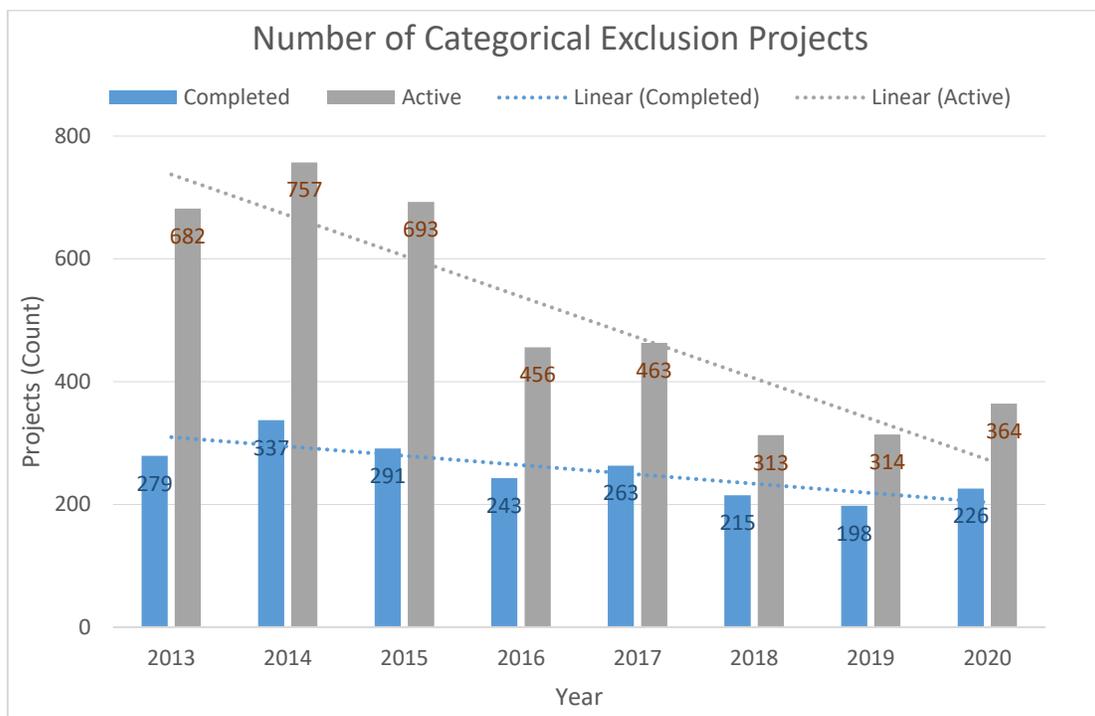
Document Type	Title of Document	Time to Complete
PEL	I-25 Central, Santa Fe to 20th Street	29 months
PEL	SH 12 Southern Mountain Loop Trail	18 months
PEL	SH 66, US 36 to Co Rd 13	37 months

PEL Average Completion Time	Did not include unusual PELs, and averaged this with the past 5 years	18 months (average)
EIS Average Completion Time	No EISs were completed in 2020 so using the five years previous data for average calculation	86 months (average)
Template EA	I-70 Vail Pass Auxiliary Lanes	37 months
Template EA Average Completion Time	Includes data from 5 prior years	15 months (average)
Standard EA Average Completion Time	No Standard EAs were completed in 2020 so using 5 years previous data for average calculation	37 months (average)

3. NEPA Workload

Each year, CDOT tracks the number of active and completed CatExs, EA/EISs and PELs. The following figures display the number of active and completed CatEx and Major NEPA Projects (EA, EIS, and PEL) for a given year.

Figure 1. Number of Active and Completed Categorical Exclusions



During the 2020 calendar year, there were 226 CatExs completed. Seven of those were Non Programmatic CatExs. This is approximately 21 less than the statistical average of 256 per year. This is likely due to the completion of the RAMP program in 2018 and significant funding draw down for capital improvement projects. RAMP funding contributed to the high level of active CatEx projects in 2013, 2014, and 2015. In addition to 226 completed CatExs, there were 364 active (federal and non-federal) projects statewide.

Figure 2. Environmental Documentation Workload - Number of EA/EIS/PEL Projects Worked On

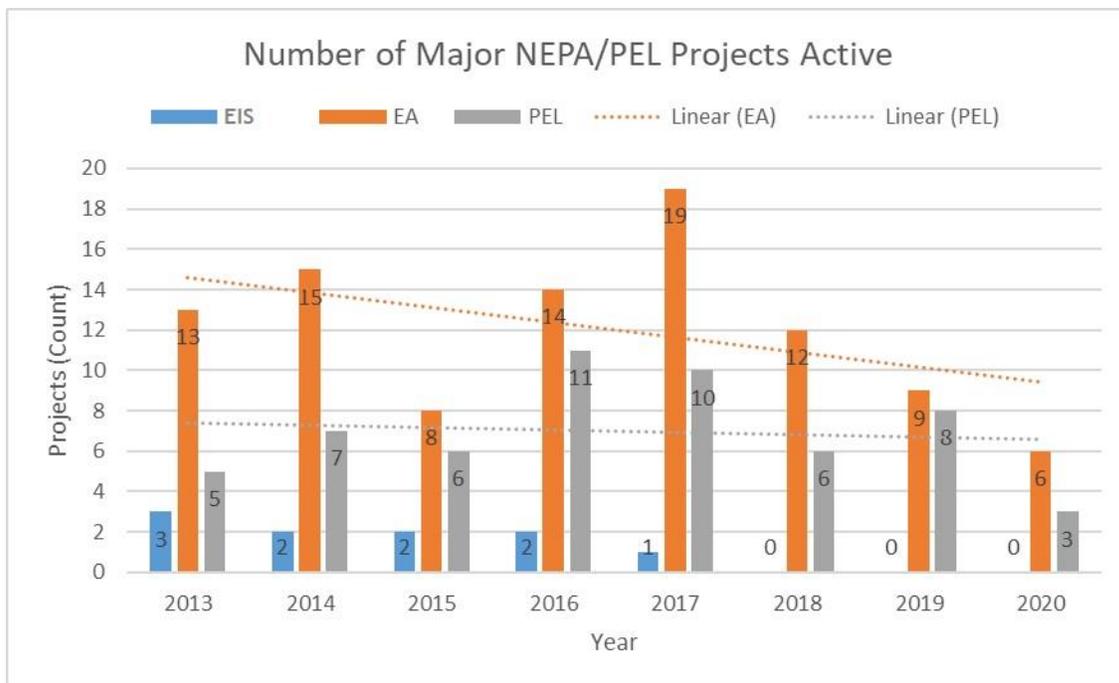


Figure 3. Environmental Documentation Workload - Number of EA/EIS/PEL Projects Completed

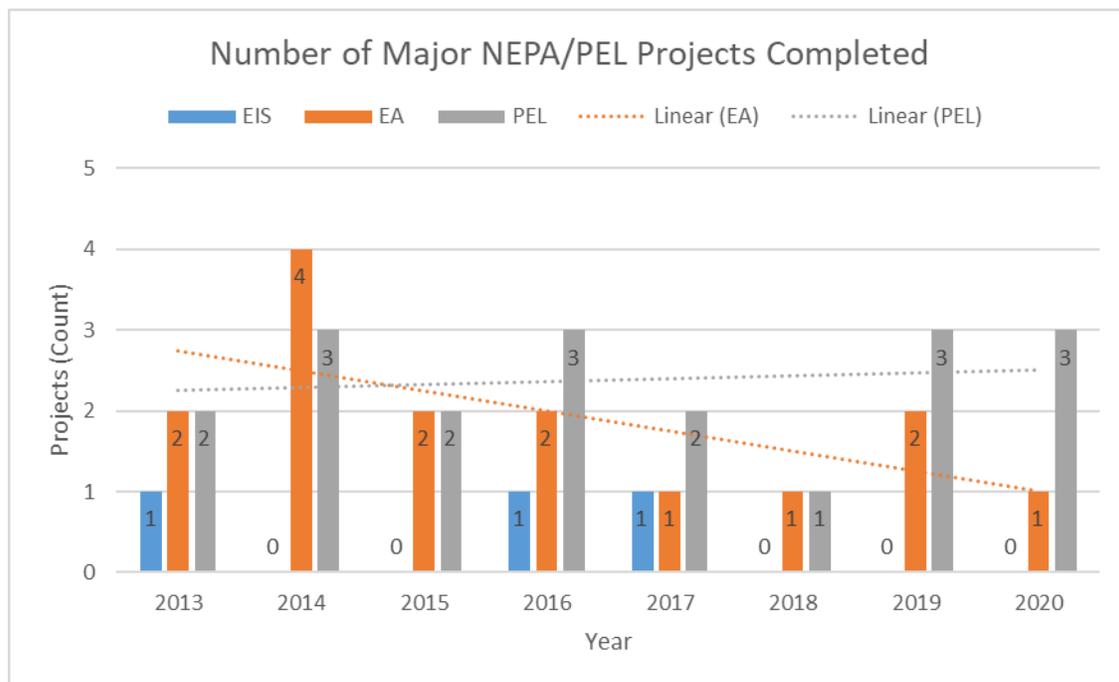
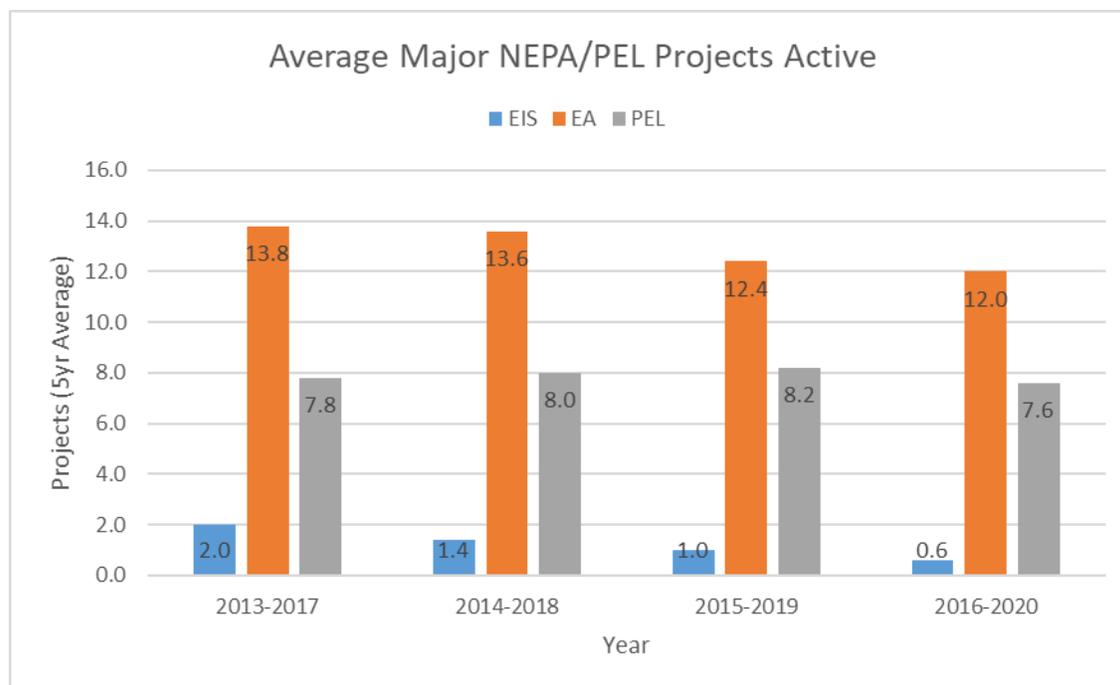


Figure 4. Environmental Documentation Workload - Five Year Average of EA/EIS/PEL Projects Worked On



EIS/ROD

No EIS documents were completed in 2020. No new EIS documents have been started since 2007. Part of this has to do with the Planning and Environmental Linkage (PEL) documents that are being used at a corridor planning level instead of Tier 1 EISs. Tier 2 EISs that were active in the past 5 years include the I-70 East.

