Denver Regional
Council of Governments

Sidewalk Delivery Guide

October 2025

active transportation plan
atp

drcog
DENVER REGIONAL COUNCIL OF GOVERNMENTS

Contents

Introduction **3**
Why sidewalk delivery matters 4
Guide resources 5

Designing for accessible, inviting walking spaces **6**
Universal design 7
Designing a sidewalk system 15
Crosswalk design 19
Prioritizing enhanced crossing treatments 19
Crosswalk design elements 23

Delivering sidewalks: challenges and solutions **26**
Rising material and labor costs 27
Physical infrastructure constraints 29
Lack of dedicated funding for sidewalks 30
Staffing and contractor shortages 32
ADA compliance and universal access 33

Seek durable and adequate funding **34**
Regional funding opportunities 35
Federal and state grant opportunities 37
Local taxes or fees 38

Evaluate performance **40**
Evaluating sidewalk program performance 41

Case studies **47**
Sidewalk Development Program, Seattle, WA 48
Sidewalk Improvement Districts, Ithaca, NY 51
Missing Links, Boulder, CO 53
Sidewalk Prioritization Model, Fort Collins, CO 56
Roadway Improvement Fee, Westminster, CO 59

Preparation of this product has been financed in part through grants from the U.S. Department of Transportation, Federal Highway Administration and Federal Transit Administration.

If you need digital accessibility assistance, submit a request at **drcog.org/access** or call 303-455-1000. Please expect a response within 72 hours (three business days).

Figures

Figure 1 Able-bodied adult and child dimensions 8
Figure 2 Stroller Dimensions and Pedestrian Space Requirements 9
Figure 3 Spatial requirements for manual and power wheelchair users 10
Figure 4 Pre-ADA sidewalks image 10
Figure 5 Heaved sidewalk image 10
Figure 6 Ponded crossing image. 10
Figure 7 Visual cues for pedestrians at a typical urban crosswalk. 11
Figure 8 Illustrations of types of blindness 11
Figure 9 Blind and low-vision pedestrians primarily use noise cues to detect traffic. 12
Figure 10 Common surface materials and interpretations for blind users 12
Figure 11 WalkNYC wayfinding boards provide large displays that benefit all pedestrians 13
Figure 12 FHWA Sidewalk Zone System 15
Figure 13 DRCOG Regional Complete Streets Typology 16
Figure 14 Denver Uncontrolled Pedestrian Crossing Guidelines flowchart 20
Figure 15 Boulder Uncontrolled Pedestrian Crossing Treatment flowchart 20
Figure 16 Example of a high-visibility crosswalk. 23
Figure 17 Example of an accessible curb ramp. 23
Figure 18 Truncated dome mat 24
Figure 19 Corduroy strip tiles 24
Figure 20 Trapezoidal edge tile 24
Figure 21 Accessible Pedestrian Signal 24
Figure 22 Curb extension 25
Figure 23 Pedestrian island and median 25
Figure 24 CDOT Construction Cost Index by quarter, 2019 - 2025 27
Figure 25 City of Austin Interim Standard Detail – Curb Extension Details 28
Figure 26 Four typical solutions to expanding substandard sidewalks 29
Figure 27 Screen capture of DRCOG's Data Tool. 42
Figure 28 Ithaca's Sidewalk Program Improvement Dashboard 42

Tables

Table 1 Pedestrian characteristics across age groups 8
Table 2 Design considerations for people with disabilities 9
Table 3 Recommended minimum sidewalk zone width 16
Table 4 Latent pedestrian demand scoring matrix (City and County of Denver) 20
Table 5 Low-stress pedestrian crossing factors 22
Table 6 DRCOG Active Transportation Plan pedestrian key performance indicators 41

Introduction

The Sidewalk Delivery Guide serves as a resource for public agencies and their partners, providing insights, best practices and strategic guidance to enhance sidewalk infrastructure throughout the Denver region.

This guide is designed to support agencies in addressing local accessibility and connectivity challenges, improving the safety and usability of pedestrian infrastructure and ensuring sidewalks are accessible to all community members, regardless of age, ability, or background. By leveraging both national standards and local case studies, this guide offers recommendations that align with universal design principles, emphasizing inclusivity and ADA compliance. Additionally, local jurisdictions are responsible for pedestrian facilities, including sidewalks, under Colorado Revised Statutes (C.R.S. 43-2-135), which clarify the roles of cities, towns and counties in maintaining pedestrian infrastructure.

Why sidewalk delivery matters

Strategic and effective development and implementation of sidewalk projects and programs is critical for meeting the region's mobility needs and being responsible stewards of public investment. With as much as 42% of the **regional roadway system** having missing or substandard pedestrian infrastructure, sidewalks remain among the largest unmet transportation needs in DRCOG's planning area. Delivering sidewalk projects on schedule and cost effectively is key to enhancing safety, providing mobilty choices, supporting public health, and powering the regional economy.

Expanding connectivity and universal access

Complete, connected, and comfortable pedestrian facilities are the foundation of the regional transportation system, serving an estimated 1.6 million walking trips every day. Though the pedestrian system serves all users, it is a lifeline for those who face the most acute transportation barriers. 21% of the region's population is under age 18, most of whom are unable to drive. 19% of residents are over age 60 and continue to age, 13% are housing and transportation cost burdened, 10% has at least one disability, and 2% of households have no vehicle, each of these is a factor that limits access to driving and further underlines the importance of transportation options.

Enhancing safety and supporting Vision Zero

DRCOG has adopted a Vision Zero goal to eliminate traffic fatalities and severe injuries by 2040. People walking bear the outsized brunt of the traffic safety crisis—while pedestrians were involved in only 1% of crashes in the region between 2019 and 2023, they were involved in 13% of fatal and severe injury crashes. Pedestrians account for 14% of those killed or severely injured during that time period.

Accessible sidewalks and safe crossings are critical to achieving Vision Zero. Beyond simply providing places to walk that are protected from vehicle traffic, encourgaging active transportation and shifting drive-alone trips to walking and rolling, especially around areas such as schools and transit stops, can reduce systemic risk and make the region safer.

Supporting health and resilience

Walkable infrastructure contributes to DRCOG's Metro Vision objectives by reducing vehicle trips and promoting active transportation, which helps lower greenhouse gas emissions. Boulder's Climate Mobilization Action Plan, for example, incorporates sidewalk expansions to encourage walking and decrease reliance on cars. Completing the sidewalk network helps communities to meet environmental goals while simultaneously improving public health by encouraging walking as an accessible form of daily exercise.

Growing local economies and anchoring communities

The Denver region has had a booming economy for the past two decades. However, during that boom, wages have struggled to keep pace with cost of living increases, placing stress on households and underscoring the importance of affordable and accessible transportation options. Complete and connected walking routes to transit, to commercial areas, and to schools and parks are critical to providing affordable and universal mobility.

Walkable, accessible neighborhoods also **support economic growth** by increasing foot traffic to local businesses, fostering a sense of community and improving property values. Sidewalks create more inviting commercial areas, encouraging people to shop locally and engage with their community.

Managing regional growth through strategic planning

As the Denver region continues to grow, sidewalk delivery offers a sustainable means to manage this expansion by integrating pedestrian infrastructure within broader transportation networks. By expanding sidewalks alongside transit and bike routes, DRCOG supports a multimodal approach to urban growth. Investing in pedestrian infrastructure ensures that sidewalks are not an afterthought but an essential component of regional planning, supporting the long-term resilience and livability of the Denver metropolitan area.

Guide resources

This guide is informed by national accessibility standards, local and peer city case studies and survey findings that highlight challenges and solutions for sidewalk delivery. The following key resources shape the recommendations presented throughout:

Sidewalk delivery survey

As part of the Sidewalk Delivery Guide planning process, a Sidewalk Delivery Survey was conducted to gain insights from member agencies on challenges, strategies and best practices in sidewalk delivery across the Denver region. Responses from 27 jurisdictions, including a range of urban, suburban and smaller municipalities, provided a comprehensive understanding of the current state of pedestrian infrastructure planning, funding, construction and maintenance. The survey results inform many of the findings and recommendations in this guide and will be referenced throughout.

More details on the survey results are available in the sidewalk delivery survey memorandum and insights from these cities will be referenced throughout the guide.

Case study cities: innovative approaches to sidewalk delivery

This guide includes case studies from cities that have successfully implemented innovative sidewalk programs. These case studies provide context for the strategies outlined in this guide and will be referenced throughout.

- **Seattle, WA** – Seattle has taken a multi-faceted approach to sidewalk expansion and maintenance, integrating projects with broader transportation improvements and leveraging innovative quick-build strategies. Programs like the **Home Zone program** and **Priority Investment Network** focus on cost-efficient solutions that enhance pedestrian access while addressing infrastructure constraints.
- **Ithaca, NY** – Ithaca has pioneered a sustainable funding model for sidewalk maintenance through its **Sidewalk Improvement Districts (SIDs)**, which require property owners to pay an annual fee dedicated to sidewalk infrastructure. This model provides a consistent revenue source while reducing reliance on general municipal funds.
- **Boulder, CO** – Boulder systematically fills sidewalk gaps through its **Missing Links Program**, which prioritizes high-impact, cost-effective solutions such as pedestrian-priority streets. Additionally, the **Accessible Boulder Plan** ensures sidewalk improvements align with ADA compliance and accessibility goals.
- **Fort Collins, CO** – Fort Collins integrates sidewalk investments into its **Street Maintenance Program**, ensuring cost efficiency by bundling repairs with broader infrastructure improvements. The city also employs a **Sidewalk Prioritization Model**, which incorporates a **Health and Equity Score** to direct funding toward underserved areas.
- **Westminster, CO** – Westminster successfully funds sidewalk projects through a **utility fee model**, incorporating a small monthly charge into residents' utility bills. This strategy provides a dedicated funding stream that adjusts to inflation and infrastructure demands.

More details on each case study city and the survey results are available in the respective memoranda and insights from both will be referenced throughout the guide.

Overview of document structure

This guide contains four main sections:

1. **Designing for Inclusive, Inviting Walking Spaces** – Describes principles of universal design, sidewalk and crosswalk design and best practices for creating accessible pedestrian environments.
2. **Delivering Sidewalks: Challenges and Solutions** – Identifies key barriers to sidewalk implementation in the DRCOG region, such as funding, infrastructure constraints and ADA compliance, while providing case studies and solutions.
3. **Seeking Durable and Adequate Funding** – Explores funding mechanisms, including regional programs, state and federal grants, local improvement districts and development-driven contributions.
4. **Evaluating Performance** – Establishes metrics for assessing sidewalk network effectiveness, including safety, accessibility, connectivity and public engagement.

The guide also includes appendices with survey results, case studies and insights from focus groups. Through these resources, agencies can develop actionable strategies to expand and maintain a comprehensive pedestrian network.

1

Designing for accessible, inviting walking spaces

This section explores the fundamental concepts and guidelines related to designing inclusive walking spaces, focusing on:

- **Universal design:** An overview of principles and regulatory frameworks, such as the Americans with Disabilities Act (ADA) and Public Right-of-Way Accessibility Guidelines (PROWAG), which provide critical guidance for ensuring accessibility.
- **Designing a sidewalk system:** Essential elements, including sidewalk zones, contextual considerations and key factors influencing pedestrian comfort and usability.
- **Crosswalk Design:** Best practices for creating safe and visible pedestrian crossings that cater to diverse user needs.

Universal design

Successful pedestrian design goes beyond meeting minimum legal requirements; it seeks to create spaces that are comfortable and accessible for all. It involves thoughtful planning that considers a wide range of abilities and accommodates various modes of pedestrian travel, such as walking, rolling and pushing strollers.

Universal design for pedestrian facilities ensures accessibility for all users, including those with physical, cognitive and sensory impairments. This design approach considers the full range of human abilities, making spaces equitable and comfortable for all. Universal Design relies on the concept of Targeted Universalism: to achieve a system that serves all users, designers must first consider those who encounter systemic barriers to using the system. In the case of sidewalk planning and design, this requires centering users with acute challenges walking and rolling on streets and paths and making design decisions to eliminate barriers.

It aligns with national standards like the **Americans with Disabilities Act (ADA)** and **Public Right-of-Way Accessibility Guidelines (PROWAG)** to create pedestrian-friendly environments. This section covers key principles of universal design, recent **PROWAG updates** and their impact on sidewalk construction.

Design users

Pedestrian infrastructure must be designed to accommodate a wide range of users with varying abilities, mobility needs and potential impairments. The transportation network must account for differences in walking speed, perception and physical capabilities across different age groups, as well as those who rely on assistive devices. By beginning with the unique needs of various pedestrian types, including children, older adults, individuals with disabilities and stroller users, urban planners can create a safer and more accessible environment for all.

With any transportation facility, planners and designers consider the universe of anticipated users, both regular and infrequent. In roadway design, these users are called the Design Vehicle—or maximal regular user of a facility—and Control Vehicle—an infrequent user who is accommodated but not necessarily at the facility's design speed.

In pedestrian facilities, designers must consider based on context and activities who the "Design" and "Control" users are. The U.S. Access Board has set minimum required dimensions for design users in the Public Right-of-Way Accessibility Guidelines (PROWAG), which are the absolute minimum dimensions for public facilities. However, creating a functional, universally accessible and successful pedestrian system relies upon facilities that accommodate regular, predictable and comfortable usage. The following design users are examples of the users who should be considered when designing pedestrian facilities:

- **Able-bodied adults**, who are generally considered the "default user." Able-bodied adults have full physical mobility and dexterity, visual acuity and awareness of traffic regulations and norms.
- **Children of all ages**. Young children are most likely accompanied by an adult, may be using a personal mobility device (e.g., a bicycle, strider bike or kick scooter) and may make more erratic decisions or not understand road regulations or operational norms. Older children are more likely to travel independently, but may still be inexperienced operating in a variety of traffic environments.
- **People pushing strollers or carts**, who require smooth travel surfaces and clear consistent paths.
- **People using wheelchairs or assistive mobility devices**, including manual or motorized wheelchairs. This may include older adults with decreasing physical mobility, or people with recent or temporary injuries, both of whom may be assumed to have slower moving travel speeds and levels of confidence using their mobility devices. Conversely, experience wheelchair users may have high levels of confidence and experience moving near vehicle traffic, but still encounter physical barriers moving through the built environment.
- **People who are blind or low-vision**, who often travel using a white cane or dog guide. Low-vision users are trained to right-justify when walking and use vertical cues, including building faces, curb or sidewalk edges, or detectable edges to orient themselves. Traffic noise is also frequently used an important navigation tool.
- **People who are neurodiverse**, including people with Autism Spectrum Disorder and/or Attention-Deficit/Hyperactivity Disorder, who may either be sensory-seeking or sensory-sensitive. These users may need regular opportunities for reprieve from traffic noise and stress; trees with foliage and buffer distance from traffic are important to attenuate traffic stress, along with regular seating or destimulating opportunities. A clear and predictable travel environment is important to supporting comfortable travel; eliminating obstructions and providing clear, legible and simple wayfinding and signage is key to facilitating travel for neurodiverse people.

Designing for people of all ages

The state of Colorado has been growing consistently for generations, and expects the population of older adults age 65 and up to be the fastest growing demographic group in the coming decades (with an anticipated 48% increase between 2025 and 2050, compared to 19% anticipated growth among all other ages of the state's population). Preparing for an aging population's distinct travel needs and characteristics is core to building a safe and mobile region.

Pedestrian behavior and abilities vary significantly across different age groups due to developmental, cognitive and physical factors. Understanding these characteristics is crucial for designing safer roadways, implementing effective pedestrian safety measures and promoting awareness among both pedestrians and drivers. This section outlines how individuals of various age ranges interact with traffic environments, highlighting key traits such as mobility, perception, judgment and reaction time. Recognizing these differences can help improve safety strategies, especially for vulnerable age groups such as young children and older adults.

Figure 1 illustrates the spatial needs of pedestrians, including typical eye-level heights, shoulder width, walking space and minimum accessible width. It highlights the preferred operating space required for safe and comfortable pedestrian movement, particularly in environments accommodating individuals of different ages and abilities.

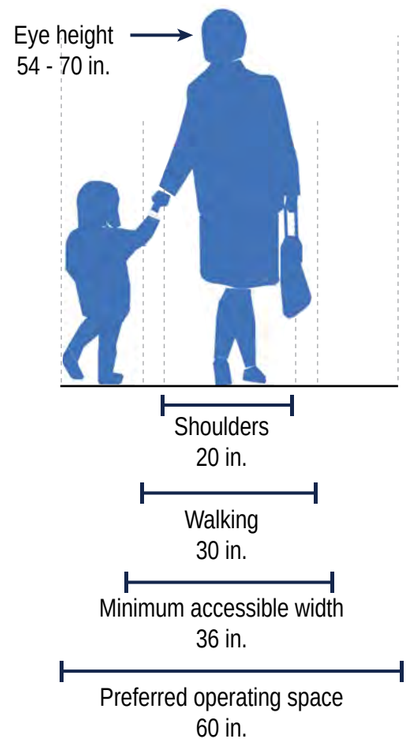


Figure 1 Able-bodied adults require at minimum 3 feet of operating space when walking, but prefer at least 5 feet for comfortable walking (Source: Alta Planning + Design)

Table 1 presents an overview of pedestrian characteristics across different age groups, as outlined in the AASHTO Guide for the Planning, Design and Operation of Pedestrian Facilities (2021). Pedestrian behavior and abilities evolve over time, influenced by physical, cognitive and sensory development. Young children require constant supervision due to their limited perception and impulsive movements, while adolescents may exhibit risk-taking behaviors. Adults generally possess better awareness and mobility, but aging leads to gradual declines in reflexes, vision and hearing, increasing vulnerability in traffic environments. Understanding these variations is crucial for designing safer pedestrian infrastructure and implementing effective safety measures.

Table 1 Pedestrian Characteristics Across Age Groups

Age Range	Typical Height	Characteristics
Under 4	20 – 40 inches	Infants and toddlers may start using pedestrian facilities as they begin learning to walk, though nearly always under adult supervision. Young children are developing peripheral vision and depth perception and may begin learning about traffic rules and signs.
5-8	38 – 55 inches	Young school-age children have increasing independence and may begin traveling short distances without a parent or adult. Young children generally understand traffic rules and signs, but are still developing judgment, depth perception and awareness of traffic.
9-13	48 – 70 inches	Older children and “tweens” are gaining increasing independence, but may still have insufficient judgment of vehicle travel speeds or distance. Middle school-aged children may still be susceptible to “darting out” in roadways.
14-18	55 – 75 inches	Teenage travelers possess improved awareness of the traffic environment. They can be fully independent travelers—for instance, RTD provides free transit fares to all youths under age 19 with a valid student ID so that students may travel independently. However, teenagers still have developing brains and may have insufficient judgment or a sense of invulnerability.
19-40	60 – 75 inches	Adults are expected to be fully aware of traffic environment and able-bodied adults generally have complete physical mobility and visual acuity.
41-65	60 – 75 inches	As adults age, they experience a gradual slowing of reflexes and decrease in reaction time and mobility.
65+	60 – 75 inches	Older adults may begin to experience more pronounced mobility difficulties, including slowed walking speed, reliance on mobility devices, declining vision and depth perception and difficulty hearing vehicles and other street users. Older adults are more susceptible to trip-and-fall risks and may fatigue more quickly.

Design needs of strollers and carts

Some adults, especially parents and care-givers of children, may regularly travel with mobility devices such as carts, wagons, or strollers to transport babies, small children and even pets. Stroller design varies, with some accommodating multiple children. Additionally, some sidewalk users use pushcarts and luggage rollers to move cargo. Several factors influence the design needs of stroller and cart users:

- **Wheel Size & Stability**: Small pivoting front wheels improve maneuverability but are less suitable for rough or unpaved surfaces.
- **Surface Considerations**: Smooth, stable surfaces and curb ramps improve accessibility and ease of movement.
- **Safety Concerns**: Lateral overturning is a primary safety issue, requiring well-designed paths with gradual inclines and minimal cross-slopes

Figure 2 illustrates the spatial requirements for pedestrians using strollers, including the sweep width and physical length. Understanding these dimensions is essential for designing pedestrian-friendly infrastructure that accommodates caregivers with strollers, ensuring accessibility and ease of movement in urban environments.

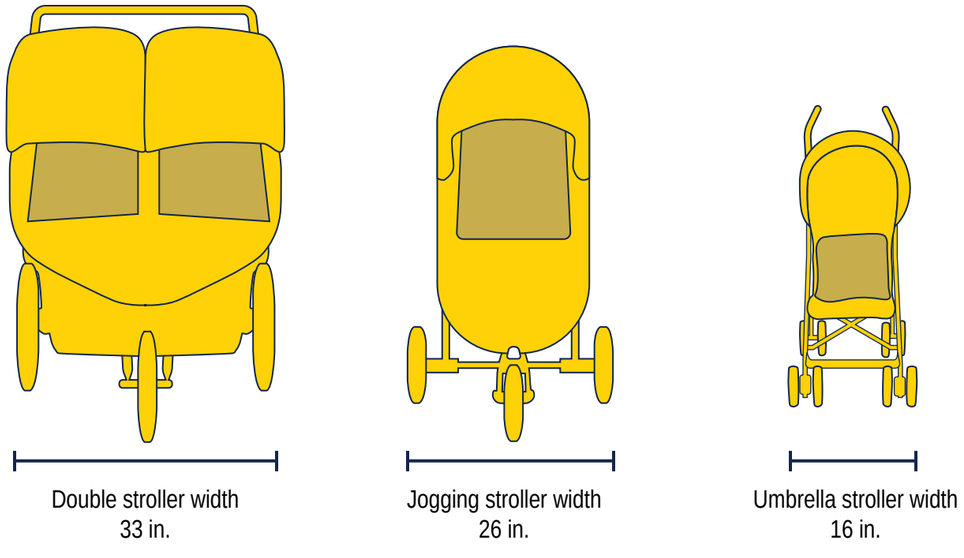


Figure 2 Stroller Dimensions and Pedestrian Space Requirements (Source: Alta Planning + Design)

Designing for people with disabilities

Per U.S. Census Bureau data, 10% of the region's population has a disability of some form—over than 335,000 people. Especially as the region's residents age, more and more people living and working in the metro area are anticipated to be living with a mobility impairment. Table 2 summarizes common physical and cognitive impairments, how they affect personal mobility and recommendations for improved pedestrian-friendly design.

Table 2 Design considerations for people with disabilities

Impairment	Effect on Mobility	Design Solution
Physical Impairment (Wheelchair/ Scooter Use)	Difficulty propelling over uneven or soft surfaces. Cross-slopes cause wheelchairs to veer downhill or tip sideways. Require wider path of travel.	Firm, stable surfaces and structures, including ramps or beveled edges. Cross-slopes of less than 2.1%. Sufficient width and maneuvering space.
Physical Impairment (Walking Aid Use)	Difficulty negotiating steep grades and cross slopes; decreased stability and tripping hazard. Slower walking speed and reduced endurance; reduced ability to react.	Cross-slopes of less than two percent. Smooth, non-slippery travel surface. Shorter crossing distances, slower walking speed to calculate pedestrian clearance interval, median refuges and street furniture.
Hearing Impairment	Less able to detect oncoming hazards at locations with limited sight lines (e.g. driveways, angled intersections, channelized right turn lanes) and complex intersections.	Longer pedestrian signal cycles, clear sight distances, highly visible pedestrian signals and markings.
Vision Impairment	Limited perception of path ahead and obstacles; reliance on memory; reliance on non-visual indicators (e.g. sound and texture).	Accessible text (larger print and raised text), accessible pedestrian signals (APS), guide strips and detectable warning surfaces, safety barriers and lighting.
Cognitive Impairment	Varies greatly. Can affect ability to perceive, recognize, understand, interpret and respond to information.	Signs with pictures, universal symbols and colors supplementing text.
Fatiguing Illnesses	Slower walking speed and reduced endurance; reduced ability to react. Increased chances of tripping or falling.	Longer pedestrian signal phases, shorter crossing distances, median refuges and street furniture. Smooth, non-slippery travel surface.

Design needs of wheelchair users

An estimated 130,000 people living in the Denver region have an ambulatory disability—nearly one in 25. While not all users with ambulatory impairments use a wheelchair (nationally, an estimated 1.6% of Americans use a wheelchair), designing for wheelchair users benefits all pedestrians: smooth travel surfaces free from obstructions with sufficient width and connected ramps and crossings improves walking comfort across the board. There are two primary categories of wheelchair use to consider in public space design:

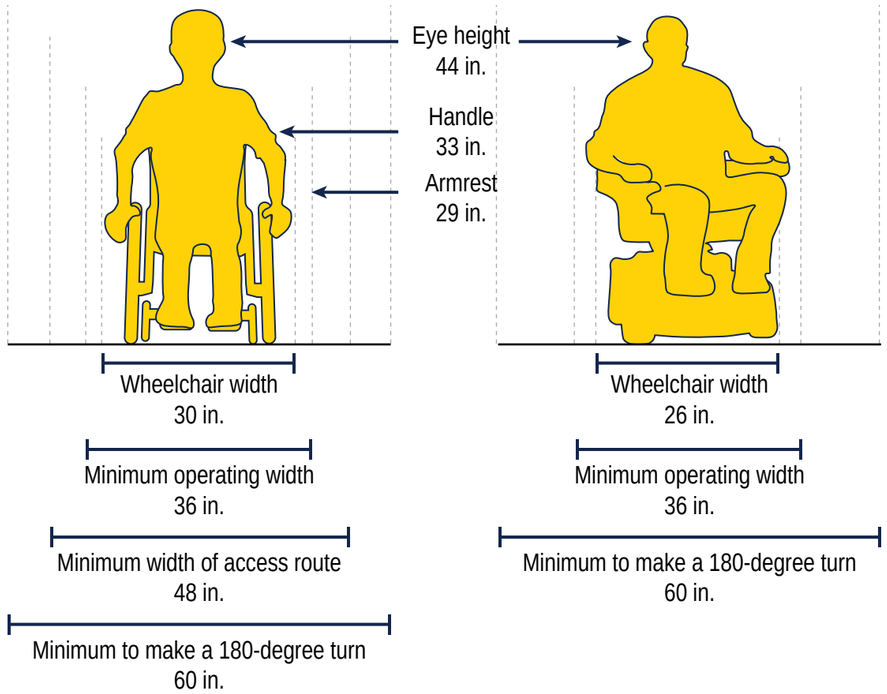


Figure 3 Spatial requirements for manual and power wheelchair users (Source: Alta Planning + Design)

Manual Wheelchairs: Propelled by the user via push rims on the rear wheels. Braking is controlled by resisting wheel movement with the hands or arm. A caregiver can also push the wheelchair using handles at the back.

