New Mexico DEPARTMENT OF TRANSPORTATION
MOBILITY FOR EVERYONE

NMDOT

Quick Build Guide

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Introduction

Communities across New Mexico need and want to deliver street improvements that support multimodal networks and address critical safety issues while working with limited resources. Quick build projects can address complete streets and safety needs in a more timely and cost-effective manner than the traditional capital project delivery process. Communities can also use quick build strategies to implement and expand their multimodal networks.

What Are Quick Build Projects?

Quick build projects fall in the middle of the project delivery continuum shown in Table 1. They are meant to remain in place for years, without requiring years to design, fund, and construct. Quick build improvements use a range of durable, lower-cost materials, most of which are straightforward to adjust or remove if needed. Many quick build treatments also lend themselves well to shorter-duration projects, if adapted to use flexible, temporary, and readily available materials. Shorter-term pop-up, demonstration, and pilot projects can build momentum and provide data to inform and justify more durable improvements.

To reduce costs and facilitate faster implementation, quick build projects reconfigure roadway pavement sections and reallocate space at crossings—and typically avoid relocating curbs, widening roadways, and demolishing existing infrastructure. Quick build designs also avoid other types of changes known to extend project timelines and increase costs, including changes to drainage and stormwater infrastructure, roadway grading, sub-surface and above-ground utilities, and right-of-way. Quick build projects retrofit rather than reconstruct streets, which makes them faster and less expensive to install than more intensive major capital projects.

Table 1. Project Type Continuum

Project Type	Pop-Up or Demonstration	Pilot	Quick Build	Major Capital
Typical Duration	1 day–1 month	1 month–1 year	1–5 years	5+ years
Materials	+ Temporary + Easily accessible or store-bought + Easily and rapidly installed and removed	+ Semi-permanent + Easily accessible + Easily maintained + Easily and rapidly installed, adjusted, and removed	+ Semi-permanent + More durable + Easily maintained + Rapidly implemented + Often adjustable and removable	+ Permanent + Most durable + Incorporated into routine maintenance programs + Hardest to adjust and remove

Why Pursue Quick Build Projects?

Quick build projects can help NMDOT as well as tribal and local public agencies achieve a variety of goals, including:

+ Create more complete streets within the available right-of-way, pavement section, and back-of-curb space
+ Address immediate concerns by installing proven safety countermeasures
+ Support accessibility through targeted spot improvements
+ Advance and complement Main Street projects and local placemaking initiatives by slowing vehicle speeds and enhancing the pedestrian realm
+ Implement lower-cost projects with a range of funding sources

Quick Build Projects as Safety Improvements

Quick build projects can help NMDOT and partner agencies improve safety outcomes and address critical safety issues on transportation networks in communities across the state. The treatments in this guide include proven safety countermeasures that help slow motor vehicle speeds, reduce conflicts and crashes, and establish dedicated spaces for different road users.

The quick build approach to project delivery empowers agencies to make progress toward Target Zero and traffic safety goals in the near term using local funds and established programs, without waiting on funding for major capital or street reconstruction projects. With advance planning and coordination, many safety treatments can be implemented as a part of existing maintenance, resurfacing, and restriping programs at little to no additional marginal cost to agencies.

What Will This Guide Cover?

This guide is structured as a toolkit with over two dozen treatments that can advance complete streets and multimodal safety along corridors and at crossings. For the typical treatment, the toolkit includes:

+ **Appropriate contexts** where quick build improvements are most likely to be feasible and effective
+ **Design considerations** including common dimensions and strategies to enhance multimodal safety and comfort
+ **Accessibility considerations** highlighting strategies to accommodate people using mobility devices and pedestrians with vision disabilities and conform with applicable standards
+ **Drainage considerations** highlighting strategies to maintain stormwater flow
+ **Maintenance considerations** including specialized routines or equipment that may be required
+ **Potential materials** for implementing each treatment
+ Probable **materials cost ranges** based on quantity ranges for quick build treatments
+ **NMDOT price agreements** and bid items associated with common quick build materials

Who Should Use This Guide?

This guide is intended to serve as a reference document for a broad range of practitioners, including planners, designers, and engineers working at NMDOT, tribal and local public agencies, nonprofit and community groups, and private firms.

Generally, this guide focuses on treatments, design strategies, and processes for NMDOT facilities. Accordingly, it showcases treatments suited for higher-volume, higher-speed corridors that serve as major arterials and main streets within communities and long-distance connections through rural areas. Many of these treatments can also improve safety and multimodal conditions on arterial, collector, and local streets outside of state right-of-way—and may be of interest to local and public agencies.

Given its focus on state facilities, this guide aligns with the NMDOT *Design Manual*, noting treatments or elements that may require variances. On local streets outside of NMDOT right-of-way, tribal and local public agencies may have their own standards and design criteria—and may have more flexibility to implement treatments as a part of quick build, pilot, and demonstration projects.

National Guidance

The appropriate contexts and design considerations listed for each treatment draw on published national guidance, with additional considerations tailored to quick build applications. The primary national resources informing this guide are:

+ AASHTO (2024) *Guide for the Development of Bicycle Facilities, 5th Edition* (AASHTO *Bike Guide, 5th Ed.*)
+ FHWA (2021) *Making Our Roads Safer | One Countermeasure at a Time* (FHWA *Proven Safety Countermeasures*)
+ FHWA (2018) *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations* (FHWA *STEP Guide*)
+ FHWA (2016) *Small Town and Rural Multimodal Networks*
+ *Small Town and Rural Design Guide* (ruraldesignguide.com)
+ FHWA (2023) *Manual on Uniform Traffic Control Devices for Streets and Highways, 11th Edition (MUTCD)*
+ U.S. Access Board *Public Right-of-Way Accessibility Guidelines (PROWAG)*
+ NCHRP (2020) *Guidance to Improve Pedestrian and Bicyclist Safety at Intersections*
+ NACTO (2013) *Urban Street Design Guide*

The content in this guide is not intended to serve as comprehensive, prescriptive, or binding design guidance, nor is it intended to supersede guidance in the *MUTCD* or NMDOT *Design Manual* for treatments along state facilities. Quick build projects along state facilities may require or benefit from engineering analysis documenting the need for multimodal treatments as well as coordination with the Traffic Technical Support Bureau prior to implementation.

For treatments intended for pedestrians, designers should refer to *PROWAG* for accessibility standards to accommodate people using mobility devices and pedestrians with vision disabilities. For treatments intended for bicyclists, designers can refer to the AASHTO *Bike Guide, 5th Ed.* for more comprehensive guidance.

Common Quick Build Materials

Quick build treatments use a variety of materials to reconfigure corridors and crossings. Many materials share similar characteristics related to cost, procurement, installation, and maintenance. Table 2 summarizes the most prevalent types of materials used in quick build projects, all of which serve important functions and allow for flexibility in design.

For many design elements, designers can choose among several potential materials. In these cases, evaluating the trade-offs between materials can help agencies manage costs and maintain facilities. The most appropriate materials depend on the context, agencies' project and maintenance budgets, and the intended duration of the project.

In many applications, materials that cost less to install—such as preformed elements bolted to the roadway—are less durable and more likely to get dislodged by motor vehicles, resulting in higher maintenance costs down the line. Conversely, more durable materials like concrete cost more to install but less to maintain. Many agencies use lower-cost, less durable materials for their first quick build projects and gradually shift toward more durable materials as they grow comfortable with common quick build designs.

The remainder of this section describes shared characteristics of similar materials and outlines specific materials listed throughout this guide.

Table 2. Quick Build Material Types

Material Type	Durability	Installation Costs	Maintenance Costs	Primary Functions
Striping & Pavement Markings	Medium–High	Low	Low–Medium	Delineating space, awareness
Signs & Beacons	High	Low–Medium	Low–Medium	Managing speeds, awareness
Preformed Vertical Elements & Delineators	Low–Medium	Low–Medium	Medium–High	Delineating space, vertical separation
Preformed Platforms & Cushions	Medium	Medium	Medium	Managing speeds, bus stops
Concrete & Asphalt	Medium–High	Medium–High	Low	Delineating space, vertical separation, managing speeds, bus stops
Culvert Plates	High	Medium	Low	Maintaining stormwater flow

Striping & Pavement Markings

Striping and pavement markings help delineate roadway space and communicate information to all roadway users. Specific materials and applications include:

+ White or yellow traffic paint applied as linear stripes of different widths
+ Raised pavement markers accompanying white or yellow stripes to improve visibility
+ Pavement markings encompassing a variety of symbols
+ Traffic paint applied across a larger area
+ Green thermoplastic or methyl methacrylate (MMA), commonly used in bicycle facilities

Signs & Beacons

Signs and beacons communicate regulations, upcoming treatments, and other information to all users to improve awareness and encourage compliance. Quick build signs and beacons include:

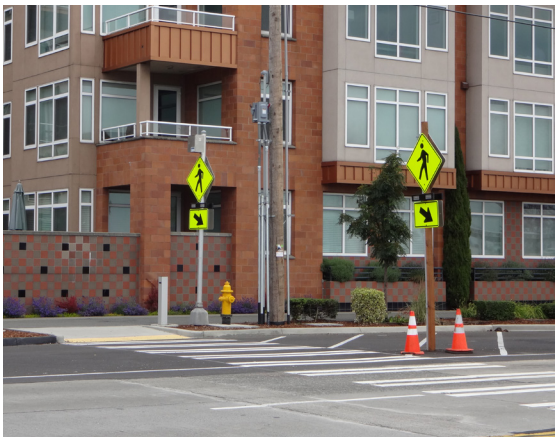
+ Metal and wooden signposts
+ Metal panels with a range of regulatory and advisory signage
+ Rapid rectangular flashing beacons
+ Radar feedback signs

Preformed Vertical Elements & Delineators

A variety of off-the-shelf products can delineate space and provide vertical separation between different portions of the roadway. Preformed delineation elements are typically made of plastic or rubber and bolted to the roadway. These materials are simple to install, adjust, and remove, but they are less durable than concrete, more likely to be traversed or swept by motorists, and more likely to become dislodged. Options include:

+ Flexible delineator posts
+ Modular curb systems
+ Modular mountable speed bump systems
+ Rubberized curb

Signage, flexible delineator posts, traffic paint, and detectable warning surfaces can enhance crossings.



Solar-powered RRFBs can be mounted to metal or wooden signposts at crossings.

Flexible delineator posts installed along centerlines and edge lines encourage slower speeds.

Preformed Platforms & Cushions

Larger preformed products can take the place of design elements that are typically constructed using concrete or asphalt in traditional capital projects. Like preformed delineation elements, these products are typically made of plastic and bolted to the roadway, making them easier to install and remove. Products include:

+ Modular bus stop and curb extension platforms
+ Speed cushions
+ Truck aprons

Concrete & Asphalt

Curbs, concrete, and asphalt offer more durable options for providing vertical separation, managing speeds through vertical deflection, and creating accessible pedestrian facilities. Applications include:

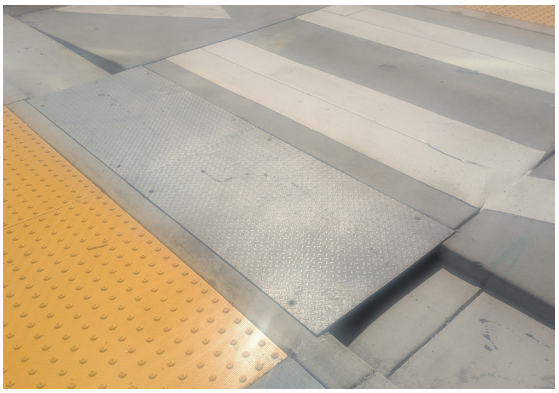
+ Pre-cast curbs, wheel stops, and parking stops
+ Pinned curbs
+ Extruded curbs
+ Cast-in-place curbs
+ Cast-in-place concrete islands
+ Accessible curb ramps with detectable warning surfaces

Culvert Plates

Culvert plates are thin metal plates that play a particularly important role in quick build projects. The plates are often installed between existing curbs and new raised concrete elements near the roadway edge, where they act like miniature bridges across the gutter pan. They provide a flush, level surface between the pedestrian realm and concrete islands, while still allowing water to flow through the gutter. This enables a variety of quick build treatments to meet pedestrian accessibility standards without significantly disrupting drainage or stormwater flow lines.

Modular bus stop platforms can create accessible transit stops within the roadway pavement section.

Pre-cast concrete curbs and traffic paint can define the edge of separated bike lanes and other facilities.



Culvert plates can span the gutter pan to provide a flush surface meeting accessibility requirements.

Common Maintenance Considerations

Many quick build treatments require maintenance to remain in a state of good repair, serve their intended purpose, and support safety and complete streets goals.

Standard Maintenance

Standard maintenance routines that apply to a variety of quick build treatments include:

+ Routine maintenance of striping and pavement markings
+ Routine street sweeping and snow clearing to ensure multimodal facilities are clear of debris and usable year-round
+ Routine replacement of vertical elements and sign posts, which can become dislodged or bent, especially if struck repeatedly or located within the swept path of larger control vehicles
+ Routine trimming of vegetation along the roadway edge to ensure visibility of crossing treatments and to allow people walking, bicycling, and rolling to use the full width of facilities

Specialized Maintenance

Certain quick build treatments require or benefit from specialized maintenance routines or equipment due to the placement of vertical delineators, culvert plates, or other elements within the right-of-way. These include:

+ Treatments that implement facilities that are narrower than a typical motor vehicle lane, like separated bike lanes and pedestrian lanes, may require specialized routines or equipment such as a narrower street sweeper to keep facilities clear of debris and snow. Where feasible, design strategies like wider buffers, mountable delineators, and locating vertical elements closer to the adjacent motor vehicle lane can help accommodate typical maintenance vehicles (like standard street sweepers).
+ Treatments with islands delineated by vertical elements, such as chicanes and curb extensions, may require specialized routines or equipment to clear debris and snow near vertical delineators, especially if delineators are closely spaced and not mountable.
+ Treatments with raised islands or platforms near the roadway edge may require specialized routines to prevent and clear obstructions from the gutter or the roadway edge to maintain stormwater flow lines, especially if gutters are covered by a culvert plate.

Maintenance Agreements

Maintenance agreements between NMDOT and local jurisdictions are an effective strategy for sharing costs over the life cycle of improvements installed along state facilities. NMDOT often secures maintenance agreements with local agencies for signals, beacons, bus stops, and streetscape enhancements along state facilities prior to implementation.

Implementation through Maintenance Programs

NMDOT maintenance programs present opportunities to implement quick build treatments. Already, maintenance crews and contractors restripe roadways as a part of resurfacing projects aimed at maintaining pavement quality. With advance planning and coordination, these resurfacing projects can incorporate new cross sections with dedicated facilities for people walking and bicycling simply through restriping for very little additional cost.

By thinking expansively and creatively about maintenance programs moving forward, NMDOT can stretch its limited resources even further and implement a broader range of quick build treatments that improve safety and comfort for all users. For example, training in-house maintenance crews or hiring contractors to install vertical delineators as a part of resurfacing projects would enable NMDOT to implement separated pedestrian and bicycle facilities, traffic calming measures, and crossing treatments through existing programs rather than as standalone projects.

Quick Build Treatments

Table 3 highlights the applicability of each quick build treatment for different modes and street design objectives. Many treatments have benefits that extend beyond an individual mode. For example, curb extensions improve safety for pedestrians by increasing the visibility of pedestrians to motorists and reducing crossing distance while providing general speed management benefits.

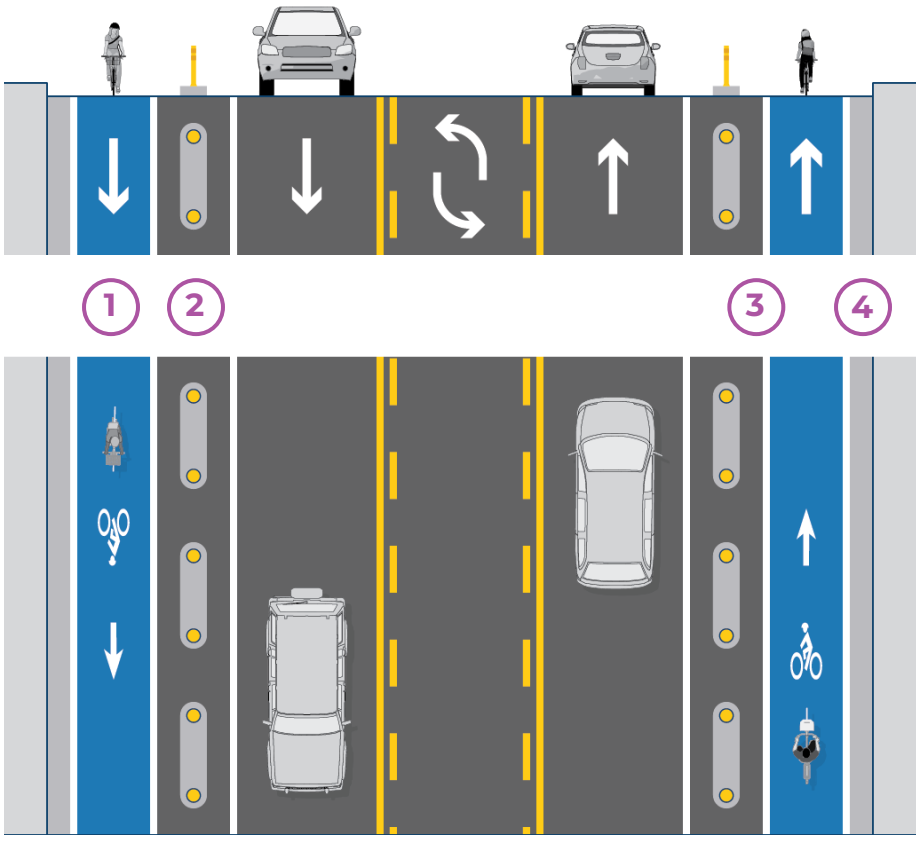
Table 3. Quick Build Treatments Summary

Quick Build Treatment	Applications				
	Bicycling	Walking	Speed Management	Transit	Streetscapes
Active Transportation Facilities					
Dedicated On-Street Bicycle Facilities		-		-	-
Pedestrian Lanes	-		-	-	-
Roadway-Level Shared Use Paths			-		-
Multimodal Paved Shoulders			-		-
Bicycle Boulevards		-		-	-
Street Reconfiguration					
Road Diets	-	-		-	-
On-Street Parking	-	-		-	-
Traffic Calming					
Speed Cushions	-	-		-	-
Chicanes & Pinch Points	-	-		-	-
Speed Signage & Pavement Markings	-	-		-	-

Quick Build Treatment	Applications				
	Bicycling	Walking	Speed Management	Transit	Streetscapes
Crossing Enhancements					
Crosswalks & Bicycle Crossing Markings					-
Curb Extensions & Daylighting	-			-	-
Median Refuges				-	-
Raised Crossings				-	-
RRFBs				-	-
Intersection Treatments					
Reduced Corner Radii & Turn Wedges		-		-	-
Hardened Centerlines	-	-		-	-
Separated Intersections		-		-	-
Enhanced Pocket Bike Lanes		-	-	-	-
Bike Boxes & Two-Stage Left Turns		-	-	-	-
Transition Bicycle Ramps		-	-	-	-
Traffic Signal Safety Enhancements	-				-
Single-Lane Roundabouts & Traffic Circles	-	-		-	
Vehicle Access Restrictions	-			-	-
Transit & Placemaking					
Accessible Bus Stops	-			-	
Placemaking Treatments	-			-	

Dedicated On-Street Bicycle Facilities

Dedicated on-street bicycle facilities—including conventional, buffered, and separated bike lanes—provide space intended exclusively for bicyclists within the roadway. **Conventional bike lanes** and **buffered bike lanes** establish dedicated space for bicyclists through striping, pavement markings, and signage. **Separated bike lanes** include vertical elements —such as flexible delineator posts or pre-cast curbs—between the bike lane and the motor vehicle lane to provide additional protection from motor vehicle traffic. The appropriate facility type depends on motor vehicle speeds and volumes and the surrounding context, with additional separation preferred on faster and higher-volume streets.



1. Bike lanes provide dedicated space in the roadway.
2. Separated bike lanes include vertical elements.
3. Bicyclists require shy distance from vertical elements.
4. Bike lanes are measured exclusive of the gutter.

Appropriate Contexts

Dedicated bicycle facilities are appropriate in:

+ Urban, suburban, and rural town contexts
+ Rural contexts (outside of towns) where high volumes or a broad range of potential bicyclists are expected:
    + Near schools, national or state parks, resorts, vacation areas, and other popular bicycling destinations
    + Roads that serve as important links in regional bicycle networks, such as roads connecting nearby towns and/or trail systems
    + Tribal communities

On-street bicycle facilities are often feasible on roads with pavement width that can be reallocated, including:

+ Road diet candidates with more motor vehicle lanes than needed to support typical traffic volumes
+ Roads with wide motor vehicle lanes
+ Roads with underutilized paved shoulders that do not need to accommodate other uses

Appropriate Facility Types

Conventional bike lanes and **buffered bike lanes** will only appeal to a broad range of bicyclists on roads with moderate motor vehicle speeds and volumes:

+ AADT up to 6,000 vehicles per day
+ Operating speeds up to 30 mph

Separated bike lanes that provide vertical separation are preferable and appropriate on roads with higher motor vehicle speeds or volumes:

+ AADT greater than 6,000 vehicles per day
+ Operating speeds greater than 30 mph

The AASHTO *Bike Guide, 5th Ed.* provides additional guidance related to appropriate design users and facility types in different contexts.

Related Treatments

- ☐ Roadway-level shared use paths
- ☐ Road diets
- ☐ Bicycle crossing markings
- ☐ Separated intersections
- ☐ Enhanced pocket bike lanes
- ☐ Transition bicycle ramps
- ☐ Bike boxes and two-stage left turn boxes

Potential Materials

- ☐ Traffic paint
- ☐ Pavement markings
- ☐ Green thermoplastic or methyl methacrylate (MMA)
- ☐ Flexible delineator posts
- ☐ Rubberized curb
- ☐ Modular curb
- ☐ Pre-cast curb
- ☐ Extruded curb
- ☐ Cast-in-place concrete

Design Considerations: Bike Lane Widths

The appropriate width for on-street bike lanes depends on a variety of factors including the facility type, roadway configuration, anticipated users and volumes, and available space. Table 4 provides recommended ranges and practical minimum widths for several types of dedicated on-street bicycle facilities in common quick-build contexts.

Table 4. Recommended Bike Lane Widths

Facility Type	Location within Roadway	Bike Lane or Path Width[1]	
		Practical Minimum[2]	Recommended Range[3]
One-way conventional or buffered bike lane	+ adjacent to edge of pavement (without curb) + between buffers	4 ft	5–7 ft
	+ adjacent to curb (with or without gutter) + between through lanes and turn lanes + adjacent to parking lane	5 ft	6–7 ft
One-way separated bike lane[3]	+ adjacent to edge of pavement (without curb) + adjacent to curb with gutter	4 ft	5.5–7.5 ft
Two-way separated bike lane[3]	+ adjacent to edge of pavement (without curb) + adjacent to curb with gutter	7.5 ft	9–11 ft
Roadway-level shared use path[3]	+ adjacent to edge of pavement (without curb) + adjacent to curb with gutter	8 ft	10–12 ft

1. Bike lane widths should be measured exclusive of adjacent buffers and the gutter pan.
2. Narrower bicycle facilities (below the recommended range) will reduce bicyclist comfort; however, narrowing facilities to the practical minimum may be appropriate in constrained areas where it is not feasible to further reallocate space.
3. Wider bicycle facilities (above the recommended range) allow for passing and side-by-side riding and may be appropriate where higher bicyclist volumes or a broader range of users traveling at different speeds are expected.
    + Recommended widths for separated bike lane widths are intended for existing or anticipated peak hour directional bicyclist volumes under 150.
    + Recommended widths for street-level side path and intended for existing or anticipated peak hour shared use path volumes between 150-300 (SUPLOS C).

