

**Broad Category of Design and Engineering**

Strategies	Description	Secondary Category	Online Resources / PSC Information	Guidance Notes (countermeasure percent, priorities, equity concerns, local initiatives, etc.)
Access Control / Diverters	An island placed at a neighborhood street intersection that prevents through and/or turning movements and decreases the number of drivers entering the street.	Roadways	<a href="http://www.pedbikesafe.org/bikesafe/countermeasures_detail.cfm?CM_NUM=29">http://www.pedbikesafe.org/bikesafe/countermeasures_detail.cfm?CM_NUM=29</a>	Discourages or prevents drivers from cutting through neighborhood streets to decrease traffic and promotes the street for other road user types.
Active Railroad Grade Crossing	Active warning and control devices such as bells, flashing lights, and gates, in addition to passive warning devices such as crossbucks (the familiar x-shaped signs that mean yield to the train), yield or stop signs and pavement markings.	Railroad	<a href="https://railroads.dot.gov/program-areas/highway-rail-grade-crossing/highway-rail-grade-crossings-overview#:~:text=Active%20Grade%20Crossings%20have%20active.stop%20signs%20and%20pavement%20markings">https://railroads.dot.gov/program-areas/highway-rail-grade-crossing/highway-rail-grade-crossings-overview#:~:text=Active%20Grade%20Crossings%20have%20active.stop%20signs%20and%20pavement%20markings</a>	
Advanced Stop Bar / Lines	Stop bar or yield markings are placed in advance of a marked crosswalk to indicate where drivers are required to stop. A STOP HERE ON RED sign can be used to supplement the recessed stop line.	Pedestrians / Bicyclists	<a href="http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=13">http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=13</a>	
Automated Pedestrian Detection	Detects the presence of pedestrians as they approach the curb to initiate the walk signal without any action required on the part of the pedestrian.	Pedestrians	<a href="http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=11">http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=11</a>	Focus on HFIN high traffic volume intersections and transit stations / bus stops.
Automated Pedestrian Recall	Provides a pedestrian interval during each traffic cycle and eliminates the need for people to push a pedestrian button. Initially, these systems can be implemented during non-peak hours for drivers.	Pedestrians	<a href="https://journals.sagepub.com/doi/abs/10.1177/03611981211002846">https://journals.sagepub.com/doi/abs/10.1177/03611981211002846</a>	Focus on HFIN high traffic volume intersections and transit stations / bus stops.
BAT- Business Access Transit Lanes	Curb lanes used only by right-turning vehicles and buses to help buses move more efficiently through traffic and provide better access to local traffic.	Roadways	<a href="https://www.ltd.org/business-access-transit-lanes/">https://www.ltd.org/business-access-transit-lanes/</a>	
Bicycle Detection at Signalized Intersections	Detects the presence of a bicyclist either by push-buttons or by automated means (e.g., in-pavement loops, video, microwave, etc).	Bicyclists	<a href="https://www.ite.org/technical-resources/topics/complete-streets/bicycle-signals/signal-detection-for-bicycles/">https://www.ite.org/technical-resources/topics/complete-streets/bicycle-signals/signal-detection-for-bicycles/</a>	
Bike Boulevards / Parallel Roadways	Providing alternative parallel routes that are safer than a main roadway for bicyclists. Includes signage and traffic calming.	Roadways	<a href="https://nacto.org/publication/urban-bikeway-design-guide/bicycle-boulevards/">https://nacto.org/publication/urban-bikeway-design-guide/bicycle-boulevards/</a>	See MRMPO Long Range Bicycle Map or local bike / trail plan.
Bike Boxes and Two-Stage Turn Boxes	A designated area at the head of a traffic lane at a signalized intersection. Provides bicyclists with a safe and visible way to get ahead of traffic during the red signal phase.	Bicyclists	<a href="https://nacto.org/publication/urban-bikeway-design-guide/intersection-treatments/bike-boxes/">https://nacto.org/publication/urban-bikeway-design-guide/intersection-treatments/bike-boxes/</a>	
Bus Turn-outs	A designated spot on the side of a road where buses pull out of the flow of traffic to pick up and drop off passengers.	Transit	<a href="https://nacto.org/publication/transit-street-design-guide/stations-stops/stop-configurations/curbside-pull-stop/">https://nacto.org/publication/transit-street-design-guide/stations-stops/stop-configurations/curbside-pull-stop/</a>	