EA

At the end of the 2020 calendar year, there were six active EA projects. One EA was completed. There is a downward trend for both EA projects active and completed. Similarly, to the CatEx graph, EA tracking showed an uptick of projects between 2014 and 2017, which may skew the graph. The 5-year average saw the same number of active EA projects than the five-year average from 2016 to 2020. Three active EA projects were downgraded this year: Belleview and I-25 widening was downgraded to a CatEx, US 85 N (I-76 to 124th) was downgraded to a reevaluation, and 104th Ave: Colorado to US85 has not become active yet.

PEL

There were three active PEL studies at the end of 2020. This is a noticeable dip from the year prior (eight active PEL studies). The five-year average has maintained around eight active PEL studies for the past several years.

Appendix A: Environment Section, Other Notable Regulations and Accomplishments to Compare for Track Trends contains more information on other accomplishments such as the timeline for when the NEPA Manual guidance was available, politics such as governors and their campaign platforms, and policies such as going after grants and partnerships that require NEPA documentation up front that could also affect the length of a NEPA document.

4. Water Quality Measure

CDOT tracks this measure throughout the year, due to the importance of complying with stormwater permits. This year is the first year counting the percentage of chronic, severe, chronic-severe, or recalcitrant inspection findings. In 2019, CDOT had 0.10% chronic, 0.15%

severe, 0.0% chronic-severe, and 0.0% recalcitrant stormwater inspection findings. Halfway through 2019, CDOT moved to an increased specification-based escalation process that more accurately reflects compliance because of the identification of chronic and recalcitrant issues (Specification 208.09 - Failure to Perform Erosion Control). In conjunction, the water quality program also released a new version of ESCAN (CDOT’s construction program compliance software) to implement and track the new specification changes. With the new software and specification release, CDOT will continue to conduct statewide trainings for Water Pollution Control Managers and PEs to diminish data entry errors and ensure statewide consistency.

Performance Measures

The following performance measures demonstrate the health of the Environment Program:

Table 2 - Performance/Compliance Measures (Environment)

PM #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/Baseline	2020 Actual
625	Completion time for major environmental documents	Major environmental documents are defined as an EA, EIS, or PEL	A list of all EAs, EISs, and PELs completed in the calendar year, identifying the length of time along with a project description as added to previous years’ data	Calendar Year	Track trend	CDOT completed one EA documents, which was completed in 37 months, and three PEL documents, which were completed in 19, 29, and 37 months. No EISs were completed this year.
104, 381-382	Active and completed NEPA documents	Projects that were active at any point in the year, and projects for which NEPA actions were completed	A list or table indicating number of active and completed NEPA documents in the calendar year divided by class of action (Categorical Exclusion [CE], EA, EIS) as added to previous years’ data	Calendar Year	Track trend	In 2020, CDOT had 364 active projects, and completed 226 Catex projects, one EAs, and three PELs.
99	Water quality measure	Percentage of chronic, severe, chronic-severe, and recalcitrant construction stormwater inspection findings (for projects using 2019 specifications or newer)	Chief Engineer Objective	Calendar Year	0%	In 2020, CDOT had 0.10% chronic, 0.15% severe, 0.0% chronic-severe, and 0.0% recalcitrant stormwater inspection findings.

KEY LEARNINGS

The environmental program continued to see workload and completion time for environmental documents as beneficial performance trackers. In 2020, CDOT had 364 active projects, and completed

226 CatEx projects, 1 EAs, and 3 PELs.

On July 15, 2020, the Council on Environmental Quality (CEQ) announced its final rule titled “Update to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act.” This rulemaking placed restrictions on the number of pages in an EA and EIS document, and placed constraints on the time allowed for an EA, EIS and accompanying decision documents. The rulemaking also had several minor changes to the NEPA process. FHWA has not released guidance on this rulemaking. CDOT’s strategy in complying with the new rulemaking will include trainings and updates to the CDOT NEPA Manual once it is released.

Several efforts were implemented to streamline the executive management team (EMT) briefing process. These included a decision tree on when to brief the EMT and a template memo. This has provided more structure for NEPA projects that lead to more efficient collaboration with the EMT and more predictable timeframes for decision-making.

NEXT STEPS

The environmental program has outlined a goal for the upcoming year that will help with environmental review:

CDOT Dashboard of Relevant NEPA Projects - this dashboard will commit to schedules for all EA, EIS, and PEL projects. This dashboard will inform the federal dashboard of NEPA projects. This process will standardize ways we measure a projects timeline, such as the begin date for EA projects.

INTRODUCTION

CDOT Manager: Marissa Gaughan, Erik Sabina, Darius Pakbaz
FHWA Manager: Bill Haas & Aaron Bustow

Three branches within the Division of Transportation Development (DTD) directly contribute to performance-based planning and programming as outlined in MAP-21 and the FAST Act: The Multimodal Planning Branch (MPB), the Information Management Branch (IMB), and the Performance and Asset Management Branch (PAMB). Other DTD branches include the Environmental Programs Branch (EPB) and Applied Research and Innovation Branch (ARIB).

QUALITY/RESULTS

For state fiscal year 2020, DTD accomplished the objectives/projects within its work program, spanning topics including statewide and Regional planning, transportation research, environmental sustainability, and improving information about our roadway network.

During 2020, DTD has lead the effort to continue reporting on the progress of meeting the national performance measure targets, particularly for metrics related for infrastructure condition and system performance. Progress towards these metrics was documented in the mid-period progress report, submitted to FHWA on October 1, 2020. The Department has elected to adjust its four-year targets related to condition of the Interstate Highway System and the non-Interstate National Highway System. These changes were reported to FHWA through the mid-period progress report.

The Transportation Commission (TC) adopted the Statewide Transportation Plan in August 2020. In November 2020, TC approved an updated Policy Directive (PD) 14 that provides performance goals and objectives for the implementation of the Statewide Transportation Plan. The Statewide Transportation and PD 14 were informed by input received after extensive public outreach during the spring and summer of 2019. This was the most expansive and inclusive transportation planning effort in CDOT MPB history, and resulted in 9,079 completed online surveys, 17,305 comments on online maps, 16,201 participants in online telephone town halls, and more than 15,000 web views.

PERFORMANCE MEASURES

The following performance measures demonstrate the health of the Planning Program:

Table - Performance/Compliance Measures (Planning)

PM #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/Baseline	Past Years	2020 Actual
738	Percentage of FY DTD Budget Expended and Encumbered by End of SFY	Percent of funds encumbered or expended compared to the estimate for the fiscal year	Feedback on annual review and tracking of percent complete on projects Progress on the work program is in the FY Accomplishments Report	State FY	70% of planned amount	2019: 79.64% 2018: 79.81%	67.77%

630	Accuracy and Timeliness of HPMS and Other Transportation Data Submitted	Annual HPMS Report Card Score from FHWA HPMS Review	Annual HPMS Report Card Score	State FY	120	2019: 138 2018: 135	N/A ¹
817	Truck Travel Time Reliability (TTTR) Index	The sum of maximum TTTR for each reporting segment divided by the total Interstate system miles per federal requirements	Highway Performance Monitoring System (HPMS)	Calendar Year	National Performance Measure Targets: 2020: 1.5 2022: 1.5	2019: 1.45 2018: 1.38 2017: 1.37 2016: 1.68 2015: 1.51	1.42
818	Peak Hours of Excessive Delay (PHED)	Annual hours of Peak Hour Excessive Delay (PHED) per capita for the Denver-Aurora Urbanized Area per federal requirements	Highway Performance Monitoring System (HPMS)	Calendar Year	National Performance Measure Targets: 2020: 52 2022: 54	2019: 16.7 2018: 18.7 2017: 17.9 2016: 15.7 2015: 16.5 2014: 16.7	8.7
819	Non-SOV Travel	Percent of Non-Single Occupancy Vehicle (SOV) Travel for the Denver-Aurora Urbanized Area per federal requirements	American Community Survey (United States Census Bureau)	Calendar Year	National Performance Measure Targets: 2020: 24% 2022: 25%	2019: 24.7% 2018: 24.2% 2017: 24.1% 2016: 23.8%	N/A ²
820-823	On-Road Mobile Source Emissions Reduction Benefit from CMAQ-funded Projects	Total Emissions Reduction Benefit per federal requirements from the following pollutants and precursors in kg/day: VOC,	CMAQ Public Access System	Federal FY	National Performance Measure Targets: VOC 2020: 86 VOC 2022: 105 PM10 2020: 31 PM10 2022: 152 CO 2020: 1,152	2019: VOC - 87.48 CO - 542.66 NOx - 251.74 PM10 - 19.19 2018: VOC - 100.09 CO - 1152.51 NOx - 289.63 PM10 - 34.13	N/A ³

¹The HPMS Report Card is being replaced with a new system evaluate HPMS submissions nationwide

²American Community Survey data for 2019 will not be available until November 2020.

³2020 data not available until after the submission deadline in May 2020.

KEY LEARNINGS

Key Learnings for the performance-based planning and programming program for the next year include:

As part of the publication of the statewide long-range plan, updates on performance levels for the metrics required under the FAST Act should include breakdowns for performance levels within each of the five MPO's within the state. CDOT has included baseline data for the current statewide, 10-year plan, and future statewide plans and/or plan update will include updated performance levels to illustrate how implementation of the statewide plan is affecting these performance levels statewide and with MPO partners.

NEXT STEPS

Next steps for the performance-based planning and programing program for the next year include:

Work with internal subject matter experts and MPO partners to begin the process of developing targets for performance metrics for the infrastructure condition and system performance goal areas for the next four-year performance period.

Update Appendix G: Performance Measures of the Statewide Transportation Plan as needed

2.18. TRANSPORTATION DEVELOPMENT: INNOVATIVE MOBILITY

INTRODUCTION

CDOT Manager: Lisa Streisfeld
FHWA Manager: N/A

The Office of Innovative Mobility is dedicated to promoting multimodal transportation options to improve the safety, mobility, and air quality throughout Colorado. The Office of Innovative Mobility works closely with the Colorado Energy Office to promote zero emission vehicle deployments for light, medium, and heavy-duty vehicles. Connected and autonomous vehicle efforts are focused on overarching policy and strategic investments to prepare CDOT for the future of mobility technologies. In addition, the Office is exploring efforts to better utilize new mobility services such as ride hailing, e-commerce, and shared mobility to provide more options for all Coloradans, including vulnerable populations with specialized transportation needs. The Office also includes the Division of Transit and Rail, which administers millions of dollars of State and Federal transit dollars, plans for, and constructs transit infrastructure, awards transit grants to local governments and transit operators, and operates Bustang/Outrider, a statewide intercity and rural bus program.