Source: AASHTO *Bike Guide, 5th Ed.*

Design Considerations: Buffers & Vertical Elements

- The width of the buffer for buffered and separated bike lanes is often determined based on the available space.
  - Standard buffers for buffered bike lanes without vertical elements measure 2 to 4 ft in width.
  - Where space allows, vertical elements should be placed 2 to 3 ft from the edge of separated bike lanes to provide shy distance.
- The AASHTO *Bike Guide, 5th Ed.* provides additional guidance related to buffers and vertical elements for dedicated bicycle facilities.

Maintenance Considerations

- Standard maintenance of striping and pavement markings, street sweeping, snow clearing, replacement of dislodged vertical elements, and trimming of vegetation
- Depending on facility width and design, specialized routines or equipment may be necessary to clear debris and snow from separated bike lanes. Mountable vertical elements and wider bike lanes and buffers can enable maintenance by a broader range of vehicles.
- See Common Maintenance Considerations on page 10.

A separated bike lane in Tucson, Arizona provides dedicated space and vertical separation by using delineator posts and pre-cast concrete curb.

Pedestrian Lanes

Although traditional sidewalks represent best practice for supporting people walking and using mobility devices, there are contexts where constrained right-of-way, construction costs, or other factors make installing a concrete sidewalk infeasible. In these situations, a pedestrian lane at roadway level can create separate and dedicated space for people walking and rolling at a low cost and on a fast timeline. Although pedestrian lanes are best suited for low-volume, lower-speed streets, they can also fill short gaps or get around constrained conditions in pedestrian facilities along busier or higher-speed roads. Pedestrian lanes are intended to be exclusively used by pedestrians and must meet all accessibility standards.

A pedestrian lane fills a short gap in an off-street trail through constrained conditions in Pacific Grove, California.

A pedestrian lane connects to an accessible curb ramp leading to an off-street trail on a local street without sidewalks in Austin, Texas.

Appropriate Contexts

+ Pedestrian lanes are most appropriate on low-volume local streets with low vehicle operating speeds.
+ In constrained situations for short distances, pedestrian lanes can maintain the continuity of pedestrian facilities along higher-volume roads with higher operating speeds.

Design Considerations

+ Pedestrian symbol pavement markings and signage restricting parking can clarify of the purpose of the pedestrian lane and discourage vehicle encroachment.
+ High-visibility crosswalk markings can both enhance safety and reinforce the intended function of the pedestrian lane.
+ Pedestrian warning signs paired with “ON ROADWAY” plaques can help indicate to drivers to expect people walking.

Accessibility Considerations

Pedestrian lanes require several design elements to meet accessibility standards, including:

+ An unobstructed pedestrian access route at least 4 ft wide
+ A maximum cross slope of 2.1%
+ A stable, firm, and slip resistant surface, such as asphalt
+ Detectable warning surfaces at all crosswalks, whether marked or unmarked, and driveways with traffic control
+ A continuous detectable edge between the pedestrian lane and the adjacent motor vehicle or bike lane
    + Tightly-spaced flexible delineators coupled with continuous longitudinal markings can serve as a detectable edge provided gaps do not exceed 4 ft.
    + Fully continuous, raised, and wider forms of edge delineation and vertical separation are more appropriate on higher-volume and higher-speed roadways.

Maintenance Considerations

+ Standard maintenance of striping, pavement markings, and detectable warning surfaces; replacement of vertical elements; and trimming of vegetation
+ Specialized routines or equipment may be necessary to clear debris and snow from pedestrian lanes.
+ See Common Maintenance Considerations on page 10.

Related Treatments

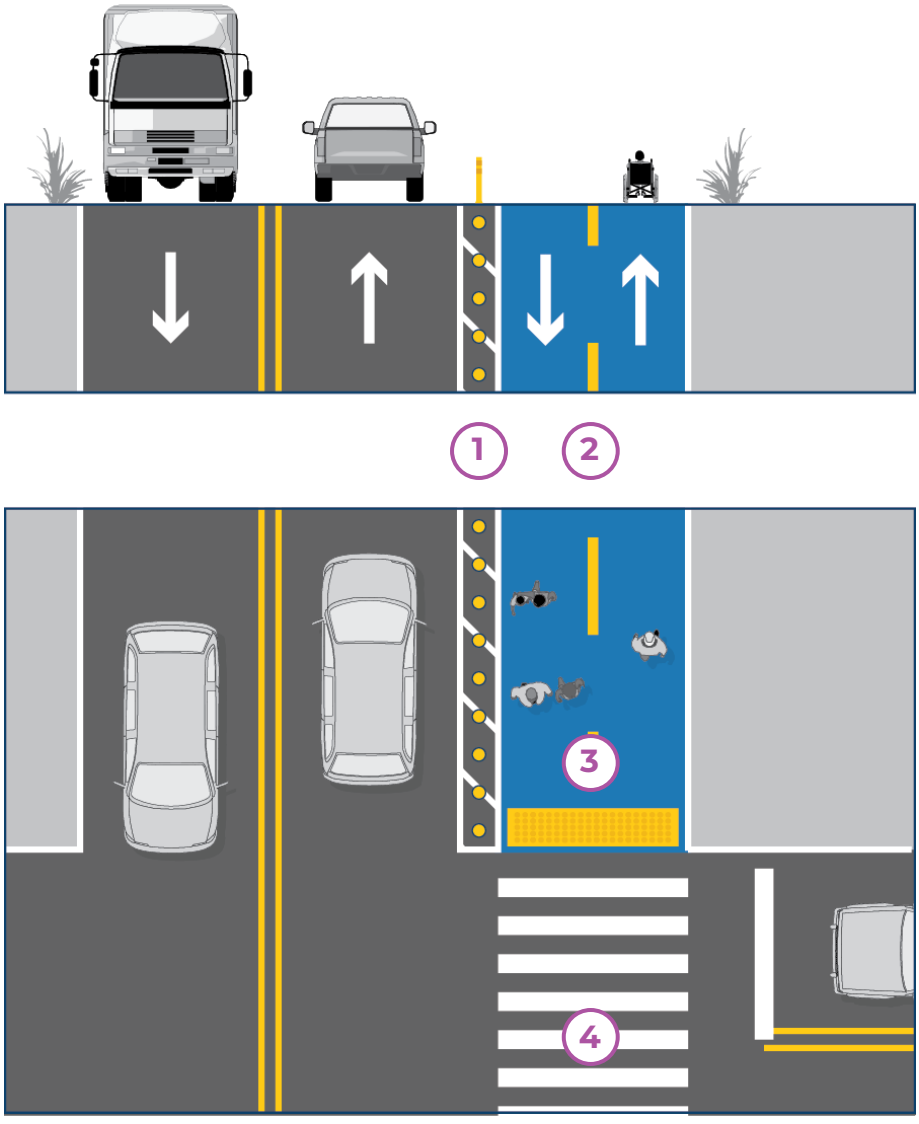
- ☐ Roadway-level shared use paths
- ☐ Road diets
- ☐ Marked crosswalks

Potential Materials

- ☐ Traffic paint
- ☐ Pavement markings
- ☐ Modular curb
- ☐ Pre-cast concrete curb or barriers
- ☐ Cast-in-place curb
- ☐ Flexible delineator posts
- ☐ Detectable warning surface

Roadway-Level Shared Use Paths

Roadway-level shared use paths offer a faster and less expensive option for implementing a dedicated space for both walking and bicycling than traditional sidepath construction, which often involves constructing curb and gutter. Roadway-level shared-use paths reallocate the existing roadway surface—e.g., a parking lane or a paved shoulder deemed no longer necessary—and provide continuous vertical separation between the path and the adjacent motor vehicle lane. Like all shared use paths, they typically allow two-way travel and can offer a direct and high-quality experience for users of all ages and abilities, especially in conditions with heavy traffic. Roadway-level shared-use paths can sometimes serve as an interim facility in advance of installing a facility behind new curb and gutter.



1. Tightly-spaced flexible delineators (no more than 4 ft apart) and longitudinal markings can define the edge of the path.
2. Roadway-level shared use paths can repurpose paved shoulders.
3. Shared use paths require detectable warning surfaces approaching crossings.
4. Marked crosswalks can reinforce the intended function of the path.

Appropriate Contexts

- Shared use paths are especially helpful on roads with higher motor vehicle speeds or volumes:
  - AADT greater than 6,000 vehicles per day
  - Operating speeds greater than 30 mph
- Roads within rural towns
- Roads with excess pavement width, such as a paved shoulder that is no longer needed to accommodate other uses

The AASHTO *Bike Guide, 5th Ed.* provides additional guidance related to appropriate design users and facility types.

Design Considerations

- Roadway-level shared use paths should follow best practices for two-way separated bike lanes as well as shared use paths.
- Table 4 on page 16 summarizes the recommended and practical minimum widths for roadway-level shared use paths.
- Pedestrian and bicycle symbol pavement markings and signage restricting parking can clarify the purpose of the path and discourage motor vehicle encroachment.
- High-visibility crosswalk markings can enhance safety and reinforce the intended function of the shared use path.
- Crossings of intersections and driveways should include treatments to reduce safety risks associated with two-way bicycle travel.
- The AASHTO *Bike Guide, 5th Ed.* provides additional guidance on two-way separated bike lanes and shared use paths.

Accessibility Considerations

- Roadway-level shared use paths require the same design elements as pedestrian lanes to meet accessibility standards. See Pedestrian Lane Accessibility Considerations on page 19.

Maintenance Considerations

- Standard maintenance of striping, pavement markings, and detectable warning surfaces; replacement of vertical elements; and trimming of vegetation
- Specialized routines or equipment may be necessary to clear debris and snow from narrower shared use paths.
- See Common Maintenance Considerations on page 10.

Related Treatments

- ☐ Dedicated on-street bicycle facilities
- ☐ Pedestrian lanes
- ☐ Road diets
- ☐ Marked crosswalks
- ☐ Separated intersections
- ☐ Traffic signal safety enhancements

Potential Materials

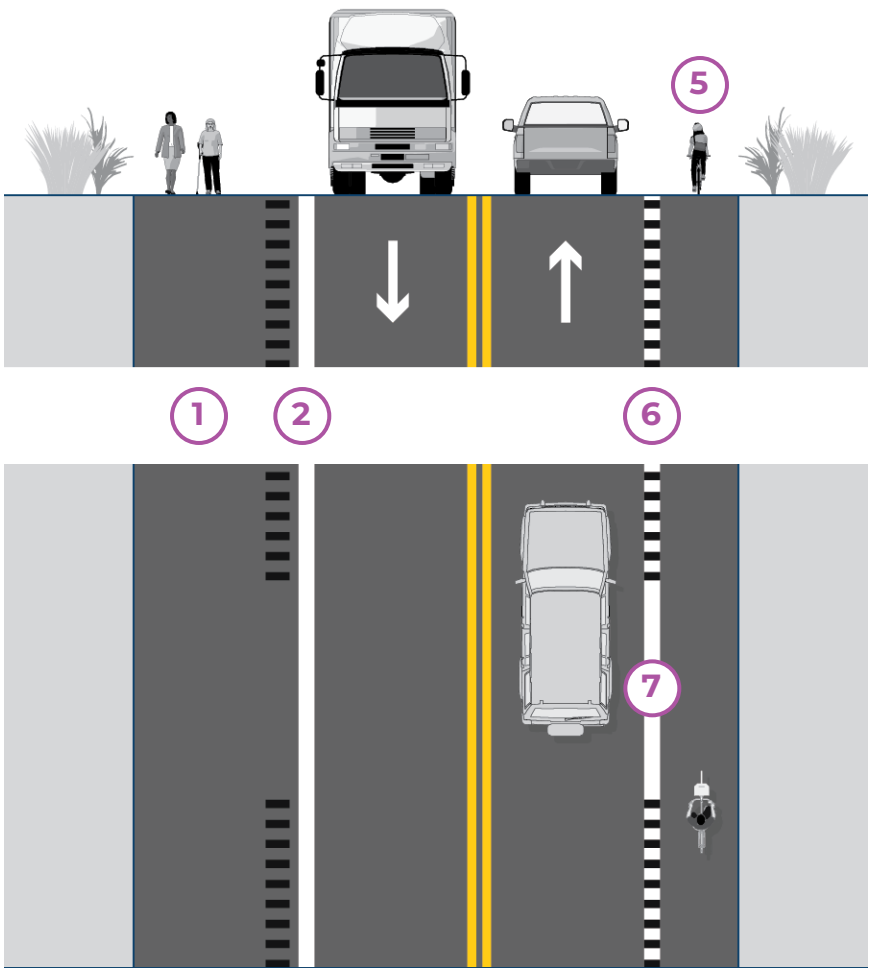
- ☐ Traffic paint
- ☐ Pavement markings
- ☐ Green thermoplastic or methyl methacrylate (MMA)
- ☐ Modular curb
- ☐ Pre-cast concrete curb or barriers
- ☐ Cast-in-place curb
- ☐ Flexible delineator posts
- ☐ Detectable warning surface

A roadway-level shared use path in Kirtland, New Mexico uses pavement previously used as a shoulder.

Multimodal Paved Shoulders

In rural contexts, paved shoulders play an important role in safety for all users. Paved shoulders are a proven safety countermeasure that reduce run-off-the-road crashes and crashes with pedestrians. Paved shoulders provide separate space for pedestrians and bicyclists outside of motor vehicle travel lanes, improving conditions on corridors where shared use paths, sidewalks, and dedicated bicycling facilities are not practical.

Although paved shoulders can improve multimodal safety in rural areas, they are not considered dedicated bicycling facilities and typically do not meet all pedestrian accessibility standards, because they are easily traversed by motor vehicles and occasionally used by stopped motorists, vehicles disabled by collisions, and slower vehicles like farm equipment. In locations where shoulders no longer need to accommodate occasional use by motor vehicles, reallocating the shoulder space to provide dedicated facilities may better align with complete streets goals. In such contexts, reconfiguring shoulders as separated bike lanes or roadway-level shared use paths can provide safer and more comfortable options for users of all ages and abilities.



1. 6- to 12-ft shoulders benefit all users.
2. Wide edge lines help delineate space.
3. Cross slopes under 2% support people with mobility devices.
4. 10- to 12-ft shoulders are preferred on roads with a large share of heavy vehicles..
5. Bicyclists need at least 4 ft (outside of rumble strips) to operate.
6. Edgeline and narrow rumble strips increase the usable space.
7. 12- to 15-ft gaps in rumble strips help bicyclists to exit and reenter.

Appropriate Contexts

Paved shoulders improve safety in a variety of rural contexts:

+ Roads serving regional travel between towns
+ Roads without existing curb and gutter
+ Roads with moderate to high vehicle speeds and volumes
    + Operating speeds greater than 25 mph
    + AADT greater than 1,000 vehicles per day

Paved shoulders are particularly valuable on roads with:

+ Operating speeds greater than 35 mph
+ AADT greater than 10,000 vehicles per day
+ Heavy vehicles comprising more than 10% of traffic
+ Inadequate sight distances on the inside of horizontal curves and heading downhill after the crest of hills
+ Grades greater than 5% heading uphill

The AASHTO *Bike Guide, 5th Ed.* provides additional guidance related to appropriate design users and facility types in different contexts.

Design Considerations

+ Where space allows, 6- to 12-ft shoulders benefit all users.
    + 10- to 12-ft shoulders are preferred on roads with AADT over 10,000 or a share of heavy vehicles over 10%.
    + Bicyclists need at least 4 ft (outside of rumble strips) to operate, plus an additional 1 ft where vertical elements like guardrails are along the roadway edge.
    + In constrained conditions, narrower shoulders can still provide safety benefits.
+ Wide edge lines, striped buffers, and contrasting pavement materials can help visually delineate space.
+ Rumble strips are uncomfortable and hazardous for bicyclists to traverse, and frequent gaps can allow bicyclists to merge into the adjacent travel lane safely.
+ The AASHTO *Bike Guide, 5th Ed.* provides additional guidance on designing paved shoulders to accommodate bicyclists.

Accessibility Considerations

+ Cross slopes measuring under 2.1% can support people using mobility devices.

Maintenance Considerations

+ Standard maintenance of striping and trimming of vegetation
+ See Common Maintenance Considerations on page 10.

Related Treatments

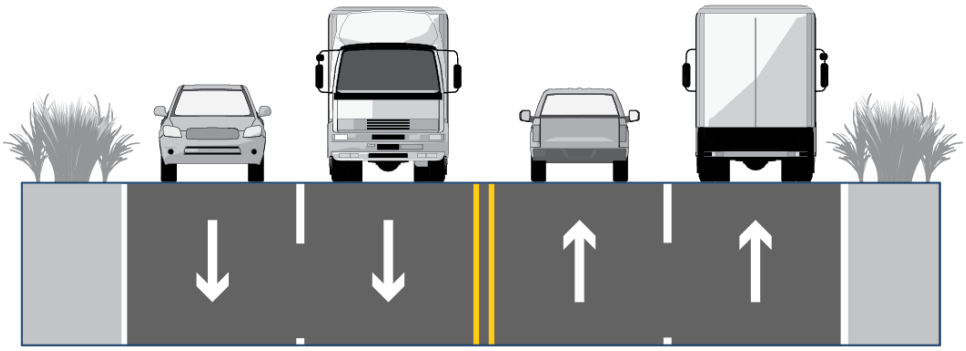
- ☐ Accessible bus stops

Potential Materials

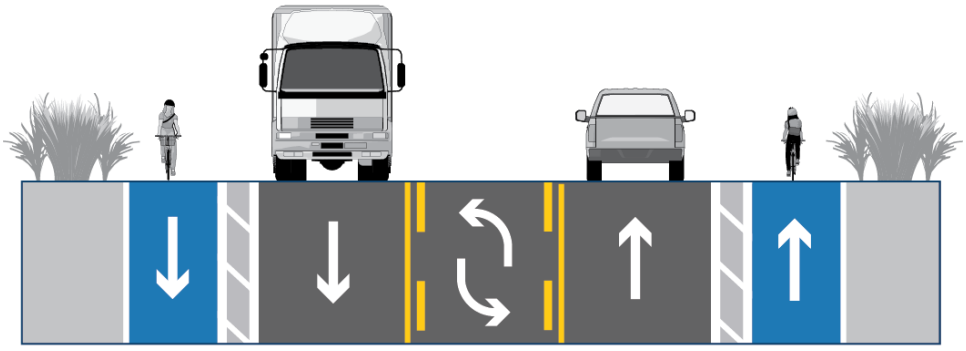
- ☐ Traffic paint
- ☐ Rumble strips

Road Diets

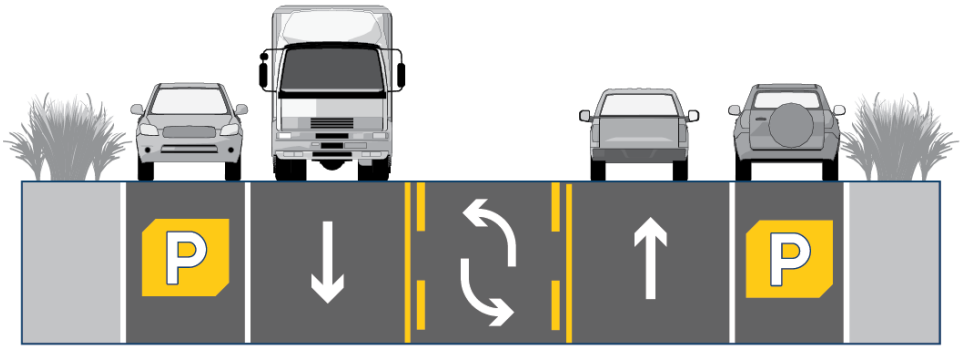
Road diets repurpose motor vehicle travel lanes to provide a safer and more comfortable experience for all users. Reducing the number of motor vehicle lanes and reallocating space can make room for a variety of other quick build treatments that advance multimodal safety and complete streets, like dedicated bicycle facilities, on-street parking, curb extensions, medians, and two-way center turn lanes with median refuges.



1 Undivided four-lane road with 12-ft travel lanes.



2 Three-lane road with center turn lane and buffered bike lanes.



3 Three-lane road with center turn lane and on-street parking.

Appropriate Contexts

Roads with more motor vehicle through lanes than needed to support typical traffic volumes are strong candidates for road diets. Planning-level thresholds for road diet candidates vary by jurisdiction and may include:

- Four-lane roads with AADT up to 15,000-20,000 vehicles per day
  - On undivided roads with frequent intersections and driveways, four- to three-lane conversions with a two-way left-turn lane can often improve safety and access without reducing motor vehicle capacity.
  - The NMDOT *Design Manual* includes additional operational considerations for four- to three-lane conversions on state highways and considers roads with AADT up to 19,000 vehicles per day likely candidates for road diets.
  - Divided roads with medians or center turn lanes may be candidates for four- to two-lane conversions.
- Six-lane roads with AADT up to 25,000-35,000 vehicles per day
  - Undivided roads with frequent intersections and driveways may be candidates for six- to five-lane conversions.
  - Divided roads with medians or center turn lanes may be candidates for six- to four-lane conversions.

Design Considerations

- Road diets on four-lane NMDOT roads with AADT over 10,000 vehicles per day require an engineering study and/or traffic operations analysis prior to implementation.
- In addition to removing motor vehicle lanes, road diets may narrow remaining lanes to support other modes and encourage slower speeds.
- Motor vehicle lane widths should reflect desired target speeds and design vehicles:
  - 10 ft lanes can typically reduce speeds while accommodating passenger vehicles.
  - 11 ft outside lanes can typically reduce speeds while accommodating larger transit, freight, and emergency response vehicles.
- Road diets are most effective at providing safe, comfortable facilities for other modes when applied continuously and consistently along a corridor, maintaining lane reallocations through intersections.

Maintenance Considerations

- Standard maintenance of striping and pavement markings
- See Common Maintenance Considerations on page 10.

Related Treatments

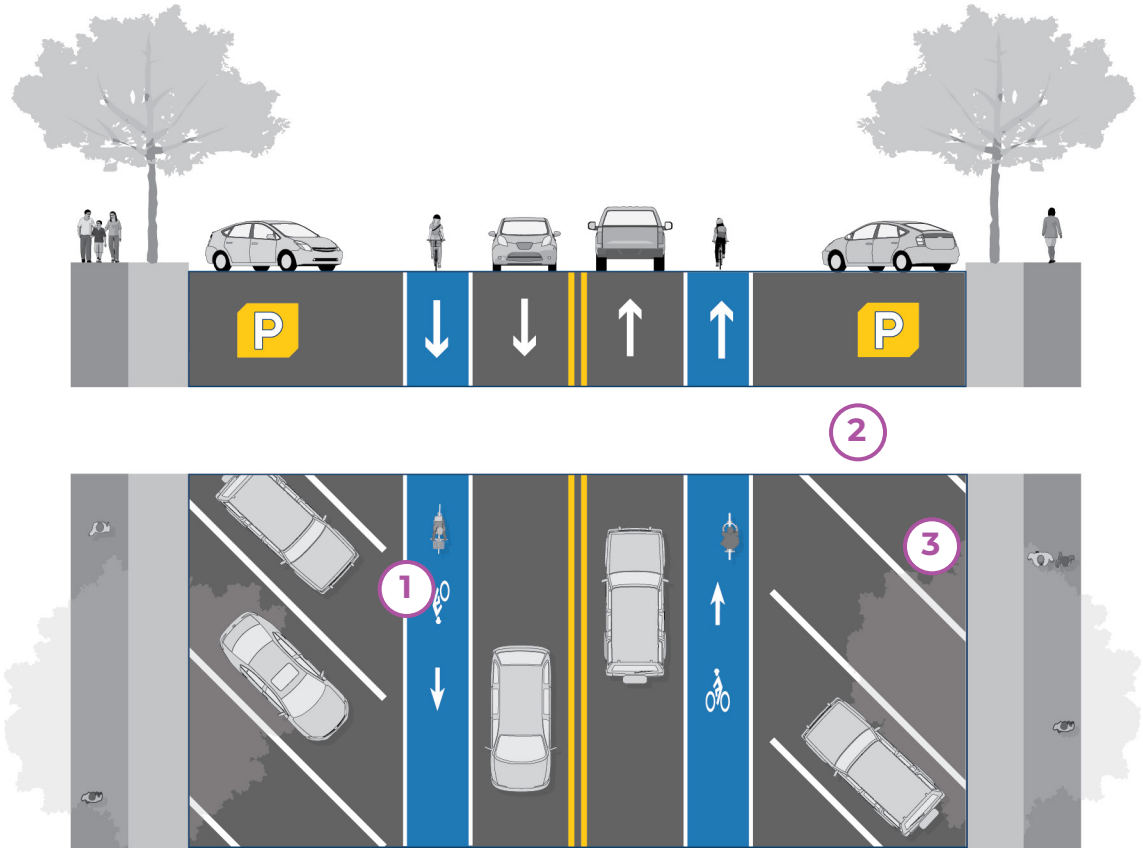
- ☐ Dedicated on-street bicycle facilities
- ☐ Pedestrian lanes
- ☐ Roadway-level shared use paths
- ☐ On-street parking
- ☐ Median refuges

Potential Materials

- ☐ Traffic paint
- ☐ Pavement markings

On-Street Parking

On-street parking on commercial corridors and main streets can support local businesses, increase foot traffic, provide additional separation between people walking and motor vehicle traffic, and encourage slower motor vehicle speeds. Adding **parallel parking** or **reverse angle parking** is often possible without moving curb lines by restriping roadways with narrower motor vehicle travel lanes or reallocating space through road diets. On-street parking lanes establish a typical cross section that lends itself to other quick build treatments that improve multimodal safety at crossings and intersections, such as daylighting and curb extensions at pedestrian crossings and separated intersections along dedicated bicycle facilities.



