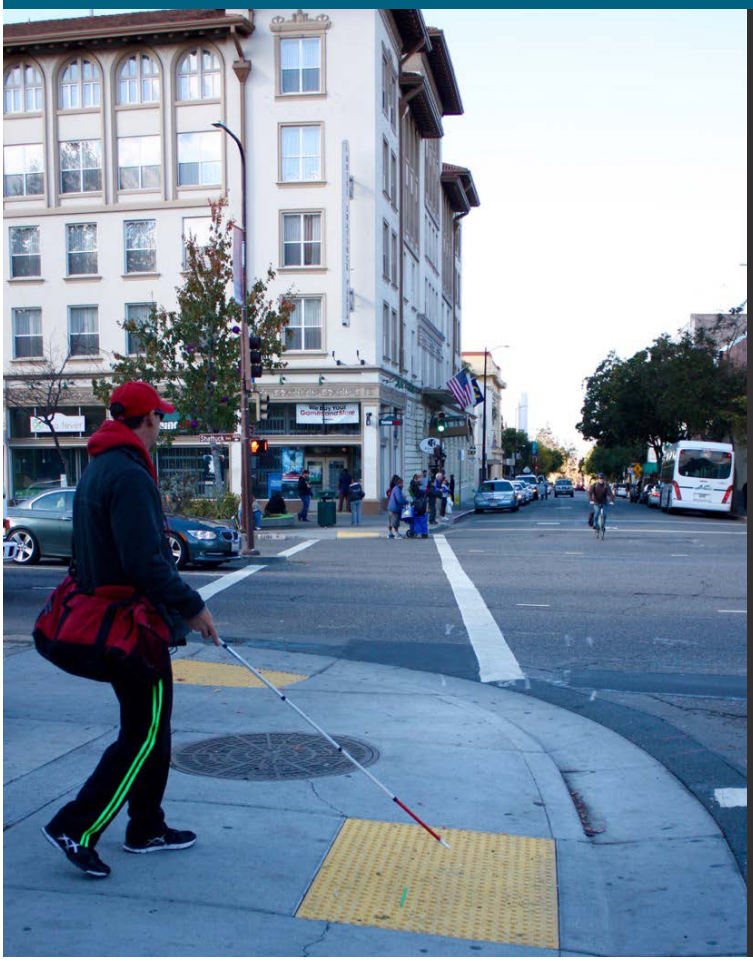
ACCESSIBILITY

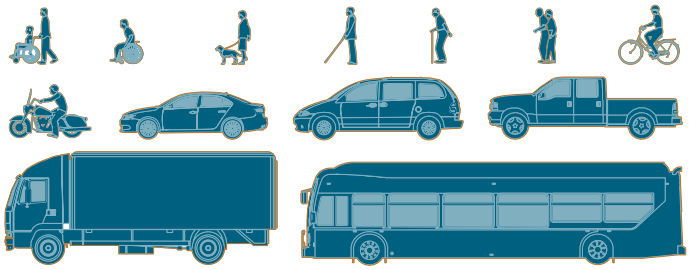


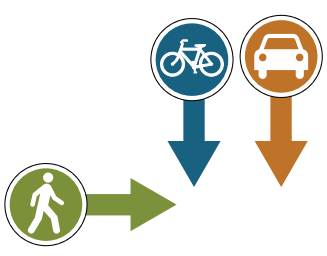
Accessible pedestrian facilities improve the quality of life for those with mobility, visual, hearing, or other disabilities by reducing barriers to services, opportunities, and social activities. Pedestrian access routes, which provide continuous and clear pedestrian pathways, enhance mobility and encourage independence by increasing transportation choice.

Nearly one in five adults under the age of 65 have difficulty traveling due to a disability, with difficulty walking cited as the most common problem (**Committee on Disability in America 2007, p. 522**). Often the built environment is a primary reason for this difficulty because it has historically been designed for people who do not have a disability. Design details for surfaces, streetscape furniture, sidewalks, signals, street crossings, and transit stops may render pedestrian facilities inaccessible. As a result, pedestrians with disabilities may be forced to walk in the street or otherwise be placed in direct conflict with motor vehicles or bicycles.

The Rehabilitation Act of 1973 prohibits agencies receiving Federal financial assistance from discriminating on the basis of disability. Since 1990, the Americans with Disabilities Act (ADA) has required pedestrian facilities in the public right-of-way to be accessible. Accessible street designs minimize multimodal conflicts by eliminating barriers for pedestrians, communicating street crossing information, and promoting predictable behavior for all roadway users.