QUALITY/RESULTS

The Office of Innovative Mobility ensures quality control and assurance by developing an annual work plan and reports regularly to CDOT executive leadership and the Transportation Commission on the status of the various initiatives, performance metrics, and expenditures.

PERFORMANCE MEASURES

The following performance measures will help assess the health of the Innovative Mobility Program:

Table - Performance Measures (Innovative Mobility)

PM #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/Baseline	2019	2020
-	CanDo Telework	Total funds awarded for the CanDo Telework	Grantees provide project end report	Calendar Year	Expend \$176k funds	N/A	\$123.8K
-	CanDo Revitalizing Main Streets Initiative	Total funds awarded for the CanDo Revitalizing Main Streets Initiative	Grantees provide project end report	Calendar Year	Expend \$6.1 million funds	N/A	\$2.84M
-	Number of EV Buses awarded through VW Settlement	Number of EV Buses awarded through VW Settlement	EvaluateCO dashboard	Calendar Year	Expend full \$30.6 million allocation	N/A	\$16.2M
-	Total EV registrations in Colorado	The total number of EV registrations in Colorado	EvaluateCO dashboard	Monthly	940,000 by FY2030	19,256	32,730
-	Total zero-emission transit vehicles in Colorado	The total amount of zero-emission transit vehicles in Colorado	EvaluateCO dashboard	Monthly	1,000 by FY2030	23	54
-	Percentage of total state highway miles	The percentage of total state	Charge Ahead Colorado Grants	Monthly	100% by FY2030	40%	46%

	within a 30-mile buffer of a publicly-accessible DC fast-charging station	highway miles within a 30-mile buffer of a publicly-accessible DC fast-charging station	Tracking				
-	Number of Colorado Scenic & Historic Byways that are classified as Electric Byways	The number of Colorado Scenic & Historic Byways that are classified as Electric Byway	Charge Ahead Colorado Grants Tracking	Monthly	26 (100%) by FY2025	3	3

KEY LEARNINGS

OIM has many successful TDM programs and is using both public and VW Settlement funds to make an impact throughout the state. The CanDo grants and EV bus awards are progressing with more funds to be expended. While there has been much progress, the number of Electric Scenic Byways should be increased, and progress needs to accelerate in order to reach the 2025 goal. The number of EV registrations and vehicles should also be a major focus as 2030 is just around the corner.

NEXT STEPS

Below listed are some potential performance metric options that are being considered by OIM for FY 21-22:

- Autonomous Attenuator
- Bustang - Advanced Driver Assistance Systems
- Statewide micromobility trips
- Total EV registration of trucks and passenger vehicles in Colorado
- Value of grants received by OIM
- Number of studies/reports completed by OIM
- VMT reduction through TDM Measures
- Number of park and ride lots and spaces
- Occupancy of park and rides in Colorado
- Internal Staff TDM metrics: VMT avoided by staff teleworking
- Number of trips booked through the Connected Colorado APP
- Percentage of successful grant applications for federal funds

SECTION 3. RISK RESPONSE STRATEGIES

Overview of the Risk Response Process

One of the most important roles of the Quality Improvement Council (QIC) is evaluating and seeking improvements to existing Federal-Aid Highway Program (FAHP) related processes. By focusing on continual improvement, CDOT and FHWA can achieve strategic goals, better meet customer's needs and expectations, lead systemic improvement, assist with the deployment of innovative technologies, and provide a more focused technical assistance.

Each year, the QIC compiles a list of risks to implementing the FAHP, as well as opportunities to improve results or streamline processes. The QIC prioritizes which risks and opportunities to focus on based on the potential impact, likelihood and resources available. In September of 2020, the QIC used a weighted priority matrix to better inform the selection of the three JPRs. The decision criteria included: safety, alignment with CDOT strategic goals, cost savings (efficiency of delivery), risk to funding, quality (expected outcome), and support from CDOT's Executive Management Team and FHWA. Based on the weighted scores and several facilitated workshop meetings, the QIC selected three Joint Process Reviews (JPR) for the upcoming Federal Fiscal Year 2020-21. Each JPR team subsequently developed a standard CDOT project charter to clearly communicate the purpose, sponsors, stakeholders, resources, data, deliverables, measures and work plan. In addition, the QIC implemented a new, cloud-based JPR tracker for open JPRs, to be updated by project leads & reviewed at least quarterly during QIC meetings.

CDOT and FHWA leads explore the risks and make recommendations on how to address them. Each August, JPR teams develop a final report that summarizes: 1) overview of risk; 2) general methodology (including project team); 3) key findings; and 4) specific recommendations for implementation. The recommendations need to be clear and discreet enough that that the QIC can easily track until they are completed. Final reports and are added to the QIC Projectwise [Process Review Library](#), and QIC champions share the implementation status of these recommendations approximately every 6 months. Completed recommendations are saved in the Projectwise [Process Review Status List](#).

The remainder of this section includes:

- Joint Process Reviews (JPRs) selected for Federal Fiscal Year (FFY) 2020-2021.
- Joint Process Reviews completed in FFY 2019-2020.
- Risk Response Recommendations to be implemented in FFY 2017-2019.

Joint Process Reviews (JPRs) selected for Federal Fiscal Year (FFY) 2020-2021

Improve the Quality of Construction of Bridge and Structural Assets (FFY 2020-2021)

Problem to Address: The statewide construction quality of our bridges (Major Structures) need to be improved to ensure efficiency in project budgets, improve the safety of the structures for the project delivery team and public users, and ensure integrity in the performance and condition over the 75 to 100 years expected life of the structures.

Approach: In November 2020, the project team developed the project charter to better understand the specific and systemic problems that result in construction issues and require special load tests or multiple revisits. The JPR team identified three focus areas: 1) Create a tracking system to identify resource gaps and common problematic project delivery milestones; 2) Increase resource support and time involved for QA on bridge delivery; 3) Create a training that will be distributed to the regional member involved with Bridge delivery.

Contacts: CDOT: Michael Collins and Keith Stefanik | FHWA: Spencer Tucker

Improve Timely & Transparent Reporting for CDOT HSIP (including local agency) Projects' Obligations and Expenditures (FFY 2020-2021)

Problem to Address: Lack of timely & transparent reporting for CDOT Highway Safety Improvement Program, (HSIP) projects' (including local agency projects) obligations and expenditures results in misunderstanding and misrepresentation of CDOT's standing among states in the program.

Approach: In November 2020, a project charter was developed and the team identified to work on this project. The project will improve reporting and the percentage obligation rates (trending in the right direction) to show improving HSIP program effectiveness compared to other states. OFMB has created a new HSIP report that details the status of HSIP funding that has been programmed but not obligated as well as the STIP status. This is a monthly report that is then summarized and provided to FHWA. The report has been generated for the first three months of 2021 and FHWA has been provided a contextualized update. As of March 2021, the project is approximately 50 percent complete.

Contacts: CDOT: David Swenka and Keith Stefanik | FHWA: Bill Haas and Dahir Egal

Improve Performance Levels for Off-System (locally owned) NHS Bridges and Pavement (FFY 2020-2021)

Problem to Address: CDOT is measured on the performance of NHS off-system pavement and bridge, but has no direct control over those projects, just the ability to make recommendations while the SHC makes the final decision. Exceeding the statewide bridge target of 10% in poor condition would limit flexibility of future spending, as the FHWA would make decisions with less CDOT input. This could result in lost funding based on a formula (amount TBD).

Approach: In November 2020, a project charter was developed and a team to work on this project identified. It was noted that CDOT does not have authority over locally owned and therefore the results of this project will need to be within CDOT's control/authority.

Contacts: CDOT: William Johnson | FHWA: Brian Dabling and Spencer Tucker

Joint Process Reviews Completed in FFY 2019-2020

Work Zone Safety and Mobility Process Review (WZSM) (FFY 2019-2020)

Problem Addressed: The original WZSM survey was distributed via email forms to a subset of stakeholders with a long list of questions that resulted in low participation and long lead times to assemble usable feedback. The questions are now reformulated and digitally distributed to a wider stakeholder group to ensure a richer and more efficiently assembled performance measure perspective

Approach: A programmatic Work Zone Safety and Mobility (WZSM) Process Review is required by FHWA every two-years. The typical process is to convene a leadership team to refine the approach, conduct data collection via a survey and obtain input from the Regional Transportation Directors and Executive Management Team (RTDs/EMT), and then convene small group work groups to refine and recommendations for improvement. The CDOT Office of Improvement is not involved with this JPR since it is a programmatic review. However, the JPR

team should coordinate with the Office of Process Improvement with any recommendations that come out of the required WZSM process review to ensure efforts are consistent with business improvement standards.

Contacts: CDOT: Tom Dinardo | FHWA: Dahir Egal

Local Public Agency (LPA) Program Review (FFY 2017-18)

Problem Addressed: CDOT's MS4 Permit, Permanent Water Quality Program requires detailed financial tracking across HQ, OFMB and Regions for all projects that receive Mitigation Pool funds.

Approach: Create a process that requires a minimum level of training prior to allowing LPA to administer the federal aid project. Improve the communication with LPAs and CDOT, between CDOT Regions and Headquarters, and between regions by using an inclusive approach to update the Local Agency Manual.

Contacts: CDOT: Cathy Cole and Neil Lacy | FHWA: Melinda Urban

Permanent Water Quality (PWQ) Mitigation Fund (FFY 2017-18)

Problem Addressed: Need to create better adherence by Local Agencies (LAs) to state and federal requirements and improve LAs accountability.

Approach: Create a process for PWQ Program Manager to review project invoices, track expenditures, and compare to the original application approvals for one year.

Contacts: CDOT: Rachel Hansgen, Jean Cordova and Jane Hann | FHWA: Randy Jensen

Risk Response Recommendations to be Implemented (2017-2019)

Highway Performance Monitoring System (HPMS) Data Review (FFY 2017-2018)

Problem Addressed: CDOT should include Local Agency construction project information in federally required reporting and provides a starting point for tracking prompt payment discrepancies identified in Local Agency projects.

Approach: Make the use of B2GNow software required for all Local Agency construction projects that go out to advertisement after January 1, 2022, to ensure successful system implementation existing CDOT specifications and contract documents can be thoroughly reviewed (and updated if appropriate). In addition, develop robust training materials to provide to Local Agency project personnel and contracting community.

Contacts: CDOT: Phyllis Snider | FHWA: Aaron Bustow

Work Zone Safety and Mobility (WZSM) Process Review (FFY 2017-2018)

Problem Addressed: Through the WZSM Process Review, the following needs were identified: 1) create better adherence by Local Agencies (LAs) to state and federal requirements; 2) improve LAs accountability; and 3) providing training.