1. Reverse angle parking positions drivers with clear sight lines.
2. Angled parking typically requires 18–22 ft of pavement width.
3. The angle of parking stalls typically ranges from 45 to 75 degrees.

Note: Angled parking along NMDOT facilities requires a design variance.

Appropriate Contexts

- Main streets, bicycle boulevards, or other streets where slower motor vehicle speeds or additional separation between pedestrian facilities and travel lanes are desired
- Roads with pavement width that can be reallocated
- **Reverse angle parking** can reduce conflicts and provide more spaces on streets with sufficient pavement width.
  - Reverse angle parking requires drivers to back into parking spaces, positioning drivers with clear sight lines of approaching bicyclists and motor vehicles when exiting parking spaces.
- Parallel parking between bike lanes and motor vehicle travel lanes can establish **parking-protected bike lanes.**

Design Considerations

- Parallel parking lanes typically measure 8 to 10 ft in width, including the width of the gutter.
- Striped buffers can encourage drivers to park close to the curb, help bicyclists avoid door zone conflicts, and narrow motor vehicle travel lanes to reduce speeds.
- Reverse angle parking lanes typically measure 18 to 22 ft from the end of the stall to the curb.
  - The angle between parking stalls and the curb typically ranges from 45 to 75 degrees.
  - Parking configured at steeper angles requires more pavement width and provides more spaces.
  - Parking stops can prevent vehicles from overhanging the sidewalk and striking streetscape elements.
  - Signage demonstrating the appropriate technique can help drivers navigate reverse angle parking.
  - Angled parking along NMDOT facilities requires a design variance.

Accessibility Considerations

- New on-street parking typically requires accessible parking in some form. Providing accessible parking may require:
  - Dedicated spaces adjacent to crosswalks and curb ramps
  - Parking spaces measuring 13 ft in width
- *PROWAG* provides additional guidance on accessible parking requirements, which vary based on the scope of improvements.

Maintenance Considerations

- Standard maintenance of striping and pavement markings and replacement of parking stops
- See Common Maintenance Considerations on page 10.

Related Treatments

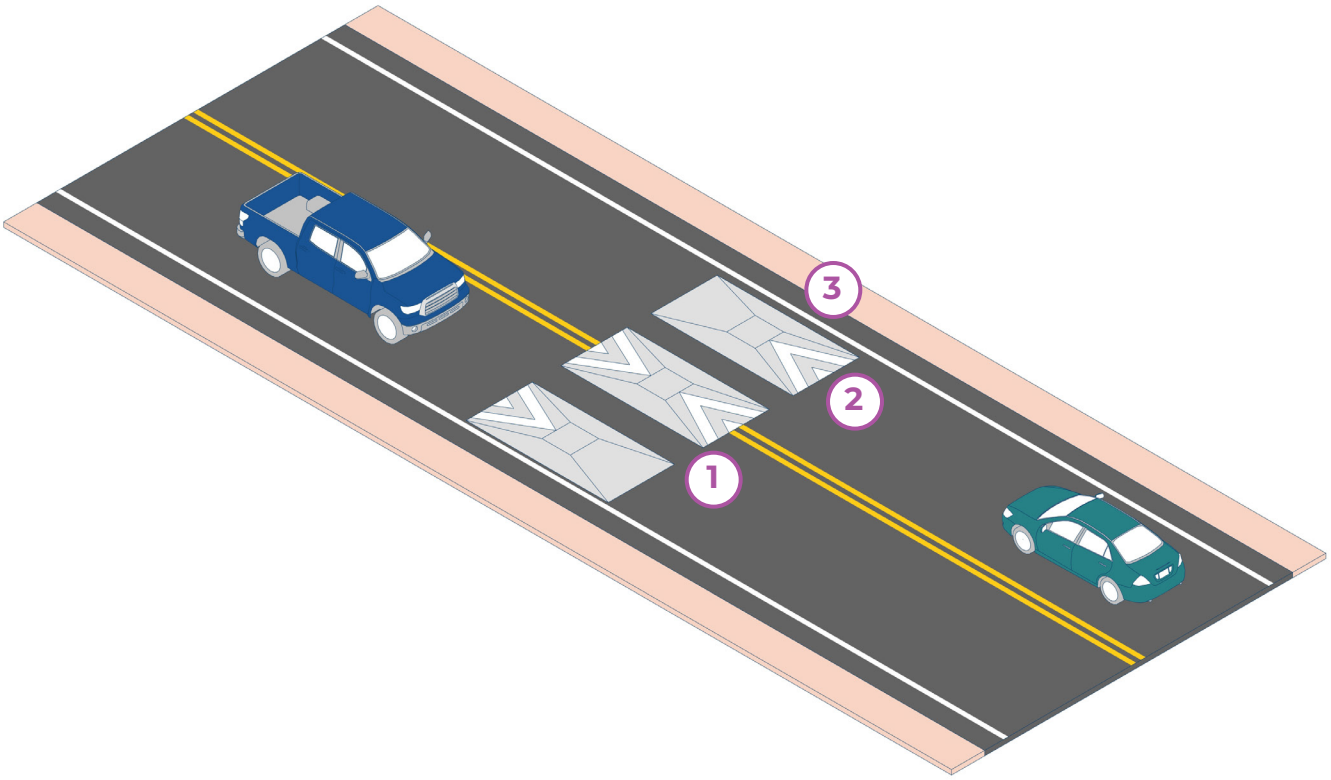
- ☐ Road diets
- ☐ Curb extensions and daylighting
- ☐ Dedicated on-street bicycle facilities
- ☐ Separated intersections

Potential Materials

- ☐ Traffic paint
- ☐ Rubberized curb
- ☐ Modular curb
- ☐ Pre-cast concrete curb

Speed Cushions

Speed cushions raise sections of the roadway surface to reduce motor vehicle speeds at regular intervals along a corridor or approaching key locations. Like traditional speed humps, speed cushions help reinforce slower speeds by introducing vertical deflections measuring several inches high along motor vehicles' travel path. In contrast to speed humps, which span the entirety of the roadway, speed cushions include gaps between individual cushions that allow bicyclists and vehicles with wide wheelbases (such as transit, freight, and emergency vehicles) to navigate the cushions at the typical roadway elevation.



1. Wheel cutouts let bicyclists and larger vehicles bypass cushions.
2. Cushions include "v"-shaped markings.
3. Offseting cushions from the roadway edge maintains stormwater flow lines.

Appropriate Contexts

+ Bicycle boulevards, main streets, or other locations where slower motor vehicle speeds are desired
+ Roads with a limited number of lanes and modest motor vehicle speeds and volumes
+ On local streets outside of NMDOT right-of-way, additional criteria and guidance for speed cushions may apply:
+ Speed cushions can accommodate transit, freight, and emergency vehicles.

Design Considerations

+ The height and slope of speed cushions should reflect desired target speeds and design vehicles.
  + Cushions typically vary from 3 to 8 in. in height and 1:12 to 1:20 in slope.
+ Cushions should include wheel cutouts (typically measuring 3 to 5 ft in width) to allow bicyclists and transit, freight, and emergency vehicles to navigate the cushions at the typical roadway elevation.
+ On bicycle boulevards, shared lane markings should align with the gaps to help bicyclists bypass the cushions.
+ Transition aprons should include “v”-shaped markings facing approaching traffic in the center of each lane.
+ Advance warning signage can improve awareness of upcoming speed cushions in areas where poor lighting or other factors impede visibility.
+ The AASHTO *Bike Guide, 5th Ed.* provides additional guidance on designing speed cushions to accommodate bicyclists.

Drainage Considerations

+ Cushions can be placed away from the gutter (or roadway edge) and designed with a taper approaching the roadway edge to maintain stormwater flow lines.

Maintenance Considerations

+ Standard maintenance of striping and pavement markings
+ Specialized routines may be necessary to prevent and clear obstructions from the gutter or the roadway edge.
+ See Common Maintenance Considerations on page 10.

Related Treatments

- ☐ Bicycle boulevards
- ☐ Raised crossings
- ☐ Speed signage and pavement markings

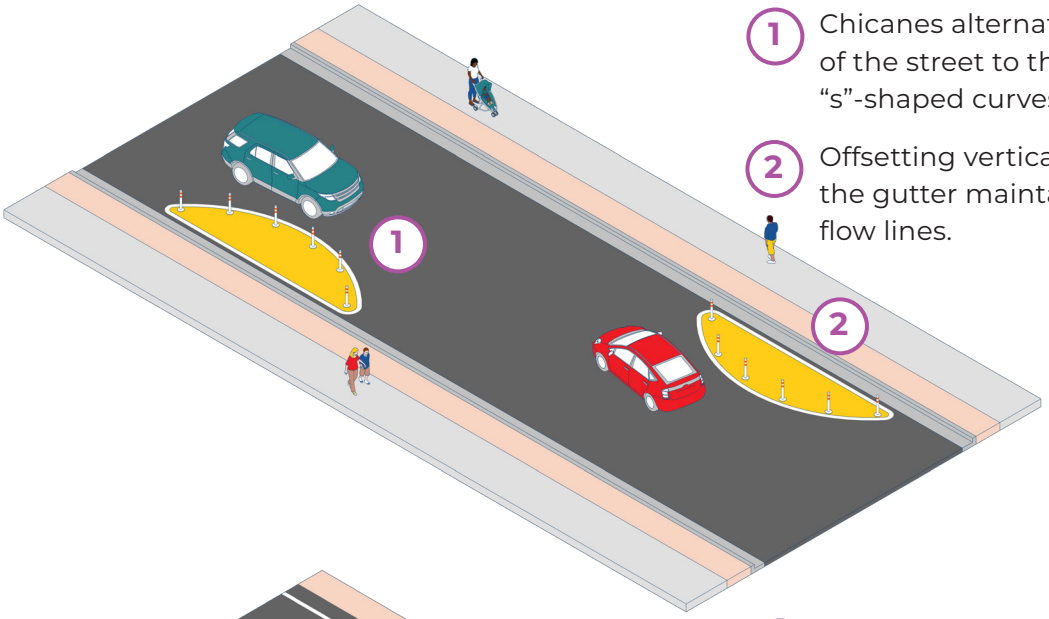
Potential Materials

- ☐ Pavement markings
- ☐ Signs and signposts
- ☐ Preformed speed cushion
- ☐ Asphalt
- ☐ Cast-in-place concrete

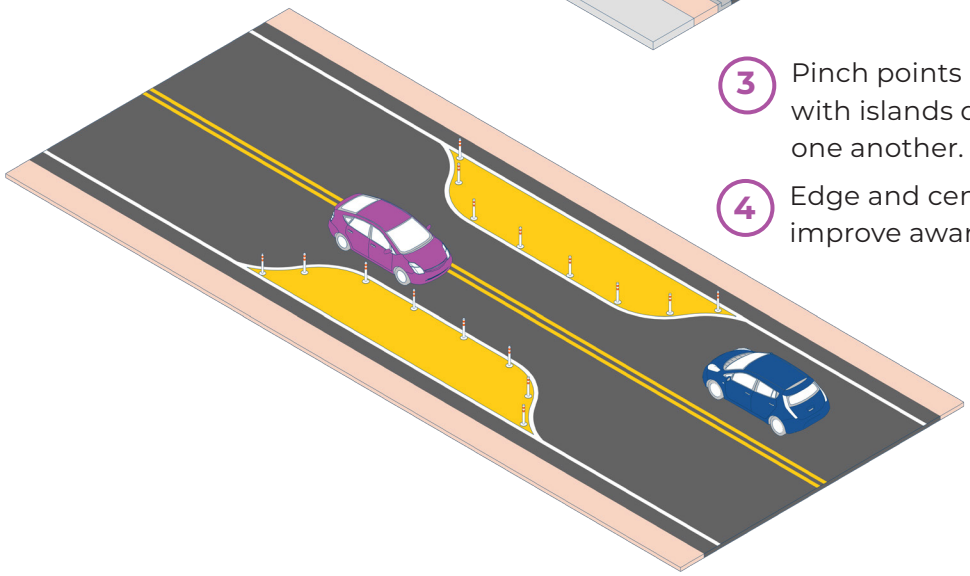
Chicanes & Pinch Points

Chicanes and pinch points calm traffic by creating slight curves in the motor vehicle path or periodically narrowing travel lanes. Chicanes are curb extensions or islands near the roadway edge that alternate from one side of the street to the other to form “s”-shaped curves, whereas pinch points narrow the roadway with curb extensions or islands directly across from one another on both sides of the street. A range of quick build materials—from paint and flexible delineator posts to cast-in-place concrete islands—can accomplish horizontal deflection as a part of demonstration, pilot, or quick build projects.

On undivided roadways without center turn lanes, periodic median islands can complement chicanes and pinch points by narrowing travel lanes and introducing horizontal deflection.



1. Chicanes alternate from one side of the street to the other to form “s”-shaped curves.
2. Offsetting vertical elements from the gutter maintains stormwater flow lines.



3. Pinch points narrow the roadway with islands directly across from one another.
4. Edge and center line markings improve awareness.

Appropriate Contexts

+ Bicycle boulevards, main streets, or other locations where slower motor vehicle speeds are desired
+ Roads with a limited number of lanes and modest motor vehicle speeds and volumes
+ On local streets outside of NMDOT right-of-way, additional criteria and guidance for traffic calming measures may apply.

Design Considerations

+ The frequency and geometric layout of chicanes and pinch points should reflect the desired target speed and design vehicles.
  + More frequent spacing, narrower travel lanes, and sharper lateral shifts encourage slower speeds.
+ Advance warning signage, edge and center line markings, delineators, and object markers can improve awareness of chicanes and pinch points in areas where poor lighting or other factors impede visibility.
+ Chicanes and pinch points may reduce the number of on-street parking spaces.

Drainage Considerations

+ Concrete islands and vertical elements delineating chicanes and pinch points can avoid the gutter and the roadway edge.

Accessibility Considerations

+ Culvert plates installed across the gutter between the curb and chicanes or pinch points can provide a flush surface meeting accessibility standards.

Maintenance Considerations

+ Standard maintenance of striping and pavement markings and replacement of vertical elements
+ Specialized routines may be necessary to prevent and clear obstructions from the gutter or the roadway edge, especially if gutters are covered by culvert plates.
+ See Common Maintenance Considerations on page 10.

Related Treatments

- ☐ Bicycle boulevards
- ☐ Curb extensions and daylighting
- ☐ Median refuges
- ☐ Speed signage and pavement markings

Potential Materials

- ☐ Traffic paint
- ☐ Signs and signposts
- ☐ Flexible delineator posts
- ☐ Rubberized curb
- ☐ Modular curb
- ☐ Modular speed bumps
- ☐ Pre-cast curb
- ☐ Extruded curb
- ☐ Cast-in-place concrete
- ☐ Culvert plates

A chicane in Tucson, Arizona calms traffic and also serves as green stormwater infrastructure.

Speed Signage & Pavement Markings

Speed signage and pavement markings remind drivers of the presence of vulnerable road users in the street and that they should drive slowly, complying with the posted speed limit. For example, speed feedback signs can be used as educational tools to raise awareness and reduce speeds, while speed limit pavement markings (such as “SLOW” or “25 MPH”) and speed reduction markers can supplement speed-limit signage.

Speed feedback signage can encourage slower speeds and alert drivers to people walking and bicycling along main streets and on rural roads.

Appropriate Contexts

Speed signage and pavement markings can be considered for all roadways. They are most helpful:

+ On roads with higher motor vehicle speeds
+ On roads with greater levels of pedestrian activity
+ At entrances to bicycle boulevards and main streets and other places where streets transition to a lower speed or a new context

Design Considerations

+ Appropriately low posted speed limits and any supplemental signage or pavement markings will be most effective if the surrounding built environment reflects such target speeds.
+ Automated speed messaging or enforcement, such as speed cameras or speed display devices can help slow motorists and manage speeds.
    + Message signs can display text such as “Slow Down” or visuals like smiley (and frowning) faces depending on the approaching motorist’s speed.
+ Speed-related supplemental signage and pavement markings can be part of a larger system of branding (e.g. “slow streets”, “school zones”, etc.) to help raise awareness and target priority corridors.

Maintenance Considerations

+ Standard maintenance of signage and pavement markings and clearing of vegetation
+ Specialized routines may be necessary to ensure automated signage equipment continues to detect speeds accurately, particularly in the case of automated enforcement.
+ See Common Maintenance Considerations on page 10.

Related Treatments

- ☐ Speed cushions
- ☐ Chicanes and pinch points
- ☐ Bicycle boulevards

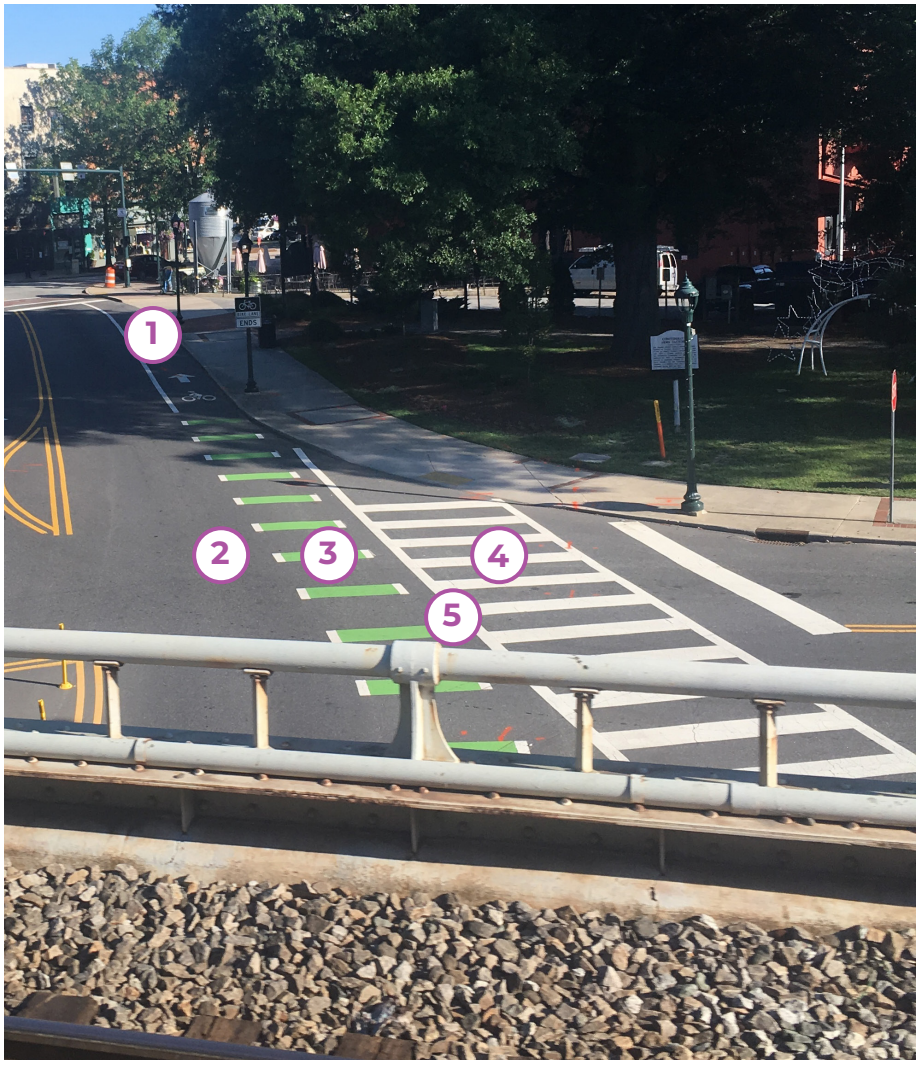
Potential Materials

- ☐ Pavement markings
- ☐ Signs and signposts
- ☐ Automated speed display signs

Crosswalks & Bicycle Crossing Markings

New Mexico code (N.M. Stat. § 66-7-334 and § 66-1-4.3) grants pedestrians right of way at all legal crosswalks, whether marked or not. **Marked crosswalks** help warn motorists to expect pedestrian crossings and clarify that motorists are expected to yield. At mid-block locations between intersections, crosswalk markings establish a legal crossing for pedestrians.

Bicycle crossing markings (also known as conflict markings, bike lane extension markings, or crossbikes) connect to bike lanes, help warn motorists to expect bicyclist crossings, and help guide bicyclists through intersections.



1. Bicycle crossing markings should connect to a bike lane on one or both sides.
2. Dashed white lines define bicycle crossing markings and act as extensions of bike lane edge lines.
3. Bicycle crossing markings may include dashed green bars between the edge lines.
4. Continental crosswalk markings with perpendicular bars are more visible to approaching motorists.
5. Crosswalks and bicycle crossings should be marked separately.

Appropriate Contexts

Marked crosswalks are appropriate at signalized intersections, unsignalized intersections, and mid-block crossings. They are especially beneficial:

+ In areas with greater levels of existing or anticipated pedestrian activity
+ Near vulnerable populations
+ Serving destinations such as schools, parks, and transit stops

Marked crosswalks are often insufficient to provide a safe, comfortable crossing when implemented without additional treatments (such as median refuges, RRFBs, or pedestrian hybrid beacons) on higher-volume and higher-speed roadways.

Bicycle crossing markings are appropriate at intersections and driveways with a dedicated bike lane on one or both sides of the crossing. They are most beneficial at:

+ Intersections with a high rate of conflicts with turning vehicles
+ Intersections with bike lanes on both sides of the crossing
+ Complex intersections such as roundabouts and interchanges
+ High-volume commercial driveways

Bicycle crossing markings also act as an extension of the edge line separating the bike lane from the adjacent motor vehicle lane. Accordingly, they are not appropriate at crossings without a connecting bike lane on one or both sides of the crossing.

Design Considerations

+ Crossings should be conveniently located and minimize out-of-direction travel for people walking and bicycling.
+ Warning signs, yield lines, and advance pavement markings help ensure drivers understand the need to yield.
+ Continental crosswalk markings with perpendicular bars are more visible to approaching motorists than parallel line markings.
+ Bicycle crossing markings should use longitudinal dotted white edge lines, and may include dashed green bars between the edge lines.
+ Bicycle crossing markings must be separate from crosswalk markings.
+ The AASHTO *Bike Guide, 5th Ed.* provides additional guidance related to bicycle crossing markings.