Power Wheelchairs: Battery-powered devices controlled via joystick, breath, or other assistive mechanisms. Their size and weight require smooth, obstacle-free routes with accessible ramps.

Adequate space must be provided for 180-degree turns, especially in areas where wheelchair users frequently navigate, such as intersections, curb ramps and transit stops. Figure 3 illustrates the physical and operational dimensions of both manual and power wheelchair users, highlighting the necessary width for accessways, turning radii and maneuvering space. The differences in size and movement capabilities between manual and power wheelchairs underscore the need for well-designed pedestrian infrastructure that ensures accessibility for all individuals using mobility-assistive devices. Common challenges that all users face (but are acutely felt by wheelchair users) while navigating streets and sidewalks are detailed below.

Figure 4 Pre-ADA sidewalks are common throughout the region, and are insufficiently wide for wheelchairs and mobility devices.

Figure 5 Heaved or buckled sidewalks can be ground down to meet ADA compliance.

Figure 6 Corner catch basins and valley gutters can exacerbate ponding and snow accumulation, decreasing accessibility.

Inadequate sidewalk width for moving easily and comfortably are the most persistent barriers that wheelchair users face. Throughout the Denver region are many legacy "Hollywood sidewalks," which are typical 33 inches wide and attached to a roll curb, making them not only insufficiently wide but also prone to obstruction from vehicles, utility poles and furniture, or vegetation. Adequate width supports continuous access, comfortable passing and social walking.

Heaved, buckled, spalled or broken sidewalks also create inaccessible barriers to the sidewalk system for people using mobility devices.

Ponded corners and curb ramps during and after rainfall can make crossing the street inaccessible for all, but especially for people using mobility devices. During winter months, snow collects are corners and blocks ramps as well, making wheelchair users the first to lose access during weather events and last to regain access after. Design mitigations can include raised crossings and intersections, trench drains, curb extensions, or regrading corners to raised the street slightly to meet the curb ramp halfway rather than ramping fully down to the flowline.

Finally, **steep cross-slopes** especially in crosswalks over streets with high roadway crowns create difficult crossing conditions.

Design needs of blind and low-vision users

An estimated one million people in the United States are legally blind, and a further seven million people have a vision impairment (CDC, Vision and Eye Health, 2024). Blindness comes in many forms—most blind people do not have complete vision loss. Figure 8 illustrates some examples of different types of blindness, ranging from degenerative to genetic to neurological conditions that impact a person's ability to see and discern light, color, shapes, movement and contrast. Another 12 million people in the U.S. are estimated to be colorblind.

Pedestrians are charged with quickly receiving and decoding a number of competing signs and cues in the public realm to navigate safely and efficiently. For those who have reduced vision, these cues may be unavailable and require non-visual supplement.

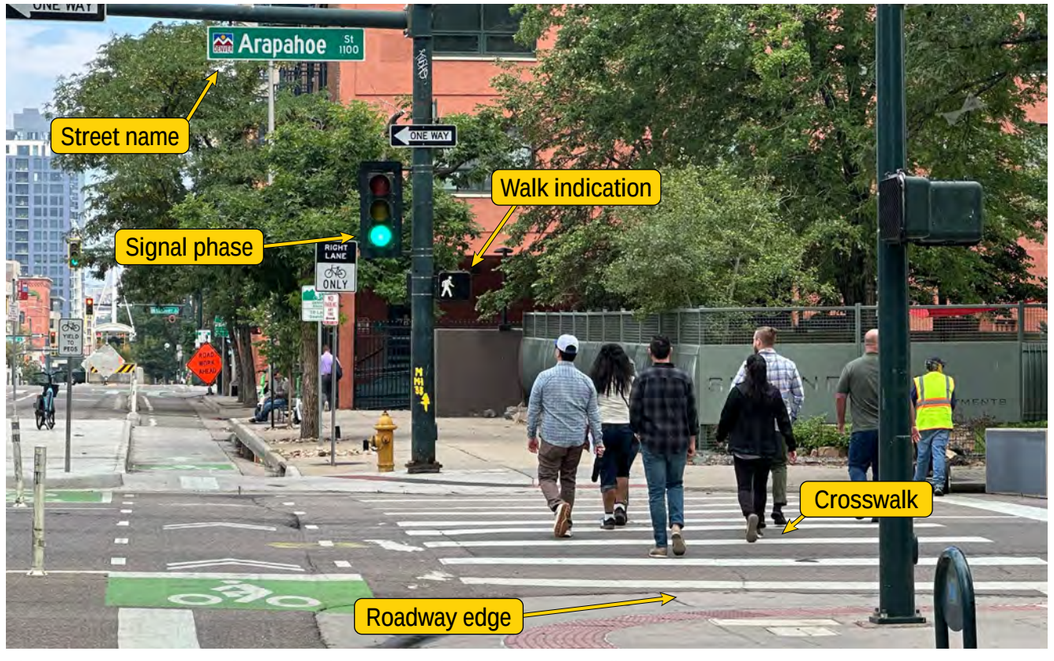


Figure 7 Visual cues for pedestrians at a typical urban crosswalk.

As shown in Figure 7, pedestrians use color, relative position and materials contrast to quickly interpret cues like current traffic signal phase, walk signal indication, roadway edge and crosswalk markings to determine when and where to cross a street. Colorblind pedestrians may use position of the three-phase signal face to determine the signal phase (i.e., rather than looking for the green ball, they may look for the bottom ball to be lit). High contrasts, limited sign clutter, and audible or tactile cues all support and supplement visual indications.

Diabetic retinopathy typically involves seeing dark spots or "floaters" in the field of vision, empty areas, or even color blindness, degrading the ability to clearly see and interpret the street environment.

Cortical/Cerebral Visual Impairment is a neurologic condition that varies widely and may include "double-vision," inability to see movement, or to recognize faces or objects.

Cataracts cause cloudy "spots" in viewfield, light sensitivity, poor low-light vision, double-vision, and glare or halos. Especially in low-light or over-lighted conditions, users may struggle to distinguish or interpret signs or hazards.

Macular degeneration results in the loss of the central vision field, reduced low-light vision, and straight lines can appear wavy. Signs and markings are more difficult to distinguish, though peripheral vision may remain.

Glaucoma can cause blurred or tunnel vision, eye pain or headaches for those experiencing it. Pedestrians with glaucoma have reduced visual field and ability to quickly scan or detect hazards.

Achromatopsia: encompasses color blindness and sensitivity to or discomfort with bright light. Street lights and traffic signals may appear blown out, or may require positional cues to differentiate.

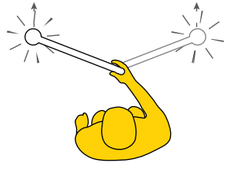
Figure 8 Illustrations of types of blindness; adapted from What blindness really looks like, Perkins School for the Blind.

There are generally two types of travel support that blind and low-vision users utilize: a long white cane or a dog guide. Service dogs are extensively trained to work with blind companions to navigate and recognize obstacles. People who use long white canes often receive travel training to navigate and detect obstacles independently.

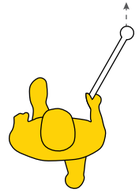
People using long white canes are trained to use several common techniques or maneuvers to navigate and analyze the built environment as they walk:

Constant contact, or sweeping the cane tip side-to-side (roughly as wide as the body) while walking. This method is useful for maintaining a line and walking in unfamiliar environments.

Tapping, or alternating taps on either side of the body's centerline, especially in contexts where obstacles are less expected and echolocation is especially useful for situating (such as parking garages).



Hybrid "tap and slide," or tapping and then pushing the cane tip forward on either side to use both sound and touch to navigate.



Shorelining, or using the cane tip along a guided edge such as a curb, building or landscape to justify oneself.

Crossing the street is one of the most common challenges blind pedestrians face. Blind and low vision walkers are trained to use the multiple directions of traffic noise to judge their crossing path. They are trained to leverage the movement and motor noise of parallel and perpendicular traffic to analyze if it clear to cross the street, as illustrated in Figure 9.

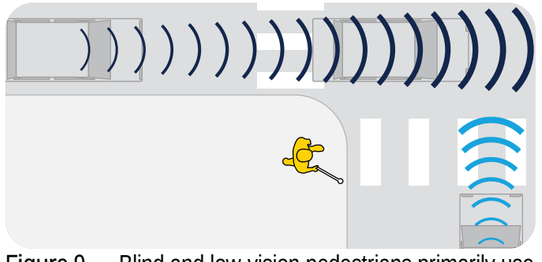


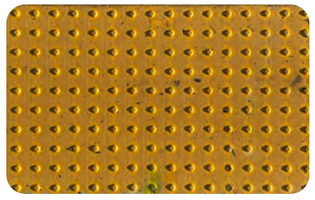
Figure 9 Blind and low-vision pedestrians primarily use noise cues to detect traffic.

Additionally, cane users become accustomed to using the **distinct sounds and textures of surface materials** that they tap or contact to determine what a material is, and where they are in an environment. Figure 10 discusses some common materials and interpretations.

Concrete is commonly understood as sidewalk or pathway. Panels and expansion joints are detectable and reinforce a predictable walking surface.

Asphalt is commonly understood as street or roadway surface; if used for shared-use paths or walkways, designers should be mindful of alternating pavement types so as not to suggest roadway transitions.

Bricks and stone pavers can be confusing, as blind users may not know if their use is intended as tactile communication or is purely aesthetic. Designers should be judicious about use of pavers or stamped concrete surfaces.



Plastic Truncated Domes have an easily recognized sound and texture. Plastic mats and panels can be tapped for confirmation.

Iron utility covers are well understood and do not obstruct access. However, if hard metals are used for other roadway features—such as tactile indicator mats or steel-faced curbing, they can be confused.

Iron Truncated Domes have a longer life cycle than plastic mats or stamped concrete or extruded MMA truncated domes, but may be difficult to differentiate from utility covers. Designers are encouraged to work with disability advocates to define use cases.

Figure 10 Common surface materials and interpretations of their typical meaning for a blind user.

Design needs of neurodiverse users

As many as 19% of people identify or are identified in the U.S. as neurodiverse, an umbrella term that includes conditions ranging from Autism Spectrum Disorder (ASD) to Attention Deficit and Hyperactivity Disorder (ADHD) to Tourette's Syndrome and more. While each person is unique and does not necessarily have the same needs or strategies, in general these users can be well supported by thoughtful public space design that provides opportunities for rest and regulation, redundancy and varied route-finding options, and slowed motor vehicle travel speeds to support safe pedestrian mobility.

Key planning considerations:

- Neurodiverse individuals may have sensory processing disorders, which can manifest as either being "sensory-seeking" or "sensory-avoidance." Sensory seeking is characterized as actively looking for interest and stimulation in the travel environment, such as busy streets and storefronts and varied destinations and features. Conversely, sensory avoidance is characterized by the experience of feeling anxious or becoming disregulated in sensory-rich situations (such as busy streets), which can be supported by opportunities for rest, reprieve and re-regulation. Sensory-avoiding people may have developed "hacks" or strategies to move through challenging environments, such as:
  - **Grounding,** or using sensory inputs to regain control; this can also include personal techniques or routines that focus the senses, such as putting hands into water, tapping, or using sound or music.
  - **Route planning** is a key regulation strategy, and can include advance research and preparation for a trip to manage stress, especially using mapping applications.
  - **Repetition** or following a familiar routine can take the anxiety out of travel. This becomes important especially during construction or travel disruptions, so construction route accommodation is especially important.
- Neurodiverse people may struggle with mobility tasks like **motor planning** or judging conflicts in the street environment. As vehicle speed increases next to the sidewalk, these challenges become amplified, and the street becomes less forgiving. Slower and calmer vehicle operations enable safer interactions between users and mitigate conflicts.
- **Lighting** especially can either help or hinder neurodiverse users; high contrast lighting or frequent light/dark spots and shifts can make walking more stressful and less legible, while even lighting supports navigation and visibility.
- Finally, **proximity to destinations** and **available travel options** are drivers of autonomy and comfort for neurodiverse users. Some people are able to travel independently with small accommodations, while others may travel with a companion. Many neurodiverse people use paratransit or hailed rides to support independent travel, which each come with a time and financial cost. Close proximity to destinations supports independent travel.

Strategies to accommodate neurodiverse users:

- Connected, dense and redundant walking **networks** are key to supporting diverse types of pedestrians with diverse travel needs. Having multiple route options enables users to select the path that suits their own level of comfort.
- Crowding can be stressful for neurodiverse people. Providing **adequate width and capacity** for comfortable passing and side-by-side walking also supports less overstimulating walking environments.

Figure 11 WalkNYC wayfinding boards provide large displays that benefit all pedestrians

- Regular **wayfinding** can support all users, but especially those who manage their anxiety through route planning. Wayfinding and map boards that use clear fonts, high contrast maps and landmarks help pedestrians quickly orient themselves and be confident in their routes. Prioritize wayfinding boards near busy travel hubs and decision points, such as transit stations, commercial areas.
- **Seating** and street furniture benefits all users, but especially older adults and people with ambulatory or cognitive disability. In addition to providing comfortable spaces for rest and reprieve for those who need it, street furniture can improve the public realm and encourage people to stop and stay in public spaces, which can support public safety and community vibrancy.
- **Street trees** and greenscape attenuate traffic speed and noise levels, and provide shade and comfort. Trees in particular are critical public health infrastructure with benefits to air and water quality, property value, and the general urban environment.
- **Lighting,** as discussed previously, is important to comfort and navigability, but is also critical for pedestrian safety. Recent studies from DRCOG and national researchers have found sharp recent upticks in nighttime crashes, for which consistent and pedestrian-scaled lighting is a crucial countermeasure.
- Minimize **noise clutter** to support a comfortable walking environment. Louder and faster moving traffic can be overwhelming and reduce the ability to detect quieter but important sound cues such as approaching bicycles, scooter or electric vehicles. Addtionally, accessible pedestrian signals that click or chirp on recall add noise clutter, and may be minimally helpful to blind or low-vision users. Consult with disability advocates when developing and deploying accessible devices.

Implementing universal design principles is crucial for creating accessible pedestrian facilities across widely varying contexts. Inconsistent adherence to ADA compliance can lead to gaps in accessibility. There are several documents that can be referenced for more information on universal design:

- **The CDOT 2022 ADA Transition Plan** outlines CDOT's policies for improving accessible facilities, including curb ramps and pedestrian push buttons within Colorado's public right-of-way.
- **The Public Rights-of-Way Accessibility Guidelines (PROWAG)** provide detailed technical specifications and best practices for ensuring accessibility in public pedestrian facilities, promoting consistent design standards nationwide. The Federal Management Regulation adopted PROWAG in July 2024.
- **Federal ADA regulations** establish comprehensive accessibility requirements applicable to all public pedestrian facilities, ensuring compliance with national standards for inclusivity and equal access.
- **The NACTO Transit Street Design Guide** includes guidance on universal design elements and accessible paths and slopes to support inclusive pedestrian environments in transit-oriented areas.
- **The NACTO Urban Street Design Guide** provides recommendations on pedestrian access and networks, emphasizing intersection design, curb extensions and pedestrian plazas to enhance accessibility and connectivity.

Updated Public Right-of-Way Accessibility Guidelines (PROWAG) and implications for sidewalk design

The Public Right-of-Way Accessibility Guidelines (PROWAG) are a set of guidelines developed by the US Access Board that contain scoping and technical requirements to ensure that all new and altered pedestrian facilities located in the public right-of-way are readily accessible to and usable by pedestrians with disabilities.

The initial Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of Way were issued in 2011, with a Supplement for Shared Use Paths issued in 2013. These guidelines were voluntarily adopted by many states, but at the time were not final or federally adopted. The final ruling of PROWAG was issued in August 2023. The Department of Justice (DOJ) and the Department of Transportation (DOT) are required to adopt these guidelines and ensure that local government programs and facilities are broadly accessible to the public.

PROWAG guidelines are enforceable standards under the Americans with Disabilities Act (ADA), after being adopted by the Department of Transportation in December 2024. Additionally, state and local government entities have obligations under Title II of the ADA to ensure their facilities are accessible to and usable by pedestrians with disabilities.

PROWAG is not applicable to certain paths used for recreational purposes. For example, a hiking trail through a mountainous area used primarily for recreational hiking and biking is likely not governed by PROWAG. However, new sidewalk construction and alterations must comply with PROWAG guidelines. These updates apply to changes in pedestrian facilities that affect or could affect accessibility, such as resurfacing or adding sidewalks along existing roads.

Notable Changes in PROWAG Final Rule (2023)

The 2023 final rule for the Public Rights-of-Way Accessibility Guidelines (PROWAG) introduces significant updates aimed at enhancing accessibility for all pedestrians, particularly individuals with disabilities. These changes provide clearer guidance on design requirements to ensure pedestrian routes are safe, accessible and usable. The following key updates address crucial elements such as pedestrian access routes, clear widths, slopes, protruding objects and accessible pedestrian signals, which are essential for fostering inclusive walking environments.

- **Pedestrian Access Route (PAR):** Sidewalks, shared use paths and other pedestrian paths must maintain a continuous, accessible and unobstructed route for people with disabilities.
- **Clear Widths:** The minimum continuous clear width of a pedestrian access route is four feet, with additional clear space required at regular intervals (five feet every 200 feet for passing).
- **Slopes and Cross-Slopes:** The maximum running slope is 5%, with a 2.1% maximum cross-slope (slightly more lenient than previous guidelines).
- **Protruding Objects:** Pedestrian circulation paths must avoid protruding objects between 27 and 80 inches above the ground, with exceptions for handrails (up to 4.5 inches).
- **Accessible Pedestrian Signals (APS):** All new or altered pedestrian signals must include APS to provide accessible timing information in non-visual formats for people with visual impairments.

New construction and alterations must comply with the PROWAG guidelines. As of 2023, alterations are defined as a change to or an addition of a pedestrian facility in an existing, developed public right-of-way that affects or could affect pedestrian access, circulation, or usability. This includes resurfacing or adding a new sidewalk along an existing road.

Designing a sidewalk system

A well-planned sidewalk system is essential for creating safe, accessible and connected pedestrian environments. Thoughtful sidewalk design considers not only the physical structure of the walkway but also its relationship to surrounding land uses, traffic conditions and pedestrian needs. A comprehensive sidewalk system ensures that people of all ages and abilities can travel comfortably and efficiently.

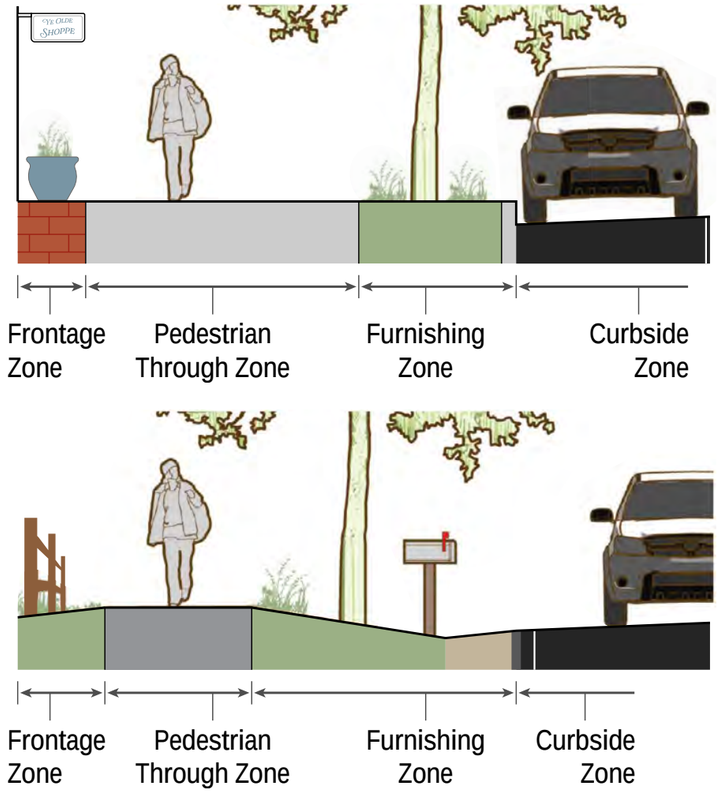
This section outlines key design principles that contribute to a functional and inviting sidewalk network. It begins with an overview on how to establish sidewalk "zones", which divides sidewalks into functional areas to optimize pedestrian movement, safety and accessibility. The next subsection, contextual consideration and impact on widths, explores how land use, street type and expected pedestrian volumes influence sidewalk dimensions. Finally, key factors to consider in sidewalk design highlights essential elements such as directness, comfort, connectivity and integration with transit networks.

By applying these principles, jurisdictions can create sidewalk systems that are not only compliant with accessibility standards but also enhance walkability, community vibrancy and multimodal connectivity.

Establish sidewalk "zones"

Sidewalk cross-sections should follow the Zone System, which divides the sidewalk into different zones based on functionality and context.

- **Pedestrian Through Zone**: This is the primary walking area, which should be sized to accommodate comfortable pedestrian flow, including bidirectional and social walking. This zone must at minimum comply with PROWAG requirements, and should not include the width of the curb (if it is an attached sidewalk).
- **Furnishing or Buffer Zone**: A buffer zone of 4 to 6 feet is recommended in urban and suburban settings to provide separation from roadways and space for pedestrian-supportive treatments like trees and landscaping, seating, shelter and light posts, as well providing space for critical roadside infrastructure that can otherwise obstruct the pedestrian through zone (including parking meters, light posts and signal cabinets). On residential streets the furnishing zone is often planted with grass (which offer minimal stormwater absorption benefit but is generally traversable), or may be planted with trees or vegetation (which performs better but is not traversable). In commercial or mixed-use areas, these are more commonly furnished with street amenities and provide opportunities for activation.
- **Curbside Zone**: The zone or lane in the roadbed adjacent to the curb may accommodate curb access, parking or other enhancements where applicable. A well-managed curbside lane can dramatically improve pedestrian comfort, both by increasing pedestrian buffer from vehicle traffic and noise and by introducing side friction to calm vehicle speeding.



Sidewalk Zone Dimension	Pedestrian Through Zone	Furnishing Zone	Total Width
Constrained Minimum	5 ft (1.2 m)	2 ft (0.6 m)	8 ft (2.4 m)
Recommended Minimum	6 ft (1.5 m)	4 ft (1.2m)	12 ft (3.6 m)

Figure 12 Sidewalk Zone System, adapted from FHWA's Small Towns and Rural Multimodal Networks Guide (figure 4-14)

DRCOG Regional Complete Streets Toolkit: context and width

The applicability and recommended width of these zones depends on the context of where the sidewalk is located; however, the Pedestrian Through Zone should adhere to PROWAG requirements at a minimum. Different zones will vary in size based on the context—urban, suburban, or rural—outlined in guidelines like FHWA's **Small Town & Rural Multimodal Networks Guide** (see Figure 12) and the City and County of Denver's **Complete Street Guidelines** (2020). In downtown areas, for example, the pedestrian through zone may need to be 10-12 feet or wider to accommodate higher pedestrian volumes, while rural areas may need only 5 feet. In suburban and urban areas, the width of the various zones changes to accommodate various contexts along the sidewalk.

The DRCOG **Regional Complete Streets Toolkit** codifies Street Types for all regional roadways—but it does not include local streets (Figure 13). The Toolkit sets modal priorities for each street type, as well as specifying the compatibility of select design elements to support each mode. Table 3 recommends pedestrian modal priority for each street type and proposes recommended minimum widths for each street type. This does not mean that all sidewalks should be designed to minimums; rather these are the minimum recommended widths to provide a basic level of service to people walking based on expected activity. Sidewalks should be sized to accommodate expected demand, as well as to unlock space for activities such as activation and placemaking, stormwater management, curbside access and utilities. The width refers to the sidewalk, free of obstructions or furnishings that would impede pedestrian access.