Approach: In December 2020 it was determined the training from the Smarter Work Zone into two separate JPRs for FFY 2020-21 because the Smarter Work Zone is a longer-term project than training. Training focuses on creating a new course designed to educate all design and

construction stakeholders on CDOT's procedures regarding work zone safety and mobility with the course to be piloted in May 2021.

Contacts: CDOT: Thomas Dinardo and Esayas Butta | FHWA: Dahir Egal

Subcontractor Prompt Payment Processes (FFY 2018-2019)

Problem Addressed: CDOT Local Agency construction contracts are still operating on a "complaint-based" reporting process to identify prompt payment issues.

Approach: CDOT will shift to a proactive monitoring process via implementation of B2G on these projects (all other CDOT contracts are using B2G now) by January 1, 2022. This improvement will allow CDOT to include Local Agency construction project information in federally required reporting and provides a starting point for tracking prompt payment discrepancies identified in Local Agency projects.

Contacts: CDOT: Greg Diehl and Steve Harelson | FHWA: Nicole Bumpers

Improve Project Specific Safety Recommendations in the Operations Evaluation (FFY 2019-2020)

Problem Addressed: Currently at CDOT, each Region has the discretion to conduct the Safety Analysis on projects independently. This has resulted in different levels of analysis and recommendations that may not sufficiently address potential safety issues that exist along the state highway system. There is a need to improve data-driven safety analysis consistency for 3R projects so that safety issues and the supporting budgets can be identified for implementation of systemic safety improvements (signage, striping, guardrail, rumble strips, etc.) leading to greater overall crash reduction statewide.

Approach: CDOT HQ is coordinating with Regions (traffic and materials) to have advanced listing of 3R projects available so that level of safety analysis (level 1 or level 2) can be determined ahead of time and possibly explore having safety assessment reports completed in advance as well. HQ developing safety analysis training workshop for region traffic groups in 2021.

Contacts: CDOT: David Swenka, Steve Harelson, Neil Lacey, and Craig Wieden | FHWA: Shaun Cutting, Dahir Egal, and Armando Henriquez

Systems Engineering Analysis (SEA) for Intelligent Transportation System (ITS) Device Implementations (FFY 2019-2020)

Problem Addressed: If projects do not have adequate Systems Engineering Analysis, then projects may not function and operate as intended, the impact of Federal-aid funds may not be maximized, and the benefits of projects to the traveling public may be compromised. In addition, CDOT is currently not meeting 23 CFR 940.

Approach: This effort will bring CDOT back into compliance of Title 23 Code of Federal Regulations Part 940 (23 CFR 940), while also providing project managers the tools, templates and defined timelines for document submission and review to improve the navigation of the SEA process. Phase one of this project included defining a list of documents that meet 23 CFR 940 and establishing clear timelines for completion of the documents. Phase two will Create and implement a tool for Project Managers to determine the appropriate scope of ITS SEA documentation as early in the project as

Possible in a, yet to be determined, existing process. ITS & Network Services Branch published an ITS specific page on PMO's website, but more importantly, they have designated a full time _____

employee (FTE) and a manager to lifting this program up. These employees have already compiled and kicked off the ITS SEA Charter. The ITS & Network Services Branch has been grateful for the opportunity to improve so far, and looks forward to making a much larger and positive impact on the CDOT ITS SEA project delivery process.

Contacts: CDOT: Emma Boff and Allie Axley | FHWA: Bill Haas and Eva LaDow

Construction Contract Management of Complex Alternative Delivery Projects (CM/GC and Design-Build) (FFY 2019-2020)

Problem Addressed: CDOT's recent experience on complex projects has been challenging, each has been administered differently, has taken a unique approach to managing risk, and there lacks a clear approach toward successful completions of the projects. There have been few examples of consistent resources being dedicated to the delivery of these types of projects as well as consistency of resources carrying on through the lifecycle of the project creating a loss of institutional knowledge of the contract. The large investment and extraordinary impact on the traveling public puts these projects in the political and public spotlight. Additionally, private investment is being used to fund these projects; missed milestones could erode CDOT/FHWA's credibility and degrade our future investment grade.

Approach: An initial investigation into the causality of the issues on complex projects would be revealing, and once the cause is apparent, we can then move into solutions that include developing an administration process that allows CDOT to hold Contractors accountable to ensure compliance with the technical requirements. For QIC purposes, the final JPR report could be findings from this discovery phase and recommended areas to focus on in the future. The JPR report could also be findings and recommendations related to problem solving on a specific component (i.e., phase 2).

Contacts: CDOT: Matthew Pacheco and Keith Stefanik | FHWA: Shaun Cutting

SECTION 4. ADDITIONAL ACCOMPLISHMENTS INFORMATION

4.1. EVERYDAY COUNTS ACCOMPLISHMENTS

Every Day Counts (EDC) is a Federal Highway Administration program that works in partnership with the American Association of State Highway and Transportation Officials, State Department of Transportations and other transportation stakeholders to foster a culture of innovation. Through this State-based effort, the goal is to facilitate rapid deployment of proven strategies and technologies to shorten the project delivery process, enhance roadway safety, reduce congestion, and improve environmental outcomes.

Every 2 years, FHWA works with State departments of transportation, local governments, tribes, private industry, and other stakeholders to identify a new set of innovative technologies and practices that merit widespread deployment through EDC. The selected innovations share common goals of shortening project delivery, enhancing the safety and durability of roads and bridges, cutting traffic congestion, and improving environmental sustainability.

CDOT and the FHWA CO Division have been active participants in EDC round five (EDC-5), which promoted the adoption of the following 10 innovations in 2019 and 2020. See https://www.fhwa.dot.gov/innovation/everydaycounts/edc_5/ for more.

1. Advanced Geotechnical Methods in Exploration (A-GaME)
2. Collaborative Hydraulics: Advancing to the Next Generation of Engineering (CHANGE)
3. Project Bundling
4. Reducing Rural Roadway Departures
5. Safe Transportation for Every Pedestrian (STEP)
6. Unmanned Aerial Systems (UAS)
7. Crowdsourcing for Operations
8. Value Capture: Capitalizing on the Value Created by Transportation
9. Virtual Public Involvement
10. Weather-Responsive Management Strategies

Through this participation, CDOT can receive or has received federal funding for peer exchanges, technical workshops, scan tours, and discretionary program awards including assistance through the Statewide Transportation Innovation Council (STIC), Technology Transfer (T²) and the Accelerated Innovation Deployment (AID) program.

Prior to EDC-5, CDOT opted in to a small number of EDC-4 Innovations. This round, CDOT opted in to nine of the ten EDC-5 Innovations listed above. The following summaries outline achievements made by CDOT, FHWA and other transportation partners towards institutionalizing these innovations:

1. Advanced Geotechnical Methods in Exploration - A-GaME

https://www.fhwa.dot.gov/innovation/everydaycounts/edc_5/geotech_methods.cfm

CDOT Champion: David Thomas

The Colorado DOT Soils & Geotechnical Services have incorporated CPT and geophysical methods into its manual of practice as well as using each technology on one or more projects.

Lessons Learned: The only obstacle is money and education. Is there money to use these technologies and is there time to educate project managers on the benefits of using them?

2. Collaborative Hydraulics: Advancing to the Next Generation of Engineering (CHANGE)

https://www.fhwa.dot.gov/innovation/everydaycounts/edc_5/change2.cfm

CDOT Champion: Brian Varrella

- 2019 & 2020 authorized the use of 2D hydraulic analyses on projects, permits and planning studies statewide with the update to the CDOT Drainage Design Manual (DDM) in Chapters 8 and 17.
- 2019 & 2020 -- CDOT personnel from Region 4 (northeast quarter of CO) participating on the Colorado 2D Collaborative (C2DC) with FEMA Region VIII, FHWA, other state agencies, and private sector partners to provide guidance to FEMA Headquarters on utilizing 2D hydraulic studies in regulatory floodplain permit and revision processes associated with requirements of the National Flood Insurance Program (NFIP) standards published in Title 44 of the Code of Federal Regulations.
- 04/2020 -- hired an Engineer in Training (EIT) to support a 2D analysis Quick Checks initiative statewide with SMS & SRH-2D on up to 50 infrastructure asset sites statewide.
- Project Sponsoring by CDOT Chief Engineer and Region 4 Transportation Director.
- EIT will provide Project Management support at 0.5-FTEs in CY2020 & 2021 as a subject
- 05/2020 -- received combined funding of \$347,000 to implement a 2D analysis Quick Checks initiative statewide with SMS & SRH-2D on up to 50 infrastructure sites statewide.
- 05/2020 -- documented up to 90 2D models completed statewide from 01/2016 through 05/2019 on infrastructure projects across Colorado; more than half from CDOT Region 4 (northeast quarter of CO).
- 06/02/2020 -- secured a prime contractor and 5 contractors to create a task order of \$250,000 to complete 50 projects in 12 months.
- 06/04/2020 -- completed a report template with assistance from private sector partner RS&H for succinct quick check reporting.
- 06/05/2020 -- confirmed 19 of 50 projects are ready to start 2D Quick Checks, with 7 more possible and 15 under investigation. Projects still arriving to Project Champion & Project Manager through March 2021.
- 07/15/2020 - 2d Quick Checks (2dQC) Project receives Notice To Proceed and work begins on project selection and initiation.
- 12/09/2020 - TAC meeting reveals 45 of 76 projects are moving forward.
- The need for 2dQC exceeds capacity statewide.
- Also received funding to develop statewide training and support program in CY2021.
- 12/29/2020 - EOC meeting authorizes sharing of 2dQC with other State DOTs and FHWA partners.
- Also authorized 3-Tiered support system.
- EOC requests establishment of a 2dQC Statewide Selection Panel; framework to be developed in CY2021 for further vetting.

Lessons Learned: EDC-5 Project Leader Varrella is available to assist other states with lessons learned and provided material evidence of successes to the FHWA Resource Center for distribution to 6 state and 2 federal partners, including the following materials:

- Colorado DOT Upper Management, Program Engineers, and Resident Engineers are enthusiastic supporters of the concept across the state; the 18-month Awareness campaign was highly successful using a team-based strategy supported by the Office of Process Improvement, including the following tactical decisions and

outcomes:

- Road-show of 2D successes in CDOT Region 4 and lessons learned on real projects.
- Preparation of a 1-Page Success Stories to succinctly document challenges, solutions and outcomes applying 2D technology to project delivery.
- Development of a Frequently Asked Questions (FAQs) summary from constructive feedback, questions from Road Shows, and gaps identified by Upper Management.
- Modifications to the CDOT Drainage Design Manual (DDM) were delivered to a public website in September 2019 but warrant further editing, peer-review, policy updates, and internal discussion before material can be effectively applied statewide. Internal talks are ongoing.
- Rollout of a statewide process requires at least 0.5-FTEs of support over a period of 2-3 years to effect change in process, as indicated by current progress at Colorado DOT. It is expected other state DOTs can accelerate this progress based on the Summary of Conclusions and Recommendations from final 2D Quick Check Initiative Reporting available in Q3 of CY 2021.
- A statewide panel of SMEs for 2dQC is necessary for long-term viability and survivability
- Panel must meet quarterly or monthly to review statewide 10-year pipeline of projects and earmark opportunities for Regional action.
- Supervisory support needed for SMEs.
- All Panel SMEs must take CDOT training developed in CY2021 and refined over time.
- Current need of 77 projects exceeds 45 project capacity in CY2021
- Next projects will be moved to Statewide 2dQC SME Panel, or CDOT will explore a Phase 2 effort to build on the current project delivery effort (Project 23532) or on the Research effort (Project 24149).
- CDOT Executive Management re-iterated the 2dQC Initiative has full support for expanding to a statewide process in CY2021 to be maintained in perpetuity.