Chicanes / Chokers / Pinch Points	A narrowing of the roadway width intended to decrease vehicle operating speeds in high multi-modal traffic areas and/or through neighborhoods.	Speed Management	<a href="http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=32">http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=32</a>	These are generally applied at local streets but can also be used for some Collectors and Bike Boulevards or parallel streets to a main thoroughfare.
Contraflow Bike Lanes	Provide dedicated, on-road space for opposite direction bicycle travel on one-way streets.	Bicyclists	<a href="http://www.pedbikesafe.org/BIKESAFE/countermeasures_detail.cfm?CM_NUM=15">http://www.pedbikesafe.org/BIKESAFE/countermeasures_detail.cfm?CM_NUM=15</a>	
Crossing Signs and Markings	Alert drivers to expect pedestrian or bicyclist crossing and indicate preferred crossing locations using signs and markings.	Pedestrians / Bicyclists	<a href="http://guide.saferoutesinfo.org/engineering/marked_crosswalks.cfm">http://guide.saferoutesinfo.org/engineering/marked_crosswalks.cfm</a>	
Curb Radii Reduction	Shorten crossing distances, reduce motor vehicle turning speeds, and improve visibility and sight distance at intersections.	Intersections	<a href="https://nacto.org/publication/urban-street-design-guide/intersection-design-elements/corner-radii/">https://nacto.org/publication/urban-street-design-guide/intersection-design-elements/corner-radii/</a>	
Curb Ramps	Provide an accessible, above and beyond ADA compliant, route to transition between the sidewalk and the road.	Pedestrians	<a href="http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=3">http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=3</a>	Consider the use of PROWAG requirements as they provide more safety benefits.
Demonstration Projects	A temporary roadway infrastructure improvement that allows public agencies and people walking, bicycling, taking transit, and driving to evaluate improvements before investing in permanent changes.	Roadways	<a href="https://www.transportation.gov/grants/ss4a/planning-and-demonstration-activities">https://www.transportation.gov/grants/ss4a/planning-and-demonstration-activities</a>	<a href="https://smartgrowthamerica.org/resources/safety-demonstration-projects-case-studies-from-orlando-fl-lexington-ky-and-south-bend-in/">https://smartgrowthamerica.org/resources/safety-demonstration-projects-case-studies-from-orlando-fl-lexington-ky-and-south-bend-in/</a>
FHWA Safety Countermeasures System Wide	Systemically adopt the use of FHWA Countermeasures into existing infrastructure improvement programs.	Planning / Engineering	<a href="https://highways.dot.gov/safety/proven-safety-countermeasures">https://highways.dot.gov/safety/proven-safety-countermeasures</a>	
Floating Bus Stops / Bus Islands	Eliminate the conflict between bicyclists traveling in bike lanes and transit vehicles that must pull up to the curb.	Transit	<a href="https://www.arlingtonva.us/Government/Programs/Transportation/Vision-Zero/Tools-and-Guidelines/Multimodal-Safety-Engineering-Toolbox-Web-Format/Floating-Bus-Stops-Bus-Islands">https://www.arlingtonva.us/Government/Programs/Transportation/Vision-Zero/Tools-and-Guidelines/Multimodal-Safety-Engineering-Toolbox-Web-Format/Floating-Bus-Stops-Bus-Islands</a>	
Four-way Stops / All-way Stops	Requires vehicles on all approaches to an intersection to stop before proceeding.	Speed Management	<a href="https://pubmed.ncbi.nlm.nih.gov/35131654/">https://pubmed.ncbi.nlm.nih.gov/35131654/</a>	Look at where signals can be replaced with 4 way stops. Consider prioritizing existing bicycle lanes combined with high frequency transit services.
Interim Public Plazas	A transformation of underutilized or unsafe areas of roadway into public spaces for surrounding residents and businesses. This transformation is done using low-cost materials, movable landscaping and flexible seating.	Roadways	<a href="https://nacto.org/publication/urban-street-design-guide/interim-design-strategies/interim-public-plazas/">https://nacto.org/publication/urban-street-design-guide/interim-design-strategies/interim-public-plazas/</a>	
LEDs	LED lighting enhances visibility making it easier to see pedestrians, bicyclists and other vehicles.	Roadways	<a href="https://highways.dot.gov/safety/other/visibility/roadway-lighting-resources">https://highways.dot.gov/safety/other/visibility/roadway-lighting-resources</a>	
Left-Turn Phasing	A protected left-turn phase provides a green arrow for left turning vehicles while stopping both oncoming traffic and parallel pedestrian crossings.	Intersections	<a href="http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=51">http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=51</a>	
Mini Roundabouts / Neighborhood Traffic Circles	Raised circular islands constructed in the center of streets to reduce speed by directing drivers to maneuver around them.	Speed Management	<a href="https://nacto.org/publication/urban-street-design-guide/intersections/minor-intersections/mini-roundabout/">https://nacto.org/publication/urban-street-design-guide/intersections/minor-intersections/mini-roundabout/</a>	Typically used for lower volume residential streets.