Maintenance Considerations

+ Standard maintenance of striping and pavement markings
+ See Common Maintenance Considerations on page 10.

Related Treatments

- ☐ Raised crossings
- ☐ Median refuges
- ☐ RRFBs
- ☐ Separated intersections
- ☐ Enhanced pocket bike lanes

Potential Materials

- ☐ Traffic paint
- ☐ Pavement markings
- ☐ Green thermoplastic or methyl methacrylate (MMA)
- ☐ Signs and signposts

Curb Extensions & Daylighting

Curb extensions, also called bulb-outs, narrow the roadway by expanding the pedestrian realm. In quick build projects, curb extensions can be implemented without moving existing curb lines by installing vertical elements or concrete islands near the roadway edge. When installed at crossings, curb extensions improve visibility between pedestrians and motorists, encourage slower motor vehicle speeds, and shorten crossing distances to reduce potential conflicts.

Daylighting is used at intersections and mid-block crossings on streets with curbside parking or loading zones to improve visibility and safety. Daylighting restricts parking and removes visual obstructions immediately approaching crossings to create clear sight lines between pedestrians and motorists. Although curb extensions often accompany daylighting, parking restrictions can be implemented without vertical elements through signage and striping.

1. Curb extensions and parking restrictions typically extend 20 to 30 ft from the crossing.
2. Offsetting vertical elements from the gutter maintains stormwater flow lines.
3. Curb extensions can use mountable elements to accommodate turning movements by larger vehicles.

Appropriate Contexts

+ Controlled intersections, uncontrolled intersections, and mid-block crossings
+ Streets with curbs and sidewalks
+ Streets with on-street parking, wide shoulders, or pavement width that can be reallocated
+ Crossings with obstructed sight lines
+ Entrances to bicycle boulevards and main streets and other places where streets transition to a lower speed or a new context

Design Considerations

+ Curb extensions and daylighting typically extend at least 20 to 30 ft from the crossing.
    + Higher-speed roadways may require longer curb extensions or parking restrictions to improve visibility and provide adequate sight lines.
+ Curb extensions can incorporate bike parking, scooter corrals, and other furnishings that do not restrict visibility.

Drainage Considerations

+ Concrete islands and vertical elements delineating curb extensions can be offset from the gutter and the roadway edge.

Accessibility Considerations

+ Culvert plates installed across the gutter between the curb and concrete islands can provide a flush surface meeting accessibility standards.
+ Curb extensions intended to be mountable and traversed by motor vehicles should not place detectable warning surfaces within the mountable area.
+ Curb extensions with concrete islands and culvert plates spanning the gutter should extend sidewalks and relocate curb ramps to meet accessibility standards.

Maintenance Considerations

+ Standard maintenance of striping and pavement markings and replacement of vertical elements
+ Specialized routines may be necessary to prevent and clear obstructions from the gutter, especially if gutters are covered by culvert plates.
+ See Common Maintenance Considerations on page 10.

Related Treatments

- ☐ Crosswalks and bicycle crossing markings
- ☐ On-street parking
- ☐ Reduced corner radii and turn wedges
- ☐ Chicanes and pinch points
- ☐ Accessible bus stops

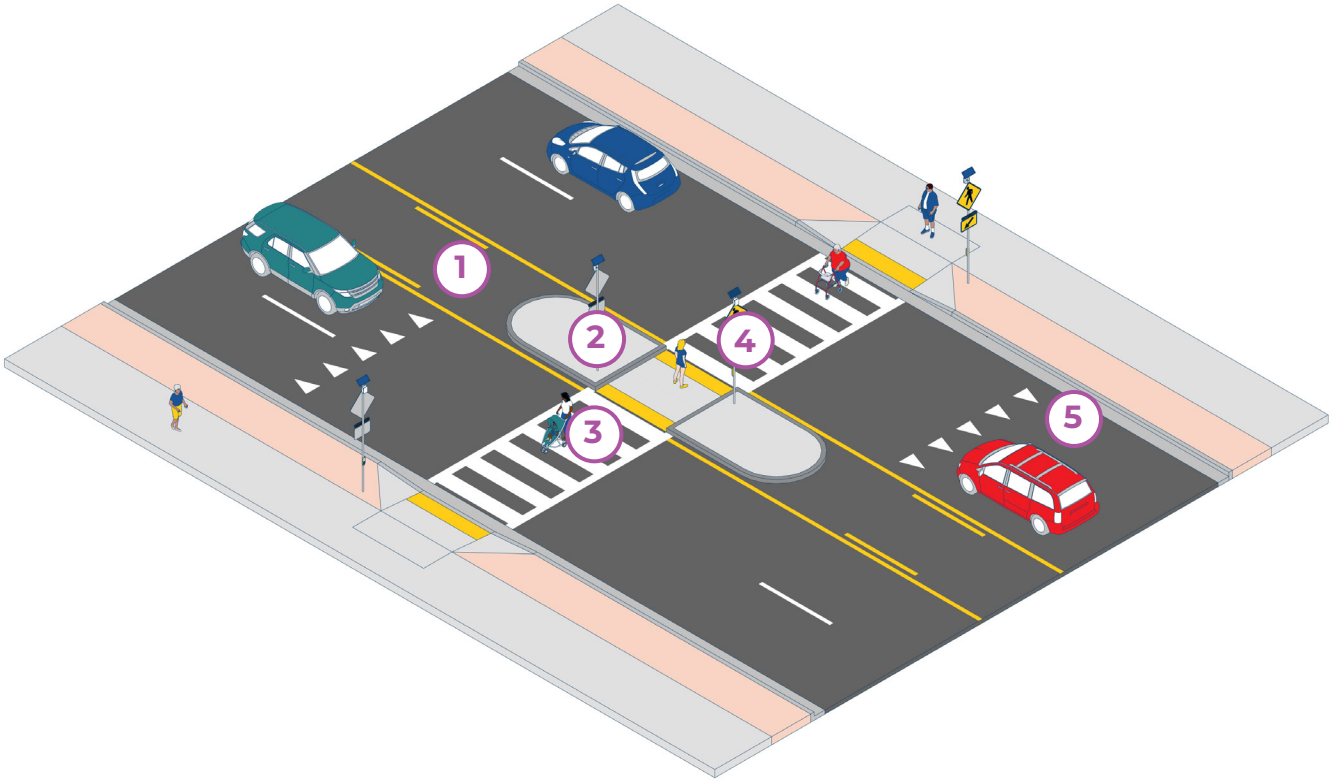
Potential Materials

- ☐ Traffic paint
- ☐ Signs and signposts
- ☐ Flexible delineator posts
- ☐ Rubberized curb
- ☐ Modular curb or speed bump systems
- ☐ Pre-cast curb
- ☐ Extruded curb
- ☐ Cast-in-place concrete
- ☐ Culvert plates
- ☐ Detectable warning surfaces

Median Refuges

Medians contribute to multimodal safety and complete streets in a variety of contexts. They can serve as a form of access restriction, limiting left turns and through movements at strategic locations. They can also introduce horizontal deflection and narrow motor vehicle lanes (like chicanes and pinch points) when introduced along undivided roadways without a center turn lane.

Median refuges, also referred to as pedestrian islands and crossing islands, create a designated area for people walking and bicycling to wait in the middle of a two-way street. Medians with refuges create two-stage crossings, which allow pedestrians and bicyclists to cross a roadway in two distinct stages and navigate conflicts with fewer lanes of travel at one time. To support people with mobility devices and with vision disabilities, pedestrian refuges must meet accessibility standards. Quick build designs offer several options for implementing median islands with accessible refuges.



1. Two-way left turn lanes provide space for creating median refuges at mid-block crossings.
2. Medians must be at least 6 ft wide to provide an accessible pedestrian refuge.
3. Pedestrian paths through refuges must be at least 5 ft wide to meet accessibility requirements.
4. Accessible pedestrian refuges should include detectable warning surfaces approaching the roadway crossing.
5. Advance pavement markings help alert motorists of upcoming crossings.

Appropriate Contexts

+ Intersections and mid-block crossings
+ Crossings of two-way roads with existing medians, two-way left turn lanes, or pavement width that can be reallocated

Median refuges are especially helpful at uncontrolled crossings of:

+ Roads with multiple vehicle through lanes per direction
+ Roads with a posted speed limit of 35 mph or greater
+ Roads with AADT of 9,000 vehicles per day or greater
+ Undivided local streets where traffic calming or slower motor vehicle speeds are desired, such as bicycle boulevards

Median refuges may be insufficient to provide a safe, comfortable crossing when implemented without additional treatments (such as RRFBs or pedestrian hybrid beacons) on higher-volume and higher-speed roadways.

Design Considerations

+ Median refuges measuring at least 10 ft in width can accommodate bicyclists and a greater range of users.
+ The AASHTO *Bike Guide, 5th Ed.* provides additional guidance related to median refuges intended for bicyclists.

Accessibility Considerations

+ Median refuges require several design elements to meet accessibility requirements for pedestrian refuges and establish a two-stage pedestrian crossing, including:
  + A pedestrian refuge measuring at least 6 ft in length (i.e., in the direction of pedestrian travel)
  + Detectable warning surfaces approaching both stages of the roadway crossing
  + Continuous detectable edges along both sides of the pedestrian route through the median refuge (described in more detail in the Pedestrian Lane Accessibility Considerations on page 19)
+ At pedestrian refuges that do not meet accessibility standards, crosswalk markings should continue through the median.
+ *PROWAG* provides additional guidance on accessibility requirements for pedestrian routes through medians.

Maintenance Considerations

+ Standard maintenance of striping and signage and replacement of vertical elements
+ Specialized routines or equipment may be necessary to clear debris and snow near medians or islands delineated by vertical elements.
+ See Common Maintenance Considerations on page 10.

Related Treatments

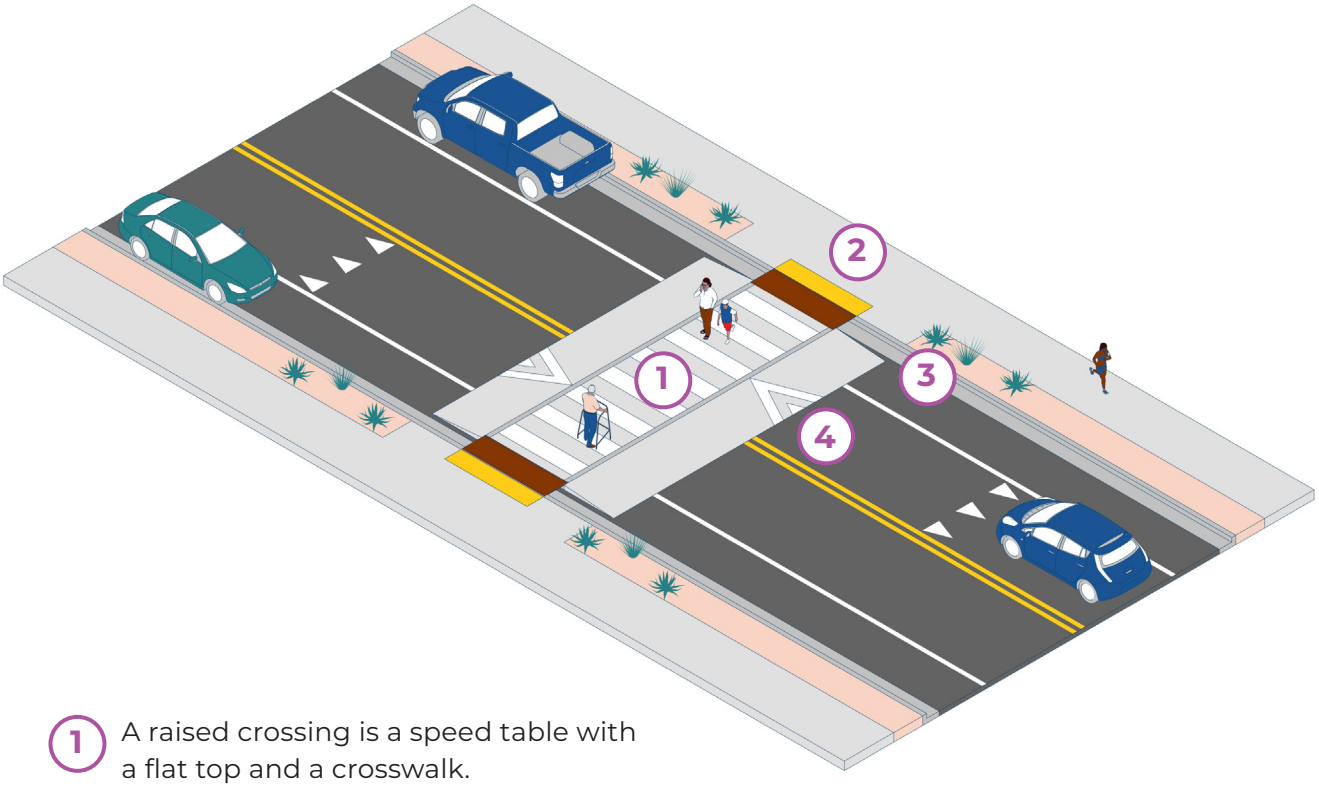
- ☐ Crosswalks and bicycle crossing markings
- ☐ Single-lane roundabouts
- ☐ RRFBs
- ☐ Raised crossings
- ☐ Chicanes and pinch points
- ☐ Vehicle access restrictions

Potential Materials

- ☐ Traffic paint
- ☐ Signs and signposts
- ☐ Flexible delineator posts
- ☐ Rubberized curbs
- ☐ Modular curbs
- ☐ Modular speed bumps
- ☐ Pre-cast concrete curb
- ☐ Cast-in-place concrete
- ☐ Detectable warning surfaces

Raised Crossings

Raised crossings are speed tables with a flat top and crosswalk markings that connect to sidewalks or shared use paths. Raised crossings allow pedestrians and bicyclists to cross the street at or near sidewalk level. Like speed cushions, raised crossings introduce vertical deflection within the roadway to encourage slower motor vehicle speeds. Raised crossings also encourage yielding by alerting drivers that they are approaching a pedestrian crossing.



1. A raised crossing is a speed table with a flat top and a crosswalk.
2. Detectable warning surfaces are required at the edge of the street.
3. Culvert plates spanning the gutter maintain stormwater flow lines.
4. Transition aprons include “v”-shaped markings.

Appropriate Contexts

- Controlled intersections, uncontrolled intersections, and mid-block crossings
- Streets with a limited number of lanes and moderate motor vehicle speeds and volumes:
  - Up to two motor vehicle through lanes per direction when implemented in conjunction with a median refuge
  - A posted speed limit up to 35 MPH
  - AADT up to 9,000 vehicles per day
- Streets with sidewalks or shared use paths at a higher elevation than the roadway (typical on streets with curb and gutter)
- Streets without a significant roadway crown
- Entrances to bicycle boulevards and main streets and other places where streets transition to a lower speed or a new context

Design Considerations

- The height and slope of raised crossings should reflect desired target speeds and design vehicles.
  - Raised crossings typically vary from 3 to 8 in. in height and 1:12 to 1:20 in slope.
  - Crossings matching the elevation of the sidewalk or shared use path are most comfortable for people walking and bicycling.
- The flat top of the raised crossing should be at least as wide as the connecting sidewalks or shared use paths and at least 10 ft wide.
- Transition aprons should include “v”-shaped markings facing approaching traffic in the center of each travel lane.
- The AASHTO *Bike Guide, 5th Ed.* provides additional guidance on designing raised crossings to accommodate bicyclists.

Accessibility Considerations

- Culvert plates installed across gutter between the curb and the speed table provide a flush surface meeting accessibility standards.
- Raised crossings require detectable warning surfaces at the edge of the street to meet accessibility standards.

Maintenance Considerations

- Standard maintenance of striping and pavement markings
- Specialized routines may be necessary to prevent and clear obstructions from gutters covered by culvert plates.
- See Common Maintenance Considerations on page 10.

Related Treatments

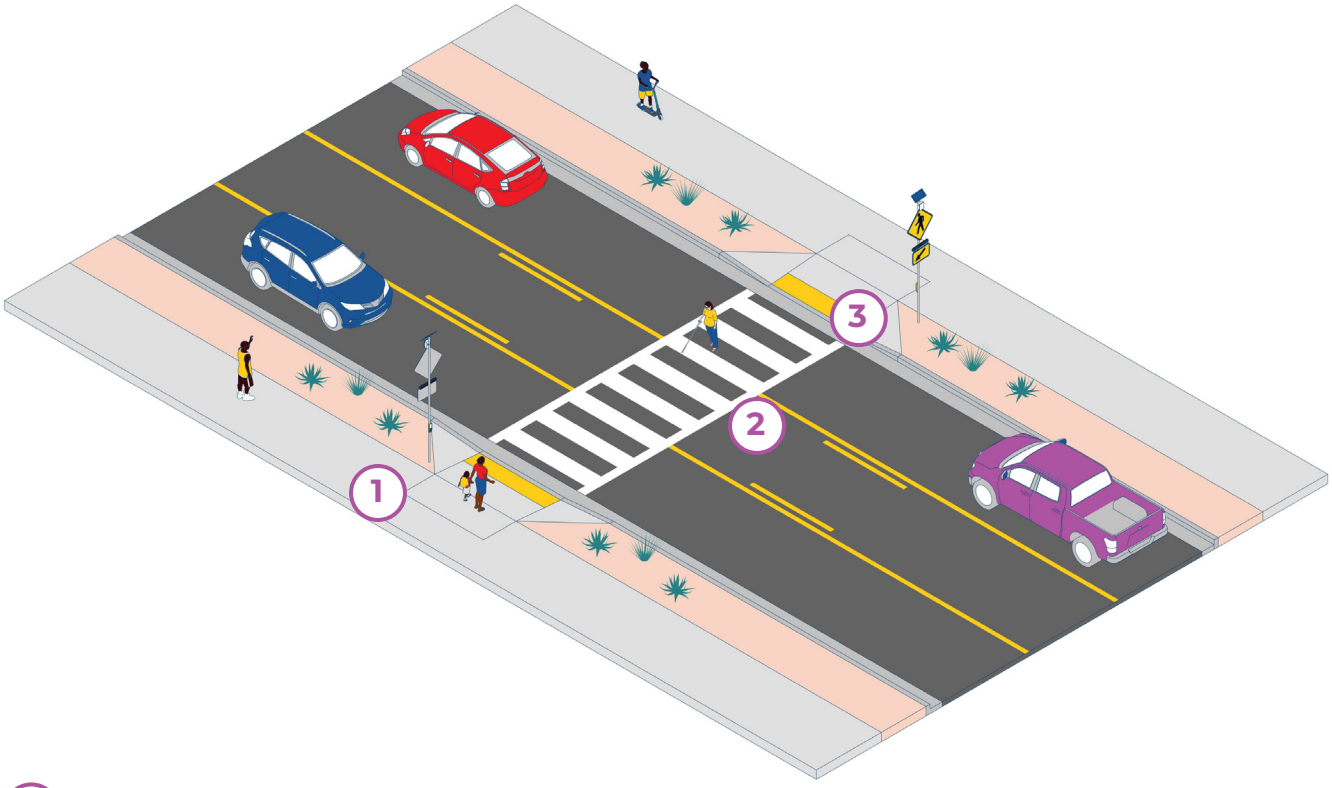
- ☐ Crosswalks
- ☐ Speed cushions
- ☐ Median refuges
- ☐ Bicycle boulevards

Potential Materials

- ☐ Traffic paint
- ☐ Pavement markings
- ☐ Signs and signposts
- ☐ Asphalt
- ☐ Cast-in-place concrete
- ☐ Culvert plates
- ☐ Detectable warning surface

Rapid Rectangular Flashing Beacons

Rapid rectangular flashing beacons (RRFBs) are yellow lights that use an irregular flash pattern of bright LEDs to alert drivers of crossing pedestrians or bicyclists and the requirement to yield. RRFBs supplement warning signs at uncontrolled intersection or mid-block crossings, and have been shown to significantly improve driver yielding rates. Pedestrians and bicyclists may activate the lights manually (via pushbutton) or automatically (via passive detection technology).



1. RRFBs should be placed on both sides of a marked crosswalk.
2. The duration of the flashing beacon should reflect pedestrian crossing time.
3. RRFBs require accessible curb ramps and detectable warning surfaces.

Appropriate Contexts

RRFBs can improve conditions at uncontrolled intersections and mid-block crossings in a variety of contexts. They are most appropriate at crossings with a limited number of lanes and moderate motor vehicle volumes and speeds:

+ up to one motor vehicle through lane per direction
+ a posted speed limit up to 35 MPH
+ AADT up to 9,000 vehicles per day

Especially when paired with median refuges, RRFBs can improve conditions of multilane crossings with higher motor vehicle volumes and lower speeds, such as crossings of roads with:

+ up to two motor vehicle through lanes per direction
+ a posted speed limit of up 30 MPH
+ AADT up to 15,000 vehicles per day

RRFBs may be insufficient to provide a safe, comfortable crossing when implemented on higher-volume and higher-speed roadways (where pedestrian hybrid beacons are preferred). The FHWA *STEP Guide* and the AASHTO *Bike Guide, 5th Ed.* provide additional guidance on appropriate contexts for RRFBs.

Design Considerations

+ RRFBs should be placed on both sides of a marked crosswalk.
+ Supplemental RRFBs can be placed within medians at two-stage crossings.
+ Installing an additional RRFB in advance of the crosswalk can improve driver awareness in locations where sight distance is limited.
+ RRFBs should not be used in conjunction with yield signs, stop signs, or traffic signals (except at roundabouts).

Accessibility Considerations

+ The duration of the flashing beacon should reflect pedestrian crossing time, as described in the *MUTCD*.
+ RRFBs require accessible curb ramps and detectable warning surfaces approaching the crosswalk to meet accessibility standards.
+ Installing additional push buttons or passive detection equipment can improve accessibility for pedestrians and bicyclists.

Maintenance Considerations

+ NMDOT typically secures maintenance agreements with local agencies for RRFBs along state facilities.
+ See Common Maintenance Considerations on page 10.