COMMON USERS IN CONFLICT AND TYPICAL CRASH TYPES





Accessible facilities guide pedestrians to safe and predictable crossing points, reducing their risk of being struck at intersections.

Accessible facilities eliminate barriers, allowing pedestrians to travel on the sidewalk and away from the roadway.

GUIDING PRINCIPLES TO REDUCE CONFLICTS

SAFETY
Designs should eliminate conflicts by maintaining an access route on pedestrian circulation paths, which includes sidewalks, curb ramps, street crossings, and connections to accessible facilities.

ACCOMMODATION AND COMFORT
Designs should eliminate barriers for people with mobility, visual, hearing, or other disabilities.

COHERENCE
Accessible pedestrian routes must provide a continuous clear width free of obstructions and protrusions.

PREDICTABILITY
Designs should provide accessible elements with consistent characteristics and in a logical arrangement to communicate the pedestrian access route.

CONTEXT-SENSITIVITY
Designs should accommodate pedestrians with disabilities in a manner that complements community character and supports community health, economic, and livability goals.

EXPERIMENTATION
Pedestrian access routes must meet Federal standards.

DESIGN STRATEGIES

Providing, maintaining, and connecting to pedestrian access routes is the central concept of the **U.S. Access Board's 2011 Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG)**. A pedestrian access route must provide a 4-foot minimum continuous clear width, a maximum grade consistent with the road grade, a maximum 2-percent cross slope, and a "firm, stable, and slip resistant" surface **(PROWAG 2011, R302)**. Accessibility requirements greatly influence the design and construction strategies for sidewalks, street crossings, curb ramps, signals, street furniture, transit stations, on-street parking, loading zones, shared use paths, and more. For more information on the relationship between the current enforceable ADA Standards and PROWAG, see p. 6.

At the network level, connecting pedestrian access routes reduces conflicts by providing access across barriers. This enables safe and comfortable walking trips from beginning to end for pedestrians of all abilities. For more information, refer to the design topic on **Network Connectivity** for network-level design strategies including small blocks, road diets, safe crossings, and gap connectivity.

SIDEWALKS

Sidewalks comprise the bulk of pedestrian access routes. They should provide a continuous circulation path and connect pedestrians to accessible elements, spaces, and facilities. 1 Where narrower than 5 feet, a 5-by 5-foot minimum passing space is required at 200-foot maximum intervals **(PROWAG 2011, R302.4)**. To increase maneuverability, additional space should be provided at "turns or changes in direction, transit stops, recesses and alcoves, building entrances, and along curved or angled routes, particularly where the grade exceeds 5 percent" **(PROWAG 2011, Advisory R302.3)**.

Streetscape furniture cannot be placed within the pedestrian access route (i.e., pedestrian through zone) and any nearby obstructions in the frontage and street furniture zones should be detectable by cane. 2 For more information on sidewalk zones, refer to the **NACTO Urban Street Design Guide 2013, p. 38**. Protruding objects, such as wall- or pole-mounted items, must be limited because they can be difficult to detect and avoid **(PROWAG 2011, R402)**.

STREET CROSSINGS

Street crossings maintain the pedestrian access route across travel lanes at intersections. A variety of striping may be used to denote the pedestrian crossing **(MUTCD 2009, Sec. 3B.18)**. High-visibility ladder style crosswalks with longitudinal lines are recommended. 3

Ensure that adequate roadway sight distance is provided in advance of the pedestrian crossing to enhance the visibility for approaching motorists and bicyclists. As motor vehicle speeds increase, additional sight distance should be provided.

Consider additional treatments at intersections that minimize multimodal conflicts by reducing motorist turning speeds and improving motorist yielding rates. Curb extensions 4 shorten crossing distances, prevent illegal stopping/parking in close proximity of the crosswalk, and further increase visibility of pedestrians to motorists, particularly on roadways with on-street parking. Raised crossings 5 enhance visibility and provide an additional traffic calming benefit to encourage motorist yielding behavior. Crossing islands 6 break up long crossings and help pedestrians manage directional conflicts. For more information, refer to the design topics on **Traffic Calming and Design Speed** and **Enhanced Crossing Treatments**.