3. Project Bundling

https://www.fhwa.dot.gov/innovation/everydaycounts/edc_5/project_bundling.cfm

CDOT Champion: Matt Pacheco and (prior to departing CDOT), Ermias Weldemicael

We have developed a guidance tool that presented to our Bridge Enterprise Group several months ago, that manages a special funding source specifically dedicated to address our aging structures throughout Colorado. This group interfaces with each of the Regions in Colorado, and most regions had representation at the presentation. Because awareness was raised on the topic of bundling and the “Bundling Tool” our State Bridge Asset Manager requested a copy of the matrix and was able to utilize it in the planning and prioritization of projects for the next fiscal year portfolio of maintenance and construction projects.

My observation as I had a brief discussion with the manager on their experience with the tool are as follows: The tool was easy to find, the use was intuitive, and the manager was overall pleased with the results, small victory but progress none the less.

Lessons Learned: It was surprising that a small informal presentation of the tool had such an impact that it warranted its unsolicited use. A typical rollout of similar tools has taken much stronger internal marketing, followed executive management compelling the use of the tool. I think this tool makes sense and the simplicity of guiding the user through several simple conversations and soliciting consideration to obstacle and opportunity regarding the areas where bundling may provide some benefit, is intuitive. Both features contribute to a

natural curiosity surrounding the tool and the intuitive nature of the tool makes it easily implemented. The next steps in implementation is to raise awareness with the regional planners and present the tool in a similar fashion as it was presented to the Bridge Enterprise Group. I will begin to reach out to the regions and seek opportunities to meet individually with all who may be interested.

4. Reducing Rural Roadway Departures (RwD)

https://www.fhwa.dot.gov/innovation/everydaycounts/edc_5/roadway_departures.cfm

CDOT Champion: David Swenka

CDOT's safety improvement programs, both the federally funded HSIP and the state funded FASTER Safety Mitigation, have completed policy and procedure updates in 2020, which will allow these programs to be more inclusive of systemic applications instead of relying solely on site-specific applications. This will potentially allow for more funding to go to improvements for rural facilities to help reduce roadway departure crashes.

A new 2020 call for local agency HSIP projects was announced in December 2020. The announcement mentions that a portion of funding will be set aside for systemic improvements along high-risk rural roads (HRRR) or safety improvements targeting crashes involving vulnerable roadway users.

CDOT partnered with FHWA on presenting a webinar workshop in December 2020 ("Introduction to Systemic Approach to Safety"). This was a four-hour course leading practitioners through the systemic safety analysis process and focuses on the benefits of the systemic approach to safety, as well as the application of the methodology to identify systemic safety improvement projects through interactive exercises and case studies. This webinar benefits local agencies looking to develop local road safety plans or advance systemic safety projects with assistance from the Highway Safety Improvement Program (HSIP).

The Colorado HSIP procedural manual is planned to be updated in 2021 with provision of details and guidelines on how systemic safety improvements are to be evaluated and funded.

Lessons Learned: Executive sponsorship and direction is necessary in order to provide the best chance of large-scale effort to address an issue like roadway departures. It is our hope that the recent CDOT safety initiatives that have been able to set aside funding for strategic safety proves to be successful.

5. Safe Transportation for Every Pedestrian (STEP)

https://www.fhwa.dot.gov/innovation/everydaycounts/edc_5/step2.cfm

CDOT Champion: Betsy Jacobsen

- CDOT's STEP EDC champion, Betsy Jacobsen retired.
- CDOT completed the Colorado Statewide Transportation Safety Plan that includes a focus area on pedestrian safety.
- CDOT is also nearing adoption of the 2045 Statewide Transportation Plan that includes an added focus on non-motorized transportation and pedestrian access and safety.
- CDOT is also in the process of developing a new Colorado Roadway Design Guide that will incorporate Context Sensitive Design, Multi-Modalism and Performance Based Practical Design. These three pillars of design will provide a more comprehensive and holistic approach to design

guidance.

- CDOT is also looking into developing a virtual training session for non-motorized detours in construction zones. While this is covered somewhat in CDOT's Chapter 14 of the Roadway Design Guide, it could be more comprehensive.

Lessons Learned: Due to COVID-19, pedestrian facility design classes that were scheduled had to be cancelled, as did the original FHWA Pedestrian Safety class that was scheduled. While in-person delivery of information is frequently preferred, finding new ways to use technology and provide similar experiences is important and becoming the new normal.

6. Unmanned Aerial Systems (UAS)

https://www.fhwa.dot.gov/innovation/everydaycounts/edc_5/uas.cfm

CDOT Champion: Kathi Lyon and Casey Hensley

- Casey Hensley replaced Kathi Lyon as CDOT champion
- CDOT's UAS Manual is in a draft form, with a few incomplete sections. Completion is anticipated to be in early 2021.
- Electronic records, consistent with CDOT processes are being developed and will be implemented in the first quarter of 2021.
- Setbacks with the pandemic and decreased funding availability have led to a strong grassroots effort for the pilots and their supervisors to come together to develop this program, rather than hiring a single point of contact. The group is very experienced and willing to put in the work needed to get the program together.
- CDOT won a T2 grant to develop a demonstration project for the development of UAS led bridge inspections.
- CDOT won a grant to develop a pilot project for permanent water quality inspections and monitoring.
- CDOT has cultivated a relationship with Ohio DOT for guidance to develop a UAS program.

Lessons Learned:

- CDOT can draw from a large variety of subject matter experts that are enthusiastic about utilizing a new technology that is safer and more efficient. Creating a program based on the people that will be using the technology (pilots and data analysts) will create a program that is dynamic and adaptable to the needs of the UAS applications.
- UAS is very attainable for CDOT because we already have many systems that the data and training can converge with. Electronic record keeping has been a clear and concise process. Data management can be used with current data management systems.

7. Use of Crowdsourcing to Advance Operations

https://www.fhwa.dot.gov/innovation/everydaycounts/edc_5/crowdsourcing.cfm

CDOT Champion: Jamie Yount, Matt Russmann

CDOT worked with ESRI to develop a traffic operations dashboard that gives users a live feed of Waze and Here Live Traffic data. Vehicle AVL data was also incorporated into the dashboard to aid operators in dispatching resources to incidents and events. This dashboard was implemented 18 months ago and operators now rely on it for their situational awareness, incident reporting, and resource dispatching. Benefits include increase notification times for traffic incidents and increased response times for CDOT resources. CDOT has Institutionalized this application of crowd sourced data into day-to-day operations. Increased response time allows CDOT to provide a greater level of

service to the travelling public. The ESRI platform has also been used to develop a data dashboard for avalanche mitigation operations and a pre-storm operational readiness application for maintenance equipment, material, and manpower resources.

Lessons Learned: The traffic operations dashboard is a great success and it is great to see it being used on a daily basis in our operations centers. The development of the dashboard is a great first step with crowdsourced data but we are only just scratching the surface of the possible uses for this data. Now that we have developed the data infrastructure in place, we are excited to use this information in other capabilities. The biggest obstacle was getting our operators familiar with a new tool and getting their buy in on the value it brought to their daily workflow. Another challenge will be maintaining the data infrastructure to keep this tool operating reliably.

8. Virtual Public Involvement (VPI)

https://www.fhwa.dot.gov/innovation/everydaycounts/edc_5/virtual_public_involvement.cfm

CDOT Champion: Aaron Willis

In light of the COVID-19 pandemic, CDOT has been forced to increase the usage of virtual public engagement tools and techniques for the Colorado Statewide Transportation Plan required 30-day public review and comment period. In response to the pandemic, CDOT has doubled the required public review and comment period to 60-days, to allow for increased participation by all interested parties. Additionally, CDOT will use e-mail blasts and virtual meetings to notify the public and stakeholders that the draft plan is available for public review and comment.

9. EDC-5 Weather-Responsive Management Strategies (WRMS)

https://www.fhwa.dot.gov/innovation/everydaycounts/edc_5/weather_strategies.cfm

CDOT Champion: Jamie Yount, Matt Russmann

CDOT is investing in more mobile friction sensor deployments. CDOT currently has 51 Teconer mobile friction sensors deployed on maintenance supervisor pickups. This Fall CDOT is deploying 3 additional sensors on the Bustang regional bus network. Future efforts are underway to deploy mobile friction sensors on plow trucks to help meet level of service goals to the traveling public in the most cost effective way possible.

Every Day Counts Next Steps

FHWA, CDOT and CO LTAP (now with Front Range Community College) are working together toward deployment of these EDC-5 Innovations. Some related info is updated here:

<https://www.codot.gov/business/process-improvement/every-day-counts-edc>

Final reporting to FHWA for EDC-5 is complete and available here:

https://www.fhwa.dot.gov/innovation/everydaycounts/reports/edc5_finalreport.pdf

EDC-6 Innovations (2021-2022). Planning for the 2020 EDC Regional Summits involving the next round of Every Day Counts (EDC 6) took place in 2020 and continues, with CDOT and FHWA participation. Originally, and as a welcome change, the EDC 6 Regional Summits were to coincide with regional STIC leadership meetings. Tentative dates and locations had been announced (November 16 (STIC meeting) and November 17-18 (EDC-6 Summit) in Phoenix Arizona). However, for safety reasons most in-person events transitioned to virtual events

during 2020 due to COVID-19 and these were no exception.

As a result, the Every Day Counts (EDC-6) National Summit was conducted virtually, December 8-10, 2020 with over 3000 attendees. More than 70 people from Colorado attended the virtual Summit including CDOT, FHWA, industry, academia, and others. CDOT had more than 25 participants attend, including the following potential champions for these EDC-6 initiatives:

- Crowdsourcing for Advancing Operations - Jamie Yount
- Next-Generation TIM: Integrating Technology, Data, and Training - Patrick Chavez
- Strategic Workforce Development - Kevin MacVittie and Melanie Vigil
- Targeted Overlay Pavement Solutions (TOPS) - Craig Wieden and Eric Prieve
- Virtual Public Involvement (VPI) - Tamara Rollison and Presley Fowler
- e-Ticketing - Paul Turtle
- UHPC for Bridge Preservation and Repair - Greg Marcuson

Additionally CDOT, LTAP, and our local agency partners, provided the following ten posters highlighting innovation successes in CO for the Virtual Innovative Showcase, and CDOT's Gary Vansuch was invited to give a presentation on Lean Everyday Ideas.