Multi-Use Trails / Pathways	Create a dedicated route for pedestrians and bicyclists that is separate from vehicles.	Pedestrians / Bicyclists	<a href="https://www.arcgis.com/apps/View/index.html?appid=59043be2fefe4d8599ce7c26ca53f303&amp;extent=-106.9364,34.9553,-106.4893,35.1422">https://www.arcgis.com/apps/View/index.html?appid=59043be2fefe4d8599ce7c26ca53f303&amp;extent=-106.9364,34.9553,-106.4893,35.1422</a>	See MRMPO Long Range Bicycle System or local plan for trail networks. Maintain existing infrastructure and fill gaps in the current trail system. Consider some of the pedestrian / bike crossing enhancements at conflict points.
No Right Turn on Red	Signs that prohibit right turns during red lights. Implementation reduces conflicts between turning vehicles and other road users at intersections.	Intersections	<a href="http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=49">http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=49</a>	
Parking Restrictions at Crossings	Improve sightlines between drivers and pedestrians or bicyclists crossing the street.	Intersections	<a href="http://pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=9">http://pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=9</a>	
Parklets	Changing the use of parking spaces into public seating platforms for adjacent businesses or the general public. The design usually incorporates seating, greenery and/or bike racks on neighborhood retail streets or commercial areas.	Roadways	<a href="https://globaldesigningcities.org/publication/global-street-design-guide/streets/pedestrian-priority-spaces/parklets/example/">https://globaldesigningcities.org/publication/global-street-design-guide/streets/pedestrian-priority-spaces/parklets/example/</a>	Look for opportunities in areas with a mix of land uses like Downtowns and Main Streets.
Pedestrian Countdown Signals	A signal that shows a countdown of the remaining time to cross the road.	Pedestrians	<a href="http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=46">http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=46</a>	
Pedestrian Crossing Signs In -Street	A yield to, or stop, for pedestrian sign that is set in the roadway or median ahead of a crosswalk. Indicates to drivers where to yield for people in a crosswalk.	Pedestrians	<a href="http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=69">http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=69</a>	
Pedestrian Lighting	Pedestrian-level lighting placed over sidewalks to improve security and safety.	Pedestrians	<a href="https://globaldesigningcities.org/publication/global-street-design-guide/utilities-and-infrastructure/lighting-and-technology/lighting-design-guidance/">https://globaldesigningcities.org/publication/global-street-design-guide/utilities-and-infrastructure/lighting-and-technology/lighting-design-guidance/</a>	
Protected Intersections	Intersection design that improves safety by reducing the speed of turning traffic, improving sightlines and designating separate space for all road users thereby reducing conflict points between drivers, bicyclists and pedestrians.	Intersections	<a href="https://nacto.org/publication/dont-give-up-at-the-intersection/protected-intersections/">https://nacto.org/publication/dont-give-up-at-the-intersection/protected-intersections/</a>	
PUFFIN Crossing	Pedestrian User-Friendly Intelligent Intersections (PUFFIN) use detection of people walking in crosswalks to determine whether the pedestrian phase of a traffic signal should be extended or canceled. Provides extra time for people in a crosswalk or shortens a driver's wait time if no one is crossing to increase efficiency and compliance.	Pedestrians	<a href="http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=11">http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=11</a>	
Slip Lane Reconfiguration / Removal	Reconfigurations to intersections that close or redesign slip lanes for right-turning drivers. Promotes right-turning drivers to travel at safer speeds, improves visibility, and reduces the complexity of the intersection.	Intersections	<a href="https://www.strongtowns.org/journal/2019/11/5/slip-lanes-would-never-exist-if-we-prioritized-safety-over-speed">https://www.strongtowns.org/journal/2019/11/5/slip-lanes-would-never-exist-if-we-prioritized-safety-over-speed</a>	

Speed Hump and Raised Crossings	Raised area that reduces vehicle speeds, increase driver yielding and improves safety for people crossing.	Speed Management	<a href="http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=35">http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=35</a>	Usually more suitable for Collectors and Local roadways.
Speed Zones / Slow Zones	A section of roadway with a different posted speed limit than the statutory speed limit to reduce vehicle speeds to facilitate safer mobility for all roadway users.	Speed Management	<a href="https://www.pedbikeinfo.org/resources/resources_details.cfm?id=4844">https://www.pedbikeinfo.org/resources/resources_details.cfm?id=4844</a>	Often used adjacent to schools but can be used in other areas as well.
Transit Access Crossings	Locating bus stops at intervals that minimize crossing the street at unmarked mid-block locations. Provides transit riders with safe and convenient crossings to get to bus stops.	Transit	<a href="http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=15#:~:text=Place%20crosswalks%20behind%20bus%20stop,motorists%20can%20see%20the%20pedestrian">http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=15#:~:text=Place%20crosswalks%20behind%20bus%20stop,motorists%20can%20see%20the%20pedestrian</a>	Some current guidance recommends bus stops are located at mid-block locations and intersections are spaced greater than 800 to 1,000 feet a mid-block crossing should be considered.
Transit Priority Lanes	Priority and transit only lanes to improve reliability, efficiency and reduce conflicts between buses and other modes of traffic.	Transit	<a href="https://nacto.org/publication/transit-street-design-guide/transit-lanes-transitways/transit-lanes/">https://nacto.org/publication/transit-street-design-guide/transit-lanes-transitways/transit-lanes/</a>	
Transit Stations and Shelters	Create an accessible, identifiable, shaded and comfortable area for waiting, boarding and alighting of bus passengers.	Transit	<a href="https://nacto.org/publication/transit-street-design-guide/station-stop-elements/stop-elements/small-transit-shelter/">https://nacto.org/publication/transit-street-design-guide/station-stop-elements/stop-elements/small-transit-shelter/</a>	