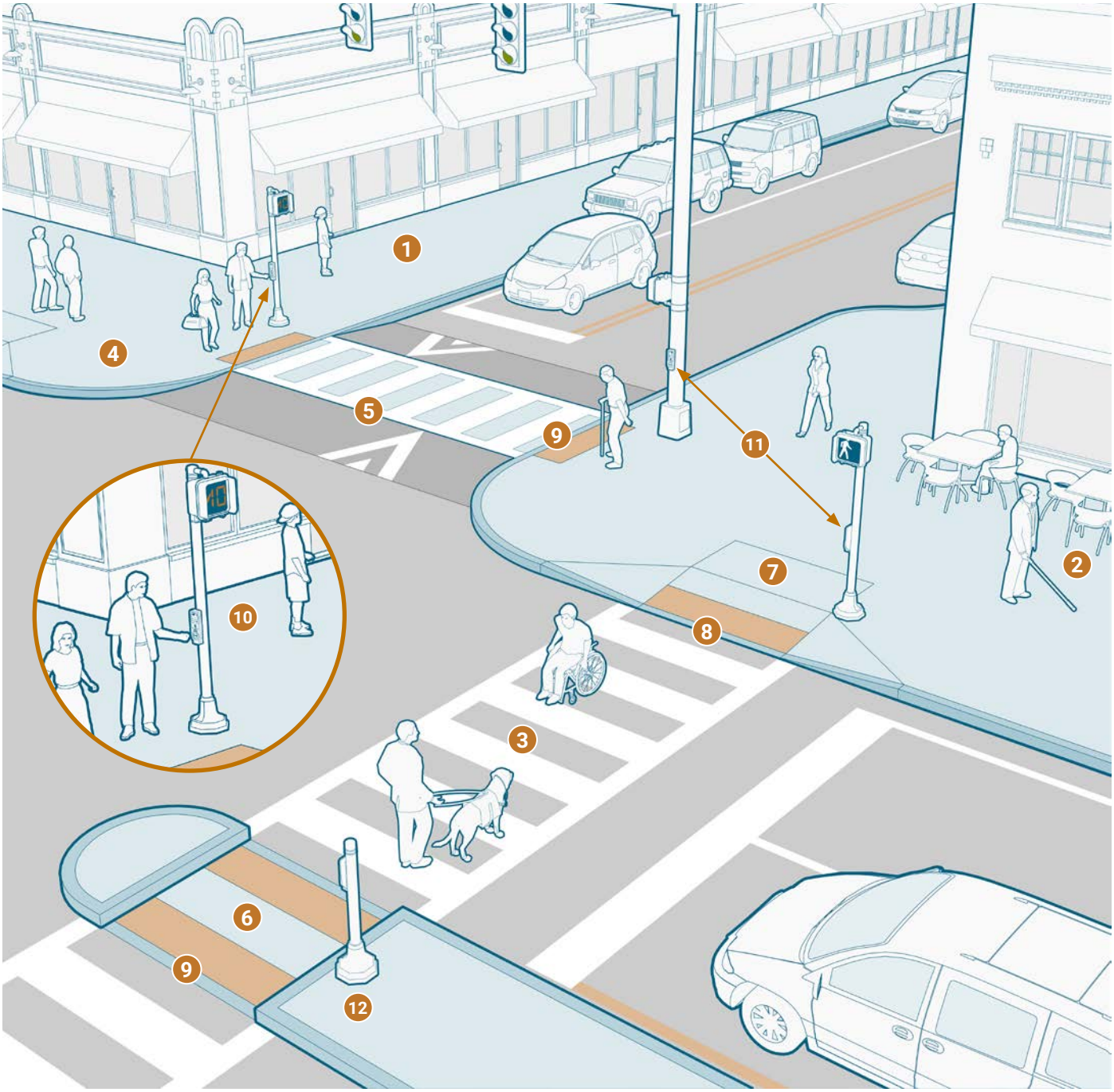
CURB RAMPS

Curb ramps facilitate pedestrian access between sidewalks and street crossings, and between sidewalks and accessible on-street parking. Curb ramps may be perpendicular or parallel to the pedestrian access route, or a combination of both, with a maximum running slope of 8.3 percent. **PROWAG** allows for different maximum cross slopes depending on the traffic control in place at the crossing **(2011, R302.6)**. Ramps should align with pedestrian crossings; the use of apex curb ramps (i.e., diagonal ramps) should be a last resort, as these ramps direct pedestrians into the intersection and away from the crosswalk.