- CDOT: Lean Everyday Ideas
- CDOT: Colorado DOT Saves Millions with 2D Hydraulic Quick Checks (2dQC) Initiative
- CDOT: Mobile RWIS & Road Friction Data Using Regional Bus Network & Snowplow Fleet
- Arapahoe County: JAWS-OF-LIFE Inexpensive Culvert Repair
- Gunnison County: Under Guardrail Reclaimer
- Arapahoe County: Glass Grid Dispenser
- El Paso County: Adaptable Bridge Safety Platform
- Town of Snowmass Village: Culvert Improvements with Low-Cost Drop Inlets
- City of Cañon City: Pipe Puller Device
- City of Westminster: Autonomous Vehicle Food Delivery Innovation

Example poster:

Lean Everyday Ideas



OVERVIEW OF INNOVATION

Lean Everyday Ideas engages employees to develop and implement innovations to improve government services, and to “borrow” innovations developed by their fellow employees, in the pursuit of continuous improvement.

As CDOT’s Executive Director noted in 2019, “We encourage everyone in the department, and especially frontline staff, to improve our day-to-day operations, which ultimately enhances safety and improves the lives of the users of our transportation system”.

In 2018, the LEI Program was named a Top 25 program by the Innovation in American Government Awards Program at the Ash Center for Democratic Governance and Innovation at Harvard University!



Several Lean Everyday Ideas at the Colorado Department of Transportation (CDOT)

BENEFITS

Extensive employee engagement in improving CDOT’s business over the long haul enhances safety, effectiveness, and efficiency in our operations.

FIND OUT MORE . . .

<https://www.codot.gov/business/process-improvement/lean-everyday-ideas>

And

<https://www.codot.gov/business/process-improvement/idea-cards>

Gary Vansuch

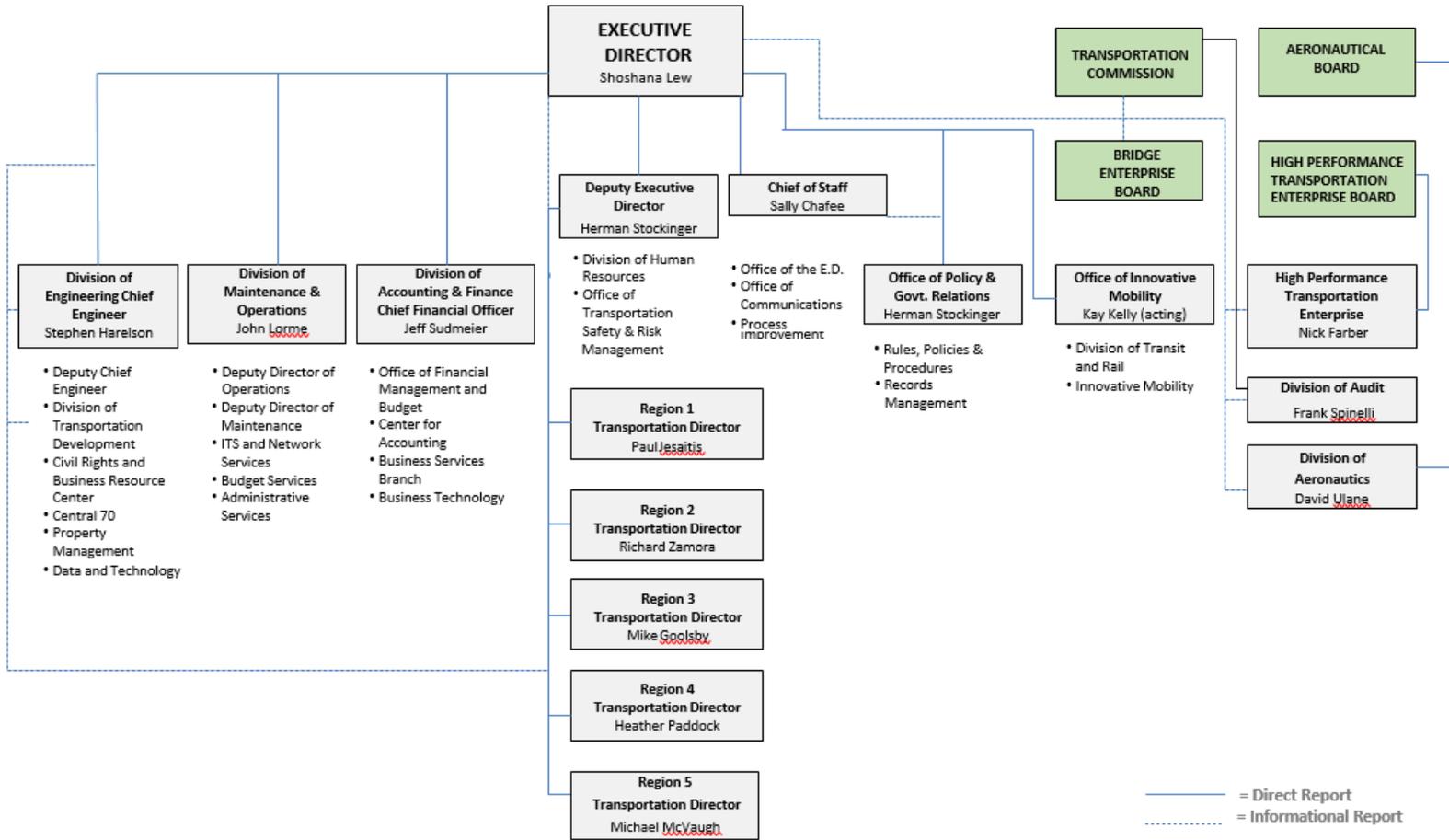
Director of Process Improvement
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Lean; process improvement; continuous improvement; employee engagement; employee empowerment; innovation; innovator; Every Day Counts; EDC; transportation; maintenance; engineering

These planning efforts helped CDOT identify champions and agree to participate in six of the seven EDC-6 Innovations during 2021-2022. Next steps for these involve participation in EDC-6 via Kickoff meetings, webinars, deployment activities, peer exchange, and the EDC Baseline Report, Status Reports, and Final Report. Additionally the Colorado STIC (State Transportation and Innovation Council) will prioritize EDC in its annual evaluation of applications for STIC funding, providing additional potential resources for EDC champions.

You can find further information on the FHWA [EDC website](#) or contact David Garcia, FHWA CO DIV EDC Coordinator.

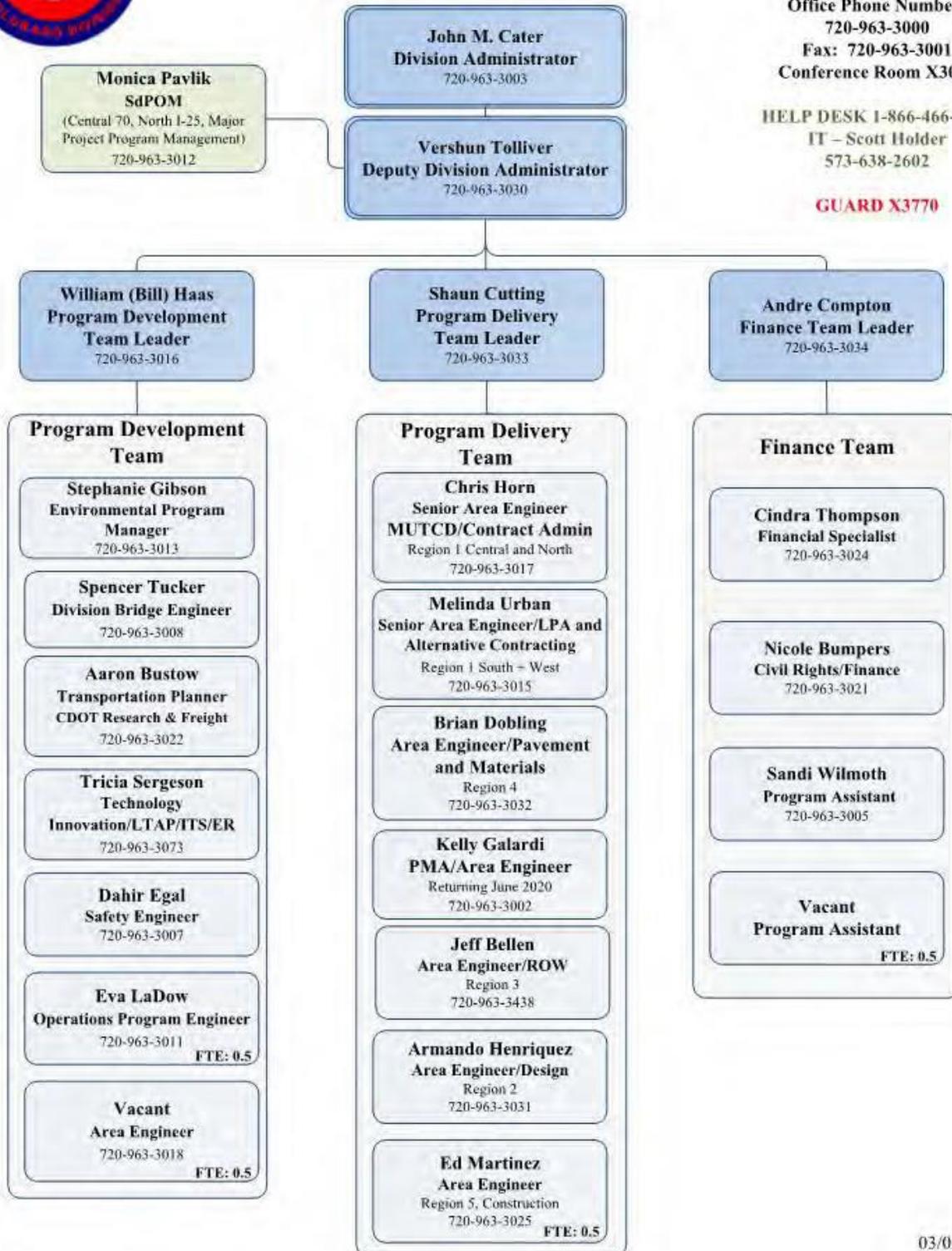
APPENDIX A. CDOT ORGANIZATIONAL CHART



APPENDIX B. FHWA ORGANIZATIONAL CHART



FHWA Colorado Division Organizational Chart



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APPENDIX C. ENVIRONMENT SECTION - OTHER NOTABLE REGULATIONS AND ACCOMPLISHMENTS TO COMPARE FOR TRACK TRENDS 2019

Priority projects:

- T-REX construction - driven by Governor Owens/Tom Norton
- SH 85 and 120th extension signed in May 2003 - driven by Tom Norton
- US 36 - Quick Final EIS/ROD driven by Tiger Grant opportunity and Governor Ritter/Russell George
- I-70 Mountain Corridor Programmatic EIS rewrite driven by Governor Ritter/Russell George (finished up by Governor Hickenlooper/Don Hunt)
- Twin Tunnel East-Bound EA - driven by Governor Hickenlooper/ Don Hunt
- I-70 East EIS/ROD driven by Governor Hickenlooper/Shailen Bhatt
- I-25 South EA (aka The Gap) driven by Governor Hickenlooper

Dropped projects:

- NW Corridor EIS (became Jefferson Parkway, a private enterprise)
- Gaming Area EIS

Notable Initiatives and Accomplishments:

- First EA/EIS in this analysis started in 1999
- CDOT Environmental Stewardship Guide - 1st version in 2003, revised in 2005, and in 2017
- Desired State Task Force initiated in 2005 (initiated the idea for the NEPA Manual)
- Step-Up (precursor to Planning and Environmental Linkages [PEL]) - 2004-2007
- First PEL document drafted in 2007
- CDOT NEPA Manual - 1st Version in June 2007
- FHWA Non-Programmatic Environmental Review Summary developed in 2008
- CDOT NEPA Manual - 2nd version (total rewrite) in August 2008
- CDOT/FHWA/USACE NEPA/404 Merger Process and Agreement
- CDOT NEPA Manual - 3rd version in March 2013 with many updates and additions
- CDOT NEPA Manual - Version 4 released in October 2014 with many updates and additions
- EA Template was created, tested, and revised and was rolled out for general use after the signature on the SH9 Iron Springs EA in May 2014.
- PEL Handbook and Training Update 2015
- Cat Ex Programmatic Agreement Update - updating the user agreement between FHWA and CDOT for administration of Cat Ex Program.
- Federal Lands MOU - improved communication and NEPA processes for projects taking place on federal land - 2016.
- CDOT NEPA Manual Version 5 2017
- CDOT Environmental Stewardship Guide (updated for the first time in 12 years) 2017
- CDOT NEPA@CDOT Training

Politics and Transportation Priorities:

1987-1999 - Governor Roy Romer was in office (Bill Jones was Executive Director for CDOT) - It was during his term that the idea for T-REX came about. A Major Investment Study (MIS) identifying the need for the later-named "TRansportation EXpansion" dubbed "T-REX" was signed in 1995 and a more refined MIS was signed in 1997. In 1998, the DRCOG 20-year plan was adopted that had T-REX at the top of the priority list.