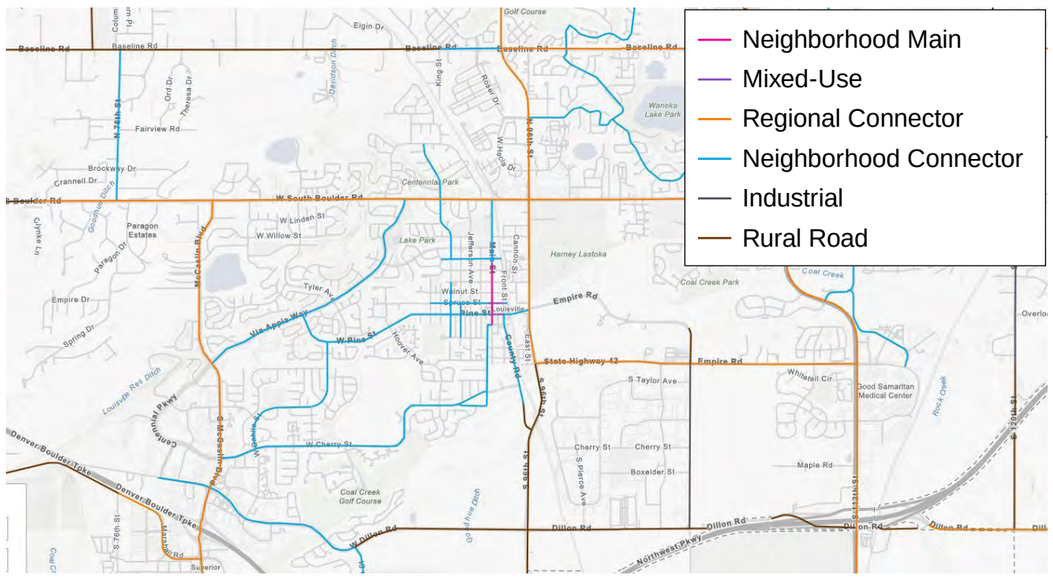


Figure 13 DRCOG Regional Complete Streets Typology

Table 3 Recommended minimum sidewalk zone width adapted from the DRCOG Complete Streets Toolkit, 2021

Street Type	Pedestrian Modal Priority	Recommended Sidewalk Zone	Furnishing / Amenity Zone	Parking/Access Lane
Downtown Commercial	High	10-12 ft	4-8 ft	8 ft
Downtown Mixed-Use	High	10-12 ft	4-8 ft	8 ft
Neighborhood Main	High	8-12 ft	4-8 ft	8 ft
Mixed-Use	High	8-10 ft	4-8 ft	8 ft
Regional Connector	High	6-8 ft	6-8 ft	8-9 ft
Neighborhood Connector	High	6-8 ft	4-8 ft	8 ft
Industrial Street	High	5 ft	6-8 ft	9 ft
Special Use	High	Variable	Variable	8-9 ft
Rural	Low	5 ft	6-8 ft	n/a
Mountain	Low	5 ft	4-8 ft	n/a
Local	High	6-8 ft	2-8 ft	8 ft

Key factors to consider in sidewalk design

When designing sidewalks, various factors must be carefully considered to ensure the infrastructure is functional, safe and accessible for all users. These factors encompass everything from the layout of the path to its relationship with surrounding areas and the types of users it will serve. Below, we expand on these key considerations in greater detail:

Continuous, connected pedestrian networks

A well-designed sidewalk network should be continuous, meaning it should link neighborhoods, commercial districts, schools, parks and transit systems without interruptions. Sidewalks should not abruptly end, as gaps in pedestrian infrastructure can discourage walking and force pedestrians to walk on dangerous streets or detour unnecessarily.

- **Interconnected systems**: Ensure that sidewalks and curb ramps connect to one another, creating a broader network that facilitates seamless pedestrian movement across a city or region. This might mean providing underpasses, overpasses, or other types of crossings to maintain connectivity where streets or highways are barriers.
- **Completeness:** the sidewalk network should be complete and uninterrupted, with no gaps between sidewalks or missing segments along streets. An incomplete sidewalk network creates safety hazards for pedestrians, forcing them into the roadway and increasing the risk of crashes.

Comfort and separation from vehicular traffic

Comfort is a crucial factor for ensuring that sidewalks are inviting and safe for pedestrians. Sidewalks should provide a comfortable walking environment that separates pedestrians from vehicular traffic. Adequate buffers between sidewalks and roads help mitigate the risks associated with traffic and provide a more pleasant walking experience.

- **Vehicle speed management:** vehicle speed adjacent to the sidewalk is a critical determinant of pedestrian safety and comfort. As vehicle speed increases (a typical threshold where comfort begins to degrade is above 25 miles per hour), pedestrian stress increases and the roadway becomes less forgiving for crashes and conflicts. As vehicle speed increases, stopping distances increase, detection-reaction time increases, and crash severity amplifies. Furthermore, increased vehicle speed results in noisier streetscapes, both making walking more stressful but also reducing pedestrians' abilities to detect potential conflicts—blind pedestrians in particular rely on traffic noise to assess vehicle presence and travel direction, and additional noise clutter reduces their ability to navigate.
- **Sidewalk width and comfort**: the sidewalk should be wide enough to accommodate expected pedestrian volume comfortably, as well as key amenities and placemaking features that support comfortable pedestrian travel. In urban settings with high foot traffic, sidewalks may need to be 10 feet or wider to prevent overcrowding. For residential or rural areas, a minimum of 5 feet of clear width is typically recommended to accommodate pedestrians, with adequate width preferred to accommodate passing and side-by-side walking, which is often a social form of travel.
- **Managed interactions with bicycles:** shared-use paths and sidepaths can be critical infrastructure for people walking *and* bicycling, especially in more suburban and rural contexts. However, these two user groups have distinct operating characteristics that can amplify stress or conflict. Refer to the Shared-Use Path Level of Service guidance in Chapter 6 of the Bicycle+ Program Guide for activity thresholds where separation of bicycle and pedestrian spaces is appropriate. If pedestrians and bicyclists do share a path facility, it should be adequately wide for comfortable passing, and include speed attenuating geometry, markings and signage to prepare bicyclists and micromobility users to slow in advance of conflicts.
- **Pedestrian buffer zones:** buffer zones, such as landscaped strips, parking lanes, or physical barriers (e.g., bollards or fences), help protect pedestrians from the hazards of moving traffic. In high-speed or high-volume areas, such buffer zones are especially important to create a physical and psychological sense of safety.
- **Traffic calming:** In addition to providing separation, incorporating traffic calming measures—such as curb extensions, raised crosswalks, or reduced speed limits—can slow vehicle traffic and create a more pedestrian-friendly environment. This can improve both the comfort and safety of pedestrians walking near busy roads.

Connection to places want to be or go

Sidewalks should provide safe, efficient and well-connected routes to key pedestrian trip generators—the places that attract large numbers of pedestrians such as schools, transit stations, parks, libraries, retail centers, healthcare facilities and residential areas. Effective sidewalk networks ensure that these destinations are accessible from all directions, offering convenience and safety for pedestrians.

- **Access on all sides of major destinations**: Key destinations should be accessible by sidewalks from all surrounding areas, not just from one side of the street. For example, a public park should have sidewalks leading from multiple entry points, so people can access it regardless of where they are coming from.
- **Ensuring accessibility to public transit**: Sidewalks should be well-integrated with transit networks, providing direct access from bus stops or transit stations to nearby streets, neighborhoods and amenities. Safe pedestrian connections from transit hubs to residential areas encourage people to use public transit and walk more, which can reduce car dependence and congestion.
- **Pathways for diverse user groups**: These connections should accommodate the needs of all users, including children, older adults, people with disabilities and people using mobility aids. For example, wide curb ramps, tactile paving and consistent signage can ensure that these essential destinations are accessible for everyone.

Directness of the pedestrian path

The directness of the pedestrian path refers to the efficiency of the sidewalk in connecting key destinations. Pedestrian paths should be designed to minimize detours or unnecessary twists, as long detours can discourage walking and make walking less convenient. Direct routes not only save time but also provide a sense of safety and continuity for pedestrians.

- **Direct, clear routes**: A sidewalk should be as straight as possible between important destinations like schools, transit stations, commercial areas, parks and residential areas. Avoiding abrupt turns or dead ends can ensure pedestrians have a smooth and straightforward journey.
- **Natural pathways**: Where possible, sidewalks should follow the natural pedestrian desire lines — the informal paths people take, often visible in areas with high foot traffic. Aligning sidewalks with these paths makes them feel more intuitive and user-friendly, as pedestrians will naturally gravitate to these direct routes.
- **Minimizing conflicts**: In addition to directness, it's important to design sidewalks that minimize conflicts with other uses, such as driveway crossings, parking areas, or intersection congestion. Providing clear separation and avoiding road crossings wherever possible can increase the attractiveness and safety of walking.
- **Local and regional connectivity**: Sidewalks should also integrate with regional walking and biking infrastructure. Shared-use paths are important walking destinations, in addition to forming the major regional spines for active travelers. Integrate path entries and crossings with local sidewalk networks, and provide consistent wayfinding.

Design width based on anticipated pedestrian traffic and surrounding land use context

The **design width of sidewalks** should be informed by the level of anticipated pedestrian traffic as well as the surrounding land use context. Designing sidewalks to the right dimensions ensures that they can safely accommodate the volume of pedestrians without feeling overcrowded or unsafe.

- **Land use context**: The type of land use surrounding the sidewalk should guide its width. For instance, sidewalks in densely built commercial or urban areas with high pedestrian traffic should be wider—often 10-12 feet—compared to sidewalks in suburban or rural areas where pedestrian volumes may be lower. Similarly, residential neighborhoods may be served by narrower sidewalks but with wider sidewalks near transit stations or schools to accommodate higher volumes during peak times.
- **Projected growth**: Anticipated growth in population and pedestrian activity should also influence sidewalk design. In rapidly growing areas, sidewalks should be designed with future increases in traffic in mind, with wider cross-sections and provisions for future expansions.
- **Flexibility in design**: Sidewalks in areas with mixed-use development, high-density housing and public transportation hubs should be designed with flexibility, allowing for multifunctional use. Wide sidewalks in such areas provide space for street furniture, trees, lighting, outdoor cafes and other amenities, enhancing the urban experience while accommodating more pedestrians.
- **Variable width for different zones**: In urban areas, sidewalks may have wider sections at transit stops or retail centers, but narrower sections may be acceptable in less dense, suburban settings. It's crucial to adapt the sidewalk width based on the type of environment—considering factors such as pedestrian volumes, adjacent land uses and the type of pedestrian activity expected.

Crosswalk design

Crosswalk design is a crucial component of pedestrian infrastructure, directly impacting safety, accessibility and overall walkability. Well planned crosswalks help ensure that pedestrians can navigate roadways safely, reducing conflicts with vehicles and enhancing visibility. Various design elements, such as crosswalk markings, pedestrian signals and traffic calming measures, play a vital role in creating safer crossing environments.

This section establishes principles for accessible pedestrian crossings, explores key considerations for prioritizing crossing treatments and provides discussion of key guidance documents. Additionally, it highlights best practices for improving pedestrian safety and comfort through proven tools and countermeasures. By understanding these design principles, transportation planners and engineers can create more accessible and effective pedestrian crossings.

Principles for accessible crossings

A comfortable and accessible crosswalk is grounded in four principles:

- Pedestrian crossings should be as **compact** as possible. As both the width and number of travel lanes increases, so does exposure and discomfort for people walking.
- Crossings should be easily **legible** to multiple senses. Regardless of age, ability, or capability, all users should have obvious cues and confirmations for how to cross the street.
- The crossing treatment should emphasize making people walking **visible** while in the roadway.
- The crossing approach should be **proud** and prominent. Manage speed, remove obstructions and elevate pedestrian position to prepare vehicle drivers to yield to pedestrians in the crossing.

Prioritizing enhanced crossing treatments

Creating streets that accommodate and encourage walking for transportation requires proactive investment, not just reactive adjustment. This section provides guidance on determining both the most suitable locations and design interventions for pedestrian crossings, building on guidance within the Denver region as well as national peers.

Controlled crossing locations

At locations with either existing traffic control devices or when evaluating whether to install a traffic control device (including stop signs, traffic signals, pedestrian hybrid beacons, or rectangular rapid flash beacons), practitioners often use warrants as outlined in the MUTCD, as well as locally adopted guidance or standards (such as the City of Boulder's **Pedestrian Crossing Treatment Installation Guidelines**). For the purpose of improving pedestrian mobility, there are four traffic signal warrants that can be applied to support better crossings: pedestrian volume, school crossings, crash experience and roadway network.

Pedestrian Volume (MUTCD Warrant 4)

This warrant is intended to provide guidance on installing signals at locations "where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street." While the MUTCD provides guidance on locations where sufficient pedestrian crossing volumes indicate a demand for a signalized crossing (ranging between a minimum of 37 and 133 pedestrians crossing per hour, depending on traffic conditions and pedestrian characteristics), these warrants can often be quite difficult to satisfy as pedestrian crossings can be suppressed by uncomfortable conditions.

Peer jurisdictions such as Seattle and Washington state have experimented with using "after" counts of pedestrian crossings to satisfy the volume warrant at locations with known or expected latent demand. This includes conducting an engineering study that includes analysis of land use and walking near the study location to estimate crossings after installation and then verifying with post-project pedestrian counts to confirm the warrant has been met. Locally, Denver and Boulder have each developed guidelines for estimating latent or supressed demand using land use and destinations, planned modal networks and other factors which are further discussed on page 20.

Roadway Network (MUTCD Warrant 8)

The MUTCD enables practitioners to pursue traffic signal installation in circumstances where a device "might be justified to encourage concentration and organization of traffic flow on a roadway network." While this warrant is more commonly applied in the context of vehicle congestion management, thoughtfully coordinated signals can provide safety and pedestrian mobility benefits by efficiently platooning vehicles at a safe speed and discouraging high-end speeding by limiting the likelihood of unconstrained arrivals at green signal phases.

Progressing or group signals together can also provide opportunities for shorter cycle lengths, more efficient network management and putting pedestrian crossings on "recall" (i.e., the pedestrian crossing phase is served every cycle rather than being actuated).

Other Warrants

Finally, **School Crossings (Warrant 5)** and **Crash Experience (Warrant 7)** can unlock opportunities to enhance the pedestrian network. The School Crossing warrant provides guidance for improving major street crossings where children are expected to be traveling.

Notably in the most recent edition of the MUTCD, the Crash Experience warrant provides multiple paths to satisfying the warrant criteria and installing an enhancement: if five angle or pedestrian crashes or three severe angle or pedestrian crashes in a single year, the warrant is met. However, designers have the option of observing a three-year period and can meet the warrant if six angle/pedestrian crashes of any severity of four severe crashes occur over that period, providing flexibility in assessing safety risks.

Uncontrolled crossing locations

At uncontrolled crossing locations, crosswalk treatments can be assessed using criteria similar to those outlined in the City and County of Denver's **Uncontrolled Pedestrian Crossing Guidelines** (see Figure 14) and the City of Boulder's **Pedestrian Crossing Treatment Installation Guidelines** (Figure 15). Key considerations include the distance to the nearest existing crosswalk, traffic volumes on the cross-street, the presence of accessible pedestrian ramps and proximity to high-pedestrian-traffic areas. Both cities recommend a minimum spacing of 300 feet between enhanced pedestrian crossings and a minimum side street traffic volume of 1,500 vehicles per day to consider a marked crosswalk. Addtionally, Denver uses geospatial data to calculate and score latent demand and trip generation to assess candidate crossing locations (shown in Table 4).

Table 4 Latent pedestrian demand scoring matrix, Denver Uncontrolled Pedestrian Crossing Guidelines

Factor	Definition	Source	Scoring Criteria
Pedestrian demand index	Based on the Denver Moves Pedestrian Demand Index, which estimates latent demand using population and employment density and diversity.	Pedestrian Demand Index	Geospatial index
Activity generator destination	Proximity to parks, healthcare, senior centers, affordable housing, grocery, etc.	GIS data and field visit	Number of destinations within walkshed
Transit destination	Locations within 300 feet of a bus stop or 500 feet of a rail station.	GIS data and field visit	Existence of bus or rail station
Connection to bike network	Locations that combine access with the existing and planned bike+ network.	GIS data and field visit	Aligns or intersects with bike network

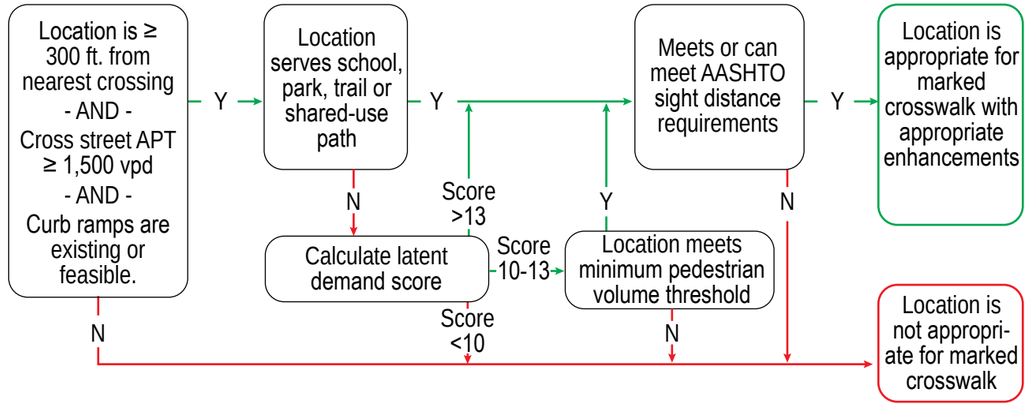


Figure 14 Candidate Location Flowchart, Denver Uncontrolled Pedestrian Crossing Guidelines

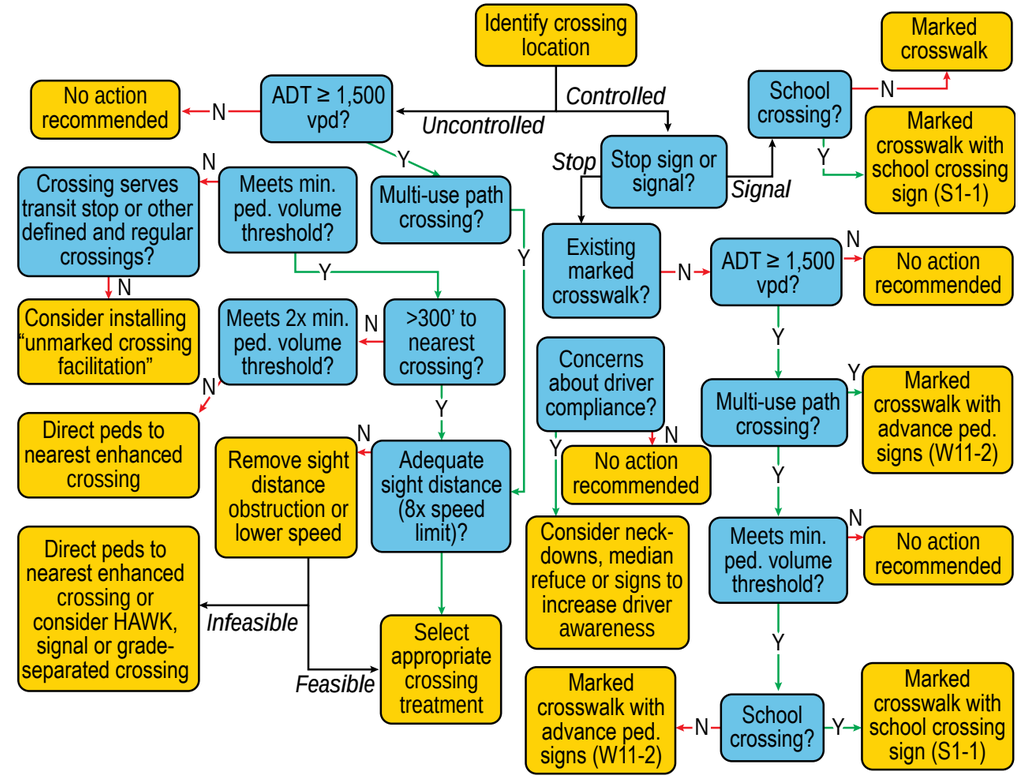
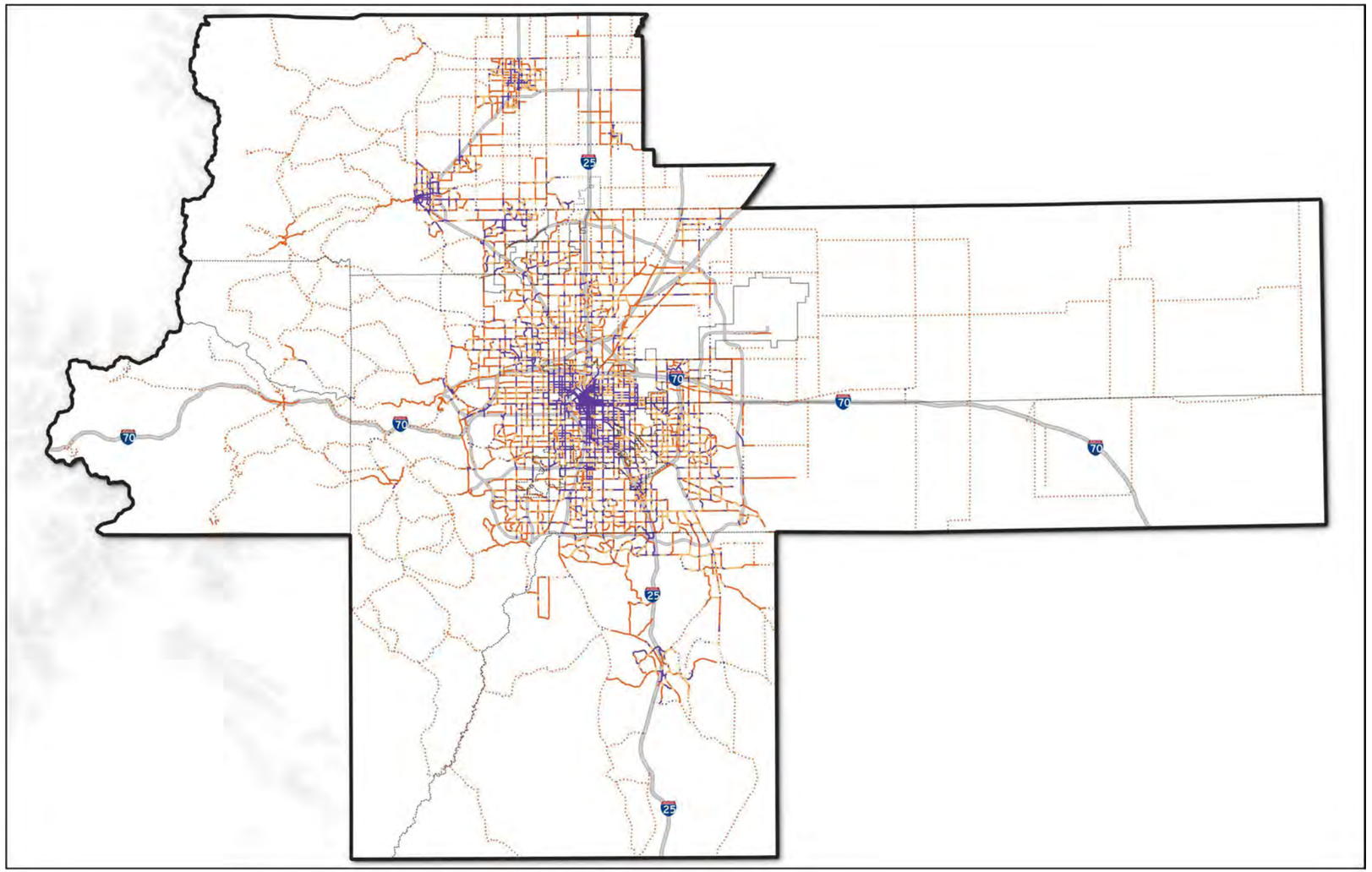


Figure 15 Boulder Uncontrolled Pedestrian Crossing Treatment Flowchart

Map 1 Low-stress crossing gap analysis, regionwide



This gap analysis map shows the average distance between comfortable pedestrian crossings on arterial and collector street segments.