Related Treatments

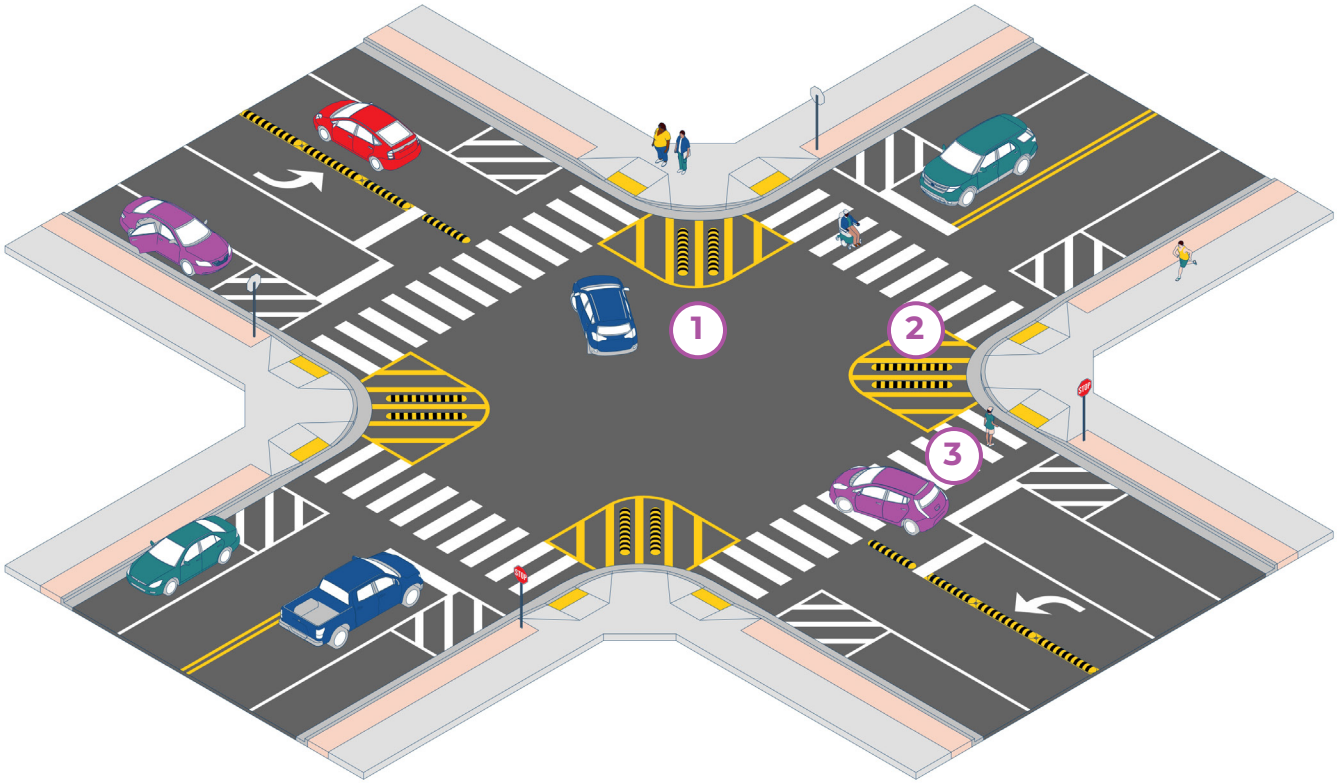
- ☐ Marked crosswalks
- ☐ Raised crossings
- ☐ Median refuges

Potential Materials

- ☐ RRFBs
- ☐ Solar-power panels
- ☐ Signs and signposts

Reduced Corner Radii & Turn Wedges

Corner radii directly impact the speed of right-turning vehicles. A large curb radius helps to accommodate large vehicles like buses and delivery trucks, but it also allows all other drivers to turn at higher speeds. Reducing corner radii through quick build curb extensions can encourage or require drivers to make tighter turns, resulting in lower turning speeds. In locations where larger control vehicles are challenging to accommodate with smaller corner radii, mountable turn wedges can reduce the effective radius for most turning vehicles while still allowing larger vehicles to track across it.



1. Corner radii measuring 10–15 ft help slow right-turning vehicles to speeds appropriate for urban contexts.
2. Mountable turn wedges can accommodate turning movements by larger control vehicles.
3. Turn wedges should not obstruct marked crosswalks.

Appropriate Contexts

Reduced corner radii and turn wedges are most effective at:

- Intersections and driveways with large effective right-turn radii, including skewed intersections and conflict points on streets with on-street parking or bike lanes
- Signalized intersections approaching streets with multiple receiving lanes
- Intersections with greater levels of pedestrian and/or bicyclist activity
- Intersections with higher volumes of motor vehicle right turns

Design Considerations

- Corner radii should reflect the target speed for typical design vehicles, such as a passenger cars or small truck.
  - Corner radii measuring 10–15 ft are best practice in urban contexts.
- On-street parking or bicycle lanes approaching intersections can increase the effective corner radii and encourage faster turning speeds.
- **Curb extensions** and **separated intersections** with raised curbs or islands can reduce corner radii for all vehicles.
- **Turn wedges** can incorporate mountable vertical elements to accommodate turning movements by larger control vehicles like trucks and buses.
- Allowing larger control vehicles to use a greater portion of the intersection space when turning—e.g., turning into the second receiving lane of roadway with multiple lanes per direction—can enable designs with smaller corner radii.
  - Restricting right turns on red helps create conditions where larger vehicles can use the second receiving lane when turning, allowing for designs with smaller corner radii.

Accessibility Considerations

- Turn wedges should not extend into or obstruct marked crosswalks.

Maintenance Considerations

- Routine maintenance of striping and pavement markings and replacement of vertical elements
- See Common Maintenance Considerations on page 10.

Related Treatments

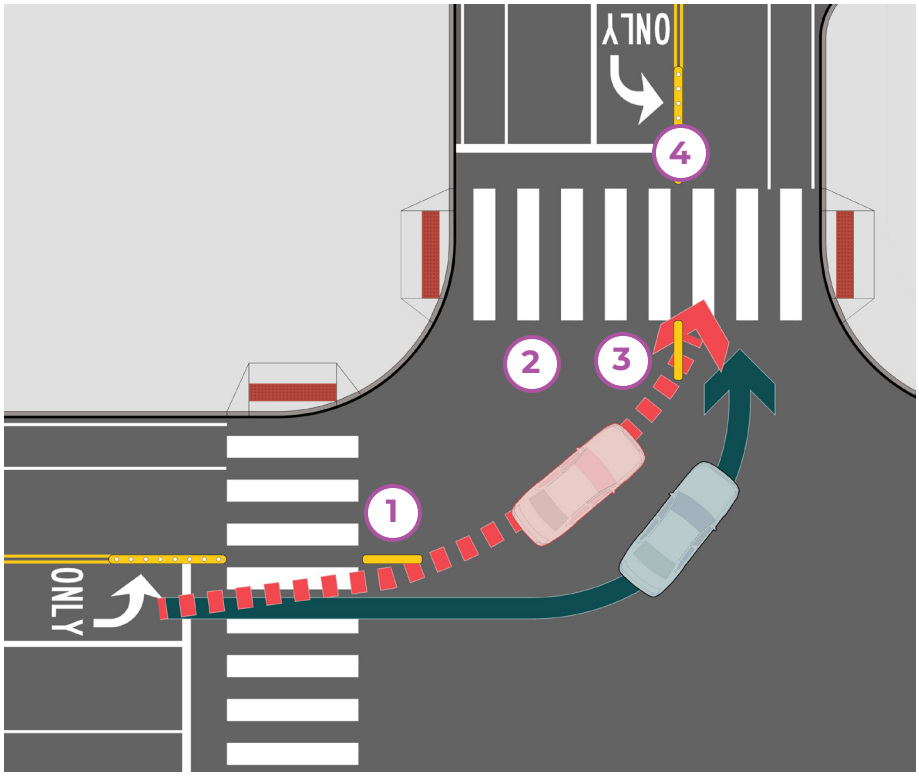
- ☐ Curb extensions
- ☐ Separated intersections
- ☐ Hardened centerlines
- ☐ Traffic signal safety enhancements

Potential Materials

- ☐ Traffic paint
- ☐ Flexible delineator posts
- ☐ Modular speed bumps

Hardened Centerlines

Hardened centerlines are vertical elements placed along the centerline at intersections that reduce the effective radius and the speed of left-turning vehicles. They reduce the risk of higher-speed collisions at intersections, particularly at multilane intersections where motorists can reach high speeds as they accelerate while turning left. Hardened centerlines extend up to (if not beyond) the marked crosswalk and are sometimes integrated with center medians. Like turn wedges for right-turning vehicles, hardened centerlines can use mountable elements closer to the intersection (such as for the nose of the hardened centerline) to minimize the effective radius for most drivers while still allowing larger control vehicles to make left turns. Quick build hardened centerline designs often use modular speed bumps and/or flexible delineator posts.



1. Extending hardened centerlines into the intersection helps slow left-turning vehicles.
2. Setting crosswalks back allows hardened centerlines to extend into the intersection.
3. Installing mountable noses can help accommodate left turns by larger vehicles.
4. Hardened centerlines should not obstruct crosswalks.

Appropriate Contexts

Hardened centerlines are most effective at:

+ Intersections with large effective left-turn radii, including skewed intersections and intersections of streets with multiple lanes per direction
+ Signalized intersections where left turns run concurrently with crossing pedestrians or bicyclists
+ Intersections with greater levels of pedestrian activity
+ Intersections with higher volumes of motor vehicle left turns

Design Considerations

+ The layout of hardened centerlines should reflect the target speed for a typical design vehicle, such as a passenger car or a small truck.
+ Extending the hardened centerline past the crosswalk into the intersection helps slow left-turning vehicles.
    + Where feasible, setting the crosswalk back from the intersection allows the hardened centerline to extend past the crosswalk.
+ Hardened centerlines can incorporate mountable vertical elements closer to the intersection—e.g., for noses extending past the crosswalk—to accommodate turning movements by larger control vehicles like trucks and buses.
+ In-street pedestrian crossing signs placed along the hardened centerline can improve awareness of crossings and help ensure drivers understand the need to yield.

Accessibility Considerations

+ Hardened centerlines should not extend into or obstruct marked crosswalks.

Maintenance Considerations

+ Routine replacement of vertical elements
+ See Common Maintenance Considerations on page 10.

Related Treatments

- ☐ Reduced corner radii and turn wedges
- ☐ Median refuges

Potential Materials

- ☐ Flexible delineator posts
- ☐ Modular speed bumps
- ☐ Modular curb

Separated Intersections

Separated intersections, also referred to as protected intersections, maintain physical separation between drivers and bicyclists (as well as pedestrians) approaching intersections. Separated intersection designs set back the bicycle (and pedestrian) crossings from the adjacent motor vehicle lane, which improves sight lines between bicyclists and right-turning motorists and gives drivers a space to yield to bicyclists outside of the motor vehicle through lane. In addition, separated intersection designs use corner islands and refuges to provide a safe and comfortable space for bicyclists to wait in an advanced position, closer to the intersection than motor vehicles. This improves sight lines and facilitates two-stage left turns by bicyclists, while also shortening the distance in which bicyclists are exposed to conflicts within an intersection. Crucially, corner islands help slow down turning vehicles relative to conventional intersections.

1. Crosswalks should be marked at all pedestrian crossings of bike lanes.
2. Where space allows, corner islands should define a forward queuing area with room for at least one bicyclist.
3. Corner radii should be designed to slow turning vehicles to 15 mph or less and can include mountable elements.
4. Setting crossings 6–16.5 ft back from the adjacent lane provides a motorist yield zone associated with safety benefits.

Appropriate Contexts

+ Signalized and 2-way stop-controlled intersections
+ Along roads with one-way buffered or separated bike lanes
+ Along roads with conventional bike lanes and excess pavement width that can be reallocated

Separated intersections are particularly helpful for:

+ Intersections with higher volumes of motor vehicle right turns
+ Intersections where two dedicated bicycle facilities connect

Design Considerations

+ Bicycle and pedestrian crossings should be set back 6–16.5 ft from the adjacent motor vehicle travel lane to provide a motorist yield zone associated with safety benefits.
+ Corner radii should be designed to slow turning vehicle speeds to 15 mph or less.
    + Mountable truck aprons or turn wedges can encourage slower vehicle speeds for typical design vehicles (like passenger cars) while accommodating larger control vehicles such as larger trucks.
+ Corner islands should define a forward bicycle queuing area that allows a bicyclist to wait without obstructing crossings.
+ Installing "BIKES USE PED SIGNAL" signs at signalized intersections enables bicyclists to cross concurrently with pedestrians while limiting the need for signal upgrades.
+ Separated intersection designs can be modified to fit within constraints and continue to provide benefits.
+ The AASHTO *Bike Guide, 5th Ed.* provides additional guidance related to separated intersection design.

Accessibility Considerations

+ Marked crosswalks should be provided at all pedestrian crossings of bike lanes, with a detectable warning surface approaching the bike lane edge.
+ Where space allows, the bike lane should be set back at least 6 ft from the motor vehicle lane in order to accommodate an accessible pedestrian refuge and a two-stage crossing.
+ Pedestrian refuges between the bike lane and motor vehicle lane should include detectable warning surfaces on both ends.

Maintenance Considerations

+ Routine maintenance of signage, striping, pavement markings, and vertical elements.
+ Specialized routines or equipment may be necessary to clear debris and snow from separated bike lanes and islands delineated by vertical elements.
+ See Common Maintenance Considerations on page 10.

Related Treatments

- ☐ Crosswalks and bicycle crossing markings
- ☐ Curb extensions and daylighting
- ☐ Median refuges
- ☐ Reduced corner radii and turn wedges

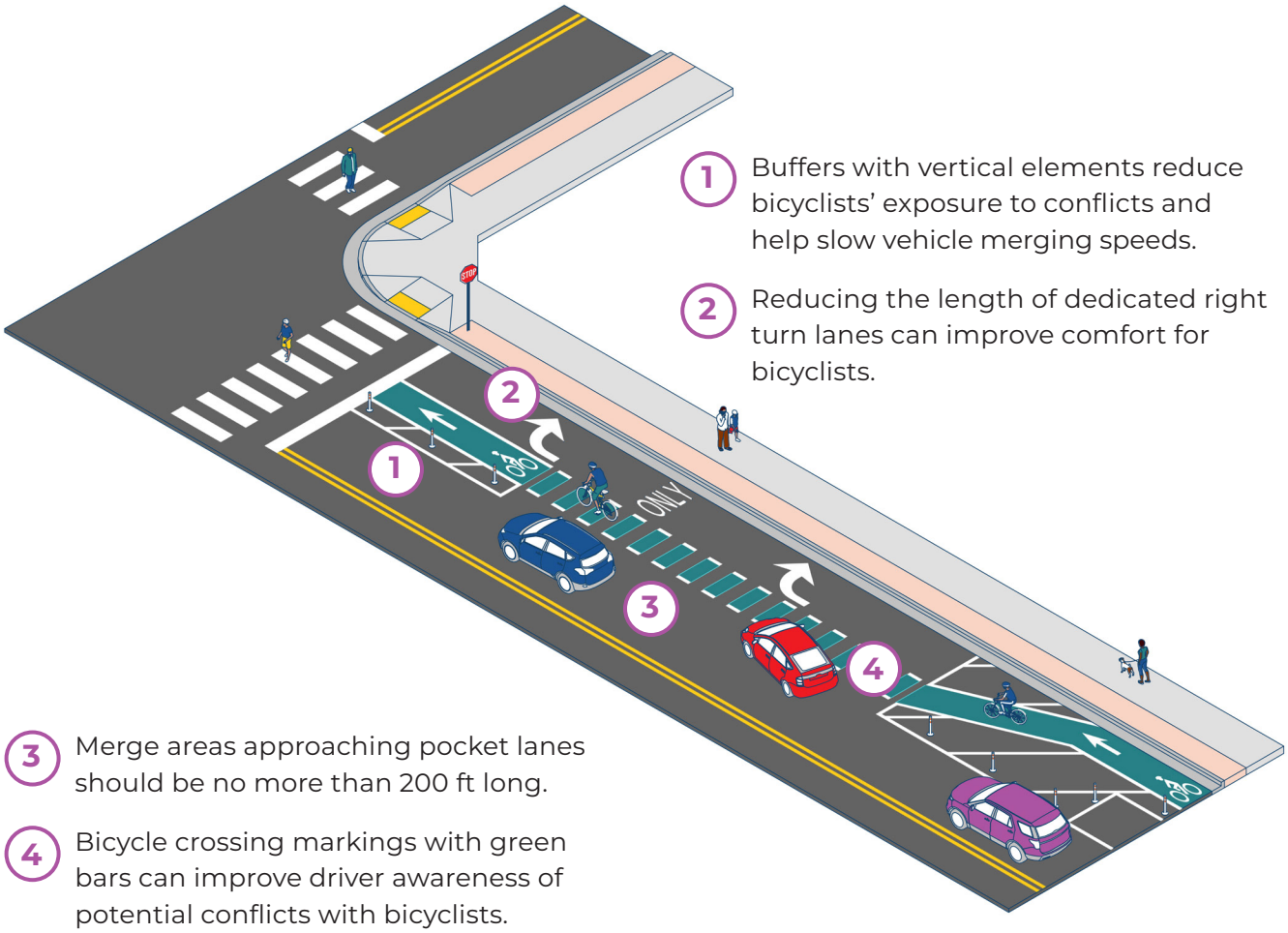
Potential Materials

- ☐ Traffic paint
- ☐ Pavement markings
- ☐ Green thermoplastic or methyl methacrylate (MMA)
- ☐ Signs and signposts
- ☐ Flexible delineator posts
- ☐ Rubberized curb
- ☐ Modular curb
- ☐ Pre-cast curb
- ☐ Cast-in-place curb

Enhanced Pocket Bike Lanes

Pocket bike lanes, which refer to dedicated bicycle facilities located between a motor vehicle through lane and a dedicated right turn lane, are a common treatment approaching major intersections on NMDOT facilities. Pocket bike lanes do not offer bicyclists the same level of comfort and safety as separated intersections (described on page 48) and/or signal phase separation, which represent best practices for mitigating conflicts between bicyclists and right-turning motor vehicles.

Where space constraints or other limitations do not allow for separated intersections or phase separation, **enhanced pocket bike lanes** can help improve safety as an interim or retrofit treatment. Enhanced pocket bike lanes use buffers with vertical elements to help limit bicyclists' exposure to conflicts with motor vehicles merging into the right turn lane. Even with enhancements, pocket bike lanes do not provide the same safety benefits as separated intersections and will only be tolerated by more confident bicyclists. Less confident bicyclists may choose to ride on the sidewalk (or find another route) in order to avoid the discomfort of pocket bike lanes.



1. Buffers with vertical elements reduce bicyclists' exposure to conflicts and help slow vehicle merging speeds.
2. Reducing the length of dedicated right turn lanes can improve comfort for bicyclists.
3. Merge areas approaching pocket lanes should be no more than 200 ft long.
4. Bicycle crossing markings with green bars can improve driver awareness of potential conflicts with bicyclists.

Appropriate Contexts

+ Approaching intersections with dedicated right turn lanes
+ Along roads with one-way buffered or separated bike lanes
+ Along roads with conventional bike lanes and excess pavement width that can be reallocated
+ Locations where separated intersections and phase separation are not feasible

Design Considerations

+ As bike lanes approach an intersection with a dedicated right turn lane, any buffers and vertical separation should terminate to provide a merge area where motor vehicles can enter the right turn lane.
+ The merge area should be as short as possible and no longer than 200 ft to limit bicyclists' exposure to conflicts while taking into account the road's design speed.
    + Transition bicycle ramps (described on page 54) connecting to off-street bikeways can provide a more comfortable option on higher-speed roads requiring merge areas longer than 200 ft.
+ Bicycle crossing markings with green bars through the merge area can help bicyclists navigate the intersection approach and improve driver awareness of potential conflicts with bicyclists.
+ Providing a buffer with vertical elements both upstream and downstream of the merge area can help ensure vehicles merge in the intended area and encourage slower vehicle merging speeds.
    + Mountable vertical elements can help accommodate turning movements by larger control vehicles like trucks and buses.
+ Reducing the length of the dedicated right turn lane (based on anticipated turning movement volumes and queue lengths) can improve comfort for bicyclists by minimizing the extents of the pocket bike lane.
+ Providing a transition bicycle ramp (described on page 54) in advance of the dedicated right turn lane gives bicyclists the option to exit the roadway and transition to a shared use path or sidewalk rather than navigating the pocket bike lane.
+ The AASHTO *Bike Guide, 5th Ed.* provides additional guidance related to intersection treatments along dedicated bicycle facilities.

Maintenance Considerations

+ Standard maintenance of striping and pavement markings and replacement of vertical elements
+ See Common Maintenance Considerations on page 10.

Related Treatments

- ☐ Dedicated on-street bicycle facilities
- ☐ Separated intersections
- ☐ Transition bicycle ramps

Potential Materials

- ☐ Traffic paint
- ☐ Pavement markings
- ☐ Green thermoplastic or methyl methacrylate (MMA)
- ☐ Flexible delineator posts
- ☐ Signs and signposts

Bike Boxes & Two-Stage Left Turn Boxes

Bike boxes and two-stage left turn boxes use striping and pavement markings to help bicyclists navigate intersections, avoid conflicts with motor vehicles, and make left turns.

A **bike box** is a designated place for bicyclists to wait in front of stopped vehicles during a red light, so they are more visible and predictable to drivers when the light turns green. Conventional bike boxes use an advance stop line and other pavement markings to place bicyclists waiting at a red light in an advanced position relative to waiting drivers, which helps bicyclists turn left and mitigates conflicts with vehicles on the green phase.

Two-stage turn boxes are designated areas on the far side of an intersection that permit bicyclists turning left to travel straight through the intersection on the right side of the street during a green light and wait for the opposing signal to turn green to complete the left-turn movement.

1. Bike boxes include an advance stop bar and should measure at least 10 ft deep.
2. At signals requiring actuation, bike boxes and two-stage left turn boxes should include bicycle detection.
3. Bike boxes should include a bicycle symbol and may be colored green.
4. Bike boxes should connect to a bike lane measuring at least 50 ft.
5. Two-stage turn boxes should be located in a protected area on either side of the bicycle crossing.
6. Two-stage turn boxes should include a left-turn arrow and may include a bicycle symbol.

Appropriate Contexts

Bike boxes are appropriate at signalized intersections on streets with bike lanes. They are particularly helpful at intersections with:

+ Higher volumes of queuing bicyclists
+ Higher volumes of motor vehicle right turns

Two-stage left turn boxes are appropriate at controlled intersections on streets with bike lanes. They are particularly helpful at intersections with:

+ Multi-lane streets higher motor vehicle volumes or higher operating speeds, where it is difficult for bicyclists to access left-turn lanes
+ Higher volumes of bicyclist left turns or queuing bicyclists

Design Considerations

+ **Bike boxes** include an advance stop line for bicyclists positioned closer to the intersection than the stop bar for motor vehicles.
+ Bike boxes should measure at least 10 ft deep and include a bicycle symbol pavement marking.
+ Bike boxes should connect directly to an approaching bike lane measuring at least 50 ft in length.
+ **Two-stage left turn boxes** should be located in a protected area on either side of the bicycle crossing markings, such as in the shadow of a parking lane or between the bicycle crossing and the crosswalk.
+ Two-stage left turn boxes should include a left turn arrow and may include a bicycle symbol pavement marking.
+ Bike boxes and two-stage left turn boxes may be colored green to improve visibility and discourage motor vehicle encroachment.
+ Banning right turns on red helps ensure motor vehicles do not obstruct bike boxes and two-stage left turn boxes.
+ Bike boxes and two-stage left turn boxes should include bicycle detection when located at traffic signals requiring actuation.
+ The *AASHTO Bike Guide, 5th Ed.* provides additional guidance related to bike boxes and two-stage left turn boxes.

Maintenance Considerations

+ Routine maintenance of striping and pavement markings
+ See Common Maintenance Considerations on page 10.

Related Treatments

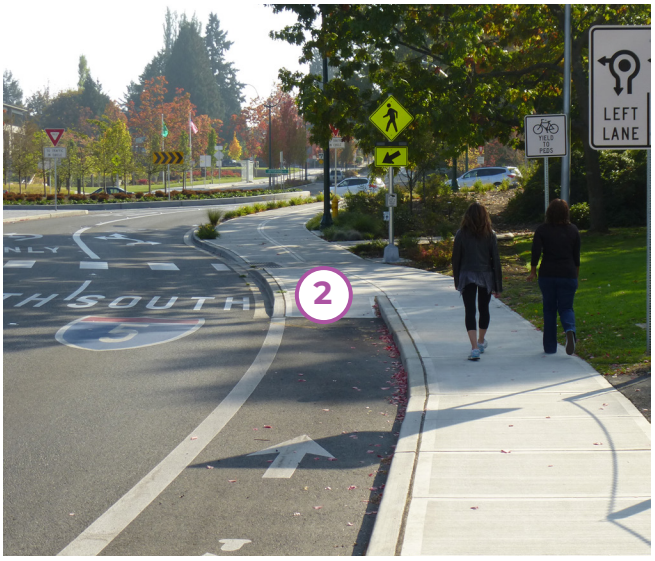
- ☐ Dedicated on-street bicycle facilities
- ☐ Separated intersections
- ☐ Traffic signal safety enhancements

Potential Materials

- ☐ Traffic paint
- ☐ Pavement markings
- ☐ Green thermoplastic or methyl methacrylate (MMA)

Transition Bicycle Ramps

Transition bicycle ramps allow bicyclists to navigate between bike lanes (or shared lanes) within the roadway and shared use paths or sidewalks at a higher elevation. They can improve comfort and safety for bicyclists approaching high-risk or high-conflict areas, as they offer less confident bicyclists the option to navigate unsafe or uncomfortable intersections from shared use paths (or sidewalks where they can dismount). Bicycle ramps are also an effective design strategy for safely terminating bike lanes ahead of roundabouts, complex intersections, or constrained conditions.



