

C.7. Walls Technical Plan

C.7.1. Introduction

Retaining walls, noise walls, and bridge walls are managed, inventoried, and inspected by the [Staff Bridge Branch](#). The Staff Bridge Branch is within CDOT's Project Support Division, which is focused on specialty services and is responsible for supporting the design, construction, and maintenance of all Major Structures within the state of Colorado.

Retaining, bridge, and noise wall asset numbers are growing as walls are becoming more common elements of projects as tools for avoiding right-of-way or environmental impacts. The growth of the known wall asset inventory has increased every year since 1998, with an average of approximately 110 walls added each year during this period.

The estimated wall area for existing structures is around 12 million square feet. Using a conservative replacement cost of \$60 per square foot, this asset class represents over \$720 million in replacement value. CDOT has observed an increasing frequency of maintenance activities or repairs associated with wall assets, particularly retaining and bridge walls. This trend also is anticipated to increase due to the growth of the asset inventory in the last 15 years. As documented below, some walls have required repairs 10 to 15 years after construction and older walls have failed within 40 years of construction. Given the growth of the wall asset inventory, CDOT is anticipating a considerable need for wall asset management moving forward as a larger quantity of walls age.

C.7.2. Regulatory Considerations

C.7.2.1. Regulations/Resolutions

The following list provides an overview of relevant federal and state regulations and requirements governing planning, policy, data, performance, funding, and project selection of walls.

- [Fixing America's Surface Transportation \(FAST\) Act](#)
- [23 Code of Federal Regulations \(CFR\) Part 515, Part 667](#)
- Transportation Commission Resolution [TC-17-10-12](#) and [TC-18-03-12](#)
- Policy Directive [14](#) and [703](#)

C.7.2.2. Guidelines

The following guidelines inform the management and performance of walls.

- [CDOT Retaining and Noise Wall Inspection and Asset Management Manual](#)
- CDOT Structure Management Manual²

² The CDOT Structure Management Manual has not yet been published. A draft of the document may be obtained from Staff Bridge Asset Management Unit.

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- CDOT Transportation Asset Management Plan

C.7.3. Asset Inventory & Condition

C.7.3.1. Asset Inventory

CDOT owns and maintains approximately 12 million square feet of wall area throughout the state. Wall assets are classified into three different wall types: noise walls, retaining walls, and bridge retaining walls (bridge walls). CDOT's [Retaining and Noise Wall Inspection and Asset Management Program](#) manual outlines the purpose for, frequency of, and systems used to inventory wall assets. Reporting wall conditions and defects helps manage the wall assets, identify risks, and estimate where funding and maintenance should be focused to increase the longevity of wall life by providing guidance on the asset management in accordance with MAP-21 requirements. Only walls measuring at least 4 feet from the finished grade in height at the maximum point along the length of the wall and displaying greater than 45-degree vertical batter qualify for this program.

Regularly updated wall inventory summaries are provided by the Staff Bridge Branch and may be viewed [here](#). Inventory data, queries, and reporting requests can be made through the Staff Bridge Branch Asset Management Unit.

C.7.3.2. Asset Conditions

CDOT's Retaining and Noise Wall Inspection and Asset Management Program compiles inventory data and provides consistent inspection condition ratings and coding guidelines to facilitate effective asset management. This program is rooted in the concepts from FHWA's Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges, and the most current version of the AASHTO Manual for Bridge Element Inspection.

Inspection data are reported and managed through SAMI – the System for Asset Management and Inspection. SAMI consists of a web-based data management and reporting platform and a mobile inspection application, both of which incorporate the guidelines from CDOT's [Retaining and Noise Wall Inspection and Asset Management Program](#).

It is the policy of CDOT Staff Bridge that routine inspections for retaining and noise walls be performed at a maximum interval of six years. The maximum inspection interval for bridge walls should not exceed four years.

C.7.4. Performance

C.7.4.1. Metrics

The performance metric for the Walls Asset Management Program is the percent of walls, by square foot, with a 'poor' main structure rating (a rating of 4 or less). The definition for this rating can be found in CDOT's [Retaining and Noise Wall Inspection and Asset Management Program](#) manual.

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C.7.4.2. Targets

The Walls Asset Management Program has a fiscally constrained target of no more than 2.5 percent wall square footage statewide in poor condition, and an aspirational target of 1 percent. Current performance for walls can be viewed [here](#).

C.7.5. Funding

C.7.5.1. Funding Mechanisms

Commonly used founding sources include:

- The State Highway Fund ([43-10-109, C.R.S. \(2016\)](#))
- Highway Users Tax Fund (HUTF) ([CRS 43-4-201-207](#))
- Colorado General Fund transfers, such as SB-1 (2018)
- U.S. DOT, The Highway Trust Fund ([26 U.S.C. § 9503](#))
- Funding Advancements for Surface Transportation and Economic Recovery Act of 2009 (FASTER) ([Senate Bill 09-108](#))

C.7.5.2. Region Pool Distributions

Region pool distributions are updated every year. Currently, distributions are based on regional poor wall count. The most recent distributions can be found [here](#).

C.7.6. Investment Strategies

Investment strategies are tested using dTIMS analysis to determine the most cost-effective treatments for a range of budget scenarios. In general, investment strategies are risk-based, meaning that the likelihood of an adverse occurrence and the associated consequence to the following areas is considered in investment decisions.

- condition loss and damage to the wall
- safety hazards to traveling public
- potential traveler delay, congestion, and mobility impacts
- CDOT Maintenance expenses for wall repair
- impacts to environmental resources
- economic loss to users (user costs)
- private property damage.

C.7.7. Lifecycle Management & Project Selection

C.7.7.1. Lifecycle Management

Current lifecycle management for walls involves addressing walls with Essential Repair Findings and poor structure ratings.

C.7.7.2. Treatment Lists

Wall treatment prioritization is in development. The goal is to use prioritization to determine best candidates for wall projects and to allocate budget percentages to the regions.

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C.7.7.3. Project Selection

The project selection process is driven by wall conditions. Regions are provided a prioritization list annually which identify walls (or projects including walls) and treatments for that year.

C.7.8. Regions

C.7.8.1. Region and Local Partner Roles

Regions work with Staff Bridge on prioritizing project needs, and ultimately decide which wall projects will take place.

C.7.8.2. Headquarters Roles

Headquarters provides support to the regions by assessing needs statewide and coordinating with Regions to refine project needs and prioritization.

C.7.9. Reporting, Management, & Documentation

C.7.9.1. Reporting to Internal and External Stakeholders

Key stakeholders having stakes in the performance of walls include:

- Transportation Commission
- Executive Management
- Regional Transportation Director (RTD)/PE III
- Resident Engineer
- Region Bridge Maintenance
- Bridge Asset Management and Inspections
- Staff Bridge Design and Rating
- Staff Bridge Fabrication and Construction

C.7.9.2. Management / Advisory Committees

The following committees influence how walls are governed.

Committee/Task Force	Meeting Schedule	Purpose
Transportation Asset Management Oversight Committee (TAMOC)	Monthly	Provides oversight and strategic direction to CDOT's Asset Management Program
Transportation Asset Management Working Committee (TAMWC)	Monthly	Performs tactical work on various CDOT Asset Management initiatives.