Context	Distance between comfortable crossings		
Urban and suburban	Less than 660 feet	660 feet to 0.25 miles	0.25 miles or greater
Rural	Less than 0.25 miles	0.25 to 0.5 miles	0.5 miles or greater

N

0 5 10
Miles

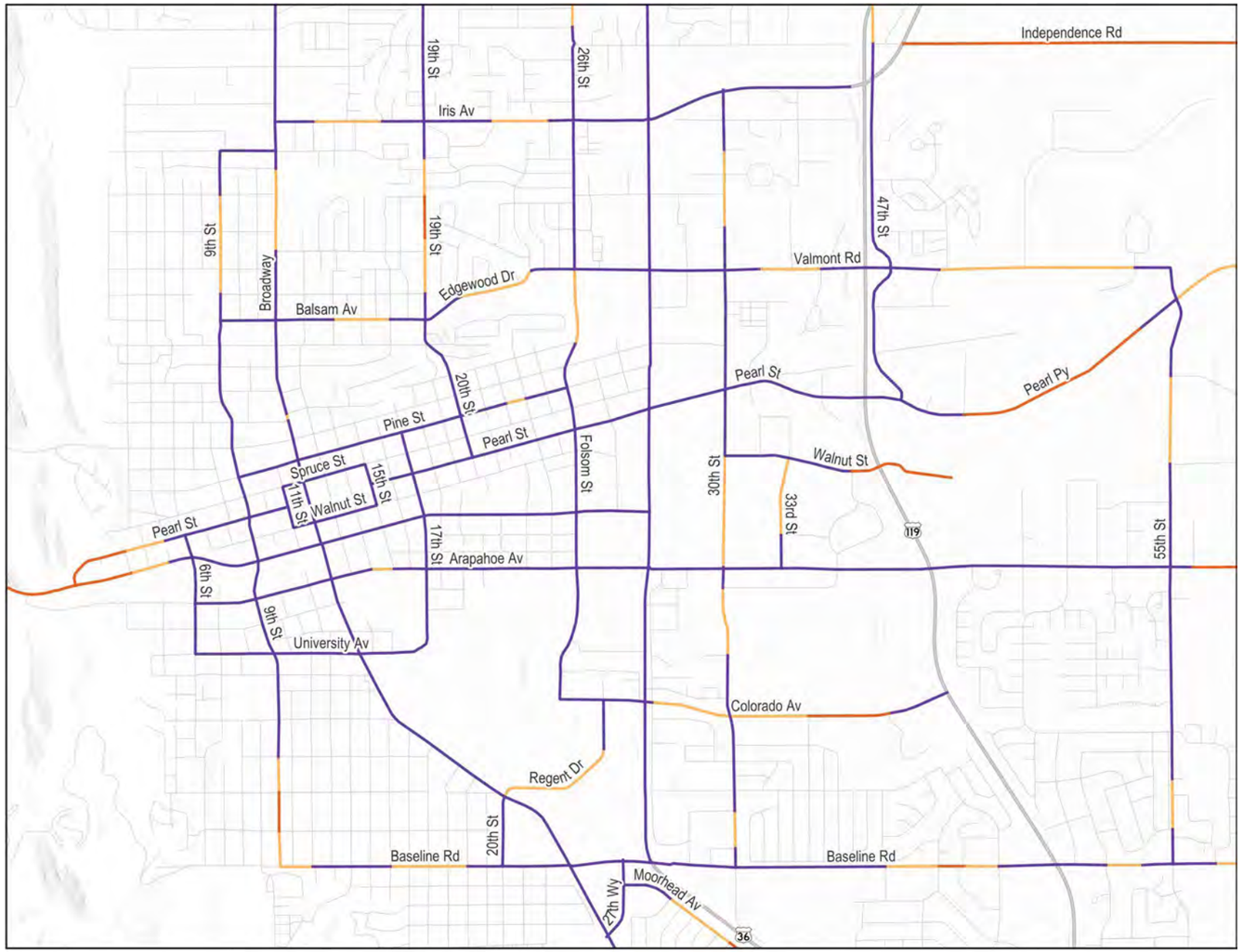
SOURCE: DRCOG analysis, 2025
Mapbox Basemap; SR 6428

Pedestrian Crossing Gaps

In support of the Active Transportation Plan, DRCOG led a preliminary analysis to identify substantially long distances between high-comfort crossings. As distance increases between low-stress crosswalks, pedestrians are faced with the choice of either traveling out of route or attempting to cross at high-stress, potentially dangerous locations—for instance, if marked and enhanced crosswalks are spaced a quarter-mile apart, a pedestrian between the crosswalks faces six minutes or more of out-of-route travel to reach a marked crossing.

The high-comfort crossing gap analysis (Map 1) utilizes regional geospatial data to identify crossings that are likely to meet a "high-comfort" threshold for pedestrians based on intersection context. "Sufficiency" of a crossing was determined by each intersection's weakest leg (i.e., most stressful for pedestrians) using the factors listed in Table 5 including traffic control device, posted speed limit, number and width of travel lanes and average daily traffic volume. Then each street segment was calculated for the average distance along that segment to a high-comfort crossing. Classification of "acceptable" proximity to a sufficient crossing was categorized by urban context:

- In Urban and Suburban contexts, 660 feet to a crossing opportunity was considered "Sufficient," while 660 feet to a quarter-mile was classified as "Excessive" and greater than a quarter-mile as "Critical."
- In Rural contexts, the thresholds were set as a quarter- and half-mile.



This gap analysis map shows the average distance between comfortable pedestrian crossings on arterial and collector street segments.

Distance between comfortable crossings

Less than 660 feet	660 feet to 0.25 miles	0.25 miles or greater
Less than 0.25 miles	0.25 to 0.5 miles	0.5 miles or greater

N

0 0.25 0.5

Miles

SOURCE: DRCOG analysis, 2025
Mapbox Basemap; SR 6428

Table 5 Low-stress pedestrian crossing factors

Crossing Treatment	Sufficiency Criteria
Marked crosswalk, uncontrolled or RRFB-controlled	• Two lanes, either less than 15,000 ADT and 35 MPH or less than 30 MPH. • Three lanes, either less than 9,000 ADT and 35 MPH or less than 15,000 ADT and 30 MPH. • Four lanes, either less than 9,000 ADT and 35 MPH with raised median or less than 9,000 ADT and 30 MPH.
Signalized crosswalk	• Where a traffic signal is considered sufficient for this analysis.
Pedestrian Hybrid Beacon	• Where a pedestrian hybrid beacon has been installed is considered sufficient for this analysis.

The analysis is meant to be used as a planning tool, and may not fully reflect on-the-ground conditions and factors, or the most recent enhancements made by local governments. However, it can help DRCOG and its partners to identify gaps and opportunities. While this analysis identifies corridor and street segments where distance between crossings may be considered "excessive," actual needs are highly context-dependent. For instance, on rural roads, long distances between crossings are to be expected due to low population density and activity generators. In urban and suburban areas, crossing gaps should be considered alongside safety and crash trends, modal network plans, and local conditions to evaluate pedestrian needs and priorities.

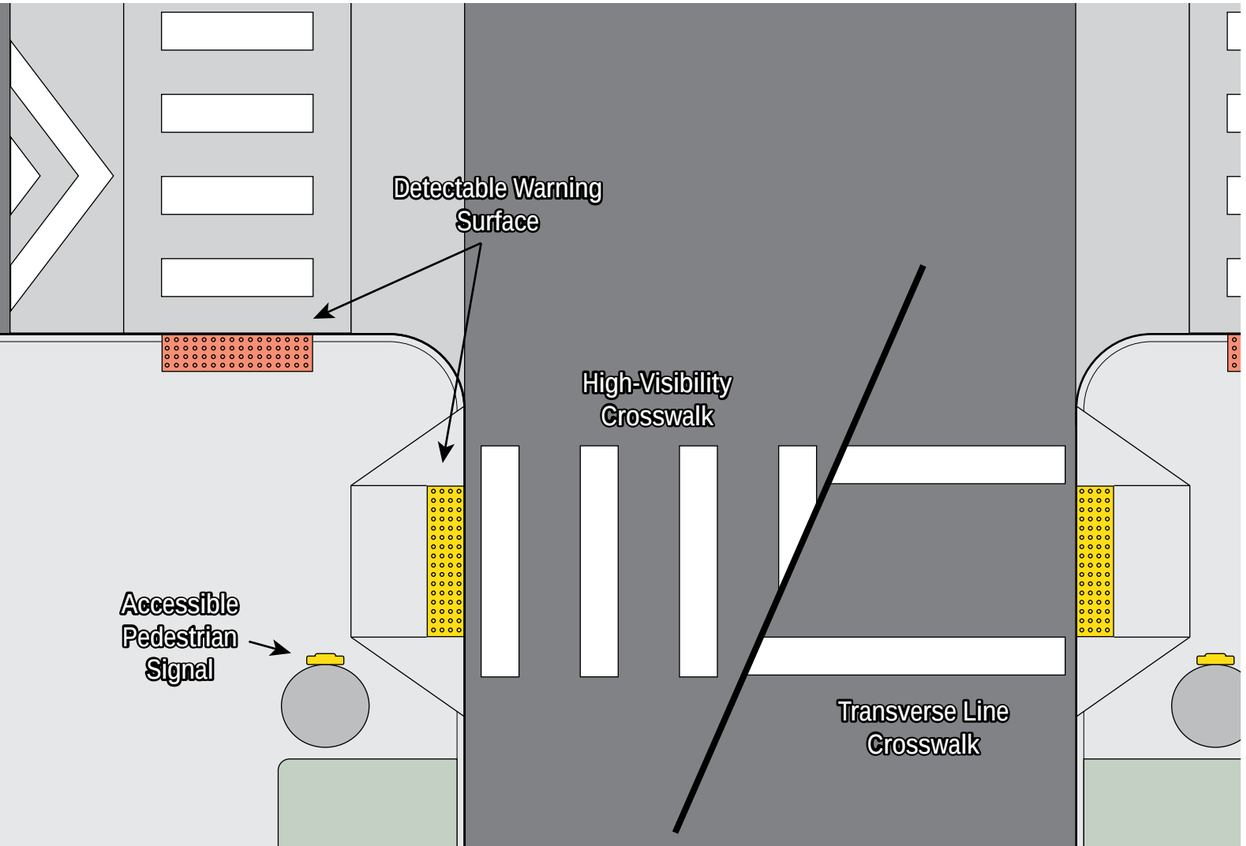
Crosswalk design elements

Beyond traditional crosswalk markings, several additional design elements play a crucial role in enhancing pedestrian safety and accessibility. Factors such as roundabouts, pedestrian refuge islands, detectable warning surfaces, traffic calming measures and accessible pedestrian signals must be carefully integrated into crossing designs to accommodate all users.

This section explores key considerations for pedestrian crossings in complex environments, including strategies for improving safety at roundabouts, the role of pedestrian islands in high-traffic areas and the importance of detectable warning surfaces for accessibility. Additionally, it highlights the benefits of traffic calming measures and the necessity of APS in ensuring safe and inclusive crossings for individuals with visual impairments.

Crosswalk basics

Crosswalk design plays a critical role in enhancing pedestrian safety and ensuring accessibility. The MUTCD 11th Edition, Section 3C.03, provides guidelines for the design of crosswalk markings, specifying two primary types of crosswalks: high-visibility crosswalks and transverse line crosswalks. High-visibility crosswalks are preferred.



High-visibility crosswalks

These crosswalks are designed to enhance pedestrian visibility, particularly at non-intersection locations, areas with high pedestrian activity or locations with frequent conflicts or crashes. High-visibility crosswalks use designed patterns such as longitudinal bars, ladder markings and bar pairs to create a high-contrast improve driver awareness of pedestrian crossings. High-visibility markings can be installed in conjunction with warning signs to alert motorists to the presence of pedestrians and improve safety outcomes, especially at unsignalized or mid-block crossings.

Figure 16 Example of a high-visibility crosswalk.

The MUTCD provides general guidelines for crosswalk markings; however, there is no universal standard governing pedestrian crossing design across all jurisdictions.

Curb ramps

Where the sidewalk and crosswalk or crossing are at different grades, an accessible curb ramp is required with a maximum running slope of 1:12 and a 48-inch deep landing area where a direction change is necessary from the pedestrian access route. The curb ramp should ideally point straight into the crosswalk, and the side treatment (whether curbed or flared) should provide non-visual guidance to enable users to align with the crossing. Diagonal ramps are not preferred.

Figure 17 Example of an accessible curb ramp.

To improve accessibility, the corner grade of the street can be gently raised at the ramp to "meet halfway"—that is if the curb is six inches high, bring the street grade up three inches at the corner so that the ramp only needs to depress three inches for a gentler transition.

Detectable warning surfaces

Variations in the sidewalk surface provide non-visual information to alert to conflicts and transitions and assist pedestrians with navigation. Detectable warning surfaces must visually contrast with adjacent walking surfaces. The contrast should be either light-on-dark or dark-on-light to provide a clear distinction for individuals with visual impairments. PROWAG requires only truncated domes to alert pedestrians that they are about to cross into a new modal space (e.g., departing the sidewalk into a crosswalk), while other detectable surface treatments are currently undergoing research and experimentation across North America.

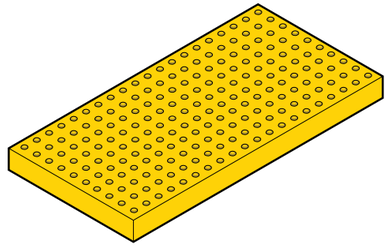


Figure 18 Truncated dome mat

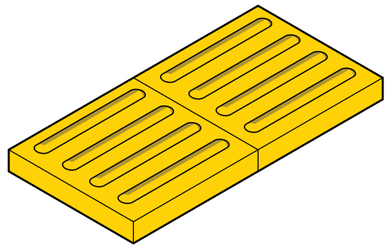


Figure 19 Corduroy strip tiles

Truncated domes (Figure 18) are required at curb ramps, blended transitions, pedestrian refuge islands, transit boarding platforms, at-grade rail crossings and stop- or yield-controlled driveway crossings by PROWAG guidance. These surfaces must extend a minimum of 24 inches in the direction of pedestrian travel to ensure that pedestrians are adequately alerted to upcoming changes in the walking environment.

Corduroy strips (Figure 19) are used to provide directional wayfinding assistance, especially for blind and low-vision pedestrians, to be able to follow the direction of the corduroy strip using a long white cane. However, these should be used judiciously, such as around novel or unfamiliar street designs such as bikeway ramps. Because they are an experimental treatment, designers should not assume that blind users will be familiar with the intent of corduroy strips. When used, the corduroy strip should indicate the centerline of the intended pedestrian path, and should be offset from the pedestrian access route edge at least one foot.

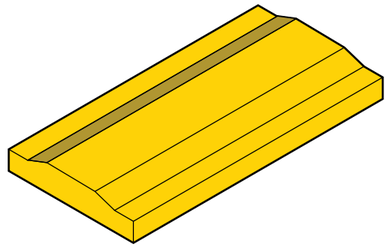


Figure 20 Trapezoidal edge tile

Trapezoidal edges (Figure 20) are an optional edge treatment for shared or curbless streets where the intent is to define an edge of the pedestrian access route. However, local agencies should consult with disabled users during the design process to ensure all materials and surfaces are easily understood, as blind users especially may be unfamiliar with emerging surface treatments.

Finally, as important to blind users as the shape and profile of detectable warning surfaces is the sound when tapped or contacted—plastic tactile mats provide a distinct and easily recognized sound, while iron or concrete surfaces can be more readily confused with other street features.

Accessible pedestrian signals (APS)

Accessible pedestrian signals (APS) primarily support individuals with visual impairments in safely navigate intersections. APS devices communicate pedestrian signal phase and crossing information through non-visual means, including audible tones, speech messages and vibrating surfaces. In addition to supporting blind and low-vision pedestrians, APS systems can support able-bodied users by providing phase confirmation and (where appropriate) pedestrian actuation. These signals are required for all new or altered pedestrian signal installations to comply with the Americans with Disabilities Act (ADA) and ensure universal access.

Figure 21 Accessible Pedestrian Signal (APS). (Source: Alta Planning + Design)

However, some considerations planners and designers should consider when selecting and installing APS equipment:

- Consult with local disability advocates and people with blindness or low-vision about their needs and experiences.
- Install APS buttons within easy reach adjacent to the crosswalk entry, preferably on the signal pole or pedestal next to the curb ramp and never behind barriers or inaccessbile from the access route.
- Be thoughtful about audible cues to reduce noise clutter and provide salient information. "Chirps" and "cuckoos" can add clutter and may reduce users' abilities to differentiate traffic noise; however, announcements of street names or crossing direction can provide valuable information to blind pedestrians.
- Finally, accessible pedestrian signals are compatible with both fixed-time and actuated signals. Especially in locations with regular pedestrian activity, fixed timing that puts the pedestrian crossing phase on recall should include the APS as a supportive device that provides relevant multi-sense guidance.

Supportive design tools

In addition to the basic elements of a crosswalk, designers have access to a large menu of supportive tools and countermeasures that can enhance pedestrian safety, comfort and accessibility. Refer to The Federal Highway Administration's (FHWA) **Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations** (colloquially the "STEP Guide") for additional guidance on site and countermeasure selectionwhich are briefly summarized below.

Daylighting and curb extensions

Where on-street parking and curbside access lanes are present, extending the corner of the sidewalk into the shadow of the curb lane shortens the pedestrian crossing distance, tightens corner radii to calm vehicle turn speeds, increases pedestrian visibility and conspicuity, and expands pedestrian space at common conflict points. Where curb extensions are not installed, parking may still be recessed from the corner to improve sightlines. A **recent study from New York City Department of Transportation** found that hardened infrastructure paired with daylighting was associated with signficantly reduced crash rates.

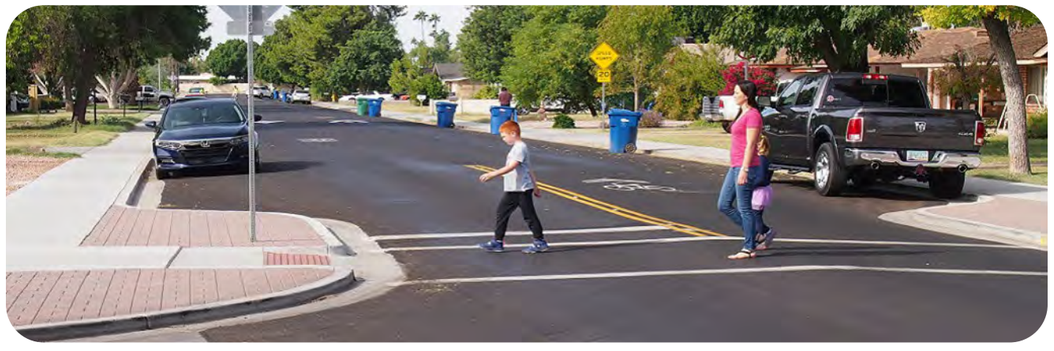


Figure 22 Curb extension (Source: Alta Planning + Design)

Raised crosswalks

Especially on minor streets or in commercial or high-pedestrian activity areas, raised crosswalks and intersections bring the street grade up to sidewalk level to further enforce vehicle yielding and improve crossing accessibility. Per FHWA guidance, these may be most suitable as a treatment on two- or three-lane crossings where posted speed is 30 miles per hour or less and average daily vehicle volumes are 9,000 or less.

Pedestrian islands and medians

Pedestrian refuge islands and medians serve as critical safety elements for individuals crossing wide or high-traffic roadways by providing a protected space to pause. These islands are especially beneficial for individuals with mobility challenges or those crossing in high-traffic environments. According to PROWAG, detectable warning surfaces are required on all pedestrian refuge islands with cut-through pathways. These surfaces should provide tactile cues and visual contrast to ensure accessibility for individuals with visual impairments. FHWA includes pedestrian refuge islands as a **Proven Safety Countermeasure** due to their effectiveness in reducing pedestrian-vehicle conflicts.

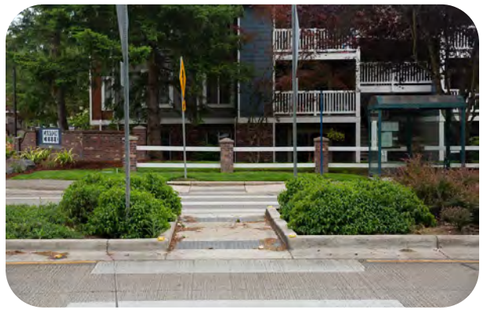


Figure 23 Pedestrian island and median. (Source: Alta Planning + Design)

Pedestrian hybrid beacons (PHBs or HAWK signals) and rectangular rapid-flashing beacons (RRFBs)

Pedestrian hybrid beacons are actuated traffic control devices typically installed at midblock crossings and provide pedestrians with an exclusive and signal-controlled crossing phase, which can be supplemented with curb extensions of refuge islands where appropriate. Rectangular rapid-flashing beacons are similarly pedestrian actuated, but utilize a a data-proven wig-wag flashing pattern to enhance conspicuity and improve vehicle yielding.

Road diet/lane reallocation

Road diets are reconfigurations of the roadway that typically reduce the number of vehicle travel lanes and focus on traffic efficiency. Per FHWA's guidance, roads with four or more travel lanes and traffic volumes up to 20,000 vehicles per day are good candidates for lane reallocation. These projects support walking safety and comfort by shortening crossing distance, improved streetscape, fewer opportunities for unconstrained speeding and elimination of multiple threat conflict.

Modern roundabouts

While not included in FHWA's STEP Guide, roundabouts are an emerging traffic safety treatment that have demonstrated positive safety outcomes in some circumstances. Especially in suburban and rural contexts where pedestrian activity is less dense, modern roundabouts can cultivate clear sightlines and single points of interaction that can reduce conflict. However, in contexts with regular pedestrian activity, roundabouts can increase walking delay and decrease comfort, requiring pedestrians to travel additional out-of-route distance and wait for multiple breaks in vehicle traffic to cross. Roundabouts should be deployed with sensitivity to context.

2

Delivering sidewalks: challenges and solutions

This section discusses the challenges associated with constructing sidewalk networks within the Denver region, using the results from a survey completed by member governments to identify the top challenges facing sidewalk delivery. The section includes ideas for addressing the challenges by learning from sidewalk programs across the country, as well as potential solutions from jurisdictions within the region.

The planning process for the development of this guide included two key outputs:

- **Sidewalk Delivery Survey:** Distributed to DRCOG member jurisdictions to identify the key challenges to sidewalk construction in the region.
- **Sidewalk Delivery Case Studies:** These case studies, from both within the region and nationwide, help provide ideas and solutions for how to implement sidewalks in the region.

Both outputs include their own reports and are included as an appendix for further information.

As part of the Sidewalk Delivery Guide development process, a Sidewalk Delivery Survey was developed to gain insights from member agencies on the challenges, strategies and best practices in sidewalk delivery across the Denver region. Responses from 27 jurisdictions, including a range of urban, suburban and smaller municipalities, provided a comprehensive understanding of the current state of pedestrian infrastructure planning, funding, construction and maintenance. The survey focused on collecting data related to funding sources, construction responsibilities, performance measures and the major challenges impacting sidewalk delivery.

Delivering and maintaining sidewalk infrastructure across the DRCOG region is becoming increasingly difficult due to a variety of financial, logistical and staffing challenges. Survey responses from jurisdictions throughout the region highlight several key obstacles that hinder timely and cost-effective sidewalk construction and maintenance.

Rising material and labor costs

Over the past decade, construction costs have risen across the U.S. and the state—according to the **Colorado Department of Transportation's Construction Cost Index**, the unit cost of concrete pavement nearly tripled from 2019 through 2024, and other common construction materials grew by as much as 50% (as shown in Figure 24). During engagement with member governments, DRCOG staff found that member governments in the Denver region assume that a 5-foot wide sidewalk costs $2.5 – 3 million per mile to construct, including planning and design work. Among Denver region governments, the most frequently cited challenge in sidewalk delivery is the rising cost of materials such as concrete, steel and asphalt. Inflationary pressures and supply chain disruptions have led to increased costs, forcing jurisdictions to prioritize maintenance over expansion.

- **19 jurisdictions** identified rising material costs as a major issue, making it difficult to complete planned projects within existing budgets.
- **16 jurisdictions** cited rising labor costs as a barrier, with high demand for skilled workers leading to increased wages and project expenses.

Cost increases make it challenging for jurisdictions to expand sidewalk networks, particularly in areas with high infrastructure needs. To manage these rising expenses, agencies are implementing cost-saving strategies such as bundling sidewalk projects with other infrastructure improvements, utilizing alternative materials and adjusting funding mechanisms to keep pace with inflation. These approaches help maximize available resources while ensuring continued sidewalk investment.

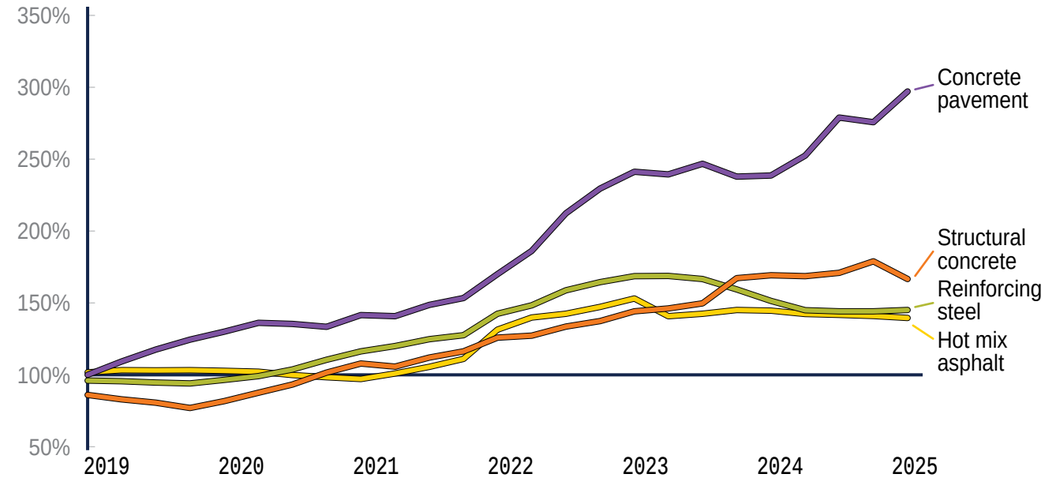


Figure 24 Colorado Department of Transportation Construction Cost Index by quarter of key construction materials (seasonally adjusted), 2019 - 2025

Establish clear design and construction standards

A key dilemma jurisdictions face when retrofitting existing streets with accessible sidewalks is solving unique right-of-way issues with bespoke designs—tailoring sidewalks to existing curblines and subsurface infrastructure, building around trees and landscape and fitting accessible paths between the roadbed and property line. Standardizing the jurisdiction's approach can have multiple benefits toward alleviating cost increases:

Developing and adopting sidewalk design and construction standards can mitigate cost escalation by solving common design challenges in advance and setting clear, consistent expectations for city crews, contractors and private developers or abutters who are building pedestrian facilities.

Austin, TX

The City of Austin's Transportation Criteria Manual—adopted in 2022—provides standard details for commonly designed and constructed right-of-way elements. However, as the City's design toolbox has grown and evolved quickly, the City has also developed **interim standard details** for a number of safety and accessibility-focused design elements ranging from bus stops to curb extensions (Figure 25) to refuge islands and directional indicators. These details provide city crews and contractors updated and replicable guidance for innovative design features consistent with national best practice, but without being delayed by an adoption process. With these standards and guidance, construction crews can more effective deliver consistent and cost-effective results supporting multimodal safety.