1. Bicycle ramps allow bicyclists to transition from the roadway to shared use paths or sidewalks.
2. Bicycle ramps are an effective strategy for terminating bike lanes ahead of roundabouts.
3. Tactile direction indicators at the top of bicycle ramps delineate the edge of pedestrian facilities and guide pedestrians away from the ramp.

Appropriate Contexts

- Roads with shared use paths or sidewalks where bicyclists can dismount
- Roads with bike lanes approaching constrained intersections with high motor vehicle turning volumes where separated intersections are not feasible
- Roads with bike lanes approaching roundabouts
- Transitions between roadway-level bike lanes (or bicycle boulevards) and shared use paths

Design Considerations

- Bicycle ramps should be at least as wide as the connecting bikeway.
- Where space allows, bicycle ramps with slopes of at least 30:1 help provide a smooth, comfortable transition.
- Where conditions permit, bicycle ramps that align with connecting bikeways and avoid abrupt lateral shifts support a comfortable bicycling experience.
  - Wider ramps can help bicyclists navigate ramps involving more abrupt shifts in alignment.
- The AASHTO *Bike Guide, 5th Ed.* provides additional guidance related to bicycle ramps.

Accessibility Considerations

- Bicycle ramps are intended for the exclusive use of bicyclists and do not need to comply with pedestrian accessibility standards (such as ramp slope requirements).
- Tactile direction indicators should be installed at the top of bicycle ramps to delineate the edge of the connecting pedestrian facility and guide pedestrians away from the ramp.

Drainage Considerations

- Bicycle ramps should be designed to avoid ponding and to prevent debris from collecting at the base of the ramp.

Maintenance Considerations

- NMDOT typically secures maintenance agreements with local agencies for curb ramps along state facilities.
- Specialized routines or equipment may be necessary to clear debris and snow from bicycle ramps.
- See Common Maintenance Considerations on page 10.

Related Treatments

- ☐ Dedicated on-street bicycle facilities
- ☐ Enhanced pocket bike lanes
- ☐ Roundabouts

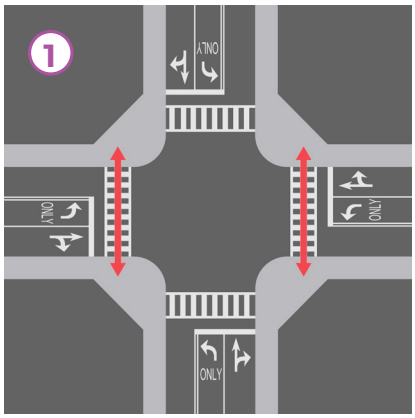
Potential Materials

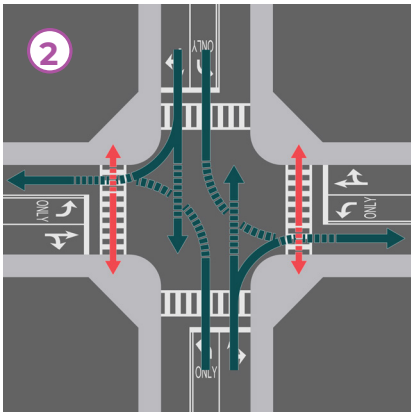
- ☐ Asphalt
- ☐ Cast-in-place concrete
- ☐ Tactile direction indicator

Traffic Signal Safety Enhancements

Several forms of traffic signal safety enhancements can reduce conflicts among pedestrians, bicyclists, and motorists at signalized intersections. Agencies can implement the following multimodal safety strategies by adjusting signal phasing and installing signage:

Leading pedestrian or bicycle intervals (LPIs/LBIs) are a signal operation strategy that provides pedestrians and/or bicyclists a 3–7 second head start when crossing at a signalized intersection. Leading intervals help mitigate conflicts by allowing pedestrians and/or bicyclists to enter an intersection and begin crossing before motorists start turning. This has been shown to increase the likelihood of motorists yielding right of way to pedestrians and bicyclists.

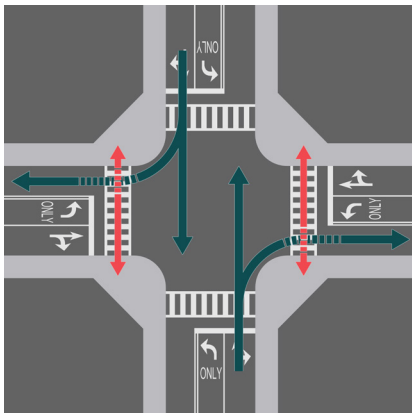


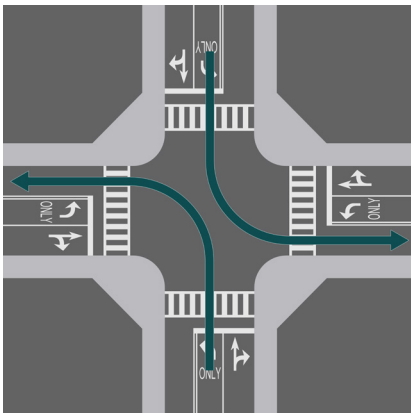


1. Leading intervals give crossing pedestrians and/or bicyclists a 3–7 second head start.
2. Once motorists begin turning, pedestrians and/or bicyclists have already entered the intersection and are more visible.

Protected phasing is a signal operation strategy that separates vehicular turning movements from pedestrian and/or bicyclist crossing movements. Common applications include:

+ Providing a separate, dedicated signal phase for motor vehicle left turns that conflict with pedestrians and bicyclists traveling across or through an intersection
+ Providing a separate phase for motor vehicle right turns that conflict with bicycle through movements





3. Protected phasing provides separate phases for pedestrian crossings and vehicle left turns.
4. Implementing protected phasing is simplest at intersections with dedicated turn lanes.

Banning right turns on red (RTOR) is a safety strategy that uses signage to restrict vehicle right turns during the red signal phase. This helps eliminate conflicts between turning vehicles and pedestrians and/or bicyclists crossing during concurrent signal phases.

Appropriate contexts:

Traffic signal safety enhancements are most effective at signalized intersections with:

- Higher volumes of turning vehicles
- Greater levels of pedestrians and/or bicyclist activity
- Separated bike lanes, shared use paths, two-way bike lanes, or contraflow bike lanes
  - The *MUTCD* now requires 'No Turn on Red' signs for intersection approaches with separated bike lanes.
  - Restricting RTOR supports separated intersection designs by ensuring pedestrians and bicyclists have an advanced queuing position.
  - Restricting RTOR helps improve safety at conflict points on two-way bikeways (such as shared use paths), where drivers trying to turn right are less likely to look for a bicyclist approaching from the other direction.
- Unconventional bikeway transitions
- Two-stage left-turn boxes

Implementing **protected phasing** as a quick build treatment is simplest and most feasible at intersections with existing dedicated turn lanes.

Design Considerations

- Implementing leading intervals, protected phasing, and other signal operations strategies may require upgrades to signal controllers.
- Implementing protected phasing may require additional signal heads and/or upgrades to signal infrastructure, such as longer mastarms that extend to left turn lanes.
- In some cases, adjusting signal phasing or implementing RTOR restrictions only during the busiest times of the day may be sufficient to address safety issues.
- Implementing leading intervals in conjunction with banning RTOR helps ensure pedestrians and bicyclists have the benefit of a head start and address concerns that the RTOR restriction will result in more right-turn-on-green conflicts.

Maintenance Considerations

- NMDOT typically secures maintenance agreements with local agencies for traffic signals along state facilities.
- Routine maintenance of signage and traffic signals
- See Common Maintenance Considerations on page 10.

Related Treatments

- ☐ Separated intersections

Potential Materials

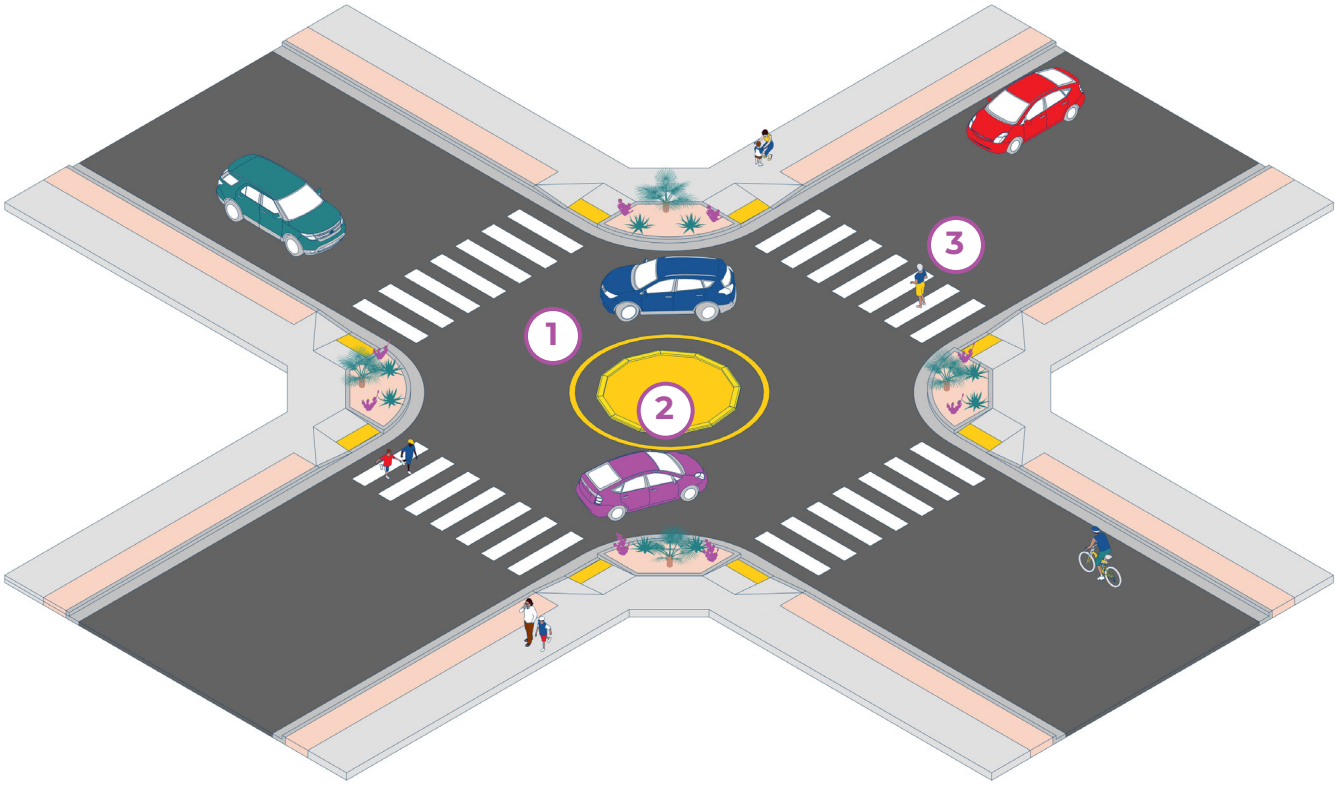
- ☐ Signs and signposts
- ☐ Signal heads
- ☐ Signal pole and base upgrades
- ☐ Signal controller upgrades

Single-Lane Roundabouts & Neighborhood Traffic Circles

Roundabouts are yield-controlled intersections where motorists travel counter-clockwise in a circulatory roadway around a center island. Roundabouts can slow motor vehicle speeds, reduce delays for motorists, and improve conditions for people walking and bicycling. **Single-lane roundabouts** are often feasible within existing curb lines using quick build materials and compact designs. They often require (or benefit from) targeted civil improvements to achieve desired target speeds, accommodate larger vehicles, and provide accessible crossings. Pedestrians with vision disabilities can have difficulty distinguishing the sound of motor vehicles approaching crossings at roundabouts, so designs include crossing setbacks and often require relocating curb ramps.

Neighborhood traffic circles, also called mini-circles, calm traffic on local streets. Like roundabouts, neighborhood traffic circles include a center island and yield control. However, they have different design criteria and involve less channelization.

Multilane roundabouts create significant challenges for people walking and bicycling. They typically require major reconstruction beyond the scope of quick build improvements.



1. The layout of traffic circles should reflect the desired target speed.
2. Center islands can use mountable elements to accommodate larger vehicles.
3. Neighborhood traffic circles do not require splitter islands and involve less channelization than roundabouts.

Appropriate Contexts

Single-lane roundabouts are appropriate at:

+ Signalized, stop-controlled, or uncontrolled intersections of streets with one through lane per direction
+ Entrances to main streets and other places where streets transition to a lower speed or a new context

Neighborhood traffic circles are appropriate along bicycle boulevards and local streets where traffic calming is desired.

Design Considerations

+ Roundabouts require splitter islands separating entering and exiting traffic on all approaches.
+ Neighborhood traffic circles do not require splitter islands.
+ The layout of roundabouts and traffic circles should reflect the desired target speed and design vehicles.
    + Center islands can incorporate mountable elements to accommodate turning movements by larger vehicles.
    + Neighborhood traffic circles can accommodate emergency vehicles by permitting them to travel the wrong way around center islands when turning left.
+ Advance signage, pavement markings, and reflectors can direct traffic flow and improve awareness in areas with limited visibility.
+ Bike lanes are not allowed within the circulatory roadway of a roundabout and should terminate in advance.
    + Shared lane markings and bicycle ramps can support transitions to shared lanes or shared use paths.

Accessibility Considerations

+ Where space allows, raised splitter islands should measure at least 6 ft in width to provide an accessible pedestrian refuge and a two-stage crossing.
+ Painted, mountable, or narrow splitter islands that do not provide accessible refuges should not include detectable warning surfaces.
+ Crossings at roundabouts should be set back at least 20 ft from the yield line to support the needs of pedestrians with vision disabilities.

Maintenance Considerations

+ Routine maintenance of striping, pavement markings, and vertical elements
+ Specialized routines or equipment may be necessary to clear debris and snow from islands delineated by vertical elements.
+ See Common Maintenance Considerations on page 10.

Related Treatments

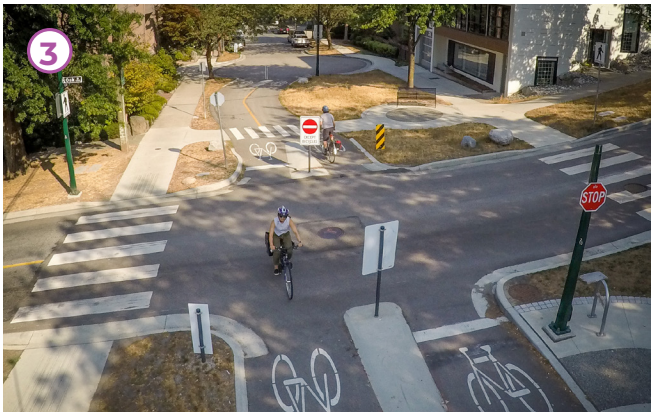
- ☐ Bicycle boulevards
- ☐ Median refuges
- ☐ Raised crossings

Potential Materials

- ☐ Traffic paint
- ☐ Signs and signposts
- ☐ Flexible delineator posts
- ☐ Rubberized curb
- ☐ Modular curb
- ☐ Modular speed bump
- ☐ Pre-cast curb
- ☐ Extruded curb
- ☐ Cast-in-place concrete
- ☐ Detectable warning surface

Vehicle Access Restrictions

Vehicle access restrictions limit specific vehicle movements, such as turning movements or through movements across an intersection, in order to help reduce conflicts at intersections (or driveways) and to help manage vehicle volumes on a given street. These treatments use diverters (such as medians) and signage to limit motor vehicle movements and volumes while at the same time remaining permeable to people walking or bicycling.



1. Quick build medians with bicycle cut-throughs can restrict motor vehicle through movements and left turns at intersections.
2. Diverter islands can prevent motor vehicles from turning onto side streets from busier roads while allowing for bicycle access.
3. Diverter islands positioned in the center of streets can help close streets to motor vehicles.
4. Quick build lane closures can prevent access to slip lanes that contribute to high speeds and safety concerns.

Appropriate Contexts

+ At entrances to bicycle boulevards or other neighborhood streets where less motor vehicle traffic is desired
+ Along roads with high volumes of uncontrolled left turns, especially those with:
  + Higher motor vehicle volumes and/or higher speeds
  + Frequent commercial driveways or intersections with low-volume streets

Design Considerations

+ Vehicle access restrictions may require an engineering study and/or traffic operations analysis prior to implementation.
+ **Medians** (or hardened centerlines) can limit left turns across oncoming lanes of traffic in mid-block locations, as well as through movements at intersections.
+ **Diverter islands** can prevent motor vehicle travel in one or both directions while remaining open to bicyclists and establish short segments of one-way streets or full street closures.
+ **Diagonal diverters** prevent all vehicle through movements at intersections and reduce cut-through traffic.
+ Bicycle cut-throughs allow bicyclists to navigate medians and diverter islands.
+ Signage and pavement marking symbols should indicate and clarify where bicyclists (and pedestrians) are exempted from restrictions implemented for vehicles.
+ Medians and diverter islands can incorporate mountable features to accommodate emergency vehicles.
+ The AASHTO *Bike Guide, 5th Ed.* provides additional guidance related to vehicle access restrictions along bicycle boulevards.

Accessibility Considerations

+ Diverter islands require many of the same design elements as median refuges to meet accessibility standards and provide pedestrian refuges. See Median Refuge Accessibility Considerations on page 39.

Maintenance Considerations

+ Standard maintenance of striping and signage and replacement of vertical elements
+ Specialized routines or equipment may be necessary to clear debris and snow near medians or islands delineated by vertical elements.
+ See Common Maintenance Considerations on page 10.

Related Treatments

- ☐ Median refuges
- ☐ Hardened centerlines
- ☐ Bicycle boulevards

Potential Materials

- ☐ Traffic paint
- ☐ Signs and signposts
- ☐ Flexible delineator posts
- ☐ Rubberized curb
- ☐ Modular curb
- ☐ Pre-cast concrete curb
- ☐ Cast-in-place concrete

Bicycle Boulevards

Bicycle boulevards, also known as neighborhood greenways, are quieter streets that provide a comfortable environment for bicycling, walking, and rolling. Bicycle boulevards often include measures to manage motor vehicle volumes and speeds, including speed cushions, vehicle access restrictions, signage, and other quick build treatments. Bicycle boulevards can provide strategic connections between other bicycle facilities and key destinations.

1. Crossing treatments (such as RRFBs) at larger roadways are a critical component of bike boulevards.
2. Traffic calming treatments like neighborhood traffic circles help reinforce slow speeds on bike boulevards.
3. Vehicle access restrictions such as diverters help reduce motor vehicle volumes to provide a more comfortable bicycling environment.

Appropriate Contexts

+ Local streets that run parallel to nearby busier streets
+ Streets with lower motor vehicle volumes and slower speeds
+ Street networks with multiple parallel streets

They are most appropriate for:

+ Streets with a target motor vehicle speed of 20 mph or less
+ Streets with AADT of less than 500 daily vehicles per day
    + Bicycle boulevards should not have motor vehicle speeds exceeding 25 mph or daily vehicle volumes above 2,000 vehicles.

The AASHTO *Bike Guide, 5th Ed.* provides additional guidance related to appropriate design users and bicycle facility types in different contexts.

Design Considerations

+ Appropriate crossing treatments that allow pedestrians and bicyclists to safely and comfortably cross major roadways, such as NMDOT facilities, are a crucial component of bike boulevards.
+ Vehicle access restrictions approaching and across major roadways help reduce motor vehicle volumes and discourage cut-through traffic.
+ Signage and pavement markings help indicate that a roadway is shared space intended to prioritize people biking, walking, and rolling.
+ Speed management elements, such as speed cushions, chicanes, neighborhood traffic circles, and curb extensions reinforce slow speeds and bicycle and pedestrian priority.
+ Removing or forgoing a striped centerline can encourage slow speeds and encourage drivers to give bicyclists adequate room when passing.
+ The AASHTO *Bike Guide, 5th Ed.* provides additional guidance related to bicycle boulevards.

Maintenance Considerations

+ Routine maintenance of striping, pavement markings, and vertical elements
+ See Common Maintenance Considerations on page 10 as well as considerations for related treatments.

Related Treatments

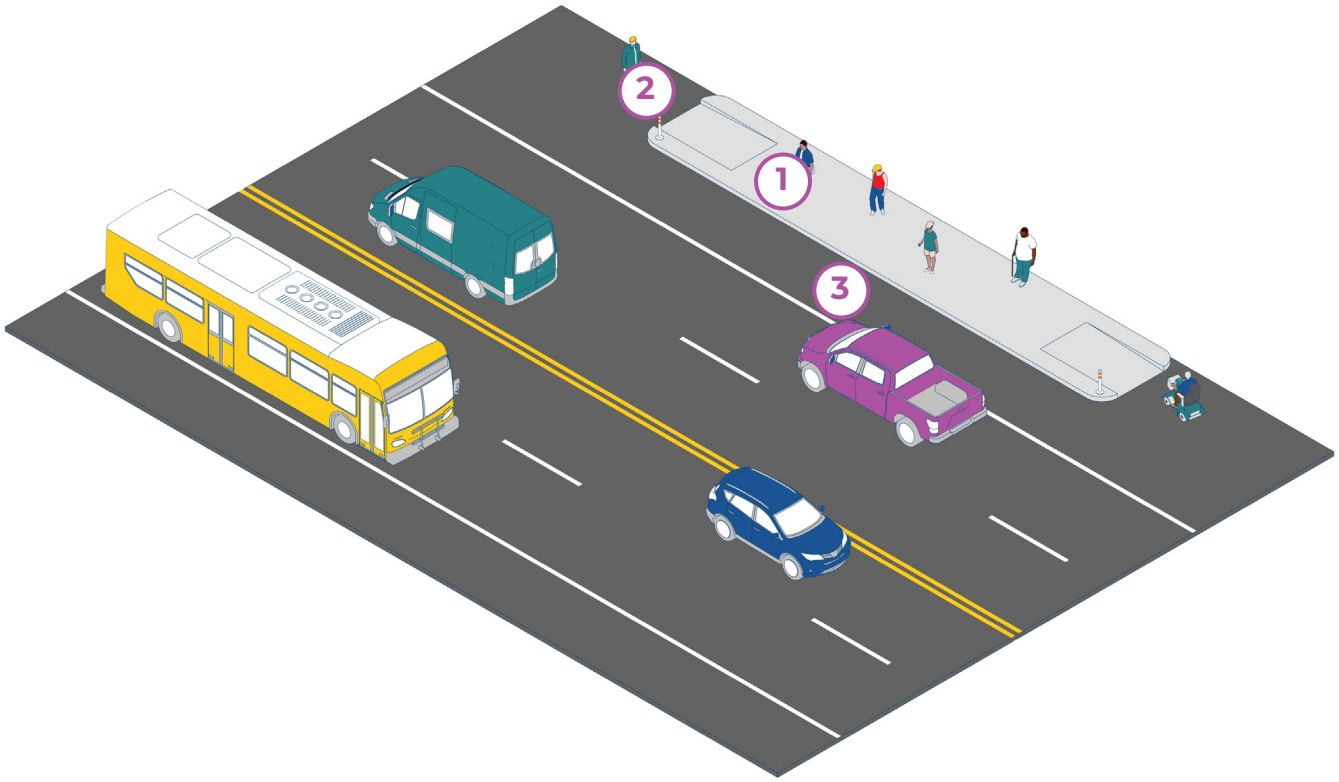
- ☐ Chicanes and pinch points
- ☐ Curb extensions
- ☐ Speed humps
- ☐ Neighborhood traffic circles
- ☐ Speed signage and pavement markings
- ☐ Vehicle access restrictions
- ☐ Median refuges

Potential Materials

- ☐ Pavement markings
- ☐ Traffic paint
- ☐ Signs and signposts
- ☐ Flexible delineator posts
- ☐ Rubberized curb
- ☐ Modular curb
- ☐ Pre-cast curb
- ☐ Extruded curb
- ☐ Cast-in-place concrete

Accessible Bus Stops

Quick build treatments can help agencies build and improve bus stops, even in contexts with limited pedestrian infrastructure and constrained right-of-way. Especially on rural roads without curbs and sidewalks, many bus stops do not meet minimum accessibility standards or support the needs of people using wheelchairs and mobility devices. Targeted civil improvements and preformed modular products provide options for improving or implementing new bus stops as low-cost, standalone projects without major reconstruction.