1999-2007 - Governor Bill Owens was in office (Tom Norton was Executive Director for CDOT): In November 1999, Owens brought his transportation funding initiative to the ballot. Called TRANS, the \$1.7 billion bonding initiative accelerated future federal transportation dollars on 28 projects across the state. The keystone project on his campaign platform was the "TRansportation EXpansion" dubbed

T-REX in 1999. T-REX combined road funding from TRANS with \$460 million of new light rail lines to expand a 19-mile stretch of Interstate 25 through the south Denver Metro Area. Through an innovative (one-of-the-first-of-its-kind) design-build concept that greatly reduced construction times, T-REX was finished in less than five years, 2001 - 2006, and came in under budget. Owens was re-elected in 2002 by the largest majority in Colorado history, after making transportation, education, and tax cuts the focus of his governorship.

The passage of Referendum C in 2005 was in large part due to a wide coalition of bi-partisan supporters, including those in the business and transportation sectors. Although Ref C does not provide direct funds for transportation, it does allow transportation revenue to flow through Senate Bill 1 and House Bill 1310. The year prior to this, Tom Norton supported many corridor EAs and EISs including completing the “beltway” around the greater Denver area.

An early version of Planning and Environmental Linkages called Strategic Transportation, Environmental and Planning Process for Urbanizing Places (STEP UP) ran from approximately 2004 through 2007 and allowed CDOT to witness first-hand how the PEL approach could streamline its transportation planning. CDOT and FHWA-CO incorporated lessons learned from STEP UP to create new PEL tools for the state and to strengthen their relationships with federal and state resources and regulatory agencies. The success of the pilot also became a motivating factor in formalizing the PEL approach for Colorado’s statewide transportation planning.

2007-2011 - Governor Bill Ritter was in office (Russell George was Executive Director for CDOT): Governor Ritter’s campaign platform was based on the following statement, “As Governor, I will bring a fresh, balanced approach to how we invest in our infrastructure, plan for future growth and protect the environment. Simply stated, the process for funding our transportation system is antiquated and needs a 21st century overhaul.” In 2007, he convened a Blue Ribbon Transportation Finance and Implementation Panel to investigate how to better prioritize and implement our infrastructure needs. In 2009, the Transportation Environmental Resources Council, a collection of regulatory and governing agencies, signed a partnering agreement for collaborating on PEL efforts to help streamline the NEPA process on large corridors.

On March 2, 2009 - Gov. Bill Ritter signed into law the FASTER transportation bill that put an emphasis on safety and bridge projects. In March through May 2009, Governor Ritter also certified 5 different Transportation Recovery Funds rounds of funding (ARRA) including one targeting transit projects, bringing multi-modal projects to the front and center of the discussion. He also proposed helping other local ventures handle their aging infrastructure and used the passage of FasTracks in metro Denver and Go 1A in greater Colorado Springs as examples of broad coalitions that were successfully built to win voter support and address regional needs.

Governor Ritter pointed out the I-70 Mountain Corridor as an example of proper planning with the environment, citing the way I-70 gracefully snakes through Glenwood Canyon. He said that this project and its concerns for our natural settings should serve as a model as we look for 21st century solutions to congestion problems throughout the I-70 mountain corridor. We must design projects that improve mobility, honor the environment and protect the livability of adjacent communities. For this reason, he proposed to preserve a transit envelope as part of a long-term I-70 transportation solution. This put a priority on the I-70 Mountain Corridor NEPA process so that work could begin on this corridor.

US 36 improvements became a priority for Governor Ritter, so Colorado submitted for Urban Partnership funding in 2007. They did not get this funding but applied for and later received \$10 million in TIGER Grant funds in 2010. To help position this project for the TIGER Grant after losing the Urban Partnership funding, the Governor put a priority in completing the EIS for this corridor to help position US 36 for this other funding. Tolling is up and running on the corridor and construction continues on stretches near McCaslin Blvd.

2011 to 2015 - Governor John Hickenlooper was in office (Donald Hunt was Executive Director for CDOT): Governor Hickenlooper saw the I-70 West Mountain Corridor as a critical corridor that affects commerce, tourism, recreation, and overall economic development with year-round congestion problems and began actively looking for funding.

He supported FASTER legislation; there were 178 bridges that were 75 years old, stretches of highways that were 75-100 years old, and expanses of interstate that are approximately 50 years old. He looked to innovative Public Private Partnerships (P3) funding to help with some needed projects as well. On October 17, 2013, 44 partnership projects were selected as part of the Responsible Acceleration of Maintenance and Partnerships (RAMP) program, totaling \$580 million, to maximize and expand the statewide transportation system.

The governor put a high priority on the I-70 East (Central) EIS project, which had been ongoing for a number of years due to public controversy. This remains a high-profile corridor for CDOT, in part because of the aging viaduct that needs to be replaced, and a lot of resources and attention were placed on its completion by the Governor.

In September 2013, a large flooding event wiped out many major roadways in northwest Colorado. Governor Hickenlooper worked with CDOT to get access to all the areas isolated by the roadway damage with a promise to open all the damaged and closed highways by Dec 1st of the same year. This goal was met before Thanksgiving, with the understanding that the emergency repairs were temporary and that the permanent repairs would occur over the next several years. The intensity of this effort pulled resources off other projects, although the normal course of business was still expected to occur at the same time, just with a lower priority that might have delayed some of the other planning efforts going on around the state.

2015 to 2018 - Governor John Hickenlooper in office second term (Shailen Bhatt/Mike Lewis served as CDOT's Executive Directors): Governor Hickenlooper and FHWA had projects of significant interest.

FHWA had Projects of Corporate Interest (POCI). The following projects were FHWA designated POCI:

- I-25: Colorado Springs Denver South Connection (PEL, NEPA, and construction)
- I-25 North (for implementation/construction)
- I-70 East (Procurement/construction)
- C-470 (for procurement/construction)
- US 36 (for financing/construction)

Additional projects on the I-70 Mountain Corridor, including the westbound Peak Period Shoulder Lane and improvements to Floyd Hill were a focus.

CDOT's decision making under NEPA was legally challenged twice in 2017. It was the first time in ten years since this has occurred.

- I-70 East lawsuit: In December 2018, CDOT reached a settlement with project opponents on their legal challenge. CDOT agreed to pay for a community health study and the planting of trees throughout nearby neighborhoods.
- C470 lawsuit: There was a decision for the C470 Kipling to I-25 NEPA challenge. In that case, the courts ruled that CDOT will need to update its noise guidance and reconfirm the model validation used for the C470 project, but the FONSI was not vacated. The judge revisited the Court's decision in late 2018. The court decision was that CDOT should improve its explanation of how its noise methodology is applied and used. The court remanded the decision back to FHWA and CDOT without a specific deadline. As a result, CDOT is updating the Noise Guidance and Abatement Criteria.

2019 to present - Governor Jared Polis in office first term (Shoshana Lew serves as CDOT's Executive

Director):

In 2019, Governor Polis signed two Executive Orders (EO) that relate to EPB's mission:

1. 'Supporting a Transition to Zero Emission Vehicles' that set the tone for an administration that advances the priority of improving air quality through reducing emissions.
2. Conserving Colorado's Big Game Winter Range and Migration Corridor

APPENDIX D. MAJOR NEPA PROJECT - HISTORICAL DATA

Note: "NUM!" refers to times that have not been calculated.

Note: Projects that are ~~struck through~~ have been either canceled or converted to a CatEx

Region	Task Name	Document Type	Start Date	EA or Draft EIS Signature	FEIS Signature Date	Decision Document Date	Total Duration (months)	Project Start to EA or Draft EIS Signature (months)	Draft EIS Signature to Final EIS Signature (months)	Project Start to Final EIS Signature (months)	Decision Document Duration (months)
2	US 50 East	Combined FEIS/ROD	2/3/2006	8/12/2016	12/15/2017	12/15/2017	142.00	126.00	16.00	142.00	0.00
1	I-225 North of Parker Road to North of 6th Ave	EA/FONSI	1/28/1999	10/17/2000	NA	5/3/2001	27.00	20.00	#N/A	27.00	6.00
1	Northwest Parkway, I-25 Interchange	EA/FONSI	4/3/2000	2/12/2001	NA	5/23/2001	13.00	10.00	#N/A	13.00	3.00
1	I-70, Hogback Parking Facility	EA/FONSI	7/19/2000	2/14/2001	NA	8/13/2001	12.00	6.00	#N/A	12.00	5.00
1	South Simms St - US 285 Interchange	EA/FONSI	1/29/2001	9/6/2001	NA	4/1/2002	14.00	7.00	#N/A	14.00	6.00
1	Nottingham Ranch Road (Post Blvd), I-70	EA/FONSI	8/2/2000	1/11/2002	NA	4/25/2003	32.00	17.00	#N/A	32.00	15.00
1	120th Ave Extension, SH 85 and Quebec	EA/FONSI	8/19/2002	5/27/2003	NA	8/1/2003	11.00	9.00	#N/A	11.00	2.00
1	I-70, SH 58 Interchange	EA/FONSI	9/18/2000	7/3/2002	NA	9/1/2004	47.00	21.00	#N/A	47.00	25.00
1	I-25, Crystal Valley/Daws on Ridge Pkwy	EA/FONSI	4/2/2002	9/20/2004	NA	2/28/2005	34.00	29.00	#N/A	34.00	5.00
1	SH 285, Foxton to Bailey	EA/FONSI	7/12/2002	8/11/2004	NA	6/3/2005	34.00	24.00	#N/A	34.00	9.00
1	SH 121, Wadsworth Blvd/Grand Ave	EA/FONSI	11/28/2003	5/9/2005	NA	8/31/2005	21.00	17.00	#N/A	21.00	3.00
1	I-70/32nd Ave Interchange (Cabela's)	EA/FONSI	2/1/2005	10/23/2006	NA	2/28/2007	24.00	20.00	#N/A	24.00	4.00
1	I-225, Colfax	EA/FONSI	3/9/2004	10/20/20	NA	3/30/200	36.00	19.00	#N/A	36.00	17.00