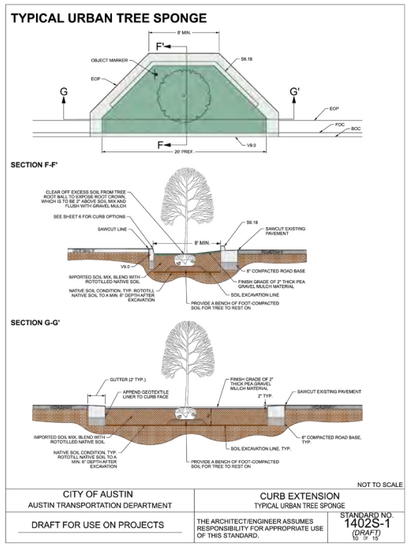


Figure 25 City of Austin Interim Standard Detail – Typical Urban Tree Sponge, Curb Extension Details

Explore alternative materials and construction methods

To mitigate rising costs and accelerate project delivery, some jurisdictions use prefabricated sidewalk sections, modular sidewalks, or alternative materials that require less labor and maintenance. By using operational tools (such as flex posts, painted curb extensions, pedestrian walkways or traffic diverters) and quick-build or interim materials (including recycled rubber, asphalt, or even wood or composite boards as used in parklets), jurisdictions can realize benefits quickly without needing to do more intensive design and civil engineering.

Seattle, WA

Seattle's Home Zone program seeks to retrofit residential streets to promote walkable neighborhoods through small-scale and low-cost treatments that calm vehicle traffic and quickly expand accessible pedestrian walkways. The program toolbox employs quick-build strategies such as pre-cast curbs, asphalt walkways and painted pedestrian spaces, street closures, parking regulation modifications and pedestrian crossing enhancements to provide immediate pedestrian access while awaiting permanent infrastructure.

Additionally, the Seattle Department of Transportation has piloted use of materials such as porous pavement, large-block pavers and recycled rubber as alternatives for addressing site-specific issues and accelerating sidewalk construction.

See page 48 for more information.

In addition to alternative materials, adapting project delivery and contracting approaches can save time and money. For instance, researchers found that as departments of transportation increase the number of projects they put out to bid each year, they receive fewer qualified bids per project, reducing cost competitiveness. Strategically packaging projects can increase competition and reduce costs.

Beyond how projects are packaged and advertised, jurisdictions may also consider alternative strategies for managing and delivering sidewalk projects. Construction Manager/General Contractor, Design Build, or Facility Bundling are alternative delivery methods based on project size, scope and complexity; the contracting and delivery method should be chose carefully based on the project or program needs. Refer to FHWA's **Alternative Project Delivery** resource hub for detailed information about contracting approaches.

Focus on retaining staff and expanding internal capacity

A 2025 paper entitled **State Capacity and Infrastructure Costs** explored infrastructure project costs across the U.S. between 2014 and 2020, and reported two particularly striking findings around engineering staff capacity within state departments of transporation. First, the researchers assert that agency size is inversely related to project costs—adding one transportation employee per 1,000 residents is correlated with 26% lower project-level costs. Second, the paper finds that staff engineer and project manager experience and quality are

associated with significant project cost reductions—the authors find that "moving from the 25th to 75th percentile of Project Head quality is associated with a 14% reduction in costs per mile, amounting to more than three times the average engineer salary."

Hiring and retaining experienced and knowledgeable public staff is a key strategy for controlling costs. While many jurisdictions, especially smaller cities, towns and counties with constrained budgets, have limited capacity to directly complete design, engineering and construction work, retaining experienced and knowledgeable staff who can identify efficiencies and effectively manage projects and contracts is a key strategy to mitigating rising costs, averting costly delays and change orders.

Adjust fee structures to account for inflation

Updating impact fees and local funding structures, which are generally set through ordinance and often at fixed nominal amounts, can help jurisdictions keep pace with inflation and rising costs.

Westminster, CO

The City of Westminster recommended adjusting its Roadway Improvement Fee—which is incorporated into residents' utility bills—to better offset increases in construction expenses. Originally set at $6 per month, the fee was recommended to be increased to $7 for residential accounts and to $20 (or $10 per 1,000 square feet) for nonresidential accounts. This adjustment was determined based on measured increases in material and labor costs in line with inflationary trends, ensuring that there is consistent and adequate funding available for ongoing sidewalk projects. See page 59 for more information.

Physical infrastructure constraints

Many jurisdictions struggle with right-of-way limitations, drainage issues and utility conflicts that complicate sidewalk construction. These technical barriers often require costly modifications or coordination with other agencies, leading to delays and budget overruns.

- **18 jurisdictions** reported that physical infrastructure constraints were a significant challenge, particularly in built-out urban areas where space for sidewalks is limited.

Physical barriers such as right-of-way limitations, utility conflicts and geographic constraints often complicate sidewalk installation, particularly in built-out areas. To address these challenges, jurisdictions are adopting flexible sidewalk design solutions that make better use of existing space and collaborating with utility and transportation agencies to align infrastructure improvements. These approaches help streamline project delivery while maintaining pedestrian connectivity.

Adaptive sidewalk design for constrained spaces

Where physical barriers such as narrow rights-of-way or utility conflicts exist, jurisdictions have adopted creative design alternatives that are targeted to pedestrian-focused corridors rather than applied uniformly to all streets. These solutions are selectively implemented in areas where connectivity is significantly impeded.

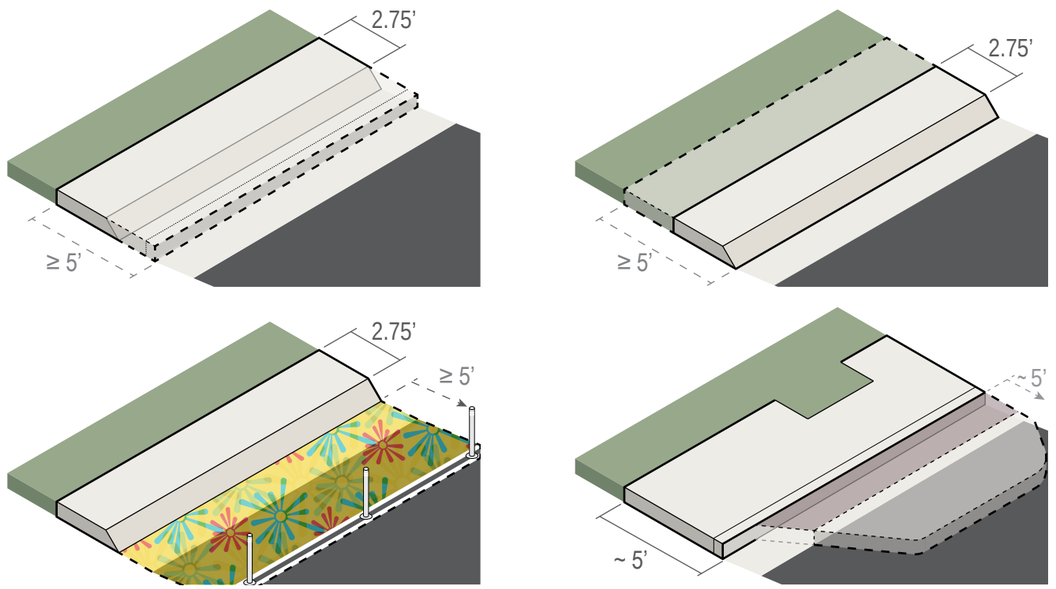


Figure 26 Four typical solutions to expanding substandard sidewalks. Clockwise from top left: extending the curb into the road to achieve standard width; extending the sidewalk back toward the property line; using "paint-and-post" interim materials to extend into the road; and bulb-outs to navigate obstructions.

While sidewalk expansions and retrofits can often be costly and challenging due to existing drainage and grade, Figure 26 illustrates four example solutions of how to creatively adapt design to retrofit sidewalks for universal access. Sidewalk easements, interim or quick-build materials, and strategic use of trench drains can each add flexibility to the design toolbox.

Boulder's Missing Links Program

Boulder's program systematically identifies critical gaps in the sidewalk network, concentrating on locations with high pedestrian demand where physical barriers exist. By using streamlined processes—including simplified design approaches, coordinated permitting and proactive utility management—the program efficiently addresses missing links. These methods are applied selectively to corridors where barriers prevent continuous pedestrian connectivity, ensuring that limited resources are directed to the most impactful improvements. More details on this approach can be found on Boulder's **Missing Sidewalk Links** project webpage.

Seattle's Priority Investment Network

Seattle's approach involves a data-driven assessment of streets with limited right-of-way. The network prioritizes improvements in corridors that are identified as having significant pedestrian access challenges due to physical constraints. In these targeted areas, the program develops alternative pedestrian routes or shared spaces designed to overcome the specific barriers present, rather than applying a one-size-fits-all solution across every street. This focused strategy ensures that interventions are both cost-effective and directly responsive to areas with the greatest need, as demonstrated in multiple case studies from Seattle. See page 48 for more information.

These strategies illustrate how targeted, flexible design solutions can effectively enhance pedestrian connectivity in challenging environments without necessitating wholesale changes to all street designs.

Coordinating with utility and transportation agencies

In Seattle's approach, collaboration between city departments, transit agencies and utility providers plays a crucial role in streamlining project approvals and minimizing disruptions. For instance, Seattle works directly with transit agencies to coordinate sidewalk upgrades with transit expansion projects. Transit agency and city staff jointly assess first/last mile connectivity around transit stops by reviewing ridership data, safety metrics and accessibility standards, identifying deficiencies in pedestrian infrastructure and prioritizing improvements based on transit demand, ensuring that sidewalk upgrades effectively support transit riders.

Moreover, these coordinated efforts extend to utility management. By aligning sidewalk construction with planned utility upgrades and stormwater management projects, the city reduces delays and leverages shared funding opportunities. Overall, this integrated approach not only optimizes space and funding efficiency but also enhances the overall connectivity of Seattle's multimodal transportation network.

Lack of dedicated funding for sidewalks

While most jurisdictions rely on general funds and grants for pedestrian infrastructure, funding remains inconsistent and insufficient to meet demand.

- **Many jurisdictions depend on development-driven funding**, with an average of **6.2 miles of sidewalk constructed annually** through redevelopment projects. However, this approach can lead to uneven sidewalk coverage, as improvements are only made where new development occurs.
- **Fewer jurisdictions use impact fees, bonds, or local improvement districts**, limiting the ability to secure dedicated sidewalk funding outside of general budgets.

As a result, many agencies struggle to fund sidewalk maintenance and expansion at the scale needed to meet regional growth and accessibility goals.

Sustainable sidewalk delivery depends on securing reliable, long-term funding beyond general municipal budgets. Many jurisdictions are implementing innovative funding models such as special improvement districts, development-driven contributions and dedicated tax levies. Additionally, agencies are maximizing state and federal grant opportunities to supplement local resources. These diverse funding strategies help ensure continued investment in pedestrian infrastructure while reducing reliance on limited general funds.

Creatively bundle sidewalk projects with other capital programs

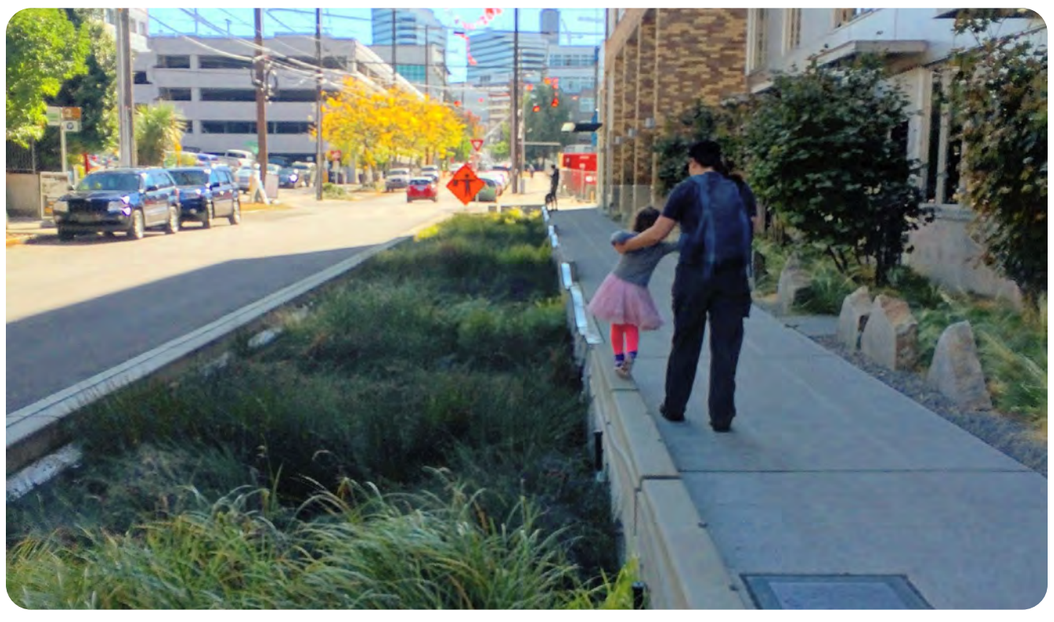
Many jurisdictions capture benefits of scale and unlock opportunities by integrating sidewalk and curb ramp construction with larger capital infrastructure projects, such as major street reconstruction or road repaving. However, related right-of-way projects including stormwater infrastructure and utility upgrades can also create opportunities for completing or upgrading pedestrian facilities and may unlock new funding sources. Setting clear policy and guidance for what projects trigger sidewalk improvements and what facilities must be implemented per context is a potential solution for accelerating sidewalk delivery.

Fort Collins, CO

Fort Collins Street Maintenance Program—funded through a combination of dedicated sales tax and general fund—repairs and resurfaces streets each year. While the primary focus is preventative maintenance of the roadbed, the program is structured to also coordinate sidewalk repairs and ADA curb ramp upgrades, ensuring cost-efficient project bundling. The City keeps a list of conditions that indicate sidewalk repairs, including accessibility issues, safety concerns and drainage issues. See page 56 for more information.

Seattle, WA

Seattle is under a consent decree with the U.S. Environmental Protection Agency to mitigate stormwater runoff and outfalls through investments in green and sub-surface infrastructure citywide. To capture opportunities and limit the disruption of infrastructure projects, the Seattle Department of Transportation partners with Seattle Public Utilities (SPU) to align sidewalk construction with stormwater improvements, capitalizing on an aligned program and reducing overall program costs. For instance, when SPU identifies project areas in need of green infrastructure or sewer separation, the two agencies partner to simultaneously install new sidewalks, curb extensions, street trees and bioretention areas that improve both walking comfort and ecosystem performance. See page 48 for more information. In addition to the approaches above, jurisdictions may consider bundling sidewalk projects not merely as isolated gap-fillers, but as part of a comprehensive capital project. Instead of addressing small sections individually, a coordinated program could upgrade entire corridors or multiple streets simultaneously. This strategy creates a contiguous, high-quality pedestrian network and achieves economies of scale. For instance, the Seattle case study demonstrates how a corridor-wide initiative—the Aurora Ave Corridor Project—can integrate multiple sidewalk upgrades with other capital improvements to transform extensive infrastructure deficits into a cohesive, accessible network.



District-based and localized funding models

Instead of relying solely on general funds and state grants, cities have explored sustainable funding models such as impact fees, local improvement districts (LIDs) and special tax levies. These approaches not only provide dedicated revenue streams but also shift maintenance responsibility from individual property owners to the jurisdiction, allowing for more consistent and large-scale improvements rather than incremental, property-owner-led repairs.

Instead of relying solely on general funds and state grants, cities have explored sustainable funding models such as impact fees, local improvement districts (LIDs) and special tax levies.

Ithaca, NY

Ithaca's Sidewalk Improvement Districts (SIDs) require property owners to pay a dedicated annual fee for sidewalk maintenance, with rates structured based on property type and frontage. The city is divided into five SIDs, excluding Cornell University, which maintains its own sidewalks. Fees collected within each district are reinvested in sidewalk repairs and improvements specifically within that district, ensuring localized benefits. The city prioritizes projects through a data-driven evaluation process that considers accessibility needs, pedestrian demand and infrastructure conditions, with annual updates guiding investments. In exchange for the fee, the city assumes responsibility for sidewalk maintenance and reconstruction, relieving individual property owners of repair obligations. This structured approach ensures a more equitable, transparent and large-scale improvement process, rather than relying on incremental, property-owner-led repairs. See page 51 for more information.

Westminster, CO

Westminster successfully implemented a *utility* fee model to fund sidewalk infrastructure in 2014, charging a flat $6 monthly per utility account. Updated in 2022 to $7, the fee now applies per unit to ensure a more equitable distribution of infrastructure costs across residential and commercial properties. This approach centralizes responsibility for sidewalk maintenance, allowing for coordinated, large-scale improvements rather than piecemeal repairs by individual property owners. See page 59 for more information.

Leveraging development contributions

Private development plays a key role in sidewalk expansion, but structured policies and programs are necessary to ensure consistent investments that align with citywide pedestrian infrastructure goals.

Fort Collins, CO

Fort Collins enhances traditional development-driven sidewalk construction by integrating a data-driven, equity-focused approach into its Development Review Process. While developers are required to provide frontage improvements, Fort Collins goes further by leveraging its Sidewalk Prioritization Model to guide where fee-in-lieu contributions are invested, ensuring that funds support sidewalk gaps in high-need areas rather than being limited to immediate project boundaries. Additionally, the city coordinates with developers to align sidewalk installation with broader infrastructure improvements, maximizing efficiency and pedestrian connectivity across multiple projects. This approach ensures that sidewalk delivery is not just a byproduct of new development but a strategically planned effort to improve citywide walkability, accessibility and equity. See page 56 for more information.

Staffing and contractor shortages

Limited staffing for sidewalk projects is another widespread issue. Many jurisdictions rely on external contractors, but high demand and limited availability contribute to project delays and increased costs.

- **12 jurisdictions** cited a lack of dedicated staff to manage sidewalk projects as a challenge, affecting planning, oversight and coordination efforts.
- **Five jurisdictions** reported difficulty in hiring construction staff, exacerbating delays and limiting in-house capacity for project delivery.

Additionally, smaller municipalities often lack the resources to maintain full-time sidewalk construction crews, further increasing reliance on private contractors.

Labor shortages and limited staffing capacity have made it increasingly difficult for jurisdictions to manage sidewalk projects efficiently. To overcome these challenges, agencies are fostering cross-department collaboration, forming regional partnerships and exploring the benefits of in-house construction teams. These strategies help reduce reliance on external contractors, improve project oversight and ensure timely sidewalk implementation.

Focus on staff retention

As discussed on page 28, experienced and talented staff with institutional knowledge can have dramatic effects on controlling project costs, as they develop deep understanding of local best practices and strategies for proactively mitigating common project barriers or delays. In addition to the benefits of investing in and developing strong project managers to keep work on schedule and on budget, tenured staff grow rich professional networks that drive cost competition and ultimately project savings. For instance, the reserachers behind the **State Capacity and Infrastructure Costs** report found that agencies that conduct bidder outreach for project contracts can increase the number of bids received, and that an additional bidder per project is associated with decreased project costs per mile. Retaining and investing in talented technical and managerial staff can be a powerful cost control strategy.

Cross-department and regional collaboration

Sharing resources and expertise across municipal agencies allows local governments to better coordinate pedestrian infrastructure improvements, reduce redundancies and streamline project implementation.

Seattle, WA

Seattle integrates sidewalk planning with other infrastructure projects through collaboration with multiple city departments, including the Seattle Department of Transportation (SDOT) and Seattle Public Utilities (SPU). The *Priority Investment Network (PIN)* guides the selection of sidewalk projects based on proximity to schools, transit hubs and underserved neighborhoods. Once priority areas are identified, SDOT collaborates with other city agencies to align sidewalk construction with utility upgrades, stormwater infrastructure and road maintenance, maximizing efficiency and reducing costs. See page 48 for more information.

Survey Insight: Many jurisdictions reported using on-call contractors or project-based hiring to fill labor gaps. However, delays often occur due to limited contractor availability and competing priorities across departments. Local governments that proactively integrate pedestrian projects with broader capital improvement efforts—rather than treating them as stand-alone initiatives—may be more successful in addressing these constraints.

ADA compliance and universal access

Ensuring that sidewalks are accessible and fairly distributed remains a challenge across the region.

- **14 jurisdictions have ADA transition plans,** but **12 jurisdictions were unsure** about their compliance status, indicating a need for greater awareness and coordination.
- **Only six jurisdictions track the percentage of sidewalks that meet ADA standards**, suggesting that many municipalities lack the data needed to prioritize accessibility improvements.

Without clear metrics and dedicated funding for ADA compliance, gaps in accessibility remain a significant barrier to inclusive pedestrian infrastructure.

Ensuring that sidewalks are accessible and fairly distributed remains a key priority for many jurisdictions. However, gaps in ADA compliance and pedestrian infrastructure continue to pose challenges. Local agencies are addressing these issues by developing data-driven prioritization models that identify high-need areas and investing in dedicated accessibility programs. By focusing on historically marginalized communities and ensuring sidewalks meet ADA standards, jurisdictions can remove barriers throughout the pedestrian network to support all users.

Dedicated accessibility programs

To meet ADA compliance requirements, jurisdictions have developed targeted funding streams and repair programs.

Boulder, CO

Boulder's Accessible Boulder: ADA Self-Evaluation and Transition Plan serves as the city's ADA Transition Plan, aiming to ensure that transportation facilities are accessible to individuals of all mobility levels. This comprehensive plan assesses the current compliance of Boulder's transportation system—including sidewalks, curb ramps, multi-use paths, pedestrian signals, crossings and transit stops—with the Americans with Disabilities Act (ADA). The self-evaluation identifies existing barriers and opportunities for improvement, while the transition plan prioritizes and schedules necessary enhancements to achieve ADA compliance. See page 53 for more information.

Survey Insight: Only six jurisdictions track the percentage of sidewalks that meet ADA standards, highlighting the need for improved data collection and tracking.

3

Seek durable and adequate funding

Regional funding opportunities

Many jurisdictions supplement local funding with state and federal grants to support pedestrian infrastructure improvements. Additionally, DRCOG supports sidewalk planning, design and construction through the Transportation Improvement Program (TIP), which directs federal funding to regionally important projects through multiple tracks:

- The **Regional Transportation Improvement Program,** which directs federal funding on a four-year cycle to regionally-significant projects with a focus on implementing Metro Vision and the Regional Transportation Plan.
- The **Subregional Transportation Improvement Program forums,** which enable counties and local governments to prioritize and fund local projects within eight subregions.
- DRCOG offers several **regional set-aside programs,** each with its own funding amount and distinct call for projects.

This section discusses each of the funding tracks within the Transportation Improvement Program, the sources of funding, and examples of pedestrian and active transportation projects recently programmed through the TIP.

Federal formula programs

These programs provide consistent funding through federal allocations:

- **Congestion Mitigation and Air Quality (CMAQ) Program** – Supports projects that reduce transportation-related emissions, including pedestrian improvements.
- **Surface Transportation Block Grant (STBG) Program** – Flexible federal funds for transportation infrastructure, including pedestrian and bicycle projects.
  - **Transportation Alternatives Program (TAP)** – Funds pedestrian and bicycle infrastructure such as sidewalks, trails and safe crossings.
- **Multimodal Transportation and Mitigation Options Fund (MMOF)** – Although primiarily a state funding source, MMOFT provides funding for transportation projects that improve accessibility, including sidewalks and multimodal connections.
- **Carbon Reduction Program (CRP)** – Provides fudning to projects designed to reduce transportation emissions from on-road sources.

Highway Safety Improvement Program (HSIP) – Supports projects that enhance transportation safety, including pedestrian crossings and traffic calming measures.

Regional Transportation Improvement Program

For projects funded through DRCOG, there are two opportunities for eligible project sponsors to seek funding: a regional call for projects and subregional call for projects. The regional call for projects allocates 20% of available TIP funds for regionally significant projects. The subregional call for projects allocates 80% of available TIP funds for important projects in each subregion. Projects are evaluated by staff and recommended for funding by a Project Review Panel made up of representatives from throughout the region. DRCOG's Board of Directors makes the final project selection decision.

The Transportation Improvement Program (TIP) must be fiscally constrained to funds expected to be available. The TIP specifically identifies programs and projects for federal and state funding based on DRCOG's adopted Metro Vision Regional Transportation Plan, taking the vision set forth in the plan and translating it into constructed projects. TIP-funded projects fall within the six MVRTP priorities: Safety, Active Transportation, Air Quality, Multimodal Mobility, Freight and Regional Transit.

20% of the TIP funding (post set-aside allocations) is dedicated to the regional call for projects, while the remaining 80% is dedicated to the subregional forums. Each TIP call may be tailored to a specific priority, as set forth in each adopted TIP Policy document. Below are three recent example active transportation projects funded through the regional TIP.

Peaks to Plains Trail

Sponsor: Jefferson County

Length: 3 miles

Cost: $103 million

Plan network: regional active corridor

A new shared-use path (now renamed the Clear Creek Trail) is being built through Clear Creek Canyon adjacent to US-6, including a 10-foot path, bridges, trailheads and creek access points. The path will be a hallmark active transportation facility for the region.

Mineral Station Area

Sponsor: City of Littleton

Length: 0.8 miles

Cost: $5 million

Plan network: pedestrian focus area

New and widened shared-use paths are being built to strengthen access to Littleton's Mineral LRT Station, including expanded sidepath and safety enhancements along Mineral Avenue, and active transportation connections to the regional trail network.

16th Street Mall Rehab

Sponsor: City & County of Denver

Length: 0.9 miles

Cost: $113 million

Plan network: pedestrian focus area, short trip opportunity zone

The historic 16th Street Transit Mall was completely reconstructed in downtown Denver including a new granite paving system, curbless streets, landscaping, and public realm improvements, rehabbing a signature destination.