1. Bus stops require a flat, clear boarding area at the front door.
2. Ramps at both ends of bus stops ensure access for pedestrians using shoulders.
3. Stops at the outside of wide shoulders provide more separation from traffic.

Appropriate Contexts

+ Roads with local or regional fixed-route bus service
+ Roads with paved shoulders that lack curb and gutter
+ Roads with limited space between the curb and the property line where a wider bus stop platform is desired
+ New and existing bus stop locations near controlled or enhanced crossings, essential services, community destinations, and/or residents with limited mobility

Design Considerations

+ Larger platforms can accommodate boarding and alighting at all doors of the bus and amenities like benches and shelters
+ Platforms can be built at standard curb height
+ Taller platforms measuring up to 9 in. in height allow for near-level boarding without damaging transit vehicles
    + Platforms taller than standard curb height require detectable warning surface along the edge of platform to meet accessibility standards
+ On roads without curbs with wide paved shoulders, stops can be installed within the the shoulder
    + Locating stops on the outside edge of wide shoulders can improve comfort by providing more separation from motor vehicle traffic

Accessibility Considerations

+ Stops require a flat, clear boarding area measuring at least 5 ft (parallel to the road) by 8 ft (perpendicular to the road) to meet accessibility standards
+ Platforms taller than standard curb height require detectable warning surface along the edge of platform to meet accessibility standards
+ Accessible ramps should be installed at both ends of platforms built within shoulders so pedestrians can access the stop
+ On curbed roads, culvert plates installed across the gutter between the curb and the bus stop island can provide a flush surface that meets accessibility standards

Maintenance Considerations

+ NMDOT typically secures maintenance agreements with local agencies for bus stops along state facilities.
+ Specialized routines may be necessary to prevent and clear obstructions from the gutter or roadway edge, especially if gutters are covered by culvert plates.
+ See Common Maintenance Considerations on page 10.

Related Treatments

- ☐ Multimodal paved shoulders
- ☐ Curb extensions

Potential Materials

- ☐ Cast-in-place concrete
- ☐ Preformed bus stop platforms
- ☐ Culvert plates
- ☐ Detectable warning surface

Placemaking Treatments

Placemaking is an approach to design that celebrates a community's assets and supports the identity of a place. The following treatments can complement the street design elements described in this guide to create more enjoyable public spaces and support local transportation and economic development objectives.

These treatments are not meant to be an exhaustive list. Rather, they are intended as inspiration for planners and designers to consider further ways to support the needs of people walking and biking and create context sensitive designs that enhance the communities of New Mexico.

Street Furnishings

Street furnishings encompass many types of amenities that can be located in areas for pedestrian circulation, including benches, tables, planters, kiosks, trash receptacles, bus stop amenities, and bicycle parking. They contribute to a vibrant public realm and help visually narrow the roadway, encouraging slower speeds.

Seating, tables, and public art can help activate commercial corridors and the public realm.

Public & Street Art

Public art can enhance functional street elements, features, or public spaces within a transportation corridor in a variety of ways, such as providing visual interest with sculptures, murals, or paintings on utility boxes. The process of creating and installing public art can also be a powerful form of community engagement, placemaking, and building identity.

Parklets

Parklets convert curbside parking spaces into public spaces for people to enjoy. They may be at roadway grade, but more commonly use a platform at sidewalk level. Parklets can feature a wide range of streetscape amenities, including public seating, landscaping, bicycle parking, and shade elements. Parklets may be installed on commercial streets with heavy pedestrian traffic and are especially helpful along streets with relatively narrow sidewalks.

Parklets reallocate parking spaces and provide shade, planters, and seating adjacent to the pedestrian realm.

Shade

Shade features such as tents, umbrellas, canopies or pergolas, or small trees in planters can offer shelter from the elements. Quick build shade structures are typically installed within parklets, temporary plazas, curb extensions, or transit stops to make these areas more inviting and comfortable for people walking or bicycling.

Shade and street furnishings improve comfort and visually narrow the roadway to support slow speeds..

Bike Corrals

Installing bicycle parking facilities in appropriate locations can help support convenient and secure bicycle access to key destinations while promoting a more orderly and accessible public realm. Bike corrals are typically located on corridors with on-street parking and key destinations where the sidewalk is too narrow to accommodate bicycle racks. Bike corrals can transform a typical single vehicle parking space into room for 5-8 on-street bicycle parking spaces. Given the proximity to vehicle parking, corrals should be delineated by vertical features, such as planters or flex posts, to help prevent motorists from accidentally driving or backing into the corral.

Bike corrals repurpose existing on-street parking spaces to support multimodal access to destinations.

Wayfinding

Wayfinding signage can both brand infrastructure and guide people navigating the network. Signage also provides an opportunity to inform people about a project and announce tools to provide feedback, such as through QR codes that link to surveys. Wayfinding and signage can be placed on traffic barricades at street entry points and on existing signs. The various elements of a wayfinding system should use a cohesive design language, including a wayfinding sign family and guidance on how to travel to prioritized destinations.

Wayfinding signage can help people navigate main streets and surrounding neighborhoods.

Maintenance Considerations

+ NMDOT typically secures maintenance agreements with local agencies for streetscape enhancements along state facilities.
+ Many local jurisdictions partner with local businesses, organized Business Improvement Districts (BIDs), or neighborhood associations to build and maintain streetscape enhancements.
+ See Common Maintenance Considerations on page 10..

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Appendix A

Case Studies

This appendix presents three case studies intended to showcase how quick build treatments can improve safety, support complete streets, and advance community goals along NMDOT facilities. The case studies present projects or design concepts for specific locations with existing conditions and safety challenges that are common in communities across the state. They are in different stages of design and implementation, ranging from completed projects to preliminary potential concepts.

Case Study: Truth or Consequences

NMDOT recently implemented multimodal improvements and a road diet along Main St and Broadway Blvd (I-25 Business Loop) through Downtown Truth or Consequences. The project helps illustrate the types of safety improvements that are possible by restriping downtown main streets without moving existing curb lines.

The Context

This project applied changes along two one-way couplets through Downtown Truth of Consequences—Main Ave and Broadway St—through resurfacing and restriping, as well as accessibility improvements such as upgraded curb ramps. The project implemented a road diet, reducing the number of general purpose travel lanes from two to one per direction on both streets. It maintained on-street parking, and reallocated roadway space to provide parking-protected two-way bikeways with a striped buffer on both streets. This reconfiguration improves safety along the corridor by reducing motor vehicle speeds and providing new bikeways. It also supports economic development goals and local businesses by maintaining on-street parking and providing more direct access to businesses for bicyclists.

Following the initial installation, NMDOT applied a revised layout that retained the road diet but converted the two-way cycle tracks into one-way buffered bike lanes.

Design Elements

- **On-street parking:** Demarcated on-street parking provides a larger buffer between motorists and pedestrians. The parking lane creates visual friction that encourages motorists to drive at more modest speeds while supporting local businesses.
- **Dedicated on-street bicycle facilities:** Two-way bikeways provide dedicated space for bicyclists. The parallel parking between the bikeways and motor vehicle travel lanes offers vertical separation and forms parking-protected bike lanes. The striped buffers between the bikeways and the parking lanes support bicyclist comfort and provide space for drivers and passengers to open their car doors outside of the bikeway.
- **Road diet:** Limiting Main Ave and Broadway St to one motor vehicle through lane in each direction encourages motorists to travel at slower speeds. The length of the road diet (approximately one-half mile along Main Ave) supports a consistent, safe, and comfortable corridor for other modes.

Lessons Learned

- Regular coordination during street design is needed with the Fire Department and business owners to understand parking and delivery needs.
- The striped buffer between the two-way bikeways and the parking aisle provides sufficient space for vertical features that increase bicyclist comfort levels.
- Accessible parking standards must be considered for restriping projects with on-street parking. *PROWAG* requirements include dedicated accessible spaces adjacent to crosswalks with curb ramps.

Project Cost

The total project cost was $5.6 million, primarily due to the mill and overlay pavement rehabilitation along both streets and various curb ramp upgrades.

Project Treatments

- ☐ On-street parking
- ☐ Dedicated on-street bicycle facilities
- ☐ Road diet

Project Materials

- ☐ Asphalt
- ☐ Traffic paint

Case Study: Pueblo of Jemez

The Pueblo of Jemez recently explored and developed a design concept for a demonstration project along NM-4 as a part of a federal tribal safety grant awarded to the Pueblo and other communities across the country. Although the Pueblo ultimately installed a demonstration project on a local street, the design concept illustrates how tribal and rural communities can use quick build treatments and low-cost, readily available materials to improve crossings and corridors for people walking, bicycling, and riding transit.

Soft-surface path

Pre-cast curb with flexible delineators

Clear zone

Planters

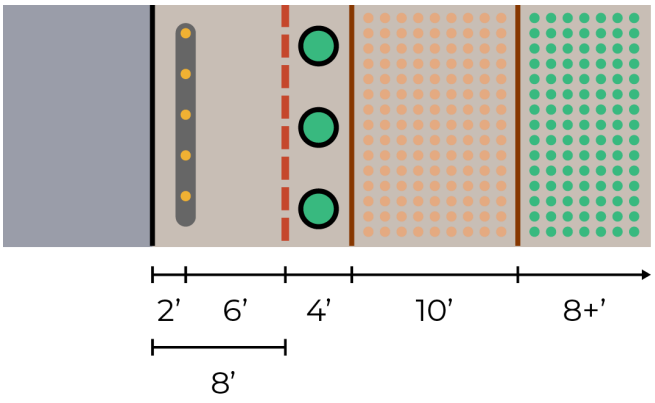
Flexible programmable space

Boulders

Curb ramp

Rio Metro bus stop

Typical Cross Section



Note: This is a preliminary concept not for construction. Field verification, site condition assessments, engineering analysis and design are necessary prior to implementing potential quick build treatments.

The Context

This case study focuses on multimodal and placemaking treatments along NM-4, a two-lane state highway that connects community destinations and carries regional through traffic. The Pueblo recently implemented the Hemish Path to Wellness, a paved shared use path along the highway that has become a popular place for walking, running, and bicycling among the community. The proposed demonstration project aims to build on the success of the shared use path by installing a soft-surface path on the east side of the highway and a new crossing connecting to the Jemez Pueblo Civic Center and Rio Metro bus stops. The proposed concept uses primarily low-cost materials that community members can easily install, with the hope that a more durable, semi-permanent design may replace initial improvements after a demonstration period.

Proposed Design Elements

+ **Crosswalk:** A continental crosswalk with connecting ramps provides a new accessible crossing for people walking and bicycling, supporting access to the Hemish Path to Wellness, bus stops, and community destinations.
+ **Shared use path:** A soft-surface path on the east side of NM-4 accommodates pedestrians and bicyclists traveling in both directions, providing a safe and accessible space away from motor vehicle traffic. Soft-surface trail materials such as decomposed granite meet accessibility standards.
+ **Buffer and clear zone:** Pre-cast concrete curbs and a buffer area separate the path from the highway and provide a traversable clear zone where motorists can stop or regain control if they depart the roadway. Vertical elements within the buffer help reduce motor vehicle speeds by defining the edge of the roadway and entrances to driveways. Pre-cast concrete curbs are well suited for unpaved areas, as most can be reinforced with rebar to help them stay in place, and flexible delineators can be affixed to wider concrete curbs to improve visibility.
+ **Placemaking treatments:** Planters between the shared use path and the clear zone add further buffering, visual barriers, and a sense of place. Likewise, the flexible programmable space between the soft-surface path and adjacent properties allows for additional amenities like benches and other furnishings. Boulders define the edge of the programmable zone near driveways, encouraging drivers to make slower turns and yield to pedestrians.

Proposed Treatments

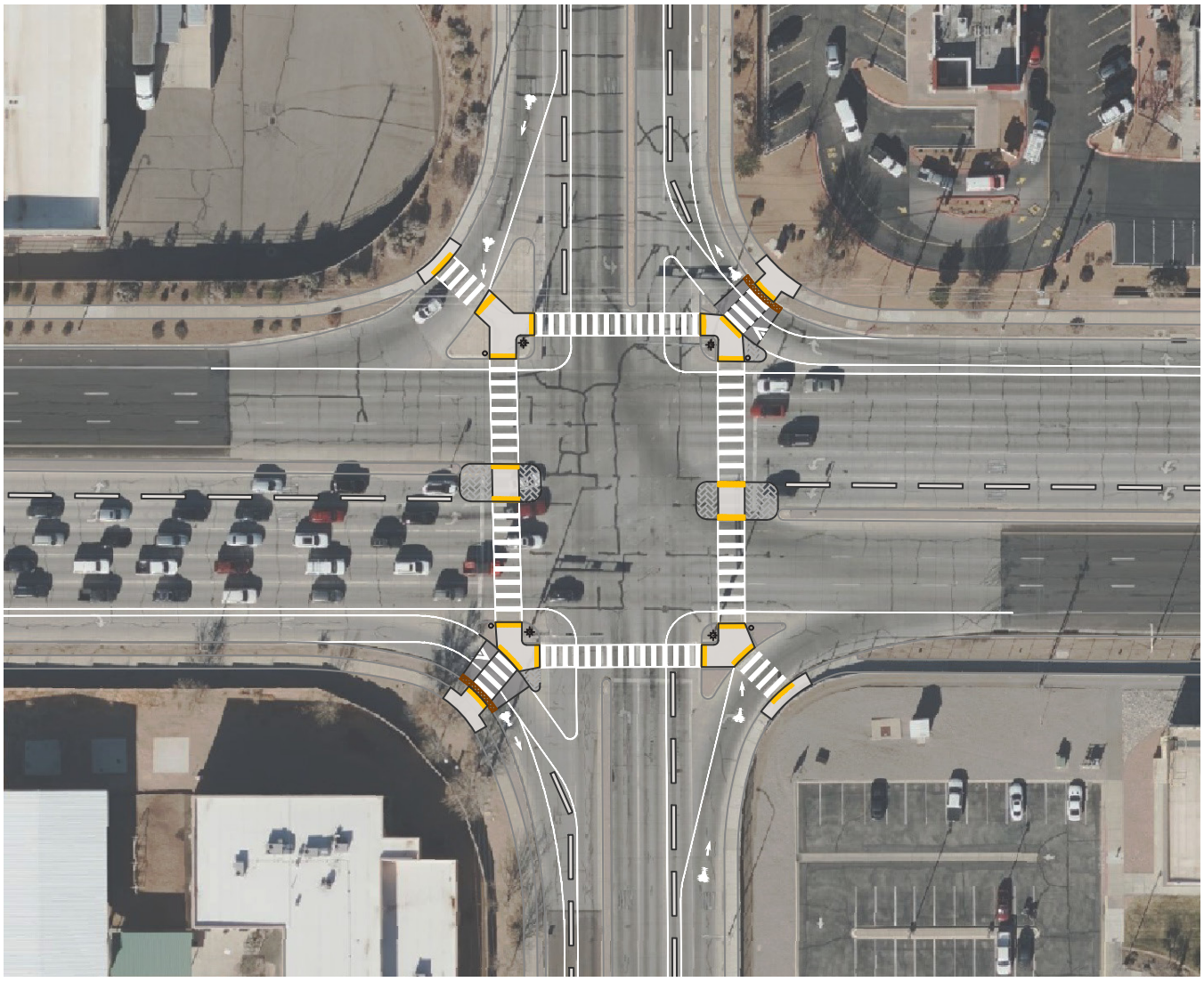
- ☐ Crosswalk
- ☐ Shared use path
- ☐ Placemaking treatments

Potential Materials

- ☐ Traffic paint
- ☐ Pre-cast concretecurb
- ☐ Flexible delineator posts
- ☐ Soft-surface trail
- ☐ Boulders
- ☐ Planters
- ☐ Cast-in-place concrete
- ☐ Detectable warning surface

Case Study: Urban Arterial Intersection

Many signalized intersections along state highways encourage high speeds and create uncomfortable and unsafe conditions, especially for people walking and bicycling. These intersections act as major barriers and obstacles to improving safety and expanding multimodal networks, because retrofitting these intersections without relocating signal infrastructure poses distinct design challenges. This case study offers a quick build design concept for incorporating separated bike lanes and improving crossings at the intersection of Paseo del Norte (NM-423) and Louisiana Blvd in the City of Albuquerque. Although this is not a proposed project, the preliminary concept helps illustrate potential improvements at a common intersection type across New Mexico.



Note: This is a preliminary concept not for construction. Field verification, site condition assessments, engineering analysis and design are necessary prior to implementing potential quick build treatments.

The Context

Currently, this intersection of a four-lane arterial and a six-lane lane state highway creates an array of conflict points for people walking and bicycling. Slip lanes encourage higher-speed right-turning movements, and dual left turn lanes create long crossing distances and enable faster left-turning speeds.

At the same time, the intersection is one of few controlled crossings of the state highway in the immediate vicinity, and improving crossing conditions for people walking and bicycling can help them reach nearby destinations. The north-south arterial also has potential to serve as a longer-distance bicycle facility and has been identified for separated bike lanes on the City's Bikeway and Trail Facility Plan. However, most of the signal infrastructure at the intersection is located on islands between the slip lanes and the main roadways, and reconstructing the signal would be a major capital project that could take years to design, fund, and construct. The proposed concept aims to implement a bikeway and improve the crossing without relocating curbs or existing signal infrastructure.

Proposed Design Elements

+ **Dedicated on-street bicycle facilities:** Reallocating the roadway pavement on the north-south arterial provides space for separated bike lanes approaching the intersection.
+ **Road diet:** Reducing the number of motor vehicle travel lanes on the north-south corridor from two through lanes per direction to one lane per direction encourages slower speeds and accommodates new bicycle facilities.
+ **Vehicle access restrictions:** Closing two of the slip lanes using vertical elements eliminates two potential conflict points for pedestrians and allows bicyclists to transition directly from the new separated bike lanes to a shared use refuge island and crossing. Likewise, closing one of the dual left-turn lanes on the east-west corridor supports the street reconfiguration project and provides space for median refuges.
+ **Raised crossings:** Speed tables through the crossings of active slip lanes connect to sidewalks and reduce the speed of motorists making right turns.
+ **Crosswalks:** Refreshing pavement markings with continental crosswalks improves visibility of the crossings.
+ **Median refuges:** Expanding the median along the east-west corridor and adding accessible refuges allows pedestrians and bicyclists to make a two-stage crossing and helps reduce the speeds of motorists making left turns.

Proposed Treatments

- ☐ Dedicated on-street bicycle facilities
- ☐ Road diet
- ☐ Vehicle access restrictions
- ☐ Raised crossings
- ☐ Crosswalks
- ☐ Median refuges

Potential Materials

- ☐ Traffic paint
- ☐ Signs
- ☐ Pre-cast curb
- ☐ Asphalt
- ☐ Cast-in-place concrete
- ☐ Detectable warning surface
- ☐ Culvert plates

Case Studies: Planning-Level Opinions of Probable Costs

Planning-Level Opinions of Probable Cost Disclaimer

The opinions of probable cost for the case studies in this guide were prepared for planning purposes only and are intended to provide an order-of-magnitude indication of potential construction costs. These opinions were developed by identifying and establishing approximate quantities for anticipated construction materials and applying generalized unit costs. Actual costs may vary substantially depending on the final design, scope, means and methods of construction, and site-specific conditions.

These planning-level cost opinions include a 50 percent contingency to account for items that are undefined or typically unknown during the early planning phase of a project. Unit costs are expressed in 2025 dollars and were derived from published City of Albuquerque bid item costs. These cost opinions do not include escalation, inflation, or adjustments for future market conditions beyond 2025 dollars.

The cost opinions do not include, and should not be interpreted as including, erosion or sediment control; demolition work; utility relocations or adjustments; easement or right-of-way acquisition; permitting; inspection; construction management; design and engineering; surveying; geotechnical investigation; environmental documentation; special site remediation; or costs associated with ongoing operations or maintenance. The cost opinions are not intended to represent a complete or comprehensive project cost estimate.

Toole Design Group, LLC and NMDOT make no representations, guarantees, or warranties, express or implied, regarding the accuracy or completeness of the cost opinions. Actual construction costs will be dependent on numerous factors, including but not limited to final project scope, design development, site conditions, schedule, procurement method, and economic conditions at the time of construction.

Table 5. Planning-Level Opinion of Probable Cost: Pueblo of Jemez Case Study

Item	City of Albuquerque Bid Item #	Unit	City of Albuquerque 2025 Unit Price	Quantity	Amount
Trail Surface	308.01	SY	$12.57	600	$7,600
Ramp Concrete	340.023	SY	$106.10	42	$4,500
Detectable Warning Surface	340.029	SF	$43.84	40	$1,800
24" Traffic Stripe	441.005	LF	$7.25	48	$400
Sign Panel	450.001	SF	$34.46	40	$1,400
Sign Post	450.01	LF	$18.14	48	$900
Planter[1]	-	EA	$100.00	40	$4,000
Potting Soil[1]	-	CF	$50.00	80	$4,000
Plants[1]	-	EA	$10.00	160	$1,600
Fruit Trees[1]	-	EA	$60.00	40	$2,400
Pre-cast curb	340.08	LF	$23.13	270	$6,300
Flexible Delineator Posts	703.001	EA	$195.00	68	$13,200
				MATERIALS COST TOTAL	$48,100
				10% Mobilization	$4,900
				10% Maintenance of Traffic	$4,900
				SUBTOTAL	$57,900
				20% Design and Construction Engineering	$11,600
				50% Contingency	$28,950
				TOTAL	$98,450
				7.5% Gross Receipts Tax	$7,400
				GRAND TOTAL	**$110,000**

1. Unit price based on Pueblo of Jemez demonstration project costs

Table 6. Planning-Level Opinion of Probable Cost: Urban Arterial Intersection Case Study

Item	City of Albuquerque Bid Item #	Unit	City of Albuquerque 2025 Unit Price	Quantity	Amount
Removal of Pavement Striping	443.101	LF	$1.45	1800	$2,700
Removal of Asphalt	343.02	SY	$10.52	110	$1,200
Removal of Concrete	343.04	SY	$21.76	240	$5,300
Removal of Curb and Gutter	343.08	LF	$10.66	75	$800
Curb and Gutter	340.06	LF	$25.39	275	$7,000
Median Concrete	340.3	SY	$105.19	130	$13,700
Sidewalk Concrete	340.01	SY	$72.54	50	$3,700
Ramp Concrete	340.023	SY	$106.10	250	$26,600
Detectable Warning Surface	340.029	SF	$43.84	500	$22,000
Culvert Plate	340.21	EA	$2,901.80	2	$5,900
Asphalt	336.024	SY	$30.83	110	$3,400
Aggregate Base Course	302.01	SY	$12.70	110	$1,400
4" Traffic Paint	441.001	LF	$1.38	5050	$7,000
24" Traffic Paint	441.005	LF	$7.25	600	$4,400
Pavement Markings	441.031	EA	$380.86	8	$3,100
Sign Panel	450.001	SF	$34.46	10	$400
Push Button	428.01	EA	$602.12	4	$2,500
Pre-cast Curb	340.08	LF	$24.12	600	$14,500
				MATERIALS COST TOTAL	$125,600
				10% Mobilization	$12,600
				10% Maintenance of Traffic	$12,600
				SUBTOTAL	$150,800
				20% Design and Construction Engineering	$30,200
				50% Contingency	$75,400
				TOTAL	$256,400
				7.5% Gross Receipts Tax	$19,300
				GRAND TOTAL	**$280,000**

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Appendix B

Material Quantity Ranges & Opinions of Probable Cost

Material Quantity Ranges & Opinions of Probable Cost

Opinion of Probable Materials Cost Disclaimer

Opinions of probable cost for the treatments identified in this guide were prepared for planning purposes only and are intended to provide an order-of-magnitude indication of potential materials costs. These opinions were developed by identifying and establishing approximate quantities for anticipated construction materials and applying generalized unit costs. A cost range has been assigned for each treatment; however, actual costs may vary substantially depending on the final design, scope, means and methods of construction, and site-specific conditions.