Each curb ramp must include a landing/turning space 7 for wheelchair maneuverability and a detectable warning surface 8 to alert pedestrians with a visual disability that they are entering or exiting the roadway. Detectable warning surfaces must include truncated domes to provide tactile feedback and must exhibit visual contrast with adjacent surfaces (e.g., light on dark or dark on light). Place detectable warning surfaces at the back of the curb, unless otherwise specified by **PROWAG (2011, R305.2)**. Detectable warning surfaces are also needed at blended transitions (i.e., crossings with a running slope less than 5 percent) raised crossings, and at pedestrian crossing islands. 9

SIGNALS

At signalized intersections, accessible pedestrian signals communicate the location of the pedestrian pushbutton and the direction and timing of WALK and DON'T WALK intervals in a non-visual format. 10 The **MUTCD** defines non-visual as one or more "audible tones, speech messages, and/or vibrating surfaces" **(2009, Sec. 4E.09)**, whereas **PROWAG** defines non-visual as both "audible tones and vibrotactile surfaces" **(2011, R209)**. Designers should separate pedestrian pushbuttons by at least 10 feet 11 and locate each near a level landing or a blended transition to "make it obvious which pushbutton is associated with each crosswalk" **(MUTCD 2009, Sec. 4E.08)**. Consider slower walking speeds (less than 3.5 feet per second) when determining pedestrian clearance times to accommodate the elderly and pedestrians with disabilities **(MUTCD 2009, Sec. 4E.06)**. Signal timing should allow pedestrians to cross both sides of the street during a single cycle. Designers should place a pushbutton at pedestrian crossing islands for slower moving pedestrians to call the signal if they cannot cross the street in a single cycle. 12



SURFACE TREATMENTS

PROWAG requires planar and smooth pedestrian access route surfaces. Uneven unit pavers, rough bricks, and hand-tooled concrete control joints cause uncomfortable or even painful vibrations for people using wheeled mobility devices. Minimize vertical discontinuities between unit pavers, vault frames, gratings, and where materials intersect (refer to **PROWAG 2011, R302.7,** for specifications for vertical discontinuities and horizontal openings). Saw-cut concrete control joints and wire-cut bricks help reduce vibrations.

MAINTENANCE

Proper maintenance of pedestrian access routes is essential to keeping pedestrians on the sidewalk and out of the roadway. The clear width should remain free and clear of obstructions, including signs, café seating, snow, ice, debris, and other clutter. Inspect pushbutton responsiveness and pedestrian signal indications on a routine schedule to avoid a lapse in functionality. Public reporting applications can further help identify maintenance needs.

CASE STUDIES

BERKELEY 2010 PEDESTRIAN MASTER PLAN
BERKELEY, CA

The City of Berkeley is regarded as one of the most accessible cities in the U.S. for its early and continued efforts to provide accessible public rights-of-way. It has more than 30 years of experience incorporating accessible elements into street design, starting several years before the introduction of national ADA legislation. Both its Disability Compliance Program (BDCP) within Public Works and its Commission on Disability ensure a culture of accessibility within City government. The City retrofits approximately 100 existing curb ramps per year to contemporary design standards, and continues to install accessible elements at locations with identified safety and accessibility deficiencies. Its most recent 2010 Pedestrian Master Plan recommends accessible facilities training for all Public Works and Planning staff, a system to track ongoing efforts, and expanded oversight for the BDCP.

OREGON STATE UNIVERSITY ACCESSIBILITY PLAN
CORVALLIS, OR

Oregon State University (OSU) is striving to create a universally accessible campus through a holistic approach to barrier removal using the 2010 ADA Standards and best practice performance standards. OSU's plan (considered a "draft" document because the campus is always changing) identified five key objectives, including identifying an Accessible Travel Grid (ATG) in collaboration with the community and the OSU Accessibility Committee. The ATG is a pedestrian access route that will connect all campus facilities with at least one accessible access point. Focusing on the ATG allowed OSU to initially prioritize 1,134 barriers for resolution (out of 5,029 total barriers identified in the exterior environment), significantly reducing the implementation timeframe and overall cost of achieving an interconnected campus.

FOR MORE INFORMATION

American Association of State Highway and Transportation Officials. *A Policy on the Geometric Design of Highways and Streets*. 2011.

Committee on Disability in America. *The Future of Disability in America, Part G: Transportation Patterns and Problems of People with Disabilities*. 2007.

Federal Highway Administration. "Americans with Disabilities Act (ADA)/Section 504 of the Rehabilitation Act of 1973 (504)." Last modified December 1, 2015. http://www.fhwa.dot.gov/civilrights/programs/ada.cfm.

Federal Highway Administration. *Manual on Uniform Traffic Control Devices*. 2009.

Transportation Research Board. "Web-Only Document 117A: Accessible Pedestrian Signals: A Guide to Best Practices." Submitted June 2007. http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_w117a.pdf

United States Access Board. *Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way*. 2011.