Subregional Transportation Improvement Program

The Subregional share of the TIP is allocated among eight county forums within DRCOG's MPO boundary (Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, Jefferson and Southwest Weld) with an allocation formula determined by population, employment, and vehicle miles traveled in each county. Each forum establishes its own governance structure and voting criteria. Eligible projects must fall into a prescribed set of categories that align with the Regional Transportation Plan, including Active Transportation, Arterial Safety/Regional Vision Zero, and Multimodal Capital projects that can support walking and bicycling.

Because the subregional forums have some autonomy to make funding recommendations, each forum can prioritize active transportation at its own consensus. Below are recent example projects funded through the Subregional TIP calls for projects.

Aurora Missing Sidewalks

Sponsor:City of Aurora

Length: 2.2 miles

Cost: $2.9 million

Plan Network: pedestrian focus area

The City of Aurora constructed detached sidewalks along arterial and collector streets to close gaps in the citywide sidewalk network, prioritizing streets near schools and in historically marginalized communities.

CO-119 Bikeway

Sponsor: Boulder County

Length: 4.6 miles

Cost: $9.4 million

Plan Network: regional active corridor

Coinciding with bus rapid transit investments along the state highway, Boulder County and its partners are constructing a 12-foot wide shared-use path connecting Boulder and Longmont along CO-119.

Nederland ADA Sidewalks

Sponsor: Town of Nederland

Length: 0.2 miles

Cost: $1.3 million

Plan Network: regional active corridor

The project will design and construct ADA-compliant sidewalks from the regional Park-n-Ride to the main commercial area and visitor center for the mountain community.

Regional set-aside programs

Each TIP cycle, a portion of available DRCOG-allocated funds are removed from the total of available funds prior to a call for projects for the Transportation Improvement Program. These funds are set-aside for specific projects that address priorities identified by DRCOG's Board of Directors. Each program develops its own policies, solicitation application and evaluation criteria. The programs denoted below may all be leveraged to support pedestrian infrastructure development or programming, though scope and activities vary by program.

Transportation demand management services

The Transportation Demand Management Services set-aside was developed to support marketing, outreach and research projects that reduce driving alone and ultimately reduce traffic congestion and improve regional air quality. The set-aside funds projects and programs that:

- Reduce single-occupant vehicle travel.
- Reduce traffic congestion.
- Improve air quality.
- Pilot new approaches to transportation demand management.
- Improve awareness of and access to mobility options for people of all ages, incomes and abilities.

DRCOG funds the transportation demand management services set-aside for fiscal years 2024-2027 with a total DRCOG allocation of about $15.4 million, with $9.6 million for DRCOG's Way to Go program, $3.8 million for transportation management associations, and $2 million for calls for non-infrastructure projects.

Regional transportation operations and technology

The Regional Transportation Operations and Technology set-aside funds deployment of technology, tools and coordinated system procedures. These improvements assist public agency staff with the management of the multimodal transportation system. The **Regional Transportation Operations and Technology Strategic Plan** describes a vision of transportation systems across the region that are interconnected and collaboratively operated safely and reliably for all system users.

In 2023, DRCOG and CDOT staff recommended funding for 12 projects totaling nearly $11 million over fiscal year 2024-2026, which include regional signal coordination and operations plans for multi-jurisdictional corridors. These projects can provide opportunities for improving pedestrian safety and access on major arterial streets, such as enhancing detection and actuation, and improving pedestrian level of service and major crossings.

Corridors, community, livability and innovative planning (CCLIP)

The Corridors, Community, Livability, and Innovative Planning set-asides are new for fiscal years 2024-2027, with a total DRCOG allocation of $12 million. The set-aside is composed of the following:

- **Transportation Corridor Planning** ($3 million), in which DRCOG staff work in partnership with local agencies to lead planning studies along regional arterial corridors. Many of the selected corridors have pedestrian gaps or persistent safety issues.
- **Community-Based Transportation Planning** ($2.5 million), where DRCOG staff and local governments work closely with community organization to identify and develop solutions for the specific mobility needs of historically marginalized communities. Past and current projects have created planning studies for school circulation, park and trail access, and neighborhood accessibility.
- **Livable Centers Small-Area Planning** ($2.5 million), which identify strategies to enhance and increase livability of connected multimodal centers. The program can support small-area plans, land use studies, and housing and transportation in regional multimodal nodes.
- **Innovative Mobility** ($4 million), which invests in piloting solutions for challenges associated with topics such as, but not limited to, curbside management, emerging modes, shared mobility, mobility as a service, transportation electrification, connected and automated vehicles, mobility data and mobility hubs. In the first project cycle, efforts including active transportation activity modeling, mobility hubs, curbside access, and near-miss analysis for multimodal conflicts.

Each of these set-asides provides opportunity for member governments to partner with DRCOG to develop and implement efforts that support pedestrian access and safety.

Federal and state grant opportunities

Both the U.S. and Colorado Departments of Transportation have historically administered discretionary grant programs to directly fund a variety of project types and activities, many of which can be used to fund active transportation work. These programs are funded through legislative appropriations and administered by executive agencies, so can change based on funding packages and administration priorities.

Federal discretionary grant programs

These competitive programs require applications and are subject to funding availability:

- Better Utilizing Investments to Leverage Development (BUILD) Grant (formerly RAISE, BUILD and TIGER) – Provides funding for transportation projects with economic and environmental benefits, including pedestrian infrastructure.
- Safe Streets for All (SS4A) Grant – Supports the U.S. Department of Transportation's goal of zero roadway deaths using a Safe System Approach. Funds are available for Planning and Demonstration grants as well as Implementation grants.
- Infrastructure for Rebuilding America (INFRA) Grant – Primarily supports freight and highway projects but often includes pedestrian safety components.
- Advanced Transportation Infrastructure Investment Program (ATIIP) – Funds emerging transportation technologies and infrastructure improvements with a multimodal focus.

State grant programs

Recent or current grant programs administered by government entitities of the State of Colorado include:

- **Revitalizing Main Streets (RMS) Grant Program** – Supports pedestrian-friendly improvements in downtown and commercial corridors to enhance safety and economic vitality. The program was paused in 2025, pending state funding allocations.
- **Great Outdoors Colorado (GoCo) Grants** – Provides funding for pedestrian and trail infrastructure projects supporting outdoor recreation and connectivity.
- **Safe Routes to School** – the statewide Safe Routes to School program provides grants for infrastructure, education and encouragement programs to promote walking and bicycling as transportation for school-aged children.

Local taxes or fees

Within local jurisdictions, many sidewalk and active transportation projects are funded through a capital improvement program, which typically draws from the city, town or county's general fund. However, some jurisdictions have implemented (typically with voter approval) special taxes or fees can be used to establish a dedicated and durable funding stream for the purpose of completing or maintaining the sidewalk network.

General fund

A common program delivery vehicle is to fund installation or improvement of sidewalks and pedestrian facilities through the jurisdiction's general fund, which can be used with discretion toward a Capital Improvements Program (CIP) or street maintenance program. General fund revenue is typically generated through sales tax, property tax, impact fees, or other local revenue sources. General fund monies give local elected officials and city department staff greater flexibility and discretion toward how to spend money, but can be susceptible to economic conditions and trends.

Bond packages or programs

Another common funding vehicle for pedestrian infrastructure in the Denver region is bond packages, which require voter approval but establish a project list with basic scopes and cost estimates and then raises revenue to design and construct those projects. Sidewalk projects can be lumped together with full street reconstructions, as well as other public facility investments (e.g., parks and libraries). Active transportation investments can also be listed as dedicated projects or programs.

Pikes Peak Rural Transportation Authority

The Pikes Peak Rural Transportation Authority, or PPRTA, is a collaborative effort between Colorado Springs, Manitou Springs, Green Mountain Falls, Ramah, Calhan and unincorporated El Paso County. It utilizes a one-cent sales tax to fund transportation projects in the region. The Authority requires voter approval each decade with a ten-year sunset cycle.

Each ballot measure includes a dedicated project list including (but not limited to) bikeway improvements, path and trail expansions and enhancements, bridge construction or rehabilitation and traffic signal upgrades. Project lists are developed in close collaboration among the local government partners, and are distributed among the urban contexts in the region. In the last ballot cycle, 55% of project funding was dedicated to capital projects, 35% to maintenance projects, and 10% toward transit funding.

Property owners and abutters

Throughout the region property owners are generally charged on building and maintaining sidewalks adjacent to their property. This reduces the direct cost to the local government, but does come with inherent risks and drawbacks. For instance, to ensure continuous access requires strong code enforcement to ensure that sidewalks meet standard and are ADA-compliant. Additionally, abutter-led sidewalks may be widely varied in width, materials, quality and comfort, especially in the absence of strong local design standards.

Development/redevelopment

Many jurisdictions in the Denver region rely on private development or redevelopment projects to deliver infrastructure improvements—especially on multi-unit, mixed-use and commercial development projects, the developer enters into an agreement with the approving jurisdiction to construct public facilities like sidewalks and traffic signals. While this approach does mitigate the public cost to build infrastructure and can capitalize on urban growth and development to accelerate network completion, it does require clear and strong design standards to ensure sidewalks are accessible, comfortable and seamlessly integrated with the network.

To ensure quality control and mitigate construction costs, local jurisdictions can adopt clear design standards and templates to ensure that developers who are constructing infrastructure while completing site development are integrated with and contributing to a cohesive pedestrian network. Sidewalk width should be consistent and designed for comfortable, accessible use, without abrupt shifts in the pedestrian clear path and with appropriate buffering from vehicle traffic. An alternative option is for the jurisdiction to consider "payment in lieu of" opportunities or programs that allow a site developer to contribute funding for the city or county to then directly construct public infrastructure. This approach allows the jurisdiction to more directly manage street development, lump together connected projects and use more cost-effective in-house or contracted crews to construct infrastructure.

5th Street and Illinois Street, Golden, CO

In an example of leveraging opportunities, the City of Golden partnered with a developer to collect a nominal "payment in lieu of" to knit together a planned city-led sidewalk improvement with a developer-led improvement. In this case, because the City of Golden was pursuing a sidewalk project on adjacent street segments, the City negotiated a one-time payment with a parcel owner to deliver a sidewalk project along a development site rather than requiring the developer to do so. As a result, the City was able to deliver a consistent cross-section and six-foot wide sidewalk for an entire block, rather than having two separate projects with varied sidewalk widths and configurations.

Enterprise programs

Finally, an emerging option is the development of enterprise programs with dedicated public funding sources and mandates. Because an enterprise program is chartered as a separate entity from core department work and functions (and with dedicated funding), this structure can be a more durable and efficient structure to manage and deliver large public infrastructure programs.

Denver Deserves Sidewalks (Question 307)

In 2022, Denver voters approved ballot question 307, colloquially known as "Denver Deserves Sidewalks." Initiated by local advocates, the ballot measure established a property tax increase (eventually organized as an annual fee) to create a City-managed enterprise program. For most properties in Denver city limits, property owners will pay an additional $150 each year, with small graduated increases for properties with greater than 230 feet of street frontage. Additionally, the program established instant rebates for income-qualified households. The program is expected to raise over $100 million in its first three years, which can be used to design and construct the nearly 3,500 miles of the city's missing sidewalks.

4

Evaluate performance

Measuring pedestrian systems for safety, accessibility, comfort and use are critical to informing decisions and making continuous progress. A structured assessment process allows local governments to prioritize investments, improve accessibility and ensure responsible use of public resources.

This chapter covers the following performance measurement topics:

- **Regional performance measurement** – measures set by Metro Vision and its cascading plans and resources that guide DRCOG's work with member governments and partners.
- **Sidewalk network expansion measures** – prioritizing work and evaluating program performance.
- **Pedestrian safety, accessibility and comfort measures** – tools for evaluating the design and performance of existing and planned facilities.
- **Stakeholder and public engagement** – incorporating public input and communicating program goals and progress with constituents.

Evaluating sidewalk program performance

Successful sidewalk delivery is built on data. Thoughtful and strategic performance measurement is key to supporting programmatic efforts, including:

- Program planning and development, including project prioritization;
- Tracking progress toward program goals and assessing impact, ensuring responsible and effective use of public resources;
- Leveraging additional funding and resources by demonstrating needs and benefits;
- Evaluating design, funding and management approaches for continuous improvement;
- And communicating with the public and stakeholders, both to address concerns and to build political momentum around successes.

This section details regional and local performance evaluation approaches, including suggested metrics and case study examples. The chapter is organized as follows:

- **Regional performance measurement,** including DRCOG's metrics for tracking sidewalk expansion and safety, as well as tools and resources for local agencies and partners.
- **Sidewalk network expansion metrics** to support progress tracking and program improvement.
- **Pedestrian safety, accessibility and comfort measures** that support assessment of design and infrastructure quality.
- **Public communications and messaging guidance** to build momentum and celebrate wins.

Regional performance measurement

DRCOG sets regional performance measures through Metro Vision and its supporting plans and resources that track sidewalk network expansion, pedestrian safety, and access to the network for people living in the region or using its mobility system. The Active Transportation Plan for the Denver region sets forth indicators for measuring progress, including eight metrics specific to sidewalk and pedestrian accessibility and safety, as detailed in Table 6.

Table 6 2025 DRCOG Active Transportation Plan pedestrian-specific key performance indicators

Active Transportation Plan performance measure	Baseline	Base year	Plan goal direction	2050 MVRTP target
Number of pedestrian and bicyclist fatalities and serious injuries	533	2023	Decrease	0
Number of pedestrian fatalities and serious injuries per 100,000 residents	12.2	2023	Decrease	0
Average daily walking trips	1.4 million	2023	Increase	-
Average daily bicycling and walking trips in Short Trip Opportunity Zones	914,000	2023	Increase	-
Percentage of arterial and collector streets with sidewalks within 1/4-mile of transit stations	91%	2022	Increase	100%
Percent of population using non-drive-alone mode to work	29%	2023	Increase	35%
Percent of streets in the regional roadway system with sidewalks.	46%	2022	Increase	-
Percent of streets in Pedestrian Focus Areas with sidewalks.	68%	2022	Increase	-

These metrics apply to DRCOG's entire ten-county planning region; individual agencies are not held to these measures at the local level, but are encouraged to utilize them to inform their planning work. At the regional scale, DRCOG considers these measures in developing plan and program recommendations (e.g., the Active Transportation Plan, the Regional Transportation Plan and Taking Action on Regional Vision Zero) and guiding funding decisions (e.g., the TIP Policy and regional calls for projects).

Resources for local partners

In addition to setting regional measures of sidewalk network completeness and pedestrian activity, DRCOG maintains a Regional Data Catalog with data and GIS resources. Particularly relevant data products that are available to partners and members of the public include:

- **Planimetric Sidewalk Coverage,** which uses aerial imagery to develop geospatial data of existing sidewalk conditions. While the data does not span the entire DRCOG planning area, it includes much of the urbanized area for the Denver region and includes sidewalk width, location, gaps and crosswalks.
- **The Regional Active Transportation Network,** including the three components of the vision network that DRCOG uses to guide planning, policy and funding.
- **Crash data** received from the State of Colorado and curated by DRCOG, released annually and including detailed crash typing and geolocation. DRCOG also maintains the **Regional High Injury Network**.
- **Pedestrian counts,** compiled from DRCOG's direct collection as well as from annual data requests.
- Transportation network datasets including **Street Centerlines**, **Traffic Signals**, the regional **Complete Streets typology**, and a **Bicycle Facility Inventory** that includes the path and trail network.

Finally, DRCOG also maintains a Data Tool that can be uses by project sponsors and interested parties to query corridors and small areas for relevant data metrics including proximity to transit, DRCOG Index scores, crashes and more, shown in Figure 27.

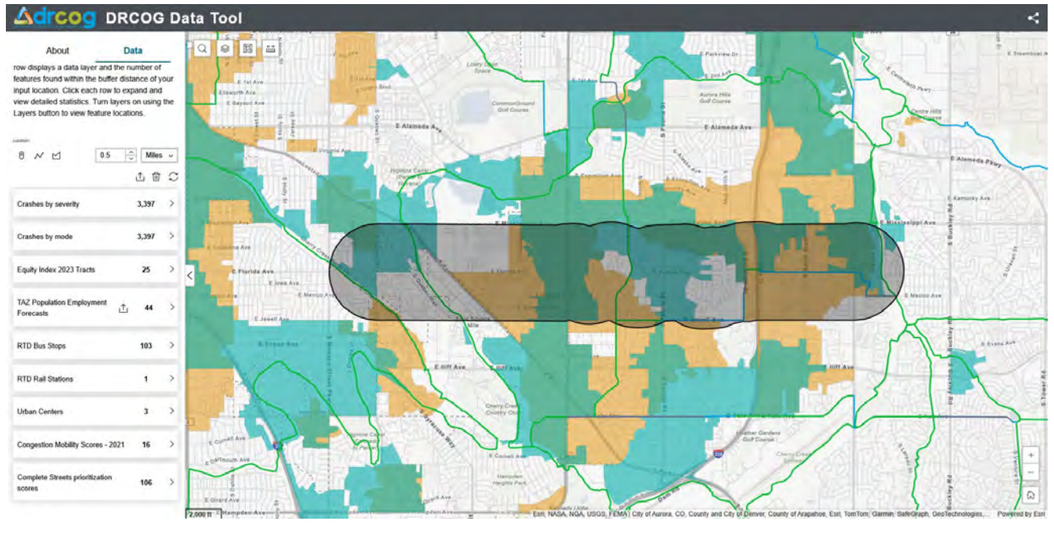


Figure 27 Screen capture of DRCOG's Data Tool.

Sidewalk network expansion measures

To ensure sidewalk infrastructure effectively supports pedestrian mobility, jurisdictions should track network growth, connectivity improvements and infrastructure condition. Systematic monitoring helps communities prioritize investments, enhance accessibility and maintain safe sidewalks.

Key metrics:

- **Annual sidewalk mileage constructed** – Track total sidewalk miles added or repaired annually to measure progress.
- **Connectivity enhancements** – Assess how new sidewalks improve access to schools, transit stops, parks and commercial areas using:
  - **Walkshed analyses** – Mapping pedestrian access within a 5- to 10-minute walking radius.
  - **Pre- and post-construction pedestrian volume counts** – Measuring changes in pedestrian traffic to evaluate effectiveness.
  - **GIS-based network connectivity scoring** – Assessing overall improvements in accessibility and sidewalk coverage.

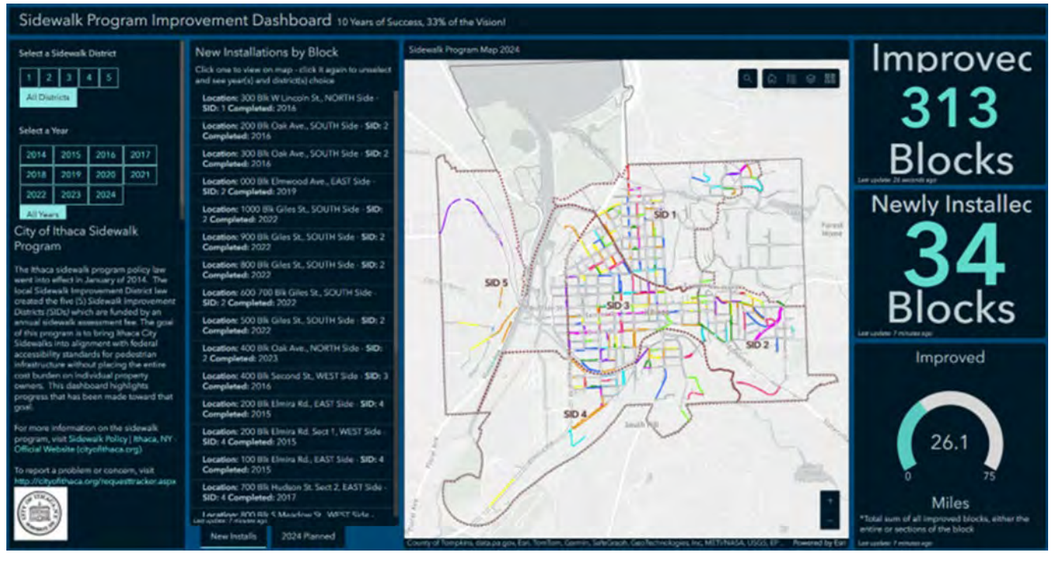


Figure 28 Ithaca's Sidewalk Program Improvement Dashboard

Case Study Insights

Several cities have successfully implemented sidewalk tracking tools to improve pedestrian accessibility:

- *Seattle* incorporates **equity-based analysis** into its tracking framework to evaluate how pedestrian infrastructure projects address disparities. By analyzing demographic data, historical disinvestment and safety concerns, the city ensures that investments prioritize historically underserved communities. See page 48 for more information.
- *Fort Collins* uses a GIS-based **Sidewalk Prioritization Model** to assess the impact of new sidewalks on connectivity and accessibility. This tool helps track progress toward closing critical sidewalk gaps and improving pedestrian access to essential services. See page 56 for more information.
- *Boulder* uses a **Neighborhood GreenStreets Plan** to prioritize sidewalk projects near transit stops, schools and high-density areas. See page 53 for more information.
- *Ithaca* uses a **Sidewalk Program Dashboard** to track completed and planned sidewalk projects, improving transparency and accountability in infrastructure development. See Figure 28 for a screenshot of the dashboard.

Pedestrian safety, accessibility and comfort measures

While the previous sections of this chapter highlight performance measures for tracking programmatic progress, metrics for safety, accessibility and comfort are primarily occupied with informing and improving design and infrastructure quality. This section discusses performance categories, potential metrics and data sources.

Safety, injury reduction and Vision Zero

Between 2010 and 2023, annual pedestrian deaths and severe injuries in the Denver region more than doubled—like the rest of the country, the region is in the midst of a pedestrian safety crisis. Measuring and reporting on crash trends is key to making progress toward Vision Zero.

Potential metrics:

- **Before and after fatal and severe injury crashes,** which can indicate locations where systemic risk is persistent and concentrated. If using to measure project success, separate into pre- and post-construction periods, and consider using a three- or five-year rolling average to control for fluctuations and improve data significance. Before and after comparisons are especially powerful for measuring and communicating safety improvements.
- **Property damage crashes,** while certainly less severe than injury crashes, can also indicate locations with systemic risk. Geographic clusters of property damage crashes can be leading indicators for design problems, and can be used to identify or prioritize safety countermeasure projects.
- **Near miss conflicts** can be used to identify common types of conflicts. Because injury crashes tend to be stochastic events resulting from converging risk factors, near-miss analytics enable planners and engineers to be more proactive to addressing design issues at locations with known safety issues. Video data collection is generally required for robust analysis, though some jurisdictions have piloted self-report web portals or 311-type services to collect near-miss data.

Lighting and illumination

Per analysis conducted for DRCOG's **Active Modes Crash Report**, 25% of fatal and severe injury pedestrian crashes fell during the first three hours of darkness each evening, the most during any part of the day. A recent NCHRP study found that 74% of pedestrian fatalities between 2010 and 2020 occurred at night. Improved lighting and illumination is an important safety countermeasure and leading metric.

Potential metrics:

The **2023 FHWA Lighting Handbook** offers six detailed metrics for evaluating lighting in a specific street environment that designers should refer to. Additionally, CDOT's **Lighting**

Design Guidelines provides guidance for lighting on sidewalks, bikeways, paths and intersections. For pedestrian and safety planning, network-level metrics may be most salient.

- **Lighting coverage,** which can use street light location and type to assess corridor and intersection lighting conditions. CDOT's Lighting Design Guidelines also offer minimum criteria for lighted locations.
- **Crashes,** which contain attribute fields for time of day and lighting conditions that can be used to identify problem locations.

Sidewalk accessibility and comfort

A comfortable and accessible pedestrian environment encourages more people to walk and respects those who are currently walking for transportation. Evaluations should include sidewalk width, obstructions, pavement conditions and level of comfort metrics to ensure the pedestrian system is providing substantive access. Sidewalk accessibility should be primarily measured against PROWAG requirements,

Potential metrics:

- **Walk audits** involve structure site visits, often with community partners or key stakeholders. Walk audits provide a forum to identify sub-standard widths and slopes, gaps, obstructions and maintenance issues that impede accessibility.
- **Street imagery** can be an efficient method to quickly survey and identify potential accessible barriers, which should then be field-verified.
- **Pavement quality index** can be utilized on sidewalks and shared-use paths as well to identify walking hazards and barriers. This can be collected manually, using photos or mobile applications, or other technology tools. The City of Arvada, for example, uses a DataBike with fitted instruments to collect video and surface quality data on the citywide path network.
- **Pedestrian Level of Traffic Stress,** building on bicycle level of traffic stress, uses contextual information to assess the likely perception of stress for people walking. Geospatial analysis uses factors like sidewalk presence and width, buffer from the roadway, adjacent vehicle speed and number of travel lanes to quantify level of traffic stress at the network level.
- **Tree canopy** is strongly associated with pedestrian comfort. Geospatial data developed using aerial imagery can inform network-wide assessment of tree canopy coverage that supports comfortable walking, while street imagery site visits can confirm access to trees and greenery.
- **Noise monitoring** is an often overlooked metric that girds pedestrian experience. Public health professionals have found that persistent environmental noise at 70dB or higher has a negative impact on mental health. Noise monitors can measure street noise pollution.

Pedestrian activity and mode share

DRCOG aims to reduce single-occupant vehicle (SOV) trips and increase walking, biking and transit use. Sidewalk performance should track pedestrian counts and mode shift towards walking and connectivity to transit stops to support investment in complete streets.