	Avenue Interchange			05		7						
1	I-70, E-470 Interchange Complex	EA/FONSI	9/24/2004	11/7/2006	NA	7/10/2007	33.00	25.00	#N/A	33.00	8.00	
1	SH 402, US 287 to I-25 Interchange	EA/FONSI	8/13/2001	7/23/2007	NA	1/14/2008	77.00	71.00	#N/A	77.00	5.00	
1	SH 88, Federal Blvd, Alameda Ave to 6th Ave	EA/FONSI	8/29/2005	11/14/2007	NA	2/28/2008	29.00	26.00	#N/A	29.00	3.00	
1	I-70, I-70B West	EA/FONSI	8/8/2006	3/19/2008	NA	8/8/2008	24.00	19.00	#N/A	24.00	4.00	
1	South Broadway	EA/FONSI	6/1/2005	3/26/2008	NA	10/8/2008	40.00	33.00	#N/A	40.00	6.00	
1	56th Ave Quebec to Havana	EA/FONSI	4/12/2007	9/4/2008	NA	1/15/2009	21.00	16.00	#N/A	21.00	4.00	
1	Central Park Blvd	EA/FONSI	7/3/2008	6/4/2009	NA	8/3/2009	13.00	11.00	#N/A	13.00	1.00	
1	6th Ave/Wadsworth	EA/FONSI	6/1/2007	6/29/2009	NA	3/12/2010	33.00	24.00	#N/A	33.00	8.00	
1	I-25, North Meadows Extension to US 85 and I-25	EA/FONSI	7/2/2007	3/23/2010	NA	3/17/2011	44.00	32.00	#N/A	44.00	11.00	
1	I-25 Dillon Drive	EA/FONSI	12/18/2008	1/26/2011	NA	7/28/2011	31.00	25.00	#N/A	31.00	6.00	
1	Twin Tunnels	EA/FONSI	9/1/2011	6/28/2012	NA	10/17/2012	13.00	9.00	#N/A	13.00	3.00	
1	I-25 Arapahoe Road	EA/FONSI	3/3/2010	8/29/2012	NA	3/15/2013	36.00	29.00	#N/A	36.00	6.00	
1	Martin Luther King Blvd Extension	EA/FONSI	8/16/2010	6/21/2017	NA	10/30/2017	86.00	82.00	#N/A	86.00	4.00	
2	I-25 North Colorado Springs	EA/FONSI	2/1/1999	3/29/2004	NA	9/10/2004	67.00	61.00	#N/A	67.00	5.00	
2	US 34 Business Route, SH 257 to 71st Ave	EA/FONSI	10/11/2002	9/13/2005	NA	5/2/2006	42.00	35.00	#N/A	42.00	7.00	
2	DAR, US Army Pueblo Chemical Depot	EA/FONSI	10/26/2004	1/16/2007	NA	5/7/2007	30.00	26.00	#N/A	30.00	3.00	
2	I-25, SH 16, East Entrance to Fort Carson	EA/FONSI	2/2/2006	7/12/2007	NA	9/20/2007	19.00	17.00	#N/A	19.00	2.00	
2	Woodmen Road	EA/FONSI	6/14/2000	12/16/2005	NA	12/14/2007	90.00	66.00	#N/A	90.00	23.00	

2	Powers Blvd	EA/FONSI	10/29/2001	5/4/2010	NA	1/4/2011	110.00	102.00	#N/A	110.00	8.00
2	US 24, I-25 West to Manitou	EA/FONSI	8/27/2003	5/16/2012	NA	10/1/2014	133.00	104.00	#N/A	133.00	28.00
2	SH 287 Reliever Route in Lamar	EA/FONSI	4/25/2002	8/15/2013	NA	11/10/2014	150.00	135.00	#N/A	150.00	14.00
3	I-70 Eagle County Airport Interchange	EA/FONSI	4/14/2000	8/30/2004	NA	6/23/2005	62.00	52.00	#N/A	62.00	9.00
3	I-70, Parachute West Interchange	EA/FONSI	8/24/2007	1/5/2010	NA	8/10/2010	35.00	28.00	#N/A	35.00	7.00
3	I-70 East Eagle Interchange	EA/FONSI	7/18/2006	9/3/2010	NA	5/24/2011	58.00	49.00	#N/A	58.00	8.00
3	Grand Ave Bridge	EA/FONSI	5/2/2011	10/18/2014	NA	5/28/2015	48.00	41.00	#N/A	48.00	7.00
4	I-25, 136th Ave Interchange	EA/FONSI	2/17/2000	5/15/2002	NA	1/8/2003	34.00	26.00	#N/A	34.00	7.00
4	I-25, 144th Ave Interchange, Adams County	EA/FONSI	7/7/2000	1/12/2005	NA	4/15/2005	57.00	54.00	#N/A	57.00	3.00
4	US 34 Madison Ave to Larimer County	EA/FONSI	9/1/2004	4/4/2007	NA	5/4/2007	32.00	31.00	#N/A	32.00	1.00
4	SH 7, Cherryvale Rd to 75th St	EA/FONSI	3/1/2004	5/30/2008	NA	9/15/2008	54.00	50.00	#N/A	54.00	3.00
5	US 550, Improvements from State Line to CR 220	EA/FONSI	2/12/2003	7/27/2005	NA	12/21/2005	34.00	29.00	#N/A	34.00	4.00
3	South Bridge - Glenwood Springs	EA REEAVL/FONSI	12/14/2007	10/8/2013	NA	10/1/2020	153.00	69.00	#N/A	153.00	83.00
1	Valley Highway	EIS/ROD	7/23/2002	4/19/2005	12/7/2006	7/5/2007	59.00	32.00	19.00	59.00	6.00
1	US 36	EIS/ROD	10/21/2003	7/23/2007	10/30/2009	12/24/2009	74.00	45.00	27.00	74.00	1.00
1	I-70 Mtn Corridor	EIS/ROD	1/25/2000	8/10/2010	2/24/2011	6/16/2011	136.00	126.00	6.00	136.00	3.00
1	I-70 East	EIS/ROD	8/19/2003	10/29/2008	12/14/2015	1/19/2017	161.00	62.00	85.00	161.00	13.00
2	I-25 Through Pueblo	EIS/ROD	1/27/2003	10/21/2011	8/15/2013	4/17/2014	134.00	104.00	21.00	134.00	8.00
3	SH 9	EIS/ROD	3/23/1999	5/31/2002	3/4/2004	5/24/2004	62.00	38.00	21.00	62.00	2.00
4	North I-25	EIS/ROD	12/22/20	10/31/20	8/19/201	12/29/20	96.00	58.00	33.00	96.00	4.00

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5	US 160 Durango to Bayfield	EIS/ROD	12/24/2002	9/13/2005	5/12/2006	11/7/2006	46.00	32.00	7.00	46.00	5.00
5	US 550/160 Supplemental EIS	EIS/ROD	10/1/2007	10/3/2011	7/3/2012	5/15/2015	91.00	48.00	9.00	91.00	34.00
4	I-25 North ROD 5: Vine St. Bridge Replacement	Ongoing ROD	6/1/2016		NA	12/15/2017	18.00	#NUM!	#N/A	18.00	1415.00
4	North I-25 Segment 5/6	Ongoing ROD	8/1/2017		NA		#NUM!	#NUM!	#N/A	#NUM!	0.00
1	88th Avenue: I-76 to SH 2	Ongoing Template EA	10/1/2018		NA						
1	C470, Kipling to I70	Ongoing Template EA	10/2/2017		NA		#NUM!	#NUM!	0.00	#NUM!	0.00
1	I-25 US 36 to 104th	Ongoing Template EA	1/2/2017		NA		#NUM!	#NUM!	0.00	#NUM!	0.00
1	I-70 Floyd Hill	Ongoing Template EA	8/1/2017		NA		#NUM!	#NUM!	0.00	#NUM!	0.00
3	I-70 Vail Pass Auxiliary Lanes	Ongoing Template EA	7/17/2017	9/1/2020	NA		#NUM!	37.00	#NUM!	#NUM!	#NUM!
1	I-270: Widening from I-76 to I-70	Ongoing Template EA	3/1/2020								
4	I-25 North Revised ROD 2	Revised ROD	1/2/2012		NA	7/23/2015	42.00	#NUM!	#N/A	42.00	42.00
4	I-25 North ROD 3	Revised ROD	3/7/2016		NA	6/15/2016	3.00	#NUM!	#N/A	3.00	3.00
4	I-25 North Revised ROD 1	Revised ROD	1/2/2012		NA	10/20/2017	69.00	#NUM!	#N/A	69.00	69.00
4	I-25 North ROD 4: SH 392 to SH 56	ROD	7/1/2016		NA	4/27/2017	9.00	#NUM!	#N/A	9.00	9.00
1	Federal Blvd, 7th to Howard Place	Template EA/FONSI	2/11/2014	10/8/2014	NA	1/14/2015	11.00	7.00	3.00	11.00	3.00
1	I-76 and Bridge Street	Template EA/FONSI	5/1/2013	1/14/2015	NA	8/13/2015	27.00	20.00	6.00	27.00	6.00
1	C-470 I-25 to Kipling Revised EA	Template EA/FONSI	4/2/2013	7/24/2015	NA	9/1/2015	28.00	27.00	1.00	28.00	1.00
1	6th Ave Parkway Extension	Template EA/FONSI	9/19/2014	6/16/2016	NA	12/6/2016	26.00	20.00	5.00	26.00	5.00
1	I-25, Monument to Plum Creek	Template EA/FONSI	12/9/2017	4/25/2018	NA	6/27/2018	#NUM!	4.00	2.00	6.00	2.00

	(Gap Project)											
1	Kipling and I70 Interchange	Template EA/FONSI	7/1/2016	1/1/2019	NA	3/20/2019	32.00	30.00	2.00	32.00	2.00	
1	Wadsworth Boulevard: 35th-44th Widening	Template EA/FONSI	5/5/2016	4/1/2019	NA	9/1/2019	39.00	34.00	5.00	39.00	5.00	
2	US 50 West, Ourcell Blvd. to Willis Blvd.	Template EA/FONSI	12/16/2013	6/4/2014	NA	9/11/2014	8.00	5.00	3.00	8.00	3.00	
2	US 50 West, Wills Blvd to McCulloch Blvd.	Template EA/FONSI	3/18/2015	6/30/2016	NA	8/30/2016	17.00	15.00	2.00	17.00	2.00	
3	SH 9 Iron Springs	Template EA/FONSI	8/1/2012	5/6/2014	NA	12/17/2014	28.00	21.00	7.00	28.00	7.00	