These planning-level cost opinions include a 50 percent contingency to account for items that are undefined or typically unknown during the early planning phase of a project. Unit costs are expressed in 2025 dollars and were derived from published City of Albuquerque bid item costs. These cost opinions do not include escalation, inflation, or adjustments for future market conditions beyond 2025 dollars.

The cost opinions do not include, and should not be interpreted as including, contractor mobilization; maintenance of traffic; erosion or sediment control; demolition work; utility relocations or adjustments; easement or right-of-way acquisition; permitting; inspection; construction management; design and engineering; surveying; geotechnical investigation; environmental documentation; special site remediation; or costs associated with ongoing operations or maintenance. The cost opinions are not intended to represent a complete or comprehensive project cost estimate.

Toole Design Group, LLC and NMDOT make no representations, guarantees, or warranties, express or implied, regarding the accuracy or completeness of the cost opinions. Actual construction costs will be dependent on numerous factors, including but not limited to final project scope, design development, site conditions, schedule, procurement method, and economic conditions at the time of construction.

Table 7. Planning-Level Opinion of Probable Cost: Urban Arterial Intersection Case Study

Treatments	Item	City of Albuquerque Bid Item #	Unit	City of Albuquerque 2025 Unit Price	Quantity Range		Cost Range		Notes & Assumptions
					Lower	Upper	Lower	Upper	
Dedicated On-Street Bicycle Lanes	4" Traffic Paint	441.001	LF	$1.38	10,560	31,680	$14,600	$43,800	Bike lanes on both sides, 2-6 lane stripes
	Pavement Markings	441.031	EA	$380.86	20	54	$7,700	$20,600	Bicycle symbols every 200-500 ft
	Flexible Delineator Posts	703.001	EA	$195.00	–	2,640	–	$514,800	Optional vertical elements as close as every 4 ft
	Pre-cast Curb	340.08	LF	$24.12	–	10,560	–	$254,800	Optional continuous curb
						MATERIALS SUBTOTAL	$22,300	$834,000	
						50% Contingency	$11,200	$417,000	
						SUBTOTAL	$33,500	$1,251,000	
						7.5% GRT	$2,500	$93,800	
						TOTAL	**$36,000**	**$1,345,000**	**per roadway centerline mile (2 bike lanes)**
Pedestrian Lane	4" Traffic Paint	441.001	LF	$1.38	5,280	15,840	$7,300	$21,900	Pedestrian lane on one side, 1-3 lane stripes
	Pavement Markings	441.031	EA	$380.86	20	54	$7,700	$20,600	2-way pedestrian symbols every 200-500 ft
	Flexible Delineator Posts	703.001	EA	$195.00	–	1,320	–	$257,400	Optional vertical elements as close as every 4 ft
	Pre-cast Curb	340.08	LF	$24.12	5,280	5,280	$127,400	$127,400	Continuous curb
						MATERIALS SUBTOTAL	$142,400	$427,300	
						50% Contingency	$71,200	$213,700	
						SUBTOTAL	$213,600	$641,000	
						7.5% GRT	$16,000	$48,100	
						TOTAL	**$230,000**	**$690,000**	**per roadway centerline mile (1 lane)**
Roadway-Level Shared Use Path	4" Traffic Paint	441.001	LF	$1.38	5,280	15,840	$7,300	$21,900	Path on one side, 1-3 lane stripes
	Pavement Markings	441.031	EA	$380.86	40	108	$15,300	$41,200	2-way bicycle and pedestrian symbols every 200-500 ft
	Flexible Delineator Posts	703.001	EA	$195.00	–	1,320	–	$257,400	Optional vertical elements as close as every 4 ft
	Pre-cast Curb	340.08	LF	$24.12	5,280	5,280	$127,400	$127,400	Continuous curb
						MATERIALS SUBTOTAL	$150,000	$447,900	
						50% Contingency	$75,000	$224,000	
						SUBTOTAL	$225,000	$671,900	
						7.5% GRT	$16,900	$50,400	
						TOTAL	**$242,000**	**$723,000**	**per roadway centerline mile (1 path)**
Road Diet	4" Traffic Paint	440.001	LF	$1.72	21,120	42,240	$36,400	$72,700	4-lane undivided roadway, 4-8 lane stripes
						MATERIALS SUBTOTAL	$36,400	$72,700	
						50% Contingency	$18,200	$36,400	
						SUBTOTAL	$54,600	$109,100	
						7.5% GRT	$4,100	$8,200	
						TOTAL	**$59,000**	**$118,000**	**per roadway centerline mile**

Treatments	Item	City of Albuquerque Bid Item #	Unit	City of Albuquerque 2025 Unit Price	Quantity Range Lower	Quantity Range Upper	Cost Range Lower	Cost Range Upper	Notes & Assumptions
On-Street Parking	4" Traffic Paint	440.001	LF	$1.72	11,660	12,180	$20,100	$21,000	Angled parking on one side, 45-75 degree angle
	Pre-cast Curb	340.08	LF	$24.12	–	4,800	–	$115,800	Optional parking stops
						MATERIALS SUBTOTAL	$20,100	$136,800	
						50% Contingency	$10,100	$68,400	
						SUBTOTAL	$30,200	$205,200	
						7.5% GRT	$2,300	$15,400	
						TOTAL	**$33,000**	**$221,000**	**per roadway centerline mile (1 parking lane)**
Speed Cushions	Asphalt	336.024	SY	$30.83	30	40	$1,000	$1,300	3-4 cushions per location
	Aggregate Base Course	302.01	SY	$12.70	30	40	$400	$600	6 in. under cushions
	Pavement Markings	440.01	EA	$90.68	3	4	$300	$400	1 symbol per cushion
	Sign Panel	450.001	SF	$34.46	12	12	$500	$500	2 signs, 6 sq ft per sign panel
	Sign Post	450.01	LF	$18.14	24	24	$500	$500	2 signs, 12 ft per sign post
						MATERIALS SUBTOTAL	$2,700	$3,300	
						50% Contingency	$1,400	$1,700	
						SUBTOTAL	$4,100	$5,000	
						7.5% GRT	$300	$400	
						TOTAL	**$5,000**	**$6,000**	**per location (3-4 cushions)**
Chicanes & Pinch Points	4" Traffic Paint	440.001	LF	$1.72	72	88	$200	$200	2 islands per location, 20 ft by 8-12 ft islands
	Flexible Delineator Posts	703.001	EA	$195.00	10	22	$2,000	$4,300	Vertical elements every 4-8 ft
	Cast-in-place Concrete	337.02	SY	$127.32	–	53	–	$6,800	Optional for chicane or pinch point islands
	Curb and Gutter	340.05	LF	$32.55	–	128	–	$4,200	Optional for chicane or pinch point islands
						MATERIALS SUBTOTAL	$2,200	$15,500	
						50% Contingency	$1,100	$7,800	
						SUBTOTAL	$3,300	$23,300	
						7.5% GRT	$200	$1,700	
						TOTAL	**$4,000**	**$25,000**	**per location (2 islands)**
Crosswalk Markings	24" Traffic Paint	441.005	LF	$7.25	40	200	$300	$1,500	10 ft wide crosswalk, 24-100 ft crossing
	Sign Panel	450.001	SF	$34.46	–	24	–	$900	Up to 4 signs, 6 sq ft per sign
	Sign Post	450.01	LF	$18.14	–	48	–	$900	Up to 4 signs, 12 ft per sign post
						MATERIALS SUBTOTAL	$300	$3,300	
						50% Contingency	$200	$1,700	
						SUBTOTAL	$500	$5,000	
						7.5% GRT	$40	$400	
						TOTAL	**$1,000**	**$6,000**	**each (per crossing)**

Treatments	Item	City of Albuquerque Bid Item #	Unit	City of Albuquerque 2025 Unit Price	Quantity Range Lower	Quantity Range Upper	Cost Range Lower	Cost Range Upper	Notes & Assumptions
Curb Extensions	4" Traffic Paint	440.001	LF	$1.72	144	176	$300	$400	4 curb extensions per crossing, 20 ft by 8-12 ft
	Flexible Delineator Posts	703.001	EA	$195.00	20	44	$3,900	$8,600	Vertical elements every 4-8 ft
	Detectable Warning Surface	340.029	SF	$43.84	–	40	–	$1,800	Optional, up to 10 ft pedestrian path
	Cast-in-place Concrete	337.02	SY	$127.32	–	107	–	$13,600	Optional for curb extension islands
	Curb and Gutter	340.05	LF	$32.55	–	256	–	$8,400	Optional for curb extension islands
	Sidewalk Concrete	340.01	SY	$72.54	–	13	–	$1,000	Optional through islands, up to 10 ft pedestrian path
	Ramp Concrete	340.023	SY	$106.10	–	20	–	$2,200	Optional through islands, up to 10 ft pedestrian path
	Culvert Plate	340.21	EA	$2,901.80	–	2	–	$5,900	Optional for curb extension islands
					MATERIALS SUBTOTAL		$4,200	$41,900	
					50% Contingency		$2,100	$21,000	
					SUBTOTAL		$6,300	$62,900	
					7.5% GRT		$500	$4,700	
					TOTAL		**$7,000**	**$68,000**	**per crossing (4 curb extensions)**
Median Refuge	4" Traffic Paint	440.001	LF	$1.72	104	128	$200	$300	6-12 ft by 40 ft median with refuge
	Flexible Delineator Posts	703.001	EA	$195.00	26	32	$5,100	$6,300	Vertical elements every 4 ft
	Detectable Warning Surface	340.029	SF	$43.84	24	40	$1,100	$1,800	6-10 ft pedestrian path through median
	Cast-in-place Concrete	337.02	SY	$127.32	–	53	–	$6,800	Optional for median island
	Curb and Gutter	340.06	LF	$25.39	–	128	–	$3,300	Optional for median island
	Sidewalk Concrete	340.01	SY	$72.54	–	13	–	$1,000	Optional, up to 10 ft pedestrian path
	Ramp Concrete	340.023	SY	$106.10	–	20	–	$2,200	Optional, up to 10 ft pedestrian path
					MATERIALS SUBTOTAL		$6,400	$21,700	
					50% Contingency		$3,200	$10,900	
					SUBTOTAL		$9,600	$32,600	
					7.5% GRT		$700	$2,400	
					TOTAL		**$11,000**	**$35,000**	**each (per crossing)**

Treatments	Item	City of Albuquerque Bid Item #	Unit	City of Albuquerque 2025 Unit Price	Quantity Range Lower	Quantity Range Upper	Cost Range Lower	Cost Range Upper	Notes & Assumptions
Raised Crossing	24" Traffic Paint	441.005	LF	$7.25	30	100	$300	$800	10 ft crosswalk for 12-48 ft crossing
	Pavement Markings	441.04	EA	$226.70	1	4	$300	$1,000	1-4 travel lanes, 1 symbol per travel lane
	Asphalt	336.024	SY	$30.83	29	117	$1,000	$3,700	Speed table with 10 ft crosswalk for 12-48 ft crossing
	Aggregate Base Course	302.01	SY	$12.70	29	117	$400	$1,500	6 in. under speed table
	Detectable Warning Surface	340.029	SF	$43.84	24	40	$1,100	$1,800	6-10 pedestrian path approaching crossing
	Culvert Plate	340.21	EA	$2,901.80	2	2	$5,900	$5,900	Connecting sidewalks to speed table
	Sign Panel	450.001	SF	$34.46	–	24	–	$900	Up to 4 signs, 6 sq ft per sign panel
	Sign Post	450.01	LF	$18.14	–	48	–	$900	Up to 4 signs, 12 ft per sign post
	Ramp Concrete	340.023	SY	$106.10	–	20	–	$2,200	Up to 2 ramps per crossing, up to 10 ft pedestrian path
						MATERIALS SUBTOTAL	$9,000	$18,700	
						50% Contingency	$4,500	$9,400	
						SUBTOTAL	$13,500	$28,100	
						7.5% GRT	$1,000	$2,100	
						TOTAL	**$15,000**	**$31,000**	**each (per crossing)**
Rapid Rectangular Flashing Beacons	RRFB	427.029	EA	$12,363.88	2	4	$24,800	$49,500	2-4 beacons per crossing
						MATERIALS SUBTOTAL	$24,800	$49,500	
						50% Contingency	$12,400	$24,800	
						SUBTOTAL	$37,200	$74,300	
						7.5% GRT	$2,800	$5,600	
						TOTAL	**$40,000**	**$80,000**	**per crossing**
Reduced Corner Radius & Turn Wedge	4" Traffic Paint	440.001	LF	$1.72	50	100	$100	$200	10-15 ft radius extending 25-50 ft
	Rubberized Curb	703.003	EA	$175.00	2	4	$400	$700	2-4 mountable elements per corner
	Flexible Delineator Posts	703.001	EA	$195.00	–	25	–	$4,900	Optional vertical elements as close as every 4 ft
						MATERIALS SUBTOTAL	$500	$5,800	
						50% Contingency	$300	$2,900	
						SUBTOTAL	$800	$8,700	
						7.5% GRT	$100	$700	
						TOTAL	**$1,000**	**$10,000**	**each (per corner)**
Hardened Centerline	4" Traffic Paint	440.001	LF	$1.72	80	100	$200	$200	40-50 ft of double yellow centerline
	Rubberized Curb	703.003	EA	$175.00	13	17	$2,400	$3,000	40-50 ft of continuous mountable curb
	Flexible Delineator Posts	703.001	EA	$195.00	–	12	–	$2,400	Optional vertical elements as close as every 4 ft
						MATERIALS SUBTOTAL	$2,600	$5,600	
						50% Contingency	$1,300	$2,800	
						SUBTOTAL	$3,900	$8,400	
						7.5% GRT	$300	$600	
						TOTAL	**$5,000**	**$9,000**	**each (per leg)**

Treatments	Item	City of Albuquerque Bid Item #	Unit	City of Albuquerque 2025 Unit Price	Quantity Range Lower	Quantity Range Upper	Cost Range Lower	Cost Range Upper	Notes & Assumptions
Separated Intersection	4" Traffic Paint	440.001	LF	$1.72	600	800	$1,100	$1,400	4 corner islands offset 6-16 ft from travel lanes
	Pavement Markings	441.031	EA	$380.86	–	4	–	$1,600	Optional bicycle symbols
	Flexible Delineator Posts	703.001	EA	$195.00	24	64	$4,700	$12,500	Vertical elements every 4 ft
	Rubberized Curb	703.003	EA	$175.00	–	16	–	$2,800	Up to 4 mountable elements per corner island
					MATERIALS SUBTOTAL		$5,800	$18,300	
					50% Contingency		$2,900	$9,200	
					SUBTOTAL		$8,700	$27,500	
					7.5% GRT		$700	$2,100	
					TOTAL		**$10,000**	**$30,000**	**each (per intersection)**
Enhanced Pocket Bike Lane	4" Traffic Paint	440.001	LF	$1.72	150	400	$300	$700	40-100 ft of bike lane plus 60-200 ft merge area
	Pavement Markings	441.031	EA	$380.86	3	5	$1,200	$2,000	Bicycle and right turn lane symbols
	Sign Panel	450.001	SF	$34.46	6	6	$300	$300	1 sign, 6 sq ft per sign panel
	Sign Post	450.01	LF	$18.14	12	12	$300	$300	1 sign, 12 ft per sign post
	Flexible Delineator Posts	703.001	EA	$195.00	6	25	$1,200	$4,900	Vertical elements every 4-8 ft on both sides of merge area
	Pre-cast Curb	340.08	LF	$24.12	–	100	–	$2,500	Optional continuous curb on both sides of merge area
					MATERIALS SUBTOTAL		$3,300	$10,700	
					50% Contingency		$1,700	$5,400	
					SUBTOTAL		$5,000	$16,100	
					7.5% GRT		$400	$1,200	
					TOTAL		**$6,000**	**$18,000**	**each (per lane/approach)**
Bike Box	12" Traffic Paint	441.004	LF	$3.81	30	54	$200	$300	Bike box spanning 1-2 lanes
	4" Traffic Paint	440.001	LF	$1.72	100	100	$200	$200	2 lane stripes for 50 ft of approaching bike lane
	Pavement Markings	441.031	EA	$380.86	2	3	$800	$1,200	2-3 bicycle symbols
					MATERIALS SUBTOTAL		$1,200	$1,700	
					50% Contingency		$600	$900	
					SUBTOTAL		$1,800	$2,600	
					7.5% GRT		$100	$200	
					TOTAL		**$2,000**	**$3,000**	**each**

Treatments	Item	City of Albuquerque Bid Item #	Unit	City of Albuquerque 2025 Unit Price	Quantity Range Lower	Quantity Range Upper	Cost Range Lower	Cost Range Upper	Notes & Assumptions
2-Stage Bicycle Left Turn	4" Traffic Paint	440.001	LF	$1.72	32			$100	6 ft by 10 ft two-stage left turn box
	Pavement Markings	441.031	EA	$380.86	1			$400	Bicycle symbol
					MATERIALS SUBTOTAL			$500	
					50% Contingency			$300	
					SUBTOTAL			$800	
					7.5% GRT			$100	
					TOTAL			**$1,000**	**each**
Transition Bicycle Ramp	Ramp Concrete	340.023	SY	$106.10	7	10	$800	$1,100	6 ft by 10-15 ft ramp
	Pavement Markings	441.031	EA	$380.86	–	1	$-	$400	Optional bicycle symbol
					MATERIALS SUBTOTAL		$800	$1,500	
					50% Contingency		$400	$800	
					SUBTOTAL		$1,200	$2,300	
					7.5% GRT		$100	$200	
					TOTAL		**$2,000**	**$3,000**	**each**
Neighborhood Traffic Circle	12" Traffic Paint	441.004	LF	$3.81	47	63	$200	$300	15-20 ft diameter traffic circle
	Sign Panel	450.001	SF	$34.46	36	72	$1,300	$2,500	6-12 signs, 6 sq ft per sign panel
	Sign Post	450.01	LF	$18.14	72	144	$1,400	$2,700	6-12 signs, 12 ft per sign post
	Rubberized Curb	703.003	EA	$175.00	16	21	$2,800	$3,700	Continuous flexible curb
	Flexible Delineator Posts	703.001	EA	$195.00	–	16	$-	$3,100	Optional vertical elements as close as every 4 ft
	Cast-in-place Concrete	337.02	SY	$127.32	–	35	$-	$4,500	Optional for traffic circle
	Curb and Gutter	340.06	LF	$25.39	–	63	$-	$1,600	Optional for traffic circle
					MATERIALS SUBTOTAL		$5,700	$18,400	
					50% Contingency		$2,900	$9,200	
					SUBTOTAL		$8,600	$27,600	
					7.5% GRT		$600	$2,100	
					TOTAL		**$10,000**	**$30,000**	**each (per intersection)**

	Item	City of Albuquerque Bid Item #	Unit	City of Albuquerque 2025 Unit Price	Quantity Range Lower	Quantity Range Upper	Cost Range Lower	Cost Range Upper	Notes & Assumptions
Vehicle Access Restriction	4" Traffic Paint	440.001	LF	$1.72	52	80	$100	$200	6-10 ft by 20-30 ft diverter island
	Sign Panel	450.001	SF	$34.46	6	24	$300	$900	1-4 signs, 6 sq ft per sign panel
	Sign Post	450.01	LF	$18.14	12	48	$300	$900	1-4 signs, 12 ft per sign post
	Flexible Delineator Posts	703.001	EA	$195.00	7	20	$1,300	$3,900	Vertical elements every 4-8 ft
	Cast-in-place Concrete	337.02	SY	$127.32	–	33	$-	$4,300	Optional for diverter island
	Curb and Gutter	340.06	LF	$25.39	–	80	$-	$2,100	Optional for diverter island
						MATERIALS SUBTOTAL	$2,000	$12,300	
						50% Contingency	$1,000	$6,200	
						SUBTOTAL	$3,000	$18,500	
						7.5% GRT	$200	$1,400	
						TOTAL	**$4,000**	**$20,000**	**each (per diverter)**
Accessible Bus Stop	Cast-in-place Concrete	337.02	SY	$127.32	36	53	$4,600	$6,800	40 ft by 8-12 ft bus stop
	Curb and Gutter	340.06	LF	$25.39	120	128	$3,100	$3,300	40 ft by 8-12 ft bus stop with connecting ramps
	Ramp Concrete	340.023	SY	$106.10	12	20	$1,300	$2,200	2 ramps per bus stop, 6-10 ft pedestrian path
						MATERIALS SUBTOTAL	$9,000	$12,300	
						50% Contingency	$4,500	$6,200	
						SUBTOTAL	$13,500	$18,500	
						7.5% GRT	$1,000	$1,400	
						TOTAL	**$15,000**	**$20,000**	**each**

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Appendix C

Price Agreements

Utilizing price agreements managed by the NMDOT Maintenance Bureau can accelerate project delivery for safety and complete streets improvements, including treatments in this guide. This appendix lists active NMDOT price agreements and items covering common quick build materials and applications.

Table 8. NMDOT Price Agreement Items for Quick Build Materials & Applications

	Material	Price Agreement	Item Numbers
Striping & Pavement Markings	Traffic Paint	Reflectorized Pavement Marking	001-003, 011-016, 023-027, 029-030, 038-042, 050-055, 065-066, 073-075
		Sign and Pavement Marking Material, Reflective	18, 39, 49, 51, 78
	Raised Pavement Markers	Reflectorized Pavement Marking	088, 090
		Sign and Pavement Marking Material, Reflective	56-57
	Pavement Markings	Reflectorized Pavement Marking	001-003, 028, 031, 043, 056, 067, 076
		Sign and Pavement Marking Material, Reflective	19-38, 40-47, 50, 52, 58-77, 79-86
	Green Thermoplastic	Reflectorized Pavement Marking	056, 067, 076
		Sign and Pavement Marking Material, Reflective	49-52
Signs & Beacons	Signs	Sign and Pavement Marking Material, Reflective	1-14
		Signs, Aluminum Sign Blanks and Silk Screens	1-8, 16-18
	Signposts	Steel Traffic Sign Posts, Tamper Resistant Nuts, Delineator Posts and Related Items	1-7
	RRFBs	Traffic Signal Equipment and Supplies	1-12
	Automated Speed Display Signs	Traffic Signal Equipment and Supplies	1-12
Preformed Vertical Elements & Delineators	Flexible Delineator Posts	Delineators and Channelizing Devices	1-40, 72-79
	Modular Curb Systems/ Rubberized Curb	Delineators and Channelizing Devices	83

	Material	Price Agreement	Item Numbers
Concrete & Asphalt	Cast-in-place Curbs	Concrete Repair	49-52
	Cast-in-place Concrete Sidewalk	Concrete Repair	59-63
	Detectable Warning Surface	Reflectorized Pavement Marking	096
		Concrete Repair	57
	Rumble Strips	Cold Milling Pavement Surfaces and Milling of Rumble Strips	73