Potential metrics:

- **Pedestrian counts,** which can be collected manually or using technology tools. Short-duration counts are the easiest to collect, but provide only a small snapshot of activity (typically two hours). Infrared or video counts can provide 24-hour count data; best practice is to collect 10 to 14 days of 24-hour count data to understand average daily activity. DRCOG provides access to mobile bicycle and pedestrian counters to member governments upon request.
- **Street mode share** collects count data by all modes to understand the mode splits along a corridor or segment, and can be a powerful communication tool for illustrating changes in travel before and after a project.
- **Commute mode share** can be assessed using either annual American Community Survey data from the U.S. Census Bureau or household travel survey data (both national and Colorado statewide). However, these data sources lack granularity and are based in statistical estimates, but can be useful tools for measuring citywide or regionwide trends. Census data is limited to work commutes trips only and tends to undercount walking trips, while household travel surveys capture the fuller range of travel activities.

Travel reliability and intersection performance

Vehicle Level of Service (LOS) is a nearly universal metric for assessing intersection and network performance, and delay in the transportation system; however, its prioritization over other metrics can lead to degraded performance for all other modes. Utilizing robust mulitmodal travel reliability and delay metrics is critical to providing a resilient and accessible mobility system.

Potential metrics:

- **Pedestrian intersection delay,** which calculates the average delay a pedestrian is likely to encounter at an intersection, potentially using signal cycle length and and pedestrian counts and observed/video count collection. Longer signal cycles increase vehicle capacity while simultaneously increasing pedestrian delay. At stop-controlled or uncontrolled crossings, pedestrians face delays while waiting for gaps in traffic. Longer delays exceeding 60 seconds are associated with increased likelihood for pedestrians to cross against a signal or in unsafe locations, exacerbating safety risks.
- **Intersection density and walkshed analyses** identify how far pedestrians can travel within a given time, and more importantly how many destinations are accessible within a designated walkshed. Increased intersection density is associated with greater pedestrian access, and can be assessed using geospatial analysis.

- **Low-stress crossing gap analysis,** like the one on page 21, uses geospatial information to identify overlong distances between comfortable crossing opportunities for people walking. Requiring longer out-of-route diversions increases travel time and can incentivize unprotected crossings.

Air quality and congestion reduction

Shifting single-occupant vehicle trips to more efficient modes is key to reducing pollution (which is core to the region coming into air quality compliance) and reducing time lost to traffic congestion.

Potential metrics:

- **Vehicle miles traveled** are the most common proxy measure for emissions and air quality, and can be measured at the corridor, zone, or jurisdiction-wide level. DRCOG supports member governments by maintaining regional estimates using the FOCUS travel model, as well as completing an annual congestion report for the region that quantifies congestion delay and impacts.
- **Air quality monitoring** directly measures pollutants and emissions throughout the region.
- **Time-series traffic counts and delay metrics** can be powerful for assessing changes over time in congestion and emissions. Especially where jurisdictions are working toward mode shift, understand delay per user by mode is key to quantifying and communicating progress.

Public and stakeholder engagement and evaluation

Engagement for sidewalk projects and programs can be among the most personal for members of the public—in some cases literally coming to their front doors. Public and stakeholder engagement provides opportunities to gather deep and substantive feedback, to build and strengthen community relationships, and to leverage the public's knowledge and lived experience to nurture a great transportation system.

DRCOG's **Public Engagement Plan** (most recently updated in 2025) outlines principles and strategies for the regional agency to conduct its own outreach activites, as well as guidance for local partners. The plan provides the following principles for public engagement:

- **Early engagement,** our bringing in the public at the beginning when people can have the greatest effect shaping a plan or project.
- **Ongoing engagement** at regular phases or intervals to ensure that the public has multiple opportunities to get involved.
- **Timely and adequate notice,** including meeting any notice requirements and advertising in the media of record.
- **Consistent access to information,** accomplished by proactively posting project materials online, responding to requests and completing document translation upon request.
- **Public review and comments,** which ensure that all deliverables are reviewed and staff provide responses.

Evaluating sidewalk performance should build on these principles and create opportunities to welcome members of the public into the planning process.

Evaluation through engagement

Engagement with everyday users is critical to designing and refining high-quality sidewalks.

Potential activies:

- **Walk and accessibility audits** bring stakeholders and community members into the field side-by-side with planners and designers to observe, inventory and ideate around existing issues and potential solutions. For example templates, consider AARP's **Walk Audit Tool Kit** or the Safe Routes Partnership's **Let's Go for a Walk** worksheet. Engage disability advocates and children or families to understand the acute issues that key population groups face.
- **Pre- and post-construction surveys** can be used to benchmark community attitudes toward a project, as well as to refine future planning and design work. Seek opportunities to learn from those with lived experience.
- **Public space audits** can similarly capture community attitudes toward a completed project, and are key to quantifying more typically qualitative benefits. Observe how people use pedestrian spaces in the public realm, where and how long they stay, and what activities are facilitated by design.

Communicating progress, celebrating success

Finally, when building support and momentum for a local or regional sidewalk program, it is important to consider the key data points that can indicate and communicate success with the public and stakeholders. Collecting data and publishing materials that demonstrate progress and own lessons learned can be powerful campaign tools for building and expanding support for investments in pedestrian infrastructure.

Potential activies:

- **Public dashboards** are a powerful tool for communicating needs and annual progress, and give members of the public and stakeholders the opportunity to engage with a program at a self-driven pace. Including construction updates can also support transparency and nurture public trust.
- **Counts and intercept surveys** can benchmark a variety of important markers, including walking activity before and after implementation, arrivals by mode to local business, spending habits, and perceptions of safety, comfort and enjoyment. These can be conducted early in planning to demonstrate a project need, as well as after construction to evaluate and demonstrate impact.
- **Before and after photography** is a powerful messaging tool for demonstrating investments. Capturing photos from matched angles, showing people using new infrastructure and engaging in common activities, and visualizing the mobility and access benefits of a project can make efforts concrete in ways that quantitative data cannot.

Insights from Case Studies

- Boulder uses pre- and post-construction pedestrian counts to quantify changes in sidewalk usage and validate investment impact. See page 53 for more information.
- Westminster used community input to prioritize sidewalk gap closures, ensuring projects aligned with public needs. See page 59 for more information.
- Ithaca engages the public through an annual sidewalk evaluation process, allowing residents to submit concerns and suggest improvements. See page 51 for more information.

By embedding stakeholder engagement within sidewalk evaluation, jurisdictions ensure that infrastructure investments reflect both regional policy goals and local community needs.

Case studies

The case studies were selected to provide DRCOG with a diverse array of best practices, challenges and successes in sidewalk delivery, which can inform the development of a robust sidewalk delivery guide:

- Seattle, WA
- Ithaca, NY
- Boulder, CO
- Fort Collins, CO
- Westminster, CO

Developing an effective and resilient sidewalk delivery framework requires understanding and adapting best practices and insights from cities across diverse contexts. Five case studies—two national and three from Colorado—were identified to provide valuable insights for the DRCOG region. These case studies, from Seattle, WA; Ithaca, NY; Boulder, CO; Fort Collins, CO; and Westminster, CO, offer lessons in sidewalk planning, prioritization, funding strategies and overcoming common challenges. Each city has employed unique approaches to enhance pedestrian infrastructure, navigate constraints and increase accessibility, safety and equity. By examining their strategies and successes, these case studies offer guidance to help DRCOG create a comprehensive, adaptable sidewalk delivery guide that aligns with regional goals and addresses local challenges.

- **Seattle, WA:** Known for its prioritization of equity and its use of data-driven approaches, Seattle illustrates how cities can tackle substantial infrastructure deficits with a focus on high-need areas. Seattle's Priority Investment Network and partnership with other city departments provide a replicable model for addressing pedestrian infrastructure efficiently.
- **Ithaca, NY:** Ithaca's Sidewalk Improvement Districts (SID) program provides an innovative localized funding solution that reduces the reliance on general funds for sidewalk repairs and expansions. Ithaca's model demonstrates how targeted, district-based funding can effectively support pedestrian infrastructure needs in a sustainable way.
- **Boulder, CO:** Chosen for its comprehensive Pedestrian Plan and innovative programming, Boulder demonstrates a strong commitment to equity, accessibility and sustainability in pedestrian infrastructure. The city's programs, like the Missing Links and Pedestrian Crossing Treatment programs, exemplify effective strategies to fill network gaps and enhance safety.
- **Fort Collins, CO:** This case study was selected for its highly effective Sidewalk Prioritization Model, which integrates health and equity metrics to identify high-need sidewalk improvements. Fort Collins demonstrates how cities can use data to ensure equitable, strategic investment in pedestrian infrastructure.
- **Westminster, CO:** With an emphasis on local funding mechanisms, including its utility fee model, Westminster showcases unique strategies to secure dedicated sidewalk funding, even in the face of rising costs. The city's integration of sidewalks with transportation and mobility planning offers valuable insights into maximizing resource use through cross-departmental collaboration.

Sidewalk Development Program, Seattle, WA

Population

755,078 (2023)

Context

Urban

Key Reason for Case Study

Sidewalk Planning, Evaluation & Monitoring. Seattle is highlighted as a case study for its robust sidewalk planning, evaluation and monitoring processes, which emphasize safety, equity and the integration of pedestrian infrastructure within broader urban planning goals. The city's innovative approaches to tackling challenges like rising costs and infrastructure deficits provide valuable insights for other cities aiming to enhance their pedestrian networks.

Objectives

The primary goals for sidewalk delivery in Seattle include improving pedestrian access, focusing on safety and equity, supporting climate action and enhancing the pedestrian experience for all ages and abilities. Seattle aims to provide comfortable pedestrian accommodations on all streets to ensure a connected, safe and accessible transportation system for all users, including children, seniors and people with disabilities.

Planning and prioritization

Planning: Seattle's planning for sidewalk construction is grounded in the Seattle Pedestrian Master Plan, which was first adopted in 2009 and updated in 2017. This plan is integrated into the larger Seattle Transportation Plan (STP), updated in 2024. The city's pedestrian planning includes a focus on improving access to key destinations like schools, transit stops and parks, while also considering safety and equity issues across neighborhoods.

Prioritization: Seattle uses a Priority Investment Network (PIN) to prioritize sidewalk improvements. Streets and intersections are scored based on proximity to high pedestrian trip areas, safety needs (like the number of crashes or road width) and equity considerations. For example, areas with schools, transit stops and parks are prioritized, especially in neighborhoods with high rates of traffic incidents or those that have been historically underserved.

Equity and Accessibility Focus: Seattle has specific programs aimed at improving equity and accessibility, such as the Pedestrian Racial Equity Analysis . This analysis informs where investments are needed most in underserved communities. The city's focus includes ensuring that sidewalks and crossings are safe and accessible for people with disabilities, expanding the use of curb ramps, accessible pedestrian signals and other accessibility features across the network.

Sidewalk delivery challenges & solutions

Challenges

Rising Costs: Seattle is addressing rising costs and labor shortages by exploring the use of sustainable materials with lower lifecycle costs. They also focus on partnerships to leverage funding and resources more effectively. Seattle also promotes quick-build solutions (such as paint and post) as interim measures to address safety and comfort while waiting for permanent capital improvements.

Infrastructure Deficits: About 26% of Seattle's streets are missing sidewalks. The city also faces challenges related to environmental and drainage constraints, which complicate sidewalk installations in certain areas. In addition, there are geographic pinch points where pedestrian access competes with other modes like freight and transit.

Solutions

Program Innovations: Seattle has implemented the Home Zone program , which collaborates with communities to develop holistic approaches using quick-build solutions to make residential streets more walkable. This program offers alternatives to traditional sidewalk construction, like shared streets and walkways.

Partnerships and Collaboration: Seattle has strengthened partnerships with Seattle Public Utilities to implement joint projects, constructing new sidewalks alongside natural drainage elements. These collaborations have helped accelerate sidewalk construction and incorporate green infrastructure.

Data-driven approach

Investment Tools: Seattle leverages data and findings from tools like the Bicycle and Pedestrian Safety Analysis to guide strategic investments in pedestrian safety, ensuring that sidewalk projects are data-informed and targeted based on need.

Assessment Tools: Seattle uses a scoring system as part of their Pedestrian Master Plan to prioritize investments in the sidewalk network. The city's Priority Investment Network (PIN) includes criteria like proximity to schools, parks and transit hubs, as well as safety and equity considerations.

Accelerated delivery approaches

Cross-Sector Collaboration: Seattle accelerates sidewalk delivery by integrating sidewalk work with green stormwater infrastructure projects, collaborating with other city departments to streamline the construction process and maximize the use of available funds.

Success Stories: Catalyst projects in Seattle are large-scale, pedestrian-related initiatives designed to address significant connectivity barriers within the city. These projects often require creative solutions, substantial capital investments and coordination among multiple stakeholders. Key pedestrian-focused catalyst projects include:

- **Aurora Ave Corridor Project:** This project aims to improve pedestrian mobility and safety along the busy Aurora Avenue. The improvements address the lack of adequate pedestrian infrastructure and enhance crossings, sidewalks and connections to transit.
- **Lake City Way Corridor Project:** Similar to the Aurora project, this initiative focuses on pedestrian safety and connectivity along Lake City Way. It includes the construction of sidewalks, crossings and other pedestrian facilities to make the area safer and more accessible for people walking and rolling.

These catalyst projects not only focus on overcoming physical barriers but also involve collaboration between city departments, external agencies and community stakeholders to achieve long-term pedestrian mobility goals.

Funding mechanisms

Public-private cost sharing

Seattle promotes cost-sharing by exploring partnerships with developers, incentivizing pedestrian improvements above and beyond land use code requirements. This strategy encourages developers to contribute to sidewalk construction while meeting their project mitigation requirements.

Levy to Move Seattle

The Levy to Move Seattle is a nine-year, $930 million property tax levy approved by Seattle voters in 2015 to fund transportation improvements across the city. This levy replaced the earlier "Bridging the Gap" levy and provides approximately 30% of the Seattle Department of Transportation's (SDOT) budget. The levy supports a wide range of projects aimed at enhancing safety, maintaining infrastructure and expanding travel options. Key areas of investment include:

- **Safety Enhancements:** Implementing measures to protect all travelers, such as pedestrian crossings and traffic calming projects.
- **Maintenance and Repair:** Upgrading streets and bridges to ensure reliability and longevity.
- **Congestion Relief:** Investing in reliable, affordable travel options to accommodate Seattle's growing population.

A significant portion of the levy is allocated to the Sidewalk Development Program, which focuses on expanding and improving the city's sidewalk network. This includes constructing new sidewalks, particularly in areas lacking pedestrian infrastructure and repairing existing sidewalks to enhance safety and accessibility. The program emphasizes equity by prioritizing projects in neighborhoods with higher needs, considering factors like demographics, pedestrian demand and safety concerns. The levy also funds innovative, cost-effective solutions such as pedestrian walkways and low-cost pathway installations to address connectivity gaps. By leveraging levy funds, the Sidewalk Development Program can implement these improvements in a phased approach, ensuring that resources are allocated efficiently to maximize impact.

Lessons learned & key takeaways

Seattle’s sidewalk delivery approach demonstrates the importance of equity-driven prioritization, innovative funding mechanisms and cross-sector collaboration. The city’s commitment to addressing infrastructure gaps and improving pedestrian accessibility offers valuable lessons for other urban areas.

Lessons learned

Equity-Driven Prioritization Ensures Inclusive Improvements: Seattle’s Priority Investment Network (PIN) uses data on safety, pedestrian demand and demographics to prioritize underserved areas, ensuring sidewalk investments benefit communities with the greatest need.

Cross-Sector Collaboration Enhances Efficiency: Partnerships with agencies like Seattle Public Utilities allow for coordinated sidewalk projects alongside stormwater infrastructure improvements, reducing costs and accelerating delivery.

Quick-Build Solutions Provide Immediate Benefits: Programs like the Home Zone initiative implement low-cost, interim safety measures (e.g., paint-and-post walkways) to improve walkability while permanent infrastructure is developed.

Innovative Funding Mechanisms Sustain Infrastructure: The Levy to Move Seattle, a nine-year, $930 million property tax levy, funds a significant portion of sidewalk and transportation improvements, emphasizing equity and safety.

Recommendations for other cities

Integrate Equity-Driven Planning: Use tools like Seattle’s Priority Investment Network to guide sidewalk investments in high-need areas based on safety, demographics and pedestrian demand.

Foster Cross-Sector Partnerships: Collaborate with utilities, environmental agencies and private developers to align sidewalk projects with other infrastructure improvements, optimizing resources.

Adopt Quick-Build Strategies: Implement temporary, cost-effective solutions to enhance pedestrian safety and accessibility while long-term improvements are planned.

Explore Dedicated Funding Mechanisms: Establish property tax levies or similar funding sources to sustain investments in sidewalk infrastructure, with a focus on equity and accessibility.

Focus on Community-Driven Catalyst Projects: Develop large-scale initiatives, like Seattle’s Aurora Avenue and Lake City Way Corridor Projects, to address significant pedestrian connectivity barriers through multi-agency coordination.

Sidewalk Improvement Districts, Ithaca, NY

Population

32,724 (2023)

Context

Mix of rural, suburban and urban landscapes; college town (home to Cornell University).

Key reason for case study

Unique funding mechanisms and localized district-based approach for sidewalk maintenance and improvements.

Objectives

Accessibility and Equity. Ithaca's sidewalk program aims to bring sidewalks into alignment with federal accessibility standards without placing the entire financial burden on individual property owners.

Planning and prioritization

Planning

Property owners can report damaged sidewalk infrastructure to the City. The City of Ithaca conducts a comprehensive survey of sidewalks and ADA ramps every ten years to assess conditions and compliance. Sidewalk deficiencies from its comprehensive survey as well as resident requests are documented and prioritized to be completed on an annual basis. The City is divided into five sidewalk improvement districts that are bounded as shown on the "Official Sidewalk Improvement District Map ," and fees are collected from residents and businesses within each district that fund the majority of improvements.

Prioritization

Ithaca prioritizes sidewalk construction based on criteria such as cross-slope issues, accessibility barriers, tripping hazards, broken or narrow slabs, missing ADA ramps and gaps in the network. Yearly updates on projects and budgets by Sidewalk Improvement Districts (SIDs) guide sidewalk improvement plans.

Yearly updates on projects and budgets by Sidewalk Improvement Districts (SIDs) guide sidewalk improvement plans.

Equity and Accessibility Focus

Ithaca's planning approach ensures that improvements are evenly distributed through a structured yearly process, rather than on-demand service, helping to maintain equity in sidewalk delivery.

Sidewalk delivery challenges & solutions

Challenges

Rising Costs: Increasing costs of materials and labor impact the City's ability to maintain and expand sidewalk infrastructure.

Infrastructure Deficits: Missing links in the sidewalk network and aging sidewalks require accelerated delivery models to address safety and connectivity issues.

Solutions

Program Innovations: All repairs and replacements are designed to meet ADA/PROWAG standards to ensure universal accessibility.

Partnerships and Collaboration: The city collaborates with the New York State Department of Transportation (NYSDOT), TAP Grants and local capital funding to extend its budget, working with City Streets' Crews to streamline sidewalk repair and construction.

Data-driven approach

Dashboard tools

Sidewalk Program Improvement Dashboard. Components include a Sidewalk Program Map, with options to view holistically, by sidewalk district and by year. Map highlights new installations by block and 2024 planned construction. Provides summary of improved blocks, newly installed blocks and number of miles improved (goal of 75 miles)2.

Assessment tools

The City of Ithaca employs a detailed evaluation framework to prioritize sidewalk improvements, considering safety, accessibility and community impact. Criteria include:

- **Sidewalk Issues:** Locations with sidewalks that are too steep or too narrow, tripping hazards, or broken or missing segments are prioritized.
- **Accessibility Needs:** Areas missing ADA-compliant ramps or with inadequate accessibility features receive higher scores.

- **Proximity Factors:** Sidewalks near schools, government buildings, businesses and high-foot-traffic streets are given greater weight.
- **Community Feedback:** Requested locations, multiple unique complaints and claims against the city are factored in.
- **Context and Coordination:** Consideration is given to the condition of the sidewalk on the opposite side of the street, other planned work at the location (e.g., utility, tree, or asphalt maintenance) and ensuring balanced work distribution year-over-year through improvement districts.

Tools used for evaluation and whether all categories are weighted equally were not specified.

Accelerated delivery approaches

Cross-Sector Collaboration: Ithaca accelerates sidewalk delivery by coordinating sidewalk work with broader infrastructure projects whenever possible, such as road and utility improvements.

Success Stories: Successes include the consistent and comprehensive updates to sidewalk improvements by district, allowing targeted and equitable upgrades across the city's neighborhoods.

Funding mechanisms

Public-private cost sharing

The city incorporates a cost-sharing approach through its structured Sidewalk Improvement Districts (SIDs), where fees from property owners fund sidewalk maintenance and improvements within their respective districts.

Sidewalk Improvement Districts (SID)

Ithaca has established five SIDs, excluding Cornell University, which maintains its own sidewalks. The SID program includes:

- Single-Family Homes: $80 annual fee (approx. $0.22/day) with no square footage fee.
- Other Properties: $150 annual fee, with additional frontage fees ($50 per 55 feet) and square footage fees ($0.02 per square foot).

These fees support a wide range of sidewalk-related expenses, including construction, inspection, capital repayment, contingency funds and administration, ensuring that each district benefits directly from the funds collected within it.

Lessons learned & key takeaways

Ithaca's sidewalk delivery approach emphasizes localized funding, structured planning and equity-focused prioritization, offering valuable insights for cities looking to enhance pedestrian infrastructure sustainably and inclusively.

Lessons learned

Localized Funding Models Promote Sustainability: The Sidewalk Improvement Districts (SIDs) distribute costs equitably across property types while ensuring sufficient funds for sidewalk maintenance and improvements.

Equity through Structured Planning Over On-Demand Repairs: Avoiding on-demand repair services in favor of a structured annual evaluation process ensures fair distribution of resources, benefiting underserved neighborhoods.

Transparency and Accountability: Tools like the Sidewalk Program Improvement Dashboard enhance public trust by clearly showing how fees are used and where improvements are planned or completed.

Collaborative Funding and Grants: Partnerships with the New York State Department of Transportation (NYSDOT) and federal grant programs extend local budgets and support infrastructure goals.

Recommendations for other vities

Adopt District-Based Funding Models: Implement SIDs or similar localized funding strategies to sustain sidewalk improvements and encourage buy-in from residents and businesses.

Leverage Data-Driven Prioritization: Use tools and metrics to prioritize projects based on accessibility, safety and usage, ensuring equitable allocation of resources.

Foster Transparency and Community Engagement: Provide public dashboards or similar platforms to increase accountability and allow residents to track progress and understand how funds are applied.

Coordinate Infrastructure Projects: Integrate sidewalk work with broader infrastructure projects, such as road repairs or utility upgrades, to maximize efficiency and reduce costs.

Pursue Collaborative Grants and Partnerships: Work with state and federal agencies to supplement local funding and enhance the scope and impact of sidewalk delivery initiatives.

Missing Links, Boulder, CO

Population

105,898 (2023)

Context

Urban

Key reason for case study

Sidewalk Planning and Programming. Boulder serves as an exemplary case study due to its comprehensive approach to sidewalk planning and programming, which effectively integrates various objectives like safety, equity, sustainability and connectivity. The city's innovative programs and resourceful use of planning documents, data-driven tools and public-private partnerships make it a valuable model for other urban areas aiming to enhance their pedestrian infrastructure.

Objectives

Boulder's updated Pedestrian Plan is designed to make the city more walkable, accessible and inclusive, setting several important objectives for improving the pedestrian infrastructure. These objectives are closely tied to broader priorities like safety, equity, sustainability and connectivity.

Planning and prioritization

Planning

Boulder utilizes an extensive set of planning documents and analyses to guide sidewalk planning and prioritization, including:

- **The 2019 Boulder Pedestrian System Plan:** Boulder's Pedestrian System Plan outlines a comprehensive vision for creating a safe, connected and accessible pedestrian network throughout the city. The plan emphasizes improving sidewalk infrastructure, enhancing safety and integrating pedestrian pathways with multimodal transportation systems to promote walking as a sustainable and convenient travel choice.
- **Walking in Boulder - Existing Conditions report:** The Boulder Existing Conditions Report provides a detailed analysis of the city's current pedestrian infrastructure, identifying gaps, challenges and opportunities within the network. It highlights areas for improvement in connectivity, safety and accessibility, serving as a foundation for informed planning and prioritization in the Pedestrian System Plan.
- **Sidewalk Inventory by Type Map:** The Boulder Sidewalk Inventory Map offers a comprehensive assessment of the city's sidewalk infrastructure, documenting existing conditions (attached, detached sidewalks etc.) and identifying gaps in the network.
- **Pedestrian Crossing Treatment Inventory Map:** The Pedestrian Crossing Inventory Map categorizes crossing infrastructure in Boulder, including standard marked crosswalks, enhanced crossings with features like median refuges, crossings with flashing beacons, pedestrian and full traffic signals (some with head-start timing), as well as underpasses and overpasses. The map also highlights crossings near schools to support safer routes for students.
- **2017 Pedestrian Collisions and Close Calls Map:** The 2017 Pedestrian Collisions and Close Calls Report analyzes pedestrian-related crashes and near-miss incidents in Boulder. It identifies high-risk locations and patterns to inform safety improvements and reduce conflicts between pedestrians and vehicles.

These resources provide a comprehensive overview of current conditions, safety data and infrastructure needs to support Boulder's pedestrian infrastructure goals.

Programming

Missing Links Program

The **Missing Links Program** aims to fill the gaps in the city's sidewalk network by constructing new sidewalks in areas where they are missing. This program is crucial in connecting residential neighborhoods, schools and commercial areas, ensuring that all parts of Boulder are walkable and accessible for pedestrians. It addresses the 49 miles of missing sidewalks throughout the city, particularly in areas with residential developments that historically lacked pedestrian infrastructure.

Multi-Use Paths (Greenways Program)

The **Greenways Program** develops and maintains multi-use paths along Boulder's tributaries, providing safe, scenic routes for pedestrians and cyclists alike. These paths not only support recreational walking and cycling but also serve as vital transportation corridors connecting neighborhoods, parks, schools and employment centers. The program emphasizes a balance between transportation and environmental preservation, utilizing natural waterways for eco-friendly path development.

Pedestrian Crossing Treatment Program

The **Pedestrian Crossing Treatment Program** focuses on improving the safety of crossings at intersections and mid-block locations by installing features like Rectangular Rapid Flashing Beacons (RRFBs), raised crosswalks and curb extensions. These treatments help enhance pedestrian visibility and safety, particularly at high-traffic locations. This program is integral to Boulder's Vision Zero commitment to eliminate serious injuries and fatalities on the road.

Pavement Management Program

As part of its ongoing pavement repair efforts, Boulder's **Pavement Management Program** also addresses accessibility by upgrading curb ramps to meet Americans with Disabilities Act (ADA) standards. This dual-focus approach ensures that the city's roadways are not only well-maintained but also accessible to individuals with disabilities. The program integrates ADA compliance into broader street repair initiatives, supporting equitable access to public spaces.

Sidewalk Repair Program

The **Sidewalk Repair Program** is dedicated to fixing damaged or broken sidewalks caused by natural factors like tree roots, weather, or general wear and tear. The city often partners with property owners to share the cost of these repairs, maintaining the integrity of the pedestrian network and ensuring that sidewalks remain safe and navigable for all users.

Snow and Ice Removal Program

Boulder's **Snow and Ice Removal Program** is designed to ensure that pedestrian paths remain clear and accessible during winter months. The city prioritizes clearing snow and ice from 50% of streets and 98% of its multi-use paths, focusing on areas that serve key pedestrian routes to transit stops and other essential destinations. This program plays a critical role in maintaining year-round pedestrian mobility and safety.

Prioritization

The City of Boulder has implemented several strategies to prioritize sidewalk improvements and pedestrian safety through initiatives like the Neighborhood GreenStreets and Low-Stress Walk Network Plan, which focuses on providing safe, low-stress routes for pedestrians and cyclists alike. A key part of this prioritization involves identifying Pedestrian Improvement Areas using GIS data to assess low- and high-stress pedestrian facilities. These areas are prioritized for sidewalk repairs, upgrades to ADA standards, new pedestrian crossings and enhancements such as lighting and wayfinding.

The City of Boulder uses a mix of community feedback and quantitative analysis to support prioritization, including:

- Proximity to key destinations (parks, schools and high-frequency transit stops)
- Crashes and close calls
- Equity index (% population with a disability, % families living below the poverty level, % households with no vehicle, % non-white population, % population under 17 or over 65 years old, % population with a disability, % families living below the poverty level, % households with no vehicle, % non-white population, % population under 17 or over 65 years old).
- Population and employment density.

Equity and accessibility focus

Boulder's pedestrian plan places a strong emphasis on equity and accessibility through initiatives like the Accessible Boulder: ADA Self-Evaluation and Transition Plan, which addresses ADA compliance and ensures pedestrian facilities are accessible to people of all abilities. This plan aims to remove barriers that disproportionately affect individuals with disabilities and improve sidewalk access for everyone, focusing on safety and comfort for all ages and abilities. Additionally, Boulder's Vision Zero commitment aims to reduce traffic fatalities and serious injuries, with a particular focus on vulnerable populations, making equitable and safe walking environments a top priority.

Resources:

Vision Zero: Community's goal to reduce the number of traffic-related fatalities and serious injuries to zero.

Share the path: Promotes a series of rules designed to encourage proper etiquette and safety for all path users.

Boulder Walks: Organized community group walks to celebrate and encourage walking as a travel choice for residents and employees.

Safe Routes to School: Enables, encourages and empowers students by addressing barriers that make it difficult or unsafe to walk and bike to school.

Pedestrian close-call reporting: The Close Call Form allows Boulder residents to report near-miss incidents involving walking, biking, scooting, or driving. These submissions help the city identify problematic locations and inform improvements in infrastructure, traffic control and safety initiatives, enhancing travel comfort and safety for all users.

Sidewalk delivery challenges & solutions

Challenges

Rising Costs: Potentially due to increasing costs and resource constraints, Boulder allocates the majority (90%) of its pedestrian-related budget to repair and maintenance. This focus leaves only 10% available for the construction of new sidewalks and crossings.

Infrastructure Deficits: Significant gaps in Boulder's sidewalk infrastructure remain, with 49 miles of missing sidewalks, particularly in residential areas. This gap emphasizes the need for a targeted and accelerated delivery model to meet growing pedestrian demand.

Solutions

Program Innovations: To address sidewalk maintenance and repair, Boulder has established programs like the Sidewalk Repair Program and the Missing Links Program, which focus on building and repairing sidewalks where gaps exist.

Partnerships and Collaboration: Boulder emphasizes collaboration between city agencies and the community to tackle maintenance challenges. The city employs sidewalk repair cost-sharing programs and encourages property owners to maintain clear sidewalks through vegetation trimming and snow removal.

Data-driven approach

Assessment tools

- Pedestrian level of stress.
- Areas with few destinations within 15-minute walk.
- Pedestrian-involved crashes.

Accelerated delivery approaches

Cross-Sector Collaboration: Boulder accelerates sidewalk delivery by integrating sidewalk projects with other ongoing infrastructure efforts. For example, the Pavement Management Program not only focuses on pavement repairs but also upgrades curb ramps to meet ADA standards during the process as per FHWA . This cross-sector collaboration allows Boulder to address pedestrian needs within the larger scope of roadway improvement projects, minimizing disruption while leveraging resources efficiently. Additionally, the city combines efforts through programs like the Missing Links Program, which builds sidewalks where gaps exist, ensuring resources are allocated to the most needed areas of pedestrian infrastructure.

Success Stories: Boulder has successfully addressed pedestrian infrastructure gaps through its Neighborhood GreenStreets initiative. This project focuses on low-cost, high-impact improvements that enhance pedestrian and cycling conditions on lower-traffic streets. The initiative exemplifies the city's commitment to rapid, cost-effective improvements while creating safer, more accessible routes for pedestrians and cyclists.

Funding mechanisms

Public-private cost sharing

The Miscellaneous Sidewalk Repair Program in Boulder fosters a collaborative funding approach between the city and property owners. Under this program, property owners share 50% of the repair costs for sidewalks adjacent to their properties. For flagstone sidewalks, owners are responsible for additional costs. If property owners opt to use a city-licensed contractor, the city offers a reimbursement of up to 50% of the repair cost, ensuring flexibility and shared financial responsibility. Unlike other programs, the $450 maximum charge for single-family homeowners does not apply, reflecting the city's commitment to addressing urgent sidewalk repairs for public safety and accessibility.

Sales tax revenue

Boulder's Sidewalk Repair Program is part of the broader Pavement Management Program (PMP), which inspects and rates the city's 300 miles of streets every three years. Funded by sales tax revenue, the program prioritizes curb and gutter repairs, ADA-compliant curb ramp upgrades and may include additional improvements such as road striping or bicycle and pedestrian enhancements.

Sidewalk Improvement Districts (SID)

Although not explicitly named as "Sidewalk Improvement Districts" in the document, Boulder's strategy involves focusing on Pedestrian Improvement Areas (PIAs), where improvements such as new sidewalks, crossing treatments and ADA upgrades are concentrated. These areas are studied in detail to identify and prioritize infrastructure upgrades, with the goal of addressing gaps and ensuring pedestrian safety and connectivity. Pedestrian Improvement Areas (PIAs) are funded through a combination of local and federal sources.

Lessons learned & key takeaways

Boulder's sidewalk delivery approach highlights critical strategies for addressing infrastructure challenges, emphasizing collaboration, innovation, equity and community engagement.

Lessons learned

Cross-Sector Collaboration is Critical for Success: Integrating sidewalk delivery with broader infrastructure projects, such as the Pavement Management Program, minimizes disruptions and ensures efficient use of resources while addressing both pedestrian and vehicular needs.

Innovative programs can Bridge Infrastructure Gaps: Targeted initiatives like the Missing Links Program and Pedestrian Crossing Treatment Program effectively fill gaps in the sidewalk network and enhance safety at key crossings, demonstrating how focused strategies can overcome resource constraints.

Prioritize equity and accessibility: Boulder's commitment to ADA compliance through initiatives like the Accessible Boulder: ADA Self-Evaluation and Transition Plan underscores the importance of inclusive design, benefiting both individuals with disabilities and the wider community by improving safety and comfort for all.

Public-private partnerships: Programs like Boulder's Sidewalk Repair Program, which involves cost-sharing with property owners, accelerate repairs and distribute financial responsibility, demonstrating an effective solution for budget constraints.

Recommendations for other cities

Leverage Cross-Sector Collaboration to Maximize Resources: Integrate sidewalk improvements with larger infrastructure projects, such as road resurfacing or stormwater management, to streamline delivery and attract contractor interest while addressing pedestrian needs.

Implement Focused Programs to Address Infrastructure Gaps: Develop targeted initiatives like Boulder's Missing Links Program to systematically address connectivity deficits and create a cohesive pedestrian network.

Adopt Cost-Sharing Models to Tackle Funding Challenges: Encourage public-private partnerships, similar to Boulder's Sidewalk Repair Program, to involve residents and businesses in funding sidewalk maintenance, reducing the financial burden on municipal budgets while ensuring timely upgrades.

Sidewalk Prioritization Model, Fort Collins, CO

Population

170,376 (2023)

Context

Urban

Key reason for case study

Prioritization, information and analysis. Fort Collins is highlighted as a case study for its innovative and data-driven approach to sidewalk delivery, emphasizing prioritization and comprehensive analysis. The city's methodologies offer valuable insights for other municipalities aiming to enhance pedestrian access, safety and equity through effective planning and resource allocation.

Objectives

For sidewalk delivery in Fort Collins, the key objectives focus on several core principles that aim to improve pedestrian access, safety and equity throughout the city. These objectives include:

- **Improving Pedestrian Access:** Fort Collins strives to create a comprehensive and accessible sidewalk network, ensuring that pedestrians of all ages and abilities can safely and conveniently walk throughout the city. The city works towards identifying gaps in the existing sidewalk infrastructure and prioritizes sidewalk delivery in key areas, particularly in residential neighborhoods and near schools and commercial districts. This includes providing direct, barrier-free paths to key destinations and integrating pedestrian infrastructure with transit and bicycle networks.
- **Safety and Comfort:** Fort Collins' sidewalk network development is closely aligned with its Vision Zero goals, which aim to eliminate fatalities and serious injuries related to traffic incidents. The city places an emphasis on designing sidewalks that prioritize pedestrian safety, comfort and accessibility by upgrading existing sidewalks and constructing new ones that meet the standards of the Public Right-of-Way Accessibility Guidelines (PROWAG).
- **Equity and Inclusion:** A significant focus is placed on ensuring that sidewalk improvements address systemic barriers, especially for historically underserved populations and people with disabilities. By prioritizing sidewalk construction and repair in areas where infrastructure is lacking or inadequate, the city aims to create a more inclusive pedestrian network that serves all residents equitably.

Planning and prioritization

Master Streets Plan: The Master Street Plan (MSP) is Fort Collins' long-term vision for its major street network, detailing existing and future vehicle, bicycle and pedestrian connections within the city and its growth management area. It guides development by specifying street types and general locations, ensuring that infrastructure aligns with the city's transportation goals.

Active Modes Plan: The Active Modes Plan envisions Fort Collins as a community where walking, biking and other active modes are safe, convenient and enjoyable for everyone. Adopted in December 2022, the plan focuses on improving infrastructure, accessibility and connections to support sustainable and active transportation options.

Prioritization: Fort Collins has a dedicated and robust Sidewalk Prioritization Model which analyzes the entire sidewalk system to identify priorities in the system. The results of the model are available through an online interactive map .

Equity and Accessibility Focus: A key feature of the prioritization analysis is a “Health and Equity Score” which accounts for 20% of the total prioritization score. The equity score was derived from the following factors included in the 2011-2015 American Community Survey 5-year estimates: age (under 18 and 65 or older), households at or below federal poverty level, Hispanic/Latino, race (non-white), households without a vehicle and disability status.

Sidewalk delivery challenges & solutions

Challenges

Rising Costs: Rising Costs: Fort Collins faces significant challenges related to rising material costs and labor shortages, which affect the ability to maintain and expand pedestrian infrastructure. This has resulted in limited funding available for new sidewalk projects. The city estimates that it will cost approximately $20 million to complete the pedestrian projects outlined in their Active Modes plan.

Infrastructure Deficits: The city also has substantial infrastructure deficits, with 221 miles of missing sidewalks and 217 miles of existing sidewalks that are not ADA-compliant. Many neighborhoods in the southern, western and northeastern parts of Fort Collins are particularly affected, either lacking sidewalks entirely or having sidewalks that are too narrow or inaccessible. These gaps hinder connectivity and make pedestrian travel more challenging in underserved areas.

Solutions

Program Innovations: To address the maintenance and repair of sidewalks, Fort Collins has integrated innovative solutions such as the Street Maintenance Program (SMP). Through regular maintenance and resurfacing projects, the city includes sidewalk and curb repairs, along with ADA-compliant curb ramp upgrades, which help address these infrastructure needs efficiently.

Partnerships and Collaboration: Fort Collins has also been successful in fostering partnerships with both private and public sector entities to enhance sidewalk delivery. The Development Review Process requires private developers to contribute to pedestrian infrastructure as part of new developments, reducing the financial burden on public funds. Additionally, the city collaborates with entities like Colorado State University and Larimer County to further extend sidewalk improvements into key areas.

Data-driven approach

Dashboard Tools: The Fort Collins **2022 Sidewalk Construction Program interactive map** presents details of sidewalk projects aimed at improving pedestrian infrastructure across the city. It highlights areas where new sidewalks were constructed to fill gaps, showing completed, ongoing and planned construction. Users can explore specific project locations and learn about funding sources, timelines and the overall impact on accessibility and safety. The map visually enhances understanding of the city’s efforts to create a more connected and pedestrian-friendly environment and an interactive map of active modes plan recommendations.

Assessment Tools: Fort Collins has a dedicated and robust Sidewalk Prioritization Model which analyzes the entire sidewalk system to identify priorities in the system. The results of the model are available through an online interactive map.

Accelerated delivery approaches

Cross-Sector Collaboration: Fort Collins has successfully accelerated sidewalk delivery by coordinating with various sectors and aligning sidewalk projects with broader infrastructure developments. One key example is the city's Development Review process, where private developers are required to contribute to pedestrian infrastructure during new development projects. This collaboration ensures that sidewalk delivery is integrated with other construction activities, maximizing efficiency and minimizing costs. Additionally, partnerships with organizations like Colorado State University (CSU) and Larimer County enable the city to leverage resources and expand the reach of sidewalk projects.

Success Stories: Fort Collins has implemented the Sidewalk Prioritization Model, which identifies areas with the greatest need for sidewalk improvements, such as gaps in the network or high-traffic zones. This model has been instrumental in ensuring that sidewalk delivery is both strategic and effective. A significant success has been the city's focus on ADA compliance—upgrading existing sidewalks and ramps to meet accessibility standards, ensuring a safer and more inclusive environment for pedestrians. This prioritization has led to the development of a more connected and accessible pedestrian network across the city.

Funding mechanisms

Public-private cost sharing

Fort Collins utilizes a Development Review process where private developers contribute to infrastructure investments, including sidewalks, during the development of new properties. This approach allows the city to leverage private investments for infrastructure improvements, thereby reducing the financial burden on public funds. Private developers are required to either provide direct infrastructure investments or pay fees (fee-in-lieu) that support the management of streets and pedestrian infrastructure during the development process .

Sidewalk Improvement Districts (SID)

While Fort Collins does not appear to have a formal "Sidewalk Improvement District" (SID) program, the city funds sidewalk improvements through a combination of public and private sources, including programs like the Community Capital Improvement Program (CCIP), which helps fund projects like sidewalk ADA compliance and the Sidewalk Prioritization Model. This model helps to identify and prioritize gaps in the sidewalk network for future projects. Additionally, the city may partner with institutions like Colorado State University or ot Fort Collins' Street Maintenance Program is primarily funded by a 0.25% sales tax, first approved by voters in 1990 and renewed multiple times, most recently in November 2024 for a 20-year term.

Fort Collins' Street Maintenance Program

Primarily funded by a 0.25% sales tax, first approved by voters in 1990 and renewed multiple times, most recently in November 2024 for a 20-year term. This tax generates approximately $10.7 million annually, covering about 50% of the program's costs, with the remainder funded by the city's general fund. The program focuses on maintaining and rehabilitating the city's street infrastructure, including road repaving and sidewalk repairs.

Lessons learned & key takeaways

Fort Collins' approach to sidewalk delivery underscores the power of data-driven strategies and collaboration to enhance pedestrian infrastructure. The city's focus on equity, safety and accessibility offers valuable insights for other municipalities.

Lessons learned

Data-Driven Prioritization Enhances Equity and Efficiency: The implementation of the Sidewalk Prioritization Model with a "Health and Equity Score" has been crucial in identifying and addressing critical gaps in Fort Collins' pedestrian network. By focusing on underserved neighborhoods and areas with the greatest need, the city ensures that resources are allocated effectively and equitably.

Cross-Sector Collaboration Accelerates Delivery: Partnerships with private developers, Colorado State University and Larimer County have enabled Fort Collins to expand sidewalk improvements beyond what public funding alone could achieve. Requiring developers to contribute to pedestrian infrastructure during new developments reduces the financial burden on the city and integrates sidewalk delivery with broader construction activities.

Integrated Planning Maximizes Impact: Aligning sidewalk projects with broader infrastructure developments, such as the Street Maintenance Program (SMP), allows for efficient use of resources and minimizes disruptions. Including sidewalk and curb repairs in regular maintenance and resurfacing projects addresses infrastructure needs systematically.

Recommendations for other cities

Develop Data-Driven Prioritization Tools: Implement a prioritization model similar to Fort Collins' Sidewalk Prioritization Model. Incorporate health and equity metrics to ensure that sidewalk improvements benefit all residents, especially those in underserved areas.

Leverage Private Partnerships: Require private developers to contribute to sidewalk infrastructure as part of the development process. This approach reduces the financial burden on public funds and ensure that new developments are integrated into the pedestrian network.

Coordinate Infrastructure Projects: Integrate sidewalk improvements with regular maintenance programs and other infrastructure projects. This coordination can maximize resources, reduce costs and minimize disruptions to the community.

Focus on Accessibility and Inclusivity: Prioritize upgrading existing sidewalks and ramps to meet ADA standards, ensuring a safer and more inclusive environment for all pedestrians.

Roadway Improvement Fee, Westminster, CO

Population

114,875 (2023)

Context

Suburban

Key reason for case study

Unique funding mechanisms. The City of Westminster uses unique funding strategies to secure dedicated sidewalk funding. Property owners pay a monthly Roadway Improvement Fee for each dwelling unit that is included in the property's water bill to fund roadway maintenance and improvement projects, including sidewalks.

Objectives

Access to Opportunity: As outlined in the Westminster City Council Strategic Plan , a priority is to "advance access to opportunity and prosperity for all" by promoting diverse housing choices, expanded mobility options, walkable neighborhoods and strengthened community networks.

Safety and Connectivity: Community input from 2019 and 2020 indicated that safety and filling sidewalk gaps are top priorities, especially around schools, parks and transit hubs. Completing these gaps takes precedence over upgrading existing sidewalks, as expressed in public engagement feedback.

Planning and prioritization

Planning: Westminster's Transportation & Mobility Plan (TMP) aims to create a safe, connected and accessible network of pedestrian, bicycle and trail pathways. Westminster's Pedestrian Plan is included as Chapter 8 of the TMP. The development of the Pedestrian Plan integrates technical analysis and community input to guide improvements in pedestrian infrastructure. Key elements include a pedestrian demand heat map to prioritize high-activity areas, context-sensitive facility designs based on land use typologies and a short-trip analysis to identify corridors where improved facilities could encourage walking and biking for short-distance trips.

Prioritization: The 2021 TMP Appendix D identifies 24 key corridors for recommended improvements. Each corridor is described with estimated implementation timeframes (near-term, mid-term and long-term), cost estimates and key considerations, including partnerships and funding needs. Specific sidewalk projects are listed in the Pedestrian Plan projects table (Table D.4, document pg. D-59; pg. 235), identifying priorities based on the need for improved safety and connectivity.

Equity and Accessibility Focus: Westminster introduced a Roadway Improvement Fee in 2014, charging $6 monthly per utility account. Updated in 2022, the fee now applies per unit to ensure a more equitable distribution of infrastructure costs across residential and commercial properties.

Sidewalk delivery challenges & solutions

Challenges

Rising Costs: Westminster's 2014 roadway improvement fee initially did not account for inflation and as construction costs rose, the city was forced to reassess funding. As of August 2024, the city is recommending to consider increasing the fee to $7 for residential and $20 (or $10 per 1,000 sq ft) for nonresidential accounts to better align with rising concrete and labor costs.

Infrastructure Deficits: Significant sidewalk gaps persist throughout Westminster, especially in residential neighborhoods where pedestrian connectivity is limited. Addressing these gaps requires an accelerated approach to meet community needs.

Solutions

Program Innovations: Westminster has implemented targeted infrastructure programs, including a Sidewalk Gap Program, which focuses on addressing key missing links in the pedestrian network and Rapid Repair Initiatives to ensure timely maintenance of existing infrastructure. The Rapid Repair Initiatives prioritize quick fixes for damaged or deteriorated sidewalks, such as addressing trip hazards, repairing cracks and improving accessibility features like curb ramps, to enhance safety and usability. The TMC's Pedestrian Plan emphasizes completing network gaps, improving pedestrian safety and enhancing comfort. Projects identified in the plan are funded through a combination of grant funding and city matching funds via the Roadway Improvement Fee.

Partnerships and Collaboration: The city collaborates with utility providers and private developers. Developers contribute to pedestrian infrastructure in new developments and partnerships with agencies like RTD help integrate transit and pedestrian improvements.

Data-driven approach

Assessment Tools: The TMP's assessment criteria include tracking miles of newly implemented pedestrian facilities, improvements in accessibility and high-need areas flagged through safety metrics, equity indicators and public feedback.

Accelerated delivery approaches

Cross-Sector Collaboration: Westminster combines sidewalk improvements with other public works projects, such as street repaving or utility upgrades, to streamline project timelines and reduce costs. This collaboration ensures sidewalks are improved without needing standalone projects.

Success Stories: The 72nd Avenue Corridor Study is a notable success, accelerating sidewalk delivery along a key route by coordinating with roadway improvements, significantly enhancing safety and connectivity for pedestrians and transit riders.

Funding mechanisms

Roadway Improvement Fee: Westminster's Roadway Improvement Fee, established in 2006 and updated in 2014, provides essential funding for the city's curb, gutter, sidewalk and street lighting maintenance. This $6 monthly fee, appearing on residents' utility bills, generates approximately $2.2 million annually, with around $750,000 dedicated to concrete replacement projects and $1.45 million allocated to street lighting energy and repair costs.

To address funding inequities and inflation-related cost increases, the city proposed a fee structure update in 2022. Currently, the fee is based on the number of water meters per property, meaning multi-family and large commercial properties with a single meter pay the same amount as single-family homes. The proposed adjustment introduces a $6 monthly charge per unit or dwelling, aligning charges more equitably across all property types and helping cover the estimated $10 million annual cost to maintain roadway quality. This change is part of a data-driven initiative to close the funding gap in Westminster's roadway infrastructure needs, ensuring sustainable, high-quality streets and pedestrian pathways across the city.

Lessons learned & key takeaways

Westminster's sidewalk delivery approach highlights the value of equitable funding mechanisms, community engagement and cross-sector collaboration. Its focus on addressing sidewalk gaps and ensuring sustainable infrastructure funding offers practical insights for other municipalities.

Lessons learned

Equitable Funding Mechanisms: Transitioning the Roadway Improvement Fee to a per-unit model ensured more equitable distribution of costs across residential and commercial properties, addressing previous funding inequities.

Cross-Sector Collaboration Enhances Efficiency: Combining sidewalk projects with broader infrastructure efforts, such as street repaving or utility upgrades, streamlined timelines and reduced costs, demonstrating the benefits of coordinated delivery.

Community Engagement Shapes Prioritization: Public feedback highlighted the importance of filling sidewalk gaps over upgrading existing infrastructure. By aligning projects with community priorities, Westminster ensured resources were focused on the most impactful improvements.

Recommendations for other cities

1. **Adopt Equitable and Scalable Funding Models:** Implement a fee-based funding mechanism similar to Westminster's Roadway Improvement Fee to generate sustainable resources for sidewalk and other infrastructure needs while addressing inflationary pressures.
2. **Leverage Development Contributions:** Require developers to invest in pedestrian infrastructure as part of new developments, reducing the financial burden on city budgets and ensuring sidewalk integration into new projects.
3. **Integrate Sidewalk Projects with Broader Infrastructure Initiatives:** Coordinate sidewalk improvements with other public works projects to maximize resources and minimize disruptions, as Westminster demonstrated through its 72nd Avenue Corridor Study.
4. **Engage the Community in Planning:** Actively involve residents in identifying priorities to ensure projects align with safety and connectivity needs, leading to more targeted and effective investments.

drcog
DENVER REGIONAL COUNCIL OF GOVERNMENTS